

April 1965

50¢

CQ

ICD



**OSCAR IS UP!
IT'S A-OKAY!**

This Month...

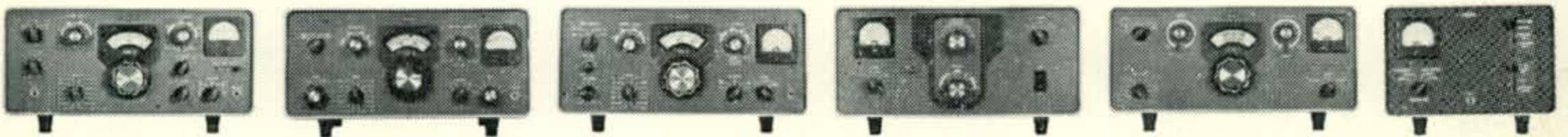
**Transceiving
with the
75A-4
and
HT-32**

The Radio Amateur's Journal

$$I - t = C$$
$$\frac{C}{x} = V$$

SIMPLE ARITHMETIC

No other equipment on the market holds its value like Collins' S/Line gear. That's one reason Collins is such a good investment. A little simple arithmetic brings home the point. Your initial investment minus trade-in value equals your cost for Collins' S/Line. Divide your cost by the number of years you keep your S/Line gear and you'll have the true value of how little it costs to own the finest. Check your Collins distributor and compare prices. Then check and compare equipment features. Collins offers you complete station compatibility; frequency stability; frequency calibration; more QSO's per kilocycle; mechanical filters; dual or single PTO control; automatic load control; negative RF feedback; light weight; distinctive simplicity and styling. Once, these features were all Collins "exclusives." Even today, Collins offers you all ten — Collins is still unexcelled. Visit your Collins distributor and see the S/Line. Then do your own simple arithmetic. Find out for yourself that it costs less to own the finest.





Edging, Rounding and Pre-dimensioning Blanks.



Plating to Frequency, with Utmost Precision.



Base-plating is an Important Process.



Baking Crystals in Oven at Elevated Temperature.

Preferred by Amateurs for More Than Thirty Years

Since 1934, amateurs everywhere have been enthusiastic about the performance of PR Crystals . . . their activity, dependability, low drift, and hair-line accuracy. These qualities are built-in by precision workmanship at every stage of manufacture. There are scores of operations from the slicing of the raw quartz crystal to the final rigid inspection. Some of these operations are shown in the photographs at left. PR Crystals are made by highly skilled craftsmen, equipped with the finest precision machinery and electronic devices. Every PR is checked by frequency meters having an accuracy of better than one part in ten million. And EVERY PR CRYSTAL IS UNCONDITIONALLY GUARANTEED.

AMATEUR TYPES



FUNDAMENTAL, PR TYPE Z-2—Frequency Ranges in Kcs.: 1,750 to 2,000 (160M) 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2-M); 8,334 to 9,000 (6M) \pm 500 Cycles. \$2.95 Net

(All Z-2 Crystals calibrated with a load capacity of 32 mmfd.)

TYPE Z-6A — Frequency Standard, .050" pins, 100 Kc. . . . \$6.95 Net



Third Overtone, PR Type Z-9A, 24,000 to 24,666, 25,000 to 27,000 Kc. \pm 3 Kc., 28,000 to 29,700 Kc. \pm 5 Kc. . . \$3.95 Net

6 Meters, Fifth Overtone, PR Type Z-9A, 50 to 54 Mc., \pm 15 Kc. . . \$4.95 Net

Citizens Band, PR Type Z-9R
Calibrated .005% \$2.95 Net
Calibrated .002% \$3.95 Net

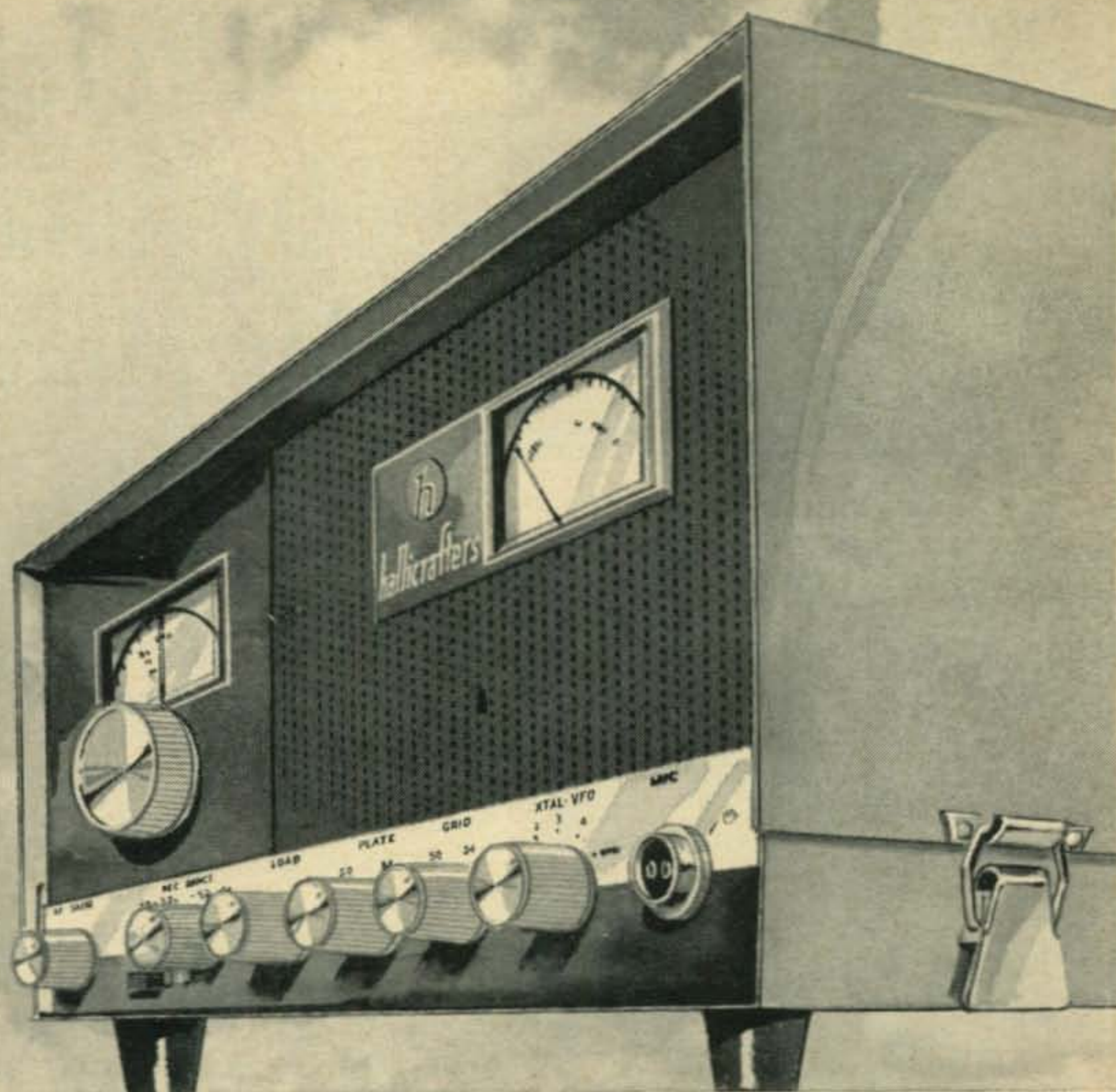
ORDER FROM YOUR JOBBER

USE **PR** AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 West Broadway, Council Bluffs, Iowa

For further information, check number 1, on page 110

*Bye
Bye
Birdie*



Efficient filters and selected injection frequencies make the NEW SR-46 and SR-42 VHF transceivers virtually immune to FM and TV interference.

Interference-free reception is only one of many advantages in the new SR-46. Complete six meter band coverage is another. Or full two meter coverage, if you prefer, in the companion SR-42 unit. Both give you double the usual bandspread, through use of dual tuning ranges. A neutralized nuvistor front end boosts sensitivity, and eleven tuned circuits increase selectivity while suppressing interference. Push to talk, of course.

Thorough field testing, before production, by hundreds of operators, assures you of years of trouble-free performance. It all adds up to your top VHF value. See the SR-46, or the SR-42, at your distributor today.

FEATURES

Frequency Coverage: 50 to 52 Mc and 52 to 54 Mc (144 to 146 Mc and 146 to 148 Mc in the SR-42). **Power Input:** 10-12 watts. **Power Supply:** 115 VAC and 12 VDC (vibrator and line cord optional extra). **Transmitter Crystals:** high frequency type; provision for four (one furnished), plus external VFO, switch-selected from front panel. **Tubes:** 10, plus zener diode oscillator control and four diodes (11 tubes, 2 zeners and four diodes in the SR-42). **"S" Meter** automatically switches to RFO. **Cabinet:** "snap-off" type for easy access. **Size:** 5½" high, 12⅛" wide, 8¼" deep. **Shipping Weight:** 17 lbs. **Amateur Net Price:** \$189.95.

New SR-46

SIX METER VHF TRANSCEIVER
and SR-42 for two meters

Export: International Div., Hallicrafters.
Canada: Gould Sales Company, Montreal, P.Q.

For further information, check number 2, on page 110

*"Quality through
Craftsmanship"*



hallicrafters

5th & Kostner Aves., Chicago, Ill. 60624



The Radio Amateur's Journal

STAFF

EDITORIAL

RICHARD A. ROSS, K2MGA
Editor

ALAN M. DORHOFFER, K2EEK
Assistant Editor

IRVING TEPPER
Technical Editor

WILFRED M. SCHERER, W2AEF
Technical Director

MARCIA HIGGINS
Editorial Assistant

CONTRIBUTING

FRANK ANZALONE, W1WY
Contest Calendar

ROBERT M. BROWN, K2ZSQ
VHF

WALT BURDINE, W8ZCV
Novice

GEORGE JACOBS, W3ASK
Propagation, Space

ALLEN KATZ, K2UYH
VHF

BYRON H. KRETZMAN, W2JTP
RTTY

A. EDWARD HOPPER, W2GT
USA-CA

URBAN LE JEUNE, W2DEC
DX

ALFRED G. SMITH, WA2TAQ
Club Forum

LOUISA B. SANDO, W5RZJ
YL

CHARLES J. SCHAUERS, W6QLV
Ham Clinic

BUSINESS

SANFORD R. COWAN
Publisher

JACK N. SCHNEIDER, WA2FPE

RICHARD A. COWAN, WA2LRO
Advertising Representatives

HAROLD WEISNER, WA2OBR
Circulation Manager

PRODUCTION

CARY L. COWAN
Production Manager

RUTH SOKOLOW
Art Director

TABLE OF CONTENTS

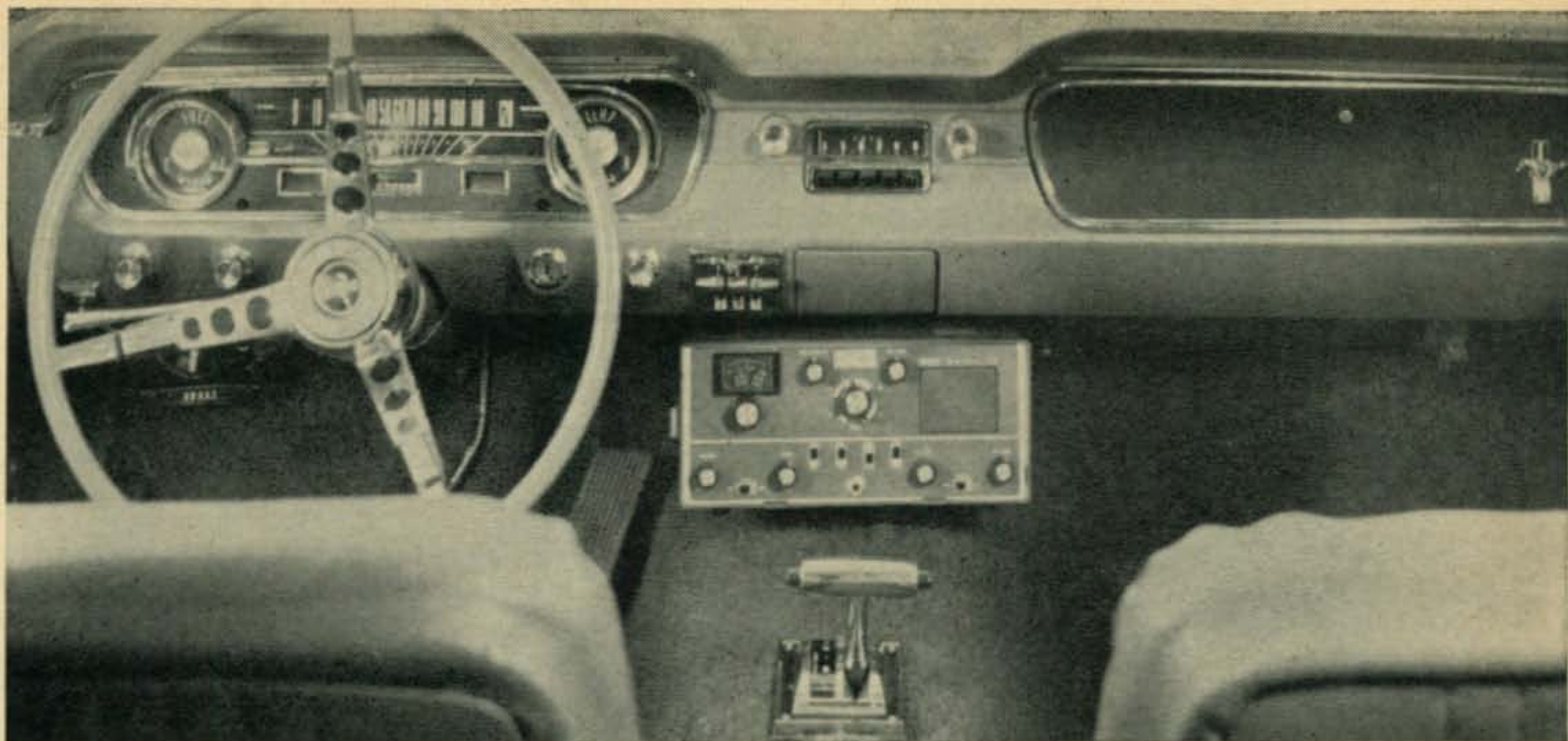
30	A 75A-4/HT-32 TRANSCEIVER	J. W. Spencer, W4HDX
32	PUTTING THE EICO 772 ON TEN	Mike Beck, K2QMM
34	CRANIUM QUERIES	
35	A COAX DUMMY LOAD FOR 200 MC AND UP	James G. Lee, W6VAT
36	LORD HOWE HOLIDAY	Graham G. Hall, VK2AGH
38	SLUG TUNED COILS	R. M. Baldwin, K4ZQR
41	ANNOUNCING THE NEW SPRING 1965 VHF CONTEST	
43	CLEAN UP YOUR SHACK!	Howard S. Pyle, W7OE
44	MODIFYING THE TH-5/TG TERMINAL UNIT	Leroy May, W5AJG/AF5AJG
45	THE POOR MAN'S FREQUENCY FINDER	Don Wennerberger, WA4PXR
46	RTTY FROM A TO Z, PART IX	Durward Tucker, W5VU
51	WHO IS DURWARD TUCKER?	Staff
51	DEVELOPING A DX VOICE.....	CQ Staff in consultation with Prof. Emil Heisseluft
55	PEOPLE AND PLACES	
56	SLIDE RULES	Wilfred M. Scherer, W2AEF
62	A C.W. MONITOR FOR GRID-BLOCK KEYED TRANSCEIVERS	Al D'Onofrio, W2PRO and Pete Stark, K2OAW

DEPARTMENTS

20	ANNOUNCEMENTS	68	PROPAGATION
25	CLUB FORUM	88	RTTY
70	CONTEST CALENDAR	72	SPACE
64	DX	78	USA-CA
82	HAM CLINIC	74	VHF
14	LETTERS	90	YL
85	NOVICE	7	ZERO BIAS

Offices: 14 Vanderventer Avenue, Port Washington, L. I., N. Y. 11050. Telephone: 516 PO 7-9080.

CQ—(Title registered U. S. Post Office) is published monthly by Cowan Publishing Corp. Second class postage paid at Port Washington and Garden City, New York. Subscription Prices: U. S. A., Canada and Mexico, one year, \$5.00; two years, \$9.00; three years, \$13.00. Pan-American and foreign add one dollar per year. Entire contents copyright 1965 by Cowan Publishing Corp. CQ does not assume responsibility for unsolicited manuscripts. Please allow six weeks for change of address. Printed in the United States of America.



1000 watts...neatly tucked in



SB2-LA Linear in trunk.



SB-3DCP Inverter in engine compartment.

SB-34 and SB-2LA combo
add up to the best KW p.e.p.
value on the market!

SB-34 Transceiver
..... 395.00

SB-2LA Linear Amp
..... 249.50

SB-3DCP Inverter
..... 249.50

The small size of the new **SB-34** four-band SSB transceiver really proves its importance when installed in the lively 1965 small cars. In fact, using only standard available SBE equipment, it's no trick at all to tuck in a complete 1000 watt p.e.p. station. Observe in the photo that the **SB-34** fits under the dash—and blends with the interior of this well-appointed car like it was specially tailored. The exceptionally compact **SB-2LA Linear Amplifier** arranges easily in a corner of the rear trunk. Happily too, the **SBE Inverter** that powers this linear finds a made-to-order—and well ventilated—mounting space in the front section of the engine compartment of this popular car. Need we mention that SB-34 has its own **built-in 12V DC and 117V AC universal power supply** thereby simplifying greatly the problem of finding mounting space in a compact car? And if you're wondering how to mount an antenna on that really snug, contoured bumper—don't. Band-spanner H-215 contour mount makes it easy, supports the short-column model of the Band-spanner "Topsider" with its KW coil.



HIGHLIGHTS: 135 watts p.e.p. input. (Slightly lower on 15). **Frequency range:** 3775-4025 kc.—7050-7300 kc.—14.1-14.35 mc.—21.2-21.45 mc. • 23 transistors, 18 diodes, 1-zener diode, 1-varactor diode, 2—6GB5's PA, 1—12DQ7 driver. **Speaker built in** (external speaker provisions). Pre-wired receptacles on rear of set accept VOX and 100 kc. calibrator—both items being optionally available. **Size:** 5" high, 11¼" wide, 10" deep. Weight, approx. 20 pounds.

SIDEBAND **SBE** ENGINEERS

317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIFORNIA

Export sales: Raytheon Company, **RAYTHEON** International Sales & Services, Lexington 73, Mass. U.S.A.

For further information, check number 4, on page 110

Here is what a Ham thinks about the new 6 meter base station antenna . . .

"I do a lot of 6 meter work since I act as net control for the Michigan, Ohio, Pennsylvania SSB Net and in addition, stations from other midwestern and eastern states check in. My 10 element commercial beam with a 24' boom has met with several accidents due to high winds."

"Recently, I purchased and installed your new Coveya-6 beam antenna. To make a comparison with my previous 10 element beam I went on the air without revealing the change. You'll be glad to know that the results surpassed the performance of 10 element beam and besides, I obtained these additional advantages:

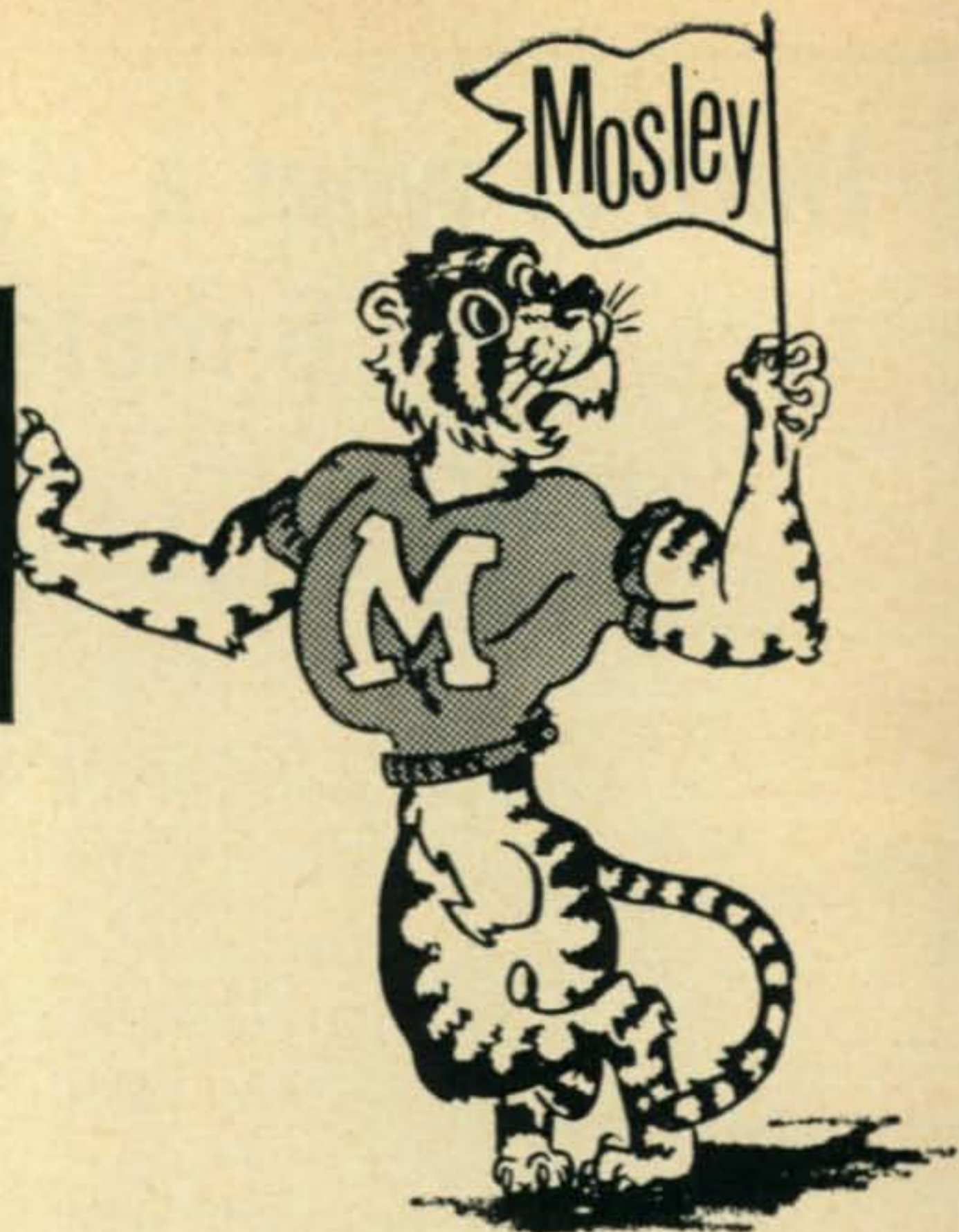
1. Better front to back ratio for receiving — at least 25 DB.
2. An improved forward pattern.
3. Much wider coverage of forward pattern on transmit, thus eliminating moving the antenna often.
4. Very low VSWR — 1.1 to 1 across entire band.
5. Completely weatherproofed assembly making weatherproofing spray unnecessary."

"My greatest satisfaction was the ability of the Coveya-6 to reach out and get the long distance ground wave stations. All comparison checks in the log book were very favorable to the Coveya-6."

Elmer D. Sauers, WA8AUZ, Akron, Ohio

this is just one of numerous favorable comments we received about our COVEYA-"6" see it at your distributors or write for literature

"The Home of Originals" **NEW-TRONICS CORPORATION**
3455 Vega Avenue Cleveland, Ohio 44113



Tig-Array

Three Cheers For That Mosley "TIGER" Of A Signal!

You'll feel like cheering when you punch through that QRM on 10, 15, and 20 with the new Tig-Array MP-33 - a direct descendent of the world famous TA-33. This antenna produces those 5-9++ reports!

The Tig-Array is a medium priced antenna rated for medium power, 750 watts on AM and CW or 2 KW PEP (input to the final amplifier), with the same famous Mosley quality construction throughout! Features VSWR - 1.5/1 or better, feed point 50 ohms, forward gain - up to 8 db. and a front-to-back ratio of 20 db.

net price \$82.91

TIG-ARRAY FOR 40 METER OPERATION.

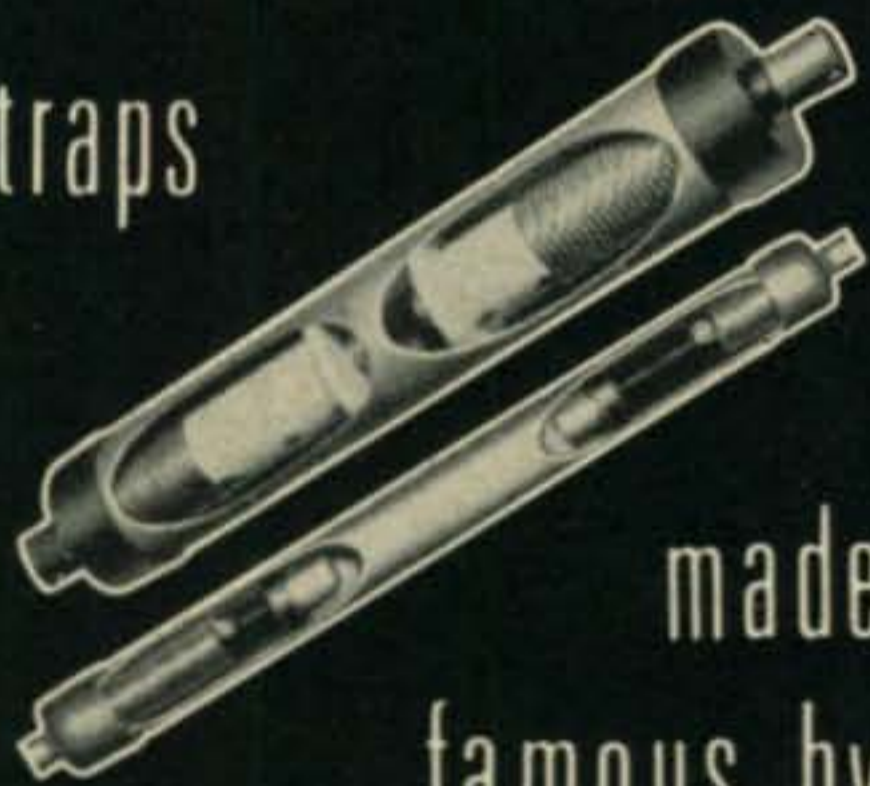
The Tig-Array can be easily modified for operation on 40 without affecting the operation of the MP-33 on 10, 15, and 20. The Conversion Kit, called the TA-40KR, enables the Tig-Array's radiating element to operate as a rotatable dipole. The power rating on 40 meters is 1000 watts AM or CW and 2000 watts P.E.P. on SSB (input to final amplifier).

net price \$44.79

Electronics Inc.

4610 N. LINDBERGH BLVD. - BRIDGETON, MO. 63044

Features the Mosley
all-metal enclosed
traps



made
famous by
TA-33 & TA-33 Jr.
antennas

ASK YOUR DEALER FOR FULL
SPECIFICATIONS OR WRITE...

MOSLEY

For further information, check number 6, on page 110



ZERO BIAS

OSCAR III is in Orbit!

Initial parameters: 103 minute orbital period, 70 inclination, almost circular pattern about 600 statute miles above the earth, the maximum visibility between pairs of stations 3500 miles. After first few passes both telemetry transmitters are working OK. At this time the 10th orbit has been completed. No confirmed report of 2-way QSO's yet. K9AAJ reports receiving KL7CUH on the 9th pass. Bill Brady, ex-W2ABP reports hearing HB9RF on passes 8, 9, 10, at his QTH in Selsey, England, on the channel. Everything so far is OK and the complete story to follow for next month.—W3ASK

WE'RE pleased to be able to bring you this month the full text of the FCC's order concerning the application of Public Law 88-313, (Reciprocal Privileges for alien amateur radio operators). The order (see page 22) spells out quite clearly the proper procedure to be followed by a foreign amateur wishing to operate in the U.S.

Things seem to be speeding up a bit regarding the establishment of the necessary bilateral licensing agreements. We are informed that some 28 countries are involved in some stage of negotiations, and as we go to press, word is received that the required agreement has been reached with the Dominican Republic, effective March 29. This brings the grand total of bilateral agreements to two! But, it *is* two more than only half a year ago.

In a sometimes alarmingly unstable world, it is encouraging to see so many widely scattered countries working (even in a small way) to improve international relations on a personal, man-to-man level. Even a hopeless optimist like myself can't visualize a flood of visiting amateurs to the U.S., but won't it be nice to hear even an occasional TI2 - -/W3?

The State of the Hobby

A strange and disturbing situation is making itself evident with each passing month. The number of U.S. amateurs appears to be marking time at around 265,000. It's a pretty healthy number, but the rate of growth has diminished drastically. For instance, here at *CQ* we formerly received the names of around 1000 newly licensed amateurs each month. Growth of at least 10,000 amateurs per year was assured.

The past 2 years or so have brought about a great change. The monthly total of new licensees is now around 500. Why? We don't know for sure, but several possible reasons do come to mind. First, of course, is the shock of the ARRL's incentive licensing proposal in January 1963. Like it or not, a great deal of dissension was created because of the rather sudden appearance of the proposal, and many supposedly responsible amateur publications saw it as fair

game for editorial warfare. They may well have experienced increased sales as a result, but we feel that almost irreparable damage was inflicted upon the spirit of the hobby by irresponsible journalism.

A second possible factor is the increased hobby-type use of the Citizens Band, in defiance of FCC regulations. Undoubtedly, many newcomers to the world of two-way radio communications have been attracted to CB by the promise of low cost gear, loads of fun and no license requirements. We feel that a substantial source of new blood has been diverted away from amateur radio. Now, it may be argued that these CB'ers interested in radio as a hobby will eventually turn to amateur radio, and such has been the case with hundreds of fellows. But how many thousands have either taken root on 11 meters or else been discouraged from advancing themselves in the hobby by unwarranted dissension between the two services? Too many, we feel.

A third possibility is the licensing requirement changes initiated and acted upon (against all objections) by the FCC. How many would-be hams have not entered the amateur ranks because of fees for even an unsuccessful attempt at the General or Technician exam? Not many, you say? If even one newcomer has been lost because of a miserable \$4 fee, it's one too many! And now the Conditional license has all but been eliminated. If even 25% of all Conditional licenses were issued on illegitimate claims, the remaining 75% legitimate applicants represented a major growth area for amateur radio. Now this too has been cut off.

We're not prophesizing the demise of amateur radio—not by a longshot. But what we're anxious to see is the shaking off of the fog created by these three conditions, and the renewal of an active interest by our readers in recruiting new blood. In any field of endeavor, lack of growth in an otherwise growing society is a dangerous sign. Let's not let an unfortunate sequence of events take the life out of the King of Hobbies.

73, Dick, K2MGA

Waters

AMATEUR
RADIO
EQUIPMENT

“Convenience Engineered”

Waters amateur radio equipment is “Convenience Engineered” to make correct operating practices easier while assuring superior performance. The Waters trademark is a guarantee of the finest that advanced engineering skill and sound manufacturing principles can produce.

Bob Waters—W1PRI





Waters TEST EQUIPMENT

Good clean signals and maximum efficiency are usually the result of proper adjustment using reliable test equipment. Waters Test Equipment provides the means to get the most out of your equipment.

WATERS DUMMY LOAD/WATTMETER — Model 334

The Dummy Load/Wattmeter is an RF power absorption device and an RF wattmeter for making non-radiating performance tests on radio transmitters.

It combines a structured monolithic 52 ohm load and an integral direct reading RF wattmeter. The load is contained in an hermetically sealed liquid dielectric-filled container providing RF shielding and cooling. It is rated for continuous operation at 50 watts and intermittent use to 1,000 watts over a frequency range of 2 to 230 megacycles. A thermostatically operated warning light indicates when the maximum safe-operating temperature is reached.



DUMMY LOAD/WATTMETER SPECIFICATIONS: Frequency Range: 2 to 230 mc. Load: Non-inductive, oil cooled. Load Impedance: 52 ohms. VSWR: Less than 1.3:1 up to 230 mc. Power Range: 50 watts continuous; 1,000 watts intermittent. (Maximum inner case temperature of 220 F is reached in 5 to 7 minutes at 1,000 watts input. Warning light signals at this point.) Wattmeter Range: 3 calibrated scales: 0-10 w; 0-100 w; 0-1,000 w. Accuracy: 2-30 mc, $\pm 5\%$ of full scale; 30-150 mc, $\pm 10\%$ of full scale; 150-230 mc, $\pm 20\%$ of full scale. Input Connector: Hermetically sealed SO-239 UHF, mates with JAN standard PL-259 (Amphenol 83-1SP). Size: 4 $\frac{3}{4}$ " x 9" x 10 $\frac{1}{4}$ " Weight: 12 lb. Price: \$89.95

WATERS REFLECTOMETER—Model 369

The new Waters REFLECTOMETER is a dual indicator voltage standing wave ratio MEASURING instrument. BOTH the forward and reflected voltages expressed in RF watts are shown at the same time on the unique double meter. Unlike conventional VSWR indicators, the REFLECTOMETER has multiple scales that provide 5 & 10 db increase in sensitivity of Reflected Power, permitting very accurate readings of low reverse power values.

The REFLECTOMETER Indicator is housed separately from its Directional Coupler which may be located remotely on the coaxial line and connected with shielded cable.



REFLECTOMETER SPECIFICATIONS: Scales Forward: 1,000 watts; 200 watts. Scales Reflected: 200 watts; 20 watts.

Impedance: 52 ohms. Frequency Range: 3 to 30 megacycles. Accuracy: (Power) $\pm 10\%$ of full scale (in 52 ohms). Power Loss: Negligible. Size: Indicator—5 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " x 4 $\frac{1}{4}$ "; Directional Coupler—4" x 2" x 2 $\frac{7}{16}$ ". Weight: Indicator—1 $\frac{1}{2}$ lb; Coupler— $\frac{3}{4}$ lb. Price and Availability: To be announced.

WATERS WIDE RANGE ATTENUATOR—Model 371 & Model 372

The new WIDE RANGE ATTENUATOR is an accessory device designed to provide stepped attenuation of signals in receivers, signal generators and other low-level radio frequency equipment (converters, etc.). The WIDE RANGE ATTENUATOR installs in the coaxial line using either HF or BNC connectors. Attenuation steps are selected with rocker-type switches marked in decibels. There is 0 insertion loss with switches in OUT position.

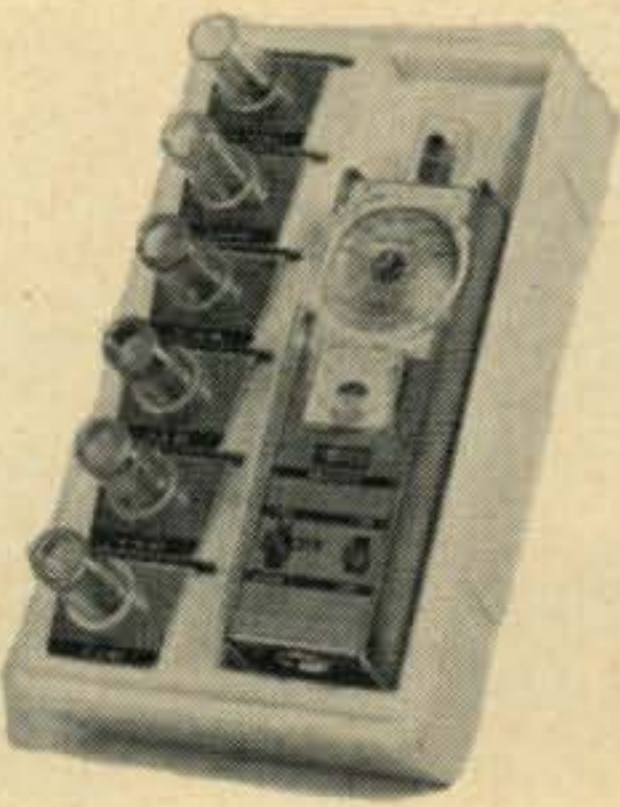


ATTENUATOR SPECIFICATIONS: Power Level: $\frac{1}{4}$ watt maximum. VSWR: 1.3 maximum DC to 225 mc. Impedance: 50 ohms, nominal. Attenuation Range: 0-61 db in 1 db steps. Attenuation Accuracy: .1 db/db DC-60 mc; .1 db/db ± 5 db DC-150 mc; .1 db/db ± 1.0 db DC-225 mc. (Model 371-1 with SO239 UHF connectors. Model 371-2 with BNC UG-1094/U connectors. Price and Availability: To be announced

WATERS "LITTLE DIPPER"® TRANSISTORIZED RADIO FREQUENCY DIP OSCILLATOR — Model 331

The "LITTLE DIPPER" is a fully transistorized RF dip oscillator which performs all functions of a grid dip oscillator, an absorption wave meter and a signal generator for field use with its built-in audio modulation.

The "Little Dipper" consists of: 1) a stabilized MADT transistor RF oscillator covering the frequency range of 2 to 230 mc in 7 overlapping plug-in coil ranges. Each coil carries its own linear calibrated frequency scale. 2) Transistorized 1,000 cycle audio oscillator for modulation. 3) Transistorized DC amplifier and meter for detecting the dip.



"LITTLE DIPPER" SPECIFICATIONS: Frequency Ranges: 2-4 mc, 4-8 mc, 8-16 mc, 16-32 mc, 32-64 mc, 50-110 mc, 100-230 mc. Accuracy: $\pm 3\%$ (full scale value). Modulation Frequency: 1,000 cps nominal. Battery Life: 300 hours. Power: Four AA penlight batteries. Size: 7" x 2 $\frac{1}{4}$ " x 2 $\frac{1}{2}$ " Weight: 1 lb. 6 oz. Case: Stainless steel. Price: \$129.75

WATERS

MANUFACTURING INC. WAYLAND, MASSACHUSETTS



Waters **NEW AUTO-MATCH™**

The Stronger Mobile Antenna



Combining stronger structural strength with stronger signal strength Waters new AUTO-MATCH Mobile Antenna is setting new high standards in the mobile operating field! AUTO-MATCH operates with only a coil-change on every ham band to provide more signal strength with its greater radiation efficiency. The tapered radiator tip is of drawn 17-7 PH stainless steel and adjusts to all frequencies. Interchangeable Top-Center loading coils are molded in low-loss Epoxy and are completely sealed

against moisture and water seepage. High Q stable inductance handles 500 watts of RF and at resonance presents an "Auto-Match" of 50 ohms. The lower mast is of aircraft aluminum tubing upper mast of solid tapered-drawn aluminum rod. Pull-up foldover hinge drops AUTO-MATCH to car-top level and AUTO-MATCH fits any standard base or bumper mount. AUTO-MATCH is rugged, very rugged — designed to last for car after car, rig after rig.

PRICES

MAST 370-1	\$12.95	COIL 370-20	\$13.45
RADIATOR TIP 370-2	\$ 9.95	COIL 370-15	\$12.75
COIL 370-75	\$15.95	COIL 370-11	\$11.95
COIL 370-40	\$14.95	COIL 370-10	\$11.95



Waters

CODAX™

Automatic Keyer

MODEL 361

Waters CODAX Automatic Keyer makes "smoothest-ever" CW operating possible with automatic spacing and timing for any speed from 5 to 50 WPM. A built-in double-paddle key (one for dots and one for dashes) adjusts to accommodate any fist and CODAX won't walk at high speed transmissions. CODAX has solid state digital circuitry and an hermetically sealed "Reed" relay for last-

ing reliability. The keyed 1500 cycle audio output is at microphone level permitting use of the VOX circuit on either upper or lower sideband. CODAX permits self-monitoring and interconnects with any transmitter, transceiver or receiver (keying the grid block circuit or operating keying relay in AM/CW rigs). CODAX is self-powered.



CODAX SPECIFICATIONS: Speed Range: 5 to 50 WPM, variable. Dot-Dash Ratio: Fixed 3-to-1. Space-to-Character Ratio: Fixed 1-to-1. Controls: Audio output level/On-Off switch; Speed control. Semiconductors: 10 transistors; 14 diodes. Outputs: #1 Cable—Relay contacts rated at 15 watts total power; 250 volts DC maximum and 1 ampere maximum. (Volts x Amperes not to exceed 15 watts.) #2 Cable—Keyed audio, 1500 CPS nominal, .050 volts @ less than 100 ohms #3 Jack—Sidetone/mixed audio from receiver for headphone operation. Input: #4 Cable and Plug—Audio from receiver output. Power: #6 RM—502R Mallory 1.35 volt batteries (not furnished). Size: 2 3/8" x 3 3/4" x 6 1/8". Price: \$92.50



"to give you **BETTER PERFORMANCE**
and **GREATER VERSATILITY"**

Waters "Convenience Engineered" ham equipment helps you to become a better operator with a better station.

**WATERS
COMPREAMP™ Model 359**

The COMPREAMP Audio Preamplifier/Limiter increases the effective speech power output of a transmitter up to four times. Self-contained and battery powered, the two-stage transistorized COMPREAMP is designed to be used with all types of transmitters.

COMPREAMP connects between the microphone (50,000 ohm dynamic or high impedance ceramic) and the transmitter microphone input connector without any wiring change. Provision is made for switching the Compreamp in and out of the circuit and for adjustment of compression level. Recommended for use with tape recorders and public address system amplifiers.



COMPREAMP SPECIFICATIONS: Input Impedance: 100K ohms, nominal. Input Level: .005 to .020 volts. Gain: (voltage) 10 db, nominal. Output Level: .060 volts. Output Impedance: 50K ohms, nominal. Power: 9-volt Burgess 2U6 or equivalent. (Not supplied.) Size: 2 3/4" x 3" x 4 1/2". 1/2". Price: \$27.95 (less battery.)

**WATERS
CLIPREAMP™ Model 372**

The new Waters Clipreamp is a solid state, battery operated Preamplifier-Clipper designed for use with voice modulated transmitters to increase "talk power" and intelligibility under adverse band conditions. Frequency response is carefully adjusted for maximum intelligibility and minimum distortion. RF "flat topping" is prevented in SSB operation. Clipreamp is easily installed between high impedance microphone (dynamic, crystal or ceramic) and microphone input of transmitter.



CLIPREAMP SPECIFICATIONS: Voltage Gain: 10-13 db. Frequency Response: 300-3000 cps. Input Level: .020 volts, nominal. Output Level: .060 volts, nominal. Impedance Input: Suitable for high-impedance microphones. Output Impedance: 50,000 ohms. Power: 9-volt Burgess 206 or equivalent, (not supplied) Size: 3 1/8" x 2 5/8" x 3 1/4" Weight: 6 1/2 oz. Price: \$21.95 (less battery)

**WATERS
"NUVERTER"® — Model 346**

The Nuverter adds 2 and 6 meter coverage to any ham superheterodyne receiver that tunes 10 meters. It is easily installed without modifying or drilling and requires no external switches or relays. A single function switch selects wanted frequency band and also transfers antenna connections between HF and VHF. Nuverter has separate all-Nuvisor converters for each band, high-stability crystal oscillators and an integral power supply. The receiver's automatic gain control may be fed into the Nuverter to provide complete AVC performance at VHF. Broad-banded circuitry covers 1.8 megacycles in three 600 KC segments on both 2 and 6 meters.



NUVERTER SPECIFICATIONS: Frequency Range: 50.0 to 51.8 mc; 144.0 to 145.8 mc. Frequency Sub-Bands: 50.0 to 50.6 mc; 50.6 to 51.2 mc; 51.2 mc to 51.8 mc—144.0 to 144.6 mc; 144.6 to 145.2 mc; 145.2 to 145.8 mc. Output IF: 28.5 to 29.1 mc (50 ohms). Input RF: 3 antenna inputs at 50 ohms (2 meter, 6 meter and HF antennas). Power: 115 volts AC or 12 volts DC @ .27 amperes and 125 volts DC @ 25 MA. Sensitivity: .1 microvolt SSB/CW. Noise Figure: 4.0 db maximum at 50 mc mc; 5.0 db maximum at 144 mc. Size: 2 3/4" x 6 1/2" x 7 1/2". Weight: 4 1/4 lb. Price: \$175.

**WATERS
COAXIAL FILTERS — Model 373-2 & 373-6**

Waters new Coaxial Filters are double-tuned, resonant cavity band-pass filters for both 2 and 6 meter transmitters and receivers. Installed in 52 ohm coaxial antenna lines, the filter assures an outgoing signal free of the spurious frequencies that cause serious interference problems. (TVI, etc.) The filter provides rejection at the receiver front end of high-level out-of-band signals such as beats between local TV stations. No tuning adjustments required and insertion loss is held to 1.5 db maximum.



FILTER SPECIFICATIONS: 373-2 — Center Frequency: 146 mc. Shape Factor: 40 db — 12 max. 3 db Bandwidth at 3 db: 5 mc, nominal. Insertion Loss: 1.5 db max. Maximum Power Level: 100 watts PEP. 373-6 — Center Frequency: 51 mc. Shape Factor: 40 db — 20 max. Bandwidth at 3 db: 3 mc nominal. Insertion Loss: 1.5 db max. Maximum Power Level: 100 watts PEP. Weight: 2 lb. Size: 6 3/4" x 8 3/4" x 3 5/8"

Price and Availability: To be announced

WATERS

MANUFACTURING INC.

WAYLAND, MASSACHUSETTS



Improved Operation for COLLINS 75S-1 and KWM-2/2A

WATERS "CHANNELATOR"® — Model 349

The Channelator is a crystal-controlled "external PTO" providing up to six preselected EXACT crystal frequencies. With Channelator operation frequency-problems are eliminated on nets and round tables since BOTH receiving and transmitting frequencies are crystal-controlled. Novel oscillator circuit together with Waters special crystals permits "pulling" of the crystal to an EXACT frequency. The built-in heterodyne frequency meter provides precise measurement of each crystal. A function switch selects normal PTO or Channelator crystal operation as well as "split channel" use.



The Waters Channelator connects to the Collins equipment in minutes and may be mounted directly on the 75S series and KWM-2/2A. All cables and plugs are furnished. It operates from any fixed or mobile Collins DC or AC power supply. The front panel is reversible to permit vertical or horizontal mounting.

Price: \$79.95 (less crystals)
Adapter Kit Model 349-27 for "S-line" installation \$15.95
Crystals—any frequency, USB or LSB \$6.00 each.

WATERS Q-MULTIPLIER/NOTCH FILTER

The Waters Q-Multiplier/Notch Filter eliminates heterodynes and other unwanted signals in the IF passband. By combining an isolating amplifier and a tunable LC Bridged-T network with a Q-Multiplier, it provides a deep transmission null or notch of over 40 db, tunable across the entire passband. Operating with only a single tuning control on the front panel, the Q-Multiplier/Notch Filter becomes an integral part of the 75S-1 or KWM-2/2A. Escutcheon plates and knobs are matched to the Collins panel and no drilling of the panel is required. Operates in fixed or mobile service with any standard Collins power supply.



SPECIFICATIONS: 337-S1A (for Collins 75S-1) Center Frequency: 455 KC nominal. Notch Depth: Greater than 40 db. Notch Tuning Range: 2.5 KC. Power: (from 75S-1) .3 a @ 6.3 v, 1.5 ma @ 140 v. Price: \$39.95

340-A (for Collins KWM-2/2A) Center Frequency: 455 KC nominal. Notch Depth: Greater than 40 db. Notch Tuning Range: 2.5 KC. Power: (from KWM-2/2A) .3 a @ 6.3 v, 1.5 ma @ 275 v. Price: \$53.75

WATERS "EVT" ELECTRONIC VERNIER TUNING

The "EVT" provides a 20-to-1 tuning ratio reduction on the KWM-2/2A. A stable, solid state varactor tuning device it attaches to the PTO without wiring change. Tuning range of ± 500 cycles from any PTO setting. Complete with matching escutcheon plate, knobs, hardware, instructions, etc.

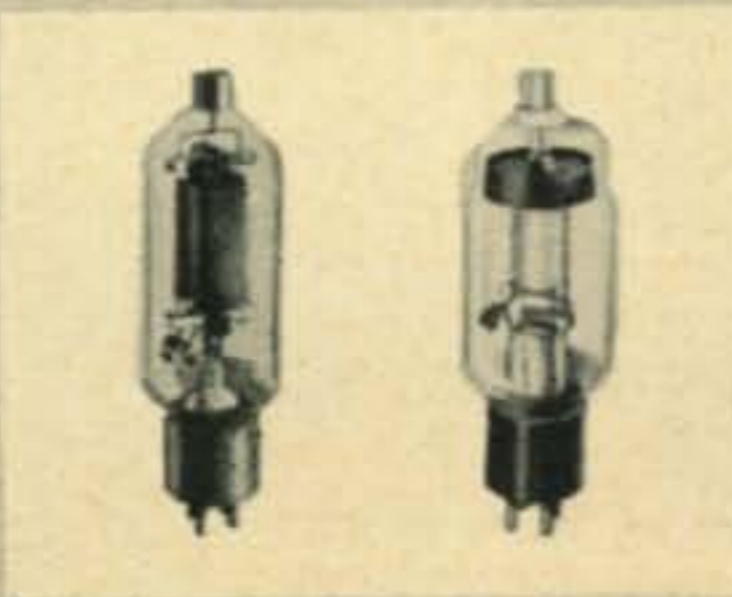


Model 354: For KWM-2A without Waters Q-Multiplier/Notch Filter. For KWM-2 when equipped with Q-Multiplier/Notch Filter. (337-M2 or 340-PT) Price: \$23.95

Model 355: For KWM-2 without Waters Q-Multiplier/Notch Filter or with Model 340-A Q-Multiplier/Notch Filter. Price: \$21.95

WATERS UEW 572B HIGH POWER AMPLIFIER TRIODE

The UEW572B is a zero bias power triode ideal for use in grounded grid amplifiers. Built in a hard glass envelope with heavy graphite plate, the UEW572B has a plate dissipation of 160 watts. It is directly interchangeable with 811-A tubes and one 572B is the equivalent of two 811-A's. Complete operating data including ratings and general characteristics will be sent on request. Price: \$13.95



WATERS UEW 3B28 XENON FILLED RECTIFIER

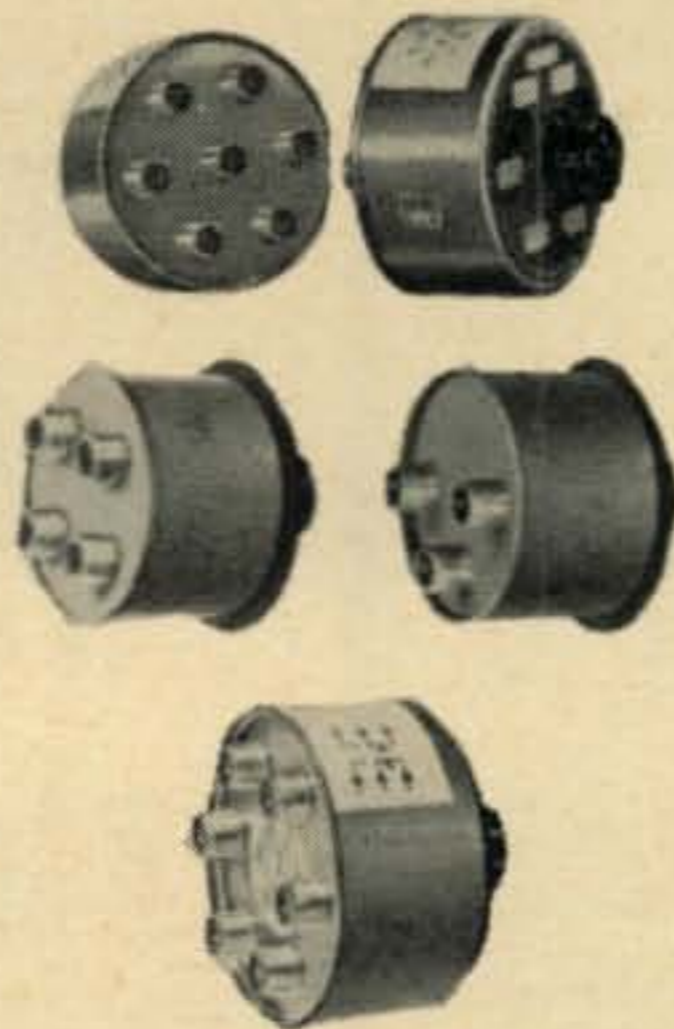
The UEW3B28 is a half wave, hot cathode, Xenon filled rectifier tube directly replacing the 866A. The UEW3B28 operates over a wide temperature range without heating or cooling and does not require prolonged conditioning before application of plate voltage. "Hash filters" are not necessary. Complete operating data will be sent on request. Price: \$6.40



WATERS COAXIAL SWITCHES

Waters Coaxial Switches are designed for panel mounting and feature in-line orientation of the coaxial connectors. They occupy minimum space and are readily accessible for connecting and disconnecting. Waters switches add to the station appearance, are easily installed and provide efficient and convenient switching techniques.

SPECIFICATIONS: Internal Construction: Ceramic switch with silver plated conductors. Power Carrying Capacity: 1000 watts. Insertion Loss: Negligible. VSWR: Less than 1.2 up to 150 mc. Mounting: Mounts behind panel with 3 screws. Hardware Supplied: Mounting screws, escutch-plate with provision for erasable marking; knob.



COAXIAL SELECTOR SWITCH — Model 335. Single pole, six-position for switching RF sources, antennas, etc. Has seven UHF (SO-239) connectors. Price: \$12.95

COAXIAL TRANSFER SWITCH—Model 336. Double-pole, double-throw internally strapped for switching amplifier in and out between exciter and antenna. Four UHF (SO-239) connectors. Price: \$11.45

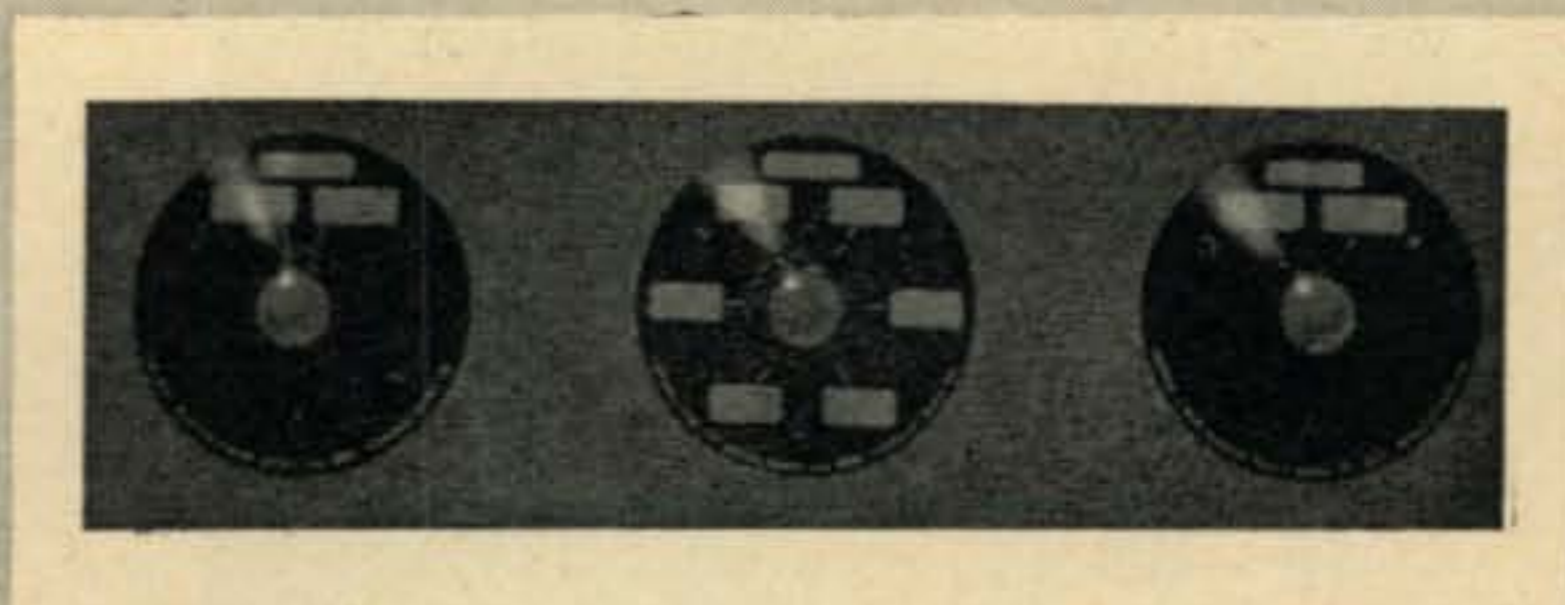
ANTENNA SYSTEM TRANSFER SWITCH—Model 341. Single-pole, double-throw for switching RF device to either of two antennas or two RF devices to single antenna, etc. Three UHF (SO-239) connectors. Price: \$11.45

DUAL COAXIAL TRANSFER SWITCH — Model 351. Double-pole, double-throw for switching converters, filters, etc. in and out of coaxial lines. Six UHF (SO-239) connectors. Price: \$12.95

WATERS ILLUMINATED KNOB—Model 347

Waters Illuminated Knobs serve as pilot lights and position indicators. The Knob projects a light beam on the panel to identify position and has a lighted red pointer as a pilot light. Ideal for applications where the pointer position must be read accurately or identified from a distance or under poor lighting conditions.

Installation is simple. The knob contains the light and mounts on any 1/4" shaft rotary control or switch. No changes required behind the panel. One wire provides the 6 volt source for light with the shaft serving as ground. Price: \$5.00



WATERS UNIVERSAL HYBRID COUPLER and PHONE PATCH — 3001 & 3002

3002 UNIVERSAL HYBRID COUPLER II

The Universal Hybrid Coupler II is an excellent phone patch that connects receiver and transmitter to the phone line for remote voice operation. Provision is also made in the Coupler to connect a tape recorder for both recording and playback of station QSO's and the telephone line. The hybrid circuit provides for effortless VOX operation of the phone patch. A built-in "Compreamp" speech preamplifier/limiter serves to increase the level of weak phone signals and also to avoid over-modulation when the local telephone serves as the station microphone. The "Compreamp" also functions as a preamplifier/limiter with the station microphone, if desired. Front panel is reversible to permit either horizontal or vertical mounting.

3001 UNIVERSAL HYBRID COUPLER

Identical to 3002 but without the "Compreamp"



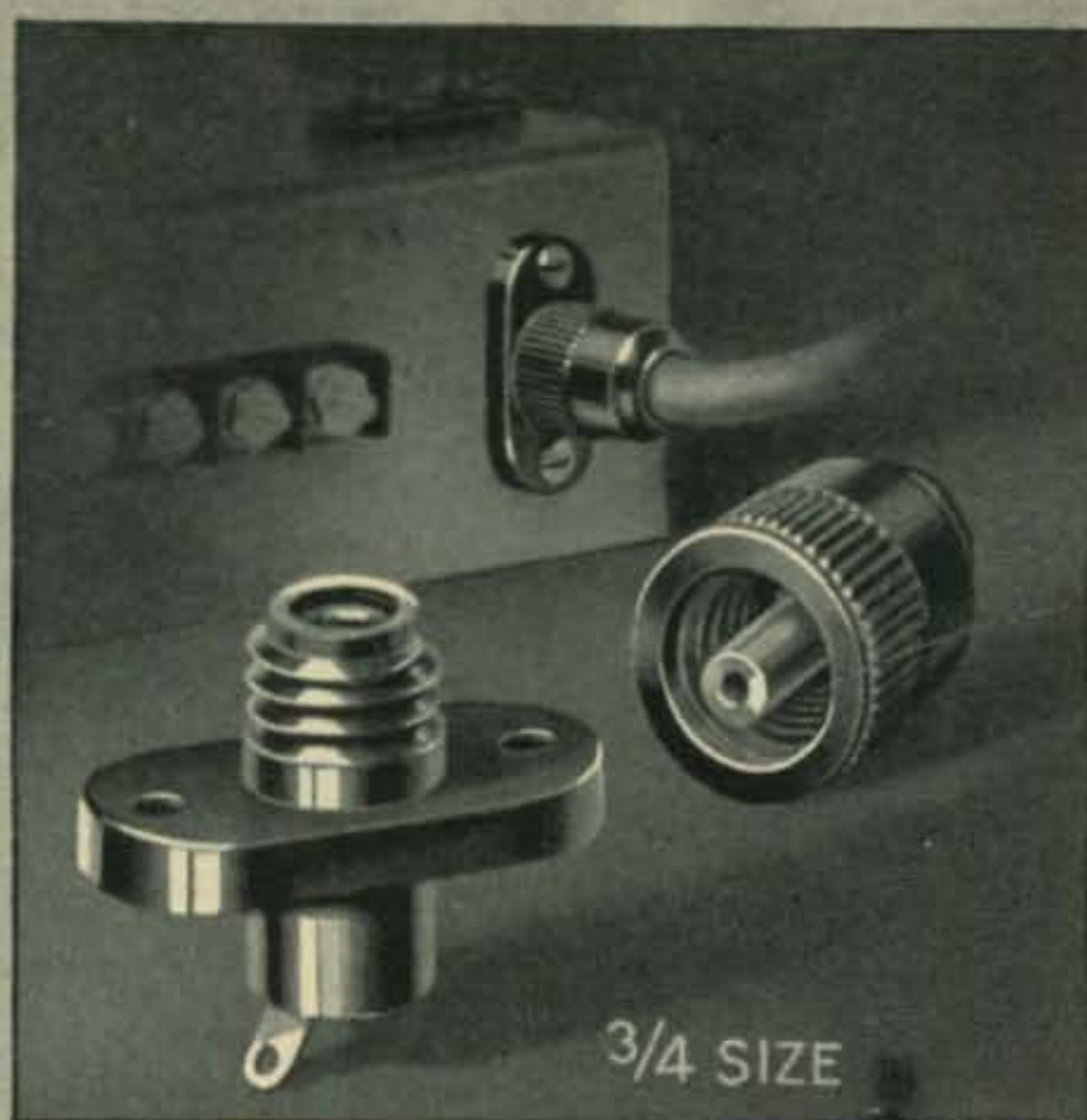
SPECIFICATIONS: Input Impedances: Line — 600 ohms nominal. RX Output — 4 ohms nominal (varies with receiver output control). Mike—High impedance crystal or dynamic. Tape Recorder Speaker—4 ohms nominal. Output Impedances: To Tape Recorder — 1/2 meg. ohm. To XMTR — 50 ohms nominal. RX SPKR — 4 ohms nominal.

PRICES: 3002 \$69.95 (less battery)
3001 \$49.50 (less battery)

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.

**JAMES MILLEN
MFG. CO., INC.**

MAIN OFFICE AND FACTORY
**MALDEN
MASSACHUSETTS**



LETTERS TO THE EDITOR

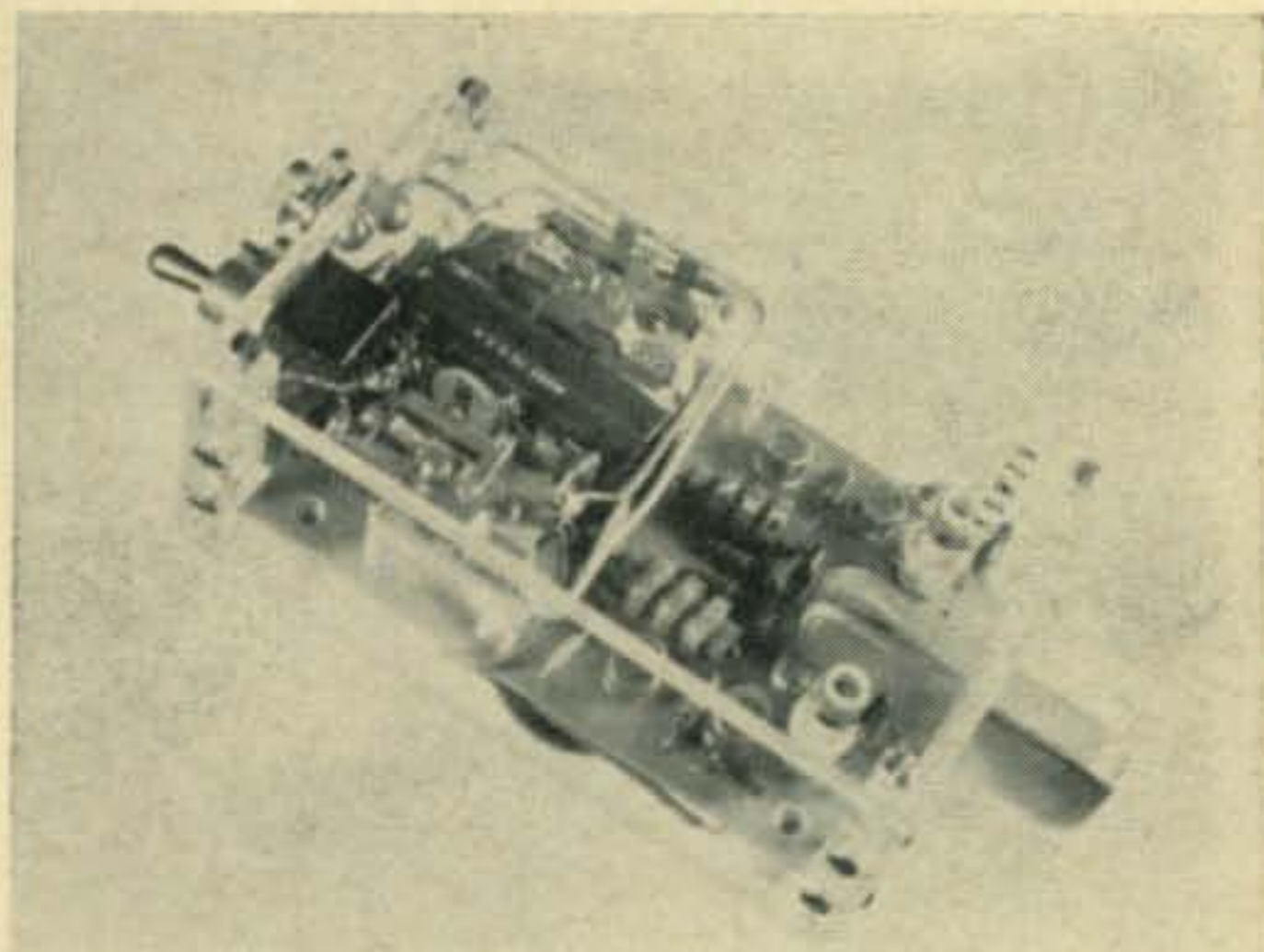


More Satisfied Customers

Editor, *CQ*:

I thought you might like to know how much your articles on construction are appreciated, and maybe a picture of something I built would prove that they are being read.

This is the "Touch-Key" from your November 1964 issue of *CQ*.



I did not like the idea of building such a nice circuit in a can (I work for a large can company), so I tried my hand at a little Plexiglass work. I also thought the relays should be incorporated in the main chassis in order to avoid more loose wires than I already have in the shack. I used some bargain relays (\$1.19 each) from Burstein-Applebee Co. and with a little loosening of the tension, they work perfectly. In fact the article states that you need a certain amount of contact area between finger and paddle, but I find the slightest touch of the edge will trip the relays consistently.

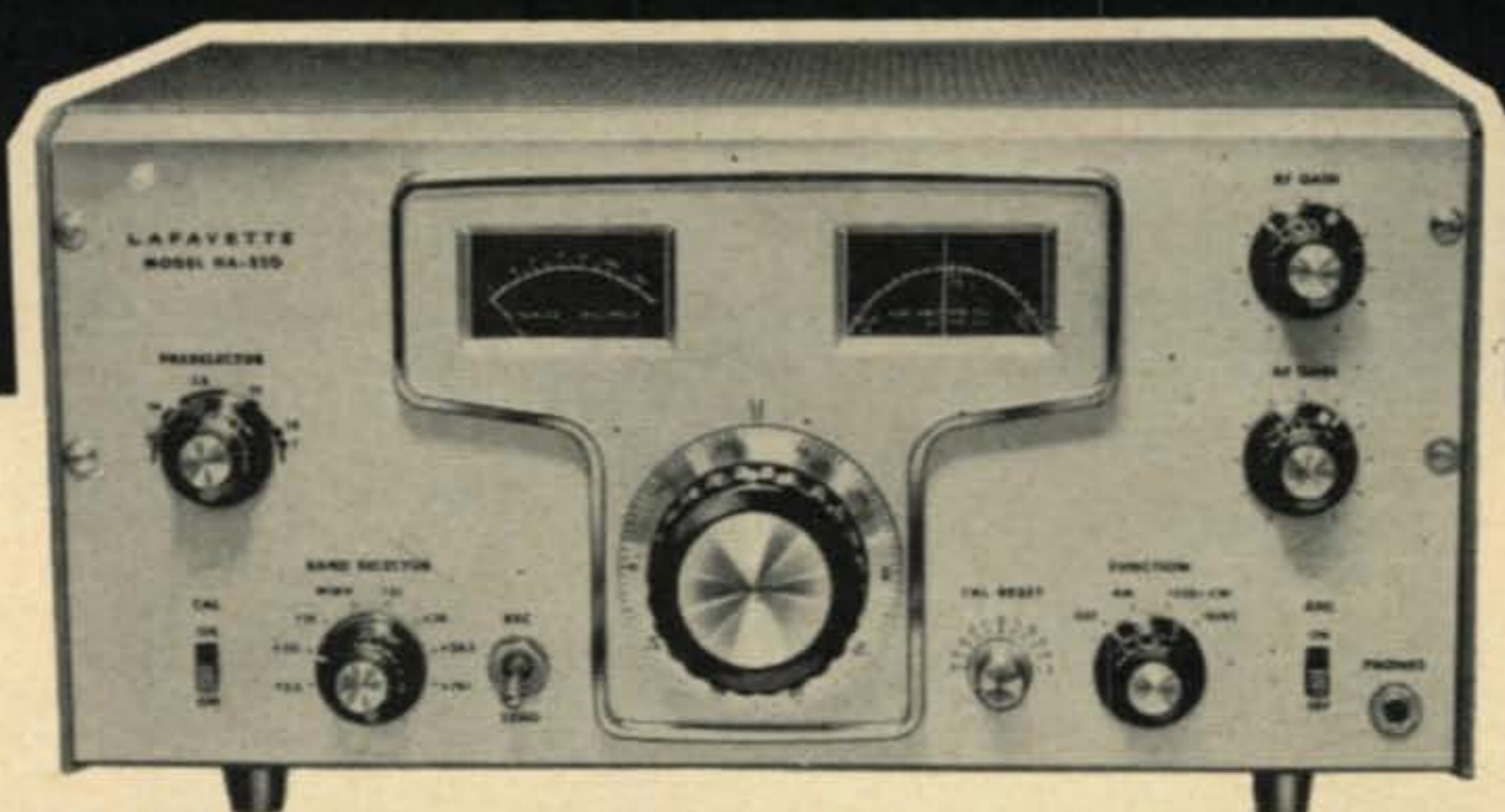
I really enjoyed building this unit and look forward to many more fine construction ideas.

J. L. Godar, Jr., K9WZH
110 W. Church Street
Wauconda, Illinois 60084

Editor, *CQ*:

This is just a note to let you know that I heartily approve of the articles on relatively simple equipment that have appeared in recent issues, i.e. "The Simple-Gen Receiver," "The 16 Watt Rock Crusher," "The Portable 80-40" etc.

NEW! LAFAYETTE



10-80 METER DUAL CONVERSION AMATEUR RECEIVER Model HA-350

Uses Mechanical Filter For Exceptional Selectivity—
Offers 2KC Bandwidth!

189⁵⁰

99-2524WX

Lafayette's newest! A dual conversion superheterodyne communications receiver covering the 10 through 80 meter amateur bands and offering a high order of electrical and mechanical stability for superior AM, CW and SSB operation. Check some of the exceptional features!

- Sensitivity 1 μ v or Better
- 7 Band-Switching Positions—3.5, 7, 14, 21, 28, 28.5 and 29.1 MC, plus WWV on 15 MC
- Covers 600 KC for Each Band
- 12 Tubes
- Crystal-controlled 1st Oscillator
- Transmitter-type for 2nd Osc.
- Preselector Tuning
- Crystal-controlled BFO (Dual frequencies)

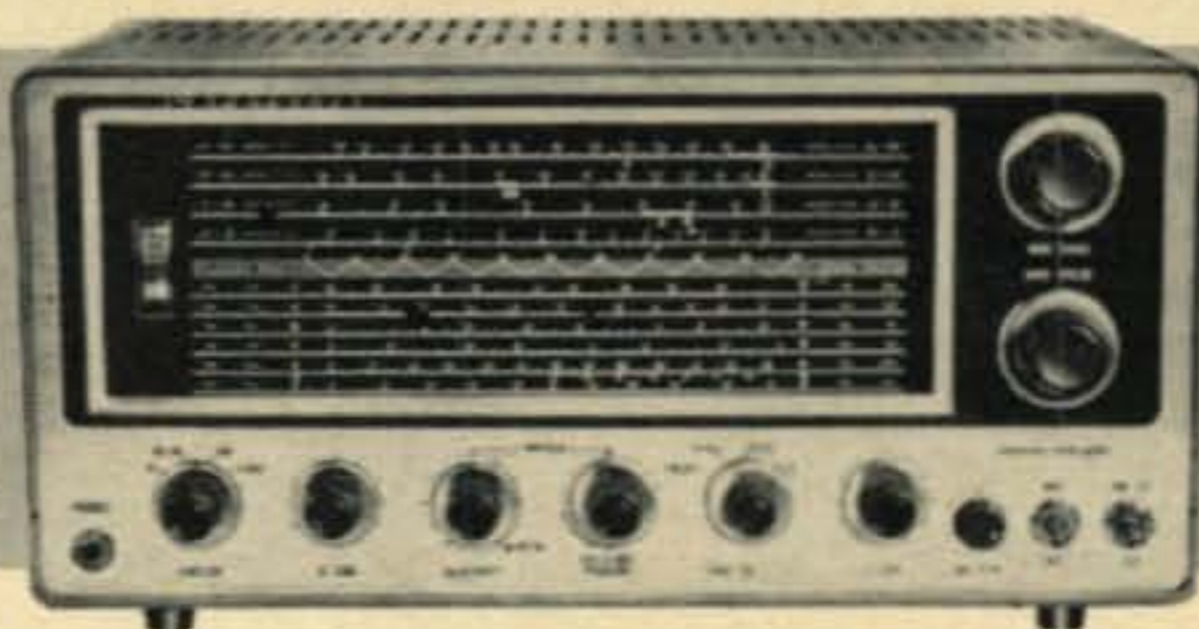
- All Heterodyning crystals supplied
- Selectable Sidebands
- Geared Tuning Mechanism
- 100 KC Calibrator Circuit (crystal optional extra)
- Separate Diode AM Detector and CW/SSB product Detector
- Coax Antenna Input
- 8 and 500 ohm Outputs
- Imported

NEW! LAFAYETTE Professional-Quality 8-TUBE AMATEUR RECEIVER Model HA-230

Model HA-230

89⁵⁰

Wired
99-2522WX



Model KT-340

74⁵⁰

Semi-kit version
99-2521WX

4 BANDS:

550-1600KC 4.8-14.5MC
1.6-4.8MC 10.5-30MC

Features "ALWAYS ON" FILAMENT VOLTAGE ON MIXER AND OSCILLATOR STAGES FOR FREQUENCY STABILITY . . . LONGER TUBE LIFE . . . FASTER WARMUP!

- 8 Tube Superhet Circuit
- 1 RF + 2 IF Stages For High Gain
- Illuminated 10½" Slide Rule Dial
- Built-in Q Multiplier For Crowded Phone Operation
- Calibrated Electrical Bandsread on 80 thru 10 Meters

- Effective Automatic Noise Limiter
- Stable Oscillator And BFO For Clean AM, CW and SSB Reception
- AVC-MVC Selector On Front Panel
- Built-in Edgewise S-Meter
- Imported

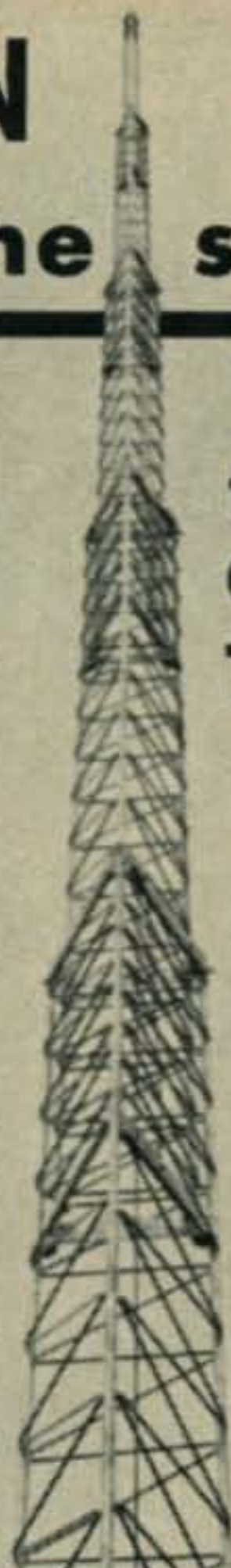
FREE!

Lafayette 516—Pg. 1965 Catalog No. 650. Write:
Lafayette Radio Electronics Corp., Dept. CC-5, P.O. Box 10, Syosset, L. I., N. Y. 11791

ROHN sets the standard

for
**CRANK-UP
TOWERS**

Why settle
for less
than the best?



TWO CATEGORIES TO CHOOSE FROM

Standard Duty Guyed in
Heights of 37 - 54 - 88 - 105
and 122 feet

Heavy Duty Self Supporting
and Guyed in Heights of
37 - 54 feet (SS)
71 - 88 feet (guyed)

ROHN has these 6 IMPORTANT POINTS:

Ease of Operation—roller guides between sections assure easy, safe, friction-free raising and lowering. **Strength**—welded tubular steel sections overlap 3 feet at maximum height for extra sturdiness and strength. Unique ROHN raising procedure **raises all sections together**—uniformly with an equal section overlap at all heights! **Versatility**—designed to support the largest antennae with complete safety and assurance at any height desired! **Simple Installation**—install it yourself—use either flat base or special tilting base (illustrated above) depending on your needs. **Rated and Tested**—entire line engineered so you can get exactly the right size and properly rated tower for your antenna. The ROHN line of towers is complete. **Zinc Galvanized**—hot dipped galvanizing a standard—not an extra—with all ROHN towers! Prices start at less than \$100.

SEND FOR ROHN TOWER HANDBOOK

—\$1.25 Value

—**ONLY \$100** postpaid (special to readers of this magazine). Nearest source of supply sent on request. Representatives world-wide to serve you. Write today to:



ROHN Manufacturing Co.

