March 1962
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CQ

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Beam Installation Techniques

The Radio Amateur's Journal

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NEW VHF ADAPTER FOR 6 AND 2 METERS! We won't keep you in the dark any longer on a development that will more than double your present frequency coverage. □ Collins 62S-1 Adapter will give you full 6 *and* 2 meter operation — with the flick of a switch and with no cable changing when moving from HF to VHF! The new self-contained (using exciter's high voltage) unit supplies a 3 to 5 db noise figure on receive and 160 watts PEP input on transmit. □ Designed for use with the S/Line, KWM-2 and KWM-1, the 62S-1 will convert most equipment operating in the 14.0 to 14.2-mc range. □ Price and delivery to be announced in July. □ The 62S-1 will be on display at the Single Sideband Dinner March 27 at the Statler-Hilton, New York City.

COLLINS

For further information, check number 1, on page 126

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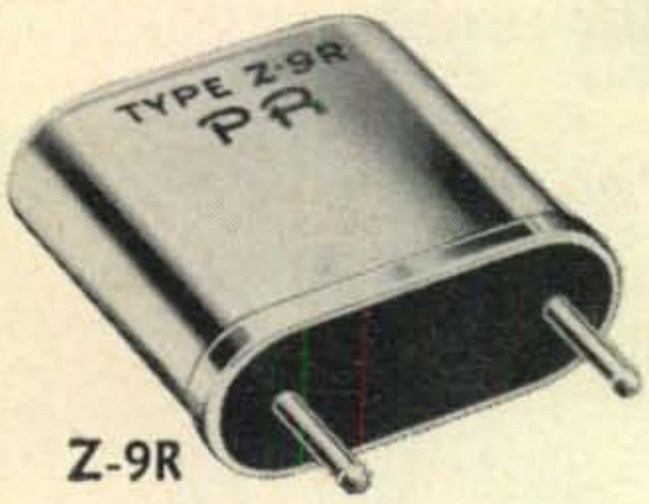

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For further information, check number 3, on page 126

CQ The Radio Amateur's Journal

VOL. 18, NO. 3 MARCH 1962

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TABLE OF CONTENTS

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- Amateur Crystals
- Commercial Crystals
- Citizens Band Crystals
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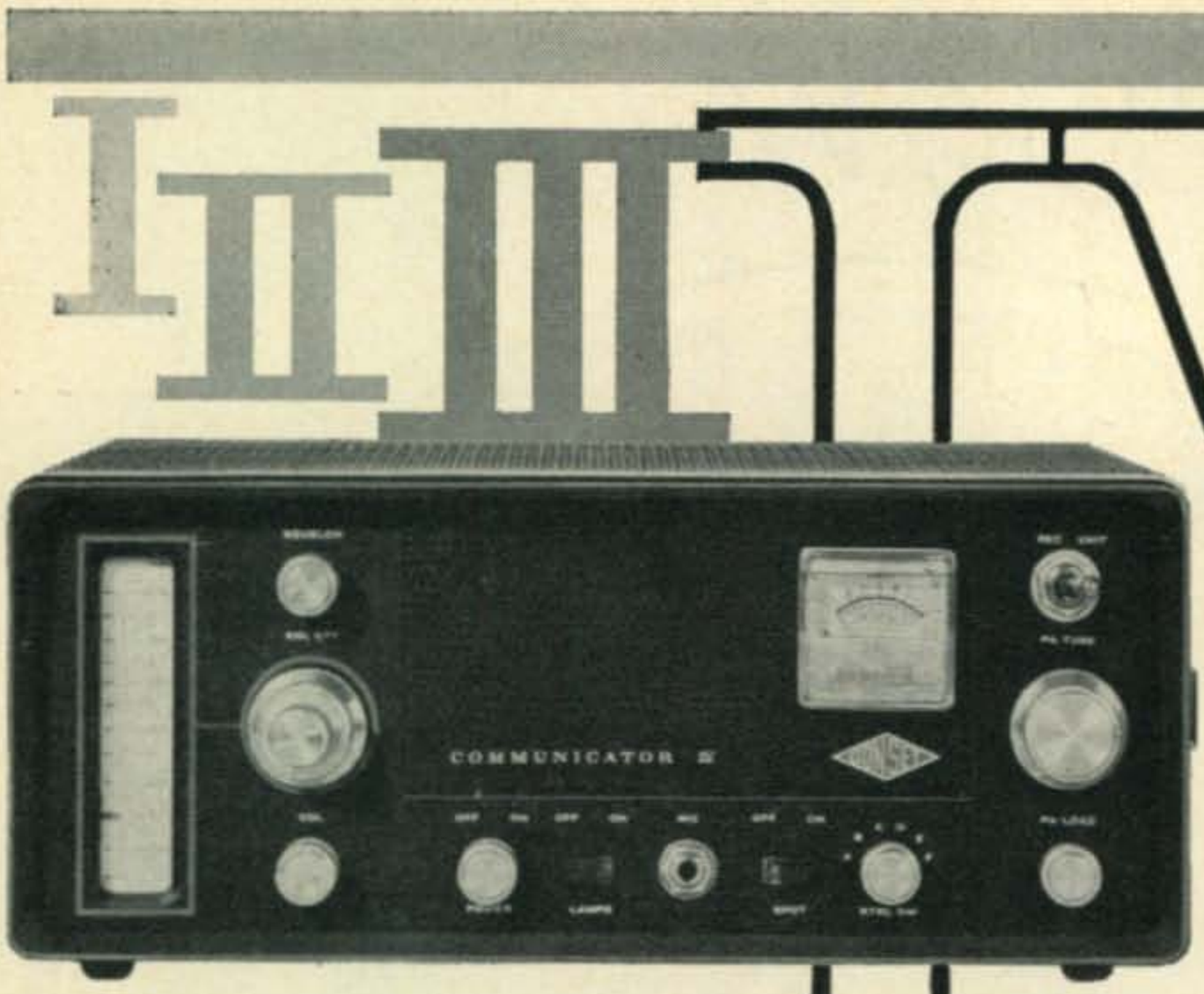

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For further information, check number 5, on page 126

ZERO BIAS

AT THE time this is being written, there are approximately 220,000 licensed radio amateurs in the United States. At the same time, the number of issued citizens' radio licenses exceed 260,000.

At a normal rate of growth, the number of amateurs licensed twelve months from now will probably be in the order of 260,000, while the number of citizens' band licenses will approximate 500,000. These figures are estimates based on current growth curves from recent FCC figures.

But, we learn from a just-issued news release, that one of the three major automobile manufacturers has just signed a contract with a large radio equipment manufacturer to offer two-way citizen band transceivers as optional equipment with every new car sold. If that manufacturer were to sell one-million automobiles during the next year, and only twenty-five per-cent were to include CB rigs, the number of citizen banders might very well be almost a million by this time next year, as compared to an approximate quarter-million amateurs.

Just what does this mean to the amateur fraternity? Well, in the first place, it means that some of these citizens' band operators will get the amateur-radio fever and become active amateurs, further strengthening the amateur ranks.

More likely however, it means that the CB populous will seek more frequencies on which to operate. As yet, there is no organization comparable to ARRL within the CB ranks to lobby for such frequencies, but rest assured, some financially conspicuous individual or group will sooner or later become aware that this field is ripe for exploitation.

Citizens radio, under its original concept as a means of communications for business and industry was a well-intentioned idea, but with CB clubs, QSL bureaus, and the CQers that have sprung up since its inception, citizens' radio has become a Frankenstein out of control.

Unfortunately, the FCC has neither the manpower nor the funds to thoroughly monitor the CB bands, and the CBers know it, so the situation is bound to get worse before it gets better. With the tremendous growth predicted, we can see only more confusion on the subject in the months ahead.

Now, just how does CB affect amateur radio? Unfortunately, CBers cause a good deal of TVI that is blamed on amateurs. This, however, is merely a small thorn in the amateur's side.

Much more important, is the possibility, indeed the probability that CBers will begin to scream for increased freqency allocations. Where are these frequencies to come from?

Naturally, as we see it, the application of s.s.b. will increase the existing number of channels four fold, but will this be enough to satisfy the growing number of CBers? More important, should an association of CBers evolve, as it well may, will this association lobby strongly for more frequencies if for no other reason than to justify its existence. We strongly suspect it will.

What can we as amateurs do to protect the frequencies we have? Several things. First of all, we can urge strongly for 100% participation in ARRL by all amateurs, active or not, as a further indication of the real strength of the amateur fraternity. A strong ARRL with a large membership is the most powerful force we can have to protect our amateur privileges.

Next, we can sacrifice to a small extent, our personal operating hours to make sure that we use as much of the frequency spectrum as possible. Remember, the biggest single excuse for taking away any frequency is the age-old cry, "But the hams aren't using that frequency, anyway." Instead of eight and ten-deep roundtables on a single frequency, there could be four or five spearate two-way QSOs on four or five frequencies; a little less fun perhaps, but essential, nevertheless. Band edges have always been a favorite stomping ground for DX, skeds, experiments, etc., and it is now time to reevaluate this type of operation and come up with a reasonable scheme of frequency usage.

The amateur group still remains an enormous pool of highly skilled operators ready to step forward during emergencies and national disasters; enhance international good will and provide advancements to the state of the radio communication art. Citizens' radio certainly has its place, but let us hope that their numbers alone will not overshadow amateur contributions of which we are so very proud.

Progress

It should be of interest to our readers to briefly mention that author's fees, paid for articles appearing during 1961, totaled $31,704, exceeding the previous year by over four thousand dollars and almost doubling that paid for material in 1956. If the first three months of 1962 offers an accurate picture of what's to come, payments in 1962 will again exceed all previous figures.

We feel this rapid increase is a good sign. That the articles now published are better written, better prepared and more interesting is obvious; but rather than that, they are now much more accurate; something for which *CQ* has been called to task in the past.

Foreign authors are also taking a bigger part in the format of *CQ*, indicating a greater desire on the part of our DX brethren to disseminate technical material from abroad.

Unknown authors, as well as "brand names" are now finding their material being treated professionally, resulting, not only in prompt payment but higher prestige on their part.

The appearance of an accurate annual index in the December 1961 and 1962 issues has also reduced the burden of research on our authors, our contributing editors and most important of all, our readers. We hope you have noticed the changes.

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For further information, check number 7, on page 126

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CM-52, CM-75

Phase Unit CM-52-2 and CM-75-2

Control

CM-52-2 and CM-75-2 Special

CL-52-72

"Original"

"Supreme" "Regency"

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Employs mutual inductance and capacity coupling between linear conductors for continuous measurement of standing waves on transmission lines. For continuous line insertion 25 to 1,000 watts, at frequencies from 3 to 200 mc. Will operate on power input of 10 watts, 7 mc and up. Requires only five watts input, 25 mc and up. Line insertion loss, less than 1 db at 30 mc. Ideal for inserting into coax feed lines at antenna for visual reading in SWR while making antenna adjustments; SWR observed immediately, at all times, without adjustment of Reflectometer. No balancing adjustments, no reversing. Prevents false loading from antenna tuner, match box, pi network, etc. Reduces line reflection, making possible increased radiated power. Uses 0-100 μa meter calibrated directly in standing wave ratio and relative power. Each unit hand calibrated and perfectly balanced. Includes loading control and forward to reflected power reversing toggle switch. With 83-1R (SO-239) connectors at each end. Gray hammertone aluminum case, 3" w. x 2⅛" d. x 5¼" h. Shipped with key-type mounting on back and full instructions.

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Resistive type unit for ooserving standing waves when adjusting antenna matching networks. For use on 52, 72 or 75 ohm coax lines and small amounts of RF excitation or grid dip oscillator. Requires use of external indicator, such as 0-100 μa meter (as in Simpson multi-meter). Hammertone gray aluminum case, 2⅛" w. x 1½" d. x 4⅛" h. Complete with instructions, SWR graph and antenna tuning procedures.

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"ORIGINAL" TEL-O-PATCH

High quality sound receiving and transmitting unit for low-Z lines in amateur and experimental use. Undistorted voice reproduction with perfect intelligibility at 100% modulation. Eliminates feedback, hum, noise, etc. Designed for high gain input but can be adapted to low gain input. Works on any receiver with an output impedance of 500-5,000 ohms. Mounts on receiver or operating desk by means of reversible mounting plate. Provides standard phone jack output; Amphenol 75-PC1M connector for input. Size, 2" w. x 4" d. x 4" h. Complete with instructions, diagrams, mounting screws.

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"SUPREME" TEL-O-PATCH

Combination phone patch and transmit-receive control. For use with custom and commercial equipment. Undistorted voice reproduction at 100% modulation. For any receiver with output impedance of 500-5,000 ohms, and for high gain transmitter inputs (can be adapted to low gain). Separate On-Off control; standard phone jack output; Amphenol 75-PC1M mike connector input; Amphenol 4-contact plug and socket for transmit-receive control; reversible mounting plate. Size, 2" w. x 4" d. x 4" h. Complete with instructions, diagram, mounting screws.

Cesco "Supreme" Tel-O-Patch—Net Each..... **$24.95**

"REGENCY" TEL-O-PATCH

For use with units such as 32V-KW1-75A, Globe King, B & W, Ranger, Valient 500, or similar high quality equipment with push-to-talk operation. No modifying, ready for use. Eliminates feedback, hum, noise; voice reproduction undistorted at 100% modulation. For any receiver with 500-5,000 ohms output impedance and for high gain input; can be converted to low gain. Lever-action telephone type switch controls both transmitter and modulation; separate On-Off switch. Size, 2" w. x 4" d. x 4" h. Complete with 3' cord and 80MC2M plug, installation instructions, diagram, and mounting screws (mounting plate is reversible).

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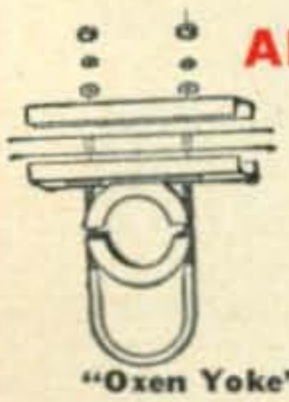
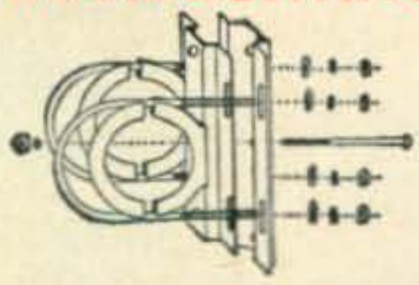
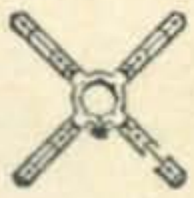


"Oxen Yoke"



Boom Mounting



Quad Mount

"OXEN YOKE" BEAM ANTENNA CLAMP

For element sizes ¾" to 1½" in diameter and booms 1½" to 3" in diameter. All components are completely interchangeable, permitting element and boom selection to your requirements. For continuous or cut elements at center; all channel lock assembly. Always specify element size and boom size when ordering. Net Each..... **$2.29**

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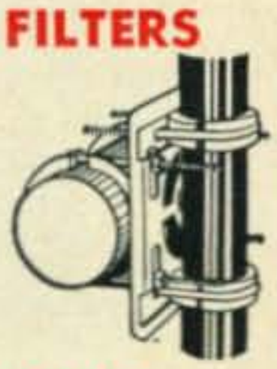
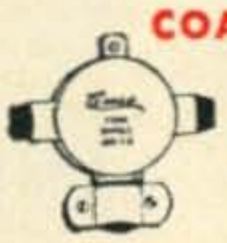


COAX DIPOLE DRI-FIT CONNECTOR



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448-61A

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TRANSICHECK, TEL-O-RECORD, FIELDOMETERS


CB-52-C


CB-52-S


ET-1, ET-2


ST-1


Mobile Model MC


HCE, HCE-20


LCE, LCE-20


MCP

CITIZENS BAND TRANSICHEK

Test instrument, designed for use with Citizens' Band transmitters, checks transmitter power output and antenna efficiency. Can be used for resonating or tuning power output plate circuit and adjusting antenna loading capacitor to assure maximum output. Ideal for determining accuracy of 50-ohm coaxial transmission line match to the antenna. Under scale on meter indicates SWR, match or mismatch of transmission line to antenna; lower scale, graduated 1–5, indicates power output and permits observing output when adjusting antenna plate circuit and loading capacitor. Comes complete with drawings and information on applications and use. Hammertone finish, aluminum case 4⅛" h. x 2⅛" w. x 1½" d.

Cesco Model CB-52-C—With coax connector. Net Each. **$19.95**
Cesco Model CB-52-S—Auto spade connector, Net Each **$18.95**

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Automatic, transistorized control has circuitry and control relays to start and stop motor, make or break B+ circuit of any recording machine. Recorder must have sufficient starting torque to run with switches in record position. When off, recorder automatically returns to manual operation. Can be used on remote phones up to five miles away from the parent phone. Permits the recorder to operate unattended. Built-in power supply is well filtered; operates from 115 v. AC, 60 cps. Size, 5" h. x 4" w. x 3" d.

Cesco Model ET-1—For intermittent recording. Net Ea. **$79.95**
Cesco Model ET-2—Special model for applications where recorder is used exclusively for phone recording. Net Each..... **$79.95**

TEL-O-RECORD PICK-UP AND TRANSFER

For recording phone messages on tape, wire or disc recorders. Also used for paging systems. Records both sides of a conversation. By secondary lines, parallel terminated, many sources may feed the mike input on a paging amplifier; when used this way, phone must be partly dialed to remove dial tone before speaking. High quality transformer will not load phone line; free of distortion and hum. Aluminum, gray hammertone box has slip-on mounting bracket. Complete with cords, plugs and installation instructions.

Cesco Model ST-1—Net Each..... **$14.95**

CESCO FIELDOMETERS

Wide spectrum, sensitive field strength analyzer and field measuring device works satisfactorily at 1 kc to 1000 mc radiated frequencies, without use of plug-in coils. Sensitive 0–100 μa meter withstands heavy shock without damage. Ultra-sensitive models also available. Shunt-type sensitivity control prevents off-scale readings or overload in strong fields.

MODEL MC FIELDOMETER

For mobile, amateur, police, aircraft and industrial uses. Ideal for tune-up. Indicates transmitted signal at all times. Has capacity wand, sensitivity control and μa meter. U-shaped mounting bracket fits dash at windshield rim or rear-view mirror. Pivoted case 3½" h. x 2¾" w. x 1½" d.

Cesco Model MC—Net Each..... **$24.95**

MODELS HCE AND HCE-20 FIELDOMETERS

Portable hand unit of fixed-capacity type with 0–100 μa meter and sensitivity control on handle end. Capacity wand and components covered by screw-on 4¼" lg. plastic cover. Handle 4¼" long. Provision made for plug-in interchange for capacity wand to electrostatic, peak resonant broad-skirted wands (available on special order for any specified frequency). Case size same as Model MC.

Cesco Model HCE—Net Each..... **$29.95**
Cesco Model HCE-20—Same as above, but with ultra-sensitive 0–20 μa meter. Net Each..... **$44.95**

MODELS LCE AND LCE-20 FIELDOMETERS

same as Model HCE, except designed for laboratory use. Indicator and sensitivity controls mount in portable, slanted meter case 3⅜" h. x 2⅞" w. x 2¾" d. Comes with corded probe four ft. long and capacity wand (convertable to electrostatic type with plug-in resonant wand available).

Cesco Model LCE—Net Each..... **$29.95**
Cesco Model LCE-20—Same as above, but with ultra-sensitive 0–20 μa meter. Net Each..... **$44.95**

MODEL MCP PROBE ADAPTER

Corded probe, capacitive-type adapter for use with any multitester with a basic movement of 0–50 or 0–100 μa. Meter must be brought to separate terminals (as found on Simpson Model 260 and similar types).

Cesco Model MCP—Net Each..... **$12.95**

CITIZENS BAND ANTENNAS AND ACCESSORIES

DUO-POLE GROUND PLANE ANTENNA

Delivers broad, equal, groundwave circular coverage for good communications even with low power output. Aircraft aluminum construction. Grounded quarter-wave foldback lightning safety factor. Adjustable element ring locks. Factory resonated at 27.085 or channel 11; works well over all channels with low VSWR, 1.2:1 or less. Special feedline terminals incloses in masting. Nominal base impedance, 52 ohms. Shipping carton only 68" long. Shipping Weight, 7½ lbs.

Cesco Duo-Pole Antenna—Net Each..... **$29.97**
Industrial Version, 25-175 mc, Also Available at Same Price.

C-B BEAM ANTENNAS

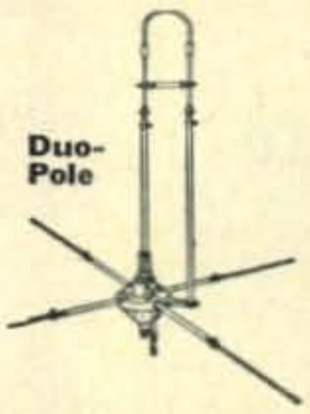
Factory pre-tuned beam antenna has exclusive Acromatch for increased power output. Extruded aluminum tubing with 1¼" boom; elements have ½" dia. center sections, ⅜" dia. inserts. Elements mount either horizontally or vertically. Resonated at 27.085 mc; low SWR. Assemblies in minutes with permanently secured locking rings. Lightweight; will rotate with any TV rotator. Shipping carton only 86" long.

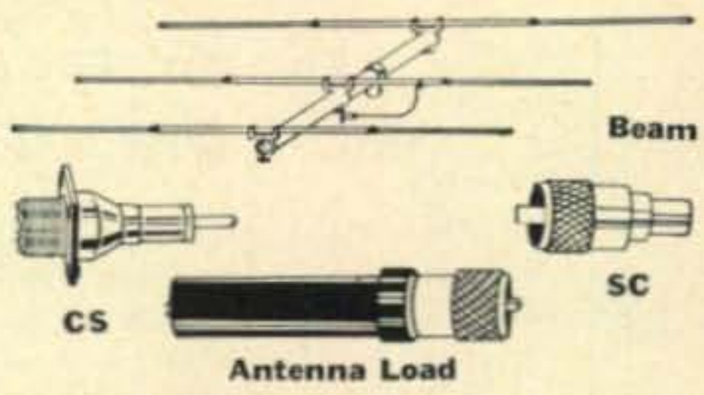
Cesco 3-Element Beam—Gain 7 db; boom 10' long. **$29.95**
Shipping Weight, 8 lbs. Net Each.....
Cesco 4-Element Beam—Gain, 8 db; boom 15' long. **$39.95**
Shipping Weight, 11 lbs. Net Each.....
Cesco 5-Element Beam—Gain, 9 db; boom 20' long. **$49.95**
Shipping Weight, 13¼ lbs. Net Each.....

QUAD ARM KITS

Permits easy fabrication of durable, cubical quad antenna. Each arm has one 1¼" aluminum section with end swaged to 1" dia., plus one or two fiberglas telescoping sections. Stainless steel clamp holds fiberglas section to aluminum tube. Detailed instruction book supplied.

Cesco Model QB-2 Quad Arm Kit—With eight arms of one section aluminum tubing and one section fiberglas, each. **$59.95**
Makes 10- and 15-meter quad antenna. Net Each.....
Cesco Model QB-3 Quad Arm Kit—Same, but with two sections of fiberglas per arm, and an epoxy resin kit for joining the fiberglas tubes. Makes 10-, 15-, and 20-meter quad or single 20-meter antenna. Net Each..... **$89.95**





CABLE ADAPTERS

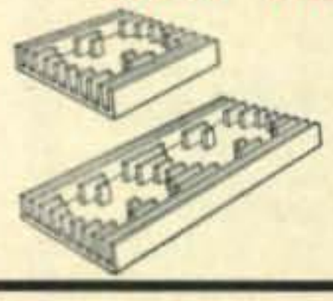
Cesco Model CS—Permanent connector consists of 83-IR, SO-239 coaxial socket and auto radio type spade lug. One-piece construction. Net Each..... **$1.29**
Cesco Model SC—Rugged, permanent adapter connects auto radio spade plug to coaxial socket 83-IR or SO-239. No floating pins. Net Each..... **$1.29**

PHANTOM ANTENNA LOAD

Non-inductive 52-ohm substitute antenna load has adequate power rating for any C-B transceiver in the 26–27 mc range. Ideal for testing and repairing citizens' band units. Also useable as a coaxial line terminator.

Cesco Phantom Antenna Load—Net Each..... **$1.49**

NEW TRANSISTOR HEAT SINKS



Unique method of production makes heat sinks from match plate, green sand aluminum castings which increase heat radiating efficiency with less heat sink area. Available in any size and shape by industrial specification. Circular types available for Motorola round transistors.

Cesco Std. 2-Cell Heat Sink—Net. **$1.25**
Cesco Std. 4-Cell Heat Sink—Net. **$1.95**

Letters..... to the Editor

Too Late?

Editor *CQ:*

This is only the second time in my life that I have written an opinion regarding a magazine article, but, upon reading Mr. Edward Broderick's "Before It's Too Late" in Jan. *CQ*, I couldn't refrain.

His opinions regarding hamming for the sole purposes of DX, QSL's and yakking, so concur with my own that I had an eerie sensation while reading it.

A great many of the rapid advances in radio communications and techniques are directly due to amateurs with an inclination to experiment and to refuse to be satisfied with a good circuit, but to always be seeking a better circuit.

Many amateurs, I believe are missing out on a great deal by not attempting to build home-brew rigs.

The radio spectrum is still in its infancy, and even though the skilled engineers will probably produce the greater part of the new discoveries, there is still very much left for the curious and avid amateur in the realm of application.

To sum up, it takes much more skill to use a set of tools than it requires to man a microphone or key, and it follows that the satisfaction is far greater.

Please convey my heartiest congratulations to Mr. Broderick on his fine article and to your very wonderful magazine.

Ben Morris, K4YDW
2664 Edgewood St., S.W.
Roanoke, Va.

Editor *CQ:*

Hooray for Mr. Broderick! (January, 1962). He's said what I've been trying to say for years, and said it most effectively.

How long can we expect our hobby to last, if we do not re-recognize our responsibilities as amateurs? And how can we stimulate our teen-agers to scientific achievement when so many otherwise respectable old-time amateurs are content to merely "plug-in and yack?" The handwriting is already on the wall.

C. F. Rockey, W9SCH
1124 Camille Avenue
Deerfield, Illinois

Editor *CQ:*

It seems to me that Mr. Broderick is a little over concerned about losing our hobby because of purchased gear. I am all for any amateur who likes to build his own equipment as a means of self education and advancement of the art but I cannot agree that it will have the affect he states on the retention of our frequency assignments.

If Mr. Broderick had investigated more closely the basis for the amateur frequency assignments and the reason that the amateur has been able to retain his identity in the spectrum, he would have found the following facts:

1. Paragraph 12.2 of Part 12 of the FCC regulations defines Amateur Operators as a "person interested in radio technique solely with a personal aim and without pecuniary interest, . . ." Nowhere within the regulations governing amateur radio is there any stipulation regarding the make, kind or type of equipment that shall be used. Only that certain engineering requirements be met.

2. No radio broadcasting station, regardless of type of service, can retain its license unless it is on the air in the public interest, convenience or necessity. Amateur Radio is no exception, although continuing advance-

←For further information, check number 9, on page 126

CARL E. SMITH
E. E., President

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CQ-86

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ment of the art is an inherent characteristic of amateur radio, the only reason for its present day existence, in the light of opposition from commercial interests, is public service. I think it can be safely said that the FCC could not care less whether amateur equipment is commercial or home made as long as PICON is served. . . .

If Mr. Broderick is interested in saving our frequencies he should use them by getting on the air with whatever means he has available.

J. L. McCoy, WØLQV
8319 Marty
Overland Park, Kansas

Hearts or Spades

Editor, CQ:

A bundle of posies to Mr. Cates, WA6GER, Re: "DXing is Different . . . In 6 Land" (January, 1962).

His most deft kick to the behind side with a humorous pat on the back of the W6's is well directed, to say nothing of being most diplomatic.

For my money he could have conserved the energy used, offering the pat on the back, and applied it to the former—only in spades.

Ken Tate, W5EMK
1323 Patricia Drive
Bossier City, La.

So What!?

Editor, CQ:

After reading the impressive list of amateurs who worked all-of-this, and all-of-that, in the November, (Honor Roll) 1961 *CQ*, I just can't help wondering (at the risk of having a bunch of your readers horsewhip me editorially) with just how much of an accomplishment these amateurs are being credited? What equipment did they use, and did they build it themselves? How much power did they use?

My wonderment started by a fellow amateur who keeps showing QSL cards from all sorts of exotic places. I haven't said so, but my feeling is: "So What!?" Because he has an expensive s.s.b. rig with an amplifier running 2000 watts p.e.p. to an extra-special manufactured three-element beam on a very fine manufactured tower with a grade-A rotator? I can't help but compare him with a close friend who has worked over 100 countries with a homebrew 60 watt rig into 150 feet of wire thrown over a couple of palm trees.

It's not that I begrudge anyone their awards. I just believe that possibly there should be some qualification of the awards given to indicate on what basis they were obtained.

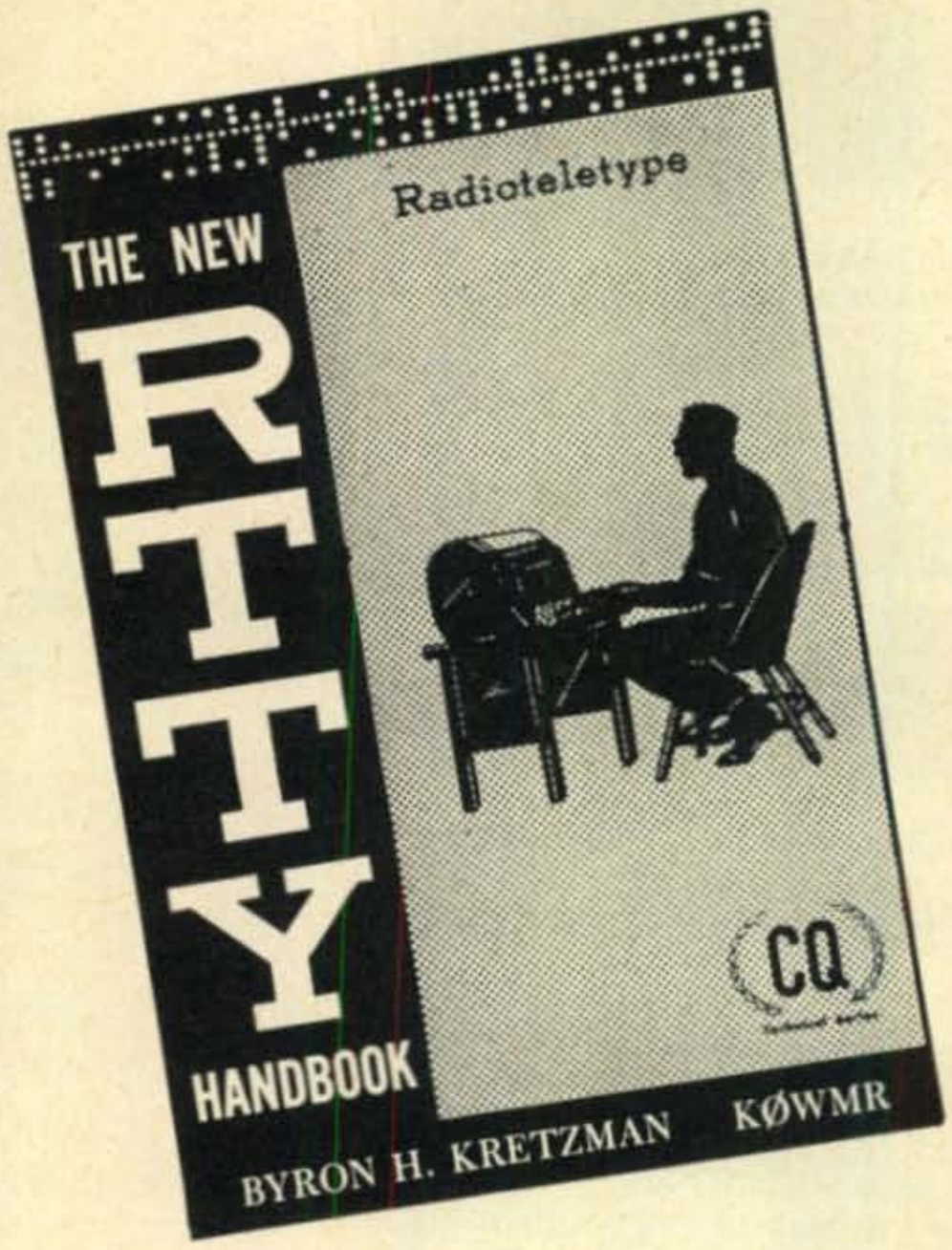
It might be well to remind some of these jokers that many a Novice works all of the States and many foreign countries with 75 watts or less and in many cases a homemade antenna. And all of this without the benefit of a v.f.o. and on crowded bands.

Ricker J. Bodholdt, K3QOK
Route 1, Box 307-A
Phoenix, Maryland

Has anyone heard of operating skill lately?—*Ed.*

Eleventh Annual S.S.B. Dinner

The S.S.B. Amateur Radio Association will sponsor the Eleventh Annual S.S.B. Dinner and Hamfest on Tuesday March 27th at the Hotel Statler-Hilton, 33rd St. and 7th Avenue, N.Y.C. All amateurs and their friends are invited. Held during the week of the I.R.E. Convention, this dinner attracts many outstanding radio amateurs and communications men from all parts of the world. Emphasis will be placed on a large social gathering featuring good food, good fellowship and professional entertainment. Equipment displays open at 10 A.M. and the dinner starts at 7:30 P.M. Bill Leonard, W2SKE, noted television personality, will be master of ceremonies. Tickets purchased in advance are $10 each



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A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, operating procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, all written by Byron Kretzman, W2JTP, a well known authority in the field. This book is a *must* for your library!

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More Good Will

Hirokuni Asada, a member of the Toho Amateur Radio Club (JA1YAK) in Tokyo would be very pleased to receive old books, magazines, etc. that may no longer be of use to the gang and would contribute to the study of the hobby as well as improve their English. The QTH is 326 Funabashicho Setagaya, Tokyo, Japan.

H. S. R. C.

The Woodbury N.J. High School Radio Club has elected new officers for 1962. The Station trustee is WA2LSI and they wonder if a few readers would have some unused equipment to donate. The address is 37 So. Columbia St., Woodbury, N.J.

Chess Anyone?

Al Lazarus, K5FYM, News Editor at *The Shreveport Times* is an avid chess player and is interested in contacting anyone, who would like to make a "chessked." Any takers?

R.S.G.B. Handbook

The Radio Society of Great Britain has just completed their third edition of *The Amateur Radio Handbook*. This buckram-bound volume, containing 552 pages, covers every aspect of amateur radio in Great Britain. Along with section on theory, the *Handbook* contains many construction articles and is beautifully printed and profusely illustrated. If your library lacks a European standard, written in English, of course, we suggest you write to the R.S.G.B., 28 Little Russell St., London W. C. 1, for this gem.

San Diego DX Club

The San Diego DX Club, coordinators of the W6-QSL bureau have announced new officers for calendar 1962. Officers are: President, K6BHM, Vice-President, K6ENX; and Sec.-Treas., W6CAE. W6BKZ and K6EC have been appointed as delegates to the San Diego Council of Amateur Radio Organizations.

Alabama Hamfest

The State Coliseum in Montgomery Alabama will be the site for the Montgomery "Hamfair" sponsored by the Montgomery A.R.C. Information can be obtained from club headquarters at P. O. Box 6187, Montgomery 8, Alabama.

RCA Tube Manual

If you've got a loose buck stashed away and want to invest it wisely, take a look at the New *RCA Receiving Tube Manual*. It contains 480 pages this year and the popular Circuits Section includes a 144 mc receiver and a 10 meter nuvistor preamplifier. The *Manual* is designated RC-21 and should be at all distributer counters by the time you read this.

Catalogue No. 62

Cush-Craft Antenna products will send free, upon request, their latest catalogue No. 62, illustrating their complete line of beams, verticals and accessories. Their address is 621 Hayward Street, Manchester, N.H.

RTTY Dinner

Monday evening, March 26th, is the date set for the Annual RTTY Dinner to be held at the White-Turkey Town House, 260 Madison Ave., N.Y.C. A grand list of RTTY enthusiasts are expected to attend, including: Merrill Swan, W6AEE; Phil Catona, W2JAV; Ed Handy, W1BDI and Byron Kretzman, W2JTP. Guest speaker will be Charles R. Teeters, W2DHE, of the Signal Corps, who will speak on and display miniaturized RTTY equipment. Tickets are available at $6.00 each from Elston H. Swanson, W2PEE, 101 New South Rd., Hicksville, L.I., N.Y.

WATCH YOUR "S" METER!

The Ham You Are Working May Be Using

THE NEW *Master Mobile* "J"

2 METER MOBILE/FIXED ANTENNA

If you like the way his signal pins your "S" meter, get one of these signal-hurlers yourself,.and get your 2 meter signal "way out."

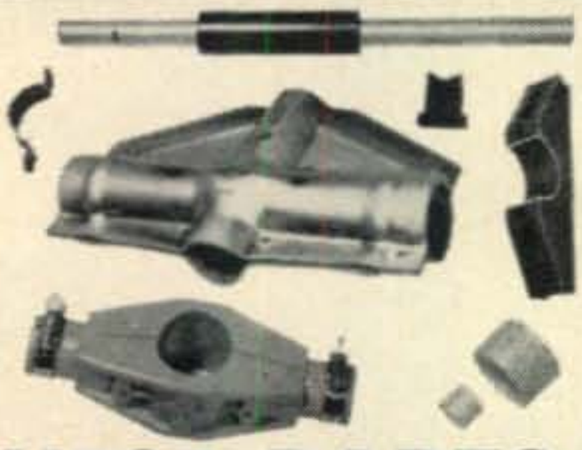
- **Substantial gain over mobile whip**
- **Directly matches 52 ohm line**
- **Overall height 86 inches**
- **Exact impedance match**
- **Low radiation angle**

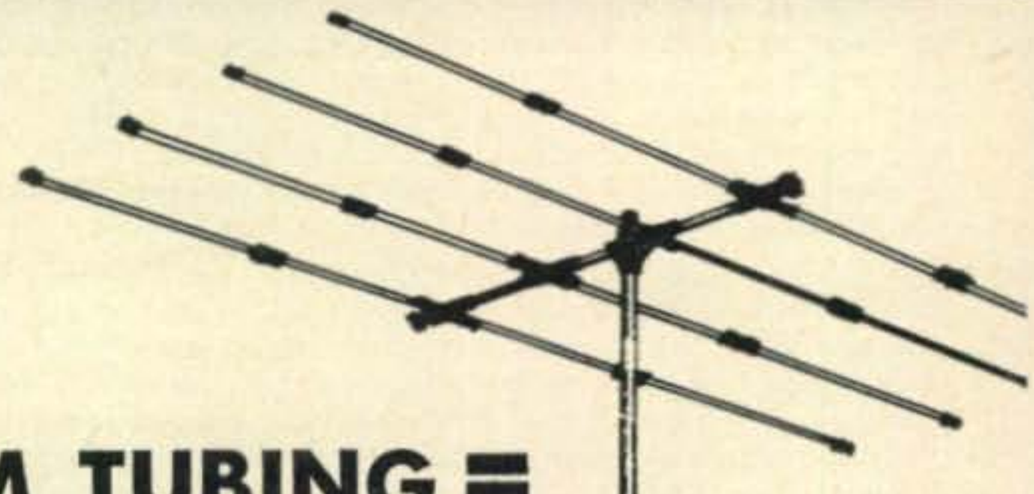
An ideal mobile 2 meter antenna, it also serves as a perfect fixed station multiplier! Can be switched from mobile to fixed use in a jiffy, using Master Mobile E-Z Off Connector. Fits any auto mount (body or bumper) with ⅜"-24 thread, or any fixed base mount with same thread.

Give it a close look at your ham dealer now . . . or send for complete technical bulletin and name of nearest parts jobber.

Amateur Net 14.95

MODEL AM-28





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DESIGN-IT-YOURSELF BEAM PARTS

Master Mobile offers the do-it-yourself antenna builder all the necessary parts, factory pre-built, to design his own beam. The only thing we do not supply is aluminum tubing, which can easily be obtained locally. Why pay transportation costs for aluminum tubing? The heart of any well constructed beam is the mounting hardware, boom clamps, element supports, thin-line traps, etc. These are individually available from your Master Mobile parts jobber so that you can build any beam of your own design, or pattern it after any commercial beam on the market . . . 10 meters to 40 meters, tri-banders, 2 elements or 6 . . . you name it . . . at tremendous savings! Using Master Mobile parts you are assured of the finest mountings and clamping assemblies to withstand high winds and ice loading. These are identical to the high-impact cycolac parts used in the manufacture of many famous beams, but you buy only the parts you want, and only as you need them. Traps and mount assemblies are available for verticals also.

Send for beam data sheets, price information and technical bulletins. Name of nearest stocking parts jobber on request.

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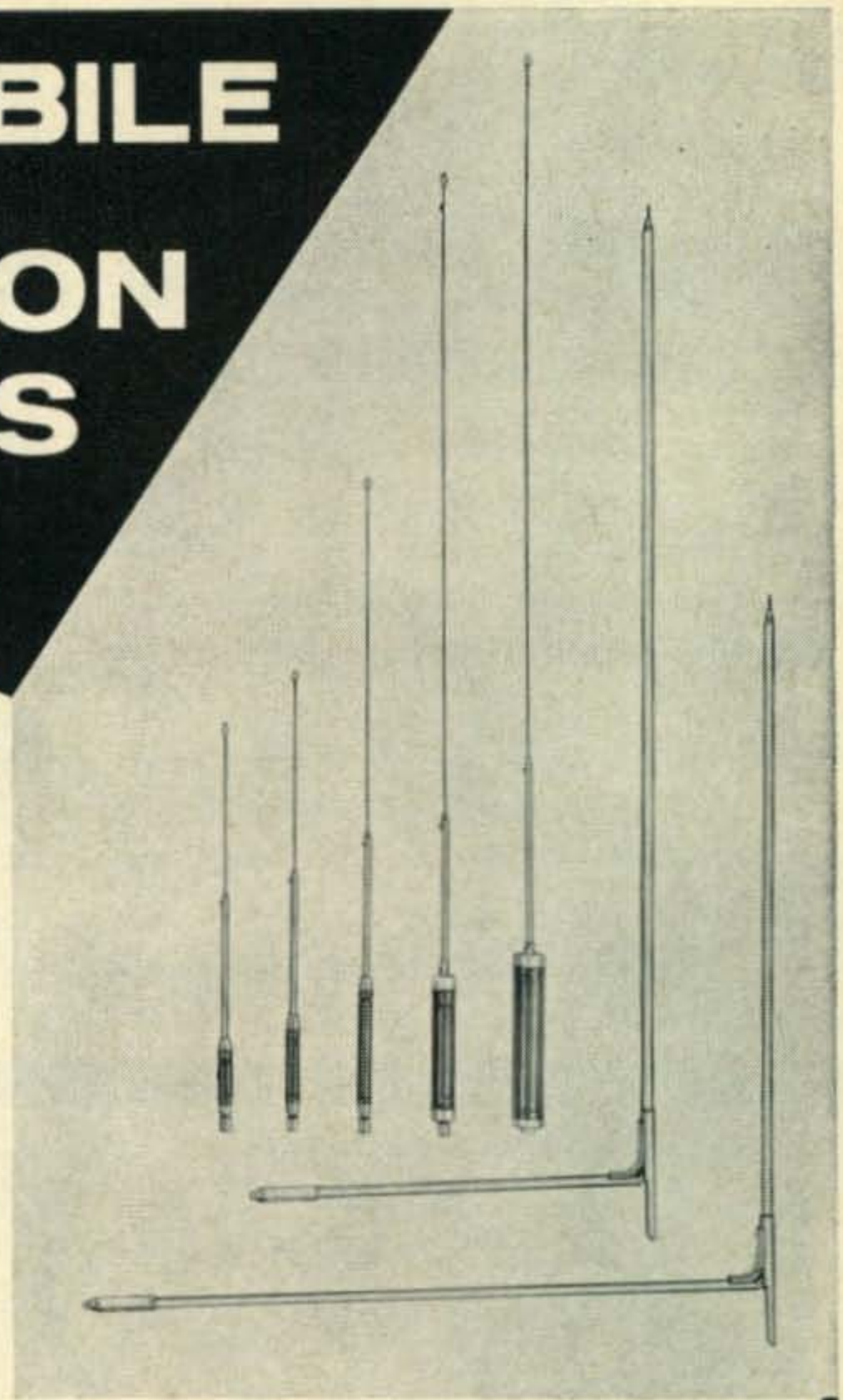


You can reach unlimited distances and get unusual voice quality on every band with this new mobile antenna assembly. Buy only the mast and resonators for the bands you operate. No need for matching devices, **no feed line length problems. Use any length of 52 ohm cable.** This is a new, efficient concept of center loading. Each of the five resonators has a coil specially designed for maximum radiation for a particular band. Center frequency tuning is by means of an adjustable stainless steel rod in the resonator.

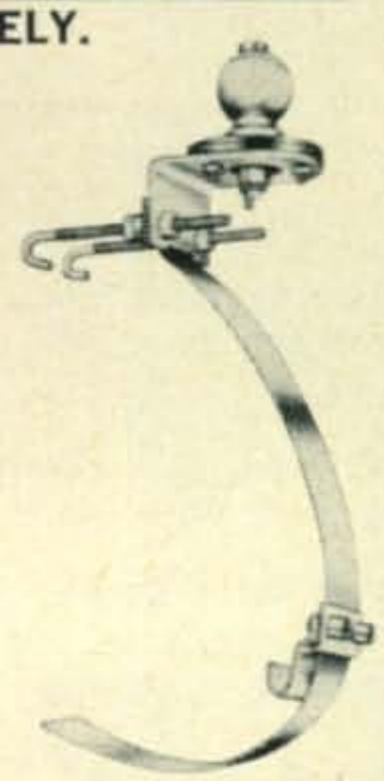
The 54-inch fold over, heat treated, ½" aluminum mast permits instantaneous interchange of resonators. Folding over the mast prevents striking of overhead objects. When opened to full height, the two sections of the permanently hinged mast are held rigidly in the vertical position by a shake proof sleeve arrangement. Mast has ⅜-24 base stud to fit all standard mobile mounts. SWR is less than 2 to 1 for any center frequency range within the band. Power rating is 75 watts for AM and 150 watts for SSB.

ANTENNA ASSEMBLY CONSISTS OF:

Part No.	Description	Total Height of Antenna	Amateur Net
MO-1	54" Mast folds at 15" from base	(For Rear Deck or Fender Mount)	$ 7.95
MO-2	54" Mast folds at 27" from base	(For Bumper Mount)	7.95
RM-10	10 Meter Resonator	Maximum 80" — Minimum 75"	5.95
RM-15	15 Meter Resonator	Maximum 81" — Minimum 76"	6.95
RM-20	20 Meter Resonator	Maximum 83" — Minimum 78"	7.95
RM-40	40 Meter Resonator	Maximum 92" — Minimum 87"	9.95
RM-75	75 Meter Resonator	Maximum 97" — Minimum 91"	11.95

ANY MAST OR RESONATOR MAY BE PURCHASED SEPARATELY.

FITS MORE CARS THAN ANY OTHER BUMPER MOUNT!



MODEL BM-1 Flat alloy steel strap fits tightly against any shape bumper yet is inconspicuous. Length of strap permits its attachment to both large and small bumpers.

Assembly is held in place by two "J" bolts at the top of the bumper and strap clamp at the bottom. "J" bolts may be inserted between top of bumper and car body where clearance is as low as ¼".

Whip receptacle assembly consists of a heavily chrome plated 1½" die cast Zamak ball with ⅜-24 thread. Adjustable so as to maintain whip in true vertical position. Black phenolic base. All metal parts of the bumper mount are heavy cadmium plated. **$6.95**

See these outstanding NEW-TRONICS products at your electronics distributor. If he cannot supply you send check or money order for immediate delivery. Write for literature on the complete NEW-TRONICS line.

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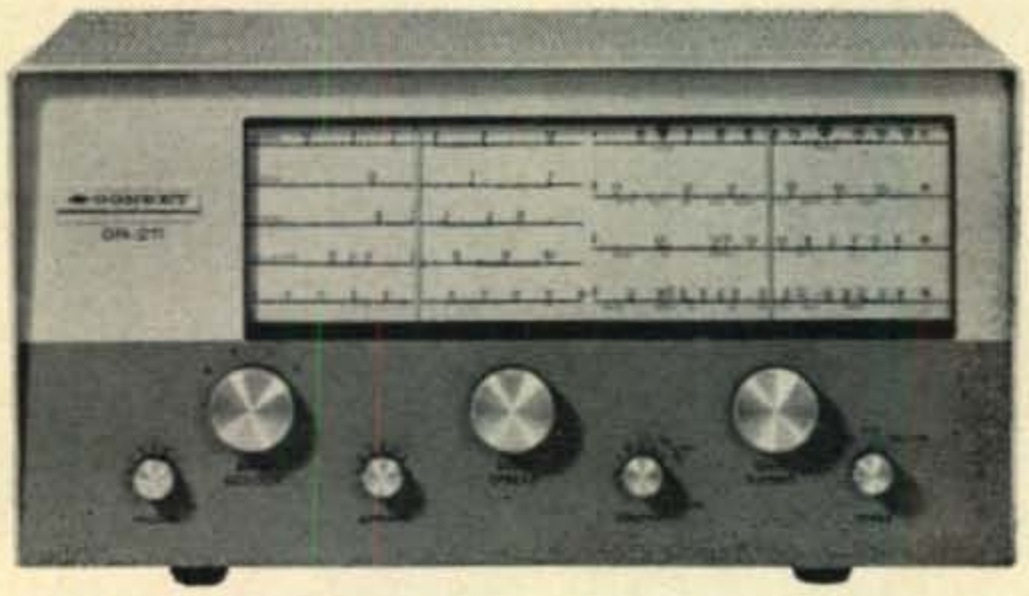

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GR 211

General coverage from standard broadcast through 34 mc band, including WWV, foreign & Voice of America.

- Printed circuit techniques and advanced design for extra sensitivity, better, quieter reception, even on highest frequency bands.
- 5 tubes plus 2 solid state rectifiers, TRANSFORMER-POWERED (not ac/dc) for higher over-all gain, better signal-to-noise ratio.
- Circuit features leading to higher sensitivity include quality, high-Q, permeability-tuned coils.
- Two full-vision, illuminated, slide-rule type dials provide instant identification of broadcast and short-wave frequencies.
- Vernier tuning knob counter-weighted for smooth, non-critical short-wave tuning.

Amateur net price **$73.50**

ONLY DUAL CONVERSION RECEIVER PRICED UNDER $115!

GR 212

- Dual conversion for increased selectivity.
- Variable BFO.
- Sensitivity: At least 6 db $\frac{S+N}{N}$ at 1 μv (mod. 30% at 400 cps) input on all H.F. Bands.
- Two full-vision, illuminated, slide-rule type dials provide instant identification of broadcast and short-wave frequencies.
- Panel-mounted "S" meter.
- Band-spread tuning knob is inertia flywheel weighted for smoothest tuning.
- Separate band-spread dial for amateur bands.

Amateur net price **$110.00**

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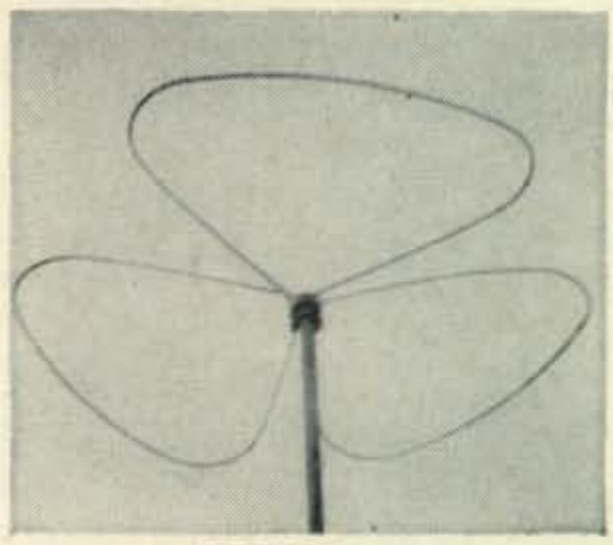

* . . . the brain child of Dr. Robert Mellen and Carl Milner plus the production know-how of Cush Craft now presents this new VHF-UHF antenna. This new clover leaf antenna gives fantastic performance: omni-directional, it has horizontal polarization and extremely low Q. This results in improved band width, ease of matching and large "capture area." Dual stacked, Big Wheel gain figures (in all directions) compare favorably with the 7 element Yagi in its favored direction.

PERFORMANCE SPECIFICATIONS

Pattern: 360 horizontal, variations of ± 2DB or less
Band Width: SWR 1 : 1.2 or less over 4 Mc
Gain:
Single bay — approx. 5 DB over Halo
Two bay — approx. 5.5 DB over single bay
Four bay — approx. 7.5 DB over single bay

PRICES

1 BAY						
¾	meter	Model No.	ABW	— 420	—	$ 8.95
1¼	meter	Model No.	ABW	— 220	—	$10.95
2	meter	Model No.	ABW	— 144	—	$12.95
2 BAY						
¾	meter	Model No.	ABW2	— 430	—	$20.75
1¼	meter	Model No.	ABW2	— 220	—	$26.95
2	meter	Model No.	ABW2	— 144	—	$29.65
4 Bay						
¾	meter	Model No.	ABW4	— 430	—	$44.50
1¼	meter	Model No.	ABW4	— 220	—	$55.50
2	meter	Model No.	ABW4	— 144	—	$62.75

Complete with brackets and harness ready for your mast and 50 ohm cable.

For Further Information & Illustrations Refer to: Page 42 September QST and Page 60 October QST

Cush Craft 621 Hayward Street, Manchester, N. H.

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SSB

THIS IS THE NEW AMPEREX 8117 RF LINEAR AMPLIFIER TWIN TETRODE. IT IS SPECIALLY DESIGNED TO PROVIDE EXCELLENT LINEARITY IN PARALLEL FOR PEP OUTPUTS UP TO 140 WATTS, CCS — WITH A THIRD ORDER IM DISTORTION BETTER THAN 30 DB DOWN! THE AMPEREX 8117 OFFERS: MAXIMUM RATINGS TO 60 MC., REDUCED RATINGS TO 175 MC.; CCS PLATE DISSIPATION OF 60 WATTS; FORCED AIR AND HEAT SINK RATINGS, AND EITHER 6.3- OR 12.6-VOLT FILAMENT VOLTAGE OPERATION. SEE IF YOU DON'T AGREE WITH US THAT IT IS THE MOST EFFICIENT CLASS AB_1 TUBE IN EXISTENCE!

TYPICAL OPERATION — AB_1 LINEAR RF AMPLIFIER, BOTH UNITS IN PARALLEL

Frequency	*30.....30 Mc.*	*Average D.C. Plate Current*	*131.....130 ma*
D.C. Plate Voltage	*1000...800 volts*	*Peak RF Grid Voltage*	*34....34 volts*
D.C. Grid #2 Voltage	*250...250 volts*	*Average Plate Power Output*	*70.5...56 watts*
D.C. Grid #1 Voltage	*–34...–34 volts*	*Peak Envelope Plate Power Output*	*141...112 watts*
Zero Signal D.C. Plate Current	*50.....50 ma*	*3rd Order IM Distortion*	*30.....30 db*
Effective RF Load Resistance	*3100..2300 ohms*		

ALSO AVAILABLE: Amperex type 8116, similar to the 8117, but with 26.5 volt heater.

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For further information, check number 18, on page 126

3 new value packed Heathkits for

SUPERB HEATHKIT SSB MARAUDER TRANSMITTER COMPARES FEATURE FOR FEATURE . . . WITH GEAR SELLING AT TWICE THE PRICE

First complete filter-type SSB transmitter in kit form . . . over two years in development. An outstanding array of features, combine with neat, functional styling, clean open circuit layout. Quality construction and materials bring you performance, convenience and dependability unheard of in this low price range! Special features include: Precision gear-drive tuning assembly with approximately 10 kc per turn for precise frequency settings . . . smooth action; a full-function accessory socket provides for receiver muting, amplifier cutoff bias, 117 vac antenna relay power, etc.; A switched 117 vac outlet powers monitor scope or other accessories; "Spot" control; Voice control (VOX); Drive level control and many, many more! All control functions are located on the front panel for convenience and ease of operation . . . no doors or hatches to open . . . no equipment to move! Here is a transmitter you will be proud to own and use for years to come! Allow 60 hours for assembly. Complete details available on request. 92 lbs.

Kit HX-10 . . . no money down, as low as $22 mo. . . . $334.95

SPECIFICATIONS—Emission: SSB (upper or lower sideband), CW, AM and FSK. **Power input:** 180 watts PEP—SSB and CW, 75 watts AM. **Output impedance:** 50 to 75 ohms with not more than approximately 2:1 SWR. **Frequency range: (MC:)** 3.5 to 4.1; 6.9 to 7.5; 13.9 to 14.5; 20.9 to 21.5; 27.9 to 28.5; 28.5 to 29.1; 29.1 to 29.7. **Frequency stability:** within 100 cps, overall. **Carrier suppression:** 50 db below peak output. **Unwanted sideband suppression:** 55 db below peak output. **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone using grid-block keying. **Audio output:** High impedance microphone. **Audio frequency response:** 400 to 3000 cps at ±3 db. **Power requirements:** OFF 4 watts; STANDBY—200 watts; KEY DOWN—400 watts at 117 volts, 50/60 cycles AC. **Cabinet size:** 19" W x 11⅜" H x 16" D.

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- All crystals furnished for 80 through 10 meters
- Operates SSB (upper or lower sideband), AM, CW & FSK
- VOX controlled break-in CW operation
- Multi-section hermetically sealed crystal band-pass filter
- Dual conversion; crystal controlled heterodyne oscillator
- Preheated, temperature compensated VFO
- VFO or crystal frequency control
- Automatic level control for higher talk power
- 165 to 1 gear drive tuning assembly
- Air-cooled, shielded final amplifier

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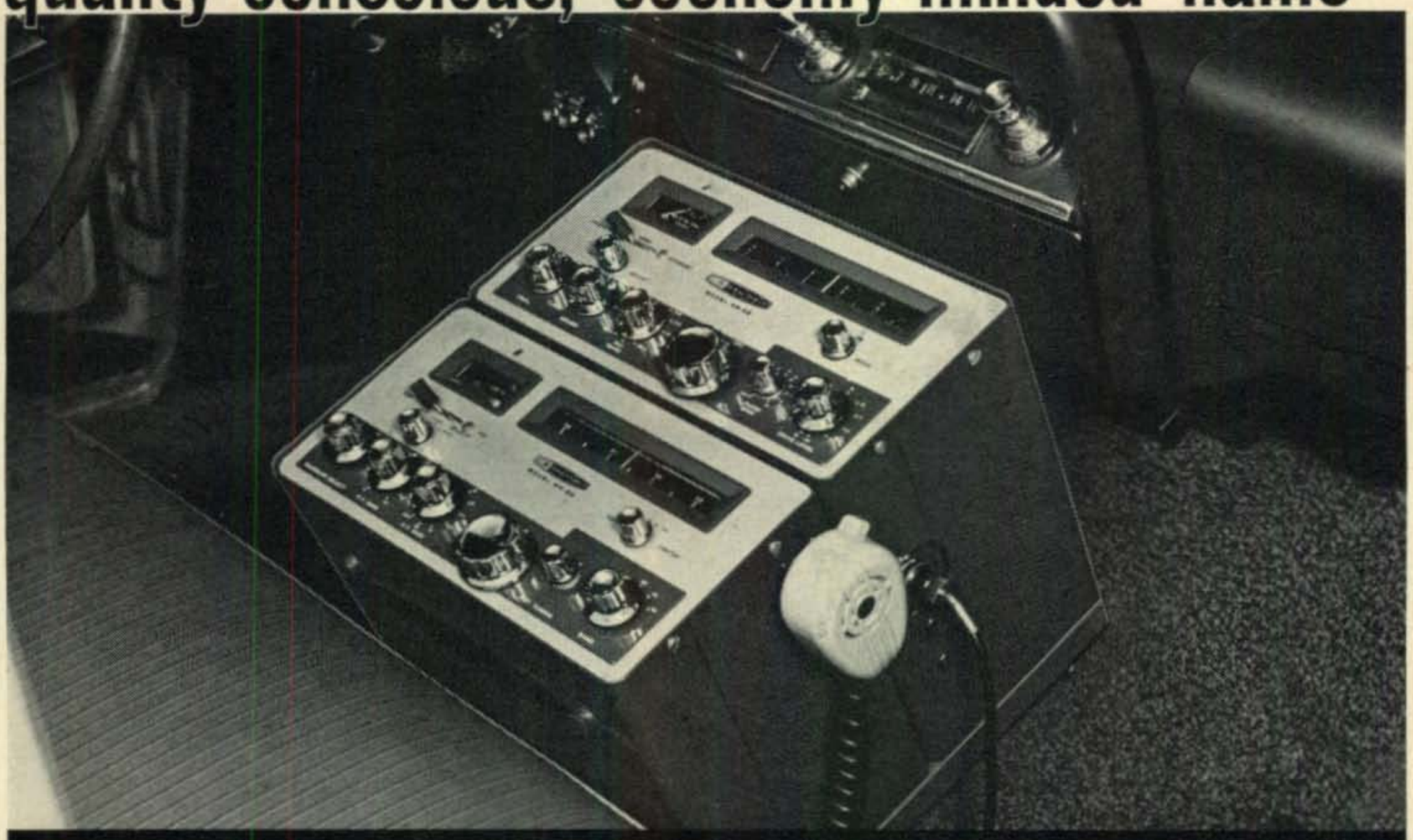

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SPECIFICATIONS AND SCHEMATICS AVAILABLE FREE ON REQUEST

Heathkit HX-20 SSB MOBILE TRANSMITTER

• Same basic circuitry as Heathkit HX-10 • Complete bandswitching—80 through 10 meters • Hermetically sealed crystal bandpass filter • Crystal controlled dual conversion heterodyne circuitry • Automatic level control for maximum talk power, low distortion • Fixed 50 ohm loading for easy tuneup • VOX or PTT operation • Switch selection of USB, LSB & CW

Kit HX-20, 19 lbs., no money down, $19 mo. . . . **$199.95**

GH-12: Microphone illustrated **$6.95**

SPECIFICATIONS—Types of emission: SSB (Upper or lower) and CW. **Power input:** 90 watts PEP, SSB and CW. **Output impedance:** 50 to 75 ohms with not more than approx. 2:1 SWR. **Frequency range** (MC): 3.5 to 4; 7.0 to 7.5; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 29.5 (using crystals furnished; extra crystal required for 29.5 to 29.7 MC). **Frequency stability:** Overall frequency stability within 100 CPS after warmup. **Carrier suppression:** 50 DB below peak output. **Unwanted sideband suppression:** 55 DB below peak output. **Keying characteristics:** Grid block keying throughout. **Audio input:** High impedance microphone. **Power requirements:** 6.3 V at 8 amps. or 12.6 V at 4 amps.;—125 volts 20 milliamps; 300 volts 100 milliamps; 600 volts 130 milliamps (uses Heath.HP-20 or HP-10 power supplies). **Cabinet size:** 12¼" W x 6¼" H x 9¾" D.

Heathkit HR-20 SSB MOBILE RECEIVER

• Modern 8-tube superhet circuit • Tunes SSB, AM & CW signals—80 through 10 meters • Crystal I. F. bandpass filter • Crystal controlled BFO's for selectable sideband reception • Built-in calibrated "S" meter • 30-1 gear drive tuning • Fast or slow AVC selection • Series noise limiter

Kit HR-20 . . . 17 lbs.

no money down, $13 mo. **$134.50**

SPECIFICATIONS—Frequency range: 80 thru 10 meters in 5 bands-3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.35; 21.0 to 21.5; 28.0 to 29.7 MC. **Intermediate frequency filter:** Center frequency, 3.0 MC; Bandwidth at —6 db, 3.0 KC; Bandwidth at —60 db, 10.0 KC Max.; Hermetically sealed. **Panel controls:** Sideband Select; R.F. gain; A.F. gain—Off—On; Noise Limiter; AVC select; main tuning; band switch; antenna trimmer; SSB, CW-AM switch. **Signal-to-noise ratio:** 10 db at 1 microvolt or less. **Output impedance:** 500 ohms and 8 ohms. **Power requirements:** 6.3 V at 8 amps. or 12.6 V at 4 amps. AC or DC, 300 volts DC at 120 MA. (Uses Heathkit HP-10 or HP-20 power supplies). **Cabinet size:** 6¼" H x 12¼" W x 19¾" D.

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For further information, check number 19, on page 126

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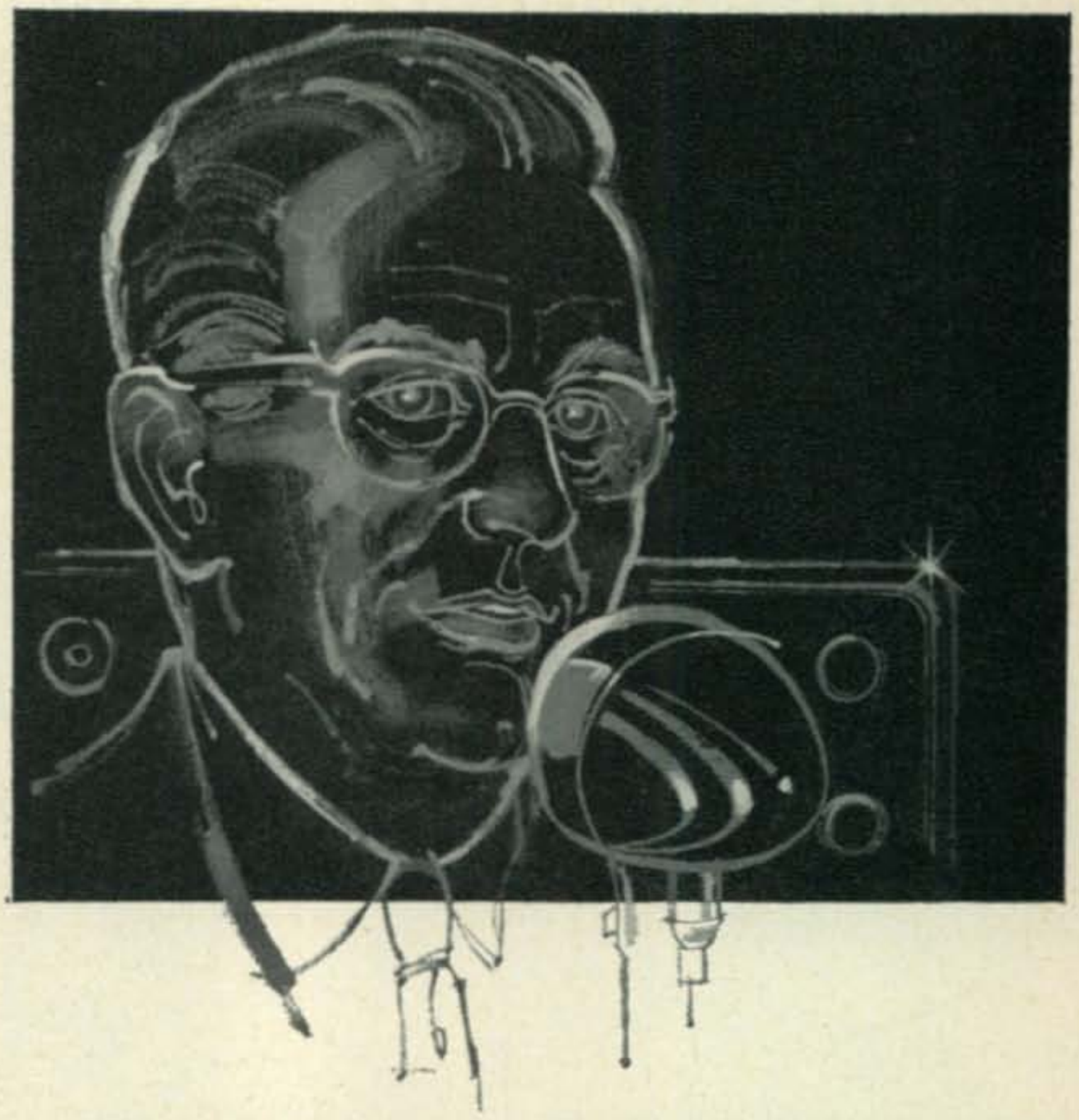
Excellent dollar value . . . solid power . . . dozens of convenience features—just a few of the many good reasons why you get much more with a Viking! Yes, dollar for dollar, a Viking is your best buy . . . and that's why Viking transmitters are "first choice" among the nation's amateurs!



NEW! "10 METER PERSONAL MESSENGER" Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes—super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity—two stage transmitter punches signal home, delivers high power output—smooth operating "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells) Rechargeable cadmium battery and other accessories available.

Cat. No.	Amateur Net
242-103 100 milliwatt	$109.50
242-104 1 watt	$129.50

RANGER II—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 thru 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying. TVI suppressed. Pi-network load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No.	Amateur Net
240-162-1 Kit	$249.50
240-162-2 Wired, tested	$359.50

ADVENTURER—Completely self-contained single knob bandswitching 80 thru 10 meters . . . effective TVI suppressed . . . and puts 50 watts of power into a rugged 807 transmitting tube. Operates by crystal or external VFO control. Front panel meter switching permits monitoring of the final grid or plate currents . . . keying is clean and crisp. Wide range pi-network output. With tubes, less crystals.

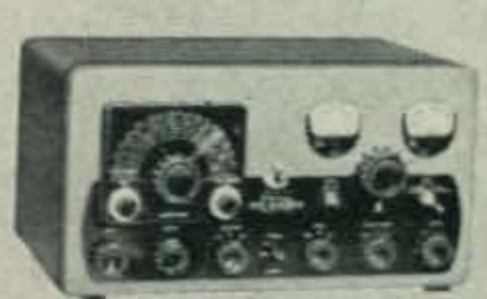
Cat. No.	Amateur Net
240-181-1 Kit	$54.95

VALIANT—275 watts input CW and SSB(P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant bandswitching 160 thru 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

Cat. No.	Amateur Net
240-104-1 Kit	$349.50
240-104-2 Wired, tested	$439.50

6N2—Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with "Viking I, II", "Range I, II", "Valiant" or similar power supply/modulator combination. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

Cat. No.	Amateur Net
240-201-1 Kit	$129.50
240-201-2 Wired, tested	$169.50



FIVE HUNDRED—Full 600 watts CW—500 watts phone and SSB(P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 thru 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-500-1 Kit	$749.50
240-500-2 Wired, tested	$949.50

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Instead of shipping to our factory, equipment to be serviced may also be sent to:

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Park-Armature Co.
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B and S Electronics, Inc.
6326 W. Roosevelt Rd.
Oak Park, Ill.

Radio Communication and Engr.
Pinehurst Place
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INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db. sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 thru 10 meters —no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts AM (25 to 30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio A6C and ALS (limiter type) provide greater average speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested, with tubes and crystals.

Cat. No. 240-302-2 Amateur Net.....**$619.50**

INVADER 2000—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts AM (250 to 300 watts output—upper sideband and carrier). Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested, with power supply, tubes and crystals.

