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AUGUST 1962

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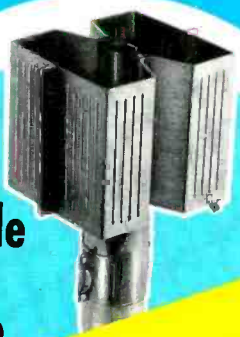

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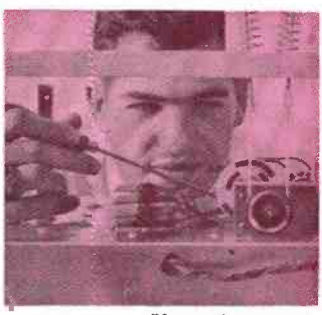

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POPULAR ELECTRONICS is Indexed in the Readers' Guide to Periodical Literature

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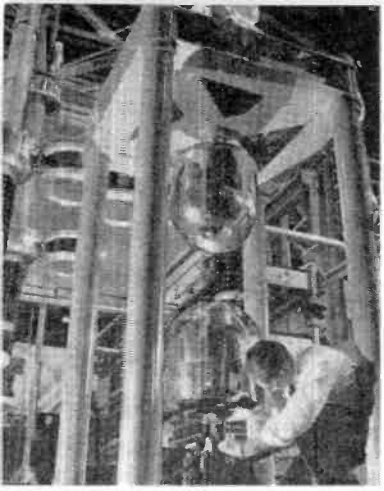


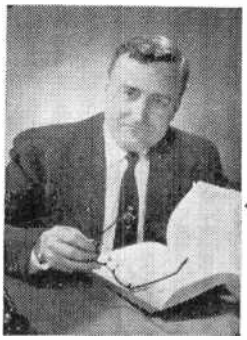
POP'tronics NEWS SCOPE

FUSES CAN'T DO IT but this complex device can. Called a crowbar discharge switch, the Westinghouse-developed instrument performs the same job as a lightning rod on a home or barn for expensive high-powered radar tubes which are on the receiving end of 270,000 volts of direct current. The shiny spheres adjust themselves automatically to power supply voltage changes. During operation, if the radar tubes are in danger of burn-out from high-fault currents, the switch will respond in eight-millionths of a second and discharge thousands of amperes from the power supply. The valuable radar tubes thus protected from damage are part of the Nike-Zeus anti-missile missile defense system.

ONE OUT OF A HUNDRED—A new tone selective-calling system to be used in conjunction with two-way radios will enable radio dispatchers to call one of 99 vehicles individually without sacrificing the ability to talk to all mobile units at once. The new General Electric device, called the Encoder 100, is designed for use with GE's transistorized two-way radio equipment line. To call Car 98, the dispatcher presses buttons 9 and 8 on the unit, then presses the SEND bar—which sends out a tone signal that only the two-way radio equipment in Car 98 can decode automatically. One tone signal out of the possible 100 is used to page all units.

FROZEN FILLET—"Fresh" fish may soon be even fresher when you get them, as a result of experiments begun at the Gloucester Technological Laboratory of the U.S. Bureau of Commercial Fisheries. Fishing fleets taking long cruises must freeze their catches to prevent spoilage, and, once in port, their haul must be defrosted to permit filleting and packing. Present water defrosting methods take several hours, delaying fish delivery for another day. To do the defrosting job almost instantaneously, Gloucester scientists are placing the frozen fish on a conveyor which passes through a Raytheon microwave-energy Radarange oven. The microwaves penetrate the fish for 60 seconds; then the fish emerge from the other side of the oven completely thawed. A year-long test is planned to determine the effect of microwave heating on the food value and flavor of the fish.

INSTANT SPACE HUTS—Tomorrow's space settlers won't worry about building shelters; they'll carry "instant" homes and furnishings in a hip-pocket package or small canister. All the space emigrants need do to inflate their canned space huts, say Hughes Aircraft Company designers, is to wait for the sun's rays to warm a newly developed plastic material—and presto!—a shelter, a chair, or other needed structure will grow before their eyes. The new plastic resembles bubbly suds after it is warmed in a vacuum, but unlike such suds, it forms a tough, rigid material which is also a good insulator against extremes of heat and cold. Future space travelers will never know what's inside unmarked tin cans—a house . . . or Spam.



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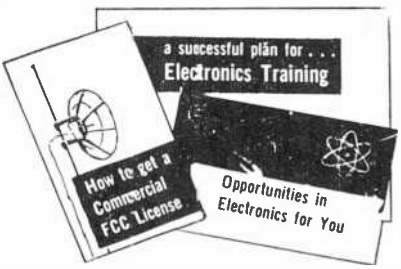

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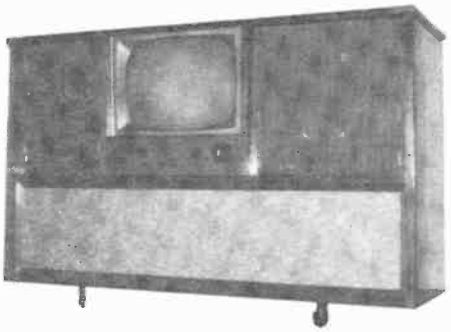
PE-93

LETTER TRAY

Address correspondence for this department to: Letters Editor, POPULAR ELECTRONICS, One Park Avenue, New York 16, N. Y.

"Sweet 16" Plus Boom

■ Far from being a cabinet maker, or even a carpenter by trade, I found it possible to come up with a beautiful 34" x 52" x 18" cabinet made from ¾" plywood finished in walnut. Behind the meshed lower front surface (see photo) are housed 16 5" speakers (shades of the Sweet 16!) and one 12" speaker, with provisions for two tweeters to be added later. Exclusive of the 17" TV set, the cabinet plus the 4-speed changer, amplifier and speakers cost only $108 . . . and I am getting $500 worth of sound out of them.



A. S. KLEPAC
Houston 18, Texas

Great job, "carpenter" Klepac! Let's see, one-o-eight from five hundred is . . . ye gads, man, start production at once!

The Sparking Light

■ John Frye turned out a fine Carl and Jerry adventure, as usual, in "The Sparking Light" (May 1962 issue). And I think you'll be interested to hear that the General Electric ZJ235 light-activated switches, which were described in the story as developmental devices, are now in production and available through normal channels.

J.E. KAISH
Press Relations
General Electric Co.

Automatic Diode Checker

■ Several P. E. readers have written me that they have been having difficulty with my "Automatic Diode Checker" (June 1962 issue). It seems that, in some cases, both the "short" and "good" lamps (*I2* and *I3*) light when a shorted diode is being tested. The problem is caused by manufacturing

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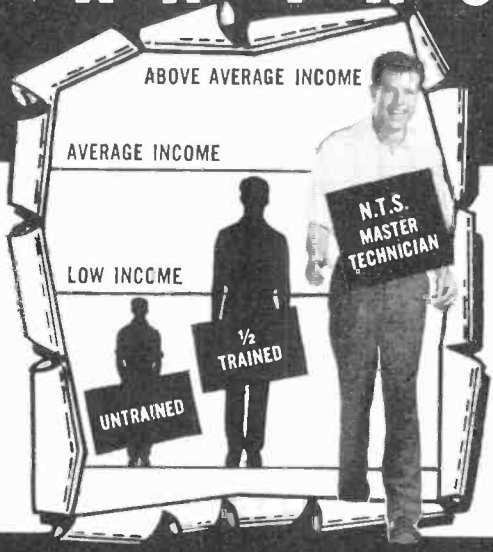

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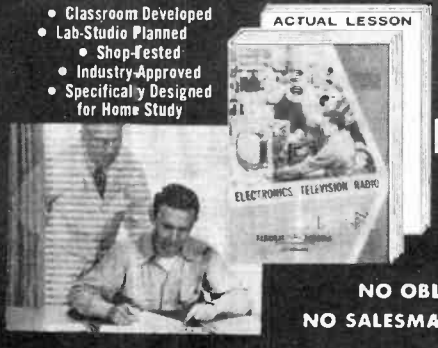

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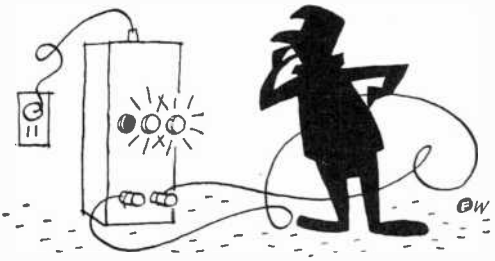
Letter Tray

(*Continued from page 8*)

variations in the electrolytic capacitors used for *C1* and *C2*. One way to solve it is to increase the values of resistors *R4* and *R5* (try substituting a

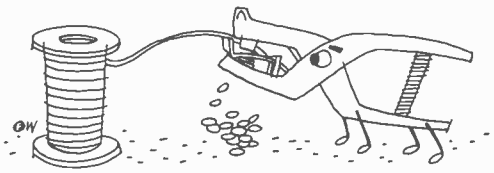


14-18 ohm resistor for each one). Or, with some capacitors, the trouble can be corrected by connecting the top end of capacitor *C1* to the junction of *L3* and *R5* instead of to the junction of *R4* and *R5* as shown in the schematic.

KEITH SUEKER
Manager, Product Planning
Semiconductor Division
Westinghouse Electric Corp.
Youngwood, Pa.

Full of Holes

■ An interesting item in your "Tips and Techniques" column in May (1962) tells how George Wlodarski punched spaced holes in the insulation of 300-ohm line to reduce dielectric loss. As Mr. Wlodarski pointed out, this procedure requires both time and patience—both of which are unnecessary since our company has been manufacturing perforated 300-ohm line for many years. The perforations are punched by a machine built for



this purpose. If some of your readers would like to purchase this low-loss line, we suggest that they visit their local parts distributor.

AL GOLDSTEIN
Vice President, Sales
Jersey Speciality Co., Inc.
Mountain View, N. J.

"The Mood Lighter"

■ I believe there is an error in "The Mood Lighter" (June 1962 issue). On page 51, you correctly state that switch *S1* is opened to dim a lamp. On page 52, however, you say that *S1* is closed for dimming.

ROBERT KRUKOWSKI
Camden, N. J.

As you say, Bob, the statement on page 51 is the correct one. Thanks for telling us about the misprint. —30—

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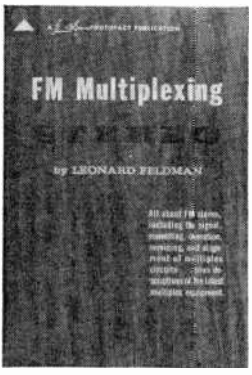
POP'tronics Bookshelf

FM MULTIPLEXING FOR STEREO

by Leonard Feldman

With approximately 17 million non-multiplex FM receivers in the hands of the listening public, technicians and set owners alike will be interested in methods for conversion to stereo. This guide, written in a simple style, explains the principles of FM stereo multiplexing, the theory and operation of the circuits involved, and the alignment and servicing of these circuits. The seven chapters cover: "Introduction to FM Stereo," "Analysis of the Approved Stereo Signal," "Converting to FM Stereo," "Multiplex Decoder Circuits," "Servicing Multiplex Circuits," "FM Stereo Test Equipment and Multiplex Circuit Alignment," and "Latest Multiplex Circuits."



Published by Howard W. Sams & Co., Inc., 1720 East 38th St., Indianapolis 6, Ind. 160 pages. Soft cover. $2.50.

RADAR POCKET BOOK, Second Edition

by R.S.H. Boulding

This is a revised and greatly enlarged version of the original edition, which was published in 1955. Small in size (the pages are 7¼" x 4¾"), the volume is organized for quick reference and should be valuable to engineer and technician alike. The subject of radar is broken down into 18 major chapters which, in turn, are divided into independent paragraphs having large subheadings. The chapter on "Secondary Radar" is completely new. Though the designs and equipment presented are largely British, the material is thoroughly covered.

Published by D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N.J. 248 pages. Hard cover. $4.50.

(*Continued on page* 14)

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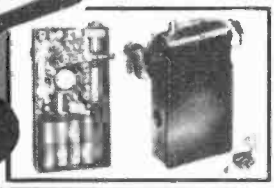

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Only **59.50** No Money Down

Superheterodyne receiver now with 8 crystal controlled transmitting positions.

- Effective Full-wave variable noise limiter
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- Improved selectivity and power output
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Chrome swivel ball mount base designed for mounting on any surface. Stainless steel spring holds rod in property adjusted position.

Bookshelf

(*Continued from page 12*)

ELECTRONICS MADE EASY

by Lothar Stern

Revised to include the latest information in the field, *Electronics Made Easy* is written in a style simple enough for the layman to grasp. The detailed chapters explain electronics fundamentals without the use of complicated mathematical formulas, and show you how to build over 25 pieces of electronic equipment — ranging from a simple crystal set to a complex, 5-tube broadcast receiver. The original chapter on high fidelity has been enlarged and provides a comprehensive discussion of the reproduction of sound and the workings of hi-fi components. An appendix includes information on resistor, capacitor, and transformer color codes, as well as a convenient glossary.

Published by Hawthorn Books, Inc., 70 Fifth Ave., New York 11, N.Y. Soft cover. 224 pages. $4.95.

New Literature

"Practical Radio Mathematics," a 32-page booklet which reviews simple arithmetical and algebraic operations and relates them to practical radio problems, is now available from Supreme Publications, 1760 Balsam Rd., Highland Park, Ill., for 25 cents.

Home constructors and building contractors, as well as hi-fi fans, will be interested in Allied Radio's 16-page booklet entitled "Built-In Stereo Hi-Fi Music System." It provides instructions for the installation and wiring of amplifiers, tuners, tape decks, record changers, TV chassis, speakers, etc. Customizing tips, an explanation of multiplex FM broadcasting, and a question-answer section on the most common music wall problems are also included. Send 10 cents to Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., with your request for a copy. —30—

GET YOUR First Class Commercial F.C.C. LICENSE IN 12 WEEKS!

Is the course proven?

A high percentage of our fulltime resident students get their 1st class licenses within 12 weeks from the time they start the course. Intensive FCC license training is our specialty – not just a sideline.

Is the course complete?

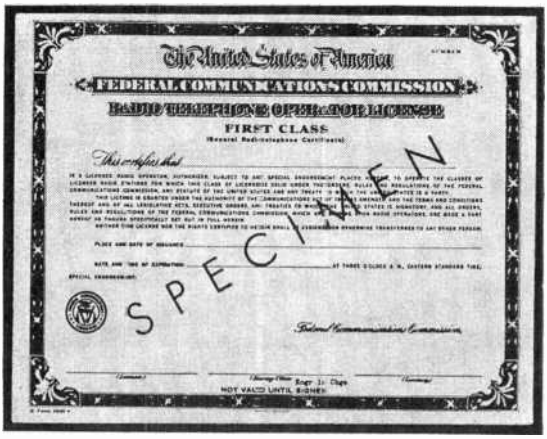
The Grantham course covers all the required subject matter completely. Even though it is planned primarily to lead directly to a first class FCC license, it does this by TEACHING you electronics.

Is the course "padded"?

The streamlined Grantham course is designed specifically to prepare you to pass certain FCC examinations. All of the instruction is presented with the FCC examinations in mind. If your main objective is an FCC license and a thorough understanding of basic electronics, you want a course that is right to the point – not a course which is "padded" to extend the length of time you're in school. The study of higher mathematics or receiver repair work is fine if your plans for the future include them, but they are not necessary to obtain an FCC license.

Is it a "coaching service"?

Some schools and individuals offer a "coaching service" in FCC license preparation. The weakness of the "coaching service" method is that it presumes the student already has a knowledge of technical radio. On the other hand, the Grantham course "begins at the beginning" and progresses in logical order from one point to another. Every subject is covered simply and in detail. The emphasis is on making the subject easy to understand. With each lesson, you receive an FCC type test so you can discover daily just which points you do not understand and clear them up as you go along.



Is the school accredited?

Accreditation by the National Home Study Council is your assurance of quality and high standards. Grantham is accredited.

Is it a "memory course"?

No doubt you've heard rumors about "memory courses" and "cram courses" offering "all the exact FCC questions." Ask anyone who has an FCC license if the necessary material can be memorized. Even if you had the exact exam questions and answers, it would be much more difficult to memorize this "meaningless" material than to learn to understand the subject. Choose the school that teaches you to thoroughly understand – choose Grantham School of Electronics.

THE GRANTHAM *FCC License Course in Communications Electronics is available by CORRESPONDENCE or in RESIDENT classes.*

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Hi-Fi Showcase

A quick look at new products in the stereo/hi-fi field*

A versatile hi-fi/stereo music center for the home, ***Harman-Kardon***'s new 30-watt AM/FM-stereo receiver combines a sensitive FM-stereo tuner, an AM tuner, a stereo amplifier, and a master control center on a single chassis. Dubbed the "Stereo Recital II" (TA3000X), it offers professional performance at a moderate price. Among its many features: a wide-band Foster-Seeley discriminator, a gated-beam discriminator, blend and balance controls. Inputs are provided for tape head as well as magnetic, crystal, or ceramic phono cartridges, and there is also an "auxiliary" input for connecting other equipment. In all, the TA-3000X contains 17 tubes and 8 diodes; adaptable to any setting, it can be placed on a shelf or table or mounted in a wall or a cabinet. The unit itself sells for $239.95, and an optional walnut enclosure lists at $29.95. . . . From ***Heath*** comes a three-way speaker system in kit form that's only 5" deep. Housed in a tube-tuned bass-reflex cabinet, the AS-22 is built around a 10" woofer of special inverted design, plus a 6" mid-range and a 3½" tweeter. As for mounting, you can stand it on the floor, set it vertically or horizontally on a table or bookshelf, or even hang it, picture-fashion, on the wall. Two models are available: the AS-22U (unfinished) lists for $49.95, while the AS-22W (walnut) sells for $54.95. Both prices are f.o.b. Benton Harbor, Mich. . . .

Paco Model MX100 multiplex adapter

If you already own an FM tuner, you'll be interested in ***Paco***'s new MX100 FM-stereo (multiplex) adapter. Supplied in either kit or factory-wired form, the MX100 produces

**Write to the manufacturers listed at the end of this column for more data on products mentioned*

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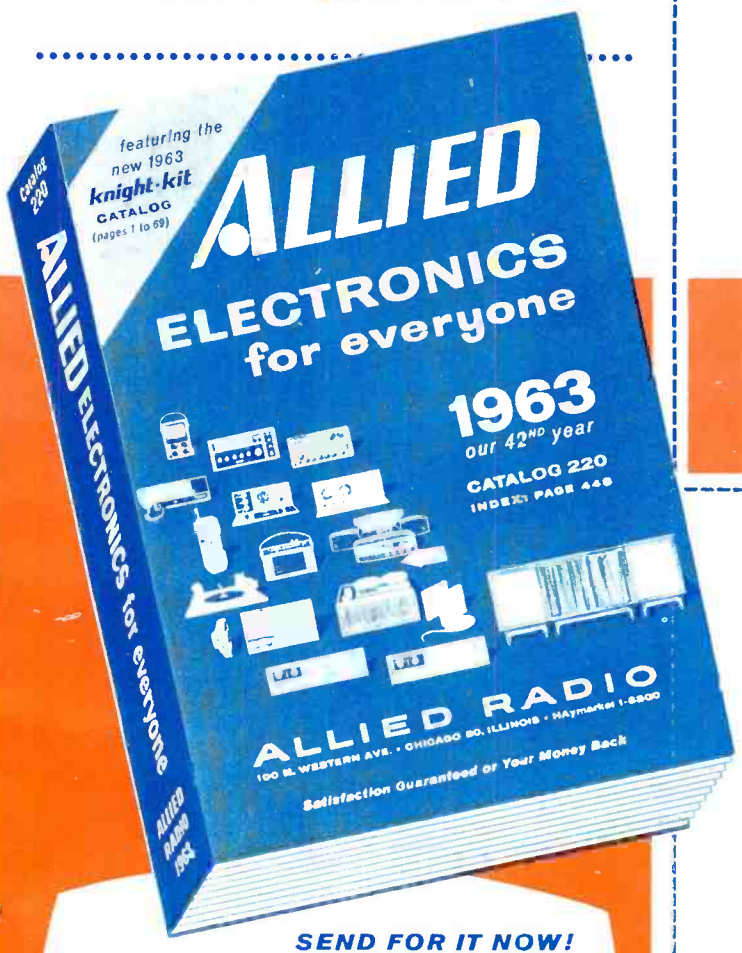

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Stereo Hi-Fi

Complete selection of components and systems; latest all-transistor equipment and Stereo Multiplex FM.

NEW

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Complete recorders, tape decks, recording and pre-recorded tapes at big savings.

NEW

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Latest 2-way radio—no exam required—a complete selection of top-value CB equipment, including Walkie-Talkies.

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Best buys in all types of compact transistor radios, including quality FM-AM portables.

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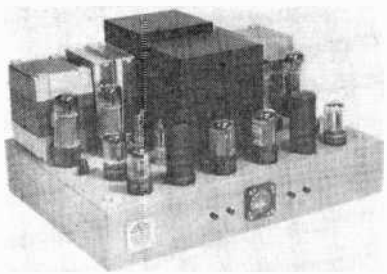
Showcase

(*Continued from page* 16)

less than 1% total harmonic distortion, and boasts a frequency response within 1 db from 15 to 15,000 cycles. A front-panel-mounted dimension control provides for ready adjustment of stereo separation, and a switch selects the proper high-impedance cathode-follower input for either wide-band or narrow-band tuners. Prices: $49.95 in kit form; $69.95, fully assembled . . . A custom stereo amplifier by ***Ultra Electronics***, the "Stereo 50-50" is a hand-crafted unit with specifications to make it the envy of almost any other unit on the market. Power output is a flat 50 watts per channel, and hum and noise are a whopping 90 db or more below this figure. As for the sound, harmonic distortion is approximately 0.1% at full power output, and intermodulation distortion—one of the "bugs" of any quality amplifier—



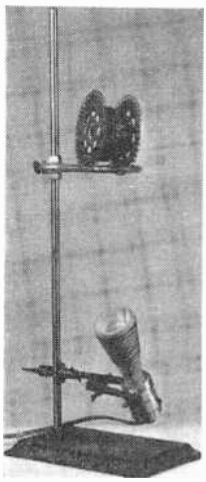
Ultra Electronics "Stereo 50-50"

measures a low 0.64%, again at the 50-watt figure. Equipped with world-renowned Partridge output transformers and Mullard's EL34/6CA7 output tubes, the "Stereo 50/50" has no controls and must be used with a stereo preamplifier capable of matching its exacting specifications. Price, $349.00. . . . From ***Utah*** comes a bookshelf speaker system that's thinner than most rows of books and fits, both size-wise and style-wise, into practically any living room. Basically a bass-reflex type cabinet with a tuned port, the system contains an 8" woofer and a 3½" tweeter, complete with an electrical crossover network. Dubbed the "Sorcerer," the unit handles up to 12 watts and is available in either walnut veneer (Model SH-4W, priced at $49.95) or unfinished hardwood veneer (Model SH-4U, priced at $46.95).

Harman-Kardon Inc., 520 Main St., Westbury, N.Y.
Heath Co., Benton Harbor, Mich.
Paco Electronics Co., Inc., 70-31 84th St., Glendale 27, L.I., N.Y.
Ultra Electronics Inc., 235 E. 60th St., New York 22, N.Y.
Utah Electronics Corp., 1124 E. Franklin St., Huntington, Ind.

Tips and Techniques

HEATED WIRE MAKES TIGHTER COILS

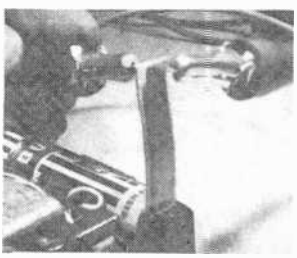


You can do a more satisfactory job of turning out a hand-wound relay, transformer, or choke coil if you heat the wire first. After the wire cools on the form, it will be much tighter than could be managed by hand tension alone, and the coil will remain firm even at higher-than-normal temperatures. Clamp your supply spool above a heating element as shown so that the wire can be kept hot as you wind.

—*W. C. Wilhite*

HANDY "TAB" GADGET MEASURES BATTERY DRAIN

If you often have occasion to measure current drain in battery-operated circuits, you'll find it worthwhile to make yourself one of these little gadgets. Just take two ½" x 1½" strips of thin brass and form a "tab" in each one by making a 90° bend ¼" from the end. Now glue the strips together, back to back, with a strip of insulating cardboard between them. Keep this "sandwich" clamped in a vise long enough for the glue to dry, and you're finished. To use the device, insert it between the *negative* end of the battery and the battery contact (the protruding positive end of the battery makes for too tight a fit). Then connect a milliammeter across



(*Continued on page* 26)

how will your success in electronics compare with this man's?

Will you have a rewarding career, like Robert T. Blanks? or will you never get beyond a routine job? It's up to you.

A CREI Home Study Program helped Robert T. Blanks become an Electronics Engineer. Blanks is employed by the Research and Study Division, Vitro Laboratories, Silver Spring, Md. Division of Vitro Corporation of America.

LET'S LOOK AT THE FACTS. There's something wonderful about knowing how a circuit works or what a filter capacitor does. If you've ever fixed a TV set, built a radio or used a voltmeter, you've tasted the thrills of electronics.

This excitement may have led you to a job in electronics. But the glamour fades if you are stuck in the same job year after year. You'll be bored with routine and unhappy about prospects for future earnings. You'll discover, as have many men, that simply working in electronics does not assure a good future.

If electronics is the "field of opportunity," how is this possible? No question about it, electronics offers many opportunities, *but only to qualified men*. In any career field, it is how much you know that counts. This is particularly true in the fast moving field of electronics. The man without thorough technical education doesn't advance. Even men with intensive military technical training find their careers can be limited in civilian electronics.

ADVANCED TECHNICAL KNOWLEDGE IS THE KEY to success in electronics. If you have a practical knowledge of current engineering developments, if you understand "why" as well as "how," you have what employers want and pay for. With such qualifications, you can expect to move ahead.

CREI OFFERS YOU, for study at home, a complete program in electronic engineering technology designed to prepare you for a rewarding, well-paying career in electronics. CREI equips you with a practical working knowledge of advanced and up-to-date electronic developments that will put you on the level of specialization where men are most in demand.

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NEW FREQUENCY SYNTHESIZER

With International's new crystal controlled frequency synthesizer you can switch instantly to any one of the 23 CB channels. Each channel uses the same crystal for transmitting and receiving. A 24th position is provided as a spare. Illuminated dial. Self contained power supply. Unit matches Model 100 and Model 50 Executives. Meets FCC requirements for frequency tolerance and spurious radiation.

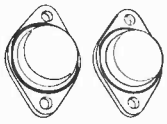
Complete with interconnecting cables and instructions $159.50

NEW MODEL 100 A EXECUTIVE TRANSCEIVER

Now International brings you an advanced design Executive transceiver, for **more reliable mobile operation,** featuring a **transistor power supply, new perforated metal cabinet,** and equipped with a **new rugged dynamic microphone.** This is the latest in the famous line of International Executive transceivers. The first commercially available CB unit to make use of a high frequency crystal filter to achieve and permanently guarantee receiver selectivity for the life of the equipment. Twelve crystal controlled channels. Two crystal controlled receive positions. Dual conversion superheterodyne receiver tuning all 23 channels. Built-in calibration circuit. Transistor power supply operates from 6/12 vdc or 115 vac. Push-to-talk operation. Certified tolerance ± .005%.

Model 100 A, complete with 1 transmit crystal, 1 receive crystal, and microphone.... $199.50

Check these new features.



- Transistor Power Supply

- New Dynamic Microphone

for Outstanding Performance

Citizens Band licensees with International equipped stations know the unquestioned superiority and advantages of Executive transceivers and their system engineered accessories.

EXTERNAL SPEAKER S/METER

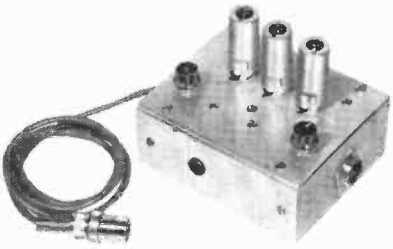
The perfect companion for the International Executive Model 100. Utilizes a high impedance vacuum tube volt meter circuit. Connects to socket on rear of transceiver. S/meter reads in three ranges Brown cabinet, brown and silver panel matches Model 100 Executive. Dimensions: 5½" H. x 8½" W. x 7" D.

Complete with interconnecting cable....$49.50

EXECUTIVE SPEECH CLIPPER/FILTER AMPLIFIER

A microphone amplifier designed to increase average modulation . . . limits modulation peaks . . . filters audio frequencies above 2500 cycles. Permits arms-length microphone operation. Power requirements: 12 vac or 12 vdc.

Complete with interconnecting cable....$36.50



12.6 VAC, 2 AMPERE POWER UNIT

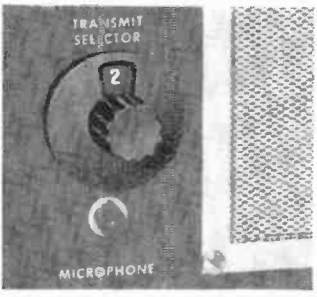
Base station power unit for Speech Clipper/Amplifier. Operates from 115 vac. Provides 12.6 vac at 2 amperes.

Complete with mounting chassis, power cord, fuse, switch.....$12.50

NEW ILLUMINATED DIAL ASSEMBLY

A new 12-position dial, designed and engineered by International as an accessory for the Model 100 Executive transceiver. Illuminated numerals assist in selecting any one of 12 crystal controlled transmit channels. Simple to install. Dial assembly may also be used with any 12-position, 30 degree switch.

Complete with instructions.....$11.25



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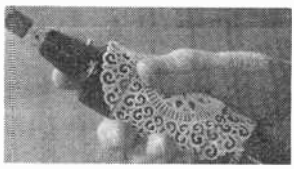
Tips

(*Continued from page 22*)

the two tabs (being sure to observe the proper polarity), turn on the equipment, and read the current.—*Robert E. Kelland*

NON-SKID GRIP FOR SMALL POWER TOOLS

Do small power tools slip through your moist hands in hot weather? The solution to this problem is an easy one. Just wrap the tools with inexpensive plastic doilies from the dime store. The perforations provide a sure grip and allow air to circulate between the tool and your hand. You can square off the doilies with a scissors, if you like, and hold them in place with rubber bands. —*Ken Murray*



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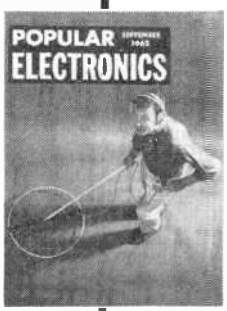

Whether you're a gold digger, plumber, scrap dealer, or just plain "handyman," you'll find plenty of uses for this easy-to-build metal locator. Fully transistorized, it's light in weight and pleasingly portable. How do you *know* there's no gold in "them thar hills"?

ON SALE AUGUST 28

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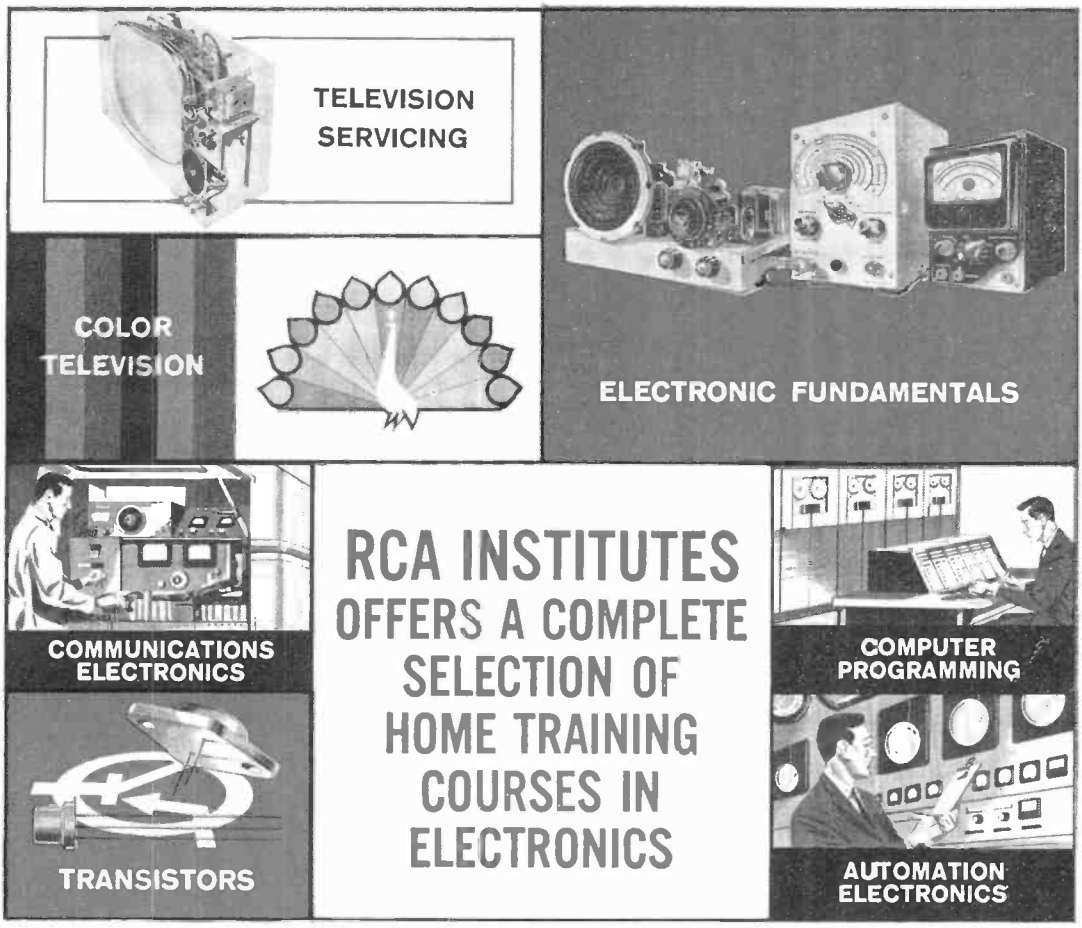
  This mighty magnet might surpass even Mighty Mouse's immoderate might! You'll need a special jig to build it, but you'll have a magnet that picks up nonferrous metals.
- **DIRECT-DIALING THE NEWS**
  Want the news while it's "hot"? You can get it "straight from the horse's mouth" once you know when and where to listen for news broadcasts around the clock around the globe.
- **TUNING FORK OSCILLATOR**
  An ideal frequency standard, this little battery-operated gadget utilizes an ordinary tuning fork to produce an extremely accurate 440-cycle signal.



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You will learn how to build radios, using regular schematics; how to wire and solder in a professional manner; how to service radios. You will work with the standard type of punched metal chassis as well as the latest development of Printed Circuit chassis.

You will learn the basic principles of radio. You will construct, study and work with RF and AF amplifiers and oscillators, detectors, rectifiers, test equipment. You will learn and practice code, using the Progressive Code Oscillator. You will learn and practice trouble-shooting, using the Progressive Signal Tracer, Progressive Signal Injector, Progressive Dynamic Radio & Electronics Tester, Square Wave Generator and the accompanying instructional material.

You will receive training for the Novice, Technician and General Classes of F.C.C. Radio Amateur Licenses. You will build 20 Receiver, Transmitter, Square Wave Generator, Code Oscillator, Signal Tracer and Signal Injector circuits, and learn how to operate them. You will receive an excellent background for television, Hi-Fi and Electronics.

Absolutely no previous knowledge of radio or science is required. The "Edu-Kit" is the product of many years of teaching and engineering experience. The "Edu-Kit" will provide you with a basic education in Electronics and Radio, worth many times the complete price of $26.95. The Signal Tracer alone is worth more than the price of the entire Kit.

THE KIT FOR EVERYONE

You do not need the slightest background in radio or science. Whether you are interested in Radio & Electronics because you want an interesting hobby, a well paying business or a job with a future, you will find the "Edu-Kit" a worth-while investment.

Many thousands of individuals of all ages and backgrounds have successfully used the "Edu-Kit" in more than 79 countries of the world. The "Edu-Kit" has been carefully designed, step by step, so that you cannot make a mistake. The "Edu-Kit" allows you to teach yourself at your own rate. No instructor is necessary.

PROGRESSIVE TEACHING METHOD

The Progressive Radio "Edu-Kit" is the foremost educational radio kit in the world, and is universally accepted as the standard in the field of electronics training. The "Edu-Kit" uses the modern educational principle of "Learn by Doing." Therefore you construct, learn schematics, study theory, practice trouble-shooting—all in a closely integrated program designed to provide an easily-learned, thorough and interesting background in radio.

You begin by examining the various parts of the "Edu-Kit." You then learn the function, theory and wiring of these parts. Then you build a simple radio. With this first set you will enjoy listening to regular broadcast stations, learn theory, practice testing and trouble-shooting. Then you build a more advanced radio, learn more advanced theory and techniques. Gradually, in a progressive manner, and at your own rate, you will find yourself constructing more advanced multi-tube radio circuits, and doing work like a professional Radio Technician.

Included in the "Edu-Kit" course are twenty Receiver, Transmitter, Code Oscillator, Signal Tracer, Square Wave Generator and Signal Injector circuits. These are not unprofessional "breadboard" experiments, but genuine radio circuits, constructed by means of professional wiring and soldering on metal chassis, plus, the new method of radio construction known as "Printed Circuitry." These circuits operate on your regular AC or DC house current.

THE "EDU-KIT" IS COMPLETE

You will receive all parts and instructions necessary to build 20 different radio and electronics circuits, each guaranteed to operate. Our Kits contain tubes, tube sockets, variable, electrolytic, mica, ceramic and paper dielectric condensers, resistors, tie strips, coils, hardware, tubing, punched metal chassis, instruction Manuals, hook-up wire, solder, selenium rectifiers, volume controls and switches, etc.

In addition, you receive Printed Circuit materials, including Printed Circuit chassis, special tube sockets, hardware and instructions. You also receive a useful set of tools, a professional electric soldering iron, a self-powered Dynamic Radio and Electronics Tester. The "Edu-Kit" also includes Code Instructions and the Progressive Code Oscillator, in addition to F.C.C.-type Questions and Answers for Radio Amateur License training. You will also receive lessons for servicing with the Progressive Signal Tracer and the Progressive Signal Injector, a High Fidelity Guide and a Quiz Book. You receive Membership in Radio-TV Club, Free Consultation Service, Certificate of Merit and Discount Privileges. You receive all parts, tools, instructions, etc. Everything is yours to keep.

SERVICING LESSONS

You will learn trouble-shooting and servicing in a progressive manner. You will practice repairs on the sets that you construct. You will learn symptoms and causes of trouble in home, portable and car radios. You will learn how to use the professional Signal Tracer, the unique Signal Injector and the dynamic Radio & Electronics Tester. While you are learning in this practical way, you will be able to do many a repair job for your friends and neighbors, and charge fees which will far exceed the price of the "Edu-Kit." Our Consultation Service will help you with any technical problems you may have.

J. Stataitis, of 25 Poplar Pl., Waterbury, Conn., writes: "I have repaired several sets for my friends, and made money. The "Edu-Kit" paid for itself. I was ready to spend $240 for a Course, but I found your ad and sent for your Kit."

FROM OUR MAIL BAG

Ben Valerio, P. O. Box 21, Magna, Utah: "The Edu-Kits are wonderful. Here I am sending you the questions and also the answers for them. I have been in Radio for the last seven years, but like to work with Radio Kits, and like to build Radio Testing Equipment. I enjoyed every minute I worked with the different kits; the Signal Tracer works fine. Also like to let you know that I feel proud of becoming a member of your Radio-TV Club."

Robert L. Shuff, 1534 Monroe Ave., Huntington, W. Va.: "Thought I would drop you a few lines to say that I received my Edu-Kit, and was really amazed that such a bargain can be had at such a low price. I have already started repairing radios and phonographs. My friends were really surprised to see me get into the swing of it so quickly. The Trouble-shooting Tester that comes with the Kit is really swell, and finds the trouble, if there is any to be found."

PRINTED CIRCUITRY

At no increase in price, the "Edu-Kit" now induces Printed Circuitry. You build a Printed Circuit Signal Injector, a unique serving instrument that can detect many Radio and TV troubles. This revolutionary new technique of radio construction is now becoming popular in commercial radio and TV sets.

A Printed Circuit is a special insulated chassis on which has been deposited a conducting material which takes the place of wiring. The various parts are merely plugged in and soldered to terminals.

Printed Circuitry is the basis of modern Automation Electronics. A knowledge of this subject is a necessity today for anyone interested in Electronics.

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- ★ SIGNAL TRACER
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The Progressive Radio "Edu-Kit" has been sold to many thousands of individuals, schools and organizations, public and private, throughout the world. It is recognized internationally as the ideal radio course.

