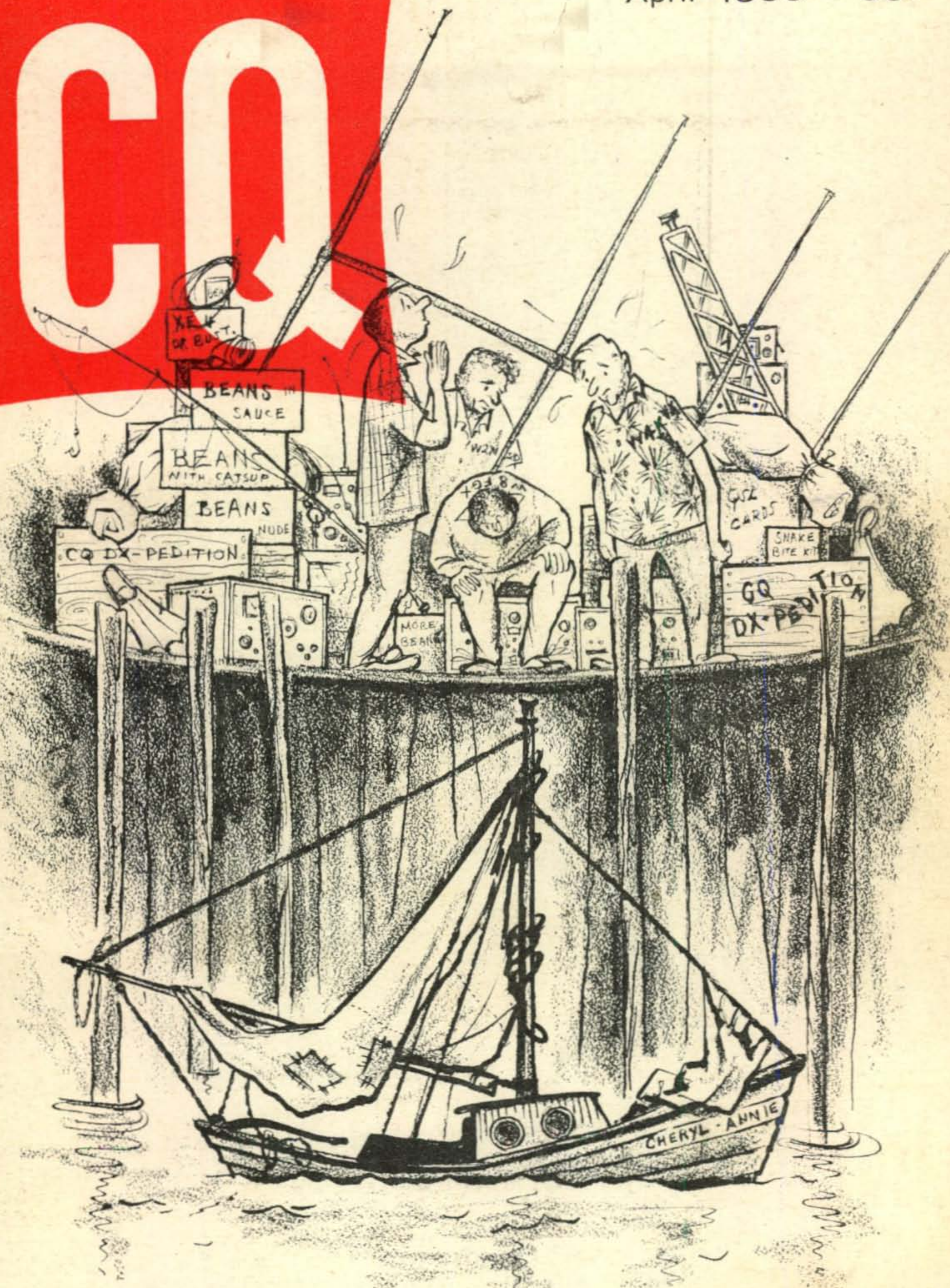


CQ





TO XYL'S


ONLY

Does your OM's ham-shack resemble a surplus store? Are you afraid to clean "that corner" for fear the vacuum cleaner

will inhale cables, spare tubes or crystals? For your own future peace of mind why not describe Collins compact KWM-1 to him: small enough to fit neatly into the bookshelves in the living room, 175 watts of input power (SSB-PEP), a

super-sensitive receiver, outstanding frequency stability and calibration, 14-30 mc frequency range — and, when he is mobiling in the family car, it makes a neat installation, easily removable, not a "shin bumper." Cost? Through the years it will cost him less than anything else he can build or buy. Tell him to call his Collins distributor for the facts about the revolutionary KWM-1 mobile transceiver. Available on easy terms.

For further information, check number 1 on page 126.

Collins CREATIVE LEADER IN COMMUNICATION 

There's a PR for every Service!

AMATEUR

40, 80 and 160 Meters, PR Type Z-2

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed.....\$2.95 Net



20 Meters, PR Type Z-3

Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. Stable as fundamental oscillators. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation.....\$3.95 Net



COMMERCIAL

COMMERCIAL, PR Type Z-1

Designed for rigors of all types of commercial service. Calibrated .005 per cent of specified frequency. Weight less than 3/4 ounce. Sealed against moisture and contamination. Meets FCC requirements for all types of service.

SPECIAL TYPES

Type Z-1, AIRCRAFT

3023.5 Kc., .005%.....\$3.45 Net

Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range. Calibrated to .005%. 1500 to 10000 Kc. \$3.45 Net

Type Z-6A

FREQUENCY STANDARD

To determine band-edge. To keep the VFO and receiver properly calibrated.

100 Kc. \$6.95 Net



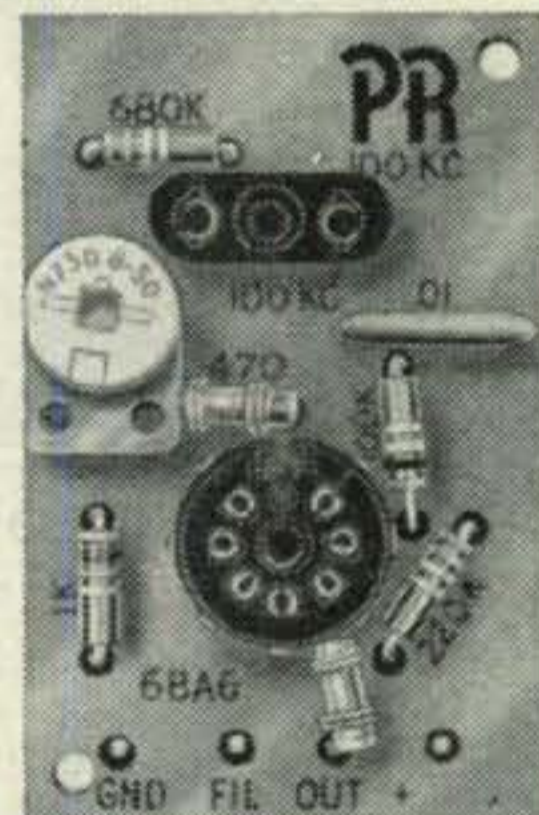
PR PRINTED OSCILLATOR KIT

Has many uses—

- As 100 Kc. Marker
- As 1000 Kc. Marker for Check Points up to 54 Mc.
- As Foundation Circuit for Low Frequency SSB Crystals

Assembled in minutes. Kit contains everything but 6BA6 oscillator tube and crystal.

Each \$4.50 Net

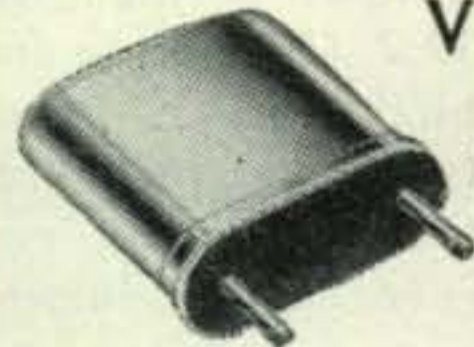


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Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc. (Fund.) ± 5 Kc. . . . \$3.45 Net

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VHF Type Z-9R

For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range.

Each \$4.95 Net

Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .04% . . . \$3.95 Net



Type Z-1 TV Marker Crystals

- Channels 2 through 13 \$6.45 Net
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ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

For further information, check number 4 on page 126.

Designed for



Application



**PHOTO MULTIPLIER SHIELDS
MU-METAL**

The photo multiplier tube operates most effectively when perfectly shielded. Careful study has proven that mu-metal provides superior shielding. Millen Mu-Metal shields are available from stock for the most popular tubes.

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- No. 80802B for the 5819, 6217, 6292, 6343.....
- No. 80802C for the 6199, 6291, 6497....
- No. 80802E for the 6866.....
- No. 80803J for the 6363.....
- No. 80805M for the 6364.....

A full line of mu-metal shields for cathode ray tubes is available. Custom made shields for special application can be provided.

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MFG. CO., INC.**

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CQ, the Radio Amateurs' Journal is published for active hams by active hams. Not affiliated with any clubs or other political groups, CQ endeavors to be a true and honest reporter for those interested in the hobby. Suggestions for improvement are welcomed.

Authors would do well to send for the CQ Style sheet which will explain our confused system of abbreviations and symbols. The article "Author Author" (October 1952 CQ) tells all about how to write articles for CQ, how much we pay, etc. Reprints of this article are available from CQ if you have been improvident in keeping up your radio library.

CQ Certificates:

The WPX Award is granted for two-way contact with certain number of amateurs in different prefixes of the world. Full details are contained in the WPX Record Book which is available for 15c from CQ. Application forms are free.

The WAZ Award is granted for contacting all of the amateur zones of the world. Current standings of amateurs working for this award will be found in the DX column. A DX Zone map of the world is available free from CQ. Send stamped envelope.

Technical Information:

Please check the 11-year cumulative index which was published in the January 1956 CQ for information about articles in past issues of CQ. The December 1956 and 1957 CQ yearly indexes will bring you up to date. Most back issues are available at 50c from us. Check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free.

For further information see the Ham Clinic column.

Disclaimer:

The authors and editors do the best they can to make everything as correct as possible in the articles. If for any reason any of them should happen to goof we hasten to point out that everything is experimental and we guarantee nothing.

Cover Story:

The CQ DX Department and the Ohio Valley Radio Association get together for a DXpedition to Socorro Island, about 400 miles west of Mazatlan, Mexico. Full particulars will be available next month, (if they survive). The DXpedition is being led by Don Chesser, W4KVX, photographed by W2NSD, with W8FGX doing most of the work.

← For further information, check number 5 on page 126.

CQ—The Radio Amateur's Journal

April, 1958

vol. 14 no. 4

300 West 43rd Street, New York 36, N. Y.

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Branch Advertising Offices: James D. Summers, Suite 556, Pure Oil Building, 35 East Wacker Drive, Chicago 1, Ill. ANdover 3-1154.

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Charles W. Hoefer, 1664 Emerson Street, Palo Alto, Calif. DAvenport 4-2661.

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circulation manager Harold Weisner
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advertising representative Dick Cowan
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CQ — (title registered U.S. Post Office) is published monthly by Cowan Publishing Corporation. Executive and editorial offices at 300 West 43rd Street, New York 36, N. Y. Telephone JUdson 2-4460. Second Class Mail privileges authorized at New York, N. Y.

SUBSCRIPTION RATES: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year \$4.00; two years \$7.00; three years \$10.00. Pan-American and foreign: one year \$6.00; two years \$11.00; three years \$16.00.

FOREIGN SUBSCRIPTIONS: Great Britain: RSGB, New Ruskin House, Little Russell St.; London WC 1, England. Australia: Technical Book Co., 297 Swanston St., Melbourne C 1, Victoria, Australia.

Printed in U.S.A. Entire contents copyright 1958 by Cowan Publishing Corporation. CQ does not assume responsibility for unsolicited manuscripts.

Postmaster: Send Form 3579 to CQ, 300 West 43rd Street, New York, N. Y.



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AL K8BLL

All of these licensed radio amateurs make important contributions to the Heath line of fine ham kits. In a sense, they are your personal representatives within the company, because their design ideas and performance preferences reflect not only their own "on-the-air" experiences, but those of the amateur fraternity with which they are in constant contact. With this kind of representation in Benton Harbor, you can continue to rely on high-performance Heathkit amateur radio equipment designed by hams, for hams!

HEATH *hams work to bring you*



CHUCK K8CJI



ROGER MACE (W8MWZ)
SENIOR HAM ENGINEER
HEATH COMPANY

HEATHKIT 50-WATT CW TRANSMITTER KIT

MODEL DX-20

\$35⁹⁵



If high efficiency at low cost in a CW transmitter interests you, you should be using a DX-20! It employs a single 6DQ6A tube in the final Amplifier stage for plate power input of 50 watts. The oscillator stage is a 6CL6, and the rectifier is a 5U4GB. Single-knob band-switching is featured to cover 80, 40, 20, 15, 11 and 10 meters, and a pi network output circuit matches antenna impedances between 500 and 1000 ohms to reduce harmonic output. Designed for the novice as well as the advanced class CW operator. The transmitter is actually fun to build, even for a beginner, with complete step-by-step instructions and pictorial diagrams. All the parts are top-quality and well rated for their application. "Potted" transformers, copper-plated chassis, and ceramic switch insulation are typical. Mechanical and electrical construction is such that TVI problems are minimized. If you desire a good clean CW signal, this is the transmitter for you! Shpg. Wt. 18 lbs.

HEATHKIT DX-100 PHONE & CW TRANSMITTER KIT

MODEL
DX-100

\$189⁵⁰

Shipped motor freight unless otherwise specified. \$50.00 deposit required on C.O.D. orders.

You get more for your transmitter dollar when you decide on a DX-100 for your ham shack! Recognized as a leader in its power class, the DX-100 offers such features as a built in VFO, built in modulator, TVI suppression, Pi network output coupling to match a variety of antenna impedances from 50 to 600 ohms, Pi network interstage coupling, and high quality materials throughout. Copperplated No. 16 gauge steel chassis, ceramic switch and coil insulation, silver-plated or solid silver switch contacts, etc., are typical of the kind of parts you get, to use in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11, and 10 meters with a single band switch, and with VFO or crystal operation on all bands. RF output is in excess of 100 watts on phone and 120 watts on CW, with a pair of 6146 tubes in parallel for the final Amplifier, modulated by a pair of 1625 tubes in parallel. Other tubes featured are: 6AL5 bias rectifier, 5V4 low voltage rectifier, 2-5R4GY high voltage rectifiers, OA2 voltage regulator, 12AX7 speech amplifier, 12BY7 Audio driver, 6AV6 VFO, 12BY7 crystal oscillator-buffer, 5763 r.f. driver, and a 6AQ5 clamp tube. VFO tuning dial and panel meter are both illuminated



for easy reading, even under subdued lighting conditions. Attractive front panel and case styling is completely functional, for operating convenience. The DX-100 was designed exclusively for easy step-by-step assembly, and no other transmitter in this power class combines high quality and real economy so effectively. Listen to any ham band between 160 meters and 10 meters and make a mental note of how many DX transmitters you hear! This kind of acceptance by the amateur fraternity testifies to the performance and quality of the rig. Its the kind of a transmitter you will be proud to own, and one that will give you a very respectable signal on the air. Time payments available! Shpg. Wt. 107 lbs.

...top quality at lowest prices!

NEW HEATHKIT PHONE & CW TRANSMITTER KIT



MODEL
DX-40

\$64⁹⁵

The new DX-40 incorporates the same high quality and stability as the DX-100, but is a lower powered rig, for crystal operation, or for use with an external VFO. Plate power input is 75 watts on CW, permitting the novice to utilize maximum power. An efficient, controlled-carrier modulator for phone operation peaks up to 60-watts, so that the rig has tremendous appeal to the general class operator also. Single-knob switching covers 80, 40, 20, 15, 11 and 10 meters. Pi network output coupling makes for easy antenna loading, and Pi network interstage coupling between the buffer and final amplifier improves stability and attenuates harmonics. A line filter is incorporated for power line isolation. The efficient oscillator and buffer circuits provide adequate drive to the 6146 final amplifier from 80 to 10 meters, even with an 80 meter crystal. A drive control adjustment is provided, and the function switch incorporates an extra "tune" position so the buffer stage can be pretuned before the final is on, and so



the operator can locate his own signal on the band. Tubes used are a 6CL6 Colpitts oscillator, a 6CL6 buffer, a 6146 final amplifier, a 12AX7 speech amplifier, a 6DE7 modulator, and 5U4GB rectifier. The modulator, incidentally, has plenty of "punch" for clear, strong phone operation. A switch selects any of three crystals, or a jack for external VFO. A high-quality meter with D'Arsonval movement mounts on the front panel for tuning. Whether you are a newcomer or an old-timer, you will find the DX-40 an ideal rig in its power class! Shpg. Wt. 26 lbs.

HEATH COMPANY

A Subsidiary of Daystrom, Inc.

BENTON HARBOR 12,
MICH.



ALL-BAND RECEIVER

HEATHKIT ALL-BAND COMMUNICATIONS-TYPE RECEIVER KIT

Ideal for the short wave listener or beginning amateur, this Receiver covers 550 KC through 30 MC in four bands. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer type—power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—internal 5½" speaker—head phone jack and AGC. Has built-in BFO for CW reception. An accessory power socket is also provided for connecting the Heathkit model QF-1 Q Multiplier. Will supply 250 VDC at 15 ma

MODEL AR-3

and 12.6 VAC at 300 ma. Shpg. Wt. 12 lbs. Cabinet: Fabric covered cabinet with aluminum panel as shown part 91-15A. Shpg. Wt. 5 lbs. \$4.95

\$29⁹⁵



ELECTRONIC VOICE CONTROL

HEATHKIT ELECTRONIC VOICE CONTROL KIT

Here is a new and exciting kit that will add greatly to your enjoyment in the ham shack. Allows you to switch from Receiver to Transmitter merely by talking into your microphone. Lets you operate "break-in" with an ordinary AM transmitter. A terminal strip is provided for Receiver and speaker connections and also for a 117 volt antenna relay. Unit is adjustable to all conditions by sensitivity and gain controls provided. Easy to build with complete instructions provided. Requires no transmitter or Receiver alterations to operate. Shpg. Wt. 5 lbs.

MODEL VX-1

\$23⁹⁵



"Q" MULTIPLIER

HEATHKIT "Q" MULTIPLIER KIT

This fine Q Multiplier is a worthwhile addition to any communications, or Broadcast Receiver. It provides additional selectivity for separating signals, or will reject one signal and eliminate a heterodyne. Functions with any AM Receiver having an IF frequency between 450 and 460 KC that is not AC-DC type. Operates from your Receiver power supply, and requires only 6.3 VAC at 300 ma (or 12.6 VAC at 150 ma), and 150 to 250 VDC at 2 ma. Simple to connect with cable and plugs supplied. Effective Q of approximately 4000 for sharp "peak" or "null". A tremendous help on crowded phone or CW bands. Shpg. Wt. 3 lbs.

MODEL QF-1

\$9⁹⁵

more fine ham gear from the pioneer



GRID DIP METER

HEATHKIT GRID DIP METER KIT

A Grid Dip Meter is basically an RF Oscillator used to determine the frequency of other Oscillators, or tuned circuits. Numerous other applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, designed procedures, etc. Features continuous frequency coverage from 2 MC to 250 MC, with a complete set of prewound coils, and a 500 ua panel meter. Has sensitivity control and a phone jack for listening to the "Zero-Beat". It will also double as an absorption-type wave meter. Shpg. Wt. 4 lbs.

MODEL GD-1B

Low frequency coil kit: two extra plug-in coils extend frequency coverage down to 350 KC. Shpg. Wt. 1 lb. No. 341-A \$3.00

\$21⁹⁵

HEATHKIT VARIABLE FREQUENCY OSCILLATOR KIT

Enjoy the convenience and flexibility of VFO operation by obtaining this fine variable frequency oscillator. It covers 160-80-40-20-15-11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a, available on most transmitters. It features voltage regulation for frequency stability, and has illuminated frequency dial. VFO operation allows you to move out from under interference and select the portion of the band you want to use without having to be tied down to only 2 or 3 frequencies through the use of crystals. "Zero in" on the other fellows signal and return his CQ on his own frequency! Shpg. Wt. 7 lbs.

MODEL VF-1

\$19⁵⁰

HEATHKIT REFLECTED POWER METER KIT

A necessity in every well equipped ham shack, the model AM-2 lets you check the match of the antenna transmission system, by measuring the forward and reflected power or standing wave ratio. Handles up to one kilowatt of energy on all bands from 160 to 2 meters, and may be left in the antenna system feed line at all times. Input and output impedances for 50 or 75 ohm lines. No external power required for operation. Meter indicates percentage forward and reflected power, and standing wave ratio from 1:1 to 6:1. Shpg. Wt. 3 lbs.

MODEL AM-2

\$15⁹⁵

HEATHKIT BALUN COIL KIT

This convenient transmitter accessory has the capability of matching unbalanced coax lines, used on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance. Design of the bifilar wound Balun Coils will enable transmitters with unbalanced output to operate into balanced transmission line, such as used with dipoles, folded dipoles or any balanced antenna system. Can be used with transmitters and Receivers without adjustment over the frequency range of 80 through 10 meters. Will handle power inputs up to 200 watts. Shpg. Wt. 4 lbs.

MODEL B-1

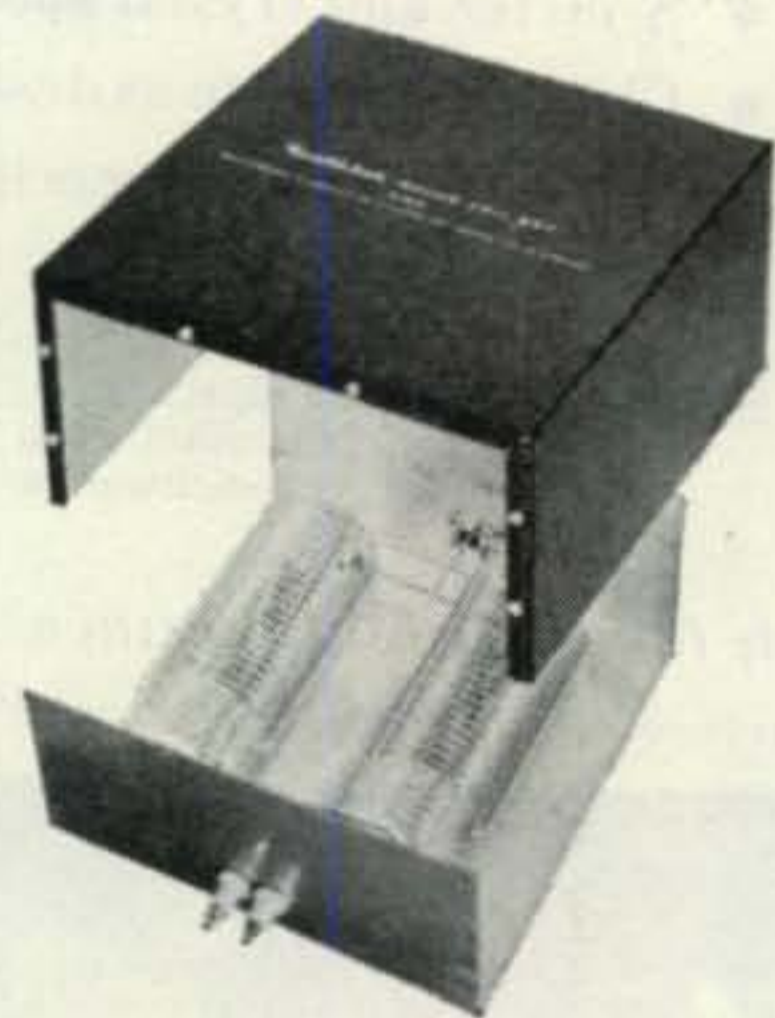
\$8⁹⁵



VARIABLE FREQUENCY OSCILLATOR



REFLECTED POWER METER



BALUN COIL

...in do-it-yourself electronics!



**FREE
1958
Catalog**

Send for this Free informative catalog listing our entire line of kits, with complete schematics and specifications.

Rush Free 1958 catalog.

HEATH COMPANY

BENTON HARBOR 12, MICH. a subsidiary of Daystrom, Inc.



name _____

address _____

city & state _____

QUAN.	ITEM	MODEL NO.	PRICE

\$ _____ enclosed. Parcel post, include postage—express is shipped collect.

For further information, check number 6 on page 126.

April, 1958 • CQ • 7

Scheduled for Summer delivery
WORLD'S FIRST COMPLETE
2 and 6 METER RADIO STATION

Only Hallicrafters Offers ALL These Features!

- Three-way, built-in power supply for 115 V. AC, 6 V. DC, and 12 V. DC operation. Highly efficient, transistorized power supply for both 6 and 12 V. DC usage.
- Designed for fixed, mobile or portable applications.
- Full AM or CW operation on both 2 and 6 meter bands.
- Cross band operation possible.
- Push to talk operation.
- S-meter and crystal spotting for receiver.
- Change of voltage as desired is instantaneous.
- Exceeds F.C.D.A. specifications, qualifies for matching funds.

Export Sales: International Operations
Raytheon Manufacturing Co.
Waltham, Massachusetts

Watch for complete specifications!

For further info, check No. 7 on Pg. 126

SR-34

two and six meter
transmitter/receiver



*Available with convenient terms
from your Radio Parts Distributor*



Our 25th year of service

*The new ideas in communications
are born at . . .*

hallicrafters

Chicago 24, Illinois



. . . de W2NSD

never say die

Caveat Emptor

Buyer beware is the translation. For all of the equipment being sold in our hobby there seems to be a remarkably high level of honesty. Occasionally I hear of some outfit that is taking advantage of things, but this is very rare. Unfortunately the major exception to this rule is in the amateur radioteletype field, one of special interest to me for several years now. I, too, was taken in by the operator and his one-man Teletype Society. I spent hundreds of dollars buying almost worthless printer equipment and stuff which has not been delivered after more than two years. Please fellows, before you send a check to any "Society" drop a note to Byron Kretzman, W2JTP or Merrill Swan, W6AEE. Don't be gulched.

For the benefit of the few RTTY'ers who may have run across something called an "ARTS" bulletin I would like to point out that the Amateur Radio Teletype Society bulletins were originally started by me in 1951 and were concluded with bulletin #36 when I became editor of CQ in January 1955. No one has permission to use the name.

CQ Dallas

Hey down there, does anyone have a copy of the 1949 phone book? If so, please send me page 152, if you can bear to part with it.

April 12th Mobile Rally

Everyone is invited to throw a receiver in their car and have a try at some transmitter hunting. The hunt will start at Jacob Riis Park parking lot, Saturday, April 12th at 10 A.M., with cars leaving at one minute intervals. Registration starts at 9 A.M. Registration fee will be \$2.50 per car with the proceeds to go for the prizes. There will be a minimum of six major awards, three for the top three drivers and three for the navigators. If enough cars enter there will be prizes for the first ten winners.

The hidden transmitters will be operating on two, six and ten meters simultaneously so that almost any sort of mobile installation can be used to participate. You will be limited to one driver and one navigator per car, but there is no limit to the amount of equipment you can

use. We highly recommend that you come equipped with a reliable watch (or stopwatch) and a sliderule (or plenty of pencils and paper. Mileage will count heavily, and points will be taken off for arriving early or late. The entire event should take about three hours to run plus thirty minutes out for a lunch stop. You will not have to remove the receivers from the car in order to find the hidden transmitters, by the way.

There will be a separate award for the top car in a club team as well as a club award for the winning team. Club teams will consist of three cars each. This should settle once and for all just how the various clubs really stand at transmitter hunting. We admit right now that the hunt is going to be difficult and that a team will have to demonstrate exceptional ability just to follow the entire course of three hidden transmitters and time/speed/distance legs.

Provisions will be made for letting you find yourself once you get lost, so everyone will have fun. Luck will not enter into this, merely your ability to read instructions (no gimmiks) and find a hidden transmitter.

Second Rally on May 18th

For those that manage to survive the first rally we will have a second event on Sunday, May 18th, starting at the same place. Riis Park was chosen because it is so easy to reach from just about anywhere. You can get there from Connecticut in less than 45 minutes, 30 minutes from Manhattan, and about the same from Long Island. It is just a few minutes from the Belt Parkway. Those coming up from Southern Jersey and Philadelphia can reach it by coming across the Staten Island 69th Street Ferry or coming through the Holland or Lincoln Tunnel and then the Brooklyn-Battery Tunnel and out the Parkway.

It will take at least six people to run each hidden transmitter site and checkpoint so we need help badly on running this event. If you would like to take part in the operation please drop me a card with your address and phone number so we can get things organized.

[Continued on page 10]

Dayton Hamvention

The biggest ham convention each year turns out to be the Dayton Hamvention. This year probably won't be any exception, so if you are within flying or driving distance of Dayton, Ohio you ought to hop in and buzz over. What makes a convention way out in the middle of Ohio such a resounding success every year? Well, the main thing is that the Dayton gang have evolved a technique of putting on a convention that is practically flawless . . . complete with exhibits by most of the manufacturers in the industry, technical symposiums on all important facets of the hobby, prizes galore (by the gross), and the largest banquet you have ever seen.

This year Don Chesser will be there to run the DX sessions, complete with movies of the Socorro Island trip in March . . . if my movie camera holds out OK. Sam Harris & Helen will moderate the VHF forum. Myself will buttonhole everyone handy for CQ subscription renewals at the secret-low-confidential-direct-from-the-editor price. Bob Adams will probably be there again with the SSB gang and the yearly SSB dinner. Jim Morrisett, old frosty beard, as we call him, will be there to swap sea stories with other ex-Antarcticans and maybe show some icy movies of his trip.

And prizes! Few Hamventioners go home with prizes worth less than the admission price.

Y'all come. Starts Friday evening April 18th, bigger doings Saturday the 19th . . . Dayton Biltmore.

FCC Rulemaking Proposed

The Maritime Mobile Amateur Radio Club has a petition in the FCC works to allow the use of lower frequency bands in certain areas outside the continental United States. If you are interested you might send for a copy of Docket 12307 from the FCC, Washington 25, D.C. In my discussions of the problem of frequency band restrictions with quite a few maritime mobile operators I have found that the present limitations (15 meters and above) were very restrictive and there seemed no practical reasons why some system for operation on the lower frequencies couldn't be devised. Let's hope that no one gums up the works on this proposal.

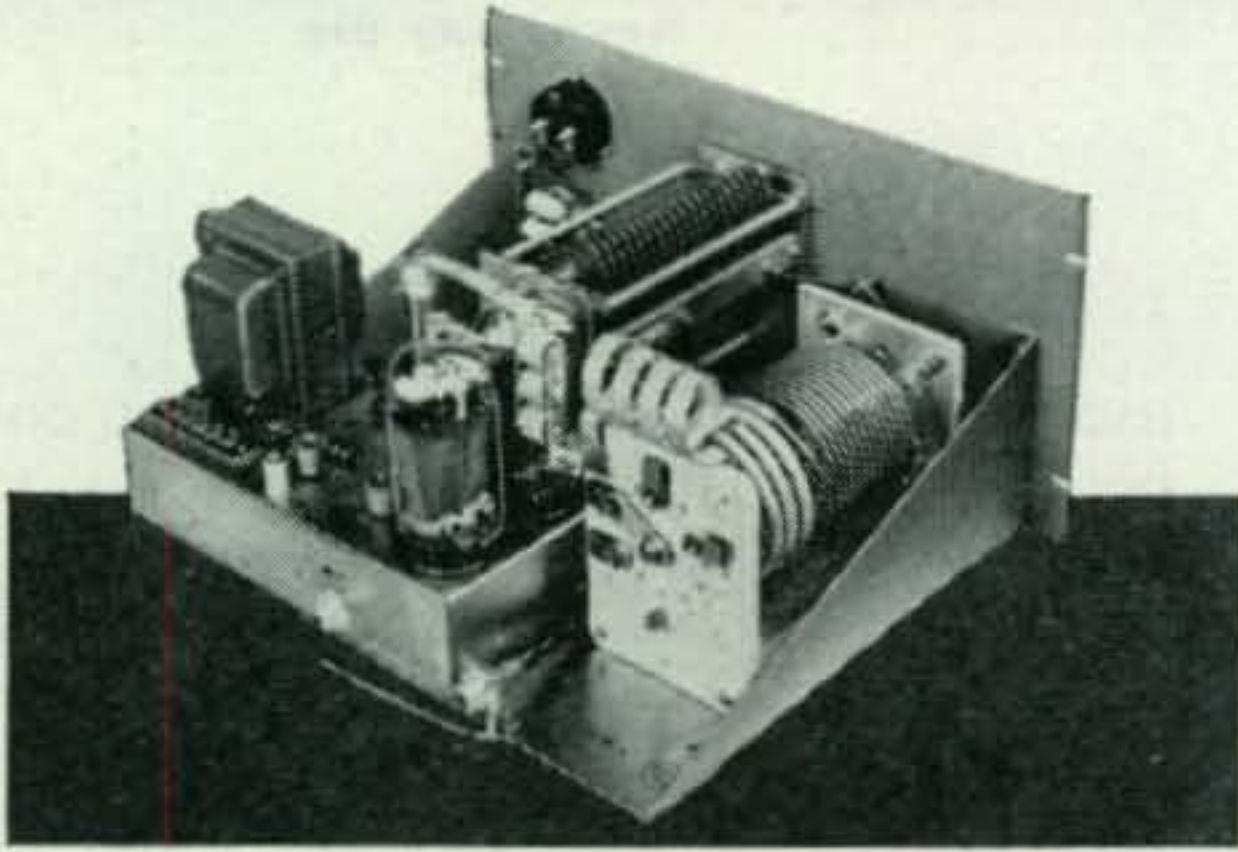
Edison Award

The 1958 Edison Award was won by Jim Harrington, K5BQT of Lake Charles, Louisiana. He received a trophy and \$500 prize at a dinner recently in Washington for his work in setting up and operating his station during the devastating hurricane last year. The story of this operation was covered in the September '57 CQ in the article by W5ØVE. Judges for the award were FCC Commissioner Rosel Hyde, E. Roland Harriman of the American Red Cross and G. L. Dosland of the ARRL.

[Continued on page 22]



You fellows have been asking for it

**.. NOW IT'S HERE—the L-1001-A**

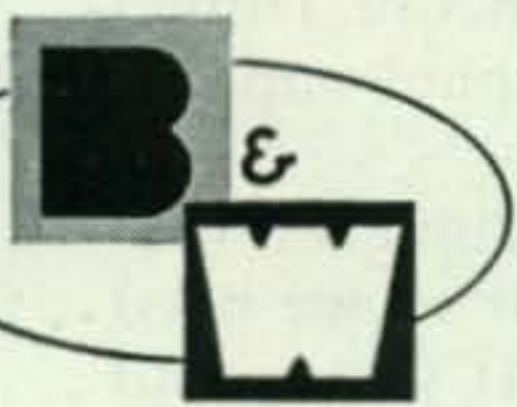
Ever since B&W first came out with their grounded grid linear amplifier, amateurs from all over the country have been clamouring for just the RF section of the unit.

Now it's here! At last, you can buy only this RF section and have all the advantages of the complete B&W L-1000-A. Use of your own power supply will save many dollars.

Two tetrodes in the RF section are connected as high-Mu grounded grid triodes. Intermodulation distortion products of a grounded grid amplifier are far less than those generated in a conventional grounded cathode circuit because of the inherent negative feed-back. Increased driving power requirements are offset by recovery of most of the driving power in the output circuit.

This RF section will boost your signal to the maximum allowable. Quality of materials and workmanship is unsurpassed. Tuning and loading are precise over the 80, 40, 20, 15, 11 and 10 meter bands. Why not drop in at your favorite dealer and take a look at either the Model L-1000-A or just the RF section, Model L-1001-A. If he doesn't have them in stock write the factory for details.

For further information, check number 8 on page 126.



Barker & Williamson, Inc.

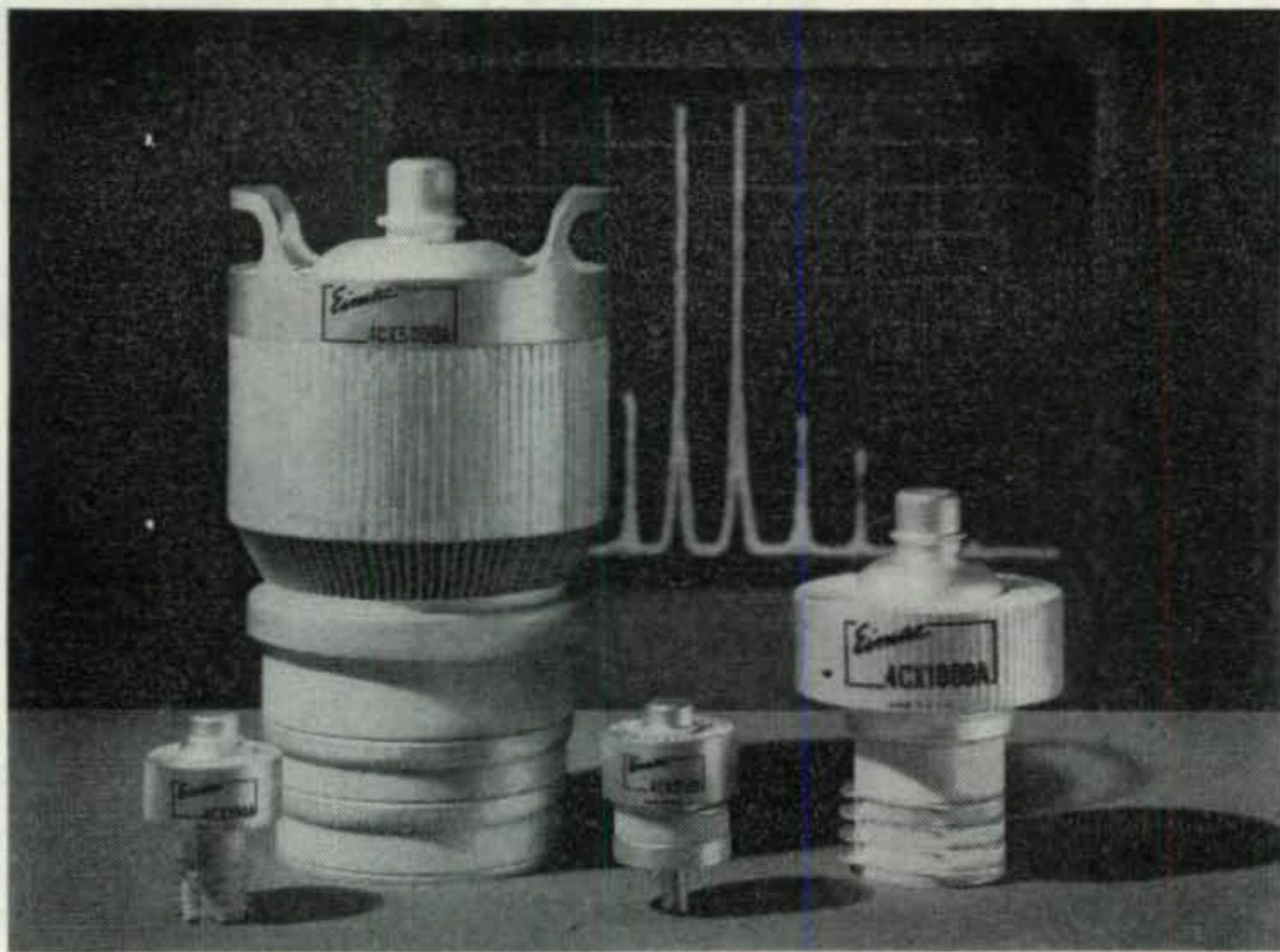
Bristol, Pa.

B&W AMATEUR EQUIPMENT: Transmitters • AM—CW—SSB • Single Sideband Generators • Grounded Grid Linear Amplifiers • Single Sideband Receiving Adapters • Dip Meters • Match Masters • Frequency Multipliers • Low-Pass Filters • T-R Switches • R-F Filament Chokes • Transmitting R-F Plate Chokes • Audio Phase Shift Networks • Band Switching Pi-Networks • Cyclometer-type Counters • Antenna Co-axial Connectors • Baluns • Variable Capacitors • Fixed and Rotary Type Coils • Band Switching Turrets • Standard Inductor Materials •

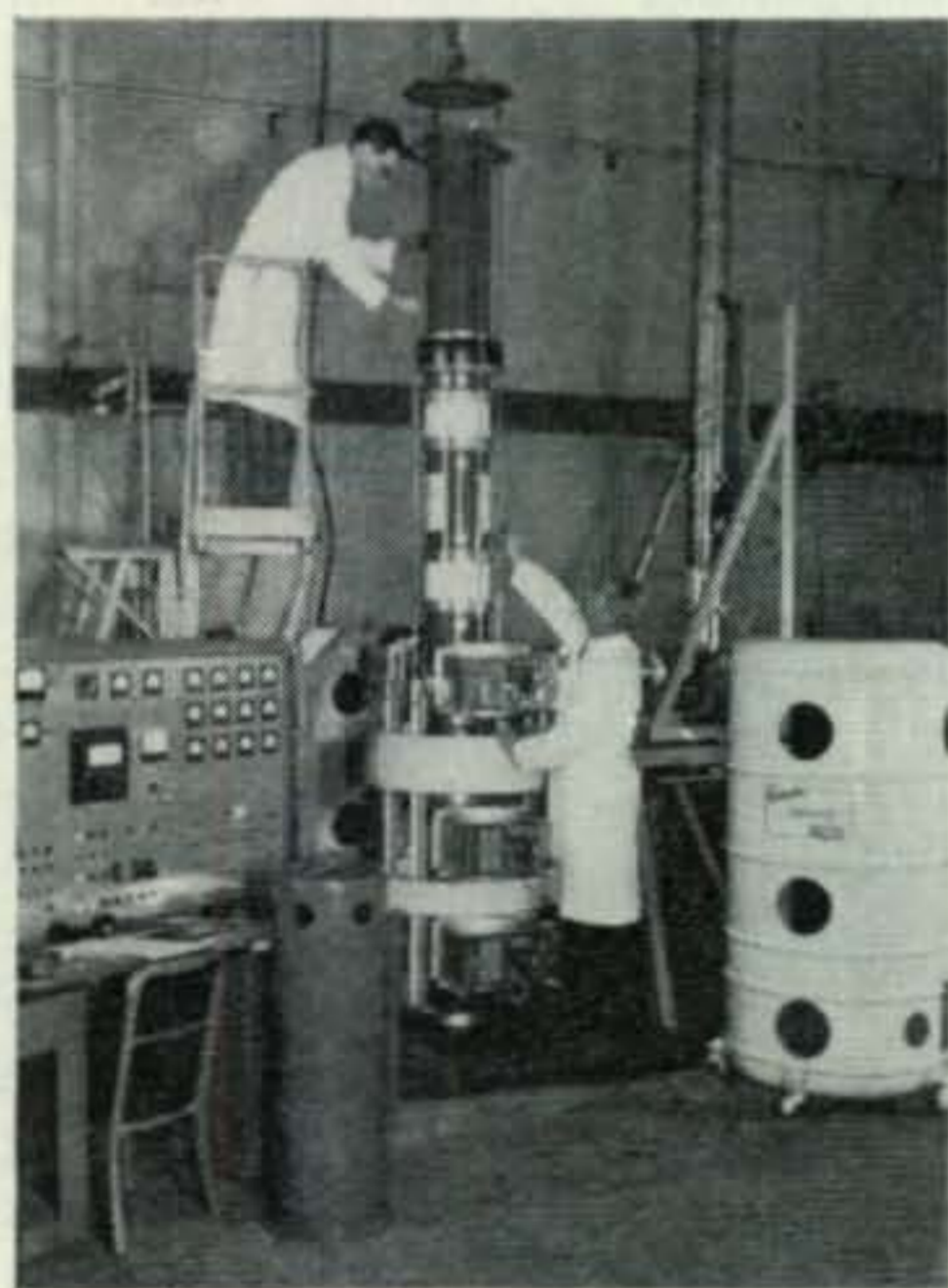
What's New with the Electron...1958

Eimac Ceramic Tubes Covering the RF Spectrum Displayed at 1958 I. R. E. Show in New York City

More than 40 distinct tube types now enjoy the advantages of Eimac ceramic-metal design. These ceramic types, comprising one-third of the Eimac line, include rectifier, negative-grid, beam-switch, klystron, traveling wave, and receiving tubes. The Eimac display at the 1958 Institute of Radio Engineers Show and Convention in New York City last month emphasized the broad frequency coverage and wide range of power levels offered by these Eimac ceramic tubes. A selection of klystrons was shown, ranging from new reflex types for



Modern Ceramic Tetrodes Ideal for SSB



Eimac 1.25 Megawatt Klystron

super-high-frequency applications to power amplifier klystrons capable of megawatt output powers.

Focal point of the display was an impact survival demonstration. Visitors subjected an operating Eimac reflex klystron to repeated 100 to 200G impacts. Performance of the reflex klystron during the tests was monitored on an oscilloscope. Consistent performance and minimum frequency deviation under these rigorous conditions gave dramatic proof of the high reliability and ruggedness of this ceramic-metal tube.

Eimac's entry into the field of traveling wave tubes was announced with the display of the X686, a lightweight, ruggedized, ceramic-metal tube designed specifically for use in severe



Ceramic Reflex Klystrons for SHF

air-borne environments. This high-altitude tube covers a frequency range of 4,000 to 7,000 megacycles with an output power of 1 watt and a gain of 50 db.

Of particular interest to the amateur as well as the commercial equipment designer, were the ceramic-metal 4CX250B, 4CX300A, and 4CX1000A, all ideally suited for single sideband applications. Shown also were a number of Eimac's perennially popular multi-grid, internal-anode glass tubes, such as the 4-125A, 4-250A, 4-400A, and 4E27A/5-125B.

For more detailed information on these latest Eimac tube developments, write our Amateur Service Department and request a copy of "What's New With The Electron . . . 1958".



EITEL-McCULLOUGH, INC.
SAN BRUNO · CALIFORNIA

Eimac First with ceramic tubes that can take it

For further information, check number 9 on page 126.

FREE



An FCC License can be Your
Guarantee of Success in Electronics.

Get your FCC Commercial License
— or your money back

The Master Course in Electronics will provide you with the mental tools of the electronics technician and prepare you for a First Class FCC License (Commercial) with a radar endorsement. When you successfully complete the Master Course, if you fail to pass the FCC examination, you will receive a full refund of all tuition payments.

HERE'S PROOF:

Name and Address	License	Time
John H. Johnson, Boise City, Okla.....	1st	20 weeks
Prentice Harrison, Lewes, Del.....	1st	27 weeks
J. A. Niedeck, Bethlehem, Pa.....	2nd	8 weeks

WE CAN PROVIDE NAMES IN YOUR AREA ON REQUEST

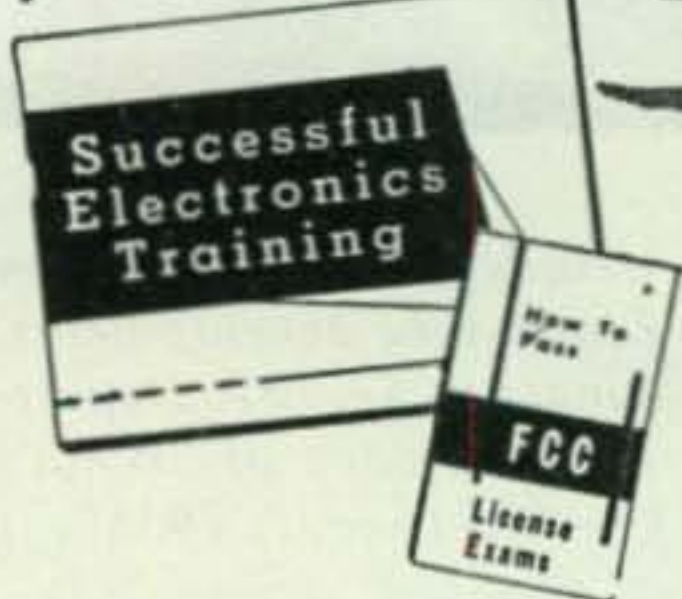
EMPLOYERS MAKE OFFERS LIKE THIS:

Letter from nationally-known Airlines: "Radio Operators and Radio Mechanics are needed for our company. Periodic wage increase with opportunity for advancement. Many company benefits."

OUR TRAINEES GET JOBS LIKE THIS:

"Since enrolling with Cleveland Institute I have received my 1st class license, and am now Chief Engineer of Station WAIN. Thanks to the Institute for making this possible."

Lewis M. Owens, Columbia, Ky.



MAIL COUPON TODAY
AND RECEIVE ALL
2 BOOKLETS

FREE

Accredited by National
Home Study Council



Cleveland Institute of Radio Electronics
Carl E. Smith, Consulting Engineer, President
Desk CQ-39, 4900 Euclid Ave., Cleveland 3, Ohio

Please send Free Booklets prepared to help me get ahead in Electronics. I have had training or experience in Electronics as indicated below:

- | | |
|---|---|
| <input type="checkbox"/> Military | <input type="checkbox"/> Broadcasting |
| <input type="checkbox"/> Radio-TV Servicing | <input type="checkbox"/> Home experimenting |
| <input type="checkbox"/> Manufacturing | <input type="checkbox"/> Telephone Company |
| <input type="checkbox"/> Amateur Radio | <input type="checkbox"/> Others |

In what kind of work are you now engaged?.....

In what branch of Electronics are you interested.....

Name Age.....

Address

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



Feenix, Ariz.

Deer Hon. Ed:

Sometimes I not figuring how things can happening to me like they doing. Are you thinking samewise Hon. Ed? Like taking what I just going through. Not wunce in millyun yeers would it happening to average amchoor. In fackly, Scratchi not seeing how it happening to any amchoor.

Cupple days ago I wandering into Hon. Shack, and noticing things kinda dusty. De-siding maybe better operating rig to making surely everything in hunky-dory shape. Not that I reely needing to operating rig that day, but wanting to know it okeh on acct. having skedyule next day with cute YL in New York, and not wanting to disappointing her.

So, turning on reseever, turning on filaments in rig, wateing few seconds, then turning on plate power, and noting are getting reel slicky reedings everywhere. Next are plugging in mike, turning up speech amplifier gain control —and that when it happening. Are heering most horrendus screech you ever heering. Quick-like turning back gain control. Screeching stopping. Turning up gain control, screeching starting. And so on.

Rite now letting me telling you that turning gain control back and forth are no meen feet. No indeedy, on acct. it not a little pot. It are reel fifty what resistor I are getting from big surplus sale.

So what are the screeching noyse? I heer you saying it, Hon. Ed., R-F feedbacks. Natch-yourally, anybuddies know that. The big quest-shun are what cawsing it. And, this time, Scratchi are not going to running around willy-nilly trying to fix it. No sirree, this time I are going to take it step by step.

I remembering one other time having loud ticking noyse on carrier. Taking me to days to finding what cawsing that. You remembering, Hon. Ed? That are when I finding my rist-watch strapped around the mike where I putting it so can telling rite time.

[Continued on page 14]

attenuation within ± 5 KCS, with extremely steep side skirts. This razor-sharp notch may be moved above, or below the desired signal by means of a control on the front panel. The notch filter plays an important part in improving all forms of reception by eliminating interfering signals.

IF AM

contribution to the antenna tri-axial ratio of the selection antenna for maximum to frequency.

DUAL

response and 20 dB intermediate with a moderate Q-multiplier.

Q-MULTIPLIER

feature permits the user to eliminate interference.

NOTCH

rate receiver. The HQ-160 improves accuracy.

Automatic

the IF AVC RF amplifier provides optimum noise ratio and helps to overcome fading and signal strength variations.

S METER

Accurate tuning and accurate signal strength read-outs are easy with the S-meter circuit of the HQ-160.

the audio amplifier. When receiving a strong signal, the frequency response of the audio approaches high-fidelity standards. In addition to this, the auto-tuning speaker response, thus Responsively damped speaker "The result is excellent production when the



noise line

image over-5 an dned later-

important his feature minimizes under (XX7)

corpo- the 60 db it the

speaker of ear-panel for ear-connections are at the rear of the

ones. A panel on the speaker connections are at the rear of the cabinet.

Whatever method of listening you use, you'll find the HQ-160 a masterpiece of performance on AM, SSB and CW. A true Hammarlund receiver worthy

Shattering All Old-Fashioned Receiver Ideas—The All-New HAMMARLUND HQ-160 . . .

Brand-new features, plus the hottest performance ever . . . that's the all-new Hammarlund HQ-160 in a nutshell. There's never been anything like it—you've got to see it, try it, to believe it. General coverage, dual conversion, built-in notch filter, Q-multiplier, crystal calibrator, and just about everything you could ask for . . .

Ask your Hammarlund dealer, or WRITE FOR COMPLETE DETAILS . . .

\$379⁰⁰



Established 1910

HAMMARLUND

HAMMARLUND MANUFACTURING COMPANY, INC., 460 W. 34th ST., N. Y. 1, N. Y.

Export: Rocke International, 13 E. 40th St., N. Y. 16, N. Y.

Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

For further information, check number 10 on page 126.

"Phasemaster II - A"

IMPROVED AND ADVANCED OPERATING FEATURES

SSB or DSB suppressed carrier or with carrier, PM and CW.

6146 power amplifier delivers 65 PEP watts output, giving sufficient power to drive nearly all types of linear amplifiers INCLUDING grounded grid finals.

Calibrate control allows variable control of signal for zero beating VFO to receiver frequency or TOF (talk on frequency.)

Voltage Regulation of 6146 Screen and 9MC OSC.

Temperature compensating condensers in critical 9MC circuit for improved stability.

FRONT PANEL OPERATING CONTROLS

Emission switch with 5 positions for selecting CW PM — AM or DSB — Sideband 1 — Sideband 2

Indicator Switch —

Position 1. Tuning eye indicates R.F. output.

Position 2. Tuning eye indicates when flattopping occurs.

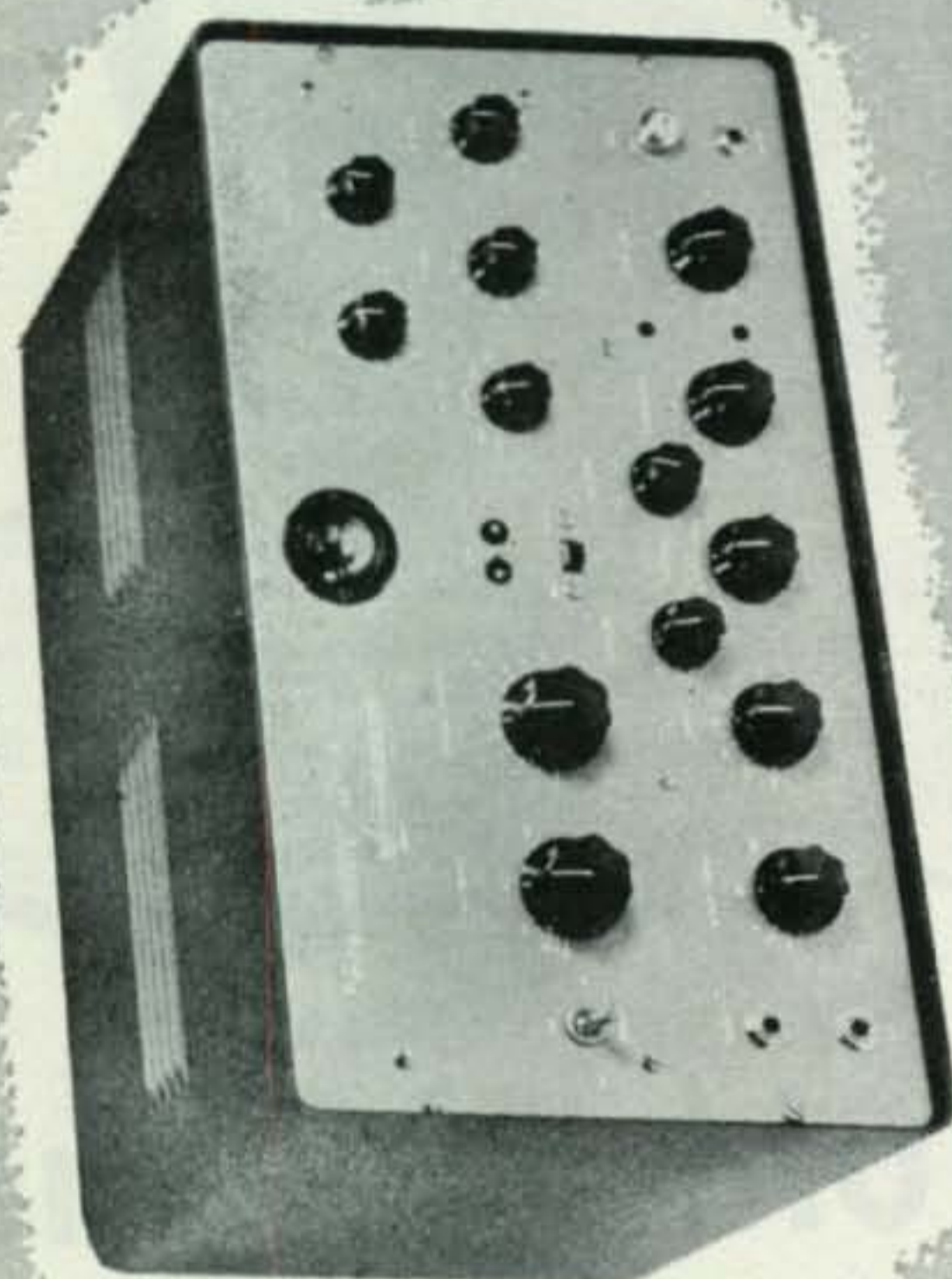
Valuable aid for tuning up on AM and as a Distortion indicator for SSB.

"Phasemaster II-A" complete **\$329.50**

"Bandhopper" VFO complete **\$139.50**

P-400 Grounded Grid Linear Amplifier **\$269.50**

Price and design subject to change without notice.



ALL BAND OPERATION

See Your Dealer or Write Today

Lakeshore INDUSTRIES

MANITOWOC, WISCONSIN

MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

SCRATCHI [from page 12]

Nothing like that this time. Just good honest case of R-F feedbacks which anybuddies can tracing down if they applying sighthentic method.

So, I getting to work. Checking mike. No watch. Changing mikes. Still have screech. Checking to seeing if anything near mike which can feeding R-F into it. Nothing.

Opening top of speech amplifier. Coffing for cupple minutes from all the dust in speech amplifier. Searching around until finding toobs. Taking them out. Putting new toobs in. Trying. Still get screech. At this point desiding trubble must be in R-F end of rig, or in antenna match.

Hon. Ed., I not wanting to boreing you with all the horribul detales, but I doing everything in the Hon. Book and a cupple things they not even menshunning in the book. I newtralizing every stage. I shielding every stage. I shielding antenna cupler. Putting in new coax line to cupler.

Checking SWR on antenna. Running new ground pipe into ground and connectng to rig. Trying new toobs everywhere in rig. But, no matters what I doing, everytime I turning up gain control, get horribul screech.

Even shielding mike. Even mutting shield wire over shielded mike cable. Shielding a-c lines. Putting in a-c line filters. Plugging rig into different a-c socket. Hon. Ed., I even cutting power down to an even kilowhat, and not even that are working.

No needing to telling you that Scratchi are pretty discouraged feller that evening. Have you ever had feeling that you have done everything rite, and yet Hon. Fate are sitting back laffng at you? Well, the way I feeling Hon. Fate must be having histairics.

Next morning I getting up in time for skedyule with the YL from New York, but still having screech, so can't doing anything about skedyule but wish rig were reely working. During brekfast, howsumever, I doing some hevvy thinking. I reviewing everything I doing. Can't think of one place I going rong.

So, strolling into Hon. Shack, going over to operating table, and turning gain control. Sure enough. Screech. Hon. Ed., you knowing what I saying?? It going screech, but rig aren't turned on. It even screeches when rig not turned on!!

Quicklike I yanking out speech amplifier and turning it upside down. Hon. Ed., you not buleeving it. Why are these things happening to me? It reely were a screech. Rite next to gain control are little nest of bats—baby bats. Whenever turning gain control arm are coming around and squashing nest of baby bats. So, they screeching!! No wonder I not finding trubble. Scratchi looking for R-F Feedbacks, not R-F Feedbats.

Respectfully yours,
Hashafisti Scratchi

For further information, check number 11 on page 126.



EVERYONE'S TALKING "3-BANDER"

On every count — the logical beam for 3-band operation on 10, 15 and 20 meters. Streamlined, light in weight, handsome in appearance, outstanding in performance and . . . no coils!

No tuning

Just put it up and operate. Elements are factory cut to correct length and tuning sleeves are set, (and locked) to specified position when the beam is assembled.

No special tools . . .

No special tools required for assembly, just screwdriver, pliers, tapemeasure. Big, easy to read drawings detail each step, speed and simplify assembly.

Complete

All hardware, nuts, bolts, lockwashers, clamps, spacers etc., are supplied. Every beam piece is pre-cut, all holes are precision drilled for exact alignment. Judging from the letters received, owners everywhere agree that packaging is unusually complete, no details overlooked.

3-Banders perform

The 3-Bander in the un-retouched photograph went up one day before the start of the 1958 DX contest. This week-end resulted in over 200 DX contacts and a country multiplier of 106 on 14, 21, 27 and 28 mcs. (54 countries on 14 mcs). This same beam subsequently rode out a gale with 50 mph winds without damage.

Dimensions

Longest element is about 32 feet. Boom for 3-element is 18 feet — for 2-element, 9 feet. Both beams feed with single RG8/U coax have low VSWR all bands and easily handle 1 KW.

2-element #3219,	84 ⁵⁰
3-element #3220.	124 ⁵⁰

(coax not supplied)



BANK,
CALIF.

DIVISION OF
YOUNG SPRING & WIRE
CORPORATION.

EVERYONE'S
TALKING
"3-BANDER"

.and with good reasons



Letters . . . to the editor

Bravo CQ!

Dear Mr. Editor:

The other day I saw your magazine in the store with the picture of Mr. A. Ham with an antenna looking up a high tension tower. I have a hat and a screwdriver just like his so I bought it. When I got home I opened it up and the first thing I saw was the fine picture of your office. I was sold at first sight. Such style, so modern, such class, so casual, such a cute Assistant Ed., and above all, the intense gleaning of some of the highest quality contemporary intellectual literature available today. Namely, MAD. I hold in highest esteem any student of this school of self-mortification and liquidation who can survive the excruciating torment of this thought and ire provoking MADness. So, please, please take my miserable \$4.00 and send me your magazine full of junk and stuff for a while.

I am an electromaniac monkeyer and specialize in blowing fuses, CRTs and meters. I would like to see some articles on the finer points of blowing gear.

Ned Nichoff
Akron, Ohio

Just wire things up as per our diagrams and you will do a good job of blowing fuses, tubes, crystals, and most anything else you have handy.

Another Column?

Dear Wayne:

How about a column for us bootleggers? After all bootlegging is a radio hobby too. Bootlegging dates from way

back and can claim a few firsts. Remember who was heard on the other side of the Atlantic first?

You could have articles on how to build rough sounding chirpy little rigs that work good into attic antennas.

You could list rare sounding calls and exotic locations turned in by your readers that got took.

You could even have a PHONY of the month contest.

There are quite a few of us bootleggers that get our kicks out of slipping a top dx-er a juicy call on a murky night!

73

Al Bhee, GO2L

Dear Wayne:

Reference Don Stoner's radar speed meter receiver, I would like to point out that all of the electronic cooking ranges presently on the market also operate in this band. This may cause some interference, but may also be used as a signal for peaking the receiver antenna. These ranges emit a 120 cycle modulated note which in turn is varied by the rotation of the "stirrer." The result sounds like a bullfrog in mating season and is easily identified.

Tom Lamb, K8ERV
The Tappan Company
Mansfield, Ohio

Dear Wayne,

Have taken to reading your rag on lab time. Re Jan 58 Puzzles, the solutions are:

x	1	4	7	10	13
y	62	48	34	20	6
z	37	48	59	70	81

Shame!

Bob, W2TUC

PS: If you can't skin dive through the ice, let's go water skiing.

Brr, wait until May, Bob old buddy. Several fellows discovered the other four solutions too, but thanks anyway, glad to know you are still alive.

Dear Sir:

Would you please send me a magazine about radios.

Thank you,

Johnny Garrett
Muleshoe, Texas

QSL contest



winner

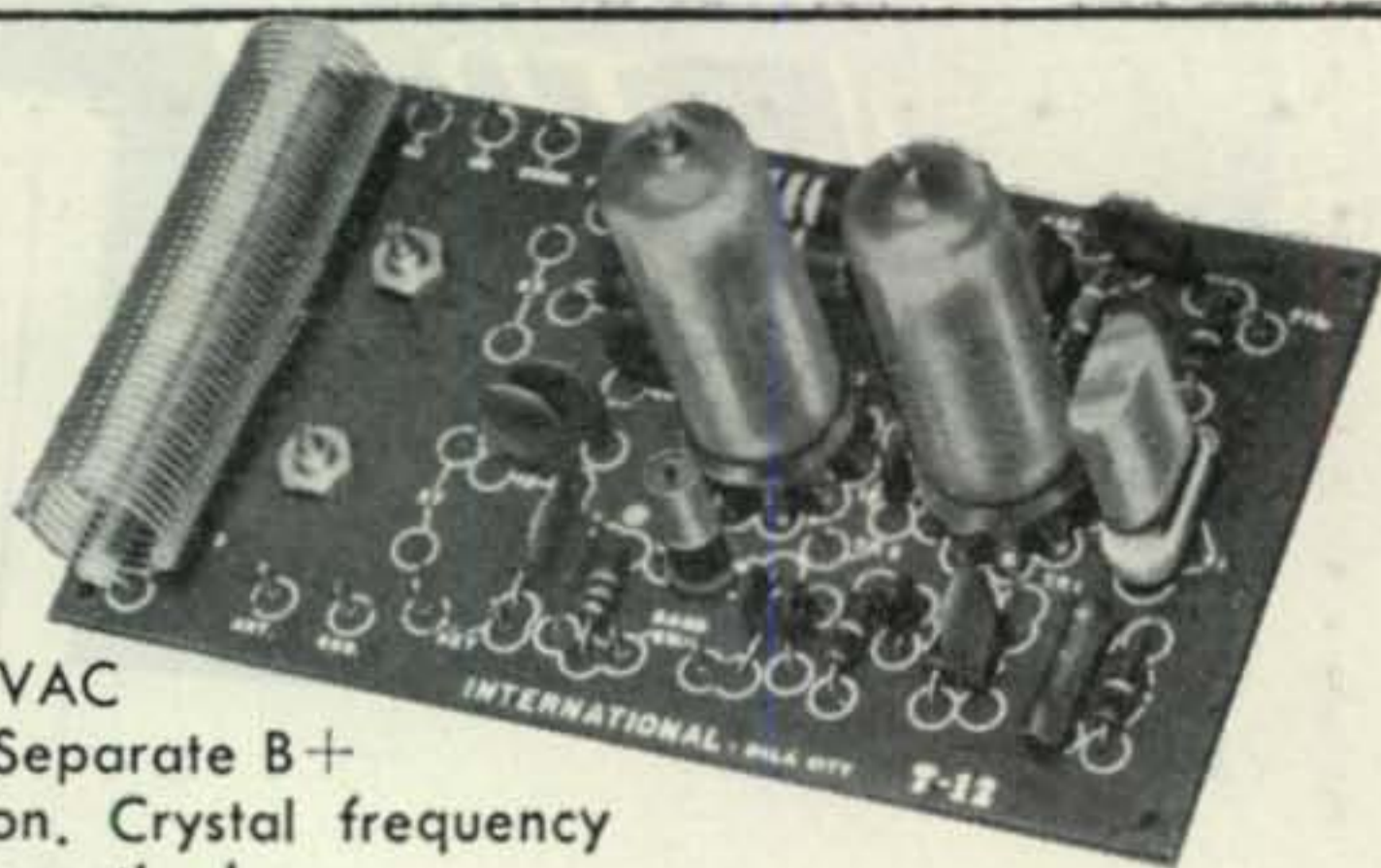
This month's winner for the jazziest of QSL's is Bill Kendrick, K8AEO. Almost as good but not quite (after all we have to have some losers for this page too), were the entries of club station OH2AA, Finland, J. Van Neer, OQØVN, Ruanda-Urundi and Oke Kaarela, OH50P, Finland.



losers

● T-12 TRANSMITTER 12-WATT
3500-4000 KC 7000-7300 KC

Pi-network output enables operator to couple into almost any type antenna. Low drive oscillator with International FA or F-6 crystals; may be used in close tolerance applications. 12BH7 Oscillator-buffer and 5763 final. Power requirements: Filaments 6.3 VAC @ 1.35 amp. Plate supply 350 volts dc @ 50 mils. Separate B+ input connection to final for addition of modulation. Crystal frequency same as output frequency; uses straight through operation!



T-12 Wired with tubes and one 80 or 40 meter crystal (Specify KC).....\$15.95
 (Kits for assembly also available)

● FCV-2 CONVERTER

- Model 50—6 Meters
- Model 144—2 Meters

A 6U8 tube is used for oscillator-mixer. Cascode r-f amplifier using 6BQ7A. IF outputs available from broadcast band through 30 MC. Designed to mount in a standard 3" x 4" x 5" minibox.

Kit with crystal (less tubes).....\$12.95
 Wired with crystal and tubes.....\$17.95



● VFA-1 CASCODE PREAMPLIFIER

For 2 Meters or 6 Meters, using the 6BQ7A in a low noise circuit. Designed to mount in a standard 3" x 4" x 5" minibox.

Kit, less tubes.....\$4.75
 Wired, with tubes..... 6.95



● IFA-10 IF AMPLIFIER

For use between converter and receiver. Uses 6AH6 type tube. Available for I-F ranges from broadcast band through 30 MC. Designed to mount in a standard 3" x 4" x 5" minibox.

Kit, less tube.....\$5.75
 Wire, with tube..... 8.50

HOW TO ORDER

NEW MAIL ORDER POLICY (Revised January 1958)

Please supply sufficient information with order to facilitate accurate processing. Shipments are made on open account F. O. B. Oklahoma City when credit has been approved. On C. O. D. orders of \$25.00 or over, 1/3 down payment with order is required.

Please include in check or money order sufficient postage and insurance for your Parcel Post Zone. Shipping weight of Printed Circuit Units, 2 lbs.

Zone	Amount
1 and 2 (Up to 150 miles)	.27c
3 (150-300 miles)	.29c
4 (300-600 miles)	.31c
5 (600-1000 miles)	.36c
6 (1000-1400 miles)	.40c
7 (1400-1800 miles)	.46c
8 (Over 1800 miles)	.51c

For Insurance, add:
 10c up to \$10.00 Value
 20c up to \$25.00 Value

International

CRYSTAL MFG. CO., INC.

18 N. LEE PHONE RE 6-3741 OKLAHOMA CITY

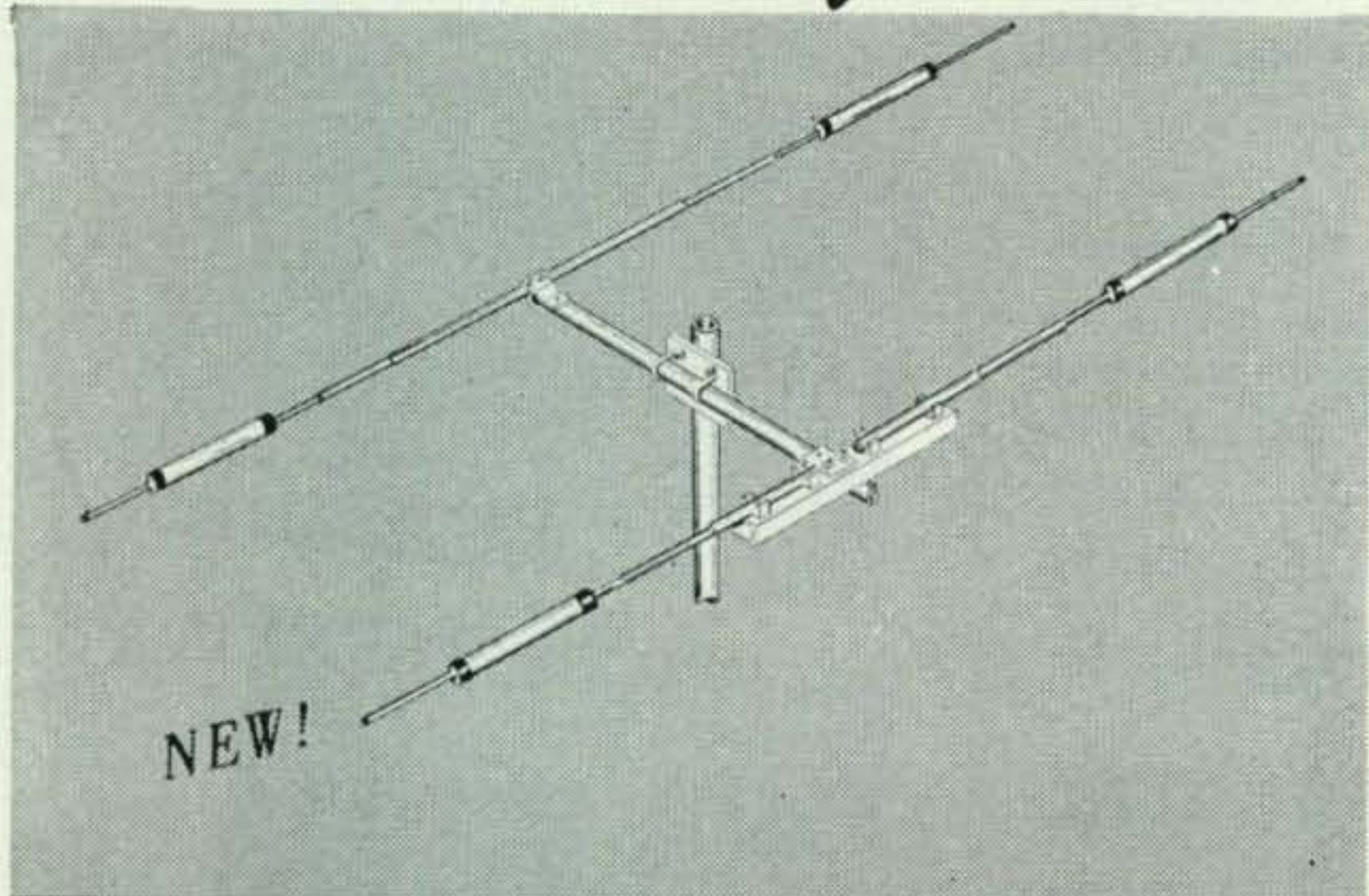
Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday through Thursday will be shipped the day following. Orders received on Friday will be shipped the following Monday.

For further information, check number 13 on page 126.

the **TRAP**
MASTER
family

by
Mosley

Two New Beams for Hams using 300 watts or less!



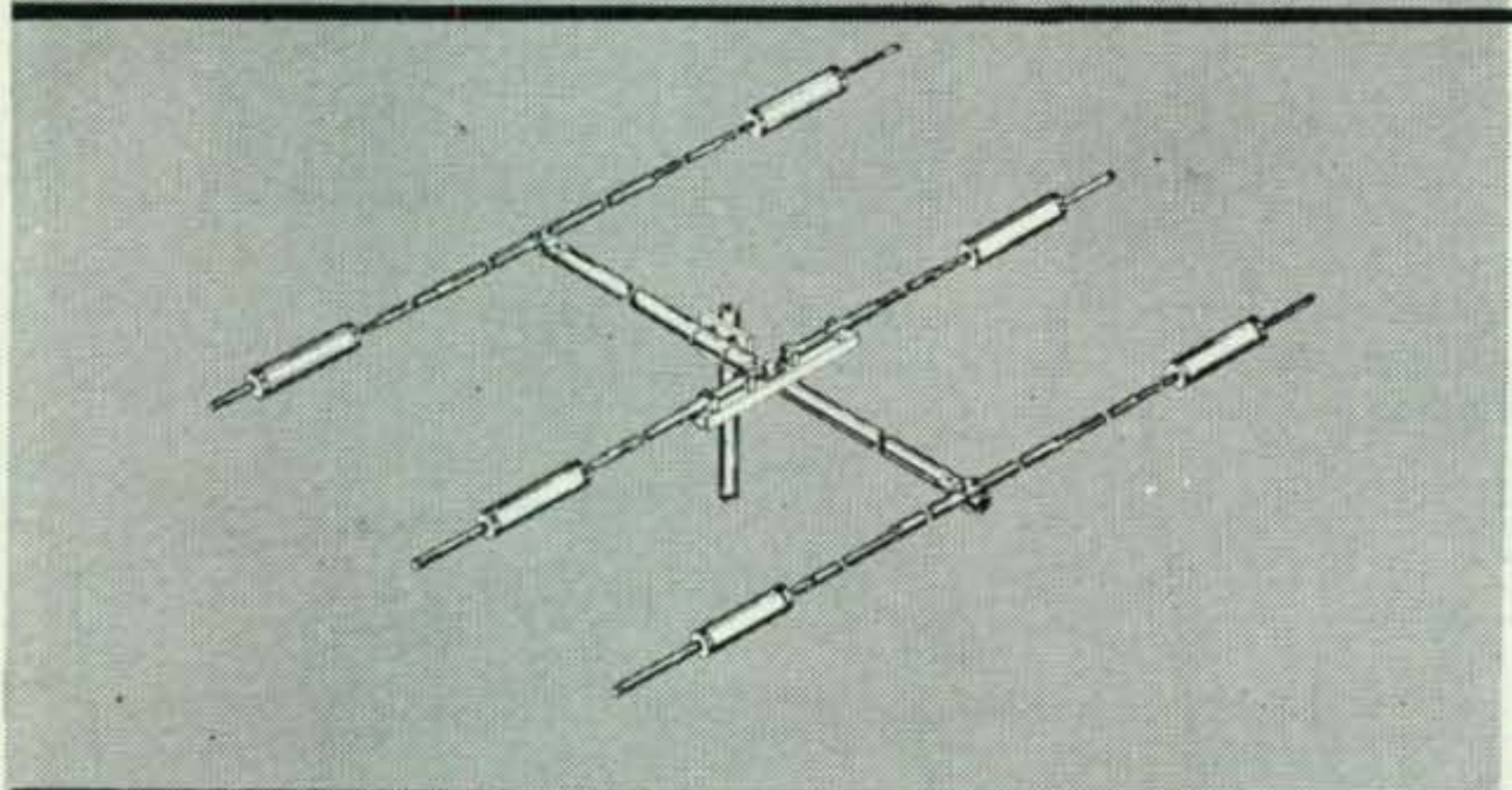
NOW! Famous "Trap-Master" performance for max. 300 watts input, plate modulation!

● 8db Gain ● 25db F-B ● 1.5/1 SWR

Now! No need to spend extra money for a beam rated to a kw—if you're only running 300 watts, or less! Make that low or medium power rig speak up with a new Mosley "Trap-Master Jr." 3-Band Beam for 10-15-20! All the desirable features found in the world famous TA-33 "Trap-Master" are incorporated in this new "Junior". The only difference is in the power handling capability of the traps. Available in 2 or 3 element models—at a price to suit all Hams!

