

CQ

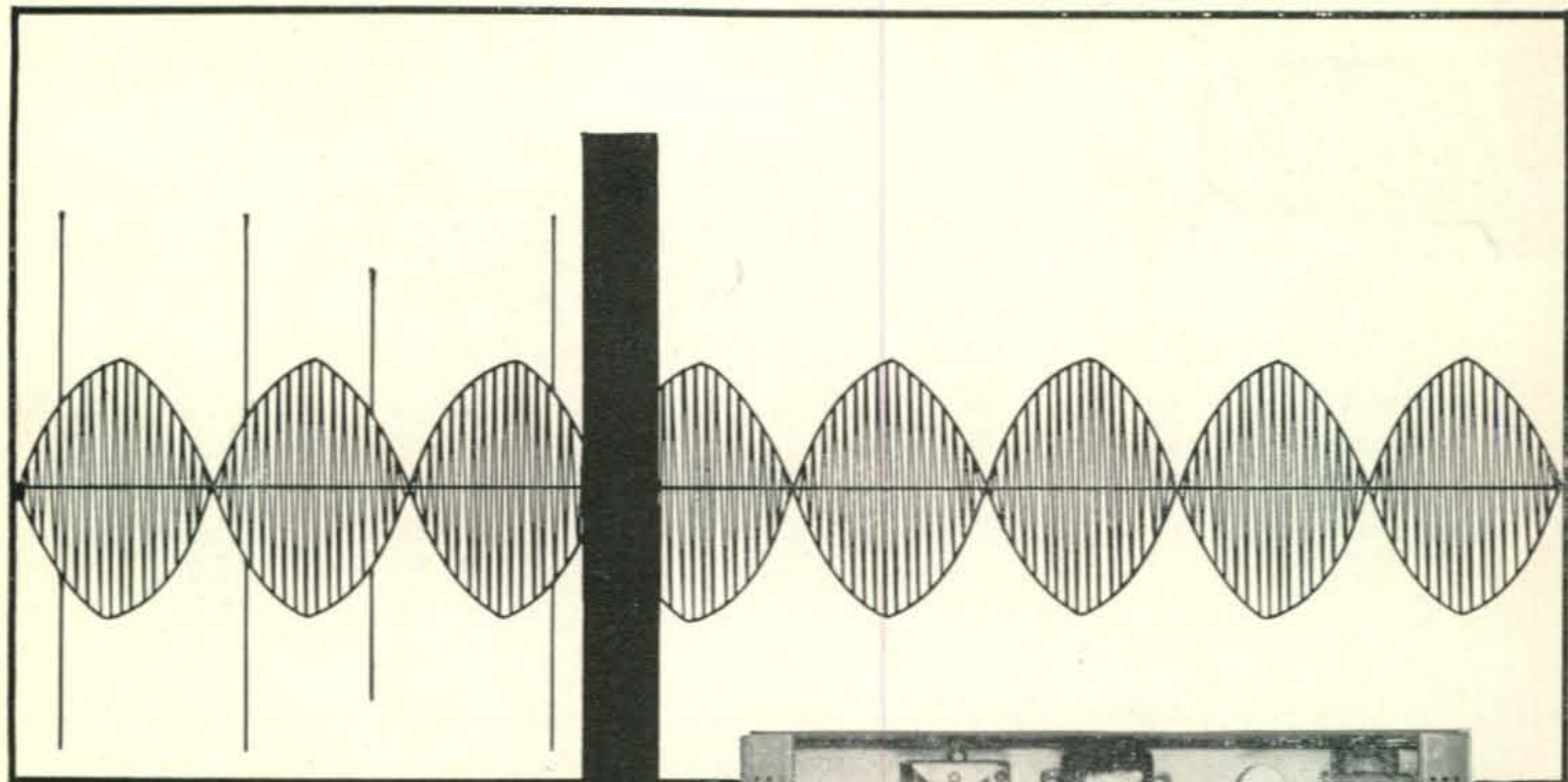
April 1959

50¢

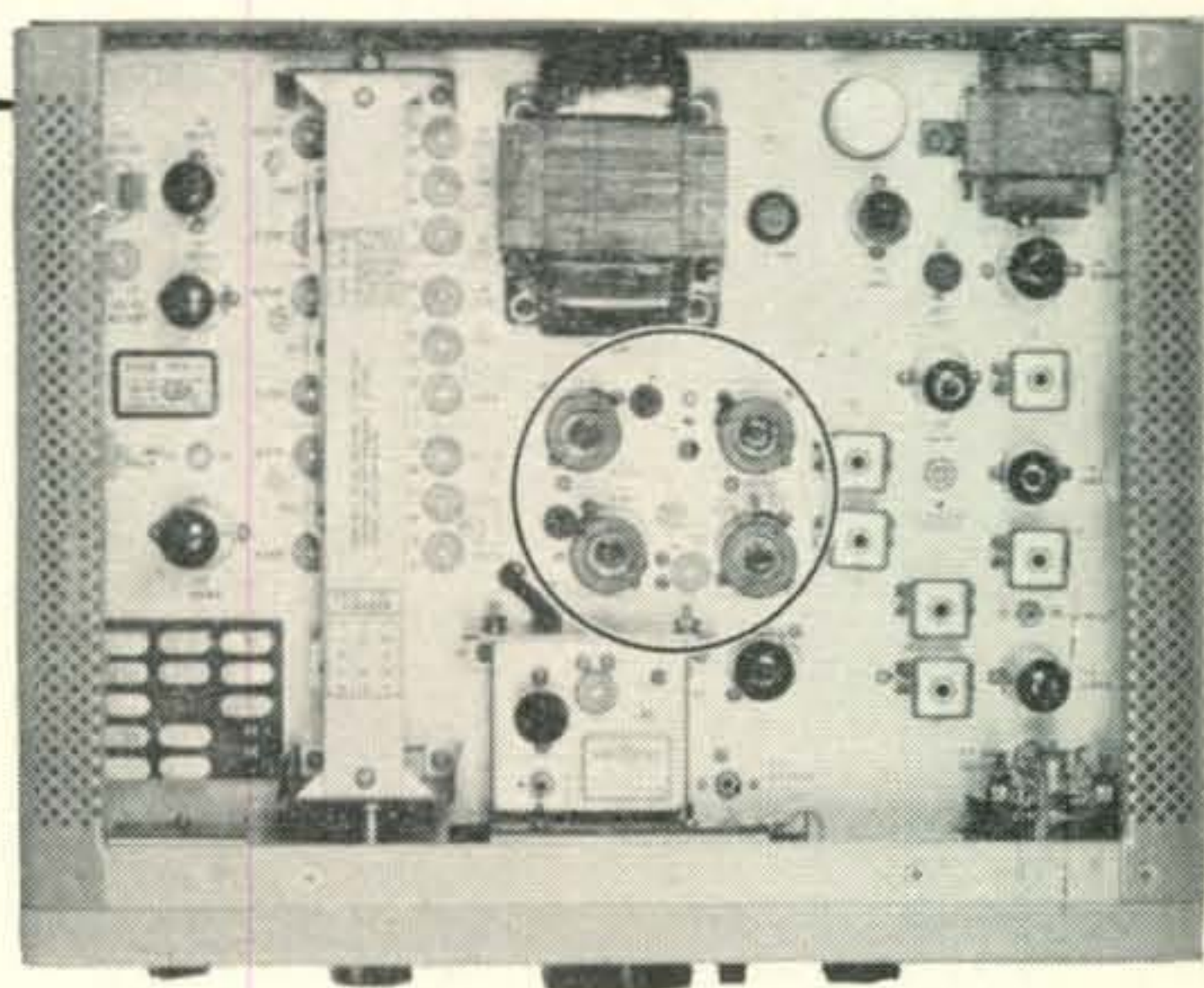
**Edison Award
Winner, K2KGJ**



The Radio Amateur's Journal



Eliminate
Impulse
Noise
with



NEW COLLINS NOISE BLANKER

Enjoy interference-free phone or CW contacts with your late model Collins receiver, even when operating in areas with intense electrical noise. The new Collins 136 series Noise Blankers effectively eliminate impulse signals having a repetition rate of up to 10 kc, which includes ignition, electric motor, and appliance noises together with some types of corona and atmospheric discharges. The Noise Blanking unit is a compact unit for mounting within the amateur equipment, and has a front panel control.

Unlike simple audio clipping circuits or series type limiters, the Collins Noise Blank-

er accomplishes its noise silencing ahead of the selective sideband filters, making it ideal for SSB reception. Basically, it is a TRF receiver tuned to 40 mc. A received noise spike is amplified, detected, pulse shaped and used to trigger a gating circuit placed in the IF circuits of the amateur receiver. The noise pulse shuts off the receiver for the duration of the noise, usually from 10 to 40 microseconds.

Soon to be available from your distributor, the 136 series Noise Blanking unit may be quickly and easily installed in your Collins 75S-1, KWM-1 or 75A-4.

For further information, check number 1 on page 126.



There's a PR for every Service!

AMATEUR

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

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed; ± 500 cycles.....\$2.95 Net



20 Meters, PR Type Z-3

Third overtone oscillator. Low drift. High activity. Can be keyed in most circuits. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation; ± 500 cycles.....\$3.95 Net

24 to 27 Mc., PR Type Z-9A

Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24 to 27 mc., ± 3 kc.; .050" pins.

\$4.95 Net



50 to 54 Mc., PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 mc., ± 15 kc.; .050" pins.

\$6.95 Net



SPECIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

Type Z-1, AIRCRAFT

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

Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc. \$3.45 Net

Type Z-6A

FREQUENCY STANDARD

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

100 Kc. \$6.95 Net



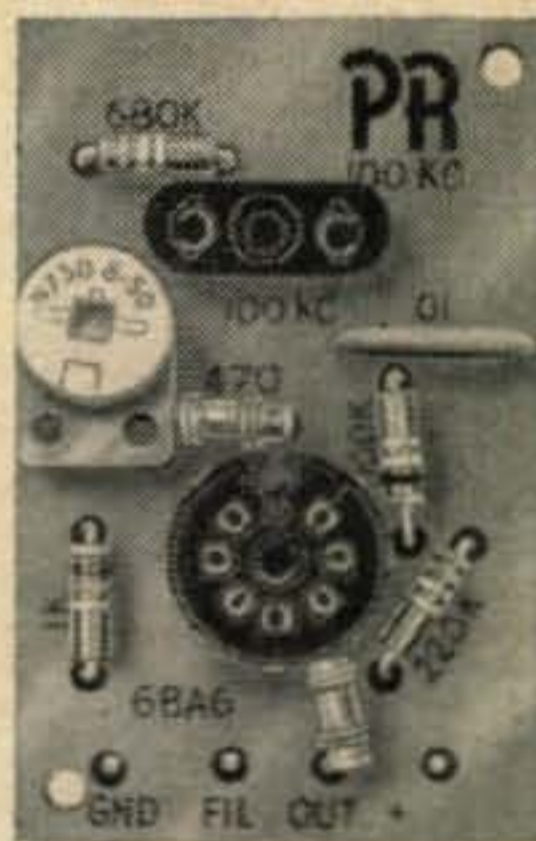
PR PRINTED OSCILLATOR KIT

Has many uses—

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

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

Each \$4.50 Net



Type 2XP

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

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

12001 to 25000 Kc. (3d Mode) ± 10 Kc. . . . \$4.45 Net

VHF Type Z-9R, Aircraft



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

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Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .005% . . . \$4.25 Net



Type Z-1 TV Marker Crystals

Channels 2 through

13 \$6.45 Net

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10.7 Mc. FM, IF, .01% . . . 2.95 Net

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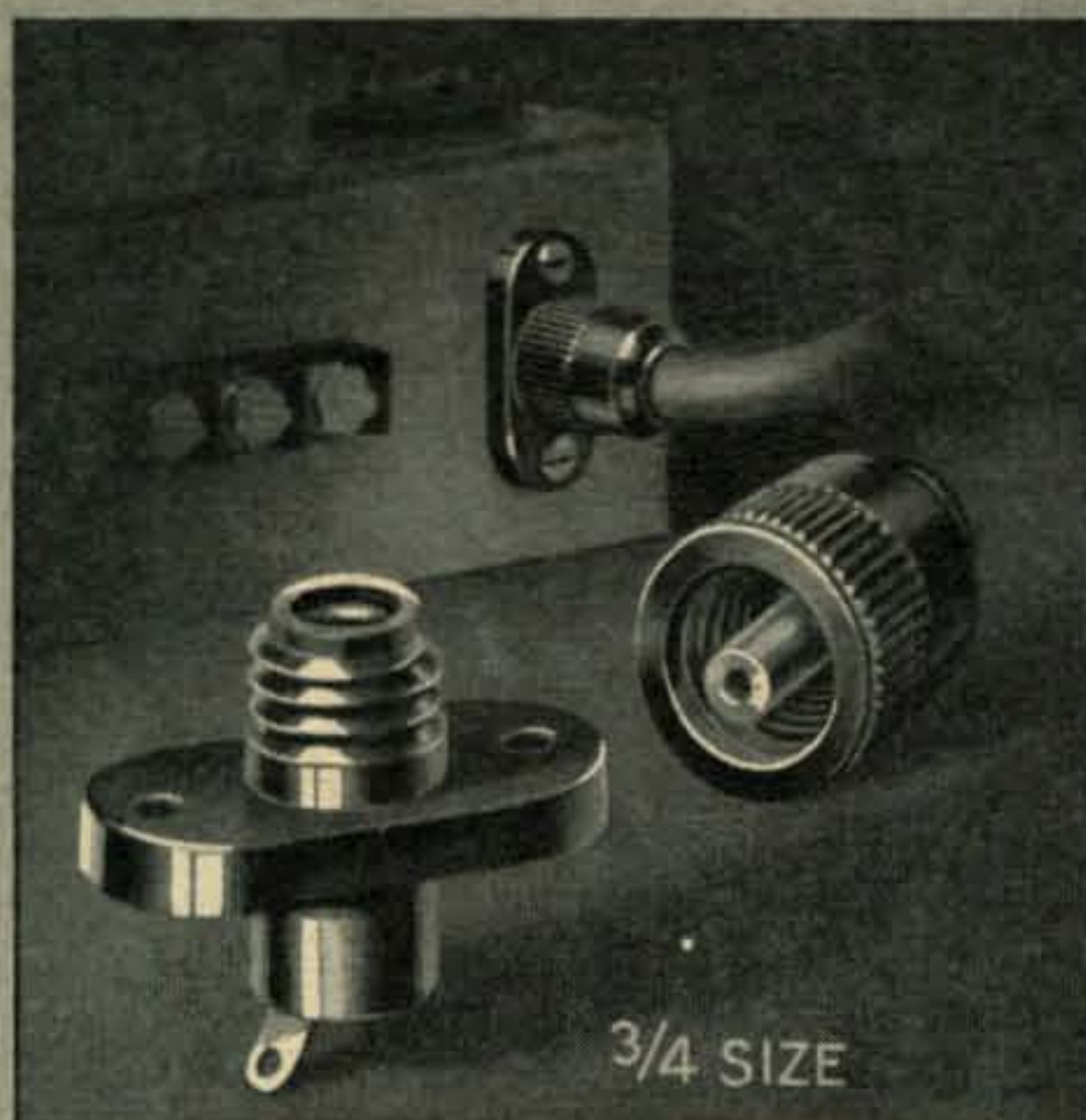
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For further information, check number 3 on page 126.

Designed for



Application



THE NO. 37001 SAFETY TERMINAL

An old favorite in the line of exclusive Millen "Designed for Application" products. Combination high voltage terminal and thru-bushing. Tapered contact pin fits firmly into conical socket providing large area, low resistance connection. Pin is swivel mounted in cap to prevent twisting of lead wire. Easy to use. $\frac{1}{4}$ " o.d. insulation high voltage cable fits into opening in cap. Bared conductor passes thru pin for easy soldering to pre-tinned tip of contact plug.

Standard 37001 available in either black or red bakelite. No. 37501 is low loss mica filled yellow bakelite for R.F. applications.

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

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

CQ CERTIFICATES:

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

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

Special SB Certificates are available from the Sideband Department for operators providing proof of contact (QSL cards) with stations in 50, 75 and 100 countries using two-way sideband. Send cards directly to the SB Editor.

TECHNICAL INFORMATION:

Please check the 11-year cumulative index which was published in the January 1956 CQ for information about articles in past issues of CQ. The December 1956 to 1958 CQ yearly indexes will bring you up to date. Most back issues are available at \$1 from us. Check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free. For further information see the Ham Clinic column.

DISCLAIMER:

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

CQ—The Radio Amateur's Journal

April, 1959
vol. 15, no. 4

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Cover

Jules Madey, K2KGJ was the winner of the coveted Edison Award, given him by G.E. for his work in handling messages and phone patches for men wintering over in Antarctica and our armed forces in the Pacific. Jules has made over 12,000 patches during the last three years!

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HAM GEAR



HEATHKIT HAM EQUIPMENT
IS DESIGNED BY HAMS
WHO KNOW YOUR
PROBLEMS AND
NEEDS.

PROVEN, "ON THE AIR"
PERFORMANCE



"SENECA" VHF HAM TRANSMITTER KIT

Beautifully styled and a top performer of highest quality throughout. The "Seneca" is a completely self-contained 6 and 2 meter transmitter featuring a built-in VFO for both 6 and 2 meters, and 4 switch-selected crystal positions, 2 power supplies, 5 radio frequency stages, and 2 dual-triode audio stages. Panel controls allow VFO or crystal control, phone or CW operation on both amateur bands. An auxiliary socket provides for receiver muting, remote operation of antenna relay and remote control of the transmitter such as with the Heathkit VX-1 Voice Control. Features up to 120 watts input on phone and 140 watts on CW in the 6 meter band. Ratings slightly reduced in the 2 meter band. Ideal for ham operators wishing to extend transmission into the VHF region. Shpg. Wt. 56 lbs.



HEATHKIT VHF-1 **\$159⁹⁵**




HEATHKIT DX-20 **\$35⁹⁵**

DX-20 CW TRANSMITTER KIT

Designed exclusively for CW work, the DX-20 provides the novice as well as the advanced-class CW operator with a low cost transmitter featuring high operating efficiency. Single-knob bandswitching covers 80, 40, 20, 15 and 10 meters using crystals or an external VFO. Pi network output circuit matches antenna impedances between 50 and 1,000 ohms. Employs a single 6DQ6A tube in the final amplifier stage for plate power input of 50 watts. A 6CL6 serves as the crystal oscillator. The husky power supply uses a heavy duty 5U4GB rectifier and top-quality "potted" transformer for long service life. Easy-to-read panel meter indicates final grid or plate current selected by the panel switch. Complete RF shielding to minimize TVI interference. Easy-to-build with complete instructions provided. Shpg. Wt. 19 lbs.

HEATH COMPANY Benton Harbor, Michigan

 a subsidiary of Daystrom, Inc.

Mobile Gear...for the Ham on the Go!

"CHEYENNE" MOBILE HAM TRANSMITTER KIT

All the fun and excitement . . . plus the convenience of mobile operation are yours in the all-new Heathkit "Cheyenne" transmitter. The neat, compact, and efficient circuitry provides you with high power capability in mobile operation, with low battery drain using carrier controlled modulation. All necessary power is supplied by the model MP-1 described below. Covers 80, 40, 20, 15 and 10 meters with up to 90 watts input on phone. Features built-in VFO, modulator, 4 RF stages, with a 6146 final amplifier and pi network (coaxial) output coupling. High quality components are used for long service life and reliable operation, along with rugged chassis construction to withstand mobile vibrations and shock. Thoughtful circuit layout provides for ease of assembly with complete instructions and detailed pictorial diagrams to insure success. A spotting switch is also provided. A specially designed ceramic microphone is included to insure effective modulation with plenty of "punch". Plan now to enjoy the fun of mobile operation by building this superb transmitter. Shpg. Wt. 19 lbs.



HEATHKIT MT-1
\$99⁹⁵



"COMANCHE" MOBILE HAM RECEIVER KIT

Everything you could ask for in modern design mobile gear is provided in the "Comanche" . . . handsome styling, rugged construction, top quality components . . . and, best of all, a price you can afford. The "Comanche" is an 8-tube superheterodyne ham band receiver operating AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands. A 3 mc crystal lattice-type IF filter permits the receiver to use single conversion without image interference, and at the same time creates a steep sided 3 kc flat top IF bandpass characteristic comparable to mechanical type filters. The neat, compact and easy-to-assemble circuitry features outstanding sensitivity, stability and selectivity on all bands. Circuit includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. Sensitivity is better than 1 microvolt on all bands and signal-to-noise ratio is better than 10 db down at 1 microvolt input. One of the finest investments you can make in mobile gear. Shpg. Wt. 19 lbs.



HEATHKIT MR-1
\$119⁹⁵

MOBILE SPEAKER KIT

A matching companion speaker for the "Comanche" mobile receiver. Housed in a rugged steel case with brackets provided for easy installation on fire wall or under dashboard, etc. Uses 5 PM speaker with 8 ohm voice coil. Measures 5" H. x 5" W. x 2 1/2" D. Shpg. Wt. 4 lbs.



HEATHKIT AK-7
\$5⁹⁵



HEATHKIT AK-6
\$4⁹⁵

HEATHKIT MP-1
\$44⁹⁵



MOBILE POWER SUPPLY KIT

This heavy duty transistor power supply furnishes all the power required to operate both the MT-1 Transmitter and MR-1 Receiver. It features two 2N442 transistors in a 400 cycle switching circuit, supplying a full 120 watts of DC power. Under intermittent operation it will deliver up to 150 watts. Kit contains everything required for complete installation, including 12' of heavy battery cable, tap-in studs for battery posts, power plug and 15' of connecting cable. Chassis size is 9 1/16" L. x 4 3/4" W. x 2" H. Operates from 12-14 volt battery source. Circuit convenience provided by self-contained relay which allows push-to-talk mobile operation. Shpg. Wt. 8 lbs.

MOBILE BASE MOUNT KIT

The AK-6 Base Mount is designed to hold both transmitter and receiver conveniently at driver's side. Universal mounting bracket has adjustable legs to fit most automobiles. Shpg. Wt. 5 lbs.

POWER METER KIT

This handy unit picks up energy from your mobile antenna and indicates when your transmitter is tuned for maximum output. A variable sensitivity control is provided. Features a strong magnet on a swivel-mount for holding it on a car dashboard or other suitable spot. Has its own antenna or may be connected to existing antenna. Sensitive 200 ua meter. Shpg. Wt. 2 lbs.

HEATHKIT
PM-2
\$12⁹⁵





COMPANION UNITS



HEATHKIT TX-1 **\$234⁹⁵**

"APACHE" HAM TRANSMITTER KIT

The many features and modern styling of the "Apache" will provide you with just about everything you could ask for in transmitting facilities. Emphasizing high quality the "Apache" operates with a 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, built-in switch selected circuitry provides for single-sideband transmission using the SB-10 External adapter. The newly designed, compact and stable VFO provides low drift frequency control necessary for SSB transmission. A slide rule type illuminated rotating VFO dial with full gear drive vernier tuning provides ample bandspread and precise frequency settings. The bandswitch allows quick selection of the amateur bands on 80, 40, 20, 15 and 10 meters. This unit also has adjustable low-level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation. The final amplifier is completely shielded for TVI protection and neutralized for greater stability. A cooling fan is also provided. The formed one-piece cabinet with convenient access hatch provides accessibility to tubes and crystal sockets. Die-cast aluminum knobs and control panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. A "spotting" push button enables the operator to "zero beat" an incoming frequency without putting the transmitter on the air. Equip your ham shack now for top transmitting enjoyment with this outstanding unit. Shpg. Wt. 110 lbs. Shipped motor freight unless otherwise specified.

HEATHKIT SB-10 SINGLE SIDEBAND ADAPTER KIT

\$89⁹⁵



Designed as a compatible plug-in adapter unit for the TX-1 "Apache" transmitter, this unit lets you operate on SSB at a minimum of cost, yet does not affect the normal AM and CW functions of the transmitter. By making a few simple circuit modifications, the DX-100 and DX-100-B transmitters can be used, utilizing all existing RF circuitry. Extremely easy to operate and tune, the adapter employs the phasing method for generating a single-sideband signal, thus allowing operation entirely on fundamental frequencies. The critical audio phase shift network is supplied completely preassembled and wired in a sealed plug-in unit. Produces either a USB, LSB or DSB signal, with or without carrier insertion. Covers 80, 40, 20, 15 and 10 meter bands. An easy-to-read panel meter indicates power output to aid in tuning. A built-in electronic voice control with anti-trip circuit is also provided. 10 watts PEP output. Unwanted sideband suppression is in excess of 30 db and carrier suppression is in excess of 40 db. An EL84/6BQ5 tube is used for linear RF output. Shpg. Wt. 12 lbs.

MODIFICATION KIT: Modifies DX-100 and DX-100-B for use with the SB-10 Adapter. Model MK-1. Shpg. Wt. 1 lb. **\$8.95**.



HEATHKIT AR-3
\$29⁹⁵

(less cabinet)

ALL-BAND RECEIVER KIT

A fine receiver for the beginning ham or short wave listener, designed for high circuit efficiency and easy construction. Covers 550 kc to 30 mc in four bands clearly marked on a slide-rule dial. Transformer operated power supply. Features include: bandswitch, bandspread tuning, phone-standby-CW switch, phone jack, antenna trimmer, noise eliminator, RF gain control and AF control. Shpg. Wt. 12 lbs.

CABINET: Opt. extra. No. 91-15A. Shpg. Wt. 5 lbs. **\$4.95**.



HEATHKIT QF-1
\$9⁹⁵

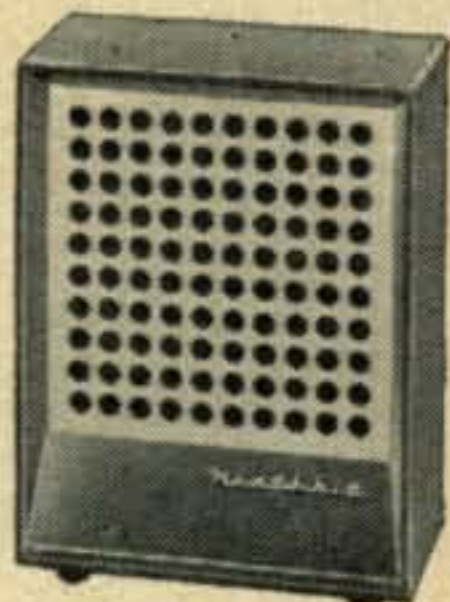
"Q" MULTIPLIER KIT

Useful on crowded phone and CW bands, this kit adds selectivity and signal rejection to your receiver. Use it with any AM receiver having an IF frequency between 450 and 460 kc that is not AC-DC type. Provides an effective "Q" of approximately 4,000 for extremely sharp "peak" or "null". The QF-1 is powered from the receiver with which it is used. Shpg. Wt. 3 lbs.

OF DISTINCTIVE QUALITY

ACCESSORY SPEAKER KIT

Handsomely designed and color styled to match the "Mohawk" receiver this heavy duty 8" speaker with 4.7 ounce magnet provides excellent tone quality. Housed in attractive 3/8" plywood cabinet with perforated metal grille. Speaker impedance is 8 ohms. Shpg. Wt. 7 lbs.



HEATHKIT AK-5
\$9⁹⁵



HEATHKIT RX-1 \$274⁹⁵

"MOHAWK" HAM RECEIVER KIT

Styled to match the "Apache" transmitter the "Mohawk" ham band receiver provides all the functions required for clear, rock-steady reception. Designed especially for ham band operation this 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc and covers all the amateur frequencies from 160 through 10 meters on 7 bands with an extra band calibrated to cover 6 and 2 meters using a converter. Specially designed for single sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled wired and aligned front end coil bandswitch assembly assures ease of construction and top performance of the finished unit. Other features include 5 selectivity positions from 5 kc to 500 CPS, bridge T-notch filter for excellent heterodyne rejection, and a built-in 100 kc crystal calibrator. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandspread. Front panel features S-meter, separate RF, IF and AF gain controls, T-notch tuning, T-notch depth, ANL, AVC, BFO, Bandswitch tuning, antenna trimmer, calibrate set, calibrate on, CW-SSB-AM, receive-standby, upper-lower sideband, selectivity, phone jack and illuminated gear driven vernier slide rule tuning dial. Attractively styled with die-cast aluminum control knobs and escutcheons. No external alignment equipment is required for precise calibration of the "Mohawk". All adjustments are easily accomplished using the unique method described in the manual. An outstanding buy in a communications receiver. Shpg. Wt. 66 lbs. Shipped motor freight unless otherwise specified.



HEATHKIT AM-2
\$15⁹⁵

REFLECTED POWER METER KIT

The AM-2 measures forward and reflected power or standing wave ratio. Handles a peak power of well over 1 kilowatt of energy and covers 160 through 6 meters. Input and output impedance provided for 50 or 75 ohm lines. No external power required for operation. Use it also to match impedances between exciters or RF sources and grounded grid amplifiers. Shpg. Wt. 3 lbs.

BALUN COIL KIT

Match unbalanced coaxial lines, found on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance with this handy transmitter accessory. Capable of handling power input up to 200 watts, the B-1 may be used with transmitters and receivers covering 80 through 10 meters. No adjustment required. Shpg. Wt. 4 lbs.



HEATHKIT B-1
\$8⁹⁵



HEATHKIT VX-1
\$23⁹⁵

ELECTRONIC VOICE CONTROL KIT

Eliminate hand switching with this convenient kit. Switch from receiver to transmitter by merely talking into your microphone. Sensitivity controls allow adjustment to all conditions. Power supply is built in and terminal strip on the rear of the chassis accommodates receiver and speaker connections and also a 117 volt antenna relay. Shpg. Wt. 5 lbs.



HEATHKIT VF-1
\$19⁵⁰

VFO KIT

Far below the cost of crystals to obtain the same frequency coverage this variable frequency oscillator covers 160, 80, 40, 20, 15 and 10 meters with three basic oscillator frequencies. Providing better than 10 volt average RF output on fundamentals, the VF-1 is capable of driving the most modern transmitters. Requires only 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a. Illuminated dial reads direct. Shpg. Wt. 7 lbs.

Save 1/2 or more...with Heathkits



HEATHKIT DX-100-B \$189⁵⁰



HEATHKIT DX-40 \$64⁹⁵

DX-100-B PHONE AND CW TRANSMITTER KIT

A long standing favorite in the Heathkit line, the DX-100-B combines modern styling and circuit ingenuity to bring you an exceptionally fine transmitter at an economical price. Panel controls allow VFO or crystal control, phone or CW operation on all amateur bands up to 30 mc. The rugged one-piece formed cabinet features a convenient top-access hatch for changing crystals and making other adjustments. The chassis is punched to accept sideband adapter modifications. Featured are a built-in VFO, modulator, and power supply, complete shielding to minimize TVI, and a pi network output coupling to match impedances from 50 to 72 ohms. RF output is in excess of 100 watts on phone and 120 watts on CW. Band coverage is from 160 through 10 meters. For operating convenience single-knob bandswitching and illuminated VFO dial on meter face are provided. A pair of 6146 tubes in parallel are employed in the output stage modulated by a pair of 1625's. Shpg. Wt. 107 lbs. Shipped motor freight unless otherwise specified.

DX-40 PHONE AND CW TRANSMITTER KIT

An outstanding buy in its power class the DX-40 provides both phone and CW operation on 80, 40, 20, 15 and 10 meters. A single 6146 tube is used in the final amplifier stage to provide full 75 watt plate power input on CW or controlled carrier modulation peaks up to 60 watts for phone operation. Modulator and power supplies are built in and single-knob bandswitching is combined with the pi network output circuit for complete operating convenience. Features a D'Arsonval movement panel meter. A line filter and liberal shielding provides for high stability and minimum TVI. Provision is made for three crystals easily accessible through a "trap door" in the back of the cabinet. A 4-position switch selects any of the three crystals or jack for external VFO. Power for the VFO is available on the rear apron of the chassis. Easy-to-follow step-by-step instructions let assembly proceed smoothly from start to finish even for an individual who has never built electronic equipment before. Shpg. Wt. 25 lbs.

Free Send now for latest Heathkit Catalog describing in detail over 100 easy-to-assemble kits for the Hi-Fi fan, radio ham, boat owner and technician.



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NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

QUANTITY	KIT NAME	MODEL NO.	PRICE

For further information, check number 5 on page 126.



. . . de W2NSD

never say die

Modernizing the Amateur Bands

We've been going along with only minor changes in the makeup of our bands for many years now. Our hobby has changed tremendously down through the years, but our division of the bands has remained essentially the same. The last big upheaval was the National Amateur Radio Council inspired Forty Meter phone band which was finally added after long and fierce opposition by another group.

Discussed recently at a Board of Directors meeting of the Quarter Century Wireless Association was the possibility of petitioning the FCC for a revision of our sub assignments in the five most popular ham bands. It was pointed out that a check of the heterodynes over the various bands shows today that about 80 percent of the operation is on phone and that large segments of the bands outside of the phone assignments are little used.

A table was presented which gave a good comparison of the number of channels available for cw and phone on the bands.

Band	Band Width (kc)	Phone (kc)	Other (kc)	Phone Channels	Other Channels
80m	500	200	300	40	300
40m	300	100	200	20	200
20m	350	100	250	20	250
15m	450	200	250	40	250
10m	1700	1200	500	240	500

Channels are figured on the basis of 5 kc per phone station and 1 kc per cw station. Looking at the above chart it is easy to see why the phone bands are so congested.

Taking into consideration the percentage of occupancy and bandwidth per channel, plus the need for Novice bands and a buffer band for DX phone stations, a new subassignment table was proposed.

This should be good for some heated arguments at club meetings. My first reaction was that this was going too far, even though I am an admitted phone man. But then, as I thought it over and spent some time actually tuning the bands and counting heterodynes, I began to see that maybe they knew what they were doing when they made the suggestion. It certainly was a complete surprise to have such an idea pop up from the QCWA, which many of us had considered to be even more CW-oriented than the ARRL, if that is possible. They even have CW in their name!

Band	Clear CW	Buffer DX Phone	U/S Phone Channels	CW clear Channels		
80m	3.50- 3.55	3.55- 3.60	3.60- 3.65	3.65- 4.00	100	70
40m	7.00- 7.05	7.05- 7.10	7.05- 7.10	7.10- 7.30	100	40
20m	14.00-14.05		14.05-14.10	14.10-14.35	50	50
15m	21.00-21.05	21.05-21.10	21.10-21.15	21.15-21.45	100	60
10m	28.00-28.25		28.25-28.50	28.50-29.70	250	240

The CW beginnings of ham radio should, theoretically, make the pioneers of our hobby inclined against phone. Yet, as I understand it, early results of the poll of members showed a small percentage in favor. The ARRL, I should expect, would be dead against any such doings. The reported resignation of their secretary and all the other top brass of the League from QCWA would seem to substantiate this.

By the time this reaches print all of the hassle will probably be resolved. QCWA is by nature a peaceful club. Most of the members have also been ARRL members for most of their lives, so the natural course will be to drop the whole thing and let the ARRL take what action it sees fit.

Unfortunately for me, I am not so peaceful. I want to find out more about this whole idea. I want to find out on a nationwide basis just what the actual occupancy of our bands is these days. I want to find out what all the active operating hams think about changing our assignments. I'm stubborn. And I'll get a few more enemies for this. Actually I could use a few good enemies, the ones I've got now are as motley a bunch of buzzards as you could ever hope to know. Of the four that come immediately to mind, two are alcoholics and two used to make their living by gypping hams. Let's get some good talent in there fellows.

The first step is to get the statistics. Obviously the compiling of the needed statistics is far beyond the capabilities of just myself. If there are any ham clubs in the New York area that would like to help out, please give me a call at JU 2-4460 so we can make arrangements.

Report Form

In the interests of standardization all reports
[Continued on page 22]

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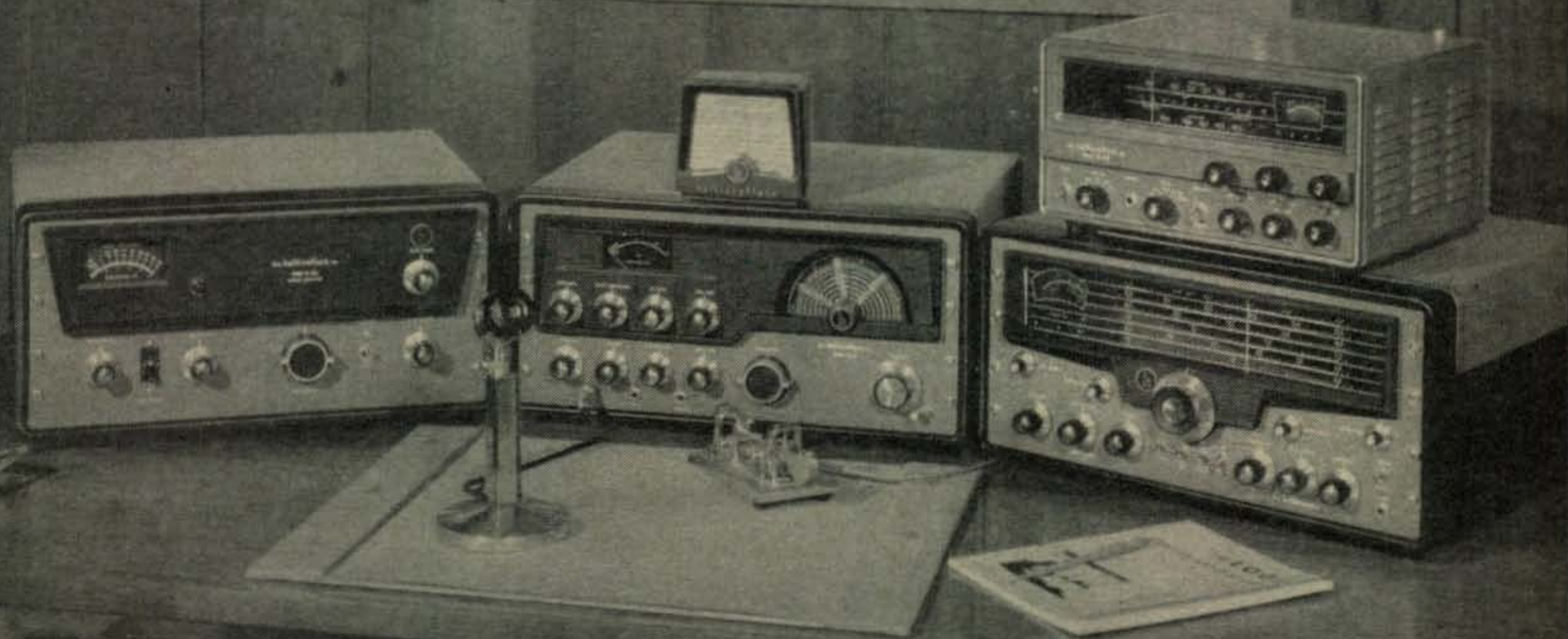


LOSERS



Big winner this month is K3DAK. Well, actually we don't know how big Bob really is, but his card is terrific. Silk screened white electron whizzes on light blue background, call letters in muddy brown, and modulation envelope in pure 14K gold. The prize? Twelve more issues of CQ, and everlasting fame! Runners up win only the fame: K8LPV, LA5YA, and ZS1SP.

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For further information,
check number 6 on page 126.

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For further information, check number 7 on page 126.

Letters to the Editor

WWV Converter

Dear Wayne,

With all the new "only Ham Band" receivers now out I would like to see someone design a simple, cheap, inexpensive junk box converter which would let us hear WWV for calibrations. It would have to be simple and cheap because if you are like me and have one of these new receivers you have scrapped every possible means for greenbacks and probably tapped the bank a little to finance it.

William R. Gierhart, K5CCO
19 North Moccasin Place
Sapulpa, Oklahoma

Lamp Bulb Resistance

Dear Sirs:

I recently had occasion to make use of J. J. Nagle's article on the power-resistance-current characteristics of incandescent light bulbs (CQ, Vol. 7, 1951, p. 30)

I found that, by replotting all of his data on a common basis, in terms of the ratios of resistance, current and power to their values at the lamp rating, a single curve could be obtained for all lamps. Due to the smoothing effect of using all of the data to obtain one curve, the effect of experimental errors at low currents was reduced and a more reasonable looking curve obtained.

When plotted in this way, the information also becomes more useful, since the values for a lamp of any rating can be obtained without interpolation, provided it operates at nearly the same filament temperature at rating.

Albert E. Weller, Jr.
Columbus 12, Ohio

G. G. Improvements

Dear Sir:

I have just finished construction on the 811a grounded grid linear amplifier in March 1958 CQ (H. Smith W6COU) and would like to pass along some comments that might aid others on the same project. I have tried different components and values and made what I hope may be helpful discoveries.

A primary source of trouble is the grid circuit. The ground at the grids should be as electrically close as possible to the ground on the variable condenser in the output circuit. If a 1500 volt supply is used with a bias battery this goes for the battery ground and the two .01 mfd by-passing it. The text mentioned that the value of the DC blocking condenser in the plate circuit is not critical, however, I have found thru some experimenting, that if the value used is greater than .001mfd the idling current of about 30 ma present when excitation is removed will jump as far as 400 ma and, obviously, if one is not stocked with a numerous quantity of 811a's and is interested in CW operation the current is much too high. Also, for AM, I would suggest a heavier coil than the 75 watt B&W junior.

All in all, I am well pleased with the rig. It will easily take AM RF with 1500 volts on the plate. 45 watts AM excitation gives 100% distortion free modulation. While using it on 40 meters, I have received very excellent reports on its strength and reproductive qualities. I plan to use it on SSB as soon as I am able to construct a suitable exciter.

Thank you for a timely and informative article.

Charles W. de Seve, K2VMW
Troy, N. Y.

Hams in P.H.S.

Dear Wayne,

Recently I've been reading of the success of amateurs in the armed services. I'm spending my two years as a normal control patient or "guinea pig" at the National Institutes of Health, a Public Health Service research hospital. I started the wheels rolling when I arrived in

new 5 BAND VERTICAL
new 2 BAND VERTICAL
AVAILABLE NOW!!

MODEL V-5 Work 10, 15, 20, 40 and 80 with one antenna . . . one RG/8U feed-line!

Designed and built to meet United States Air Force electrical and structural specifications. The V-5 is 100% rust proof and performs brilliantly on each of the 5 bands. It is capable of handling power of 1 KW to the antenna! Weatherproof trap assemblies are used throughout . . . no external loading coil needed.

Maximum length of antenna is 43 feet, 8 inches. Supplied complete with polyethylene guy rope, heavy duty base with internal coax fitting and all necessary hardware. For best results radials (not supplied) should consist of 12 wires, each approximately 64' in length.

Amateur Net \$118.50

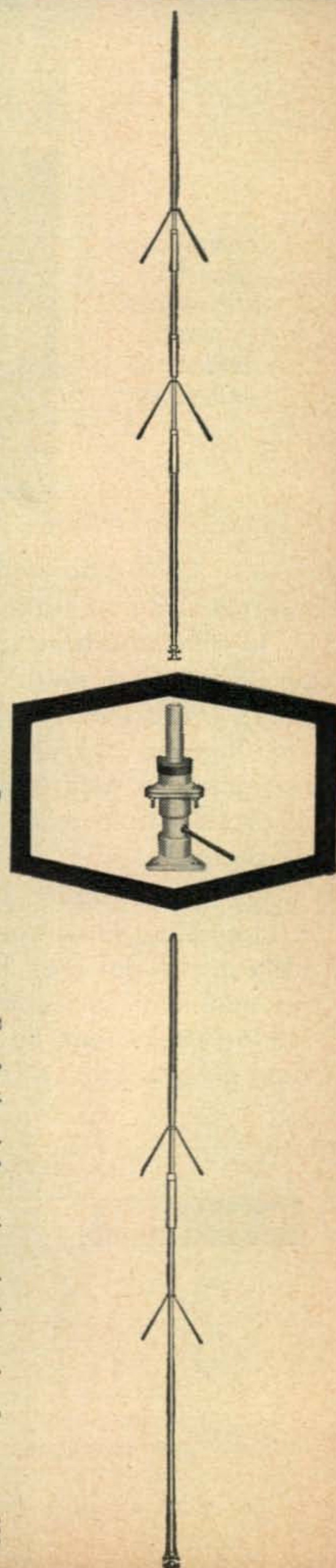
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 HEAVY DUTY BASE MOUNT supplied with
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MASTER

MODEL V-4-8 For 40 and 80 meter bands. Equivalent to a separate $\frac{1}{4}$ wavelength vertical on each band. Heavy duty 100% rust proof construction. Husky over-size trap assembly handles 1 KW (AM) in the antenna. Maximum overall length of the antenna is 52 feet, 3 inches. . . The antenna requires 12 radials each 64 feet in length for best performance. Antenna comes complete with base mount, described above, polyethylene guy rope, hardware and detailed instructions.

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For further information, check number 8 on page 126.

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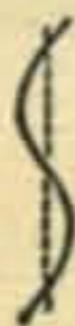
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For further information, check number 9 on page 126.

September, but the P.H.S. has had no previous experience with hams and I seem to be stalemated. I see no reason why the P.H.S. would be reluctant, as all the other services are quite enthusiastic on this score. Of course I have my own rig here and will use it. All I want to do is *operate!* Perhaps you or your readers would know some way of pushing this on through. Any help would be greatly appreciated.

John D. Mininger, K9DMC/3
4 West, C.C., N.I.H.
Bethesda, Md.

Dear Wayne:

In regards to your indirect inquiry in the June CQ concerning amateurs in the armed services.

I am a member of the Air Force and just re-enlisted for 6 years so it isn't too bad!!!

The Air Force uses a series of aptitude tests to determine in what field a man can best be utilized. These do not always hold true, but they really don't try to put round pegs in square holes. In these aptitude tests an amateur who has put any time into his hobby will show a good to excellent score in electronics and radio operation.

In a phase of training known as career counseling, I was asked what job I would like in the service. I was more interested in the operation end of the game than the maintenance so I chose radio operation rather than the other associated fields. The sergeant who was interviewing me was trying to sway my attention to the fields of maintenance, since I had shown a remarkable aptitude in this, but the argument was settled when my ticket appeared on his table.

Due to code being an old story to me and having a much better knowledge of fundamentals, and a little experience at message handling, the school was a snap and I graduated with very good grades at the top of my class.

I spent an overseas tour in Saudi Arabia where due to having my ticket I could spend some of my dull moments operating the mars station on base on 15 SSB (HZ1AB). My regular assignment was in the airways station where we worked with a group of ICAO stations; this was a great improvement to my code speed.

Now I am stationed a Truax field in Madison, Wis. where upon producing an amateur license, I was assigned to the base mars station AF9FCV and have my rig set up in the station where I can spend some of the dull time rag chewing on 40 cw.

You will get some letters from the other point of view, but I haven't met a ham in the service who got a bad deal. I'm sold on the service.

vy 73,
A/2C Thomas N. Lubbers (W8RMF/9)
327 Abron Box 18
Truax Field
Madison 7, Wisconsin

Improved Phonetics

Dear OM:

We use our "Able-Baker-Charlie" system and the DX stations use something else. My call, W4OWI, comes back to me as "W4 Ontario Washington Italy." On an international basis I am now in favor of using a phonetic system based on the names of countries and cities commonly known throughout the world. I feel that foreigners have given up our "Able-Baker-Charlie" system as unpronounceable and non-understandable. "Italy" makes sense to them, "Item" does not. "France" makes sense, "Fox" does not since they have no such word in their language.

Bob Leach, W4OWI
Tampa, Florida

Not So Improved Phonetics

Editor CQ Magazine:

Can't help but comment on the article in the February issue of your magazine concerning the new phonetic alphabet. I'm a commercial airlines radio operator and am so sick of this so called "new and helpful" phonetic

[continued on page 18]

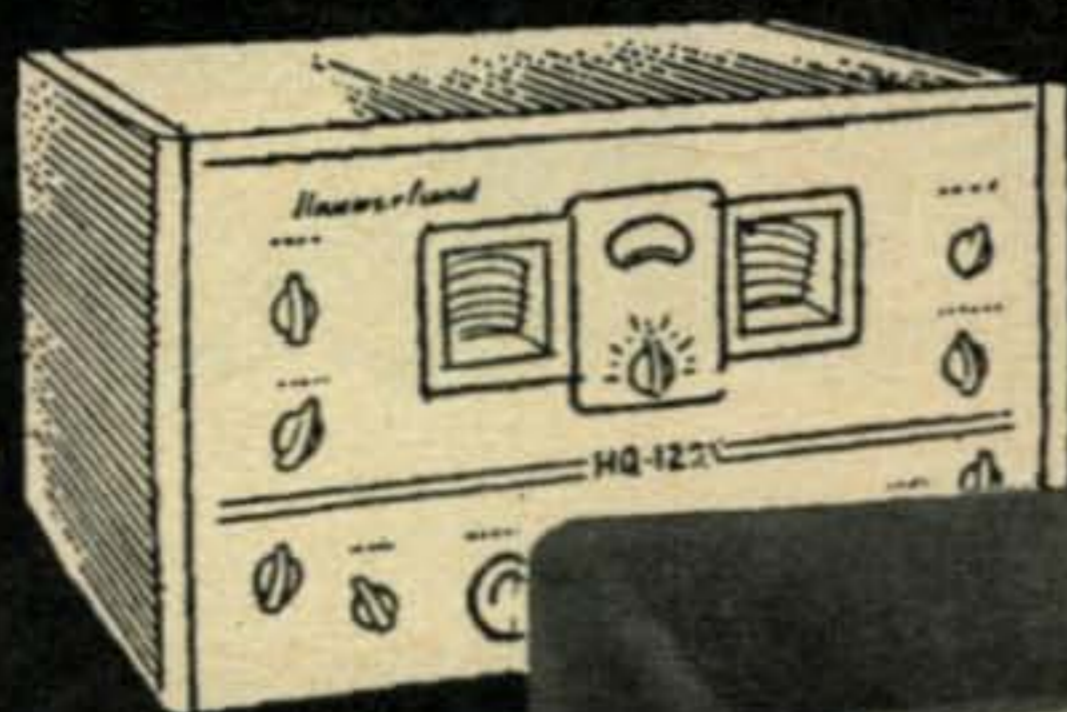
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\$269⁰⁰
Clock-Timer
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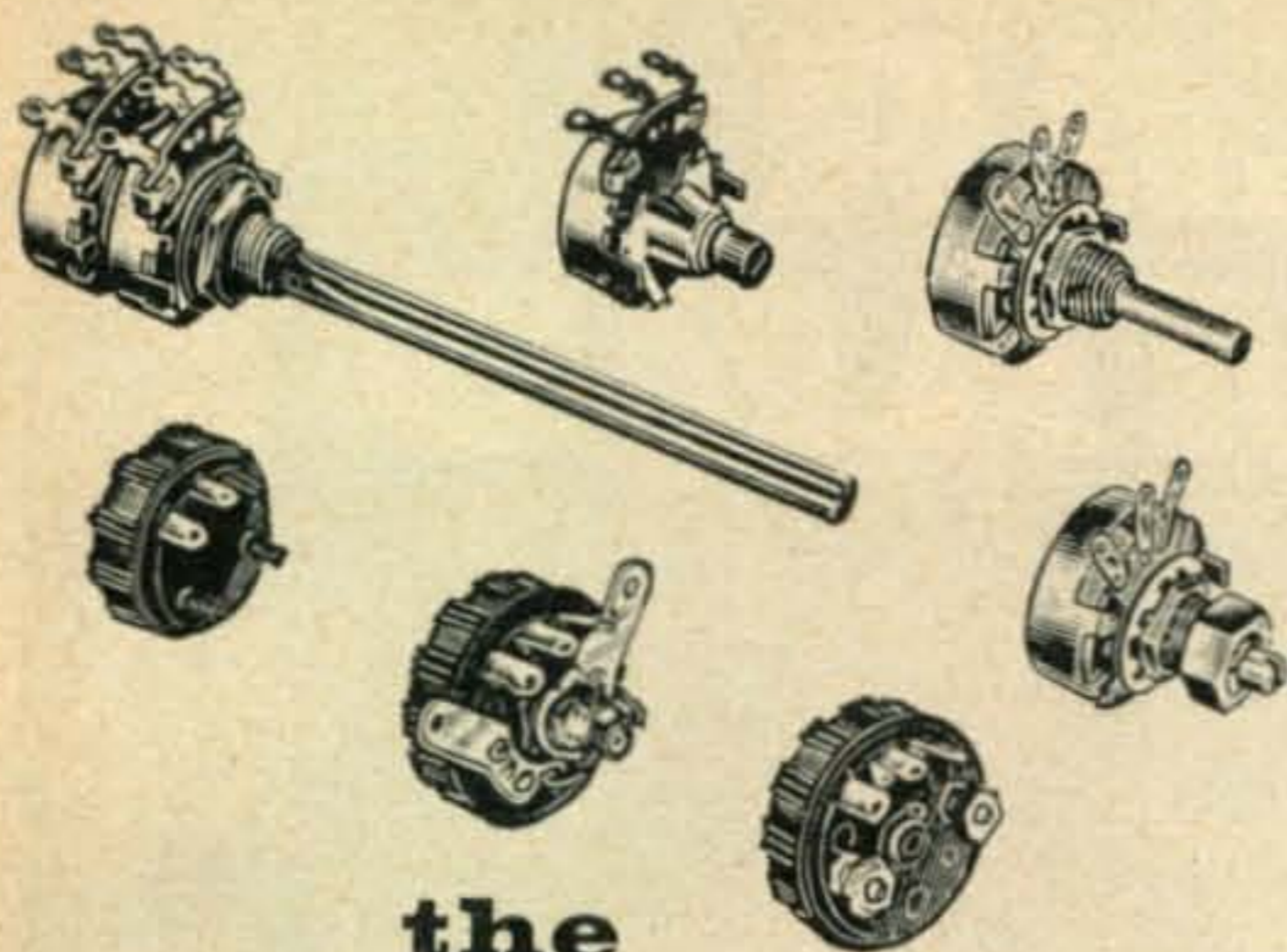
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For further information, check number 11 on page 126.



Feenix, Ariz.

Deer Hon. Ed:

Boy oh boys, are this the life. Scratchi are reely in the lap of Hon. Luckshury. Eggscuse please while telling Hon. Butler to bringing another porshun of cacktus jooce. As I were saying, Hon. Ed., this are the life—yes, indeedy.

Rite now are sitting in front of thirtyfoots long operating table. Chair are sitting in being on tracks so can sliding chair to proper parts operating table. Where it are rite now are being in fronts of 2400 megacycle reseever and operating controls for 2400 megacycle kilowhats transmitter. Band not seeming to be open.

By pushing button on arm of chair, can having motor propel chair to any parts of operating table where having sooper-sensitive reseever and kilowhats transmitter for each amchoor band. Even having cupple spare positshuns in case FCC getting generus some day and giving amchoors more bands.

Howcomes, you thinking, Hon. Ed? You thinking I dreeming? Not on your tinnytype. Scratchi are getting himself married up to gal with plenty bux. In fackly, XYL having so much monies not even Scratchi can spending it all!!

I admitting all this happening reel fast. Howsumever, one day are on air talking to YL in Hon. Hawiyan Eyelands, and next thing you knowing she popping the questshun, and there are good old Scratchi in airplane hedging to Hawiyan Eyelands.

You asking what eyeland she living on, Hon. Ed? That reel foolish questshun, on acct. you should be asking what eyeland she owning. Yes indeedy, she owning hole eyeland. What a place for antennas. Wowiee!!

Are putting up vee beems, rombics, and rotary beems for each band. On higher freakwency bands using parabolas and horn antennas. You never seeing so much wire in your life. From airplane antenna towers looking like bristles on brush.

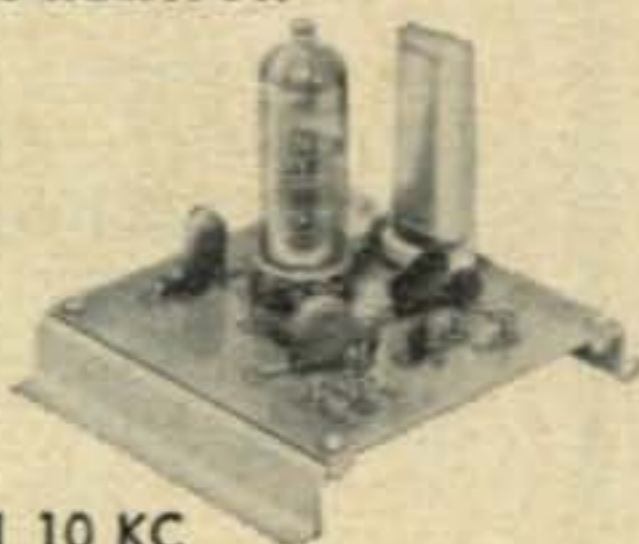
But that only the beginning. Hon. Amchoor Shack are being the reel end. For examples. Each time being on air are having tape recorder in ackshun. After each QSO Scratchi's Hon. Secretary are listening to hole QSO, making notes on what happening, and putting



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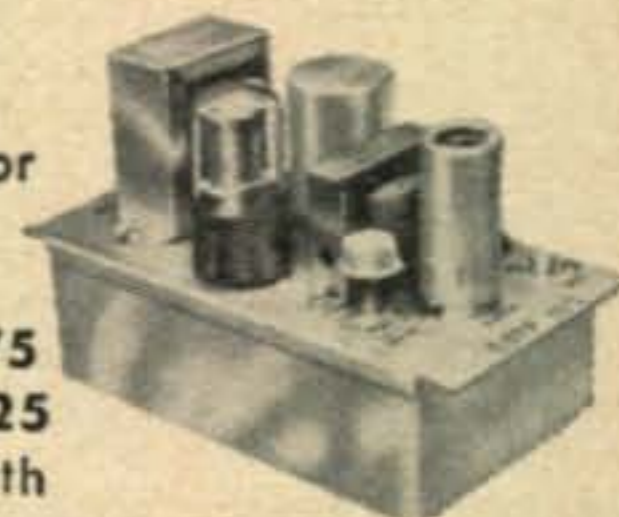
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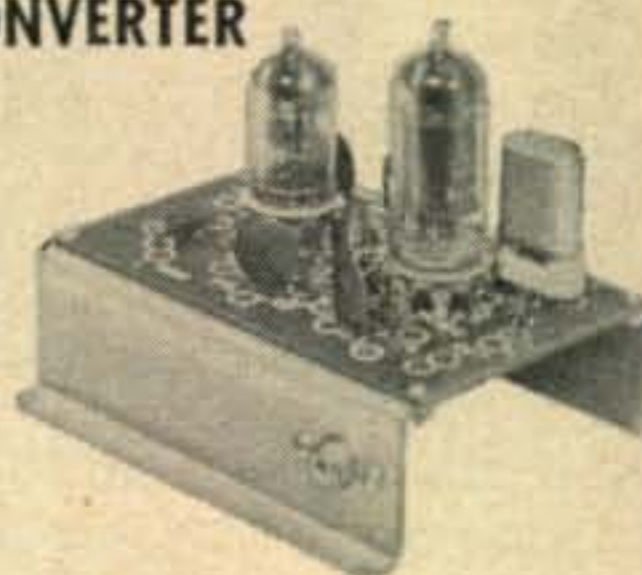
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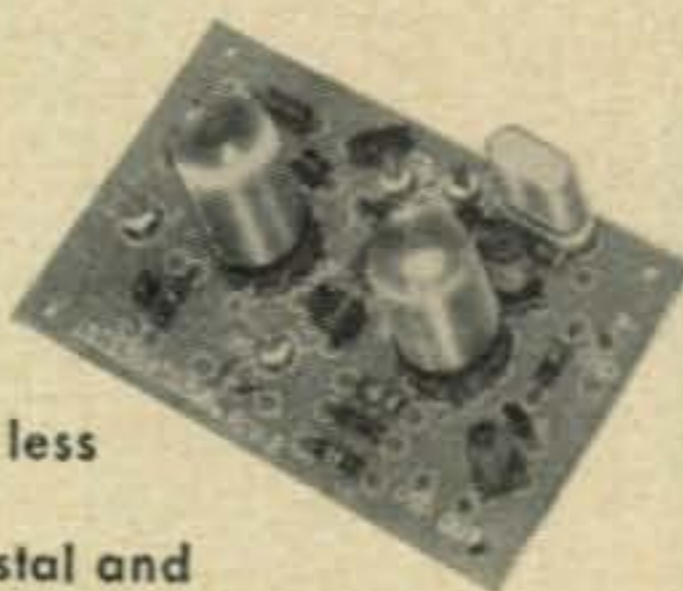
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Kit with crystal less tubes **\$10.95**
Wired with tubes and crystal **\$15.95**
Shipping Weight **2 lbs.**



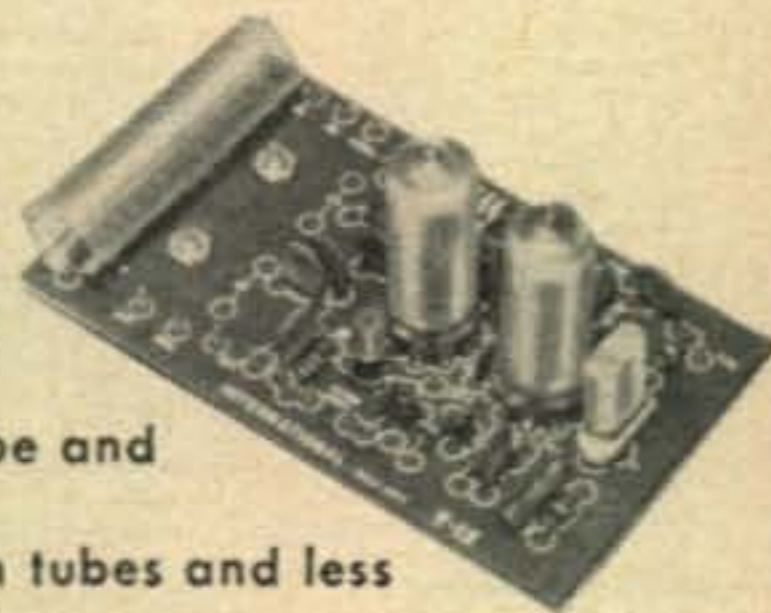
FCV-2 CONVERTER

Model 50,
6 Meters
Model 144,
2 Meters
Kit with crystal less tubes **\$12.95**
Wired with crystal and tubes **\$17.95**
Shipping Weight **2 lbs.**



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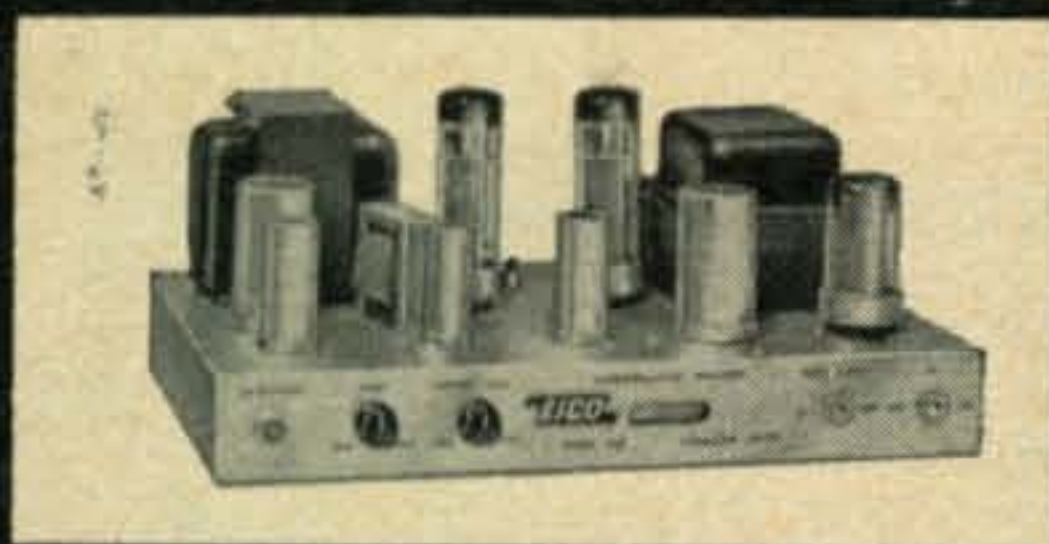
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NEW UNIVERSAL MODULATOR-DRIVER #730
KIT \$49.95 WIRED \$79.95 Cover E-5 \$4.50

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NEW GRID DIP METER #710
KIT \$29.95 WIRED \$49.95 including complete set of coils for full band coverage.



Exceptionally versatile. Basically a VFO with microammeter in grid; determines freq. of other osc. or tuned circuits; sens. control & phone jack facilitate "zero beat" listening. Excellent absorption wave meter. Ham uses: pre-tuning & neutralizing xmitters, power indication, locating parasitic osc., antenna adj., correcting TVI, de-bugging with xmitter power off, determining C.L.Q. Servicing uses: alignment of filters, IF's; as sig. or marker gen. Easy to hold & thumb-tune with 1 hand. Continuous 400 kc-250 mc coverage in 7 ranges, pre-wound 0.5% accurate coils. 500 ua meter movement. 6AF4(A) or 6T4 Colpitts osc. Xmfr-operated sel. rect. 2 1/4" H, 2 1/4" W, 6 1/4" L. Satin deep-etched aluminum panel; grey wrinkle steel case.

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Show me HOW TO SAVE 50% on 60
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For further information, check number 13 on page 126.

informayshun on cards which sticking in Hon. Compewter.

Now, next time I wanting to contacting same stayshun, just dialing call letters and Hon. Compewter awtomatically tooning reseever on that band to freakwency other amchoor last using, then xmitter coming on and from tape recording are awtomatically calling other amchoor. If other feller coming back to me, compewter switching to manual control and Scratchi taking over.

For see-w even more awtomatic. Hon. Compewter can calling seek-you, and when amchoor coming back, compewter are reseev-ing signals and putting them in memory bank, then awtomatically sending back, on see-w, answer to whatever questshuns amchoor are asking. Scratchi not even having to be around. Can be some place reeding good book or swimming in oshun.

Resently are setting compewter to only calling seek-you dee-x. Shortly after going away for overnites on trip, and when coming back are checking log that compewter are awtomatically printing, and finding that compewter are working hundred and forty-to countries (compewter awtomatically counting number of countries as it working them).

You thinking I having hard time sending QSL cards to so many countries? Hon. Ed., you not having any imaginayshun. Hon. Compewter doing hole thing. After making contact, compewter sending informayshun to self-contained printing-press, and are awtomatically printing hole QSL card, with signal report, wether condishuns, and other amchoors call, figyuring out how much airmale postage needed, licking stamp, and putting it on card. Only one problum. Are having to reminding butler to maleing cards.

So, what you thinking, Hon Ed? I thinking you crazy if you buleeving me. You being out of country so long you forgetting what happening on first day of April? April Fool!!

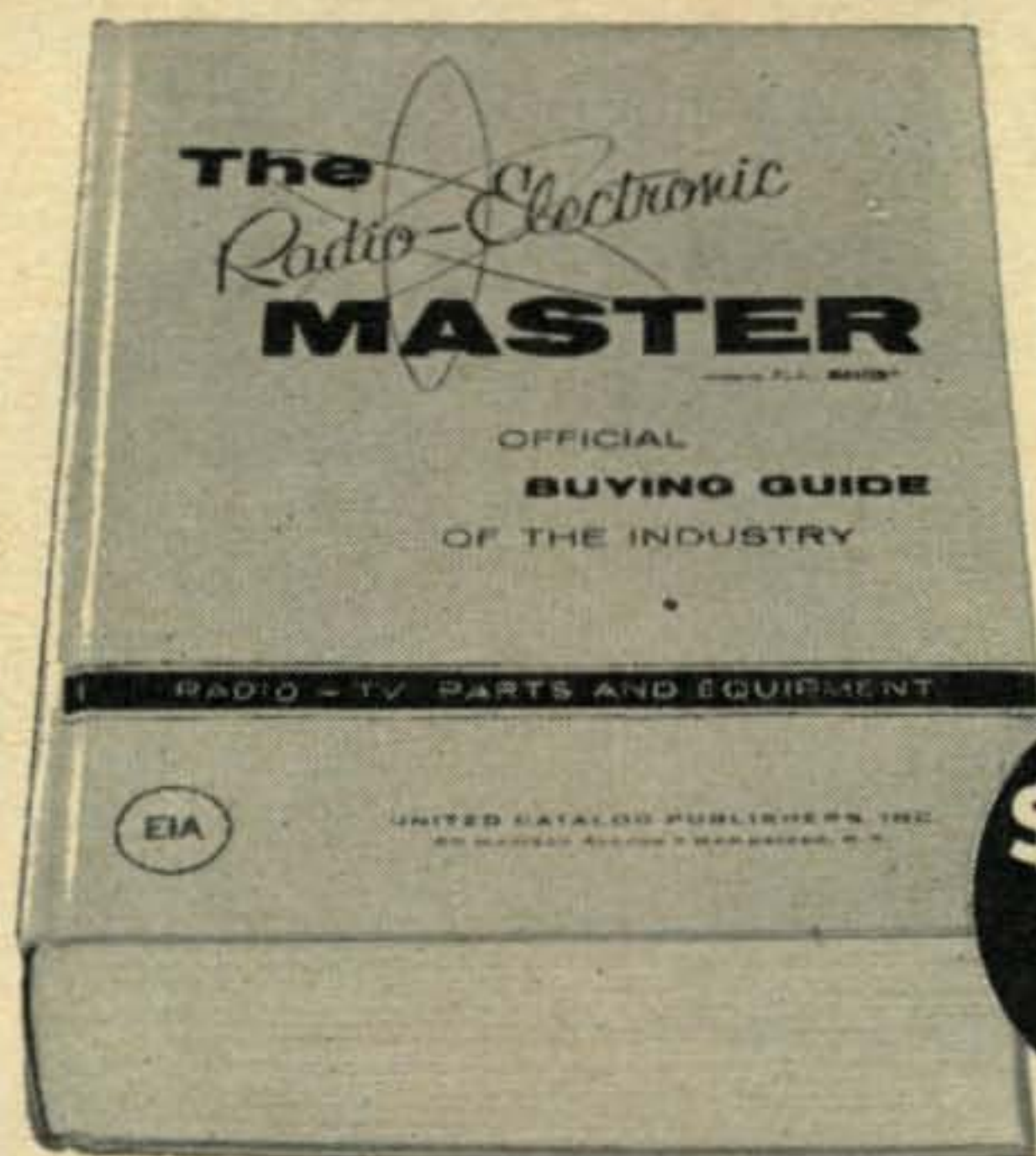
Respectively yours,
Hashafisti Scratchi

LETTERS [from page 14]

alphabet that can only use discouraging words to describe it. I've been a ham for 6 years and am used to using the names of foreign countries and girls and other interesting subject names for a phonetic alphabet. You might say it adds a bit of spice to ham radio and distinguishes it from the commercial/military type of communications, and makes ham radio seem like a hobby which I believe it's supposed to be. The phonetic alphabet that has been used in ham radio since the hobby began is different and possibly not as all-fire accurate as the one some mental case dug up for the commercial/military services, but it's not dull and it gives the ham the feeling that he is "hamming," not providing commercial communications. When ham pubs and ARRL "officials" start telling hams to use the commercial/military phonetics, I say drop dead. That may sound childish, but I feel strongly about the subject. Ham radio is getting so commercial that it's ceasing to be an enjoyable hobby.

Richard Dixon, W7QZO/KL7

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prices of receivers, transmitters, hi-fi components, cabinets, racks and many hard-to-locate items not usually found in smaller incomplete catalogs. All latest SSB and mobile ham gear included.

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Please send me your 24-page Panel Lamp Chart. Enclosed is 10¢ for handling. (Free with order)

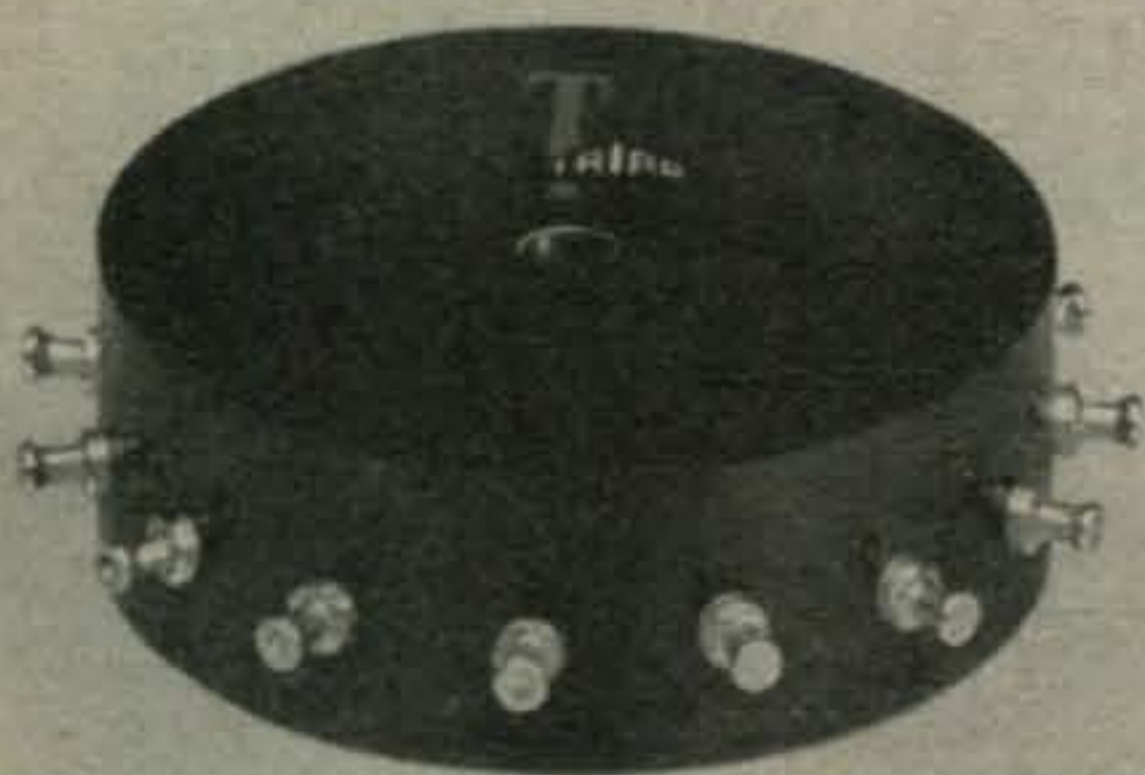
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For further information, check number 14 on page 126.

20 • CQ • April, 1959

CLUB BULLETINS

Marvin D. Lipton, VE3DQX

311 Rosemary Road, Toronto 10, Ontario, Canada

In this day of rapid transit, instant coffee, ready cooked meals and other time savers, I was not too surprised to see a form letter enclosed in a club paper recently reaching me. The missive, requesting a certain course of action on an administrative matter, was addressed to a government agency. The reader of the bulletin containing the letter, was expected to fix his signature, thereby endorsing the cause within. The arguments contained in the letter were well written and were sensible, but the possibilities of the desired results being achieved were slight.

The implications of correspondence of this type are enough to prejudice the recipient so that he is made indifferent. If I were to receive a few hundred rubber stamped letters, I certainly would question the intensity of the author's opinions. Glorified petitions with borrowed signatures may have their place, but I for one, do not think that it is at the rear of Amateur publications.

Notes

Ward Drill, K9CLS, has replaced Norm Krohne, W9SKF, as editor of HAM TRIX, West Allis R.A.C. Inc., and Ray Weiss, W8RGB, takes over from Len Nathanson, W8DQL, former editor of the DARA QMN BULLETIN, Detroit A.R.A. Best wishes for success to both new editors.

The Milwaukee Radio Amateur Club Inc. has won the first of our free one year subscriptions to CQ for being quoted most often in the last news release, CQ NEWS.

Hal Shea, W4BKC, informs us that the Orlando A.R.C. will hold its annual hamfest on Sunday April 5, at Sanlando Springs Florida. To get all the details write to Hal at 7 West Columbia St., Orlando, Florida.

Members

We'd sure like to add your club's name to our growing list of affiliated clubs in our News Service. Clubs without journals may join as associated members and receive a copy of our CQ NEWS to tack onto the bulletin board. New members for the past month are: CARRIER, San Fernando Valley R.C. Inc., PARC AUDIOGRAM, Panhandle A.R.C., QLF, Knights of the Roundtable, UQA, First U.S. Army MARS, and FLYSHEET, Stockton A.R.C.

CQ will be putting out a special issue next month and we are taking a brief rest. CQ NEWS will continue as usual and we'll c.u. in June.

73, Marv, VE3DQX.

Known World-Wide by its Audio

for

Price · Performance
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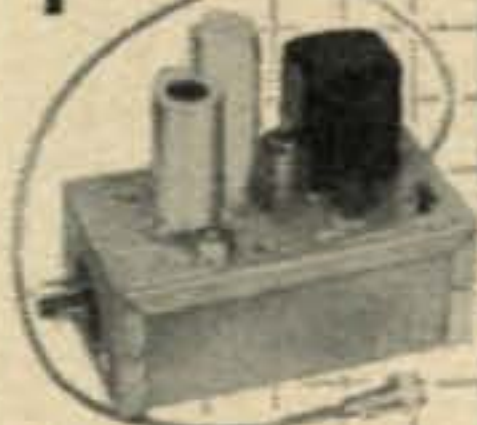
Globe King 500C

Built-in antenna relay, built-in VFO, separate power supply for modulator. Commercial type compression circuit. Grid block keying for signal clarity. Pi-Net matches most antennas 52-300 ohms. Optional crystal operation. SSB input & operation with 15-20w external exciter. 31x22x14 3/4" cabinet designed for TVI-suppression.

Wired & Tested:
\$795.00

Completely Bandswitching, 10-160M. 540w AM & CW; 700w max. on DSB or SSB (PEP), with 15-20w external exciter.

Speech Booster FCL-1



Wired & Tested:
\$24.95
In Kit Form:
\$15.95

Peak limiting audio preamplifier that clips and filters speech frequencies exceeding pre-set amplitude. Increases modulation intensity for most penetrating audio. Includes harmonic suppression. Plugs directly into Scout & Hi-Bander. Adaptable to other Xmtrs.

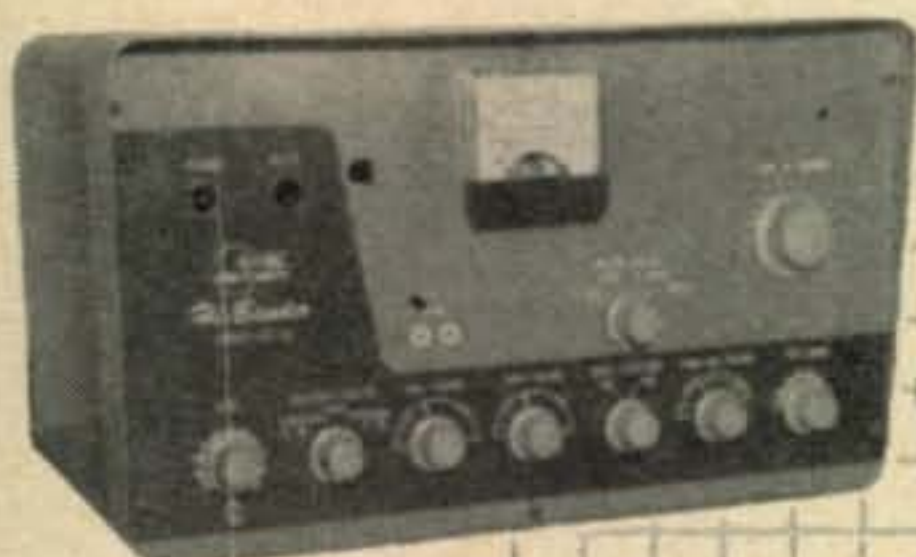
Power Attenuator PA-1



Wired & Tested:
\$10.95

General purpose attenuator for exciters up to 70 watts input. Suitable to attenuate drive between many exciter-amplifier combinations. Standard coax input and output connectors. Tap switch to select any of three attenuation positions or straight through.

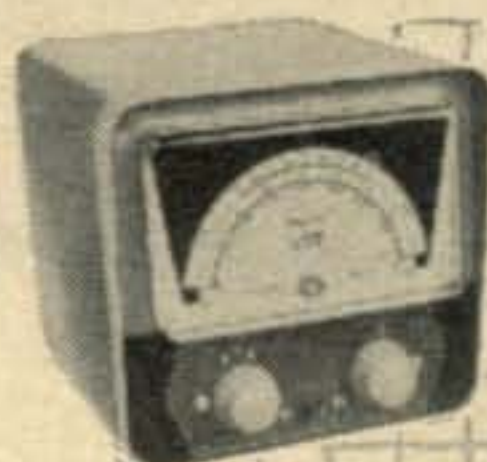
Tops on 6 and 2M



Wired & Tested:
\$149.95
In Kit Form:
\$129.95

Globe Hi-Bander

60w CW, 55w AM input on both 6 & 2M. Single control bandswitching. 4-stage RF section allowing straight through operation. Good harmonic and TVI-suppression. RF stages metered. Provisions for mobile use. 52-72 ohm coax output. New duo-band final tank circuit eliminates switching. Variable antenna loading control. Reserve power socket on rear chassis apron for accessories.



Wired & Tested:
\$59.95
In Kit Form:
\$49.95

Globe VFO 6-2

Perfect zero beat. Built-in power supply with voltage regulation. Ideal for driving 6 and 2 meter transmitters. Temperature compensated for utmost stability. Excellent for use with Hi-Bander. Approx. 50V RF output in 8-9 mc. range. 13:1 tuning ratio, king-size tuning scale. Sideband stability.

Wired & Tested:
\$29.95
In Kit Form:
\$21.95

6M Converter

New, improved circuit for higher gain, greater signal/noise ratio. Printed circuit for ease in kit assembly. Models for fixed or mobile stations or 12 volt filaments. I.F. output of 10-14 mc. on fixed, 600-1600 kc. on mobile model. Highly stable, completely shielded, crystal controlled, complete with tubes, crystal, cables. 3x5 1/2 x 4 1/2".