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- TESTER INSTRUCTION MANUAL
- HIGH FIDELITY GUIDE • QUIZZES
- TELEVISION BOOK • RADIO TROUBLE-SHOOTING BOOK
- MEMBERSHIP IN RADIO-TV CLUB; CONSULTATION SERVICE • FCC AMATEUR LICENSE TRAINING
- PRINTED CIRCUITRY

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- • • FOR anyone who wishes to learn more about radio construction, theory and servicing.
- • • FOR anyone who is looking for an interesting hobby.
- • • FOR anyone who would like to learn radio but does not have time to attend regular school hours.
- • • FOR anyone who wants to start studying for a high paying radio job.
- • • FOR anyone who wisiies to start in Television.

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☐ Rush me FREE descriptive literature concerning "Edu-Kit."

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New Products

ECONOMICAL TRANSISTOR BATTERIES

Two new 9-volt dry batteries, the 2MN6 and the PM6 "super activators," have been introduced by Burgess to provide economical power for transistor radios. Costing less than mercury types and only a little more than carbon-zinc types, the batteries are said to have exceptionally long life. Though both are intended for transistor sets, the 2MN6 (left) fits most of the popular pocket-sized radios. The price of the 2MN6 is less than $1.00, and the PM6 is priced at less than $1.20. (*Burgess Battery Co.*, Freeport, Ill.)

BASIC COMMUNICATION KIT

The Scientific Development Corporation offers a "Basic Communication Kit" which is designed to provide an introduction to the field of communication electronics. The complete package consists of a "Starter Kit" and two "Add-On Kits." A basic communications laboratory, including power supplies, control boxes, transistorized

speech amplifiers, and a transistorized voltmeter can be built with the Starter Kit (microphones and headphones are also included). Later, if desired, the Add-On Kits can be purchased to be used with the

Progressive Technical Advances

created the

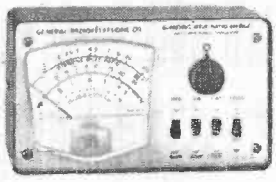
General MC5

The World's most advanced 11 meter two-way radio

3.25 watts minimum output. • High level modulation transformer for unparalleled talk power. • New Zener Diode shunt noise-clamp and series gated limiter circuit for highest noise limiting ever achieved. • New ultra-low drift oscillators for unsurpassed stability. • New Hi-level Tone-Signal. • Illuminated "S" Meter. • 6V, 12V, 115V operation. • 15 watt construction. • Net Price including microphone and crystal . . . $199.95. Optional accessories available. 6 Volt or 12 Volt cord, each $4.95. Crystal T or R, each $2.95. 90 day warranty. F.O.B. Burbank, California.

Under present rules part 19.32 the FCC does not provide for more than five (5) watt input in the Citizens Radio Service (26.965-27.225 MC Band).

General's Model 615 Multi Function Bridge



The only single precision instrument that measures True Power, Standing Wave Ratio, Relative Field Strength, Net Price $39.95. F.O.B. Burbank, California. **FREE—Write for schematic and complete technical manual.**

General

Your dealer or write:

RADIOTELEPHONE COMPANY

Dept. P8, 3501 Burbank Boulevard, Burbank, California

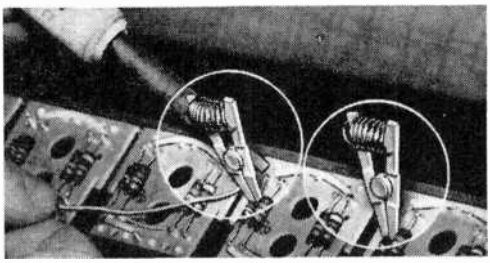
Products

(*Continued from page* 30)

Starter Kit to form a versatile electronic communications system. The Starter Kit is priced at $34.95, and the Add-On Kits are available at $15.00 each. (*Scientific Development Corporation,* 372 Main St., Watertown, Mass.)

CLIP-ON HEAT SINKS

Servicemen and hobbyists who have been using makeshift heat sinks to protect semiconductors and other heat-sensitive components while soldering can now obtain devices made especially for this purpose. Introduced to electronics manufacturers about a year ago, Avtron's heat sink clips may now be found on display at many



parts houses. Once fastened to a component lead, the spring-loaded clips remain firmly in place, leaving both hands free for soldering. A package of four sells for 98 cents. (*Avtron Manufacturing, Inc.,* 10409 Meech Ave., Cleveland 5, Ohio)

EMERGENCY SIREN/AMPLIFIER

A replacement for mechanical sirens, University's "Vanguard I" is fully transistorized and operates from any standard 12-volt car battery. Push the proper button, and it'll produce a standard "warbling" siren wail or a "manual" siren tone for as long as the button is depressed; operate as a public-address amplifier; deliver a Civil Defense alert signal; and—in conjunction with a communications radio—operate as a radio relay. When the unit functions as a siren, output is 50 watts; it produces 30 watts from microphone or radio. Since operation is instantaneous, the Vanguard I needs no warmup whatever. And, even if you should accidentally leave it on, its quiescent current drain is a low 150 ma. A Signal Corps type microphone is built in, and almost any p.a. speaker is suitable for use with the system. Price, $249.50. (*University Loudspeakers, Inc.,* 80 S. Kensico Ave., White Plains, N.Y.) —30—

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- Transformers
- Transistors
- Tubes
- Wire

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Radio Shack Corporation of Boston, Massachusetts is one of America's big 3 distributors of things electronic to the general public, industry, craftsmen and hobbyists. We offer a complete selection of precision built products by mail, through stores, and direct to manufacturers. Our exclusive REALISTIC® line of electronic products is famous nationwide for its high quality, dependable service and fine values. Our selection of national brand products is the largest in America.

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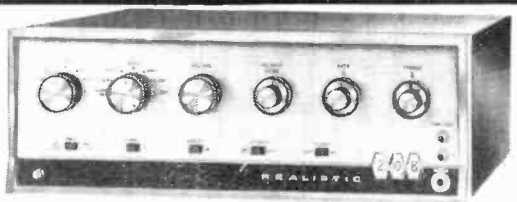
80-Watt Stereo Amplifier Kit

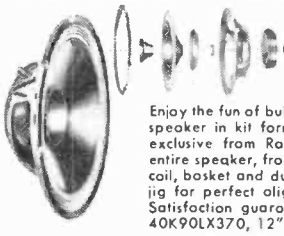
$139.95

$8 Monthly

Easy Assembly; Fabulous Savings! Features Massive Transformers!



The proud result of creative engineering, this Realistic® HK-208 80-Watt Stereo Amplifier sets new standards of transient response and definition, delivers an extra margin of performance. Premium Minneapolis-Honeywell tetrode transistors utilized throughout! A host of spectacular technical features make this the unqualified leader in its field! 16½x7½x14½". No money down. Satisfaction guaranteed.
30K90LX093, Amp. Kit, Wt. 19 lbs., $8 Monthly ..... Net 139.95



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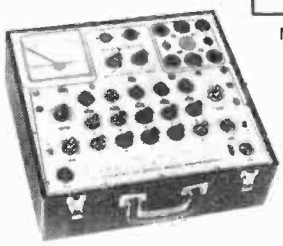
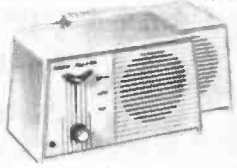
Enjoy the fun of building the world's only hi-fi speaker in kit form . . . another Realistic® exclusive from Radio Shack! Assemble the entire speaker, from 1¾ lb. magnet to voice coil, basket and dual cone, using a precision jig for perfect alignment. No money down. Satisfaction guaranteed. Ship. wt. 7½ lbs.
40K90LX370, 12" Speaker ..... $5 Monthly, Net 19.95



New! Professional Tube Tester Kit
Realistic® Design! Professional Accuracy! **$99.95**

Checks the complete condition of virtually all tube types with laboratory precision! Also tests transistors, incl. diodes, triodes and tetrades, for leakage and gain. Roll-chart gives full test instructions. 16½x7½x14½". Cover and instructions included. No money down. Satisfaction guaranteed. Wt. 25 lbs.
22K94LX010, TK-113 Kit ..... $6 Monthly, Net 99.95



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Add convenient room-to-room, floor-to-floor intercommunication for truly modern living! Just plug into your house current and talk. Range over 1 mile. Size: 8x5x5". No money down! Wt. 10 lbs.
43K90LX844, Kit (pair)
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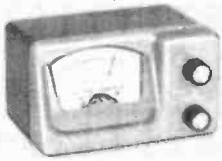
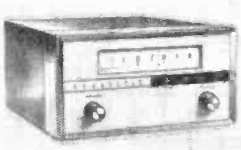


Electronic Thermometer Kit
Famous "Novatherm" Accuate to ½°F. **19.95**

Another Realistic® exclusive! Equal to precision thermometers selling for $80 and up! Easy to assemble. Fast reaction to temperature change. Ideal for darkrooms, laboratories, freezers, amateur radio equip. Size 3¾x6¼x4½". Builder's manual included. No money down. Satisfaction guaranteed.
22K94LX095, Novatherm Kit, Wt. 5 lbs., $5 Mo., Net 19.95



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For maximum listening enjoyment and top economy, it's Realistic's FM Tuner Kit! A pleasure to assemble. Lets you add quality FM reception to your home music center . . . at fantastically low cost! Incl. brushed gold case, instructions. No money down. Satisfaction guaranteed.
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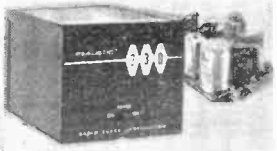

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Converts Monaural FM Tuners to Stereo! **19.95**

Fully self-powered; famous Realistic® quality; completely pre-aligned! No test equipment needed. Resp.: 50-15,000 cps, ±3db. Size: 3½"H x 4"W x 5"D. Black case incl. Uses 15 watts, 105-125V, 50/60 cy. Easy-to-follow instructions. No money down. Satisfaction guaranteed.
31K90LX099, Ship. wt. 4 lbs. Kit ..... $5 Monthly, Net 19.95

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ELECTRONICS DATEBOOK

AUG. 13-16
Pacific Energy Conversion Conference
Fairmont Hotel,
San Francisco, Calif.

AUG. 14-16
International Conference on Precision Electromagnetic Measurements
NBS Boulder Labs, Boulder, Colo.

AUG. 21-24
Western Electronics Show & Convention (WESCON)
Statler Hilton Hotel & Memorial Sports Arena, Los Angeles, Calif.

AUG. 31-SEPT. 9
World's Fair of Music and Sound
McCormick Place, Chicago, Ill.

SEPT. 1-3
National ARRL Convention
Memorial Coliseum,
Portland, Oregon

SEPT. 19-20
Industrial Electronics Symposium
Hotel Sheraton, Chicago, Ill.

OCT. 2-4
National Symposium on Space Electronics & Telemetry
Fontainebleau Hotel
Miami Beach, Fla.

OCT. 2-6
New York High Fidelity Music Show
Trade Show Bldg., New York, N.Y.

OCT. 7-12
American Institute of Electrical Engineers Fall General Meeting
Pick-Congress Hotel, Chicago, Ill.

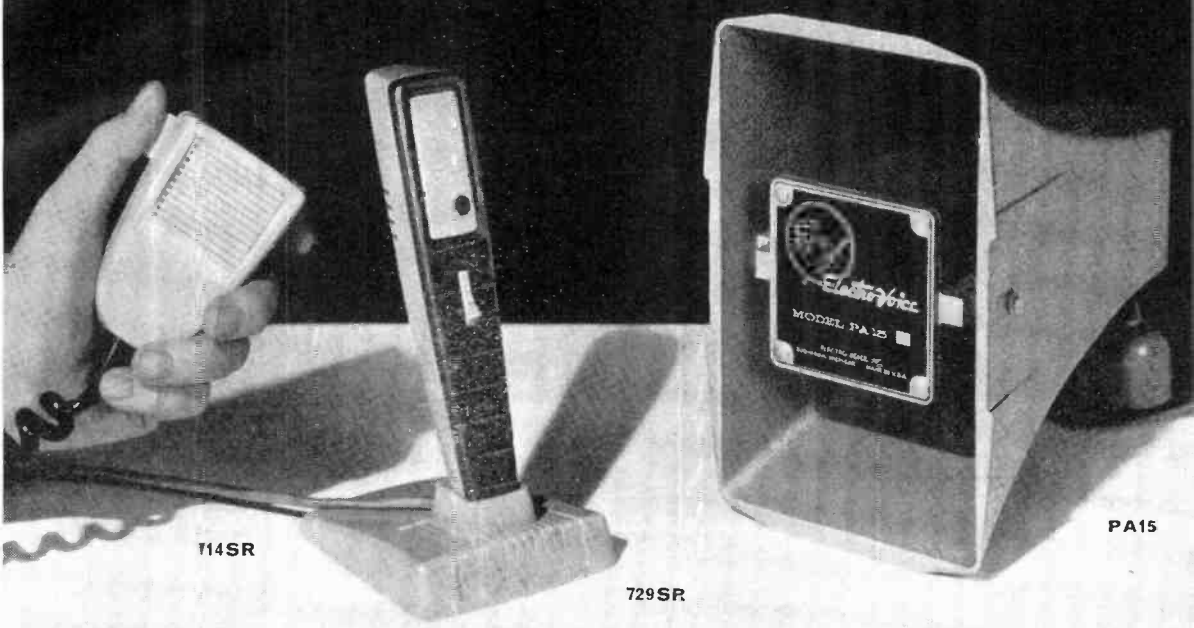
OCT. 8-10
National Electronics Conference and Exhibition (NEC)
McCormick Place, Chicago, Ill.

OCT. 15-19
Audio Engineering Society Fall Convention & Exhibit
Barbizon-Plaza Hotel,
New York, N. Y.

NOV. 28-DEC. 2
International Communications Fair
New York Coliseum, New York, N. Y.

Amateur / CB / Industrial 2-Way Radio Operators . . .

DON'T WASTE A WATT!



Add an E-V microphone and speaker to significantly improve your communications.

When You Talk . . .

these E-V microphones guarantee smooth, carefully tailored response that eliminates power-robbing peaks—allows maximum useful modulation to better cut through noise and interference. For highest effective output from your transmitter, select one of these Electro-Voice microphones.

MODEL 714SR Ceramic Mobile Microphone

All-new hand-held design. Unbreakable Cycolac® case withstands roughest handling — feels comfortable at any temperature. Ceramic element is unaffected by extremes of heat, humidity. Panel mounting bracket included. Hi-Z output -55 db. Shielded coiled cord. DPDT switch. Net price $9.90.

MODEL 729SR Ceramic Cardioid Microphone

Improves base station performance at remarkably low cost. Cardioid pickup pattern cuts out room noise, improves VOX action, permits greater working distance from microphone. Ceramic element rugged enough for mobile use. Handsome case fits easily in hand, or slips quickly into desk stand or floor stand adapter provided. DPST switch. Hi-Z output -60 db. Net price $15.90. Without switch (Model 729) $14.70.

When You Listen . . .

an E-V communications loudspeaker adds useful volume and articulation to your fixed or mobile receiver. Carefully controlled band-pass of compression driver and horn improves efficiency, cuts distortion and overloading, eliminates unwanted noise.

MODEL PA15 Communications Loudspeaker

Rugged, die-cast construction ideal for outdoor or indoor use. Outperforms typical cone speakers. Install with no circuit changes. Impedance 8 ohms. Universal swivel mount. Net price $18.00.

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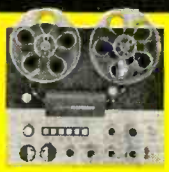
BEST BUYS IN STEREO AND MONO HI-FI

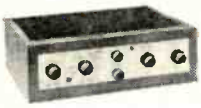
New Transistorized Stereo/Mono 4-Track Tape Deck RP100
Semikit (electronics in kit form) $299.95 Wired $399.95



New FM-AM Stereo Tuner ST96
Kit $89.95 Wired $129.95
Incl. FET

New 70-Watt Integrated Stereo Amplifier ST70
Kit $99.95 Wired $149.95

New 40-Watt Integrated Stereo Amplifier ST40
Kit $79.95 Wired $129.95



28W Integrated Stereo Amplifier HF81
Kit $69.95 Wired $109.95

FM Tuner HFT90
Kit $39.95 Wired $65.95
Incl. FET Metal Cover $3.95

AM Tuner HFT94 Incl. FET
Kit $39.95 Wired $65.95

Stereo Preamplifier HF85
Kit $39.95 Wired $64.95

Stereo Power Amplifiers

	Kit	Wired
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28W HF86:	$43.95	$ 74.95

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Tube Tester =625
Kit $34.95 Wired $49.95

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Kit $26.95
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1000 Ohms/Volt V-O-M =536
Kit $12.90
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Kit $29.95
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Kit $38.95 Wired $47.95

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Kit $19.95
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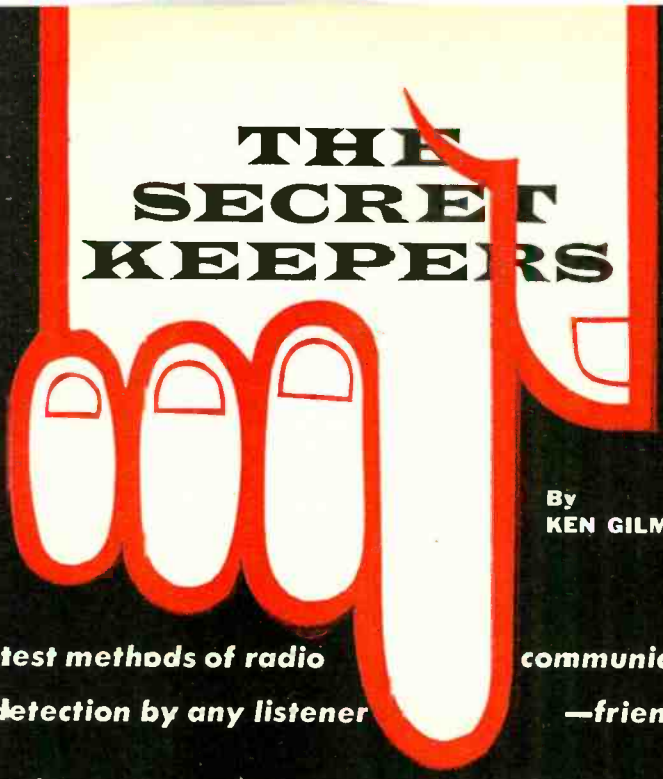
THE SECRET KEEPERS



By
KEN GILMORE

The latest methods of radio communications defy detection by any listener —friend or foe

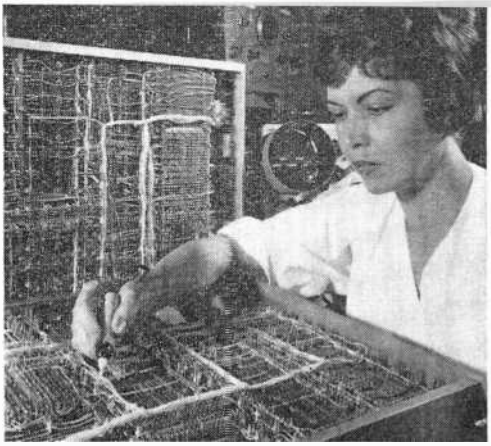
MOST radio communications systems are like "party lines"—anyone can listen in. But electronics scientists have been working overtime to come up with

TOP SECRET

the equivalents, radio-wise, for the more desirable (and costly) "private lines." Their objective: to allow our military and government officials to transmit secret information on the air with the full assurance that it can be "received" only by those listeners it is intended for.

Perhaps the best known gadget of this kind is President Kennedy's "scrambler." Thanks to this device, the transmitters in his private automobiles and airplanes take his words and turn them into a kind of electronic "hash." Then a special receiver which is set for the right "code" unscrambles the hash and turns it into intelligent speech again. The result is that no unauthorized listener can eavesdrop on the President's conversations.

Electronics engineers are coming up with a number of devices to allow "private" radio communications. And some of them—already being tested by the armed services—do the job by perform-



The equivalent of a private telephone system, the Martin Co's RACEP (left) needs no wires or central switching facilities. Another new communications device, Hughes' vocoder (above), "condenses" speech into basic sounds, reproduces it artificially.

ing a series of ingenious electronic tricks.

RACEP. The Orlando Division of the Martin Company has come up with a system called RACEP (short for *R*andom *A*ccess and *C*orrelation for *E*xtended *P*erformance). One of the more promising schemes to insure secrecy on the airwaves, RACEP is based on a principle that is really quite simple—electronic circuits are capable of switching millions of times a second, but our ears, by comparison, are very slow.

Therefore, suppose an electronic circuit were designed to snip tiny samples out of words being spoken. Let's say this circuit takes 8000 such samples every second, and that each sample is one microsecond long.

Now suppose you're talking by radio and speak a 1-syllable word which has a fundamental frequency of 200 cycles—about average for a man's voice. During one cycle of your voice signal, the sampling circuit will take 40 1-microsecond samples.

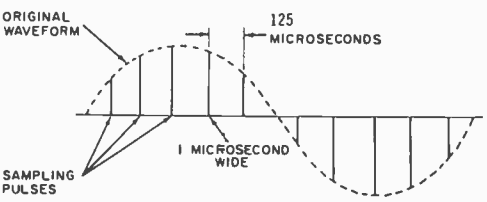
The pulses generated by this sampling technique will trace out the shape of your voice waveform quite accurately. Using just these pulses, decoding equipment at the receiving end can reconstruct the original 200-cycle voice signal so well that the human ear can't tell it from the original "unsliced" signal. Your voice, in other words, has been transmitted faithfully by a series of pulses.

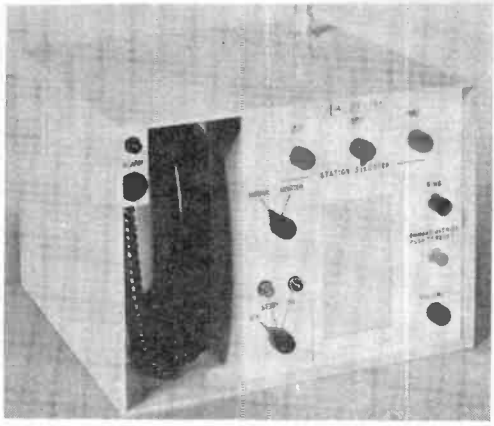
Now, to take it one step further, suppose the transmitter keeps shifting its frequency, so that each pulse is sent out on a different wavelength. A receiver, in order to pick up this tricky signal, must be set to synchronize with the pulses at the proper repetition rate. And, at the same time, the receiver must keep changing frequency exactly in step with the transmitter, so that it's tuned in to each pulse at the right time and at the right frequency.

Your words will be heard clearly on this special receiver, of course, but they'd be lost on any radio not set up to receive them properly. Military planners are excited about RACEP because it would be almost impossible for enemy electronics experts—even if they knew the principles involved—to analyze the waveforms and build equipment capable of intercepting and untangling the scrambled RACEP signals.

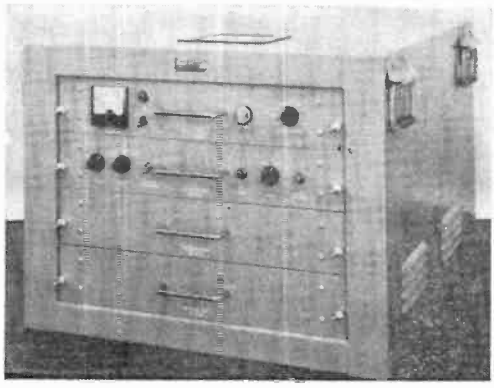
Another big advantage: a RACEP user can call any receiver whose code he knows, simply by setting up his transmitter to broadcast its pulses in that

The RACEP system transmits during only 1 microsecond out of 125, but its "chopped-up" waveforms contain enough data for accurate reproduction.





Hughes Aircraft

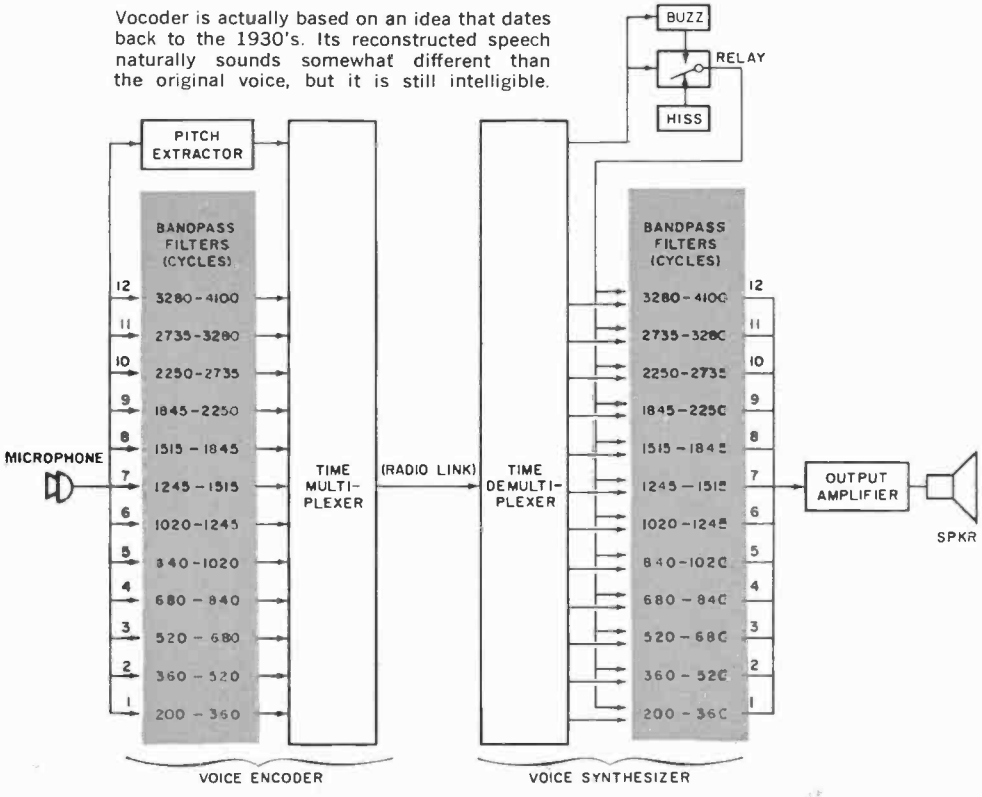


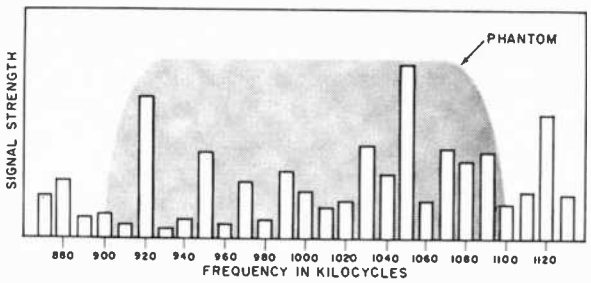
Pulse-modulated RACEP equipment similar to that shown above handles as many as 70 separate conversations at the same time and on the same frequency. Vocoder (right) transmits up to ten conversations in a bandwidth normally carrying one.

code. Battle-field units could call each other as easily as dialing a telephone.

Let's say you want to call receiver 35. Just as you can call a friend on the telephone if you know his number, you could call receiver 35 by dialing its number on your transmitter. The code you dial sets up your transmitter to broadcast a series of coded pulses at a specific repetition rate. Furthermore, each of the pulses is sent out on a slightly different frequency. Each receiver, on the other hand, is set up to receive signals which are broadcast at a predetermined pulse rate

Vocoder is actually based on an idea that dates back to the 1930's. Its reconstructed speech naturally sounds somewhat different than the original voice, but it is still intelligible.





If General Electric's "Phantom" were used on the standard broadcast band, its carrier would occupy about the same space as 20 conventional stations. But only a special wide-band receiver specifically "cued" to a particular Phantom transmitter would respond to the broadcasts.

and which change frequency in a predetermined pattern.

If you transmit the pulse pattern which receiver 35 is set up to receive, its operator will hear your words as clearly as though you were speaking over a regular radio. Other receivers, not set to detect this particular combination of pulse rate and frequency changes, very likely won't hear a thing.

RACEP brings with it another advantage, too. Your voice is sampled only one microsecond out of every 125. The system, then, is working for one microsecond, and idle for 124. Your transmitter is on the air only 1/125 of the time you are speaking, so many other transmitters can be operating in the same frequency band at the same time without interfering with you or with each other. Even if an occasional pulse does happen to synchronize with another in both time and frequency, this slight interference would be so brief as to be unnoticeable.

Development engineers at the Martin Company have found that scores of conversations can be going on simultaneously in a band about 4 mc. wide without seriously interfering with each other. Even in such busy systems as air-to-ground radio, each individual is using his radio only a small percentage of the time. Therefore, systems planners estimate that up to 700 receivers could be operating in one area with the RACEP system.

Phantom. RACEP isn't the only new communications system. General Electric researchers have come up with an entirely different approach which they call "Phantom."

The principle, again, is rather simple. A radio transmitter—one used by a regular commercial radio station, for example—may broadcast on a carrier frequency of 1000 kc. If it broadcasts a 5000-cycle note—about the highest frequency transmitted by most AM stations—this signal modulates the carrier so that the final output signal contains frequencies between 995 and 1005 kc. Engineers call this a *bandwidth* of 10 kc. (1005 — 995 = 10 kc.).

Your receiver has a *bandpass* of about 10 kc., too. As you tune across the dial, you shift the position of this bandpass. When you tune to 1000 kc., the bandpass is centered around this frequency so that you receive all frequencies between 995 and 1005 kc. and thus hear the program the station is transmitting.

The Phantom system, however, would stretch the audio signal over an extremely wide band of frequencies—perhaps 200 kc. or more. The transmitted signal, then, would cover a band of frequencies from 900 to 1100 kc. Since it is spread over such a wide area, only a tiny fraction of the signal would fall within the bandpass of an ordinary receiver.

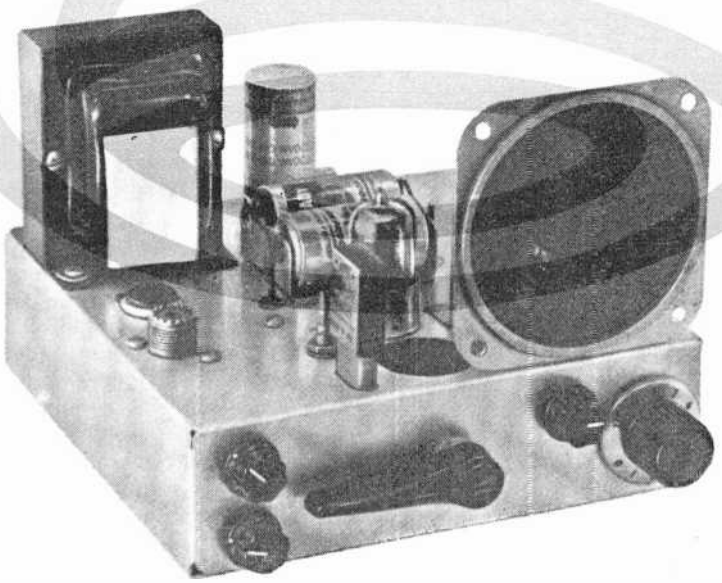
It wouldn't be possible to tune in on the wide-band Phantom signal simply by having an extra-wide-band receiver, either. If you had this kind of setup, a jumble of stations broadcasting on frequencies within the band you were covering would come tumbling in. To get around this problem, Phantom designers "tag" the transmitted signal with a special waveform. The Phantom receiver lets in only signals which are identified by this waveform and rejects all others.

You may have heard Phantom broadcasts without knowing it. General Electric has transmitted Phantom signals more than 2000 miles across the country to test the system. Because this special waveform is spread over such a wide frequency band, its amplitude in the bandpass of any normal receiver is very

(*Continued on page* 102)

TRANSCEIVER FOR

By **MICHAEL S. ROBBINS,** K6QAH

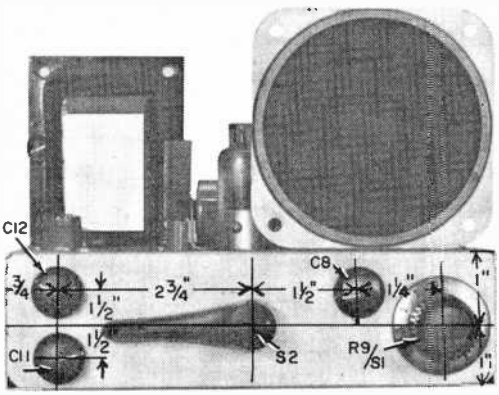


One tube serves both as a regenerative receiver and a 2-watt AM transmitter in this peppy 6-meter rig

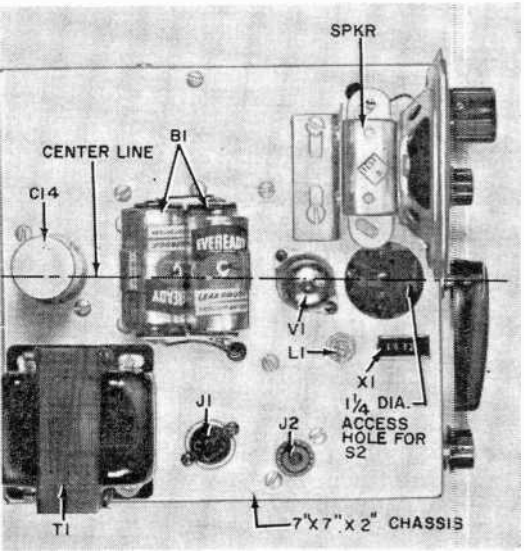
TRANSCEIVERS have long been popular items of station equipment with hams operating on 6 meters. All kinds of units are employed, ranging from simple "handie talkies" to elaborate fixed station rigs combining multi-watt transmitters with superheterodyne receivers. But the one in use at K6QAH evolved from a project aimed at determining just how good a circuit could be designed around a single, multi-purpose tube. The results more than met the author's expectations, and if you, too, would like to try your hand at 1-tube QSO'ing on 6, complete construction details on the transceiver are given here.

Operating off the a.c. line, a triple triode does double duty as a crystal-controlled, plate-modulated transmitter and a regenerative receiver with an isolating r.f. stage and speaker output. The rig puts out a creditable 2-watt signal anywhere in the 6-meter band, and receives dependably at distances up to 25 miles. During a recent band opening, in fact, stations from the Mexican to the Canadian borders were heard at the author's

TRANSCEIVER FOR 6



Parts placement on the front (above) and top (below) of the transceiver's chassis is shown here. Follow these photographs carefully; improper lay-out will make wiring difficult.



Los Angeles QTH. And only a simple dipole antenna was used.

Receiving Circuit. With "transmit-receive" switch *S2* in the position shown on the schematic, the transceiver functions as a regenerative receiver. Signals from the antenna are coupled to the grid of *V1a* (one of the three triode sections of the 6EZ8 tube). This section serves as an r.f. amplifier and isolates regenerative detector *V1b* from the loading effects of the antenna. Though the transmitter's pi-network output circuit (capacitors *C11* and *C12*, chokes *L5* and *L6*) remains in series with the antenna on "receive," it tunes quite broadly and has little effect.

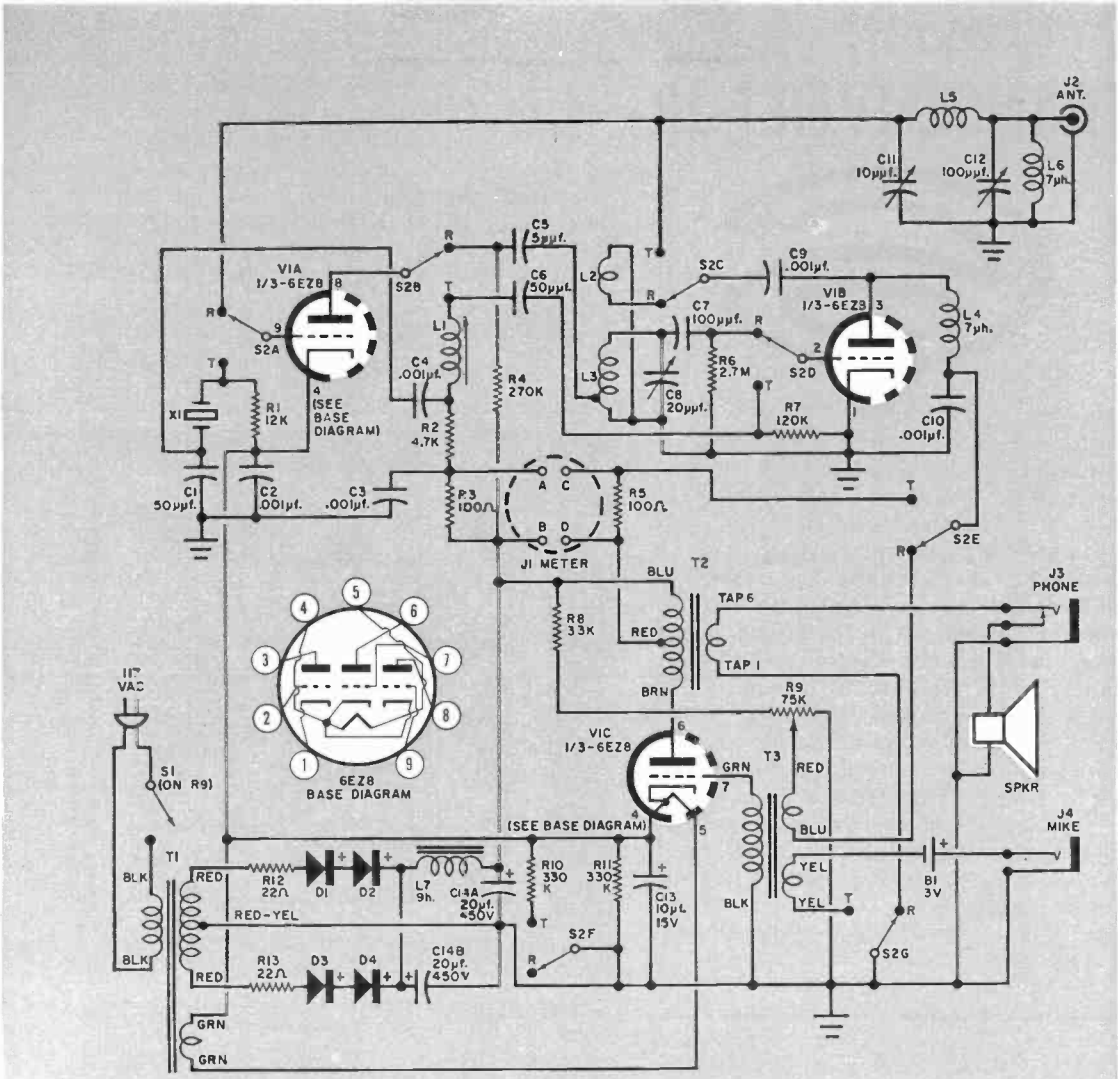
Capacitor *C8* and coil *L3* tune detector *V1b* through a range of 45-65 mc. A bandspread capacitor can be added (see "Tune-Up and Operation" section) if desired. Coil *L2* is the "tickler," coupling part of *V1b*'s plate signal back into the grid to provide regeneration. Potentiometer *R9* varies the plate voltage to *V1b* and acts as a regeneration control.

The "red-blue" primary winding of transformer *T3* couples the output of *V1b* to *T3*'s secondary, and thence to the grid of audio amplifier *V1c*. The speaker, or the earphone section of a handset (via jack *J3*), is driven by *V1c* through output transformer *T2*.

The speaker has a high-impedance voice coil so that it will come close to matching the impedance of the handset earphone (both being operated from the same output transformer). If the hand-

PARTS LIST

B1—3-volt battery (two Burgess Type 1 flashlight cells in series, or equivalent)
C1, C6—50 μμf.
C2, C3, C4, C9, C10—0.001 μf. *all 500-volt, ceramic disc capacitors*
C5—5 μμf.
C7—100 μμf.
C8—20-μμf. variable capacitor (Hammarlund MAC-20 or equivalent)
C11—10-μμf. variable capacitor (Hammarlund MAC-10 or equivalent)
C12—100-μμf. trimmer capacitor (Hammarlund MAPC-100-B or equivalent)
C13—10-μf., 15-volt electrolytic capacitor
C14—Dual 20-μf., 450-volt electrolytic capacitor
D1, D2, D3, D4—5E4 diode (International Rectifier)
J1—4-pin socket to accept meter probes
J2—Female coaxial connector, chassis-type (Amphenol 83-1R or equivalent)
J3—2-conductor, closed-circuit phone jack
J4—2-conductor, open-circuit phone jack



The 6EZ8 tube, as shown in schematic diagram, is set for "transmit" or "receive" by 8-pole switch S2.