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HIGH POWER CONVERSION—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary —complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net.....**$619.50**

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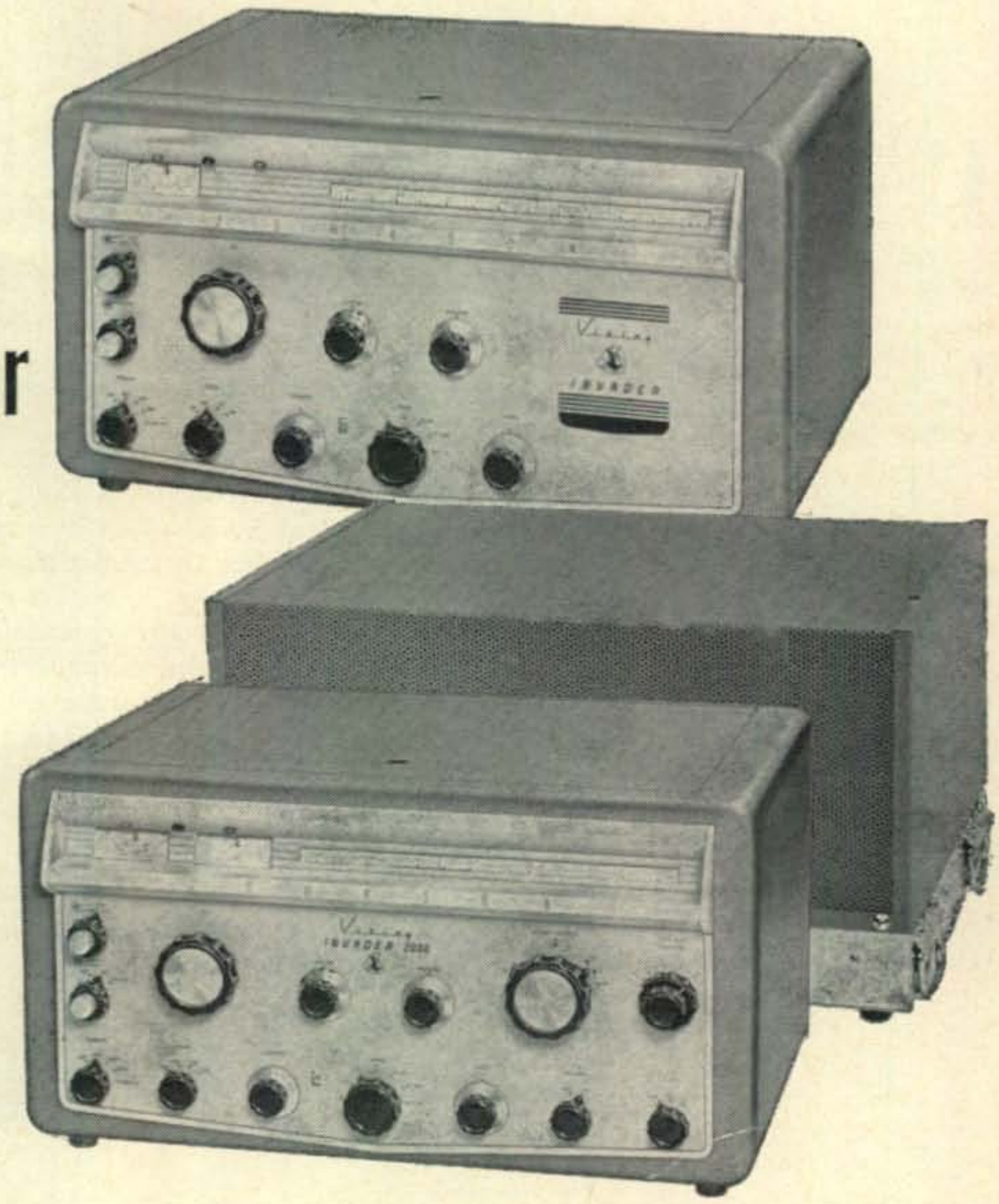

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For further information, check number 20, on page 126

A Remote Control Antenna Switch

BY MORRIS GUZICK*, W5BGP

This motor driven switch will permit remote selection of antennas from the operating position and eliminate untold lengths of feedline. Its very simplicity contributes to foolproof operation. The unit could easily be applied to the solution of other problems such as remote tuning of antennas and switching of receiver converters.

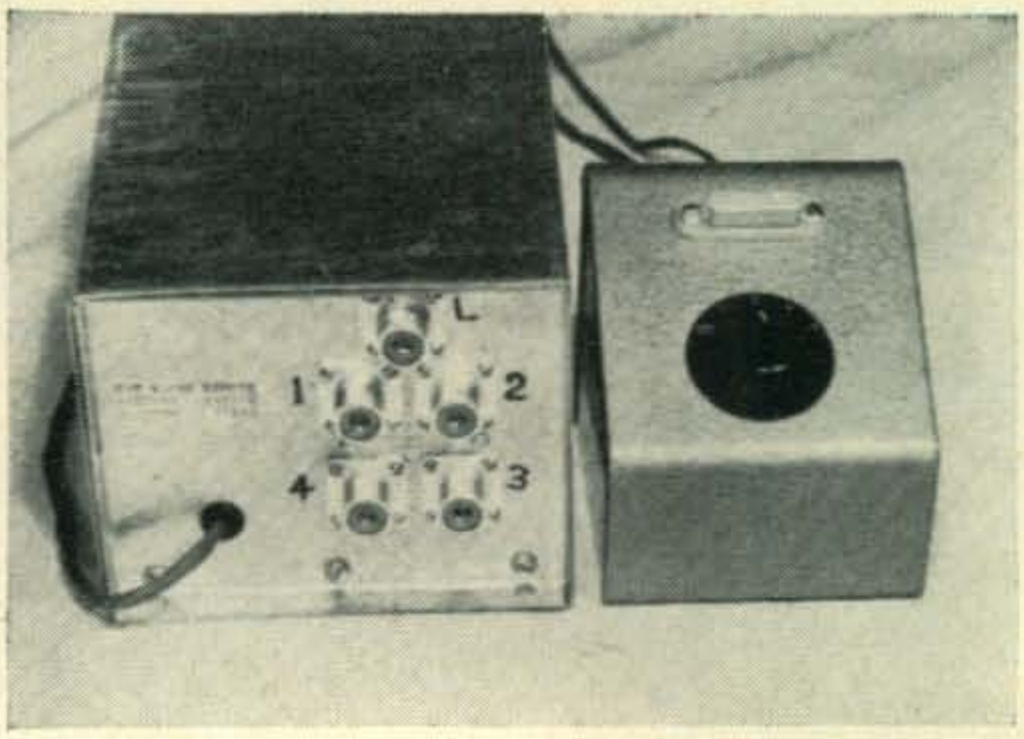
THE old saying, "Necessity is the mother of invention," certainly holds true for this remote antenna switch. Several years ago one of the local hams purchased a new Collins KW-1 transmitter, Collins receiver and Telrex twenty and fifteen meter beams. He also had forty and eighty meter doublets. Living in a large two story brick home with a spacious yard, he naturally wanted to install his antennas as far removed from the house as possible. At this point in the story it sure looked as if some one would sell a lot of RG-8/U.

He presented me with the problem of building a remote antenna switch. Now there are a lot of ways to do this, but he wanted one that was as foolproof as possible, with no loss and the least amount of cross-talk; last but not least no TVI. Many ideas came to mind. The Mallory 161C ceramic (non shorting) 1 circuit 4 position switch was a starting point. For the doubtful ones, this switch is quite a bit heavier than the normal run of rotaries, and will take a kilowatt with ease if the line is 52 ohms and you don't have an unbearable standing wave ratio. This switch has 90 degree indexing and continuous rotation. This switch was mounted in a small metal container with five 83-1R coax receptacles.

Tests were made on this part of the remote switch. No loss was noticeable up through 145 mc and this was as high as we could go with the equipment on hand. Cross-talk was nonexistent as far as amateur equipment is concerned. The Collins KW-1 powered makeshift dummy loads through the switch with the current in the line as high as 8 amps without any signs of damage to the switch.

The next problem was to remotely control this switch from the operating position and have the switch and waterproof housing favorably located to all the antennas a hundred and fifty feet from the shack. In the first model the Mallory switch and coax receptacles were mounted in a metal compartment as shown in the photographs and drawings. A Guardian solenoid was used to ratchet the switch 90 degrees everytime the solenoid was excited. Another wafer section was added to the switch assembly just outside of the shielded compartment. This switch was used to pick up a circuit to energize one of four lights on the control box to indicate which antenna was connected to the line. To change antennas one just excited the solenoid with a push button switch on the control box. Several of these remote controls were made and have given years of trouble free operation.

Nothing being perfect, we found one strong objection to the solenoid operated switch. Everytime the solenoid was excited the slam of the solenoid armature hitting the winding



The SO-239 coaxial connectors and switch mount in the weather-proof cabinet on the left. The remote switch on the right uses a Drake Type 110 pilot light and is on only during the motor cycle time.

*1303 East Richards Street, Sherman, Texas.

core produced a noise that could be heard on the next block. Imagine what your XYL would say if this type of switch was used in the shack for some purpose other than a remote antenna switch, especially at some wee hour of the morning. Recently a visiting ham friend saw one of the switches used by the author. He said he would like us to build him one but all his antennas were in the attic of his apartment and his neighbors would object to the noise made by the solenoid. Out of necessity then, another idea was born which made quite an improvement in the switch. We decided to drive it with a motor. The switch works so well and fills so many needs we feel that other amateurs may want to duplicate it. Other than some sheet metal work no special skills are needed.

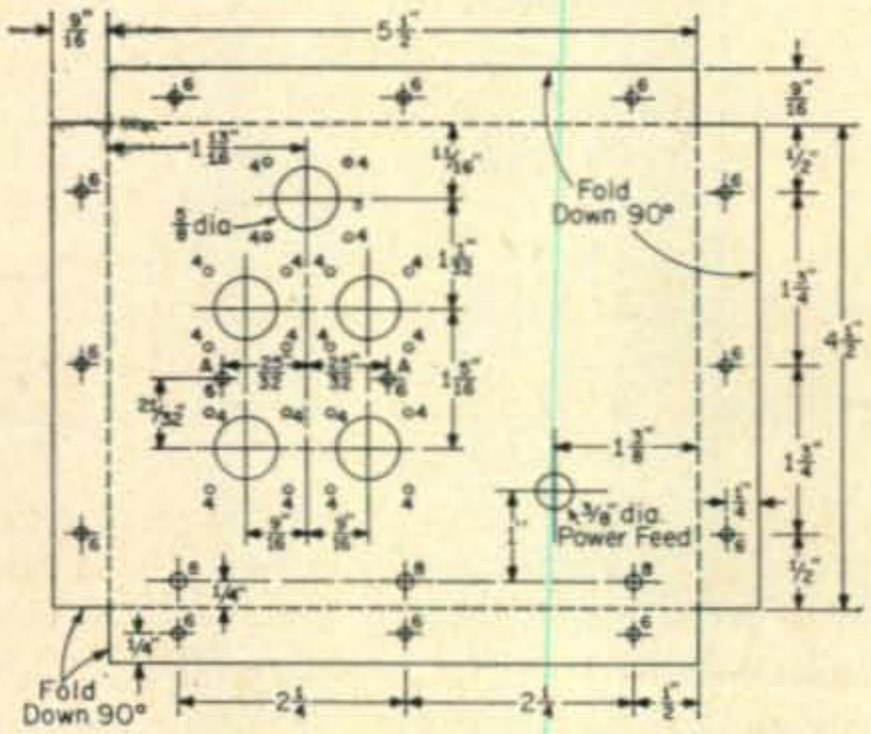


Fig. 1—Dimensions, bending and drilling data for the front panel of the remote switch. The numbers alongside the holes denote the screw size used. The panel and all other sheet metal work, is made from 20 guage galvanized iron.

Forming The Panel

If you don't have a metal break available and you are going to bend the necessary parts in a vise with a couple of pieces of angle iron, it might be a good idea to do the bending first before you drill the holes. Cut out the panel shown in fig. 1, drill and make the four necessary bends. There are no dimensions given for the twenty small holes to mount the coax receptacles as they can be marked and drilled after the ⅝" holes. Insert the coax receptacles and mark off and drill the holes. You will notice the bends are 9/16"; they will come out ½" as 1/16" will be taken up in the bend.

Next make the chassis (fig. 2) and fit it to the panel as shown in the photographs. Then mount the five coax receptacles on the panel.

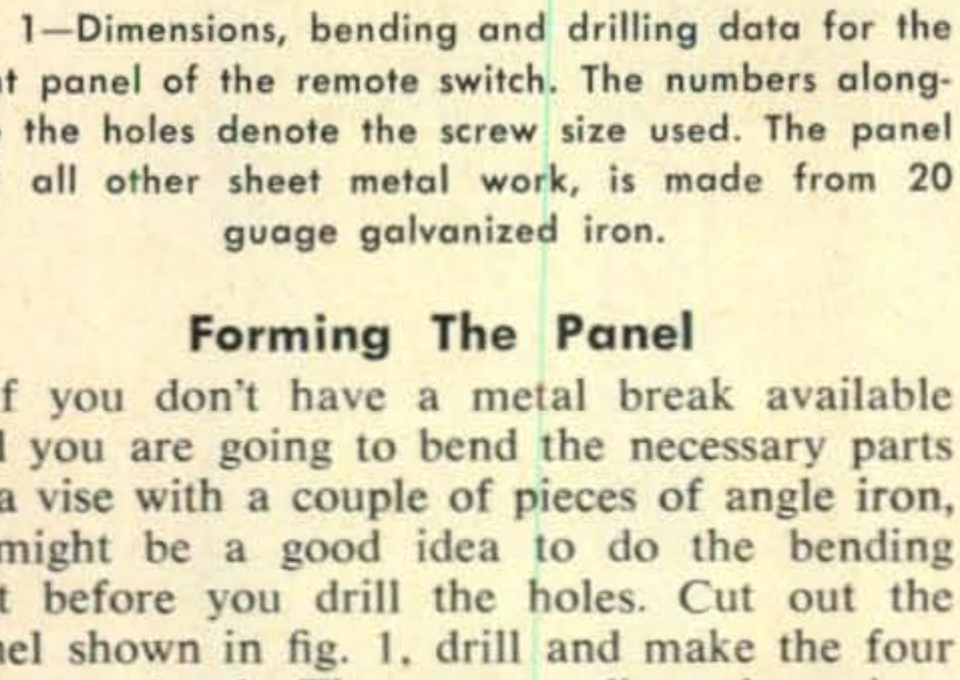


Fig. 2—Dimensions, bending and drilling data for the remote chassis.

Preparing The Switch

Disassemble the Mallory type 161C switch (all the necessary spacers and washers come with the switch assembly). A slight bit of prying with a screwdriver blade will weaken the tension on the indexing springs. This will relieve the motor requirements somewhat and provide more reliable operation. The tension should be relieved enough so one can easily operate the switch with his fingers and still feel the indexing. When this has been accomplished assemble and mount the switch as shown in fig. 3. Two holes (A-A) in fig. 1—are for mounting the switch. If the switch has been mounted correctly the four switch soldering terminals will be flush with the soldering terminals of the coax receptacles and should require no wire for the connections but can be soldered directly. The only exception will be the switch arm which will require a short length of wire to reach the upper coax receptacle.

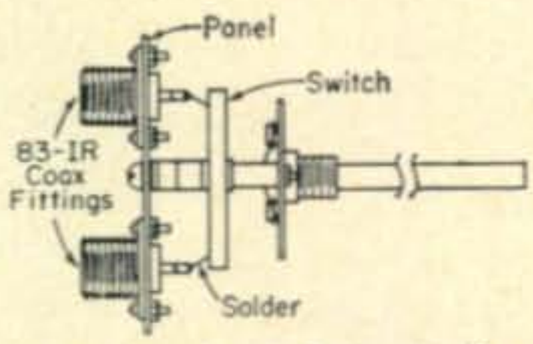


Fig. 3—Cross section view of the Mallory 161C switch completely assembled and mounted on the front panel.

Switch Shield

Next, find a tin can whose outside diameter is 3⅛". Del Monte has a lot of its products in such cans. Drill and cut the cans as shown in fig. 4. The large hole will let the switch shaft come through and the two small holes will permit the two switch mounting screws to protrude. The mounting screws only protrude through the shield to allow the can to fit flush against the switch indexing assembly. The ⅜" nut and washers are used for holding the shield to the switch. You will note in the side view drawing that there is a 1/16" cut out on two

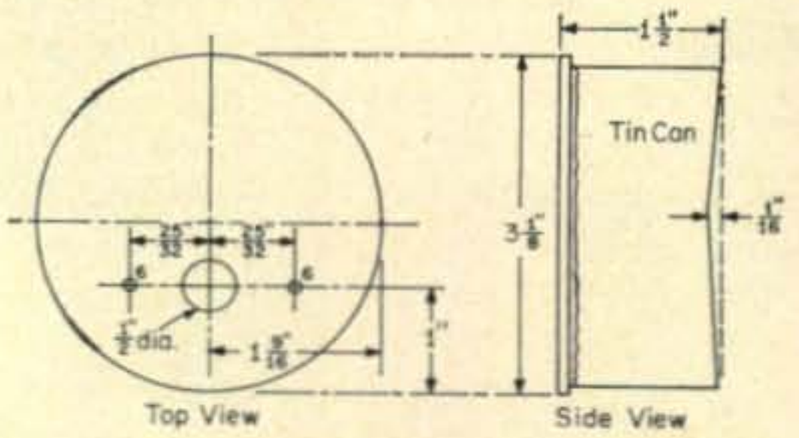
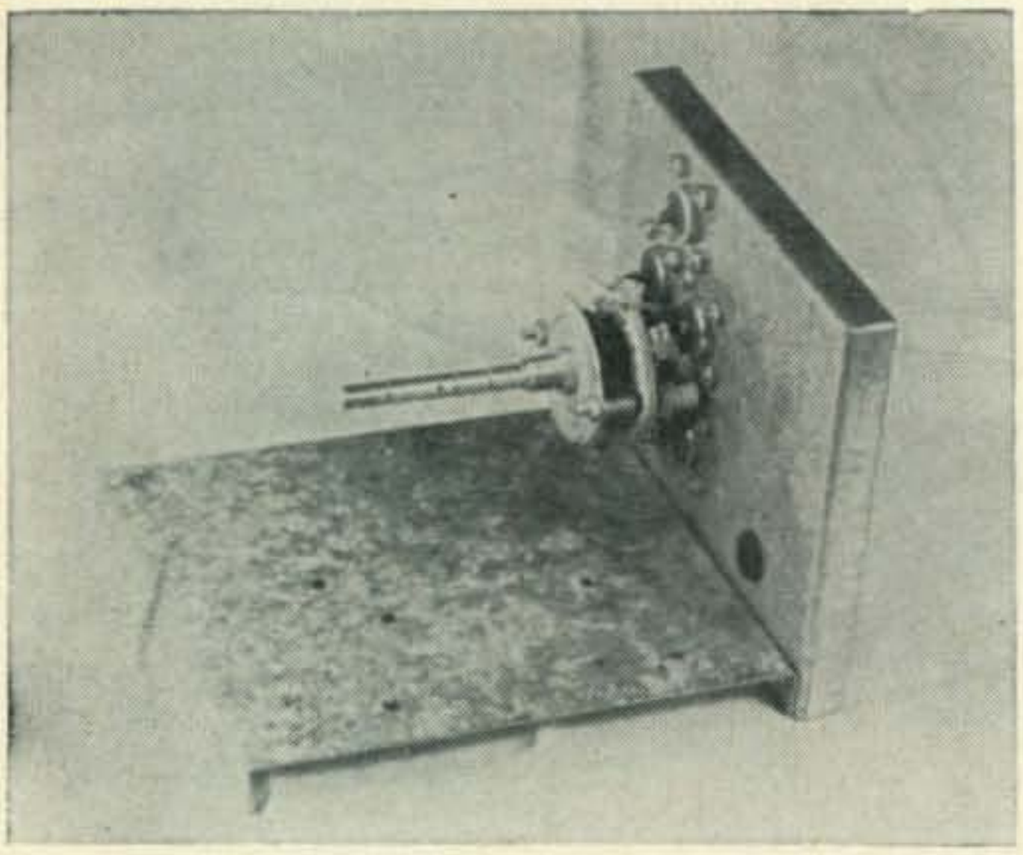


Fig. 4—Switch shield is formed from a 3⅛" diameter can as explained in the text.



View of the selector switch mounting before the shield and commutator are added.

sides of the can. This is necessary if you want the shield to fit flush against the panel after being pushed out of round to cover the connectors. After you get a proper fit for the shield, remove it and place it off to one side until you are ready for the final assembly.

Motor Mounting

Next make the motor mounting bracket as shown in fig. 5, and fasten the motor in place on the chassis. Note that the motor shaft has a 3/16" diameter and the switch shaft diameter is ¼". The IRC type C-3 coupler has a bushing that reduces one end of the coupler to 3/16" to fit the motor while the other end of the coupler will fit the switch shaft. With the coupler fastened to the motor shaft it should engage the switch shaft. If the motor couples to the switch satisfactorily, remove the motor and bracket and place them to one side until needed again.

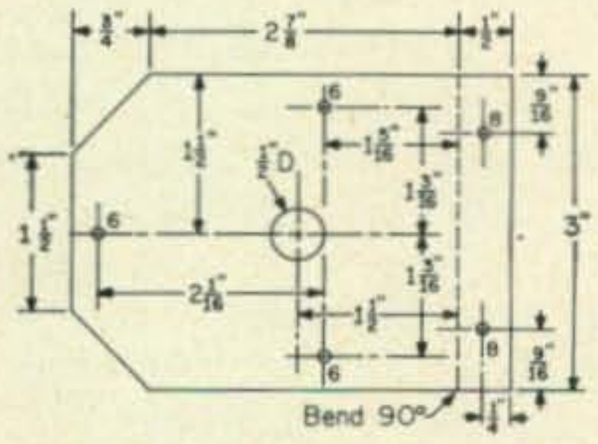


Fig. 5—Motor mounting bracket construction details.

Commutator Construction

Next we will make the commutator, details of which are shown in fig. 6. Keep in mind that this part should be made with some precision, so take your time and do it right. Take a 2" length of 1" o.d. brass or aluminum tubing and a piece of broom or mop handle that is slightly larger then the hole in the tubing. Place the tubing on a solid base and drive the wood through the tubing. This provides a solid wood core inside of the tubing. Square off both ends of the tubing so it is 1⅝" long.

A ¼" hole should be drilled through the center of the wood core. This should be done in a drill press for accuracy and not tried with

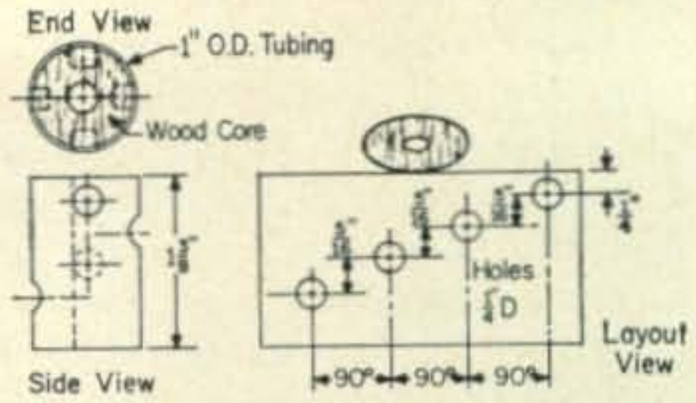


Fig. 6—Commutator construction details. View (B) presents the 1" aluminum tube rolled out to illustrate the hole locations. The holes are located 90 degrees apart at the intersecting lines shown in the end view of (A).

a hand drill. Drill through with a small pilot hole before going through with the ¼" drill. Now refer to the drawing of the commutator and mark off the four ¼" holes as shown. This should be done with as much precision as possible. When done, center punch the spots. The commutator should then be placed in a V-block or small vise so it can be held securely while drilling the four holes. Drill pilot holes before drilling the ¼" holes and have the drill press set to a depth of ¼". If you drill deeper you will enter the center hole of the commutator. Dress off any burrs you might have on the face of the commutator. Cut four lengths of ¼ inch diameter polystyrene rod slightly longer than ¼ inch long. Round off one end of each to fit the contour of the bottom of the drilled hole in the commutator. Place a drop of coil dope in each hole and force the pieces of polystyrene rod in the four holes. After the holes have been filled and dried, dress off the commutator until you have a good round smooth surface. Paint the wood ends of the commutator with glyptol and place to one side to dry.

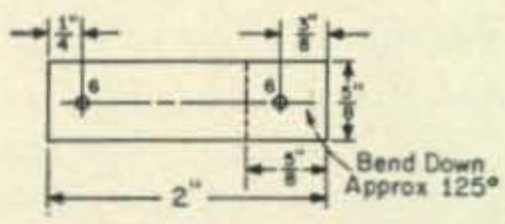


Fig. 7—Commutator contact bar mounting brackets. Two are made from 20 gauge galvanized iron.

Make the two contact mounting brackets shown in fig. 7. The drawing and photographs are self explanatory.

Constructing The Commutator Contact Holder

Now you can manufacture the commutator contact holder as shown in fig. 8. The ten

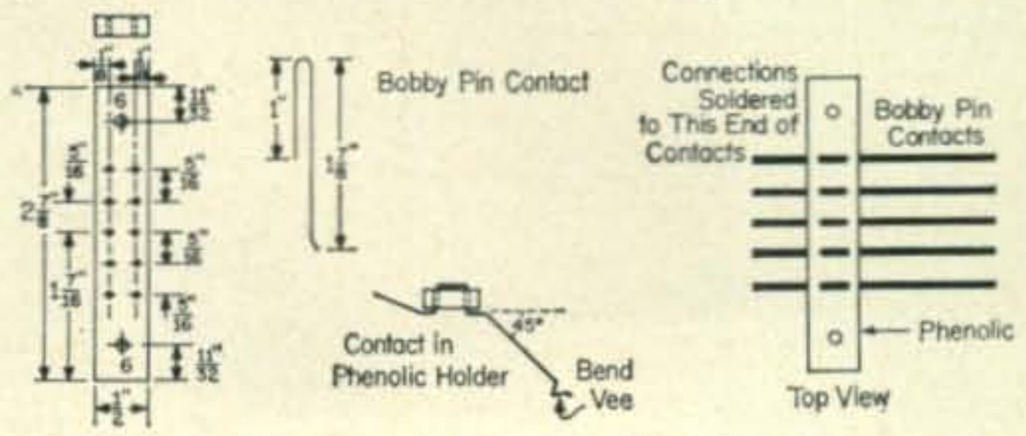
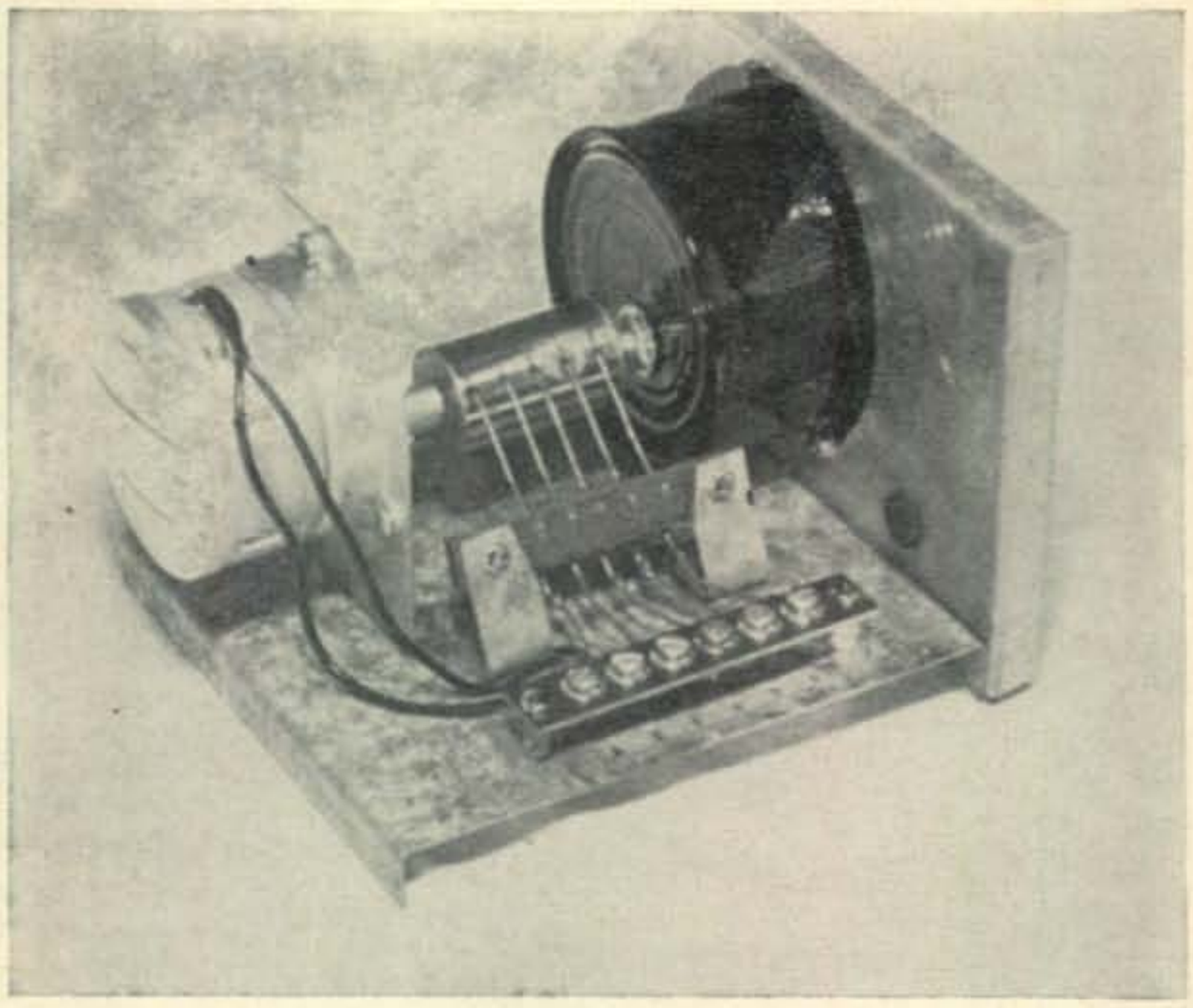


Fig. 8—Construction and assembly data for the commutator contact holder. Ordinary bobby pins are used as wiper arms. The contact holder is made from 3/16" phenolic.



Completely assembled motor driven remote switch before insertion in waterproof case. Note the switch shield constructed from a tin can.

small holes for mounting the bobby pins should be only large enough to force the pins through. Some of the pins are rubber tipped, so must be scraped before insertion. Start with the center contact first and work out to each end as this will give you working room to flatten the bobby pins as shown in the end view drawing of the contact assembly. Bobby pins are made of spring steel and if one is broken while forming just call the XYL and gently remove another one. The small vee in the end of the bobby pin should be bent after the pin has been placed through the phenolic. All vees should be of equal distance from the phenolic block edge. After the contact assembly has been formed, take a small piece of sand paper and clean the under side of the vee in the bobby pin contact, as most pins have a coat of varnish. This part of the pin remains in contact with the commutator. Next, clean and tin the opposite end of the pin in preparation for wiring.

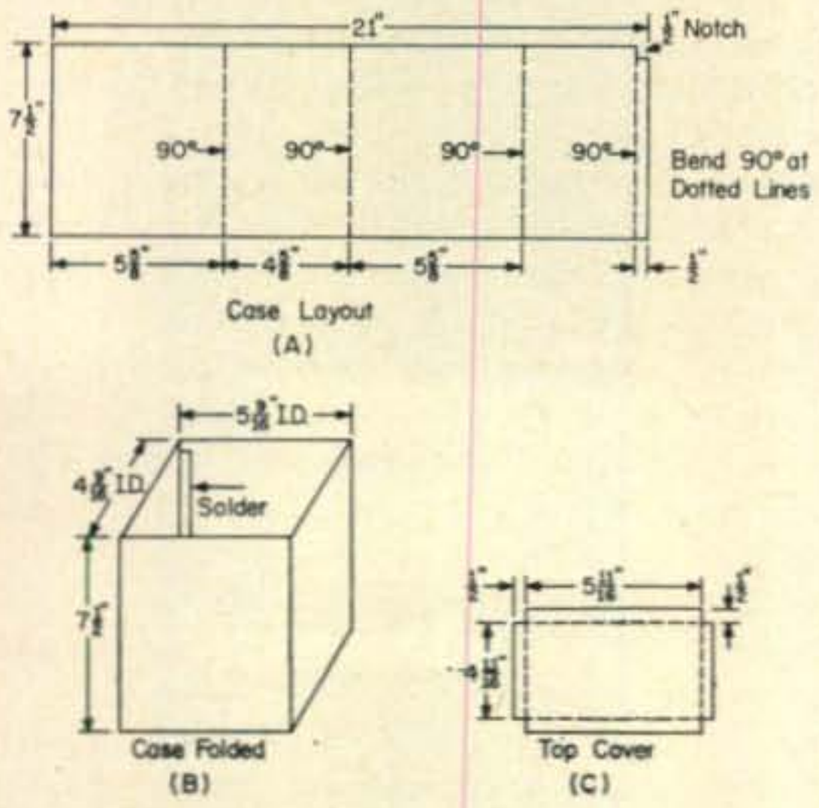


Fig. 9—Dimensions of the waterproof case for the remote switch. The ½" notch in (A) is cut to permit the front panel to seat firmly. The ½" flap is soldered to the opposite side when folded as in (B). The top cover, (C), is formed and soldered at the four corners for weather-poofing.

Remote Case

Now build the case and cover shown in fig. 9. It would be a good idea to remeasure the outside dimensions of the panel so when the case is formed and assembled the fit will be good. At this point also it is a good idea to do all the necessary drilling of holes to fasten the lid and the panel to the case. Notice the ½" notch cut out of the case flap so that the panel will fit into the case. The case can be held together with a few small screws while soldering which is necessary for waterproofing.

Control Box

Examination of the control box photographs will show the parts placement in the Bud sloping panel cabinet. There are no critical dimensions and one can get a good idea of the placement of the switch (Mallory type 3215J) and the light on the front panel. Mallory dial plate Type 384 with markings: OFF, 1-2-3 and 4 is used with the Type 3215J switch. The terminal strip soldering lugs should be bent out for easy approach for soldering and mounting. The fuse block can be mounted anyplace that will be out of the way of the other parts in the cabinet. The terminals should be numbered from one through six with scotch tape or some clear varnish used to hold the numbers in place. A terminal strip is also used in the remote switch box with the soldering lugs bent as in the control box. Both terminal strips are mounted on ½" spacers which can be cut from 3/16" tubing. When the parts have been mounted in the cabinet complete the wiring as shown in fig. 10.

Testing The Remote Switch

Now let's go back and finish the remote switch assembly. First make sure you have the switch soldered to all the proper coax receptacles. Next, force the commutator on the switch shaft as far as it will go and back it off slightly so it will not jam against the threaded section of the switch where the shaft goes through. Brace the switch with your fingers when forcing the commutator on the switch shaft. Replace the motor and bracket on the chassis and couple it to the switch shaft. A flat section filed on the switch shaft will let the set screws of the

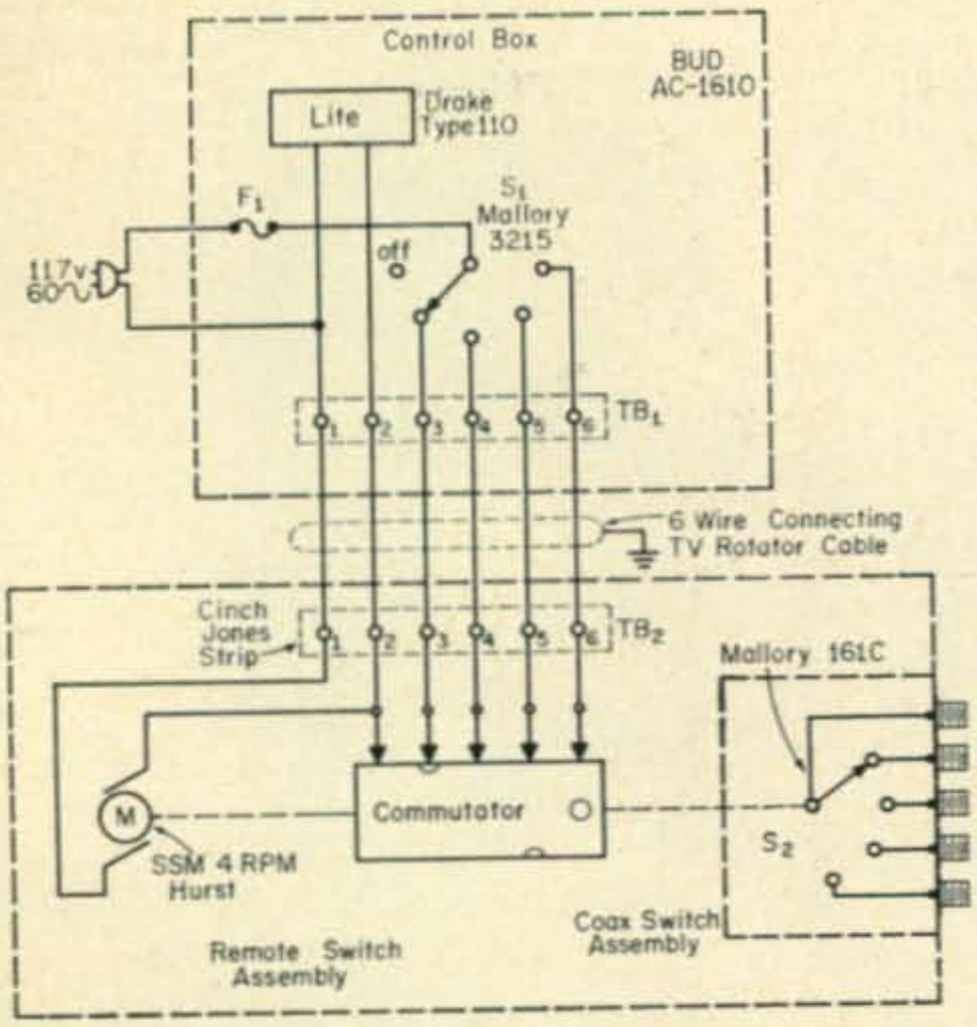


Fig. 10—Circuit of the remote control antenna switch. While the author has run 117 volts a.c. out to the remote, this is an electrical violation in many areas and is not advisable. The same motor can be obtained for operation on 24 v.a.c. with a special capacitor (at a slight extra cost), and a step down transformer (117/24 v.a.c.) may be included in the control box. If this is done be sure to change the indicator light from a 117 to a 24 volt unit.

shaft coupler make a more secure connection. Apply power to the motor leads and see if it turns the switch, which it should do very easily.

Next place the commutator contact assembly in place and make sure that the vee shaped contacts ride on the commutator with some tension and the four contacts line up with the filled-in holes in the commutator. The outer contact of the assembly should line up with one outer end of the commutator which has no hole. This contact will maintain a continuous connection with the commutator. The commutator can be shifted slightly on the switch shaft for proper alignment. The contacts can be bent or the two contact holders can be bent slightly to get the proper tension on the commutator.

Now connect a short piece of six wire TV rotator cable to the control box and the other end of the cable can be temporarily connected to the bobby pin contacts that have been previously tinned. Consult the wiring diagram for proper connections. With the switch in one of its 90 degree index positions, turn the commutator until one of the insulated holes is under one of the contacts. The contact, at this point, will be insulated from the commutator. Now apply power to the control box and select one of the four positions. If you have not selected the contact that is in the open circuit position the motor should start turning the switch and automatically cut off when the contact selected is over the insulated spot on the commutator. The motor will coast a few degrees when shut off and the index of the switch should be in one of its 90 degree positions. At this point it might be necessary to time the commutator's position on switch shaft so the motor cuts off a few degrees before the switch is in the index. The few degrees the motor will coast will let the switch move on into the index.

Assembling The Remote

Now let's assume the commutator and brush or contact assembly has been timed with the 161C switch. Mark the position of the commutator on the switch shaft. Next remove the wiring from the contact assembly and remove the contact assembly and motor from the chassis. Remove the commutator from the switch shaft with caution. Next place the switch shield in position, making sure it covers the coax receptacles. The cut edge of the shield should fit flush against the panel. Take the ⅜" nut and washer that came with the switch and fasten the shield as shown in the photographs. Next take a large soldering iron and solder the shield edge to the panel face. About three spots equally spaced around the shield should be soldered and if acid core solder is used be sure to neutralize the joint with a weak solution of soda water. Next take some metal to wood glue or some glyptol and coat the switch shaft and the inside center hole of the commutator. Slip the commutator back on the switch shaft to the position previously marked. Replace the motor and couple it to the switch shaft. Replace the contact assembly and install the terminal strip. Number the terminal strip the same way you did on the one in the control box and wire it as shown in fig. 10.

Reconnect the six wire cable from the control box to the terminal strip on the remote switch and check for proper operation. If you are not sure the commutator is back in the same spot on the shaft, (the switch is now enclosed in the shield) operate the switch to each of its four positions and on each position take a hold of the shaft coupling and turn slightly back and forth and feel if the switch has stopped in its index position. If not, and not too much time has elapsed since you installed the commutator, it can be repositioned by holding the shaft coupling and moving the commutator.

After proper operation has been assured, take some glyptol or varnish and paint the shield, the soldered connections on the bobby pins, all screws and nuts and allow the glyptol or varnish to flow freely in the small holes in the phenolic block used to hold the bobby pin contacts. The wood core ends of the commutator should also be painted. A ⅜" rubber grommet should be placed in the hole provided for the cable entrance on the front panel of the remote assembly.

The remote control box should be mounted with the panel facing down for complete waterproofing. Any type of strap can be applied

to the case for mounting and it should be no problem to fit the individual need.

Assembling the Control Box

The four screws furnished with the control box cabinet should be replaced with #4 sheet metal screws, 3/8" long. The screws will fit the same holes and should be used to hold four rubber feet on the cabinet.

Circuit Operation

If you will study the wiring diagram for a few minutes you will notice how really simple it is. The wiper that is connected to one side of the motor maintains contact with the commutator at all times, never hitting an insulated spot. The other four contacts at one time or other, while the motor is in operation, will break circuit whenever an insulated spot passes under a contact. Keep in mind that the insulated spots on the commutator are 90 degrees apart on the commutator circumference. If the motor is not running and the switch is in one of its 90 degrees index positions, three of the contacts will be off one of the insulated spots on the commutator and the fourth contact will be resting on one of the insulated spots. The one resting on the insulated spot will be the contact selected by the switch in the control box and will break the circuit to the motor and light. Now, since the three other contacts are making connection with the commutator, and if one of the three contacts were to be selected by the switch in the control box, the motor would start and run until the selected contact was over its insulated spot. This would break the circuit to the motor and stop the switch in a 90 degree index position, which in turn would be selecting a different coax receptacle.

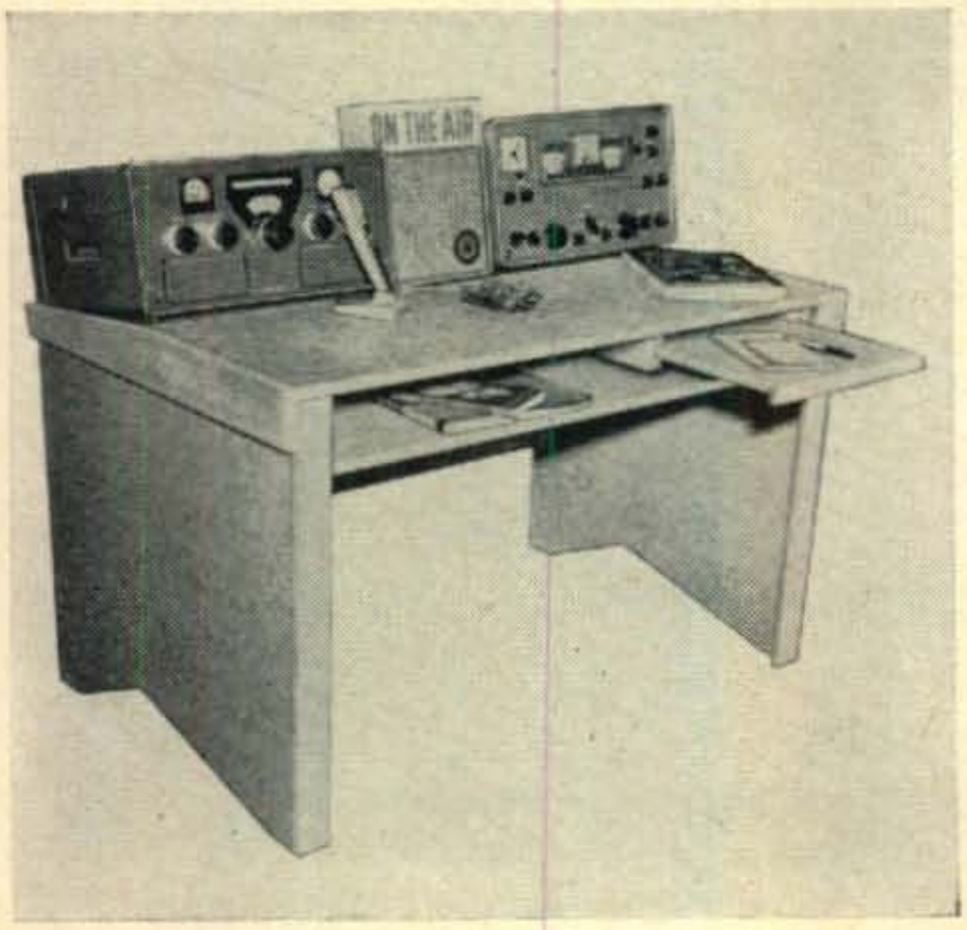
The small light in the control box is wired in parallel with the motor and will light any time the motor is energized and will go out when the motor stops. The control switch has an OFF position but should not be left in this position except in the event one would like to disconnect all antennas from the line coming into the shack. For instance, you may not want an antenna connected to your receiver when monitoring, or measuring frequency. It is possible to start the motor and quickly turn the control selector switch to the OFF position and catch the switch, in the remote box, between the 90 degree indexing positions; no connection would be made to any of the four coax receptacles. To put the switch back in operation select any one of the four antennas and the remote will automatically turn to that position and cut off. The motor has a speed of four r.p.m. and would require approximately 15 seconds to select an antenna in the extreme position. Any selection in between would, of course, require less time.

Conclusion

It sure is nice to sit at the operating table and be able to change antennas in a few seconds with the flip of a switch. The appearance of the shack has also been improved by the elimination of many feet of RG-8/U. I'm sure the switch will prove to be an asset to any shack.

If I can be of further help, a stamped self addressed envelope will bring any information that might be needed. These switches are not toys, but something you will be proud to put in service. There is nothing difficult or complicated in its manufacture; a little time and patience will do the trick. ■

New Amateur Products



Operating Desk

WRL's new Comet desk is designed specifically for the ham, experimenter, or industrial and laboratory use. The sloping top provides the best equipment view and operating ease. Handy, slide-out leaf provides extra space for writing and logging notes. Large shelf directly under top of desk has ample space for books, papers, and other storage. Desk is constructed of extremely durable, first grade Nova-Ply and will accept any finish of your choice; stain, laquer, varnish, or simply wax and polish. Easily assembled in 30 minutes. Comes complete in knock-down kit form, supplied with easy step-by-step instructions. Assembled desk size: 49 ½" wide, 29 ¾" high, and 31" deep. For further information check A on page 126.

An 80 & 40 Meter Inverted V

BY C. W. ZAWACKI*, K8LTU

With declining activity on the higher frequencies occasioned by the present sun spot cycle, many amateurs, who are equipped with a 10-15-20 meter beam antenna mounted on a tower, are considering taking advantage of increased activity on the 40 and 80 meter bands. The installation described here makes use of the available tower and permits single feedline operation on the two bands.

BASICALLY, the system is a multiband antenna in the familiar inverted "V" configuration. The material is inexpensive, consisting of bare copper ground wire (.065" dia.), available in any hardware store, six-egg insulators, an SO-239 chassis coax connector and some nylon rope. A length of RG-8/U, 52-ohm coax line, serves as the feed line.

Installation consists of first tying a small pulley, with a length of clothes line reaching to the ground, to the top section of the tower. From there on it's just a matter of tying the assembled feed point to the clothes line and hauling away! The feed point used, illustrated in the photographs, utilizing an SO-239 connector, offers a good match and may be soldered together in a very short time.

Feed Point Construction

To construct the feed point, begin by assembling the egg insulators to the coax connector. Start with an eleven inch length of copper ground wire by stringing one end through one of the four holes in the connector flange, leaving ½" bent over. Do not solder yet. Run the remaining end through the far holes of the first egg insulator, through the nearest connector hole and pull the insulator tight against the flange as a 90° bend is made in the wire. Loop the wire 1¾" from the flange (to form ½ of the feed point support) and again, run the end through the same connector hole, making another 90° bend to accommodate the second egg

*16168 Reedmere, Birmingham, Mich.

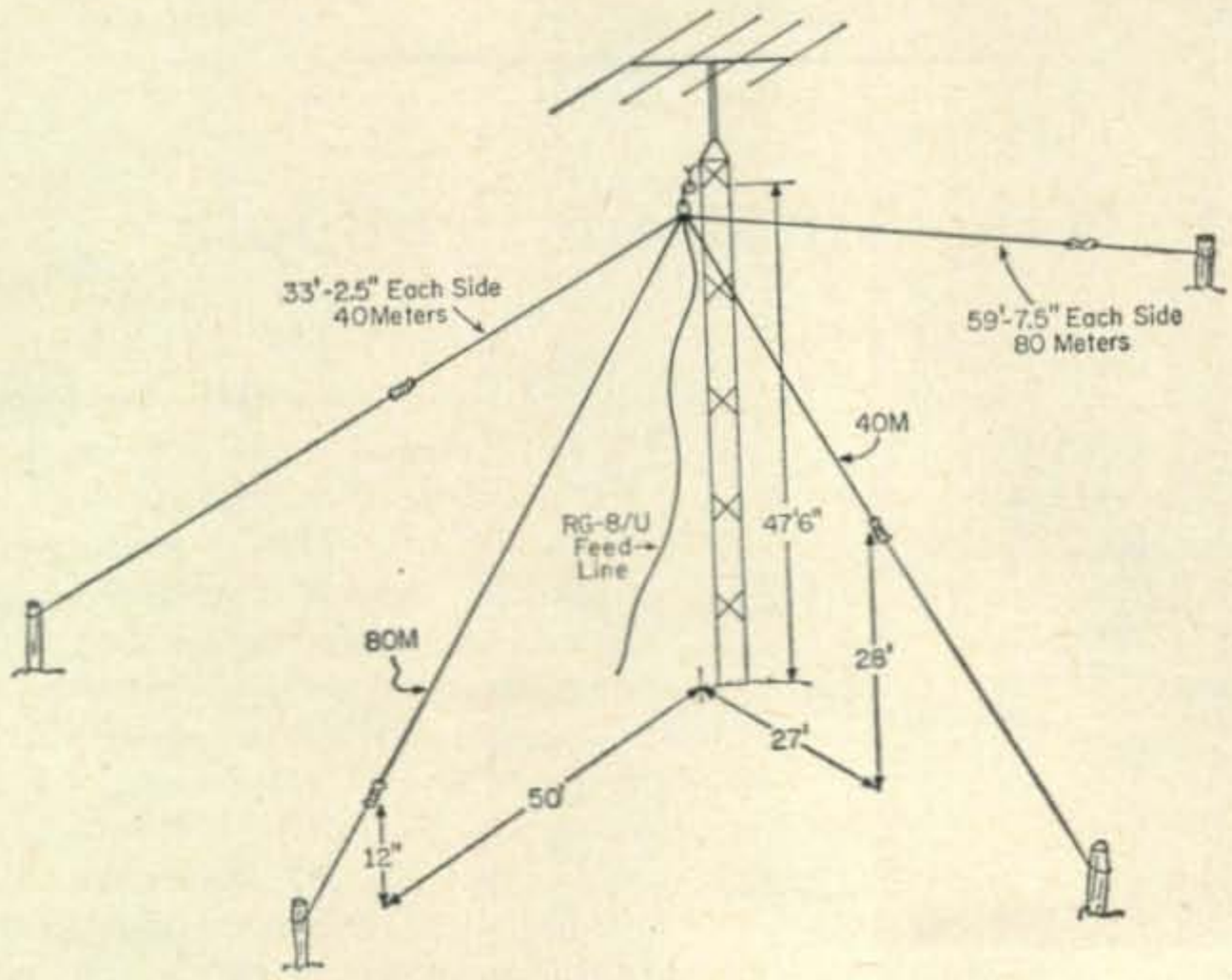
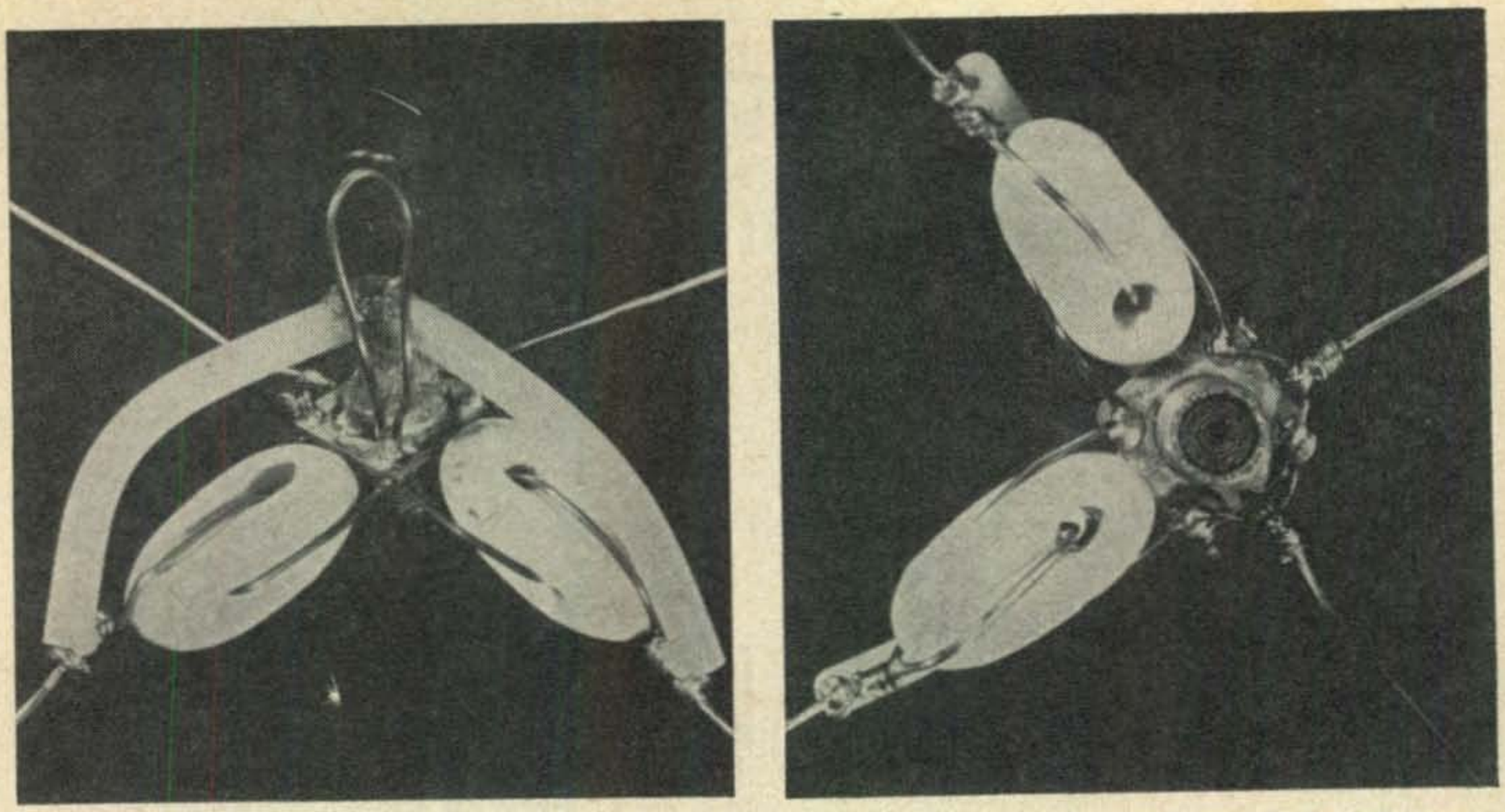


Fig. 1—View of the tower illustrating the installation of 2 inverted V antennas. Choice of terminating points should be made, wherever possible, to maintain a 90 degree relationship between the two antennas.



Top and bottom views of the inverted V feedpoint. The supporting loops may be clearly seen in the left view.

insulator. Now string the wire through the third coax hole, again leaving ½" bent over. Each of the egg insulators serve to support, respectively, one end of the 40 and 80 meter "V" antenna legs. For the remaining elements, repeat the procedure, starting with a 6½" length of wire, leaving enough room, about ½" from the flange, to solder the legs of the 40 and 80 "V"'s. The bent over ½" ends can now be twisted and all four flange holes soldered.

The center conductor is connected to the insulated legs by soldering a bare ½" length of coax center conductor wire into the terminal provided on the fitting, then connecting and soldering to it, two 4" conductor lengths at 90° as shown in the photographs. The 4" conductors are made of the polyethylene coated center conductor of RG-8/U coax, with ½" of the polyethylene stripped from the ends for soldering. A water tight seal of the center conductor from the flange may be made by melting polyethylene over the exposed wire with a soldering iron.

Dimensions

Figure 1 illustrates antenna leg dimensions arrived at after considerable experimentation. The eighty meter "V" forms a plane almost perpendicular to the earth, while the 40 meter "V" is slanted somewhat. The installation was guided by two limiting factors: (1) a desire to keep the planes formed by the antennas 90° apart and (2) the location of existing trees, rain gutter supports and poles to which the nylon support ropes were attached at my QTH.

After connecting and soldering the insulated and non-insulated legs the array is ready for raising. A good deal of frustration, brought about by tangled copper wire and nylon string, can be avoided by the simple precaution of stretching out the wires fanwise on the ground before raising the feed point. It will also help to weight the support strings if your XYL, junior ops or neighborhood sidewalk supervisors are not willing to hold them during the raising.

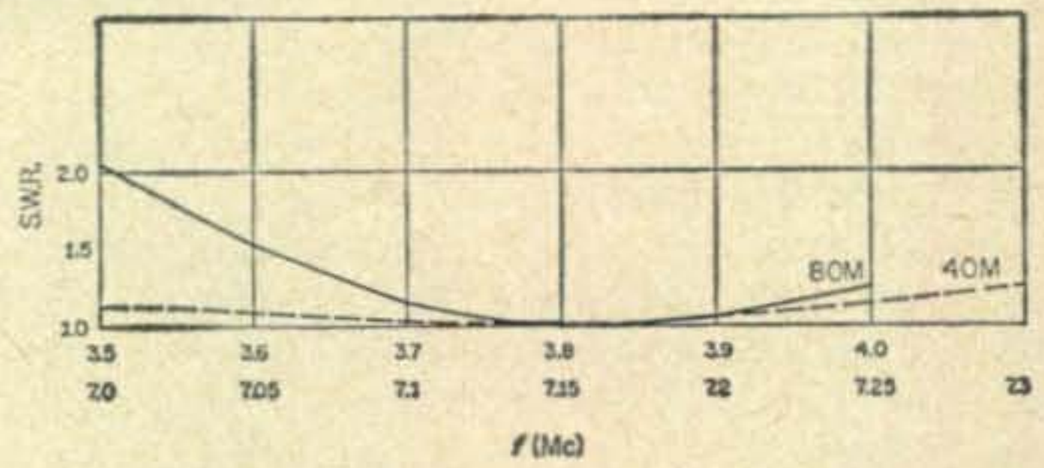


Fig. 2—Curves showing the s.w.r. of the 40-80 meter inverted V for the installation at K8LTU. The s.w.r. varies as the element angles are shifted.

S.W.R.

You'll find that the s.w.r. will vary with each change in the plane angle or the "V" angle. A check for the lowest s.w.r. reading will indicate the resonant frequency. This frequency can be adjusted as needed by soldering equal lengths of wire at the two insulators nearest the ground. Leave the ends dangling, and recheck the s.w.r. reading, after each trimming at the resonant frequency. When a satisfactory reading is obtained the antenna legs are cut and the adjusted wire lengths soldered in permanently.

Results obtained have been far superior to those attained with horizontal dipoles. Since the "V"'s present a more omni-directional pattern, more stations were heard and worked. Outside of attaching the pulley, no tower climbing is required. All four nylon support points are tied down at heights no greater than 9 feet, easily reached by stepladder. As the feed line does not strain the antennas, wire stretching is practically nil. Maintenance is of course, greatly simplified by the pulley arrangement. ■

Power Supply Safety Techniques

BY PAUL BARTON*, W6JAT

An authority on power supply protection presents some key points on how to protect the power supply and operator. Use of a "hook" and special overload circuits are thoroughly described.

No it is not a 1961 Wouff Hong, but it could be.[1]

Transmitter attendants will recognize it as a crowbar and hams would do well to get acquainted with it too. (Apologies to those who are already converted.)

Commercial transmitters of any appreciable power normally have comparable devices built in, or attached as standard equipment.

A transmitter attendant or technician religiously "crowbars" the rig before entering the transmitter enclosure. Usually this means "hanging the hook on the plate". Of course the other end of the wire is connected to ground.

The idea is to be sure the filter capacitors are completely discharged.

Experienced transmitter men, including hams, know to crowbar a rig before working on it. They often use a screwdriver or other handy tool. Of course there is nothing wrong with this practice if it is followed religiously.

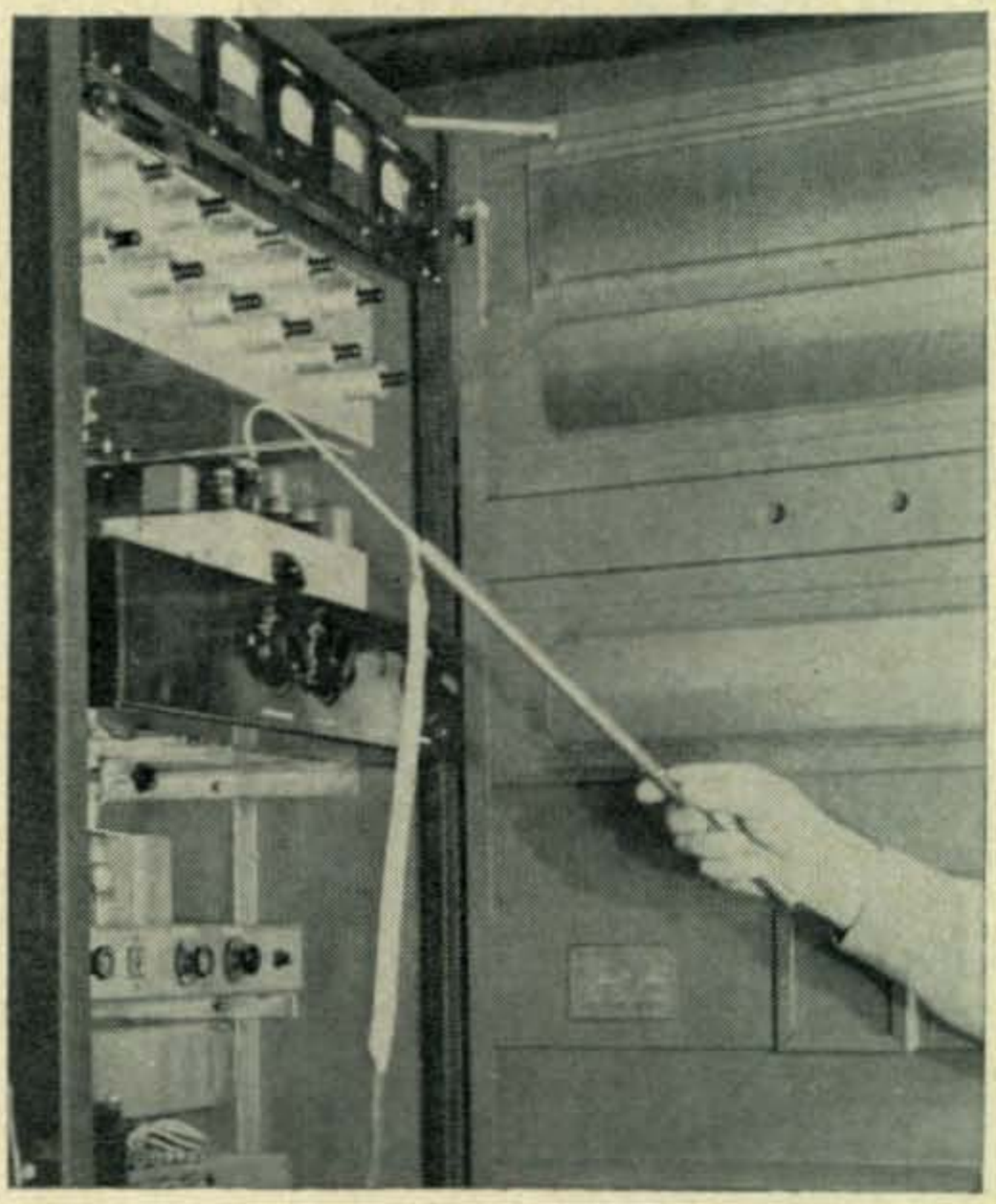
A better practice is to install the "hook" type crowbar permanently in the rig, with its sturdy pigtail type lead solidly connected to ground.

Provide a convenient point to hang the hook when not in use, then *always* hang the hook on the plate before touching the "hot spots". Leave it there until the work is finished, but it is best to remove it before turning on the plate supply again (That's a joke, son!)

Use of the crowbar in this manner makes the rig reasonably safe for the operator, but even then most transmitter men feel better with "one hand in their pocket".

If the power supply has an overload relay, crowbaring a live power supply, or turning on a power supply with the crowbar in place may do little harm, unless the crowbar is connected after the meters.

Actually, crowbaring from plate to ground, though convenient, is not completely safe. For instance, the plate r.f. choke or B+ high voltage fuse could open up. Then a crowbar at the plate could give the *appearance* of safety, yet a very dangerous condition could exist at the hot end of the choke, or fuse.



Completed hook in use on a Collins TDO 1 kw rig.

It is nearly impossible to completely "moron proof" a rig; there is no substitute for brains. But probably the best place to connect a crowbar is directly across the terminals of the filter capacitors.

Figure 1 is an excellent plan. The crowbar is directly across the filter capacitor to ground, with the meter in the cathode lead of the final. This latter is often difficult or impossible, however. Placing the meter in the hot lead, as in fig. 2, is a possible alternative.

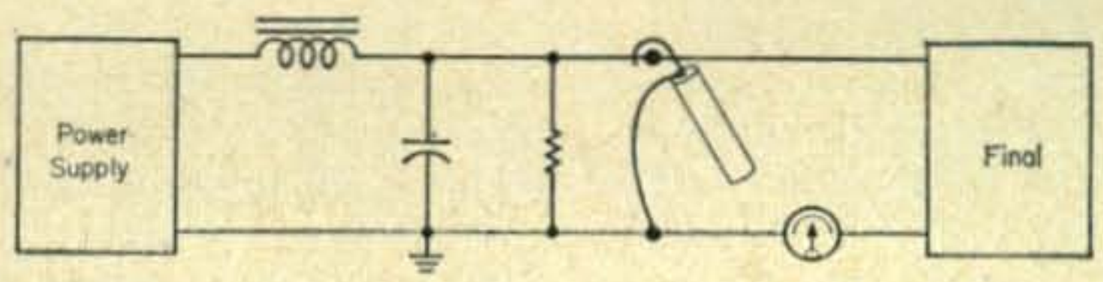


Fig. 1—The crowbar connected across the filter capacitors assure a discharged power supply. In this circuit the meter is in the cathode of the final.

*Jennings Radio Mfg. Corp., High voltage laboratory, P. O. B. 1278, 970 McLaughlin Avenue, San Jose 8, California

[1] Seems to be omitted from the A.R.R.L. Handbook these days. Look in the older ones.

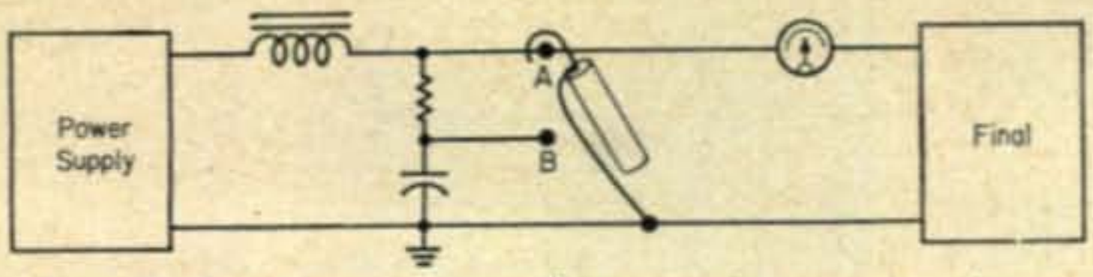


Fig. 2—Some power supplies contain surge resistors in series with the filter capacitor. Point B should be "hooked" first and then A. In this circuit the meter is in the hot lead and must be well insulated.

In fig. 3, the meter is in the B minus lead of the power supply. This works fine, but crowbaring to ground could be hard on the meter, so crowbar right across the filter capacitor. The crowbar must not be hung on ground when not in use, as it will shunt the meter. In fig. 2, a surge resistor is shown in series with the filter capacitor. This is done in the KWS-1. In order to remove the possibility of this resistor being open, crowbar *across* the filter capacitor first, then hang the hook on the B+ line.

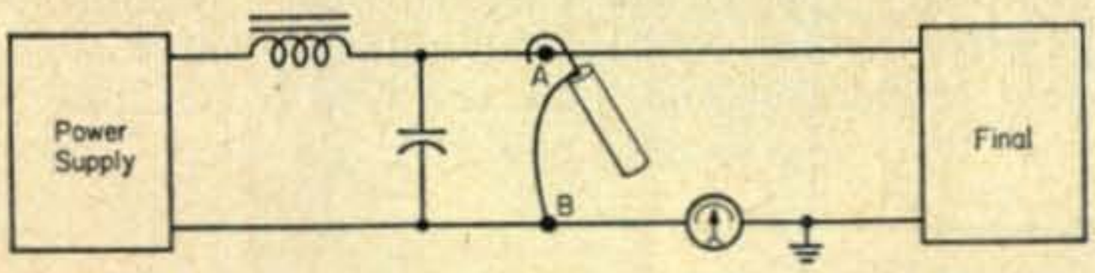


Fig. 3—In a meter circuit of this type the crowbar must be hung from A to B rather than A to ground. When not in use the hook must be hung on B.

Crowbaring at the plate of the amplifier tube, though a good safety measure, can be hard on r.f. choke and plate meters, if the power is still on.

A good transmitter man seldom trusts a one chance crowbar. Usually, on entering a transmitter enclosure, he will jab around with his "hook" and check all likely hot spots before hanging the hook on the plate or filter capacitor terminal. (For instance, it makes for a red face —or worse—to make the high voltage safe, then get your hand in the bias or screen voltage.) He seems to feel that good transmitter men are less expendable than good rigs, and worries plenty about getting the grounds on before working on the rig, but he doesn't worry too much about accidently leaving a ground on after leaving. Otherwise, "what are overloads for? Shouldn't you check them for proper operation once in a while?"

Overload Circuits

There are many ways of affecting an overload circuit—one of the easiest being fuses. However, fuses though cheap and simple, are slow. A lot of damage can occur while a fuse is melting out.

Most overload relays have light duty contacts meant to operate a second relay, not to interrupt the load directly. Therefore, a contactor (a heavy duty relay) is usually required for the overload relay to operate.

The contactor circuit, shown in fig. 4, is quite standard. The contactor must have a pair of contacts capable of handling the required load, plus an auxiliary contact for latch-in. The auxiliary contact is paralleled with the start button (normally open, momentary closed). Depressing the start button completes the circuit to the contactor solenoid which closes the two main contacts and the auxiliary contact. When the start button is released, the auxiliary contact maintains continuity of the circuit. The stop button (normally closed, momentary open) when pressed, interrupts the circuit which then allows the contactor to drop out.