90w CW

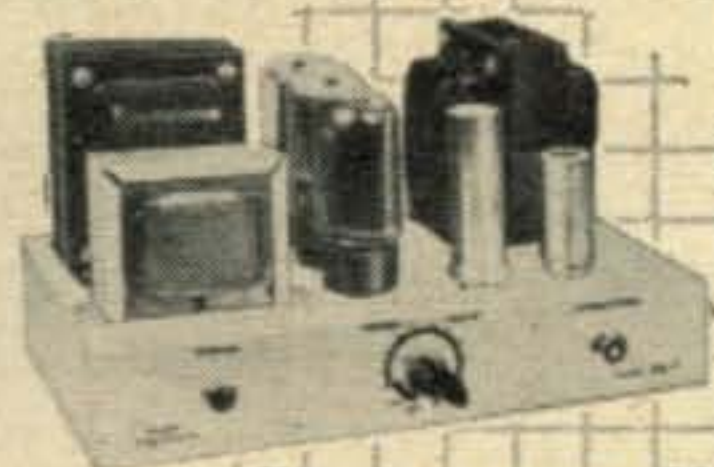


Wired & Tested: **\$74.50**
In Kit Form: **\$59.95**

Globe Chief 90A

Completely bandswitching 10-160M. Compact (8x14x9"), well-filtered, with built-in power supply. Pi-Net matches most antennas 52-600 ohms. Modified Grid-Block keying. Provisions for VFO input & operation. Can be converted to fono with Globe Models UM-1 or SM-90 Modulators. Shielded for TVI-reduction. Kit contains all tubes, pre-punched chassis, etc.

Modulates RF inputs to 100w



Kit: (less tubes) **\$32.50**
In Wired Form: **\$49.95**

Universal Modulator UM-1

Class A or AB-2 modulator, driver for higher power modulator, or PA amplifier. Matches output impedances 500-20,000 ohms. Carbon or crystal mike usable. Supplies up to 45w audio with proper output tubes. Provisions for addition of external meter for monitoring modulator cathode currents; for remote control of modulator. Perforated steel cover, \$3.00 extra.



In Kit Form only: **\$11.95.**

Screen Modulator SM-90

Ideal for use with Chief, but instructions for use with similar CW Xmtrs. Permits radio-telephone operation at minimum cost. Self-contained. Printed circuit board, all parts and complete instructions.

Visit Your Favorite Distributor for Details!

OTHER TOP FLIGHT GLOBE PRODUCTS

globe champ, w/t: \$495.00; sidebander dsb-100, w/t: \$139.95, kit: \$119.95; globe linear la-1, w/t: \$124.50, kit: \$99.50; vfo-755a, w/t: \$59.95, kit: \$49.95; vox, w/t: \$24.95, kit: \$19.95; qt-10, w/t: \$9.95; globe matcher sr. at-4, w/t: \$79.50, kit: \$69.50; globe matcher jr. at-3, w/t: \$15.95, kit: \$11.95; globe scout 680a, w/t: \$119.95, kit: \$99.95; power booster pb-1, w/t: \$21.95, kit: \$14.95.

GLOBE
electronics
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COUNCIL BLUFFS, IOWA

For further information, check number 15 on page 126.

If performance doesn't count . . .

If solid reliable performance is *not important to you* . . . if you thrill to the "Transmitter of the Month" idea . . . then you don't want, nor should you investigate the 5100-B! The 5100-B is only for

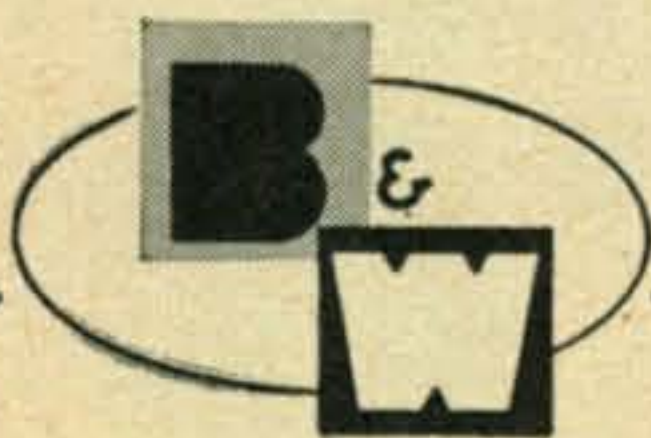
Those who have been searching for a proven work-horse that can be used with confidence on various amateur bands.

Those who want versatility and maximum power into the antenna, consistent with power rating, on CW or high level modulated AM and—SSB when desired at a later date.

Novice Class operators who must comply with FCC regulations—75 watts, crystal controlled on restricted band sections, but, who want full power as soon as they are General Class, without added expense.

Those who want a medium powered transmitter that can be used to drive any high-powered final, including grounded grid types, with power to spare on all bands.

The 5100-B is just a down-to-earth time-tested transmitter that will delight all newcomers and old-timers alike. Single sideband is achieved simply by plugging-in the companion 51SB-B. Ask the man who owns a 5100-B.



You can't appreciate the 5100-B from a small picture. See one in person at your favorite dealer or write the factory for details.

Barker & Williamson, Inc.
Bristol, Penna.

B & W AMATEUR EQUIPMENT: Transmitters • AM—CW—SSB • Single Sideband Generators • Grounded Grid Linear Amplifiers • Single Sideband Receiving Adapters • Dip Meters • Match Masters • Frequency Multipliers

For further information, check number 16 on page 126.

W2NSD [from page 9]

should be submitted on identical forms. The 3" x 5" file card is probably the most universal form available so we'll use that. Get the lined type with 10 lines on it, each 1/4" apart. Foreign operators, and we very much want reports from every part of the world, should prepare cards 12.7 cm x 7.6 cm, or fairly close to that size. Make 10 lines on the card horizontally. The cards should be sent in to "It's Time To Be Counted, CQ Magazine, 300 West 43rd Street, New York 36, N.Y." This can be shortened to: "Counting, CQ Magazine, 300 W 43, N.Y. 36, N.Y." Wait until you have a bundle of cards, don't send 'em in one at a time. Use one card for each observation.

_____ Band
 _____ State or Country. _____ City
 _____ Day of Week. Mon-1; Tue-2; Wed-3 etc
 _____ Time (GMT) in hours only
 _____ CW Channels in use
 _____ Phone Channels (—AM; —SSB)
 _____ Total Channels in use
 _____ Month (April-4; May-5; June-6; July-7)
 _____ Day of Month

OBSERVER _____ CALL _____

Write only numbers in the blanks. These cards will have to be as simple as possible for rapid analysis. The counting procedure is simple. Using a dipole or other non-directional antenna, tune your receiver slowly from one end of the band to the other with the BFO on and count the number of QSO's in progress. This is simple with CW and AM, but may require a bit more care in the SSB section. We've put in a space to break the phone channels to AM and SSB if you so desire. This is interesting info too, but not pertinent to the basic question we are investigating, so it will be treated as a separate matter.

Naturally there must be a time limit on this investigation. The months of April, May, June and July should give us a good picture of activity under both good and fair propagation conditions. We will, in our analysis, treat each month separately, running activity curves for each of the four months. We will also run separate curves for each band, etc.

Contests

We've got two big contests coming up this month. First there is the Sideband Contest, which has turned out to be one of the biggest contests in the world. This year the rules have been changed a bit to make things as fair as possible for all areas of the world. Check for the rules in the Sideband column. The contest is restricted to sideband stations only and runs for 24 hours straight.

The VHF department has a contest for the 25/26 April which is now a yearly affair and

[Continued on page 74]

HEAVY DUTY MOBILE BASE MOUNTS



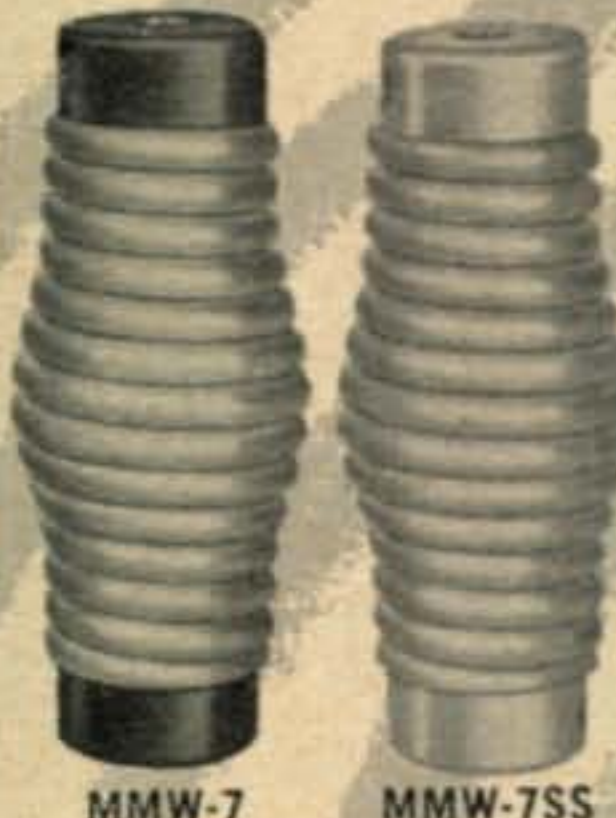
NEW!

MMW-3AE MMW-3APS

Ebony Finish \$6.95 Polished Finish \$7.95
Ebony Finish, S. S. Hardware \$8.95
Polished Finish, S. S. Hardware..... \$9.25

PROTECTS YOUR MOBILE ANTENNA

NEW HEAVY DUTY MOBILE SPRINGS



MMW-7 Cad. plated, black painted ends \$4.50
MMW-7HC Heavy Cad. plated—Ex Protection \$5.50
MMW-7SS Deluxe Stain. Steel \$8.95

NEW MULTI-BAND ANTENNA COILS

New Plug-In type coils for the Ham, designed to operate with a standard 3' base section and standard 5' whip



No. 900 10-15-20-40-75 METERS

- Rigidly tested & engineered—found to have "Q" of 525
- Handles 500 Watts input
- Operates into a 52-ohm cable
- Positive contact—noise-free, trouble-free operation
- Weathersealed
- Factory pre-tuned—no adjustments needed

YOUR CHOICE METERS \$14.95

No. 999 10-15-20 METERS

NEW! SLIM-JIM
ALL-BAND BASE LOADING ANTENNA COIL

96" WHIP ↑

FOR 10, 11, 12, 15, 20, 40, 80 METERS

SIZE 1 3/8" x 19"

NO. B-1080

Positive action, just slide whip in or out to loading point and lock nut into position.

\$17.95

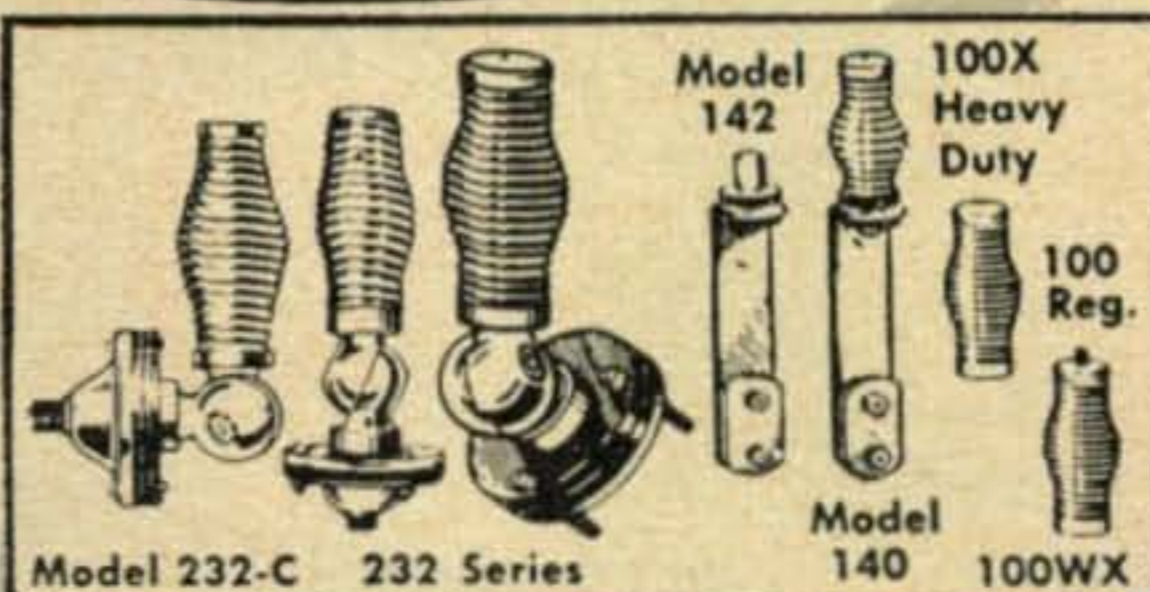
Leaders in the Design and Manufacturing of Mobile Communication Equipment & Antennas

No. 321 BODY MOUNT \$7.95



MASTER MATCHER & FIELD STRENGTH METER
6 or 12 volt models \$24.95

Automatically tunes the entire band from the drivers seat!



MASTER-MAGIC WAND

New easy-to-install, single band, top-loaded plastic covered fiber glass mobile antenna provides maximum performance at the most useful radiation frequencies.

10 Met-5 Ft. L. \$12.95
15 Met-5 Ft. L. 12.95
20 Met-5 Ft. L. 12.95
40 Met-6 Ft. L. 14.95
80 Met-6 Ft. L. 14.95
NEW CITIZENS BAND 27.255 mc . . . \$12.95

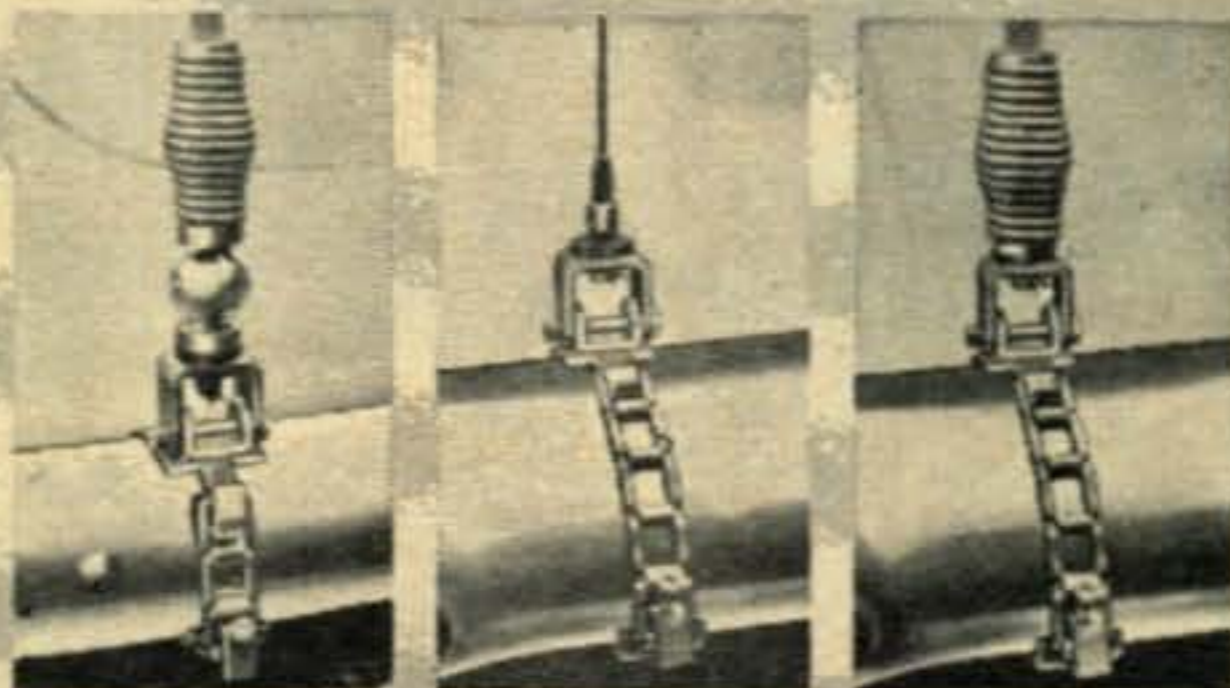
FIBRE-GLAS WHIPS

The Feather-Weight Antenna with Spring-Steel Strength!

The completely weather-proof, breakproof antenna with special flexibility that prevents accidental shorting-out against overhead obstructions which sometimes cause loss of signal or serious damage to your equipment.

FG-60 60" . . \$4.95
FG-72 72" . . \$4.95
FG-84 84" . . \$5.15
FG-96 96" . . \$5.20

BUMPER MOUNTS WITH NEW X-HEAVY DUTY CHAINS



No. 444 \$17.80 No. 445 \$7.95 No. 446 \$13.45

Adjustable to any bumper. No holes to drill, easy to attach. High-polished Chrome Plated 3/8"-24 thread, to fit all antennas. Precision engineered.

SUPER HY-GAIN CITIZEN BAND

Citizen band mobile stacked coaxial antenna provides 5 to 6 DB gain. 42" high from ground plane. Furn. with 12" extension for bumper mount.

\$21.95

EMERGENCY • COMMERCIAL • AMATEURS



Master Mobile Mounts, Inc.

1306 BOND STREET • LOS ANGELES 15, CALIF.

AT LEADING RADIO JOBBERS EVERYWHERE

For further information, check number 17 on page 126.

"HAM-M" ROTOR by CDR

Installed and working in 30 minutes

COMPLETE PACKAGED SYSTEM.

Nothing else to buy. Can be installed atop *any* tower, and inside most towers.

EXTREMELY RUGGED.

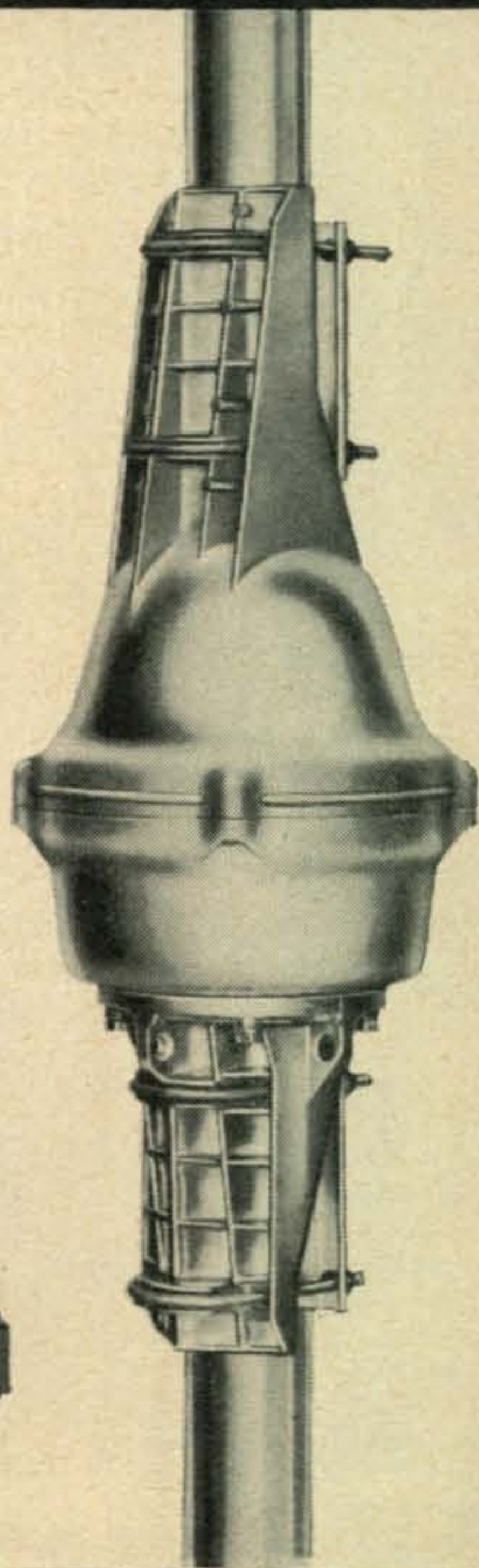
Extra heavy-duty. Thousands of "Ham-M" rotors are now in operation in every kind of climate, rotating every conceivable antenna combination. "Ham-M" is wind-proof, ice-proof, moisture-proof! Won't drift. Provides 3500 in.-lb. resistance to lateral thrust.

FIELD KITS FOR EASY INSTALLATION.

North-Center Meter Scale kit. Base plate for internal tower mounts. Anti-meter flutter kit. Mounts on shaft or flat on plate in 30 minutes.

WHY PAY MORE?

"Ham-M" is the pet of hams from coast to coast—and for good reasons! "Ham-M" gives better performance...holds heaviest antennas...stands up against the elements far better than other rotors, yet COSTS LESS! See "Ham-M" at your distributors: only \$119.50



EXCLUSIVE OFFER:
CDR "CALL-LETTERS" JEWELRY FREE! Handsome rhodium-finish tie-bar and key chain, both with your call-letters engraved FREE with your purchase of the "HAM-M." Both bear amateur radio emblem. Just examine the "HAM-M" and get both for only \$3.60 (tax included), a \$7.20 value for half price. See your CDR distributor for details.

CDR

HAM ANTENNA ROTOR

Cornell-Dubilier Electric Corp.,
South Plainfield, N. J.

The Radiart Corporation,
Indianapolis, Ind.

For further information, check number 18 on page 126.

For further information, check number 19 on page 126. →

Spring is here...

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so
is
the

EE-3A

the most popular and versatile
ELECTRONIC KEY
on the market



again available from your dealer
this month

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A Division of Radio Engineering Laboratories, Inc.

Zanzibar

The Island of Spices and Cloves

John E. Roberts, VQ3GX

Dar-Es-Salaam, Tanganyika

Most of us have, at some time or another wished that we could carry out a DXpedition to some rare country, but for numerous reasons have been unable to think twice about it.

However on being transferred from up-country Kenya to the coast at Dar es Salaam, operating a station from Zanzibar Island became a practible proposition.

Unfortunately it was not as easy as it first sounded, because I had sold the 20A and 75A1 in order to purchase new American SSB equipment, which by the way did not materialize due to currency restrictions. So it was eventually decided that a home built rig would have to serve the purpose.

Six months later, the transmitter, W2EWL circuit, and a W6TNS inspired receiver were completed, and plans for the expedition were well under way. Just a few short weeks of testing and operation from VQ3GX were available before commencing the trip.

Ron, VQ1RET was my close co-operator, without whose assistance the expedition would not have been a success.

For business reasons, Ron could not accompany me for the whole time of the expedition, and was only able to fly across from the mainland for two days.

The great day dawned, and on the morning of the 4th January the two large cases of gear and 12 foot length of well wrapped cubical quad was transferred from the motor launch on to the Sultan of Zanzibar's Yacht, which runs a weekly service between Dar es Salaam and Zanzibar Island.

At 9.30 we were under way, and 3½ hours

and a couple of cold 807s later, we arrived at the Island.

After passing through Customs and the usual Immigration formalities the gear was loaded on to a hand cart affair, and pushed the mile or so to the Pigalle Hotel, which is operated by two very pleasant and extremely helpful French ladies.

By this time the effort was beginning to tell, and walking in 110 degrees of blazing sun is no joke. But a couple of cans of cold *rf* soon put that right, and all was well.

The other hotel in Zanzibar was at this time occupied by my very good friend Robbie VQ1ERR whose KWMI had been in operation for the past two days working Ws fast and furious.

The roof of the Pigalle was chosen as a very suitable site and very soon the gear had been brought up and assembled ready for operation. Only one element of the quad was erected at this stage and the first contact made was with Robbie, this I'm sure can be recorded as the first VQ1 to VQ1 QSO ever.

Operating was not taken very seriously, being extremely tired so the day was rounded off very appropriately by having a little get together with VQ1ERR at the Zanzibar Hotel. Robbie was knocking off W's in rapid succession.

The following day I met the midday aeroplane which brought in VQ1RET and at the same time saw Robbie off, back to Nairobi.

The heat and humidity were terrific, and the very first thing Ron wanted was a cold

[Continued on page 82]



Ron, VQ1RET (right), John VQ1SSB (center) and friend.

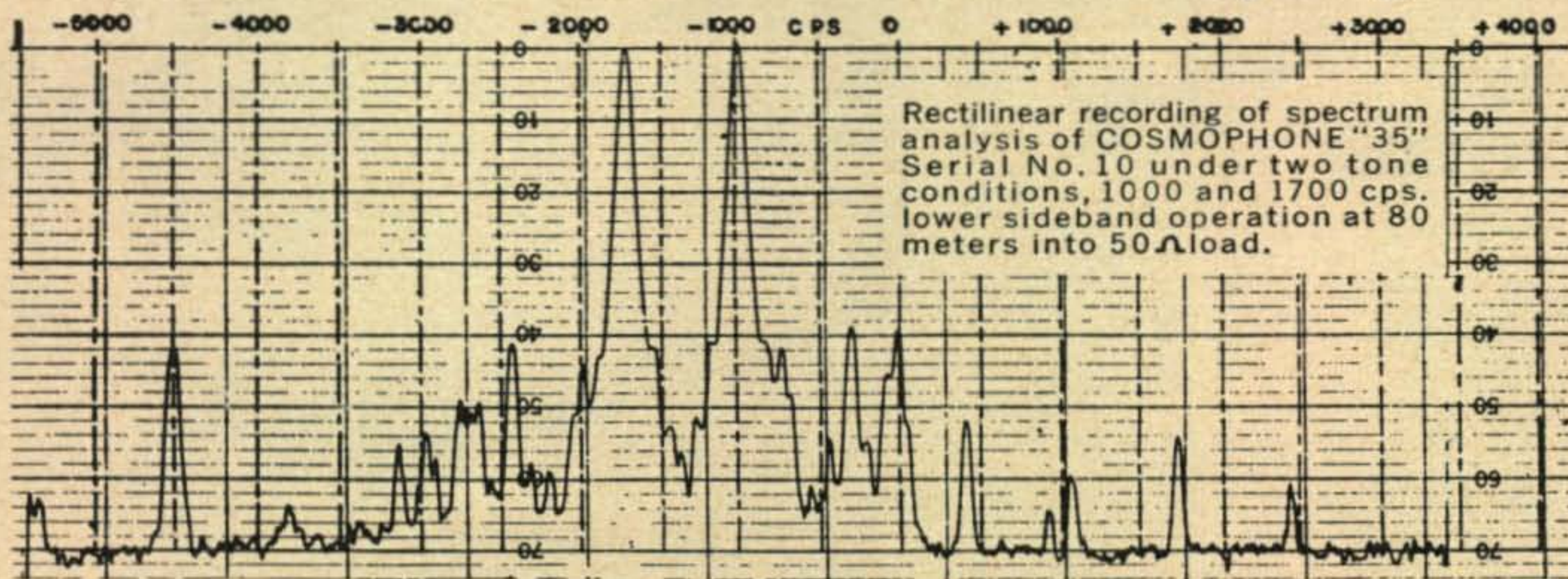


SSB gear on right, converted TCS on left. John on the mike. The Quad.

He Measured the Heartbeat of a COSMOPHONE "35"

A new Cosmophone "35" owner put his unit through its paces and kindly sent us the unsolicited "electro-cardiogram" shown below. We are proud to publish this inter-modulation components characteristic of its amazing, unwonted signal suppression—why Cosmophone "35" audio is clearly identifiable over any other set. We challenge you to compare the Cosmophone system by any standards over any other receiver-and-transmitter combination available today. You'll agree that there simply is no comparison!

See it at Your Dealer . . . You've Never Seen Anything Like It!



THE FIRST DUAL CHANNEL BILATERAL TRANSCEIVER

- Operates on 10, 11, 15, 20, 40 and 80 meter bands.
- Transmits or receives SSB (upper or lower), single sideband with carrier (AM) or C.W.
- Peak-Null "Q" Multiplier.
- Receiver Sensitivity. 1 Micro-volt @ 6 db S/N ratio.
- Single 6146 output.
- Built-in VOX and QT.
- 40 db suppression.
- Meter Indication for R.F. output, final Grid or Plate current and receiver signal strength.
- Dimensions 17" wide x 12" high x 15" deep.
- 3.1 kc mechanical filter for transmission and reception.
- Dual speed tuning knobs with ratios of 20:1 and 100:1 over a 600 kc band spread.

Power Supply #P35

Amateur Net Price **\$799⁵⁰** **\$139⁵⁰**



See You at the

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Immediate Delivery at your Dealer

For additional information and dealer nearest you, write Dept. CQ-4

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FOREIGN REPRESENTATIVES: Minthorne International Company, Inc., Cable Address: Minthorne, N. Y.

For further information, check number 20 on page 126.

WHETHER THEY BUY 'EM WIRED . . . OR BUILD 'EM . . . AMATEURS WILL TELL YOU

Viking transmitters outsell all others!

Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter . . . that's why Viking transmitters outsell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!



NEW! . . . "6N2" CONVERTER

This compact, new Viking "6N2" Converter provides instant front panel bandswitching from normal receiver operation to either 6 or 2 meters. Designed for maximum sensitivity and low noise figure . . . offers excellent image and I. F. rejection. With tubes.

Cat. No.	Amateur Net
250-43-1, or -2, or -3..Kit.....	\$59.95
250-43-12, or -22, or -32..Wired, tested	\$89.95

NOTE: Specify either Kit or Wired plus your choice of the following ranges: 26 to 30 mcs.; 28 to 30 mcs.; 14 to 18 mcs.



"6N2" TRANSMITTER

Instant bandswitching 6 and 2 meters. Rated 150 watts CW; 100 watts AM phone. Use with "Ranger", "Viking I", "Viking II", or similar power supply/modulator combinations. With tubes, less crystals.

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

"6N2" VFO

Compact—stable! Replaces 8 to 9 mc. crystals in frequency multiplying 6 and 2 meter transmitters. With tubes and pre-calibrated dial.

Cat. No.	Amateur Net
240-133-1..Kit.....	\$34.95
240-133-2..Wired, tested.....	\$54.95



"RANGER" TRANSMITTER/EXCITER

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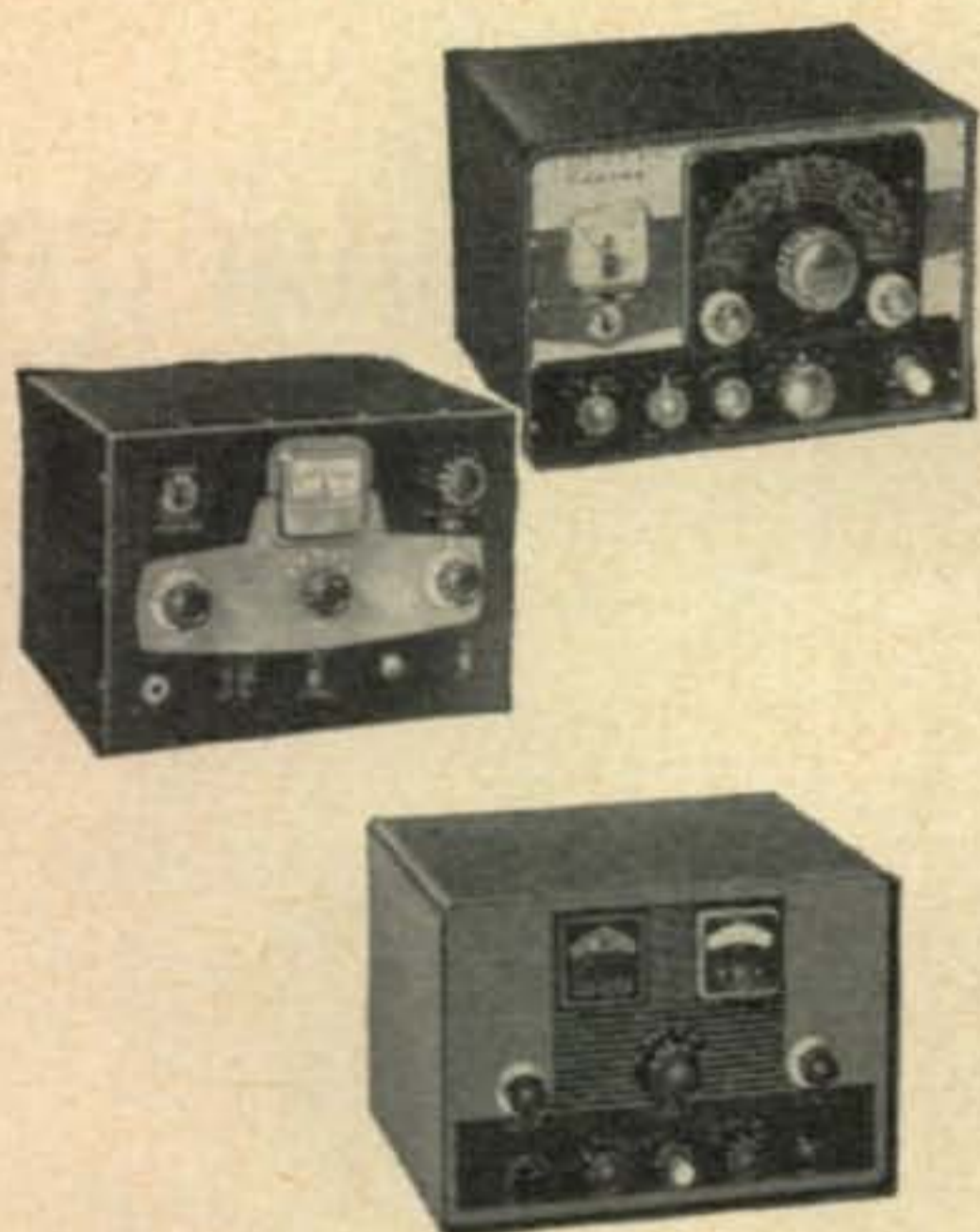
"VALIANT" TRANSMITTER

Here's effective power, wide flexibility, and many unique operating features combined in a compact desk-top transmitter! 275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) and 200 watts phone. Bandswitching 160 through 10. Built-in VFO or crystal control. Final amplifier utilizes three 6146 tubes in parallel—wide range pi-network output. With tubes, less crystals.

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Ideal for fixed station or portable use! Fast, easy tuning—excellent stability and plenty of reserve drive. 70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW input on 6 meters. Wide-range pi-network output—effectively TVI suppressed—excellent keying system. For crystal or external VFO control. With tubes.

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"KILOWATT" AMPLIFIER

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**The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.*



"FIVE HUNDRED" TRANSMITTER

More than one-half kilowatt of power and operating convenience! 600 watts CW input . . . 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meters! All exciter stages ganged to VFO tuning. High gain push-to-talk audio system. Highly stable, built-in VFO or crystal control. Wide range pi-network output. Low level audio clipping—effectively TVI suppressed. With tubes, less crystals.

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Here's real power and peak performance in a compact desk-top amplifier. Rated 2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs.—instant bandswitching. May be driven by the "Ranger", "Pacemaker" or other unit of comparable output. Two 4-400A tetrodes in parallel, bridge neutralized. Wide range pi-network output. With tubes.

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FIRST CHOICE AMONG THE NATION'S AMATEURS

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For further information, check number 56 on page 126.

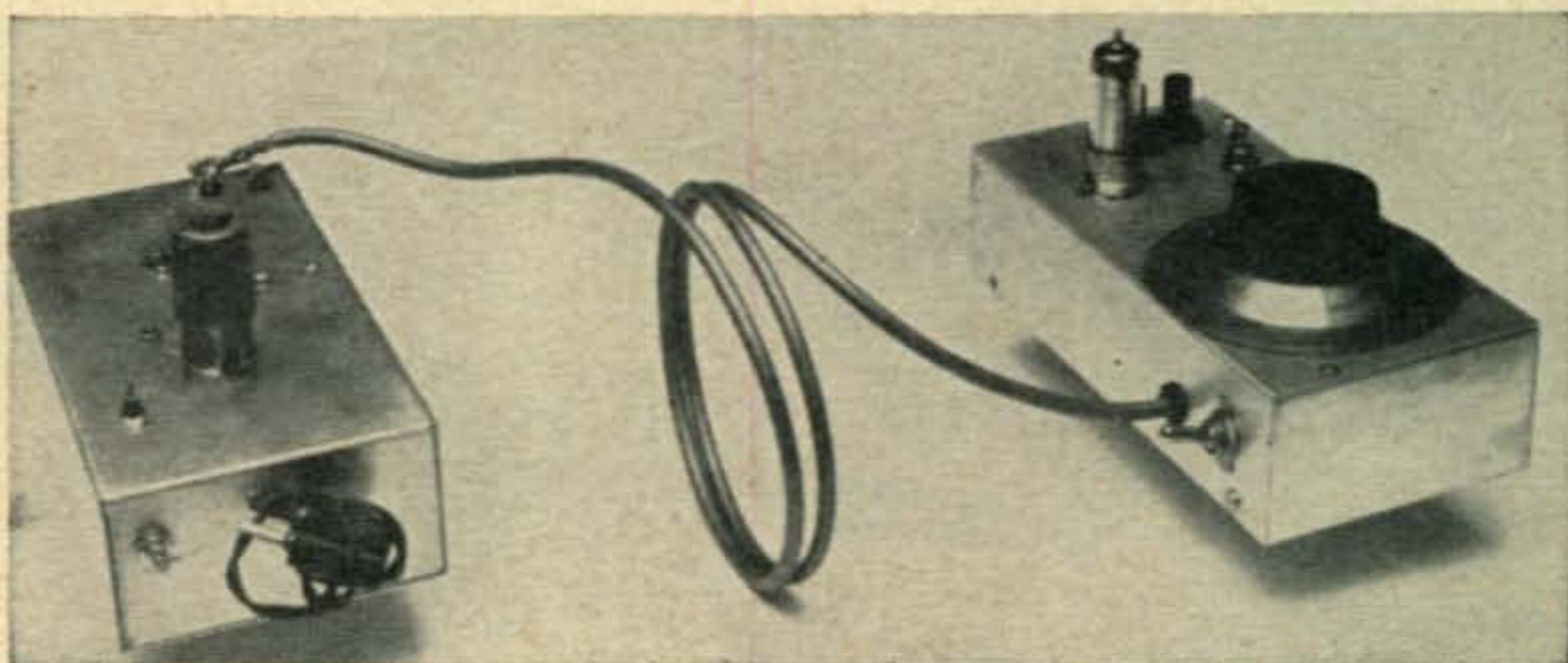
The Voltage-Variable Silicon Capacitor

C. W. Brands, K6CDW

11856 S. Daphne Ave.
Inglewood 4, Calif.

E. J. Mitchell, K6VTQ

5008 Macafee Rd.
Torrance, Calif.



The silicon capacitor is a new device which we believe will have a far-reaching effect on the design of future commercial, military and amateur equipment. A few of the advantages of the silicon capacitor over the conventional variable reactance device are that they weigh almost nothing, are very small in size, and are completely insensitive to mechanical shock and vibration (this is a real bugaboo in conventional *vfo*'s; try banging on the cabinet of yours!) Perhaps the chief advantage lies in the fact that these devices open the doorway to the possibility of simple remote tuning. The distance that the frequency-controlling potentiometer can be located from the tuned circuit depends only on the amount of wire available. This statement should immediately suggest to the mobile crowd the possibility of relegating all the gear now shin-busting under the dashboard to the trunk or some other equally obscure location.

The application of silicon capacitors is limited only by the Amateur's imagination. A few of the possible applications that have already been suggested are the following: frequency multiplication, division, and conversion; R-C oscillators; amplitude and phase modulators; voltage-controlled filters with variable frequency response; and replacement of reactance tubes in *afc* and frequency modulation circuits. These capacitors make a completely automatic signal-seeking radio possible. Instead of varying a potentiometer, one merely pushes a button and the silicon capacitors sweep up the band to the next station and lock on. Another push, and the next station is precisely tuned.

In this article we are going to describe our application of silicon capacitors to an amateur *vfo*. This is not a how-to-do-it article, as we feel that those interested in such a *vfo* will not want to make an exact duplicate of our experimental setup.

It has been known for a good many years that the capacitance of a semiconductor junction varies with the applied voltage across it. Basically, the silicon capacitor is very much like an ordinary silicon diode, but it incorporates a few differences to enhance the desired capacitance effect. (In many diodes, especially those made for high frequency use, or where "quick recovery" on the order of microseconds or milli-microseconds is desired, the manufacturer deliberately limits the capacitance of the junction to a small value, but for these silicon voltage-variable capacitors a much larger capacitance is desirable.) We call them "voltage-variable" capacitors because their capacitance is varied by varying the voltage across the junction.

For those readers who may not be familiar with semi-conductors, a few words will be said about the properties of the P-N junction. Further information may be obtained from the references listed at the end of this article. Semi-conductors, as their name implies, are materials whose properties are midway between those of insulators and conductors. The most common semiconductor materials are germanium (Ge) and silicon (Si), neither of which occurs in the free state in nature. Germanium is relatively rare on the earth (approximately 0.0001%)*, whereas silicon is the second most abundant element, comprising 28% of the earth's crust.* The sand at the beach is composed of silicon and oxygen, and silicon occurs in many rocks, such as quartz, flint and amethyst. Before it can be used as a semiconductor, the silicon must first be purified. This is accomplished by a combination of chemical and metallurgical treatments.

In the absolutely pure or "intrinsic" state (one part of impurities in 100,000,000,000 is

* Lange, Handbook of Chemistry, 1957 edition.

considered far from pure for semiconductors), the semiconductor material, for instance silicon, would have a high resistance—theoretically 54,000 ohms for a piece of silicon 1 cm square and 1 cm long. This is the definition of the “resistivity” of the silicon, and we say that intrinsic silicon has a resistivity of 54,000 ohm-centimeters. In order to obtain diode action we must first “dope” the intrinsic silicon by adding a controlled amount of a certain impurity as a “doping agent” in order to make the silicon N-type or P-type and provide an excess of either electrons or “holes” to carry the current across the junction. Then we must form a rectifying junction, which is a line of demarcation between a region which is highly doped with an impurity causing it to be N-type or P-type, and another region which is of the opposite type. When the P-region is made positive with respect to the N-region, holes and electrons flow easily across the junction because it is biased in the forward or easy-flow direction. A negative potential applied to the P-region would result in very little current flowing across the junction. Silicon capacitors are operated in this configuration, with the junction reverse-biased.

As illustrated in fig. 1, when a P-N junction is biased in the reverse direction, the electric field across the junction will establish a “depletion region” around the junction from which all of the mobile electrons and holes have been swept away. This appears to the external circuit as if it were a region of dielectric between two conducting regions—and this is the definition of a capacitor. Since the width of the depletion region depends on the amount of voltage impressed across the junction, it follows that the capacitance exhibited by the junction also varies with the voltage across it. This is the basis of the voltage-variable silicon capacitor. Theoretically, the capacitance of a fused-junction diode varies inversely as the 0.5 power of the voltage across the junction, i.e., $C \propto (V)^{-0.5}$. In practice, the exponent of V may be between -0.35 and -0.50 .

It might be well to say a few words about the construction of silicon capacitors. They may be made by a number of processes, one of which will now be described. First, “hyper-pure” silicon purchased from the supplier is melted by the use of an induction heating furnace and the desired quantity of doping impurity is added to the melt. Arsenic will be added in order to obtain N-type silicon. Next, one end of a “seed” crystal is dipped into the molten silicon and an ingot of N-type silicon is pulled slowly (about 1-inch per hour), out of the melt. After it has cooled, this ingot is cut into thin slices by means of a diamond saw, and then the slices are cut into 0.04” square “dice.” Next the dice are etched chemically to remove the surface roughness left by the cutting process, and placed in a vacuum chamber where aluminum is deposited on one side by

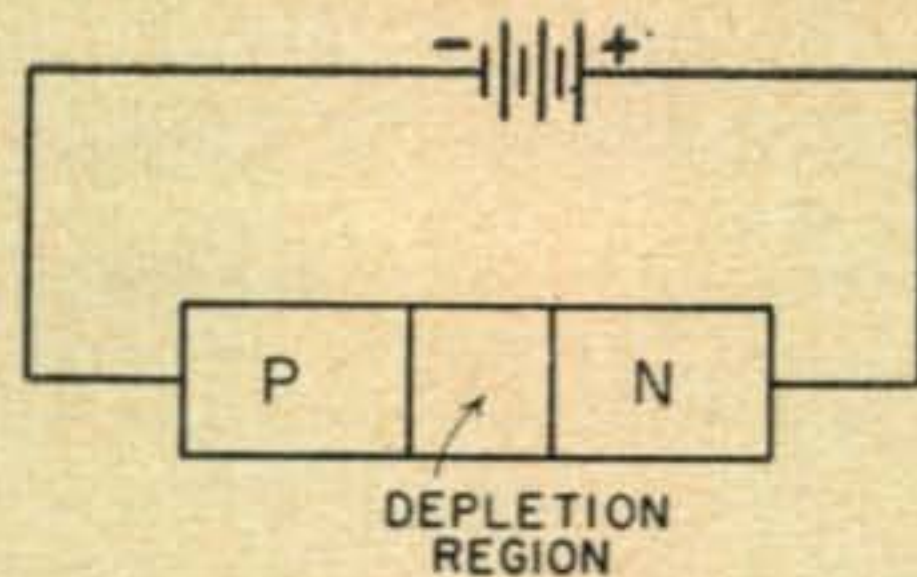


Fig. 1—Silicon diode reverse biased thus establishing a depletion region.

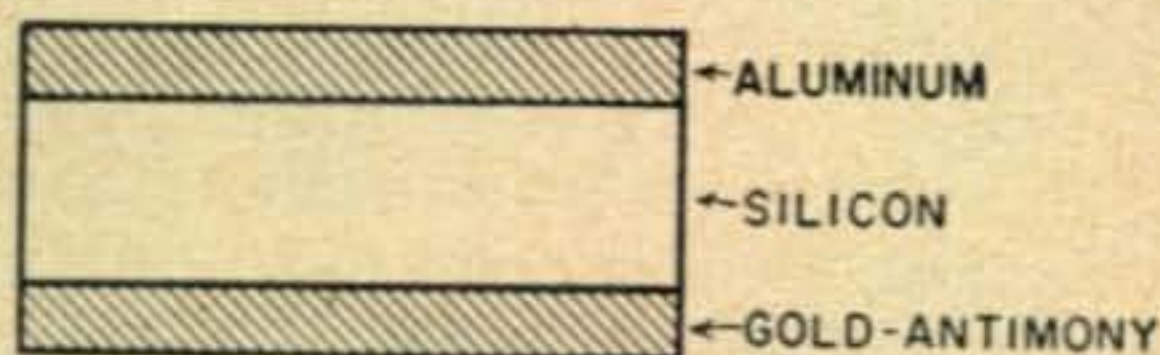


Fig. 2—The silicon is sandwiched between the aluminum and gold-antimony as explained in the text.

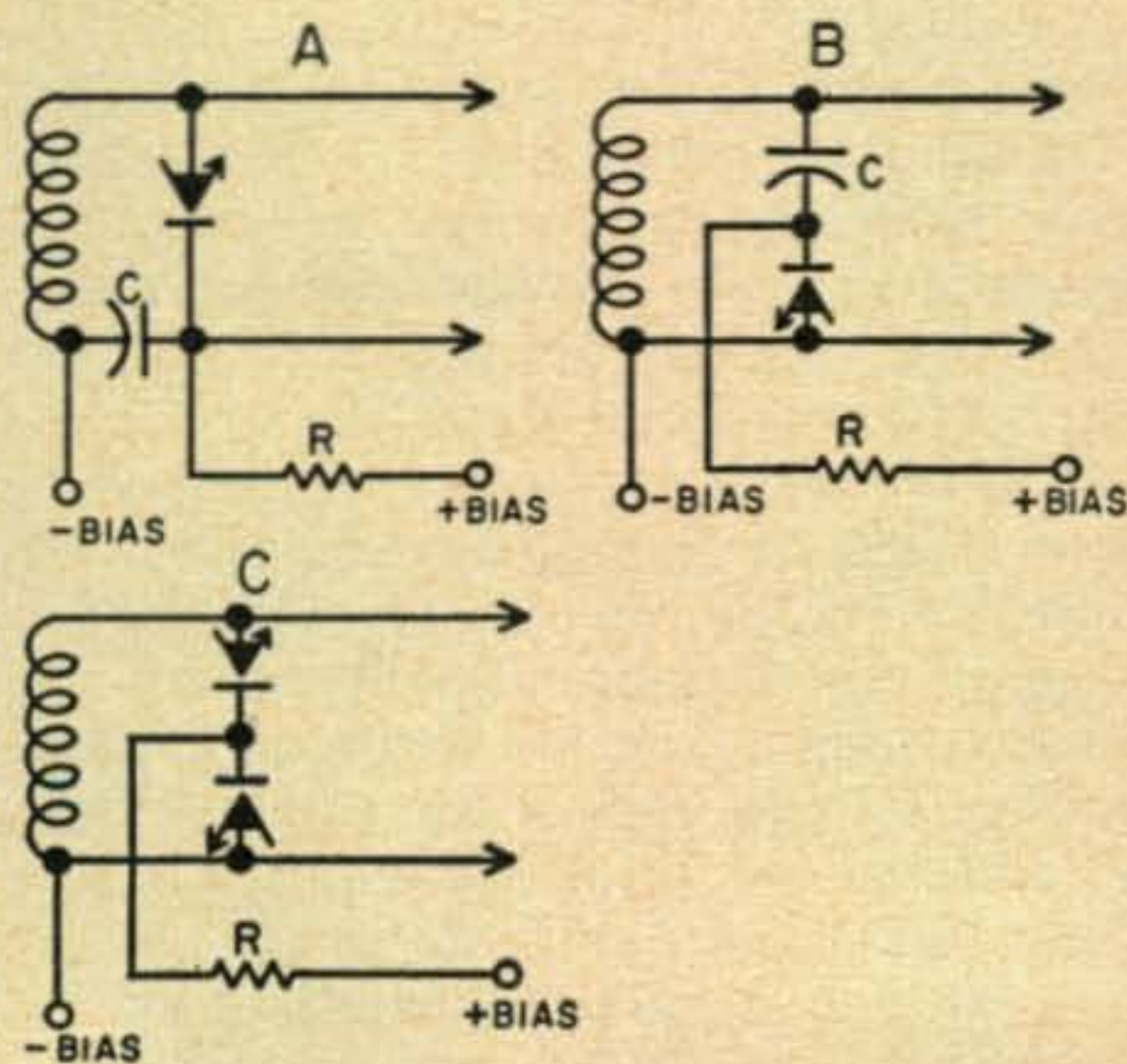


Fig. 3A, B, C—Three basic methods of incorporating silicon capacitors in the LC tank.

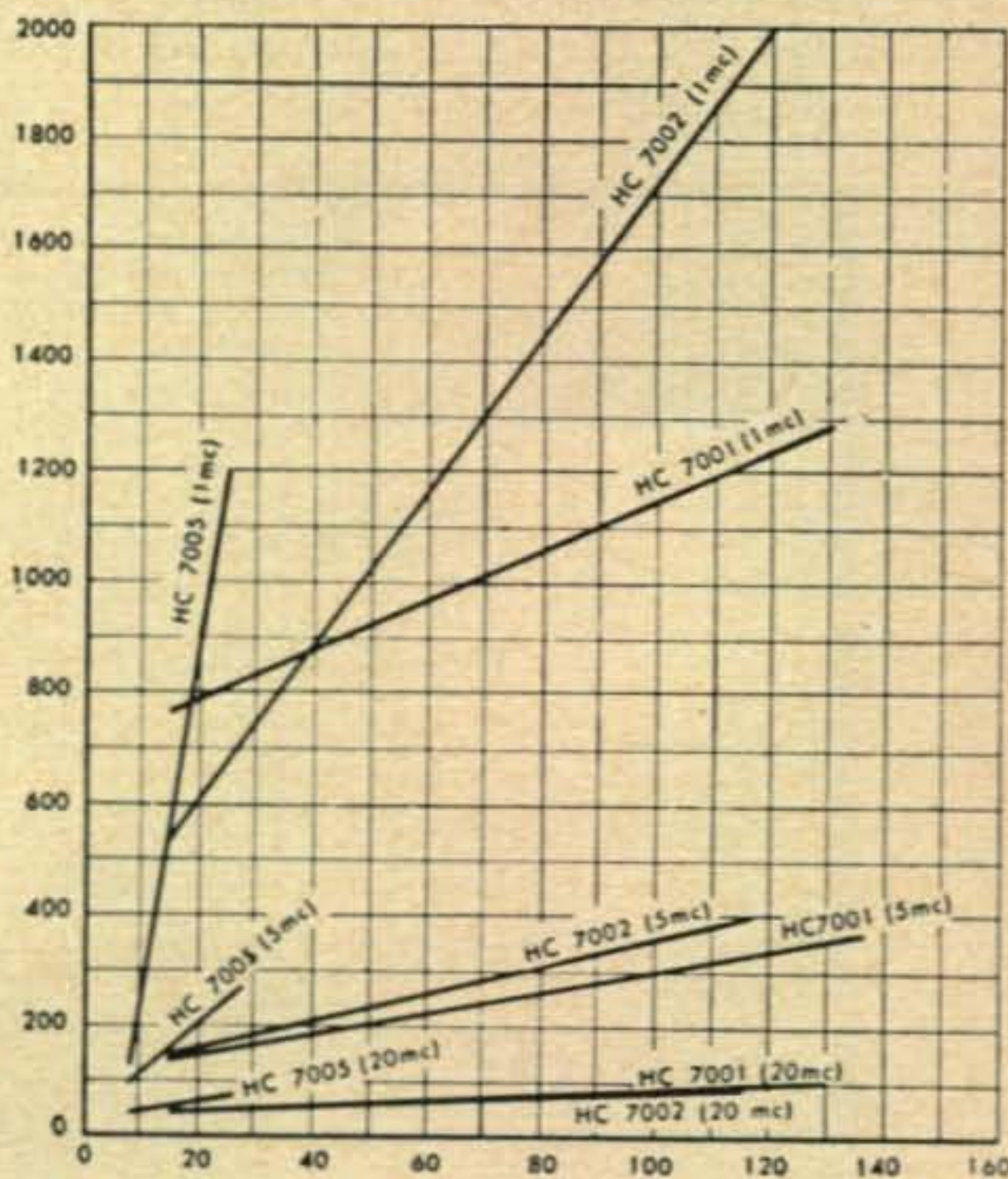


Fig. 4A—Graph showing the relationship between the applied voltage and Q. Note how the effect decreases as the frequency rises.

evaporation from a hot wire. The aluminum is allowed to fuse into the surface of the silicon wafers, thereby producing a rectifying junction. The dice are then turned over and a gold-antimony alloy is evaporated onto their other side, for the purpose of making a non-rectifying (ohmic) contact to the silicon. We now have a small square of silicon which looks like the sketch in fig. 2. The exposed portions of the rectifying junction will be etched again to clean them up and then all that remains to be done is to mount the crystal securely and provide connecting leads. The completed silicon capacitor may be seen in the photograph. It is contained in a glass cylinder about the size of a quarter-watt resistor, with a lead mounted axially at each end.

Turning now to some of the practical design considerations in a voltage controlled *vfo*, there are a number of methods of incorporating silicon capacitors into an LC tank circuit. Fig. 3A illustrates the most basic configuration. If C is chosen to be many times larger than the maximum capacitance of the silicon capacitor, then the frequency coverage will be determined entirely by the capacitance variation of the silicon capacitor. In many cases this arrangement may yield a satisfactory circuit Q, however it may often be found that the reverse losses of the silicon capacitor cause a detrimental reduction in Q. Another disadvantage is that the signal voltage will cause a self-bias to appear across the tank circuit (due to the rectifying action of the silicon capacitor), thus reducing the total capacitance range, and clipping the signal.

Fig. 3B depicts another method of connection. The insertion of a loss-free fixed capacitor in series with the silicon capacitor increases the Q and prevents the dc which is developed across the silicon capacitor from appearing across the tank circuit, however this advantage is offset to some extent by the loss

in effective capacitance range.

Fig. 3C illustrates how two silicon capacitors may be connected in series opposition to increase the circuit Q while retaining a reasonably large capacitance range. Since the silicon capacitors are connected in series opposition no self-bias due to the signal can occur, consequently much distortion can be avoided.

The series resistor R in each of the diagrams serves a two-fold purpose. Since the reverse current in the silicon capacitor is measured in milli-microamperes the resistor can be quite large (several megohms), effectively isolating the tuned circuit from the low impedance dc supply. It also serves to protect the silicon capacitor from excessive current in the event the maximum PIV (peak inverse voltage) is exceeded. An *rf* choke used with the resistor would be the best combination to obtain the highest impedance, but at the time of these experiments no commercial choke with enough inductance to be of any real value at the frequency of operation was available.

Referring now to fig. 4A and 4B it becomes apparent that the Q increases with applied voltage and decreasing frequency. It behooves the designer then, to use the lowest frequency and highest applied dc voltage consistent with circuit objectives.

The variation of capacitance with applied voltage has been plotted in fig. 5 on linear graph paper. A plot of the same information on semi-logarithmic paper would appear as more nearly a straight line. As can be seen from fig. 5, ΔC^* is very rapid in the low-voltage region. While this would give the greatest frequency coverage the extreme sensitivity to

* Incremental change of capacitance.

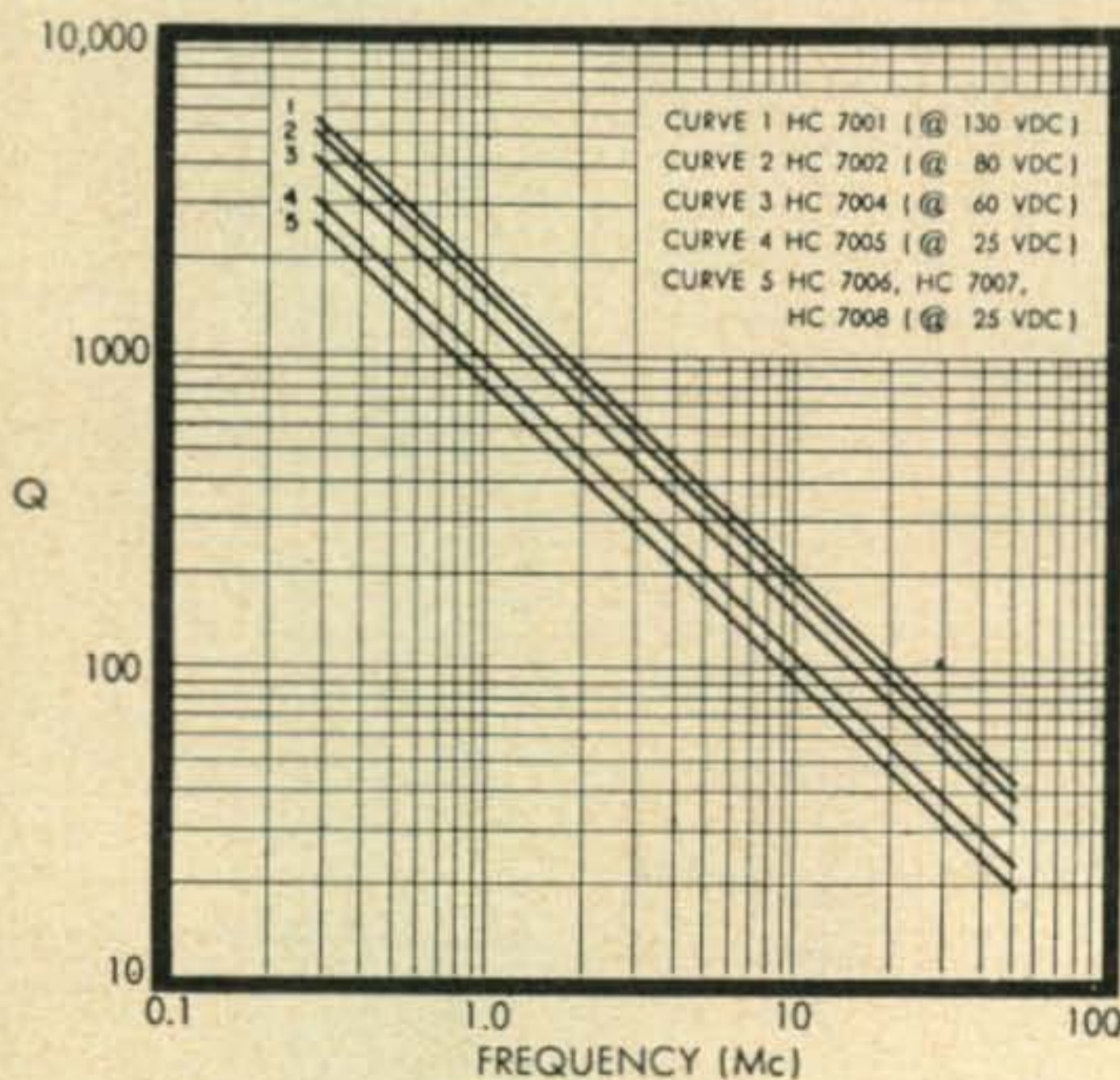


Fig. 4B—Graph showing the relationship between the tank frequency and Q.

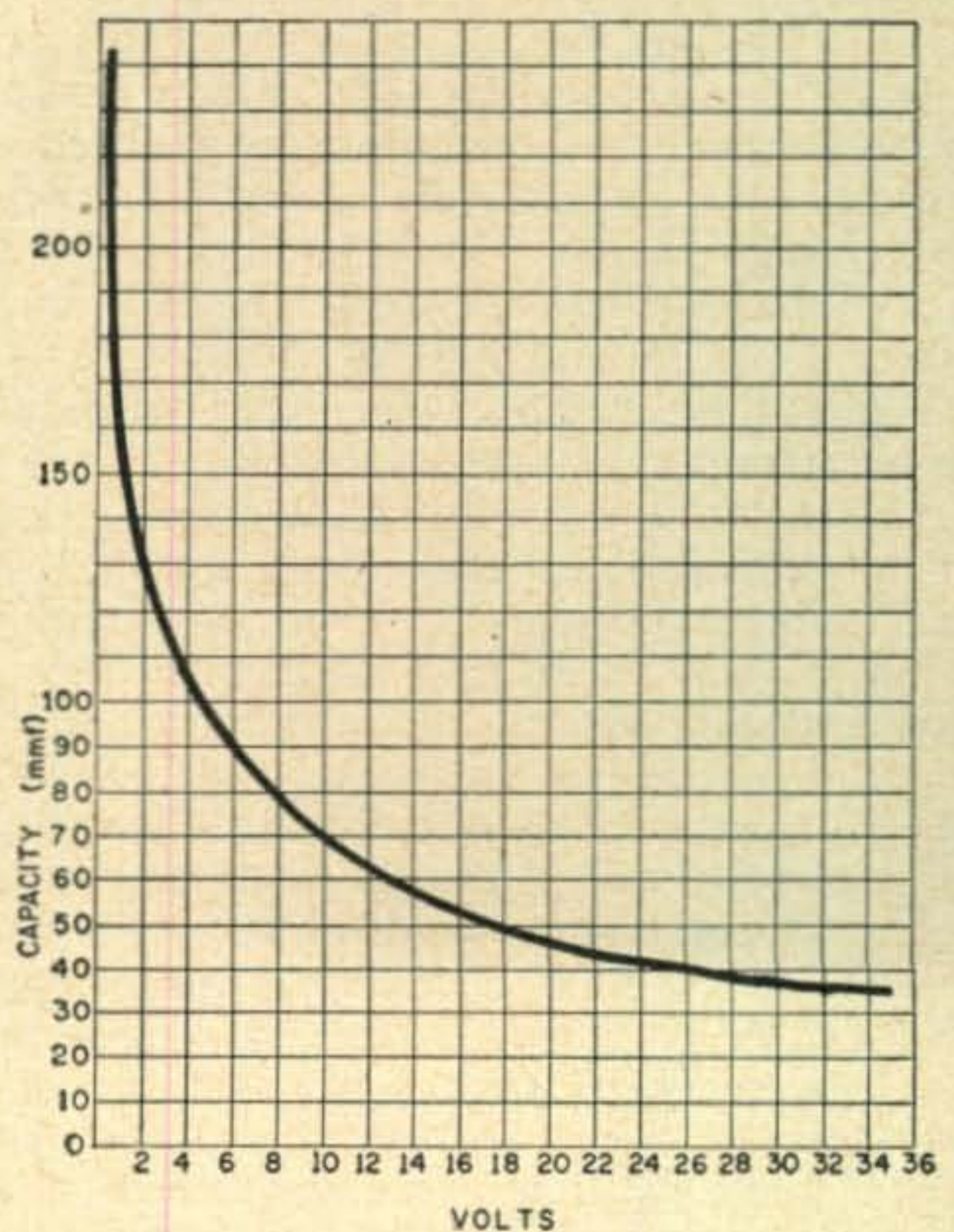


Fig. 5—Variation in capacitance versus applied voltage.

voltage transients would rule out this portion of the curve in a completely stable *vfo*. Thus, only the upper or more linear portion of the curve will be considered in this article. This is not to say that the lower portion is unusable; it is quite satisfactory, in fact advantageous in some applications that are beyond the scope of this article.

By this time it is no doubt apparent to the reader that some form of dc voltage stabilization to the silicon capacitor must be incorporated. A number of experiments were conducted with various types of regulators to obtain the best possible results consistent with cost and space considerations. An OB2 gas regulator with 7 ma of current was selected. A zener diode gave better regulation, however it was felt it would be advantageous not to incorporate a zener diode at this time, due to its cost and availability status. Using the OB2 operated at 7 ma idling current, a 10% change in input voltage to the regulator caused the oscillator frequency to change 110 cycles. A voltage variation of this magnitude would not normally be encountered, so the stability is entirely satisfactory for amateur applications.

The capacitance variation with temperature of the silicon capacitor has been measured to be less than 200 parts per million per degree Centigrade over the rated temperature range of -65°C to 150°C . Although this figure does not approach that of a good air dielectric

variable reactance device, precautions can be taken which will result in completely acceptable results. One precaution that can be taken is to minimize the effect of temperature variations. Heat transfer occurs in three ways: by conduction, by convection, and by radiation. If the heat can be caused to transfer by conduction only, random variations in ambient temperature of the *vfo* will not affect the frequency. Furthermore, a definite controlled warm-up condition will exist. This goal can be brought about by a number of methods; the simplest and probably the best is the heat sink.

A "heat sink" is defined as something that can accept an infinite quantity of heat without raising its own temperature. Ordinarily, however, we apply the term to any mass that is sufficiently large enough so that it can accept a

[continued on page 124]

Parts List

- L1 14½ turns No. 14 enameled wire, wound on 1¼" dia. ceramic form, winding length 1¼". Cathode tap 4 turns up from ground end.
- L2 2.5 mh rfc
- L3 Slug-tuned coil, scramble-wound with No. 24 enameled wire to tune desired range.
- CR1, CR2. Silicon capacitors, Type HC7005, made by Hughes Products Divn of Hughes Aircraft Co., Los Angeles.
- C1 .001 mf silver mica
- C2 250 mmf silver mica
- C3 47 mmf Erie N750K neg. temp.
- C4 100 mmf silver mica
- C5 100 mmf Hammarlund APC-100 trimmer
- C6 .01 mf discap
- C7, C8, C10, C11 .001 mf discap
- C9 100 mmf discap
- R1 1 meg ½ watt
- R2 47K ½ watt
- R3 6.8K 2 watt
- R4 68K ½ watt
- R5 27K ½ watt
- R6 50K pot. Centralab Type B-32 with C-2 taper
- V1 6AU6
- V2 OB2

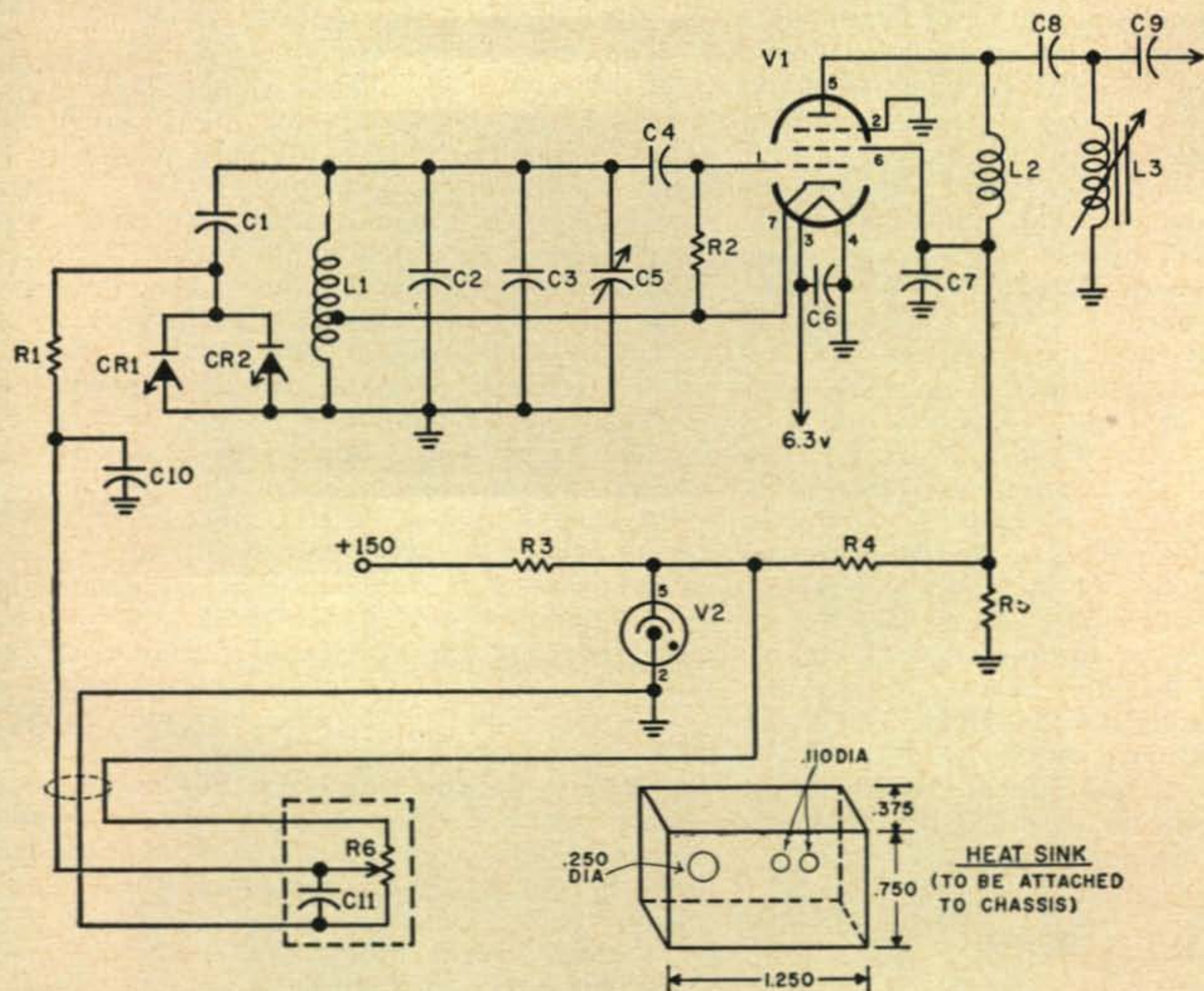


Fig. 6—Hartley oscillator tuned with silicon condensers. Unit containing R6 and C11 controls the frequency and may be remotely located. The lead from R1 to the arm of R6 should be shielded.

Reduced Carrier Operation

By Michael B. Ruggiero, W2NVR/2

Captain, U.S. Army Signal Corps
Fort Monmouth, N.J.

It is the intention of the writer to present a method of improving the communication effectiveness of the average commercial or home-built plate modulated rig without a modification that changes the identity or re-sale value of the conventional AM transmitter. Simply, this method is the reduction of the carrier input to at least half its present power level, and increasing the audio power to maximum without generating distortion, or causing over-modulation. Such a system will place the conventional AM rig in a commanding position in the phone bands. The narrowed bandwidths brought about by the elimination of negative peak overmodulation through the use of the Ultra Modulation system, will also provide more room on the bands for the ever increasing number of amateurs operating on phone.

In recent months a number of articles have been published which compare single sideband operation with conventional double sideband AM, and double sideband suppressed carrier operation with single sideband and conventional double sideband AM. The DSSC system¹ as described by Dr. Costas, and Mr. Grammer², has been offered as an alternative to SSB. The merits of conventional AM (DSAM) vs SSB have been argued over and over both in print and on the air. Now with the introduction of DSSC (which is not new, but resurrected by Dr. Costas et al) we have another method of voice emission that eliminates the carrier but retains both sidebands. The apparent advantage (or disadvantage according to which side of the fence you're on) is the additional sideband that provides a 3 db gain over SSB due to the presence of the additional sideband that may be used if one sideband is unintelligible due to QRM. The transmitter power gain, and simpler transmitter circuitry must also be considered. DSSC is not as yet a reality since a practical receiving system has not been standardized.

SSB vs. DSAM

SSB has made rapid strides in amateur ranks in recent months, but the vast majority of

1 Costas, CQ January 1957

2 Grammer, QST March 1957

amateurs on phone still cling to their beloved DSAM. It is doubtful that SSB or DSSC will ever completely replace DSAM. Therefore, what strides have been made to improve the DSAM transmitter to make it more effective, and keep the bandwidth within bounds?

Actually, considerable progress has been made, but it has not gained wide recognition. The standard AM transmitter is still "king" on all phone bands. Reduced carrier or controlled carrier³ was introduced as a method of improving the efficiency of the final amplifier and getting more "talk power" into the sidebands. Taylor, Reinartz, and Rothman, all designed audio systems where the power in the sidebands could be increased beyond the conventional limits of 50 percent audio power to 100 percent carrier power.

The most recent system of audio control, called the Ultra Modulation system, holds great promise, and is possibly the improvement on DSAM that the "die hard" AM phone amateurs have been waiting for. The use of Ultra Modulation on a conventional transmitter was well covered by Allen in his excellent article⁴ and will not be treated here. The "sleeper" that Allen faintly suggests in his article is what we will deal with here; that is, the use of a high ratio of audio to carrier power, or reduced carrier with high audio power.

The cry of "why waste power on developing a carrier" is once again raised. The advocates of SSB have long pushed this point, and it has great merit. The carrier conveys no intelligence, so why use it! It was completely eliminated in SSB operation, but the difficulty was in the reinsertion of the carrier in the receiver. It still requires a better than average receiver and a good operator to efficiently pull in SSB. The use of DSSC also eliminates the carrier, but retains the two sidebands. For the average phone operator either of these systems would require extensive modification of their present rigs, or the purchase of the necessary equipment.

Taylor's "Super Modulation"⁵ was a step in the right direction when he advocated reduced

3 Grammer, QST June 1951

4 Allen, QST October 1956

5 Taylor, Radio & TV News September and October 1948

carrier and high audio for greater communication effectiveness. Rothman developed a similar system, but both required considerable modification of the conventional transmitter. This drawback withheld wide acceptance of these systems by the amateur. The Reinartz system of negative peak limiting was a major step forward for increasing the effectiveness of the conventional DSAM transmitter without extensive modification, but his system had limitations which were overcome by the Allen Ultra Modulation system.

Since it is universally accepted that the carrier has little value, but is necessary for detection in the conventional receiver, let us again investigate the use of a reduced carrier input while increasing the audio output to a high level. Principally, let us investigate it from the viewpoint of the amateur with a conventional plate modulated transmitter, who does not want to go in for extensive modifications of his rig. This is of prime importance, since the changes necessary to adapt the systems mentioned above, were the chief factors for their rejection by the average amateur.

Reducing Carrier Level

The carrier level should be reduced for several reasons which are listed below. The average phone operator may find this hard to accept because it has always been felt that the more carrier output the stronger the signal. In a general sense this is true, since the greater the carrier output, the higher the audio power that could be put into the sidebands. However, the communication effectiveness of the transmitter would not be decreased if the carrier input level was reduced, and the audio output maintained at the original level without causing overmodulation splatter. In fact by increasing the audio output of the transmitter (possible on most transmitters) the communication effectiveness is greatly increased over the original condition for the following reasons:

1. Increase in operating efficiency of the final amplifier. The tube power capacity no longer required for generating a full resting carrier, is available to be used to generate more sideband power, thus increasing the overall efficiency and raising the effectiveness of the signal.
2. A considerable increase in the sideband power output. It is the sidebands, not the

carrier that do the talking at the receiving end. Why generate two-thirds of the output of a transmitter to develop a high resting carrier that does no more than hold up the "S" meter on the receiving end?

3. The transmitted signal creates less heterodyne interference. The reduced carrier input does not cause near the heterodyne "squeal" that is produced when two strong carriers are received near the same frequency.

4. More power is available for modulation on transmitters with a single high voltage supply for the modulators and final amplifier. The modulators can be used to operate at peak output with full voltage and current available from the power supply.

Carrier Reduction

Reducing the carrier can be accomplished simply in two ways. On the transmitter with a separate power supply for the final amplifier, and another for the modulators, the B-plus to the final can be reduced by lowering the voltage on the primary of the power transformer. This can be done simply by connecting a conventional 110 volt AC light socket in series with the AC line. See figure 1. Various size light bulbs can then be inserted in series with the AC line to provide the desired B-plus and carrier level. The exact reduced carrier level will depend upon the impedance the final must present to the secondary of the modulation transformer. For example, a final amplifier operating normally with 1000 volts on the plate at 250 ma. has a modulating impedance of 4000 ohms. This impedance must be maintained after the carrier level is reduced. Therefore, if the voltage is reduced to 500 volts, the current flow in the final amplifier must be reduced to about 125 ma. to present the same 4000 ohm modulating impedance. The impedance is derived by dividing the plate current (in amperes) into the plate voltage.

For the transmitter with a single high voltage supply for both the final amplifier and modulators, a resistor and an audio by-pass capacitor are inserted in series with the rf lead to the final amplifier being modulated. See fig. 2. The correct modulating impedance must be maintained as mentioned above.

The carrier level should not be reduced to any desired level. An audio to carrier ratio of 2 to 1 is the acceptable limit without caus-

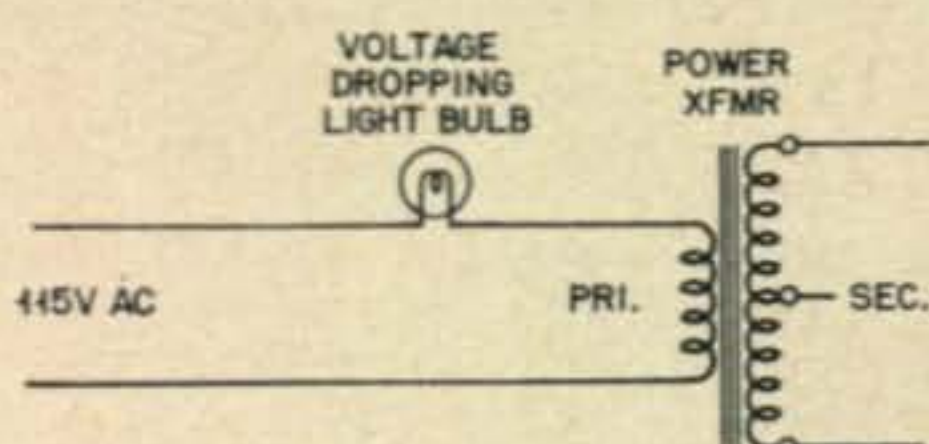


Fig. 1—Simple method of reducing the ac input to the final power supply.

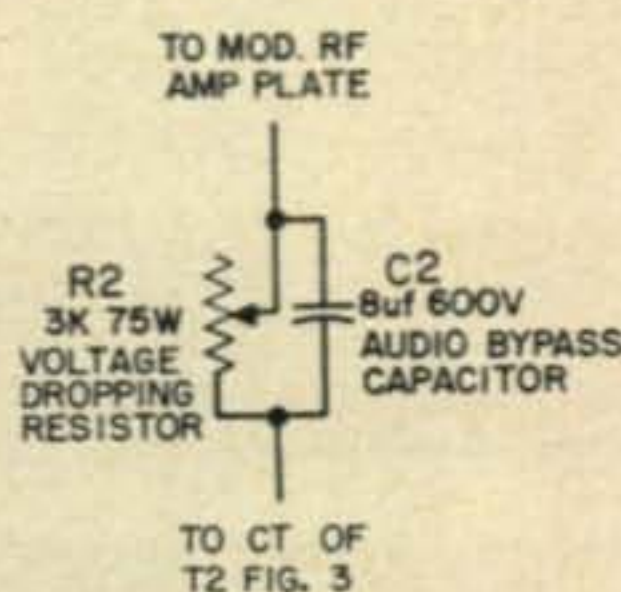


Fig. 2—When the speech and RF finals share a common power supply, the addition of R2 and C2 will reduce the RF B plus. The value of R2 is for a rig of the DX 100 class.



The Barrier. Entering Tanganyika from Kenya.

Site of VQ3ERR.

E. Robson, VQ4ERR

P.O. Box 30077
Nairobi, Kenya Colony

The Elephant Took The Biscuit or SSB In Tanganyika

To put it mildly travelling in East Africa has never a dull moment. There is so much in driving on these colonial roads that falling asleep at the wheel is just about impossible. Man size potholes, clouds of dust or inches per hour of rain and the ever present hazard of game dashing across the dirt track from the dense bush on either side keep the driver awake!

Everything in Africa is dished up by Mother Nature on a lavish scale—nothing by instalments. Weather forecast—no rain!

Nairobi to Arusha is only one hundred and seventy five miles. Eighty miles of it is quite good road but the rest of it is just the usual "Africa," in spite of being labelled an "all weather road."

Leaving Nairobi at midday in a good fast Jaguar 2.4 which has plenty of clearance (7 inches) one might expect to get to Arusha in three hours. It took five and a half hours as it happened. Half way is a place called "Namanga," the entrance to the world famous "Amboseli" Game Park, where fabulous amounts of big game congregate. Lion, elephant and rhinoceros abound and much of Kenya's and Tanganyika's revenue is realised by visitors from USA who come to photograph this natural game reserve. Amboseli is a freak of nature. Lying in a dust bowl under the slopes of Mount Kilimanjaro it used to be a lake bed years ago and it is as flat as a pancake, and abounds in hundreds of small springs coming from the snows of Kilimanjaro. The game comes in from all around to water and feed on the lush vegetation and this results in the largest concentration of big game animals in the world.

Between Nairobi and Namanga I drove slap into a "Cloud-burst." How many inches in the hour I don't know but it is a continual sliding fight to keep the car in the centre of the track. Once you get off centre you slide into the ditch and there you stay until the sun dries up the road again. Usually a lorry skids across the track and then all traffic is held up.