L1—15 turns of #30 d.c.c. wire close-wound on a J. W. Miller 4400-R slug-tuned form
L2—3¼ turns of B&W 3003 coil stock (½"-diameter, 16 turns per inch) or equivalent
L3—5¾ turns of B&W 3003 coil stock or equivalent, tapped ¼ turn from ground end
L4, L6—7-μh., 1000-ma. r.f. choke (Ohmite Z-50 or equivalent)
L5—4¼ turns of B&W 3015 coil stock (1"-diameter, 16 turns per inch) or equivalent
L7—9-henry, 50-ma. filter choke (Stancor C-1215 or equivalent)
R1—12,000 ohms
R2—4700 ohms — *all resistors*
R3, R5—100 ohms — *½-watt, 10%, unless*
R4—270,000 ohms — *otherwise specified*
R6—2.7 megohms
R7—120,000 ohms
R8—33,000 ohms, 1 watt
R9—75,000-ohm, linear-taper potentiometer, with s.p.s.t. switch (Ohmite CU7531 with CS-1 switch, or equivalent)
R10, R11—330,000 ohms
R12, R13—22 ohms
S1—S.p.s.t. switch (on R9)
S2—8-pole, 2-position rotary switch, non-shorting type (Centralab PA-1025 with one pole unused, or equivalent)
SPKR—3½" PM speaker, 45-ohm voice coil—see text
T1—Power transformer; primary, 117 volts; secondaries, 460 volts CT @ 50 ma., 6.3 volts @ 2.5 amperes (Stancor PC-8418 or equivalent)
T2—Universal output transformer (Stancor A-3823 or equivalent)
T3—Transceiver transformer; primaries, 100 and 10,000 ohms; secondary, 100,000 ohms (Triad A-21X)
V1—6EZ8 tube
X1—Crystal—see text
1—2" x 7" x 7" aluminum chassis (Bud AC-405 or equivalent)
Misc.—Sockets for V1 and X1, holder for B1, terminal strips, line cord and plug, perforated board and terminals, 1" spacers, bandspread capacitor (optional), handset or mike, etc.

TRANSCEIVER FOR

set feature is not desired, a standard 3.2-ohm speaker can be used—but the connections to *T2*'s taps must be changed (see "Construction" section).

Transmitting Circuit. When *S2* is switched to the "transmit" position, *V1a* becomes a crystal-controlled oscillator—providing an output in the 25-mc. range. The crystal used at *X1* can be a "fundamental" type having a frequency between 8.350 mc. and 9.000 mc. or between 12.525 mc. and 13.500 mc. An "overtone" crystal designed for the 25.-050 to 27.000 mc. range can also be used.

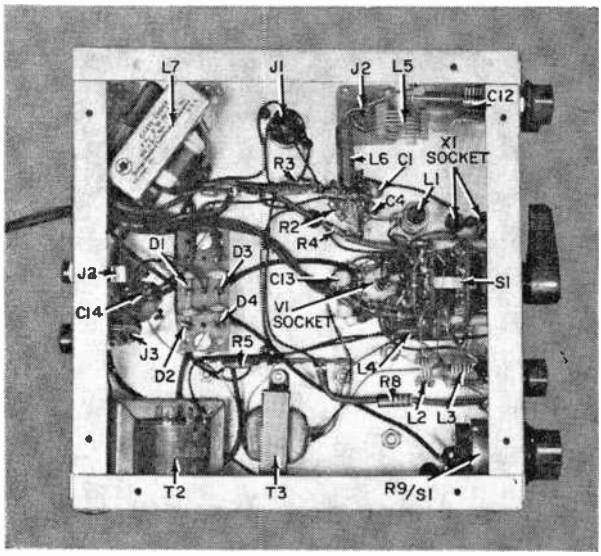
Section *V1b* of the 6EZ8 is the final output tube. Doubling the 25-mc. oscillator output, it delivers a 50.1 - 54 mc. signal from crystals in the above ranges (50.1 - 54 mc. is the AM-phone portion of the 6-meter band). Since triode *V1b* is a frequency doubler, it requires no neutralization. The plate circuit of *V1b* is matched to the antenna by means of the pi-network circuit mentioned earlier.

Battery *B1* supplies the operating current for a carbon microphone (or the microphone section of a handset) plugged into jack *J4*. The mike signal is fed to the "yellow-yellow" primary winding of transformer *T3*, and is coupled to the grid of *V1c* (the latter now acting as a modulator). The primary of transformer *T2* serves as a choke to couple the output of *V1c* to the plate circuit of final amplifier *V1b*.

Power Supply Circuit. A full-wave rectifier supplies the d.c. voltages for the transceiver. Two inexpensive 400-PIV diodes in series are used in each rectifier leg, each pair (*D1/D2*, *D3/D4*) being the equivalent of an 800-PIV diode. Resistors *R12* and *R13* protect the diodes against current surges. The filter network consists of *C14a* and *C14b*, and *L7*.

The heater circuit of *V1* is not grounded at any point because the cathodes of *V1a* and *V1c* are internally connected to the heater (see base diagram on schematic). If the heater were grounded, these cathodes could not be properly biased. Bias is supplied through resistor *R11* on "receive" and through resistors *R10* and *R11* in parallel on "transmit."

Construction. The transceiver is built on a 2" x 7" x 7" aluminum chassis.



Your completed 6-meter transceiver should look (above, left) is not crowded except in vicinity of

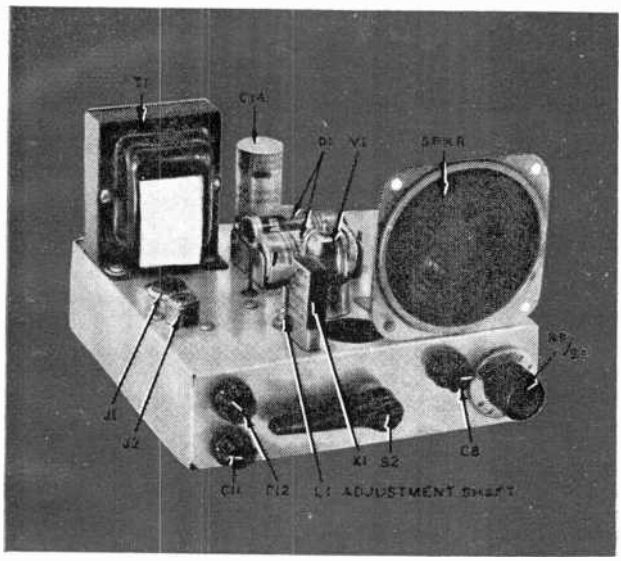
When mounting the parts, follow the author's layout as closely as possible. This applies especially to switch *S2* and the socket for tube *V1*, since the wiring around these components is a bit crowded and leads must be kept short.

Specifications for the construction of coils *L1*, *L2*, *L3*, and *L5* will be found in the Parts List. Coils *L2*, *L3*, and *L5*, cut from Barker and Williamson "Miniductor" stock, are supported by their own leads—be sure to make these leads long enough for connection into the circuit. Coils *L2* and *L3* should be mounted about ¼" apart; this spacing will be adjusted more closely later (see "Tune-Up and Operation" section).

Because it would be difficult to prewire switch *S2*, and because most of the terminals would otherwise be difficult to

reach once this switch is mounted in place, an access hole is punched in the chassis directly above *S2*. This 1¼"-diameter opening can be made with an ordinary tube-socket punch, and permits access to all of the switch terminals which can't be reached from the other side of the chassis.

The switch specified for *S2* has two decks—four poles available on each one. Use the rear deck (the one farthest



much like the photo above, right. The underchassis V1 and S1, where wiring must be carefully done.

from the knob) for sections *S2b*, *S2c*, *S2d*, and *S2f*. Sections *S2a*, *S2e*, and *S2g* are wired to the front deck, and the remaining pole on this deck is left unused.

If you plan to use a handset with the transceiver, install *J3* and use taps 1 and 6 on transformer *T2* as shown on the schematic. Should the handset feature not be desired, *J3* would not be needed and a standard 3.2-ohm speaker could be substituted for the 45-ohm unit specified for the speaker; tap 1 on *T2* would remain connected as before, but the speaker would be connected between ground and tap 3.

The remainder of the construction is straightforward and needs little comment—but note that diodes *D1-D4* are mounted on a small section of perforated board. The board is installed on a pair of 1" spacers so that none of the connections will touch the chassis. Resistors *R12* and *R13* are also wired to the board (on the opposite side).

Tune-Up and Operation. Set switch *S2* to "transmit," plug in a crystal at *X1*, and connect a #47 dial lamp across *J2* as a dummy load. Now close power switch *S1* and allow *V1* to warm up. With a VOM set to its lowest "d.c. volts" scale connected across *J1a* and *J1b* (positive to *J1b*), adjust the slug of *L1* for a dip. The "dipped" reading should range from 0.6 to 1 volt. If a wavemeter or grid-dip meter is available, check the frequency of *V1*'s output (it should be about 25 mc.).

Now connect the positive lead of the VOM (still set at the lowest d.c. volts scale) to *J1d* and the negative lead to *J1c*. With capacitor *C12* set at its minimum capacity position, adjust capacitor *C11* for a dip on the meter. If no dip is obtained, adjust *C12* so that its plates are half-meshed and try again. If you still don't get a dip with *C11*, try other settings of *C12* until you do. The "dipped" reading on the meter should be about the same as before (0.6 - 1 volt).

Next, adjust *C12* for maximum brilliance of the dial-lamp dummy load, continually readjusting *C11* for a dip. When maximum brilliance has been obtained, the meter reading should still be in the neighborhood of 0.6 - 1 volt. At this point, a wavemeter, grid-dip meter, or communications receiver should be used to make sure the output at *J2* is in the 6-meter band.

The dial lamp is now disconnected from *J2* and a 50- or 75-ohm antenna connected in its place. Retune *C11* for the dip, and the adjustment of the transmitter section is completed.

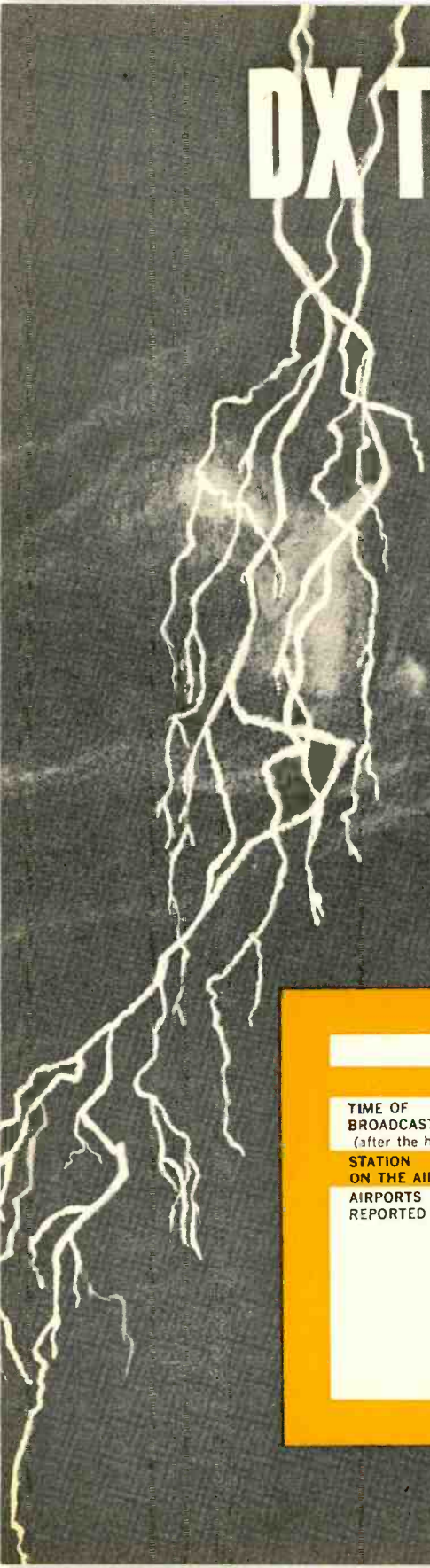
Switch *S2* to "receive" and, with regeneration control *R9* set so that you hear signals, tune capacitor *C8* through its range. The 6-meter band (50 - 54 mc.) will be found between commercial stations operating on 45 - 50 mc. and television channel 2 (54 - 60 mc.). Once you've determined that the receiver is working, tune to a weak station, set regeneration control *R9* at the midpoint of its rotation, and adjust the spacing

(*Continued on page* 119)

DX THE WORLD'S

Everyone talks about the weather— now SWL's can log it

by WALTER P. BLASS



NORTH ATLANTIC AREA

Frequencies (in kilocycles): 3001, 5559, 8823.5, 13264.5

TIME OF BROADCAST (after the hour)	00 30	15 45	20 50
STATION ON THE AIR	SHANNON	NEW YORK	GANDER
AIRPORTS REPORTED ON	Amsterdam Brussels Frankfurt Koln Zurich Geneva Shannon Dublin Prestwick London Gatwick Copenhagen	Baltimore Washington Philadelphia New York Newark Boston	Gander Goose Bay, Labrador Montreal Stephenville, Newf. Halifax Toronto Ottawa Chicago Detroit Sydney, Nova Scotia Sonderstrom, Greenland Frobisher, Baffin Is. New York (Idlewild)

WEATHER

YOU can be an expert on the daily fickle fluctuations of the weather in Europe, on the high seas, in Alaska or Honolulu, or just about anywhere. All it takes is a short-wave receiver, a long-wire antenna, and the knowledge of when to listen and where to turn to on your dial.

Weather conditions in the entire North Atlantic area, from Washington up through Canada, Newfoundland across to Ireland, and all of Western Europe are broadcast every half hour. The purpose is to keep international airline pilots abreast of weather changes, just as broadcasts on the low-frequency band (200-400 kc.) do for the domestic and cross-continent flyers.

Until recently, the weather broadcasts were quite limited, both as to number of sites covered and data provided. Since March 15, 1962, however, this is all changed. You no longer have to try to understand a Belgian trying to speak English on top of all the QRM and static to learn about hailstones in Brussels. Three stations, all of them operating on four frequencies simultaneously (see table below, left) with 3000 watts, are multiplexed to give you the weather story around the clock. Detailed information is broadcast for each airport regarding the existing cloud cover, visibility, temperature, dew-point, precipitation (if any), wind speed and direction, and barometric pressure. Then forecasts for the next 6-12 hours are given.

A similar service is available for the Pacific air routes (see table below). For the easterners who are curious about the weather at the World's Fair in Seattle, the West Coast stations can be heard during the early morning hours even on simple, low-cost receivers, under favorable listening conditions. To get an idea of the scope of the Pacific area coverage, try sticking some pins on a globe or map of the world representing all the stations listed here.

And that isn't all. Eastern Europe, Africa, South America, and even South Asia use the same general bands. Up-to-date details are contained in *Meteorological Tables for International Air Navigation*, Document 7155, published by the International Civil Aviation Organization, Montreal, Canada. It costs $3.50 in Canadian currency (about $3.25 in U. S. dollars), and will permit you to . . . DX the world's weather. —30—

PACIFIC AREA

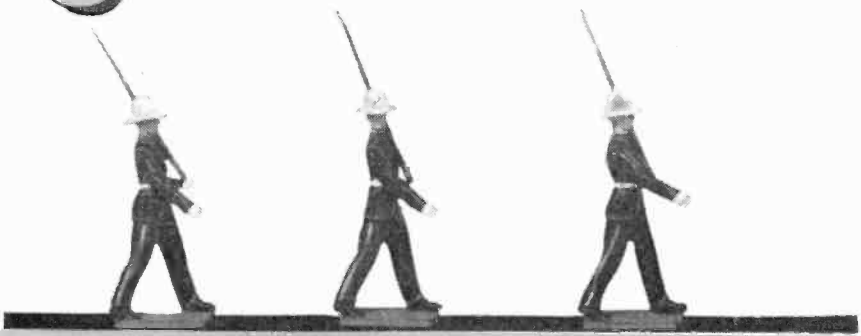
Frequencies (in kilocycles): 2980, 5574, 8905

05 35	10 40	15 45	20 50	25 55
SAN FRANCISCO	TOKYO	HONG KONG *(2980 kc. not used)*	ANCHORAGE	HONOLULU
Los Angeles Portland Seattle Sacramento Riverside Fairfield/ Travis Sacramento/ McClellan	Tokyo Nagoya Osaka Okinawa/ Naha Chitose	Hong Kong Waglan Cheung Chau Taipei Tainan Manila	Barrow Galena Fairbanks Big Delta Anchorage Kodiak Cold Bay Adak Vancouver	Wake Canton

On the air 24 hours a day, the stations at left can be heard twice every hour. Each station reports on the weather conditions at the airports listed below it. In any one half-hour interval, you can hear weather reports covering the entire North Atlantic or Pacific area.

1-2-3 TOTALIZER

Here's one electronic counter that's handy time and again—it responds to



YOU CAN probably think of umpteen uses for an electronic counter, and once you've studied the circuitry of the little unit shown here, you'll no doubt think up umpteen more. Because of its sensitivity and versatility, the counter about to be described will fill the bill for just about every application.

The cadmium sulphide photocell in the device is especially sensitive and is therefore effective even with relatively small amounts of incident light. Even more important, the unit can be set to count either "light" or "dark" pulses at the flip of a switch, and there is a jack which allows you to bypass its photocell and use a remote switch or relay whenever you wish.

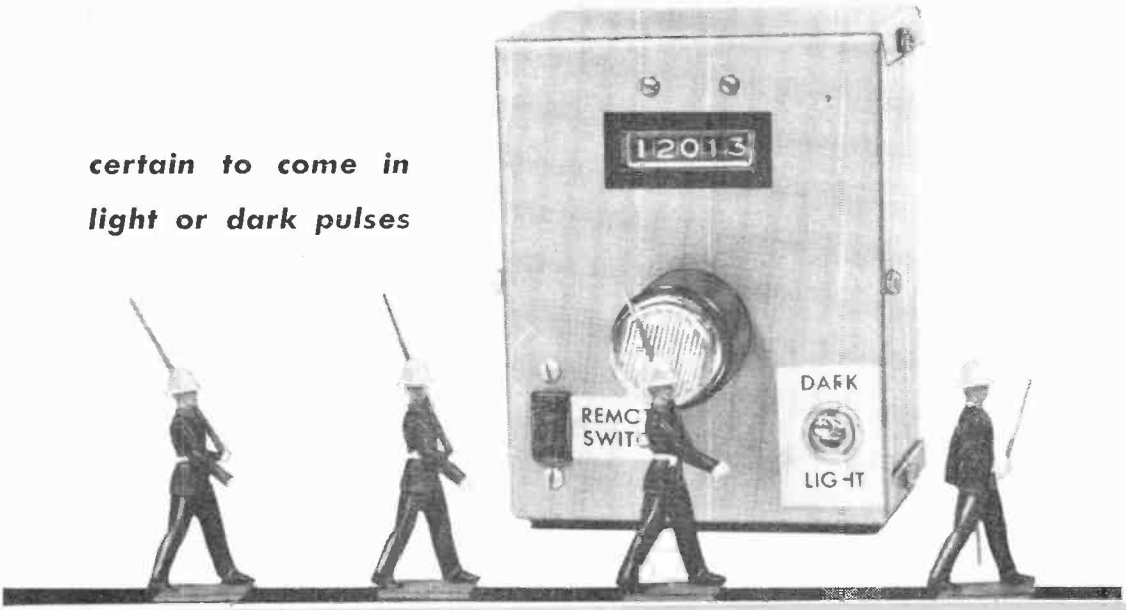
Construction. Building the electronic counter requires little more than mounting the components on the top cover of the utility box and wiring them up as shown in the schematic diagram.

Begin by attaching the counting mechanism to the upper part of the cover. Then center the octal socket for the photocell below the counting mechanism. The jack (*J1*) for connecting a switch, relay, or other triggering device should be mounted on the lower left-hand side of the cover; and the "dark/light" switch (*S1*) should be mounted on the lower right-hand side.

Photocell *PC1* comes installed in a tube base and can either be plugged directly into the socket on the front panel or into a similar socket on a "probe" cable. The author prepared a cable from a length of #16 rubber zip cord with an octal socket on one end (for mating with the tube base on the cell) and an octal plug on the other (for mating with the tube socket on the counter itself).

This arrangement makes the unit much more versatile than it would otherwise be, since the photocell can be conveniently moved about and placed almost anywhere. The probe cord can be any reasonable length. Since only two terminals are required, it's a simple matter to hook up the sockets and plugs so that they mate properly.

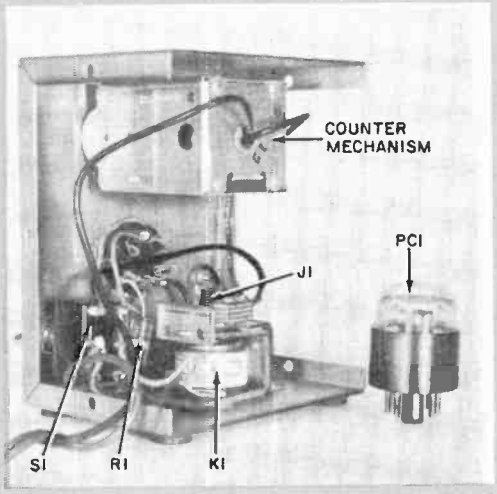
certain to come in light or dark pulses



By HAROLD REED

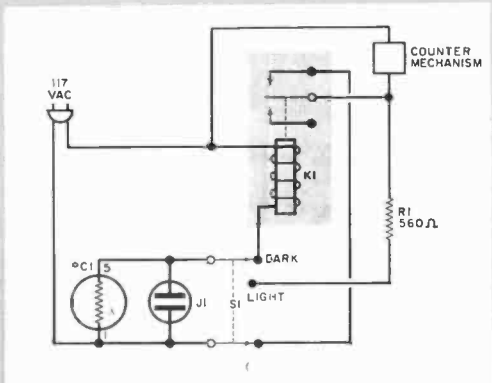
Operation. To use the counter, it's only necessary to plug the photocell into the front panel socket (or into the probe cable), plug in the power cord, flip *S1* to "light" or "dark" (depending on what kind of pulses you want to trigger the counter), and "direct" these pulses on the cell "window." Don't worry about

(*Continued on page 110*)



PARTS LIST

J1—Chassis-mounting a.c. socket (Cinch-Jones 2R2 or equivalent)
K1—S.p.d.t. relay, 115-volt a.c. coil (Guardian universal "200" series or equivalent)
PC1—Cadmium sulphide photocell mounted in octal tube base (Lafayette Radio MS-882 or equivalent)
R1—560-ohm, 1-watt resistor
S1—D.p.d.t. toggle switch
1—Counter mechanism (General Controls CE40BN502 or equivalent—available from Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., catalog #77 P 031, for $6.40, plus postage)
1—5" x 4" x 3" aluminum utility box (Bud CU-2105-A or equivalent)
1—Line cord and plug
Misc.—Octal socket, wire, solder, etc.



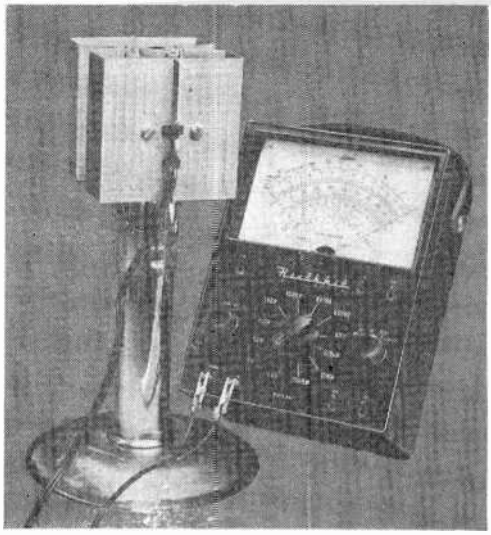
From Wax to Watts

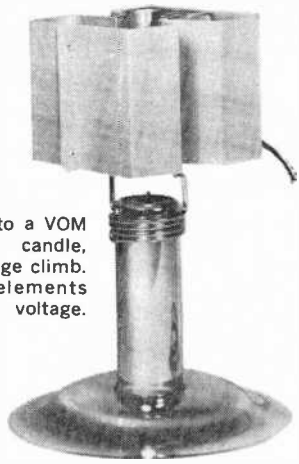
THERMOELECTRIC GENERATORS, previously limited to classroom demonstrations and government projects due to high costs, are beginning to find consumer applications. Among the first on the market is the Model 151 "Seejenator," which uses a plumber's candle to create enough electricity to operate a transistor radio. Light the candle, attach two leads, and your radio will play in a fallout shelter or on a camping trip—with no batteries to go dead.

Made by Harco Laboratories, Inc. (77 Olive St., New Haven, Conn.), and priced at $19.95, the Seejenator has two thermoelectric elements connected in series or parallel by means of a built-in slide switch. Open-circuit voltage is 8 volts (series-connected) and internal resistance about 800 ohms; 4 volts can be obtained (parallel-connected) with 200-ohm resistance.

An adapter comes with the unit which allows the user to adjust the height of the elements over the flame with a resulting change in output-voltage—less heat means lower voltages. The Seejenator output cannot power a Part 15 transistor transmitter, but when the generator is connected across the transmitter's wet cells (through a diode to prevent reverse current flow), it provides a trickle charge.

From time to time it will be necessary to remove carbon deposits from the elements, using a small bottle brush. Also, it's a good idea to have a stock of replacement candles. Oh, yes, and matches, too . . . —30—





Connect generator to a VOM (top photo), light candle, and watch the voltage climb. Raising heated elements (right) varies the voltage.

HAVE GALL, WILL CALL

by David Moore

"Okay on the weather, Dave, and on the setup, too.
Weather here is overcast, and station here home-brew.
I don't go in for factory sets, especially wired gear,
And even from factory chassis I usually stay clear.

"I grind out my own crystals, make my own knobs, too.
Yes, there's nothing like a station that's totally home-brew.
The rig, homemade of course, uses 811A's,
Running 1400 volts, we find that power pays.

"We've heard a lot of DX on the home-brew hearing aid.
All we need is several more, and DXCC is made.
The beam, like all the rest, is also made by hand,
And gives us 1:1 on the 20-meter band."

And so our home-brew friend, who was manually inclined,
Rambled on for hours as his setup he defined.

No longer do I hear this jolly fellow on the band.
No longer do I hear of all the rigs he's built by hand.
It seems that said enthusiast was not a ham at all—
It seems that said enthusiast had signed a home-brew call!

NEW FORM FOR CB

Once a stumbling block for prospective CB'ers, FCC Form 505 now speeds up license processing

By **JULIAN M. SIENKIEWICZ**
Managing Editor, 2W5115

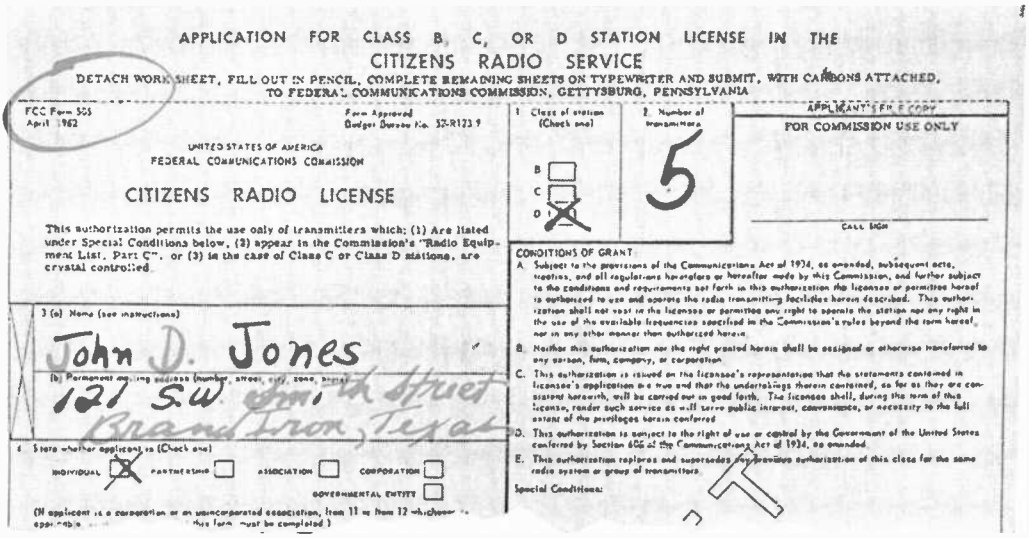
WAY BACK in the year One of the "new" Citizens Band, the Editors of POPULAR ELECTRONICS decided to publish an article on how to apply for a CB license. Our reasons were simple. We wanted to inform our readers of the new radio service which, up to that time, had not been championed by any magazine. Also, from our contacts with the Federal Communications Commission, we had learned that an unnecessarily large portion of the applicants for the prized CB ticket were being turned down simply because they were not filling out Form 505 correctly.

Who was to blame for the bouncing CB license applications? Well, in some cases it must have been the rejected applicants themselves, since a good many applications were received in good order and licenses were issued. The FCC might be partially to blame—for the creation of the complicated Form 505. But if a mere application form is the cause of so many troubles, why not rip it up and start out fresh with a new one? Well, that's exactly what the FCC has done. A new Form 505 is in the works and a few of you may already have used it in the past month.

To spot the new form, look at the upper left-hand corner of the application and you will see printed "FCC Form 505, April 1962." (The old form bears the date "September 1958.") The new form can only be used by applicants for Class B, C, and D stations; Class A CB'ers now have to use FCC Form 400.

For Class D CB'ers Only. Applications for Class D Citizens Band licenses for

Look for the date "April 1962" in the upper left-hand corner of the Form 505 you have. If it is there, this article will guide you in filling out the form.



APPLICATION FOR CLASS B, C, OR D STATION LICENSE IN THE CITIZENS RADIO SERVICE

DETACH WORK SHEET, FILL OUT IN PENCIL, COMPLETE REMAINING SHEETS ON TYPEWRITER AND SUBMIT, WITH CARBONS ATTACHED, TO FEDERAL COMMUNICATIONS COMMISSION, GETTYSBURG, PENNSYLVANIA

FCC Form 505
April 1962

Form Approved
Budget Bureau No. 32-R123.9

APPLICANT'S FILE COPY

FOR COMMISSION USE ONLY

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

CITIZENS RADIO LICENSE

This authorization permits the use only of transmitters which: (1) Are listed under Special Conditions below, (2) appear in the Commission's "Radio Equipment List, Part C", or (3) in the case of Class C or Class D stations, are crystal controlled.

1. Class of station (Check one): B ☐ C ☐ D ☒
2. Number of transmitters: 5

CALL SIGN

3 (a) Name (see instructions)
John D. Jones

(b) Permanent mailing address (number, street, city, zone, state)
121 S.W. Smith Street
Brand Iron, Texas

4. State whether applicant is (Check one)
INDIVIDUAL ☒ PARTNERSHIP ☐ ASSOCIATION ☐ CORPORATION ☐
GOVERNMENTAL ENTITY ☐

(If applicant is a corporation or an unincorporated association, Item 11 or Item 12 whichever is applicable ... this form must be completed.)

CONDITIONS OF GRANT

A. Subject to the provisions of the Communications Act of 1934, as amended, subsequent acts, treaties, and all regulations heretofore made by this Commission, and further subject to the conditions and requirements set forth in this authorization the licensee or permittee hereof is authorized to use and operate the radio transmitting facilities herein described. This authorization shall not vest in the licensee or permittee any right to operate the station nor any right in the use of the available frequencies specified in the Commission's rules beyond the term hereof, nor in any other manner than authorized herein.

B. Neither this authorization nor the right granted herein shall be assigned or otherwise transferred to any person, firm, company, or corporation.

C. This authorization is issued on the licensee's representations that the statements contained in licensee's application are true and that the undertakings therein contained, so far as they are consistent herewith, will be carried out in good faith. The licensee shall, during the term of this license, render such service as will serve public interest, convenience, or necessity to the full extent of the privileges herein conferred.

D. This authorization is subject to the right of use or control by the Government of the United States conferred by Section 606 of the Communications Act of 1934, as amended.

E. This authorization replaces and supersedes the previous authorization of this class for the same radio system or group of transmitters.

Special Conditions:

individuals outnumber by far all other CB license requests. Therefore, a step-by-step procedure is given below to help the typical would-be "individual" CB'er fill out the application. The item numbers match those on Form 505 and the work sheet that comes with it. When you receive your application material, rip off the work sheet and fill it out, using a pencil so that possible mistakes can be easily erased.

Item 1. Put an "X" in box D.

Item 2. Write in the number of transmitters you plan to operate within the next five years under this license.

Item 3a. Write in your full legal name. Married women should write their own names (i.e., Jane Jones. not Mrs. John Jones).

Item 3b. Insert your permanent address in this box. If you would like to have your license mailed to some other place, turn the work sheet over and in the large box entitled "Remarks and Additional Data" insert the mailing instructions—giving complete details.

Item 4. Mark the box labeled "Individual."

Item 5a. In almost all cases, you will either own or plan to purchase transceivers; if this is so, mark the box labeled "Yes."

Item 5b. Since you have answered *Item 5a* with a "Yes," skip this item.

Item 6. Insert the county and state for the address given in *Item 3b* in the appropriate boxes. If you are in doubt as to the county in which you live, a phone call to any local or state government office will get you the information.

Item 7. In this item, the FCC wants you to state that you have read and understood the FCC rules* governing the station you want to operate, that you intend to operate your station according to these rules, and that you will control your station yourself at all times. So, the answers to *Item 7* a, b, and c should be "Yes," "Yes," and "No," in the order given.

Item 8. If you have never been convicted of a crime for which you were fined $500 or more or were sentenced to six months or more in jail, put an "X" in the box labeled "No."

Item 9. If you now have a Class D station license, you are required to give the call-sign and state why you are filling out this form. You might be filing the application "to change permanent address," or "to add new mobile units," or for just about any other reason that would make the statements on your original application no longer true. New applicants or holders of expired Citizens Band licenses can just write "Not applicable."

Item 10. Most CB'ers buy equipment approved by the FCC for Class D operation; if such is the case with you, just forget about this item.

Finishing Up. The work sheet is almost complete. All that remains for you to do is read the statements under "I CERTIFY THAT:" near the bottom of the sheet, sign the work sheet, and insert the date on the line indicated by the arrow. Your signature should agree with the name given in *Item 3a*; no other signatures are needed for "individual" applications. Then mark the box labeled "INDIVIDUAL APPLICANT" under your signature.

Now fill out the actual application, using a *typewriter*. Carefully copy everything from your work sheet onto the application, sign it, go over it to be sure that you have made no mistakes, and mail it to the FCC. Address the envelope: "Federal Communications Commission, Gettysburg, Pa." DON'T detach the carbon paper from the copies of the form—the FCC still has a use for it in processing your application.

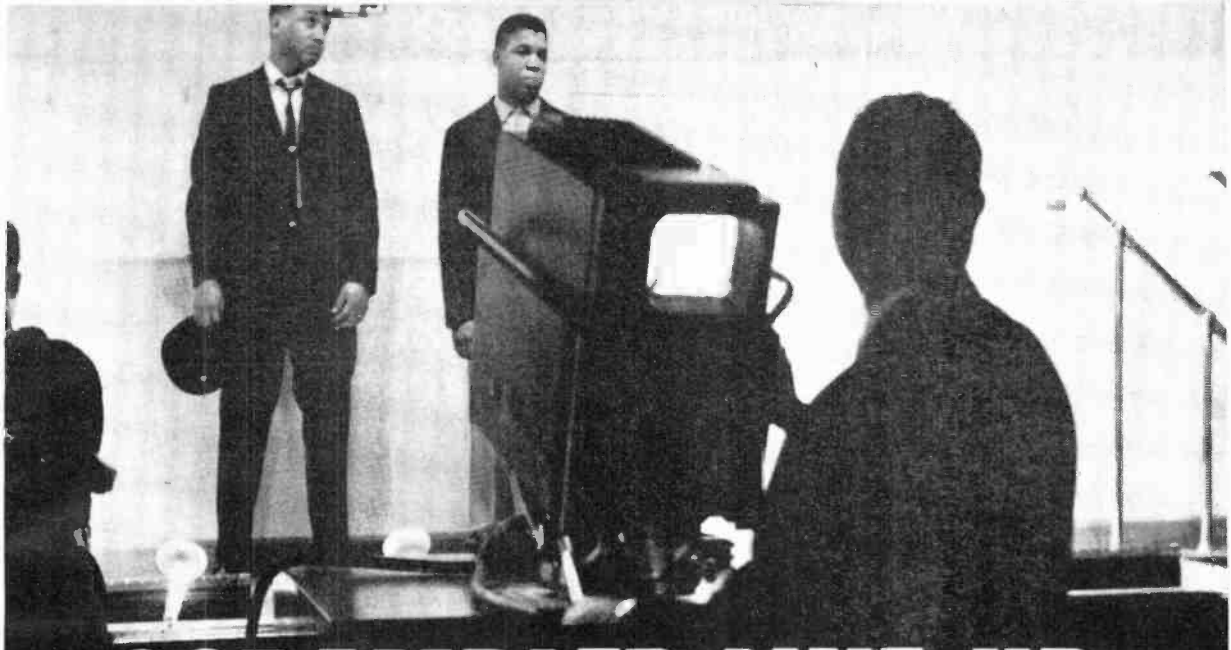
Some CB old-timers will say, "It's just too simple to be true," and "Don't you have to tell them *why* you want a CB license?" and "What about the notary seal on the license application?"

One of the reasons for creating the new Form 505, as we said before, was to reduce the complexity of the application. Also, if you use your license within the scope of the FCC Rules and Regulations, then the purpose must be okay; so, the FCC feels, why state it? And as for the notary seal, it is now no longer necessary either for the new form or for the old one.

Don't use the old form after December

(*Continued on page* 115)

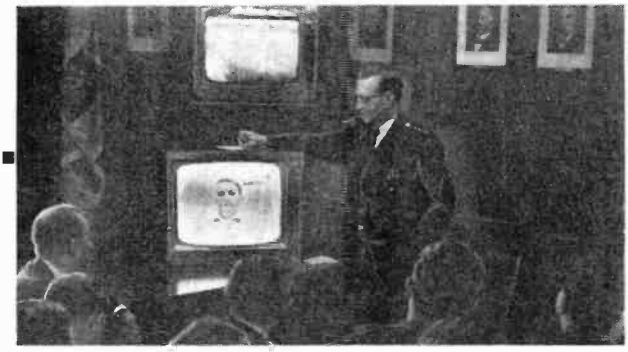
*You are required to read and understand the provisions of a current copy of Part 19, the Citizens Radio Service Rules. This is in Volume VI, FCC Rules and Regulations. To purchase Volume VI, send $1.25 to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.



SCRAMBLED LINE-UP

By IRA KAMEN

In the battle for TV ratings crime will be the loser when WUHF broadcasts the line-up



THE New York City police are using UHF-television as a weapon in their war against crime. Now, more than ten times the number of detectives can view and study the features and mannerisms of criminals at police line-ups than was previously possible—by watching a TV screen at their local precincts.

At police headquarters, suspected criminals are posed on the line-up stage ("suspects" shown in photo at top of page are actually detectives) and viewed by a television camera. The video signal is then "scrambled" by an encoder and sent to the top of the Empire State Building, where it is transmitted by New York City's UHF-TV station, WUHF, on Channel 31. Standard TV receivers equipped with out-boarded decoders permit selected police audiences to view the line-up. (Small photo at right shows both scrambled and decoded picture.)

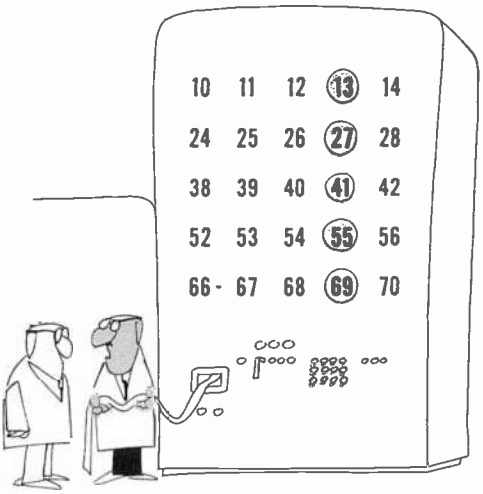
The Police Department believes that this application of UHF-TV will save them considerable man-power and man-hours. In addition, key witnesses will be able to view the line-up without traveling to Police Headquarters.

The designer of this "video security system," Teleglobe Cosmotronics Corporation of New York City, assures police that no unscrambling of the picture is possible on home receivers. Without the decoder, the scrambled picture suggests that the set's vertical and horizontal hold circuits have gone berserk. -30-

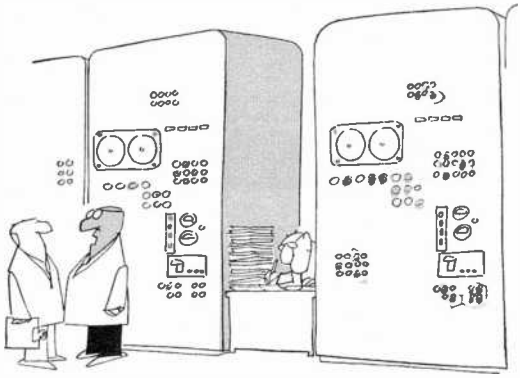
Hobnobbing with Harbaugh

The Office Monster

"I'll say you fixed it . . . every time I press a button, water comes out."