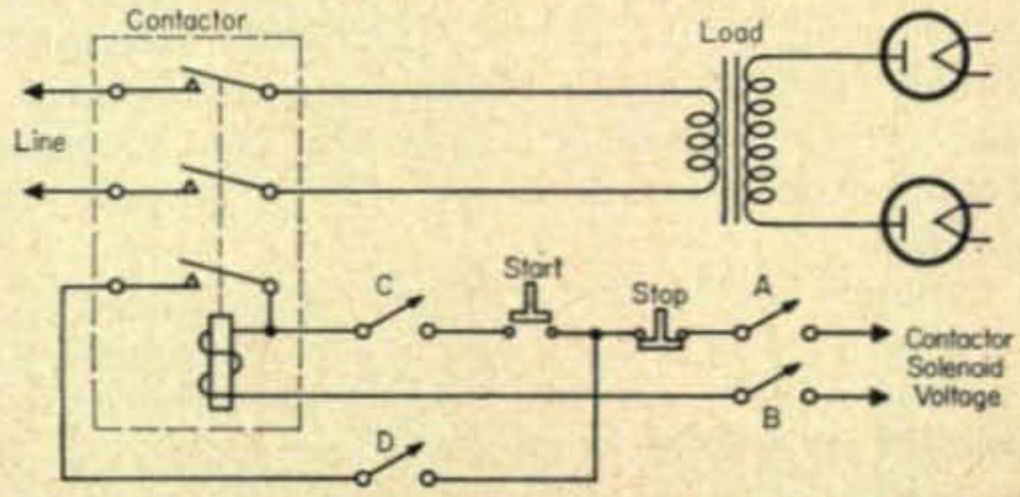


Fig. 4—A common contactor circuit that can "kick out" much more rapidly than fuses. On-Off control is accomplished by Start-Stop push buttons. The overload relay controls the contactor solenoid and the relay contacts may be connected to points A, B, C or D.

The overload relay's normally closed contacts are then put in series with the stop button of the contactor. In fig. 4, the overload relay contacts could be satisfactorily inserted at B, C, or D. If placed at D, however, the overload relay can not function as long as the start button is depressed. This location is sometimes used in starting heavy loads such as motors, etc., in which case there should be a thermal cut-out and fuses in the circuit also.

Contactors normally "bounce" a little when closing in. This bounce (or closing and opening several times rapidly) creates transient voltages that can be very high. Silicon rectifiers are particularly subject to transient voltage failure.

Transients from contactor bounce may be reduced by using two or more contacts in parallel as shown in fig. 5. Figure 5 shows the contactor solenoid voltage taken from the line, as is usually done. In fig. 4 the contactor solenoid supply was not shown. There are often some fine surplus 28 volt d.c. contactors available at a considerable savings. A chime trans-

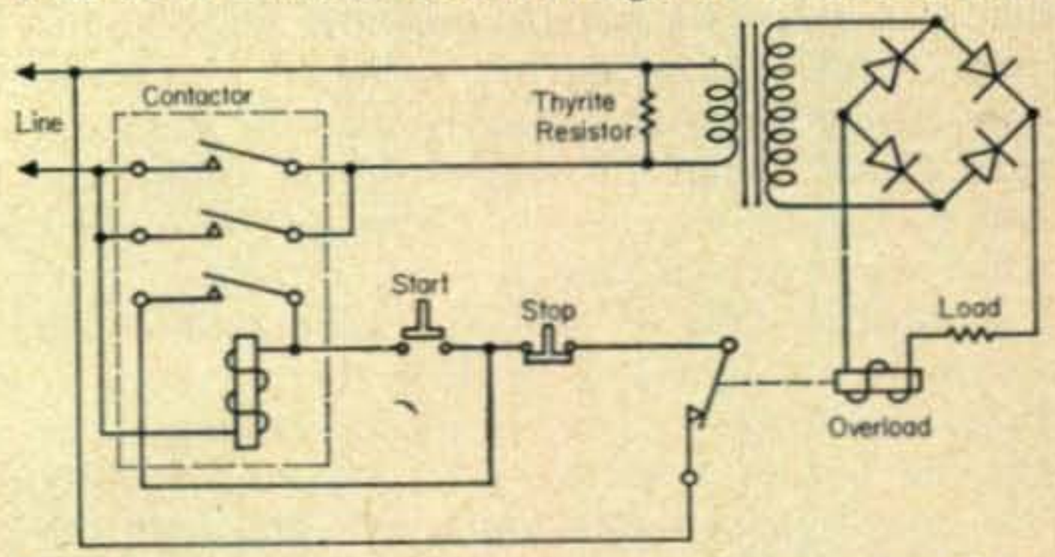


Fig. 5—When the contactor contacts are placed in parallel, transients, due to bounce, are markedly reduced. The thyrite resistor across the primary also partially absorbs transients to protect the silicons. This type of circuit, with the proper relays, can clear a fault in one tenth the time of fuses.

former and some small silicon rectifiers can furnish the necessary solenoid voltage.

Another plan is to take the solenoid power (assuming correct voltages) *directly* from the primary of the filament transformer of the final. Loss of this voltage then automatically drops out the plate supply.

Constructing A Crowbar

Back to crowbars. Due to the possibility of crowbaring a live power supply, an overload circuit (and contactor circuit) is recommended. The crowbar hook is simple and can be cobbered up in a few minutes. Details are shown in fig. 6.

An insulated handle such as a birch dowel or bakelite rod are excellent. The flexible lead is usually not insulated. (A broken wire inside the insulation would be a very dangerous.) A length of braid stripped from an old piece of coaxial cable works fine.

The crowbar hook in the picture is a piece of number ten copper wire with a #6-32 thread screwed into the end of a ½" diameter bakelite dowel. The braid is ½" tinned Belden braid. It is shown in use in a modified Collins TDO 1 kw rig, used as an exciter for a 20 kw rig. In this case it is hooked on the plates of the 813's which is poor practice, but "what the heck"? Rigs are cheaper than operators. Hook to safety and be an old-timer. There are old technicians and there are bold technicians, but there are no old, bold, technicians. ■

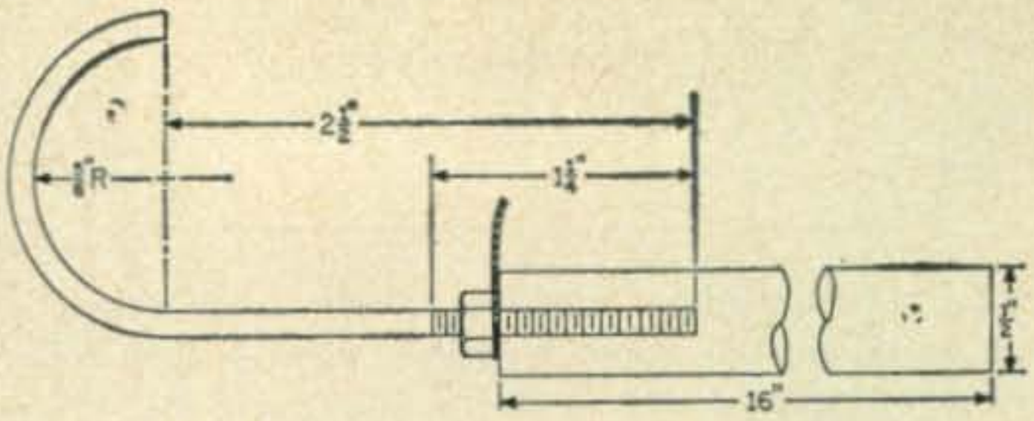


Fig. 6—Construction details for a safety hook. The hook end is formed of #10 copper wire with a 6-32 thread on the straight end. This end is threaded into a ½" diameter, 16" long bakelite or birch rod. The braid may be secured under the knut or solder to the hook.

Diode Multipliers In V.H.F. Exciters

FREDERICK W. BROWN*, W6HPH

Crystal control in the v.h.f. spectrum usually means several multiplier stages or high frequency crystals. Neither situation is desirable. The use of crystal diode multipliers, however, minimizes both problems.

OBTAINING crystal controlled output at 144 mc and higher with a minimum number of tubes has always been a challenging problem. Of course, it's not so hard with v.h.f. crystals, but these are expensive, fragile, and not as stable as lower frequency rocks. It has recently been pointed out[1] that a diode multiplier followed by an amplifier is more efficient than the same tube used as a conventional class-C multiplier. The analysis was based on the assumption of a multiplication efficiency of only $1/(2n^2)$ (n being the order of multiplication). Since varactor diodes can theoretically yield much higher efficiencies, diode multiplication should be an effective technique in simplifying v.h.f. exciter design.

Described here is an experimental 144 mc transmitter designed to explore the potential of diode multipliers. The resulting circuit gives 144 mc output from 8 mc crystals using only two tubes (neither dual purpose), and with the crystal oscillating at 8 mc (not 24). Output is sufficient to drive a 6360 or other low drive requirement final.

Inspection of the diagram (fig. 1) shows a 6C4 used in a Keen oscillator circuit giving 24 mc output across L_2. The 24 mc signal is multiplied 6 times by the diode CR_1 to drive the 6AK5 final straight through at 144 mc. In theory it would have been better to triple and then double using two diodes than to multiply 6 times in one diode, but one stage is used here in the interest of simplicity. Bias for the diode is taken from the oscillator grid leak. This has the advantage of providing bias proportional to the oscillator amplitude, thereby compensating for changes in supply voltage, etc. Much experimenting proved the necessity of the parallel tuned circuit L_3, C_3. I believe the function of this circuit is to provide an idler loop[2] in conjunction with C_2. Nearly all of the component values given in fig. 1 were empirically optimized for maximum performance.

Construction

Parts placement is not critical, but the usual precautions as to keeping r.f. leads short should

* Box 78, Star Route, Idyllwild, Calif.

[1] G. F. Montgomery, "Efficient Harmonic Generation," *Proc. IRE*, pp. 251; February, 1960.

[2] I. Kaufman and D. Douthett, "Harmonic Generation Using Idling Circuits," *Proc. IRE*, pp. 790, April, 1960.

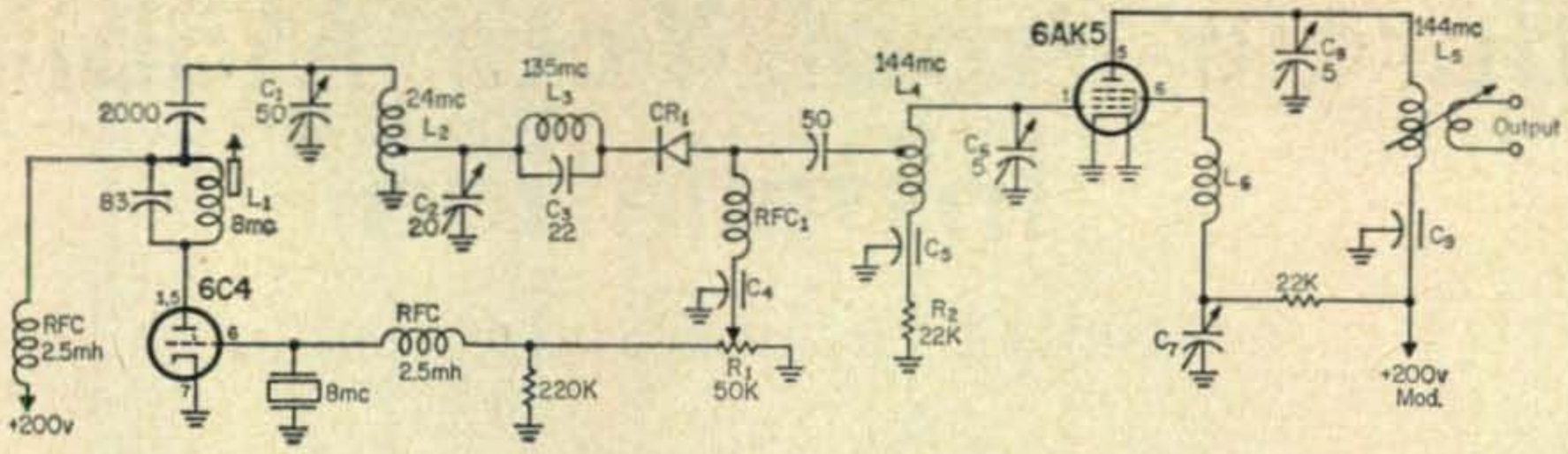


Fig. 1—Schematic of an exciter transmitter using 8 mc crystals and a crystal diode multiplier to achieve 144 mc output. Power output from the 6AK5 amplifier is about ½ watt.

C_4, C_5, C_9—.001 mf feed-through capacitors.
C_7—3-30 mmf mica compression trimmer.
CR_1—Two selected 1N270 in parallel, see text.
L_1—14 t. #28e. closewound or ½" dia. slug tuned form.
L_2—15 t. #18e. ½" dia. 1" long. Tap 6 t. from ground.
L_3—3 t. #22e. ¼" dia. Tune to 135 mc with C_3.
L_4—4 t. #18e. 5/16" dia. ⅜" long. Tap 1 t. from top.
L_5—4 t. #18e. ⅜" dia. ⅜" long. Link 2 t. for 300 Ω line, 1 t. for 50 Ω line.
L_6—4 t. #20e. 3/16" dia. ¼" long.
RFC_1—14 t. #26e. 3/16 dia. ⅝" long.

be observed. The 6AK5 should have its input and output circuits as well isolated as possible. A shield should be placed across the 6AK5 socket, isolating pins 1 and 2. The shield is grounded on both sides of the socket; pin 2 and the center post are soldered directly to the shield. These precautions prevent instability problems in the final.

Adjustment

First step in tuning up is to set all tuned circuits with aid of a grid dip meter to the approximate frequencies indicated in fig. 1. Coil L_4 must be adjusted by squeezing or spreading the turns. With 200 volts on the oscillator only, tune L_1 for maximum d.c. voltage (measured with a v.t.v.m.) across R_1. Check with your receiver to make sure the oscillator is crystal controlled on 8 mc. Next, set the diode bias at about −17 volts and tune in the 2 meter harmonic of the 8 mc crystal. Tune C_1, C_2, C_6, and R_1 for maximum S-meter reading. There may be more than one peak on C_2, in which case use the setting of greatest output.

At this point you should be able to measure a d.c. voltage across R_2 with your v.t.v.m. The object is to get this voltage as high as possible, since it is a direct measure of drive to the final. You should end up with more than seven volts. Some experimenting with different diodes will pay off here. Although practically any diode will work, some are much better than others. The gold bonded germanium types seem to be best. Of the ones I tried, the DR303 was most efficient. The 1N277 placed second and the 1N270 third. Of course, there's nothing wrong with using a regular varactor diode, if you happen to have one.

There seems to be quite a variation among different diodes of the same number. I ended up using two selected 1N270's in parallel, as this gave more output than one. You may find that three in parallel is better than two, but it's best to try all possible combinations of one at a time, two at a time, etc. It is necessary to retune C_1, C_2, C_6, and R_1 after each substitution. Since there is some interaction among these four adjustments, it is best to follow a reiteration procedure in tuning up.

After you are convinced that you have the maximum voltage that can be developed across R_2, you are ready to neutralize the final. For this purpose you'll need an r.f. probe for your v.t.v.m. (fig. 2). Connect it to the output link and with no plate or screen voltage on the 6AK5, adjust C_8 for maximum output. Now tune C_7 for minimum output. If you can't get the output below 0.2 volts, it means you'll need to do a better job of shielding between the grid and plate circuits.

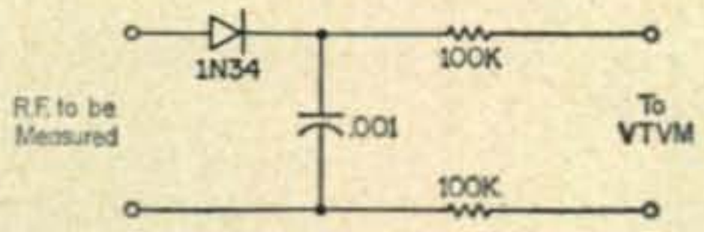


Fig. 2—Circuit for an r.f. probe suitable for measuring r.f. output voltage of the diode multiplier transmitter.

Having properly neutralized the final, connect a 1 watt carbon resistor equal to your antenna impedance to the output terminals and apply 200 volts to the 6AK5. Peak all adjustments for maximum output as measured with the r.f. probe across the dummy load. The setting of the final link is somewhat critical. Output power is approximately E^2/R, where E is the voltmeter reading, and R is the load resistance. The output may be increased by increasing the plate voltage, but 200 volts is about all a 6AK5 will take under modulation. Plate current is about 10 ma and screen current 3.7 ma for the 6AK5. The 6C4 pulls 13 ma for a total drain of around 27 ma. Output power under these conditions is about ½ watt. About 1.4 watts of audio will fully modulate the final, and linearity is good.

The best DX worked so far, using a twin 3 antenna and transistor modulator, is W6SDM in Oxnard, about 145 miles. The signal report was Q5 and S6. ■

Burgle-Proof Your Mobile Installation

BY RICHARD A. FREEDMAN*, K2DEM

Are you concerned about the safety of your mobile rig or any other property in your car? Here is a simple scheme to burgle-proof your car at the cost of a toggle switch and a length of hookup wire.

Do you have a mobile rig in your car? If you do, the chances are that you also have a fairly obvious antenna on the car that advertises to all potential thieves, "Come and get it." Most mobile rigs are in a fairly easy-to-spot place in the car. Any passer-by with larceny on the mind cannot help but notice it.

From the number of notices regarding stolen equipment that I have seen in the various magazines lately, it would seem to be worth a *few pennies* and a half hour's time to install a burglar alarm on your car. Even if you do not have a mobile rig in the car, this simple alarm can protect whatever valuables you may leave in the family buggy, or the buggy itself for that matter.

Most junk boxes have all that you will need: a small toggle switch and some hook-up wire. This system is considerably cheaper than a burglar alarm that has been advertised recently for about $60.

The idea is very simple; to the best of my knowledge it was first thought of by Danny, K2DPI, a few years ago. Whenever the doors of your car are opened, your horn will sound full blast. What crook would remain around, taking the necessary time to gather up something to steal, if your horn were sounding full blast, attracting the attention of people for blocks around?

The installation is simple, and should not take much more than a half hour.

How It Works

In almost every car, either a dashboard or dome light goes on when any door is opened. The switch that puts on this light, by grounding its return lead, is located right in the door-frame, usually near the door hinges. If you could get this switch to trigger the horn, as well as the light, you are in business. This is a very simple matter.

The only hitch is that your horn takes about thirty amperes, and that little switch will not pass nearly that much. This, however, is no real problem. The auto manufacturers have already solved it for you by installing a relay right under the hood. Rather than have thirty amperes run through high resistance wire all around your car, and through the horn button, they use a relay. When you press your horn button, which is a grounding switch, you are only causing a mere few hundredths of that thirty amperes to flow. This small current activates a relay which does the dirty work, causing the horn to sound. This relay is usually located right near your horns, and is a little black box, of a few cubic inches, with three terminals on it. One outside terminal will have a rather heavy wire connected to it going to the horn; and the other outside terminal will have a thin wire on it from the horn button. The center terminal is the common, with a heavy lead on it from the battery. The heavy wire connects the battery to the horn when the relay is closed. The thinner wire connects the battery to the relay coil through the horn button. The battery terminal may have other connections on it, being used as a terminal strip for other accessories which do not concern us. If you have any trouble locating your horn relay, ask your auto mechanic to point it out the next time he opens the hood to check your oil.

Now, if a wire is run from the door switch (which can be gotten at usually by merely loosening a few screws holding it in place) to

[*Continued on page 114*]

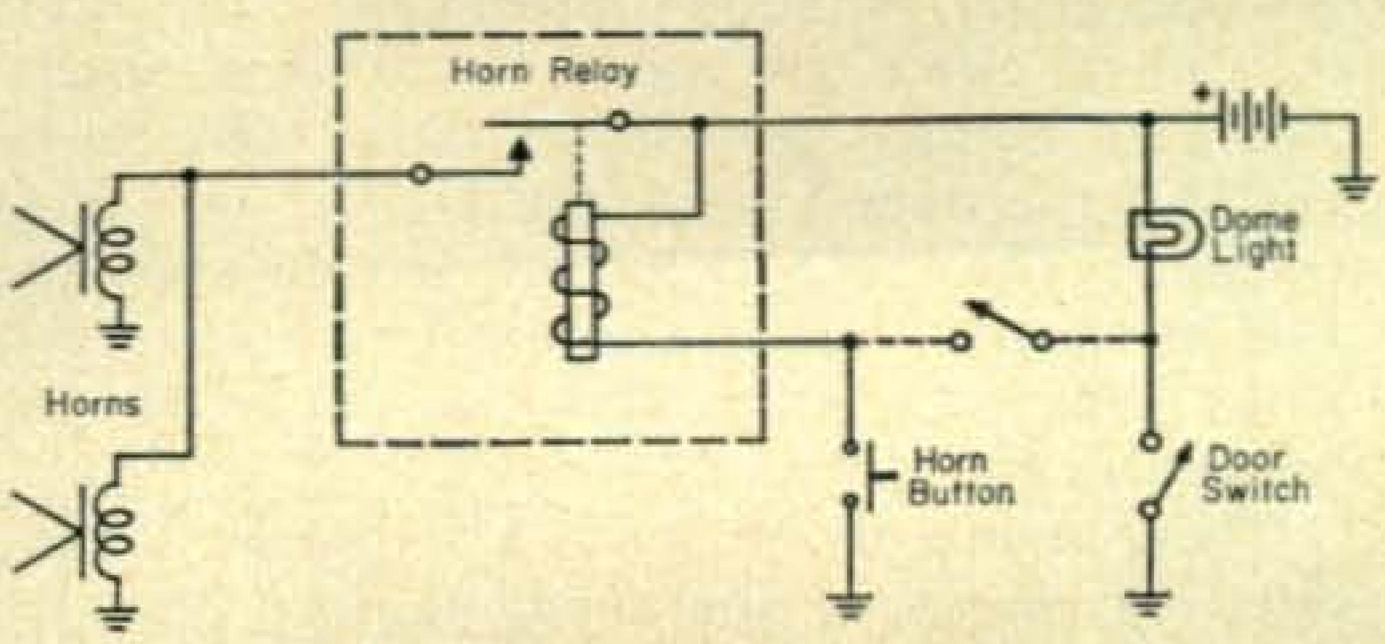


Fig. 1—Horn relay and dome light circuit of the average car. If the toggle switch and the dotted line are added, the horns will blow each time the door is opened.

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How Kit Transmitters Work

PART II, Conclusion

BY DAVID T. GEISER*, WA2ANU

In Part I of this article, methods used by a number of kit transmitters to generate a signal were described, leading up to the delivery of a signal from the plate of the final amplifier. This second part carries the discussion to successfull delivery of the signal to the antenna or transmission line.

REVIEWING, the discussion, in Part I, was keyed in its application to some common kits, with the clear assurance that at least some parts of the discussion would apply to every amateur transmitter. (There was no implication that *only* the keyed transmitters were good performers in amateur use.)

The key used to identify the transmitters where a statement applied was to put an identifying letter in parenthesis after the statement, and was: Eico Models 720 (A), and 723 (B), Globe Chief Models 90A (D), and Deluxe (E) Globe Scout 680A (F), Heathkit Models DX-20 (G) and DX-40 (H), Knight-Kit Model T-50 (J), and Johnson Viking Adventurer (K), Challenger (M), Navigator (N), and Ranger (P).

Now back to the discussion. As you may recall, we had partially discussed the importance of the plate tuning capacitor of the final. To continue:

Coil Merit or "Q"

The selectivity of a tuned circuit is specified by a factor called Q[18]. This Q depends on the ratio of the power circulating (flywheel fashion) in the circuit to the total power lost from the circuit in the form of heat and by transfer to the antenna. The higher this ratio, the higher the Q and selectivity of the tuned circuit. When a tuned circuit is unloaded it has high Q. It is desirable to have a Q of 10 to 15 and questionable to have a higher or lower Q. Harmonics or losses increase outside of this range. An interesting and useful effect occurs when the value of Q is 10 or over. Antenna loading can be increased (if resistive) without any change necessary in the value of C_1 (fig. 8) to "dip" the final (tune it to resonance). Therefore a very good test of whether the Q of the final amplifier tank circuit has been reduced below

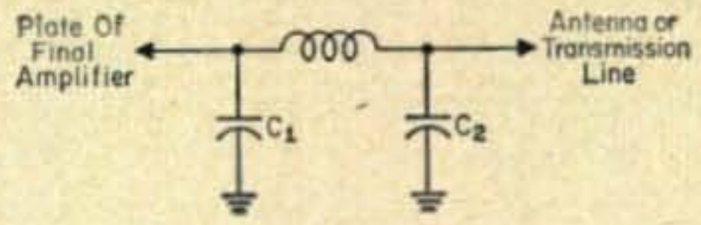

Fig. 8—The Pi network most commonly used in kit transmitters to feed power from the final amplifier to the antenna or transmission line. Bandswitching is not shown for simplicity.

10 is to see if it is necessary to readjust C_1. When transmitters have loading controls, the transmitter can be tuned up with minimum loading (maximum C_2) and the setting of C_1 be compared to its normal position. There should be very little change for a Q over 10, but more about that later in the section on antenna loading.

Dipping the Final

When the amplifier plate tuning is adjusted to that capacitance necessary for either desired or harmonic frequency resonance, the direct current drawn by the tube plate will decrease (fig. 9). This is the "dip".[19] When this tank circuit is heavily loaded, the dip will be shallow. Best operating tuning position for a Q of

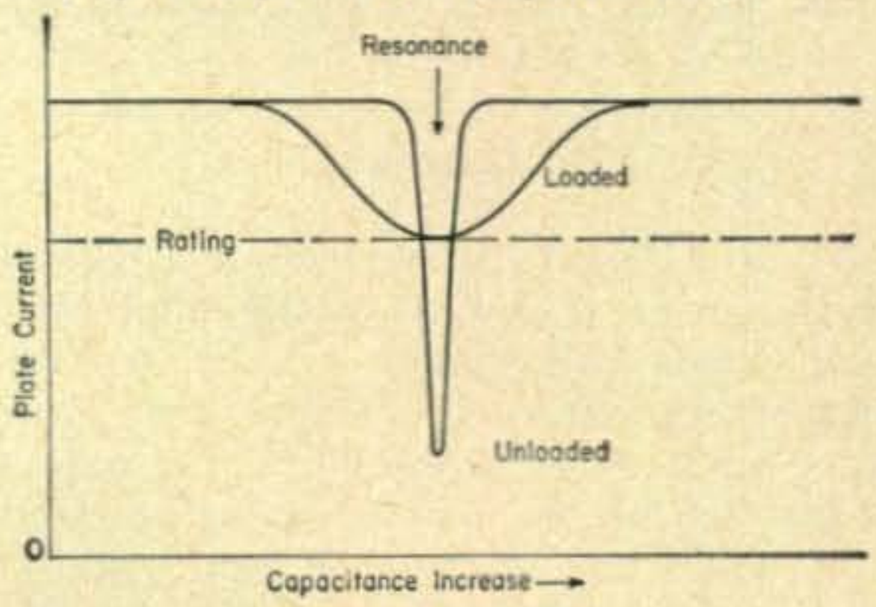

Fig. 9—Plate current vs. final tuning capacitance for unloaded and loaded conditions where moderately good Q exists. In low-Q circuits, the dips will not occur at the same capacitance setting.

*Light Military Electronics Department, General Electric Co., Utica, New York

[18] *The Radio Amateur's Handbook*, ARRL, 38 ed., p. 43. Terman, *Electronic and Radio Engineering*, Mc-Graw-Hill Publishing Co., 1950, pp. 50-57.

[19] ARRL, op. cit., p. 167. Terman, op. cit., p. 448-471 (separate line).

10 or more is in the center of the dip. It may be off to one side of the dip when the Q is low or a tendency for oscillation exists.

Neutralization

When oscillator circuits were being discussed, it was mentioned that some of the output energy was intentionally fed back into the input of an amplifier tube to generate the oscillating signal. Once the signal is generated, it is necessary to keep any other stage from oscillating. This can be done by very careful tube choice, component choice, layout, and the liberal use of metal walls shielding the output circuit of an amplifier from its input. If losses in feedback paths can be made high, any oscillation that has a tendency to start will be starved. This is the reason for parasitic chokes (A, B, D, E, F, G, H, J, K, M, N, P), resistors in control (B, D, G, H, K) or screen grid leads, and the location of grid and plate circuits (all) on opposite sides of metal shielding. There is, however, always a remainder.

Designers may find it desirable to neutralize[20] an amplifier to improve operation when using high-gain tubes and circuitry. Neutralization is the process of taking some of the output energy and feeding it back into the input in a fashion that just cancels the feedback that would tend to produce oscillation. The most common circuit for screen grid tubes is shown in fig. 10

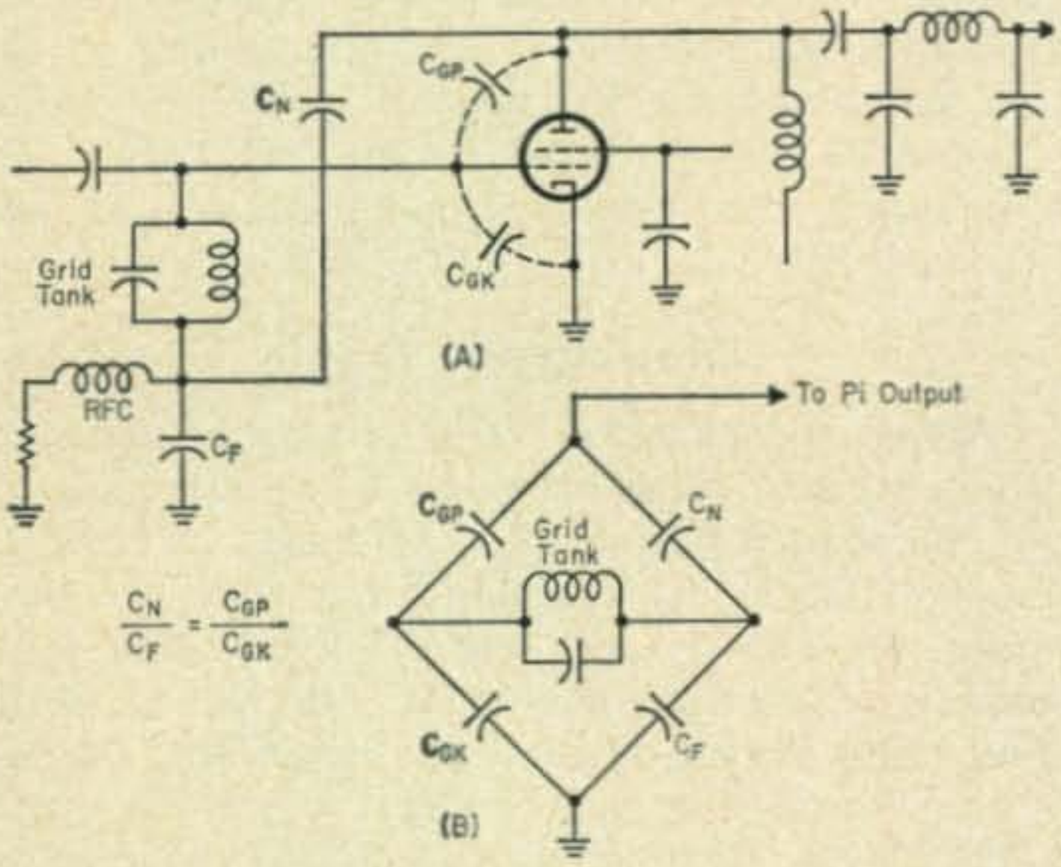

Fig. 10—The most common form of neutralization used with screen grid tubes. The actual circuit (A) reduces to the bridge circuit (B) thus isolating the amplifier input from its output.

(B, M, N). Usually neutralization is performed with the positive supply to the final amplifier disconnected. Adjustment of the neutralizing capacitor minimizes the signal fed from the input circuit of the amplifier to the output. As feed-through paths are the same as feedback paths (when the amplifier is not amplifying), this elimination of the feed-through path eliminates feedback and the amplifier is stable.

[20] ARRL, op. cit., pp. 160-162.
Bruene, "How to Neutralize Your Single-ended Tetrode Final," *CQ*, Aug. 1950, p. 11.

Usually neutralization is performed on the highest frequency band of the transmitter as feedback is potentially most severe on high frequencies. An exception may occur when the final amplifier is used to double to the highest frequency. In this case, the amplifier is usually neutralized on the highest frequency band having the amplifier input and output frequency the same ("working straight through").

Loading the Antenna

Probably the most confusing part of transmitter operation to either the beginner *or* oldtimer is how to feed the transmitter power to an antenna.[21] (Antennas and transmission lines are topics that could fill books, so it will be assumed in this discussion that we are talking about the antenna as seen *at the transmitter*.)

Loading with a pi network is simple. The output or loading capacitor (C_2) is set at maximum capacitance (fully meshed). The dip is found by rotating the final plate tuning capacitor (C_1). Capacitor C_2 is slowly unmeshed while the dip point is repeatedly rechecked with C_1. Stop when *either* the position of C_1 at dip begins to move *or* the final amplifier is loaded to its design current. The setting of C_1 to a new dip position is not disastrous but does indicate the possibility of increased harmonics or losses. (See other parts of this article.)

Unless the antenna looks like either a short circuit or an open circuit, it will appear to be a combination of resistance, capacitance, and inductance at the feed point. At any single frequency it will seem to be either pure resistance *(R)*, resistance and capacitance *(RC)*, or resistance and inductance *(RL)*. Transmitters are usually designed to work best when loaded into pure resistance but will compensate for small amounts of C or L. One of the best investments an amateur can make is in an antenna bridge, such as the Antennascope[22] (for coaxial cable) or the original Micromatch[23] (for open wire or twin lead lines). Any other s.w.r. bridge is useful, but these two are specifically mentioned because they give a direct reading of what the antenna resistance is and will not null (balance perfectly) if the load is not a pure resistance (fig. 11). If the load is not a pure resistance, the amateur can parallel inductance or capacitance across the line to make the load at the feed point purely resistive. (This L or C compensation can also be put in series with the line, but the "answer" will probably be different though not necessarily undesirable.)[24]

[21] ARRL op. cit., p. 43-49, 149-153.
[22] Scherer, "The Antennascope," *CQ Anthology;* also *CQ*, Sept. 1950, p. 13.
[23] Jones and Sontheimer, "The Micromatch," *QST* April 1947, p. 15 and July 1947, p. 45.
[24] This is because a series circuit is equal, at a fixed frequency, to a somewhat different parallel circuit when RC or RL are involved. See ARRL, op. cit., p. 36.

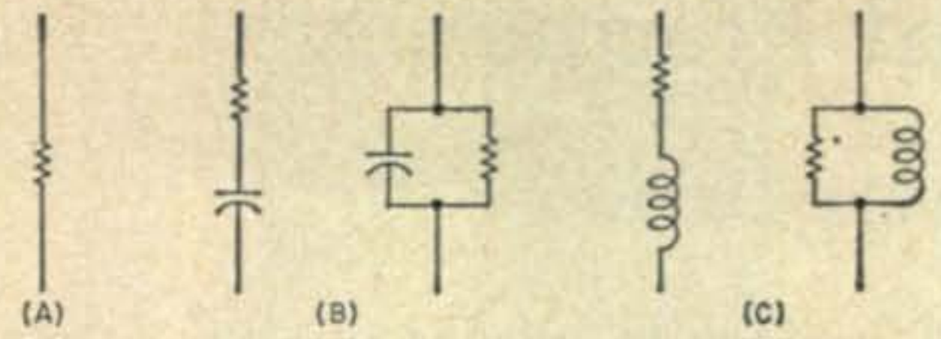

Fig. 11—Loads appearing resistive (A), capacitive (B), and inductive (C). Capacitive and inductive loads may be considered either series or parallel as most convenient. An antenna plus feedline *may* appear as any combination.

Strictly speaking, a pi network with fine adjustment possible only in C_1 and C_2 will accommodate a variety of different R, L, and C loads only if the Q of the section near the tube plate is allowed to change. There is one narrow range of loads that will permit power transfer while maintaining the Q between 10 and 15. Power will definitely be transferred over a much wider range, but it is always well to have an amateur a mile or so away check for harmonics. Experimentation[25] to find the best load is always worthwhile to educate and familiarize the amateur with the transmitter and theory, but the chances are that little difference will be noted in signal reports unless the radiating part of the antenna is also changed.

Metering[26]

There usually are no meters in the transmitter that will tell what the actual power output is. True power output is difficult to measure because usually voltmeter and ammeter accuracy and actual load impedance are not well known at r.f. However, if the amateur has made no changes in feedline or antenna, he can tell when power fed to this combination reaches a maximum by measuring feedpoint current with an r.f. ammeter; maximum current occurs at maximum power for that particular frequency. Since the load changes with frequency, the operator cannot expect to get the same current at all frequencies even with constant output power.

Meters internal to the transmitter are most commonly limited to final amplifier grid and plate current (A, B, F, G, H, J, K, M, N). Commonly, "plate current" measured is actually cathode current which combines grid, screen, and plate current (A, B, F, G, H). Error is not great (and always on the legal side) in a properly operating transmitter. On a really deep dip, screen current may be dangerously greater than plate current. (Screen grids are not designed to dissipate power and may rapidly burn out if an amplifier is maintained in a deep dip.)

Some more elaborate rigs will monitor oscillator, buffer[27], and modulator plate currents, buffer grid currents, standing wave ratio (s.w.r.), and "power output". Usually in small or inexpensive rigs only one meter is used to conserve space and cost, and performance of the different functions is accomplished by switching the meter into different circuits.

These different functions often require quite different meter sensitivities, so metering circuit choice must combine a switching of meter sensitivity with switching that keeps the circuits operable when the meter is not in any one particular circuit. If one uses a sensitive meter[28], theory helps him switch meters between circuits. The designer can leave the paralleling resistors (that reduce sensitivity the needed amount) in the current-metered circuits and not have to break these circuits during switching. Circuits that measure voltage do not have this problem.

The reason that most metering is done in a way that permits one side of the meter to be grounded is that the meter has only a limited amount of insulation between the meter movement and the case (and also the zero-adjust screw, if there is one.) Incidentally, the zero-adjust screw should not be moved very much under any conditions, and certainly not when the equipment is plugged in and turned on. The zero-adjust *does not* change the current or voltage being measured, but only changes the meter *indication* of what that current or voltage is.

Further Notes

The Editor of *CQ* has specifically asked that as many references as necessary be included to assist readers who may want to explore this subject more deeply. This article is only the briefest introduction into the field of transmitter theory. Not covered were modulators, variable frequency oscillators, power supplies, or particular conditions that affect the very high frequency transmitters.

References to handbooks and texts are to current editions, but most, if not all, material will be found in any handbook covering transmitter operation. Where more than one book or article is referenced, usually the material covered is similar.

The author will attempt to answer questions if they are each accompanied by a self-addressed stamped envelope. The reader should note, however, that transmitter details were gathered from manufacturers' handbooks that are the permanent property of the *CQ* Magazine Technical Library and have been returned to them. Therefore, please supply adequate information, diagrams, etc. ■

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[25] ARRL, op. cit., pp. 345-354.
Johnson, *Transmission Lines and Networks*, McGraw-Hill Publishing Co., 1950.
[26] ARRL, op. cit., pp. 167-168, 507-509.
U. S. Navy, NAVPERS 10622, Electricity, Govt. Printing Office 1945, pp. 259-289.

[27] Buffers or buffer amplifiers are amplifiers between an oscillator and a final amplifier. They are commonly used to isolate the oscillator from the amplifier, provide adequate drive for the final amplifier and in some cases act as frequency multipliers.
[28] Usually between 50 microamperes and 1 ma full scale.

Vary your Crystal Frequency

BY J. E. GREENBAUM*, W1LIG

W1LIG reviews some tried and true methods of varying crystal frequency.

BEFORE the war, way back in 1938, I had 3 crystals with which I used to operate c.w. on 10, 20, and 40 meters. So did W1HBL, (who eventually became a W4); in fact, he had the same 3 frequencies, too.

I had read of various ways to bring frequency up or down fast or slow; pencil lead, solder, mercurochrome, iodine, Tincture of merthiolate, layers of tissue paper; what a myriad of ways to reduce the frequency. Since a pencil was the most accessible device, that's what I used. I took the crystal holder apart, put some pencil marks on one side of the crystal, assembled the crystal holder, then checked it. Miracle of miracles—I was on the right track: the crystal was down a few cycles!

Tuning Crystals

After spending a few hours on each crystal, I quit. Took too much time and patience, and was very boring; there must be an easier way. Since a variable capacitor should have some effect on a crystal, I put a 3-30 mmf trimmer across the crystal as shown in fig. 1. If the crystal was within 100 cycles of the frequency, the assembly would work; if it were more than 100 cycles, no deal.

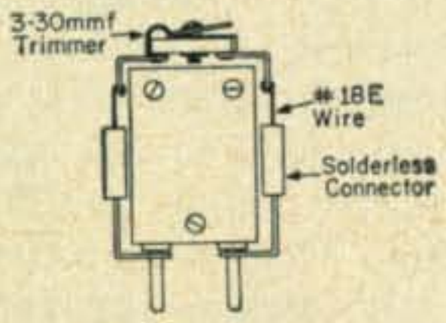


Fig. 1-A 3-30 mmf trimmer capacitor in parallel with the crystal can bring it on frequency if it is within a 100 cycles to begin with.

Spring Variable

Digging back through the magazines, I read W4RMU's article in the Feb. 1956 *QST*, and he told how to make a special spring to be used in varying crystal frequency. It used shim stock, and was easy to make, but since I had no access to the necessary materials and tools I just saved the article. But hooray for M.A.R.S.; the brown 8120 kc. crystals and some other frequencies in the brown crystal holders marked CR-1A/AR CJQ had the special springs in them. Now there was no need for me to bother with the system of using pencil, etc., on crystals—there was a supply of springs to use.

Well, this is the lazy way to make a "rubber" crystal, thanks to Bliley, W4RMU, and M.A.R.S. (In case you've forgotten, or never knew it, a "rubber" crystal is one where the fundamental

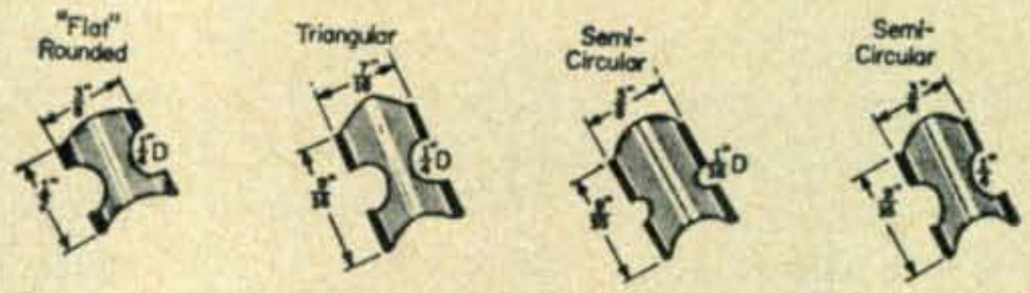


Fig. 2—Three types of springs found in the CR1A/AR CQJ crystals. Of the three types the right hand unit will give superior performance.

frequency can be varied over a given range each side of zerobeat.)

Anyway, go to the nearest surplus supply house and con the salesman out of the G.I. "CJQ" crystal holders before someone tips him off, or get them from M.A.R.S., but latch on to them somehow. Just remember to look for the "CJQ" on the holders; those contain the special springs needed for the rubber crystals. (Of those shown in fig. 2: number 3 is the best type. Modify the others to that type, if you wish; it gives the best pressure in my opinion.)

Remove that spring from the "CJQ" holders, (send me the crystals), then take an FT-243 holder apart, and substitute the new special spring for one plate of the two that hold the crystal. (send me the coiled spring). Drill a hole in the center of the metal plate of the FT-243 holder covering the assembly fig. 3, tap it for a 6/32 screw or whatever size screw you wish to place there; then assemble the case again. (I've used 1/16" lucite in place of the metal top, just to be able to see inside the holder.) Now you have a "rubber" crystal, and are ready to go "VFO-Crystal."

I've changed my M.A.R.S. crystal, and some net crystals to "rubber" crystals so I can readily zerobeat the N.C.S., and I've made up some for my friends. (My trouble is getting the FT-243 crystal holders: got any to spare?) ■

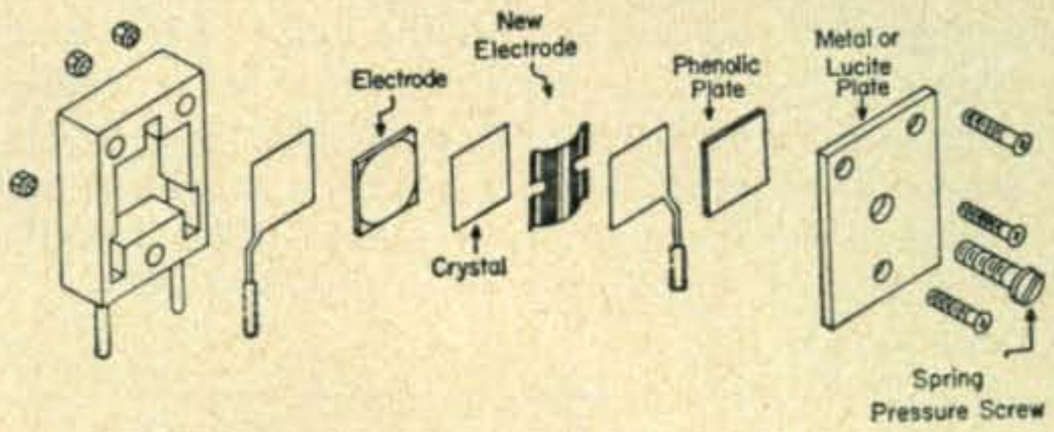


Fig. 3—Modification of the FT-243 holder as shown will permit frequency variations. The spring, shown in fig. 2, replaces one of the plates holding the crystal and the screw adjusts the spring pressure.

*1668 Iranistan Ave., Bridgeport 4, Conn.

Ham Hospitality-
South American Style!

BY CAROLE F. HOOVER*, K9AMD

SPEAKING for hundreds of American hams who are unable to operate in DX countries where they work, Bill Allen, K9AKF, of Raymond, Illinois, and Tia Juana, Venezuela, told his story in the March 1960 issue of *CQ*. While on vacation last summer, Bill had some good news. Thanks to the third party traffic arrangement and a hospitable ham in Venezuela, Bill and several other Americans have been able to get back to a microphone now and then.

"Even though I can't have my own station," he said, "I've had some good phone patches back home and a few ragchews, too. Frank Bencini, YV1EM, has made a lot of friends among way-faring hams, including me!"

Ex-I1ANF, Frank is a tele-communications supervisor of Creole Petroleum Corporation on Lake Maracaibo in Western Venezuela. A subsidiary of Standard Oil of New Jersey, the company employs geologist Allen and many other Americans. A c.w. man with a yen for

Frank, YV1EM, at the operating position. Formerly I1ANF, Frank is telecommunications manager of Creole Petroleum Corp.

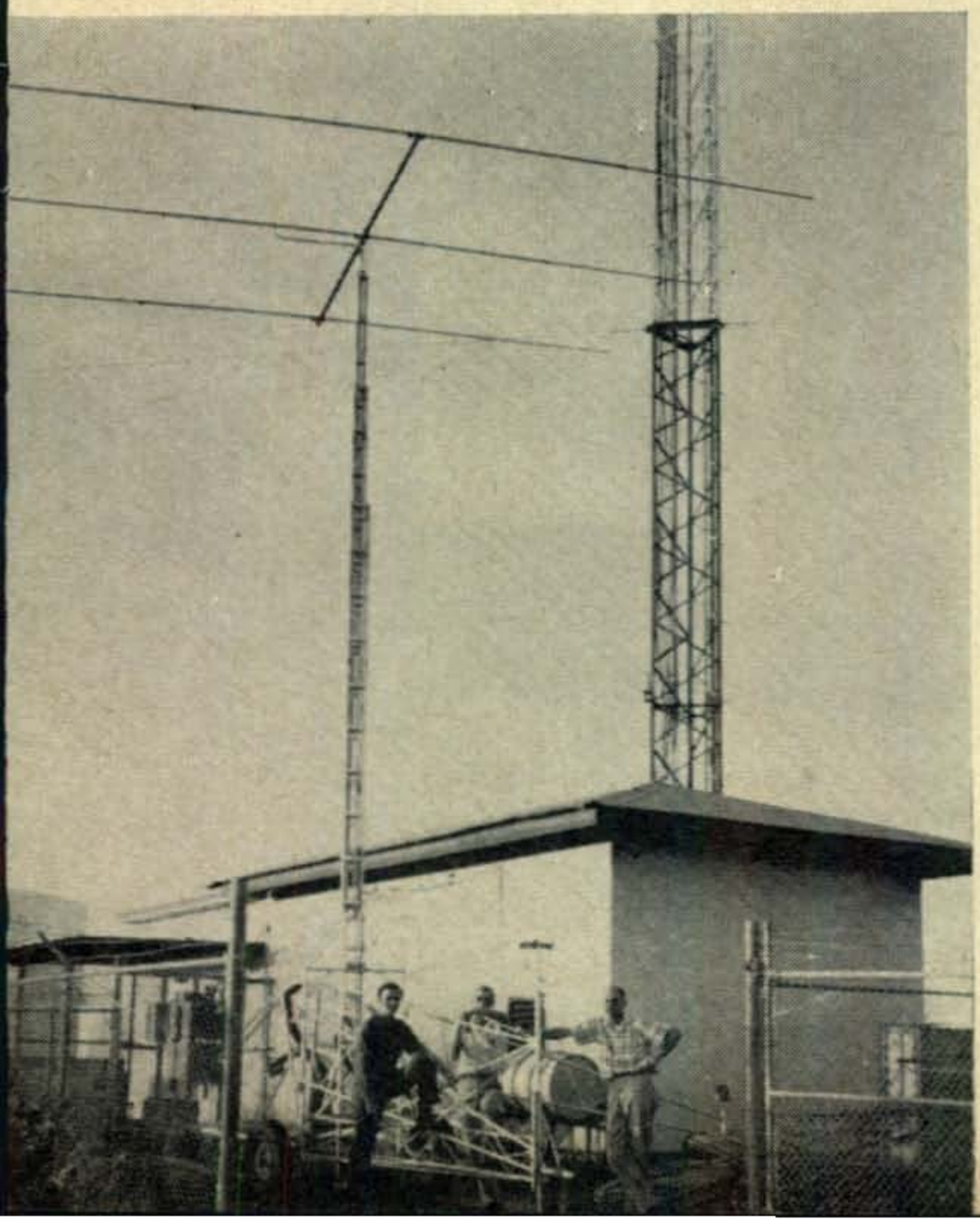
r.t.t.y., Frank's rig is a homebrew transmitter using a pair of 6146's and a Hammerlund SP-600. He and the Creole boys whipped up a three-element beam one afternoon, and signal reports have been excellent on 15 meters. The shack itself is located in a special communications building guarded with barbed wire, so the fellows don't have to worry about TVI and angry neighbors.

"When Frank is at his station, he's hardly ever alone," K9AKF observed. "Mac, W5SAY of Baton Rouge, Louisiana; Jim, K5CNZ, of Bishop, Texas, and George, K3JRM, from Pittsburgh, Pennsylvania, are just as happy as I am to watch a ham in action and maybe get a turn at the mike."

Another Venezuelan amateur due for a vote of praise is YV1CV, Guillermo Macias, of Lagunillas, who is always glad to help out with a phone patch to the States.

"Being an overseas ham isn't like it used to be," says Bill Allen; "that is, if you work in Venezuela and get to know YV1EM." ■

*401 East Wood Street, Hillsboro, Illinois



YV1EM, K5CNZ, and K9AKF (left to right) stand outside the communications building of Creole Petroleum Corp. at La Salina, Venezuela. The 15 meter beam is home-brew, and the big tower belongs to Creole.

V.H.F. Beams From TV Antennas

JACK MYERS*, W5KKB

An abundance of Channel 2 and Channel 6 TV antennas and the need for simple v.h.f. beams led to the development of these simple 2 and 6 meter beams.

BUILDING a v.h.f. beam from scratch can be pretty difficult and expensive. It is often much easier to modify a TV antenna to operate on one of the v.h.f. bands. This article describes two such antennas: a 10 element 2 meter beam made from a channel 6 antenna and a 3 element 6 meter beam made from a channel 2 antenna. The channel of the TV antenna is not especially critical, since the antenna will be cut or extended to the correct v.h.f. band anyway. It just happens that around Baton Rouge there is a surplus of TV antennas for channels 2 and 6.

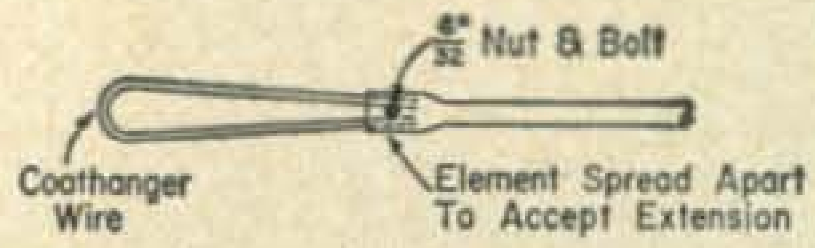


Fig. 2—Details of the "rugbeater" extensions for the 6 meter beam. Coathanger wire is used for the extensions while the element tip is spread to accept the extension.

taining the center and outer elements of the TV antenna and removing the other two.

After these two elements have been removed, the elements remaining must be lengthened as shown in fig. 1. The elements are extended by

Element	R	DE	D1	D2	D3	D4	D5	D6	D7	D8
½ Length	20¾	19¾	18¾	18½	18⅜	18¼	18⅛	18	17⅞	17¾

Table I—Element lengths for the 2 meter beams. Dimensions shown represent ½ actual lengths of elements.

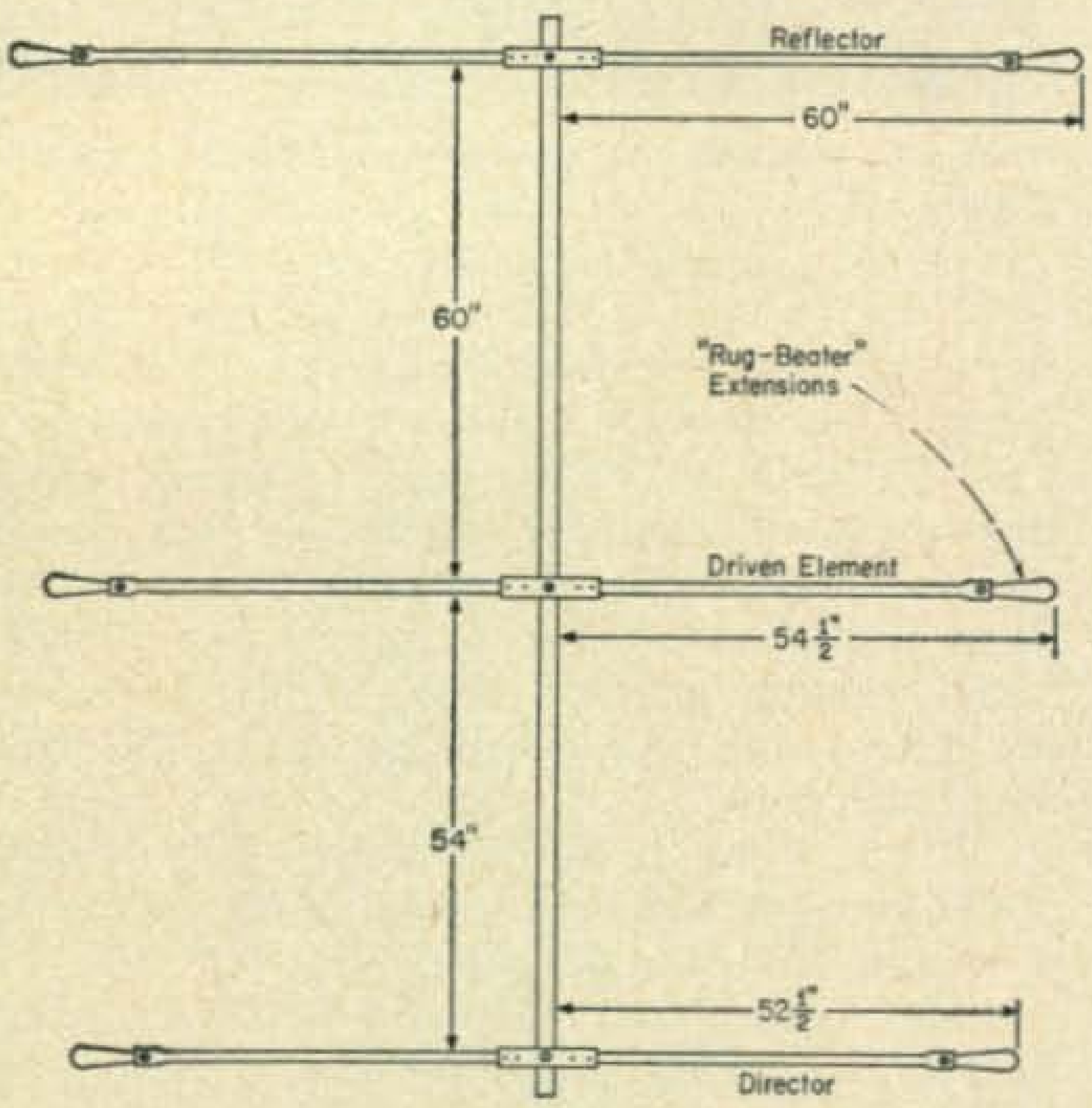


Fig. 1—Layout and dimensions of the six meter beam constructed from a 5 element channel 2 yagi. Elements are lengthened by the addition of "rugbeater" tips as shown in figure 2.

The 6 Meter Beam

A five element channel 2 antenna was used as the base for the 6 meter beam. TV antennas use extremely close spacing, since most people judge a TV antenna by the number of elements rather than the gain. The best gain on 6 meters with the least modification is achieved by re-

the use of coathanger "rug beaters." The details of this are shown in fig. 2. This method has the advantages of light weight and low wind resistance.

The resulting 6 meter beam has a theoretical gain of about 8 db and, due to all aluminum construction, weighs only 3 lbs.

The 2 Meter Beam

The 2 meter beam was built from a 10 element channel 6 antenna. No elements are removed and spacings remain the same. The elements should be cut down to the lengths given in Table I. Note that the lengths given are for half of each element, measured from the end of the element to the center of the boom. The resulting beam seems to be highly directional. The TV antenna used was of galvanized thin walled steel which makes it rather heavy in comparison to the 6 meter beam. It weighs 12 lbs.

The Gamma Matches

Basically the same type of gamma match was used on both beams. An insulator supplied with the TV antenna is used to support the gamma arm and condenser. The gamma arm lengths are 16½ for the 6 meter and 11 inches for the 2 meter beams. The outer end of the arm is fastened to the driven element with an aluminum strap which can be slid up or down the arm for adjustment (fig. 3).

For initial tune-up, mount the beam on a ladder or mast where it is accessible and con-

[*Continued on page 102*]

* 443 Centenary Dr., Baton Rouge 8, La.

CRANIUM QUERIES

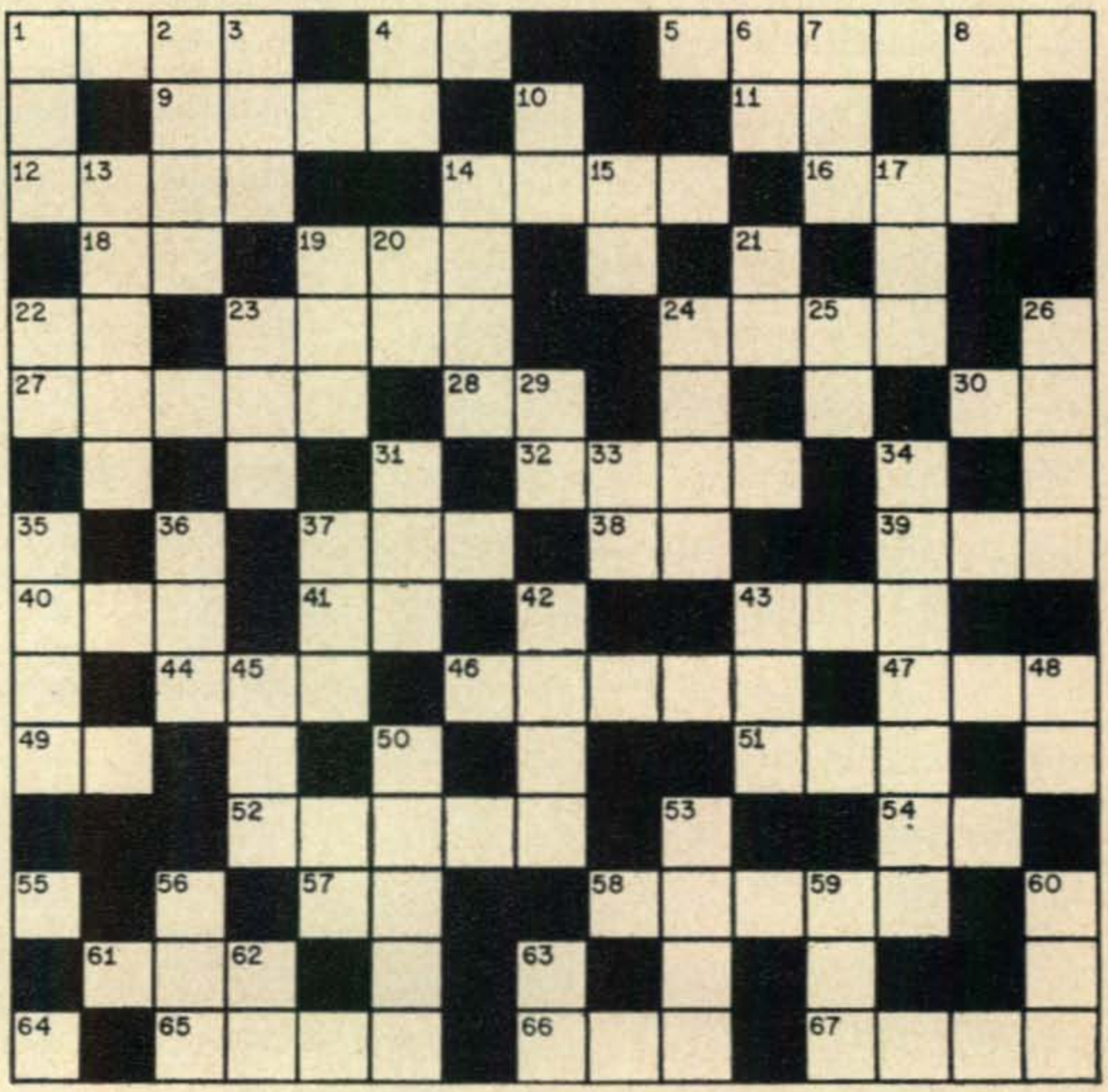
QRL? Got a pencil handy? Try your skill at working this fun-filled crossword puzzle. All the words and abbreviations are related to amateur radio. When you think you've penciled in all the right answers, the correct answers can be found elsewhere in this issue.

ACROSS

1. Phenomena which improves DX.
4. Opposite of to.
5. Station on wheels.
9. Type of cable.
11. More than a kilocycle.
12. Blended signals.
14. May be standing or moving.
16. Continuous waves that aren't.
18. No need for clue. Guess!
19. Standby signal.
22. Grid e.m.f.
23. Aids control rotation.
24. Something operated.
27. Necessary for telephone pickups.
28. Wide-casting.
30. Hear.
32. Type of circuit.
37. Electro-mechanical "modulator."
38. Parting signal.
39. May bear a postage stamp.
40. Give it to your neighbor and he may give you static in return.
41. Below radio frequency.
43. Good question.
44. Supports a mast.
46. County in Idaho. Also an electrical quantity.
47. Oscillator well known for its stable output.
49. Static plate potential having a deficiency of electrons.
51. Former young lady.
52. Last transmit stage.
54. Your favorite ham journal.
55. Impedance.
57. Vacuum tube plate resistance.
58. County in south-central Mississippi bordering Scott and Jasper Counties.
61. Type of transistor.
64. The axis of a piezoelectric crystal lying in a plane at right angles to the Z-axis.
65. Unit of electrical quantity.
66. Carries B+.
67. Device often used with meter.

DOWN

1. Singular sideband.
2. Rating applied to electronic parts used in commercial and amateur service.
3. Variable resistance.
4. Not nearby.
6. XYL's husband.
7. QRN to regular broadcast.
8. The FCC enforces it.
10. Return to transmitting.
13. County in southeastern Illinois.
14. Southwestern Texas county bordering Dimmit and Zapata.
15. Common electrical unit of measurement based on a reference level which is included.
17. Made a transmission.
19. Clue unnecessary!
20. Negative.
21. Not certain.
22. Static plate e.m.f.
23. Caroline Islands prefix.
24. Swinging.
25. Most common crystal cut used for transmitters operating between 500 kc and 10 mc.
26. An amateur radio association.
29. Used in connection with transformers, coils, and variable resistors.
31. Maximum usable frequency.
33. Class of amplification.
34. An a.v.c. circuit.
35. Line matching device.
36. Amateur radio gear.
37. Part of an array.
42. Component of a tuned circuit.
43. When will you call me again?
45. TV type.
48. Aged young lady.
50. Circuit receiving signal.
53. More than one unit of current.
56. Second letter of this Q-signal is 14th in alphabet.
59. Connection.
60. Comment.
62. Amplifier which primarily handles E-I.
63. Band open to general public.



Observations From Abroad

BY LT. COL. HARRY LONGERICH*, W2GQY/4, ex-DL4RX

DL4RX has recently pulled the big switch after three very pleasant years of operation. During these years I've experienced the opportunity of learning a few things that kind-of-make one "sit up" and take notice. Just as a brief background, most of my operations were mainly on 20 and 80 meters using s.s.b. Maximum power used was 300 watts on 20 and 35 watts p.e.p. on 80 meters. The antennas used were a ground plane and dipole for 20 and 80 respectively. Not much in the way of a power house but it certainly provided me with countless hours of enjoyment and I made many new friends. In addition, I've been able to observe European operating techniques, customs, their problems (amateur), and their reactions in general, to other hams. My own listening and QSO's, are however the primary observations set forth herein.

We as American amateurs are indeed fortunate. We have more frequencies allocated for our hobby than any other country in the world. Our authorized power is the highest anywhere. Obtaining a ham ticket in the U.S. is a snap in comparison to some other countries. The Federal Communications Commission is really liberal in its views and actions concerning our operations. Not so in other countries. They're watched closely and legal actions may be instituted for very minor infractions of their laws. We should indeed be thankful that we as American amateurs can enjoy our hobby to the extent that we do. That's on the "plus" side of the ledger. How about the other side? The mental impressions that other amateurs may possibly form when tuning across 20 meters. The following are some general and frequent examples:

"Break; Break; Break; say OM can you give me a report so I can chalk you up as another confirmed DX contact? I'll send you my QSL without fail." It apparently didn't make a bit of difference to this W station that the choice DX station was already engaged in a QSO with another station. Nor did the W bother to determine whether the DX station may possibly be engaged in a QSO relating to a personal affair of one kind or another. Many of the amateurs here in Europe travel to or are stationed in remote parts of the globe and their only "Live" contact with the outside world is via ham radio. Needless to say this particular W did not receive his report, let alone a QSL card.

I wonder how many of us in America realize the tremendous technical handicaps which confront our fellow hams across the seas? Commercial gear is difficult and expensive to obtain. How many QSO's have transpired wherein the foreign station mentions that his station is home brewed and took a "bit of doing" to complete. Yet some of us hardly inquire into his rig, circuitry or give him a pat. Yet I've listened to many W/Ks expound on the virtues (of which there are many) of their commercial gear, and for example, when questioned about their v.f.o. operating frequency, they're stumped. It's a rather unfortunate situation when some operators are unable to answer such simple queries especially when the manufacturer furnishes a comprehensive instruction book. By the same token it comes as no surprise after listening to some of the poor quality signals that appear on 20 meters.

Another incident that has me puzzled is the case of a DX station (his power limited by law in this particular case was 150 watts) gave the W a report of 20 over 9 and the W gave this DX station 10 over 9. The W very proudly announced that he was running a full gallon, and when requested by the DX station to reduce his power just to see what would happen to his signal, the W exclaimed: "Aw no, I have to blast my way through the local QRM here." I feel certain that had this W station thought a bit, he never would have uttered such nonsense over the air.

The "30 second QSO" (excluding contests) is another item which stands out like a sore thumb. I almost believe it can be classified as being rude. Amateurs by and large are among the friendliest people found anywhere in the world. One of the most enjoyable aspects of ham radio is in making new acquaintances over the air. There is a virtual treasure house of enjoyment available in every QSO, new or old, if we but make the effort to obtain it. Any number of hams can offer a multitude of reasons as to why he can't keep a QSO going but show me the ham who says "let's try to keep this QSO going" and I'll show you a ham who enjoys his hobby to the N^{th} degree. I believe you'll agree that it takes a great deal of skill, patience and "know-how" to keep a QSO going on 20 for any length of time. It's a mighty good feeling when you succeed in combating QRM, QRN and have a good QSO to boot. All of our QSO's cannot be 100 per cent successful but that's no reason for the "hello and goodbye type which appear so frequently on our bands.

A particularly disconcerting and inconsiderate action is the practice of testing a rig on the air. Granted, in certain instances there is no other way out, but in most cases the use of a dummy load would have accomplished the same thing. (I'm surprised some enterprising manufacture hasn't considered a dummy load as an integral part of the transmitter.) *CQ* has published many articles on inexpensive dummy loads that will

[*continued on page 102*]

*Hq U.S. Army Security Agency, Arlington Hall Station, Arlington 12, Va.

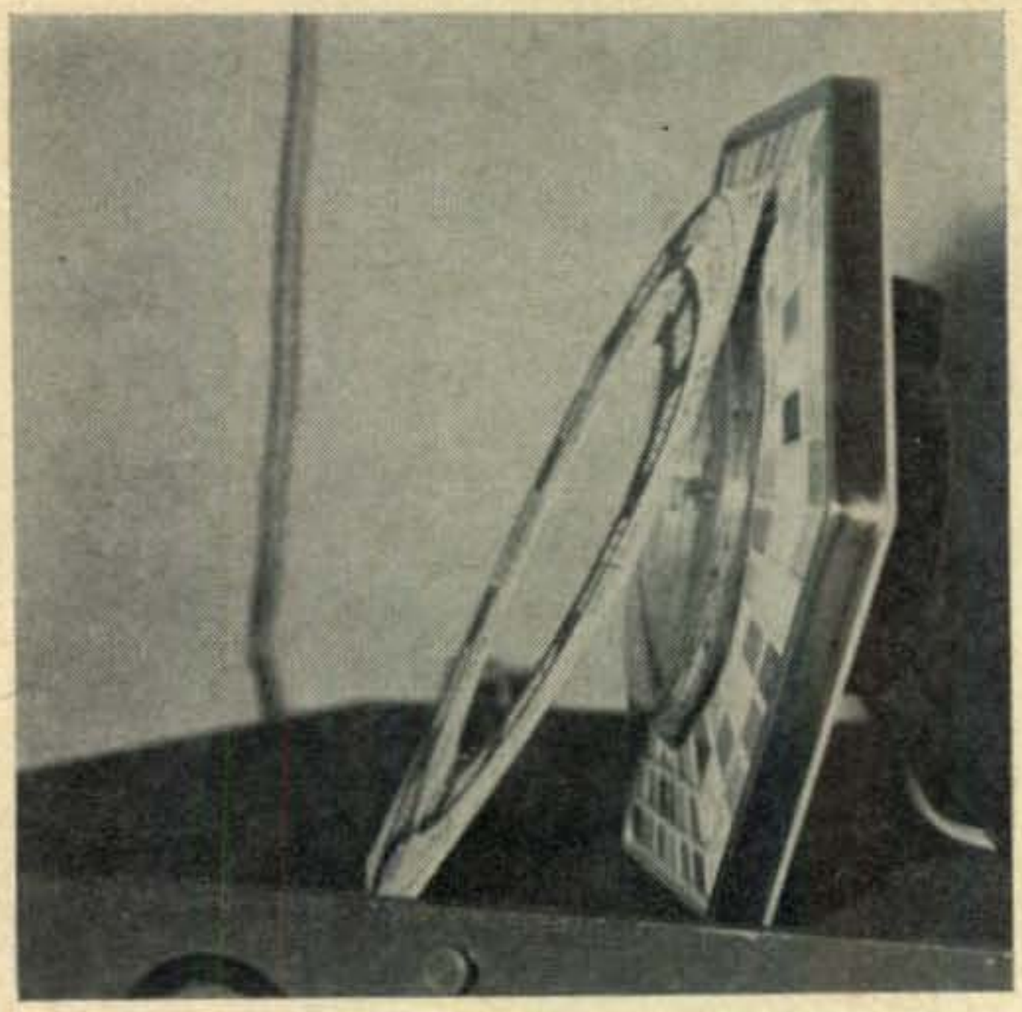


Fig. 1—G. E. model 2118 electric clock showing the wide decorative flange and removable bracket for table use.