This wasn't too bad as minutes before the road was dry and although streams were pouring across the road they had not cut through. Only in one place did I have to walk in to see how deep the water was and if the car could take it. These four miles took over an hour to get through. Once through the deluge, as I rounded a bend I came in sight of what looked like a big dog or baboon in the road and on getting nearer I saw it was a baby elephant. How cute! etc. yes, I agree, but what about the "protection" of the worried parents—sure enough—here they come! I start reversing slowly but in the mirror what do I see but some elephant staring at me from behind! At this moment the young calf decided to investigate the car and started coming towards me. After backing a little more and gently beeping the hooter—no good—I tried throwing out my lunch packet—first a banana but "we are not interested"—then a tomato which he picked up but dropped again and then a handfull of biscuits as a last delaying tactic. That worked—he picked them up and examined them and played with them a bit while I backed away about 40 feet. His mother or auntie then took charge and putting her trunk round him nudged and shoved him back

[continued on page 114]

A 6 Meter Transmitter-Receiver

Joel Ross, K2HXS

2254 East 23rd Street
Brooklyn, New York

The unit to be described is a complete station for 6 meters which can be used either in fixed or mobile operation. It is not particularly difficult to build, and may be assembled for about \$45.00, exclusive of the vibrator power supply, which is required for mobile operation. The transmitter and receiver sections are electrically separate, facilitating repairs or modifications on either.

Circuit Description

The transmitter consists of a 6U8, the pentode section being used as an oscillator-multiplier. Either an 8.3 or a 12.5 mc crystal may be used. The plate circuit is tuned to 25 mc by L1 and fed to the triode section of the same tube, whose plate circuit is tuned to 50 mc by L2. The rf amplifier is a 5763, which runs about 12 watts input. The output to the antenna is about 7 watts. A 6AU6 is used as a

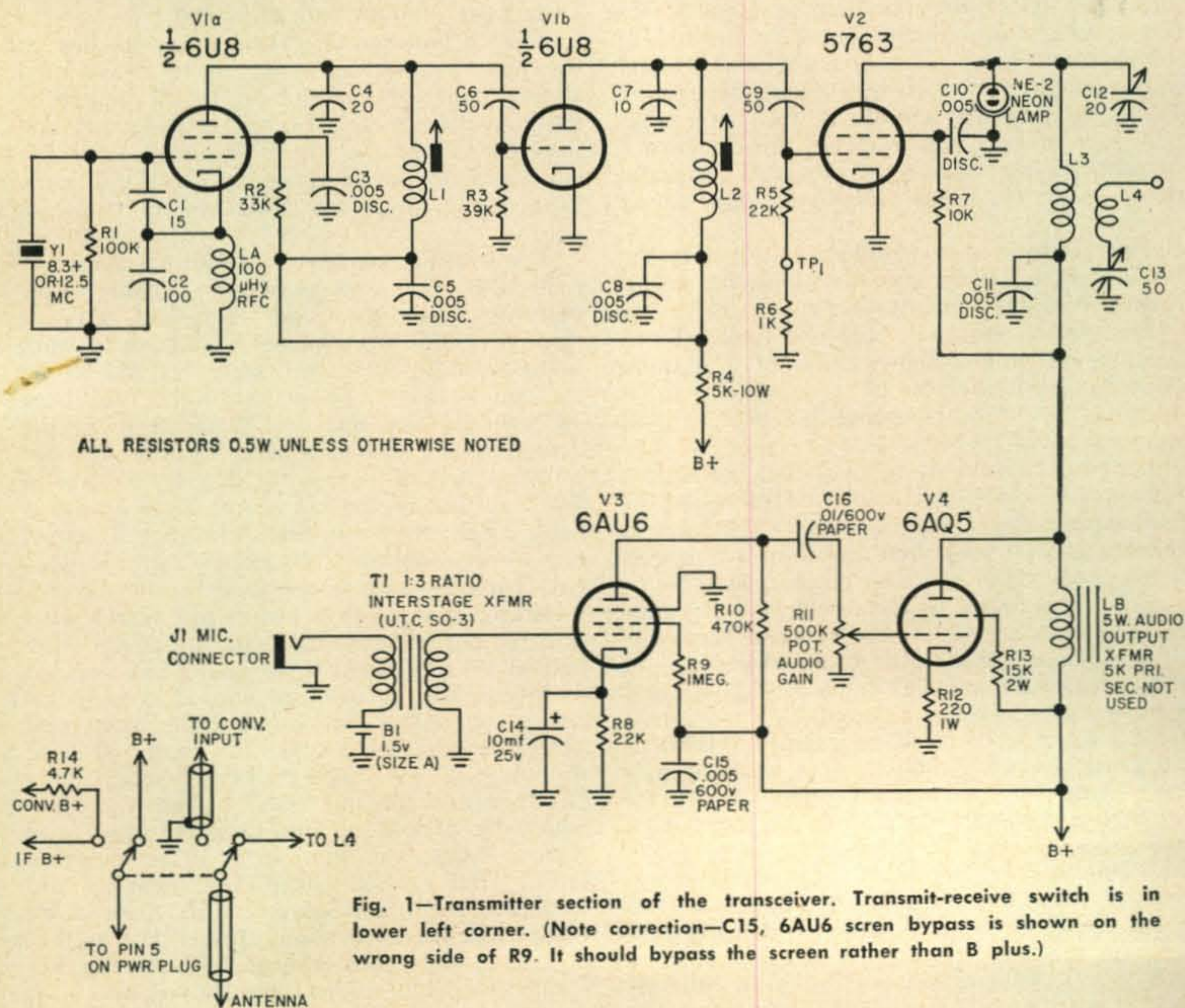
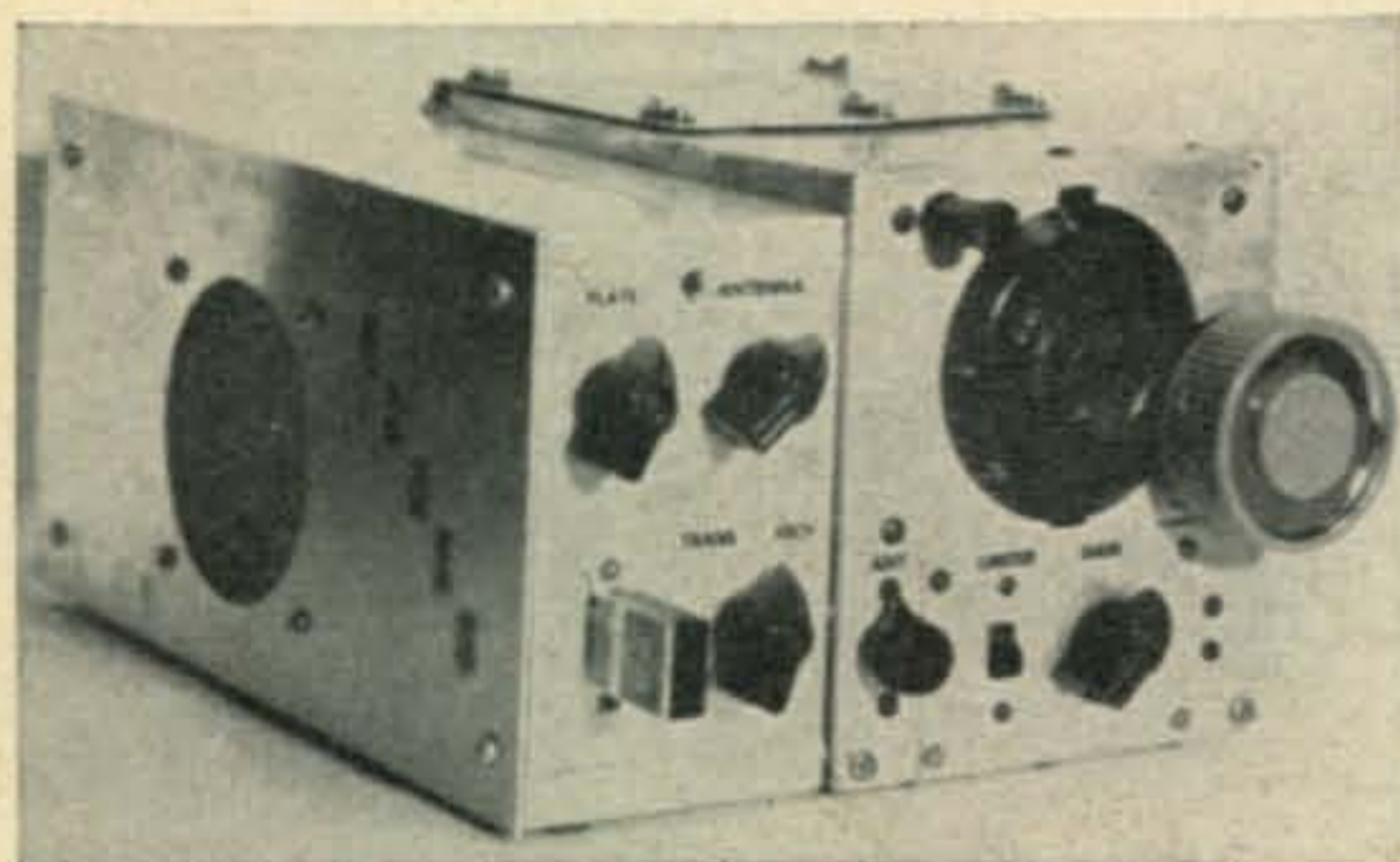


Fig. 1—Transmitter section of the transceiver. Transmit-receive switch is in lower left corner. (Note correction—C15, 6AU6 screen bypass is shown on the wrong side of R9. It should bypass the screen rather than B plus.)

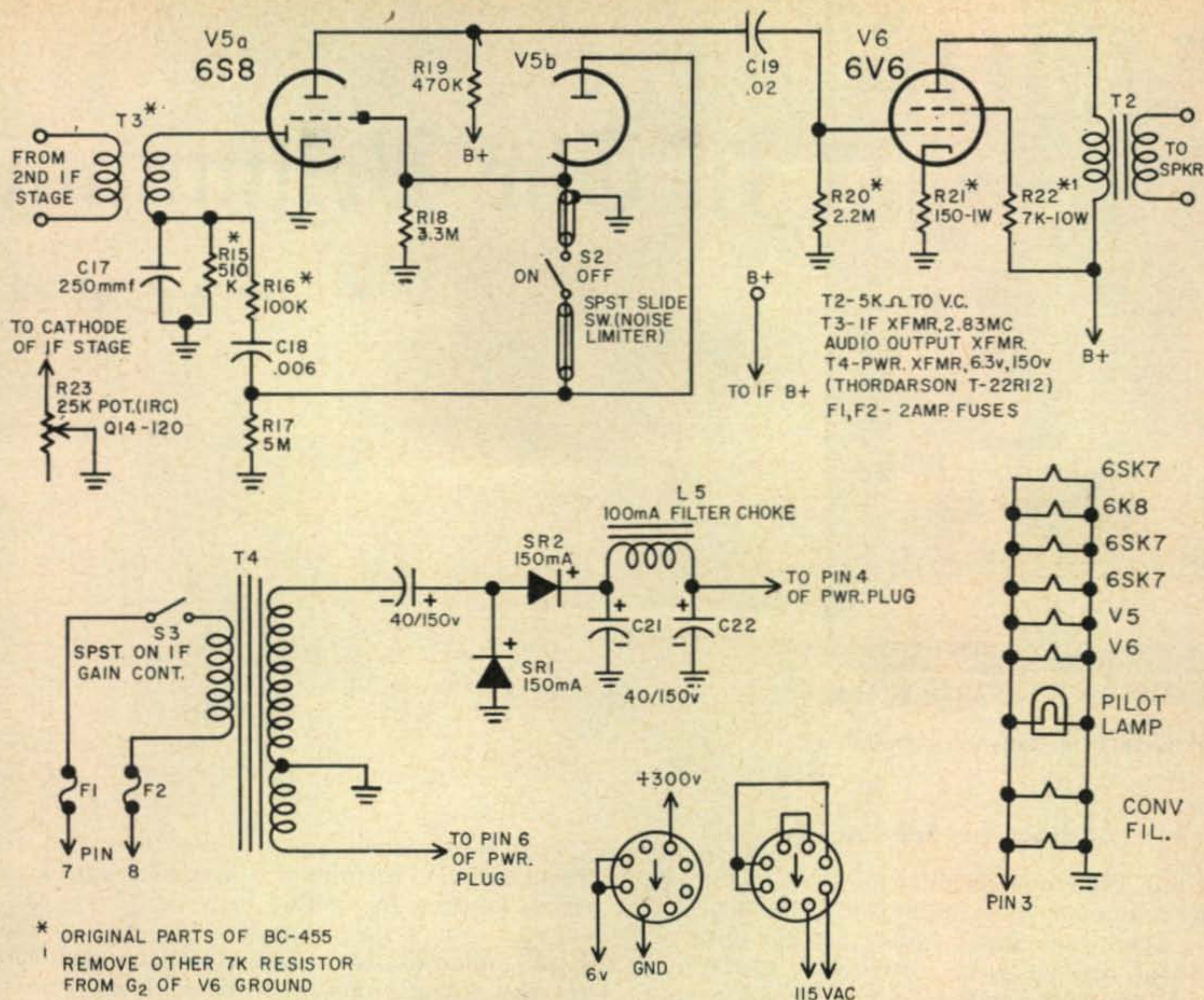


Fig. 2—Modified circuit of the BC-455 bfo and audio stages. Power plug wiring for 6 vdc and 115 ac is described in the text.

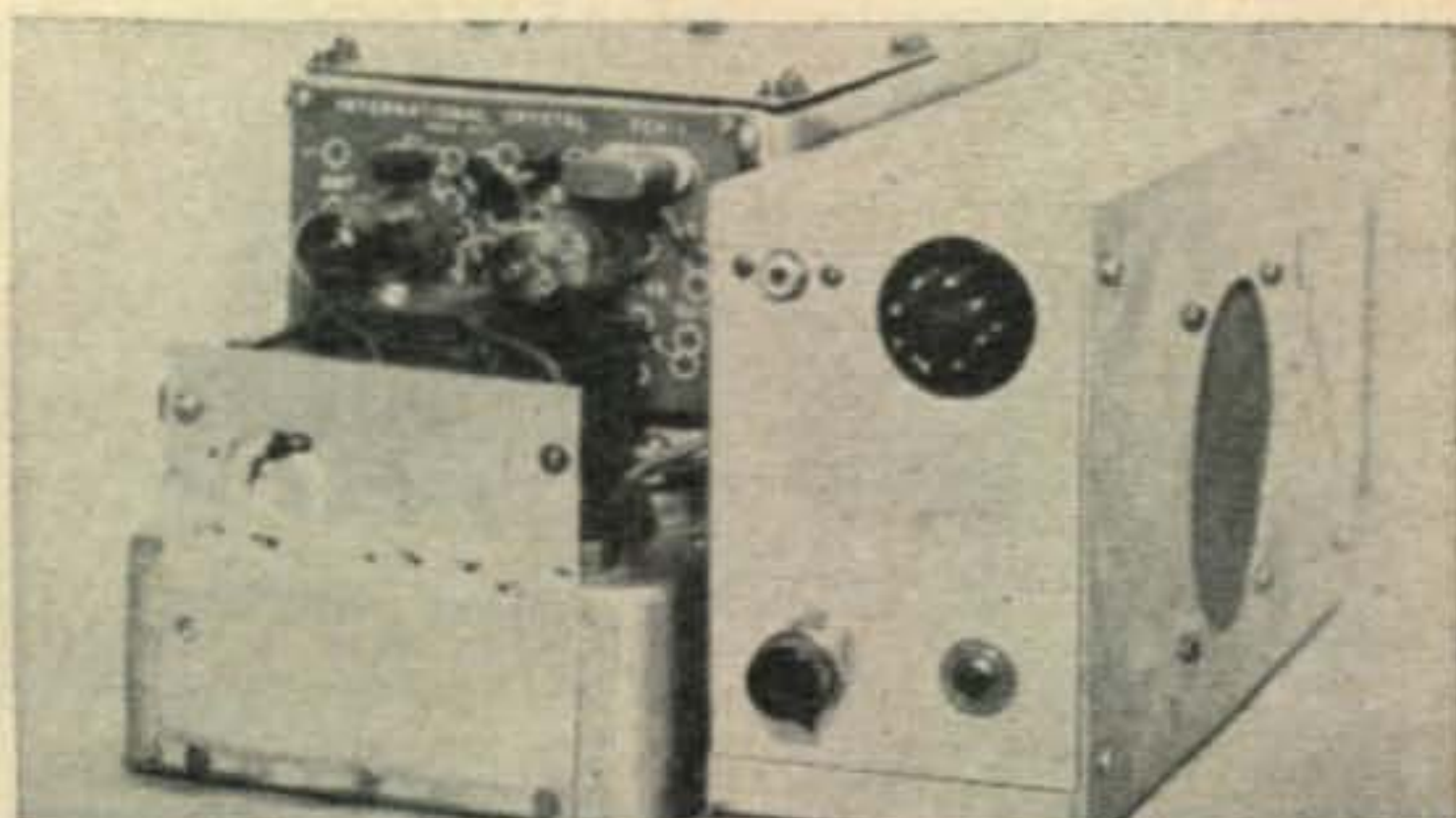
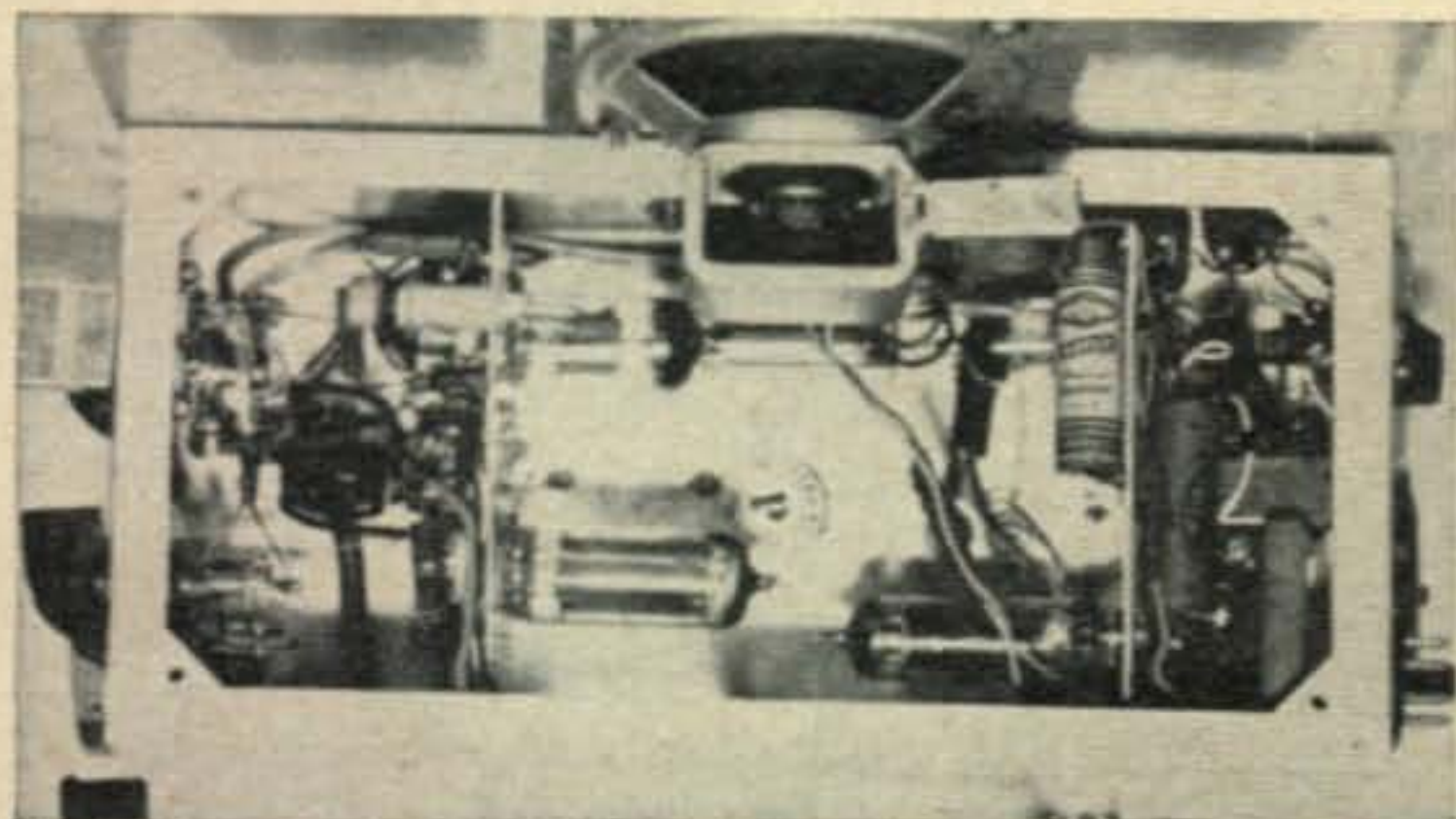
voltage amplifier to drive the 6AQ5 Heising modulator. A carbon mike is used since the 6AU6 does not have enough gain when used with a crystal mike.

The receiver section consists of an International Crystal Co. FCV-1 converter working into a BC-455 surplus receiver. These units are both modified, however, to produce more gain and less noise. The 6AK5 in the converter is changed to a 6CB6. The bfo and audio stages in the BC-455 are removed and modified considerably. The tubes are changed to their 6 volt equivalents with the exception of the 12SR7 and 12A6. (12 volt operation will be described later.) A 6V6 is used to replace the 12A6 and a 6S8 replaces the 12SR7. This stage,

originally the detector-bfo, is now used as the detector, noise limiter and first audio stages. The transmit/receive switch is used to switch the B+ and antenna connections only. The power supply is of the voltage doubler type, providing about 255 volts under load. The power socket is wired so that when the ac cable is removed, this supply is disconnected, permitting a vibrator-type supply to be connected.

Construction Details

The transmitter and modulator are each assembled on an aluminum plate measuring 4" x 2 3/4". These plates have small tabs bent down
 [Continued on page 112]





In The Beginning

F. D. Whitmore, W2AAA

223 W. Holly Ave.
Pitman, N. J.

Part III

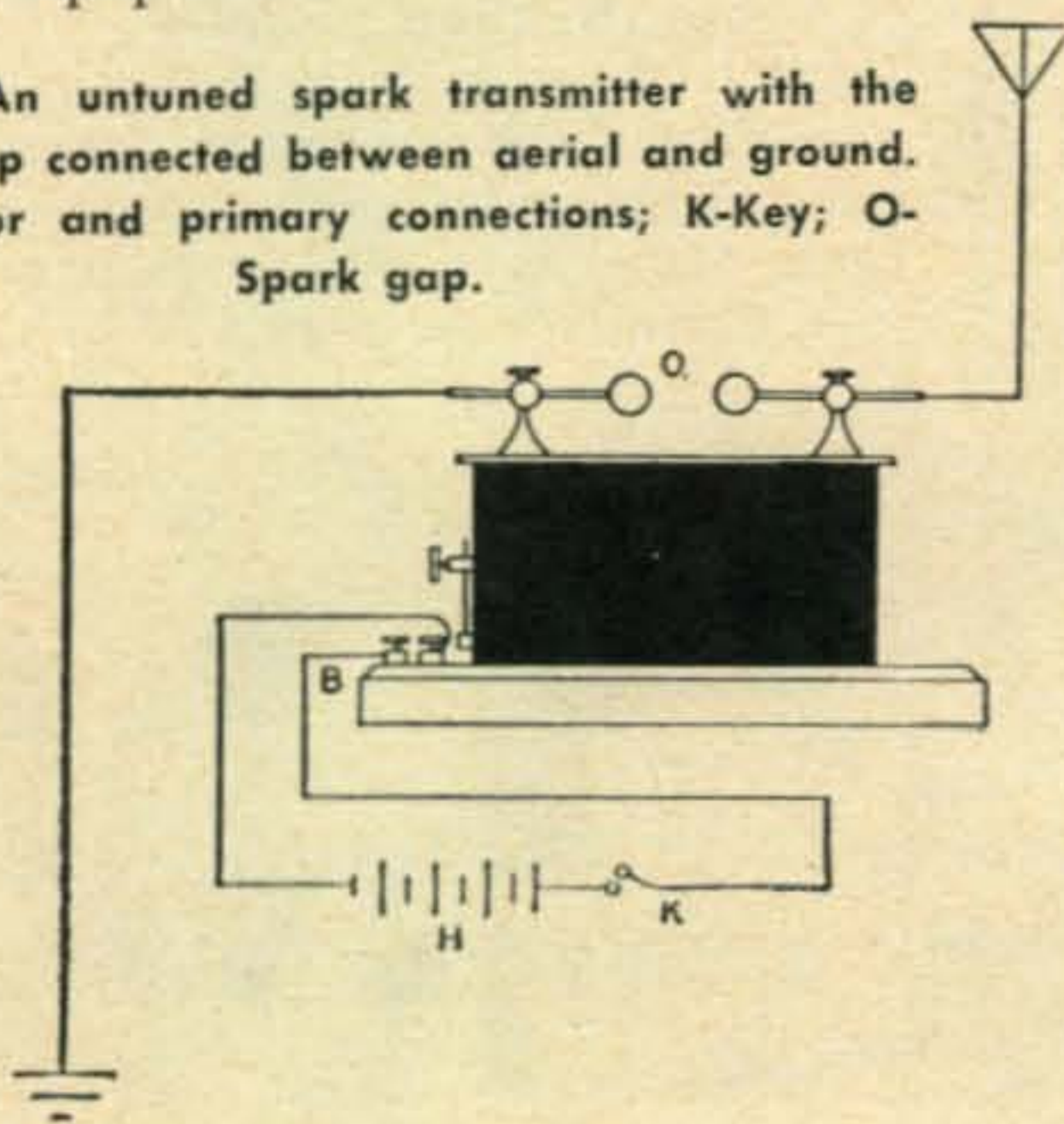
A periodical current in the early days of wireless.

Adding the Sending Set

Until 1908 our neighborhood receiving station remained a listening post. Suddenly—things changed. Sam's house buzzed with excitement. Strange pieces of wireless gear spread across the table and up the wall. Soon they would transmit.

Walt was directly responsible for these additions. No big mystery prevailed about it though. The boys and their father wanted a sending set for several years. Up to now, however, even a little outlay for receiving material severely "burned" the bankroll. Expanding to sending apparatus would have sunk it. Walt changed this situation by working after school and Saturdays for the local grocer. He delivered groceries with the store's horse and wagon. And some of his earnings went for sending equipment.

Fig. 7—An untuned spark transmitter with the spark gap connected between aerial and ground. B—Vibrator and primary connections; K—Key; O—Spark gap.



Two things they knew. First, you had to create a spark; second, you needed a long high aerial. Getting the aerial high and long consumed most of the money; so, the size of the spark suffered. In the end, their depleted treasury allowed only a Ford spark coil. With the spark gap in the antenna-ground circuit, they sent out their first signals.

This type sending set took wireless back ten years. Marconi's early equipment placed the spark gap between antenna and ground. He used this hook-up when making his original experiments. Marconi discarded this system in 1898. The great help extended to Marconi in 1897 and 1898 by England's brilliant scientist, Sir Oliver Lodge, obsoleted the untuned spark. From experiments during this period originated the technique of transmitting on definite wavelengths. Marconi filed application for his famed patent No. 7777 covering a tuned or synchronized system of wireless. He received the patent on April 26, 1900.

Though his spark was small, Walt's enthusiasm and ambition were big. Into that high four-wire skywire he pounded his signals for several days. At last he heard an answer. It came from another experimenter living in the same block. Reluctantly he deduced that communication with a Ford spark coil required both sender and receiver to be in the same block with their antennas almost touching.

Disappointment hung heavy. Walt thought of the hours spent learning the code plus the cost involved. There was that wire suspended from his third story bedroom to a neighbor's across the street. Two buzzers, keys and dry cells represented more wasted cash. Now, despite all this effort, he still couldn't commu-

nicate—and the fun came from contacts, not receiving.

Walt made many wagon-wheel ruts for the grocer before a slick one inch spark coil nestled on the operating table. But one day there it was along with a shiny transmitting helix. They planned to do things right this time. From periodicals they obtained instructions for building each transmitter part. Only the spark coil was purchased. By carefully following the instructions, they were certain to land their signals *among the commercials*.

When they heaved the Ford spark coil, they also threw out the dry cells. Now a storage battery supplied the power. Each week someone had to wheel it to a battery charger and back again. But due to their great enthusiasm for wireless, this chore never seemed a burden.

Unknowingly, Walt's mother contributed to this rebuilding program. She probably never missed them, but six of her quart preserving jars became Leyden jar condensers. Lined part way inside and out with tin foil, they produced a fat hot spark across the spark gap.

They made the tuning coil (helix) by winding ten turns of No. 10 bare copper wire on an open hard rubber frame ten inches high and eight inches in diameter. Four wires connected to the helix: the aerial, ground, one side of spark coil, and one side of the spark gap.

The helix and condensers formed a tuned circuit basically placing the transmitter on a certain wavelength. For distance and dependability the tuned wireless transmitter was best. The open circuit type (with spark gap in the antenna-ground circuit) emitted a wave of short duration. The open circuit had a great dampening effect. The maximum power of the coil couldn't be secured as a certain amount of energy was lost in charging an aerial not in resonance with the power source.

In the tuned set, a condenser was in series with a tuning coil around the spark gap. The condenser stored a charge until it became high enough to break down the spark gap resistance. When this occurred the charge flowed back and forth through the gap, helix and condenser. The helix and condenser determined the wavelength. Adjustments of the antenna and ground connections on the helix tuned the aerial to resonance. The number of vibrations per second of the spark-coil vibrator accounted for the tone of the signal. The greater the vibrations, the higher pitched the note. Greatest distance occurred with a short fat spark across the spark gap. The size of the condenser directly influenced this.

The antenna looked real commercial. Sixteen-foot spreaders held four aluminum wires between two thirty-foot masts. The masts set on houses at each end of the city block. This arrangement suspended the 230-foot aerial aloft sixty-five feet. A Geisler tube indicated correct loading. Adjustments of antenna and ground connections on the helix resonated the antenna. The nearer to resonance, the more

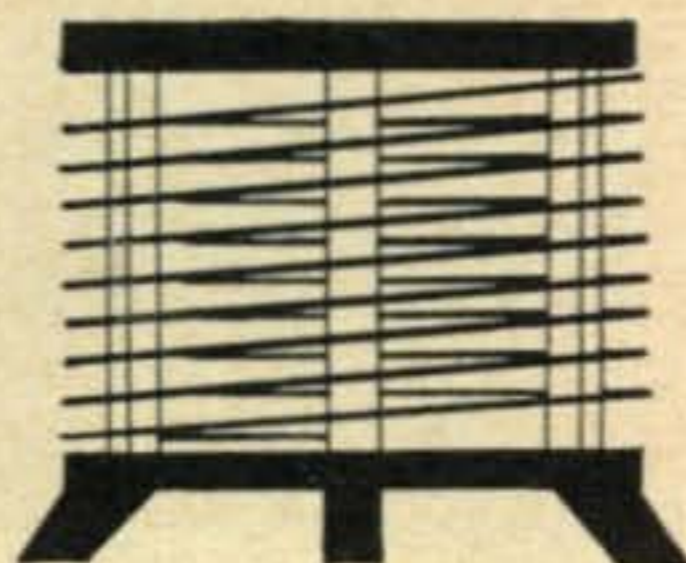
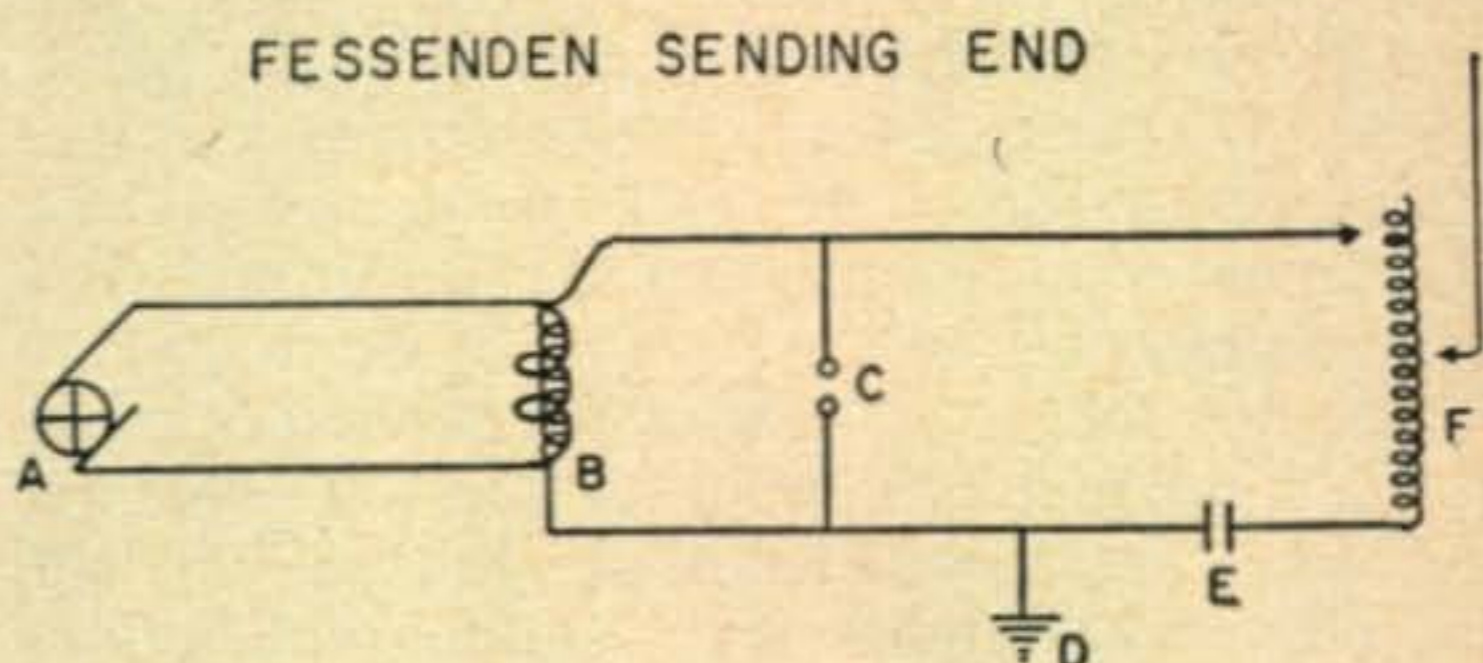
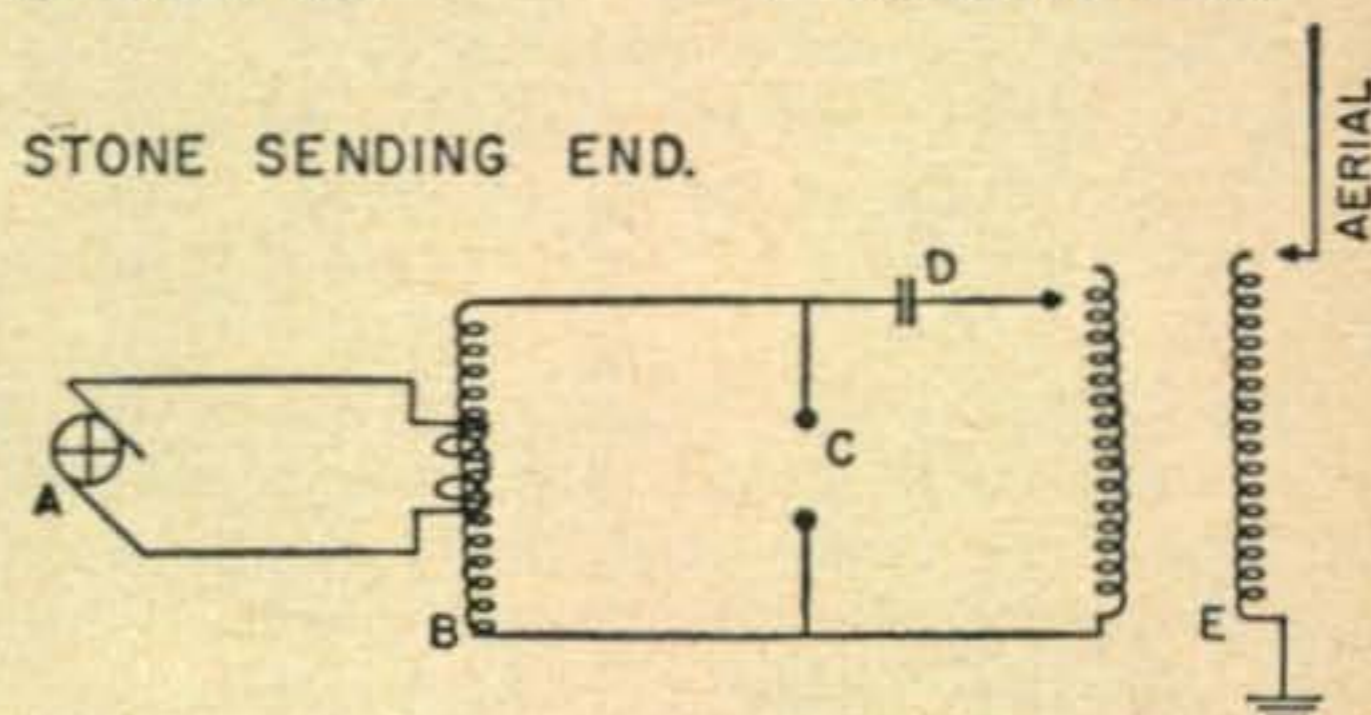


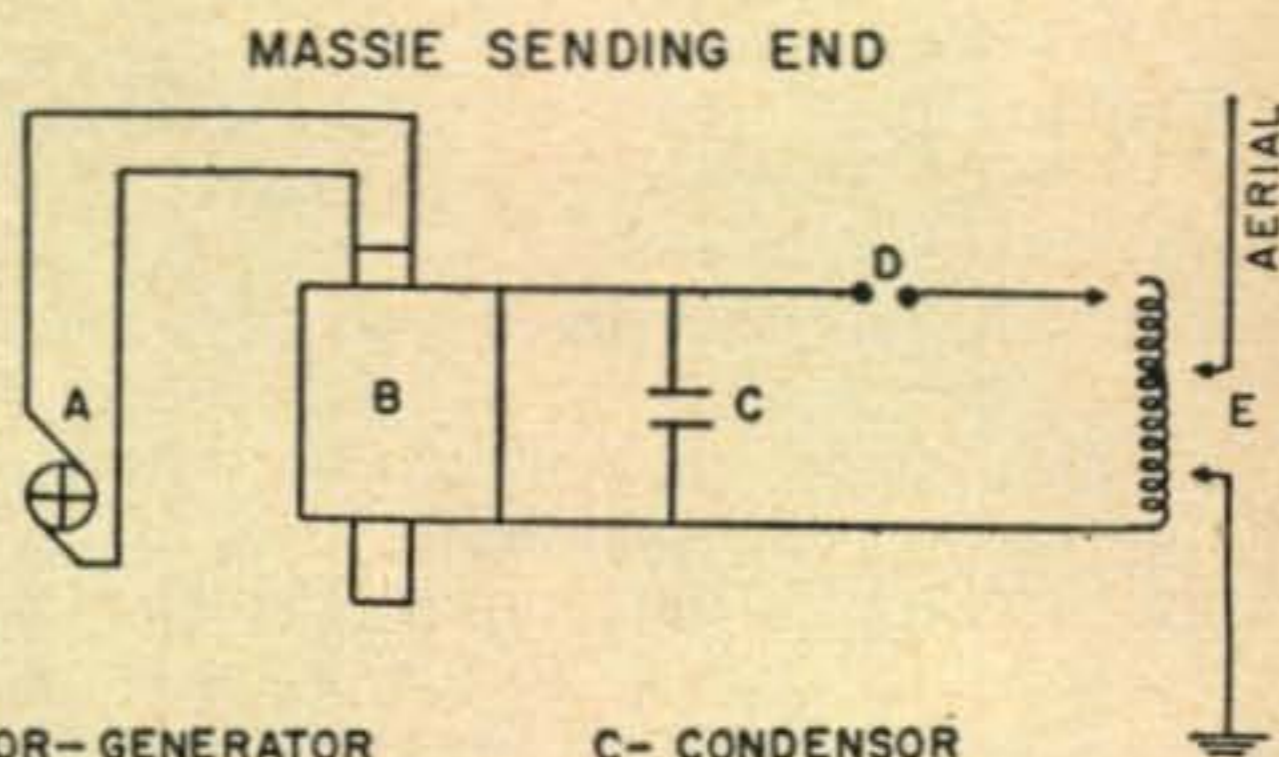
Fig. 8 — Transmitting helix.



- | | |
|-------------------|--------------------|
| A- A.C. GENERATOR | D- GROUND |
| B- TRANSFORMER | E- CONDENSOR |
| C- SPARK GAP | F- INDUCTIVE HELIX |



- | | |
|------------------------|---------------|
| A- 110 A.C. GENERATOR. | C- SPARK GAP. |
| B- TRANSFORMER. | D- CONDENSER |
| E- OSCILLATING CIRCUIT | |



- | | |
|--------------------|--------------|
| A- MOTOR-GENERATOR | C- CONDENSOR |
| B- TRANSFORMER | D- SPARK GAP |
| E- INDUCTIVE HELIX | |

Fig. 9

current the antenna took. Higher antenna current increased the peak glow in the Geisler tube.

Testing the New Rig

Finally the zero hour arrived: They were ready to try the new rig. With the family grouped about in a semi-circle, Walt dipped the detector. Everyone leaned forward slightly. "Small fry," anxious to see too, strained against

those blocking their view. All eyes peered steadily forward.

Suddenly, a shout from Walt, "It works!"

Tension broke and all surged forward. Everybody talked at once. They took turns at listening. Sure enough, rhythmic code filled the earphones. What an improvement the electrolytic detector and headset was over the erratic coherer and electric bell restorer.

Eager hands trembled as each took another turn donning the earphones. They could still hear those sweet rasping buzzes from a "band-blocking" spark. Eventually, even the kids got a chance to listen. In fact, so great was the excitement that Walt's Dad called to his wife to come hear.

Ah, but that was a *faux pas*. Their mother was a kind gentle woman, a fine housekeeper, and could bake wonderful apple pies; but she had no scientific tendency. No one realized her severe "handicap" as she cautiously entered the room. Politely she settled the headset over her pompadour. For a few seconds she tolerantly listened. Then came her historic remark, "How can you enjoy wasting your time listening to those horribly monotonous noises?"

Noises she called them then; and noises she was still calling them many years later. She never admitted to a happy moment if it involved wireless.

Her husband was undaunted, however; and he plunged with gusto into an explanation of the three new parts—coil, headset and electrolytic detector. He put greatest emphasis on the coil. All the males present were extremely proud of that coil. It represented the *delicate* handiwork of three pairs of out-doors hardened hands.

I'll say this for his wife: She listened and looked; and suddenly, she looked again. Her wail followed the second look. "Oh-oh-oo! My rolling pin!" Her search of the last hour had ended. There it was; nearly filled with enamel wire and supported between two end blocks that held the slider rods. No one could question the sturdiness of this receiver coil. Then she really started. "You knew I had baking to do. The pies have to be ready early in the morning for the church sale. They have to be made tonight. And now not a store is open. Oh . . ." and she started for the door. Whether out of sympathy for their father, a pure accident, or just plain fun, Sam couldn't recall. But

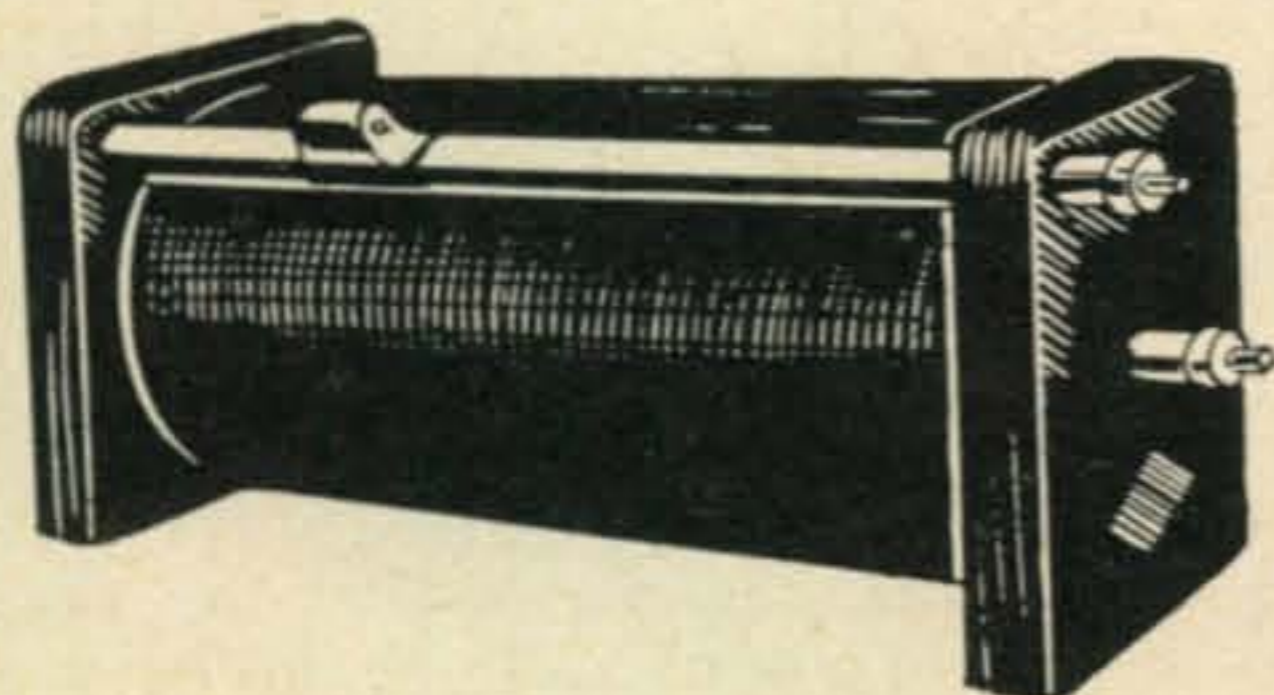


Fig. 10—One slider receiving coil.

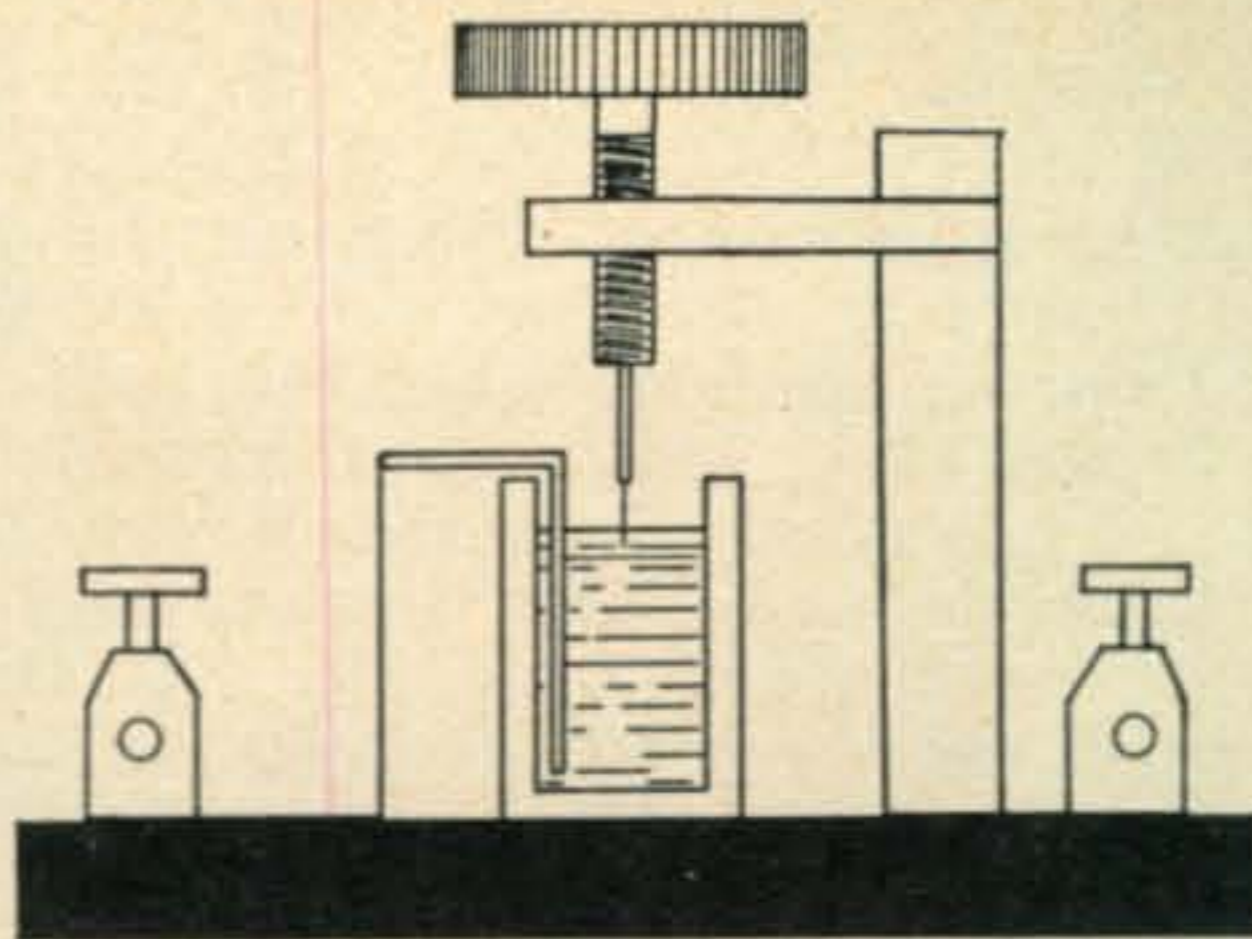


Fig. 11A—Electrolytic detector.

as she passed the transmitter end of the operating table, a spark crackled and hissed across the spark gap. Screaming, "EE-EE-EEE!" she made the doorway in one leap.

That spark sounded like an explosion. Undoubtedly, the timing had something to do with the effect. With everyone else quiet, and everybody's nerves on edge, a firecracker wouldn't have sounded any louder. This was another of numerous incidents that kept her on poor speaking terms with wireless. No one ever saw her come into the wireless room again.

Beyond any doubt, the rolling pin was ruined. The unauthorized kitchen appropriation occurred because cardboard tubes were not easily come by in those days—at least not in their house. Naturally the solid wood made a fine coil. It was a little heavy, but very sturdy. With the handles sawed off and the body filled with shiny tight-wound wire, it looked real pretty. Fastened to the wooden blocks and with the slider bar and slider mounted, it looked quite professional to a wireless man. During the time they used it, it performed very well.

Every night and many times during the day Walt had the one inch spark set fired up. He soon lost the identity of Walt and acquired a new nickname—BG. These were the call letters by which his contacts throughout the city and nearby suburbs knew him. Most of the other operators he worked used their initials.

Detectors

Two strong trends existed about now. One was for sharper tuning and the other for a simplified sensitive detector. The electrolytic detector satisfied the second desire very well. Professor Reginald A. Fessenden invented it in 1902. At that time he called it a liquid bar-rater. Leading wireless companies and the United States Navy used them for quite a while.

Construction of an electrolytic detector was very simple. It consisted of the point of a very fine platinum wire touching a dilute solution of nitric or sulphuric acid. One of the simpler forms comprised a thin platinum wire about 0.003 inch in diameter. Solder held the wire in the slit of a thumb screw which in turn worked through a metal standard (See figure 11A. A glass cup placed under the thumb screw

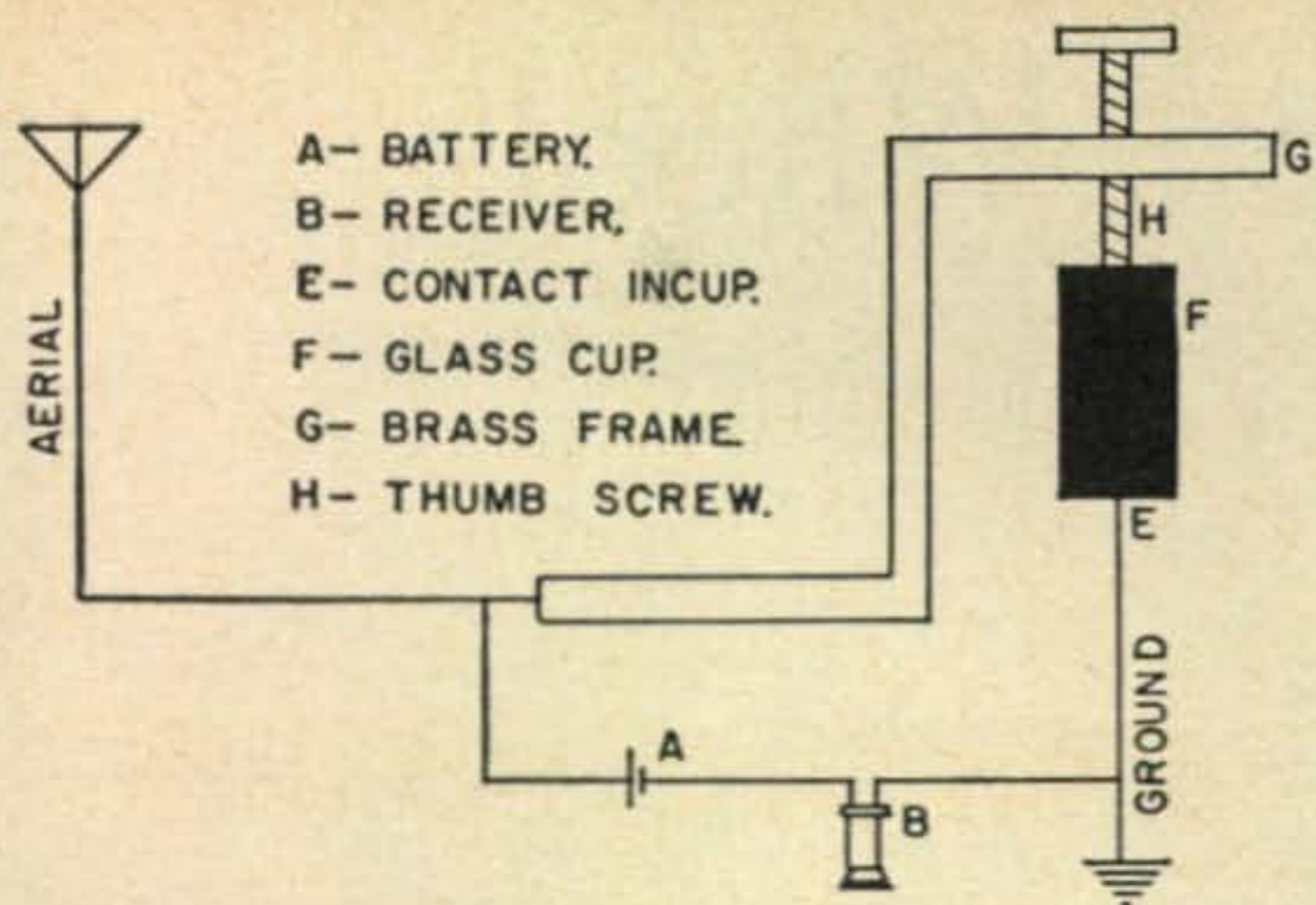


Fig. 11B—Electrolytic detector circuit.

contained the acid and the large platinum negative wire. The aerial wire connected to the standard supporting the thumb screw. The ground wire fastened to the contact in the glass cup. A battery and telephone receiver in series connected across the detector contacts. The positive battery connection went to the thin platinum wire.

When the tip of the fine platinum wire touched the electrolyte, current from the battery flowed through the fine wire into the electrolyte. This caused an accumulation of oxygen to form around the platinum point and polarize it. When this happened, the wire became insulated from the electrolyte preventing further flow of battery current.

Wireless waves picked up by the antenna flowed through the platinum wire into the electrolyte and to ground. These waves broke down the polarized condition around the platinum point allowing local battery current to pass once more. As the battery current travelled through the telephone receiver or headset, a hissing sound was heard that lasted for the duration of the incoming wave. A rheostat in series with the battery restricted the current to a value sufficient to cause polarization at the platinum point but not strong enough to break down the polarization formed.

Electrolytic detectors had several advantages. In sensitivity they far surpassed the temperamental coherers. Their main drawback was the requirement for frequent adjustment. Jolts as well as eroding action by the acid destroyed the connection between the end of the platinum wire and the acid. Greatest sensitivity occurred with the smallest amount of platinum touching the acid. To accomplish this, the wire was dipped into the acid and then withdrawn causing the surface of acid to raise a little and cling to the platinum wire tip. (See figure 12.) When finished receiving, the wire was lifted from the acid to prevent unnecessary eroding.

Another type of electrolytic detector construction made certain only a small point of platinum touched the acid. This detector had an extremely fine platinum wire sealed in glass. Grinding the wire down to the glass provided the smallest area of platinum at all times.

The second advantage of electrolytic detectors was their self-restorative ability. Upon cessation of wireless waves, it automatically restored its high resistance making it inoperative until receipt of the next wave train. This was a great asset over the mechanically tapped coherers.

The third big advantage of this type detector was its receiving speed. Claims made for coherer receiving speeds, placed their ability as high as twelve words a minute. But for dependability under variable conditions, probably half that speed was more accurate. The immediate self-restoring power of "electrolytics," however, placed speed limitations solely upon the operator's ability.

A fourth advantage was its ability to receive telephony signals. It enabled users to listen in on voice experiments. This was something that couldn't be done with coherers; they were limited to CW.

Many other self-restoring detectors appeared in this period. Some were ingenious and worked extremely well for experimental purposes. Following is a few of them with a short description of how they worked:

Microphone detector—many Old-Timers remember using this one. A simple form used a needle laid across knife-like carbon edges. An improved form had the point of a fine needle rest on a flat carbon block placed on a brass plate. A fine wire went to the other end of the needle. This type was more sensitive than the first; like all microphone detectors, though, it got out of adjustment too quickly for practical use.

Water detector—A drop of water placed between carbon surfaces also responds to radio waves. This never became a practical type. Like the microphone detector, its best use was for experimenting.

Coal detector—A piece of coal also make a detector. It should be held between brass surfaces with considerable pressure supplied.

Corroded detector—Properly treated metal surfaces acted like thermal cells. By placing a flat piece of iron or steel in a nitric acid solution for about five minutes and then drying, the surface becomes corroded. A light spring rest-

[Continued on page 110]

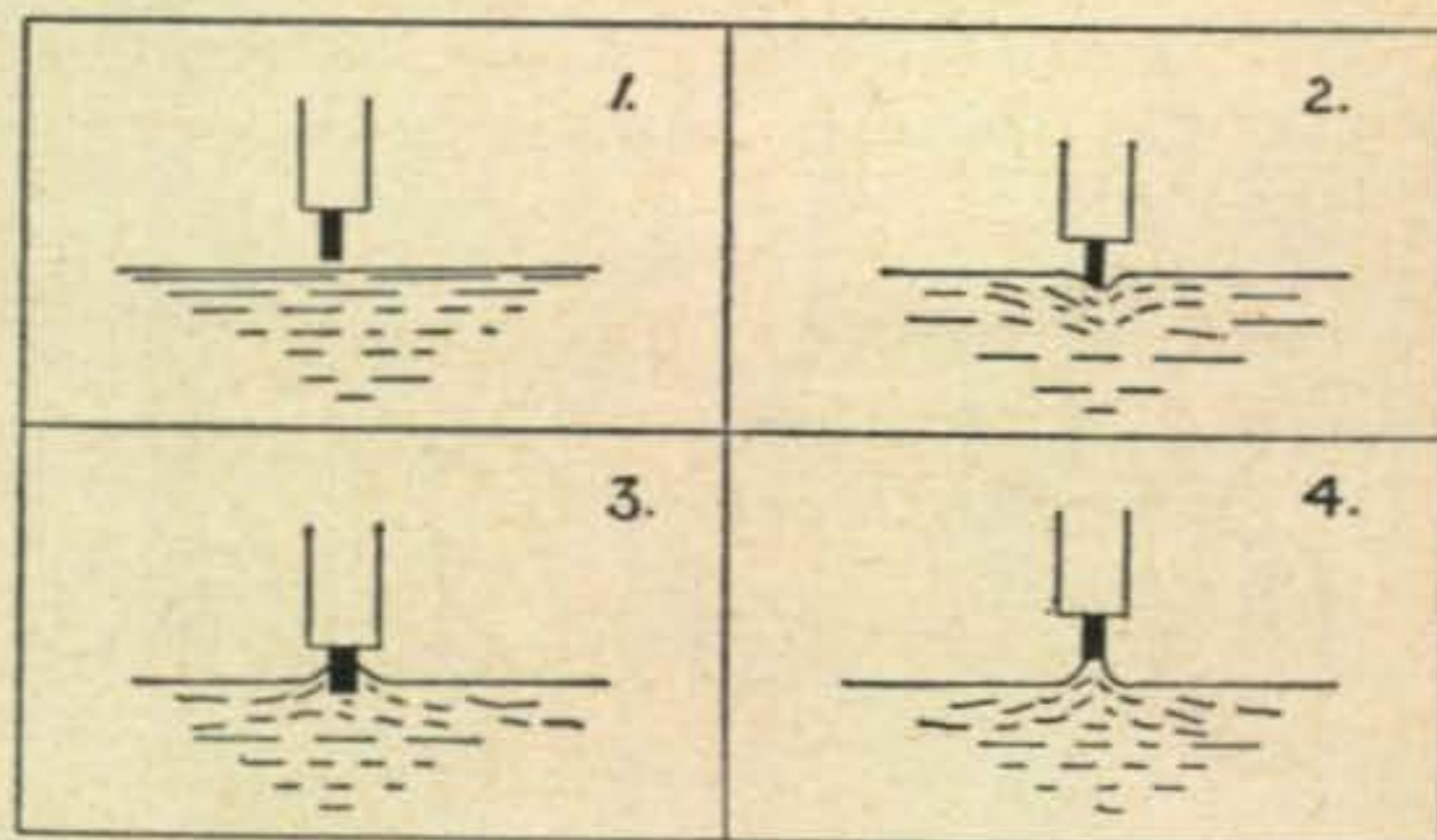


Fig. 12—Proper dipping technique for the electrolytic detector.

Selectivity on Wheels

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A need is felt by most mobile operators for improved selectivity in the converter-auto radio receivers. For signals 4 to 6 *kc*, off frequency to cause severe interference is needless. A toroidal filter inserted between the converter and receiver was tried for some time with mediocre success, but the complexities of construction, particularly hand-winding of the toroids, and the difficulty of procuring cores, offered too little compensation performance wise. Actually, the common crystal contained the requirements desired but for insertion loss, and the loss could be compensated for by a stage of amplification.

Why not employ a transistor in a suitable circuit as a narrow band amplifier, with just one lead required for power? Transistors were available with gains of from 15 to 30 *db* at 500 *kc* and the alpha cutoff from those in our possession was listed as 4 *mc* or higher. A 2N167 was chosen to be employed in a common emitter circuit. With bread board set-up and several days of experimentation, the circuit shown in fig. 1 was worked out. Results were quite impressive, but selectivity was far too sharp

for satisfactory audio intelligence. Resistors were inserted across the crystal in a suitable switching arrangement to progressively increase the Q of the crystal, from "off" to position 3. Though this method appears crude, it is simple and serves to alter the shape of the pass-band to that required. Elimination of other controls such as phasing, was deemed advisable.

Installation

Installation is accomplished by mounting the unit in an easily accessible place, plugging the output of the converter into the filter, and its output to the auto receiver, plus the connection of one power lead to a source of 6 volts.

Adjustment

Adjustments presents virtually no problem. The crystal frequency must match that of the converter output (ours was 1525 *kc*). With the receiving equipment on, and the filter selector in position 3, C1 is tuned for maximum noise, and the tuning condenser on the auto radio is centered on the pass band. Then one of the pushbuttons is locked to this position.

Operation

The unit differs from the conventional crystal filter in that it contains no phasing control. In the "off" position it is completely bypassed with power removed from the transistor. Normal use of the auto receiver is realized in this position. In position 1, the selectivity is minimum, with some slight gain noticeable. Position 2, increases the crystal Q, gain is somewhat reduced, and stations which formerly appeared broad now have a definite place on the dial. Ringing is apparent, and offending heterodynes can be dropped into the crystal notch with considerable attenuation. Position 3, employs the maximum Q available, modified by the switch shunt capacity. When stations are tuned to the center of the pass band, voices become "boomy" due to high frequency attenuation, and careful tuning of the converter is called for. The preferred method is to place the desired signal on high or low side of the vertical slope.

The versatility of the filter becomes more apparent with continued use. You'll wonder how it was possible to hear those fellows buried in the QRM without it. It wasn't! Switch the filter out and see. ■

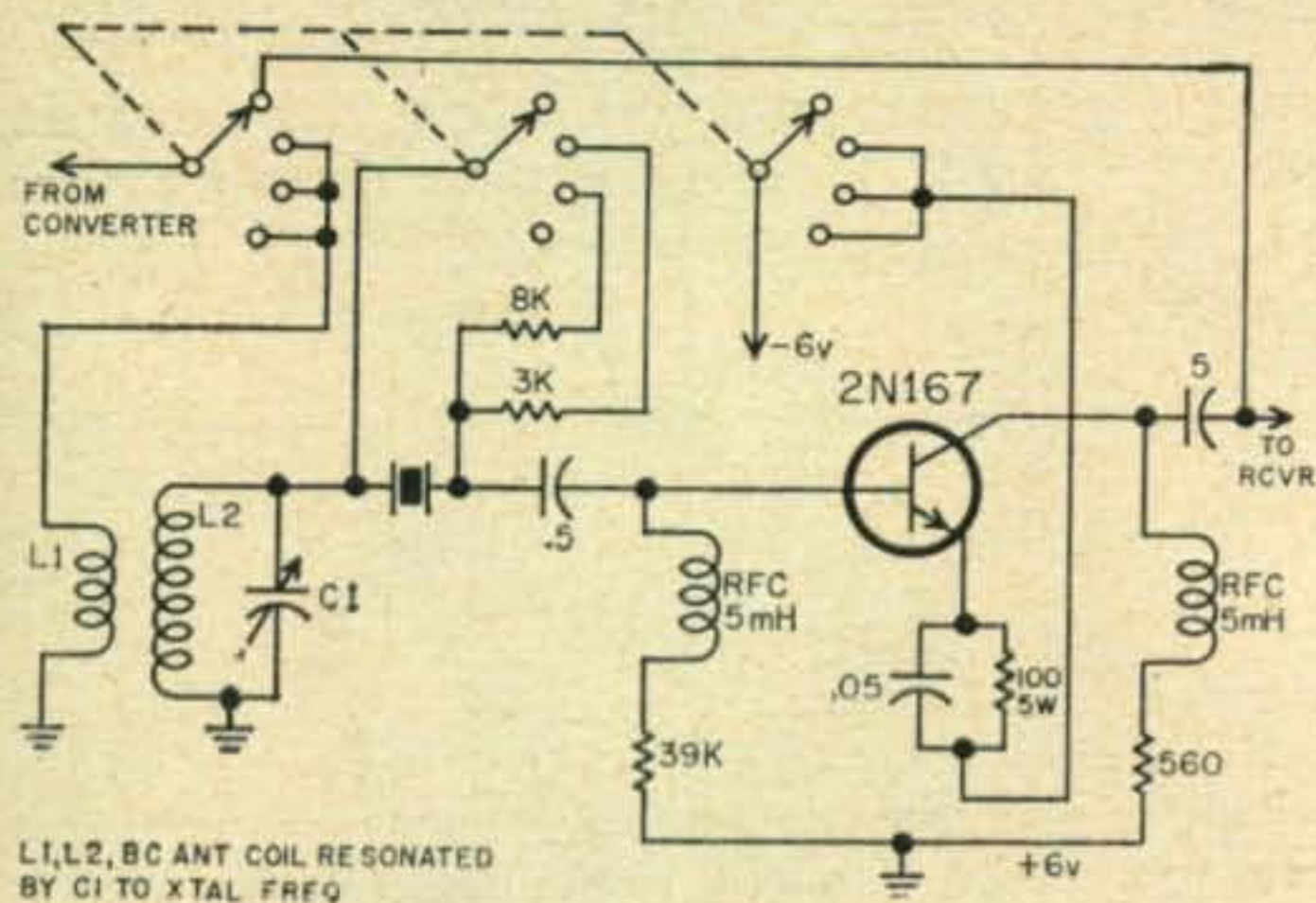
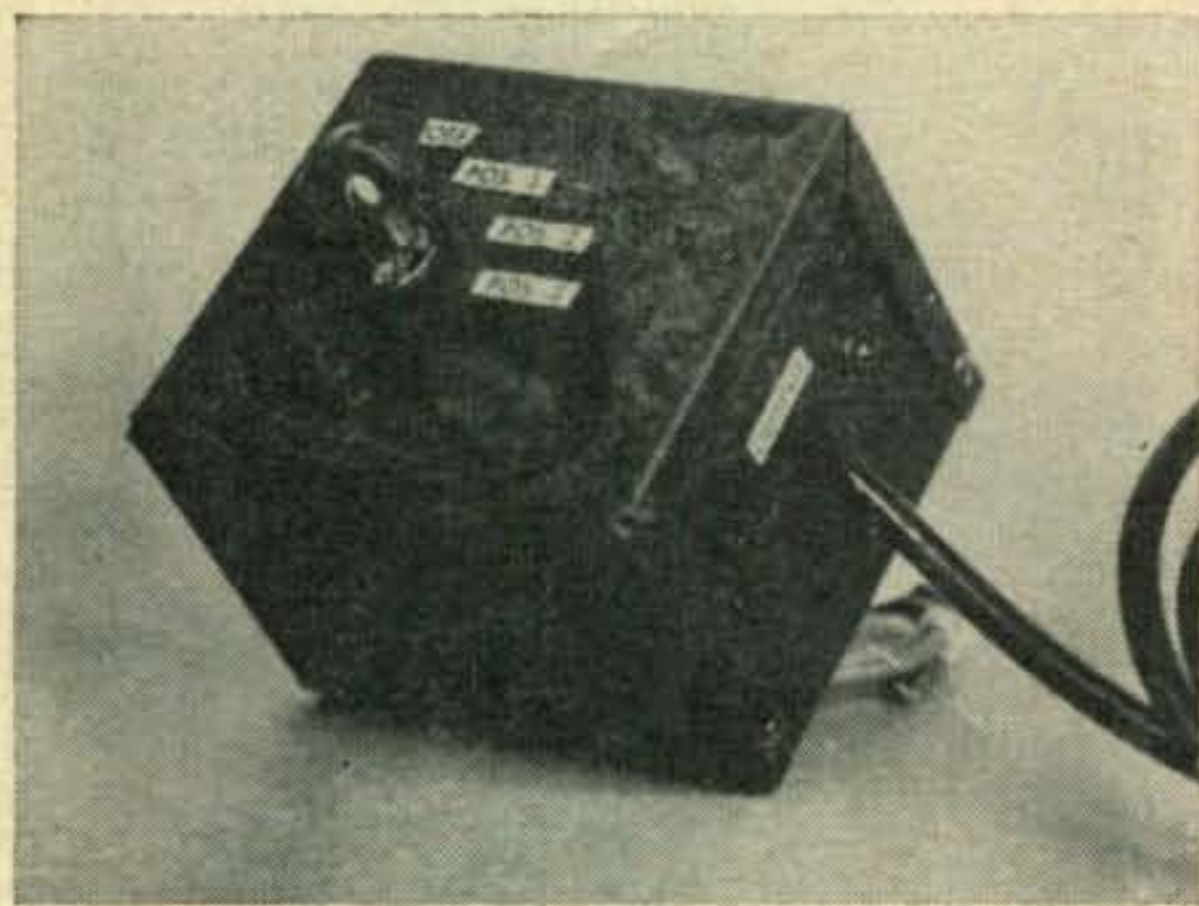


Fig. 1—Circuit of simple transistorized amplifier

Automatic Code Transmission for Pennies

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The need for simple automatic code transmission is already established. Automatic code is to the ham what the automatic pilot is to the flyboy. The difficulty is and has been how to attain it without complicated and expensive tape punching equipment.

After a tape recorder had been acquired at W5DF and the new had worn off recording my own signals and others for audio playback, the need for converting the audio into keyed impulses became acute. Much discussion centered around vacuum tube limiters and rectifiers to convert the audio tone to a relay pull in.

One night, in about 5 minutes, I merely hooked a selenium rectifier in series with a relay and fed the output of the tape recorder into it. (See Fig 1) To my surprise it would key perfectly. In fact the relay I had was so fast in its pull-in and drop-out that it was following the audio cycles and keying the transmitter at an audio rate. Since this is ICW and not legal on ordinary code bands it needed to be removed. The addition of a paper capacitor across the relay coil removed the audio cycles from the keyed characters.

The relay that happened to be handy at the time this was tried was a sensitive Sigma plate circuit relay of about 5000 ohm resistance and operable on a few milliamperes. However, I feel sure there is enough rectified dc to operate a more insensitive type of relay.

In recording the signal of another station, the signal must be in the clear and stronger than the noise that is present. An interfering signal that does not hamper copying at all will either key the relay on playback, or it will alter the character of the code. Static crashes will also key the relay. With careful tuning most signals of S6 or better can be recorded and played back. I have recorded and played back various European and other DX stations on 20 meters with no trouble.

In playing back and keying, the audio volume is critical. If the volume is advanced too far the characters will become heavier than

the original. If the volume is too low the characters will be too light. If severe fading is present on the recorded signal the characters will vary from light to heavy as the signal strength moves up. A little practice will enable the operator to take care of these variations.

How fast will it follow? It has no trouble accurately reproducing code at 40 to 50 wpm, provided a steady strong signal is recorded. A weak signal, or one down in the noise, no.

One of the nice things is that you can record at slow speed of the tape, and then play it back at twice the speed it was recorded. If you record your own signal at 25 wpm and play it back at 50 wpm you can get good code at this speed. Many operators who claim they can send 50 wpm with a hand keyer just send botched up characters at that speed. However they can send good code at 25 and then double its speed.

Pretty slick to set the tape recorder on a CQ at 50 wpm then sit back and watch the 866 rectifiers flash. I admit you don't get a high percentage of replies this way, but the ones you do get can read code. I get them coming back calling all kinds of various calls such as W5BR, W5TF.

Another thing we have done is to record another station and play him back at $\frac{1}{2}$ or $\frac{1}{4}$ speed for the purpose of letting him analyze his own sending. Some stations have commented this helped them a lot to correct spacing errors. In every case the stations who have been recorded and played back have been enthusiastic about hearing their own code.

In operation it is extremely simple and the recorder can be operated with one hand, while the other hand is on the hand key. I use a roll of tape with different colors of tape spliced in several parts. I can quickly run the tape to a certain color for automatic transmission of previous recorded material, and the recorded material can be changed at any time on these sections. I can put several stations in different sections and find them quickly. ■

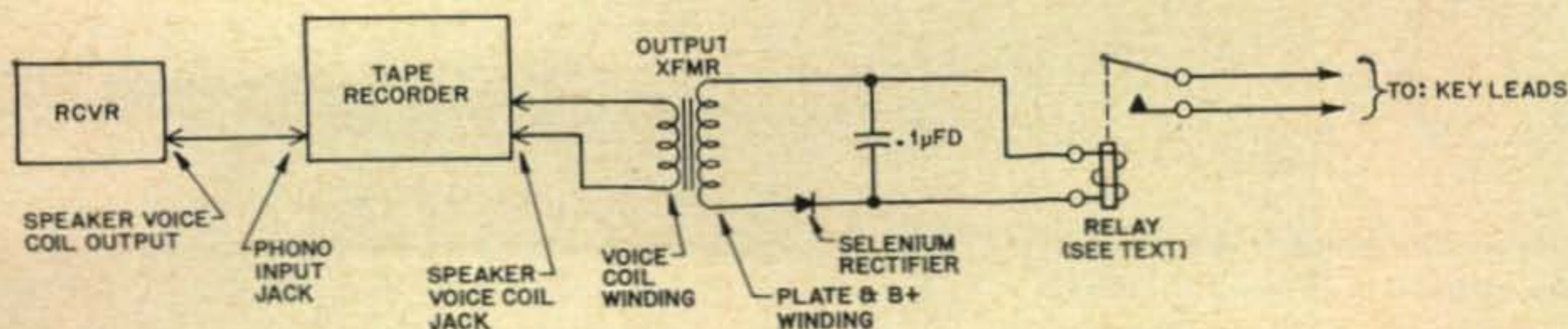


Fig. 1

William I. Orr, W6SAI/3A2AF

An Improved Keying System for the DX-100

With over 160,000 amateurs in the United States, there is bound to be a great deal of local interference, blocking, cross-modulation between stations, and other unhappy situations. One thoughtless signal can ruin the enjoyment of countless amateurs, so it is up to each of us to make sure "our skirts are clean".

One of the problems that always seems to be with us is the generation of keying transients and the accompanying "key clicks". Some transmitters seem to "click" worse than others, and the clicks are like the fleas of a dog: they're always with us!

This point was brought home to me with clarity the other day when a local ham opened up in my back yard with a DX-100 and nearly clicked my head off! The proximity effect, to be sure, since the same transmitter sounded passable a mile or so away. Then too, other hams have noted that the keying of almost any transmitter always seems to become "harder" when a high powered amplifier is added to the rig. A push-pull 250TH amplifier added to a nearby 150 watt commercial rig made life almost unbearable for cw minded hams living within several miles of the transmitter. The well known attribute of the class C amplifier for sharpening the leading and trailing edge of the exciting signal was illustrated with a vengeance! With these examples in mind, and with an eye to providing a smooth, clickless cw signal, the keying circuit of the DX-100 was examined. These recommended changes might

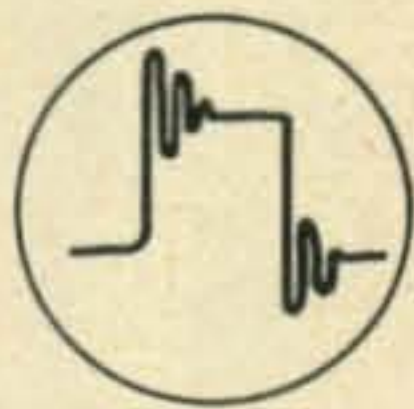


Fig. 1—'Scope picture of "Key-click." Sharp wave front, combined with overshoot of wave produces key-click resulting in harmonics which splatter.

apply to other transmitters of the same type. If you're a phone man, and don't work cw, you can skip the rest of this article and go read **Scratchi!**

The Original Circuit

The original keying circuit of the DX-100 involves simultaneous keying of the oscillator (6AU6) and buffer (12BY7) stages. These two tubes are keyed in the cathode circuit. The 5763 buffer and 6146 amplifier stages are biased to cutoff and remain idle until excited by the low level stages. This method of keying is simple, fool-proof, and allows break-in operation. You can't have an egg in your beer, however, and certain handicaps must be accepted if this simple system is to be used. As the oscillator is started and stopped there is a tendency toward keying "chirps" or frequency

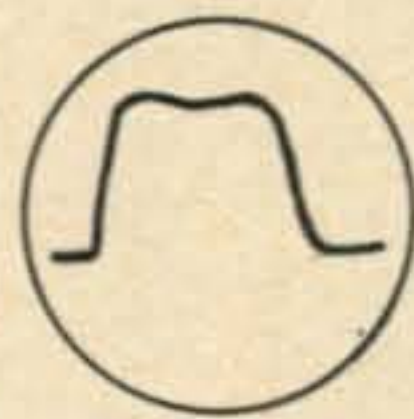


Fig. 2—'Scope picture of a clickless signal. Rounding the corners of the keyed wave prevents higher order harmonics and key-clicks.

shift, particularly noticeable on the higher frequencies of operation. Also, there is a tendency toward key clicks as there is no provision for wave shaping.

The sudden starting of any oscillator produces a sharp wavefront with a possibility of overshoot (fig. 1). The class C stages that follow the keyed stage further sharpen the wavefront, resulting in key clicks which cause interference at frequencies removed from the carrier frequency.

As you see, there are two problems that must be solved before good keying is possible. The first one is to eliminate the keying "chirp" caused by a small frequency shift of the oscil-

lator when power is applied and removed from the circuit. The second problem is to eliminate the extremely sharp wavefront which produces the keying clicks.

A good solution to the chirp problem is to allow the oscillator to run continuously and to key a following stage. This might preclude the possibility of operating break-in on one's own frequency; however, the oscillator in the DX-100 is well shielded in a separate case in addition to the shielding afforded by the transmitter cabinet. Tests performed with a well shielded receiver and a coaxial antenna gave a signal strength meter reading of only S-1 for the oscillator signal of the DX-100. This would readily allow break-in on any frequency, since the received signals would over-ride the oscillator radiation.