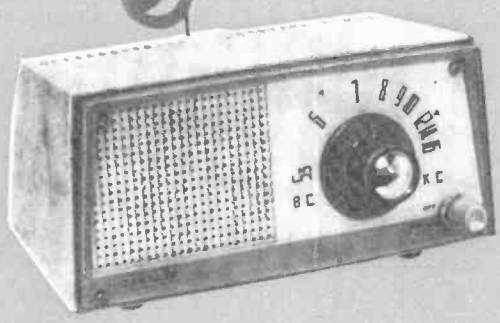
"It says 'Bingo.' "



"I'd certainly have to give Halworth an 'A' for effort."

"The following answers will be in living color!"

Take almost any a.c./d.c. receiver, or buy a receiver kit. Do a little rewiring, and presto! You have a . . .



By WILLIAM J. MILLARD

ONE-ARMED THEREMIN

EVER hear of a *theremin?* If you haven't, you've missed something—this fascinating device has been around since the days when electronics wore diapers, and it might aptly be called the "handyman's musical instrument."

Because you play it by varying the position of your hand near its antenna, you'll need little in the way of musical training to "master" the theremin. In fact, a good ear, a steady hand, and a little practice are about all it takes to develop sufficient proficiency to play a duet with your favorite record. In time, you may even want to show off your virtuosity with a solo performance!

Some of the more elaborate theremin circuits boast gimmicky volume controls, regulated power supplies, variable tone controls, and so on. Inevitably, though, these "refinements" increase the cost and complexity, and they also add to the difficulty of construction.

The circuit shown here, on the other hand, trades such embellishments for good old simplicity, stability, and economy. It can be built in a couple of evenings from a "retired" a.c./d.c. receiver of the "All-American 5" variety, a few odds and ends of hardware, and a couple of r.f. chokes. Or, if you prefer to duplicate the unit illustrated in the photographs, you can do

so for little more than the cost of the receiver—$9.95.

Original Experiments. The prototype of the unit pictured here was built in response to a request for "something that could be made from an old radio." The original circuit was assembled on a breadboard, using only those components that you might reasonably expect to find in a typical a.c./d.c. receiver (except for coils *L1* and *L2*).

The results were more than satisfactory, and the circuit worked well with a wide range of values for the resistors and capacitors. In fact, the only critical parts were the two r.f. coils (*L1* and *L2*) and capacitors *C3* and *C4*, all of which make up the variable oscillator's tank circuit.

Since the device was such a success on the breadboard, the decision naturally followed to "dress it up" a little. With no old receiver available for "cannibalization," a five-tube "semi-kit"† was purchased—it provides all of the major components you'll need, as well as a goodly share of the resistors and capacitors.

If you decide to use this kit, remove the loopstick, the oscillator coil (*L1* on the kit schematic), and the coil (*L2* on the kit schematic) and the 100-$\mu\mu$f. capacitor which is in parallel with it from the plate circuit of the i.f. amplifier tube. In addition, take out all of the wiring to the i.f. transformer (*T1* on the kit schematic) and to the 12BE6 and the 12BA6 tubes (with the exception of that going to the heaters).

This procedure holds true with any a.c./d.c. receiver. The audio and rectifier circuits remain intact, but everything in front of the second detector has to go. Only one i.f. transformer is required (either one will do), and the choice will depend on which is the more conveniently located.

Both the rectifier and audio stages are pretty much standard, the only addition being capacitor *C13* which bypasses the r.f. hash to ground. The front end of the circuit, however, departs drastically from normal circuitry. In fact, it uses conventional components in a rather unconventional manner, as we'll see in a moment.

About the Circuit. Basically, the theremin delivers an audible signal by beating two r.f. signals together. The r.f. voltages are produced by two oscillators—one generating a fixed-frequency signal, the other controlled by body capacity and producing a signal of varying frequency. We'll refer to them as the "fixed oscillator" and the "variable oscillator," respectively.

Tube *V2*, the 12BE6 pentagrid converter, is connected as an oscillator to generate the fixed-frequency signal. It operates in the vicinity of 80 to 100 kc., depending on the values of the components. An i.f. transformer, with its primary and secondary windings in series, is employed as a tapped inductance in a Hartley oscillator. The cathode of tube *V2* is connected to the jumper between the two coils, and both sections of the tuning capacitor (*C10*), as well as capacitor *C9*, are attached to the "grid" end of the i.f. transformer.

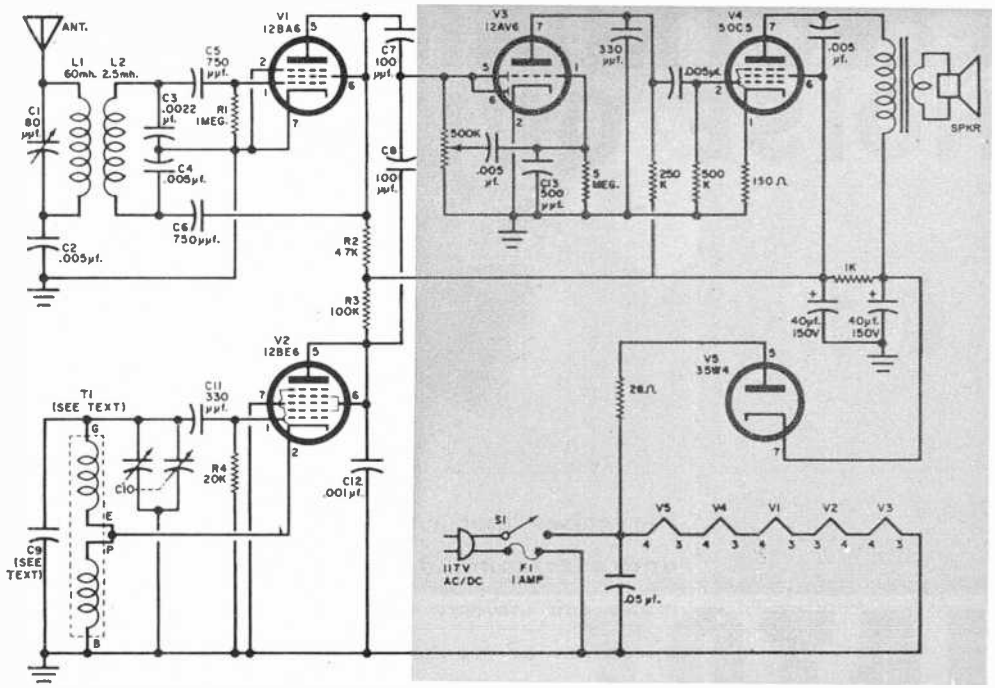
Tube *V1*, the variable oscillator, is connected in a Colpitts circuit, a configuration which is doubly attractive in this particular application. First, it allows the use of a high capacitance across the grid and plate circuits, thus minimizing the effects of interelectrode capacity variations on frequency stability. And second, it permits the use of a single, untapped inductance to complete the resonant tank circuit.

(*Continued on page* 112)

PARTS LIST

**C1—5-80$\mu\mu$f. trimmer capacitor*
**C2, C4—0.005 μf.* — *All capacitors*
**C3—0.0022 μf.* — *1000-volt ceramic*
**C5—750 $\mu\mu$f.* — *disc types, unless*
C7, C8—100 $\mu\mu$f. — *otherwise indicated*
**C9—Disc capacitor—see text*
C10—2-gang tuning capacitor, with both sections connected in parallel
C11—330 $\mu\mu$f.
**C12—0.001 μf.*
C13—500 $\mu\mu$f.
**L1—60-mh. r.f. choke (J. W. Miller 693 or equivalent)*
**L2—2.5-mh. r.f. choke (J. W. Miller 640 or equivalent)*
R1—1 megohm

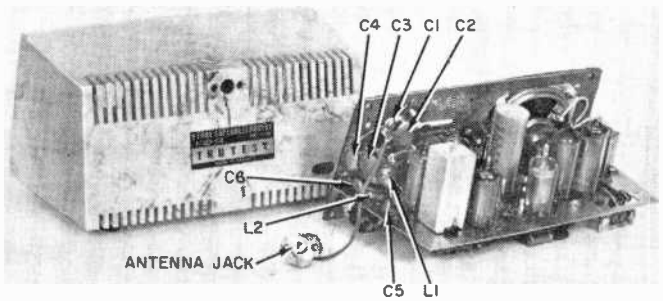
†The kit, catalog number KT-204, features a superheterodyne circuit with all major components already mounted on the chassis. It's available from Lafayette Radio Electronics Corp., 111 Jericho Turnpike, Syosset, L. I., N. Y., for $9.95 plus postage.

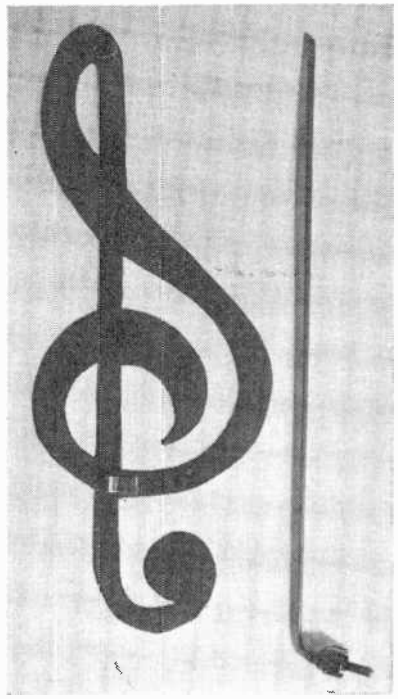


Schematic diagram is based on semi-kit used by author. Letters on transformer T1 correspond to those on unit in semi-kit; gray portion of schematic is essentially unaltered. Below: rear views of antenna assembly and of the theremin.

*R2—47,000 ohms — *All resistors*
*R3—100,000 ohms — *½-watt, 10%*
R4—20,000 ohms
T1—I.f. transformer—see text.
V1—12BA6 tube
V2—12BE6 tube
V3—12AV6 tube
V4—50C5 tube
V5—35W4 tube
1—A.c./d.c. receiver or "semi-kit"—see text
**1—"G-clef" antenna—see text*
**1—RCA phono plug and jack (for connecting antenna)*

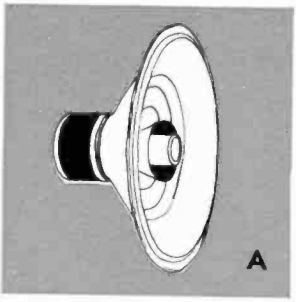
*Not supplied with "semi-kit" receiver used by the author

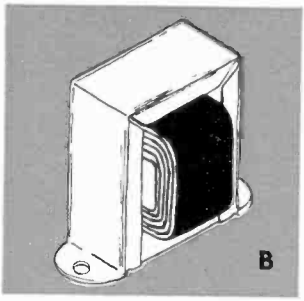


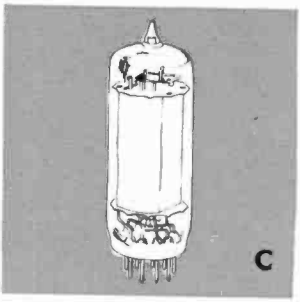


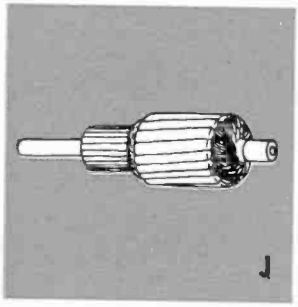
ELECTRONIC NOISE QUIZ

By ROBERT P. BALIN

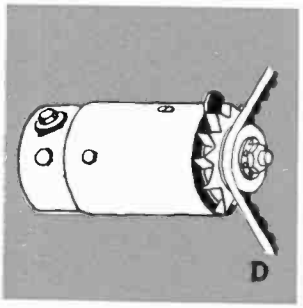




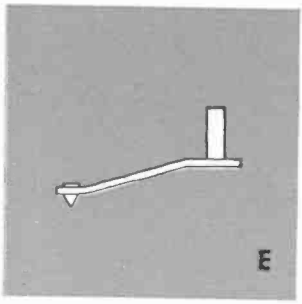


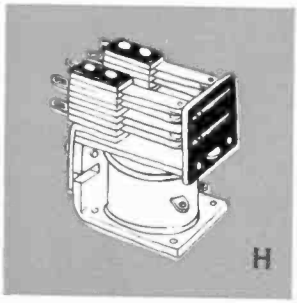


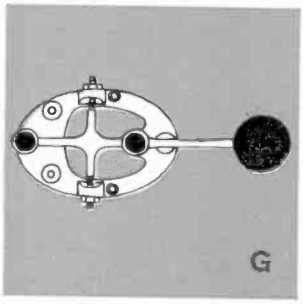
The noises that electrical and electronic devices make can indicate normal operation or trouble, and a clever technician trains his ear to distinguish one from the other. Test your noise knowledge by matching the 10 noises listed below with the drawings (A-J) of the devices that usually produce them.

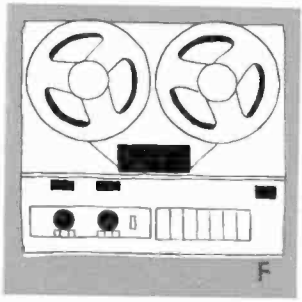


(*Answers on page 116*)



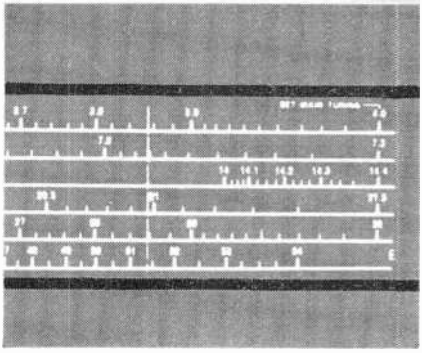






1 Buzz_____ 2 Chatter_____ 3 Rumble_____ 4 Chirp_____ 5 Growl_____

6 Boom_____ 7 Scratch_____ 8 Hiss_____ 9 Wow_____ 10 Whine_____



Across the Ham Bands

By **HERB S. BRIER,** W9EGQ
Amateur Radio Editor

HOW TO INCREASE YOUR DX SCORE

AS SOON AS most Novice operators discover that they can contact local hams without too much trouble, they begin asking: "Where's all that DX I read about in 'News and Views'? I make lots of contacts, but I never hear any DX. Why?"

The answer is that the difference between making routine contacts and working DX is comparable to that between fishing for pan fish and fishing for game fish. The latter requires more "know-how." Here are some of the things an eager newcomer must learn before he can be very successful at DX'ing.

DX in the Novice Bands. There is, of course, a greater variety of DX to be heard outside the Novice bands than within them. Nevertheless, there are Novices to be worked in Alaska (WL7's), Hawaii (WH6's), Puerto Rico (WP4's), and in the rarer states like Nevada, Wyoming, Delaware, and New Hampshire. In addition, some foreign stations move into, or near, the Novice bands especially to work Novices—you have to dig for those, though.

Remember, too, that the best frequencies for distant contacts depend on the time of day. Fifteen meters is the best Novice band for foreign DX'ing during daylight hours, 40 meters usually taking over at night. But don't overlook 80 meters—especially as a source of missing states for your WAS certificate.

A Lot of Listening. Getting down to fundamentals, the first rule for working a lot of DX is to listen, listen, and then listen some more. Pass over stations from states and countries already confirmed without a backward glance, only calling the new ones.

When you hear an interesting CQ, answer it, of course, but also keep your ears open for QSO's already in progress. Patiently waiting for a contact to end, then calling the station you want, is an effective way to pull a new state or coun-

Novice Station of the Month

This month's winning photo in the "Novice Station of the Month" contest shows Herb Galloway, KN1VMT, 46 Oak Hill Dr., Arlington 74, Mass., at the controls of his Heathkit DX-40 transmitter and National NC-270 receiver. Herb, who has made over 250 contacts in 40 states over a period of four months, feels that amateur radio is the ideal hobby for anyone under the age of 90. He works 80, 40 and 15 meters, using a vertical antenna on 80 and a 40-meter dipole on 40 and 15.

Herb will receive a one-year free subscription to P.E. for his photo. If you would like to try for a similar award, send us a picture of your station—preferably showing you at the controls, and include with your entry some information about yourself, your equipment and your activities. You may be one of the lucky winners. Non-prize-winning photos will also be published as space permits. All entries should be sent to Herb S. Brier, Amateur Radio Editor, POPULAR ELECTRONICS, P. O. Box 678, Gary, Indiana.

try out of the hat. Don't be surprised, however, if most of the other hams on the band seem to have the same idea. The size of the pile-up that develops around a rare DX station can often reach awesome proportions.

Pile-Up Tactics. Listening for the pile-ups is one easy way to locate DX in the ham bands, but the drawback is that you are guaranteed a maximum of interference with your calls. For this reason, most successful low-power DX chasers try to locate a station just coming on the air for an operating session—before the competition finds it.

But don't automatically give up on a DX station which is surrounded, like a queen bee, by a swarm. Carefully listening to the buzzing for a few minutes may pay dividends. While many operators listen for replies only on a single frequency (usually their own), some play "receiver roulette"—never answering two calls on the same frequency in a row.

The latter are the Novice's friends, because the high-power DX men can't "zero in" on them. A low-power operator then has a chance to slip his call letters through the barrage.

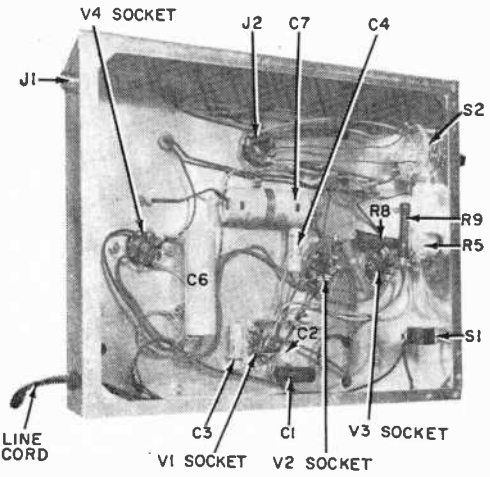
MODULATOR FOR THE EX-NOVICE

If you are an ex-Novice with a brand-new General or Conditional Class license, you're probably anxious to convert your CW transmitter to phone operation. These days, though, you face a rather bewildering choice as to what type of modulator to use. Should it be AM, narrow-band FM, SSB, or what?

Well, the time-honored and efficient plate-modulation system of AM still has a lot to offer. The equipment is easy to construct, not too expensive, and requires no complicated adjustments.

You can add the simple 25-watt plate modulator (Class AB_1) described here to any CW transmitter rated at up to 50 watts input. And the result will be an AM phone rig delivering about 35 watts of r.f. to your antenna. Not an overpowering signal, to be sure, but one that (properly used) will net you plenty of DX.

Construction. The modulator is built on a 10" x 12" x 3" aluminum chassis. Although the parts layout is not particularly critical, we suggest following the photographs fairly closely.

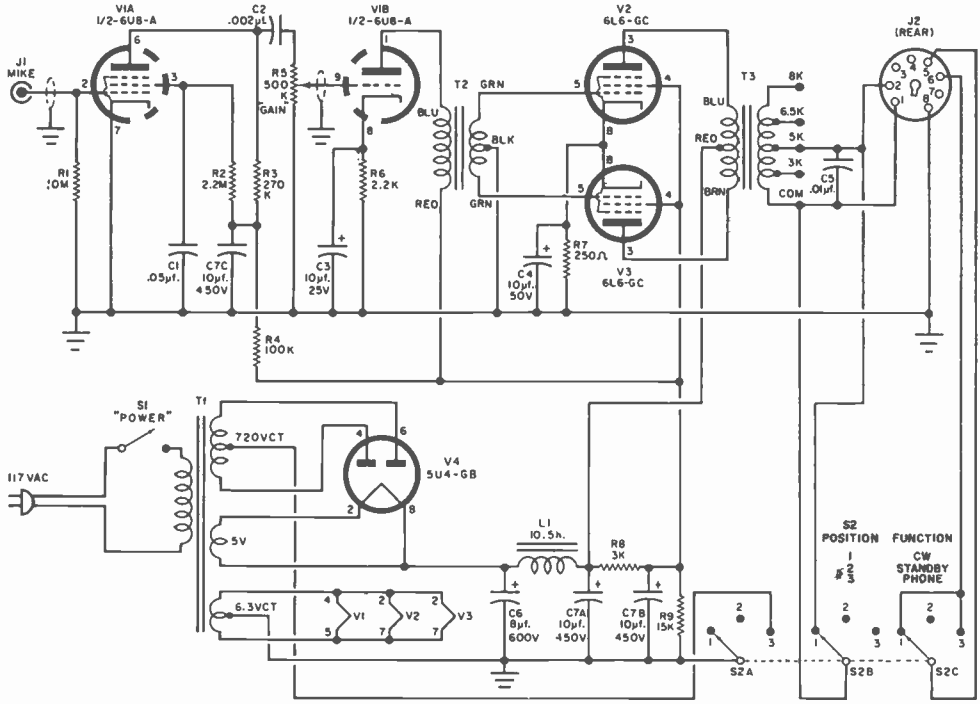


Modulator components fit on the 10" x 12" x 3" aluminum chassis with plenty of room to spare, as can be seen in photos above and at far right. The push-pull 6L6-GC's put out 25 watts of audio, will drive transmitters running up to 50 watts input. Transformer T3 (see schematic at right) has taps to match impedance of most r.f. amplifiers.

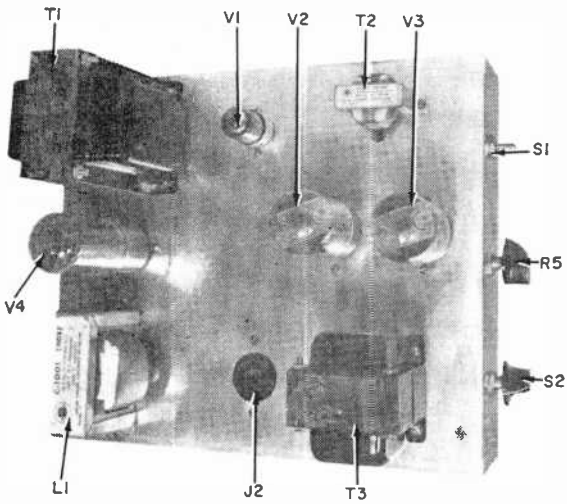
PARTS LIST

C1—0.05-μf., 400-volt paper capacitor
C2—0.002-μf., 400-volt ceramic capacitor
C3—10-μf., 25-volt electrolytic capacitor
C4—10-μf., 50-volt electrolytic capacitor
C5—0.01-μf., 1600-volt ceramic capacitor
C6—8-μf., 600-volt electrolytic capacitor
C7—Triple 10-μf., 450-volt electrolytic capacitor
J1—Single-button-contact microphone receptacle, chassis-type (Amphenol 75 PC1M or equiv.)
J2—Octal socket
L1—10.5-henry, 110-ma. filter choke (Stancor C1001 or equivalent)
R1—10 megohms
R2—2.2 megohms
R3—270,000 ohms
R4—100,000 ohms
R5—500,000-ohm potentiometer, audio taper
R6—2200 ohms
R7—250 ohms, 5 watts
R8—3000 ohms, 10 watts
R9—15,000 ohms, 10 watts
S1—S.p.s.t. toggle switch
all ½-watt, 10% resistors unless otherwise specified

While mounting the components, position a 3-lug terminal strip adjacent to the 6U8-A tube socket and install a 1-lug strip under one of modulation transformer *T3*'s mounting screws. The triple-section capacitor (*C7*) should be anchored under one of jack *J2*'s mounting screws; all other fixed capacitors and resistors are supported by their leads.



S2—3-pole, 3-position rotary switch
T1—Power transformer; primary, 117 volts; secondaries, 720 volts CT @ 120 ma., 5 volts @ 3 amp., 6.3 volts @ 3.5 amp. (Stancor PC-8410 or equivalent)
T2—Audio transformer; single plate to push-pull grids; for 7000- to 15,000-ohm plate impedance; 1:3 turns ratio; 10-ma. primary (Stancor A-53-C or equivalent)
T3—25-watt modulation transformer; primary, 10,000 ohms CT; secondary tapped at 8000, 6500, 5000, and 3000 ohms (Stancor A-3845 or equivalent)
V1—6U8-A tube
V2, V3—6L6-GC tube
V4—5U4-GB tube
1—3" x 12" x 10" aluminum chassis (Bud AC-413 or equivalent)
Misc.—Tube sockets, hookup wire (including shielded cable), 5-conductor cable for interconnection to transmitter, terminal strips, hardware, line cord and plug, crystal mike, etc.



Wiring is point-to-point and needs little comment. But be sure to use shielded wire (with the shield grounded to the chassis) for the connections from tube *V1a* to jack *J1* and to gain control *R5*. Solder lugs for ground connections can be installed, under existing screws, as needed.

Transmitter Connections. For details on how to connect the output of the modulator (pins 1 and 2 of jack *J2*) to your transmitter, refer to the transmitter's instruction book. In general, pins 1 and 2 are connected in series with the B+ supply to the final r.f. amplifier tube's plate circuit—with pin 1 going to the B+, pin 2 going to the plate circuit.

Pins 5 and 6 of *J2* are connected across the transmitter standby switch, and pin 8 is grounded to the transmitter chassis. All of the above connections between

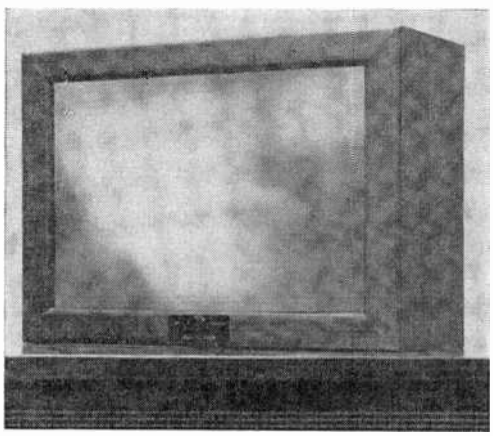
(*Continued on page* 120)

Transistor Topics

By **LOU GARNER,** Semiconductor Editor

A "live" performance by an orchestra can be much more interesting than the best reproduction through electronic/mechanical means. In fact, some people prefer to watch a performance on TV, even with the limitations of most television sound systems, rather than hear the same orchestra on records through a high-quality stereo system.

The difference, of course, lies in the simultaneous visual stimulation. A live or TV performance gives you something to watch—the movements of the conductor, the changing overall pattern as different instrments are used, and, often, the techniques of individual musicians.



The "Audiocolor," developed by Scope, Inc., is a unique transistorized device which converts audio signals into attractive color patterns.

Recognizing the importance of visual stimulation to the full enjoyment of good music, Scope, Inc. (121 Fallfax Dr., Falls Church, Va.) has developed a unique transistorized device that displays musical signals as constantly changing, vivid color patterns synchronized with the music's rhythm. Dubbed the "Audiocolor," the instrument displays its colored light patterns on a 9" x 13" frosted plastic screen mounted in a wooden cabinet measuring approximately 11½" x 15¼" x 6¼" overall. It is powered from a standard a.c. line and derives its control signal from the speaker terminals of the audio system with which it is used.

A block diagram of the "Audiocolor" appears in Fig. 1. The "heart" of the unit is a transparent, multi-colored wheel or disc mounted behind the frosted plastic screen and rotated slowly by a small electric motor. Two lamps illuminate the screen through the disc, one responding to low-frequency audio signals, the other to high-frequency notes. The crossover point is approximately 500 cycles.

Circuitwise, the instrument is essen-

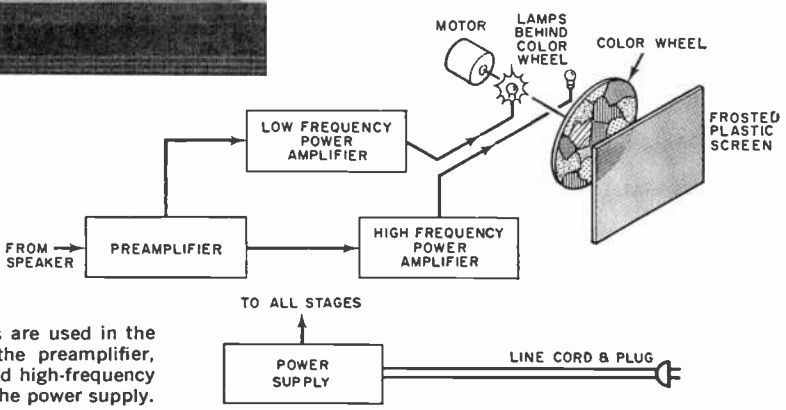


Fig. 1. Four transistors are used in the "Audiocolor"—one in the preamplifier, one each in the low- and high-frequency amplifiers, and one in the power supply.

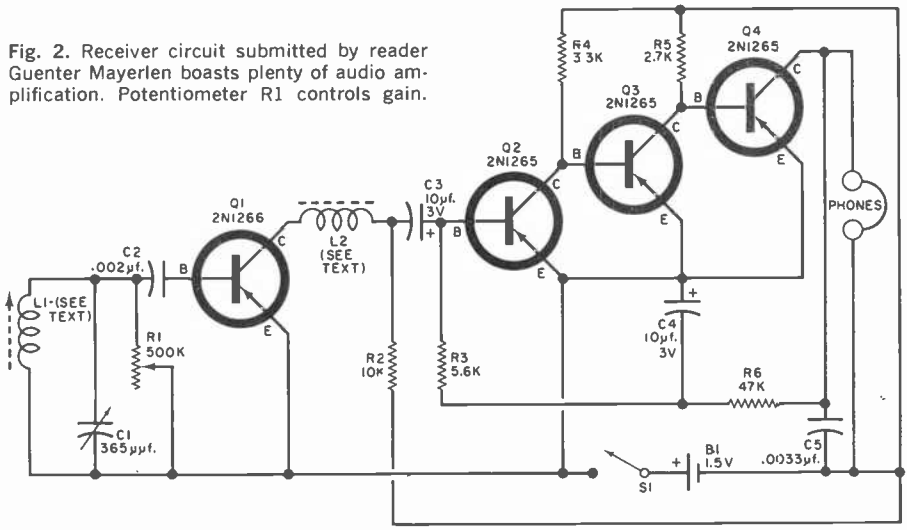


Fig. 2. Receiver circuit submitted by reader Guenter Mayerlen boasts plenty of audio amplification. Potentiometer R1 controls gain.

tially a resistance/capacitance-coupled audio amplifier with four 2N176 *pnp* power transistors, one being used as a preamplifier, and two serving as power amplifiers direct-coupled to #89 pilot lamps; R/C filters limit the response of one power amplifier to low-frequency signals, the other to high-frequency notes. The remaining transistor is used as a half-wave rectifier in the power supply circuit.

Either or both of the lamps may light, with their instantaneous brightness depending on the relative amplitude of the audio signals. The lamps, in turn, project the slowly rotating color pattern on the frosted screen. Final result: a constantly shifting configuration of colored light, which varies with the tonal content and volume of the music.

Scope, Inc. manufactures the "Audiocolor" both as a kit and in factory-assembled form. The completed unit, ready to use, sells for $39.95. Kits are available with a finished walnut cabinet at $32.95, or with an unfinished and unassembled cabinet at $29.95. All prices, incidentally, are f.o.b. Falls Church, Va.

Reader's Circuit. While acknowledging that one- and two-transistor receiver circuits are the most popular with the majority of experimenters, reader Guenter Mayerlen (162 De Graff Bay, Winnipeg 16, Man., Canada) points out that a three- or even four-transistor receiver needn't be unduly complicated. It isn't necessary to go to the complexity of a superheterodyne design to achieve such a circuit, for quite satisfactory results can be obtained by combining a detector with a high-gain, multi-stage audio amplifier. As a typical example, he has submitted the circuit in Fig. 2.

You'll note that Guenter's design consists of a detector (*Q1*), driving a three-stage, direct-coupled audio amplifier (*Q2*, *Q3*, and *Q4*). He has used *pnp* transistors in the common-emitter configuration throughout and has powered his receiver with a single 1.5-volt cell, *B1*. If the audio amplifier section has a familiar look, don't be surprised—Guenter has simply adapted the "Tiny Mite" amplifier described by author Forrest H. Frantz, Sr. in an earlier issue of POP'-tronics (June, 1960, p. 73). Guenter's chief modification of the original "Tiny Mite" circuit is the addition of a small r.f. bypass capacitor, *C5*.

In operation, r.f. signals picked up by the loopstick antenna coil, *L1*, are selected by tuned circuit *L1/C1* and coupled through *C2* to the detector stage (*Q1*). A standard potentiometer, *R1*, is shunted across the tuned circuit to serve as a gain control. Transistor *Q1*'s collector load is made up of two components —an r.f. choke, *L2*, and a resistor, *R2*. The detected audio signal appearing across *R2* is coupled through d.c. blocking capacitor *C3* to the input of the three-stage, direct-coupled amplifier.

Several base-biasing techniques are used—*Q1* is operated without external

Two d.c. power supplies made by Electro Products Laboratories operate from any standard 117-volt line. One delivers a fixed 12-volt output, while the other can furnish any voltage between zero and 16 volts.

base bias to improve its action as a detector; *Q2*'s base bias is obtained from *Q4*'s collector through *R6* (bypassed by *C4*) and through *R3*. Transistor *Q3*'s base bias is derived from *Q2*'s collector current, while, in a similar fashion, *Q4*'s base bias is obtained from *Q3*. Resistors *R4* and *R5* serve as collector loads for *Q2* and *Q3*, respectively.

The amplified audio signal delivered by the three-stage circuit is applied directly to the magnetic earphones serving as *Q4*'s collector load, with *C5*, as mentioned earlier, bypassing r.f. components and thus insuring stable operation.

Reader Mayerlen's circuit can be duplicated quite easily using standard, readily available components. With the exception of *R1* (a standard 500,000-ohm potentiometer), the resistors are all ½-watt units. Capacitors *C2* and *C5* are small paper, ceramic, or mica units, while *C3* and *C4* are 3-volt electrolytics; *C1*, of course, is a conventional 365-$\mu\mu$f. tuning capacitor. Coil *L1* can be any ferrite core loopstick antenna coil (such as the Lafayette MS-11), while *L2* consists of 75 turns of enameled wire close-wound on a ferrite rod 1¼" long and ¼" in diameter. Switch *S1* is a s.p.s.t. toggle, slide, or rotary switch and, if desired, can be ganged to gain control *R1*. Battery *B1* is a standard penlight or flashlight cell, although a mercury battery can be used if preferred.

Neither layout nor lead dress should be especially critical. As a result, you can follow your own preferences as far as construction is concerned, using a perforated Bakelite base, etched circuit board, or even a conventional metal chassis. Many builders will prefer to assemble the receiver in a small plastic box as a pocket-sized set. Battery and electrolytic capacitor polarities must be observed, of course, and care must be taken not to overheat the transistor leads if these components are soldered in place.

Once the wiring is completed, all connections should be double-checked for possible errors *before* the battery is installed. The receiver tunes the standard AM broadcast band (550-1600 kc.), with best results being obtained when it is used with moderate-impedance (1000- to 3000-ohm) earphones. An external antenna probably won't be required for reception of strong local stations.

Low-Cost Power Supplies. An adequate source of d.c. power is just as essential when you're servicing transistorized radio receivers and amplifiers as it is in developing and testing new circuits. For this reason, service technicians and experimenters alike will welcome the introduction of two low-cost d.c. power supplies by Electro Products Laboratories, Inc. (4501 N. Ravenswood Ave., Chicago 40, Ill.).

The two new supplies were designed to fill the need for low-cost, factory-built units requiring a minimum of bench space and yet capable of delivering sufficient low-ripple d.c. to power both auto and portable receivers as well as p.a. amplifiers and similar equipment. Each one measures only 10¾" high by a little over 4" wide and only 6½" deep, and is designed for operation on a standard 117-volt, 60-cycle line.

Model EC-1 is a fixed output unit delivering 12 volts at up to 5 amperes. Selling for $29.95, it is intended primarily for use in the service shop, or in applications requiring a 12-volt d.c. source.

Model EC-2, on the other hand, sup-

(*Continued on page 118*)

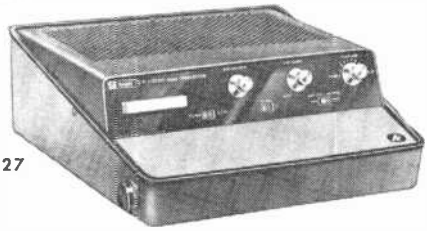
CB POPULAR ELECTRONICS DIRECTORY

The following 23 pages comprise the 2nd Annual Catalog and Directory of Citizens Band Equipment. The listings are divided into five sections: Part 19 Transmitters and Transceivers (150 milliwatts to 5 watts input); Microphones (p. 81); CB Station Accessories (p. 83); Antenna Check List (p. 88-89); and Hand-Held Transceivers (p. 90-91). The Directory closes on page 91 with a few words about crystal manufacturers and book publishers.

Part 19 Transmitters and Transceivers

Knight-Kit C-11

Knight-Kit C-22



Knight-Kit C-27

Knight-Kit C-4000

ALLIED RADIO CORP.

100 N. Western Ave., Chicago 80, Ill.

Knight-Kit C-11

1-channel transmit; tunable superregenerative receiver; 5 tubes (including rectifier); TVI trap; link-coupled output; ceramic mike; 6⅛ x 11⅜ x 7¼; 9¾ lb. Accessories: 6-12 volt mobile supply ($9.95); mobile mounting bracket ($4.95) and various antennas.

$39.95 (kit only)

Knight-Kit C-22

5-channel, crystal-controlled transmit and receive plus tunable receiver; universal (117- and 12-volt) power supply; 9-tube performance superhet (1 r.f. and 2 1650-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; electroluminescent front panel; 12 lb. Accessories: various antennas and mobile mounting bracket.

$59.95 (kit only, less crystals)
$54.95 (kit only, less crystals, 117-volt power supply only)

Knight-Kit C-27

2-channel transmit and 2-channel crystal-controlled receive plus tunable receiver; 117-volt supply; 14-tube performance double-conversion superhet receiver; series noise limiter; adjustable squelch; TVI trap; link-coupled output, no mike supplied—specker doubles as mike; 5½ x 12⅞ x 15⅛; 16 lb. Accessories: ceramic mike ($9.95); handset ($19.95); 6-12 volt mobile supply ($12.95); mobile mounting bracket ($5.95) and various antennas.

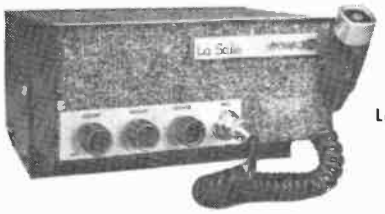
$79.95 (kit only)

Knight-Kit C-4000

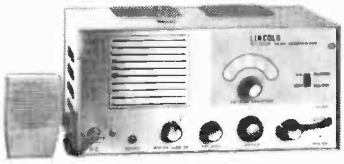
1-channel, crystal-controlled transmit and receive; 1-watt input; transistorized (9 transistors and 3 diodes); battery operated with 8 easily obtainable "C" cells (or rechargeable substitutions); superhet receiver (1 r.f. and 2 455-kc. i.f. stages); noise limiter; adjustable squelch; receiver has 'Local-Distance' switching to adjust sensitivity; 10⅜ x 3⅝ x 4½; about 1¾ lb. Accessories: additional plug-in crystals and rechargeable batteries.

$59.95 (kit only)

CB DIRECTORY

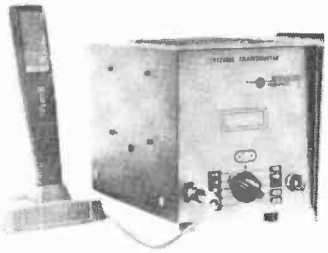


La Salle Model LA-101

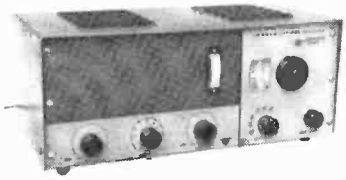


Lincoln L-2000A

Mobilaire



Compact

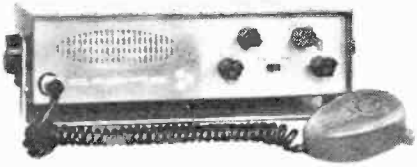


Model R-2700

Model S-9

Model 23 Over S9

Model 500

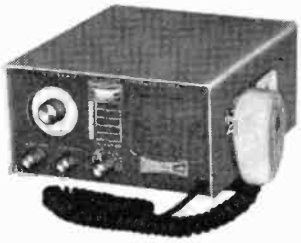


Model 500-1

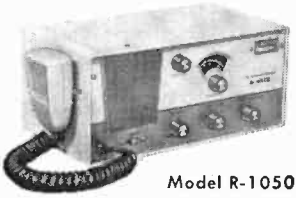
Model C-75

Model TR-910B

Model 761A/762A



Model DM-348



Model R-1050

Lincoln L-2000A

5-channel transmit; tunable receiver; 117-volt power supply; 9-tube performance superhet (1 r.f. and 1 1750-kc. i.f. stage); adjustable series noise limiter; no squelch; ceramic mike; link-coupled output; neon-bulb output indicator; can be made to double as "paging system" using extension speaker. 5½ x 10¼ x 6⅜; 9 lb. Accessories 6- or 12-volt mobile power supplies ($11.95 each).