P. O. Box 2000

Peoria, Illinois

"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers, and installers of complete communication tower systems."

For further information, check number 16, on page 110

Not all of us are born with a high degree of electronic sophistication and "beginners" articles of this sort are in demand. We who were born in relatively recent decades couldn't grow up gradually with the state of the art and for us these are wonderful articles describing equipment we can easily build and learn with.

Keep it up!

Wm. "Bill" Schwarting, WA2AHC
Radio Instructor
Scotia Junior High School
Sacandaga Road
Scotia, New York 12302

Equipment Reviews

Editor, CQ:

Having just finished reading the article "CQ Reviews the Waters Compreamp" in the February 1965 issue, I feel compelled to write this letter to express my displeasure.

This item of commercial manufacture received a glowing endorsement by the technical director of CQ, and probably justly deserved it. However, I feel that the schematic of this piece of gear should have been included, both for a more complete evaluation of the device, and for the use of those amateurs who would like to construct a similar unit themselves. If the manufacturer objects to this, I don't believe the 2½ pages of "free" advertising could be given to him. Obviously, when the device described is so complex as to require special parts and techniques, the schematic would be useless, but when a simple item like the Compreamp is described, there is no excuse for not including it.

Please try to remedy this situation in the future.

Kenneth Seil, WA2JYX
66 Sharon Drive
Rochester, New York

Ken, you make a good point. I believe in the future, we'll be making a regular practice of publishing schematics whenever practical, and whenever the manufacturer is cooperative.—K2MGA

Pro and Con Jan. Zero Bias

Editor, CQ:

I wish to congratulate you on your magnificent editorial of your January issue. Although I am not a ham, I plan to get my license soon and I have no desire to be greeted by 10-4's on two meters.

The main point seems to be that simply having a desire for something does not give one a right to it. We cannot afford to have the ham bands turned into a nationwide party line for these gab-happy lids.

Bryant Julstrom
226 E. Grant St.
Macomb, Illinois 61455

Editor, CQ:

Re: January ZERO BIAS.

The statement was made, in effect, that many high-caliber technicians, engineers and other electronic geniuses were being kept out of amateur radio due to their inability to master the code.

I would like to mention that two of my harmonics, ages 7 and 9, were taught code (by sound) and, with very few hours of practice, could easily receive 5 w.p.m. Neither was a graduate engineer, technician or anything close to a genius and they did it just for fun!!

Could it possibly be that the big obstacle of having to learn code is merely a convenient excuse for those who are either too lazy or else "All smoke and no fire"?

While c.w. can stand on its own merits, the code test might be of value in keeping some of the less serious aspirants from adding to the QRM. The code tests should prove intent and the theory test ability.

As a final thought—it is common knowledge that any person who places a high enough value on the privileges that a ham ticket offers can learn the code. If it isn't worth that much effort to them, we haven't lost a thing.

George E. Schupp, K9FPA
R. R. No. 2
Princeton, Indiana 47570

November's CQ

Editor, CQ:

After reading CQ on and off for a year at our station library I decided to subscribe based on on three major

INTERNATIONAL FREQUENCY METERS



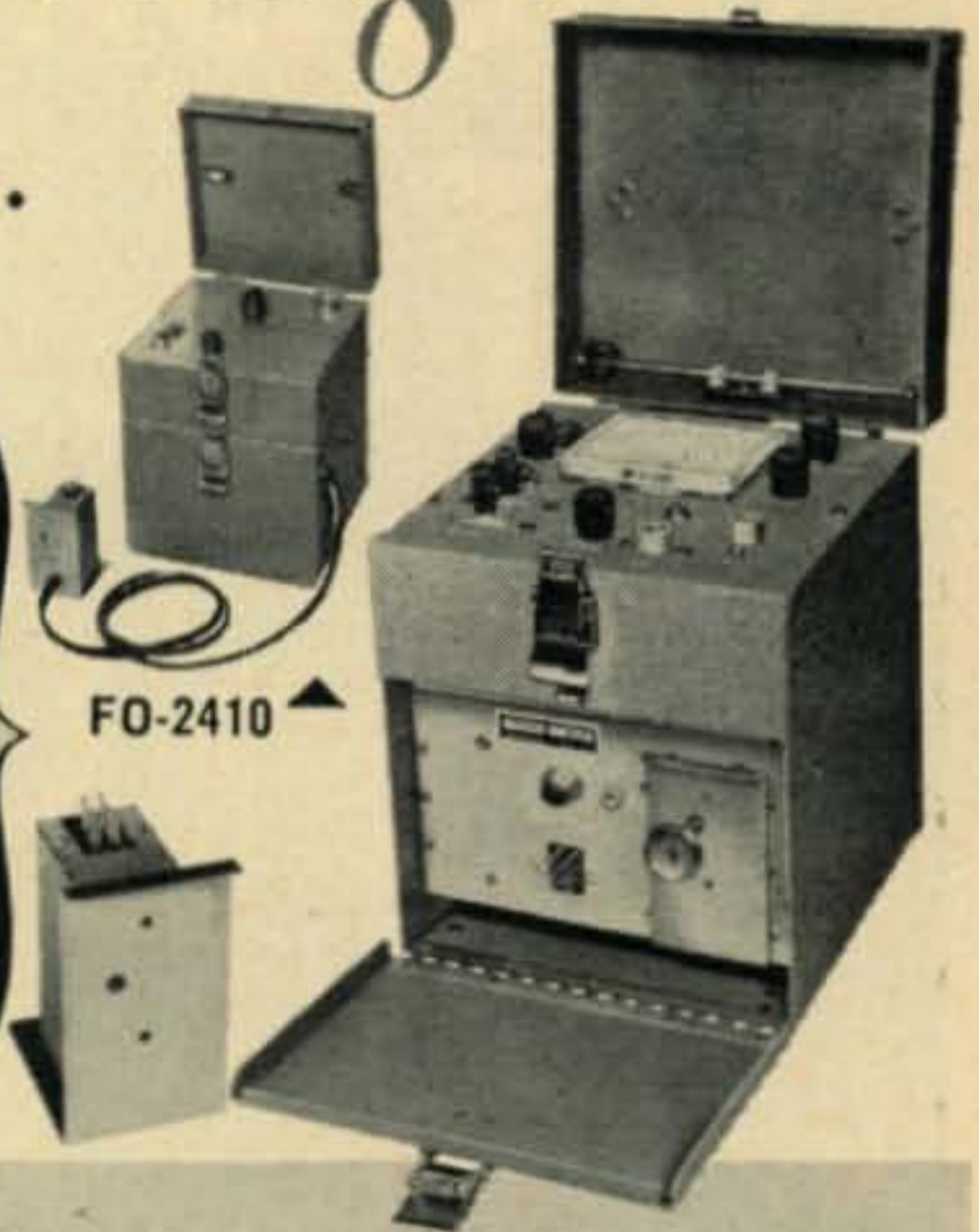
designed for servicing!

**Equip your lab or service bench with the finest . . .
Discover new operating convenience.**

FM-5000 FREQUENCY METER 25 MC to 470 MC

The FM-5000 is a beat frequency measuring device incorporating a transistor counter circuit, low RF output for receiver checking, transmitter keying circuit, audio oscillator, self contained batteries, plug-in oscillators with heating circuits covering frequencies from 100 kc to 60 mc. Stability: $\pm .00025\%$ $+85^{\circ}$ to $+95^{\circ}$ F, $\pm .0005\%$ $+50^{\circ}$ to $+100^{\circ}$ F, $\pm .001\%$ $+32^{\circ}$ to $+120^{\circ}$ F. A separate oscillator (FO-2410) housing 24 crystals and a heater circuit is available. Dimensions: FM-5000, 10" x 8" x 7 $\frac{1}{2}$ ".

FM-5000 with batteries, accessories and complete instruction manual, less oscillators, and crystals. Shipping weight: 18 lbs. Cat. No. 620-103 \$375.00
Plug-in oscillators with crystal \$16.00 to \$50.00



C-12B FREQUENCY METER For Citizens Band Servicing

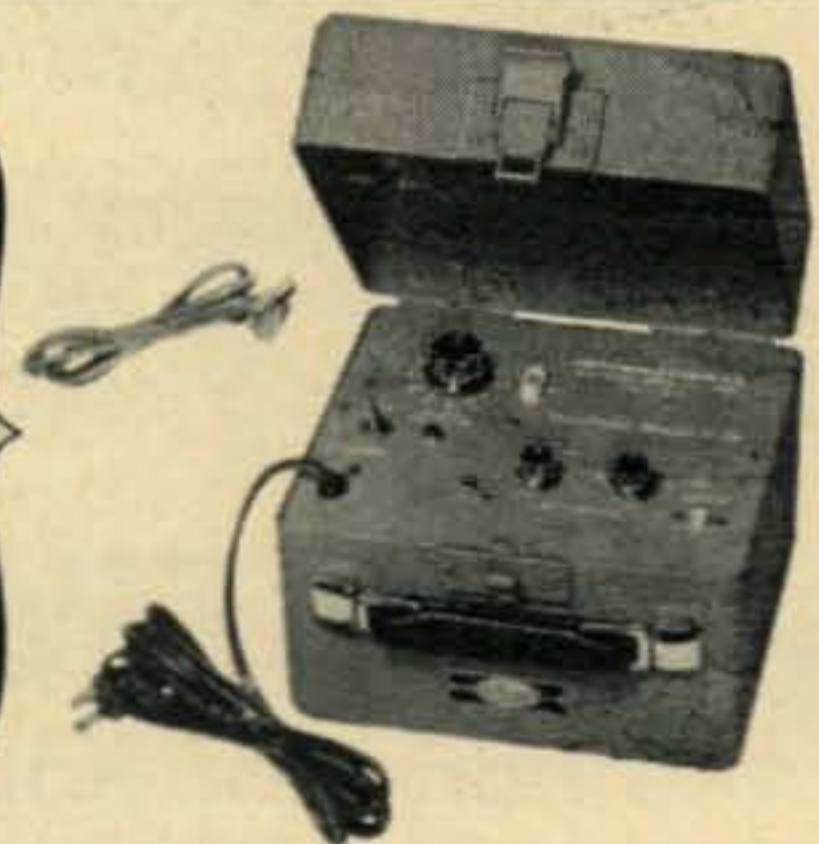
This extremely portable secondary frequency standard is a self contained unit for servicing radio transmitters and receivers used in the 27 mc Citizens Band. The meter is capable of holding 24 crystals and comes with 23 crystals installed. The 23 crystals cover Channel 1 through 23. The frequency stability of the C-12B is $\pm .0025\%$ 32° to 125° F, $.0015\%$ 50° to 100° F. Other features include a transistorized frequency counter circuit, AM percentage modulation checker and power output meter.

C-12B complete with PK (pick-off) box, dummy load and connecting cable, crystals and batteries. Shipping weight: 9 lbs. Cat. No. 620-101 \$300.00

C-12 CRYSTAL CONTROLLED ALIGNMENT OSCILLATOR

The International C-12 alignment oscillator provides a standard for alignment of IF and RF circuits 200 kc to 60 mc. It makes the 12 most used frequencies instantly available through 12 crystal positions 200 kc to 15,000 kc. Special oscillators are available for use at the higher frequencies to 60 mc. Maximum output .6 volt. Power requirements: 115 vac.

C-12 complete, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-100 . . \$69.50



C-12M FREQUENCY METER For Marine Band Servicing

The International C-12M is a portable secondary standard for servicing radio transmitters and receivers used in the 2 mc to 15 mc range. The meter has sockets for 24 crystals. The frequency stability is $\pm .0025\%$ 32° to 125° F, $\pm .0015\%$ 50° to 100° F. The C-12M has a built-in transistorized frequency counter circuit, AM percentage modulation checker and modulation carrier and relative percentage field strength.

C-12M complete with PK (pick-off) box and connecting cable, batteries, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-104 \$235.00
Crystals for C-12M (specify frequency) \$5.00 ea.

KEEPING YOU ON FREQUENCY IS OUR BUSINESS...

Write today for our FREE 1965 CATALOG

**INTERNATIONAL
CRYSTAL MFG. CO., INC.**

For further information, check number 17, on page 110

18 NORTH LEE OKLAHOMA CITY, OKLAHOMA

good
mobiles
STILL

go



HUSTLER

by **NEW-TRONICS**
the home of originals!

HUSTLER is the mobile antenna that has won the widest praise from everyone that has used it. For really reaching out, and for exceptional results on every band, the HUSTLER has no equal. For unbiased opinion of performance, ask any HUSTLER user... there are thousands of them.

See the HUSTLER at your dealer or write us for literature.

NEW-TRONICS CORPORATION
"the home of originals"
3455 Vega Ave., Cleveland, Ohio 44113

For further information, check number 18, on page 110

18 • CQ • April, 1965

factors; 1. Best balanced amateur coverage. 2. Mr. Charles Schauers HAM CLINIC. 3. Your statement in the October '64 issue that November's issue would be outstanding. I had planned to subscribe for some time, but the last reason "did it" for me. I'm very pleased I did, but unhappy that I didn't receive a Nov. issue.

I have a receipt . . . dated Oct. 19, of course I sent my order to them prior to this and feel I should have received the Nov. issue.

I am sure you can rectify this oversight.

Lee C. Haas
Box 11
Naselle AFS, Washington

Thanks for the kind words, Lee, but you've caught us in the embarrassing position of not having enough November issues to go around. November CQ was a great issue—one of the best in recent years. Our newsstand buyers were quick to recognize the fact, and the issue vanished from the stands at an unbelievable rate, leaving very few to be returned to us. You have my word, though, that you will get the promised issue.

By the way, we're willing to pay 75¢ cash or add two months to your CQ subscription if you'll send us a good, clean, unmarked November 1964 issue. We need about 100 copies, so think it over.—K2MGA

Surplus Addicts Take Note

Editor, CQ:

We thought your readers might be interested in some of the headaches that manifest themselves upon firms such as ours, who buy and sell U.S. Government surplus electronics material.

As you know, the usual purchase from the Government is made as the result of making the highest bid for the material offered. The obligation is upon the bidder to inspect the material and appraise its condition and value. The Government does make an official estimate as to condition, but it's *caveat emptor* with them.

We recently went to a military depot to inspect some test sets that were being offered for sale and described by the Government as "unused." This particular lot consisted of hundreds of very large overseas-crated units. We worked half a day prying open spot-selected crates and were satisfied that the units were indeed new. We bid accordingly, were awarded the purchase contract, and proceeded to advertise the units according to what we had seen.

After making several shipments, we started to receive some angry letters informing us that the units were not new at all, but indeed used, repainted, etc.

We immediately investigated further and found that about 1/6 of our purchase consisted of used units, packed in the newest, most beautiful crates you've ever seen.

We, of course, replaced all unsatisfactory units with new ones as soon as we received notice. Naturally, this whole episode was at considerable expense to us.

We admit that the responsibility was ours alone. But we would like to assure your readers that this was an honest mistake—and, we're sure—one that has plagued all surplus dealers from time to time.

Descriptions of the condition of electronic equipment seems pretty flexible. For what it's worth, here is our system, to which we adhere religiously:

New: Unused since manufacture

Rebuilt: Unused since depot or factory rebuilding.

We hope that this explanation will help to improve the image of the surplus dealer in the minds of those readers who, because of past disappointments in mail-ordering surplus (probably due to honest errors) have become convinced that all dealers are fast-buck artists.

David J. Goodman, President
Telemethods International
3075 East 123rd Street
Cleveland, Ohio 44120

Please . . .

When writing to CQ for any reason, be sure to include your ZIP code. It will help us serve you better, and assure delivery of CQ to your door each month.

IT'S THE SAME LITTLE OLD BOX



1962 SWAN SINGLE BANDER —
1 BAND — 180 WATTS — \$275



1963 SWAN 240 — 3 BANDS — 240 WATTS — \$320

but we've put a **LOT MORE** in it!



NOW THE **SWAN-350** TRANSCIVER
5 BANDS — 400 WATTS AND ONLY \$395

- 3.5 - 4.0 mc, 7.0 - 7.5 mc, 13.85 - 14.35 mc, 21.0 - 21.5 mc, 28.5 - 29.0 mc (10 meter full coverage kit available.)
- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.
- 400 watts SSB input
320 watts CW input
125 watts AM input
- Sideband suppression: 40 db
Carrier suppression: 50 db
Third order distortion: 30 db
- Lower sideband on 80M and 40M.
Upper sideband on 20M, 15M, and 10M.
(Opposite sideband kit available.)

WITH THE SAME RELIABILITY AND PERFORMANCE
WE'VE PUT IN ALL OUR LITTLE BOXES

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C.....\$ 85
- 12 Volt DC Power supply. Model 412.....\$130
- Plug-in VOX. Model VX-1.....\$ 35

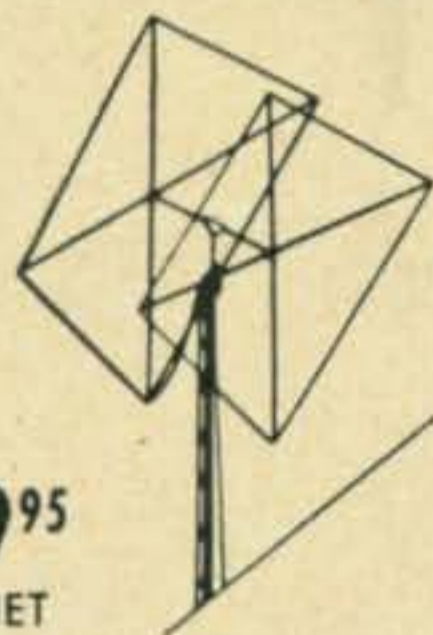
SEE THE NEW SWAN 350
AT YOUR DEALER'S NOW!



ELECTRONICS CORP.
Oceanside, California

For further information, check number 19, on page 110

INCREASE RANGE AND QUALITY



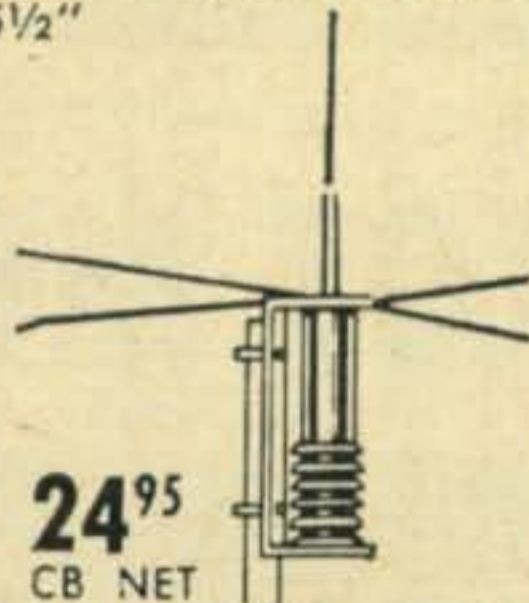
39⁹⁵
NET

Giant Q-11 BASE STATION CUBICAL QUAD

For Class D, 27-mc operation
Light but rugged, it increases
CB range. SPECIFICATIONS: 8
db Forward Gain; 40 db Front
to Back; 52 ohm coax Feed;
horizontal or vertical polariza-
tion; Longest Element, 9'3";
Boom, 65 1/2"

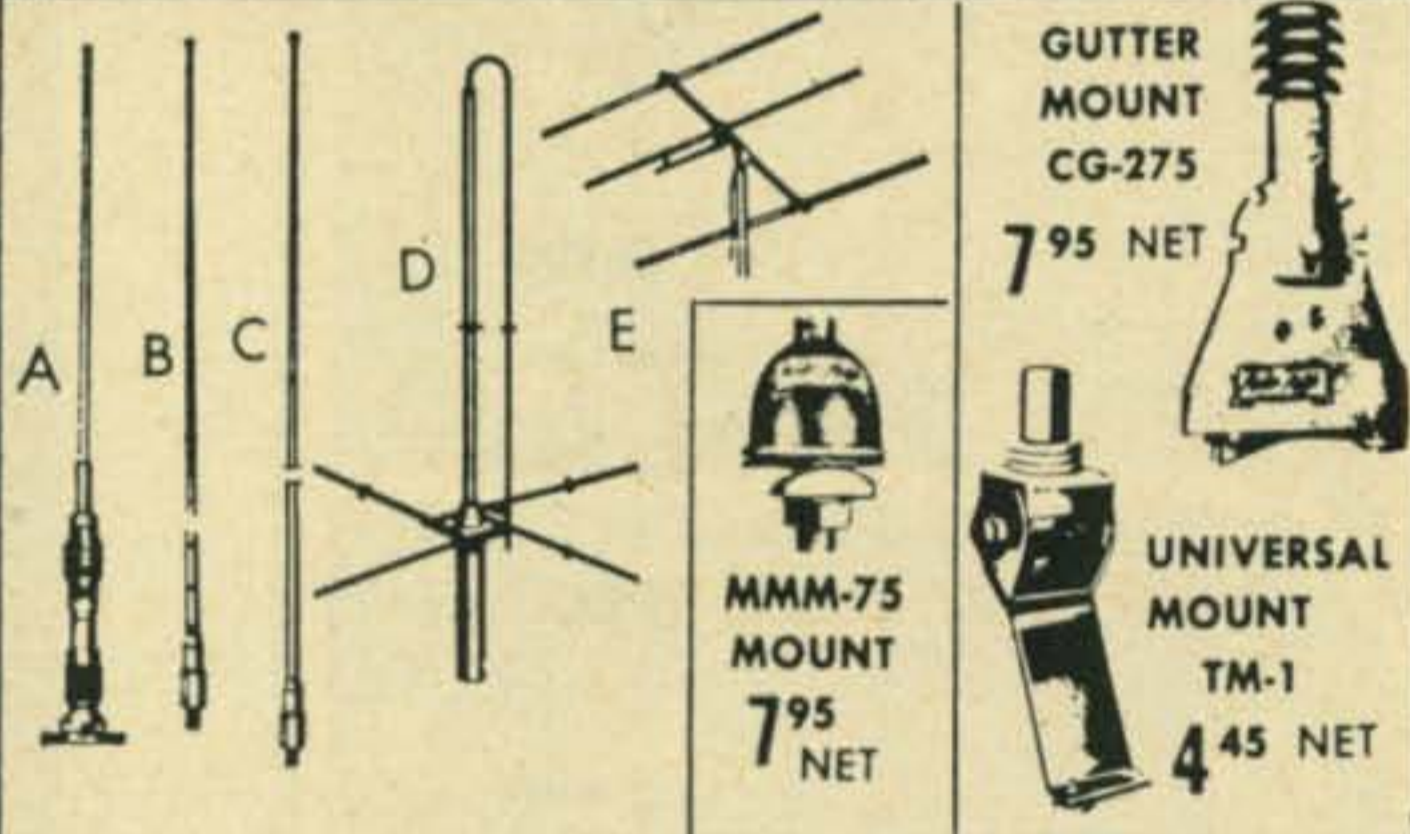
CB-5 GROUND PLANE

Half wave gives more gain than
1/4 wave without bulky trans-
formers. SPECIFICATIONS: VSWR
(50 ohm cable) 1.3:1 • Band-
width (under 2.1 VSWR) ± 4%
• 750 watts max. power input
• 50 ohm nominal input imp.
• Intl. feedline RG-8A/U
Termination SO. 239



24⁹⁵
CB NET

NEW AM-106 BASE STATION. 3/4 WAVE **34⁹⁵**
Ground Plane — 3.7 DB Gain. Net . . .



- A CB-1 Air Sentry "Shorty" — 23" overall with 18" whip — top loaded fiberglass — complete with spring, mount and 12 ft. coax cable. For auto CB use. **10⁹⁵**
- B CBS-311 mounts on top, fender or trunk lid. 52 ohms, 60 watts, RG 58 or equiv., 1.5 mc min., 1.1 to 1 at resonant frequency. For auto, plane or boat. **5²⁵**
- C FG-103 universal 103" fiberglass whip with 3/8" x 24 thread base fitting. **6⁹⁵**
(Not Shown) 100-1035 Stainless Steel 103" whip with 3/8" stud threaded to fit all mounts. **6⁹⁵**
- D SR-600-11 base station monopole for 11 meters. Radiating and ground plane elements grounded to reduce lightning damage. Write for specs. **24⁵⁰**
- E SR-500-11 3-element beam antenna with power gain approx. 2 1/2 (8DB) in forward direction — about 10 to 1 interference reduction from sides and rear. Handles up to 1 Kw input. 11 Meters **24⁹⁵**

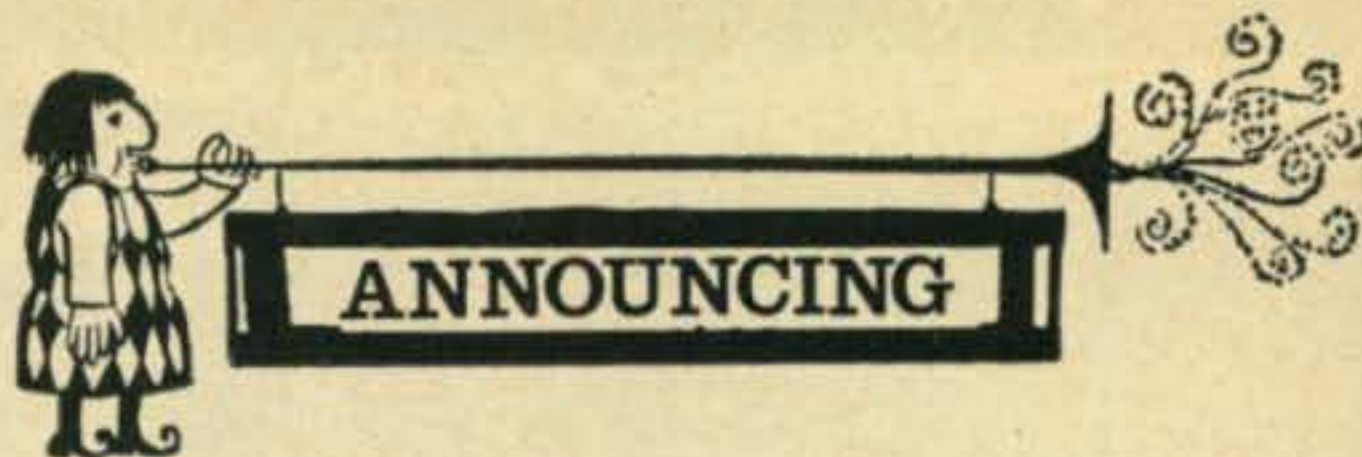
SEND FOR "ANTENNA BUYER'S GUIDE"
with over 200 Antennas. It's FREE!

Master Mobile Mounts

4125 W. JEFFERSON BLVD. CQ-4
LOS ANGELES, CALIF. 90016
AREA 213, 731-2251



DIVISION OF



Fresno, California

The Fresno Amateur Radio Club will hold its 23rd annual Hamfest on Saturday, May 15, 1965. It will be at the Towne and Country Lodge in Fresno. There will be prizes, contests and a dinner. Tickets and information can be had by writing to Howard Craven, W6DUD, Fresno A.R.C., P.O. Box 783, Fresno, California.

London SSB Association

The London Single Side Band Association will hold a dinner at the Waldorf Hotel, Aldwych, London, W.C.2. There will be entertainment and prizes. The date is Sat., May 29th. For further details contact Norman A. S. Fitch, G3FPK, 79 Murchison Rd., London, E. 10, England.

Orlando, Florida

The Orlando Amateur Radio Club will hold its annual Orlando Hamfest at the Cherry Plaza Hotel on April 23rd through the 25th. Featured items will be a swap shop, technical talks, Dances, and displays. Write to Betty Kuller, WA4JIU, 401 Halsey Street, Orlando, Florida, for more information.

Sycamore, Illinois

The Kishwaukee Radio Club will hold their Swap-Fest on Sunday, May 2nd, at the Hopkins Park Shelter House on Route 23, in Dekalb, Illinois. A \$1.00 donation is requested. Contact Al Brand, WA9MBJ, 415 E. Sycamore St., Sycamore, Illinois for further details.

Emporia, Kansas

The Neoshe Valley Amateur Radio Club Hamfest will be on Sunday, May 2nd at Bluestem Hall, northwest of Emporia. Registration is \$.50. A covered-dish picnic is planned at noon. For more info contact W0ZGB, 420 Neoshe Street, Emporia, aKnsas.

Swampscott, Massachusetts

The 1965 New England ARRL Convention will be held in Swampscott, Mass., on Saturday and Sunday April 24th and 25th at the New Ocean House Hotel. A new NASA space exhibit is planned for Saturday along with several prominent feature speakers and a Laser demonstration. A Saturday night dinner is planned with dancing and entertainment. Sunday there will be YL activities, a banquet, and the drawing of prizes. Registration is \$3.00 and the Sunday banquet is \$5.50. Reservations and information can be had by writing to John McCormick, W1KCO, RFD 1, Berkley Street, Tauton, Massachusetts.

Portland, Maine

The Portland Amateur Wireless Association will hold its annual Hamfest and dinner on May 15th at the Holiday Inn, in Portland. There will be a mobile hunt in the afternoon and the dinner in the evening. For further details, contact the Portland Wireless Association, 277 Cumberland Ave., Portland, Maine.

Detroit, Michigan

The Detroit Amateur Radio Association will have its annual Swap 'n' Shop at the Knights of Columbus Hall, Grand River Ave. and Lesure Ave. on Sunday, April 25th. Time: 10:00 A.M. to 4:30 P.M. Admission is \$.25 and display table charge will be \$1.00. Refreshments will be served.

North Jersey DXers Meet

The North Jersey DX Association's second annual DX roundup will be held on Saturday, March 20th at Schraffts Eastchester Restaurant. Activities start at 1 P.M. and dinner at 6:30 P.M. Don Miller, W9WNV, will be guest of honor and will illustrate his talk on

For further information, check number 20, on page 110

POWERFUL **BIG** NEWS



NEW!...2 METER-6 METER RF POWER AMPLIFIERS

More power in the VHF band!... and there is plenty of it in the new Gonset 2 and 6 Meter RF Power Amplifiers. Model 903A (2 meter) and Model 913A (6 meter) has a power input of 500 watt in all modes of operation. A 4X150A is used in the final, and the equipment is rated for CCAS* service. Only 5 watts is required to drive the 903A and 913A to full rated output. Output impedance is 50 ohms nominal with an input impedance of 50 to 75 ohms. The all solid state power supply is self-contained within the amplifier chassis. All stages are metered and all controls are on the front panel for ease of operation. The new linear amplifiers may be used with any of the famous Gonset Communicator series, as well as being ideally compatible for the new Gonset Sidewinder series.

Amateur Net Price \$299.00

*Continuous Commercial and Amateur Service.



NEW!...GONSET SIDEWINDER 6 METER SSB-AM-CW TRANSCEIVER

The new Gonset Model 910A *Sidewinder* offers coverage of the entire 6 meter band in 1 mc segments. Like its mate—the Model 900A 2 meter *Sidewinder*—this ultra-compact transceiver features all-transistor receiver and power supply and partially transistorized transmitter (except mixer, driver, and final stages). Designed for mobile or fixed communications, the unit operates with separate AC (shown above) or DC power supplies.

ANOTHER NEWSWORTHY NOTE: the Gonset GSB-201 Linear Amplifier was recently increased from 1500 to 2000 watts PEP (SSB). For those who operate on 10 to 80 meters—the GSB-201 is a natural companion for any of today's exciters.

WOULD YOU LIKE TO BE PLACED ON OUR NEW PRODUCT MAILING LIST?

We'll send you complete information on the products above and keep you informed of new Gonset developments from time to time. Merely write Dept. CQ-4

For further information, check number 21, on page 110

... COMES IN
POWERFUL
LITTLE PACKAGES
from
GONSET

SIDEWINDER SPECIFICATIONS:

TRANSMITTER:	
Power Input:	20 watts PEP (SSB) 6 watts AM 20 Watts CW
Spurious Suppression:	-40 db
Carrier Suppression:	-50 db on SSB
Unwanted Sideband Suppression: VFO or Crystal Control	-40 db
RECEIVER:	
Frequency Stability:	Highly stable incremental tuning utilizes same VFO as transmitter
Sensitivity:	$\frac{1}{2}$ μ v or better for 10 db S + N
Selectivity:	Lattice crystal filter for both receiver and transmitter
Spurious Rejection:	-50 db or better
Image Rejection:	-50 db (both receiver and transmitter utilize double conversion)
AMATEUR NET:	\$399.50
AC Power Supply	\$ 67.75
DC Power Supply	\$ 79.50

GONSET, INC.

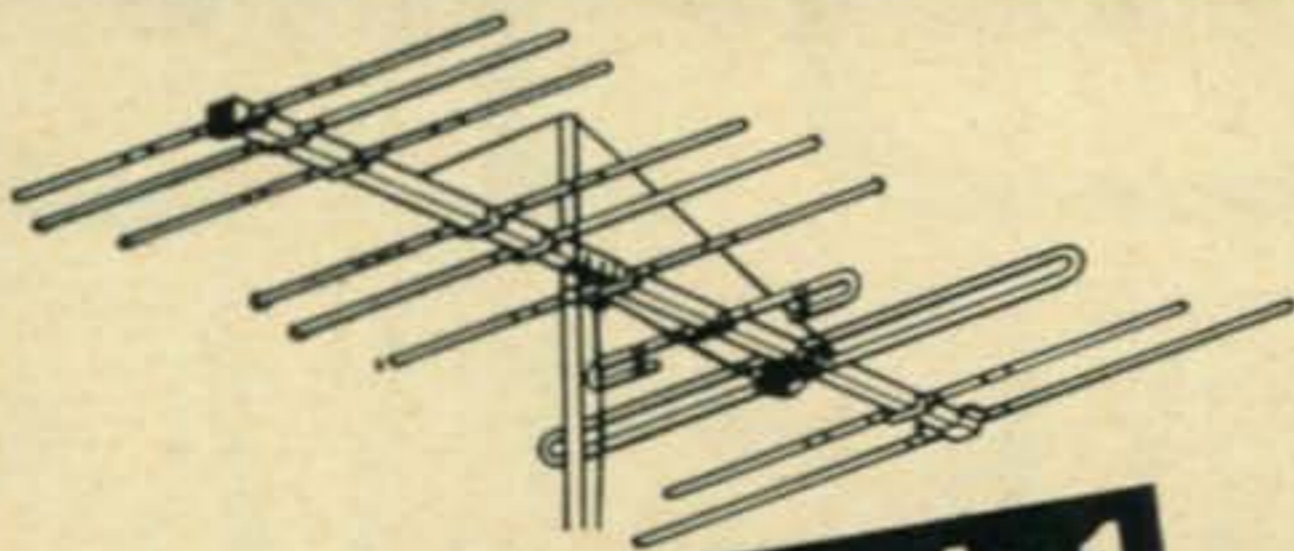
ALTEC LANSING CORPORATION

LTV A Subsidiary of Ling-Temco-Vought, Inc.

1515 SOUTH MANCHESTER AVENUE, ANAHEIM, CALIF.

© 1964 ALG

FINCO 6 & 2 Meter Combination Beam Antennas

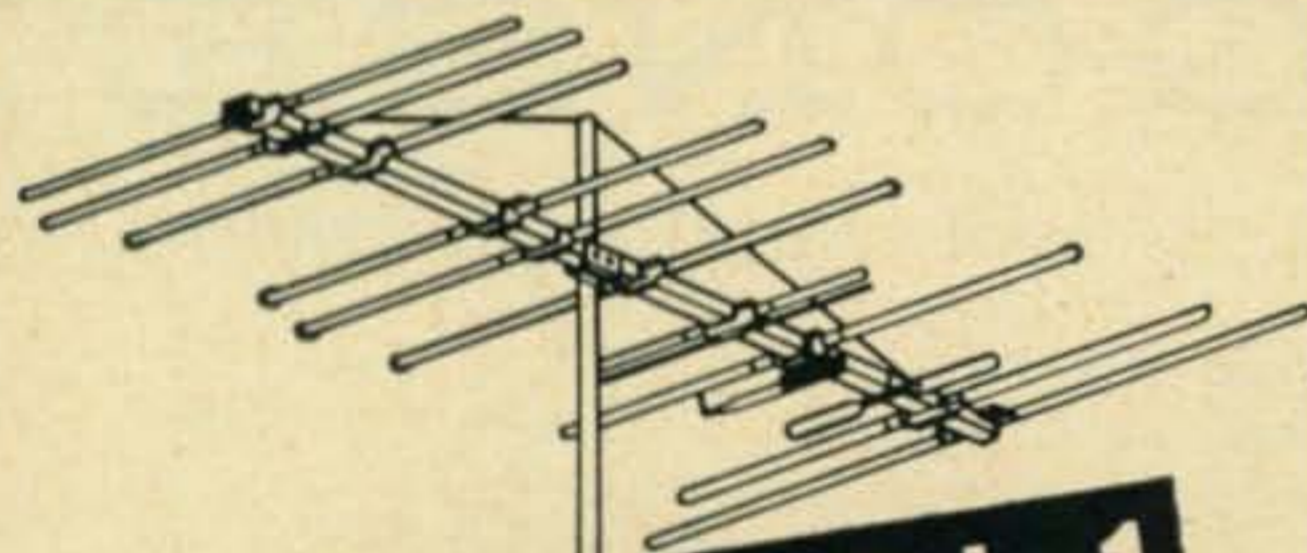


2 ANTENNAS in 1

MODEL A-62 · 300 OHM

On 2 Meters:	On 6 Meters:
18 Elements	Full 4 Elements
1-Folded Dipole Plus Special Phasing Stub	1-Folded Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net \$33.00
Stacking Kit \$2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:	On 6 Meters:
Equivalent to 18 Elements	4 Elements
1-Gamma-Matched Dipole	1-Gamma-Matched Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net \$34.50
Stacking Kit \$18.00

MODEL AB-62 GMC

On 2 Meters:	On 6 Meters:
Equivalent to 30 Elements	Equivalent to 6 Elements

Amateur Net \$52.50

Also:

- 5 New 6 Meter Beams
- 3 New 2 Meter Beams
- 1 New 1 1/4 Meter Beams

Gold Corodized for Protection Against Corrosion

See Your Finco Distributor or write for Catalog 20-226

The FINNEY Company - Bedford, Ohio

Cambodia with color slides. Tickets for the complete program and the dinner are \$8.50. Check with Bob Stankus, W2VCZ, 30 Pitcairn Ave., Ho-Ho-Kus, N.J. for reservations.

Trenton, New Jersey

The Delaware Valley Radio Association will sponsor its 18th annual Old Timer's Nite Round-Up and banquet on Saturday evening April 24th, at Barrett's Restaurant on the River Road, 4 miles west of Trenton. Guest speakers are planned with an antique wireless display by W2ZI and an award for the amateur holding the earliest ticket. As in the past, the event will be stag. Reservations are \$7.00 each and can be had from A. G. Wentzel, W2HX, 318 Gardner Ave., Trenton 8, N.J.

Johnson City, New York

The Southern Tier Radio Club is having their sixth annual dinner on April 3rd, 1965. It will be at the St. John's Ukranian Hall, Johnson City, N.Y. The doors open at 5 P.M. and dinner will be at 7 P.M. Tickets are \$3.00 for adults and \$1.75 for children under twelve. Info and tickets are available from Harry Spencer, W2SDA, 1165 Vestal Ave., Binghamton, N.Y.

Syracuse, New York

The Radio Amateurs of Greater Syracuse are holding their Tenth Anniversary Hamfest on Saturday, April 24th at Hinerwadels Grove, Fay Road, North Syracuse.

There will be a dinner, entertainment, speakers, and demonstrations. Write to Norm Esterson, W2YRL, 118 Legion Drive, No. Syracuse, New York, for tickets and information.

Harleysville, Pennsylvania

The North Penn. Amateur Radio Club will have their 12th annual banquet at the Audubon Inn, Egypt and Paulings Roads, Audubon, Pa., on May 14th. The dinner starts at 7:00 P.M. There is a choice of prime ribs of beef or shrimp dinner, both at \$4.00. Tickets may be purchased from Jack Barnshaw, K3ROK, 309 Prince Frederick Street, King of Prussia, Pa.

Turtle Creek, Pennsylvania

The Tri-State Pittsburgh SSB Society will hold their Spring dinner at Johnny Garneau's Smorgasbord Restaurant on May 1st at 6:30 P.M. It is located one mile west of the Pittsburgh interchange of the Turnpike on Route 22. Tickets are \$4.00 each and are available from Jim Gerdwin, W3NUK, 1409 Chestnut Street, Turtle Creek, Pa., 15145.

Greenville, South Carolina

The sixth annual Greenville Hamfest will be held Sunday, May 2nd at the Greenville County Fairgrounds, Greenville. Lunch will be served and is included in the admission price. Advance tickets and further information is available from: Don Robertson, WA4KLT, 101 Griffin Drive, Greenville, South Carolina 29607.

Amarillo, Texas

The Panhandle Amateur Radio Club is holding its fifth annual Golden Spread Hamfest on May 1st and 2nd at the National Guard Armory in Amarillo. For advance registration contact Lorna S. Parmer, K5WZD, 504 W. Colorado Ave., Amarillo, Texas.

Attention Rho Epsilon Members

David Mitchell, K7NPL, is looking for past members of Rho Epsilon Fraternity. Rho Epsilon is a college fraternity founded for amateurs at Washington State University. It was a national fraternity prior to WW II, but was not revived nationally after the war. Those of you who are either past members or have information about the fraternity please contact David Mitchell, K7NPL, Vice-President and historian, Alpha Chapter, Rho Epsilon Fraternity, Washington State University, Pullman, Washington 99163.

Reciprocal Privileges

The FCC has finally taken official recognition of Public Law 88-313, sometimes referred to as the Goldwater Reciprocal Privileges bill. The text of the recently released order, outlining the limits of such privileges, begins on the next page.

SSB COMMUNICATIONS

FOR MILITARY APPLICATIONS

TRANSCEIVER MODEL RF-301

FREQ. RANGE: 2-15 MC.

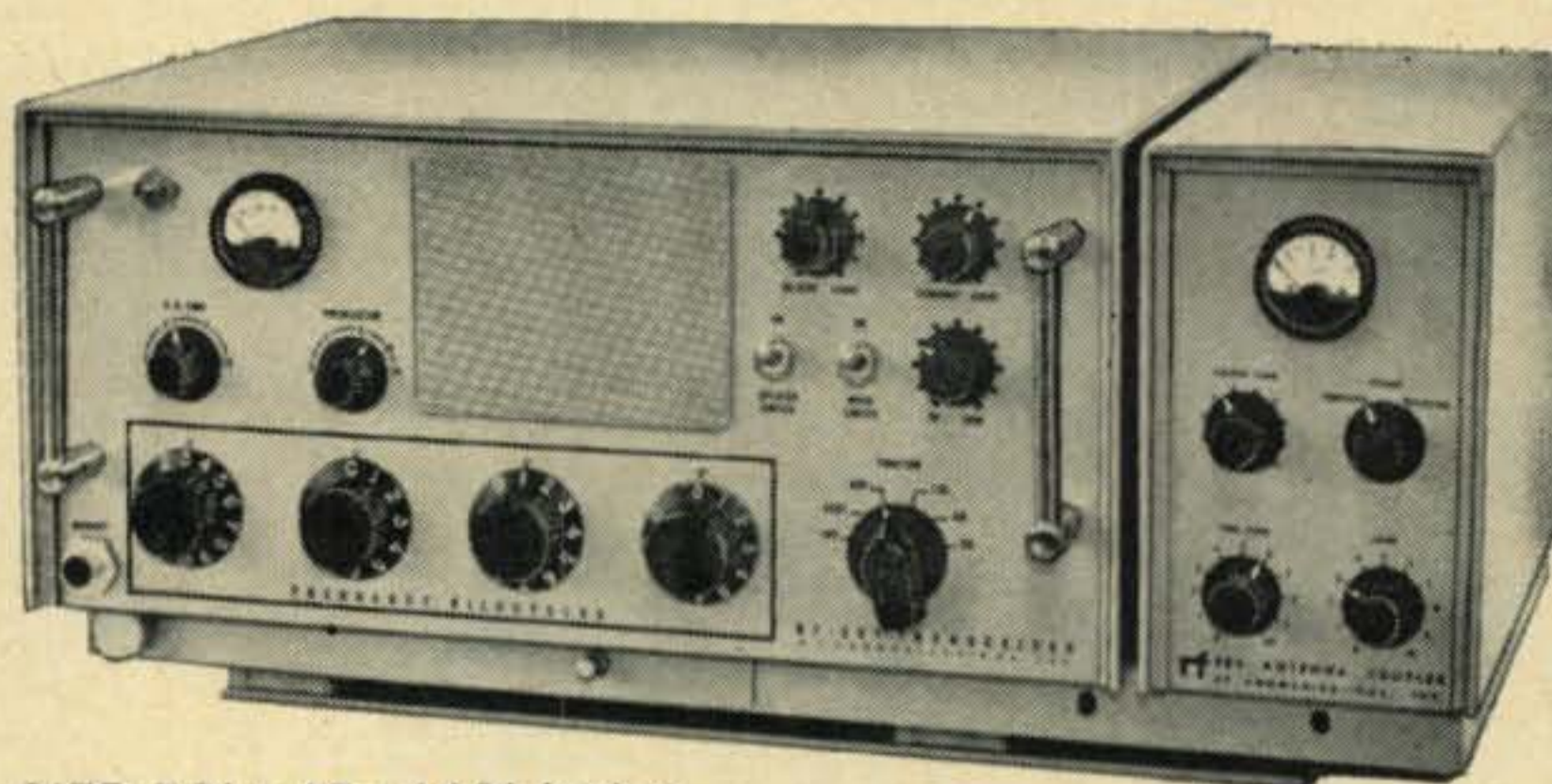
SYNTHESIZER: 1 KC Channels

STABILITY: 1 part 10^6 standard,
5 parts 10^8 available.

VFO MODE: Continuous tuning
calibrated to 100 cycle increments.

POWER OUTPUT: 100 Watts
p.e.p. & Average

MODES: USB, LSB, CW, AM
FSK (with external tone keyer)



SIZE: $7\frac{3}{4}$ x 17 x $14\frac{3}{4}$ inches

WEIGHT: 55 pounds

POWER INPUT: 115/230 Volts, 50/60 Cycles AC & 24 Volts D.C.
No external boxes required (12 V.D.C. can replace 24 V.D.C.)

FULLY TRANSISTORIZED except for PA & RF Amp.

FULL MIL SPEC AT A COMMERCIAL PRICE!

The RF-301 Transceiver is intended to be used in tactical military applications. It is **COMPATIBLE** with high-frequency SSB equipment now being used by all U.S. defense agencies. The RF-301 can be set to **ANY** channel with 1 KC spacing between 2 and 15 Mc with the built-in high-stability synthesizer. Between 1 KC steps a V.F.O. is included for **CONTINUOUS** tuning with 100 cycle calibration.

This is the only transceiver available with the advantages of BOTH a stabilized synthesizer and continuous tuning for both transmit and receive.

Providing continuous duty 100 watt power output (both p.e.p. & average), the RF-301 is ideal for **SSB, AM, CW, & FSK** operation. The transceiver is rated to operate continuously at ambient temperatures up to 65°C . It meets the vibration specifications of MIL-E-16400 and is splash-proof and resistant to humidity and fungus.

THE RF-301 CAN BE USED IN OPEN VEHICLES AND BOATS

Complete input power flexibility is provided internally in this transceiver. It can operate with 115/230 volt, 50/60 cycle A.C. power **AND** 24 volt D.C. power with no accessories or external converters. A 12 volt D.C. capability is available in place of 24 volt D.C. The RF-301 is **COMPLETELY TRANSISTORIZED** with the exception of the P.A. and R.F. stages.

COMPANION ANTENNA COUPLER AND SHOCK MOUNTS AVAILABLE

WRITE FOR DETAILS ON THESE AND OTHER PRODUCTS IN THE
WORLD'S MOST COMPLETE LINE OF FIXED CHANNEL SSB EQUIPMENT



R F COMMUNICATIONS, INC.

1680 UNIVERSITY AVENUE • ROCHESTER, NEW YORK 14610

For further information, check number 23, on page 110

THE UNIQUE

Joystick

VARIABLE FREQUENCY ANTENNA

The DX aerial for
any QTH!

Hear and work that spicy DX with the Joystick—End the frustration of "hunk of wire" contacts—Now you can put out the kind of signal your

ONLY
\$10.00
COMPLETE

transmitter was designed to produce—yes, even from inside an apartment or home!

A lifetime of experience and antenna "know-how" has gone into the development of this revolutionary "Variable Frequency Antenna" on which World Patents are pending. Uniformly excellent performance on all bands from 160 thru 10 meters. The Joystick's special matching and feeding system insures top efficiency on any frequency. Complete systems are available for s.w.l.'s and mobile, too. Over 1,500 Joysticks are in use around the world.

Acclaimed by CQ (July, 1964), *Short Wave Magazine*, International Short-Wave League, well known hams such as W1BB, W3QCW, G2VV, and hundreds more. An amazing achievement with a Joystick system: ZL4GA worked All continents in one day—in very poor conditions!

SIZE 7'6"
VERTICAL
2-3 METRES

ORDER YOUR JOYSTICK NOW

Full money-back GUARANTEE if you're not completely satisfied.

Still not convinced? Complete the coupon below for a detailed brochure and testimonials.

Please ship Joystick system checked below:

- Complete Deluxe Joystick Transmitting System (Shpg. to USA Incl.).....\$24.00
- Same as above, but Standard model\$21.15
- Complete Deluxe Joystick Receiving System (Shpg. to USA Incl.)\$20.85
- Same as above, but Standard model\$18.00
- Complete Joystick Mobile System (Shpg. to USA Incl.)\$21.10
- Please send brochures and testimonials.

Name.....Call.....

Address.....

City.....State.....Zip Code.....

Partridge Electronics, Ltd.

7 SOWELL STREET BROADSTAIRS, KENT, ENGLAND

For further information, check number 24, on page 110

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of
Amendment of Parts 0, 1 and 97
of the Commission's rules
to implement the provisions of
Public Law 88-313.

ORDER

By the Commission:

At a session of the Federal Communication Commission held at its offices in Washington, D.C. on the 24th day of February, 1965.

The Commission having under consideration Public Law 88-313, approved May 28, 1964, which amended Sections 303 (1) and 310 (a) of the Communications Act of 1934, as amended, to provide for the issuance of an authorization, under such conditions and terms as the Commission may prescribe, to permit an alien licensed by his government as an amateur radio operator to operate his amateur radio station licensed by his government in the United States, its possessions, and the Commonwealth of Puerto Rico provided there is in effect a bilateral agreement between the United States and the alien's government for such operation by United States amateurs on a reciprocal basis; and

IT APPEARING, That rules implementing Public Law 88-313 should be adopted; and

IT FURTHER APPEARING, That authority for the issuance of the rules herein adopted is contained in Section 4 (i), 303, and 310 (a) of the Communications Act of 1934, amended; and

IT FURTHER APPEARING, That the rules adopted herein are pursuant to Public Law 88-313, involve interpretative rules and rules of agency practices and procedures, and that the public notice and effective date provisions of Section 4 of the Administrative Procedure Act are not applicable;

IT IS ORDERED, effective March 29, 1965, That Parts 0, 1, and 97 of the Commission's rules are amended as set forth in the Appendix, and FCC Form 610-A is adopted.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Secretary

A P P E N D I X

1. Section 0.332, Paragraph (i) is added to read as follows:

§ 0.332 Additional Authority delegated.

* * *

(i) To grant or deny applications for permits and to modify, suspend, or cancel such permits, pursuant to Subpart G, Part 97 of this chapter.

2. Section 1.911, Paragraph (e) is added to read as follows:

§ 1.911 Applications required.

* * *

(e) An alien amateur desiring to operate in the United States under provisions of Sections 303 (1), (2) and 310 (a) of the Communications Act of 1934, as amended, and under the terms of a bilateral agreement in force between his country and the United States concluded pursuant to the provisions of Public Law 88-313, shall make application on FCC Form 610-A, which shall be filed with the Secretary, Federal Communications Commission, Washington, D.C. 20554. Forms may be obtained from the Secretary, any field office of the Commission and, in some instances, from United States missions abroad.

3. Section 1.922 (Amendment)

In Section 1.992, the following form number and title are added in the proper numerical sequence:

610-A Application of Alien Amateur Radio Licensee for Permit to Operate in the United States.

4. Part 97 is amended by adding new Subpart G, as follows:

SUBPART G—OPERATION OF AMATEUR RADIO STATIONS IN THE UNITED STATES BY ALIENS.

Sec. 37301 Basis, purpose, and scope.

Sec. 97.303 Permit required.

Sec. 97.305 Application for permit.

Sec. 97.307 Issuance of permit.

Sec. 97.309 Modification, suspension, or cancellation of permit.

[Continued on page 108]

The Amateur Radio Club Forum

AL SMITH,* WA2TAQ

MOST people are probably aware that magazines such as *CQ* must be made up at least two months ahead of time. An example is that it is now January and I'm preparing the April column. The point is that this is the first chance I have to comment on the response received on my introductory column in the January issue. First I wish to thank all those sending in messages of congratulations and contributions to the Club Forum. I hope that by this time I will have sent each person writing in at least a post card acknowledging their letters.

The letters received represented all types of amateur radio clubs. They ranged from probably the smallest to the largest clubs. I believe mere mention of the purposes of the smaller club may be enough to stimulate others to form similar groups. They are: To secure for its members; 1. Increased enjoyment of the hobby of amateur radio through full sharing of experience, knowledge, and fraternalism. 2. Association with persons commonly interested in the technical aspects of the hobby. 3. The furthering of the state of the art by increased knowledge and operating proficiency. 4. A technically high level of preparedness for the PICON.

This group has no dues and no permanent President. There is however a President pro-tem for each meeting, the host in whose home the monthly meeting may be held. There is a Secretary Treasurer to take care of records, meeting notices, and such. Holding the membership down to eight members makes it easy for the group to meet in each other's homes, and results in achieving their aims without the clamor which is so often evident in meetings of larger clubs.

The 4H Amateur Radio Club of Fairfax County (Clifton, Virginia) has an interesting program. In addition to the usual club license class program, each student is requested to build their own station. At each club meeting an equipment check is held and the students demonstrate their progress. This club concentrates on c.w. which they find more challenging than phone. The 4H group is interested in exchanging ideas with other clubs and maybe arrange inter club skeds. Those interested can contact Vic, W4KFC.

Many of our newer clubs have intentions of filing an application for a club station call sign. You can save both the FCC and yourself some time by being sure to include the following with your form 610: A letter (on club stationery if you have same) authorizing the applicant as Trustee for your contemplated club station call, signed by a club officer. A copy of the clubs

*504 Beach 43rd St., Far Rockaway, N. Y. 11691.

PINT SIZE POWERHOUSE!

300 WATT SSB/CW TRANSCEIVERS
LESS THAN 1 CUBIC FOOT IN SIZE!!



Deluxe GALAXY V

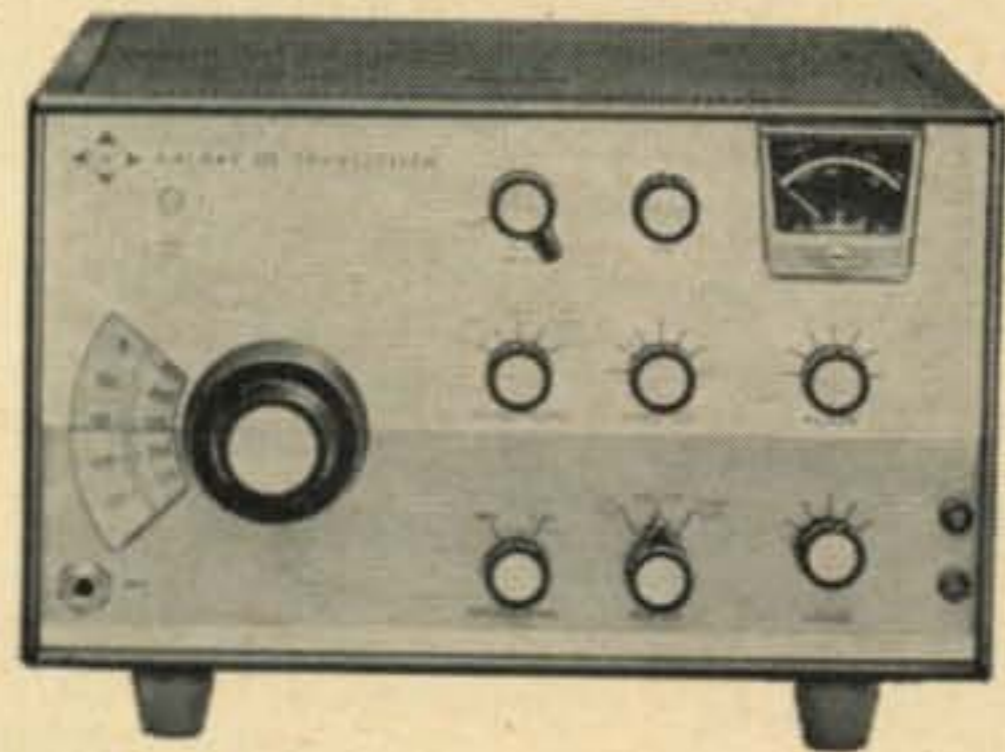
Extremely compact, conservatively rated 300 watts PEP/SSB/CW — packs a real wallop!

Covers 80-40-20-15-10 meters, with a choice of either sideband on all bands!

Designed for either FIXED or MOBILE OPERATION. 6 crystal filter provides the "hottest" RECEIVER ANYWHERE! Has exclusive — VFO SIDE VIEW DIAL — for better mobiling. Compatible with a full line of Galaxy accessories, including DX remote VFO, deluxe accessory console (phone patch, SPKR, 24 hr. clock, SWR bridge).



**GALAXY QUALITY
IN A CLASS ALL ITS OWN**



GALAXY III

Has all the outstanding performance features of the Galaxy V, except coverage is 80-40-20 meter band.

\$349.95

Your NEW pacesetter in amateur design.



GALAXY ELECTRONICS
10 South 34th Street
Council Bluffs, Iowa 51504

- Please rush me your FREE detailed brochure.
- Galaxy III or V operating manual (\$1.00 ea. Postpaid Continental USA)

Name _____

Address _____

City _____ State _____ Zip _____

For further information, check number 25, on page 110

April, 1965 • CQ • 25

NEW callbook

**HOT OFF
THE
PRESS!**



**Over 60% of listings
changed in only a year!**

PLUS THESE EXTRA FEATURES:

- Great Circle Bearings
- Great Circle Charts
- Prefixes by Countries
- "Q" and "Z" Signals
- World Time Chart
- Int'l. Postal Rates

United States Listings...\$5.00
DX Listings..... 3.00

**RADIO AMATEURS
REFERENCE LIBRARY OF MAPS
ORDER YOUR SET TODAY!**



WORLD PREFIX MAP—Full color, 42" x 29", shows prefixes on each country . . . DX zones, time zones, cities, cross referenced tables.....postpaid \$1.00

POLAR PROJECTION MAP—Azimuthal equidistant projection. Shows prefixes on each country, DX zones, cities, prefix index by countries, 29" x 25"postpaid \$1.00

UNITED STATES MAP—All 50 States with call areas, prefixes, DX and time zones, FCC frequency allocation chart. Plus interesting information on all 50 States. 29" x 17"postpaid 50c

WORLD ATLAS—Only Atlas compiled for amateurs. Polar projection, six continents, prefixes on each country . . . full color, 16 pages.....postpaid \$1.00

Complete reference library of maps—set of 4 as listed above.....postpaid \$2.50

**WRITE FOR
FREE
BROCHURE!**

**RADIO AMATEUR
callbook INC.**
Dept. C, 4844 W. Fullerton Ave.
Chicago, Ill. 60639

See your favorite dealer or order direct (add 25¢ for mailing)

constitution and By-Laws, and the four dollar application fee. If you are requesting a special call sign in memory of a departed member you must submit a payment of twenty dollars. Remember, that the money sent in is an application fee, and as such is required with each application whether the application is accepted or rejected, in other words NO refunds. The FCC will accept a photostat for renewal purposes.

In correspondence received, by far the largest concern is keeping members interested in club doings. I suppose most clubs have gone down the list of usual items such as; nets, building projects, QSO parties, awards, auctions, hamfests, club station activities, and bunny hunts to name a few. These are the tried and true amateur radio club activities. Perhaps not only new things are needed but variations on the old as well. I'm sure that many of you now reading this may have some ideas on how to improve on the old methods, you can be of service to fellow club amateurs by sending in your suggestions to the Amateur Radio CLUB FORUM.

Our avocation is in fact communication, however it's amazing how little use we make of it for such things as building up club membership. I have heard active club amateurs in QSO with stations new to the community without mentioning the neighborhood amateur radio club. Perhaps club officers should consider a program of educating the membership in this regard. This would make a good item for club publications.

An excellent suggestion was advanced by Al Gerel, proprietor of Algeradio Electronics, of Hempstead, Long Island. This was that a listing be compiled of amateur radio clubs with the secretary's addresses for use by the supply stores. No doubt many amateurs and would-be amateurs have queried these people on the subject.

Club editors take note: word has been received of yet another amateur editors, and public relations group. Known as ARNS (Amateur Radio News Service), membership is open to staff members of club papers and public relations groups. If the reader desires further information on any organization or activity mentioned drop me a card and I will let you know who to contact.

Speaking of public relations, how about each reader telling a friend or fellow club member about the CLUB FORUM. Also why not let the members know at a meeting that the CLUB FORUM exists and that it's here for the benefit of amateur radio clubs everywhere.

Does your club have a publication? If not, it should, even if it is a one page sheet. It is not too difficult to put out a paper and it can make a big difference for your club. There is a booklet available called the "Club Paper" published by Ralph Anderson, W3NL, Editor of the *Washington Amateur Radio News* and *Auto Call*. You can get a copy for a quarter (that's wholesale) by dropping a line to Ralph at 2509 32nd St., S.E., Washington, D. C. 20020.

By the way to make for faster, accurate mail

service use the ZIP code of your post office on every letter or card you send out. The mail will be delivered faster.

By this writing your club plans for Field Day should be in the advanced stages. Here's a few tips that may be helpful to FD newcomers. A chairman and/or co-chairman should have been appointed and possibly a chairman for each band operated or station to be set up. Every club member should be participating in FD and a job assigned to all. The older fellows who cannot be too active can do a great service to their club members by assuming the job of safety inspectors. All of us at FD have a tendency to get antennas, towers, tents and equipment set up in a hurry and may overlook even the most basic rules of safety. The old timers acting as a watchdog committee can check such things as stability of antenna supports, proper tying down of tents, and very important the electrical safety of both the transmitting and receiving gear as well as the a.c. circuits.

Grounding is a must not only for efficient operation of our rigs but for our own personal protection. Check your handbook for proper grounding methods.

Many a ham has taken a header in the wee hours tripping over a tent peg or a guy wire. Keep the area well lighted and bring a good supply of bright rag strips that can be tied to these obstacles to point out their location.

In the past year or so many new clubs have sprouted up and will hold their first FD this year. A good point for these clubs would be to contact someone with FD experience and invite them to speak on the subject at a club meeting.

This writer hopes that amateur radio clubs will keep in mind the title FIELD DAY. Far too many clubs take the Field out of Field Day and wind up in ready made buildings, with ready made antenna supports and such. Make this year a real test of preparedness by utilizing remote locations and having a real FIELD DAY.

It's a good idea to let the local constabulary know that you will be setting up for FD, and should be at the site for over 24 hours. Ask them to drop by when making their rounds, you never know who may wander in and cause problems. It will also show the powers that be, that you can and are doing a service for the community.

Another important consideration is to be sure each operator has his amateur license with him or her (the original not a photostat) and that at least a photostat of the club call or call being used is on hand. Remember too that FCC rules state that you must say your location when portable or mobile.

Finally have a good first aid kit on hand, and unless you happen to have a MD at the site, scout out the location of the nearest doctor or hospital so that if medical aid is needed in a hurry there will be no delay. I hope these hints will help and perhaps we'll add a few more for next month.

73 AI WA2TAQ

send for New FREE

CRYSTAL
CATALOG

... with New
TRANSISTOR
OSCILLATOR
CIRCUITS

3 BIG MODERN PLANTS
TO SERVE YOU BETTER

2 in Fort Myers

1 in Los Angeles



HERMETICALLY SEALED
PRECISION GROUND
CUSTOM-MADE
NON-OVEN CRYSTALS

Top performance assured with quality controlled throughout manufacture. Gold or silver plating acts as electrodes. Crystals are spring mounted and sealed under vacuum or filled with inert gas. Very high frequency stability. Max. current capacity is 10 milliwatts—5 for overtone type. Conformity to military specifications guaranteed.

1000KC to 1600KC (Fund. Freq.)	.....	Prices on Request
1601KC to 2000KC (Fund. Freq.)	.....	\$5.00 ea.
2001KC to 2500KC (Fund. Freq.)	.....	4.00 ea.
2501KC to 5000KC (Fund. Freq.)	.....	3.50 ea.
5001KC to 7000KC (Fund. Freq.)	.....	3.90 ea.
7001KC to 10,000KC (Fund. Freq.)	.....	3.25 ea.
10,001KC to 15,000KC (Fund. Freq.)	.....	3.75 ea.
15MC to 20MC (Fund. Freq.)	.....	5.00 ea.

OVERTONE CRYSTALS

15MC to 30MC Third Overtone	.....	\$3.85 ea.
30MC to 40MC Third Overtone	.....	4.10 ea.
40MC to 65MC Third or Fifth Overtone	.....	4.50 ea.
65MC to 100MC Fifth Overtone	.....	6.00 ea.

DRAKE 2-B Receiver Crystals \$4.00
(All Channels—Order by Freq.)

OVEN-TYPE CRYSTALS

for Motorola, GE, Gonset, Bendix, etc.

Add \$2.00 per crystal to above prices

SUB-MINIATURE PRICES slightly higher

CITIZEN BAND Class "D" Crystals \$2.95
Over 50,000 CB crystals in stock for all sets and channels, both HC6/U and miniature types. To insure proper correlation and correct freq. operation, order by manufacturer model number and channel.

NOW . . . 48 HOUR SHIPMENT

ALL TEXAS CRYSTALS are made to exacting specifications, quality checked, and unconditionally guaranteed!

Send for our new
CITIZEN BAND CRYSTAL
INTERCHANGEABILITY

CHART WITH TEXAS CRYSTALS CODE
SYSTEM

ORDER FROM CLOSER PLANT

TEXAS CRYSTALS

DEPT. CQ-4
1000 Crystal Drive
FORT MYERS, FLORIDA
Phone 813 WE 6-2109
AND
4117 W. Jefferson Blvd.
LOS ANGELES, CALIF.
Phone 213-731-2258

Division of



For further information, check number 27, on page 110

HEATHKIT® Amateur Radio Gear . . .

"SINGLE-BANDER" SSB TRANSCEIVERS

HW-12
Choose 80,
40, or 20
meters
\$119⁹⁵



200 watts on the band of your choice with built-in PTT and VOX. Versatile! See line listing below for power supplies. Go mobile or fixed!

Kit HW-12 (80-meter), Kit HW-32 (20-meter), Kit HW-22 (40-meter), 16 lbs. each \$119.95



BENTON HARBOR LUNCH BOXES . . .

HW-29A
6 & 2 Meter
Transceivers
\$44⁹⁵

Take along one of these handy 5-watt rigs on your next outing. Complete for 117 v. AC operation. Use Heathkit GP-11 power supply for mobile.

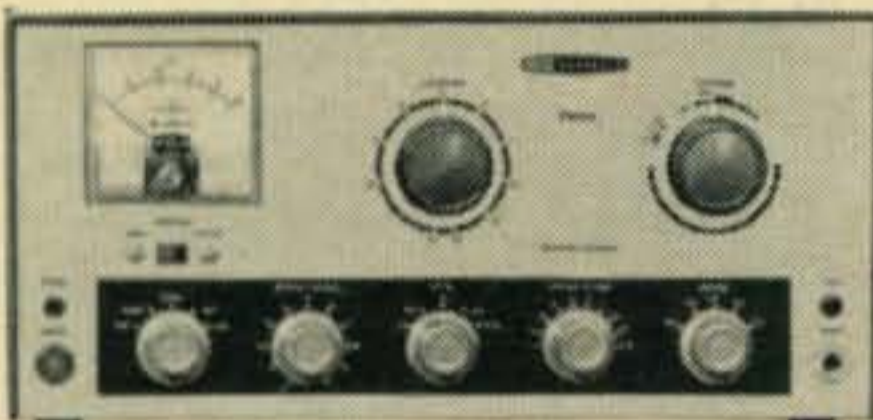
Kit HW-29A (6 meter) & HW-30 (2 meter) . . . each \$44.95

"COMBO" FOR THE NOVICE

HR-10
Receiver
\$79⁹⁵



Heathkit
DX-60A
AM/CW Transmitter
\$79⁹⁵



Here's inexpensive amateur radio . . . yet the finest quality! HR-10 provides amateur band coverage 80-10 meters with xtal filter, calibrator, BFO, and AVC. DX-60A provides 90 watts AM or CW with low harmonic output from xtal control or external VFO.

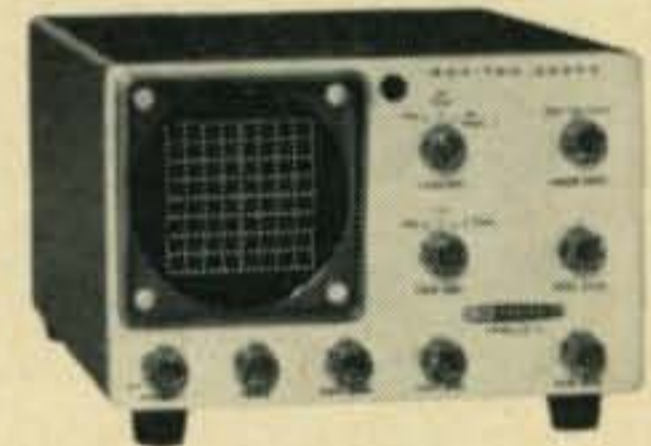
Kit HR-10, 20 lbs. \$79.95
Kit DX-60A, 25 lbs. \$79.95

HEATHKIT "MONITORS" ADD PROFESSIONAL QUALITY TO THE AMATEUR STATION

H0-13
"Ham-Scan"
Spectrum Monitor
\$79⁰⁰



H0-10
Signal Monitor
\$59⁹⁵



"Ham-Scan" shows a panoramic display of radio signals 50 kc's on each side of receiver tuning. Shows band conditions instantly!

Kit H0-13, 12 lbs. \$79.00

H0-10 shows actual quality of transmitted and received signals. Displays envelope, AF and RF trapezoid patterns.

Kit H0-10, 12 lbs. \$59.95

TUNNEL DIPPER

HM-10A
\$34⁹⁵



Outperforms the usual grid-dip meter through solid-state circuitry.

Kit HM-10A, 3 lbs. \$34.95

HEATHKIT "CANTENNA" TRANSMITTER DUMMY LOAD

HN-31
\$9⁹⁵



50-ohm impedance. Oil cooled. Allows power measurements with minimum radiated signal. (Oil not included).

Kit HN-31, 3 lbs. \$9.95

For Complete Descriptions See Your 1965 Heathkit Catalog

Kit HP-13 DC Power Supply (converts 12 v. DC to power for single-banders), 7 lbs. \$59.95

Kit GP-11 Vibrator Power Supply (6 or 12 v. DC to 250 v. DC @ 100 ma.), 6 lbs. \$16.88

Kit HP-23 AC Power Supply (converts 120 v. AC to power for single-banders), 19 lbs. \$39.95

Kit HS-24 Mobile Speaker, 3 lbs. \$7.00

Kit PM-2 RF Power Meter, 2 lbs. \$12.95

Kit HD-19 Hybrid Phone Patch, 4 lbs. \$29.95

Kit HD-11 "Q" Multiplier, 3 lbs. \$14.95

Kit HG-10 VFO, 80-2 meters, provides 5 volts RMS, 12 lbs. \$34.95

Kit HD-20 100 kc Crystal Calibrator, 1 lb. \$14.95

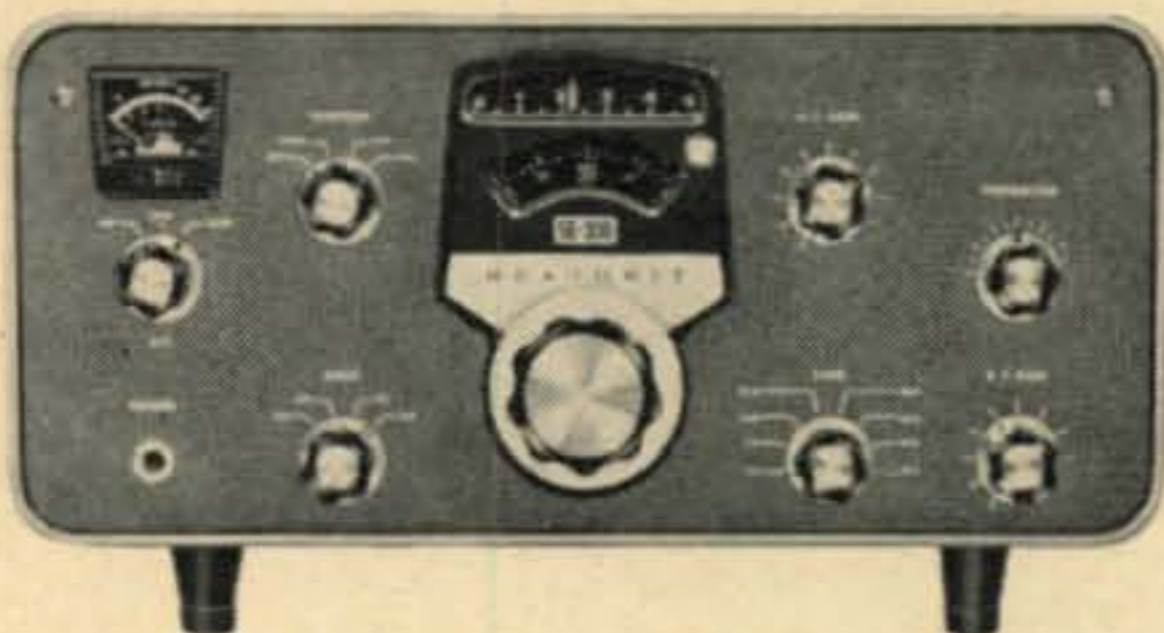
Kit HM-11 Reflected Power Meter, 3 lbs. \$15.95

World's Largest Selection!

YOU CAN SAVE UP TO 50%

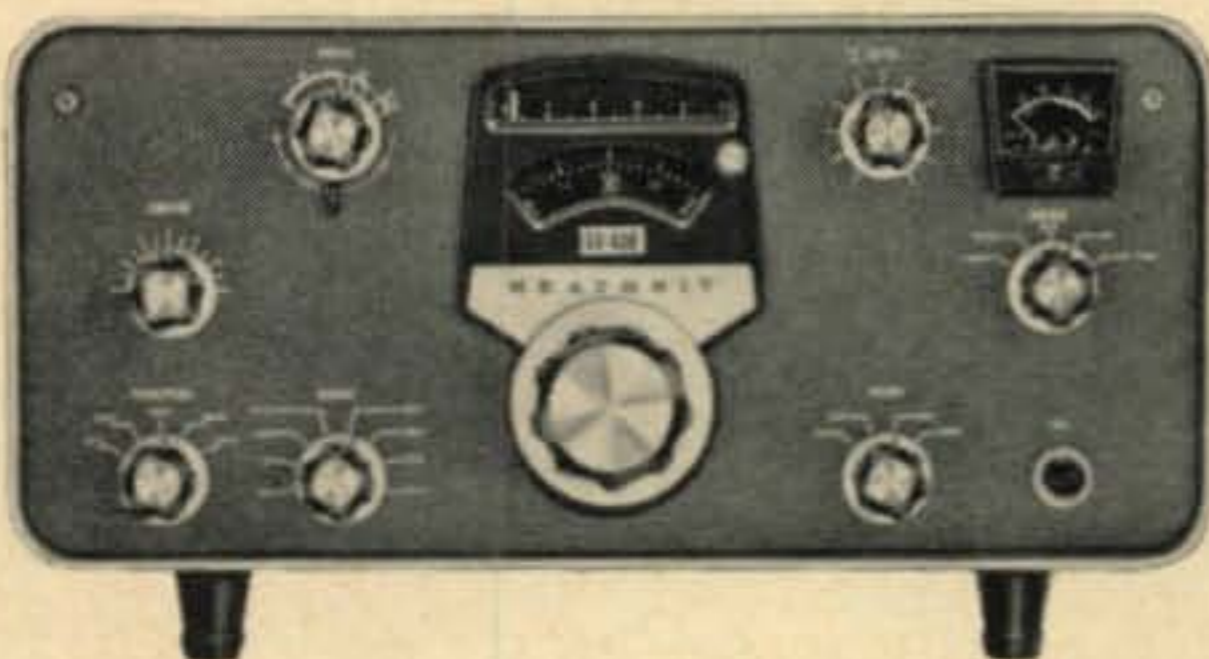
HEATHKIT DELUXE SB SERIES . . .

SB-300 SSB RECEIVER . . . \$265.00



- A new standard of amateur performance & value • 80-10 meters with provision for VHF converters • Crystal-controlled front-end for same rate tuning on all bands • 1 kc dial calibrations—100 kc per dial revolution • Bandspread equal to 10 feet per megacycle • Provision for transceive operation with matching SB-400 transmitter • Drift less than 100 cps per hour after warmup • 8 ohm audio output matches HS-24 speaker • Compact—weighs only 22 lbs.

SB-400 DELUXE SSB TRANSMITTER . . . \$325.00



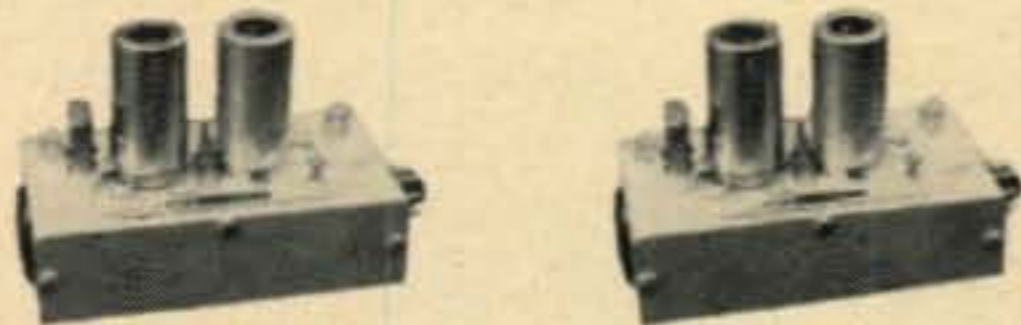
- Built-in power supply • Complete transceive capability with SB-300 receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation (upper or lower sideband) • VOX operated CW uses CW sidetone • 1 kc dial calibration—100 kc per dial revolution • 500 kc coverage per bandswitch position • 33 lbs. weight.