The solution to the click problem is to round off the corners of the keyed waveform, preventing the generation of the higher order harmonics which raise havoc on adjacent channels. This may be accomplished (fig. 2) by using a keying system that allows the introduction of

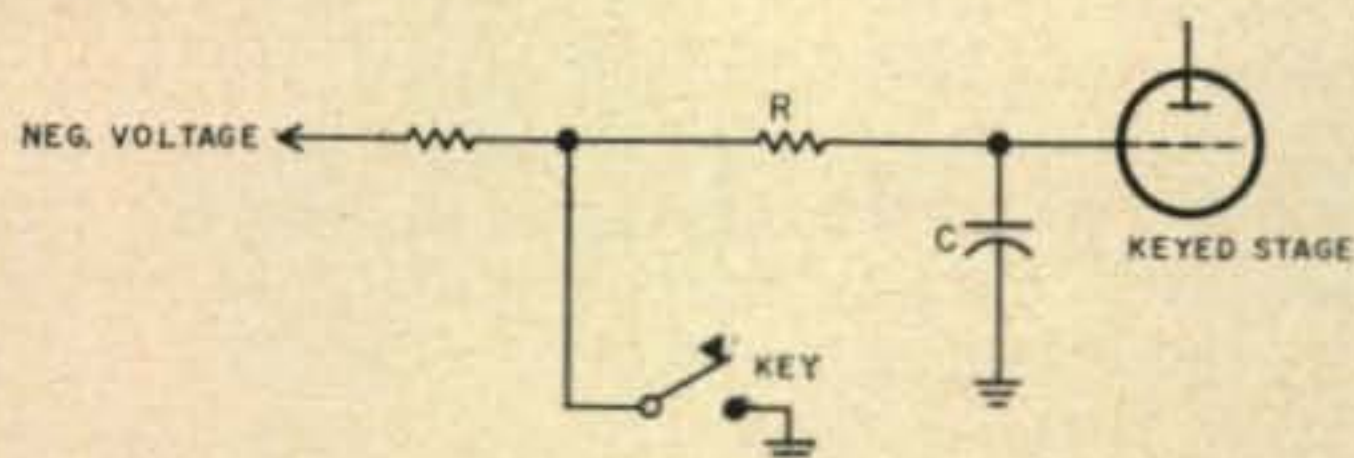


Fig. 3—Simple RC keying filter for blocked grid keying systems.

a time constant in the circuit. The time constant slows the starting and stopping time of the wave, eliminating the sharp wavefront and the overshoot. Grid block keying is one system wherein it is quite simple to introduce a time constant in the circuit. In this arrangement a relatively high negative voltage is applied to the control grid of the keyed stage, cutting off the flow of plate current in the tube. When the key is closed, the negative voltage is shorted to ground and the tube is allowed to operate in a normal manner. The rate of change between the on and off conditions may be set by properly choosing the constants of the time constant circuit. A simple circuit of this type is shown in fig. 3.

Modifications to the DX-100

If we are foxy, we can modify the DX-100 without having to initiate a major rebuilding program. The first step is to remove the keying choke from terminal 9 of the phone cw switch and attach it to an insulated phenolic tie-point which can be bolted to the chassis under the key jack. Use the retaining bolt that holds the filter capacitor in place. The lead in question is the one having the rf choke in it, running from the key jack to the switch. The next step is to run a short length of insulated wire from pin 9 of the phone cw switch to pin 7 of the same switch. (See your DX-100 manual for

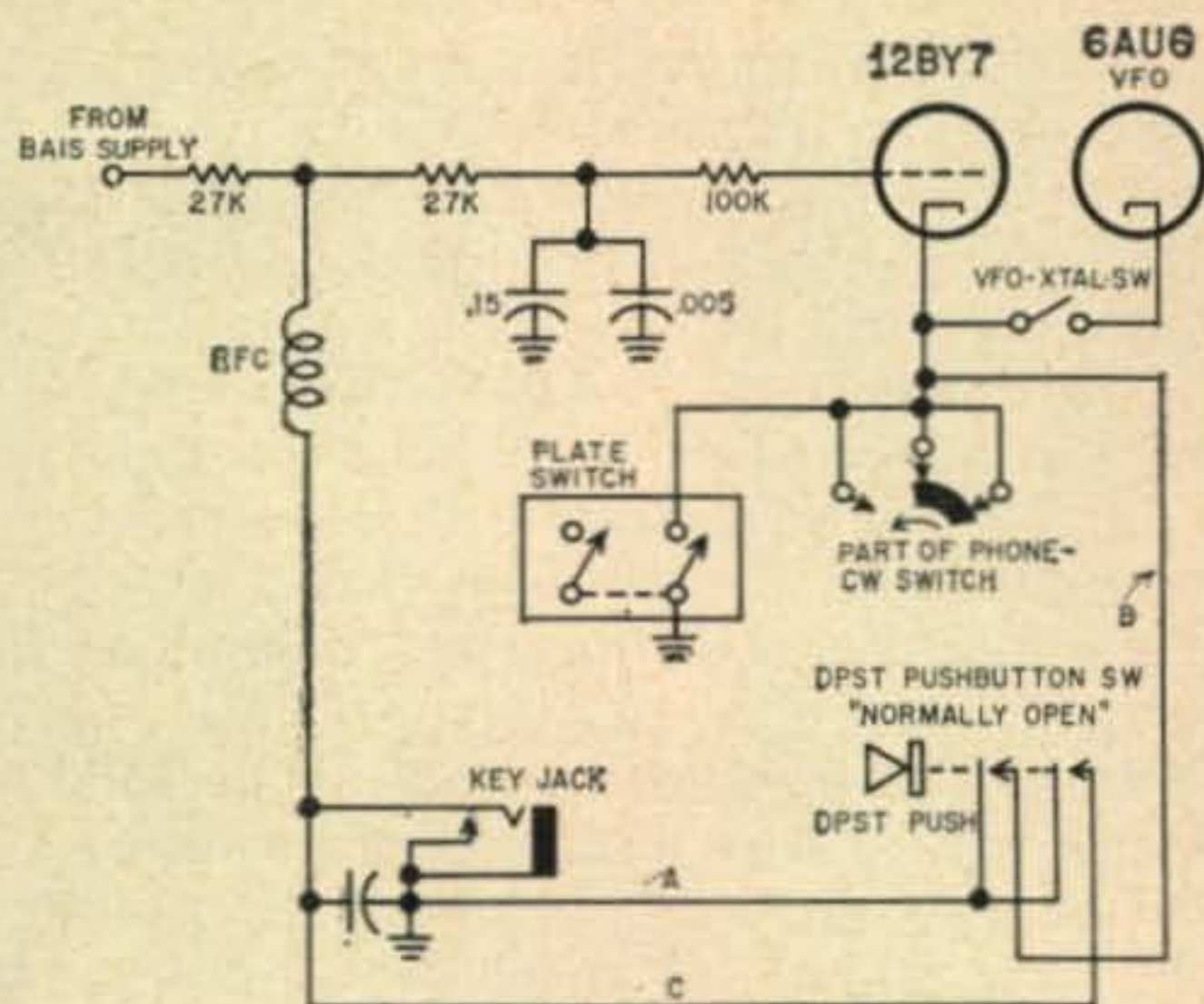


Fig. 4—Schematic of a keying system for the DX-100.

terminal designations, etc.) This simple modification results in the plate switch turning on the oscillator and buffer stages whenever the high voltage is on. This action occurs in both the cw and phone positions. The oscillator stage is the only one that operates however, as the buffer stage is (or soon will be) rendered inoperative by blocking bias.

The DX-100 has a built-in bias supply (6AL5) which delivers approximately -60 volts. This can be used as a blocking voltage. To install the parts for this modification, mount a three terminal lug strip behind the 12BY7 stage, using the mounting screw that holds the octagonal loading capacitor. Remove the 100,000 ohm resistor connected between pin 2 of the 12BY7 socket and ground. Look at fig. 4 and fig. 5 and you will see what is now going to be done. The 27K isolation resistor is installed between terminal 1 of strip DD and pin 1 (unused) of the 5V4 socket. Next, a lead is run from pin 7 (unused) of the 5V4 socket, through the interstage shield to one terminal of the two terminal phenolic terminal strip. A new 100K resistor is mounted between this terminal and pin 2 of the 12BY7 socket. This terminal is next bypassed to the center terminal (ground) with a .005 disc type ceramic capacitor. Finally, a 27K resistor is mounted between the two insulated terminals of the strip. Two long leads are now soldered to the free terminal holding the 27K resistor. One lead passes back through the previously mentioned grommet to pin 1 of the 5V4 socket. The other lead follows the contour of the chassis to the grommet which permits passage of the lead to the vicinity of the key jack. The lead is passed through the grommet and the end is attached to the single terminal tie-point that holds the keying choke. Finally, the 0.15 mfd paper waveforming capacitor is connected between pin 7 of the 5V4 socket and the ground lug of the adjacent filter capacitor.

The last step is to mount and wire the "tune" switch. A 3/8-inch hole is required for the

switch. The hole goes below the nameplate escutcheon at the upper right hand panel area of the transmitter. The center of the hole is exactly $4\frac{15}{16}$ -inch below the top edge of the panel, and 3-inches in from the right-hand edge (figure 6.) Drill the hole first with a small drill to ensure accuracy. Hold a block of wood behind the panel to protect the filter capacitors. It will be costly if you drill into them! Take care that metal filings from this operation do not get distributed within the transmitter! Easy does it!

Wire the push-button switch in the following manner before it is mounted in the hole: Connect the two moving blades of the switch together and attach a 7" wire to this point. Mark the end of this wire for future identification. We'll call this **lead A**. Connect two other wires of the same length to the two stationary contacts of the switch. These wires need not be distinguished from each other. We'll call these **leads B** and **C**. Now, mount the switch on the panel and feed the three wire through the chassis hole between the filter capacitors. **Lead A** is connected to terminal 1 of the key jack (ground), and **lead B** is attached to terminal 8 of the phone/c-w switch. **Lead C** is attached to the left-hand terminal of the key jack (terminal #3). This completes the modification.

Transmitter Adjustment

Check all your wiring against the illustrations to make sure that all connections are made properly. Inspect your work for "rosin" joints and poor connections. After you are sure that everything is in order, turn on the transmitter and readjust the clamp circuit. With plate power applied to the final amplifier and no excitation (VFO-xtal switch in an unused xtal position) set the clamp voltage (screwdriver adjustment) until the final amplifier plate current returns to zero. Do not pass this setting.

Turn off the high voltage, set the switch for vfo operation and while pushing closed the tune switch, tune the vfo and buffer to the desired operating frequency. Now, release the push-button, turn on the high voltage and tune the final amplifier for normal operation. The

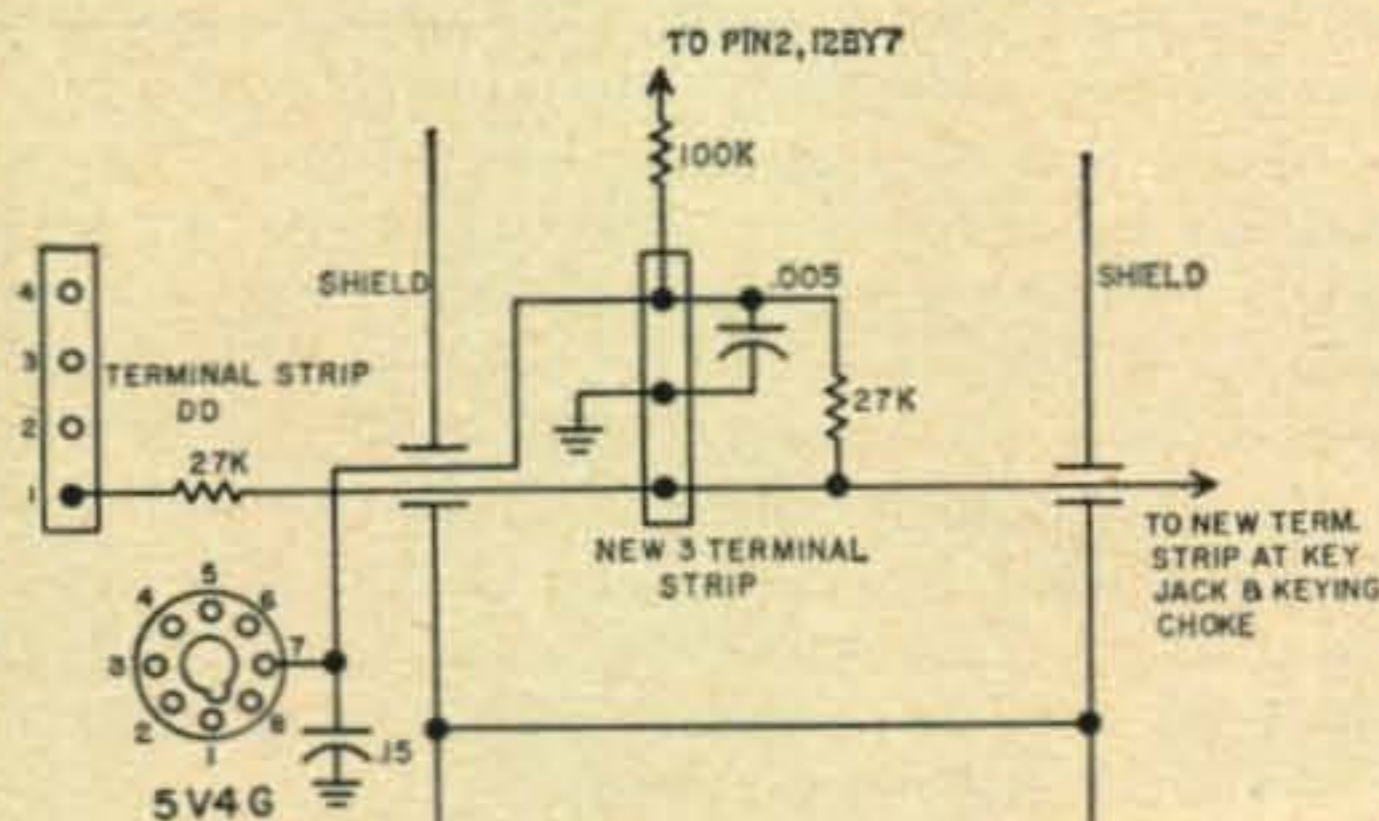


Fig. 5—Pictorial parts layout for the keyer.

push-button switch may now be used for frequency spotting—and man!!—is it a handy thing to have!

Theory of Operation

About -60 volts is "stolen" from the bias supply and applied to the grid of the 12BY7 buffer, cutting the tube off. The bias voltage is passed through two 27K and one 100K resistors to the grid. Since no current is drawn, the full sixty volts appears at the grid terminal of the tube. When the key is closed, the point between the two 27K resistors is grounded. The first 27K resistor isolates the bias supply so that it is not shorted out when the key is closed. The second 27K resistor in conjunction with the 0.15 mfd capacitor provides the RC time constant for the "make" portion of the keyed wave. The 0.15 mfd capacitor discharges through the 27K resistor to ground by way of the key contacts. Thus the negative blocking voltage on the grid of the 12BY7 does not instantaneously fall to zero, and a "slope" is introduced on the keyed wave. With the key down, the 12BY7 is self-biased through the 27K and 100K resistors, and operates in normal fashion. When the key is open, the 0.15 mfd capacitor charges through both 27K resistors, and the blocking voltage at the grid of the 12BY7 rises slowly as the charge on the capacitor increases. By the time the capacitor is fully charged, the tube is inoperative. This action produces a slope on the "break" portion of the keyed wave, eliminating the keying transient at this point.

Results?

Ah, the results! It really makes life worth living. The keyed signal will pass the closest scrutiny of the most jaded DX-man, whose ears titillate at the least sign of a click. If it is desired to soften the keying even more (as may be necessary when a high power amplifier is driven by the DX-100) the 0.15 mfd timing capacitor may be increased to 0.25 mfd or even 0.35 mfd. ■

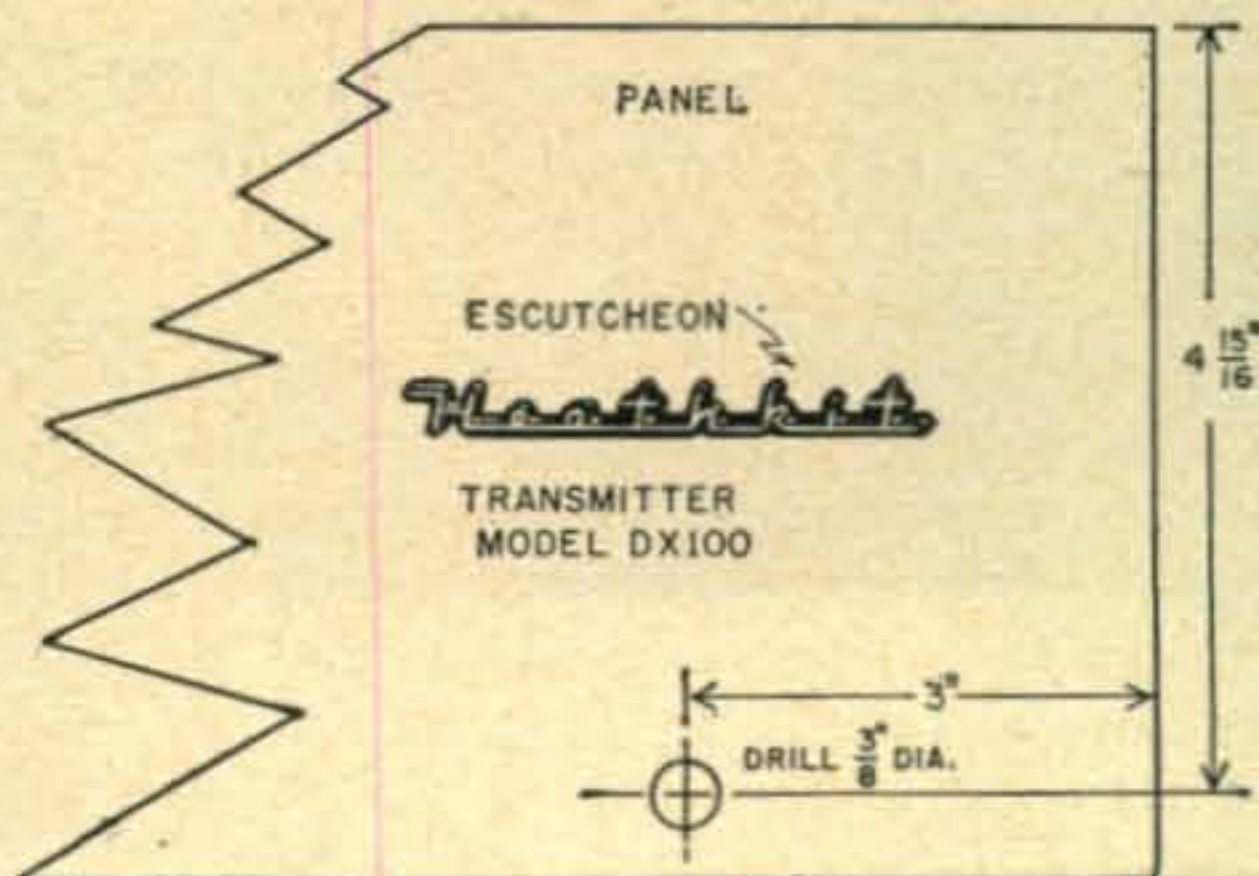


Fig. 6—Panel layout for the new tune switch.



The Knight-Kit Receiver

Oddly enough, while the "do it yourself" craze has invaded much of the electronics field in the form of transmitters, hi-fi amplifiers and all types of accessories, the communications receiver has been a strictly "store boughten" item for the great majority of amateurs. The complexities of the modern amateur receiver, together with an increasing emphasis on stability, selectivity and high sensitivity have been largely responsible for this lack of receiver kits which can compete with already manufactured receivers not only in these quarters but in appearance and cost as well.

The Allied Knight-Kit receiver model 83YU-726 has been designed with these factors in mind and competes very favorably both performance-wise and cost-wise with factory built receivers costing considerably more. The finished product presents a pleasing, well packaged and neat appearance so that the average ham does not have to apologize to any of the visiting firemen for a receiver that he has assembled himself, nor is it necessary for "hay-wire" to arouse the ire of the female contingent of the family when cleaning day is destined for the ham shack.

Assembly and Wiring

The kit comes nicely packaged with each part identified so that there is little chance for confusion. There is no drilling, bending or sledge hammer work necessary so that even the kitchen table may be used for the cliff dwellers whose shop is a mere dream of the future. The printed circuit boards—there are two of them—eliminate about 75% of the tiresome wiring job and about 95% of the errors that are so easily made. One of these printed circuit boards includes all of the *rf* wiring and the other

includes the *if* and audio circuits so that the only actual wiring that has to be done is that of the power supply, interconnection of circuit boards, and the different controls which are attached to the front of the chassis. While these printed circuit boards are not preassembled and prealigned, the assembly is made very simple as each resistor, coil, or other part is identified by a number which is printed in an appropriate place on the circuit board. This shows the constructor exactly where the part is to be placed and provides the identifying number that can be matched with that printed on the part or package in which it is shipped.

A word about the instruction book, because the value of the kit is largely determined by the ability of the purchaser (whose skill may vary in range from that of a mere beginner to that of a skilled technician) to assemble the kit without confusion or error. For the beginner the book devotes several pages to construction hints and soldering kinks. A step by step assembly and wiring procedure which if followed, results in little or no question as to the receiver's performance when completed. Each group of steps is well illustrated and a quick resistance check is suggested periodically with expected values shown. Where the assembly is difficult to illustrate, exploded views are given of the mechanical set-up which clear up any difficulty in the mind of the builder.

The testing and alignment instructions are complete, very adequate and easy to understand and follow. A chart of the alignment is included for the more skilled technician and the alignment, if done according to the instructions results in a thoroughly satisfactory performance of the completed receiver.

[Continued on page 110]

Transatlantic Video DX

Thomas K. Aalund, K2VBI

Box 13
Roslyn, L. I., N. Y.

Recently another amateur, W2UFU, asked an apparently simple question: "I have occasionally picked up transatlantic TV signals. How do I go about putting them on the screen, inasmuch as they use different standards over there?"

Naturally it was not new to us that they used different standards over there, and we also knew that the line frequency there is 50 cycles as opposed to our 60 cycles. But we certainly did not know how many different standards are in use in Europe! We started to do some research and the results are confusing and interesting. Anyone wishing to pick up not just TV signals from one but several different countries faces an interesting challenge, but the project is far from impossible. Certain of the circuits in the television receiver will have to be equipped with switching facilities in order to change from one standard to another as signals from different countries are picked up.

A considerable amount of research was put into the answers for this question and we believe that this information is of sufficiently wide interest to warrant publication of the results. It should be pointed out right here that we do not expect anyone to be able to receive signals from all of the more powerful stations, inasmuch as some strong stations are operating in the same frequencies. Video signals have however been received and all that remains to be done is to put them on the screen. For this we need firstly a listing of all applicable standards so that a TV receiver can be modified accordingly; referring to Table I we see that we have a total of six different sets of standards, none identical with the system used in the United States. In addition to the above, two TV stations are being operated in Germany by the US AFN (Armed Forces Network), according to U.S. standards. Due to their limited power it is extremely unlikely that these can be logged here however.

Taking a closer look at Table I we see that the situation is not as bad as it appears. While there are six different standards, there are many identities and similarities. The number of lines for example has only three possibilities, i.e. 405, 625, or 819 (our own system having 525). The vertical frequency is in all cases obtained from the line frequency, which is 50 cycles. In all cases the ratio of picture width to height, including the U.S., is 4 to 3. The only exception is France with a ratio of 4.12 to 3. This small difference is insignificant. These and other similarities make one wonder if it would be possible to modify a U.S. tele-

vision receiver and to incorporate switching facilities to accommodate all standards. We find that this is exactly what is done in the case of the latest European receivers. The problem they face is the fact that it is possible to receive signals from across the border and the neighboring country might have a different standard. A single standard receiver would be quite useless.

Since each individual receiver will require a different treatment, it is not possible, within the limits of a short article, to present exact and detailed modification suggestions. It is understood that a good antenna system and a low-noise preamplifier are a must if success is to be expected. We can only describe some of the systems in detail and give a few general hints.

France. The picture consists of 819 lines with a vertical frequency of 50 cycles and positive modulation. Maximum video carrier amplitude is transmitted for white. It is an advantage of the positive modulation system that interference pulses cannot upset the synchronization. Such interfering pulses can however create disturbing whitespots in the picture, while they would result in less noticeable dark spots in the case of negative modulation. The sound carrier frequency distance from the video carrier is 11.15 *mc* and the sound carrier is amplitude modulated. This latter fact makes it impossible to use an intercarrier system. The sound carrier frequency is below the video carrier frequency, or above the video frequency. This means that either sideband may be cut. In all other standards, including the U.S., but excluding Great Britain, the lower sideband is the one that is being cut. In the French system the suppressed sideband is transmitted to an extent of 2 *mc* while other systems cut much sharper.

Belgium. This country is plagued by the simultaneous coexistence of two different systems. The difference between the two systems is however only in the number of lines, which can be 625 as in the general European standard or 819 as in France. Both systems have copied from France the positive modulation and the amplitude modulated sound. AM sound again eliminates the use of an intercarrier system. The channel width is according to the European standard, also called the CCIR standard. The video and sound carrier separation is 5.5 *mc*. Additional confusion is caused by the fact that a Belgian station operating on 625 lines may, after proper announcement, change over to 819 lines and vice versa.

European Standard. (CCIR Standard). In most European countries the CCIR Standard is used. The picture consists of 625 lines, with a vertical frequency of 50 cycles and negative modulation. The modulation system is similar to ours, the sync pulse being maximum amplitude and the black level of video being about 75% carrier amplitude. The sound carrier frequency is 5.5 mc above the video carrier frequency, i.e. the separation is 1 mc more than in our case, where the separation is 4.5 mc. 'White' is at 10% amplitude and this is the minimum amplitude transmitted. These measures and the fact that the sound is FM make it possible to use an intercarrier system. The total channel width of this system is 7 mc.

Great Britain. Their system uses only 405 lines, with a vertical frequency of 50 cycles and positive modulation. The sound carrier, which is amplitude modulated, is 3.5 mc below the video carrier frequency. They have the narrowest channel, with only 5 mc; 3 mc of which is the video bandwidth. As in all positive modulation systems, the white level is transmitted at 100% modulation. The sync pulse amplitude is 0 to 2% of maximum and the black level occurs at 30% of maximum.

The above data will make it possible to arrange for proper switching circuits when changing from one standard to another. It might be helpful to consider several other points when making such a conversion. When receiving signals from a Belgian station the sound carrier has to be suppressed considerably, since an AM interference signal (the sound signal) can more easily disturb the picture than an FM signal. A suppression around 35-40 db at the first video *if* stage seems just right. When receiving French signals the required bandwidth is almost double any other, i.e. 13.5 mc, and the following steps might help: in-

creased coupling, flattening the response curve of the *if* (without losing too much gain) and care to suppress the sound carrier.

On any positive modulation signal the detector polarity has to be reversed unless a negative picture on the CRT can be tolerated. The final video stage should not run into positive bias. Therefore a negative signal should be applied at the grid which is strong enough to hold the grid just below zero even at maximum white, i.e. maximum signal amplitude. Variation of this negative voltage can serve as a contrast adjustment. This will not influence the brightness setting in most sets.

Due to the differences in separation between video and sound carrier frequency it is a requirement to have a sound i-f strip with adjustable frequency, i.e. the resonant frequency of the i-f transformers can be changed by means of tapped coils and/or additional parallel capacitors. The detector stage will have to have provisions for FM as well as AM.

While all the above details may seem a bit confusing at first, it should be remembered that there are commercially available sets on the market which *automatically* switch from one standard to another, depending on the station received. They will select any one of four standards (not all standards can be selected on automatic sets so far). With this in mind we want to pat our ham fraternity on the back and state that hams can do the same, even if not automatically (who wants that anyway?). We are curious to know how soon some ham will have a unit in operation. In closing we want to point out that any device with such a great bandwidth as a video display device (television to you) can also serve as a good indication if the band is hot, in as much as you receive and observe a fairly wide range of frequencies simultaneously. ■

TABLE I

	Europe (CCIR)	Belgium I	Belgium II	France	England	Eastern Europe	USA
# of lines	625	625	819	819	405	625	525
Vertical freq.	50	50	50	50	50	50	60
Horiz. freq.	15625	15625	20475	20475	10125	15625	15750
Picture width to height ratio	4:3	4:3	4:3	4.12:3	4:3	4:3	4:3
Video modulation	AM neg	AM pos	AM pos	AM pos	AM pos	AM neg	AM neg
Sound modulation	FM	AM	AM	AM	AM	FM	FM
Sound bandwidth FM channel width	50 kc					50 kc	25 kc
Video bandwidth	7 mc	7 mc	7 mc	13.5 mc	5 mc	8 mc	6 mc
Sound carrier	5 mc	5 mc	5 mc	10.6 mc	3 mc	6 mc	4 mc
Separation from video carrier	+5.5 mc	+5.5 mc	+5.5 mc	±11.15 mc	-3.5 mc	+6.5 mc	+4.5 mc
Sideband being cut	lower	lower	lower	lower or upper	upper	lower	lower
Black level, % of maximum level	75	25	25	25	30	75	75
white level, % of max. carrier level	10	100	100	100	100	10	15
Sync pulse level of max. carrier level	100	3	3	3	0 2	100	100

URBAN Le JUNE Jr., W2DEC
416 North 15 St., Kenilworth, N.J.

DX DX DX DX DX DX DX DX

Congratulations are in order for the following upon obtaining WAZ.

K2GMO Robert W. Ainge	G3JHZ Pete Brisbar
F91L Edmond Dubois	ON4MN Frans Legge
F3CB Robert Breton	W2TXB Al Keltz
K2FC Sidney X. Shore	VK7CH Charles Harrisson
OH3TH Peter Mure	W3BQA Charles T. Vogelsong
G3HFJ R. G. Wyatt	DL3LL Dr. K. H. Schonherr
W6GMC Milton C. Smith	W8DLZ Norman C. MacPhail
DU7SV Voltaire Sotto	W6CZQ George G. Enos
VE8PB K. C. Jung	

Also, congratulations to the following recipients of WPX.

W2PTD Charles W. Floring 300CW
W8YBZ George A. Cunningham, Jr., 150 SSB
K4JVE Dr. Hal S. Johnson 300 CW

The records have not yet been received from W4KVX, therefore numbers cannot be given at this time. Also, WPX endorsements cannot be given until the records are obtained.

This month I'm starting what I'd like to be a regular monthly feature, a short story on a rare DX station. Unfortunately, little material is usually available on these rare exotic stations, however, I hope to be able to piece together little bits of information that you fellows can probably furnish. Any help you can give along these lines will be greatly appreciated. Any pictures furnished can be returned, of course.

AC5PN

As long as we're talking about rare ones, we might as well go to the top of the ladder. Just the mention of this call is enough to quicken the pulse of most DX hounds. Whenever a DX session is in progress, it's only a matter of time until the conversation turns to the AC's. True, there may be countries that are rarer than any of the AC countries, but

there has always been some kind of magic about these mysterious countries nestled in the Himalayas. So, let's take a look at Chhawna, AC5PN. As can be seen from the picture, Chhawna is a young fellow and has been married for about a year and a half. He was educated in England and works for the Bhutanees government. His work at times takes him on field trips with the King for periods as long as five months. He has been in every corner of Bhutan and some places are so rugged that even the mules cannot make it and everyone must go on foot.

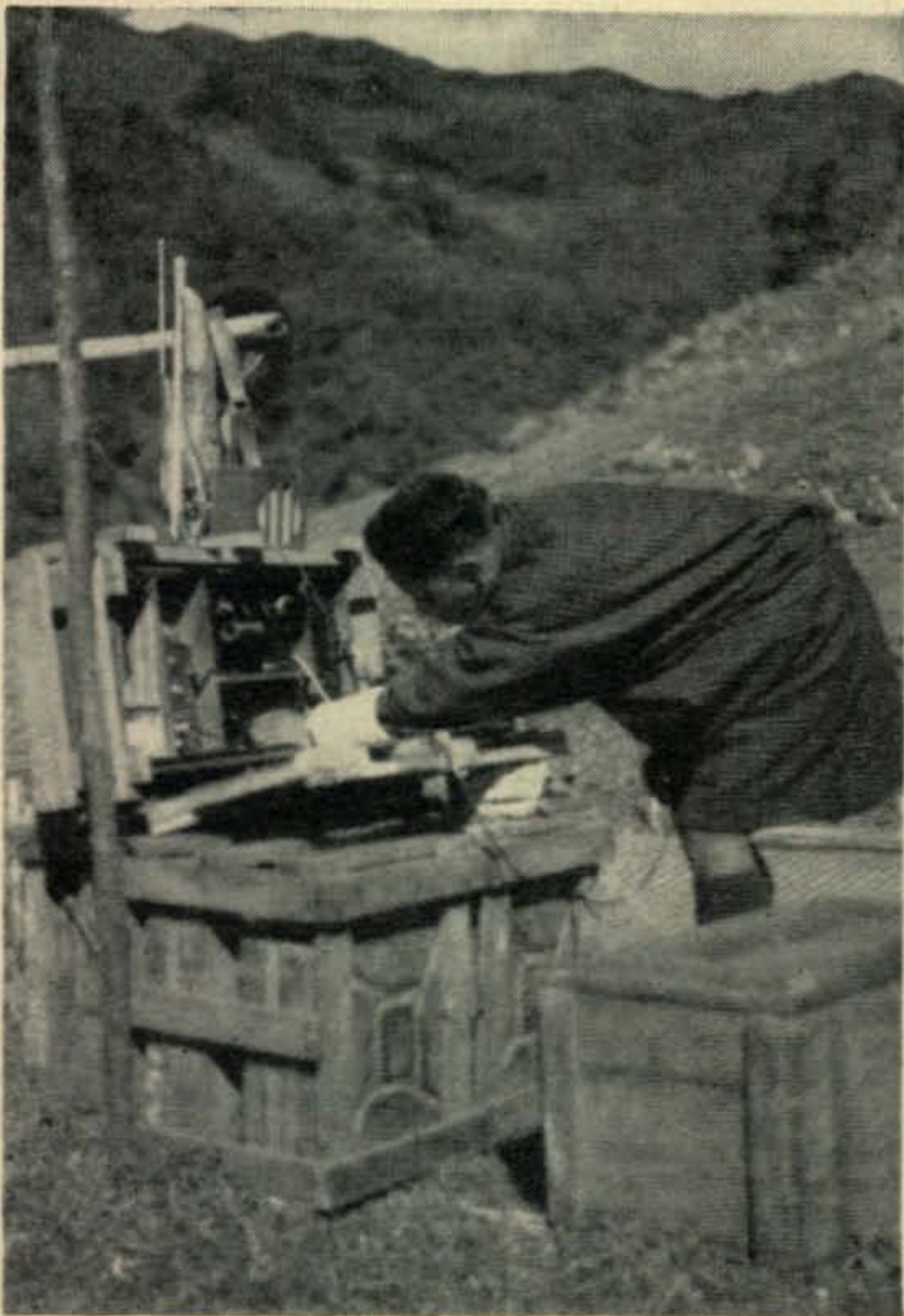
Chhawna's rig is shown in the picture and is out in the open. However, he has very little snow as his QTH is only 1000 feet above sea level. He has a BC610 in India but until now it's impossible to get to it over the mountains. AC5PN's QSL was kindly loaned to us by W2JT. To prove the old story that once you work them it's easy the second time, Earl tells this little tale. In November, 1955, Earl worked Chhawna in a big pile up to become his 6th W QSO. About six months later, tuning the band and not hearing anything interesting, Earl called CQ and who came back? You guessed it, AC5PN. He thanked Earl for his QSL and wanted to know if Earl had received his. What's more, he has both cards to prove it. So, there he is men. As you will see below, it looks like Chhawna is now active with none other than AC3SQ as second op! Oh yes, one more thing. When you hear him, my telephone number is BRidge 2-5983, hi. Thanks to W2AGW and W2JT for the pictures and information.

AC3 Sikkim—Did any of you notice the article about Sikkim in Time magazine a few weeks back? In the article, it told about the Maharajah who rode around the country's 28 miles of paved roads in a pink Mercedes. The Maharajah is none other than AC3PT. It's a shame he doesn't have a KWM-1 in that Mercedes.

AC4 Tibet—Shankar, AC4AX, continues occasional activity on 14098. He is located 350 miles from Lhasa near India. AC4NC is now in AC3 land (no license) so Shankar is the



Chhawana, AC5PN, and two of his local friends. The weapon at his side is for those who get out of line in pile ups. He didn't say so but I bet the mountains in the background are directly in line with the states. (Tnx W2AGW and W2JT)



AC5PN getting ready to turn the band into a state of pandemonium. (Tnx W2AGW) (AC5PN QSL) Here's one most of us would give our right arm to have hanging on the wall. (Tnx W2JT)

DECHEN-CHOLING, THIMPHU,
VIA POST OFFICE, KALIMPONG, INDIA
BHUTAN
ZONE 22

A C 5 P N

TO RADIO W2JT THIS CONFIRMS OUR A1 - A3
RADIO CONTACT OF 19.11.59 1959 ON 17 MCS.
AT 12:45 GMT UR SIGS RST 39
1875 BHUTAN TIME QSL Tnx

73s from N. Chhawna

only AC4 at present. He is now having QSL cards printed. (Tnx WGDXC)

AC5 Bhutan—The AC5PN heard recently is apparently good. Saja, AC3SQ is now in Bhutan and operating from AC5PN's shack. Jerry, KA8KW, recently worked them and took traffic for Japan. The recipients were very pleased and knew from whom they had come. (Tnx WDDXC)

CEØ Juan Fernandex — CE3AG whose CEØAA expedition was the start of DXpeditions, as we know them today, is really doing a job as CEØZA. He was working guys con-



If you have an FQ8 QSL chances are it's from one of these two gentlemen, FQ8AP on the left and FQ8HA on the right. They are both part of an IGY team in Bangui, French Equatorial Africa. Serge is shown at the operating position of FQ8AP.

test style as much as 30 kc up the band! It is a pleasure to listen to Luis operate. The way he controls pile-ups is perfection itself. CEØZB, CEØZC, and CEØZD are operating 21 mc and 28 mc fone. CEØ ZB is CE3HL and CEØZD is CE3QG, QSL may be sent direct or via RCCH. If a self-addressed envelope is sent, make it a large one, at least 6" x 4".

F7 France—Dixie, W2ZVS, has been assigned the call F7FI and is looking forward to making a few expeditions. He is a flight officer and gets around quite a bit, so let's hope for the best.

K6LYR, Jerry, has been assigned the call F7EH.

FB8C Comoros—In a letter from Serge, FQ8AP, he states that FB8CD, Comoros, is definitely back on the air each Monday and Tuesday at 1600 GMT. No frequency, but his old frequency was 14075.

JT1 Mongolia—In a very interesting letter from Jan, OK1JX, he helps straighten out some of the JT1AA mystery. Ludvik was originally scheduled to close down at the end of the CQ DX contest, but was active until Dec. 29th breaking in a new HAM! Ludvik's replacement was not a ham but got the bug when he arrived in Ulan Bator. He is trying to get the call, JT1BK, which are his initials. Also, a club station was formed and issued the call, JT1KAA, but all operators are inexperienced and intend to operate 3.5 mc and 7 mc exclusively. When Ludvik returns, he will be the QSL manager for the new JT1.

Now Ludvik will be applying for his own office, and Ludvik will be applying for his own WAZ shortly. Jan said he is sorry that there has been some delay in forwarding JT1 cards, but he has been very busy with work and as we all sometimes forget, duty goes before hamming. Now cards are flowing smoothly again. It would be very nice if everyone who got a new country or Zone 23 from Ludvik, and that's everyone, would drop him a line of thanks for a very difficult job well done. He can be reached at C.R.C., Box 69, Praha 3, Czechoslovakia.

KAØ Iwo Jima—There has been quite a bit of activity from this spot. KAØIM, Jim, 28430 kc at 0135 GMT. KAØCG, Jerry, also on 28 mc fone about same time and frequency. KAØIJ is now in Japan but is bringing back a KWS 1 which should be on the air by the time you read this. (Tnx OVARA Ether Waves)

VEØNI, a very good one for WPX, has been active on 14010 kc. Also fone on 14190. The station was activated on 17 December.

VP2 Danny—As you probably know, Danny ran aground at Union Island (no not ZM7) putting a three by six foot hole in the Yasme and giving himself severe leg lacerations. All radio gear was removed without damage and forty oil drums were put aboard the Yasme to keep her afloat. The boat is repairable and Danny will be back on his way as soon as possible. He's still planning on HC8, CEØ, etc.

VP8 S. Georgia—Einar, VP8BK, has been very active on 14018 and 14076 and has been on fone on the latter frequency for the first time. Odd, an LA7 has also been operating the rig QSL via LA1RC.

VS5 Bruni—VS5JA ex ZL4JA has been putting this spot on 14 mc cw. He prefers to work his ZL, VK friends but works others when he finishes. His most regular time appears to be 1000 GMT about 14078 kc.

VS9 Sultanate of Oman—Probably the biggest news of the month is that VS9OM is now on from this rare spot. Brian was VS9AS before going to Oman for a six-month tour of duty with the RAF. His 8-watt crystal-controlled transmitter has been putting a good S6 or 7 signal here on the east coast. QRG is 14047 with a slight downward drift (no, I don't know how it happens with an xtal controlled rig) of about 1½ kc. He seems to enjoy listening for fone and frequently calls CQ and tunes the American fone band. Brian is very active weekends and most days starting about 2000 GMT and some times as late as 2400 GMT. He also has a 14000 crystal but has not been heard on this frequency yet. On cw, it is best to call him about 10 kc high. On fone, it's anyone's guess. If you don't have fone, don't hesitate to call him on CW in the fone band as he works many this way. As mentioned earlier, he will be there for six months. QSL via W6BSY. Charles handled Brian's QSL's from VS9AS. The cards were sent and Charles forwarded them. However, he is trying to have Brian send the logs via air mail so the cards will be able to be dispatched quicker. ZB2A/-VS9 operated Brian's rig for a few days and if you worked him, QSL via W4ML.

W6 California "KD" W6D1X will make a trip again in May to rare California countries for the benefit of those working for WACC. (Tnx W6KG)

W8 Ralph W8OLJ is planning a plane trip around the world starting in April. He hopes to operate from some rare places with a rig he is taking along. Hope to have more details next month. (Tnx W6KG)

ZL1ABZ Kermadec Islands—It looks as though Mike is going to send QSL's to all stations worked. I certainly hope so. It will be greatly appreciated by the many fellows who put long hours into trying to work him.

ZS2MI. A new operator, Jim, has just taken over at 2MI. Was heard here on 14316 at 1900 GMT. Harry, ZS2HX, is going to try and have him on that frequency every Sunday at 1900 GMT. Line forms to the left on this one. QSL via ZS6ANE.

Just a little thought for trying to extract QSL's out of some of those "tough ones." In many places, IRC's are not acceptable and many frown on "dollars." A method I have found very successful has been to send stamps for the country concerned. "Sax" W2SAW has gotten together most of the stamps you



Chuck, 5A1FF well known SB DX'er, was on an oil exploration team in the middle of the Sahara. Our SSB Handbook editor W6TNS was Chuck's last QSO before pulling up stakes. (Tnx W6TNS)

would be interested in and they are surprisingly inexpensive. Enough for air mail postage to the states is always cheaper than the number of IRC's required for air mail reutrn. Drop Sax a line with a self-addressed, stamped envelope, and he'll be glad to send you the list.

160 Meters

G3PU and W1PPN made the first trans-atlantic crossing of the season with a solid 15 minute contact. Signals varied from 339 to 579. W9PNE worked G6BQ, G3PU and VP7BT. VP7BT and VP9EP are providing many of the boys with a new one. VP3AD is also firing up on the band. VP7BT plans extensive use of band including contest, etc. Look for him between 1800-1810 kc.

DXPeditions

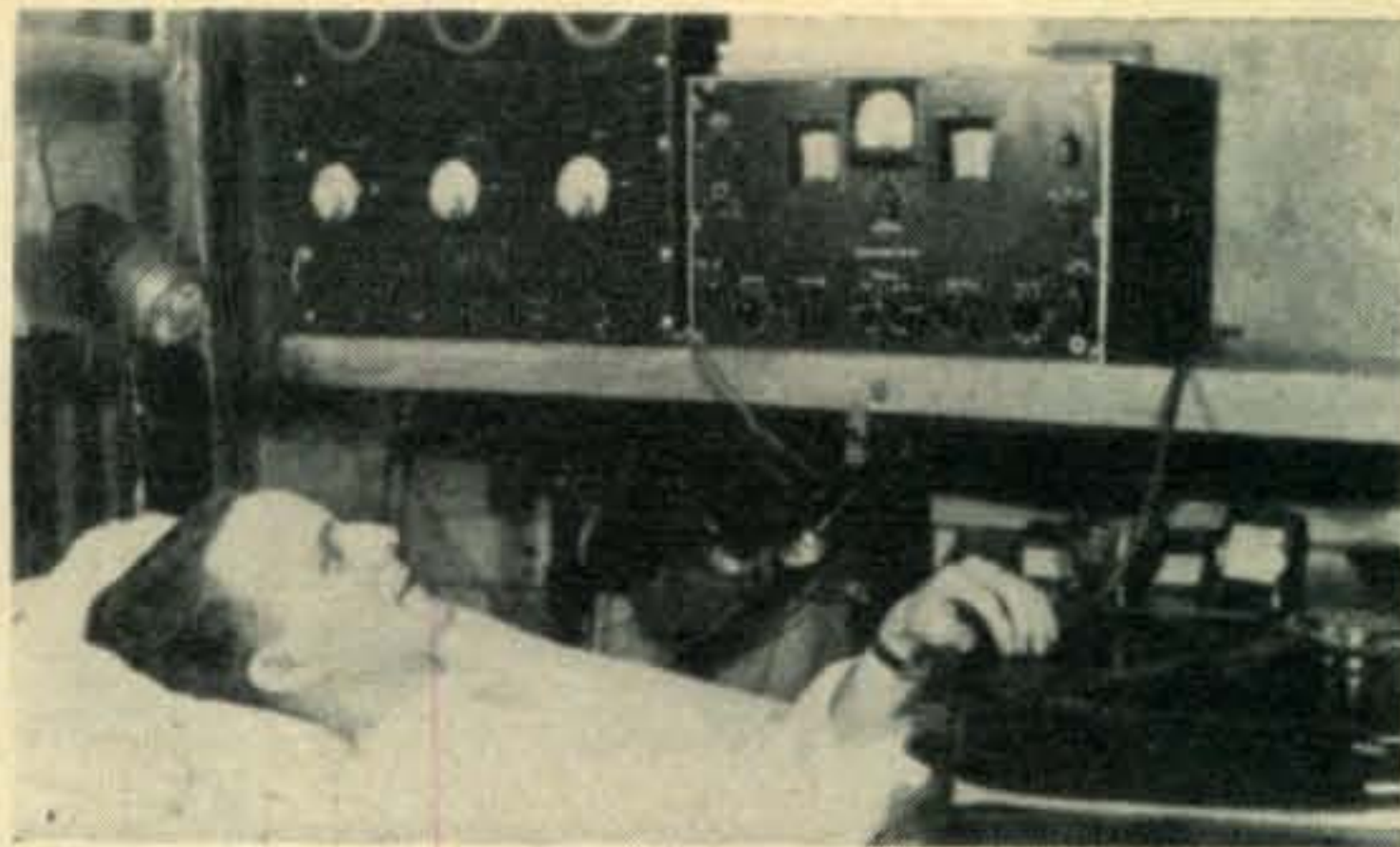
VR5 Tonga—What looks like a real big one

is promised by Win, ZL3DX. Win is getting three weeks vacation and said he already has operating permission and transportation arrangements made for a trip to Tonga. Win, as you remember, was ZL3DA on Chatham Island on his expedition there. He will more than likely spend most of his time on SSB but don't hesitate to call him on CW. He is a 30 wpm operator. While operating ZL3DA, he frequently tuned the cw portion of the band while operating SSB on the high end. Several of the DX clubs in the states have contributed to help Win defray his transportation expenses.

FG7 or FM7—It looks like the Ohio Valley gang will hit either of these two places on their annual expedition. A license was denied from France for either of these two spots because of lack of reciprocity, but they are trying to make arrangements to operate from one of the native licensee shacks. (The way they did at VP5BH) If arrangements can be made, they will be there in April or May. (Tnx OVARA ETHER Waves).

Soap Box

Now that my second little Epistle is about ready to head for the cutting room, I feel entitled to step on the soap box, so here goes. A few nights ago, after several hours of digging turned up nothing worth calling, to break the monotony, I called CQ. Back came a UB5. While the usual RST, QTH, name, QRU were transpiring, I was thinking what a smooth fist and clean note he has. So, I told him. What had started out to be a little more than a five-minute exchange of signal reports turned into an extremely interesting 55-minute chat. We talked about the weather, his rig, it was entirely home made, including the receiver, his work as an electronic technician in a radio factory, and his wife and two small daughters. We talked about some of our common problems, TVI, XYL complaining we spend too much time on the air and not enough time taking them out, hi. As time drew close for him to QRT for work, we promised to exchange "fotos" as well as QSL's. When we finally said 73, I sat back and reflected for a while (it doesn't happen very often). Here we all spend hundreds of dollars putting up high towers, big beams, building high-powered transmitters, buying super-selective receivers so that we can be first in line to hear ur 589 HR in Bolukestan and in turn, we say ur 559, pse QSL, ur new country, 73. Not that I'm advocating we give that all up, I for one don't think I could keep my interest in ham radio if it wasn't for the tremendous thrill you get when you pull a new one out of a big pile up. However, we tend to forget that this same equipment will bring someone from the other side of the world right into our shack for a chat. We begin to see that people are the same all over the world. We're all looking for the same thing and we all have the same prob-



Here is Les Halliwell W1LSZ with his 160 meter rig. He furnishes W1BB with much information in the annual 160 meter DX "tests." Les also chases 10 meter DX with a 32V3/NC173 combination and on that band has had over 600 QSO's with his friend Z55MP. In recognition of this feat he was recently presented with a medal from Z55MP. Les particularly enjoys visitors and likes to hear from his fellow hams.

lems. But above all, we've made a friend. My greatest thrill at Christmas was the Christmas cards I received from my good friend, Father Cav, KC6JC and a UA3 from Moscow. These cards were sent from one friend to another, unlike most of the others that were sent primarily as a matter of formality. It's also a good feeling when someone calls you and says, "Urb, it's good to see u agn." Give it a try the next time the band doesn't sound too good.

Last minute news. It looks like the Yasmie III is a complete loss. All gear except one HT33 was removed without damage. Both Dick KV4AA and Danny promise Danny will finish his rounds of the VP2's, boat or no boat. The new JT1 has been on. His call is JT1AB—FB8CJ is ex FK8AO.—VP9DU will be on from ZD8 for a year.—ZL3 DA will be going to ZM6 and ZK2 as well as VR5 on his expedition.—VE3MR is going with TI2HP to TI9—CR5AC returned to CT1 on March 10th.

QTH's Tnx to W6DXC, NCDXC, OVARA, OK1JX, K9EAB, and W6KG.

CEØZA via CE3AG

CEØZB via VE3HL

CEØZD via CE3QG

CEØZC via RCCH

F7EH Lt. Jerrold E. Gallagher, AO 3080340, 10th TRP Carrier Sq. APO 84 c/o PM, New York, New York

F7FI Lt. H. E. Kiefer, 40th TRP Carrier Sq. APO 253 c/o PM, New York, New York

ex JT1AA and JT1YL

via CRC Box 60

Praha 3, Czechoslovakia

KAØCG USCG Loran Station, APO 815 c/o PM, San Francisco, Calif.

KAØIJ Radio MARS Station APO 815 c/o PM, San Francisco Calif.

ØX3BQ Sven Jorgenson, Upernavik, Greenland

VEØNI HMCS Saurent, Amateur Radio Club, FMO, Halifax, N.S. Canada

VK9RO c/o Posts and Telegraphs, Port Moresby, Papua Territory via Australia

VP8BK via LA1RC

VS9OM via W6BSY

ZB2A/VS9 via W4ML

ZD9AF Dave Watt, Tristan da Cunha, South Atlantic Ocean, c/o G.P.O. Cape Town, Union of South Africa

ZS2MI via ZS6ANE

CQ 1958 World Wide DX Contest

Frank Anzalone, WIWY

Well, what kind of a Contest was it in 1958? It was a contest in which the Phone boys had to sweat it out and the CW gang had a ball. The Phone week-end is perhaps best described by the comments of ZL1MQ. Cliff said, "The moans, groans and screams could be heard all over the world. Conditions were below normal at the beginning and slowly got worse as the contest progressed." This seemed opposite to the conditions experienced here in the US. K6CTV on 14 *mc* said, "Conditions seemed quite sub-par for the Phone week-end, especially the first 24 hours." That was also our experience here on the East coast, Dick. Those fellows who have been advocating a shorter contest period might consider the above example of varying conditions. Like past years, 90% of the activity was concentrated in the United States and Europe, with our neighbors conspicuous by their absence. The side-winders didn't show much interest either. KL7BHE on 21 *mc* wanted to know, "Where were the SSB stations that were advertised?" You've got me Sheila, I was told to expect SSB activity.

Some of the fellows had their own personal problems. IIAHW had to write with his left hand as he had injured his right. Sorry to hear about your accident Beghini, better be careful next time you work on motors. OH5NW had a 6 week session in the hospital right after the contest. Trust you are feeling well now Toivo.

It now seems that a DX contest is the signal for the FCC to send its field agents on the prowl. W3GRF, W4NQM and W8NGO were a few of the boys who received a visit from the R. I. and lost precious time of operation. Ed suggested that each contest log sheet be signed by the operator on duty, since this is the only fault the "Polizie" could find at W8NGO. Guess the boys were disappointed

that they did not make a haul like they did on the West coast during the ARRL "brawl."

Then there were the many moments of exasperation. W3RPG, Bill was talking to himself when the rare ones outside the American phone band called CQ but did not tune down to where the Ws were shouting themselves hoarse. KH6PM, Fred was probably shaking his first at IIAIM/M1, who was booming in like a local on 21 *mc* but didn't listen to the American phone band. And can you imagine what VQ4FK was saying each time the ex-YL plugged in the cooker and dropped the line voltage from 240 down to 170 volts. Next contest have the OW serve cold meals, Dillian. We can't print the language in W2AGW's shack when Howie blew his modulation transformer after his first contact in the contest.

On the humorous side, W5HW, Rod, fell asleep at the desk during a crucial period when DX was finally coming thru on 28 *mc*. Maybe he wont think it so funny when he sees W5ALB's score next month. W6UED, Dennis spent considerable time erecting a new ground plane for 7 *mc* and then put in over 20 hours of operating only to have his log disappear. His kid brother had hid it from him; but we received it in time. But the one that really made us snicker was the note on W9VTV's log. It was Bill's first DX contest and he thought he had to be an OO, OE or something, to join in the activity. Checked QST for rules and information with no success. P. S. The boys up at Hartford were good enough to forward his log. And along these same lines, W8UPN wants to know why ARRL persists in holding their CD party on this particular week-end. Don't know Newt, I've been asking the same question. Maybe this one is not so funny. VU2RM was not familiar with the rules so he only worked a few stations from each

Philadelphians—Not!!

There will be a special ham TV show April 18, 0730 to 0830 on WCAU-TV. This is being put on by the Radio Clubs of the Greater Delaware Valley and the time is being donated by WCAU-TV. Tell everybody.

country in order not to exceed his quota.

It might be of interest that out of 137 QSOs AP2AD had on 21 *mc*, Ahmed only worked six W/K stations. There were only two Phone entries from Barbados, VP6FR and VP6LT, both operated on 21 *mc*. What a waste. ZE1JN advised us that the Radio Society of Southern Rhodesia has a floating trophy awarded to the top scoring ZE station. YN4CB hopes the prize for Nicaragua will go to his QTH. It will Brother Jerome, have no fear. And Alberto gave a new country to a lot of the gang when he operated portable as IIAIM/M1 from San Marino.

A few compliments are always in order. OH5NW, "Finest contest, always enough stations to work." Axel should know, he worked 715 stations on 28 *mc*. LU9FAY, "Needless to say the finest contest of them all." Wish more of your countrymen and neighbors were of the same opinion, Boruch.

However for the CW week-end it was a totally different story. Conditions were so good that W1JYH, Roger worked Zone 23 twice on 14 *mc*. JT1YL as his first QSO and JT1AA was the last entry on his log. W2EQS had an All Band total nearly double that of the previous year. Of course Charlie failed to mention that he is now using nearly double the power and he has a beam to boot. W9IU, Les made WAC in 34 minutes and DXCC in 47 hours. And K2UZJ, Gary made WAC on 10 with only 30 watts. However although conditions were good the elements raised havoc in some sections of the country. High winds had K2DGT's been spinning like a top, which accounted for that peculiar flutter on Bob's signal. W4DHZ lost his beam during a storm on Saturday night but that did not stop Haywood. But for real trouble listen to this tale of woe from W4IFN. Ice covered beam on Friday night, came down with the flu on Saturday and three junior ops. to handle on Sunday while his wife was away, but he stuck it out. Warren is ex-3A2AG. W1ODW complained about poor activity to the south. W8EV not only complained about lack of activity from South America but Africa and Oceania as well. Bennett suggested that we review our publicity plans. Well, I'm open to suggestions but here is what we did last year. Included a copy of the 1958 rules with each certificate. Also notified all the known Ham magazines and DX Clubs in the world. A good supply of rules were also given to leading US DX clubs, for distribution by its members. Now, any additional ideas anyone?

Bill, W3RPG, condemned tail-ending. Says it drove away some of the DX boys. While another Bill, KR6BF, is gratified we no longer advocate working stations off their frequency. Well, we neither condemn one or advocate the other. I say "let the DX station set the pattern." Can you imagine not tail-ending stations like CE3AG or KH6IJ? And K2YOR was

annoyed because he had to work the US and Canada to get Zone and Country multipliers. Maybe Ralph can suggest some other way to get Zones 2, 3, 4 and 5. WØVIP was surprised at the increase in the minimum hours rule. "Can't practice medicine and not make these contests more than just a leisure week-end." Well Doc, guess you will just have to go "off call" come next contest. VE8FO complained of the bad manners of W/K stations who cut in while he was trying to work an AP5. I'd get sore too Jim, I could write a book on that topic.



XZ25Y, "Soe Ya." DXCC, WAC, WBE.

On the lighter side, W3HEC was unable to devote full time because it seems Dan had to entertain his good looking sister-in-law who arrived on an unexpected visit. "C'est la vie!" And LZ1AF had YL trouble too, Dimiter's sister had to pick that Sunday to get married. But all the YLs didn't get in the boy's hair; W3LSG's ex-YL brought his meals to the shack. As an operating aid many of the fellows had "an understanding wife."

Then of course there were the many demands for a power multiplier but W7AHX answered that very nicely for us. Said George, "I can find no fault with the rules. They give medium and low powered stations a chance to win by single band concentration."

All in all we had quite a shindig. VS9AS, Brian, "My first contest and by no means my last." And wouldn't it be nice to be in Don's shoes. K6VXM, "I'm only 16 years old so have many CQ DX contests to look forward to." And said GM3FJP, "it was a strenuous contest, but most enjoyable." Incidentally he is ex-VU2JP, if you should need his card.

All scoring records went out the window and it looks like most of the Trophies will find permanent homes over seas. However its still a bit early to really tell so be sure to see next month's issue for a complete report on the Phone results. If we can dig out from under the CW avalanche, we will have those results in the following issue.

CONTEST CALENDAR

by Frank Anzalone, WIWY

14 Sherwood Road, Stamford, Conn.

Contest Calendar

April	4-5	Helvetia
April	11-12	REF PHONE
April	18-19	CQ WW SSB
April	25-26	PACC CW
April	25-26	CQ VHF
May	2-3	PACC PHONE

Helvetia 22

This is your opportunity to fill in those missing cantons for the beautiful Helvetia 22 certificate, and at the same time compete for a contest certificate.

The object of the contest is for stations outside Switzerland to work as many stations as possible in each of the 22 Swiss Cantons.

Starts: Saturday, April 4th at 1500 GMT.

Ends: Sunday, April 5th at 1700 GMT.

1. All bands between 3.5 mc and 29.7 mc may be used, CW/CW or Phone/Phone.

2. Serial numbers will be the usual five or six digit numbers, signal report plus a progressive 3 figure contact number.

3. Each contact counts 3 points and the same station can be worked once on each band.

4. The multiplier will be the sum of Swiss Cantons worked on each band. The CW contacts plus the Phone contact. Therefore the maximum multiplier possible, on each band is 44. (22 on CW and 22 on Phone.)

5. Your final score therefore will be the sum of QSO points on all band, multiplied by the sum of Cantons worked on each band.

6. Use a separate log sheet for each band, using only one side of paper.

7. A certificate will be awarded to the two highest scores from each country. Each district in the United States and Canada will be considered as a separate country.

8. Sign the following declaration: "I certify that my station was operated in accordance with the rules and spirit of the contest, and

I agree that the decision of the council of the USKA will be final in all cases of dispute."

9. Your logs must be postmarked not later than April 20th 1959. Mail them to: The U S K A, Att: Acklin Frank, HB9NL, Knutwil/LU, Switzerland.

Names and abbreviations of cantons:

Zurich—ZH	Schaffhouse—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	Grisson—GR

REF

The CW section is now all over. However you phone men still have a week-end of activity. It starts at 1400 GMT on Saturday and ends at 2200 GMT on Sunday. If you don't know what it's all about refer back to last month's Calendar. Be sure your log is in the mail not later than May 3rd. Send your entry to the REF Contest Committee, B.P. 42-01, Paris R P, France.

CQ WW SSB

Bob Adams filled you in on all the details in his column last month. Don't forget, it's a WPX multiplier instead of the usual country. It's a 24-hour affair starting at 1800 GMT Saturday and ending at 1800 GMT Sunday.

PACC

This is the 4th Annual PACC contest held by the VERON. The object of the contest being for stations outside the Netherlands to work as many PA stations as possible. Contest
[continued on page 89]

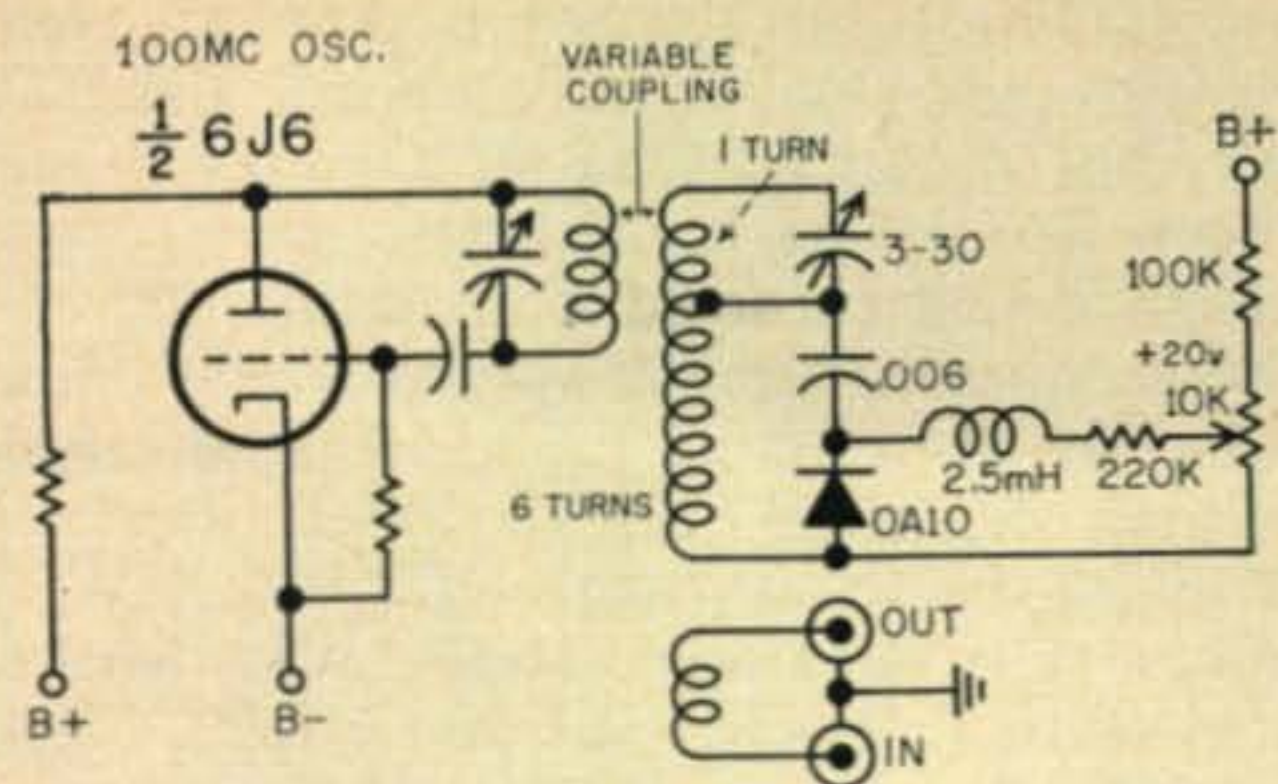


Fig. 1-A 50 megacycle parametric amplifier suggested by VK3ZOG. The OA10 is a germanium diode made by Philips for computer work.

top quality V.H.F. equipment, Tapetone Inc. is donating a six meter converter to be given away at the V.H.F. forum. Tickets for this prize will be available at the V.H.F. registration desk in the V.H.F. room.

I don't want to seem repetitious but the Dayton Hamvention is good enough to bear repeating. *Don't Miss it This Year!*

Parametric Amplifiers

Seems like the word is slowly sinking in. Information from all corners indicates that the VHF boys are really on the ball on this one. Several good construction articles are on the way and this column will publish all hints and kinks which we receive on the subject. Latest goody is from Ian Macmillan, VK3ZDG, 1 Norfolk Road, Surrey Hills E. 10, Victoria, Australia. Jock sends the circuit shown in fig. 1 and lists seven points to observe as follows:

1. Shunt C impossible as swamps delta C of varactance varactor.
2. Varactance (I invent—) picofarads/volt measured at 50 (or 60) c/s. Don't try and measure in tuned circuit with GDO or some such—the strangest things happen!
3. 220K resistor only there to protect (when I was using battery) against reversal of battery polarity. First resistor to hand.
4. .006 condenser—picked at random from junk box.
5. *NOT* essential to have circuit resonant at F pump, but if you don't you have to belt the injection in.
6. Idler resonance *is* necessary.
7. It's not "anything might work," it's "It's surprising what does work."

Received word from Frank (W6AJF) that his paramps are working on two meters, 220 mc and 420 mc with 1296 in the offing. Frank has several construction articles in the works and you should know by now that when it's done by Jones it's done right. Frank has some hot ideas which you don't want to miss.

Present work here is on a complete paramp converter for 220 mc. Already have one working on 1296 which gives 1.0 db NF into a 6 db if system. Other goodies in the work, let's hear how you are doing.

Clubs, Nets, Notices, etc.

NOTICE—That all of southern California from Bakersfield to San Diego will be horizontally polarized by March 1st on 220 mc. This will mean that the 220 mc band is now horizontally polarized all over the United States and might bring more DX records to the west coast.

Picnic—Royal Order of Hoot Owls 5th Annual Family Picnic

June 21, 1959 Registration 9:00 A.M. to 1:00 P.M.

Crazy Hat Contest (XYL), Swimming, games —FUN

Gaffney's Resort on Lake Wilderness near Renton, Washington. Use R.O.H.O. name for admission. For "Hootowl Membership" and Family only.

Six Meters

One of the best and queerest days of operating six meters was on February 1, 1959; it compares to February 23, 1958 which was even a little bit better for DX operation.

This year on February first the band was open to Europe and to South America at the same time. WIHOY turned her beam toward Europe, called "CQ DX" and heard nothing but the British T.V. After listening carefully for a few moments, she heard a very weak signal calling "CQ DX" and signing HC1Y?. Frantically pushing and pulling switches WIHOY managed to get the beam headed south and called HC1Y?, but no luck and no reply. Upon calling another "CQ" and tuning again she did get a call from HC1FS in Quito, Ecuador on 50.2 Of course by this time (two months later) everyone or almost everyone has heard if not worked Fred.

After signing with Fred and standing by for a DX call Helen heard HB9BZ in Switzerland coming back to her call. Aagain, this was with the beam toward the south. She swung the beam toward Switzerland and Karl's signal was still in there but unreadable. On swinging the beam back to the south it became a good Q5, S5 signal and the contact was completed.



Another avid VHF contester and winner on 50 mc is Hank Palmeto, W3JMY.

The band also opened to the west coast a couple of hours later.

Now the comparison with February 28th of 1958. On that date the band was open to Europe, to South America and to the West Coast all at the same time, and with the beam headed south. To the south PZ1AE was coming in at the same time that EI2W was being heard. XEIPY was coming in along with Rene and Harry and scattered around between the dx stations we were hearing stations in Texas, California and Washington. TG9JW was also coming in for the first and only time heard in W1 land.

So far as we know these are the only times known when DX from so many directions all came in at the same time and with the beam peaked toward the south.

The Hague, Holland Word has been received from Bert Van der Wart (PAØWAR) to the effect that—: "Have heard you (W1HOY) calling CQ DX Europe several times yesterday (February 1, 1959) and also many other times. W1GKE was also a very good signal on February 1st. Conditions were not bad and the stations from the eastern part of the USA came in here rather well despite severe QSB periods."

"My activities on six are restricted to listening only. My ham activities are principally on VHF and UHF. The two meter and 70 mc bands are rather popular in western Europe."

"Have also converters and antennas for your earth-satellites and moon-bounce signals, 108 mc and 151 mc respectively. The last I've never heard yet." *Very nice of you to write us Bert and maybe we'll make a moon-bounce contact yet.*

Oahu, New Zealand Keith Kirkcaldie (ZL2DS) sent us his 100 QSLs from New Zealand for six meter "Century Club Certificate" and those cards are enough to make us all drool. Along with the cards he sent the following news: "The most outstanding fact of this year's DX to W land have been the earliness of the openings. Back in '47 and '48 we never looked for W signals until 1130 or so local time (2330 GMT), but this season from the 20th of February ('58) on the band opened here around 0800 N.Z.S.T. I have noticed here that JA's, VK9 and VK6's come through near 0800 hours their local times and feel that many places have been missing out on six meter DX through not listening early enough."

"The six meter band was open here for DX QSOs on more than half the days between 2/13/58 and 5/18/58."

"This spring the band has been poor; One QSO with K6RNQ, Bob on the 14th of November; JAØ and JA6 on 18th of November, VK9XK on the 10th of November and 7th of December. We are now back working VK's on Sporadic E. *Just imagine, working VK's on Sporadic E!!!!*

"The IGY stations in South America were coming through almost daily up till the 11th of May, but no sign of hams. One LU8 may have been worked by ZL2ABX."

"We have just received bad news. All ZL's have been moved from 50 mc to a new band, 51-53 mc as from January 31, 1959. We have faint hopes of getting back to 50 mc.

"I finished the season working 1-W4, 6-W5's, 55-W6's, 4-W7s, and seven states. Also worked 56-JA's, XE1GE, KX6, ZK1 and VK9's." *And I have the QSLs to prove it too. Ever seen a KX6, VK9, ZK1, VR2 or even a ZL 6 METER QSL? Keith is very trusting, for the above cards were sent to me for C.C.C. for six meters.*

Halifax Co., Nova Scotia From Our neighbor to the North, Bud Kingsbury ((VE1ZR) we hear:

"I now have twenty-eight states and nine countries on six meters. I work out best toward Europe as I am on the eastern slope of a hill about three hundred feet from the Atlantic. EI2W is between 20 and 30 over S9 here, and he give me the same kind of reports."

"We are going to give 144 mc a good try this summer to try to make the first 'across the pond' on two meters." *Good luck Bud, might let us know what you're using and when Schedules are set up.*

"It is too bad the W1's don't look up this way for VE1's on backscatter and aurora more than they do. We are looking forward for the Sporadic E to get a few of the east coast stations I need, then hope for the best for the W5 and WØ strip of states I need." *Hope you get them this season Bud! Good luck!*

Montreal, Quebec News concerning six meters, two meters and 420 mc and operation of same in Canada, comes to us from Dave Still (K2VTX/VE2):

"Good old six meters has had a very fruitful harvest with the extraordinary skip conditions, etc. VQ4's, CT1's, ZE2's, G2's, SM's, and of course friend EI2W were predominant above all others."

"The rig here at present is a '5252,' running about 15 watts on six and ten to 12 watts on two meters. Receiving on the other hand is a homebrew 3 tube job running before an S-76 receiver with a homebrew dipole about 525 feet above sea level."

"I am happy to say that many VE2's are on two meters and a contact may be had without great pains, but chances are much better in the evenings."

"Interest is booming on 420 mc with more equipment being built and installed. At present there are seven stations able to put audio and video on 420: VE2s—AKT, AFM, JF, ASW, AZT, LS, and K2VTX/VE2. VE2AFM recently put on an interesting, entertaining and educational TV (ham style) non-commercial program which lasted one hour and twenty minutes." *Sounds like the VHFers to the north*



Novice winner for Rhode Island way back last August, Henry Sippen, KN1DRU.

of us are progressing quite a lot faster in some lines than the rest of us.

"On 420 mc the rig here is '5894's' running 50 watts TV while the receiver is a standard model with a homebrew cascode converter running everything into a six over six element beam about 545 feet over sea level. The cameras are scanners 'ATJ' and a homebrew triple torrent vidicon '6326.' VE2AFM uses scanners, iconoscope, and 'ATK-ATJ' camera. Usual frequency is about 432.090 mc."

"K2HJC and K2HJD only await a transmitter before they put a picture on the air with an 'ATK-ATJ' and a homebrew scanner from Plattsburg, New York. We hope this will be the first Canadian-American 420 mc TV contact in the history of 'Ham TV.'" *Congratulations to all of you hard-working TV-ites! Hope you make more than one new record.*

Arlington, California Bill Locy (K6GTG), another hard-working 220 megacycler sez:

"I have worked one hundred stations on 220

mc but do not have all the QSL cards yet. I did it in eight and a half months." *All right now you fellows, Bill's contacts, come through, and let him be the first to receive the 220 mc "Century Club Certificate."*

"Also on December 18th and 19th, I made two way contact with W7LEE in Parker, Arizona. His signal was S7 to S9. Bob is running 800 watts to a 44 element vertical beam. *Let's see now, is Arlington in southern California?* I was running 25 to 35 watts to a 44 element vertical beam. My signal was S3-S6. We have been able to make two way contact anytime during the day or night with good signal strength."

"Bob and myself are going to be horizontally polarized (*guess that answers the question*) February 1st and I will be running a kw. Will be looking for lots of schedules". *Looks like 220 mc is beginning to boom in all directions.*

Rahway, New Jersey Bob Brown (K2ZAQ) ye editor of the "Channel A" bulletin, comes through with somepin' fer us too. "Exceptionally good ground wave conditions observed here lately. It's not unusual to hear Maryland, Delaware or West Virginia coming through with good signals. (*This was dated 1/27/59.*) EI2W has been measured at 29 db over S9 here quite frequently. I have hit the MUF just right quite a few times recently and been able to be the 'only K2 we're hearing.' It doesn't last long, but it's fun while it's there. *Ain't it the truth!* Heard JA1's in here a few weeks ago, but they were down to an S1-2, but readable on cw. *You didn't say if you nabbed any or not Bob, how about it, did you?* Openings to the west coast are really thinning out, actually becoming rare. I worked about thirty-eight W6's through November and December." *Thanks Bob for taking the time when I'm very sure that's a scarce commodity with you.*

73, Sam, W1FZJ

Mobile Third Hand

Dear Sir:

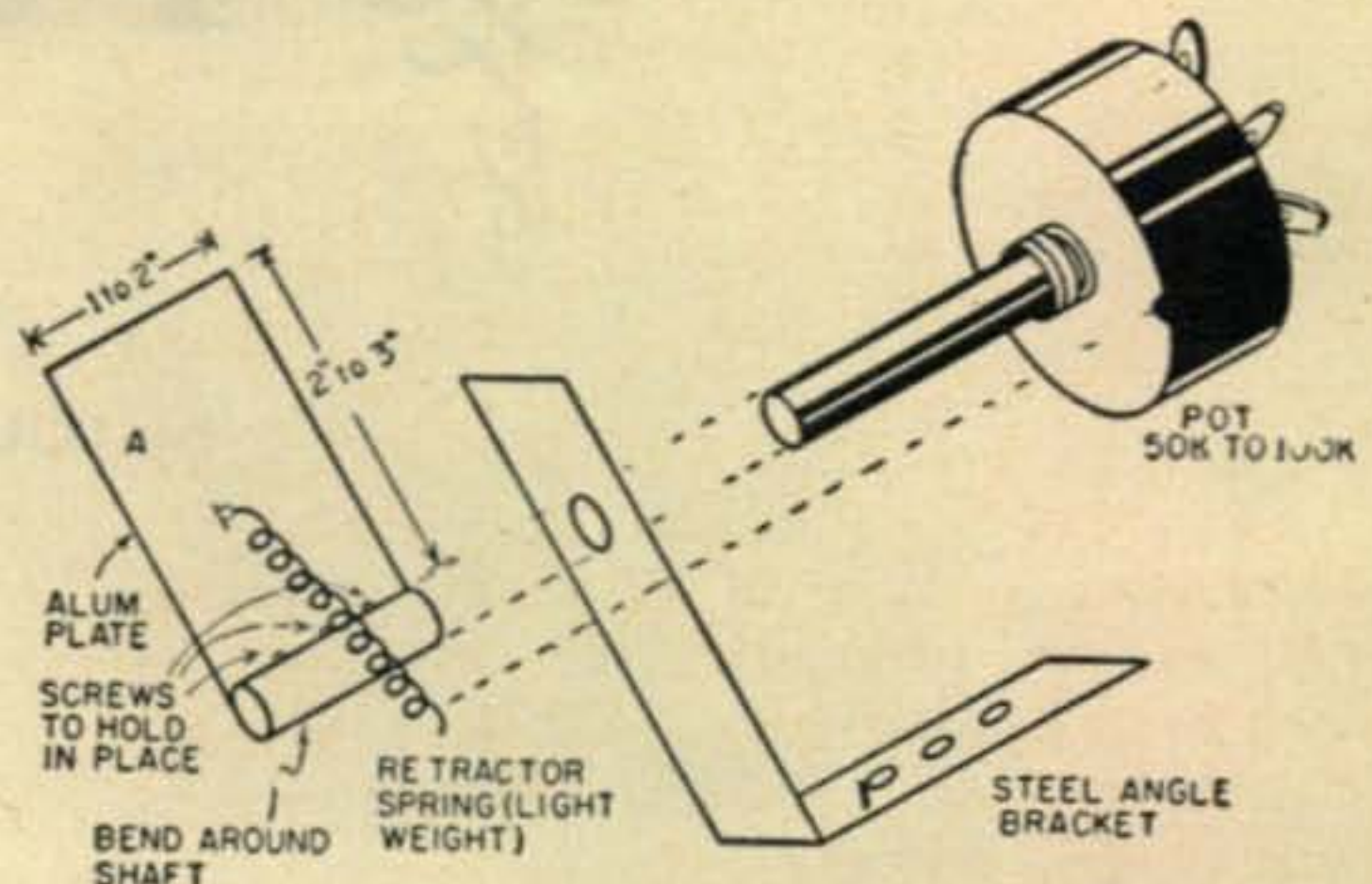
Enclosed is a small, but nice item to have when operating mobile. It acts as a third hand for adjustment of the gain control and gain of the receiver as the speed of the car is increased.

With the mike in one hand and having to more or less control the car, the XYL, the kids, the receiver, the VFO and with the other also adjust the gain control of the receiver, it makes for too many extra hands. This unit at least will help in the adjustment of the gain monrol on the receiver.

The pot can be anything from 50,000 to 100,000 ohms and before anything else is done spray it with weather protection, like glug (rubber), or anything that will protect it. The next step is to mount the unit and run the wires from the control unit to the gain control of the receiver. Next is the adjustment of the plate, if the size given does not do the job for you a larger (just in length) one should be cut. After all adjustments have been made, secure the screws on the shaft and you are free and clear for good reception no matter what your speed may be, the wind blowing around the windows will not bother the volume of the receiver because the gain will go up as the speed is increased.

Leslie C. Hindman, Jr. KØHPJ
916 Security Drive
Pueblo, Colorado

The spring will return the gain control to normal or decrease gain as speed is slowed down. The unit is mounted between the radiator and the front grill. The aluminum is light enough so it can be bent around the shaft, which by the way should be the long style, and secured with the screws.





Hams all are these members of the Pennington family at San Antonio, Texas. L. to r., Barbara, K5HVV; Mary, K5HVX; Rosa Lee, K5HVZ; Harry Jr., K5HVW. Harry and Rosa Lee travel a lot and enjoy a KWM-1 in their Triumph TR-3.



by **LOUISA B. SANDO, W5RZJ**

212 Sombrio Drive, Santa Fe, N. M.

Take a look at the photo of the Triumph sport cars and the mobile set-up—make you drool? The occupants, Hams all, are members of the Harry Pennington, Jr. family of San Antonio. With the mobile rig are Barbara, K5HVV (driving), and Mary, K5HVX, with the mike. Mother and Dad are Rosa Lee, K5HVZ, and Harry Jr., K5HVW. Mary drives a Triumph 10 and was a bit irked that it didn't get into the picture also! The girls' brother, Harry III, claims he is distinguished because he is a non-Ham (he is working on his Ph.D. in psychology at the U. of Tex.—and for you sport car fans, he drives a Magnett).

Ham radio started for the Penningtons a couple of years ago while Barbara, then 19, was attending Randolph-Macon Woman's College at Lynchburg, Va. Rosa Lee says that at that point they were under the illusion that the phone bill would be substantially reduced. But she recalls at least one occasion when her OM called Barbara long distance three times in thirty minutes—that was when they were getting together on Novice cw! With their first contact, she adds, Marconi couldn't have felt more of a thrill.

As Novices they kept schedules with Barbara in Virginia three times a week. In the meantime Rosa Lee and Harry labored on code all winter and managed to pass their Generals before summer. With school out Barbara and Mary were soon doing rings around their parents on cw. Within two weeks the girls had passed their Generals. Mary immediately went into a contest with her father on collecting DX cards.

Mary "snows" her teacher with her knowledge of geography and has written numerous themes on Antarctica from information gleaned through Ham radio. Seventeen years old and currently a senior in high school, Mary plans to enter Randolph-Macon next fall. She expects to major in math and physics and is gathering information about colleges throughout the world with the thought of doing graduate work in another country.

Barbara possibly has set a record in DX dates—an OM in the service called on her at school in Virginia just a week after she QSOed him in the Aleutian Islands! After graduating from college last June, Barbara has been making her debut in San Antonio this winter and has had little time for Hamming, though she enjoys bringing her friends over to work phone patches to their husbands in Greenland, Alaska, etc.

All of the family enjoy working ssb on 20 meters at the home station and while traveling Rosa Lee and Harry Jr. work mobile using a KWM-1 with Heli-whip antennas on 15 or 20 meters. Harry Jr. also prints all of the family QSLs on his own press.

Midwest YL Convention

The 9th Midwest YL Convention will be

held at the Polly Valley Motel at Milwaukee, Wis. on May 22-24. Chairman for the meeting, W9RUJ, has been enjoying eyeball QSOs from Wis. to Calif. and many points in between (so nice to see you again, Mary!), but will be home about the time you read this. Get reservations to her (registration \$2) by May 10.