$57.50

Lincoln L-2500 (not illustrated)

6-channel, crystal-controlled transmit and receive plus tunable receiver; 3 i.f. stages; "spotting" switch on front panel; ceramic mike; S-meter and output indicator; adjustable squelch; series noise limiter; headphone jack; electronic switching (no relays).

$99.50 (approximate price—see Allied Radio 1963 Catalog for firm details not available at this writing).

BIGGS ELECTRONICS, INC.

1328 Pulaski St., Peru, Ill.

La Salle Model LA-101

5-channel, crystal-controlled transmit and receive; universal (117-, 12-, or 6-volt) power supply; 10-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch, ceramic mike; link-coupled output; 6 x 13 x 6.

$164.95 (net)

BROWNING LABORATORIES, INC.

100 Union Ave., Laconia, N. H.

Compact *(transmitter only)*

11 crystal-controlled channels including special crystal socket on front panel permitting easy crystal change; 4 tubes; pi-network output; neon output indicator; ceramic mike; may only be used with units having "transmit" switching facilities; 7 x 5½ x 9½; 15 lb.

$84.50 (mail order only)

Mobilaire

4-channel, crystal-controlled transmit and receive; universal transistorized (117-, 12-, and 6-volt) power supply; 12-tube performance double-conversion superhet (1 r.f. stage, 4.0-mc. conversion, 1 455-kc. i.f. stage); special noise limiter and "noise immune" adjustable squelch; pi-network output; ceramic mike; output indicator; 5¼ x 9¼ x 8¼; 11 lb. Accessories: various types of mobile antennas.

$159.50 (mail order only)

Model R-2700 *(receiver only)*

All-channel bandspread receiver calibrated in frequencies and channel numbers plus 5 crystal-controlled channels; 117 volts only; 15-tube performance double-conversion superhet; adjustable series noise limiter; adjustable squelch; S-meter; delayed a.v.c.; antenna tuning adjustment on front panel; 7 x 15½ x 9½; 25 lb.

$149.00 (mail order only)

Model S-9 *(transmitter only)*

6 channels; 7 tubes; ceramic mike; pi-network output; TVI trap; metered for modulation percentage, plate current and plate voltage of final amplifier tube; "spatting" switch; speech filter and clipper built in; VOX (voice to transmit) operation is optional; may be used with any communications receiver having "transmit" switching facilities; 7 x 9¾ x 9½; 23 lb.

$119.50 (mail order only)

Model 23 Over 59 *(transmitter only)*

Provisions for 23-channel operation; 5 tubes, plus silicon rectifiers; metered for modulation percentage and SWR; "spotting" switch; speech clipper and splatter filter; ceramic mike; "on-the-air" indicator; 7 x 9¾ x 9½; 20 lb.

$144.00 with 1 crystal to $189.00 with all 23 crystals (mail order only)

CADRE INDUSTRIES CORP.

Endicott, N. Y.

Model 500 *(Model 500-C in Canada)*

5-channel, crystal-controlled transmit and receive plus tunable receiver; transistorized 117-and 12-volt power supply (2 watts drain on receive and 8 watts drain on transmit); NO tubes; 18 transistors and 8 diodes; double-conversion superhet; series noise limiter; adjustable squelch; pi-network output; TVI trap; ceramic mike; 4 x 12 x 6; 6 lb.

$199.95 (suggested retail)

Model 500-1

Same as Model 500 but with lightweight rechargeable battery pack and protective housing; carrying handle; extensible antenna; 11½ x 7½ x 3½; 10 lb.

$199.95 (suggested retail, plus $29.95 for portable pack and $21.90 for 2 rechargeable batteries)

Model C-75

2-channel, crystal-controlled transmit and receive; rechargeable battery power supply; 1.2-watt transmitter output; 10 transistors and 3 diodes; noise limiter; adjustable squelch; sold with belt or shoulder carrying case; 2¾ lb. Accessories: rechargeable unit ($3.50).

$109.95 (available Sept. 1)

DAYSTROM PRODUCTS CORP.

St. Joseph, Mich.

Model DM-348

5-channel transmit and receive plus tunable receiver; universal power supply (117-, 12-, or 6-volt); 9-tube performance superhet (1 r.f. and 1 455-kc. i.f. stage); series noise limiter; adjustable squelch; S-meter or modulation indicator; link-coupled output; 4⅝ x 11⅜ x 11; 14½ lb.

$119.95 (kit only)

DeWALD *(United Scientific Labs., Inc.)*

35-09 37th Ave., Long Island City 1, N. Y.

Model R-1050

6-channel, crystal-controlled transmit and receive, plus tunable receiver; 117-volt power supply; 10-tube performance superhet with 3 i.f. stages and Nuvistor r.f. stage; series noise limiter; adjustable squelch; ceramic mike; S-meter and transmit plate current indicator.

$119.95 (list)

Model TR-910B *("Radio-Phone")*

5-channel transmit; 117-volt supply; 10-tube performance, tunable superhet receiver (1 r.f. stage and 1 1750-kc. i.f. stage); series noise limiter; S-meter; adjustable squelch; ceramic mike; link-coupled output; plate current meter; TVI trap; 4¾ x 10¼ x 6⅜; 9 lb. Accessories: 6- or 12-volt mobile power supply ($19.95 list).

$99.95 (list)

EICO ELECTRONIC INSTRUMENT CO., INC.

33-00 Northern Blvd., Long Island City 1, N. Y.

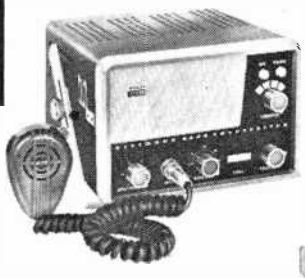
Model 760A/761A/762A

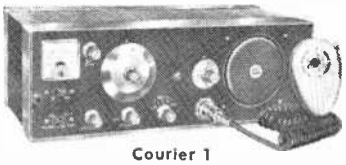
3-channel, crystal-controlled transmit and 3-channel preset receiver; 117-volt power supply; 9-tube performance superhet (1 r.f. stage and 2 1750-kc. i.f. stages), series noise limiter; no squelch; ceramic mike; pi-network output; neon output indicator; 6 x 8½ x 9; 10 lb. Model 761A has 117- and 6-volt power supply. Model 762A has 117- and 12 volt power supply.

Model 760A: *$59.95* (kit) and *$89.95* (wired). Others: *$69.95* (kit) and *$99.95* (wired).

CB DIRECTORY

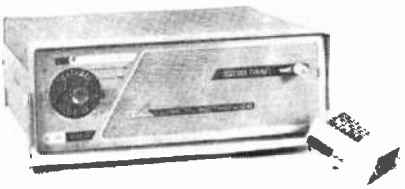
Model 770/771/772



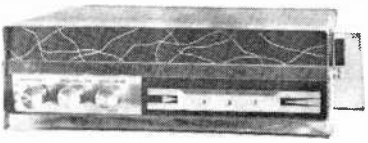


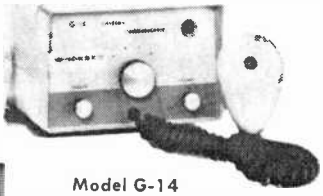
Courier 1

Model CB-200



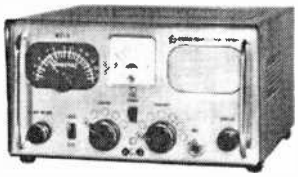
Model CB-100A





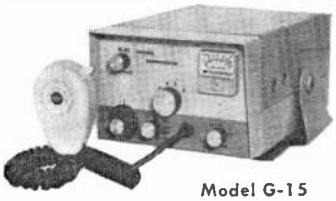
Model "Star"

Model MC-5



Model G-14

Model CB-23



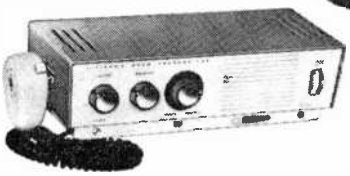
Model G-15

Model CB-3A

Model GW-12

Model HQ-105 TRS

Model GW-11



Model 770/771/772

4-channel, crystal-controlled transmit; 1-channel crystal-controlled receive, plus tunable receiver; 117-volt power supply; 10-tube performance superhet (1 r.f. and 2 1750-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; neon output indicator; pi-network output; 6 x 8½ x 9; 10 lb. Model 771 has 117- and 6-volt power supply. Model 772 has 117- and 12-volt power supply.

Model 770: *$79.95* (kit) and *$109.95* (wired). Others: *$89.95* (kit) and *$119.95* (wired)

ELECTRONICS COMMUNICATIONS, INC. (E.C.I.)

325 No. Macquesten Pkwy., Mt. Vernon, N. Y.

Courier 1

12-channel, crystal-controlled transmit; 3-channel, crystal-controlled receive plus tunable receiver; 117- and 12-volt power supply; 15-tube performance triple-conversion superhet (1 r.f. stage, 10.4-mc. conversion, 1505-kc. conversion, 2 262-kc. i.f. stages); r.f. gain control; series noise limiter; adjustable squelch; S-meter and output indicator; ceramic mike; 4¾ x 14¼ x 7¼; 14 lb. Accessories: AM radio (optional extra).

$189.50 (net)

GC ELECTRONICS CO.

400 S. Wyman St., Rockford, Ill.

Model CB-100A (*"Citizens Broadcaster"*)

3-channel, crystal-controlled transmit and receive; universal (117-, 12- and 6-volt) power supply; 11-tube performance superhet (1 r.f. stage and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; output jack for remote speaker; 3 x 13 x 10½; 13 lb. Accessories: 12-volt power cable ($3.49); 6-volt power cable ($2.95).

$139.95 (net)

Model CB-200 (*"Broadcaster Deluxe"*)

5-channel transmit with 4-channel crystal-controlled receive plus tunable receiver; universal (117-, 12- and 6-volt) power supply; 14-tube performance double-conversion superhet; series noise limiter; adjustable squelch; ceramic mike; pi-network output; output jack for remote speaker; 4 x 12 x 10; 14 lb. Accessories: 12-volt power cable ($3.49); 6-volt power cable ($2.95).

$189.95 (net)

Model "Star"

5-channel, crystal-controlled transmit and receive; universal power supply (117-, 12- and 6-volt); 11-tube performance double-conversion superhet (1 r.f. stage, 1680-kc. conversion, and 1 262-kc. i.f. stage); series gate noise limiter; adjustable squelch; ceramic mike; pi-network output; 4½ x 9 x 9½; 13¼ lb.

$159.95 (either 117- and 12-volt or 117- and 6-volt supply)

GENERAL RADIOTELEPHONE CO.

3501 Burbank Blvd., Burbank, Calif.

Model MC-5

6-channel transmit plus front panel connection for 7th crystal; 4 crystal-controlled receive channels plus tunable receiver; universal (117-, 12- and 6-volt) semiconductor power supply; 10-tube performance superhet (2 r.f. and 2 452-kc. i.f. stages) including special crystal mixer; series noise limiter; adjustable squelch; ceramic mike; pi-network output, metered output indicator; output jack to remote speaker; sliding variable tone generator for "calling"; "Local-Dist" switch reduces receiver sensitivity; 4¼ x 8¼ x 10½; 15 lb. Accessories: 12- or 6-volt power cables ($4.95); mounting rails ($1.95).

$199.95 (net)

GONSET

801 South Main St., Burbank, Calif.

Model G-14

4-channel, crystal-controlled transmit and receive; universal power supply (117 and 12 volts, but may be internally modified for 6-volt operation); 11-tube performance double-conversion superhet (1 r.f. stage, 1650-kc. conversion, and 2 455-kc. i.f. stages); series gate noise limiter; adjustable squelch; ceramic mike; pi-network output; TVI filter; output indicator; 4 x 7 x 11¼; 11 lb.

$149.50 (net)

Model G-15

4-channel, crystal-controlled transmit and receive, plus tunable receiver; built-in "spotting" switch; universal power supply (117 and 12 volts, but may be internally modified for 6-volt operation); 12-tube performance double-conversion superhet (1 r.f. stage, 1650-kc. conversion, and 2 455-kc. i.f. stages); series gate noise limiter; adjustable squelch; voltage regulator tube; ceramic mike; pi-network output; TVI filter; S-meter and output indicator; 4 x 7 x 11¼; 11 lb.

$199.50 (net)

HALLICRAFTERS CO

5th and Kostner Avenues, Chicago 24, Ill.

Model CB-3A

8-channel, crystal-controlled transmit and receive; universal power supply (117 and 12 volts); 10-tube performance double-conversion superhet (1 r.f. stage, 1650-kc. conversion, 1 262-kc. i.f. stage); series noise limiter; adjustable squelch; ceramic mike; pi-network output, TVI filter; neon output indicator; S-meter kit available; 5 x 12 x 8; 12¾ lb.

$159.50 (without S-meter which is $8.95 optional extra)

HAMMARLUND MFG. CO., INC.

53 West 23rd St., New York 10, N. Y.

Model CB-23

23-channel, crystal-controlled transmit and receive using special crystal-fixed circuitry; universal power supply (117 and 12 volts); 11-tube performance double-conversion superhet (1 r.f. stage; 1650-kc. conversion, 1 262-kc. i.f. stage); series noise limiter; adjustable squelch; ceramic mike; S-meter and output indicator; headphone jack on front panel; vernier tuning control on receive.

$229.50 (net)

Model HQ-105 TRS

1-channel transmit (see below); tunable communications-style receiver covering 540 kc. to 30.0 mc. (identical to standard receivers in the Hammarlund line), including bandspread, Q-multiplier, S-meter, noise limiter, etc.; This model has built-in speaker (also available without); 9 7/16 x 16¼ x 9⅛; 30 lb. Accessories: see separate listing for OCT-X 8-channel crystal selector ($15.95), external speaker ($14.95), clock timer ($9.95).

$224.50 (net with built-in speaker)

HEATH CO.

Benton Harbor, Mich.

Model GW-11

3-channel transmit and 1-channel crystal-controlled receive plus tunable receiver; 117-volt power supply (others available); 9-tube performance superhet (no r.f. stage, 1 455-kc. i.f. stage); series noise limiter; adjustable squelch; ceramic mike; link-coupled output; transmit indicator; S-meter; 4½ x 13½ x 5¾; 7¾ lb. (This unit replaces the GW-10 through addition of extra stage in transmitter and S-meter.)

$69.95 (kit for 117, 12, or 6 volts); *$99.95* (wired 117-volt model); *$104.95* (wired 12- or 6-volt model)

Model GW-12

1-channel, crystal-controlled transmit and receive; 117-volt power supply; superhet receiver; series gate noise limiter; adjustable squelch; ceramic mike; 7¼ lb. Accessory: 12- or 6-volt power supply—$7.95 (kit only).

$39.95 (kit only); *$44.95* (kit only, 117- and 12-volt power supply)

CB DIRECTORY

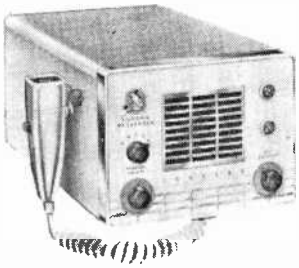
Model 100

Model 50

Model 10

Model TR-327

Personal Messenger



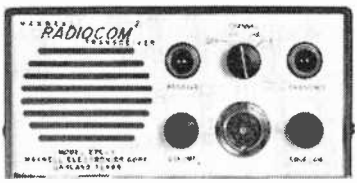
Messenger

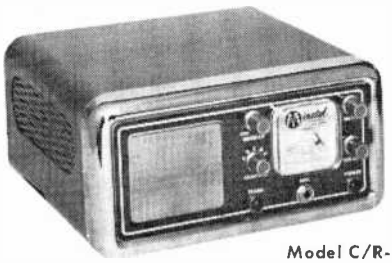
Model TR-327B

Model HE-20C

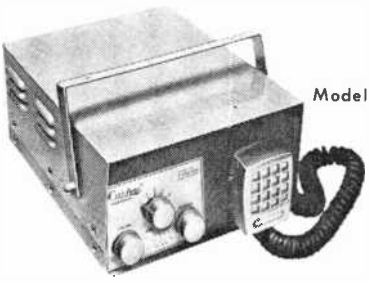
Model HE-15B

Model 27C-3





Model C/R-117



Model CD-5

INTERNATIONAL COMMUNICATIONS CORP.

1929 Wilshire Blvd., Santa Monica, Calif.

Detailed information on new transistorized models not available as we go to press.

INTERNATIONAL CRYSTAL MFG. CO., INC.

18 North Lee, Oklahoma City, Okla.

Model 100

12-channel, crystal-controlled transmit and 2-channel, crystal-controlled receiver, plus tunable receiver; universal power supply (117, 12 and 6 volts); 13-tube performance double-conversion superhet; crystal-filter selectivity gate; series noise limiter; adjustable squelch; ceramic mike; pi-network output; built-in 'calibrate' circuit; 5½ x 8½ x 9; 12 lb. Accessories: see separate listing, plus antennas, mounts, etc.

$199.50 (net)

Model 50

3-channel, crystal-controlled transmit and 2-channel, crystal-controlled receive, plus tunable receiver; universal power supply (117, 12 and 6 volts); 12-tube performance double-conversion superhet; series noise limiter; adjustable squelch; ceramic mike; pi-network output; modulation indicator; 5½ x 8½ x 9; 12 lb. Accessories: crystals, antennas, mounts, etc.

$159.50 (net)

Model 10

3-channel, crystal-controlled transmit, plus tunable receiver; power supply sold separately for $19.50 (specify 117, 12 or 6 volts when ordering); 10-tube performance superhet; series noise limiter; squelch attachment sold separately for $4.95; ceramic mike; external speaker; 3⅜ x 8 x 7; 5 lb. Accessories: see text above, plus crystals, antennas, mounts, etc.

$79.50 (net)

E. F. JOHNSON CO.

Waseca, Minn.

Messenger

5-channel, crystal-controlled transmit and receive; available with two basic types of power supply arrangements—Model No. 242-126 is for 117 volts only, Model Nos. 242-127, 242-128, 242-129 and 242-138 are for all possible variations of 230, 117, 24, 12 and 6 volts; 9-tube performance superhet (1 r.f. and 1 455-kc. i.f. stage); series noise limiter; adjustable squelch; ceramic mike; pi-network output; modulation indicator; 5⅜ x 7 x 11⅜; 12 lb. Accessories: electrical noise suppression kit ($13.50); mobile mounting bracket ($2.50); carrying handle ($1.50); and various antennas.

$134.95 (117-volt a.c. model, net)

$144.95 (117- and 12- or 6-volt models, net)

Personal Messenger

1-channel, crystal-controlled transmit and receive; battery power supply (see below); 1-watt input; superhet receiver; series noise limiter; adjustable squelch (labeled "Quiet" control); may be used with external antenna; headphone jack. Accessories: rechargeable nickel-cadmium battery ($19.95 net); cigarette lighter adapter; earphone; external antenna.

$129.50 (net, with battery compartment for 8 penlight cells)

KAAR ENGINEERING CORP.

2995 Middlefield Rd., Palo Alto, Calif.

Model TR-327

4-channel, crystal-controlled transmit and receive; universal (117-, 12- and 6-volt) power supply; 14-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; TVI trap; "Power" tuning control on front panel used to tune transmitter to maximum output; S-meter; special 2-tube a.v.c. circuit varies gain of receiver to minimize effects of noise and interference; 5⅜ x 10¼ x 8½; 16 lb. Accessories: mounting hood ($3.90) and various antennas.

$179.00 (suggested resale price)

Model TR-327B

Same as above, but 2 channels (of possible 5) are crystal-controlled transmit and receive while 3 channels are crystal-controlled transmit and tunable receive.

$189.00 (suggested resale price)

LAFAYETTE RADIO ELECTRONICS CORP.

111 Jericho Turnpike, Syosset, L. I., N. Y.

Model HE-20C

8-channel, crystal-controlled transmit and receive plus tunable receiver; universal (117- and 12-volt) power supply; 10-tube performance superhet (1 r.f. and 2 1650-kc. i.f. stages); series noise limiter, adjustable squelch; ceramic mike; link-coupled output; TVI trap; plate current of power output stage is metered; S-meter; 5½ x 12½ x 8; 11½ lb. Accessories: power output meters and field strength meters (various) and fixed and mobile antennas.

$109.50 (net)

Model HE-15B

8-channel transmit; 117-volt supply; 8-tube performance superhet (1 r.f. and 1 1750-kc. i.f. stage); adjustable series noise limiter; no squelch; ceramic mike (no push-to-talk); link-coupled output; neon tube output indicator; TVI trap; cathode current of transmitter metered from front panel jack; 5½ x 10¼ x 6⅜; 9 lb. Accessories: mobile power supplies for either 6 or 12 volts ($10.95) and various antennas.

$57.50 (net)

MAXWELL ELECTRONICS CORP.

229 Garvon St., Garland, Texas

Model 27C-3

3-channel, crystal-controlled transmit and receive; 117-volt power supply (other models available for 12 or 6 volts at some price); 13-tube performance superhet (2 high-gain r.f. and 1 455-kc. i.f. stage); noise clipper and series noise limiter; adjustable squelch; dynamic mike; link-coupled output; 3½ x 7⅛ x 11¼; 6 lb. Accessories: battery eliminator converting 12-volt model to 117 volts ($29.95) and various antennas.

$159.50 (net) or *$149.50* (net) for single-channel model

MESUR-MATIC ELECTRONICS

Warner, N. H.

Saturn CBX-15 *(not illustrated)*

Full information not available at press time.

MIRATEL, INC.

Richardson St., New Brighton 12, Minn.

Model C/R-117

5-channel, crystal-controlled transmit and receive; universal solid-state power supply (117-, 12-, or 6-volt); 12-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output with TVI trap; metered to read percentage of modulation and carrier output; S-meter; 5¼ x 10½ x 10; 18 lb.

$229.00 (suggested retail)

MULTI-PRODUCTS CO.

21470 Coolidge Highway, Oak Park 37, Mich.

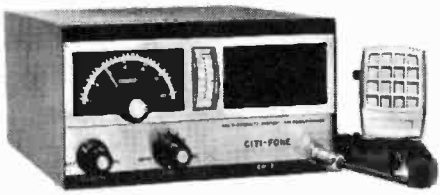
Model CD-5 *("Citi-fone")*

5-channel, crystal-controlled transmit and receive; universal (117- and 12-, or 117- and 6-volt) power supply; 10-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable "noise immune" squelch; ceramic mike; pi-network output; TVI trap; 4¼ x 8 x 11; 15 lb. Accessories: various antennas.

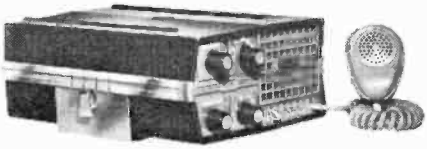
$134.50 (suggested retail)

CB DIRECTORY

Model CD-6



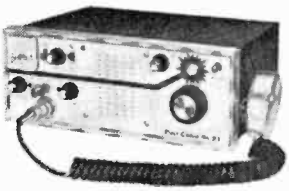
Model CD-7



Companion

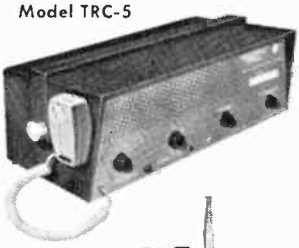
Model "Duo-Com 120"

Poly-Comm "N"



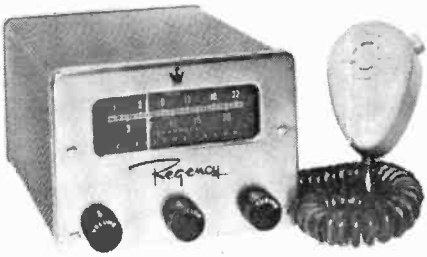
Poly-Comm Sr. 23

Model TRC-5



Model TRC-27A

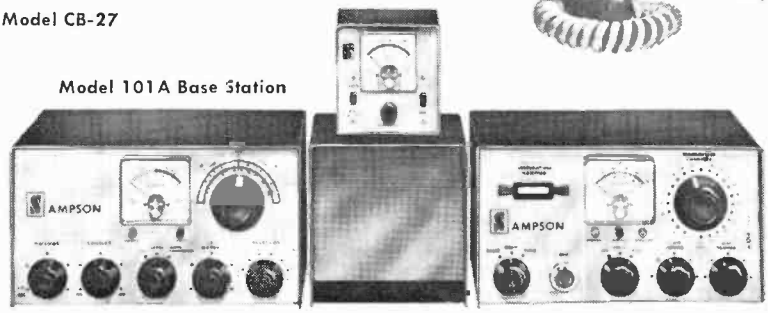
Model 400



Model CB-27

Ray-Tel TWR-2

Model 101A Base Station



Model CD-6 ("Citi-fone")

5-channel, crystal-controlled transmit and receive; universal (117- and 12-, or 117- and 6-volt) power supply; 10-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable "noise immune" squelch; ceramic mike; pi-network output; TVI trap; jack for external speaker; 4¼ x 8 x 11; 13 lb. Accessories: various antennas.

$149.50 (suggested retail)

Model CD-7 ("Citi-fone")

5-channel, crystal-controlled transmit and receive, plus tunable receiver; universal power supply (117- and 12-volt); superhet receiver; series noise limiter; adjustable "noise immune" squelch; ceramic mike; pi-network output; TVI trap; jack for external speaker or headphones; S-meter and output indicator.

$189.50 (suggested retail)

OSBORNE ELECTRONICS CORP.

13105 S. Crenshaw Blvd., Hawthorne, Calif.

Model 320 (not illustrated)

4-channel, crystal-controlled transmit and receive; fully transistorized (17 transistors, plus 9 diodes); double-conversion superhet; noise limiter; adjustable squelch; ceramic mike; can be used as public address system through remote speaker jacks; change of input voltage governed by power cable (117, 32, 24, 12, or 6 volts); 4½ lb.

Price not announced at press time

Model "Duo-Com 120"

1 channel, crystal-controlled transmit and receive; battery power supply (see below); 1 watt input to r.f. amplifier; double-conversion transistorized superhet with ceramic i.f. transformers; noise limiter; adjustable squelch; jacks for external antenna and earphones; 7¾ x 4 x 1⅝; 28 oz. Accessories: rechargeable batteries ($12.50, ea.) and model 900 charger ($19.50).

$149.50 (plus batteries)

PEARCE-SIMPSON, INC.

1385 N.W. 27th Ave., Miami 35, Fla.

Companion

5-channel, crystal-controlled transmit with extra crystal socket on front panel for 6th channel; 5-channel, crystal-controlled receive, plus tunable receiver; universal transistorized power supply (117 and 12 volts); 11-tube performance superhet (1 r.f. stage and 2 455-kc. i.f. stages); preset noise limiter; adjustable squelch; carbon mike; transmit indicator light; link-coupled with reactance 'tune-out' adjustment; durable plastic cabinet; 5 x 8¾ x 12¼; 8½ lb.

$189.50 (FOB, Miami)

POLYTRONICS LAB, INC.

388 Getty Ave., Clifton, N. J.

Poly-Comm "N"

4-channel, crystal-controlled transmit and receive; universal power supply (117, 12 and 6 volts); 12-tube performance double-conversion superhet (1 Nuvistor r.f. stage, 6.0-mc. conversion, 3 455-kc. i.f. stages); series gate noise limiter; adjustable squelch; ceramic mike; pi-network output; pilot bulb output indicator; TVI trap; extra rugged construction; 5 x 11 x 7½; 12¾ lb. Accessories: see separate listing.

$189.50 (net)

Poly-Comm Sr. 23

23-channel transmit and receive through use of special "frequency synthesizing" circuitry; universal power supply (117 and 12 volts); 14-tube performance double-conversion superhet (1 Nuvistor r.f. stage, 6.0-mc. conversion, 2 455-kc. i.f. stages); series gate noise limiter; adjustable squelch with level settings for weak and strong signals; ceramic mike; pi-network output; S-meter and output indicator calibrated in watts; no relays—electronic switching; built-in tone filter and generator for selective calling; message light; may be used as a public address system; 4½ x 12 x 8½; 13¾ lb.

$349.50 (net)

RADIO CORPORATION OF AMERICA

Telecommunications Center, Meadowlands, Pa.

Mark VIII

Details on this new model were not available at press time.

RADIO SHACK CORP.

730 Commonwealth Ave., Boston 17, Mass.

Model TRC-27A

3-channel, crystal-controlled transmit and receive; universal (117- and 12-volt) transistorized power supply; 11-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output. Accessories: field strength meter ($6.95) and various antennas.

$89.95 (net)

Model TRC-5

5-channel, crystal-controlled transmit; 1-channel, crystal-controlled receive, plus tunable receiver; 117-volt power supply (see below); superhet receiver; noise limiter; adjustable squelch; ceramic mike; no relays—electronic switching; 10 lb. Accessories: conversion power supplies, either 12- or 6-volt ($15.98, each).

$69.95 (net)

RAYTHEON CO.

411 Providence Turnpike, Westwood, Mass.

Ray-Tel TWR-2

5-channel, crystal-controlled transmit and receive; universal power supply (117 and 12 volts); 10-tube performance double-conversion superhet; series noise limiter; adjustable squelch; special carbon mike; pi-network output; pilot-bulb output indicator; transmitter filaments may be switched off at front panel during "standby" periods; no relays—electronic switching; auxiliary speaker connections; 5 x 9½ x 8¼; 12½ lb.

$189.95 (suggested list)

REGENCY ELECTRONICS, INC.

7900 Pendleton Pike, Indianapolis 26, Ind.

Model CB-27

2-channel transmit; tunable receiver; 117-volt power supply (other models available); 9-tube performance double-conversion superhet; series noise limiter; adjustable squelch; ceramic mike; pi-network output; neon-bulb output indicator; 4½ x 6½ x 8¾; 8¾ lb. Accessory: Model CS-6 crystal switch adds 5 more channels ($19.95, list).

$124.95 (12- and 6-volt units available at same price)

ROSS LABORATORIES, INC.

124 Lakeside Ave., Seattle 22, Wash.

Model 400

1-channel, crystal-controlled transmit and receive; hand-held battery-operated transceiver with 1.5 watts input; superhet receiver; automatic noise limiter; adjustable squelch; may be used with penlight cells; 9¼ x 3¼ x 1¼; under 2 lb. Accessories: rechargeable nickel-cadmium batteries and built-in charger ($45.00); alkaline battery pack ($4.00).

$164.50 (net)

SAMPSON COMPANY

2244 S. Western Ave., Chicago 8, Ill.

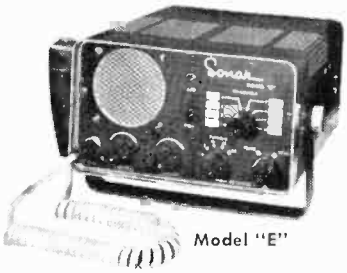
Model 101A Base Station

Transmitter (Model T-110A) has provisions for 23 channels; 117-volt power supply; external crystal socket for test purposes; pi-network output; plate current and voltage meter; modulation indicator; 6 x 11 x 7¼. Receiver (Model R-101A) has 5-channel crystal-controlled receive, plus tunable receiver; 117-volt power supply; 14-tube performance double-conversion superhet (2 r.f. stages, 10.7-mc. conversion, 2 455-kc. i.f.

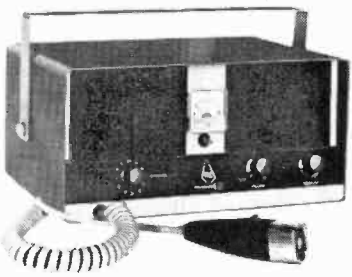
CB DIRECTORY

Model "G"

Falcon Radiophone Mk V

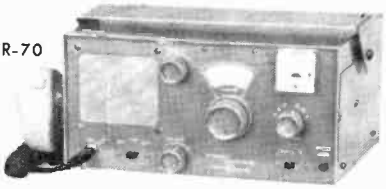


Model "E"

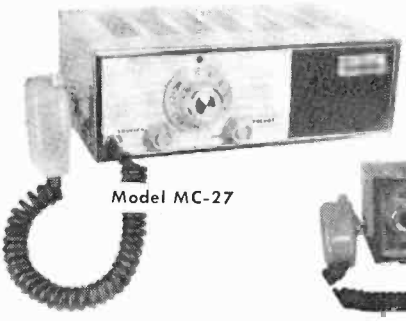


Hallmark 2-12

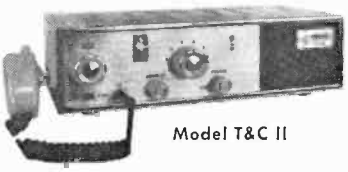
Model TR-27



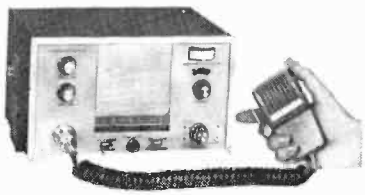
Model TR-70



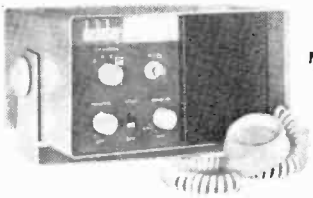
Model MC-27



Model T&C II

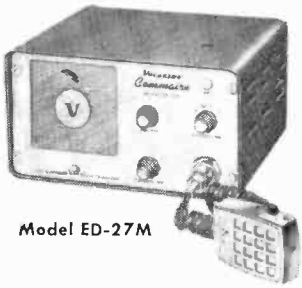


Model ED-276

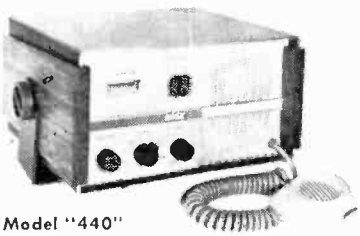


Model "411"

Model PT-27 ("Commaire")



Model ED-27M



Model "440"

stages); series gate noise limiter; adjustable squelch; Local-Distant sensitivity switching to prevent overload; 6 x 11 x 7¼. Speaker in separate cabinet; 6 x 6 x 6. Power-SWR meter sits atop speaker; measures power output into dummy load; measures VSWR (direct readings).

$377.80 (complete station, including mike). Receiver and Transmitter may be purchased separately for *$159.95*, each. Speaker is *$15.95* and meter is *$41.95*.

SONAR RADIO CORP.

3050 West 21st St., Brooklyn 24, N. Y.

Model "E"

8-channel, crystal-controlled transmit and receive plus tunable receiver; universal (117-, 12- and 6-volt) power supply; 11-tube performance superhet (1 r.f. and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; pilot-bulb output indicator; 4¾ x 9½ x 11¼; 9 lb. Accessories: S-meter ($17.95) and various antennas.

$179.50 (net)

Model "G"

8-channel, crystal-controlled transmit and receive, plus tunable receiver; universal power supply (either 117 and 12, or 117 and 6 volts); 10-tube performance double-conversion superhet; series noise limiter; adjustable squelch; transmit "spotting" switch on front panel; S-meter and output indicator; ceramic mike; pi-network output; TVI filtered; 4¾ x 9½ x 11¼; 9 lb. Accessories: antennas, noise suppresion kits and mounts.

$229.50 (net)

TECRAFT SALES CORP.

Box 84, South Hackensack, N. J.

Falcon Radiophone Mk V

5-channel transmit with tunable receiver, plus 1 crystal-controlled receive channel; universal (117-, 12- and 6-volt) power supply; 13-tube performance double-conversion superhet; series noise limiter; adjustable squelch; ceramic mike; pi-network output; plate current metered in transmitter; r.f. gain control may be purchased with special "TNS" noise-eliminating and squelch circuit built in ($20.00); 5½ x 11¼ x 9⅜; 12 lb.

$169.95 (also available with 5 crystal-controlled receive channels for same price)

TEXAS RESEARCH and ELECTRONIC CORP.

6612 Denton Drive, Dallas, Texas

Hallmark 2-12

12-channel, crystal-controlled transmit and receive; universal power supply (117 and 12 volts); 9-tube performance superhet (2 r.f. stages and 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; TVI filter; S-meter; neon modulation indicator; 5½ x 12 x 7; 12½ lb.

$149.50 (net)

TRAM ELECTRONICS, INC.

Box 187, Winnisquam, N. H.

Model TR-27B

8-channel, crystal-controlled transmit and receive, plus tunable receiver; 117-volt power supply; 14-tube performance double-conversion superhet (2 r.f. stages, 3.0-mc. conversion, 2 455-kc. i.f. stages); series noise limiter; adjustable squelch; ceramic mike; pi-network output; S-meter and modulation indicator; TVI trap; "spotting" switch; built-in speech compression; external speaker connections; 7¼ x 15½ x 9¾; 23 lb.

$249.00 (net)

Model TR-70

6-channel, crystal-controlled transmit and receive, plus tunable receiver; transistorized mobile power supply for 12 and 6 volts with either positive or negative grounding; 14-tube performance double-conversion superhet (2 r.f. stages, 3.0-mc. conversion, 2 455-kc. i.f. stages); noise limiter, adjustable squelch; ceramic mike; pi-network output; modulation indicator; S-meter; TVI trap; 5⅜ x 11 x 9; 17 lb.

$225.00

UTICA COMMUNICATIONS CORP.

5055 N. Kedzie Ave., Chicago 75, Ill.

Model MC-27

6-channel, crystal-controlled transmit and receive; universal power supply (117, 12 and 6 volts); 10-tube performance double-conversion superhet (1 r.f. stage, 1680-kc. conversion, 1 266-kc. i.f. stage); noise limiter; adjustable squelch; ceramic mike; link-coupled output; 4 x 11⅞ x 7; 11 lb. Accessories: antennas (see separate listing), mounting brackets ($4.95) and power cables ($4.80, each).

$179.50 (list)

Model T&C II

6-channel, crystal-controlled transmit (1 channel is a spare socket on the front panel) and receive, plus tunable receiver; universal power supply (117, 12 and 6 volts); 13-tube-and-transistor performance double-conversion superhet (1 r.f. stage, 1680-kc. conversion, 1 266-kc. i.f. stage); noise limiter; adjustable squelch; S-meter and output indicator; link-coupled output; 4 x 13 x 7; 12 lb.

$199.95

VOCALINE COMPANY OF AMERICA, INC.

Old Saybrook, Conn.

Model ED-276

6-channel, crystal-controlled transmit (1 channel is a socket on the front panel) and receive, plus tunable receiver; universal solid-state power supply (117 and 12 volts); transistorized double-conversion receiver; noise limiter and combined adjustable squelch and sensitivity; receiver has fine-tuning front-panel adjustment when used for "Crystal Receive"; tubes used in transmitter section; 5⅜ x 9⅜ x 9⅜; 14½ lb.

$249.95 (list)

Model ED-27M

4-channel, crystal-controlled transmit and receive; universal transistorized power supply (117, 12, and 6 volts); 12-tube performance double-conversion superhet (1 r.f. stage, 4.0-mc. conversion, 1 455-kc. i.f. stage); noise pulse suppressor; patented "Vocatron" noise-immune adjustable squelch; ceramic mike; pi-network output; pilot-bulb output indicator; 5¼ x 9¼ x 8¼; 11 lb. Accessories: marine mount ($27.95 list); noise suppression kit ($26.28 list); various antennas.

$189.50 (list)

Model PT-27 *("Commaire")*

4-channel, crystal-controlled transmit and receive—plus tunable CB receiver—plus standard broadcast-band AM reception; rechargeable dry-battery power supply; transistorized double-conversion superhet receiver; 2-tube transmitter with about 1-watt input; noise limiter; squelch switched "in" or "out"; ceramic mike; pi-network output; crystal diode rectifier operates special power meter attached to antenna circuit; built-in flashlight; 9 x 4 x 11; 11½ lb.

$250.00 (list)

WEBSTER MANUFACTURING

317 Roebling Rd., South San Francisco, Calif.

Model "411"

4-channel, crystal-controlled transmit and receive; universal (117- and 12-volt) power supply; 9-tube performance superhet (1 r.f. and 1 455-kc. i.f. stage); series noise limiter; adjustable squelch; carbon mike; pi-network output; pilot-bulb output indicator; 5 x 9½ x 8¼; 12¼ lb. Accessories: various antennas.

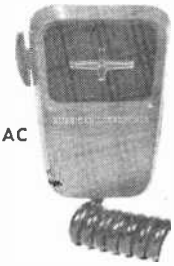
$169.95 (list)

Model "440"

10-channel, crystal-controlled transmit and receive, plus tunable receiver; universal (117- and 12-volt) power supply; double-conversion superhet (1 r.f. stage; 1650-kc. conversion, 1 250-kc. i.f. stage); noise limiter; adjustable squelch; carbon mike; pi-network output; S-meter and power output indicator; requires only 1 crystal per channel since unit has built-in "frequency synthesizing" circuit.