SB-200 KW LINEAR AMPLIFIER . . . \$200.00

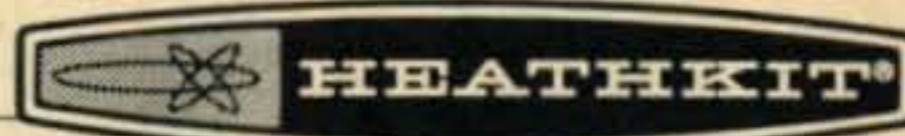


- 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation • Weight 42 lbs.

6 & 2 METER PLUG-IN CONVERTERS EXTEND OPERATION OF SB-300



6 meter model extends coverage from 48-54 mc (50-52 mc crystal supplied). 2 meter model extends coverage from 142-150 mc (144-146 mc crystal supplied). Designed to plug-in to SB-300, but work with any receiver having proper voltages and 10 meter coverage. 2 lbs. **SBA-300-3** (6 meter), **SBA-300-4** (2 meter), 2 lbs. \$19.95 each



FREE 1965 HEATHKIT CATALOG



See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications . . . Send for Free copy!

HEATH COMPANY, Benton Harbor, Michigan 49023
In Canada: Daystrom, Ltd., Cooksville, Ontario Dept. 12-4

Enclosed is \$ _____, plus shipping.

Please send model (s) _____

Please send FREE 1965 Heathkit Catalog.

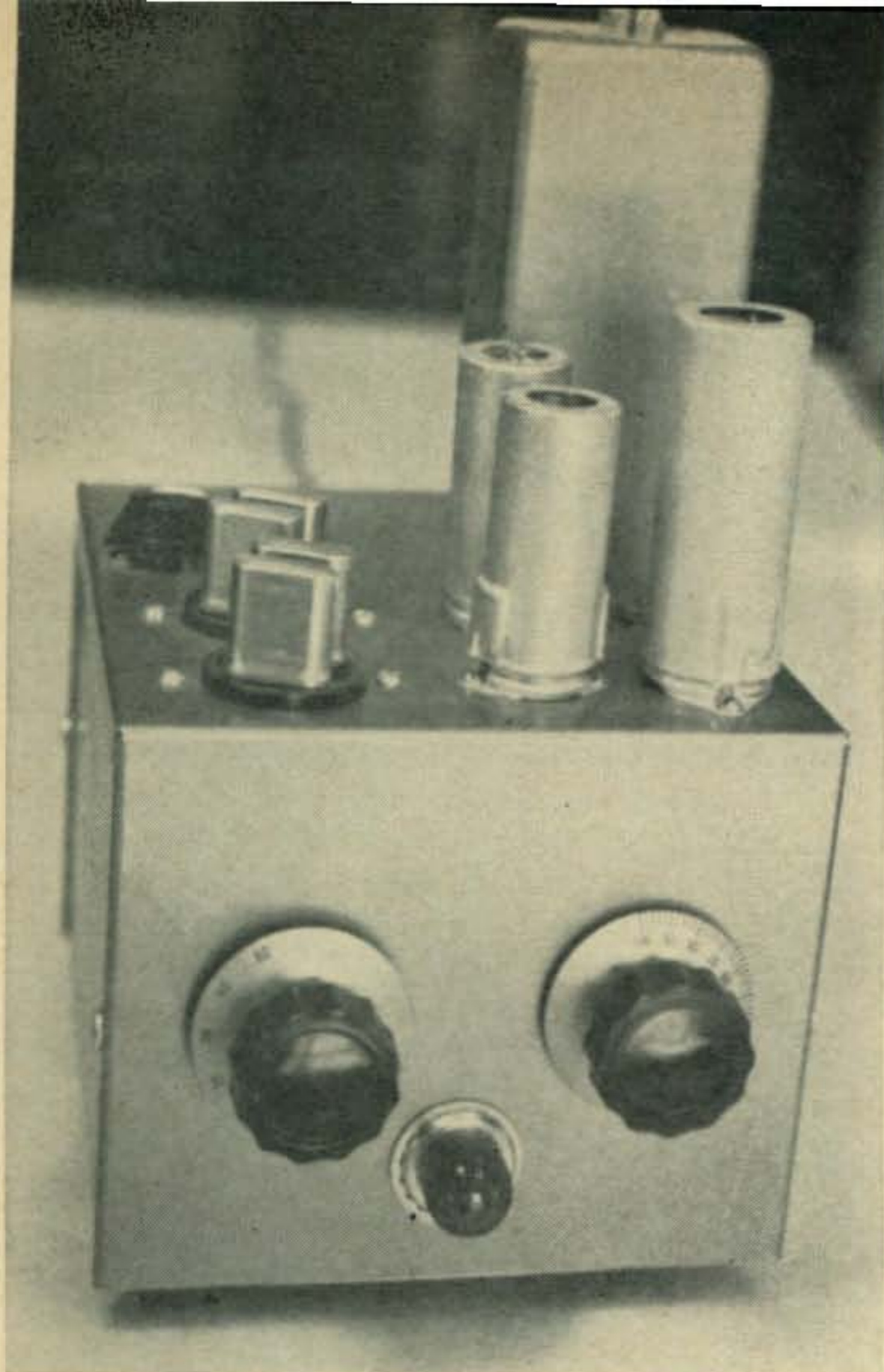
Name _____
(Please Print)

Address _____

City _____ State _____ Zip _____

Prices & specifications subject to change without notice. AM-153

For further information, check number 29, on page 110



Front view of the adaptor shows the simplicity. On the left is the combined ON-OFF BANDSWITCH. To the right, is the oscillator FREQUENCY VERNIER. On top of the chassis, at the right, is the 6BA7; alongside it, the 6C4 is in front and the 6CB6 just behind it. Inductor L_2 is in the large can. The knob for tuning capacitor C_2 may be seen just behind the four crystals.

A

A 75A-4/HT-32

"Transceiver"

BY J. W. SPENCER,* W4HDX

A simple three tube adaptor can be made to permit transceive operation with a conventional receiver and transmitter such as the 75A-4/HT-32 combination. Such a unit is described below. The unit can be modified simply to accommodate any other combination of quality units.

SINCE the general trend seems to be toward transceive operation, many operators have traded in equipment which in our opinion is far superior to many of the transceivers on the market today. For example, there are many desirable features lacking in some of the transceivers such as a Q multiplier, Notch Filter and Noise Limiter circuit. We won't even mention the fact that the sensitivity of the larger receivers is better than the average transceiver which we have had the opportunity to listen to. There are also advantages to be found in some of the earlier transmitters such as s.s.b.-a.m. operation and full frequency coverage not available in most transceivers. Unless you are going mobile, there is really no reason to trade in your gear. Here's a simple little gadget that will let you keep your cake and eat it too.

Theory of Operation

The transceive adaptor picks off a small amount of r.f. from the variable oscillator in the receiver through a small coupling capacitor from the mixer injection grid. This r.f. is fed into a mixer stage which converts to the proper frequency (5.0-5.5 mc). This is amplified and fed into the v.f.o. socket in the transmitter. The

circuit of this unit is shown in fig. 1.

It is not necessary to drill any holes or modify any wiring in either the receiver or transmitter since r.f. input and output connections are made through the use of plug-in "voltage test sockets." These units are readily available from any jobber and are the type that are used for checking socket voltages above the chassis in TV sets. They have metal tabs sticking out around the side of the socket which can be used to connect the r.f. leads.

Construction

Precautions should be taken in the construction of the unit to shield the input and output r.f. leads all the way up to the tube socket pin to prevent stray radiation from getting into the v.f.o. input of the transmitter. This is very important since, if the receiver v.f.o. frequency, 2455 kc to 2655 kc, is allowed to enter the transmitter v.f.o. input circuit, it will multiply to 4910-5310 kc and cause spurious emissions and out of band operation. Proper shielding of the input and output leads as well as the output plate tank coil in the adaptor will eliminate this difficulty. Do not use any larger capacitors than shown in the circuit for coupling in and out of the adaptor as it will affect the operation of the receiver by loading down the grid of the

*Spencer Communications Inc., 440 25th Street, West Palm Beach, Florida.

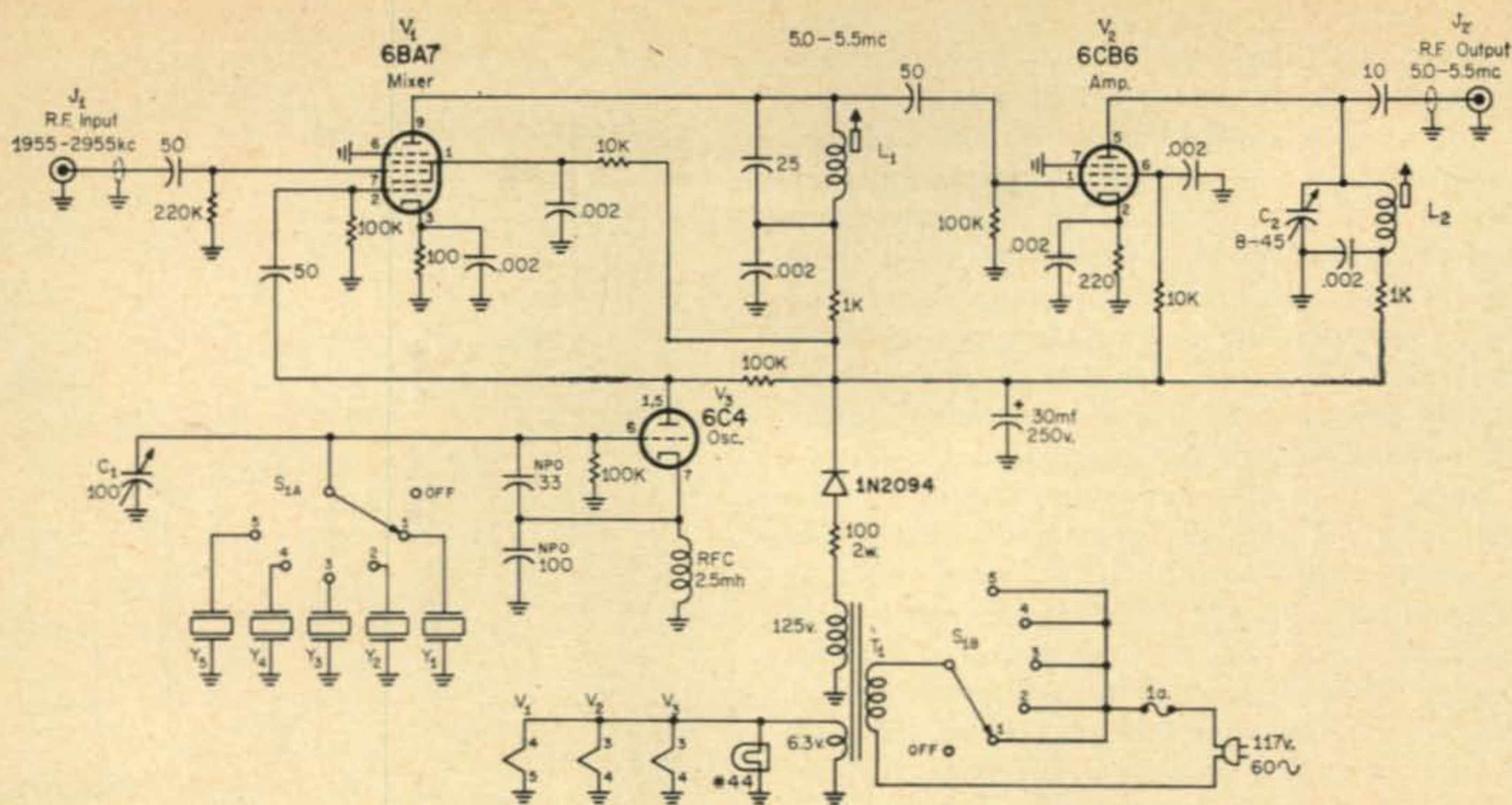


Fig. 1—Circuit of the transceiver adaptor. All capacitors greater than one are in mmf and those smaller than one are in mf. All resistors are $\frac{1}{2}$ watt unless otherwise noted. The coils are discussed in the text.

mixer or detune the v.f.o. plate circuit in the transmitter thereby reducing the r.f. drive to the transmitter.

The 5.0-5.5 mc coils used in the unit were obtained from surplus equipment but could be wound very easily with the aid of a grid-dip meter. The output coil, L_2 , should be shielded.

The crystals are the only critical part of the unit. They can be obtained from any reputable crystal manufacturer at a price of about \$4.00 each. When ordering, be sure to specify that they are to operate with a load capacity of 32 mmf.

Tune-Up and Adjustment

First, (before connecting the adaptor unit) tune up the HT-32 transmitter in the a.m. mode on 21.3 mc. Then remove the 6CB6 v.f.o. tube V_9 from the transmitter and insert the output lead from the transceiver adaptor in the v.f.o. socket. (Do not replace the transmitter v.f.o. tube in the top of the adaptor).

Next, remove the 6BA7 mixer tube V_5 from the 75A-4 receiver and insert the input lead from the transceiver adaptor into the mixer socket. Replace the 6BA7 tube in the top of the test socket. Tune the 75A-4 to 21.3 mc. Turn on power to the transceiver adaptor and set band-switch to 15 meters USB position with a grid-dip

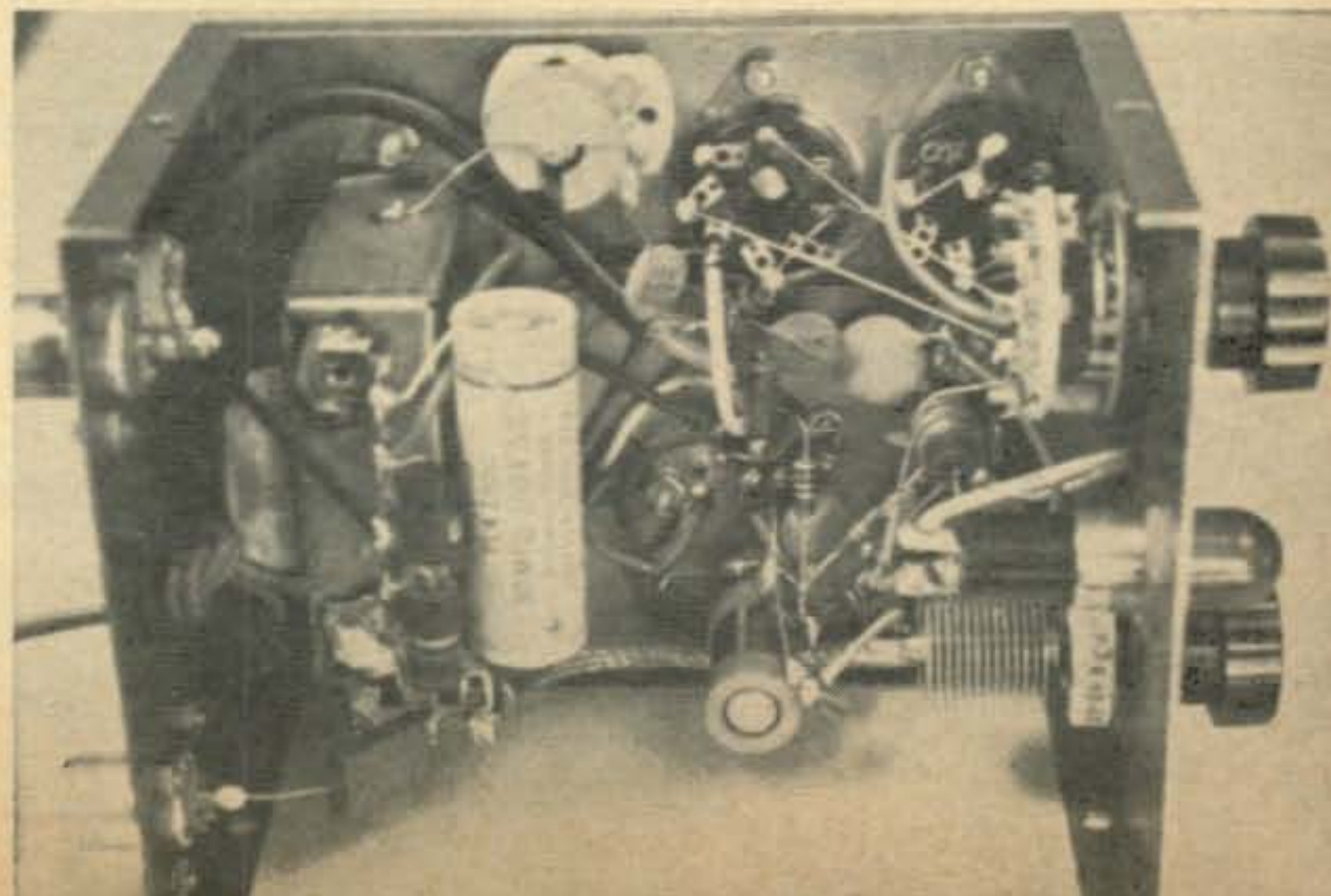
Table I—Crystal Frequencies

Band	Sideband	Crystal Freq. (kc)
80	Lower	2844
	Upper	2846
40	Lower	2744
	Upper	2746
20	Lower	7956
	Upper	7954
15	Lower	7456
	Upper	7454
10	Lower	7456
	Upper	7454

meter coupled to L_1 . Adjust L_1 for resonance at approximately 5.3 mc. Couple the grid-dip meter to L_2 and adjust L_2 for resonance with the trimmer capacitor C_2 set at half capacity.

Now key the HT-32 in the a.m. mode and watch the r.f. output meter. An r.f. indication should be obtained. Go back and peak L_1 and L_2 for maximum r.f. output on the transmitter while

Bottom view of the transceiver adaptor shows the power supply circuit neatly mounted atop the power transformer on the left. Inductor L_1 may be seen just to the right of C_1 . The input r.f. jack is on top.



keeping the receiver and transmitter tuned to 21.3 mc.

Since slug tuned tank circuits are used in the adaptor, with the exception of the r.f. output circuit (which has a variable trimmer) the circuits will have to be adjusted to give the desired output over the portion of the bands which is desired. It was found however, that by peaking all r.f. tank circuits with the equipment set up on 21.3 mc that adequate r.f. drive was available over the s.s.b. phone segments of all bands by merely adjusting the trimmer in the r.f. output tank of the adaptor for each band.

Some HT-32 transmitters may require increasing the 9 mc amplifier gain adjustment in the transmitter slightly to obtain adequate drive, as this control is set at the factory and varies with each individual unit. It is easily accessible from the top of the chassis. (A word of caution here.) *Do not increase this gain any more than absolutely necessary to obtain adequate drive or you will find that it becomes difficult to maintain carrier null in the transmitter.*

Next, set the PASSBAND adjustment on the 75A-4 for U.S.B. and listen for a signal while keying the transmitter. It will be necessary to disable any muting circuit for the time being so that the receiver will remain on while the transmitter is being keyed.

Switch the transmitter to U.S.B. mode and "talk the signal in" on the receiver by adjusting the local oscillator frequency control on the transceive adaptor. (Note: It will probably be necessary to make a slight adjustment of the "passband tuning" on the receiver to obtain exact zero beat since this control also shifts the variable oscillator frequency in the 75A-4.)

Once you have obtained zero beat, do not readjust the passband adjustment or it will throw your transmit frequency off to one side or the other. It is a good idea to first set the passband at the desired position for normal operation and then leave it there.

Although no voltage regulation was employed

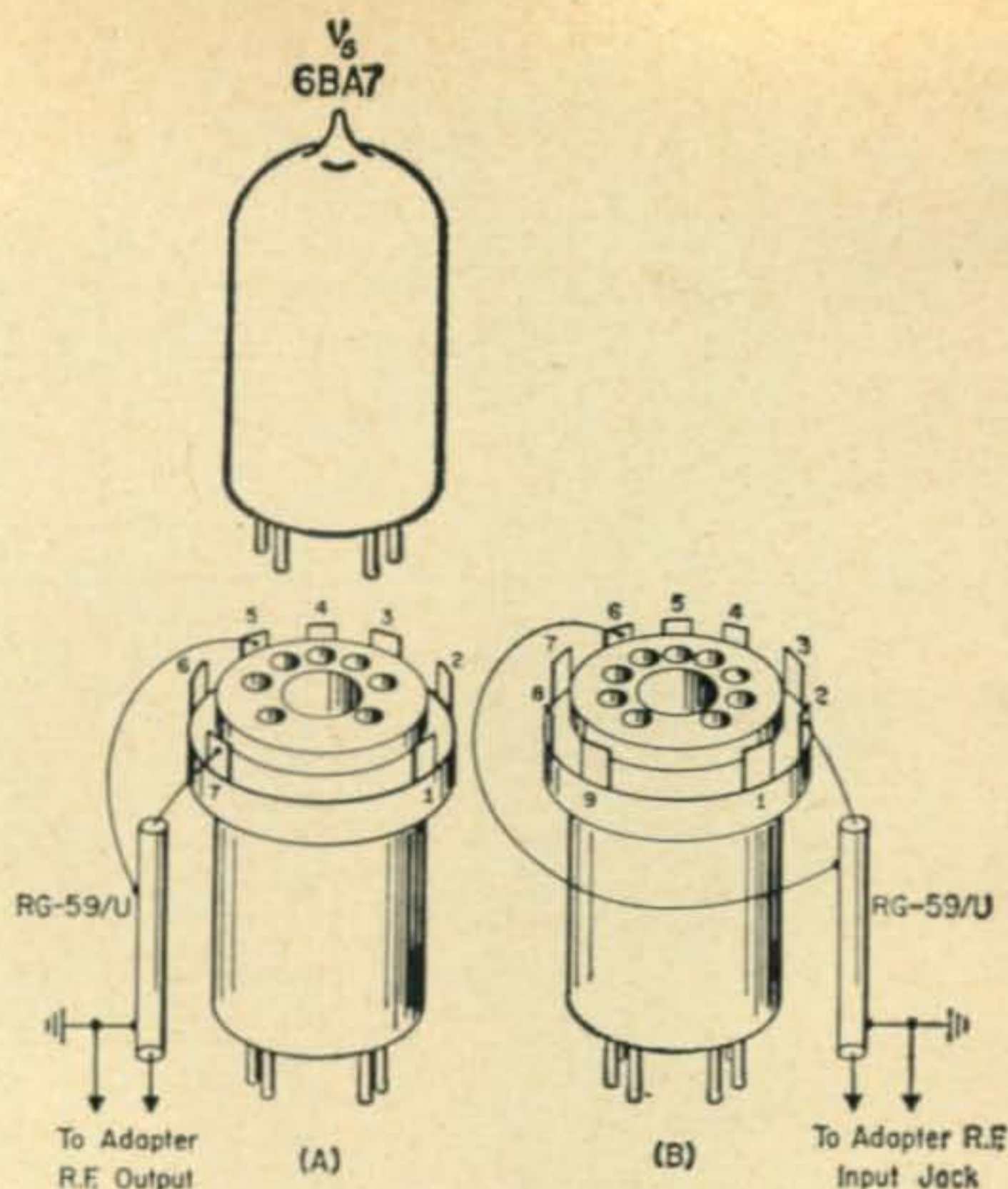


Fig. 2—(A) Pictorial of the receiver oscillator signal take-off plug adaptor. The 6BA7 is replaced in the adaptor. (B) Pictorial of the transmitter v.f.o. tube plug. The tube is not reinserted in this unit.

in the transceive adaptor, we noticed a slight frequency shift of a few cycles occurred during the first 20 minutes of operation which could probably be eliminated by feeding the 6C4 oscillator from a regulated supply. This drift was so slight, however, that no attempt was made to correct it.

Total cost of the unit will vary from about \$35.00 to \$65.00 depending on how many crystals are used. By using l.s.b. on 80 and 40 and u.s.b. on 20, 15, and 10 meters, you can get by with four crystals since the same crystal is used for 15 and 10 meters.

This unit has been in operation over a year at our shack with excellent results and now is operating at the shack of WA4NST in Birmingham with equally good results. ■

Putting The Eico 772 on Ten

BY MIKE BECK,* K2QMM

With the forthcoming improvement in the sunspot cycle we can look forward to better conditions on 10 meters. Once again, low power will be useable and the eleven meter CB rigs will make ideal fixed and mobile transceivers. They are extremely easy to modify as noted in this article.

MANY of us remember the days when ten was jumping with world wide DX activity. Now that the eleven year sunspot cycle has reached its low point and begun its

*79-35 209 Street, Flushing, New York.

swing upward, we may again look forward to the same type of activity. During the past few years of the sunspot low, most hams have become accustomed to high power because it has been necessary. One thing I remember about

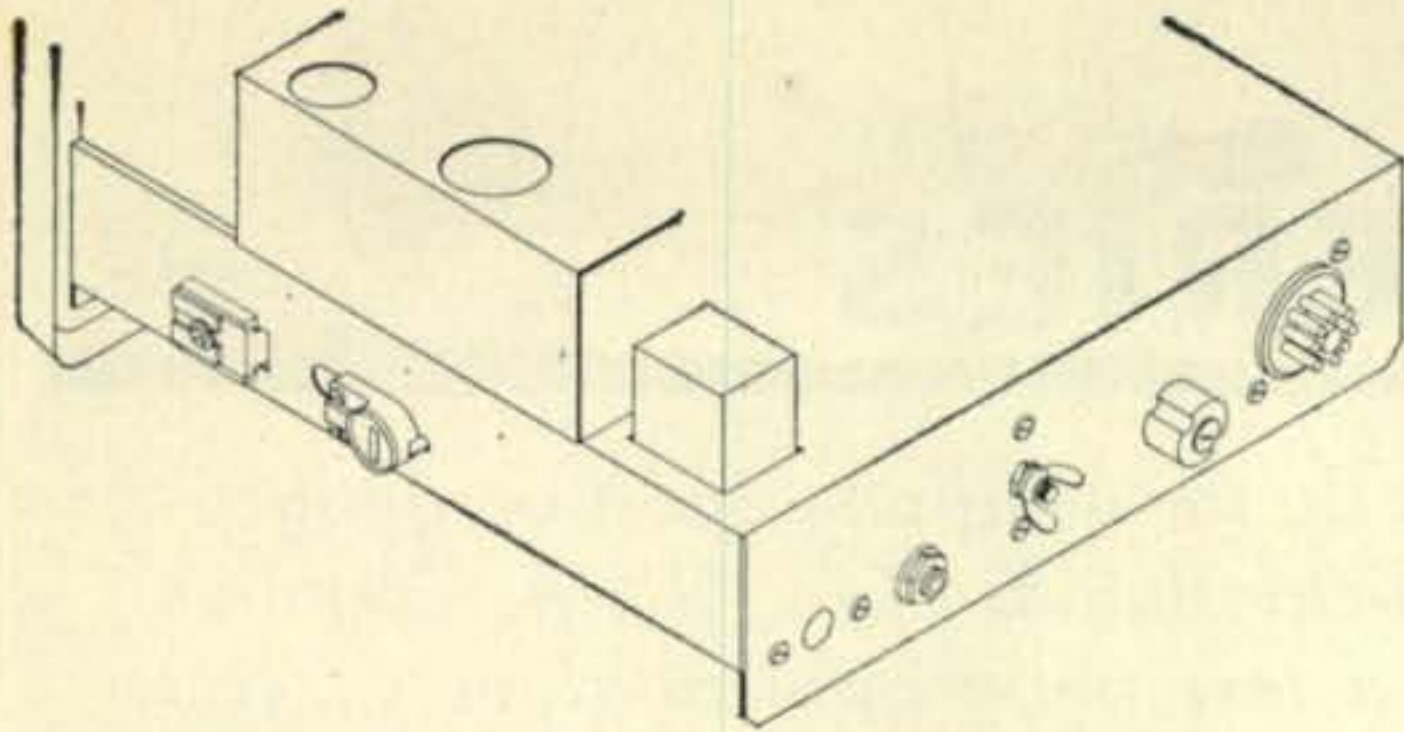


Fig. 1—Sketch of the Eico 772 CB Transceiver above shows the location of the two tuning capacitors for the pi-network. The capacitor to the rear of the chassis is the P.A. TUNING and the other is LOADING.

ten meters is that when the band opened it wasn't necessary to run a kw and a sixteen element wide spaced beam to work DX. It was often done with low power and a dipole.

For one reason or another, a great many CB rigs are now and will be looking for new homes. They can be picked up from disinterested CBers sometimes for unbelievable prices. Many of these rigs have sensitive receivers and well modulated five watt transmitters all wrapped up in neat little packages (not to mention the dual power supplies 110 v.a.c. and 12 v.d.c.).

Three years ago I built two Eico 772 citizen band transceivers for which I have found no use since. They are compact units with good receivers, transmitters, a.c.-d.c. power supplies and push-to-talk operation. Rather than sell them I thought that I might convert at least one to ten meters.

Receiver Circuit

The receiver is a very sensitive superheterodyne circuit with two oscillators, one tuneable and one crystal controlled. The CHANNEL SELECTOR switch is four position unit and when it is in the extreme counter clockwise position the receiver is operated crystal control. The other three positions of the CHANNEL SELECTOR switch activates the tuneable oscillator.

The receiver circuit consists of an r.f. amplifier, mixer, tuneable oscillator, two i.f. amplifiers at 1.75 mc, a diode detector, squelch and two stages of audio.

The receiver crystal used for fixed frequency operation is the r.f. plus the i.f. Since my receiver unit was set for channel 2 (26.975 mc) a crystal for 28.725 mc (26.975 plus 1.75 mc) was handy for 10 meter operation of the transmitter.

Transmitter Circuit and Modification

The transmitter is a simple two tube unit. The oscillator is a 6FY5 in a crystal overtone circuit driving a 12BY7 final. The receiver crystal (used for channel 2 in my unit) at 28.725 mc was inserted and the transmitter tuned up without problems.

With the channel 2 receiver crystal plugged in, L_1 , the oscillator plate load, was tuned to resonance. Care was taken to adjust L_1 for stable oscillator operation. The signal should be

monitored on your receiver. The pi-net output circuit was tuned next and it covered the frequency easily. The tuning adjustments are made by screwdriver through the side panel. The location of the adjustments are shown in fig. 1.

Receiver Adjustments

Feed in a signal at 28.5 mc with the receiver tuning capacitor fully meshed. Now adjust the receiver oscillator coil L_6 until the signal is tuned in. See fig. 2. The signal source may be a signal generator, a grid dip oscillator or even the calibrate signal from your transmitter. (I used my HT-32.)

After bringing the oscillator on frequency the signal will not be too strong. Adjust the antenna coil L_4 and the r.f. coil L_5 for maximum signal.

Next, the crystal oscillator should be adjusted. The channel 2 transmit crystal is exactly correct for operating the receiver to match the receiver crystal in the transmitter. Freely translated it means that all we have to do with the CB channel 2 crystals is swap; transmitter unit to receiver and *vice versa*. The 26.975 transmit crystal plus the 1.75 mc i.f. will receive an r.f. of 28.725 mc to match the transmitter.

Plug the crystal into the receive socket, S_2 . Set the signal source to 28.725 mc and adjust L_7 . When the inductance is set correctly the crystal will oscillate and the signal will be heard.

Spotting Switch

Now that the conversion is complete there is one thing left to do. Put in a spotting switch. A push-button switch across contacts #6 and #10 on the push-to-talk relay will do the trick. This turns on the transmitter oscillator while the receiver is on.

The conversion of most other CB transceivers is equally simple. It can be done in just a few minutes once you get acquainted with the circuit. When ten meters opens again many of these ex-CB rigs will be used both fixed and mobile. The transmitter power is adequate, especially if it isn't in competition with kw's. Save all that high power for the rare DX pileups on 15 and 20 meters. ■

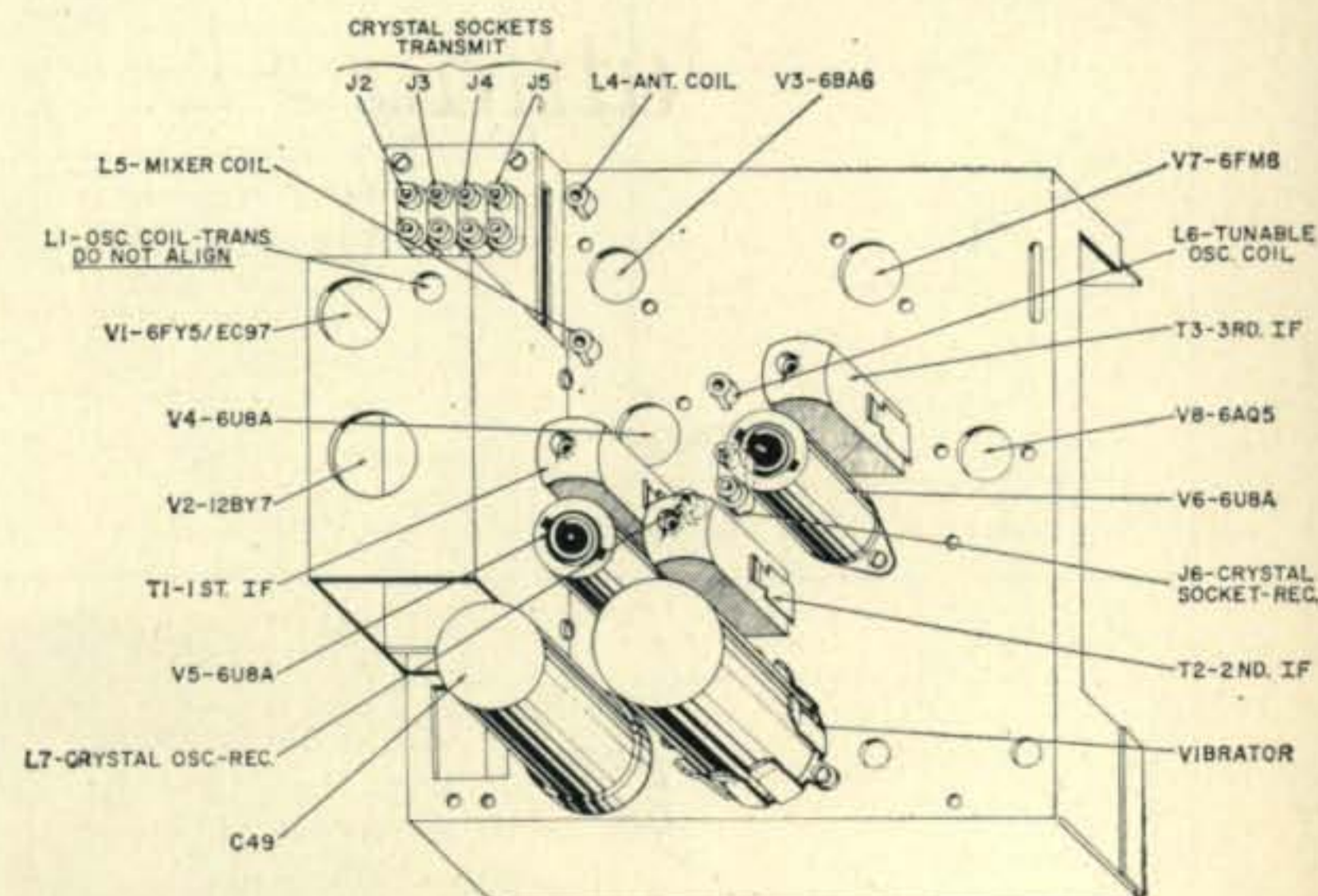


Fig. 2—Top view of the 772 chassis showing the location of the major components.

CRANIUM QUERIES



Here's an especially interesting puzzle for everyone good on geography, or for those of you who are participating in CQ's "U.S.A. Counties Award Program." Each county has a few geographical clues so you should experience only little difficulty if you are not too rusty on U.S. geography. After you have penciled in your answers, turn to page (109).

<p>1</p> <p>Bounded on the North by Ulster and Sullivan Counties on the South, by Rockland County.</p> <p><input type="text"/></p>	<p>6</p> <p>A famed Civil War Memorial is located in this County in South Carolina.</p> <p><input type="text"/></p>
<p>2</p> <p>An international event was held in this County during 1962.</p> <p><input type="text"/></p>	<p>7</p> <p>Many experiments and tests are conducted in this County which is geographically North of Texas.</p> <p><input type="text"/></p>
<p>3</p> <p>If you were "shooting for the moon," you'd undoubtedly do it from this County.</p> <p><input type="text"/></p>	<p>8</p> <p>A County well-known for its autos.</p> <p><input type="text"/></p>
<p>4</p> <p>The famed "Grand Canyon" is located in this Arizona County.</p> <p><input type="text"/></p>	<p>9</p> <p>U.S. County completely surrounded by water.</p> <p><input type="text"/></p>
<p>5</p> <p>U.S. County in a State having only a total of five Counties.</p> <p><input type="text"/></p>	<p>10</p> <p>The U.S. Air Force Academy is located in this Colorado County.</p> <p><input type="text"/></p>

A Coax Dummy Load

For 200 Mc. And Up

BY JAMES G. LEE,* W6VAT

GOOD v.h.f.-u.h.f. dummy loads are expensive to buy and difficult to build. Yet, by using some undesirable properties of coax cable you can make a v.h.f. dummy load whose measured s.w.r. actually decreases with increasing frequency. The load is 100 feet or more of coax with a connector on one end and the other end shorted.

To see how it works, first consider a length l of lossless coax cable. The ratio of outer conductor diameter to inner conductor diameter determines a particular characteristic impedance of the line. When the cable is terminated with a resistor equal to its characteristic impedance all power delivered through the cable will be dissipated in the load termination. If there is either an open or a short circuit for the load then power reaching the end of the cable has nowhere to go except to be reflected back toward the source.

"Infinite Length"

Now connect a second length l to the first one. The same situation results as before, but let's keep on adding lengths until the cable is infinitely long. Now you have a perfect dummy load. Power delivered through the cable will never return. Where do you get an infinite length of coax? The answer is obvious but we made the assumption that the cable was lossless at the start and practical cable has a definite loss. This means we don't need an infinite length of cable for the dummy load.

If a given length of cable has say 10 db attenuation then power delivered through the cable will be only 1/10 as much when it reaches the load termination. If the load end is a short or open circuit the power will be reflected back toward the source and suffer an additional 10 db loss on the return trip. An s.w.r. measurement at the source would show a low value.

RG-58, 50 ohm coax cable has a little over 7 db attenuation per 100 feet at 200 mc. RG-122 and RG-21 have 11 db and 20 db attenuation respectively. However, RG-21 costs about twice as much as RG-58 while RG-122 is cheaper. Make the dummy load of 100 feet or more of either RG-58 or 122. One hundred feet is the *minimum* length. Put male coax connectors at

either end and make up a mating shorted connector. In this way, you can easily convert from the shorted load to a length of coax that's useful at lower frequencies. The load can be coiled or draped over the floor when in use.

Load Limit

The coax load is limited by the maximum r.m.s. voltage it can handle and by the melting point of the inner insulation. The smaller RG-122 is more critical in this respect. RG-122 is rated at 100 watts at 150 mc while RG-58 will handle this power at 300 mc. There is no point in terminating the load with a resistor instead of a short since this resistor must have proper characteristics or else it's no better than the short. The short is cheaper and easier to make.

The true s.w.r. of the cable is quite high due to the gross mismatch the short presents to the cable. The attenuation of the cable plus the fact that the s.w.r. measurement point is at the "sending" end of the cable accounts for the apparent low s.w.r. If however, the s.w.r. is measured at the shorted end it will be quite high. Although a thorough discussion of how one chooses the proper transmission line is beyond the scope of this article, it can be seen that very misleading s.w.r. figures can result from a poor choice of transmission line and lack of proper matching conditions between the line and the antenna. ■



"I don't care what Ann Landers says! I'll stay up and operate my equipment every night if I want to!"

*Box 357, Cupertino, California.



Lord Howe Holiday

BY GRAHAM G. HALL,* VK2AGH

What man alive with the memories of the adventure stories of Robert Louis Stevenson and Ballantyne has never dreamt of a spell away on a coral islet lapped by the idyllic blue seas of the South Pacific? Such is the lovely unspoiled beauty of Lord Howe Island, Australia, guarded by the world's most southerly coral reef and where the temperature never falls below 60° F nor rises above 85° F.

LORD Howe Island is the place my wife and I spent a whole two weeks, away from the rat race and ant-bed activity of the modern bustling City of Sydney, only to take a transceiver and jump back into the dogpiles of ham radio. But how nice, no noise, no TV, no ignition QRM, little static, and generally fantastic radio receiving conditions.

The Island, a minute and spectacular fragment of New South Wales, is the largest of a cluster of rocky islets, lying in the Pacific Ocean 430 miles north east of Sydney at 159°E. longitude and 31°S. latitude. It is crescent shaped, about 7 miles long and varies from one to one and a half miles wide. Two massive peaks, Mt. Gower—2840 ft. high and Mt. Lidgbird—2504 ft., at the southern end dominate the entire island. Several smaller hills up to 750 feet provide excellent panoramic

views for those not agile enough to scale the mountains.

Lord Howe Island was discovered in 1788 by Lieutenant Henry Lidgbird Ball in the HMS "Supply" on the way to Norfolk Island, and named after Lord Howe then Secretary of State for the Colonies in the British Cabinet. The Island was not populated until 1833. As time went by the chief source of income was derived from gathering the seed of the beautiful "Howea" or "Kenita" palms for the world market. The delicately fronded "Paradise Palms" (as the Americans call them) are unique to Lord Howe and predominate the Island's lush jungles of pisonia, hibiscus and banyan trees.

This industry received a severe set back some years ago, when rats from a wrecked ship swam ashore, and virtually overran the island. This menace is now very well under control as each Islander was duty bound to kill his quota of rats

*79 Kyle Pde. Kyle Bay, Hurstville Sth., N.S.W. Australia.

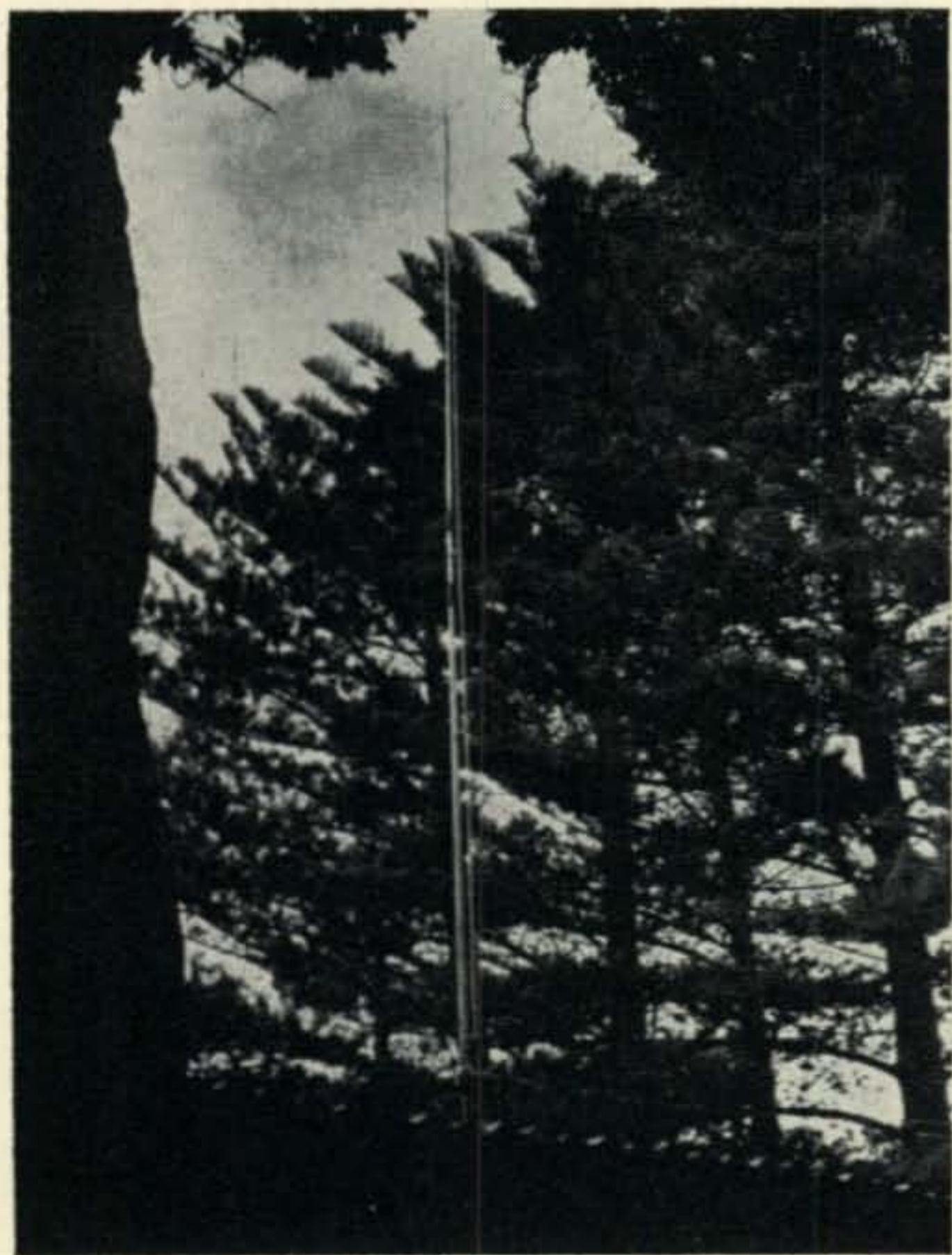
Lord Howe Island, from Mt. Malabar, looking south towards Mt. Lidgbird and Mt. Gower (tops covered in clouds). The lagoon with Rabbit Is. is on the right. Neds Beach is in the left foreground. Air radio beacon towers are in the center of the island. VK2AGH was located half way between the towers and the first hill center background.

each week. The Island has a permanent population of approximately 250 inhabitants with a continuous floating population of 150-250 tourists. The inhabitants are white people, there being no indigenous native population.

The only way to get to Lord Howe is by Flying boat, a journey of about three hours from Sydney. The flying boat can only land at high tide in the lagoon so the service is restricted to a maximum of one flight per day in summer and two per week in winter. There is no passenger shipping service, but freight vessels visit the island four to five times per year. Consequently most goods are freighted by air, and this is especially so in the case of transmitters, power supplies, antennas and the like which are carried at excess baggage rates!

So much for the brief historical and geographical facts, now to the radio side of our holiday, and fortunately I have a very understanding XYL.

The equipment consisted of an Australian made Wagner transceiver approximately 90 watts p.e.p. and 70 watts c.w. A Hy-Gain 14AVS Multitrap vertical was used on 15, 20 and 40 meters and a windom for 80 meters. Because of the long runs a special low loss coaxial cable type WH98 was used.



Hygain 14AVS antenna used by VK2AGH/LH on Lord Howe Island. Pinetrees behind the antenna are 110 feet high. The tree in the foreground is 90 feet high.



VK2AGH/LH at the operating position on Lord Howe Island.

After arriving at the Island about noon and getting the 120 lbs. of radio gear ashore safely, the first thing was to look the Guest House over, walking around mostly with the eyes skyward! A line of pine trees 120 ft. high were situated only 40 to 50 feet from the building which nestled in the shade of overhanging Moreton Bay fig trees and others with very thick and heavy foliage. Not a very good place for aerials. However I noticed a length of wire disappearing up one of the pine trees—someone had been there before—no not Gus!! Hastily setting up the rig on the floor—it was raised later to the top of a card table—I joined more wire to that found in the pine tree and behold—it worked; not too good on 20 but reasonable on 40 and 80. The first QSO was VK2EO followed quickly by other VK's on 40 and 80.

Next day the 14AVS was assembled and mounted on a 20 ft. length of water pipe borrowed from the guest house store. Radials were put on for 15, 20 and 40, and at 0300 April 16th, I was in business.

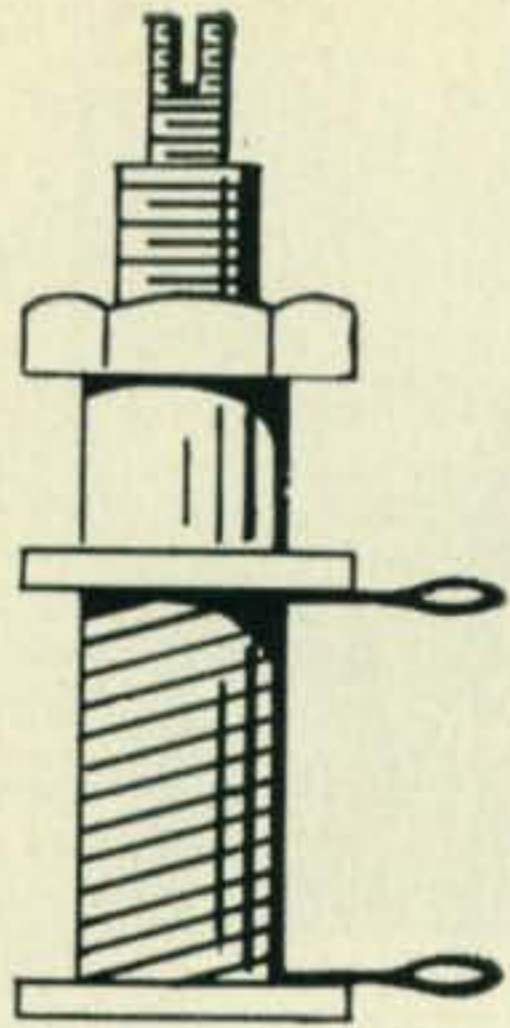
The first CQ netted WA6EPQ at 599 and it was on then in fine style for several hours, both c.w. and s.s.b. I had quite some trouble in breaking through the Californian curtain to the East coast. However, thanks to the W6 boys for their kindness in staying off when I did call east coast only. I could see their fingers poised—it must have been a strain on them. The first East coast was W2SSC followed quickly by W2FZY and then the band apparently closed or they were all in bed hi!!

The W6's seemed to have a pipe line to the end of the Island—and a 2 meter pipeline amongst themselves—their signals were fantastically strong.

The first 2 or 3 days were quite busy, especially on s.s.b. going alternatively between the American phone band and the DX section—how many stations are there in Caracas?

Saturday April 18th however was just not my day. Late Friday night the transmitter lost drive, and after locating the trouble, an open r.f. choke to driver plate—it could happen to anyone—the next job was to fix it.

I'm sure it was the first component assembled
[Continued on page 94]



Slug Tuned Coils

BY R. M. BALDWIN,* K4ZQR

ANYONE who has been exposed to ham radio for any length of time, is familiar with the slug-tuned coil. Familiar, perhaps, in the knowledge of what one looks like; but I'll venture to predict that most average hams have a lot to learn about what makes a slug-tuned coil behave the way it does.

My own search for knowledge began with a deep sense of frustration. I'm an avid reader of practically every ham publication, and my junk box never approaches that "well-stocked" level simply because I'm always building something. Sometimes they work and sometimes they don't, and as often as not the villain is the subject of this little treatise—the slug-tuned coil.

An author will specify a 3/8" slug-tuned form, No. 168B4956, and even though we are blessed here in town with one of the pioneer electronic supply houses in the United States—they never heard of it. So I dig into the trusty junk box and come up with a 3/8" slug-tuned form that looks like the author's illustration. Will it work? You never know until you try, and I'll tell you right now you probably won't be any better off in this same situation after reading the rest of this article—only you might know why it *didn't* work.

Tuning slugs or ferrite cores are made by a

Why will one slug-tuned coil work in a circuit and another, apparently similar, not work? The factors that determine the frequency range in which a slug-tuned coil will operate are discussed below and some ready reference data is supplied.

number of manufacturers to different specifications. They are blends of various powdered-iron materials with other metallic oxides added, and they are molded and sintered at temperatures up to 1200° centigrade to create desired mechanical and magnetic characteristics.

The unit for measuring magnetic flux density is *Gauss*, and the measure of applied magnetizing force is the *Oersted*. The characteristic of a given core of specific formulation is defined by the relation of flux density to applied force, plus the effects of frequency and temperature upon these properties.

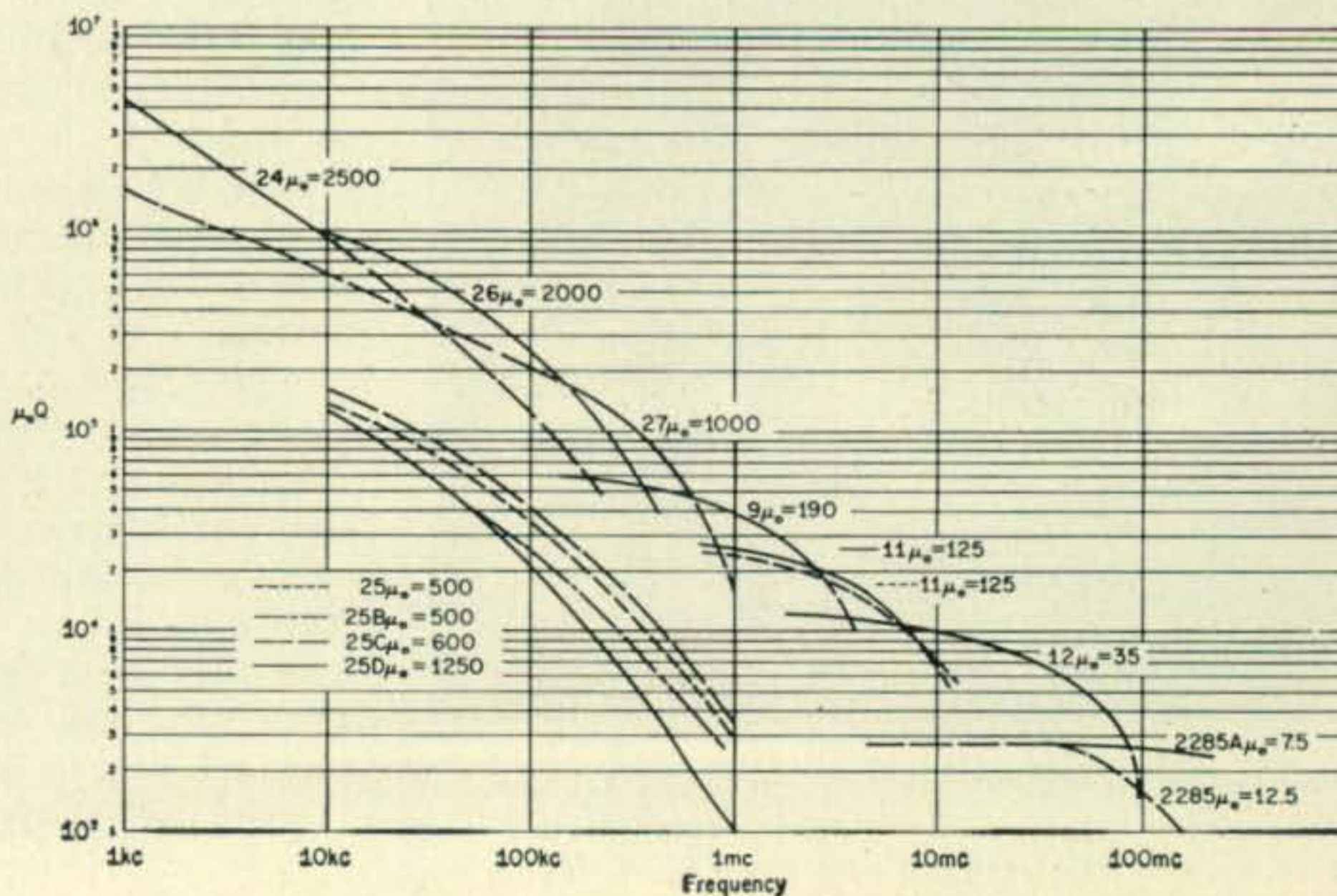
The term permeability (μ_o) is used to indicate the over-all magnetic properties of a given slug (measured in Gauss), and among the magnetic specifications listed for a given grade of core or slug material, you will find such things as initial permeability, maximum permeability, incremental permeability, and a lot of other specifications only a design engineer would need to understand.

What is important to remember at this time is that the iron core in a slug-tuned form is designed for a specific job, and if given a chance to do the job it was designed to do it can:

1. Increase the *Q* of a small coil, or in other words, its selective properties.
2. Increase the inductance, thereby permitting

*409 Kaelin Drive, Louisville 7, Kentucky.

Fig. 1—Plot of MERIT FACTOR versus FREQUENCY for Ceramag cores, a product of Stackpole Carbon Company. The data was obtained under toroidal conditions with sinusoidal waveforms and only material losses are shown. The μ_o is constant over the frequency range shown and only the *Q* changes.



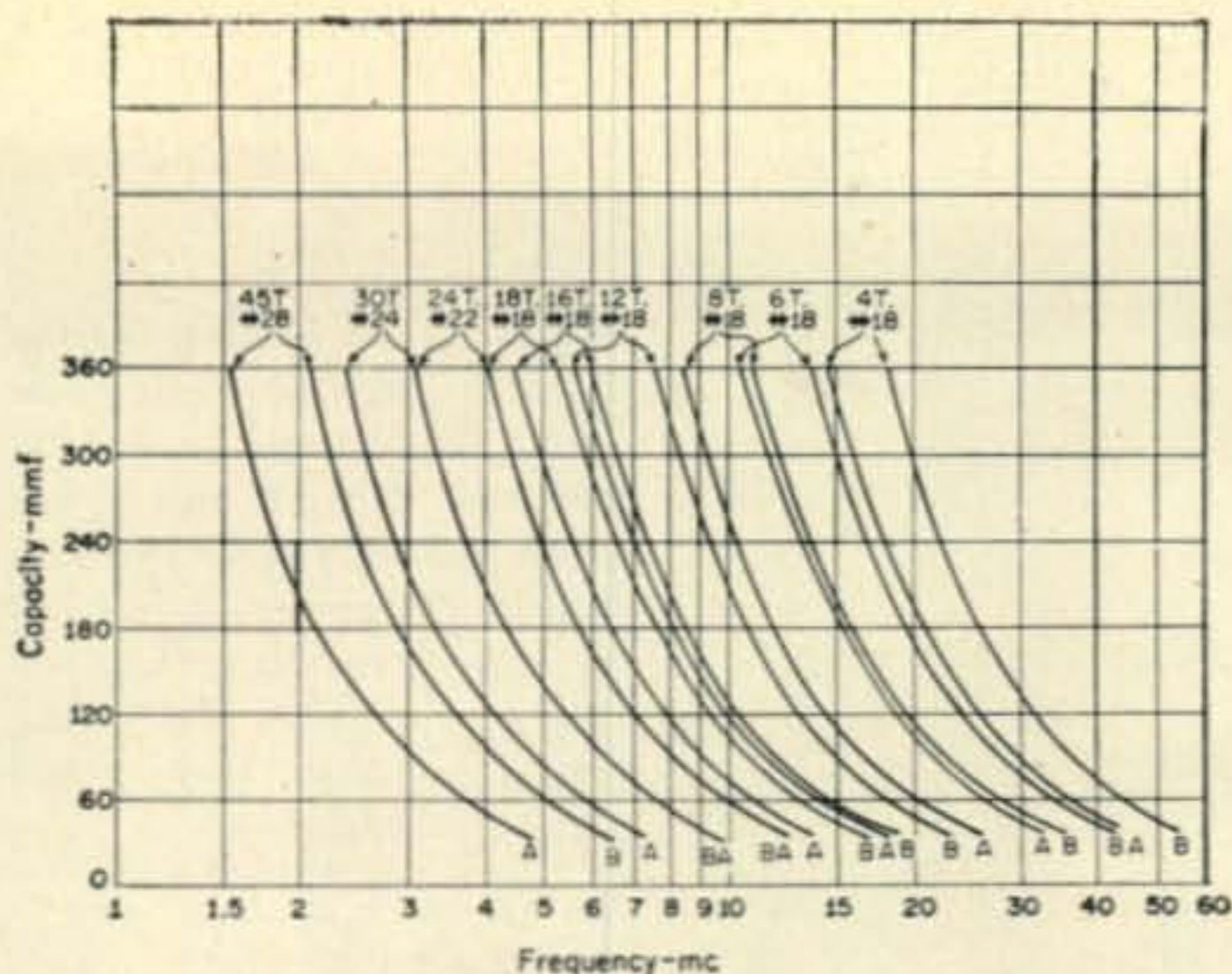


Fig. 2—Frequency—Capacity chart for the National XR-50 form. The A curves are with the cores set for maximum inductance and the B curves are for minimum inductance.

use of smaller coils than would be possible with air-core coils alone.

3. Act as a tuning device. In general, the higher the permeability (μ) the more effect the slug will have upon the inductance and hence the tuning range.

On the other hand, the introduction of a slug into a coil can, if not properly chosen, actually lowers the Q of the system, and the right amount of permeability to do the job is the problem which has to be successfully solved, for best results.

To observe the characteristics of various cores, examine fig. 1. Shown is a graph, supplied by Stackpole Carbon Company, plotting Q versus frequency for various Cermag brand ferromagnetic cores.

On this chart, the various grades of Ceramag are graphically illustrated in relation to frequency. The numbers represent initial permea-

bility ($\mu_0 = 1000$ Gauss in the case of Ceramag No. 27). You can easily imagine the results you would get if you reached into your well-stocked junk box and pulled out a coil form with the characteristics of their No. 27, and proceeded to wind a 50 mc coil on it. Too much permeability—too many losses—too low a Q ; no merit factor, in other words.

Coding

At this point we all should begin to wonder why the manufacturers of slug-tuned coil forms don't package construction data such as optimum frequency range in with their products, instead of simply sealing up one No. 168B4956 form in a poly bag, and letting you guess the rest.

Well, all is not quite lost because there is some help available in a limited way from color codes used by a few manufacturers. If you pick up a form, and it has a dab of one of the following colors on the end of the slug, you can get a fair idea of the frequency range over which it might be effective from this data.

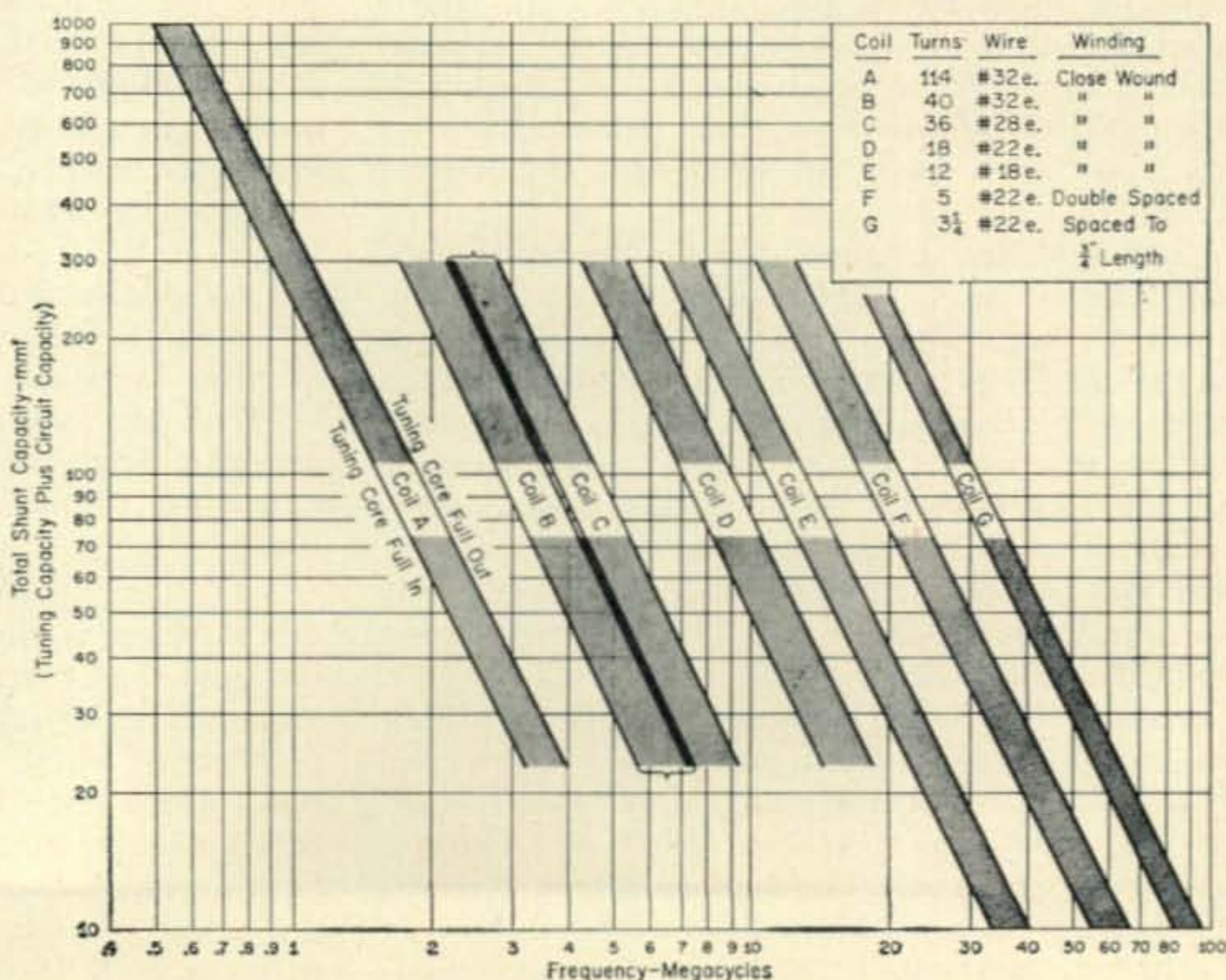
- Yellow — Up to 1.5 mc
- Red — 1 mc to about 20 mc
- Purple — 10 mc to 30 mc
- Blue — 10 mc to 40-50 mc
- Green — 20 mc to 50 mc
- White — 50 mc and up

This isn't an ironclad code, and purple slug from one manufacturer might be good at 40 mc while another make might only go to 20 mc. It is a guide, however, providing you can find a color code.

Published Data

Another approach is to use known published data on coil forms. Undoubtedly, one of the reasons for the popularity of the National Radio XR-50 form was the inductance vs. turns chart they supplied with it. We have reproduced this

Fig. 3—Chart used to determine windings and parallel capacity value required to tune from 0.5 mc to 95 mc with Millen No. 74001 form.



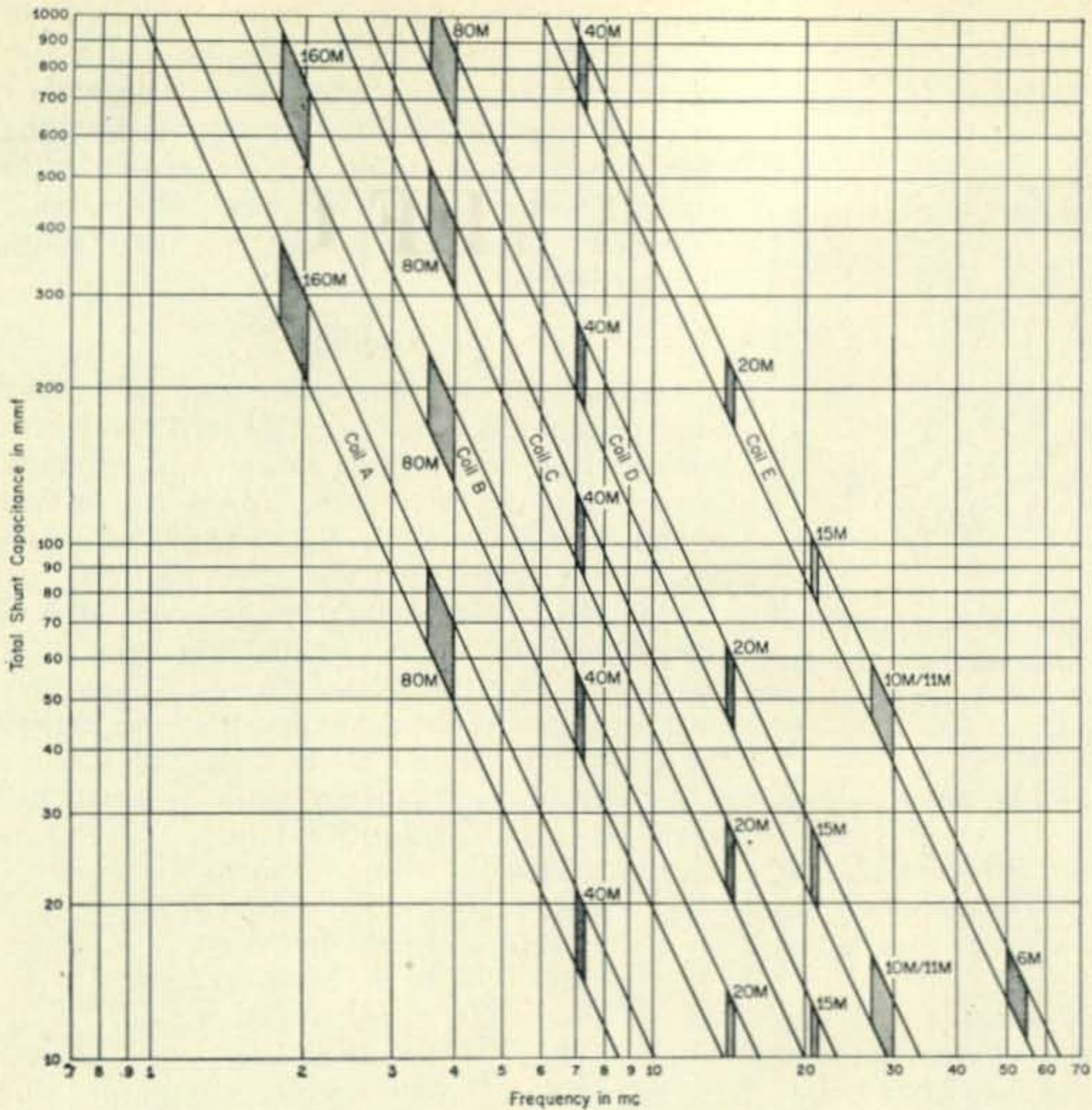


Fig. 4—Data needed for the use of Millen coil form #69046 is given above. The two lines, X and Y, for each coil represents the slug full in (X) and slug full out (Y). The Total Shunt Capacitance represents the tuning capacity plus the circuit capacity.

- Coil A—62t. #28e., close spaced.
- Coil B—40t. #24e., close spaced.
- Coil C—28t. #20e., close spaced.
- Coil D—18t. #18e., close spaced.
- Coil E—10t. #18e., spaced to fit between clips.

chart (fig. 2) because it apparently isn't generally available, and any home-brew artist could do a lot worse than use this data if he is working in the ranges of from 3 to 30 mc. As you can see, this one just about does it except for v.h.f., by using a combination of different wire sizes, number of turns, and capacity. Strangely, this is the only data of this sort apparently available on National forms.

J. W. Miller Company manufactures a number of ready-made coils and also offers coil forms. No frequency-capacity charts are available on these forms but from the data sheets packed with them it can be determined that good results up to 8 mc or so can be obtained with their No. 4400 coil form, and from 2.5 mc up to 25 mc with their No. 4500 with red marked core.

James Millen, another major manufacturer of coil forms, has extensive engineering data on most of their forms. Their "Cadillac" coil form is the No. 74001, which is a completely shielded form with an octal base. The slug is tuned from below the octal socket as the shaft extends through the keyway. With various combinations of shunt capacity, and by also varying the wire size and number of turns, this form can be made to tune from 0.5 to 95 mc. This chart is shown in fig. 3.

In addition to the shielded coil form, Millen makes a line of ceramic forms from 3/16" to 1/2" in diameter and with winding space from 11/32" to 1 1/2". Data on their No. 69046 coil form is shown in fig. 4 with the ham bands blocked in. This form will cover from 160 meters all the way up to 6 meters with, of course, various combina-

tions of capacitance and wire sizes and numbers of turns.

For the v.h.f. crowd, all is not lost either. Notice that we hit 6 meters on that last chart. Take the same coil form and use a copper slug, and it's Millen's form No. 69045, which will reach 2 meters or 6 meters with three turns of No. 14 tinned and spaced to fit between the clips. Of course, to tune 2 meters you only need about 10 mmf of capacity, while it takes around 80 mmf to tune 6 with this combination.

National also makes v.h.f. coil forms, and those with brass slugs, such as their XR-91, will hit 2 meters. Unfortunately, no chart data seems to be available so the capacitance and wire turns data is cut and try. I have substituted this form with good results, however, on 2 meter construction projects when I couldn't buy the one specified.

Cores made of non-ferrous materials affect the inductance of a coil in opposite fashion to those of iron. Insertion of a brass core, for example, tends to decrease the inductance rather than increase it. Such cores, however, result in a better *Q* at v.h.f. frequencies above 50 mc as a general rule.

Conclusions

That there is more to this slug-tuned coil form business than meets the eye should now be apparent. This article probably hasn't solved that problem of whether you can substitute that junk box form for the No. 168B4956 your parts distributor never heard of—but you will at least have an idea of why it didn't work after reading this—and then you can go out and buy one that will. ■

Announcing:

The NEW Spring 1965 VHF Contest

May 1-2, 1965

WE'RE off and running with a new contest and a new schedule for all future v.h.f. affairs! From now on the contests will fall on the same weekend each year; the *first full weekend in May* for the Spring VHF Contest, and the *first full weekend in August* for the Summer VHF Contest. This schedule should alleviate any question of date and make it possible for you to plan well in advance.

What else is new? Contest time has been extended by popular request. Both contests will now run from 1 P.M. Saturday until 8 P.M. Sunday. We feel that the addition of these hours will make Sunday an important part of the contest operating time and yet give mountaintoppers and those who have to get up early Monday morning plenty of time to recuperate.

News items to note in the rules: Check the "Contact Points" section and you'll see that the higher in frequency you go, the more the multipliers. Power multiplier has been lowered to permit more flea-power stations to compete. New exchange addition: the handle. It's nice to know who you're talking to!

This Is The Big One!

Why? Because all CQ's Spring v.h.f. bashes feature Club Aggregate competition. If you belong to an active radio club, by all means mark your log for additional club scoring (and don't forget to tell us which club!). The prize? The coveted Top Honors Trophy.

Presently the Mt. Airy VHF Society of Pennsylvania is holding this award, stolen away from the Peninsula Amateur Radio Klub last year. Mt. Airy will be a tough one to beat, but the more club members you have participating, the better your chances!

You Can Enter In Three Categories

For the newcomer, our Spring contest offers three classifications: Single Band, Single Operator, Club Aggregate, and Novice—all wrapped into one if you can qualify. Two nationwide listings permit coast-to-coast fame for the leading club and highest-scoring Novice. (*Note: Last year we caught a Technician using his Novice call on 2 meters in this contest and claiming Novice classification. Don't try it. He was disqualified!*).

Awards in the form of handsome certificates are up for grabs in all categories. Last year we

had the pleasure of mailing over 125 certificates, ranging from statewide winners competing by band to leaders in the enormous Club Aggregate nationwide competition.

Prepare Now!

So the time has come once again for the annual struggle for fame and glory. It looks, however, as if those top honors are getting harder and harder to win. We have seen numerous stations come and go through the ranks of the hallowed winner's "hall of fame." It is interesting to note, though, that in few instances does one station continue to win year after year. The reason is simple: One cannot stand still and remain on top. Even the boys with the mountaintop kilowatts and multiple-element antennas can be beaten. By whom? By the more *highly skilled* operator. In this day and age we are beginning to realize that even on v.h.f. it is sometimes hard to distinguish one signal from another (in terms of contrasting strength) during a contest. When everyone does their utmost to "put the loudest signal on the band," the result is too often bedlam. Make that bedlam work for you instead of merely contributing to it. Listen longer and you'll catch the rare ones. Use c.w. wherever possible; it will bring multipliers that will astound the phone boys in the area. And by all means use u.h.f. With this year's new rules, there's a chance to make 8 points for every u.h.f. QSO!

New VHF Contest Rules

I. CONTEST PERIOD

The duration of this contest is thirty-one (31) hours, starting at 1 P.M. local time, Saturday, May 1, 1965, and ending at 8 P.M. local time, Sunday, May 2, 1965. Contacts between time zones will count only when both time zones are participating in the contest.

II. BANDS

All bands, 50 mc and above may be used for this contest.

III. COMPETITION

Two major categories of competition are offered in this contest.

A. SINGLE BAND, SINGLE OPERATOR

A single operator means just that—no help may be solicited for relief during the contest period or for logkeeping. More than one band may be operated, but a separate log and entry must be made for each band used.

B. MULTIPLE OPERATOR, MULTIPLE BAND

Even if a single band is operated, multi-operator stations will be classified with the multi-band operators. This division is designed primarily for team stations and club entries. Includes all stations operating more than one band *and* using more than one operator.

In addition, two classifications are provided for those who qualify in the above competitions. Clearly indicate on each logsheet which one (or both) of the below you wish listed.

C. CLUB AGGREGATE

In addition to a station submitting his score for individual credit, he may also apply his score to his club's total. Logs from categories A and B above may be submitted for club aggregate credit. All club members should clearly mark logs: "Club Aggregate."

D. NOVICE

In addition to their own individual state competition in the single-band, single-operator category, all Novice Class entrants will compete nationally among themselves.

IV. EXCHANGE

Exchanges will consist of the following information: signal report, serial number, county and state, handle and "roger" on other station's information. The serial number of *each band* shall consist of the signal report followed by a three-digit number beginning 001. Failure to start with 001 will result in disqualification. Example: 59001 (phone), 579001 (c.w.). Contestants call "CQ Contest" on phone and "CQ TEST" on c.w.

V. CONTACT POINTS

Contacts between stations worked for the first time on the same band score as follows: Each complete contact on 6 and 2 meters will count two (2) points. Contacts on 220 mc, four (4) points; 432 mc, six (6) points; 1296 mc and above, eight (8) points.

A one-way exchange of information counts half in the above figures. Mobile-in-motion contacts of any kind will count only for contact purposes and *not* for county multipliers.

VI. MULTIPLIERS

Four types of multipliers will be used in this contest.

A. CONTACT

See section V above, "Contact Points."

B. COUNTY

A multiplier of one (1) will be allowed for each *new* county worked on each new band.

C. HOUR

A multiplier of one (1) will be allowed for each hour of station operation during which at least *one* legal contact is logged. The maximum number of multiplier hours allowed for any station in *any category* will be thirty-one (31).

D. POWER

A multiplier of 1.25 will be allowed for stations which at no time during the contest period run in excess of 30 watts input on any band. Stations exceeding to 30 watts input will use a power multiplier of one (1).