Tangle Net

W4SGD, Katherine, who is currently managing the 20-meter Tangle Net, announces a new starting time for the net—1300 EST.

YLRL

YLRL now has an official Historian—W6CEE, Vada Letcher, has accepted this position. . . . D/C for Alaska for '59 is KL-7ZR, Rose Cowles.

With The Clubs

GAYLARK would like sample copies of certificates issued by the YL clubs throughout the U.S. and any DX ones, along with instructions as to how to obtain these certificates. They plan to make a display of them in the booth they will have at the National Convention in June. Please mail sample certificates to W5EGD, Lillian Beebe, 2503 Forest Oaks, Houston, Tex. . . . At their first birthday party GAYLARKs presented founding president K5BJU with a linen tablecloth decorated with "gaylarks" and inscription by K5SPD and autographed by each member.

At their December meeting the YLRC of San Francisco officially changed its name to BAYLARC—Bay Area Young Ladies Amateur Radio Club. New officers for '59 include: Pres., W6BDE, Esther; V.P., K6QCL, Joyce; secy, K6HIW, Kay; treas., K6CUW, Lee. Board members: W6PCN, Peggy; Rose Buckley, Elsie Bachman, Eleanor Sloper. The club held its 5th anniversary dinner on Jan. 24. . . . K6HIW, K6QCL W6BDE and W6FEA will be among those working at Squaw Valley Feb. 15-Mar. 3 during the dry runs for the Olympics. There will be 5 locations along the ski trails and a hq. station acting as liaison between the races and San Francisco.

The WHOOTs in Dallas have elected these officers: Pres. & certificate custodian, K5GRF, Irene; V.P., K5MTF, Estelle; secy, K5KDY, Jennie; treas., W5SPV, Patt.

PARKA in Alaska now numbers over 40 members. During the first week of April the PARKA YLs will be on the air as much as possible for QSOs and to advertise the PARKA Lucky Seven Award (for working 7 of their members). Stamped addressed envelopes for return of QSLs and sufficient postage for the certificate (21¢ by air, 5¢ regular mail) are required. Custodian of the award is Geraldine Nichols, KL7ALZ, Star Route "A," Box 4017, Spenard, Alaska.

The 1959 Council for SAWRC includes:



KØIKL, Joyce Polley, earned second high score in cw section of YLRL's 19th A.P.

Pres., ZS5OB, Edna; V.P., ZS5RI, Kay; secy, ZS5FN, Lue. Custodian of the two SAWRC certificates, W.A.Y.L. and K.K.K., is Marge Snyman, ZS1RM, Box 80, Strand, Cape Province, S.A. Ten QSLs must be sent for W.A.-Y.L. Write to ZS1RM for application forms for K.K.K. and she will advise about checking of logs. All contacts for K.K.K. must be after midnight Dec. 31, 1956. OMs also may apply for the triple-K certificate.

CW Op

Second high scorer in the cw section of YLRL's A.P. was KØIKL, Joyce Polley. When write-ups on top scorers in the A.P. were being prepared for Feb. CQ no details were on hand re KØIKL. Belatedly, here are a few notes: Joyce, whose QTH is Minneapolis, became a Novice in Jan. '57 and a General that June. She works mostly 15-m cw with a little on 20, and phone on 15, 75. KØIKL has WAS on cw, WAC on ssb, CPC-25, YLCC-150, and 64 countries toward DXCC. Her OM is VE1EG/WØ and they have two little jr. ops. Joyce, who is 22, wonders why she doesn't hear other YLs of her age on the air, adding, "Most are 10 to many years older and a few are teenagers."

Here's one to look for, Joyce—Kn8KSO, Juanita Hatcher, at Mullens, W.Va. She is 24

and a YF also. Juanita works 80 and 40 and is trying for WAS.

While going through some 1934 issues of QST in doing research for the book "CQ YL," we came across the department known as "Reserved for the YLs and YFs." We like that term "YF"—what happened that it lost popularity? Surely it is preferable to XYL.

Thanks . . .

Our sincere thanks to YLRL for nominating W5RZJ (for writing and publishing "CQ YL") for the 1958 Edison Award. We are grateful for the time and trouble many of you, YL and OM alike, took to write the award committee on our behalf. We also much appreciate the "Letter of Commendation" received from the committee and signed by the judges of the '58 Award.

"CQ YL"

"CQ YL" has been brought up to date with two additional pages giving the 1959 YLRL officers, new YLRL and YL club certificates available, recent YL recipients of W.A.Z. and DXCC, together with the latest listings of WAS/YL, WAC/YL and YLCC awards issued. For those who already have the book and would like the additional pages, drop W5RZJ a note and enclose a couple of 4¢ stamps to cover cost of postage and heavy mailing envelope.

The one and only book about the YLs, "CQ YL" contains 169 pages, over 500 photographs. Order direct from author, W5RZJ, 212 Sombrio Dr., Santa Fe, N.M., \$3.50, postpaid and autographed.

SK

Feb. 3 was the occasion of the Mothers March of Dimes in the San Francisco area. A week earlier a woman called W6PCN and asked her if she would be one of the marching mothers. Peg asked when they marched and was told Tues. Feb. 3. Peg said she was sorry to decline but that was her night to be on MARS. A most indignant committee woman replied that she didn't mind legitimate excuses but she hated smart alecs. Hi, hi!

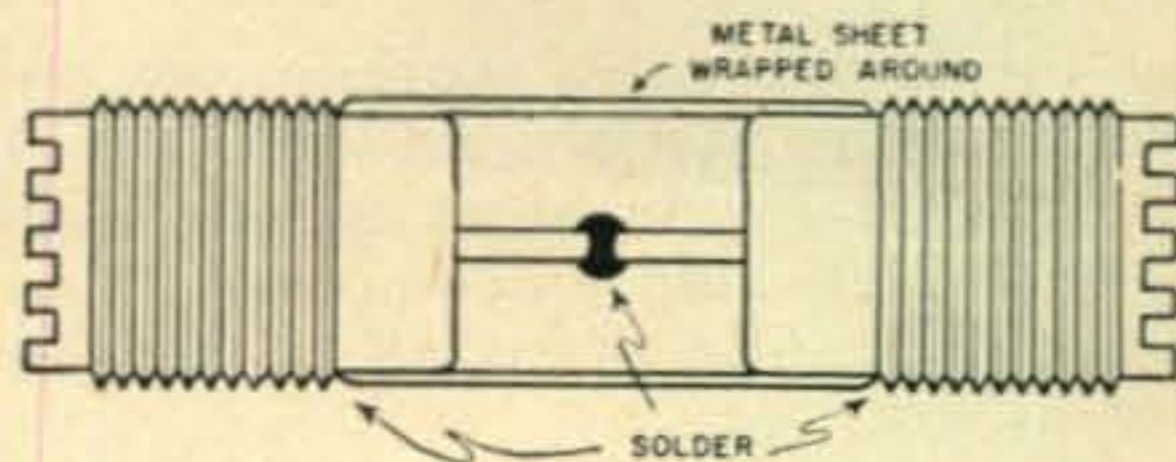
33, Louisa, W5RZJ

RG Series Connector

The connection of two or more lengths of RG-8U (52 ohm) coax frequently becomes necessary and requires the use of a PL-275 straight adapter which is often hard to procure. Chassis type receptacles, SO-239 are usually more plentiful on the chassis of surplus equipment, etc.

A very practical straight adapter can be made by removing the flanges from two chassis receptacles either in a lathe or with a hacksaw and filing flush with the diameter of the connector. The normal protruding connections are then soldered together as shown in the above sketch, keeping both pieces as close on centerline as is possible. Then wrap a piece of sheet metal com-

W. W. Peterka, W8HXB
528 Sharon Lane
Hamilton, Ohio



pletely around and over the gap over-lapping the start of the sheet slightly. This continues the shielded portion. Now solder along all the edges.



Novice

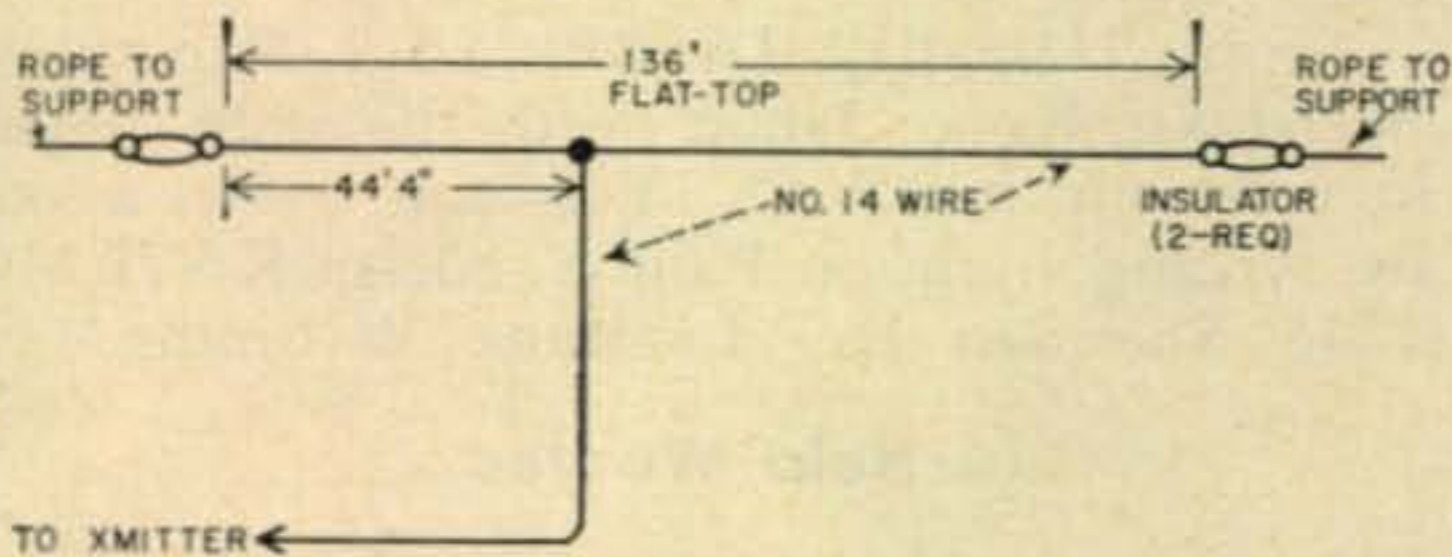


Fig. 1—The popular Windom Antenna for 80-40-20-10 meter operation. A twin lead fed version is described in the ARRL Handbook.

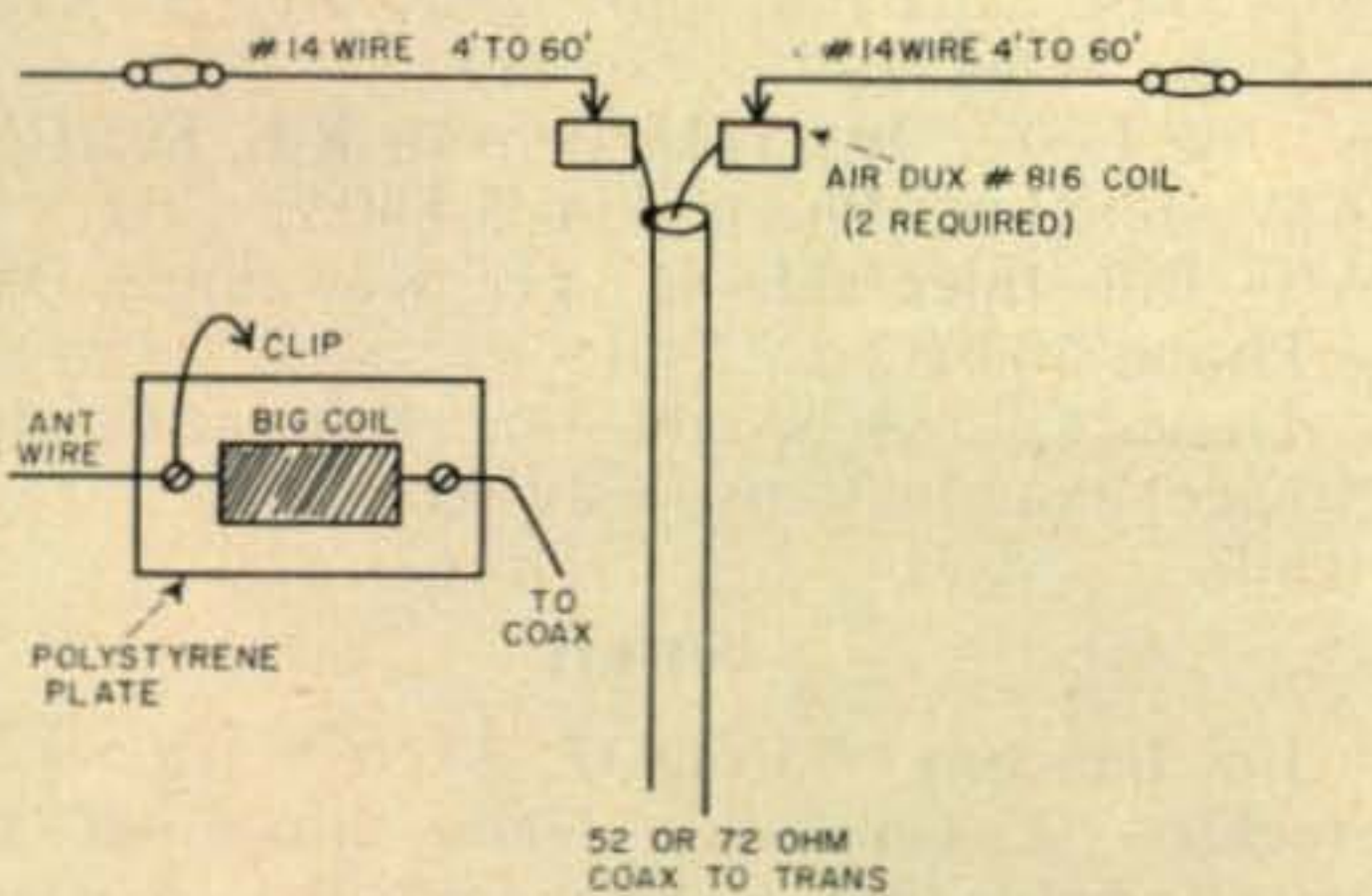


Fig. 2—A limited space antenna can be erected with as little as 9' between support structures.

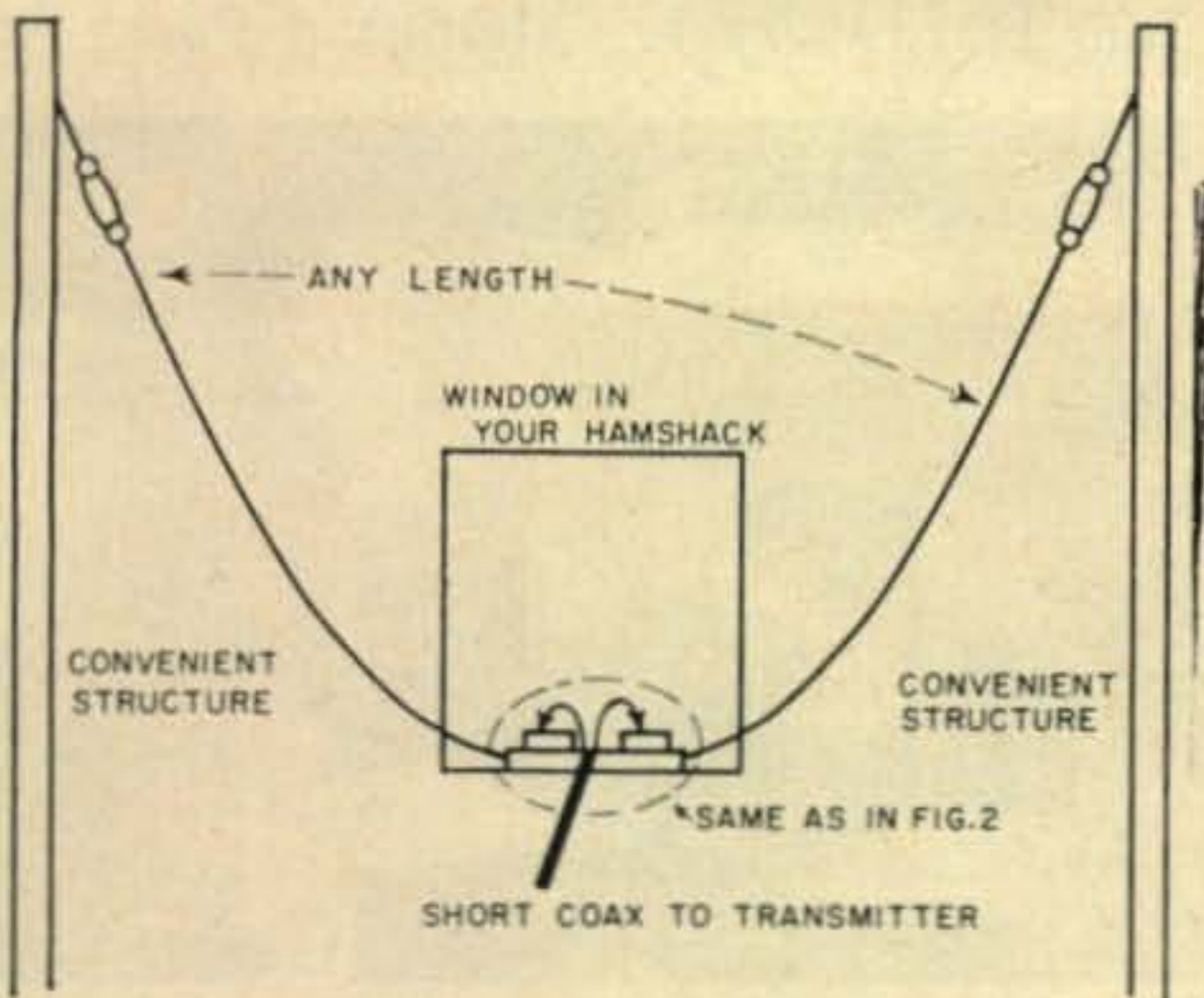


Fig. 3—A limited space all band antenna. By using loading coils the length and position of the wires is quite flexible.

The other evening I was telling a fellow-ham about my "120 foot long-wire for the 75 meter band," and got called on it. Long-wire is an often misused term, like "best 73's OM" (which I am also guilty of using). A piece of wire 120 foot long would constitute a $\frac{1}{2}$ wave on 75 meters and therefore does not qualify as a long-wire. The Radio Handbook implies that a long-wire must be at least one wavelength long. The "old timers" probably would not think of such an end fed antenna as a long-wire until its length exceeded three wavelengths.

Speaking of antennas, I receive a lot of requests for information on the Windom and on limited space antennas for 80 and 40 meters. The Windom, or off-center-fed, is a multiband antenna that is $\frac{1}{2}$ wavelength long on the lowest frequency supplied to the antenna. It can be fed with a single wire or with 300 ohm TV lead-in, as long as desired. The Windom only works on even multiples, such as 80, 40, 20, 10, but not 15 meters. If you need an antenna for these four bands, try the Windom shown in fig. 1. It should be pointed out that this antenna is more sensitive to TVI than a dipole, particularly when fed directly from your pi-network or link. If harmonic type TVI is a problem, use it with an antenna coupler.

Space your problem? If so, figure out what the longest flat-top you can erect would be. Cut a piece of #14 to this length, then cut it in half. Connect two of the Air Dux 816 coils as shown in fig. 2, and connect to your transmission line (either 52 or 72 ohm coax). Put taps every turn on the *loading coils* so that you can adjust the amount of *inductance* in series with the antenna wire. The point the alligator clip is connected to can be determined by checking with a field strength meter, adjust for maximum signal, of course. Do not use your receiver "S" meter as the indicator. If you do not have a suitable measuring device, check your signal strength with a ham across town.

A variation of this antenna, that will appeal to apartment dwellers, is shown in fig. 3. Make the two halves of the dipole as long as pos-



Michael Hunt, KN5TCQ, Rt. 1, Box 243, N. Biloxi, Miss. runs 25 watts to a home brew exhaler, and reproduces 'em with an SX-43 receiver. Look for Mike on 40.

sible, and as close to the same length as you can. The dipole elements do not have to be horizontal or even pointed in opposite directions. Keep the ends of the antenna as high as possible, and keep the two wires as far apart as possible. The coil, which is on your window sill, is adjusted in the same manner as before. However, since it is so easy to-get-to you can change the taps for each band, 80 through 10 meters. Once you have determined the proper tap points for each band, the extra taps can be removed, if you like.

Who's DX?

The following stations were logged at W6TNS on the 20 meter band: KN9PSN, Dec. 30, 1958, 14.318 *mc*, RST 568, at 2045 GMT, KN4CTP, Jan. 29, 1959, 14.310 *mc*, 539, 2110 GMT, KN4CFI, Jan. 29, 1959, 14.310 *mc*, 559, 2348 GMT- KNØRUQ, Feb. 7, 1959, 14.312 *mc*, 539, 1753 GMT.

Three new DX reporters tell of Novice stations heard in far away lands. The first, Hans Nystrom, SM3NJ, Box 3224, Hofors, Sweden logged the following stations on 40 meters between the hours of 0200- 0300 GMT on the first of January, 1959: KN1HEF, HOI, IRI, KN2ULL, KN3EPF, GAD, HAG, KN4UOK, VCX, YLR, WV2APQ, BJL, BRL, CTB. His receiving equipment consists of a RCA AR-88 and a 270' longwire. The 40 meter band is Hans' favorite and he will be looking for Novices on the various holidays.

If you 80 meter boys feel slighted, fret no more. The DX has been good and you were heard by Paul L. Fracker, W8QOH/MM on board the SS "Alcoa Pioneer," anchored off Haifa, Israel. The following stations were copied on Jan. 16, between 0455- 0511 GMT: KN2OJQ (559) calling K8BNL, KN2QEV (459) calling CQ, KN2SNQ (559) working WV2AEZ, KN4BZC (559) working KN5TJG, KN5SNC (449) calling ?, KN5TJG (349) calling CQ. On the 17th of Jan. Paul logged these three stations: WV2CVV (568- drift) calling CQ, K4RNM (559) calling CQ, K5-KMG (449) —. As Paul says "these fellows

should be congratulated for having very efficient rigs and antenna setups."

Were you one of the ones lucky enough to work my friend Flavio Serrano, PY1CK, on his DXpedition to Trindade Island as PYØNA. Flavio says that whenever he would call CQ-Novice, he would be flooded with other calls and was only able to work nine stations. They were: KN1IFJ, Nov. 2, 0043 GMT (579), KN2SQI, Nov. 2, 0030 GMT (569), KN2UVU, Nov. 17, 1944 GMT, (599), WV2BWS, Nov. 18, 2122 GMT (449), KN4YPO, Nov. 21, 2044 GMT, (559), KN5QKK, Nov. 22, 0453 GMT, (549), KN8IHZ, Nov. 15, 0227 GMT, (549), KN8JDM, Nov. 15, 0214 GMT, (569), KN8KTZ, Nov. 22, 0447 GMT, (559). Congratulations fellows, this was quite an accomplishment. I know, I was in there pitching too!

Seimi Hamada, JA3BP, 25-5 Nagaracho, Nagataku, Kobe, Japan needs the state of Del. to complete his WAS. You can make a sked by writing him, or Paul Sandels, KN7EMO, 1415 Sheridan St., Laramie, Wyoming.

Help Wanted

- W2- Larry Meyer, 93-54 Queens Blvd., (N.Y.C. ????) Phone IL 9-2957
Lanny Brown, 69-21 229 St., Bayside 64, N. Y. Phone FL 7-5330
W7- Dick Schatzha, 3608 2nd Ave. N., Great Falls, Montana
Joe Lester Jr., 5415 Penrith Rd., Seattle 5, Washington, Phone LA 5-8403
W9- Bill Ihlenfeld, R. #1, Kewaunee, Wis. Phone 503-F2

These fellows would like help with their Novice examinations. Can you give them a hand?

Letters

Jim Baucom, WV6DOZ, 3520 Margaret St., Stockton 4, California leads things off this month, by telling us he would like to start a 2 meter CD net for the Central Calif. valley. Jim also operates 80 and 40 with a home brew 50 watter and a S-85 receiver.

Bob Hardwick, Jr., Memorial Park, Athens,



Just to prove you guys don't have a monopoly on things, here is a shot of the XYL of Joe Poston, K9GCE. Look for them on the 15 meter Novice band, 21.109 or 21.112

Georgia, is trying to form a Northeast Georgia teenage Amateur Radio club, and welcomes any teen-ham within thirty miles. Drop him a line at the above address if interested.

George Yahwak, Jr., WV2CQH, 119 North St., Auburn, N.Y., would like to buy a two meter converter. Any takers?

Charlie Steinberg, K2RDA, P. O. Box 38, East Setauket, N. Y. is a new General but racked up 15 countries and 22 states, as a Novice, using a DX-40, SX-100, and Hy-Gain vertical. Since becoming a General, Charlie says he has yet to make a DX contact. He prefers cw to phone operation and likes to rag chew.

Jon Swope, 5202- 101st St., SW, Tacoma 99, Wash., is still an SWL, but wonders how do you talk your folks into spending a kilobuck for your ham rig. (I want to know how you talk your XYL into it—ed.)

Richard Jones, 4521 31st. St. South, Arlington 6, Va., is also an SWL, but copies code with a borrowed command set receiver. Dick plans on getting a Globe Chief 90A.

Tex Birnholz, K2VAB, 634 High St., Newark 2, N. J., is trying to locate a ham ex-KN3AIC, whose handle is R. W. Javins. Anyone knowing of his whereabouts—etc.

Mike Lynch, 5102 Tawney St., Amarillo, Texas is 14 and holds the call KN5SEK. Mike's shack is located in a closet which he says is cramped, but away from the "local QRM." This 3' x 8' room hides his DX40, S-38, and QSL's confirming 36 states.

Harry McClellan, KN4BAD, 117 Kingston, Apt. 2, Louisville 14, Ky. operates 80 meters only, and likes to SWL. "I wish more SWL's would send reports. Look for me on 3720 and 3736."

Carlton Ellis, KN2OES, 321 Elm St., Penn Yan, N. Y. is hoping for an NC-60 receiver to go along with his home brew 75 watt rig. He will sked for any reason, look for him on 7178 kc.

Peter Metcalf, KN1IWR, 1 Lunt St., Byfield, Mass. poses a question. No, Pete, it will not damage your receiver if you monitor your own transmissions. I do this all the time; can't send right otherwise!

Larry Underwood, KN5QCM, 1014 North Beech, Little Rock, Ark., has piled up 293 contacts in about 115 days on the air, and has a WAS of 43, and DX including G3, VE3, and WP4. Larry lacks W. Va., N. Mex., Idaho, Utah, and Nev. for his WAS. Skeds?

Talk about DX! Crag Burnett, KN6LJU, Box 686, Soledad, Calif. has 41 states with his DX-40 and SX-71, not to mention JA1, SM5, LU5, VP7, VP8, VK3, plus assorted locals like KL, KH, etc. Crag is proudest of his contact with KC4USK at Wilkes Station in the Antarctic. First Novice to do this? Also, Crag would like to swap school papers (this sounds like a good idea!)

Charles Simkins, Jr., 449 Kenilworth, S. E.,

Warren, Ohio, is KN8LVN and pokes out with a DX-40 in conjunction with his S-85. Chuck would like info on RTTY. (Drop a self addressed envelope to Byron Kretzman, W2JTP, Charles.)

John F. Sanders, KN1IFJ, 16 Ridge Rd., Danbury, Conn. is another DX'er (see PYØNA list!) and wants to stress that it does not take high power or super antennas to work it. He has racked up 14 countries including KC4, PYØ, ZS4, and EA8 with his S-38, Globe Chief, and folded dipole. Get up just as the sun rises . . . it's there!

Martell Bolden, KNØSAJ, 1110 W. 12th St., Des Moines, Iowa, has had 200 contacts with 41 states using his home brew \$3.00 antenna. Drop him a line for info.

DX'er Don Zielinski, KNØPVI, 2288 Forest, Denver 7, Colo., makes me drool with his DX list; VE3, LK7, KH6, VP9, VK3-5, DU7, XEØ, PY3, G3, YN1, VP7, AC3 (you're kidding!) and JA2. Don worked this with his NC-57, Globe Scout, and 2 el. beam, plus lots of patience and good operating technique, I'll bet!

Norm Gignac, WV2AFX, 45 No. Elliott Pl., Apt. 11-G, Brooklyn 5, N. Y. writes a mighty interesting letter about his station. He would like to implore the other novices to tune the entire band after they call CQ, for not all the fellows can blanket the band with "rocks." Also, listen before blasting out that CQ call.

Bob Edwards, KN90RZ, Box 2177, East Chicago, Indiana, has a neat 70' vertical made with No. 12 wire that wrapped up WAS for him (all confirmed). The antenna, tied to an SX-101 and DX-40. Bob forgot to say how the XYL, KN9PQS, got any time to operate.

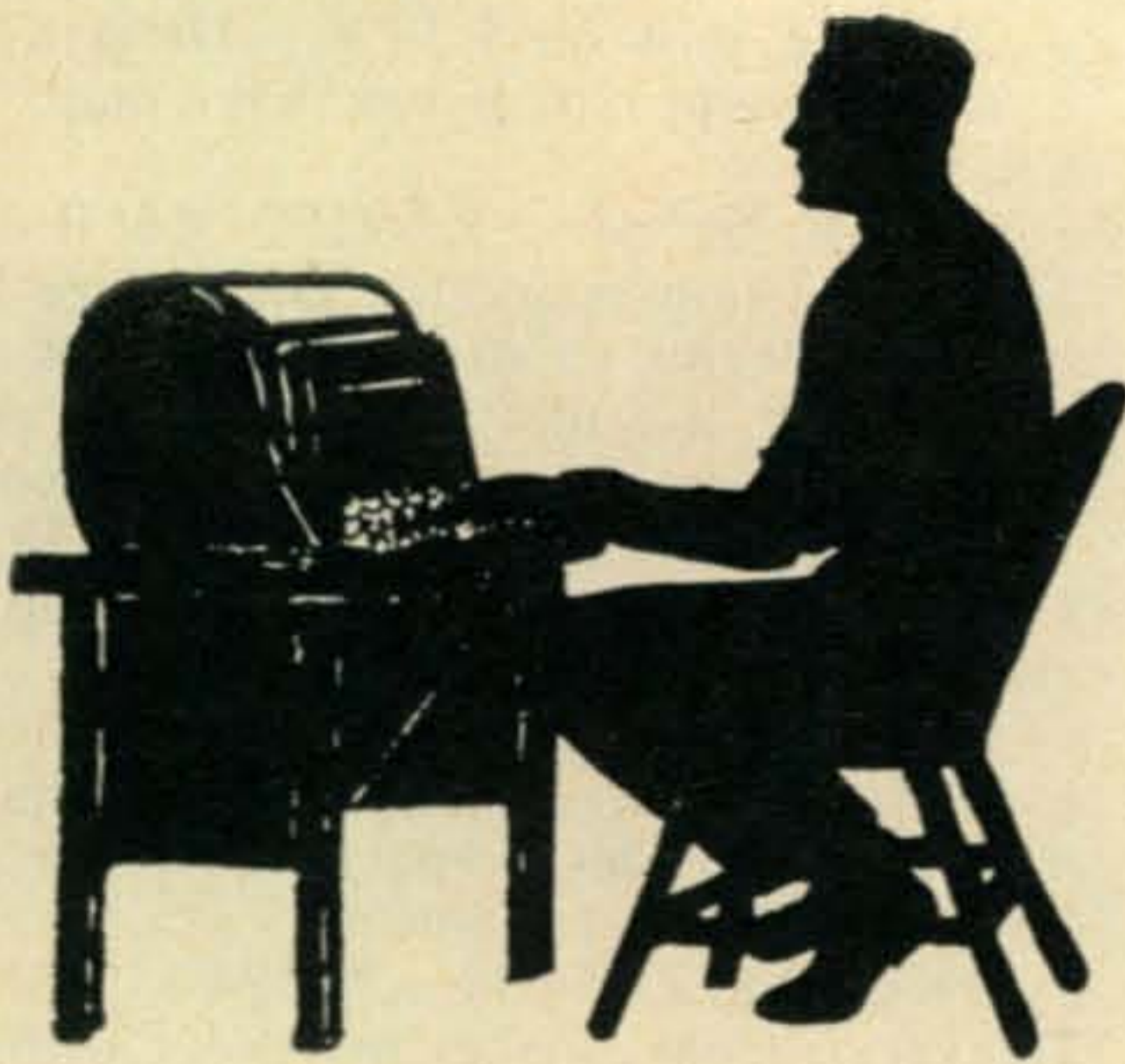
Ray, KN4DAB, 108 Destin Circle, Huntsville, Ala., has had his ticket since Dec. 19, and has 14 states so far. Ray works the 40 meter band, QSL's 100% and would like a sked with a ham in Topeka, Kansas.

Albert Johnson, 55 Pinnacle Rd., Newport, N. H., would like skeds with Nev., Ariz., Utah, Ida., N. Dak., and Alaska to finish out his 43 confirmed. Look for Al on all the Novice bands except two meters.

Paul Sandels, KN7EMO, 1415 Sheridan St., Laramie, Wyo., is a dyed-in-the-wool DX'er with WAS, JA, KA, ZL, G, F, SM, XE, and a host of others under his belt. Paul suggests that DX'ers include two IRC's along with their QSL to DX stations. The countries list in the call books lists the exact amount required Paul. Some of the countries extract seven for postage!

Husband and wife ham are Mr. and Mrs. John Moffit, KNØRTT and KNØSOC, of Mechanicsville, Iowa. They share a Chief 90A and HQ-110 and tell of the big ones that got away- OK20P and ON4JB- hi. Look for them on 40 or 15 and how abt. skeds with the 7's and 4's for WAS?

Well, like they say in East Africa—Abyssinia!
73, Don, W6TNS



RTTY

Byron H. Kretzman, W2JTP

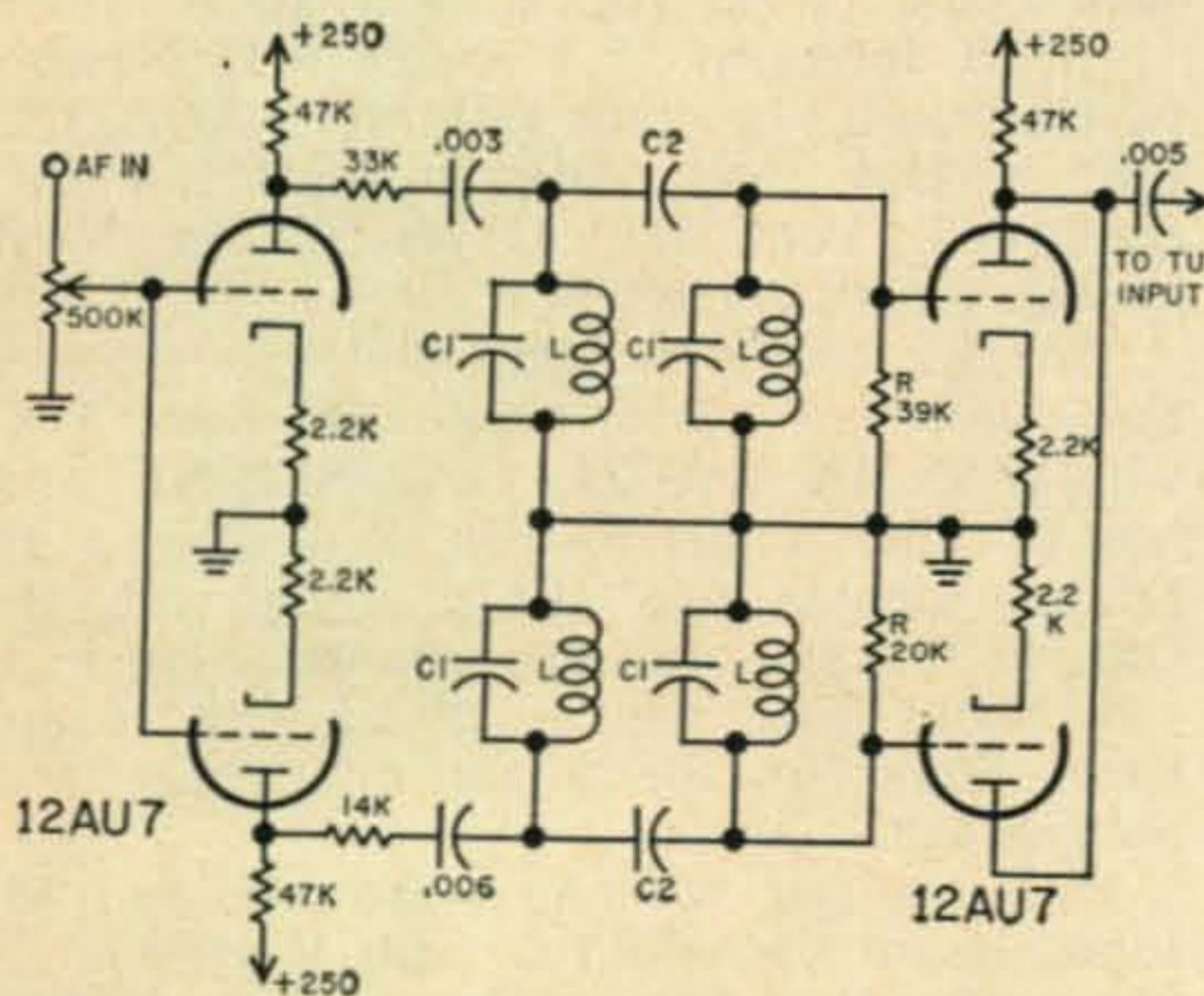
2260 Matilda St.,
St. Paul 18, Minn.

RTTYers build! Those of us who have been hamming for twenty or more years, like your RTTY Editor, have been saddened by the trend towards factory-built rigs on our bands. So, we gather up our tool and "junk" boxes and head for the last frontier of amateur radio -RTTY.

While an occasional letter asks, "Where can I buy an RTTY converter?," most letters to your RTTY Department ask for technical information, and they tell us that you would like to see more diagrams in the column. This we will try to do, although the RTTY column has been eliminated from the May, July, September, and November issues. (Not enough of you RTTYers sent in those Poll blanks that appeared in the January issue.)

Comb Filter

This month's tidy technical tidbit of tele-



NOTE: IF TU POWER SUPPLY IS USED, DECOUPLE

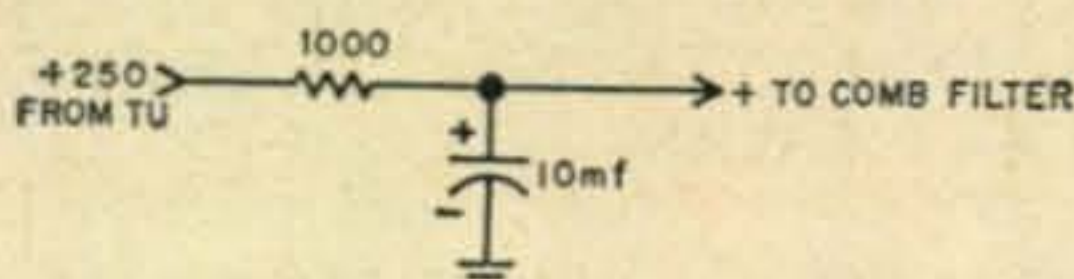


Fig. 1—Schematic Diagram, Comb Filter

printer technology comes from Don Wiggins, W4EHU, and is a typical example of the technical information supplied to RTTYers in the Southeast by the DARTS, Inc. (W4RWM, Sec.) This "Comb Filter" is used in place of the usual band-pass filter ahead of an audio-type converter, or TU. Don claims an increase in performance since a "notch" is provided between the 2125-cycle *mark* and the 2975-cycle *space*. Of course, "skirt" selectivity of the TU is improved in addition. All these things increase the over-all ability of the TU to combat QRM.

Figure 1 shows the schematic diagram of the Comb Filter. Two dual triodes, 12AU7's or 6SN7's, are used. The input and output terminals are high impedance, and the LC circuits are made from those ubiquitous 88 *mhy* "loading coil" toroids. (\$1, each, postpaid from W6CQK.) Table I shows the approximate values of the tuning capacitors for either a 250 cycle or a 150 cycle pass-band, whichever is desired. Note that the two LC circuits are separately resonated (uncoupled) at the frequency indicated in the table. This is done by feeding the LC combination from the audio oscillator through a 100k-ohm isolating resistor. A high-impedance VTVM or 'scope is connected across the LC circuit to indicate maximum voltage. Condenser C-1 is then trimmed to tune that LC combination to the frequency listed in Table I for the desired pass-band.

Somebody is going to ask, "Which shall I

Table I

fo	Pass Band	L	* C-1	C-2	Tune LC to:	R
2125-cps	250-cps	88-mhy	.06	.004	2250-cps	20k
	150-cps			.003	2200-cps	
2975-cps	250-cps	88-mhy	.03	.002	3100-cps	39k
	150-cps			.0015	3050-cps	

* C-1 is trimmed to tune LC to frequency listed.



Cap Beckley, W5VHR, Sec., West Gulf DX Club
Houston, Texas. Uses a Model 15 Machine with
a KWS-1.

use, a 150 cycle or a 250 cycle pass-band?" Wal, that depends. If you have a real stable receiver, or an *afc* set-up, use the 150-cycle values. If your receiver drifts a bit, and you have no *afc*, use the 250 cycle values. Tuning will be less critical with the 250 cycle values, too.

Radioteletype Channels

Last month we suggested caution in the use of RTTY channels on 6-meters and on 2-meters, since the FCC, effective January 10, 1959, granted exclusive cw segments in those bands, acting on Docket 12485. Since these segments were not on the low ends of the bands, as the ARRL proposed, the ARRL requested a delay in the effective date of the order. This the FCC promptly granted, setting March 10th as the final date for possible filing of petitions for rehearing. So, if you haven't copied an Official Bulletin recently, don't transmit.

Dual Identification

Have you written to or otherwise contacted your Division Director, acquainting him with the unhappy FCC Rules that require us to identify in Morse as well as with the teleprinter code? Have you written Mr. Budlong, the General Manager of the ARRL, reminding him that last May the Board of Directors requested him to determine the "feasibility" of eliminating Dual Identifications? (See the RTTY column in the February 1959 issue, page 77.)

Hits and Bits

Although it is spring, as you read this column, it is being written in February in Minnesota, the first column from "the center of RTTY activity," according to WØBP, and where it snows horizontally, according to W2JTP/Ø. So, having just arrived, this month's news items stem largely from center-man BeeP.

An RTTY Dinner will be held in Boston, tentatively Friday March 20th or Saturday March

21st. Contact Jack Berman, W1BGW. NCS of the East Coast RT Net which meets every Wednesday night at 7 pm on 3620 kc.

W2ZRA is on 80, 40, and 2-meters with his Model 26 and a W2JAV converter. (CQ, April 1958) W2PBG is keeping Huntington, New York, on the RTTY map, mostly on 15-meters, and with low power, too.

Tom, WØBKV, reports fsk on 2-meters far superior to afsk. Merrill, W6AEE, wants to know if anyone has a cheap source of platen cranks for Model 15's. W6FYM has moved from Belmont to Palo Alto. WØHZR charges his car battery with an antenna, a silicon rectifier, and an LC circuit tuned to WØBP.

KR6AK still checks in with WØBP on 15-meters. Cas reports W6KUY/MM passing Okinawa, Formosa, and the Phillipines. VK3KF also is reported resuming his RTTY tests. Geri, KL7ALZ, Bunny Gulch, Alaska, the most active KL7 RTTYer, reports that PARKA, the Polar Amateur Radio Klub of Alaska, has 32 licensed YL's. Bruce, ZL1WB, expects soon to be authorized for fsk on 15 and 20.

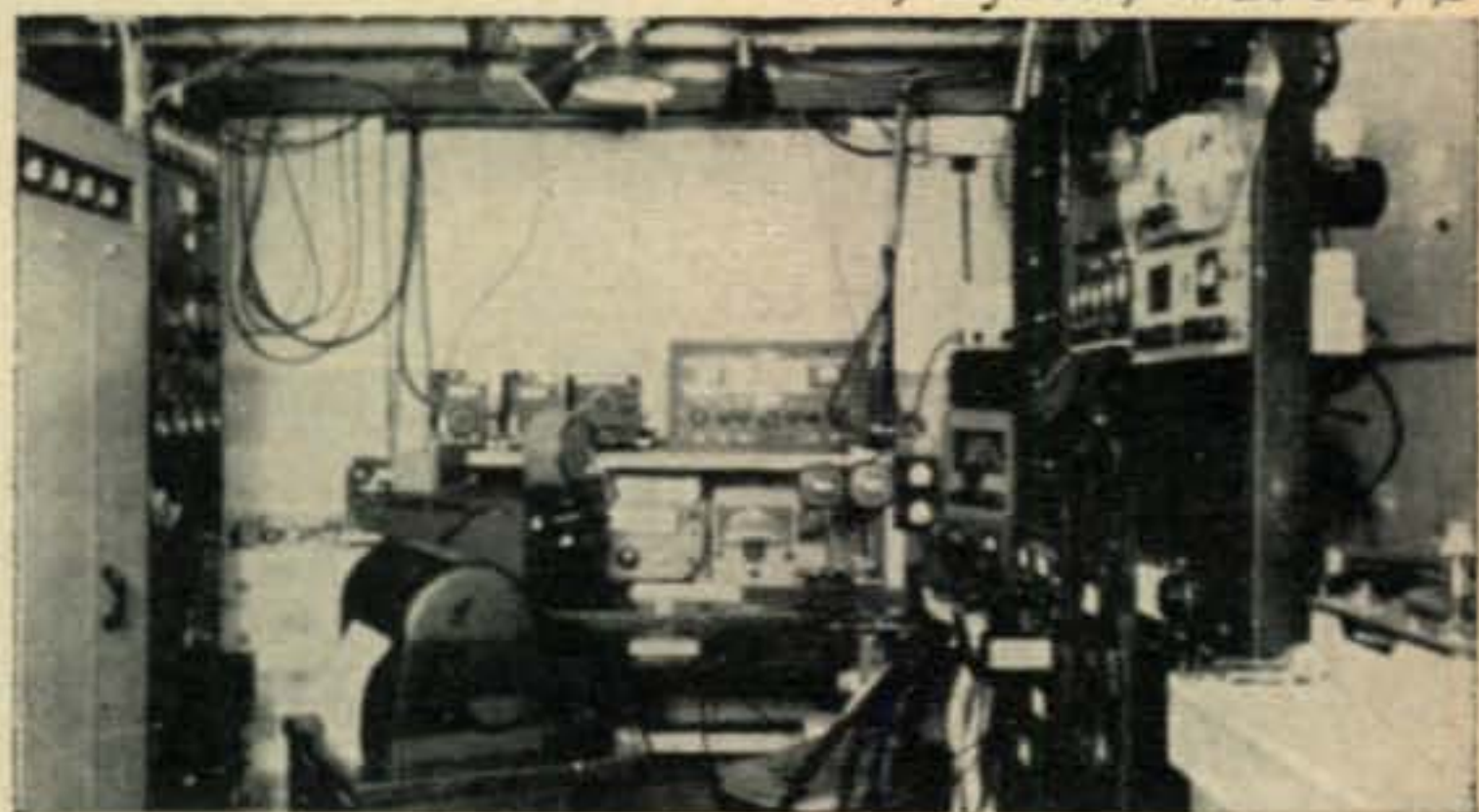
Comments

As we mentioned near the beginning of this column, most of the letters that come to your RTTY Editor are of technical nature. Many of these letters ask where they can read something about RTTY. These people apparently do not know that not too long ago W2NSD and W2JTP put together an *RTTY Handbook*, mainly because there just were not any places where such information, especially for radio amateurs, could be obtained. So, at our own expense, without any advertising, we put together the *RTTY Handbook* by the off-set printing process. This book is crammed with information on basic principles, machines, terminal units or converters, fsk circuits, and operating procedure. In addition there is constructional information on tone standards, an audio deviation meter, and an automatic frequency control (AFC) system for receiving.

If you haven't gotten your *RTTY Handbook*, send a \$3 check or money order to W2JTP/Ø, 2260 Matilda Street, St. Paul 18, Minnesota, and you will receive yours postpaid.

So long until June.

73, Byron, W2JTP/Ø



W9DPY, Lombard, Illinois.
David E. Chapman.

PROPAGATION

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN

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

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

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

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees, and are centered on the Eastern, Central and Western areas of the USA. The forecasts are valid through May 15, 1959, and are based upon basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

As a result of the seasonal *decrease* in peak daytime ionization during the spring and summer months, few 6-meter DX openings are expected during April, although some *trans-equatorial scatter* openings to South America may occur. While world-wide 10-meter openings are forecast for April, the band will open on considerably fewer days than during the winter months. Excellent world-wide propagation conditions are forecast to continue on 15-meters, with the band peaking during the late afternoon and early evening hours. During the evening hours, and until well past dawn, world-wide propagation conditions are also expected to be excellent on 20-meters. Higher static levels, and fewer hours of darkness, are expected to bring about seasonally poorer propagation conditions on 40, 80, and 160-meters. Sporadic-E (short-skip) propagation begins to increase during April (reaching a peak during June and July), with openings of this type most noticeable on the 6, 10, and 15-meter bands. There is a tendency for the occurrence of magnetic storms and auroral displays to increase during April, resulting in periods of several days of near black-out conditions on the short-wave bands, and unusual ionospheric short-skip openings on the *vhf* bands (see Last Minute Forecast).

Solar Cycle

The Swiss Solar Observatory reports a monthly average sunspot number of 210 for January, 1959. This results in a 12-month smoothed sunspot number of 182 centered on July, 1958. The present solar cycle continues to decline slowly from peak intensity. This month's *CQ* forecasts are based on a predicted smoothed sunspot number of 152 centered on April, 1959.

CCIR Los Angeles

On April 1st, many of the world's leading radio communication engineers and scientists will gather at the Biltmore Hotel in Los Angeles to begin a month long international technical conference dealing with radio communications.

Held under the auspices of the *International Radio Consultative Committee* (abbreviated CCIR after the French spelling), engineers and scientists from several dozen countries

(including the USSR) will be called upon to study and issue recommendations on technical questions dealing with international radio communications. A large number of the more than one-hundred radio engineers and scientists expected to attend the Los Angeles CCIR meetings are also radio amateurs.

This will be the first meeting of the CCIR since 1956, and the Conference will be faced with hundreds of important questions ranging from the development of standards for space communications to the development of an internationally standardized technical vocabulary. As further indication of the wide range of important topics to be considered, the CCIR meetings will be broken down into the following Study Groups:

Study Group	Topic
1	Transmitter Design and Standards.
2	Receiver Design and Standards.
3	Radio Systems.
4	Ground Wave Propagation.
5	Tropospheric Propagation.
6	Ionospheric Propagation.
7	Standard Frequency Transmissions and Time Signals.
8	International Monitoring.
9	General Technical Questions.
10	Broadcasting.
11	Television, including questions relating to Single Sideband.
12	Tropical Broadcasting.
13	Operational Questions of a Technical Nature.
14	Technical Vocabulary.

The CCIR was created in 1929 as an international organization for developing international technical standards, and studying technical and operational questions concerning radio communications. The first world-wide technical conference of the CCIR (Plenary Assembly) was held in Holland during 1929. Since that time seven other Plenary Assemblies have been held, the most recent being in Warsaw, Poland during 1956. In 1947 the CCIR became a permanent organ of the *International Telecommunications Union* in
[Continued on page 92]

Last Minute Forecast

Moderate ionospheric storms are forecast for April 6-7 and April 11-13. Periods of exceptionally good propagation conditions are expected April 1-4 and April 15-18. The remainder of the month should be seasonably normal.

Two major meteor showers are expected to occur during April and early May. The Lyrids should begin on April 19th, running through the 23rd, and the Aquarids should begin on May 1st, lasting through the 6th. Both showers are likely to produce some meteor type ionospheric openings on 10 and 6-meters.

APRIL, 1959

ALL TIMES IN E. S. T.

EASTERN USA TO:

	6*/10 Meters	15 Meters	20 Meters	40/80** Meters
Western Europe	7A-10A (2) 10A-3P (3) 3P-5P (2)	6A-2P (3) 2P-6P (4) 6P-9P (2) 9P-12M (1)	4A-8A (2) 8A-12N (1) 12N-5P (2) 5P-11P (4) 11P-4A (3)	7P-11P (3) 11P-2A (2) 10P-1A (2)**
Central Europe & European USSR	8A-10A (1) 10A-3P (2) 3P-5P (1)	6A-9A (2) 9A-11A (1) 11A-1P (2) 1P-5P (3) 5P-9P (2)	6A-2P (1) 2P-6P (2) 6P-11P (3) 11P-6A (2)	7P-12M (2) 8P-11P (1)**
Eastern Mediterranean	7A-9A (1) 9A-2P (2) 2P-6P (1)	6A-11A (1) 11A-1P (2) 1P-6P (3) 6P-9P (2) 9P-11P (1)	7A-1P (1) 1P-4P (2) 4P-12M (3) 12M-7A (2)	7P-10P (2) 8P-10P (1)**
North & Central Africa	7A-10A (2) 10A-12N (3) 12N-2P (4) 2P-5P (2) 5P-7P (1)	4A-12N (2) 12N-3P (3) 3P-6P (4) 6P-10P (2) 10P-12M (1)	6A-3P (1) 3P-5P (2) 5P-11P (3) 11P-2A (2) 2A-6A (1)	7P-12M (2) 8P-11P (1)**
South Africa	6A-9A (1) 9A-12N (2) 12N-3P (4) 3P-6P (3) 6P-8P (1)	9A-1P (1) 1P-3P (3) 3P-7P (4) 7P-11P (2) 11P-3A (1)	8A-4P (1) 4P-6P (2) 6P-11P (3) 11P-3A (2)	8P-11P (1)
South America	11A-3P (1)* 6P-9P (1)* 6A-3P (3) 3P-6P (4) 6P-10P (3) 10P-1A (2)	6A-9A (3) 9A-2P (2) 2P-5P (3) 5P-9P (4) 9P-1A (3) 1A-6A (1)	7A-3P (1) 3P-5P (2) 5P-1A (4) 1A-5A (3) 5A-7A (2)	7P-12M (2) 12M-4A (3) 4A-7A (2) 12M-4A (1)**
Central & South Asia	12N-4P (1) 4P-6P (2) 6P-8P (1)	8A-12N (1) 12N-5P (2) 5P-9P (1)	2A-6A (1) 6A-9A (2) 9A-3P (1) 3P-6P (2) 6P-8P (1)	8P-10P (1)
Australasia	9A-12N (1) 3P-5P (1) 5P-8P (2) 8P-10P (1)	8A-12N (3) 12N-4P (2) 4P-9P (1) 9P-1A (2)	6A-9A (3) 9A-12N (2) 12N-12M (1) 12M-4A (2) 4A-6A (1)	3A-7A (2) 4A-6A (1)**
Guam & Pacific	2P-5P (1) 5P-7P (2) 7P-9P (1)	8A-12N (2) 12N-5P (3) 5P-11P (2)	11P-1A (2) 1A-6A (1) 6A-9A (3) 9A-11A (2) 11A-1P (1)	4A-8A (1)
Japan & Far East	8A-10A (1) 3P-7P (2) 7P-9P (1)	8A-10A (2) 2P-8P (3) 8P-10P (1)	1A-6A (2) 6A-9A (3) 9A-12N (2) 12N-5P (1)	4A-9A (1)
Antarctica	12N-2P (2) 2P-6P (3) 6P-9P (2)	8A-11A (3) 11A-3P (2) 3P-10P (3) 10P-12M (2)	8A-12N (2) 12N-7P (1) 7P-12M (3) 12M-2A (2)	9P-1A (2) 1A-4A (1) 10P-1A (1)**

ALL TIMES IN C. S. T.

CENTRAL USA TO:

	6*/10 Meters	15 Meters	20 Meters	40/80** Meters
Western & Central Europe	8A-11A (2) 11A-2P (3) 2P-4P (2)	5A-10A (2) 10A-4P (3) 4P-6P (2) 6P-9P (1)	12N-5P (2) 5P-8P (3) 8P-12M (4) 12M-3A (2) 3A-12N (1)	6P-12M (2) 8P-11P (1)**
Southern Europe & North Africa	8A-11A (2) 11A-2P (3) 2P-5P (2)	4A-11A (2) 11A-4P (3) 4P-8P (2) 8P-12M (1)	7A-3P (1) 3P-5P (2) 5P-10P (4) 10P-3A (3) 3A-7A (2)	7P-12M (2) 8P-11P (1)**
Central & South Africa	8A-12N (2) 12N-3P (4) 3P-6P (3) 6P-8P (1)	10A-1P (1) 1P-3P (2) 3P-7P (4) 7P-11P (3) 11P-2A (1)	8A-3P (1) 3P-5P (2) 5P-11P (3) 11P-2A (2)	8P-10P (2) 8P-10P (1)**
South America	11A-3P (1)* 6P-9P (1)* 6A-2P (3) 2P-6P (4) 6P-10P (3) 10P-12M (2)	6A-9A (3) 9A-4P (2) 4P-6P (3) 6P-11P (4) 11P-2A (3) 2A-6A (1)	8A-2P (1) 2P-5P (2) 5P-1A (4) 1A-5A (3) 5A-8A (2)	7P-12M (2) 12M-4A (3) 4A-7A (2) 12M-4A (1)**

ALL TIMES IN C. S. T. (Cont'd)

CENTRAL USA TO:

	6*/10 Meters	15 Meters	20 Meters	40/80** Meters
Hawaii	10A-12N (2) 12N-6P (4) 6P-9P (3) 9P-11P (1)	9A-11A (2) 11A-5P (3) 5P-10P (4) 10P-12M (3) 12M-4A (2)	8A-10A (3) 10A-6P (2) 6P-4A (4) 4A-8A (2)	8P-10P (2) 10P-6A (4) 6A-8A (2) 11P-5A (2)**
Japan & Far East	2P-4P (1) 4P-8P (2) 8P-10P (1)	8A-10A (2) 10A-1P (1) 1P-4P (3) 4P-7P (2) 7P-9P (3) 9P-11P (2)	2A-6A (1) 6A-9A (3) 9A-11A (2) 11A-3P (1) 3P-2A (2)	3A-9A (1)
Central & South Asia	2P-4P (1) 4P-6P (2) 6P-9P (1)	7A-10A (1) 10A-2P (2) 2P-4P (3) 4P-10P (1)	4A-7A (1) 7A-9A (3) 9A-12N (2) 12N-4P (1)	8P-10P (1)
Australasia	8A-11A (2) 11A-3P (1) 3P-8P (3) 8P-10P (1)	8A-11A (3) 11A-2P (1) 2P-9P (2) 9P-12M (3) 12M-3A (1)	10P-12M (2) 12M-4A (3) 4A-7A (2) 7A-10A (3) 10A-1P (2) 1P-10P (1)	2A-7A (3) 3A-6A (2)**
Antarctica	1P-3P (2) 3P-6P (3) 6P-9P (2)	8A-10A (3) 10A-4P (2) 4P-9P (3) 9P-11P (2)	9A-12N (2) 12N-7P (1) 7P-11P (3) 11P-1A (2)	9P-1A (2) 1A-4A (1) 10P-12M (1)**

ALL TIMES IN P. S. T.

WESTERN USA TO:

	6*/10 Meters	15 Meters	20 Meters	40/80** Meters
Europe & North America	8A-10A (1) 10A-1P (2) 1P-4P (1)	6A-10A (2) 10A-4P (3) 4P-8P (2) 8P-11P (1)	11A-1P (2) 1P-9P (3) 9P-1A (2) 1A-6A (1) 6A-9A (2) 9A-11A (1)	6P-11P (2) 7P-10P (1)**
Central & South Africa	6A-8A (2) 8A-2P (3) 2P-4P (2) 4P-7P (1)	6A-8A (1) 8A-11A (2) 11A-4P (4) 4P-7P (2) 7P-9P (1) 9P-1A (2)	6A-11A (1) 11A-2P (2) 2P-6P (3) 6P-9P (2) 9P-11P (3) 11P-2A (1)	6P-10P (2) 7P-9P (1)**
South America	11A-3P (1)* 6P-8P (1)* 6A-12N (3) 12N-4P (4) 4P-9P (3) 9P-12M (2)	2A-1P (2) 1P-3P (3) 3P-10P (4) 10P-2A (3)	8A-3P (1) 3P-6P (2) 6P-2A (5) 2A-4A (4) 4A-8A (3)	8P-10P (2) 10P-12M (3) 12M-3A (2) 10P-12M (1)**
Guam & Pacific Islands	8A-10A (2) 10A-2P (3) 2P-6P (2) 6P-8P (3) 8P-10P (2)	7A-12N (3) 12N-7P (1) 7P-12M (3) 12M-7A (2)	8P-2A (2) 2A-8A (3) 8A-11A (2)	1A-5A (2) 3A-5A (1)**
Australasia	2P-6P (1)* 7A-3P (2) 3P-6P (3) 6P-10P (4) 10P-2A (2)	7A-12N (3) 12N-6P (1) 6P-1A (4) 1A-7A (2)	5A-8A (3) 8A-10A (2) 10A-7P (1) 7P-9P (2) 9P-2A (3) 2A-5A (4)	11P-2A (1) 2A-6A (2) 6A-8A (1) 2A-6A (1)**
Japan, Okinawa & Far East	10A-12N (2) 12N-7P (3) 7P-10P (2)	8A-12N (2) 12N-4P (3) 4P-7P (4) 7P-12M (3) 12M-4A (2)	8P-1A (2) 1A-7A (4) 7A-10A (3) 10A-1P (2) 1P-8P (1)	1A-3A (1) 3A-6A (2) 3A-6A (1)**
Philippine Islands & East Indies	8A-11A (2) 11A-2P (1) 2P-4P (3) 4P-10P (2)	7A-12N (3) 12N-3P (2) 3P-10P (1) 10P-7A (2)	1A-4A (1) 4A-6A (2) 6A-8A (3) 8A-12N (2)	3A-6A (1)
Malaya & South East Asia	8A-11A (2) 11A-2P (1) 2P-6P (3) 6P-8P (2)	7A-12N (3) 12N-3P (2) 3P-10P (1) 10P-3A (2)	12M-4A (1) 4A-8A (2) 8A-11A (1)	4A-7A (1)
Hong Kong, Macao & Formosa	8A-12N (1) 12N-8P (3) 8P-10P (1)	7A-12N (3) 12N-8P (2) 8P-12M (3) 12M-3A (2)	9P-2A (2) 2A-8A (3) 8A-12N (2) 12N-9P (1)	2A-4A (1) 4A-6A (2) 3A-5A (1)**

has grown to be almost the biggest of VHF contests. The scoring system has proven to be one of the best ever devised for VHF work, being on the basis of number of contacts and counties contacted. See the VHF column for details.

Europe, Continued . . .

After leaving Karl, DL3FM, Peter, DL3AR and John, DL4WW at Weinheim I visited the Stars and Stripes HQ in Darmstadt and found out what CQ should do to get on the Army newsstands around Europe. (CQ is now available in most Army PX's as a result.)

Heidelberg was right on the Autobahn so I stopped off to visit Brig. Gen. Bill Hamlin, DL4WH. Turned out he was in London for a couple of days, so I missed him. I did get a chance to talk with Harrison Berger, DL4JG for a while though and found out quite a bit about the radio setup in Germany, the relationship between the DL4's and DL3's, etc.

Arriving back in Stuttgart I found that Lothar Woerner, DJ1BZ had made arrangements for me to have dinner that night at the famous Fernsehturm, the Television tower that sits high on a hill overlooking Stuttgart. The view from the tower is breathtaking. I understand that there was considerable discussion when the tower was built about whether to put in a sight-seeing platform and elevator. The elevator fees alone have paid for the structure more than twice over so far. Up near the top of the huge tower they've built a small building. Observation platform on top, TV station next, and a complete restaurant under that. It was a lot like eating at the Top of the Mark in San Francisco or high on the Empire State Building.

The meal was wonderful. Lothar knew just what to order and introduced me to several interesting local specialties. We were joined, as the meal progressed, by most of the best known hams from the area. Most of them were pictured in the June 1958 CQ in the report on the winners of the DX Contest, including Lothar. The Chief Engineer, being a ham, showed us through the station and explained how he occasionally plugged the TV antenna into his two meter rig and worked all over Europe! What a location!

The Porsche factory worked real hard the next day and got my car ready by quitting time. They installed just about everything I could think of in the way of accessories for hamming, rallying, and just plain fast driving. They said not to run it at over 3500 rpm for the first 1500 miles . . . this is 70 mph. I drove from the factory to the Autobahn and continued at 3500 rpm all the way to Munich, 150 miles away. Hugh Avary, DL4WX put me up, showed me around town, helped me do some shopping in the local PX, and set up a meeting

where I showed my Navassa KC4AF slides to over 100 local amateurs. I spoke slowly and most of them were able to understand without translation.

Next stop Vienna and a visit with OE1FF. The roads through Austria are quite a let-down after the beautiful German Autobahns, which are much like our turnpikes. It is more like driving through the small two lane roads in New England, but with towns spaced about three miles apart. You have to take it pretty

[Continued on page 98]



The Fernsehturm television tower in Stuttgart.

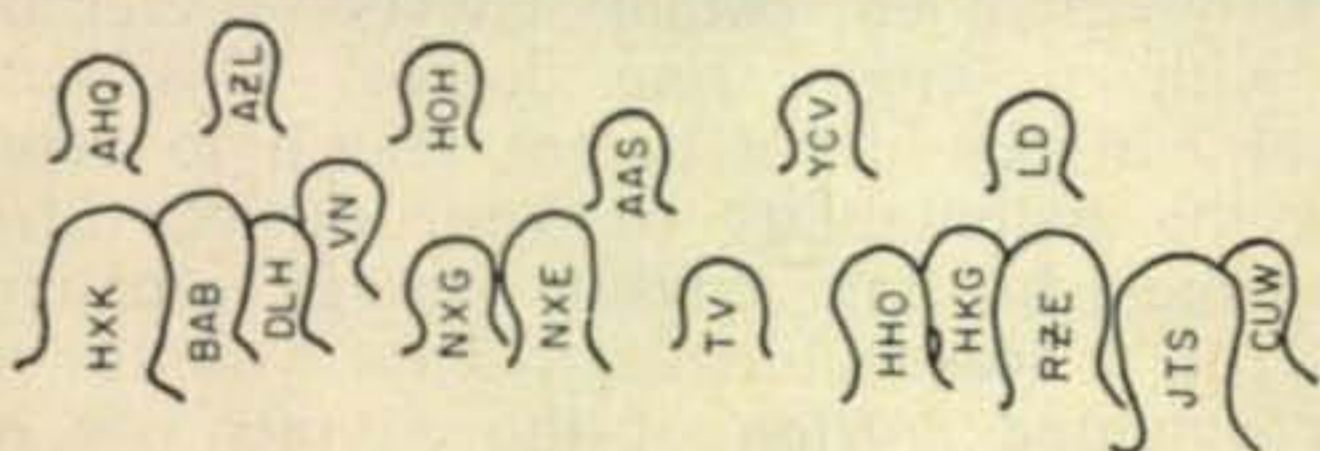


L to R—OE1FF, OE1ER, W2NSD/OE in Vienna.

Announcements

Malden Mass

The Malden Amateur Radio group met last month to celebrate the successful semi-yearly auction held by their organization. The profits of the well attended auction was passed along to the "free-loaders" for their efforts. The main purpose of the meeting, in addition to the refreshments, was to discuss ways and means of improving their efforts in Civil Defense work.



W1AHQ, John Moran; K1AZL, Paul Wolfson; W1HOH, Dave Smith; W1AAS, Frank Fortier; W1YCV, Marvin Tepper; W1LD, Del Hood; W1VH, John Plummer; W1NXG, Bernie Nelson; W1TV, Bill Doyle; W1HKG, Eli Nannis; K1CUW, Jack Kohn; K1DLH, Frank Lord; W1NXE, Phil Stoddart; W1HHO, Calder Latham; W1BAB, Warren Holmgren; W1HXK, Arthur Shulman; W1RZE, Arthur Pugsley; W1JTS, Warren Ray.

FCC Ruling

By Memorandum Opinion and Order, the Commission denied a petition by George H. Goldstone, Detroit, Mich., for amendments to Part 12 of the rules to (1) divide the present extra class amateur license into extra radiotelegraph and extra radiotelephone licenses, (2) award a "Radio Pioneer Certificate" to amateur operators licensed prior to April 6, 1917 in lieu of an extra class license but with all the privileges of the latter class; and (3) limit the maximum power input of amateur stations by novice class operators to 35 watts, general and conditional to 150 watts, and, with certain exceptions, extra radiotelegraph and extra radiotelephone class and pioneer radio certificate holders to 1000 watts. However, since the Commission believes the petitioner's objective of restoring some degree of prestige to the extra class license is praise-worthy, it proposes to issue a Notice of Inquiry to explore the possibilities of restoring meaning and prestige to that class of license.

Abilene, Texas

The Abilene Amateur Radio Club, Abilene, Texas will have their annual swapfest on May 3, 1959.

West Virginia

West Virginia State Hamfest, Jackson Mills 4-H Camp near Weston W. Va. on U.S. Route No. 19 July 11th and 12th, 1959. Registration \$1.59 by June 1st and \$2.00 at the Mill. Accommodations at Jackson Mills \$4.50 per person for lodging and three meals but advance registration also required by June 1st. Not necessary to stay at the Mill to attend Hamfest. Special prize drawing for those registering in advance. Program will include activity for everyone so bring the whole family. Reservation, more detail and a brochure may be had by writing to West Va. Hamfest, Box 909, Fairmont, West Va.

Ham Shack At A.M.A.

"Amateur Radio As A Doctor's Hobby" will be the title of an exhibit at the A.M.A. Meeting to be held in Atlantic City, June 6-12, 1959. This exhibit will be presented by a group of M.D.'s of the Camden, N. J. area who have a mutual interest in amateur radio as a hobby. According to Dr. Chester L. Samuelson, who is heading up the group, the exhibit will consist of the latest equipment (ham gear) which will be in actual operation from Convention Hall under Dr. Samuelson's call—K2SVD/2.

The exhibit will also include information relative to amateur radio as a means of Civil Defense and emergency contact between M.D.'s, hospitals, C.D. groups, etc.

According to Dr. Samuelson, the group has now contacted approximately 500 M.D.'s having amateur radio as a hobby and 400 of these contacts and their calls have been confirmed. A listing of these confirmed M.D. Calls will be given to those who register at the exhibit and will be available upon request to any doctor who sends in his call. The group is most anxious to hear from any M.D. who is a licensed amateur operator and has not been contacted to date so their call may be included in the listing. They would also like to hear from any M.D. who may have published any article on any subject pertaining to amateur radio.

It is hoped that all those who have amateur radio as a hobby and attend the Meeting will visit this exhibit. The equipment will be available for operation by any licensed operator and as much traffic and as many messages will be handled as possible.

For further information and to list your call, please contact Dr. Chester L. Samuelson, Medical Director, Mobil Oil Company, Inc., Paulsboro, N.J.

Indiana University

The Indiana University announces the formation of a radio amateur club. The group name is The Indiana Memorial Union Amateur Radio Club.

Lehigh Valley

The Lehigh Valley Amateur Radio Club in Allentown, Pennsylvania has received its former call W3OI. (This is something rare these days.) Perhaps some of the fraternity would like to receive one of their attractive QSL cards. This can be done, of course, by working the station.

St. Louis, Mo.

The Annual WØ-DXCC Dinner and Meeting will be held in St. Louis, Mo., on Saturday, April 25th, at the Statler-Hilton Hotel. The informal meeting begins at 1:00 P.M. and dinner will be served at 7:00 P.M. Tickets are available from Sam Halley, WØIJW, 5022 Queens Ave., St. Louis 15, Mo. for \$6.00. Advance registration is requested to be able to anticipate dinner requirements. The meeting is open to anyone interested in DX.

Trenton, New Jersey

You are cordially invited to attend the 14th Annual Old Timer's Nite Round-Up and Banquet to be held on Saturday evening, April 18th, 1959 in the Grand Ballroom, Hotel Stacy-Trent, in downtown Trenton. As in the past the party will be STAG.

This annual event, sponsored by the Delaware Valley Radio Assn., is held to honor the early living pioneers of wireless, and to reminisce on their experiences of yesteryear. A turkey dinner will be served promptly at 6:30 o'clock in the ballroom. Bring along your oldest amateur and commercial licenses, as awards will be made to those holding the earliest dates. Tickets are by reservation only, and may be obtained by mailing your request, on or before April 13th, with your remittance of \$6.00 per man

[continued on page 92]



ham clinic

by **CHARLES J. SCHAUERS, F7FE**

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

In my various travels throughout the world I have visited many hams. I cannot remember a visit which did not afford me the opportunity to pick up some very solid bits of information.

Many of the stations visited contained new and novel ideas. When reminded that some of these innovations could be made the matter of a fine article for publication in CQ, a few of the hams visited indicated that they would give the subject some thought. But to this day I have only seen three articles published as a result of my "prodding."

Writing an article for the pages of CQ is not a difficult task. All you need do is to put down on paper the information which you normally would impart verbally. Pictures of equipment are no problem either. Most hams go in for photography too; and one can always find at least one who will be willing to help you with the picture taking. Perfect drafting is not essential—a good clear simple sketch or diagram will do.

CQ wants your pet ideas and projects in its pages. If you work in the electronic industry, remember that your technical amateur radio articles are usually recognized as technical achievement by your firm.

There is a lot of satisfaction derived from seeing one's efforts in print, especially when it is realized that what you write is read by thousands of hams the world over.

Observed: too many radio amateurs are "hoarding" fine ideas and designs which would be very interesting and very usable to and by the ham fraternity at large. Send in your articles NOW to our editor and contribute to the advancement of ham radio. You'll be glad you did!

Questions

Legal Advice

"Can you give me legal advice relative to the utilization of various circuits (which I have modified) for use in a device to be used by hams which I would like to manufacture and market commercially? Also, what must I do to determine whether or not a circuit is patented?"

First off, HAM CLINIC *does* not impart legal advice—this is a specialized field. The information you seek must come from a properly qualified patent lawyer—preferably one with an engineering degree. This same lawyer can conduct a patent search to determine the patentability of your device. Most companies holding circuit (design) patents will, for a reasonable fee license you to use their patented *portion* of the circuits you intend to use.

There are many circuits in existence that are now considered "open" due to patent expiration (non-renewal) and may be used by anyone commercially. However a search is necessary to determine what these are.

To save yourself possible future trouble, contact a reliable law firm in Washington, D. C. specializing in patent law.

Equipment Faults

As pointed out once before, the mere fact that we publish equipment troubles and possible solutions does not necessarily mean that the troubles described are or will be prevalent in *every* piece of the same equipment. This peculiar situation only occurs when there has been a slight slip-up on a particular assembly line run or in individual part manufacture. However, we do not *always* know this and assume that the same trouble *may* crop up in the same equipment owned by other than the ham who submitted a request for trouble-shooting information in the first place.

If a piece of equipment does have a peculiar fault, the best place to advertise it is through HAM CLINIC. Only a fool would judge a piece of equipment based solely on a few isolated instances of trouble. Equipment does change hands; and manufacturer's service sheets and modification information do not always find their way into the hands of the new owners. This is the reason we like to receive such information from the manufacturers for publication.

There is not one piece of ham equipment on the market today which is 100% trouble-free. Mechanical and electrical parts age and wear as does nearly everything else on this fast mov-

ing planet of ours.

To assist manufacturers in disseminating trouble-shooting information or modification data on their equipment (both new and used) HAM CLINIC invites their service sheets and modification bulletins.

Black Widow

"I have a Black Widow transmitter (10 meters). I'm having modulator trouble. Checking, I found no plate voltage on the 6AQ5s. The modulation transformer seems to be okeh. How come no plate voltage if the windings of the mod transformer are not open?"

Check the .65 ohm metering resistor and its CONNECTIONS. Your B+ voltage is fed through it to the center-tap of the mod transformer.

SX-99

A *Hallicrafters* SX-99 receiver was reported as having a background noise starting at about 26 mc and apparent as hash in the 10 meter band. For the answer to this problem, we offer our hand and *thank you* to W9GXH, Service Manager for *Hallicrafters*.

W9GXH writes: "We have not received other reports from the field to indicate that this is a chronic condition in the SX-99 receiver and perhaps the set is in need of realignment. In addition, the oscillator tube should be checked and replaced if necessary and the wiper on the oscillator portion of the main tuning and bandspread condensers should be checked to insure proper grounding action is taking place. The tension should be adjusted for proper wiping action and if there is any accumulation of foreign material between the wiper and the rotor shaft this can be cleaned out with any good contact cleaner.

"When aligning the receiver, the image should appear below the fundamental frequency on the first three bands. On the fourth band (12.0-34.0 mc) the image will fall above the fundamental frequency. It is possible too that the noise you are experiencing may be electrical interference peculiar to your location. This can be checked by substituting another receiver and listening on the same frequencies."

Heath VFO for 6 Meters

Thanks to Bob Brown, K2ZSQ for the following information relative to the use of the *Heathkit* vfo on 6 meters. He writes . . . "a recent visit to Mike, K2UGH indicated that he was controlling his high power final successfully with the vfo and that no major changes were required. To change the 40 meter section to 8 mc operation the following steps should be taken: 1. Remove the vfo from its case; 2. Find the 40 meter section (This is on the left and consists of a coil and trimmer capacitor combination); 3. With a screwdriver, turn the slug of the 40 meter coil all the way out so that the slug is as far out of the coil as it can go; 4. On the front scale (dial) set the markings as you want them on 6 meters (or find a

clear spot and use that); 5. Locate the trimmer capacitor that is right above the coil; 6. Tune to 50 mc on the receiver; 7. Turn the trimmer until a signal is heard in the receiver. (There should be only one signal as the trimmer is turned. If there is more, vary the inductance with the slug again, then retune the trimmer); 8. Put the vfo back into the case; 9. Retune through the hole at the top of the case (the trimmer) until the signal is again heard in the receiver. (This must be done as the capacity is affected when the case is replaced and the frequency changes.) The same procedure can be used on 144 mc too; merely tune for the 144 mc signal. Any questions relative to the above modification I will gladly answer if letters include return postage." Again Bob, thanks a million!

108 MC on NC 300-C2

"What changes are necessary to enable my *National* NC300-C2 converter to pick up satellite transmitters on 108 mc?"

Thanks to *National* here is the information. First, add approximately 12 mmf across L-7 (a 5 to 20 mmf variable will do) so that L7 may be tuned to the second harmonic of the crystal instead of the third, 75.666 mc. Second, add approximately 3 mmf across L1, L2 and L3 (2.5 to 6 mmf variables will do). Third, add 10 mmf across L4. Finally, the capacitors across L1, L2 and L3 may now be adjusted to 108 mc. L4's capacitor should be adjusted to the point just below oscillation on the side of minimum capacity. None of the coils need be disturbed and the converter may be returned to its original condition merely by removing the capacitors mentioned above. 108 mc will occur at about 32.334 mc on the X band which is close to mid-scale of the various ranges employing this band. Check over your diagram carefully before doing the changeover.

6146s

"Say you have two 6146s in parallel in an rf amplifier. How can you tell when one of them is slightly (sic) bad?"

A shorted element in one will short out the other; amplifier will be inoperative. A slight drop in emission or tube efficiency may be evident in plate current readings (depending upon the meter employed). If one 6146 is really bad, the other 6146 will no doubt heat up abnormally. Grid overdrive will result too. Poor modulation will result. But the real indicator for trouble is the final plate current meter.

DSB

"I built up a DSB transmitter using 807s in the final. I am feeding the grids through a series coupling condenser from the buffer plate. My carrier suppression is low; any suggestions?"

Yes. For proper DSB operation both final tubes must be series excited with equal amounts of rf drive to their grids; the plates are *nearly*

always paralleled. This series-parallel circuitry gives you carrier cancellation. The screens are of course modulated. If you'll refer to the article in the March issue of CQ (1958) by K2GZT of GE you will see that his arrangement for proper grid-excitation is a simple link-to-tuned-circuit method which allows proper series feed. Split capacitance will work if you incorporate a system for varying *rf* feed to both grids. This can be accomplished by using a balanced arrangement to ground using separate variables of about 100 mmf; each grid can then be adjusted for proper and equal drive. The tuned circuit arrangement with center tapped coil is preferred however. Another thing, be sure that your grid and plate circuits are properly isolated; that you have proper parasitic suppression and that proper grid drive is available (about 4 mils per 807).

Transistor Modulator

"I recently constructed a transistor modulator using 2N255s and 2N256s patterned after the CBS model, to modulate a single 807. No matter what I do I cannot seem to get it to work properly (no full modulation of the carrier). What can you advise?"

First, with 12 volts on the 2N256s your *af* output will average about 10 watts, which means around 18-20 watts input to your 807 for nearly 100% modulation. A 2E26 final would be better. Operating your 807 at 300 volts at 70 mils will give you about 21 watts input. Figuring about 50% efficiency, this means about 10 watts in the antenna. Your modulator output impedance for proper transformer matching to your 807 would be about 4300 ohms not figuring negative cycle loading. Decreasing your final input to about 18 watts would enable your modulator to do a better job. One should always figure about 1/2 of *rf* input power for 100% modulation, plus about 25% for losses. Make sure you use a large enough modulation transformer so that you will not have current saturation. I think you're trying to modulate an 807 whose *rf* input power is maximum and you do not have sufficient modulator power to do it.

Dummy Loads

"Please set me straight. In a contemporary ham magazine one article says a light bulb makes a good dummy load and another says they are not so good. What's the dope?"

A light bulb when connected to the output of a transmitter only indicates *relative* output. Actually it is a varying load. Resistance of the bulb's filament changes with different power levels. As an indicator of *rf* it is ok; as a load for accurate measurement it is not.

Closed Circuit TV

"Does one need a license for closed circuit TV? Where can I find a good book on it?"

As far as we know, no license is required for closed circuit TV. Try: Government Service Dept., RCA Service Co., Camden, N. J.

to obtain the book which sells for \$4.50. I do not have a copy but according to a friend of mine who is a TV engineer, he says it's hard to beat.