A Local—GMT "Two-Timer"

BY DR. WALTER DROZDIAK*, W6LDO

Here is a useful timepiece for anyone who has difficulty keeping track of GMT in relation to local time.

You have to pick up your wife downtown at 3:30 P.M. and you also want to keep that DX sked at 2330 GMT. Can you do both? That depends on where you live and whether or not you can "read" GMT. Though we conduct our daily lives on local time, radio communications are best timed by Greenwich Mean Time, so a convenient conversion system is sorely needed.

This easily made "Two-Timer" clock will simultaneously show local and GMT times. It eliminates local four digit time and related time tables and simplifies use of GMT in logging ham communications.

A clock onlay scale with GMT numerals is hand drawn in black ink on thick white paper cut to suitable size and fastened around an electric clock as shown in fig. 1. Any available clock will do of course, but the clock suggested, General Electric model 2118 has a wide hexagonal flange to which the GMT onlay scale may easily be attached with tape. Further, the face is round and the numerals are so slanted as to permit GMT numerals to be lined up correspondingly and this makes for easier reading. Also, a removable bracket permits its use as either a table or wall model.

Figure 2 shows the GMT scale drawn for Pacific Standard Time and fig. 3 shows GMT for Pacific Daylight Saving Time. Note that the dark and white scales always divide at 12 o'clock and at 6 o'clock for all time zones, but the GMT times will be oriented differently for various time zones, as shown in Table I. Reference to handbooks will show tables for converting GMT to other time zones of the world.

The clock is set to run on local time, and as the clock hour hand points to the hour of local time, it also points to the corresponding hour in GMT. The minute readings are the same in local and GMT. When it is daytime locally, read GMT in the white (day) portion of the scale. When it is nighttime locally, read GMT in the dark (night) portion of the scale.

Let us refer to the clock as set up for Pacific Standard Time (fig. 2) for several examples. Eight A.M. PST (local time) would be read in the white or daytime scale for GMT, making it 1600 GMT. Conversely, when a schedule is timed at 1600 GMT, the clock shows this time to be in the white scale or daytime hours local time and so it would be 8:00 A.M. The afternoon GMT times, say at 2:15 P.M. local time, would be read in the day-

*1840 Hurst Ave., San Jose 25, California.

Table I—Time Conversion and Scale Layout Plan

Local Time A.M. & P.M.	GMT to PST		GMT to PDST		GMT to MST		GMT to MDST		GMT to CST		GMT to CDST		GMT to EST		GMT to EDST	
	Black	*White*	*Black*	*White*	*Black*	*White*	*Black*	*White*	*Black*	*White*	*Black*	*White*	*Black*	*White*	*Black*	*White*
1:00	0900	2100	0800	2000	0800	2000	0700	1900	0700	1900	0600	1800	0600	1800	0500	1700
2:00	1000	2200	0900	2100	0900	2100	0800	2000	0800	2000	0700	1900	0700	1900	0600	1800
3:00	1100	2300	1000	2200	1000	2200	0900	2100	0900	2100	0800	2000	0800	2000	0700	1900
4:00	1200	0000	1100	2300	1100	2300	1000	2200	1000	2200	0900	2100	0900	2100	0800	2000
5:00	1300	0100	1200	0000	1200	0000	1100	2300	1100	2300	1000	2200	1000	2200	0900	2100
6:00	0200	1400	0100	1300	0100	1300	0000	1200	0000	1200	2300	1100	2300	1100	2200	1000
7:00	0300	1500	0200	1400	0200	1400	0100	1300	0100	1300	0000	1200	0000	1200	2300	1100
8:00	0400	1600	0300	1500	0300	1500	0200	1400	0200	1400	0100	1300	0100	1300	0000	1200
9:00	0500	1700	0400	1600	0400	1600	0300	1500	0300	1500	0200	1400	0200	1400	0100	1300
10:00	0600	1800	0500	1700	0500	1700	0400	1600	0400	1600	0300	1500	0300	1500	0200	1400
11:00	0700	1900	0600	1800	0600	1800	0500	1700	0500	1700	0400	1600	0400	1600	0300	1500
12:00	0800	2000	0700	1900	0700	1900	0600	1800	0600	1800	0500	1700	0500	1700	0400	1600

Local changes from day to night are arbitrarily set at 6 A.M. and 6 P.M. with daytime represented by white. When 0000 GMT is passed the date must be advanced one day even though it has not actually been reached locally.

time scale again and is read as 2215 GMT. Late afternoon, say at 5:17 P.M., it still being daytime, the white scale would be read making it 0117 GMT of the following day.

Correct Date

Passing through 0000 GMT represents the start of the new date and though it may be 4 P.M. PST Monday, the same instant would be 0000 GMT Tuesday (tomorrow). The correct date is an integral part of keeping time in GMT, and this date may or may not be the same date as in the local situation. At 0000 GMT, it is midnight in Greenwich, England and is the instant the new GMT day begins. When logging, this new date must be recorded, even though this new date has not yet arrived at the local scene.

Light and Dark Scales

Later, at 6:00 P.M. PST, the nighttime hours are arbitrarily considered to begin and so GMT is read in the dark or nighttime portion of the scale as 0200 GMT. At 10:45 P.M., it being nighttime, GMT is read in the dark portion as 0645 GMT. Later, in the early morning hours at, say 4:00 A.M., it still being nighttime locally, the GMT is read on the dark portion of the scale as 1200 GMT. Then, when the rooster crows at 6:00 A.M., daytime begins locally and GMT is read on the white portion of the scale as 1400 GMT.

Say a DX station is listed as operating on a given frequency only between 1900 and 2100 GMT. The clock shows that this is in the white portion of the scale and therefore it will be daytime locally at 11:00 A.M. to 1:00 P.M. After a little practice, local-GMT conversion merges into a quick glance at the clock.

The dark and white areas are staggered rather than making complete dark and white circles for night and day because during the course of time, changing from one circle to the other at 12 o'clock is less confusing than at 6 o'clock.

When local time changes to daylight saving time, the GMT scale will have to be changed. A new clock onlay scale must be made, with the GMT scale rotated clockwise one hour as illustrated in fig. 3 and listed in Table I. The scales should be properly labelled for standard and daylight saving times. ■

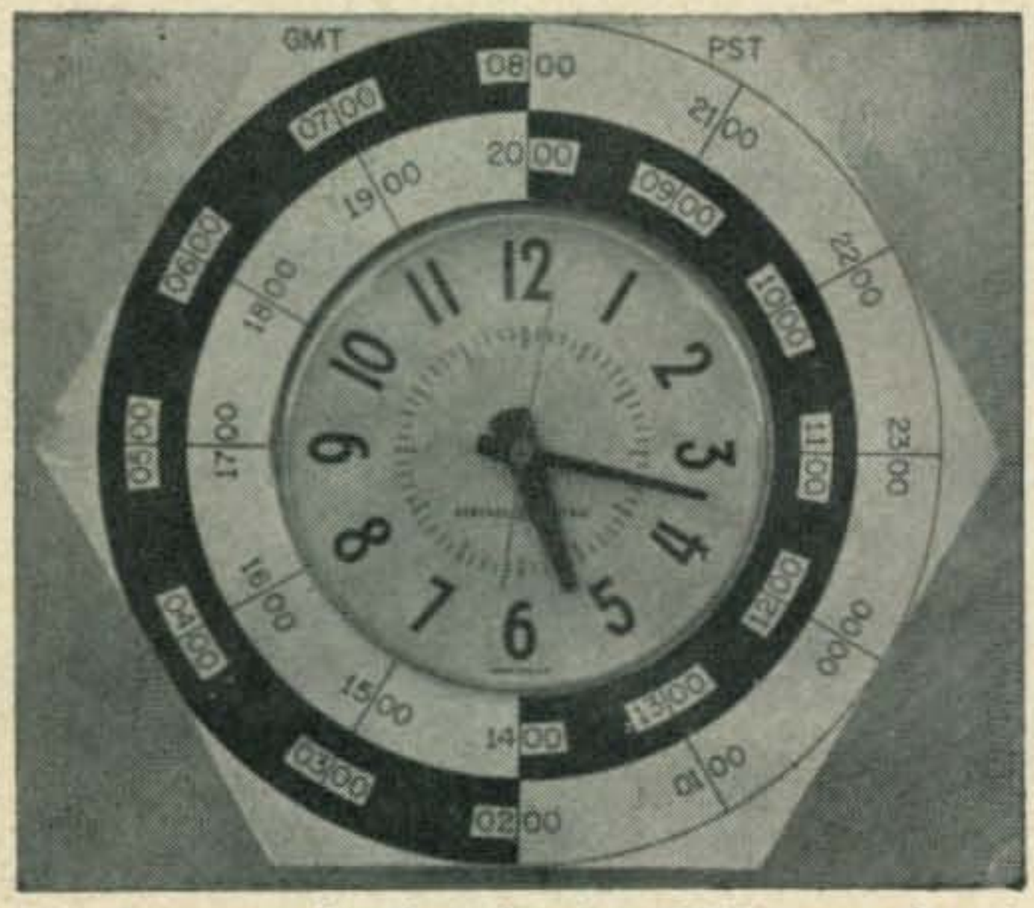


Fig. 2—Mounted onlay showing GMT numerals oriented for Pacific Standard Time.

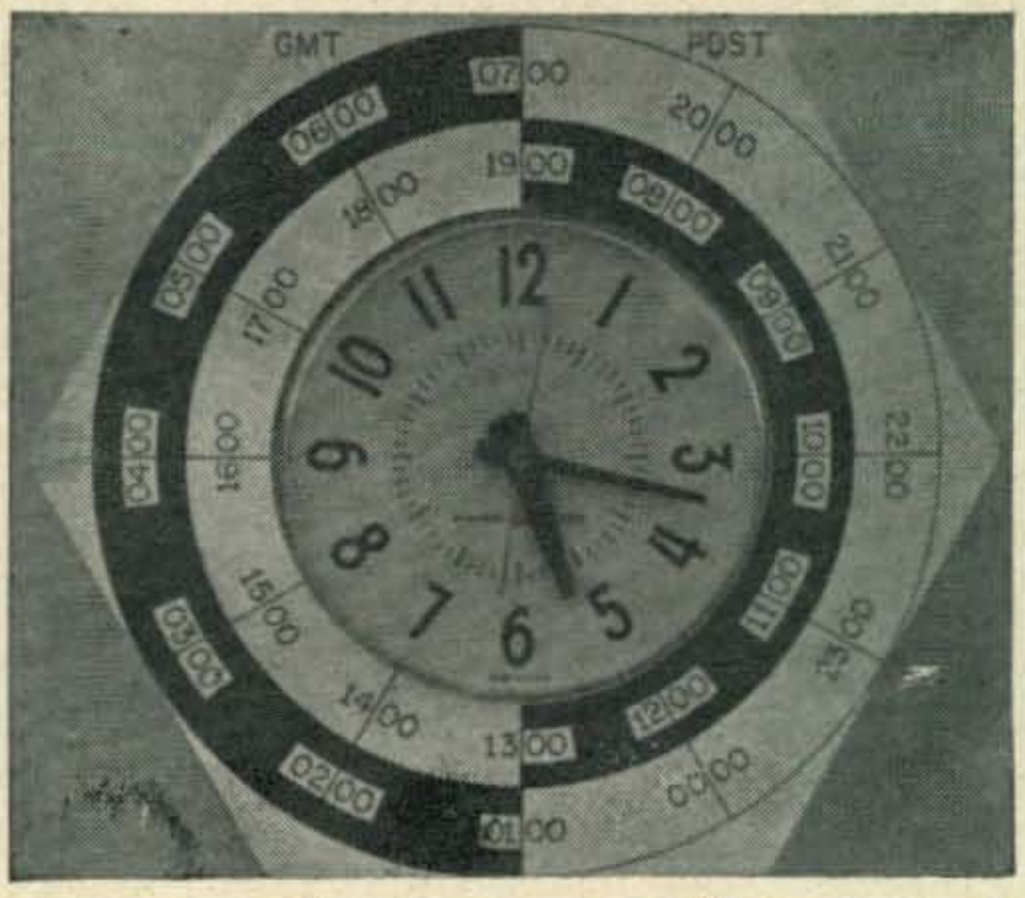


Fig. 3—Mounted onlay showing GMT numerals oriented for Pacific Daylight Saving Time.

A 20 Meter Mini-Dipole

BY GEORGE POSKLENSKY*, K2EEE

The use of loading coils enables the overall length of a 20 meter dipole to be reduced to approximately 16 feet. The reduced size and weight permits the use of a TV type rotator.

I WAS not at home when that 4 element, 6 meter beam, which I had ordered, arrived. But the lady of the house was. "Please bring it in," she said to the delivery man, and was she overwhelmed. The thin, long, corrugated box which contained the boom and elements began a long trek through the door which lasted about three minutes according to our children. When I finally arrived home, I found the carton, because of its size, under the bed and extending all the way into the living room. I was a little taken aback, because up to now I had only been familiar with antennas of the TV variety. I am now certain that I must have been of sound mind when I ordered the 4 element beam with a 12 foot boom, but picturing a 12 foot boom mentally and having one in your living room is a horse of another color.

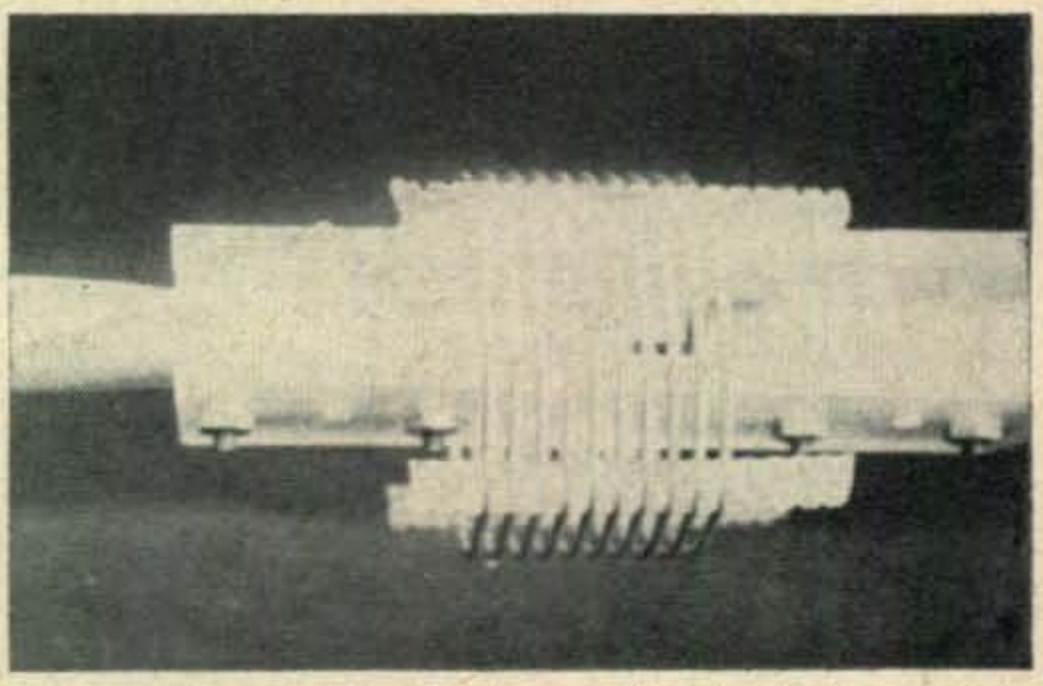
Of course, this is a long winded way of saying that the 6 meter beam was gigantic and when someone suggested that I get a beam for 10 meters, I thought him to be mentally questionable, but I did get a 3 element full size beam with 8 foot elements dangling from the boom.

Then came that urge for working twenty meters with a rotatable, antenna, and I shouted out loud, "an 8 foot element is going to be the limit!" and so it was for the 20 meter antenna.

I began investigating the construction of a 20 meter mini-dipole, and so I scanned through antenna books and manuals. To my surprise little if any information was available on the making of mini-dipoles on beams. I therefore considered applying known information about short verticals to a horizontal element.

The problem was where to place the loading coils, center loaded, or middle element loaded. Loading coils are required to make up for the stunted physical length of the elements.

Placing the loading coils farther along the elements seems to increase the radiation resistance if a high horizontal antenna can be compared with a vertical[1]. The one-half wave horizontal antenna having twice the radiation resistance of a ¼ wave vertical[2] indicated the placement of the loading coils away from the center of the dipole to make for easier coupling between antenna and transmission line. When I finally placed the loading coils at the approximate center of each element the radiation resistance turned out to be 70 ohms, a good match for 72 ohm coax, and not too bad a match for 50 ohm coax. I did not use anything to match the unbalanced coax to a balanced dipole and experienced no reduction in results. The s.w.r. turned out to be very close to 1:1 for 72 ohm coax at 14.3 mc with little change in s.w.r. 50 kc on either side.



A view of one of the loading coils. The three quarter inch elements are flattened and sandwiched by the two polystyrene plates. The coil, made from B & W stock, is connected to the inner mounting screws.

Construction

Elements are made from ¾" aluminum tubing with proper wall thickness to allow for a ⅝" aluminum tube to slide inside it. The aluminum tubing is readily available at most hardware stores. About two feet of ⅝" aluminum tube is used for adjustable elements on either side of the main elements to tune the antenna to a selected frequency.

The ¾" tubing is cut to size as shown in fig. 1 to allow for placement of loading coils. The loading coils were made from B&W 3905-1. My calculations indicated that I needed a 7.5 microhenry coil in order to make an 8' element resonant on 20 meters. Eleven turns gave me the proper inductance. You can make your

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[1]Whip Antennas, "A.R.R.L. Antenna Handbook," 7th ed. Pages 283-284.

[2]Dipoles, "Radiotron Designers Handbook" 4th Ed. Page 904.

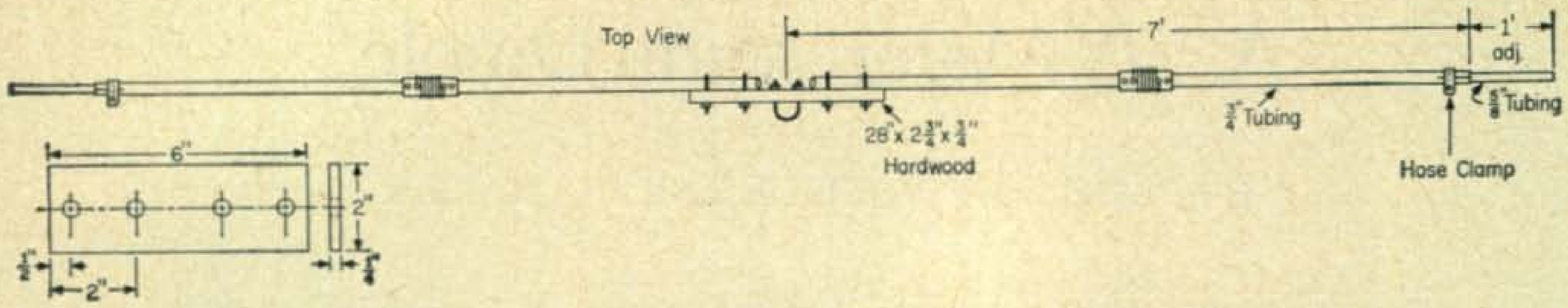


Fig. 1. Construction details for a 20 meter mini-dipole. The loading coils are placed in the center of each element. The hardwood mounting center should be properly weatherproofed.

own coil using #12 or #14 wire. Wind eleven turns on a 2½" diameter form, 6 turns per inch. Mount the ¼" polystyrene cut to size as per diagram. You will need two sets to sandwich the ¾" elements.

I used brass screws and nuts to mount the poly plates and also anchor the coils. Any hardware which will resist corrosion will do. Flatten the ¾" aluminum at the point where the poly is to be mounted. This will make for more bearing surface against the polystyrene. I next tied the coils to elements using the same brass screws which fastened the poly to the element. You may use "Q-Dope" to anchor the coils to the polystyrene but this is not absolutely necessary.

The elements may now be mounted on a hard piece of wood such as oak or mahogany, about 28" long and 2¾" wide. "U" bolts are employed, as indicated in fig. 1 to hold the elements and masts. The 1" "U" bolts are readily available in hardware and TV supply stores.

An SO-239 coax Amphenol connector is also mounted on the board to allow for rapid connect and disconnect of the transmission line.

Three quarter inch hose clamps are used to hold adjustable elements in place. Place a 1" long slit on each ¾" element to facilitate tightening of the ⅝" adjustable tube.

Now adjust elements to dimensions shown in the diagram. The overall length will depend on surrounding objects and how closely you duplicated the coils.

You may use an s.w.r. bridge to give the lowest reading for frequency used. My antenna was adjusted to give me practically a 1:1 s.w.r. using 72 ohm coax. ■

The First "KC4"

BY DICK BARRETT*, W6CFK

This is the story of the first transmitter flown over the South Pole, and of Admiral Richard E. Byrd who pioneered the area.

THE first radio transmitter ever flown over the South Pole has been added to a collection of historic equipment in the Smithsonian Institute in Washington, D.C.

The story of the transmitter begins in the late 1920's when Ralph M. Heintz, W6RH, then a San Franciscan, was summoned to New York by Commander (later Admiral) Richard E. Byrd, who was planning his first expedition to the antarctic. Heintz, of Heintz & Kaufman, was invited to present a proposal for constructing two transmitters for the expedition—one for use on the ice and for Byrd's planes "The Stars and Stripes" and "The Floyd Bennett."

When Heintz described the equipment he proposed to build, Byrd nodded approvingly.

"We want to thank you, Mr. Heintz, for giving us this equipment," he said.

"Wait a minute," Heintz replied. "We aren't giving it to you. My company is a small one and we can't afford to do that."

Byrd told him that everything else was being donated, including the dog biscuits, because of the advertising value. Heintz was adamant.

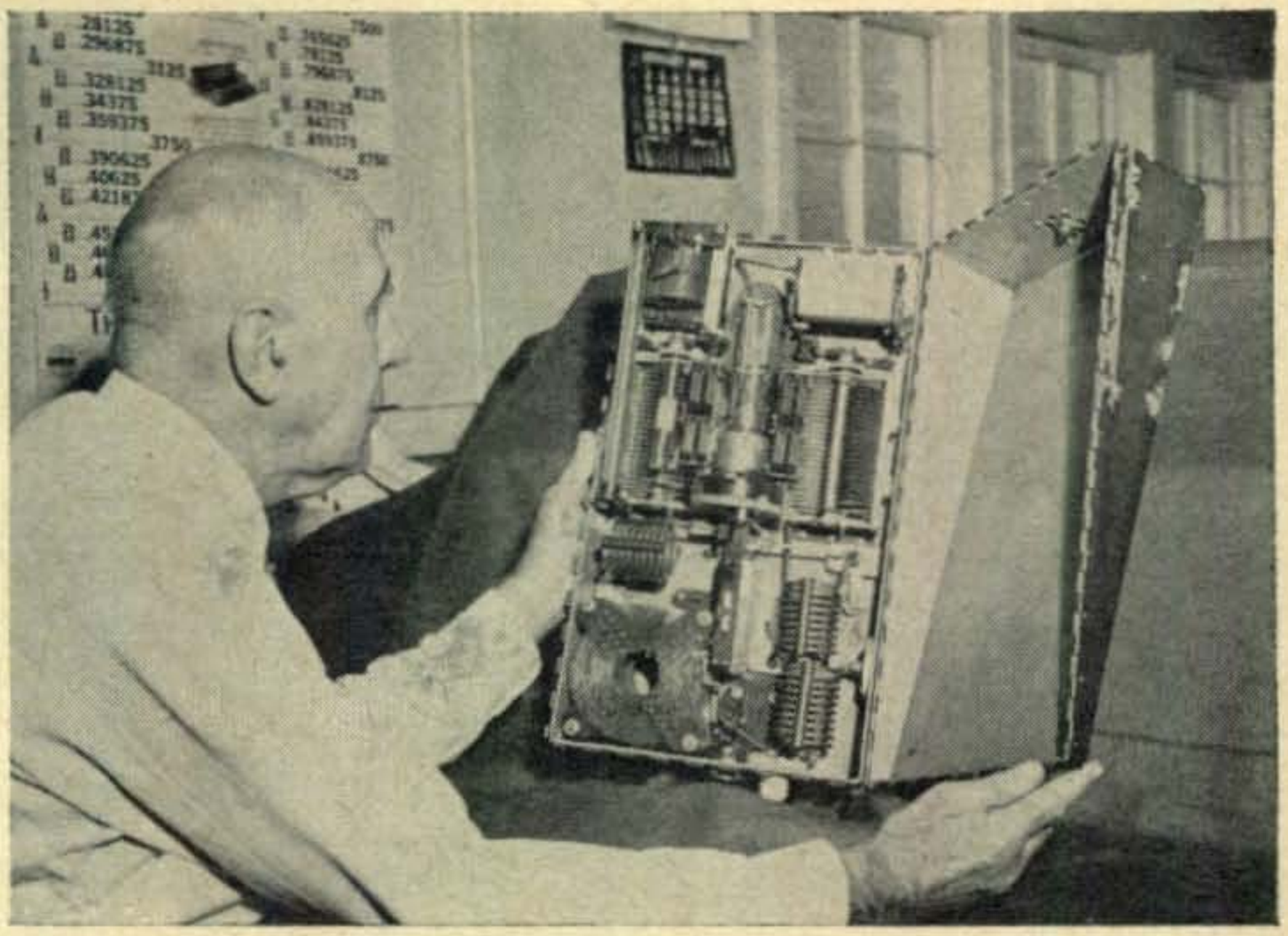
"I'm sorry, Mr. Heintz," Byrd said finally, "but we'll be unable to use your equipment."

Heintz said he was sorry, too, because he had equipped a number of other expeditions and felt it would be an honor to add Byrd's name to the roll.

Heintz went back to California and was barely off the train when he received a telegram from Byrd asking him to return to New York. He did so and Byrd said he would buy Heintz radio gear after all. The astonished Heintz asked Byrd's two operators, Howard Mason and Malcolm Hanson, what had caused the change of heart.

"We said we wouldn't go unless we had your equipment," they told him.

* 1520 Santa Maria Ave., San Jose 25, California



Ralph M. Heintz W6RH, displays a transmitter he built for the Byrd Antarctic Expedition. He recently donated it to the Smithsonian Institute where it joins a collection of other expedition radio gear built by Heintz.

Heintz built the two transmitters and power supplies. The two rigs were tuned-grid, tuned-plate transmitters using 50 watt tubes and weighing only 25 pounds. To power them Heintz built 360 cycle two-phase alternators to be driven off the airplane engine. This was the first polyphase power supply used in an aircraft radio, a system which is now standard in the industry.

In 1929 Byrd established Little America at the edge of the Bay of Whales and the world was kept advised of his progress by the Heintz equipment. Heintz's wife, Sophie, an amateur radio operator, got up every morning at 4 o'clock to handle much of the traffic.

On Nov. 28, 1929, Byrd, Pilot Bernt Balchen, Harold June, the radio operator, and A. C. McKinley, photographer, made the first flight over the South Pole in the "Floyd Bennett" and the little transmitter flashed the work back to base camp from where it was relayed to the world.

When Byrd completed the 1929 expedition he left his airplane with the radio equipment on the ice. When Byrd returned to the antarctic five years later the airplane was chopped out from under several feet of ice. The transmitter was used again, being found unharmed by the minus 80 degree cold—a cold so dry there was no moisture to cause deterioration.

Byrd brought the "Stars and Stripes" home after the second expedition and sold it to Alton Walker of Pebble Beach, Calif., who had it reconditioned and used it barnstorming for three years. Last year he got in touch with Heintz and asked him if he would like to buy back the transmitter. The latter jumped at the chance. Not long ago he sent it to the Smithsonian, which already had the transmitters he built for Sir Charles Kingsford-Smith's "Southern Cross," which made the pioneer trans-Pacific flight from California to Australia; for Sir Hubert Wilkins's arctic trip of 1928; Lincoln Ellsworth's antarctic expedition of the same year and the "Trader Horn" movie company's trek to Africa.

"This completes the line-up of my expedition transmitters in the Smithsonian," Heintz said.

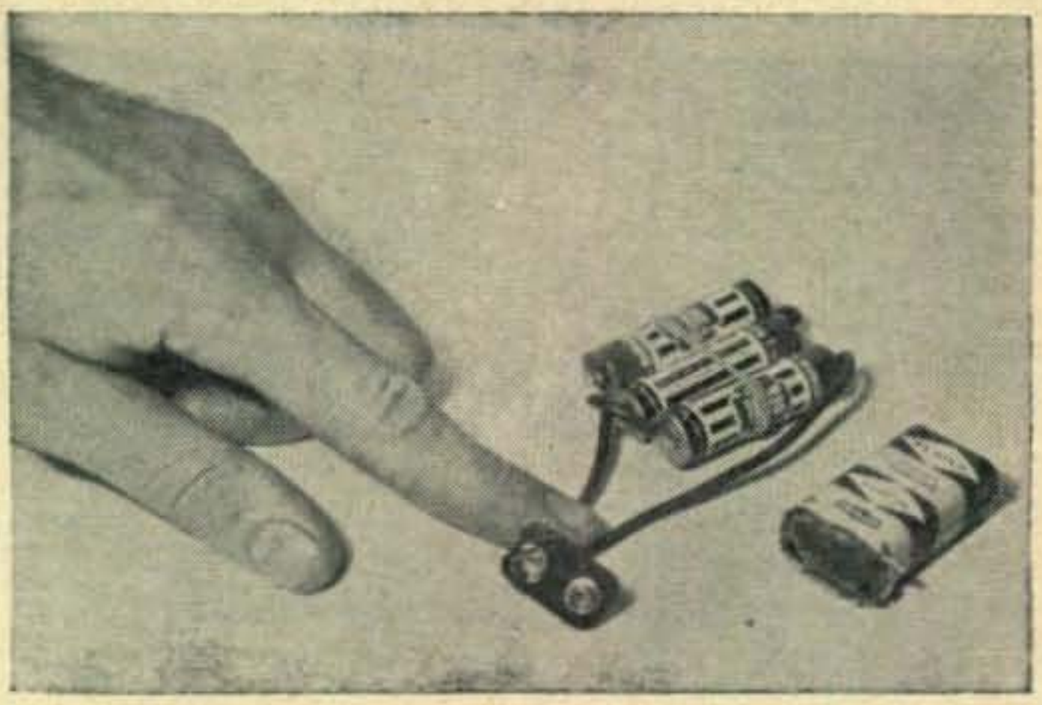
Heintz in recent years has been developing a smog-free auto engine in his private laboratory. His bemusement with smog may date back to another of his "distinctions".

It will be recalled that Byrd established a lonely outpost on the ice and spent several months in isolation in order to record his psychological reaction. He took along a Heintz transmitter and gasoline generator. When, after some time, his signals became erratic, it was realized that he must be ill, but would not summon help in the hazards of the antarctic night.

A rescue party found him in poor condition from the carbon monoxide that was spewed out by the power equipment every time he went on the air.

"I have the doubtful distinction," Heintz says, "of having built the power supply that almost killed Admiral Byrd." ■

Ham Hints



Save Those Battery Connectors

Remove and save those handy connectors atop 9-volt transistor radio batteries. They come in handy for all sorts of electronic gadgets you might decide to build in the future.

Biography of a Modified NC-183

BY DON BEATY*, W6WNR

When W6WNR's receiver failed to measure up to the latest units he modified it rather than break his bank account purchasing a new unit. Described below are his experiences and excellent results in updating his NC-183.

WAY back in the dark ages of receiver design, 1950 that is, my new NC-183 was a pretty hot receiver. Not the best, mind you, but good enough so that it was no trouble at all to convince myself that what it wouldn't do couldn't really be so very important. For the next two or three years I could say to myself, "I can hear anything that guy can hear!" and really believe it.

This account really begins one summer day when the amateur bands were on vacation. Ten phone was completely dead. Dead, that is except for a local pretending to work DX. Only he wasn't pretending. He had a fancy new receiver with a greater number of shinier knobs and he could copy signals I couldn't even hear with the b.f.o. turned on. The normal attrition of the years and the relentless march of progress had cast the pall of obsolescence over my once proud electronic marvel. In other words, it was trade-in time only I hadn't discovered it yet.

When instances of this sort began to be a daily occurence and the usual alignment and tube replacement routine failed to make more than a token improvement, it became impossible for me not to face the facts. The state of the art had really been given a boost and all those fancy claims in the catalogs were really based on performance. The state of my bank account was such that there remained little doubt that my NC-183 and I were destined to grow old together.

It was time for an objective appraisal of the situation. While it was very true that my receiver didn't have all the fancy features of the latest on the market, it was basically a very good receiver. If I could come up with a modification or two that would improve its performance in only two respects I could be right up there giving the state of the art a run for the money.

Oscillator Pull

There were really two difficulties that kept my NC-183 from staying up with the new receivers. It had lots of gain but somehow just didn't seem to be able to reach into the noise and pull out the weak ones on ten and twenty meters. As is often the case with a single conversion superhet with a 455 kc i.f., reception on the higher bands involved just enough oscillator pulling to give the feeling of backlash in the tuning mechanism. Tuning a c.w. signal with the crystal filter cranked all the way in was as much a matter of luck as skill. The effect was rather like tuning a receiver using a rubber band for a dial cord.

Signal to Noise Ratio

The books say that signal to noise ratio below very high frequencies is the responsibility of the r.f. amplifier department. My receiver had two r.f. amplifiers so my first efforts were directed toward the front end. I modified everything that had anything to do with the input of the receiver. I tried every fancy tube I could get my hands on, tried various combinations of a.g.c. delay on the two tubes, but always returned to the factory parameters and tube line-up. I even tried several types of external preselectors, all with less than startling success. Every improvement had its attendant drawback.

Quite by accident I stumbled on the real culprit. Late one evening I happened to pull both r.f. amplifier tubes from their sockets and was surprised to find that the noise in the receiver output did not diminish. That cascade of sound that had been obliterating all those rare DX signals had not been coming from the receiver input at all but originated with the 6SA7 mixer. That little powerhouse was generating so much electrical confusion that only the healthiest of signals could punch through. One by one I replaced the associated components with no significant decrease in the racket. Back to the books again.

It seems that it is axiomatic that the noisiest of all mixers commonly used in communication receivers is the pentagrid tube. The more grids the more noise, or something to that effect, seems to be the rule. The pentagrid tube, when used with a separate oscillator as in the NC-

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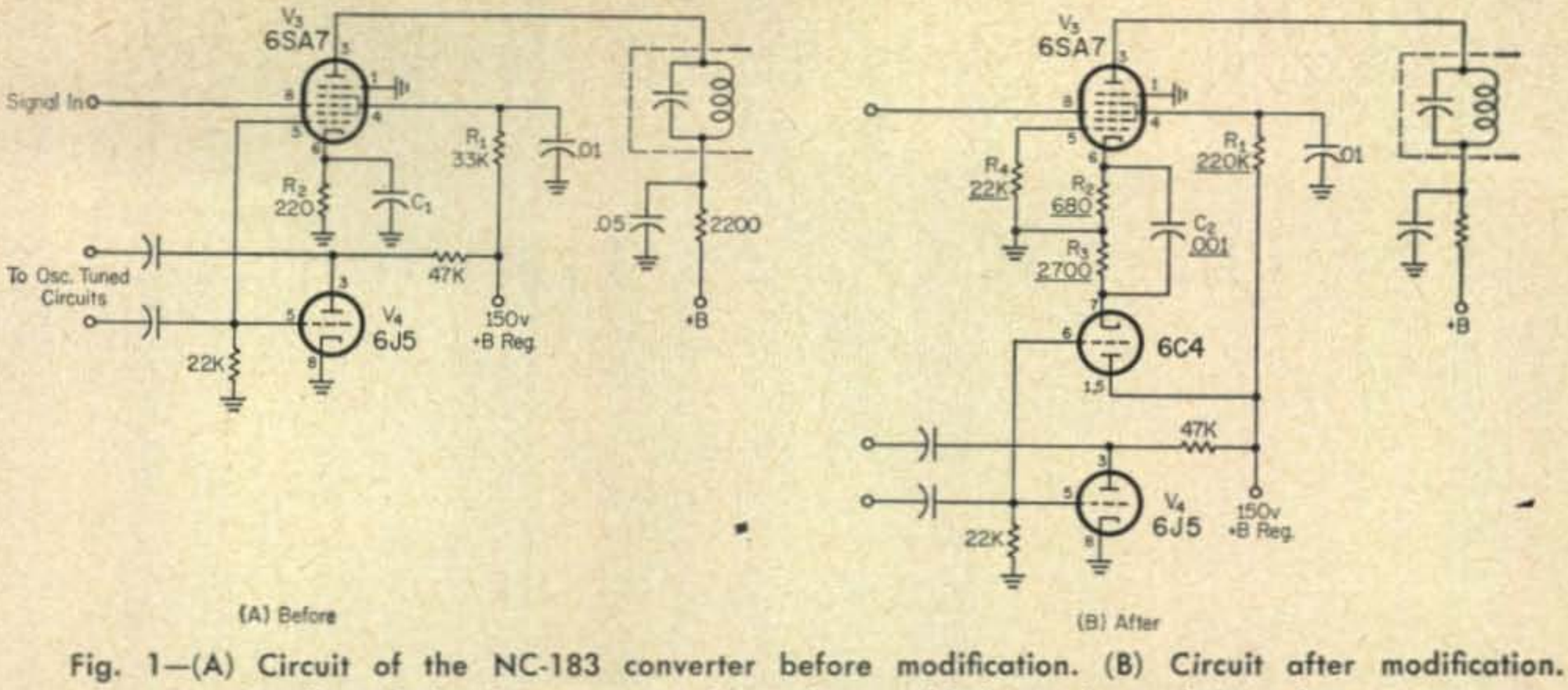


(A) Before

(B) After

Fig. 1—(A) Circuit of the NC-183 converter before modification. (B) Circuit after modification. All underlined components have been added or changed in value.

183, does afford the highest order of isolation between oscillator and mixer, and so results in less oscillator pulling.

Now I had a new problem. If I changed to a tetrode or a triode mixer in an effort to minimize the noise, in all probability I'd find the already objectionable oscillator pulling even more of a problem. However, the noise generated in a mixer tube is a function of the plate current within the tube. Less plate current, less noise. Changing the plate current can be accomplished by the simple expedient of changing the screen voltage.

A quarter of a pound of solder later the following circuit evolved. Changing the screen dropping resistor from the original 33K to 220K made a really dramatic improvement in the signal to noise ratio. Surprisingly enough this change also improved the receiver's ability to handle strong signals without overload. Removing the cathode bypass capacitor and changing the cathode resistor to 680 ohms made it possible to inject the local oscillator on the cathode, a really big step in minimizing the oscillator pulling. Replacing the first r.f. amplifier tube with a 6AC7 compensated for the slight loss in conversion gain resulting from the reduced screen voltage and cathode degeneration.

Oscillator Isolation

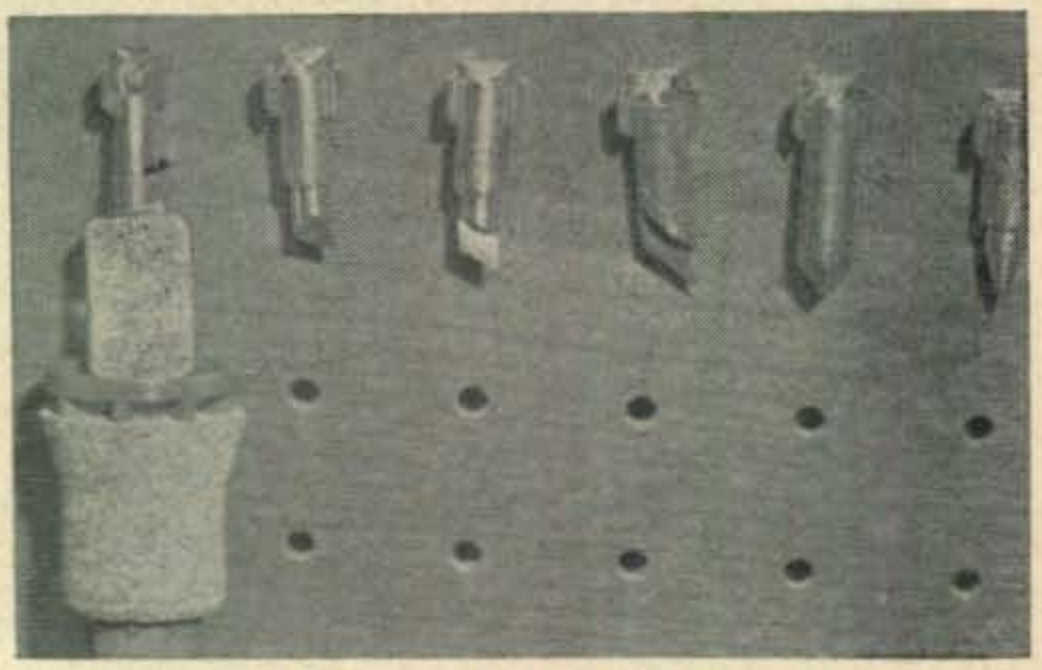
The last vestige of objectionable oscillator pulling was dispatched by isolating the local oscillator and the mixer with a cathode follower as shown in fig. 1. I used a small sub-miniature triode that happened to be in the junk box, but there is plenty of room to install a 6C4 or its equivalent on a small sub-chassis, and lead dress seems to be indifferent in this circuit. Only a slight touch-up is necessary to restore the receiver to correct calibration, and the r.f. mixer and grid trimmers should be peaked for maximum sensitivity.

After years of cut and try with indifferent effect, these changes result in performance that is little short of amazing. The useful sensitivity is now limited by what comes down the antenna feed line. The new stability imparts the feeling that you're the boss when tuning c.w. signals.

If my approach seems somewhat bizarre, and the indicated circuit constants somewhat arbitrary, I can only say that this design was entirely empirical. My slide rule never once left its case. My approach was completely pragmatic. The components chosen were selected because a departure higher or lower in value resulted in noticeably degraded performance.

If you wonder why this article is not replete with photographs of the inner workings of my much modified receiver, I have only this to say. Think back to the last circuit you modified by cut and try. By the time all your resistors had stubby leads and you'd soldered extensions on all of the capacitor leads so they would reach from here to there, would you take a picture of the resulting mess for all to see? One of these days I'll clean it all out and do a workmanlike job, but in the meantime I'm having too much fun just tuning around the bands. ■

Ham Hints



Hangers For Pencil Iron

There is no tool hanger available that will let you hang your pencil soldering iron and its bits on a perforated tool board. To do this, buy some fuse clips like the kind used in radios and TV sets and attach them to your tool panel with small screws. They make excellent hangers for an iron and its spare bits.

The EICO 723 Transmitter

BY LEE AURICK*, K3QAX

THE Eico 723 transmitter, hardly more than a good handfull, offers the Novice or graybeard a reliable and flexible rig that operates from 80 to 10 meters, as well as one that is extremely easy to build.

Rated at 60 watts input on c.w., and 50 watts on a.m. with an external plate modulator, the 723 has been in use for several months and has been put through its paces with innumerable contacts on the low end of 40 meters. All reports have been T9, and each request for a check on key clicks has brought a negative response.

The 723 weighs in at 15 lbs., and is compactly packaged in a perforated metal cabinet with a solid die-cast bezel and measures 6" × 8½" × 11¼".

Oscillator

An electron-coupled Colpitts utilizing a high-transconductance 6CL6 pentode generates the r.f. energy. Two features of this circuit, high harmonic output, and low crystal heating, account for the flexibility, compactness, and stability of the 723. The load imposed by the final is isolated from the oscillator circuit by the screen grid of the 6CL6, thereby minimizing any tendency on the part of the oscillator to shift frequency under load. The oscillator output tank is automatically bandswitched by the same control that tunes the final amplifier. It is only necessary to select the desired band; both oscillator and final amplifier pi-network are simultaneously switched. The oscillator plate circuit resonates at the output frequency on all bands except when operating on ten meters. On that band it resonates at 14 mc. The oscillator makes use of 80 meter crystals for 80, 40, and 20 meter operation, and 40 meter crystals for 40, 20, 15, and 10 meter operation.

*Mt. Pleasant Rd., RD#1 Columbia, Pa.

Final Amplifier

The 6DQ6-B final amplifier operates straight through on all bands except on ten meters. On ten the tube doubles from twenty meters. The conventional, variable-tuned, output pi-network is designed to match the amplifier into a variety of loads between 50 and 1000 ohms approximately. Should additional capacitance be required, a slide switch on the rear apron connects a 1000 mmf capacitor across the 900 mmf variable which functions as the output capacitor of the pi-network. This feature can be a great convenience when attempting to match into very low-impedance loads.

Power Supply

A GZ-34 full-wave rectifier provides 500 volts to a swinging choke followed by two 40 mf electrolytic capacitors. This arrangement results in good voltage regulation, particularly under c.w. operating conditions. The power for the final amplifier is applied through an octal plug at the rear of the transmitter, and this set-up makes it a snap to apply plate modulation to the 723 simply by connecting these terminals to a suitable modulator. For c.w. use, these terminals are jumpered. Also, 117 volts, and 6.3 volts are available at this plug for powering a change-over relay or other accessories. The 117 volts is applied only in the TRANSMIT position of the front-panel function switch.

Controls

The FUNCTION switch, a four-position control, provides an OFF position and three other modes; STANDBY, TUNE, and TRANSMIT.

The two-position METER SWITCH meters both

[*Continued on page 116*]

A Transmitter Temperature Gauge

BY HAROLD J. WEBER*

Tube and component life can be drastically shortened by excessive heat. Here is a constant direct reading heat gauge that may be included in the sophisticated final for the ultimate in protection.

THE automobile has a water temperature gauge to protect its heart. What ham transmitter has provision for protecting itself against the same enemy—heat? With the onset of large and expensive transmitting apparatus employed by many hams, such a device is not as absurd as it might sound. This is especially true since the complete installation need not cost over ten dollars.

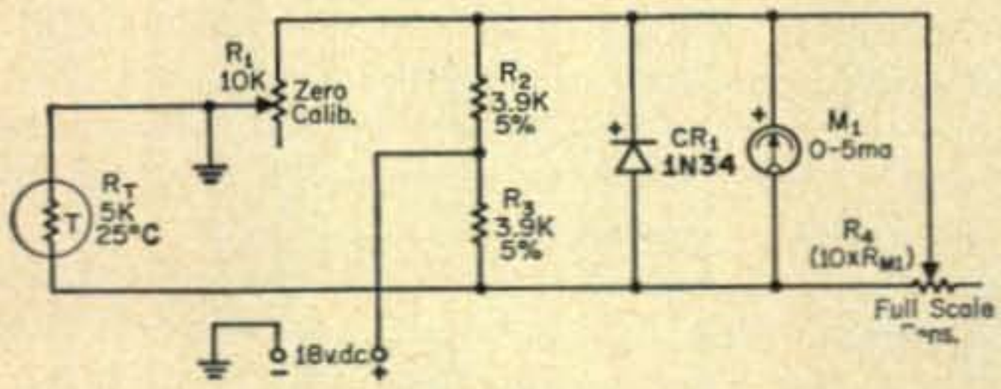


Fig. 1—Circuit of a direct reading heat meter. The resistance value of R_T, a thermistor, varies with temperature and changes the bridge balance to produce a meter indication.

Circuit Operation

Figure 1 illustrates the circuit. The meter, M_1, is employed to measure the bridge unbalance introduced by R_T, a Glennite type 35TF1 or equivalent thermistor. At 25° C (77°F) the thermistor resistance is 5,000 ohms. This temperature is used as a minimum scale (0 ma) reference. Another point on the temperature curve could be used equally as well. As the thermistor is increased in temperature its resistance decreases. This decrease causes the bridge to unbalance with the meter indicating the degree of unbalance.

If the temperature of R_T is below 25° C its resistance increases above 5,000 ohms rapidly. Diode CR_1 prevents the meter from being severely pegged in the negative direction due to the negative bridge unbalance. Control R_1 serves to set the zero point at 25° C; R_4 is employed to set the full scale sensitivity. The resistance of R_4 should be about ten times the resistance of the meter movement.

Calibration

A Shurite model 950 meter serves nicely as an indicator; a 5 ma range is recommended. The scale may be arbitrarily marked in bands, possibly colored, indicating "safe," "caution," and "danger." Direct temperature calibration can be made with the aid of the thermistor calibration chart. Pick five or six temperature points; obtain carbon resistors corresponding to the thermistor resistance at the selected temperature points. Substitute the resistors in place of the thermistor, R_T and mark the dial accordingly. For example, in the described circuit, 1000 ohms is equivalent to 66° C, etc.

The thermistor should be placed adjacent to a potential heat source such as the final amplifier tube base or socket. If a central cooling system is employed, the thermistor may be placed in the outlet duct to detect an increase in exhaust air temperature.

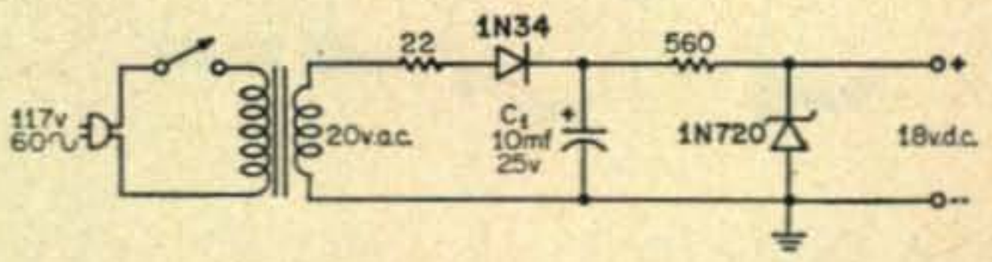


Fig. 2—Power supply provides a regulated 18 volts for operating the bridge in fig. 1.

An 18 volt source is required. Figure 2 shows a recommended power supply employing a small 20 volt transformer, such as a doorbell type. The rectified voltage is regulated by a 1N720 zener diode (Hoffman Electronics) to prevent voltage drift or fluctuation.■

*24 Edith Road, Saxonville, Mass.

DXpedition To The Rare One

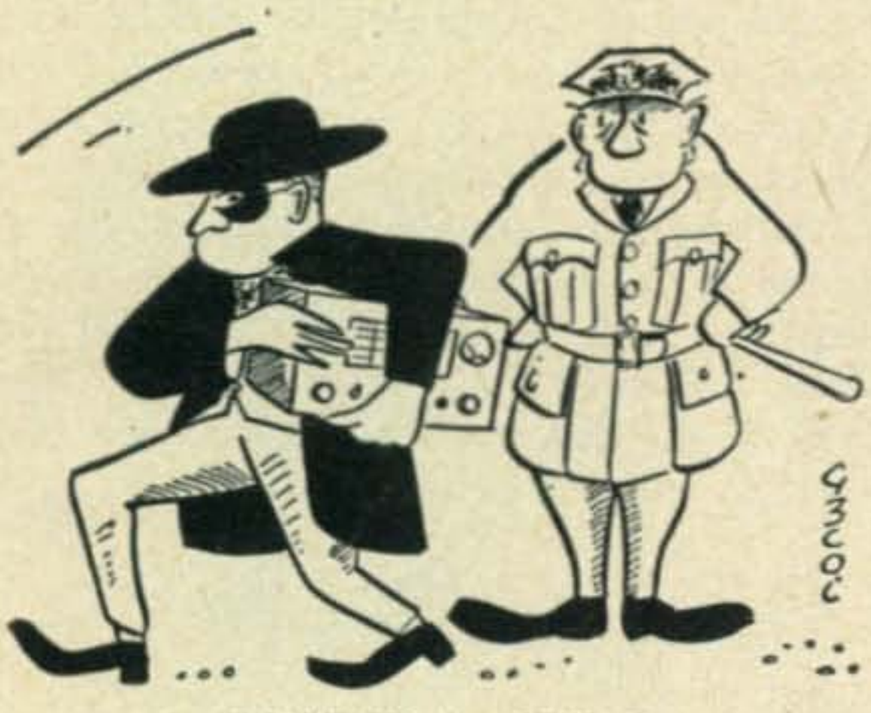
BY H. T. ORR*, WØWET

THE Kingdom of Vermont has always been a difficult country to work. Many hams are lacking a Vermontonian QSL for the W.A.S. award. I managed to obtain at least two QSL cards from every other state before working my first Vermont station.

When I recently had the opportunity to drive through the New England states, I had but one thought—to smuggle a transmitter and receiver into the Grand Duchy of Vermont, and to put it on the air.

Here are a few facts about the little-known Republic of Vermont. It is a small mountainous country bordered by the United States on three sides and by Canada on the fourth. Because of its strategic location, it is sometimes classed as a portion of the United States and is a required QSO for the Worked All States award.

Since the Commonwealth of Vermont does not have an embassy in the United States, I decided that it would be impossible to obtain the necessary entrance visa. Permission to operate an amateur radio station from a country that has seen so little amateur radio, would probably have been impossible, so that left only one course—clandestine operation.



..... CLANDESTINE OPERATION

A careful check of the map indicated that Vermont's eastern border is the Connecticut River. The Royal Militia would probably have difficulty in guarding the entire border, so the plan of action was to smuggle a ham station across the river by boat at night.

I packed burnt cork for blackening my face and was careful to remove any identification that would give away my origin. I told my friends and relatives that I was just on a routine pleasure trip to New England. I thought of carrying a small firearm for use in killing game, in case I had to find my way back through the brush, but decided against it as I might be considered an aggressor if captured. I even considered carrying poison in the event of capture, but decided against it since living things like to go on living.

Although by some, this trip could be considered just a "milk run," I was understandably nervous as I started the drive across New Hampshire to a spot near the border of Vermont.

I parked on a high hill in western New Hampshire and looked through binoculars. There it was—the Connecticut River and, across, Vermont! The goal—somehow to get a rig in operation from there.

Close observation revealed what appeared to be an unguarded bridge spanning the river. This could really be a stroke of luck for my one-man expedition, or it could be a trap. I very carefully observed the area around the bridge but could find no trace of any border guards. This meant that it would not be necessary to row across the river at midnight.

I still don't understand why the bridge was left unguarded. It may have been a national holiday. I just drove across the bridge as if it were any other bridge. I didn't see a single member of the Royal Militia.

The plan was to drive to the top of the nearest mountain and begin operation. This shows how little I knew about Vermont. The roads in Vermont do not go to the tops of mountains. They do not even go along the sides of the mountains. The roads in Vermont run only in deep valleys, the towns are in deep valleys, and most of the people live in deep valleys. It is no wonder that the few natives interested in amateur radio are rarely heard outside the country's borders.

After driving through many native villages, I discovered a small road leading up a mountain. It led to a farmhouse and barn near the top. I spoke with the owner and had surprisingly little difficulty understanding the native language. He was very friendly and I readily obtained permission to operate my mobile station from his yard.

This was it—Vermont at last! I turned the transmitter on with a sweaty hand, called a quick CQ and signed. No answers . . . better try again. "This is WØWET mobile in VERMONT

*172 N.E. Logan Parkway, Minneapolis 21, Minn.

calling CQ and tuning." Still no answer. What, am I getting out?

I tuned across the band and heard a Texas station calling CQ . . . answered him . . . he came back. "Thank you for the call, you're five and eight here in Dallas. . . ." Not one comment did he make about my being in Vermont. I came back to him, this time stressing WØWET mobile in VERMONT VERMONT VERMONT. He came back, "OK on your QTH." My heart sank —could it be that he didn't even care that I was in Vermont? There must be something wrong with him. I signed with the Texas station.

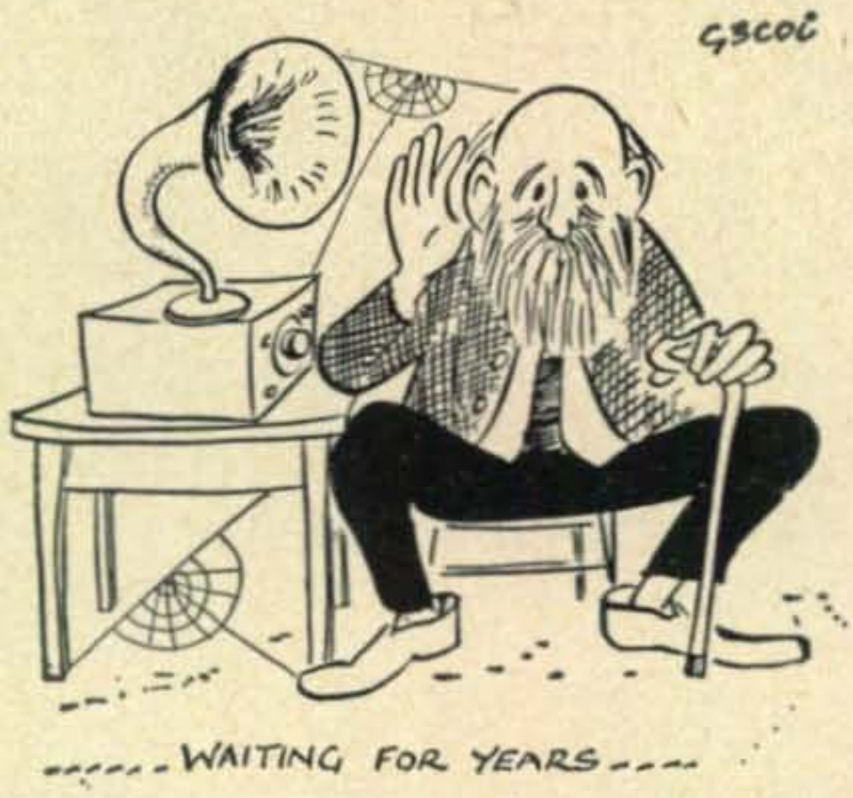
I moved a few kilocycles off the frequency and called another CQ. Again no answer . . . . called a W4 . . . . same story . . . . fine on your QTH . . . . not even a hint about sending a QSL card for a Vermont QSO.

-----THERE MUST BE SOMETHING WRONG WITH HIM----

I worked a few more stations who couldn't care less where I was. The best compliment I could get was, "You've got a nice signal for a mobile rig." About that time one of the inhabitants of the farm came into the yard and announced that they could hear me talking to Texas on the TV set, but were unable to hear the Texas station. Was there anything that I could do so that they could hear the other station as well?

I thanked the people for the use of their yard and started the long drive down the mountain, mumbling something to myself about stations that didn't know rare DX when they heard it.

The next day I worked a few dozen more stations, none of them caring about my location when finally it happened. W4SKC, (bless him) almost screamed when I came back to him. "Boy, am I ever glad to get ahold of you. I've been waiting for years for a Vermont QSO. Please *Please* QSL. Boy, I'll bet the fellows are after you." I was so tickled that I drove into the nearest town and mailed him a QSL about ten minutes after the QSO.



------WAITING FOR YEARS----

So the Royal Militia didn't bother me after all. The Vermonters were quite friendly and I saw some scenic countryside. I made a lot of enjoyable QSO's—can it be that Vermont is not such a rare country after all? ■

Rescue Of The Sleeping Driver

BY DORIS IRISH*, WØWHL

A STATION wagon with a long whip on the back fender, sped along the dark deserted highway of the North Dakota Badlands. The lone driver stared at the road ahead trying desperately to keep awake for the last thirty miles home.

He blinked his eyes hard and breathed deeply of the crisp night air blowing in the window, but the construction work of the long day past had demanded all his energy. The Elmac receiver below the dash was on but nothing stirred on the frequency. He had instructed the XYL on the rig at home earlier not to wait up for him. It seemed the whole world was at rest but him, and he had to fight to keep from joining them.

The long stretch ahead was straight now. The minutes droned into the sound of the motor, the wind, and the radio. The headlights blurred; the line down the middle of the road became two lines. His eyes closed. His head nodded.

Suddenly over the radio came a loud call . . . his call. "WØVAR . . . WØVAR. This is WØWHL calling. Are you there?"

He jerked awake and gripped the wheel just in time to steer the car into the proper lane. He reached for the microphone and acknowledged the call.

"WØVAR . . . WØWHL," his wife answered. "Are you nearly home? I had to get up with one of the children so I thought I'd see if you were around." ■

*2825 South Gilpin Denver 10, Colorado.

A 6 Meter Linear Amplifier

BY T. JAMES BARNES*, K9TFJ

Frustrated with your 2½ watts on 6? Here is an inexpensive linear amplifier that will give you a solid 25 watts of output when driven by the Heath Sixer or a similar rig.

BACK in 1955, a series of articles[1] appeared in *CQ* on grounded-grid linear amplifiers. The advantages of grounded-grid circuitry were well set forth. The fact that tubes for lower frequencies would work at considerably higher frequencies, when used in grounded-grid circuits, appealed to me.

Having a Heath Sixer, and wanting more power, I reviewed the articles on grounded-grid circuits. For Class B linear use on a.m., a possible ten to one increase in power does not seem earth-shaking, but to step up the Benton Harbor Sixer from two or three watts output, to twenty-five or thirty watts does sound good.

Circuit Description

Having a number of surplus tuning units from the BC-375 transmitters, high voltage micas, dials and tuning capacitors were salvaged from them. The r.f. chokes are not suitable. The 7 plate bandset capacitors were used for tank tuning in the driver and final stages.

The driver stage consists of an 837 grounded-grid with series tuning in the plate circuit to adapt the high interelectrode capacities to v.h.f. use. The driver tank is inductively coupled to the push-pull cathode coil of the final 837's. A center-tap connects to ground through an r.f. choke and closed circuit jack. The coupling from the driver tank to the cathode coil is mildly critical. An intermesh of about ¼ inch seems to work all right.

The final 837's are operated in push-pull because, at 50 megacycles, the interelectrode capacities would be quite high when connected in parallel. Since single band operation was intended, a pi-network was not considered; besides, push-pull operation would about eliminate all even-order harmonics that might fall in the f.m. broadcast band and TV channels.

Parallel feed of high voltage to the final plates was used to keep high voltage off the tank capacitor. This seemed safest since a single section capacitor was used with the rotor floating and *not* connected to ground.

The antenna tuning capacitor is a double spaced 100 mmf capacitor and with my antenna and rig it is usually near minimum capacity.

The Sixer is used as a driver for the linear only and a converter feeding an SX28-A is used for receiving. If the Sixer receiver is to be used, then an antenna connector may be mounted on the rear deck of the transceiver and connected to point 10 on the send receive switch by a length of coax. The coax connector may be fed to an antenna relay which would then switch the antenna from the Sixer receiver to the linear.

837 Characteristics

Do not fail to ground pin 2, the inner shield of the 837! Around 51 mc the linear will tend to oscillate.

With no excitation, the cathode current, per tube, is very low. It varied (with different 837's) from zero in the driver to 4.5 ma per tube in the final with 700 volts on the plates. With the 2½ watts input from the Sixer, the cathode current rises to about 45 to 50 milliamperes per tube and upon modulating the Sixer, the current rises to about 120 milliamperes total in the final. Do not exceed 150 ma.

Construction and Adjustment

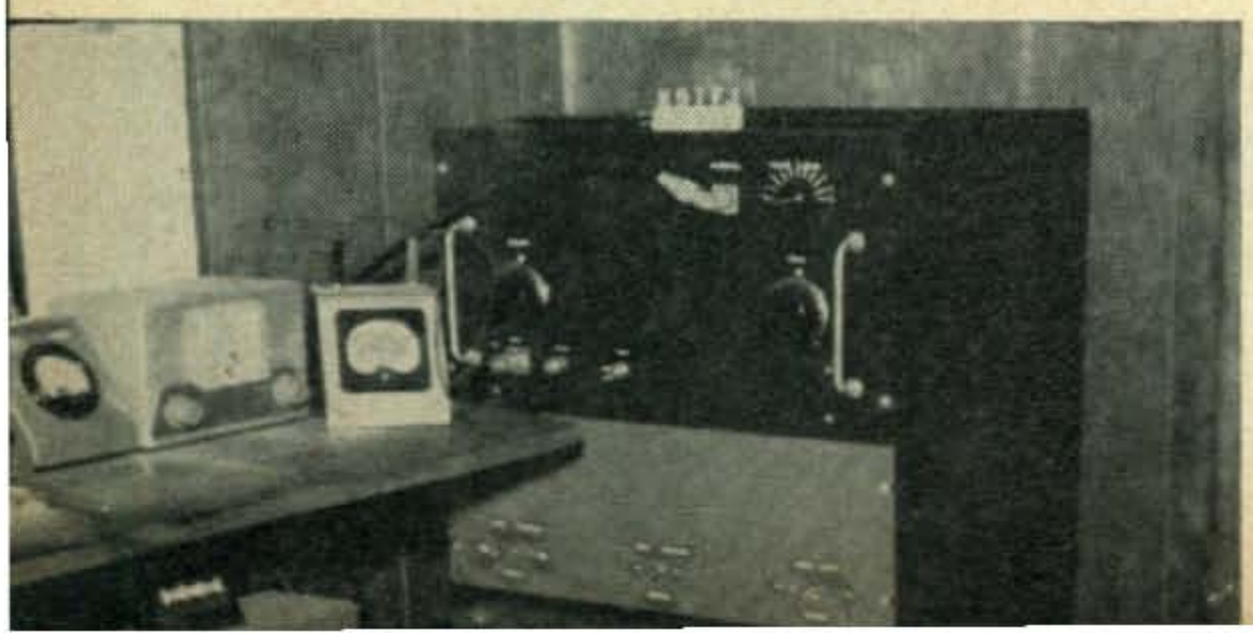
The coils were formed about a size D flashlight cell, expanding a little when removed from this form. Further coil data is given in fig. 1.

To power the 12 volt heaters, the primaries of two 6.3 volt filament transformers were

*Runyon Road, RFD 4, Greenwood, Indiana

[1] McLaughlin, N.R., "Grounded Grid Linears", *CQ*, July 1955 page 28.
McLaughlin, N.R., "More On Grounded Grid", *CQ*, September 1955 page 16.

Front view of the linear amplifier in a corner of the authors shack. The left tuning knob is the Driver Plate, the lower right knob the Final Plate and the upper right Antenna Tuning. The input connector is located under the Driver Tuning and the output is taken from the jack to the left of the Antenna Tuner. The two closed circuit jacks are located to the right of the input connector.



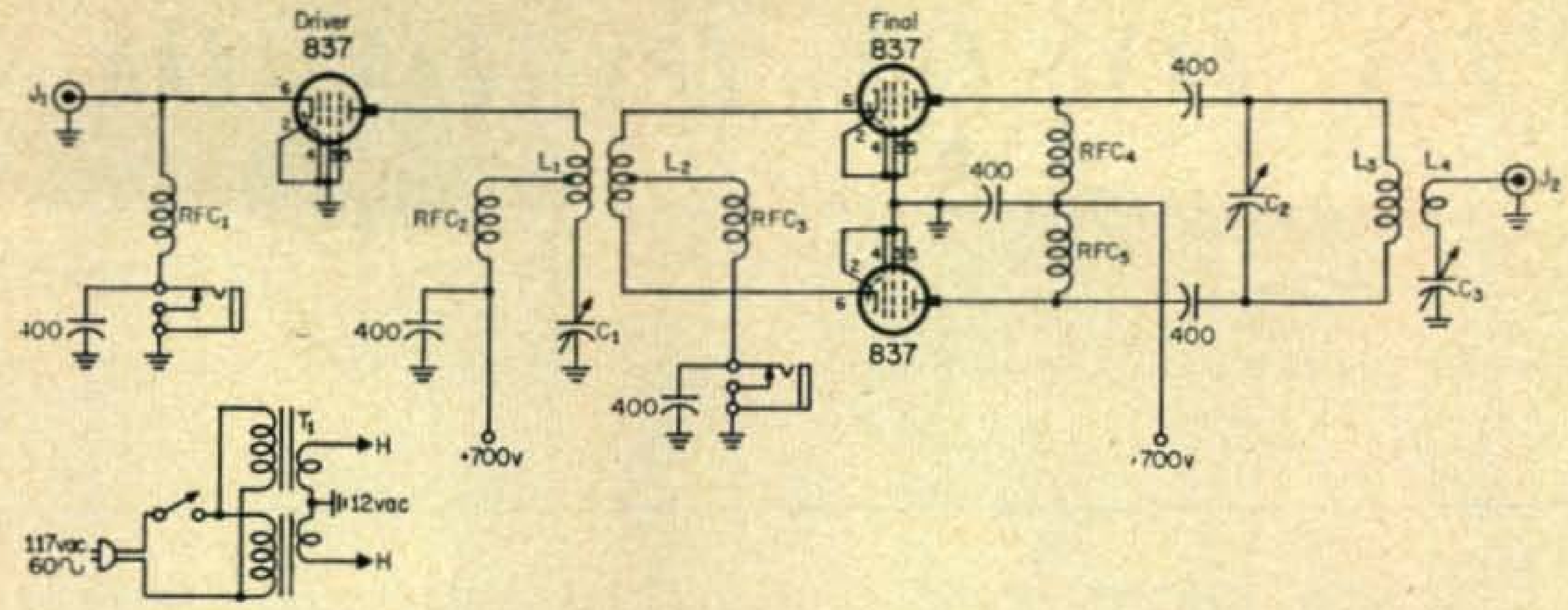


Fig. 1—Circuit of the 6 meter linear amplifier that may be driven by the Heath Sixer.

C_1, C_2—7 plate band set capacitors from BC-375 tuning units.
T_1, T_2—See Text.
C_3—100 mmf double spaced.
J_1, J_2—SO-239 connectors
L_1—6¾t #12 E., c.t., 1½" long, 1¼" diam.
L_2—6t #16 rayon covered, c.t., 1½" l., 1¼" d.
L_3—3½t #12 E., 1½" long, 1¼" diam.
L_4—2t #16 rayon covered, 1½" long, 1" diam.
RFC_1, RFC_2, RFC_3, RFC_4, RFC_5—1 Microhenry, 300 ma.

paralleled, while the secondarys were put in series. (Be sure they are connected in the correct phase or the output voltage will be nil.) The secondary current rating should be from 2.5 to 3 amperes.

The final 837's are mounted horizontally with the sockets located on the shield plate between the two stages. This reduces the lead length between the cathodes of the final tubes and the plate coil of the driver stage so that no transmission line is needed between the two stages. The extent of the shielding may be seen in the photographs.

The driver and final tanks should be pretuned with a grid-dipper before application of excitation. A field strength meter is very useful for loading the final into the antenna. I connect my field strength meter to my two meter beam while operating on six meters.

The field strength meter is set to read 100 micro-amperes, while running the Sixer barefoot. It will then kick-up to about 300 micro-amperes using the linear, representing a power gain of 9 to 1.