VII. LOG INSTRUCTIONS

A. Use separate log sheets for each band. (Logs available from *CQ*—Please include a large self-addressed stamped envelope).

B. All times are to be kept in *local* time.

C. Fill in the date (required only once), time, call, county and state, serial number sent and received, and handle of station worked. PRINT or

TYPE.

D. All contestants are expected to compute their own scores. Logs should be checked by another amateur for duplication and proper point and multiplier credit before submission.

E. Be sure to include a signed pledge stating that all rules have been obeyed and that all logged data is accurate. This pledge is included on standard summary forms also available from *CQ*.

F. The VHF editors suggest that you include a letter with your comments on contest activity, etc., and wherever possible a sharp photograph of you at your contest station. (Club stations and Novice entrants are especially desired). Photographs not used in the contest results will be drawn upon from time to time for inclusion in the VHF Column.

VIII. SCORING

Scores will be computed by multiplying the *total* contact points \times *total* county multiplier \times *total* hour multiplier \times 1.25 power multiplier (if applicable).

$$\begin{array}{r} \text{Example:} \quad 200 \text{ Contact Points} \\ \quad \times 10 \text{ Counties} \\ \hline \quad 2000 \\ \quad \times 10 \text{ Hours} \\ \hline \quad 20,000 \\ \quad \times 1.25 \text{ Power Mult. (If applicable)} \\ \hline \quad 25,000 \text{ FINAL SCORE} \end{array}$$

Multi-band stations will compute their score by *adding* contacts, counties, hours on all bands; then proceeding as below.

$$\begin{array}{r} \text{Example:} \quad 400 \text{ Contact Points (200 on 50 mc,} \\ \quad \quad \quad 100 \text{ on 144 mc and 100 on} \\ \quad \quad \quad 220 \text{ mc)} \\ \quad \times 79 \text{ Counties (56 on 50 mc, 21 on} \\ \quad \quad \quad 144 \text{ mc and 2 on 220 mc)} \\ \hline \quad 31,600 \\ \quad \times 31 \text{ Hours (maximum allowable)} \\ \hline \quad 979,600 \\ \quad \times 1.25 \text{ Power Mult. (use only once} \\ \quad \quad \quad \text{if applicable)} \\ \hline \quad 1,224,500 \text{ FINAL SCORE} \end{array}$$

IX. AWARDS

A. Certificates will be awarded to the highest scoring station in each state or country on each band or bands. In addition, high scoring Novice Class entrants will receive certificates issued on a national basis. Additional awards will be made in this category at the discretion of the Contest Committee.

B. A certificate will be awarded to the highest scoring entry in the Club Aggregate competition. In addition, an engraved trophy will be awarded by *CQ* on a rotating basis to the overall high scoring club in the Club Aggregate category.

X. DISQUALIFICATION

Violation of the amateur rules, the rules of this contest, unsportsmanlike conduct, or insufficient log data will be deemed adequate cause for disqualification. Amateurs entering this contest agree to abide by the decision made by the Contest Committee.

XI. DEADLINE

All logs must be postmarked NO LATER THAN JUNE 1, 1965. Logs received after this date will be used for checking purposes only! Results will be published in *CQ* within four months of the contest. Send logs directly to:

CQ VHF Contest Committee
14 Vanderventer Avenue
Port Washington, L.I., New York 11050

Clean Up Your Shack!

BY HOWARD S. PYLE,* W7OE

SUCH a title may sound like a tirade having to do with a 'broom and dust-pan' job. Naturally, that is important but let's go a bit farther; how about the equipment itself? How often do you dust the transmitter and receiver cabinets, accessory items and the surrounding surfaces?

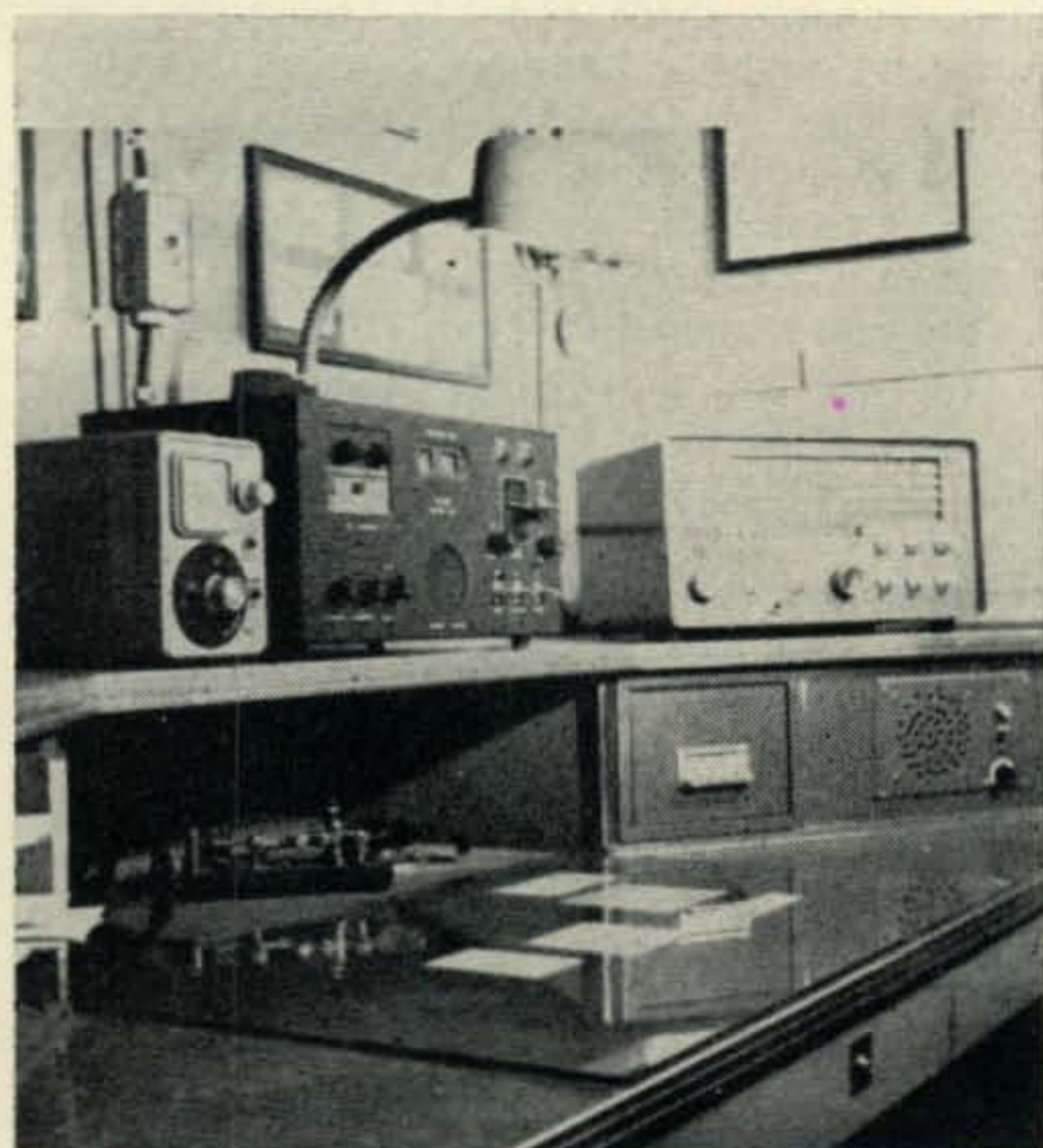
Did it ever occur to you to also do a bit of 'spit and polish' on the chrome or other bright parts on the various pieces of your gear? The majority of folks wouldn't think of driving up to a new neighbors' home with the chrome work on the car dull and grimy, the body finish mud-spattered and unattractive. No, they first wash the car and do a bit of polish on the body and the bright work. Why? To make a good impression of course which should be repeated on future excursions. So, does your ham gear have to reflect a dull, neglected appearance even though it works OK? You're proud of your ham station (at least you should be), and you want it to reflect an appearance which will indicate such pride.

You don't have to be a "show-off" to present a neat and clean face to the public. Does your wife, mother or other women-folk leave dust all over the stereo/hi-fi or breakfast crumbs on the rug if she knows that 'company' may be along at any time? Of course not; she uses the vacuum cleaner or even a simple broom and dust cloth to make things presentable; shouldn't you?

Papers scattered all over your operating desk, overflowing waste-basket, dust in evidence in many places; do they contribute to a favorable impression of amateur radio in its' overall phases to your visitors or disgust them with the "kid stuff" which only leaves a misunderstanding of what ham radio is all about? As a legitimate, licensed amateur, it is incumbent on *you* to demonstrate the worth-while activities of your hobby to your visiting public if you want to help to keep such hobby alive. What better way than to present a neat, clean and efficient operating center to such visitors? They judge you from only two standpoints; your signal on the air which may or may not (and it better *not!*) interfere with their radio or TV reception, and by the physical appearance of your ham shack.

The actual radiation from your equipment is a matter which must be worked out between your neighbor and yourself, if you are causing interference to his reception. You'll get a lot of help from your local ham club if the fault is yours; your neighbor will have to look to his TV service man if it is *his* equipment which is faulty. Regardless of where such possible difficulty might lie, the chances are that your ham shack and equipment may possibly be the subject of some rather intensive scrutiny either by an FCC official or other interested parties. Isn't it a smart idea to present an "apple-pie" appearance to such scrutinizing eyes rather than a heterogeneous collection of "junk" which will cause raised eyebrows and maybe justifiable criticism on the part of those who may have filed claims of interference caused by you?

Think it over then get busy and *clean up the shack* not only with a broom and dust pan but electronically as well; get rid of all those straggling wires and other extraneous material; make your station completely "ship-shape"; it will pay off!



A neat, clean and effective ham station arrangement like this will greatly increase your operating pleasure and favorably impress your visitors.

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

Modifying The TH-5/TG Terminal Unit

BY LEROY MAY*, W5AJG/AF5AJG

The surplus Telegraph Terminal Unit, TH-5/TG is turning up in the surplus houses and can easily be converted to amateur RTTY use as outlined below.

THE Telegraph Terminal Unit TH-5/TG is a part of the Telegraph Telephone Terminal Unit AN/TCC-14, which comprises a total of three equipments. The other two units are; Electrical Filter Assembly, F-98/U and Telegraph-Telephone Signal Converter, TA-182/U. The last two named play no part in the modification under discussion—that of the TH-5/TG. This unit is a 15 tube, frequency shift carrier modulator and demodulator. It modulates d.c. teletypewriter impulses to 1,225 c.p.s. and 1,325 c.p.s. It demodulates 1,225 and 1,325 c.p.s. frequencies to d.c. teletypewriter pulses. These d.c. pulses must be capable of activating a teletypewriter selector magnet which requires a 20 ma current.

The TH-5/TG is a compact lightweight unit of miniature construction. The components of the transmitting, receiving, and a.c. operated power supply circuits are mounted on a chassis assembly that is fitted into a waterproof outer case. The panel contains two three-position wafer type switches used to select the type of operation, a non-locking lever switch used to transmit a 20 c.p.s. frequency, three jacks for teletypewriter connections, and six binding posts for connections in 2-wire, 4-wire and radio-telegraph application. The 20 c.p.s. ringing signal is used for break-in purposes and will probably not be used in amateur work.

As the unit stands, using the 1,225 and 1,325 c.p.s. frequencies, copy is excellent on narrow shifts of 170 c.p.s. or less, since the coils and capacitors are actually tuned for a pass band of 200 c.p.s. However, the more normal amateur FSK standard of 850 c.p.s. will not fare so well.

This unit will also, on the TRANSMIT side, develop a couple of narrow shift frequencies that are OK for experimental transmissions but will not satisfactorily trigger the universally used 850 c.p.s. shift ham terminal-units.

The purpose of the conversion on this piece of gear is to change the unit from its original mark and space frequencies to the conforming frequencies of 2,125 c.p.s. for the marking frequency and 2,975 c.p.s. for the spacing frequency. Also the transmitting circuits are

changed—that is the AFSK tones developed on the TRANSMIT position are changed over to the more conventional ones mentioned above.

Modifications

All component parts of the TH-5/TG are plainly marked, and no trouble should be encountered in locating the pertinent points and performing the modifications. All mica capacitors that are in need of changing out are on top of the chassis and easily located. It will be necessary only to lay back the terminal boards on the bottom of the chassis, but this is very easy to do by removing four screws. This is necessary so that one may get to the mounting bolts of the mica capacitors and allow changing them.

Here are the changes required. In the receiving section; Discriminator Mark Transformer T_2 , with capacitors C_{10} , C_{11} and C_{12} originally resonates at 1,400 c.p.s. Replace C_{10} , C_{11} and C_{12} with a new capacity of 0.0074 mf, and the complete circuit will now respond to the space frequency of 2,975 c.p.s.

Discriminator Space Transformer T_3 , with C_{14} and C_{15} was originally resonated at 1,210 c.p.s. and by replacing C_{14} and C_{15} with a new value of 0.0147 mf, the complete circuit will now respond to the mark frequency of 2,125 c.p.s.

This will allow excellent operation of the

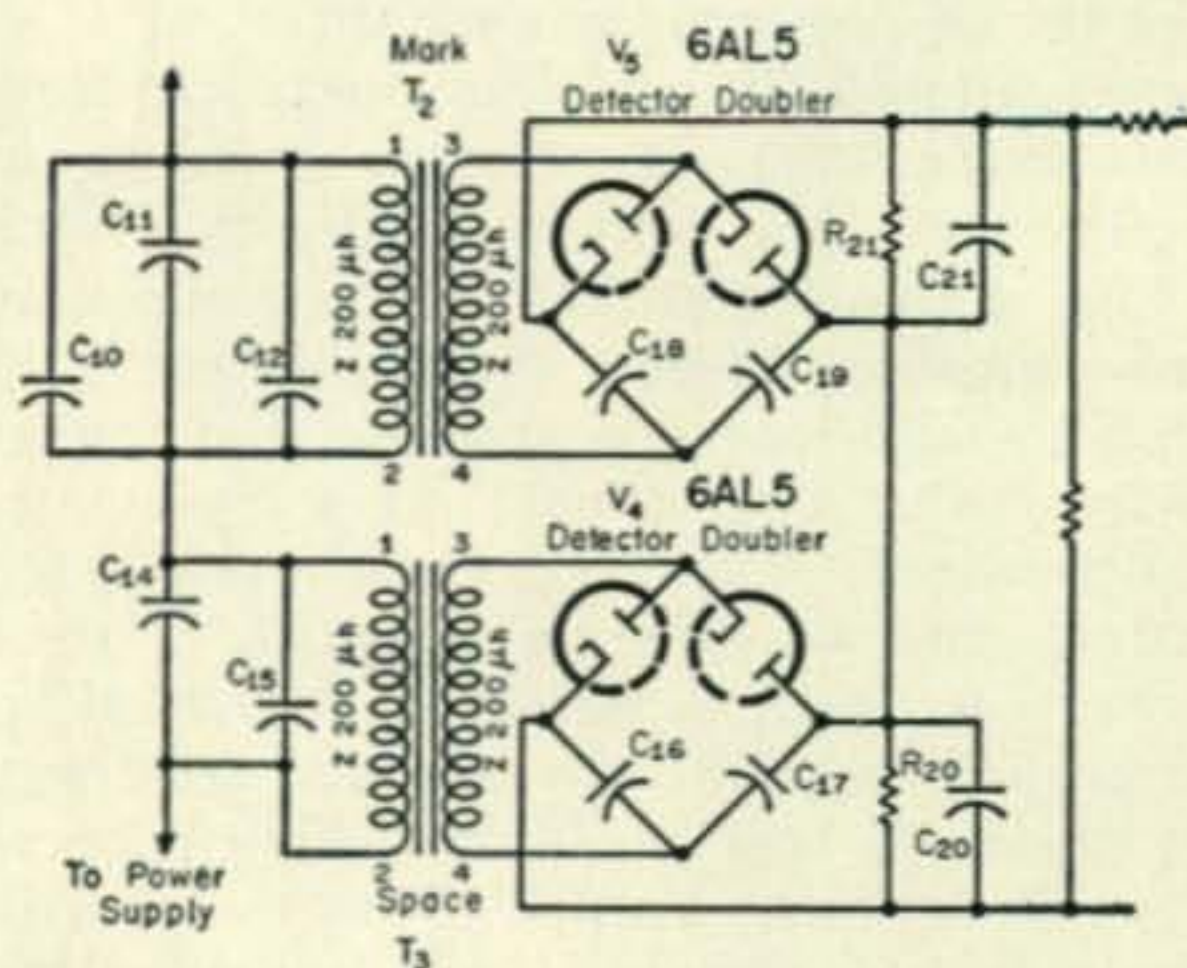


Fig. 1—Receiver section of the TH-5/TG Telegraph Terminal Unit shown above is modified by replacing C_{10} , C_{11} and C_{12} with a 0.0074 mf unit and C_{14} and C_{15} with a 0.0147 mf unit.

*9428 Hobart St., Dallas 18, Texas

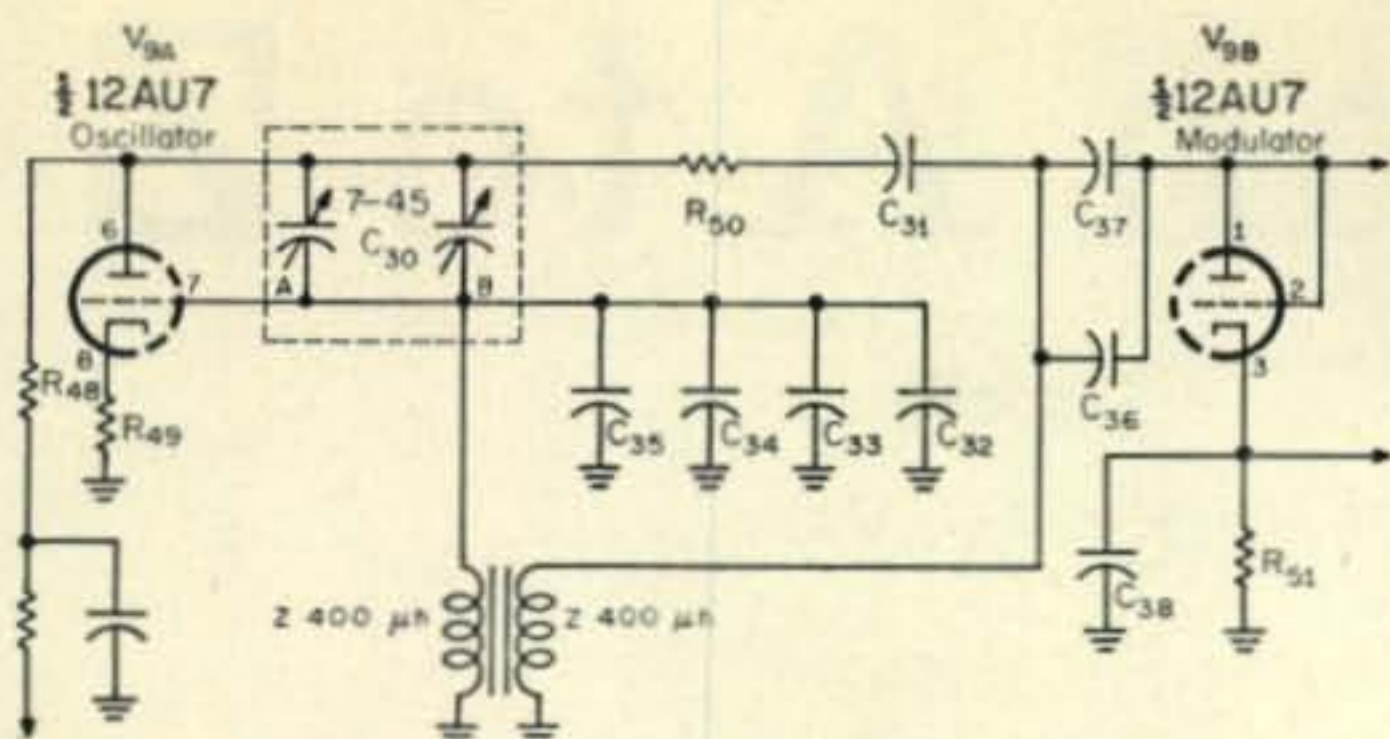


Fig. 2—The transmitting section of the TH-5/TG terminal unit is modified by replacing C_{34} and C_{35} with a 0.00127 mf capacitor and adding a 0.0039 mf capacitor across the C_{36} , C_{37} parallel network. Capacitors C_{30} A and B may then be used to adjust to the exact frequency.

standard 850 c.p.s. RTTY signals.

In the transmitting department, remove capacitors C_{34} and C_{35} . In their place, substitute a new value of 0.00127 mf to produce the space tone of 2,975 c.p.s. Add a frequency of 0.0039 mf across existing C_{36} and C_{37} capacitors to produce the new mark tone of 2,125 c.p.s. Existing variable capacitors C_{30} may be used for trimming to exact frequency.

The capacitors just removed should be kept

for future use, in case narrow shift operation is contemplated, or should one want to restore the unit to its original condition.

This completes the modification. The capacitor values just given above may be produced in any combination available and it is probably that each individual TH-5/TG will require a bit of trimming one way or the other to get dead on frequency, as far as the exact values of capacitors are concerned. The values given, however, will be quite close in any event.

Remarks

Since the input and output impedance of the TH-5/TG is 600 ohms nominal, the unit is very versatile in scope, matching the majority of ham installations audio wise, *etc.* Since the unit is completely self-containing with its own 110 volt a.c. power supply, as well as furnishing its own loop current, it will make a most useful addition to an RTTY setup.

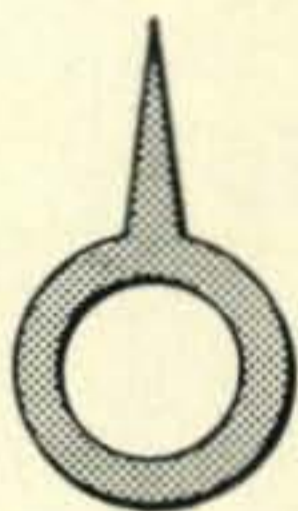
The above project was completed several years ago for the Central Technical Net of A. F. MARS, Texas Section. Since these units have begun to show in surplus houses and junk yards, it was thought the information might be of some interest to those who might possess the units. ■

The Poor Man's Frequency Finder

BY DON WENNERBERGER,* WA4PXR

HAVE you ever tuned off frequency, with a transceiver, to hunt for a hole or monitor another frequency only to find it most difficult to return to the original frequency, right smack on the button? I have had this problem many times but not any more.

Fig. 1—Plastic ring shown will permit accurate frequency reset.



The following simple device solved my problem and if we share the problem we can share the device. Originally, a flat piece of plastic or vinyl was cut in the shape shown in fig. 1. The ring is slipped over the main tuning knob (v.f.o. knob). By placing the pointer at the 12 o'clock position during a QSO and aligning it with a fixed vertical line on the transceiver's face, the operator could go off frequency and return to the original setting with ease. Just retune to the

*Box 535, De Funiak Springs, Florida.

frequency and set the stem to 12 o'clock again and you will be right on frequency. Many transceivers have a tuning knob with a skirt that is moveable as shown in fig. 2. A fine white line was painted on the skirt and this was used instead of the plastic pointer. As long as the knob skirt is moveable this alternative may be used.

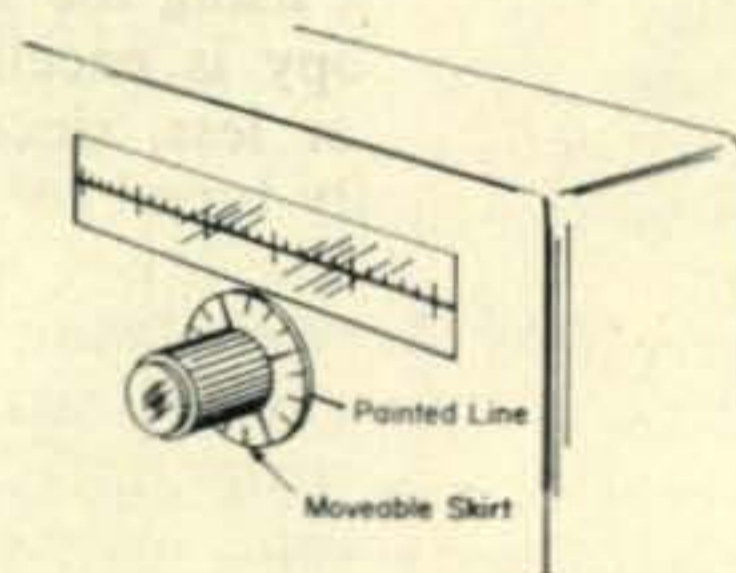


Fig. 2—Moveable skirt with painted line also provides accurate reset.

One can work outside of the American band on receive and of course transmit in the band. This would require two pointers for accurate setting and both the skirt and the plastic pointer may then be used. ■

RTTY From A to Z

BY DURWARD J. TUCKER,* W5VU

Part IX

Previous chapters touched on the polar relay, an item often used in RTTY work. Discussed below are the advantages, construction, types and applications of polar relays. Next month, in Part 10, the methods of adjusting the polar relay will be covered.

It was noted in the discussion of the two early converters that polar relays were used in both units. Polar relays are still used extensively in connection with RTTY converters. They are also used extensively in connection with transmitter frequency shift keying circuits. In fact, polar relays are very much a part of RTTY work. Therefore, this all-important subject should be thoroughly covered before going further.

The polar or differential relay as it is sometimes called, has amateur applications other than in RTTY work, such as transmitter keying circuits as well as many commercial applications. Before we go into the why of polar relays, we might ask what a polar relay has that most other relays don't have. One answer to this might be, "Nothing really, except that it does it better than most other relays." Another answer might be, "It has a weightless (almost) armature and a high sensitivity." The question might also be answered with a negative statement: "It doesn't have something that most other relays do have. That something is a spring to hold the armature contact to one side or the other." In other words, a polar relay has no *mechanical biasing spring* on its armature! These answers should give you some idea of why the polar relay is generally considered as something special.

Why A Polar Relay

Relays, *per se*, are not new to the amateur; they have been with us for a long time. However, one can recall when turning it back to the other fellow was somewhat of a ritual. It was more like a missile firing countdown with all of the switches that had to be thrown. Then relays, at a price that the amateur could afford, became more plentiful and cheaper. Relays have solved a lot of problems for us and have made certain cumbersome functions plain matter-of-fact operations.

In most radio amateur applications, the requirements of a relay are relatively simple. It needs to pull in readily when its coil is energized and turn loose as readily when the circuit energizing its coil is opened. The turning loose part in common relays is aided by means of a spring. Not so for a polar relay because it *has no* armature biasing spring.

The amateur is acquainted with the need to use a relay for the closing and opening of electrical circuits. This need also exists in the operation of teletype machines and in the frequency shift keying of transmitters. The requirements of a relay in this service are far more exacting

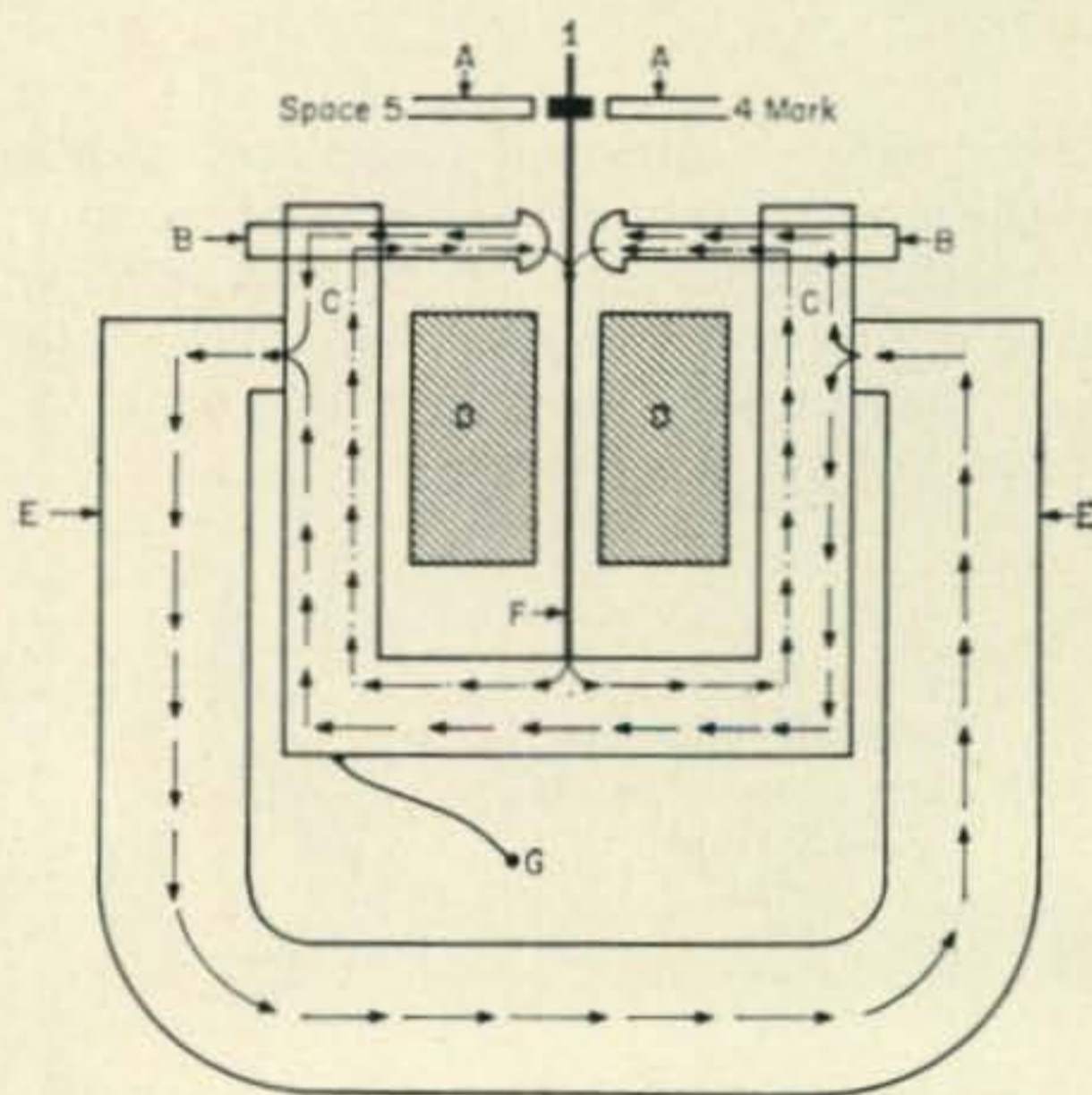


Fig. 50—Simplified mechanical construction of a polar relay showing the direction of magnetic lines of force. The permanent magnet flux path is shown by the dashed line while the flux path due to the current in a coil winding is shown by the dot dash combination.

Parts identified are:

A—Contact connections, B—Adjustable pole piece (screws), C—Permanent magnet extension pieces, D—Coil windings, E—Permanent magnet, F—Armature, G—Armature connection.

*6906 Kingsbury Drive, Dallas 31, Texas.

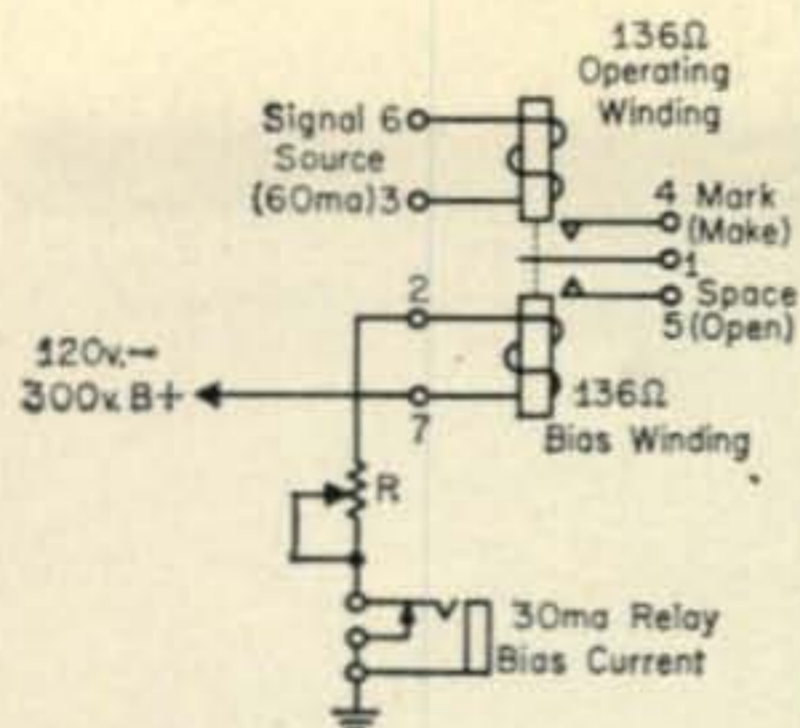


Fig. 51—Schematic symbol and electrical data for the Western Electric Type—255-A polar relay. The value of R is discussed in the text.

than for a relay for switching the antenna, muting the receiver and a multitude of other services.

One might be inclined to consider that a relay is simply a device with a coil to be energized which, in turn, causes an armature to open and close electrical contacts. A polar relay is more than that. It approaches more the role of being, in a true sense, a *relay* or *repeater* of data or information given to it. That is what sets it apart from the ordinary relay. On the other hand, we should not lose sight of the fact that it is a mechanical device and its armature is not quite "weightless" so it is not altogether a perfect device. However, when a polar relay is properly adjusted it does an excellent job of truly being a relay.

Basic Construction

The construction of a polar relay is a bit more complicated and detailed than an average relay. For one thing, it is built to closer tolerances and has many mechanical refinements. Its armature is very light and is also relatively long and thin. This minimizes the effects of inertia and thus contributes to its accuracy as well as sensitivity.

Figure 50 shows a simplified version of the basic mechanical construction of a polar relay. Let us inspect it in detail. The basic parts of a polar relay are a permanent magnet, an armature and two or more coil windings. In addition there are two contacts that the armature alternately connects with, a special base with contact pins and permanent magnet extension bars. There are also adjustable pole pieces that can be screwed in or out to change the spacing between them and the armature. There are still other parts whose function are secondary but

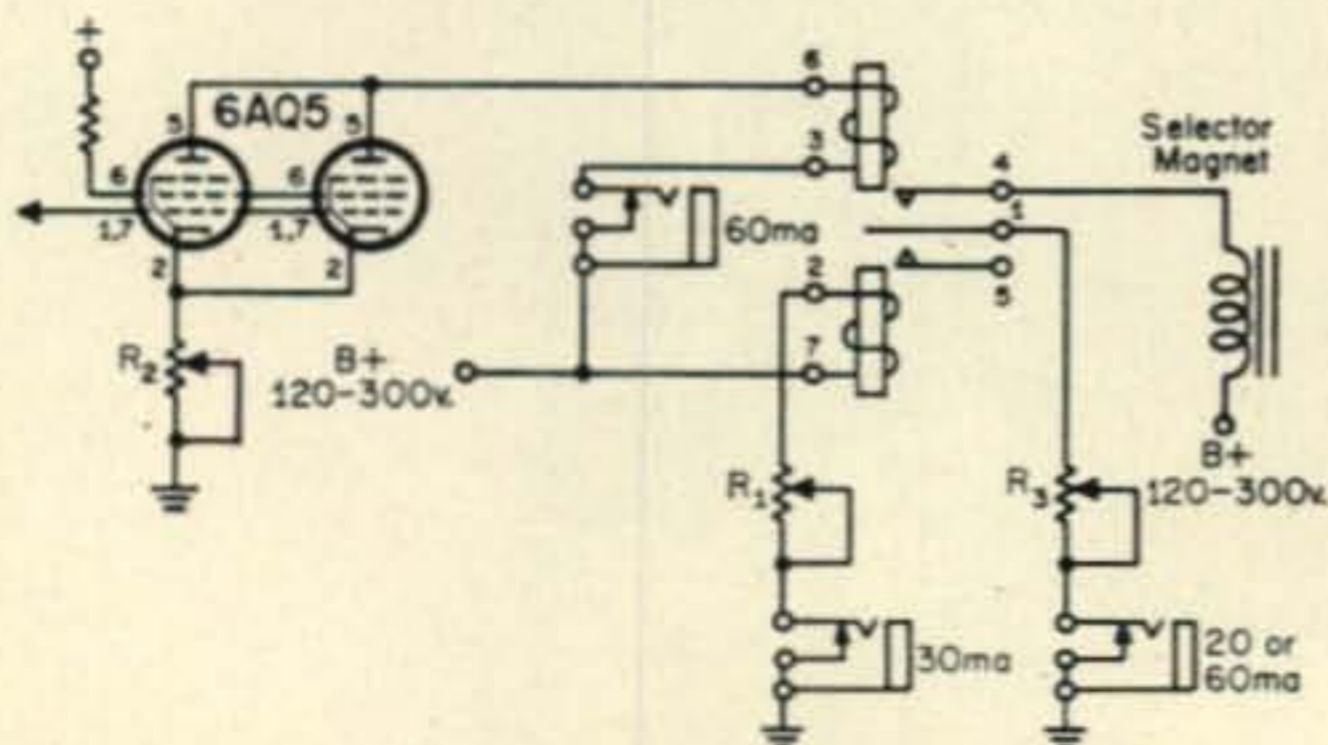


Fig. 52—Typical application of a polar relay in receiving. In actual practice there would probably be added circuitry as noted in the text.

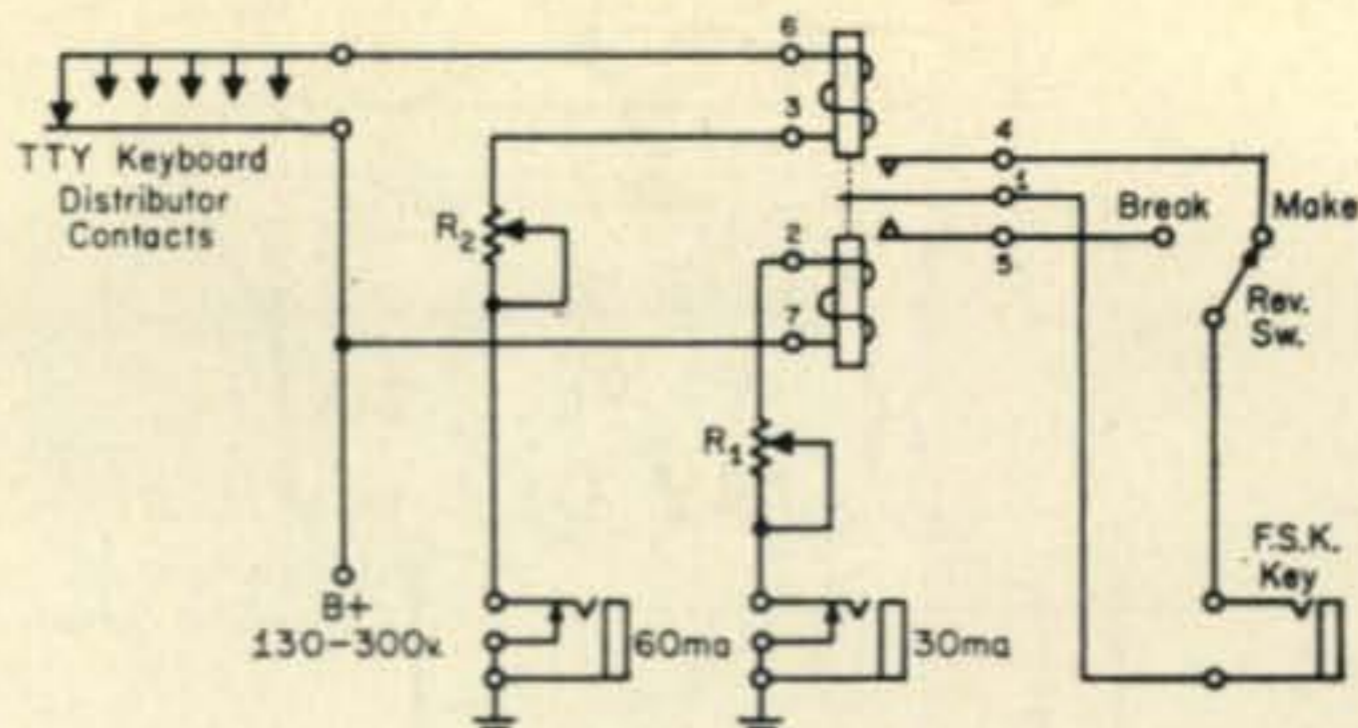


Fig. 53—Typical polar relay circuit for frequency shift keying of a transmitter. Resistors R_1 and R_2 are adjusted for the currents shown.

necessary. They are mostly associated with the mechanical fabrication and refinements of the relay, as well as for mechanical rigidity.

Theory of Operation

The operation of the polar relay can best be visualized by viewing its simplified basic outline given in fig. 50. Consider first that no voltage is being applied to either of the coil windings. Consider further that the armature is reasonably positioned in the center of the coils and that the permanent magnet, the yoke, and permanent magnet extension pieces are fairly symmetrical with the armature. This is taken care of in the design and construction except for minor adjustments. Under the above conditions it should be possible to adjust the two pole pieces so that the armature floats between them. In other words, there would be a condition existing where the pull on the armature to either side would be the same.

If a voltage is now applied to one of the windings (either one) it will cause the armature to snap to one side or the other. The direction depends on the polarity of the applied voltage. A reversal of polarity creates a reversal of the direction of current flow through the coil and causes the armature to snap to the other side.

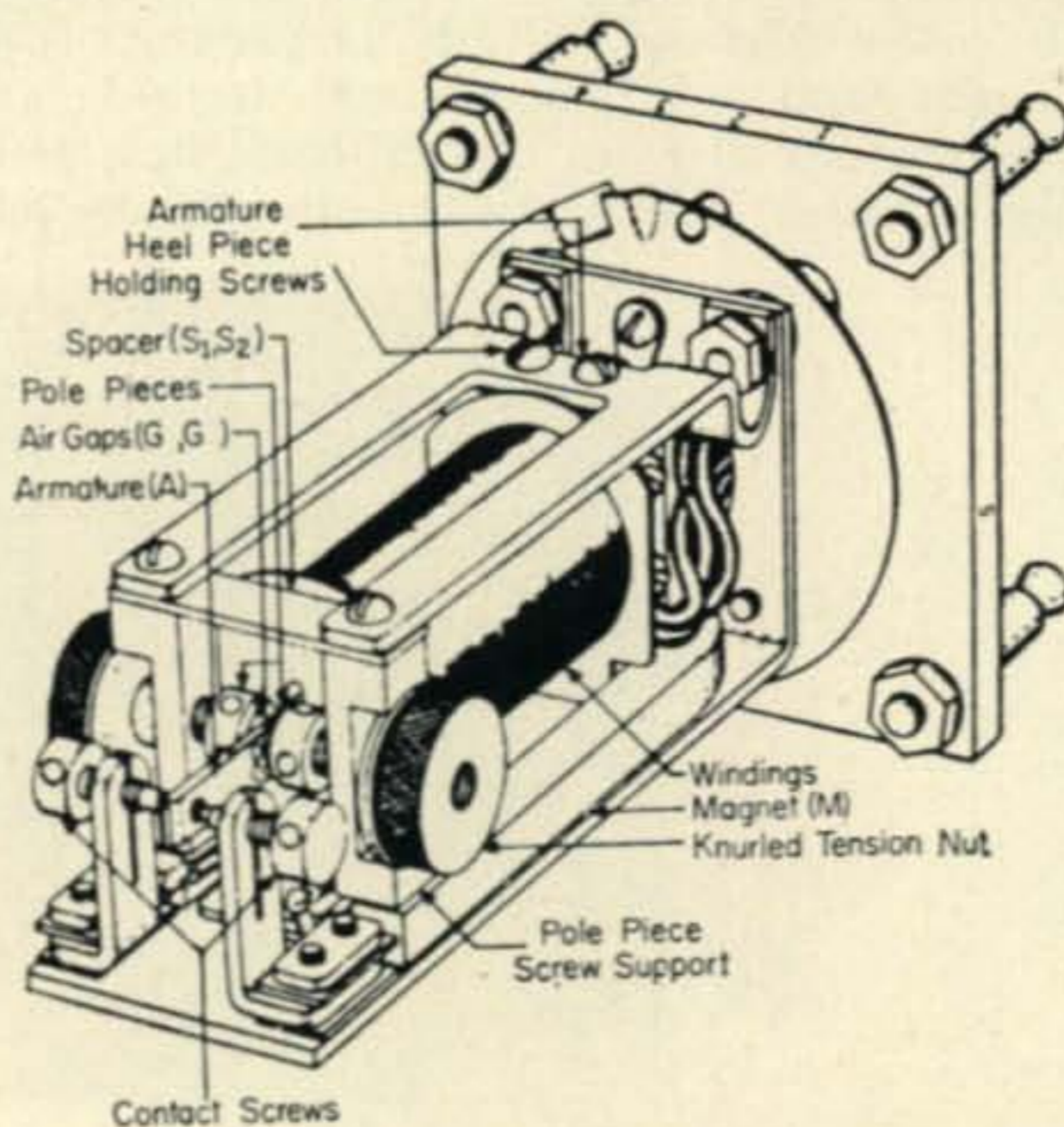


Fig. 54—Drawing of the 255-A polar relay show the details of its mechanical construction. A cylindrical dust cover fits securely over the forward end of the relay.

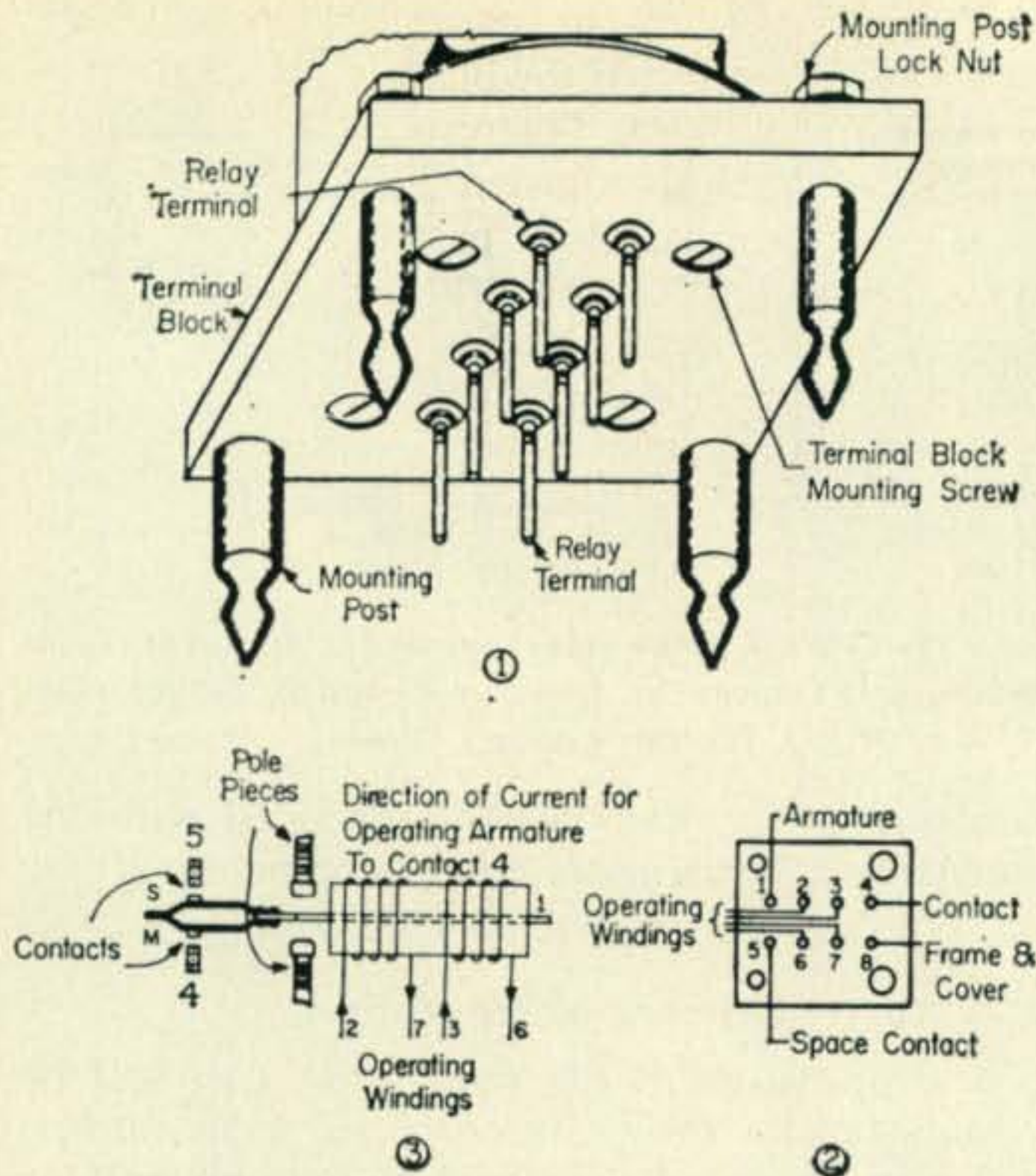


Fig. 55—(1) Base view of the 255-A polar relay; (2) Base connection prongs; (3) Coil and contact arrangement.

The effect of applying a voltage to one of the coil windings is indicated by showing the resultant lines of flux about the coil, in the armature, yoke, permanent magnet extension pieces and the adjustable pole pieces. It will be noted that the coil flux lines are additive with the permanent magnet flux lines in the right-hand adjustable pole piece and oppose the permanent magnet flux lines in the left-hand adjustable pole piece. The result is that the magnetic pull on the armature from the left-hand pole piece will decrease and the magnet pull on the armature from the right-hand pole piece will increase. This simply means that the armature will move to the right making connection with contact 4, which we will arbitrarily call the *mark* contact.

A reversal of the voltage would change the direction of current flow and the opposite would be true, the magnetic pull on the armature from the right-hand pole piece would decrease and the magnetic pull from the left-hand pole piece would increase, pulling the armature to the left.

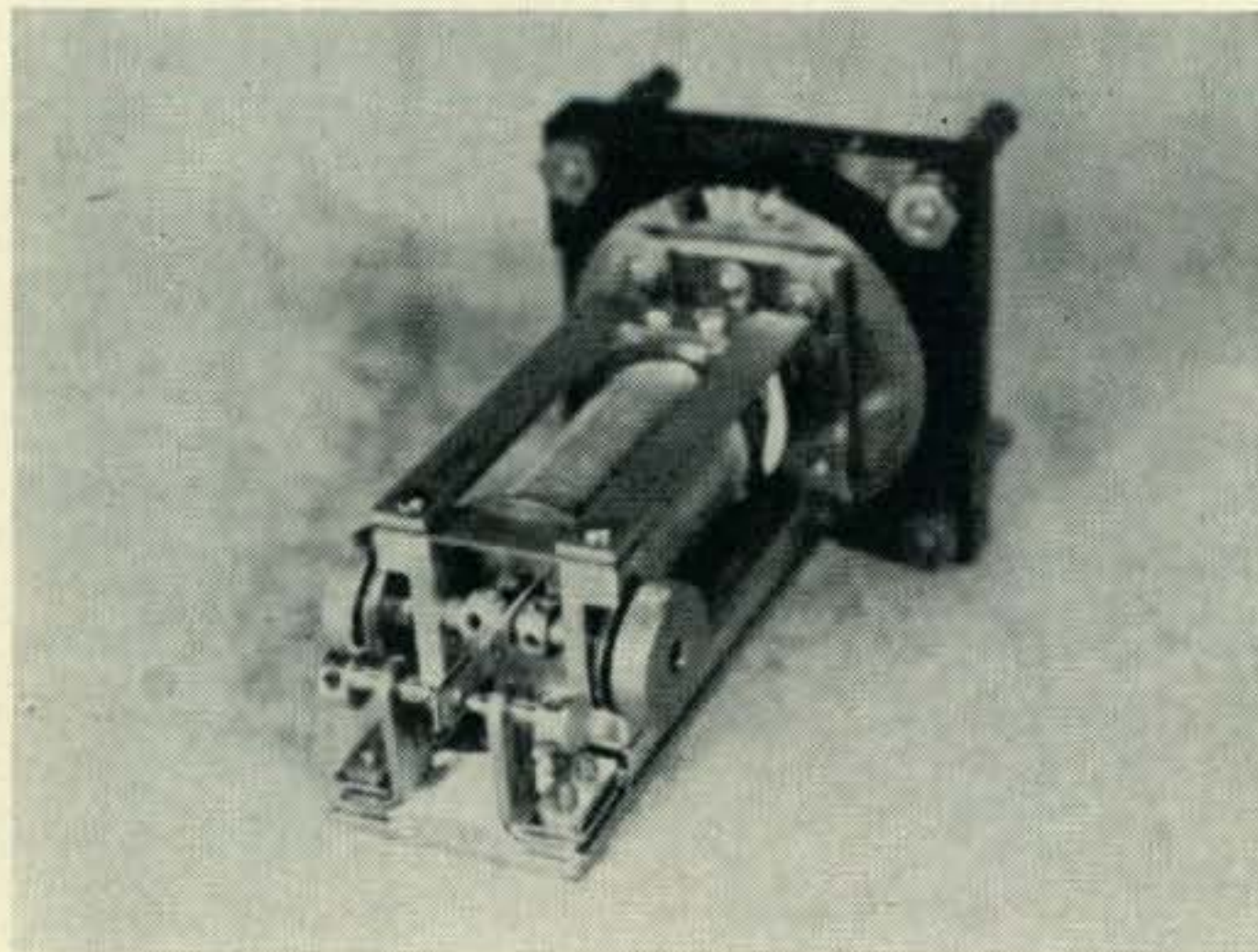


Fig. 56—General view of a Western Electric 255-A polar relay with the dust cover removed and properly oriented for mounting.

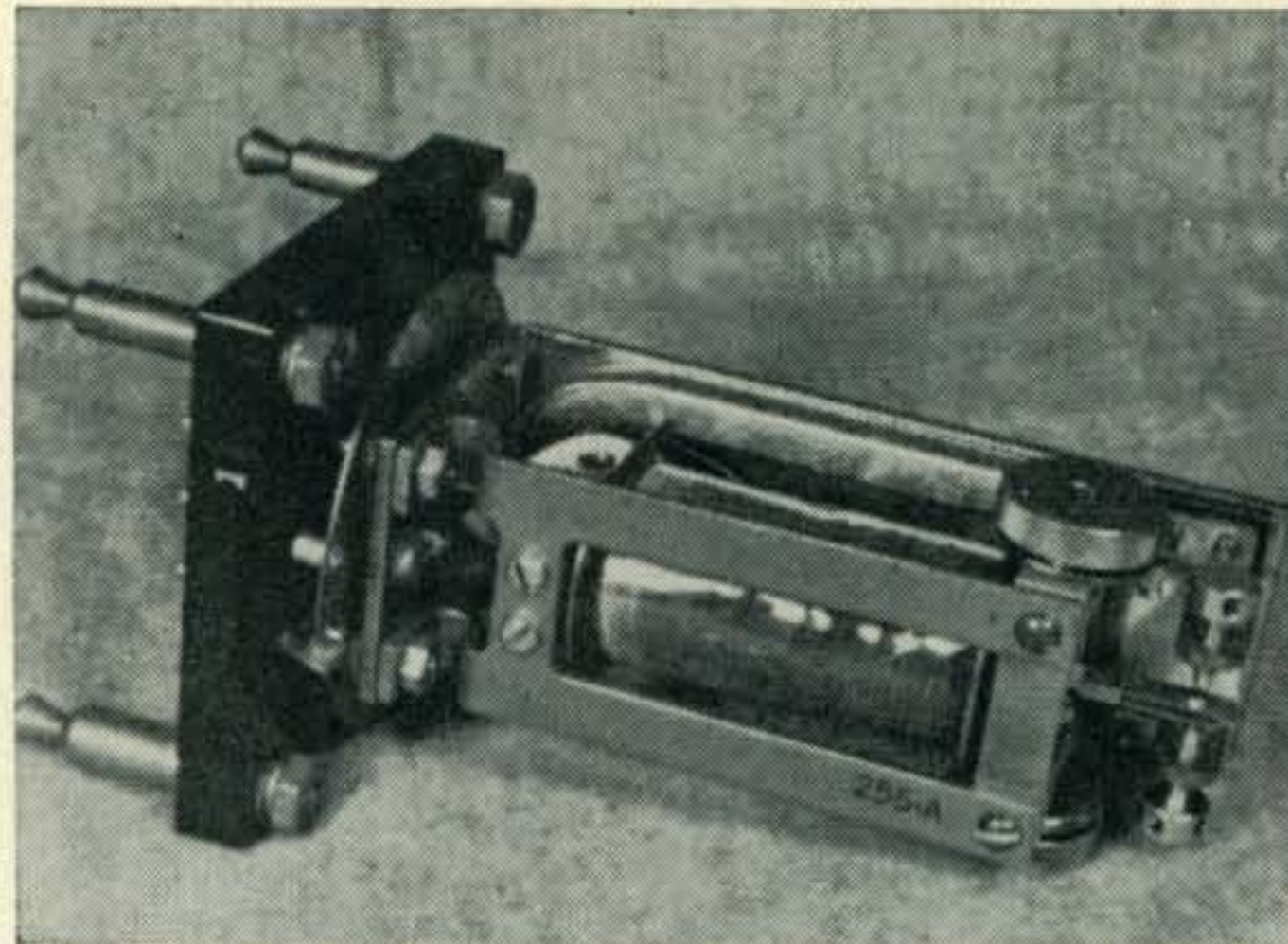


Fig. 57—View of a 255-A relay showing general construction details.

Contact would now be made to the space terminal.

Basic Polar Relay Circuit

Obviously, no advantages would come from a continued manual reversal of the voltage leads to the polar relay coil as outlined above. However, this principle does have an application in land-line polar telegraph circuits as well as land-line polar teletype circuits.

Perhaps you have been wondering about the other coil winding that the polar relay has. It was pointed out earlier that the polar relay has no spring to pull or mechanically bias the armature to one side. The other coil winding is used to do this electrically and do it better than any mechanical spring could ever do it.

The circuit of fig. 51 shows how the polar relay may be connected so that one winding is used as a bias winding and the other winding is used as an operating or keying winding. The value of the current limiting resistor R depends upon the $B+$ voltage selected. The value of R is adjusted so that the bias current is approximately 30 ma and should be in the order of 2000 ohms or more. After a quick mental calculation one may wonder why we don't use about 4 volts at the $B+$ point and little or no resistance for R . One should go back and read the section on "Selector Magnet Current" for a detailed

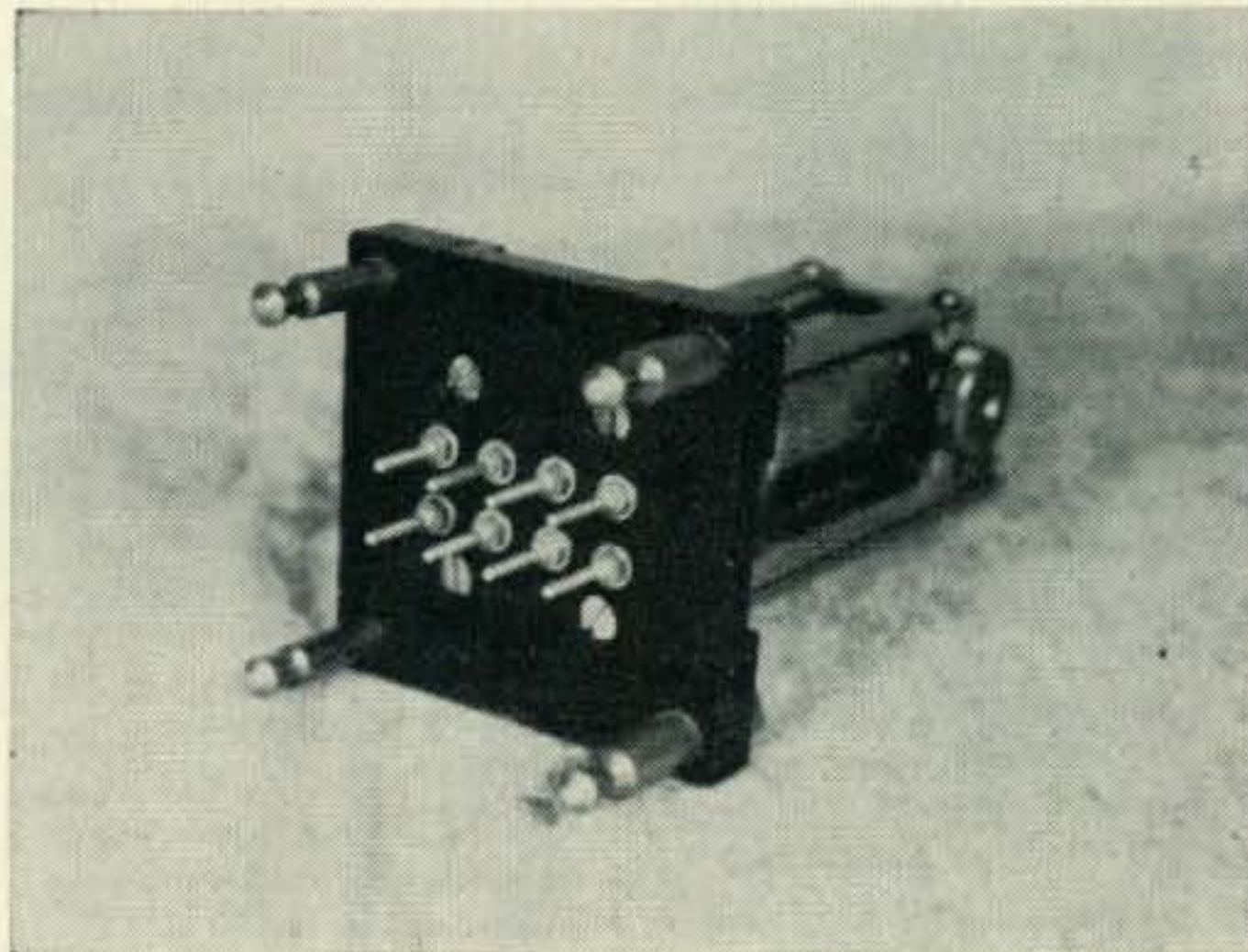


Fig. 58—Base view of the 255-A polar relay showing the arrangement of the contact pins and mechanical guide posts.

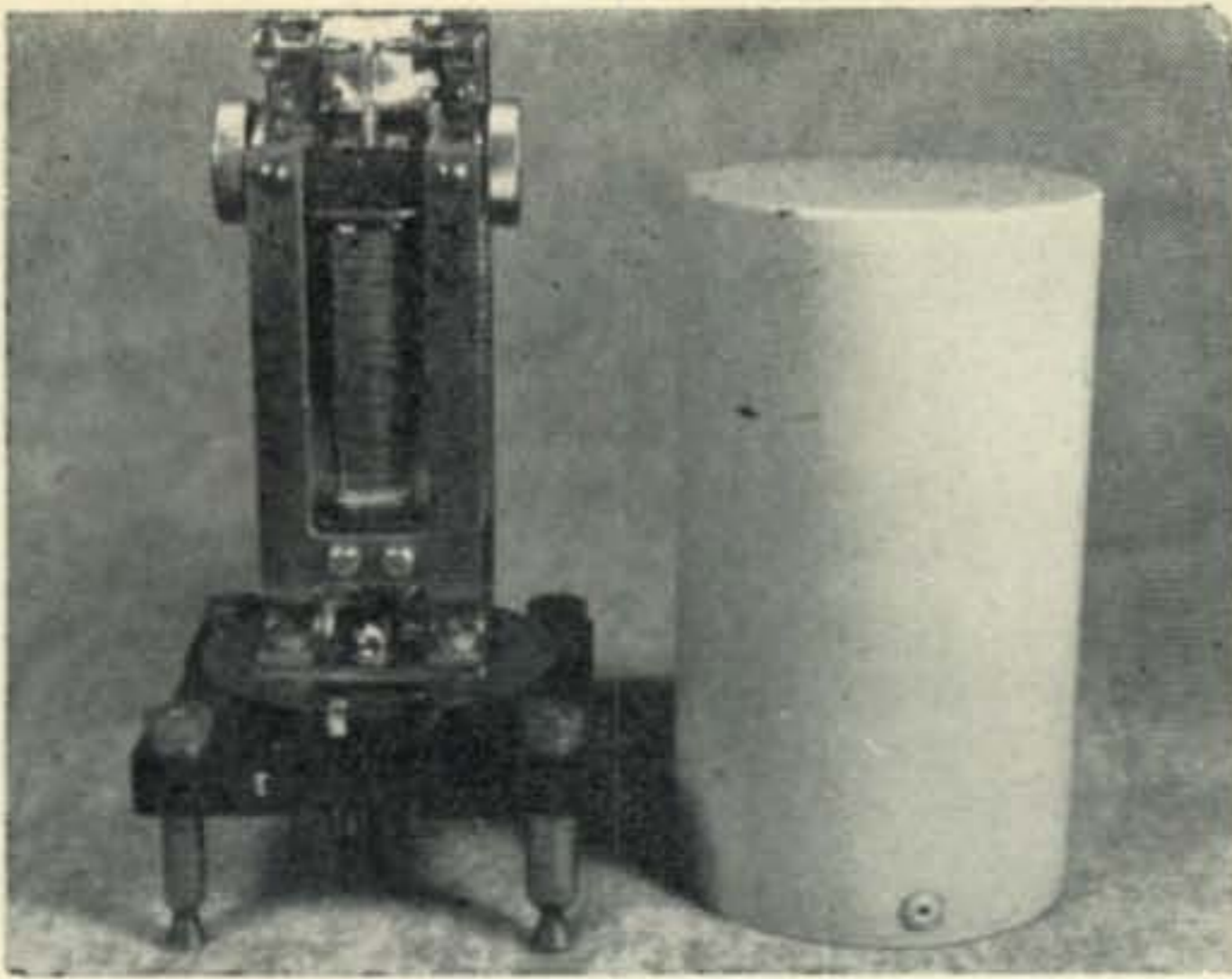


Fig. 59—View of what should normally be the horizontal plane of the 255-A polar relay.

answer to this question. Figure 51 may be compared to fig. 24 covering the circuit of a selector magnet.

A fixed current of 30 ma in the bias winding of the polar relay in fig. 52 pulls the armature to one side or the other depending upon the direction of the current flow. This position is normally the *space* position. The armature will stay in this position until a current in the signal winding creates a magnetic field of sufficient magnitude to swing the armature to the other side, normally the *mark* position.

The direction of the current in the signal winding has to create a magnetic field in opposition to the field created by the bias winding. The *magnitude* of the signal current must also neutralize the effect of the bias winding current and have *enough* magnetic force left to move the armature to the *other* side. Since it is considered desirable to have 30 ma of current in the bias winding to properly hold the armature to one side, it would seem reasonable that it would take 30 ma to neutralize this pull and also take an additional 30 ma to move the armature to the other side. That is the case; it is desirable that the signal current be in the order of 60 ma. As in the bias winding circuit (fig. 51) and the selector magnet circuit (fig. 24) it is necessary that the circuit voltage be in the order of 120-300 volts with an adjusted circuit resistance so that the current is 60 ma.

A reversal switch at this point in the circuit could shift the order of *mark* and *space*. An occasion for this would be when the incoming signal is being sent "upside down" and reversal is necessary.

Typical Polar Relay Circuits

The polar relay circuit shown in fig. 51 may be used in connection with an RTTY converter for receiving or it may be used in the frequency shift keying of a transmitter. Such circuits, not only involving the polar relay, but the selector magnets and the keyboard contacts of a teletypewriter as well, are usually referred to as "local loops." Figure 52 shows how the polar relay circuit of fig. 51 might be adapted to an RTTY converter keyer stage using a pair of

6AQ5's connected in parallel. The resistance R_1 is adjusted so that the bias winding (terminals 2-7) receives 30 ma. The resistance of R_2 and the screen voltage are adjusted so that the operating winding (terminals 3-6) passes 60 ma when the two keyer tubes of converter are conducting on *mark*. The resistance of R_3 is adjusted for either 20 ma or 60 ma depending upon whether the two selector magnet windings are connected in series or parallel. In actual practice there would probably be added circuitry, especially in the 1-4 contact key circuit.

The question might well be raised as to why use a polar relay such as in the W2JAV converter or in a circuit such as fig. 52 when in each case the selector magnets may be placed in the circuit directly. There *are* arguments for both sides. The decision of an operator to use the polar relay probably hinges more on the individual, his own particular local loop circuit, the number of teletype machines and terminal distributor machines he uses as well as how he uses them. Some varied uses were briefly mentioned under Model 14 Transmitter Distributor in an earlier chapter. This subject will be covered in greater detail later.

The use of a polar relay can lend convenience as well as flexibility to ones RTTY activity. Also, we might add, that it acts as a good low pass filter by favoring and passing only the keying spectrum while discriminating against the higher frequency noise pulses.

FSK

Figure 53 shows how the polar relay circuit of fig. 51 might be adapted to the frequency shift keying of a transmitter. This circuit could be used to key any of the several frequency shift keying circuits outlined previously. It will be noted that a single pole double throw switch is included so that the keying of the transmitter may be reversed if necessary.

Relay Types

Figures 54 and 55 show the details of construction of a Bell Telephone System type 255-A polar relay. Views of the 255-A relay are given

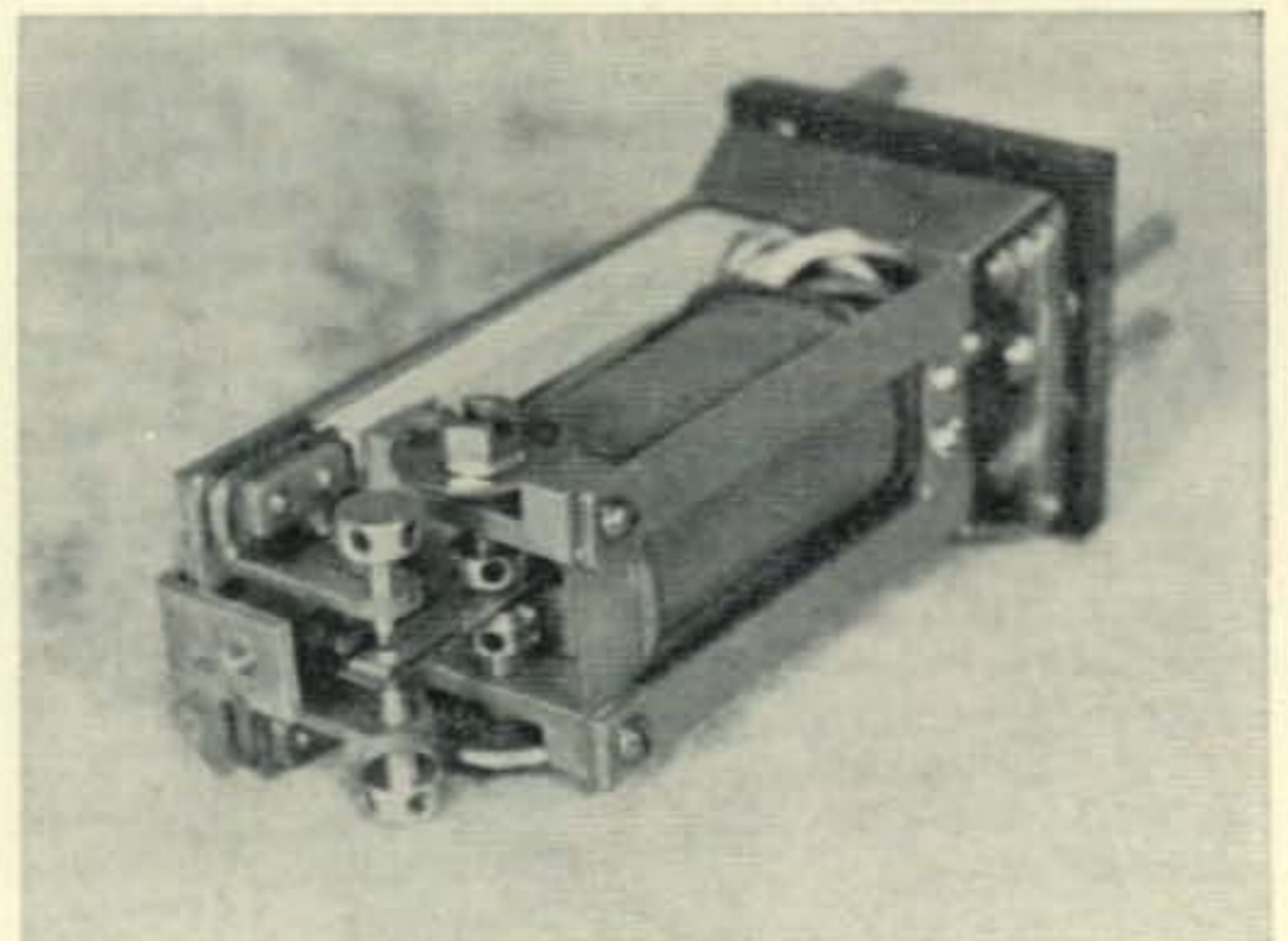


Fig. 60—View of the Western Electric D-164816 polar relay lying on its side showing the face. Note its close similarity to the 255-A polar relay. The D-164816 polar relay uses a rectangular dust cover.

in figs. 56, 57, 58 and 59. One should have no difficulty in locating the long horse shoe or tuning fork type permanent magnet located flat against the long portion of the L shaped mounting bracket. The two permanent magnet extension pieces are to be seen extending at right angles from the ends of the "horse-shoe" or U-shaped permanent magnet. The opposite ends of the permanent magnet extension pieces connect to one end of the yoke. The armature, contacts, and the two adjustable pole pieces should be just as easy to locate and identify.

Figures 60 and 61 are views of a polar relay advertised on the surplus market as a Western Electric D-164816. The armature, permanent magnet and other parts for the magnetic circuit are essentially the same as for the type 255-A polar relay, as can be seen by comparing figs. 60 and 61 to figs. 56, 57, 58 and 59. This relay has a base contact pin arrangement that fits a standard nine pin socket. In addition, the dust cover is rectangular whereas the dust cover for the 255-A is cylindrical. A further difference between the Type 255-A and the Type D-164816 polar relays is that the latter has three coil windings as shown in fig. 62.

Relay Mounting

An inspection of the drawings and actual photographs of the two polar relays under discussion indicates that the relays have mechanical guide pins as well as electrical contact pins on the base. Two of the guide pins on the 255-A polar relay are of one size (see right pins of fig. 58) and the other two are of a smaller size. This permits insertion of the relay one way only. The ends of the guide pins are shaped the same as the end of a standard phone plug. The socket for a 255-A relay has V-shaped metal springs that fit into these indentations on the ends of the guide pins. It requires a special socket to fit the electrical pin arrangement of the 255-A relay as well as its mechanical guide and hold pins. These sockets are usually available on the surplus market from the same sources that advertise the relays. There does not seem to be a special socket available to fit the nine pins of the D-164816 relay and, at the same time, ac-

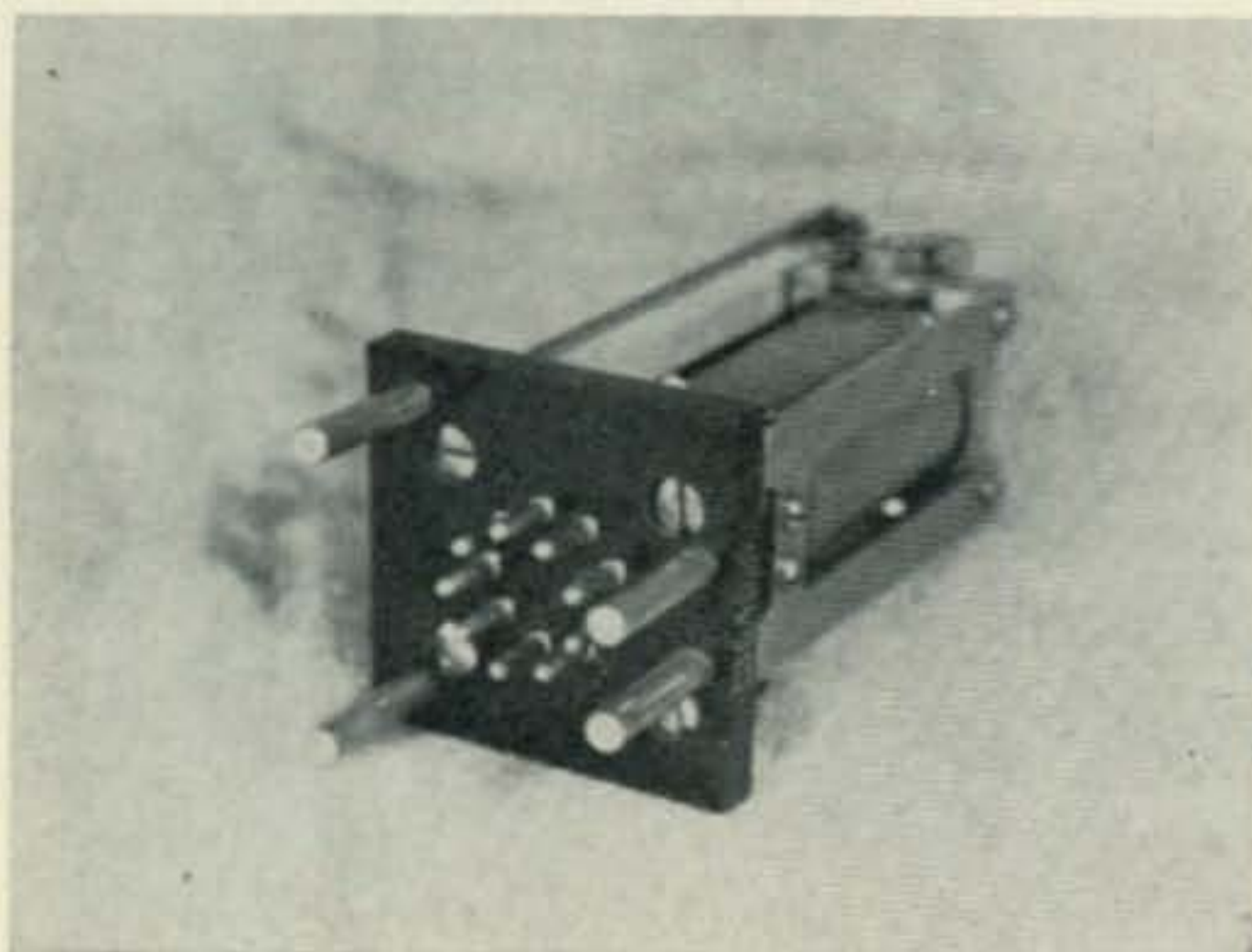


Fig. 61—Base view of the D-164816 relay shows the pin arrangement that fits a standard nine pin socket.