Book Review

If you do not have a copy of Don Stoner's SSB Handbook published by Cowan you owe it to yourself and fellow hams to get one. No "gobleygook" and confusing formulae in this one! No sir, it covers the field in very readable terms. One article on a *vfo* within its pages is worth the price! If you're not on SSB now I'll bet you will give it some serious consideration after reading Don's book. It not only describes homemade rigs but also covers do-it-yourself kit models and commercial SSB and DSB rigs as well. Even if you are a dyed-in-the-wool AM and CW man, you'll certainly be more tolerant of the SSB and DSB boys after reading it. Take it from me, it's tops!

Condenser Voltage

"What determines the amount of voltage a condenser will stand before flashing over or breaking down?"

The type and amount of dielectric.

KWM-1 Frequency Control

"I have a KWM-1 which to me is the 'ultimate.' However, I'd like to be able to work cross-frequency (American to foreign) without using the Collins adaptor. Any circuits about that are not too complicated?"

Yes. Look in Stoner's SSB Handbook. He has one which is a "peach."

50KC Transistor Multivibrator

"Any articles in recent ham mags relative to the construction of a 50kc transistor multivibrator circuit?"

Yes. QST for July 1958 page 18.

Linear Amplifier

"I have a pair of Eimac 4-65s and I'd like to build a linear. How about a circuit?"

Look on page 10, *Western Radio Amateur*, Sept. 1958. W6BLZ has a fine one. For your copy, send two bits to WRA, 10517 Haverly St., El Monte, Calif.

Infrared Frequencies

"What is the frequency of infrared radiation?"

100 kilomegacycles to 0.7 microns.

RF Distance

"Tell me what the factors are which control the range over which a signal may be transmitted?"

Transmitted power:—generated power; antenna gain and efficiency. Received power:—sensitivity; antenna gain and efficiency.

Corner Reflector Gain

"How much gain does a corner reflector in conjunction with a dipole have over a dipole alone?"

Between 8 and 10 db.

[continued on page 104]

SURPLUS

by **KENNETH B. GRAYSON, W2HDM**

Care of CQ 300 West 43rd Street, N. Y. C. 36, N. Y.

If I were asked which piece of surplus gave you the most for your money I would be forced to say the ARC-5 command sets, but right on the heels of the ARC-5 would be the BC-221 frequency meter. It's hard to find a secondary frequency standard with as much versatility as the 221 for under five hundred dollars, yet that's exactly what the commercial models go for. I've seen a BC-221 go for as little as forty dollars with the calibration book, and in perfect condition. Nowadays, they are still under a hundred and worth every cent.

The BC-221 (and the Navy LM counterpart) is a portable frequency meter of the heterodyne type capable of accuracies of 25 cycles at 20 *mc*, to the nearest kilocycle. The 221 covers two bands, namely 125 *kc* to 2000 *kc* and 2000 *kc* to 20,000 *kc*. Essentially it is a highly stable, well calibrated oscillator with a low frequency range of 125 to 250 *kc* and a high frequency range of 2000 to 4000 *kc*. By means of harmonics, the complete range is covered. The companion calibration book is individually calibrated for its own BC-221 and carries the same serial number as the frequency meter itself. The slight error which may occur due to temperature changes, aging of tubes etc, is accounted for by checking the calibration against the 1000 *kc* standard built into the equipment, and compensating the calibration by a fine trimmer known as the corrector. Many frequency check points occur over the band, and errors can be reduced to as low as 0.02 percent.

In use, the frequency meter is turned on and, in the case of an oscillator or transmitter, beat against the unknown signal. The frequency meter has a detector and an audio amplifier so

that the beat is heard in a pair of high impedance earphones. The calibration of receiver is very simple. The 221 is set to a particular frequency and the receiver tuned so as to receive the 221's signal. In some models of the frequency meter a modulated signal is available so the *bfo* of the receiver need not be turned on, but this is only in the later models.

The *rf* signal required to operate the BC-221 is relatively small, and only a short length wire for pickup is needed. As a special note, don't connect it directly to the antenna or to a transmitter. Near the antenna is close enough. Likewise when testing a receiver, don't couple the frequency meter directly, but instead connect a short piece of wire to the 221 antenna post and just bring it near enough to allow the receiver's antenna to pick up a signal.

The output of the frequency meter is high enough to allow its use as a fine *vfo*. A cathode follower may be necessary in some cases to prevent loading of the output.

Conversion of the BC-221 is practically negligible except for the power supply to take the place of the batteries and a modulator. We're indebted to DL4VG (W9YUE) who came up with the modulator last year for us. I'm sure that he thought we forgot all about it, but it's well worth passing on and requires very few parts. It is shown in fig. 1. It will allow you to tune up that receiver, under AM conditions, to the exact frequency and be right on when that sked is due. It also allows you to use the 221 as a signal generator for accurate alignment.

The power supply is simple. The original power supply used for 1½ volt large cells for fila-

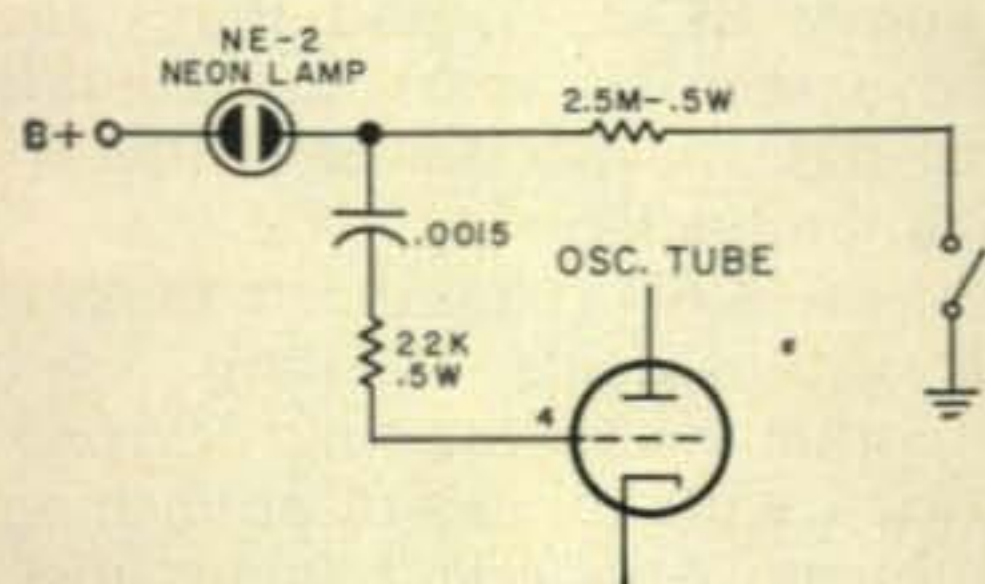


Fig. 1—Simple neon lamp modulator circuit for a 400 cycle tone.

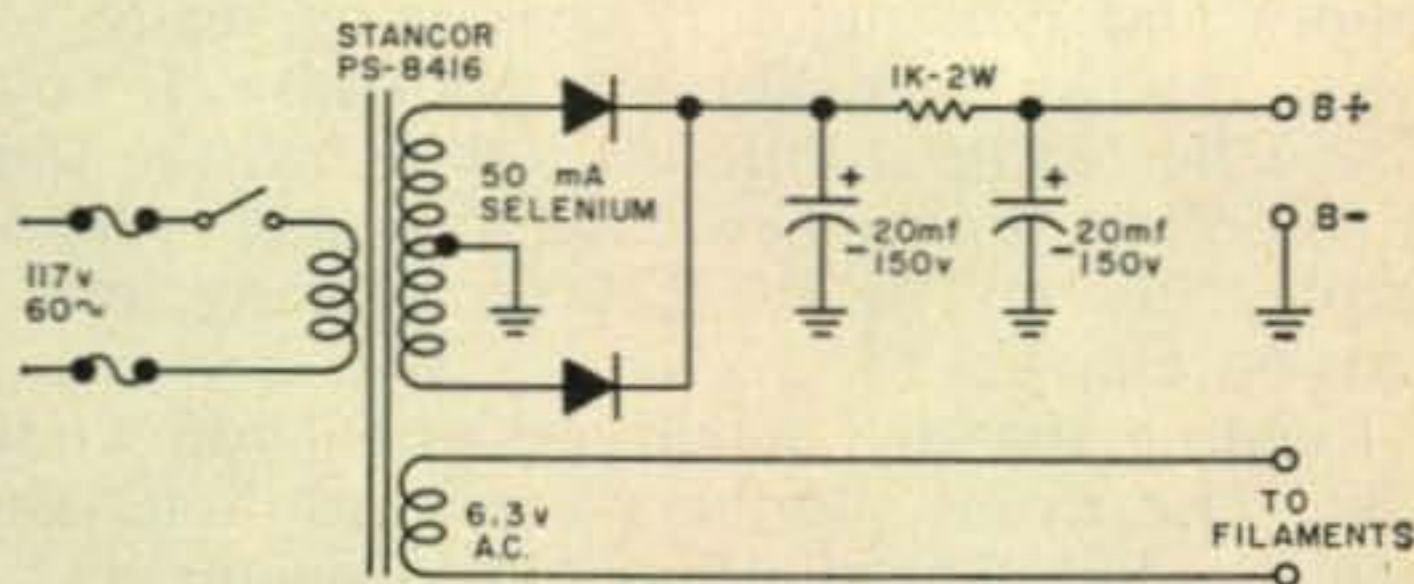
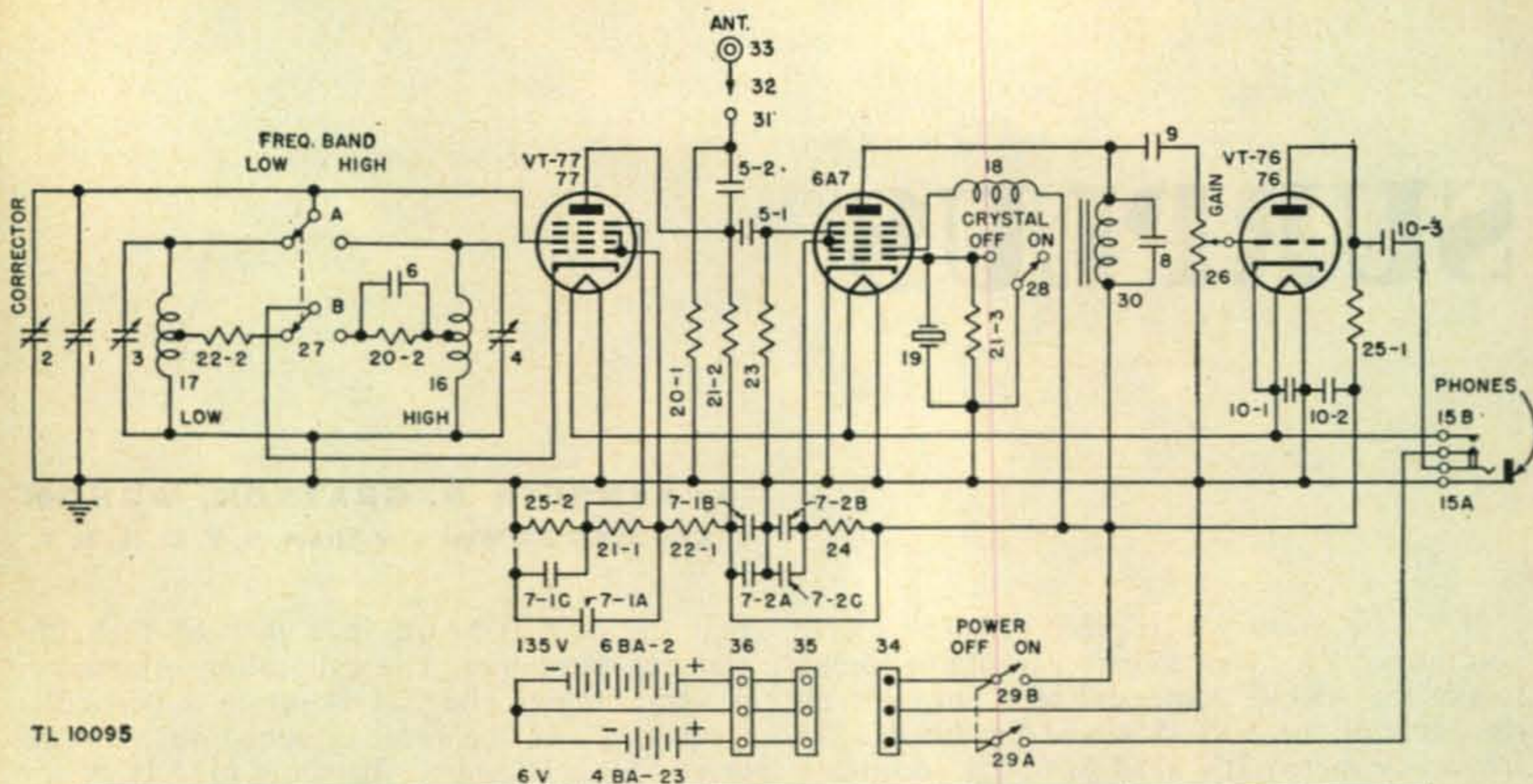


Fig. 2—Full wave power supply to operate BC-221 from the ac line



TL 10095

REF	DESCRIPTION	REF	DESCRIPTION	REF	DESCRIPTION	REF	DESCRIPTION	REF	DESCRIPTION
1	150 μ f	7-1C	0.1 μ f	15B	FIL. SWITCH	23	1 MEGOHM	31	ANT. PLUG
2	2 μ f	7-2A	0.1 μ f	16	HIGH FREQ. COIL	24	30,000 OHM	32	CONTACT SPRING
3	10 μ f	7-2B	0.1 μ f	17	LOW FREQ. COIL	25-1&2	15,000 OHM	33	BINDING POST
4	10 μ f	7-2C	0.1 μ f	18	1.7 MILLIHY	26	0.5 MEGOHM	34	POWER PLUGS
5-1&2	10 μ f	8	.001 μ f	19	CRYSTAL	27	SWITCH	35	POWER JACKS
6	250 μ f	9	.02 μ f	20-1&2	5,000 OHM	28	SWITCH	36	BATTERY TERM
7-1A	0.1 μ f	10-1,2,3	0.5 μ f	21-1,2,3	50,000 OHM	29	SWITCH		
7-1B	0.1 μ f	15A	JACK	22-1&2	10,000 OHM	30	450 HENRYS		

Fig. 3—Circuit diagram of the BC-221 frequency meter.

ments and six 22½ volt cells for plate supply.

This adds up to a few bucks worth of batteries every year. True you don't use the 221 that much, but the power supply shown in fig. 2 can be built for the price of one set of batteries, and you will always have it working when you need it. The power supply is a full wave using selenium rectifiers and good filtering. Rather than drill a switch hole in the front panel the audio gain control potentiometer was removed and a similar one megohm switch type was substituted. By this means, no possible chance of calibration change can occur.

The BC-221 originally came with two different cases, namely the wooden, khaki colored, and the metal, black crackled. In recent months a new case has found itself on the surplus market. Originally used in aircraft, it included a regulated filament supply for use from 24 volts in the plane, and makes use of the plane's communication's receiver for a B+ source. By removing these parts from their compartment, adequate space will be found for the power supply and modulator. Provision is made for the storage of the calibration book also. If your case is beaten-up a little it's well worth the four or so dollars for the new case, available in many surplus stores. The BC-221 fits directly into it with no changes.

Reading the dial is simple when you know how. The drum numbers are read first, and then the dial. The dial has 100 divisions and a vernier which allows reading to one-tenth of a division. Vernier dials are fairly simple in the-

ory. They consist of a second fixed dial marked from 0 to 10 which is eleven divisions. This just covers ten divisions of the main dial. Therefore only the first and the last lines line up with the main dial at zero. Each line is off by 1/10 a division so that line two is 2/10ths off, line three is off 3/10ths etc. If our main dial has a line which lines up with line seven of our vernier then it is 7/10ths past the number on the dial, and we can read that number to a very fine accuracy.

By checking in our calibration book we can tell exactly what frequency we are on, provided we know approximately what our frequency is to start with.

The 1000 kc (1 mc) oscillator also has a correction trimmer (located behind the nameplate). By setting the output knobs to XTAL ONLY and using a receiver to tune in WWV at 5 mc we can zero beat the crystal against WWV. All in all, the heterodyne frequency meter is a good buy at \$37.50 less power supply, which is the price J. J. Glass in Los Angeles, is getting for the LM (navy BC-221), and that's the lowest price I have seen in years. Incidentally, J. J. Glass also has the ac power supplies for the BC-1335 at ten bucks.

Cliff Evans, K6BX has been making a survey of all surplus dealers dealing in prop-pitch motors or other beam rotating devices, as well as accessories, with an idea of publishing a book on the subject. Any one having info of any kind of this type of device should get in touch

[Continued on page 105]

By: Bob Adams, W3SW

P. O. Box 625
Silver Spring Md.

sideband
sideband
sideband

SIDEBAND

Worked 100 Countries — Two way SSB
(in order of award)

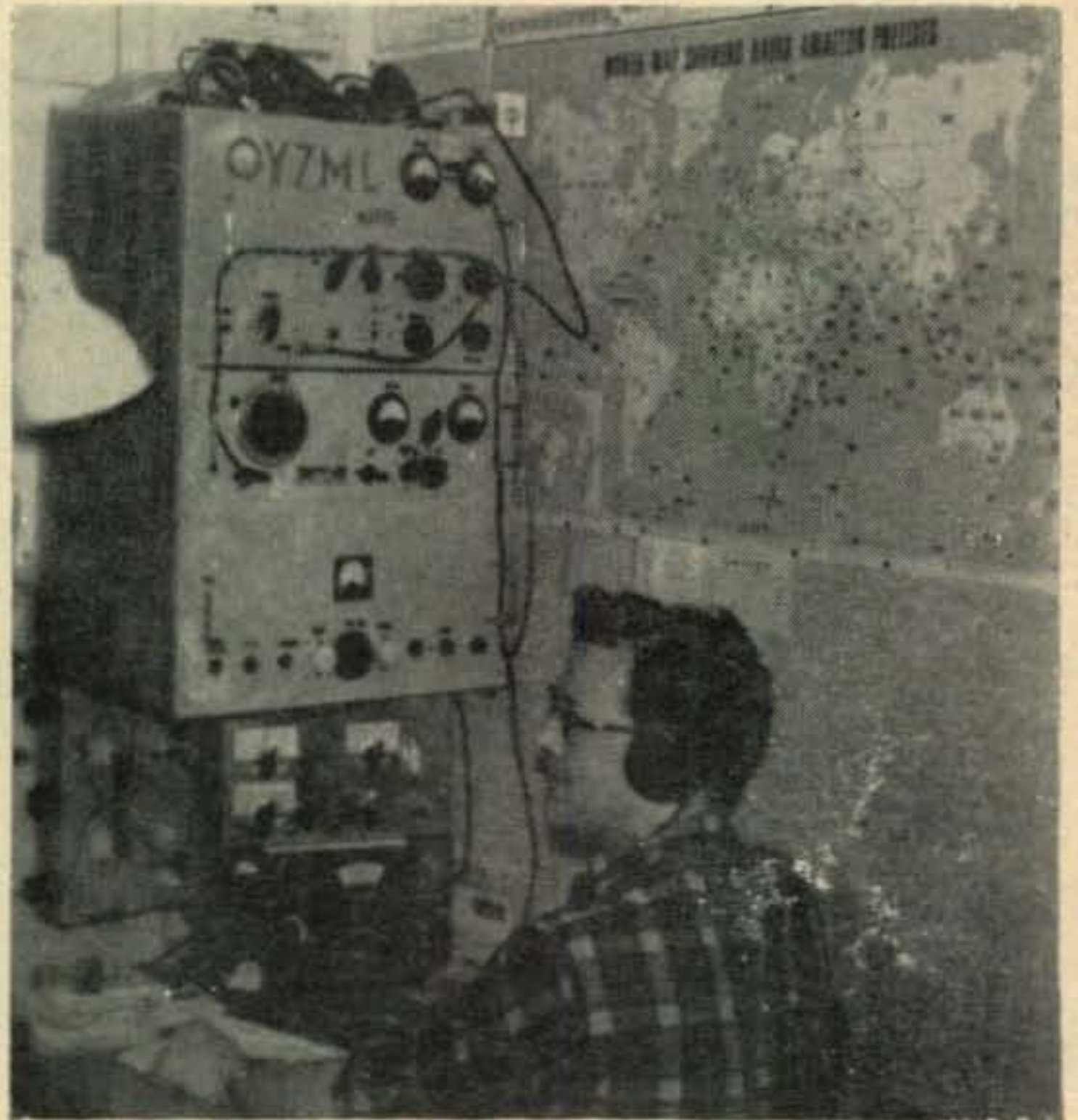
W6UOU	W8PQQ	PY2JU
W2JXH	ZL3PJ	W6UPP
F7AF	K2MGE	W6PXH
K6GMA	W2OQO	WØCVU
W3SW	W2VZV	W4INL
W4IYC	W6IAL	W8YIN
TI2HP	K2JFV	TG9AD
W8QNF	W1ADM	W3NKM
W6ITH	TI2RC	W6QFE
VE3MR	W2CFT	W8MG
W8GCN	KØABH	PY4TK
W8EAP	ZL3IA	K9EAB
W8YBZ	W6BAF	W7IAA
WØQVZ	W2TP	VQ4ERR
WØFUH	W6RKP	W8MPW

There are now forty-five members of the select "Worked 100 Club," and of these, ten have already furnished proof of having worked 150 or more. To qualify for this CQ certificate it is necessary to forward to the SB Editor at the above address, 100 or more QSL cards verifying two-way side-band QSOs with different countries, together with a list of the countries listed alphabetically by prefix. The cards should also be placed in this order. The cards should be sent via registered mail and sufficient postage should be included for returning your cards, plus fifty cents to cover costs of sending the certificate. Awards for "Worked 50" and "Worked 75" are issued upon receipt of a list of the necessary number of stations worked two-way SB and verified by another amateur certifying that he has examined the cards. It is not necessary to send the cards until applying for the "Worked 100."

When we listed the top twenty-five scorers in the last "Worked All States" Contest in the December issue we inadvertently omitted the totals of Humberto, TI2HP. His log showed contacts with 48 of the 49 States with 342 QSOs for a total of 16,416 points. This score placed Humberto in third place right back of W1HKK who had 16,544 points. We hope to get all of the certificates for that Contest in the mail in a few
[Continued on page 106]



Jack of W8JDV with his Mobile Rig.



Martin of OY7ML. ↑ ↓ Beda of OK1MB.



ZANZIBAR [from page 26]

807. After showing him the location and general set up we set off through the narrow lanes of Zanzibar town in search of a 20 foot water pipe to support the quad.

Success was ours, when an ironmongery duka (store), after learning that we were setting up a radio station, agreed to loan us a pipe. Well the quad went up, but only just. With a roof temperature of over 120 degrees F and 98% humidity we were a couple of wet rags around 16.30 and felt more like a siesta than operating DX. We found out later that the island had experienced a heat wave, and believe me it's hot enough normally.

That evening VQ1RET took the air on AM and made quite a few contacts, but the rig, hastily prepared, developed faults in the modulator. This was a modified Collins TCS 12.

Undeterred Ron pressed on with the QSO's, during the whole time he was working the modulation was low. I should mention that it was Ron's first time on the air as a licenced operator and it was quite a big thing for him. It was also his quadratic monstrosity which we brought over and erected.

The next morning we got into full swing with an early start, and made about fifty state side contacts before breakfast, and left the majority of that evening for VQ1RET with medium hop DX.

The following morning after another fifty W contacts we were able to spend a little time sight seeing before Ron's departure to Dar es Salaam.

I now took advantage of every QSO I could

make. The first station I heard was KC4USX with a 5 x 9 plus, and the beam South but unfortunately they were not listening for me or we certainly would have been able to QSO. Danny Weil VP2LW did cause me QRM on my xtal frequency. (The kind of QTH skip to fierce ham population to make 1000s of QSOs) However full co-operation was received from Danny and the South American stations, once the facts were known to them.

It was extremely interesting to work stations on the long path and then four or five hours later on the short path.

The last evening on Zanzibar, the band seemed to open up and I was able to make the whole project worth while.

One humorous incident was working KA2LT, LOIS who remarked that her OM would be hopping mad when he came home and found she had snaffed a VQ1.

Then later, talking to W2CMM, Bing, said that his XYL would put him in the dog box when she arrived home to find he had worked a VQ1.

So Bing asked me to look out for K2TEX Kitty. Well K2TEX was the last QSO from VQ1SSB and the band went dead almost immediately afterwards.

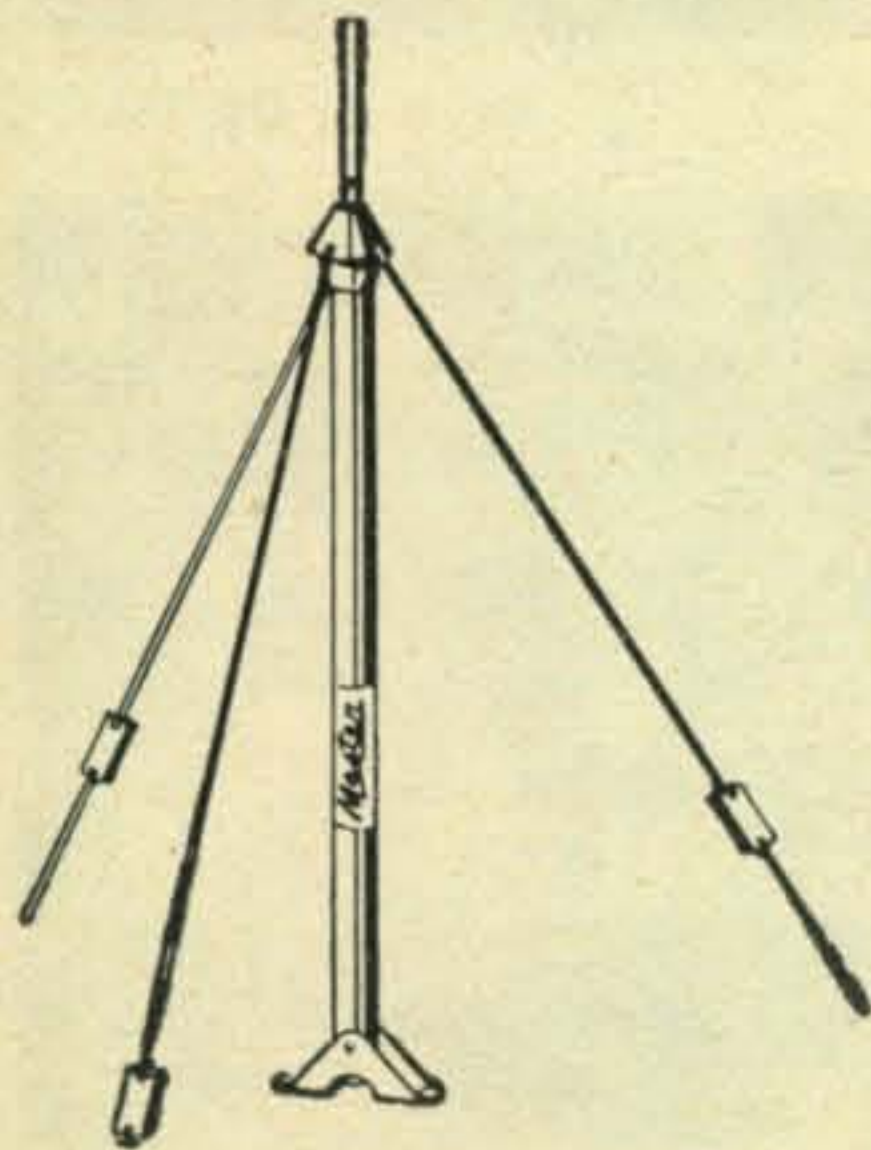
I would like to thank W5EB, Marvin for handling the QSL Cards. I really do appreciate that, and I thank everyone for their good common-sense operating, which certainly made the expedition a great success.

I have talked to many stations from ZB2A—GW31VS—VS6CW—VQ4GX—VQ3GX and VQ1SSB and I hope that in the very near future to QSO from a great deal more, how about FB8 COMOROS—VQ9 SEYCHELLES VQ2—CR7 etc!!

New Amateur Equipment

Blitz Bug

Cush Craft has come out with a darned good gadget which just about every one of us should be using. It is a coaxial cable lightning arrester which will screw right in your coax line and protect your equipment from lightning, static build-up and high standing waves which might puncture your coax. Other than affording protection all out of line with its cost of \$3.95, it will in no way affect the performance of your feeder. Smudge B on page 126 for more.



Citizens Band Antenna

Here is the answer to the new 27.0 mc citizens band home station antenna installation by Master Mobile Mounts, Inc. It will provide the maximum electrical performance possible over all the available channels. It consists of an easily mounted vertical antenna complete with a swivel base for mounting on a flat or peaked roof. Complete with all guy wires, guy wire hooks, insulators and 50 feet of lead in cable. Can be installed in less than an hour by following simple pictorial mounting instructions furnished in each kit. Turn to page 126 and diddle D for data.

Join the Rest — Order the Best! Says Leo I. Meyerson, WØGFQ

The National Line
FROM
"the house the hams built"

THE GREAT NEW
National NC-303

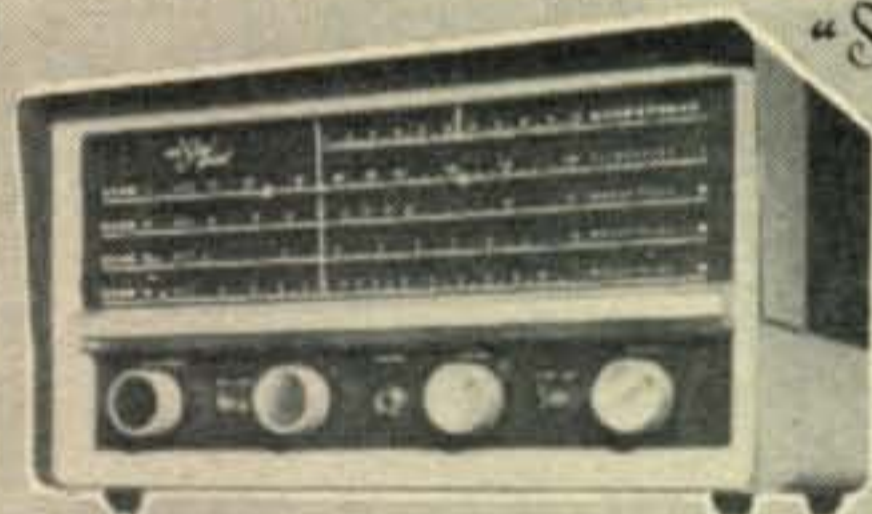


\$44.90 down
\$25.50
per mo.
or \$449
Amateur
Net

Here's the time proven features of the fine NC-300 plus the following features. Front panel selector provides instant sideband choice. Retuning or detuning eliminated. "Q" Multiplier. 5-position IF selector (.5kc, SSB-1, SSB-2, 4kc, 8kc). Separate ANL for AM. Separate manually adjusted limiter for CW, DSB and SSB. WWV converter position. Hi-speed 40-1 ratio tuning dial. Fine tuning vernier dial on CW, SSB and DSB. Antenna trimmer. 15 tubes. Sensitivity: 1.5mv. Image rejection 50-80db. Black & grey enamel finish. Shp. wt.: 64 lbs.

and the first, all new,
low-priced shortwave receiver

National NC-60
"Special"



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\$5.00
per mo.
or \$59.95
Amateur Net

The NC-60 Special Receiver offers continuous coverage of AM broadcast, Amateur and world-wide shortwave bands. Full electrical bandspread. General coverage 540kc to 31mc in 4 bands. Bandspread knob can be used as vernier on all frequencies. 5 tubes. Built-in speaker. Two-tone grey and black enamel. Shp. wt.: 15 lbs.

We stock the complete National Line:
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- ★ 25 hams here who specialize in personalized service.
- ★ Fast shipment from the center of the U. S. A.
- ★ Stocking the nation's leading ham gear.

Dear Leo: Please send your free 1959 Catalog, information on the National line, and quote your best trade offer on my present **C-4**

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For further information, check number 21 on page 126.



semiconductors

by **DONALD L. STONER, W6TNS**
P.O. Box 137, Ontario, Calif.

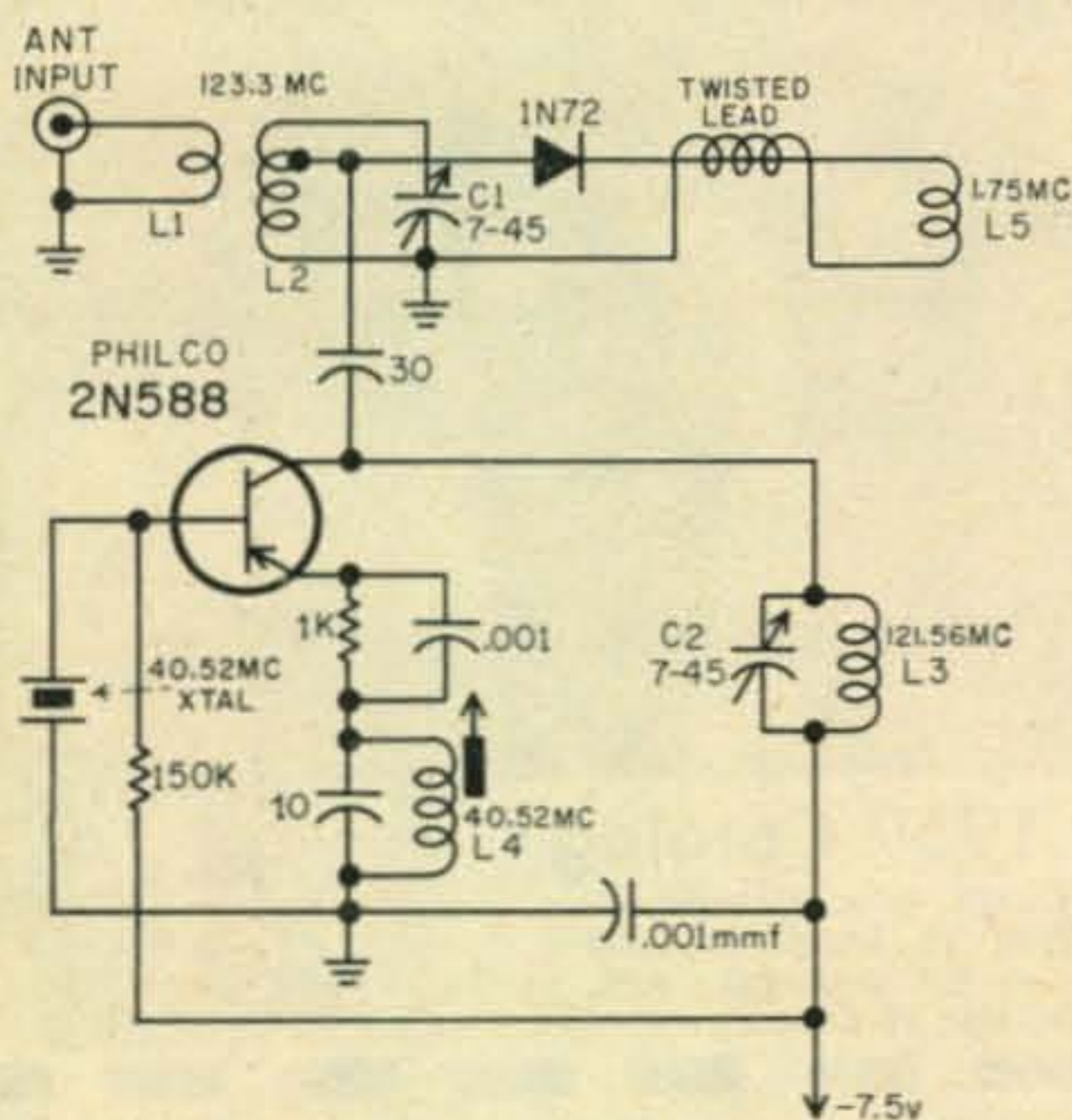
Low frequency transistor circuits (below 30 mc) are rapidly becoming passe and reader interest seems to be swinging to vhf stuff. Following the trend, I am brewing up several circuits that will interest you high frequency hounds. Future columns will include a crystal controlled two meter transmitter with two transistors in the *rf* portion, a 420 transistor oscillator (transistor costs about \$12.00!), and a two meter transistor receiver. Currently being tested is a solar powered six meter to two meter transistor repeater which could be ballooned over the South West. Can any one come up with a spare rocket for orbiting purposes?

This month's contribution comes from Jack C. Thomas, K6UQK, 4497 Rolfe Rd., San Diego, California. Jack designed and built the

crystal controlled *vhf* converter shown in fig. 1, and uses it in conjunction with a Heath XR-1 transistor portable to listen to the glider frequency of 123.3 mc. L1 tunes to the crystal frequency of a third overtone rock. The output tank is tuned to the third harmonic of the crystal, 121.56 mc. There is quite a bit of interaction between the oscillator output circuit and the mixer tank. C1 and C2 are adjusted alternately to produce maximum output. The oscillator output is 50 microwatts and is sufficient for injection.

Sensitivity measurements indicate that a 3 microvolt signal is required for a readability. A glider, with a 1 watt transmitter, can be copied S9 at 5 miles.

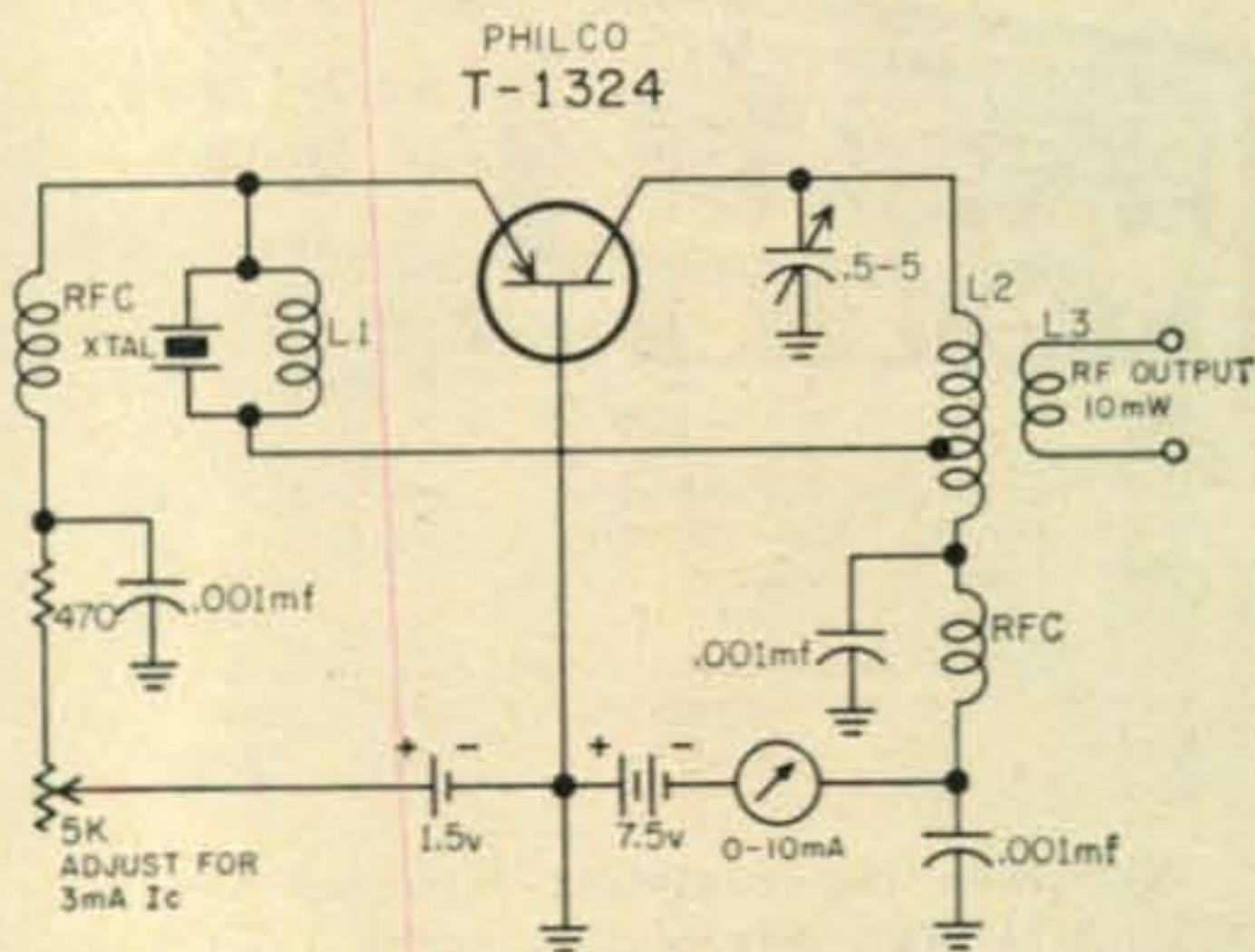
The oscillator and mixer sections are



Coil Table

- L1—2 turn link of #26 plastic covered wire wound over cold end of L2.
- L2—5 turns #20 tinned wire air wound, 1/4 inch i.d. x 3/8 inch long, tapped one half turn from top.
- L3—Same as L2, but without tap.
- L4—21 turns #26 enam. wire close wound on 5/16 inch slug turned form.
- L5—12 turns #26 enam. wire wound directly over the base winding of the Heathkit loopstick.

Fig. 1—VHF converter circuit designed and constructed by Jack Thomas, K6UQK



Coil Table

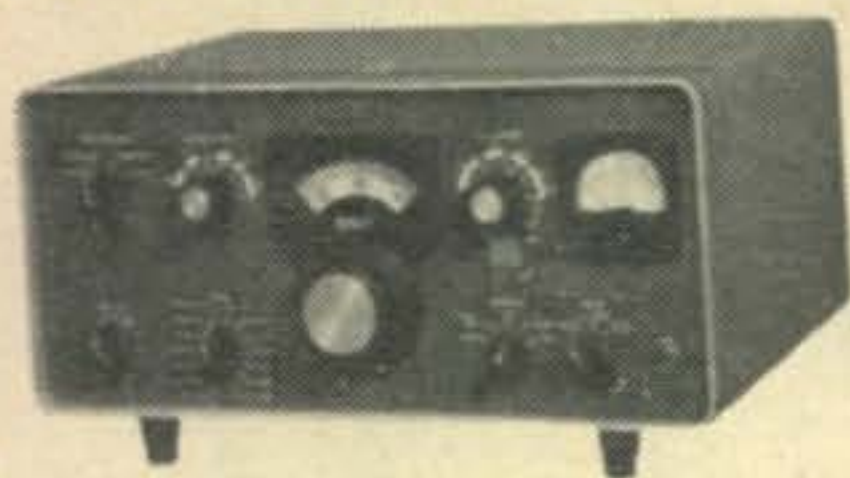
- L1—Approximately 25 turns #26 enam. wound on 1/2 watt 1 meg. resistor. This coil should resonate with the crystal and crystal socket capacity to about 3 mc. higher than the overtone crystal frequency (72 mc.). In this circuit it resonates at 75 mc.
- L2—5 turns, #16 tinned wire, 3/8" i.d. spaced diameter of wire, tapped one turn up from cold end.
- L3—2 turns, #22 plastic covered hookup wire. Adjust coupling for max. power output.
- RFC—Approximately 50 turns #26 enam. closewound on a 1 watt 1 meg. resistor. This should resonate with the full resistor lead length to overtone frequency (72 mc.).
- Xtal—5th overtone xtal, International FA-9 for 72.02 mc.

Fig. 2—72 mc crystal controlled oscillator circuit.

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The Completely New S/Line from Collins.
The Latest addition to its distinguished
single sideband series of amateur
radio systems.

THE COLLINS 32S-1 TRANSMITTER \$590.00



Frequency Range: 80, 40, 20, 15, and 10 meter amateur bands. Easily retuned to frequencies between amateur bands by using different crystals.

Output impedance: 50 ohms.

Frequency stability: After warm-up over-all stability due to temperature, humidity, pressure and voltage variation is 100 cps.

Calibration accuracy: 1 kc.

The 32S-1 is an SSB or CW transmitter with a nominal output of 100 watts for operation on all amateur bands between 3.5 and 29.7 mc. Input power is 175 watts PEP on SSB or 160 watts on CW.

Oscillators: Double conversion circuit is used with CR-18/U crystals in the HF oscillator. A VFO tuning 2.500 to 2.700 mc, provides 200 kc bands. A crystal oscillator operating on either side of the Mechanical Filter passband provides carrier for SSB generation and choice of upper or lower sideband.

THE COLLINS 75S-1 RECEIVER \$495.00



Frequency Range:
80 meters—3.4 to 4.0 mc.
40 meters—7.0 to 7.4 mc.
20 meters—14.0 to 14.4 mc.
WWV—14.8 to 15.0 mc.
15 meters—21.0 to 21.6 mc.

Choice of three 200-kc portions of 10 meters: 28.5 to 28.7 furnished.

Overtravel—7.5 kc on all bands.

Frequency Stability: After warm-up, over-all stability due to temperature, humidity, pressure, and voltage variation: 100 cps.

Calibration accuracy: 1 kc

Visual Dial Accuracy: 200 cps all bands.

Electrical Dial Accuracy: (after calibration): 300 cps all bands.

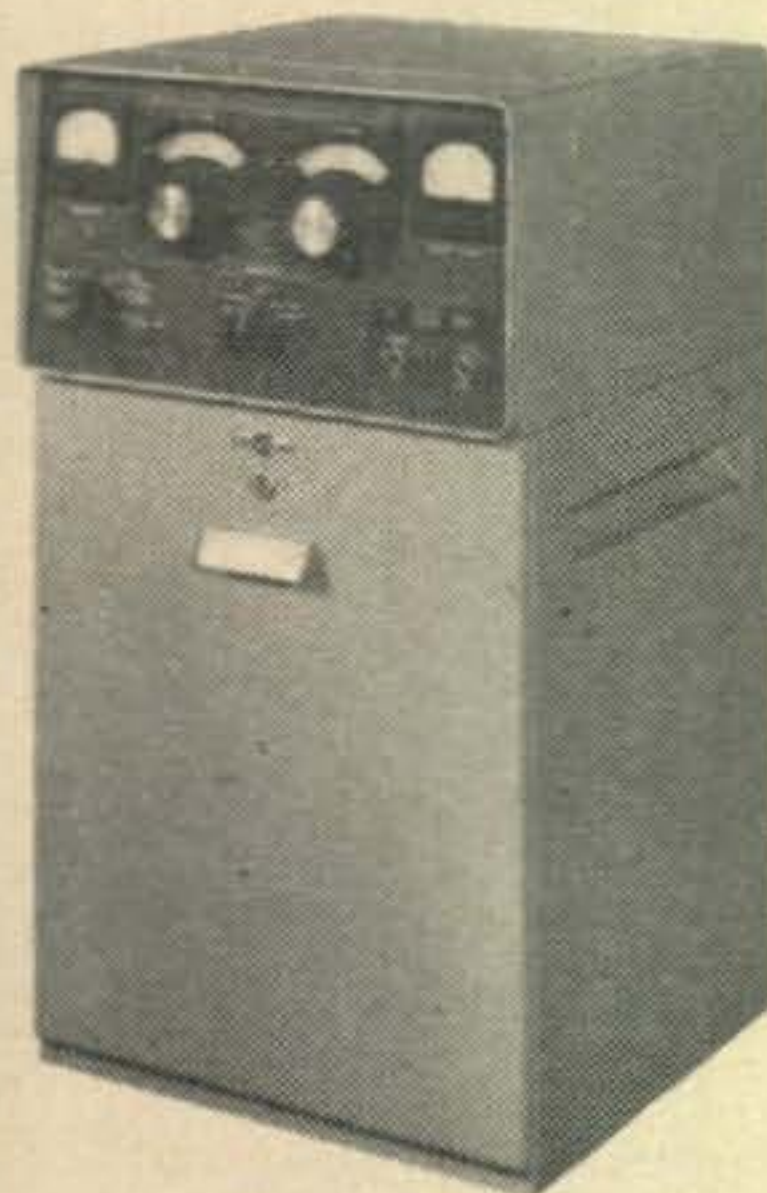
Backlash: Less than 50 cps.

Sensitivity: The CW sensitivity is better than 1 microvolt (with a 50-ohm dummy antenna) for a 10 db single-plus-noise-to-noise-ratio.

Selectivity: 2.1 kc Mechanical Filter for SSB; 0.5 ks. Mechanical Filter (not supplied) for CW; 4.0 kc IF transformer passband for AM.

The 75S-1 provides SSB, CW and AM reception on all amateur bands between 3.5 and 29.7 mc. It is capable of coverage of the entire HF spectrum between 3.5 and 20 mc by selection of the appropriate high frequency beating crystals.

THE COLLINS 30S-1 LINEAR AMPLIFIER \$1470.00



The 30S-1 Linear Amplifier rounds out the S/Line to make a single, complete, high powered amateur SSB station.

Frequency Ranges: 3.5—4.0 mc; 7.0—7.3; 14.0—14.4; 21.0—21.45; 28.0—29.7. Covers entire spectrum from 3.5 to 30 mc by retuning cathode circuit.

Output Impedance: 50 ohms.

Input Impedance: 50 ohms unbalanced.

Power Input: SSB-1 kw average, CW-1 kw.

Power Output: SSB: 1000 watts PEP with 40 db signal to distortion ratio; 1300 watts PEP with 35 db signal to distortion ratio. CW: 600 watts with 1 kw input.

Controls: Band Change, Multi-meter, Filament, H.V., Bias Control, Tuning, Loading.

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ACCESSORIES:

312B-4 SPEAKER CONSOLE integrates the 32S-1, 75S-1 and accessories into an operating system. \$185.00

312B-3 SPEAKER contains a 5"x7" speaker and connecting cable. \$27.50

516F-2 AC POWER SUPPLY operates from 115V AC, 50-60 cps to provide all voltages for the 32S-1. \$105.00

516E-1 DC POWER SUPPLY operates from 12V DC to provide all operating voltages for the 32S-1 and 75S-1 for mobile or portable operation. \$262.00

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For further information, check number 22 on page 126.

mounted on a small chassis $4\frac{5}{8}$ " X 1" X 1", which is bolted to the Heath chassis, above the speaker. No changes are made to the XR-1 and broadcast reception is unaffected. Coil L5 is wound over the base coil on the loopstick and the XR-1 is tuned to 1.74 *mc*.

Although Jack describes a specialized application, the experimenter could modify this circuit for other frequencies. I believe the Philco 2N588 will oscillate at a frequency that is suitable for two meter converter injection. Possible improvements might be the use of a 1N82A silicon diode and the addition of an *if* amplifier. This circuit should work on six meters using the Philco T-1324 which nets for \$1.65.

Speaking of the T-1324, I have been doing some experimenting out near alpha for this device. Alpha is rather difficult to check without elaborate test equipment, so I used the transistors in a overtone circuit. The highest frequency crystal available was an International 5th overtone on 72.02 *mc*. The circuit shown in fig. 2 was constructed and optimized for 72 *mc*. Of six transistors selected at random, five oscillated at the crystal frequency and produced between three and five *mw* output with 10 *mw* in. The sixth transistor was even sluggish on six meters.

Although the T-1324 is rated to dissipate only 10 *mw*, I have used it in the oscillator circuit shown running at 24 *mw* input (8 volts at 3 *ma*) for several weeks constantly. Power output is steady at 10 *mw*. Transistor ratings were made for engineers, not hams—hi.

This circuit could be used to drive a Philco 2N500 (\$10.90) or Philco 2N502 (\$12.40) as a doubler to two meters.

New Literature

Kupfrian Mfg. Corp., 395 State St., Binghamton, N. Y. is providing data sheets on their line of transistor power converters. Good prices, particularly the kits. Drop them a post card if you're in the market.

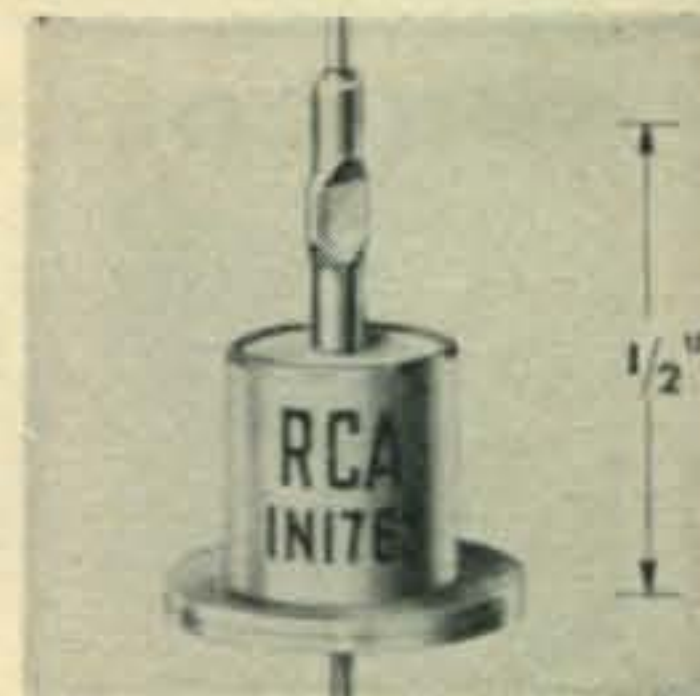
Sylvania has come out with a transistor course, that looks very good. Don't know at this writing if it is available on a tube deal or to experimenters.

Texas Instruments, Dallas, Texas, has a new publication—New Parameter News (NPN); this describes applications for their transistors. Issue #4 shows how to use their tetrode transistors up to 150 *mc*.

Need a good catalog on rectifiers? International is mailing their short form catalog covering 405 types of silicon and selenium rectifiers. For a free copy, write International Rectifier Corp., El Segundo, Calif. and request "short form Catalog."

More literature on transistor power converters is available from Creative Electronics, 94 Lincoln Avenue, Stamford, Conn.

The RCA 2N1010 is a super lo-noise audio transistor. Don't overlook this one, when designing that speech amplifier circuit. Data sheets are available.



Although intended for radio and TV applications, these new RCA 1N1763 and 64 rectifiers will be bargains for experimenters.

Semiconductor News

General Electric is going great guns with their silicon rectifier line. Thirty seven stud types and twenty lead mounted cells have been added. Bulletins ECG-349 through ECG-351 describe the new units.

Of interest to industrial readers is the General Electric Silicon Controlled Rectifier. This is a three terminal device that acts like a regular diode, until a signal is introduced to the gate terminal. Upon applying voltage to the gate it conducts like a piece of #00 bus-bar wire. Data sheets on the C35 and ZJ39L are available.

International Rectifier Corp. is now marketing calibrated solar cells for calibration and accurate radiation measurements. Each cell is selected to have at least 9% conversion efficiency. Bulletin SR-277 describes them.

Miniature silicon rectifiers in a bridge configuration are also available from International Rectifier Corp., El Segundo, California. These assemblies occupy only 1/10 the volume (see photo) and weigh less than 1/60 of equivalent tube circuitry. Bulletin SR-207 describes them.

Olson Radio Warehouse, 260 South Forge St., Akron, Ohio, is marketing a new line of "Shield-Crest" transistor and portable radio batteries. If Olson runs "true-to-form" these should be much less expensive than other types.

As hinted earlier, Pacific Semiconductors, Inc., 10451 West Jefferson Blvd., Culver City, Calif., has entered the transistor field, and in a big way too! Six transistors, designed for satellite use, spear-head the line. Here they are: Oscillators, XT-515, XT-516, XT-517, Amplifiers, XT-518, XT-519, XT-520. All six have the following rating: V_{CB} -16 Vac peak, V_{CB} -120 Vdc, I_c -75 ma., Junction temp. T_J -150° C, Dissipation 2.8 watts at 25° C. The oscillators will produce 250 *mw*, 500 *mw*, and 750 *mw*, at 75 *mc* with 80 volts on the collector, drawing 30 ma. The amplifiers will provide 10 *db* of gain with the same power output ratings!

[Continued on page 118]

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32S-1 TRANSMITTER!



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32S-1 Transmitter—3.5-29.7 mc. 175 watt PEP input on SSB; 160 watt on CW. Incorporates time-proved features of KWS-1, KWM-1 including Mechanical Filter-type sideband generation; stable, permeability-tuned VFO; crystal-controlled high frequency oscillator; RF inverse feedback for better linearity, and automatic load control for higher average talk power. 6 $\frac{7}{8}$ " H, 14 $\frac{1}{2}$ " W, 11 $\frac{5}{8}$ " D.

32S-1 Transmitter—Net Price	\$590.00
516F-2 AC Power Supply	105.00
516E-1 12V DC Power Supply	262.00
75S-1 Receiver	495.00
312B-3 Speaker	27.50
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For further information, check number 23 on page 126.

It's Mobile Time At ARROW!

"Wonder Bar" 10 Meter Antenna

As featured in Nov. 1956 QST. Complete with B&W 3013 Miniductor. Only 8 feet long for 10 meters. Net.....\$7.85



Sub-Miniature 0-200 Microampere Meter

A high quality instrument made by International Instrument Co. (Model 100). Only 1" in diameter. Ideal for limited space applications and transistorized circuits. A natural for transistorized grid dip oscillator as described in June '58 QST.

Amateur Net \$3.95 ea. 2 for \$7.50

2" round 0-500 microamperes. Bakelite case. Made by G. E. and Dejur.

Amateur Net \$2.95 ea. 2 for \$5.50

Weston 2" 0-4 amp RF meter Model 507. A giveaway at \$2.95 ea. 2 for \$5.50

1 1/2" sq. (ruggedized) 0-100 microamps. \$3.95 each 2 for \$7.00



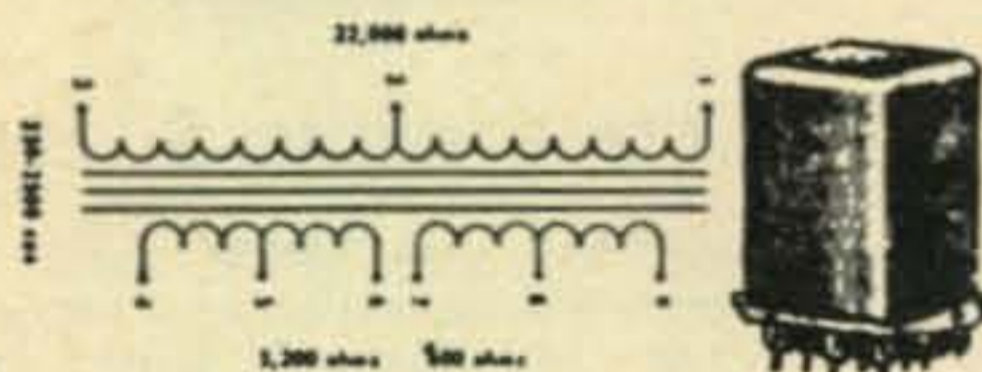
6 Volt Dynamotor

Rated output: 425 V. DC at 375 ma. High efficiency, compact. 4" diameter, 7 1/2" long. Shpg. wt. 13 lbs. Worth 2 to 3 times this low price \$12.95



12 Volt Dynamotor

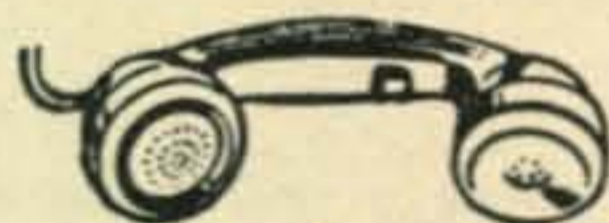
Rated output: 625 V. DC at 225 ma. High efficiency, compact, no battery strain, latest design. Brand new, recent military production. 5" diam., 9" long. Shpg. wt. 16 lb. Worth 2 to 3 times this low price \$13.95



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Same as used in W2EWL SSB Rig - March '56 QST. 3 sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22,000 ohms. (By using the centertaps the impedances are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x 1/4" w. x 1/4" d. Brand new. Fully shielded.

Amateur Net, each..... \$1.39
3 for \$3.49 10 for \$10.75



TS-13 Handsets

Push-to-talk butterfly switch. Handy units for use in mobile, CD units, Ham use, etc. Complete with rubber covered cable and plugs. Shpg. wt. 3 lbs.

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For further information, check number 24 on page 126.

MARS BULLETINS

First Army MARS SSB Technical Net

Wednesday evening, 9 PM EST on 4030 kc upper sideband.

April 1—"Variable Reactance (Parametric) Amplifiers" by Dr. Sidney Deutsch, Associate Professor of Electrical Engineering, Polytechnic Institute of Brooklyn.

April 8—"Electro-Mechanical Filters" by Oscar P. Olson, Department Head Research & Development, Collins Radio Company.

April 15—"Phosphors and Electro-Luminescence" by Dr. Paul Goldberg, Engineering Specialist, Sylvania Electric Products Corp.

April 22—"Atlas-Score Communications System" by Samuel P. Brown, Deputy Director, Transmission Facilities Division, U.S. Army Research and Development Laboratory, Fort Monmouth.

April 29—"Interchanging Scientific Information By Multilateral Radio Communication" by S. Edwin Piller, W2KPQ/A2KPQ, Director, First U.S. Army MARS SSB Technical Net.

The First Army Technical Net will pass another milestone when on April 8th the Collins Radio Company speaker, originating from California, will be broadcast throughout the eastern United States. This will be accomplished by means of a transcontinental phone patch between Burbank and New York City.

Air Force MARS Western Technical Net

Sunday 2-4 PM EST—7832.5 kc, 3295 kc, 143.46 mc.

April 5—"Automatic Multipurpose Electronic Checkout System for Military Weapons Systems or Industrial Systems" by Larry Mast, Senior Project Engineer, Packard Bell Electronic Corp. and as Moderator for the program, Colonel Frank Shannon USAF (ret), Manager, Technical Field Service, P.B. Electronics.

April 12—"Compressor Amplifiers, Transistorized Telephone Repeater Amplifiers and Twenty Four Volt Power Supplies for the Air Force 'Quick Fit' Program" by John K. Hilliard, Vice President, Director of Advanced Engineering, ALTEC Lansing Corporation.

April 19—"Silicon Rectifiers" by H. S. Katzenberger, Rectifier Division, Audio Devices Inc.

April 26—"Equipment Utilization and Conversion Information" by USAF MARS W.T.N. Members.

CONTEST CAL. [from page 59]

PACC-CONTEST

CALL

Name

Address..... Street..... Entry: CW
Phone

Date & Time GMT	Station Call	Prov.	New number of prov. for each band					NUMBERS		Points
			3 1/2	7	14	21	28	SENT	Received	
April										
13.10	PAgLOU	ZH			1			569 001	579 002	3
13.15	PAgPUL	UT			2			559 002	569 004	3
13.22	PAgBG	GR			3			589 003	569 003	3
13.45	PAgHP	ZH				1		559 004	559 003	3
13.67	PAgRE	NB					1	559 005	458 007	3
19.20	PAgTA	FR	1					579 006	559 009	3
20.50	PAgLOU	ZH		1				569 007	579 016	3
April										
09.50	PAgBW	NB		2				579 008	589 023	3
12.40	PAgPN	ZL				2		569 009	569 063	3
14.50	PAgLV	FR			4			569 010	579 040	3
14.55	PAgLR	NH						559 011	569 036	3
15.40	PAgll	ZH					2	449 012	459 039	3
			1	2	4	2	2			36

Summary. Points 36 Number of prov. 11 Score 36 x 11 = 396 Points.

Signature.....

contacts can also be applied toward the PACC Certificate, which requires proof (QSL cards or your contest log) of having worked 100 different PA stations.

CW

Starts: Saturday, April 25th at 1200 GMT
Ends: Sunday, April 26th at 2400 GMT

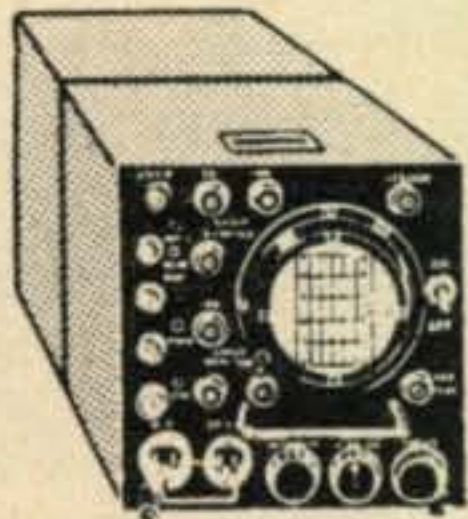
Phone

Starts: Saturday, May 2nd at 1200 GMT
Ends: Sunday, May 3rd at 2400 GMT

1. All bands 3.5 mc thru 28 mc may be used.

2. Serial numbers will consist of the usual RS or RST report plus a progressive three digit number starting with 001.

3. Each completed QSO counts 3 points. A station can be worked once on each band, and
[Continued on page 101]



BC-929 3" SCOPE INDICATOR COMPLETE

Originally used for IFF and Radar Navigation. Can be easily converted for general bench service work. Tubes included: 2-6SN7, 2-6H6, 1-6X5, 1-6G6, 1-2X2 and 3BP1 Cathode Ray Tube. A TERRIFIC BUY at our low price!
Excellent used..... **\$12.95**
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Conversion instructions for AC operation65



LORAN APN/4 'SCOPE

Easily converted for use on radio-TV service bench.

Completely Assembled

Supplied with 5" Scope, type 5CP1 only.

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SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

Type	Description	Used	LIKE NEW
BC-453	Receiver 190-550 KC.....	\$14.95	\$16.95
BC-454	Receiver 3-6 Mc	9.95	12.95
BC-455	Receiver 6-9 MC	10.95	13.50
BC-450	3-Receiver Control Box	1.49	1.95

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BC-457 TRANSMITTER—4-5.3 Mc. complete with all tubes and crystal. BRAND NEW..... **\$7.85**

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BC-451 Transmitter Control Box..... 1.25 NEW 1.49

POWER SUPPLY KIT for All Command Sets, input 110 V 60 cy. AC. Top Quality..... \$29.50

ASB-5 SCOPE INDICATOR



BRAND NEW, including all tubes, together with 5BP1 Scope Tube. Originally used in Navy Aircraft RADAR equipment. Easily converted for AC operation.

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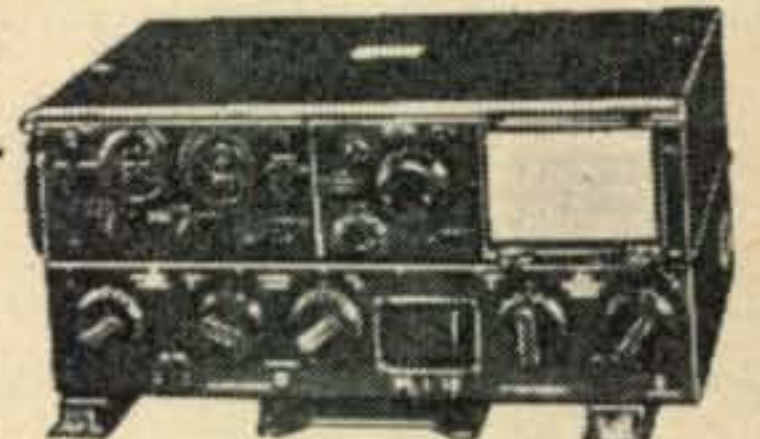
AN/ART-13 XMTR 11 CHANNELS

200-1500 Kc. — 2 to 18.1 Mc.

OUR PRICE

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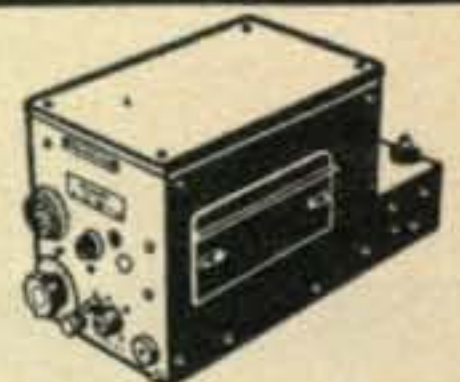
Complete With Tubes



Navy Model Collins Autotune Aircraft Transmitter—one of the very finest! Original cost \$1800. Up to 90 watts output on CW, MCW or Voice. Easily preset frequencies. Simple operation. Subassembly construction for quick repair. This is a sensational smash value at our low price. Exc. used, Limited Quantity.
0-16 Low Freq. Coil for ART-13..... \$ 7.95
24V Dynamotor for ART-13..... \$11.95

234-258 MC RECEIVER

AN/ARR-2. BRAND NEW 11-tube UHF Tunable Receiver with schematic. Complete with tubes. Hurry — it's a buy!.....Only **\$8.88**



AC POWER SUPPLY for BC603, 683. Interchangeable, replaces dynamotor. No rcvr change needed. On-off switch on power supply. Provides 220V DC @ 80 Ma, 24 V AC @ 2 Amps.

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Wired, ready for operation..... \$9.49

Complete 240-page technical manual for BC-603, 604..... \$2.95

BC-906 FREQ. METER-SPECIAL

Cavity type, 145 to 235 Mc. BRAND NEW, complete with antenna. Manual incl.

OUR LOW PRICE..... **\$9.88**



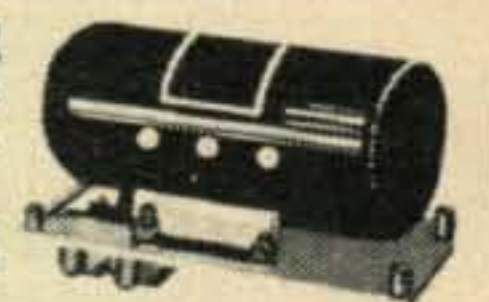
PANEL METER BARGAINS

2"	Weston, GE, Panel Meter, 1 mil full scale, 0-100 scale reading.....	\$1.99
2"	150V AC Westinghouse Panel Meter, Black face with luminous scale, Brand New.....	\$2.25
3"	150V DC Hoyt panel meter Brand New.....	\$2.45

MOBILE-MARINE DYNAMOTOR

Input 12V DC. Output: 625 V DC @ 225 Ma. for press-to-talk intermittent operation. Shipping weight 14 lbs.

OUR LOW PRICE..... **\$6.45**



Please include 25% Deposit with order—Balance C.O.D. 50c HANDLING CHARGE on Orders under \$5.00 MINIMUM. All Shipments F.O.B. Our Warehouse N.Y.C. All merchandise subject to prior sale and price change.

G & G Radio Supply Co.
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53 Vesey St., New York 7, N. Y.

THE HAM SHOP

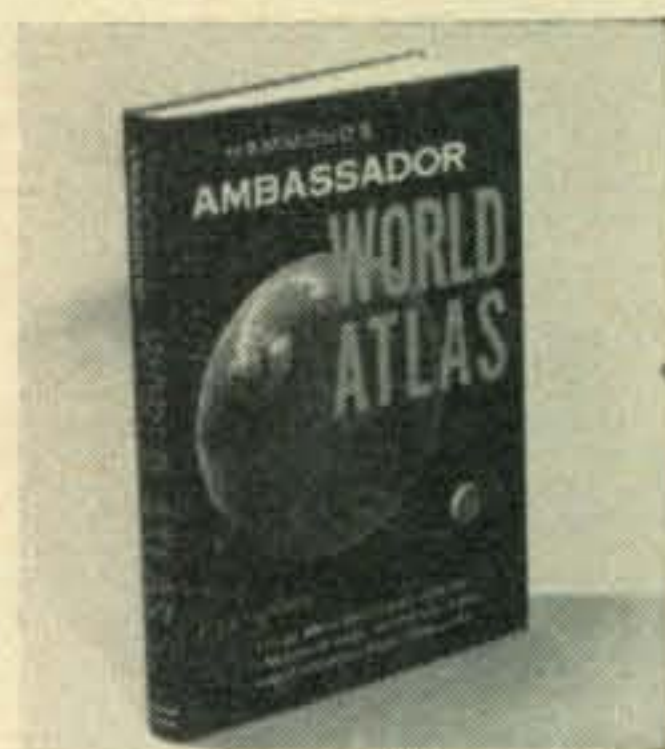


GLOBE

We can't see how you can get along without this beautiful 19-inch, 8 color World Globe. It can be yours, including a one-year subscription to CQ for: lighted model W/bulb \$24.95; unlighted model \$19.95.

ATLAS

Come on, get with it. Don't pull a blank when some one asks you for the capital of Honduras. For only \$12.50 you can own 7 lbs. of full-color maps and a complete gazeteer. Send for this Hammond Atlas. PLUS a one year subscription to CQ.



only \$12.50

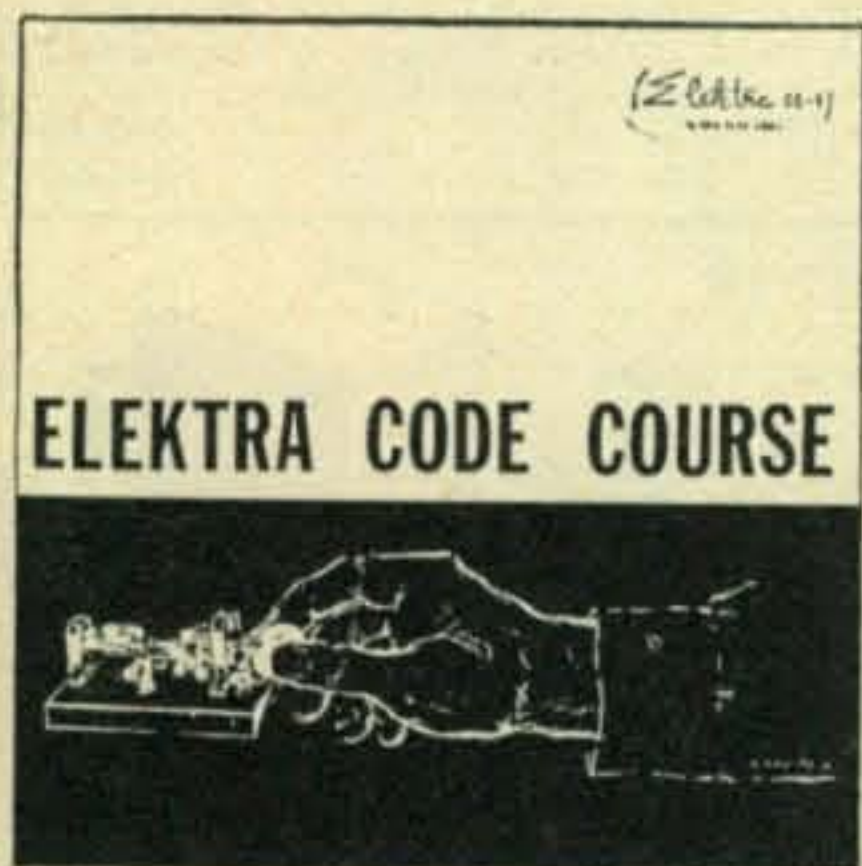
COMMAND SETS

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 PPD.



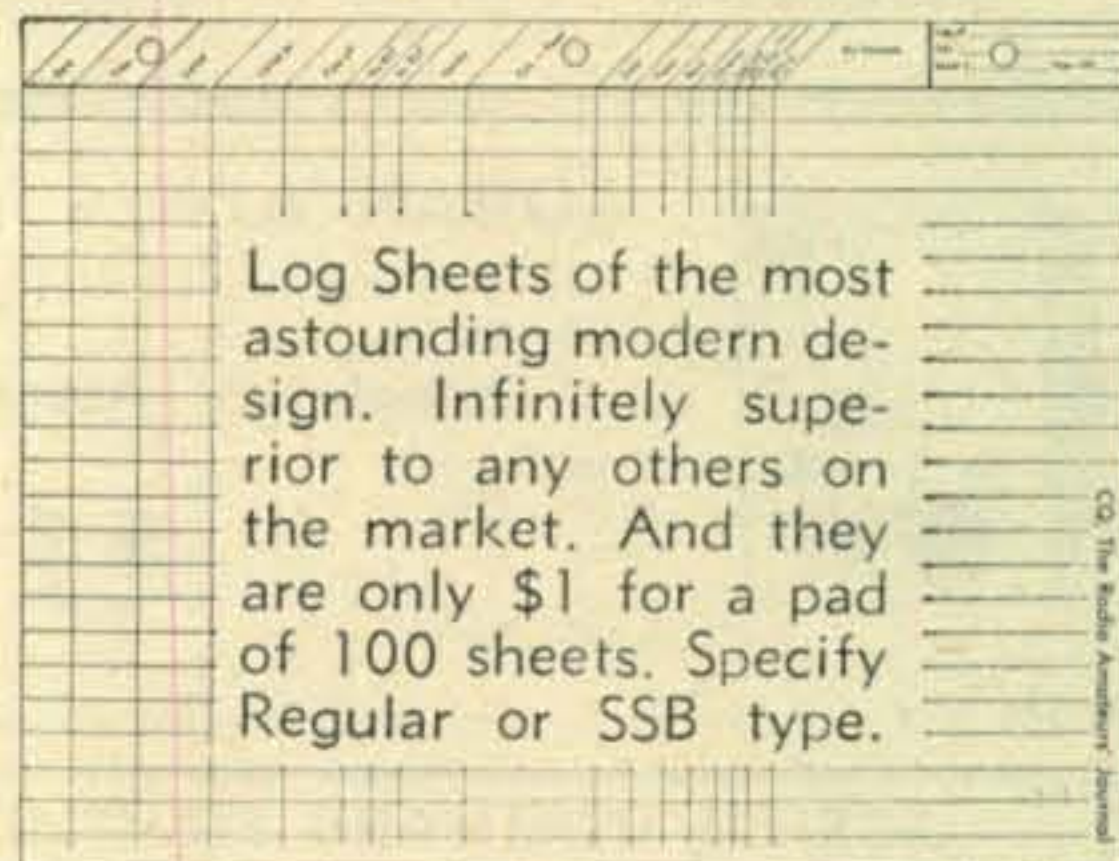
MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from all of the experienced mobile operators. There is all sorts of information in here that cannot be found anywhere else. This is NOT a collection of reprints. \$2.95 postpaid.



CODE RECORD

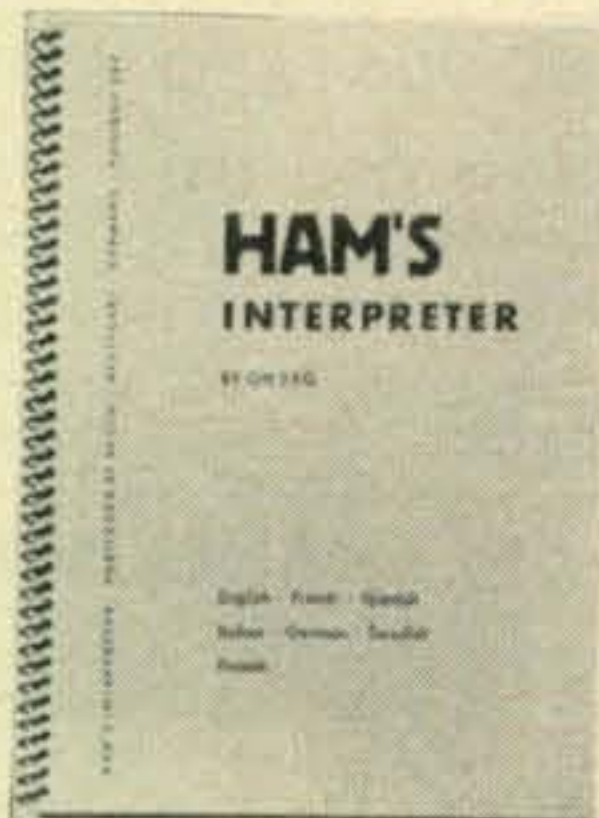
Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General license. \$3.50 each.



Log Sheets of the most astounding modern design. Infinitely superior to any others on the market. And they are only \$1 for a pad of 100 sheets. Specify Regular or SSB type.

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

WIDBM's newly written TVI book (no reprints) 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 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.

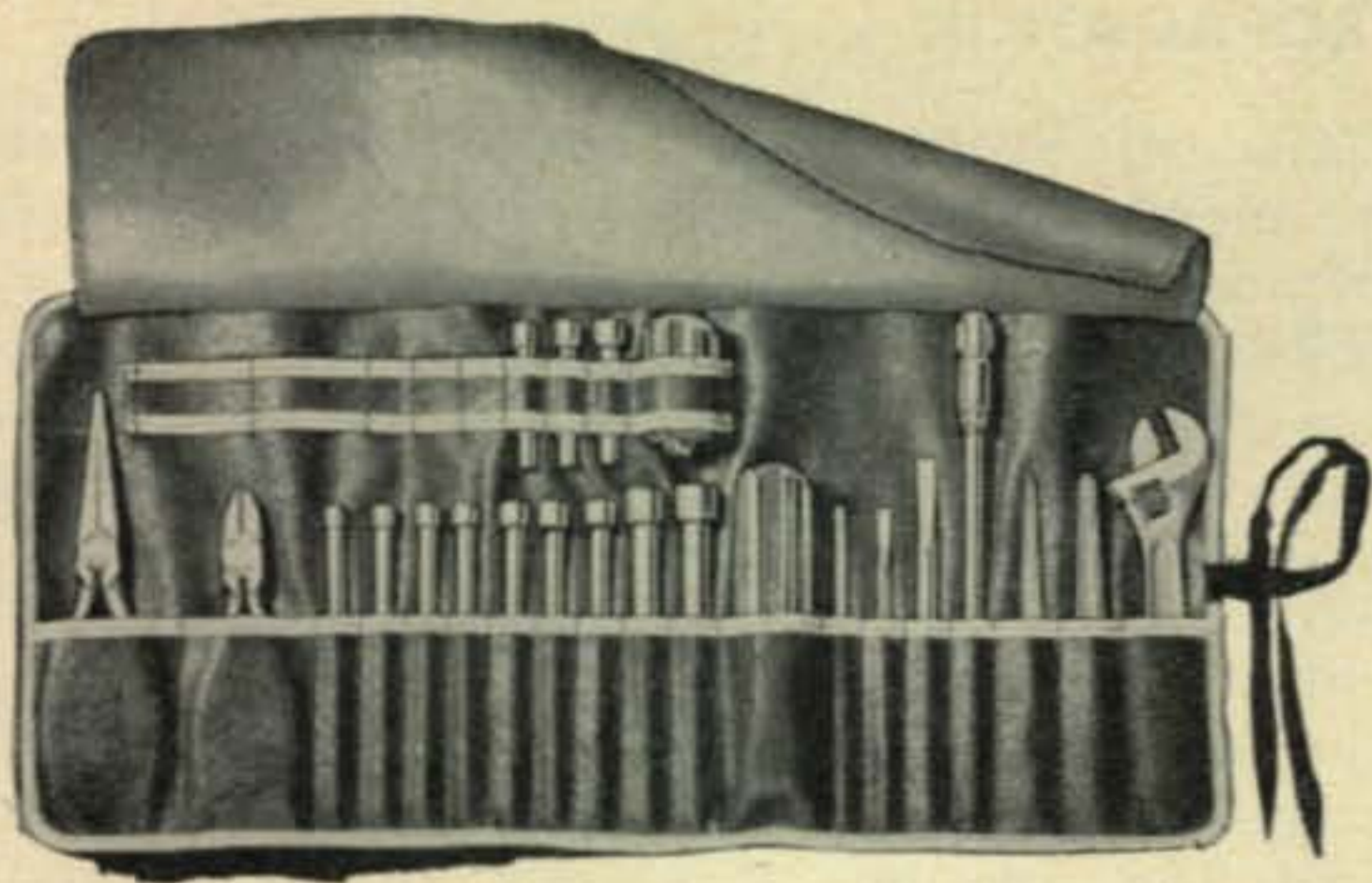
BINDER

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 each

BOUND VOLUME

By far the handiest way to keep your library. Why not go first class? This impressive volume is only \$10.00. We only made a few of them this year, so don't expect to get one later. 1958 still available, released Jan. 1st.