Operation

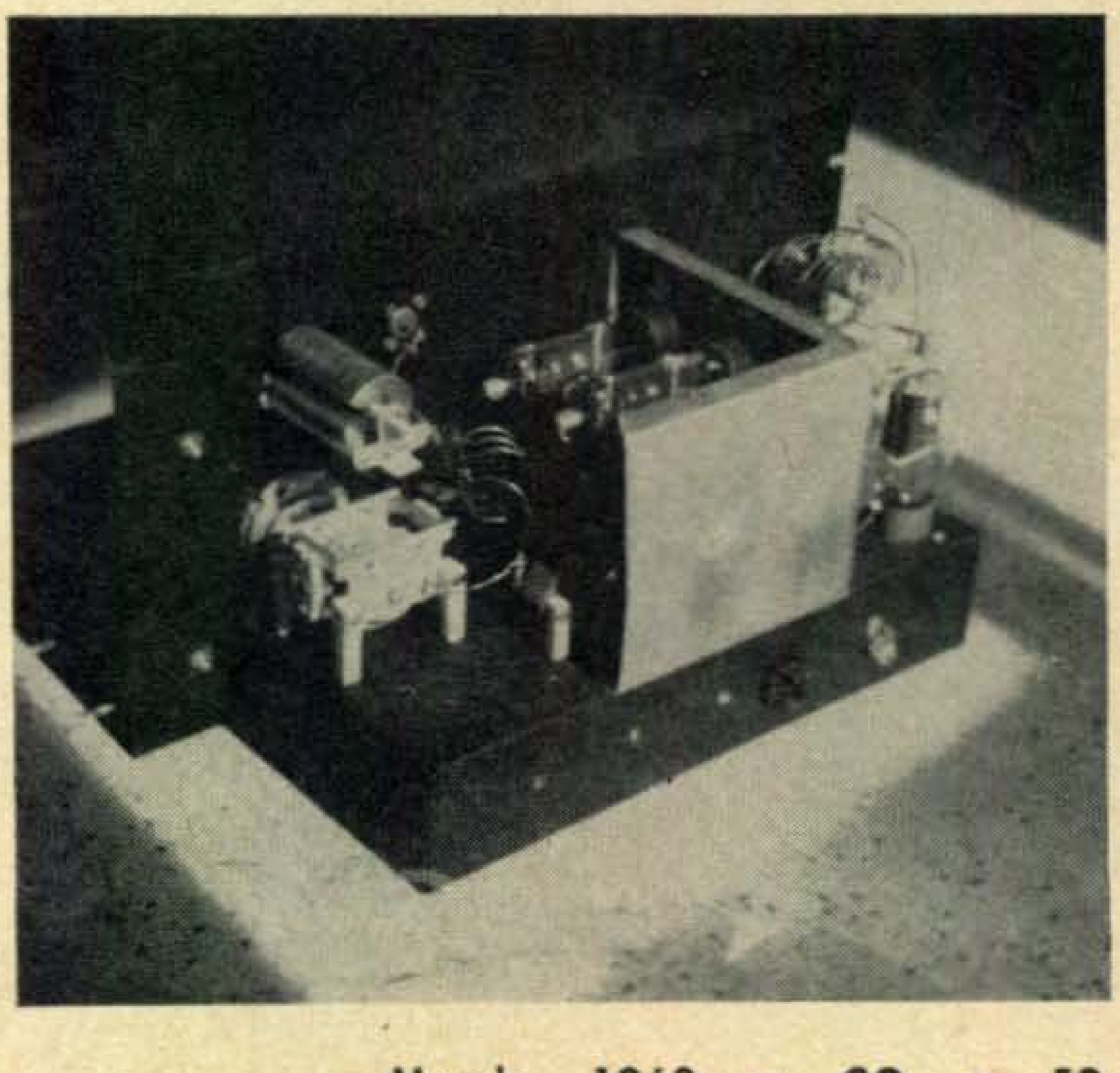
Any low output 6 meter rig will drive this linear, but if your rig has an output much over 10 watts, you may find it necessary to eliminate the 837 driver stage. Even a Sixer will overdrive this amplifier. I detune the driver tank slightly to keep the current in the final down.

Be careful not to modulate this rig too heavily as it will splatter. The cathode meter, in the final, can twitch a little but the Heath Power Meter I used must remain pretty steady or overmodulation is indicated. If I adhere to this rule, I get good signal reports from fellow amateurs.

Performance

The antenna here is a 5 element, gamma-matched beam only 22 feet above ground. With the Sixer G.G. Linear combination, I have worked from Halifax (VE1BC) to Florida with

[*Continued on page 98*]



Rear view of the 6 meter linear amplifier. The 837 driver is at the right rear of the chassis with the plate coil mounted above it. The cathode coil for the final is meshed ¼" with the plate coil. The two 837's in the final are mounted horizontally in the L shaped enclosure. The driver tuning capacitor is mounted in front of the 837 and is obscured by the shield. The final tuning capacitor is at the bottom right with the antenna tuning capacitor just above it. The power feeds are mounted on the rear flange of the chassis. An additional perforated plate covers the final enclosure when operating.

DX DX DX DX DX DX DX DX

URBAN LE JEUNE, JR., W2DEC
BOX 35, HAZLET, NEW JERSEY

The following certificates were issued between the period from December 5th, 1961 to and including January 4th, 1962:

CW/PHONE WAZ

1619	W6MDK	Bob Mintle
1620	W1CKA	Paul A. Neveu, Jr.
1621	W6PHF	David H. Palmer
1622	ZP5LS	Humberto Viola
1623	W6NKR	Marion J. Henson
1624	UA3AW	
1625	UA1CK	Vladimir Cuploon
1626	UA3GM	Hermann Qelchkov
1627	ZS4MG	Sid Coosner
1628	VE3TB	Douglas G. Hall
1629	W6HDL	H. D. Huston
1630	VE4XO	Charles E. Johnson
1631	W2BVN	Donald W. Morris
1632	G3LPS	Eric Pickering
1633	UR2AR	Enn Lohk
1634	DJ1DF	Bernhard Krohs
1635	K4GSS	Roger M. Lindley

ALL-PHONE WAZ

106	W7AQB	Philip True
107	MP4BBW	Ian Cable
108	SM5RY	B. Scheierman
109	W5PQA	H. W. Merideth
110	W6HYG	Gene DeYoung
111	W5KGX	Robert O. Lowery
112	W1UOP	Roger C. Paulson
113	VE7MD	John Black
114	W8MPW	Carl A. Drake
115	K2DCA	Paul Tissot
116	VE7GI	Frank Taylor
117	VE5RU	R. Alden Frederickson
118	W9EXY	D. A. Jensen
119	W4EEE	George F. Norton

SSB WAZ

26	K8RTW	E. A. Coleman
27	GM3CIX	L. J. Mc. Dougall
28	SM5DW	Rolf Anderson
29	W4VCB/KL7	Evelyn Wikoff
30	MP4BBW	Ian Cable
31	WØUUV	Don E. Johnsen
32	W9JJF	Walter Cuga
33	ZS5DW	W. F. Meyer
34	VE7MD	John Black
35	G8KS	S. L. Hill
36	W9EXY	D. A. Jensen
37	DL1JV	Helmut Eckhardt
38	W6HYG	Gene DeYoung
39	W1DCE	T. V. Evans
40	W3LMA	Edward Dillmeier
41	W8MPW	Carl A. Drake
42	TI2HP	Humberto V. Perez
43	W5MMD	T. C. Wherry
44	VE7GI	Frank Taylor
45	W7DLR	J. H. Wilson
46	WØCVU	Charles W. Boegel
47	W1LLF	Robert A. Smith
48	EP2AG	Geo. H. Buchanan
49	W1ICV	Jane P. Anderson
50	W1OOS	C. Vernon Anderson
51	K2DCA	Paul Tissot

CW WPX

242	HA5BU	Ordog Istvan
243	DL1ES	Paul Maisel
244	W2RA	Robert Anders
245	W3AYS	C. Bayard Smack, Jr.
246	W2OWX	John A. Bink
247	W9IHN	Charles R. Pendl
248	VE7SB	Allen H. N. Koo
249	W6DIX	K. D. Wilson
250	ZS1ACD	Max Adler
251	WA2CBB	Edward J. Bizub
252	W1CKU	Charles J. Burton
253	W6BZ	Mel Whiteman
254	W6FLT	W. R. Stangel
255	VK5NQ	Jeff Vale
256	VK5NO	Tubby Vale
257	W9MZP	George T. Watkins
258	G8PL	L. A. Kippin
259	W1BPW	Peter K. Butler
260	W2GNQ	J. A. Anderten

PHONE WPX

45	MP4BBW	Ian Cable
46	ZS1AB	B. Joel
47	W3CGS	Harry W. Stark
48	SM3AZI	Sture Richtner

SSB WPX

87	DL4NQ	William F. Dennen
88	SM3BIZ	Curt Westling

MIXED WPX

5	WØMCX	Arthur A. Jablonsky
6	W2GT	A. Edward Hopper

WPX HONOR ROLL

CW WPX

W2HMJ	651
W8KPL	553
W9YSX	544
W5KC	541
K6CQM	538
W4OPM	531
W6KG	528
W1IJB	513
W6WO	511
W2GT	510
W8LY	506
W2EQS	501
W1EQ	500
K2UKQ	500
W1NLM	491
SM5CCE	488
W8PQQ	481
W4HYW	478
K6SXA	464
K2ZKU	461
W3BCY	457
K9AGB	454
W9UXO	453
K9EAB	451
W2MUM	450
W2NUT	450
W8JIN	449
W3BQA	437
K5LIA	428
OK1MB	428
W3CGS	426
W1EIO	425
WØPGI	420
W2HO	418
G2GM	418
W5AWT	412
W5DA	412
W2PTD	411
K4JVE	407
W5AFX	407
W3OCU	405
DL3RK	403
JA2JW	403
VE6VK	403
PY4OD	402
W5LGG	401
W9GFF	401
W9SFR	400
VK3KB	400

PHONE WPX

W8WT	531
G3DO	476
CT1PK	471
W9YSQ	452
MP4BBW	431
VK6RU	421
TG9AD	381
W9WHM	367
PAØHBO	363
SM3EP	361
W5ERY	358
W8JIN	356
W9UZC	356
DL3TJ	354
PY2CK	354
5A5TO	353

SSB WPX

MP4BBW	392
W4OPM	372
TI2HP	356
K9EAB	350
W8PQQ	315
HB9TL	315
K2MGE	263
W2VCZ	261
W2YBO	257
W3VSU	256
UR2AR	255
G3NUG	250

MIXED WPX

W2GT	528
WØMCX	476
W3CGS	475
W1EIO	432
W9KA	405

"The view to San Marino is so impressive that I chose it for my QSL card" writes Ralph, M1/HB1EO. The rock with the town of San Marino is about 2,200 above sea level

Letters

The following letter was received from KH6EGO. Del describes his recent trip to Johnston Island.

"I had some wonderful contacts with hundreds of stateside calls and have a DXCC on the log plus several thrown in for good measure for the 12 days I spent there.

"Johnston Island is not too active judging from the pileups I experienced. I worked several stations on three bands (15-20-40 meters) in one day.

"It is a great joy to be able to give several of the real DX men a chance.

"As a Communications Maintenance man with the U. S. Air Force, I was indeed happy to be able to spend a few days there and work all the fine DX I did. Calls like 9M2GA, HS1K, ZS6UR, ZS6FR, EP2GA, CE1GJ, ZE4JN, UA3CR, UA9DT, VR2EF, YV5AFF, BV1USG, TI2HP, XW8AS, JA2AEV, OA8I, KC4USE, VE3CRM, ZL3LE, TF2WFH, HH2P, VK4BE, OA4CV, CX2CO and KZ5SW were booming into the QTH. All-in-all, 975 contacts were made. All fifty states were worked within the first eight hours of air time. Approximately 65 hours of air time were logged.

"Upon my return to Hawaii, I found over 250 QSL cards at my home, with the KH6 QSL Manager telling me that many had arrived and were awaiting pickup.

"Phone patches were completed for many of the men stationed there, giving them their first contact by spoken word with their families in over 10 months.

"All of the Pacific Islands worked. KR6, KC6, KG6, KX6, KW6, KM6 and KJ6BV seemed pleased to hear that the operation went as well as it did, even if it was only by "happenchance," that I was able to complete the contacts that I did.

"The inherent satisfaction coming from this short TDY trip to Johnston Island was evident, but the true reward was from the cards and notes that greeted me when I returned home. The warmth and friendliness of our fraternity has always pleased me, but the success of the operation was greatly enhanced by the operators calling for a contact and patiently waiting until I had logged one station and requested additional calls. The pileups were tremendous at times, but, like a good rough game of football, the scores were well earned. The compliments accepted, and the criticism heard are all part of the game. I am sorry I could not work all who desired the contact, but better luck next time to those listening in when the call again goes on the air from the 77 acre sand strip.

"Thanks for your interest in the operation, and thanks, too, for taking the time to tune us in."

Here, There and Anywhere

AC4 Tibet: SV0WI recently worked one AC4CE. Keep your fingers crossed.

CR10 Timor: VK2QJ has been refused a CR10 ticket, but VK8OW is still trying for next Spring. Pat Daluz, the original holder of CR10AA in 1949 is now the Portuguese Consul in Darwin, so maybe there is still hope. (*Tnx K2UYG*)

FR7 Reunion Is.: FR7ZG is a new station now active on 14 mc phone. FR7ZD can still be heard on 21 mc a.m.-c.w. about 1400 to 1600 GMT and on 14 mc a.m.-c.w. about 0330 GMT. (*Tnx* DXer)

HK0 Baja Neuvo: The DXpedition of HK1QQ and Co. will take place in April. Operation should begin about the 27th. (*Tnx WGDXC*)

KB6 Canton Island: KB6-land is still active with KB6BC on s.s.b. (14.285) and KB6BS on 14.2 a.m. KB6BU and BR are inactive. Don Miller will soon be on 20 and 15 s.s.b. probably with the call KB6BV using a 30S-1 to a three element Hy-Gain beam. (*Tnx NCDXC*)

M1 San Marino: Ralph, HB9EO, sent this interesting account of his trip to M1-land along with his QSL.

"Having made several DXpeditions to Leichtenstein before with the calls HE1EO in 1947 and in the following years as HB1EO/HE and HB1EO/FL, I decided to go to M1 this year as HE is no longer a rare country as it was earlier. In eight days of operation 1500 contacts were made, about 600 of them with USA sta-

The operating position of M1/HB1EO. See Ralph's story in the text. (*Tnx HB9EO*)

tions. As my XYL, who is Italian, came with me, I was not QRV so often and so didn't make more QSO's, hi.

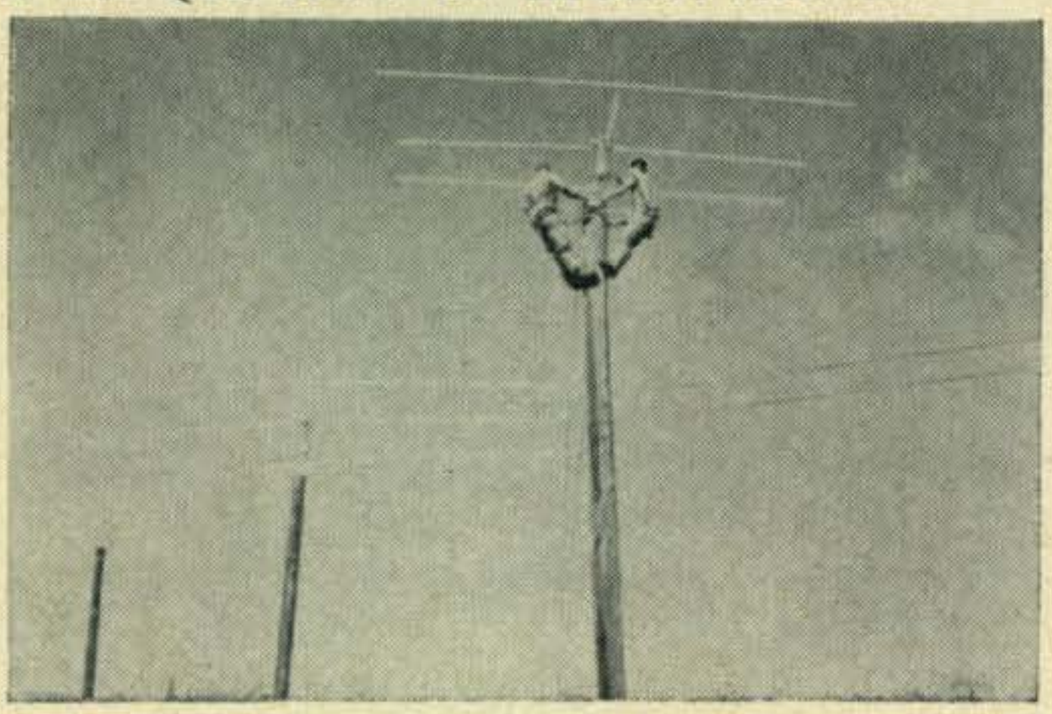
"The equipment was a Viking Valiant and a HQ-180 with a W3DZZ antenna and a dipole for 20 meters. DX conditions were good only on 3 days and the other time quite poor.

"M1 seems to be one of the rarest countries in Europe these days. Most of the time, in spite of rather poor conditions there were so many calls on my frequency that I had to ask to call 5 or 10 kc up. Especially on a.m. it was practically impossible to work on the same frequency, but this method always cleared the situation. With this well-known method, it is possible for every DX station, even with the rarest call, to continue QSO's and to handle pileups in an easy way. MC-type of operation is nonsense and serves nothing.

"One problem, however, was the heavy European QRM because many European stations insisted on calling, even if I mentioned 'DX please—no EU' during the hours, when DX was coming through. This situation was cleared up by QSYing from time to time.

"As already observed by other DXpeditions, USA hams are very good operators with much discipline, but EU stations, generally speaking, have to learn how to operate when calling and working a rare country.

"Please put a notice in *CQ* that QSLs for M1/HB1EO should go direct with IRC to HB9EO unt. Graben 16, Zofingen, Switzerland. I will QSL 100% for all cards received.



The rig and antenna at KH6EGO/KJ6. A separate beam is available for 10, 15, 20 and 40. See Del's story in the text.

Gerry, K8YUW/KR6NN, operating KR6LF. The HT-33A (on end) is now a silent key. Look for them on 15 and 20 s.s.b. and c.w. almost every day *(Official U.S. Navy Photograph)*

"At present, there are 3 licensed stations in San Marino: M1H and M1D are very seldom on the air and only on 40 and 20 meters a.m. M1B, the well known 'Marion' was practically QRT the last year, but is rebuilding his rig and hopes to be active again next year.

"The trip was so successful and so agreeable that I intend to make another trip next year and next time I shall operate s.s.b. and I will take a better antenna with me.

"Please excuse my poor English; I hope you can understand my writing.

"I wish you all the very best of good luck and DX and hope to meet you again."

OY7 Faeroe Island: "I have been corresponding the past several months with Martin Haasen, OY7ML. I am now taking it upon myself to raise the money for a commercial tri-band beam. I would like to raise enough to pay for the beam, shipping charges and for the taxes Martin must pay there on the Faeroe Islands. Incidentally, the beam there in the Faeroe's would cost Martin three months salary.

"I would appreciate it if you would let the DX gang, and any others interested in this project that I would very much appreciate contributions. As you know, Martin is very active and works a.m., s.s.b. and c.w."

The above note is from K9ECE. Any of you fellows who would like to help a good cause, drop a line to Don Wibel, K9ECE, 5115 Delaware Ave., Fort Wayne, Indiana.

PK Indonesia: A contract was awarded recently by the Indonesian Government jointly to Philco and Westrex to install a large microwave and scatter system for telephone communications up and down the various islands. A large number of engineers are to be sent over for installation and maintenance training for over a two-year period. Let's hope a few are hams and can exert some influence in obtaining ham operating privileges. If I remember correctly, Rundy is connected with Westrex in some capacity. If anyone can do it, he can. (*Tnx NCDXC*)

UAØ Tanna Tuva: Speculation that the Tuva area may be reinstated as a separate ARRL

country has come to an end. According to a letter received from Bob White, W1WPO at ARRL to the *Florida DX Report:* "Tanna Tuva, having been proclaimed an autonomous Soviet Republic, will not be reinstated as a separate DXCC country. Tuva made it 18 of this type. It is like UN1 is now". It still remains Zone 23, however, and it offers UAØKYA, UAØKYE, UAØYB and UAØYE. (*Tnx* Florida DX Report)

VP5 Jamaica: Jack Lambert, G3TA, who operated VP4WD on Tobago during 1959/1960, will be in Jamaica operating 20 and 40 c.w. Look for VP5TA, JL or JDL from 2300 to 0200 GMT.

VP5 Turks: "Just a line to let you know what's going on here on Grand Turks. We don't have too much news to add, since our last note to you, but we do have one new face since last time.

"I am sending along a picture of all the hams on Turks, hope you will be able to use it. There are at this time three of us on a.m., one on s.s.b. and one on c.w. VP5CH is on s.s.b., doing some work on 75 meters of late. You will find VP5GT on c.w. most of the day, on ten through seventy-five meters, and the rest of us on the same bands whenever they are open. Not too much work being done on 20 meters from here, as the QRM is pretty rough most of the time.

"We do have a 'Worked All Turks' certificate available now, work three of us to qualify and send an s.a.s.e. to Bert, VP5BB, along with the information as to the stations, dates, times and frequency and the certificate will be sent in return. QSL cards are not required, nor are IRC coupons. By the way, we all send QSL cards out to those stations who send us one. I think we have a very good record on that score. All cards may be sent via VP5BB, or to the address as shown in the *Call Book*.

"I think that's about all the news from here for this time, so 73's from all of us out here."

Thanks to VP5LG for the above info, it looks as though the boys keep the band well covered.

XZ2 Burma: XZ2US, ex K4ZOK, and XZ2VK have been very active lately working 14 mc mostly. 14274 kc on s.s.b. and 14075 kc on c.w. The rig is a KWM-2 and 75A-4.

ZS2MI Marion Island: ZS2MI is able to get on the air only on Sundays at 1400 to 1500 GMT. Look for him on 14060 kc. (*Tnx* DX Magazine)

3A2 Monaco: The following letter from G3CWL should clear a mistake as well as yield some information: "I notice that in your DX section in *CQ* for November at page 126, you state '3A2DA via HB9AAW'.

"As holder of the call sign 3A2DA, I must tell you that this information is not correct. The facts are that the call sign was allocated to me when I went to Monaco in June, 1960. Owing to a 'mistake' the same call sign was given to HB9AAW and HB9AAV when they went to Monaco in August this year. I was also transmitting from Monaco in September this year again using 3A2DA. What a muddle. . . . I have now confirmed from the authorities in Monaco that the call sign is personally allocated to me and I hope to be transmitting from the Principality again next year."

Argentine Antarctic Stations

As you know, all these stations have calls beginning with the letter Z, such as LU2ZM, LU3ZO, etc.

Calls	*Location*
ZA, ZG, ZM	Laurie Island Base, South Orkney Isles.

This is the location of the VS9K DXpedition. The sign says that the normal population is 3000. (*Tnx VE3CFG*)

Alan, G3OLV, on location at Kamaran Island. Alan was G3OLV/VS9K. *(Tnx VE3CFG)*

ZC, ZI, ZO	Deception Island Base, S. Shetland Islands.
ZB, ZH, ZN	Observatory Island Base, Melchior, Antarctica.
ZD, ZJ, ZP	Gen. San Martin Base, Bahia, Marguerita, Antarctica.
ZE, ZK, ZQ	Almirante Brown Base, Antarctica.
ZF, ZL, ZR, ZU, ZV	Bahia Esperanza Base, Antarctica.
ZW	Gen. Belgrado Base, Terra del Coats, Antarctica.
ZY	South Sandwich Islands.

QSL Information: *Army* LU stations with last letters of call, D, J, U, V, W, X, should go to: Sub. of Mayor Carlos E. Cejos, Red. Sirme-Sec Communicacione Comando en Vefe Ejercito, Cabildo 65, Buenos Aires, Argentina. *Navy* LU stations with letters A, B, C, E, F, H, I, L, M, O, P, Q, R, S, T, should go to: Sub. of Ppal Aldo Venaria, Estado Mayor General Naval Communicaciones, Ministerio de Marina, Canzallo 55, Buenos Aires. (*Tnx K6BX*)

160 Meters

Sunday Morning, December 31st, 1961—At 0400 GMT DHJ54/2 (DL-land) was coming thru weakly, but coming thru at all indicates possibility of DX—and sure enough at 0548 W1PPN who "Hears 'em First" QSO'd G3PU, Ern, thru QRM/QSB—reports 449/569. Immediately after 0510 W1BB QSO'd G3PU (and again at 0745 GMT). However, the real excitement of the evening, I should say was HG1AGI, Don, W3EIS, now QTH c/o N.A.S.A., U.S. Embassy, Quito Ecuador. He came on early, 1807 kc CQing repeatedly but not making contact. Later learned his noise level was very high there. At 0645 he answered W1BB's call, giving 579 and receiving 569/QSB—thereafter QSOing W2IU and W9HBB. He could have QSO'd more but his location is a one hour drive from Quito, over poor roads and Don had to get going, however, he will try to be on quite regularly Sunday mornings, especially for the regular test dates. He uses 400 watts and will QSL for sure. (This is, apparently, the first HC-160-meter activity since W1BB's first USA/SA QSO with HC1JW January 20, 1951.

This is the entire ham population of Turks Island, from l. to r.: VP5BB, Bert; VP5CH, Charlie; VP5CW, Chuck; VP5GT, George and VP5LG, Dick. *(Tnx VP5LG)*

Ron PY2AJK is on an extended visit in Japan and would like to hear from his W-friends. His present QTH is Rodrigo G. Rolim PY2AJK, Sumiyoshi-Cho 1 Nakano-Ku, Tokyo, Japan. *(Tns W6SFM)*

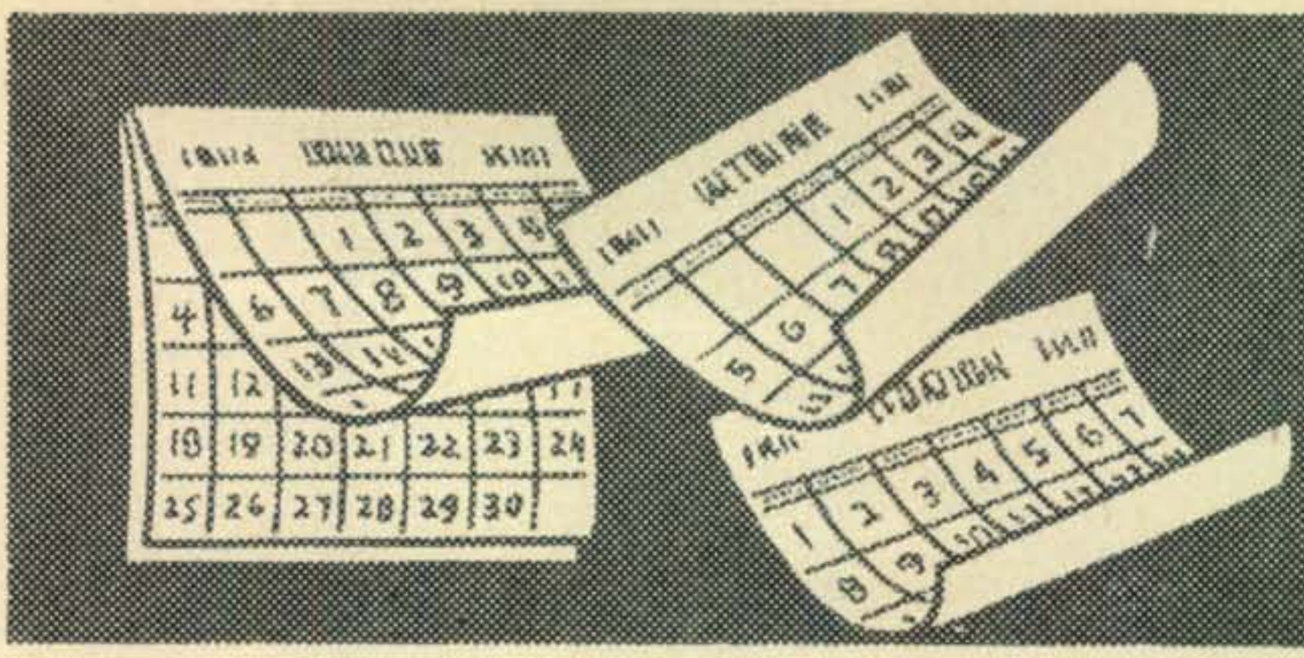
First ever 160 meter s.s.b. transatlantic phone QSO was made by G3CHN and W2FTY December 21st, 1961. Congratulations fellows. (*Tnx K4KSY*)

First Canadian crossing when VE1ZZ QSO'd GD3UB October 10, 1961. Congratulations! K3MBF and G3KOR QSO'd also October 10th.

QTH and QSL Managers

BV3HPT Box 11, Hsintien, Taiwan, Republic of China.
EL6E via VE4OX, Box 4, Winnipeg 9, Canada.
FG7XN Miath Daniel, assainissement A88, Pointe-a-Pitre, Guadeloupe, FWI.
FW7WX QSL Grant, B. P. 137, Fort de France.
FY7YE QSL via W5JLU.
GW8DD Box 190, Dakar, Senegal.
JA1BF JARL Awards Manager. New QTH: Y. Suzuki, 1217 Babacho, Tsurumiku, Yokohama, Japan.
JY2NZK via HB9PL.
KA5AS A. B. Sengletary AT1, Patron 50, c/o FPO, San Francisco, Cal.
KH6EGO/KJ6 517 Langley Loop, APO 915, c/o PM, San Francisco, Cal.
ex-KL7DIR new W2JQU, 1546-A Cedar St., Fort Dix, N.J.
KR6LY via K5PSO.
SM5ZS/ZC6 Bob Eugren, Box 66, Sodenhaven, Sweden.
TL8AC via W8KML.
UH8BO Box 93, Ashkabad, USSR.
UAØBP Box 328, Krasnojarsk 37, USSR.
VKØFZ via W5WW.
VP2SY Box 80, St. Vincent.
VP6PV QSL via W2CTN.
VP8EG For QSO's on or before Oct. 5, 1961 via G8KS; for QSO's after Oct. 5, 1961 via G3-PAG.
VP8GQ via G3PAG, J. J. Davies, 139 The Fairway, Leigh-on-Sea, Essex, England.
VS9MB ARS VS9MB Royal Air Force, Gan, BFPO, No. 1, London, England.
W2WSP/VP9 NASO, APO 856, N.Y., N.Y.
XW8AS MAAG/Laos, Box 179, APO 152, San Francisco, Calif.
XW8AS MAAG/Laos, Box 179, c/o American Embassy, Vientiane, Laos.

[*Continued on page 98*]



CONTEST CALENDAR

FRANK ANZALONE, W1WY
14 Sherwood Road, Stamford, Conn.

CALENDAR OF EVENTS

March	2—4	ARRL DX Phone
March	10—11	B E R U
March	10—12	YL-OM C.W.
March	16—18	ARRL DX C.W.
March	24—25	*CQ* WW DX S.S.B.
Mar. 31—	Apr. 1	Helvetia 22
April	7—8	PZK C.W.
April	14—15	REF Phone
April	14—15	PZK Phone
April	14—15	*CQ* WW VHF
April	28—29	PACC C.W.
May	5—6	PACC Phone
May	5—6	USSR DX
June	1—4	CHC/HTH Party

ARRL-DX

Phone: March 2-4 and C.W. March 16-18. Starting time 2400 GMT Friday and ending 2400 GMT Sunday on each weekend.

The first half had already taken place during February, so if you didn't get in on that one it is too late to do anything about it. However you might want to try the second half, for kicks that is.

B.E.R.U.

Unless you are eligible, avoid calling those juicy pre-fixes you hear during this contest. Its only open to countries that are part of the British Empire, you know.

YL/OM

Starts: 1800 GMT Saturday, March 10th.
Ends: 0500 GMT Monday, March 12th.

The Phone section took place last month, two weeks ago. Above dates are for the C.W. week-end. Check Louisa Sando, W5RZJ's YL COLUMN for February for details. Your logs go to: Lillian C. Byrne, K2JYZ, 24 Stillwell Place, Freeport, L.I., N.Y.

CQ WW SSB

Starts: 1200 GMT Saturday, March 24th.
Ends: 1800 GMT Sunday, March 25th.

Don't forget, you are only permitted to operate 24 hours out of the 30 hour contest period. There have been some rule changes too so be sure to check Dorothy's and Irv's SSB COLUMN for January.

Your logs go to: *CQ* SIDEBAND Editors, 12 Elm Street, Lynbrook, L.I., N.Y.

Helvetia 22

Starts: 1500 GMT Saturday, March 31.
Ends: 1700 GMT Sunday, April 1.

Because of the full calendar of contest activity in April, the USKA deemed it necessary to change their Helvetia 22 Contest to a new date. Rules are the same as in previous years and are as follows:

1. Use all bands, 3.5 thru 29.7 mc, c.w./c.w. or phone/phone.
2. Serial numbers will be the usual five or six digit variety, signal report plus a progressive 3 figure contact report.
3. Each contact counts 3 points and the same station can be worked twice on each band, once on c.w. and again on phone.
4. The multiplier is the sum of Swiss Cantons worked on each band, c.w. plus phone, making a possible multiplier of 44.
5. Your final score therefore will be the sum of QSO points on all bands, multiplied by the number of Cantons worked on each band.
6. Use a separate log sheet for each band and only one side of the paper.
7. Certificates will be given to the two highest scorers in each country. Each district in the United States and Canada will be considered as a separate country.
8. Your logs must be postmarked no later than April 31st and should be sent to: The USKA secretary, HB9NL, Bueron, LU. Switzerland.

Names and abbreviations of Cantons

Zurich	ZH	Scaffhouse	SH
Berne	BE	Appencell	AR
Lucerne	LU	St. Gall	SG
Uri	UR	Argovie	AG
Schwyz	SZ	Thurgovie	TG
Unterwald	NW	Tessin	TI
Glaris	GL	Vaud	VD
Zoug	ZG	Valais	VS
Fribourg	FR	Neuchatel	NE
Soleure	SO	Geneva	GE
Basle	BS	Girsson	GR

K1BVI/2—A portable call does not necessarily mean the station is on wheels. Armed service personnel are allowed to retain their home station call. Here we have Bernie Welch and his fixed portable station at Plattsburgh A.F.B., New York.

Results of the 1961 R.E.F. Contest

C.W.

Call	Score
G3EYN	4437
OH2KH	2992
DJ5VQ	2752
SP5ADZ	2622
YU1SF	2583
OH9PF	2304
PAØLV	2074
SP9CS	1539
HB9DX	1500
TF3AB	1457
OK1RX	1450
SP6BZ	1428
DJ2KU	1380
UA1DH	1323
OH2PT	1320
SP8HR	1300
DM3KBM	1140
LA2Q	1066
UC2KAA	912
SM5TW	875
SP8MJ	850
OK5TK	738
SP8HT	726
HB9UD	689
HA8KCU	589
SM3BYJ	682
DL1IB	546
UQ2BA	540
UQ2DB	484
SM3CNN	468
SL5BH	442
DL1GN	442
OH6AA	432
UP2NV	416
OK3CAT	408
W8JIN	400
SM7AIL	400
SP2CO	391
SP6AAT	391
KP4CC	360
W4HQN	360
W8YAH	352
G2ZR	345
OK1GT	330
OK2KJU	322
W9WIO	320
OE3WB	320
W5KC	315
HA5AW	315
UA3KH	308
OH2YL	288
W9KXK	273
VE1AE	234
YU1AOP	234
OK1NK	209
OK1ADM	192
OZ2NU	182
OK2XA	180
VE1EK	169
SM3AST	169
SM6APJ	165
SP3HD	150
K4TFL	144
SM3CCM	130
OK2BBJ	112
PAØWAC	108
DM2ATL	101
SP6LK	90
IT1TAI	81
SP8KDF	80
DL1YA	72
K1JTL	64
PAØLY	63
SM5BFE	56
W4HYW	56
HA5BI	49
LA6U	35
W2NCG	30
OK2BCB	30
OZ4RT	25
SM6CJK	25
HA5AM	25
UR2BU	20
SM6CWP	20
OK1VK	16
VE2AFC	4
OZ7GC	4
OK1TJ	4
JA8LN	4
OK2ABU	1
LA3DB	1

PHONE

Call	Score
I1FMC	7626
G3NAC	6904
9U5PD	5460
LA5ID	5050
LA9AG	4371
LA5HE	4005
LA8WF	4004
IT1ZDA	3362
PAØNN	3157
EA7JT	2997
CT1FI	2394
PAØLV	2280
DL1IB	1462
SP3HD	1196
SM5CHA	975
DJ2UU	924
YO3RK	851
SM5BFE	672
PAØPAT	660
OH2KO	620
SM5MN	572
GW3LAD	391
SP9RJ	256
SM6AVM	238
SM7BFT	224
HK3TZ	140
HA5DG	112
OH2EW	88
EA7DH	72
PAØPAN	42
ZS4MG	4
SP2SJ	2
VE2AFC	1

P.Z.K.

C.W.

Starts: 2000 GMT Saturday, April 7th.
Ends: 2000 GMT Sunday, April 8th.

Phone

Starts: 2000 GMT Saturday, April 14th.
Ends: 2000 GMT Sunday, April 15th.

This is a new one organized by the P.Z.K. in commemoration of the thousandth anniversary of the Polish state. It's an international type contest but extra credits are given for working Polish stations. Rules are as follows:

1. All bands, 3.5 thru 28 mc.
2. Usual five or six digit serial numbers, RS/RST plus a progressive 3 figure QSO number starting with 001.
3. Each completed contact counts 1 point, but 2 points if made with a Polish station. The same station can be worked once on each band.
4. Your multiplier is determined by the number of DXCC countries worked. In addition each SP call area, SP1-SP9, will also be considered as a multiplier.
5. Final score is the sum of QSO points multiplied by the sum of the multiplier. (The word sum would indicate to me that the multiplier is the total on each band.)
6. There are two classifications, single operator and multioperator (Club) stations. However multi-transmitter operation is not allowed.
7. Awards will be made to the highest scoring station in each classification and section, (C.W. and Phone) in each country. (It is strongly recommended that the committee consider awards for each call area in the USA and Canada and possibly other countries covering large areas.)

There is also an s.w.l. division and scoring is the same as for transmitting entries. However s.w.l.'s are obliged to note the call signs of both stations and the exchanged serial numbers.

R. E. F.

Starts: 1400 GMT Saturday, April 14th.
Ends: 2200 GMT Sunday, April 15th.

Above time is for the Phone week-end. The C.W. contest was on the last week-end in February. (Just about the time you will be receiving this issue in the States.) Rules were covered in the February issue. Logs go to: R.E.F. Contest Committee, B P 42-01, Paris RP, France.

PACC

C.W.

Starts: 1200 GMT Saturday, April 28th.
Ends: 2000 GMT Sunday, April 29th.

Phone

Starts: 1200 GMT Saturday, May 5th.
Ends: 2000 GMT Sunday, May 6th.

Complete rules in next month's CALENDAR.

U.S.S.R.

Starts: 2100 GMT Saturday, May 5th.
Ends: 2100 GMT Sunday, May 6th.

This is a world wide c.w. only contest. We are awaiting a translation of the rules by K3CUI, should have them in next month's CALENDAR.

[*Continued on page 98*]

PROPAGATION

George Jacobs, W3ASK
11307 Clara St., Silver Spring, Md.

LAST MINUTE FORECAST

The following is a forecast of day-to-day propagation conditions expected during March 1962. This forecast attempts to predict *specific* days upon which openings shown in the Propagation Charts in this column are most likely to occur, and the expected quality of the openings. For example, the following forecast shows that circuits rated (2) in the Charts are most likely to open with "good" quality (B) when conditions are above normal (March 1, 13-14 & 28), and with "fair to poor" quality (C-D) on days when conditions are expected to be normal. Circuits rated (2) are not expected to open on those days forecast to be "below normal" or "disturbed", etc.

PROPAGATION CONDITIONS and CIRCUIT QUALITY

Prop. Chart Forecast Rating	*Above Normal Days* Mar. 1, 13-14, 28	*Normal Days* Mar. 2, 9-10 12, 15-20, 25-27, 29, 31	*Below Normal Days* Mar. 3-4, 8, 11, 23-24, 30	*Disturbed Days* Mar. 5-7, 21-22
(1)	C	D-E	E	E
(2)	B	C-D	E	E
(3)	A	B-C	D-E	E
(4)	A	A-B	C	D-E

Where:

A—An excellent opening with strong steady signals.
B—Good opening, moderately strong signals, with some fading and noise.
C—Fair opening, signals fluctuating between moderately strong and weak, with moderate fading and noise.
D—Poor opening, signals generally weak, with considerable fading and high noise level.
E—Very poor opening, or none at all.

THE following is an overall picture of h.f. band openings forecast for March, 1962. For specific times of DX openings refer to the DX Propagation Charts which appeared in last month's column. This month's column contain Short-Skip Propagation Charts for March and April, as well as Charts centered on Hawaii and Alaska. The Short-Skip Charts contain propagation forecasts for circuits varying in length between distances of 50 and 2300 miles. For day-to-day propagation conditions expected during March, see the "Last Minute Forecast," which appears elsewhere in this column.

10 Meters: Few DX openings are expected during March. Some short-skip openings are likely to occur between distances of approximately 750 and 2300 miles, mainly as a result of Sporadic-*E* propagation which begins to increase during March.

15 Meters: While this band is expected to remain the best band for DX during the daytime hours, fewer openings are predicted than during past months. Peak conditions should occur late in the day, and on some circuits to the southern hemisphere, the band may remain open during the early evening hours. Short-skip conditions, between distances of approximately 1000 and 2300 miles, are expected to peak during the afternoon hours.

20 Meters: With longer hours of daylight, 20 meters is expected to remain open somewhat later into the evening hours. It is expected to be the best band for DX openings during the sunrise and sunset periods, especially to Asiatic areas, Australasia, South America and South Africa. Good daytime short-skip openings are expected for distances between 750 and 2300 miles, with many openings lasting through the early evening hours.

40 Meters: Good DX openings are forecast to many areas of the world from sundown through sunrise, with conditions peaking during the hours of darkness. Conditions to Australasia and many other areas in the southern hemisphere are expected to improve considerably on 40 meters during March. Good daytime short-skip openings are expected to occur between 50 and 750 miles, while nighttime short-skip openings are expected between 500 and 2300 miles.

80 Meters: The increasing hours of daylight, as the sun rises higher in the northern sky, results in greater ionospheric absorption and somewhat higher static levels on this band. Although some good DX openings to several areas of the world are forecast for the hours of darkness, signals are expected to be weaker during March, and the band noisier than during the winter months. Good daytime short-skip openings between 50 and 250 miles are forecast, and regular short-skip openings between 200 and 2300 miles should be possible during the hours of darkness.

160 Meters: Increased ionospheric absorption is not likely to permit any daytime openings on 160 meters. Short-skip openings up to 2300 miles, and DX openings to some areas of the world, are forecast for the hours of darkness. The band is expected to be considerably noisier during March than the winter months, as a result of the seasonal increase in the static level.

CQ SHORT-SKIP PROPAGATION CHART

MARCH & APRIL, 1962

OPENINGS GIVEN IN LOCAL STANDARD TIME AT PATH MID-POINT

Band Meters	50-250 Miles	250-750 Miles	750-1300 Miles	1300-2300 Miles
10	NIL	NIL	8 A - 8 P (0-1)	8 A - 3 P (1-0) 3 P - 6 P (1) 6 P - 8 P (1-0)
15	NIL	9 A - 4 P (0-1)	9 A - 1 P (1) 1 P - 4 P (1-2) 4 P - 6 P (0-1)	8 A - 9 A (0-1) 9 A - 10A (1) 10A - 1 P (1-2) 1 P - 2 P (2) 2 P - 4 P (2-3) 4 P - 6 P (1-2) 6 P - 9 P (0-1)
20	NIL	7 A - 12N (0-2) 12N - 4 P (0-3) 4 P - 6 P (0-2) 6 P - 7 A (0-1)	6 A - 7 A (0-1) 7 A - 8 A (2) 8 A - 10A (2-3) 10A - 12N (2-4) 12N - 4 P (3-4) 4 P - 6 P (2-4) 6 P - 7 P (1-3) 7 P - 9 P (1-2) 9 P - 11P (1)	6 A - 7 A (1) 7 A - 8 A (2) 8 A - 10A (3) 10A - 3 P (4-3) 3 P - 6 P (4) 6 P - 7 P (3-4) 7 P - 9 P (2-3) 9 P - 11P (1-2) 11P - 1 A (0-1)
40	6 A - 7 A (0-1) 7 A - 8 A (1-2) 8 A - 10A (2-4) 10A - 6 P (3-4) 6 P - 8 P (2-3) 8 P - 9 P (1-2) 9 P - 11P (0-1)	6 A - 7 A (1-2) 7 A - 8 A (2) 8 A - 3 P (4-3) 3 P - 6 P (4) 6 P - 8 P (3-4) 8 P - 9 P (2-3) 9 P - 11P (1-3) 11P - 2 A (1-2) 2 A - 6 A (0-1)	6 A - 8 A (2) 8 A - 3 P (3-1) 3 P - 6 P (4-2) 6 P - 7 P (4-3) 7 P - 8 P (4) 8 P - 11P (3-4) 11P - 2 A (2-4) 2 A - 6 A (1-3)	6 A - 8 A (2-1) 8 A - 3 P (1-0) 3 P - 4 P (2-0) 4 P - 6 P (2-1) 6 P - 7 P (3-2) 7 P - 2 A (4) 2 A - 5 A (3) 5 A - 6 A (3-2)
80	7 A - 11A (4) 11A - 6 P (4-3) 6 P - 10P (4) 10P - 1 A (3-4) 1 A - 5 A (2-3) 5 A - 8 A (3-4)	7 A - 11A (4-1) 11A - 4 P (3-0) 4 P - 6 P (3-2) 6 P - 8 P (4-2) 8 P - 1 A (4) 1 A - 5 A (3) 5 A - 7 A (4-2)	7 A - 11A (1-0) 11A - 4 P (0) 4 P - 7 P (2-1) 7 P - 8 P (2) 8 P - 9 P (4-2) 9 P - 1 A (4) 1 A - 5 A (3) 5 A - 7 A (2-1)	7 A - 4 P (0) 4 P - 6 P (1-0) 6 P - 7 P (1) 7 P - 8 P (2-1) 8 P - 9 P (2) 9 P - 10P (4-2) 10P - 1 A (4-3) 1 A - 5 A (3-2) 5 A - 7 A (1)
160	5 A - 7 A (4-2) 7 A - 9 A (3-1) 9 A - 6 P (2-0) 6 P - 8 P (4-2) 8 P - 5 A (4)	5 A - 6 A (2-1) 6 A - 7 A (2-0) 7 A - 9 A (1-0) 9 A - 6 P (0) 6 P - 8 P (2-1) 8 P - 10P (4-2) 10P - 4 A (4-3) 4 A - 5 A (4-1)	5 A - 6 A (1) 6 A - 6 P (0) 6 P - 8 P (1) 8 P - 9 P (2-1) 9 P - 10P (2) 10P - 2 A (3) 2 A - 4 A (3-2) 4 A - 5 A (2-1)	5 A - 6 A (1-0) 6 A - 6 P (0) 6 P - 9 P (1) 9 P - 10P (2) 10P - 2 A (3-2) 2 A - 4 A (2-1) 4 A - 5 A (1)

HAWAII

OPENINGS GIVEN IN HAWAIIAN STANDARD TIME***

TO:	10*/15 Meters	20 Meters	40 Meters	80/160**Meters
Eastern USA	12N - 3 P (1)* 6 A - 8 A (1) 8 A - 12N (2) 12N - 3 P (3) 3 P - 4 P (2) 4 P - 5 P (1)	2 A - 5 A (1) 5 A - 7 A (2) 7 A - 1 P (1) 1 P - 3 P (2) 3 P - 6 P (3) 6 P - 7 P (2) 7 P - 9 P (1)	6 P - 7 P (1) 7 P - 9 P (2) 9 P - 12M (3) 12M - 2 A (2) 2 A - 3 A (1)	7 P - 9 P (1) 9 P - 12M (2) 12M - 2 A (2) 9 P - 12M (1)**
Central USA	11A - 12N (1)* 12N - 3 P (2)* 3 P - 4 P (1)* 6 A - 8 A (1) 8 A - 1 P (2) 1 P - 3 P (4) 3 P - 4 P (3) 4 P - 5 P (2) 5 P - 7 P (1)	5 A - 8 A (2) 8 A - 1 P (1) 1 P - 3 P (2) 3 P - 4 P (3) 4 P - 7 P (4) 7 P - 8 P (3) 8 P - 10P (2) 10P - 1 A (1)	6 P - 7 P (1) 7 P - 9 P (2) 9 P - 1 A (3) 1 A - 4 A (2) 4 A - 5 A (1)	7 P - 9 P (1) 9 P - 1 A (3) 1 A - 2 A (2) 2 A - 3 A (1) 8 P - 1 A (1)**
Western USA	10A - 12N (1)* 12N - 4 P (2)* 4 P - 6 P (1)* 7 A - 8 A (1) 8 A - 9 A (2) 9 A - 11A (3) 11A - 4 P (4) 4 P - 5 P (3) 5 P - 6 P (2) 6 P - 7 P (1)	4 A - 6 A (2) 6 A - 11A (4) 11A - 3 P (3) 3 P - 6 P (4) 6 P - 8 P (8) 8 P - 10P (2) 10P - 2 A (1)	4 P - 6 P (1) 6 P - 8 P (2) 8 P - 3 A (4) 3 A - 5 A (3) 5 A - 6 A (2) 6 A - 7 A (1)	6 P - 8 P (1) 8 P - 3 A (3) 3 A - 4 A (2) 4 A - 6 A (1) 8 P - 12M (1)** 12M - 2 A (2)** 2 A - 4 A (1)**

*Indicates predicted 10 meter openings
**Indicates predicted 160 meter openings

***To convert from Hawaiian Standard Time to:

Eastern Standard Time, ADD five hours (12 Noon HST is 5 PM EST);
Central Standard Time, ADD four hours (12 Noon HST is 4 PM CST);
Mountain Standard Time, ADD three hours (12 Noon HST is 3 PM MST);
Pacific Standard Time, ADD two hours (12 Noon HST is 2 PM PST).

ALASKA

OPENINGS GIVEN IN ALASKAN STANDARD TIME***

TO:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	1 P - 4 P (1)	1 P - 3 P (1) 3 P - 5 P (2) 5 P - 7 P (1)	10P - 4 A (1)	NIL
Central USA	2 P - 5 P (1)	3 P - 6 P (1) 6 P - 7 P (2) 7 P - 9 P (1)	11P - 4 A (1)	NIL
Western USA	3 P - 6 P (1)	10A - 3 P (1) 3 P - 7 P (2) 7 P - 10P (1)	12M - 6 A (1)	1 A - 5 A (1)

***There are four different time zones in Alaska. This Chart is based on standard time in the zone from Skagway to 141 degrees west longitude. To convert from standard time in this area (AST) to:

Eastern Standard Time, ADD four hours (12 Noon AST is 4 PM EST);
Central Standard Time, ADD three hours (12 Noon AST is 3 PM CST);
Mountain Standard Time, ADD two hours (12 Noon AST is 2 PM MST);
Pacific Standard Time, ADD one hour (12 Noon AST is 1 PM PST).

Forecast Ratings

The numerals appearing in parenthesis following each predicted time of opening indicate the total number of days during each month of the forecast period that the opening is expected to occur, as follows:

(1) Less than 7 days
(2) Between 8 and 13 days
(3) Between 14 and 22 days
(4) More than 22 days

On the Short-Skip Propagation Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance, and the second to the longer distance, for which the forecast is made.

For the specific days of each month on which a particular opening is most likely to occur, as well as a day-to-day forecast of reception quality (signal, noise and fading levels), see the "Last Minute Forecast" which appears elsewhere in this column.

A - A. M. P - P. M. N - Noon M - Midnight

The CQ Short-Skip Propagation Charts are based upon a CW effective radiated power of 75 watts from a half-wave dipole antenna, a half-wave or higher above ground. The Charts are valid through April 30, 1962. These forecasts are based upon basic propagation data ppublished monthly be the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

Ionospheric propagation may be possible on the v.h.f. amateur bands during auroral disturbances (see "Last Minute Forecast" for likely dates), which occur frequently during March and the spring months. Meteor-type ionospheric openings are likely to occur during March 10-12 and 20th, when minor meteor showers are expected.

Sunspot Cycle

The sunspot cycle continues to decline. The Zurich Solar Observatory reports a monthly sunspot number of 38 for December, 1961. This results in a 12-month running smoothed sunspot number of 55 centered on June, 1961. The sunspot cycle is based on the smoothed sunspot number.

Sunspot activity at the present time is at about the same level as was observed during the spring months of 1952 and 1942. A smoothed sunspot number of 40 is predicted for March, 1962.

The shortwave service of the Swiss Broadcasting Corporation recently announced a change in its schedule for English language sunspot number broadcasts. These broadcasts, which contain the latest sunspot observations of the Swiss Federal Observatory, are now beamed to North America on the *first Friday* of each month, at 8:55 and 11:40 P.M., EST, following the "Alpine Echos" Swiss musical program. These special five minute broadcasts are transmitted on 11865, 9535 and 6165 kc, and are followed by the Swiss Broadcasting Corporation's "DX Corner" program, which is devoted to fifteen minutes of late news concerning amateur radio, shortwave listening, and DX in general.

[*Continued on page 104*]

Space Communications

GEORGE JACOBS, W3ASK
11307 CLARA STREET,
SILVER SPRING, MARYLAND

OSCAR I's 100 milliwatt beacon transmitter on 145 mc went silent on Monday, January 1, 1962 after three weeks and 312 revolutions in space.

Launched December 12, 1961 with an expected life of approximately three weeks, OSCAR's "HI" signals in Morse Code were heard loud and clear in all corners of the earth until Saturday, December 30, when battery deterioration caused the "HI" transmissions to change to a continuous series of dots. On Sunday, December 31, OSCAR was reported sending an almost continuous carrier, broken by intermittent dots, and an occasional "HI". As the batteries continued to deteriorate, OSCAR's signal became intermittent and weak. OSCAR's weak, intermittent carrier continued through the early hours of the New Year, but on its 322 orbit around the earth, the transmitter went silent.

Data Reduction

OSCAR I has ushered in the space age for amateur radio. The initial phase of this thrilling venture has ended successfully. The imporant task of data reduction is now underway. More than two dozen radio amateur volunteers at Project OSCAR's Sunnyvale, California headquarters are carefully examining for technical and scientific information, the mountain of reports that have been received from all corners of the world.

The analysis has already shown that the data has been of sufficient excellence to establish the orbital parameters of the satellite with a high degree of accuracy, temperature of the package, tumbling rate and maximum reception range. It has already been noted that OSCAR's signals were sometimes lost in areas of auroral disturbances, and that the last "I" was often reported missing by stations hearing OSCAR in the high latitudes. Another unusual phenomenon already detected from the analysis of OSCAR's data is that the signal often reappeared for a minute or so, after the satellite had dropped below the horizon.

No doubt, many more additional bits of valuable information will be uncovered from the examination of the thousands of OSCAR reception reports. As soon as the data reduction is complete, a full report will be published.

All reception reports of the satellite sent to ARRL or to the Project OSCAR headquarters *by mail,* will be confirmed with a special OSCAR QSL card. Reports sent in by radio should be confirmed by mail in order to receive the special QSL card.

OSCAR Acclaimed

No other amateur activity in recent years has so fired the imagination and thoughts of the general public. Congratulatory messages streamed into OSCAR headquarters from statesmen, scientists, radio amateurs and the general public, both in this country and from many foreign lands.

National and international reaction to OSCAR I has been excellent, and wide and valuable publicity has been received from press, radio and TV coverage. Project OSCAR has done much to prove once again that amateur radio can participate in useful scientific experiments that provide valuable information. The results achieved with OSCAR I are a great credit to radio amateurs everywhere.

OSCAR II

The success of OSCAR I emphasizes the great need for additional scientific data that only a beacon transmitter can provide. Accordingly, a second beacon transmitter for operation on 145 mc, similar to OSCAR I, has been put through its required tests, and is now ready for launch (see photo of OSCAR II).

Although a launch date for OSCAR II has *not* yet been established, discussions are under-

Serge Canivenc, F8SH (left), shown with CQ's Space Communications Editor, W3ASK (center), and Leonard Jaffe, K3NVS (right), during a recent visit to the United States. F8SH is Radio Propagation and Space Communication Editor for *RADIO REF*, the French Amateur Radio Journal, and he is also in charge of building France's first space telecommunication ground terminal. K3NVS is in charge of space communications for NASA. (*Photo by Ronald Jaffe*).

Here's the first photograph taken of OSCAR II, as the Project Engineers complete initial tests on what is hoped soon will be amateur radio's second space-born 145 mc beacon transmitter. Shown holding OSCAR II are (left to right): Orv Dalton K6VEY, Harry Workman K6JTC, and Chuck Smallhouse WA6-MGZ. (*Photo by K6GJ*).

way with Government officials with an early spring date in mind. During the spring months there is an increase in Sporadic-*E* propagation and meteor activity, both of which play an important role in v.h.f. propagation. Launching OSCAR II during this period could reap a bonus of scientific information.

More on OSCAR II next month.

OSCAR Reports Not Third Party Traffic

On December 29, 1961 the FCC announced that provision 1561 of the Geneva Radio Regulations, concerning third party traffic, *is not* applicable to the collection of OSCAR reports relayed to U.S. amateurs from overseas stations.

This announcement broke a bottleneck that began to develop when many U.S. amateurs were unwilling to accept relay of OSCAR data from overseas amateurs in countries which have no third-party traffic agreement with the United States.

U.S. to Host International Space Meeting

The United States will play host to a large number of leading communication scientists and engineers from more than two dozen countries who are expected to attend meetings of Study Group IV of the International Radio Consultative Committee (CCIR), being held in Washington, D.C., March 10-23, 1962.

The CCIR is a specialized committee within the framework of the International Telecommunication Union, and is responsible for the study of technical and operating questions relating to radio communications on an international level. Study Group IV is studying questions regarding systems of telecommunication with and between locations in space.

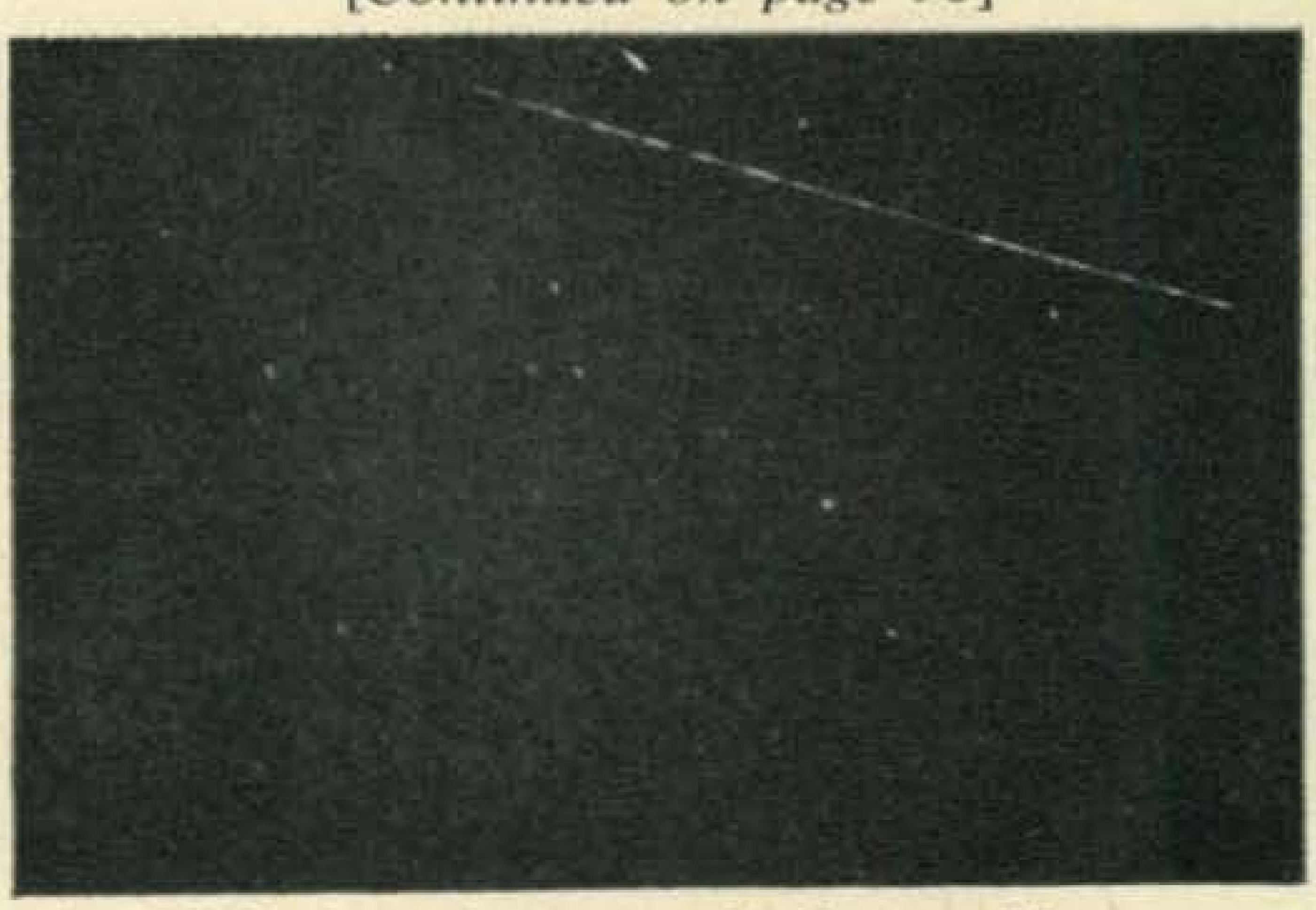
Formed in 1959, this will be the first international meeting of Study Group IV. Under consideration during the two week meeting will be questions concerning all technical phases of space communications, with heavy emphasis on those factors affecting the selection of frequencies for telecommunication with and between space vehicles.

Reports and recommendations drafted at this meeting are expected to play an important role in the development of future space telecommunication systems, and in subsequent international discussions where agreement may be sought for internationally regulating space for

Book Review

The exploration of space during the past four years has been a dramatic experience for

[*Continued on page 98*]



The ECHO I passive communication satellite seen recently travelling across the night sky over the Mediterranean island of Mallorca. Direction of travel is from left to right. Picture was taken by Gunter Joraschkewitz, HB9UD, using an Exakta Varex II camera with a Zeiss Tessar f/2.8 50mm lens. High speed Ektachrome (daylight) film was used, at a lens opening of 2.8 and a 60 second exposure time. ECHO I, in orbit for nearly a year and a half, is still rendering useful data, although it is now distorted somewhat in shape.

sideband sideband sideband

SIDEBAND

IRV and DOROTHY STRAUBER,
K2HEA/K2MGE
12 ELM STREET, LYNBROOK, NEW YORK

SSB DX HONOR ROLL

TI2HP	258	W3MAC	201
VQ4ERR	257	W5KFT	201
W8PQQ	251	PZ1AX	201
W8EAP	246	W1LLF	200
W6UOU	243	W2TP	200
W2ZX	242	WØUUV	200
PY4TK	234	W3LMA	200
WØQVZ	230	K6LGF	188
K2MGE	227	W2YBO	187
W2FXN	225	K2FW	181
K9EAB	225	DL1IN	178
W6RKP	224	K1IXG	178
MP4BBW	224	W3VSU	177
W6PXH	222	G8KS	177
W2JXH	221	W2VCZ	175
VK3AHO	220	WA6EYP	175
W6BAF	219	W2HXG	175
K4TJL	216	G2BVN	175
W6WNE	215	W2NUT	175
K8RTW	206	W5RHW	175
W3KT	205	G3NUG	175
W5IYU	204	K6MLS	171
W2LV	203	W1AOL	171
G3AWZ	201	PJ2AA	170
K6ZXW	201	K4ASU	168

CQ SSB STICKERS AND CERTIFICATES

Worked 250
VQ4ERR W8PQQ

Worked 225
K2MGE

Worked 200
W3LMA W3KT
WØUUV PZ1AX

Worked 175
G8KS G3NUG

Worked 150
K4ASU

Worked 125
G3NUY K9PPX

Worked 100
KP4GN W4VCB/KL7
W2PTM K1JMV
K1GHT K8ONV
K1JDN K8NZD

Worked 75
K4VQP ON4QX
WA2EQQ

Worked 50
XZ2SY K9JTD
W8EVZ K4HMX
UF6FB

Third Party or What?

The 1959 Geneva Radio Regulations, Chapter X, Article 41, Section 1561 S 2, are quite specific. It states, 'When transmissions between amateur stations of different countries are permitted, they shall be made in plain language and shall be limited to messages of a technical nature relating to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. *It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties*'. Section 1562 S 2 further states, 'The preceding provisions may be modified by special arrangements between the administrations of the countries concerned'.

Nothing could be simpler yet inadvertently we are violating the letter of this law daily on the ham bands because there is no clearly understood definition of just what "third party traffic" constitutes. Not only is the newcomer bewildered, but the "old timer" cannot be sure of his interpretation, a result of many years of hearing differing opinions and conflicting reports from other hams.

It would seem, on the surface, that transmitting "messages" between two stations for the benefit or at the instigation of someone other than the operators of the respective stations would be a clear violation of the article in the Convention. Not so clear are the borderline cases. How would you treat the following conversation between operators in two countries not party to a third party agreement?

Station 1. "By the way, I saw your son yesterday and he said he was leaving for home. When you see him, give him my regards."

Station 2. "When I see him, I will."

Innocent enough? Third party traffic? Station 2 received an FCC citation for third party traffic!

The Amateur fraternity can take measurable pride in the self-policing system which has functioned admirably over many years. The system has worked only because we knew the rules of the road. The new amateur was briefed first by the regulations he had to know in order to pass the test for his license and secondly by his on-the-air contacts in which he emulated the veteran hams he met and talked with. By the gradual process of listening and reading the various publications, he acquired a certain amount of "savvy" and rarely, if ever, was on the receiving end of a pink ticket.

Times have changed, the pace has quickened and the new operator not always has time to steep himself in the lore and rules, written and unwritten, of proper operating before he is faced with a situation that could make him a target for a citation. Sideband in particular has attracted many new hams who may run afoul of the regulations before they realize that they are on forbidden ground. In the absence of

a definition, a meaningful one, many a ham, neophyte or veteran, will come a cropper when, unwittingly, he sends his regards to a friend or even asks one ham friend to ask another to "get on the air" for a chat.

We might be accused of kicking a sleeping dog by raising the question, but it does seem that the FCC is taking a renewed interest in enforcing this rule, which they have every right to do. We do feel, that in fairness to the fraternity, a more specific explanation of the words "third party traffic" is very much in order. This is one specific item and an important one. Phone patching seems to have become a sideband way of life, like it or no. Unwittingly violations of this rule and others by the seemingly harmless exchange of remarks concerning mutual friends, hams or otherwise, could be avoided by some explanatory words on the part of the FCC. We ask for some explanation of what constitutes "third party traffic."

Perhaps the easiest way would be to publish the contents of citation notices issued without, of course, mentioning the stations involved since no station licenses are being revoked or suspended unless the violations are flagrant. In this way, we can become more familiar with the way the monitoring stations are interpreting the rules. The border line cases are the ones which interest us most; direct violations such as phone patching between two non-agreement countries are obvious.

We are prepared to open this column for such a purpose. If you have received a citation which if published, would help someone else avoid making the same mistake, send it to us. We'll keep the parties involved secret; we're interested only in the facts which led to the citation.

Happy Coincidence

Thanks to Ben Snyder, W2SOH, of Harrison fame, we can pass along what we think is an amusing anecdote. Recently a W7 operator (we couldn't get the whole call) picked up a KWM-2 package complete with portable antenna and installed the station in his room on the sixth floor of the Statler Hilton Hotel in New York. Whiling away his time between business conferences, he called CQ one evening and was answered by a W6 station for a real solid contact. The W6 eventually inquired as to the location of the portable designation and was told that the rig was being operated from a room at the hotel. As we reconstruct the conversation, it must have gone like this:

W6XXX "Say, old man, you have a real fine signal. Where did you say you were?"

W7YYY/2 "I'm operating a KWM-2 from the 6th floor of the Statler here in New York."

W6XXX "Well I'll be darned. I'm using the same rig . . . on the 4th floor!"

Mr. and Mrs. Ed Bonnet, W8OVG, of Dayton, Ohio, where Ed was honored last year as the outstanding amateur of the year.

A gentleman who has long been outstanding for service to other hams is Ralph Barber, W2ZM, Secretary of the QCWA, and a long time member of the sideband fraternity. Ralph travels all over the country on behalf of the QCWA and has probably met more hams personally than any one else we can think of.

We Have Done It

We receive at our house the publication of the South African Radio League, a most interesting publication. With articles in both English and Afrikaans, it is the only ham publication we have seen that carries a front page ad (a common practice among the English Commonwealth publications) for a washing machine! With a refreshing candor, the editors give the reason of the need for revenue to keep the magazine coming out each month! But this is not the reason for the pat on the back; the story is on page 5 under the heading "We Have Done It."

The story relates the treatment given a broadcasting station operating illegally in the 15 meter band; right in the middle of the ham band. To quote "—a few of the locals immediately put our plan into operation, of using our rightful frequencies for testing purposes. DX stations reported that our efforts were being heard in Europe and that reception of the broadcasts was spoilt by c.w. and heterodynes. Within one week the b.c. station disappeared from the scene. On 20 meters, the boys have also been active and whether it is

Zone 19 operation by the Russian amateurs above. L. to r. Victor, UA3AT/Ø; Vlad, UAØJA, chief of club station UAØKJA; and Ros, UAØBP completed WAZ-SSB for many sidebanders throughout the world. So many contacts were made by Ros during his DXpedition to Zone 19 that he lost his voice and had to return to c.w. for several months! Let's hope that Ros has now recovered and is back on sideband from his home in Zone 18 which is still needed by many. *(Photo courtesy Leo, UA3CR.)*

imagination or not, we are not sure, but the number of commercials seems to have decreased slightly. Enlist the help of all your friends and let us rid the Amateur Bands of unauthorized transmissions."

We ain't suggesting, we merely doff our sombreros in a south easterly direction!

Getting The Right Start On Sideband

The 40 and 75 meter bands have shown greater inclinations to remain open for longer distances and later hours than during the past six years, due to the change in sunspot activity. (Although we personally have not, as yet, become familiar with 160 meters, we believe that it reacts similarly to 75.)

40 meters is an excellent band during the daylight hours with good contacts possible between purely local areas and areas many hundreds of miles away. Sideband operation is most prevalent from 7203 to 7230 (lower sideband) and 7290 to 7296 (upper sideband). Unfortunately, there is so much heavy commercial broadcasting interference on 40 during the evening hours, that it is difficult to find a clear spot for sideband operations. However, through judicious zero-beating of a less strongly modulated broadcast, it is still possible to make limited use of this band. At the top end, the interference is not quite so severe and the sideband group finds it easy to maintain nightly roundtables including DX stations from various parts of the world.

75 meters—now here is truly a coat of many colors! Depending upon how you look at it, 75 can provide you with some wonderful opportunities for sideband contacts or it can be one of the most frustrating experiences of your ham career. Unless you are a member of a group meeting regularly on a certain frequency or a member of a sideband net, making a contact on 75 is quite often hopeless. In several test cases, we have tried calling CQ on 75 meter sideband, knowing that there is plenty of activity on the band, and have met with no response. The tendency on 75 is to join one of the many roundtables in operation even though it means acclimating yourself to a new way of life. Your best bet is to listen around the band (lower sideband, by the way) until you find a congenial group; then call one of the operators and announce your call during a lull in the conversation. Before you know it, you'll be drawn into the conversation and from then on, it's up to you! You can either just sit and listen, making a transmission only long enough to identify yourself or you can contribute some words of wit or wisdom that will interest the group.

If a roundtable gets so tremendous that one identification period almost lasts long enough to blend into another, it might be a good idea for a small group to break away to another frequency and start their own roundtable. In this way, there'll be a continuity of operation that will make 75 meters more enjoyable for all.

Last month's column carried a fine article by Bill Leonard, W2SKE, on working 40 and 75 meter DX so there is need to make further comments on that score. We hope that you all read Bill's suggestions and that they work out well for you.

In this series of articles on sideband operation and procedure, we have tried to put ourselves in the position of a newcomer to sideband and anticipate some of the questions that might arise. We hope that we have been of some service to those of you who have recently joined the sideband fraternity. Any aspects of sideband operation that we have not covered may be discussed further through the mails. All we can wish for you is that you enjoy your sideband operation as much as we have enjoyed ours.

Two top men in ham radio industry are Ben Snyder, W2SOH, Vice President and General Manager of Harrison Radio, and Frank Lester, W2AMJ, Vice President of Hammarlund.

Here's an outstanding shack that many sidebanders would like to copy! Ira, W4KKG, of Jeffersontown Kentucky, looks very much at home here as well it might since he is the proud owner and operator of this fine station.