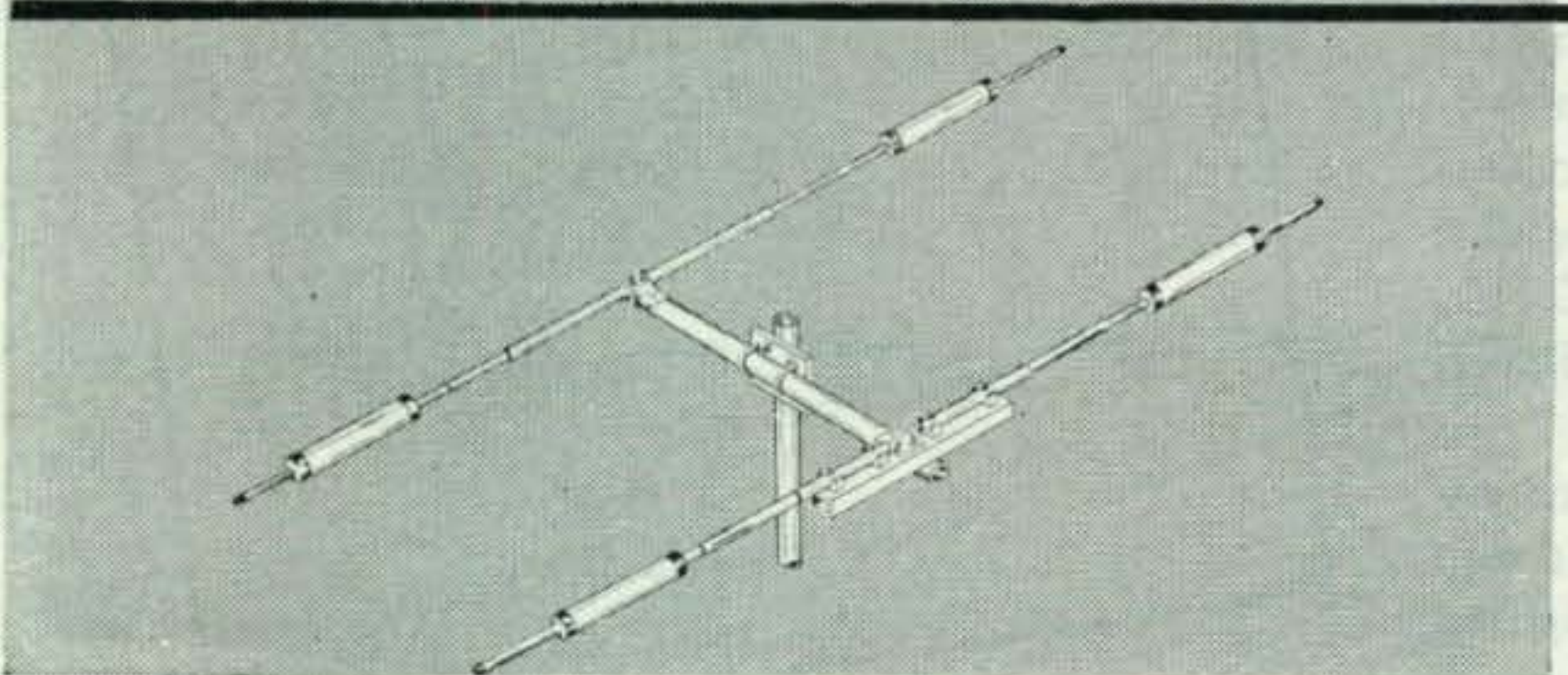
Model TA-33 Jr. \$69 50

Model TA-32 Jr. (Illst.) \$49 50



Top performance at a moderate price is yours in this Mosley 3-element tribander. Sturdy construction that requires no extra bracing and it's lightweight too—just 39 lbs. 10, 15 or 20 meters with 8db forward gain, 25db front-back and 1.5/1 swr on all bands. Maximum element length is 28 ft. mounted on a 14 ft. aluminum boom. Trap-Master design by Mosley features weather-proof, dust-proof traps—space wound coils of No. 10 tinned copper wire that cannot change inductance plus...that superlative dependability found in all Mosley Beams.

Model TA-33 \$99 75



This is a 2-element version of the above mentioned beam. The same sturdy construction throughout provides you with a low cost, 3-band beam for 10, 15 or 20 meters. Max. element length is 28 ft., weight, 26 lbs. 5.5db forward gain, 20db front-back, 1.5/1 swr is typical of the performance to expect from the TA-32. No tuning or adjusting needed!

Model TA-32 \$69 50

A complete line of Mosley Rotary Beams are available at your Ham Distributor!

FREE: Write main office for Mosley Catalog H-58.

Mosley Electronics, Inc.

WEST COAST BRANCH
1406-08 South Grand Avenue
Los Angeles 15, California

EXPORT DEPARTMENT
15 Moore Street
New York 4, New York

MAIN OFFICE AND PLANT
8622 St. Charles Rock Road
St. Louis 14, Missouri

the **TRAP**
MASTER
 family

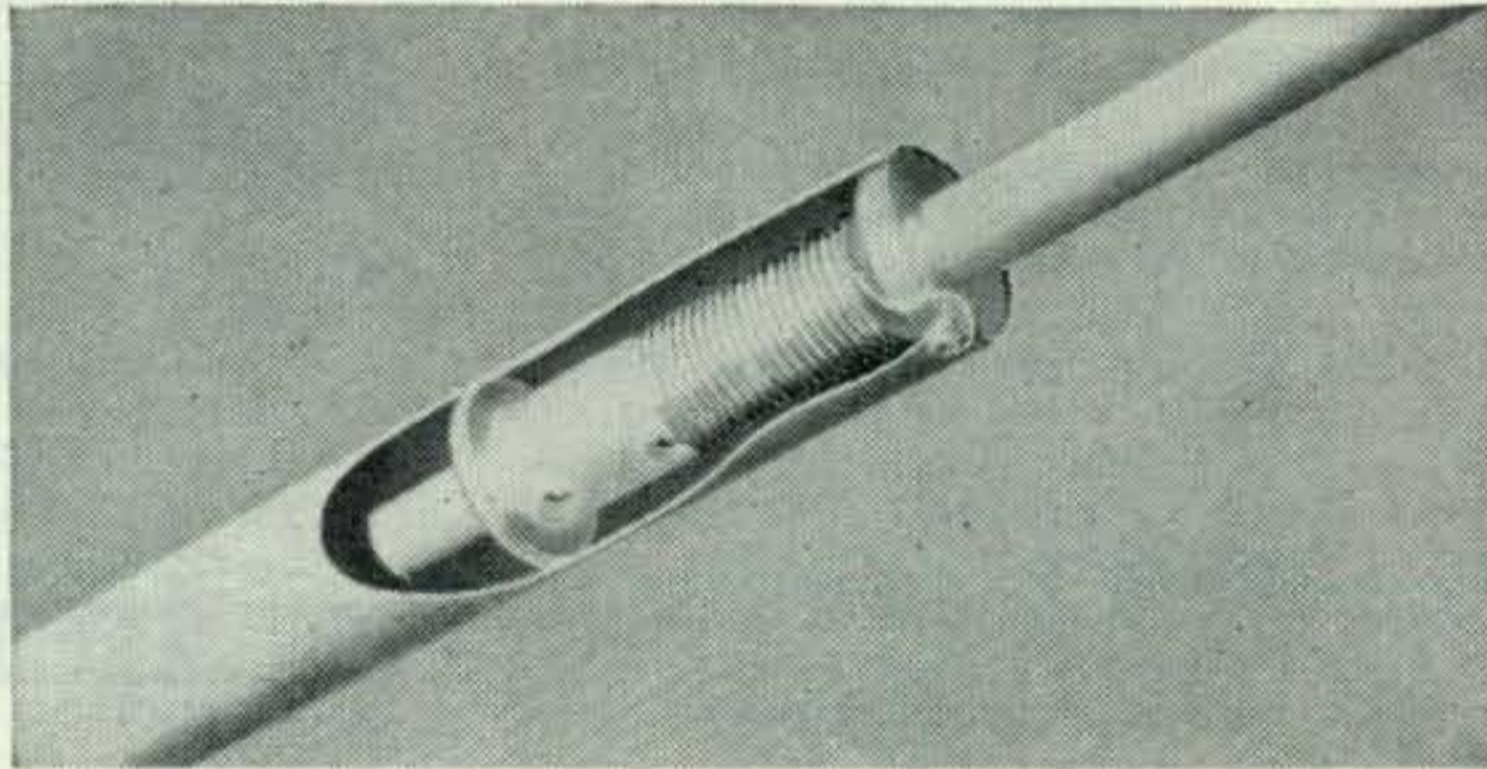
by
Mosley

NEW!

Here's 3-band mobile operation at its best... "Trap-Mobile" by MOSLEY! "Trap-Mobile" offers you the convenience of bandswitching right at the transmitter and receiver. No mechanical gadgets or relays! Stainless steel whip sections and polished aluminum traps provide everlasting beauty and operating qualities. Space wound coils will never change inductance — weather sealed traps and potted base coil provide a lifetime of uninterrupted operating pleasure! New anti-sway design and slim profile styling cut down wind resistance and drag. "Trap-Mobile" has radiating qualities equal to an 8 ft. whip on each band...yet the overall length is only 7 ft. 9 in. from base to tip. The plus feature of this antenna is the surprisingly low SWR over the full width of each band!

Model MA-3

\$19.95



Delivering the "punch" to all "Trap-Master" antennas is this carefully engineered coil. Die cast of high impact polystyrene with preformed grooves that are precision wound with No. 10 tinned copper wire. This winding cannot move or change inductance; your guarantee of peak efficiency...always!

Ideal for the Ham with limited space. This fine, low cost vertical antenna has all the desirable characteristics found in "Trap-Master" design; weather-proof traps, low SWR, and sturdy, lightweight construction. Broad band! Automatic bandswitching from 10 thru 40 meters. The MOSLEY "Trap-Master" Vertical will handle 1 kw and maintain an electrical quarter wave length on each band. Comes complete with all necessary hardware, guy line and instructions. May be mounted on ground or rooftop. Requires no tuning or adjusting.

Model V-4-6

\$27.95

AVAILABLE
 80 Meter Base
 Loading Coil.
 Model D-4BC
\$14.95

FREE: Write main office for
 Mosley Catalog H-58.

Mosley Electronics, Inc.

WEST COAST BRANCH
 1406-08 South Grand Avenue
 Los Angeles 15, California

EXPORT DEPARTMENT
 15 Moore Street
 New York 4, New York

MAIN OFFICE AND PLANT
 8622 St. Charles Rock Road
 St. Louis 14, Missouri

For further information, check number 14 on page 126.

GREATER ELECTRONIC KNOW-HOW THE EASY, LOW-COST RIDER BOOK WAY CAREER ADVANCEMENT—MORE SUCCESSFUL HAM OPERATION

NOW AVAILABLE

READ THESE NEW RIDER BOOKS

PHYSICS AND MATHEMATICS IN ELECTRICAL COMMUNICATION by James Owen Perinne, Ph.D.—Profound and probing explanation of what happens in electrical circuits that contain resistance, inductance and capacitance. On a foundation of associated mathematics made completely understandable and replete with numerical examples, the author brilliantly ties together physical concepts and electrical communications. An entirely new approach is used in analyzing hyperbolic functions, exponential equations and related functions. #219, 8½" x 11", cloth bound, 268 pp., \$7.50.

CONDUCTANCE CURVE DESIGN MANUAL, by Keats A. Pullen, Jr., Ph.D.—An original technique for designing electronic circuits based on conductance curves. $G_{m, r, p}$ and μ are replotted as necessary so as to enable design using small signal parameters to predict large signal performance. Shortens design time and minimizes problems arising from approximation.

Circuit reliability can be improved and distortion reduced at the same time by using the tables and curves in the manual. Engineers, engineering students and laboratory technicians can now select the proper tubes and their associated components to suit the needs of almost any type of circuit with greater reliability than ever before. #210, 8½" x 11", stiff cover, \$4.25.

INDUSTRIAL CONTROL CIRCUITS, by Sidney Platt—Control circuits are responsible for the rigid regulation and control of countless industrial processes. They constitute the core of industrial electronics. This book covers those control applications most frequently encountered in industrial electronics. #202, soft cover, \$3.90.

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W2RID



For further information, check number 15 on page 126.

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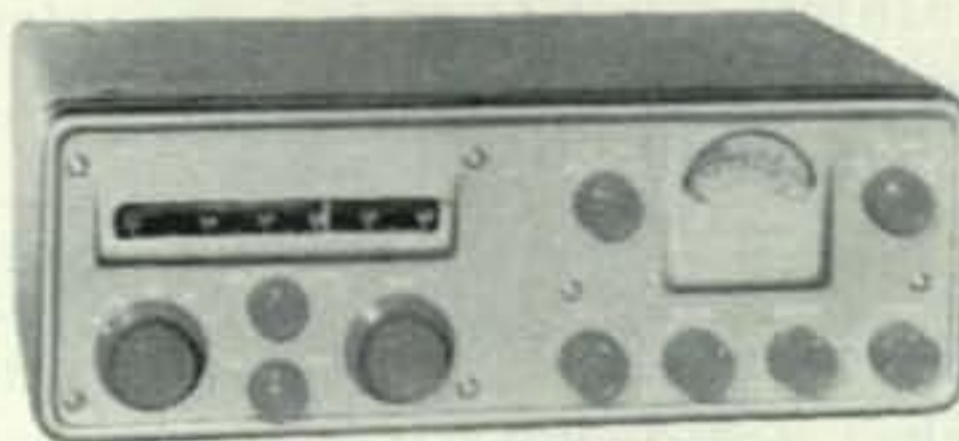


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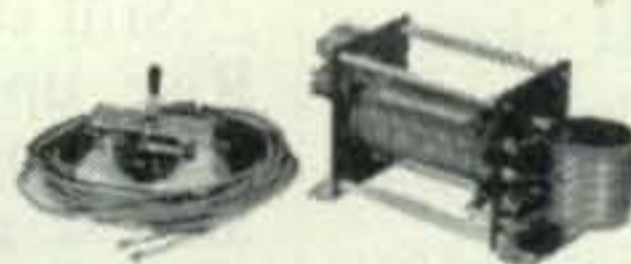
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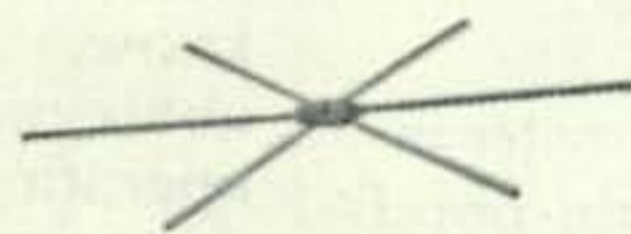


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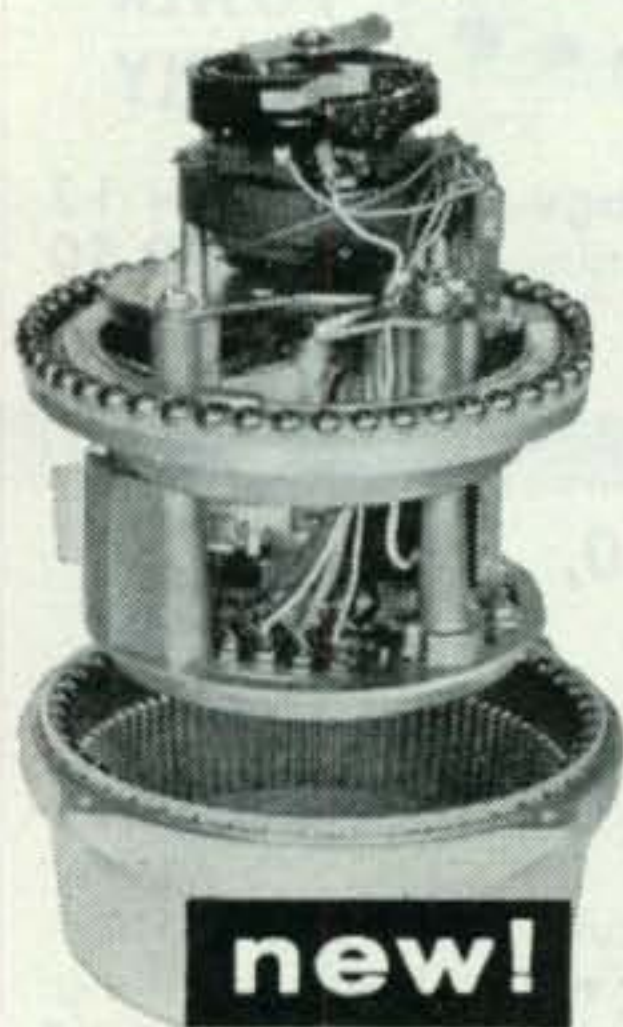
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THE RADIART CORP., Indianapolis, Ind.

For further information, check number 17 on page 126.

de W2NSD [from page 10]

Soldering Iron

Reeve O. Strock, K4AW, the distributor of the Quik-Shot soldering irons sent one up for a test. This looked like just the thing for antenna work and for expeditions, etc. It was pretty cold and windy out, but in the interests of science and good reporting I bundled up and took out the Quik-Shot for a climactic test.

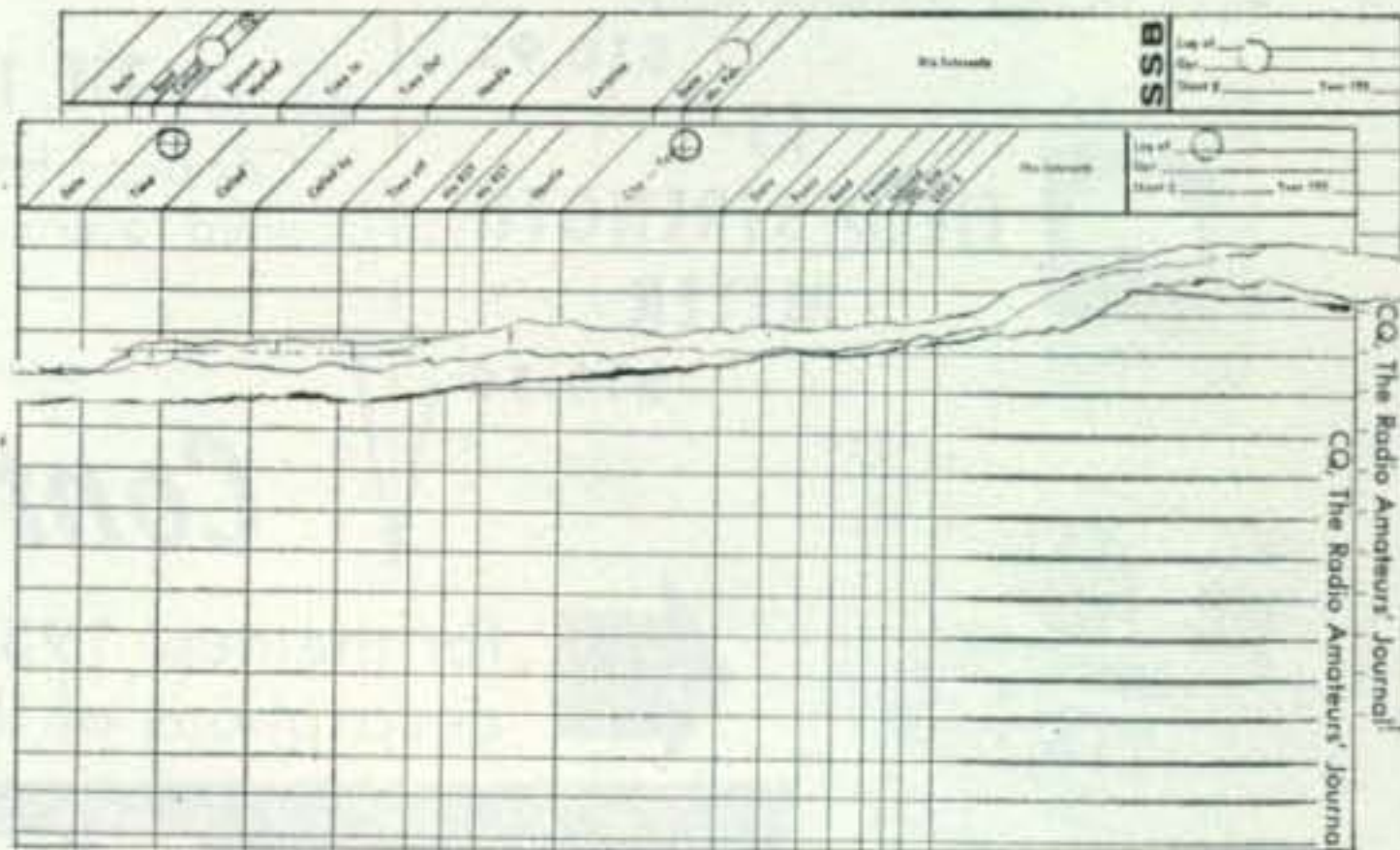
This contraption runs off a small cartridge which fits in the bulge just below the tip. After having had to run AC lines through snow, across walks and up into trees in order to solder the end of an antenna this looked like a real deal. And for portable use where you usually have to lug along a blow-torch or something for heating the iron this would be invaluable.

Under test the iron heated up to soldering temperature in 18 seconds inside the house and in about 25 seconds out in the 19° wind. Soldering was possible for over 8 minutes in the house and for a good five minutes outside . . . considerably longer than my fingers stayed warm. Why is it that I do most of my antenna work right after a snowstorm in freezing weather?

At any rate, this doohinky does just what Reeve claims, and will tag along on all trips from now on. There is a New Products Release on it on page 49 in case you want to send for literature.

CQ Log Sheets

Still struggling with old fashioned log books? Rise up and strike back, sir. Good old CQ has some log sheets which they are reluctantly almost giving away in order to help promote the magazine . . . only \$1 per pad of a hundred sheets. And further, there are two types: regular and sideband. The regular logs are scientifically designed to give you all the room you need to put down just what you want to know. The sideband logs are considerably abbreviated to better fit in with the different operating techniques involved.



SWL Column

The reaction to the SWL Letter in the February CQ was interesting. A few hams wrote in endorsing the idea of our running

[Continued on page 24]

THE BROADBAND TWINS



**THE REVOLUTIONARY NEW 100V
EXCITER-TRANSMITTER**

NO TUNING (except VFO), uses famous CE BROADBAND system. PRECISION LINEAR VFO—1KC Calibration. Single Knob Bandswitch 80 thru 10. SSB—DSB—AM—PM—CW and FSK. RF Output adjustable 10 to 100 Watts PEP. Meter reads Watts Input, Amps Output and Carrier Suppression. 2" RF Scope. Speech Level and Load Mismatch Indicators. Audio Filter — Inverse Feedback — 50 db Carrier and Sideband Suppression.

IN PRODUCTION SOON.....PRICE \$595.00



**FAMOUS MODEL 600L
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NO TUNING CONTROLS — CE BROADBAND Couplers in HIGH EFFECIENCY CLASS AB² using single 813. Easily driven to 600 Watts PEP Input 160 thru 10 by a 20A or 100V. Built-In HEAVY DUTY POWER SUPPLY — 45 MFD PAPER Capacitor. Meter reads WATTS INPUT, GRID DRIVE, RF AMPS, and SWR. Completely shielded — TVI suppressed — parasitic free. REMEMBER there is LESS than ONE S UNIT difference between the 600L and a 2 KW PEP job.PRICE \$495.00

MODEL 20A



THESE MULTIPHASE EXCITERS PIONEERED AMATEUR SSB

MODEL 10B — 10 watts PEP. Plug-in coils 160 thru 10 meters. Perfect voice control on SSB—DSB—AM and PM — CW breakin; Carrier and calibrate level controls. 40 DB suppression.

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MODEL GC-1. Gated Compression Amplifier. Connects between receiver and speaker. Automatically brings all received signals to same level—no blasting. Compensates for receiver AVC deficiencies. Compresses a 40 db increase in level to less than 3 db. Magic Eye continuously monitors compression value. Keep peace with your family and neighbors — buy a GC-1.

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IF adapter RM-455 or RM-80 or RM-50\$9.95
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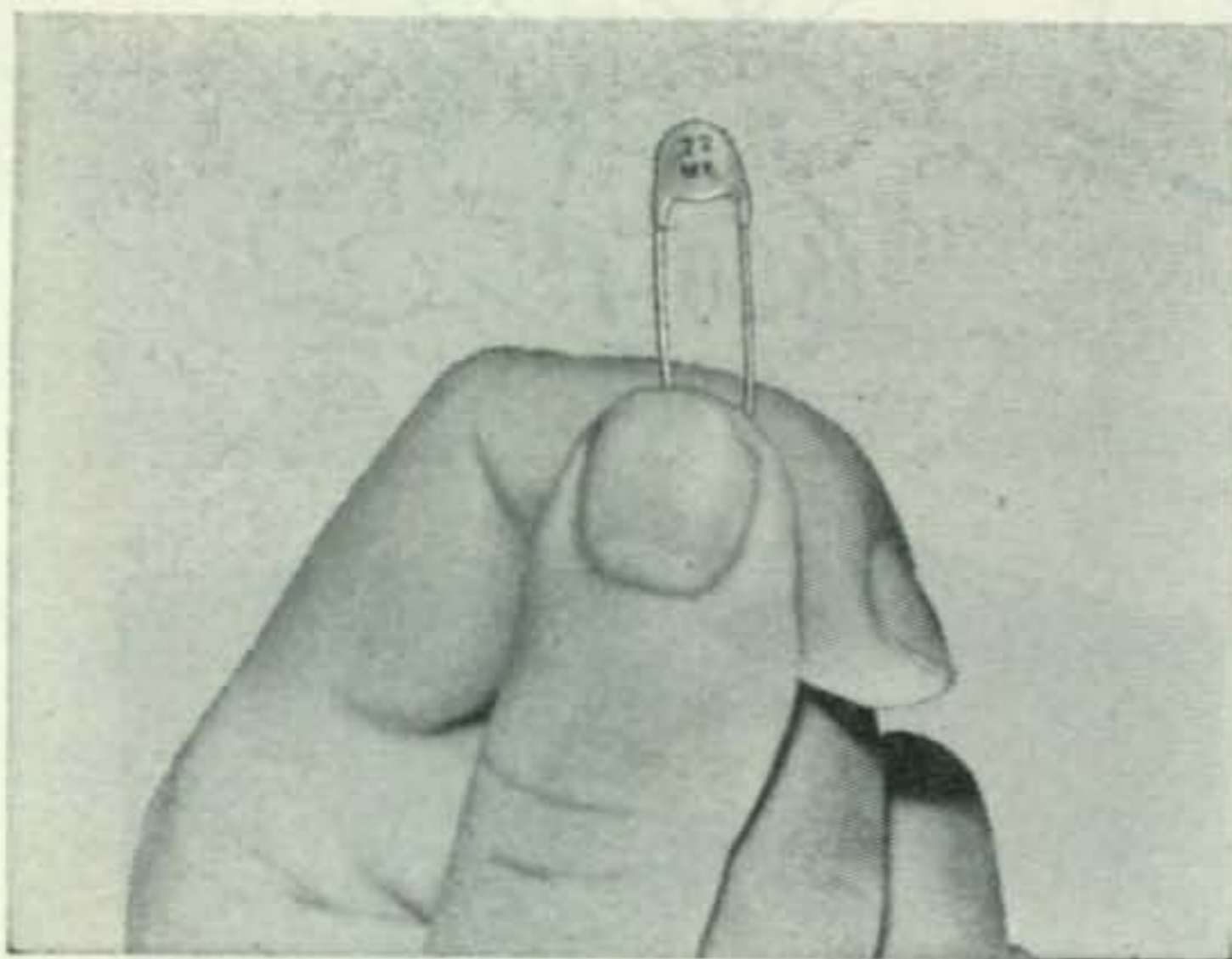
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For further information, check number 18 on page 126.

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For further information, check number 19 on page 126.

de W2NSD [from page 22]

SWL information, but most of the ham letters agreed with my feeling that since this is a ham magazine that we should stick to our main purpose and provide ham information.

Dozens of letters came in from Short Wave Listeners, who were, without exception, in favor of the column. Since our SWL readership is rather limited I got a little suspicious and checked a sampling of the letters with our subscription lists and our readers information service lists and found that none of those checked were on these lists. Since it is not my purpose to add columns to the magazine to attract new readers, but rather to provide a more interesting magazine to those already reading it these SWL letters were pretty much beside the point.

Thus, as you have probably guessed, the decision is to continue staggering along without an SWL column. Popular Electronics covers the SWL field pretty well anyway.

73, Wayne

hamfest

The Amateur Radio Club of Southwest Louisiana is again sponsoring a hamfest in Lake Charles on May 3rd and 4th at the Columbia Southern Recreation Center.

There will be a Fish-fry Saturday starting at 5 PM and a Barbecue Sunday starting at 11:30 AM. The total price for these two meals and the festivities will be only \$2.00 (which also includes 807's and 6146's).

There will be a Swap-Shop, Fishpond, Transmitter Hunt, dancing and supervised activities and games for teenagers.

Chairman of the reservation Committee is Forest Gaspard, W5BWZ, 3719 Vanderbilt, Lake Charles, La.

AF-Mars Eastern Technical Net

Sundays 2-4 P.M. 7540 kc.

- April 6 "RADIOTELETYPE"
Sal Barone, Pres. Northern Radio Corp.
- April 13 "The MODERN COMMERCIAL TRANSMITTING STATION"
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- April 20 "The MODERN COMMERCIAL MESSAGE CENTER"
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- April 27 "MODERN COMMERCIAL COMMUNICATIONS EQUIPMENT"
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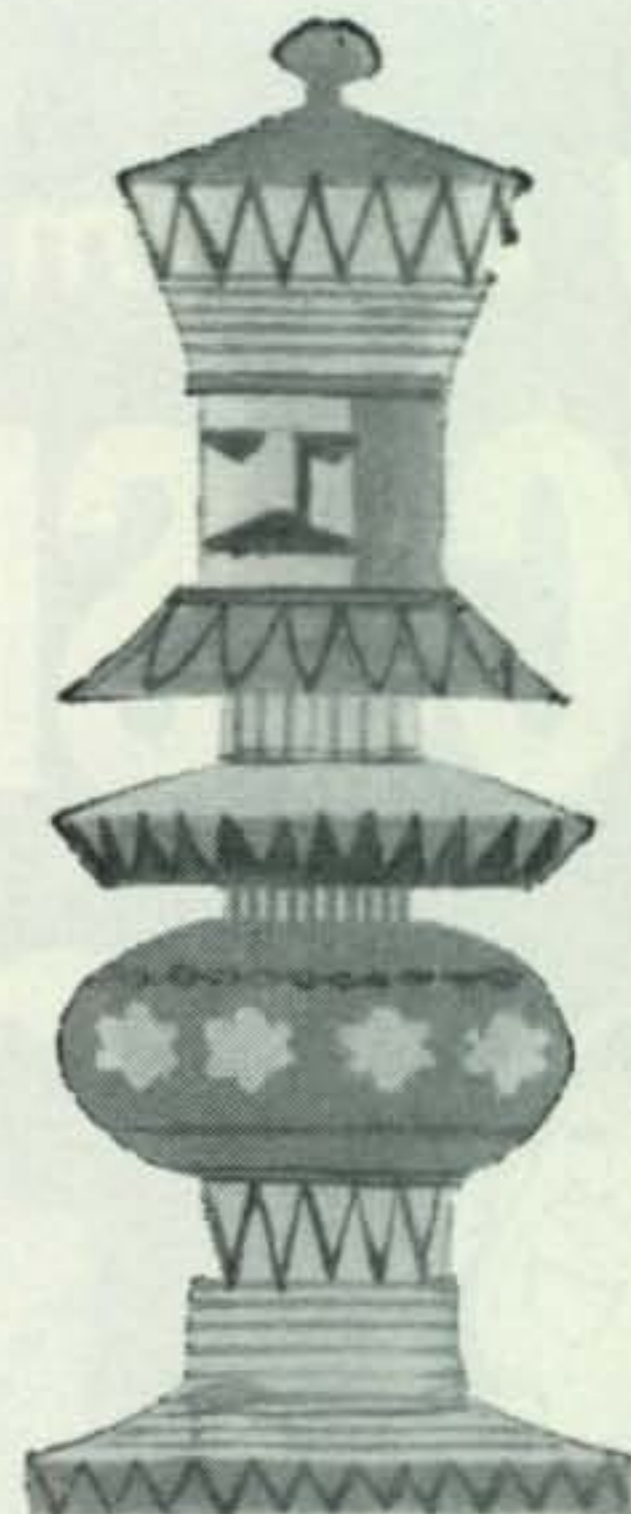
For further information, check number 20 on page 126.

April, 1958 • CQ • 25

Checkmate QRM with full communication power!

First choice among the nation's amateurs, Viking transmitters deliver solid communication power to punch your signal home every time! For effective practical design and honest dollar value, Viking transmitters stand ahead of all others. So, whether you choose the "Adventurer" as your first transmitter, or the power-packed Viking "Kilowatt" as the "last word", you know beyond a doubt that your transmitter dollar is soundly invested with Viking equipment.

‡Results of a recent nationwide survey conducted by an impartial organization prove that Johnson Viking transmitters in use outnumber those of any other manufacturer. Published copies of this survey available on request.



VIKING "KILOWATT" AMPLIFIER—in a class by itself . . . the only transmitter available that provides full, maximum legal power in all modes SSB, CW and AM—more than 2000 watts SSB*. Class C final amplifier operation provides plate circuit efficiencies in excess of 70% with unequalled broadcast-type HIGH LEVEL AMPLITUDE MODULATION with more than three times the AM power obtained in KW class linear equipments! Continuous tuning 3.5 to 30 mcs. Excitation requirements: 30 watts RF and 10 watts audio for AM; 2-3 watts peak for SSB. Wired and tested, with tubes.

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*New
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VIKING "COURIER" AMPLIFIER—Rated a solid 500 watts P.E.P. input with auxiliary SSB exciter as a Class B linear amplifier; 500 watts CW or 200 watts AM linear. Self-contained desk-top package—may be driven by the Viking "Navigator", "Ranger", "Pacemaker" or other unit of comparable output. Continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts depending on mode and frequency desired. Employs two 811A triodes in parallel. Pi-network output will match 40 to 600 ohm loads. TVI suppressed. With tubes and built-in power supply.

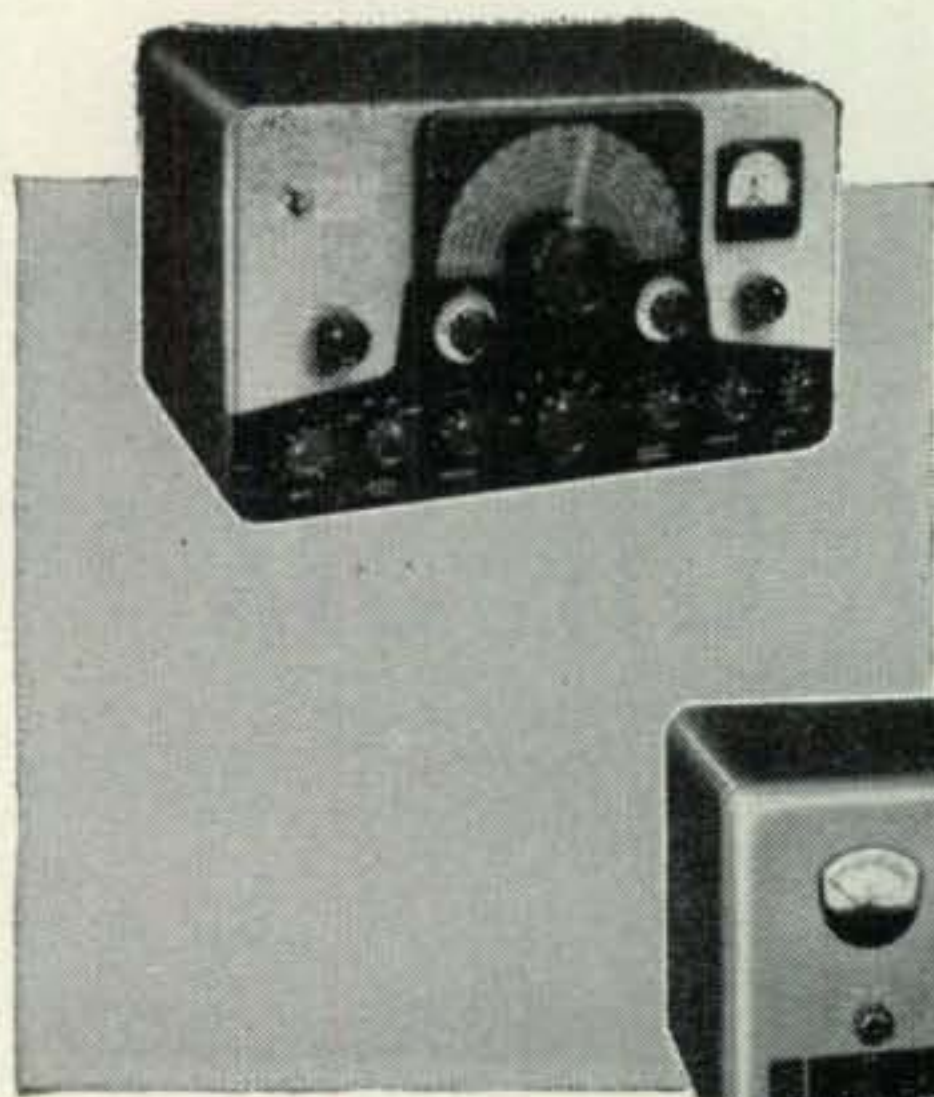
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VIKING "THUNDERBOLT" AMPLIFIER—The hottest linear amplifier on the market—engineered to provide maximum "talk-power" to smash through QRM. 2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear; in a completely self-contained desk-top package. Delivers a dominant signal on all amateur bands—continuous coverage 3.5 to 30 mcs.—instant bandswitching. May be driven by the Viking "Navigator", "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: approx. 10 watts in Class AB₂ linear, 20 watts Class C continuous wave. Final amplifier employs two 4-400A tetrodes in parallel, bridge neutralized. Complete with tubes and built-in power supply.
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*The F.C.C. permits a maximum one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

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VIKING "FIVE HUNDRED" TRANSMITTER—Rated a full 600 watts CW . . . 500 watts phone and SSB. (P.E.P. with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation—power supply/modulator unit may be placed in any convenient location. All exciter stages ganged to VFO tuning—also may be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system—low level audio clipping. Final amplifier uses a 4-400A high efficiency tetrode. Pi-network output will match a wide range of antenna impedances. Complete with tubes, less crystals, key and microphone.

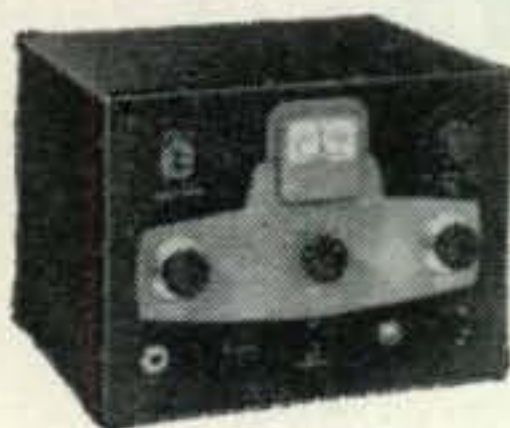
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SPEECH AMPLIFIER/SCREEN MODULATOR—Designed to provide phone operation for the "Adventurer". High gain—use with crystal or dynamic microphones. Simple installation. With tubes.
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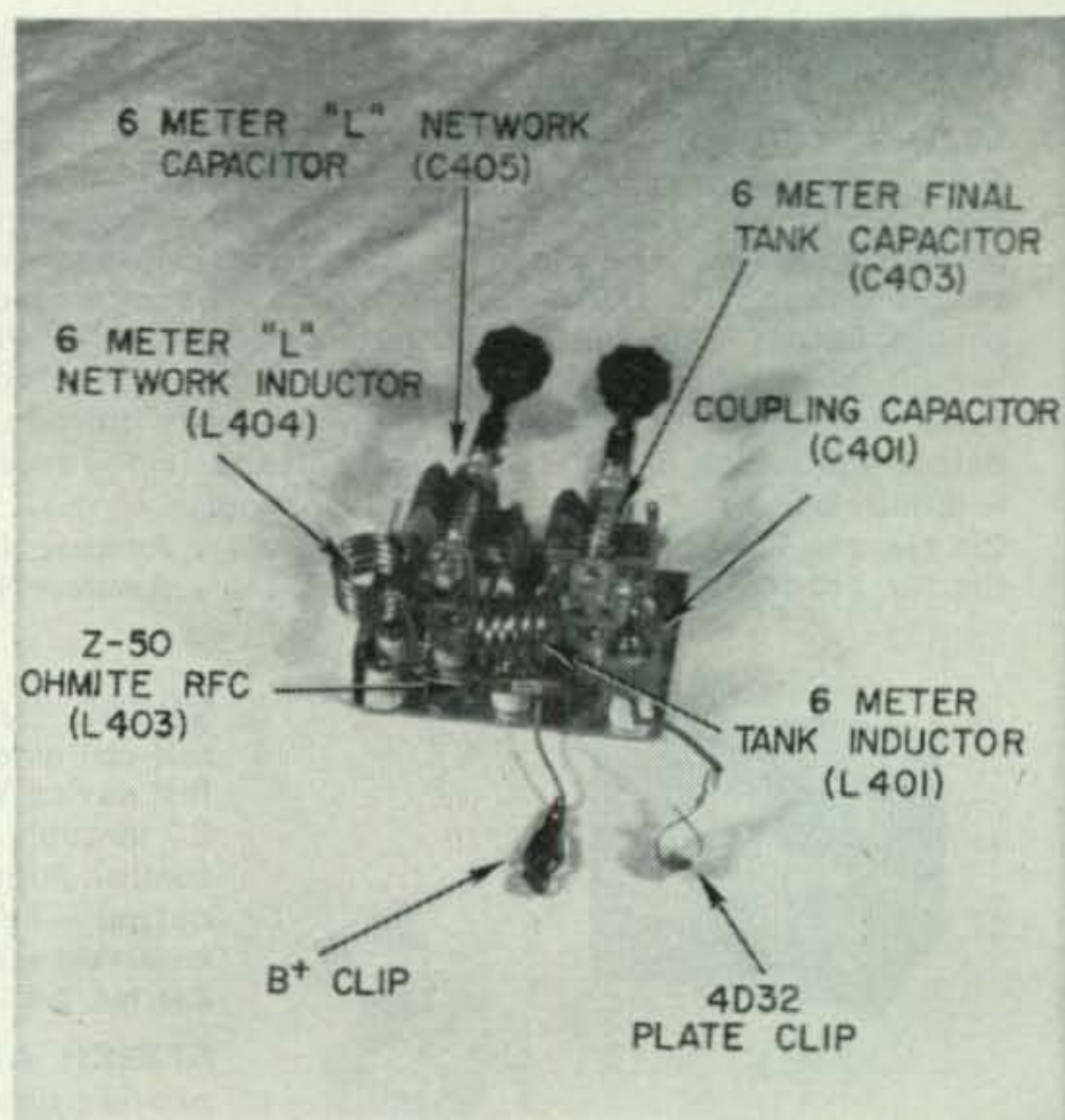
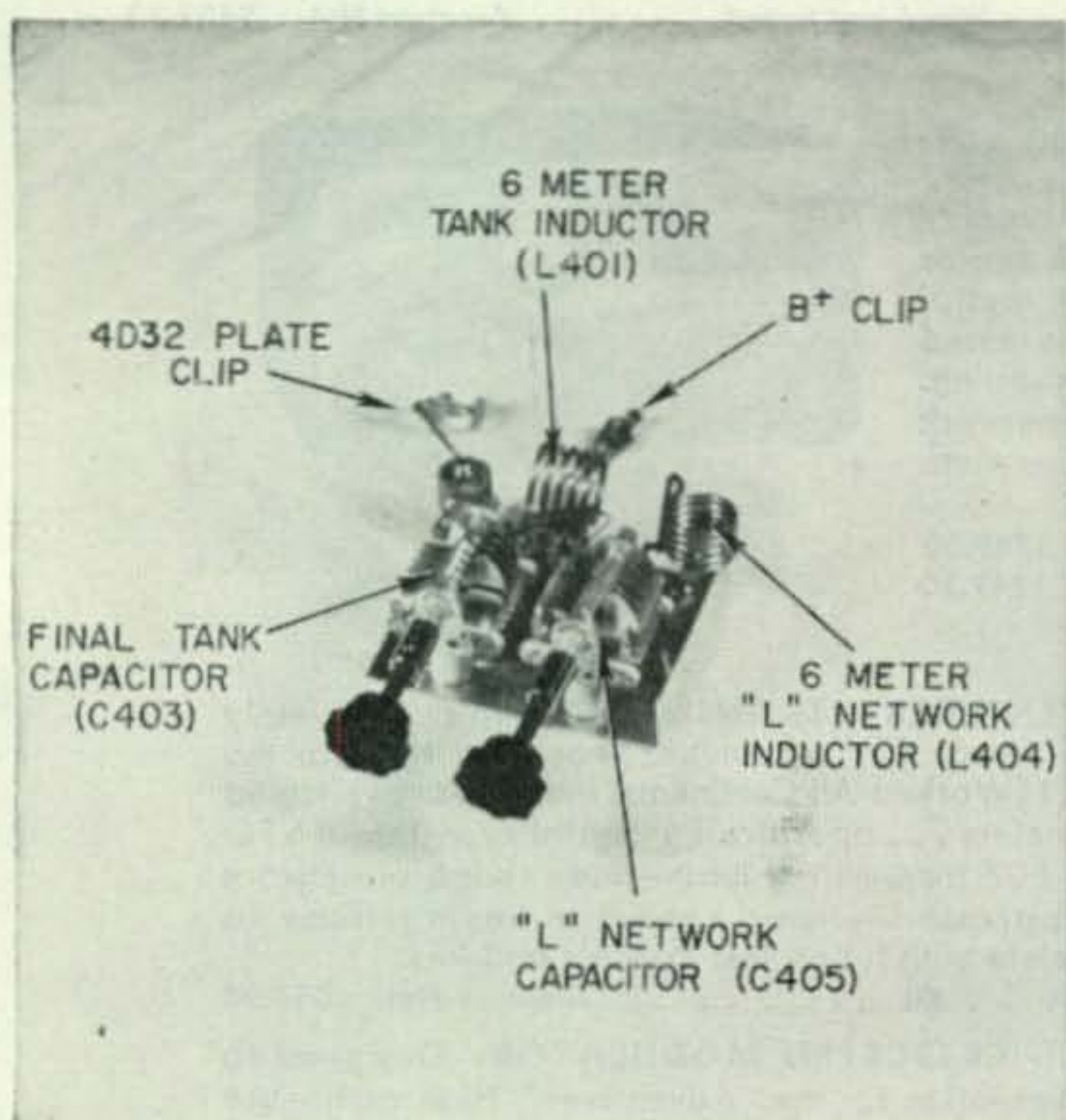
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For further information, check number 21 on page 126.

Putting The Collins 32V On Six

by JOSEPH ZELLE, W8FAZ

WERE AM-FM-TV, Cleveland, Ohio



Although the Collins 32V- transmitter has proved itself on the frequencies for which it was designed, it can be used satisfactorily on the newly activated six meter band. The change can be made with a minimum of trouble and effort. Two methods are available.

Shunt Inductance

On the 27 mc and 28 mc band scale of the transmitter, tuning the main control knob to the low end will bring the entire transmitter to about 25.6 mc. This is the lowest frequency which can be reached without alterations. When doubled in the plate circuit, it will put the transmitter output in the six meter band. Thus the Collins can roughly cover 51.2 mc to 54 mc. Even at this extreme end of the dial the multiplier circuits track well and there is adequate grid drive, 12-13 grid mils.

With the main tuning condenser, C403B, and the loading condenser, C405, set at minimum in position 6, it is just possible to resonate

the final as a doubler feeding a 300 ohm load. With a 52 ohm load resonance at 51.2 mc may be difficult to reach.

The solution is a shunt for the ten meter coil, L405. With the tank capacity available, the tank inductance can be reduced with a shunt inductance.

Unfortunately, there is considerable stray inductance due to the selector switch wiring and the long leads to the tank and loading condensers. To effectively shunt all this inductance, it is necessary to connect a heavy gauge shunt wire from the lug of the plate blocking condenser (C401) to the lug holding the connection on the loading condenser (C405). Under these conditions, 51.2 mc is tuned quite easily with the tank condenser, resonance being indicated by a strong dip in the plate meter, M302. The frequency should be checked with a frequency meter.

For occasional or temporary operating this will suffice to get on six meters. Since the 4D32 final tube is now operating as a doubler,

the bias conditions will not be correct for full power operation. Grid leak R120 (3300 ohms) might be changed or additional resistance added to improve biasing conditions. However, since the plate dissipation of 50 watts is being exceeded you should operate the transmitter in the "Tune" position, thus eliminating biasing and plate dissipation problems. The "Tune-Operate" resistors, R320 and R321, are husky and for ordinary short transmissions should not burn out. Power output of 25 watts and more can be easily obtained this way.

Fairly strong harmonics are picked up at 103 mc and 153 mc, which create serious TVI on Channels 5 and 8 in Cleveland. The Collins TVI filter, 35C-2, is worthless here since it has a cut-off frequency of 35 mc. It must be removed from the circuit and another filter built which will cut off beyond say, 52 or 53 mc.*

The efficiency ran between 39 and 48% for several loading conditions. By placing the "High-Low" switch, S305, in the "High" position, and keeping the "Tune-Operate" switch in the "Tune" position, a small additional voltage is available. Biasing and dissipation limitations, however, will not be exceeded. This power compares very favorably with that of most Technician stations operating in the six meter band.

New Doubler Tank

In order to improve the efficiency and reduce the spurious harmonics, I decided to design a tank circuit specifically for the six meter band. It was simple. All I did was remove the original plate clip from the 4D32 and clip on the new tank circuit.

Quite an improvement! The static plate current (unloaded condition) ran around 35 mils instead of 65 or 70. The second harmonic component could not be detected on the *Millen* Grid Dip Oscillator. However, some third harmonic was present and there was a tendency for the final to take off. With excitation removed, no parasitics could be detected. Careful tuning of the final tank was necessary.

Link coupling to the RG8/U cable was unsatisfactory so I decided to use an "L" type low-pass network, similar to the original tank circuit. An "L" network helps to reduce harmonics and loads easily . . . just what I wanted.

With an effective TVI filter for the higher harmonics, the transmitter can be safely operated in the "Tune" low position to give 25 watts of r.f.; while the "Operate" low position yields 65 watts of well-modulated r.f. power.

The lead from the antenna jack conveniently comes to the top of the loading coil, L404. All that is necessary for normal use is to remove the coil lead from the lug, place it on a separate lug, and arrange a clip for connecting to the antenna feedline. Thus the original r.f. antenna jack connections can be used without disturbing the original installation.

The tank circuit at W8FAZ was mounted as shown, in place of the low-frequency tank coil. However, the tank circuit could very easily be mounted above the multiplier tubes (V101 to V104). The two tuning condenser shafts could be extended with the couplers through the louvers, along the left forward side. Then, in going to six meters, only the original plate clip has to be removed, the new plate clip attached, and the "B plus" clipped to the left or "cold" end of the r.f. choke, L403.

The Collins 32V-3 owners will have to make some provision for getting around the internal shield, particularly if they intend to operate on the lower bands as well as on six.

Conclusion

This extended range of the 32V- transmitter

* Bud LF-601 low-pass filter



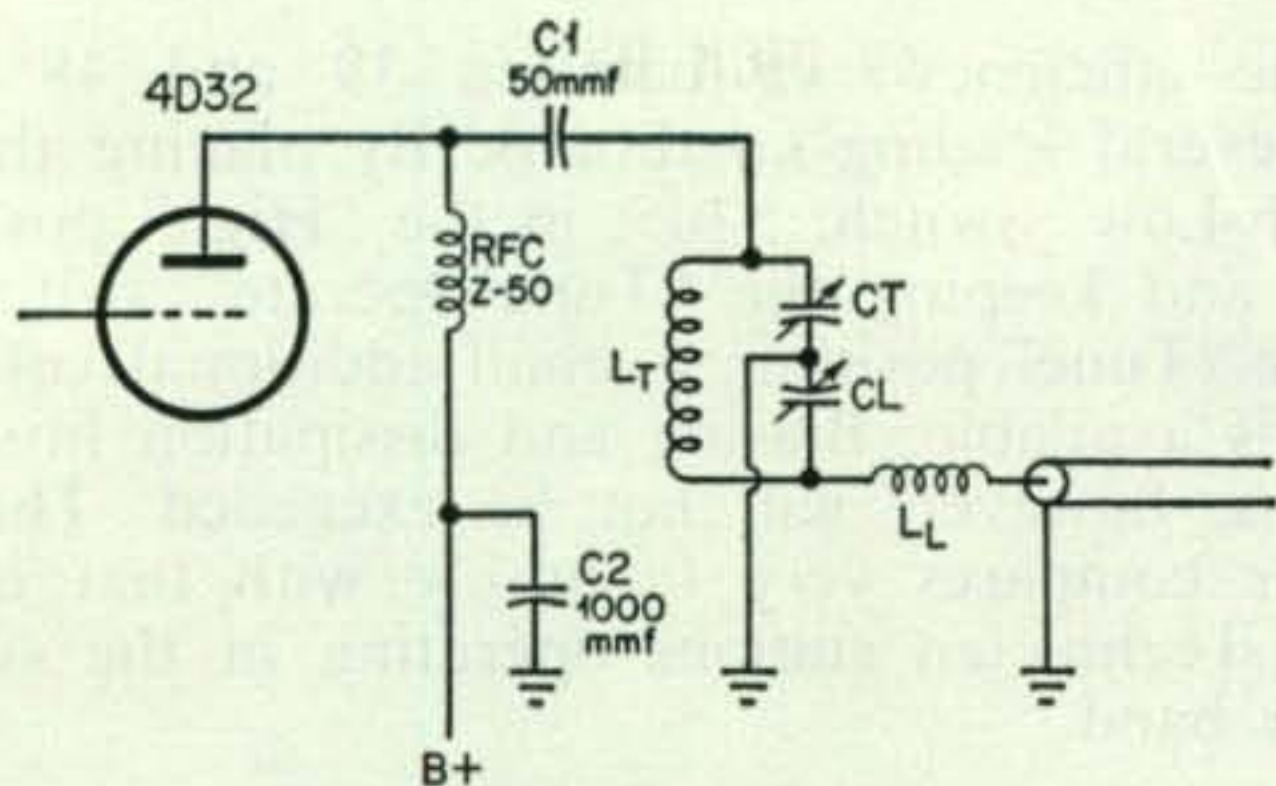


Fig. 1 and parts list.

- | | |
|--|--|
| CT—35 mmfd. Tank Condenser (2 rotor plates removed) Bud MC-1862. | #12 wire. |
| CL—140 mmfd. Series Line Condenser, Bud MC-1856. | LL—Line Coil, (for 52 ohms), 5 Turns, 3/4 inch diam., 3/4 inch long, #12 wire. |
| C1—Place Blocking Condenser, 50 mmfd. Centralab Type 850. | RFC—Ohmite Z-50. |
| C2—R-F Bypass Condenser, 1,000 mfd., Sprague Type H. | National Grid Clip (for 4D32 plate). |
| LT—Tank Coil, 5 Turns, 3/4 inch diam., 1 inch long, | Mueller Test Clip, #45-C (for B plus). |
| | 8 E. F. Johnson Steatite Cone Insulators, #135-500. |

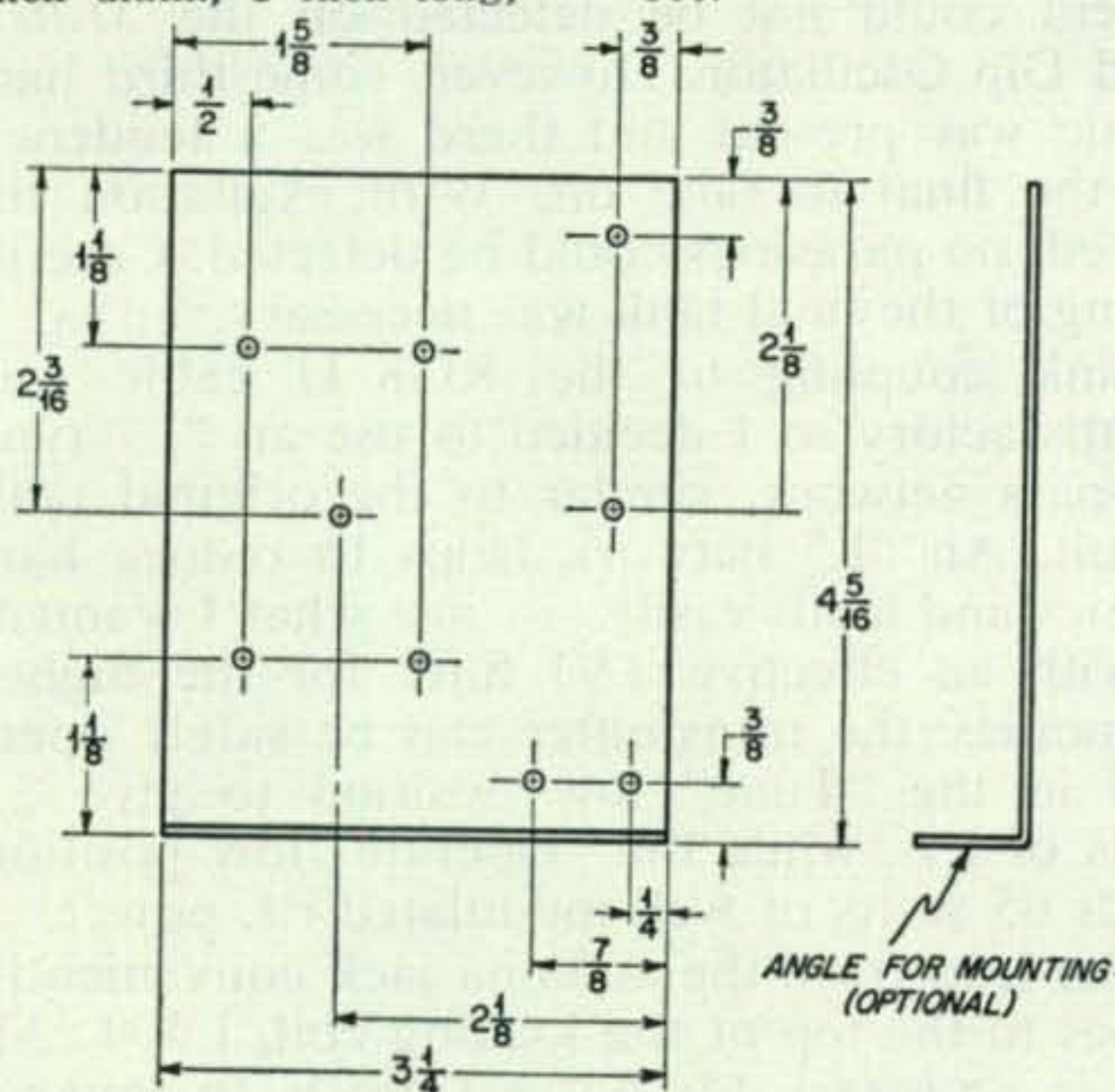


Fig. 2

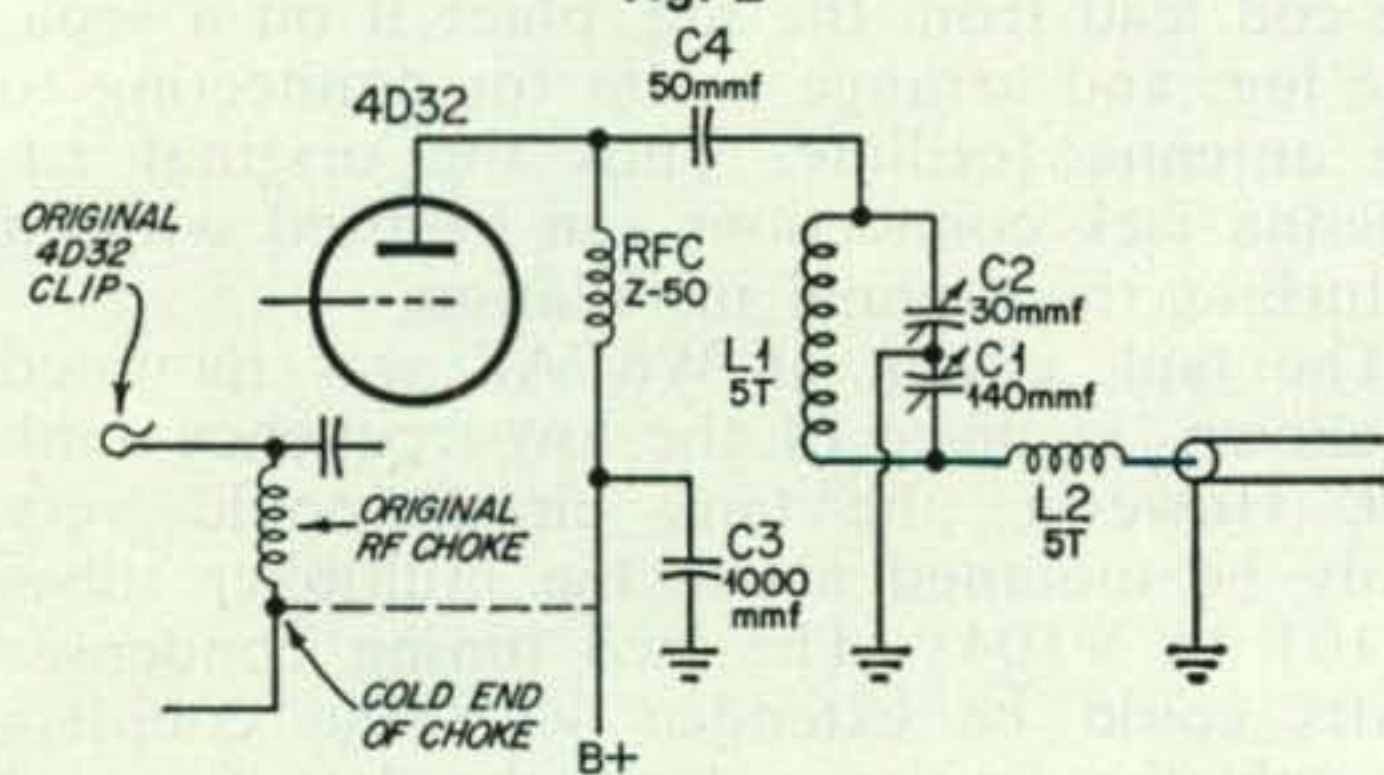


Fig. 3

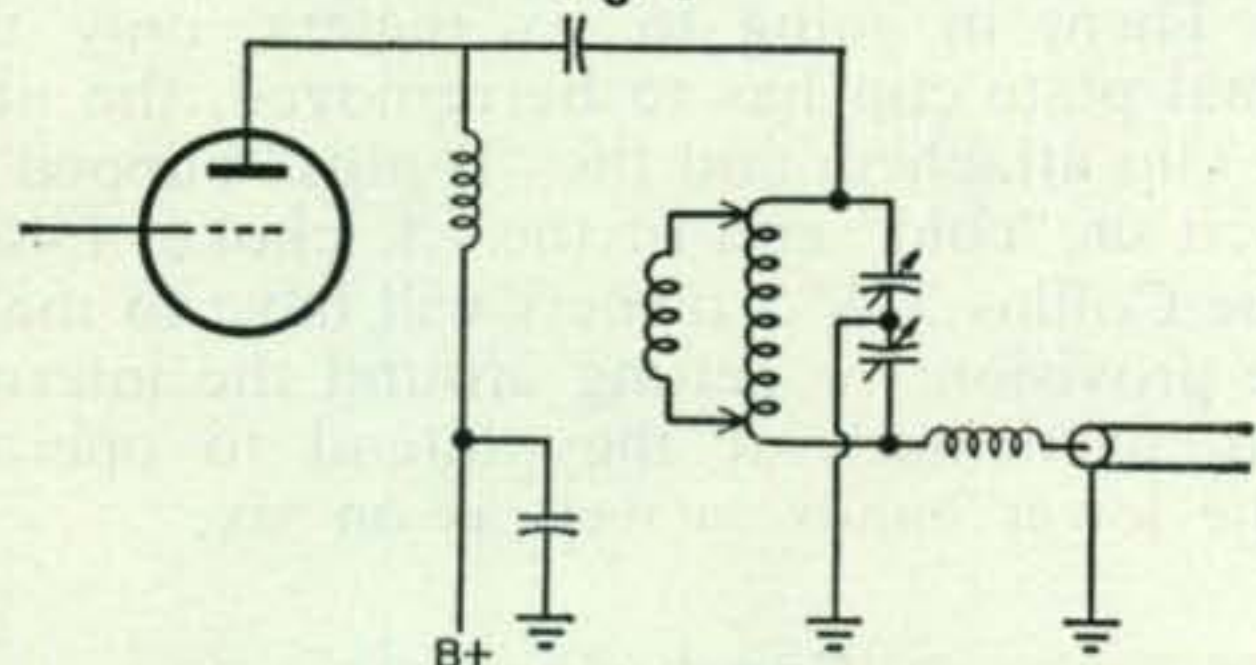


Fig. 4—Shunting the "total effective" inductance with a smaller inductance. Tank Q and losses are ignored.

once again testifies to the excellent engineering of a Collins product. Although it has given many hours of enjoyment on the conventional bands, it has likewise proved itself now on six. With the higher frequencies opening up as the sunspot maximum approaches, W8FAZ looks with new zest to VHF operation with his Collins, 32V-2 transmitter. ■

Operating Conditions

	<i>CW Position</i>	<i>Phone Position</i>
	<i>tune operate</i>	<i>tune operate</i>
UNLOADED High voltage		
(700 volts tap)		

Grid Current in final	14.2 ma	14.0 ma
Plate Current in final	55 ma	52 ma

	<i>CW Position</i>	<i>Phone Position</i>
	<i>tune operate</i>	<i>tune operate</i>
UNLOADED Low voltage		
(600 volts tap)		

Grid Current in final	14.5 ma	14.5 ma	14.2 ma
Plate Current in final	45 ma	65 ma	65 ma

LOADED High voltage			
(700 volts tap)			
Grid Current in final	12.5 ma		12.8 ma
Plate Current in final	260 ma*		270 ma*
Watts output..	65 ma		65 ma

	<i>CW Position</i>	<i>Phone Position</i>
	<i>tune operate</i>	<i>tune operate</i>
LOADED Low voltage		
(600 volts tap)		

Grid Current in final	13.5 ma	12.8 ma	13.5 ma	12.5 ma
Plate Current in final	125 ma	200 ma	115 ma	200 ma
Watts output..	22.5	49	18.5	48

* Maximum loading current; not necessarily recommended for continuous operation.

Plate voltage reading on high power tap was 620 volts. Plate voltage reading on low power tap was 540 volts.

All measurements were made on Thruline Wattmeter, Model 43 (line impedance 50 ohms, for 25–60 mc up to 50 watts; terminated by Coaxial Resistor Termaline Model 81, impedance of 51.5 ohms, 50 watts capacity. Both manufactured by Bird Electronic Corporation, Cleveland, Ohio. (Courtesy of Carl E. Smith Consulting Engineers).

Typical 32V- Readings for Six Meters

Shunt Inductance — Phone — "Tune" Position

	Volt-Current age	Grid Ma.	Input Watts	Output Watts	Eff.	RL
Unloaded Low	445	0.068	12.5	30.26		
Unloaded High	495	0.075	12.5	37.1		
Loaded Low	435	0.133	13.5	58	27.74	60 watt lamp
Loaded High	465	0.145	13.5	67.5	30.4	45 % lamp

Shunt Inductance — Phone — "Operate" Position

Unloaded Low	620	0.105	12.2	65.2		
Unloaded High	775	0.14	12.0	108.2		
Loaded Low	590	0.18	12.0	106	40.8	38.5% lamp
Loaded High	—	—	—	—	—	—

[Continued on page 110]

THE MULTIPLE IMAGE REFLEX YAGI

This idea first began shaping up the night the XYL and I were getting ready for the Club Dinner. She wouldn't take my word that the hair-do looked swell, and had quite a session with the side mirrors on the dressing table, checking from every possible, and impossible angle. I remember glancing at the multiple images and making some crack about having fifty wives, who each took fifty minutes getting dolled up. If I hadn't ducked quick I guess that hairbrush would have raised a bump like an egg!

My recollections of the dinner are a little vague.—Believe I was asked to make some sort of speech, and there was a raffle, but I didn't win anything (I never do). Some technical type got me involved in an argument about *ground reflection factor*, and something about the gain of a beam being higher when it was down near the ground than when it was way up almost in free space. Didn't seem right to me, and frankly, at the time, with a noble brandy and a good cigar, I didn't care much either way.

However, come the weekend, I had a browse through the gen books, just to satisfy myself that this ground reflection factor was a lot of hot air. To my disgust, I got around to the point where it began to look as though the wretched man was right after all. Seemed like the ground acts as some sort of mirror under the antenna and forms an image antenna more or less after the style of Figs. 1 and 2 for a vertical and a horizontal antenna respectively.

If the ground is of high conductivity, this image antenna behaves just as though it were a real live solid antenna placed below the fed antenna. The signals from the two antennas add together to produce an increase of signal over what would be obtained with a single antenna remote from ground. The increase in gain can be evaluated on the same basis as stacked dipoles.

Remember that the effective spacing is *twice* the height of the driven antenna above ground. The treatment is not restricted to dipoles. It applies equally to Yagi type beams. For example, a four element beam gives a gain of about 9db. Two such beams stacked a wavelength apart would give a gain of 12-13db.

[Continued on page 101]

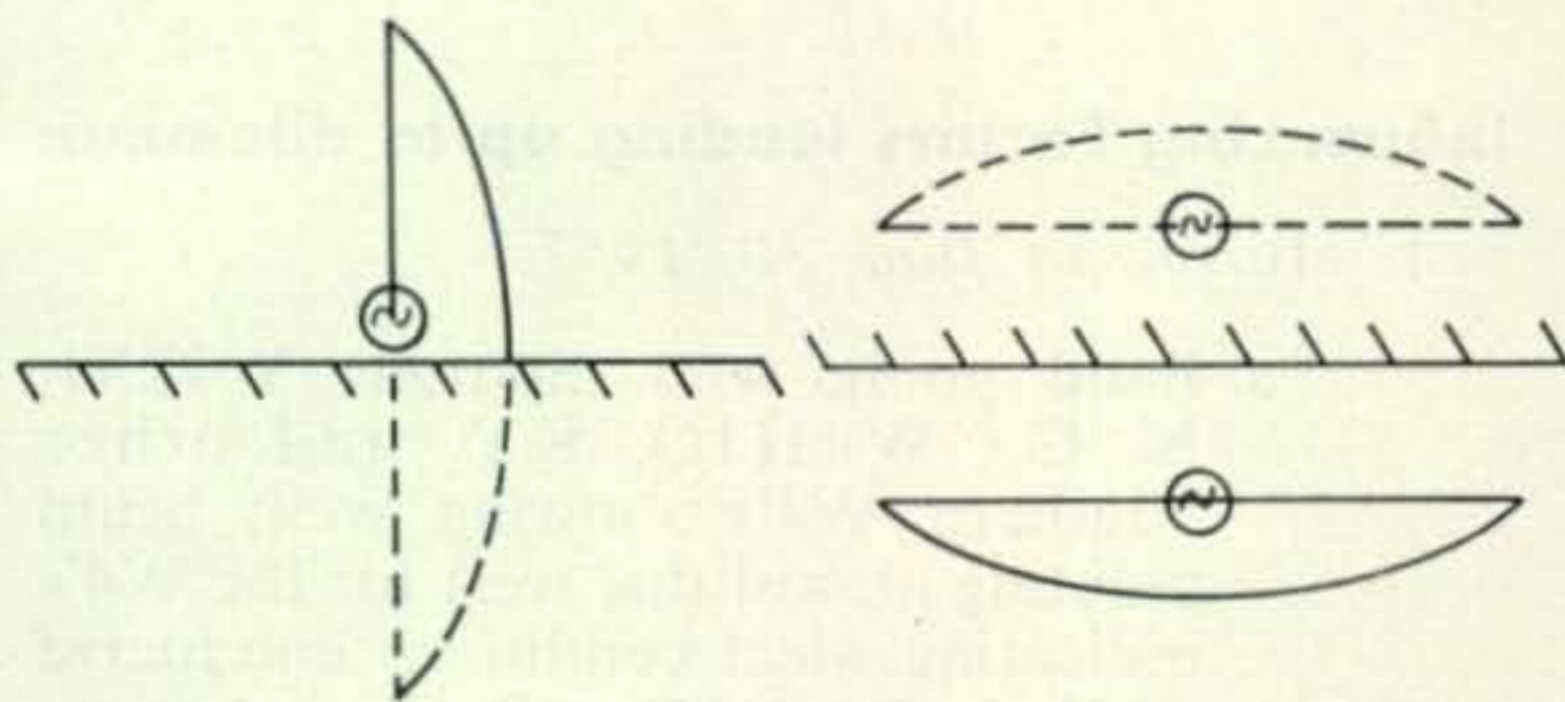


Fig. 1

Fig. 2

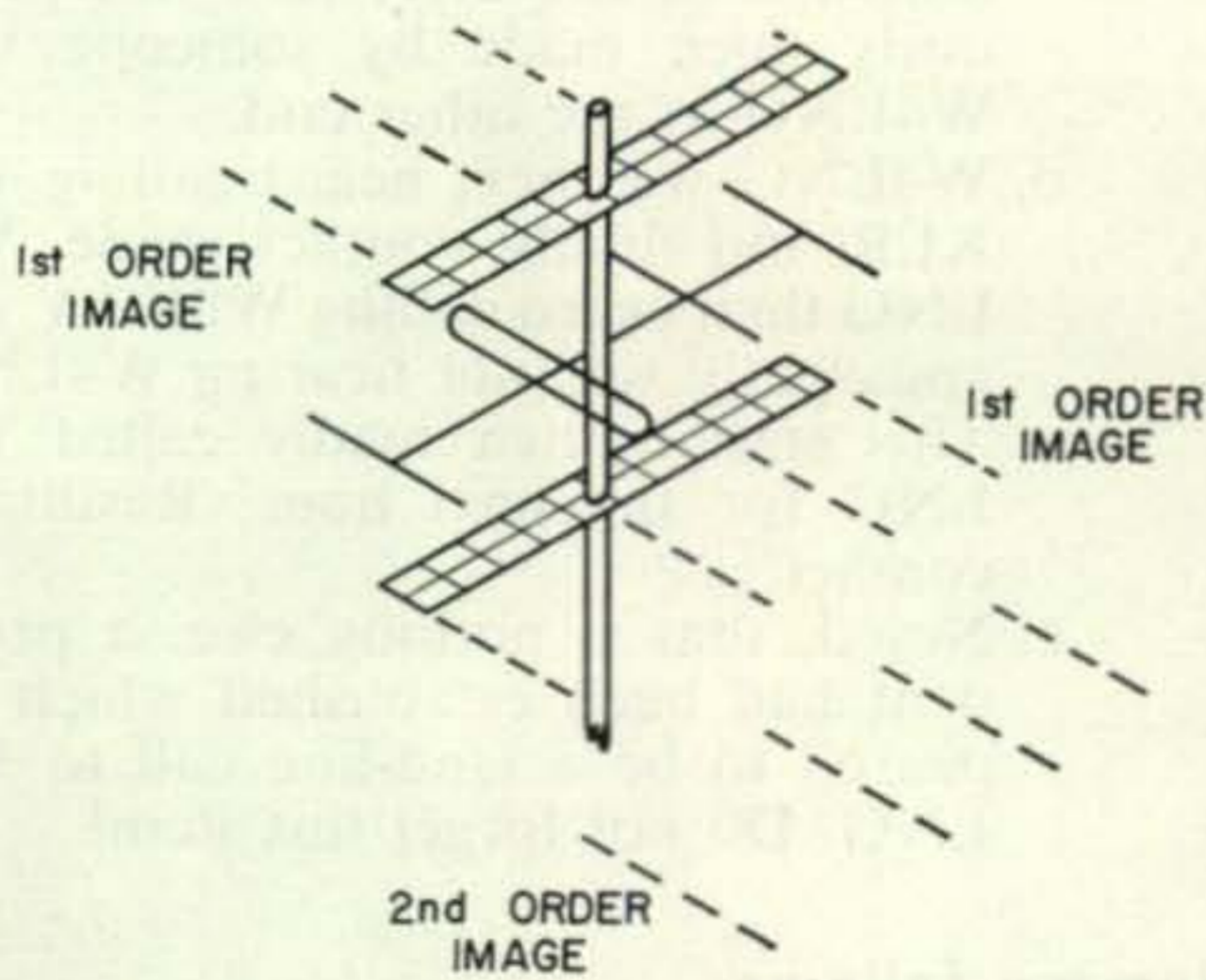


Fig. 3

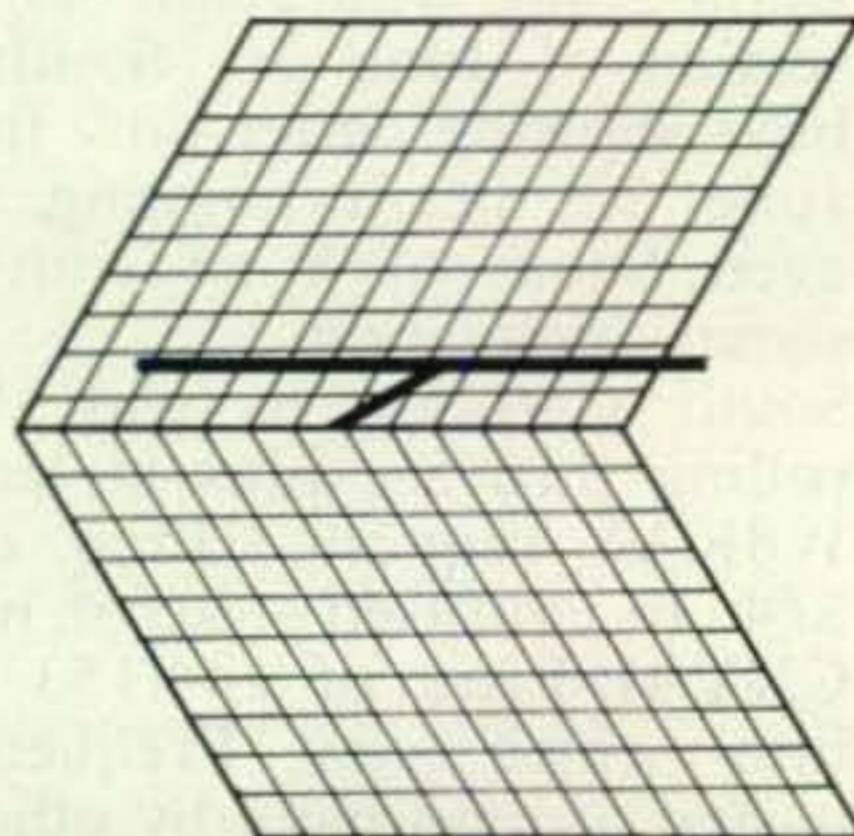


Fig. 4—Corner reflector—gain 12db.

Modern Dilemma, 144 Mc Style

by WALTER MORRISON, W2CXY

229 Longwood Ave., Chatham, N. J.

Influencing Factors leading up to dilemma:

1. Aurora of June 30, 1957:

- a. Band going wild. Stations W4ZXI, N. C.; W4HJQ, KY, and other Southern W4's showing well; beam pointing almost due west for the W4's indicating ideal conditions conducive to N. J./Tenn., Ga., S. C., Ark., etc. contact.
- b. This station does not have Georgia.
- c. Heard W9KLR frantically calling W4LNG in Ga.; it was shortly evident that a land-line alert had just previously been made by someone with W4LNG at the other end.
- d. W4LNG was next heard calling W9KLR and finally contact made. W4LNG then heard calling W8KAY who apparently was not hearing W4LNG. This station then madly called W4LNG for the next hour. Result, no contact!
- e. Noted, that if nothing else, a precedent had been established which appeared to be a land-line call to W4LNG. Do not forget this item!