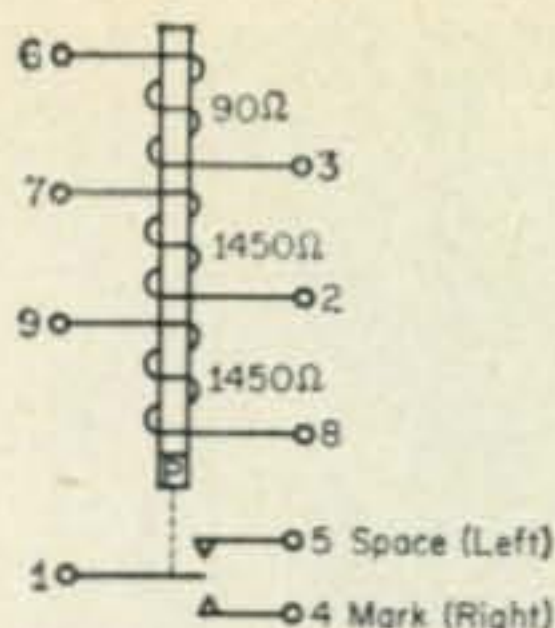


Fig. 62—Coil and terminal data for the Western Electric D-164816 polar relay. Application of the positive voltage to terminals 2, 3 or 8 moves the armature to the *mark* side (1 to 4). Data supplied by Todd Electronics Co., Omaha, Nebraska.

commodate the four mechanical guide pins as shown in figs. 61 and 62. The best thing to do is to use a standard nine pin socket for the electrical contact pins and drill the chassis, in which the socket was mounted, to accommodate the four mechanical guide pins. When mounted in the proper place for best results, the "face" of a polar relay should face horizontally and not vertically. At the same time it should not be mounted on its side. Figure 56 shows the proper orientation of a polar relay for mounting.

Figure 59 shows a view of the 255-A polar relay looking down on its "top" or horizontal plane. It is usually recommended that this and similar polar relays be mounted in this plane for best results. All views of the polar relay are with the bakelite or fiber dust cover removed in order to show the detailed construction of the relays. Normally these covers should stay in place at all times, being removed only when inspection or adjustments are in order.

Availability

The Western Electric Type 255-A relay is perhaps the easiest to obtain on the surplus market or from one of the state RTTY societies so it is the most popular as well as the most common. The Western Electric type 215-A polar relay is also occasionally available although it was not as accurately built as the type 255-A that followed. The 215-A is harder to adjust than the 255-A but the 255-A is not easy to adjust.

The type 215-A has two coils whose d.c. resistance is approximately 90 ohms each, while the resistance of each coil of the type 255-A polar relay is approximately 136 ohms. The Western Electric D-164816 polar relay has three coil windings whose d.c. resistance are respectively 90 ohms, 1450 ohms and 1450 ohms. Prices on these three types of relays on the surplus market range from about \$2.00 to \$5.00 each, depending upon their condition. The 255-A socket ranges from about \$1.00 to \$2.00 if you can find it.

As stated at the outset, the polar relay is a precision made and operated device and it must be adjusted accordingly. Part 10 will cover polar relay adjustments as well as the construction and operation of a device for accomplishing this.

[To be continued]

Durward J. Tucker, W5VU, Managing Director of WRR and WRR-FM, Dallas, Texas. The plate glass window at the rear is to a special sound proof communications room (shown in the other picture) which Durward may occupy, at a moments notice, as Chairman of the Texas State Industry Advisory Committee (EBS, Police, Amateur, etc.), as well as Director of Communications for Dallas and Dallas County Civil Defense.



Who is Durward J. Tucker?

MANY of our readers have become quite interested in a series of articles, RTTY From A to Z, by Durward J. Tucker (W5VU), currently running in *CQ*. The series started with the August, 1964 issue and will run well into next year. The series is already longer than any other in *CQ* that we can recall.

There is no wonder that many of our readers have asked about W5VU. His clear-cut style of writing, interspersed with sly humor, makes for interesting as well as informative reading.

Durward J. Tucker, W5VU, is a radio broadcast executive, being Managing Director of 5000



The corner of the room shown gives a view of part of the RTTY and other radio amateur emergency equipment. Out of view is a Model No. 14 and TD Unit. These, together with the Model 15 shown, are being replaced with a single Model 19 to give more space. This room is used mostly for supervisory purposes and small scale emergencies, as the main communication center is at the underground Civil Defense Headquarters about one-third mile away. Extensive RTTY facilities are being used in the Dallas CD setup. This special Dallas RTTY system will be covered in detail in one of the authors articles on RTTY.

watt WRR-AM station and 100 kw WRR-FM station for the past fifteen years.

As a veteran broadcaster, he is very active in broadcasting, being on the Board of Directors of the Mutual Broadcasting System; a Director of the Texas Association of Broadcasters, and Chairman of the State Industry Advisory Committee to the FCC for Texas. Under his direction is not only the Emergency Broadcast System (which replaced Conelrad), but Police radio Fire radio, Petroleum, Citizens Band, Public Utilities, Industrial; as well as Amateur Radio, and, in fact, all radio for the State of Texas, (Quite a chore within itself—even if you didn't have a regular job to take care of) Director of Communications for Civil Defense for Dallas and Dallas County (another healthy chore). Being an advertising man, he frequents New York and other advertising centers and is certainly no stranger to Madison Avenue. He is a 32° Mason and Shriner, and is closely associated with many Dallas civic organizations and activities; and is well known to the music lovers in Dallas since WRR-FM is one of the nation's outstanding classical music stations.

Durward is an engineer within his own right; however, doing extensive Management and Engineering Consulting work in his spare time during the war years and for a number of years following the war. He holds two degrees in Electrical Engineering, is a member of Eta Kappa Nu, taught evening classes in Electrical Engineering at SMU during the war years, at which time he authored a textbook: *Introduction to Practical Radio* (mostly math) published by The Macmillan Company in 1945. He is a registered Professional Engineer in the State of Texas, member of the National Society of Professional Engineers, as well as the Texas Society of Professional

[Continued on page 102]

Developing A DX Voice

BY THE CQ STAFF, IN CONSULTATION WITH
PROFESSOR EMIL HEISSELUFT*

HOW often have you noticed that certain voices seem to cut through the QRM and QRN much better than others? With the assistance of an eminent authority in the field of voice development, CQ has conducted a study to determine what sort of voice it takes to pick up those extra db's of intelligibility, and how, if possible, such a voice might be developed by the average radio amateur. The following article shows how, by practicing simple voice development exercises for a month, almost anyone can increase his audio punch ten-fold, for a gain in intelligibility of 10 db.

The "Power-Intelligibility" Anomaly

Curve 1, fig. 1, shows how power is distributed in the average male voice. Curve 2 shows where the greatest amount of intelligibility lies. Male voice power is concentrated in the frequency range between 100 and 750 c.p.s., while articulation, or the greatest amount of intelligibility lies in the range between approximately 1000 and 3000 c.p.s. (Female voices tend to have slightly more power in the upper range). This spread between power and intelligibility is an anomaly of nature—where the voice is strongest, the sounds carry little intelligence; where the voice is weakest, the sounds are most intelligible. The trick in improving intelligibility is to try to get as much power as possible in the voice range between 1000 and 3000 c.p.s.

* c/o CQ, 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050.

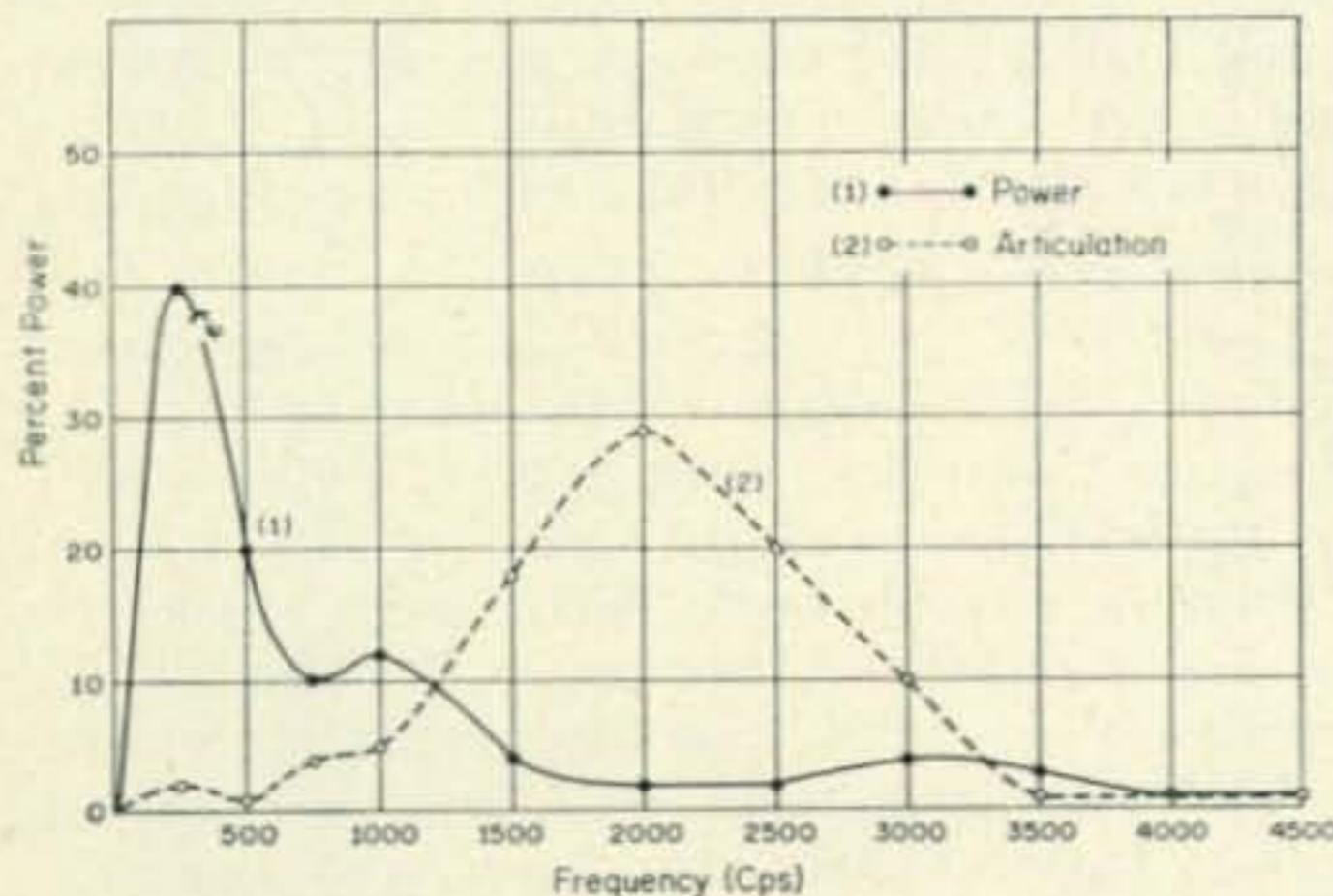


Fig. 1—Distribution of power (curve 1) and articulation, or degree of intelligibility (curve 2), for a typical male voice. Power is seen to be concentrated below 750 cps, while maximum articulation occurs between 1000 and 3000 cps. (From Fletcher, "Speech and Hearing," D. Van Nostrand Co., Seventh Printing, 1948).

Over the years, electronic circuitry has been developed in an attempt to narrow the mis-match between power and articulation. Speech expanders, audio filters, clippers, etc., all try to filter out, by one means or another, as much speech as possible below 750 c.p.s., and boost the power in the range between 1000 and 3000 c.p.s. To varying degrees, these devices accomplish their purpose, and it is often possible to achieve as much as a 12 db gain in intelligibility using these techniques. Wherever possible, such devices should be a part of every amateur radio station using either s.s.b. or A.M.

While electronic circuitry helps bring the power and intelligibility in speech closer together, the thought has often occurred, "is it not possible to train the voice so that the operator himself can concentrate a greater amount of voice power between 1000 and 3000 c.p.s.?" If this could be done, electronic audio shaping devices would work with greater efficiency, and a gain of many more db might be possible in voice intelligibility.

Professor Heisseluft Visits CQ

Earlier this year, CQ had the honor of a visit to its new offices from the eminent Professor Emil Heisseluft. Professor Heisseluft is one of the world's experts in the Bel-Canto system of tone and voice development. Bel-Canto is a training system which develops a style of singing characterized by brilliant vocal display and clarity of tone.

The Professor holds a Master's degree in Natural Science ("Magister der Natur Wissenschaft"), from the famous Lauton Institute, Grossmaul-an Der Donau, Austria. At the present time he is on a lecture tour of the United States, but he plans to return to the Institute this fall, where he will take up the cherished post of *Pinkelgrosschen-beamte*, which is awarded bi-annually to the institute's most distinguished faculty member.

The following is a transcript, made from a tape recording of the discussion held between members of the CQ staff and the Professor, on the subject of voice training for radio amateurs.
CQ: Welcome Professor Heisseluft to our new offices. Professor are you familiar with amateur radio?
Prof.: Thank you. I'm very pleased to be here. Yes, I do know something about radio amateurs. In my early days at University, before the War, I had a classmate who was always experimenting with amateur radio. I have often wondered what became of

him. Also, in Austria there are now many radio amateurs.

CQ: Fine. Professor, radio amateurs are always trying to find new ways of making their signals stronger and stronger. Do you think that it might be possible for them to get more signal punch by training their voices so that as much power as possible is concentrated in the frequency range where there is the greatest amount of articulation, or intelligibility.

Prof.: This is an old question with me. I am faced with it almost every time a new student enters the Institute. Singers can be taught to project their voices, develop tone quality, and raise their register. I believe that radio amateurs can do this also.

CQ: Is this very difficult? Would it require a lot of training?

Prof.: To be a singer, yes, it might be difficult, and would require a great deal of training. But radio amateurs want only to speak effectively. This is a much easier task. I don't think that the training would be very difficult.

CQ: What would you suggest?

Prof.: The training method I would suggest would consist of certain basic elements of the Bel-Canto system. This has been used to train people to sing for more than 500 years. I have seen it do wonders for people who have had absolutely no ability to sing.

CQ: Isn't this the field in which you are considered to be a world famous expert?

Prof.: It is very nice of you to say that.

CQ: Can you tell us a little about the Bel-Canto system?

Prof.: Yes, but I will try not to be too technical. The Bell-Canto system stresses three main points—knowledge of how the voice is produced, exercise to develop proper tone, and practice, lots of practice.

CQ: How is sound produced?

Prof.: Well the source of power for speech is air, which is expelled from the lungs. Sound is superimposed on this air as the air passes the larynx and the vocal cords. In the production of voiced sounds, air is forced through a narrow slit between the vocal cords, causing them to vibrate under pressure. This generates a fundamental frequency along with a large number of very prominent higher harmonics. The vibrations then travel through a series of natural resonating chambers in the chest, throat, mouth, sinuses, nose and head. These chambers cause the vibrations to have the pitch, or tone quality, that is associated with a person's voice.

CQ: That should be easy for radio amateurs to understand. You're talking our language, Professor. Let's see now, the basic power comes from air expelled from the lungs, the basic sound from the larynx and the vocal cords, and the overtones from the resonant chambers of the upper body.

Prof.: Excellent. Now I will show how radio amateurs can learn to control their voices so that as much power as possible can be placed where it can do the most good. First, proper breathing must be developed; second, proper muscular control of the larynx and throat must be developed; and third, methods must be developed for adjusting the resonant chambers so that the desired tone can be achieved.

CQ: How can this be accomplished?

Prof.: It isn't too difficult. I understand that radio amateurs would like to put as much voice power as possible into the frequency range where there is the highest degree of articulation.

CQ: That's right. We're looking for maximum intelligibility.

Prof.: I understand the reason for this. Now, most

of the energy, or power in the average voice is below 750 c.p.s. This is the part of speech that is responsible for vowel formation. The greatest amount of intelligibility is in the consonant sounds. These occur between 1000 and 3000 c.p.s. What must be done is to shift the power from the vowel sounds to the consonants. This can be done.

CQ: Please tell us how, Professor.

Prof.: First, breathing must be adjusted so that right from the start, power will be diverted from the vowels to the consonants. The following exercises will help do this automatically.

(1) Rotate the arms clockwise (backwards) over the head. Then let the arms drop naturally to the sides. This leaves the shoulders and chest relatively high. This gives the necessary lift to the muscles responsible for expelling air from the lungs during the formation of consonant sounds.

(2) The simple word "HAH" is excellent for exercising muscles that place power into the consonant sounds. Repeating this word as much as possible will help do the trick.

CQ: That sounds easy enough.

Prof.: Well, that takes care of breathing. The next thing is proper muscular control of the larynx, throat and tongue, which all help to make sounds. Vowel sounds are produced by stiffening these muscles, consonant sounds by relaxing them. So, the secret to more speech power in the consonants is to r-e-l-a-x the muscles which help produce these sounds.

CQ: Can you suggest some exercises for this?

Prof.: Of course. Here are some that will help relax the proper muscles.

(3) Stick the tongue out as far as it will go. Notice that in this position, the jaw is completely relaxed, and cannot be tightened. Repeat this exercise for several minutes, and the muscles will begin to relax automatically during the production of consonant sounds.

(4) To free the tongue itself of tension, practice the saying, "one and one are one." While this is poor arithmetic, it is an excellent saying for relaxing the tongue muscles used in producing consonants.

(5) Put the forefinger and the middle finger into the mouth. In this position say the following series of words, "NAH", "NO", "MOAN", and "YUM". This will relax the larynx and throat muscles. Repeat this exercise for several minutes.

(6) Drink a glass of hot, plain tea before speaking engagements. Just plain tea, no cream or lemon or

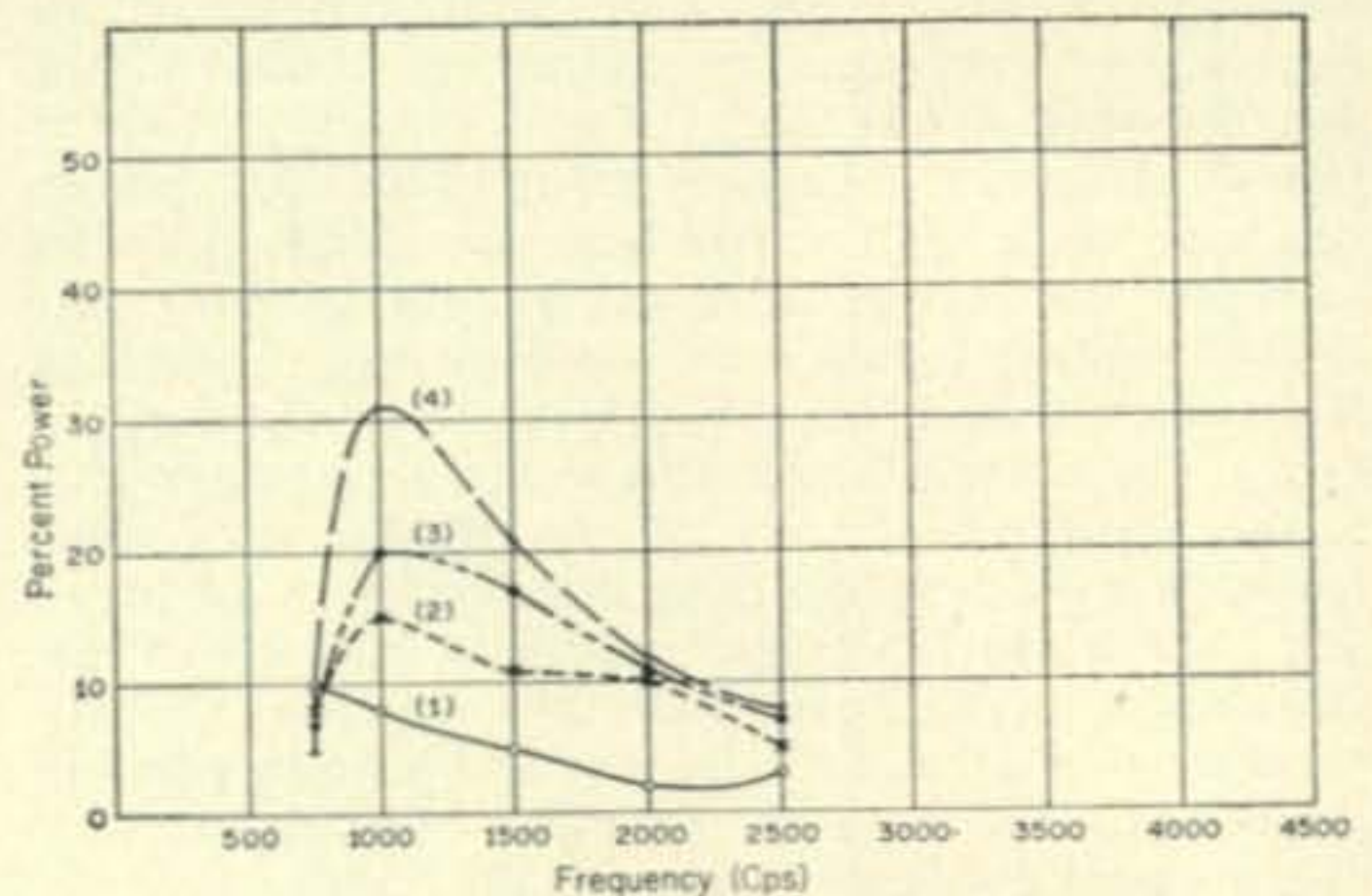


Fig. 2—Curve 1 shows power distribution in subject's voice before experiment began; curve 2 shows power distribution with nasal resonance control; curve 3 after 15 days practice with tone development exercises; curve 4 after completion of month-long experiment. A ten-fold gain in power was observed, equivalent to a gain of 10 db in intelligibility.

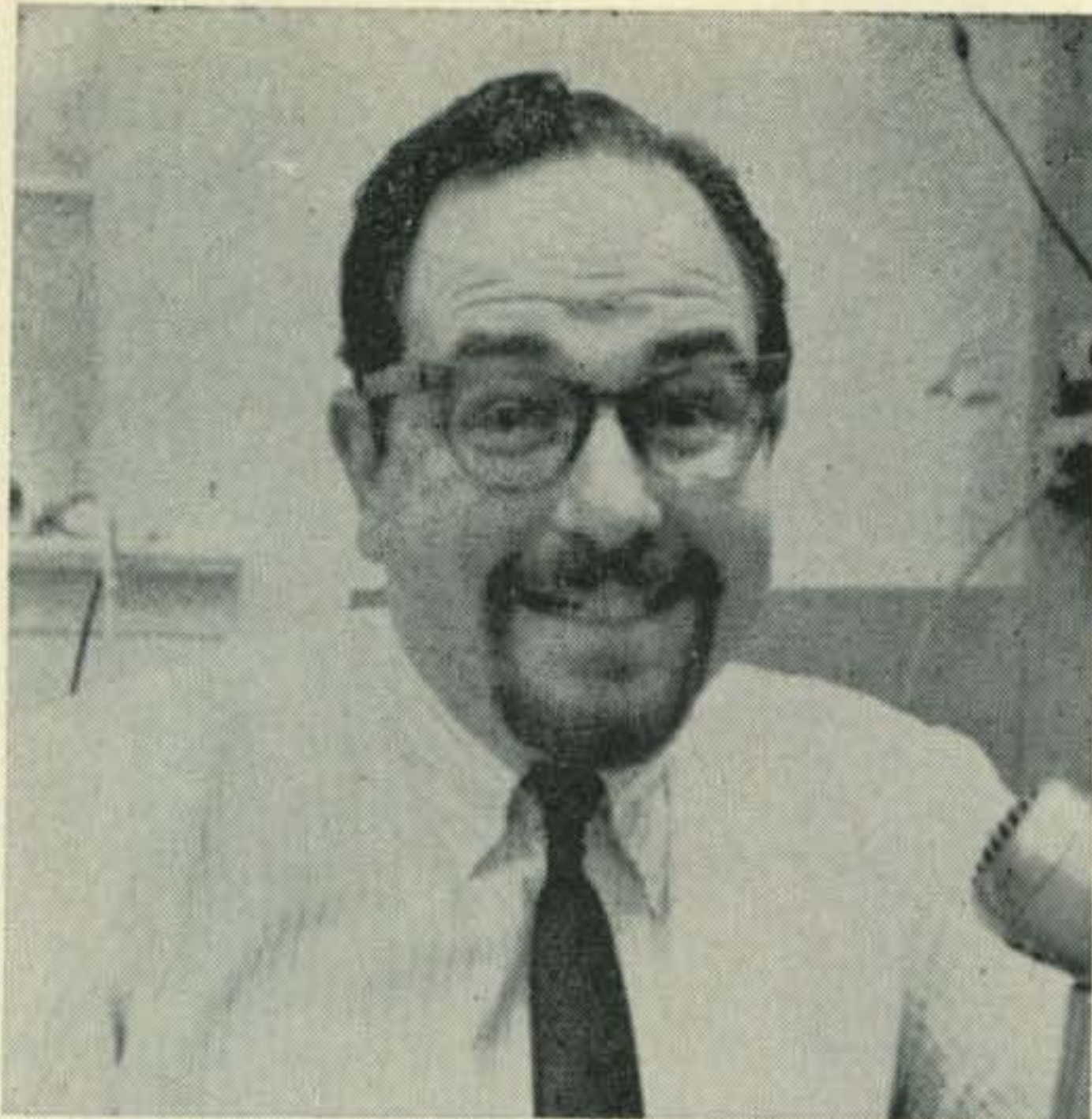


Fig. 3—"A bright, cheery disposition will usually produce a refreshing and vibrant quality voice, rich in consonants."

sugar. This can do wonders in relaxing the muscles.

CQ: Very good, Professor. What comes next?

Prof.: Now for some suggestions for controlling the resonant cavities. Of course, there is really very little that can be done about the chest, throat, sinuses and head cavities, but there is quite a bit that can be done in controlling the mouth and nasal cavities. Here are some exercises that will help to do this. Singers refer to this as "Placing the voice in the mask."

(7) To put extra power into the consonants, talk with the mouth as wide open as possible. Don't mumble. Make an effort to pronounce each word clearly. Practice opening the mouth as wide as possible for a few minutes every day.

(8) To control the nasal chamber, simply close the chamber by pinching the end of the nose with the thumb and forefinger. To prove that this works, say a sentence normally, then repeat it with the nasal cavity closed. Notice that the pitch is higher, and that there is a greater amount of power in the consonants.

CQ: I've just tried it, and you're absolutely right. But it would be a little awkward talking in front of a microphone holding one's nose.

Prof.: I see what you mean. Well, instead of the fingers, you can use a clothespin, or a nose clamp like the skin divers do.

CQ: Professor, I have kept track of the suggestions you have made. So far, you have given eight different exercises for improving tonal quality so that there might be more communication punch in our voices. How often should these exercises be performed?

Prof.: The more practice the better. Remember, that is the third main point of the Bel-Canto system. I always tell my students to practice, practice, practice. The more often one practices, the sooner the muscles will react automatically to give the desired tonal quality. I would say that a radio amateur should practice each of the eight exercises at least five minutes every day, more if possible.

CQ: Well, that means at least forty minutes a day. How long a period of time should it take to get some results?

Prof.: This will vary from person to person. Women, for example, have somewhat more power in the consonant sounds to begin with, and they may get results in two or three weeks, if they practice the

eight exercises for at least forty minutes a day. I believe that it would take a little longer for a man . . . maybe a month, or so.

Results Of Experiment

For an entire month, for forty minutes every day, a member of the *CQ* staff followed faithfully the eight exercises suggested by Professor Heisseluft.

Before the tests began, extensive measurements were made of the power distribution in the subject's voice. These measurements were re-taken at various intervals during the experiment to note changes and progress. The results are shown in fig. 2.

Curve 1 in fig. 2 shows the power distribution in the subject's voice before the experiment began. It approximates the distribution for a normal male voice. The power level between 750 and 2500 c.p.s. is between 2 and 10%.

Curve 2 shows the increase in power in this range as a result of nasal resonance control, using a clothespin, and attempting to speak with the mouth as wide open as possible. The power level in the consonants jumped to between 5 and 15%.

Curve 3 was taken after the subject had practiced the eight exercises, forty minutes a day, for fifteen days. The subject used nasal resonance control, and had a glass of hot tea before the measurements were made. Under these conditions, the power level increased to between 7 and 20%.

Curve 4 was taken at the end of the month, also with nasal resonance control, and with a glass of hot tea. It represents the end result of the entire experiment. The power level in the spectrum between 750 and 2500 c.p.s. rose to between 8 and 31%. On an intergrated basis, this represents a ten-fold increase in power, which is equivalent to a 10 db increase in intelligibility.

After these startling results were measured,
[Continued on page 96]



Fig. 4—"To improve intelligibility, you must talk with the mouth as wide open as possible."



Bill Richardson, K6VVM, (Left), accepts the 1964 grant of sideband equipment presented by the Single Sideband Amateur Radio Association (SSBARA) to the Braille Institute of America from Ray Meyers, W6MLZ. The equipment, to be used at the institute's club station, WA6GLN, consists of a Swan transceiver; Tri-Ex tower; Hy-Gain beam; microphones; timers; coaxial switches; cable; and every other accessory necessary to the installation and operation of a first rate sideband station. Special arrangements were made with the manufacturers to include braille markings on all dials and controls in order that sightless amateurs of the institute's radio club, headed by K6VVM, would have no difficulty operating and tuning the equipment furnished.

The SSBARA was commended in a resolution passed by the Los Angeles City Council for "its generous gesture in making available to blind persons this equipment which will greatly enhance the radio training program at the institute." (Photo by K6RKN)

PEOPLE AND PLACES



No, it's not the CQ technical staff. This photo was supplied to us by the CBS television show "The Munsters," and depicts Fred Gwynne as Herman Munster and Al Lewis as Grandpa using their "Ham Rig." In the story they think that they are in contact with the planet Mars. By the way, the rig is a BC-654-A (SCR-284) and is a 17 watt a.m., c.w. transmitter-receiver that covers 3800 to 5800 kc. No, we don't have their conversion on it, but a schematic appears in the *Surplus Schematics Handbook* on page 38.



Fort MacArthur, California. John Chambers, W6NLZ, (A6NLZ), of Space Technology Laboratories, appearing before an Army MARS meeting. John presented the subject "VHF Signals Beyond the Horizon." (U.S. Army Photograph)



This neat set-up belongs to Bob Gregory, W7HPH. The rig runs 200 watts on all bands and includes RTTY with a Model 15 printer. Bob is also active on a two meter MARS net.

Electronics Slide Rules for the Amateur

BY WILFRED M. SCHERER,* W2AEF

Don't run off and hide just because we're going to talk about slide rules! They're not as high-falutin' as you may think, and any ham worth his salt will profit by knowing a bit about them. Below is a short discussion of several slip-sticks ideally suited for the building ham.

THE slide rule is a mechanical device used for rapidly solving math problems involving multiplication and division, including powers and roots, reciprocals and ratios, and those involving trigonometry and logarithms. The slide rule reduces the working of problems to a fraction of the time required with pencil-and-paper. Thus, it has become an indispensable tool for the engineer and ham alike.

Electronic problems relating to reactance, inductance, capacitance, frequency, resonance, decibels, etc., often require quite a series of operations in multiplication and division. Although standard slide rules may be used, a slide rule designed especially for electronics can shorten the required work still more.

The slide rules described here have been especially designed for solving electronic problems either directly or with a minimum of work. Included are some very simple and inexpensive calculators for limited use, which even the neophyte should find easy to manipulate. As a matter of fact, none of the slide rules is hard to master once you have set your mind to it.

Conventional-Type Slide Rules

In discussing the specialized slide rules, as distinguished from the simple calculators described later, it is assumed that the reader is

acquainted with normal slide-rule operation and with various standard scales and their uses.

For the sake of clarity, only a portion of each rule is shown in the illustrations where the fundamental special operations are indicated. Unless otherwise noted, only the significant figures are identified.

Cooke Radio Slide Rule

To the best of our knowledge, the Cooke Radio Slide Rule, made by Keuffel & Esser Company, is the first one of its type produced especially for electronics problems, having been used during World War II.

This rule includes all the scales of the K & E Polyphase Duplex Decitrig Rule (A, B, T, ST, S, C, D, DI, L, DF, CF, CIF, CI), except scale K which has been replaced by an LC scale, and a 2π scale, folded at 2π , has been added.

Many electronic problems involve the constant 2π , so use of the 2π scale can save one or more slide-rule operations. First, $\omega = 2\pi f$, is simply found by setting the indicator to the frequency on the 2π scale and under the indicator reading ω on scale D. To solve for capacitive reactance, $X_c = 1/(2\pi fC)$, we only need set the hairline indicator to the frequency on the 2π scale, set the capacitance on the CI scale at the indicator, and read the reactance on scale C opposite the index on scale D. The operation is similar for $X_L = 2\pi fL$, except X_L is read on scale D oppo-

*Technical Director, CQ.

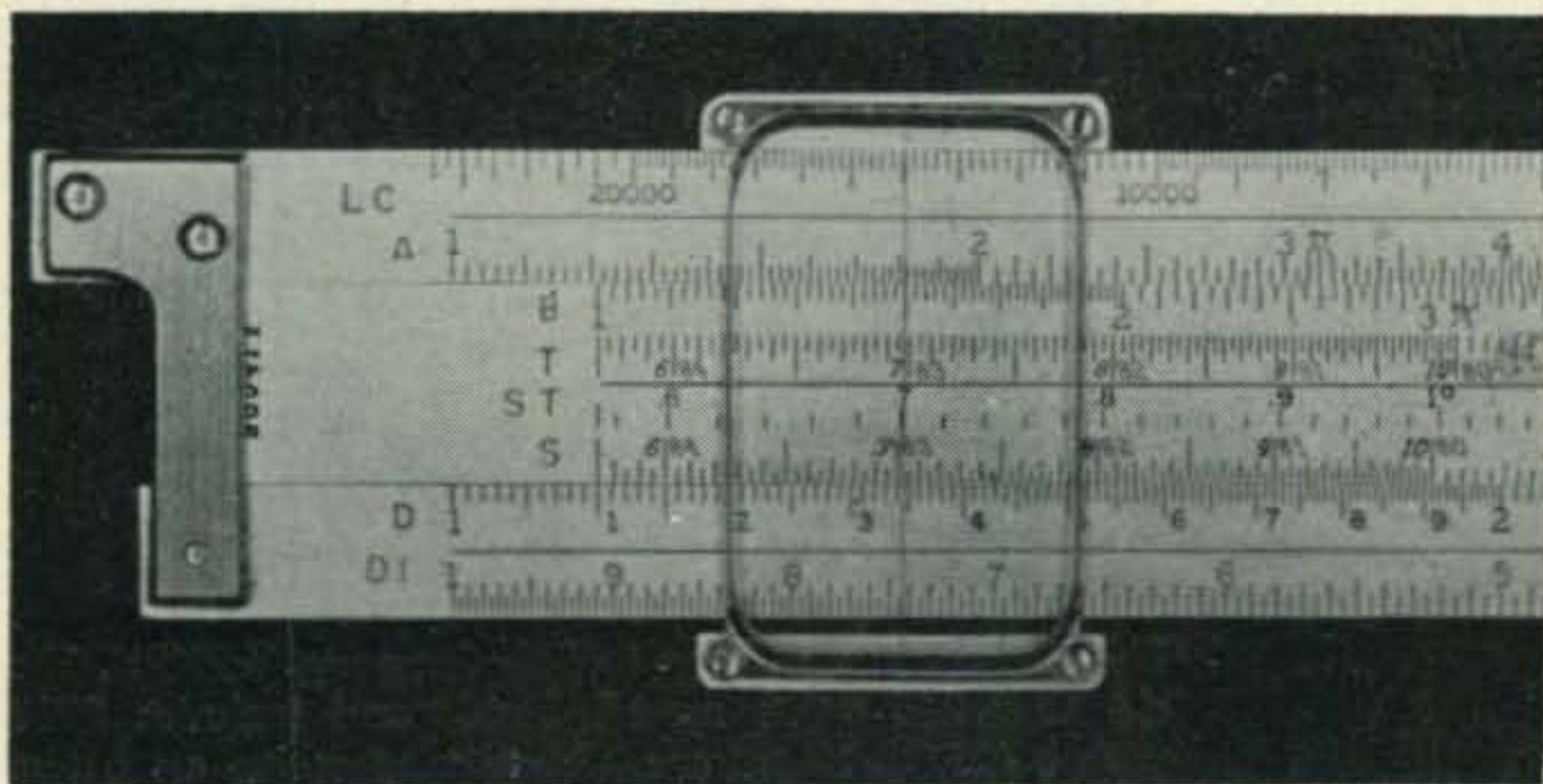


Fig. 1—The Cooke Radio Slide Rule. The index on scale S is set opposite the frequency 1.1 mc on D scale. Under the hairline indicator, the capacitance on B scale is set at 150 mmf and the inductance under the indicator on the LC scale reads 139 μ h. If the indicator were set to the frequency 1.1 on scale D, the L-C product for this frequency would read 20850 on the LC scale under the indicator. A 2π scale is on the reverse side.

Fig. 2—The Cleveland Institute Electronics Slide Rule. Several operations are illustrated. For inductive reactance, the indicator is shown set at the frequency, 2, on the $(f_x) 2\pi$ scale and the inductance, $85 \mu h$, is placed under the indicator on the $(L_x \text{ or } C_x)$ CI scale. Opposite the index of C scale the reactance on scale D reads 107. The decimal point is found on the Decimal-Point Locator shown below, where for $L=85 \mu h$ on the upper scale has been placed opposite 2 mc on the middle scale. Opposite the $X_L \Omega$ index, just above the bottom scale, the reading is $1000 + \Omega$, which according to the slide-rule figures then is 1070 ohms.

In respect to resonance, the indicator is set at inductance, 16, on the (L_r) H scale (top). The capacitance, 138, on scale (C_r) B is placed under the indicator and the resonant frequency reads 107 on scale D opposite the C index. The significant figures, of course, must be pointed off according to the decimal point table.

One other function that can be seen is that the indicator is set at a power ratio of 1.26 on scale D, and under the indicator on scale L is .1, which when multiplied by 10 comes out to 1 db. Similarly for converting from a voltage ratio, .1 is multiplied by 20, and the answer is 2 db.

site C index. The procedures are reversed for finding one of the other unknowns.

As with most standard slide-rules, only the significant figures are used, so the location of the decimal point must be determined mentally by simple rough calculations.

An $L-C$ product scale, identified by LC, is used in conjunction with the B, C, and D scales for solving resonant-frequency problems. See fig. 1.

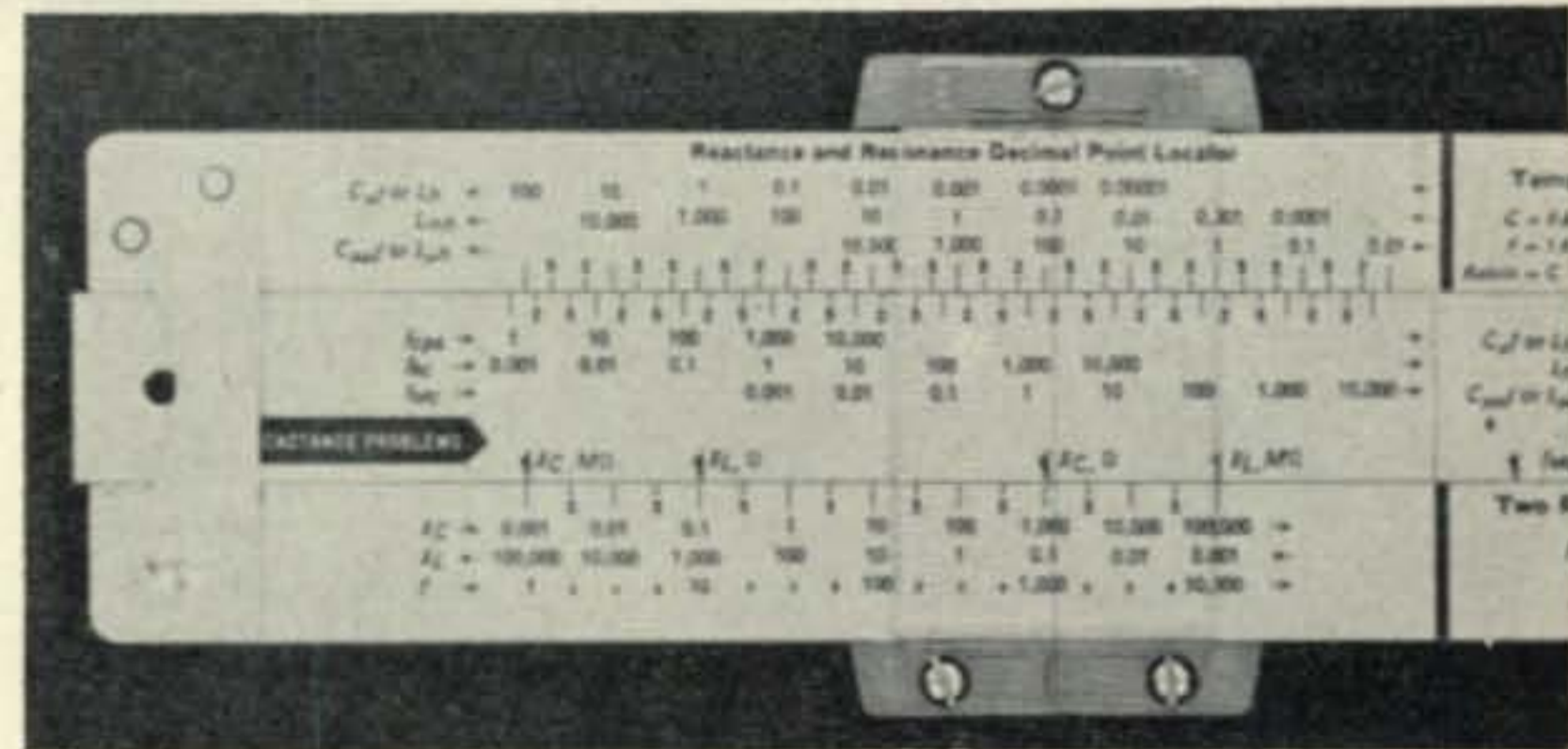
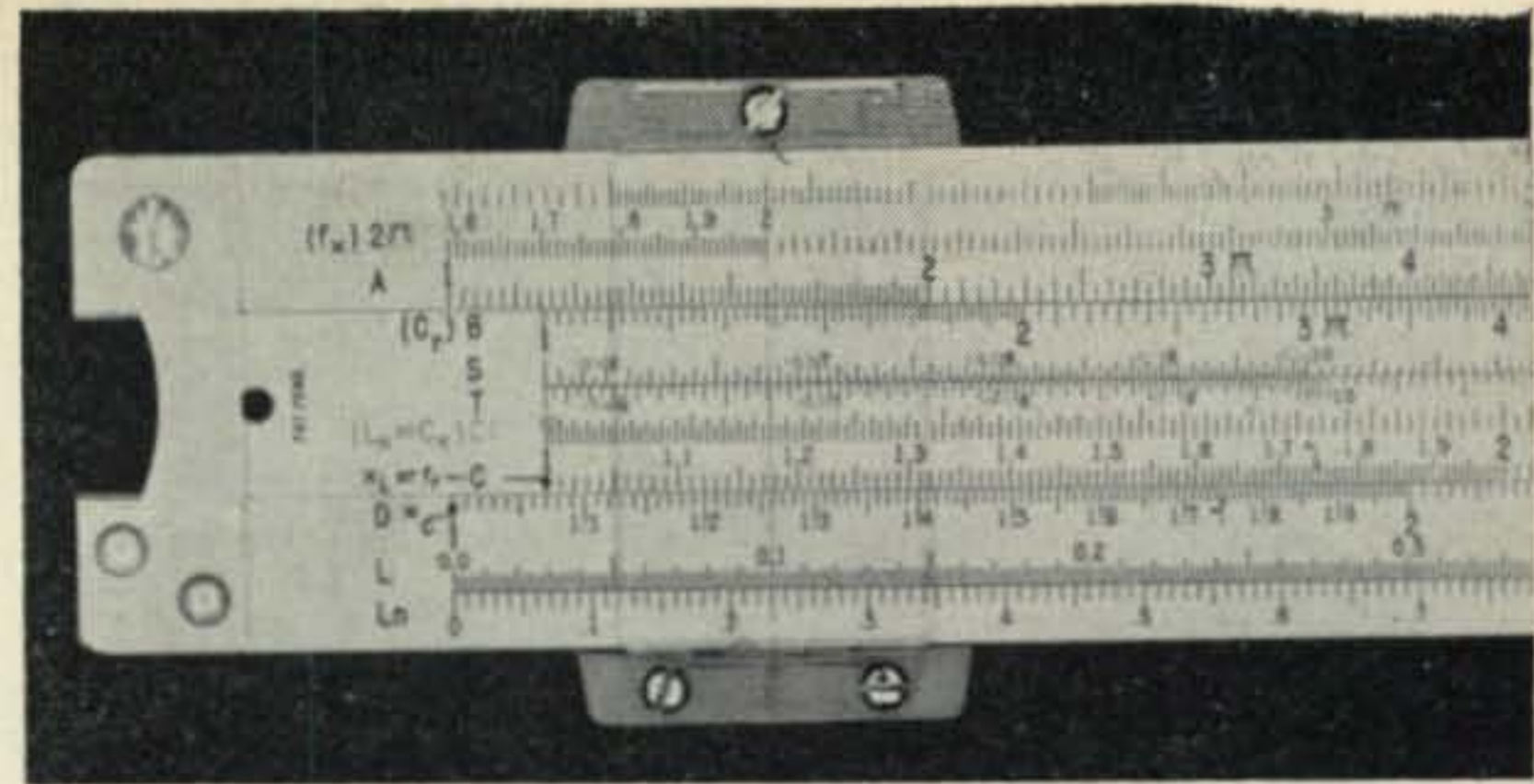
$Q = (2\pi fL)/R$, Dissipation $D = 2\pi CR$, impedance of parallel-resonant circuit $Z = (2\pi fL)^2/R$ and other problems involving 2π also may be solved with a minimum of work as explained in the instruction manual. Data is also included for using the standard scales for solving many other electronic problems such as voltage and power ratios, decibels, vectors, phase angles, etc. Problem exercises in the various categories are set up for practice operation, with the answers listed in the back of the book.

The body material of the K & E Cooke Radio Slide Rule is mahogany faced with a white synthetic material that has indented "engine-divided" graduations and numerals in black, except on the inverted or descending scales where the numerals are red. This rule is in the \$25 to \$30 range, depending upon the carrying case.

Cleveland Institute Slide Rule

This rule has the standard scales: A, B, S, T, CI, C, D, L and Ln. The special ones are: a 2π scale for reactance problems, etc., and scale H which is an $L-C$ product scale for resonance problems.

Unless you use a slide rule almost daily, it often is difficult to remember which scales are used for different problems. A special feature of the Cleveland rule is that, besides being identified by a letter, each scale including the standard ones, also is marked according to the electronics purpose for which it is used, eliminating frequent references to the manual. In fact, you can just about figure out how to use the various scales



simply by observing the special identifications.

Another particular feature of this rule is that on the back is a Reactance and Resonance Decimal-Point Locator which makes it possible to easily place the decimal, or to determine the fractional units for problems of reactance, capacitance, inductance or frequency. It also does away with the need to convert from one unit to another.

The Decimal-Point Locator utilizes a nomograph technique with a sliding scale and indexes employed in place of a straightedge. The scales are calibrated for mmf, mf, μh , mh, h., c.p.s., kc, mc, X_L & X_c in ohms and M-ohms, with graduations only at major points. Besides indicating the electrical units involved, the Decimal Locator also provides a rough numerical answer which may be close enough in many instances, but where a more accurate result is required, the values obtained may be used to correlate the more precise figures obtained using the 2π and H scales on the face of the rule. Thus, this rule may be used either as a simple calculator for approximate answers or as a regular slide rule for accurate answers. The rear of the rule also contains many of the commonly used formulas and conversion factors for electronics.

Referring to fig. 2, in working reactance problems, the 2π (f_x) scale is used in conjunction with the CI $(L_x \text{ or } C_x)$, C (X_c) and D (X_L) scales. Resonant-frequency problems are solved using the H (L_r) scale in conjunction with the B (C_r) and D (f_r) scales and the C index (f_r) .

The Cleveland Institute Electronics Slide Rule is supplied with a comprehensive 123-page instruction manual which not only describes how to work a host of problems using both special and standard scales, but which also describes slide rule fundamentals and operation. Actually, it is a self-training course for students and is a handy refresher for those desiring to brush up on forgotten slide-rule procedures. Over 100 problems, with answers in the rear of the manual, are in-

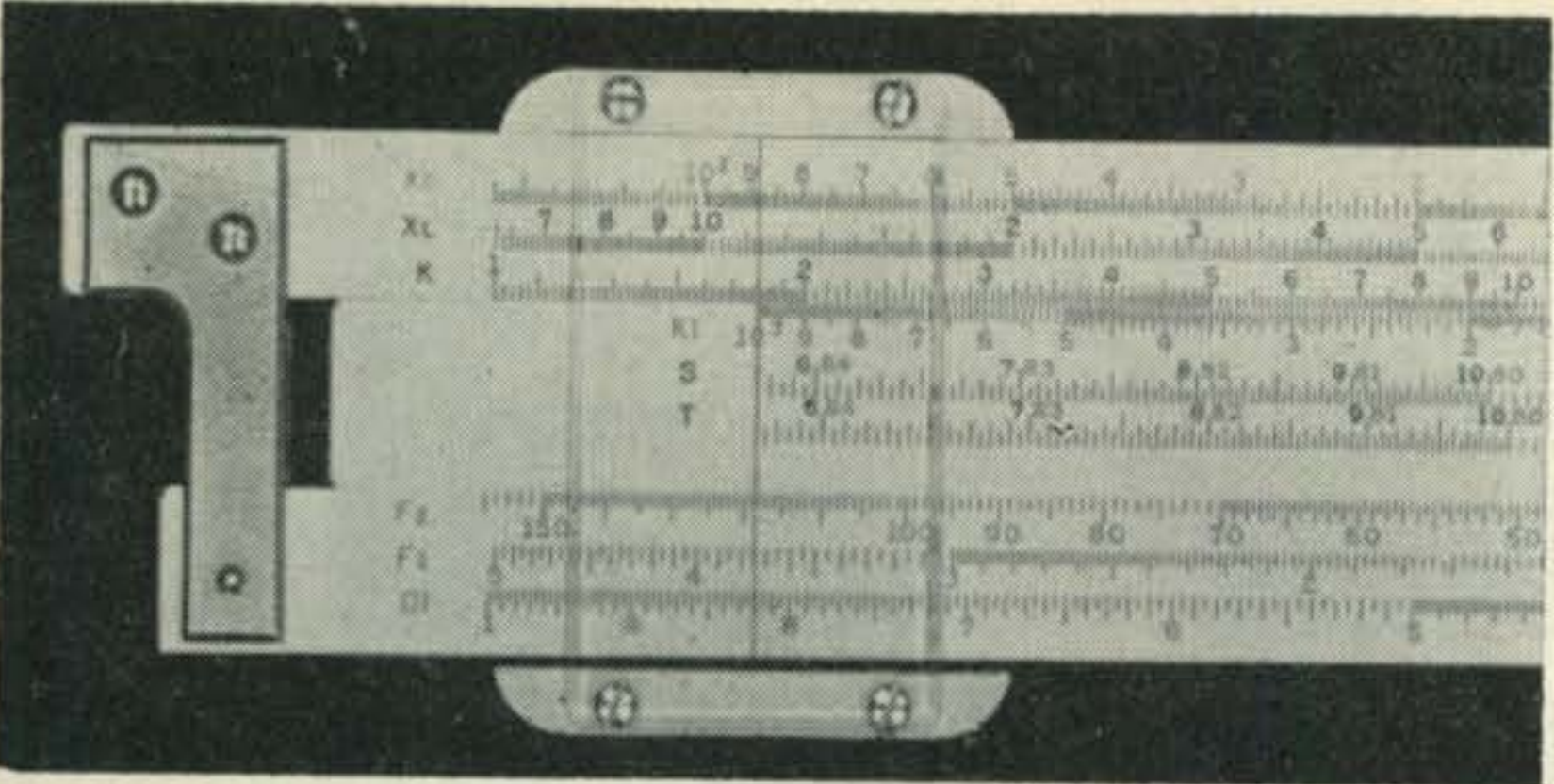


Fig. 3—The Lafayette Decima-Dyne Slide Rule. The capacitance, 6, on KI scale is shown set opposite the frequency, 3, on scale K. The indicator is set at the KI index, 10^3 , with the capacitive reactance shown under the indicator at 87 on the X_c scale.

Working with inductive reactance, 6 on K scale represents the inductance, instead of capacitance, and the reactance is shown reading 113 under the indicator on the X_L scale.

A resonant-frequency operation also is shown. A capacitance, 6, on the KI scale is shown set opposite an inductance, 3, on the K scale. The indicator is set at the KI index, 10^3 , and the resonant frequency for this combination of C and L is shown under the indicator on F_2 scale at 117. Any other combinations of C and L that are opposite each other on the K and KI scales also will resonate at a frequency of 117.

The decimal point for the settings is determined from Decimal-Point tables in the manual.

cluded along with an examination which may be worked and sent to the Cleveland Institute of Electronics for grading and correction.

The rule embodies rugged all-metal construction for dimensional stability. It has a white facing with engine divided graduations and numerals in black. Red numerals are used on the inverted scales. The price is \$14.95, complete.

Lafayette Decima-Dyne Rule

This rule has the standard scales: A, C, D, CI, CIF, CF, DF, S, T, DI, K, KI, and the special scales: db (linearly calibrated from 0 to 20 db), X_c (a KI scale folded at $\frac{1}{2}\pi$), X_L (a K scale folded at 2π) and resonant-frequency scales F_1 and F_2 . The X_c , X_L , K and KI scales each cover three decades.

Referring to fig. 3, reactance problems are solved using the K and KI scales in conjunction with the X_c or X_L scales. Resonant-frequency problems are worked using the K, KI, F_1 and F_2 scales. The position of the decimal point is determined by the use of a decimal-point table in the manual.

The A and D scales are used for db calculations in conjunction with the db scale which is calibrated over a range of 20 db in both ascending and descending increments, so that db gain or loss may be quickly determined. Voltage and current ratios are converted to db by setting the indicator to the ratio on scale D, and reading the db gain or loss on the db scale. When the ratio is such that the gain or loss is greater than 20 db, a decibel table in the manual indicates the number of 20 db increments to be added to or

subtracted from the db scale reading. Not indicated in the manual is that power ratios can be converted to db by setting the indicator to the power ratio on scale A and reading db under the indicator on the db scale. This is similar to standard slide-rule operation where the D scale is used along with the L scale.

Additional calculations are described in the manual for computing frequency-modulation percentage, frequency and wavelength, vectors, effective value of a distorted wave, circuit impedance, current and voltage in reactive circuits and surge impedance.

The Lafayette Model F-990 Decima-Dyne Slide Rule has a bamboo body faced with white plastic on which the graduations and numerals are dark blue, except on the descending scales where the numerals are red. It is imported, and priced at \$13.95.

Pickett Electronics Rule

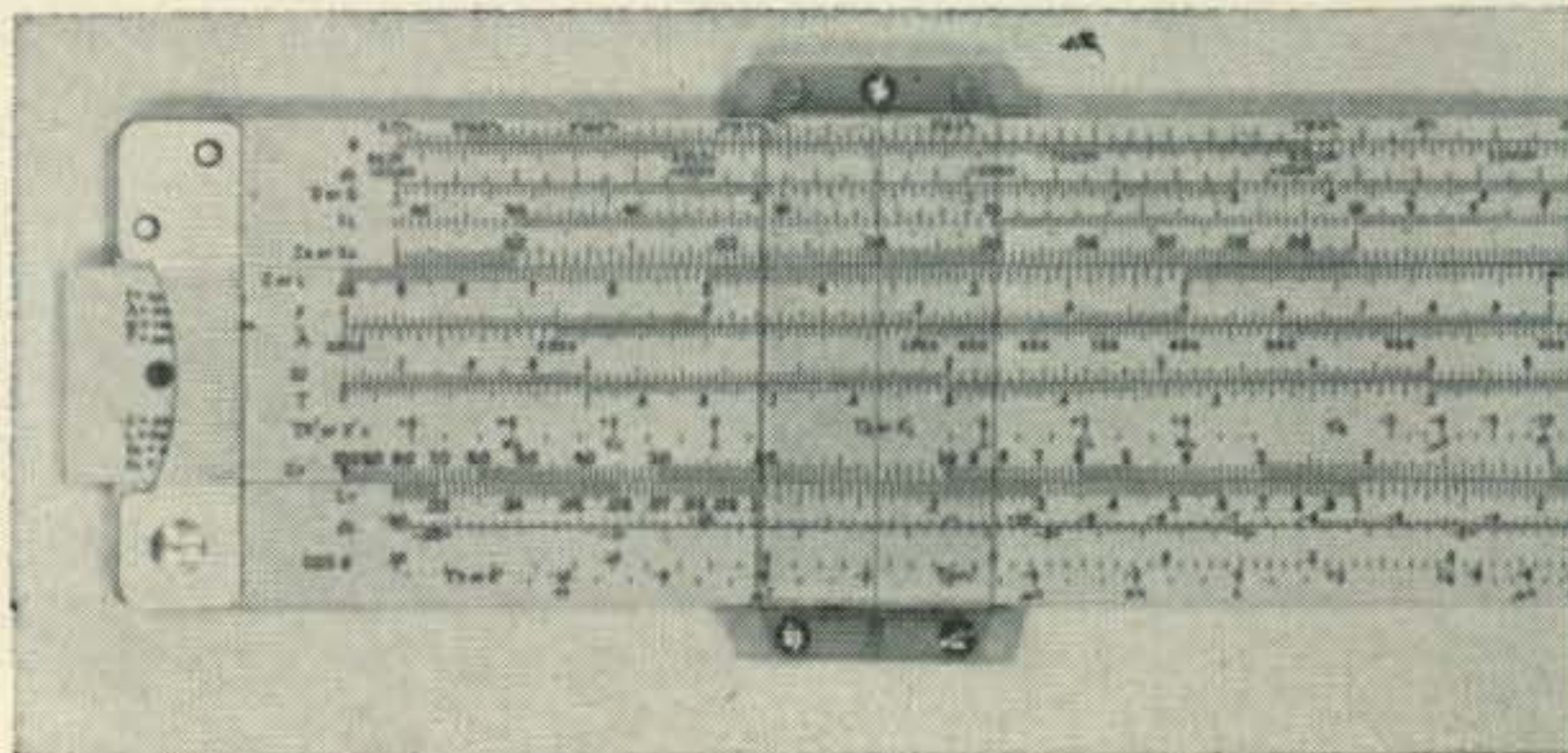
The Pickett Electronics Slide Rule is more elaborate than the others described here. One side has 16 standard scales; the other side has 18 special scales designed for solving complex electronic problems concerning reactance, resonance, R-C coupling networks, transmission or delay lines, time constants, db ratios, angular velocity and radians, etc.

The standard scales are: SH1, SH2, TH, DF, CF, L, S, ST, T, CI, C, D, LL1, LL2, LL3 and Ln. The special scales are: θ —used for finding phase-shift angles; db—for use with power and voltage ratios; D or Q—for quality factor in reactive circuits; X_L —for inductive reactance; Z_c or X_c —for transmission-line impedance or capacitive reactance; C or L—for capacitive or inductive

Fig. 4—The Pickett Electronics Slide Rule. The frequency, 1.1, on scale F has been placed opposite an index arrow (not shown) on scale D. For reactance, the indicator is shown set to capacitance or inductance, 3.6, on scale C or L. The capacitive reactance under the indicator on scale Z_s or X_c reads .0402 and the inductive reactance reads 24.8 on the X_L scale.

For resonance, the capacitance, 13, is under the indicator on scale C_r as is the inductance, .161 on scale L_r . Any other values of capacitance and inductance that are shown opposite each other on the C_r and the L_r scales respectively, also will resonate at a frequency of 1.1.

The figures given in the examples are then converted to the applicable fractional units using the powers-of-ten as determined from the Decimal-Point Locator scales.



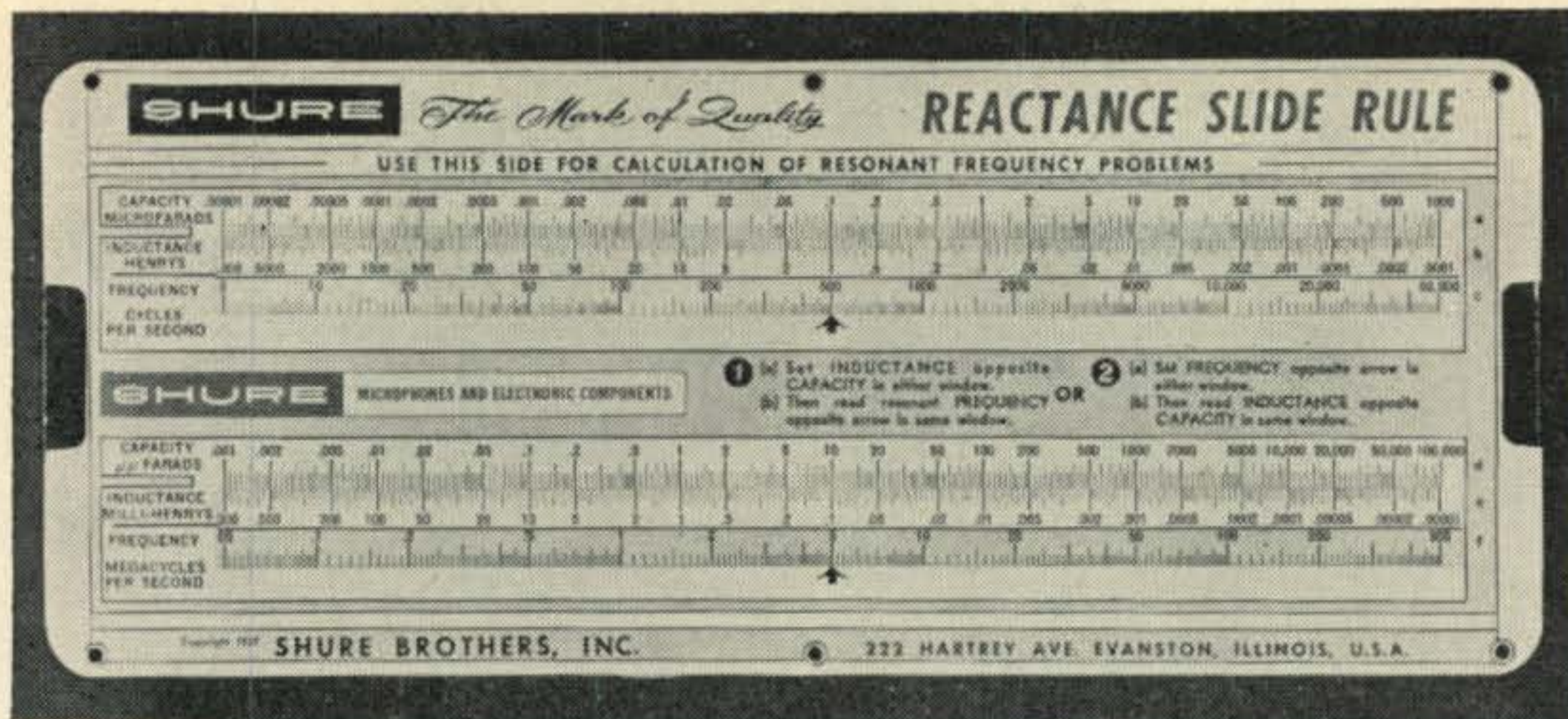


Fig. 5—The Shure Reactance Slide Rule. At the upper half, 500 c.p.s. on the sliding frequency scale is shown placed opposite the index arrow at the center. 2 henries on the inductance scale, also located on the slide, appears opposite .05 mf on the adjacent fixed scale. Thus, 2 h. and .05 mf will resonate at 500 c.p.s. Any other values of inductance and capacitance that appear opposite each other also will resonate at 500 c.p.s. Values for other frequencies are found by setting the new frequency opposite the arrow and reading C and L accordingly. The lower half of the rule is used for higher frequencies up to 500 mc. Reactance and Q problems are solved on the reverse side of the rule in a similar manner.

values in farads or henries; F —for frequency in cps; λ —for wavelength; ω —for angular rotation in radians-per-second; τ —for time constant; R' or X'_c —for use with decimal-point locator scales; C_r & L_r —for capacitance and inductance in resonant circuits; $\cos \theta$ —for relative gain in coupling circuits; and *—a row of dots above the X_L scale to indicate the nearest standard resistance values in ohms when referred to X_L , and a row of dots below the X_L scale for referring to standard capacitances on X_c scale. A number of Decimal-Point Locator scales is included too.

Some of the operations are shown at fig. 4. Reactance problems are worked using the F , X_c , X_L scales and the index arrow which is located in the middle of the D - Q scale. Resonant-frequency calculations involve the F , C_r , L_r scales and the index arrow. The ω or λ scales may be used in place of the F scale for problems concerned with angular velocity or wavelength.

One of the features of this rule is that relative values of quantities involved can then be determined by use of the slide and one of the special Decimal-Point Locator scales situated along the lower edge of the rule. These indicate the powers-of-ten to be applied to the significant figures of the readings.

Many additional kinds of electronic problems can be conveniently and rapidly worked, while the inclusion of more than the usual number of standard scales covers a wide scope of operations

in other fields. Instructions are included in the manual.

The Pickett Electronics Slide Rule is constructed of metal throughout for durability and accuracy stability. It is faced with "Eye-Saver" yellow/green which is at Angstrom "5600", the point of maximum visibility on the color spectrum. The price is about \$30.

Simple Slide Rules

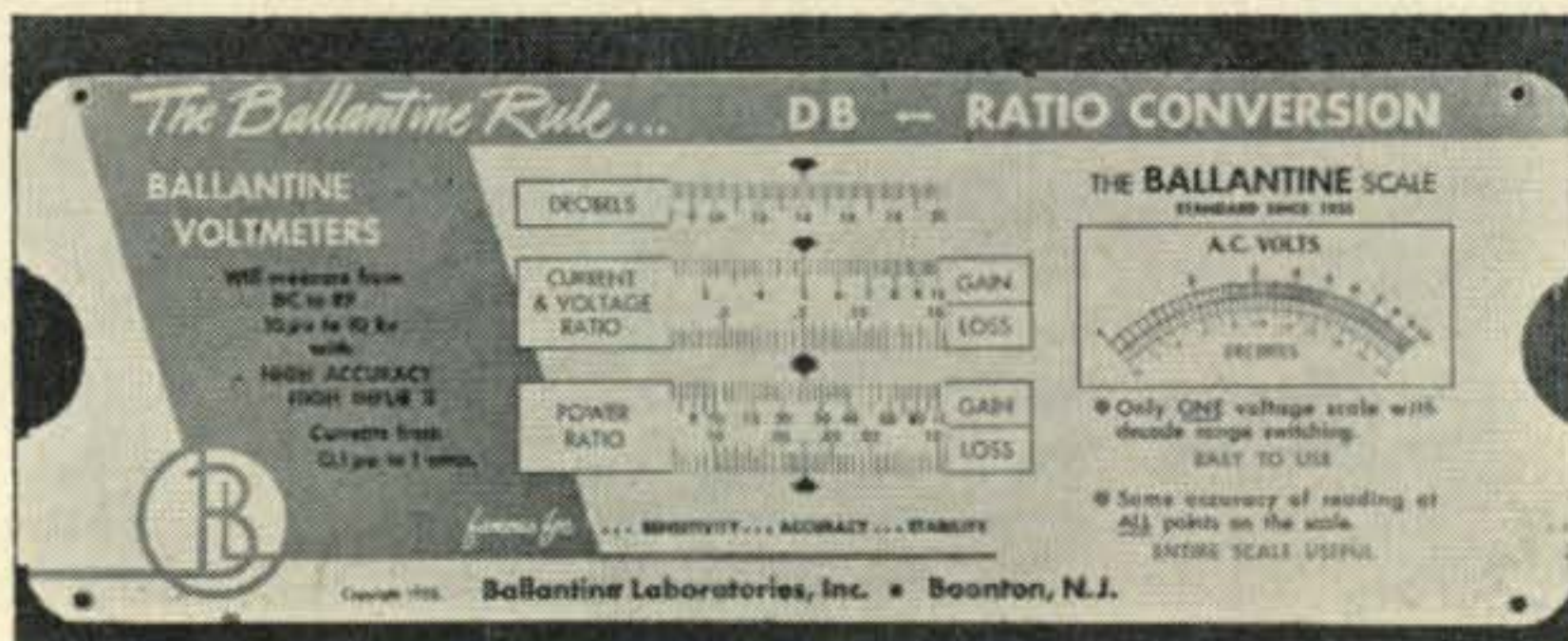
The simple slide rules or calculators described below are inexpensive devices made of cardboard. Their accuracy is not as good as the higher-priced "exotic" slide rules, but one of their advantages is that readings are made in direct values, eliminating the problems of placing the decimal point. These rules are handy for quick calculations which at least get you "into the ball park" or they may be used as decimal-point locators. Thus, they can be useful items to have on hand even for the user of the conventional-type slide rules.

Shure Reactance Slide Rule

This rule is used for calculating resonant-frequency constants, for determining capacitive or inductive reactance and for finding the figure-of-merit or Q . All scales are calibrated directly in the quantities involved. Problems may be solved quickly and directly with reasonable accuracy.

One side of the rule is used for resonance problems. The scales cover .001 mmf to 1000 mf,

Fig. 6—The Ballantine Rule. The current and voltage gain and loss scales are shown set at 5 and .2 respectively, and the power-ratio gain and loss scales are set at 25 and .04 respectively. The gain or loss for the indicated ratios is shown on the decibel scale as 14 db. The voltage vs. db power-level operation is conducted on the reverse side of the rule.



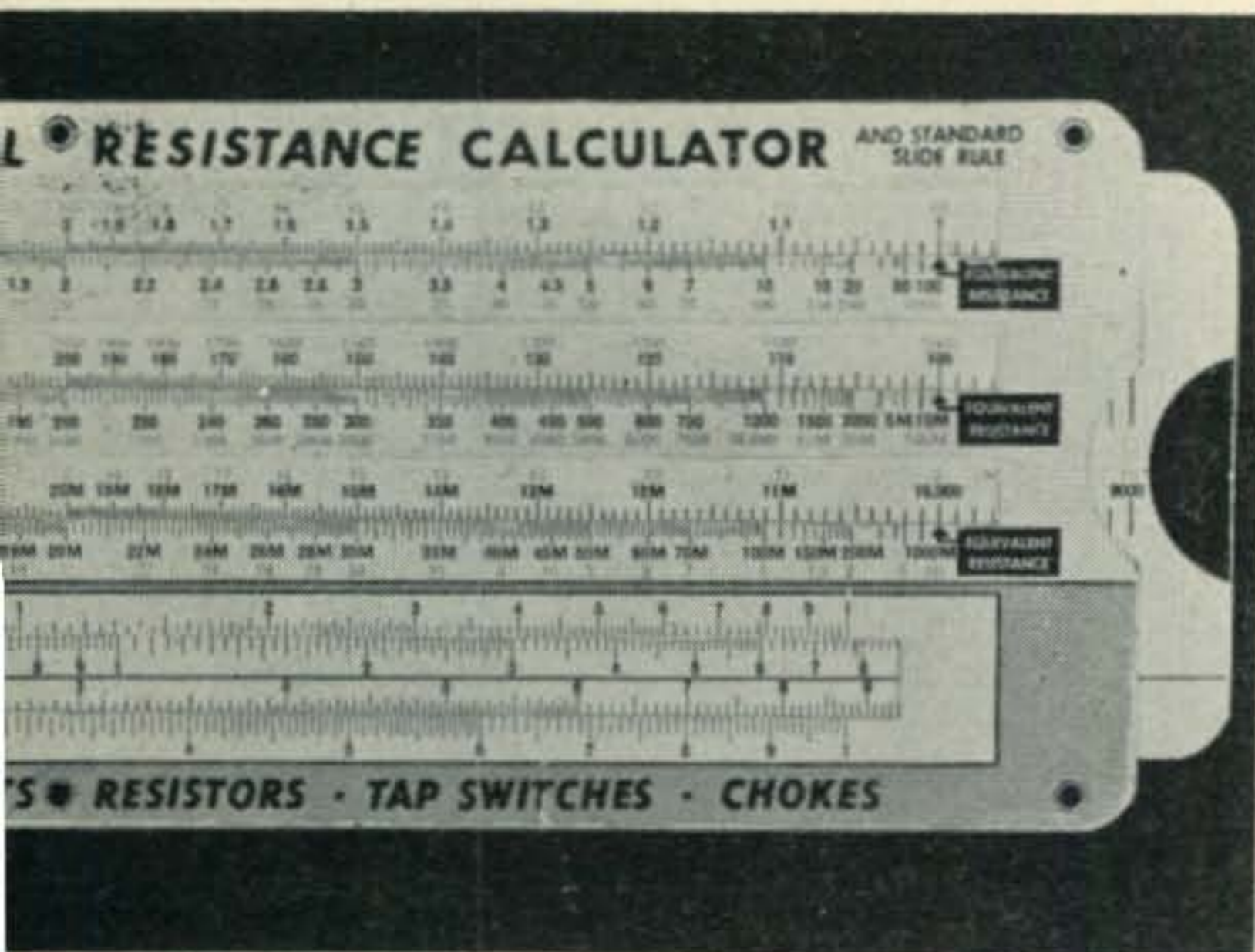


Fig. 7—The Ohmite Calculator. The equivalent resistance of two parallel-connected resistors is found by setting the value of one resistor, on a sliding scale, opposite the value of the other resistor on a fixed scale, and then reading the resulting resistance on the sliding scale opposite an index arrow on the fixed scale. Referring to the two top scales in the photograph, 1.5 ohms has been placed opposite 3 ohms. The equivalent resistance with these two values, connected in parallel, is shown as 1 ohm opposite the indexing arrow at the upper right. Any other values of resistance that fall opposite each other on the top scales also will result in an equivalent resistance of 1 ohm when they are parallel connected. The standard slide-rule scales, A, B, C, D, are located at the bottom. Ohm's Law problems are worked on the reverse side of the rule.

.01 μ h to 10,000 h. and 5 c.p.s. to 500 mc. Operation is indicated at fig. 5.

The other side of the rule is used for reactance or quality-factor problems. The scales cover inductances of .001 mh to 100 h; capacitances of 1 mmf to 100 mf, inductive reactance and resistance of .00001 ohm to 100 megohms, capacitive reactance and resistance of .01 to 100,000 ohms, and dissipation factors (D) or Q of .00002 to 10,000.

An extra dividend, not shown in the instructions that are printed on the rule, is that either the D or Q scales may be used with the frequency scales to perform multiplication and division by using them as the A and B or C and D scales of the standard slide rule. Furthermore, the decimal point is automatically indicated and is shown over a large range of values (.00002 to 1,000,000).

The Shure Reactance Slide Rule is available from Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois, for \$1.00.

Ballantine Rule

The Ballantine Rule is designed to provide quick solutions for problems concerned with current, voltage and power ratios vs db gain or loss and for db power levels v.s. voltage in relation to different standard O-db-power reference levels. A nomograph technique is employed whereby all quantities are indicated on several scales located on a common slide with aligned index arrows on the body of the rule.

To find the db gain or loss for a known current or voltage ratio, the ratio on the current/voltage gain or loss scale is set opposite the ratio index arrow and the db gain or loss is read on the db scale opposite the db index arrow. Power ratios are likewise converted to db, and visa versa, using the power-ratio gain or loss scales in conjunction with the db scale. See fig. 6.

For finding the power level at a given voltage, relative to one of the O-db references, 0 db on the db scale is set opposite an index which is set up for the desired reference level, and the db power level is then read opposite the voltage on an adjacent scale.

Secondary operations that can be performed with this rule are: finding the square, square root, reciprocal or logarithm (including the characteristic and mantissa) of a number.

The Ballantine Rule is available from Ballantine Laboratories, Inc., Boonton, N.J. Send 35¢ to cover mailing and handling costs.

Ohmite Calculator

The Ohmite Calculator employs a slide-rule technique for determining the equivalent resistance of paralleled resistors. A nomograph technique is used with sliding scales for Ohm's Law problems. The standard slide-rule scales A, B, C and D also are included.

Operation for resistance problems is shown at fig. 7.