Looking Back

If it weren't for Ted Wilds, KZ5SW, we'd probably miss out on a lot of information that should be of interest to you. For example, referring to our December column, Ted suggested that we clarify the point about "tailending." It has recently come to our attention that the FCC is again issuing citations for this practice as well as for the unidentified "break break." Amateur radio regulations call for a station not only to clearly indicate his own call but also that of the *station being called!* So, if you want to let a station know that you are on the frequency, be sure to use his call as well as your own.

Another interesting comment made by KZ5SW concerned QSLing. He suggested that you ask each station to whom you intend to send a QSL whether he is OK in the *Call Book* or not. (That is, each station with whom you have a ragchew; NOT a DXpedition operator or a rare new DX station who will announce QSL information from time to time between contacts!) With the steady increase of sidebanders, many of whom have only recently returned to hamming, you will find more and more often that only the most recent *Call Book* is up to date and who among us, replaces this reference every season? Quite often, in querying a station, you'll find that either he is listed only in the latest *Call Book* or his address is changed from a previous listing. So, during a QSO, take a minute and check the address, it will certainly save you much time and frustration!

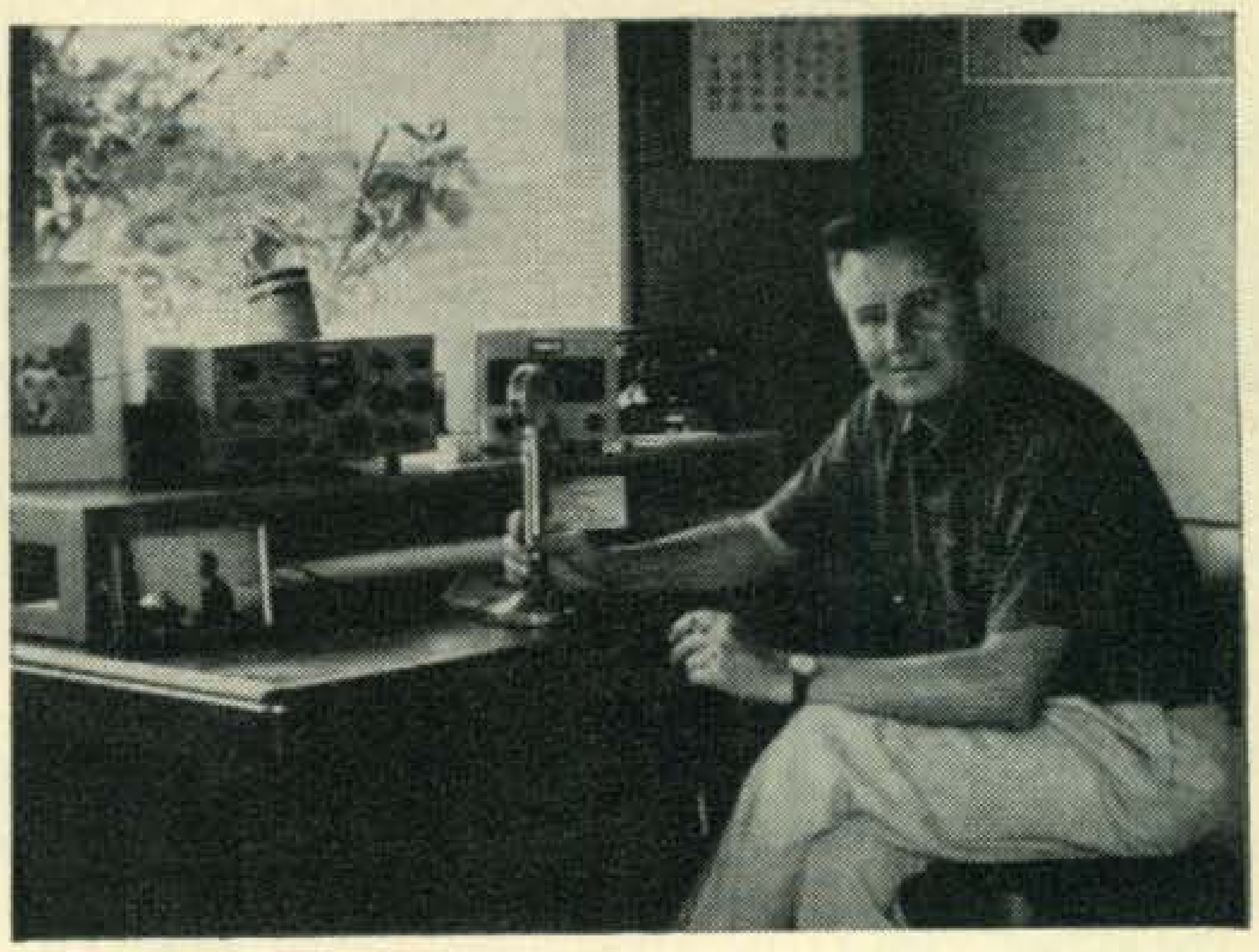
Some time ago, we indicated that IRCs are useless in many parts of the world. For example, in the Canal Zone, an IRC for which we pay 15¢, is exchangeable only for a 4¢ stamp. Therefore, it seems quite logical to follow the suggestion of KZ5SW that a dime would be more effective inasmuch as it buys not only a card but an envelope and a 7¢ airmail stamp in the Canal Zone as well! This sending of currency holds true for other areas as well where the DX boys would like to subscribe to U.S. ham magazines but can't get the necessary U.S. funds. Many of you have spent a great deal of money on IRCs in the mistaken notion that you are extending all courtesy and consideration to the DX station. A dime or quarter or a stamp of the country involved would get you better results faster!

Sideband Around The World

Thanks again are due Leo, UA3CR, for arranging to have s.s.b. operation from Franz Josef Land (UA1KED) begin in conjunction with our DX contest. UA3AT and UA3FE were mentioned as the probable operators and it is expected that activity would continue for 10 days to two weeks. . . . Herm, HK1QQ, heads another DXpedition in April, this one to Baja Nuevo. A large group of operators, including HK3LX, HK3TZ, HKØAI, W8FGX, W6HAW, W4QVJ, W4DQS, and W4CKB, will keep the two transmitters hot on s.s.b., a.m., and c.w. for about five days. . . . CR7IZ is another newcomer to sideband operation. . . . It was good to learn that both George, ZS7S, and Bruce, VK3BM, are planning to visit the States and Canada later this year. . . . Hugh, ex-VO2AD, is now VE2WM/2, located on Anticosti Island, and again active on 20 and 75 meters. . . . Art, VE6BY, devoted part of his holiday in the Caribbean during January to operating as VP2AC and VP4BY. . . . Dave, 5H3HH, is another of the many DX stations making use of the fine QSL service of John, W2CTN.

Augie, EL1G, is again active on sideband from the Firestone Rubber Plantation in Liberia after a 6 month holiday in Europe during which he visited his daughters at school in France. . . . Bushy, ZS6YQ, is a sales representative in a big way. He sells locomotives! . . . As soon as John, now PJ3AR, fulfilled the residence requirements on Aruba, he hastened to get his amateur license and get on sideband. John is one of the engineers with the Standard Oil Co. of New Jersey refining plant in Aruba. . . . Ruth, 9G1YL, and UA3CG are two of the DX YLs active on s.s.b. . . . Hans, PAØZD, has a unique method of keeping his patients' minds off his dental drill. He keeps a rig right in his office in The Hague. Thanks to Steve, WA6NDO, and Glenn, WA6FJE, there'll be increased sideband activity from Tahiti. They sent a complete station to Ray, FO8AQ, whom they met during a film junket to Tahiti last year. Ray has been licensed for many years but was never able to assemble a station for himself. . . . Will wonders never cease? Our roving friend, Cal, ex-5A5TR, etc., married a Norwegian girl and is now back in the States, rumor has it in Philadelphia. . . .

[*Continued on page 106*]



Dave Packard, who as YN1TAT and now as HH2P, has become one of the most popular and best known sidebanders in the world.

VHF

DONALD L. STONER, W6TNS
P.O. BOX 137, ONTARIO, CALIF.

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

It is a great pleasure for me to take over the reins of the VHF COLUMN. I have always had a special fondness for the high frequencies. My first "experimental transmissions" were on 432 mc with a derelict surplus APS-13. Later, when I was licensed, I moved down to the more populated two meter band.

For the past five years I have resided on the d.c. bands with only an occasional excursion to two meters to talk with the Novice residents. Upon looking around now, I find the state of the v.h.f. art has left me behind. Amateurs are doing what would have been impossible five years ago. I have a lot to learn and I hope you will enjoy learning with me.

The Video Rangers

Bob Brown, the previous conductor of these proceedings, unleashed a Pandora's Box with his editorial comments a few months ago. As a result I received a flood of vitriolic letters on the subject of Technicians.

I have no desire to antagonize anyone and don't wish to start a running gun battle with the Technicians. However, like the majority of people who took the trouble to write on the subject, I have some definite opinions. In many cases they are opposite Bob's.

As Al Placa, K2DDK, put it, "Have you ever wondered *why* the topic did not die off years ago? Who put the Technician at the lowly status of 'second class ham'?" For the most part it is the Video Rangers themselves who have perpetuated the stigma connected with the Technician class license.

Before I saw completely through this particular limb, I should add that I have many friends who are technicians. For the most part they are fine people who conduct themselves on the air properly. The tech license serves their purpose ideally and they have no incentive to bother with the General class exams. This is their business and my comments are in no way directed at them.

Carl Drumeller, W5EHC, expressed the majority opinion with: "most operators do not object to the Technicians because of their particular class of license. They object to the technicians because a very large percentage of them obtained their license by fraud."

The boys in California have a neat gimmick going for them. The code test, an easy 5 words per minute, is taken before a General class ham. After legally passing the test, our budding Technician decides to wait a few days before tackling the written exam. Our gullible General never sees his protege again! The law permits any adult, ham or not, to sign for the written part of the exam. Thus big brother, on his weekend home from Crib College can sign. Uncle Lushwell can sign or our boy can go into the handwriting business himself. It would be interesting to know how many Technician applications have two different signatures at the bottom.

The original purpose of the Technician license was to permit model airplane enthuasists to fly their R/C gear without going the 13 word per minute route! It was also introduced to allow serious v.h.f. experimenters access to the frequencies above 50 mc. Since its inception almost 10 years ago it has been prostituted by a small minority group of people with box-top licenses and those who use the microphone like a switch blade knife. Their only contact with electronics is hot-jumping ignition switches.

If you are one of the majority of "up and up" technicians don't be offended by my remarks. They were not meant for you. If you don't like the stigma connected with your license, bone up for the General class. It's a lousy form of incentive, but it's all we have!

VHF Around the World

American hams certainly have no corner on v.h.f. interest or activity. Even with this knowledge, I was still surprised to learn of the activity in the Middle East from the well traveled and many call lettered Bryan A. Bisley, currently ZC4B. He writes: "The main centre of v.h.f. activity is the Island of Cyprus. There are a number of stations equipped for two metres, the most active of whom are ZC4MO, (QTH-Mount Olympus at 6500') and ZC4WR (QTH-Limassol at sea-level). There are also stations active in Nicosia and due to the mountainous nature of the island's terrain they are workable from Limassol only by knife-edge refraction.

"In Lebanon there are a number of stations

active on two, in and around Beirut. They include OD5CG, OD5DT and OD5CU. OD5CC and OD5CN will also be on two shortly. Cyprus is easily worked from Lebanon (distance of about 150 miles) and nightly skeds take place. Signals in the summer season are exceptionally good for the distance and are nearly always S9 plus. In winter, signal-levels vary considerably and appear to be at their lowest during rainy weather.

"In Israel 4X4AS is active on two and has been worked many times by ZC4 stations. He can also be heard in Lebanon, but contacts between OD5 and 4X4 are not allowed.

"The best DX so far worked from Beirut is Athens, Greece but stations at greater distance have been heard. Meteor scatter tests are being run between Beirut and MP4BBW, Ian, on Bahrain Island, on the two-metre band, the distance involved being about 900 miles.

"There are a few stations on, or building for two, in the Persian Gulf. MP4BBW is on from Bahrain, with MP4BBL, MP4BCC and MP4-BDC building. MP4BBW has worked into HZ1AB, Saudi Arabia on two. There are also a couple of stations on from Kuwait (9K2) and general interest seems to be building up in that area.

"On 70 cm/s, OD5CG has been heard by ZC4WR and worked cross-band 420/144. It was noted that the signals were stronger on 420 than 144, even though OD5CG's power is far less on 420. Tests are continuing and more 70 cm activity is hoped for this summer.

"Although stations in I.T.U. Region I are not allowed to transmit on six metres, both ZC4WR and myself listen nightly on 50.04 mc for ZE2JV, ZS1LA and ZS6PW who are often heard at quite good strengths by means of the trans-equatorial propagation phenomena.

"As I travel around from country to country in the course of my work, my own equipment consists of a Gonset Communicator IV and a 4 el. Yagi. In Beirut, where I am still awaiting my license, I have a 10 over 10 el. Yagi and I add a Nuvisitor pre-amp and a 5894 linear to the Communicator as out-board units for 144 mc. For six metres I have a 4 el. Yagi into a HQ-170 with a 6BQ7 pre-amp. I also hope to be on 420 mc before long and am building a tripler.

"I will be taking my Communicator around the Persian Gulf shortly and hope to work MP4BBW and the others from Kuwait, Qatar, Das Island and Trucial Oman. If successful I will write further notes to let you know the results."

From Sidcup, Kent, England, George Haylock, G2DHV, writes to say he is gearing up for OSCAR and Echo II experiments. Speaking of OSCAR and G-land hams, the RSGB is to be commended for their assistance. They airmailed a huge pile of tracking reports to the OSCAR Association, collected from English hams participating in the program. Returning to George, he writes that G5MA worked DL6OS, OZ5BK, G3ABH heard several SP and OK stations while G3ILD has heard OK stations and SP4GZ. In Ireland, GI3GXP, GI5AJ and GI3OFT are active on v.h.f. HB1QQ worked for a new country via tropo opening which included DJ3ENA, SM7BAE, LX1SI, GD3UB and SM6ANR for some fb QSO's. Also worked in Switzerland were HB1KL, HB9KM and HB9BZ.

The High Nets

Jack Dietrick, WN9AHZ, writes with the following net news: "We would like to let everyone know that we have formed a new association, the Midwest VHF-UHF Amateur Association. Our 2 meter emergency net is run every Monday at 1930 (Chicago time) with about 40 stations checking in. K9RVG is Net Control. The frequency, which is also used for mobile, is 145.42 (8079 crystal). Our association's main aim is to create more activity on the higher frequencies during contests and to get the stations to submit their logs for contests. Anyone in the Midwest interested in our association write to me at 9343 Hamilton Avenue, Chicago 20, Illinois".

The Puget Sound Emergency Net meets every Monday evening at 2000 local time on the frequency of 50.850. Net manager K7LQI tells us that the net is now well organized and that he is now working on arranging simulated emergency drills that will be of interest to all participants. The "swap and shop" conducted after the net session, has proved to be a very interesting activity. New check-ins are always welcome in the Puget Sound Emergency Net.

Let's Get Technical

The transmitter to be described was originally intended as an airborne signal source that would be helpful in training prior to an OSCAR shot. However, the folks in Sunnyvale worked faster than I and such practice beacons are relatively unnecessary now. It is still useful for club projects connected with OSCAR or even transmitter hunts. The beacon can also be used for its original purpose by suspending it from a balloon. Contrary to what you may think, the FCC will authorize a waiver if it is part of a worthy experiment and the transmission period is closely controlled.

The transmitter consists of a complete two meter transmitter packaged in a balsa wood box measuring 1" × 2⅜" × 4½" and weighing 3.5 ounces, complete with batteries and antenna. Entertainment type transistors are used to generate a power output of 20 milliwatts (0.02 watts). Radiation is accomplished by means of a horizontally polarized dipole measuring 38 inches tip-to-tip. Environmental testing has shown it to perform satisfactorily between −30 and +130°F. The oscillator is made intentionally temperature sensitive and shifts higher in frequency with decreasing temperature at a rate of approximately 100 cycles per degree F.

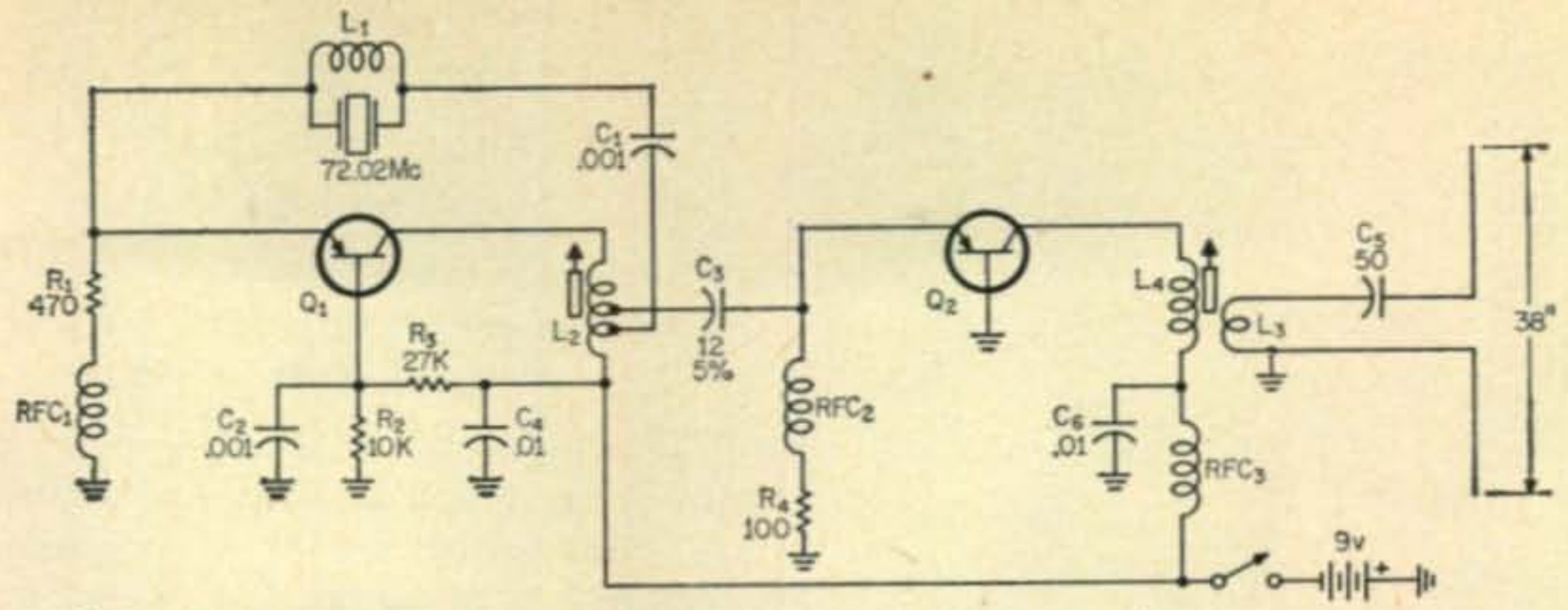


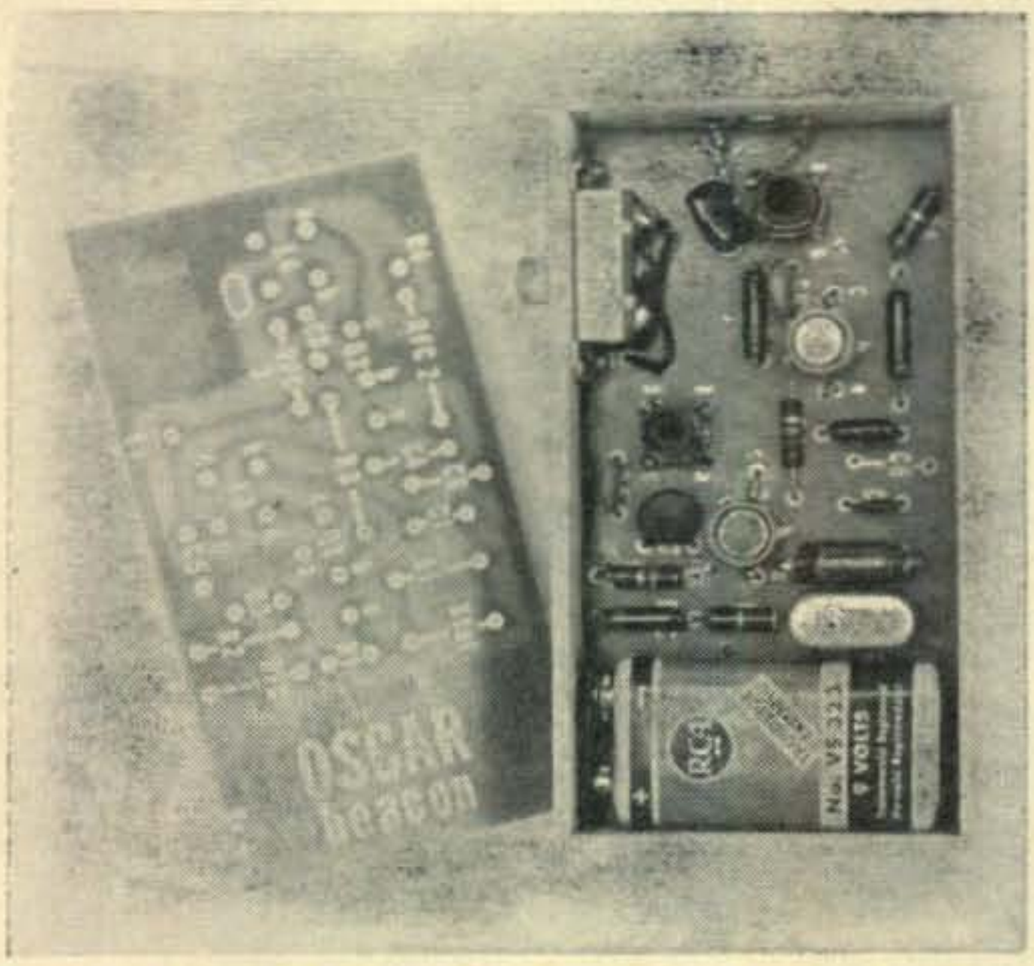
Fig. 1—Schematic diagram of a practice OSCAR beacon. The 20 milliwatt 2 meter transmitter uses 5th overtone crystals at 72 mc and is powered by a single 9 volt mercury battery. Capacitors C_3 and C_5 are silver mica; all others are disc ceramic.

L_1—19 t. #24 e. on 1 meg, 1 w. resistor.
L_2—9½ t. #24 e. on 5/16" dia. slug tuned printed ckt. form tap 3¾ t. and 2½ t. from cold end.
L_3—1¾ t. #22 e. on cold end of L_4.
L_4—6¼ t. #24 e. spaced approximately 1/16", on 5/16" dia. slug tuned form. Remove slug, spread or compress turns for maximum output.
Q_1, Q_2—T 1693, T 1858 or 2N1745 (Philco).

Circuit Details

The schematic diagram for the beacon transmitter is shown in fig. 1. It consists of a 72 mc fifth-overtone oscillator driving a buffer-doubler to 144 mc.

The oscillator is a Philco 2N1745 MADT (Micro Alloy Diffused Transistor) connected in a common base configuration. Forward bias is applied to the base at the junction of R_2 and R_3. Resistor R_1 provides d.c. degeneration to stabilize the stage. Capacitors C_2 and C_4 bypass the base and collector circuit. The output coil is resonant at the fifth-overtone frequency in conjunction with the collector-base capacitance. This not only makes the output impedance quite high but also makes the stage temperature sensitive. Feedback is permitted between a tap on the coil and the emitter through the quartz crystal. The capacitance of the crystal must be neutralized to prevent feedback of an incorrect frequency through the capacitance of the plates. Coil L_1 is resonant approximately 5% higher than the fifth-overtone frequency. Off resonance it appears to be an open circuit. At resonance the r.f. sees a low impedance and a feedback path is created. Although a 72.02 mc crystal is used, the circuit pulls the frequency several kc and the nominal frequency is approximately 144.05 mc at room temperature. The oscillator has been designed to operate at a battery end-life voltage of 3 volts. At this point the power output is less than one milliwatt.



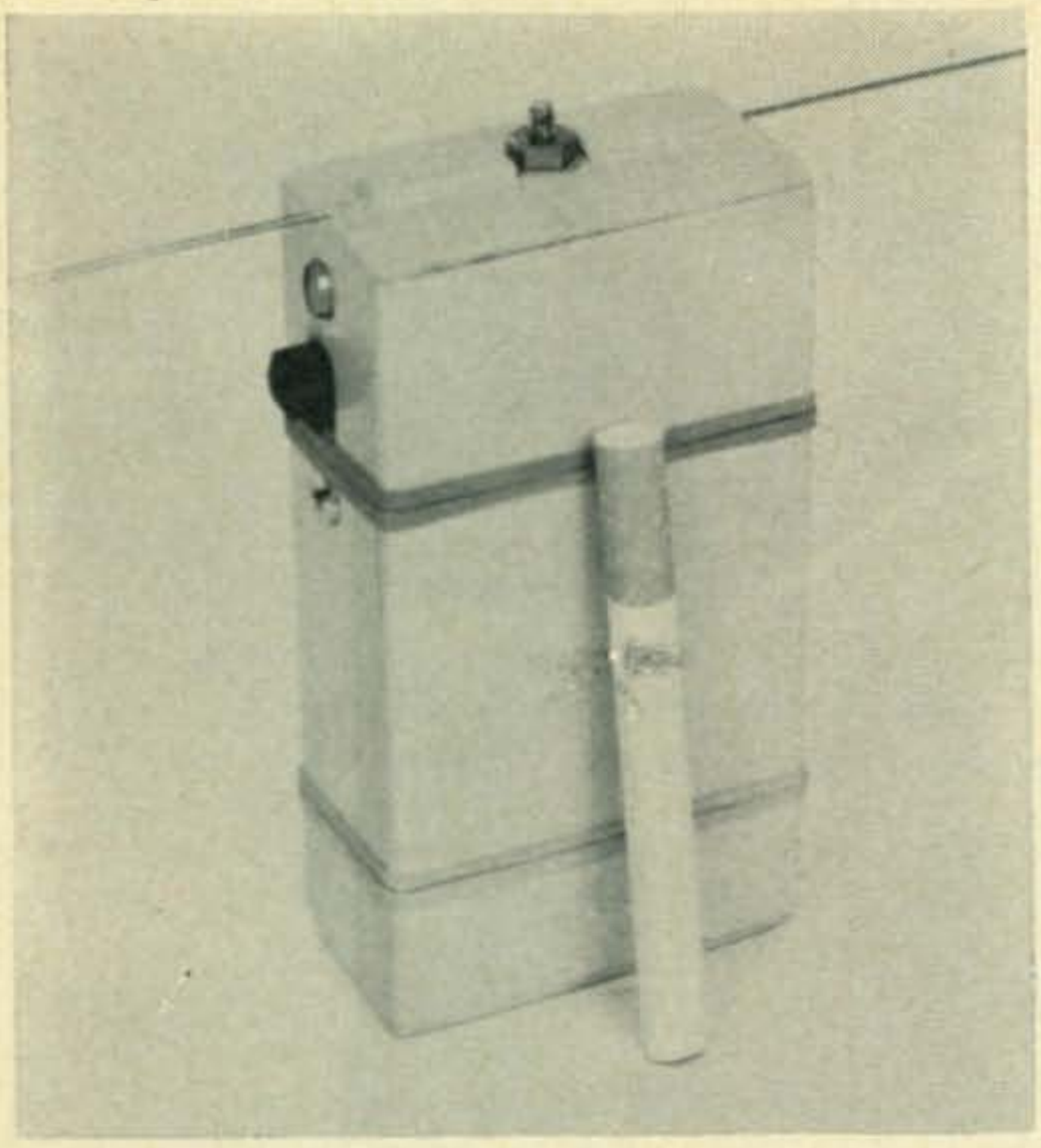
Inside view of the OSCAR practice beacon showing the location of the various components. The battery is held in place by a piece of foam rubber cemented to the lid.

The driving power from the oscillator stage is fed to the buffer/doubler from an appropriate tap on the oscillator coil. This stage operates in the common base configuration and receives its forward bias due to the rectification in the base-emitter diode. The operation is much the same as grid current bias in a vacuum tube circuit. The positive r.f. cycles cause the stage to draw current. Since there is a good deal of clipping, and the stage is operated class B, the output is rich in harmonics. The tank circuit, consisting of L_4 and the output capacitance of transistor Q_2, is resonated at 144 mc. Chokes RFC_3 and RFC_2 isolate the stage from the remainder of the circuitry. Resistor R_4 determines the operating point for the doubler and also serves to limit the stage dissipation.

R.f. output from the doubler is coupled to the dipole antenna through link L_3. Capacitor C_5 cancels out the link reactance. A nine-volt transistor radio battery supplies power for both stages. The total current consumption is 10 milliamperes or 90 milliwatts power drawn from the battery. Thus the efficiency overall is between 20 and 25% which is about "par" for the course.

Choice of Transistors

The transistors used in the transmitter are entertainment types (used in Philco portable television and f.m. receivers) and are available



A size comparison of the OSCAR practice beacon. The name and address of the owner is pasted on the other side of the balsa box, should someone happen to find the unit.

for approximately $3.00 each. Their dissipation is 75 milliwatts which is more than adequate for this application. For slightly more power output, the less efficient RCA 2N384 type can be used. It may be possible to obtain 30 to 40 milliwatts from two 2N384's in this circuit.

Chokes and Neutralization

The exact inductance and number of turns for the chokes is not important. What is important is that they be self resonant at 144 mc. Construct the chokes by winding a ½ watt resistor full of #36 enamel wire. When they are cemented and dry, grasp one end and touch the other end to a grid-dipper coil terminal. Adjust the frequency of the dipper until the meter reads the highest. This is the self-resonant frequency of the choke. If the frequency is not within 10% of 144 mc, remove or add turns as necessary.

The adjustment technique for the neutralizing coil is similar. Start by winding a full solenoid of #26 wire on a 1 megohm, one-watt resistor. Clip the leads to ½ inch or so and connect them directly to the pins of the crystal (don't use too much heat). Measure the resonant frequency of this combination with a grid-dip meter. If it is low (which is likely) remove turns until the target frequency is reached. Do not confuse the dip and sharp rise at the crystal frequency with the higher frequency dip caused by resonance of the neutralizing coil.

Adjustment

The oscillator should be adjusted first by measuring the voltage developed across R_4. With a full 9 volt source (fresh battery), the

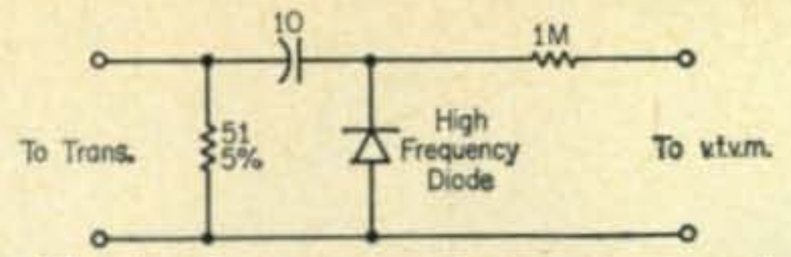


Fig. 2—Circuit of a probe for measuring low r.f. voltages using a standard v.t.v.m. The probe is moderately accurate to 144 mc.

voltage will be approximately 0.5 volts, indicating a current flow of 5 ma in the doubler stage. Next adjust coil L_4 for maximum power output with a grid-dipper. A Millen dipper will read approximately 0.2 with 20 mw output. To increase the stage efficiency, the slug has been removed. Maximum power output is obtained by spreading or compressing turns.

An extremely handy device, for measuring small power outputs, is shown in fig. 2. This r.f. voltmeter measures the voltage developed across a 51 ohm load resistor. The 10 mmf capacitor compensates for the difference between peak and r.m.s. The voltage readings (as indicated by a Heath V-7A) compare favorably with a Hewlett-Packard 410B. Naturally the probe is frequency sensitive and is accurate only at 144 mc.

The power output can be determined very accurately by reading the voltage, squaring the figure and then dividing by the load resistance. The beacon will produce slightly more than 1.2 volts, indicating a power output in excess of 20 milliwatts.

The final tuning of the transmitter should be done by observing a field strength meter, with the beacon antenna in a clear space, free from nearby wire or obstructions.

Construction

The transmitter was built on an epoxy circuit board but there is nothing magic about this technique and any suitable insulating material should suit the purpose. The coil taps listed in the parts breakdown fan out directly above the four terminals on the etched circuit coil form.

Transistor sockets were used so that the most efficient type of transistors could be determined without a lot of soldering and unsoldering. These need not be incorporated however, if the same type of transistors are used.

A balsa wood box was constructed to contain the board and keep the elements off the circuitry. The dipole antenna, consisting of two 18½ inch lengths of wire, was secured to the top by cutting a groove in the wood. The antenna wire, with right angle bends at the center, were cemented into these grooves, then covered with another piece of balsa for additional rigidity. The spacing between the two terminals is one inch. Capacitor C_5, and the lead from coil L_3, were soldered to the ends of the dipole, where they enter the case. A $^6/_{32}$ bolt projects through the top, between the two antenna terminals. A small hole drilled in this bolt accepts a length of wire for suspending the rig.

Other Applications

The transmitter could also be located at a high spot for a fixed signal source. Such a signal would be useful for antenna testing and weak signal converter adjustments. A similar unit, constructed by the author and located at Running Springs, California, was consistently heard in San Diego (approximately 120 miles to the south) with an S7 signal strength. The transmitter elevation was 6,400 feet above sea level.

The transmitter could also be used to generate a weak signal on 420 mc, by replacing C_5 with a back biased Pacific Semiconductors High-Q Varicap diode and cutting the antenna down to 12.5 inches.

Who's News?

Frank O'Brien, W6IAL, is a very active amateur on the 1296 mc band. He is also the Director of Advertising and Public Relations at Pacific Semiconductors. Frank told me that PSI recently ran a "which transistor advertisement is best" contest and that amateur radio operators were prominent in the winners circle. First prize was won by Charley Sturtevant, W3OXO, and included of all things a "brand new" 1937 Classic Packard Country Club Coupe and two astrojet tickets to Los Angeles so that the Sturtevants could pick up their mint condition Classic Car. Frank Medd, KØVTY, Minneapolis, Minn., placed third in the contest and received a $300 cash award.

Wayne King, Box 372, Seneca, Mo., would like to get going on six meters and would like to convert the 11 meter band on his Johnson Valiant to six. Possibly one of the readers is familiar with this conversion and can help you, Wayne. If all else fails, you can sell it to a CB'er. I understand these rigs are in demand-HI.

David McKenzie, KØSVJ, 406 South Main Street, Leon, Iowa, would like to locate a conversion of the ARC-5/SCR274N to six meters. He says "The only reference to v.h.f. I can find is the ARC-5 v.h.f. to two meters. I have some of the 274N's but not the v.h.f. version and would like to get on six". I have never seen the conversion Dave, but believe it could be done with one 1625 in the final. There were quite a few police rigs made with 807's in the final and the 1625 should work as well.

W4SVP says cool weather has brought them back to the shack for sure! The six meter band has really been busy now that the leaves are down and the stars come out early. Several new stations are on in Charlotte and vicinity and more "a threatenin". Lots of old voices cracking through the cobwebs, too.

Looking for DX? W4RMU, Jacksonville, Fla., sends CQ calls nightly at 2100 EST on 144.100 mc, for a period of 5 minutes. W4FJ reports meteor bursts of several seconds heard in Richmond, Va. W2ESX, N. J., reports the same. He has been heard and worked on tropo from N. C. in the past. Try your luck.

Did you know that there are some very fine certificates to be earned on the v.h.f. bands? For example, if you contact stations in the Tacoma area ask about the beautiful "Loggers" certificate. Anyone who has been around the six meter band for a year or so should be able to give you the info on the "Northwest Certificate". There are rumors regarding a new certificate being promoted by operators in the Everett, Wash. area. The six meter band is a fine place to truly earn your "Rag Chewers" diploma. Contact W7IDI, Jerry, and learn more about the "Covered Wagon" certificate.

Edgar Seeler, W1BDF, joggles our memory with "Why do you ignore the new *foam* cables? The Amphenol 621-111 (8U) has 1.8 db attenuation per 100 ft at 100 mc, and 2.7 db at 200 mc. The cost of this polyfoam cable, which has a velocity factor of 84%, is $14.30 per 100 ft. The Times T4-50 (8U) has a solid #10 center wire, same attenuation as the Amphenol and a velocity factor of 81.5%. It costs $12.70 per 100 ft."

During the past several weeks several of our Northwest Six meter operators have been heard working in the c.w. portion of the 50 mc band while contacting California stations on forward scatter. The local stations heard were W7ZQX and K7DTH. The California stations worked were W6NLZ and W6FZA. We understand that W7ZQX has tape recordings of several of his contacts which he forwarded to the California stations to show how well their sigs were coming thru. These contacts are added proof that there can be many exciting contacts made on the v.h.f. bands.

K7ISI, Mauri Norton, tells us that there is a fair amount of activity on two meter a.m. phone but that there is a lot more room for many more stations on this very worthwhile band. If you have two meter gear why not fire it up and be ready for action about 1845 to 1930 in the Vancouver and Portland area? Mauri also tells us that W7RT, K7IRR, K7OSM and others are getting gear on the 220 mc band.

W. G. Eslick, KØVQY, would like design ideas on a good two and six meter Nuvistor converter. He is interested in a cascode using two 6CW4's into a triode or tetrode Nuvistor mixer.

Thirty

One of the comments heard most often is "why don't you have more technical information in the VHF COLUMN?" For several years there have been no schematics in the column (or *QST* for that matter).

I have high hopes of making the column more interesting to technically oriented readers, without sacrificing the news tidbits of interest to the majority of hams. On the agenda is a two-tube filter exciter so that no one will

[*Continued on page 106*]

ham clinic

CHARLES J. SCHAUERS, W4VZO
c/o CQ, 300 WEST 43rd ST.,
NEW YORK 36, N Y

SELDOM do we receive a batch of mail which does not contain a letter or two requesting our opinion on various vertical antennas, especially those designed for multi-band operation.

These letters pose questions like these: "Is the vertical antenna of "X" Company worth the money? Tell me, will it do all that they say it will? How does a good vertical installation compare with a beam setup? How about the doublet, would you prefer it to a vertical? Is it not true that a good efficient vertical must have radials? What is the best way to match a vertical to a coax line? If I mount the "X" Company's vertical on our apartment house roof, what do you recommend for a good ground? How about trap verticals that we hear so much about—are they as efficient as the manufacturers make them out to be?"

I admit that information relative to the *practical* operational aspects of the vertical antenna is not too plentiful. Most antenna books, including the various ham handbooks generally devote no more than a few paragraphs to the vertical and little less or nothing at all on the trap vertical.

The vertical is attractive to the average ham because of the lack of space for doublets, long-wire or similar types of antennas. Although a beam takes little free space and can be mounted either on a tower, pole or living structure, a good one does cost much more than a vertical and in some situations, may not perform as well.

A single vertical antenna is multi-directional. Unlike the beam, it does not concentrate its radiation in one direction, and its overall gain is lower.

The r.f. emitted by the vertical antenna is vertically polarized; and where ground wave transmission is a must (especially in the medium or low frequency spectrum), the vertical antenna is ideal. However, horizontally polarized antennas such as the beam, doublet, long wire and so on, are preferable at the higher frequency ranges because they are less receptive to vertically polarized man-made QRN like rotating machinery (generators and motors), auto ignition systems and many types of home electrical appliances.

When the higher frequencies are used, which depend on skywave transmission for long distance communication either vertical or horizontal transmission may be employed with little difference. Ionospherically reflected h.f. waves generally arrive at an antenna *elliptically* polarized anyway so a ham can use either horizontal or vertical radiating systems.

For v.h.f. or u.h.f. work, where line-of-sight is the general rule and not the exception, the emitted waves arrive at a receiving antenna as *originally* polarized by either a vertical or horizontal antenna, so the receiving antenna for maximum signal reception must have the same polarity as the transmitting antenna.

Horizontal vs. Vertical

Both vertical and horizontal antennas have inherent advantages and disadvantages, depending upon the frequency used and the mode of transmission employed.

A vertical antenna is less susceptible to local QRM from f.m. and TV stations because their signals are horizontally polarized. Some cases of severe t.v.i. have been solved by merely changing from a horizontal to a vertical antenna.

For over-water transmissions and for mobile work, the vertical antenna is best. On the other hand, the horizontal antenna is less affected by a location near buildings, trees, towers etc.

At u.h.f. and v.h.f. frequencies, the vertical antenna radiation pattern is affected less by flying aircraft. In the case of the horizontal however, as an aircraft flies over a signal path, there will be some fluctuation in signal at the received end due to reflection from the aircraft.

The vertical requires little space for installation as compared to the horizontal.

For work on the 40 and 80 meter bands, a well designed vertical antenna is hard to beat. But for *most* hams a vertical must be of the "abbreviated" type and employ traps or loading coils because long verticals do present mechanical difficulties.

In order for the vertical antenna to perform properly it should be mounted over a good *conducting* ground or radials used to increase radiated power; this being especially applicable to the quarter-wave vertical.

A horizontal antenna can "stand" some lack of uniform ground conductivity, but this is easily compensated for by utilizing a good counterpoise which performs quite similarly to the well designed radial system used with verticals.

For general multi-band use, the vertical

because of physical height limitations will not perform as well as say a multi-band dipole system. This was borne out sometime ago when we checked out a trapped dipole and a trapped vertical in the same location.

The Quarter-wave Vertical

The effective height of a quarter-wave vertical antenna is about 0.6 of it physical length and at ⅛ wavelength the effective height is decreased to around 0.5. If we shorten the antenna below 0.5, there will be a large drop-off in overall efficiency.

Most quarter-wave vertical antennas are operated in the "Marconi" mode. That is, they are connected to ground either directly or through a series tuned circuit.

Because of ground reflection the ground-connected vertical appears as a one-half wavelength antenna, the ground supplying the additional quarter pattern, *if* it has low resistance.

The radiation resistance of the average quarter-wave vertical is around 36 ohms, and as the physical height is decreased so is the radiation resistance.

It must be remembered that the current which flows in the entire antenna circuit and the overall radiation resistance determine the amount of power radiated. In the grounded vertical installation, it must be remembered that the ground *is* a part of the antenna circuit and it does (depending upon resistance), have a large influence on the amount of current which flows in the antenna proper. To overcome the effects of high ground resistance and poor conductivity, radials are used, or they should be, in the average ham installation.

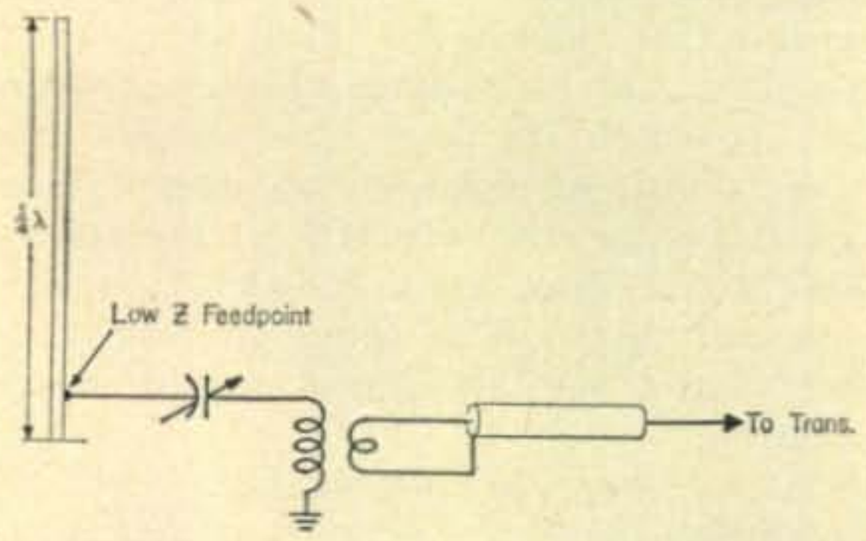


Fig. 1—Method for feeding a grounded ¼ wavelength vertical.

If the hams who purchased vertical antennas would merely install a simple but effective radial system which consists of a group of radials at least one-quarter wavelength long and install it under their verticals they would have much better success. If the radials are buried about a foot or so (arranged in the form of a wheel with spokes) the center connected to the vertical ground point, a near zero resistance ground system will result. The radial system can be installed above the ground too if the ground is flat and even. The "wagon wheel" radials are merely laid on the ground under the antenna and well fastened to the ground itself with metal stakes.

If an ungrounded vertical antenna (sometimes referred to as the Hertz vertical) is used, it must be mounted on an insulator. The insulator must have good insulating properties because a high voltage does exist between the antenna base and ground—as much as 500 volts at 1 kw input to the transmitter final that is modulated at 100%. If a Hertz is made one-half wavelength long, the base to ground voltage will be approximately three times that of the quarter-wave vertical.

Feeding the grounded quarter-wave vertical antenna can be accomplished as shown in fig. 1. In fig. 2 is shown the method for feeding the "ungrounded" or Hertz vertical which seems to be very popular with the mobile gang.

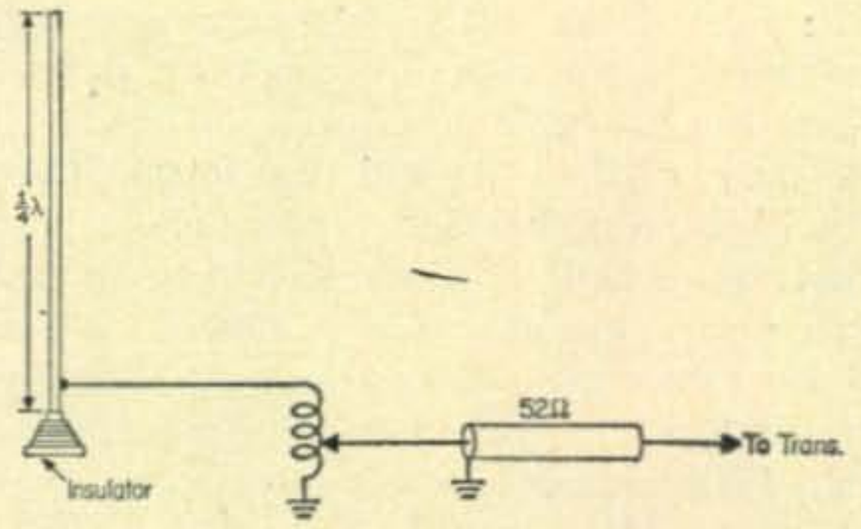


Fig. 2—Method for feeding an "ungrounded" ¼ wavelength vertical.

At the higher ham frequencies, 10, 6 and 2 meters, a quarter wavelength vertical is not impossible mechanically. However, on 80 meters, a quarter wavelength vertical is approximately 70 feet high. One can readily see that erecting an antenna of this height would not be an easy task, although it has been done. So how do we make a vertical work on 80? Well, this involves the elimination of as much of the high capacitive reactance (antenna to ground) as we can when we use a short antenna of ⅜ wavelength or less, and making the antenna we use electrically equivalent to a quarter wavelength and resonant to the desired frequency. By adding lumped inductance in the form of a loading coil we increase the effective length of the antenna and thus we can resonate it at the lower frequencies.

Most mobile antennas are self-resonant on 10 meters because they are a quarter wavelength long. For operation on the lower frequency bands a loading coil is generally used. Each time we desire to go to a different band with this antenna we must either use a different loading coil or we must adjust a variable coil if one is used. The average all-band mobile antenna is not very efficient on the lower frequencies.

For the home installation, a vertical antenna of 20 feet or so in height is practical and by using the proper size of coil (most often at its base) we can operate on most amateur bands with some success.

A vertical antenna that is an exact quarter wavelength long at any specific frequency can

usually be fed with 52 ohm coaxial cable directly, a better match would be half of this or two 52 ohm cables in parallel.

Trap Verticals

During the last few years we have seen the increased use of the trap type antenna. This antenna permits multi-band operation with a fairly good v.s.w.r. However, as has been pointed out before, any trap antenna, whether it be a beam, doublet or vertical must necessarily be a compromise, with efficiency and practicality being the prime considerations.

The trap vertical consists of permanently installed parallel tuned inductor-capacitor sections (traps) in series with vertical sections of aluminum pipe. It is designed so that maximum use is made of the available mechanical length of the vertical for radiation on each band .

When the s.w.r. is measured on each band for a trap vertical it will be found that it will be higher on the higher frequencies.

The trap vertical antenna should be mounted as high above ground as is practical; although it will operate quite satisfactorily on the ground if not hemmed in with trees, buildings, etc.

Very little design data is available on the trap vertical. However, the values used for the doublet trap antenna can be modified (by cut and try); and because there will be less actual mechanical length of the vertical sections as compared to the doublet horizontal sections, the values for the coil and condenser trap combinations must be increased.

Other Considerations

As the length of a vertical antenna is increased, the angle of radiation is decreased. This is so because the current loops are higher up on the antenna thus concentrating more of the energy in the horizontal plane. Any time the current loop is shifted upward in a vertical antenna better radiation can be expected. The current loop can be shifted by placing lumped inductance or capacitance at the base of the vertical antenna, increasing its length beyond a quarter wavelength or by terminating the vertical portion in a flat top configuration.

The flat top inverted L antenna is not too well known by the majority of hams so it is shown in fig. 3. The current loop in this antenna is at the topmost part of the straight vertical portion, with the result that it exhibits high radiation efficiency.

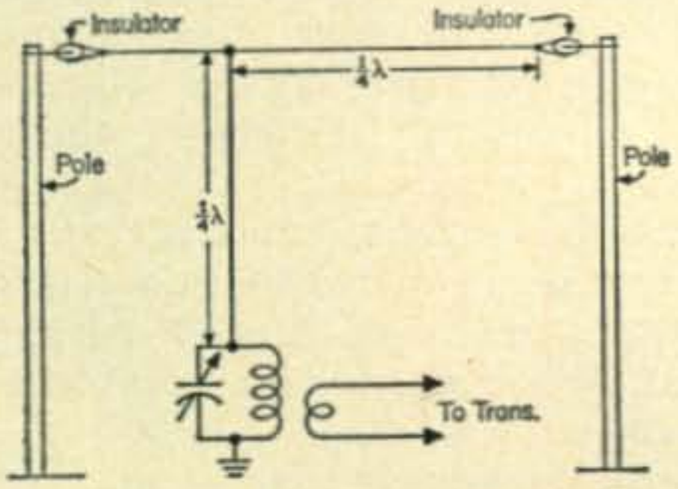


Fig. 3—Flat top vertical antenna.

In general, the vertical antenna is a good antenna and should be tried by those who have little antenna mounting space. If it is fed properly and a good ground is provided it will perform wonderfully well. I've been sold on the vertical since my 160 meter days; for this band a vertical is the "king."

Observation

Most people, regardless of who they are do not like change. Having become accustomed to doing things the same old way for years and years makes them reticent. When some young person with a good head on his shoulders sometimes comes up with a good idea or a method for doing something better, those who do not like change are generally against it just on general principles.

In our ham ranks we have the die-hards who will not admit that amplitude modulation is definitely on its way out of the ham bands and is being rapidly replaced with the more efficient mode, s.s.b. However, the day will surely come when the a.m. rig will fade out of the picture as did the old spark transmitter. That will be the day!

Those who are against s.s.b. should begin to think about eventually swinging over to it, not because it is just better than a.m., but because we will have more operating space and less band crowding and much, much less noisey QRM. Who can argue that s.s.b. does not take less band space than a.m.? I'd like to hear from him.

Questions

Recorder Intermittent—"My tape recorder works fine for about 20 minutes then the volume drops off to a bare whisper. Snapping the power switch on and off does not bring back the volume as it sometimes does with one of my old a.c.-d.c. BC sets. If I let the recorder cool off, it will play again for twenty minutes then go out again. The tubes are okay. I'm stumped and your assistance would be appreciated."

Sounds like heat is your villain. First check your recording head for good electrical contact and operation. Next, take the recorder out of its case and put it into operation. Wait until the volume drops. Then with a piece of ice wrapped in Saran-wrap or cellophane, touch each hot resistor in each plate, cathode and screen circuit. There is a spray coolant on the market designed specifically for this purpose, but the ice will work okay. If the volume returns to normal after touching a resistor, clip it out and replace with one of a higher wattage value with the same resistance.

If the resistors are okay, then try bridging interstage coupling capacitors with a good one of the proper value. If they are open you'll soon find out. However, if they are shorted the bridging won't work so you'll have to clip one end (the grid input end) and insert a voltmeter in series with the clipped end and ground.

If there is a voltage reading the capacitor is shorted. Try another capacitor and you are back in the recording business. Good luck!

S.s.b. Test Oscillator—"How about a diagram for an s.s.b. test oscillator putting out about 1000 cycles that will connect to my mike input?"

Sure. See fig. 4.

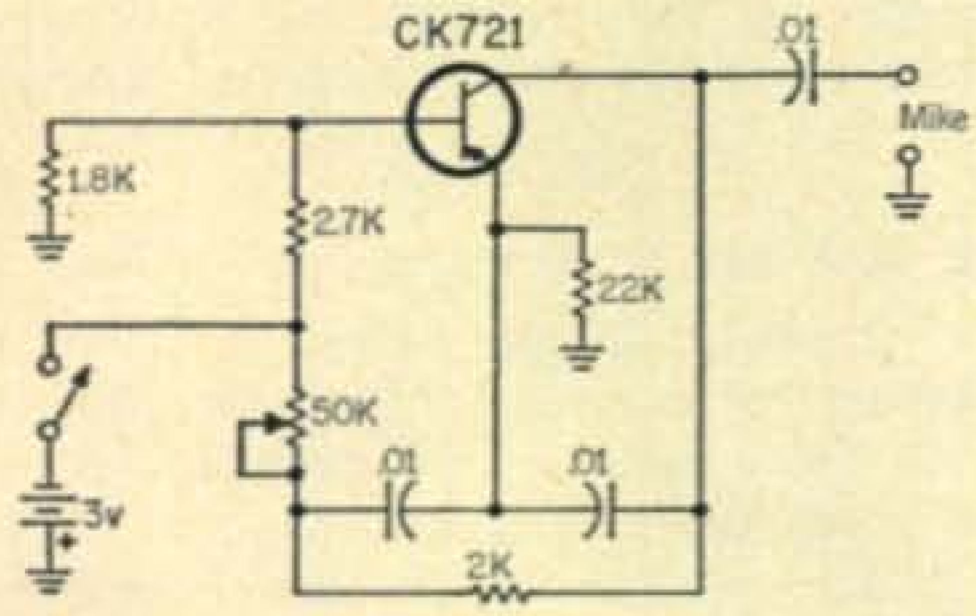


Fig. 4—Oscillator for s.s.b. alignment.

Power Line "I"—"A 44,000 volt power line is located about 500 feet away from my home. My property is shaped so that I can only run my doublet antenna parallel to this line with the result that I can seldom work on 40 or 80 meters on account of the noise. Any suggestions?"

The only suggestion I have is to *try* a vertical.

Non-Technical—"Little did I think that when my son became a ham that this hobby would be so expensive. I shelled out $150.00 for a used transmitter the other day, now he wants me to buy him a receiver for $225.00. Can't he get along with a less expensive one?"

I know of a number of used receivers for less than $150.00 which should suit your son. However, a good receiver is a good investment. I suggest you get him the better receiver, it is an investment in his ham radio future. I cannot remember of ever hearing of a boy interested in ham radio ever being a so-called "teen-age delinquent."

Tube Trouble—"Besides seeing a purplish glow in a tube, how can one tell from transmitter meter readings whether a tube is gassy or not?"

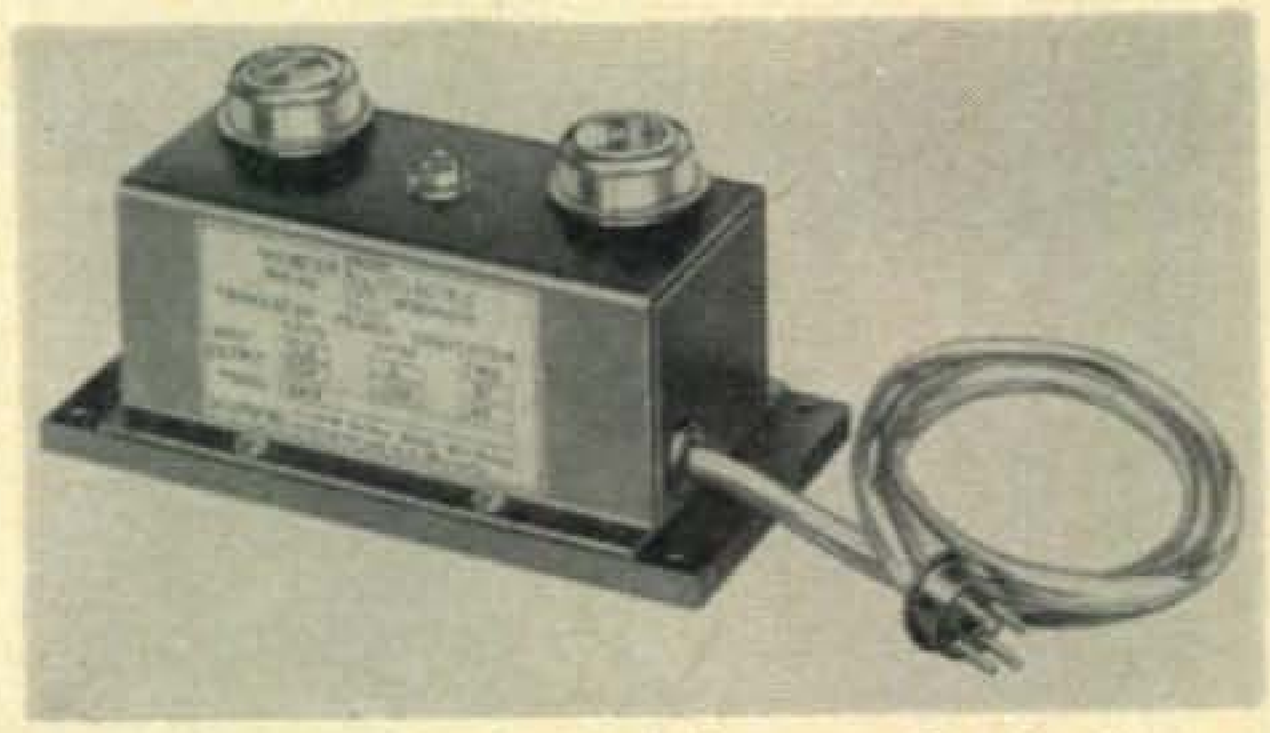
Excessive plate current will be the first indication. You'll find that with a gassy tube you won't get too much of a dip in plate current when tuning up and your loaded plate current will be higher than normal.

Surplus Modification Info—"Don't you think that surplus electronic dealers should supply modification information on the surplus they sell to hams? It seems to me that they would sell more if they took out the time to modify a particular piece of equipment and make the modification information available to buyers. What are your thoughts on the subject?"

I agree with you. There are still a number of surplus bargains available. Just the other day I bought some rotary switches for 50¢ each surplus—the new off-the-shelf price for them is around $3.00.

Receiver Supply—"I need a good transistorized power supply putting out 250 volts d.c. at 100 ma for continuous service. The size is important, I do not want one over 4"×6". Can you recommend one for me? It should operate from 12.6 volts."

Yes. Webster Electric's Model 2D12 transistor power supply will fill the bill. It requires a mounting space of only 3"×4½", has less than 0.1% ripple at full load and operates at 75% efficiency. See photo.



The Webster Electric mobile transistorized power supply.

T23/ARC-5 to 2 Meters—"Can you tell me where to obtain information for putting the ARC-5 (T-23) on 2 meters?"

Yes. Obtain a copy of the April 1957 *CQ*, page 30. This article gives you detailed info on how to put the ARC-5 on 2 meters.

NC-190 Wiring—"Checking out the wiring of the crystal calibrator socket against the diagram in my instruction book for the NC-190 I note there seems to be a typographical error. Am I correct?"

Yes. The NC-190 crystal calibrator socket is shown incorrectly in the NC-190 schematic appearing in the old issues of the instruction manual. A corrected version appears in fig. 5. The NC-190 receiver is properly wired to accept the XCU-190 calibrator by simply plugging it into the socket on the rear apron of the set. For external control of the receiver, the standby receive switch may be left in the standby position and the receiver can then be operated by shortening terminals 3 and 4 of the calibrator socket instead of terminals 4 and 5 as stated on page 5 of the instruction manual. Incidentally, in checking out this fine receiver I found it just as hot on signal gathering as some of its larger brothers. Its stability is terrific!

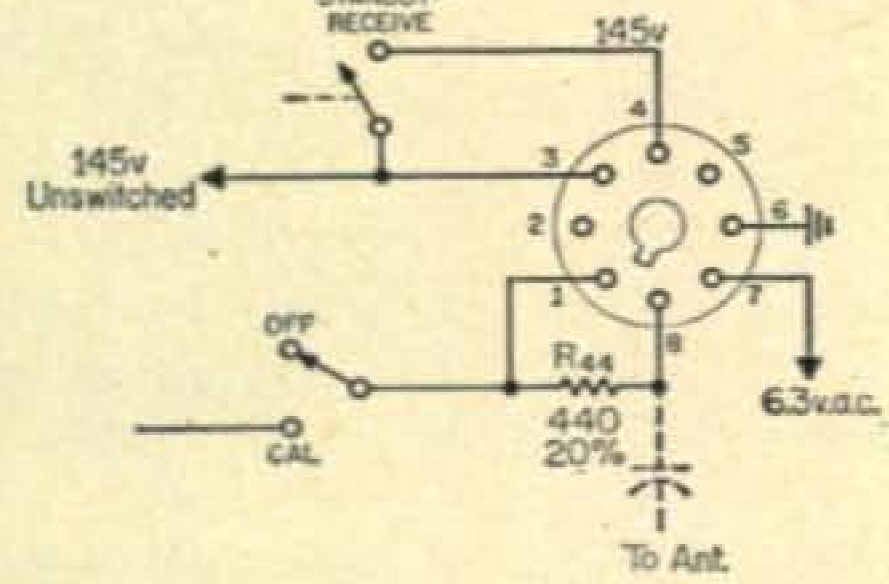


Fig. 5—Corrected version of schematic of calibrator socket in the new National NC-190.

Thirty

The ham and/or CB mobile operator interested in learning (in a non-technical way) how to eliminate ignition interference etc., should

[*Continued on page 114*]

USA-CA RULES and PROGRAM

The United States of America Counties Award sponsored by **CQ**, is issued for confirmed contacts with specified numbers of U.S. counties under Rules and conditions hereafter stated.

A. Awards Classes

The USA-CA is issued in seven (7) different classes, each a separate achievement as endorsed on the basic certificate by use of special seals for higher class. Also, special endorsements will be made for all one band or mode operations subject to the rules.

Class	Counties Required	States Required
USA-500	500	any
USA-1000	1000	25
USA-1500	1500	45
USA-2000	2000	50
USA-2500	2500	50
USA-3000	3000	50

USA-3079-CA for ALL counties and Special Honors Plaque

B. Conditions:

1—USA-CA is available to all licensed amateurs everywhere in the world and is issued to them as individuals for all county contacts made, regardless of calls held, operating QTH's or dates whatever.

Special USA-CA's also available to s.w.l.'s on a **heard** basis.

2—All contacts must be confirmed by QSL and such QSL's must be in one's possession for identification by certification officials.

3—Any QSL card found to be altered in any way disqualifies applicant.

C. County Identity:

1—The Directory of Post Offices (P.O.D. Publication #26) will be the official guide in determining identity of counties of contact as ascertained by name of nearest municipality. It is suggested a copy of P.O.D. Publication #26 be obtained to facilitate operating reference and precheck cards for application purpose. Publication #26 is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. (Price $2.25).

2—Unless otherwise indicated on QSL cards, the QTH printed on cards will determine county identity.

3—For mobile and portable operations the postmark shall identify the county unless information stated on QSL cards make other positive identity. When in doubt of location, mobile stations should name the nearest municipality as identified by road sign or road map.

4—In the case of Cities, Parks or Reservations not within counties proper, applicants may claim any one of adjoining counties for credit.

D. Administration of USA-CA Program:

1—The USA-CA program will be administered by a **CQ** staff member acting as USA-CA Custodian, and all applications and related correspondence should be sent direct to him at his QTH.

2—Decisions of the Custodian in administering these Rules and their interpretation including future amendments are final.

E. Record Book and Bookkeeping:

1—The scope of USA-CA makes it mandatory that special Record Books be used for application. For this purpose, **CQ** has provided a 108 page, 8½ × 11" Record Book which contains application, and certification forms, a USA county map, maps of each of the 50 U.S. States showing county outline, and which provides record-log space meeting the conditions of any Class award and/or endorsement requested.

2—A completed USA-CA Record Book constitutes medium of basic application and becomes the property of **CQ** for record purposes. On subsequent applications for either higher classes or for special endorsements, applicant may use additional Record Books to list required data or may make up own alphabetical lists conforming to requirements. In this connection, through a printer's bust, the Record books left out the column for naming Cities/Towns, mandatory to validate County identity, so it is suggested that the time/date column be renamed and used for this purpose.

3—Record Books are to be obtained **directly** from **CQ**, 300 West 43rd Street, New York 36, N. Y. for $1.25 each. Recommend two be obtained, one for application use and one for personal file copy.

F. Application:

1—Make Record Book entries necessary for county identity and enter other log data necessary to satisfy any special endorsements (band-mode) requested. It is mandatory that Cities and Towns or other specific location be named.

2—Complete application forms provided in Record Book, or, if preparing own lists for later applications, use special application forms available from the Custodian for s.a.s.e. or 1 IRC.

3—Have the certification form provided signed by two licensed amateurs (General Class or higher) or an official of a national-level radio organization or affiliated club, verifying that QSL cards for all contacts as listed have been seen. The USA-CA Custodian reserves the right to request any specific cards to satisfy any doubt whatever. In such cases applicant should send sufficient postage for return of cards by registered mail.

4—Send original completed Record Book and certification forms and handling fee of $1.00 U.S. or 10 IRC's to USA-CA Custodian, Clif Evans, K6BX, Box 385, Bonita, California. For later applications for higher class seals, send either Record Book or self prepared list per the rules and 25¢ or 3 IRC's handling charge. For application for later special endorsements (Band/Mode) where certificates must be returned for endorsement, send certificate and 50¢ or 5 IRC's for handling charges. Note: At the time any USA-CA award certificate is being processed there are no charges other than the basic fee regardless of number of endorsements or seals; likewise, the Directory's "Top Class Rule" prevails and one may skip lower classes of USA-CA and get higher classes without losing any lower awards credits or paying any fee for them. ■

The USA-CA Program

BY CLIF EVANS*, K6BX

THE first big USA-CA rush for low numbers has petered out as we expected. Six new applications received up to January 3rd as we beat the deadline for this issue. New winners were:

USA-CA-500

W9QGR W9CMC
W8APN KØDEO
W9QWM

USA-CA-1000

K6YMZ

Third person to come in for the USA-CA-1000 was Phil "Ozzie" Ossian who already had knocked off the USA-CA-500.

Like the 'man' told you, USA-CA is not an award just to be grasped with easy effort even though thousands of QSLs already may be on file. From the thousands of Record Books purchased we know many now are enjoying the USA-CA's many fun outlets which include not only working toward USA-CA proper but hundreds of other U.S. awards encompassed within its scope and support. The OLD MAN is now up to 497 count.

USA-CA Rules Revised

Once each year it is custom of Custodians of various *CQ* awards programs to re-publish and clarify their rules. Well, our calendar tells us March ushers in Spring with all its freshness, so what better time to freshen up USA-CA; besides, gives us opportunity to make similar changes in April issue of *Directory of Certificates.*

*United States of America Counties Award Custodian, Box 385, Bonita, California

Borderline Friendship Award commemorating the thousands of miles of unguarded and friendly neighbor border that lies 'somewhere' between the United States and Canada. See Jan. CQ for awards details. OLD MAN K6BX was first to win all three seals.

No major rule changes; just a few 'alternate' procedures in making applications which might be of economic advantage to some.

Looking at revised USA-CA Rules you will note in par. A. that rather than having separate smaller USA-CA certificates for each class as was originally contemplated, 'we' decided to provide a larger, more colorful, certificate with provisions for gold seals as endorsements for higher classes (like CHC certificate). This, we feel, offers a more attractive award for display with increasing 'value' as additional gold seals are added.

The Illinois Counties Certificate is a fairly recent award sponsored by the Peoria ARC and handled by CHCer Cliff Corne, K9EAB. Note this award uses gold seals with state seal to give endorsements for 82, 92 and 102 counties respectively.

In par. E 2 of Rules, note that while the requirements of using a Record Book with original application is mandatory to establish a basic file, thereafter applicants have choice of using either Record Books or self-prepared lists in later applications. This is now administratively possible because we are dealing with the same award and appending supplemental lists to the original record.

In par. F 1 note it is mandatory that cities and towns be named to validate county identity, and it is suggested the date/time column in Record Books be used for this purpose.

In par. F 2 note that persons preferring, for economic reasons, to use their own state/county lists, still must use special prepared application and certification blanks available from the custodian for s.a.s.e. or 1 IRC.

In par. F 4 it will be noted that change from separate type certificates to one master certificate with gold seals permits a change in fee requirements whereby handling fee for basic certificate remains at $1 but subsequent

endorsement gold seals are available for a 25¢ handling charge. Note also provisions have been made that certificates may be returned to Custodian for special endorsements (other than seals) for awards credit. Also is a reminder that under Directory's Top Class Rule it is not necessary that lower classes of the award be applied for as all credits automatically accrue and all endorsements can be applied to any higher classes and for a single handling fee. Likewise, under stated Directory procedures, any and all endorsements and/or gold seals are provided for a single handling fee at time of processing any award.

We trust this will clear up some of the fantastic arithmetic some of our 'opposition friends' have been engaging in and clear the air with better understanding that USA-CA is not just an award as such but is a life-long program of fun, entertainment and education and that one can spend as little on it or as much as one pleases by his own choice. For example, in-so-far as the rules are concerned, one can achieve the USA-CA Special Honors Plaque under Top Class Rule by total expenditure of $1.25 for a Record Book and a $1 handling fee or total of $2.25, and for the $2.25 he would not only get the Plaque but the beautiful USA-CA-3000 award certificate with five gold seals.

On practical side of the ledger, record shows that to date only two persons in the world have produced evidence of confirmations from over 1000 U.S. counties; therefore it is ridiculous to say that over one person in a thousand entering the USA-CA Program will ever have opportunity to spend any significant sum in relation to what the program offers in healthy outlet. The OLD MAN is rather amused by a few of his 'opposition friends' belly aching about 'possible' costs when it is most obvious they in particular couldn't qualify for even the basic USA-CA-500, nor USA-CA-2000 in their lifetime.

Worked All Miami Springs Award by the Miami RC, K4OSQ for working five stations in the Miami Springs Area. Note the Mayor signs certificate.

Wacky Wing Dingers Society Certificates for working seven members in Jacksonville Area. The Society promotes the concepts and philosophy that "A Milliwatt of Public Service and Good Fellowship Returns a Kilowatt of Satisfaction" and "The Spark That Fired Our Civilization Went Out and Our Only Hope for the Future is Man's Universal desire to Communicate and Exchange Ideas . . . and His Sense of Humor." Certificate gives a picture of Jacksonville, Florida. QTH c/o W4HLE.

Awards Design Improving

The OLD MAN is pleased to see new awards coming out with a bit more colorful design and particularly likes use of seals rather than 'stickers' for designating significant additional achievements. We'd say there is a definite upswing in design 'value' of awards in general. As time progresses we'll bring you pictures of a few of the more recent ones and will also run a picture series covering various states.

QSL Problems and Cures

Have received much correspondence lamenting the poor QSLing habits of hams of many countries, and we are none too happy to report that the U.S. about heads list among those delinquent. You know, when you stop to think of it, just like pennies make dollars, individual QSLs make awards, so, in fact, individual QSLs are miniature awards within themselves. Jack Adams, W4NOK, carries this thought to its full conclusion. See picture of Jack's QSL card which itself is a miniature "QSL AWARD" as he states on it.