Dilemma follows:

2. Aurora of July 7, 1957:

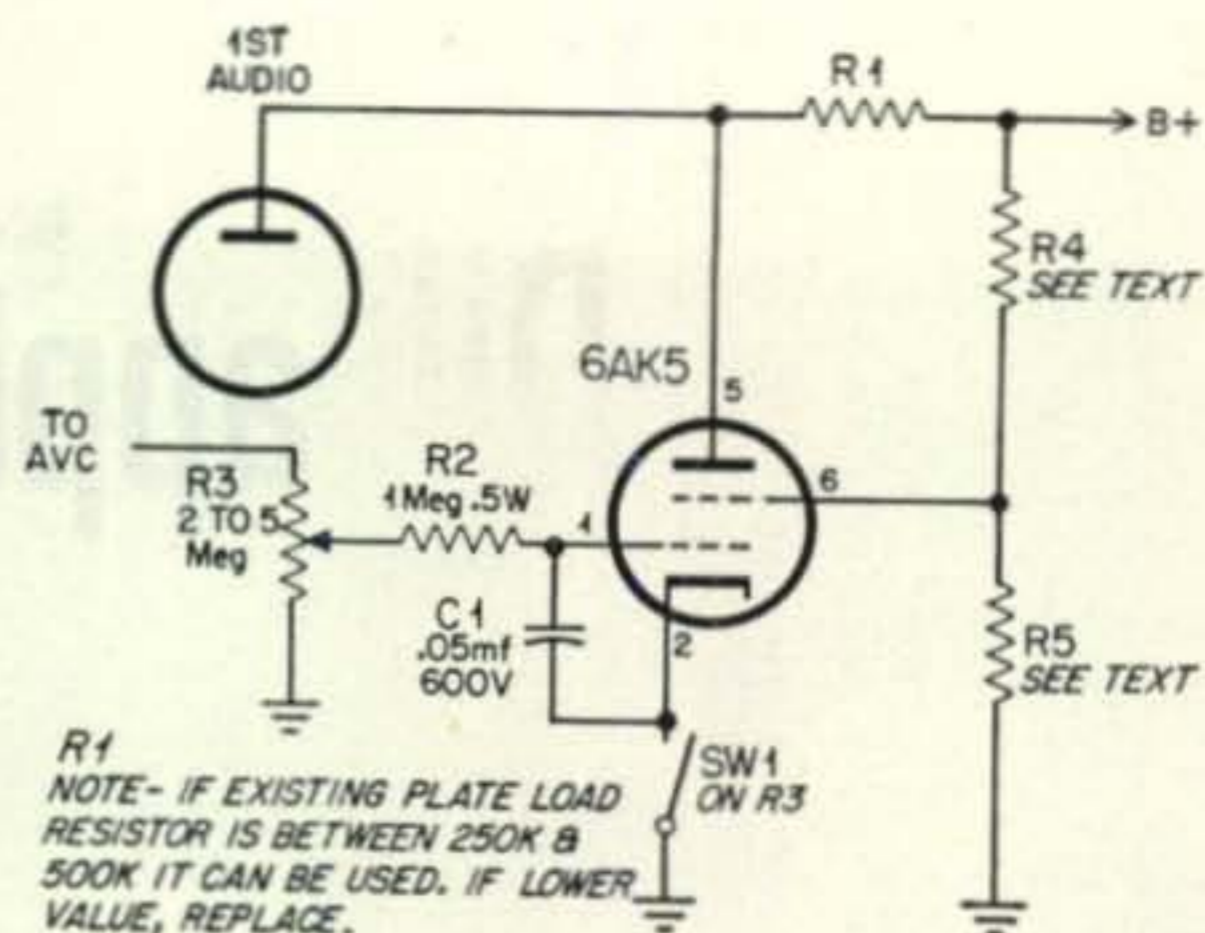
- a. Time, much later, about midnight or after, E.D.T.
- b. Band going wild again same as buzz session of June 30. Southern buzz-boys showing better now than during June 30; beam pointing west, and even South of West with but little signal attenuation.
- c. South Carolina in with W2BHS/4 rolling thru S9, plus at least 20 db! W8KAY requested Freq. of W4BHS/4. In confused state of mind (W2CXY's) Freq. of 144.153 was given him which was Frequency being passed around band by others. Check of log next day showed a recorded

- Freq. of 144.054! My apologies, Art.
- d. Only one thing wrong, Georgia missing, however, since phone call precedent was previously established, decision was quickly and easily made to call Ruddy, W4LNG, on land-line (after all, it was only one hour after mid-nite, 0100 EDT)!!
 - e. Deep barrell-like growling voice with southern accent answer phone and he say, "Whatsamatter wi you boy, you crackin' up? You keep dis up and I going send man after you wid de net!!" Note obstacle No. 1! Some treatment too, right after I have promise pay Tel. Co. one buck eighty five to make connection. Still full of confidence I try explain. No good. He say, "I can promise you nuttin', an besides, I got to wake wife up". Note obstacle No. 2. After lots whispering in back-ground he say", an besides it going take 25 minutes through heavy traffic to get to transmitter location!" (This 1 a.m. in morning—heavy traffic?) Note obstacle No. 3, time 0105 EDT.
 - f. I now sit back in chair and listen to band. It still boiling! Confidence begin to rise. Begin trying to figure how to let local VHF partner, W2AZL, know that band is buzzing and to look for W4LNG (after I work Him)! This is small problem count of I call Carl at only 4 a.m. For last aurora when he stumble downstair to answer telephone. Only one leg in cast now but wife still mad at me. For what?
 - g. Ruddy on road now 10 minutes with 15 to go. I begin tuning band making sure radio still working; I even commence tapping telegraph key to make sure it not stick. It good. I start get nervous so I am calling W4LNG. Mebbe he get to station sooner 'en 25 minutes but is now still 10 minutes to go.

[Continued on page 104]

James Lanterman, K4GOM

2920 Maryland Dr.
Montgomery 8, Alabama



REAL EASY SQUELCH

The following diagram is not original at all. My only claim to it is that after finding it in an old radio book and using it for sometime, I introduced it to the local boys. All who have used it once just wouldn't be without it.

There are many other squelch circuits being used, no doubt, and as long as they do the job, fine. But this is so simple to add to the receiver that I felt it would be of interest to others.

To keep from having to cut a hole in the chassis, the tube can be mounted under the chassis on an "L" bracket and thus become part of the receiver. Or it can be built as a separate unit in a minibox and plugged into the auxiliary socket which most receivers have on the back of the chassis.

The main points to keep in mind are that the lead from the detector plate must be shielded wire. If the leads are to be very long, the AVC lead should also be shielded. Many variations can be made from the one given. In one receiver I use the level control as shown in the diagram, but use the r.f. control to set the level of squelch action. In my mobile receiver luck was with me, I guess, for hooked in *without* the control it operates just above the normal noise of the average mobile conditions. With the converter switched out, it quiets the set very nicely between broadcast stations.

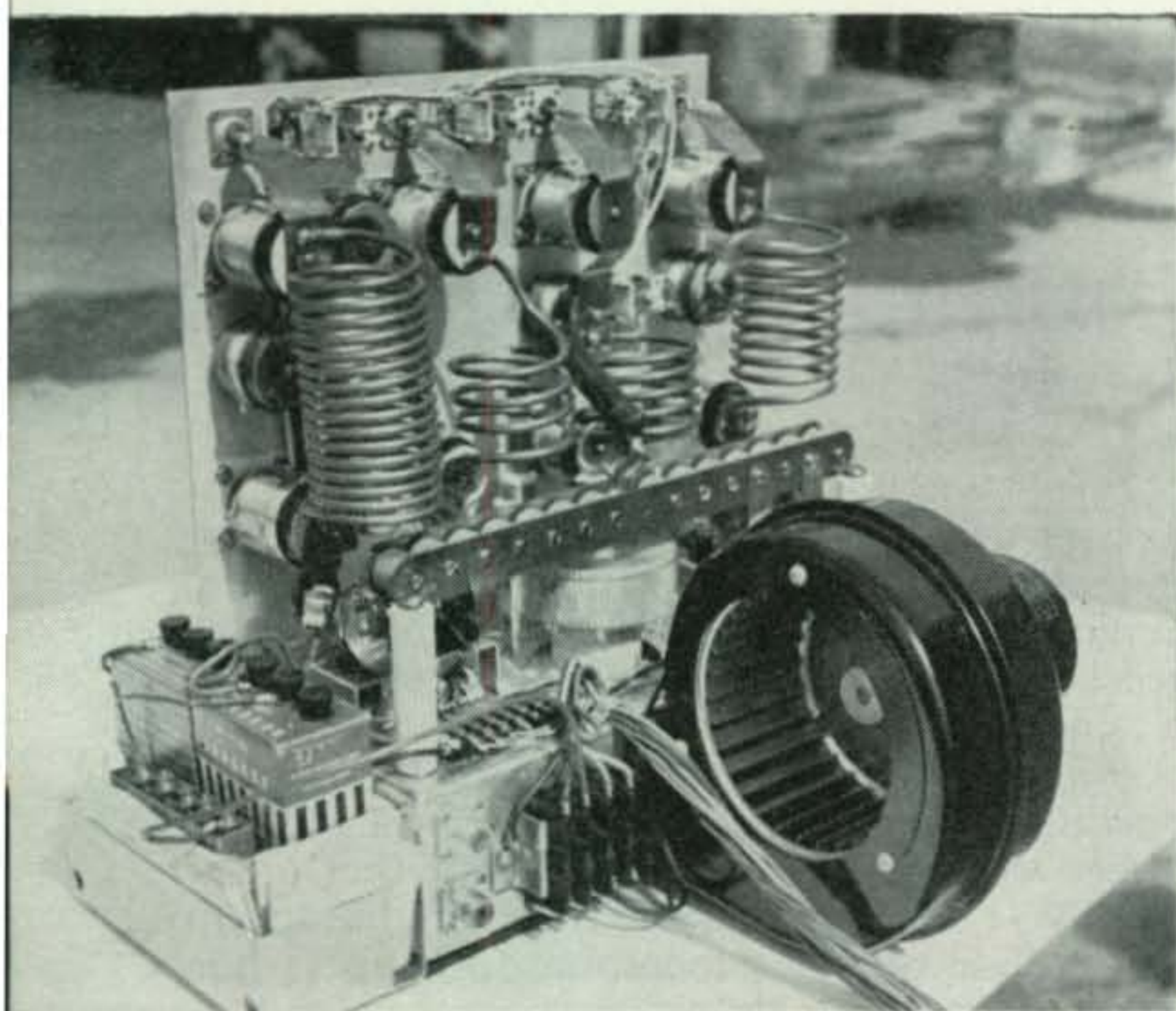
A word about the action of this squelch. When no signal is being received the 6AK5 has no bias and thus the plate conducts fairly heavily. With the high value of plate load

resistor of the first audio and the 6AK5 drawing all the current, the output of the first audio is just about zero. When a signal is being received the AVC is applied to the 6AK5, biasing it to cutoff. In that condition, it has absolutely no noticeable effect on the normal operation of the receiver. There's hardly any in-between with this squelch. It is either on or off. SW-1 takes the squelch out of the circuit just in case one gets lonesome for noise while waiting for a signal.

Possibly any sharp cutoff tube could be used. I used the 6AK5 because of its small size. The screen can be connected to any point in the receiver which already has a heavily bled 40 to 60 volts positive. If no such point is available it can be fed from a 50,000 to 75,000 ohm sliding-tap wirebound resistor or can be made up of two fixed resistors with values to give the desired voltage.

W4CJA added this to his NC-300 by building it into a small minibox and cabling it to the auxiliary socket on the rear of the receiver. In his case all the necessary voltages and connections were already at the socket except the lead to the plate of the first audio. He removed one of the ground connections (there were two socket pins grounded) and hooked his first audio plate lead there. I mention this case in particular to show that the performance of even such a receiver as the NC-300 could be improved. In Lloyd's own words, "How did I ever get along *without* the squelch?" ■

application for the new



Regular readers of *CQ* will be able to recall our past articles pioneering the use of Eimac tetrode PA tubes connected in parallel plus individually tuned tank circuits. We have been using them and advocating their expanded use for over two years. The fact that this new linear amplifier with one tube follows the same general design should come as no surprise.

There has long been a need for a high power tube with the same characteristics as those exhibited by the 4X250's. Our extended use of the new Eimac 4CX1000A tube since it was installed in June prompts the writing of this article.

The photographs and schematic diagram should be self-explanatory but the operational details will be discussed further. As you check the schematic it is obvious that a 10-meter band is missing. That is not due to any oversight. Nor, does it mean that the tube is not

capable of operating at or above 30 megs. It is due to unfavorable operating conditions at my QTH.

Recalling earlier models of our linears with their individually tuned tank circuits, you will see that certain components are missing from this one. This is the outcome of experience and many years of operation. Many of the prior models are still on the air. We learned that certain features and components could be eliminated without loss in efficiency.

One feature which has not changed yet and which may bear a little clarification is the termination of the individual output circuits. As shown here and on the past models, separate coaxial connectors are used for each antenna. With slight modification, multiple antennas can be operated with equal success from one coaxial connector. The transmit-receive positions use vacuum relays; however, air relays will do almost as well.

The 4CX1000A

I would like to begin the discussion of the final amplifier tube with an explanation of the grid circuit. I use an Eldico SSB100, although a standard AM-SSB exciter delivering 100 watts P.E.P. could be used. A 100 ohm terminating resistor is used in the coaxial input circuit to the grid of the PA tube. We have attained excellent broad banding and a degree of electrical stability not normally present in amplifiers where all of the circuits must be peaked to attain rated power output. The grid driving voltage should be up to 67½ volts and may be from a battery or a suitable stabilized bias supply. I have chosen small 45 and 22½ volt B batteries in series as a simple method of supplying this voltage. This was done since the operating life is six months to one year and very little space is required. The tube is normally operating with zero grid current. During maximum power output, voltage peaks may drive the tube into small amounts of current

4CX1000A EIMAC TETRODE

by JO EMMETT JENNINGS, W6EI

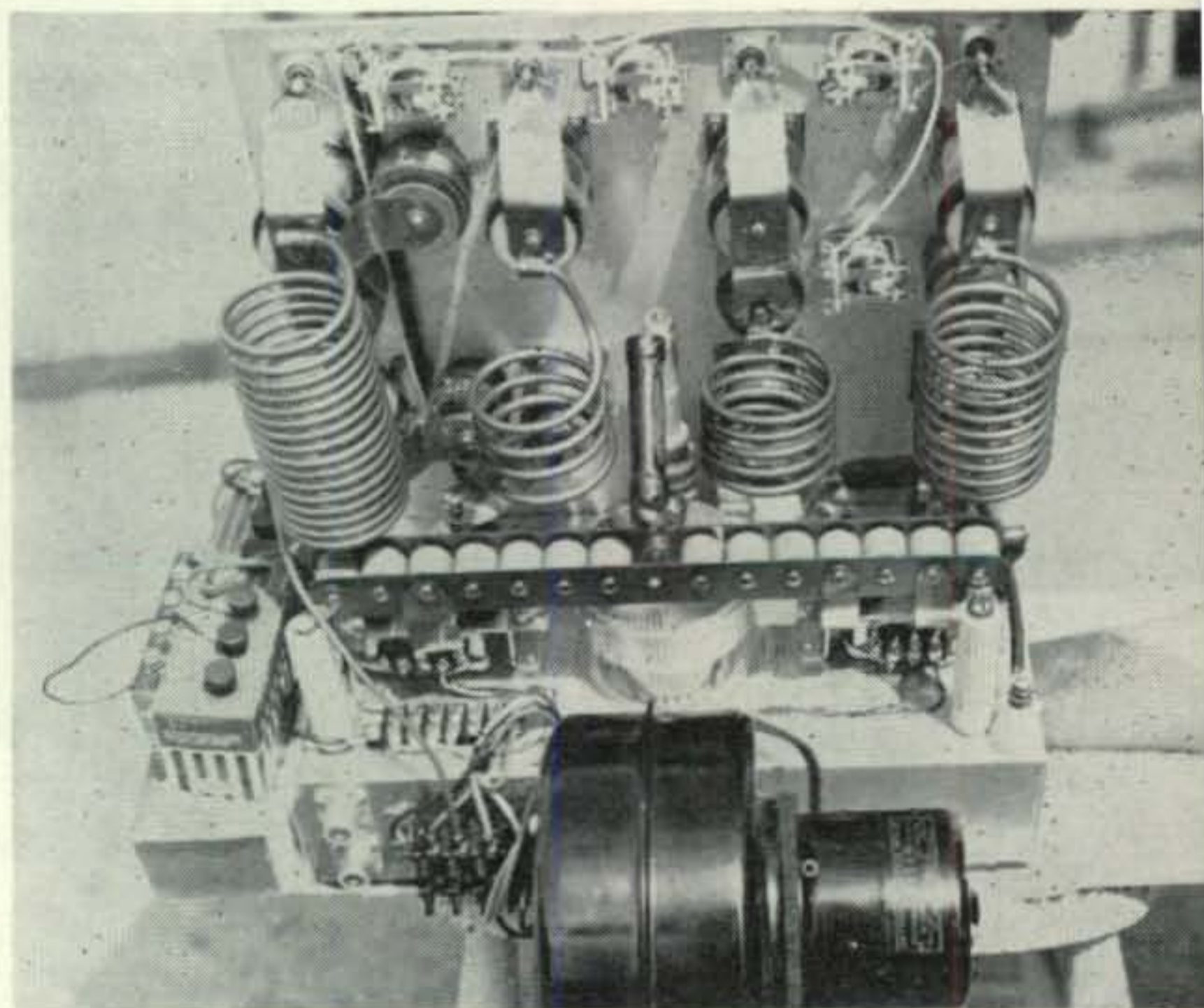
Box 1278, San Jose 8, Calif.

unless adequate suppression has been built into the speech amplifier or exciter. This condition gives us better linearity and reduces distortion but, we must confess, it was TVI that prompted us to operate under these rigid conditions.

Our past operating experience has also led us to attempt to maintain zero as our nominal value for screen current. Under normal voice modulation conditions, the screen meter will show a slight deflection on the negative side when the grid is under excited. On peaks, the meter will deflect slightly positive when the tube is driven to full power output. This condition is in no way detrimental and occurs during normal operation. If you are familiar with its characteristics, the 4X250B operates under similar electrical conditions regarding the output loading of the amplifier tube. High screen current is not recommended so we must increase the loading to the antenna and arrive at a value where the screen current is zero. Overcoupling to the antenna will make the screen current fluctuate negatively. Inserted carrier is used for making rough adjustments of the output and input capacitors. Final adjustments are made under actual modulation conditions either for AM or SSB.

The screen supply is critical with regard to voltage fluctuations. The voltage must be regulated either with regulator tubes or with a heavy load. An increase in screen voltage lowers the plate impedance of the tube and simultaneously increases the plate current. For example, when inserted carrier is used for adjustments, an increase in voltage from 300 to 350 will necessitate reloading the tank circuit by decreasing the output capacitance to such a point that the screen current comes back to zero.

Very high screen voltages can be applied to this circuit; up to 600 volts, provided the output circuit is properly coupled to keep the



screen current at zero. Proper handling of these tubes means long life and superlative operation. For example, we have yet to lose a 4X150B, 4X250B, 4W300 or a 4CX300 due to screen difficulties. One can expect the same results on the 4CX1000A if proper care is exercised in the tuning procedures. Operational time on the aforementioned types is some seven years and includes about 60 different tubes.

Two other components which are essential to superlative operation are the vacuum switches and capacitors. Miniaturization of the Jennings GSLA adjustable capacitors has reached a point where they require roughly one-fifth the space of the conventional vacuum models. Less distributed capacity, higher internal resonant frequency, lower internal inductance and smaller space all add up to greater overall efficiency. The Jennings miniature vacuum switch type RB1 has sufficient ratings to withstand over three times the rated current as well

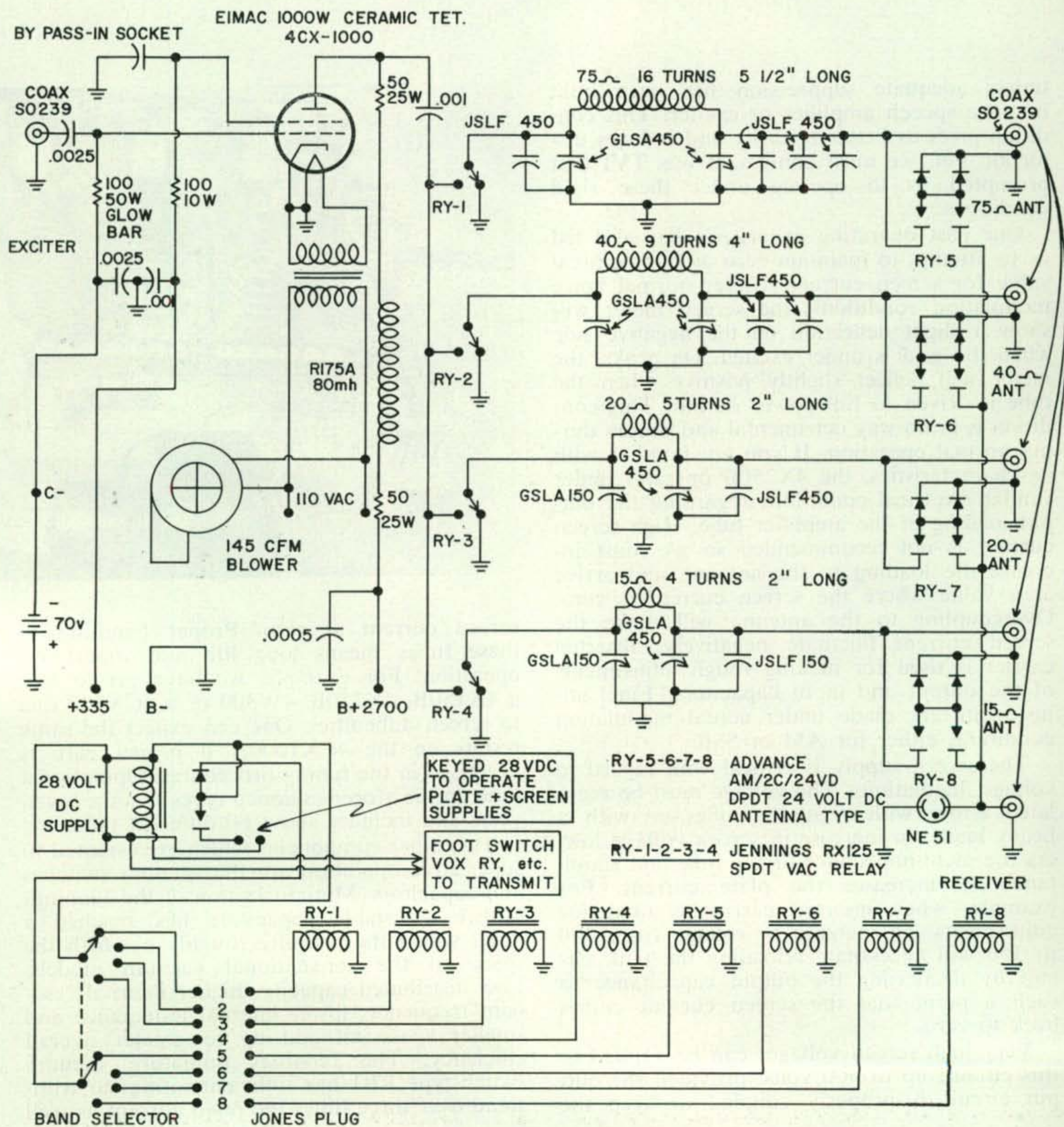
as three times the rated voltage of the power amplifier. The combination of components in a band switching amplifier now requires less space than previous models of single band amplifiers.

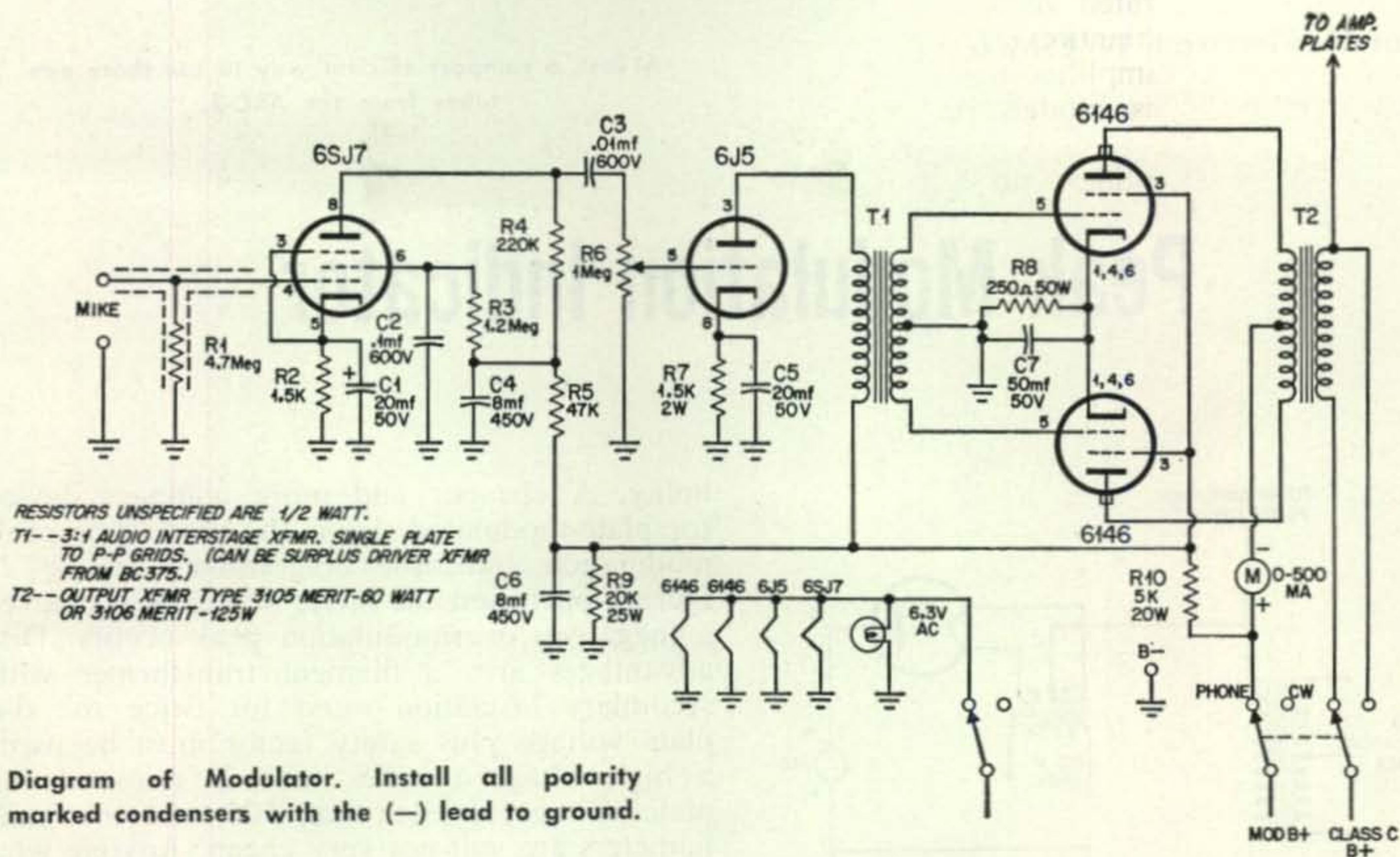
Using linear amplifiers on SSB brings up another important point which should be considered and discussed. This is the subject of regulation of the plate power supply. This new tube normally idles at 150 to 250 mils, but under lab testing we can drive it to values exceeding an ampere. Tube emission and power supply regulation are the causes of limiting or distortion. It is therefore not recommended that this tube be operated under overload con-

ditions, if best results are desired.

We might add, too, that it is not the purpose of this short disclosure on the new 4CX1000A to make grandiose statements as to how much power (KWs) are supplied from it. We can safely say though, that it will operate beautifully at 3KW input to a dummy load. It is my belief that this new tube answers the need for single tube high power linear amplifiers having adequate capabilities for all legal power, and yet offer the user long life when intelligently operated. Actually, it was possible to excite the tube under normal grid conditions with 1 watt of power and deliver 1KW output.

Schematic diagram of 1 kw linear amplifier using the Eimac 4CX1000A.





bargain 125 watt modulator

Jack Taylor, W4CWB

2025 N. Madison St.
Arlington 5, Virginia

Curt Wilson, W4TEF

5814 Brook Drive
Falls Church, Virginia

If you need a good modulator for that 100 to 250 watt rig then you will be interested in how we've got the mostest for the leastest and get continual raves on quality besides. It took a lot of head scratching to come up with a circuit which would leave us plenty of beer money and still put out all the modulation we ask for.

The performance of the 6146 tube is the gimmik. A quick look at the data sheet for the 6146 shows us that it is an excellent tube for use in class AB₁ audio applications; it also shows that two of these tubes are capable of producing 120 watts of audio without driving power—yes we said without driving power! Thus the need for a husky power amplifier stage in the speech amplifier section is eliminated. Also eliminated are the multiple distortion problems arising from the high grid currents required to drive class "B" modulator tubes in this power range. Since no grid current is drawn, a small inexpensive driver transformer functions well in this circuit as T₁.

The modulator meets the requirement of good speech reproduction with an audio output of 60-80 or 100-125 watts, depending on the modulation transformer selected, or in other words enough output to handle rigs from 100 to 250 watts of carrier. It is also of simple de-

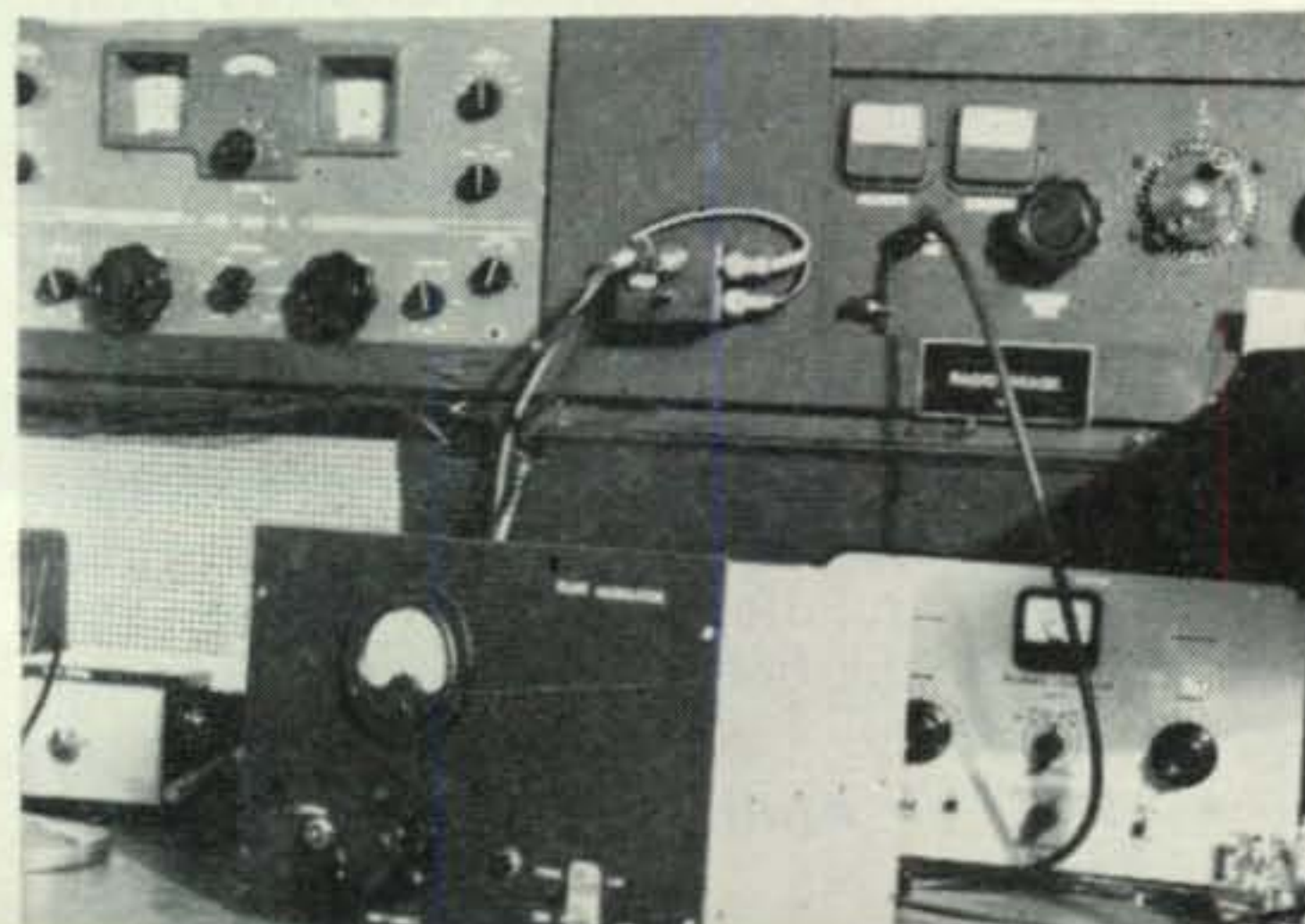
sign, easy to assemble and it has more than ample gain to operate with a crystal mike plus plenty of extra "oomph" for those occasional weak fone-patch inputs.

The heat dissipated by this unit is negligible for the amount of space it occupies and you should experience no difficulty in the adjustment or operation of the modulator. No special precautions beyond the usual basic rules of audio amplifiers need be observed.

Now for some discussion about the power supply. A separate power supply may be used as is done by W4TEF or it may even be taken from the class "C" r-f amplifier supply as is done by W4CWB; however, good dynamic regulation is desirable in any plate power to a modulator. If your present supply is used, it should deliver 500 to 700 volts and be husky enough to supply the combined current load.

We have experimentally varied the plate supply from 400 to 750 volts with no change in bias and with no noticeable detrimental effects on the modulator or modulation quality. Nat-

[Continued on page 102]



Peak Modulation Indicator

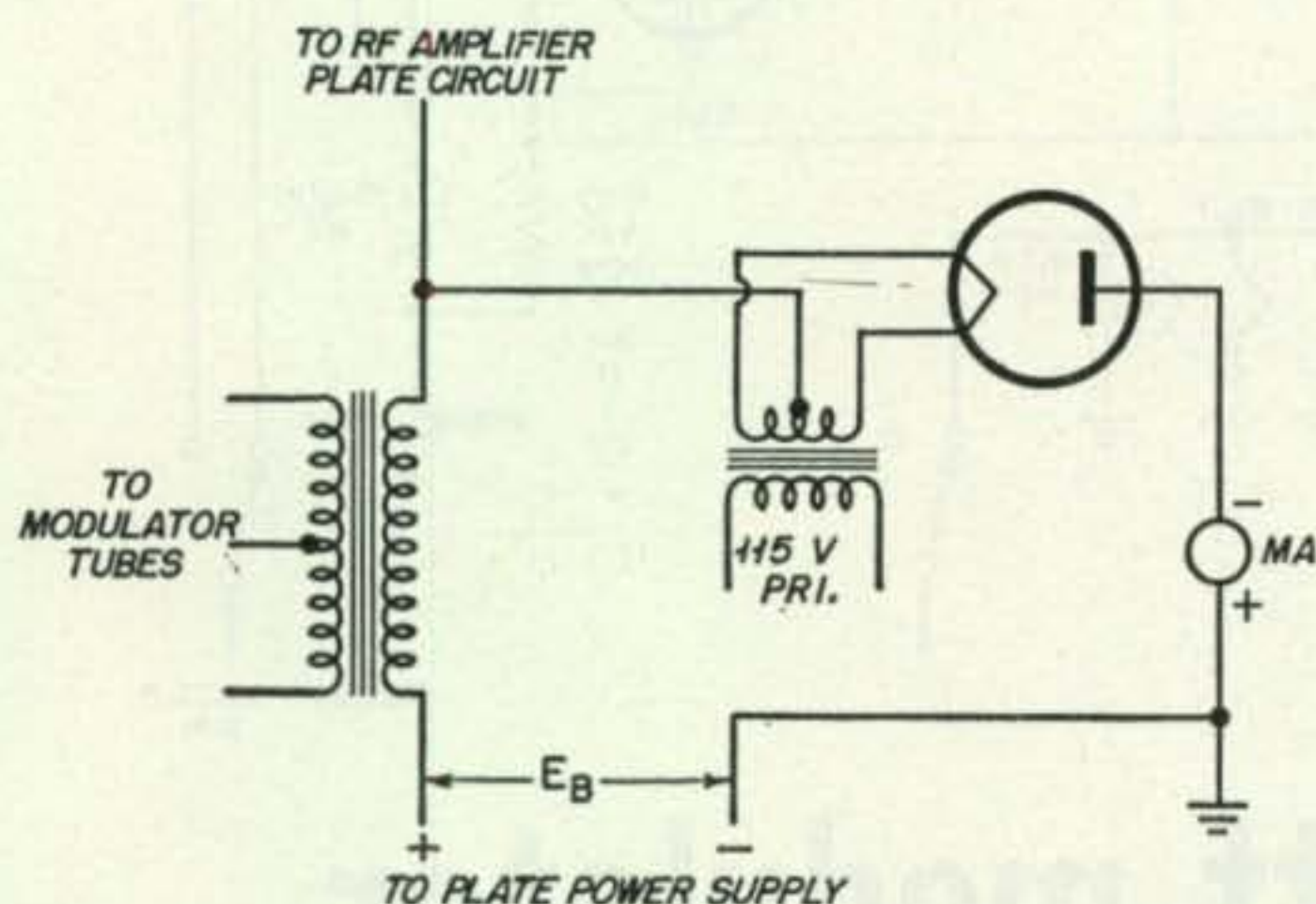


Fig. 1. Conventional diode-type peak modulation indicator.

Section 12.133, of the rules governing amateur radio service, specify for modulated transmitters that "means shall be employed to insure that the transmission is not modulated in excess of its modulation capability for proper technical operation." From a legal standpoint, the phrase, "means shall be employed," is delightfully vague; almost anything done in the way of checking for overmodulation might count as "means." For instance, it is not uncommon to hear an exchange something like this: "Say, old man, I think you may be hitting the modulation a little hard. There seems to be some splatter on your signal." (The same idea is sometimes expressed in hotter words by a breaking station whose receiver is being smeared all over the band by the offender's splatter.) "Thanks for the report on the modulation. I'll turn the gain down a little." All of which indicates that the only means ever employed by the latter op in checking for overmodulation is a remote monitor, of the human variety. Unfortunately, such remote monitors do not usually begin to indicate until the splatter is really terrific; sometimes they fail to indicate at all, and other ops in the vicinity understandably take a very dim view of such an arrangement.

The best means of monitoring modulation is, of course, an oscilloscope; it will show the actual percentage of modulation at each instant as well as the modulation linearity, and can be used with all types of transmitters and methods of modulation. It is not universally employed by hams because it is expensive and

bulky. A cheaper and more compact device for plate-modulated rigs is the diode-type peak modulation indicator diagrammed in *fig 1*. During operation the meter will flick whenever a (negative) overmodulation peak occurs. Disadvantages are: a filament transformer with secondary insulation rated for twice the d-c plate voltage plus safety factor must be used, a high-voltage rectifier tube is required for plate voltages greater than 500, and that milliameters are still not very cheap. Anyone who has used this type of indicator is also aware that the meter takes quite a beating—speaking into the mike a shade louder than usual will cause the meter to hit full scale very hard if a sensitive meter (0-10 ma for example) is used. If a meter with a larger range is used, many of the smaller overmodulation bursts pass by without causing noticeable needle movement. (This problem might be solved by shunting the sensitive meter with a germanium or silicon diode which would act as an automatically variable shunt having high resistance when the current is low and vice versa.) Finally, this type of indicator is still too large to be installed in some rigs.

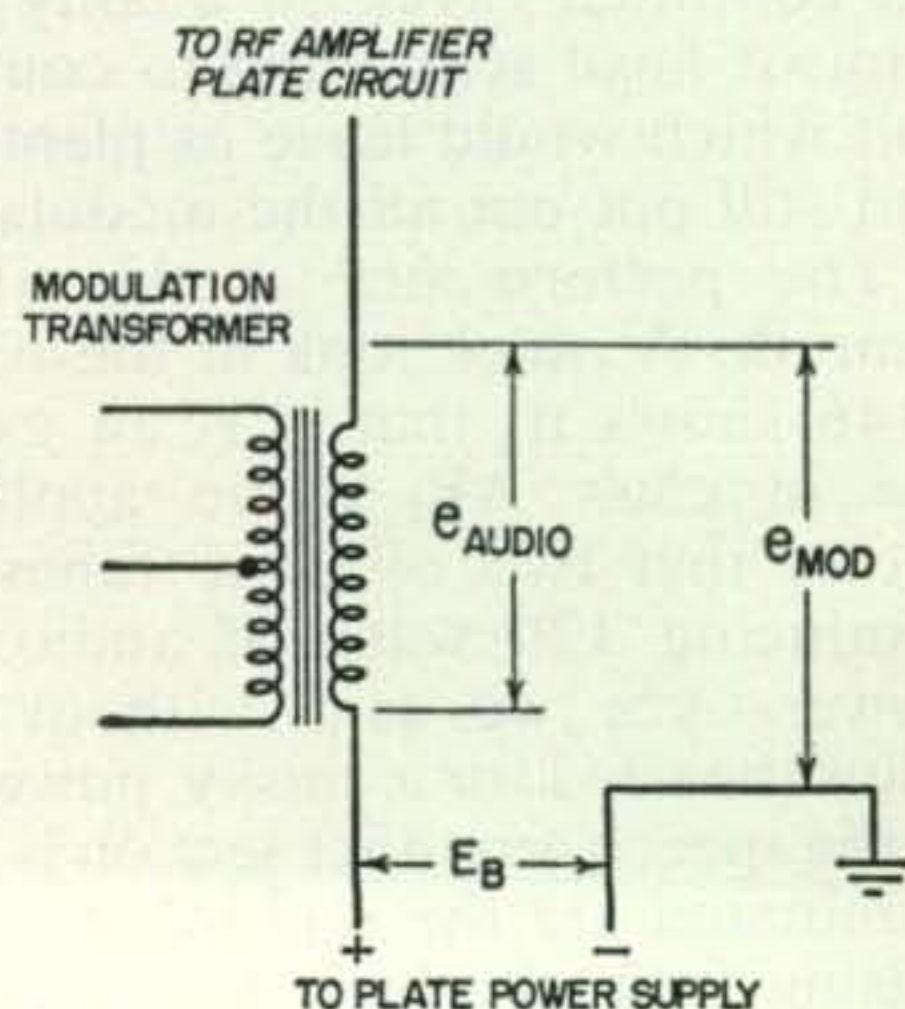


Fig. 2. Voltages in plate modulation.

Since the principle of operation of the indicator about to be described is based on that of the diode-type indicator, it might be well to review what goes on in the latter. *Fig 2* shows the voltages which are involved in a plate modulation circuit. The a-c audio voltage which is generated in the secondary of the modulation transformer is in series with the B voltage, and therefore adds to or subtracts from the latter, depending upon which half of the audio

cycle is being considered. The net plate voltage supplied to the r-f amplifier, E_{mod} , consequently varies above and below the B voltage. The voltage relationships are graphed in *fig 3*. A plate supply of 1000 volts is assumed for purposes of illustration, but the relationships are of course proportionally the same for any plate supply and modulator. When the peak audio voltage equals the B voltage, as in *fig. 3B*, the net voltage applied to the r-f stage will be twice the B voltage on positive peaks, and zero on negative peaks as shown in *fig 3C*. This is the condition which exists for 100-percent modulation. If a greater percentage is attempted by increasing the audio voltage, *fig 3D*, there will be proportionally greater r-f output on the positive peak because of the higher E_{mod} , but notice what happens to the negative peak: E_{mod} is negative during time *a-b*. Since negative plate voltage is no different than zero plate voltage so far as the r-f tube or tubes is concerned, this excursion of E_{mod} merely means that there is no r-f output during time *a-b*. The r-f output envelope will therefore change from that of the smooth curve it had under conditions of 100-percent modulation to one with sharp corners and flat 'troughs.' Such a waveform is rich in spurious sidebands, and the transmitted signal now 'splatters' throughout a band of frequencies which is broader than that occupied by the 100-percent modulated signal. In a word, most of the splatter due to overmodulation occurs whenever the voltage supplied to the r-f amplifier goes negative for an appreciable part of the audio cycle.

The Diode-type Indicator

The diode-type indicator of *fig 1* represents one method of showing the existence of bursts of negative plate voltage. Current flows in a diode whenever the plate is positive with respect to the filament, or cathode. Current will likewise flow when the cathode is negative with respect to the plate because this is merely looking at the same circuit from a different viewpoint. In the more usual instance where the cathode is at or near 'ground' potential (i.e. the zero, or reference, potential), we must make the plate positive to have current flow. But if the plate is grounded we must then make the cathode negative in order to meet the basic condition that the plate be positive with respect to the cathode. *Fig 1* shows the filament of a diode connected to a potential of E_{mod} , and its plate grounded. Consequently, whenever E_{mod} goes negative the diode will conduct and the meter will indicate the current flow. If a 50-volt bias supply is now connected in series with the meter, with its positive terminal nearest the diode plate, it will not be necessary for E_{mod} to go negative before the meter needle moves; it will begin to move when E_{mod} is 50 volts positive (a point representing 95-percent modulation for a 1000-volt plate sup-

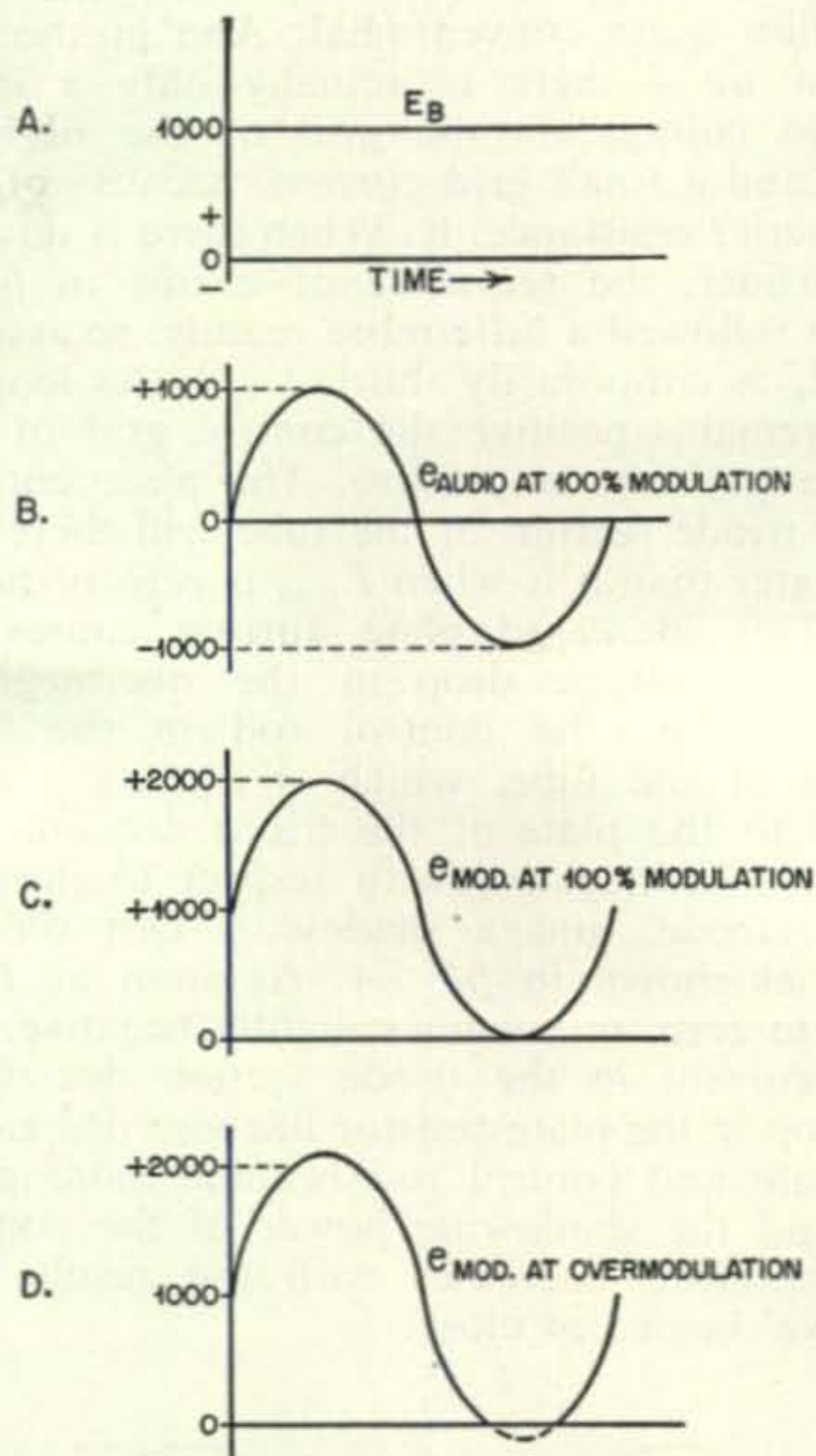


Fig. 3. Voltage relationships in plate modulation.

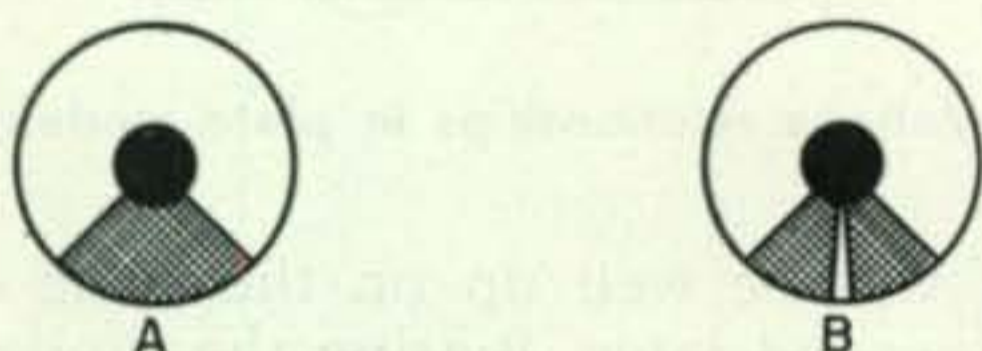
ply) and will be well up on the scale a fraction of a second later. Biasing the diode therefore provides the advantage of having a meter indication before overmodulation occurs.

a Simpler Indicator

The compact, low-cost indicator is diagrammed in *fig. 4*. A type 6E5 'magic-eye' tube does the work of both diode and milliammeter in the conventional circuit, and a special filament transformer is not necessary. If a 12-volt heater supply is available somewhere in the rig, a 1629 taken from a surplus Command transmitter can be used instead of the 6E5. The two types are electrically equal except for heater voltage. Other 'magic-eye' types, such as the 6G5 and 6U5 are *not* recommended because of their remote cut-off characteristics. When the modulation is less than 100-percent, the eye is open, as in *fig. 5A*; at 100-percent a wedge-shaped spot of green light appears in the lower central part of the eye, as in *fig 5B*. The indication is similar to that of volume-level indicators used on some kinds of tape recorders and similar equipment.

The operation of the circuit is straightforward, although at first glance the arrangement may seem outrageous. Imagine, putting something like 2000 volts positive on the grid of a poor little receiving tube! Some years back the idea of any positive voltage at all on the grid of such a tube would have raised some eye-

brows, but television circuitry has made such operation quite conventional. And in the circuit of *fig 4* there is actually only a small positive voltage on the grid of the 6E5, or 1629, and a small grid current, because of the large series resistance, R. When there is no bias to consider, the sequence of events in *fig 4* can be followed a little more readily, so assume that R_k is temporarily shorted out: As long as E_{mod} remains positive the control grid of the 'magic-eye' tube is positive. The plate current in the triode section of the tube will therefore be greater than it is when E_{mod} is zero or negative. This increased plate current causes an increased voltage drop in the one-megohm plate resistor; the control rod in the 'eye' section of the tube, which is internally connected to the plate of the triode section, will therefore be negative with respect to the target electrode, and a shadow is cast on the target as shown in *fig 5A*. As soon as E_{mod} drops to zero, or becomes slightly negative, the plate current in the triode section decreases, the drop in the plate resistor likewise decreases, the plate and control rod become more positive, and the shadowing power of the control rod therefore decreases with the result that the 'eye' begins to close.



APPEARANCE OF MAGIC EYE WHEN MODULATION IS LESS THAN 100%

APPEARANCE OF MAGIC EYE AT 100% MODULATION

Fig. 5. Circuit of the simple modulation indicator. Values of R and R_k are discussed in the text.

The arrangement with no cathode bias was actually tried first, but was unsatisfactory because the very slight narrowing of the shadow at the beginning of overmodulation was difficult to see. By introducing R_k the cathode is biased positive; the grid voltage does not then have to drop to zero to produce a change in plate current. As soon as E_{mod} becomes less than the bias voltage the grid will be negative with respect to the cathode, and as it drops still further the grid is soon sufficiently negative to cut off all plate current; the control rod is then at the same potential as the target and the 'eye' closes so much that there is a slight overlapping, resulting in the narrow, bright center wedge shown in *fig 5B*. Because electrons are practically without inertia, the 'eye' responds much faster than a meter needle, and the wedge is noticeable on very slight overmodulation peaks (i.e. when the time interval *a-b* in *fig 3D* is short). If the modulator gain is adjusted so that these wedges appear only on occasional syllables, and for brief instants,

the transmitter is being used at its maximum effectiveness and there will be no audible splatter. It is true the E_{mod} has to go several volts negative in order to cause the triode to cut off, but the response of the 'eye' is so quick that no harm is done if there is only an occasional appearance of the bright wedge. However, the indicator can be set to produce the wedge at percentages of modulation less than 100 by the addition of fixed bias, such as connecting a resistance between the cathode and target electrode, or by connecting the grid of the tube through a series resistance, equal to R, to the bias supply of the transmitter. This latter procedure must be used if it is desired to have an indication at a relatively low percentage of modulation. In the case of the 1000-volt plate supply and 90-percent modulation for example, it would be necessary to connect the grid to a source of 100 volts negative.

Circuit Values

The only critical value among the various resistances shown in *fig 4* is R_k , and it can be within plus or minus ten percent of the proper nominal value. This nominal value can be found in several ways: The best way is to borrow an oscilloscope and, temporarily using a 50,000-ohm variable resistor for R_k , setting the latter so that the bright wedge appears when the scope shows 100-percent modulation. The variable resistor can then be measured and a fixed

[Continued on page 100]

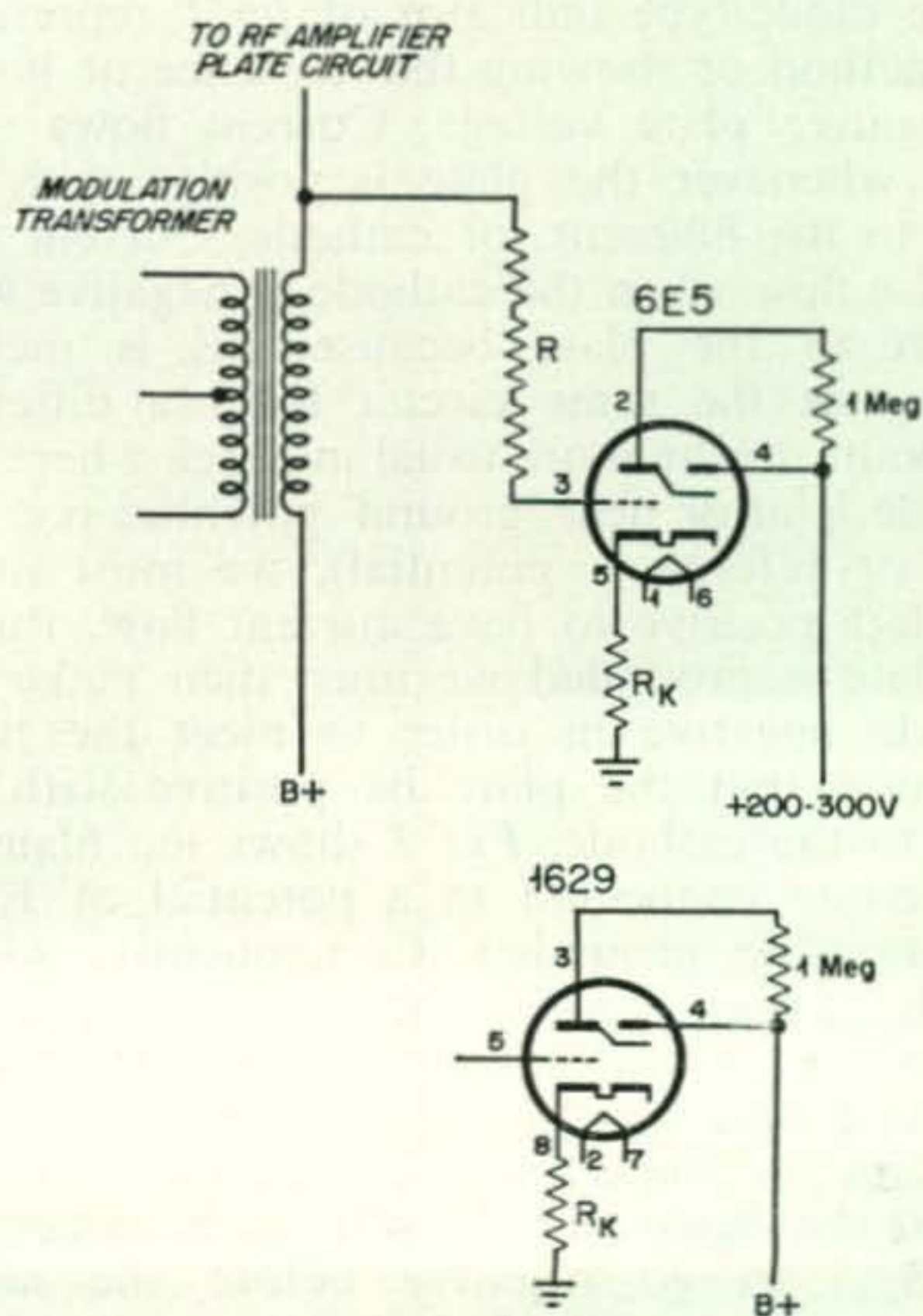


Fig. 4

Transistor Keying Monitor

by C. W. CLEMENS, K6TIZ

Box 1202, Pomona, Calif.

I'm a CW ham from away back. Up to recently I always used the time worn method of turning my r-f gain all the way down on my receiver to listen to what I was sending. But then one day I caught the transistor bug. Here is one of the units that emerged from the experimenting that followed. The circuit is not new or unusual, but it sure is a nifty monitor. It doesn't have to be touched when you change bands either. The tone is very clean and neat and it is very comfortable to listen to when sending.

The unit was built in a small tobacco can. The reason for this is that the vertical blocking oscillator transformer is very large compared to the other parts and needs a mounting. If I had had another sub-sub miniature audio transformer like the one I used for T2 I could have made the unit much smaller. However, I began with the idea of building this oscillator with parts from the junk box and that's the way it turned out.

The vertical blocking oscillator transformer was mounted on the lid of the tobacco can. A small terminal strip was mounted under the lid and the transistor and two resistors were mounted on it. The on-off switch was mounted in the side of the can. The output side of the oscillator uses a transistor audio interstage transformer, T2. It is connected so that the low impedance side is in the transistor base circuit. The high-impedance side is connected to the phono input terminals on my receiver.

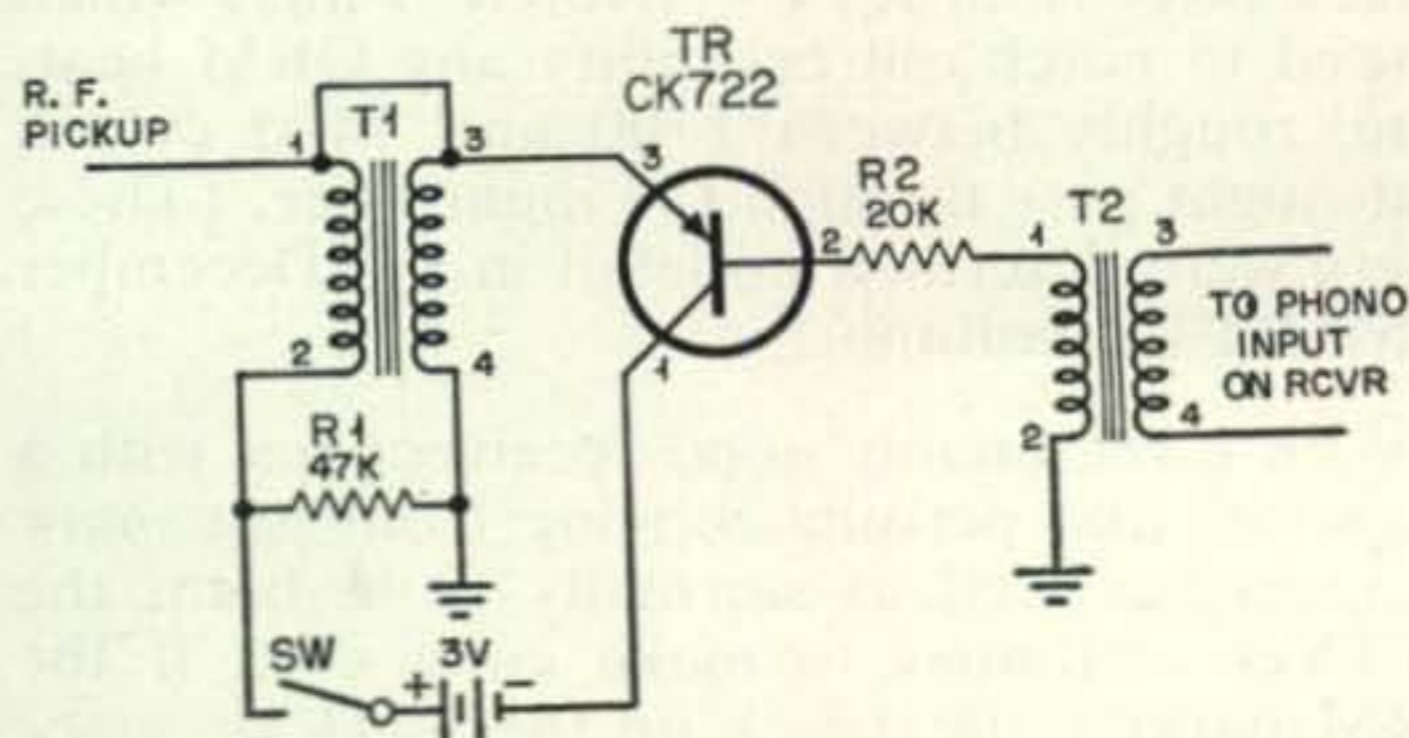
When transmitting, a relay cuts the B voltage to the r-f and i-f stages in the receiver, but leaves the audio stages operating. The monitor is then heard in the phones. The small transformer was laid in the bottom of the can on top of the two small penlight cells used to power the unit.

The idea behind this monitor is to build an audio oscillator that is just below the point of starting for itself. Then when you couple this unit to the r-f from your transmitter, the oscillator will be triggered and you will hear a beautiful tone in your phones to monitor your keying. Probably you will build this monitor from parts in your junk box like I did. In that case you will need to experiment with values for the resistors in order to get the trigger action and tone you want. I would suggest that

you start with a high value for R1 and lower it to just below the value needed to maintain oscillation. R2 controls the tone. Start with a low value for this one and increase until you have the tone you want. For initial testing before coupling to your receiver or transmitter you can use a high impedance set of phones in place of the transformer T2.

When you are ready to use this unit, attach a piece of stiff wire at the point marked "R.F. Pickup" on the schematic. Place this nearly parallel to your end fed antenna, parallel line feeders, final tank etc. In my case, I am using an end fed antenna and simply place the pickup parallel to the wire for a distance of 2 inches. I found with my rig (a pair of 807's) that I could obtain sufficient pickup when the unit's probe was one inch from the antenna. *Be careful not to overcouple.* If you undercouple slightly, the oscillator will be rough in making or breaking and if you undercouple still more it won't key at all.

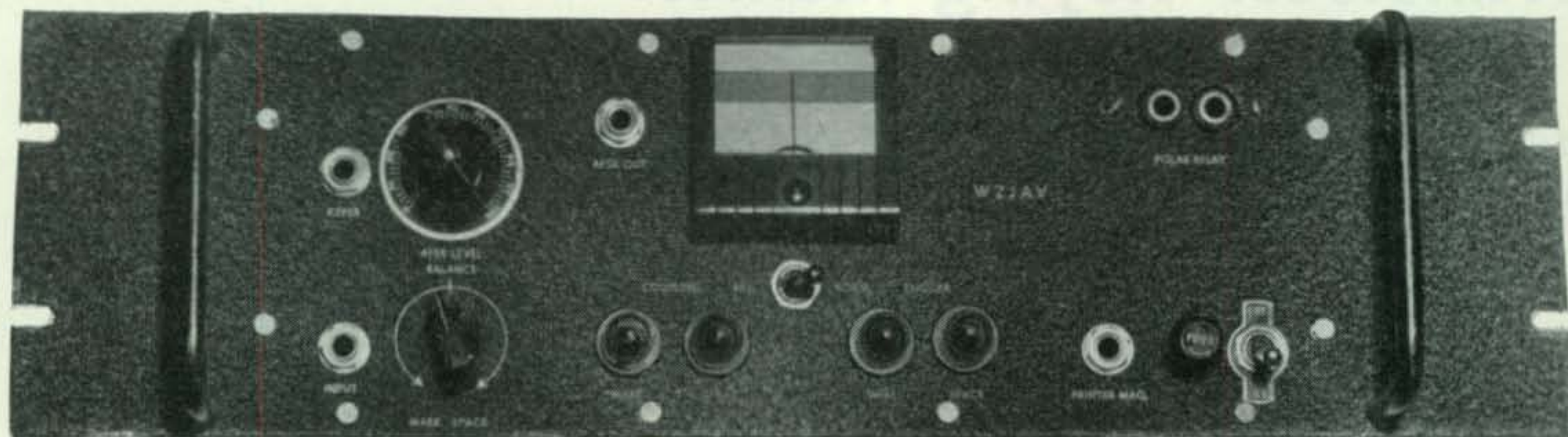
The whole monitor was built in about two hours and I think it was well worth the time. Certainly it's a lot better than wearing out r-f gain controls turning them up and down. ■



Parts List

T1—Vertical Blocking Osc. Transformer. Pri-167 ohms. (Term 3-Red, 4-Blue) Sec-1500 ohms (Term 1-Yellow, 2-Green)
T2 — Transistor Audio Transformer- Argonne #AR 102 (Lafayette

Radio) Pri-100,000 ohms (Term 3-Blue, 4-Red) Sec-1500 ohms (Term 1-Green, 2-Yellow)
TR — Transistor CK-722. Terminals are numbered from red dot.
R1—47,000 ohms
R2—20,000 ohms



An Improved Radioteletype Converter

by BYRON KRETZMAN, W2JTP

16 Ridge Drive, High Hills, Huntington Station, N. Y.

In the December 1957 issue of *CQ*, the RTTY column outlined some of the techniques used by the amateur radioteletyper to beat QRM. Briefly, two "black boxes" are connected in between the receiver and the RTTY converter, or Terminal Unit, as it is sometimes called. (Generally, the interconnecting line is 500 or 600 ohms impedance.) One "black box" is a band-pass input filter, passing approximately 1800 to 3200 cycles. This filter attenuates those beat-notes whose harmonics would fall into the 2125 (*mark*) and 2975 (*space*) channel filters of the converter. The other "black box" is an RTTY "Notch" Filter, which is used to notch out or nullify any QRM beat-note, roughly between 1700 and 3400 cycles, that might pass through the input filter. (These filters were described in detail in the December 1957 RTTY column.)

With a reasonably good receiver, and with a converter that permits copying from just *mark* or *space*, as well as normally from both, the RTTYer continues to make copy even if the QRM parks right smack on the *mark* or *space* frequency.

This is the story of that converter. Phil Catona, W2JAV, modestly claims no originality or invention of any of its circuits or features. Merely included are all of the desirable attributes of a radioteletype converter as ascertained in more than a decade of radioteletype experimenting, operating, and more experimenting. And, the components are all readily available items. But that is getting ahead of our story.

Background

Fig. 1 shows the schematic diagram of the converter. Its fundamental design goes back to that of the "PAT" converter described by Marvin Bernstein, W2PAT, in the January 1953 issue of *QST*. Simplicity was the keynote of Marvin's converter, since it was designed specifically for afsk use on the vhf bands where modulation of the transmitter carrier by an audio frequency shift oscillator is ordinarily employed. The inductors were television width coils and two NE-51 neon pilot lamps were used as pulse switches.

It will be noted that this converter of W2JAV has *four* NE-51 neon lamps instead of two, plus another pair of companion triodes. This is the brain-child of T. W. Groger, W7HJC, and was published in the June 1956 issue of *RTTY*, the monthly bulletin of the RTTY Society of Southern California. (\$2.50 per year, via W6AEE, 372 West Warren Way, Arcadia, California.) The idea here is to make it possible to get readable copy on *mark* only pulses or on *space* only pulses. This is a different approach to converter design, but for crowded ham-band operation it is ideal. It takes advantage of the law of probability that says while it is quite likely that QRM will mess up *mark* or *space*, it is less likely that it will mess up both of them at the same time.

Note, too, that this converter uses the more selective toroid-wound coils, another weapon in the battle with QRM. Toroids may be unfamiliar to the usual radio amateur, but they are neither difficult to obtain nor to use. More about these later.

RTTY

To see how it works, let's follow a couple of those 22-millisecond teleprinter pulses through the converter. But, first of all, for the benefit of the "unwashed multitude," to use a phrase of BeeP's, bear with us while we briefly review just what an RTTY fsk signal consists of:

Fig. 2 shows the teleprinter code. Each character consists of a start pulse (always *space*), five selecting pulses, combinations of *marks* and *spaces*, which determine just what character it is, and finally the stop pulse (always *mark*). All pulses are 22-milliseconds, except the synchronizing stop pulse, which is 31-milliseconds. Take the letter Y for example. The pulses are in this order: *space* (start), *mark*, *space*, *mark*, *space*, *mark*, *mark* (stop). Note that the two last pulses merge to make one pulse 53-ms long. This whole group of pulses is sent, at a certain fixed speed determined usually by a synchronous motor, when the Y-key on the keyboard is depressed.

Just how do we transform this into fsk? Very simple. The keyboard contacts, following

the above procedure, operate a diode keyer connected to the VFO. This diode switches in and out just enough added capacitance to move the output frequency of the transmitter 850-cycles lower (if standard shift is used) when a *space* pulse is received from your own keyboard.

Your receiver looks at the fsk signal very much as if it were a cw signal, except that it is shifting back and forth 850-cycles. The BFO, though, is moved to provide beat-notes of 2125-cycles for *mark* and 2975-cycles for *space*. It is these standard tones that are fed to this converter and then transformed by the converter into the d-c pulses that operate the receiving mechanism of a teleprinter.

For a more detailed discussion of these basic principles of RTTY, see page 14 of the *RTTY Handbook*. See, also, the simple diode shifter used with the *Heathkit* VFO's on page 80, and the receiver tuning-in procedure on page 90.

Theory

Now, to get down to the business of chasing those pulses through the converter. The incom-

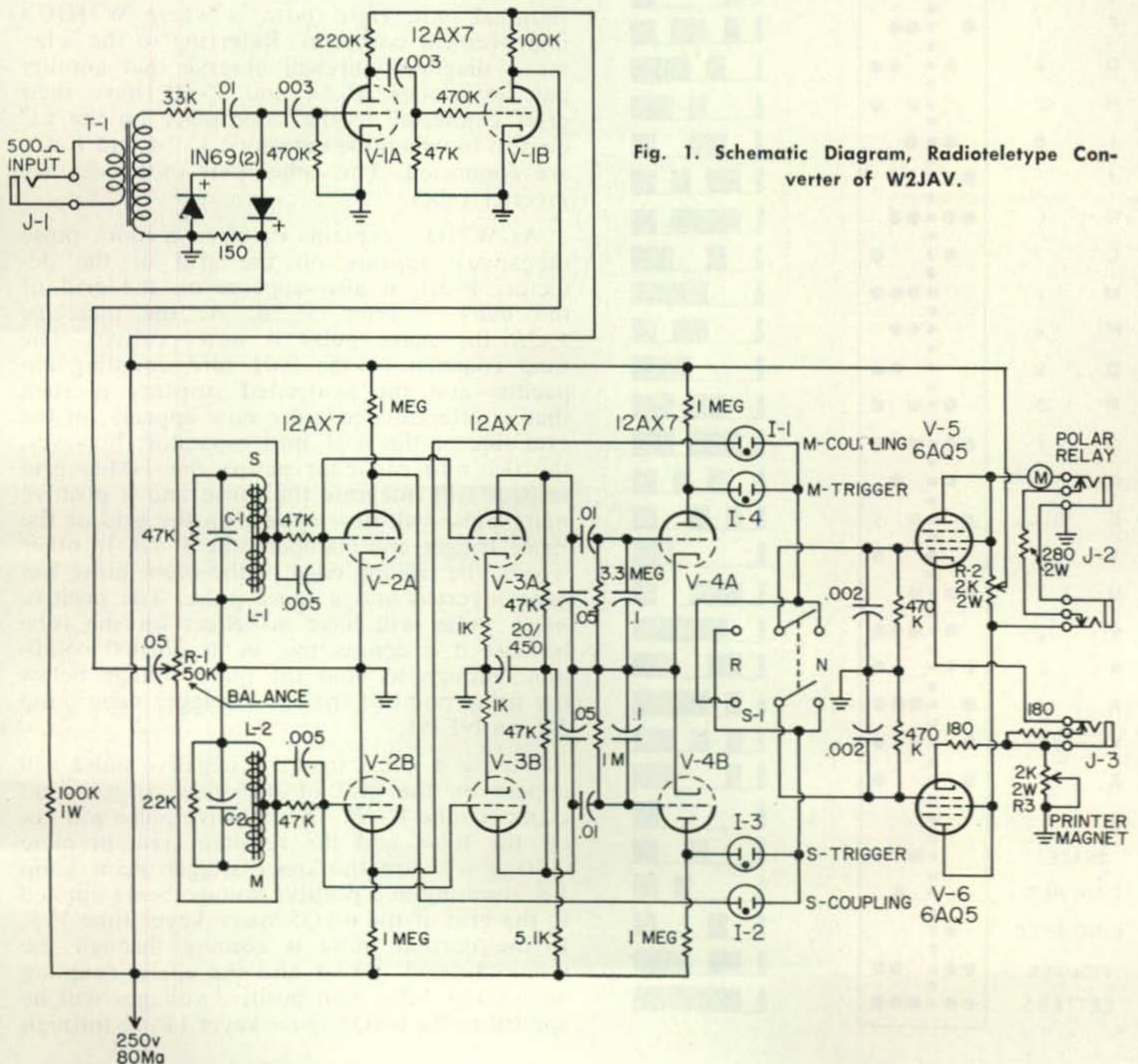
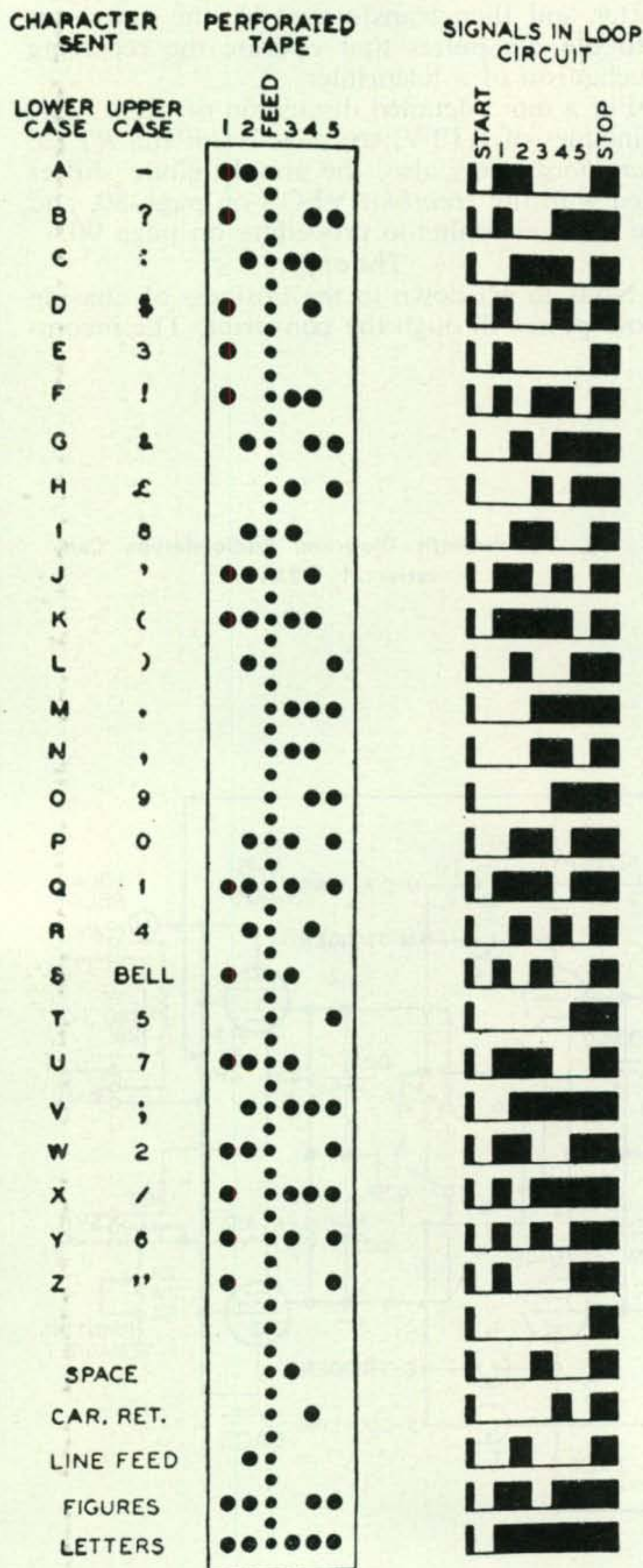


Fig. 1. Schematic Diagram, Radioteletype Converter of W2JAV.

ing tones, both *mark* and *space* pulses, are first fed to a simple dual-diode limiter consisting of a pair of 1N69 germanium diodes. These are biased to about 0.3 volt and, because they are connected with opposite polarity, they clip both positive and negative parts of the sine-wave (more or less) tones coming from the receiver. This limits the maximum voltage on the grid of the first triode, *V-1A*, of the 12AX7. Both triodes of *V-1* are connected as limiter-amplifiers, further increasing the range of limiting and further stabilizing the output amplitude.

Fig. 2. Teleprinter Code.



The actual range of limiting is about 37 db.

The output of *V-1B* appears across *R-1*, the 50k BALANCE control, which controls the ratio of the *mark* and *space* pulses fed to the parallel-tuned LC circuits. *L1-C1* tunes to *space* (2975-cycles), and *L2-C2* is tuned to *mark* (2125-cycles). These coils are standard "88-mhy" telephone-type loading coils, or surplus field-wire loading pots. (see Appendix) The *mark* coil *L2* requires approximately .068 mfd to resonate at 2125-cycles, and the *space* coil *L1* requires about .033 mfd to resonate at 2975-cycles. Note that these loading coils each have two windings, and that these windings are connected in series-aiding.

V-2, another 12AX7, has both triodes connected as grid rectifying detectors, one for *mark* and the other for *space*. The grids are connected to the junction of the two windings on each toroid. In other words, the grids are tapped down on the LC circuits to reduce the possibility of ringing. Bandwidth is adjusted by loading each LC circuit with resistance.