Price not available at press time

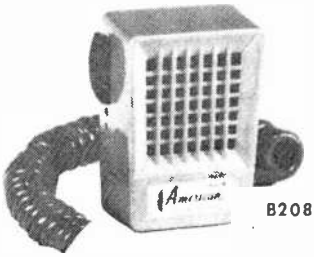
CB DIRECTORY


B213AC


513

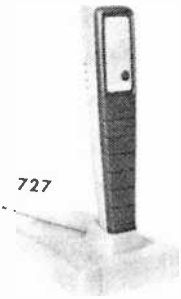

511

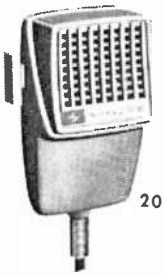

600D


B208AC


633/634


714SR


727


201/401

275SK


488

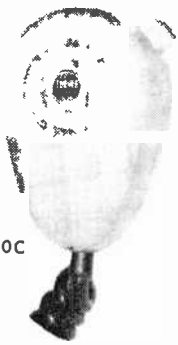

"Ten-Four"


CM-30/CM-31


254C


355C


61/61HF


350C

Microphones

Not all microphones listed below were measured and calibrated to the same set of standards. Sensitivity and frequency response characteristics are taken from manufacturers' specifications.

AMERICAN MICROPHONE CO.

Galien, Mich.

Model B208AC

Ceramic element; rated output level —58 db; 50-8000 cycle response; 5' coiled cord; available without coiled cord for $1.45 less; has 'Slide-Lock' d.p.s.t. switch; molded case.

$13.95 (list)

Model B213AC

Ceramic element; rated output at —58 db; 50-8000 cycle response; 5' coiled neoprene cord; available with or without d.p.s.t. switch; also available with crystal element for $2.50 less; sold with dash bracket; hi-impact polystyrene case.

$16.75 (list)

ASTATIC CORP.

Conneaut, Ohio

Model 511

Ceramic element; rated output level —52 db; frequency response not given; 5½' coiled cord; press-to-talk leaf-type d.p.s.t. switch; plastic case with spun-aluminum grill.

$19.95 (list)

Model 513

Dynamic element; rated output level —52 db; frequency response not given; 5½' coiled cord; press-to-talk leaf-type d.p.s.t. switch; plastic case with spun-aluminum grill.

$34.50 (list)

ELECTRO-VOICE, INC.

Buchanan, Mich.

Model 600D/602

Dynamic element; rated output level —55 db; 100-7000 cycle response; 6' coiled cord; available in hi-Z or lo-Z; d.p.s.t. switch; black plastic finish; mounting bracket. Model 602 has the same response, but incorporates a noise-cancelling aperture to permit close-talking where high ambient noise is encountered.

Model 600D: *$47.50* (list)
Model 602: *$57.50* (list)

Model 633/634

Dynamic element; rated output level —57 db; 70-10,000 cycle response; 6' cord (base station mike); hi-Z or balanced 150 ohms; chrome case; Model 634 is furnished without fixed-tilt stand coupler; both models have on-off switch.

Model 633: *$35.00* (list)
Model 634: *$31.50* (list)

Model 714SR

Ceramic element; rated output level —55 db; 60-7000 cycle response; 5' coiled cord; d.p.d.t. switch; beige finish with Cycolac plastic body; supplied with hang-up bracket.

$16.50 (list)

Model 727

Ceramic element, rated output level —55 db; 60-8000 cycle response; 8½' cord (base station mike); supplied with slip-in die-cast desk stand plus floor stand adapter; Model 727SR has d.p.d.t. leaf-type switch, gray finish; same mike with cardioid pattern called Model 729.

Model 727: *$18.00* (list); Model 727SR: *$20.00* (list)
Model 729: *$24.50* (list); Model 729SR: *$26.50* (list)

SHURE BROTHERS, INC.

222 Hartrey Ave., Evanston, Ill.

Model 201/401

Ceramic element; rated output level —55 db; 200-4000 cycle response; 5' coiled cord; d.p.d.t. switch; supplied with mounting bracket; blue finish, plastic "Armo-Dur" case; Model 401 is similar, but has dynamic element and —49 db response.

Model 201: *$18.00* (list)
Model 401: *$22.00* (list)

Model 275SK

Ceramic element; rated output level —59.5 db; 40-10,000 cycle response; 5' coiled cord; s.p.d.t. switch; supplied with mounting bracket; black finish, plastic "Armo-Dur" case; desk stand optional accessory.

$16.50 (list)

Model 488

Controlled reluctance with noise-cancelling features; rated output level —58 db; 200-4000 cycle response; 5½' coiled cord; d.p.d.t. switch; hi-Z or lo-Z models available; gray finish with lip guard; plastic "Armo-Dur" case.

$57.50 (list)

"Ten-Four"

"Controlled magnetic" element; manufacturer rates output at —50 db; 200-8000 cycle response; 5½' coiled cord; various switching combinations are available; sold with mounting bracket; Model 405T includes transistor amplifier as replacement for carbon mikes ($48.50 list); conversion kit Model R5T ($25.00 list) may be purchased to convert standard carbon mike to "controlled magnetic."

$33.00 (list)

SONOTONE CORPORATION

Elmsford, N. Y.

Model CM-30/CM-31

Ceramic element; rated output level —49 db; 90-7000 cycle response; 6' coiled cord; lightweight plastic case; d.p.s.t. switch; Model 31 does not have switch; either model available with magnetic dashboard mount (add letter "M") in place of bracket.

Model CM-30: *$14.00*; Model CM-30M: *$16.50*
Model CM 31: *$13.50*; Model CM-31M: *$15.00*

TURNER MICROPHONE CO.

909 17th St., N E., Cedar Rapids, Iowa

Model 254C

Ceramic element; rated output level —54 db; 80-7000 cycle response; base station mike with fixed desk stand; touch bar on-off switch and lever-lock switch; 7' cable; also available with a dynamic or crystal element.

$23.50 (list)

Model 350C

Ceramic element; rated output level —54 db; 80-7000 cycle response; d.p.s.t. switch; 5' coiled cord; gray finish, polystrene case; supplied mounting bracket. A special combination of the 254C and 350C are sold in one package for $40.30 (list).

$16.80 (list)

Model 355C

Ceramic element; rated output level —50 db; 80-7000 cycle response; d.p.s.t. switch; 5' coiled cord; heavy-duty plastic case; mounting bracket supplies.

$12.50 (list)

UNIVERSITY LOUDSPEAKERS, INC.

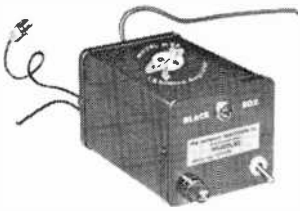
80 S. Kensico Ave., White Plains, N. Y.

Model 61/61HF

Ceramic element; rated output level —55 db; 95-9500 cycle response (Model 61HF has a response of 70-14,000 cycles); 6' coiled cord; d.p.s.t. switch; gray finish; heavy-duty plastic.

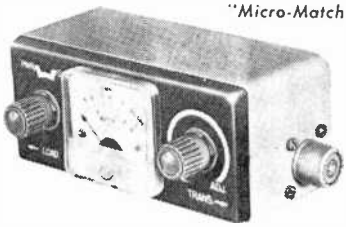
$24.95 (net)

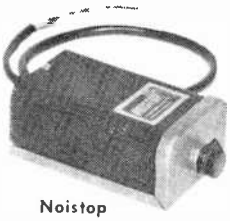
CB DIRECTORY



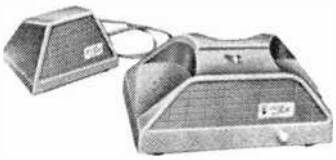
Model M-82 ("Black Box")

"Micro-Match"



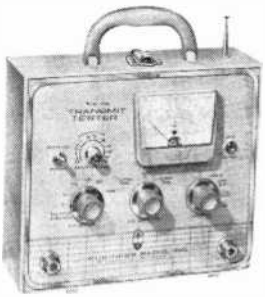


Noistop



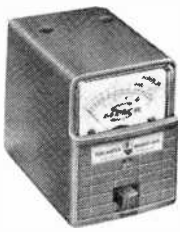
Patch-a-Call

Power-Meter



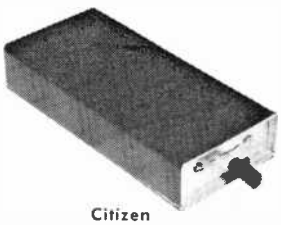
Transmit Tester

SpeakEasy



S-Master

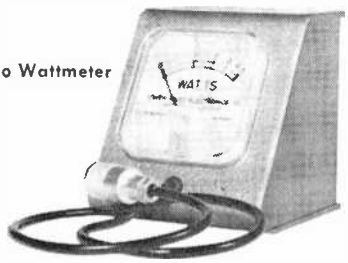
"Transicheck"

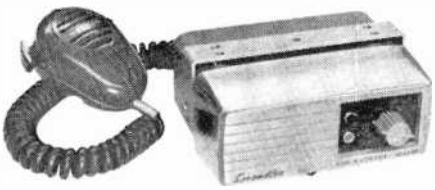


Citizen

Model LCF

Sweco Wattmeter





"Scrambler"

ANTENNA SPECIALISTS CO.

12435 Euclid Ave., Cleveland 6, Ohio

Model M-82 *("Black Box")*

R.f. power amplifier (limited gain to meet FCC regulations) and receiver preamplifier; 2 separate elements—1 mounted 10' from antenna, other near transceiver; manufacturer claims up to 20 db gain in receive signals; no internal connections to transceiver; "U" bolts included for antenna tower mounting.

$79.95

BENDIX CORPORATION

c/o M. C. Jones Electronics Co., Bristol, Conn.

Model 290 *("Micro-Match")*

Measures VSWR (direct readings); measures true power output to 52-ohm load up to 4 watts; may be left in coax line; r.f. load resistor available ($2.95) and cable assembly for connecting to transceiver ($2.45).

$26.50

BIGGS ASSOCIATES, INC.

1328 Puloski St., Peru, Ill.

Standing Wave-Power-Meter

Measures VSWR (direct readings) and when terminated with non-inductive load will read power output in watts. Must be connected to transmitter with very short (not over 1 foot) piece of coax cable. May be left in transmission line at all times without ill effects.

$24.95 (net)

BUSINESS RADIO CO., INC.

P.O. Box 5652, Minneapolis 17, Minn.

Noistop *(Model 612)*

Special noise-eliminating and squelch circuit mounted in 1½ x 2½ x 4 box; may be attached to any single- or double-conversion superhet (wiring instructions supplied for 18 different CB sets); ideal for mobile use; printed-circuit board, circuit is variation of famous TNS (Twin Noise Squelcher).

$16.95 (net)

Patch-a-Call

Automatic, transistorized voice-operated phone patch; powered by 117-volt line; incoming voice activates transmitter—pauses make base station go back to receive; auxiliary speaker permits phone monitoring by base station operator; sold with complete wiring and installation instructions.

Price to be announced

S-Master

Transistorized outboard meter to be connected to a.v.c. bus in transceiver; gives accurate proportional reading of incoming signal strength; internal battery (NEDA-1064) has 9-12 month operational life.

$9.95 (net)

Transmit Tester

Measures relative field strength using telescoping antenna; measures VSWR and true power output (up to 1000 watts); measures percentage of modulation—positive and negative; no insertion loss—may be left in coax line; 100-watt dummy load available as optional extra.

Price to be announced

COMMUNICATIONS, INC.

33 Danbury Road, Wilton, Conn.

SpeakEasy

Audio compressor to increase so-called "Talk Power"; available for either 117- and 12-volt, or 117- and 6-volt operation; variable modulation control; easily attached to any CB transceiver; has front panel meter to show percentage of modulation; available without meter (but with 100% modulation indicating lamp) for $29.75.

$34.75 (net)

CONTINENTAL ELECTRONICS & SOUND CO.

6151 Dayton Liberty Road, Dayton 18, Ohio

Model CM-52 ("Reflectometer") *(not illustrated)*

Measures VSWR (direct readings) from 3 to 200 mc. at power levels up to 1000 watts; reads comparative output power; less than 1 db line insertion loss up to 30 mc.; Model CM-52 is calibrated for 52-ohm coax, Model CM-75 is calibrated for 75-ohm line.

$29.95 (net)

Model CB-52-T ("Tronsicheck")

Similar to CM-52, but calibrated for the 26-28 mc. band; reads power output in 0-5.0 watts (direct readings).

$24.95 (net)

This company also offers a number of tuned traps to remove generator whine; TVI and voltage regulator filters.

CREATIVE PRODUCTS, INC.

6944 Plainfield Rd., Cincinnati 36, Ohio

Model LCF

Loading coil to be used with 92" to 102" whip antennas; base-mounted on spring to correct capacitive effects through addition of small inductance; manufacturer claims substantial gain in radiated r.f. field.

$5.00 (list)

CROWNE CONVERTERS

Box 586, Canoga Park, Calif.

Citizen

Mobile converter easily attached to auto radio; no power connections to radio; tunes CB channels through auto radio dial.

$25.95 (prepaid, mail order only)

DELCON CORP.

943 Industrial Ave., Palo Alto, Calif.

Model 206 "Scrambler"

Compact transistorized speech scrambler that converts normal speech into unintelligible gibberish; available in two inversion frequencies (2700 and 3900 cycles); available as 117-volt base station or 12-volt mobile.

$298.00 (list)

FRANKLIN SERVICE CO.

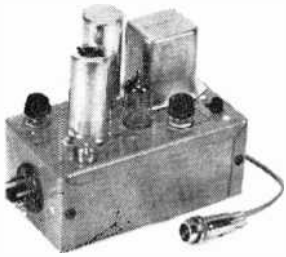
P.O. Box 6162, Bakersfield, Calif.

Sweco Wattmeter

Measures power output to 52-ohm resistive load with directly read accurate readings, 0-5.0 watts. Not to be left in coax line—only used during tune-up periods.

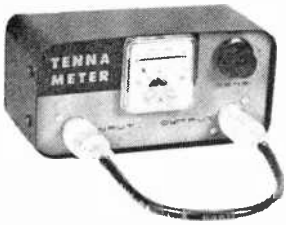
$18.75 (net)

CB DIRECTORY

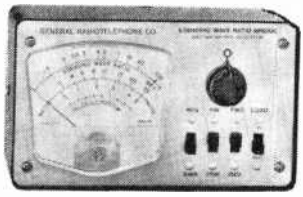


"Speech Booster"

"Signal Optimizer"

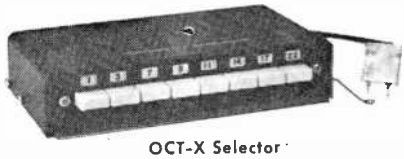


"Tenna-Meter"



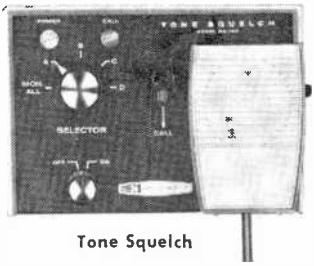
"SWR Bridge"

ACA-1 Compressor

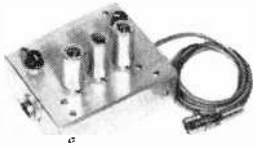


OCT-X Selector

Executive S/Meter Speaker

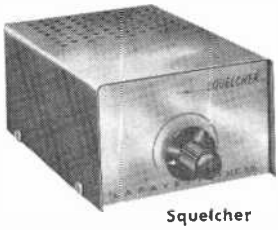


Tone Squelch

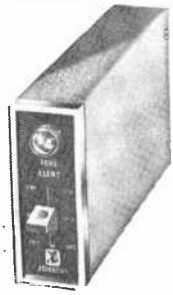


Executive Speech Filter

Directional Coupler and Indicator



Squelcher



Tone Alert

GC ELECTRONICS CO.

400 S. Wyman St., Rockford, Ill.

Model 65-419 *("Speech Booster")*

Low-gain compressor amplifier with limited bandpass characteristics (300-2500 cycles); clips and filters speech frequencies exceeding preset amplitude level; must be adapted to CB equipment; requires 400-volt d.c. supply at 5 ma. and 6.3 volts a.c. at 0.6 ampere.

$24.95 (net)

Model 65-518 *("Signal Optimizer")*

Measures VSWR (direct readings); measures power output in watts (direct readings); checks crystal activity; can be used as field strength meter (built-in telescoping antenna); plug-in headphones permit check on modulation quality.

$47.50 (net)

Model 65-512 *("Tenna-Meter")*

Inserted in coax line to measure relative power output and to assist in tune-up of transmitter.

$15.95 (net)

GENERAL RADIOTELEPHONE CO.

3501 Burbank Blvd., Burbank, Calif.

Model 615 *("SWR Bridge")*

Measures VSWR (direct readings) up to 54 mc.; measures true power output to 52-ohm load (self-contained) in two ranges—0-5.0 and 0-25.0 watts; measures relative field strength using attachable telescoping antenna; may be left permanently in coax line; adapter cables for connecting to Motorola plugs available at $1.95 each.

$39.95 (net)

GROVE ELECTRONIC MFG. CO.

4103 West Belmont Ave., Chicago 41, Ill.

This company manufacturers and distributes a wide variety of moderately-priced items. Included in their most recent product announcements were noise suppressors, channel selectors, antennas, body mounts, etc. Write the address above for details.

HALLICRAFTERS CO.

5th and Kostner Avenues, Chicago 24, Ill.

Noise Suppression Kit *(Model HA-3) (not illustrated)*

Components to effectively suppress mobile radio noise from spark plugs, distributor, ignition coil and voltage regulator; may also be used on inboard powered boats.

Price not available

HAMMARLUND MFG. CO.

53 West 23rd St., New York 10, N. Y.

ACA-1 Compressor

Speech amplitude compressor with limited bandpass characteristics (90-3000 cycles); clips and filters speech frequencies exceeding preset amplitude level; permits weaker audio tones to reach higher volume levels; increases so-called "Talk-Power;" self-contained power supply; built-in 1000-cycle tone generator.

$49.50 (net)

OCT-X Selector

Push-button switch designed for use with Hammarlund HQ-105 TRS transmitter/communications receiver; plugs into existing crystal socket—new crystals plug into back of selector.

$15.95 (net, less crystals)

HEATH COMPANY

Benton Harbor, Mich.

Tone Squelch *(Kit GD-162A)*

Selective calling system; one of 4 different audio tones chosen by front panel switch; variable "hold" adjustment; 117-volt, self-contained power supply; incoming call indicator; external connections to alarm devices provided at rear of chassis; each unit is complete tone generator as well as monitor with resonant-reed relay; 12-volt d.c. kit available ($37.95).

$33.95 (kit only)

INTERNATIONAL CRYSTAL MFG. CO., INC.

18 North Lee, Oklahoma City, Okla.

Executive S/Meter Speaker

Designed for use with manufacturer's Model 100; built-in VTVM circuit for accurate S-meter readings (3 ranges); also contains special speaker for voice clarity.

$49.50 (net)

Executive Speech Filter

Designed for use with manufacturer's Model 100; speech compressor and filter; limits voices to 2500 cycles maximum; raises modulation level; increases so-called "Talk Power."

$36.50 (net)

E. F. JOHNSON COMPANY

Waseca, Wis.

Directional Coupler and Indicator

Measures VSWR (direct readings); measures relative power in transmission line; indicator unit separate—provided with 6' connecting leads to directional coupler.

$36.75 (net, complete unit)

Automotive Noise Suppression Kit *(not illustrated)*

Components to effectively suppress mobile radio noise from spark plugs, distributor, ignition coil and voltage regulator; may also be used on inboard-powered boats.

$13.50 (net)

Tone Alert

Selective calling system; may be attached to most CB transceivers; self-contained power supply; each unit is both tone generator and monitor with resonant-reed relay; indicator call light remains on after incoming signal is received; 37 possible tones available; either 117 and 12 volts, or 117 and 6 volts.

$59.95 (net)

KUHN ELECTRONICS, INC.

20 Glenwood Ave., Cincinnati 17, Ohio

Limiter Squelch *(not illustrated)*

Transistor/tube hybrid design to provide effective ignition noise suppression and squelch facility for auto radios; easily connected (requires no plate voltage other than 12 volts d.c. in car battery); available without squelch feature for $28.95.

$34.95 (net)

LAFAYETTE RADIO ELECTRONICS CORP.

111 Jericho Turnpike, Syosset, L. I., N. Y.

Squelcher *(Model HE-55)*

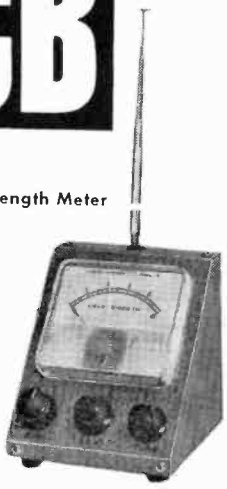
Ignition or pulse-type noise eliminator with built-in squelch control; based on famous TNS circuit; 2 tubes; requires external filament and B-plus voltages; easily installed; sold with complete wiring instructions.

$10.95 (net)

CB DIRECTORY

Selectro

Field Strength Meter

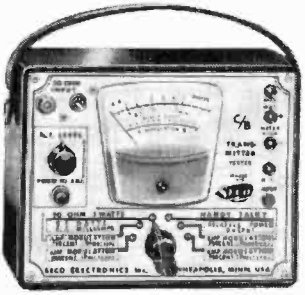


1-10'er

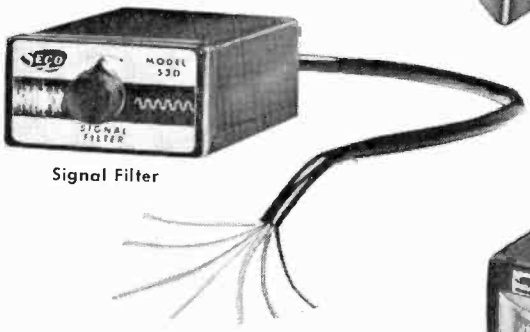
Power Modulator

Antenna Tester

CRYSTalignMETER



C/B Transmitter Tester



Signal Filter

"S" Meter

Pow-R-Mike

Auto-Patch

Field Strength Meter *(Model TM-16A)*

Transistorized design permits sensitive tune-up of CB equipment; battery-operated (1.5-volt flashlight cell); has earphone jack for monitoring output modulation quality of transmitter; available with 3 ranges; external telescoping antenna.

$15.95 (net)

MARK HELIWHIP

1801 W. Belle Plaine Ave., Chicago 13, Ill.

CB-AM Coupler *(not illustrated)*

R.f. splitter for coupling AM broadcast receiver to cowl-type CB antenna; sold with SO-239 input connector, and output cables.

$8.95 (net)

MIRATEL ELECTRONICS, INC.

Richardson St., New Brighton 12, Minn.

Selectro

Selective calling system; transistarized in 2 separate packages; Model "C" Coder has 9 tone channel possibilities; Model "D" is decoder for base station use (also requires 12 volts a.c. or d.c.); system operates by pressing "Call" button on "C" Coder for 3 seconds.

$29.50 (Model "C") and *$59.50* (Model "D")

OZCO SALES

Granite Ave. Extension, Canaan, Conn.

1-10'er

Coupling network permitting use of the cowl-type CB antenna as auto AM radio antenna; completely automatic—no switching; supplied with 2' output cables; peaked for operation near channel 11.

$5.95 (postpaid)

POLYTRONICS LABORATORIES INC.

388 Getty Ave., Clifton, N. J.

Poly-Tuner *(not illustrated)*

Outboard accessory to provide 22-channel reception to owners of manufacturers' Poly-Comm "N" or Poly-Comm IIG CB transceivers; also contains S-meter (illuminated model available at slightly extra cost).

$34.95 (net)

SAMPSON COMPANY

Chicago 8, Ill.

Power Modulator

Compressor/amplifier connected between microphone and transceiver; limits frequency response of audio system; clips and filters to build up overall modulation level; available with 117- and 12-volt power supply.

$49.95

SECO ELECTRONICS, INC.

1201 S. Clover Dr., Minneapolis 20, Minn.

Antenna Tester *(Model 520)*

Measures VSWR (direct readings) up to 180 mc.; measures true power output to 50-ohm load up to 1000 watts—reads on 3 scales (0-10, 0-100, and 0-1000); may be left in coax line; scale especially divided in Good-Poor ranges to assist novice in obtaining peak results with equipment; does not require external shunts or correction charts.

$42.95 (net)

C/B Transmitter Tester *(Model 510)*

Measures power output to 5 watts (direct readings with 50-ohm load); measures relative power output of 100-milliwatt hand-held transceivers; measures percentage of modulation (positive and negative); may also be used as field strength meter and remote r.f. indicator; optional accessory is attenuator to enable measurements with transmitters up to 50 watts output ($21.50).

$46.95 (net)

CRYSTalignMETER *(Model 500)*

Valuable instrument for checking crystal activity; checks all crystal oscillating modes; transistorized with self-contained battery supply; can be used as crystal-controlled signal generator with tone modulation; built-in loop will detect r.f. fields near base of antenna; cable connections permit use as remote r.f. indicator; may also be used to check modulation; plate current, etc.

Signal Filter *(Model 530)*

Pulse and ignition noise eliminator; adjustable squelch control; seems to be based on famous TNS circuit; requires filament and B-plus voltage connections to transceiver; easily wired into most superhet receivers; instructions supplied by manufacturer; 2 tubes; very rugged design.

$15.88 (net)

"S" Meter *(Model 540)*

Transistarized meter circuit easily connected to a.v.c. bus in any superhet; self-contained; battery-operated (standard 9 volts); 2 controls—sensitivity and zero set; size matches that of Model 540 Signal Filter.

$13.88 (net)

SMEA ENGINEERING

Tipton, Ind.

Pow-R-Mike

Speech compressor to increase so-called "Talk Power"; 117-volt power supply built in; ceramic microphone mounted in front panel; can be made extremely sensitive and will pick up voices 25-50 feet away from mike; variable compression; 3½ x 9 x 5; 2¼ lb.

$39.95 (net)

SPRAGUE PRODUCTS CO.

North Adams, Mass.

Suppressikit *(not illustrated)*

Easily installed kit of 5 basic parts to suppress radio interference from generator, distributor, voltage regulator and high-voltage coil; uses well-known "Thru-Pass" Sprague capacitors; liberal use of shielded cabling.

$17.85 (net)

STONER ELECTRONICS

Box 7388, Alta Loma, Calif.

Auto-Patch

Connects telephone line to CB transceiver; requires connections to microphone, speaker and telephone lines—can be done in about 5 minutes; fully automatic once installed; modulation level setting on rear apron of Auto-Patch.

$14.95 (net)

WORLD RADIO LABORATORIES

Council Bluffs, Iowa

CB Preamplifier *(Model NA-27)* *(not illustrated)*

R.f. preamplifier fixed-tuned (but sufficiently broad-banded) to 27-mc.; uses 2 Nuvistor tubes; printed-circuit wiring; easily installed—requires filament and low B-plus voltage; manufacturer claims gain of 20 db.; usable with either superhet or superregen receivers; manufacturer supplies wiring instructions.

$11.95

NOTE: At right is a list of manufacturers whose primary business is making antennas. Popular types of CB antennas are listed below. For specifications, write the manufacturer (mentioning that you saw the name in POPULAR ELECTRONICS). For prices, consult your mail order catalog, or your local parts jobber.

	Antennas	Manufacturer: Antenna Specialists Co. 12435 Euclid Ave. Cleveland 6, Ohio	Browning Laboratories, Inc. 100 Union Ave. Laconia, N.H.	CES Co. 6151 Dayton Liberty Rd. Dayton 18, Ohio	Columbia Products Co. RFD #3 Columbia, S.C.	Cubex Company 3322 Tonia Ave. Altadena, Calif.	GC Electronics Co. 400 S. Wyman St. Rockford, Ill.	
Base Station (all antennas vertically polarized)	Rigid Ground Plane				✓		✓	
	Drooping Ground Plane	✓						
	Colinear Ground Plane						✓	
	Folded Radiator Ground Plane			✓				
	Half-Wave Coaxial	✓			✓			
	End-Fed Dipole	✓					✓	
	2-Element Beam							
	3-Element Beam	✓		✓				
	6-Element beam		✓	✓				
	Special Beam					✓		
	Special Attachments	✓					✓	
Mobile Station (all antennas vertically polarized)	Steel Whips (96"-102")	✓					✓	
	Fiberglass Whips (96"-102")				✓			
	Base-Loaded Shortened Whip	✓						
	Center-Loaded Shortened Whip	✓						
	Top-Loaded Shortened Whip						✓	
	Continuously Loaded Shortened Whip	✓			✓			
	Special Marine	✓			✓			
	Special Automotive				✓			
	Mounts (Springs, Ball Joints, etc.)	✓		✓	✓		✓	

	Herb Kreckman Co. Cresco, Pa.	Hy-Gain Antenna Products Lincoln, Nebr.	Mark Heliwhip 1801 W. Belle Plaine Ave. Chicago 13, Ill.	Master Mobile Mounts, Inc. 4125 W. Jefferson Blvd. Los Angeles 16, Calif.	Mosley Electronics, Inc. 4610 Lindbergh Blvd. Bridgeton, Mo.	New-tronics Corp. 3455 Vega Ave. Cleveland 13, Ohio	Telrex Laboratories Asbury Park 80, N.J.	Utica Communications Corp. 5055 N. Kedzie Ave. Chicago 25, Ill.	Ward Products Corp. Amsterdam, N.Y.	Webster 317 Roebling Rd. S. San Francisco, Calif.
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CB DIRECTORY

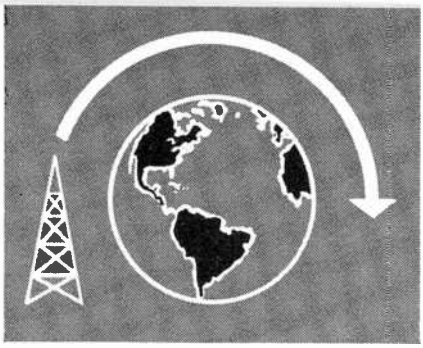
HAND-HELD TRANSCEIVERS

(All transmitters have 100 milliwatts input)

Manufacturer	Model	Type	Weight	Price
Allied Radio Corp. 100 N. Western Ave. Chicago 80, Ill.	Com-Pak 800	Superhet	24 oz.	$29.95 (net)
Cadre Industries Endicott, N.Y.	Tourphone	Superhet	15 oz.	not announced
EICO 33-00 Northern Blvd. Long Island City, N.Y.	740	Superhet	19 oz.	$54.95 (kit) $79.95 (wired)
Electra International 1348 Foothill Blvd. La Canada, Calif.	Miniphone 400 Mk. II	Superhet	10 oz.	$89.75 (net)
	Miniphone 600	Superhet		$99.50 (net)
Electronic Products Corp. St. Louis 20, Mo.	Trans-Com	Superhet	12 oz.	not announced
Electrosolids Corp. 12740 San Fernando Rd. N. Sylmar, Calif.	Spacephone Mk. II	Superregen	11 oz.	$39.95 (list)
Fanon Electronic Industries 439 Freinghuysen Ave. Newark 14, N.J.	Fanon-Masco	Superhet	24 oz.	$64.95 (list)
GC Electronics Co. Rockford, Ill.	Pocketphone	Superhet	13 oz.	$125.00 (net)
American Geloso 251 Park Ave. New York 17, N.Y.	Nivico	Superhet	16 oz.	not announced
General Radiotelephone Co. 3501 Burbank Blvd. Burbank, Calif.	Fieldmaster (Echo-9)	Superhet	12 oz.	$59.95 (net)
Hallicrafters Co. 4401 West Fifth Ave. Chicago 24, Ill.	CB-4	Superhet	24 oz.	
Heath Co. Benton Harbor, Mich.	GW-21	Superhet	24 oz.	$44.95 (kit) $71.95 (wired)

Manufacturer	Model	Type	Weight	Price
Heath Co. Benton Harbor, Mich.	GW-30	Superregen	32 oz.	$28.95 (kit) $44.95 (wired)
	GW-31	Superregen	20 oz.	$24.95 (kit) $37.75 (wired)
Kaar Engineering Corp. 2995 Middlefield Rd. Palo Alto, Calif.	TR-330	Superhet	31 oz.	$129.50 (list)
Keltner Electronics 1045 W. Hampden Englewood, Colo.	HT-2	Superregen	12 oz.	$59.95 (list)
Lafayette Radio Electronics 111 Jericho Turnpike Syosset, L.I., N.Y.	HE-29B	Superhet	18 oz.	$39.95 (net)
Magnavox Co. Ft. Wayne 4, Ind.	WT101	Superhet	16 oz.	$99.95 (list per pair)
Monarch Electronics, Inc. North Hollywood, Calif.	TC-900B	Superhet	14 oz.	not announced
Osborne Electronics Corp. 13105 S. Crenshaw Blvd. Hawthorne, Calif.	Duo-Com 100S	Superhet	20 oz.	$119.50
Radio Shack Corp. 730 Commonwealth Ave. Boston 17, Mass.	TRC-2	Superhet		$34.95 (net)
R.C.A. Electron Tube Division. Harrison, N.J.	Personal-Com 300	Superhet	17 oz.	$149.95 (list)
Ross Laboratories 124 Lakeside Ave. Seattle 22, Wash.	Model 300	Superhet	23 oz.	$124.50 (net)
Sony Corp. of America 514 Broadway New York 12, N.Y.	Sony 9	Superhet	16 oz.	$149.95 (list per pair)
Vanguard Electronic Labs 190-48 99th Ave. Hollis 23, N.Y.	Mark I	Superregen	48 oz.	$59.98 (net)
	Mark II	Superhet	52 oz.	$79.98 (net)

All transceiver manufacturers will supply crystals to change CB channels. Crystals are also available at most radio parts jobbers and supply stores. They may also be ordered directly from: International Crystal Mfg. Co. 18 N. Lee, Oklahoma City, Okla.); James Knight Co. (Sandwich, Ill.); Petersen Radio Co. (2800 W. Broadway, Council Bluffs, Iowa); or Texas Crystal (1000 Crystal Drive, Fort Myers, Fla.). A number of interesting and valuable books have been published on installation, service and maintenance of CB equipment. Investigate "Citizens Band Radio" (a RIDER Publication); "Citizens Band Radio Handbook" (Howard W. Sams & Co.); and the various books of Radio Publications.



Monthly Short-Wave Report

By **HANK BENNETT,** W2PNA/WPE2FT
Short-Wave Editor

NOTES FROM YOUR SHORT-WAVE EDITOR'S DESK

IN RECENT MONTHS there has been quite a bit of confusion regarding the proper designations for the African territories formerly known as the Belgian Congo and French Equatorial Africa. Various names have been given to the two areas, and perhaps none (at least in this column) has been entirely correct.

The 1962 *World Radio Handbook* lists these two territories as "Republic of the Congo" (capital, Leopoldville) and "Congo" (Franco-African Community), while the latest Foreign Broadcast Information Service books call them "East Congo" and "West Congo," respectively. For simplicity's sake, we favor the latter version, and will use it in the future.

Listed at right are the various stations now operating in East and West Congo, with their addresses, as given in the 1962 *World Radio Handbook*:

WEST CONGO

R. Brazzaville, B. P. 108, Brazzaville
R. Congo, B. P. 2241, Brazzaville

EAST CONGO

Radiodifusion Congolaise, B. P. 7699, Leopoldville
R. Leopoldville (exact address unknown)
R. Coquilhatville, B. P. 1061, Coquilhatville
R. Bukavu, B. P. 475, Bukavu
R. Elisabethville, B. P. 1038, Elisabethville

(*Continued on page* 124)

ENGLISH-LANGUAGE NEWSCASTS TO NORTH AMERICA

All of the stations that are listed here specifically beam English-language newscasts to the U.S.A. at the times indicated. The times may vary a few minutes from day to day.

COUNTRY	STATION	FREQUENCY *(kc.)*	TIMES *(EST)*
Belgium	Brussels	9745, 9705	1900
Bulgaria	Sofia	9700	1900, 2000, 2300
Czechoslovakia	Prague	7345, 9550, 9795 11,990, 15,285	2000
		7345, 9550, 9795 11,745, 11,990	2330
East Congo	Brazzaville	11,710	2115
England	London	15,375, 11,780	1800, 1900
		11,780, 9510	2100
Hungary	Budapest	11,895, 9833, 7225	1900
		9833, 6326, 5960	2230
Italy	Rome	11,905 and 9575	1930-1940, 2205-2215
Netherlands	Hilversum	11,730, 9715	1630
		6020, 5985	2030
Spain	Madrid	9360, 6130	2215, 2315, 0015
Switzerland	Berne	11,865, 9535, 6165	2030-2035, 2315-2320
USSR	Moscow	12,010, 11,960, 11,820 11,730, 9740, and 9680	1700-0100 (on the hour)
West Germany	Cologne	9640, 9575, 6100	1900, 2150 (to Eastern N.A.) 2200, 0050 (to Western N.A.)
Yugoslavia	Belgrade	6100	1700

On the Citizens Band

with **DICK STRIPPEL,** 2W1452, CB Editor

IN MOST LOCALITIES, police, fire, and Civil Defense officials are anxious to enlist the support of CB clubs—provided the CB operators prove that they will be an asset. Emergency communications of any kind are a serious matter, and many lives can depend upon the proper attitude in the handling of messages. Channel discipline must be stringent, and all traffic handled in a businesslike way.

We weren't too happy to hear, recently, that CB'ers will no longer have a part in the emergency communications plans for the Chicago area. It seems the Cook County CD officials complained that the CB'ers weren't taking their work seriously enough, and that, in any case, the communications system was adequate without them.

On the other hand, one of the many clubs which seem to be doing an excellent job in emergency work is the Citizens Radio Operators Organization (CROO) of Jacksonville and Duval counties, Florida. Thus far, the actions of the CROO members have been exemplary, and the Jacksonville area has one of the most efficient radio networks in the country.

We had an opportunity to speak to the CROO president, W. Henry Nicols, 7W1383, who explained that a large measure of their success could be attributed to the fact that most of the members are people who use CB radio in their businesses.

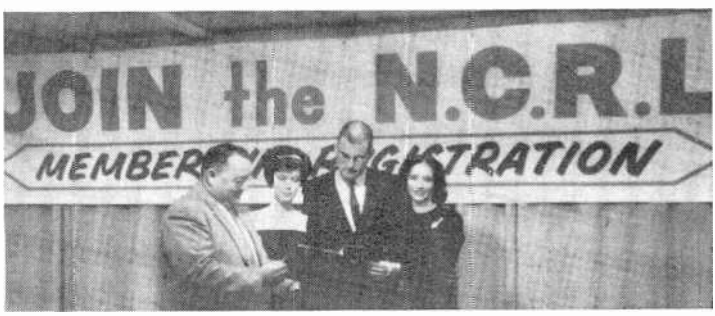
The CROO meetings are held the second Tuesday of each month at Jacksonville's Main Street Estate Civic Club, 285 East 44th Street. Assigned duties of the members are to provide communications between storm refuge and fallout shelters and CD headquarters. In addition, the members are on constant call to participate in CD exercises, real or drill.

Tech Topics. Judging by the mail being received these days, rig modifications seem to be a favorite topic. Because of

(*Continued on page* 106)

The Midwest National Jamboree will be held August 8 to 11 in conjunction with the Carroll County Fair at Milledgeville, Ill. Exhibits are to be housed in a 40′ x 100′ building on the fair grounds, and guarded by members of the county sheriff's radio patrol—who will also direct visitors and help locate "lost parents." Tickets are $1.00 each at the gate, but clubs can purchase blocks of tickets at 50 cents each, reselling them to members at 75 cents each.

Shown in the accompanying photo are the members of the Midwest National Jamboree Committee. The chairman, Eugene Litwiller, is at the far left. The other three members are all officers of the Tri-County CB Club (Sterling, Ill.). From left to right, they are: Norma Meyer, secretary; David Reavley, president; and Agnes Dennis, treasurer. Here's hoping the Jamboree will be a big success!



ELECTRONIC ERASER

a Carl and Jerry Adventure

By
JOHN T. FRYE
W9EGV

CARL, JERRY, Police Chief Morton, and a pale, young, well-dressed stranger were engaged in serious conversation in the boys' basement laboratory.

"I need rather specialized help in a hurry," young Mr. Adams was saying. "When I talked to the department head of the Federal agency for which I work, explained the situation to him, and told him where I was, he remembered that you boys had helped another of our operators about a year ago. He says you designed a small transmitter that fitted inside a dog's collar and enabled our agent to get some valuable information."

"Sure; that was Mr. Cody, a big fellow who was light on his feet and gave out next to nothing in the way of information," Carl recalled.