CQ TOOL KIT

Here is what you get in this complete kit: full size long nose pliers and diagonal cutters; a full set of nut drivers (size 6 thru 12-14-16) in the regular size and 8-10-12 in the stubby size; small and medium screwdrivers; Phillips screwdriver; two sizes of reamers, a 6" extension blade for any of the screwdrivers or nutdrivers; a 6" Crescent wrench; a regular and stubby handle and a roll kit with a compartment for each tool. All tools are of the finest grade highly polished Nickel Chrome finish.

Whether you are going to use this kit in the ham shack or take it in the car you will find it the most terrific set of tools you have ever owned.

Price? Ah, there's the catch, as you may have suspected. You send us \$24.00 (lists for \$33.50) and we send you the kit postpaid . . . plus (here is the hooker) a year's subscription or extension of your present subscription to CQ.

SERVICE DEALER
& ELECTRONIC SERVICING

Television **SCHEMATICS**
 and SERVICE GUIDE

Including: Alignment Data, Waveforms, Tube Location Guide, Operating Voltages, Essential Parts Numbers, etc.

TV SCHEMATIC PACKET

96 Pages of 45 representative TV schematics, covering the most prominent TV manufacturers. Factory authorized, crystal clear and accurate.
\$3.00

HI-FI BOOK

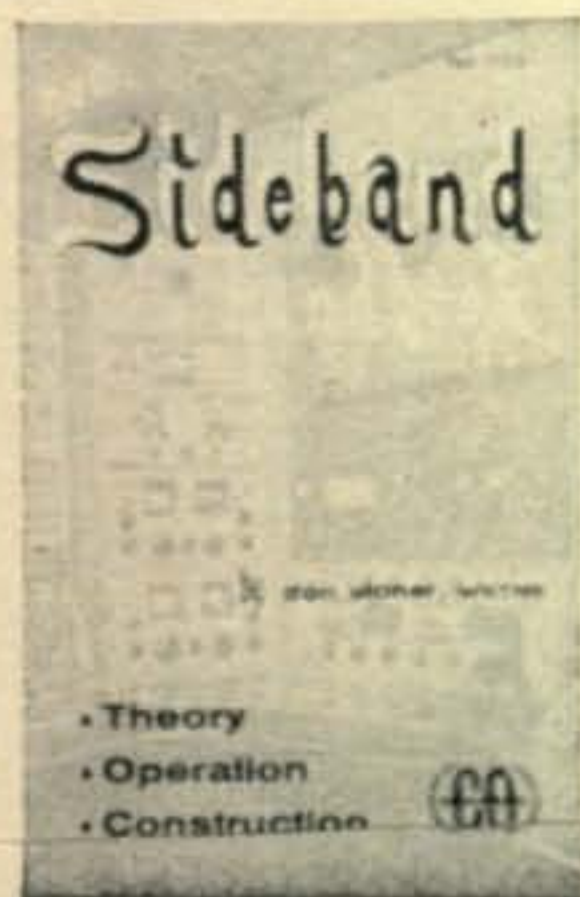
This nifty volume contains the latest dope on amplifiers, pre-amplifiers and equalizers plus a buyer's guide of component manufacturers!

Over 150—5½ x 8½" pages of heavily illustrated descriptions covering Hi Fi Audio Components — the greatest publication value in its field today. Only \$2.50 per copy



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 of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only \$3.00.



C-4

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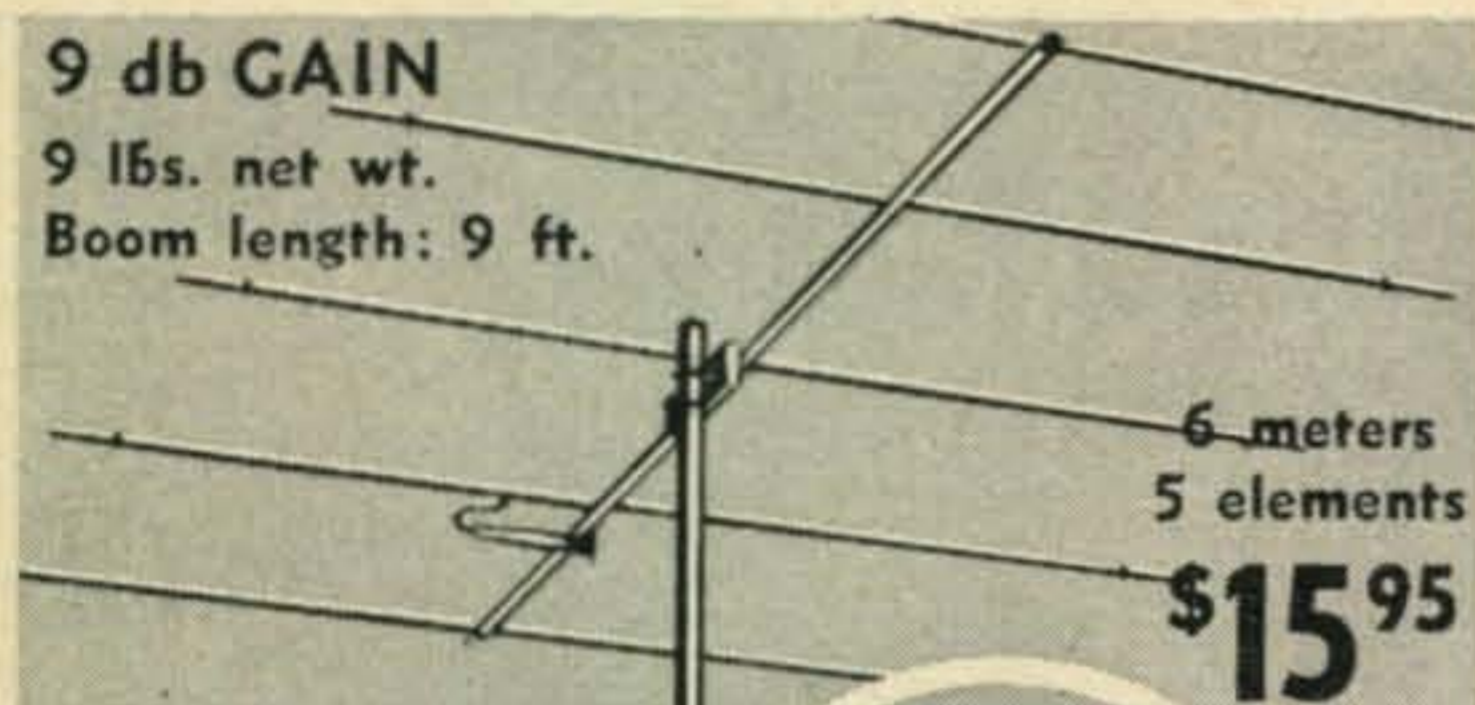
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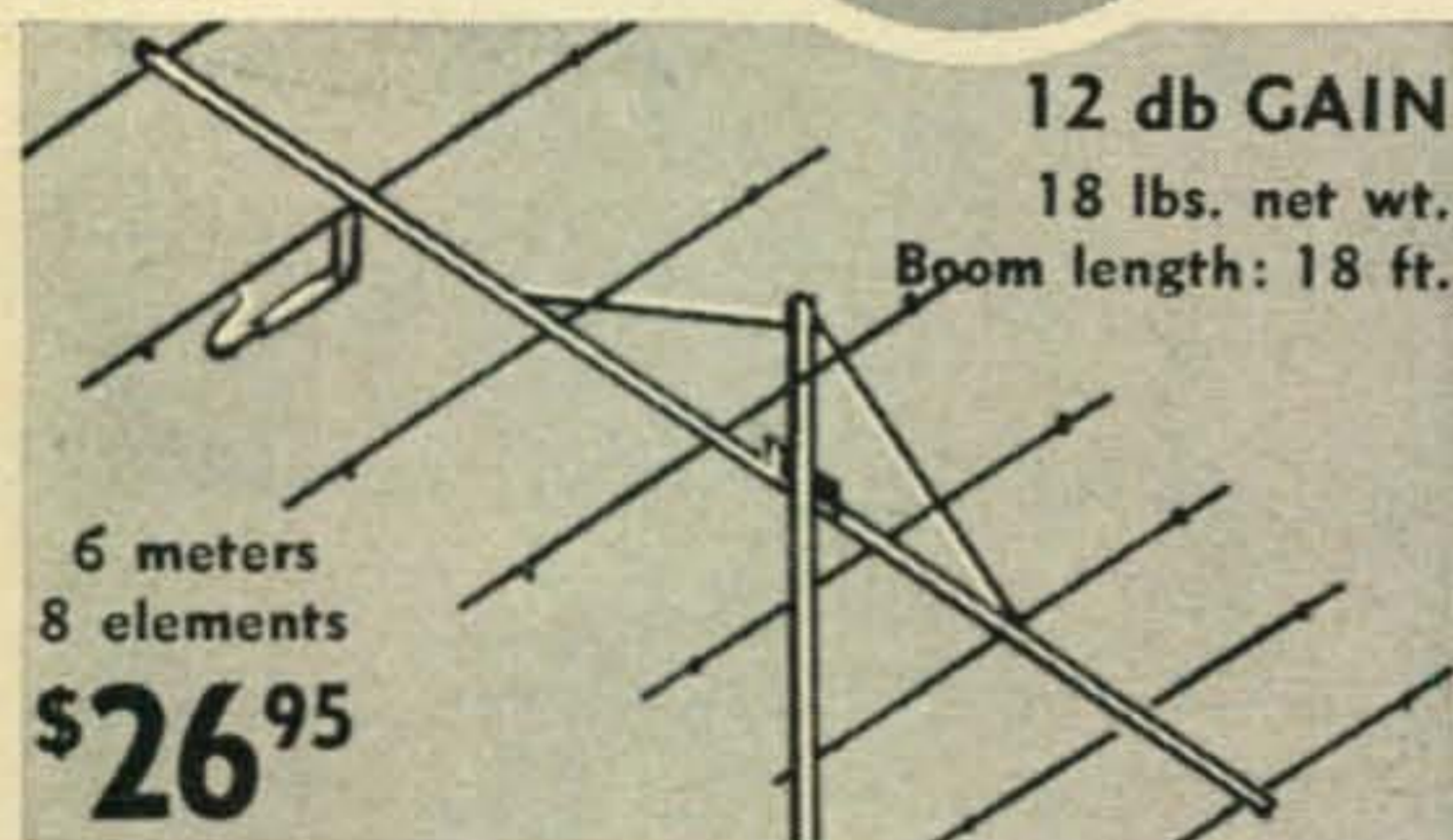
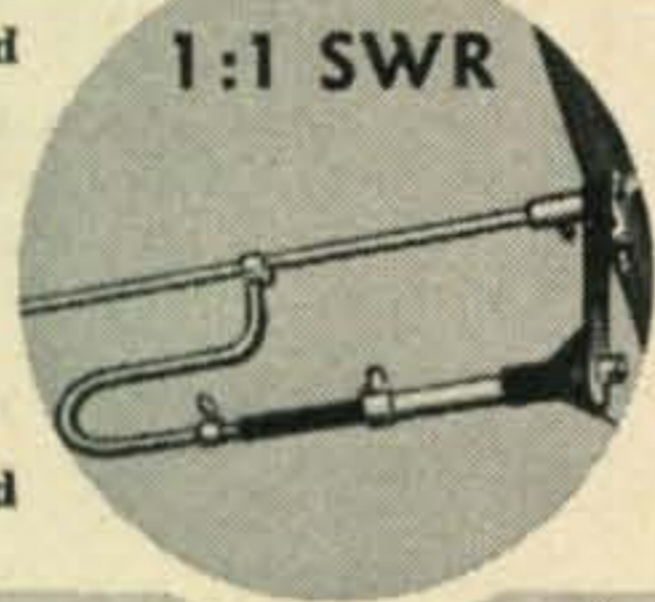
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Elements of the 6-Meter VHF beams are 7/16" diameter heavy wall 6061T6 aluminum tubing, securely attached to boom through heavy duty, double-sided aluminum clamp assembly. Booms constructed of 1 1/4" diameter heavy wall aluminum tubing. Extra heavy positive mast grip bracket. All hardware hot dipped galvanized and iridite treated for maximum weather ability! ONE FULL YEAR GUARANTEE!



Hy-Gain's Precalibrated (Gamma) Gamma Match assembly with coaxially formed reactance cancelling capacitor built in, makes possible for the first time a perfect 1:1 SWR. Coax connector for 52 ohm feed included.



Look for the complete Hy-Gain Line
In Stock at . . .

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CEDAR RAPIDS, IOWA
Phone EM 4-1172

EXPORT BUSINESS WELCOMED

For further information, check number 26 on page 126.

92 • CQ • April, 1959

PROPAGATION [from page 72]

Geneva, Switzerland. The 94 countries that are members of the ITU, and the 5 associate members, can take part in the work of the CCIR. The 9th Plenary Assembly meetings in Los Angeles during the month of April may prove to be one of the most important ever held since they convene a few short months before the International Radio Conference which will begin in Geneva on August 17th. The answers to many of the questions under study by the CCIR will, no doubt, provide the basis for revision of several of the Radio Regulations at the Geneva Conferences, and will assist in coordinating the international use of the radio spectrum for the next decade.

73, George W3ASK

ANNOUNCEMENTS [from page 72]

to Ed G. Raser, W2ZI, 19 Blackwood Drive, Trenton 8, N. J. Late comers will be assessed \$7.00 at the door. W2ZI's now famous collection of Antique Wireless Gear will be on display. Plan to bring along as many guests as you wish, EVERYONE is welcome. Even the Novices come along to join in the fun.

Central Montana Hamfest

The Central Montana Hamfest will be held at the Fergus County Fairgrounds in Lewistown, Montana, on June 6 and 7, 1959. We expect an attendance of about 200 amateurs and their families.

Dayton Hamvention

On Saturday, May 9, 1959, at the Dayton-Biltmore Hotel, Dayton, the Dayton Amateur Radio Association will hold its 9th annual HAMVENTION. The one-day program will feature outstanding speakers and demonstrations on many phases of ham radio. Forums will be held throughout the day on such subjects as DX, SS Band, V.H.F. and others. Plan to bring the XYL, as a fine program has been prepared, just for her. The HAMVENTION will be terminated by the Grand Banquet, which begins at 7:00 Saturday evening.

Order your tickets now. Tickets purchased before May 5, 1959 are priced at \$5.50. This includes registration and banquet. You may also take home a prize. After May 5, 1959 the price will be \$6.00.

On Friday evening May 8, 1959, there will be a S.S. Band dinner and also a V.H.F. dinner at the hotel. These tickets must be purchased in advance and are priced at \$4.00. Reservations, more information, and an attractive brochure may be had by dropping a postal card to: D.A.R.A. P.O. Box 426, Dayton, Ohio.

Crystal Radio Club

The Crystal Radio Club (W2DMC) will hold their 28th anniversary dinner at the Wayside Inn, Route 9W, Stony Point, N. Y. on May 2, 1959 at 8:00 P.M. Price is \$4.00 per person. Tickets may be purchased by sending money order or check payable to the Crystal Radio Club care of Tony Maiorano, W2EHZ, 14 Peck St, West Haverstraw, N. Y. Prizes and dancing are on the agenda.

Oregon Amateur

The annual convention of the Oregon Amateur Radio Association, will be held at the Hotel Umpqua, Roseburg, Oregon, on May 2nd and 3rd, 1959. There will be commercial displays of ham gear and demonstrations by



Again in this issue a new section appears in CQ where distributors may advertise trade-in and reconditioned equipment. This section, called the TRADING POST, will be confined only to legitimate ham distributors as a means of announcing the many excellent used items available.

RECONDITIONED OR LIKE-NEW EQUIPMENT

Hammarlund HQ-129X & Spkr., 54-30MC	\$129.00
Hammarlund SP-794-B, 1.25-40 MC	175.00
Hammarlund SP-600-JX-26, 540 KC-54 MC	325.00
Hammarlund SP-600-JX-17, 540 KC-54 MC	395.00
Collins 51J-3, rack mounting, 500 KC-30.5 MC	575.00
Collins 75A-3, Serial #617 3KC Filter	345.00
Collins 32V-1	275.00
National NC-183-D & Spkr. 540 KC-31 MC, 48-56 MC	249.00
National NC-200 & Spkr.	119.00
National HRO JR, power supply, 4 coils	59.00
Central Electronics 20A & VFO	225.00
Johnson Pacemaker, SSB	345.00
Johnson Thunderbolt, factory wired	549.00

Alltronics-Howard Co., Box 19, Boston 1, Mass.
(Ri 2-0048)

GUARANTEED USED EQUIPMENT

B&W 5100 and 518B—\$495.00; Collins 32V-2—\$375.00, 32V-3—\$450.00, 310B-1—\$159.95; Eldico SSB-100A—like new—\$295.00; Hallcrafters SX-100—\$220.00; Johnson Ranger—\$199.95, Vik. I—\$169.95, Vik. II \$239.95, National HRO-60—\$425.00; TMC-GPR-90—\$375.00.

Liberal Trades — Time Payments

"WRITE FOR LATEST USED EQUIPMENT LIST"

EVANS RADIO PO BOX 312 CONCORD, N. H.

Collins 75A1 \$260, 75A2 \$295, 75A4 \$505, 32V2 \$290, KWS-1 \$1300, Johnson VIK. II & VFO \$205, Vallent A-1 \$345, Hallcrafters S-38E \$35, new S-53A \$69, SX-99 \$105, SX-101 Mark II \$280, Natl. NC-188 \$110, NC-109 \$135, Gonset Com III 6M. \$210, G-66B \$150, 2M Com. II \$130, Elmac AF-67 \$125, PMR-7 \$100, AF-54 \$60, Hamm. HQ-110 \$180, HQ-160 \$280, HQ-120 \$100. Write for complete listing.

AMATEUR ELECTRONIC SUPPLY
3832 West Lisbon Ave., Milwaukee 8, Wisc.
Ph. WE 3-3262

Bargains. Reconditioned and guaranteed. Shipped on trial. National SW54 \$35.00; NC 57 \$59.00; NC300 \$279.00; HROs: Hallcrafters \$38 \$29.00; S40B \$69.00; S85 \$89.00; SX99 \$119.00; SX71; SX96; SX100; SX101; Hammarlund HQ100 \$139.00; HQ129X \$159.00; HQ110 \$189.00; HQ140; HQ150; HQ160; HQ170; Johnson Ranger \$179.00; Viking II; Valiant; Thunderbolt; Pacemaker; Collins 75A1; 75A2; 75A3; 75A4; 32Vs; KWM1; KWS1; Globe; Gonset; Heath; Elmac; complete stock of reconditioned and new gear. Write for list.

HENRY RADIO, Butler, Missouri

dealers and manufacturers, lectures, movies, banquets, entertainment, music, a mobile hunt and tours to points of interest.

Pre-registration to April 5th, 1959, Hams \$6.50, Non Hams \$3.50. After April 5th, Hams \$7.50, Non Hams \$4.00. Come to Roseburg, Oregon and have some fun. Order your pre-registration tickets and make your hotel and motel reservations early. Write to Don L. Bell, W7SHA, Convention chairman, Box 953 Roseburg, Oregon.

Amarillo, Texas

The Panhandle Amateur Radio Club of Amarillo, Texas, is offering to all hams that can qualify an attractive WAA (Worked All Amarillo) Certificate, which will be mailed to the applicant upon submission of the necessary information taken from the log.

All out-of-town stations may secure one of these certificates by working at least 15 Amarillo stations. All amateurs operating within the city limits of Amarillo, giving Amarillo, Texas as their mailing address, or belonging to the Panhandle Amateur Radio Club may secure one by working at least 25 stations. No QSL cards are necessary. Applicants for the award may simply list the contacts on paper, taking the following information from the log: station worked; time worked; date worked; frequency used. Either fone or cw contacts are valid for this award.

All applications should be addressed to: Panhandle Amateur Radio Club, 1800 Harrison, Amarillo, Texas; or Carl Kunkel, K5IBI, Secretary-PARC, 1807 N. Roberts, Amarillo, Texas.



W2APF

David L. "Uncle Dave" Marks, 56, of Albany, New York, one of the most widely known amateur radio operators in the world, is off on another around the world trip for face-to-face visits with some of the many thousands of "hams" he knows "on the air."

"Uncle Dave," as he is known to fellow amateur radio men in every country on the globe, is making his 24th overseas trip as a self-appointed good-will ambassador from U.S. amateurs to the ham fraternity in other nations.

It is his third 'round-the-world voyage in the interests of amateur radio. Starting from Albany, Dave Marks plans to be gone four months, flying more than 40,000 miles and visiting 42 countries. He'll visit the Far East, the Philippine Islands, Formosa, Hawaii, Australia and Europe. Traveling with him is his wife, Mrs. Elizabeth H. Marks.

Marks' prime purpose, besides having a wonderful time visiting with fellow hams, is the promotion of international amateur radio.

Specifically, he is adding his weight to the campaign for participation in international amateur radio reciprocal agreements that would allow nationals of other nations to operate amateur radio in the United States.

At present the U.S. does not allow foreign amateurs to operate in the U.S. until they become citizens, despite the fact that many other nations extend this privilege to American hams.

"I want to urge amateurs in other countries to write



\$249

HQ-110



\$189

HQ-100

for hammarlund

ROGERS



RADIO

HQ-170



\$359

HQ-160



\$379

MEL ROGERS WØGQY
1648-52 WAZEE ST., DENVER 2, COLO.
TABOR 5-5142 & 5141

Top trade-ins, easy payments, 10 per cent down,

up to 18 months to pay. Send your orders to us.

For further information, check number 28 on page 126.



NEW 100V EXCITER-TRANSMITTER

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

IN PRODUCTION NOWPRICE \$595.00

SUPERIOR SSB GEAR



MODEL 600L BROADBAND LINEAR

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

MODEL 20A



THESE MULTIPHASE EXCITERS PIONEERED AMATEUR SSB

MODEL 10B - 10 watts PEP. Plug-in coils 160 thru 10 meters. Perfect voice control on SSB-DSB-AM and PM - CW breakin. Carrier and calibrate level controls. 40 DB suppression.
Wired.....\$179.50 Kit.....\$139.50

MODEL 20A - 20 watts PEP. Bandswitched 160 thru 10 meters. SSB-DSB-AM-PM and CW. Magic eye monitors carrier null and peak modulation. Ideal for driving AB₁, AB₂, and most Class B linears.
Wired.....\$279.50 Kit.....\$219.50

MODEL 10B



Central Electronics, Inc.

1247 W. Belmont Ave.

Chicago 13, Illinois

For further information, check number 29 on page 126.

NEW GLOBE'S 6 Meter CONVERTER

WITH PRINTED CIRCUIT

FOR FIXED STATION OR MOBILE USE

Before You Buy . . .
Look at These Features

- * New improved circuit provides higher gain, better signal-to-noise ratio.
- * Completely shielded to minimize feed-through of unwanted signals.
- * Printed circuit for simplifying kit assembly.
- * Works with most receivers on the market today, including home broadcast receivers and car radios using proper converter.
- * Highly stable, crystal controlled oscillator.
- * Measures only 3x5 1/2x4 1/2"; complete with tubes, crystal and connecting cables.
- * B plus requirements 150-250V at 15-18 Ma. Provisions for changing filaments for 6 or 12V operation.
- * Available—Model 6PMC1: 10-14 Mc. output. Model 6PMC2: 600-1600 Kc. output.



Wired/Tested:

\$29⁹⁵

In Kit Form:

\$21⁹⁵

NEW THE MODEL PH-1 HYBRID

Globe Patcher

PHONE PATCH THAT MOUNTS ANYWHERE

Complete!
SIZE:
5 3/8 x 1 5/8 x 9



"Book Shelf" Design
Wired & Tested, Only:

\$29⁹⁵

SEE US FOR THE COMPLETE IN-STOCK LINE OF
Globe Electronics

WRITE - WIRE - OR CALL

C & G RADIO SUPPLY CO

2502 JEFFERSON Phone
TACOMA 2, WASH. BR 3181

to the Federal Communications Commission in Washington, D.C., and to the American Radio Relay League at West Hartford, Connecticut, to urge that the United States ratify the reciprocal agreements," said Marks.

"We all know how the Iron Curtain nations are working to develop scientists. Among the ways they are doing this is to encourage amateur radio work in their countries.

"Amateur radio historically has played a major role in promoting international understanding. Anything we can do to help break down the barriers between the various peoples of the world will contribute to the ultimate victory over the forces that work to create international mistrust and hatred," Marks declared.

"Uncle Dave" Marks has been an avid amateur radio enthusiast since 1921. He operates under the call letters W2APF from his home in Albany, his camp at Warner's Lake in the nearby Helderberg Mountains, from his office at the Fort Orange Radio Distributing Company, of which he is president, and mobile from his car.

Marks' home and office are Meccas for visiting hams from all points of the compass. Hardly a week goes by without amateurs from far-off countries dropping in at "Uncle Dave's" hamshack. Many are hams with whom he has talked regularly over the air for many years dropping in for their first face-to-face "QSO," as amateur conversations are called.

Marks helped to promote radio in its early days, when it was still considered a somewhat mysterious plaything by many people, by operating one of the first sound trucks in the world.

Back in 1923 he equipped an old Model T Ford truck with a radio receiver and an amplifier and loudspeakers. He took it around Albany and used it to re-broadcast prize fights and election results being broadcast by local stations.

When Albany radio listeners were plagued by a mysterious form of interference that prevented them from hearing the few stations then on the air, Dave's radio truck was called in to help locate the sources of the noise. It was known the interference came from power lines, but not until the Marks mobile receiver was used were the power line engineers able to pinpoint the trouble spots.

Marks plans to carry his radio good will message to amateur radio clubs in every country he visits.

He has been made a member of more than 30 radio clubs in foreign lands, among them clubs in Dublin, Ireland; France; Great Britain; Hawaii; Japan; Switzerland; Spain; the Philippines; Guam and Okinawa.

He has received several public service awards for his work in providing radio communications during floods, storms and other emergencies in this country.

Besides radio, his hobbies include photography, fishing and, of course, travel.

It was on one of his trips, while visiting a Hungarian refugee camp in Vienna in 1957 that he found a Hungarian amateur radio operator and his family, victims of that nation's ill-fated revolt against its Soviet masters.

With Dave's help, that Hungarian ham and his family are now living happily in Montreal, Canada, where the man is working for a radio manufacturing corporation.

They were among more than 20 refugees and displaced persons Dave has been instrumental in bringing into the U.S. from Europe and helping find homes and jobs.

While on his globe-girdling trip, Marks will represent CQ and other radio publications.

Marks hopes particularly to be able to meet personally some of the U.S. armed forces personnel stationed at overseas bases who have been able to talk to their families at home through radio phone-patch calls through Marks' Albany station.

Marks is one of the many American amateurs who regularly provide phone-patch calls for U.S. servicemen overseas and who receive and transmit uncounted thousands of personal messages for them and their families.

And, just to make certain the ranks of amateurs continue strong, Marks for the past several years has provided at his radio company headquarters facilities for amateur radio classes. He has helped between 300 and 400 hams qualify for their amateur licenses through these classes.

FOR INFORMATION, check number 30 on page 126.



FASTEST, EASIEST WAY TO LEARN CODE EVER DEVELOPED

NEW RIDER 'SOUND-N-SIGHT' CODE COURSE

by Lewis Robins & Reed Harris

W2RID

Combines sound and sight plus an imaginary instructor to speed code learning.

Now you can learn code faster, easier than ever before thanks to a scientific breakthrough in learning called REINFORCED LEARNING. The psychological principle behind this new method of learning code has already proved successful by the Armed Forces in teaching Morse and Blinker Code and typing.

REINFORCED LEARNING

... a dramatic step forward to faster learning

REINFORCED LEARNING is a form of training without memory—requiring no conscious effort to memorize. It teaches communications skills such as code by applying the psychological principle that people learn more quickly when the act they are trying to learn is immediately given some reinforcement or reward, like a pat on the back or a word of praise. It holds that a correct guess immediately followed by the instructor's approval will remain more firmly embedded in the student's memory than if he learned the signals by memory alone.

The 'Sound-N-Sight' course applies the REINFORCED LEARNING approach. It is the first code training course that combines sound and sight and actually puts an imaginary instructor at your side to speed your learning of three separate abilities necessary to learn code:

1. Hearing the signal correctly or sound perception—telling the difference between the **dits** and the **dahs**.
2. Identifying the correct letter for each signal pattern, or sight identification.
3. Combining sound and sight to recognize the signal and immediately identify it.

EXPERTS SAY ...

"REINFORCED LEARNING—AN OUTSTANDING SUCCESS"

In the Armed Forces and industry, the REINFORCED LEARNING method has produced astoundingly successful results:

From the Educational Review, November, 1958: "The Lewis Robins-Reed Harris reinforced learning system ... is achieving almost incredible results in shortening training time. The original tests conducted in the Navy ... showed that if the reinforced learning system were used, typing and code could be learned in about half the time formerly required. Tests then conducted by an unofficial organization, the staff of Navy Times in Washington, quickly proved the validity of the conclusions. Now IBM, RCA and the Chrysler Corporation are trying the method."

From William Haddad, The New York Post, November 14, 1957: "Dr. Harry J. Carman, world-famous historian, Dean Emeritus of Columbia College and Co-chairman of the President's Committee on the Arts & Sciences, said that Lewis Robins had adopted a 'brilliant approach' ... " In a later article, November 22, Mr. Haddad reported: "... Captain Philip Winston, commander of the Fleet Training School ... said ... 'The group is learning faster than any other group we've ever had ...'"

From Richard M. Mansfield, military writer of the Norfolk Virginian-Pilot: "Professor Fred S. Keller ... one of the nation's top psychologists, has been quoted as citing Robins 'as one of the five or six persons who really have seen what the learning process is all about, and have really brought any fresh thought to bear upon it!'"

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The course combines sound (clearly transmitted signal patterns on records with the instructor's voice *immediately* informing you if you are correct) with sight (47 identification cards with individual signal patterns and the letter, number or punctuation mark for which they stand). A clearly written book tells you how to apply the course, increase your speed, practice with someone else, transmit and provides charts to check your day-by-day progress. The records start by giving signal patterns and an imaginary instructor at your side tells you immediately if you have recognized the correct pattern of dits and dahs, teaching you to hear and recognize signals correctly. Next, by using the identification cards you learn the correct letter associated with each signal pattern. Finally, the records tie together your ability to hear the signal correctly and identify the letter for which it stands. You can learn to receive as rapidly as you learn to send—proof positive of the effectiveness of this method. The instructor's voice is on hand at all times to give you the correct answer immediately. From this point on it's a matter of increasing speed. With the 'Sound-N-Sight' course many people have learned to receive 5 words per minute within 9½ hours!

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Six 10" LP records (192 minutes of recording, 46 recordings), 47 identification cards and book train you to receive up to 20 words per minute. Also trains you to transmit. #REC-020, \$15.95.

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Three 10" LP records (96 minutes of recording, 28 recordings), 47 identification cards and book train you to receive up to 8 words per minute and how to transmit. #REC-08, \$9.50.

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easy driving through town for many of them are quite old and there are no sidewalks. There wasn't a lot of room for my Porsche to wind through the streets, I'd sure hate to try it in a big American car.

Frank, OE1FF, guided me through Wien (Vienna) on a tour of the stores, introduced me to several local hams, and fed me a wonderful home cooked meal of Wienerschnitzel and Apfulstrudel. We tried out his rig and had a few stateside QSO's. No phone-patching from Austria. Later that day we visited OE1ER and his family and operated from there for a while. I showed them how to tune SSB signals and we had a short talk with Al Waring, W2CFT. I mentioned to Al that I had been showing copies of his slides of DX SSB stations that he had taken a couple of years before on a swing through Europe.

There were several ham beams visible as I toured Venice, but I didn't know anyone to look up there so I played the role of the tourist, snapping pictures right and left and buying souvenirs. At each stop through Europe I had been told that the sun had been out the day before I arrived. When I came I brought fog, drizzle, and rain. The sun came out in Venice and I kept all my cameras going steadily to celebrate. These were about the first pictures I had been able to take.

I was due that evening in Milano so I had to rush a bit. Driving through Italy after dark is a nightmare. There are bicycles everywhere . . . thousands of them. A few have dim headlights, fewer have reflectors on the back . . . most of them you see just as you whip past them, missing them by scant inches. Nerve wracking experience.

Mario, I1ER and I had dinner at a small Italian restaurant (what else?) and then went to visit I1BAO, one of the best known sidebanders in Italy. Darned if he didn't have a KWM-1! We had a wonderful time rag chewing with the 20 meter gang. Wherever I go I run into the same people: K2MGE, TI2HP, etc. I think I've contacted Dorothy and Humberto from at least ten different countries and as many States. It's no wonder that Humberto was the first one to win the Sideband WPX Award . . . he's always in there.

Next month: Bill Orr on the Riviera, the situation in Geneva, and further adventures of Dangerous Green, Mad Porsche Driver, on the Continent.

Dayton Hamvention

The largest collection of human hams in this end of the galaxy will congregate at Dayton for the yearly Dayton Hamvention. The date this year is May 9th; location: Dayton-Biltmore Hotel. There are technical talks, exhibits by manufacturers, and lots of prizes. See the Announcement page for details.

Amateurs of the World, Let's get together!

Nearly every country in the world recognizes the importance of the radio amateur. As a potential source of trained communications personnel or for utilization in grave national disasters, the radio amateur in EVERY country is indeed a great asset.

In the United States, over 160,000 radio amateurs (the largest number of any country in the world) utilize every available band. Any cuts in their allocated space are greeted with no little amount of opposition.

Even Russia and Communist China with their huge populations do not begin to approach the USA in the number of amateur stations on the air.

It is all well and good that every nation should have equal vote in the forthcoming International Conference (of the ITU) at Geneva; but if **any** country votes for a reduction of presently allocated amateur radio frequencies they are hurting not only **themselves** but others as well. The frequencies as now allocated should remain as they are.

Countries who disregard the sanctity of agreements arrived at by the majority cannot hope to advance the art of radio by occupying amateur frequencies with commercial or State owned broadcast stations. Furthermore, those countries who jam the transmissions of others often do not design their equipment for proper harmonic suppression; the result is the obliteration (especially in Europe) of certain amateur radio frequencies.

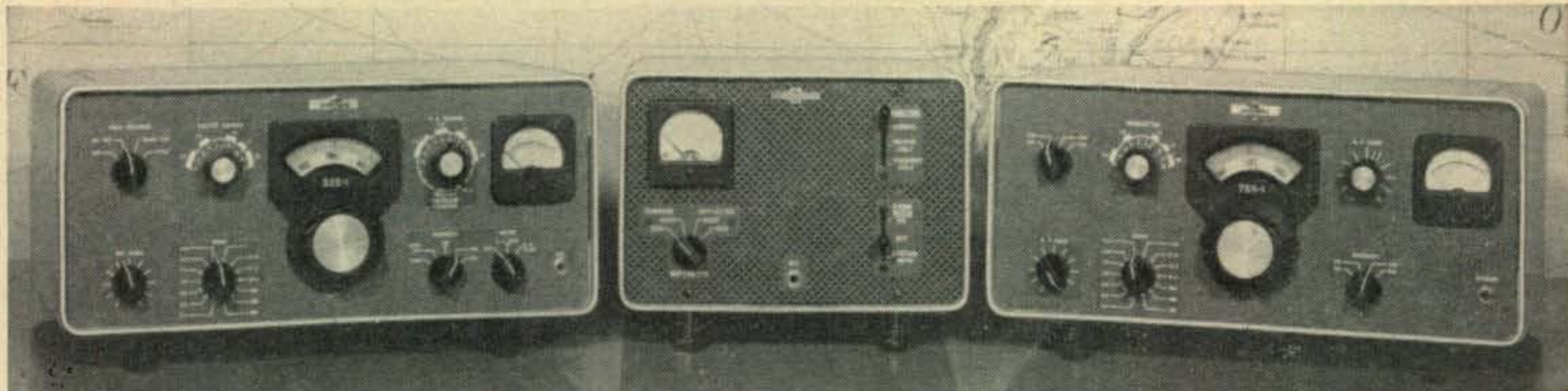
The airways belong to **no particular country**. Cooperation is needed to keep the airways policed properly frequency-wise.

Our U.S. representatives at the forthcoming Conference must emphasize the importance of the amateur bands as now constituted.

Those representatives of **any** nation who vote to curtail amateur radio activity throughout the world will be those who have forgotten the contributions to the art of radio communications made by the radio amateurs of every nation. They will have forgotten the potential pool of trained radio personnel which may be utilized, especially in emergencies; and they will have forgotten what others think of their disregard for justice and neighborliness.

Radio amateurs of the world! Let the ARRL, RSGB, REF, and other representative national radio societies know your feelings. Write! Write! Write!

By pulling together we can make our voices heard. **Only if you, you and you** make your representatives understand the **IMPORTANCE** of **THEIR JOBS** can we retain **all** the amateur bands which have contributed and will contribute so much to international understanding and goodwill.



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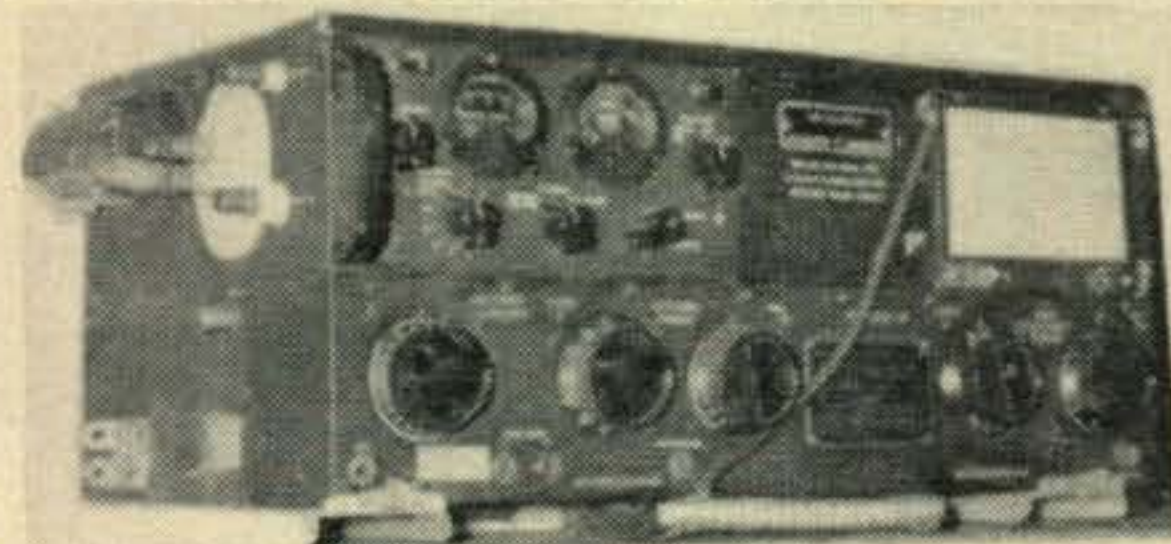
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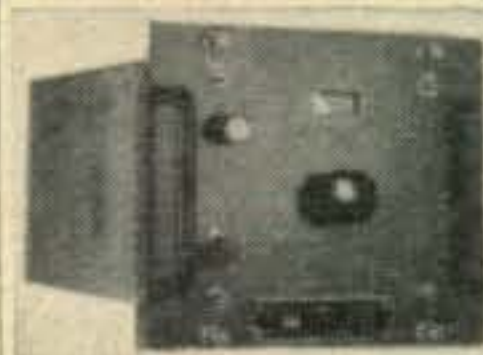
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For further information, check number 33 on page 126.

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In order not to give the impression that we feature only magazines in the English language we shall this month introduce to you one of our contemporaries from the continent, **Das DL—QTC**, *Zeitschrift für den Kurzwellen-Amateur*. This is the official publication of the DARC, the German Amateur Radio Club. Foreign subscription orders are handled by DL1CU. As the official publication of the DARC this magazine is the successor to the *QRV* and the *CQ* (Germany), both of which would now be in their thirteenth and thirtieth year of publication respectively. The DARC itself is technically the successor to the old DASD (Deutscher Amateur Sende Dienst) but represents an entirely different type of organization. With the January issue their circulation has reached 12,000 and still having on hand a few of the *CQ* and *QRV* issues from shortly after the war this writer can observe the progress they have made. Membership in the DARC also includes insurance covering any liability that might arise from a member's activity as a radio amateur. Other clubs please take notice.

The cover of the January issue shows Heinz, DL1BA/OE7/mobile with his station, and same is reproduced above. The articles in this issue combine theory and practical design, the first one being entitled "The Noise Generator and its Construction", by DL3FM. It covers nine pages and goes into considerable detail. "On the Q-Multiplier" is the title of the next article, by DL8BY. A point well taken is the fact that a Q-Multiplier is much more versatile than a crystal filter and in a way accomplishes more for less. DL9FE devotes several pages to autotransformer design. The decision to use an autotransformer requires some caution however as the result is a hot chassis if it is used in a power supply circuit. An article by DL3NF gives design notes on shunting resistors for meters and brings up a very interesting but often overlooked point: The damping of a meter can be insufficient, i.e. the needle overshoots the actual value and finally returns to the proper reading. Just as bad is however overdamping which causes a needle to take too long to move. The author describes how



this can be corrected in addition to the usual shunt and series resistors for a multi-range meter. Two more articles describe a simple magnetron oscillator and a transistorized power supply. What follows is a collection of columns as found in most other magazines; such as DX, YL, UHF, IGY-News, and DARC Club News. Ham ads and commercial ads round out the magazine. Random items noted in the columns: DL1QT (he made WPX) will be qrt for a few years as he is going to Turkey on business. He will try to get a license there, but it is well known that this is very hard. DL3YBA has five countries on 435 mc. DL9HF and DL3ZG are mobile in Africa with a VW, using various calls, and have been there for about two years.

Other Publications this month: Last month we mentioned the "Type 26 RF-Unit", advertised in the *Short Wave Magazine*, and we received several inquiries concerning this item. Unfortunately we were not able to get it in as much as we were advised that it is now out of stock. More's the pity since this item is used by quite a few British hams for six-meter transatlantic work and one must conclude that it does work. This is the second time we ordered a piece of equipment from the other side and were too late.

Amatirski Radio, OK, December 1958 has an article about quad antennas. While OK1JX does not offer radically new ideas, his useful contribution to the everpopular quad field is a listing of references to other quad articles. He lists a total of eighteen articles in the English language alone that have appeared over the last ten years in the various magazines.

According to *Old Man*, HB, Jan/Feb. 1959, the first European two-way two-meter meteor scatter contact took place on December 14, 1958, between SM6BTT and HB9RG. The same magazine also mentions a case of TVI in reverse: A Swiss television transmitter had some harmonics falling into the two-meter band. This was brought to the attention of the responsible parties and suppression is now better than 70 db. Also in this issue are the regulations for the Helvatia 22 contest, run-

[continued on page 123]

CONTEST CAL. [from page 89]

cross-band operation is not permitted.

4. For stations outside the Netherlands the multiplier is determined by the number of provinces worked on each band.

5. The final score therefore will be the sum of QSO points multiplied by the sum of the provinces worked on each band.

6. Awards will be given to the highest scorer, both CW and Phone, in each country. In the case of W/K, VE/VO, PY, CE, ZL, VK and ZS each district will receive an award.

The PA stations will identify the province

by two letters after their number. The provinces, eleven in all, are as follows:

FR—Friesland	UT—Utrecht
GR—Groningen	LB—Limburg
DR—Drente	NH—Noord-Holland
NB—Noord-Brabant	ZH—Zuid-Holland
OV—Overijssel	ZL—Zeeland
GD—Gelderland	

Mail your logs not later than June 15th to P.v.d. Berg, Contest Manager, Keizerstraat 54, Gouda, the Netherlands.

Not much contest activity after this month, fellows, so make the most of it. You have the whole summer to rest up.

73 for now, Frank, WIWY

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- ★ Full dial coverage of 6, 10, 15, 20, 40, 80 and 160 meter amateur bands.
- ★ Razor-sharp slot filter, adjustable ± 5 KCS over passband with up to 60 db attenuation.
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- ★ Separate linear detector for CW and SSB reception.
- ★ Tuned IF amplifier with seven selectivity positions for skirt selectivity.
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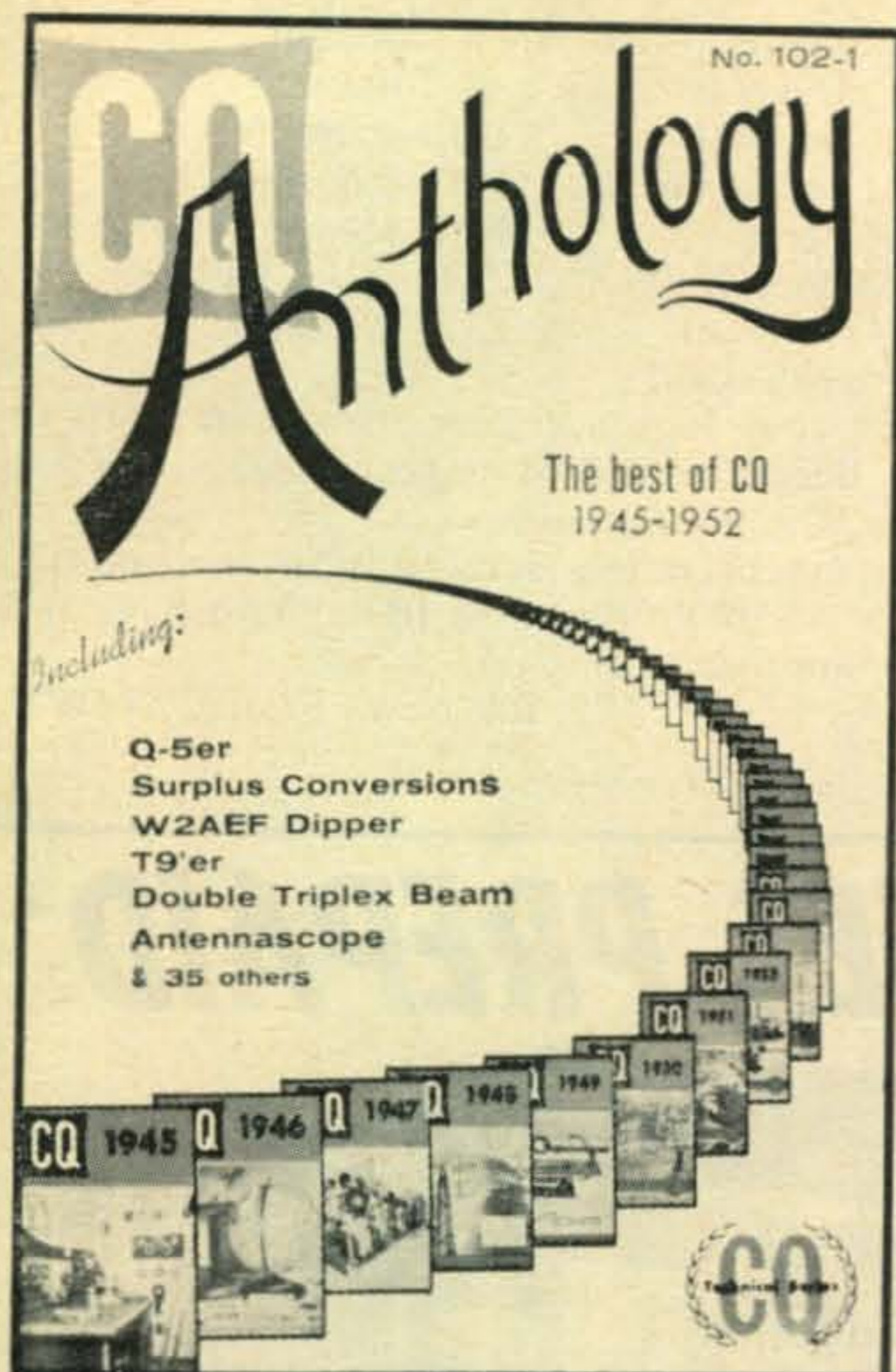
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For further information, check number 34 on page 126.



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Down through the years CQ has had the honor of being there first with just about every major discovery in the amateur radio field. Unfortunately most amateurs do not have a good file of back issues of CQ to fall back on when they are interested in building up something or in improving their equipment. So we've looked back through the years 1945-1952 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 and are unavailable. The price is a paltry \$2.00.

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For further information, check number 35 on page 126.

HAM CLINIC [from page 78]

Rhombic Antenna Gain

"Why do most books describing the rhombic antenna limit the length of each side to less than 6 wavelengths long?"

To limit directivity in the vertical plane.

Leaking Condensers

"I own an old receiver and was wondering if I should replace all the condensers of the paper type which have evidently been leaking wax?"

I would replace them. However, it all depends on how well the set is operating.

Information Wanted

Anyone using a B&W 51SB SSB generator with a Viking Valiant without major modification and/or circuit additions? HAM CLINIC would like full information.

Grounded Grid Final

"How about a circuit of a grounded-grid 4-250A or 4-400A final?"

Twenty-eight requests for this circuit have been received. See Figure 1 for a final patterned after one which B&W recommends with

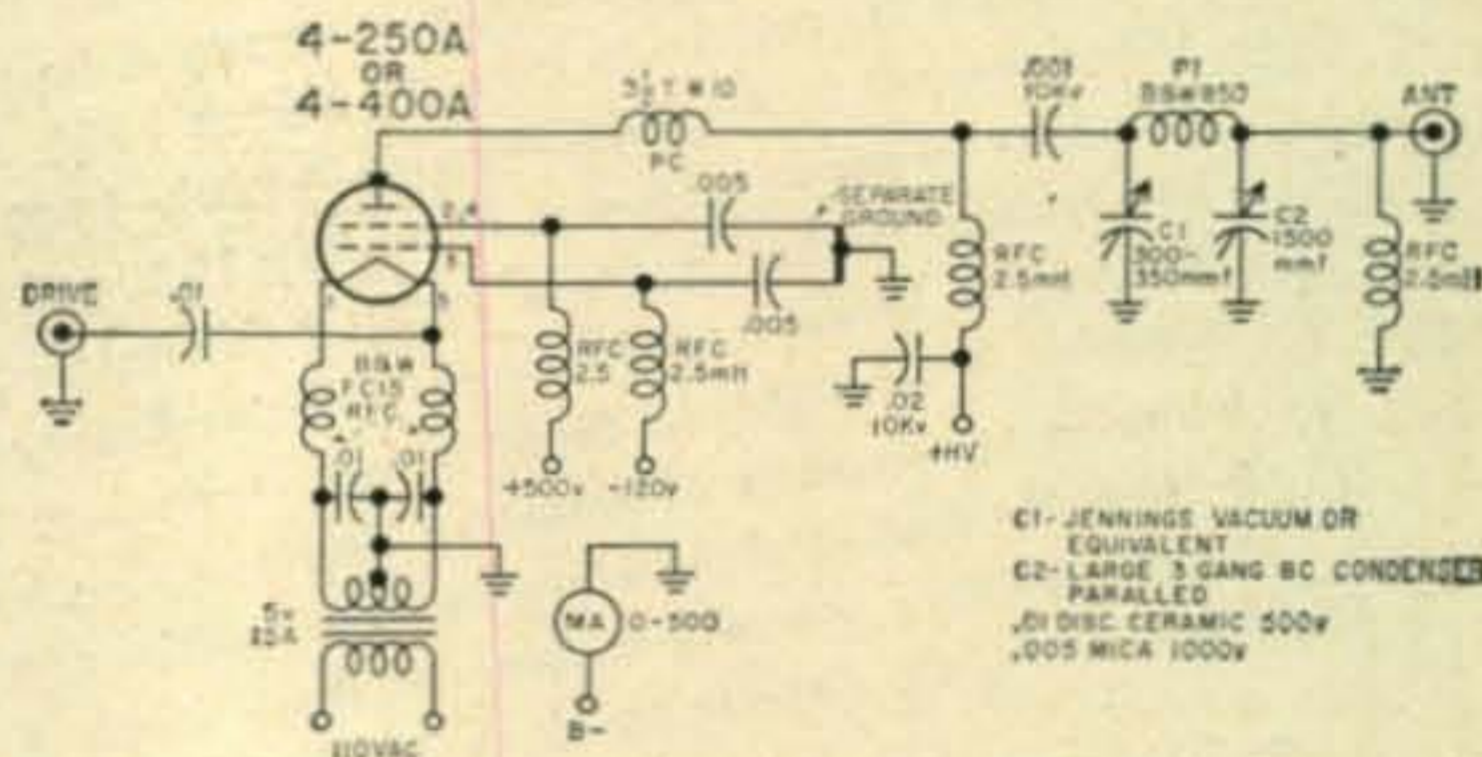


Fig. 1—GG final that may be driven by most of the SSB exciters now on the market. It employs a 4-250A or a 4-400A and uses standard parts.

their filament chokes. Actually nothing could be simpler or easier to build. All parts are easily obtainable. It will drive with most SSB exciters now on the market.

Tech Twist

Most grid dip oscillators on the market today are not designed for split-cycle frequency accuracy. Letters have been received as to the steps which may be taken to increase GDO accuracy. First of all, GDOs have very little bandspread in their tuning mechanisms. On the higher frequencies setting the dial accurately is quite difficult in most cases. Here is a hint (simple but not often thought of) on how to obtain accurate measurement (within a kilocycle or two) with the average GDO. First, calibrate your receiver using WWV (5, 10, 20, etc. mc), then set the receiver dial to your

frequency (measuring coils, tuned circuits, antenna resonance, etc.); then after your GDO has warmed up for about 20 minutes or so, set IT to the frequency on the receiver dial by zero-beating it, note the zero beat point and proceed with your measurements.

Thirty

We now have our station on the air in France, its call: F7FE. Listen for us on all workable bands using CW, AM and SSB.

73, Chuck, F7FE/W6QLV

SURPLUS [from page 80]

with Cliff and let him know any details that would be of value to hams in general. His address is Box 385, Bonita, California. One thing that would be of special value is the location of a source of brushes for these motors.

In the market for a handbook of diagrams? Well CQ will shortly have a set of books covering all of the surplus equipment that we could locate (including some which have not been released yet). No conversion will be given, just the circuits, which are usually hard to come by, and a little run-down on the peculiarities of each piece of equipment, as well as power requirements.

The imminent publication of the schematic manual doesn't mean that we will change our policy of handbook requests. There will always be a need for specific information regarding some piece of gear that could only be found in the manuals. W1TNQ/9, Bill Briggs of 300 Oak St., Angola, Indiana is looking for a TBY-2 handbook. Special help is wanted by W6FRG, Jonas R. Savage of R-2 Box 900, Vacoville, California who is disabled since the war and is looking for assistance in converting the BC-604 to six meters. Here is a chance to really show the ham spirit to a new ham who, as a disabled veteran, took up the hobby for his health. W6WT is looking for a modification of the TCS to SSB, in the same manner that the DX-100 has been modified of late. K7EWG is looking for a conversion of the B-19, Mark II transceiver for mobile. W6IQM is trying to get hold of a manual for the APR-1. K5JQG is looking for some way of converting the PE-94 to 12 volt operation from 24 volts. This is a dynamotor, and may be in the same category as the PE-101.

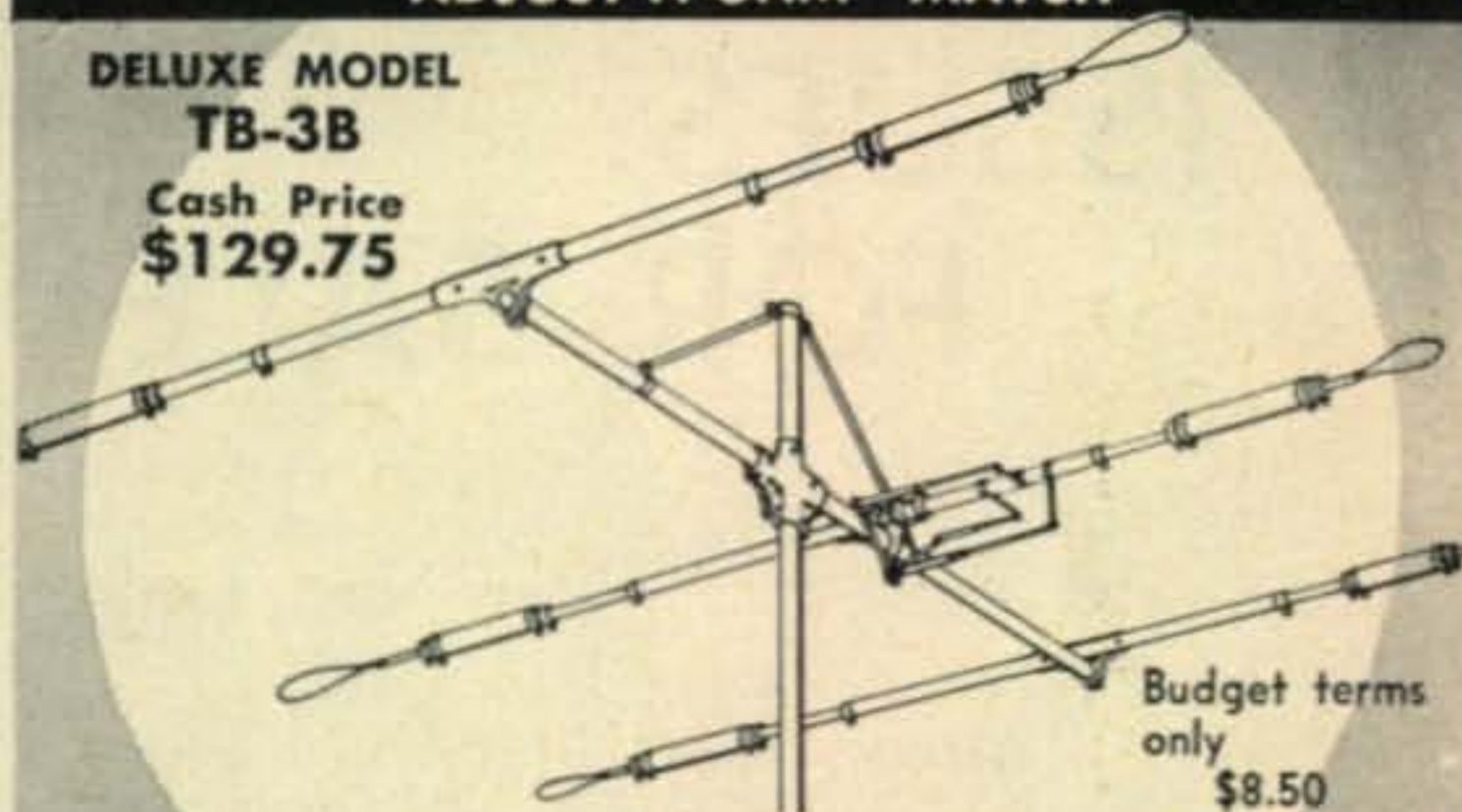
Both Steve Snee, Box 182, Bucknell University, Lewisburg, Pa., and Louis Hiser, 148 Sherman Avenue, Morgantown, W. Va., are looking for a conversion for the BC-620. Specifically they want to convert to AM, but they would like to get the manual as well. Harold Otis, 12328 Shoemaker Avenue, Whittier, California, is also interested in the BC-620 to AM, and the BC-1335 and BC-603 and BC-604.

W. O'Brien, 1534 South Avenue, Syracuse 7, N. Y., needs the RBM manual. Don Scher, 11

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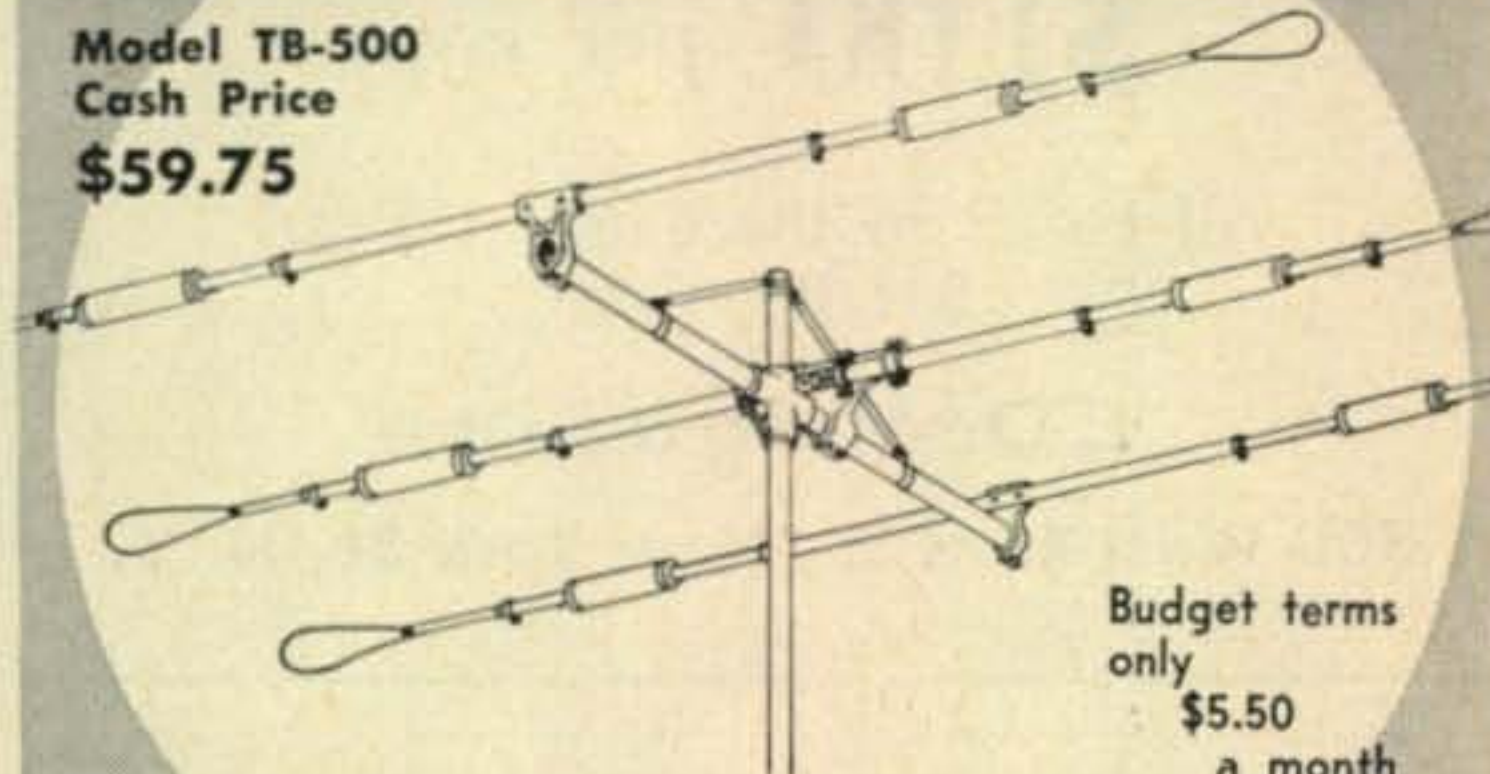
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For further information, check number 36 on page 126.

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Webster Street, Irvington, N. J., wants the manuals for the RBL-3, R-28/ARC-5 and the R-44/ARR-5. Joe Kay, K1GQW, has one of the RU-16 receivers and is lacking the manuals or any operating data. The T-4/FRC is new on the surplus market and in need of a handbook for one is Gary L. Koeiner, 1311 Watson Street, Scranton 4, Pa. John Wora, K2KFG, writes that he needs the parts list and schematic for the BC-307-B transmitter. K6ZNK is trying to use his newly purchased BC-779A and would like to get hold of a manual on it.

From Canada, VE1PO writes that he is looking for information on a piece of British built equipment. It bears the nameplate number TR-1935 and model number 2118/3 and 974/2. It also has a reference number 10D/17694. Anybody knowing the whereabouts of suitable instructions for this rig get in touch with Gerald Kennedy VE1PO, 9 Lakewood Drive, Moncton, New Brunswick, Canada.

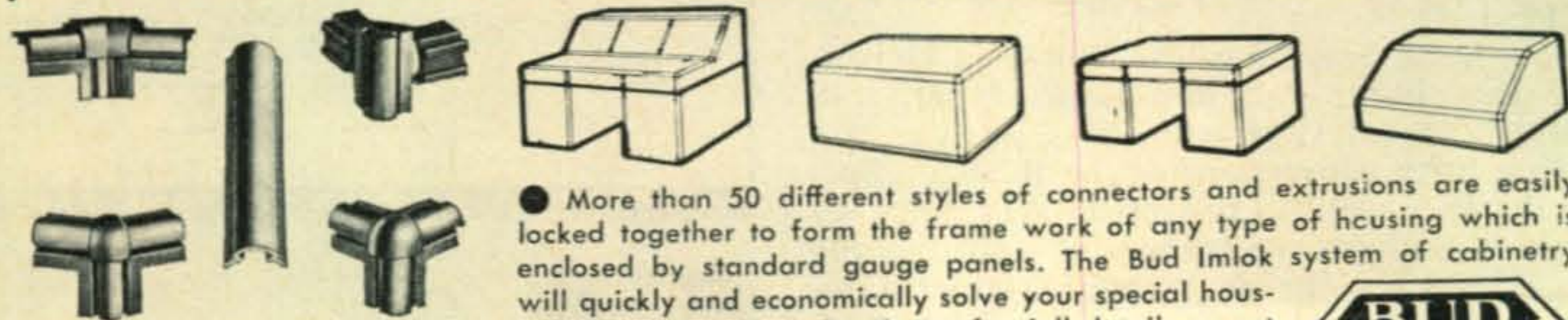
W1ZUH wants the Tech Manual on the TBW-2, while Dale Wayne at 123 North Hyatt Street, Tipp City, Ohio, is in need of the RAK handbook. K5EXW still is looking to hear from someone about the RBM manual. The BC-222 is back again and K2TWY needs the book. Bendix made a radio-compass known as the MN-26. Stephan Collins of 15036-85 Avenue, Edmonton, Alberta, Canada, has one covering the 150 to 1500 kc band and needs conversion information. The schematics for the TBX-4 are needed by W7MBV. Like many others, John Morse, K2KFN has an ART-13, but no info on it. This is new, at the price they are at on the market, and they are well worth the money. They were converted years ago in CQ in Nov. 46, Feb. 48, Dec. 47, and in the Eleventh Edition of the Radio Handbook published by the Editors and Engineers on the West Coast.

73, Ken, W2HDM

SIDEBAND [from page 81]

days, and expect W2SKE, Bill to have forwarded all of the WAS albums to the Sectional Winners.

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For further information, check number 57 on page 126.

Martin, OY7ML who has done such a wonderful job of operating on SSB from Faeroes Island writes that he will have to return the KWM-1 to W6AXS at the end of February. We will sure hate to see Martin go back to CW operations, and wonder if any one reading this column has an exciter such as a Central Electronics' 10A to donate to the cause. Martin wants to continue on SSB but reports the duty on equipment is prohibitive.

While on the subject of DX, your Editor has been combing the country in search of a gasoline driven generator with 115 volt, 60 cycle ac output at 500 watts with a 12 volt DC source for battery charging. The unit should preferably weigh less than 100 pounds. This is urgently required for the Seychelles Island d/xpedition to be made by Robby, VQ4ERR in August of this year. This will be the first SSB operation from VQ9 which would not have to depend upon the hotel's power plant available only one half hour each day. Who could loan this generator to VQ9ERR? Please call me collect if you have one. British currency restrictions make it next to impossible to purchase American equipment in Kenya, and existing British made generators are too large and heavy for a two man expedition.

Bob, K2ZSQ reports considerable SSB and DSB activity on six meters. W7MAH in Reno, Nevada provided many contacts from that rare State. The following are found every evening on 50.3 mc: W2SZE, K1ACD, K2DZM, K2VIX, K2EFX, K2ZSP and K2ZSQ.

Thanks to Jim, W2JVO who visited Glasgow last Summer, we have a small picture of Jimmy of GM3CIX, who is the only SSB station in Scotland on 15 and 20 meters. GM3CIX has worked 39 Zones and has confirmations to prove it. He missed JT1AA for the fortieth. As you can see Jimmy's rig is mostly homemade except for the receiver.

At the January Annual meeting of the SSB Amateur Radio Association the following officers were elected: S. Edwin Piller, W2KPB, President; Irving Binger, W2CMM, vice president, Alex MacDonald, W2PRB, Secretary and Irving Richter, W2IVW, Treasurer. Chosen as Directors were: Ed, W2BXY; Frank, W2ALS; Herman, W2TP; Norm, K2DFW; Ben, W2QZ, Stu, W2ZE; Irv, K2HEA; and Harry, W2JXH. George, W2KH; Mort, W2KR; Bob, W2JIO and John, W2RID are serving unexpired terms as directors.

The SSBARA is a world-wide organization of radio amateurs interested in furthering the use of SSB transmission in amateur communications. The Association meets each month in the NBC studios in the RCA Building, New York.

We show a photograph of OK1MB, Beda with the gold cup awarded by Chuck, WØCVU for the station who furnished him his 100th country on SSB. The KWM-1 in the picture is one of the two rigs which OK7HZ and OK7ZH

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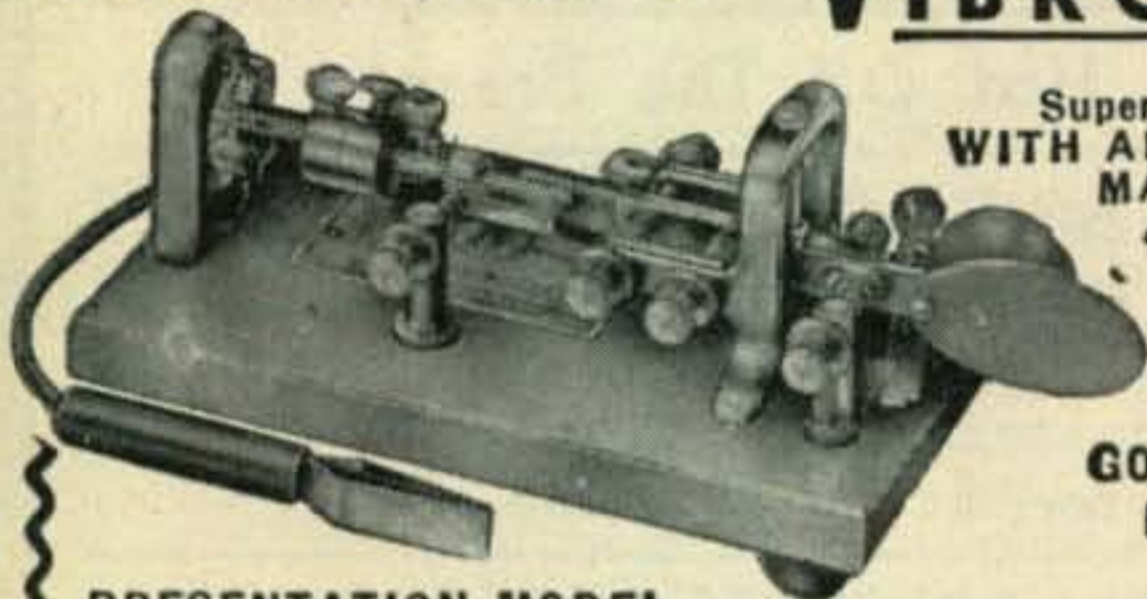
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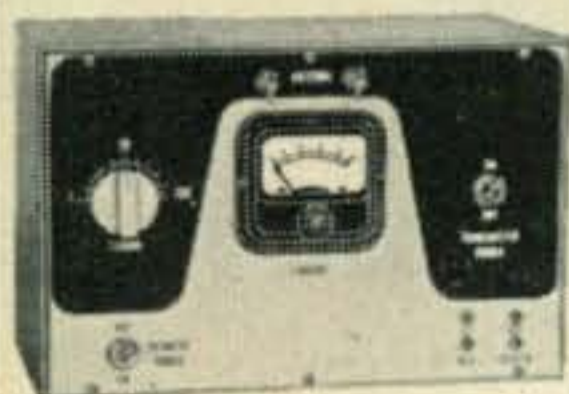
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Standing left to right: Directors Morton B. Kahn, W2KR; John F. Rider, W2RID, Edward Gundrum, W2BXY; Stuart W. Seeley, W2XE; and Irving Strauber, K2HEA.

Directors not shown are: George W. Bailey, W2KH; Robert W. Gunderson, W2JIO; Frank A. Gunther, W2ALS; Herman G. Mustermann, W2TP; Norman L. Rowe, K2DFW; Benjamin H. Russ, W2QZ and Harry Whiting, W2JXH.

will take on their five year expedition around the world.

As you read this it will be about time to get set for our Third Annual CQ World Wide Side Band DX Contest, and from all appearances it will be a great affair. The new method of scoring as described in the March column, should make it possible for anyone to become the top scorer. We sure hope that George Jacobs blesses us with good conditions during the twenty-four hours of the Contest.

Bill, W2KG, whose Florida call is W4VEC, was host at a dinner at the Boca Raton Club Hotel, in Boca Raton, Florida on January 26 for a large group of sidebanders. Among those enjoying Bill's hospitality and golf demonstrations were the following: W2CMM, W2MDQ, W2JIO, W2KR, W2ZE, W2ZG, W2PJS, K2AAA, W3RE, W4GL, W4BMR, W4CF, W4GG, W4FH, W4HB, W4EIK, W4ODK, W4RNT, W2AWR, W2NSA, CM9AA, CO2AG, WØZB, W4UEL, KØDWC, W4QS, W4AHG and W3SW. Twenty meter SB must have been pretty dead during this event, Hi. During a fishing trip on K2AAA's boat, Robby, W3RE caught a 180 pound Mako shark



GM3CIX, Jimmy.

after an hour's fight. On several occasions the giant fish jumped twenty feet out of the water like a tarpon, and Stu, W2ZE caught some wonderful shots with his camera.

Dorothy, K2MGE and her OM, Irv, K2HEA, won four hundred dollars in a recent television quiz show. Wonder what new radio gear they are planning to buy?

We are all happy to hear Leo, W4ERK back on the air after his confinement in a hospital. Take it easy Leo and don't scare us again like you did.

One of the most active sidebanders in France, Charlie, F7AF is returning to the States after three years overseas assignment in the USAF. Charlie is expected to locate in Washington again. His side kick, Les who was F7EM returned several months ago and is active on SSB from W4ERZ/1. Tom and George of HL9KR are also returning Stateside leaving Cal to keep Korea operational.

Don, W6TNS is building a small portable SSB rig which he intends to ship to various



remote spots in the world similar to the activity of Ted's, W6UOU "Little Jaugernot."

Mobile activity continues to increase as the boys discover how effective SSB rigs are when operated from the car. Hallicrafter should be shipping their FPM-200 by the time you read this.

Twenty-two "Worked 50" and eleven "Worked 75" certificates were mailed out this month so we will soon be having some additional qualifiers for the 100 award. The rules of the WPX award say you do not have to send your cards with your application but I have been advised by the Editor that cards must be submitted with the application.

I wish to thank all of you who forwarded the CQ survey questionnaire and indicated your interest in the SB column. The percentage however was disappointingly low for what I believe to be such a popular and fast growing mode of communication. As a result of this low hooper rating the SB Column may be shortened. If you want to see bigger and more interesting SB columns then dig out January 1959 CQ and mail in the questionnaire on page 61.

73, Bob, W3SW.

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IN THE BEGINNING [from page 43]

ing on a well corroded part will detect wireless signals.

Mercury detector—This produced exceptionally loud signals for local work. A brass cup held a little mercury. A tantalum wire or fine lead pencil point made contact with it. A spring supplied fixed tension.

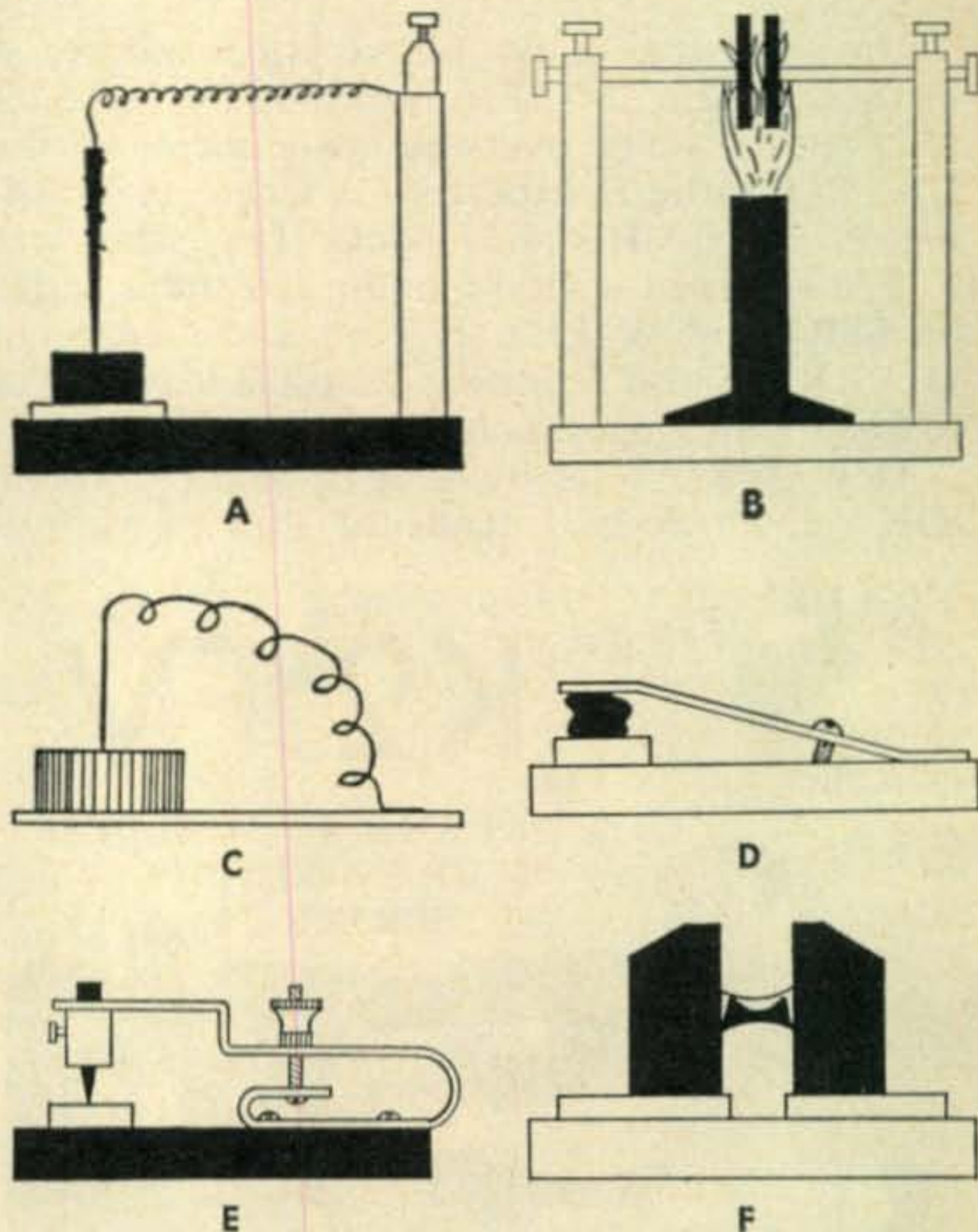


Fig. 13—Various forms of ancient detectors. A—Microphone detector; B—Flame detector; C—Corroded metal detector; D—Coal detector; E—Mercury detector; F—Water detector.

Flame detector—This was a very sensitive detector good for experimental purposes. The fluctuating flame quality made it unreliable for practical work. Two metal disks separated one sixty-fourth to one thirty-second of an inch were supported above a bunsen burner flame. A strong battery current was necessary for its operation.

[Continued next month]

KNIGHT-KIT [from page 49]

For the beginner there is a section of the book devoted to the operation of the receiver for both broadcast and different modes of amateur reception—CW, AM, SSB, etc.

A fair sized schematic diagram (two page spread) together with some servicing hints completes the instruction book. It is difficult to imagine anyone making mistakes if he fol-

lows the instructions closely.

Receiver Features

The completed receiver offers many very interesting and valuable operating conveniences. It is a general coverage receiver with band spread dial calibrated in all Ham bands every 10 kc. Frequency-wise it covers from the low end of the broadcast band (.53 mc.) for those who wish the set to "double in brass" as a broadcast receiver, through 31.0 mc with continuous tuning.