Up to this point there has been little difference in actual circuitry from the original PAT terminal unit. Here, now, is where W7HJC's improvement comes in. Referring to the schematic diagram you will observe that another pair of triodes, *V-3A* and *V-3B*, have their grids connected to the same place on the LC circuits to which the detectors, *V-2A* and *V-2B*, are connected. This other pair of triodes are inverter tubes.

As W7HJC explains it, when a *mark* pulse (negative) appears on the grid of the detector, *V-2B*, it also appears on the grid of the *mark* inverter, *V-3B*. At the plate of *V-3B* the *mark* pulse is now positive. The time constant of the 0.01 mfd coupling capacitor and the associated resistors is such that a differentiated pulse now appears on the grid side of the 0.01 mfd capacitor; however, the 0.1 mfd capacitor across the 1-Meg grid resistor will integrate the pulse and a positive *mark* pulse will now appear on the grid of the *space* trigger and clamper tube *V-4B*. In other words, the trailing edge of the *mark* pulse has been inverted into a *space* pulse. The positive *mark* pulse will have no effect on the tube because it is conducting, in its normal condition, enough to hold the plate voltage below the firing point of the *space* trigger neon lamp *I-3*, an NE-51.

During a *space* signal, a negative pulse will appear on the grid of the *space* trigger and clamper tube *V-4B*. The negative pulse will cut off the tube, and the resultant rise in plate voltage will fire the *space* trigger neon lamp *I-3*, resulting in a positive voltage being applied to the grid of the 6AQ5 *space* keyer tube *V-5*. If the normal pulse is coming through the *space* channel (*V-2A* and the *space* coupling neon lamp *I-2*), both positive voltages will be applied to the 6AQ5 *space* keyer (*V-6*) through

both space neon lamps, I-2 and I-3.

The space inverter V-3A and the mark trigger and clamper V-4A work in a similar manner. A longer time constant is required to keep the printer from running "open" during temporary absence of the mark pulse during periods of no character transmission, so the grid resistor of V-4A is increased to 3.3 Megohms.

The 0.05 mfd capacitors connected to the plates of the inverter tube V-3 bypass any audio that appears there. Further "low-pass" filtering is done by the .002 mfd capacitors in the keyer tube grid circuits. The zero-center meter M in the plate circuit of the keyer tubes can be a 50-0-50 ma. or a 100-0-100 ma. meter. The surplus market has had the IS-80 meter from military test sets. This meter has a basic movement of 1-0-1 ma., so it has to be shunted experimentally until it reads the scale value of 100-0-100 ma., or 50-0-50 ma. if you don't mind dividing by two when you read it.

Panel jacks are provided for either direct selector magnet keying or polar relay keying. As a matter of fact, both may be used simultaneously, if desired. It's most simple, of course, to just plug in the machine, without bothering with the polar relay, but we would like to point out that while fairly good range may be obtained this way, use of a polar relay permits the full 80-point range to be obtained. An explanation of range-finder use on the Model 15, equally applicable to the Model 26, is found on page 24 of the *RTTY Handbook*.

A reversing switch, S-1, permits "turning-over" the received signal applied to the keyer tubes V-5 and V-6. This is quite handy, as it permits us to set the BFO of the receiver on one side or the other; which ever is most favorable in the face of QRM.

Only one control appears on the front panel of this converter. This is R-1, the BALANCE control. The other two controls, R-2 the keyer static balance control, and R-3, the control that sets the printer magnet current to the desired value, are mounted on the back of the chassis as they are set once and then let alone. (The AFSK LEVEL control is not part of the converter. We will explain this later.)

The power supply, not shown on the schematic diagram, should have reasonably good regulation, and it should be capable of delivering at least 80-ma. at 250-volts.

Adjustment

Adjustment of this converter is only a little more involved than that required by the original PAT unit. First of all, after double-checking wiring and voltages, it is necessary to adjust the resonant frequency of each of the channel filters. If you don't have a frequency counter (!) available, it is necessary to have some sort of standard against which you can check your audio oscillator. Undoubtedly a nearby active RTTYer will know someone who has a 425-cycle fork standard vaguely related to the one described on page 56 of the *RTTY Handbook*.

The object, of course, is to provide the 2125-

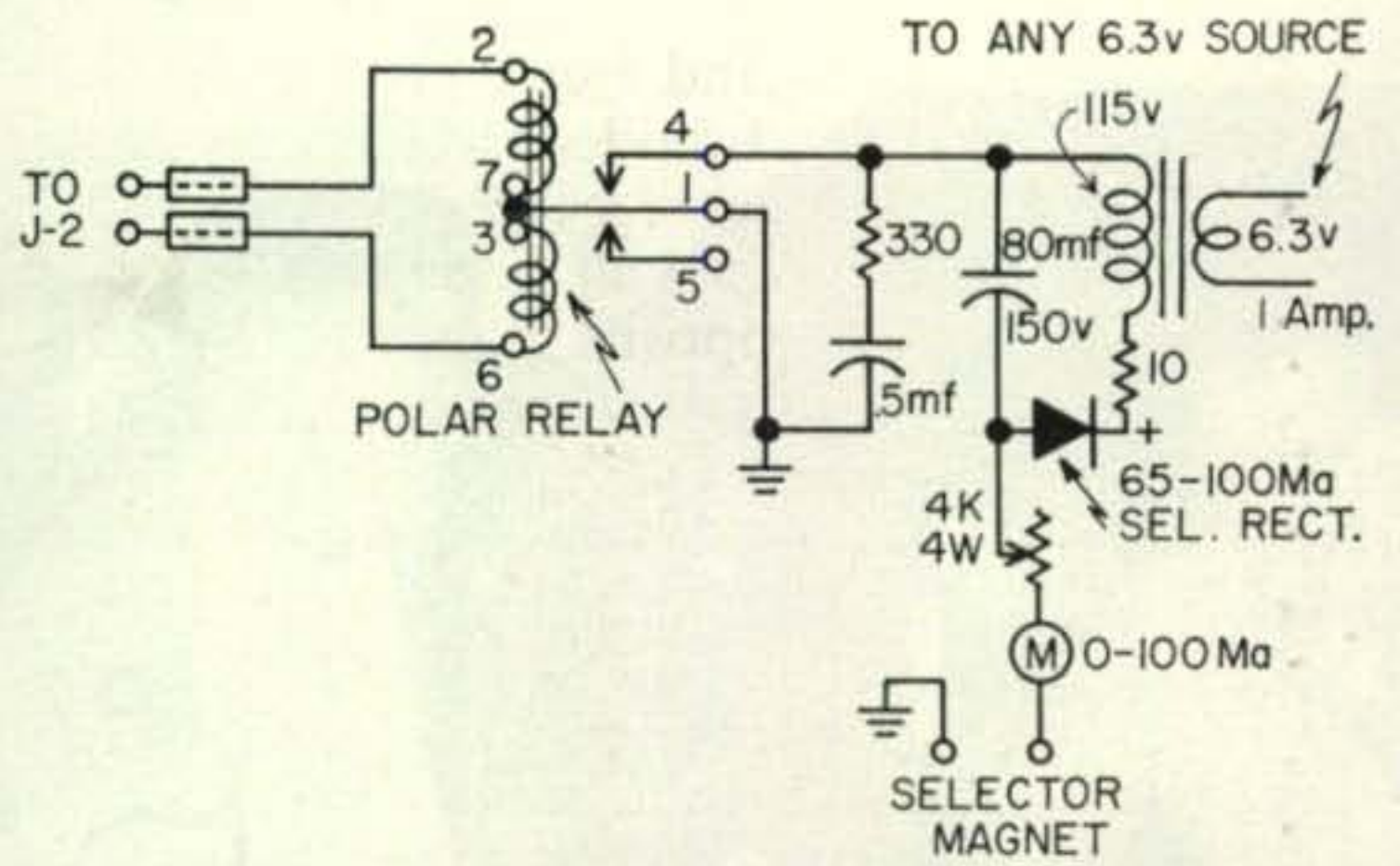


Fig. 3. Polar Relay Supply.

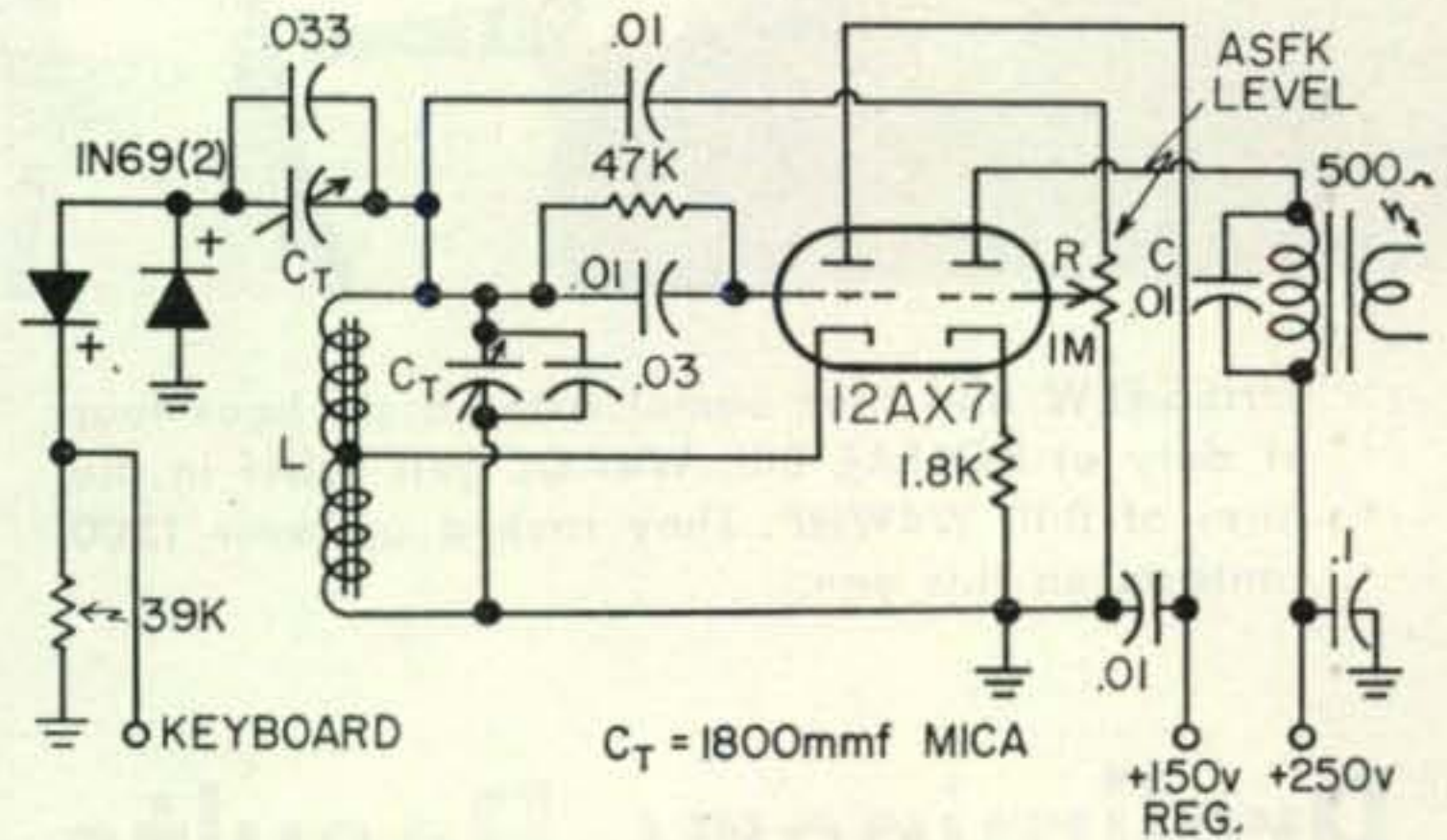


Fig. 4. AFSK Oscillator Schematic Diagram.

cycle mark and 2975-cycle space frequencies to enable you to set up the channel filters as accurately as possible. A vacuum tube volt meter (VTVM) is quite useful, too.

Here is how we do it: Feed in one of the tones, say the mark frequency of 2125-cycles. Connect the VTVM to the grid of V-2B and try substituting various values of capacity for C-2, around .068 mfd, to get the highest reading on the VTVM. A decade capacitance box will be very handy right here.

Follow the same procedure for the space channel filter, but feed in 2975-cycles and connect the VTVM to the grid of V-2A. The value of capacitance required to resonate L-2 to 2975-cycles will be around .033 mfd.

The rest is easy. R-2, on the back of the chassis, is used to balance the slight difference in the plate currents of the two keyer tubes V-5 and V-6. With the audio input to the converter shorted and the BALANCE control close to the center, turn R-2 until the panel meter M reads 0 on center. This gives the d-c static balance to the converter.

R-3, also on the back of the chassis, is used to set the printer magnet current to the value your machine requires, generally 20-ma. for the Model 26. (See page 19 in the *RTTY Handbook*.) With the printer plugged into J-3, and an external 0-50 ma. or 0-100 ma. meter in series, feed in a mark signal and adjust R-3 until the external meter reads the required value.

[Continued on page 107]



WHEE-EEW and then some! After a six hour tour of duty at KG6FAE Bill, W4AQL gets relief in the form of Bill, W4WHP. They racked up over 1300 contacts on this one.

Preliminary Results—CQ DX CONTEST

by FRANK ANZALONE, W1WY

They will be talking about this one for a long time. George Jacobs, W3ASK, picked out the dates, gave us the green light, chased away any electronic storms and then the fun began. 20 was open around the clock, 15 didn't leave much time for sleeping and 10 was waiting for the early risers. There were some complaints that 40 and 80 were not up to par but that might have been due to lack of activity. The higher bands were so hot that only the all banders, looking for new multipliers, bothered with the lower bands.

K2GL, Fone—"Never have I heard such excellent conditions during a DX contest." Bill, W2SKE should know, he's been in many a contest. He was one of the boys behind the mics. at K2GL and they were out to break a million in this one. They didn't quite make it but came up with a record breaking score that is going to stand for a long time.

VE8MA, CW—"Conditions excellent on the higher bands. Lower bands not so good." The boys claim this to be the most northern station in the contest.

All zones were represented. It was good to hear the boys in zones 16, 17, 18 and 19. Unfortunately not many of their logs were received but they were certainly in there knocking them off at a good clip.

And as an added thrill JT1AA showed up on 20 and gave the boys that elusive zone 23.

To prove it, the gang at W6RW worked all zones in approximately 37 hours and made DXCC in less than 35 hours on 14 mc. And that's not the only record they established.

W4KFC, CW—"After participating in a hundred contests more or less, I'd come to the conclusion that nothing new could happen. This one produced a new thrill however, when I snagged JT1AA only seconds before the final gun." And that's not the only one Vic snagged. Wait 'til you see his score. Operating with only one hour's sleep he made his new antenna farm pay off.

We received our usual quota of compliments and I'm not that modest that I'm not going to mention a few.

KL7GI, CW—"My hat is off to you guys for your efforts in providing so much fun for all of us. The drinks are on me if any of you fellows happen to get up this way." Be careful Dean, you'd be surprised to what lengths some of us will go for a drink.

CX3BH, Fone—"As usual, by far the best DX contest of the year. Altho it is still being ignored by——." Now I wonder who he could be referring too? As an added oddity, Horacio is still using a pair of 210s of 1928 vintage.

All was not a bed of roses. Some of the

fellows had real problems. Not amusing at the time but good for a chuckle now that its all over.

ZLIMQ, Fone—"This was my 103rd contest, and never have I spent a more frustrating 48 hours. I spent more time off the air checking equipment than on the air working DX." To condense Cliff's long tale of woe. It seems the RF was going everywhere but into the antenna. Days later he discovered that the local authorities had installed a short piece of plastic waterpipe across the road leaving him with practically no earthing. (Ground to you guys.)

G2HPF, CW—"Half way thru the contest I noticed I was getting no answers on 21 mc. Tracking down the trouble I discovered that the dog had chewed thru the coaxial out in the garden that feeds the Quad." Bet in the future Harry will have the pooch locked up during contest time.

KR6BW, CW—"This one really tops 'em all. Frank was waiting for his copy of QST so that he would know how to score his log. Boy, is he a mixed up kid.

And everybody wasn't happy about the way we run things. The QRP boys want a power multiplier, VEs complain that the Ws won't let them work DX and the Europeans don't like the inclusion of 11 meters and 160. But this is the first time we have received the following complaint.

KR6RY, CW—"My first contest and I hope my last. Clobbers up the whole band so a guy has to QRT or join the gang. Next time I will QRT." Who was it that said, "if you can't beat 'em, join 'em." Wanna bet that George will be in the pile-up again come next year.

All the gripes don't come from the contestants. The fellows who check your logs have a few pet peeves. One of the boys left this little note for me, on a couple of thick logs. "Check this stinker yourself, life is too short." Well, I couldn't blame Ben. This chap had almost 200 contacts on Fone and over 600 on CW. All bands on continuing sheets; zones, countries and points not listed. Being he was from a rather rare spot I scored them both, so he will have himself a couple of certificates.

And were not to happy about some of the better known Ws, who were heard active on all bands, but no signs of their logs. CQ goes to a lot of expense and we put in a lot of man hours to make these annual parties interesting. If you find them worth while participating, the least you can do is to send us your log, so that we can use it for checking purposes.

And believe it or not, some characters didn't even list what band they were working.

I could write a book on all the comments, suggestions and criticisms the fellows had to offer, but this should give you a fair idea of the trend. Next month we will give you a full report on the results of the Phone Section. ■



4X4DK. Ami was last year's Top Man in the Phone contest. See next month's issue for this year's winner.



4X4BX. Sam was Top Banana on CW in 1956. The CW results will appear in the June issue.

JT1AA, Ludvik put zone 23 on the air and made it possible for the boys to work all zones in a contest.



new products



Frequency Meters, New

The James Millen Manufacturing Company (Inc.) of Malden (Mass.) has come out with a line of indicating absorption frequency meters. Five of the units cover the range from 170 kc to 700 mc. Each unit has three or four plug-in coils so that the calibration will be well spread out for accurate reading. A 500 μ a meter plus into the heads for sensitive indication. Interested? Circle K on page 126 for complete data, prices, etc.

Johnson SWR Meter

This directional coupler is designed to be installed in a 52 ohm coaxial line and will read either incident or reflected power, at levels up to a full kw. A regular multi-meter can be used with the coupler or the special directly calibrated 100 micro-ammeter designed to operate with the coupler which reads in SWR and relative power. Circle H on page 126 for data sheet on this coupler.



New Low Priced Linear

The new linear just announced by Transitron may shake things up a bit. Rated at 300 watts CW, 430 PEP for SSB and 100 watts for AM, it can be driven at full output by 15 watts of drive . . . like a 20A or a Phasemaster III! Weighs only 18 pounds, uses four 6CL6's, and costs only \$99.50 net. It tunes from 3-35 mc continuously (no plug in coils or band switch) with one tuning control and a loading switch. TVI shielded and filtered, etc. Circle J on page 126 for a data sheet on this.



New Eimac 1000 watt Tetrode for SSB

The 4CX1000A is a ceramic/metal high current low voltage tetrode designed for Class AB₁ rf or af linear amplifier service, particularly SSB. It runs maximum power output with zero grid drive, making driving simple and eliminating a major source of distortion (and TVI). Circle EE on page 126 for a tech sheet.



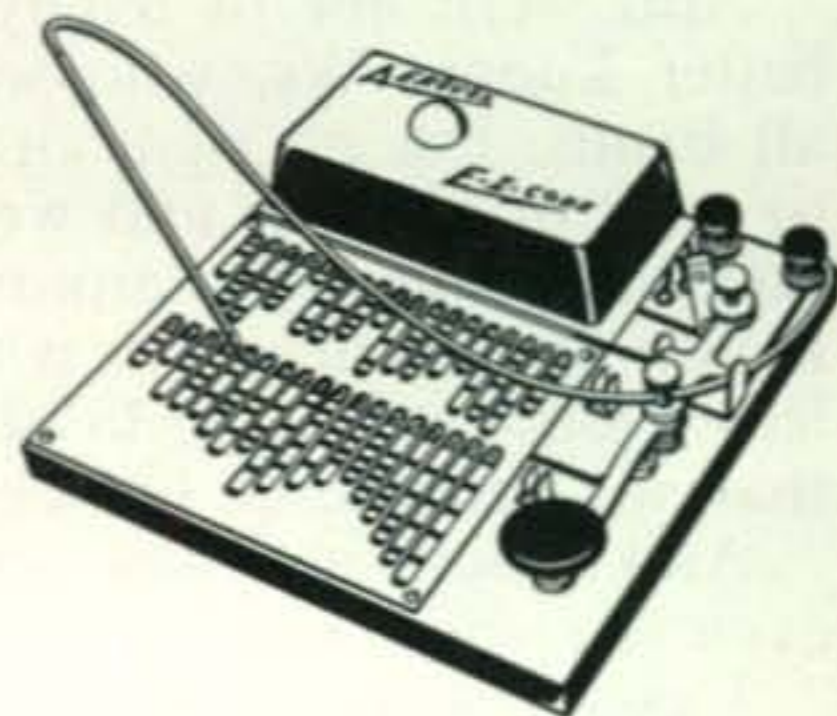
VFO for Two and Six

National Co. now has a VFO for you Two and Six meterites. Fundamental output is in the 8 mc band, as required by most transmitters (Communicators, 522, etc.). It is self powered and has built in provisions for a 1 mc calibrating xtal. A front panel xtal socket is provided for xtal control of the transmitter. List price is \$69.95. For more word on this circle I on page 126.



Aerovox E-Z- Code

OK all you DX men, let's get that code under your belts. The code is printed on this in copper and a metal pencil is provided to draw across the letters, giving them audibly by completing a circuit to the enclosed buzzer. Retail for \$12.95, complete with built-in key. Two units can be connected together over considerable distances. Looks like a good idea in code learning. Your local Aerovox distributor has 'em.



Call Letter Set

Hewlett Sales has a dandy call letter deal for you. For \$4.95 they will send you a tie bar and lapel pin with your call letters. Silver plated. Modest types can use one or the other, depending upon the situation . . . the more aggressive can wear both at once so no one will overlook their call. Let 'em know you're a ham. See Pg. 100.

Automated Tube Tester

RCA has did it again. Clever, these Americans. You plug in the tube, slip in the pre-punched computer-type information card, and read the meter. Gad! Tests for trans-conductance, inter-electrode shorts and leakage, and gas content. Portable too. Dunno how much it costs, but it looks like a corker. We'll send you more info if you circle DD on page 126.

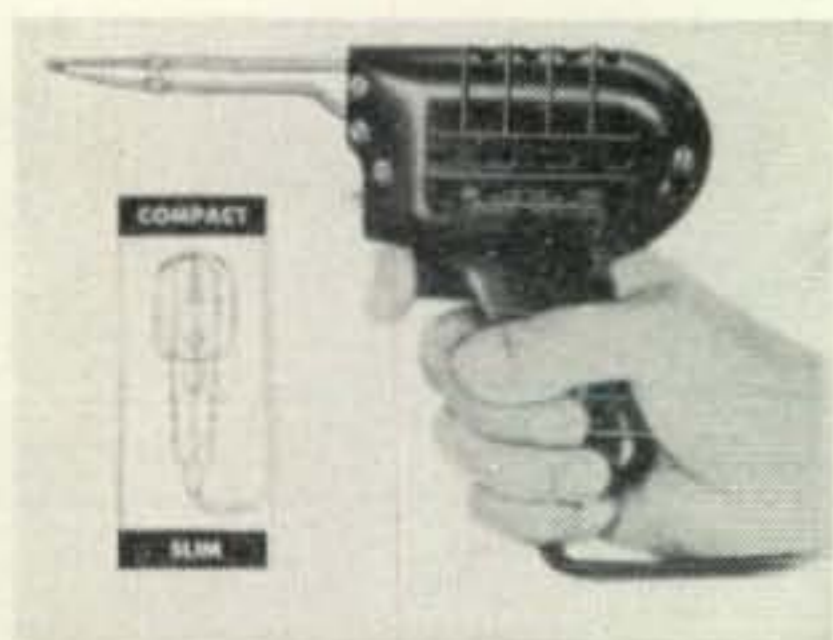
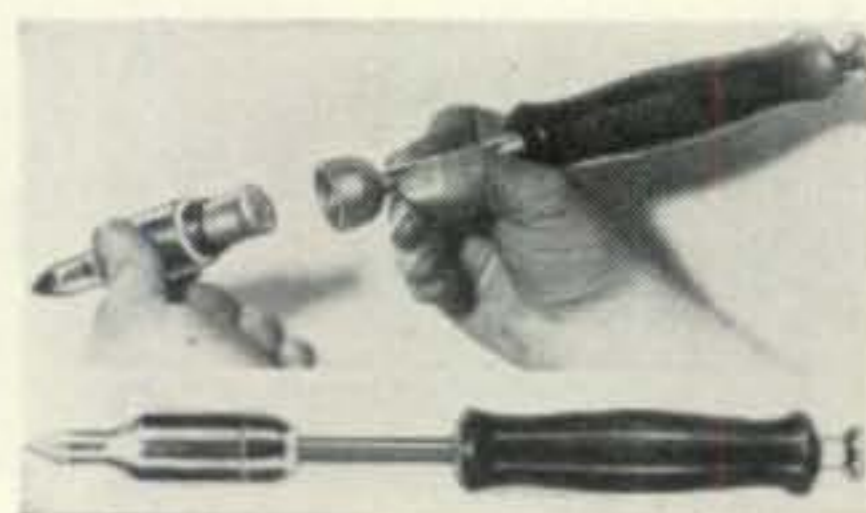


Coaxial Switch

Electronics International (our old friends International Crystal) have a new gadget that looks good. They didn't say how much it cost or where to buy them, but I'll bet that a circle on XX on page 126 will bring you info of this nature. This was designed for TV use so it probably is not very expensive. Impedance is 75 ohms and it has regular coaxial RG-59/U fittings. Interested?

Quick-Shot Soldering Iron

This is a terrific idea: a soldering iron that heats from a small cartridge. No 110 ac, no batteries, no blow-torches . . . all you have to do is insert a small inexpensive cartridge in the middle and pull the trigger. Within 20 seconds it is up to working temperature, which it maintains for six to eight minutes. The iron gets as hot as a 250 watt iron. Cartridges list for a little over 20¢ each and the iron runs \$12.50 list. Circle G on page 126 for more info on this iron. Distributed by K4AW.

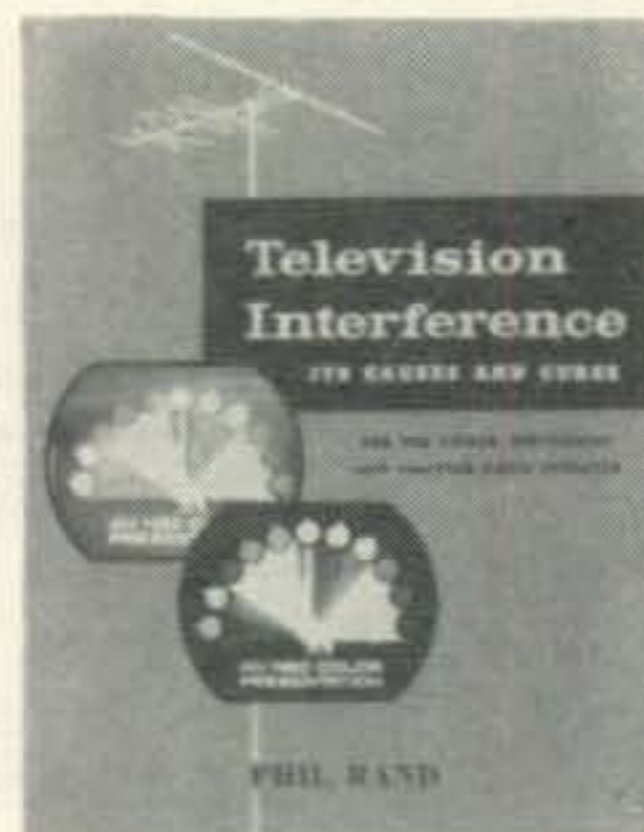


Thin Soldering Gun

Wen Products has a new soldering gun out. This one heats in 2-3 seconds, draws 100 watts, has a built-in spotlight angled at the work, and is only 1-11/16" thick! The light weight of the gun (only 19 oz) makes it easy to handle. Several different styles of tips are available. And lots more features you'll want to know about. Price is only \$5.95 list. Those features? Circle C on page 126 so Wen can Wend them your way.

New TVI Book

Phil Rand has just announced a new and completely revised edition of his famous Television Interference book. This edition goes into all of the causes and cures of TVI and is invaluable to every Novice, Technician, General, Advanced, and Extra Class licensee as well as proving points to stubborn TV servicemen and viewers. Wise up OM, don't have the neighbors greet you with, "Heard you on my TV last night." Unless you *were* on TV last night, of course. \$1.75 at parts distributors or direct from publisher.



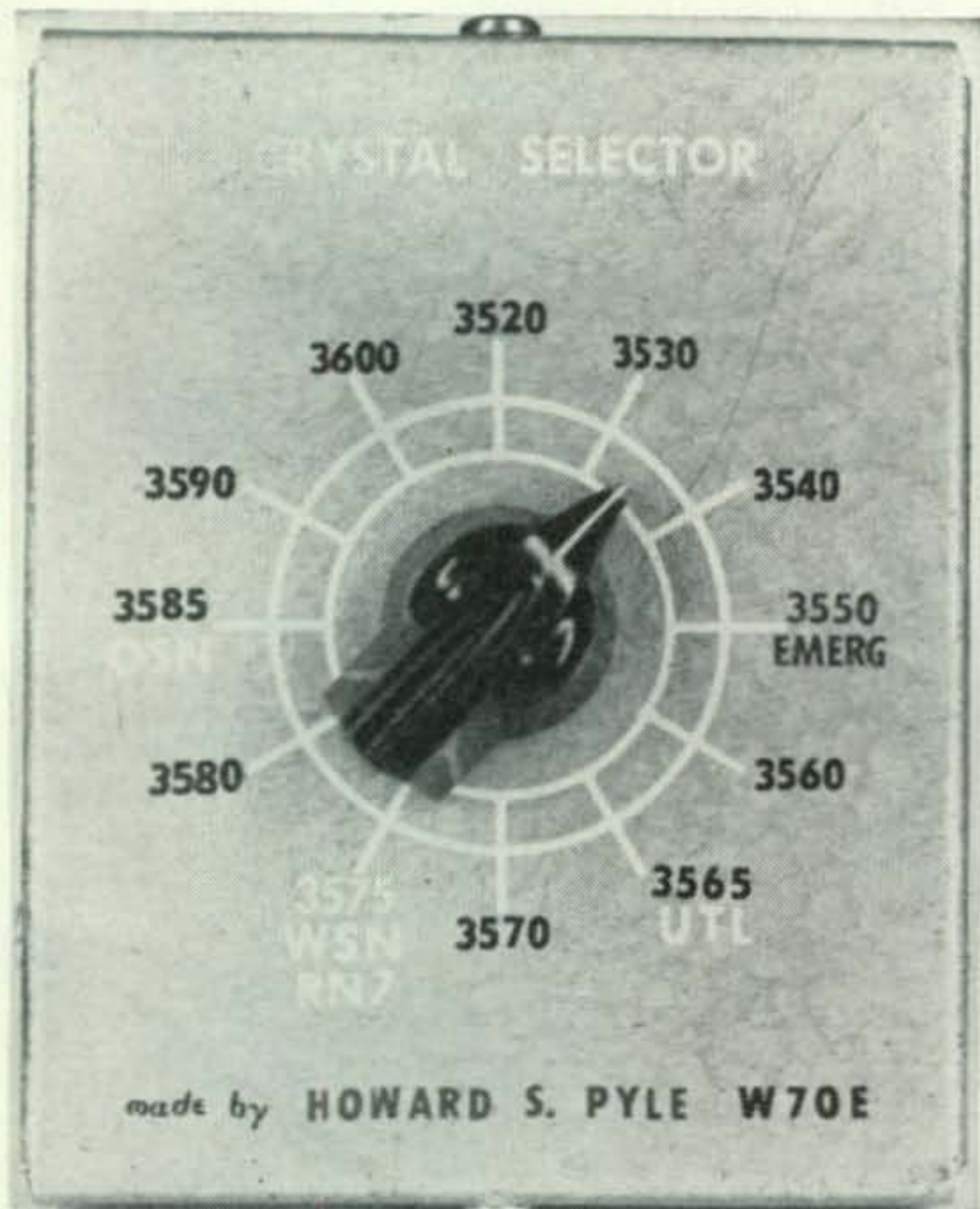
Drill Accessories Kit

The Wen Toter, complete with accessories, lists for \$9.95. The tote box measures 18" x 6" x 8" and contains a paint mixer, 3" wire brush, 3 3/4" grinding wheel, 3" buffing wheel, 9 twist drills in a plastic case, 15 5" sandpaper discs, a 5" rubber pad, a 5 1/2" lambs wool polishing bonnet with 1" nap, 3" adapter set and a speed stand. Quite a useful assortment. Want to know more? Sure, circle D on page 126 and Wen'll send more info.

Gonset Communications VHF Receivers

Gonset has announced a new line of receivers for aircraft, airports, police, fire, taxis, trucks, etc. All have rf stages and use 8 tubes plus rectifier. They have squelch, ANL, and a built-in speaker. Four models are available: 30-50 mc FM, 112-132 mc AM, 132-154 mc AM, and 154-172 FM. Crystal controlled units are also available. Circle HH on page 126 for more info on these receivers.





by HOWARD S. PYLE, W70E

3434 74th Ave., S.E., Mercer Island, Wash.

CRYSTAL FLEXIBILITY

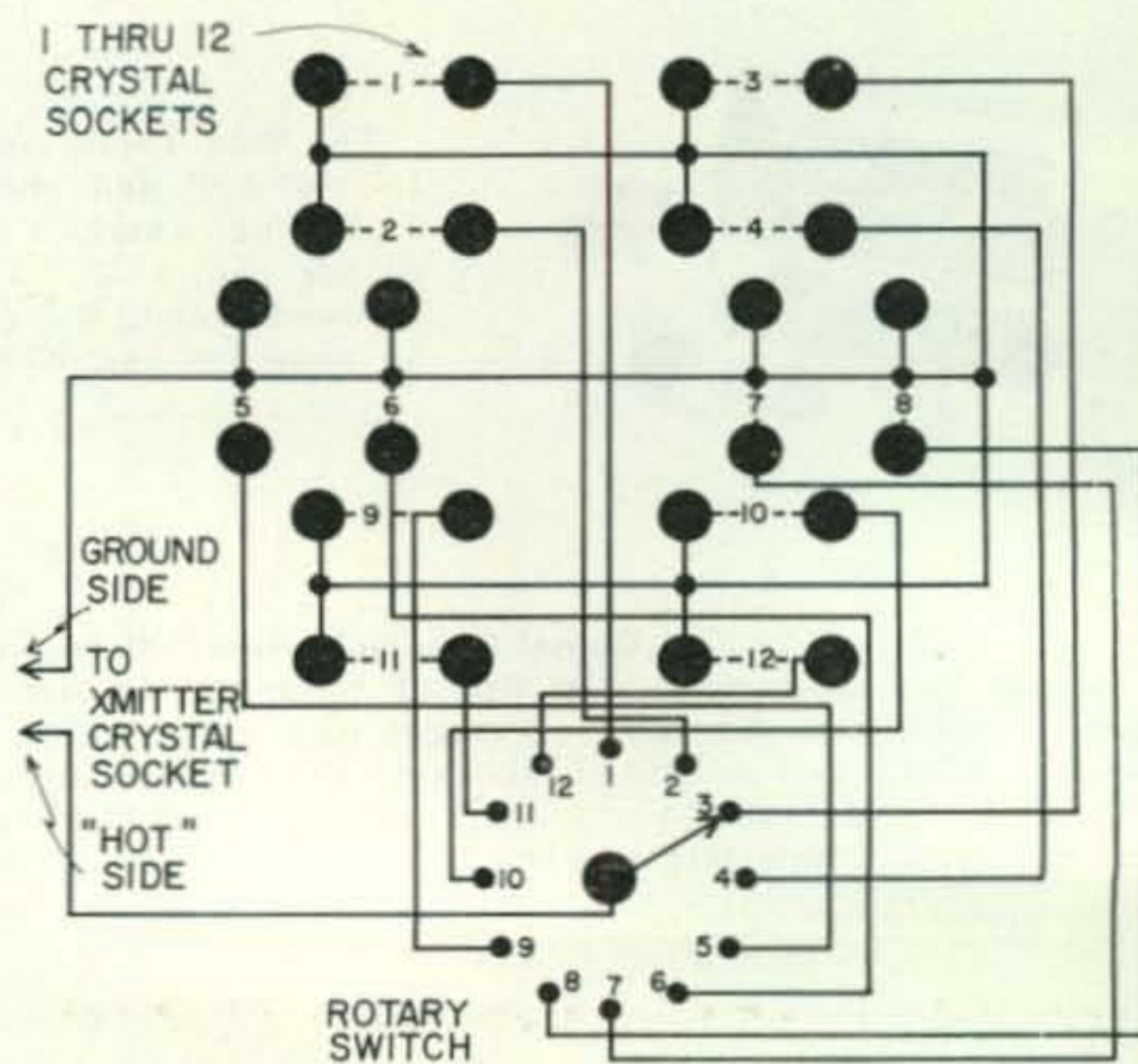
Without going into a lengthy discussion of the relative merits of "crystal versus VFO" let's start out with the honest admission that they 'both have their place'. For the 'ham fisherman' who likes to excursion around a band or several bands with random 'CQ's' and enjoys any resultant contacts, the VFO is the thing. For the traffic man or others who maintain regular schedules on definite frequencies, crystals provide better assurance of quickly landing on a spot frequency . . . the same each time.

The ideal of course, is a combination rig which embodies BOTH crystal and VFO control at will, thus providing greater versatility of operation. Unfortunately, practically all factory-made transmitters, with few exceptions, as well as all too many 'home-brew' rigs, make provision for crystal frequency control as though it were an 'after-thought' to which they resignedly bow. Even rigs designed EXCLUSIVELY for crystal control make little, if any provision for more than one or two crystals. If you want to change frequency, you must pluck the thing from the socket, wildly hunt through the stack for the right one and hope you get it pushed in place before you lose the other guy! Traffic netters and others who are often required to shift "up ten" or "down twenty" or otherwise hop around to pre-deter-

mined frequencies, will appreciate what I mean.

Fortunately, most factory-built gear and home-made rigs ordinarily have their crystal socket(s) conveniently available on the front panel. So, no trick at all to substitute a crystal socket plug for the usual crystal holder. Then,

Schematic—12 position crystal selector.



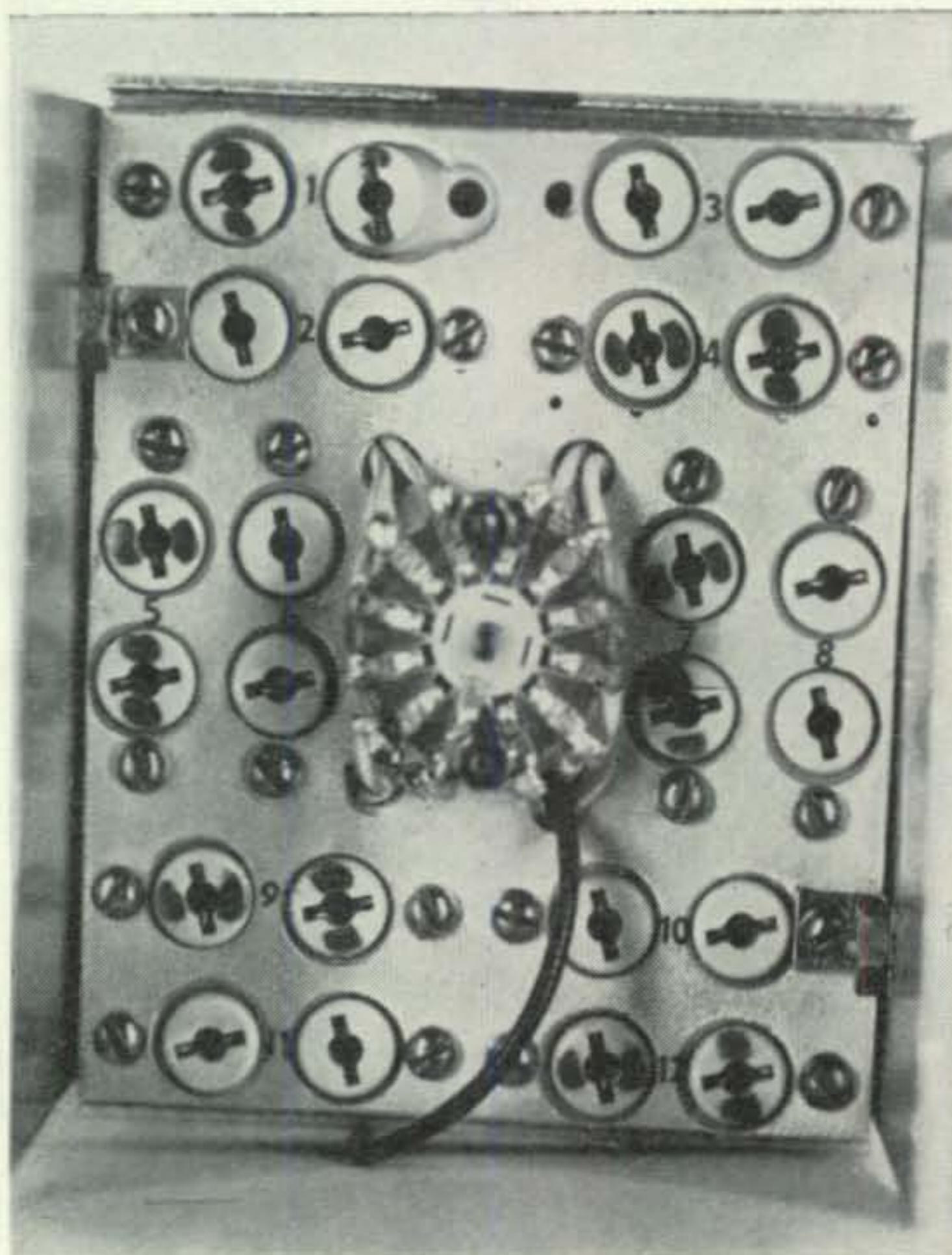
why not a neat little 'crystal box' with your most-used line up of crystals mounted therein together with a convenient switch for instantaneous selection of the desired frequency? No 'guess work' . . . no 'fiddling around' to split hairs on a VFO dial against a variable parallax.

Construction is simple . . . wiring is practically negligible and every bit of both is repaid many-fold when you have to meet a schedule, hop around on traffic nets or be ready with an immediate reply *on frequency* to a possible emergency call on one of the National Calling and emergency frequencies which every really *good* ham should be guarding at all odd times.

This is not a 'construction' article in the sense that no particularly detailed data is offered for tossing together a 'quick selection' crystal box. However, the accompanying photos and few specifications which follow will give you the general idea and briefly describe and illustrate a very satisfactory and certainly exceedingly handy little crystal selector. I use this most successfully with a *Viking Ranger* at home and with either a *Viking Adventurer* or *WRL Globe Chief*, one or the other of which I carry with me on the road for portable use. For my purpose, I found that for most flexibility, I required nine spot frequencies; to provide for possible future schedules, I decided to add three additional for a total of twelve. With a little 'juggling' I found that all twelve crystal sockets (*Millen #33102* in my case) would fit nicely in an LMB #135 box chassis ($3\frac{3}{4}'' \times 3'' \times 2''$), and still leave space for a twelve position, single-deck rotary switch. However . . . and mark this well if you intend to duplicate my little "gem box" . . . one of the standard size wafer switches with an over-all size of $1\frac{1}{4}''$ across the wafer, *won't* fit! You've only got a hair under one inch maximum space to accommodate the wafer! I found the solution in a beautifully made little miniature switch manufactured by Inter-National Instruments, Inc., of New Haven, Conn., and known as their Model #71121 . . . this is a twelve position switch . . . specify the number of positions that *you* want, should you order one. This little switch has an overall wafer diameter of only $\frac{7}{8}''$ and is really precision-made. It will cost you a bit more than conventional types but it's a 'must' if you're going to duplicate my little unit.

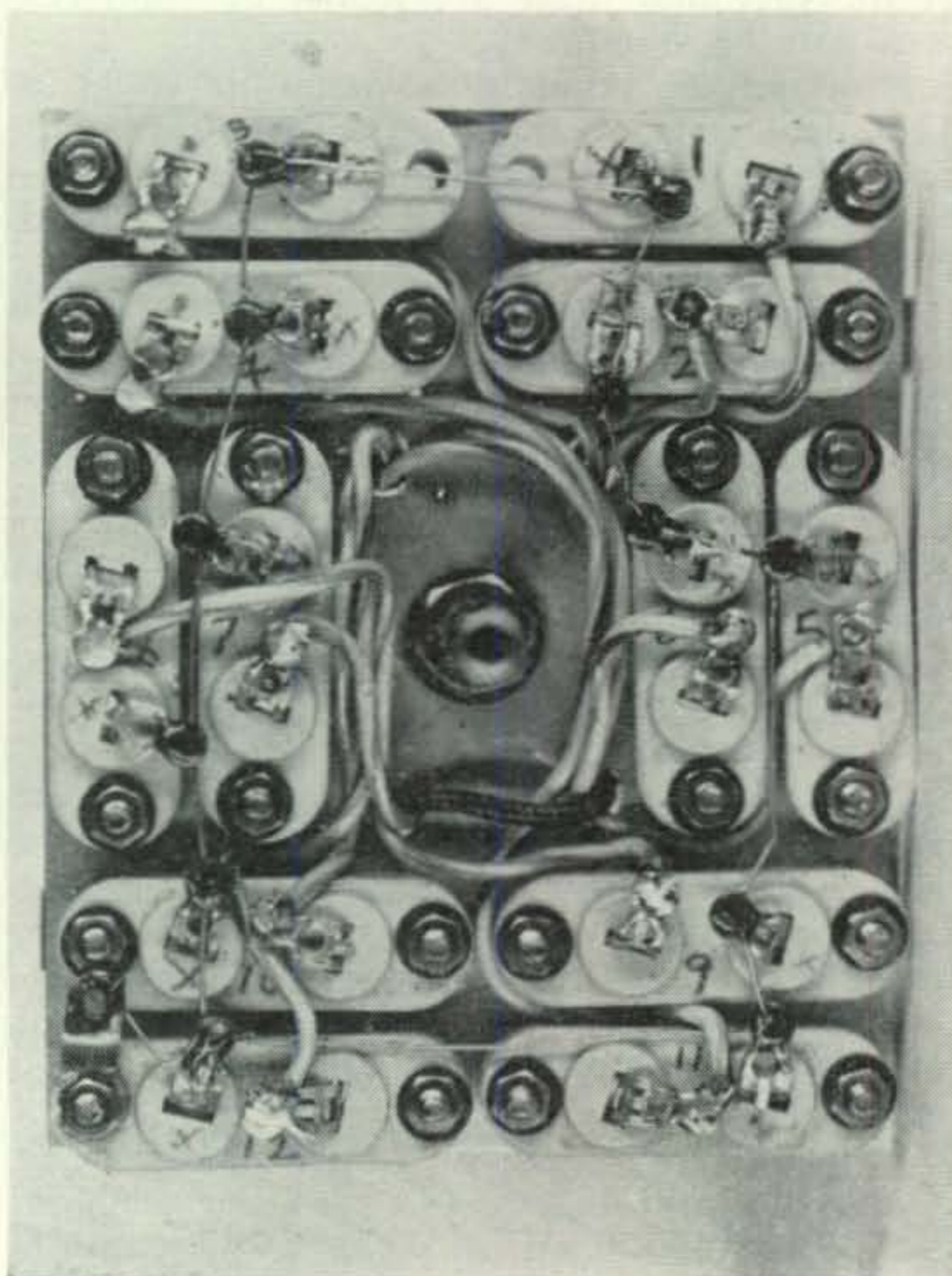
I assembled the switch and all of the sockets on a piece of 16 gauge aluminum, $3\frac{1}{2}'' \times 2\frac{7}{8}''$, which forms a miniature sub-chassis plate as shown in one of the photos. This eliminates a myriad of unsightly socket mounting screws appearing on the front panel and greatly simplifies the wiring operation as the sub-chassis can be completely assembled and wired before being placed in the relatively cramped space between the sides of the chassis box. While the wiring itself is exceedingly 'elemental', there are a total of 26 soldered connections so a

[Continued on page 106]



Top view of sub-chassis mounted in position in LMB #135 chassis box with a miniature 12 position rotary switch in the center.

Rear view of sub-chassis showing wiring of crystal sockets. Switch shaft is in center.



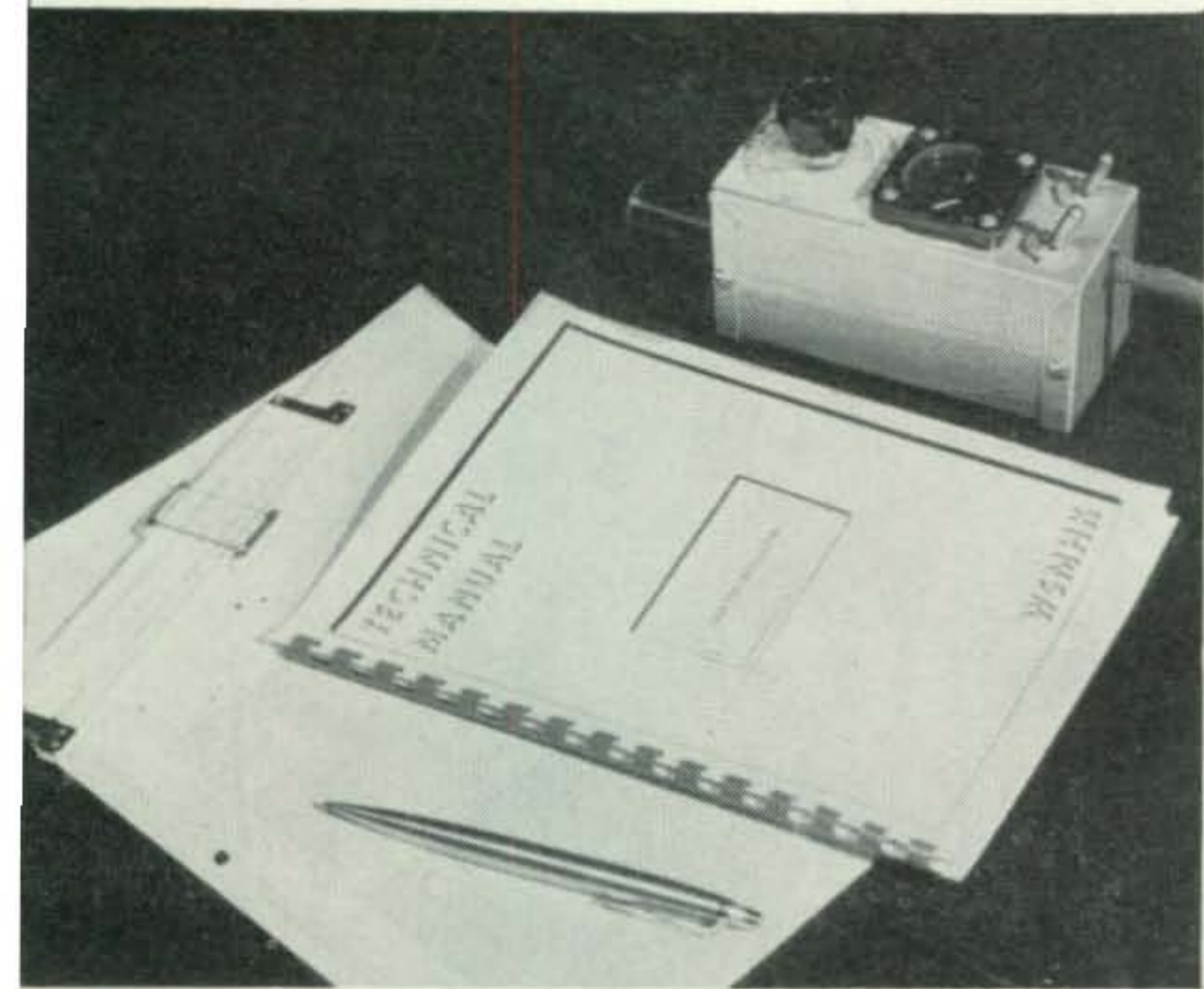


Fig. 1—The cover for this Tech Manual was reproduced photographically from the original art work. The plastic binder was commercially applied.

Technical Manuals For The Amateur

You've probably never really finished any Ham gear. That may come as something of a surprise, but chances are it is true. For, though industry now realizes that no equipment is complete without a Technical Manual, not one Ham in a hundred ever bothers to make up one on the equipment he builds. This is in spite of the fact that there are plenty of good reasons why he should.

Commercial companies maintain staffs of Technical Writers who expend considerable time and effort in compiling the instruction books which accompany the company's products into the field. This is not an altruistic endeavor on the part of the companies, but is done because they have come to realize that the equipment they manufacture cannot give full satisfaction unless complete information for its operation and maintenance is handily available to the user. Admittedly, you are not manufacturing electronic equipment for shipment to distant buyers, but if you think this means that Technical Manuals are of no value to you, just consider what happened to me recently.

After some years of inactivity, I dug out my Ham gear in preparation for adding my bit to the QRM. Among other things, I had a Grid-Dip Oscillator. It was based on the one in the well-known CQ article*, but was modified during construction to suit my ideas and junk box. At that time, a schematic and parts list

*The Improved Dipper, W. M. Scherer, CQ, February, 1949.

were carefully drawn up but that loose sheet of paper had disappeared in the interim and now I had to take the dipper apart and take time to draw up new ones. Even then, there remained some doubt about the accuracy of calibration which will have to be resolved later. A simple instruction book—a matter of a few minutes work—made at the time of construction, would have obviated the entire problem.

If you have been involved in Amateur Radio for any length of time, it is almost certain that at some time or another you have stood staring at a chassis and scratching your head over connections, limitations, operating procedure or some peculiarity of some gear you had built long before. Just a glance at the simplest sort of instruction book would have told you what you were trying to remember. There is another advantage which we might call the 'Professional Touch' and which may very well be the greatest advantage of all. We will go into that in a moment, but first, let's see just how simple it really is to write and assemble such a book.

The average Ham technical manual or 'Tech Manual' as they are generally called, will be only a few pages in length. Typewritten copy is preferable but there is no rule against legible handwriting, if you can do it. As for the writing itself, there is only one rule which you need follow: State all the facts concisely. That is, omit nothing which is truly pertinent, but don't be verbose. After all, if you ramble on into a novel-length *magnum opus* on every piece of gear you build, you will wind up writing all the time and may not even have time to tune

Fig. 2—The simplest and least expensive method of binding. A manila file-folder is cut down to fit and the entire book is stapled together.



by **CHARLES WELCH, W5MHK/4**

1207 Edwards Ave., Orlando, Fla.

in on the latest chapter in the Double-versus-Single-Sideband feud.

In the interests of simplicity, it is a good idea to follow a standard format in laying out your book. It should be divided into sections and each section should begin a new page. It is also a good idea to write on one side of the paper only, leaving the backs blank.

The first thing in the book should be the title page bearing the title of the book (or the name of the equipment described), the date and your name or call letters. If the book is large enough to warrant a Table of Contents, it should come next. On the next page we begin the first section. Headed INTRODUCTION, it is a paragraph or two which describes the gear and states briefly its features and intended use. This is not as superfluous as it may seem. While it is true that the cover and title page will state that it is, let's say, a frequency meter, that tells nothing of the tolerance of the dial calibration, the temperature stability, or the fact that it has built-in means of receiving WWV for calibration purposes.

The next section, headed DESCRIPTION, covers the overall operating philosophy of the instrument and goes into a more complete discussion of the circuits used in the various stages. If these circuits are perfectly straightforward in design and use, little more than naming them is necessary. However, if they are at all unusual in design or application, be sure to say so and explain exactly how they diverge and how they work. Don't skimp on this point for it is this sort of thing which

usually causes the most confusion after the project is no longer fresh in your mind.

OPERATING PROCEDURES is the next section. First, state even the obvious things like turn-on procedures and warm-up requirements, if there are any. State precisely the procedures for calibration or checking which are necessary and then go on to list and explain the uses for which the unit was designed and for which it could be used around the shack.

Follow this with the Schematic Diagram and Parts List, together with any graphs or other illustrations which are needed. This completes the contents of the book. No provision has been made in this outline for a section on trouble shooting as is usually found in commercial publications. It is doubtful if such a section would be feasible since commercial companies base such sections on tests of a prototype unit, a procedure quite outside the realm of amateur construction practices.

If you have built the gear from a magazine article with no changes or adaptations, the problem is even more simple. The article will form virtually the entire contents of the book since such an article generally explains all aspects of the equipment in sections which correspond roughly to those outlined above. In the case of the dipper, I had a copy of the magazine which carried the original article* dealing with its uses, and this became the text of the OPERATING PROCEDURES section of my book. The only other requirements in this particular case were a title page, description of my modified version of the dipper, a schematic and a parts list. Since the magazine pages were to be used directly, the format of *CQ* dictated the size of the tech manual. Rather than cut the pages out with a razor blade, remove the staples and dismantle the entire

[Continued on page 103]

**Applications of the Grid-Dip Oscillator*, W. M. Scherer, *CQ*, January, 1949.



ham clinic

This column is being written in Europe. Those who wrote to my old home address instead of to CQ (as directed) will of necessity be forced to wait a little longer for a reply.

Letters are no longer filed and are destroyed after being answered; so if you write again concerning a problem be sure to give a brief summary of your original communication. Attempting to keep a file of over 4000 letters (about 4 months accumulation) was just too burdensome and required too much space.

Your future communications will be airmailed by CQ to me twice each month and there should be no excessive delay in receiving replies. By the time this column reaches print I hope to have my technical files at hand. However, I have made arrangements with my assistants who have volunteered to continue to help me with the problems received, to air-mail all letters. Be sure to include an airmail (6¢) stamp for quick service.

We will soon be on the air from here and will give you our call.

Observation

Many communications have been received relative to the merits of various commercially available beam antennae for 10, 15 and 20 meters. Before the average amateur spends his hard-earned dollars for something new he usually wants some assurance from someone else who is satisfied, that he will receive his money's worth.

All too often however, the average ham is usually not in a position to interpret correctly the claims of various antennae manufacturers. He relies on good solid information from friends who have taken the "bold step" and acquired a particular antenna. His general feeling is that if an antenna his friend purchased and installed works fine, then he more than likely will get the same results. But this is not ALWAYS true!

Geographical location, antenna height above ground, method of feeding, transmitter power output, man-made obstacles, type of ground over which the antenna is installed etc., all enter into the picture!

by **CHARLES J. SCHAUERS, W6QLV**

CQ Magazine, 300 West 43rd St., New York 36, N. Y.

Make no mistake, the beam antenna designed for *one* band and possibly *one* frequency is best! Trap antennae, multi-band beams, "abbreviated doublets" etc. are compromises, but if they are installed properly and adjusted for low vswr they WILL work excellently. However, all the pi-networks in the world will not make up for poor antenna impedance matching.

I have used a plain old 75 meter doublet for years on all bands with success. Perhaps I have been fortunate in having good radio locations (astutely chosen)! However, W6VVF uses a 75 meter doublet and works the world with his fine AM-CW-SSB-RTTY setup on all bands.

Before you buy any antenna be certain to look into the manufacturer's specifications carefully. Inquire into the merits of the antennae your various on-the-air contacts honestly believe they have . . . do not trust to blind judgment, but investigate.

"Forward DB gain" will be argued by beam enthusiasts and they will tell you that without their three element "dandy" they wouldn't be able to work out of their backyards. This may be true; however, after seeing some of the antennae used by European hams in conjunction with their low-power rigs, I wonder!

My observation: many amateurs buy beam antennae without taking into consideration the various factors affecting their OWN locations. They are sometimes prone to blame a manufacturer because his antenna did not live up to expectations; but this is wrong.

Manufacturers should furnish the following information on their beam antennae: maximum height above ground for optimum efficiency; band width tolerances (in DB) before re-tuning is mandatory (a large number of hams think that the average beam for 10 meters will work fine on *all* 10 meter frequencies without retuning); forward gain (in DB); front-to-back ratio (in DB); effect of various lengths of transmission line (in DB); alternate feed methods; and *SIMPLE* adjustment data.

Questions

M. C. writes from Tampa, Florida: "I'm

a SWL and love to 'prowl' the ham bands but I have trouble with my old Philco set separating the stations. Can I install something on my set to spread out the ham bands?"

Yes, Mike you can. Full information on electrical band spread is contained in most amateur radio handbooks. However, it is quite simple to install. Generally, bandspreading is accomplished by adding one or more variable condensers across already existing tuning capacitors. "Verneer" tuning is a must and can be accomplished by using available dial mechanisms.

D. R. from Los Angeles writes: "Is it true that when an antenna is designed properly for transmitting it also will be a good receiving antenna?"

Well, the "reciprocal law" has been argued since spark transmitter days. I would say that if the antenna is *properly* matched to *both* receiver and transmitter, yes. On the other hand, if they are not, no.

K. L. writing from Puerto Rico wants to know what the cathode resistor value for a 6SJ7 speech amplifier tube feeding a 6SN7 should be.

The value depends upon the current you wish to draw. Generally, the value is 1500 ohms $\frac{1}{2}$ watt bypassed with 25 mfd. (electrolytic).

B. S. asks us this from Washington, D. C.: "How come there is little FM activity on 10 meters?"

Personally, I do not like to copy it. It is not easy to tune in and requires a little patience. A mal-adjusted FM transmitter sounds worse than Donald Duck with a cold! I think the main reason for little FM activity seems to be due to the lack of interest on the part of most of the 10 meter gang. Anyone have any ideas?

C. H. from Hartford, Conn. writes: "I have a bunch of pilot light bulbs and the only writing on them is the number 48. The bead color is pink. What's the voltage and current rating of these lights?"

You have a screw base bulb; 2 volts at .06 amps.

M. M. of Milwaukee writes: "What is the output of a PE 103 dynamotor with 6 volt input when it is loaded down to 200 mils?"

I assume you want the voltage output. It's about 450 volts.

C. L. wants this information sent to him at Kansas City: "For a push-pull pair of 4.250As operating class 'C' at 3000 plate volts with 450 volts on the screens what is a satisfactory bias for phone work?"

-300 to -335 volts.

F. R. from Seattle, Washington writes: "I'd like an antenna operating on 6 meters that has very broad band characteristics, vertically polarized and omnidirectional, what do you suggest?"

Look into the discone antenna. It has good

ground wave coverage and is easily matched with RG-8U coax.

G. P. writes from Memphis: "I heard a discussion on the air the other night and the term 'isotropic antenna' was brought up. What in the heck is an isotropic antenna?"

An isotropic antenna George, is an antenna which produces waves that are of equal strength in all directions. It is an imaginary antenna whose characteristics are easily "seen" by those working in the field of antenna theory. That is, it is used in conceptual analysis for purposes of comparison with calculated antenna parameters.

J. P. from Boston writes: "Can you tell me what a 'butterfly oscillator' is and where is it used?"

Yes. A butterfly oscillator is a tunable low power oscillator which is used usually in the 100 to 1000 megacycle range. It is tuned by a device which resembles an ordinary variable condenser but is circular in shape. When the plates are rotated, both capacity and inductance change. It has a very wide frequency range not uncommonly as high as 5:1 and good mechanical stability. The oscillator gets its name from the resonator described.

R. S. writes from Calgary, Canada: "When a transistor power pack is used to power a receiver is there really less noise than when a vibrator supply is used? Would it be worth the change?"

Yes to both questions.

Kit Wiring

Those of you who like the kits but not the work involved in putting them together can "have your cake and eat it too." Frank Warnock of 1225 Franklin Avenue, Portsmouth, Ohio is physically handicapped but willing and able to do kit wiring for a very modest fee. If you let him do your work you can rest assured that he will do a professional job. You'll have the satisfaction that you helped out someone who deserves a hand for being so eager and who has enough initiative to "stand" on his own two feet. Write Frank and tell him what you have in mind. You can't lose.

Twists and Techniques

An ingenious idea from K6ESZ is this: you mobileers who have trouble tuning up your transmitters can do it quickly with an ordinary Xmas tree bulb clamped to the antenna where you can see it in the rear-view mirror. The bulb is simply link-coupled below the loading coil. Full brilliance puts you on the air!

Thirty

As soon as we are settled we'll put the rig on the air and talk to the wonderful United States. We hope you are listening on 10, 15 and 20 meters. Look for us on SSB, AM and CW. By the time you read this we hope to have our call which we will pass on to Wayne and Susan.

So until next month with some foreign amateur radio observations,

73, Chuck, W6QLV



Novice

by **DONALD L. STONER, W6TNS**

P.O. Box 137, Ontario, Calif.

At this writing, The Army/Caltech "Explorer" satellite has been orbiting for a week. It looks like it may stay up there for quite some time. I admit that I spent so much time recording, experimenting with antennas, and fiddling with low-low noise converters that I must burn the "midnight oil" getting the column out. One by-product of my efforts is a high quality-low noise vhf converter that will be described in CQ magazine in the future.

For those of you that would like to construct a simple and inexpensive converter for receiving the telemeter transmissions of "Explorer", look up the article in *Popular Electronics* about the time that you read this.

The mail brought us a lot of newsy letters, dx reports, and photographs, so I had best plunge into the business at hand.

Who's DX?

Ulf Ericsson, Sandelhielmsgatan 3, Vanersborg, Sweden, who is now the happy owner of the call SM6BMB, advises me that he has been calling CQ KN/WN on 7145 but has not had much luck so far. He believes that most Novices do not listen outside their band. He is getting out as he has QSO'ed several W's. So tune carefully around 7145 kc! Ulf reports hearing the following stations: Dec. 20, 0800-0820 GMT; WN2JTG, Kn8HCC, GIU, EUX. Dec. 22, 0550 GMT, KN4SAY. Dec. 23, 0800 GMT; KN1DEG. Dec. 27, 0900 GMT; KN4QXP, KN5LMG. Dec. 29, 0750-1000 GMT; KN1DNE, KN2YIO, WN2HGR, PGC, KN3ATI/2, BVH, WN3MEK, KN6IEA,

KN8GOG, HTT, HVS, GVF, KN9HTK, JOY. Jan. 1, 0900-0915 GMT; KN2HCH, KN4SGV, RZM, KN9IRP. Jan. 2, 0800 GMT; WN2TIK, KN3BNM. Jan. 3, 0745-0830 GMT; KN1DQQ, WN2PVX, RPQ, KN4PUD (RST 589), KN5KEZ MHF, WN6YJP, KN7BNG, KN8ESM, KN9JCQ, KNØMOL. Jan. 5, 0845 GMT; WN3KOW. Although mainly on 40, Ulf has been doing some listening on 15 meters. He reports hearing the following stations on the 15 meter band: Sept. 7, 2150 GMT; WN2KIN, KN8HMS. Sept. 11, 1940 GMT; KN1ALV. Dec. 30, 1910-2000 GMT; WN20QS, TKX, KN8ETA. Jan. 8, 1230-1255 GMT; KN3BVK, BBV, VQB. Many thanks for the reports, Ulf, and I hope to snag you myself one of these days. Maybe on DSB, eh?

Our friend Tima Popovic, YU1FR (YU1RS 357) sends us his list of calls heard during the month of November, 1957. Nov. 4, 2000-2200 GMT; KN1BDU, BHV, CDM, CDV, CKV, CMF, CWR, DAT, DMT, KN2GJX, YGT, YXY, WN2DIG, GZA, LOJ, ONQ, KN3ALL, BTC, WN3KYN, WP4ALC, KN4OWT, PQR, QHC, QLL, RAD, RHI, RNA, SGQ, KN8DHA, EUT, GIE, HFO, HYD, IQC, KN9GVT, IAT, IUT, JJS, KNØKIS. Nov. 8, 1900-2130 GMT; KN1CBA, CBY, KLN, KN2AHO, WN2BAG, PSZ, KN20XH, YMD, KN3BPQ, CEU, WN3KYN, KN3RIX, KN4MOJ, OGN, QZA, QZG, QZJ, QZN, KN5JWW, MVS, WN6HPS, KN8EEW, ESY, HZO, KNØKZJ, LTB, LUZ. Nov. 11, 1620-2020 GMT; KN1AYT, BBV, BGM, BOM, CAU, CLT, CMR, CPB, CQU, CQV,

The rare species known as "a yl ham" graces the pages of the Novice column. Marianne Bushong, KN5LKC, 5814 Greenwood Road, Shreveport, Louisiana uses an AT-1 modified using a 6146 in the final running 66 watts to an 80 meter doublet and 15 meter beam.

Randy Baily, KN5KNR, P. O. Box 830, Huntsville, Texas has a very neat looking installation. Randy is thinking of getting a Valiant when the General ticket arrives and would like to hear from Valiant owners. He will sked anyone needing Texas for WAS.

Ed Johnson (15) Kn40LX, 65 Greenbriar Ave., Hampton, Va. received his ticket on April Fools day, by golly. He is only on 80 meters, using a Globe Scout 680 to a V80 Vertical and receives on an NC-24OD. Ed will make skeds for any reason.



CVH, CZG, KN2AHT, WN2ALI/1, KN2-APG, CBV, WN2KLN, NPD, REH, RON, SGA, KN2VTI, YPN, ZGV, KN3AYT, BHN, WN3LQE, WP4ALQ, KN4QFO, RDD/4, RNV, RWV, KN5KBH, KBJ, KN7JBF/7, KN8HED, HLE, GPN, GZS, KN9JED, JWU/9, JZW, KNØLNS, LNV. Nov. 15, 1800-2100 GMT; KN1AJB, BNO, CYR, DID, KN2AOT, QMU, ZAJ, KN3AIJ, AIT, AKN, AWY, BSY, BVY, BVW, WN3JWN/3, LWO, KN4PWB, QAW, KN5KYO, KN8DPD, HJC, HZU, HWW, KN9IMV, HOL, KNØLQB, MAH. Nov. 16, 2000-2200 GMT; KN1APY, ASJ, BHC, BSI, CRU/4, CZH, KN3AMY, WN3AUT, KN3CHC, WP4ALT, KN4OII, OKY, OVT, QHQ, QIE, QIJ, KN5KMS, KSJ, KN8EZJ, GRZ, GTI, GWK, GZG, HCS, HEK, HQU, HWW. Thanks once again, Tima, for the fine signal reports. They are always greatly appreciated.

Want to work dx? Sure you do. Listen to this. "Dear Don: I would like to sked any of the Novices that would like a KG1 contact and confirmation. The following schedule will be maintained, if at all possible, as of February 12, '58 until my return to the United States on approximately December 1, '58. Dates: Weekdays. Times: 0800-1000 EST and 1400-1600 EST. Transmit: 21.160 mc. Receive: 21.120 to 21.210 mc. All contacts will be confirmed 100% but via the various ARRL QSL Bureaus *only*. Sincerely, Bud W. Lafferty, S/Sgt., 1983rd AACS Sq. (MATS) APO 23-New York, N. Y." There it is fellows, here is your chance to work Greenland: I hope you know what you're letting yourself in for Bud! Good luck.



Help Wanted

The little blurb that I put in the February Novice column really brought out a lot of "would like to be hams". If any of the readers are near the people listed, please get in touch with them and provide them with that needed helping hand.



Dan Bernard, KN8GVG (15), 622 N. Cherry St., Kenton, Ohio has a WAS total of 46 and needs Idaho and Vermont to complete it. His DX includes VE3 and 5, KL7, WP4, VO2, and VQ2. Dan can be found on around 7 PM EST. Listen for him on 40 and 15.



John Cummings, WN6SFI, 752 Pico Avenue, San Mateo, Calif. met a fine pen pal via the Novice column, and would like to write to others. John will sked anyone needing Calif. for WAS or anyone wishing a nomination to the Rag Chewers Club.

Larry Esco, 1630 50th St. C.P., Birmingham 8, Alabama would like help with the code and theory. His phone number is STate 67438.

Henry H. Brown, 6038 S.E. Lexington, Portland 6, Oregon is an "ole timer" but would like to get back into ham radio. Henry would like to meet a local ham.

Carl Haywook (15) Box 314, Claypool, Arizona needs help with the code and theory. His phone number is GR 3-3242.

J. A. Fredricks, 314 South 13th Avenue, Yakima, Wash. would like help with the code and theory. His phone is GL 2-4119.

Mike Choucalas, P.O. Box 1790, Chicago 90, Illinois is 20 years old and would like to get an amateur license. Mike goes to college in Chicago and lives in Gary, Indiana.

David Lutton, 1617 Chickasaw Blvd., and Richard Southern, 813 Mulberry Ave. N.W. live in Ardmore, Okla. and need help with the code.

John Thomas, P.O. Box 238, Mt. Angel, Oregon has been trying to get help with the code and part of the theory for two years.

Charles Mason, 116 W. Blount St., Pensacola, Fla. is swl'ing but would like to become a ham.

Don Woods Jr., 1133 Oriental Rd., Jacksonville, Fla. is almost 14 years old and would like help with the code. His phone is FL 9-4551.

Allen Manasee, 32 Stonewall Lane, Mamaroneck, N. Y. would like to meet a ham or join a club and obtain help with the code and theory. His phone number is MA 9-8167.

Lory Watkins, Rt. #4, Sturgeon Bay, Wisconsin would like help with the code and theory. The phone number is PI 3-5659.

Ken Hutchins and Mike Brawn both of Meredith, N. Y. would like help in obtaining their amateur license.

Henry Kiernan, 86 Oxford Rd., New Rochelle, N. Y. is 17 years old and is a "bored swl". His phone number is NE 2-8066

Kenneth L. Dunlop, Rt. Box 77, Tuscumbia, Alabama would like help with the code and theory.

Pete Madsen, Box 209 Suquamish, Washington would like help obtaining his Novice license.

James T. Scofield, 1214 Clover Drive, Visalia, Calif. is an elementary school teacher would like help with the code and theory.

Tom Pappan, 404 Division St., East Lansing, Michigan would like to meet a local ham who will start him out in ham radio.

Harold R. Gove, 29 Valley Road, Southampton, Mass. would like to become a radio amateur.

Layprince Hale, Route 1, Box 46-A, Conway, Arkansas has the theory down "pat" but needs help with the code.

Richard L. Halford, 3318 Kleemon Rd., Cincinnati 11, Ohio would like to become a ham.



Dick, KN2DLX, 220 Taylor Avenue, Endicott, N. Y. made a beautiful communications receiver out of the war surplus BC-453 (The SSB Q5'er) as shown

in the accompanying photograph. Dick can be found on 7194 running 75 watts to a DX-40. Nice job, Dick.

Wilbert J. Wilson, Jr., 708 W. Grant Avenue, Apt. #3, Duquesne, Penna., would like help learning the code for his Novice license.

James H. Lannon, 16 Arbor Road, Holbrook, Mass., would like help obtaining his Novice license.

Miles (Mike) R. Bleech, 904 Evanston Drive, Jackson, Michigan would like to locate someone that will help him with the code and theory for his license.

T/Sgt. Harold Cosier, 1052 South Cooper, Memphis 4, Tennessee would appreciate any help or suggestions on obtaining his Novice license.

Sam F. Weiner, M.D., 207 N. Naomi St., Burbank, Calif. and his family would like help on obtaining their Novice licenses.

Mel Murray Jr. (13), 1715 Catawba St., Fayetteville, N. C. would like help in obtaining his Novice license.

L. R. Leftwich, 2702 W. Brooklyn, Dallas 11, Texas would like to see a ham shack and obtain help passing his Novice examination.

One of the persons listed above tells us about "a local radio club that consists of hams from all over the county, but they talk way over my head and do not seem to be interested in establishing a small class for people like myself who are interested but do not know the first thing about radio." Is your radio club like this???????

Letters

Jeanne Johnston, KN9IWT, Rt. 1, Box 139, Mundelein, Illinois sent in a cute poem about the woes of an xyl. Sorry that there is not enough space this month to include it, Jeanne.

Norm McCourt, 6014 Dowling Ave., Berkeley 21, Mo. is 16 and has been a ham for a year now. Norm uses a Gonset Communicator on two meters and a Hallicrafter SX-99 and Globe Scout 65-A on the lower frequency bands. By the time you read this he will be on six meters too!

Ronald A. Laks, K2YGT, (17) 488 Gregory Ave., Passaic, N. J. pumps it out with a Globe Scout 66 and drags 'em in with a HQ-100 receiver. As a Novice he worked 37 states WP4, DL3, and SM7. Ron uses a 68 ft. Windom and a 15 meter folded dipole.

Marge and Jim Campbell, KN4RNR and KN4RNS, 24 Palmento Drive, Ormond Beach, Fla. are an OM/XYL team. They are trying for WAS but need Maine and the 7th call area badly. Look for them on 40 and 15 with their Viking Adventurer and SX-99.

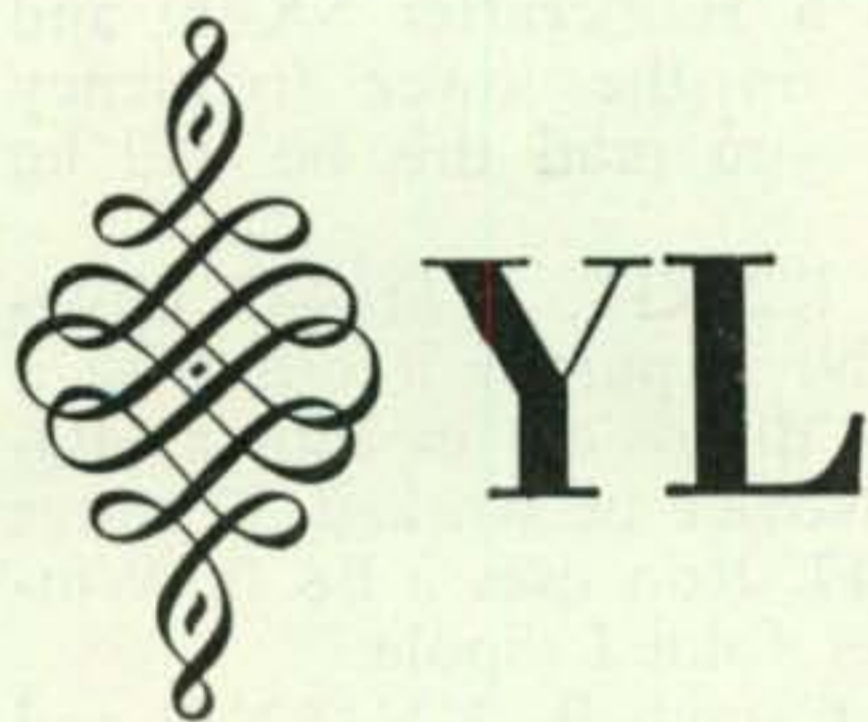
Steve Swaim, KN3BVV (16), 363 Fox Chapel Road, Pittsburg 38, Pa. also uses an Adventurer and SX-99 combination. With it he has worked 33 states, a KG4 and CE9 in five months of operation. He would like skeds

[Continued on page 111]



W5KRJ, Pearl Webb, checks a map of Louisiana showing the cities covered by the AF MARS net of which she is a member.

by **LOUISA B. SANDO, W5RZJ**
212 Sombrio Drive, Santa Fe, N. M.



YLS Receive Edison Award PSC

Of the 48 amateurs in 25 states nominated for General Electric's 1957 Edison Radio Amateur Award for public service, four were YLs. Though a YL did not place first this year (OM K5BQT won the Award), these YLs will receive Edison Award Public Service Commendations for their efforts.

W5KRJ, Pearl M. Webb, of Maplewood, La., whose OM is W5APH, was nominated for the award by MARS. During Hurricane

Audrey W5KRJ handled some 1,000 messages over an 80-hour period without sleep, including traffic for both military and Civil Defense units between Lake Charles, Cameron and Fort Polk.