Speaking of QSL cards and 'stories' about how heavy U.S. demand for pasteboards literally drives many of our DX friends off the air because they can't afford tab of QSL and mail costs, well, believe me, today such are just 'stories' without foundation. Argue if you will but we have facts. The OLD MAN publishes the *DX-QSL-News Letter* (see November *CQ* ad) which lists around 2000 QSL managers for DXers or special folks the knowledge of whom you must have if you expect to get that many 'rare' QSL cards. Along with this *News Letter* service is a clearing house to which *any* DXer in need of assistance of a U.S. ham to help him with his QSLing chores may get immediate response. Likewise, U.S. hams who are willing to offer their QSL Manager services to

W4NOK, Jack Adams, proves that a QSL card can also be an award. Jack's card is 4 × 5½ inches in size.

deserving DXers are listed in each news letter for all to see and contacts may be made direct or through K6BX services. For some time this list has been of such proportions that volunteer U.S. QSL Managers are available to unlimited numbers of DXers who care to avail themselves of this fellow-ham-good-fellowship offer. The many U.S. hams now acting as QSL Managers exemplifies hamdom's healthy attitude and spirit. They are to be commended in helping relieve our many DX friends from what *once* was an unduely heavy QSL imposition to satisfy the U.S.'s growing 'demand' for QSLs. We'd like to give our list of U.S. hams now standing by and ready to provide QSL Manager services. DXers the world over may feel free to contact them directly for making mutual arrangements. In most cases the U.S. ham will pick up whole cost.

STANDBY U.S. QSL MANAGER LIST

K1KQI	K3COW	K5BXG	K8VUH
K1KSG	K3CYX	W5HNS	W9JFJ
K1MEM	K3KLJ	W5LGG	K9SRR
K1QGC	K3MNJ	K5SEU	W9TCB
W1UOP	K3NAS	K5ZJK	K9UCR
WA2BQK	W3YLL	W6DIX	W9UZC
WA2DES	W4CSY	K5UXP	K9VLQ
WA2FIT	K4CWR	K7ADL	W9WXA
W2GHK	K4HDR	W8EKG	KØBQI
WA2GKX	K4HOR	W8GIU	WØIJN
K2HWF	K4KSY	K8GZK	KØGZN
W2JDK	W4PK	K8JWC	KØKMO
WA2MEQ	W4TAJ	K8ORC	WØMCX
WA2MHY	K4WIS	W8TOC	KØRDP
K2PFC	K4ZRA	W8UMR	KØVTG
K2SWZ	W5BUK	K8VDV	VE2AFC

San Gabriel Club Station W6PKN
Richland ARC, P.O. Box 73, Richland, Wash.
York ARC, W3NGN

In connection with above, U.S. hams are invited, when talking to a DX ham who expresses QSLing problems, to feel free to tell such DX ham the QSL Manager 'story' and pass along any or all of the listed hams as possible benefactors.

Florida Skip County Program

The *Florida Skip* magazine has launched a double-barrelled awards program to help all comers work all of Florida's 67 counties and 'effectively occupy' 28 mc and above during our present lack of sunspot activity. As CHCer Andy Clark, W4IYT, Editor, says, if we don't make some concentrated effort to occupy and use these bands we might have a fight on our hands to retain them for amateur use; fact is says Andy, even the CB boys might attempt to move into the 'vacuum'. On top of that, as Andy says, the program will relieve some of congestion on lower bands.

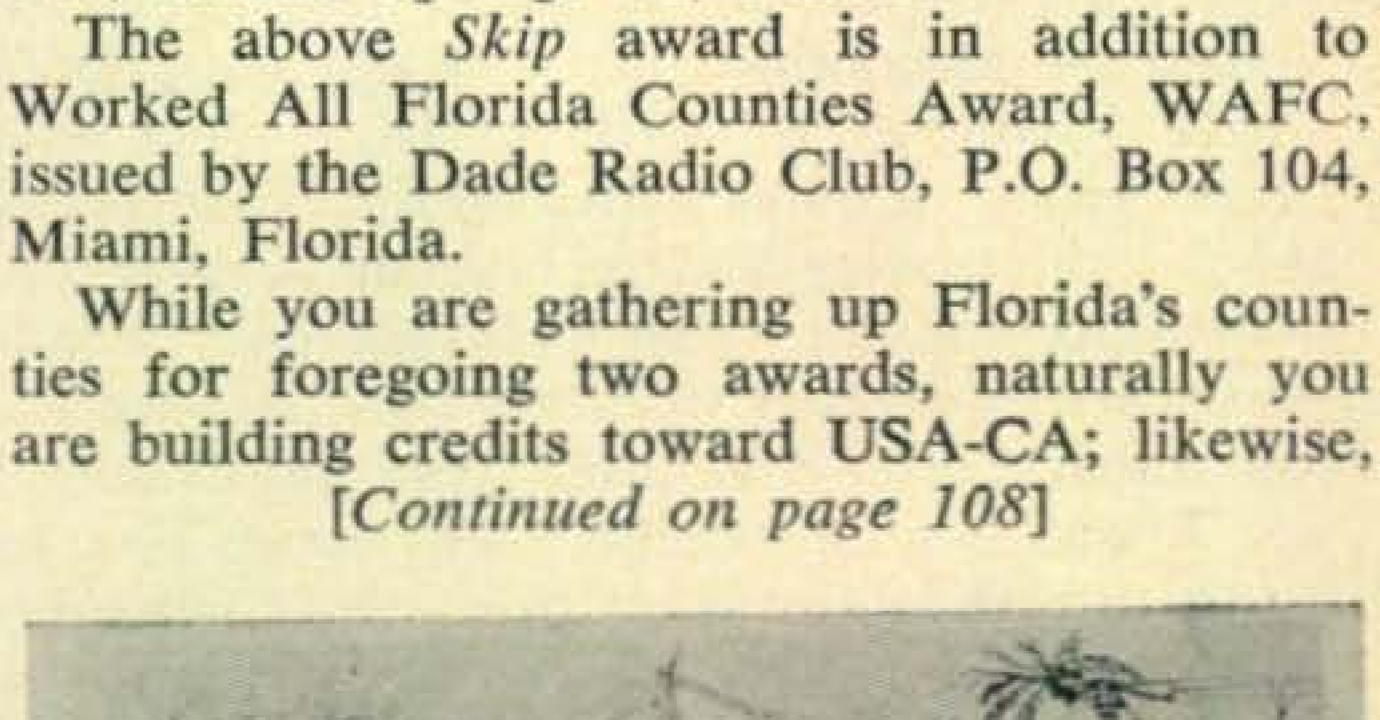
The program runs throughout 1962 and is something uniquely 'different'. What you do is originate exchange messages using ARRL form; message may contain any question requiring a reasonable answer. Certificates will be awarded upon receipt of messages from your first five Florida Counties. Endorsement stickers will be awarded in groups of five new counties. To qualify for each county it is only necessary to mail the *Florida Skip* two messages; one, your message to station in that county asking a question, and two, your message received from station in that county containing answer. Messages may be relayed as necessary, providing same band is used. Each message must bear a number, station of origin, check count, place of origin, time filed, date, approx. frequency and with calls of all stations involved. Band use is restricted to 28 mc and above.

When you have received your certificate with all 67 Florida counties, properly endorsed, you will be duly Knighted into the Royal Order RAC-67 and a handsome plaque will be presented you by the Florida Skip. Mail entries to *Florida Skip*, Inc., Contest Editor, P.O. Box 501, Miami Springs 66, Florida.

The above *Skip* award is in addition to Worked All Florida Counties Award, WAFC, issued by the Dade Radio Club, P.O. Box 104, Miami, Florida.

While you are gathering up Florida's counties for foregoing two awards, naturally you are building credits toward USA-CA; likewise,

[*Continued on page 108*]



Conch Net Certificate issued for working ten stations "located on the Island of Cayo Hueso, Tropical Paradise 90 miles North of Havana, Cuba, the Southernmost place in the United States, also known as Key West, Florida." By Key West ARC, c/o K4NCN.

Novice

BY WALTER G. BURDINE, W8ZCV
R.F.D. 3, WAYNESVILLE, OHIO

As I'm writing this on New Years Day, I'm forced to think of all of the good things that have come my way through the use of my ham license. First, I must be thankful for the many friends, far and near that have come my way, both on the air and in person. Herb Nicholson, VE6GK and Don Stewart made us a surprise visit about two weeks ago, I hope they got back to Old, Alberta in time for Christmas. Bob Pielage, now signing AJ1BX, also took the time while home to spend a few hours at my home, I'm sure glad he finally has his general. Hurry home Bob and let's get that s.h.f. gear going. Visitors from Nashville, Chicago, Indianapolis and South Carolina have stopped here within the last month. I keep a visitors log of all the people that stop here and now have an all time list of 39 states, including Alaska and Hawaii and 26 countries, including the South Pole. I know that it was worth the effort put forth to get my license.

I must be thankful for the many wonderful people we visit on the air every day. They have helped me to continue my string of daily QSOs above 50 mc to 2,500 days. There is a wonderful group of hams above 50 mc, I am thankful for the novice and technician licensee that helped to populate the high-frequency bands. Again I will say, "If we don't use them we will lose them." You are doing your part, keep it up. Improve your station, help some one get on the air and enjoy ham radio more each day. Write me a letter about your pet project or an idea to help improve this column.

Ham radio is a wonderful training ground for the living in the future space world we are building. It is a good training ground for future job opportunities. We must have technicians in all branches of science to long continue our way of life and this is one of the easiest ways to get started. The ham has an inquisitive mind and this is a necessary item in the training of the future scientist. We hold our future in our own hands; we must not depend upon someone else to win our future for us. If you are goofing off in school today, you are jeopardizing our future happiness and that of your own. In school today, apply yourself to the task at hand and make an effort for the future of all of us.

When an amateur conceives an idea to perform an experiment, and at the same time garner some favorable publicity for amateur radio, and proceeds to carry this idea to completion, the amateur fraternity should stand up and applaud its originator. We need this kind of publicity for our hobby.

An idea was conceived by Col. John W. Riggs, K8WRT and Major Eugene Driskell, K8ONI, then DAAFD MARS director, to test an air-borne net control station for the two meter MARS net.

The DAAFD C-47 was equipped with a Gonset Communicator IV using the C-47 v.h.f. antenna in an experiment to test the effective range of the low-powered air borne control station for the 143.950 MARS net.

The C-47 was piloted by Col. Riggs with Capt. Jack Sharkey as co-pilot and it carried other hams and news men from the Dayton area. Besides Col. Riggs K8WRT and Capt. Sharkey the plane also had aboard the following: Major Eugene Driskell, K8ONI, DAAFD MARS director, Miss Ruby Brothers, DAAFD Public Information Officer, Wm. (Bill) Newton, W8ARQ, Director of Maintenance, Edgar Fisher, W8PQZ, NCS for our MARS net, Robert Simon, aviation advisor, Dayton Area Chamber of Commerce, Jack Jones, Reporter for the Dayton Daily News, Phil Donahue, WHIO newsman and Dick Hale, WHIO Air Scout. All aboard were impressed with the emergency communications possibilities. The itinerary was from Dayton to Columbus, Lima, Richmond, Indiana, Cincinnati and back to Dayton, at an altitude of 9,500 feet. The only difficulty in the airborne command post was the

Joan Henderson, KN8YII and Nick Butcher, KN8YNF, soon to be man and wife. The Cincinnati couple has set the date for June 2, 1962.

high noise level within the cabin of the plane and a blown fuse which put the Communicator off the air for a few minutes.

The experiment was an unqualified success. Over 40 MARS members were contacted in the Dayton areas as was Clarence McConaughey, AFA8NBY on a fishing trip to Coldwater, Michigan. Mac was using a 4 element beam on the back of his station wagon and was loud and clear in the plane. Three of the MARS members were operating on emergency power, 12 were mobile and the balance were at home. The entire experiment was tape-recorded by Charlie, K8WZG and by AF8ZCV, who was using emergency power for all operations. A transmission from the C-47 by Phil Donahue was recorded in the WHIO-TV studios by Larry Brandenburg, AF8TEK for retransmission on the Don Wayne Newscast that evening. All equipment was low-powered (about 10 watts), all capable of being operated from emergency power or mobile as needed. Mobile units are quite useful in an emergency as the units could travel to the scene of a disaster. The use of the airborne control station could extend the range of low-powered two meter emergency equipment to about 100 miles from the plane.

Col. Riggs, K8WRT is now the MARS director of DAAFD. K8WRT is the first officer to come to The Dayton Air Force Depot and become a ham while stationed there. He is working on the code now to get the general and I'm sure he'll have it soon.

Help Wanted

If you would like to get a ham license and you don't know any one in your neighborhood to help you and if you are willing to do your share of the little amount of work required to get a ticket, you can send me your name and I will put it in our Help Wanted section and some kind friend will, most likely, offer to help you. Read *CQ* and *QST*, practice the code a little every day and build your equipment as you are studying. In this way you can be ready when your license arrives. It really isn't as hard as you may think.

Col. John W. Riggs, K8WRT/AFA8WRT, 1223 Earlham Drive, Dayton, Ohio is shown at the operating position in the C-47 used as an experimental air-borne net control station for the 2 m MARS net. Col. Riggs is the MARS director at the Dayton Air Force Depot, Dayton, Ohio. The experiment was a great success.

Ralph Everett Riggs III, KN3NCQ, 10304 Julep Ave., Silver Springs, Maryland. Ralph was the winner of the first novice construction contest conducted by the Rock Creek Amateur Radio Association of Maryland.

Can you offer help to these fellows?
Jack Elias, 2416 South 7th Street, Philadelphia 48, Pennsylvania. Phone DE 4-8862.
Bob Wasitis, 505 North 84th Street, East Saint Louis, Illinois.

Letters

From Coby Johnson, Jr. of Chardon, Ohio, this progress report: "I enjoy *CQ* very much and I'd like to wish you luck with the NOVICE COLUMN.

"My rig consists of a Viking Challenger, an HQ-100 serving as the hearing aid; a Hallicrafters S-38-E serves as monitor. The antennas are a 15 meter dipole and a 40 meter dipole. Soon I will become the possessor of a Gotham V-80 and am considering a 40 meter beam (home-brew).

"The brag list at KN8BVH is 35 worked and 32 confirmed and I won't bother to list my DX. The age is 12 and I took my general December sixth, I haven't gotten anything in the mail from the FCC yet.

"My sister is 9 years old. She is already well-prepared for her ticket, and is going to take her novice very soon. One thing is for sure though, I wouldn't be where I am if it wasn't for George Hole, K8VSL. I have a 20 w.p.m. CP.

73, Coby, KN8BVH"

This one from Wichita, Kansas: "I thought I would drop you a line to let you know that I am now KØKCD and have started my fifth month on the air today. I have had 400 QSOs, worked 42 states with 38 confirmed and the rest said they would QSL. I have worked 4 continents but so far only North America has QSLed.

"The new SX-101A along with my HT-40 and the Hy-Gain Vertical has helped me to make 10 DX contacts and they are still coming in very well. Oh yes, one last thing, I would like to make a sked with Hawaii and North Dakota.

73, Ronnie Bramball"

As you know, there are things that happen on the amateur bands that are quite hard to

Coby Johnson, KN8BVH, 127 North Street, Chardon, Ohio surely has what it takes here to do the job and it also looks as if it was done well. Coby should be a general by now.

explain. Read this and, if you can shed any light on this contact, either write to Bill or write me and I will get it in the column.

"Dear Walt: Every month I read the NOVICE column in *CQ* and you always add, Keep the cards and letters coming in (Ed. note: *I repeat the same thing here*). Well, here goes. The transmitter is an EICO 720K at 75 watts and the receiver is an S-120. I use a Demi-quad for 15 meters and a dipole for 40 meters. The frequencies in use are 21.120, 21.204, and 7.168; look for me.

"I have worked 28 states with 26 being confirmed, have had 200 QSOs and have worked G2, OA4, 2-HK7s, 5-KP4s and KZ5 in three months on the air. I will sked anyone any time for any reason. 73, Bill

"P.S. I also have a question on a station that I have worked. Believe it or not, this is the station's call: SOSC. I called CQ and he answered me on 21.130 at 2310 GMT on October 21. He said his name was Don and that he was operating on a ship at 21° N, 109° W. Please help me find out about this. I have been told that some one was kidding me; I don't think so. The beam was pointed in that direction, he was weak and had QSB, a 557 signal. Result: a very puzzled Bill."

Bill's station is reached at: Bill Early, WN9AEA, 451 Hill Avenue, Glen Ellyn, Illinois.

Michael Sealfon, WA2OCG, 107 Stony Ridge Drive, Hillsdale, New Jersey writes: "Here is the latest word from Penn State University. I am QRT with only my SX-110 here with me. Much listening is done here when I have a break in my studies. Outside my room is a 150 foot long-wire antenna that does a fine job. I can hardly wait to get home to my fixed station: DX-60, NC-190, two element Hy-Gain beam, and 40 and 80 meter trap dipoles and my bug.

"I celebrated my first anniversary in amateur radio this past August. It has been a most enjoyable year with many things accomplished. My awards are: WAS, CP-15, RCC, Novice Roundup Section Award for N.N.J., 43 countries worked with 24 confirmed, WRK and USA-CA 325/257; balance please QSL.

"Letters would be appreciated while at college, and skeds can be arranged for my return home. Address at college is: Michael Sealfon, WA2OCG/3, Nittany 26, Room 11, Box 1398, Pennsylvania State University, State College, Penn. 73, Michael"

We amateurs should be the first to know anyway so here goes. Get out the rice and old shoes for Joan Henderson, KN8YII and Nick Butcher, KN8YNE of Cincinnati, Ohio. Nick writes: "I enjoy the NOVICE COLUMN in *CQ* very much and thought you might be interested in the following.

"My name is Nick Butcher, KN8YNE and my fiance is Joan Henderson, KN8YII. We both received our novice licenses in January 1961 and we are taking our test for the general in December, 1961. I have a WAS of 36/33 and Joan has a 12/12. Our equipment is a DX-100 transmitter cranked down to 70 watts and an S-108 Hallicrafters receiver. The antenna in use is a dipole for 40 meters and a home-brew beam for 15 meters. We both QSL 100%. The Ham wedding will take place June 2, 1962. A picture of the rig and operators is enclosed. 73, Nick"

Nick's address is Nick Butcher, KN8YNE, 3217 Harry Lee Lane, Cincinnati 39, Ohio.

This idea might be used by many radio clubs to stimulate interest and attendance at club meetings. Also possibly the local radio or TV stations might follow the suit of WHFS-FM as a public service to the community. This might be worked into a very interesting program and could help the status of amateur radio in the community.

At a recent meeting of the Rock Creek (Maryland) Amateur Radio Association a Savings Bond was presented to a 16 year old Novice for building the winning piece of radio equipment in the club's 1961 "build-it-yourself" competition.

[*Continued on page 110*]

I wonder how long this nice station will look like this? Probably has a signal as clean as it looks. The neat rig belongs to Bill Early, WN9AEA.

RTTY

BYRON H. KRETZMAN, W2JTP
300 W. 43 ST.
NEW YORK 36, N. Y.

RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc.

80 meters	3620 kc
40 meters	7040 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.6 mc

WERE you tuned in to your RTTY COLUMN last month? If you were, you learned that this radioteletype business doesn't have to be expensive or complicated, even if you transistorize the terminal gear; namely, the converter or terminal unit (TU), and the a.f.s.k. oscillator. As a matter of fact, transistorizing this gear not only saves you space, is eliminates all those hot, old-fashioned, vacuum tubes and greatly increases the reliability of your RTTY station. Reliability, by the way, you may not think important unless you have ever operated an old W2BFD TU, with its string of 6SN7's, on clock-timed autostart. Tubes fail far too frequently in this type of on-off operation.

RTTY-Transistorized, Part II

Last month we described in detail Phil (W2JAV) Catona's transistorized polar TU, the receiving converter. This month we will describe Phil's transistorized a.f.s.k. oscillator, the transmitting part of the terminal gear of an RTTY station.

Perhaps, for the benefit of the unwashed multitude, as 'ole BeeP (WØBP) used to call 'em, we should define "a.f.s.k. oscillator." Simply, these letters stand for "audio-frequency-shift-keying." As you probably know, when a teletypewriter keyboard is not operated, its keying circuit is closed, and we are transmitting in a *mark* condition. When the keyboard is operated, its keying circuit is open (at certain times), and we transmit a *space* when ever the circuit is open. Now, it has been standardized upon that, for a.f.s.k., we transmit an audio frequency of 2125 cycles for *mark* and 2975 cycles for *space*. If you read last month's column you will recognize these frequencies as being the same as those fed to the converter or TU for reception. (Also, refer to Chap. 2, section 2.1d of the *New RTTY Handbook*.)

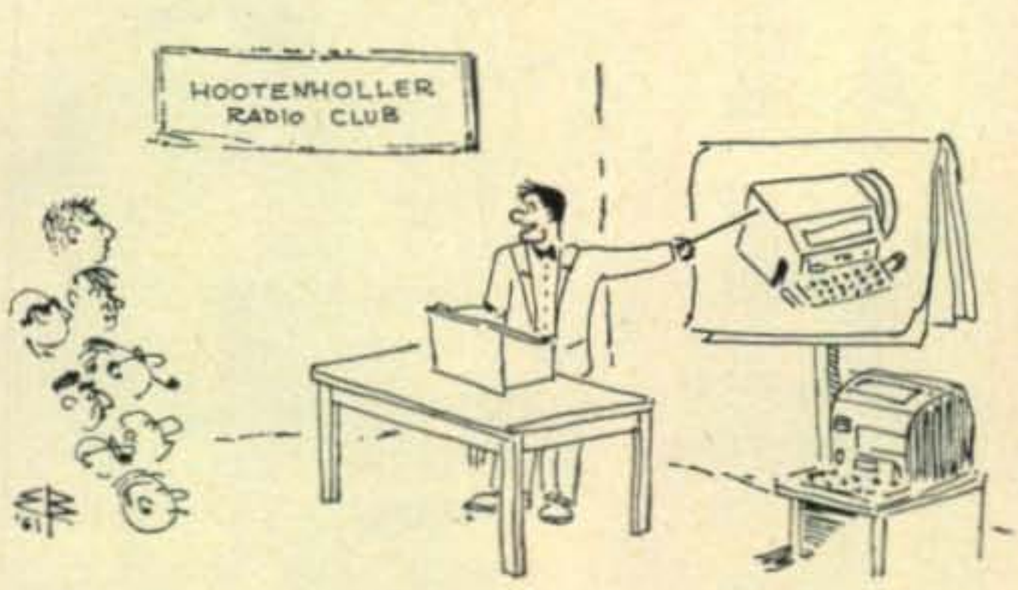
To transmit, on 80 for example, the keyed tones of the a.f.s.k. oscillator are fed to the TU, and its polar relay contacts are used to key the frequency shift circuit built into the v.f.o. Transmission on v.h.f. is accomplished by feeding the keyed tones right into the modulator of the transmitter, a.m. or f.m.

The Circuit

Simplicity is the keynote of design in this particular a.f.s.k. oscillator. The oscillator, Q_1, utilizes an RCA 2N404 and the buffer-amplifier; Q_2, also uses a 2N404. The frequency determining components are: the 88 mh telephone loading coil L_1, capacitor C_1 which sets the 2975 cycle *space* frequency (keyboard open), and C_2 which, when added to C_1, sets the 2125 cycle *mark* frequency when the keyboard circuit is closed. CR_1 and CR_2 are arranged in the form of a diode switch so that the leads to the keyboard may be any convenient length.

Output from the oscillator stage is taken from the junction of the two coils on L_1, which are connected in series-aiding by soldering together two adjacent wires, one on each side of one of the plastic barriers that separate the two coils. The wires next to the other plastic barrier are then used for connection to the collector circuit of Q_1 and to the regulated −3.5 volt supply. A miniature 100K ohm potentiometer controls input to Q_2, the buffer-amplifier. The output transformer is the same surplus transformer used as an input transformer in the TU described last month. This transformer has three windings: 22,000, 5200, and 600 ohms. In this application the 5200 ohm winding is used as the primary and the 600 ohm winding is used as the audio output. The transformer is known as the "s.s.b. special"

RTTY The Hard Way . . . No. 8



". . . and with this tape equipment, fellas, you can send all those spelling mistakes and all that poor grammer at a solid 60 words per minute!"

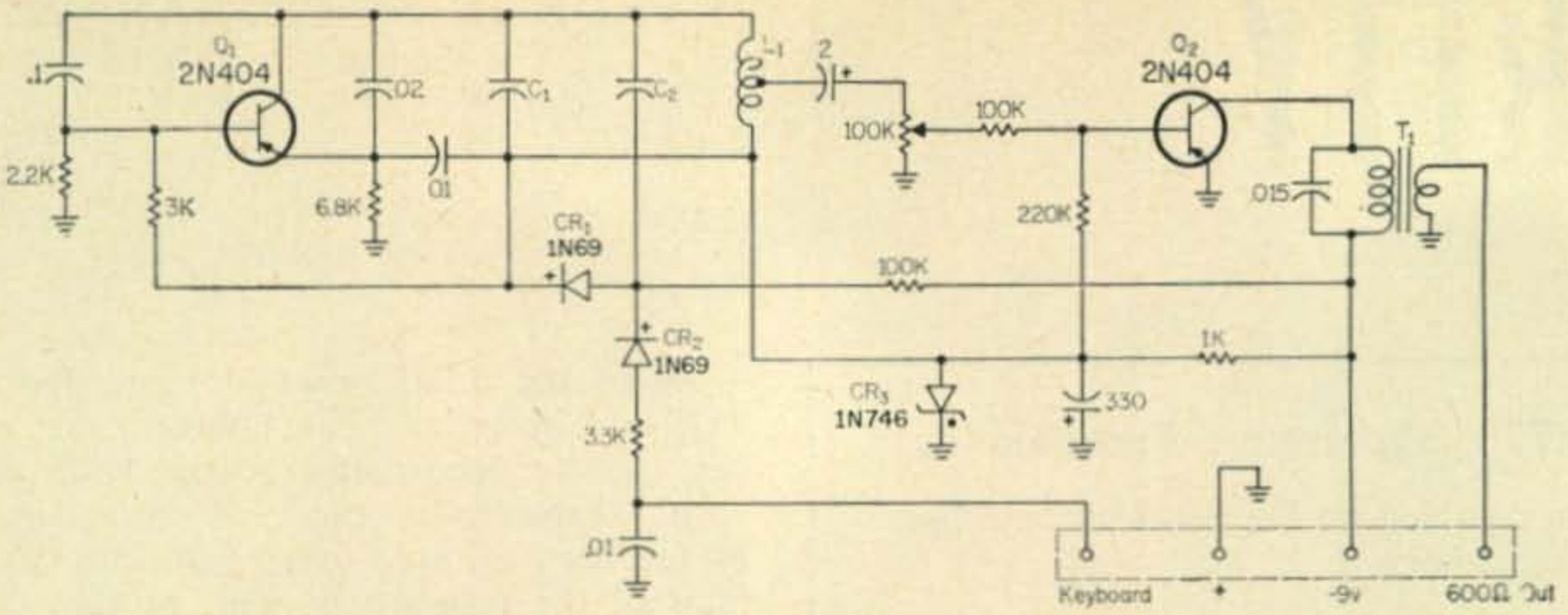


Fig. 1—Transistorized A.F.S.K. Oscillator of W2JAV.

C_1—.001 mf paper. See text.
C_2—.033 mf paper. See text.
L_1—88 mh telephone type loading coil.
T_1—"W2EWL Special" FTR TF1A19 or equiv.

and is available from Barry Electronics, New York. (See their ads in *CQ*.)

The circuit shows a 1N746 zener diode, CR_3, connected as a voltage regulator to stabilize the oscillator collector supply voltage at −3.5 volts. The object here is to keep the output level of the two tone frequencies within 0.5 db. An 820 ohm ½ watt resistor can be used in place of the zener diode but then the change in output level between *mark* and *space* is about 1 or 2 db.

Construction

The photos show that the a.f.s.k. oscillator is built on a printed circuit board like the TU described last month; however, it could be built using the miniature peg board and flea clips available from Lafayette Radio. (*See last month's column, and above all, don't write Phil for boards, photo masters, or negatives. Write to the RTTY Editor, enclosing the usual self-addressed and stamped envelope.*)

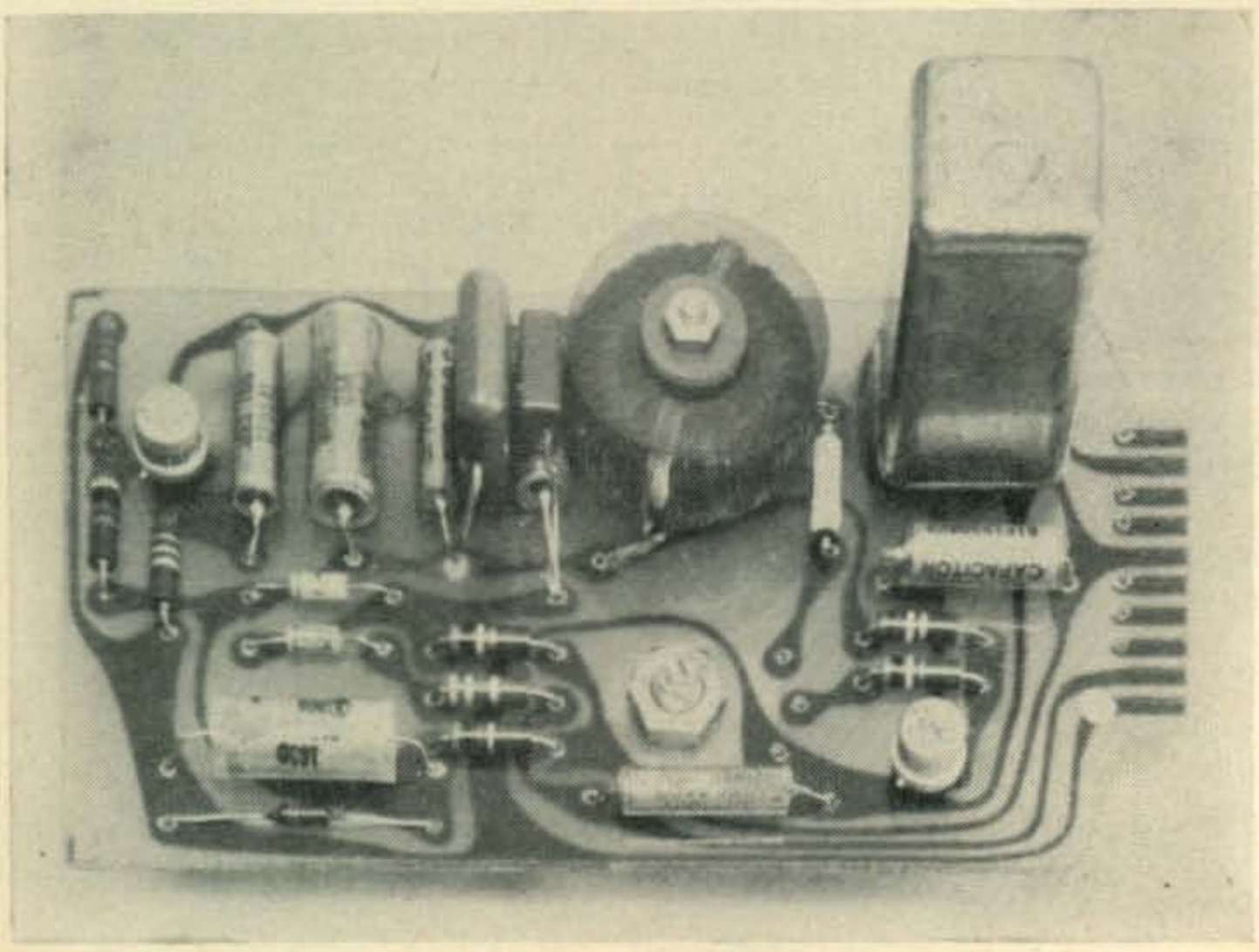
Use a good grade of paper capacitors in the oscillator circuit. Remember that the lower the voltage rating the smaller they are apt to be. Don't use ceramic capacitors as they are temperature sensitive. The value of the by-pass capacitor in the oscillator decoupling circuit is not critical but it should be at least 100 mf. All resistors are of the ½ watt variety, and the voltage supplied to the unit should be about 7 to 9 volts.

Adjustment

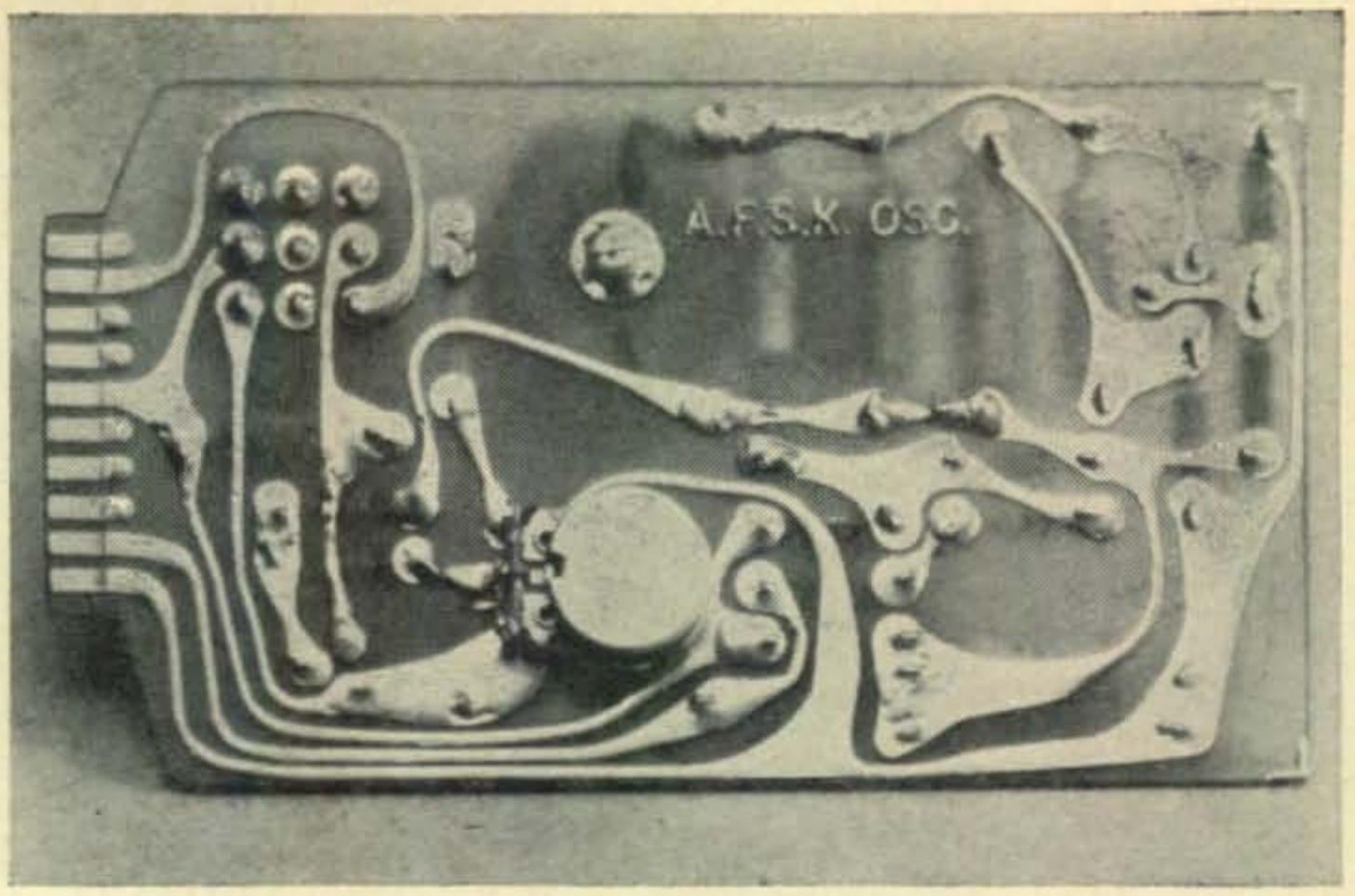
For the usual 88 mh loading coil toroid, such as obtained from W6CQK Filters, Box 426, Oakhurst, California, C_1 comes out about 0.001 mf for 2975 cycles, and about 0.033 mf for C_2 will move the frequency to 2125 cycles. You should have (or borrow) an accurate tone standard for comparison, such as that described in Chap. 7, section 7.4 of the *New RTTY Handbook*.

Machines in Canada

RTTY in Canada has never been at a high level because of the difficulty in obtaining machines. You can well imagine the problems involving importing one from the U.S.! So, strictly for our Canadian brothers we would like to pass along some information on a possible source of Model 14 and 15 machines,



Transistorized A.F.S.K. Oscillator of W2JAV, Component Side of Printed Circuit Board.



Printed Circuit Side of Transistorized A.F.S.K. Oscillator.

plus a large quantity of polar relays of the Wheatstone, Creed, and Western Electric 255-A types. This is all because the Commercial Cable Company of New York is closing their repeater station on the coast of Nova Scotia. It is suggested that Canadian RTTYers contact Mr. Roderick Goodwin, Hazel Hill, Nova Scotia, Canada.

Across the Nation

BC station WATR in Waterbury, Connecticut, has some Model 15's for sale. Contact Chief Engineer Corbett. K2SKK of Livingston, New Jersey, reports commercial c.w. QRM on 3620 kc from 2300 to 0500 GMT. W3FEY got his Model 15 from MARS and is on a.f.s.k. from Lancaster, Pa.

K4KKZ, box 268, Ft. Pierce, Florida has a Model 12 with keyboard for sale, "cheap." W4GJY of Roanoke, Virginia, has an AN/URA-6 complete diversity TU and is looking for a technical manual for it. Ben is on 40, 20, and 15 with a Model 26 and a Model 19. W4YPG of Sewanee, Tennessee, now has the TT-8/FG version of the Model 15.

W7ULL is on the MARS 2 meter net in the Spokane, Washington, area. W7LVU of Casper, Wyoming, has trouble copying RY's from NERK just above 4 mc. (*So has everyone else, Gordon!*) W7HFH of Portland, Oregon, has unshift problems with his printer. K9GZK of Ripon, Wisconsin, has a Model 26 and is building a TU. W9LAG of Jim Falls, Wisconsin, has a Model 15. K9IBZ of Evanston, Illinois, suggests using the 6BN6 gated beam discriminator with a crystal in an i.f. converter. (*Has anyone else tried this?*) W9FAC of Eau Claire, Wisconsin, has built the Twin City TU.

KØAQA of Buffalo Lake, Minnesota, is building the Twin City TU and is looking for a manual on the Model 15. WØWYT of Duluth, Minnesota, has a Model 14 tape printer and has high hopes for a 26 or 15 soon. The MARTS 2 meter net (Mo. and Kansas) meets every Sunday at 2000 hours on 146.0 mc, a.m. (ancient modulation), and on 146.94 mc f.m. WØNHP, 7205 Center Drive, Des Moines 12, Iowa, has for sale some interesting 3.7, 2.0, and 1.7 h toroids, plus a low pass (below 3500 c.p.s.) filter, and a 130 cycle band-pass filter centered on 800 cycles. Drop Dick a post card for the details.

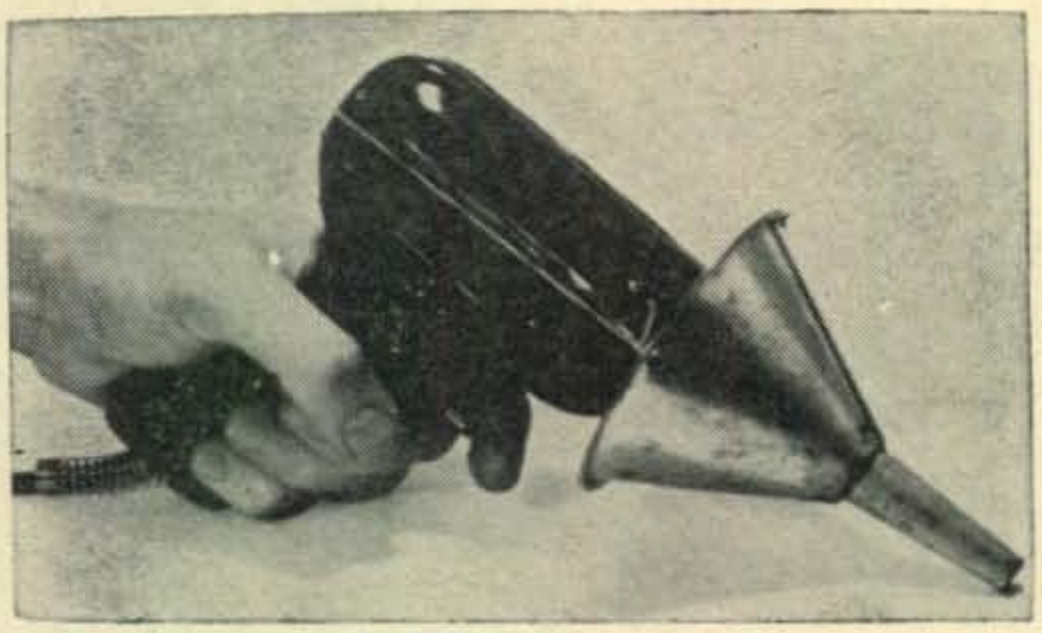
Comments

Be sure to tune in next month for Part III, the details on the voltage regulated d.c. power supply. This was pictured last month, in the "family" photo of all of Phil's transistorized RTTY gear. Please note: this one little power supply operates *all* the transistorized terminal equipment in an RTTY station.

By the way, we trust you fellows operating on 40 meters have noticed the almost complete transition from 7140 kc to 7040 kc of RTTY stations. (*We would like some comments from you fellows who regularly work 40. Drop me a post card, will you?*)

73, Byron, W2JTP

Ham Hints



Good Gun Tip Guard

When your soldering gun is stored in a toolbox or drawer with other tools, here is how to avoid having the gun's soft copper-tip bent by other heavy tools. Make a protective guard for the gun from a small tin funnel. Drill two small holes in the funnel edge and attach a rubber band to hold the guard in place. This guard also avoids the possibility of spotlight breakage.

YL

BY LOUISA B. SANDO, W5RZJ
4417 ELEVENTH ST., N.W.,
ALBUQUERQUE, N. M.

THIS column in Dec. '60 carried reports on some of the early YLs in Ham radio. Among comments were these from W6BGU, James Blanchet:

"Your article 'Pioneer YLs' sure brought back so many memories. The equipment Kathleen Parkin (6SO-6BP) operated is similar to the very equipment we used, only we go back to 1908. As a li'l tot we swiped the privilege of using mother's clothesline for an antenna, and with a silicon detector, a doorbell battery, and buzzer, we talked to the battleship *Oregon* in the Willamette river at Portland, a mile or so away—great DX, working the Navy!

"And so we thought it might be wonderful if you could publish a book, write it, or supervise, one of the same nature as your *CQ YL*. You could call it *CQ OM*, I'm sure it would be in demand." How about it OMs? This is a task for one of you!

Returning to Kathleen Parkin, we had this news of her from W6YPM, Erv: "We located Kathleen living with her brother in San Rafael. She still has the ¼-kw. spark transmitter that is mentioned in the Oct. 1916 *Electrical Experimenter,* and she also has the original article."

These comments from another reader: "I call your attention to the *Third Annual Wireless Blue Book of the Wireless Association of America* corrected to June 1, 1911 (also published by Hugo Gernsback). It lists 'Alice A. Ball, Seattle,, Wash.—call AB—100 meters—one-inch spark.' Also 'Franny Glen, Beloit, Wis.—call MSA—120 meters—¼ kw.' whom I assume is female. Many only have initials so there may be others. My own call listed in same book is Harold Vorhis, Red Bank, N.J.—call NDM—121 meters—1½-inch spark."

Tnx OMs. Any more items on pioneer YLs? We're always glad to receive any you may run across in old magazines or call books.

OSCAR

Did you hear OSCAR's cheery "hi" as it orbited around this "little" old earth? This was a terrific accomplishment and the hams involved in the project are certainly to be congratulated! We've been hearing for years how ham radio is losing its pioneering spirit and operators are merely switch throwers of assembly-line produced, store-bought gear. Maybe a lot of us fit that category, but we're mighty proud that the name "amateur" still includes such fellows as the hams connected with Project OSCAR.

WHOOT Officers

These YLs will be heading the WHOOT club of Dallas in 1962: Pres., W5RYX, Lyn; V.P., W5SPV, Pat; secy, K5MTF, Estelle; treas., K5PLC, Jean. K5BNH, Bea, is custodian of the club certificate. The WHOOT YLs meet the second Friday of each month in the Sanger-Harris (Oak Cliff) shopping center at 10 A.M. YLs and XYLs interested in amateur radio are invited to attend.

Coming Conventions

March 30-April 1: All-California YL Convention, otherwise known as the "April Fool Fun

Members of Colorado YLs, l. to r.: KØ's WZN, UNS, SQK, RXK, EPE, ZSQ, K5OPS/Ø, KØBTV, RGU, W6-AAX/Ø. Contact five members for the sYLver DOLL-ar award.

L.A. YLs during their "Here's How" party—l. to r., K6SQU, Donna; and K6OAI, Anita.

Fest." Sponsored by BAYLARCs, at Whitcomb Hotel, San Francisco.

The hotel will handle reservations and rates are $7 to $12 single, $9 to $16 double. Registration will start at 3 P.M. March 30. On the 31st the luncheon ($3.50) and banquet ($4.50) will be held in the beautiful Vista Room overlooking most of downtown San Francisco. OMs attending will find a special program for them, including prizes. Registration is $2 and should be sent to Rose Buckley, 901 Grafton Ave. S.F. 12; pre-registration brings a chance of winning a tape recorder.

May 18-19: 12th Annual Mid-west YL Convention. To be held at Flint, Mich. Chairman, W8ATB, Esther.

Sept. 1-3: National Convention, Portland, Oreg. YL and XYL activities sponsored by the Portland Roses. Details in recent issues; more as plans develop.

Some of the Toledo, Ohio YLs, l. to r.: W8HUX, Marvel; W8RZN, Dot; W8MBI, Marie; W8HWX, Lillian. W8MBI is custodian of the Buckeye Belles' certificate and is also editor of *Ham Shack Gossip*. Her OM is W8PXS and they operate 160 thru 15, 6 and 2 meters. They also enjoy outdoor activities and belong to the Toledo Naturalists Assn.

Pink & Blue Shower

The YLs of Oregon held a "pink & blue" shower on Nov. 22 for K7KQC, Nancy. A number of the YLs met at the QTH of W7HHH, Bea, and following luncheon at a cafeteria they returned to Bea's for the net at 2 P.M. on 3885 when Nancy opened her gifts. Other YLs participating, on the net and/or by sending gifts, were hostesses K7JPI and K7DMI plus W7's ZLS, CPV, DIF, RAX, GWG, WFO, GNC, NJS, DIC, ETM; K7's MAW, RFO, ATP, DLS; KN7's MPD, OEM, and XYLs of K7HQJ and W7FSU. This is the fifth "pink & blue" shower via a net held by the Oregon YLs and seems to be unique to this area.

S.W. Division Convention

Dates: June 1-2-3, 1962. Place: Disneyland Hotel, Anaheim, Calif. This is one for all the family!

A "first time" feature will be the "Queen"—Miss Amateur Radio of 1962, who will "reign" during the convention and be crowned at the banquet. Selected as Queen is Marilyn Meyers, WV6RXU. Runners-up in the contest were WV6RTZ, Kathy; W6UHA, Maxine; WV6-RMG, "Cookie."

Special attraction for the YLs will be the luncheon fashion show by Georgia Bullock, to be in the Poolside Room of Disneyland Hotel at noon on Saturday. Several gowns will be given as prizes! Sat. A.M. will feature a YL operators session, W6CEE, Vada, conducting. Sat. at 2 P.M. there will be SWOOP initiation MC'd by W6DXI, Gladys. Sat. night will be family night at Disneyland Park with special price ticket books available for convention goers.

The banquet will be at 1500 hours on Sun. June 3 at the Disneyland Hotel. Besides prize drawings at every session and on every hour, the really big ones will be drawn for during the banquet. The Lee DeForest Award will be presented during the banquet. This is a perpetual memorial award to be presented to the amateur (OM or YL) of the S.W. Division who has made the year's greatest contribution to amateur radio.

Registration only—before April 15, $1.50; thereafter $2.00. Tickets for all activities (registration, banquet, all prize drawings, fashion-show luncheon), $10 before April 15; $12.00 thereafter.

Hotel and motel accommodations are available through The Visitors and Convention Bureau, Anaheim. Address registration and inquiries to S.W. Div. Convention, P.O. Box 1685, Newport Beach, Calif. Besides Disneyland attractions there are many others nearby—beaches for swimming, Knott's Berry Farm,

W9MLE, Peggy Putnam, placed 3rd high in the c.w. section of the YLRL A.P. She has been top district c.w. scorer for 4 years in the A.P. and 3 years on c.w. in the YL-OM Contest. Peggy works mostly c.w. on 10, 15, 20 and 40 using a homebrew rig with 813s in the final. Her OM is W9AKJ. She received her General in '49; she teaches code classes and helps prospective Novices. Seven grandchildren, sewing, painting and her rose garden, also take her interest.

Selected as Miss Amateur Radio to reign over the SW Div. Convention at Disneyland June 1-3 is Marilyn Meyers, WV6RXU, shown surrounded by judges. The jr. YL of W6MLZ, Marilyn is 21, licensed in the last year, graduate of Pasadena Junior College and employed by Shell Oil Co. *(Photo by K6RKN, P/C of the convention committee.)*

Capistrano and the Missions, Hollywood, Marineland, Pacific Ocean Park, etc. See you there?

New Certificates

The Monitor magazine, published at Dallas, is offering two new certificates—"W.E.M.", for having worked any five of its editors, past or present, and "DX 100 YL" for confirmed contacts with 100 DX YLs. Custodians are the Watsons at 316 E. Hurd St., Edmond, Okla.—Allen, W5ERY, for W.E.M., and Bertha, W5JCY, for DX 100 YL.

13th YL-OM Contest

Hope the dates of this year's YL-OM Contest are already on your operating calendar. Phone—Feb. 24-25; C.W.—Mar. 10-11, 1962. Check this column in Feb. *CQ* for the rules.

Here and There

Want to do a YL a favor? W7DIC, Bessie, lost all of her QSLs when her QTH at Veneta, Ore. burned to the ground. Bessie had about 150 YL QSLs but had not yet applied for YLCC. If you have QSO'd W7DIC in the past, how about checking your log and sending her a new QSL? Bessie underwent major surgery just before her home burned. Her present QTH is 1188 Tyler St., Eugene, Ore.

Our condolences to W6FEA, Gertie, whose OM, W6WJF, Claire, has become a Silent Key. . . . Our sympathy also to the family of W6DXI, Gladys, in the loss of their first grandson.

Congratulations to K5MRU, Grace (ex-KZ5DG), for receiving her private pilot's license. (K6BX take note.)

Congratulations to KØZZE, Jean, and KØZZF, Dick, for being presented the U.S. Air Force Scroll of Appreciation. The award, made by Lt. Col. Gandy, KØRVI, was for their outstanding communications service to Air Force personnel stationed in Greenland.

Results 22nd YLRL A.P.

Phone

W1RLQ	7800	W5DVV	8100	K8ITF	3570
W1ZEN	6370	K5FXX	7430	W8HWX	3259
K1IZT	6095	K5TXQ	5906	W8WUT	2475
W1YPH	4436	W5JCY	5700	K8LHF	2175
K1EKO	3978	K5SGJ	4455	K8MQB	1531
K1LCI	3780	K6YQG	4323	W8OTK	1250
K1IIF	3325	W5WXT	3063	W8ATB	1224
K1OLM	1152	K5MIZ	1953	K8ONV	903
K1NST	756	K5IHF	1519		
K1OGU	244	K5IMD	510	K9JDE	4339
K1NZK	44	K5YTT	408	K9ILK	3610
K1IJV	44	W5RZJ	146	K9CQF	3461
				K9QGR	2190
K2JYZ	6815	K6OAI	7696	K9UJT	2131
K2ETC	5336	W6JZA	7050	K9AXS	1938
WA2GPT	4350	K6KCI	7063	W9AXV	698
W2OWL	2663	W6YZV	2698		
K2UKQ	2080	WA6AOE	2596	KØIKL	9585
W2EBW	531	WA6KLP	2380	KØHEU	7105
K2FBM	396	W6UHA	1664	K5OPS/Ø	6624
		K6VFE	1176	WØRAW	4095
W3MDJ	3488	K6UHI	1014	KØGIC	3106
K3HZY	2584	W6DXI	839	WØVTX	2701
		K6JCL	585	WØZWL	2210
K4DNL	6613	K6QPG	88	KØLQS	1121
K4RNS	4004			KØKLQ	700
W4WPD	3420	K7MRX	5794	KØUOK	425
W4UF	920	W7TGG	4200		
W4VIM	650	K7CHA	3827	CT1YE	1000
K4RHU	425	W7HHH	3420	KP4CL	3913
		K7ADI	1921	KZ5EJ	4193
K5BJU	12,980	W7GGV	1575	OA4GR	910
K5YIB	12,825	W7OUE	1150	OA4HK	138
K5BNQ	12,600	K7KSF	1000	OH5SM	20
K5SBN	9281	W7DIF	160	YV4DU	4278
K5OPT	9234	W7GXI	56	ZE1JE	45

C.W.

K1NST	1716	K5TXQ	2700	K8MQB	1188
W1YPH	1406	K5BNQ	2406	W8HWX	960
K1LCI	720	K5YIB	2351	W8LHF	800
W1RLQ	608	K5LIU	1994	W8OTK	510
K1IJV	113	K5OPT	176	W8NAL	489
		K5OKR	20	K8KKU	315
K2UKQ	2080			K8ITF	193
K2JYZ	1680	K6OWQ	2054		
W2EBW	248	WA6AOE	1156	W9MLE	2775
		W6PCA	1040	K9UJT	45
W3TSC	1188	K6QPG	531		
K3HZY	594	W6DXI	420	KØIKL	3238
W3MDJ	563	K6VFE	272	KØGIC	1950
W4UF	908	W7OUE	1006	OH5RZ	20
K4RHU	425	K7RAM	368	OH2YL	1
K4LMB	244			VE6ABV	1344
		K8ONV	1792	VE6YW	125
K5BJU	3106	W8WUT	1260	VE7ADR	1094

Logs received dated after the mailing deadline of Nov. 22 were used for confirmation only.

Book Supplement

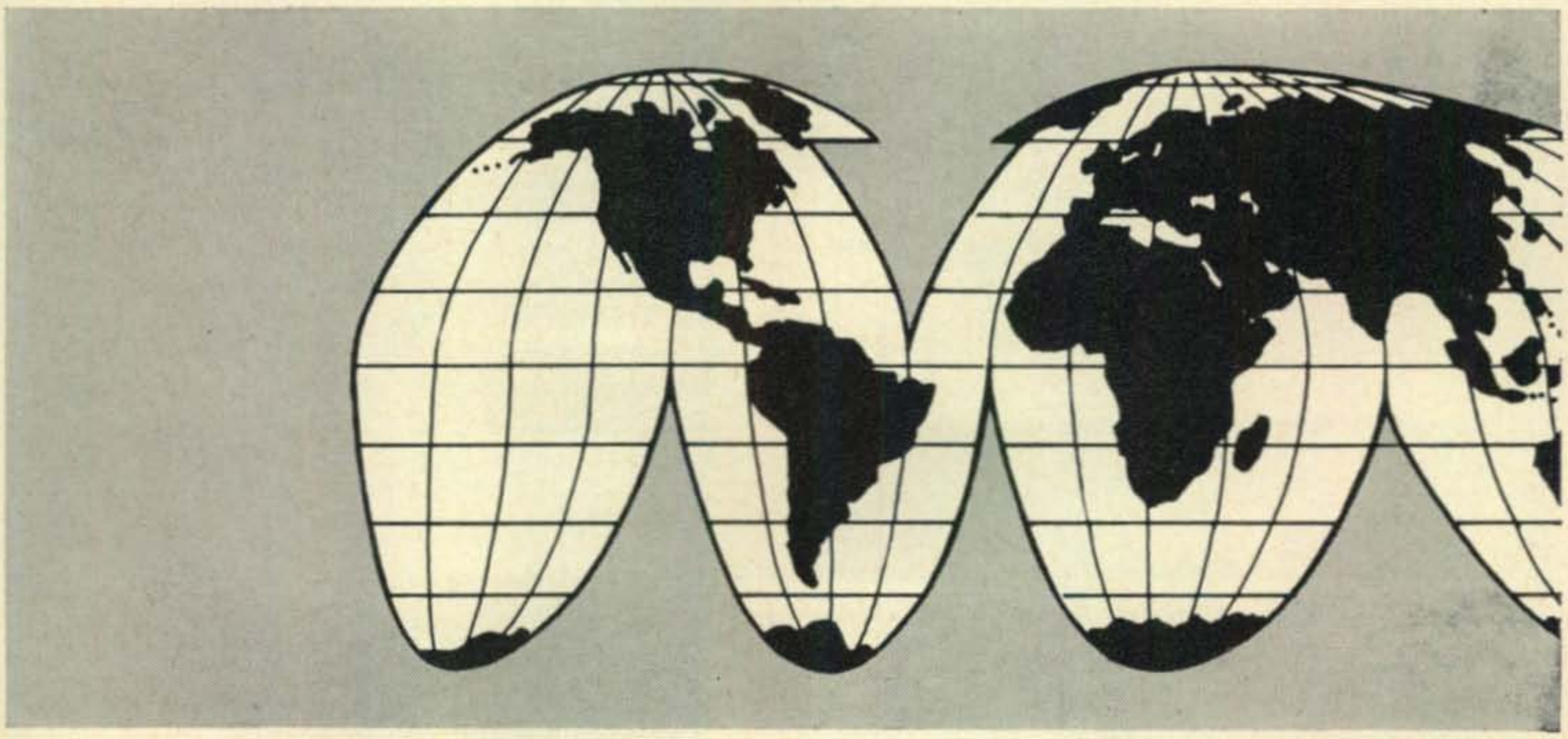
As mentioned in the last couple of issues, the supplement pages 36C and 36D are available to anyone who has a copy of our book *CQ YL*. Just send a note to W5RZJ and enclose a couple of 4¢ stamps to cover cost of mailing. (Copies of pages 36A and 36B are also still available if you don't yet have them.)

CQ YL is the one and only book devoted entirely to the very big part the YLs are playing in ham radio. Order from W5RZJ, $3, postpaid.

33, W5RZJ

AN IMPORTANT MESSAGE ABOUT HARVEY'S NEW GLOBAL ORDER SERVICE...

A special handling service has been set up by Harvey Radio to handle world-wide orders promptly and reliably — to assure the equipments safe arrival in perfect operating condition in the quickest possible time. Here's how it works:



- All orders for ham equipment are personally supervised and handled in all phases by hams. W2DIO and his ham associates understand your needs and Harvey has the immediate answer in its large up-to-date inventory.
- Upon your instructions, Harvey opens the original factory sealed cartons and gives the equipment a complete inspection and checkout. You can be sure it works when it leaves Harvey.
- Each product is carefully packaged to exacting overseas requirements. Proper protective shipping methods assure you that your equipment will arrive in perfect condition.

Hams around the world have always known Harvey to be a reliable source of supply. Now Harvey's Global Order Service adds blue-ribbon expediting to Harvey's well-established reliability. This combination assures you—more than ever before—of complete satisfaction.

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See us at the Single Sideband Amateur Radio Assocation Hamfest and Dinner. Statler-Hilton Hotel, N. Y. C. March 27th from 10 A.M.

For further information, check number 26, on page 126

DX [*from page 64*]

XZ2US, VK Box 833, Rangoon, Burma.
ZD1S via K8MTI.
ZL2IS (ex-VP6WK) G. McLean, Wilford, Waimen, West, R. O. Brightwater, Nelson, New Zealand.
ZS3LW Box 2773, Windoch, Southwest Africa.
5H3GC Neville Jackson, Box 111, Mbeya, Tanganyika.
5H3PBD Peter B. Dodd, P. O. Box 9053, Dar-es-Salaam, Tanganyika.
5N2PJB via W7VEU.

W2CTN, QSL Manager Extraordinary for CR4AH, VK9RR, FG7XF, HK2YO, HP1IE, HR2FG, FK8AT, FK8AI, FK8AW, KV4CI, KW6CP, KZ5LC, OX3DL, OX3UD, PJ2ME, TG9AL, TI2CMF, VP6PJ, VP6PV, VP6RG, VP3RW, VQ3HH, VQ3H, VQ4AQ, VR2DK, VK2FR, VK9GK, VQ2EW, VQ2WM, VQ2WQ, VQ3HD, VP8AI, YS1IM, ZP9AY, ZD9AM, ZB2I, ZB1FA, VQ5IG, 5A4TC, OA7F, 9G1BO, 5N2DCP, FM7WO, PZ1AP, PZ1AX, YS1MG, 3A2BZ, 5N2KHK, ZD2KHK/NC, CR4AX, FG7XH, W8AI/FG7, HC4IM, HC4IE, KW6CU, OX3RH, TI2WD, VO3CF, VR2DW, VR2DA, VQ1HT, VQ1SC, VP2KH, JZØPH, FM7WU. At the time of writing, this list was up to date, however, by the time you read this, Jack will have probably added several more to the list.

I guess no one has to be told that conditions have been pretty lousy of late. I think the Swiss Broadcasting Corporation summed it up very nicely on their DX corner program recently when they were giving propagation forecasts. The program ended something like this: "20 meters open for DX from 1200 to 1900 GMT. After that time, you might just as well pack up and go for a drink."

I guess that's about it for this month.

73 es best of DX, Urb, W2DEC

Six Meter Linear [*from page 59*]

New Brunswick and South Carolina the only exceptions. On ground wave, K8MHJ at Cedarville, Ohio was worked with a Q5 S6 report, (125 miles). To the West on skip, KØZVR at Ft. Crook, Nebraska gave a report of Q5 S9 plus 20 db. To the East, W1FCH at Danielson, Conn. was worked, but terrific QSB interrupted the QSO. ■

Contest Calendar [*from page 66*]

Editors Note

In case you receive this issue in time, don't forget our 160 C.W. Contest on February 24/25th. It starts 9:00 P.M. EST Friday the 23rd and ends Sunday morning at 9:00 A.M. Rules were in the January issue. Logs go to: *CQ* WW 160 Contest, 300 West 43rd Street, New York 36, N.Y.

That's about it for this time. Now to get busy on a preliminary report of our own DX Contest for next month's issue.

73 for now, Frank, W1WY

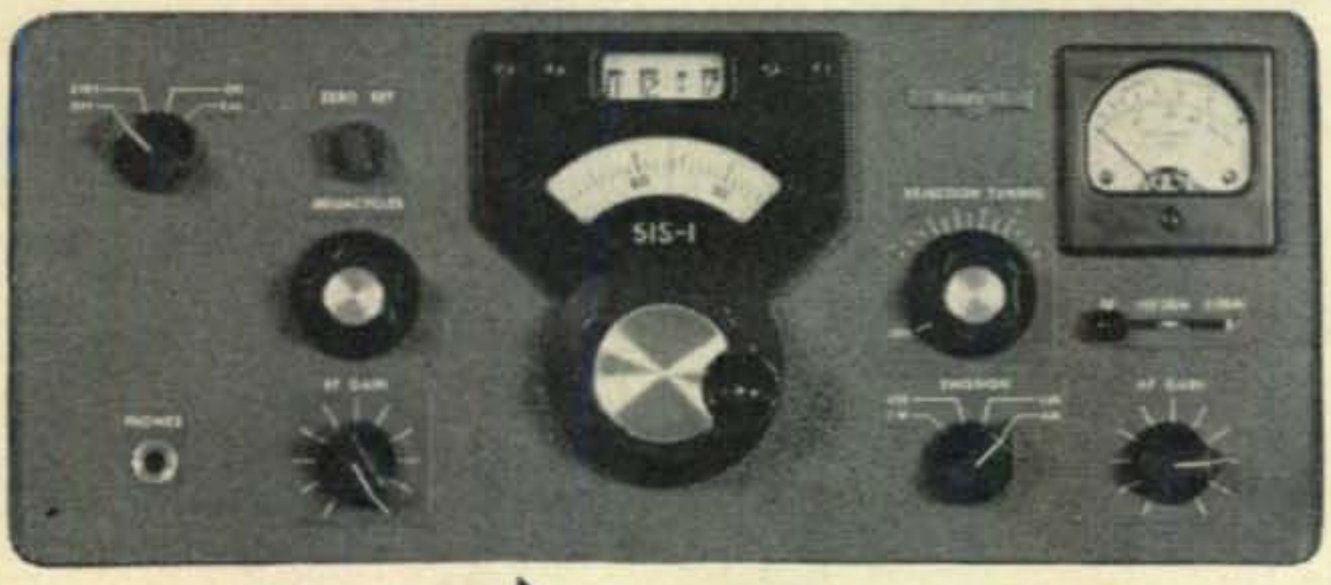
Space [*from page 70*]

all mankind. Like so many important endeavors, however, man's efforts to navigate space have evolved over many years, and results from the contributions of many people.

In order to provide a fuller appreciation of the events and activities which have led to

Get Terry's (W9DIA) Deal on Collins...

$5.00 DOWN ...UP TO 3 YEARS TO PAY



New 51S-1 COLLINS H. F. Communication Receiver

LOOK AT MY LOW MONTHLY PAYMENTS:

$1828 (price, ham net)

MONTHLY PAYMENT SCHEDULE

1 year $167.11 — 2 years $91.15 — 3 years $65.83

COLLINS RECONDITIONED EQUIPMENT

75A-1 Receiver	$239.00
75A-2 Receiver	299.00
75A-3 Receiver	399.00
75S-1 Receiver	379.00
75A-4 Receiver	575.00
32V-1 Transmitter	199.00
32V-2 Transmitter	249.00
32V-3 Transmitter	299.00
32S-1 Transmitter	479.00
KWM-1 Transceiver	449.00
AC supply for above	99.00
30S-1 Linear Amplifier	995.00

WRITE FOR OUR LATEST LISTING. 10% down — up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order — $5.00 deposit to held. Subject to prior sale.

All Reconditioned in our own shops

Terrific Trades

We need your present equipment for our two stores. Rush coupon below now for amazing alowance offer!

Terry Makes it Easy to Put Any Collins Gear in Your Shack

NEW COLLINS EQUIPMENT — $5.00 DOWN

	Ham Net Price	Monthly Payments
30L-1 Linear Amplifier	$ 520.00	$18.59
30S-1 Linear Amplifier	1556.00	56.00
32S-1 Transmitter	666.00	24.42
75S-1 Receiver	520.00	18.59
75S-3 Receiver	620.00	22.20
51J-4 Receiver	1464.00	52.69
51S-1 Receiver	1828.00	65.83
KWM-2 Transceiver	1150.00	41.35
DL-1 Dummy Load	58.00	1.91
351D-2 Mobile Mount (KWM-2)	120.00	4.15
CC-2 Carrying Case (KWM-2, KWM-2A, 39-L, 51S-1)	85.00	2.88
MP-1 15V DC Power Supply	198.00	7.10
PM-2 Portable Power Supply	150.00	5.24
516F-2 AC Power Supply (KWM-2)	115.00	3.97
312B-3 Speaker (S-Line)	32.00	.97
312B-4 Speaker Console (S-Line)	195.00	7.00
312B-5 PTO Console (KWM-2)	350.00	12.45
399C-1 PTO Speaker	164.00	5.74
F455K-15 Mechanical Filter (75S)	60.00	1.99
F455Q-5 Mechanical Filter (75S)	52.00	1.70
302C-3 Directional Wattmeter	130.00	4.51
189A-2 Phone Patch	67.00	2.10
440E-1 Cable (516E-1 to KWM-2)	17.00	.43
136B-2 Noise Blanker (KWM-2)	124.00	4.30

WRITE FOR COMPLETE COLLINS PRICE LIST AND CATALOG

NOTE: Above are shown for a three (3) year contract. Minimum order which can be financed for one (1) year is $60.00, for two (2) years is $120.00 and for three (3) years is $180.00.

Collins Reconditioned Equipment
10% DOWN—up to 3 years to pay

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You
PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

MANAGER, STEVE, W9EAN

MILWAUKEE, WISCONSIN
3832 Lisbon Avenue
Phone: WEst 3-3262

MANAGER, "DOC", W9HJS

CHICAGO, ILLINOIS
6430 Milwaukee Avenue
Phone: ROdney 3-1030

Amateur Electronic Supply—Mail Order Dept. C3
3832 W. Lisbon Ave., Milwaukee 8, Wisc.

Ship me .....
I enclose .....: I will pay the balance in

☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade
..... What's your deal?

Name .....

Address .....

City .....State.....

☐ Send reconditioned equipment bulletin

For further information, check number 33, on page 126

today's space age, the National Aeronautics and Space Administration (NASA) has recently published a chronology of space history entitled, *Aeronautics and Astronautics–An American Chronology of Science and Technology in the Exploration of Space, 1915-1960.*

The author of this interesting historical record, Dr. Eugene M. Emme, is well qualified to write on the subject. Now serving as NASA's official Historian, Dr. Emme is the author of numerous other professional articles on the history of the development of air power in this country.

Reading like a personal diary, the 240-page hard-covered book records the major milestones in man's exploration of space since 1915, as well as many of the not-well-known events. All-in-all, the chronology contains more than 2500 listings.

Beginning with the year in which the National Advisory Committee for Aeronautics (NASA's predecessor) was created to "supervise and direct the scientific study of problems of flight, with a view of their practical solution", the attractively bound chronology traces the evolution of the aeronautical and space sciences in this country from the setting of new endurance records for biplanes, to the launching of artificial satellites for the exploration of the outer reaches of space. The report stresses the role of aircraft, rockets, balloons and space craft as tools of scientific research and engineering development in aeronautics, astronautics and related fields.

The first section of the book, "The Dawn of the Space Age", records chronologically those events which led ultimately to the launching of the first earth satellite. The second section, "The First Three Years of the Space Age", records events which have taken place since SPUTNIK I was launched on October 4, 1957, through December 31, 1960. Several appendices to the book contain interesting and useful statistics on all satellites launched through December 31, 1960; a chronicle of world airplane records as compiled by the International Aeronautical Federation; statistics on major balloon flights; and a select list of awards and honors bestowed in aeronautics and astronautics. The book also contains a lengthy bibliography on these subjects.

Aeronautics and Astronautics paints a clear picture of the events and activities which have led to today's space age, and gives some insight into the meaning of events that are likely to come tomorrow in the field of space exploration. The information appearing in the book is well presented, and makes for easy and interesting reading. Much of the data appears in print in a single reference for the first time. As such, it is recommended as a basic reference for the amateur and professional reader alike, having an interest in space exploration.

The history of science and technology, espe-

[*Continued on page 104*]

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida
Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

V-80 VERTICAL ANTENNA

FACTS

- If K6INI can do it, so can you
- Absolutely no guying needed.
- Radials not required.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Four metal mounting straps furnished.
- Special B & W loading coil
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.

YOU COULD WORK WONDERS WITH A GOTHAM VERTICAL ANTENNA!

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. CQ
1805-A PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15 ..... $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name_____

Address_____

City_____ Zone_____ State_____

For further information, check number 36, on page 126

UHF Beams [*from page 44*]

nect a 100 mmf variable between the two terminals on the insulator. Connect the center lead of the coax to the terminal that is not supporting the gamma arm. Load up the beam and check the s.w.r. If it is too high, adjust the variable condenser for minimum s.w.r. It may help to adjust the position of the aluminum strap, but this will have much less effect than the condenser. When a satisfactory s.w.r. is achieved, remove the condenser, being careful not to disturb its setting, and measure its value on a condenser checker. Then buy a high quality fixed condenser of the closest value and connect it in place of the variable. The author used two 100 mmf silver micas in series for each beam. This procedure eliminates the trouble of sealing a variable from the weather.