"Sounds like Cody," the pleasant stranger said with a wan smile. "Anyway, I was told to contact you through Chief Morton and see what you could do. I'm afraid, like Mr. Cody, I can only divulge just the information you must have to understand the problem; but believe me, this affair is important to every living American.

"Tonight at ten a man will board a bus leaving here for Center City. He will be carrying a small tape recording, probably in a briefcase. On the bus will be another man waiting to receive the tape. After it changes hands, the receiver of the tape will somehow check the recording to make sure it's what he wants. If he is satisfied, a large sum of money will be given to the man who surrenders the tape.

"Now it's most essential, first, that the men do not know they are under surveillance; second, that the tape not change hands; and third, if at all possible, that the tape itself be destroyed. Can you men, with your background of electronics, think of any way these three objectives might be accomplished?"

"Am I right in believing it's the material recorded on the tape that you don't want to change hands rather than the physical tape itself?" Jerry asked.

"That's right, but what are you driving at?"

"I was thinking of some method by which we might erase the tape without its ever leaving the possession of the man who has it now."

"And without his knowing that it was being erased?"

"Yes," said Jerry. "I'm not at all sure it can be done, but suppose you give Carl and me about three hours—until 8 p.m., say—to do some experimenting. In the meantime, perhaps you'd better be thinking up a second plan to use in case we strike out."

"I like the way you think—" Mr. Adams started to say as he rose to his feet, but suddenly he gasped and nearly doubled over in pain. "Guess I got kind of a catch in my side," he explained as he straightened up. "I'll be back at eight to see what you've found out, but I surely hope you come up with something. I don't seem to be thinking too well today, and I ran out of ideas before I came here."

SOUNDS to me as though you're biting off quite a chunk, old buddy," Carl observed after the other two had left.

"That business about the men not knowing any hanky-panky is going on while their precious tape is being erased is the toughie. What do you have in mind? Rubbing a big permanent magnet over the guy's briefcase?"

"It's worth trying," Jerry answered promptly. "Let's do some experimenting and see what kind of results we can get with brute force d.c. erase—that's the name applied to using a permanent magnet to erase a recording from a tape."

It didn't take the boys long to convince themselves that this approach showed little promise. A very strong alnico magnet out of a speaker had to be almost in contact with the tape to erase the recording completely. When a quarter-inch of space was kept between the magnet and a recorded reel of tape, only a very slight weakening of the recording was noticed.

"I was afraid of that," Jerry observed. "We must be able to work through a distance of at least a quarter of an inch to allow for the thickness of the leather in the man's briefcase, a cardboard container for the tape, etc. You see, a d.c. erase system on a tape recorder doesn't consist simply of a method of passing a tape over a strong permanent magnet. That's only the first step, which leaves the tape in a very strongly magnetized condition. It must then be passed over a weaker magnet of opposite polarity, or sometimes several magnets of alternating polarity or a magnet with a diagonal gap in it, so that the end result is a tape which is completely demagnetized. That's what we need, some way of literally bathing the recording right through the briefcase with an alternating, diminishing magnetic field."

"And how do we do that?"

"Let's try to construct a portable, battery-operated bulk eraser. As you know, a bulk eraser is simply a strong electromagnet with 60-cycle a.c. going through its coil. As a reel of tape is subjected to this strong reversing field and then gradually withdrawn, the little magnetic particles of the tape are first jerked violently in unison out of their recorded pattern and then are subjected to weaker and weaker pushing and tugging forces that eventually leave them lying in the unpatterned disarray of virgin tape."

"Don't you think it's going to be a little difficult to get a.c. out of your batteries—or are you going to use a.c. batteries?"

"Don't be cute. We can get a first cousin of a.c., pulsing d.c., simply by using an interrupter between the batteries and our coil," Jerry retorted. "Suppose you see what you can do about converting this old 6-volt auto radio vibrator into a simple interrupter while I get started winding a magnet."

Jerry started by boring a small hole in the center of a 2″-diameter, 1″-thick piece of soft iron; a bolt passed through this hole was able to hold two circles of plywood clamped against the sides of the iron core. Next, he cut several short pieces of plastic electrician's tape and looped them down into the space between the two pieces of plywood with their sticky sides turned away from the wood and iron. Then he chucked the end of the bolt in his electric drill and wound

layer after layer of #20 enameled wire on the core.

Jerry did his best to wind the wire in tight, even layers as the electric drill rotated the core, and he kept at it until his bobbin of wire was some five or six inches in diameter. Next, he carefully lapped the loose ends of each piece of tape over each other to hold the wire securely in place while he removed the wooden sides and pushed the iron core out of the middle. Now, very carefully, he wrapped the whole doughnut of wire with thin plastic tape and then forced the soft iron core back into the center.

By this time Carl had the vibrator reworked, and it was connected to a battery eliminator and the coil so that the heavy contacts of the vibrating reed connected and disconnected the six-volt d.c. supply to the coil at a rate of about 115 cycles per second. A capacitor substitute box was connected across the points of the interrupter and adjusted for minimum arcing; then a capacitor of this value was soldered in place.

Finally, the boys placed an issue of POPULAR ELECTRONICS on top of the coil, laid a reel of recorded tape on top of that, and turned on the battery substitute. The tape was slid around on the magazine for a few seconds and then lifted away before the power was cut off. When the tape was placed on the recorder and run through in the "Play" position, not a sound—except for a slight hiss—came from the recorder speaker.

"That does it!" Jerry exclaimed jubilantly. "Now let's get busy installing this rat's nest and some parallel heavy-duty six-volt lantern batteries in that old attache case of Dad's upstairs. We want plenty of current, for the magnetic field is dependent on ampere-turns. Mr. Adams should be here in an hour, and I want to be able to give him a convincing demonstration."

FIRST they cut a hole in the side of the case so that one side of the coil could be mounted flush with the surface of the leather. This opening was concealed with brown press-on paper that was used to cover the entire case. The batteries were anchored in place, and the vibrator was wrapped in several layers of sound-insulating foam rubber. Wires were run through the handle to a simple push-button switch which could be operated easily with one finger.

"We want to have our magnet just as close as possible to that reel of tape," Jerry said as he smoothed the thin paper over the magnet core. "The strength of a magnetic field is inversely proportional to the distance, and it works on a square law. Plus or minus a sixty-fourth of an inch might spell the difference between sucess or failure in our completely erasing that tape."

He was interrupted by the arrival of Mr. Adams and Chief Morton. The former looked even paler than he had that afternoon, and bent over a little.

Quickly the boys explained what they had done. They let Mr. Adams hear a few feet of recorded tape and then placed the reel of tape in a briefcase. While

The three biggest names in CB microphones are

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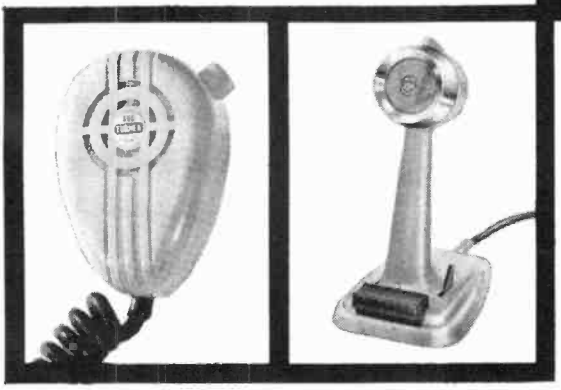
(ONLY THE MODEL NUMBERS ARE DIFFERENT TO PREVENT CONFUSION)

THE TURNER MODEL 355C

The newest addition to the fine Turner line of top performing CB microphones. Turner's all new hand-ease switch is ideal for mobile rig mounting — comfortable to hold, convenient to operate. The 355C comes complete with hanger button and standard dash bracket for easy mounting. Equipped with an 11" retracted, five foot extended, rubber-jacketed, coiled cord, wired for relay operation. Smooth response from 80 to 7000 cps. Output level: —50db.



THE TURNER MODEL 254C

The matched companion to the fine Turner mobile microphones. You get the same Turner quality, performance and dependability in a base-station mike. Same performance specifications as 350C, but with an on-off push-to-talk and lock switch and 7 foot cable, three conductor (one shielded), wired for relay operation.

THE TURNER MODEL 350C

More Turner 350C's are used as original equipment in CB than any other microphone. There are three excellent reasons: top Turner performance, quality Turner sound reproduction and rugged Turner dependability.

THE TURNER MICROPHONE COMPANY
952 17th Street NE
Cedar Rapids, Iowa

IN CANADA:
Tri-Tel Associates, Ltd.
81 Sheppard Avenue West
Willowdale, Ontario

EXPORT:
Ad Auriema, Inc.
85 Broad Street
New York 4, New York

Jerry walked around the basement dangling this case from one arm, Carl brushed against him with the attache case. In spite of what seemed to be a very brief and casual contact between the briefcase and the attache case, the tape was found to be completely blank when it was placed on the recorder.

"Guess we better show you how to work it; we haven't much time," Jerry offered.

"Boys, I have bad news for you," Mr. Adams said as he wiped cold sweat from his forehead. "You're going to have to use that gadget yourself. The doctor is waiting for me in a squad car outside, and I must go straight from here to the hospital for an emergency appendectomy.

"This is a picture of the man who will have the tape," he went on. "You should be able to spot him in the bus station. And here are two round-trip tickets for the bus to Center City. Good luck!"

With that, Chief Morton half-led, half carried Mr. Adams through the door and up the outside basement steps.

Meanwhile, Carl and Jerry stared at each other in pop-eyed amazement. "Well," Carl finally said, "I guess we better get started. You wrap up in your cloak while I dash over and get my dagger!"

IN SPITE of their joking, both boys had a feeling of rising excitement as they parked their car across the street from the bus station.

They spotted their man as soon as they entered the door, even though he was not wearing dark glasses, had no beard, and looked amazingly like any ordinary businessman. But he also happened to look exactly like the picture in Jerry's shirt pocket, and a thin briefcase rested on his knees. Out of the corners of their eyes, the boys could actually make out the square outline of the cardboard container for a 3″ reel of tape through the leather.

It seemed to Carl and Jerry the bus would never come, but finally it did. As the stranger stood up with his briefcase in his right hand, Jerry transferred the attache case to his left hand and followed the man closely. At the door of the bus there was a little knot of people awaiting the alighting passengers before

(*Continued on page* 100)

SHORT-WAVE MONITOR CERTIFICATE APPLICATION

To become a Short-Wave Monitor registered with POPULAR ELECTRONICS, just follow these simple directions:

1 Fill out the form below. (You must be a short-wave listener presently active in the hobby to be eligible for a Short-Wave Certificate.)

2 Send us 10 cents in coin to cover the cost of the certificate as well as the handling and registration costs. If you live outside the United States and cannot obtain U. S. coins, send either 15 cents in Canadian currency or two International Reply Coupons (IRC's).

3 Insert the application form, coins (or IRC's) and a stamped, self-addressed envelope in another envelope and mail it to:
Monitor Registration, POPULAR ELECTRONICS
One Park Avenue, New York 16, N. Y.

(Please Print)

Name ..... Ham Call-Area Prefix .....

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

Receivers — Make ..... Model .....

Make ..... Model .....

Principal SW Bands Monitored ..... Number of QSL Cards Received .....

Type of Antenna Used .....

Signature ..... Date .....

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No other rig manufactured today swings quite like Utica's. These cats are the ones who first swung with the MC-27 Town & Country, and now it's the T&C II. Utica Gismotchy Horizontal-Vertical Beam Antenna—Utica Buddy Whip Mobile Antenna—Utica Buddy Ground Plane Antenna

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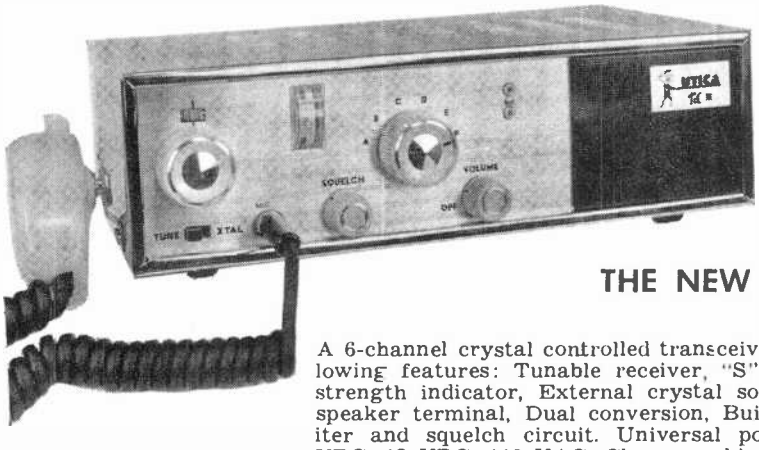

THE NEW T&C II

A 6-channel crystal controlled transceiver with the following features: Tunable receiver, "S" meter, Output strength indicator, External crystal socket, Auxiliary speaker terminal, Dual conversion, Built-in noise limiter and squelch circuit. Universal power supply—6 VDC, 12 VDC, 110 VAC, Chrome cabinet.

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they started getting on, and it was here Jerry had his chance.

While Carl stood on the man's left and asked him something about whether the bus was on time or not, Jerry pushed the switch under his finger and brushed his case lightly against the briefcase, rubbing it around with a circular motion. The man never noticed.

The bus was not crowded. Carl and Jerry followed their man to the rear, where he selected a seat alongside of a short fat man who was dictating letters in a low voice into the microphone of a portable tape recorder that was resting on his knees.

The two men apparently took no notice of each other until the bus was a dozen miles out of town. Then the man with the briefcase turned to the other and said, "Pardon me, sir, but I wonder if you might do me a great favor. I have a tape here sent me by my nephew in the army overseas, but I have no recorder. Could you possibly let me hear it on your machine?"

"Why, certainly; just let me have it and I'll get it started for you," the fat man answered obligingly.

As Carl and Jerry watched tensely, the fat man took the tape from the briefcase and put it on the machine. Then he put the listening earpiece in his ear and started the tape moving. After a few seconds he began to frown and he threw a switch that sent the tape whirring at a faster speed. Next he turned the tape over and tried to listen to the other side. Finally he handed the earpiece to the first man and said coldly, "Your nephew is a practical joker. There is absolutely nothing on that tape. Hear for yourself."

The man trying to sell the tape listened to every inch of it with growing puzzlement and dejection. "I don't understand it; I don't understand it at all," he muttered over and over.

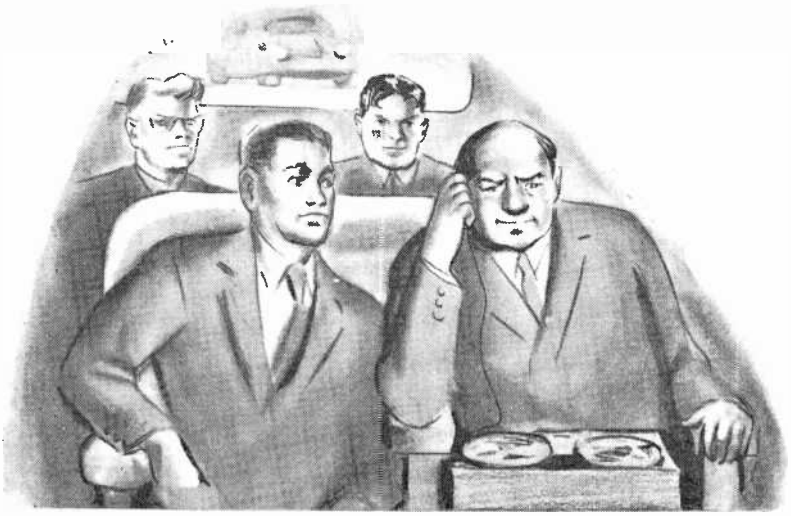
"You'd better tell your nephew practical jokes can be dangerous," the little fat man said menacingly as he turned his back and stared out the window.

AT CENTER CITY Carl and Jerry followed their man outside the bus station. As he walked past an alley, he impulsively tore the reel of tape from his pocket and tossed it into an ash can. The boys retrieved it and took the next bus home.

Chief Morton was waiting for them at the station, and the three of them went to the hospital. There Mr. Adams was out from under the anesthetic, and he was delighted at what the boys told him.

"Well done!" he said weakly. "If this keeps up, we're going to have to put you on our payroll. Seriously, though, you'll hear more about this as soon as I'm back on my feet and send in my report. In the meantime, boys, you've done a great service for your country—greater than you realize."

"As far as I can see, all we've done is get tangled up in some government tape," Carl said jokingly as they headed for the door. -30-

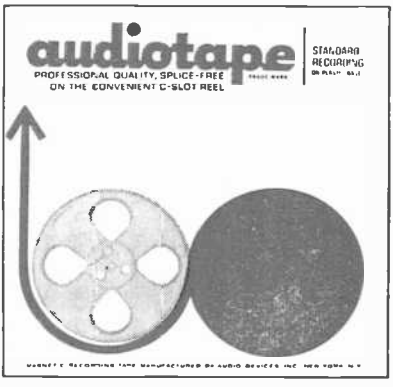


Pardon us while we change our face

Some say that only women are privileged to change their minds, and their faces, whenever they choose. We disagree. And we have the courage of our convictions, because—from this day forward—Audiotape will be wearing a bright new face you've never seen before.

We think you'll like the new Audiotape look, not only because it's fresh, clean and attractive but because it will now be easier than ever to select the type of Audiotape you need. We've assigned a distinct, highly visible color to each of the eight types so that you can locate your favorite immediately. We've also printed a description of the contents on every package—brief, simple and in large, clear letters. (No matter which Audiotape you favor, you're getting the tape that quality made famous.)

Look for the new family of Audiotape packages. They're well worth your attention.



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AUDIO DEVICES INC., 444 Madison Ave., New York
Offices in Los Angeles, Chicago, Washington, D. C.

The Secret Keepers

(*Continued from page 44*)

low—so low that you wouldn't notice it even if you happened to be tuned in somewhere on the broad band of frequencies across which the Phantom signals go skittering. And if your receiver were sensitive enough to hear the Phantom signal, you would probably think it was just ordinary static!

Incidentally, GE engineers who didn't know the exact waveform tried to intercept the messages during the test transmissions, just to see whether an enemy could break the "code." The results: *they* couldn't. Said one, "It's like a combination lock. Even if you know the principle on which it works, that doesn't mean you can open it without knowing the combination of the particular lock you want to open."

Phantom systems can use literally thousands of "combinations" or special identifying waveforms, and they can also change from one to another rapidly. Thus, even if someone happened to stumble on the code accidentally—about as likely as opening a combination lock by chance—it wouldn't do him much good. Next time he tried, the combination would have been changed.

Vocoder. Engineers at Hughes Aircraft have come up with still another way to transmit messages secretly, although the gadget they use to do it wasn't originally developed for that purpose. Their basic approach, as a matter of fact, isn't even new.

Back during the 1930's, Bell Laboratories scientists built a gadget they called a "vocoder." It consisted of a cabinet full of sound generators, filters, and other circuitry, and it was designed to create a reasonable facsimile of the human voice. If you turned on the right combination of circuits and did it fast enough, the vocoder produced a series of speech-like sounds.

These electronically generated words were quite intelligible. In fact, Bell's vocoder created a sensation at the New York World's Fair in 1939, where an operator played it from a keyboard much like that on a piano. By pressing the right combination of keys in the right sequence, he could make the vocoder "speak" whole sentences.

Hughes' entry in the secrecy sweepstakes makes use of the old vocoder principle. Essentially, the spoken words to be transmitted are fed into an analyzing circuit which determines several important characteristics of the various sounds which go to make up each word—pitch, intensity, and so on. This information, electrically coded, is sent on to a receiver, which, much like the earlier Bell Labs unit, turns these signals into intelligible speech.

The basic diagram is on page 43. The voice signal to be transmitted is applied to the inputs of a series of 12 bandpass filters. The output of each filter is determined by how much sound energy the word or syllable being spoken contains in that particular frequency region.

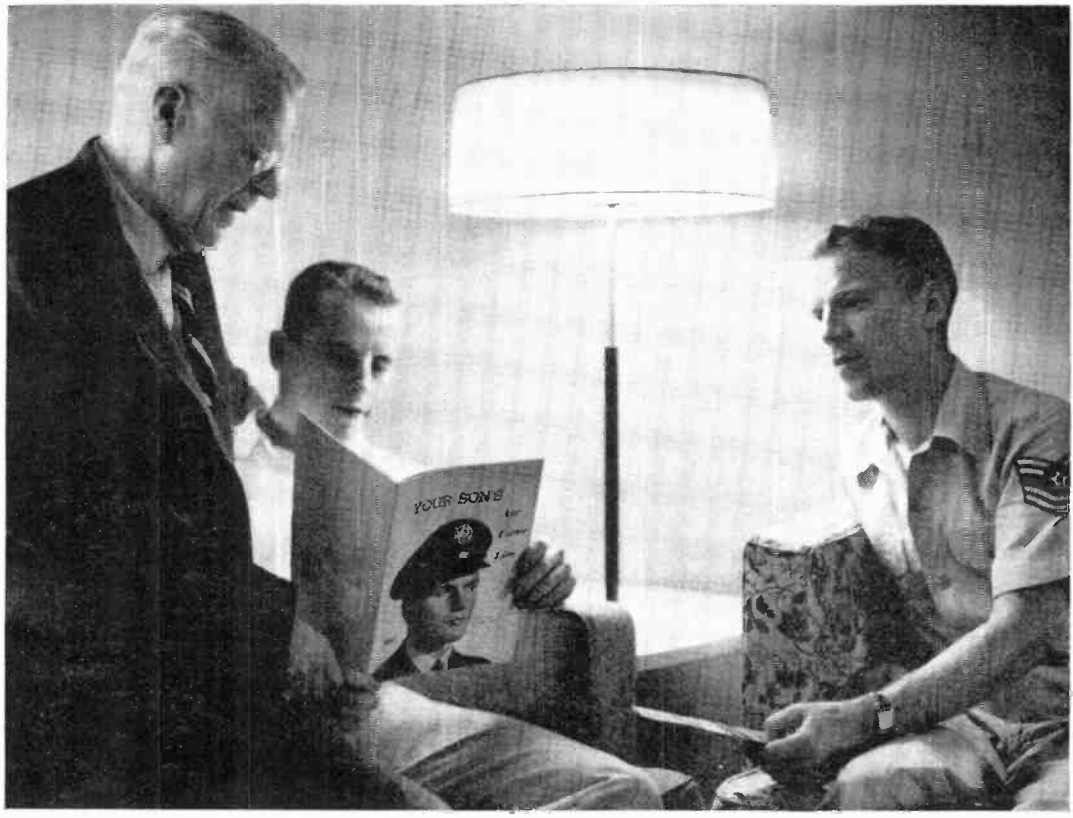
Since the outputs from these circuits are rectified, the sound energy going through a particular filter shows up as a d.c. voltage. The louder the sound applied to the input of any specific filter falling within that filter's frequency range, the higher the voltage at the output of that filter.

A final circuit—called the pitch extractor—finds out two things. First, it determines the presence or absence of pitch. And second, if sounds with a definite pitch are present, it determines their frequency.

By way of explanation, a vowel—an "a," for example—is produced when our vocal cords generate a sound of a certain frequency. A consonant, on the other hand—such as an "s"—is a less specific sound (a hiss, in this case), requires no movement of the vocal cords, and is at no particular frequency.

The pitch extractor transmits an encoded electrical signal which determines whether pitch is present, and, if so, what its frequency is. The signals from the pitch extractor and the 12 filters go to a time multiplexer which forms them into a single composite signal for transmission by radio.

At the receiving end, a time de-multiplexer splits up all of the signals again and sends each one to its proper circuit. The signal from the pitch extractor is applied to a relay, which turns on one of two circuits. If there is no pitch pres-



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ent at the transmitter, the relay turns on a "hiss generator" which produces white noise. If pitch is present, the relay activates a "buzz generator" which puts out a sound rich in harmonics and similar to that produced by the human larynx. The buzz generator operates at the same fundamental frequency that the pitch extractor detected in the speech at the transmitting end.

Now, either the hiss or the buzz (depending on which one happens to be present at any given moment) is applied to the inputs of all the bandpass filters in the receiver. Suppose, at one particular moment, that the person back at the transmitter is saying "a." The fundamental frequency of his "a" might be 300 cycles.

His particular voice quality—the characteristics of his voice which allow his friends to distinguish his speech from someone else's—is determined, among other things, by the relative strengths of the various harmonics of this basic 300-cycle tone. Let's say, for example, that the second harmonic- 600 cycles—is twice as strong as the fundamental, and that the third harmonic—900 cycles—is half as strong as the fundamental.

Again, for the sake of illustration, let's say that bandpass filter No. 1 at the transmitter has put out a signal of 4 volts, corresponding to the intensity of the 300-cycle fundamental. Bandpass filter No. 3, carrying the second harmonic, would have put out a signal twice as large—8 volts. Filter No. 5, transmitting the third harmonic, would have produced only 2 volts.

At the receiving end, these signals of varying strengths are applied to corresponding filters. Number 3, then, amplifies the output of the buzz filter—which, you'll remember, is operating at the same 300-cycle fundamental—twice as much as number 1 and four times as much as number 5. The result is a sound very close to the original "a" spoken into the transmitter.

The vocoder was originally designed to squeeze voice signals into a narrower bandwidth and make space for more messages in the crowded radio spectrum. And it does this very efficiently. The encoding vocoder generates 13 signals: one from each of the 12 filters and one from the pitch extractor. Each of these 13 signals can be squeezed into a channel just 25 cycles wide, and all 13 taken together require a total bandwidth of only 325 cycles.

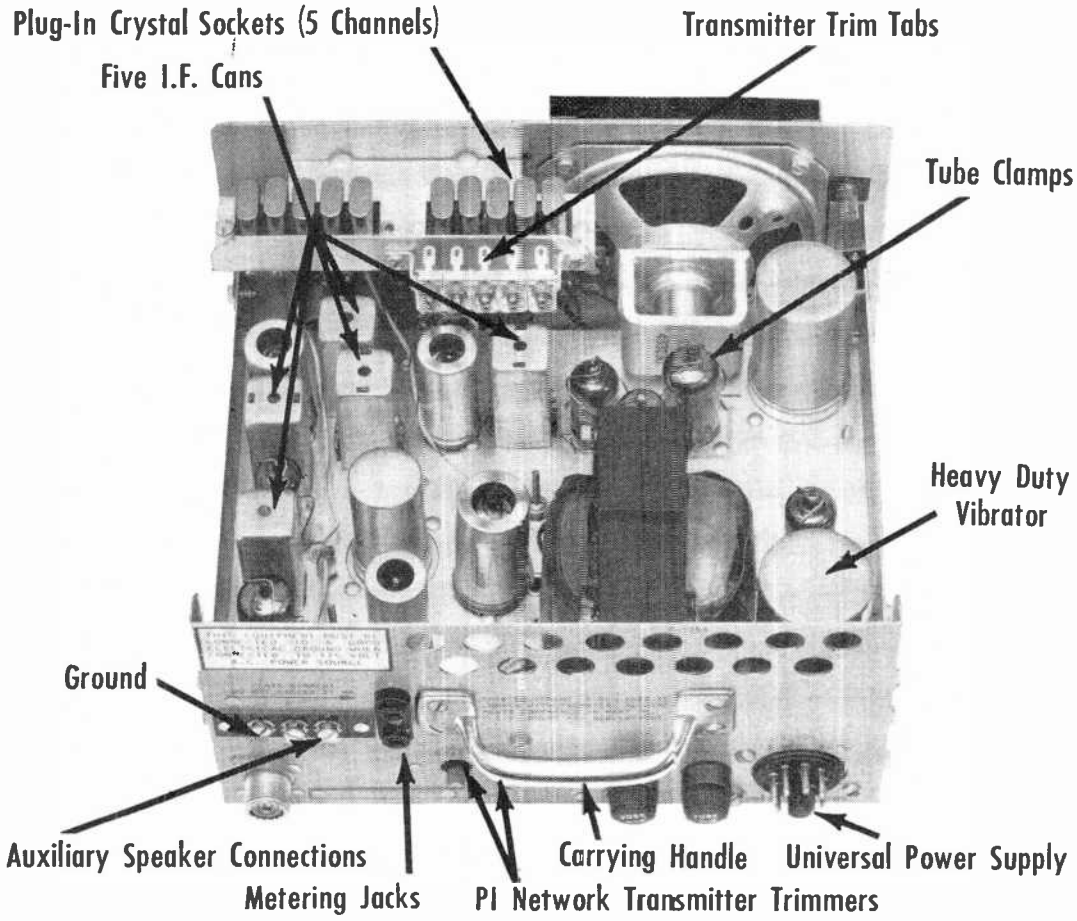
Normally, communications channels such as those used by the military, commercial airlines, and so on, are some 3000 cycles wide—about the same as a telephone channel. With the vocoder, about nine conversations can be squeezed into the band space usually taken up by only one.

A vocoder operating as described above is said to be an *analog* device, that is, the voltage output of the separate circuits varies continuously as the input signals change, and these constantly changing values are transmitted continuously. But the vocoder can also be operated as a *digital* encoder and decoder.

When operated digitally, a sampling circuit checks each of the individual circuit outputs some 50 times a second. The series of pulses obtained by this method is transmitted to a receiver where an unscrambler separates the various pulses. Then, it sends each to the circuit in the receiver corresponding to its counterpart in the transmitter.

As you may have guessed, digital operation gives the vocoder several outstanding advantages. First, it can operate reliably in the presence of tremendous amounts of interference—amounts which would paralyze an analog system; consequently, a digital system is far harder to jam. Second, signals from a digital vocoder can easily be encoded—by turning them into a kind of electronic "hash" something like that used with President Kennedy's scrambler. Then, a special unscrambler at the receiving end turns the scrambled signals back into words. To anyone listening without an unscrambler set specifically for the message being transmitted, the signal sounds like pure gibberish.

Thus, with such tricky electronic devices as these, our military forces and government officials can have all the advantages of radio's instant communications. And they can also have another advantage that radio has seldom offered—the assurance that their messages have traveled through the ether in such a manner that only the persons they are intended for will ever know what they were all about. —30—



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RAYTHEON

On the Citizens Band

(*Continued from page* 93)

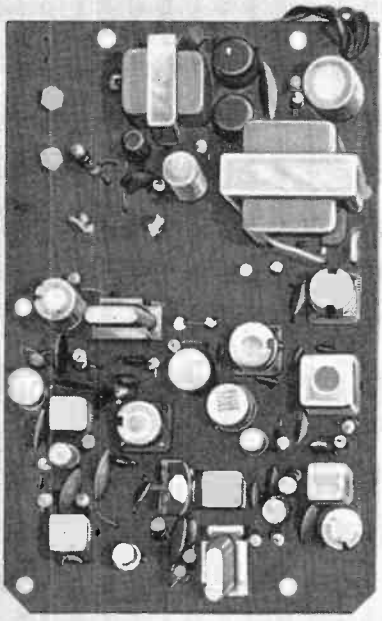
possible violations of FCC rules, however, we at POPULAR ELECTRONICS don't recommend any direct circuit changes to transmitters. As they stand now, the vast majority of transmitters cannot be modified without violating the rules—as you will see from the following examples.

A number of owners of a very popular —though now almost obsolete—rig substituted a "hotter" tube in the transmitter section. We tried the modification (into a dummy load, of course), and found that while the output *was* greater (plate power input was still less than five watts), frequency drift during "transmit" was severe.

As a second example, we know a CB'er who tried to replace an already efficient coil-type antenna coupling arrangement with a "pi" network. The result was extreme instability and parasitic oscillations in the final amplifier, which showed up as a "burbling" sound on the signal and caused interference to AM sets in the area.

On the other hand, a number of things may be done to "hop up" a receiver. Some time ago, Herb Brier in his *Across the Ham Bands* column discussed replacing certain tubes with "hotter" types. Among these substitutions could be a 6BZ6 for a 6BA6, for example, with the socket rewired for the 6BZ6 (a check of your tube manual will show you the pin basing arrangements for both types, as well as which types have similar base connections). If you do change tubes in your set, you should, however, be prepared for the consequences if the new tube causes instability or other troubles.

High on the list of equipment which will go far to soup up your receiver is the "Q-multiplier." These units can be obtained either already built or in kit form. Or, if you wish, you can build one from plans which appeared in this magazine (March 1961 issue). A Q-multiplier increases selectivity and hops up your set in two ways: first, it tends to kill adjacent-channel interference;



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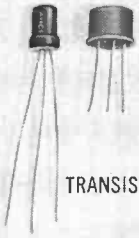
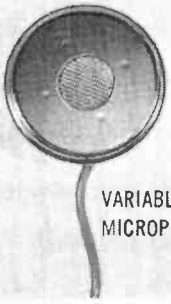


TRANSISTORS



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SONY

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and secondly, by narrowing selectivity, it actually improves the signal-to-noise ratio of the set.

You can achieve a "simulated Q-multiplier effect" quite simply. It won't be as effective as the real thing when you're dealing with strong signals, but it will "pull in the skirts" of almost any receiver.

Simply solder a short (about ½") length of solid hookup wire to the plate terminal (again, check the tube manual) of the first i.f. amplifier and "point it" in the direction of the grid pin. Turn on your set, and, using an insulated alignment tool, position the piece of wire so that the normal "hiss" of the set changes to a lower tone. Do not adjust it to the point where you receive a whistle along with a weak received signal, however.

Club Chatter. Are your meetings a little on the dreary side? Here's a tip on how to add some pep to them. Call your local telephone company and ask if they have a "speakers' bureau." Many phone companies do, and can supply interesting people who will talk knowledgeably on many communications topics far removed from the lowly telephone. . . . Members of the Greater Dallas (Tex.) CB Club are sporting club monogrammed shirts and blouses, thanks to a local store. Nicknames and calls can be added over the pocket. . . . *MRCBC News,* club publication of the Memphis Radio CB organization states that a number of locals have received "show cause" notes from the FCC and asks all members to "tighten up." The club's address is P. O. Box 7013, Memphis, Tenn. . . . One of the best newsletters to cross my desk in a long time is the *Rebel Yell* which says, among other things, "Talk on 5 and Listen on 2." It's the handiwork of the Rebel Communications Association (Box 1467, Marietta, Ga.). They apparently meet at the Marietta Police Station. . . . A good many of the publications we see use paid advertising to cut down on the overhead. This is a great idea, and as long as the sales pitches are confined to paper and stay off the air, CB "non-commercial" rules are not violated.

A Word to the Wise. In winding up this month, here's something in the line of a word to the wise for all CB club mem-

The most informative books for the experimenter and electronic hobbyist

VACUUM-TUBE CIRCUITS FOR THE ELECTRONIC EXPERIMENTER by Julian M. Sienkiewicz. At last in one book—all the basic diagrams, schematics, and other vital information on vacuum-tubes and their circuits. 192 pgs. 100 illus. **$4.95**

CLASS D CITIZENS RADIO ***by Leo G. Sands***
The first complete book on the two-way radiotelephone. Its history, rules, how it works, applications, equipment, receiver circuits, transmitters, antennas, installations, illus. **$4.95**

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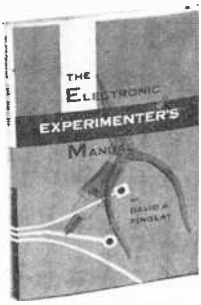

THE ELECTRONIC EXPERIMENTER'S MANUAL
by David A. Findlay
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bers. It was swiped from the *Racine* (Wis.) *Heterodyne,* which in turn gives credit for it to the *Lansing* (Mich.) *Clear Nine:*

"Xvxn though my typxwritxr is an old modxl, it works quitx wxll xxcxpt for onx of thx kxys. It is trux that all thx othxr kxys work wxll xnough, but just onx of thx kxys not working makxs thx diffxrxncx.

"Somxtimxs it sxxms a club is somxwhat likx my typxwritxr—not all of thx kxy pxoplx arx working. Who arx thx kxy pxoplx? Any mxmbxr. You may say to yoursxlf, 'I am only onx pxrson; I won't makx or brxak thx club.' But it doxs makx a diffxrxncx. Bxcausx a club to bx xffxctivx nxxds thx activx work of xvxrybody. So thx nxxt timx you think your xfforts won't bx missxd, rxmxmbxr my typxwritxr."

Lxt's kxxp thx nxws and picturxs (xspxcially thx picturxs) rolling in! —30—

1-2-3 Totalizer

(*Continued from page* 53)

the frequency of the pulses—you'll find that the unit will count almost any succession of pulses (it's capable of registering better than 400 counts per minute).

One good way to check the operation of the device is to cut out a circle of stiff cardboard about 2" larger than your phonograph turntable. Cut out a ½"-diameter hole about 1" from the outer edge of the cardboard and place the cardboard disc on the turntable. Then, when you place the photocell under the cardboard in line with the hole and a source of light (a flashlight should do very nicely) above the hole, the unit will count the number of times the hole passes by. If the speed of your turntable is 78 rpm, for example, the counter will register 78 counts per minute, assuming your turntable speed is correct.

Counting with a remote switch or relay requires only that the switch or relay be plugged into jack *J1* and the line cord into a 117-volt outlet. In this case, there's no need to plug in the photocell, since you'll be using another device to trigger the counting mechanism. —30—

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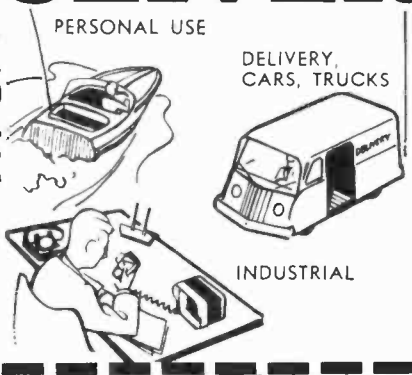

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One-Armed Theremin

(*Continued from page* 61)

The *L1/L2* coil combination functions as a transformer to couple a low-capacity "input" to a high capacity "output." In other words, tuned circuit *L1/C1*, along with any body-capacity effects, is coupled through mutual inductance to the oscillator tank circuit. As a result, any change in the resonant frequency of *L1/C1* will cause a corresponding change in the frequency of oscillation.

The outputs of the two oscillators are coupled to the diode section of tube *V3* by capacitors *C7* and *C8*. After rectification or demodulation in the diode section of tube *V3*, the audio component is amplified in the normal manner by the triode section of *V3*. It then passes to tube *V4* and from this stage into the speaker.

Construction Hints. Whether you buy the kit or revamp a "retired" a.c./d.c. receiver, you'll have little choice in the parts layout, since the location of the various components will have already been determined. In the unit shown here, coils *L1* and *L2* were mounted on the chassis adjacent to tuning capacitor *C10*, and trimmer capacitor *C1* was placed on the front panel near *L1* and *L2*.

The author found it easiest to mount these two coils one on top of the other on a brass machine screw. A fiber washer was inserted between the coils to separate them from one another, and this entire assembly was then mounted on the chassis in a vertical fashion.

The antenna consists of a heavy copper wire or rod securely soldered into a standard RCA phono plug. In order to increase the effect of the operator's hand, an appropriate symbol (a "G" clef) was cut from light gauge aluminum and attached to the antenna rod.

Variable Oscillator Adjustments. With the antenna mounted and the theremin thoroughly warmed up, rotate tuning capacitor *C10*. If everything is functioning properly, you'll hear several beat-notes of varying intensity. Using a vacuum-tube voltmeter, or a VOM with a

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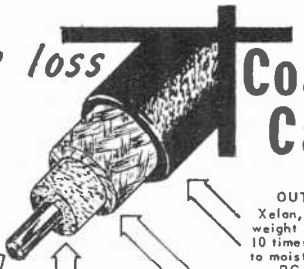

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Larger, solid conductors reduce attenuation due to contact resistance and copper loss, and provide greater tensile strength.

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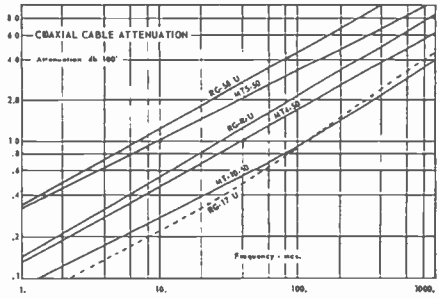

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MOSLEY ELECTRONICS, INC.

SPECIFICATIONS - lo/ten COAXIAL CABLE

50 Ohm Impedance

TYPE	CONDUCTOR	CORE	SHIELD	JACKET	MAX. OPERATING VOLTAGE	DIELECTRIC STRENGTH	NOMINAL CAPACITANCE	VELOCITY of PROPAGATION
MT4-50	No. 10 AWG SOFT BC. .102	.285 ± .007	BC BRAID .335 MAX.	BLK POLY 407 ± .010	2,500 VOLTS RMS	5,000 VOLTS RMS	25.5 mmf/ft.	79.6%
MT5-50	No. 16 AWG HD. BC. .051	.146 ± .005	BC BRAID .140 MAX.	BLK POLY .242 ± .007	1,000 VOLTS RMS	2,000 VOLTS RMS	25.5 mmf/ft.	79.6%
MT10-50	No. 5 AWG SOFT BC .118	.525 ± .015	BC BRAID .585 MAX.	BLK POLY .675 ± .015	3,000 VOLTS RMS	6,000 VOLTS RMS	25.5 mmf/ft.	79.6%

Lo/Ten is manufactured for Mosley by *Times Wire and Cable Company*, Division of International Silver Company, and is familiar to coaxial cable users as T-Line. Lo/Ten is distributed by Mosley through exclusive arrangement with *Times Wire and Cable Company*.