Also honored for providing emergency communications was W5SYL, Iva Haley, of Grand Prairie, Tex. During 1957 Iva spent over 2,500 hours on the air handling over 2,800 pieces of traffic, mostly having to do with blizzard, flood, tornado and hurricane emergencies. With her OM W5MTQ, Iva operated for 60 con-

tinuous hours following the tornado at Dallas.

Iva got her General in June 1951. She operates 10 through 75 using from 500 watts to a kw. She is active in MARS and RACES, 7290 traffic net, Texas YL Round-up Net, and is a member of WHOOT. She was YLRL 5th D/C for 1956 and Texas Wing NCS in CAP 1954-56.

W8GJX, Helen Cloutier, of Escanaba, Mich. was nominated for the Edison Award for this public service work: Handling radio telephone calls daily between servicemen stationed in Labrador and their homes, conducting civil defense radio drills, participating in a weather reporting radio network, and teaching youths interested in radio.

Helen has appeared in this column several times, most recently in Dec. 1957 following publication of her latest book, "Isle Royale Calling."

W2RUF, Clara Reger, of Buffalo, N. Y., has done much public service work. She was nominated for the 1957 Edison Award for conducting a fund-raising and morale-building campaign for a 14-year old boy who lost both arms in an electrical accident. Clara was the only one who could draw a smile from him, and her efforts resulted in his obtaining an amateur license despite his disability.

Clara also has appeared in this column several times. See "Long-time YLs," CQ, March, 1957.

"CQ YL"

"CQ YL"—the first, the only book recording the important part YLs have played in amateur radio. Beginning with Emma Candler, 8NH, in 1915, it traces the growth in numbers and activity of the feminine Hams and of their organization, the YLRL. "CQ YL" contains 18 chapters and over 500 photographs! Here are the contents:

Preface (by W5CA)

Introduction

The Young Ladies Radio League

History of the YLRL

Officers of the YLRL

1st International YLRL Convention

2nd International YLRL Convention

YL Clubs

Long-Time YLs, 1915-1925

Long-Time YLs, 1926-1935

**Other Pre-World War II Licensees,
1936-1941**

War Service

YL Marine Operators

DX, VHF, Field Day

Young YLs

Handicapped YLs

DX YLs

Conventions and Hamfests

By the time you read this the book will be ready for the presses! PLEASE HELP PAY THE PRINTER! Order yours today!

"CQ YL" is \$3.50 per copy. Send your request with check (or money order) to your

column editor: Louisa Sando, W5RZJ, 212 Sombrio Dr., Santa Fe, New Mexico. Please state whether or not you want the book to be autographed. Numbered receipts will be mailed to each purchaser, and the books will be mailed, as soon as available, in the same order in which the orders are received.

So how about it, gals and guys? This will be a book to read and re-read; to show your friends, Ham and non-Ham alike; the only complete story of the YLs in amateur radio. It's costing several thousand dollars to get the book published, so get your orders in to help pay its way.

Dayton Hamvention

April 19 is the date set for the Dayton HAMVENTION this year, to be held at the Dayton Biltmore. The YL Forum, for which the moderator will be W8MDK, Ruby, will pay tribute to some of the women pioneers in amateur radio. The story of 8NH, Emma Candler, will be told by W8VWL, Ruth; and that of 7FG, Winifred Dow Williams, by Lillian, XYL of W8HB. Other speakers will be W3CUL, Mae, Edison Award winner for 1957, and W8ZCV, Walt, who will give his impression of a man's view of YL ops. The XYL program will be handled by Terry, XYL of W8ZHJ.

"The 8th in the 8th in '58"

Thus W8MBI, Marie, convention chairman.

W5SYL, Iva Haley





RIYL Club officers for 1958, l. to r., front, W1WED, Ruth, VP; W1OTI, Louise, treas.; back, W1GSD, Dorothea, sec'y; K1AAK, Helen, president.

1958 officers of the Camellia Capital Chirps are, l. to r., seated, K6ENK, Wanda, president; K6UZA, Dorie, sec'y; W6HTS, Mildred, VP. Standing, K6HOI, Pat, publicity. Not in photo, K6HHD, Jan, treas. Photo by K6IXU.

labels the 8th annual Midwest YL Convention to be held May 23-25, 1958, in Toledo, Ohio. Sponsored by the Toledo Radio Club, meeting place will be the Mid-City Motel. Friday plans include a tour, luncheon, and buffet supper followed by a QRM Party (the OMs to have their own party at the same time). Saturday will provide for a shopping tour, YL luncheon and in the evening a YL-OM banquet. Baby sitters will be available for YLs who bring jr. ops. The registration fee of \$2 should be mailed by May 10 if possible.

AWTAR Radio Net

Radio net chairman for the All-Woman Transcontinental Air Race July 4-9, 1958, is W3GTC, Carolyn Currens, YLs are needed to help in Yuma, Ariz.; Montgomery, Ala.; Macon, Ga., and Charleston, S.C. If you can help, contact W3GTC.

YLRL Membership Campaign

W7NJS, Beth, president of the Young Ladies Radio League, has announced a membership campaign for 1958. Eastern membership chairman is W8OTK, Alice Geib, RFD 1, Van Buren, Ohio. Western membership chairman is K6BUS, Midge Rommell, 8508 Trask Ave., Playa del Rey, Calif. These girls have lists of non-member YLs. YLs or clubs are asked to

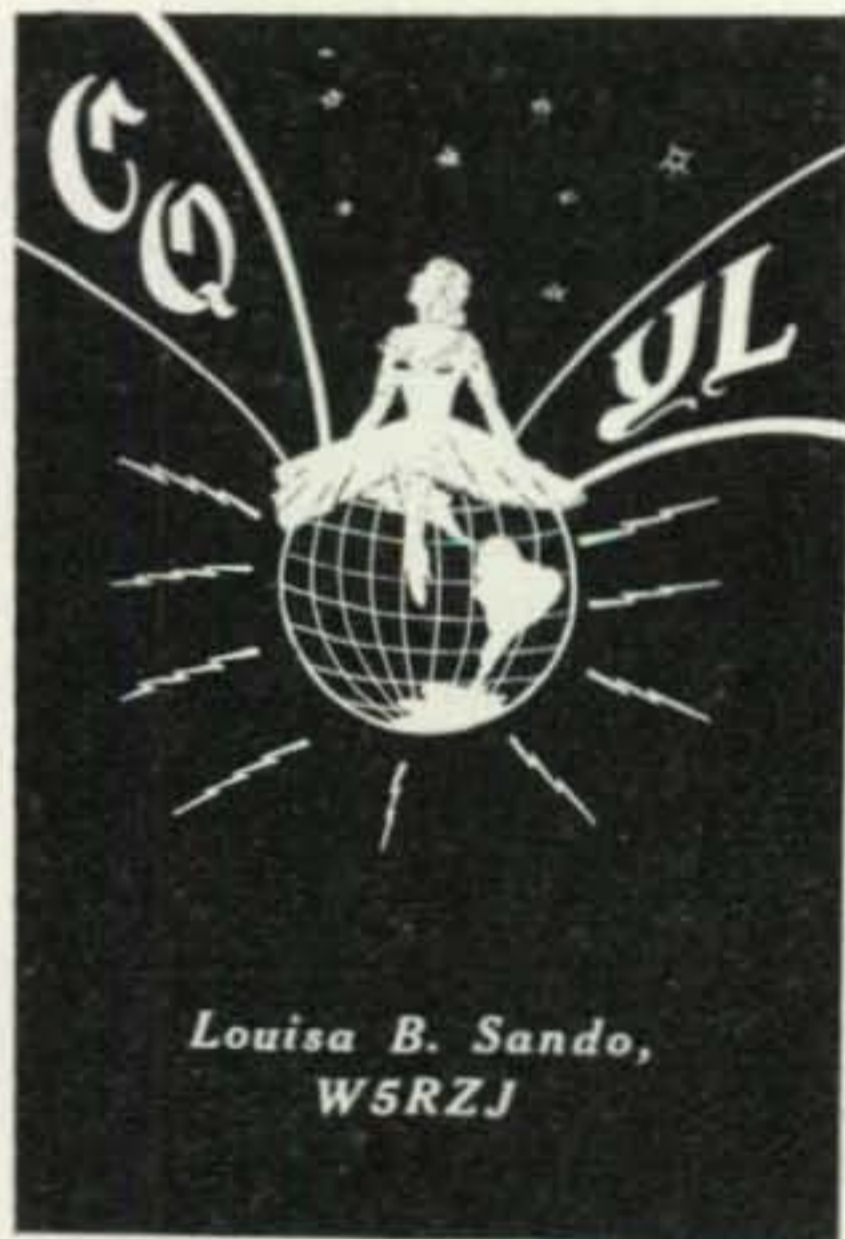


write the M/C nearest them requesting a list of 10 names (or as many more as you want) and the mailing material (descriptive literature, plus membership application card). At the end of the year there will be prizes for the three bringing in the most new members. Members must be sure their name is on the "Endorsed by . . ." line.

Any and all licensed YLs are invited to join YLRL. You don't need to wait for another YL to contact you—write to YLRL Secretary WØTYB, Betty Rogers, 1645 Garfield, Denver 6, Colo., or to your column editor for information sheets and membership application card. Dues are \$2.00 a year and include the bi-monthly publication *YL Harmonics*.

With the Clubs

Members of WHO, Inc. put on a fine demonstration of Ham radio at the Southwestern Exposition and Fat Stock Show held at Ft. Worth, Tex. Jan. 24-Feb. 2, 1958. Using their club call K5LZW, the YLs manned four positions, operating on 75, 40, 15 and 10 meters,



"CQ YL" cover design, executed by W2JZX, Vi, is printed in silver on blue, the YLRL colors.

and handled hundreds of messages for visitors to the show.

Officers of WHO, Inc. for 1958 are: President, K5CRH, Marie; VP, W5IHB, Dell; sec'y, W5ETH, Betty; treas., W5GXG, Maudine; P/C, Marge Klor.

The 1958 officers of WHOOT (Dallas) are: Pres., K5GMI, Ruth; VP, K5BNH, Bea; sec'y, W5SYL, Iva; treas., K5GRF, Irene; program chairman, K5KDY, Ginnie.

KL7ALZ, Geri, president of PARKA, announces a change in the rules for the PARKA certificate. Contacts will be valid from Feb. 1, 1955, rather than Jan. 1, 1957, as first announced.

The 1958 NYC YLRL officers, installed at a luncheon on Jan. 25th are: Pres., K2DPN, Dot; VP, W2EUL, Amy; sec'y, Helen Zuparn; treas., W2EEO, Madeline.

W8MDK, Ruby Rhude, receives from Major Hudgins her fifth incentive award for suggestions to improve or save cost on equipment repaired and maintained at the Dayton Air Force Depot. Ruby, who works at the depot as a radio repairer, used her award checks to buy an HQ-150. She has put together her own DX-100, plus converters for 2 and 6 meters and 108 Mc. Ruby will be moderator at the Dayton Hamvention YL Forum.



The loaded Clothes Line YL Net, which was started in April, 1957, is now organized as a club with officers, by-laws, etc. The LCL net meets on Mondays at 9:30 a.m. MST on 7235 kc. with the president as NCS. To become a member, a YL must check into the regular net meeting for three out of a possible five sessions. Dues are \$1.50 a year. Present officers are: Pres., K5GYZ, Lucille; sec'y-treas., KØHFB, Irma; P/C, KØEVG, Pat. To date YLs from 10 states are checking into the LCL net.

The HAWKS of Indiana are offering a certificate to any amateur working ten of their members after Jan. 1, 1958. This club, whose members are 100% YLRL, meets twice a year at the regular meetings of the Indiana Radio Club Council.

The Camellia Capital Chirps are compiling a cook book featuring recipes with a tie-in to Ham life—casserole dishes that will have dinner ready with the YL getting some extra time at the transmitter; things to serve when Ham friends drop in of an evening. Send your recipes, as soon as possible, to K6PWH, Colleen Huey, 2017 Maryal Dr., Sacramento 21, Calif.

33, Louisa, W5RZJ

VHF

50mc. 144mc. 220mc. 420mc. and above

by **SAM HARRIS, W1FZJ**

P.O. Box 2505, Medfield, Mass.

ATTENTION VHF CONTEST WINNERS

If you have not received your "Winner's Certificate" please notify "Rhododendron Swamp VHF Society", P.O. Box 2502, Medfield, Mass. All certificates have been mailed out and should have been received some time ago.

CQ 220 mc CC

	<i>Stations</i>	<i>States</i>	<i>DX</i>
W1FOS	33	12	300
W1OOP	32	12	290
W1DU	22	6	200
W1HOY	8	6	150

Information pertaining to Century Club listings must be received by the 15th of the month.

APRIL VHF CONTEST

What: A VHF Contest primarily designed to give the VHF operators a chance to compete on an even basis, and have fun doing it.

When: 8:00 P.M. Local Stand Time, April 26, 1958 to 8:00 P.M. Local Standard Time, April 27, 1958.

Who: All amateurs throughout the world.

Winners certificates will be awarded to the top scorers on *each* VHF band for each state or province in the United States and Canada and for each country.

Separate certificates for the top scoring Novice in each state or province and for top scoring equivalents in other countries will also be awarded.

How: Just fire up on your favorite VHF band and exchange contest information with as many stations in as many different (a) Counties in the U.S. and Canada (b) Provinces, states or other similar political subdivisions in countries other than the U.S. and Canada. Contacts must be made on the band for which the log is submitted.

Separate entries may be made for more than one band, but the score for each band must consist of contacts made on that band only.

Crossband contacts are permissible for extra contact points but sections must be worked on the band the transmitter is on and for which the log is submitted.

Only one contact per station is allowed, whether it be crossband or direct.

Scoring: For each complete exchange of information consisting of message number, county (or political subdivision) and state (or country), and handle, two points are accrued.

The total number of contact points is then multiplied by the total number of different counties (or political subdivisions in foreign countries).

For instance: Total number of contacts $100 \times 2 = 200$. Total number of counties 50. Contest score $50 \times 200 = 10,000$.

Countries or other political subdivisions in different states, provinces, or countries having the same name are obviously separate counties and count as such in the totalling of the multiplier.

The exchange of reports, while not required by the contest rules, is suggested as good operating procedure.

Time: As mentioned in previous contest issues, it is desirable to end the contest with a round table discussion and exchange of scores. In this manner preliminary contest reports can be gathered and published in an earlier issue.

Contest logs must be post marked by the 15th of May in order to be eligible for certificate.

Address contest logs to: Log Department, Microwave Associates, Burlington, Massachusetts, U.S.A. Good luck, have fun and be sure and get your logs mailed in time.

420 MC AND UP

The 1215 mc converter article by Wayne and Henry (W1WID and W1OOP) has a sequel in the form of a 2C39 tripler. This tricky little device gets you crystal controlled on 1215 with a minimum amount of plumbers help. If you are unable to wait for article you might try writing a line to either Wayne or Hank asking for some advance info. Present plans at W1BU call for feeding the tripler into a ten inch diameter parabolic dish and making an effort to beat the present dx record.

Intrepid constructioneers who are making the big effort on the 1215 converter will be pleased to note that hot crystals for the converter are available from *Microwave Associates* in Burlington, Massachusetts. I would suggest that letters requesting crystals be addressed to Dana W. Atchley (Pres.), (W1HKK) and should contain sufficient information to convince him that you are in fact building a converter and that you really will use the crystal. *Microwave Associates* is not a philanthropic organization and crystals are made available to amateurs in the hope that some reliable information will be forthcoming. Continued company interest can be assured only if you make the effort to report your results.

Questions concerning the converter may be addressed to the Rhododendron Swamp VHF Society, P.O. Box 2502, Medfield, Mass. Suggestions concerning the feeding of our ten foot dish at 1215 mc will be appreciated. Reflector is mounted a hundred feet above ground and feed line distance will be 132 feet.

Six Meters

Six meter operators who are contemplating the big step to high power are advised to take a good look at the Eimac 4-1000A. Don't quit when you hear the price. Make some comparisons anent plate dissipation vs. dollars with other tubes such as 4-250A's or 4-400A's. Consider the dollars per month of operating. My 4-1000A had 1000 hours of use in a commercial FM transmitter before I started using it. Since then it has faithfully performed for five years as a kw final amplifier and shows no signs of weakening. On six meters it runs a cool kw without any effort. Drive requirements are supplied by an 829B running at 50 watts input. The circuit used at W1HOY is shown and any questions concerning the care and feeding of same will be cheerfully answered. Tune up procedure is as follows:

1. Using G.D.O. adjust spacing of L1 and L2 to provide resonance at the desired operating frequency with the tuning capacitors set on mid valve.

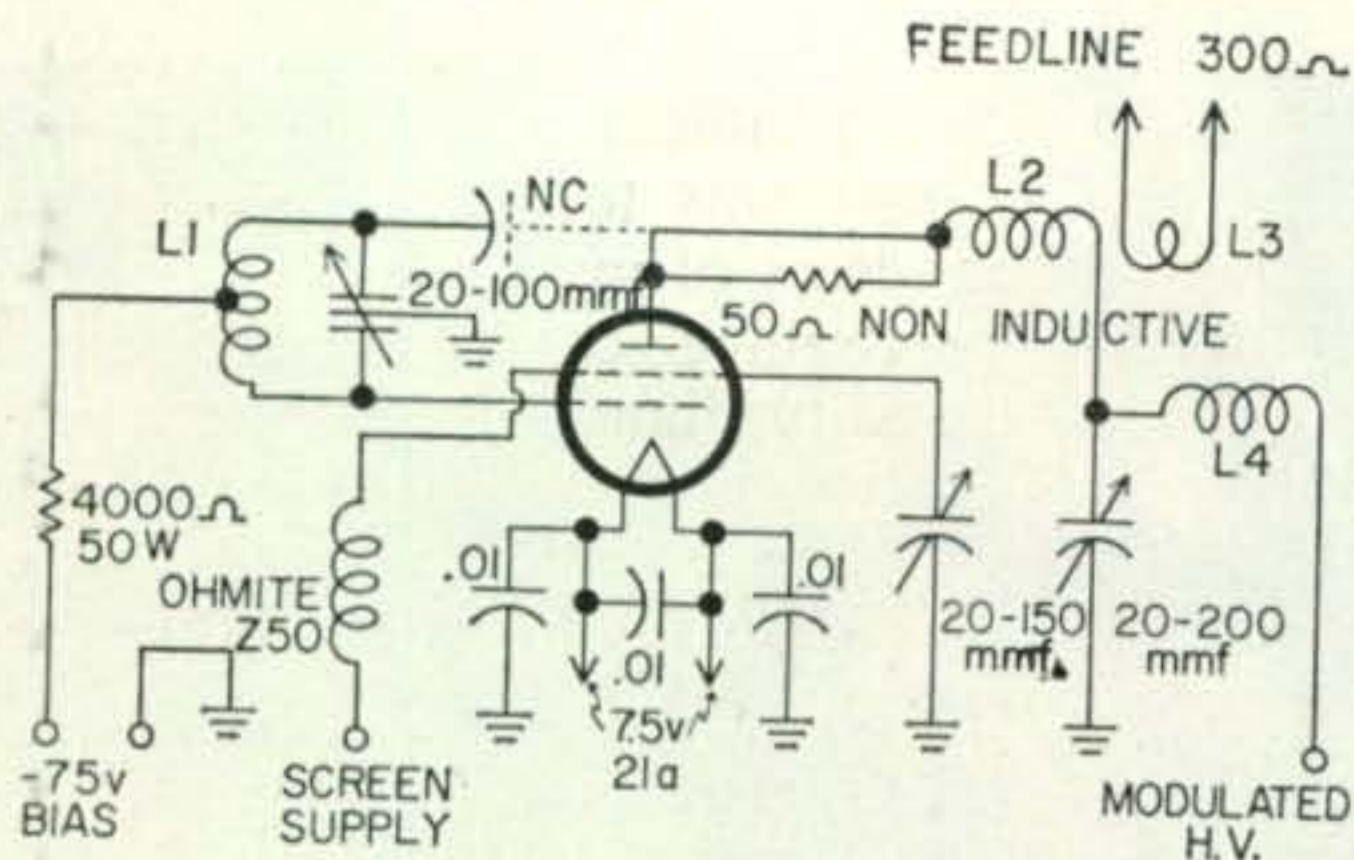
2. Apply drive to the grid circuit, resonate the plate circuit and indicate the rf in the plate



One of the many XYL's on six meters in California (and Alan's, W6FZA, XYL too), Norma, K6ZEH.

Reading from left to right—Alan, W6FZA—Gibb, W6BJI—and Bob, K6GDI.





Six meter kw amplifier.

Parts List

- | | |
|---|---|
| L1 - 3 turns 1/8" copper tubing 2" diam. | All coils turns spaced one to two tubing diameters apart. |
| L2 - 4 turns 3/8" copper tubing 2" diam. | |
| L3 - 2 turns 3/8" copper tubing 2" diam. | Adjust for resonance at mid capacity. |
| L4 - 10 turns #14 copper wire 0.74" diam. | N.C. is 1" wide by 3" long copper strip. |

circuit using a sensitive detector. (Such as the G.D.O. in diode position.)

3. Adjust screen capacitor for minimum rf in the plate circuit.

4. Adjust neutralizing tab for minimum rf in plate circuit. (Be sure to keep grid and plate tuning at resonance during this step.)

The old saw about tuning *through* resonance applies to all neutralizing adjustments. The neutralizer tab adjustment should be set for minimum rf in the plate tank and moving either way should increase the rf in the tank. The same applies to the screen neutralizing.

With a suitable load attached to the antenna terminals power can now be applied to the final plate and screen. Screen voltage can be anything from 300 to 430 volts. Plate voltage from 2000 to 5000 volts can be used.

Adjust the antenna coil to provide the necessary loading, being sure to keep the plate tuning at resonance. *Do not* operate the final without a load as excessive screen current will be drawn.

Proper operation of the final can be assured by completing the following steps:

1. With the transmitter turned on and loaded into a proper load, tune the plate tuning back and forth through resonance. Observe that minimum plate current occurs at the same tuning adjustment as maximum screen current and maximum grid current. Any indications of the grid current not being highest when the plate current is at a minimum means that you have not achieved the proper neutralization adjustment. There is *no* excuse for operating your final under these conditions. You can either go through the neutralizing procedure again (preferred) or you can neutralize it "hot". The latter procedure requires adjustment of the neutralizing tab and observing whether the grid current maximum comes closer to the

plate current minimum or goes farther away. The end result of either procedure is to have the grid current maximum, the screen current maximum, and the plate current minimum at the same time.

2. With the transmitter operating into a normal load, remove the grid drive, leaving the final plate and screen supply on. (Be sure your grid bias supply is operating.)

Final plate input should dip to a low value (depending on plate supply voltage and grid bias). There should be no indication of rf in either the plate tank coil or the grid coil. Tuning the plate and grid condensers through their range should not produce any signs of instability.

Any tendency toward instability under these conditions will be the result of improper screen neutralizing adjustment or improper parasitic suppression. Parasitic suppression is accomplished by the 50 ohm non-inductive resistor which should be bridging the first two inches of the plate lead. *Do not* attempt to operate your final without this resistor in place. Slight readjustment of the amount of plate lead spanned by the resistor should eliminate all parasitic tendencies. Be sure that the resistor leads are as short as practical.

3. With the transmitter in operation, turn the exciter off and on at a rate of about 300 times per minute. (Information on accomplishing this will be found in the ARRL handbook under "Keying the Transmitter"). Listen to the signal on your six meter receiver. You *should not* notice any tendency for the signal to hang on after the excitation is removed. (This is generally evidenced by a loud brraaking sound.) With your TV set turned to any channel on which there is a station, there should be *no* evidence of interference when the excitation is removed. With the excitation turned on there may be some small amount of cross hatching (depending on your TV set) but no heavy black bars or some such are permissible.

Any positive indications in this section are evidence of improper parasitic suppression.

4. With the final loaded into a normal load and the screen supplied from a screen supply complete with audio choke as per Eimac recommendations, modulation should be applied to the final plate. (The production of sine waves by expelling air through your pursed lips is *not* a desirable method of checking the modulation capabilities of the transmitter.) The closest thing to actual operating condition is to speak distinctly into the microphone. Words like "Ole! Cabalaboosh! Ya Mata hana-ral!" are acceptable substitutes for plain English. Speaking thusly into the microphone should cause your rf indicator to increase slightly in amplitude. It should *not* cause large black lines on your TV set. (Generally an indication of overmodulation or parasitics or both.)

5. Assuming the proper indications from the foregoing, you are now ready to receive some on the air reports. Remark: You have a new transmitter and if someone tells you it sounds bad you should be happy to get the report. *Do not* blame him. He didn't build it.

Any Old Toobalduo

In case you just can't get your hands on a 4-1000A, I hasten to point out that the circuit doesn't care what tube you use. It so happens that the 4-400A, the 4-250A and the 4-125A will all work in the 4-1000A socket. They don't exactly fit but the pins all make connection. Operating at reduced input any of them will perform very satisfactorily in the circuit described. Slight readjustment of the coil spacings and reneutralizing are all that is required.

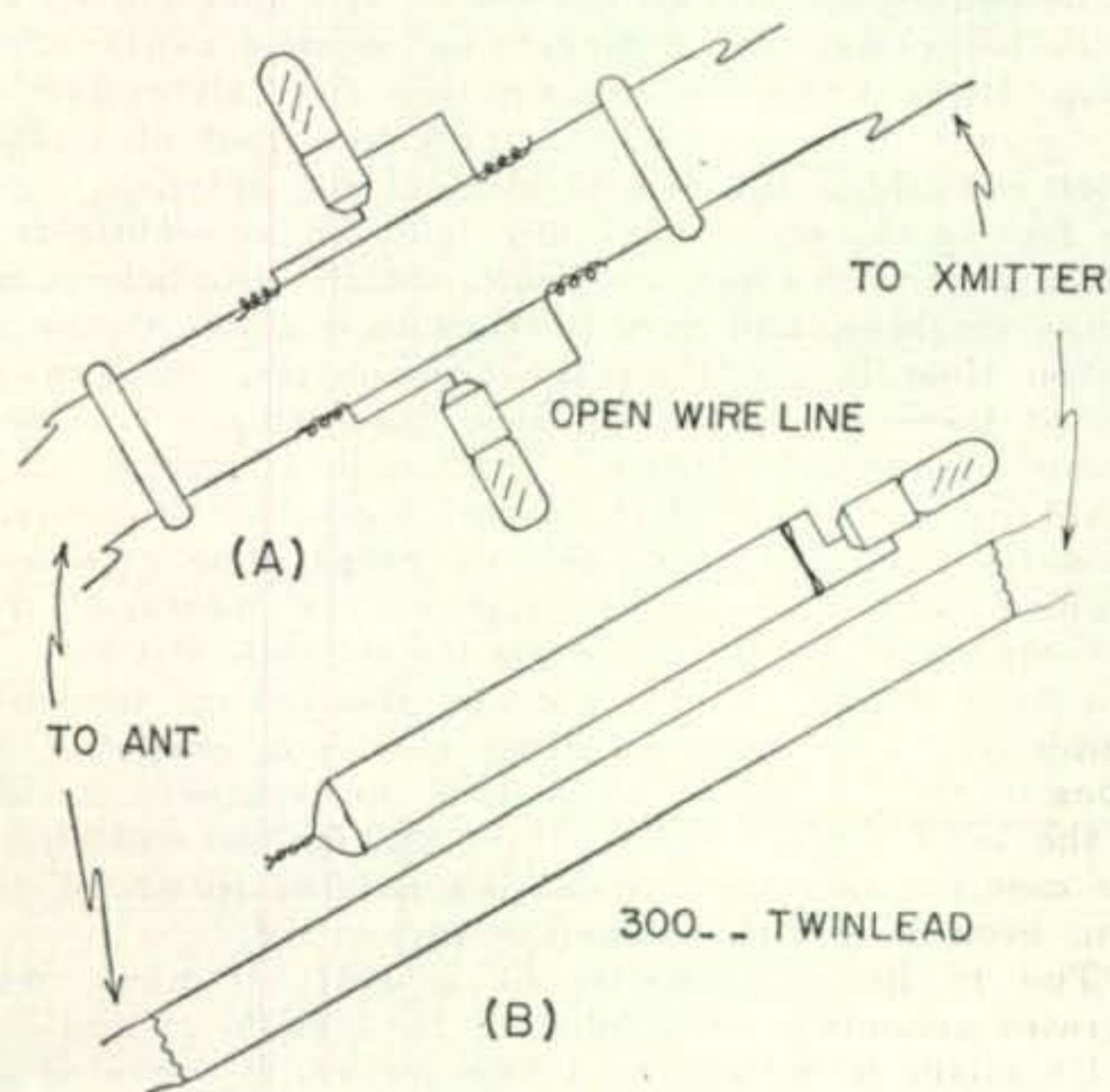


Fig. 1

Old Reliable

Seems like hams nowadays just don't appreciate the finer things in life. Take for instance the old reliable light bulb. Time was when no ham worthy of the name would try to get a rig on the air without a light bulb somewhere in the place to tell him he was in fact on the air. Since then the purveyors of equipment have come up with all kinds of expensive substitutes which purport to replace the lowly light bulb. They have in fact failed miserably and the good old reliable pilot lite and a loop of wire is still the most reliable and informative indicator available for amateur use. Trouble is not many hams seem aware of the fact. Natural enough in view of the increasing tendency for technical writers to display their erudition in place of their horse sense.

What do you use a light bulb for? Primarily as an indicator of rf current. A light bulb connected in series with a loop of wire and coupled to any portion of the transmitter which is carrying rf current will light up. The brilliancy with which it lights will depend on its wattage rating, the amount of power in the circuit and the closeness of coupling. Usual procedure is to couple loosely to your final

tank to provide an indication of power output. Subsequent adjustments to the transmitter can be evaluated in terms of more or less brilliance. Modulation percentage can be estimated in terms of increased brilliance under modulation. Decrease in brilliance under modulation indicates *trouble*. Poor neutralization, insufficient drive, etc. Violent increases in brilliance generally indicates parasitics, or instability. (No change indicates that you are using FM or you just don't have sufficient audio, or the mike is disconnected.) If the bulb doesn't light at all, you forgot to turn the rig on or you didn't close the key. (Key?) After you become acquainted with the operation of the bulb when coupled to the final tank you will want to graduate to the feed line coupler. This is accomplished in several ways depending on the type of feed line you are using. Open wire feedline current can be coupled by bridging a couple of inches of the feed line with a bulb. Preferably with one bulb on each side of the feedline. Bulbs should be spaced evenly and made as symmetrical as possible. Fig. 1A. Bulbs should light evenly. Unequal brilliance indicates unequal feeder currents and should be corrected. If you connect a second set of bulbs a quarter wave down the line, you can get a good indication of your standing waves. Both sets of bulbs should light equally if you have a low VSWR. Subsequent adjustments to your antenna matching device (ye gods! You don't have one?!) will be indicated by an evening up of the bulb brilliancy.

Twin lead users can use the alternate coupling system shown in Fig. 1B. The piece of twin lead to which the bulb is attached should be as short as possible consistent with a reasonable mount of brilliance and should be scotch taped to the feedline at a place conveniently visible from the operating position.

I have only touched on the possible uses for Old Reliable. Maybe you have some more you would like to tell me about. I might point out that at W1BU (Rhododendron Swamp VHF Society) we have a scope, a Pamadaptor, a General Radio Modulation Monitor and a remote indicating rf type thermoscope. When we go on the air the first thing we look at is the feedline coupler, just outside the window. They never lie. If they aren't lighted, we just aren't on the air. If they don't flicker when we talk, we just aren't modulating. If they don't go out when we open the key, well—you guess.

Concerning WAC Operators on Six Meters

We've collected some vital statistics on another one of that growing body of six meter men to make WAC on six meters. This time it's Alan, W6FZA.

Al was the youngest ham in the world at the age of nine, received his license in 1932, twenty-six years ago this coming April. He

held the 420 mc record, 170 miles, in 1946. The record held for a couple of years. Alan worked his sixth continent in January 1958 but after airmailing four QSL's to JA3EK (for Asia) still does not have that continent confirmed.

Alan went to Stanford University, got his degree in Electrical Engineering. For the last nine years has been a Motorola dealer, sales and service, some design, two-way radio in Tulare and Kings counties.

Still holds experimental license, XE1PZ, which he acquired while radio engineer for the U.S. Government, Department of Agriculture in Mexico, some eleven years ago. He set up HF communication network for Foot and Mouth Disease Commission. Was there, in Mexico City, for a year and a half, and knows XE1GE, Jeff Lord, quite well.

Alan is married to K6ZEH, Norma, and they have two harmonics, a five year old girl and the baby, two years old. (Prospective hams?)

Norma has had her call about ten months and operates six meters also. She has thirty-three states and four continents in her short time of operating. However, if the band is open you're sure to hear Norma in there, working 'em like mad.

Wisconsin and WAC

On January 19th at 1305 CST, Willy Moulton (W9DSP) from Chippewa Falls, Wisconsin worked KH6NS for country number twelve and continent number five. On January 26th he worked KP4ACH for country number thirteen. This was followed by PJ2AO in Aruba, Netherlands Antilles at 0938, for the first U.S.A. to Aruba 50 mc QSO! This contact was country number fourteen and Continent number six to make WAC for W9DSP. Feel sure that this is the first W9 WAC. Congratulations Willy, on a fine job and lots of persistence.

We understand that Bob Perry, K6GDI, has been unable to get confirmation of his South American contact. Bob was the first U.S. station to get WAC, but without confirmation—what can you do. Too bad Bob, we really feel almost as badly as you do about it.

Second on the list of WAC comes Paul Boberg, W6BAZ, who has had his continents confirmed for several weeks. The cards he sent in to ARRL for his WAC award are: ZE2JV-Africa, LU9MA-South America, JA7-GP-Asia, EI2W-Europe, VE1QY-North America, and KH6BRJ-Oceania.

Congratulations to you too, Paul. As long as Bob couldn't get his confirmed, we're glad that you were next on the list. You've certainly worked at it and all VHF work hard enough to receive a trophy.

MARK TWAIN AWARD

"This is an award issued by the Hannibal, Missouri Amateur Radio Club to any amateur working any five members on any band or

bands."

"W9KQX, F. D. White, of Springfield, Illinois, was the first amateur to win the "Mark Twain Award" using only two meters. He worked WØTBI, WØGQP, WØVOO, WØW-HX, and WØLFE, all about one hundred miles from him. He has worked into this area consistently. The group operates on 144,775. WØTBI, Ken Morrison is in charge of the award."

The foregoing from a letter from Ed Porter, WØLFE, Bowling Green, Missouri. Thanks for the information Ed, and congratulations to W9KQX for being the first on two to do it.

Beloit, Wisconsin A most interesting letter received from Bob Mosher (W9GAB) concerning rebuilding:

"For the last six months I have been rebuilding most of the equipment around the shack, and have gotten most of the little bugs out of everything. *A good winter's work I say.* On 144 mc we are running the full power now with a new 3000 volt power supply to a pair of 4-125A's, which is pushing the new 64 element col. antenna, eighty-five feet in the air. I have also built an automatic transmitter control for meteor work, which also incorporates a tape machine, and here is the way it goes. At the prescribed time it turns on the transmitter, sends a prescribed message for 12 seconds, then stands by for 30 seconds to receive again. This relieves much of the nervous strain involved in meteor work, so all I have to do is to listen for those desired pings. The only sweat involved is in cutting the tape for the message." *Isn't that cheating? To cut down on the nervous strain?*

"I have rebuilt the 144 mc and the 432 mc converters completely, also incorporating complete shielding and bypassing of all power leads, and the complete shielding of the converters proper; (actually double shielding in this case.) This extra precaution eliminated all i-f feed-thru, even with the converters turned off."

"The rf line-up consists of a 416B rf amp, which operates grounded grid, followed by a 6CB6 rf amp, into a 6U8 mixer of which the triode section is operated as a cathode follower i-f output amplifier. The oscillator is a single 6U8 with the pentode section as the crystal osc. on 64.5 mc and the triode section operates as a doubler to 129 mc; giving the desired 15 mc i-f frequency. The noise figure of the converter is determined by the particular 416B installed, which varies quite a little from tube to tube. Several must be tried to get an ultimate noise figure. The tubes tested here of which ALL are used when we get them, have in about 50% of the cases, cathode to grid short, varying from 100 meg ohms down to a few thousand ohms. Any tube lower than .1 meg or so are pretty well shorted and probably can't be saved. I have good success in ridding the tubes of these shorts by two methods. First, tap the tube on the cathode shell with a handle of a small screwdriver, and try to shake loose the short. In most cases this will just about clear any low resistance leakage. However, if this fails, I try the HV burn-off technique. Take the anode lead off the TV set, ground the grid of the 416B to the TV chassis, and bring the HV lead near the DC cathode lead of the 416B and let a couple of arcs pass through the tube. If the short is still there, next time bring the HV lead a little closer so that a steady arc is present and hold this on for a second or so. *Well now, how about that! Remember fellas, Bob is giving this remedy, we haven't tried it ourselves.* Chances are that this will clear the short completely. If the leakage is above 50 megohms, and does not vary when the tube is tapped, you have an excellent tube. The above cure has been very effective in almost all of the cases, however one word of caution . . . The 416B grid is made up of very fine wire and if one of these grid wires are burned off, it probably will permanently ruin the tube, so—DON'T RUN HIGH CURRENT when trying to clear shorts. Insert a couple of 1 meg resistors in series with the HV lead if in doubt. You want a very thin blue spark

(red is o.k.), NOT a fat white spark. Arc it to the chassis of the TV set first to test the current. HOLD HV lead with a stick if you're chicken." *Now how did we get into that?*

"The noise figure on the 416B runs as low as .8 db on some tubes with the average around 1.5 to 2 db on 144 mc and as low as 2.5 to 3 db on 432 mc."

"On 432 mc the converter line-up is as follows: a 416B rf amp into a 6AM4 grounded grid stage, to the mixer which is a 6AN4. The oscillator section consists of a 6AK5 crystal oscillator, at 69.5 mc, into a 6J6 tripler to 208.5; then into the second half of the 6J6 to double to 417 mc to give an I.F. output of 15 mc at 432 mc input to the converter."

"On 432 mc the transmitter runs the limit of 50 watts to a 4X150A final driven by a 4X150A tripler from 144 mc. The antenna is a 24 foot long yagi consisting of 29 elements with 27 directors and a corner reflector. The coaxial line that feeds the antenna 80 feet in the air is 135 feet of RG35U with a loss of 3 db at 432, and .95 db at 144 mc. The same cable is also used for the 144 mc antenna through an antenna relay at the antennas. A pre amp is used on 432 at the antenna, with a noise figure of 3db, consisting of a 416B into a 6AM4. A separate coaxial line carries down the signal, as well as carrying up the 28 volts AC for the preamp power supply."

"Now that we are loaded for bear on 144 and 432, we would like to make some skeds." *Sounds like you've done a lot of work lately, Bob, and we surely hope it pays off with some skeds that work through.*

Rensselaer, Indiana Our old friend Bill Rose (W9KLR) also sends a bit of two meter information.

"Have worked thirty-five states on two meters during 1957 alone. Heard thirty-eight states. (Now have a total of 37 states worked and forty states heard on two meters since November 1956.) *WOWEE!* Got Colorado for #37. I now need Maine, (*W1OUN, W1DEO*) Delaware, (*W3ASD*), and W6 and W7. Other six call areas complete. How about you and the rest of the big-antenna gang getting up expeditions to Maine and Delaware for some of the big meteor shower dates? *And don't think we haven't been considering this!* Unfortunately I wasn't home last September when the aurora had Maine and Delaware signals in this section. I'm working on getting activity out in the states I need west of here, but no luck to the east. Guess I should be on 220 mc one of these days, then I can start all over on STATES!" *I'm all for that too, Bill. Nice going.*

Redwood City, California From Guy Black (6RLB), a few words of wisdom:

"Six meters is a popular band in the San Francisco Bay area. It's the usual gang, mostly technicians. The move to high power is general. I'm the cause of some of it. With a pair of 4-400's, and a 650 foot elevation, I overlook six towns and fifty to seventy-five six meter men. Half of their receivers jump off the table when I open up, especially the Gonsets. *This I can understand.* I've been on six meters since 1950, and don't have much interest in anything but DX. My score is lousy!" *Thanks for the news, Guy. We don't hear too much from the west coast except when the band is open. How about making it regular?*

Dallas, Texas Seldom-heard-on-six-meters-in-New-England Texas comes through via Randy (W5FEG):

"As the newly elected President of the "Six Meter Club of Dallas", I would like to remind you and the newcomers to six meters that the organization is still offering an Honorary Membership Certificate to all those good and true souls who can work ten of our members, and can remember to send the list of stations worked with the date and time, to our good Secretary, K5BDL, 6209 Menger Ave., Dallas 27, Texas."

"So far we have issued seven certificates and now have H.M.'s in Michigan, Ohio and Illinois. We want members in all forty-eight of the states if we can make it and

this spring would be a good time to try. There are now thirty-four of us, all active."

"I just had a short visit with XE1GE and the band is still open to the south, that's one reason for the poor typing. *You know I've had that happen too, when the column was due.* The XE's have been in for almost two hours and it's now 2200." *We're looking all the time Randy. That's a certificate that W1HOY sure would like to have.*

Albany, Georgia A last letter from this location via Ben (K4BLA) who is moving to San Diego, California.

"On Jan. 1, heard W4AZD working W4UUF from 0940 until 1012 and some back scatter from other Tennessee stations. Also worked W4CCA at 3030. Jan. 3, worked W9DSP at 0755, no other signals heard. Jan. 4, heard LA5YE at 0900 and some very weak signals. His signals were 5-9 plus. 0950, SM6BTT, also very fine signal. 1140, SM5BRT, also good signal. Jan. 5, 1240 heard W7JPA and W7RGS/7 but no contact."

"Heard and worked 4's (in other states) W5's, W6's, W7's, W0's and VE7's almost every day for the remainder of the month of January. Not all of these call areas every day, but some of them."

"January 31—Well today I leave and there will be no more reports from this QTH. The next one will be from sunny California, so you California six meter amateurs will be hearing the big BLA from South Georgia soon." *Thanks so very much Ben for the time and effort spent in preparing and sending these reports to us from Georgia.*

Roswell, New Mexico That much-needed state and Frank Greene (K5IQL) sez:

"Six meter band open into Nova Scotia at least fifteen days this month (January). Twice, skip never shortened this side of Sidney."

"Morning of 26th heard W1's for the first time. Heard W1HOY and W1NRF calling CQ New Mexico. Gave Helen a shout, but W1QCC/VE1 covered her up (*don't know as we'll ever talk to Russ again.*) with his 600 watts SSB! Better luck next time." *Sure hope so.*

"Would appreciate hearing from anyone who has proved, or disproved that the gamma match is reciprocal for VHF, that is, good for receiving as well as transmitting. We do not find it so and are going through a series of checks with folded-dipoles." *Nice to know a little about what's going on out your way Frank. Always nice to hear from New Mexico, one way or another.*

Santa Rosa, California News from Paul (6BAZ):

"Sure miss the east coast openings. Band seems kinda dead, after that FB month of January."

"February seems to be opening time to the west. *It is?* Let's see. K6RNQ worked ZL4GY about 1550 PST on Saturday, February 1st. Guess I was asleep." *Shame! Don't you know Paul that you just can't afford to sleep anymore? Not with six meters in its present condition.*

"On January 31, heard W1HOY calling KH6UK. *Didn't make it that day Paul.* About 1010 I heard KP4IF? on 50.066. February 1st—opening to KH6 and east coast. East coast working KH6 both phone and cw. *That was the day!* February 2nd—short KH6 opening. February 3rd—No KH6 but worked JA8AO at 1504 PST. Partial contact with a couple of other JA's (JA8BU) but not complete QSO open to JA until 1602 PST. February 4th—KH6 opening from 1130 to 1200. JA opening from 1515 to 1530. Worked JA1AOR and heard JA1AXE. If we're getting this stuff in the afternoon, why ain't we gettin' somethin' in the morning?" *Ask the sunspot Paul, not me.*

"KH6UK worked seventeen JA's one day and just about double that amount the next."

"When is someone going to make a receiver especially for VHF work? I mean a receiver with good dial spread and calibration. Something with enough extra image response etc., so that with a converter ahead of it, you won't hear the garbage from image frequency. (2 x 455 kc.) Also, one where, when, (*huh*) with the converter connected, you don't hear broadcast stations at 1500 kc.

[Continued on page 116]

sideband
sideband
sideband

SIDEBAND

by **BOB ADAMS, W3SW**
919 McCeney Road, Silver Springs, Md.

During the past month many SB stations have reached or passed the magical 100 countries worked on Two-Way SB. Harry, W2JXH as announced last month was the first to do it, closely followed by Cyril, VK3AEE. Other stations who have worked DXCC include DL4SV, ZS6KD, ZL3IA, ZL3PJ, G6LX, G3MY, with W4INL and W6UOU having 98 worked.

Twenty six "Worked 50" certificates were sent out this month and seven others have qualified for the "Worked 75". As previously stated, it is not necessary to forward the actual

cards showing two-way contacts on SB, but rather a list of the countries and calls which were worked and a certification of another amateur who verifies that he has examined the cards. This applies to the fifty and seventy-five awards. It will be necessary to forward the cards to qualify for the "Worked 100 Countries" certificate.

Ted Henry, W6UOU reported that his little 11 pound SSB "Argonaut" which has already operated in several new countries will soon go on an exciting ocean voyage with stop-overs at CR10, VK9, FU8 and VR4.

Mick, ZL3PJ who has worked 102 countries and received verifications for SB QSO's with all forty-eight States, asks that we remind every-one to plainly mark your QSLs to show two-way SB. This will be absolutely necessary when applying for SB awards.

Bob, W4INL who built his own 35 tube receiver is putting up a new 15 meter beam. All of his 99 countries were worked on twenty.

Charlie, F7AF now has 93 by working VQ3EO, VQ5EO and 4x4DK. He reports that QSL's are coming in nicely.

Martin, VE3MR who sent the exciter that put 4X4DK on SB, will handle all W and VE QSLs for 4X4DK. Martin will receive duplicate logs from Ami and will cross-check cards received for 4X4DK with the logs. VE3MR's QTH is P.O. Box 304, Station "F", Toronto 5, Ontario.

Paul, VQ4EO is now on his safari across Africa, and has been very active on SB. He has already operated from VQ3 and VQ5 and has been putting some very consistent signals into the USA as well as other parts of the world. We hope to have all the details of Paul's trip in a later column.

9G1BQ, John has been active on 14330 with his bare-foot 20A, but is building a new linear amplifier. He is expecting Joe, ex ZD4BF to join him in a few days. Joe's new call will

Home and Antenna of OQ5IE/OQ5GU.



be 9G1BF.

A new XYL is active on 20, 15 and 10 meters with a big signal from Stanleyville, Belgium Congo. She is Jane, OQ5IE, and her OM is Paul OQ5GU. Paul is ex ON4DB and went to the Congo five years ago. Paul and Jane have their own stations but use the same antenna, shown in the photo. Power on both rigs is fifty watts but they sound like kilowatts. Jane is anxious to meet other YL and XYL operators. Dorothy, K2MGE has enjoyed several nice contacts with Jane who speaks very good English as well as French etc.

Les, F7EM stopped in to see me last week and we had a nice long visit. He is in the US for a brief official visit.

Abe, KA2MA is leaving Japan this month and we will lose one of the most active Hams on SB. One could nearly always find KA2MA in the early morning hours, and Abe was always ready to carry on an interesting QSO. We will all miss you Abe, and we will be waiting to hear about your next assignment. He reports a thirteen country roundtable on February 12th starting at 1500Z and lasting two hours. All stations in the round-table heard each other Q4 or better. The following participated: HS1A, AP2BP, YA1AA, JA1ANG, JA1ACB, VQ4EX, 4X4JW, VS6AZ, 5A5TH, ZB1CZ, YU1AD, VU2RX, CN8MM and KA2MA.

Jack, K2JFW, qualified for a "Worked 50" award, worked 49 on fifteen and one on twenty. He reports that W2VZV, Bill, W2MG, Bill, and Ken W2MA are all active on SB in the Rochester area.

Mickey, W8YIN advises that GD3GMH on the Isle of Man who is well known for his large and colorful QSL card will soon have to stop sending QSL's. The Tourist Board which is similar to our Chamber of Commerce has in the past paid for half of the cost of the cards which Jeff uses. They have decided to discontinue this subsidy so Mickey suggests that every one who has received Jeff's card write a short note to the Tourist Board, 13 Victoria Street, Douglas, Isle of Man thanking them for an opportunity of viewing the colorful scene of the Harbor of Douglas. It might cause the Board to reconsider their decision, and ensure the continuation of QSLs from the only SB station on the Isle.

A new country will soon be heard on 10, 15 and 20. Commander Bob Thurman, K2LLK will take an SX101, HT-32 and HT-33 to Bikini Atoll and operate with the call KX6BY. He will be on the Island for several months and promises to QSL 100%. A five element triband High Gain beam will insure a good signal. Hallicrafters have furnished the equipment to Bob.

Have you noticed the large number of Collins KWM-1 portables on the air lately? They are sure helping to demonstrate that you don't have to run high power on SB to have enjoy-



Scott, KAØSC.

able contacts even when in motion as mobiles.

CE7AY said that he will soon have QSL cards, and will send one to everyone whom he has contacted. DL4SV, Jim reports that UA3CR, UC2AA and UB5FG are very active on 20 SB.

Phil, W2DME says that forty is very active and that I should report more about the lower frequency bands in the column. I would be glad to if I would receive some reports from the fellows who use these bands. Phil worked into Hawaii last night on forty.

Harry, W2JXH and Mort, W2KR expect the Side-Band Dinner in New York on March 25th, to be the biggest one in the eight year history of the event. A sell out is expected, which would mean that eight hundred were in attendance.

Sam, W3HN is working hard with his SB committee, to ensure that the Side-Band Dinner to be held during the National Convention in Washington this year will be a huge success. We will have more information on this event in next month's column.

Irv, W5HHT finally put up a beam for 10, 15 and 20 and has improved his signal considerably. Dick, W4GL is recovering from an illness and is feeling much better. This is the time of the year when all our well to do ham friends are heard signing calls from Florida.

We hear rumors that Peter, OZ3EA is planning a visit to the USA. Welcome OM.

Frank, W3CO flew several of the local SB boys to K5JRZ's plantation where a good time was had by all. The group included Dave, W4ABY and Roy, W4IFW.

Many of the Old Timers in this area got together at the meeting of the Quarter Century Wireless Association, and many of them were SB operators. It was wonderful to see how well George Sterling, W1AE/W3DF looked. George is active on SB from Maine, and as you all should know was Chief Engineer and Commissioner of the FCC for many years.

73, Bob, W3SW

by **GEORGE JACOBS, W3ASK**
607 Beacon Road, Silver Spring, Md.

PROPAGATION

During April and early May, static levels in the United States increase considerably as a result of the seasonal increase in thunderstorms during this period. The higher noise levels will be most noticeable on the 40, 80, and 160-meter bands.

The occurrence of short-skip openings as a result of *Sporadic-E* propagation begins to increase during April, with openings of this type most noticeable on the 6, 10, and 15-meter bands.

Several *auroral displays* are likely to occur during April, resulting in periods of near black-out conditions on the short wave bands, and unusual ionospheric short-skip openings on the VHF bands.

Two major *meteor showers* are expected to occur during the forecast period, *Lyrids* from the 19th through the 23rd of April, and *Aquarids*, between May 1st and 6th. Both showers should produce some meteor type openings on 10 and 6-meters.

Because of the seasonal *decrease* in peak daytime ionization during the spring and summer months, the record breaking 6-meter DX openings of this past winter are just about finished now until next fall. Some 6-meter openings may, however, occur to South America as a result of *trans-equatorial scatter*, and between the West Coast and Australasia.

DX-wise, excellent world-wide propagation conditions are expected to continue on 10 and 15-meters during the hours of daylight, with 15-meters remaining open around-the-clock to some areas of the world. During the evening hours, and until well past dawn, world-wide DX conditions are expected to be excellent on 20-meters. Higher static levels, and fewer hours of darkness, are expected to decrease the number of DX openings on 40, 80 and 160-meters until next fall.

Sunspot Cycle

The present sunspot cycle continues to break all existing records for intensity. The Zurich Observatory reports a monthly number of 203 for January, 1958. This results in a 12-month smoothed sunspot number (upon which the sunspot cycle is based) of 192 centered on

July, 1957. This month's forecast is based upon a predicted smoothed number of 174.

Explorer

At 10:48 PM, EST, on January 31st, a scientist in a blockhouse at Cape Canaveral, Florida, pushed a button—and America entered the space age. At that instant, in a burst of flame, a mighty Jupiter C four stage rocket lunged towards the blackened sky, carrying a thirty pound earth satellite in its nose. Named the *Explorer*, America's first satellite is circling the earth between 200 and 1700 miles high, in an orbit roughly reaching from the mid-latitudes of the northern hemisphere into the mid-latitudes of the southern hemisphere. Balancing the earth's gravitational force by its own centrifugal force, the Explorer completes an orbit in about 110 minutes.

The Explorer's instrumentation includes two transmitters and devices for measuring temperature within and without the satellite, cosmic rays, and the number of times meteorite particles collide with it. By telemetering techniques, the information is conveyed from outer space to earth bound scientists throughout the world as another of America's contribution to the International Geophysical Year.

The more powerful of the Explorer's two transmitters operates on a frequency of *108.03 megacycles*, and the other on *108 megacycles*. Before its batteries gave out on February 13th, the more powerful transmitter was tracked by a dozen scientific *minitrack* stations scattered around the world, and by many radio amateurs using special converters. Incidentally, the *Voice of America* will QSL all reports of reception of the Explorer's transmitters. Reports, containing time and date of reception, should be sent to:

Explorer
Voice of America
Washington, 25, D.C.

This data will also be used by the Naval Research Laboratory for checking the orbit of the satellite.

America's Explorer, the Russian Sputniks, and the bigger and further reaching satellites which are sure to follow, will no doubt unlock

Last minute forecast

Exceptionally good conditions are expected between April 17-24. The entire period between April 5-11 is expected to be subnormal to seriously disturbed, with the remainder of the month seasonably normal.

**In a burst of flame, America's first earth satellite,
Explorer, is launched towards outer space by a
mighty Jupiter-C four stage rocket.**

(Official Dept. of Defense Photo)



many secrets of the ionosphere, and the entire world around us.

Red Aurora

Most of the United States was treated to one of nature's most beautiful, and breathtaking, phenomenon during the evening of February 10th and the early morning of February 11th, when a *red aurora* lit the northern sky with a fiery glow. While auroral displays have occurred rather often during the past two years, the occurrence of a red aurora is extremely rare. The last one witnessed by this writer was over Iceland from a B-17 during 1945.

The display was reported from such scattered points as Boston, New York, Des Moines, Albuquerque, Los Angeles, and Havana, Cuba. At Silver Spring, Md. the glowing sky extended

from a brilliant white arc on the horizon, to overhead where weird red draperies were shimmering, flecked with shafts of yellowish-white light.

Co-incident with the auroral display, widespread 10 and 6-meter short-skip openings were reported from almost all areas of the country.

Nature, however, took a toll for this beautiful show. The magnetic storm which began with the display, disrupted the ionosphere, and caused a severe shortwave blackout on February 11th and 12th.

Auroral displays are expected to continue to occur rather frequently during the next year or two, co-incident with the passing of the peak of the present sunspot cycle.

73, George, W3ASK

ALL TIMES IN E. S. T.					ALL TIMES IN P. S. T.																																																													
EASTERN USA TO: *6/10 Meters					WESTERN USA TO: *6/10 Meters																																																													
	15 Meters	20 Meters	40/80** Meters		15 Meters	20 Meters	40/80** Meters		15 Meters	20 Meters	40/80** Meters																																																							
Western Europe	7 A - 9 A (2) 9 A - 12 N (3) 12 N - 3 P (4) 3 P - 6 P (2)	5 A - 2 P (3) 2 P - 6 P (4) 6 P - 9 P (3) 9 P - 5 A (2)	4 A - 8 A (2) 8 A - 3 P (1) 3 P - 5 P (2) 5 P - 11 P (4) 11 P - 4 A (3)	7 P - 11 P (3) 11 P - 1 A (2) 10 P - 12 M (2)**	South America	11 A - 6 P (1)* 5 A - 2 P (3) 2 P - 6 P (4) 6 P - 10 P (3) 10 P - 12 M (2)	5 A - 9 A (3) 9 A - 4 P (2) 4 P - 6 P (3) 6 P - 11 P (4) 11 P - 2 A (3) 2 A - 5 A (2)	8 A - 2 P (1) 2 P - 5 P (2) 5 P - 1 A (4) 1 A - 5 A (2)	7 P - 12 M (2) 12 M - 4 A (3) 4 A - 7 A (2) 7 A - 11 P (3) 11 P - 2 A (3) 2 A - 5 A (2)	Central & South Asia	8 A - 11 A (2) 11 A - 3 P (1) 3 P - 7 P (2)	7 A - 9 A (2) 9 A - 2 P (1) 2 P - 9 P (3) 9 P - 11 P (1)	8 P - 10 P (1) 10 P - 12 M (2) 12 M - 4 A (3) 4 A - 7 A (2) 7 A - 11 P (3) 11 P - 2 A (3) 2 A - 5 A (2)	Antarctica	11 A - 2 P (1) 2 P - 6 P (2) 6 P - 9 P (1)	8 A - 2 P (1) 2 P - 6 P (2) 6 P - 10 P (3) 10 P - 2 A (2)	8 A - 4 P (1) 4 P - 7 P (2) 7 P - 2 A (3) 2 A - 8 A (2)	11 P - 6 A (2) 12 M - 5 A (1)**																																																
Central Europe & European USSR	7 A - 10 A (2) 10 A - 3 P (3) 3 P - 5 P (2)	5 A - 7 A (2) 7 A - 11 A (1) 11 A - 1 P (2) 1 P - 5 P (3) 5 P - 9 P (2)	6 A - 2 P (1) 2 P - 5 P (2) 5 P - 9 P (4) 9 P - 12 M (3) 12 M - 6 A (2)	7 P - 12 M (2) 8 P - 11 P (1)**	North & Central Africa	7 A - 9 A (2) 9 A - 11 A (3) 11 A - 2 P (4) 2 P - 5 P (2)	4 A - 12 N (2) 12 N - 3 P (3) 3 P - 6 P (4) 6 P - 11 P (2) 11 P - 4 A (1)	6 A - 3 P (1) 3 P - 5 P (2) 5 P - 11 P (4) 11 P - 2 A (3) 2 A - 5 A (2)	7 P - 12 M (2) 8 P 11 P (1)**	Europe & North Africa	8 A - 10 A (2) 10 A - 1 P (3) 1 P - 3 P (2)	6 A - 9 A (1) 9 A - 11 A (2) 11 A - 2 P (3) 2 P - 10 P (2)	11 A - 2 P (2) 2 P - 9 P (3) 9 P - 3 A (2) 3 A - 11 A (1)	7 P - 10 P (1)	Guam & Pacific Islands	7 A - 10 A (2) 10 A - 2 P (3) 2 P - 6 P (4) 6 P - 9 P (2)	7 A - 11 A (1) 11 A - 2 P (2) 2 P - 4 P (3) 4 P - 8 P (4) 8 P - 1 A (2)	1 P - 3 P (1) 3 P - 5 P (2) 5 P - 9 P (4) 9 P - 12 M (3) 12 M - 8 A (1)	6 P - 10 P (1)	South America	12 N - 6 P (1)* 5 A - 3 P (3) 3 P - 6 P (4) 6 P - 10 P (3) 10 P - 1 A (2)	9 A - 2 P (2) 2 P - 5 P (3) 5 P - 1 A (4) 1 A - 5 A (2)	7 A - 3 P (1) 3 P - 5 P (2) 5 P - 1 A (4) 1 A - 5 A (2)	7 P - 12 M (2) 12 M - 4 A (3) 4 A - 7 A (2) 7 A - 11 P (3) 11 P - 2 A (3) 2 A - 5 A (2)	Central & South Asia	9 A - 12 N (1) 12 N - 7 P (2)	7 A - 10 A (2) 10 A - 4 P (1) 4 P - 9 P (2) 9 P - 11 P (1)	5 P - 7 P (1) 7 P - 12 M (2) 12 M - 6 A (1) 6 A - 8 A (2) 8 A - 10 A (1)	8 P - 10 P (1)	Guam & Pacific Islands	8 A - 10 A (2) 10 A - 2 P (3) 2 P - 6 P (4) 6 P - 9 P (2)	7 A - 12 N (3) 12 N - 7 P (1) 7 P - 12 M (3) 12 M - 7 A (2)	8 P - 2 A (2) 2 A - 8 A (3) 8 A - 11 A (2)	1 A - 5 A (2) 3 A - 5 A (1)**	Australasia	9 A - 11 A (2) 11 A - 4 P (1) 4 P - 6 P (2) 6 P - 8 P (3) 8 P - 10 P (2)	7 A - 9 A (2) 9 A - 4 P (1) 4 P - 9 P (2) 9 P - 12 M (3) 12 M - 7 A (1)	8 A - 10 A (2) 10 A - 12 M (1) 12 M - 4 A (3) 4 A - 8 A (4)	2 A - 5 A (2) 4 A - 6 A (1)**	10 P - 4 A (1)	Australasia	2 P - 6 P (1)* 7 A - 3 P (2) 3 P - 6 P (3) 6 P - 10 P (4) 10 P - 2 A (2)	7 A - 12 N (3) 12 N - 6 P (1) 6 P - 1 A (4) 1 A - 7 A (2)	5 A - 8 A (3) 8 A - 10 A (2) 10 A - 7 P (1) 7 P - 9 P (2) 9 P - 2 A (3) 2 A - 5 A (4)	11 P - 2 A (1) 2 A - 6 A (2) 6 A - 8 A (3) 8 A - 6 A (1)**	Japan, Okinawa, & Far East	10 A - 12 N (2) 12 N - 7 P (4) 7 P - 10 P (2)	8 A - 12 N (2) 12 N - 4 P (3) 4 P - 7 P (4) 7 P - 12 M (3) 12 M - 4 A (2) 4 A - 8 A (1)	8 P - 1 A (2) 1 A - 7 A (4) 7 A - 10 A (3) 10 A - 1 P (2) 1 P - 8 P (1)	1 A - 3 A (1) 3 A - 6 A (2) 6 A - 8 A (3) 8 A - 6 A (1)**	NIL	Philippine Islands & East Indies	8 A - 11 A (2) 11 A - 2 P (1) 2 P - 4 P (3) 4 P - 11 P (2)	7 A - 12 N (3) 12 N - 3 P (2) 3 P - 10 P (1) 10 P - 7 A (2)	1 A - 4 A (1) 4 A - 6 A (2) 6 A - 8 A (3) 8 A - 12 N (2)	3 A - 6 A (1)	Malaya & South East Asia	8 A - 11 A (3) 11 A - 2 P (1) 2 P - 6 P (3) 6 P - 10 P (1)	7 A - 12 N (3) 12 N - 3 P (2) 3 P - 10 P (1) 10 P - 3 A (2)	12 M - 4 A (1) 4 A - 8 A (2) 8 A - 11 A (1)	4 A - 7 A (1)	Hong Kong, Macao, & Formosa	8 A - 12 N (1) 12 N - 8 P (3) 8 P - 10 P (1)	7 A - 12 N (3) 12 N - 8 P (2) 8 P - 12 M (3) 12 M - 3 A (2) 3 A - 7 A (1)	9 P - 2 A (2) 2 A - 8 A (3) 8 A - 12 N (2) 12 N - 9 P (1)	2 A - 4 A (1) 4 A - 6 A (2) 6 A - 5 A (1)**
ALL TIMES IN C. S. T.					ALL TIMES IN P. S. T.																																																													
CENTRAL USA TO: *6/10 Meters					WESTERN USA TO: *6/10 Meters																																																													
	15 Meters	20 Meters	40/80** Meters		15 Meters	20 Meters	40/80** Meters		15 Meters	20 Meters	40/80** Meters																																																							
Western & Central Europe	7 A - 10 A (2) 10 A - 2 P (3) 2 P - 4 P (2)	4 A - 11 A (2) 11 A - 3 P (3) 3 P - 8 P (2) 8 P - 4 A (1)	3 A - 7 A (2) 7 A - 2 P (1) 2 P - 4 P (2) 4 P - 9 P (4) 9 P - 3 A (3)	7 P - 12 M (2) 8 P - 11 P (1)**	Southern Europe & North Africa	9 A - 11 A (3) 11 A - 1 P (4) 1 P - 5 P (2)	4 A - 11 A (2) 11 A - 1 P (3) 1 P - 4 P (4) 4 P - 7 P (3) 7 P - 12 M (2) 12 M - 4 A (1)	4 A - 7 A (2) 7 A - 3 P (1) 3 P - 5 P (2) 5 P - 10 P (4) 10 P - 4 A (3)	7 P - 12 M (2) 8 P - 11 P (1)**	Central & South Africa	5 A - 9 A (1) 9 A - 12 N (2) 12 N - 3 P (4) 3 P - 6 P (3) 6 P - 8 P (1)	10 A - 1 P (1) 1 P - 3 P (2) 3 P - 7 P (4) 7 P - 1 A (2) 1 A - 5 A (2)	8 A - 3 P (1) 3 P - 5 P (2) 5 P - 11 P (3) 11 P - 2 A (1)	8 P - 10 P (1)																																																				

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN

(1) 1 - 4 days (2) 5 - 11 days (3) 12 - 18 days (4) 19 - 26 days (5) over 26 days

* Indicates time of possible six-meter openings
** Indicates time of possible eighty-meter openings

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees, and are centered on the Eastern, Central and Western areas of the USA. The forecasts are valid through May 15, 1958, and are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

by **BYRON H. KRETZMAN, W2JTP**
 16 Ridge Drive, High Hills, Huntington Station, N. Y.

RTTY

Amateur Radioteletype Channels

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.
 National, AFSK 27.2, 147.96, 144.138 mc.

Area Nets:

California	147.85	Mc.	AFSK on AM
Chicago, Ill.	147.70	Mc.	AFSK on FM
Detroit, Mich.	147.30	Mc.	AFSK on FM
Washington, D.C.	147.96	Mc.	AFSK on AM
	147.495	Mc.	AFSK on AM
New York City	147.96	Mc.	AFSK on AM
Livingston, N.J.	146.30	Mc.	AFSK on AM
Buffalo/Niagara	147.50	Mc.	AFK on AM
Boston, Mass.	147.96	Mc.	AFSK on AM
Seattle, Wash.	147.00	Mc.	AFSK on AM
Spokane, Wash.	147.15	Mc.	AFSK on AM
Minneapolis, Minn.	144.90	Mc.	AFSK on AM

WAC-RTTY for the first time has been almost accomplished, as reported in last month's RTTY column. What we need is at least one amateur station in Europe on RTTY. Who will it be? As we commented in the October, 1957, issue of *CQ*, RTTY isn't easy for the European amateur; however, European radio amateurs long have had a reputation of ingenuity and perseverance when it comes to building their gear, so we feel that perhaps we can help a bit by passing along some of the basic differences in teleprinter codes used over there and here.

One of the most lucid discussions of this subject that we have ever read was written by Fred W. Smith of the *Western Union Telegraph Company* (New York) and appeared in the October 1957 issue of *Wire and Radio Communications* (\$1.50 per year, United States, its possessions, and Canada. Elsewhere \$3.00. QTH: 25 Beaver Street, New York 4, N. Y.) We have the very kind permission of the Editor to reprint this valuable information

in *CQ*, so here it is—with a table (Fig. 1) for ready reference:

Speeds, Pulse Lengths of Five-Unit Start-Stop Printing Telegraph Codes

“... When the five-unit Baudot code was originally adapted for use with start-stop telegraph apparatus by adding a start pulse and a stop, or rest pulse, the start stop pulses were made the same length as the code pulses, resulting in a code having seven pulses of equal length. The term seven-unit code has been generally adopted to describe such a code. A more accurate but less commonly used term is a five-unit code with a seven-unit pattern.

“It was found that the operating margin of some of the early printing telegraph apparatus could be improved by making the stop pulse longer than the start and code pulses. Consequently, the rest pulse length was increased to 1.42 times the length of a code pulse.

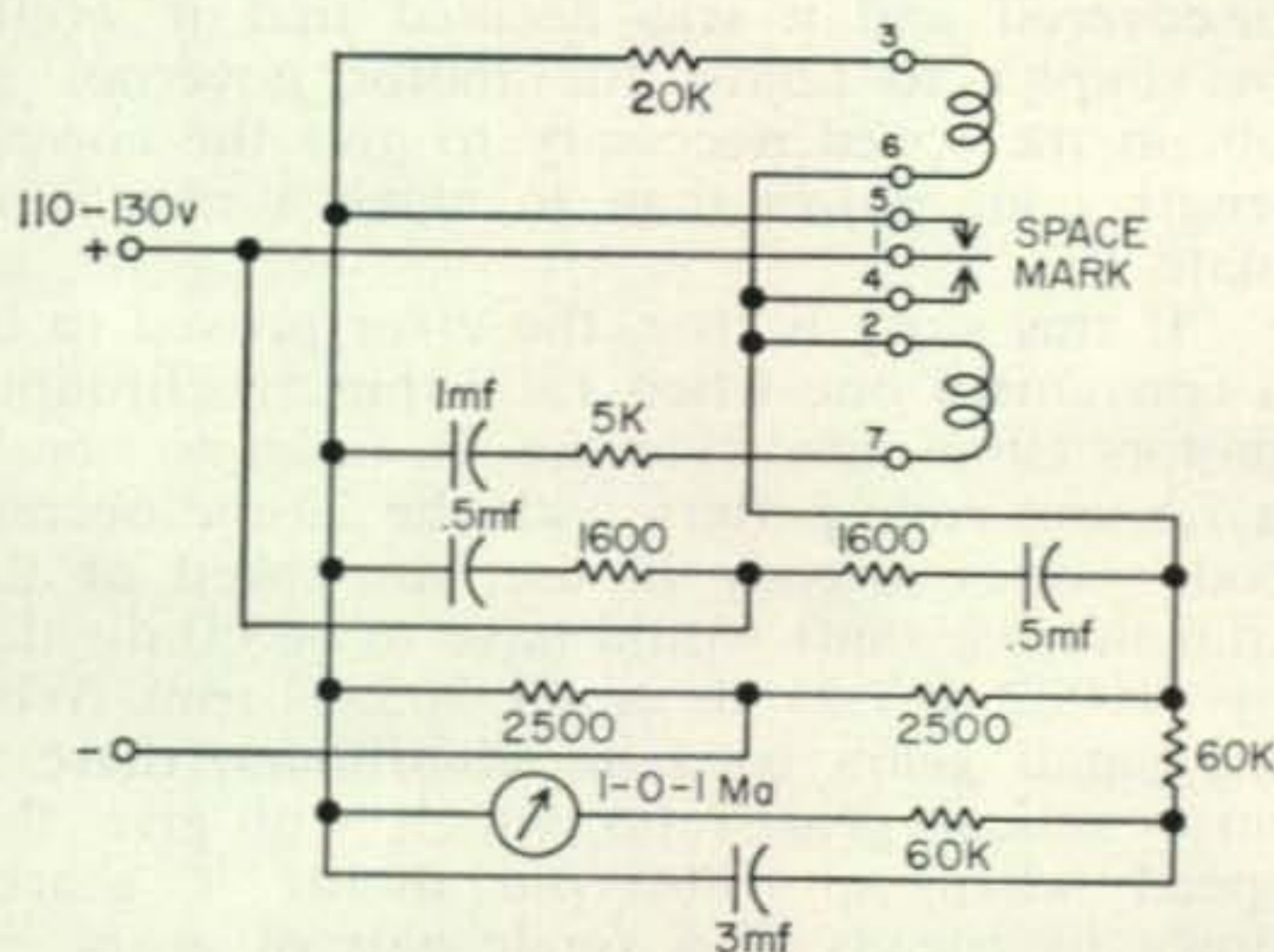


Fig. 2 — Polar Relay Test Set Schematic

CODE PATTERN (TOTAL NUMBER OF PULSES PER CHARACTER)	NOMINAL SPEEDS AND PULSE LENGTHS						MILLI- SEC'DS PER CHAR- ACTER	WHERE USED
	TRANSMITTING SPEEDS			PULSE LENGTHS IN MILLISECONDS		REC'V'G SHAFT SPEED IN RPM		
	OPER'NS PER MINUTE	AVERAGE WORDS PER MINUTE	BAUDS	START AND FIVE CODE PULSES	REST PULSE			
7.42-Unit	368*	61.33	45.45	22	31	420	163	Bell System—U.S.
7-Unit	390*	65	45.45	22	22	420	154	Western Union—U.S.
7.5-Unit	400**	66.67	50	20	30	461.5	150	C.C.I.T. Standard—Europe
7.42-Unit	404**	67.33	50	20	28.4	461.7	148.4	U.S. Military, for Inter- operation with Allies
7-Unit	428.6**	71.43	50	20	20	461.5	140	Former C.C.I.T. Standard —Europe
7.42-Unit	460	76.67	56.88	17.57	25	525.7	130.43	U.S.—All Commerical and Military Users
7.42-Unit	600***	100	74.2	13.47	19.18	685	100	U.S.—All Users
7-Unit	636***	106	74.2	13.47	13.47	685	94.3	U.S. Military—Limited Use

*These two codes are compatible

**These three codes are compatible

***These two codes are compatible

Fig. 1 — Five-Unit Start-Stop Printing Telegraph Codes.

"The question is often raised as to how an odd figure such as 1.42 came to be chosen. One plausible-sounding story is that the engineer who designed the first faceplate distributor intended to make a 7.5-unit faceplate. He calculated the angular length of the code and start segments, then turned over the job of laying out the faceplate to a draftsman, with instructions to provide slots between adjacent segments. The draftsman laid out the faceplate as instructed without shortening the angular length of the code and start segments to compensate for the slots. The rest segment was then shortened to compensate for all the slots, and it turned out to be 1.42 times the length of the other six segments. The first models of the faceplate were made before the error was discovered and it was decided that it would be simpler to adjust the motor governor to obtain the speed necessary to give the correct length code pulses than to make a new faceplate.

"If this story is true, the error proved to be a convenient one when 1800-rpm synchronous motors came into wide use. In order to obtain a 7.5-unit code pattern with the 22-millisecond code pulses already in use, the speed of the transmitting shaft would have to be 60 divided by (0.022 x 7.5) to equal 363.63 rpm. With the small gears used in teleprinters, there is no practical gear ratio which will give this speed when an 1800-rpm motor is geared down by means of a single pair of gears.

"In every code shown in the accompanying

table the start and five code pulses are all equal in length, but the rest pulse length may be 1.0, 1.42, or 1.5 times the code pulse length. All speeds and pulse lengths given in the table are nominal. The actual lengths may vary somewhat due to necessary compromises in gear ratios and to rounding off of calculated angular dimensions.

"The average number of words per minute shown in the third column is obtained by dividing the speed in operations per minute by six, on the assumption that an average word requires six operations of the teleprinter, including the space between words and any other nonprinting function of the teleprinter such as letters shift, figures shift, carriage return, and line feed.

"The fourth column gives the speed in bauds for each code. A baud is the reciprocal of the length in seconds of one code pulse; in other words, a baud is the maximum rate of transmission in pulses per second. Thus, for a code with 22-ms pulses the speed in bauds is 1 divided by 0.022 to equal 45.45. In general, two codes are compatible if their speeds in bauds are equal and the receiving shafts of the two teleprinters operate at the same speeds.

"The abbreviation of C.C.I.T. given in the last column stands for the Consultative Committee on International Telegraph, an organization devoted to development of recommended international standards for telegraphy. The standards recommended by this com-

mittee have been adopted in most European countries.

"Until very recently the use of a 7-unit code at speeds higher than 390 opm had been considered inadvisable because of the reduced margin of operation expected with a short rest pulse. The selector armature of a teleprinter must be in the marking position at the time the receiving shaft completes a revolution so that the receiving shaft will stop briefly at the end of each revolution and thus remain in start-stop synchronism with the transmitting apparatus.

"On a teleprinter geared for 600 opm, the receiving shaft rotates at 685 rpm and the time required for one revolution of the shaft is 60 divided by 685 or 0.0876 seconds. The length of one pulse at 600 opm is 13.47 ms and the length of a 7-unit signal train compatible with this code is 13.47×7 or 94.29 ms. Thus, the take-up time of the receiving shaft clutch must not exceed 94.29 minus 87.6 or 6.69 ms. If the take-up time does exceed this value, the shaft will not complete a revolution before the end of the rest pulse and the receiver will be out of synchronism during the following signal train.

"When a requirement for a 7-unit code with 13.47 -ms pulses developed, tests were made on Model 28 teleprinters and printer-perforators to determine the practicability of such a code. It was found that the receiving apparatus performed satisfactorily at this speed with ample margin of operation. The code was then adopted for this special requirement. This code is the last one listed in the accompanying table.

"It will be noted from the table that the speeds frequently referred to as 60-word and 75-word are actually 61.33 and 76.67 wpm, respectively. Also, a 7.42-unit code pattern is frequently referred to as a seven-and-a-half unit code. Use of such 'verbal shorthand' in referring to the speeds and code patterns occasionally leads to misunderstanding and should be avoided. It is preferable, for example, to designate the speed in operations per minute.

"Start-stop teleprinter codes which contain five intelligence pulses are referred to as five-level, five-channel, or five-unit codes. All three of these terms mean exactly the same thing. Intelligence pulses are also frequently referred to as bits and the baud speed as bits per second."

Polar Relay Test Set

For those belonging to the school that believes that the polar relay is an indispensable part of a radioteletype converter, it is highly desirable to have some means of determining whether or not the thing is properly adjusted, particularly as to balance. Fairly detailed instructions in the hand adjustments can be found on pages 30 and 31 of the *RTTY Handbook*, but most of us would prefer some means

KR6AK, Okinawa, WOJG Forrest D. Castle (Cas),
22nd AAA Bn, working RTTY from his home on
Kishaba Terrace U.S. Army Photograph



of further checking our manual dexterity.

Fig. 2 is the schematic diagram of a polar relay test circuit borrowed from the book on the surplus CF-6 carrier telegraph terminal equipment. This simple test set, powered by the 110-130 volt usually-handy teleprinter d-c loop supply, can be used to accurately balance a polar relay such as the WE 215A or the 255A. Only the balance can be checked. You will still have to depend upon your manual dexterity for the sensitivity part.

The idea is very simple. The circuit merely causes the armature of the relay to vibrate roughly about 22-cps, while the zero-center meter, damped by the 60,000 ohm resistor and the 3.0 ufd capacitor, measures the ratio of dwell on the *mark* and *space* contacts. The meter is the surplus IS-80 meter, found either by itself or in a surplus "bias" measuring set. The basic movement is 1-0-1 ma.

Toroids

"Where on earth can I get those 88-mhy loading-coil toroids?" The letters pour in, all asking this question, everytime *CQ* or *RTTY* prints a circuit using them. Here, in the east, it is particularly unusual to find even an odd

[Continued on page 114]

KR6USA, Okinawa, M/Sgt Bill R. Coppock, NCOIC
of the MARS Radio Station working a Stateside
net. U.S. Army Photograph





transistors

by **DONALD L. STONER, W6TNS**

P.O. Box 137, Ontario, Calif.

The Army/Caltech "Explorer" satellite is a good illustration of what can be accomplished with low power transmitters. As W6EWB has pointed out to me the "Explorer" should hold the Transistor transmitter contest record (Feb. 58 CQ). Assuming an apogee of 2,000 miles, a frequency of 108 mc., and a power of 10 mw., it gives "Explorer" 21,600 points in the contest. If that "high flying hamshack" has a ham license the whole contest is "loused up"!