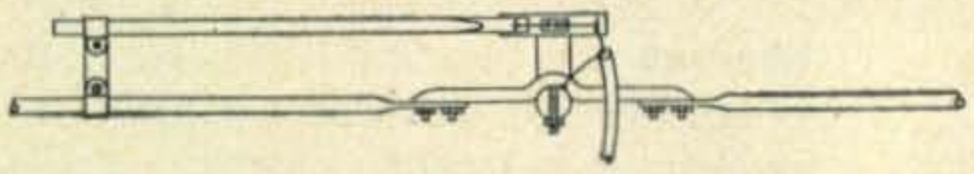


Fig. 3—Details of the gamma match construction. Similar construction is used in both the 2 and 6 meter beams.

Results

The beams were stacked about three feet or so apart and mounted about 50 feet in the air. Both performed very well. In spite of the fact that they were tuned up only 10 feet off the ground, the s.w.r. was well below 2:1 when they were mounted on the tower. ■

Observations From Abroad [*from page 46*]

fill just about every ham need. Our overcrowded amateur bands should certainly warrant our individual attention towards eliminating this practice.

QSL Cards

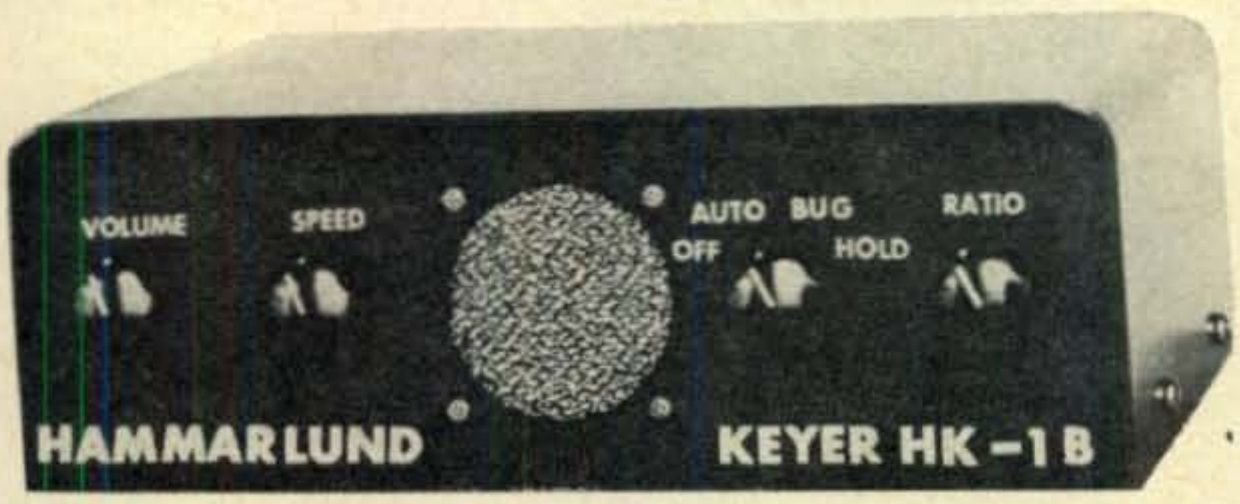
Last but not least I think that the W/K hams have aquired a notorious reputation for promising their QSL card, and then for one reason or another failing to keep their word. I know this happens over here also. On the other hand it's no crime (at least not in my book) to tell a man that you don't QSL, if that is your policy, but by the same token you shouldn't request a QSL from him unless you intend to reciprocate.

These general observations are not intended to be critical but rather, I hope they may serve to make us a bit more aware of our role as American amateurs. There are more exceptions to these observations than not, but unfortunately a few within our ranks may not realize that throughout this world our audiences consist of peoples from every walk of life. In the final analysis, what counts is simply caring about being a ham, not to be knowingly ingratiating to other men, but for the sake of one's own dignity, and self respect. ■

Get Terry's (W9DIA) Deal on Hammarlund

$5.00 DOWN ...UP TO 3 YEARS TO PAY

NEW! Hammarlund Electronic Keyer



- All Transitorized. Self contained battery supply
- Adjustable "personal touch" ratio of dots/dashes
- Instantly adjustable speed range
- Pleasing sidetone signal with adjustable volume for monitoring or code practice

Model HK 1B Ham net **$39.95** Pay only $5 down and $5 per month

HAMMARLUND RECONDITIONED GEAR

HQ-100 Receiver	$129.00
HQ-100C Receiver	139.00
HQ-110C Receiver	179.00
HQ-145 Receiver	219.00
HQ-160 Receiver	259.00
HQ-170 Receiver	259.00
HQ-129X Receiver	119.00
HX-500 Transmitter demo	499.00

WRITE FOR OUR LATEST LISTING. 10% down—up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order. $5.00 deposit to hold. Subject to prior sale.

HQ 170C Ham Band Receiver

One of the best values ever offered in an all-band receiver for SSB and AM/MCW. Covers 160 through 6 meters. Available optionally with or without clock-timer.

Amateur net $359 (clock-timer $10 extra) Monthly payments only $13.14

HQ 180C All band receiver **$439** . . . Monthly payment after $5 down payment: **$15.67**

HAMMARLUND NEW EQUIPMENT

	Ham Net price	(3 years) Monthly payments
HQ-100-AC Receiver	$199.00	$ 7.00
HQ-105TRC Receiver/Transmitter	$229.45	$ 8.11
HQ-110C Receiver	$259.00	$ 9.17
S-100 Matching Speaker	$ 14.95	$ .36
HQ-145XC	$279.00	$ 9.89
HQ-170-C Receiver	$369.00	$13.14
S-200 Matching speaker, in cabinet	$ 19.95	$ .54
HQ-180C Receiver	$439.00	$15.67
HK-1B Electronic Keyer	$ 39.95	$ 1.26

NOTE: Above are shown for a three (3) year contract. Minimum order which can be financed for one (1) year is $60.00, for two (2) years is $120.00 and for three (3) years is $180.00.

TERRIFIC TRADE-IN DEALS — Use Coupon

NEED CASH? We'll buy your ham gear for spot cash. Tell us what you have to sell and we'll rush our offer.

$1,000,000 in '62

A E S is out to sell a million dollars worth of ham gear this year. This is why you get the best deal and service here! Let us prove it!

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You

PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

MANAGER, STEVE, W9EAN

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3832 Lisbon Avenue
Phone: WEst 3-3262

MANAGER, "DOC", W9HJS

CHICAGO, ILLINOIS
6430 Milwaukee Avenue
Phone: ROdney 3-1030

Amateur Electronic Supply—Mail Order Dept. CA-3
3832 W. Lisbon Ave., Milwaukee 8, Wisc.

Ship me .....
I enclose .....: I will pay the balance in

☐ 1 yr. ☐ 2 yr. ☐ 3 yr. ☐ C.O.D.

Let's hear UR Combination Deal on the following

.....

.....

Name .....

Address .....

City ..... State .....

For further information, check number 29, on page 126

Space [*from page 100*]

cially in the fields of aeronautics and astronautics, has not received its share of serious attention in the past. Dr. Emme's book does much to correct this situation.

Aeronautics and Astronautics–An American Chronology of Science and Technology in the Exploration of Space, 1915-1960, by Dr. Eugene M. Emme, is on sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., for $1.75 a copy.

Next month; a discussion of NASA's ECHO II project and another scientific program in which radio amateurs are invited to participate, and a completely revised Space Chronicle giving essential statistics for all satellites launched to date.

73, George, W3ASK

Propagation [*from page 68*]

Radio Amateurs Asked To Assist In Auroral Scientific Program

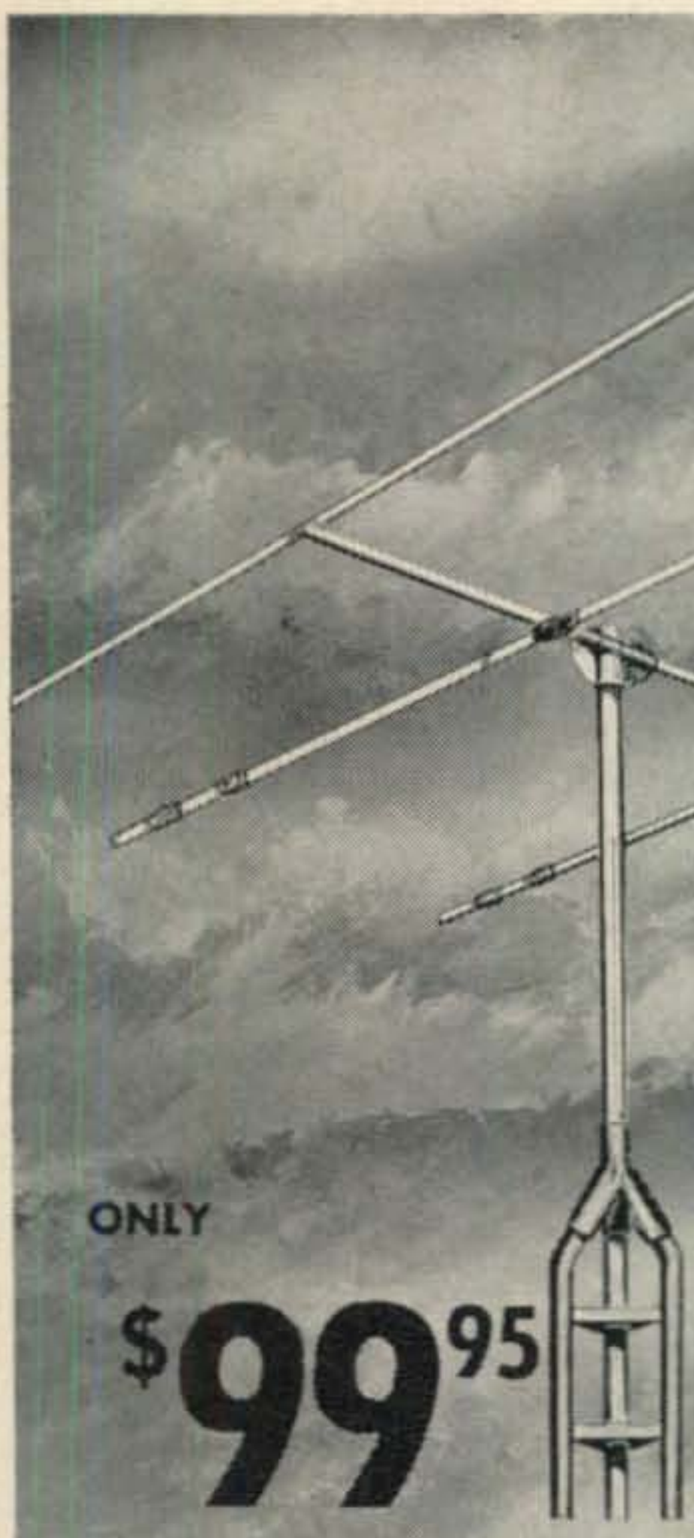
Drs. C. W. Gartlein and S. Sprague of the IGY Auroral Data Center, Cornell University, Ithaca, N.Y., have again invited radio amateurs to participate in a scientific project designed to learn more about the aurora, or Northern Lights. Many readers of this column responded to a similar invitation made in 1957, and contributed much valuable scientific information concerning the aurora during the IGY period, which ended December 31, 1958.

The Cornell scientists said that 350 visual auroral observers are presently scanning the sky in a continuation of the IGY program, and are reporting additional useful information concerning auroral displays. The present observers are mainly high school students interested in science, and amateur radio operators and astronomers. An effort to enlist the assistance of additional radio amateurs is now being made, since the present program could use another 350 observers.

Drs. Gartlein and Sprague said auroras are most likely to be seen in the northern third of the country, and most frequently in the middle of the night. Observers are most urgently needed from the north-western states and Alaska.

The present Cornell auroral program is especially interested in learning more about the rare blue color found in the more spectacular auroral displays. The blue light, seen best with a special blue fllter, usually occurs later in the display than the white, yellow or red colors. Reports of such observations will fill a gap in present auroral information, and may help to explain why auroras glow. The program is also interested in further establishing the area in which the northern lights occur most often, and a means for predicting their occurrence.

Auroral reports from visual observers are very important because no computer or instrument is yet able to do the work of humans in observing the northern lights for form, loca-



HUSH!

OR WE'LL HEAR YOU

WITH YOUR NEW

hy-gain 3-Element Thunderbird

ONLY

$99.95

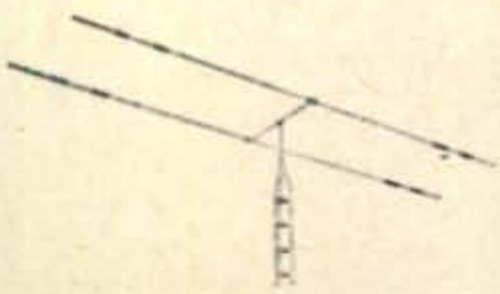
HAM NET

On 10, on 15, on 20 meters, your signal goes out on the finest mechanically and electrically constructed 3-element trap tribander ever mass produced. We will unconditionally guarantee the TH-3 to outperform any similar antenna regardless of price.

Boom length 14 ft., longest element 26 ft. Forward gain up to 8 db. All aluminum construction of 2" OD boom, 1¼ - 3/4" OD elements, new plastic and steel gusset bracket assemblies. 100% rust-proof. New solid state slim-traps. SWR less than 2:1. Simplified assembly.

Try the TH-3 yourself for the "big signal".

2-ELEMENT THUNDERBIRD



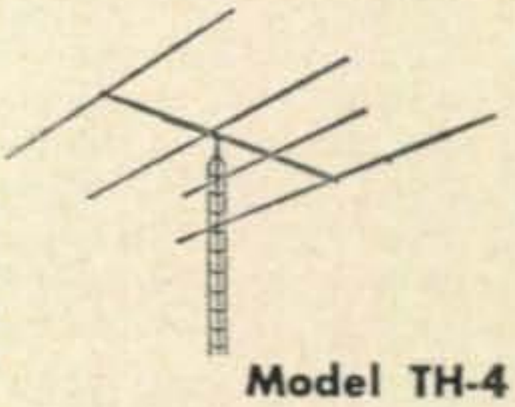
Model TH-2

Easy to install most anywhere, weighs only 20 lbs. Rotates with TV rotator. Boom 6 ft., longest element 26 ft.

$69.95

4-ELEMENT THUNDERBIRD

Longest element 32 ft. Full size boom spacing of 16 ft. Interlaced 4th element for higher gain & F/B ratio. 38 lbs.



Model TH-4

$117.50

WRITE TO US FOR DETAILED TECHNICAL INFORMATION ON THE THUNDERBIRDS.

HCJ ELECTRONICS

6904 East Sprague
Spokane 63, Wash.

Ralph Farano, W7 **HCJ**

Large stocks of clean reconditioned equipment, all guaranteed, of course. The Great Northwest's Newest and Largest Ham Eqpt. Distributor. See Honest Cousin John for the best trades on all the newest equipment.

For further information, check number 32, on page 126

tion, color and motion. Radio amateurs are especially useful as visual observers, since they are often the first to know that an auroral display is in progress from their observations of reception conditions on the h.f. and v.h.f. amateur bands.

It costs nothing to participate in this program as a visual auroral observer, and observers are sent filters for viewing the aurora, instruction books, report forms, postpaid envelopes for returning the reports, and other equipment, without charge. Radio amateurs in the northern third of the country who are interested in participating in this interesting scientific program in which little is known, may send requests directly to: Aurora Data Center, Cornell University, Ithaca, New York.

73, George, W3ASK

Sideband [*from page 74*]

Another good friend, Ray ex-F7BT, SVØWK, has also been heard from as W9BJY in Belleville, Indiana. . . . We were happy to learn that the DARC now has Hardi, DJ3JZ, writing its DX news while *Radio ZS* boasts a new sideband columnist, Attie, ZS6AMV. . . . Louis, 9G1DP, is hoping to repeat his activities from XT2Z around Eastertime. . . . VS9APH cards are now being distributed to W-VE contacts by Reg, W3HQO, who also mentions that Ken, G2CWL, is now representing the EX 'G' Club in the UK for all certificates.

G3CHN and Tony, W2FYT, made what is believed to be the first two-way s.s.b. DX contact on 160 meters. It took almost eight weeks of scheduling to get the right conditions but the boys made it! Now, Tony, in Bordentown, N.J., is eager to make WAC on 160 and would like to sked anyone in Africa, Asia, South America, and Oceania with patience and enthusiasm enough for top band DXing on sideband.

Overheard on the air one day. . . .

W2LNP/M "I hear that the CB operators are complaining about QRM on their band. At the rate they are going, they might try to take over the ham bands."

W2WK/M "Would you call that Citizen Banditry?"

Band Hopping

Via Jack Doyle, W9GPI, we learn that Henry Adams, W9VCN, of Milwaukee, was killed in an airplane accident with his 18 year old son in November. Our sympathies are extended to the bereaved family. . . . Also from Jack comes the brighter news that Mary, W9RUJ, is steadily progressing in health and activity and that, in listening to her receiver, she again recognizes voices and calls. Knowing Mary, we are sure that one day soon we will have the great pleasure of having her back on the air with us. . . . Authority has been granted to operate maritime mobil aboard the U.S. Submarine *Darter* with operation under the call of W4CSE, mostly on s.s.b. but some c.w. included. Johnny, W4CSE, and Dave, K3BUV, will be the operators; QSLs to go to Dave, K3BUV/4, Rt. 9, Box 310, Charleston Heights, S.C. . . . Looks like the St. Louis boys have also found that the 2 meter DX tip-off net is a worthwhile operation. Joe, WØPGI, wrote us that, thanks to the net and his new Drake 2B, he's still managing to garner all the new DX. . . . Leave it to Al, W8PQQ, to dream up an improved method of logging for DXpeditions! Al designed and executed a new logging system, complete with symbolic language, to be used by Gus, W4BPD, when he repeats his grand DX tour. . . . Congratulations to Joy, K4QIO, who is the first XYL ever to be elected to the presidency of the Louisville, Ky. amateur radio club.

Some fellows are so anxious to get on sideband they can't even wait to assemble a rig. Like, Don,

Get Terry's (W9DIA) Deal on Hallicrafters

$5.00 DOWN ...UP TO 3 YEARS TO PAY

You'll Never Get a Better Deal on Hallicrafters than I'll Make* Right Now! *Terry, W9DIA

This picture tells the story. We're overstocked on Hallicrafters, and if you're ready to deal, I'll make you the best offer you'll ever get anywhere. Act now while we're in this spot.

Look at these low monthly payments after $5 down payment.

NEW HALLICRAFTERS EQUIPMENT — $5.00 DOWN

	Price	Monthly Payments
S-38E Rcvr	$ 59.95	$ 1.98
SX-62A Rcvr	359.00	14.08
S-94 Rcvr	69.95	2.35
S-95 Rcvr	69.95	2.35
SX-100 Rcvr	325.00	11.56
SX-101A Rcvr	445.00	15.89
S-107 Rcvr	94.95	3.25
S-108 Rcvr	139.95	4.87
SX-110 Rcvr	169.95	5.96
SX-111 Rcvr	279.50	9.91
*SX-115 Rcvr	599.95	21.48
S-120 Rcvr	69.95	2.35
SX-140 Rcvr	124.95	4.33
SX-140K Rcvr	104.95	3.61
SR-34AC Transcvr	395.00	14.08
R-47 Spkr	12.95	.29
R-48 Spkr	19.95	.54
HT-32B Xmtr	725.00	26.00
HT-33B Xmtr	995.00	35.75
*HT-37 Xmtr	495.00	17.69
HT-40 Xmtr	109.95	3.79
HT-40K Xmtr	89.95	3.07
HA-4 Keyer	59.95	1.98
HA-2 2-Meter Transvtr	349.50	12.44
HA-6 6-Meter Transvtr	349.50	12.44
P-26 Sup for above	99.50	3.41
FPM-200 Mob. Transcvr	1995.00	71.86
HT-41 KW Lin	395.00	14.08
S-119 SWL Rcvr	49.95	1.62
S-119K Kit	39.95	1.26
CB-3 C.B. Transcvr	149.95	5.23
CB-4 C.B. Hand Held	89.95	3.06

NOTE: Above are shown for a three (3) year contract. Minimum order which can be financed for one (1) year is $60.00, for (2) years is $120.00 and for three (3) years is $180.00.

*New Prices Effective January 15, 1962.

HALLICRAFTERS RECONDITIONED GEAR — 10% DOWN

SX-25 Rcvr	$ 74	SX-101 Mark III Rcvr	279
SX-28 Rcvr	99	SX-101A Rcvr	299
SX-40 Rcvr	49	S-102 Rcvr	39
SX-40B Rcvr	69	SX-111 Rcvr	199
SX-43 Rcvr	99	HT-18 VFO	39
SX-62A Rcvr	299	HT-30 SSB Exciter	199
S-85 Rcvr	79	HT-31 Lin Amp	179
SX-95 Rcvr	49	HT-32 Exciter	399
SX-99 Rcvr	99	HT 32A Exciter	449
SX-100 Rcvr	199	HT-33 Lin	249
SX-101 Mark II Rcvr	249		

WRITE FOR OUR LATEST LISTING. 10% DOWN—up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order—$5.00 deposit to hold—Subject to Prior Sale.

HOW ABOUT TRADES . . . if you have a weak heart, don't ask for our trade-in deals! It is guaranteed to amaze you. Tell us what you have! Use coupon below.

NEED CASH? We'll buy your ham gear for spot cash. Tell us what you have to sell and we'll rush our offer.

$1,000,000 in '62
A E S is out to sell a million dollars worth of ham gear this year. This is why you get the best deal and service here! Let us prove it!

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You
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For further information, check number 34, on page 126

W2QUF, who worked Lou, K4DY, with his rig spread all over the operating table—and, by golly, it worked! . . . Tony, W2EWL, whose call is so well known, is coming out with a new transceiver in the Spring. Bet it will be as popular as the famous "W2EWL Special". . . . We were sorry to learn that Frank Taylor, W9ESP, one of the original 40 meter sidebanders, passed away during the summer. . . . You Just Can't Win Dept: When Jack, W2LZX, who has used his private plane so often for business purposes, decided to take the family on a pleasure trip to Florida, the flying weather was so bad in Norfolk, he had to turn back to New York and drive down instead! . . . If you've been listening to the YL international net on Thursday and wonder what "FINS" stands for, it means the "Floradoras International Sidebanders." V. Mayree, K4ICA, one of the net's founders, tells us there's a super certificate available to all DX gals who check into the net for five consecutive weeks.

Jim Manship, ex-K2FW, is now K6KO. . . . It was certainly good to hear Hoby, W8WSO, back on the air again after a 13 week stay in the hospital. All good health to you, Hoby, from here on in. . . . Congratulations to Pete, W2MDQ, and his XYL, Jane, upon the arrival of a new grandson at the beginning of the new year. . . . A warm welcome to Russ, K4FPA, who is the Dad of Bill, K4RID, famous for his feat of being the first novice to make DXCC. . . . Among those whom we have enjoyed contacting recently on 75 meters are Carl, W2ZYD; Herb, K3LNA; Chuck, W2JXC; Steve, WA2MET; Ralph, WA2DFO, and Carl, W8BMX. By the time this comes out in print, we expect to make many more entries in the log for 75 meter operation.

We hope that you all participated in and enjoyed the *CQ* s.s.b. DX Contest and that conditions improved to the point where sidebanders from all over the world were active.

A final reminder about the 11th Annual SSBARA Hamfest and Dinner on March 27, 1962 at the Statler Hilton Hotel in New York City. As usual, a large turnout of sidebanders from all over the country is expected and rumor has it that Les, G8KS; Sid, G3NUY; Hardi, DJ3JZ; and Lot, DJ1BZ, will be among the honored DX guests. Tickets are $10 per person and may be obtained from Stan, WA2GFV, 1385 Richmond Court, East Meadow, New York. We're looking forward to meeting many of you personally at the Sideband Dinner.

73, Irv and Dorothy

V.H.F. [*from page 79*]

have an excuse for not operating sideband, a s.s.b. conversion for the T-23/ARC-5, a frequency spotter for satellites and scatter work and a harmonic generator for the BC-221 to permit alignment and calibration up to 500 mc.

This should keep me busy for some time. However, I cannot do the job by myself. I will need the help of everyone to make it a well-rounded, informative column. Let's hear from you today.

73, de Don, W6TNS

USA-CA [*from page 87*]

Florida has a host of other 'exciting' awards. See pictures and captions of a few. The OLD MAN has a warm spot in his heart for those Florida 'sand crabs' as back in '22 he was 4CY in Florida and through the years held W4DJ and a crowning glory, W4GZA in "Conch" land where we actually were "W4GZA, The Southernmost Ham in the USA". You know, that little ditty got me plenty of arguments from those Texas 'cow hands' as they just couldn't understand by looking at Texas maps,

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- TUNES 550 KCS TO 30 MCS IN FOUR BANDS
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Sensitivity is 1.0 microvolt for 10 db, Signal to Noise ratio. Selectivity is ± 0.8 KCS at —6db with Q-MULTIPLIER. TUBES: 6BA6—RF Amp, 6BE6 Mixer, 6BE6 OSC., 6AV6 Q-Multiplier—BFO, 2-6BA6 IF Amp., 6AV6 Det-AF Amp. ANL, 6AQ5-Audio output, 5Y3 Rectifier.

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The Communications Receiver that meets every amateur need—available in easy-to-assemble kit form. Signal to noise ratio is 10 db at 3.5 MC with 1.25 microvolt signal. Selectivity is —60 db at 10 kc, image reflection is —40 db at 3 MC. Tubes: 3—6BD6, 2—6BE6, 2—6AV6, 1—6AR5, 1—5Y3.

New! LAFAYETTE HE-45 DELUXE 6-METER TRANSCEIVER

- Highly Sensitive Superheterodyne Receiver Section for 50-54 Mc
- Effective Series Gate Noise Limiter
- 3-Stage, 12-Watt Transmitter with 2E26 Final
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For further information, check number 41, on page 126

how Florida had any such 'advantage'.

Sorry we can't 'pressurize' the *CQ* Editor for more space in his technical rag or we'd bring you the whole 1000 awards now listed in the *Directory* but then guess we'd be out of business, except things in awards field changes so rapidly that without at least quarterly revision service like Directory gives, one soon would be getting return mail. You know, it wasn't easy to convince that Editor bloke in New York you award hunting swabs were interested in 'awards stories' like the OLD MAN has to tell, so before he fires me, how about sending in a post card to him, you know . . . just like they tell you to do on TV to give the 'show' a rating. We, just as he, are very interested to learn if you folks enjoy the OLD MAN's new USA-CA column which, as you've guessed, sometimes encompasses the Moon in its coverage.

That's it for this sitting folks; don't forget to buy a green necktie for the 17th, and come the 20th, forget hamming for a spell and initiate that "green thumb". The Good Lord and the Editor willing, we'll be around come next issue and will celebrate our *n*th birthday!

God Love you all, the OLD MAN, K6BX

Novice [*from page 90*]

The winner, Ralph Everett Riggs, constructed a transistorized keying monitor. Ralph lives with his parents at 10304 Julep Avenue, Silver Springs, Maryland. Now in his junior year at Northwood Senior High School, he received his novice license, KN3NCQ, in 1960 and is now awaiting his technician license. The award was made by Nathan F. Coffey, W3OBR, Research Electronic Engineer for the laboratory of Physiology at the National Institute of Health, who was the club's first president.

Riggs hopes to train for the field of electrical engineering. Following the award, Riggs was interviewed on the opening day program of radio station WHFS-FM, Bethesda, Maryland, which devotes a 15 minute period each week to amateur radio interests.

The above was sent to us for the COLUMN by Mr. Willis Brown, W3HB. Thanks Brownie.

This column is being written for both the novice and technician and I will try to give something for each grade licensee in every column but I must know what you want, so you will have to write me a note and tell me your preference of material. I will answer any letter that must be answered. If you need an item to improve the operation of your station and I can build it and write it for the column, I will do that. I would like to see our stations operating at top efficiency and doing their part to foster international friendship. This is another way we can help make this world a better place in which to live.

Don't forget the help wanted section, and don't forget to help some one that needs help as you once did. 73, Walt, W8ZCV

Get Terry's (W9DIA) Deal on CLEGG

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Bob Fishelson, K9GEI, says:

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Transmitter is TOPS . . . and I've tried a lot of units.

Fond du Lac, my home town is 60 miles from the nearest TV stations. But now, thanks to the ZEUS, I don't even need a low pass filter for 6 meter operation. I am Net Control for the Fox River Valley C.D. net and the ZEUS really talks out. I've had a lot of different rigs and done a lot of shopping but the deal at Amateur Electronic Supply is the fairest I've found."

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99'r CLEGG Transceiver for 6 Meters . . . $139.00

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CC-3

For further information, check number 46, on page 126

THE CQ HAM MART

MOBILE HANDBOOK

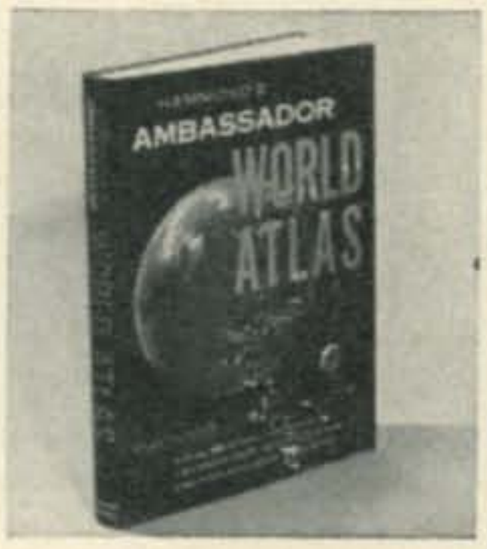
Anyone who tries to go mobile without getting this book, should register for a sanity hearing. Bill Orr, W6SAI has put everythink you need to know in this book. Build-its by the dozen . . . solutions to ignition problems, keeping the battery charged, noise . . . only $2.95 postpaid.

COMMAND SETS

This is a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous, amazing terrific pages for only $1.50 postpaid.

19" GLOBE

Here is a chance to preserve your breath for posterity! This beautiful World Globe, made by Hammond, is a must for every hamshack. Plain for $19.95 or lighted for $24.95. The first 10,000 people who jump at this bargin will get a year of CQ at no extra charge.



ATLAS

What! You don't know where Nicobar Island is? Incredible! And with the CQ deal on the Hammond Atlas so reasonable too. This is a reference book that will get good usage around your house if you have any kids. 7 lbs. of colored maps and a gazetteer for only $12.50 . . . and you get a year of CQ.

HAM'S INTERPRETER

Now you can talk in broken French, Spanish, Italian, German, Swedish and Finnish. This handy little book gives all the popular ham conversation in seven languages, including letters and numbers. Only $1.50 postpaid.

TVI HANDBOOK

W1DBM's newly written TVI book (2nd edition) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2- and 6-meter TVI as well as Citizen's Band, Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price $1.75 postpaid, USA, $2.00 Foreign.

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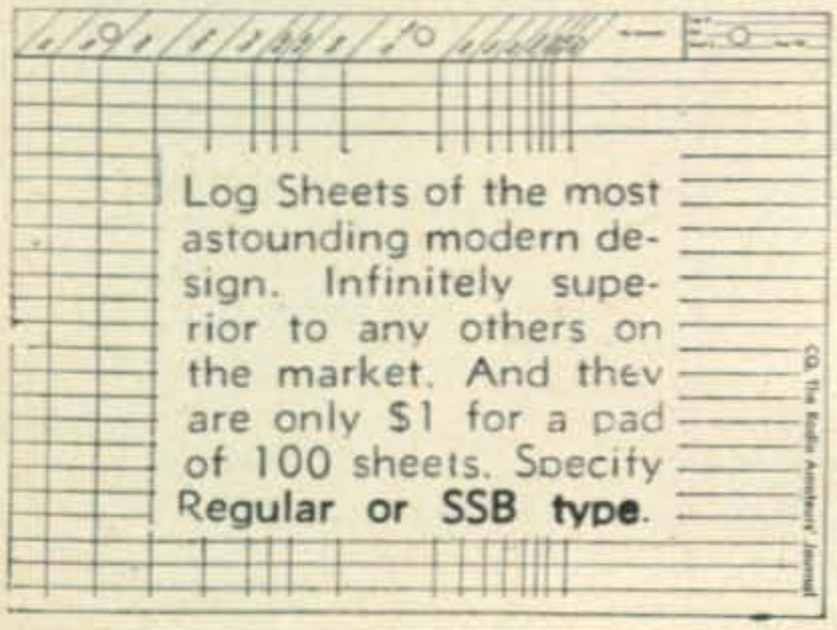
There is no other good way to keep your back issues. Make 'em neat. We supply the binder, with the year embossed in gold, not merely a sticker which will come off later. Specify what year you want stamped on your binder. $3.50.



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Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General License. $3.50 each.

CQ ANTHOLOGY

Most amateurs do not have a good file of back issues of CQ. So we've looked back through the years 1945-52 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out. The price is a mere $2.00.

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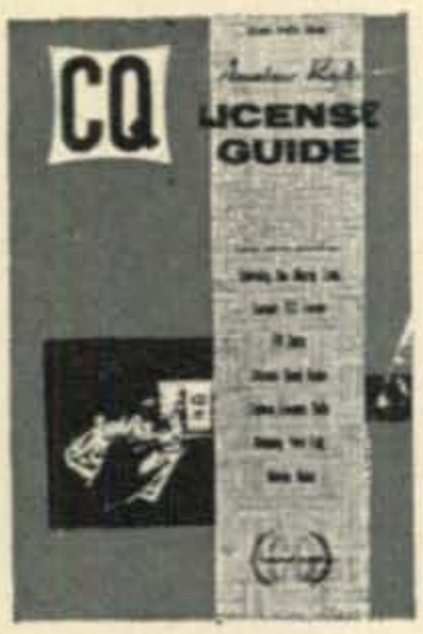
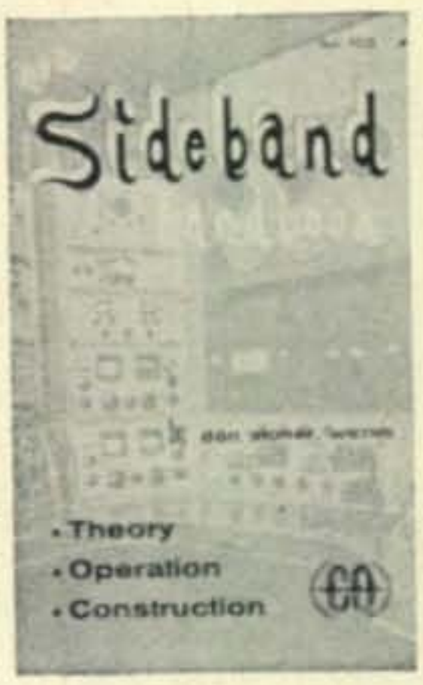
You can't afford to be without this dynamic new handbook designed with the VHF amateur in mind. Filled from cover to cover with all new and original construction material presented so that you can understand it. Written by Frank C. Jones W6APF, nationally acclaimed for his VHF pioneering. Available now for only $3.50.



CQ LICENSE GUIDE

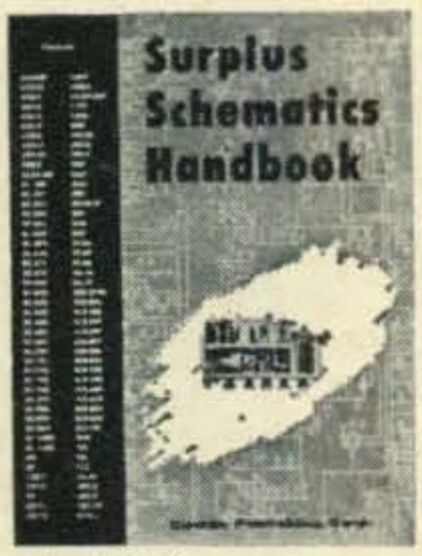
212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator. All this for only $2.50.



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, was almost one full year in the preparation of this terrific volume. This is not a technical book. It explains sideband showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots if how to build-it stuff, gadgets, receiving adaptors, exciters, ampliers Price, only $3.00.

SURPLUS SCHEMATICS HANDBOOK



This is a book literally loaded with schematics for al the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available. Trying to figure out the circuitry cold turkey can be many times more difficult that the most involved puzzle, and purchasing a single instruction book can run as high as $3.50. Why knock yourself out when you can have a book with complete coverage on hand in your library? All this for only $2.50.

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Ham Clinic

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I would like to remind those who write into HAM CLINIC for technical help that they should include a self-addressed stamped envelope. Your communication is kept confidential unless you send us a technical tip for publication.

For this month then, thank you for reading the column.

72, 73 and 75, Chuck

Burgle-Proof [*from page 38*]

the lug of the horn relay having the single thin wire, the relay coil will be energized at the same time that the lights go on in the car; when the door is opened. Make sure to connect the wire to the side of the door switch that has voltage when the switch is *open*. (Button pushed *in*.) If it is connected to the ground side, your horn will sound continuously. A toggle switch should be installed in the line that is run from the door switch to the horn relay so that you can shut it off to enter the car! The wire to the horn relay can be pushed through any of the holes for wires in the firewall of the car. There should be no need to make a new hole.

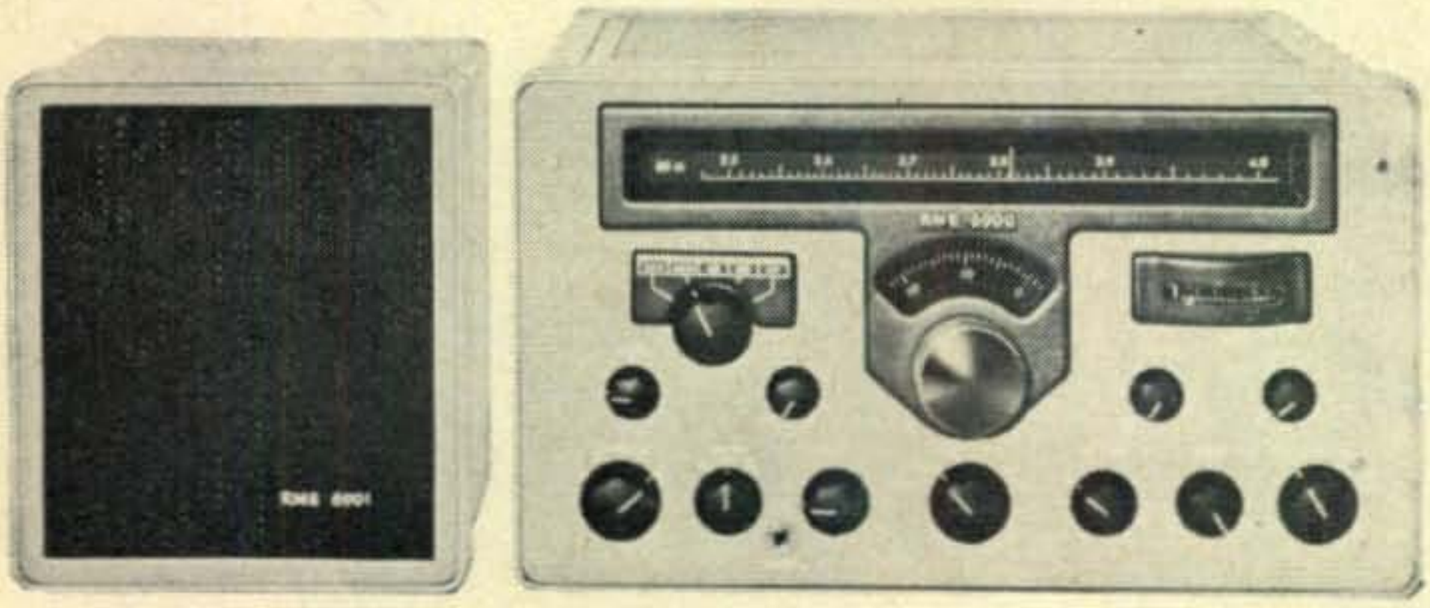
The toggle switch should be hidden where only you know where it is. For example, it could be mounted under a bumper, inside the grill work, under the chassis, or inside the hood. It is best to place it where it is hidden, but also readily accessible. A key-operated switch could be used if you wish to place it in the open. It must, however, be on the outside of the car so that you can turn it off before entering the car. Figure 1 shows the probable wiring diagram of your auto. The circuitry to be added is shown by dotted lines. The installation is simple and should not take more than a half hour.

If you have a four door car, and a different light goes on when the rear doors are opened, then another wire and switch section (a d.p.s.t.) can be added. If you feel that you must also protect your trunk or glove compartment, the principle may be extended. In most cars a light goes on in the trunk or glove compartment when the door is opened. To use this system in conjunction with unlit trunks, hoods and glove compartments, a small gravity-operated switch (mercury switch or the like) can be mounted on the opening lid.

The only disadvantage of this alarm is that the horn will not continue blowing once the door is closed, but this does not seem to be a great disadvantage. One blast of the horn should be sufficient to scare any potential thief

BARRY ELECTRONICS CORP.

Presents: The RME 6900 SSB/AM/CW Ham-Band Receiver



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RME 6900	$369.00
RME 6901 Speaker	$ 19.50

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USA or Foreign

THE **RME 6900** offers optimum performance on SSB, AM or CW with no compromises or apologies to competitive high-priced receivers.

WE HAVE just received another brand-new lot of these fine receivers with matching **RME 6901** Speakers. These units are, of course, brand new in factory-sealed cartons, and are covered by full factory warranty. Whether you operate SSB, CW, or AM, you have the almost uncanny feeling that the **RME 6900** was designed solely for you.

EVERY circuit in the **6900** is designed to provide high selectivity; frequency stability, sensitivity and low internal noise. Finally, inclusion of ALL function controls necessary for a modern communications receiver. . . . Vernier-control knob with override clutch for fast tuning; RF gain; AF gain; Antenna Trimmer; Band-Selector; Stand-By/Receive/Calibrate/Transmit: ANL Limiter; "T"-Notch Filter; Internal 100 Kc Hermetically-sealed crystal calibrator. Some additional important features of the **RME 6900** are:

- CONTROLS: 11½" Single Slide Rule Tuning Dial plus Logging Scale.
- COVERAGE: 80, 40, 20, 15 and 10 on 5 Bands, plus 10 to 11 Mc for WWV or WWVH.
- PEAK Selectivity plus tunable "T" Notch.
- AUDIO: 500 and 4 Ohm Outputs.
- NOISE Limiter for SSB and CW, AM.
- SEPARATE Detector for Single Sideband.
- S-Meter Calibrated in 6 db. Steps above S9 for Better Readings.
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- SELECTABLE Sideband. Upper or Lower.

ONE-HAND control knob of the Modemaster Switch gives five distinct functions . . . vitally required in the reception of AM, CW and SSB. The AM band-width is 3.5 Kc with fast attack AVC System. In upper and lower sideband the AVC system is also switched to fast attack, with the BFO automatically turned on and positioned for desired sideband reception. An advanced Product Detector switches in to replace the Diode Detector in all SSB and CW positions. When switched to the CW position, the band-pass on the IF system is reduced to 500 CPS, with the BFO Injection Control and Pitch becoming operational. The AVC System is changed for optimum use, when operating under CW conditions. It is our opinion that the **RME 6900** is truly the paramount CW/SSB/AM Receiver. You are cordially invited to visit us and listen for yourself.

Substantial trade-ins on your present receiver will be given. Let us know of your interest and we will give you the BEST POSSIBLE DEAL available!! We are sold on this Receiver and it should also be noted that the manufacturer stands behind us in the guarantee. The top DX'ers using this receiver have attested to its capabilities, particularly when the QRM conditions prevail or when the rare DX shows up.

MARCH SURPLUS BARGAINS

Brand New JAN RCA 4X150 Tubes **$13.00**
Plate Transformer: Pri: 115V. at 60 CPS. With Pri. taps to produce the following Sec. voltage: 1600-1350-1100-0-1100-1350-1600 V.C.T. at 350 Ma. 21 lbs net wt. 6" H x 4½" W x 6½" D. Order Stk #ET-18A **$13.95**
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- ☐ I have available for trade-in for the 6900 Receiver the following: .....

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Name ..... Title

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away. If any thief is going to take the trouble to figure out how to beat the alarm, you would be just as bad off with an alarm that kept sounding, because they can all be silenced by any burglar that knows his trade well. A continuously sounding alarm will also leave you with a dead battery when you return if you have been away from the car for a period of time. This system has been employed in my auto for the last few years quite successfully. The few minutes installation time could well save you hundreds of dollars worth of equipment, or even the loss of your car. ■

EICO 723 [*from page 54*]

the GRID and PLATE of the 6DQ6-B final amplifier.

The variable ANTENNA LOADING capacitor in the pi-network functions on all bands, and matches the antenna to loads between 50 and 1000 ohms approximately.

The BAND SELECTOR selects one of four coils in the oscillator circuit and the correct tap and coil in the plate tank of the final amplifier while the PLATE TUNING variable capacitor tunes the final amplifier circuit to resonance.

The GRID TUNING variable capacitor tunes the oscillator-multiplier plate tank to resonance at either the fundamental, second or third harmonic frequency.

Either a crystal or external v.f.o. may be plugged into the XTAL socket.

The MODULATOR ACCESSORY octal socket on the rear apron serves a number of purposes: 1) modulator input, 2) operation of antenna relay, 3) power take-off for external v.f.o., 4) power input for mobile or emergency operation.

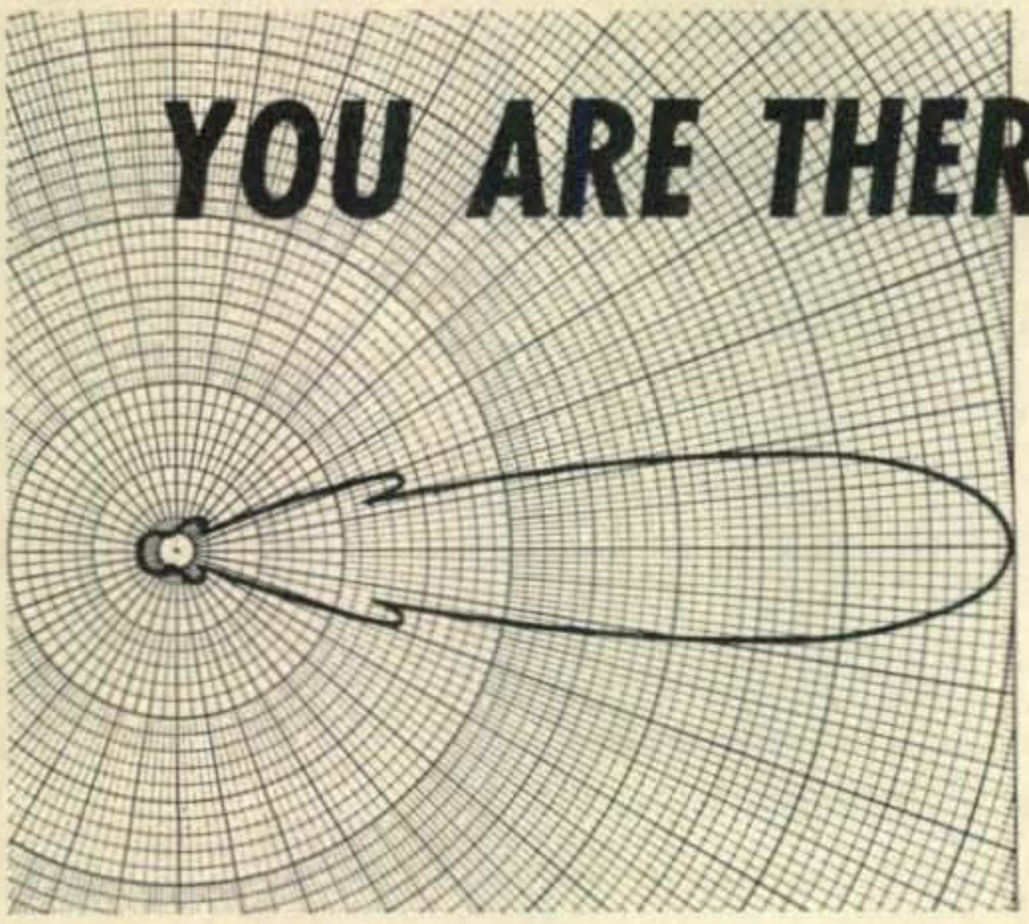
The ANTENNA LOAD switch which materially increases the range of impedances into which the pi-network may match the transmitter. This control is used in conjunction with the ANTENNA LOADING control.

Assembly

Excellent instructions are provided for the assembly of the 723 and no difficulty should be encountered, even by the inexperienced builder. Total time from start to finish should be between 11 and 12 hours. A very simple procedure is described to neutralize the final amplifier, and this operation takes just a few minutes. At that point you're ready to try it on the air.

As with all kit assembly, read the instructions carefully, go through the motions, and then check to see that everything agrees. After making the connection it is wise to again check with the instructions. If this careful procedure is followed the unit will *have* to work the first time.

The Eico 723 transmitter is a well designed transmitter that assembles easily, and performs very well. It makes a fine rig for the newcomer and a very convenient standby rig for the established ham. ■



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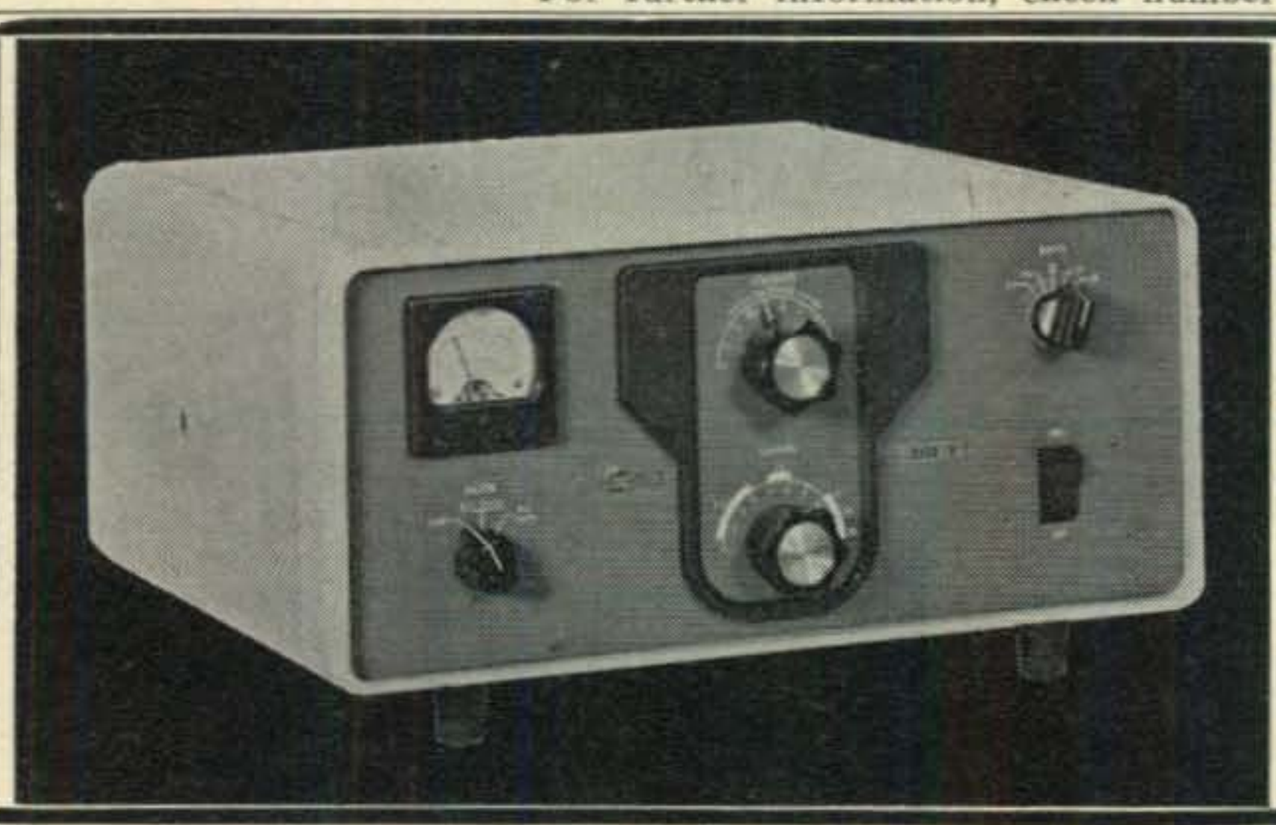

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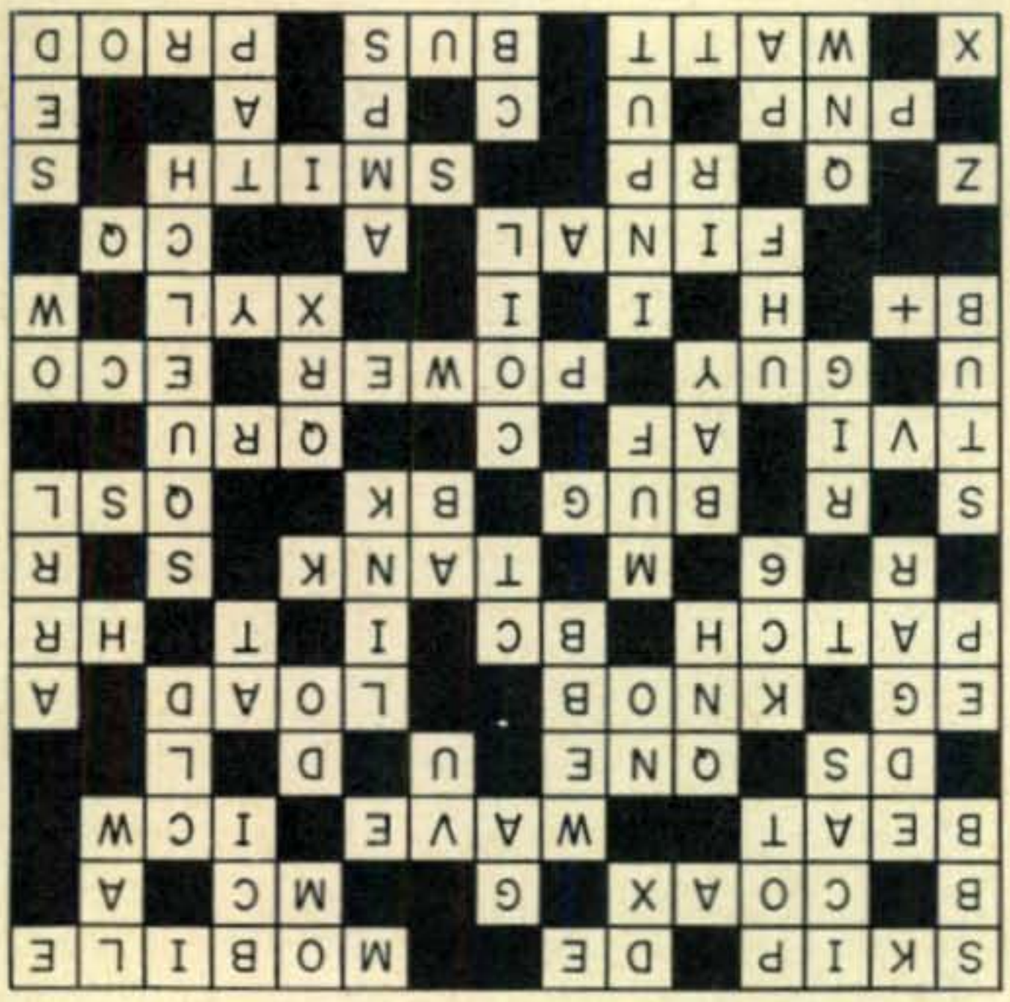

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FOR SALE: One new 833-A, $20; one used 4-1000A, $25; one TCS-14 set complete 12v. with manual, $100; one BC-754 with PE-157 power supply, $17.50, you pay freight. Will trade in compliment for s.s.b. gear, SB-10 etc. Rod Hogg, KØEQH 715 North Seridan, Minneapolis, Kansas.

CLEANING HOUSE—NC-300 plus 6&2 meter converters $250—32V-1 $300. Seneca (perfect) $150—plate modulator $50.—Q multiplier $10.—SB-10 (new) $95—RCA RBC-1 precision rcvr & supplies $200. Modified Tener $40, 125 watt 829 6 meter xmtr complete in metal cabinet $100. Hy-gain 8 element 6 meter beam $20. FOB Carlisle. Will swap 99'er, Tri bander beam, rotor or what have you. W3YXV Bob Shaffner, 22 Baltimore St., Carlisle, Pa.

SELL NC-98 RECEIVER $70, Superior TV-50 generator $19, Globe PH-1 phone patch $14, Heathkit AG-9A audio generator $22, NC-60 receiver $30, Sprague in-circuit condenser tester $9. Century FC-2 tube tester $25. Bud FCC-90 100 kc Calib. 110 a.c. $10, new Collins 13621 noise blanker $95, Eldico EE-3A electronic key $40, Lampkin 103B freq. meter $195. Robert Ireland, Pleasant Valley, N.Y.

FOR SALE Globe King 500 C, SX-99, or will trade for Hi Fi Equipment, Audio signal generator, or other test equipment or mobile gear. Will work U on 75 Ph Wid King, after 5 PM W4YBL Andy, 420 Plymouth Ave., Charlotte, N.C.

WANTED—Hickok 292X Sig. Gen. and Manual. State Condx and price. B. Lamberti (WØWSJ), 3408 3rd St., Des Moines, Iowa.

QSLs. Priced right. Samples (stamp appreciated). K2ZMH Press, Box 55-C, Copake Falls, N.Y.

ANTENNA, $10, Mobile or Fixed, 32'5" high. See it on the cover of September 1961 CQ. Wt. 11 lbs. W6WFR, 199 Random, Walnut Creek, California.

WANTED: A few 304TL tubes needed urgently. J. Callanan, W9AU P.O. Box 155 Barrington, Illinois.

HUNDRED QSLs: 80¢. Samples, dime. Meininger, Jesup, Iowa.

MICHIGAN State Convention, Grand Rapids. 15th Annual April 14, 1962. Pantlind Hotel. Write Post Office Box 333.

ELECTRICAL COUNTER CP-288-XC-2-TTC, Relay Test Set TX-902-XC-2-TTc-4, Test Set EE-65-G. All Sets New. George H. Sandt, 13 Pen Argyl St., Pen Argyl, Pa.

CENTRAL ELECTRONICS 20-A, QT-1 and v.f.o., $200. LA-400 with 837's, $75. All Factory Wired. Write Box 213, Blytheville, Arkansas.

SELL: Apache & Mohawk. Excellent Condition $475. K8DQC 3713 Brooklyn Ave, Cleveland 9, Ohio.

KWM-1, #1089. One of the last built, with lock key position and in excellent physical and electrical condition. Matching 516F-1 a.c. supply, 312B-1 speaker. Will ship in original packing cases with manual. All for $595, FOB. Maj. C. L. Stacey, W4DYH, 600 Selfridge Road, Goldsboro, N.C. Area Code 919, 735-0051.

FOR SALE: Two 4X250B's New, $18 each or $35 pair. Also 4-1000 sockets, new, E1MAC $12 each. W8BPT .

A-1 RECONDITIONED EQUIPMENT. On approval. Trades, Terms. Hallicrafters S-85 $79, SX-99, SX-100 $199. SX-111 $199. SX-101A $299, HT-32, HT-37; Hammarlund HQ-100 $129, HQ-110 $179, HQ-160 $299, HQ-170 $289; National NC-183D $199, HRO-60 $345; Gonset G-50 $229; Central 20A $149, Viking II $159. Valiant $279; Collins 75S-1, 32V-1, 32V-3, 32V-1, 75A-4, KWM-2; Elmac, Globe, Gonset, Heath, Johnson, RME, other items. List free. Henry Radio Company, Butler, Missouri.

LIKE NEW HQ-160 RECEIVER used one week—13 QSO's. Paralized in auto accident in fall of '60. $250. Allen Blackledge, 1923 N. 3rd Ave. Laurel, Mississippi.

FOR SALE: Harmon-Kardon Citation 3 FM turner, $110, Heathkit TT-1 tube Tester, $100. Both perfect. Wired by technician—Meyer Gottesman 1777 Central Street, Yorktown Heights, New York, YO 2-9803.

QSL's-SWL's samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio.

QSL's. SWL's XYL-OM's (Sample assortment approximately 9¾¢). Covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fantabulous, DX-attracting, protoypay, snazzy, unparagoned cards. (Wow!) Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minnesota.

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a message to SWLs

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Order Ten Kits We Ship Eleven!!! ONE EACH ABOVE KIT ONLY ..... **99¢**

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2N670 rated 300 Mw. **50¢ @, 10 for $4**
2N671 rate one watt **75¢ @, 10 for $6**

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Operation Up to 125° C Case Temp.

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.25	.45	2	1.00
.60	1.00	3	1.80
.70	1.25	6	2.00
.85	1.50	12	2.20
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12VDC to 500VDC up to 200MA

100 Watts; Tap at 250VDC

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***MFGRD in U.S.A.
Replaces Medium & HiWattage Types
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3Q4	.68	12AY7	1.29		
3Q5	.86	12B4	.95	5/$5 10/$12	
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4-125A	27.50	12BA7	.99	811A	Q
4-250A	34.00	12BD6	.59	812	3.95
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4X250	36.00	12BH6	.79	815	1.75
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6BN6	1.08	FG33	15.00	5750	2.75
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2N293 NPN 45¢, **12 for $5, 100/$37**
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On the lab bench and in the field . . .

NATIONAL NC-270 provides exceptional stability . . . sensitivity!

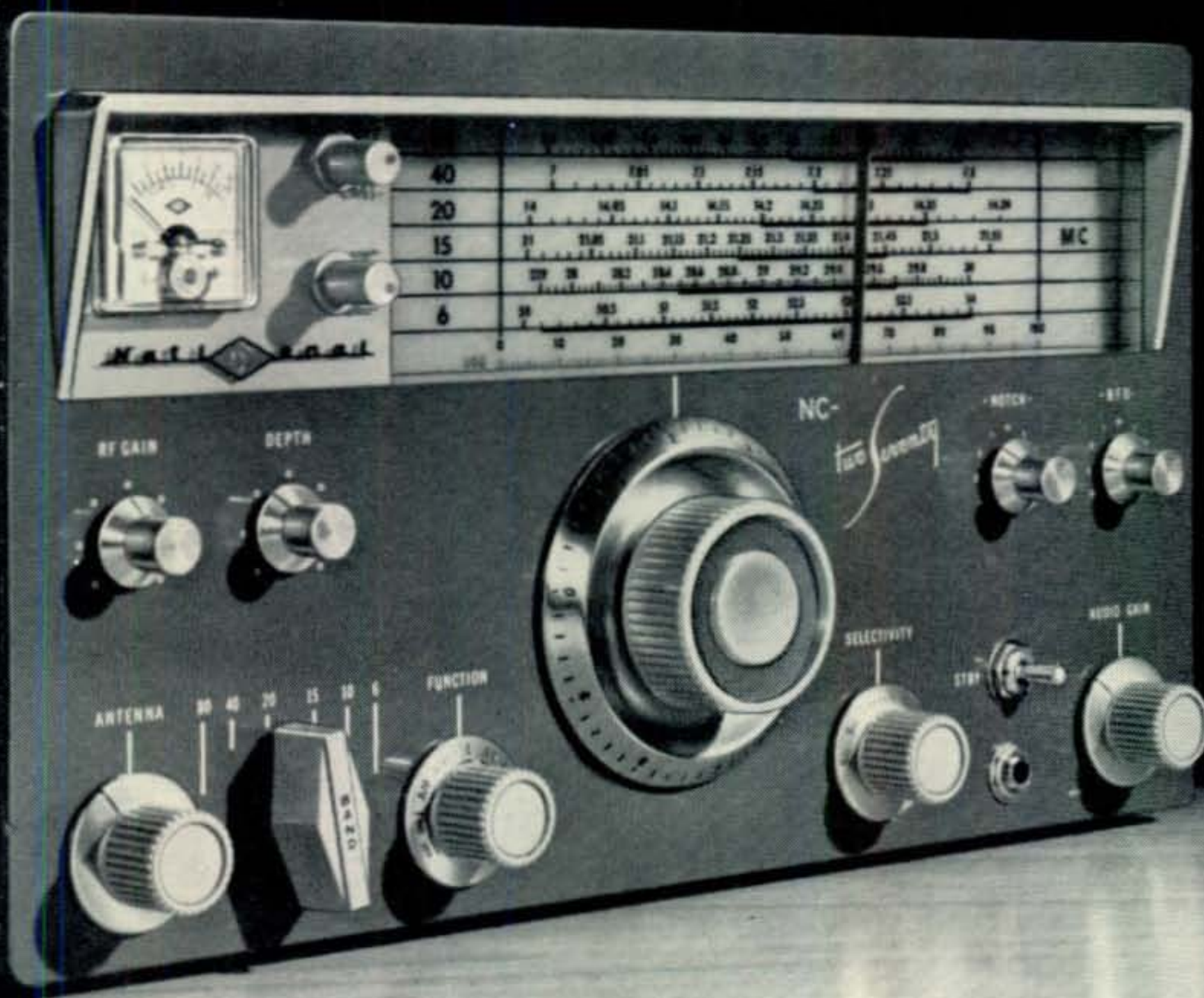
National's NC-270 proves itself the *only* way — in actual performance on the lab bench and under adverse operating conditions in the field. CQ and QST experts gave the NC-270 truly remarkable reviews. Of equal importance — letters from amateurs all over the world cite astounding performance under almost unbelievable receiving conditions.

FROM QST — JANUARY 1961

"Stability, both mechanical and electrical, is exceptional . . . The NC-270 works well enough on 50 Mc. to encourage a v.h.f. enthusiast to design his converters . . . so that they will work into the 6-meter range rather than into the lower bands. This would give him full coverage of the 144-Mc. band and a four-megacycle spread in any of the bands from 220 Mc. up . . . and he can skip the construction of a 50-Mc. job. The NC-270 should do all he'll need in that range."

FROM CQ — MAY 1961

" . . . retains all the "feel" of the more expensive receivers for which this company is known . . . It is unusual to see a front panel NOTCH DEPTH control in this price class . . . The a.n.l. circuit in the NC-270 is exceptionally good . . . Mechanical stability is impressive. It is possible to tune a s.s.b. signal on one of the high frequency bands, lift the front of the receiver up several inches and let go. Unless the main tuning knob moves, the signal will still be there . . . (The National NC-270) is an extremely stable and sensitive receiver . . . "



BRUCE W. BUTLER W5PXN/5 CITES OUTSTANDING 270 PERFORMANCE DURING HURRICANE CARLA

"I would like to congratulate you on one of the finest communications receivers on the market; the NC-270. (At RACES center during hurricane Carla) communications were maintained with schools and hospitals . . . Your receivers performed for over 60 hours. The thing that impressed me most was its extreme stability under the most adverse conditions. Emergency power and, at best, poor antennas did not help our situation, nor the 70 mph winds which blow at the airport where we were set up. The selectivity of the NC-270 helped to maintain contact with other stations with low power and bad antennas. On 6 meters, we rarely needed a relay and when this did happen it was due to their receiving conditions, not ours . . . performed like a high priced receiver . . ."

If you want a proven medium priced receiver, we strongly suggest that you hear the NC-270 at your dealer's. Write today for technical information.

National Radio Company, Inc.
Melrose 76, Mass.
A Wholly Owned Subsidiary of
National Company, Inc.

Export: Ad Auriema Inc., 85 Broad St., N.Y.C.

Canada: Tri-Tel Assoc., 81 Sheppard Ave. W., Willowdale, Ontario

Rush me free, complete information on the National NC-270. C-03

Name.....

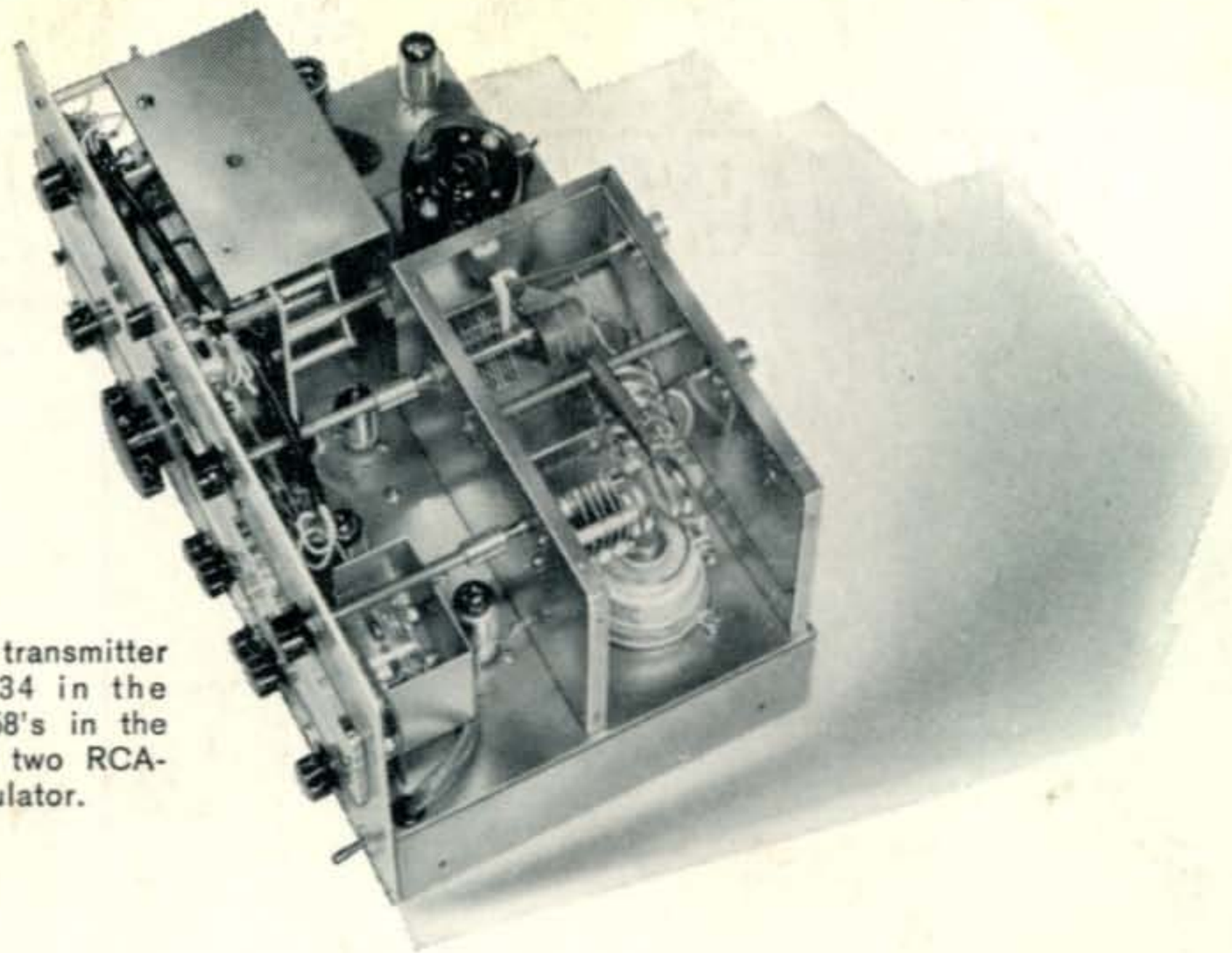
Address.....

City.....State.....

If you would like a copy of National's 270 instruction manual enclose 25¢.

$279.95 — Slightly higher west of Rockies and outside USA.

For further information, check number 60, on page 126



Clegg's new Zeus transmitter uses an RCA-7034 in the "final", 2 RCA-7558's in the driver stages, and two RCA-811A's in the modulator.

The Clegg Zeus Does It with an RCA-7034/4X150A "Final"

RCA-7034—operates with higher margin of safety and longer life, directly replaces 4X150A in present transmitters without circuit changes.

Capable of up to 185 watts input AM or CW on 6 and 2 meters, thi new transmitter by Clegg Laboratories, Inc., uses one of the mos outstanding beam power tubes in amateur radio—RCA-7034.

Designed with a high-efficiency radiator to handle higher power RCA-7034 operates with input ratings up to 500 watts on CW an SSB at frequencies up to 150 Mc—operates at reduced power up t 500 Mc! And note this: the RCA-7034 is not much bigger than golf ball.

The RCA-7034 is available at your RCA Industrial Tube Distribu tor. For a technical bulletin, write Section C 15 M, Commercia Engineering, RCA Electron Tube Division, Harrison, N.J.

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