Mosley Electronics, Inc. ● 4610 N. Lindbergh Blvd. ● Bridgeton, Mo.

sensitivity of 20,000 ohms per volt or better, measure the bias voltage between the control grid of *V1* (pin 1) and ground, and adjust trimmer capacitor *C1* for *minimum* voltage reading.

Due to tolerances in component values, you may not be able to spot any fluctuation in voltage between maximum and minimum settings of the trimmer. If this is the case, it will be necessary to alter the values of *C3* and *C4*. Try substituting another capacitor for either one—a unit with about 10% increase or decrease in capacity should be adequate to bring the resonant frequency of the circuit within the range of the trimmer.

The "sensitivity" of the antenna is directly dependent on the trimmer adjustment. Therefore, repeat this step a few times until a minimum meter reading is obtained. Once set, it will seldom require readjustment.

Fixed Oscillator Adjustment. The fixed oscillator (*V2*) must now be tuned to the frequency of the variable oscillator. This is most easily accomplished with an oscilloscope, but it can also be done in a "cut-and-try" fashion. If you have a scope on hand, adjust the horizontal sweep to the frequency of the variable oscillator, then check the frequency of the fixed oscillator.

You'll probably find it necessary to add capacitance in the form of capacitor *C9*—the original model required an additional 0.0015-μf. capacitance. Simply select a capacitor that will place the zero-beat condition at the mid-point of the variable capacitor's range.

If no scope is available, try several different values for capacitor *C9*, noting the relative volume of the audio note as the tuning capacitor is rotated. When a signal appreciably louder than the others comes pounding through, it's likely that you have both oscillators tuned to the same frequency.

Playing the Theremin. Always allow several minutes warm-up time to permit the oscillators to stabilize, then turn the tuning capacitor (*C10*) until zero-beat is reached. Rock the capacitor back and forth, noting that the audio note starts with a low "buzz" and mounts rapidly to a high-pitched tone at either side of the zero-beat point.

Tune the capacitor toward the minimum capacity until the beat-note starts, then back it off carefully to the point where the sound ceases. Correctly adjusted, the theremin will produce its lowest note when your hand is five or six inches from the antenna. As your hand approaches the antenna the tone mounts smoothly in frequency to inaudibility.

Before making your "debut" in front of family or friends, practice a little to determine just how much movement of your hand is required. Try for steady tones until you acquire some familiarity with the relative position of your hand for the various notes of the scale.

The next trick is to learn to "vibrate" your hand gently from the wrist. This produces a pleasant tremolo effect and disguises a sour note until you can bring it to the proper pitch.

Judicious use of the volume control will also do much to enhance the effect. And keeping the volume low—at least at first—will help preserve friendly relations with those who aren't overly impressed with your virtuosity! -30-

New Form for CB

(*Continued from page* 56)

31, 1962. (Class A CB'ers cannot use the old form after August 31, 1962.)

Instruction Sheet. The FCC supplies an instruction sheet with each Form 505 which covers all possible contingencies that may come up.

This article has singled out the largest group of applicants for CB licenses. If you don't fall into this group, do not despair. Read the instruction sheet very carefully, and fill out the work sheet as it tells you to. If you have any questions, phone the nearest FCC field office for advice. And if it is just over your head, see your lawyer—especially if you represent a company or corporation that wants to use CB radio.

All in all, a cheer should arise from the rank and file of CB'ers throughout the nation for the action which has been taken by the FCC in setting up this new form. Hip, hip . . . -30-

Electronic Noise Quiz Answers

(*Quiz on page 62*)

1 — B Transformer buzz is usually produced by the vibration of loose laminations in the transformer's iron core.

2 — H Relay chatter occurs when the current value in the relay coil is somewhere between the normal operating value and the drop-out value.

3 — I Turntable rumble is a low-frequency vibration mechanically transmitted to the phono cartridge pickup by the turntable drive mechanism.

4 — G Keying chirp is caused by undesirable variations in transmitted frequency when the transmitter r.f. oscillator is keyed.

5 — J Armature growl is a symptomatic sound made by an armature containing shorted turns when placed on a test-stand device called a "growler."

6 — A Loudspeaker boom is produced by self-oscillation of the speaker at a low-frequency resonant point.

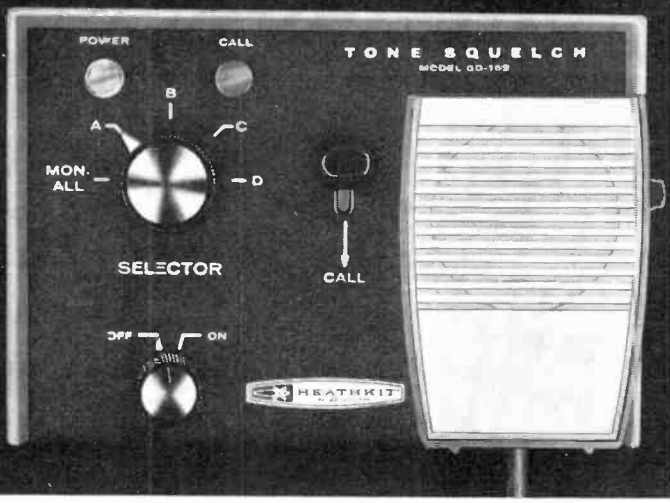
7 — E Needle scratch is due to a worn stylus point. Dirt and dust on a record or a defective record can produce the same sound.

8 — C Tube hiss is due to electron collisions in an irregular electron stream caused by an uneven cathode coating. Although a tape recorder (F) and a car generator (D) will also produce hiss, they are not the correct answers for question 8, but for 9 and 10 which follow.

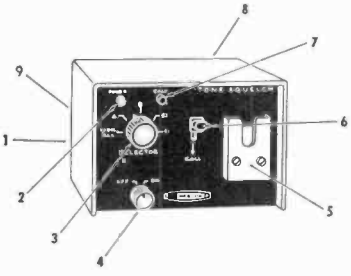
9 — F Tape recorder wow is comprised of slow variations in the pitch of recorded sounds caused by irregular slippage or drag in the tape drive mechanism. A turntable (I) with a friction drive will also produce wow sounds, but (I) has already been matched with question 3.

10 — D Generator whine is due to commutator sparking and changes in frequency with varying engine speeds, and it sometimes interferes with reception in or from mobile stations.

First new concept in citizen's band equipment in two years! . . . Heathkit 4-Position Selective-Call kit



an exclusive with Heath, this inexpensive unit converts your CB station from "party line" confusion to "private line" calling convenience



FEATURES

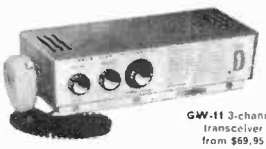
(1) squelch time-delay control, (2) power indicator, (3) tone selector switch (4 tones plus "monitor all" position), (4) tone squelch "defeat" switch for normal operation (5) "lift-to-operate" microphone bracket, (6) "call" lever (7) "call" indicator, (8) external alarm contacts to signal received call, (9) input and output level controls.

Here's welcome news for the serious user of Citizen's Band two-way radio. Heath's new Selective-Call Kit with tone squelch makes it possible for you to enjoy the calm of a CB station that is completely silent, yet ever alert for a personal call . . . makes it possible for you to call your choice of four specific units in your system at the touch of a button.

Using a unique new method, Heath's Selective-Call Kit features an *exclusive* 4-position rotary selected resonant-reed relay which responds only to calls transmitted by similarly equipped units using the same tone frequency. Upon receipt of the proper tone, your unit will automatically "come to life" permitting you to hear the call letters transmitted . . . you reply by merely lifting the microphone and acknowledging. At all other times, your station is peacefully quiet, allowing you to perform your job without one ear "cocked", for this unit does your listening for you.

To call another unit, just select the correct one of four tone frequencies, press the lever, and the called station will be waiting for you. Nothing could be simpler or more convenient. A "defeat" switch allows normal transceiver operation at any time. Equip all your CB units now with this economical new advance in communication ease . . . instructions included for installation with most popular CB transceivers using PTT.

Kit GD-162A (AC), no money down, $5 mo. **$33.95**; **Kit GD-162D (DC) $37.95**



GW-11 3-channel transceiver from $69.95

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Ordering Instructions: Fill out the order blank. Include charges for parcel post according to weights shown. Express orders shipped delivery charges collect. All prices F. O. B. Benton Harbor, Mich. A 20% deposit is required on all C.O.D. orders. Prices subject to change without notice. Dealer and export prices slightly higher.

Enclosed is $_____; send_____

Name_____

Address_____

City_____ Zone_____ State_____

Transistor Topics

(*Continued from page* 68)

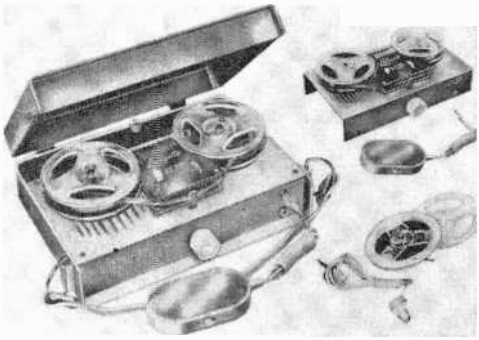
plies a continuously adjustable output voltage, ranging from 0 to 16 volts. It is provided with a built-in voltage/current meter calibrated to 20 volts and 10 amperes. Like the EC-1, it has a maximum ripple component of less than 0.5% at full load. Excellent for experimental applications, the EC-2 sells for $39.95.

Product News. Several new items are now available from General Electric Company (Electronics Park, Syracuse, N. Y.). For one thing, there are ten new high-performance germanium tunnel diodes. Types 1N3712 through 1N3721. Designed primarily for low-level switching circuits, these diodes are also valuable for high-frequency applications, such as in sine-wave oscillators and as frequency converters in receivers. Cutoff frequencies range from 1600 mc. for the 22-ma. type to 2300 mc. for the 1-ma. unit. Premium types are also available, with cutoff frequencies ranging from 2600 mc. for the 22-ma. unit to 3400 mc. for the 5-ma. model.

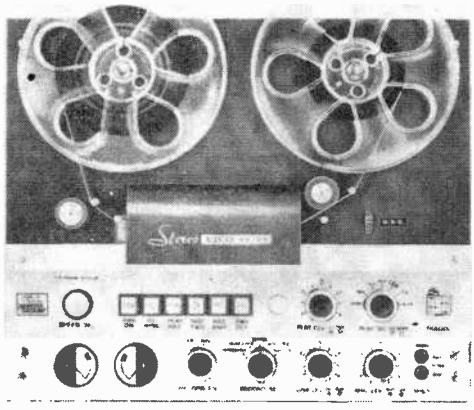
In addition to the new series of tunnel diodes, G.E. has introduced a series of germanium tunnel diode *pairs* matched as to both a.c. *and* d.c. characteristics over a 40° temperature range—the first matched pairs to be guaranteed by a manufacturer under varying temperature conditions. Each matched pair is assembled in a single package, with three different types available, differing only in their peak point current specifications (1, 2.2, and 4.7 ma.)

Finally, General Electric is offering a medium-current silicon controlled rectifier for applications in the consumer, light industrial, and experimenter markets. Known as Type C37, it is a 16-ampere (r.m.s.) device, available in six voltage ranges; and it's the first SCR manufactured by G.E. for broad applications not having the critical environmental requirements of military specifications. Typical applications are in electric hand tools, light dimmers, and home appliances. Detailed characteristics and specifications are contained in brochure #160.23, available on request from the General Electric Co., Rectifier Components Dept., W. Genesee St., Auburn, N. Y.

An improved transistorized stereo/mono 4-track tape deck has been announced by EICO Electronic Instrument Co., Inc. (33-00 Northern Blvd., Long Island City 1, N. Y.). Designated as the Model RP100, it features a number of mechanical improvements over the older model while retaining such features as separate stereo record and playback heads, separate transistor stereo record and playback amplifiers, monaural re-



This low-cost transistorized tape recorder is available in "semi-kit" form from Lafayette Radio. Its small size makes it easy to carry, and, since it's battery-operated, you can use it almost anywhere.



Separate record and play heads as well as two record-level meters are featured on EICO's Model RP100 transistorized four-track tape deck.

cording on four tracks, a digital turns counter, electrodynamic braking, two recording level meters, and excellent electronic control facilities. In kit form, the RP100 nets for $299.95; a factory-assembled unit sells for $399.95. An optional carrying case is available at $29.95 or rack-mounting at $9.95.

Lafayette Radio Electronics Corp. (111 Jericho Turnpike, Syosset, L. I., N. Y.) has introduced a miniature transistorized tape recorder in "semi-kit" form. Known as the "Kordex" (Catalog No. KT-201), it nets for $17.95 plus postage. Featuring a prewired three-transistor amplifier, the unit will record and play up to 20 minutes on a 3″ reel of ½-mil tape. It is powered by two standard "C" cells and a 9-volt transistor battery, and it comes complete with a combination microphone/telephone pickup, earphone, batteries, two 3″ reels, 100 feet of tape, and instructions. The completed recorder measures 8¼″ x 6″ and will fit easily into a small briefcase or handbag.

That covers the semiconductor story for now—'bye till next month . . .

—*Lou*

Transceiver for 6

(*Continued from page* 49)

between *L2* and *L3* for optimum reception (you may have to retune *C8* during the procedure). This will insure proper operation of *R9*.

If you would like to have provisions for bandspread tuning, install a Hammarlund MAC-5 midget variable capacitor (with all plates but one rotor and one stator removed) in parallel with *C8*. Set this bandspread capacitor to its maximum capacity and adjust *C8* to the low end (50 mc.) of the 6-meter band. Tuning through 54 mc. can now be done exclusively with the bandspread capacitor.

Finally, plug a mike into *J4* (or a handset into *J3* and *J4*), and you're ready to go on the air. And the fact that you're operating a 2-watt, 1-tube station should make enough conversation for many enjoyable QSO's. —30—

Across the Ham Bands

(*Continued from page* 65)

the modulator and transmitter are made via a 5-wire cable running from one unit to the other.

To determine which tap on modulation transformer *T3* to use, divide the plate voltage of the transmitter's final r.f. amplifier tube by the plate current (in amperes). This will give you the "equivalent load impedance" of the stage. Connect to the tap which most closely matches this impedance, and you're ready to go on the air. (The 5000-ohm tap will be correct for most 50-watt transmitters.)

Operation. Turn switch *S2* to position 1 ("CW") and tune up your rig, as you normally would on CW, for an input power of 50 watts or less. In the "CW" position, incidentally, section *S2a* of switch *S2* cuts the modulator power; section *S2b* shorts pins 1 and 2 of *J2* together—connecting the transmitter for CW operation, and section *S2c* actuates the transmitter.

Now connect a ceramic or crystal mike to jack *J1* and turn *S2* to position 3 ("Phone"). With the switch in this position, power is supplied to the modulator, the short is removed from pins 1 and 2 of *J2*, and the transmitter remains activated.

All that remains to be done is to set gain control *R5*. To do this, speak into the mike at a normal level and advance the control until the plate-current meter for the final r.f. stage quivers a bit on peaks. Now you're transmitting on AM phone with an audio quality many other operators will envy.

To put the rig on standby when you're ready to receive, just set *S2* to position 2.

News and Views

Andy Freeman, WNØAAD, 1805 North Third St., Grand Forks, N. D., is following in the footsteps of his dad, who was W9EAP 25 years ago. Using a Johnson Ranger II feeding either a 40-meter dipole or a Gotham vertical antenna on 80 meters and a Hallicrafters SX-100 receiver, Andy has worked 44 states and three Canadian provinces. With a 15-wpm code-proficiency certificate

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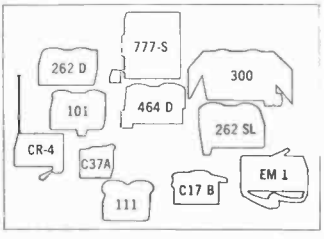

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SUPERSCOPE *The Tapeway to Stereo*

on the wall, he feels that he's ready for his General exam now. . . . In Havre De Grace, Md., **Ronald "Duke" Ward, KN3QWO,** 815 Giles St., stirs up the electrons on 40 and 15 meters with a Heathkit DX-40 transmitter cranked up to 75 watts input. A 40-meter dipole, 30' high, and a National NC-98 receiver complete the equipment. Duke has 39 states, Puerto Rico, and Colombia worked, and is in the comfortable position of waiting for his General Class ticket to arrive. When it does, he plans to give six meters a whirl. . . . **Don Mead, KN7RQX,** 690 S.E. 9th St., Beaverton, Ore., shows what you can do with 40-odd dollars (that's what his equipment cost him) and a little ingenuity. He uses a home-brew, 75-watt transmitter and an ancient Hallicrafters SX-23 receiver. And, though his antenna (a 40-meter dipole) is only 15' high, he has put signals into 22 states and Ontario, Canada, in five weeks of 40-meter operation.

Ronnie Stultz, WN4BXO, Route 3, Winchester, Va., has worked 20 states on 40 meters, transmitting on a Heathkit DX-20 and receiving on a National NC-57. As an SWL (WPE4CHK), Ronnie has logged 33 countries—20 confirmed. Ronnie thanks the Shenandoah Valley Amateur Radio Club for their Novice class. . . . **Haskell B. Small, KN3SGO,** 3706 Mass. Ave., NW, Washington 16, D.C., is doing what he can to make his town famous around the world via ham radio. A Hallicrafters SX-140 receiver, an HT-40 transmitter, and a Gotham V-80 vertical antenna have carried the word to 19 states so far. . . . **Wayne Dohnal, WN9BPZ,** 5128 George St., Chicago 41, Ill., didn't know whether to thank or sue the postman the day his license came. You see, the postman delivered the license safely, but he dropped the package containing the transmitter (a Heathkit DX-60). It took a week for replacement parts to arrive. Wayne's first two antennas each had a maximum range of one mile; the third one, however, is doing the trick—he now has 21 contacts in seven states.

Delores "De" Y. Hovendick, KN1VGH, 164 Lois St., Manchester, N.H., works 40 meters only and has made 183 contacts in 25 states in her four months on the air. Besides hamming, De has four children, bowls in two leagues, sings in a choir, and teaches Sunday School to keep herself busy. Also, she graduated two students from a code class she taught, and will be glad to help other prospective hams earn their licenses. She'll sked you, too, if you need a New Hampshire contact (with QSL guaranteed). De's equipment consists of a Heathkit DX-35 feeding a 40-meter dipole, and a National NC-109 receiver; her husband, Jim, K1TLT, shares it with her. . . . **Steven Lomazow, WV2VHY,** 703 Byron Ave., Franklin Square, N.Y., found that contacts came hard during his first three months on the air (he was running 35 watts into a "long wire" antenna). Then Steve obtained a Heathkit DX-40 transmitter and a multi-band vertical antenna and really took off. In the two months since

Here are a couple of real old-timers! John Mattson, WNØAEA, St. Paul, Minn. (above), is 10 years old and has been a Novice for 7 months; a General ticket is in the offing. Herbert Rippe, WN8DCH, Sharonville, Ohio, not quite 10, likes 40 meters.

UNUSUAL HAM CONTEST

The Duneland Amateur Radio Club, Valparaiso, Indiana, sponsors an annual contest that other ham groups might like to try. Each contestant attempts to contact 26 different amateur radio stations whose call-signs end with different letters of the alphabet.

To make the contest more interesting, the contestants receive sealed envelopes (chosen by lot) containing special instructions. The instructions might say, for example, "Work at least five different call areas in forming your alphabet," or "Do not include more than 10 QSO's from any one call area."

The winner is the contestant who submits QSL cards, or other written evidence, to prove that he has worked the greatest number of "letters" during the contest period. In the event of a tie, the dates and times of the postmarks on the QSL cards determine the winner.

The contest period is one week, starting immediately at the conclusion of the club meeting at which the sealed instrutions are distributed. Claimed scores and QSL cards must be submitted to the club secretary at, or before, the next meeting (one month later).

GREAT CIRCLE CHART

A large, full-color "Radio Amateur Great Circle Chart" is being offered by ELECTRONICS WORLD, our sister publication. Suitable for framing, it contains a complete list of amateur prefixes by calls and countries, and gives the true great-circle directions of all countries from the United States. The latter feature is especially useful to amateurs with rotary beam antennas, since directions are often not what they seem to be on conventional maps. If you'd like to have one of these charts, send 15 cents to ELECTRONICS WORLD, Box 378, Church Street Station, New York 8, N. Y., and ask for Chart #5.

then, he has worked 15 different countries and 19 states. . . . **Bob Read, WNØAGF/WAØAGF,** 103 Arcadian Ct., McPherson, Kansas, works all four Novice bands. On 80, 40, and 15 meters, he has a home-built 75-watt transmitter using a pair of 807's to feed either a 40-meter dipole or a multi-band vertical antenna; he receives on these bands with a "war-surplus" BC-312 receiver. On two meters, a home-built transmitter using a 6146 in the final amplifier does the transmitting; a home-built converter ahead of the BC-312 does the receiving. The 2-meter signal-squirter is a 16-element beam.

We're at the bottom of the page again, but we'll be looking for your "News and Views" next month. Send them to: Herb S. Brier, W9EGQ, Amateur Radio Editor, POPULAR ELECTRONICS, P.O. Box 678, Gary, Indiana. 73,

Herb, W9EGQ

"Good night, Chet."

"Good night, David."

Short-Wave Report

(*Continued from page* 92)

R. Luluabourg (exact address unknown)
R. Stanleyville, B. P. 1745, Stanleyville

If you have been nearly as confused about the two Congos as we have, the preceding information may clarify the situation a little for you.

New S.W. Stations. Applications have been made to the Federal Communications Commission for two new short-wave broadcasting stations. The first, to be operated by *Trans-World Radio* in the 15- and 17-megacycle bands, will be located near Vega Baja, Puerto Rico; beamed to South America, Europe, and North Africa; and rated at 250 kilowatts. The second, to be operated by International Communications, Inc., will be located at Maury Island, Wash., with a studio at the Seattle World's Fair Grounds; headed for the 15-mc. band with 50 kw., this station will be beamed to Mexico, Central America, and South America.

Rumor has it that *Radio Yamo,* 9225 kc., is being heard at 2340-0000. The fact of the matter is that this station, reportedly located near India, simply does not exist nor does the country of Yamo!

No official word has been received with regard to WINB, Red Lion, Pa., said to have a construction permit for stations

John Sullivan, WPE1CZX, of East Greenwich, R. I., has accumulated 21 veries to date using a Hallicrafters S-120 receiver and a 100'-long antenna.

on 9610 and 11,920 kc. Do any of our readers have up-to-date information on WINB?

Receiver Listings. Plans are being made by your Short-Wave Editor to list the receivers used by POP'tronics Monitors each month in addition to names and call letters. So that this information will be readily available, we request that you make it a point to indicate the make and model number of your receiver in future reports, in addition to your WPE call letters.

Current Station Reports

The following is a resume of current reports. At time of compilation all reports are as accurate as possible, but stations may change frequency and/or schedule with little or no advance notice. Reports should be sent to P. O. Box 254, Haddonfield, N. J., in time to reach your Short-Wave Editor by the eighth of each month; be sure to include your call letters, and the make and model number of your receiver. All times shown here are Eastern Standard and the 24-hour system is used.

Afghanistan—*R. Australia* reports that *R. Kabul* transmits Eng. to Indonesia at 0600-0630 on 15,425 kc. Have any of our reporters heard this xmsn?

Argentina—The latest schedule for *Radiodifusion Argentina Al Exterior* (*R.A.E.*), Buenos Aires, to North, Central, and South America reads as follows: 1900-2000 in Portuguese, 2000-2200 and 2300-0100 in Spanish, and 2200-2300 and 0100-0200 in Eng., all on 9690 kc.

Belgium—The latest Brussels schedule reads: to Africa at 0500-0700 on 17,860, 21,510, and 21,725 kc., at 0900-1100 on the same channels (except 21,500 kc. in place of 21,510 kc.), and at 1100-1200 on 17,860 kc.; to N.A. at 1100-1200 on 15,335 kc., at 1615-1800 on 11,720 kc., and at 1815-2000 on 9705 kc. A late report indicates a possible deviation from this schedule, however, as the 1635-1735 Flemish program has been noted on 11,735 kc.

Bolivia—*Southern Cross Radio*, La Paz, has moved to 4985 kc. where it is noted from 2135 to 2205 s/off with Eng. and Spanish religious programs and a complete Eng. ID at s/off. *R. Grigota*, CP24, Santa Cruz de la Sierra, is a new station broadcasting on 4826 kc.; it is heard in Brazil from 2115 to 2158 s/off with music, time checks, and advertisements. After s/off, another station is noted in Russian; this may be Ashkabad, U.S.S.R. Another new Bolivian station is *R. La Voz del Ferroviario*, La Paz (?), on 6198 kc.; also heard in Brazil at 2200, it is QRM'ed by 2230. The latter station has the same name as one last noted in 1959 on 9203 kc.; it may have returned to the air.

Costa Rica—*R. Monumental*, San Jose, is good on 6185 kc. (down from 6230 kc.) at 2300 with light music, frequent ID's and short news bulletins. The first few bars of

SHORT-WAVE CONTRIBUTORS

Anson Boice *(WPE1BD)*, New Britain, Conn.
Ernest Zecchini *(WPE1CIH)*, Lawrence, Mass.
Ed Scott *(WPE1CPS)*, Brewer, Maine
George Palazio, Jr. *(WPE1DBS)*, Warren, R. I.
Thomas Clancy *(WPE1DMR)*, Quincy, Mass.
Ralph Hunnewell *(WPE1DNX)*, Hudson, N. H.
Stan Floroski *(WPE1DUB)*, Trumbull, Conn.
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Howard Sinberg *(WPE2FRK)*, New York, N. Y.
Joseph Kotowicz, Jr. *(WPE2FXQ)*, Glen Cove, N. Y.
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Bruce Coleman *(WPE2GNX)*, Westfield, N. J.
Martin Rosenzweig *(WPE2GOQ)*, Levittown, N. Y.
George Fank *(WPE2GQD)*, North Valley Stream, N. Y.
Irwin Karliner *(WPE2GTO)*, Flushing, N. Y.
Grant Nicholls *(WPE2GXU)*, Medford Lakes, N. J.
John McDermott *(WPE2HGA)*, Franklin Lakes, N. J.
Nicholas Nicastro *(WPE2HHS)*, Hoboken, N. J.
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Kenneth Lempert *(WPE3CSV)*, Baltimore, Md.
Paul Gallagher *(WPE3CTW)*, Radnor, Pa.
Alfred Iopolo *(WPE3CUG)*, Philadelphia, Pa.
Jim McKechnie *(WPE3CUV)*, Camp Hill, Pa.
Mark Riley *(WPE3CVP)*, Devon, Pa.
Robert Nagle *(WPE3DIX)*, Allentown, Pa.
John Wilson *(WPE3NB)*, Wilmington, Del.
Grady Ferguson *(WPE4BC)*, Charlotte, N. C.
John Brunst *(WPE4BQ)*, Neptune Beach, Fla.
Bill Carter *(WPE4DHH)*, Mt. Airy, N. C.
Gus Anderson *(WPE4DOS)*, Staunton, Va.
David Merritt *(WPE4EDJ)*, Paducah, Ky.
Harold Oney *(WPE4EEM)*, Somerset, Ky.
Wayne Topa *(WPE4EJR)*, Myrtle Beach, S. C.
Buford Reynolds *(WPE4EMF)*, Nashville, Tenn.
Ernest Childs *(WPE4EMV)*, Charleston, S. C.
John Oneal *(WPE4EPQ)*, Cleveland, Tenn.
William Taylor *(WPE4ETU)*, Raleigh, N. C.
Bruce Churchill *(WPE4EVD)*, Pensacola, Fla.
Ronald Schatz *(WPE4EVF)*, Miami Beach, Fla.
Wayne Stanfield *(WPE4EVR)*, Alton, Va.
William Bing *(WPE5AG)*, New Orleans, La.
Raymond Hertz *(WPE5CDP)*, Dallas, Texas
James Coston *(WPE5CEP)*, Winfield, Texas
Delbert Hirst *(WPE5CFU)*, Snyder, Texas
M. J. Fenrich *(WPE6CDJ)*, U.S.A.F., Guam
Leo Watson *(WPE6DCR)*, West Covina, Calif.
Barry Keating *(WPE7BBV)*, Idaho Falls, Idaho
Tim Shaw *(WPE8BUV)*, Bay Village, Ohio
Allan Hubbert *(WPE8DXJ)*, Detroit, Mich.
Robert Hackenberg *(WPE8DXR)*, Barberton, Ohio
Bruce Van Epps *(WPE8ECH)*, Grand Ledge, Mich.
Ken Meinken *(WPE8ELC)*, Cincinnati, Ohio
E. J. Stuart, Jr. *(WPE8EMM)*, Weirton, W. Va.
Mike Kander *(WPE8IIS)*, Dayton, Ohio
Robin Fisher *(WPE8OG)*, Beach City, Ohio
Bob Massey *(WPE9AKZ)*, Appleton, Wis.
Ray Fansler *(WPE9CQC)*, Fairfield, Ill.
Jerome Wysocki *(WPE9DCO)*, Chicago, Ill.
Dan Lyon *(WPE9DMJ)*, Lincolnwood, Ill.
J. P. Arendt *(WPE9DN)*, Aurora, Ill.
Daniel Weinstein *(WPE9DST)*, Madison, Wis.
Tom Reitze *(WPE9EDO)*, Evanston, Ill.
Michael Peters *(WPE9EEC)*, Burnett, Wis.
Gregory Ganz *(WPE9EFU)*, Riverdale, Ill.
Edward Bassett *(WPE9EHF)*, Toledo, Ill.
Don Allen *(WPE9EJR)*, Covington, Ind.
John Beaver, Sr. *(WPEØAE)*, Pueblo, Colo.
James Vachalek *(WPEØCDT)*, Festus, Mo.
George Buchanan *(WPEØVB)*, Webster Groves, Mo.
Hector Davila *(KP4PE1G)*, Bayamon, P. R.
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Gregg Calkin *(VE1PE3L)*, Saint John, N. B.
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Brian Palin *(VE3PE1LW)*, Toronto, Ont.
Danny Ostler *(VE3PE1NK)*, Toronto, Ont.
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Michael Leff, Bronx, N. Y.
Bill Miller, South Bend, Ind.
Bob Norris, Metuchen, N. J.
Joe Overmyer, Fort Wayne, Ind.
Irving R. Potts, Union, N. J.
Frank Ruzicka, Aurora, Ohio
Dave Thomas, Proctorville, Ohio

"Beyond The Sea" are noted before each news item or report.

Denmark—The latest schedule to N.A. is 2030-2130 and 2200-2300 on 9520 kc. There is a mailbag on Saturdays and a DX bulletin on Tuesdays.

East Congo—Leopoldville was noted on 11,755 kc. from 2300 to past 0000 in Eng. with music and news. A late report indicates a possible change in frequency to 11, 710 kc. for the 2115-2145 segment to N.A., but this has not as yet been confirmed.

Egypt—The complete Eng. schedule from the Egyptian B/C Corp. reads as follows: to Asia on 17,760 kc. at 0830-0930; to Africa on 17,760 kc. at 1245-1330 and on 17,690 kc. at 1415-1500; to Europe on 11,915 kc. at 1630-1730. News at dictation speed is given on 7050 and 11,745 kc. at 0130-0200. Reports go to: Monitoring Department, United Arab Republic Broadcasting Service, Cairo, Egypt.

Formosa—*Voice of Free China*, Taipei, is operating in Eng. at 0515-0555 on 11,825, 9770 kc. (announced as 9720 kc.), 9685 kc. (announced as 9660 or 9665 kc.), 7130, and 6095 kc., with news, talks, and some Chinese music. The 6100-kc. outlet was also noted at 0430 in English—beam not certain. Another outlet on 15,175 kc. was noted at 2015 with Chinese music.

France—Paris, 15,290 kc., has been heard from 0815 with Eng. news beamed to the Far East. The English xmsn continued to past 0835.

Germany—English was noted from *Deutsche Welle*, Cologne, on 6150 kc. at 0100-0115 in German-English language lessons, and on 15,275 kc. to the Middle East at 0845-0910 with music, news to 0915, then French.

Haiti—The complete schedule of *R. Lumiere*, including medium-wave stations (which may be heard at times), is as follows: 4VI, 760 kc., 4VU, 2410 kc., and 4VO, 6090 kc., all in Cayes; 4VIE, 1180 kc., in Jeremie; and 4VUE (soon to be in operation on 780 kc.) in Port-au-Prince, at 0530-0900 and 1530-2215 weekdays and at 0530-2215 Sundays in French and Creole. There is an Eng. news bulletin daily at 2130. The 4VU xmtr is used for the Cuban beam on 9635 kc. at 0746-0830.

Station 4VE, Cap Haitien, has been found on 2490 kc. with 250 watts from 2235 to 2304 s/off. This is an outlet of the more commonly known 4VEH which operates on 6120 and 9770 kc.

Hungary—Budapest has Eng. to Great Britain and Europe at 1500-1530 on 9833 and 7225 kc. and at 1700-1730 on 9833, 7225, and 6326 kc.

Indonesia—YDF6, *Voice of Indonesia*, Djakarta, is good on 9585 kc. in Eng. at 0930-1030, with the best signal heard towards the end of the period.

Japan—The latest schedule from Tokyo reads as follows: to N.A. at 1930-2030 on 15,135, 15.390, and 17,895 kc.; to N.A. and L.A. at 2200-0000 on 9505, 11,705, 11,780, and 15,235 kc.; to Hawaii at 0030-0200 on 15.235 and 17,725 kc.; to Europe at 0115-0345 on 15,135 and 17.895 kc.; to Australia and New Zealand at 0430-0530 on 11,875 and 15,235 kc.; to the Philippines and Indonesia at 0730-0930 on 11,780 and 15.135 kc.; to S. E. Asia at 0800-1100 on 9675 and 11,705 kc.; to S. Asia at 1000-1130 on 9525 and 11,780 kc.; to the Middle East and N. Africa at 1145-1345 on 7195, 9525, and 11,780 kc.; to Africa at 1500-1600 on 9525 and 11,875 kc. General Services: 2000-2030, 2100-2130, 2200-2230, 2300-2330, and 000-0030 on 15,105, 15.195, and 17,755 kc.; 0100-0130, 0200-0230, 0300-0330, 0400-0430, and 0500-0530 on 11,725, 15.195, and 11,865 kc.; 0600-0630, 0700-0730, 0800-0830, 0900-0930, and 1000-1030 on 11,725, 11,875, and 11,855 kc.

Lebanon—Beirut has been found on 7280 kc. at 2330-0000 in Arabic with music and news; the ID is *Huna Beirut*.

Netherlands—There are conflicting reports regarding the "Happy Station Program" from Hilversum but the very latest schedule shows this timetable: 0100-0225 to Australia and New Zealand on 11,780 and 9715 kc.; 0530-0700 to Europe and the Far East on 17,810, 6020, and 5980 kc.; 1100-1230 to Africa, the Middle East and Europe on 21,480, 15,425, and 6020 kc.; 1600-1730 to S. America on 11,710, 15.425, and 6020 kc.; and 2100-2230 to N.A. on 9590, 6020, and 5985 kc.

Newfoundland—DX'ers who want to log this Canadian Province should tune for *Gander Aeradio* on 3001 kc. at 2145-2155 with weather bulletins after *New York Aeradio* has s/off.

New Guinea—VL9BR, 4840 kc., 250 watts, operates at 0255-0600 (Saturdays and Sundays from 0340) to the Gazelle Peninsula of New Britain in Tolai, Pidgin, and English. Reports go to: *Radio Rabaul*, P. O. Box 71, Rabaul, New Guinea.

Norway—"Norway This Week" in Eng. is broadcast from Oslo to N. A. and to the North Atlantic and Caribbean areas at 2100-2130 on Sundays, and to the West Coast of N.A., North Atlantic and Pacific areas, and East Africa at 0000-0030 (presumably on Mondays) on 15.175, 11,850, 9610, and 6130 kc. Medium-wave DX'ers might try for the 1578-kc. outlet which also broadcasts this program at the times indicated above.

Paraguay—ZPA7, *R. Guarani*, Asuncion, thought to be inactive, is being noted on 15,210 kc. around 1410 with request music and at 1745-2045 with sports, music, and frequent ID's.

Portugal—Lisbon has extended its "Voice

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of the West" program in Eng. to N.A. by 15 minutes; the schedule now reads 2100-2145 to the East Coast of N.A. and 2245-2330 to the West Coast of N.A. on 6025 and 6185 kc. The 17,895-kc. xmsn in Eng. to Europe and Africa at 1315-1430 is also being broadcast on 15,125 kc.

Reunion—*R. Reunion,* St. Denis, has finally been tuned on 4820 kc. after over two years of trying for it. Mostly in French, there is a news bulletin around 2142, Eng. pop tunes to 2230, then a weather forecast.

Rumania—English xmsns, other than those to N.A., can be noted as follows: to Europe at 1430-1500 on 9510, 7195, and 6190 kc., and at 1600-1630 and 1730-1800 on 9570 and 7195 kc.; to the Near and Middle East at 1400-1430 on 9510, 7195, and 6190 kc.; to Asia at 1000-1030 on 15,250 kc.; and to Africa at 1000-1030 on 15,380 and 11,810 kc.

SHORT-WAVE ABBREVIATIONS

B/C—Broadcasting	QRM—Station interference
Eng.—English	R.—Radio
ID—Identification	s/off—Sign-off
kc.—Kilocycles	s/on—Sign-on
kw.—Kilowatts	xmsn—Transmission
L.A.—Latin America	xmtr—Transmitter
N.A.—North America	

Singapore—The British B/C Corp. Far Eastern Service in Singapore has been noted on 7110 and 9725 kc. with a London news relay at 0600 and commentary at 0610.

Surinam—AVROS, *R. Surinam,* Paramaribo, 15,465 kc., now has good signals daily around 1700-2100 in Dutch. There is a special Eng. program each Monday at 2045-2050.

Sweden—The latest schedule for English broadcasts from Stockholm reads: to the Far East at 0730-0800 on 17,845 and 15,155 kc.; to S. Asia at 0945-1015 on 17,845 and 15,420 kc.; to the Middle East at 1115-1145 on 15,240 and 11,705 kc.; to Africa at 1245-1315 and 1445-1515 on 11,705 kc.; to Europe at 1700-1730 on 6065 kc.; to Eastern N.A. at 0900 on 17,840 kc. and 2045 on 6065 kc.; and to Western N.A. at 2115 on 6065 kc.

Syria—Damascus, 15,165 kc., has French news and Arabic chanting to Europe at 1430-1515; Eng. news follows to 1530 s/off.

West Congo—Brazzaville, 11,725 kc., has Eng. news at 2015-2032 and music to 2100 s/off. Several late reports also indicate either a retiming of the Eng. program or an additional program at 2100-2200 with Eng. news, music and French lessons. A letterbox program is aired on Fridays at 2030.

Windward Islands—Windward Islands Broadcasting Service, St. Georges, Grenada, was noted on 15,235 kc. at 1300 with band music to 1305 s/off and at 1615-1700 to Great Britain with pop music. The 31-meter outlet has moved up to 9820 kc., where it is heard from 1745 to 1900 with newscasts at 1800 and 1845. It is not heard on 11,974 kc. at present.

Yugoslavia—*R. Belgrade* carries an Eng. newscast and commentary at 1030-1040 on 15,240 kc. -30-

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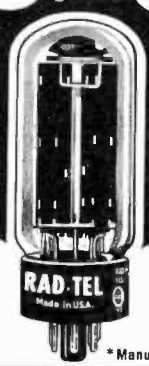

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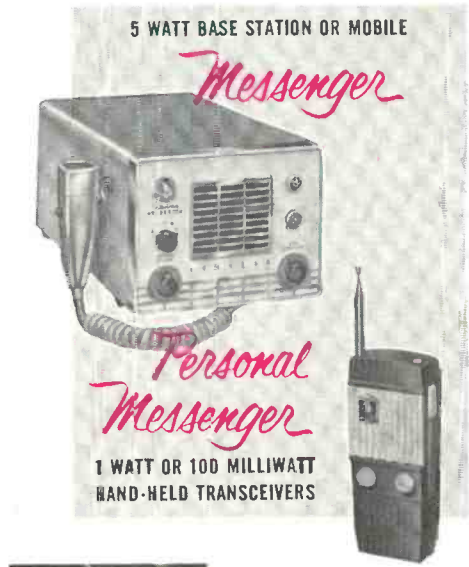

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