The February issue also included the W6TNS "pocket-talkie." As many of you discovered the parts list was in-advertently omitted. I have included the parts list near the end of the column, and also possibly in the "Oops-we goofed" section. This same circuit may be used on six meters by replacing L1 with a tunable coil that will resonate on six. The rf choke would be modified to be self resonant near 50 mc. The SB-100 will not perform reliably on 50 mc., so it should be replaced with an RCA 2N384 (see new semiconductor section for price reduction) or a Philco SB-103. Also, I was just kidding with you fellows. The SB-100 doesn't draw 30 amps, honest! I should have read 30 microamperes, of course.

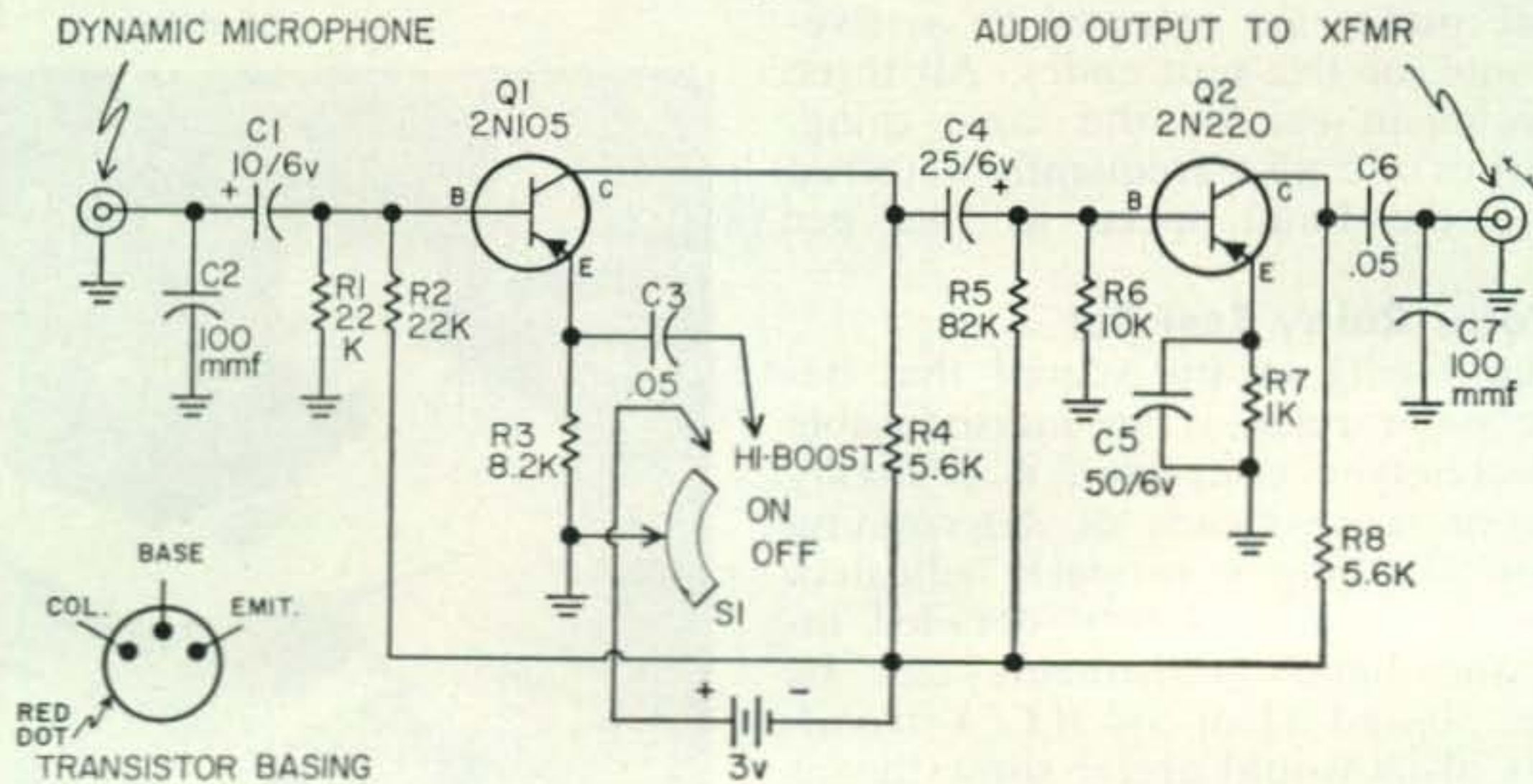
Paul A. Lux W6CZA, 1612- B Walnut St., Berkeley 9, Calif. sent in some data on voltage controlled variable capacity diodes that he had been experimenting with. He included a circuit for remote tuning of a vfo, which I am reproducing here. Although Paul used a 200 ma silicon diode (1N336) in his circuit, the Pacific Semiconductors "Varicap diode is a natural for this application (see new semiconductors section).

The DX Mike Pre-Amp.

The construction project this month is a real "bomb". Figuratively speaking, of course. It is a preamplifier for low level microphones. It was designed so that the response can be peaked for "crisp" speech. When used with ham rigs and PA systems it has the ability to cut through extremely high noise levels. I have used the device on marginal dx circuits when the "high boost" allowed and otherwise impossible contact.

The pre-amp may be used with any of the lower output microphones. The transistors that were used in this circuit are extremely high quality. The level of noise generated by the transistors is many db below the speech

Fig. 1



level. The experimenter type of inexpensive transistors have proved to be extremely noisy in this application.

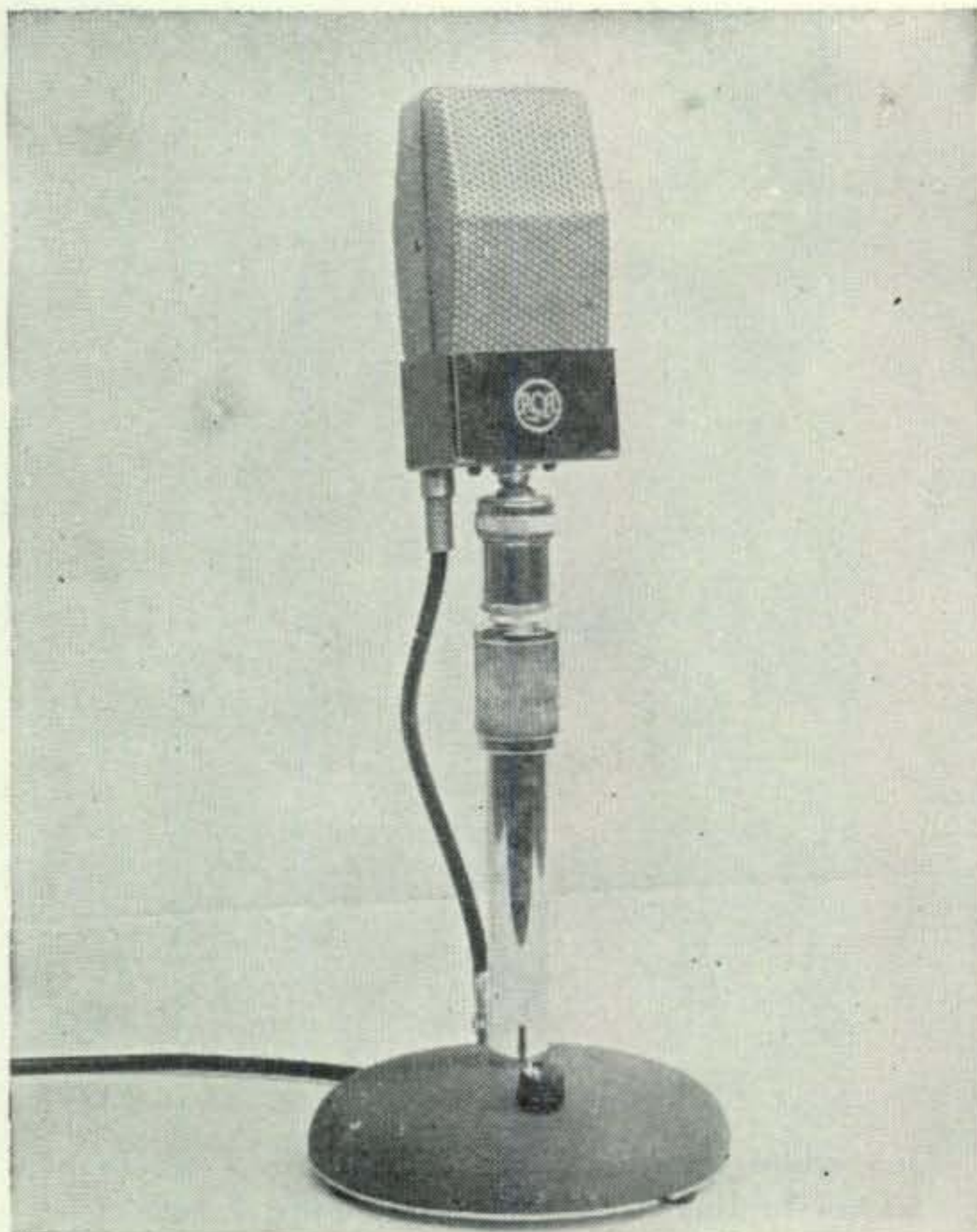
Fig. 1 is the schematic diagram for the pre-amp. It consists of two resistance coupled common emitter amplifiers. Audio is applied to the base of the first amplifier (RCA 2N105) and appears greatly amplified across the collector resistor (R4). Capacitor C4 couples the audio voltage to the base of the second stage, where it is again amplified. The output appears across R8 and capacitor C6 couples the signal to the speech input on your modulator. Resistors R1 and R2 provide base bias for the first stage and R5 and R6 bias the second stage. Resistors are inserted in each emitter lead (R3 and R7) for DC stabilization. Two disc ceramic capacitors were connected across the input and output (C1 and C7). Because of the diode action of transistors they have a tendency to rectify any stray rf that might be floating around the shack. These two capacitors bypass any rf that might be picked up on the mike or output lead.

The high frequency boost is accomplished in the first stage. In the flat or "hi-fi" position resistor R3 is un-bypassed. The audio across this resistor will act as a degenerative feedback voltage. This reduces the stage gain for all audio frequencies. However, when switch S1 is rotated to the clockwise position the .05 mf capacitor is connected in parallel with R3. The capacitor by-passes the higher frequencies, leaving the low frequency degeneration. This circuit produces a boost of approximately 10 db at 10 kc.

The pre-amp is used at this station in conjunction with an RCA Ribbon Velocity mike, type 74B (MI-4036). The circuitry was built into the base of an *Atlas DS-7* mike stand and the casting was drilled to accept the switch shank ($\frac{3}{8}$ "). The layout does not seem to be critical. If more convenient, the pre-amp could be built in an LMB or similar "chassis box". Two "penlite" cells provide the voltage for operating the transistors. The author has forgotten to turn the mike off on many occasions and the batteries are still going strong. Total drain is 1.6 ma! One other construction note occurs to me. Be extremely careful in soldering the leads from the transistors. Excessive heat from the iron will ruin the transistor junctions.

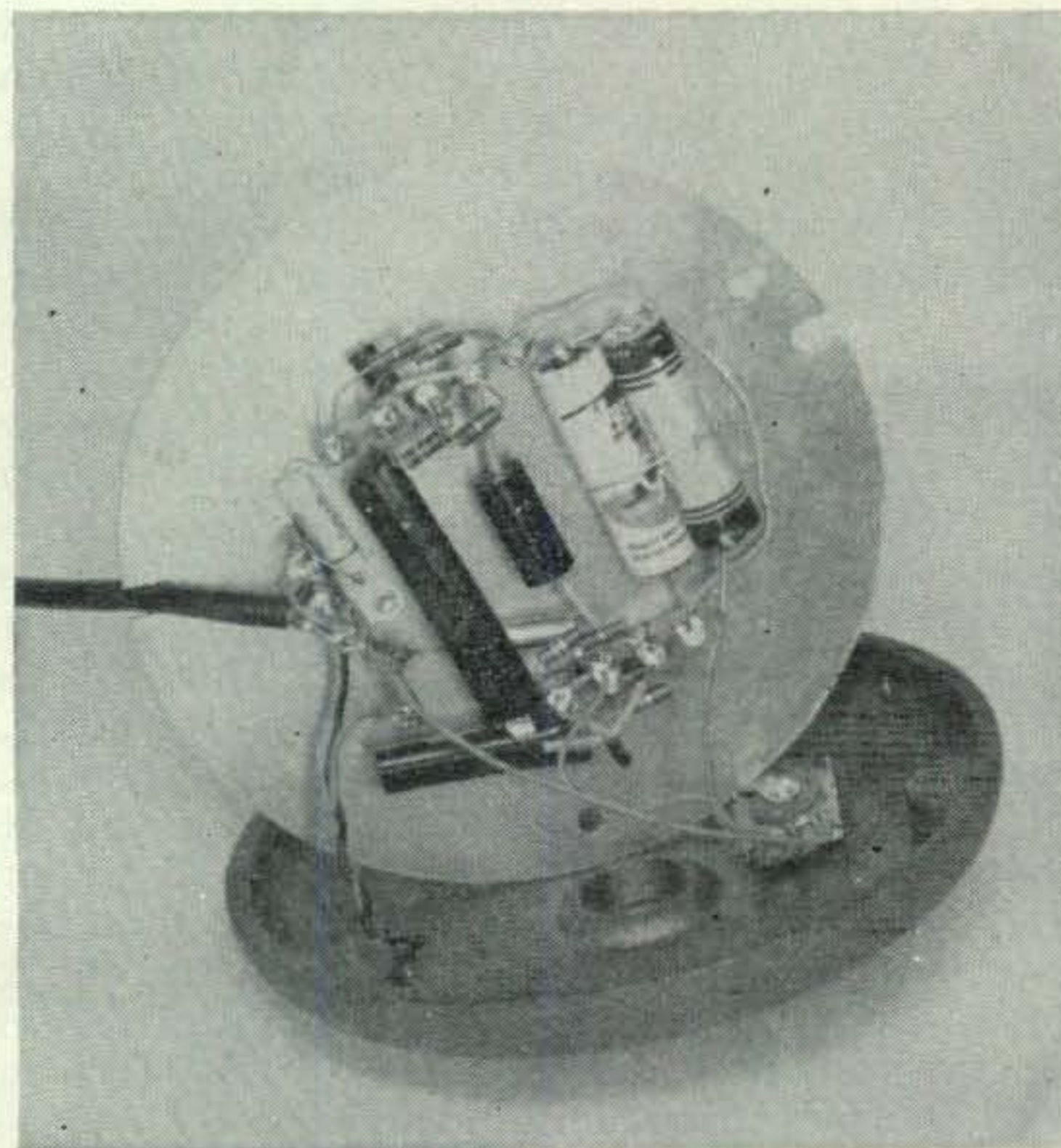
RCA is giving away a booklet titled *RCA Drift Transistors*. It describes the theory of how the drift transistor works and includes specifications on the complete drift series. Write directly to RCA, Semiconductor Division, Somerville, New Jersey.

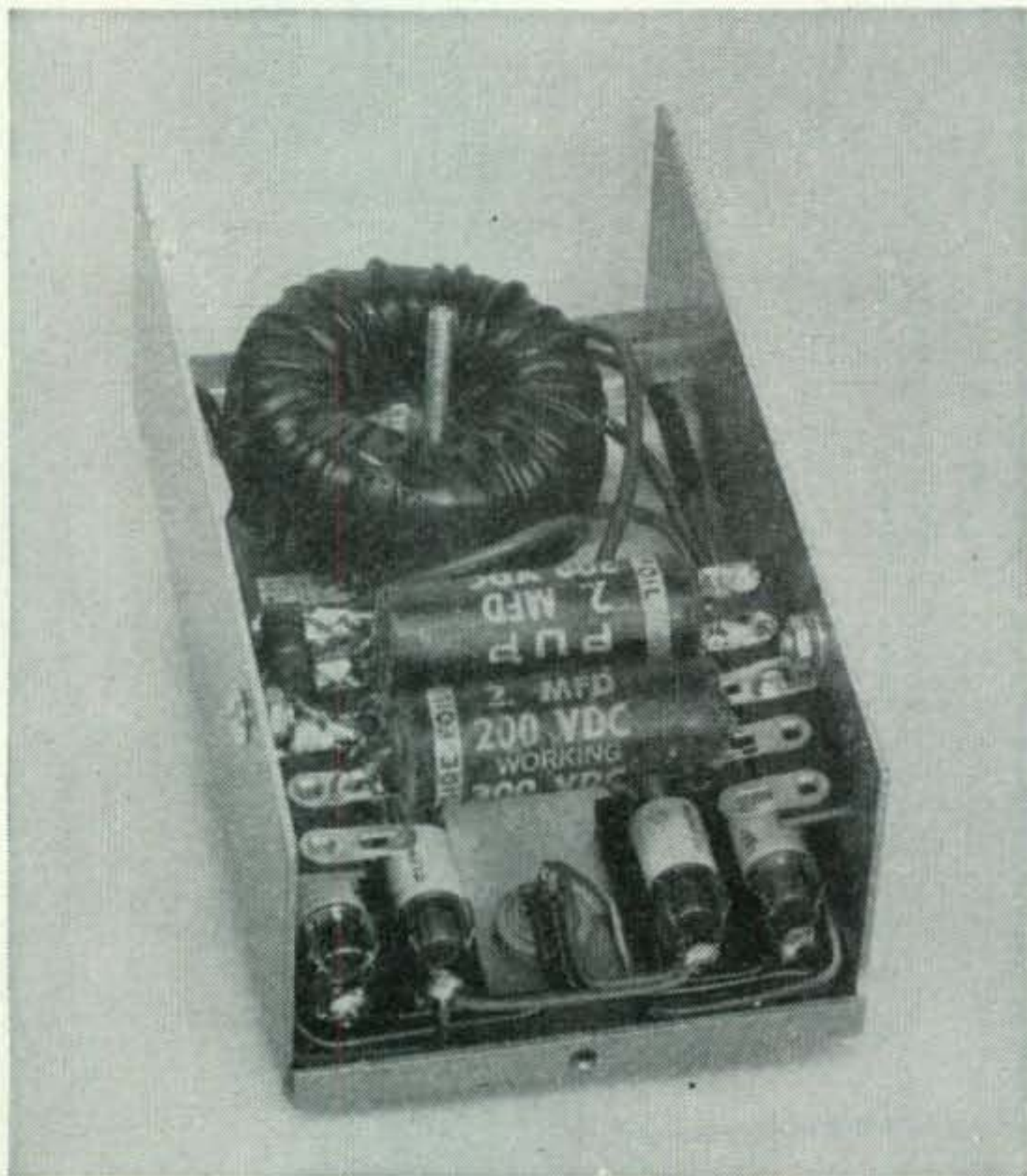
For those of you with something more than a passing interest in transistors, I would like to recommend *Semiconductor Products*. This is a brand new publication devoted to the various breeds of diodes, transistors, and other mysterious solid state devices. It is engineering



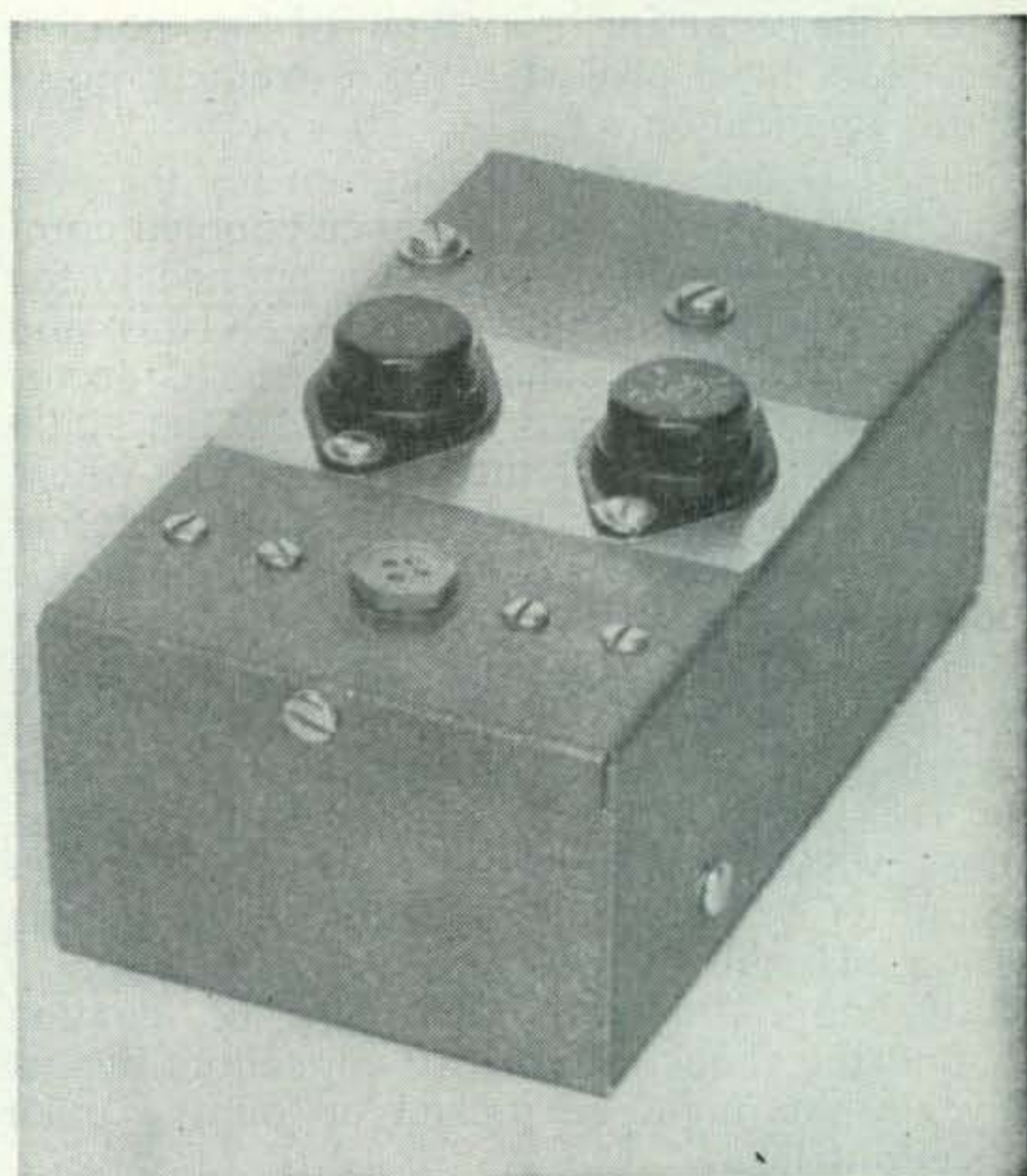
The two stage transistor is mounted in the case base of an Atlas DS-7 mike stand. The switch in the foreground is used to turn the amplifier on and off. An extra position inserts a high boost in the response.

The transistors are soldered directly to Cinch Jones Tie points. The black objects are the electrolytic coupling capacitors with large plastic tubing covers.





The white cartridges in the foreground are four Sarkes Tarzian M-500 silicon rectifiers. A two inch square piece of micarta was used to hold the toroid secure. It was removed for the photograph.



The transistorized 300 volt, 100 ma. power supply that was described last month. Somehow the photographs forgot to get in the envelope along with the manuscript.

level material and as such contains a wealth of valuable information. It is published by Cowan Publishing Company, 300 W. 43 St., New York 36, N. Y.

A two-penny postal card to Lafayette Radio, 100 Sixth Avenue, New York 13, N. Y. brought a free copy of Transistor Catalog T4-56. *This catalog* is novel in that it contains many circuits, complete with part values, for such things as transistor code practice oscillators, receivers, amplifiers, conelrad monitors, commercial killers, signal tracers, plus a very complete listing of current transistors and components! All this for two cents! When writing, don't forget to ask for their regular catalog #305. It's free too! Mention CQ.

If you are interested in improving your knowledge of transistors, you might be interested in doing what I did. I enrolled in the CBS-Hytron Transistor Home Study Course. This course was prepared for CBS-Hytron by Mr. A. C. W. Saunders, a recognized expert in the field of education. The material is easily digested and the theory flows along in a logical sequence. Each lesson has a short multiple choice quiz at the end. This quiz is sent back to CBS for correction and grading, when you have finished the lesson. Actually, all the answers are right there in the text, if you care to look them up. However, I prefer to read the lesson once or twice and then answer the quiz without looking back to check my memory retention. For more information on the transistor course, write to CBS-Hytron Co. Danvers, Massachusetts.

Semiconductor News

RCA has just announced price reductions on several of their transistors. As I predicted a few months ago, the price of the 2N384 (usable as an oscillator to 250 mc) would drop. The optional distributor resale price on this unit is now \$9.66. Improved manufacturing processes have substantially increased the rate of production on the 2N301 and 2N301A also. The price of the 2N301 has been reduced 23% and the 301A has been cut 25%.

The RCA shortwave series 2N370, 2N371, and 2N372 to be used next month in the mobile converters are drift transistors of the

Transitron's new transistorized frequency standard. This amazing unit measures only 6 $\frac{3}{8}$ x 4 x 2 $\frac{3}{8}$ inches! It is completely self contained, including the power source. See text.



germanium pnp type designed for use in all wave battery portable receivers. They are controlled during manufacture for input and output values and for power gain characteristics to insure unit-to-unit interchangeability. In addition, low values of base resistance and collector transition capacitance permit the design of circuits having superior high-frequency performance.

The 2N404 (RCA) is designed for use in switching circuits of compact, medium speed computers. It is also useful in other low-level on-off control circuits. The 2N404 features a maximum collector-to emitter saturation voltage of -150 millivolts at a current gain of 30, a maximum collector cutoff current of -5 uamp at 25°C and a minimum alpha cutoff frequency of 4 mc.

The 2N407 and 2N408 are intended for class A and B audio service. Collector E max. is -18 volts.

The 2N409 and 2N410 are germanium-alloy pnp transistors designed for 455 kc if amplifier applications in transistorized receivers. They have a power gain of 31.2 db at 455 kc. in a common emitter type of circuit.

The RCA 2N411 and 412 are controlled types designed to meet the requirements of converter and mixer-oscillator applications on the Standard AM Broadcast Band. In a common emitter circuit these transistors feature a conversion power gain of 32 db at one mc.

Hughes Aircraft Company, International Airport Station, Los Angeles 45, Calif. have been making fine quality diodes for some time now. They have taken the jump into the transistor business with their recent announcement of two silicon beauties; the HA7501 and HA7502.

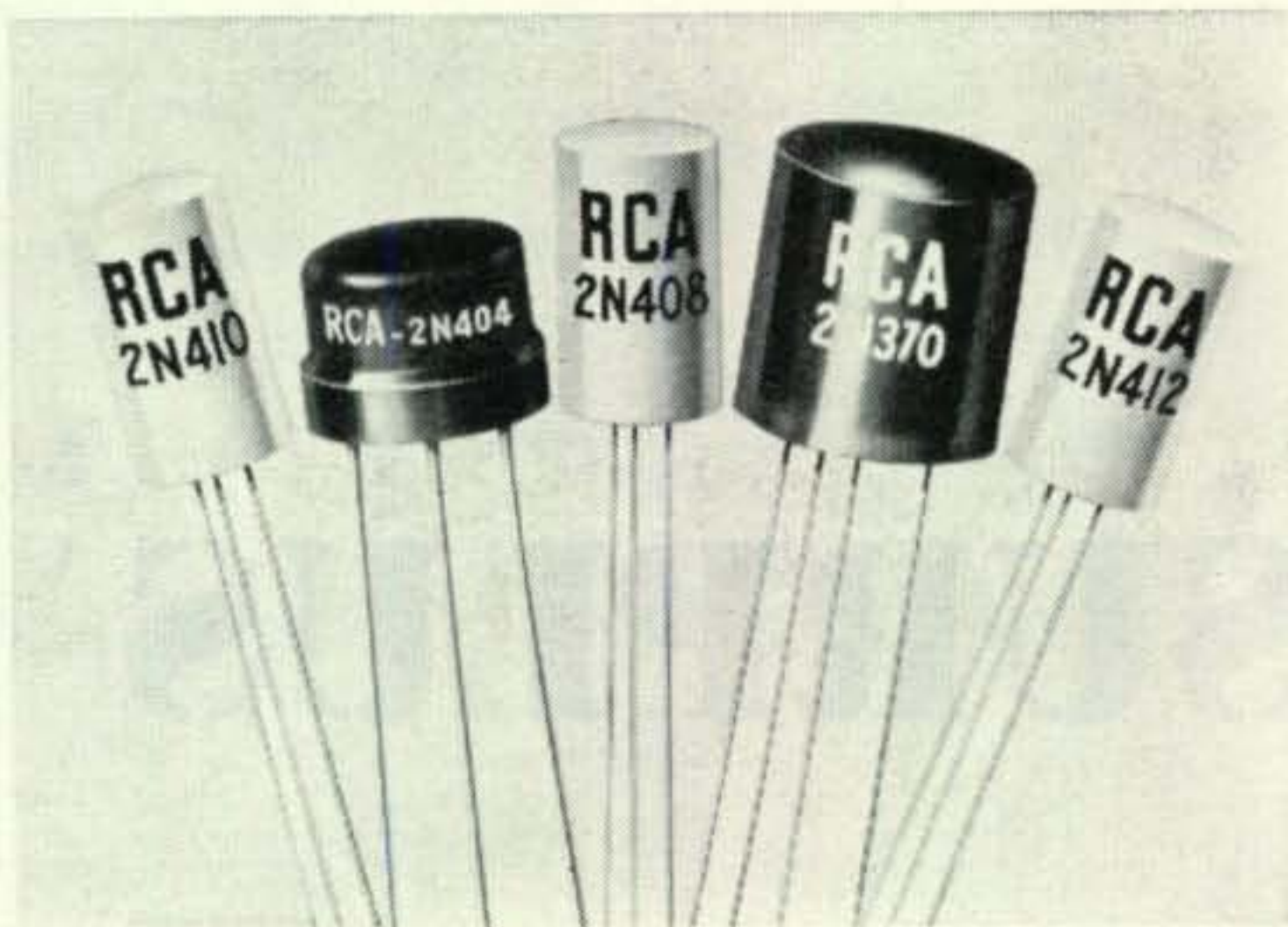
Rumor has it that another large West Coast semiconductor manufacturer is taking the plunge into the transistor market. Watch for big things to come.

Transitron Electronic Corporation, 186-182 Albion St., Wakefield, Mass. has announced three new silicon transistors intended as replacements for military approved units. The 2N471A, 2N474A and 2N479A are packaged in the JETEC 30 case and are said to have tighter specifications than their counterpart the 2N117, 2N118, and 2N119.

Bendix Aviation Corporation, Red Bank Division, Long Branch, New Jersey have a fine series of audio and switching transistors. Several of these units are priced quite low. Bendix also has an anodized washer kit available for mounting power transistors to heat sinks.

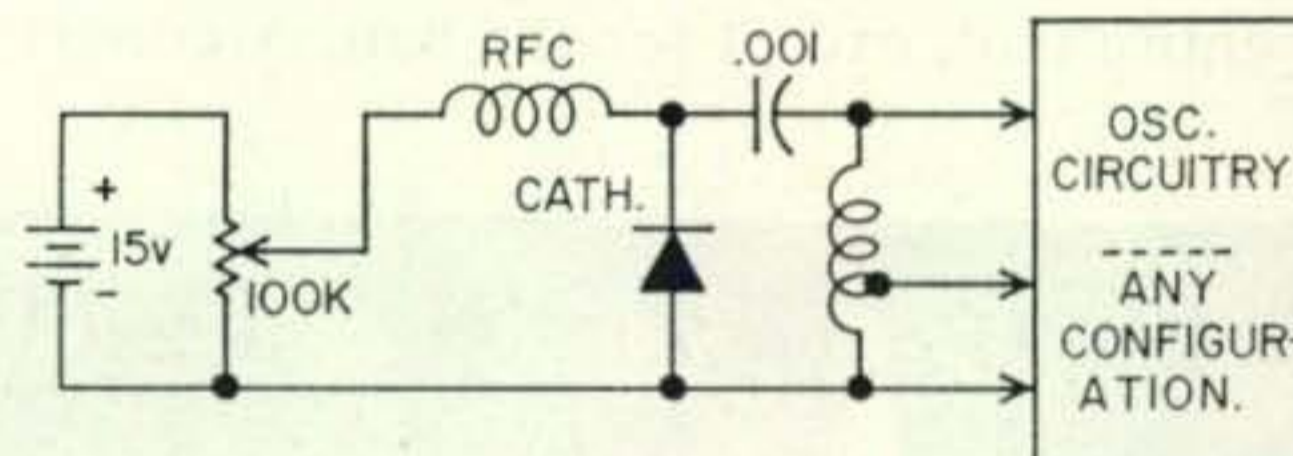
More information on General Electric's new silicon controlled rectifier. The current developmental models are about the size of a thimble and are capable of handling loads varying from 200 watts to 1000 watts at a stud temperature of 125°C. When switching

[Continued on page 105]

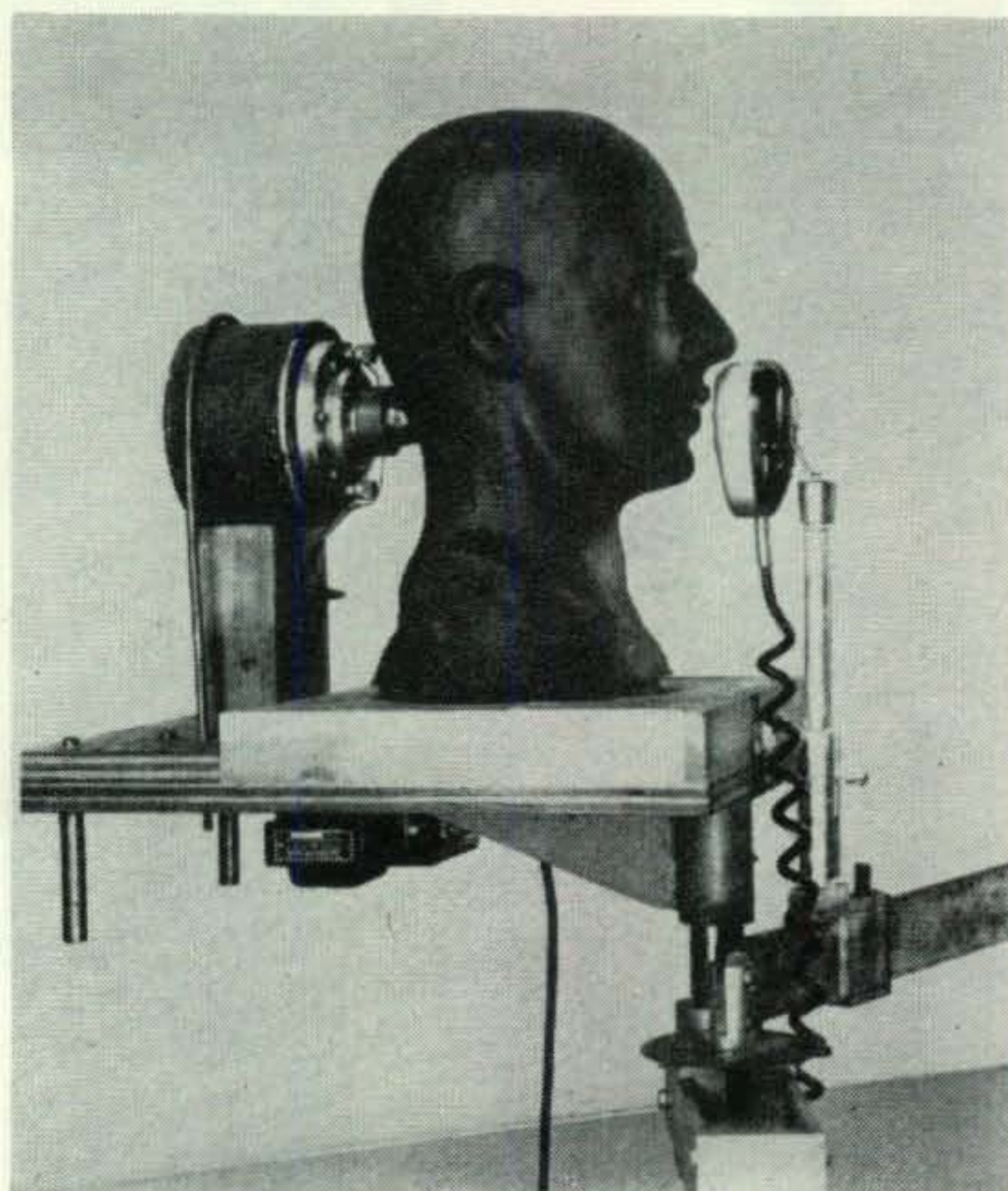


From Radio Corporation of America, a new series of transistors. Refer to text for more information.

Remote controlled VFO circuitry using variable capacity diode. Suggested by Paul Lux, W6CZA.



Life-size artificial head that was used by Shure Brothers, Inc., to test their new "Ranger" 505T transistorized microphone. This method of testing insures duplicating the conditions of actual use.



by **KENNETH B. GRAYSON, W2HDM**

110-20 71st St., Forest Hills 75, N. Y.

SURPLUS

Known as the AN/CRC-7, this waterproof transceiver was part of a survival kit of the Naval Air Force, and have recently been released to surplus. The transmitter is crystal controlled and the receiver is a fixed frequency super-regenerative receiver. Switching from transmitter to receiver is accomplished by the simple switching of filaments. Provision is made for slow MCW keying or voice (A-3). The entire unit, except for the battery compart-

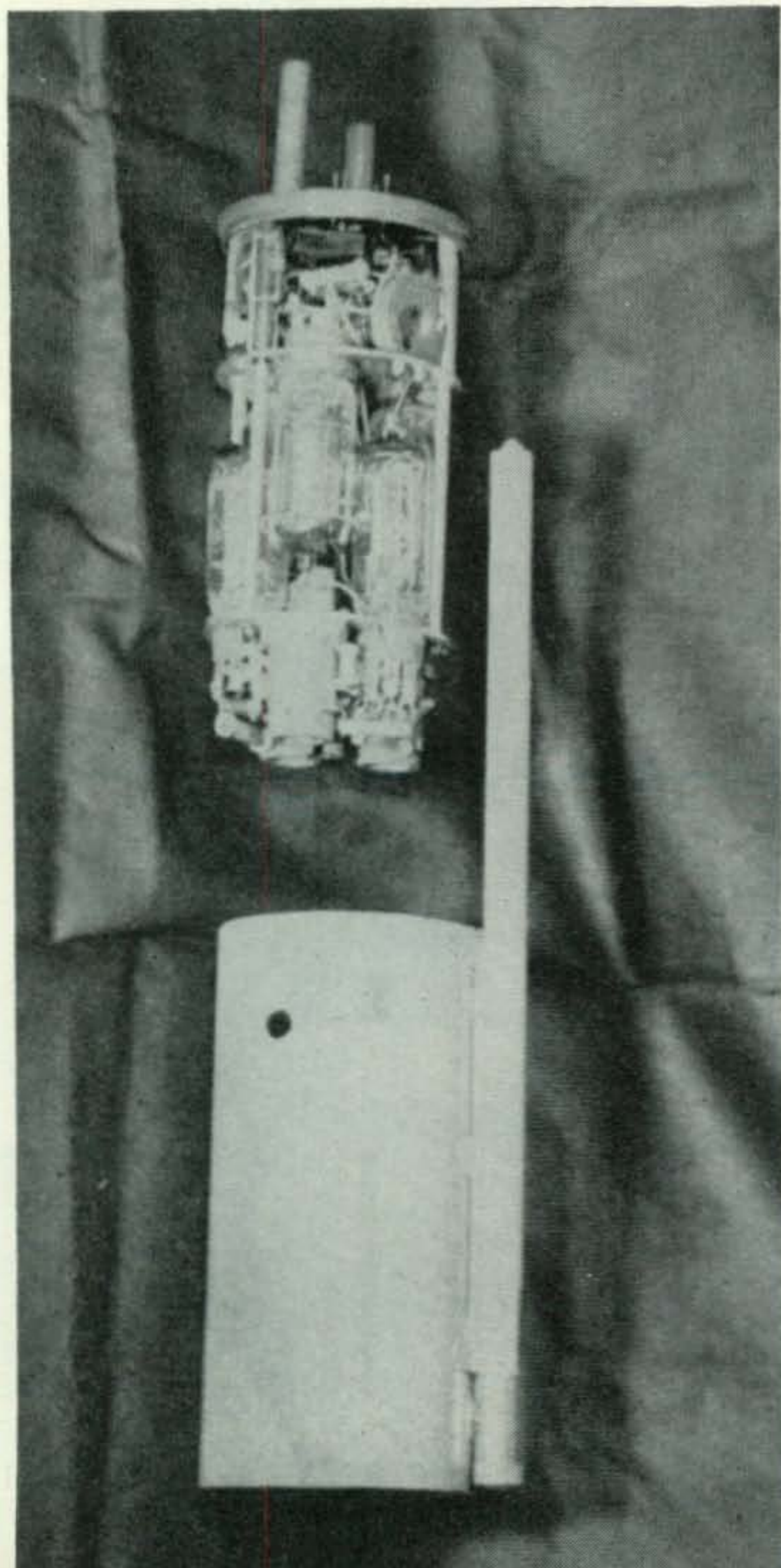
ment and switching is hermetically sealed. This proved to be a slight problem, but as you will see, we overcame it. The original operating frequency was 140.58 Mc, so very little conversion was really necessary to hit two meters.

The complete AN/CRC-7 measures 15½ inches long and 2-9/16 inches diameter. With batteries the entire unit weighs only two and a half pounds. Most of the length is taken up by batteries and could be cut down, but the overall length strongly hints that the case forms part of the antenna system, making a half-wave dipole. Never-the-less, the unit is compact and handy and not difficult to operate. As a matter of fact this equipment will probably lend itself to a whole series of designs of amateur emergency equipment.

As was mentioned the equipment was hermetically sealed. Well actually only the audio and rf sections are sealed. The combination microphone-speaker and the switching components are outside of the sealed section, as is a resistor and a capacitor which can be used for metering. The first step of the conversion is to study the unit you have. Our experience shows that there are three models, which are basically the same, but which have minor constructional differences. The first type has a one piece battery and switching compartment, and wires leading to an hermetically sealed header in the rf compartment. The other two have a separate battery compartment, a separate microphone switching compartment and a separate rf section—all connected by means of plugs and sockets. In all units the compartments are held together by two bolts, one on each side of the body.

The antenna fits in a housing attached to the body of the sealed section and is of telescopic stainless steel sections. A nylon lanyard to prevent loss and a clever safety pin switch lock to prevent accidental operation completes the equipment. All operational instructions are printed on the body of the equipment.

The second step in the conversion is to disassemble the equipment. Remove the two body bolts and pull the various sections apart. A little effort may be required as they are fitted very well—but they do come apart. The plug or wires going to the hermetic seal should be



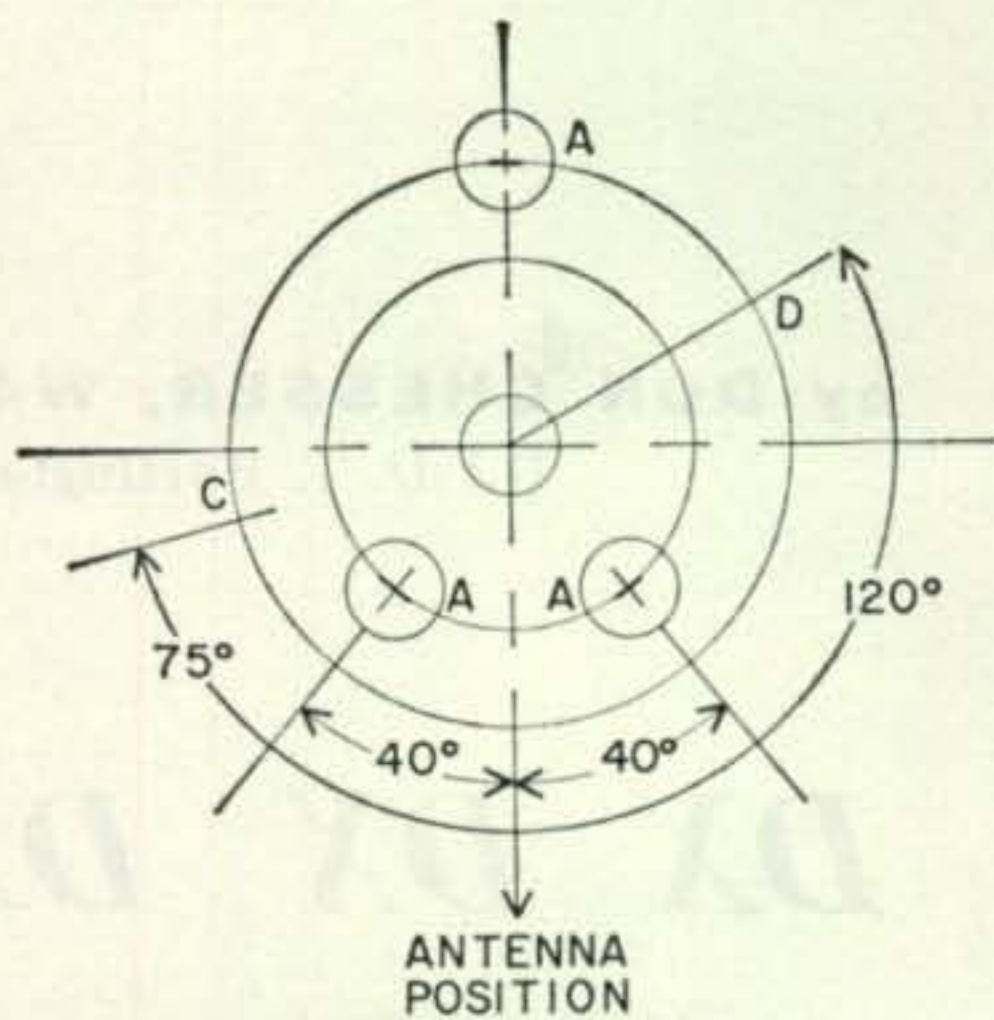
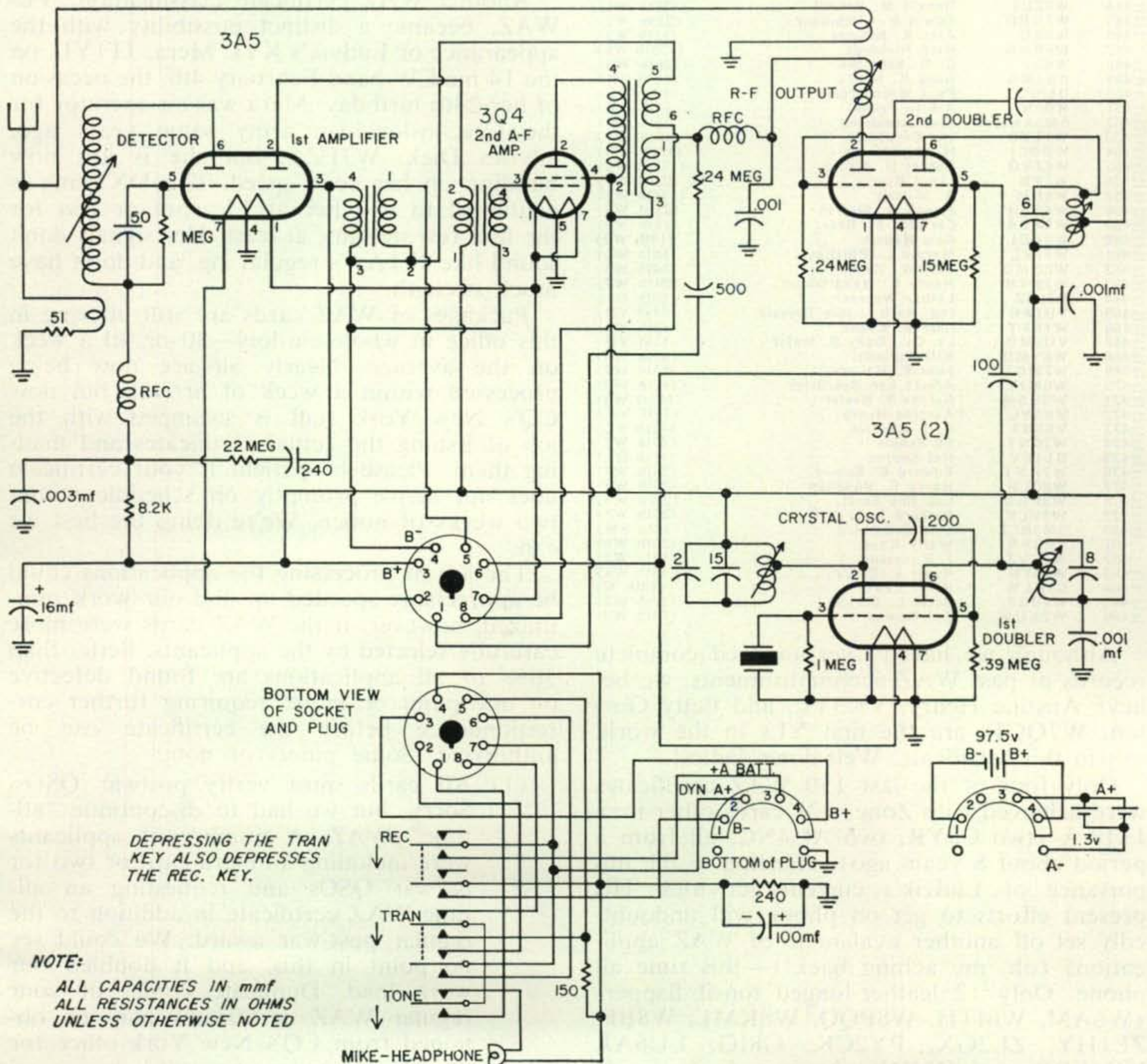


Fig. 1—Top view for drilling.
A—Three holes $\frac{3}{8}$ " diam. on $1\frac{1}{2}$ " diam. circle.
B—One $\frac{3}{8}$ " diam. hole in center.
C—Crystal socket holes. Center hole $\frac{9}{16}$ " down from top.
D—Receiver tuning hole 3.8" diam. $3\frac{3}{4}$ " down from top.

visible. If wires are used they should be marked as to where they go and unsoldered from the seal. Any components attached to the cover will have to be removed after noting their location and connections. This will not be necessary if the plug type is obtained since the plug disconnects everything when separated from the other compartments. The next step is difficult to accomplish, and great care should be used when performing the job of opening the sealed section. Either a small torch or a heavy soldering iron will be required. Carefully place the unit in a vise with the hermetic seal up. Don't apply more force than is necessary to hold the unit in the vise firmly, since the possibility of crushing tubes and components does exist. Carefully heat the seal and pull the unit up simultaneously. This operation is tricky and should be done in as little time as possible to prevent damage to the insides by the heat used. Once loose, do not play the torch inside, and have a bucket of water handy in case of fire. Once free the entire unit

Schematic of the Navy AN/CRC-7.

[Continued on page 94]



by **DON CHESSER, W4KVV**
R.F.D. 1, Burlington, Ky.

DX DX DX DX DX DX DX DX

WAZ

Our heartiest congratulations to the following stout fellows who have just achieved WAZ:

#439	W8DFQ	Steve V. Setar	(22nd W8)
#440	W9IU	Les Gregg	(16th W9)
#441	W3VKD	Arthur E. Lewis	(21st W3)
#442	W6KBC	John C. Parkinson	(133rd W6)
#443	W7PHO	William H. Bennett	(22nd W7)
#444	W6ZUI	Donald M. Bristol	(134th W6)
#445	W3DRD	Edwin N. Limberger	(22nd W3)
#446	W9EU	Alex K. Scherer	(17th W9)
#447	W6KYG	Herb Richards	(135th W6)
#448	W6UJ	C. R. Schrotke	(136th W6)
#449	OKIMB	Beda K. Micka	(10th OK)
#450	DL9PX	Paul Weinberger	(9th DL)
#451	HB9NL	Acklin Frank	(4th HB)
#452	SM5AHK	Curt Israelsson	(6th SM)
#453	W1TYQ	Vic Crawford	(6th W1)
#454	W0BCI	H. H. Stevens	(17th W0)
#455	W6ZVQ	Robert D. Miller	(137th W6)
#456	W7FB	Lloyd Byerly	(23rd W7)
#457	W6NIF	A. Wilson	(138th W6)
#458	W8BSH	Joseph A. Mullen	(23rd W8)
#459	W9ABA	Carleton P. Ross	(18th W9)
#460	W9RBI	Ross Hansch	(19th W9)
#461	W5PZL	Marvin L. Phillips	(18th W5)
#462	W8DMD	Carl W. Keske	(24th W8)
#463	W7KTN	Henry E. Hendrickson	(24th W7)
#464	DJIBZ	Lothar Woerner	(10th DL)
#465	YUIAG	Ing. Arch. Djuro Borosic	(1st YU)
#466	W1BFT	Carl B. Evans	(7th W1)
#467	VU2MD	Lt. Col. Dady S. Major	(1st VU)
#468	W6YMD	Bill Guimont	(139th W6)
#469	W7MGT	John E. Holmes	(25th W7)
#470	W6MJY	Albert Lee Beardsley	(140th W6)
#471	W6KSM	George S. Keeler	(141st W6)
#472	VK3YL	Austine Henry	(19th VK)
#473	VE6NX	C. J. Gawlick	(12th VE)
#474	W2CNT	Ed Schum	(17th W2)
#475	DL1GV	Hei Soujon	(11th DL)
#476	W7HKT	Edward E. Squier	(26th W7)
#477	W8CLR	Henry F. Vaughan	(25th W8)
#478	W3PGB	Lee Roy Scott	(23rd W3)
#479	W8VLK	Richard Justy	(26th W8)
#480	SM5BCE	Erik Soderberg	(7th SM)
#481	K9BVR	Wally Kays	(20th W9)
#482	W2GVZ	J. P. Jessup	(18th W2)
#483	W1JYH	Roger E. Corey	(8th W1)
#484	G3HLY	H. J. Lawn	(28th G)
#485	W7QGF	Betty L. Gorton	(27th W7)
#486	W2KUW	Ted Dames	(19th W2)

Although we haven't yet amassed complete records of past WAZ accomplishments, we believe Austine Henry, VK3YL, and Betty Gorton, W7QGF, are the first YLs in the world to win this certificate. Well done, ladies!

Only four of the last 150 WAZ certificates were achieved with Zone #23 cards other than JT1AA (two C8YR, two AC4NC, all from a period about 8 years ago), attesting to the importance of Ludvik's current activities. His present efforts to get on phone will undoubtedly set off another avalanche of WAZ applications (oh, my aching back!)—this time all phone. Only 12 leather-lunged tonsil flappers (W6AM, W6ITH, W8PQQ, W8KML, W8BF, ZL1HY, ZL2GX, PY2CK, G8IG, LU6AJ, VQ4ERR, and 4X4DK) have made the grade

in the 20 some years of WAZ history, but we suspect the exclusiveness of this hierarchy is nearly ended. Scores of others needing only Zone #23 to complete their list are listening on 21092 kc with bated breath for Ludvik's first vocal efforts.

Another WAZ certificate classification, YL-WAZ, became a distinct possibility with the appearance of Ludvik's XYL Mera, JT1YL, on the 14 mc CW band February 4th, the occasion of her 24th birthday. Mera was an operator for the Czechoslovakian army some years ago, advises Dick, W7FZA, but she is just now building up her code speed. The DX gang is cautioned to call her at 15 wpm or less for the first few months, at least. Her signals don't sound like JT1AA's regular rig, and don't have much strength.

Packages of WAZ cards are still pouring in this office in wholesale lots—30 or 40 a week on the average. Nearly all are now being processed within a week of arrival, but now CQ's New York staff is swamped with the job of issuing the actual certificates and mailing them. Please be patient if your certificate does not arrive promptly on schedule within two weeks of notice. We're doing the best we can.

The job of processing the applications could be appreciably speeded up and our work minimized, however, if the WAZ cards were more carefully selected by the applicants. Better than 50% of all applications are found defective on one point or more, requiring further correspondence before the certificate can be authorized. Some points of note:

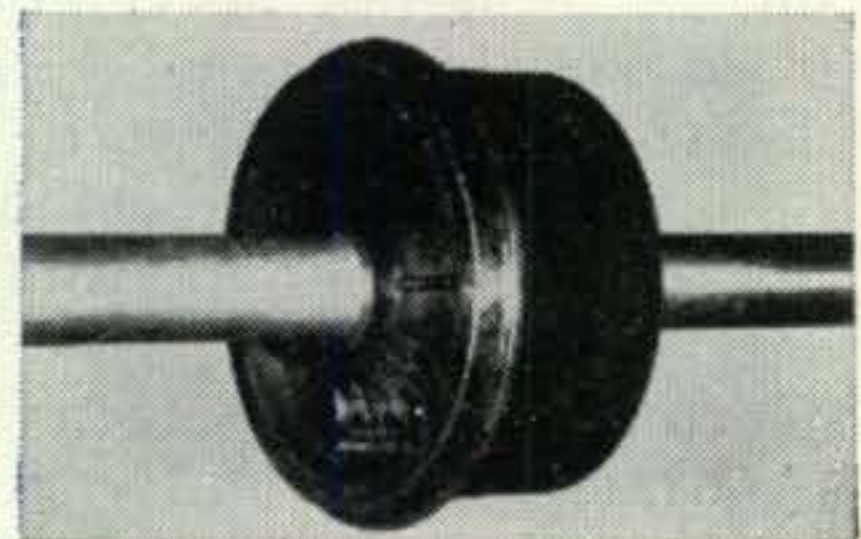
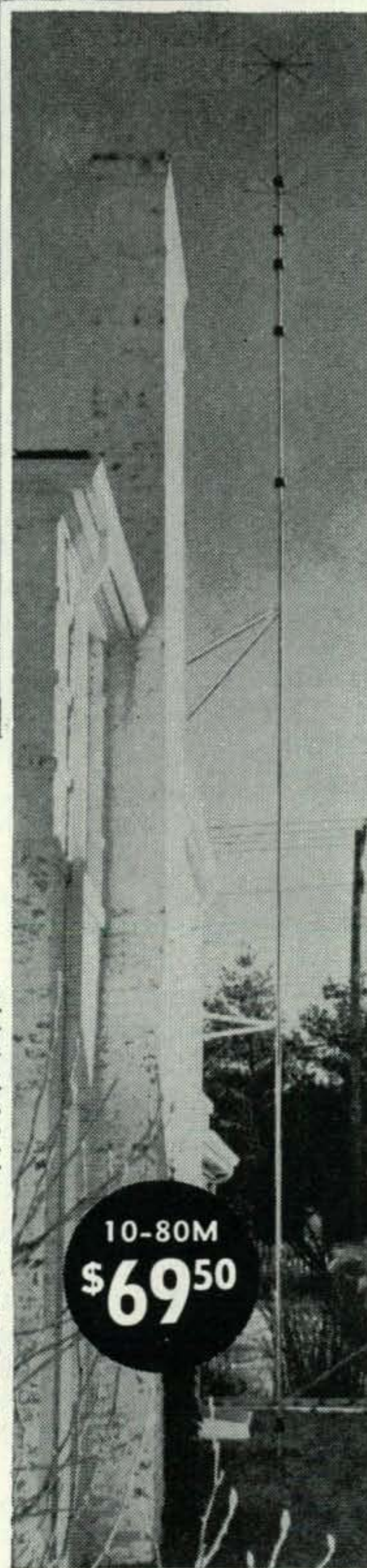
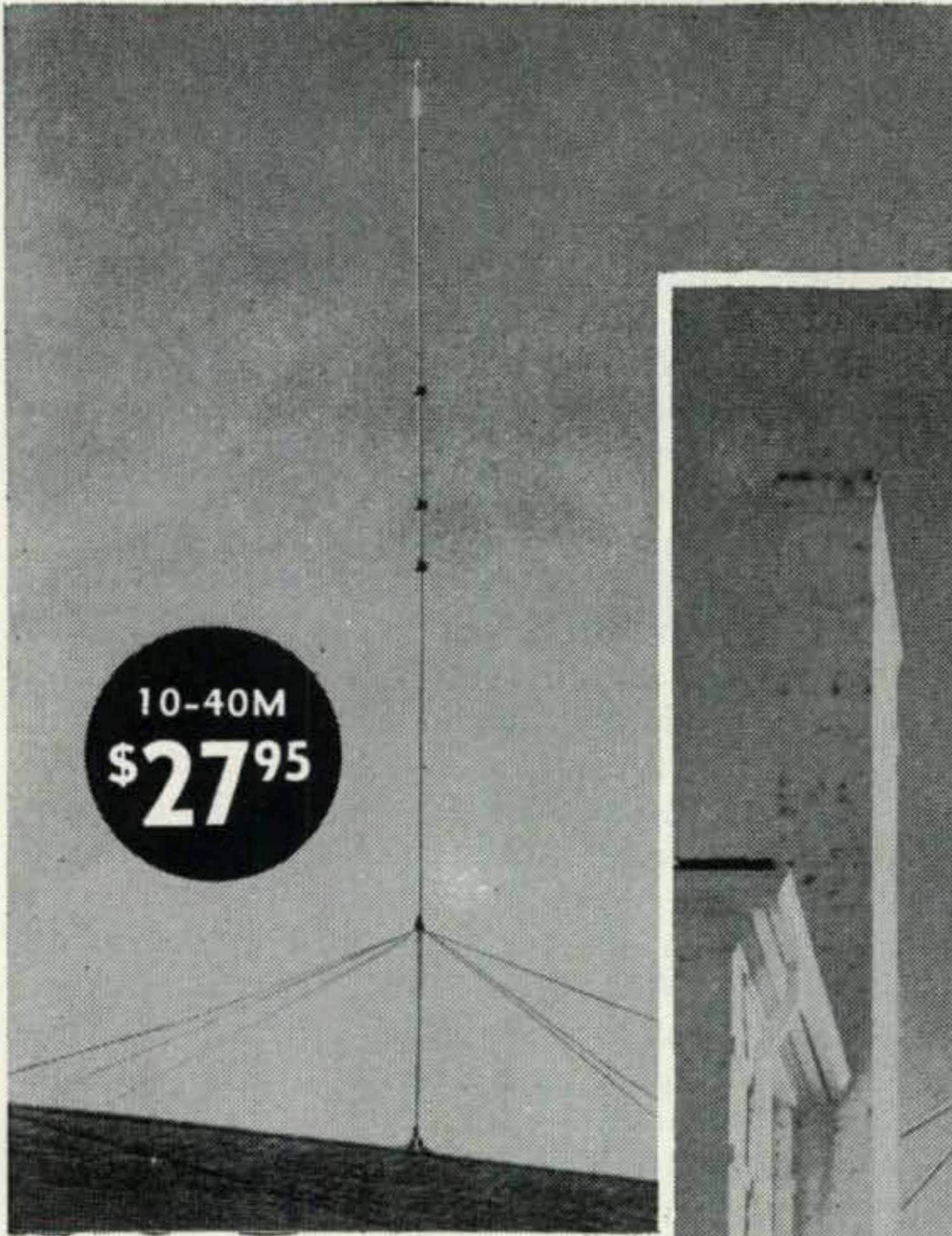
- (1) All cards must verify postwar QSOs. Sorry, but we had to discontinue "all-time" WAZ. A number of applicants were including an extra card or two for prewar QSOs and requesting an all-time WAZ certificate in addition to the regular post-war award. We could see no point in this, and it doubled our work load. Duplicate copies of your regular WAZ certificates may be obtained from CQ's New York office for

[Continued on page 86]

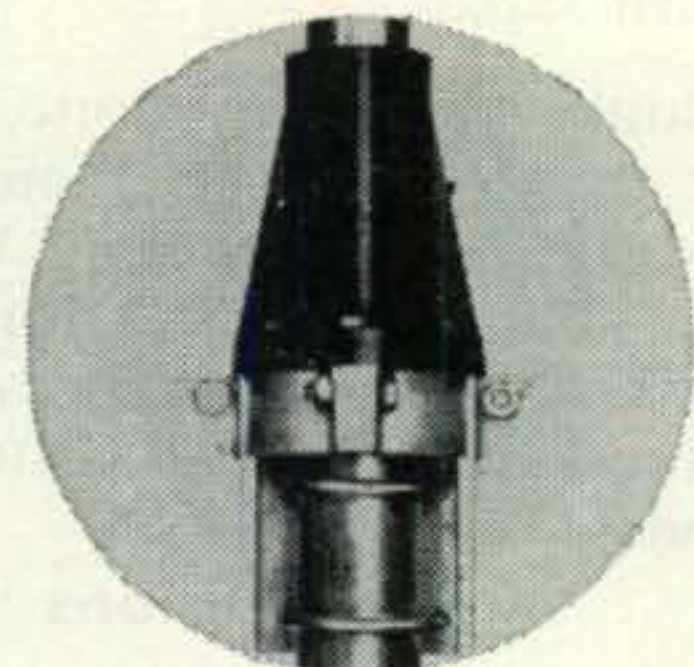
From Carton to Contact in 47 Minutes!

WITH **hy-gain's**
MULTI-BAND TRAP VERTICALS

Shown here are two of the great new hy-gain trap verticals, the 14-AV (for 10-40M), roof mounted, and the 18-AV (for 10-80M), side mounted, each using the sensational Insu-Traps to isolate the various sections of the verticals. 14-AV develops $\frac{1}{4}$ -wave resonance. 18-AV develops $\frac{1}{4}$ -wave resonance on 40-80M; $\frac{3}{4}$ -wave resonance on the 10, 15 & 20 M bands. Each uses new Capacity Hat principle to increase radiating efficiency, and new nylon base insulator for self-support. Less than 2:1 SWR on all bands, single 52 ohm feed line. Combination Guy Wire and Radial Mount Kit available for 14-AV for rooftop mounting. 18-AV comes complete with side-mount bracket fixtures and nylon guring kit, all parts completely weather-treated.



Heart of the hy-gain trap antennas, the Insu-Trap makes possible for the first time a really efficient multi-band antenna system. It acts as an insulator at its resonant frequencies, but allows radio energies of other frequencies to pass freely. This automatic switch action isolates various sections of the verticals to make them the proper length for each band. Completely mechanically and electrically stable, the entire trap circuit is enclosed in a carbon activated polyethylene cover and cap. Traps are effective over the entire band. Completely weather-proof and air tight. Guaranteed for the life of the antenna.



Nylon base assembly makes possible the self-support of the Trap Verticals. Cast aluminum mounting bracket is adjustable for various sizes of masts, with weather protected internal coaxial fitting. All electrical connections are factory sealed. Entire unit completely weather-sealed.

Also available (not shown), is the model 26-AV vertical for the 2 and 6 meter bands, complete with new decoupling sleeve and ground plane. Overall height and length of ground plane: 5 ft. . . . and the model 12-AV Trap Vertical (for 10, 15 & 20M), using the Insu-Trap principle to isolate sections and develop $\frac{1}{4}$ -wave resonance. Combination Guy Wire and Radial Mounting Kit available for rooftop mounting the 12-AV.

- Model 26-AV (2-6M) — \$16.95
- Model 12-AV (10, 15 20M) — \$19.95
- Model 14-AV (10-40M) — \$27.95
- Model 18-AV (10-80M) — \$69.50
- 12-AV Mounting Kit — \$8.95
- 14-AV Mounting Kit — \$9.95



*Leo says: "For Best Trades & Most Personalized Service . . .
Buy these IN STOCK hy-gain verticals"*

LEO I. MEYERSON
WØGFO



From

"THE WORLD'S LARGEST DISTRIBUTOR OF
AMATEUR RADIO EQUIPMENT!"

ONLY 10% DOWN

Ask About the famous line of WRL Xmitters!

For further information, check number 22 on page 126.

April, 1958 • CQ • 85

DX [from page 84]

\$1 each to cover handling and artist's services. You must include serial number and issuance date of your original certificate with your request.

- (2) All cards must indicate transmitter QTH by geographical name or bearing. Some Russian cards come through without QTHs at all. Although the call prefixes may be correct by previously published lists, these cards are unacceptable. Most Russian cards, however, have QTHs printed or rubber-stamped in the Russian language, which is quite acceptable. The QTHs can be easily translated by using a Russian/English alphabet (see May 1957 CQ, page 63).
- (3) Cards must show confirmation of QSOs with you by call, not by first name or handle (thus, "CFMG QSO with Henry on. . . ." is not acceptable.)
- (4) Cards for all-phone WAZ should indicate the QSOs were by two-way phone. Negatively speaking, they must not confirm the opposite (thus, "UR sigs RST579 UR phone OK" is not acceptable).
- (5) Contrary to previously published info, most of West Pakistan is in Zone #22. Only the Baluchistan province of West Pakistan is in Zone #21.
- (6) Until further notice all of Antarctica is counted as Zone #13.
- (7) Sakhalin Island, Siberian SSR, is divided in half by the 50th parallel. Only the northern half is in Zone #19—the southern half is in Zone #25 with Japan.

If in doubt about any zone, include several cards for that zone. A CQ map of the world zones may be had by writing W4KVB. Please include a stamp or two for postage. And please include return postage with your cards. Our postage problem is assuming mammoth proportions!

Expeditions

"DXpeditions are bustin' out all over," exclaims Art, W3VKD. PZ1AP informs us W4ANE is going to Surinam soon with a SSB rig. A letter from W4PBH says he plans to put Navassa Island on the SB map this summer. KP4AIO practically guarantees an expedition to Navassa this coming July. VQ4AQ is rumored going to Zanzibar, and W9EVI to Clipperton for three weeks. A YU is planning a trip to Albania soon. VS1HU is trying like mad to get to the Maldives. The long-awaited VQ4EO expedition to many African countries is finally rolling. ZL1ABZ is now on the Kermedecs. And a certain South African teases us with hints of a big, hush-hush, terrific DXpedition in the making to a very rare prefix, with all-band, all-mode operation planned.

By the time you read this the 1958 Ohio

Valley expedition to Socorro Island, XE4, may still be on the air. Plans are completed at this writing and preparations for the trip frantically in progress. Barring unforeseen delays, we plan to leave Cincinnati the morning of March 14th, drive in caravan to Mazatlan, Mexico, and there board the chartered boat of Jack Richardson, KN6YNI, on Monday morning, March 17th. With luck and fair winds we hope to arrive Socorro Wednesday evening, March 19th, and immediately set up our stations on shore, where we plan to operate for a full week, until about Thursday, March 27th.

At least two of last year's VP5BH Cayman Island expedition operators (W8EZF and W4KVB) are members of this XE4 crew, and some of the Hallicrafters equipment used at VP5BH, but there the similarity ends. This year the operation is much bigger. Two complete and separate stations are planned, with a staff of eight operators keeping the two rigs hot 24-hours a day for the entire week, on all bands, CW, AM, and SSB. Separate rotary tri-band beams on separate towers, separate generators, and separate tents for the stations are included in the plans.

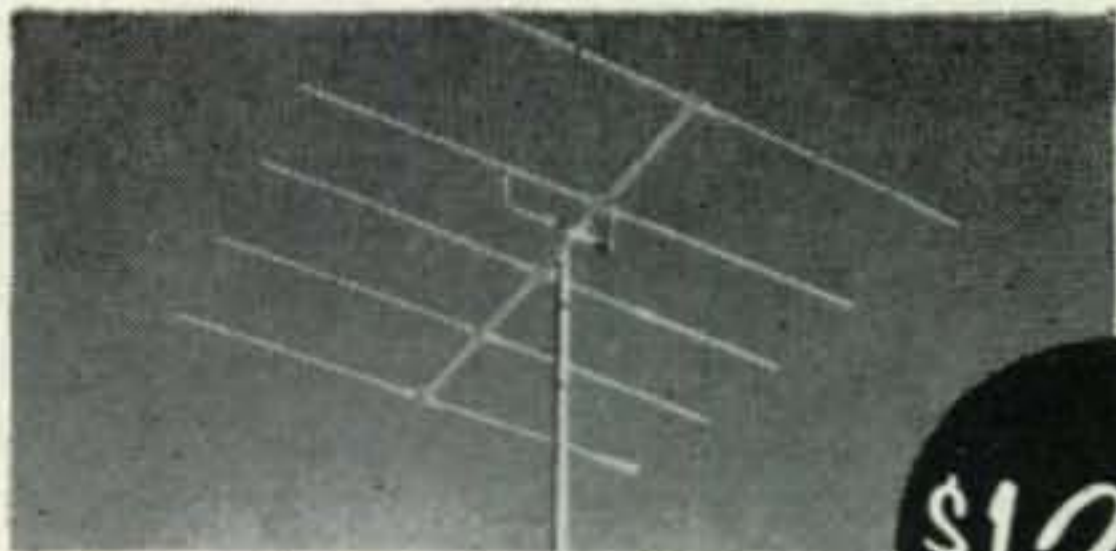
Ambitious? You bet! The whole affair, incidentally, is made possible by the unstinting help of a number of individuals, by the generous assistance of several well-known manufacturers, such as Hallicrafters, Gonset, and Hy-Gain, who loaned us the equipment (more about this later), and, most particularly, by the financial assistance you DXers showered on us last spring after our Cayman fling. The donations resulting from that campaign were individually small but very numerous, and they added up to an expedition fund which, with about \$250 each from the operators making this trip, put us over the top. We couldn't have afforded this DXpedition without your help. Our deepest thanks, and we hope you find as much fun working us and sharing our experiences as we'll have, ourselves.

This expedition, as VP5BH was last year, is an Ohio Valley club project. QSLs this year (please include a donation, if you will be so kind) go to the OVARA club treasurer, Vern Madill, W8TJM, 581 Rockwell Rd., Cincinnati 38, Ohio. Jim Ringland, W8JIN, heads a committee of club members who will see that all QSLs, 100%, are answered as rapidly as possible. All donations received will go into a special club fund from which QSL costs and postage will be drawn, the balance earmarked for another DXpedition in 1959, God willing. We'll continue these annual DX rat races as long as we are financially able, but we can't possibly without your help.

DX Notes

ZL1ABZ, Kermedec Islands, is the choice DX this month, but he's rather difficult to work. He's only on 80 meters, with two crystals—3690 kc CW, and 3844 kc phone. If

[Continued on page 86]



6 Meter, 5 Element beam; boom length of 108", with a forward gain of 9 db. Net wt., 9 lbs.

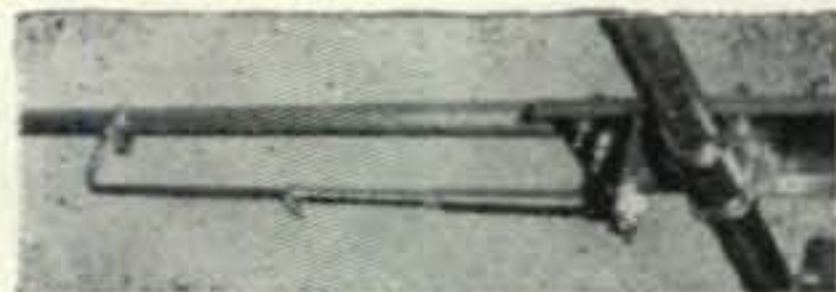
\$12⁹⁵



6 Meter, 8 Element beam; boom length of 216", with a forward gain of 12 db. Net wt., 18 lbs.

\$24⁹⁵

The hy-gain 6-meter beams are adjustable for maximum gain over the entire band, from our instructions. No further tuning is necessary. A Calibration Chart is supplied with each instruction manual. Factory preassembled, these beams feature heavy wall 1/2" aluminum elements of 6061T6 alloy, and 1 1/4" diameter aluminum booms. They may be stacked for additional gain. Stacking bars for further gain for either model are available at \$3.95 additional.



New pre-calibrated (GAMMA-XIAL) Gamma Match assembly with coaxially formed reactance cancelling capacitor built in, makes possible for the first time a perfect 1:1 SWR. Coax connector for 52 ohm feed included. Developed by hy-gain's engineering staff and used exclusively in the hy-gain single band beams.

THE COMPLETE LINE OF

Hy-gain

VHF Antennas!

FOR THE 1 1/4, 2 & 6M BANDS



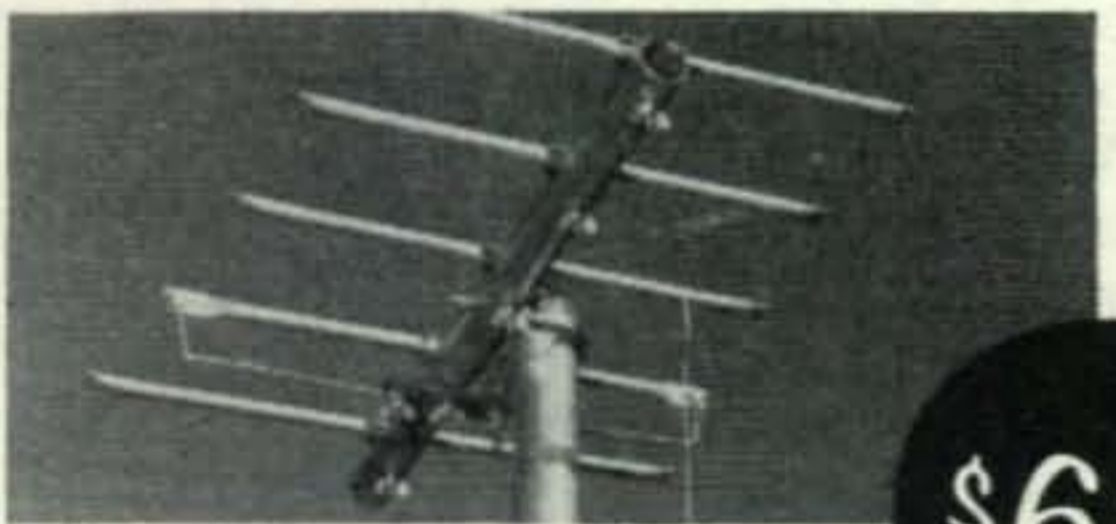
1 1/4 Meter, 10 Element beam; boom length of 80", with a forward gain of 12 db. Net wt., 2.5 lbs.

\$9⁹⁵

These hy-gain 1 1/4 and 2 Meter Beams are factory pre-assembled; the elements snap into position for immediate use. Each features 3/8" aluminum elements of 6061T6 alloy, and 1" diameter aluminum booms. Extremely easy to put up and into operation, these beams may be stacked for additional gain. Stacking bars for further gain for any of the models are available at \$3.95 additional.

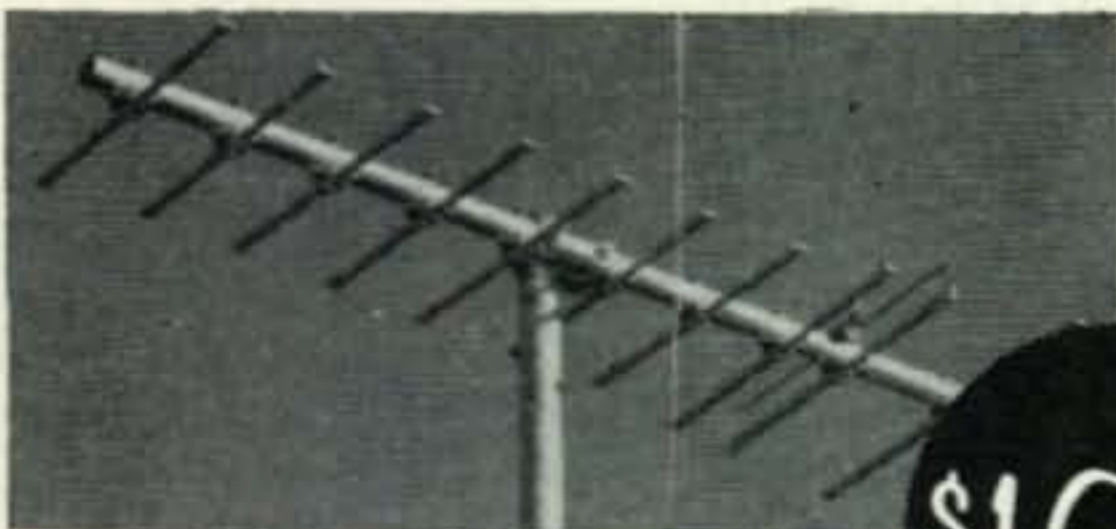


Hy-Gain's 1 1/4 and 2 meter Beams incorporate the Folded Ratio Dipole with nominal impedance of 200 ohms. An adjustable 1/4-wave Q bar matching transformer is included, making possible perfect 1:1 SWR with 52 and 72 ohm coax or 300 ohm and 450 ohm balanced lines.