When the receiver was first turned on it seemed so quiet that investigation was immediately started to determine if the set was operating properly. After some investigation only 2.15 volts was measured at the screen of the mixer tube (6BH8) which made the converter tube operate at very low gain and thus at an extremely low noise level as well. Since most of the internal noise in a receiver has its origin in the converter the reason for the low noise level became immediately apparent. The converter was not designed to operate at high gain but the remainder of the *rf* and *if* circuits using modern TV tubes and properly designed components enables the receiver to have more than adequate gain. As a matter of fact, the 1½ microvolt figure which the manufacturer advertises seemed at first to be a little high, but after measuring the performance on a Ferris Microvolter, it proved to be less than 1 microvolt on the 40 and 80 meter amateur bands and less than 1½ microvolts on all other bands.

Stability

Stability, the bugaboo of the modern high gain receiver, seemed quite adequate even on the 28 mc band where SSB stations were worked without difficulty. Ordinary movement of the operating table caused no mechanical instability and the average amateur test of dropping a 50 pound lead weight on the cover of the receiver was not tried. However, under normal operating conditions, the exceptionally rigid sub-chassis construction of the front end gave an excellent account of itself. Another factor responsible for good stability is the remote and standby switch circuitry. In the standby position, only the cathodes of the *rf* stage and *if* stages are opened allowing the *bfo* and high frequency oscillators to remain running constantly. As an acid test, the receiver was left on WWV for 24 hours. During the first half hour of operation normal warm-up drift was encountered but after a half hour's operation the receiver drifted less than 500 cycles over a 24 hour period.

Circuitry

Just one or two features that may be of interest so far as the circuitry is concerned. The first *if* tube, which is a pentode, contains an

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for 10, 15 and 20

MATHEMATICAL FREQUENCY STABILITY

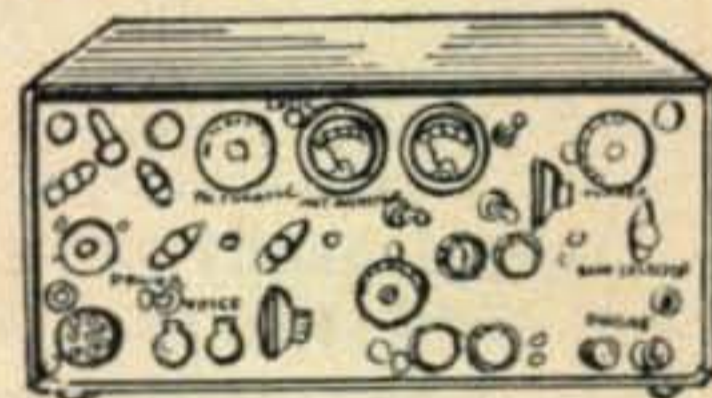
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A complete portable station (Transmitter/receiver), complete with all operating accessories. Self-contained in portable field chest. Transmitter: 9 watts CW, 3 watts phone. 837 in final. Freq. range: 2,000 kc to 4525 kc. VFO or crystal controlled. Receiver, AM or CW, 2,000 to 8,000 kc. Complete with band generator for emergency operation. Ideal for field day, and for use as an emergency standby station. New, with instruction book, antenna, all accessories (xmtr-recvr shown) **\$59.50**
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RECTIFIER SPECIAL

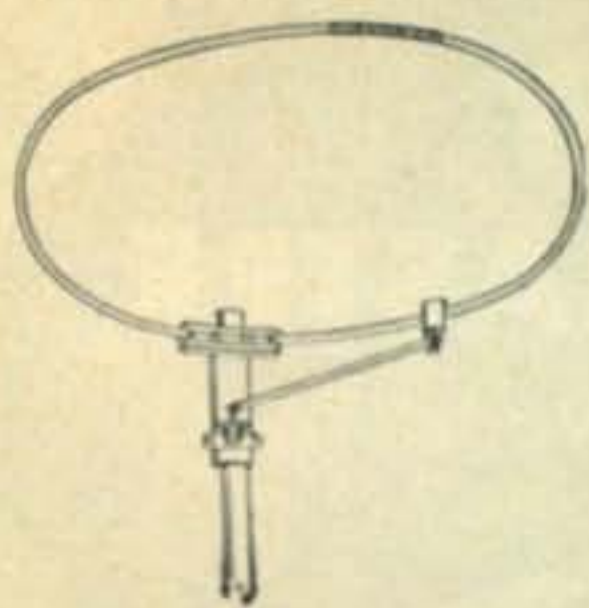
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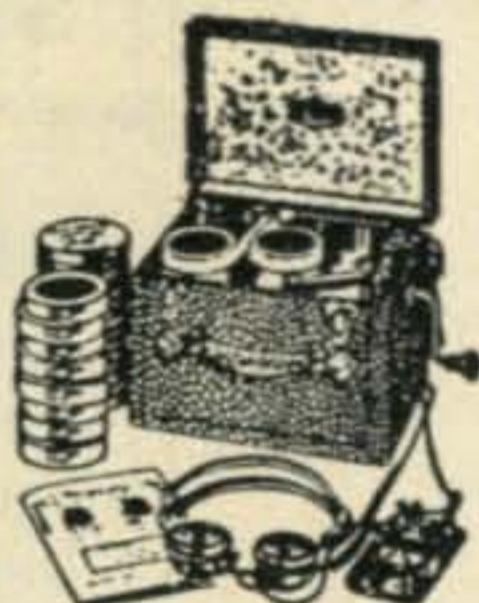
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extra triode section, unused. This suggests many uses such as a calibrator or a product detector. The 6BC7 triple diode uses separate diodes for delayed *avc*. The delay can be changed by substituting different condensers and resistors in that circuit, making this circuit adaptable to SSB reception. A diode detector (which is not unusual), and a series type noise limiter which is quite effective is also used. The Q multiplier is almost the same as Bill Shearers' original that appeared in CQ several years ago and is very effective. The depth of the null obtained was particularly good and eliminated all but the 50 above 9 heterodynes encountered while listening on 75 meter phone.

The selectivity was what one could normally expect from a receiver with one *rf* and two *if* stages. While it did not compare with the selectivity of the more expensive receivers of the double heterodyne variety, the Q multiplier certainly did wonders both on the CW and AM phone bands in helping to eliminate unwanted signals.

Several accessories are available at modest cost—the crystal calibrator for \$10.95, S meter for \$10.75 and a matching speaker for \$7.50.

The completed receiver is a worth-while addition to any ham shack both as a first and for the more experienced ham, a good standby receiver. Its overall performance is comparable with most receivers in the \$200 to \$300 price range and has the added advantage of being able to say—"I did it with my own two little hands."

A. F. Suchy, W2KHE/W1WHP

6 MTR TRANSCVR [from page 39]

on one end for mounting. The enclosure for the transmitter is a 5" x 10" x 3" chassis (preferably aluminum—it is easier to work with) with a bottom plate used as a side cover. The transmitter sub-chassis is mounted 2½" from the front edge of the chassis, and the modulator sub-chassis 1¾" from the rear edge. As much wiring as possible is done on these sub-chassis before they are mounted.

The chassis containing the transmitter and modulator is mounted on the left side of the receiver. Several of the screws holding the sides on the receiver may be used, and one or two extra holes may be drilled and bolts inserted, if desired. Two small brackets are bent from a scrap piece of aluminum and used to mount the converter vertically on the rear of the receiver. The power transformer is mounted under the converter. In order to keep the shaft on the receiver tuning knob from falling out of its socket, it is hammered to flatten it slightly and forced in. A pilot lamp socket is mounted in place of the antenna binding post; the lead formerly connected to this post is replaced by a piece of shielded wire which is run out to the rear of the receiver through holes drilled in the various shields. This lead is connected to the output of the converter.

Testing

After the wiring is completed it should be checked carefully for mistakes. The line cord may now be plugged in, a suitable antenna connected, and the switch on the *if* gain control turned on. The pilot lamp and all the filaments should light. The control should be advanced clockwise as far as it will go. After a warm-up of about 30 seconds, a loud hiss and noises should be heard from the speaker. Turn the gain control down to a suitable level. Now turn on the noise limiter switch. The noises should become lower in volume. Adjust the antenna trimmer for maximum noise and see if any stations can be heard. With a 44.00 *mc* crystal in the converter, 6 *mc* will correspond to 50 *mc*, 6.1 *mc* to 50.1 *mc*, etc. If the receiver works properly, the transmitter may now be tuned up. Remove the antenna and also disconnect plate and screen voltage from the 5763 temporarily. Insert an appropriate crystal in the crystal socket and connect a *vvm* or a 20,000 ohms per volt meter from the junction of the grid resistors to ground, with the positive lead grounded. The meter should be set on a low voltage dc range, such as 0-3 volts or 0-5 volts. The slugs in L1 and L2 may now be tuned for maximum indication on the meter, about 0.8-1.1 volts. Since this voltage is developed across a 1000 ohm resistor, 1 volt indicates a grid current of 1 *ma*. Plate and screen voltage may now be connected to the 5763, and a 7 or 10 watt bulb may be connected to the antenna terminals. The plate and antenna tuning controls may now be adjusted for maximum brilliance of the bulb, observing that maximum brilliance here corresponds to maximum brilliance in the neon lamp, NE-2. The bulb should become brighter as modulation is applied by speaking into the microphone. The neon lamp will show only a slight variation.

Mobile Operation

For operation in a car having a 6 volt electrical system, it is only necessary that a small vibrator or transistor oscillator supply (300 volts, 100 *ma*) be used to supply B+ voltage. However, for 12 volt operation, the tubes in the BC-455 need not be changed, with the exception of the 12SR7. This is changed to a 12S8. The converter filaments are operated through an 8 ohm 10 watt resistor. In the transmitter, the 6AU6 and 5763 are changed to a 12AU6 and 6417, respectively. The filaments of the 6U8 and 6AQ5 are wired in series. The pilot lamp is also changed to a 12 volt type, and the power transformer must be changed to one having a 12 volt *ac* filament winding.

To date, using a simple dipole antenna, the reports received on the signals have been favorable, and the results obtained from this rig have made the time spent in its planning and construction most worthwhile. ■



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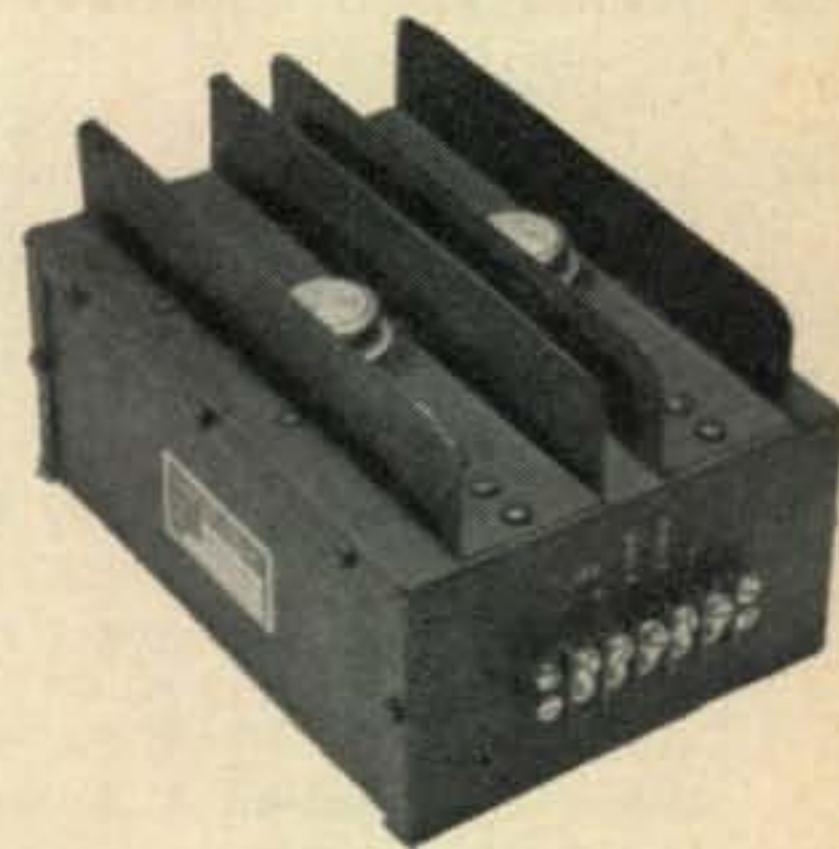
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We go through the hundreds of books on electronics and radio and select those best suited for hams. It is still possible to learn about radio, even at this late day and age. Check over the list below and let us fill in your library. Beginners will want #40-13-23-24. Next step is #21-22-28-32.

- 1 **Electronics & Radio Eng. by Terman** \$14.50
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TANGANYIKA [from page 37]

to the group and into the bush they all melted. It was only then I realised how scared I had been. My hands were shaking so badly I found it quite difficult to light a cigarette. I must be a nervous type. I then gently crept out of the "DX part of the Band" only to find of all things a flat tyre. After much thought of driving on and ruining the cover or risking a quick change I decided on the latter. There was a frenzied rush at the critical period as the wheel was actually changed over and a sigh of relief when the bolts were put on finger tight for the moment and "Let's get out of there!"

Nature relenting—the rain stopped, the sun came out and a rainbow gave me the OK and without further trouble the Jag rolled into Arusha.

The hotel people were disinterested but very kind and "go ahead—do anything you like" was the keynote.

The photo shows the flat roof with convenient ventilator pipes and the two ground planes in action. It poured with rain—the rains had arrived—after all—and I had to erect them wearing swim trunks and got them ready by dusk.

The KWM-1 was installed on a table I "borrowed" and it worked. My troubles were at an end. A hot bath, dinner and the first QSO's with W9EWC, ZS6KD, W4IMP, W8-EAP, W3ML, WØLBK on 21 mc. What a relief!

The ac main voltage dropped at intervals and I could have done with a tapped auto-transformer. I managed to work nearly 200 contacts, mostly USA and most on 15 metres. My pet band 20 metres was very flat most of the time and 10 metres just "wasn't." Europe was very poor—No UK signals at all. In all, 30 countries worked, with a suitcase Portable in heavy tropical rains says a lot for the little



The ground planes on the hotel roof.

16 lb KWM-1 transceiver which worked perfectly after 175 miles of crashing, banging potholey roads. Truly a dependable package of dynamite.

VQ4CH was to arrive a little later, but could not get through the cloud burst unfortunately. Anyway conditions were not good enough to keep one operator as busy as he would have liked to have been—never mind two.

I met VQ3GX on the air who has just completed his SSB rig (807's) and he promised to be available as SSB DX very soon. He was rock-bound on 14,335 but is fixing up a VFO, which should be ready by now and he has just completed a rotary beam. He also intends to do VQ1 in early January and plans are going ahead to have SSB, AM and CW on tap with three amateurs.

The tail piece of this article is my family's sole comment—"Did you photograph the baby elephant Daddy?" ■

REDUCED CARRIER [from page 36]

shock mounts. Should this fall, build a cardboard or celotex box to fit over the transformer with room inside to place acoustic dampening material. Some transformers have loose laminations which cause the "talk-back." This can be cured by tightening the lamination clamps and applying varnish to the laminations.

If the feed-back is due to induced audio voltages, it may be necessary to put in additional shielding in the speech amplifier. The plate caps on the modulators may also be interchanged to change the phase of the feed-back voltage.

Performance

On-the-air tests conducted for several months with DX and local stations have produced convincing results. The Heath DX-100 transmitter was used with the carrier output reduced to 50 watts, and the audio output increased to 100 watts. The voltage dropping resistor used to reduce the carrier input, could be switched in and out to compare reduced and full carrier operation. The commercial model of the Ultra Modulation Unit was used with the DX-100 and connected as shown in fig. 4.

With full carrier (120 watts input) and 100 watts of audio output, excellent reports were received. The high audio output permitted operation through heavy QRM that made normal operation with reduced audio almost impossible. However, in almost every instance, when the carrier was reduced to 50 watts with the audio held at the same 100 watt level, the receiving stations reported greater audio "punch" and a more penetrating signal. Invariably, the receiving operators believed

[Continued on page 124]



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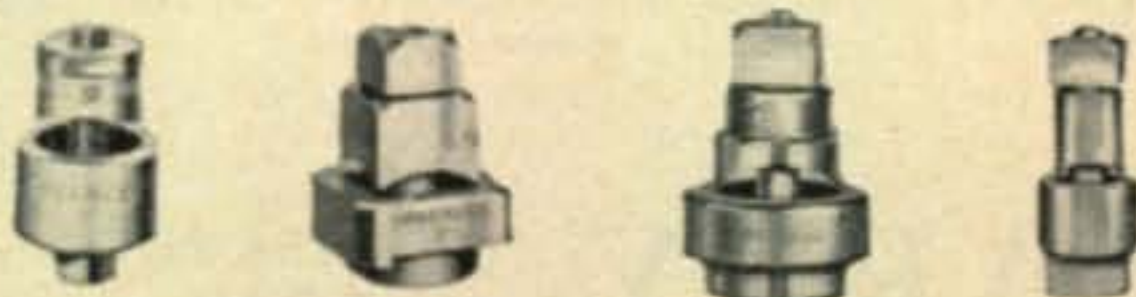
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FOR SALE: Transformers, tubes, chokes, command transmitters, variable inductors, 4D32, 813 milien GDO. Send stamp for list. W5SZB, Box 330, Edinburg, Texas.

SELL: 25-44 mc double conversion FM receivers with 13 tubes \$1600 each. Hard to get 12 volt low voltage input brushes for DM34 DM35 DY35 DY88 12 volt dynamotors. Ralph Villers, P.O. Box 1, Steubenville, Ohio.

ATTENTION MOBILEERS!! Leece Neville 6 volt 100 amp. system alternator, regulator and rectifier, \$45.00. Also Leece Neville 12 volt 100 amp. system, alternator, regulator & rectifier \$85.00. Perfect condition. Herbert A. Zimmerman, Jr., 115 Willow St., Brooklyn 1, N.Y. K2PAT, ULster 2-3472.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with \$1. in stamps or cash for each item that you want preserved. 24 hour service. Send to Dept. HW, CQ Magazine, 300 West 43rd St., N.Y. 36, N.Y.

LAKESHORE Signal Splitter, still brand new, unused. \$74.50 it cost me, \$35 it cost you. Gives you really great SSB reception (455 kc if). Printed circuit construction. Box 29, CQ, 300 West 43rd Street, N. Y. 36.

FOR SALE (contd)

FOR SALE: Authentic looking PRESS CARDS for sophisticated funsters. Will really make you feel important. Lots of fun and always good for a gag! Better order more than one . . . everyone who sees it will want one. \$1.00 ea. 6 for \$5.00. (With name filled in, and laminated in lifetime plastic, \$1.50, 6 for \$7.50.) Send check or M.O. to Fun Art, 676 8th Ave., New York City, N. Y.

TELETYPE Equipment. Model 12 printer in excellent working order, complete with table, power connectors, typing unit, keyboard, top, \$50. Auto-start control unit and converter, the most elaborate type, with audio generator, polar relays, etc., \$100. Typing perforator for tape punching, \$60. Tape sending unit with distributor and power supply, \$80. Test generator with synchronous motor and distributor, \$35. Box 19, CQ, 300 West 43rd Street, N. Y. 36.

BINOCULARS, 7x50 prism type. Made by expert optical craftsmen in Japan. Prisms and coated lens are the utmost in precision. Genuine pigskin carrying case with straps included. Indiv. focus, \$19.25. Center focus, \$22.75. Add 10% F.E. Tax and 50¢ postage. Ramson, 9905 63rd Road, Rego Park, New York.

MERCURY TURNSTILE: a horizontally polarized omnidirectional mobile or fixed antenna. "The most for two meter mobile." \$3.95. Mercury Enterprises, Box 273C, Granby, Connecticut.

ALUMINUM for every ham need. Write to Dick's, Cherry Avenue, Route 1, Tiffin, Ohio for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

GLOBE CHIEF "90" \$29.95 GUARANTEED perfect. Gil Severns W6QR, Hemet, California.

FOR SALE: Collins 51J3 with Vernier knob, mint condition, \$750. Central Model B Slicer \$79. Model MM2 RF analyzer \$90. Johnson kilowatt with desk. New, never used, \$1,350. Pacemaker, \$350. Ranger, \$195. Simpson Model 479 T.V. FM signal generator, new \$195. Mosley VPA 20-3 (20 meter shortbeam) \$25. Eldico phone patch TFP-1 \$55. Tecraft 2 meter converter with preamp and power supply \$27. Gonset 2 meter communicator III \$205. Sidney Gogel, 1096 Laux Place. NO. Bellmore, L.I., N. Y. Sunset 5-6876.

SILVER PLATE tank coils, loading coils, microwave fixtures. "Century Silverplate" chemically deposits pure silver on copper or brass upon contact. Brush or wipe on. Plates steel by electrolysis. Silver provides ultimate in "skin" conductivity. Ounce bottle \$1.50. Black River Electronic Specialties Co., 313 Longford Avenue, Elyria, Ohio.

FOR SALE: HT32 \$525.00 never used only tested will consider taking DX100 Apache or Ranger in trade. W. E. Brownfield, 2424 SW Sheffield St., Portland 1, Oregon.

DX-20 \$29.95. GUARANTEED perfect. Gil Severns, W6QR, Hemet, California.

TG-7B PRINTERS (model 15). Excellent Condition: weather keyboard, synchronous motor, \$175.00; communications, governed motor, \$165.00. Also have: BE77A line units; polar relays. Daniel Castrodale, W9WFN, 6312 Wolf Road, La Grange, Illinois.

DESK CALL-plates Plastic Black or colors 1 3/4" x 8" only \$1.00 PP. Polished Brass Nameplate 1" x 3 1/2" only \$1.00 PP. Bill Clinchard, 120 Ellis Avenue, Jackson 9, Miss.

RCA type AVTG-200X Airport Traffic Control VHF Transmitter. Crystal Controlled 100-156 Mc. Rated 50 watts output into ohm load. New, unused, with remote control panel tubes, and instruction manuals, \$395.00. Collins R-388/URR military version of 51J receiver. Like new condition with both dustcover for rack mounting, and cabinet. Excellent calibration and operating condition \$650.00. Electro-Mechanical 60 cy., 1 ph. Line voltage regulators made by Western Electric Co. for U.S. Navy. Steady 115c output at 22 amperes from varying 100 to 130v. line. Only \$98.50 in original cases. Quantity limited. Write for descriptive circular. Electronicraft, Box 399, Mt. Kisco, N. Y.

BC779 Super pros guaranteed to perform. \$74.50 each. GIZMOS & SUCH, Still River, Mass.

● HIGHEST QUALITY ● TOP BRAND - NAMES ONLY ●
BOXED ● LOWEST, SENSIBLE PRICES ● GUARANTEED ●
FAST, EFFICIENT SERVICE U. S. A. AND EXPORT

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0A2	.70	6AF4	1.45	6T8	1.15	401A	1.50
0A3	.80	6AG5	.65	6V6GT	.75	403A	.90
0B2	.65	6AG7	.95	6W4GT	.85	403B	2.40
0C3	.70	6AH4GT	1.05	6W6GT	1.00	404A	8.60
0D3	.60	6AH6	1.40	6X4	.60	407A	2.95
0Z4	.65	6AK4	1.50	6X5GT	.70	408A	1.75
1A7GT	.90	6AK5	.75	6X8	1.10	417A	8.00
1B3GT	1.00	6AL5	.65	6Y6G	1.00	420A	6.75
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1R5	.80	6AM8	1.15	8AW8A	1.40	446A	.50
1S4	.80	6AN5	2.00	8CG7	.90	450-TL	43.00
1S5	.70	6AN8	1.20	8CM7	.90	673	11.50
1U4	.50	6AQ5	.65	12A6	.40	703A	.75
1U5	.75	6AR6	1.00	12AE6	.65	717A	.20
1V2	.65	6AS7G	3.25	12AD6	.75	723A/B	5.00
1X2B	1.10	6AS8	1.15	12AT6	.70	803	1.50
1Z2	1.30	6AT6	.50	12AT7	.85	805	3.50
2C39A	9.00	6AT8	1.15	12AU6	.75	806	7.00
2C40	5.50	6AU4GT	1.15	12AU7	.85	807	1.15
2C43	6.50	6AU5GT	1.50	12AV7	1.10	807W	1.25
2C51	2.00	6AU6	.75	12AX4GT	.95	809	3.00
2D21	.65	6AU8	1.20	12AX7	.85	811	3.50
2E22	1.75	6AV6	.60	12AY7	1.25	811A	5.50
2E24	1.90	6AW8	1.25	12B4A	.90	812A	5.50
2E25	2.50	6AX4GT	.90	12BA6	.70	813	8.50
2E26	3.40	6AX5GT	1.05	12BE6	.75	814	2.00
2E30	1.70	6B4G	3.50	12BH7A	1.05	815	3.00
2E35	1.50	6BA6	.70	12BK5	1.20	816	2.25
2K25	9.95	6BC4	1.80	12BQ6GTB	1.55	826	.50
2K26	34.00	6BC5	.80	12BY7A	1.00	829-B	8.00
2K28	30.00	6BC8	1.40	12BZ7	1.05	830-B	.25
2X2	.25	6BE6	.75	12CU5	.85	832	3.75
3A3	1.10	6BG6G	2.25	12CU6	1.55	832-A	7.00
3A4	.70	6BH6	.75	12DQ6	1.55	837	1.00
3A5	.75	6BJ6	.70	12SA7GT	.95	838	1.00
3AP1	3.50	6BJ7	1.00	12SC7	.85	866A	1.50
3AL5	.65	6BK4	2.50	12SK7GT	.95	872-A	1.25
3AU6	.75	6BK5	1.10	12SL7	.75	879/2X2	.25
3AV6	.60	6BK7A	1.15	12SN7GT	.90	884	.70
3B4	2.25	6BL7GT	1.35	12SQ7GT	.85	885	1.00
3B28	3.50	6BN4	.85	12SR7	.65	889A	75.00
3BE6	.85	6BN6	1.00	12V6GT	.75	918	.85
3BC5	.85	6BQ6GT	1.50	12W6GT	1.00	954	.10
3BN6	1.00	6BQ7A	1.35	12X4	.60	955	.20
3BP1	1.50	6BS8	1.45	15R	.20	957	.20
3BU8	.95	6BU8	1.00	FG17	5.00	958-A	.25
3BY6	.85	6BX7GT	1.35	19AU4	1.20	991/NE16	.15
3BZ6	.85	6BY5G	1.15	19BG6G	2.25	1613	1.50
3C24	3.50	6BY6	.80	KY21A	22.50	1614	2.75
3CB6	.85	6BY8	.90	RX21A	21.00	1616	.60
3CF6	.90	6BZ6	.80	24G/3C24	3.50	1619	.17
3CS6	.85	6BZ7	1.40	25AX4GT	1.05	1625	.20
3D23	3.95	6BZ8	1.60	25BK5	1.25	1626	.15
3DT6	.80	6C4	.45	25BQ6GT	1.55	1629	.30
3E29	6.00	6C6	.75	25CD6GA	2.00	1635	2.00
3S4	.85	6C21	10.00	25CU6	1.60	1654	1.70
3V4	.85	6CB5	2.75	25L6GT	.70	1852	.75
4-65A	13.50	6CB6	.80	25W4GT	.95	2013	.50
4-125A	27.50	6CD6G	2.25	25Z5	.65	2014	.50
4-250A	34.00	6CF6	.90	FG27A	7.50	2050	1.25
4X150A	7.00	6CG7	.85	FG32	4.50	ZB-3200	45.00
4BC8	1.40	6CG8	1.10	35A5	1.00	5516	7.00
4BQ7A	1.40	6CL6	1.30	35B5	.90	5517	.70
4BS8	1.35	6CM6	.90	35C5	.75	5528	4.00
4BU8	1.20	6CN7	.85	35L6	.85	5557	5.00
4BZ7	1.40	6CS6	.85	35TG	1.75	5558	4.00
4C35	13.50	6CU5	.90	35W4	.50	5559	5.00
5ADP7	17.00	6CU6	1.50	35Y4	.80	5588	35.00
5AM8	1.15	6D6	.75	35Z5	.65	5636	2.25
5AN8	1.25	6DE6	.85	50A5	1.10	5637	2.50
5AQ5	.75	6DT6	.85	50B5	.90	5638	2.50
5AS8	1.20	6DQ6	1.55	50C5	.75	5639	2.95
5AT8	1.15	6F4	2.25	50L6GT	.85	5642	1.50
5AW4	1.25	6F6	.90	RKR-72	.25	5651	1.00
5BK7	1.20	6F7	.95	80	.85	5654	1.50
5BP4	3.00	6F8	1.25	81	1.75	5656	3.00
5BQ7	1.40	6H6	.45	83	1.35	5667	75.00
5C22	18.00	6J4	1.00	100-TH	9.50	5670	1.00
5CG8	1.15	6J5GT	.55	117Z23	.85	5687	1.50
5JPI	4.00	6J6	.50	VXR130	1.00	5691	4.50
5J6	1.00	6K6GT	.80	4X150A	7.00	5692	4.95
5LP1	7.00	6K7	.75	274B	.40	5693	4.50
5R4GY	1.00	6K8	1.00	GL-299	1.00	5703	1.00
5RPIA	12.00	6L6	2.00	307A	.50	5704	1.00
5T4	1.10	6S4	.75	311A	3.50	5718	1.00
5T8	1.20	6SA7GT	1.05	316A	.20	5719	1.00
5U4GB	.75	6SC7	1.05	339A	5.95	5725	1.00
5U8	1.15	6SJ7	.75	350A	2.00	5726	.70
5W4GT	.90	6SK7GT	.90	350B	1.50	5727	1.50
5Y3GT	.60	6SL7GT	.90	355A	7.00	5736	85.00
5Z4	1.25	6SN7GT	.70	357A	15.00	5744	.80
6A7	1.00	6SN7GTB	.90	371B	1.00	5749	.85
6AB4	.60	6SQ7GT	.85	394A	3.00	5750	1.75
6AC7	.75	6T4	1.30	396A	2.00	5751	1.35

AND OTHERS — WRITE!

Guarantee for cost of mdse only—Receiving Tubes Guaranteed 90 days from receipt. Transmitting and Special Purpose Tubes: 30 days from receipt. Cartons and Stackers always in stock—order or write! See TERMS on other BARRY AD on opposite page of this issue.

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CORP.

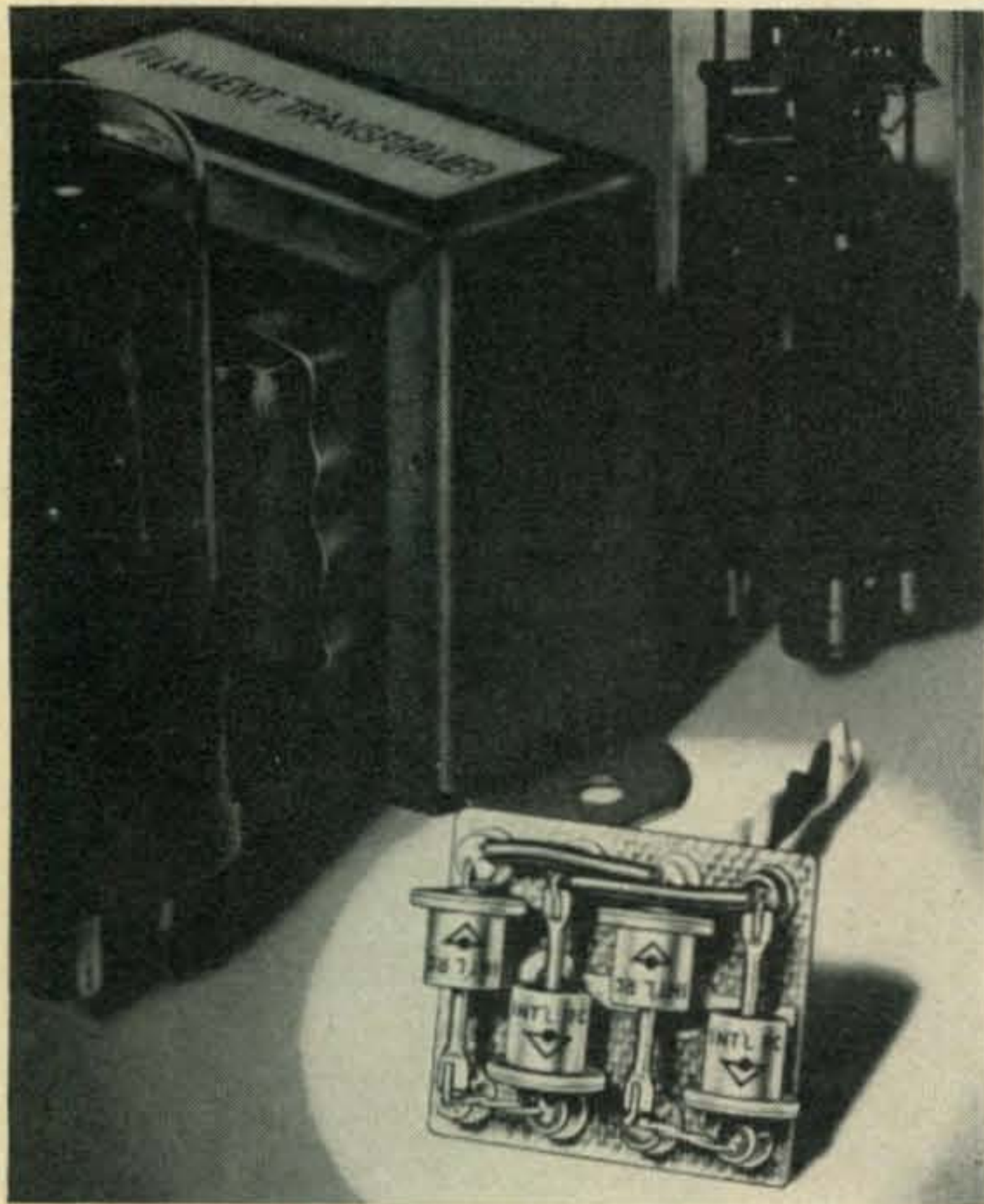
512 Broadway, Dept. 4C, N. Y. 12, N. Y.

Phone: Walker 5-7000

For further information, check number 46 on page 126.

SEMI CONDUCTORS [from page 86]

Alpha cut-off is in the vicinity of 1000 mc (no fooling!). Although these units are available for experimental work, the price is in the \$100 range. A production speed-up should yank the price down sharply, in the near future. See you on two meters.



Introducing Internationals' new packaged bridge rectifiers. Other circuit configurations including half-wave, center-tap doubler, and full-wave rectifiers are available on request.

You can now purchase the 1N1763 and 1N1764 silicon rectifiers (described in an earlier column) at your RCA distributor. These units have a 400 and 500 *piv* rating respectively. Write RCA at Somerville, N. J. for data sheets.

The RCA 2N1010 is a natural for Amateur speech amplifier applications. This transistor is designed for lo-level audio (phono cartridges, tape recorders, etc.) 1st amplification stage. The noise factor is only 5 *db* with 15 *kc* bandwidth! Data sheet available.

RCA has opened a new semiconductor facility in Findlay, Ohio, and the first transistor rolled off the production line on Feb. 5, 1959. The Findlay plant will turn out several different transistors designed for radio and phono applications. Later on, auto radio transistors will be made there also.

Sylvania Electric is now packaging diodes in an all glass enclosure with max. dimensions of .265" L and .105" D.

That's it for this month, be sure to watch next month for that xtal controlled two meter transmitter circuit.

73, Don, W6TNS

FOR SALE (Con't.)

CONNECTICUT HAMS Surplus Store Receivers—Transmitters—Parts. Hi-Mu Electronics, 135 Hamilton Street, New Haven.

35TG tubes while they last \$3.85 each. All tubes are new (Jan.) in original cartons. High efficiency all bands. Chalmer Klink, Box 509, Verona, Ohio.

Cleaning out all odds and ends SCR522 Complete Used \$30.00. BC-645 New Originally \$30.00—General Electric YRS-1 New Originally \$50.00—Collins 32RA Transmitter Used \$50.00. Many other items, Transmitters, National parts, Odds and Ends. Send for list W2EUZ, 721 Carroll, Teaneck, N. J.

FOR SALE: SX-24 want \$50. Wanted VX-1 and BC-1000. A. B. Reynolds, 55 Lake Street, Hamden, Conn.

CANADIANS: DX-20 used 3 months. Excellent. Has antenna relay. Reasonable. John Riddell, Newton, Ontario.

SELL: HRO60T with matching speaker. Mint condition and in original cartons. A, B, C, D, Coils and 100/1000 kc Crystal Calibrator. \$450.00. M. W. Roscoe, 1880 18th Street, East Moline, Illinois.

SELL: Valiant \$290.00, Viking II Wi VFO \$190.00. Both factory wired Exe, FOB—Col. Sears, 4725 Bridle-Trail, Santa Rosa, California.

NC300, excellent, first money order or check for \$275.00 takes it. Walter Tilleman, DL4WG Bendix Depot, Hq. 501st Taconwig APO 12, New York.

NEW BC-348Q Converted to AC with built-in power supply. Make offer. W7JUR, Box 118, Saratoga Springs, New York.

BARGAINS—NEW GUARANTEE: Rotobrake \$49.50; Gonset 30-40 mc FM tuner \$39.50; P-H LA400 linear \$99.50; P400GG linear \$159.00; BC610 with tuner \$425.00; Gonset 500W linear \$199.50; Elenco 77 SSB \$375.00; Elenco PA400 linear \$99.00; KWM-1 demo \$775.00; James C1450 \$49.50; DX-35 \$42.50; Scout 680 \$84.50; LA-1 linear \$89.95; NC183D \$319.00; NC300 \$299.00; S53A \$69.95; NC98 \$119.00; Globe Chief 90 \$44.50; Globe Champ 300A \$399.00; King 500 \$425.00; HT33 linear new Demo \$595.00; HT31 linear \$289.00; Morrow MAH-B \$399.00; "Q" Multipliers \$8.95; test and audio equipment, inquire. Trial, terms, write Leo, W0GFQ—Box 811 World Radio Laboratories, Council Bluffs, Iowa.

EASY PATCH. Excellent for AM superb voice control for single side band. One patch—one price. \$24.95. Duo Dens prod. Suite 101, 317 S. State Ann Arbor, Mich.

BRAND NEW, unopened TAPETONE XC-50-C4 six meter converter for Collins 75-A-4. \$50.00. Larry Kleber, K9LKA, Belvidere, Illinois.

FOR SALE: Brand New Complete SCR-528 Set includes Transmitter, Receiver, Mounting—the works. No reasonable offer refused. Mr. J. G. Pytal, 45 Sindle Avenue, Little Falls, New Jersey.

MOBILE HAMS: Stop generator whine—silence ignition noise, regulator clicks—\$5.25 postpaid—15 minute installation. Specify frequency. Ignition Kit, 19 Salem St., Cos Cob, Conn.

BURGLAR CAR ALARM: no more stolen transmitters—receivers: best protection against auto thieves: guaranteed postpaid \$10.00. Mandel, 1701 Albermarle Rd., Bklyn.

FOR SALE: Harvey Wells TBS-50-P transmitter, APS-50 power supply, National NC-200 receiver with speaker. Best offer. Ex WN9JXQ, H. Stinespring Rt. 1, Box 767, McHenry, Illinois.

FOR SALE: Gonset Communicator III, 6 Meters with manual, in original box in new condition complete with mike and crystals \$225.00. HQ 140X also in new condition with manual \$180. Ray Barker, W3EBB, 435 Old Fort Road, King of Prussia, Penna.

HQ-129-X with speaker and calibrator, \$130. Knight VFO, \$25. Heath LG-1, \$25. Viking FF7 R-LP, RP6A, 20 reels tape, \$125. FOB, W0MLK, 306 North Cascade, Colorado Springs, Colorado.

RADIO SHACK SPECIALS

TRANSISTORIZED MOBILE POWER SUPPLIES



Model
CA-1252-10

ENJOY THESE ADVANTAGES!

- Highest Efficiency . . . conserves battery power.
- Mechanically and electrically quiet. No arcing—No pitted contacts—No radio interference.
- Instant starting . . . Reliable for immediate response, such as push to talk operation.
- Rugged . . . no tubes. Remarkably shock resistant. Maintenance-free. Unaffected by moisture or vibration.
- Compact size . . . high power capacities for size and weight of unit. More watts per ounce.
- Steady DC output . . . Low ripple voltage (0.4%).
- Heavy aluminum chassis and perforated cover dissipate heat.
- Overall dimensions— $3\frac{3}{8}'' \times 4\frac{1}{8}'' \times 2\frac{1}{2}''$ high. Weight—approximately $1\frac{1}{2}$ lbs. (Model IA-1260-10 slightly larger and heavier).

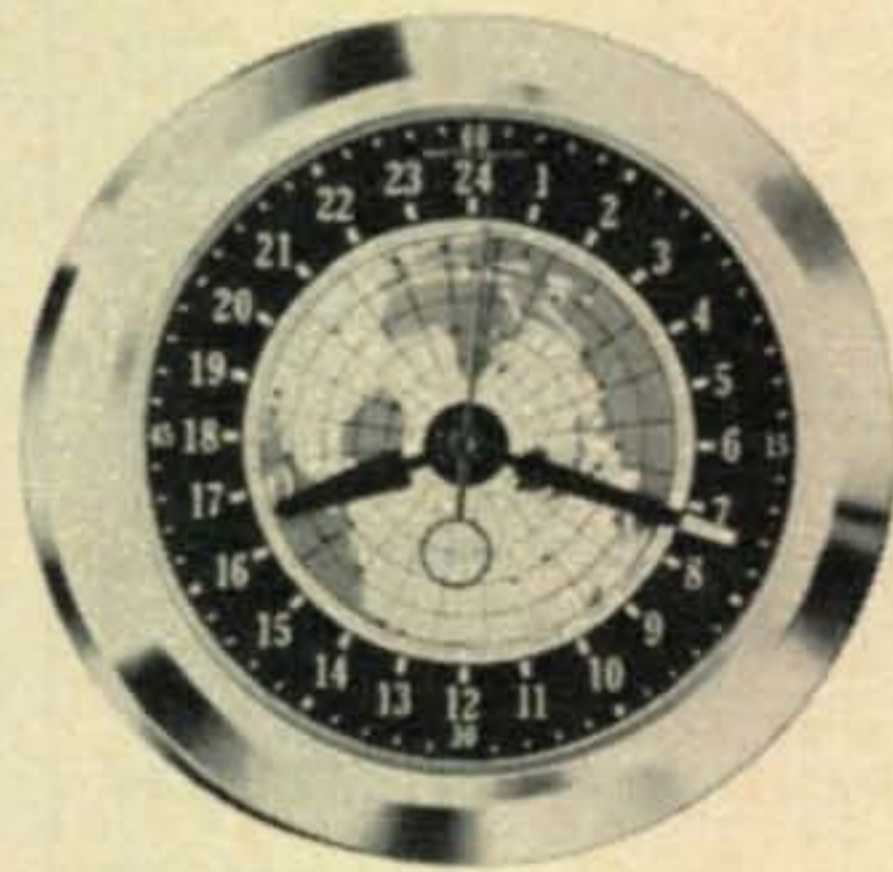
MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
CA-1231-10	12.6 V.D.C.	300/150 V.D.C.	330/400 M.A.
CA-1252-10	12.6 V.D.C.	500/250 V.D.C.	200/400 M.A.
IA-1260-10	12.6 V.D.C.	117 V.D.C.	100W—60 CYC.

Radio Shack hams extend a cordial invitation to visit our booth at the New England Ham Convention at the New Ocean House, Swampscott, Mass., on May 17, 1959.

RADIO SHACK CORPORATION

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- 167 Washington Street, Boston 8, Mass.
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The Sensational New 24-Hour World Clock



Priced
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- South Polar Projection Time Map with Dial!
- Electric! Chrome Finish!
- Big 8-inch Diameter Size!
- Lowest Priced Top Quality 24-hour Clock!

RADIO SHACK will fill your order immediately from stock for this great 24-hour world electric wall clock. At a single glance you can tell the correct time anyplace in the world! Large 24-hour, chrome-plated metal wall clock features an inner dial with the South Polar projection world map. Polar Projection dial can be adjusted for various time zones. All metal case and dial. Self-starting. U/L approved. Ship. weight $1\frac{1}{2}$ lbs. Order by mail TODAY!

RADIO SHACK CORPORATION Dept. 4C
730 Commonwealth Avenue, Boston 17, Mass.

Please send me:

Cat. No.	Model	Price
<input type="checkbox"/> 45DX791	Clock	\$ 8.47
<input type="checkbox"/> 45DX746	CA-1231-10	49.50
<input type="checkbox"/> 45DX747	CA-1252-10	54.00
<input type="checkbox"/> 45DX748	IA-1260-10	45.00

Check Money-Order C.O.D.

Name _____

Address _____

City _____ Zone _____ State _____

For further information, check number 47 on page 126.

AN/ART-13 100 WATT TRANSMITTER



Designed to provide radio communication by voice, (MCW) or CW telegraphy. Class "B" audio modulator system capable of modulating the carrier at least 90% on voice or MCW. Incorporates automatic tuning mechanism which may be used to select any one of 11 frequencies, range 2000 KC to 18,100 KC. Frequencies 200 KC to 1500 KC range is provided by addition of oscillator O-16/ART-13A.

Excellent	\$44.95
Used, Good	\$39.50
Used, less Meter	\$29.50
O-16 Low frequency oscillator coil for ART-13.	\$9.95
Excellent	
24 Volt dynamotor for ART-13	\$14.95
R44/ARR-5—AM OR FM RECEIVER 27 to 143 MC Military Version of Hallicrafter S-27. Less	\$59.50
Power Supply, EXC.	
Less Tuning Meter	\$44.50
HI-FI HEADSET, 600 Ohm. NEW	\$7.95
HS-23—2000. Ohm Headphones. NEW	\$4.95
CD-307—Extension Cord for above	\$.97
BC-669—Six Channel Crystal Controlled, 50 Watt Radio Telephone, 1600 to 4500 KC. Ideal for boats or land station.	\$59.50
Less power supply . . . Used	
LM-20 Frequency Meter Hetrodyne, crystal calibrated. Modulated covering frequencies from 125 KC to 20,000 KC continuously. Brand New.	\$39.50
	\$59.50
LM-13 Frequency Meter. Excellent	
New	\$59.50
ID 169/APN-12. SCOPE INDICATOR complete with 7 tubes and CR tube 3 BPI. Brand New w/con-	\$12.95
version instr.	

WRITE FOR LATEST FLYER

R W ELECTRONICS

2430 S. Michigan Ave., Dept. CQ, Chicago 16, Ill.
Phone: CALumet 5-1281

For further information, check number 48 on page 126.

2, 6, 10 — Meter MOBILE EQUIPMENT

MOTOROLA, R.C.A., G.E., LINK, etc. 30-50 Mc., 152-172 Mc. Used Commercial F.M. Communications Equipment Bought & Sold. Complete two-way sets meeting F.C.C. Licensing Requirements for taxicabs, Police, Fire, etc. **\$169.00** and up.

Motorola F.M. Receivers, Double
Conversion **\$55.00** each
Motorola F.M. Transmitters..... **45.00** each

COMMUNICATIONS ASSOCIATES INC.

165 Norfolk Street
Dorchester, Mass.

FOR SALE [cont'd]

CANADA—Hallicrafter receiver SX-62A, just like new, will sell for \$300.00. Ritter, 357 Davis, Sarnia, Ontario. (DI4-4634)

Your name, address, call letters, imprinted on ball point pens. Send 50¢ for samples and prices. Julius Miller, 2070 Gr. Concourse, New York City.

MOBILE HAMS: Battery troubles. Les Hay W7JWD Rt. 1, Winlock WN, has the answer to your battery troubles. This is genuine. No gimmix.

SELL: Johnson Viking II 180 watts cw. 120 watts phone \$175. W2LPC, 51 Elmire St., Hicksville (LI), New York.

FOR SALE—WRL three element tri-bander (10-15-20). Carton has never been opened. I need the money for College. K2JSS. Kenneth E. Warner, 110-49 68th Drive, Forest Hills 75, N. Y.

DELUX CALL LETTERS: engraved, polished black phenolic laminate 2 1/8" white letters on 3 1/2" x 14" x 1/8" Blank. \$1.75 P.P. J. Mudry, W8LWW, 3701 Germaine, Cleveland 9, Ohio.

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CRYSTALS SSB FT-241-A lattice filter crystals. All channels, tested, no duds 25¢ each. Matched pairs on same frequency \$1.85. Sets of 5 fundamental crystals for "SSB Package" June 1958 QST, FT-243 \$8.45 or metal hermetic holders \$11.95. Add 5¢ per crystal for mailing. (9¢ Airmailing) Have KWM-1 conversion crystals high and low frequencies. Write for information. Bob Woods, Gilbert 8-3139, 2164 Parkway, El Monte, California.

HQ100 \$130.00 DX40 and VF-1 \$75. Excellent condition or trade all or part for good upright piano. Sy Weiner, 2025 Seagirt Avenue, Far Rockaway, N. Y.

SELL CQ—1945: January \$10.00; Feb. March, \$8.00 each; April, July, Sept. & Nov. \$5.00. (See below)

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CQ Complete 1949 \$20.00; 1950 \$18.00 (See below)

Or Consider Best offer. Complete file, 1945 thru 1958. Uzzell, 110-38 216th St., Queens Village 29, New York.

LIKE NEW—Hammarlund HQ-110 Receiver FOB Price \$195. Collins 70E-8 PTD. with dial assembly, \$45. Tunes 1.65 to 2.0 mc. Dial calibrated through 10 meters. Jim Tucker, K0CYM, Box 465, Hiawatha, Iowa.

IRE Proceedings 1956, 1957, 1958. Best offer. Thiede W2EC, 169 Buckingham Rd., West Hempstead, L. I., N. Y.

HEATHKIT MODIFIED AT-1, 40 Watts, \$25.00. Harwood Shepard Jr., 230 Owasco Rd. Auburn, N. Y.

ASSORTMENT: For \$5 or \$10 I'll make you an assortment that will more than satisfy you or your money back! Please enclose postage. Joe Morgan, Lovington, Ill.

FOR SALE: Complete amateur station, Xmtr, rcvr, Xtals, the works. Send self-addressed stamped envelope for complete list of bargains. Dan Maguire, 340 Bay Ridge Avenue, Brooklyn 20, N. Y. TE 6-1360.

FOR SALE: Gonset Communicator III for 2 meters. Inquire: Tim Lazaro, 53 St. Louis St., Worcester 7, Mass.

FOR SALE: Hart 75 Watt xmtr 160 10 meters CW \$45. Louis C. King, W3TKL, Route 2, Box 249, Seaford, Del.

FOR SALE: HRO-50 type AA coil set. Can be converted to fifteen meter type AC. Nineteen dollars. Hermann, W8TSF/4, 2518 Hawthorne, Orlando, Florida.

LOCAL SALE: Complete rig, Viking one TVI'd with Johnson VFO. Comes with spare 4D32, cardax microphone and commercial HiFi preamplifier to give extra quality audio. See and hear it in operation at home station. \$175 takes all. Al Feder, K2CUI, 336 Central Park West, New York City. PHONE AAcademy 2-7309.

SELL: HT-32, HT-33 nearly new, have been tested only. SX 100, Mark III new in sealed carton all three \$1,300.00. Andy Blumenstock, 9600 Jamaica Dr., Miami 57, Fla.

WANTED

WANTED: Sky rider Diversity receiver in new condition. Box 48, CQ Magazine, 300 W. 43rd St., N. Y. 36.

WANTED: Special purpose vacuum tubes: Klystrons, Magnetrons, Power Tubes, Lab Test Equipment: X, S, K bands, Signal generator, Slotted Lines, Aircraft Communication Equipment. I pay top prices fast! REpublic 5-0215. Bob Sanett, 2053 W. Venice Blvd., Los Angeles 6, California.

WANTED: Receivers, Transmitters, Test sets, Teletype, all types military or commercial surplus, aviation, ground, 51R3, 51R2, 17L3-4, 51V-1-2-3, ARN-14, BC348, ARN30, ARN18, 18S4, others advise condition price WE pay COD. RITCO, Box 156 Annandale, Virginia Jefferson 2-5805.

WANTED: Coil set "A" for HRO-50T. E. V. Fortmiller, W7MMC, 575 Superior S. Salem, Oregon.

WANTED: All types of communications receivers, transmitters, test equipment, teletype equipment, factory built amateur gear. Cash or trade for NEW HT-32, Valiant, Thunderbolt, SX-101, NC-303, Fisher HI-FI, etc. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (Richmond 2-0048) Store: 60 Spring St. Newport, R. I. (Viking 7-3435, Fred, W1JFF)

WANTED: TELETYPE TG-7 and Model 15 and parts, printers and reperforators, etc.; COMM'NS REC'V'RS AND XMTRS, e.g. BC-610-E, -I, BC-939A, Collins 51J, 17L3, -4; R-388 and R-390/URR; 18S-2, -3; ARN-14 and -30; APR-9, -10, ARC-21, 27, etc.; APS-31, -33; and TEST EQP'T, with TS- or I- prefix. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., N. Y. 13, N. Y.

WANTED: Sixteen MM Camera and equipment for use on another rare DX expedition this summer. Will trade ham gear. W9OKM, 1207 Oneida Street, Joliet, Illinois.

WANTED: Regency ATC-1 Amateur Band Converter. Larry Kleber, K9LKA, Belvidere, Illinois.

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WANTED: Walkie-Talkie or radio-telephones. Sell or trade 813 phone rig, home brew, handbook. McAdams, 210 Cox Avenue, Raleigh, N. C. TE 2-8123.

WANTED: Used transmitter, receivers, teletype test equipment in trade for NEW Johnson, Hammarlund, Hallicrafters, National, Fisher HI-FI, Bell, Telrex, Mosley. Write: Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (Richmond 2-0048)

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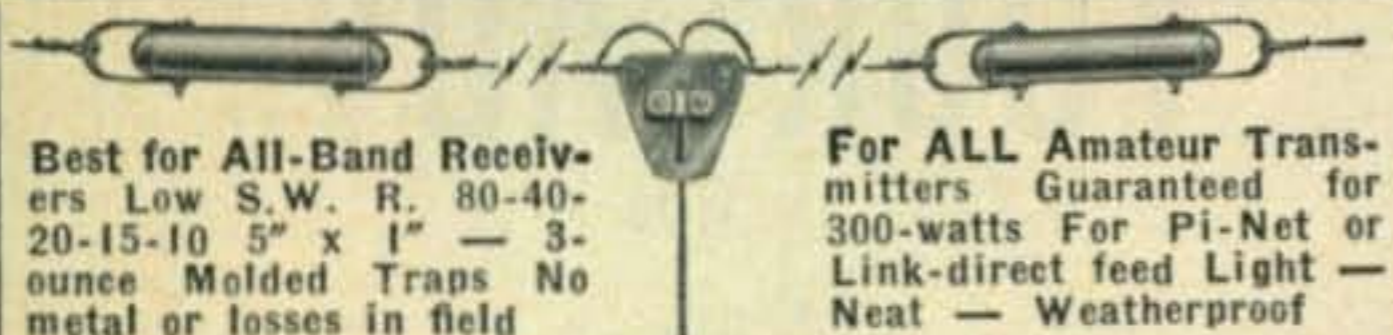
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Gospel QSL's and tracts? Samples 25¢. Sackers, W8DED, Holland, Michigan.

QSL's, Glossy cards, sparkling inks. 4 colors. 100, \$3.50. Samples 10¢. Dick W8VXK, 1018 Arthur, Mt. Pleasant, Michigan.

QSL's, SWL's, stationary. Samples, .05¢. Nicholas & Son Printery, P. O. Box 11184, Phoenix, Arizona.

QSL's: Samples, stamp. Eugene Wiener, New Munich, Minnesota.

SWAP OR SELL

RADIO MAGAZINES. Buy, sell, trade. Bob Farmer, Plainview, Texas.

TRADE \$125 telescope 3.4" refractor, accessories on good receiver or other ham gear. Glen Byars, Box 105, Kearney, Nebraska.

SWAP Leica Camera and Martin D-18 Guitar for ham gear or ancient radio gear. Paul Giganti, W6GVY.

MISCELLANEOUS

FIFTH ANNUAL Syracuse VHF Roundup, October 10, 1959.

HUMOROUS BOOK JACKETS: "Three Band Interlace for the Well Dressed Ham", "Propagation Without Sex". 6 titles on each jacket 50¢. 5 sets available for \$2.00. Fun Art, 676 8th Avenue, NYC.

DECORATE YOUR CAR WINDSHIELD WITH YOUR CALL LETTERS. Attractive 1" letters and numbers available in gold or black. Complete single set 75¢, two sets for \$1.25. Include name, call, address and color preference. Money refunded upon return of unused decals if not satisfied. All orders must be prepaid. Send to Box RJ, c/o CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

HAM Licenses, resident courses, 3 evenings weekly. Prepare for Novice Class in 4 weeks. General class in 2 months. Delehanty Institute, 117 East 11th St., New York 3, N. Y. GR 3-6900.

TREASURE: Privateer Jean LaFitte buried his treasure on Galveston Island south of the Republic of Texas. Treasure hunters will gather on June 19. Data and information available Box 73, Route 1, Galveston.

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ning from April 4 1500 GMT to April 5 1700 GMT. Operation is on cw and phone. Their National Field Day is from June 6, 1700 GMT, for 24 hours, and on cw only. Portable equipment is to be used and no commercial power source is permissible.

Would you care to find out exactly what makes the LORAN system work? This does not exactly pertain to amateur radio, but it is just one of the articles in the magazine "Radio", published in Moscow. The December 1958 issue of this magazine for the Russian amateur gives the data for a recently introduced miniature triode (6S11D) which operates up to 1,800 mc. Circuit details for a small transmitter are also given, using this tube for 1,500 mc. The article is by UA3DH. While this magazine is a general radio magazine and not specifically for the ham, they have also several other items written for and by the ham. Their editorials are however on the same "highly technical" level as the editorials of *Der Funkamateer*, referred to in the February issue of this column . . .

"Funkschau" is another overseas magazine we just started to receive. It is published in West Germany and while not specifically written for the amateur it contains a lot of interesting items also for the ham. Published every two weeks, it tends to keep one up to date with the latest electronic happenings on the continent. Some of the happenings are certainly a bit on the humorous side, like the story of the fellow from The Hague in Holland who wanted to receive distant TV stations—he uses a hydrogen-filled balloon supporting an antenna 100 feet high. Special guywires keep the beam pointed in the proper direction. We think it is a bit easier to use a tower. A construction article in the second January issue describes an antenna rotating device which utilizes the lead-in also as the control cable. No additional wires are needed. A few pages later we find a construction article for a 130 watt phone/cw transmitter, all bands, using the Gelo *vfo* unit as a basis. Under "new products" we found a rather useful item for hams who want to be sure nobody uses their station without proper authorization. It is a switch similar to a car ignition switch but much smaller, rated at 2 amperes at 250 volts. The key can only be removed in the off position. At least two European manufacturers have also started quantity production of transistors rated for up to 100 mc.

With this we have to leave you, this time for two months in as much as this column will not appear in the May issue. In June we will be back again with more about the happenings overseas.

73, Tom, K2VBI

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Crystal controlled, single channel, covers fire, police freqs. Double conversion superhet. 455 kc & 4.3 inc. IF's. Noise squeelch, double limiter stages, loud speaker output. Complete with 24 VDC vibrator supply, tubes, less crystal. Special **\$14.95**

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For further information, check number 49 on page 126.

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(W6QR)

For further information, check number 50 on page 126.

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6000/5500 L-pad, Ohmite type AB..... ½# 59¢ 2/95¢
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TRANSFORMERS . . . All have 115 volt, 60 cycle AC primaries

Filament, 6.3/22.6.3 ct/2.4.6.3/2.25.6.3 ct/0.6..... 9# \$3.29
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6.3/0.6, 2 and # KV insulation, upright shielded... 5# \$3.45
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5FP7\$1.29 ppd 5GP1\$2.45 5JP1\$2.45 ppd
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BC-1268-A radar scope with all tubes..... 100# \$6.95
10 hy/500 mil choke, 100 ohms, 2 KV RMS..... 30# \$6.95
Deleo selsyn, type II-4, C56701, 115 v, 60 eye..... 15# 2/\$17.95
Lo-pass flt, 300-2500 eye, —40 db at 3200, HS..... 4# \$1.95
BC-684 xmtr, 27-39 MC, recond Yokahama Sig Depot 50# \$7.95
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Full wave xfmr-rect combo for 24 volt DC/800 mills..... 5# \$2.59
Dynamotor, 6 volt input, 600 v/150 mills, Elcor..... 12# \$6.95
PC-610 tuning units . . . complete set \$24.95 . . . each 4# \$3.45
Bleeder resistor, 25K ohms at 160 watts..... 1# 69¢

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2X2 35¢, \$2.95/doz. 3B24 55¢, \$4.95/doz. 3C24 \$2.95
6AC7W.....85¢ 6SL7GT..... 65¢ 6SN7GT..... 55¢ 6V6GT..... 65¢
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PO BOX 6188 CCC, SACRAMENTO, CALIF.

For further information, check number 51 on page 126.

Reduced Carrier [from page 115]

that the audio output was increased.

Receiving tests made at this QTH were more convincing than the reports referred to above. Receiving W2MEF* using 600 watts of audio on a 300 watt carrier, as compared to his full carrier of 500 watts at the same audio level, was almost unbelievable. The reduced carrier operation was far superior to the full carrier condition. W2MEF was one of the first amateurs to use this method of operation with the Ultra Modulation System, and his tremendous signal on 10, 15, 20, and 40 meters is well known to many readers.

Conclusion

Straight amplitude modulation (A3) is rather inefficient, but we can overcome this inefficiency by reducing the carrier input level and increasing the sideband power. Sideband power alone, irrespective of how it is generated, is that part of the signal which conveys the intelligence to the receiver. The undesirable carrier is one of the greatest contributors to the noise and interference in most receivers. Therefore, if the carrier is reduced to a low input level, a corresponding lowered noise and interference level will be received.

Increasing the efficiency of the final amplifier by using a reduced carrier input with high audio power will correspondingly provide far greater communication effectiveness due to the increased sideband power, or "talk power" of the transmitter. The Ultra Modulation Unit makes this possible on a conventional AM transmitter. ■

* William A. Bojanowski
135 Anadale Road, Staten Island, N.Y.

SILICON CAP [from page 33]

good deal of heat without changing its temperature to any great extent. It serves as a sort of "flywheel," evening out any rapid fluctuations in temperature by virtue of its inertia or inability to be changed. A heat sink for enclosing the silicon capacitors and the temperature-compensating capacitor was fabricated from copper to the dimensions shown in the lower right-hand corner of the schematic fig. 6, and performs its functions admirably. If the heat sink is used but no other precautions are taken, the oscillator frequency will drift until the operating temperature of the unit has been reached, due not only to the silicon capacitors, but to the other circuit components as well. However, if the right amount of compensation is added the drift can be reduced nearly to zero. Tests conducted on this oscillator with compensation added disclose a temperature coefficient of 4 PPM/°C from 25°C to 85°C. This

is no mean feat when the fact that most crystals exceed this figure is considered.

The completed *vfo* is shown in the photo. This *vfo* was designed to cover the frequency range of 3.5 to 3.65 *mc*. Although any other oscillator circuit could have served the purpose, we used a tried-and-true Hartley circuit, completely conventional except for the use of silicon capacitors* in the tank circuit. The output of the *vfo* is 0.9 volts *rms* across a 10,000 ohm load, which is adequate to drive a Class A buffer stage. It must be remembered that an oscillator is designed primarily to control the frequency, and not to furnish power. The oscillator frequency was surprisingly stable with respect to changes of load impedance; changing from open-circuit to a 10K load caused a frequency shift of only 26 cycles. In accordance with accepted procedure, we made no attempt to key the oscillator stage, but keyed a buffer stage. On-the-air tests with the *vfo* controlling a 1 kw CW transmitter showed excellent results. It should be stressed that this *vfo* was not expected to be used on the air in a completed transmitter, but was built only to prove out the use of silicon capacitors in precision frequency control. A finished design should incorporate better mechanical construction, and could be made much more compact.

Although it was not attempted in this developmental version, completely linear tuning characteristics are possible with silicon capacitors, also perfect tracking is entirely feasible—much better than that attainable with ordinary variable capacitors. Any degree of bandspread may be obtained, and continuously variable bandspread is possible. It might be well to mention that any stage of a transmitter can be tuned with the use of silicon capacitors, although not necessarily with the same type as are used in this *vfo*. Capacitors with higher PIV's will be necessary in higher-powered stages.

Of course silicon capacitors may be used in receiver tuning also, and it may be that in this field they will find their widest application. Preliminary experiments in tuning a National NC-300 with silicon capacitors have met with complete success.

If you have read this far you have no doubt come to the same conclusion we have, that silicon capacitors hold forth great promise for future developments in this fascinating hobby of ours. ■

* The silicon capacitors used in this *vfo* are Type HC7005, manufactured by Hughes Products, Los Angeles, Calif. They are available at distributors around the country. The manufacturer's data curves for Type HC7005 and several other types are shown in Figs. 4A and 4B.

References:

1. Shockley, William; *Electrons and Holes in Semiconductors*; D. Van Nostrand Co., Inc., 1950.
2. Coblenz and Owens; *Transistors; Theory and Applications*; McGraw-Hill, 1955.
3. Rufus P. Turner; *Transistors—Theory and Practice*; Gernsback Publications.

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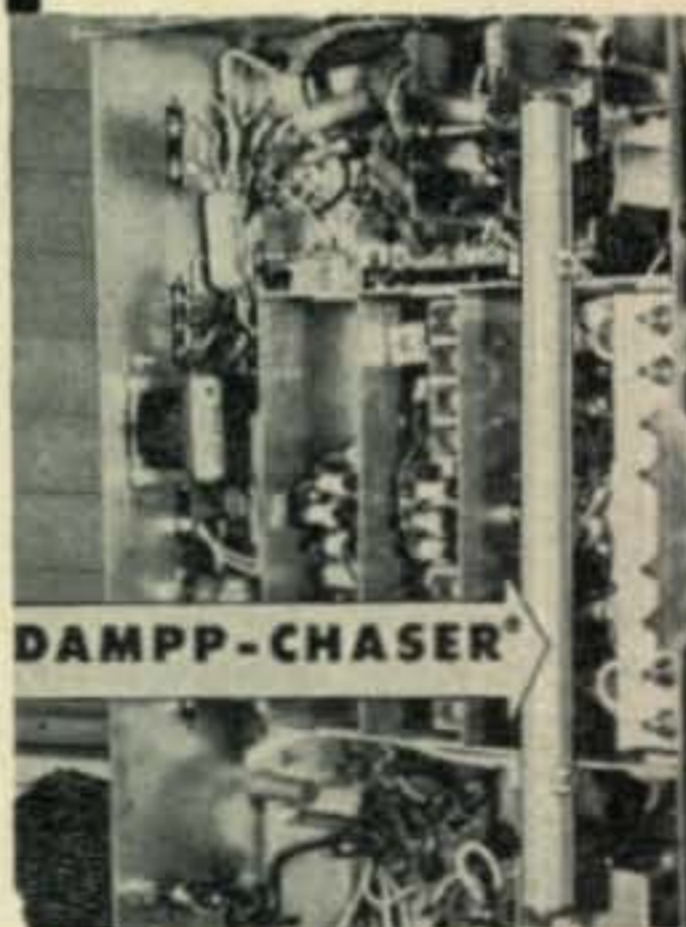
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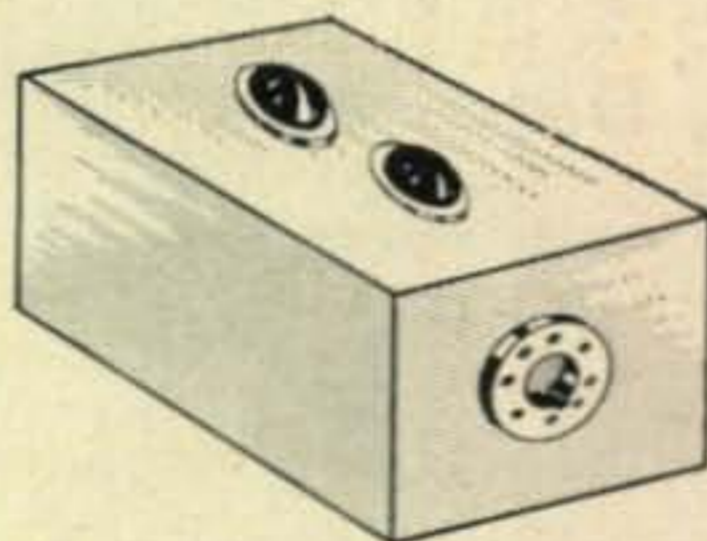
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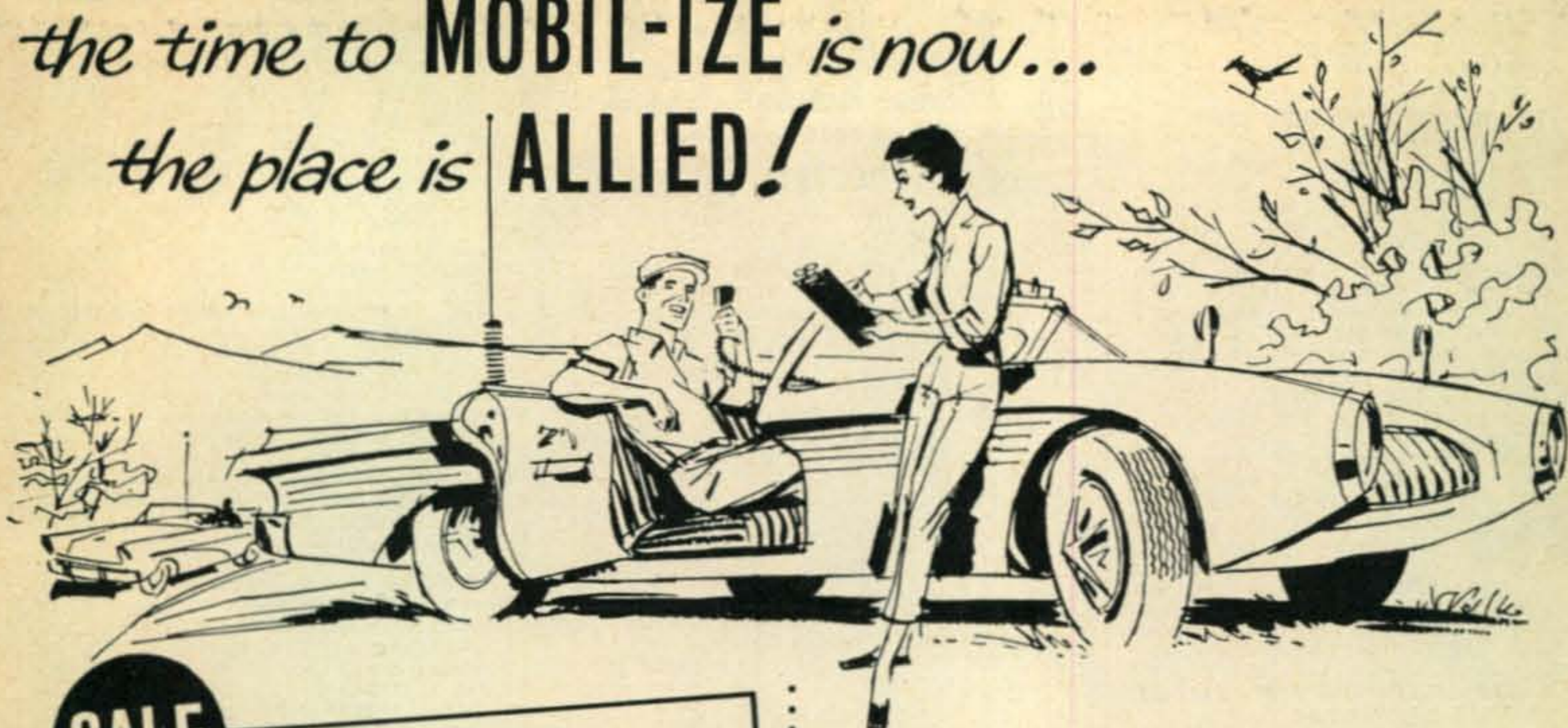
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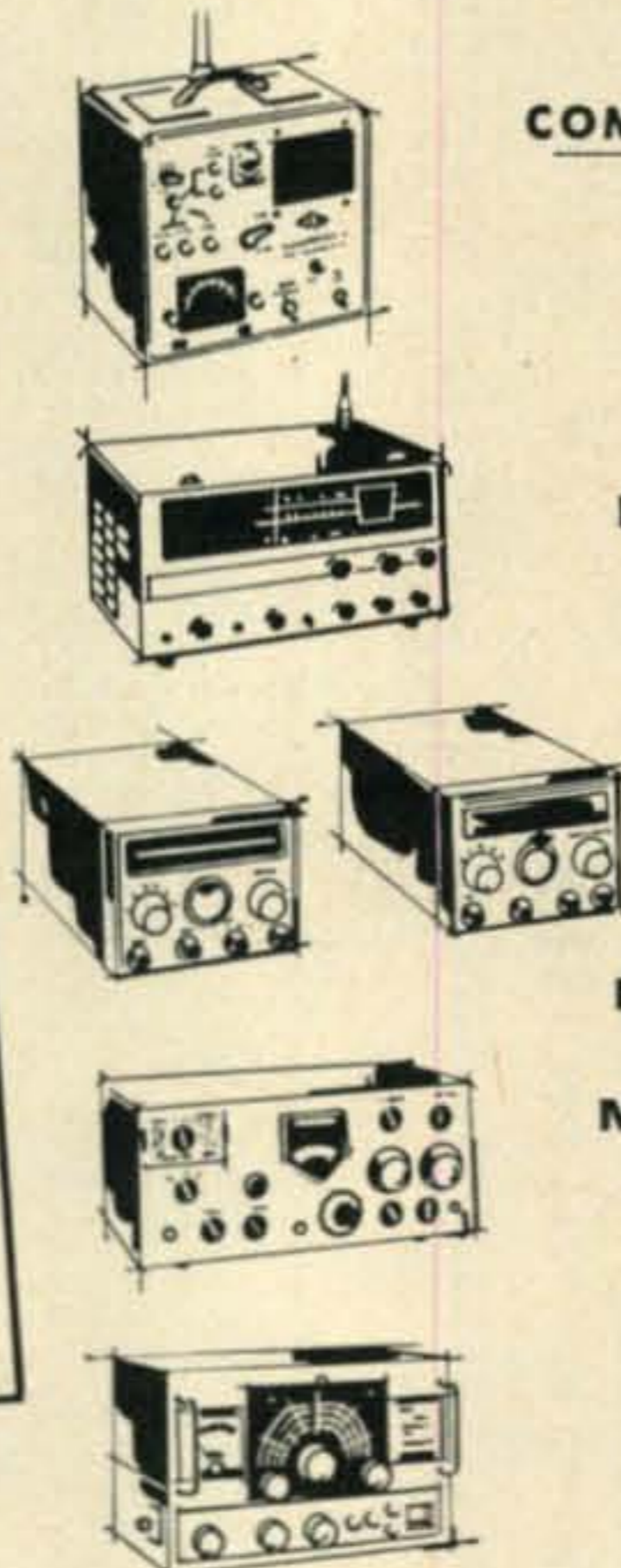
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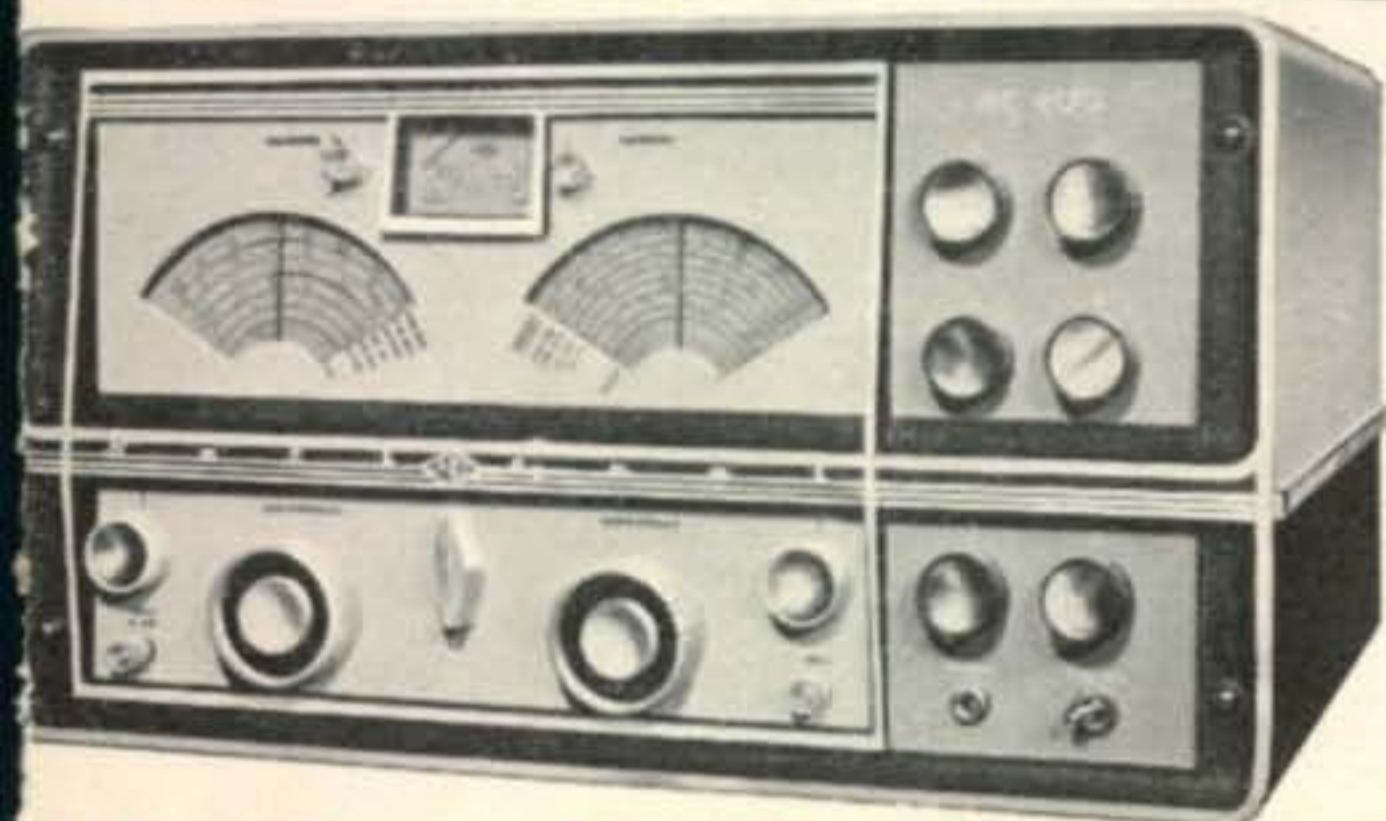
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The NC-400 is a modern, multiple purpose, general coverage receiver. Tuning range is 540 kc to 31 mc in 7 bands, with dual conversion on all frequencies above 7 mc. Its unique design provides maximum flexibility of operation to satisfy a wide variety of communications requirements.

The NC-400 may be used as a self-contained unit, either manually tuned or crystal controlled on pre-selected frequencies. In addition, external master oscillator provisions make possible use of modern synthesizer techniques for applications where extreme frequency stability is required. It may be operated in space or frequency diversity applications. Provisions are made for interconnection of any required outputs or for feed to external loads or combiners. All frequency determining circuits may be internally or externally controlled. The NC-400 also provides optimum versatility of bandwidth, either through the use of internal IF circuits or the use of optional mechanical filters.

FREQUENCY RANGE:	GENERAL COVERAGE
Band 1	.54- 1.1 MC
Band 2	1.1 - 2.1 MC
Band 3	2.1 - 4.1 MC
Band 4	4.1 - 7.0 MC
Band 5	6.9 -12.2 MC
Band 6	11.8 -20.4 MC
Band 7	19.6 -31.0 MC

NOTE: Bandsread dial provided with 0-100 logging scale and calibrated for 80, 40, 20, 15 and 10 meter amateur bands.

FREQUENCY STABILITY: Long term stability after warm-up -.002%

SENSITIVITY: 1 microvolt for 10 db signal/noise ratio

SELECTIVITY: 4, 8 and 16 kc positions provided with 6 tuned circuits. 3.5 kc wide upper and lower sideband positions provided with 14 tuned circuits. 3.5 kc sharp position activates plug-in crystal filter providing 5 additional degrees of selectivity below 3 kc plus phasing notch. Plug-in accessory available which will provide front panel selection of three mechanical filters without modification of receiver. Proper choice of filters will enable selection of bandwidths from 500 cycles to 16 kc, or will enable filter type of sideband selection from front panel.

SSB PROVISIONS: Separate SSB heterodyne detector uses pentagrid converter and separate beat oscillator. Beat oscillator may be crystal controlled. Special "fast-attack-slow release" AGC circuit. Sideband selection accomplished by exclusive, new National passband switching techniques. In the event of commercial-type SSB reception, single sideband mechanical filters may be installed and switched from front panel.

FIXED CHANNEL OPERATION: HF oscillator has 5 crystal sockets for use in fixed channel operation. Channels may be selected by front panel switch. In addition, HF oscillator may be controlled from external master oscillator selected by front panel switch. "S" meter "Tune" position permits rapid tuning of receiver to crystal controlled channel.

DIVERSITY PROVISIONS: Basic receiver may be operated from master oscillator as noted above. An accessory Diversity Modification Kit (NC-400 DMK) allows choice of internal or external control of all oscillators. Rear panel selector provisions make possible use of any receiver either as master control, or slave fed from other oscillator sources. IF, detector and AGC outputs available for feed to external loads or combiners.

POWER REQUIREMENTS: 110-220 volts, 50-60 cycles AC
MANUFACTURER'S SUGGESTED LIST PRICE: \$895.


OPTIONAL ACCESSORIES:

1. XCU-400 crystal calibrator. Output frequencies of 100 kc. and 1 mc.
2. NTS-2 matching speaker
3. NC-400 DMK diversity modification kit
4. NC-400 FH mechanical filter housing

*Manufacturer's suggested list price. Sold only by National Co. Franchised Distributors

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Famous beam power tube combination used in Globe Hi-Bander: RCA-5763 is rated to take 17 watts input CW, 15 watts 'phone; RCA-6146 is rated to take 90 watts CW, 67.5 watts 'phone. Both types are original RCA designs.

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sign—an outstanding characteristic of RCA beam power tubes—enables you to get desired power with a lot less plate voltage.

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