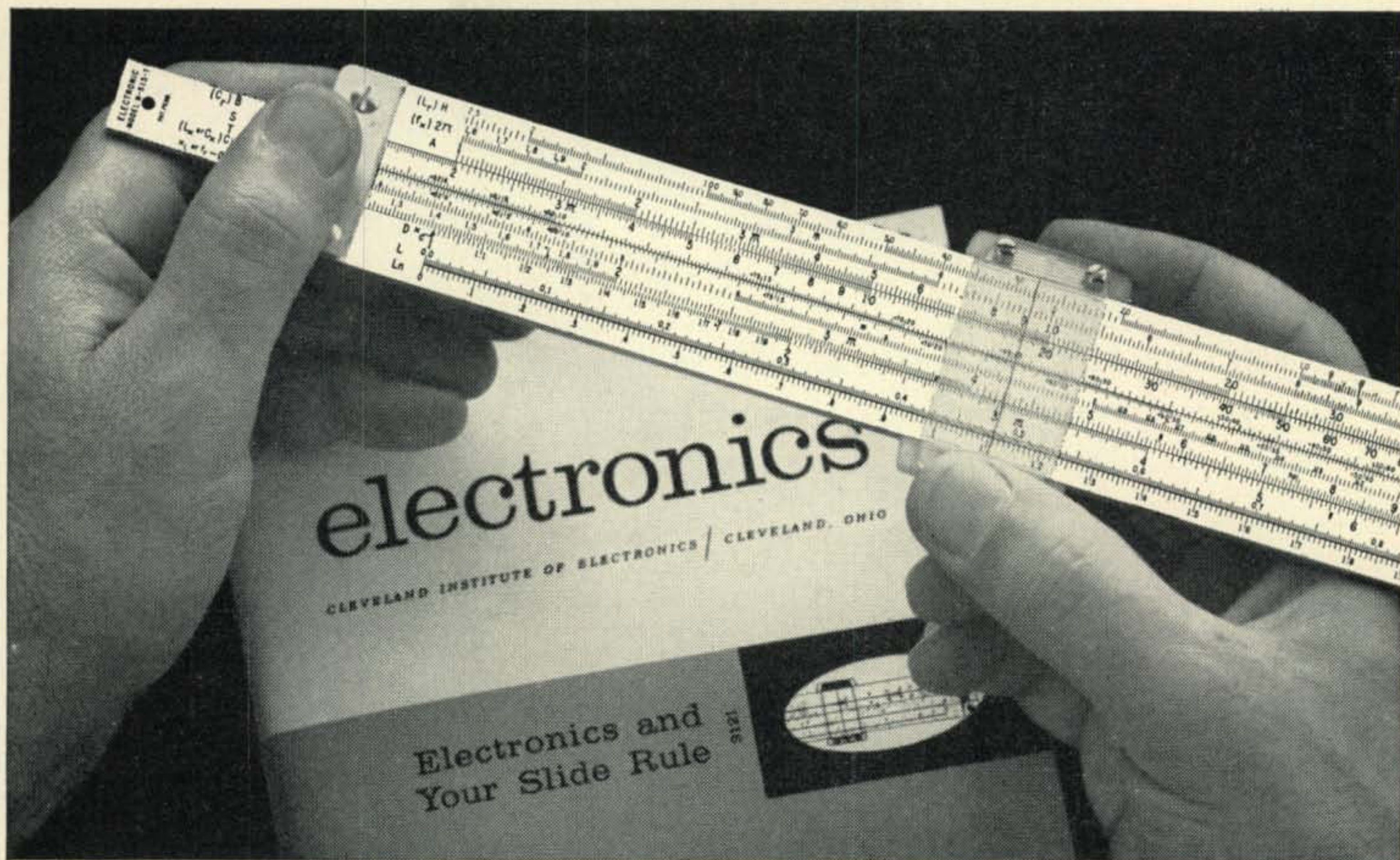
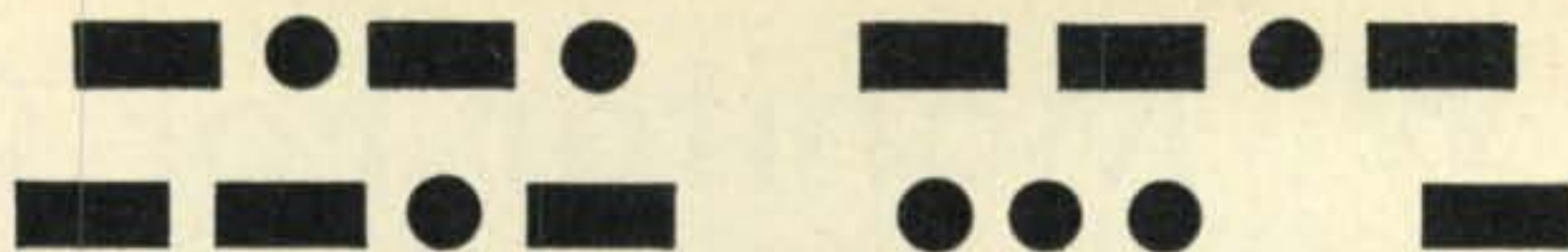
Ohm's Law calculations are conducted by setting one known quantity on a sliding scale opposite the other known quantity on a fixed scale, and reading the unknown opposite one of the known values on another pair of scales. Readings for ohms are correlated with an "Ohms" index. The ranges cover .01 ma to 100 a., 0.3 v. to 100,000 v., .01 ohms to 100 megohms and .01 to 10,000 watts. Operating instructions are printed on the rule.

This rule is made by Ohmite Manufacturing Co., Chicago, Ill., and it may be obtained from many radio supply houses for 25¢. A deluxe plastic model is \$1.50.

Slide Rule Literature

Nearly any large stationery store or artists' supply is a good source of manufacturer's literature about slide rules. However, in the absence of a local supplier, the Reader Service department of CQ will route any inquiries to the manufacturers, upon request. A postal card with your name and address, and the slide rule in question will suffice.

For some good practical background on the use of slide rules for electronics, as well as a wealth of information about math for the technician, locate a copy of *Mathematics for Electricians and Radiomen*, by Nelson M. Cooke (McGraw Hill). ■



Tune In On This New Electronics Slide Rule With Self-Training Course

Once you've seen CIE's Electronics Slide Rule, you'll know why hams across the country call it the most useful, practical tool they've come across in years. It's perfect for adjusting your rig . . . for designing test circuits . . . for figuring coil windings, db's, operating frequencies, resistor sizes and power ratings, proper inductor and capacitor sizes . . . for accurately matching antenna to final.

You'll be amazed how fast and easy it is to learn to use this terrific NEW slide rule. It comes complete with a fully illustrated AUTO-PROGRAMMED Instruction Course. You will receive four lessons and be entitled to the services of CIE's expert instructors for answering

any questions. In no time at all, you'll be using special scales to solve complex problems dealing with reactance, resonance, AC and DC circuitry, etc. And, as an added bonus, you can use this rule for conventional computation, too.

The CIE Electronics Slide Rule is no toy, no gadget. It is an all-metal, 10" precision measuring instrument that's made to our rigid specifications by one of the country's leading slide rule manufacturers. Slide Rule, Self-Training Course and handsome top-grain leather carrying case . . . all yours for just \$14.95. Cleveland Institute of Electronics, 1776 E. 17th St., Department CQ-105, Cleveland, Ohio 44114.

SATISFACTION Warranty

The Electronics Slide Rule with Self-Training Course is available only from Cleveland Institute of Electronics, and is covered by CIE's exclusive "Satisfaction Warranty." Order it now . . . use it for ten full days. Then, *if you're not completely satisfied*, you may return the Slide Rule with Self-Training Course and CIE will refund full payment.

SEND COUPON TODAY

to: **Cleveland Institute of Electronics**

1776 East 17th St., Dept. CQ-105, Cleveland, Ohio 44114

- Please send me your Electronics Slide Rule with Self-Training Course and top-grain leather carrying case. I am enclosing \$14.95. (If not fully satisfied after 10-day trial, CIE will refund payment.)
- Please send descriptive brochure only.

Name _____ (Please Print)

Address _____ County _____

City _____ State _____ Zip _____

A leader in electronics training . . . since 1934

A C.W. Monitor For Grid-Block Keyed Transceivers

BY AL D'ONOFRIO, W2PRO AND PETE STARK,* K2OAW

This simple c.w. monitor is suitable for use only with grid block keying circuits. For use with transceivers particularly, it does not require equipment modifications.

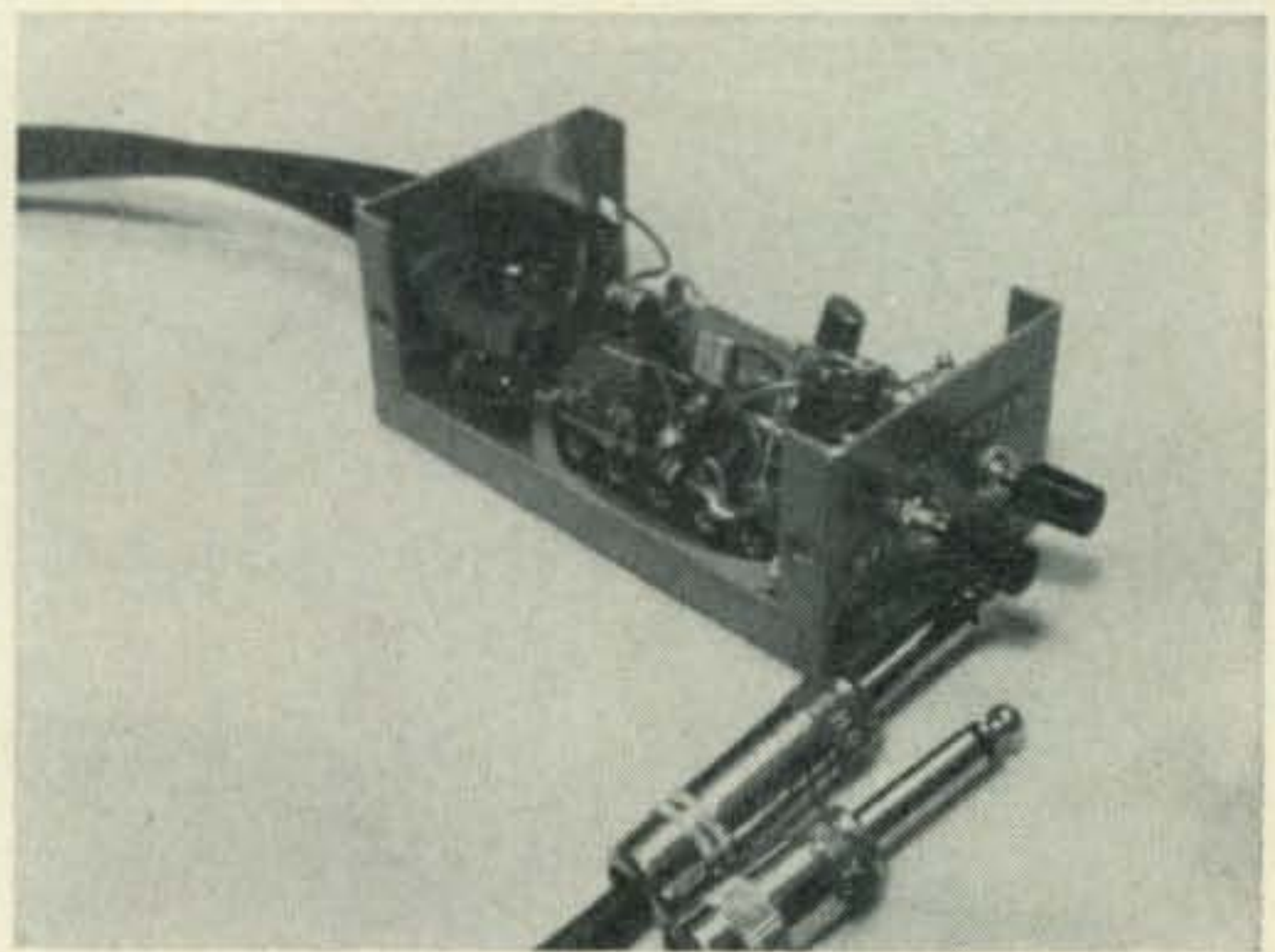
IF you've ever been caught sending 5's instead of H's, or if you keep sending question marks instead of P's, don't blame your fist—blame your transceiver! Today's popular transceivers are designed for phone, with c.w. just thrown in as an afterthought. So, if you are a confirmed c.w. man, you have to send by sense rather than by sound; there's no c.w. monitoring circuit to help you keep tabs on what your key or bug is doing. Fortunately, there's an easy way to add such a circuit to almost any grid-block keyed transceiver without digging into its innards.

We searched many handbooks and old issues of ham magazines looking for a suitable monitor for our transceivers, the National NCX-3. The closest thing we found was a five-tube monster which required modifications inside the basic rig that made us shudder when we visualized the resale price of the rig falling as a result. And so we devised this little unit. It's self-contained, compact, and self-powered. Using three transistors, it has separate volume and pitch controls, can be readily used with headphones, and can even be used as a code practice oscillator to keep the little harmonics happy. And, once it's adjusted, it needs no further care; just turn it off when you QRT.

How It Works

In a grid-block keyed transceiver, a negative voltage keeps the transmitter tubes biased off when the key is up. When the key is depressed, part of this bias is bypassed to ground through the key. In the NCX-3, the current through the key is about 1 milliamperes. This current is used to turn on a transistorized oscillator, whose output is fed to the phones.

As you can see in fig. 1, plug P_2 is connected to the transceiver keying jack and is connected



Exposed view of the c.w. monitor shows compact wiring and simple control grouping. The key and code practice jacks, J_1 and J_2 are on the rear lip.

right to the key through J_1 . But the outer conductor of J_1 , instead of going back to ground, goes to the base of transistor Q_1 . With the key up, there's no base current through Q_1 , and the transistor is off. With the key down, the keying current from the transceiver biases Q_1 into saturation.

Meanwhile, transistors Q_2 and Q_3 form a simple oscillator. The complimentary-symmetry circuit uses two transistors in a phase-shift oscillator circuit, where the feedback from the collector of Q_3 , through C_1 and R_3 , to the base of Q_2 causes oscillation. The frequency of the oscillator is adjusted by control R_2 (PITCH). If you examine the circuit carefully, you will see that the supply voltage from battery B_1 has to go through transistor Q_1 to feed the oscillator. If we saturate transistor Q_1 (or key the unit with a key plugged into the optional code practice oscillator keying jack), the oscillator starts.

Transformer T_1 couples the output from the oscillator into the earphone circuit, through volume control R_4 . By connecting the phone

*519 East 88 Street N.Y., N.Y. 10028.

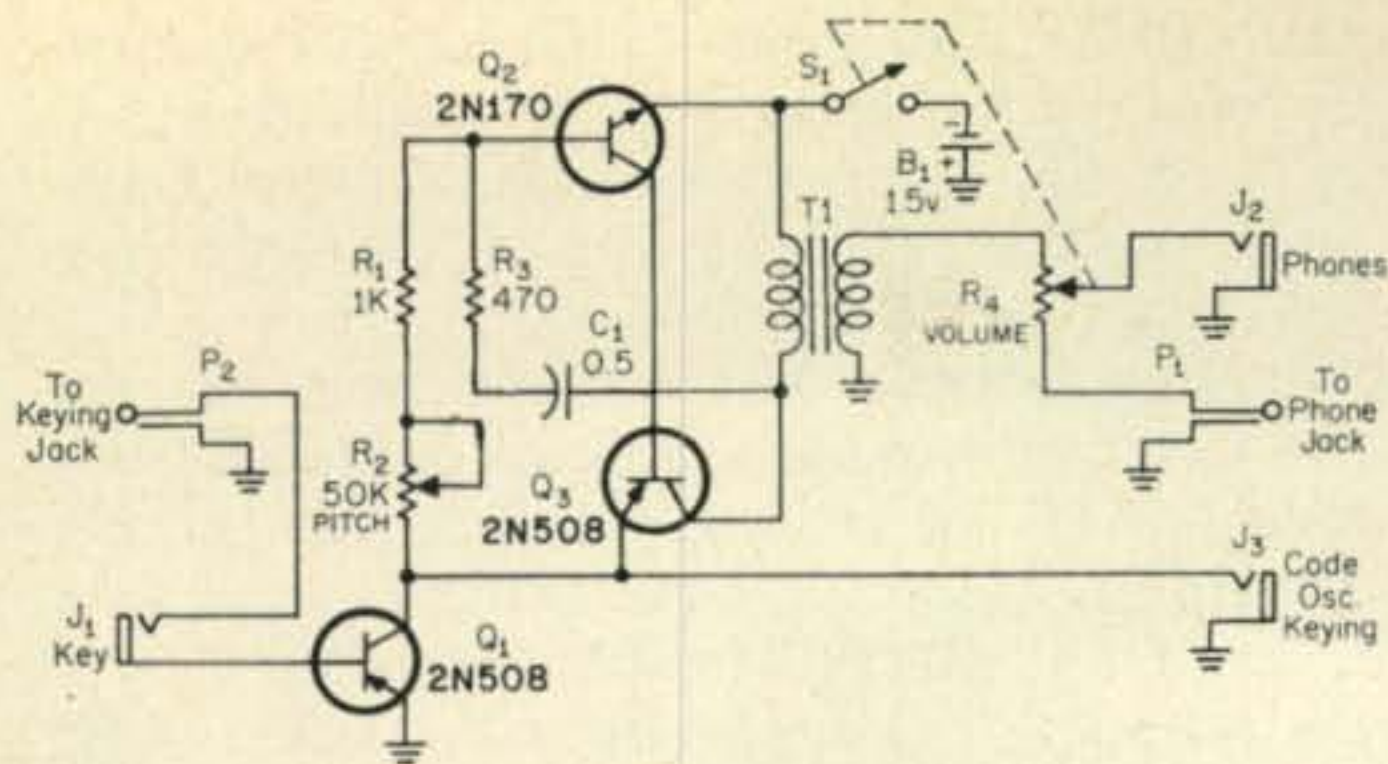


Fig. 1—Circuit of a c.w. monitor suitable for use with grid block keyed transceivers. Be certain to insulate J_1 from the chassis. Transformer T_1 is a subminiature unit such as Argonne AR-136 or equivalent.

output of the transceiver to the other end of R_4 , the volume control really becomes a mixer which mixes the received signal with the monitored signal into the same pair of phones. Once you correctly set the PITCH and VOLUME controls, and adjust the receiver audio gain, no further adjustments are required.

If you wish to connect a speaker instead of phones, the oscillator has enough output to drive one. Just connect a 4 or 8 ohm speaker instead of the 100 ohm primary winding of the transformer (T_1).

Construction

The unit was built in a readily available aluminum box measuring about 1½ by 2 by 4 inches, but it's a tight squeeze. A somewhat larger box is preferable, especially if you want to add a miniature speaker.

To begin, drill the two holes for the jacks, making the opening for keying jack J_1 a little larger than the diameter of the jack bushing. Using two insulators and a little tape, mount the jack in the hole, making sure that the frame of the jack is insulated from the case. Also

drill two openings for the two cables to the transceiver. Though we used shielded cable because it's handy, any other type of two conductor wire is good.

Now drill two openings for the VOLUME and PITCH controls. We used miniature controls designed for transistor circuits, with tiny clock radio knobs friction-fitted to the shafts. Two parallel terminal strips and a battery holder, mounted inside on the bottom, and the transformer, squeezed into one corner, complete the mounting of parts. The small parts, such as transistors and resistors, are mounted point-to-point between terminals on the terminal strips. Keep all wiring short and direct; there are no critical part placements or wiring lengths to worry about, but a neatly laid out unit always seems to work and look just a little better.

Using The Monitor

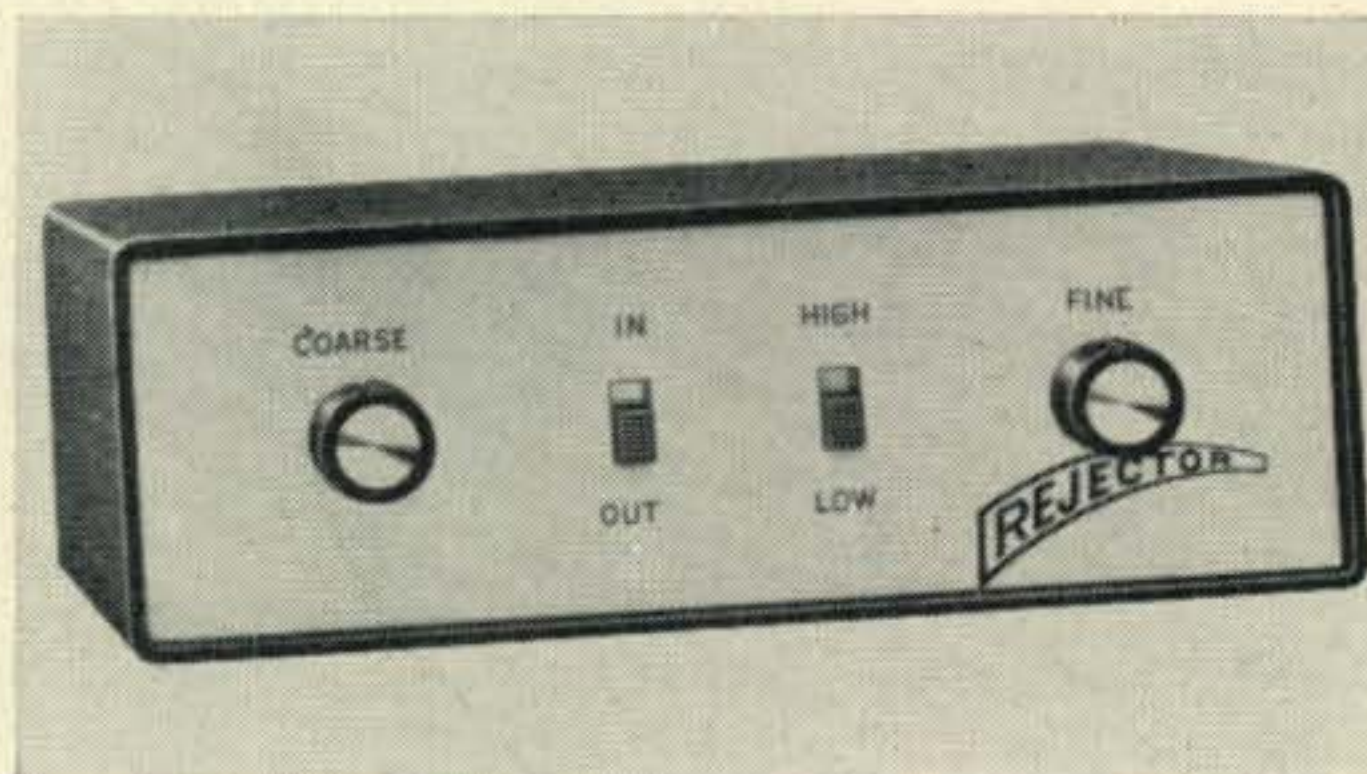
Plug the key and phones into the monitor, and plug the monitor phone and key plugs into the transceiver. Set up your transceiver for c.w. operation, turn on the monitor, and depress the key. Adjust the volume and tone controls on the monitor for a pleasant tone. When you go back to receive, readjust the audio gain control on the transceiver for a comfortable listening level, since there's a little interaction between the audio gain control and the volume control. That's all there is to it.

Once the monitor is connected, it need never be disconnected. If you go to phone, just turn off the monitor. If you were careful to wire the monitor volume control so that the arrow on the schematic is in the direction of clockwise rotation, then turning the volume control off (until the switch clicks) just connects the phones directly to the phone output of the transceiver. To prolong the life of the battery, just make sure to turn off the unit when you're QRT. ■

New Amateur Products

Galaxy Rejector Notch Filter

GALAXY Electronics of Council Bluffs, Iowa, has introduced the Rejector Notch Filter which is a tunable notch filter to their line of products. The unit improves reception in most receivers by being tunable from 300 to 5000 cycles which suppresses heterodynes, QRM, ignition and background noises and other interferences by over 40 db. It has seven transistors and connects between the receiver and the speaker. The unit sells for \$34.95. For further information write to: Galaxy Electronics, 10 South Street, Council Bluffs, Iowa, or circle 62 on page 110.





BY URB LE JEUNE,* W2DEC

WORD comes from EA7ID to the effect that all amateurs and all amateur radio clubs interested in assisting to reactivate these rare DX spots should write at once to EA7ID expressing desires to that effect, such letters will then be presented to the Director of Spanish Amateur Radio who may act favorably, therefore, if you "need" these rare ones . . . Enough said?

Weekly DX News

The Northern California DX Club Memorial Station, W6TI, transmits DX news most Sundays on 14,002 kc at 1600 GMT and 2130 GMT. All DXers are invited to QSX for the latest "scoop" on DXpeditions and the rare DX stations active on the bands. W6TI will not broadcast bulletins during the major DX contests, or when there is heavy "QRL". W6TI welcomes any contributions of DX information and would be glad to receive any published DX bulletins for reference use. Please QSP all correspondence to K6VVA, 1634 Creek Drive, San Jose, Calif., 95125.

DXpedition

Andre, SP5ALG, passes along the following story via W2VLS. Andre caused a mild furor while operating as 4XØWF from the Dead Sea.

Andre left Poland early last Summer with a home brew 200 watt rig, a Drake 2B receiver, and a long wire 80 meter antenna. After visiting such countries as SM, OZ, DL, PAØ, CN8 and 7X2 (ex-FA), his first transmissions enroute were from Sousse Tunisia with the call 3V8GM. A few QSOs were made with W stations out of more than 200 contacts made from Tunisia. Enroute from 3V8 land to Israel, he touched on countries such as OD5, YK, and JY. While in Israel, he was granted permission to operate with the call sign SP5ALG/4X4WF.

Together with Dr. Eric Friedman, 4X4WF, ex-SP6WF, he operated a DXpedition station from the Dead Sea area with the call 4XØWF. The prefix 4XØ was used for the first time in Israel. Andre and Eric operated 4XØWF for 60 hours continuously on October 18, 19, and 20, 1964. Unfortunately, conditions were very poor during the time that station 4XØWF was in operation, otherwise many more contacts would have been made. USA stations were worked on the 7 and 3.5 megacycle bands. Except for very

*Box 35, Hazlet, New Jersey 07730.

heavy QRM, conditions to Oceania and Asia were very fine business. This DXpedition was a very interesting one from the stand point of QTH because the Dead Sea is located 1200 feet below sea level.

A couple of days later, Andre obtained the call 4X4UJ and made scores of contacts from the city of Haifa. He left Israel November 25, 1964 for the USA via such countries as I, EA, ZB2 and EA8. All QSLs will be answered 100%; these include all QSOs made with ex-SP5ALG, 3V8GM, SP5ALG/4X4WF, 4XØWF and 4X4-UJ. Please address all QSLs via W2VLS. (Tnx W2VLS).

Attention Philatelists

CR7CO is interested in swapping stamps for a Mosley TA-33 beam. His full QTH is Nuno Tristao da Silva, Laboratorio C. T. T. Lourenco, Marques, Mozambique.

Here and There

CR8 Portuguese Timor: CR8AE is a new station in Portuguese Timor. He has worked some VK stations on 20 meter phone. (Tnx DX-MB).

ET3 Ethiopia: Al, K1QHP, of K1QHP/FL8 fame, reports the boys at ET3USA are always looking for Ws on 14,040 kc.

HKØ San Andres Island: Both HKØAI (QSL via W9WHM) and HKØQA (QSL via K9ECE) are reported active on s.s.b. 14100/130 kc. HKØAI can be found regularly on Sundays around 1200-1400 GMT (Tnx VERON).

KG6I Bonin Islands: John, KG6IJ, passes along the following information on KG6IJ: "Equipment in use is a KWM-2 and 30L-1 linear. A triband beam will soon be erected on top of a 70 foot tower. Operation thus far has been 20 meters only, with good success, using only a dipole. Exact QTH is Chichi Jima, the only inhabited island of the Bonin Group. We are still waiting for our QSL cards to arrive. Demands for our card have been quite high. I would prefer QSLs for me to be sent via my QSL manager, W3KTY."

KG6S: KG6SB has a new beam and Galaxie transmitter, 14040 kc c.w. from 0700 GMT week-



This neat station is HB9RAS. The station was set up at the Swiss National Exhibition in Lausanne. Equipment includes HX-10 and HX-20 transmitters, RX-1 and SB-300 receivers. Antennas are a TA-33 Jr. and a two band dipole for 40/80. (Tnx HB9RO).

The following certificates were issued between the period from January 6th to and including February 5th, 1965:

CW-PHONE WAZ			PHONE WPX		
2098	DJ2JE	Werner Gerhards	609	W8QNW	John W. Govier
2099	W6ERS	Vernon Howard	610	HA5KAG	Radio Club of Orion
2100	DJ9GD	Walter Misch	611	OK1AW	Alois Weirauch
2101	DL7JA	Gerhard Rader	612	OK3KAG	Clubstation of Technical University in Kosice
2102	OE1HGW	Dr. Gunther Haubenberger	613	OK2OQ	Oldrich Kral
2103	YV5AB	Miguel A. Delgado H.	614	OK1JN	Josef Kosar
2104	W5CYE	Charles W. Peale	615	OK2KJU	Clubstation of Prerov
2105	CR6AI	Joao Carlos Chaves	616	LU8BAJ	Carlos E. Trench
2106	DL7BK	Helmut Krockow	617	DL9VN	Erich Erbar
2107	W2ZTV	Brother C. Patrick	618	W4ZYQ	Pat Burns
2108	WA2DIG	Victor C. Ulrich	619	DL7CW	Karl B. Schwarting
2109	UA1CX	Eugene U. Chernishov	620	K1HVV	Myron E. Knowles
2110	W6JRY	Jerry E. Fuller	621	UH8DA	Yuri A. Inozemtsev
2111	SM5BIU	B. Ericson	622	UA6MF	Serge Petalin
			623	UB5KBA	Radio Club of Lvov
			624	DL7BK	M. Krockow
ALL-PHONE WAZ			SSB WPX		
283	KA2BW	William L. Weise	205	W8QNW	John W. Govier
284	VE7SB	Allen H. N. Koo	206	OK1ADP	Frantisek Meisl
285	W2ZTV	Brother C. Patrick	207	W9DWQ	E. A. Goodbout
286	W2MES	Joseph Hellman			
TWO-WAY SSB WAZ			100 TWO-WAY SSB		
290	VE7PV	Ian F. MacArthur	466	KA2RJ	Ronald J. Finger
291	OE1ES	Emanuel Strunz	467	W5LEF	Willie E. Petty
292	JA1CWP	Tay Yamaguchi			
293	IICWN	Arturo Maggiora	200 TWO-WAY SSB		
294	W2ZTV	Brother C. Patrick	124	VK4FJ	Sidney Roy Baxter
295	UD6KAR	Radio Club of Baku	300 TWO-WAY SSB		
296	OE3CL	Camillo Litschauer	7	W2TP	H. G. Mustermann
297	SM5CZY	Bengt Selin			
CW WPX					
607	W6OMR	Irving Astmann			
608	DJ2JE	Werner Gerhards			

days and 2300-1200 GMT weekends. QSL via W7PHO with s.a.s.e. (Tnx WGDXC).

KW6 Wake Island: The following stations now are active. KW6EF with 500 watts and 2 element quad, mostly 14060 c.w.; KW6EI also c.w. but sporadically; KW6EJ reported on 14255 s.s.b. around 0750 GMT. The latter, Jack, is using 100 watts into a TH3 beam. (Tnx VERON).

OD5 Lebanon: OD5LX and OD5AX again active and say others will soon be back on the air. (Tnx WGDXC).

TA Turkey: TA2FA ist auch ein Pirat, den DJØFX hat seine an Box 6, Istanbul, geschickte Karte mit dem Vermerk "unbekannt" zuruckerhalten. (Tnx DX-MB).

TJ Cameroun Republic: Walter, TJ1AD (DL9-HF), is now QRV on 14110 s.s.b. (Tnx DX-MB).

UA-U.S.S.R.: Thanks to Claude, W9TKV, for this very interesting story on radio activities in the Soviet Union.

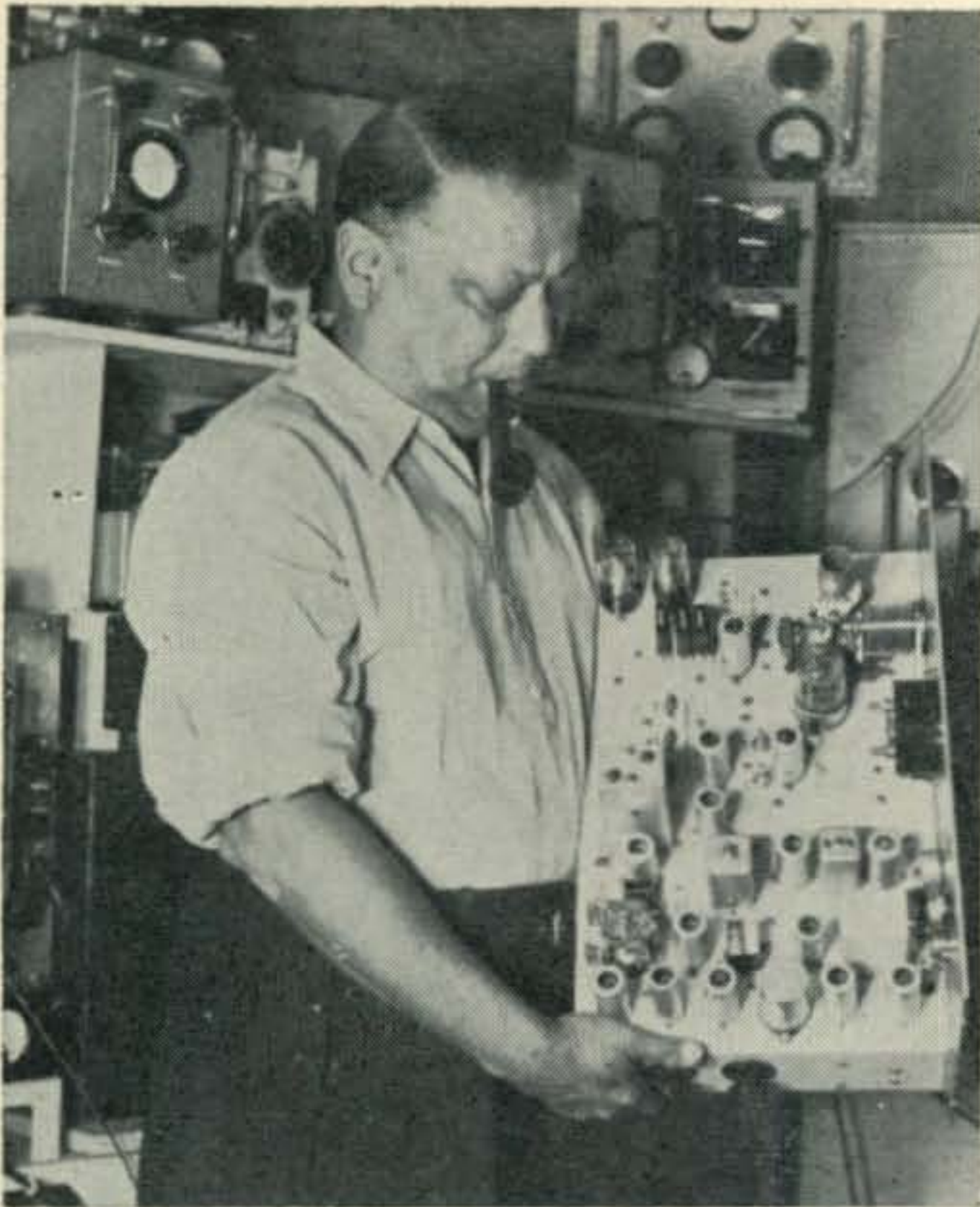
"I happen to read Russian and am carrying on a most interesting correspondence with UWØFK, Slava Lyubchenko, P. O. Box 102, Yuzhno-Sakhalinsk, Sakhalin Island, U.S.S.R. UWØFK requests that I convey to you some information on a station I am sure many heard and some worked—I refer to UAØKFG/UA3, operating out of Moscow between August 28, 1964 and September 28, 1964. A total of 2375 contacts were made with 106 countries in 37 zones and on six continents. Bands used were 20 and 40 meters. QSLs may go via usual channels or direct to UWØFK's QTH as given above.

"The real reason for the expedition can be

explained by the fact that Far East stations have a much harder time, due to their location, in qualifying for the operator's awards that mean so much to the average Soviet ham. The awards system has been set up by the Central Radio Club and, unfortunately, stations centrally located, such as UA1, UA3, UB5, etc., find it much easier to qualify than do non-centrally located stations. To attain the highest accolade—that of Master—an operator must establish contact with 40 stations in an hour or else 110 oblasts (a sort of a region) in 12 hours, or have 310 QSOs in a 12 hour period or, finally, work 12 Soviet republics in 45 minutes. Other categories, lesser in nature but still difficult are: First, Second or Third grade. As a result of living in the Far East, the three operators named felt they should prove their operating skill was equal to that of anyone else under equal circumstances—and equal circumstances meant operating from one

SSB DX HONOR ROLL

TI2HP	300	K2MGE	278	W2RGV	261	YV5AFF	239
W2BXA	296	W6UOU	277	G3DO	260	W7DLR	238
W2ZX	295	K1IXG	276	PJ2AA	258	W6YMV	235
WØQVZ	294	HB9TL	275	G2PL	256	OZ7FG	233
W8PQQ	292	DL1IN	275	KP4CL	256	W2PTM	230
W2TP	292	I1AMU	275	W6WNE	254	W3VSU	228
5Z4ERR	290	PZ1AX	274	W4RLS	252	W6ZJY	227
K4TJL	290	W6RKP	273	K6LGF	250	K1SHN	224
W2VCV	290	K9EAB	273	W1AOL	250	K2JFV	223
K8RTW	286	W2LV	271	W4PAA	249	W3FWD	216
W2FXN	281	W3KT	270	W4NJF	248	K1JMV	213
W1LLF	281	WA2IZS	269	K4HYL	248	WA2EQQ	210
W3MAC	281	G3NUG	269	GM3JDR	246	SM5UF	208
G8KS	279	W4SSU	263	XE1AE	246	K6CYG	203
W4OPM	278	G2BVN	263	K8ONV	244	W4HUE	201



One of the real old timers of DX Mickey, VU2CQ. Mickey proudly displays his new s.s.b. generator which uses a mechanical filter and a single 6146 in the final. This rig was a three-year project.

of the centrally located areas. They certainly proved their point.

"UWØFK personally found it very interesting, while operating UAØKFG/UA3, to be able to QSO countries almost impossible to contact out of Asia: TF, CT1, F, PAØ, etc. A direct comparison on operating performance was made with operators manning the home station on Sakhalin Island, during the same time the /UA3 operation made 291 contacts, the home station could effect but 19.

"The UAØKFG/UA3 station consisted of 150 watts into a 40-20-15 meter vertical; a long wire was also available for 80 meters. The receiver was a 15 tube model with a band scanner."

"UWØFK is able to read English, and he is a philatelist, so anyone wishing to send IRCs in return for Soviet stamps should contact him."

VK4 Willis Island: VK4TE has been active on 14063 kc most days. Several W/Ks have sent extra xtals to him, therefore, check all c.w. section if not heard. QSLs go via VK2AGH. (Tnx WGDXA).

VKØ Macquarie Island: VKØTR, Trevor, has crystals 14120-30-60 a.m. fone only daily.

VS6 Hong Kong: After you read this letter from VS6FO, I don't think you will complain about antennas quite as quickly.

"... As you remark, band conditions during our QSO changed very rapidly. In fact, you went from a good S8 to zero in just a few minutes. I have not been on the air too long out here, and as yet, am not very active. Regarding working stateside, I find it a complete reversal from that in the U.K. Out here I have as yet only worked the 5th, 6th and 7th call areas. In fact, I've not yet even heard 1, 2, 3, 4, 8, 9 or 0 call areas.

"I only run low power, though the DX-40

should run 75 watts. I have never yet been able to load up to that input. I am at the moment awaiting the arrival of a coax antenna change over relay from the U.K. At the moment I am all manual change over. The biggest problem I find is with antennas. I live in a three-story block, but with plenty of roof space; however, I cannot conveniently fix a mast. I was hoping to use either a Mosley or Hy-Gain vertical, but I cannot see how to place one as the roof space is communal, and I must not obstruct other people. I'm afraid the 20 and 15 meter dipoles I use at present leave a lot to be desired.

"That is a good idea you have of supplying a blank card. As a matter of fact, at present I have no ordinary QSLs. I have about 100 contacts to be confirmed soon as my cards arrive. In the meantime, I use these local postcards to reply to people who QSL me direct. If you care to pass along my QTH as I mentioned, cards will reach me quicker than going through POB 541. I intend to continue my 100% QSL policy." QTH: Flat 3, 5, Shouson Hill Rd. East, Deepwater Bay, Hong Kong.

VS9 Socotra Island: VS9SJF can be found on various c.w. frequencies in the 20 and 40 meter bands, mostly during the afternoon hours starting around 1600 GMT. He also has been heard on S9 on 14160 a.m. Socotra Islands count same as Aden for DXCC purposes, but you'll never know. (Tnx VERON).

VS90 Sultanate of Oman: VS9OC, Mike, c.w. 14010 90 kc and s.s.b. 14110 kc from 1300 GMT. (Tnx WGDXC).

XT2 Voltaic Republic: XT2HV has now gone QRT and returned to Paris.

XW8 Laos: Phanh, XW8AL is now back on the air after a short stay in Europe. In addition to Phanh, there are a couple of other boys who are also on the air from Laos, XW8AX and XW8AZ. Chuck, XW8AU, has left Laos and is now in Calif. (Tnx K6EVR).

ZL3 Chatham Island: The following letter from Ted, ZL2 AWJ, needs no introduction or comment: "Hi Urb, I've been somewhat remiss in keeping the DX fraternity acquainted with developments in my proposed Chatham DXpedition and wonder if I may explain and bring things up to date.



Andre, SP5ALG, at his home station in Warsaw. Read about Andre's wanderings under "DXpeditions." (Tnx W2VLS).

"As yet I have not made the grade to Chatham. Finance has been one problem, pressure of work another, but the main worry is just plain getting there and back. The only air service is operated by New Zealand Air Force flying boats (Sunderlands, believe it or not). Flights are few and priority naturally is given to residents who have kept the list full for the last few months. Sea travel is also irregular, priority as per the air service. However, the shipping company is very sympathetic to the cause and it looks as if I should be able to get to the island in late April for about two weeks. Will be on all bands s.s.b./c.w. and will handle QSLs through my home QTH 140 Wellington Rd., Wainuiomata, New Zealand. IRCs required for direct QSLs and 1 IRC would be appreciated for bureau QSLs.

"Soon as I have a definite date, I'll let you know Urb, but if anyone wants direct information they should send a SAE to me." Tnx Ted.

4W1 Yemen: 4W1G is the only active station from Yemen at the present time. His operation is mainly confined to c.w. and he is generally active about 1800 GMT on 14 mc (*Tnx NEDXC*).

5T5 Mauritania: 5T5AB, Andre Dubois, usually 14120-25 kc from 1900 GMT daily. (*Tnx WGDXC*).

7X2 Algeria: Harry, DL7AH/9Q5AAA/9Q5AB, should be signing a 7X2 call by the time you read this, possibly 7X2AH. While signing 9Q5-AB, Harry had almost 75,000 QSOs! (*Tnx NEDXC*).

9M4 Malaysia: The following is from Bob, 9M4LP: "Dear Urb, Sorry I didn't have a chance to get together with you when I was in New York recently. The XYL and daughter and I were only there for about 24 hours and outside of spending a very pleasant evening with a group of W2 DXers, we didn't get much done. We didn't even get to the Fair. Traveling with a three month old baby can be very hectic and certainly curtails your activities.

"Might mention in your column that 9M2JJ, Jan Jellema, who is an American Peace Corps worker and has been teaching radio at the trade school in Ipoh, Malaya for the past couple of years, is leaving us for W8 land. Jan's friendly conversation will be much missed on our Sunday morning 40 meter s.s.b. roundtables. He has also done a fine job as editor of the *M.A.R.T.S. Newsletter* for the past year.

"Might list my QTH in your column as I worked quite a number of stations and no doubt a few of them will want cards. It seems that more people read *CQ* than the *Callbook* so this is a real service that you provide. Unfortunately, conditions to the eastern and central US were extremely poor during both contests, so most of my stateside contacts were limited to W6s and W7s.

"Europe and the USA have started coming through on 160 meters. I'm hoping that the fine conditions of December '62 and January and February '63 will be repeated again on that band.

"All the best to you, your family and all the W2 DXers, Bob."



Tommy Hall, CN8AW, passes along this picture taken in front of the Kenitra Club House. Tommy is on the left of the back row, next to Chuck, WA4EWF.

9M8 Sarawak: Ed, 9M8EB, is active weekends around 14280 kc s.s.b. between 1200 and 1300 GMT.

QTHs & QSL Managers

CT3AQ	via K9ECE.
EL2AC	via K5SGJ.
FU8AG	Jean Gavarone, Box 104, Santo, New Hebrides.
HM2BD	Box 8, Sosa, Korea.
HM9AP	via K6ZDL.
HR2SY	via K9BTU.
KG6IF	via K7CAD.
KG6IJ	operator John, via W3KTY.
KG6SB	via W7PHO.
KL7WAH	HHC-1 Bn 47 LNF APO Seattle, Washington 98731.
KS6BA	Box 307, Pago-Pago, American Samoa.
MP4BEQ	c/o I.A.L. Bahrain Islain, Persian Gulf.
OA4OS	Box 4147, Lima, Peru.
SV0WKK	via K8WDC.
SV0WPP	via W5EGR.
TJ1AD	via DL3BK.
VK0DS	via VK3IE.
ex-VK0PK	18 Daly St., Gawler, S. A., Australia.
VP2DAD	via K1IMP.
VS6FO	Pete, Flat 3, 5 Shouson Hill Rd. East, Deepwater Bay, Hong Kong.
VU2NRA	via W4ANE.
XW8AL	via K6EVR.
ZS2MI	via ZS1CZ.
ZS8E	via ZS6OS.
ZS8G	Box 379, Maseru, Basutoland.
3A2DD	via WA2HOK.
4W1G	via HB9NL.
5H3JJ	Dr. P. Peham, Mission Hospital, P. O. Ifakara, Tanganyika.
5V8AB	Box 123, Lome, Togo.
6W8AJ	Box 1408, Dakar, Senegal.
7G1EZ	via WB2GTB.
7Q7DS	Box 380, Blantyre, Malawi Republic.
7Q7GN	via WB6DDL.
7X2RW	via W2VQQ.
9M4LP	Robert M. Snyder, Mount Elizabeth Flats 53 P. Nutmeg Rd., Singapore 9, Malaysia.
9M8EB	Ed Brogden, c/o BLDC, Simanggang, Sarawak.
9Q5TH	Box 2214, Leopoldville, Congo.
9U5IB	I. B. Burton, Box 1710, Bujumbura, Burundi.

73, Urb, W2DEC



Propagation

BY GEORGE JACOBS,* W3ASK

WITH longer hours of daylight during April, both 15 and 20 meters are expected to remain open for longer periods of time. During the month, 20 meters is expected to continue to be the best band for DX propagation conditions from shortly after sunrise until the early evening hours. Fairly good 15 meter DX openings are also forecast to southern and tropical areas during the hours of daylight. Few 10 meter openings are forecast for April, but some may occur to South America and other southern areas during the hours of daylight.

The 40, 80 and 160 meter bands are expected to open for DX somewhat later in the evening during April. From sunset until sunrise, 40 meters is expected to continue to be the best band for DX propagation conditions, with openings possible to many areas of the world. Fairly good openings to some areas of the world are also forecast for 80 meters during the hours of darkness, and some 160 meter openings may also occur during this period.

Ionospheric absorption continues to increase in the northern hemisphere during April, as the sun rises higher in the northern sky. This is expected to result in somewhat weaker signal levels during daytime openings on all bands. Atmospheric noise (static) is also expected to increase during April, as thunderstorms become more numerous. This should result in somewhat higher noise levels, especially on 40, 80 and 160 meters.

For specific times of DX openings expected during April, for each of the amateur bands 10 through 160 meters, refer to the *DX Propagation Charts* on the following pages. For predictions of short-skip openings (less than 2400 miles), during April, refer to the *Short-Skip Propagation Charts* which appeared in last month's column.

V.h.f. Ionospheric Openings

A moderate meteor shower, the *Lyrids*, is due to take place between April 19 and 23. During this period, increased meteor-type openings on 10 meters and the v.h.f. bands are likely to occur.

Sporadic-E propagation begins its seasonal increase during late April, and this is expected to result in a greater number of short-skip openings on 10 and 6 meters, up to distances of about 1300 miles. While sporadic-E openings may occur at any time, there is a tendency for them

*11307 Clara Street, Silver Springs, Md. 20902.

LAST MINUTE FORECAST

Day-to-Day Conditions and Quality for April

Forecast Rating & Quality

Days	(4)	(3)	(2)	(1)
Above Normal: 10, 19, 22, 25	A	A-B	B-C	C
Normal: 1, 4-5, 7-9, 11-13, 15-16, 18, 20-21, 23-24, 26, 28	A-B	B-C	C-D	D-E
Below Normal: 2-3, 6, 14, 17, 27, 29-30	C	C-D	D	E
Disturbed: None	D	D-E	E	E

HOW TO USE THESE CHARTS

The following is an explanation of the symbols shown above, and instructions for the use of the CQ propagation predictions:

1—Enter Propagation Charts on following pages under appropriate band and distance or geographical area columns. Read predicted times of band openings at intersection of both columns.

2—Following each predicted time of band opening is a forecast rating which indicates the relative number of days the band is expected to open during each month of the forecast period. The higher the rating, the more frequent the opening, as follows: (4) band open more than 22 days each month; (3) between 14 and 22 days; (2) between 8 and 13 days; (1) less than 7 days.

3—With the forecast rating noted above, start with the numbers in parentheses at the top of the "Last Minute Forecast" appearing above. Read down the table for a day-to-day forecast of propagation conditions in terms of Above Normal (WWV rating higher than 6); Normal (WWV rating 5-6); Below Normal (WWV rating 4); Disturbed (WWV rating less than 4). The letter symbols (A-E) describe reception conditions (signal quality, noise and fading levels) expected for each day of the month and have the following meanings: A—excellent opening with strong, steady signals; B—good opening, moderately strong signals, little fading and noise; C—fair opening, signals fluctuating between moderately strong and weak; D—poor opening, signals generally weak and considerable fading and noise; E—poor opening, or none at all.

4—This month's DX Propagation Charts are based upon a transmitter power of 250 watts c.w.; 500 watts s.s.b., or 1000 watts d.s.b. into a dipole antenna a quarter-wave above ground on 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, reception quality shown in the "Last Minute Forecast" will improve by one level; for each 10 db loss, reception will become poorer by one level.

5—Local Standard Time for these predictions is based on the 24-hour system.

6—The Eastern USA chart can be used in the 1, 2, 3, 4, 8, KP4, KG4 and KV4 amateur call areas; The Central USA Chart in the 5, 9 and 0 areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid through May 31, 1965, and are prepared from basic propagation data published monthly by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

to peak between 8 a.m. and noon and again between 5 and 8 p.m., local standard time.

V.h.f. auroral-type openings are likely to occur during periods of ionospheric storminess. Check the "Last Minute Forecast" at the beginning of this column for the dates during April which are expected to be "below normal" or "disturbed".

Solar Cycle

A monthly mean sunspot number of 19 was reported for January, 1965 by the Swiss Federal Solar Observatory of Zurich. This results in a

smoothed sunspot number of 10 centered on July, 1964.

There are now indications that the end of the 19th sunspot cycle may have occurred sometime between July and the end of 1964. Although it will take several months of additional data to establish the date upon which the cycle ended, it now appears that the date will be somewhat earlier than expected. (The Editor of this column expected the cycle to end sometime between November, 1964 and April, 1965). A smoothed sunspot number of 15 is predicted for April, 1965, as solar activity begins to rise again.

A recent bulletin issued by the Central Radio Propagation Laboratory notes that with rising solar activity, an increase in the occurrence of solar flares can also be expected. Solar flares produce periods of exceptionally high noise levels on the h.f. bands, as well as sudden, short-period blackouts. As a result of solar flare activity, radio communications in the h.f. bands can be interrupted, almost completely, for periods of twenty to thirty minutes. During the early months of 1965, high levels of solar noise were observed on the h.f. bands on several occasions.

CQ DX PROPAGATION CHARTS

APRIL AND MAY, 1965

Time Zone: EST (24-hour Time)

EASTERN USA TO:

	10/15 Meters	20 Meters	40 Meters	80/160 Meters
Western & Central Europe & North Africa	11-16 (1)	05-07 (1) 07-09 (3) 09-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	17-19 (1) 19-20 (2) 20-23 (3) 23-01 (2) 01-03 (1)	19-22 (1) 22-01 (2) 01-02 (1) 21-23 (1)† 23-01 (2)† 01-02 (1)†
Northern Europe & European USSR	Nil	06-07 (1) 07-10 (2) 10-16 (1)	19-00 (1)	20-23 (1)
Eastern Mediterranean & East Africa	14-16 (1)	06-13 (1) 13-16 (2) 16-19 (1)	19-21 (1) 21-23 (2) 23-01 (1)	21-23 (1)
West Africa	10-12 (1) 12-14 (2) 14-16 (1)	05-06 (1) 06-08 (3) 08-11 (2) 11-13 (1) 13-15 (2) 15-17 (4) 17-18 (2) 18-20 (1)	21-01 (1) 01-02 (2) 02-03 (1)	00-02 (1)
Central & South Africa	11-13 (1)* 09-11 (1) 11-13 (2) 13-15 (1)	06-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	21-23 (1) 23-02 (2) 02-04 (1)	22-02 (1)
Central Asia	Nil	07-09 (1) 19-21 (1)	04-06 (1) 18-20 (1)	Nil
South-east Asia	Nil	07-09 (1) 17-19 (1)	Nil	Nil

*Predicted 10 meter openings, all others in column are 15 meter openings.

†Predicted 160 meter openings, all others in column are 80 meter openings.

Far East	Nil	06-07 (1) 07-09 (2) 09-10 (1) 18-21 (1)	04-06 (1)	Nil
Guam & Pacific Islands	17-19 (1)	19-20 (1) 20-23 (2) 23-01 (1) 05-06 (1) 06-08 (2) 08-12 (1)	01-02 (1) 02-05 (2) 05-07 (1)	02-06 (1) 02-05 (1)†
Australia & New Zealand	17-19 (1)	14-16 (1) 21-23 (1) 06-07 (1) 07-08 (2) 08-10 (1)	03-04 (1) 04-06 (2) 06-07 (1)	04-06 (1) 04-06 (1)†
North & Central South America	11-13 (1)* 13-16 (2)* 16-18 (1)* 07-10 (1) 10-12 (3) 12-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-10 (3) 10-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1)	21-01 (1) 01-03 (2) 03-05 (1) 00-03 (1)†
Southern Brazil, Argentina, Chile & Uruguay	12-14 (1)* 14-16 (2)* 16-17 (1)* 07-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	18-19 (1) 19-21 (2) 21-01 (1) 01-03 (2) 03-05 (3) 05-06 (1)	03-05 (1) 04-05 (1)†
Mc-Murdo Sound, Antarctica	14-16 (1)	06-07 (1) 07-09 (2) 09-10 (1) 16-18 (1) 18-20 (2) 20-23 (1)	00-06 (1)	Nil

Time Zones: CST and MST (24-hour Time)

CENTRAL USA TO:

	10/15 Meters	20 Meters	40 Meters	80/160 Meters
Western & Central Europe & North Africa	10-15 (1)	05-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-16 (3) 16-17 (2) 17-19 (1)	19-20 (1) 20-23 (2) 23-01 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)†
Northern Europe & European USSR	Nil	06-07 (1) 07-10 (2) 10-16 (1)	19-23 (1)	Nil
Eastern Mediterranean & East Africa	13-15 (1)	06-12 (1) 12-15 (2) 15-18 (1)	19-22 (1)	Nil
West Africa	10-12 (1) 12-14 (2) 14-15 (1)	05-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	21-00 (1) 00-01 (2) 01-02 (1)	23-01 (1)
Central & South Africa	11-13 (1)* 09-11 (1) 11-13 (2) 13-16 (1)	06-14 (1) 14-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-02 (1)	22-00 (1)
Central Asia	Nil	07-09 (1) 19-21 (1)	04-06 (1) 18-20 (1)	Nil
South-east Asia	17-19 (1)	07-11 (1) 20-22 (1)	01-02 (1) 04-06 (1)	Nil

[Continued on page 98]



Contest Calendar

BY FRANK ANZALONE,* W1WY

Calendar of Events

April	1-15	Goose Bay QSO Party.
April	3-4	Helvetia 22.
April	3-4	Florida QSO Party.
April	10-11	CQ WW SSB DX.
April	10-11	SP DX C.W.
April	24-25	PACC CW/Phone.
April	24-26	Missouri QSO Party.
May	1-2	CQ Spring VHF.
May	8-9	USSR DX.
May	15-17	Georgia QSO Party.
June	4-7	CHC/FHC/HTH QSO Party.

Goose Bay QSO Party

Starts: 0001 GMT Thursday, April 1.

Ends: 2359 GMT Thursday, April 15.

This party was organized by the Goose Bay Amateur Radio Club so that the WAG Certificate would be made available to more stations. The VO2 stations will be found on all bands and modes. No serial numbers or scoring system required.

W/K and VE stations can gain the certificate by working four (4) GBARC members during the party. All others need work only three (3) members.

Submit your list and QSL cards along with your application and send it to: G.B.A.R.C., P.O. Box 232, Goose Airport, Labrador, Canada.

Helvetia 22

Starts: 1500 GMT Saturday, April 3.

Ends: 1700 GMT Sunday, April 4.

Once again the HB boys will make every effort to activate all 22 Swiss cantons so that some of the rare one will be available to hunters of the attractive Helvetia 22 certificate.

The Swiss stations will indicate their canton by sending the abbreviation along with their contest serial number. (i.e.: 579001/ZH)

A list of the 22 Swiss cantons as well as the rules of the contest appeared in last month's CALENDAR.

Deadline for mailing your contest log is April 30 and they go to USKA Traffic Manager, HB9ZY, Meggen-LU, Switzerland.

Florida QSO Party

0000—0500 GMT Saturday, April 3.

1400—2000 GMT Saturday, April 3.

0000—0400 GMT Sunday, April 4.

Besides certificates awarded for the highest scores during the party, you can also gain point

*14 Sherwood Road, Stamford, Conn. 06905.

credits toward the WAFC award (Worked all Florida Counties).

Scoring information as well as suggested frequencies appeared in last month's CALENDAR.

Mailing deadline for logs is April 30th and they go to: Florida Ship, Contest Chairman W4WHK, P.O. Box 501, Miami Springs, Fla. 33166.

CQ WW SSB DX

Starts: 1200 GMT Saturday, April 10.

Ends: 2400 GMT Sunday, April 11.

This is becoming the most popular phone contest in the world, maybe because of the WPX feature. Prefixes are used as the multiplier, QSO point credit is the same as in the WW DX contest. Rules in detail appeared in last month's (March) issue.

A copy of these rules were also sent to all the leading amateur radio organizations and publications in the world, so world wide activity can be expected.

We would appreciate comments and suggestions, especially on the controversial "rest period."

Mailing deadline for your entry is April 30th and they go to: CQ, Att.: WW SSB Contest, 14 Vanderverter Ave., Port Washington, L.I., N.Y.

SP DX C.W.

Starts: 1500 GMT Saturday, April 10.

Ends: 2200 GMT Sunday, April 11.

This year's contest will be in celebration of the 35th anniversary of the P.Z.K. (Polski Zwiasek Krotkofalowcow)

It's the world working the SP's and operation is confined to c.w. only. Rules appeared in last month's CALENDAR.

Your logs go to: P.Z.K. Contest Committee, P.O. Box 320, Warsaw, Poland. They must be in the hands of the committee no later than May 31st.

PACC CW/Phone

Starts: 1200 GMT Saturday, April 24.

Ends: 1800 GMT Sunday, April 25.

Like last year the c.w. and phone contests have been scheduled on the same week-end, although they are separate activities. Besides certificates awarded in the contest, there is also an added incentive, contest contacts can be applied toward the PACC Award for working 100 different PA stations.

1. Use all bands, 1.8 thru 30 mc. On 160 m., PA stations are confined to 1.825—1.835, c.w. only.

2. The usual 5 and 6 digit serial number, RS/RST report plus a progressive QSO number starting with 001.

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

4. The multiplier for stations outside the Netherlands is determined by the number of provinces worked on each band. There are 11 provinces, making a possible multiplier of 66. PA stations will use the DXCC country list for their multiplier. In addition the call areas in the following countries will be considered a multiplier: W/K, VE/VO, PY/VK/ZL, ZS, CE and JA.

5. The final score therefore will be the sum of QSO points from all bands, multiplied by the sum of the multiplier on each band.

6. Certificates will be awarded to the highest scorer in each country and each call district as indicated above.

7. Your log should show in this order: Date and time in GMT, station worked, serial number sent and received, province (multiplier) and QSO points.

8. The PA stations will identify their province by two letters after their serial number. The 11 provinces are: GR, GD, ZH, FR, UT, ZL, DR, NH, NB, OV, LB.

Include a summary sheet with your log and a signed declaration that all rules and regulations have been observed.

Logs must be postmarked no later than June 15th and go to: Mr. P.v.d. Berg, PAØVB, Contest Manager VERON, Keizerstraat 54, Gouda, Netherlands.

Missouri QSO Party

Starts: 1800 GMT Saturday, April 24.

Ends: 0500 GMT Monday, April 26.

The Northwest St. Louis ARC, (Club station KØAXU) announces its second Missouri QSO Party.

Exchange: Missouri stations; QSO number, signal report, county. Others; QSO number, signal report, state, province or country.

Scoring: Missouri; 1 point per contact, multiplied by the number of states, provinces and countries worked. Others; 2 points for each Missouri contact, multiplied by number of Missouri counties.

Awards: Certificates to the highest scoring station in each state, VE province and foreign country (minimum of 5 QSOs). The Top 5 Missouri stations will also receive awards, as will the 3 highest scoring clubs in the world.

Frequencies: C.W.—3525, 7025, 14050, 21050 kc. **Phone**—3900, 7225, 14250, 21350, 28650 kc. VHFers are also welcome.

The same station may be worked on more than one band, phone or c.w., for additional credit. There is no time limit or power restrictions.

Your logs and QSL cards for KØAXU go to: Rich Zysk, KØGSV, 3457a Humphrey, St. Louis, Missouri. 63118. Mailing deadline for your entry is May 30th.

CQ Spring VHF

Starts: 1 P.M. local time Saturday, May 1.

Ends: 8 P.M. local time Sunday, May 2.

See Bob Brown's VHF column on page 74 for the details on this one, and page 41 for rules.

USSR DX

Starts: 2100 GMT Saturday, May 8.

Ends: 2100 GMT Sunday, May 9.

The Radio Sport Federation of the USSR is once again sponsoring its annual Radio Day contest with the motto, "Peace to the World."

This year our good friend Ernst Krenkel, RAEM, President of the Federation, sent us a good translation of the rules, so read them carefully for future reference.

This is a world wide contest so do not concentrate on working USSR stations only.

1. Contestants must indicate *only* a 12 hour period of continuous operating time for scoring purposes. Of course you can operate the whole or part of the contest period but you must clearly indicate the continuous 12 hour period you are scoring. It is requested however that you submit a log for all your operating.

2. This is a c.w. contest only and you can use all bands, 3.5 thru 28 mc.

3. The exchange will be six digit serial numbers. USSR stations will send the RST plus the number of their oblast, therefore the last 3 figures will always remain the same. Stations of all other countries will use the conventional RST plus a progressive 3 figure contact number starting with 001.

4. Each contact counts one point and only one contact per band is permitted with the same station.

5. The "R-150-S" country list will be used as the standard to determine the country multiplier. (This is basically the same as the ARRL DXCC with the addition of DM2 as a country.)

6. Contacts between stations in the same city are not allowed. (However I believe other stations in the same country can be worked for multiplier credit.)

7. The final score is determined by the sum of QSO points on each band multiplied by the number of different countries worked on that band.

The total all band score is determined by the sum of points composed on each band. (NOTE: This is a departure from the method used in our WW and most other contests. You add the scores in the last column.)

8. Awards will be made on the basis of all band operation and to the top stations, both single and multi-operator, in each country as follows:

1st Place—A 1st degree certificate and a memorial badge.

2nd & 3rd Place—A 2nd degree certificate and a memorial badge.

4th & 5th Place—A 3rd degree certificate and a memorial badge.

In addition, each operator of a multi-operator station will also receive a badge.

There will also be special awards for the overall highest scoring station, both single and multi-operator.

A minimum of 5 entries are required from each participating country for a station to be eligible for an award. However recognition will be given to stations in countries not meeting this requirement.

9. Contacts on contest logs can be credited for any of the USSR awards: R-150-S, W-100-U, R-100-O, R-15-R, and R-10-R.

10. Use a separate sheet for each band and list your contacts as follows: Date & time in GMT, Band, Station worked, Serial number sent and received, country multiplier, QSO points.

A summary sheet with your name and address in BLOCK LETTERS, the scoring from each band, equipment description and etc. is also requested.

Your entry must be mailed no later than June 1st and they go to: The Central Radio Club of the USSR, P.O. Box 88, Moscow, U.S.S.R.

Georgia QSO Party

Starts: 2300 GMT Saturday, May 15.

Ends: 0500 GMT Monday, May 17.

This the 4th annual Georgia QSO Party sponsored by the Columbus Amateur Radio Club. Full details in next month's CALENDAR.

[Continued on page 108]



SPACE COMMUNICATIONS

BY GEORGE JACOBS,* W3ASK

As this is being written, radio amateurs, amateur space experimenters and space-listeners in all corners of the world are standing by on the 2 meter band waiting for the launch of OSCAR III—amateur radio's communication satellite.

In Malaysia

In Kuala Lumpur, Malaysia, the students of the Technical College, with the assistance of the Telecommunications Department, have completed "Project Teletek," a satellite tracking station which will be used to communicate through OSCAR III.

Work on Project Teletek started early last year. A 60-foot reinforced concrete tower supports a 30-foot parabolic dish antenna, rotated by a surplus U.S. Navy 5-inch gun mount. This antenna will be used as a radio telescope, and for tracking deep space probes.

For satellite tracking, and for use with Project OSCAR, the students have designed an antenna array consisting of four crossed-polarized log periodic antennas (see photo), mounted on an azimuth-elevation pedestal. The array covers the frequency range 108-230 mc, with approximately 12 db gain over a dipole, and a beamwidth of approximately 30 degrees. With suitable phasing of the feeds, the array can be used for linearly or circularly polarized waves.

*11307 Clara Street, Silver Springs, Md. 20902.



Erika Oslender, Dieter's XYL, pointing to automatic orbit display unit designed by Dieter. The display unit will be used to determine OSCAR III's orbit, and predict passes anywhere in the world.

Project Teletek is housed in a newly constructed building on the campus of the Technical College. The station was constructed entirely from designs submitted by students, with only slight modifications made by professional architects. The station is one of the most advanced satellite observatories in Southeast Asia.

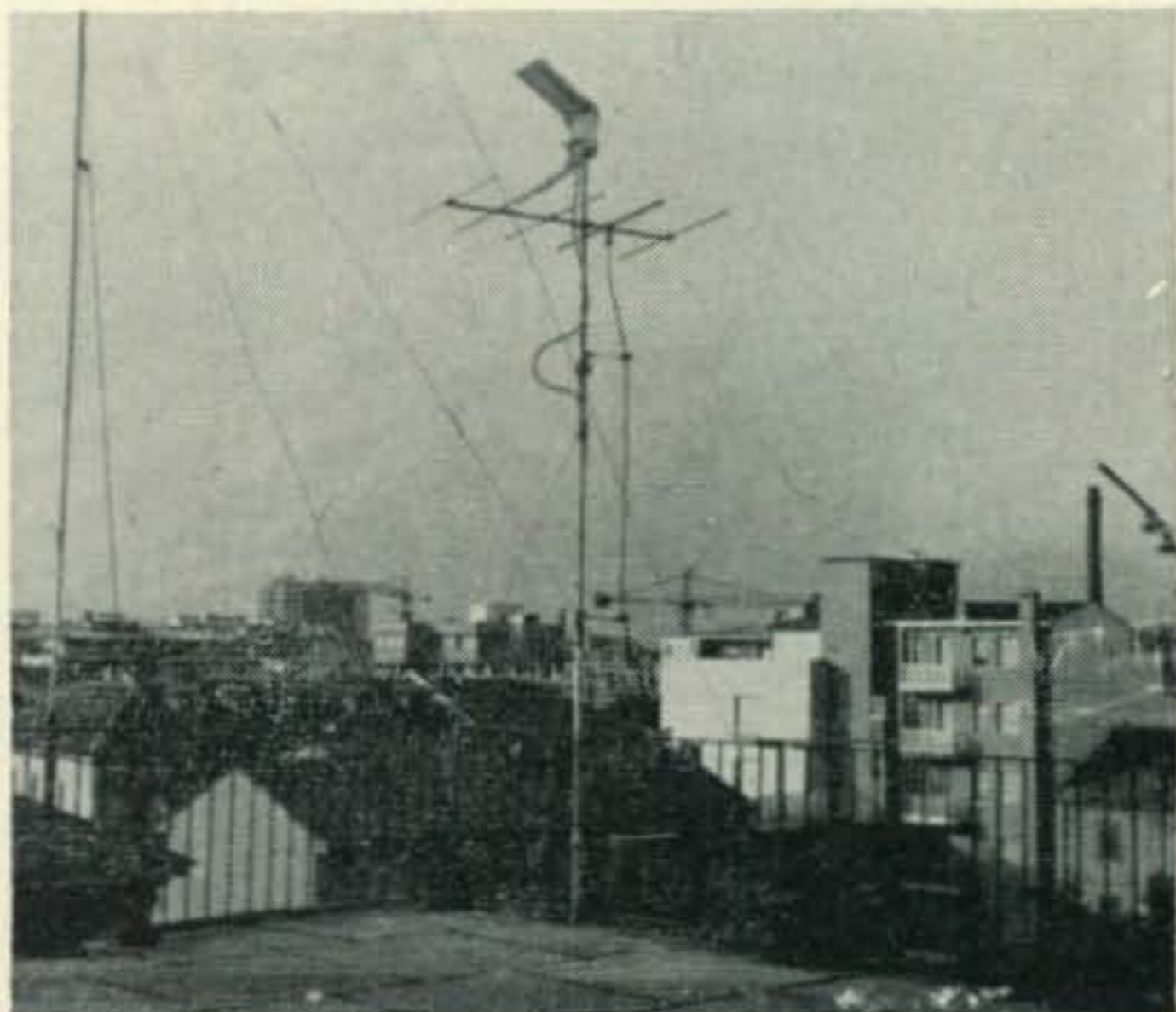
Once OSCAR III is in orbit, the station will be used to communicate with other amateur stations via the satellite, using the call sign 9M2TC. The Technical College students have also assembled a portable amateur station which will operate in North Borneo. It is hoped to link the main station in Kuala Lumpur with the portable station via OSCAR III.

At least four transmitters will also be available at 9M2TC to relay OSCAR bulletins, around-the-clock, on the h.f. amateur bands. D.s.b. and c.w. will be used on 40 and 20 meters to Southeast Asia, and s.s.b. and RTTY will be used on 20 meters for more distant points.

The aim of Project Teletek is mainly educational. It will enable students at the Technical College to apply principles and techniques advanced theoretically in their classrooms, and will encourage further research in radio astronomy and space communications. Project Teletek is a link between theory and practice for a new generation of Malaysian engineers and scientists.

In Germany and Switzerland

In Bonn, Germany, Dieter and Erika Oslender will be manning their amateur satellite observatory as soon as the news is flashed that OSCAR III is in orbit. Their receiving station, which for the most part is home-built, has been used to track almost every satellite launched since SPUTNIK I in 1957 (see photo). Recently, the Oslender's completed the installation of an automatic orbit display unit which Dieter designed. With this unit, it is possible to determine a satellite's orbit by visually tracking the satellite on the display unit. Erika and Dieter plan to plot



Mario Santangeli, I1ER, will be looking for QSO's from his Milan, Italy QTH, via OSCAR III, using the 5-element Yagi shown in the above photograph. Mario holds the honor of being among the first radio amateurs to work across the Atlantic on shortwaves more than forty years ago.

OSCAR III's orbit in this manner, and predict the satellite's location for any spot on earth.

In Geneva, Switzerland, the International Amateur Radio Club station, 4U1ITU, will go on a 24-hour operation as soon as OSCAR III is launched. Operating 2 meter gear, the Club will be trying for a trans-Atlantic QSO via the satellite. The station will also be on the h.f. bands relaying OSCAR bulletins to Europe, Africa and Asia.

In England, New Jersey and Everywhere

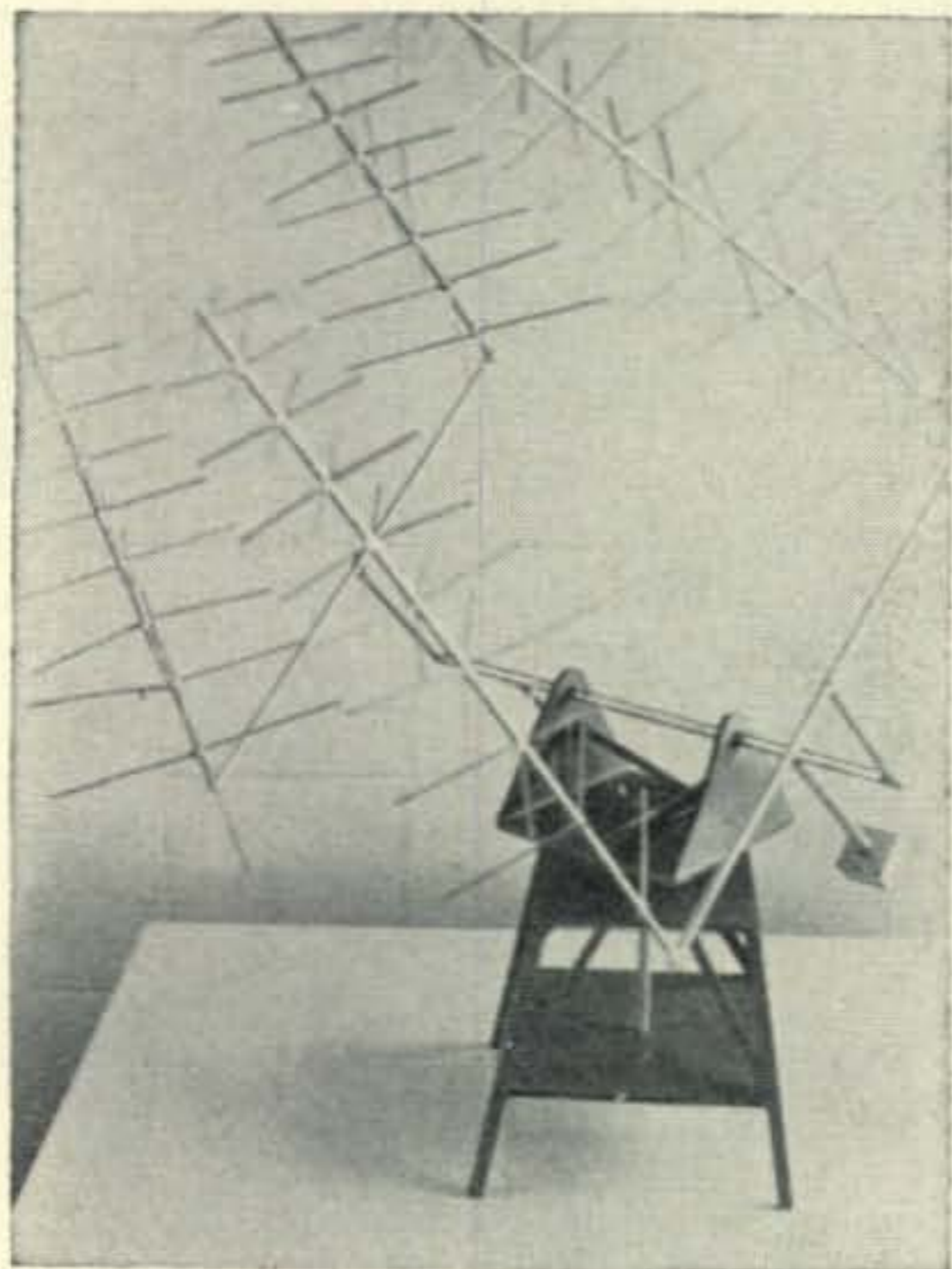
A very active moon-bounce and v.h.f. experimental group in the London area reports a fever-pitch atmosphere in anticipation of OSCAR III's launch, and a great deal of participation is expected from G-land.

In New Jersey, the Space Communication Group of the East Coast VHF Society, will be manning their club station, WA2WEB, on 2 meters looking for OSCAR III QSO's.

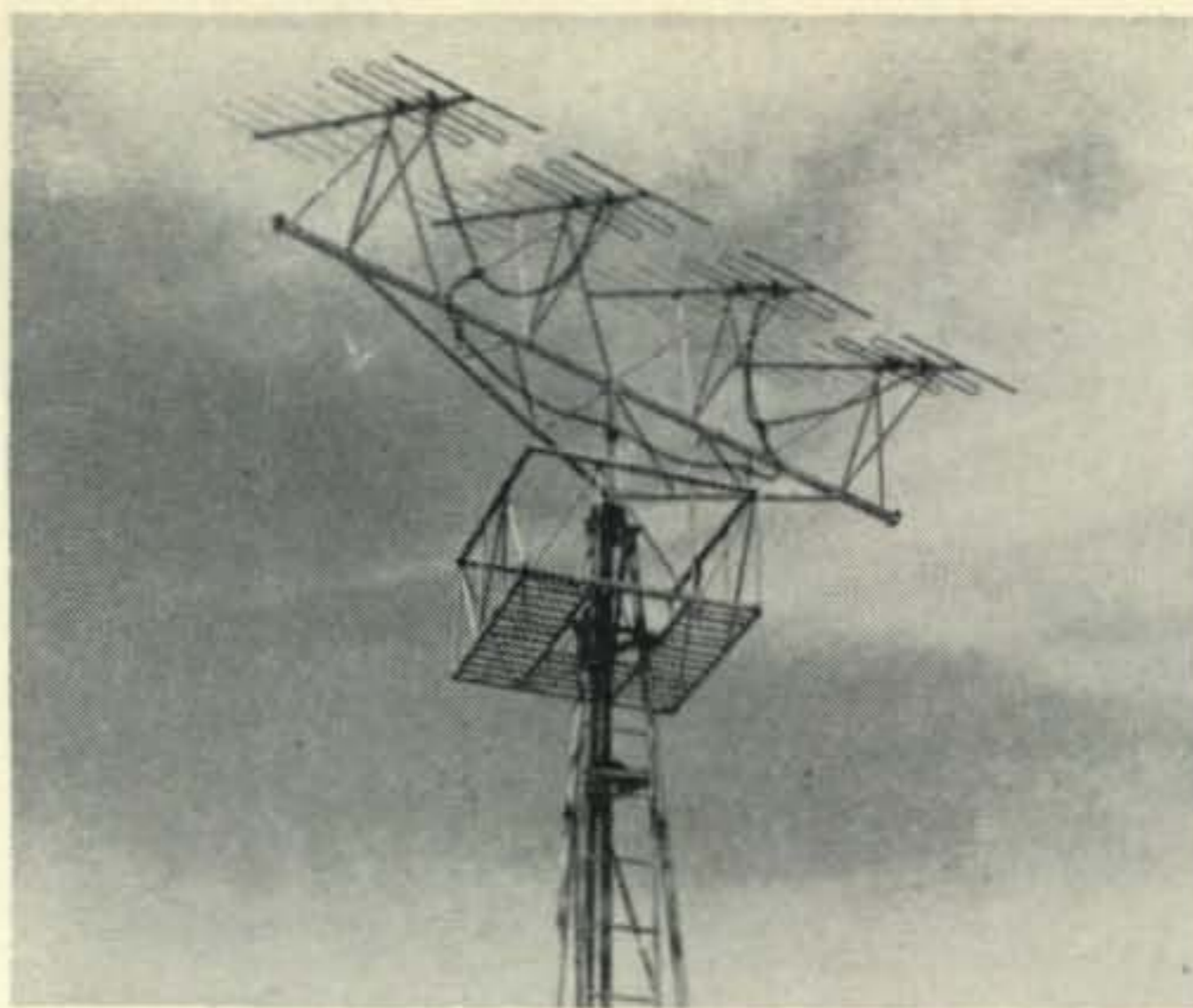
In Luanda, Angola, Portuguese West Africa, Carlos Bettencourt Fario, CR6CH will beam his 36-element Yagi array towards the OSCAR III satellite. Since little activity is expected from West Africa, Carlos is hoping that he will be able to establish new v.h.f. records, with the possibility of working into Europe, Africa, South America and Asia if the satellite's orbit is high enough.