2 Meter, 5 Element beam; boom length of 38", with a forward gain of 9 db. Net wt., 2.75 lbs.

\$6⁹⁵



2 Meter, 10 Element beam; boom length of 112", with a forward gain of 12 db. Net wt., 5 lbs.

\$10⁹⁵

GENTLEMEN:

Enclosed is my check or money order for \$_____.

Please ship immediately from stock the following

Hy-Gain antenna:_____

NAME:_____

ADDRESS:_____

CITY & STATE:_____

EVANS RADIO

P.O. BOX 312

CONCORD, N. H.

For further information, check number 23 on page 126.

April, 1958 • CQ • 87

DX [from page 86]

you don't have the punch to get through on 80, contact ZL2GX on 14 mc at 0600GMT and arrange through Jock for ZL1ABZ to listen for you cross-band. Several such complicated contacts have been made with PY2CK and some Ws.

Even more involved is the system set up to work VQ4EO, the African expedition now under way. The SCDXC BULLETIN describes it thus: "All stations will first contact W6YMD (this is not Bill's idea, but a plan to eliminate QRM on the frequency) and arrange with W6YMD at 1500GMT to pass you on to ZS6AQQ. Bill will be on 14265 kc, ZS6AQQ on 14325 kc, the latter moving up 5 kc in the event of QRM." When you reach the ZS6AQQ plateau you are in—with bells! ZS6AQQ will act as master-of-ceremonies, and will direct operations.

Here's the tentative schedule of the VQ4EO expedition: VQ3 now, then VQ5, OQ5, FF8DX/FE8, VQ4EO/ZD4 Camerouns, VQ4EO/ZD2 Nigeria, FQ8, ZD4BF, ZD3F, ZD1 Sierra Leone, then ZD3 again, and ZD6. All operation is scheduled for SSB phone, low power, to a 2E26 final. The next destination, times, frequencies, will be given from the previous stop-over, so there'll be plenty of advance notice as to the next move. QSLs are to go via the Richmond Amateur Radio Club, Box 1985, Richmond, Va.

From Bob, K2EUH: "I heard on Radio Budapest (short wave BC station) on their February 11th program that HA5AM/ZA made about 200 QSOs in 2 hours operating time. Send QSLs to the Hungarian QSL bureau, Box 185, Budapest-4, Hungary. The BC programs are on Tuesday evenings from 2315 to 2330EST (0415 to 0430GMT Wednesdays) on 9833 kc, 6.1 mc and 7.2 mc, and are conducted by HA5DD." We hear HA5AM is now back on a Hungary-Norway flight schedule, but plans several more weekends of hamming from Albania later this spring.

VQ8AQ, Willy, a friend of VQ8AS, has just received his license and is now on the air from Rodriguez Island. His signals have so far been reported rather weak.

"Danny Weil, VP2VB, etc., should be ready to sail from England soon," writes Jim, W8JIN. "He's had more trouble. His new boat broke from its moorings to the tune of \$2000, but it was covered by insurance. After fixing the damage a leak was found in the hull. Danny plans to go to Navassa first. Galapagos and Clipperton are also mentioned in his early sailings."

A really rare prefix has just been issued to the XYL of Bill Kellen, KS6AD. The call: WS6AG. Bill and his wife are sharing a DX-35 and 2-element beam, reports W3SOH.

Which reminds us the FCC is rapidly running out of amateur call letters again, and are

seriously considering issuing new prefixes WA through WZ before the numeral.

DL3VI will be YA1AB in April if a license is granted, writes WØDMA. And ZC5AL plans to close up shop in May, but before he leaves he wants to work North and South Dakota to complete his WAS. He'll be glad to listen for specific stations if they will write him air mail and request a sked.

From Mickey, W8YIN: Wes, SP3DX, is active on 144 and 50 mc, looking for W QSOs. VS1EW now has Ted Henry's KWM-1 SSB rig (how that little rig gets around!), but hasn't been active, yet. VS4JT is usually active 1130 to 1230GMT 14305 kc on SB, as is Pat, VS6AE. EL4A has skeds at 1830GMT on 21 mc SB with 150 watts on Tuesdays and Fridays, after which he is QRV for W QSOs. QSL via W4TO. MP4KAM, Kuwait, is now on 14315 kc SSB with HT-32 transmitter, kw final, 3-element beam, and SX-101 receiver!

A new prefix about to enter the lists is OR4VN, the new Belgian Antarctic Expedition, writes ON4DM. FB8YY, the French Antarctic Expedition, has been active from Terre Adelie Land.

Referring to the motto in the delightful sketch of CQ's New York office, in the February issue of CQ: "Next week we just gotta get organized!"

See you next month.

73, Don, W4K VX

The Ohio Valley DX Bulletins

If you would like much faster and more comprehensive DX news and articles than space in this column can permit, we suggest you try the Ohio Valley DX Bulletins, edited and published by W4K VX. It's 40 or more issues a year are distributed only via first class or air mail, for greatest possible speed, and costs but \$5 annually for first class service, or \$6.50 air mail. Two month trial subscriptions are available for \$1 first class, \$1.25 air mail. Sample copies may be had for the asking. Write W4K VX (address at the head of the DX column) for further details or for your membership to this excellent service.

Addresses

- HI8SKE—QSL via W2SKE
- FY7YE—QSL via W5JLU, Leonard H. Barrett, Route 6, Box 104-B, Waco, Texas.
- HE9LAC—Rene E. Mader, Eschenstrasse 425, Schaa, Liechtenstein.
- HI8RM—QSL c/o U.S. Embassy, Ciudad Trujillo, Dominican Republic.
- HL9KS—SP/2 William Shipp, HQ KMAG, APO 103, c/o PM, San Francisco, Calif.
- HS1A—QSL via W6FKH.
- HS1C—Capt. Hal S. Christensen, DET 1, U S ACAN STA JUSMAG, Box B, APO 74, c/o PM, San Francisco, Calif.
- KA2MP—Matt Parkkinen, USASSCFE, APO 503 c/o PM, San Francisco, Calif.

[Continued on page 93]



Leo says:

Here's the Nation's Best Deal!

ON *National!*

LEO I. MEYERSON
WØGFG

From "The World's Largest Distributor of Amateur Radio Equipment"



\$159.50 Amateur Net

THE NC-188

Here's a quality amateur receiver at a popular price. Directly calibrated for the 4 general coverage ranges and 5 bandspread ranges for amateur bands 80 to 10 meters. Also covers 540 kc to 40 mc. Voice or CW. Large, easy to read 11" slide rule dial. Built-in "S" meter on front panel.

Only
\$13¹⁶

per mo.

\$15.95 Down

Prompt
Personal
Service



\$199.50 Amateur Net

THE NC-109

National's low priced general coverage receiver with 4-band coverage 540 kc to 40 mc . . . voice, CW or SSB reception. Bandspread is calibrated for all bands 10 through 80 meters. Separate crystal filter and product detector for CW and SSB. 11" slide rule dial, accessory socket for external adapters, etc. Built-in "S" meter on front panel.

Only
\$16⁴⁶

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Trades!



\$399.00 Amateur Net

THE NC-300

Excellent stability — top sensitivity. Dual conversion "Dream Receiver" with more than 50 db primary rejection on all bands; more than 60 db secondary image rejection. 10 dial scales for 160 to 1 1/4 meter coverage. Extra long slide rule dial. Super selectivity, giant easy to read "S" meter.

Only
\$22⁹⁵

per mo.

\$39.90 Down

Complete
Stocks
All Ham
Items

And More "Watts per Dollar" on these WRL TRANSMITTERS!

the tried & tested **GLOBE CHIEF 90A KIT**: \$5.00 per mo.
Net: \$59.95; Wired & Tested: \$74.50; \$6.15 per mo.
the ham's choice: **GLOBE SCOUT 680A**: \$9.90 per mo.
Net: \$119.95; Kit form: \$99.75; \$8.27 per mo.
the top designed **GLOBE CHAMPION 300A**: \$28.35 per mo.
Net: \$495.00; Kit form: \$399.00; - \$22.95 per mo.
the power-built **GLOBE KING 500C**: \$45.72 per mo.
Net: \$795.00; Just \$79.50 Down

Only
10%
Down Payment

FREE 1958 CATALOG

Send for your free copy of this 200 page catalog, chock full of top quality items for the amateur, the hi-fi-ist, the experimenter and the dealer-serviceman. Hundreds and hundreds of items listed and shown.



Dear Leo: Please Rush Me Your FREE CATALOG . . . and send more information on the
National Line . . . the Globe Transmitters . . . Reconditioned Equipment

CQ
1

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World Radio
LABORATORIES
PH. 2-0277

NAME: _____

ADDRESS: _____

CITY & STATE: _____

3415 W. BROADWAY COUNCIL BLUFFS, IOWA

For further information, check number 24 on page 126.

by **FRANK ANZALONE, W1WY**

14 Sherwood Road, Stamford, Conn.

CONTEST CALENDAR

Contest Calendar

April 4- 6 DARC WAEDC Phone
April 12-13 REF CW
April 26-27 PACC CW
May 3- 4 PACC Phone
May 17-18 Helvetia 22

PACC

This is the 3rd annual PACC contest sponsored by the VERON, the radio society of the Netherlands. The idea of the contest is for stations all over the world to work as many PA stations as possible. Contacts with PA stations during the contest will be accepted for the PACC Certificate. Proof of having worked 100 different PA stations is required for this Certificate. Contacts on contest logs will be accepted in lieu of QSL cards, which are normally required.

TIME: CW 1200 GMT April 26th to 2400 GMT April 27th. Phone 1200 GMT May 3rd to 2400 GMT May 4th.

SCORING: 1. The usual serial numbers. RST or RS plus a progressive number starting with 001.

2. In addition, the PA station will indicate their province with a two letter abbreviation after the number.

FR. Friesland.	NH. Noord-Holland.
GR. Groningen.	ZH. Zuid-Holland.
DR. Drente.	ZL. Zeeland.
OV. Overijssel.	NB. Noord-Brabant.
GD. Gelderland.	LB. Limburg.
UT. Utrecht.	

3. Each completed contact counts 3 points, Incomplete 1 point.

4. The same station can be worked only once per band.

5. All bands, 3.5 thru 28 mc can be used.
MULTIPLIER: One point per province on each band. There being 11 provinces and 5 different bands the maximum multiplier would be 55.

FINAL SCORE: The total QSO points on all bands multiplied by the sum of the provinces on each band.

AWARDS: Certificates to the highest scorer in each country or district in the case of W/K, VE/VO, PY, CE, ZL, VK and VS. Both on CW and Phone.

Mail your logs not later than June 15th to:
P.v.d. Berg, Contest Manager
Keizerstraat 54,
Gouda, Netherlands

DARC

The CW section took place back in January and rules were published in our December column. Briefly, the object of the contest is for stations outside the European continent to work as many EU stations as possible. Phone operation is limited to three bands; 14, 21 and 28 mc. Besides competing for a contest certificate, this also offers an excellent opportunity to fatten up your total for the popular WAE certificates. Activity starts at 1800 GMT April 4th and ends at 2400 GMT April 6th.

Send your logs to:

DARC Contest Committee
Fuchsienweg 51
Berlin-Rudow, Germany

REF

The Phone boys had their go at it last month. The CW gang can start going at 1200 GMT April 12th and knock off at 2400 GMT April 13th. If you are after the D.P.F. or D.U.F. diplomas, here's your chance to make hay. Check February CQ for all details.

Send your logs to:

R.E.F. Contest Committee
B.P. 42-01
Paris-RP, France

Helvetia 22

The Swiss Union will again sponsor this popular contest. It starts at 1500 GMT May 17th and ends at 1700 GMT on May 18th. Operation will be on CW and Phone, all bands, 3.5 thru 29.7 mc. Full rules and a complete list of Cantons in next month's calendar.

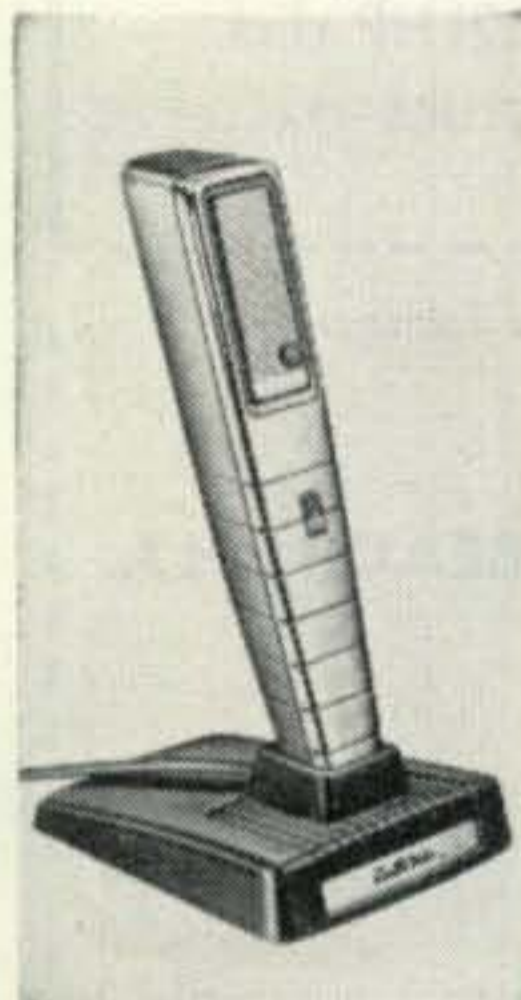
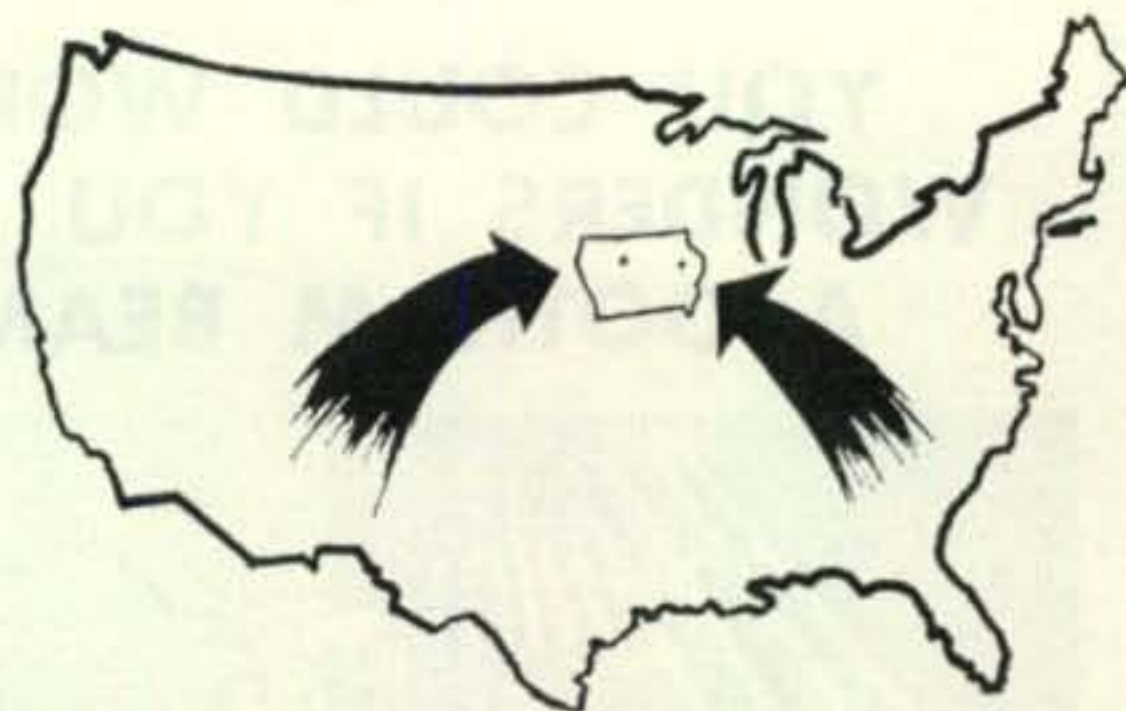
That's all for this month fellows. Now to get back to those "cotton-pickin" contest logs.
73, Frank, W1WY

KEN-ELS

RADIO SUPPLY

Personal Service from Experienced Hams.
Customer Satisfaction is Our Motto!

WØZKD—Glen	}	Fort Dodge
WØZCN—Ken		
WØCRP—Russ	}	Cedar Rapids
KØABO—Rog		

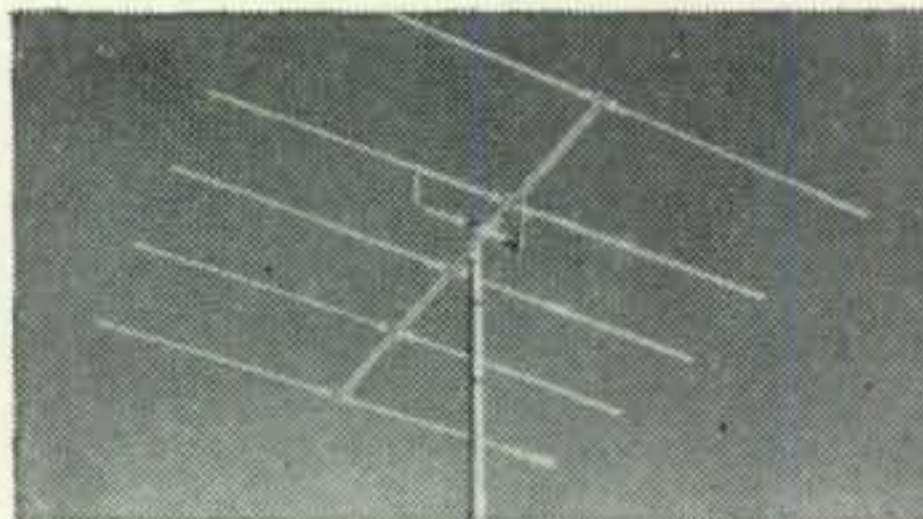


BRAND NEW ELECTROVOICE

Model 927LS

Slim Crystal Microphone. A new design crystal microphone for radio amateur, recording and general use. Response 60-8000 cycles. Output—50 db. High impedance only. 5 foot cable. Microphone muting and relay operating switch push-to-talk or push and lock. Metalustre gray front, medium gray back. 7⁷/₈" x 1¹/₂" x 1¹/₄". Supplied with attractive stand. Net weight less cable and stand 9 oz. **\$17.95**

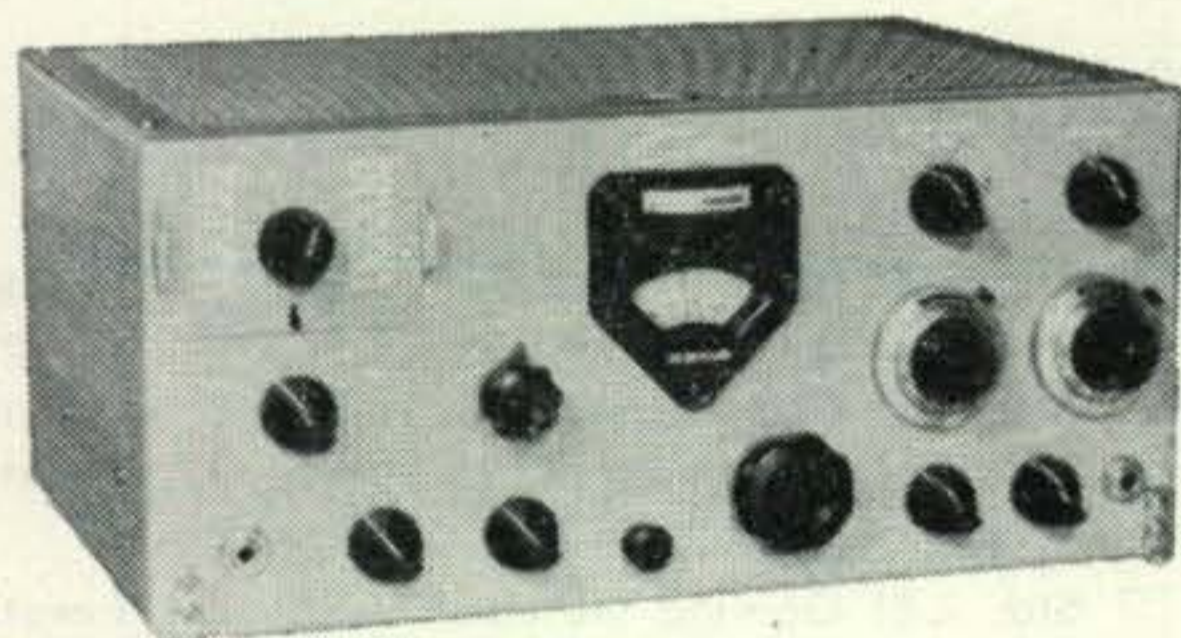
A Complete Line of



**6 METER
5 ELEMENT
\$12.95**

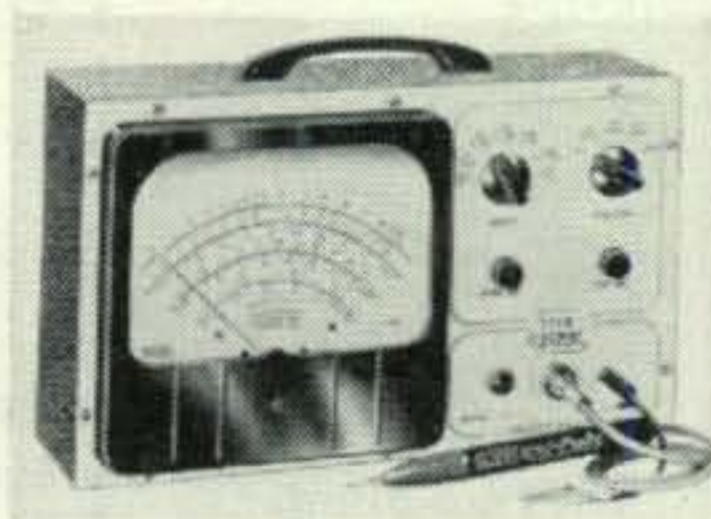
6 METER, 8 ELEMENT BEAM: \$24.95

The hy-gain 6-meter beams are adjustable for max. gain over the entire band, from our instructions. No further tuning necessary. Calibration Chart supplied with each instruction manual. Factory preassembled, these beams feature heavy wall 1/2" aluminum elements of 6061T6 alloy and 1 1/4" diameter aluminum booms. May be stacked for additional gain. Stacking Bars available at \$3.95 extra.



KWM-1 Combines PTO 175 Watt SSB/CW transmitter and extremely accurate and sensitive receiver in a compact case only 6 1/4" x 14" x 10"! Designed for convenient mobile and/or fixed station. Packs for 12 VDC, 28 VDC, and 115 VAC. Available frequency ranges 14 thru 30 MC. For Amateur and commercial service. **\$820.00**

EICO Deluxe PEAK-to-PEAK VTVM #249 with 7 1/2" meter and exclusive Uni-Probe (pat. pending). A half turn of the NEW dual-purpose probe tip selects DC or AC-OHMS. Dimensions: 8 1/2" high; 13" wide; 5" deep. Wt.: 9 lbs. Professional styling. Satin finish etched aluminum panel, grey wrinkle steel case. Kit only \$39.95; Factory Wired only. **\$59.95**



CDR ROTOR

- All New-Heavy Duty
- Stainless Steel Gears and Pinions
- Motor, Brake and Indicator operate at 24 volts or less
- Stainless Steel Mounting Hardware, prevents corrosion
- Complete with Control Unit
- Automatic Positive-Locking Brake will hold under any wind condition **\$99.50**



NOVICES and BEGINNERS. Our experienced staff welcomes your questions and problems. Come in, browse around, and let us help get your Ham rig under way. 10% down — 24 months to pay. Your trade-in may cover down payment. Export business welcomed.

428 Central Ave., Fort Dodge, Iowa • 67 16th Ave., S.W., Cedar Rapids, Iowa
Phone: 5-2451 Phone: EM 4-1172

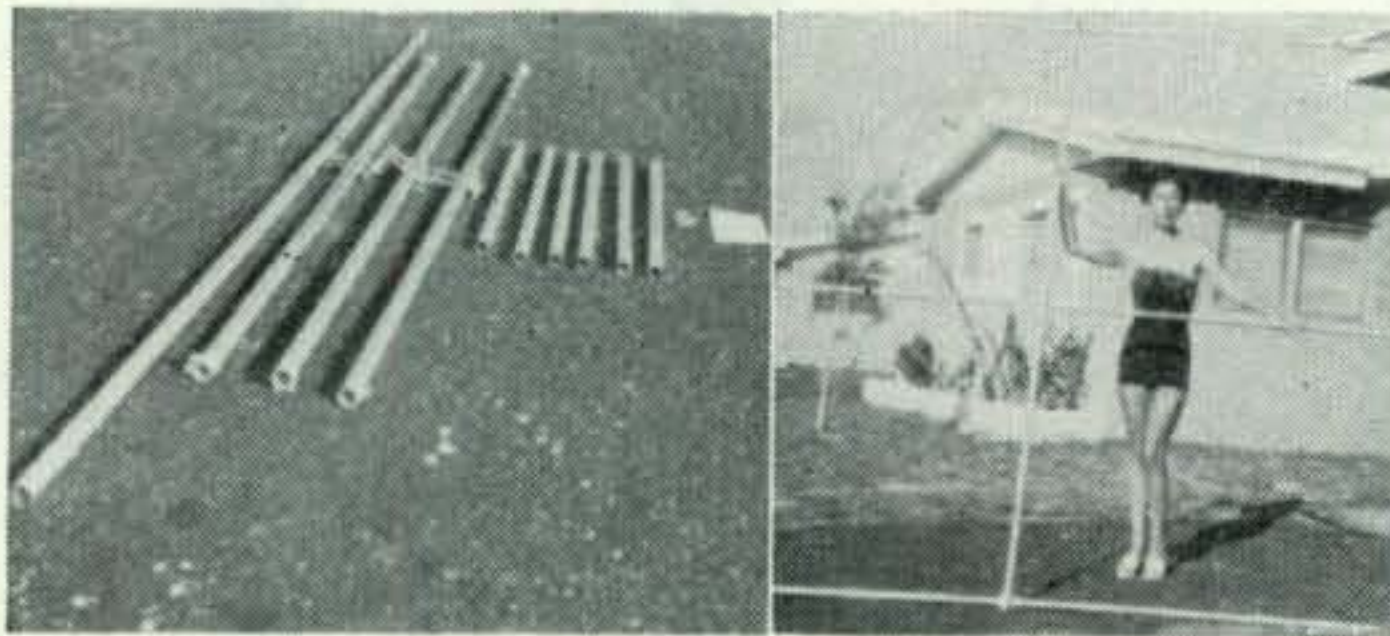
KEN-ELS RADIO SUPPLY

For further information, check number 25 on page 126.

WE HANDLE

- Dow Key
- Hammarlund
- National
- WRL Electronics
- R.L. Drake
- Hallicrafters
- Many Others

YOU COULD WORK WONDERS IF YOU HAD A GOTHAM BEAM!



Study these specifications — compare them — and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

MORE DX CONTACTS

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (6.6 db.).

THOUSANDS IN DAILY USE

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. No electronic equipment or measuring devices are required.

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

YOU WILL WORK THE WORLD

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use 5/8" and 3/4" tubing elements; the deluxe models for these bands use 7/8" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

TRIBANDER BEAMS — TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

TECHNICAL CHARACTERISTICS

S.W.R. On Each Band	1:1
Diameter of Elements	7/8" & 1"
Number of Booms	2
Diameter of Booms	1"
Boom Length	12'

6-10-15 Tribander

GAIN	F/B RATIO
6.5db on 6 mtrs	23db on 6 mtrs
7.8db on 10 mtrs	27db on 10 mtrs
6.5db on 15 mtrs	23db on 15 mtrs

10-15-20 Tribander

GAIN	F/B RATIO
6.5db on 10 mtrs	23db on 10 mtrs
7.8db on 15 mtrs	27db on 15 mtrs
6.5db on 20 mtrs	23db on 20 mtrs

All Two-Bander Beams Have A Forward Gain Of 5.8db On Each Band, And A F/G Ratio of 17db.

Two-Bander Beams Available In Following Combinations: 6-10; 10-15; 10-20; and 15-20. See Coupon.

You could work KC4USA in the Antarctica with only 90 watts on 15 meters, as W4SK did. You could work over 100 countries with a three element 10 meter beam, and be a top man on the frequency, like WØDEI.

You could work terrific skip and DX with reports of 20 over 9, with as little as 36 watts input on 20 meters, as W. E. Woods did.

You could work 29 states in three months on six meters, with low power, as K2LHP did.

NO TRAPS, COILS, BALUNS, STUBS OR INSULATORS USED!

Airmail Order Today — We Ship Tomorrow

GOTHAM

Dept. CQ

1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TWO BANDER BEAMS

<input type="checkbox"/> 6-10 TWO BANDER	<input type="checkbox"/>	\$29.95
<input type="checkbox"/> 10-15 TWO BANDER	<input type="checkbox"/>	34.95
<input type="checkbox"/> 10-20 TWO BANDER	<input type="checkbox"/>	36.95
<input type="checkbox"/> 15-20 TWO BANDER	<input type="checkbox"/>	38.95

TRIBANDER

<input type="checkbox"/> 6-10-15	\$39.95	<input type="checkbox"/> 10-15-20	\$49.95
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2 METER BEAMS

<input type="checkbox"/> Deluxe 6-Element	9.95	<input type="checkbox"/> 12-El	16.95
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6 METER BEAMS

<input type="checkbox"/> Std. 3-El Gamma match	12.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 3-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Std. 4-El Gamma match	16.95	<input type="checkbox"/> T match	19.95
<input type="checkbox"/> Deluxe 4-El Gamma match	25.95	<input type="checkbox"/> T match	28.95

10 METER BEAMS

<input type="checkbox"/> Std. 2-El Gamma match	11.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 2-El Gamma match	18.95	<input type="checkbox"/> T match	21.95
<input type="checkbox"/> Std. 3-El Gamma match	16.95	<input type="checkbox"/> T match	18.95
<input type="checkbox"/> Deluxe 3-El Gamma match	22.95	<input type="checkbox"/> T match	25.95
<input type="checkbox"/> Std. 4-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Deluxe 4-El Gamma match	27.95	<input type="checkbox"/> T match	30.95

15 METER BEAMS

<input type="checkbox"/> Std. 2-El Gamma match	19.95	<input type="checkbox"/> T match	22.95
<input type="checkbox"/> Deluxe 2-El Gamma match	29.95	<input type="checkbox"/> T match	32.95
<input type="checkbox"/> Std. 3-El Gamma match	26.95	<input type="checkbox"/> T match	29.95
<input type="checkbox"/> Deluxe 3-El Gamma match	36.95	<input type="checkbox"/> T match	39.95

20 METER BEAMS

<input type="checkbox"/> Std. 2-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Deluxe 2-El Gamma match	31.95	<input type="checkbox"/> T match	34.95
<input type="checkbox"/> Std. 3-El Gamma match	34.95	<input type="checkbox"/> T match	37.95
<input type="checkbox"/> Deluxe 3-El Gamma match	46.95	<input type="checkbox"/> T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm-coax. T-match beams use 300 ohm line.)

NEW! RUGGEDIZED 6, 10, 15 METER BEAMS

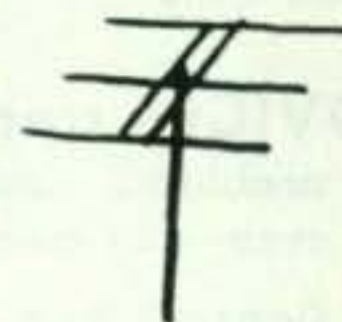
Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

<input type="checkbox"/> Beam #R6 (6 Meters, 4-El)	\$38.95
<input type="checkbox"/> Beam #R10 (10 Meters, 4-El).....	40.95
<input type="checkbox"/> Beam #R15 (15 Meters, 3-El).....	49.95

Name

Address

City Zone State



DX [from page 88]

KA8KW—Col. Jerry Branch, USAF, 6921st RGM, APO 919, c/o PM, San Francisco, Calif.

KG4AQ—D.S. Metzger, CTC Box 41, Navy 115, FPO, New York City.

KG6FAE—M/Sgt. W. W. Willis, MARS Station, APO 334, c/o PM, San Francisco, Calif.

KW6CA—Ivan C. Lundblom, c/o CAA, Wake Island, Pacific.

LU1ZS—(QTH: Tinienn Camara, Half Moon Island, South Shetlands) QSL via K4MKN.

MP4BCC—QSL via W4GNC.

OY7ML—Box 184, Torshavn, Faeroes Islands.

SV1AB—G. Vernardakis, 3 Erithrea St., Peristri, Athens, Greece.

SVØWP—USASG, APO 223, c/o PM, New York City.

UA9DN—Vladimir Semenov, Mamina-Siberiaca St., 171/90-r 67, Sverdlovsk 55, USSR.

UB5DW—Anatoly Chichko, PO Box 58, Kiev-1, USSR.

UB5KAB—Leo P. Yailenko, PO Box 27, Stalino, Ukraine, USSR.

UO5AA—Glushkov Valentin Petrovise, Box 1, Kagul, Moldavia SSR, USSR.

VP2AZ—Bill, PO Box 10, Antigua, Leeward Islands, BWI.

VP2KM—Bill J. Mashek, WØCPM, 1729 S. 86th Ave., Omaha, Nebr.

VP5FH—Seth F. Hudson, Mayaguana Island, Patrick AFB, Cocoa, Fla.

VP5TS—Hugh Green, 42 Patrick Lane, Rockledge, Fla.

VP8CW—QSL via ISWL, 86 Barrenger Rd., London N10, England.

VP8CY—QSL via G8FC.

VQ2FC—Vic, Box 19, Broken Hill, Northern Rhodesia.

VQ4AQ—G. J. Dent, PO Box 3268, Nairobi, Kenya.

VR1A—Charles W. Adams, c/o Wireless Telegraph Dept., Tarawa, Gilbert Islands.

VR6TC—QSL via John Maddox, W4TAJ, RFD #3, Johnson City, Tenn.

VS9AG/ZD3—PO Box 283, Bathurst, Gambia.

VS9AJ—QSL via VS9AD, RAF, Khormaksar, Aden.

VU2GE—Anadi Ganguly, 3/1A, Krishna Ram Bose Street, Calcutta 4, India.

XV5A—L. M. Rundlett, 137 Rue Pasteur, Saigon, Viet Nam.

XW8AE—QSL via REF.

YJ1DL—Dave Laing, Santo, New Hebrides.

YUIUB (revised)—Strahinic "Mile", Rumenacka 85, Novi Sad, Yugoslavia.

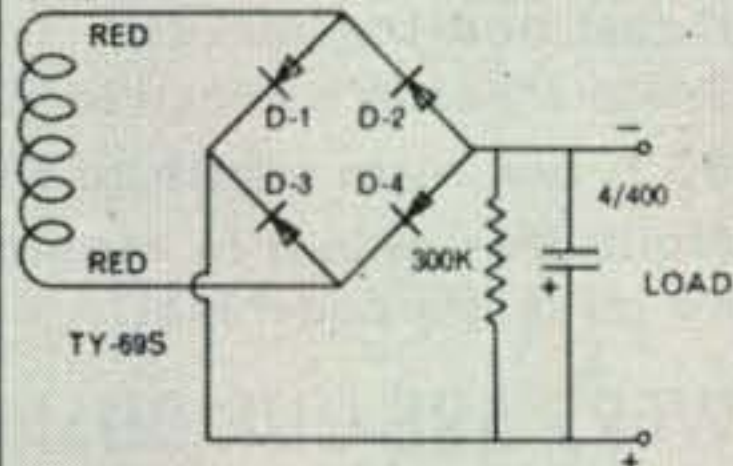
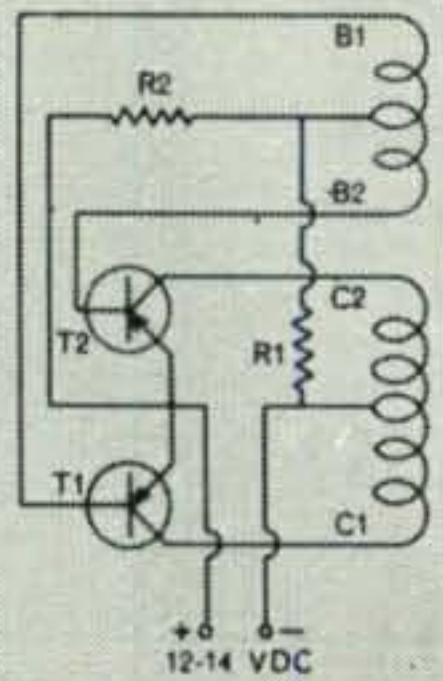
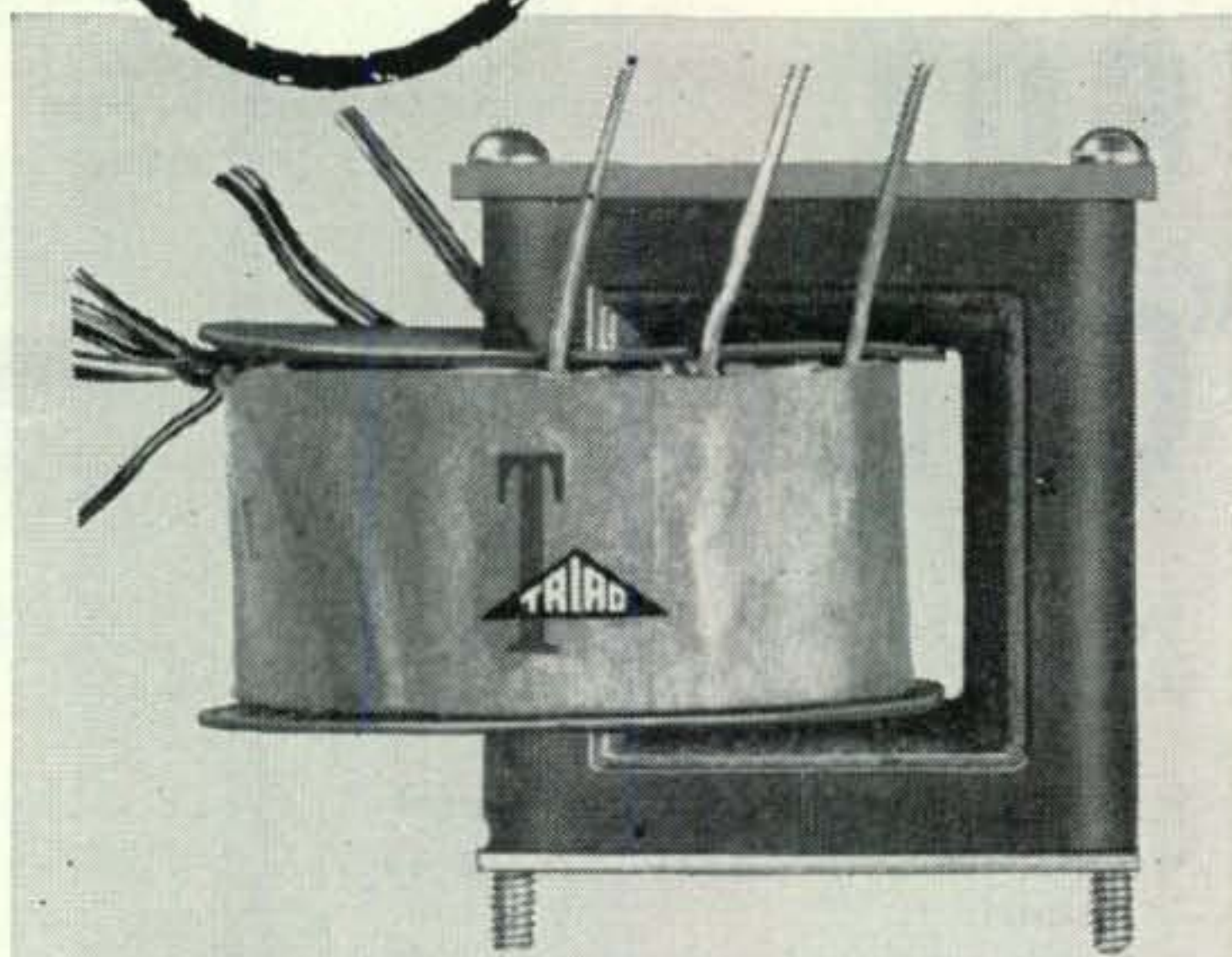
ZC4IP—Geo. F. Barrett, Box 219, Limassol, Cyprus.

9G1BQ—John, PO Box 109, Tarkwa, Ghana.

9G1CM—Mike H. Coleman, PO Box 100, Hohoe, Ghana.



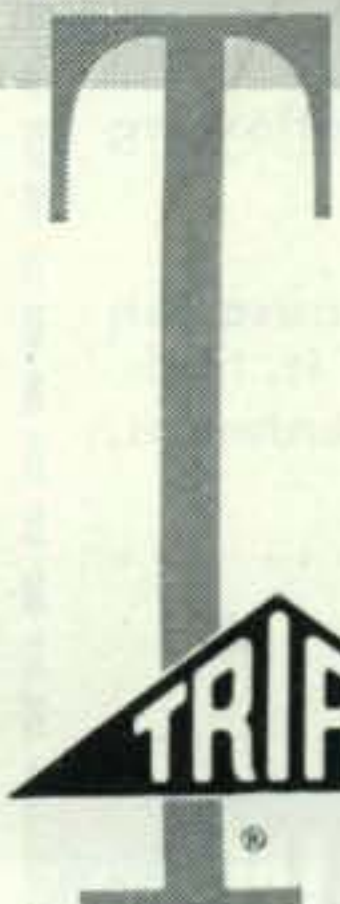
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- T1 & T2 2N277
- R1 200 OHM, 4W
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- D1 D2 D3 & D4 — M500

High Efficiency Power Transformer for Mobile Transistor Power Supplies

NEW "DC Transformers" especially designed for DC transistor circuits, with an efficiency of 80% to 85% for the entire supply, are available from Triad. The types listed here are standard Triad catalog items you can get from your Triad distributor. For a complete listing of all Triad transistor transformers, please write for your copy of Catalog TR-58.



Type No.	Input Volts	Output Volts	Current Ma.	Net Price
TY-68S	12-14	250	65	\$8.34
TY-69S	12-14	300	100	10.56
TY-70S	12-14	325	150	11.40
TY-71S	12-14	375	200	12.30
TY-74S	12-14	600	200	15.00

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VENICE, CALIFORNIA | HUNTINGTON, INDIANA

A SUBSIDIARY OF LITTON INDUSTRIES

For further information, check number 26 on page 126.

tell them you saw it in CQ

WE'VE GOT "QSHT" *

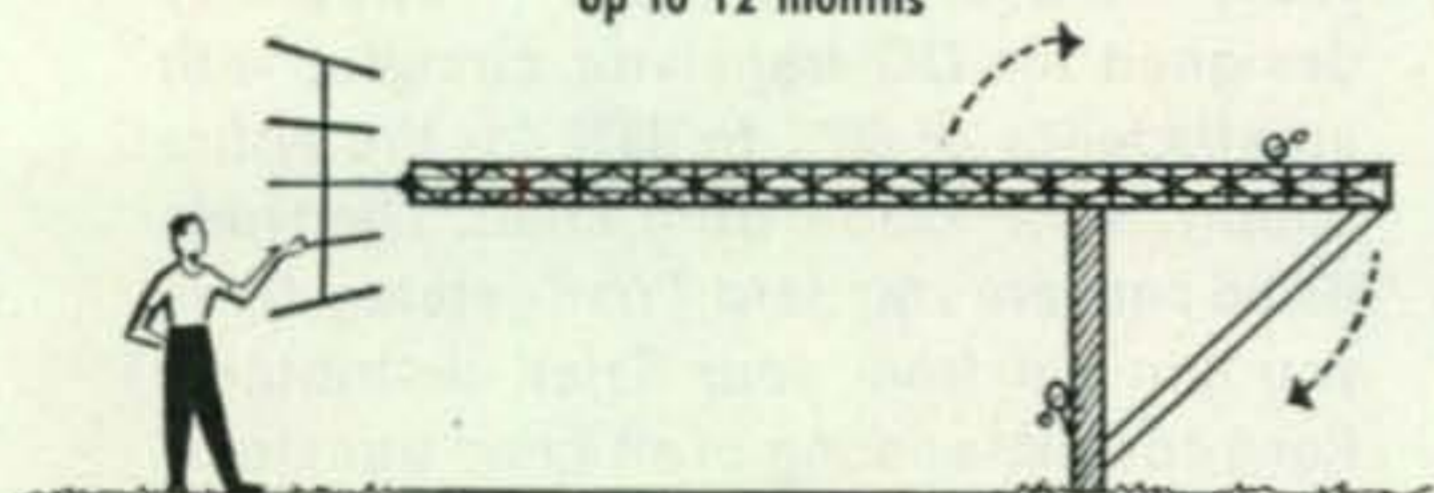
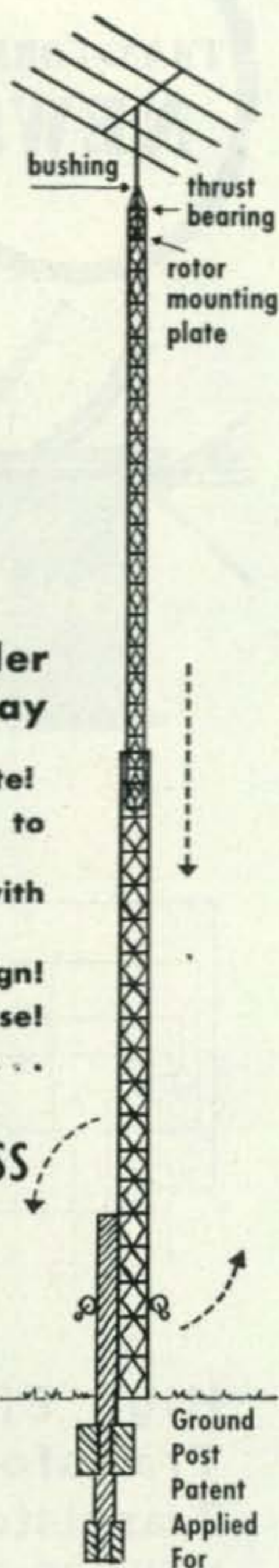
World famous "Wonder Post" exclusively E-Z Way

- Crank up or down - 1 minute!
- Tilts over for easy access to beam!
- Rotor mounts inside tower with thrust bearing above.
- Brute steel in attractive design!
- 30 types from which to choose!
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SURPLUS [from page 83]

SOLDER 4-40 3/16" HEX NUT AS SHOWN

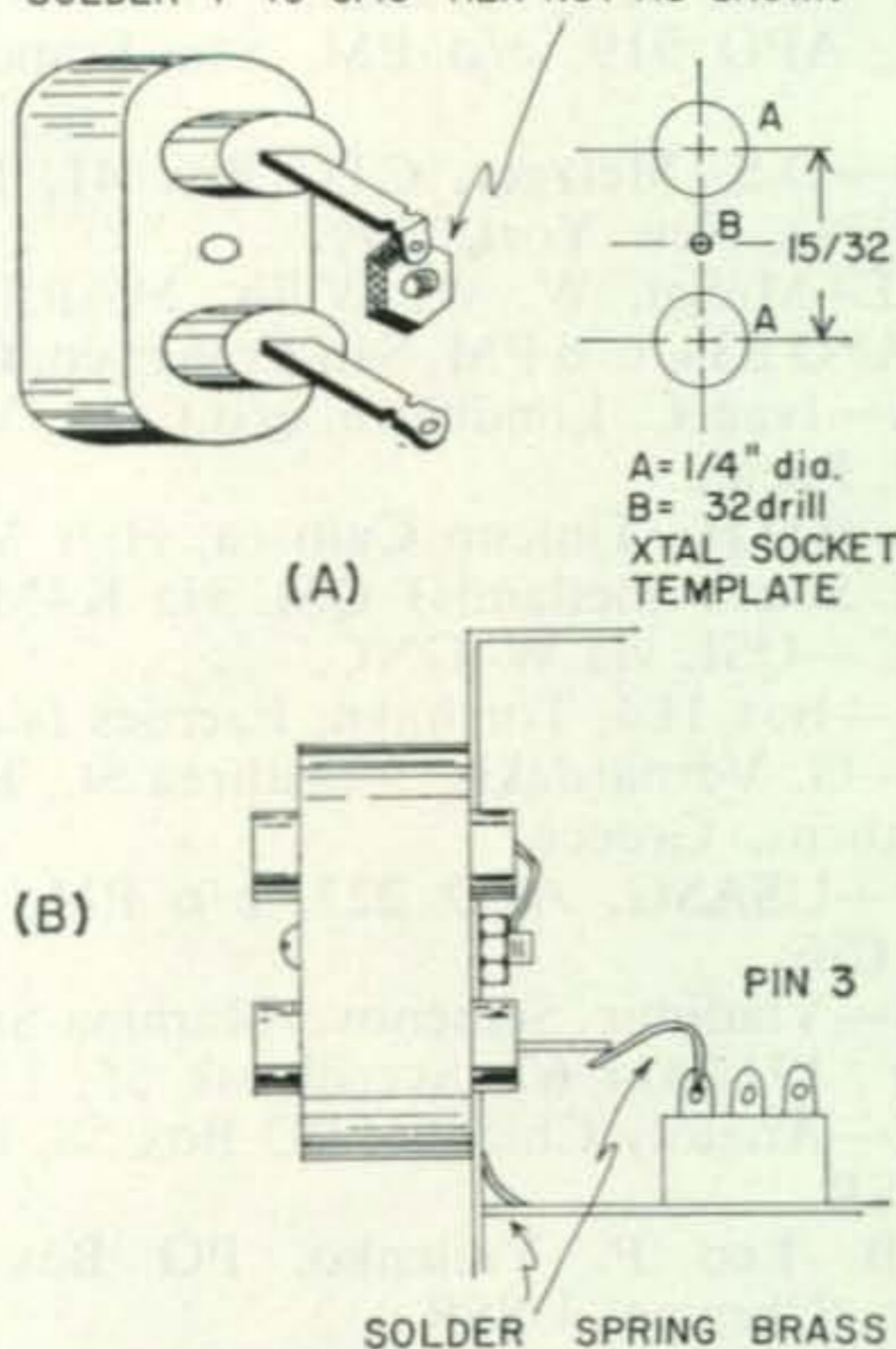


Fig. 2—Crystal socket assembly

should slip out easily. If it does not, careful work with a knife or file is indicated, to remove the solder which may have flowed inside the case and caught on a sub-chassis during the sealing process. With a soldering iron and a file clean up the excess solder and flux. It is not necessary to remove the top cover since all adjustments can be made through holes drilled into the body of the transceiver. Clean up the paint which has probably scorched and repaint later if desired.

The holes shown in Fig. 1 and a socket for the crystal assembled as in Fig. 2. Connections to the crystal are made by unsoldering the lead going to the internal crystal and soldering a small piece of springy brass to the grid connection of the socket so as to make contact with the bottom lug of the crystal socket as shown in Fig. 2. The crystal originally installed is located within the base of a coil and must be disconnected as it serves no purpose. There is no need to remove the crystal—just disconnect it. This is done by clipping the wire from pin 3 of the 3A5 and connecting the brass as already explained. A similar piece of brass should be soldered to the chassis deck so as to make ground contact to the case for the crystal return. Both of these are similar to the finger that contact the antenna when the unit is fully assembled in the case. Of course this method of connections to the crystal could be made by wire if you remove the top of the case, but that would mean having to disconnect it every time you wanted to change a tube.

Since the transmitter was just below the frequency of the two meter band we found that we merely had to peak the output on the

[Continued on page 115]



ARC-5/28 RECEIVER

2-meter Superhet, 100 to 156 Mc in 4 crystal channels. Complete with 10 tubes. **BRAND NEW \$22.45**
110 V AC Power Supply Kit for above.....\$9.75

ARC-5/T-23 TRANSMITTER

100-156 Mc Includes 2-832A, 2-1625 Tubes, all crystals. **BRAND NEW \$19.95**
Modulator for above. New, with tubes.....\$4.95
SPECIAL OFFER! Limited quantity ARC-5/T23 xmitters. **BRAND NEW, less tubes.....\$7.95**
Excellent Used, less tubes.....\$5.95

ARC-5 MARINE RECEIVER-TRANSMITTER

Navy Type Comm. Receiver 1.5 to 3 Mc **BRAND NEW with 6 tubes.....\$16.95**
Navy Type Comm. Transmitter 2.1-3 Mc **BRAND NEW with 4 tubes and Xtal.....\$12.45**



LORAN APN/4 OSCILLOSCOPE

Easily converted for use on radio-TV service bench.

Completely Assembled BRAND NEW! Supplied with 5" Scope, type 5CP1 only. **\$19.95**
Excellent. Used\$10.95

BRAND NEW SPECIAL PURPOSE TUBES

In Original Individual Packing

Type	Each	Type	Each	Type	Each
RK34	\$.39	CRP-730A	\$4.50	1626	\$.21
RK65	7.25	813	6.95	1629	.27
2C42	4.95	815	2.99	2X2	.39
2C46	3.50	826	.44	6A7	.35
2J724B	.35	829B	7.50	6AG5	.33
VR105	.79	832A	5.95	6J6	.33
VR150	.79	837	1.15	12SA7	.34
304TL	8.95	1625	.29	12SQ7	.33
717A	.29				

NEW! Cathode Ray Tubes NEW!

3CP1	\$1.18	5CP1	\$2.45
3FP7	1.18	5FP7	1.44
5BP4	2.22	9LP7	1.86



BC-906 FREQ. METER—SPECIAL!

Cavity type, 145 to 235 Mc. **BRAND NEW**, complete with antenna. Manual incl.

OUR LOW PRICE \$9.99

SCR-274 COMMAND EQUIPMENT

Type	Description	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	\$14.95	\$18.95
BC-454	Receiver 3-6 Mc	9.95	12.95
BC-455	Receiver 6-9 MC	9.95	13.50
BC-457	TRANSMITTER—4-5.3 Mc. complete with all tubes and crystal. BRAND NEW		\$7.88
BC-458	TRANSMITTER—5.3 to 7 Mc. complete with all tubes and crystal. BRAND NEW		\$7.88
BC-459	TRANSMITTER—7-9.1 Mc. complete with all tubes and crystal BRAND NEW		\$11.95
ARC-5/T-19	TRANSMITTER—3 to 4 Mc. BRAND NEW complete with all tubes & crystal		\$8.88

110 VOLT AC POWER SUPPLY KIT

For All 274-N and ARC-5 Receivers

Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. Complete kit of parts with metal case, instructions **\$7.95**
Factory wired, tested, ready to operate.....**\$11.50**

SPLINED TUNING KNOB for 274-N and ARC-5 RECEIVERS. Fits BC-453, BC-454 and others. **Only 49¢**

DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—**BRAND NEW**, only\$2.95

DYNAMIC HEADPHONES, 600-ohm impedance, with large ear-phone cushions, cord, phone plug. **BRAND NEW**, special **\$3.95**

WESTINGHOUSE 2½" round Panel Meter —10 to +4 DB, **BRAND NEW**\$2.95

SCHEMATIC DIAGRAMS For any equipment on this page, each **65¢**

FOR HOME—FOR OFFICE FOR FACTORY!

BC-605 INTERPHONE AMPLIFIER

Easily converted to general purpose inter-communication set. A fabulous BUY at this **LOW PRICE! BRAND NEW, \$4.95** with original schematic.....

AC Conversion Instructions for above.....65c



NAVY "HANDY-TALKY" TRANSCEIVER—Two way communication by voice or MCW up to 30 miles. Xtal controlled transmitter 140.58 Mc. Superregen. Receiver. Telescopic Antenna. Press-to-Talk Switch. Overall 15½" x 2½" diam. **\$22.50**
Our low price, less batteries, each.....

BC-357 RADIO BEACON RECEIVER—62 to 80 Mc, radio controlled, has 10,000 ohm plate relay, works on 24 V. AC. @ 5 A, and 220 V DC. @ 20 Ma. Fine for remote control, garage door opener, etc. **BRAND NEW, WITH TUBES.....\$4.45**

SCR-522 2-METER RIG!

Terrific buy! VHF Transmitter-receiver, 100-156 Mc. 4 channels. Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition.

SCR-522 Transmitter-Receiver, complete with all 18 tubes, top rack and metal case.

COMBINATION Special \$33.33

Receiver only, with all tubes.....\$19.50
Transmitter only, with all tubes.....\$22.25
Shock mount for above.....\$ 2.45
Accessories for above available.

BC-929 3" SCOPE INDICATOR COMPLETE

Originally used for IFF and Radar Navigation. Can be easily converted for general bench service work. Tubes included: 2-6SN7, 2-6H6, 1-6X5, 1-6G6, 1-2X2 and 3BPI Cathode Ray Tube. A **TERRIFIC BUY** at our **\$12.95** low price! Excellent used

As Above, **BRAND NEW.....\$14.95**
Conversion instructions for AC operation65



INTERPHONE AMPLIFIER

Type BC-347C. Fully wired, ready to operate! Uses 6F8G tube. Housed in metal container 5¼"x3¼"x2¾" high. **\$3.45**
A **SPECIAL VALUE** at our low price.....

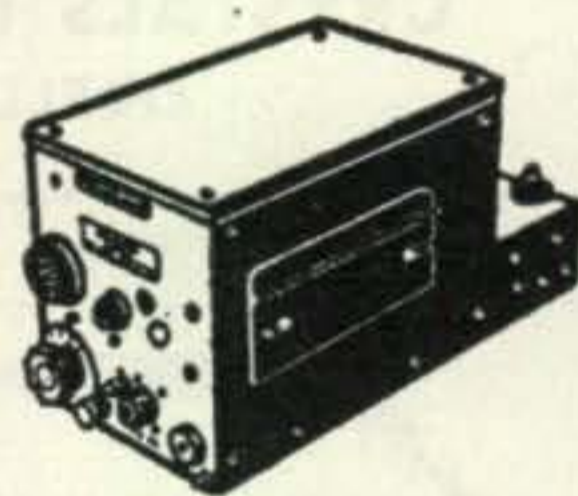
234-258 MC RECEIVER

AN/ARR-2

BRAND NEW 11-tube UHF Tunable Receiver with schematic. Only a few at this low price! **\$9.99**
Complete with tubes....

With 28V 1.6A Dynamotor, complete\$12.98

110 VOLT AC POWER SUPPLY KIT for above.....\$9.75



BC-659 TRANSMITTER & RECEIVER

27 to 38.9 Mc F.M. Two preselected channels crystal controlled. 5 to 10 watts. Complete with speaker, tubes. **\$11.95**
Excellent Used

POWER SUPPLY for above, 117 V 60 cy AC.....\$16.95

VIBRATOR POWER SUPPLY for above, works on 6-12-24 V DC\$ 9.95

GOLD PLATED SPECIAL! TS-1/ARR-1 TEST OSCILLATOR

Portable, complete with two 955 tubes cavity and antenna. **BRAND NEW**, in metal housing 9¼"x6¼" x7" high. **OUR LOW PRICE**, each..... **\$3.95**

FL-5 FILTER79c

BC-442 ANTENNA RELAY

Wonderful Value! Consists of ¼ amp 2" RF Ammeter (antenna current indicator). 0-10 scale. Transmitter-Receiver Switching relay, in aluminum case with associated components. **BRAND NEW.....\$2.49**



Please include 25% Deposit with order—Balance C.O.D. 50c **HANDLING CHARGE** on Orders under \$5.00 **MINIMUM**. All Shipments F.O.B. Our Warehouse N.Y.C.

G & G Radio Supply Co.
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Order your crystals from CRYSTALS, INC. Where you get ACCURACY, DEPENDABILITY, QUALITY, LOW PRICES and ONE DAY SERVICE.

AMATEUR BAND CRYSTALS

NOT SURPLUS! New quartz ground and etched to your EXACT SPECIFIED FREQUENCY. Checked on HP CYCLE COUNTERS. Mounted in surplus FT243 holders to save you money.

1500KC to 2000KC\$2.00 ea. postpaid
2001KC to 8995KC\$1.50 ea. "
8996KC to 11000KC\$2.50 ea. "
Any above crystals in DC34-DC35 holders \$1.00 extra

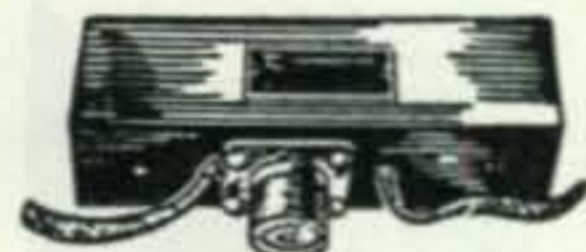
SSB FILTER CRYSTALS

Plated type in FT241A holders. All Channels 370KC to 534KC (except 500KC) 55¢ each postpaid. 500 KC—\$1.25 postpaid.

Channel groups accurately matched—No Extra Charge.

SUPERIOR COMMERCIAL CRYSTALS

CRYSTALS, INC. can supply highest quality Commercial Crystals that meet all FCC standards—in a fraction of the time required elsewhere. Write call or wire your Commercial Crystal needs.



"IMPEDACOUPLER"

The ideal line connector for coax fed antennas

Weatherproof, strainproof, constant impedance. Takes standard coax connector. Amateur net postpaid...\$4.95

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No C.O.D.s

Satisfaction guaranteed or your money back!
ILLINOIS ORDERS . . . Please include sales tax.

CRYSTALS INCORPORATED

ODELL, ILLINOIS

For further information, check number 29 on page 126.

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BC-610E



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Radio Products Sales, Inc., Los Angeles, Calif.
Portland Radio Supply Co., Portland, Ore.
Busacker Electronic Equipment Co., Inc., Houston, Tex.
Grice Radio & Electronic Supplies, Inc., Pensacola, Fla.

Voice of America Ham Program



Bill Leonard, W2SKE who writes and voices the VOA ham program.

The amateur radio programs on the Voice of America have resumed and will be heard each Tuesday at 4-4:30 pm EST on the following frequencies: 21,500; 21,485; 17,875; 15,250; 15,130; 9635 and 7110. The show will be repeated on 173 kc at 2230 GMT from the Munich 1000 kw transmitter and again on Wednesday at 0400 GMT from Tangier on 15,205 and 11,875 kc. The program is written and voiced by Bill Leonard, W2SKE (and H18SKE), one of America's leading news commentators. Gene Kern, W2BAK produces the program and George Jacobs, W3ASK provides the propagation forecasts. Hams and SWL's everywhere are invited to send their QSL cards reporting on the program and will receive a distinctive QSL which has been prepared by the VOA. (Does not count for WPX.) QTH: Amateur Radio, IBS/EC, Voice of America, Washington 25, D. C.

hamfests

Orlando, Florida

The Orlando Amateur Radio Club will hold its Traditional Sunday-After-Easter Hamfest April 13th at Sanlando Springs, one of Florida's finest tourist attractions. For details write to the club at P.O. Box 2067, Orlando, Florida.

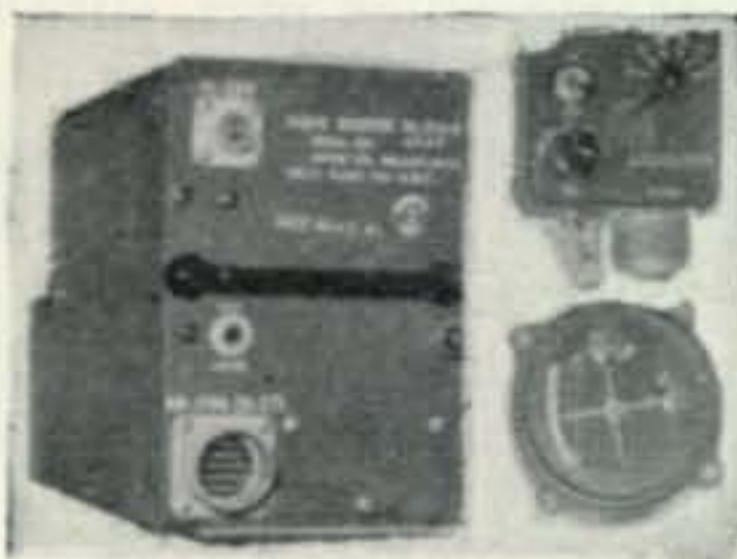
Trenton, New Jersey

The Delaware Valley Radio Association will hold its 13th annual Old Timers' Nite Round-Up and Banquet in the Grand Ballroom of the Stacy-Trent Hotel, West State Street at Willow, Trenton, April 19th.

The club station, W2ZQ will be open for your inspection from noon 'til 5:00 PM.

Tickets are by reservation only and may be obtained by mailing a self-addressed envelope on or before April 15th with remittance of \$6.00 per person or from E. G. Raser, W2ZI, 315 Beechwood Ave., Trenton 8, N. J.

"EXPLORER" SATELLITE RECEIVER

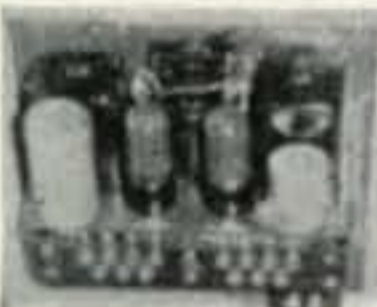


Receive Radio Signals being transmitted by the U.S. Satellite—on approx. 108 MC. This Receiver is AM and Crystal Control on Six pre-set frequencies in the 108.3 to 110.3 MC range. Provides audio and band pass filter output of 90 & 150 cycles for aircraft instrument landing for which it was originally used. Complete with Ten Tubes: 1/12AH7, 2/12SG7, 2/12SR7, 1/12SQ7, 3/717, 1/12A6. Crystals and Schematic. Voltage required: 12 or 24

VDC & 220 VDC 80 MA. Size: 13 1/2" x 5" x 7". Also can be converted to FM Receiver 80 to 108MC. Used, less tubes & crystals: \$4.95—New, Complete with Tubes and Crystals \$12.95
Control Box—New: \$2.00—Cross Point Indicators, Used: \$2.00
Plugs for Receiver, Indicator, or Control Box..... \$1.00 Each.

BC-906D FREQUENCY METER: \$7.95

Absorption Type—using the dip of a 2" 0-500 DC Microammeter for frequency indication. Battery operated, with Chart and Manual—Prices: Used \$7.95 — New..... \$9.95



AMPLIFIER Using 2/6V6 Tubes, Carbon Mic. input and tapped output Transformer. Audio Oscillator for signaling. With Tubes; less Dynamotor—**\$1.95**
BC-367—12 Volt, less Case—New.....

BC-667—24 Volt, with Case—New **\$2.95**

SCR-522 REC.-TRANS. AM—100—156 MC, complete with tubes—Used \$29.95

REC. Only, Less Shifters: With Tubes \$14.95 Less Tubes \$ 7.95
TRANS. Only, Less Shifters: With Tubes \$18.95 Less Tubes \$ 7.95

SEND TODAY FOR FREE CATALOG

PANORAMIC ADAPTER \$34.95

NAVY MODEL RDP—115/230 Volt 60 cycle; for viewing of Radio Signals on 3" C R Tube 5 MC above and below the receiver frequency simultaneously; 30 MC input, 10 MC Max. sweepwidth. Size: 18" L x 10" H x 17" W. Used—complete with Tubes.

FM RECEIVERS & TRANSMITTERS

20 TO 38.9 MC And 150 TO 172 MC

TRANS.-REC.—150 to 172 MC FM—Fixed Freq. Crystal Control; less Crystal. Both units on a common chassis. Trans. 30 Watt—Separate 6 VDC Power Supply. Complete w/Cables, Control Unit, Mic. & Antenna. Used, Checked, Raytheon #21TR11A..... \$59.50

BC-603 FM RECEIVER—20-27.9 MC. Used: \$14.95. New: \$19.95
BC-683 FM RECEIVER—27-38.9 MC. Used: \$24.95. New: \$29.95
BC-604 TRANS.-FM—20 to 27.9 MC—Used: \$14.95—New: \$19.95
BC-924 TRANS.-FM—27 to 39.1 MC—Used: \$14.95—New: \$19.95
BC-620 TRANS.-RECEIVER FM—20 to 27.9 MC Used: \$14.95
BC-659 TRANS.-RECEIVER FM—27.9 to 30.1 MC..... Used: \$19.95
6 or 12 VDC Power Supply for BC-620 or BC-659—U. \$ 9.95 N. \$12.95



RADAR OSCILLOSCOPE

Control Indicator with 25 Tubes, consisting of: 12/6SN7, 5/6SL7, 7/6V6, & 1/5CP1. All Controls on front panel, such as horizontal, vertical, sweep, intensity, centering, input and output circuits, etc. Voltage required: 2400 VDC 300 VDC & 6.3 V. Size: 24" L x 20" D. x 10 1/2" H. Complete with tubes and circuit diagram.....NEW: **\$14.95**

RD-7/APA-23 RECORDER \$29.95

Electro-Mechanical Device—intended to record radar search receiver Freq. & Time signals. Requires two minutes for sweep across recording paper. Automatic or manual operation. Operates on 80/115 V. 60—1200 cycle & 28 VDC. New.....\$29.95

PHONE PATCH TRANS.

No. C-161
\$1.95



1020 cycle acceptance or rejection. W/PL-55 Plug & Cord for plugging into Rec. Two output jacks, New: \$1.95
FL-C Filter, Used \$1.50
FL-5 Filter\$1.00

SIDE BAND LOADING COIL

No. C-114
\$1.95

BC-929 RADAR OSCILLOSCOPE

BC-929 RADAR OSCILLOSCOPE—Makes a low cost station monitor. Has horizontal, focus, sweep, & intensity controls. Tubes: 1/3BP4, 2/6H6, 2/6SN7, 1/6G6, 1/6X5, 1/2X2, and Antenna Change Motor. Voltage required: 115 V 400 cycle & 24 VDC. For conversion, see QST, August, '57. USED: \$9.95 — NEW: \$14.95

BC-191 TRANS. \$24.95

100 Watt, Voice CW, Freq. 200-500 KC. 1500-12500 KC by use of plug in Tuning Units. Uses 1/10y & 4/VT-4C Tubes. Size: 23" L x 21" H x 8" W. Complete with tubes, less tuning units. 12 Volt. Used\$24.95 — New.....\$34.95

BC-1158 TRANS. \$29.95

Easily converted to 6 Meters. Frequency coverage 53.3 to 95 MC — 50 Watt RF Doubler Amplifier & Modulation sections, complete with 4/815 & 10/12SN7 Tubes. For conversion, see C Q, January, 1957 issue. Used.....\$29.95 — New...\$39.95

T-121 Crystal Control TRANS. 3.5-4 MCNew: \$ 5.95
25 — 40 Watt TRANS. FOUNDATION UNIT (See March Ad).... \$ 2.95
RADAR TRANS. 143 to 194 MC (See March Ad)..... \$ 2.95
GASOLINE ENGINE GENERATOR (See March ad details)..... \$79.50

DM-35 DYN. New: \$14.95 Used: \$11.95

DM-34 DYN. New: \$ 4.95 Used: \$ 2.95

12 VDC DYNAMOTORS:

	NEW:	USED:
625 VDC—225 MA—DM-35	\$14.95	\$11.95
540 VDC—450 MA—DA-12	14.95	11.95
425 VDC—163 MA—WE-377	12.95	9.95
225 VDC—100 MA—D-402	8.95	5.95
220 VDC—80 MA—DM-34	5.95	2.95
230 VDC—90 MA—PE-133	4.95
150 VDC—100 MA—DM-310X	2.95
250 VDC—60 MA—DM-32-12V	4.95
250 VDC—50 MA—DM-25	4.95	2.95
500 VDC—50 MA—USA/0515	4.95	3.95
24 VDC—1.5 A—USA/0515	4.95	3.95
300 VDC—150 MA—CTR-124	5.95	4.95
230 VDC—90 MA—DM-21	5.95
275 VDC—150 MA—DM-64	8.95

6 VDC DYNAMOTORS:

640 VDC—260 MA—Reconditioned by G.E.....\$12.95
420 VDC—260 MA—Reconditioned by G.E..... 9.95
Write us your needs in other type Dynamotors, Inverters, etc.

OSCILLATOR TS-385

Crystal controlled, 376 to 418 MC; 115 V 60 cycle input. Tubes: 6X5, 6K7, 6J5, 6V6, 6A8, & 3970. KC Crystal w/Schematic. Used:\$ 9.95
New:\$12.95

HIGH FREQ. RECEIVER



53 to 88 MC — For remotely controlled radio systems on pre-selected fixed Freq. Complete with 6 Tubes: 1/6SN7, 3/6SL7, 1/6SG7, 1/6J5, and 24 Volt DynamotorNew: \$6.95

TELEPHONE & CONTROL EQUIPMENT

CONTROL UNIT

RM-53—Used to operate radio equipment and provide remote control and intercom. of such equipment by use of the RM-52 Unit listed below. Up to 1/2 mile. Uses 2 flashlight batt. Internal transformer has High-Low impedance Sw. and Sidetone. Also Mic. & Phone Jack & PL-55 & PL-68 Plugs. Used: \$2.95—New: \$4.95



REMOTE CONTROL RM-52 — Can be used with RM-53 or used as a separate telephone system. Uses 4 flashlight batt. Also can be used as a direct remote control for radio equipment. Provides bias for Mic. & Sidetone to headset. High or Low imp., Mic. & Phone Jacks. Can be used also as a Phone Patch Unit. Used: \$1.95
New: \$2.95



TS-13 HANDSET for RM-53 or RM-52Used: \$3.95

TRANSFORMERS And CHOKES:

1080 VCT/190 MA—6.3/1.2; 6.3/3.6; 5V/4	\$4.95
600 VCT/100 MA—6.3/5A; 5/3A	3.95
240 VCT/35 MA—24/9A; 6.3/6; 6.3/3	1.75
1500 VCT/260 MA—6.3/3A; 6.3/5A; 5V/4.5A	7.95
700 VCT/150 MA—6.3/4.5A; 5V/3A	3.95
1890 VCT/12.6 MA Tapped 2.5V/2A	3.95
1100 VCT/80 MA—7.5 VCT/3.25A	3.95
560 VCT/70 MA—6.3V/2.1A; 5V/3A	2.95
16 Volt 35 Amp.....\$14.95 9 Volt CT 35 Amp.....	5.95
5V/2 Amp. 3 windings; 5V/6A.....	2.95

TRANSFORMERS FOR SURPLUS EQUIPMENT:

1200 VCT/200 MA—12.5/2A; 12.5/2A; 5V/3A	H-108: \$8.95
500 VCT/50 MA—24V/1A; 6.3V/1A	H-109: 4.95
500 VCT/80 MA—24V/2A; 5V/3A	H-110: 4.95
12.6/2 Amp.....\$1.95 24V/1 Amp.....	1.95
Dual Winding—12V/4 Amp. or 24V/2 Amp.....	5.95

CHOKE 12.5 HY/100 MA	1.95
CHOKE 10 HY/250 MA	4.95
CHOKE 8 HY/150 MA 200 ohm Open Frame	1.25
CHOKE 5 HY/150 MA 85 ohm	1.50

ADDRESS DEPT. CQ • MINIMUM ORDER \$5.00 • PRICES F.O.B. LIMA, OHIO • 25% ON C.O.D. ORDERS

FAIR RADIO SALES

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LIMA, OHIO

For further information, check number 30 on page 126.

HARRISON

'Ham Headquarters, USA'
Can help you

SQUIRT MORE SIGNAL
where you want it!

We have all the best makes and models of beams, towers, rotators, cables, matching devices, relays, measuring equipment—(everything from ground rods up!) Plus a wealth of practical Antenna experience which can guide you to the best results with the least effort and expense!

Let Harrison help you
get it up—right!

Here's the new,
low priced

C.D.R. HEAVY DUTY HAM ROTOR

Guaranteed to support, rotate, and HOLD even the heaviest Ham beam on the market!

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Special 8 wire cable, \$6.25 per 100'. **ONLY \$9950**

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For further information, check number 31 on page 126.

RTTY [from page 98]

toroid of unknown characteristics in a surplus emporium.

Well, now the hunt has been simplified. Jack Pitts, W6CQK, will supply these 88-mhy toroids for \$1 each, postpaid in the U.S.A. They are the usual two-winding loading coils; *but*, they are uncased and unpotted. *No wax or tar!* QTH of W6CQK is 710 Madison Avenue, Redwood City, California.

20-Meters

Spark-plugged by WØBP, this band appears more amazing every time I listen around 14,330 kc. Midwest and west coast signals printed at W2JTP have been running S-9 to 40-db above. Sometimes some one will fade down to S-7. The copy, except where BeeP has drifted, looks like stuff printed from a 2-meter local afsk channel: It is solid. Turning up the audio monitor gain control reveals the monkey-chatter of sidebands from Latin-American 'phones, but the 'ole 26 keeps right on rhythmically pounding out solid copy, even when the monitor 'scope shows a distinct but momentary drop down into the noise.

KL7OOT, 400 miles north of Fairbanks, Alaska, in the land of the Northern Lights, has been having a field day working east, west, and midwest. He was printing solid at W2JTP recently, although listening on the monitor speaker revealed the characteristic hollow warble of a signal pushing its way through an auroral disturbance. Roy is the only operator at Camp Bullen. Fellows at this camp write their letters on a Model 19 and bring the tapes to Roy who stuffs them into a 14 TD. Down in the States, WØQPP or WØBP prints these letters at top speed, with no strain, and air-mails the copies to final addressees, saving days to weeks. One batch of seven letters ran from 300 to 1200 words in length.

To quote BeeP: "True, we would never make 'BPL' on number messages per month, but it is a distinctly new type of service. With the words writing themselves at the rate of one word every second, numbered texts or stereotyped phrases are 'for the birds,' word count, check, unknown; and the standard fifty word 'night letter' would be put to shame.

"We may pause in our daily exercise of pacing the floor to read about eskimo dogs, small special arctic planes, sunrise expected in a few weeks, comments on 'love affairs' of the adolescent back home, or the celebration of getting fresh milk from a DC-3. (Down here we still have to use cows!) But, seriously, man first learns to crawl, then must know how to stand upright, then he may run. Some of us have wondered what Hiram Percy Maxim would have said about 'Teletype' and 'RTTY's place in the cosmos.' . . ."