In Milan, Italy, radio pioneer Mario Santangeli will be listening for OSCAR III with the same enthusiasm that he listened for trans-Atlantic shortwave signals more than forty years ago. Mario, I1ER, was among the first European radio amateurs to bridge the Atlantic.

These are but a few of the many, many radio amateurs, amateur space experimenters and space-listeners who will be standing by in all corners of the world, when OSCAR III is launched.



Model of log periodic antenna designed by students at the Technical College, Kuala Lumpur, Malaysia, for tracking OSCAR III, and communicating through the satellite from 9M2TC.



A view of the 36-element Yagi array that will be used for tracking OSCAR III by Carlos Bettencourt Fario, CR6CH, at Luanda, Angola, Portuguese West Africa.

The successful launching of the OSCAR III satellite, and its use as a communications relay, is certain to mark another historic point in the annals of amateur radio.

OSCAR Communications Net

W6EE, the OSCAR tracking and communication station at Foothill College, Los Altos Hills, California, began operation on February 20, 1965.

Located at Project OSCAR headquarters, the station plans to transmit basic orbit data for the OSCAR satellite, flyover predictions for three days in advance and communication bulletins on the following frequencies:

c.w.: 3507.5, 7015, 14030 kc.

RTTY: 3620, 7040, 14080 kc.

s.s.b.: 3810, 7205, 14300 kc.

S.s.b. transmissions will begin exactly on the hour; c.w. transmissions 15 minutes after the hour; RTTY transmissions on the half-hour.

[Continued on page 109]



Equipment used by M. Dieter Oslender at his amateur space observatory in Bonn, Germany. Dieter has recorded signals from almost every satellite launched since SPUTNIK I.

THE

VHF

COLUMN

BY BOB BROWN, K2ZSQ
and ALLEN KATZ, K2UYH*

THIS month's lead-in concerns itself with antennas. If you are fairly well situated on flat terrain and your antenna is well above surrounding trees and other objects, additional height will not buy you much additional performance on either reception or transmission. If you are in a valley, get it up all you can. So much for height.

A second item of primary concern to v.h.f. men is antenna gain. In spite of much published opinion to the contrary, gain is almost directly proportional to boom length. Your problem is to decide how much antenna you can swing around without raising a howl from the neighbors. If you still want more gain, stack two antennas.

At K2ZSQ we have just installed a basic 5-element yagi for six at our new Port Washington QTH. Results using this beam have been even greater than expected, in spite of the fact that s.w.r. is still higher than it should be. QRM off the side has been greatly reduced. In comparison with a dipole used previously for monitoring purposes, the new antenna has worked miracles. But this is old hat to Yagi men.

Now let's look at antenna installations. Unless your beam is tower-mounted and you have a bearing in which the mast turns, do this: Get that long-john down so that it's practically sitting on the rotor. This will reduce the leverage on your TV rotor (who uses anything else?). This contradicts what you may have read about getting the antenna away from guys, etc. You may lose a bit in gain, but you do need a rotator that rotates. Remember how that wind howled last winter?

Galvanized guy wire as presently sold is usually electrolytic galvanizing and, as such, is porous. Because it is porous, it soon rusts and new guying is needed. Try heavy stranded aluminum guy wire. We have installed this, but will not be able to report on its advantages and faults for another year. So far, so good. If you use aluminum guy wires, use paints or a silicon grease at the points where the aluminum contacts the steel. Aluminum rusts very slowly because of its nature, but in places where it is in

contact with other metals, this process is greatly speeded up.

Most beams are grounded through the rotor to the mast. This mast must be grounded! This can be soft aluminum clothesline clamped to the mast and to a 3' to 4' length of pipe driven into the ground. This will provide reasonably good protection for your home against lightning, but your rig is another matter. Protection for your receiver and transmitter should be through a lightning arrestor installed in the feedline.

You will enjoy the best *overall* performance if your antenna system is both effective and solidly protected against the elements. Why not take another look on the roof?

Real Progress!

Progress in the art of communications comes from many places. For years v.h.f. mobileers have had to put up with flutter, QRN, and short sporadic QSO's. It was rare indeed to maintain a contact for more than 5 or ten miles (at least in hilly New Jersey). Yet everyday fellow amateurs are now making solid contacts on two and six meters over 50 and 100 miles. Even in the heart of a concrete-and-steel-canyoned city like New York, it is now possible to hit the mike switch of a mobile rig and talk 70 miles with no trouble at all.

What is the secret behind this advance in mobile v.h.f. communication? Big antenna? High power? No! In fact most stations use 19 inch whips and power seldom exceeding 60 watts. The real cause is due to two factors. One is a change in FCC rules several years ago requiring the land mobile radio services to switch over to narrow band f.m., thus making many mobile radio sets obsolete. The other is amateur ingenuity.

These surplus f.m. radio sets are easily convertible to the amateur frequencies. In some cases just changing the crystals and retuning is all that is necessary to put the units into amateur operation. Furthermore, they are reasonably priced! We have seen sets in working condition selling for as little as ten dollars. The rigs are, however, wide-band f.m. with fixed frequency receivers, a type of operation not normally used by amateurs, but ideal for repeater operation. The amateurs who purchased these rigs grasped this advantage and began forming single-channel nets whose members maintained a repeater on the net frequency. Right now there are at least four repeaters in operation in the East and many more in other parts of the country. Their success has been phenomenal. Under proper conditions it is possible to talk over 300 miles mobile-to-mobile. Contacts can be made between

Coming: May 1-2!

The Spring VHF Contest is but a few weeks away and promises to be an interesting one. For details on the new rules and classification changes, see page 41.

*c/o Allen Katz, Electrical Engineering Dept., Murray Hall, Rutgers University, New Brunswick, New Jersey.

Long Island and Schenectady, New York, or the state of Vermont, depending on how the repeater is being controlled. This is true communications progress.

WB2FXB—A Five Time Winner

While compiling our list of new Century Club members, we noticed something of a record. Bob Escallon, WB2FXB, of North White Plains, New York, has snagged CCC numbers 175, 182, 183, 187 and 211 all since January 20th of 1963. Our congratulations to a real active v.h.f.'er!

To the best of our knowledge, this has been surpassed only once: by W8PT in 1957 while he was in Texas. He accumulated 5 awards in a one-year period. His six meter certificates, however, were issued on the basis of 100 QSL cards for each award, whereas WB2FXB had to make his hundred on 144 mc. Can anyone top this new 2 meter record?

From The Mailbag

Howard F. Zeh, W8JLQ, on 432 and 1296 gear: "There has been improved activity on 432 from here in the Toledo, Ohio area. Communicated with VE3EMT and VE3BRI at London, Ontario. We also had a fine contact between myself and WØIDY on October 30, 1964. W8RQI also worked WØIDY. Later we received a report of my signal strength in New York State via WA2ODR near Buffalo." *What was it?*

"Recently you ran an example of the TV picture W8RLT puts into Toledo from Livonia (Detroit). Please run the enclosed photo sometime (if possible) so Larry will again speak to me. He says I picked the most uncomplimentary photo possible the last time. This one shows the way he really looks!" *Done! See photo of this handsome v.h.f. operator as received over 50 mile TV path elsewhere in column.*

"We have been busy constructing 1296 mc gear." *Watch for picture in near future.* "The receiver converter is conventional except, perhaps, for the cavity injection filter and mixer tank. The tripler amplifier is based on one that ran in 1955 *QST*. The cathode tanks are of my own design. The 2C39 tubes seem to deliver about 10 watts carrier at 1296 with an indicated efficiency of 40%." *That seems like a good figure. We get a little less efficiency, but are not using cathode cavities.* "Measurements were made with a Micromatch having an upper-frequency limit of 1300 mc. The power cited is that of the meter reading multiplied by a factor supplied by the manufacturer. Attempts to cover 9 miles over city terrain with 96 element arrays at each end and two APX-6's failed. So far even the crystal-controlled signals aren't overpowering! We hope to communicate with Detroit perhaps regularly by spring." *Keep up the good work. We will be looking forward to reports of your success on 1296 in the near future.*

Hiroshi Kato, JA4AKL, on TV in Japan: "I am very glad to send you a letter for the first time. I am a 32 year-old druggist and have been operating as JA4AKL since 1960.

New VHF Century Club Members

Six Meters	WA8BGU	298	DJ5UM	198
K1SUB	285	WB2NDI	299	WB2JFL
WA2UPK	286	K7WQJ	300	WA2LTM
K8CKO	287	K7YDO	301	WB2LDE
WAØHVF	288	WA8BGU	302	W9QWM
WA2PVB	289	JA1ELL	303	K4RWV
K1ZKA	290			WA2UDT
K3YGC	291	Two Meters		WA9FXX
K1WRO	292	WN8KHD	192	OK1AHO
W9OKM	293	DL1OQ	193	OK1GA
K8HNB	294	WB6IQE	194	OK2BFI
K2VJW	295	DJ3MD	195	OK3KI
WA8LWO	296	K3FNB/8	196	OK1JAM
WB6EYK	297	WA4REX	197	WB2FXB

*Certificates issued between 11/2/64 and 2/9/65.
Congratulations!*

"I cannot buy your magazine every month, but sometimes a 'W' ham friend sends me some copies of *CQ* which I enjoy very much."

"I am now a member of the Mimasaka Amateur Radio Club, which was recently licensed on 435 mc with TV. So I am sending you photographs of our club station JA4YAM. The TV rigs are made by Shibaden Co., Tokyo. The total investment is about \$10,000-hi-hi! (???????) "The video transmitter's input on 435 mc is 100 watts. The output is 30 watts with a 6816 final tube. The audio transmitter runs 30 watts input and 10 watts out with a 6252 final. Our antenna is a 7 element yagi." *Thanks very much for the letter and pictures, Hiroshi. Most American amateurs are very interested in the v.h.f. activities in Japan. We will be looking forward to hearing from you again.*

Lou Marchese, WA2PMW, on two meters: "Just a little note to let you know that two meters is not as bad in the winter as some would suggest. *Sure isn't.* "During the month of January I worked W2OPQ in Amsterdam, New York, and W2GVW in Glen Falls with good signals both ways. Also heard K1IED/4 in Virginia on c.w. with an FB signal." *So why didn't you hit the key?* "We have also worked W1HAD, K1UOK, W3ARW, W3MFY, and K3OBU (a regular here into the N.Y.C. area). This makes our score 10 states in 8 weeks of winter so far.

"On 6 meters I listened to an early group consisting of WA2SAZ, WA2PWI, WA2EYI, K3MPZ, and K3EGP, which gets going every morning between 1200 and 1300 GMT around 50.315." *We will have to drop in on your early-bird net some time.*

Al, K7VQI, active on TV from Tucson, Arizona: "Activity on two meters is quite good here on the frequencies from 144.9 to 145.8. Our video net calling frequency is 145.350 mc. The Phoenix gang uses 144.9 mc for their TV communications. There is also some activity on 220, 432 and 1296 mc in Phoenix, but none here in Tucson except, of course, 435 mc TV operation."

"The article on varactors by Thorpe in the January issue of *CQ* was intriguing. I'll be looking for more on the subject." *Will do!* "I have only one varactor and that is in my sub-carrier Ham-TV sound." *Al also adds in his letter that*



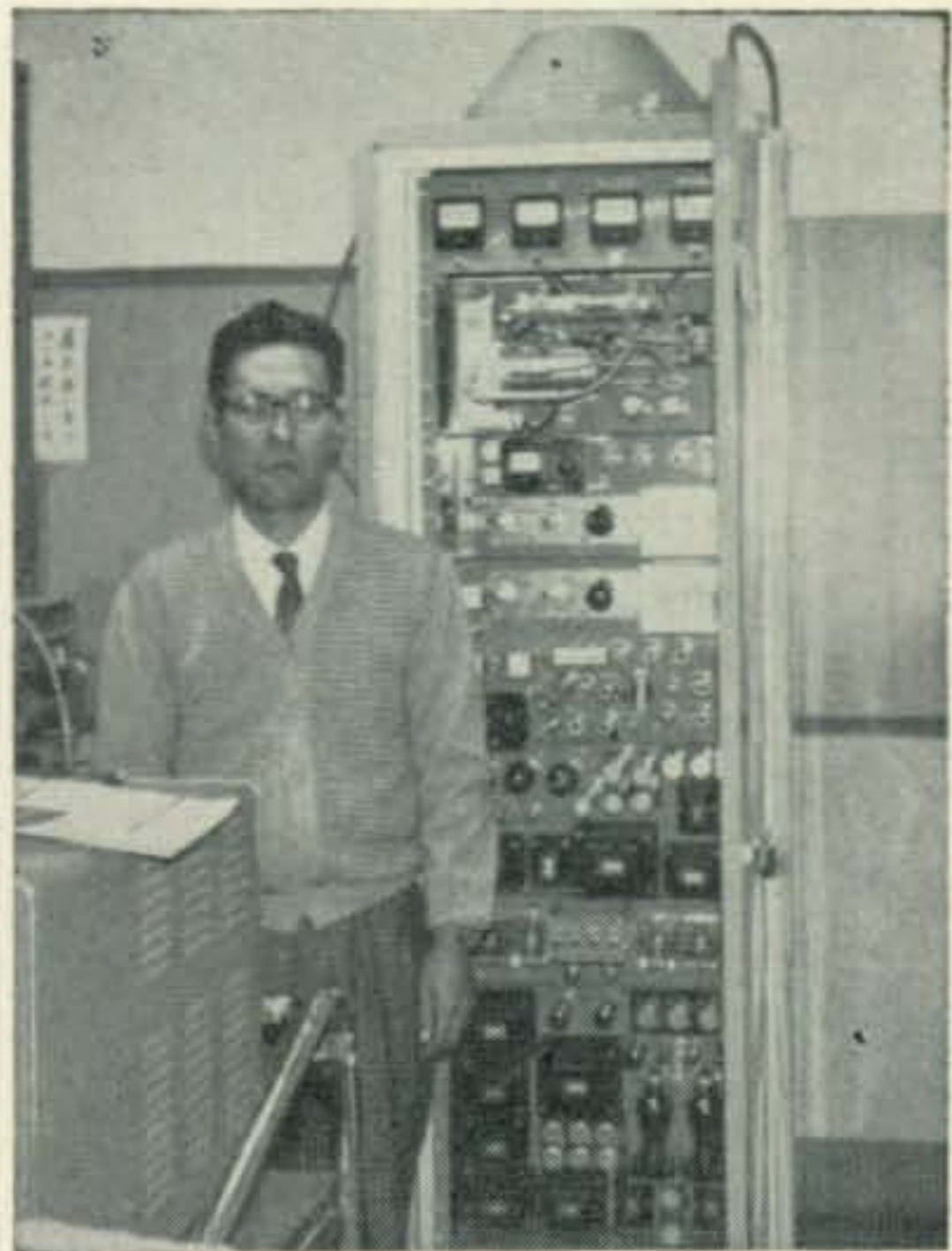
Amid this jumble of haywire and tubes, K2SMN experiments with 432 mc TV. Roger has been working with K2UYH over hilly paths for about two years.



JA4YAM's video signal as received 2 kilometers away.



Distinguished looking W8RLT as received over some 50 miles by W8JLQ. See letter.



JA4YAM club TV transmitter (435 mc) with Hiroshi Kato, JA4AKL, at the controls.



Unfortunately, we can't give you a list of all the Peninsula Amateur Radio Klub members shown here. We can tell you, though, that the trophy is the CQ Honors Award presented to the P.A.R.K., in 1963 for nationwide high score in the Spring V.H.F. Club Aggregate competition. On right of trophy is WA2UZI, club president; to left of award is the mayor of Bayonne, N.J. Pix by K2UYH.

THIS MONTH IN VHF



Consistent Alabama state winner in CQ VHF Contests is Jerry Fiore, K4HPR, who runs all bands: 160 thru 432!



The scene: last year's Spring VHF Contest. The characters: The HARC station and antenna at Hopetown, Ohio. Zero hour minus 30, with two hams in eyeball QSO. The one on the right is K8VVD and on the left is a visiting ham from a nearby town. They'll be there May 1-2. Will you?

taking his lens out of the ATJ icon TV camera and projecting directly on the mosaic slides with an ordinary home projector produces truly excellent quality video reproductions—a fact we can personally verify. Some of Al's results are shown among the pictures.

Ray Martin, WA0DZI, on v.h.f. in Kansas: "Since I haven't seen a letter from Kansas in your column, I thought I would write to you." *Good idea.* "Equipment here consists of HQ-110 receiver, HT-40 transmitter and 5 element beam on six. On two meters I use a Twoer, and an Army surplus ARC-3 transmitter. The beam is a 10 element Hy-Gain. I plan to try as many contests as possible." *Don't forget the weekend of May 1 and 2!*

Lt. Bob Migliorino, K2YFE/KL7, on v.h.f. in Alaska: "Thought I'd send some v.h.f. news from good old KL7-land. In case you're surprised, there *is* activity here; I sure was surprised to hear it. KL7CQS in Anchorage is very active and works into Fairbanks (400 miles) regularly over rough terrain on 144 mc. Our local net frequency is 145.35 mc and is always monitored. Our MARS station, KL7WAH, here at Fort Wain-

wright, Fairbanks, has a GC-105 to a J-beam 100 feet up. We will soon have some 6 meter gear, I hope. My operating hours are limited as I am Battalion Medical Officer but I'll be here for two years so I hope to give as many KL7 QSO's as possible. We also have two clubs: The 49'ers R.C. and The Arctic R.C."

Thirty

Readers have often queried us: "What does 'thirty' mean?" To answer, it is a carry-over from the early days of printing, when segments of regularly-occurring text were assigned numbers—numbers universally understood in the trade. The symbol —30— is still used today by editors to show the end of a manuscript, but most of the other numerals lost their significance as printing techniques changed over the years. (We tried once making the above breakhead read '—30—'; we lost the remaining copy as a result).

We hope you won't notice that the column is shorter than the norm. Every so often we find ourselves a bit more noncreative than usual and during such abominable periods we have found it healthier to say nothing. What follows speaks for itself.

73, Bob, K2ZSQ and Allen, K2UYH

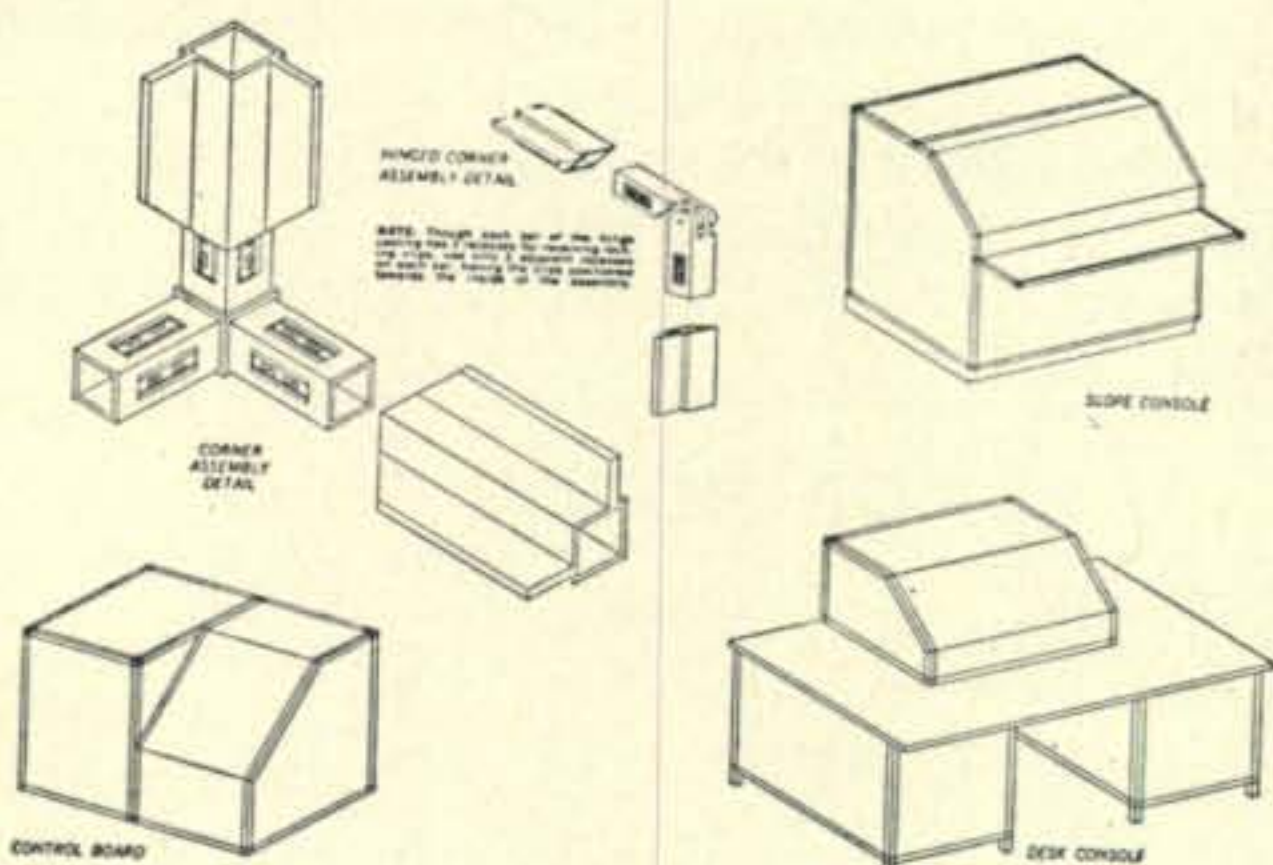
New Amateur Products

Sarron Corp. Speech Clipper/Filter

THE Sarron Clipper/Filter can be used with high or low level crystal, ceramic and dynamic microphones. An i.c. low pass filter is used in the output to eliminate distortion products above 2.5 k.c. Clipping current is monitored on the front panel meter. The clipper is compatible with any transmitter or transceiver without additional wiring, except for changing the mic. connector. The clipper is transistorized and works from a nine volt battery. The unit sells for \$29.95. For more information, write to Sarron Corp., P.O. Box 84, Cheektowaga, New York, or circle 60 on page 110.



The unit sells for \$29.95. For more information, write to Sarron Corp., P.O. Box 84, Cheektowaga, New York, or circle 60 on page 110.



Amco "Do-It-Yourself" Tubing

A NEW system of aluminum tubing and self-locking corners is now available for the

amateur interested in designing and constructing his own enclosures and instrument cabinets.

No tools or welding equipment are needed for assembly. The tubing itself is in the form of 3/4" square extrusions. It is available in plain square cross section or with a choice of 7 flanges running the length of the tubing to accommodate any type of panel mounting.

Corner castings come in 3-ear and 4-ear units for right angle assembly and there is a hinged unit that allows frame designs with slanted configurations. To assemble, after tubing is cut to length and mitered, corners are simply inserted and pushed until they are locked snugly in place.

Write for catalog to Amco Engineering Co., 7333 West Ainslie Street, Chicago, Illinois 60656, or circle 61 on page 110.



the
USA-CA
PROGRAM

BY ED HOPPER,* W2GT

AN interesting and busy month, many applications processed and much mail received which was informative and constructive. In general, most applications are now processed the same day they are received and the award or gold seal in the mail at once. An even dozen USA-CA-500 awards were issued to February 6th, all were for mixed operations with these exceptions: WA4AEB for all A3; W4CZ/W1CV for all A1, all 14 mc; K9BLX for all 7 mc, all s.s.b. while operating mobile; WA9CNN all 7 mc, all s.s.b. The only XYL/YL to receive USA-CA-500 this month was Bertha, WA4BMC, who is a bigwig in v.h.f. work in Palm Beach County in Florida. Jerry, W7ULC, received the first USA-CA award issued to anyone in the state of Oregon. Bill, VK3AHO, well known for his many DX-peditions to rare places like VK9BH, VR1N, YJ1RH and FW8BH, received the 5th USA-CA award issued to VK and the 7th award issued to Oceania. Four USA-CA-1000 awards were issued as follows: W4KA all fone; WA4MGC all s.s.b.; K7SQD for all A1 and his is the first USA-CA-1000 issued in Utah; and W9LKB for mixed operations. USA-CA-1500 was issued to K3LXN for all 7 mc and he received endorsements for all A1 for his USA-CA-500 and all s.s.b. for his USA-CA-1000. Ken, KØEJW, received USA-CA-1500 award #25 for 7 mc s.s.b. USA-CA-2000 award #13 (baker's dozen) was issued to W8UPH for mixed operations. Mabel, K5SGJ, received USA-CA-2500 for mixed operations and the very first one issued to an XYL/YL. Arcy, K5SGK was issued USA-CA-2500 award #6 for mixed operations and he also received the following endorsements for USA-CA-2000—all s.s.b., all 7 mc, all mobile. The #1 USA-CA-3000 is held by Cliff, K9EAB.

Joining The USA-CA Program

Many letters have been received regarding the USA-CA program and the most asked question is—"How do we design and have our certificate made?" Such letters have come from all parts of the country including Alaska, and the best way to answer is to quote from some other letters received on this subject.

In January we had fotos of three Garden State Awards and also "Nights at the Round Table" and about these I quote from the nice letter from Phyllis McCarthy, WA2PVB—"... The

certificate for the 'Nights at the Round Table' was designed by several of our members at a meeting. We decided what we wanted to state, what color, etc., and then I had the job of getting it done. I had heard of the fine work done by the Henry Grattan Studios of 14 Washington St., East Orange, N.J., so I went to him and explained what we wanted and asked for his advice. He showed me several fine jobs he had done, and I picked out the one that applied to the job we had on hand. He printed up proofs for us and we OK'ed them and told him to go ahead. As you can see from the certificate that I sent you for the column, this is a very different certificate, both in quality of the paper, style of print (uncial printing, which is very rarely used here in the States) and because there is no border, which we felt was being overdone. As you may imagine, this was quite a bit more expensive than the usual certificate, but this was exactly why we did it—for a really outstanding certificate. The price on these was \$70.50 for 250, including the proofs, extra color run, etc. This certificate is of course, issued at no cost to the amateur, so any group would have to have a very good treasury to go into this type of certificate.

The certificates for N.J. CHC Chapter 28 are a little more in line with what most groups would be looking for, and able to afford. The basic certificate or Garden State Award, has the scalloped border which most printers have on hand. You will find that they have a sample book with stock borders and designs that are available, and you just pick out what you want, tell him the message to be printed on it, and order it. The other two Chapter 28 certificates were designed by WA2QCQ and printed to our order. These certificates average about \$35.00 for an order, with an extra charge for every extra color used on the certificate, as the printer has to clean the machine and rerun the certificates. I would say that any group to start a certificate should have their design and content in mind, and then turn to the 'Yellow Pages' in their phone book, get a printer who will do what they want, and go to it. Tell them to remember postal costs, mailing tubes or envelopes, about \$7.50 for the metal stamp to endorse their seals, and *someone who will work hard* issuing the certificates, and do it *promptly!* If there is anything I hate, it's to send for a certificate and wait months for it to arrive . . . Again, Ed, congratulations on the

USA-CA HONOR ROLL

3000	1500	500	
K9EAB 1	K3LXN 24	K11JU 444	
	KØEJW 25	W4CZ/W1CV 445	
		WA2HGL 446	
		W2SCP 447	
		W9LKB 448	
		WA4AEB 449	
		K9BLX 450	
		WA9CNN 451	
	WA4MGC 62	WA4BMC 452	
	K7SQD 63	K4Vfy 453	
	W9LKB 64	W7ULC 454	
	W8UPH 13	W4KA 65	VK3AHO 455

*103 Whittman St., Rochelle Park, New Jersey.



All Alaska Counties Award.

column and all the best in your new endeavor.” **Ken Mac Neilage, WA2IDH** writes—“The story of the design of our award is not a particularly interesting one and in some ways I wish I could do it over again, not being completely satisfied with the results. Next time I would use “GOES” forms. These as you probably know are award size sheets with fancy borders pre-printed on them. All we did was to draw the idea on a blank paper, write in what we wanted to say, then present it to the club for any changes and final approval. A local printer took the job and that was it. A word about cost. I am very much against those who try to make money from a certificate, and unfortunately there are those who do this. . . . Another comment on the general subject of certificates is that I just can’t understand why it takes months before an award custodian gets around to mailing the certificate. We find it easy to process an application and mail the award the same day as received, and I feel that those who offer awards should be urged to be more prompt in their handling of applications.” My observation is that well over half the awards I have seen, use “GOES” forms which most printers have on hand.

QSO Party

Florida QSO Party sponsored by *Florida Skip*. The All Florida Amateur Radio publication announces its QSO Party to be held April 3rd and 4th. See details in CONTEST CALENDAR by Frank Anzalone, WIWY.

Awards

World’s FIRST “Award Hunters’ Club SWL 001”

Here is an interesting letter from Christian Zangerl, OE9-314—“It was really a long hard road, believe me, but a real radio amateur never gives up. One day I found the published rules about submitting at least 25 different s.w.l.-certificates from all over the world, these rules listed a lot of limitations, such that no two must be for doing the same things. Suddenly I realized that I must make every effort to gather certificates from after World War II, the first came at Christmas 1949 from Germany. I gathered in all 25 . . . no, there were a total of 34. I had QSLs in lots of thousands and they made pos-

sible these valuable, different, difficult s.w.l.-diplomas after all. I sent a certified list to OM John Velmo, OH2YV, honorable secretary of AHC. He was much surprised to receive my letter, the first SWL application and on checking he found many awards that were unknown even to him, so he wrote for more complete details and so John issued his very first “AHC SWL No. 001” for me, and we were both very pleased and happy. In my 34 awards there are some from Germany, Finland, England, United States, France, Russia and Italy—much difficulty with all the different languages. These represent 15 years of SWL activity, and the purpose of this letter is to interest new comers as well as old timers and let them know what fun and enjoyment can be realized by working for new awards as they become more beautiful and excellent each day. One makes many new friends, collects the most beautiful stamps and QSLs and one should never get discouraged, amateur friendship is the best thing we can ever have!”

AACA, All Alaskan Counties Award issued by the Wildwood Amateur Radio Club, Wildwood Station, Alaska. Requirements: Five contacts in Alaska—one confirmed QSO with each of the four Judicial Divisions of Alaska, *plus* one QSO with any member of the Wildwood Amateur Radio Club. All contacts must be after August 15, 1961 and minimum signal reports both ways, 459 or 4 5. Certificates will be endorsed as to “mode” and “band” in the following categories: Class I—c.w., II—a.m., III—s.s.b., IV—RTTY, V—Mixed Modes . . . Suffix A—One band, B—Mixed bands . . . for example, certification or endorsement for 14 mc s.s.b. would be Class III A. Here are a few of the often-worked KL7 locations with Division Number indicated: First Judicial Division has Juneau, Ketichican, and all points East of 141 degrees. Second Judicial Division has Nome, Barrow and entire Seward Peninsula (not to be confused with the City of Seward on the Kenai Peninsula). Third Division has Kodiak, Seward, Anchorage, entire Alaska Peninsula, entire Kenai Peninsula, and Wildwood Station. (WARC is 4 road miles from Kenai Peninsula, and is 65 air miles or 181 road miles SW of Anchorage, 1¼ miles from shore of the Cook Inlet). Division Four has Bethel, Northway and Fairbanks. Remember that *two* QSOs must be in Division Three. Send certified list (GCR) or notarial list (NOT QSLs) to A. L. Hershberger, KL7EAN, Box 280,



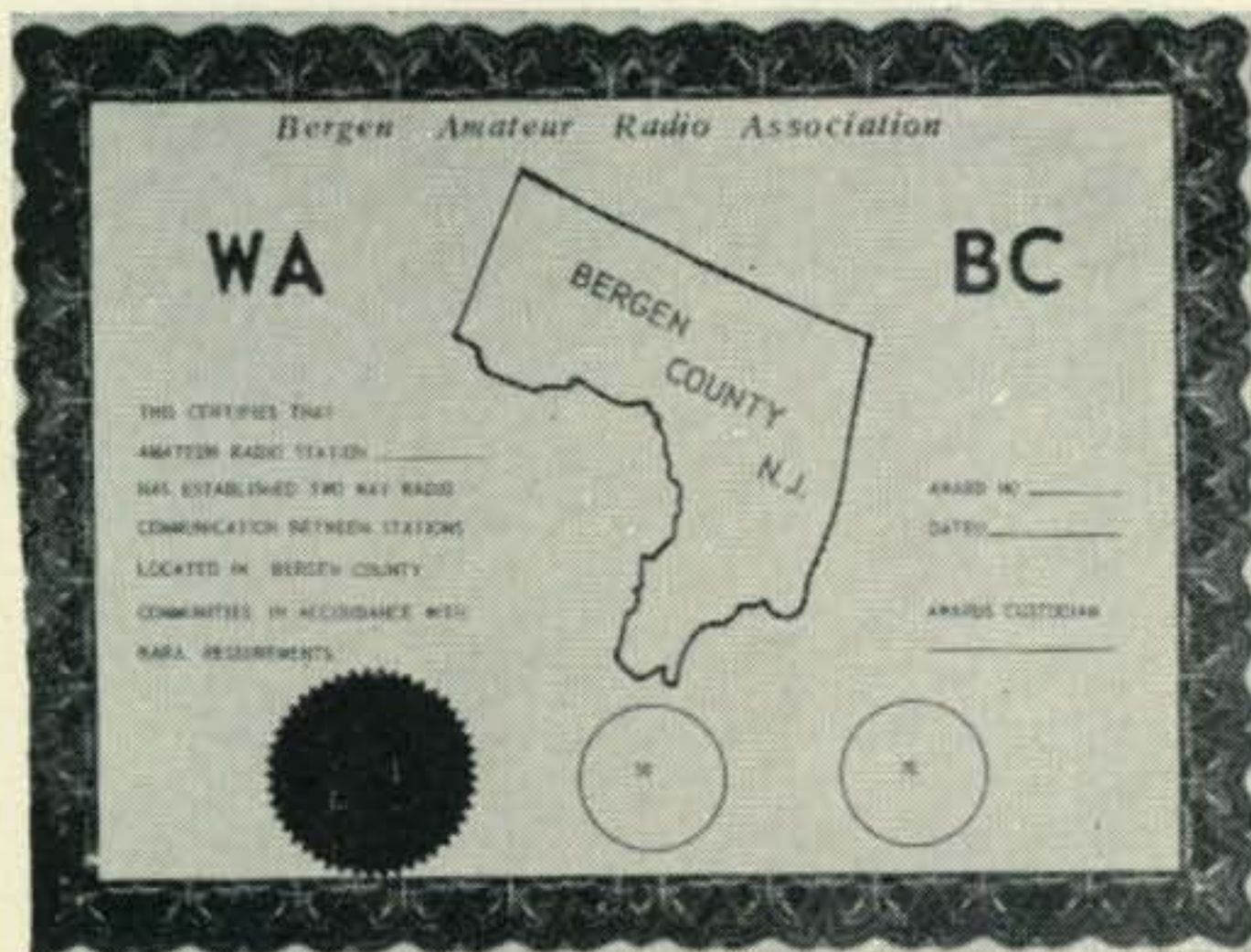
Award Hunters Club SWL 001.

Soldatna, Alaska. There is no charge for the award but be sure to enclose return postage for class of mail service desired for award.

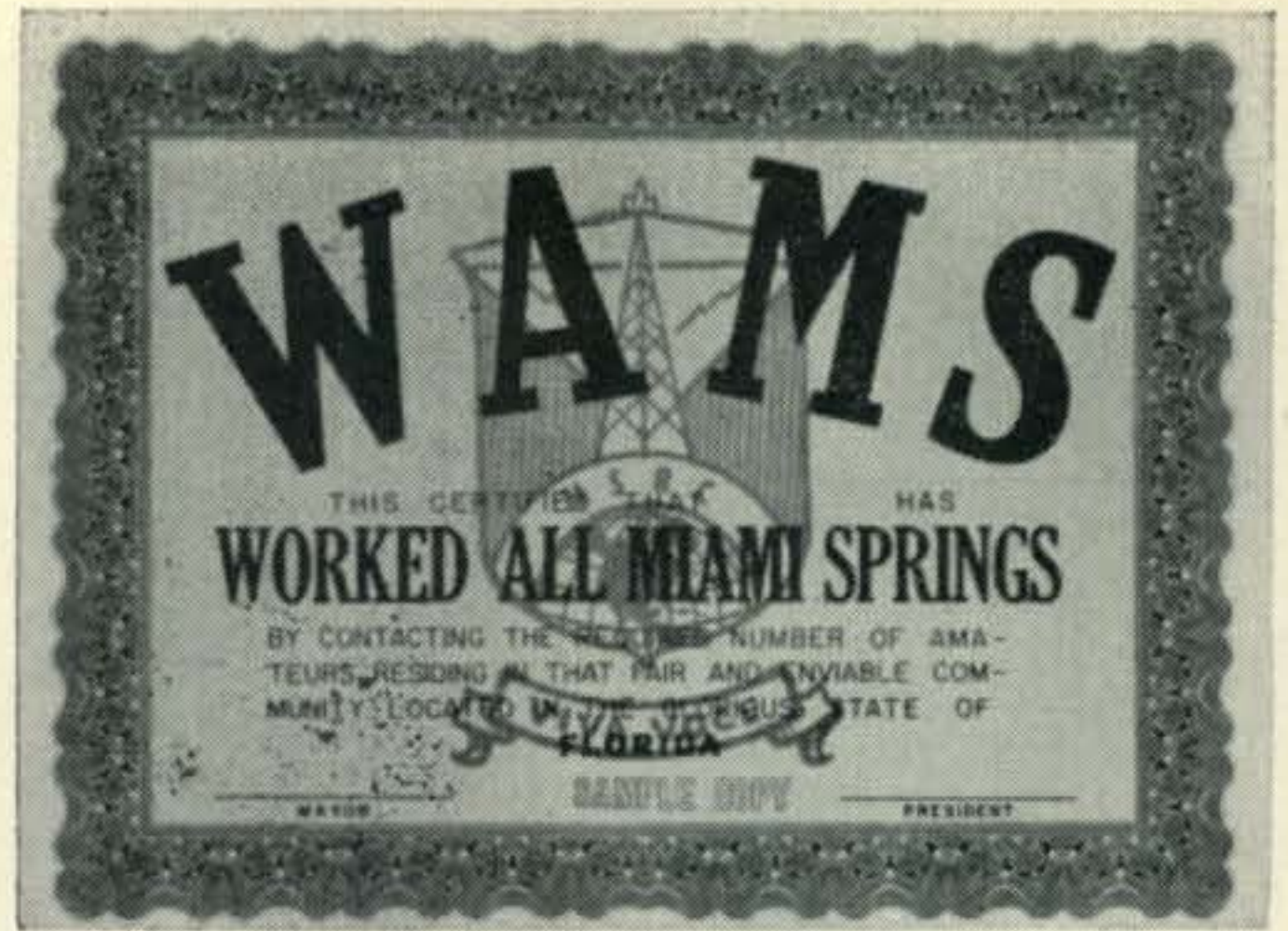
WABC, The Worked All Bergen County Award is sponsored by The Bergen Amateur Radio Association and applications should be sent to WA2IDH, Ken Mac Neilage, 322 Howard St., Westwood, N.J. The basic award is for confirmed contacts with 25 towns in Bergen County. Endorsements are available free of charge for 50 and 70 towns. Each application must be signed by a General Class licensee or higher, certifying that all QSL cards are in the possession of the applicant. The cost of the award is 50¢. There are no limitations as to date worked, band or mode, and mobile or portable contacts can count as long as the QSL cards indicate the location from which the station was operating.

WAMC, The Worked All Massachusetts Counties Award is sponsored by The Merrimac Valley Amateur Radio Club and is available to all amateurs for two way contacts with each of the 14 Massachusetts counties. Any and all bands may be used for contacts on or after January 1, 1955, but contacts must be made from the same location. QSL cards or other written confirmations must be submitted to Thomas J. Kirby, Trustee, MVARC (WINBN), Frost Road, Tyngsborough, Massachusetts. Enclose with cards 50¢ in coin for handling and sufficient postage for return of QSLs. To date, 148 certificates have been issued to amateurs all over the world.

WNH, The Worked New Hampshire Award, sponsored by The Concord Brasspounders will be issued to any and all amateurs submitting confirmations of contacts with all ten New Hampshire counties any time after 2300 GMT, October 8, 1949. Confirming QSLs or participating logs for any of the New Hampshire QSO Parties will be considered as satisfactory confirmation. Contacts must be made between one fixed home station and fixed home stations in each county, portable or mobile operation will not count. Apply to The Concord Brasspounders, Gilman K. Crowell, W1AOQ, RFD #2, Stickney Hill, Concord, N.H. No charge, return postage appreciated.



Worked All Bergen County Award.



Worked All Miami Springs.

Worked Florida Counties Award is sponsored by the Amateur Radio Club of Florida to promote activity with Florida Amateurs. It is issued in four classes: Class D—work 30 counties, DX (including KH and KL) work 20; Class C—work 45, DX work 35; Class B—work 55, DX work 45; Class A—work 67, DX work 55. Send GCR and \$1.00 to Amateur Radio Club of Florida, Box 7326 Euclid Station, St. Petersburg 34, Florida. As you progress to higher class, a new award issued for 10¢. Available to s.w.l.s on heard basis.

WAMS, The Worked All Miami Springs Award is issued for contacts with Miami Springs amateurs as follows: Out of County—3 contacts, Out of town—5 contacts, Local area—10 contacts. Send list, QSLs not required, to *Florida Skip*, Andy Clark, W4IYT, P. O. Box 501, Miami Springs, Florida.

Florida

Another BIG THANKS to *Florida Skip*, The All Florida Radio Amateur's Publication for all their encouragement and offers of help. They also issue four awards and their fine publication is issued monthly. For information on this write, Andy Clark, P. O. Box 501, Miami Springs, Florida.

Abbreviations

FOC, The First Operators Club, with membership throughout the world promotes better operating practices, members must be sponsored by five active members, pay yearly dues, sponsor yearly contest among members only, issue an award to members only. Secretary, Les Belger, G3JLB, 103 Whitehill Road, Gravesend, Kent, England.

TOPS, Tops Operators Club, with membership throughout the world, also promotes better operating practices, members must be sponsored by one or more active members, pay yearly dues, also sponsor yearly contests among members only, issue an award to members only. For additional information send s.a.s.e. to J. P. Evans, GW8WJ, 2 Ffordo-Ty-Newydd, Meliden, Prestatyn, Flintshire, Wales.

Again thanks for all your interest, cooperation, help, and mail. And how was your month? CU next month, 73, Ed, W2GT

18 PLUS....

COGENT REASONS WHY YOU SHOULD MAIL IN THE ADJACENT HANDY-DANDY SUBSCRIPTION ENVELOPE

1. You'll save money
2. You'll get your CQs faster each month
3. We need the money
4. You'll make one extra copy available each month for another potential newsstand buyer
5. We need the money
6. You'll help build our subscription list
7. We need the money
8. You'll help cure our editor's inferiority complex
9. We still need the money
10. You'll save on trips to the corner newsstand
11. Money we can always use
12. Who can't?
13. Postage is pre-paid
14. If not money, send us complimentary letters
15. We'd rather have the money
16. Why not send both?
17. It's really a shame that such a young and energetic fellow should have an inferiority complex
18. We bought an awful lot of envelopes
19. We just ran out of reasons



HAM CLINIC

CHARLES J. SCHAUERS,* W6QLV



FIELD-EFFECT transistors are destined to take over a number of tasks now performed by vacuum tubes and hams will be hearing and reading more about them as time goes on.

The field-effect transistor (FET) is unlike an ordinary transistor because it has a very high input impedance approaching 100 megohms or more. Its elements have been labeled grid, cathode and anode instead of the usual emitter, collector and base.

Like the vacuum tube, a small amount of input power in the grid circuit can effectively control large amounts of power in the anode circuit. The low noise characteristics of the FET make its use most desirable in circuits where ordinary transistors cannot be presently utilized.

FET's now available have fairly low transconductance (G_m) but this will be improved with time. By using them along with other types of transistors however, the low G_m is really not a drawback in practical circuit applications.

When more information relative to the FET is made available to us by manufacturers, we will pass it on to you via this column. One application I can think of right now in which FET's could be used are as *first* amplifiers in miniature oscilloscopes; the very high input resistance of 100 megohms of FET's would be fine.

Right now FET's are too expensive for hams, but remember when the first MADT sold for over \$100.00? Now you can buy them for a dollar or two.

Adding Additional Bands to Transceivers

One of the reasons that the KWM-2, NCX-5, SR-150, Galaxy V, Swan 350 and other similar transceivers are so popular is because they cover the 10, 15, 20, 40 and 80 meter bands. With but few exceptions, most hams like to feel that they have full h.f. coverage at their fingertips—including the 10 meter band which is now so often used for local rag-chews.

Adding an additional band or two to an existing transceiver is not an easy task as many hams have found out. First of all, space for additional components such as coils, capacitors etc. is usually not available; outboard mounting of components is not desirable or efficient. So what does one do?

Before proceeding with the modification of a transceiver to add another band, the *wise* ham will spend some time carefully analyzing frequency conversion circuitry. Both electrical and mechanical changes and/or additions should all be worked out on paper first. The "hit-and-try" method will generally not work with transceivers as well as it does for the ordinary a.m./c.w. rigs because sideband selection and more mixer circuitry is involved.

Transceivers for all-band operation cost more because there *are* more components needed and there is more engineering.

Designing and building a transceiver for 20, 40 and 80 meter operation is much less complicated than building one which will also operate on the 10 and 15 meter bands. This is apparent to serious ham designers who know that it is easier to double or mix frequencies in the 20, 40 and 80 meter bands because of their harmonic relationships. For 10 and 15 meter operation quadrupling and tripling (usually by buffer-amplifier *and* mixing stages) is necessary.

Some transceivers have no all-band provision for both upper and lower sideband selection—these sets are designed so that when one switches to the 80 meter band the set is automatically on *lower* sideband; switching to 20 meters puts the set into the *upper* sideband mode. Communication cross-band requires another transmitter or receiver or if you want to use an opposite sideband to avoid the QRM sometimes.

Suggested Modification Methods

The modifications to be made to a transceiver to provide for additional band operation are generally the following: if you are lucky enough to own a transceiver that contains a band-change switch with extra wafers and contacts, you can add a final coil for the band desired or tap an existing coil. This is no problem because most transceivers use pi output networks and only one final r.f. coil. Next, you usually will have to add a driver stage coil or tap an existing one. At this point, you must consider modification of the mixer stage tuned circuitry to provide the necessary frequency coverage of the new band, if possible, *without* modifying the v.f.o. It is never a good idea to disturb v.f.o. circuitry unless it is absolutely necessary. If you do, you may run into problems of stability and calibration. At this stage, you must determine mixer injection frequency and how to obtain it.

In the NCX-3 for example, one ham built a mixer which would take the 20 meter signal to produce 10 meter output for *upper* sideband operation. Still another, added a coil to the NCX-3 v.f.o. for 15 meter operation. Of course, changes to driver circuitry also had to be made. The NCX-3 of course, uses both a transmit and receiver mixer, so both have to be considered.

Anyway, the purpose of the "exercise" is to obtain the correct output frequency and at the same time to be able to receive the *same* frequency; how this is done is left up to the ingenuity of the set owner. There are very few short-cuts or easy solutions for efficient modi-

*c/o CQ, 14 Vanderventer Ave., Port Washington, L. I., N.Y.

fication of a limited band receiver.

In the NCX-3 no receiver r.f. coils need be added because the final pi network is used for antenna input to the r.f. amplifier. However, in other sets additional coils are needed and some receiver mixer circuits will have to be modified.

Switching

To add an extra band or two to most transceivers, r.f. switches should be changed. These switches should contain ceramic sections, and it is wise to install those which contain extra sections and contacts for possible future use. When wiring in new switches DO NOT deviate too much from the lead dress you find already in the set. If you displace wires at random you may run into a situation where you will have carrier leak-through or you will run into some other undesirable situation.

R.F. Drive

You may find that your modification gives you more drive than required. Where there is no provision for adjusting this, install a screen voltage control pot in the driver tube. It is not wise to limit drive by de-tuning any stage.

Alignment and Calibration

After all changes have been made to a set, the ham will be faced with calibration and alignment problems. These problems can be either great or small depending on the particular design changes made.

If possible, select your crystals (if used) carefully. Again, DO NOT disturb the v.f.o. By proper mixer design and signal injection to conform to dial calibration, it should be possible to avoid installing a new dial or marking up the old one—but believe me, this takes an expert.

80 Only Transceiver Conversions

There are few problems encountered in changing an 80 meter only transceiver to 40 meter operation. First because both bands use the lower sideband, and doubling from 80 to 40 is no problem at all. In many cases, it is possible to merely tap all affected coils and change crystals. You still have the problem of switching from the first to the second band however.

Conclusion

We have been asked by a number of hams to give them step-by-step instructions on how to add a band or two to an existing transceiver. As much as we would like to, the time involved is more than is available. We will be very happy however, to publish here, your modifications to any transceiver to add bands.

For those of you who have asked for information on putting the KWM-1 on 80 and 40 meters, we direct your attention to an article by W6FGC in the Jan. 31, 1959 issue of *Western Radio Amateur* (Electronics Journal), 10517 Haverly St., El Monte, Calif. This is a fine article because it does give step-by-step information. The magazine or reprints may not be available. If after writing to the author or the magazine you find they are not, we will supply a copy for \$1.50 post-paid.

Most transceivers would benefit by installing

either a Q multiplier or an appropriate i.f. selective filter. The installation of off-frequency tuning for the receiver is also a worthwhile project. Later on, we will give you more information on these.

To Build or Not

In answer to a number of queries (especially from younger hams), we say build as much of your ham equipment as you can. You will, sooner or later, like the majority of hams, eventually buy commercially built gear—but your knowledge and satisfaction gained from your building and troubleshooting will make you a better ham.

Few hams can top the engineering effort and know-how of full engineering staffs of commercial manufacturers. Of course some hams have, but they are few and far between.

I, like many other hams, do enjoy building and I also own commercial equipment. Right now I am working on a transistorized all-band receiver, and although it will never top the HRO-500, I'll get a kick out of trying.

If you are one of the hams who cannot troubleshoot your own equipment then I feel that you are not getting the most out of ham radio. Operating your rig is not the only fun in ham radio there are many facets to the hobby.

Book Review

If you really want to learn more about communications in general and s.s.b. in particular, I recommend a new s.s.b. handbook available from The Technical Materiel Corp. 700 Fenimore Road, Mamaroneck, N. Y. 10544. This book is expensive by ham standards, but is worth the price of \$10.00. Containing 210 pages of large format with a large number of fold-ins, it covers the basic, advanced and detailed theory and analysis of a.m., s.s.b. and i.s.b. techniques, power distribution with multichannel intelligence, speech processing, frequency synthesis and four channel independent a.g.c. systems. As a school text it is unexcelled because it contains problems to be worked out (with answers!). For the serious communications minded ham there is no better present than this book from TMC. I recommend it for easy reading and as an addition to any technical library.

Questions

Semiconductor Coding—"I understand that in Europe, manufacturers have adopted a standard semiconductor coding system. Is this true? Why

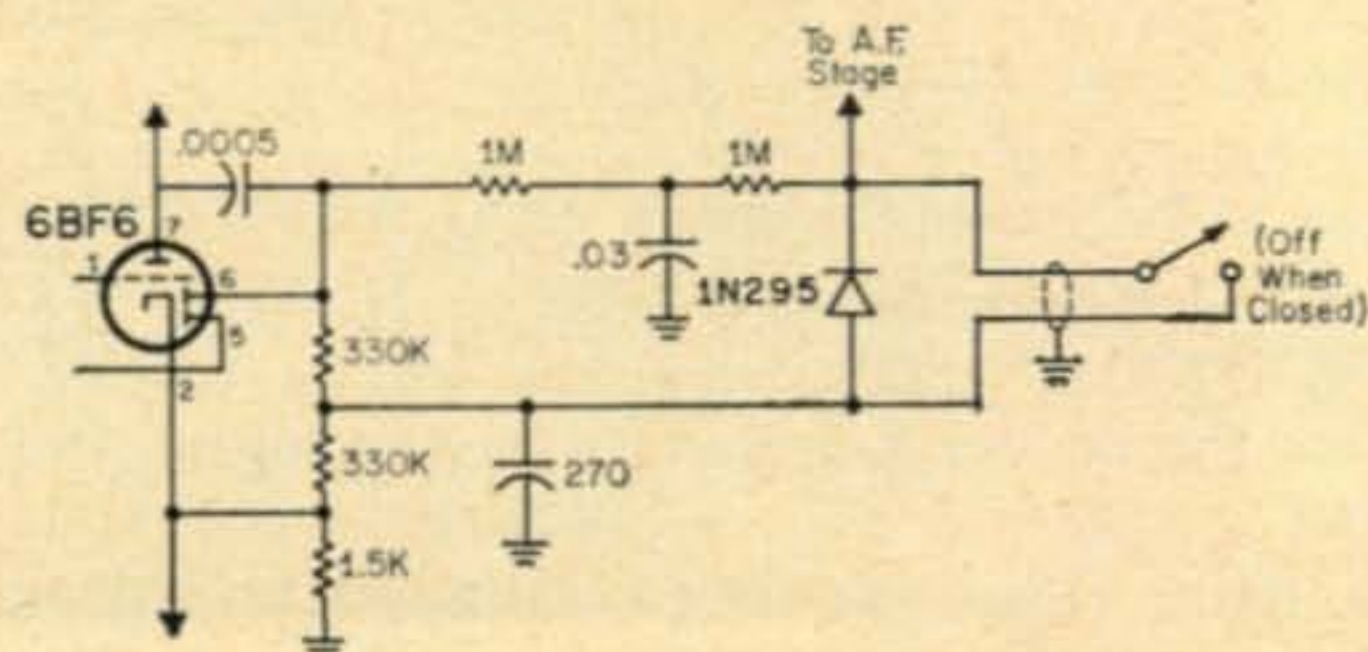


Fig. 1—Drake 2A noise limiter.

do we not do this here in America?"

Yes, European manufacturers have adopted a semiconductor coding system that is sensible. For example, a transistor marked AD121 indicates that the transistor is a germanium type (A), it is a power transistor (a.f. frequencies) (D). Its other characteristics are given by the numerical designation (121). Regardless of whose AD121 you buy in Europe it will be the same. Another example: the BA130, (B) for silicon device, (A) for diode. The answer to your second question I do not have, *except* that I think it is one of competition and *confusion*.

Voided Warranties—"I have been told by a manufacturer in response to my query regarding increasing power, that by using other final amplifier tubes in my transmitter would void the warrantee. They also told me that increasing plate voltages over those currently used could and would no doubt end in equipment failure. What are your ideas?"

The manufacturer *knows* his own equipment. Any modifications made by a set owner are his responsibility, not the manufacturer's. I would recommend following the manufacturer's recommendations, but on the other hand if you're not worried about your set warrantee and are interested in more power, it is your decision and yours alone to make the try.

SR-150 Pi Network—"For good operation with the SR-150 an antenna having an impedance of 50 ohms must be used and I have no complaint with mine. But I would like to try out antennas having various other impedances. Any suggestions?"

Removing the fixed capacitors on the antenna end of the pi network and substituting a large variable capacitor for tuning can be done, but where would you put it? This compact fine set has very little space for any other parts. My suggestion is to construct a balun for transformation from your selected impedances to 50 ohms. This is not difficult now with the materials available. See *QST* for August 1964, this article will start you off. If you need the cores called for, write Ami-tron Assoc. 12033 Otsego St., North Hollywood, California.

Drake 2-A Noise Limiter—"How about a simple modification for adding a noise limiter to the Drake 2-A receiver?"

See fig. 1. This limiter is quite effective. Diodes that have low front-to-back resistance will not work as well as the one recommended—the better the diode, the better the n.l. action.

Instead of using an extra switch you can use the ACC switch on the receiver. This limiter has been used with great success by a number of W6 hams. Its original version is by K6YCX.

NCX-3 Keying Monitor—Clifton H. Falls, W8-FAX/K8JIC sends us a fine keying monitor idea for the NCX-3. See fig. 2. The idea is fine and simple for grid block keyed rigs. Most monitors either require r.f. sampling or a relay to isolate the code practice oscillator (CPO) from the keying circuit. The waveform and out-

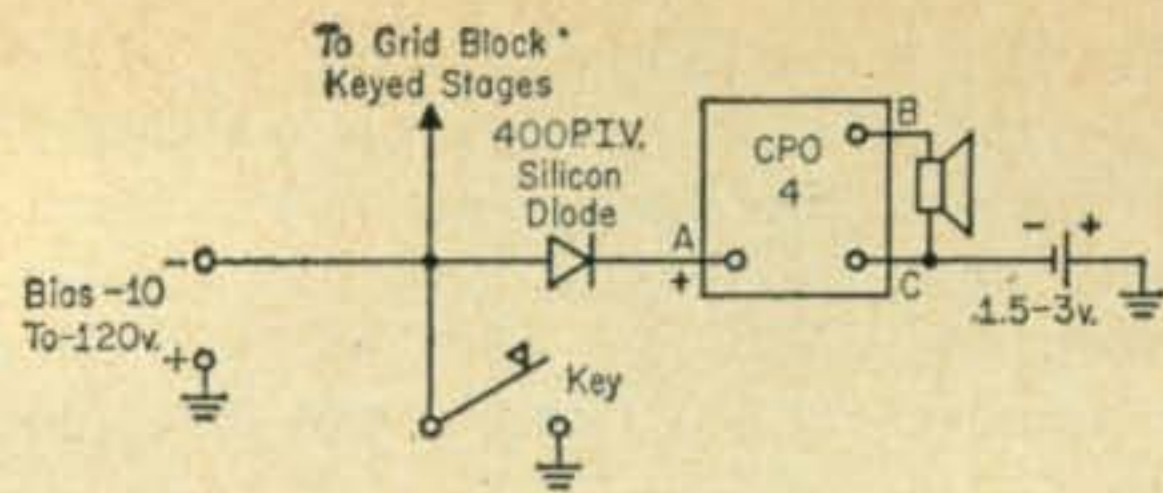


Fig. 2—NCX-3 keying monitor.

put are unaffected by the addition of the CPO as the diode isolates the CPO from the keying circuit. The tone is good and the cost is about \$1.35, less speaker. The CPO is available from N. N. Duffy & Co. 2040 Grand River Ave., Detroit, Mich. 48226 for 98¢ plus 25¢ postage and handling.

Thank you Cliff.

Transistor for Linear Operation—"Can you recommend a good transistor that will give me 10 watts output for s.s.b. linear operation at least up to 21 mc? I'm not worried about the cost, I just need the transistor."

Try *Motorola*. Their 2N3297 will give you 12 watts p.e.p., up to 30 mc. They'll be glad to tell you how to use it too.

Cross Modulation Attenuator—"Anyway to keep my converter from blocking up with the strong 50 mc signal of my nearby neighbor?"

See *CQ* for October 1962 for a variable attenuator that will help a lot. This is a simple gadget using resistors in pad configuration for attenuating strong input signals from the converter to the receiver. It can also be used ahead of the converter.

Thirty

We appreciate hearing from our readers, especially when they enclose 2 IRC's or 25¢ for a direct reply from our present QTH. But whether you enclose postage or not we will answer you as quickly as we humanly can. If we do not have the information we will try to obtain it for you, and failing that we will frankly tell you. We certainly do not have *all* the answers nor will we ever. Do drop us a line if you like the column and even if you don't.

73 Chuck, W6QLV



"Edward, I need a new dress. Couldn't you take up whittling or something?"



NOVICE

WALTER G. BURDINE,* W8ZCV

MY hobby of amateur radio has brought me in contact with many of the world's greats in the electronics world, airwise and by personal contact. The only way I could have shaken the hand of some of these, literally speaking, has come about through the medium of amateur radio. I have said before that amateur radio is one of the greatest equalizers of all the world's pursuits, no other hobby could have made this possible. Our hobby knows no difference of race, color, creed, religion or lingual barrier. This is often the only time when the millionaire will stop his busy pace to speak to a fellow that is so poor he can't buy a 6146 tube, yet you hear this happening all the time on the bands. You may be speaking to royalty one moment and the next contact can be a famous orchestra leader, movie star, farmer, indian chief or ambassador to a foreign country. We have equality with men of all walks of life.

This is a right granted to us by our governments. It is not, and should not be, given to us lightly. We should appreciate this right and try to uphold the dignity of our people, many of our brethren could serve as good foreign missionaries for our way of life. We must never think that ours is the only way of life, but that every man has his own beliefs.

We are not granted these rights by tradition or "squatters rights" but by earning them by our service to our public and our nations. This does not mean that our operation should not be lacking in geniality and pleasant conversations except in times of emergency and traffic handling when we should be prepared to operate precisely and accurately according to accepted form that we may be able to do the job correctly. Our "public image" can be improved by being able to come to the forefront during times of distress and do our job correctly. The public is more tolerant of our misdeeds after we have performed our services during an emergency. We can earn these rights by being prepared for emergencies and doing our best at the time.

How Does It Work, Final R.F. Amplifier

The power generated by a crystal oscillator usually cannot be increased very far without shattering the crystal. There are a few circuits for the lower frequencies using a crystal to control the frequency, and the screen grid acting

as the plate, which will generate considerable power with the one tube. The frequency of the crystal oscillator can be used to control a multiplier or amplifier stage, this will either increase the frequency or power output of the frequency generator. The circuit diagram of a frequency multiplier is quite similar to that of an amplifier except that the plate circuit is tuned to a multiple of the crystal frequency. The power output of a multiplier stage may be of lower amplitude than that of the oscillator depending upon the number of times the signal is multiplied. To make good use of the resultant frequency we must add an amplifier stage.

All combined stages of the transmitter immediately preceding the final amplifier stage are called the exciter and the final amplifier stage is simply called the "final".

The primary purpose of the final is to amplify the input signal without adding any other signal to the output signal unless that stage is modulated. Modulation is the process of adding or mixing the audio signal to the radio frequency signal of the final r.f. amplifier so that it will control the output of the amplifier at a syllabic rate. That is a big sentence but it will cover a lot of tough theory.

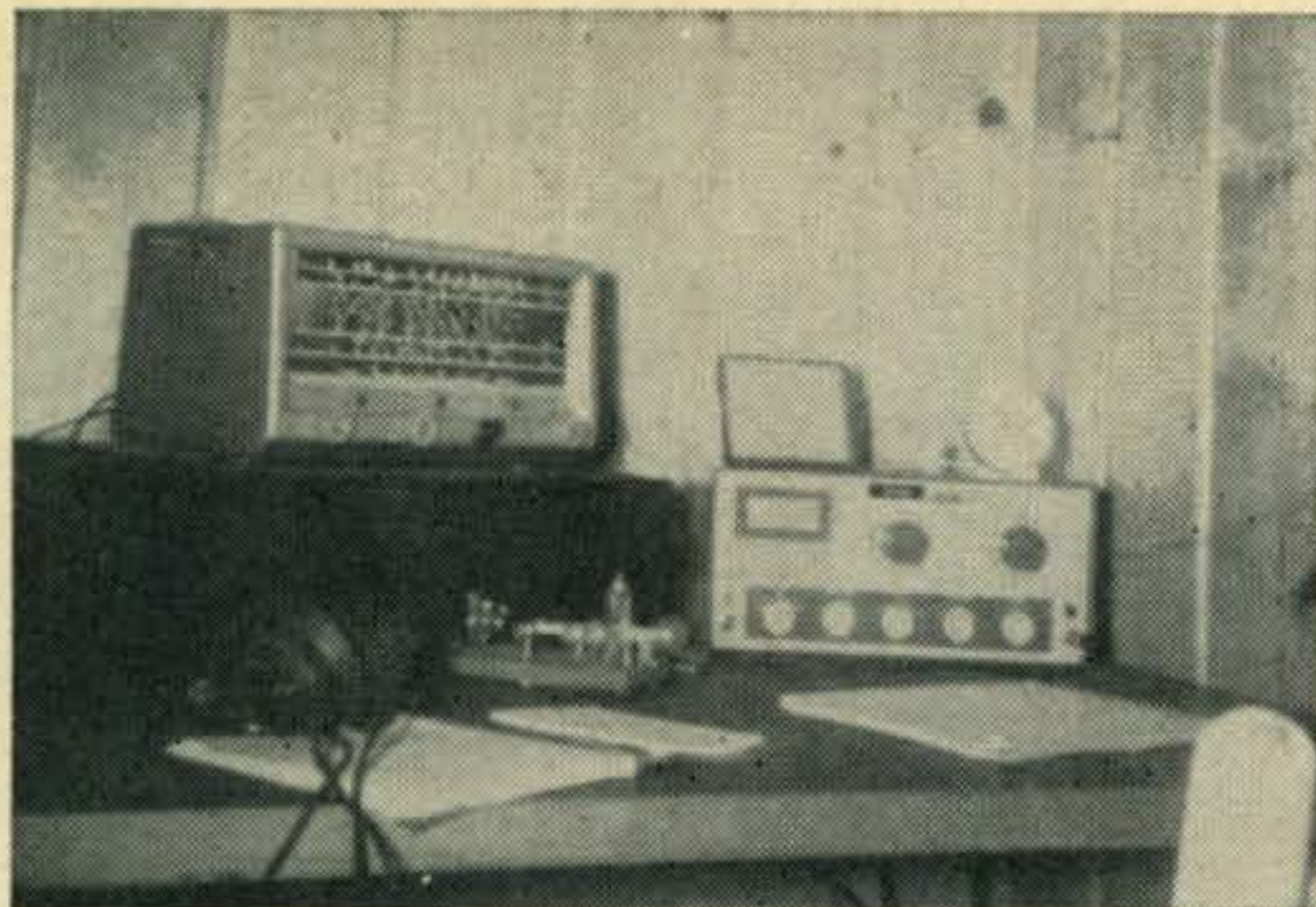
A whole book could be written about the methods of coupling the grid circuit of the amplifier to the exciter, the class of operation, the coupling to the antenna so that the power of the final can be of useful purpose. Design, construction and operation would take a good portion of the book. The proper operation of the final determines the quality and quantity of your output signal.

Correct operation of the amplifier depends upon the type of signal being amplified. That signal can be a small signal, directly from a crystal controlled oscillator, or the more exotic narrow-band frequency modulated signal of the exciter, to the more complex signal of the single side-band suppressed carrier type, straight c.w. signal or the amplitude modulation signal from the modulator amplifier. Classes of operation were discussed in an earlier issue of NOVICE.

Construction of an amplifier is no more complex than any other portion of the transmitter. Care in layout, careful layout of parts for short leads, good constructional practices and proper operation will be your reward when building the amplifier section for the station.

Aside from the power level of the power amplifier, the important parameters of the final are: the method of obtaining the bias, the method of neutralization, the method of coupling to both the exciter and the antenna and the mode of operation. Will the transmitter have a single or push-pull final? Another parameter is of course the frequency of operation and the amount of drive required. Can we supply the drive power without a buffer stage? The type of operation, the amount of drive available and the frequency of operation will determine the type tube to be used. Triode tubes will take more drive power than pentode or tetrode type tubes. Triode tube

*R.F.D. 3, Waynesville, Ohio 45068.



Guy, WA4QBJ says he enjoys CQ and hopes to be reading it for a long time. He didn't take the time to tell his name or address but he DID send a picture. Ask him why when you contact him.

always require neutralization when operated as amplifiers, some tetrode and pentodes will not require neutralization if great care is taken in the layout and construction of the final. Provisions for neutralization should always be made in the design of new amplifiers.

The type of operation will determine the class of operation of the final amplifier. The class of operation will determine the amount of bias voltages and the amount of drive required of the exciter to the final. Methods of obtaining the desired bias will be dependent upon the design of the amplifier and the type of operation.

The amount of drive required can be obtained from the tube manual for the class of operation desired. Triode tubes require more drive than tetrodes or pentodes but require no screen supply voltages, it is usually easier to get linear operation from triodes.

All of the bias methods used in receivers can also be used in transmitters. However, due to power output requirements, class B or class C amplifiers are used most frequently. The employment of class B or class C amplifiers permits the use of grid-resistor bias. This type of bias is not usually used in receivers, since most stages in a receiver operates in class A, in which case no grid current flows.

Grid-resistor bias is invariably used in the amplifier stage of radio transmitters. The grid-cathode circuit of the amplifier acts in the same way that the plate-cathode circuit of an ordinary diode acts. Current will flow when the grid is driven positive on signal-voltage peaks. The voltage developed across the grid-bias resistor consists of a series of pulses of direct current, and if a filter capacitor is placed across the resistor, a nearly steady value of d.c. voltage will be obtained. The polarity of this voltage will make the cathode end of the resistor positive and the grid end negative. Thus as long as the positive peaks of the input signal cycle exceeds the bias voltage, the plate will draw current and the grid is said to have a negative voltage on it. A resistor in the cathode circuit will develop protective bias and the grid resistor will develop operating bias.

A battery or a regulated bias voltage supply

can be used to furnish the required bias for the amplifier.

A few words about methods of coupling could not go amiss here but they best would be gleaned from the handbook. The reasons for using inductive, or capacitive coupling will determine which method you will use. I prefer inductive coupling in the transmitter because it tends to keep down the transfer of signals other than the desired signal from the preceding stage. Link coupling also makes it simpler to employ variable coupling between stages. Capacitive coupling can best be used in compact rigs of lower power, it can also be made variable by using a variable capacitor. This method of coupling tends to transfer unwanted signals from the driver stage to the final. This discussion also applies to the antenna coupling.

Neutralization procedures was explained in detail in a previous column of NOVICE. Improper neutralization of the amplifier will cause the transmission of spurious signals from the amplifier.

I have tried to give you an idea of the different stages of a transmitter and explain briefly why some of the things are being done so that you will be able to use this information when taking your test and building your transmitter. I hope it has helped you to understand the complexity of your new hobby.

Letters to the Editor

One of the very nice things about writing this column is the letters that I receive from you, the readers. Here is one that has a lot of information for future columns, and plenty of potential news from Tucson, Arizona, if those fellows get on the ball and send the pictures and letters to me. How about it fellows, you can get plenty of publicity for your group and your city? How about some pictures and schematics for your pet project, a few letters and some pictures of your favorite operator or yourself? Gee Whiz, others would like to read about YOU just like you would like to read about them. What potential lies in this letter, use it.

"Dear Walt: This is perhaps a different letter than you usually get. Please excuse "Skippy" my rusty typewriter who skips on the slightest pretext.

"Being a long time subscriber to CQ and all the other ham publications, I usually read the various columns along with the other stuff. I find every so often you learn something or are reminded of something that you had forgotten.

"What prompted this was your reference to the WERS license and I am happy to meet an ex-WERS operator. I was a member of the Civil Air Patrol and communications officer of our squadron way back in 1942 to 1945. We trained cadets and flew missions along the Atlantic Coast.

"We used 108 to 112 mc transceivers, had a ground station and some mobile stations in cars and planes. I also had a student pilots license with solo's to my credit. We flew a number of different small planes such as the Stinson, Cub and Taylor-craft. It was a lot of fun and we met a lot of nice fellows, I had Christmas cards from a couple of them this Christmas. One fellow was lucky, he got a job as co-pilot with Eastern Airlines and worked himself up to Captain. We were in Miami for 17 years and until about two years ago he used to get flights down there and visit us. I formerly lived in Boston and New York.

"You can get a lot of mileage out of two watts at 3000 feet in a plane. What outfit were you connected with during the war?

"As for hamming, I can't find my original license back in 1939 or 1940. I think I had it when I joined the CAP,

I also had a 2nd class FCC license and I think I got my first class commercial telephone and second class telegraph license, but went into broadcast engineering and never needed it.

"I did some traffic handling in Florida on 40 meters, and also here, until the band got so bad that the California net that I checked into went to 3945, which I can't work. Also had the first operational ham-TV station in Florida. I have been quite active in ham-TV here and got a lot of fellows interested in it and we have a number of TV contacts. One fellow sent us pix from a portable site with an emergency generator power supply and even from his car with emergency power. Several fellows from the U of A and senior high schools are real smart cookies electronically speaking. We also have a lot of Novices on two meters here, trying for points yesterday and today. I gave one fellow points on ham-TV on 435 mc, on a.m. on 432 and on 144 mc as well.

"I have a pretty good ham-TV set-up here with the ART-26 transmitter, ATJ camera live and slides and a vidicon camera just finished. I can only run 50 watts here unless I get special permission like some of the fellows did in Phoenix and Fresno.

"In October we started a code and theory class at the Old Pueblo Radio Club. We got a lot of newspaper publicity, and the registration meeting ran over 135 people, an overflow for our meeting place. Code and theory classes started with about 80 people. In our club room we will have a Swan 400 and maybe a ham-TV station.

"I did not intend this to get this long but when I get started it's hard to stop. Happy New Year and good luck in your fine work of helping the Novices and if you ever get a few minutes you might drop a line giving the rundown of your WERS experiences. Best 73 "Al Johnson K7VQI ex W4LSA, 5018 E. Cooper Street, Tucson, Arizona."

Thank you Al, don't forget to write some letters and send some pix of those new hams. By the way we also had an Al Johnson in our WERS net, he was W8RHG of Dayton, Ohio. We all worked for the Dayton Council for Defense of Dayton, Ohio. It was my first experience operating mobile and it was fun most of the time, but lack of gasoline and tires was our biggest worry. I operated on 115.9 mc with a modulated oscillator using an HY-75 modulated by a 6L6.

Al, we could use some pictures of the Ham TV stations and their operators as well as some letters from those new fellows and what they are doing. I might be able to stop by next year and shoot the old cow's husband with you. I am planning on a visit to Phoenix and all spots in between. I will be operating mobile and using all bands. We'll try to keep in touch, I have a lot of friends in Phoenix. There is a lot in your letter that is of interest to the new ham.

"Dear Walt: With reference to "Figure 1—A Gim-mick Condenser" page 82, *CQ*, Jan. 1965. It could not possibly be a condenser; How can you keep the juice from dribbling down where the two dielectrics are exposed to the air? Might work OK as a capacitor but condensers usually have to have a large can around to keep the juice in HI (understand the term condenser is no longer proper to use in referring to any capacitor but I think the canned ones can qualify!) 73, VT K7UTF, John K. Green, P.O. Box 412, Sedonia, Arizona."

John, I read 11 articles and the term condenser was used seven times more than the term capacitor. At least you read the article, my thanks. Any one that can explain the complexity of terminology to John may write him at the address given. Thank all of you for helping me out, I've used the term since 1925 and is it wrong or right, I don't know, it is rather hard to break a life long habit.

Help Wanted

Those needing help with their ticket or information for any purpose pertaining to radio or ham equipment can write to me, Walter G. Burdine, W8ZCV, R.F.D. #3, Waynesville, Ohio and I will print your request. Please do not write and tell me you read every word of the column and then send the letter to the offices in New York, I'll know you are fibbing. Sending the mail to New York may make it too late for the months column



Les and Larry Moller, WN7BMQ and WN7CAV, Anacortes, Washington have double fun from this neat set-up. In their location they should be able to work into Asia about as easy as the East coast of the USA. You can tell they are happy with their novice licenses.

and it puts more work on the "folks at home."

Gillies Wylie, 82 Glenpatrick Road, Eldenslie, Renfrewshire, Scotland would like an s.w.l. penpal who has some constructional experience. Gilleis is 18 years old, a police cadet (apprentice policeman). He has been interested in radio for about 3 years and hopes to get a ticket soon.

Terrance P. Lyons, N.A.T.T.C. Jacksonville AE "B" School, Jacksonville, Florida needs help with the code and someone to give him the test. He has a Radiotelephone license with radar endorsement, so theory won't be a problem.

Michael Fletcher, P.O. Box 313, Bay City, Oregon would like some help with conversion of the 274-N equipment and some amateur radio advice, help him, fellows. I have written about the *CQ* Book, *Command Sets* no. 106, price \$1.50. That has all the information for converting the 274-N equipment that is needed. A local could probably help, too.

Thanks for helping.

Well that just about covers the paper for this month, fellows and again I must say please send any ideas that you have for the column and we can use those pictures. I wouldn't have to write so much if you send the pictures, one picture is worth a thousand words, how would a column look without words? You know how it looks without pictures because you didn't send yours in.

Again I want to thank those kind hams that have helped me with my job of getting the back issues of all the leading electronic magazines, especially W3AYS, W5DAZ and Walt Dodd, W8STX who loaded his trunk full of handbooks and magazines and drove down here New Years day and spent a few hours with the old reporter. Walt says any of you boys in the Adrian Michigan area can get help from their club if you will make your wants known. Thanks again, fellows.

Reading over some of those old magazines has brought up the question of equipment improvements, maybe you should read some of this material. I know that it is hard enough to keep up with the present without delving into the past but, "If you would like to know what is in the future, read the past."

I believe that we are due for a breakthrough on the higher frequencies when we get a little more activity up there, by spring we will have quite a few 432 mc stations on the air here in the area within 25 miles of Dayton and Cincinnati, you turn your beam down this way and see. WA4OJF/8, Wilmington, Ohio is our latest 432 occupant. He is just in from the Memphis-Nashville area, look for him.

Let's get on the ball and get it done. While you are getting ready to get the soldering iron hot I'll say 73 and C U Next Month.

73, Walt, W8ZCV



BYRON H. KRETZMAN,* W2JTP

RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc on h.f.

80 meters	3620 kc
40 meters	7040 kc
40 meters (narrow shift)	7140 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.60 mc
2 meters	146.70 mc

“**W**HY don't manufacturers of commercially-built “amateur” transmitters make provision for frequency-shifting so that their products can be used on radioteletype?” We have asked this question in print many times during the past 10 years that this RTTY Column as appeared in *CQ*. No satisfactory answer has ever been received.