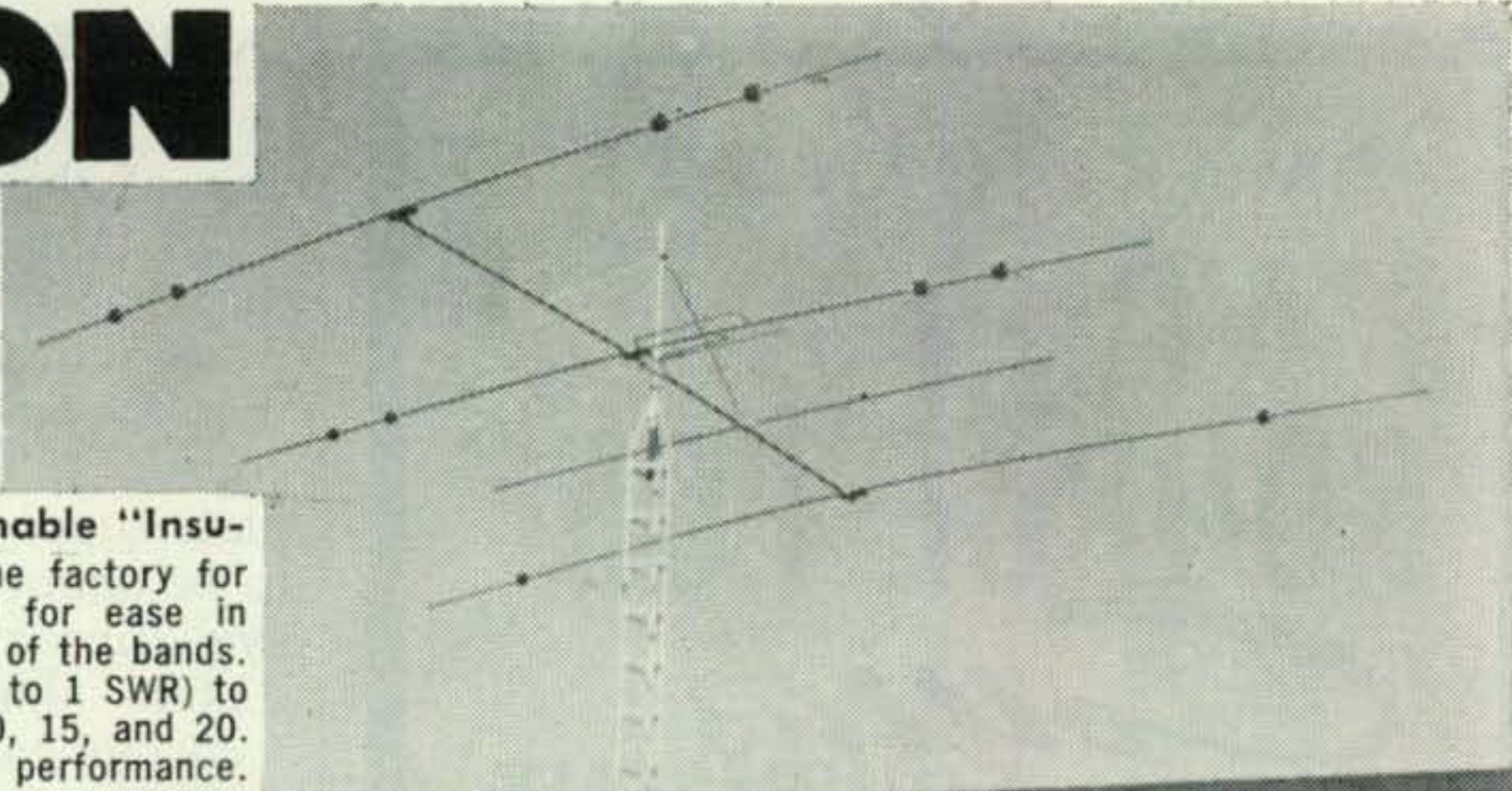
VE6UB in Calgary, Alberta, an oldtimer new to RTTY, has worked KL7OOT and WØBP. W3BNX/VE8 and W3UAK/VE8,

[Continued on page 114]

HARRISON

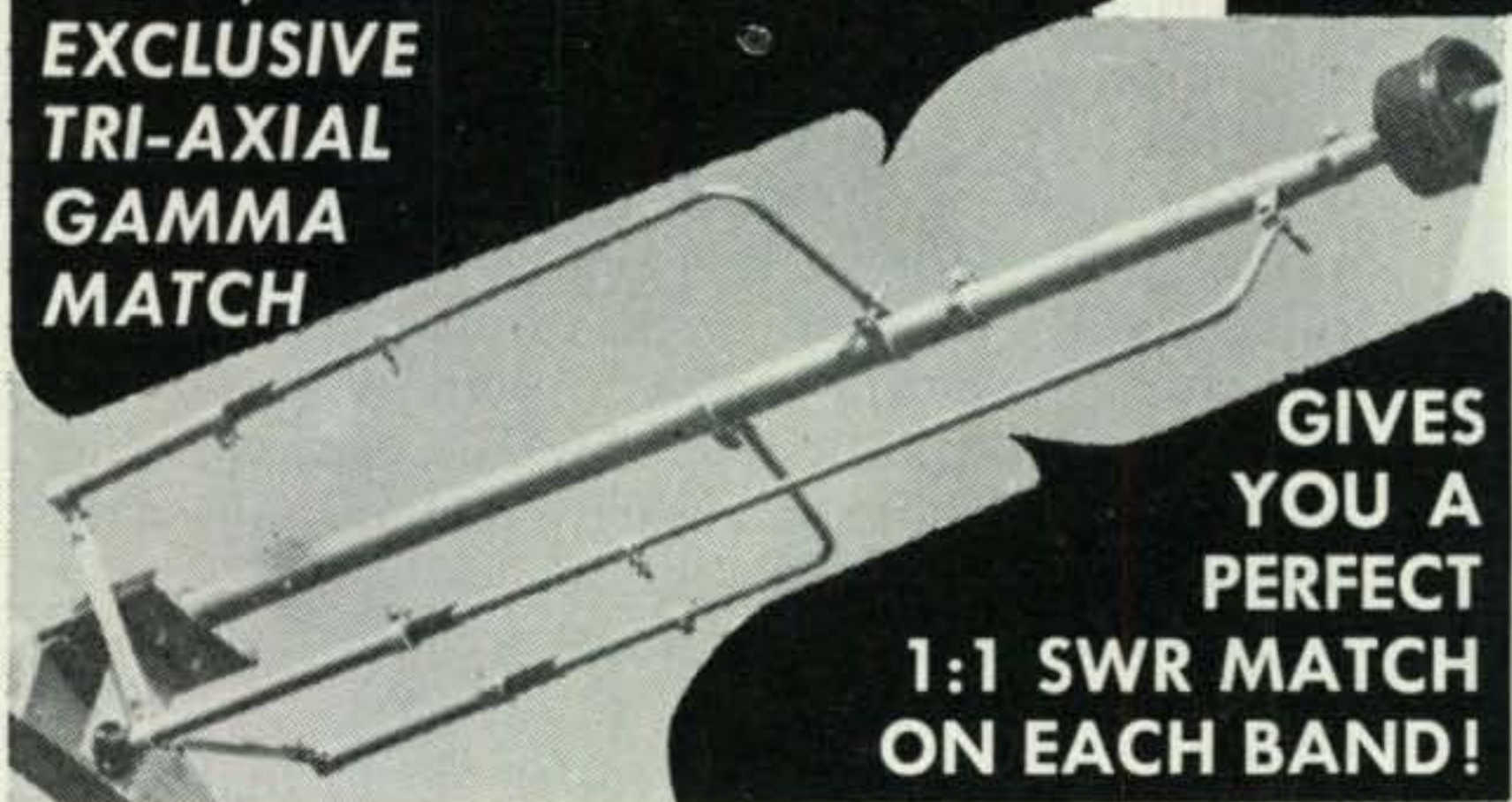
IS HEADQUARTERS

for **Hy-Gain**



Now, new improved weatherproofed and tunable "Insu-Traps" make them even better! Pre-tuned by the factory for positive performance, but color code calibrated for ease in peaking from phone to CW, or to any favored part of the bands. Rated at full KW. Perfect match (lower than 1.65 to 1 SWR) to a single 52 ohm co-ax line on all three bands—10, 15, and 20. Ruggedly constructed, for years of dependable performance.

NOW, WITH THE NEW AND EXCLUSIVE TRI-AXIAL GAMMA MATCH



GIVES YOU A PERFECT 1:1 SWR MATCH ON EACH BAND!

THE TRIPLE BAND BEAMS THAT HAMS ALL OVER THE WORLD HAVE BEEN RAVING ABOUT!

THREE ELEMENT

The favorite! Now with separate 10 meter reflector. Greatest power gain per Dollar, 8 db on all bands! 18 foot boom, 29 foot element. Weighs 58 lbs. **Model 152-TG3, \$99.75**

(Additional 10 meter director element, for even more boost in power. **Model AD-1, \$14.95**)

TWO ELEMENT

A space saver that can give you a healthy 5.8 db gain in signals transmitted and received! Boom only 6 feet long. Wt. 36 lbs. **152-TG2, \$69.50**

ONE ELEMENT

Single three-band dipole, may be rotated or fixed in favored position 28 feet-long, weighs 10 lbs. **152-TG1, \$39.95**

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New, complete heavy duty rotator system, with built-in roto-brake. Mounts in any standard tower. Has 16" diameter illuminated great circle map to automatically indicate beam direction.

Complete, with control box **\$139.95**

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With the new GAMMAXIAL 1:1 SWR MATCH.

Here's real top-grade performance and dependable long service—at reasonable prices!

Hy-Gain's line of single band, three element beams will give you an average 8.5 db power gain, a front to back ratio of 24 db. And, their exclusive, new GAMMAXIAL matching system guarantees a perfect 1:1 SWR match to 52 ohm coaxial cable—without any fuss of fiddling!

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- 15 METER 153G.....\$29.95
- 20 METER 203G.....\$57.95

NEW! SELF-SUPPORTING MULTI-BAND VERTICALS

Only 21 feet high, but capacity top-hat and 3 Insu-Traps give low SWR match to 52 ohm co-ax, on 10, 15, 20, and 40 meter band. Use with radials or on ground. Complete with new, improved fibre glass nylon base, hardware, and complete instructions. **Model 14-AV — \$27.95**

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Collins 75A-4 SSB Receiver.....	695.00
Collins KWM-I SSB Mobile Transceiver	820.00

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That's what this lapel pin and tie-bar will do. Because they've each got your call letters engraved on them. Just wait till you've taken these classic beauties out of their gift box and put them on. The heavy silver plating makes your call letters pop right out. They'll be terrific conversation pieces. They're only \$4.95.

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CITY _____ ZONE _____ STATE _____

For further information, check number 34 on page 126.

100 • CQ • April, 1958

INDICATOR [from page 40]

one of the nearest standard value substituted for it in the circuit. It was found at W7ESM that the calibration does not change appreciably when different tubes are plugged in, provided that they are in good operating condition, of course. If a scope is not available, but the plate supply used for the r-f amplifier happens to be about 1000 volts and that for the 'magic-eye' tube about 270 volts, you can make R_k 22,000 ohms and be reasonably confident of a correct calibration. For other operating conditions it would be well to leave R_k a 50,000-ohm variable for some time; set it initially at about half value and use the indicator but don't trust it completely until you can work someone who has a scope on his receiver and can give you an accurate report on your percentage modulation. However, even with a guessed value for R_k you will be in a much better position for preventing splatter than with no indicator at all. Caution! Half-value of a variable resistor does not necessarily mean half-scale rotation, because of the taper which such units often have. Better measure the resistance and be sure.

The series of resistors which go to make up R will depend on the maximum peak of E_{mod} , which is twice the B voltage. Each resistor should be of the one-watt carbon variety, and the total number in series should be four for every thousand volts of B supply, or 2 for 500 volts, 4 for 1000 volts, 6 for 1500 volts, etc. In any given string each resistor should have the same nominal value as the others. Anything between 2 and 5 megohms can be taken for this nominal value in a particular set-up. Be sure to provide insulation to ground capable of withstanding several times the B -voltage when mounting this string of resistors; ordinary terminal boards and "tie points" are unsuitable for B voltages greater than 500, except for the resistor which connects to the grid of the 'magic-eye' tube. One convenient method of mounting R is to solder the individual resistors fairly close together and in a straight line. A length of insulating sleeving is then pushed over the whole assembly, one end of which is next connected to the terminal on the modulation transformer and the other to a "tie point" which has a lead running to the grid of the tube.

This circuit has proved very practical and useful in several transmitters in the 200-watt class. There is no reason why it cannot be used in almost any plate-modulated rig. (If it is used with Heising-type modulation, the indicator should be connected to the end of series dropping resistor nearest the r-f amplifier.) For a handful of carbon resistors, a tube, and a socket you can take the guesswork out of setting modulator gain and avoid being a "splatterbug."

YAGI [from page 31]

But why bother with a second beam. Why not employ the image principal? Although I am always unlucky with raffles, I can never resist the chance of getting something for nothing.

Suddenly my mind made a flash back to the XYL and the multiple images in the two mirrors. Why not put a reflecting plane above and below a beam, and produce an almost infinite series of image antennas. I imagined myself saying 'the rig here runs 100 watts to a stack of 50 four element yagis at wavelength spacing. Approximate gain, 500 times; E.R.P. 50 kw!'

It seemed reasonable that wire netting would be OK for the two reflecting planes, providing the mesh is not greater than $2/100$. Hot dipping or soldering of all wire crosses would probably be advisable to ensure high conductivity. Obviously reflection must be as perfect as possible, or second and third order images will become progressively weaker until their contribution to the overall gain will become negligible.

The area of each reflecting plane need be no larger than the area of the beam. In fact it can probably be made somewhat smaller, as it is the center of the beam, i.e. the parts carrying maximum current which do most of the radiating. A strip of reflecting material only a quarter wave wide would probably be adequate. A suggested set up is shown in (Fig. 3). The reflecting planes should be spaced a half wavelength above and below the beam. The reflex images will then all be spaced at wavelength intervals which is just about optimum. Wider spacing, although giving slightly more gain would probably produce spurious lobes.

Until the weather becomes more suitable, I shan't be able to get all the answers on this one, but I am hoping that we have here a device that will put the low power man ahead of the kilowatt boys (if we can keep the thing sufficiently secret).

Just one thing to watch. Don't use this antenna on top of a block of flats or you may put one of your lower reflex images right inside somebody's TV receiver with disastrous results! On the other hand, if you live in a valley, the top reflex image may just enable you to get over the ridge.

The technical type I met at the dinner came round to see me last night. He pointed out that this thing is not entirely new. It is really a development of the corner reflector (Fig. 4) which uses two reflecting planes at right angles, and provides a gain of about 12db. However, a corner reflector only starts off with a dipole but my system takes off with the 9db boost of a four element beam. Anyway, I was rather bucked when I saw him going down the street on his way home just now with a roll of wire netting under his arm. Maybe he is building a chicken house?

See you on TWO with your REFLEX YAGI. ■

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anywhere, on any set with
Model ATC-1 Transistorized
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Model ATC-1 is *Self-Powered* (3 penlight batteries, shelf life expectancy); simple to connect—*one connection to antenna, other to receiver antenna input; only 4 3/4" x 3 1/4" x 4 1/8" — 30 ounces*—small and light enough to be carried easily, mounted in any convenient spot in car; adaptable to any receiver—*receives AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands; a natural for new cars using 12 volt tube and/or transistor receivers; the answer to mobile SSB listening—built in BFO plus a high degree of stability make the tuning of SSB, DSB, or CW signals a pleasure; provided with outstanding selectivity on AM phone by the modified "Q" multiplier circuit.* **Model ATC-1, \$79.50**

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For further information, check number 35 on page 126.

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6-80 Meters
65W CW
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Here's a compact, self-contained bandswitching transmitter for 65W CW, 50W Fone, plate modulated. Has built-in power supply. High level modulation maintained. Now improved for TVI suppression. Pi-Net output on 10-80M; link-coupled on 6M, matching into low impedance beams. New type, shielded meter. Size: 8x14x8" Kit comes complete with all necessary tubes and parts and step-by-step instruction manual, making assembly as "easy as pi".

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BC-659 FM Receiver-transmitter, xtal controlled, two channels, freq. range 27-38.9, 9 Mc, 13 tubes, built-in speaker, dual meter for testing filament and plate circuits. **\$6.95**
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BC 620—Same as above except less speaker **\$4.95**
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BC 683. Ten Channel Push-button or continuous tuning FM RECEIVER 27 to 39 Mc complete w/tubes, **\$19.95**
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12 Volt Dynamotor for above receivers. Exc. \$2.95 ea.

BC 604—10 Channel, 30 Watt Crystal Controlled 20 to 27 Mc Transmitter. Complete with tubes. Ship. **\$3.95**
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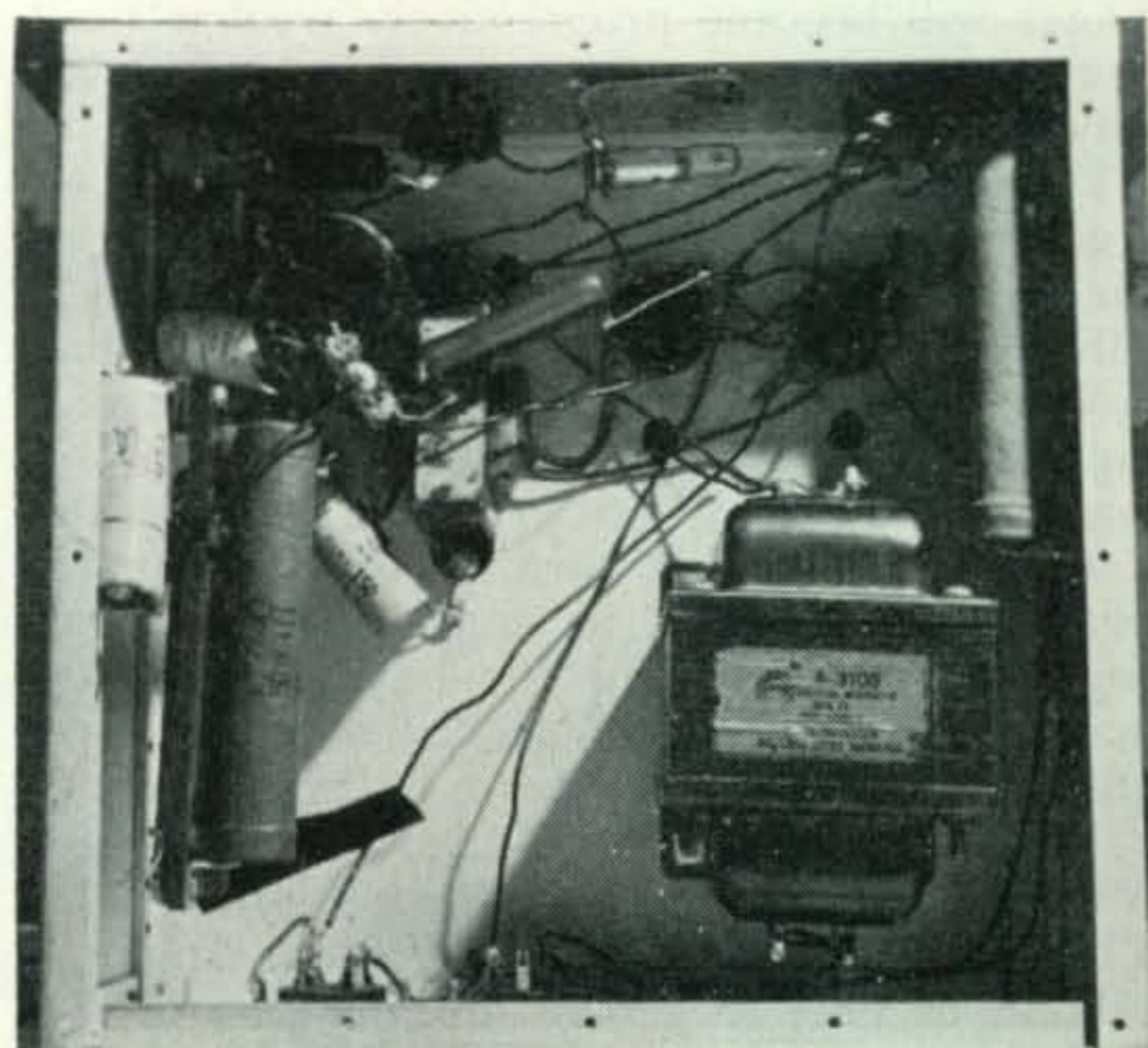
MODULATOR [from page 37]

usually, the turns ratio of the modulation transformer should be changed to match the class "C" load any time the high voltage is changed greatly. The match sheet furnished with the recommended universal modulation transformer makes the match "duck soap."

We are currently running -45 volts on the grids and 600 volts on the plates of the 6146 tubes. *A word of caution:* Never operate any modulator without a class "C" load on the secondary of the modulation transformer, to do so could cause internal arc-over due to excessive voltages developed within the modulation transformer.

The schematic diagram plus the photos and captions make construction clear.

With the modulator on the air, what results can be expected? Well . . . W4TEF has been



Bottom view of modulator.

using the 6146 tube in modulation service since the tube was first available and the modulator described in this article has been on the air tested for over two years in the shack of W4CWB with no derogatory report; quite the contrary, however, for the following are typical of comments received:

a Florida ham:

"The band is changing and you're down to zero "S" units, but still readable."

a DL4:

"Plenty of strong sigs in there OM but yours is the most intelligible."

a VE:

". . . terrific modulation . . . surprised it's home brew . . . appreciate schematic."

It is worthy of note also that hams with Panadaptors have told us that our modulation quality is equally as good as the finest commercial equipment.

Now . . . let's have a look at that old parts list. . . .

MANUALS [from page 53]

magazine. This leaves the binding margin—on the inside edges of the pages—intact and facilitates reassembly in your book. If you must cut the pages out you could cement a new binding margin in place. If you like to keep a complete file of back issues and can't get a second copy to take apart, you might copy the pages photographically or make a typewritten copy.

With the contents assembled, we need only a cover to complete the book. The simplest and least expensive method seems to be that shown in *Figure 2*, a manila file-folder is cut down to size and the book fastened together with an ordinary desk stapler. If your book is too thick for such a stapler, you may take it to a print shop and have it fastened by power stapling, saddle-stitching, spiral binding, or any of several other methods. There are also several patented fasteners on the market which you could apply yourself. One of these may actually suit you better. The title may be typed on a gummed label and stuck on or lettered with a leroy or speedball pen.

The materials and methods that are available for producing covers are virtually unlimited. The cover shown in *Figure 1*, for example, is of double-weight matte photographic printing paper. The design was printed in an enlarger from a negative shot of the original art work. Though similar to Process Camera work, this was all done at home using ordinary films and materials. The box in the center is cut away so that the title on the title page shows through. Thus, covers for all sorts of equipment—and of all sizes—can be printed as needed from this negative, eliminating the necessity of changing the lettering or reshooting new art work each time a new book is made. Labels for use on the manila-folder type binding could be produced similarly if they were made large enough to allow cutting out a section to reveal the title page. Photography has some other uses here. While it is doubtful if you will want to illustrate your manual with photographs, it is possible to copy charts, nonographs, or graphs which are applicable and enlarge or reduce them to fit your page size. This is also a convenient way to copy a schematic.

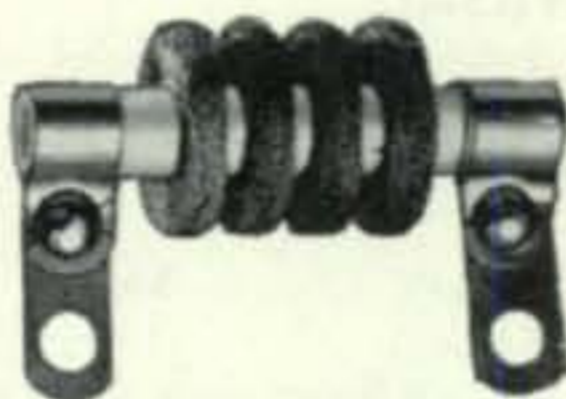
It should be apparent, then, that the time spent in writing and assembling such a book would be more than offset by the time saved later. Now let's get back to the advantage we spoke of earlier and which we called the 'Professional Touch'. Suppose you bought a receiver from a company whose products and reputation were unknown to you. If it came with a book that explained every question you were apt to ask about the receiver and its operation, you would be inclined to have confidence in the receiver immediately since, if the company was willing to expend the effort to produce the book, they would be apt to be equally as meticulous in the design and construction of the

[Continued on page 104]

NEW!

BUD HILOR CHOKES

- Carry more current for any given inductance without increase in size
- Provide higher current and lower inductance
- Lower in cost than any other chokes with comparable features



**PIE WOUND
CHOKES**

Strap or Wire Lead



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**TRANSMITTING
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• Here's a new line of R. F. chokes engineered to provide superior performance in any circuit for which they are applicable. Enamel covered wire, precision wound on special machinery, they can carry more current for any given inductance. Each type is manufactured in a variety of sizes to meet most any requirement.

See these new chokes at your distributors, check their specifications and current ratings, then compare their price with other chokes. You'll agree they are the best buy on the market.



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For further information, check number 38 on page 126.

April, 1958 • CQ • 103

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- 1 **Electronics and Radio Engineering by Terman.**
Excellent radio textbook, yet easy to read 1078 pages \$13.50
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1618 pages of formulas, tables, circuits, a handbook of handbooks \$10.00
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Patronize Ham Industry, bub.

MANUALS [from page 103]

receiver itself. If, on the other hand, this unknown company ships their receiver with little or no information, you are apt to be biased against the product before you even try it.

Now, let's see how this applies to you. Suppose you decide that you no longer need your old Two-Meter transmitter now that your new bandswitching VHF rig is completed and operating, and you decide to sell it. You show it to a Ham who admits he is interested in such a transmitter, and he asks you about the circuit.

"Well, I don't remember for sure. I think it was from *CQ* sometime back in 1953, or maybe it was 1947," is an answer hardly calculated to inspire confidence. If, on the other hand, you can hand him a good instruction book which answers his question, and any others that may arise later, watch his confidence go up . . . and the price right with it! Why not include plans for a Technical Manual when you design your next project; after all, do you see any way you could lose? ■

MODERN DILEMMA [From page 32]

- h. I hear answer—It 8KAY'. I 'tink he going say, "Wot Freq." but, no, he say "I got 9REM on hook". Mus' be long hook 'cuzz he say 9REM got WØGDH on same hook an' do I want WØQDH, Kansas? This not only obstacle No. 4 but is also big dilemma!
- i. I talk 'en talk—to who?—to myself, who else? I say, you better stick to Ruddy, remember de 185. So I say to Art, "sorry I got sked". He say, "you mus' be crackin' up,—wot kind sked, MS"? I say no, telephone. He say, "OK—wot kind?" So I repeat, I lissen but I can no copy his code fist no more, sound like he all shook up! I feel better since one obstacle remove, —also remove Kansas contact. Time now 0125 so back to Ruddy. He mus' be opening door to shack.
- j. I lissen. Band different—no more 4's, also no more 8's 'en 9's, in fact no more buzz. Is all gone!
- k. Now I mad! At who? — at me, of course"! Also Ruddy mad, so is Mrs. Ruddy mad; also is all guys on hook mad. I pull switch, now very mad! ■

don't forget...

next month...



CQ GOES MOBILE

TRANSISTORS [from page 81]

at full rating, the controlled rectifier dissipates only one half of one percent of the controlled power. Samples will be available to industry shortly.

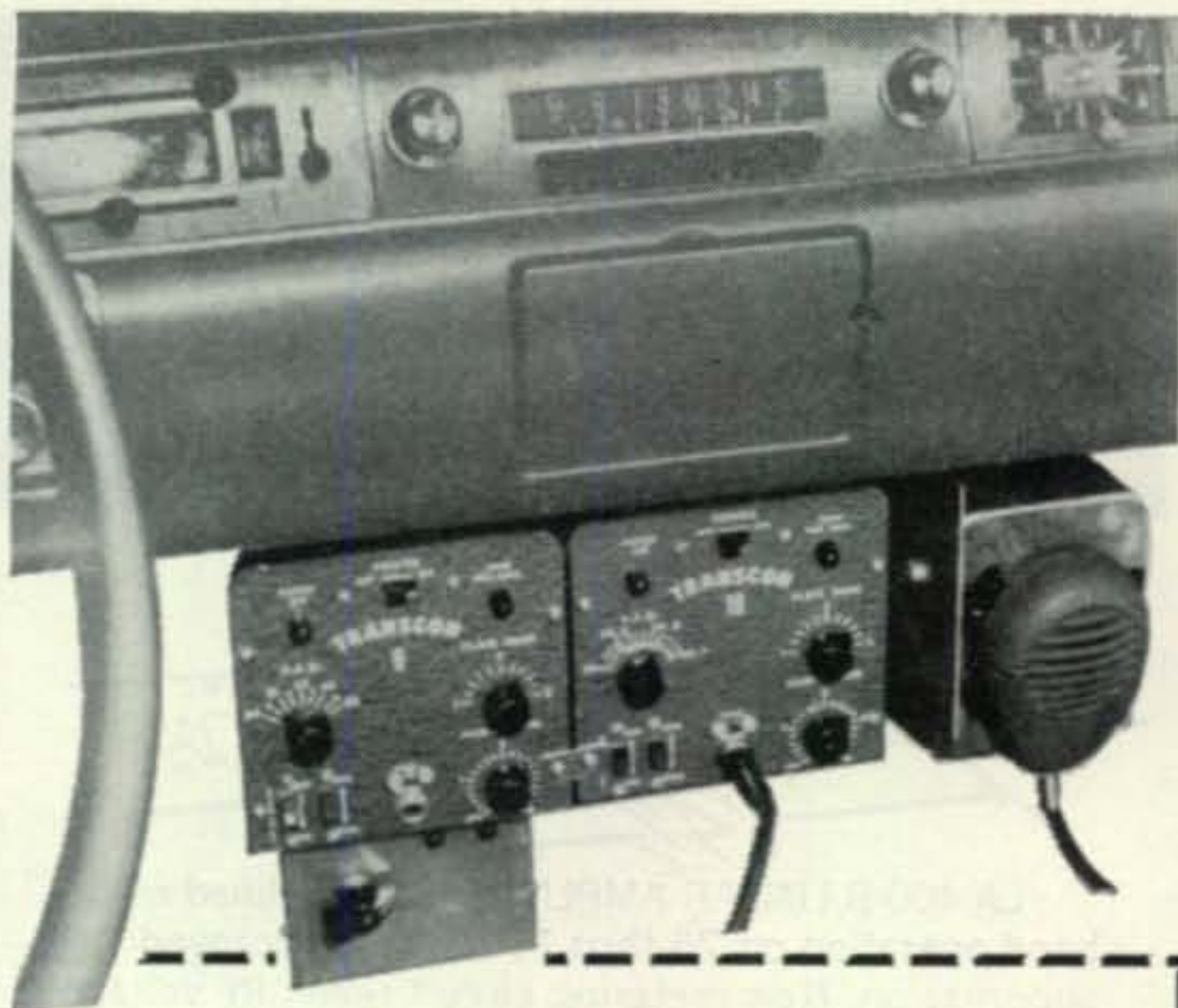
Transitron Inc., 186 Granite St., Manchester, N. H. has announced a new transistorized frequency standard, featuring 10 kc, 100 kc and 1 mc marks. Because of the high harmonic content it provides a continuous spectrum well beyond 200 mc at usable levels. A 400 cycle modulating tone is provided for rapid signal recognition or in the absence of a BFO in the receiver being calibrated. It weighs only 17 ounces and is $6\frac{3}{8} \times 4 \times 2\frac{3}{8}$ inches. For detailed information, write directly to Transitron, Inc. Also, see photo.

The Shockley Semiconductor Laboratory, Mountain View, California have announced a new type semiconductor device. It is known as the Shockley 4-Layer npnp Silicon Diode. This unit is a two terminal switch, unlike the transistor with three leads, and can be used as a sawtooth oscillator, a pulse generator, a bistable flip-flop or a ring counter. For more information, request the Shockley 4-Layer Diode data sheet.

Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill. is marketing the 505T "Ranger" transistorized dynamic microphone for mobile operation. This is the mike that was tested with the famous "Oscar", a life-size artificial head (see photo). The 505T is a direct replacement for carbon microphones, with no transmitter changes.

That brings us down to the bottom of the pile for another month fellows. Don't forget to send data on what *you* are doing with transistors.

73, Don, W6TNS



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- April 21** "Practical Applications of Transistors" by Sidney Katz of the U.S. Army Signal Corps School
- April 28** "Dielectric Heating" by Milton Rothstein, Chief Engineer, Theratron Division, Radio Receptor Co.



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For further information, check number 39 on page 126.

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For further information, check number 41 on page 126.

CRYSTAL FLEXIBILITY

[from page 51]

little 'elbow room' in the working space is a considerable asset. The wiring is shown in an accompanying sketch.

Once the sub-chassis is wired (with the switch assembled thereon, of course) the complete assembly is fitted between the two side walls of the box chassis and secured in place with two small metal brackets. Push the sub-chassis right down tight against the underside of the face-plate of the chassis box but first place a thin sheet of fibre or similar insulating board against the inner face of the chassis box to prevent accidental grounding of one or more of the socket contacts to the metal box. Obviously, a hole should be punched through the insulating sheet to permit passage of the switch shaft.

Now for the face of the unit. Nothing appears on the front plate other than the switch knob and appropriate dial plate and frequency markings. Fortunately, the little switch has 30 degree indexing which is a perfect match for the popular decalomania dial scales available at any ham store. So... the entire front panel of my unit was completely marked with decals. Where I used exact crystal frequencies, with special marking for emergency and various traffic nets to which I belong, obviously the switch positions can be marked in any manner to suit the builder... merely numbered serially, lettered alphabetically, marked in channels, etc. Likewise, fewer crystals may be provided for if desired, permitting use of a smaller chassis box and/or a conventional rotary switch. More crystals can also be accommodated by increasing the size of the chassis box proportionately.

Connection from the crystal box to the crystal socket on the transmitter can be made by any short length of 2 conductor cable. Preferably, it should either be shielded or of the Twin-lead or co-ax type and should not exceed 18" in length. On my unit, I mounted a small two prong plug on the rear cover plate of the chassis box and through a matching socket, connected the crystal box to the transmitter crystal socket through a 16" piece of RG-58/U coax line and a Millen #37412 transmission line plug which fits into any standard spacing crystal socket.

I like it! On the Viking RANGER, for random hamming, I use the VFO... chase any of 'em I want to work. When participating in a traffic net or keeping a pre-arranged schedule (I always arrange these schedules for one of my crystal frequencies) I simply set the transmitter switch on "CRYSTAL 1 or CRYSTAL 2" (I tied them both together at the socket in the RANGER) and swing the little knob on the crystal box to the desired frequency... presto!... there we are!

And... with most transmitters... that's ALL! You don't even have to dip your final or adjust your antenna load or grid drive over a range of about 100 kilocycles!

RTTY CONVERTER [from page 45]

Dynamic balance of the converter is achieved with the BALANCE control *R-1*, which is on the front panel, and we will tell you just *why* it is on the front panel in a minute. Take a look at the photo of the converter. Note that a center-line mark is provided for the BALANCE control. Now, feed in just receiver noise to the converter. Turn the BALANCE control until the panel meter jitters right at center zero. If the knob *pointer* does not fall exactly on the center-line, reset the knob on the shaft of the potentiometer so that it does.

When first using the converter on the air, actually copying a good signal, it is desirable to try the following combinations of neon lamps in and out of the circuit to make sure no distortion of the pulses is occurring:

- I-1 and I-2 M-coupling and S-coupling
- I-1 and I-3 M-coupling and S-trigger
- I-2 and I-4 S-coupling and M-trigger
- I-3 and I-4 S-trigger and M-trigger
- I-1, I-2, and I-3 M-coupling, S-coupling, and S-trigger
- I-1, I-2, and I-4 M-coupling, S-coupling, and M-trigger
- I-1, I-3, and I-4 M-coupling, S-trigger, and M-trigger
- I-2, I-3, and I-4 S-coupling, S-trigger, and M-trigger
- I-1, I-2, I-3, and I-4 all lamps

The machine should produce solid copy on all of these combinations.

Operation

Normal operation is with the BALANCE control on the center-line. Should you be receiving a weak, marginal, RTTY signal with some sending bias, it is possible to correct, up to a point, with the BALANCE control. Simply adjust until you get the best copy.

Suppose, now, that QRM rears its ugly head, right on the *mark* frequency. To prevent capture of the limiters, null out the *mark* with the RTTY "Notch" Filter previously mentioned, swing the BALANCE control over to SPACE, and continue to copy.

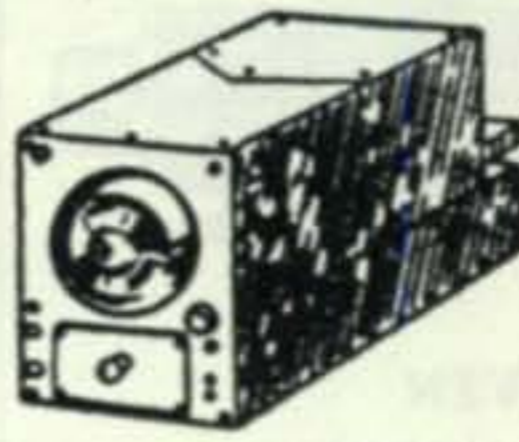
A tuning indicator, such as the phase-shift unit of WØHZR (page 65, *RTTY Handbook*) is an extremely handy and interesting device to observe the signals you are trying to copy, but with a little practice you will be able to use the W2JAV converter all by itself by just keeping one eye on the four neon lamps and the other eye on the meter. It's really less difficult than it sounds!

If at all possible, try and use a correctly balanced polar relay, such as the WE 215A or the WE 255A. It will give you that bit of extra range that might enable you to dig down a little bit farther into the QRM for that weak signal. Fig. 3 shows the schematic diagram of a simple d-c supply for the selector magnet. A 6.3-volt, 1-ampere, filament transformer is used backwards, connected to any convenient 6.3-

[Continued on page 108]

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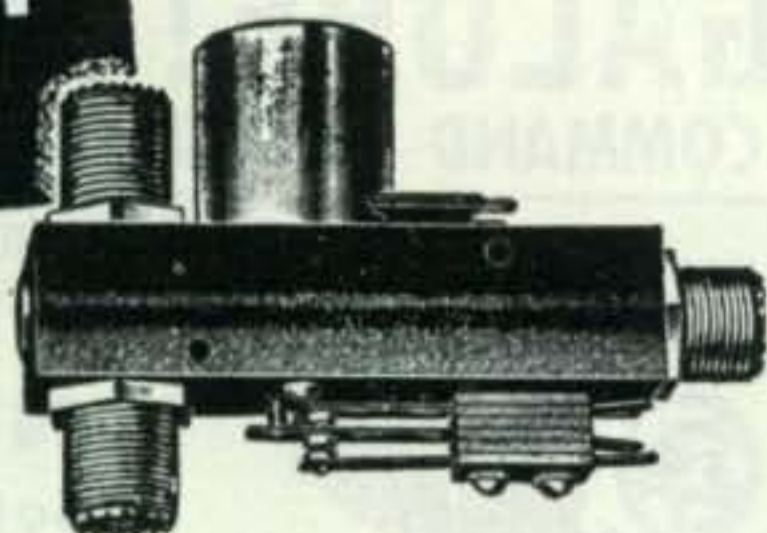
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For further information, check number 42 on page 126.

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THIEF RIVER FALLS, MINNESOTA

For further information, check number 43 on page 126.

RTTY CONVERTER [from page 107]

volt a-c source. Adjust the 4k variable resistor to get the required selector magnet current. If your machine runs open when a mark is fed to the converter, just turn over the double plug that you have in J-2.

AFSK

Now, as promised, we will explain that control on the front panel marked AFSK LEVEL. Not shown on the converter schematic, Fig. 1, but built on the same chassis is an afsk oscillator. Fig. 4 is schematic diagram.

An 88-mhy loading coil is used as in the converter with both the coils in the series-aiding connection. The cathode of the first triode of the 12AX7 connects to the junction of the two coils. A "dry-keying" shift circuit utilizing a pair of 1N69 diodes connects additional capacity across *L* to shift the frequency from 2975-cycles to 2125-cycles when the keyboard contacts are closed on *mark*. The values of the fixed capacitors are approximate, and although they are paralleled by 1800 mmfd variable mica padders, it may be necessary to use slightly different values to permit tuning to the standard frequencies.

The other triode is used as an isolation amplifier. Output level is adjustable by the gain control *R* marked AFSK LEVEL on the front panel. Transformer *T* is the usual plate-to-line transformer of about 15,000-ohms to 500 or 600 ohms. Output amplitude of the oscillator itself is different for *mark* and *space*, but since the higher frequency (2975-cycles) has the higher amplitude, line output can be equalized by increasing or decreasing the value of the capacitor *C* across the primary of *T* until equal output on *mark* and *space* is obtained.

"Why the heck have all this if you intend to work just *fsk*?" asked a W4 recently. Wal, you *don't* have to, but it's a down-right handy thing to have around an RTTY ham shack, OM. Even if you don't feed a VHF transmitter modulator with it, it gives you a convenient local *audio* "loop" right in the shack. For example, to get local copy while transmitting, the output of the afsk oscillator can be fed into the converter, and a polar relay plugged into the POLAR RELAY jack J-2 keys the fsk circuit in your VFO. At the same time your machine, plugged into the PRINTER MAG. jack J-3, copies what your keyboard sends. If you are real ingenious, you can use the same polar relay plugged into J-2 to key a d-c loop to the selector magnet instead of using J-3. There is also no reason why you can't use *two* polar relays, such as 215A's, connected in series and plugged into J-2. One relay can then fsk you VFO and the other can operate the selector magnet of your machine with the circuit of Fig. 3. Don't let all these ideas discourage you—it's actually more simple than it sounds.

[Continued on page 110]

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For further information, check number 45 on page 126.



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For further information, check number 46 on page 126.

RTTY CONVERTER [from page 108]

Phil, W2JAV, asks that if you have any questions about this TU, write Byron, W2JTP, instead of directly to him.

Appendix

Telephone line loading coils of the toroidal type can be found outside of telephone companies. If you don't have a friend who can supply you with WE #622 "88-mhy" coils, you can obtain the potted U.S. Army Signal Corps C-114A coils in surplus. These contain the 88-mhy two-coil toroids, but you have to un-pot them. Detailed instructions for unpotting them in the XYL's oven appears on page 72 of the *RTTY Handbook*. (This is at your own risk, by the way.)

The C-114A coils may be obtained in the west through the RTTY Society of Southern California, 372 West Warren Way, Arcadia, California. In the east, they may be obtained for \$1, each, from the Tallen Company, Inc., 159 Carlton Avenue, Brooklyn 5, New York. Shipping weight is about three pounds, so you figure the postage. ■

32V ON SIX [from page 30]

	New Tank — Phone — "Tune" Position					
Unloaded						
Low	470	0.045	13.0	21.2		
Loaded						
High	510	0.055	13.0	28.0		
Loaded						60 watt lamp
Low	365	0.125	12.5	45.5	24.3	53.5%
Loaded						60 watt lamp
High	380	0.14	12.5	53.2	25.2	47.3%
	New Tank — Phone — "Operate" Position					
Loaded						
Low	630	0.072	13	45.3		
Unloaded						
High	780	0.085	13	66.2		
Loaded						60 watt lamp
Low	600	0.185	12	111	65.7	61 %
Loaded						
High	—	—	—	—	—	—

1. Simplified Speech Clipping CQ May 1948
2. The Radio Amateurs Handbook—Twenty-first edition pages 362 to 366

hamfest

Trenton Old Timers' Nite

Everyone is invited to the 13th Annual Old Timers' Nite Round-Up and Banquet to be held Saturday evening, April 19th in the Grand Ballroom of the Stacy-Trent Hotel, West State Street at Willow in downtown Trenton, N. J. The party will be stag and will start with dinner at 6:30 sharp. Reservations are \$6 per from Ed Raser, W2ZI., 315 Beechwood Ave., Trenton 8, N. J. or \$7 at the door. Drop a note to Ed for full particulars of this annual event sponsored by the Delaware Valley Radio Association.

NOVICE [from page 59]

with VE7 and 5 on 15 meters.

Tony, KNØLTB (no qth) is trying to make dxcc while still a Novice. He writes of better operating procedures and they must be paying off for him for he has worked 56 countries in 27 zones.

The father and son team of John Reed, KØKTY (OM) and M. E. Reed, KØMKS, 824 N. Kansas Avenue, Liberal, Kansas write of their progress. They have piled up a list of dx as long as your arm with an SX-42 and a Viking Ranger. They QSL 100% and will sked anyone needing Kansas for any reason.

Harold Rose, W6WOE (woe is me!) operating portable four, at 103 Williamson Dr., Wilmington, North Carolina would like to help any prospective Novices or Generals with their code or theory. He would especially like to hear from them via tape recordings and will return tapes within 48 hours (either 3¼ or 7½ ips.) Tnx Harold.

Jim, W2BVE, 834 Palmer Ave., Maywood, New Jersey would like to start a net on 10 meters and an 80/40 meter net for East Coast teenagers. Anyone interested, should contact him.

Woody Woodrich, 100 Laurel Road, Chagrin Falls, Ohio is an almost Novice. He would like data on Novice antennas and also would like to join an Ohio Novice net.

Dave Fox, KN1CJV, 51 Midland Ave., Glenbrook, Conn. is also working on Novice DXCC. His final total was 48 countries and 27 zones. As you might imagine, Dave is quite interested in dx.

John Kroll, 424 Lynch St., Flint 3, Michigan (my ole home town!) would like to correspond with Technicians or those interested in six meters. John uses an S-53A receiver and plans to use a Tecraft CC-50 converter with it. The DX-35 conversion to six appeared in the Jan. 57 issue of CQ, John.

Bud T. Johnson, 815 Coleman Street, Raleigh, North Carolina has had the call KN4SSM for a month, at this writing. He runs a Globe Chief 90, an HRO-60 and a beam on 15 meters. Bud would like to make skeds for 80 or 15 meters.

Jerry France, 1211 Baseline, Boulder, Colo. would like to hear from other Novices regarding what type of gear he should use.

Gary Inkman, WN6NEH, 455 W. School Street, Compton, Calif. (of bicycle mobile fame) uses a Globe Chief transmitter and an S-40B complete with a "Q" Multiplier. Gary would like to make skeds on any band as he will probably have his General by the time this is printed.

James G. Botts III, K4EJQ, Rt. 2, Box 545, Bristol, Tennessee reminds us of the Novice harmonics that appear on the high end of the 20 meter band. I always drop a post card to

[Continued on page 112]

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CQ Magazine

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NOVICE [from page 111]

anyone I hear up there. However, it seems that for each one that fixes the trouble, another one pops up!

Ren Chassaing, KN7AEI, 6044 S.E., Reed College Pl., Portland 2, Oregon exhales with a DX-35 and inhales with an SX-99 on the 15 meter band. His dx includes JA1, WP4, WL7, VE3 & 7 with a WAS of 34 at this writing. He will sked for any reason.

Bob, KN5JTN, 509 Dakota, Norman, Oklahoma has a home brew 6146 and a Harvey Wells that are used mainly on 40. Also, Bob uses a NC-98 with a "Q" Multiplier and has a two element beam for occasional 15 meter operation. He will sked for any reason.

Lee and Don Crowell, K1AIK and W1MHG are another father and son team. These fellows have built the Novice Q5'er and the SSB Q5'er, to which they added an FL-8 filter for more selectivity (gad!). They have logged contacts in 55 countries (23 were on 40 meters). They use an antenna coupler and doublet on all bands.

Sorry that I could not print photos, sent by the following fellows, for one reason or another. Mostly, we don't have enough room. However, small, even slightly blurred photos, or color photos just do not work out.

John Storie, KN5JZV, 2427 North Boston St., Tulsa, Oklahoma is using a DX-35 and an NC-98. He works 80, 40, and 15 meters and has 32 states confirmed. By the time that you read this John should have his General class ticket. He would like skeds with anyone for any reason.

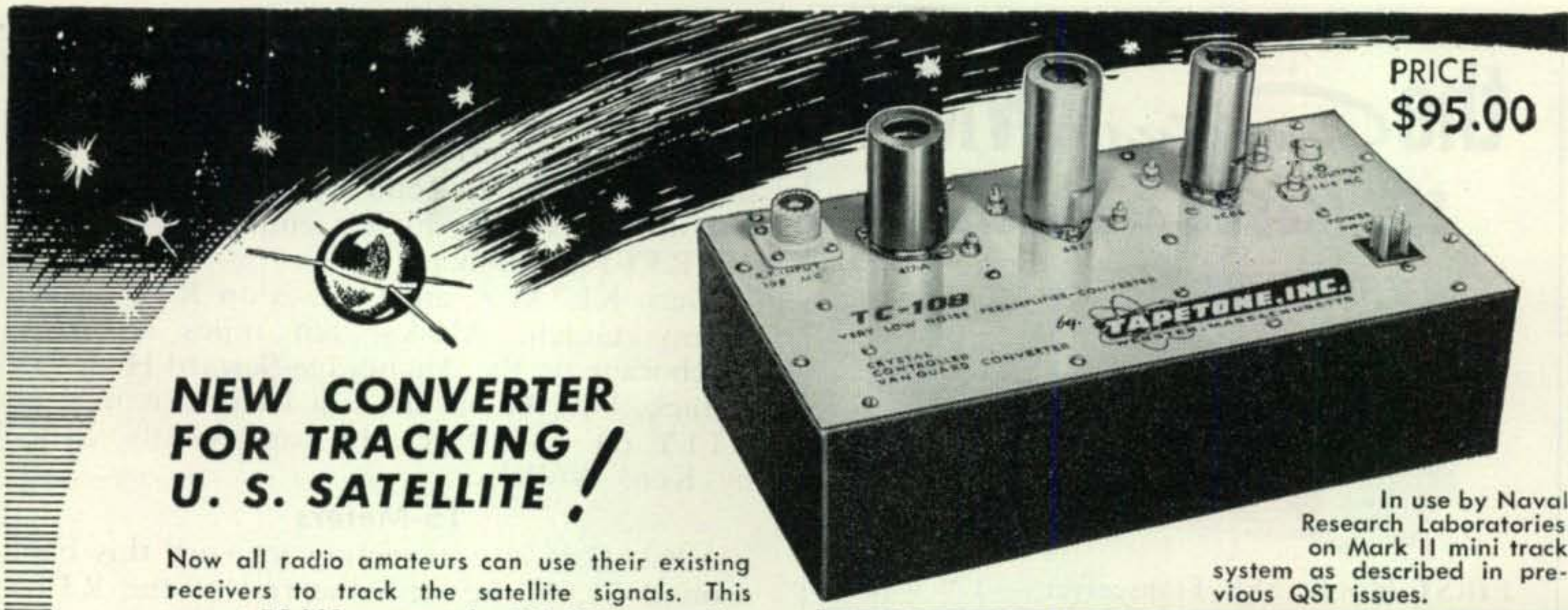
George Harrison, KN6DQS, 1736 S. Hunter St., Stockton, California has had his license for three months and snagged 14 states on 40 and 15. He uses a DX-35 and Hallicrafters S-40A.

Nelson Rau, KN3CAI, 1509 Dewey Avenue, Northampton, Pa. sure has a shack full of "goodies". He is currently using a DX-35 and an AT-1 for transmitters. Antennas include a "drooping doublet", 80 and 40 meter long wires. For receiving Nelson uses a BC-348R with a Heath "Q" Multiplier and a DB-23 preselector.

Jack Kurtz, KN9HOL, 226 West St., Lake Geneva, Wis. operates with a DX-35 and a Collins 75A3 but his prize possession is a 100 foot tower in the back yard with a three element 15 meter beam and a two meter beam perched on top. The only state Jack needs for WAS is North Dakota. His DX includes DL, EA, EI, F, G, GM, LU, OH, ON, PA, SU, ZL, ZS, KL, WH, VE, WP, OZ, VO and OK.

That brings us back down to the top of the desk for another month fellows. Keep those reports and photographs coming in. Also, I would be interested in hearing from any of you that have been receiving the "Explorer" satellite.

73, Don, W6TNS



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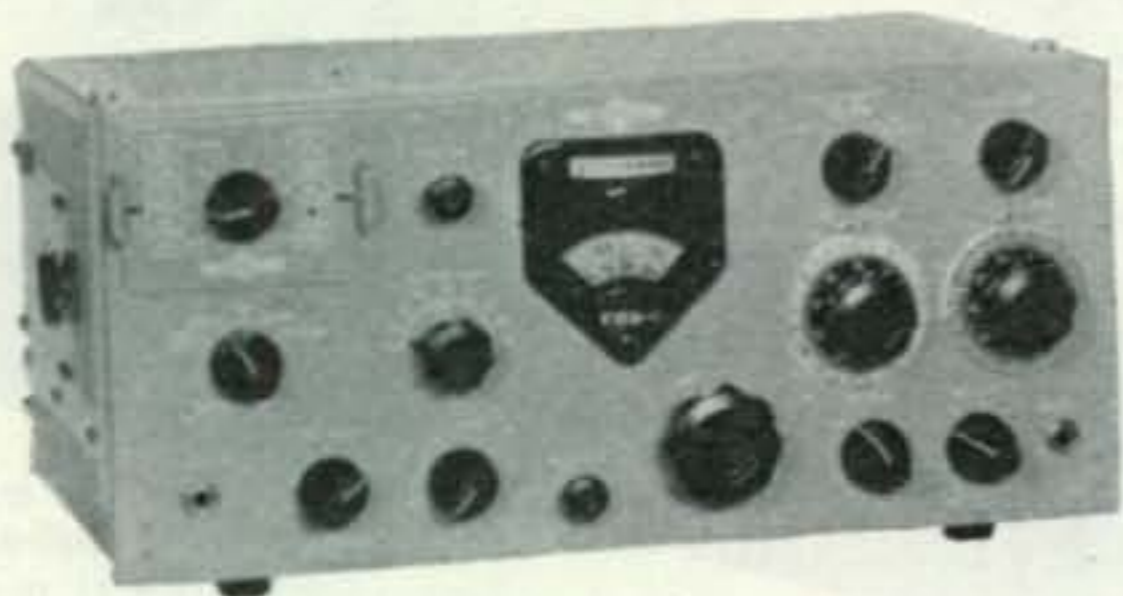
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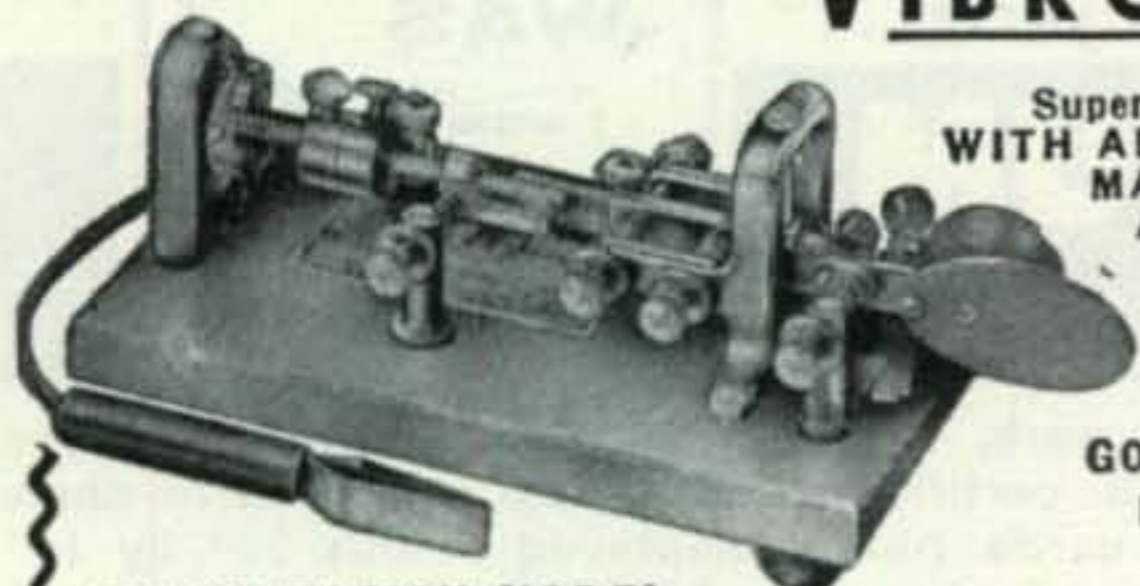
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RTTY [from page 98]

close to the North Pole, have tried with little success to call RTTY stations on the higher end by 'phone to try to arrange an RTTY QSO on the lower end. Remember, Canadians cannot use fsk on the higher end! (See the Feb. '58 RTTY column.)

Geri, KL7ALZ, an XYL, is on RTTY from Bunny Gulch, Alaska, ten miles south of Anchorage on the Anchorage-Seward Highway.

Jack, VR2AC, in the Fiji Islands, is now on RTTY on 14,330 kc. He was recently visited by Ken, W6WIS.

15-Meters

VR2AC is also expecting to work this band around 21,090 kc with the rest of the RTTY DX. Bud, W6KUY/MM worked right up to the 3 mile limit off Yokohama. Jay KR6JL and Cas KR6AK are very active from Okinawa. George KR6GF made his first RTTY contacts with Jay and BeeP. KL7OOT also works these frequencies. KA8RA in Asia has eight operators taking turns at working RTTY!

40-Meters

On the west coast, 40 seems to be the most active band for RTTY, in spite of the foreign broadcast stations. So many have been calling in on the "Forty RTTY Net" in the midwest that the NCS finds roll call cumbersome. Those who do not check in consistently get dropped as the result. An improvement program in "netting" is under way to get everyone to zero in on the NCS's mark.

WØBP is experimenting with an nfsk "station break," or code identification. With most converters, machines idle quietly on mark while a 90-cycle shift is made by a hand key for the International Morse identification required by the FCC every ten minutes or less.

2-Meters

The Bay Area in California has adopted 147.29 Mc as the RTTY operating frequency. Milt, W6KPO, has furnished a supply of crystals for this frequency and they may be obtained through NCARTS, Inc., by dropping a line to Buck, W6VPC. A6ASJ's MARS net from 1900 to 2100 Tuesday remains the most active 2-meter operation in this area. Soon, maybe by the time that this appears in print, a MARS repeater station for 2-meters will be installed atop Mt. Vaca. This will open up the Salinas, Sacramento, and San Joaquin valleys with a later possibility of a relay to the south to give coverage to southern California.

Comments

Next month we will describe an i-f type of RTTY converter which has been working remarkably well the past few months at W2JTP. It is extremely simple, having only three tubes, and it is being used with an SX-101 receiver. It really digs down into the noise. Watch for it.

Post Script: RTTY Handbook, \$3 postpaid, via W2JTP.

73, Byron, W2JTP

SURPLUS [from page 94]

meter of a grid dipper or some other wave meter, for each stage of the transmitter. The receiver coil is located at the bottom deck and its adjustment can be made from the side. The receiver could only be tuned up to about 147 mc and a single turn was removed to increase the range, but this is unnecessary for the majority of the time you can easily operate below this frequency. The sensitivity of the receiver is about 2 microvolts.

The batteries required are 1½ volt for the filaments and 97½ for the plates. Actually 90 volts is about the minimum that could be tolerated for stable operation. It was found that one G cell and one Everready 479 would fit in the battery compartment but suitable leads will have to be connected to the pins for proper connections. The superregen receiver is followed by two stages of audio and produces a surprising amount of audio. The transmitter uses crystals in the 18 mc range. The ones we used were supplied by the V-Precision Instrument Co., Elmhurst 73, N. Y. The output of the oscillator is taken at 18 and doubled to 36. The next stage doubles again as does the final stage. The power output is about 50 milliwatts and the range of operation can be up to several miles to a fixed station.
73, Ken, W2HDM

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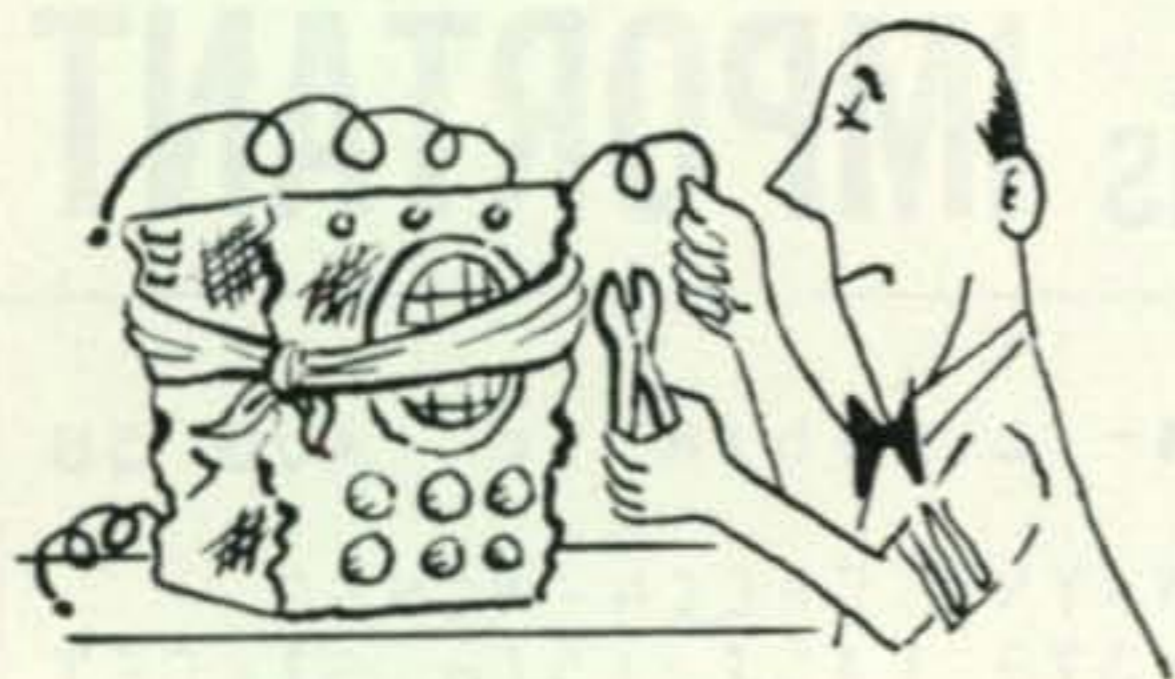
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VHF [from page 69]

(Better shielding needed. Take the converter off, and the signal stays the same.) Guess they will have to start using signal generator techniques." *We're with you Paul but it sure takes a lot of time, effort and cash to get something good like that really going.*

"K6RNQ worked LU7AT, February 5th. Feb. 7 I went to San Francisco and understand that K6RNQ worked another ZL. Today I'm going to stay home. The band won't open then. Am going to be a charter member of the WWTTRNQ club (WE WON'T TALK TO RNQ). February 9, heard OA4AEE for forty-five minutes this morning." *Very fine letter Paul . . . just one Difugulty. You miss the east coast openings. WHY? With contacts like those you've mentioned, you should maybe move to the east coast and hear what we've been hearing lately. NOTHIN'.*

Nederland, Texas From John Naff (W5TFW) and the wide open spaces:

"I work bands other than VHF (and you admit it yet) but do my building and experimenting on six and two meters. At the present time there is not much activity on two meters. *Seems to be the same all over John.* However, six is booming around here. Over thirty stations in this area, Beaumont, Port Arthur, Orange, Nederland and Port Neches. Lots of activity and there has been lots of dx worked here during quite a few openings."

"I am using an 829B medium power, a vertical (?) dipole and a three element beam horizontal. We use the vertical for local work, all stations are vertical and quite a few have beams." *That's why we don't hear too much from your area, eh.*

"I have been engaged in VHF for quite a few years and sure hope that we can keep these bands active. I guess that when the weather warms up two meters will pick up." *Thanks John, glad to know the amount of activity in your area, we'll be looking for you.*

Norwalk, Connecticut That close-by and seldom heard from state (via the P.O., that is) contributes this month through Barney Corwin (W1HMMW).

"I am on the air here with a modified AT-1 and a three element beam. I use an FCV1 and an AR-3. My best DX is W4 land. Have tried to work aurora but haven't had any luck." *One day all of a sudden you'll be working it Barney.*

"I'm rebuilding my modulator with 6F6's."

"I wonder if your readers know about the Monday 2000 six meter net in Connecticut on 50.600 mc." *Don't know if they did or not, but now they do.*

Middletown, Ohio Tom Koerber, (KN8GCV) prepares us for his entrance on six meters:

"I am waiting for my technician ticket to go through and will then be on six meters. Hope by the last of March."

"I have an International Crystal converter all ready to go and am building the 12AT7-2E26 rig in the handbook. I will be running 25 watts. At present I'm running 75 watts on 40 and 15 meter cw. If anyone has any information on putting my Globe Chief on six meters, I would like to hear from them." *O.K. you Globe Chief owners, give! Tell Tom what he wants to know.*

Washington, D.C. One of those nice fellows who operate portable during contests emits, Louis Breetz (W3KDZ) sez:

"We enjoyed all our operating from the Blue Ridge in West Virginia last summer, and all the contests too. We are looking forward to another nice year of operating. Whether we will be able to get the same cabin this year is doubtful but Buff and I will be looking (Buff-W3DHQ) for some kind of site soon. Our old site was just over the state line in West Virginia by several hundred feet. It made a new state for quite a few VHF stations." *And don't think they don't appreciate it either.*

[Continued on page 118]

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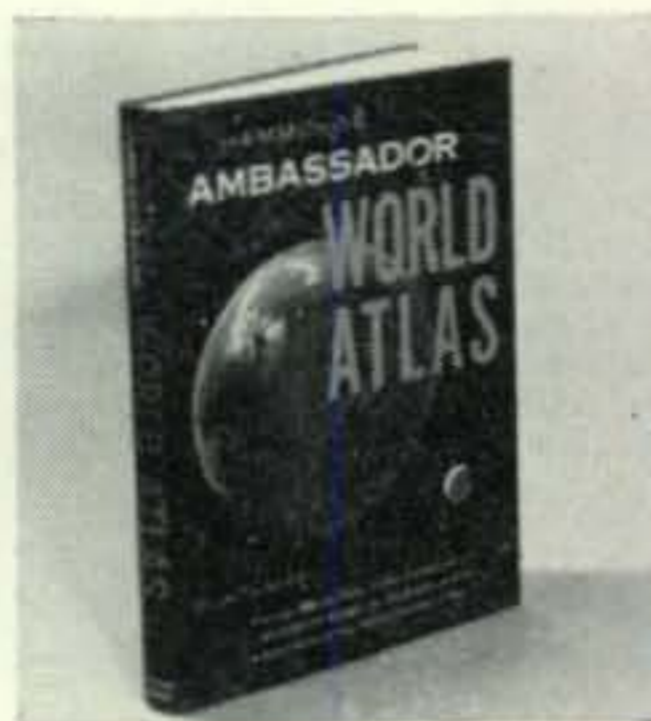
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VHF [from page 69]

"About news from this area, I have this to report. W3SFY, W3ZOE and K3AKK have begun to assemble stations on 420 mc for amateur television. They have their cameras operating and are working on their transmitters and converters. K3AKK and W3KND worked aeronautical mobile to Nashville, Tennessee, and returned to Washington via Pennsylvania. W3SFY and others worked the plane on 144 mc as far as forty miles west of Roanoke, Virginia. They also operated 220 mc but I have no performance information on that." *Lots of the gang will be glad to know about the amateur TV Louis. Hope we hear more concerning that experiment along with other news from your area.*

Imperial Beach, California Norman Haas (K6OWV) has a few pertinent facts:

"I have followed your VHF column in 'CQ' magazine for some time now and note with interest the change in the caption, which now reads; '50 mc, 144 mc, 220 mc, 420 mc, and above!' But therein I find a curious lack. In the two issues in which the column has been headed thus, I find no information, letters, technical dope or otherwise, about any frequency higher than two meters, other than the list of DX records on the VHF and UHF bands."

"In view of the tremendous increase in the number of licensed hams in the past few years and the subsequent, or consequent, crowding of the lower bands it is my personal opinion that more information should be written and published regarding the bands in the VHF and UHF range, particularly for local and short-haul contacts." *Agree with you 100% Norm and we are working along those lines. Just wish that more of the boys on these bands would take time off from their experiments and let us know what they're doing.*

"I have been active on 420 mc in the San Diego area for about two years with a converted APS-13 for the most part, but for a short time I had a crystal-controlled rig on the air using a borrowed Gonset Communicator to drive an 832A tripler. I had some nice contacts with stations in Los Angeles, a distance of about 120 miles airline. Signals were 5-9 plus both ways and QRM was nil. Shortly after I put my first APS-13 on the air I met K6BTO of National City (about seven miles away) who also had converted an APS-13. We immediately tried to make contact on 420 and have been active on the band since then. We maintained nightly contacts for a period of about seven months in an effort to determine conditions on the band. Conditions in this area have been amazingly uniform for the past two years. No QRM, no QRN and very little change in signal characteristics, the only change noted being a very slight increase in signal strength during, and just after a rain. This was probably due to increased ground reflection."

"Due to a recent modification of the shack and the rearrangement of my BC band gear, I have not done as much work on the VHF and UHF bands as I would have liked to do, but I am building a two meter converter so I can put my 100 watt two meter transmitter on the air, and I am also experimenting with two sets of RT39/APG-5 cavities for use on 2400 mc. After that I hope to build a crystal-controlled 420 mc transmitter and subsequently rigs for 220 mc and 1215 mc." *Very, very interesting Norm. Do let us know how your work progresses, we need lots of information along these lines.*

Sointula, British, Columbia Our good friend Ike (VE7AQQ) comes through for us once more.

"I worked CO2ZX on January 17th at 2115 PST. The JA's have been in only briefly at scattered intervals and only about R4 S4. On January 28th at 1600 PST I was working W7UFB, Bob, on eleven meters and thought I would tune six meters. Lo and behold! We heard a JA and a KR6 working a W0EE? By the time Bob and I could get our rigs on six the signals were gone, but Bob heard them through my transmitter as well as on his own receiver."

[Continued on page 119]

VHF [from page 118]

"By the way Bob, W7UFB, says that he seldom hears the east coast and is anxious to work a W1. *Afraid the season may be over for this year, Bob, but we'll surely keep on listenin' for you.* He operates on two frequencies, 50.334 and also 50.147. Bob and I sked almost every day on 27 mc to pass info about six meters and would be glad to have anyone interested join us."

"My score so far is about seventy-five different JA's and several hundred W's since November 2, 1957. I still need JA9 and JA0 though. I'm also on the lookout now for South America and thought I heard an LU5 this morning. (Jan. 30.)" *Nice going Ike, good looking for South America.*

Essex, England One of our trans-oceanic friends R. F. Stevens (G2BVN) has very kindly sent us a summary of his work, cross-band, since the end of December.

"The end of December provided some very good openings, particularly the 27th, 28th and 29th, when all W districts were heard, and all except 6 and 7 worked cross-band (6 and 10 meters). These days were noteworthy for the large number of 0 stations heard, previously these had not been heard too often."

"The New Year began well with a good opening on the 1st but this was eclipsed by the 4th when there was a first class path to the 4th and 5th districts. Oklahoma, New Mexico (*WHAT?*), Texas, Arkansas, and Alabama being heard, with W6NLZ in addition. After the band was apparently closed for the day W7RUX was heard at 1725 GMT 5-7-9, and was worked crossband for the first W7 QSO from this station. This completed the list of QSO's with all W call areas, and in addition QSL's have been received and are much appreciated."

"A disappointing feature of the 4th was the lack of stations listening crossband, but who were putting out lengthy CQ calls without result."

"Conditions then took a dip until the 15th when conditions were reasonable, and better than on the 17th when a poorish opening was noted, mainly to W8. The rest of the month was not very good but contacts were made on the 22nd and the 26th, W5VY (Texas) putting in a good signal when the band was apparently closed at 1610 GMT."

"The outstanding stations at this end have been W4UCH (he must have a radio active arm that reaches for the receiver directly an opening breaks), W8CMS, W1HOY, W1GKE and W1QCC/VE1. The very fine SSB signal put out by Russ of the last mentioned call, comes through when AM is down in the noise."

"Would like to voice my thanks to the 50 mc gang who have provided so many fine QSO's, and I am only sorry that the TV set up will prevent any 52.5 mc activity from this QTH, in so far as W working is concerned." *The gang in this country most certainly send you their good wishes and deepest thanks too, Steve, for being there most of the time and ready to give our gang a contact in England. Hope we see you again next year.*

New South Wales, Australia One of the Australian VHF gang Barry Goodman (VK2ZAG) gives a bit of information from that country concerning the VHF bands and activity.

"Here in Sydney there is a fair amount of activity on 144 mc or about fifty stations are active. Best DX runs several hundred miles regularly. I am using a 24 element beam, four six element yagis, and a home built version of the 'Tapetone' converter, with a 6BC4 in the front end. New rig will use 5894 with 100 watts input, this is the maximum allowable in Australia."

"Our other VHF bands, 288 mc and 576 mc are not active in New South Wales at present, although they are used quite a lot in other states. There is no activity on 1215 mc or higher, but I am working on a transmitter using a 2C39 Tripler in the final and a superhet receiver (home-brew), no surplus is available." *Very glad to receive some VHF news from your distant land Barry. Be assured that the boys here are interested in what goes on, other places than their own country.*

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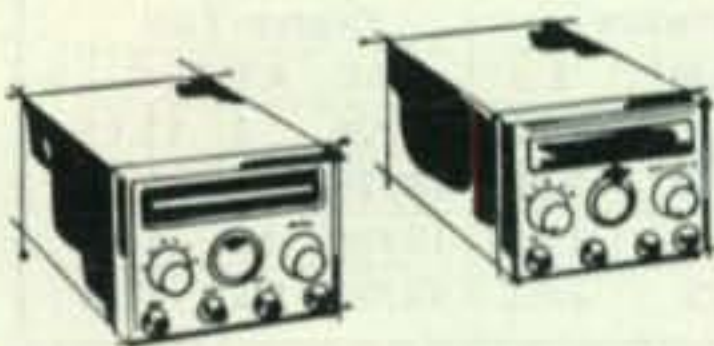


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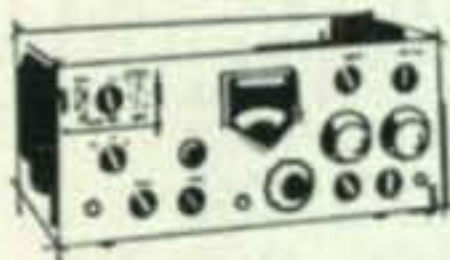
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92 SX 329. 10, 15, 20 meters & mount.
92 SX 330. 10, 15, 40 meters & mount.
92 SX 331. 10, 15, 80 meters & mount.
Special Savings Price,
Each Combination . . . \$44.50

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For further information, check number 61 on page 126.

**BUY THIS...
NOW!**



GET THIS



FREE!

AT YOUR NATIONAL DISTRIBUTORS NOW...SPECIAL OFFER...LIMITED TIME ONLY!*

FREE!

2400-HOUR ELECTRIC TIME CLOCK WITH EVERY NC-300 PURCHASE!

Fine quality clock gives you 2400-hour time every hour of the day in every time zone all over the world. Key cities clearly shown.

Direct reading, no computing or calculating necessary. Regular \$15.00 value. Order your NC-300 now while this special offer lasts... this is a limited time sale! Clock will be mailed to you and guaranteed by the clock manufacturer. Liberal trade-in allowances and budget terms offered by most National Distributors.

*Subject to cancellation without notice. Most National Distributors are participating.

SUGGESTED PRICE WHILE AVAILABLE:

NC-300

PLUS

2400-HOUR CLOCK

\$39.90

down, without trade-in.

**Cash price \$399.00
at most National
Distributors**

Both for the price of the receiver alone

BURTON BROWNE/New York

NEW FROM NATIONAL—VFO-62



At your National Distributors now! The first SELF-POWERED VARIABLE FREQUENCY OSCILLATOR for 6 and 2 meter operation! Self-powered, self-contained. Plugs into 117v AC outlet and transmitter crystal socket. Provides front panel crystal control without changing connections; has phone jack, precision vernier dial, and provision for remote standby/operate control. Low power drain (18 watts) allows 24-hour operation for pennies a day. Maximum frequency stability better than 1 part in 10⁵ per 24 hours. 6½" wide x 5¼" high x 5½" deep, 6 lbs.

Suggested Price: without trade-in, only \$10.00 down.
Cash Price \$69.95, at most National Distributors.

See your National Distributor today or write for full specifications.

Since 1914

National COMPANY, INC., MALDEN 48, MASS.

tuned to tomorrow



For further information, check number 2 on page 100

RCA Tubes for Linear RF Power Amplifier Service (Single-Sideband, Suppressed Carrier)
(Arranged according to Power Output)

RCA Type	Class of Operation	Max. Frequency for full Input Mc	Heater (H) or Filament Volts	Typical Operating Conditions (Per Tube)								
				DC Plate Volts	DC Grid-No. 2 Volts	DC Grid-No. 1 Volts	Peak RF Grid-No. 1 Signal Volts	Zero-Signal DC Plate Current Ma.	Max. Signal DC Plate Current Ma.	Approx. Max.-Sig. Driving Power Watts	Effective Load Resistance Ohms	Approx. Max.-Sig. Power Output Watts
6CL6	AB ₁	60	6.3(H)	300*	150	-6	6	4.6	16	0	9100	3
6973	AB ₁	60	6.3(H)	400	250	-24	24	8.4	33	0	5600	9
2E24	AB ₁	125	6.3	500	210	-21	21	10	35	0	8300	11
1614	AB ₁	80	6.3(H)	450	300	-35	35	14	50	0	5000	16
2E26	AB ₁	125	6.3(H)	500	210	-30	30	9	53	0	5370	17
6893	AB ₁	125	12.6(H)									
837	B	20	12.6(H)	500	0#	0#	40	2.6	61	3.5	4630	21
807	AB ₁	60	6.3(H)	750	300	-35	35	15	71	0	6250	35
1625	AB ₁	60	12.6(H)	750	300	-35	35	15	71	0	6250	35
6816	AB ₁	60	6.3(H)	850	300	-15	15	40	100	0	3500	40
6524	AB ₁	100	6.3(H)	600	300	-33.5	67†	30▲	122	0	12100‡	50
6850	AB ₁	100	12.6(H)									
6146	AB ₁	60	6.3(H)	750	180	-46	46	12	98	0	4640	52
6883	AB ₁	60	12.6(H)									
809	B	60	6.3	700	-	0	72	35	118	8	3900	59
829-B	AB ₁	200	6.3(H)	750	225	-25	50†	20▲	132▲	0	13640‡	68▲
			12.6(H)									
805	B	30	10.0	1250	-	0	110	78	204	3.5	3560	155
828	AB ₁	30	10.0	2000*	750	-115	95	25	116	0	10300	157
4X150A	AB ₁	500	6.0(H)	1250	300	-50	50	57	202	0	3500	157
811-A	B	30	6.3	1500	-	0	85	13	150	13	6260	160
813	B	30	10.0	2500	#	0#	91	30	133	12	11000	219
6161	B	900	6.3(H)	1600	-	-57	82	80	239	18	3720	225
813	AB ₁	30	10.0	2500*	750	-95	90	25	148	0	9660	245
7094	AB ₁	60	6.3(H)	2000	400	-50	44	30	200	0	6000	280
7034	AB ₁	150	6.0(H)	2000	300	-48	48	60	250	0	4270	290
833-A	B	30	10.0	3000	-	-70	165	50	328	5	5600	700

■ Twin Type
▲ Total Value per tube in Push-Pull application
† Grid No. 1 to Grid No. 1 Signal
With Grids Nos. 1, 2 & 3 tied together at socket

* With -60 Volts on Grid No. 3
● With Grid No. 3 Tied to Filament Supply Center Tap
‡ Effective plate-to-plate value



How to put your finger on the right tube for SSB!

The *right* RCA Tube for your single-sideband amplifier is listed in this chart. For the power you want, simply read down the column on the right. For the corresponding RCA Tube type, read the column on the left. When you make your choice—let the Typical Operating Conditions be your guide.

Known for their big reserve of cathode emission,

RCA Tubes meet the requirements for single-sideband transmission—to the letter. And they have the power sensitivity it takes to build a signal up to full power in one stage—from low input signals. When you go SSB...any power from a few watts to the limit...remember, you can do it better *with RCA Tubes*. They are available at your RCA Tube distributor.

For further information, check number 3 on page 126.



RADIO CORPORATION OF AMERICA

Electron Tube Division

Harrison, N. J.