Ah, ha! But W2LNP has discovered that the manufacturer of the “S-line/KWM-2” series of s.s.b. equipment *has* built in the provision for f.s.k., apparently without that intent! So, Ray has come up with an exceedingly simple “modification” for RTTY. Believe it or not, in so far as the unit it self is concerned, there are no wiring changes, no parts added, or holes drilled. And the theory of operation is quite straight forward. Advantage is taken of the built-in electronic passband shifting of the v.f.o. which shifts the frequency of the v.f.o. just enough to maintain

*431 Woodbury Road, Huntington, N. Y. 11743



I1LCF, Bologna, Italy; FANTI Dott. FRANCO

correct dial calibration when going from upper to lower sideband or vice versa. This is accomplished internally by biasing a 1N34 diode which acts as a switch connecting a small capacitor to the cathode of the v.f.o. oscillator tube.

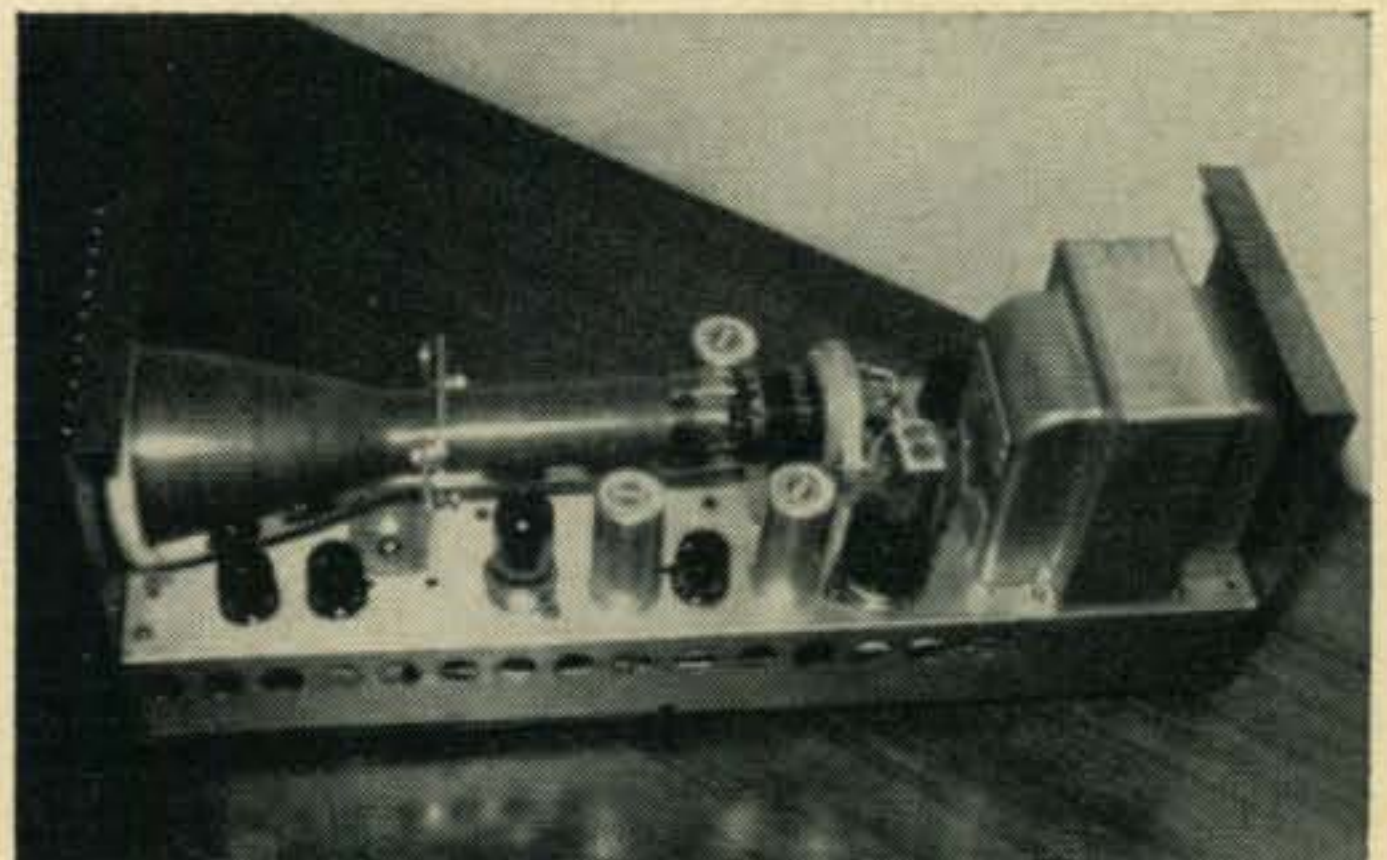
The KWM-2 on RTTY

Access to the built-in electronic shifter of the KWM-2 is made via J_{17} , the remote v.f.o. plug inside on the chassis. Remove the jumper plug and insert a thin wire in pin 5, then re-insert the jumper plug. Figure 1 shows the basic circuit used by W2LNP. As you can see, about 190-ohms is connected in series with the ground side of the local loop. (A common ground connection must be made between the KWM-2 chassis and the grounded end of the local loop.) If desired, narrow-shift Morse identification can be provided by splitting this resistance as shown. The telegraph key connected across the 39-ohm resistor gives about 100-cycles shift. The switch sw is an optional disabling switch to open up the lead to the v.f.o. if desired.

Figure 2 shows the circuit as applied to a station set-up using a polar relay in the TU output circuit, such as with the Twin City TU. (The *New RTTY Handbook*, page 92.) It should be pointed out that some sort of a *mark* hold circuit must be provided when transmitting. This could be an ordinary toggle switch, or relay contacts from the station transmit relay, to close the local loop circuit at the polar relay contacts. When a polar relay is used to key a local loop, a hash filter such as shown, must be used. All of the filter components, the r.f. chokes, capacitors, etc., should be mounted reasonably close to the relay socket. The slider of resistor R is adjusted to put the *mark* current at 60 ma. It is also recommended that shielded wire be used in the local loop circuit.

Operation

The KWM-2 is used in the LOCK or TUNE position. The amount of frequency shift is set by adjusting capacitor C_{308} , the passband zero-set variable capacitor which is located on top of the v.f.o. can next to the v.f.o. tube. The amount of shift can be set to 850-cycles, 170-cycles, or any smaller value. Drive is adjusted by setting the MIC. GAIN control. W2LNP uses his KWM-2 to drive a Viking desk kilowatt to full input, with the



WØHZR Phase Shift Tuning Unit, built by I1LCF

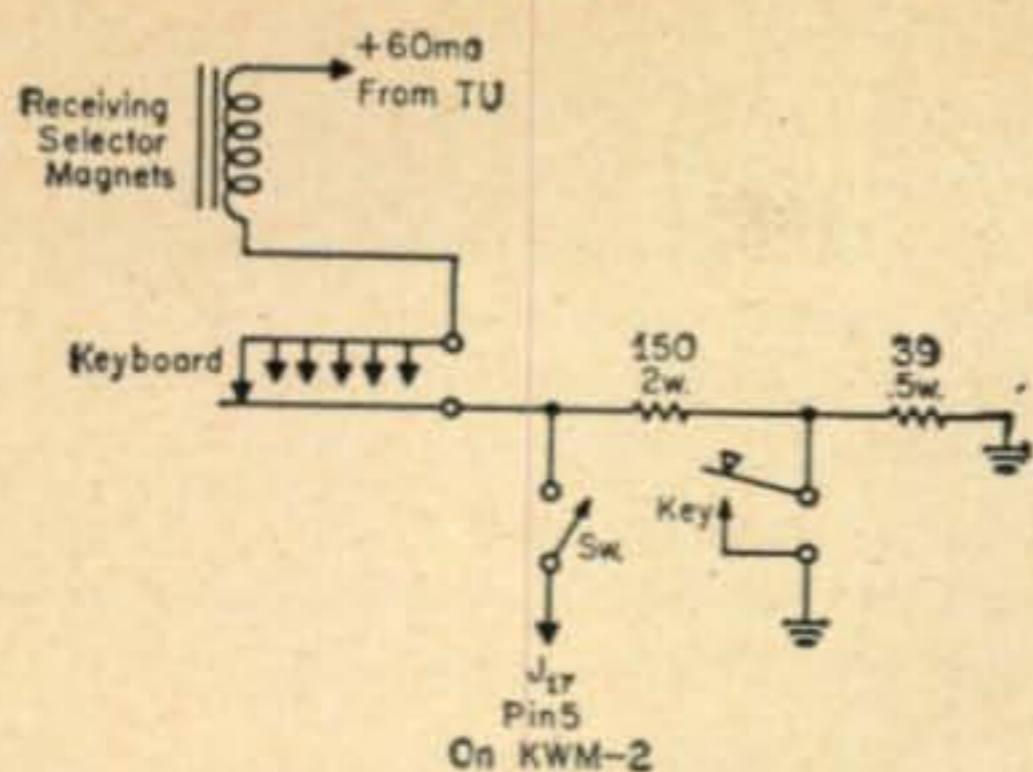


Fig. 1—W2LNP Circuit for FSKing the KWM-2

KWM-2 in the TUNE position. If the KWM-2 is used "barefoot," Ray reminds us that you should observe the usual precautions about reducing the input for continuous key-down condition.

On the Bauds

K1CPX of Lexington, Mass., worked 11ORS on 20 meters. WA2IKT of Elmont, L.I., W2NRY of Briercliff Manor, N.Y., W2RPL of Gloversville, N.Y., K2MEF of Owego, N.Y., K2SBD of Albertson, L.I., K2SOL of Niagara Falls, N.Y.; are all on 80-meter f.s.k. K2YXB of Poughkeepsie, N.Y., uses a Model 15 page printer and a Model 14 typing reperf on 80. W2ATQ of Lloyd Harbor, L.I., and WA2TNX of Great Neck, L.I., are on 20.

K3OTK of College Park, Md., uses a GSB-100 and a 4-400S (pair) linear amplifier at 750 watts with a Model 15. WA3AFR of Bowie, Md., uses a transistorized TU with his Model 14 strip printer on 80. K3GAX of Glen Burnie, Md., enjoys v.h.f. RTTY more than h.f. W3VDU of Northeast, Md., and K3RRT of Wilmington, Del., work 80 meters.

WA4GHA of Alexandria, Va., is on 80 with a Model 19, a Warrior linear amplifier, and a Twin City TU. W4AOI, old-timer (1929) of Conicville, Va., uses an HT-32A/33A with his Models 15 and 19, 75A-4 and SP-400, W5BGP TU, and a center-fed Zepp antenna on all h.f. bands. K4SJB is trying to f.s.k. his KWS-1. W6LIP of Woodland Hills, Calif., a former flyer, stage and screen actor, is on 20-meter RTTY. W7ARS, Box 694, Tucson, Arizona, has ribbon re-inkers for \$3.00 each, postpaid.

K8SOE of Loveland, Ohio, reports a local DX intercom (phone) net on 52.60, making it impossible to use RTTY. W8UUS of Kalamazoo, Mich., has an FSC-250 for sale. W8CJ of Muskegon, Mich., is NCS of the Michigan RTTY Society Sunday Net on 80 meters. WA8FYF of Flint, Mich., also works 80.

W9BIU of LaGrange, Ill., works 80. K9UHR of Evansville, Ind., is looking for a W2JAV wide-shift printed circuit board. (You have lots of company, OM!) W0DKN of Roseville, Minn., works 20 with a Model 19. W0DOP of Minneapolis, Minn., (TELCO/CD) also uses a Model 19 on 20 meters. VE7UC is /W0 at Colorado Springs, Colorado, with a Model 15, a W2JAV transistorized TU, and a W2JAV transistorized a.f.s.k. oscillator.

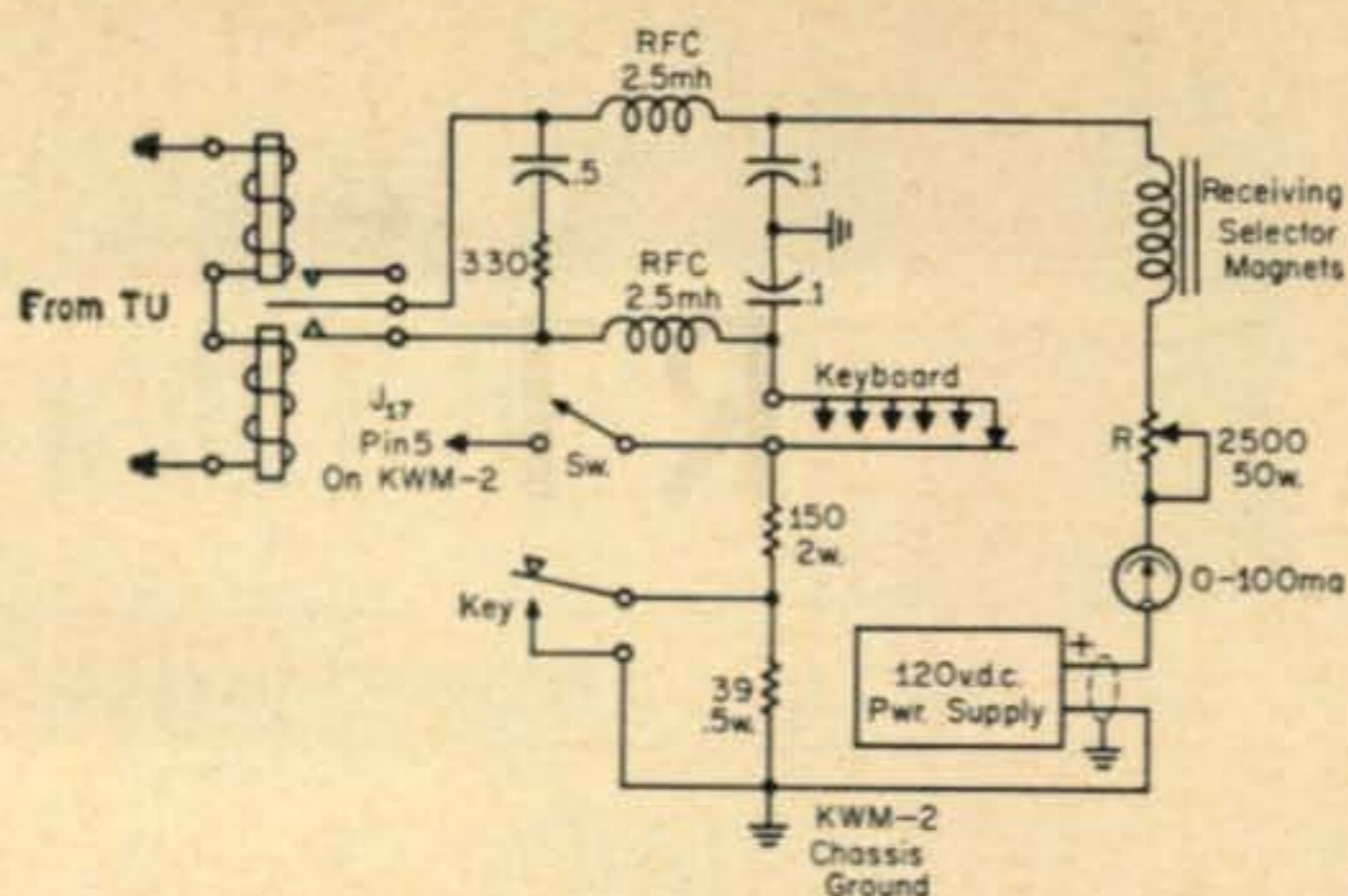


Fig. 2—W2LNP Circuit with Polar Relay Receiving System.

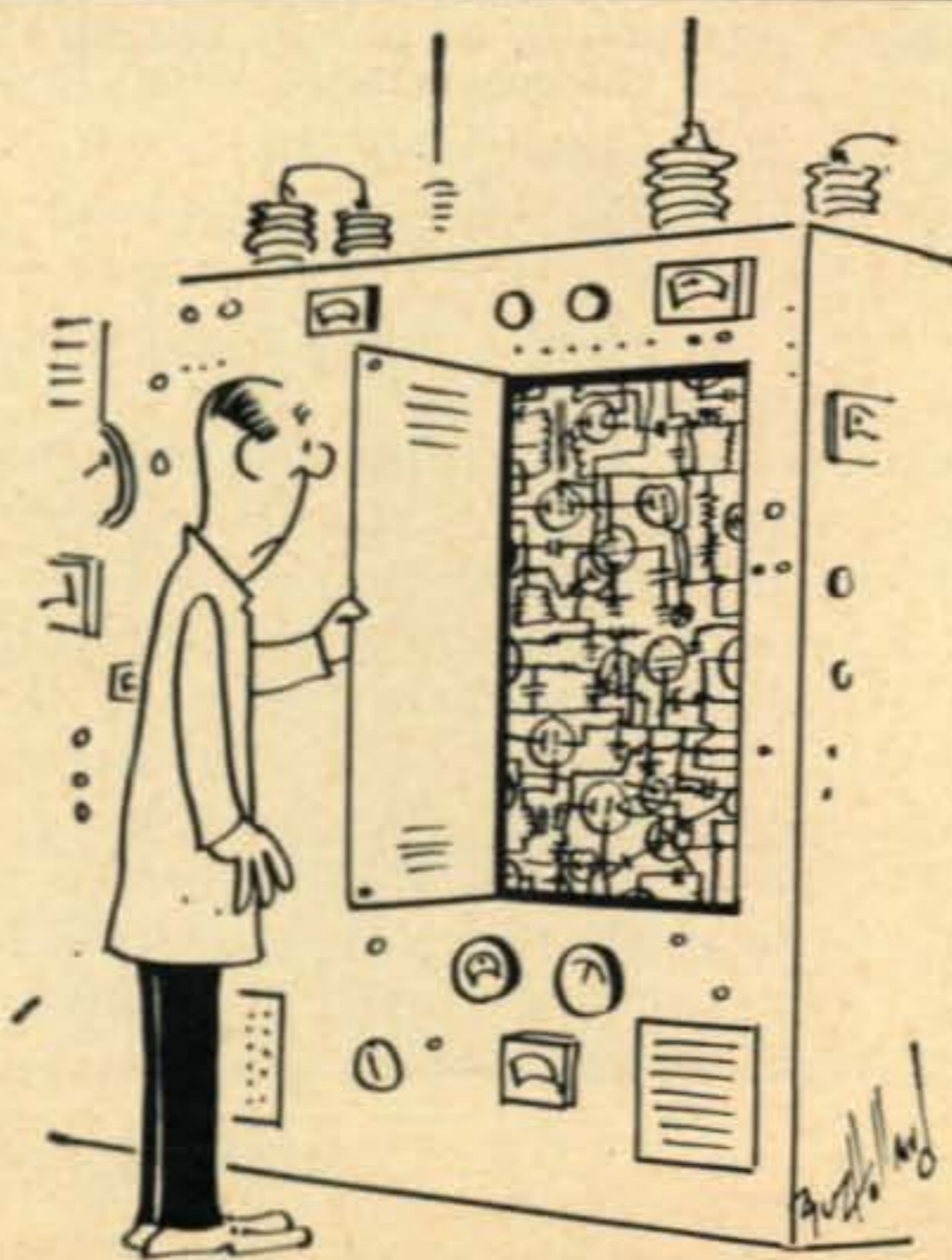
VE6UM of Calgary, Alberta, is on 20. VE3WR and VE3DTY work narrow shift on 7140 kc. DL4WX (K8PNN) is building a W2JAV narrow shift TU. SM6CKV puts in a very strong signal on 20 meters at W2JTP.

ARRL, QST, W1AW, etc.

For many years, ever since amateur RTTY burst into bloom right after the end of World War II, RTTYers have been fighting for adequate recognition of this mode by the ARRL. In the RTTY Column, the *only* regular RTTY Column in any amateur radio magazine, ever; we have repeatedly asked the questions: "Why doesn't W1AW send the official ARRL bulletins on RTTY?" and, "Why don't the traffic-handlers, reportedly the back-bone of the ARRL, use such an ideal medium as RTTY?"

At long last we think we are beginning to see a change in the tide. Articles on RTTY are beginning to appear, with some degree of regularity, in *QST*. Traffic-handlers, in particular, should not miss the most excellent article on handling traffic by radioteletype, by George Hart WINJM, which appeared in the February 1965 issue of *QST*. Most encouraging. Perhaps, eventually, we may even hear W1AW sending bulletins on RTTY!

73, Byron, W2JTP





LOUISA B. SANDO,* W5RZJ

A GAIN we salute the Houston YLs—they are really in there pitching when it comes to public service. This time it was W5ZPD, "Cindy" Dougharty, who had nice publicity in the Christmas issue of *The Log*, weekly bulletin of the Rotary Club of Houston. The story is of a 2½-year old boy, Curtis Hinds, in the Canal Zone who was born with a defective heart. The Rotarians in Cristobal, Panama decided to make Curtis their "project" and contributed the huge sum required to send him and his mother to Houston for world-famed heart surgeons to attempt to save the boy.

The article continues: "Now it happened that there was in the beautiful City of Houston an amateur short-wave operator—a lady of such retiring modesty that even today we know her only as 'Cindy.' Through 'Cindy,' contact was established with the Rotary Club of Houston, where our members were deeply moved and agreement was reached that we would accept the responsibility to receive and care for Curtis and his mother."

KZ5SS phone-patched the Cristobal Rotary president to W5ZPD, who handled the Houston end. Every day Cindy met KZ5SN, Dorothy, XYL of KZ5SS, on 15 meters. Rotary members talked and Dorothy had the Hinds' family over so they could all talk—and they still do not understand how they heard Mrs. Hinds' voice so far away!

In mid-December Curtis and his mother returned to Cristobal, the boy now running and laughing, the picture of happy health.

"Just routine traffic," says Cindy—but the kind that makes one's heart feel a little warmer.

Helping is a major part of Cindy's philosophy of life. She adds, "One day I realized a way to help other people was in my radio room. Since 1954 I have handled traffic, some just the usual greeting from a serviceman, but then there have been times when radio was the only means of communication such as the Rotary Club project. . . . I have not done more than anyone else. I feel as an amateur there are many things we should all do to help pay for the space we occupy on the bands."

W5ZPD holds four Public Service Awards, and a Distinguished Citizenship Award for service to Houston and Harris Co., given by the Harris Co. Medical Society. She has been NCS

*4417 Eleventh St., N.W., Albuquerque, New Mexico 87107.

for various emergency nets, and currently is the first woman to serve on the Bd. of Directors of Houston ARC. She has written for *HARC NEWS* since '54, and been co-editor the last two years. A big project she and her OM, Martin, W5ITA, have undertaken is a museum for HARC, which now fills five cases with about 85 pieces of antique gear. Licensed in 1953, Cindy is a charter member of TYLRUN and has served as 5th D/C for YLRL. Cindy has two daughters and she also enjoys gardening.

TYLRUN Anniversary

Members of TYLRUN celebrated the 10th Anniversary of this net/club with a party in November at Houston, sponsored by GAY-LARK. 33 YLs attended, including 5 charter members. Elected for 1965: Pres./NCS, K5-GNG; V.P., K5BTM; S-T, K5BNQ; P/C, K5-MPI; editor, K5UUK. TYLRUN started in 1955 with 10 charter members, has grown to approximately 100 members. WHO of Ft. Worth will serve as hostess for this year's get-together.

DX Awards

Special congratulations to these latest YL recipients of *CQ's* W.A.Z. award: on c.w.-phone, K6POC, Joan Saueressig (YL #26 to achieve it); on two-way s.s.b., WA6MAZ, Marcia Guest (now WA4SBK) (YL #27); on all-phone, W6QOG, Helene Leonard (YL #28).

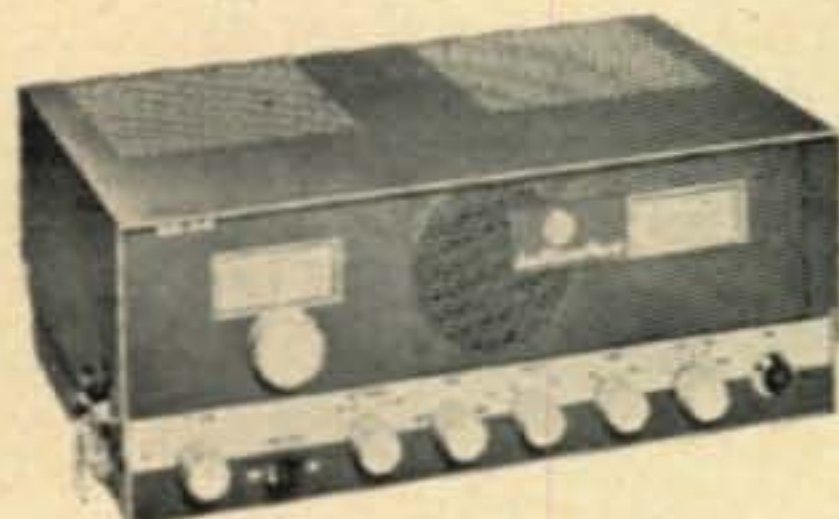
Joan, K6POC, was licensed in '55 as a Novice. Mary, W6TCN (who four years later became her mother-in-law), talked her into getting a license, taught Joan code and gave her the Novice exam. After six weeks on 40 c.w. Joan was so enthused she took her General, then started in on her mother, Alice, who in turn became K6SDS (practically a YL club right in the family!).

For the next few years Joan was inactive for her career as an airline stewardess took all of her time. Then she became engaged to Stan, W6ESW, and they kept daily skeds on c.w., Joan using 25 watts and a long wire. One night using this low power she worked Japan, and that's when the DX bug bit. She and Stan were married in 1959 (he is studio supervisor for



K6KCI, Irma Weber, holds the cup awarded her for earning highest phone score in YLRL's 25th Anniversary Party.

INCREASE YOUR POWER THE EASY WAY—GET ON VHF



OPERATE HALLICRAFTERS NEW "SR-42" OR "SR-46" TODAY!
It's the latest . . . finest . . . complete two or six meter radio station that offers everything in one compact package.

The SR-42 — SR-46 are designed for AM operation, all the functions of both receiver and transmitter are in a single compact unit. Perfect for fixed, portable or mobile communications the SR-42, SR-46 have many exclusive features. For instance, the units have a built-in two way power transformer — 115 V. A.C. and 12 V. D.C., utilizing a highly efficient power supply for 12 volt operation. In addition, the unit permits instantaneous selection of desired voltage, by merely changing line cords. Two way built-in power supply 115 V. A.C., 12 V. D.C. operation.* Receiver double conversion super heterodyne with quartz crystal controlled 2nd oscillator. Receiver contains "S" meter, ANL. Zener diode regulated HF oscillator. Cover full 2 and 6 meter ranges.

*Vibrator, D.C. power cord and mobile mounting bracket not included.
Order MR-40 mounting kit.

HALLICRAFTERS SR-42 . . . SR-46 . . . \$189.95

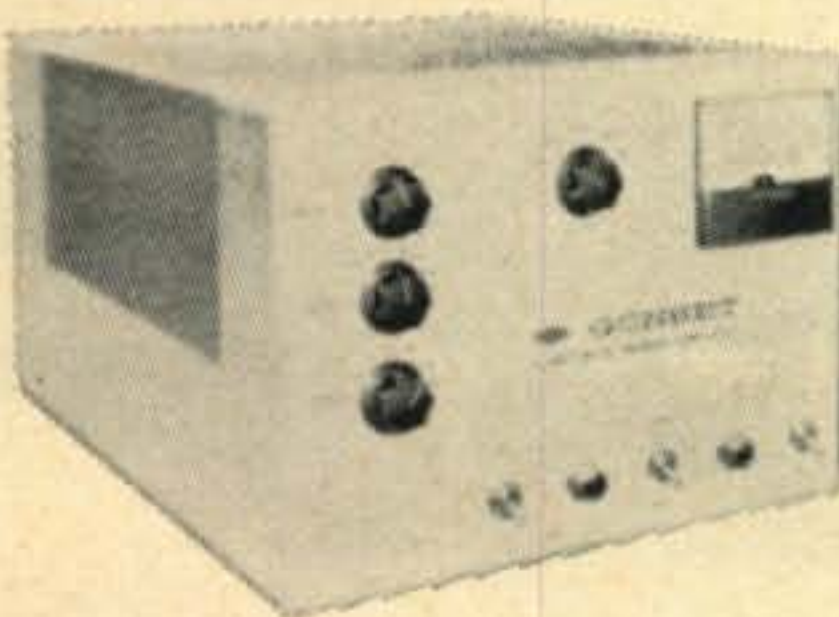


CLEGG 22'ER TWO METER TRANSCEIVER

Signal reports on the 22'er are consistently excellent, thanks to the many fine Clegg design features that result from years of experience in pioneering VHF equipment. Hams, CD groups, MARS, CAP and other vital services are signing up enthusiastically for membership in the 22'er club because they know that they can depend on superior Clegg performance at the right price. Receiver features unique new triple conversion design. Selectivity 10 KC at 6 db. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up. Full 143.8 MC to 148.2 MC coverage with tuning dial calibrated 144 to 148 MC. Adjustable Squelch.

Transmitter: Broadband exciter stages to simplify rapid QSY. High efficiency straight through final amplifier with crystal controlled 20 WATT input. High level plate and screen modulation for typical Clegg "HIGH TALK POWER" performance. Self contained universal solid state power supply for 115 volts AC and 12 volts DC.

CLEGG 22'er . . . \$239.00



NEW! GONSET 2 METER — 6 METER RF POWER AMPLIFIERS

More power in the VHF band! . . . and there is plenty of it in the new Gonset 2 and 6 Meter RF Power Amplifiers. Model 903A (2 meter) and Model 913A (6 meter) has a power input of 500 watt in all modes of operation. A 4X150A is used in the final, and the equipment is rated for CCAS* service. Only 5 watts is required to drive the 903A and 913A to full rated output. Output impedance of 50 to 75 ohms. The all solid state power supply is self-contained within the amplifier chassis. All stages are metered and all controls are on the front panel for ease of operation. The new linear amplifiers may be used with any of the famous Gonset Communicator series, as well as being ideally compatible for the new Gonset Sidewinder series.

903A TWO METER . . . \$339.95

913A SIX METER . . . \$339.95



VERSATILE B & W "VACATIONER" PORTABLE ANTENNA

Designed as a highly efficient transmitting and receiving antenna for the travelling amateur. Can be installed and disassembled in minutes. Power rating — SSB, 300 watts input PEP; CW 180 watts input: Frequency — 20, 15, 10, 6 and 2 meter amateur bands. Maximum extension, 57 inches; minimum 18½ inches. Weight, 2 lbs. complete with coils and counter-poise.

"VACATIONER" PORTABLE ANTENNA, COMPLETE . . . \$ 19.95

Send check or money order including shipping charges. We return any excess.

It takes a ham to talk to a ham. Make it your business to get equipped at Harvey . . . midtown New York's ham center. Harvey serves the world right here at the crossroads of the world. In addition you receive many exclusive extras at Harvey's. This includes opening sealed cartons for complete equipment check-out at your request — at no extra charge. The man from Harvey also guarantees everything you get — including his advice. And with liberal trade-in allowances you can be sure you are getting the best values for your ham dollar. So come to Harvey where the finest ham equipment and the best service go hand in hand. It pays to check us first.



HARVEY RADIO CO., INC.

OUR **38TH** YEAR

103 WEST 43rd STREET / NEW YORK, N.Y. 10036 / (212) JUdson 2-1500

For further information, check number 38, on page 110

April, 1965 • CQ • 91



Pictured at TYLRUN's 10th Anniversary Party are charter members (l. to r.) W5ZPD, Cindy, and W5LGY, Helen, who also were two of the club's first officers. See text for Cindy's public service work.



W6POC, Joan, 26th among the YLs to achieve W.A.Z.

KCET, Los Angeles' educational TV station). Now they have a kilowatt, 3-element beam, and 75S1 receiver. W6POC is up to 225 countries worked. She spends most of her time on 20 and 15, half on c.w. and half on s.s.b. Joan is a member of the West Gulf DX Club and also the YL International Sidebanders.

Free Pages for "CQ YL"

The following was announced in December *CQ*, but that being about the busiest month of the year for YLs and YFs, we'll repeat in case you missed it.

At YLRL's 25th Anniversary Convention the YLs attending donated money to pay for printing four supplemental pages for the book "*CQ*

YL." The pages are 14-A & B, updating the general information in Chap. Two on the Young Ladies Radio League, and pages 36-E & F, bringing current through 1965 information on officers of YLRL.

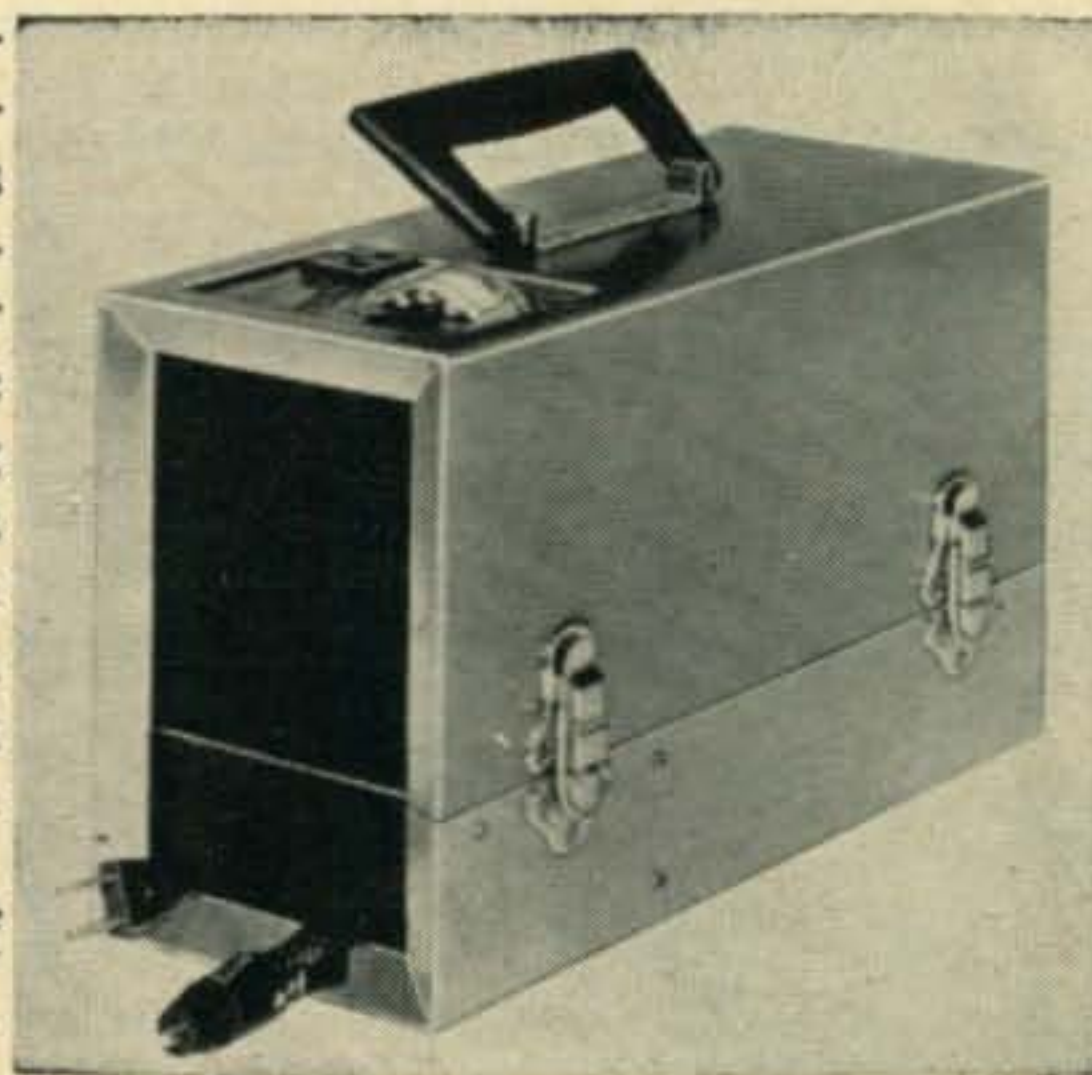
These pages are available, *free* for the asking to anyone who has a copy of "*CQ YL*"! Just send your name and address to W5RZJ (QTH at beginning of column). Please enclose a 5¢ postage stamp to cover mailing (the pages will be mailed flat in a large envelope). They are perforated for easy insertion into the book's spiral binding at the proper place.

We're working on the two additional chapters for "*CQ YL*"; more details when they are available. 33, Louisa, W5RZJ

New Amateur Product

Terado Portable Power Pack

THE Terado Corporation of St. Paul, Minnesota, announces a new source of electricity called the Trav-Electric Power Pack, Model #50-160, which changes its low voltage, 12 volt storage battery, to household electricity. 175 watts of power without auxiliary engines or generators. A turn of the switch provides 117 v.a.c. electric power. The frequency is maintained by the use of a tuning fork or reed and is kept accurate within 1/2 cycle regardless of changing load. The device weighs but 29 lbs. complete with storage battery, charger, and inverter housed in a copper clad steel case with handle. It has a meter that shows charge rate and hours of anticipated output. The price is \$69.50. It's ideal for campers, trailers, boats. Battery can be recharged from regular d.c. receptacle of car cigar lighter. For more information and literature, write TERADO CORPORATION, St. Paul, Minnesota, or circle 63 on page 110.





Leo I. Meyerson
WØGfq

LEO SAYS: BUY DIRECT AND SAVE BIG ON THESE WRL HAM EXCLUSIVES

NEW

WVG MARK II ALL BAND VERTICAL ANTENNA

Low cost — self-supporting 10 - 80 meter antenna. Tunes 3.5 — 30 Mc with manual tap adjustment. Feed with 52 ohm coax. Quick installation. Amazing efficiency for DX or local contacts. Used as portable antenna also.

\$15.95

Postpaid

Continental USA

MECHANICAL SPECS:

Overall ht. — 18'. Tubing diameter — 1 1/4" to 7/16". Max. unguyed wind survival — 50 mph. — Mtg. bracket for 1 5/8" mast. Wt. 5 lbs.

ELECTRICAL SPECS:

Maximum power: 1000 watts AM or CW — 2 KW PEP. Omnidirectional. Vertical polarized.



TECH-CEIVER 6A

Low cost, compact, 6 meter transceiver

Stable superhet receiver. 5 watt transmitter, featuring PTT, using std. (Ft 243) 8 Mc range xtals, non-critical coils, plate modulation, power and modulation indicators, 10 tube performance. Step-by-step manual included. Wt. 9 lbs. 115 VAC Power supply (kit) — 15.95.

- 5 Watt input
- Sensitivity — better than 1 UV

only \$39.95 kit



- Selective — 20KC @ 6DB points
- 49-54 Mc coverage

PSA-63 POWER SUPPLY

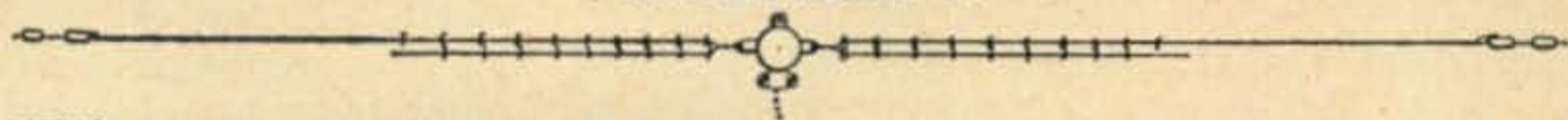
Universal Power Supply: Powers most AM rigs up to 100 watts, SSB units — up to 200 watts, PEP. Silicon rectifiers provide both 300 VDC & 600 VDC @ 300 Ma., ICAS (210 watts total), plus 6 VAC @ 10A or 12 VAC @ 5A, plus 95 VAC @ 10 Ma. Size 11 1/4" x 4 3/4" x 6". Wt. 15 lbs. Kit — 24.95, Wired — 39.95. Opt'l cabinet — 4.95.

- Use with 30-200 watt XMTRS—XCVRS
- Dual voltage B + Fil. power-bias
- Customized units available—Extra

only \$24.95 kit



DUO-DOUBLET 84



NEW 80-40 meter diapole using proven parallel diapole principle to resonate on both bands. Requires only one 52 ohm feed line (coax not supplied). Kit includes wire, insulators, center connector & full instructions. Complete formula supplied & quick graph chart for easy adjustment. May be used on 15 meters also. SWR: Better than 2:1 at resonance — 80/40. Max. length — 123 ft.; 140 ft. for lowest CW range. Easy to install. Wt. 4 1/2 lbs. Shipped Parcel Post.

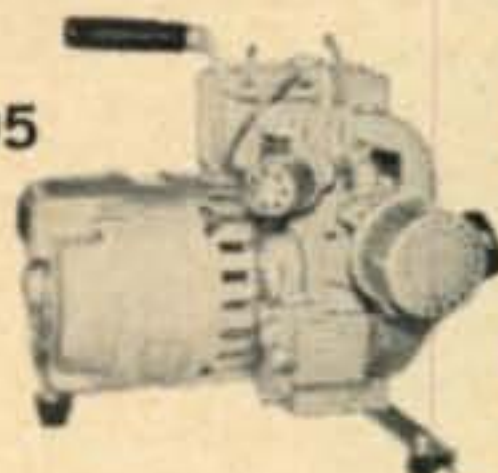
80-40 Meter Diapole
One Feed line

\$7.95

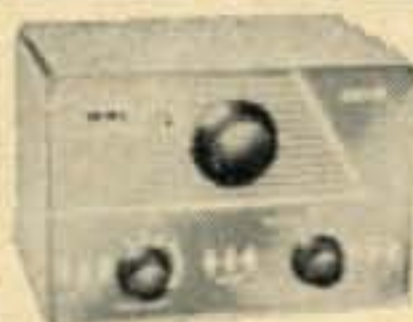
NEW

WRL'S 12R GENERATOR

\$149.95



Shielded ignition. 1250 Watts. 115 VAC, 60 cy., 77 lbs. (FOB Milwaukee, Wisconsin)



SS-3 "Q" MULTIPLIER

- Notch and peak
- Self Powered
- One simple receiver connection

Int'l 115 VAC P.S. Plugs into Collins 75S-1, KWM-2 & others. Use with receivers having 455KC-IF: AC or DC powered. Adj. selectivity: 300 cy. to 10 KC. Sharp rejection (50DB) null for heterodynes. 6 1/4" x 4 1/4" x 4 3/4".

\$15.95 kit

ANTENNA TUNER MM-100



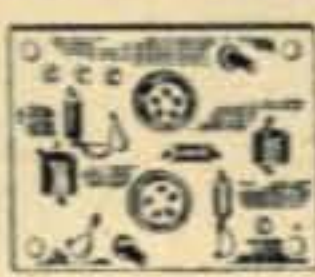
\$10.95 kit

Specifically designed to match end-fed long wire which is 1/2 wave, or multiples thereof, to 50 ohm transmitters. Panel lamp indicator. For inputs up to 150 watts SSB, 100 watts CW, 75 watts AM. 4 x 5 x 4 steel case. Reduces TVI.



\$4.98

\$6.37



WRL NUVISTOR PREAMP PRINTED CIRCUITS

PA50-2 Stage preamplifier for 6 meters. Use 2 RCA 6CW4 nuvistors. Highest grade glass epoxy board. Assembled and pre-aligned for 50 ohm input-output. Requires 60-120 VDC @ 10 MA. & 6.3 VAC

Size 2 3/4" x 2 1/4". Wired **\$6.37**

PA-144 Same as above except only 1 6CW4 nuvistor & for 2 meters. Wired **\$4.98** (less 6CW4 tubes).

WRL

WORLD RADIO LABORATORIES, INC.
3415 West Broadway
Council Bluffs, Iowa 51504

Rush me **FREE!**

WRL 1965
Catalog

Reconditioned
Specials!

Please rush me item _____

Enclosed is Cash Charge COD (25% cash w/order)

*If new customer, send credit info with your charge order

Name _____

Address _____

City _____ State _____ Zip _____

Clip & Mail

For further information, check number 34, on page 110

on the printed board with everything else built around it!! After making a special soldering iron bit out of twisted antenna wire, to get into the confined space, and fashioning a pair of tweezers and several small hooks and probes, also from antenna wire stretched hard—the long nose pliers I had taken would not fit into the space—I eventually had the choke lying on the bottom of the chassis. Gentle probing and careful extractions eventually had it free. Locating the break and shorting out one section of the winding was easy but how to get it back. Working by the light of a small reading lamp and a torch—easy you say, just reverse the process—well you try! By midnight I had the rig working again but the bands had closed.

Sunday was a real busy day as would be expected, although DX was marred somewhat by an ionospheric disturbance which carried on through most of the next week.

The rest of the week was taken up mostly with daylight 20 meter operation, that is 0300 GMT to 0730 GMT then QSY to 40 meters and 80 meter operation during local darkness with a look at 20 about every half hour. Generally speaking the 20 meter band went dead around 0800 GMT and practically no contacts were made after that time with the exception of W3CRA who seemed to be there on an otherwise dead band.

Operation seemed to come in spasms, and there were many times I called CQ for up to ½ hour with no reply although stations were working all around me. Then someone would find me and a small pile up would occur. I'd knock that over and the sequence would repeat itself. Even with the help of W6WX for nearly an hour one day there were very few customers.

On April 26th at 1205 GMT on 14 mc I heard and called several G stations notably GW3AHN who had an S67 signal but to no avail. The European QRM must have been too bad. However at 1220 GMT I worked PAØLOU and he kindly offered to assist, which he did by sending several QST calls over a period of 20 minutes, telling Europeans he had me on frequency—but still no customers!!—except several UA, UP etc. who gave him serial numbers—all of whom I could hear at S5-S7. Where were all the Europeans? The first European was I1ZL 14 mc long path at 0632 GMT on 17th April. The first African was 5A1TW followed very soon by ZE8JJ and other ZE and ZS stations. The first English contact was G2DC on 7 mc followed by G5WP, G6QB and G3JAG.

During that week I was able to put one end of the windom right to the top of a 110 ft. pine tree, and that made quite a difference on 7 mc. It had to happen though, I had to go to Lord Howe to work HC8FN on Galapagos—I still need him from the home QTH!!

The line voltage jumped all over the meter—most of the time I drove the rig with one hand on the variac, and the other on the key or holding the mike. By and large the operation was a success although I would have liked many

Lord Howe [from page 37]



The operating position at VK2AGH/LH, l. to r. s.w.r. meter, tuning unit, a.c. voltmeter on top of the Wagner transceiver and keyer paddle to the left.

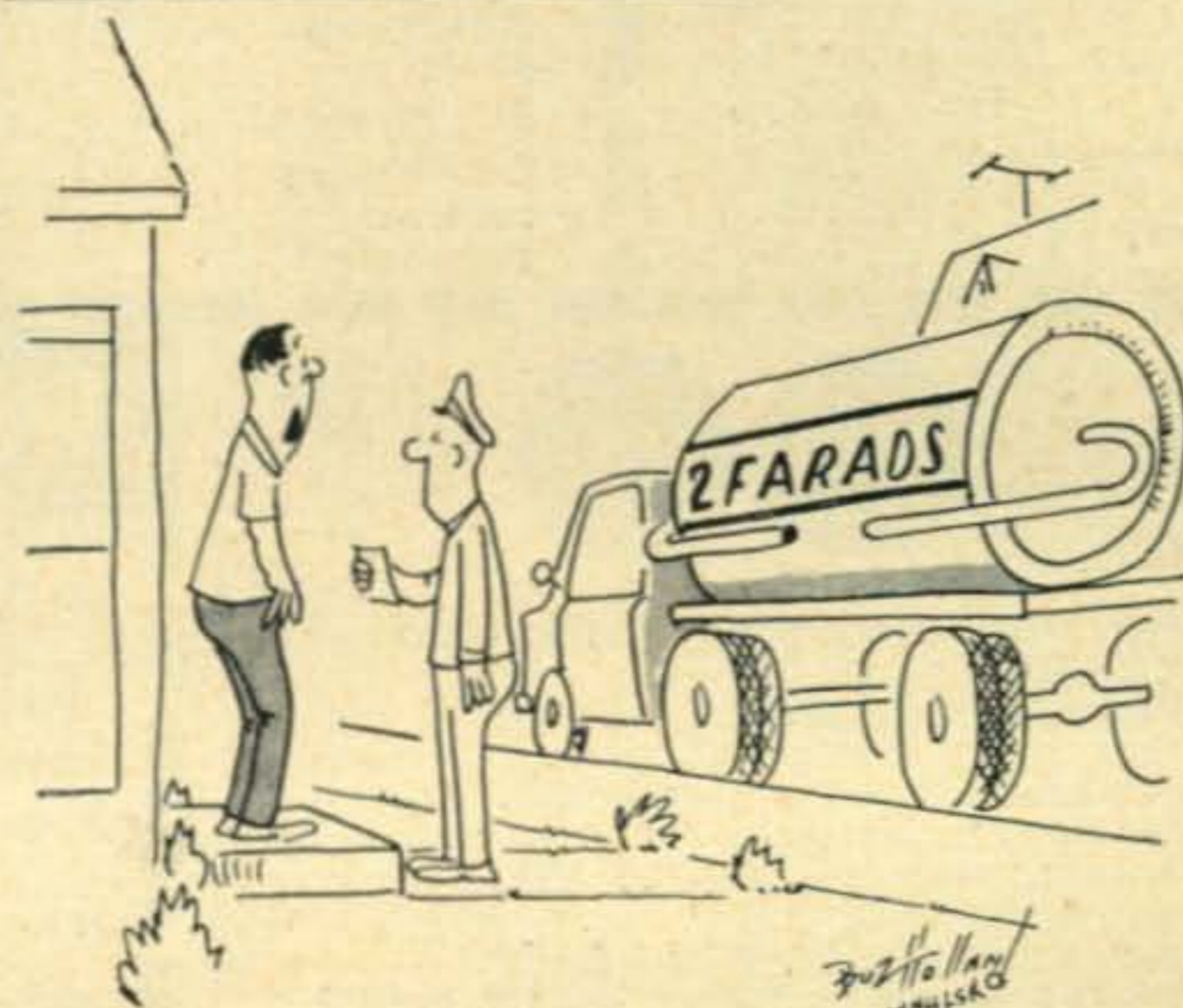
more contacts, especially Europeans and Africans whom I know need Lord Howe, but it was not to be, although not for the want of trying. Several times I sat up until 1500 GMT (1:30 AM local) in the hope that the band would open, but no good.

Band conditions generally were not good as one would expect at this time of the sunspot cycle. The general noise level on the Island is extremely low. There were times when the VK2 boys were complaining bitterly of QRN, all I could hear was a slight burble in the background. No trouble at all in copying solid a signal at S½ to S1.

Overall I had 650 contacts, of which 220 were s.s.b., and 430 c.w., from all continents but very few countries.

All good things come to an end and on April 28 after the last contact with WA6UNF on 7 mc the gear was dismantled and packed in preparation to catch the plane early next morning.

Circling Rose Bay landing area and seeing cars rushing along roads, and people scurrying like ants made us want to stay on board and go back to the idyllic surroundings of Lord Howe. However, back to the rat race!!



"I ordered it all right . . . but I must have made some kind of mistake!"



FREE! HOW TO IMPROVE YOUR TWO-WAY RADIO!

The right communications microphone may *double* the talk power of even the finest transmitters! Learn how unwanted noise can be eliminated—reliability improved—intelligibility increased by proper microphone selection. Write for our helpful free booklet today!

ELECTRO-VOICE, INC., Dept. 152EH
Buchanan, Michigan 49107

Please send the free E-V booklet on choosing communications microphones. I am interested in the following areas of two-way radio: Amateur Aviation CB Business.

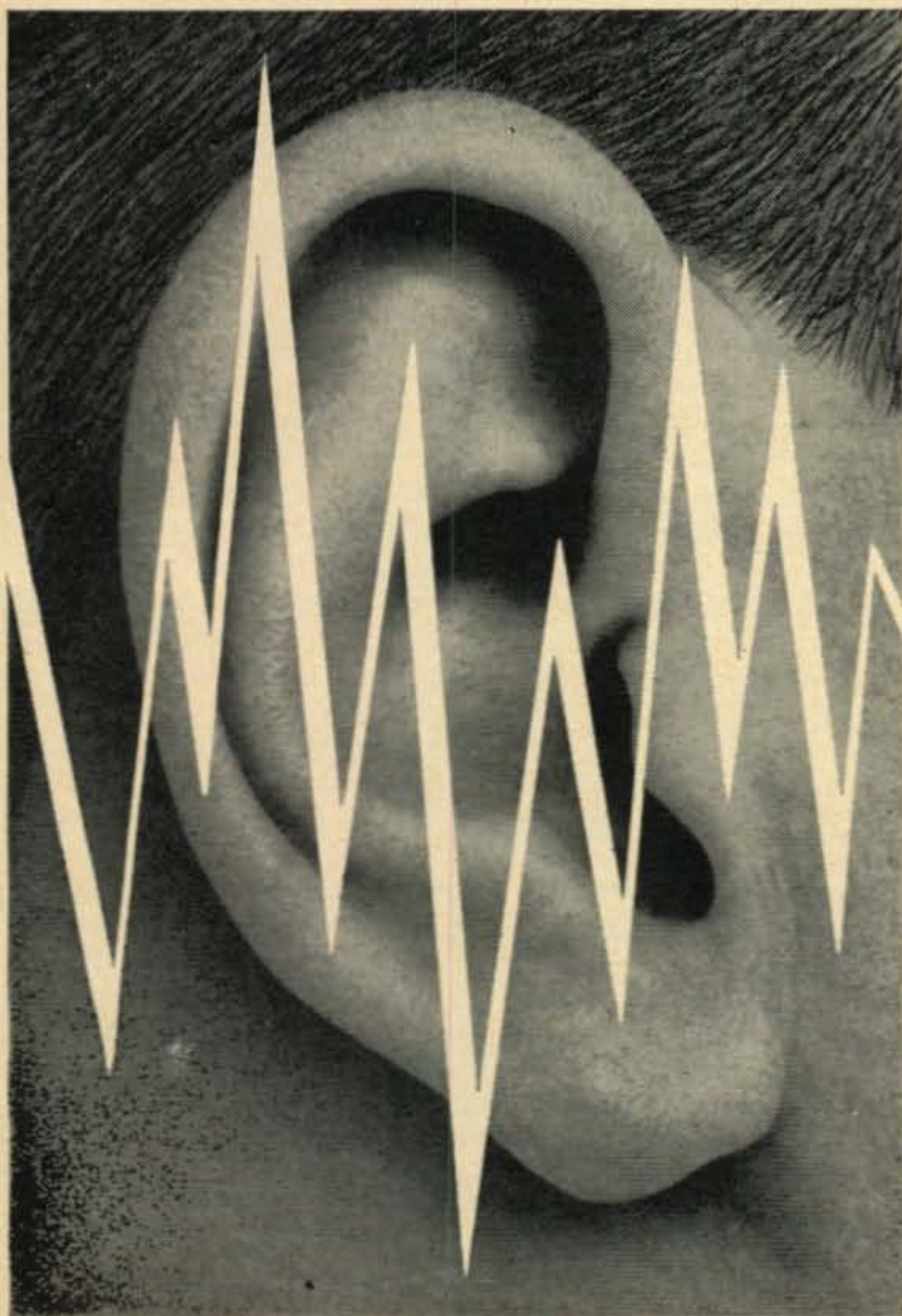
NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

For further information, check number 48, on page 110



STOP IGNITION NOISE

Where it counts — at the source with Hallett Signal Saver. Thousands of industrial, governmental and C B installations attest to the reliability of Hallett Signal Saver to eliminate interference completely. Find out the facts — Send for free booklet.

H HALLETT SIGNAL SAVER

Hallett Manufacturing Company
5920 Bowcroft Street, Los Angeles, California 90016
Please send me your folder, "Stop Ignition Noise with Hallett Signal Saver."

My name _____

Address _____

City _____ State _____ Zip Code _____

For further information, check number 49, on page 110

DX Voice [from page 54]

the subject began using his newly developed voice power on the 20 meter band. During the course of the first few QSOs it became evident that the extra db's of intelligibility were paying off. Here are some comments taken from the log book:

"Your signal is being clobbered by very heavy QRM, but your voice is cutting right through it, and I can copy you 100%."

"You're almost in the noise level, and not even budging the S-meter, but I'm copying your audio with no trouble at all."

"Your signal is 10 db lower than the other fellow with the quad, but I seem to be able to read you a lot better than I can him."

"Your audio sounds nice and crisp, and very distinctive."

By the end of the day, it was apparent, both from the scientific measurements, and from the on-the-air results, that it was possible to develop a DX voice, through the Bel-Canto system.

Professor Heisseluft Returns

As he promised, Professor Heisseluft returned to the *CQ* office shortly after the experiment was completed. Here is a transcript of the discussion which took place.

CQ: We have had marvelous results with the experiment, Professor. Our staff member was able to raise the power level in his voice, between 750 and 2500 c.p.s., by a factor of 10 times. This has resulted in an increase of intelligibility of 10 db.

Prof.: I am very glad to hear this. You sound like the parents of some of my students after they have heard their child's first recital. The results don't surprise me. After all, the Bel-Canto system has been getting results like this for over 500 years.

CQ: Do you have any other suggestions, Professor?

Prof.: No, I don't think so. I have given you all the information that would be useful to radio amateurs.

CQ: Professor, here are some pictures that were taken during the experiment. (See figs. 3-6.)

Prof.: They are very interesting. They look like the sort of pictures we take of our students at the Lauton Institute.



Fig. 5—"To control the nasal resonance chamber, simply close the chamber by pinching the end of the nose with thumb and forefinger, or use a clothespin."



Fig. 6—Subject shown conducting 20 meter QSOs after completion of month-long experimental period. Measurements confirmed a 10 db increase in intelligibility as a result of the Bel-Canto system.

CQ: With your permission, Professor, we would like to write this entire experiment up as a special article in *CQ*, so that as many radio amateurs as possible may take advantage of the wonderful advice you have given us.

Prof.: Of course, that is perfectly O.K. I am very glad to do this. In fact, if any of your readers would like more information about the Bel-Canto system, or if they have any questions, I would be very glad to hear from them. Although my lecture schedule for the next six months is rather heavy, I would be very glad to try to arrange to lecture groups of radio amateurs on this subject.

CQ: That's very nice of you Professor. Since you will be on tour, letters from *CQ* readers can be addressed to you, c/o *CQ*, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050, and we will forward the mail along to you.

Prof.: Excellent.

CQ: Is there anything that we can do for you, Professor?

Prof.: Maybe. I am trying to locate an old classmate of mine. You see, before the War, I started University in the Free State of Danzig. There was a chap there that I became quite friendly with. I believe that he was a radio amateur. He was always experimenting with the atmosphere, or something like that. I haven't seen him since the beginning of the War. You know, it was very bad in Danzig during the War, and all these years I thought that my friend probably died there. A few weeks ago, however, I told some friends of mine in New York about my visit here. They told me that they thought that my old friend was connected with *CQ* in some capacity, and that he wrote an article for the magazine last year . . .

CQ: You must be talking about Dr. Jerzy Ostermond-Tor.

Prof.: Yes, yes. That is who I am talking about. Do you know where I can find him? It would be wonderful seeing old Tor again, have a few beers with him, and talk over old times.

CQ: Yes, Professor. You are very fortunate. Tor just arrived back in the States, and he will be here only during April. I will call him on the telephone and tell him that you are here.

Prof.: Thank you very much, and please give my best regards to all of your radio amateur friends. I have certainly enjoyed this visit with you.

CQ: The pleasure has been all ours, Professor. ■

OUR MOST POPULAR HANDBOOK!

**PRICE:
\$3.00**



The most popular handbook ever to be presented in the CQ Technical Series was the venerable old "Command Sets." Countless signals on the air today are there because of the information contained in "Command Sets," which went on to become the standard reference guide and definitive work on the topic. It went through 5 sellout printings, and when the last book of the final printing was stripped from our stock room we decided that the next printing would be an even bigger, newer, expanded, revitalized version of "Command Sets."

Our new book is called "Surplus Conversion Handbook," it's 192 pages **BIG** (that's 58 pages more than its predecessor). We kicked out all of the space-taking ads which cluttered up the old book and replaced them with more conversions — conversions of surplus gear other than just "command sets" alone. So the new book contains all of the best command set conversions of the original edition, plus complete conversion details on a whole slew of the most popular military surplus gear available today, including such winners as: SCR-522, ART-13, BC-603, BC-620, BC-624, BC-659, BC-779,

ARC-1, ARC-3, ARC-4, and many more. Actually, it covers just about every piece of surplus gear which is worth the time and effort to convert for ham use.

"Surplus Conversion Handbook," Edited by Tom Kneitel, K3FLL/WB2AAI, is a book which every ham will find to be a valuable and interesting addition to the shack. It's available for immediate delivery.

COWAN PUBLISHING CORP., BOOK DIVISION
 14 Vanderventer Avenue
 Port Washington, L.I., N.Y. 11050

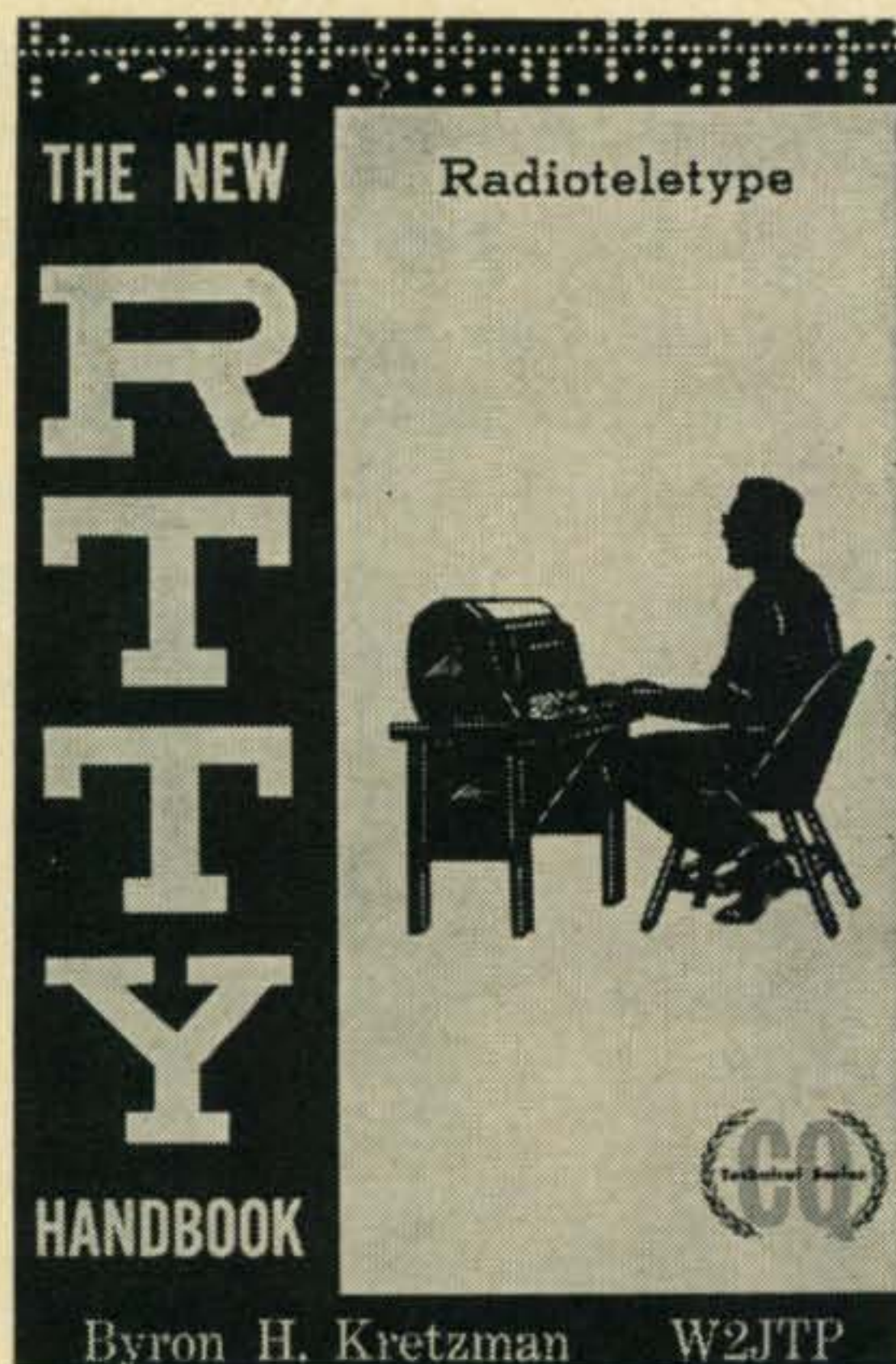
Gentlemen: Enclosed is \$_____ for _____ copy(ies)
 of the brand new SURPLUS CONVERSION HANDBOOK.

Name _____, Call _____

Address _____

City _____ State _____ Zip _____

"THE NEW RTTY HANDBOOK"



A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, operating procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, all written by Byron Kretzman, W2JTP, a well known authority in the field. This book is a must for your library! Only \$3.95.

CQ Magazine

14 VANDERVENTER AVENUE
PORT WASHINGTON, L.I., N.Y. 11050

SIRS: My check (money order) for \$ _____
is enclosed. Please send _____ copies of the
"The New RTTY Handbook."

Name _____

Address _____

City _____ State _____ Zip _____

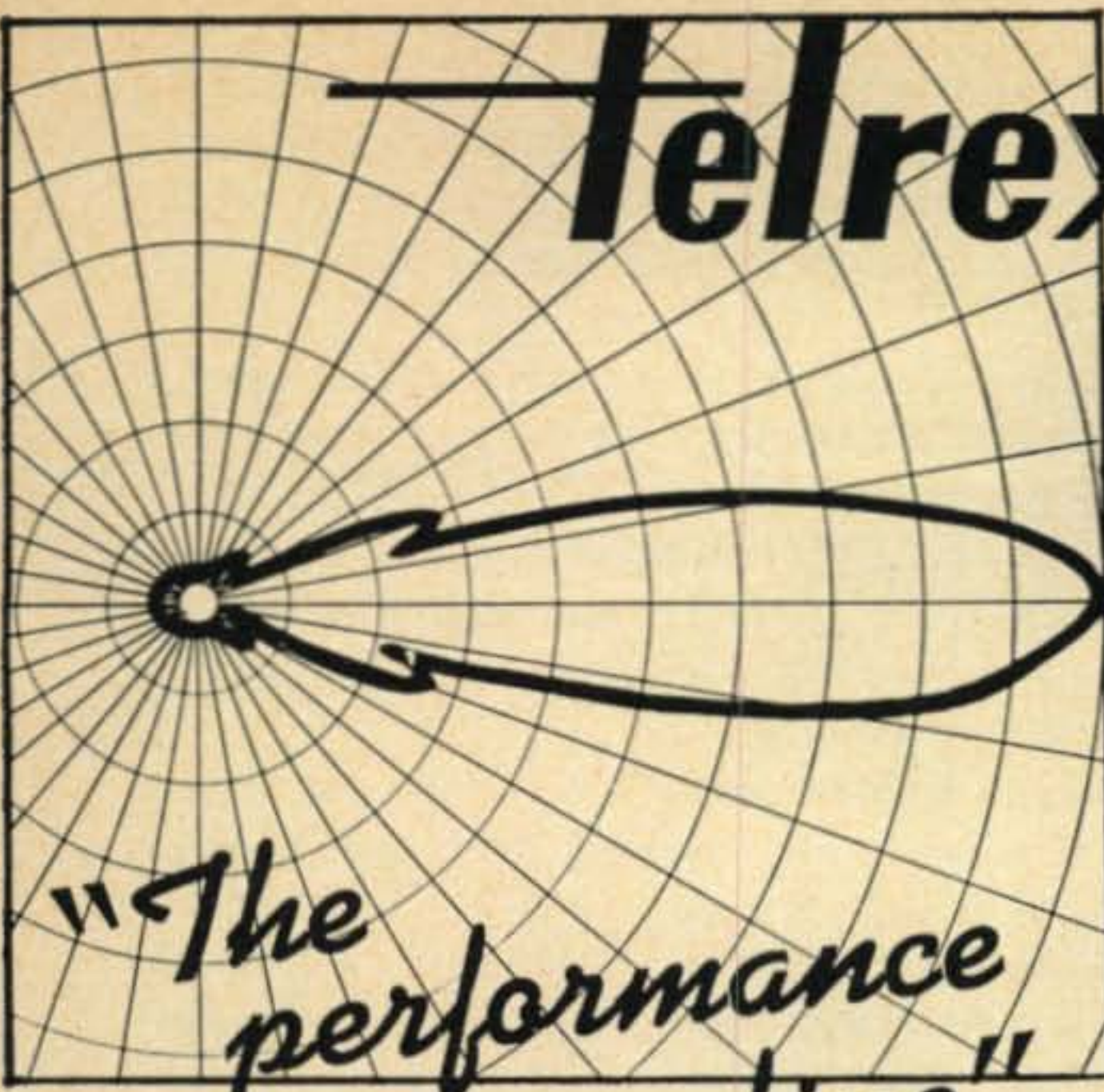
Propagation [from page 69]

Far East	18-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 19-21 (1) 21-22 (2) 22-23 (1)	00-02 (1) 02-04 (2) 04-07 (1)	03-06 (1)
Guam & Pacific Islands	15-17 (1) 17-19 (2) 19-20 (1)	05-07 (1) 07-09 (2) 09-14 (1) 14-20 (2) 20-23 (3) 23-00 (2) 00-01 (1)	00-02 (1) 02-05 (2) 05-07 (1)	01-02 (1) 02-05 (2) 05-06 (1) 02-05 (1)†
Australia & New Zealand	17-19 (1)* 15-18 (1) 18-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-22 (1) 22-00 (2) 00-01 (1)	02-03 (1) 03-05 (2) 05-07 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)†
North & Central South America	11-13 (1)* 13-15 (2)* 15-16 (1)* 06-08 (1) 08-10 (2) 10-13 (3) 13-15 (4) 15-17 (3) 17-18 (2) 18-19 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-14 (2) 14-16 (3) 16-19 (4) 19-20 (3) 20-2- (2) 21-23 (1)	18-20 (1) 20-02 (3) 02-04 (2) 04-06 (1)	20-22 (1) 22-01 (2) 01-05 (1) 22-02 (1)†
Southern Brazil, Argentina, Chile & Uruguay	12-13 (1)* 13-15 (2)* 15-17 (1)* 06-08 (1) 08-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	19-21 (1) 21-23 (2) 23-01 (1) 01-04 (2) 04-06 (1)	07-04 (1) 02-04 (1)†
Mc-Murdo Sound, Antarctica	14-16 (1)	05-06 (1) 06-08 (2) 08-11 (1) 16-17 (1) 17-19 (2) 19-22 (1)	00-05 (1)	Nil

Time Zone: PST (24-hour Time)

WESTERN USA TO:

	10/15 Meters	20 Meters	40 Meters	80/160 Meters
Western & Central Europe & North Africa	Nil	05-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-15 (1) 20-22 (1)	19-20 (1) 20-22 (2) 22-23 (1)	20-22 (1)
North-ern Europe & Euro-pean USSR	Nil	05-07 (1) 07-09 (2) 09-11 (1) 20-22 (1)	19-22 (1)	Nil
Eastern Mediter-ranean & East Africa	Nil	06-10 (1) 10-12 (2) 12-13 (1) 19-21 (1)	19-22 (1)	Nil
West & Central Africa	11-14 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-14 (2) 14-16 (3) 16-18 (2) 18-20 (1)	20-00 (1)	Nil
South Africa	09-12 (1)	05-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1) 20-22 (1)	20-01 (1)	Nil
Central Asia	Nil	08-11 (1) 16-18 (1) 18-20 (2) 20-21 (1)	04-06 (1)	Nil



telrex

"BEAMED-POWER" ANTENNAS and ANTENNA SYSTEMS

The Choice of the Discriminating Communication Engineer . . . the Man who Never Settles for Anything Less than THE-VERY-BEST!

You too—can enjoy world renowned TELREX performance and value! Send for PL65 condensed data and pricing catalog, describing the lowest priced antennas on the market, in relation to materials and performance! Expanded data sheets—including your favorite band, are also available.

"The performance with a line"

MATERIAL DIFFERENCE —IN USE IN 135 LANDS!

ANTENNAS SINCE 1921 **telrex** COMMUNICATION SYSTEMS LABORATORIES

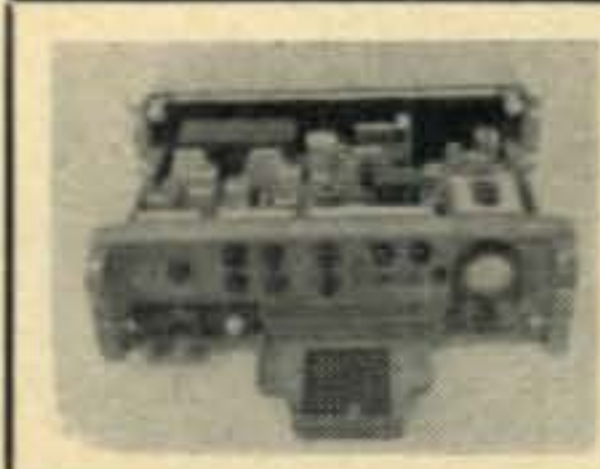
ASBURY PARK 25, NEW JERSEY, U.S.A.

For further information, check number 35, on page 110

URGENT, NEED IMMEDIATELY

Very high prices paid. Freight prepaid. AN/GRC; PRC; APR; APN; ARC; ALT; URM; UPM; TS. We also buy all military and commercial test, radar, and communication equipment. **CALL COLLECT. IT COSTS YOU NOTHING TO HEAR OUR HIGH OFFER.**

SPACE ELECTRONICS
4178 Park Ave., Bronx, N. Y. • (212) CY 9-0300



Teletype Frequency Shift Converters

Model CV-57 less tubes \$ 75.00
with tubes \$135.00

FOB L.I.C., N.Y.
SPERA ELECTRONICS
37-10 33rd St., Long Island City, N. Y.

South-east Asia	16-20 (1)	07-08 (1) 08-09 (2) 09-12 (1) 19-21 (1) 21-23 (2) 23-00 (1)	23-00 (1) 00-01 (2) 01-06 (1)	00-01 (1) 05-06 (1)
Far East	18-21 (1)	07-11 (1) 11-12 (2) 12-15 (1) 15-18 (2) 18-20 (3) 20-22 (4) 22-23 (2) 23-00 (1)	22-00 (1) 00-01 (2) 01-03 (3) 03-05 (2) 05-07 (1)	23-01 (1) 01-04 (2) 04-06 (1) 01-04 (1)†
Guam & Pacific Islands	14-15 (1) 15-16 (2) 16-18 (1) 18-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (3) 13-17 (2) 17-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	23-01 (1) 01-06 (3) 06-07 (1)	00-01 (1) 02-05 (2) 05-06 (1) 02-05 (1)†
Australia & New Zealand	15-19 (1)* 12-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	00-01 (1) 01-05 (2) 05-06 (1)	01-02 (1) 02-04 (2) 04-05 (1) 02-04 (1)†
North & Central South America	12-14 (1)* 06-09 (1) 09-11 (2) 11-13 (3) 13-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-14 (2) 14-16 (3) 16-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	18-20 (1) 20-01 (3) 01-02 (2) 02-05 (1)	19-20 (1) 20-01 (2) 01-04 (1) 20-01 (1)†
Southern Brazil, Argen-	12-13 (1)* 13-15 (2)* 15-16 (1)* 06-09 (1)	04-05 (1) 05-06 (2) 06-15 (1) 15-16 (2)	23-01 (1) 01-03 (2) 03-05 (1)	01-03 (1) 01-03 (1)†

tina, Chile & Uruguay	09-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	16-19 (4) 19-20 (2) 20-22 (1)		
Mc-Murdo Sound, Antarctica	14-16 (1)	04-05 (1) 05-06 (2) 06-07 (1) 10-12 (1) 16-17 (1) 17-18 (2) 18-20 (1)	00-04 (1)	Nil

CQ DX Contest Post Mortem

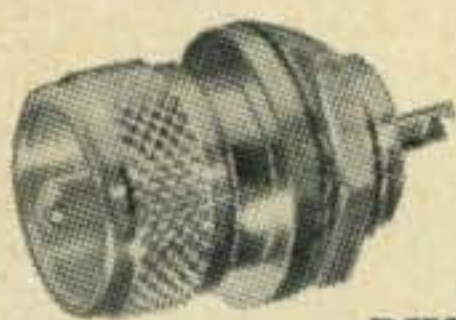
Propagation conditions during the 1964 CQ World-Wide DX Contest appear to have been normal during most of the phone and c.w. periods. While conditions dropped to "below normal" for a few hours during both periods, no significant ionospheric disturbances were reported. The normal conditions that prevailed during most of the Contest are expected to result in a high level of scoring among the participants. Here's how observed conditions compared with CQ's "Last Minute Forecasts", and with band opening data contained in the CQ Propagation Charts devised for the Contest.

October 24 (phone period): CQ forecast "normal" conditions, ranging between fair and fair-to-good.

CRPL observed conditions on north-Atlantic and north-Pacific circuits as "beginning poor-to-fair, becoming fair after a few hours, and then fair-to-good for most of the day."

DOW-KEY

UHF CONNECTORS



DK201

DOW-KEY connectors are precision units, made of machined brass with all surfaces silver plated to provide perfect connection.

DK201
UHF Panel mount male connector -- each \$1.25

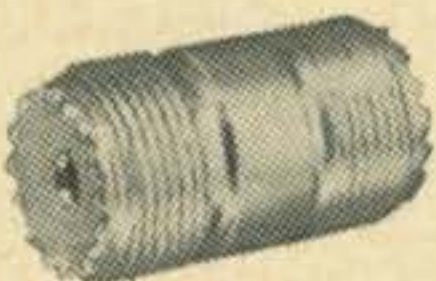
DK202
UHF double female connector -- each .85

DK210 — Female UHF to male phono connector ----- each \$1.25

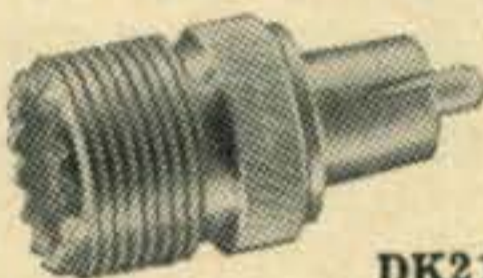
DK211
Male UHF to male phono connector -- each \$1.25

Available at your dealer or write:

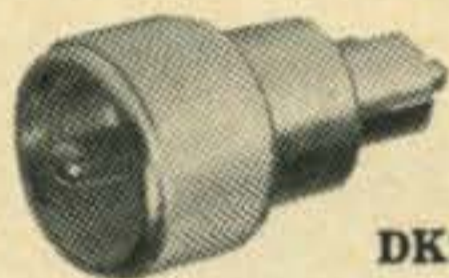
DOW-KEY CO., Thief River Falls, Minn.



DK202



DK210

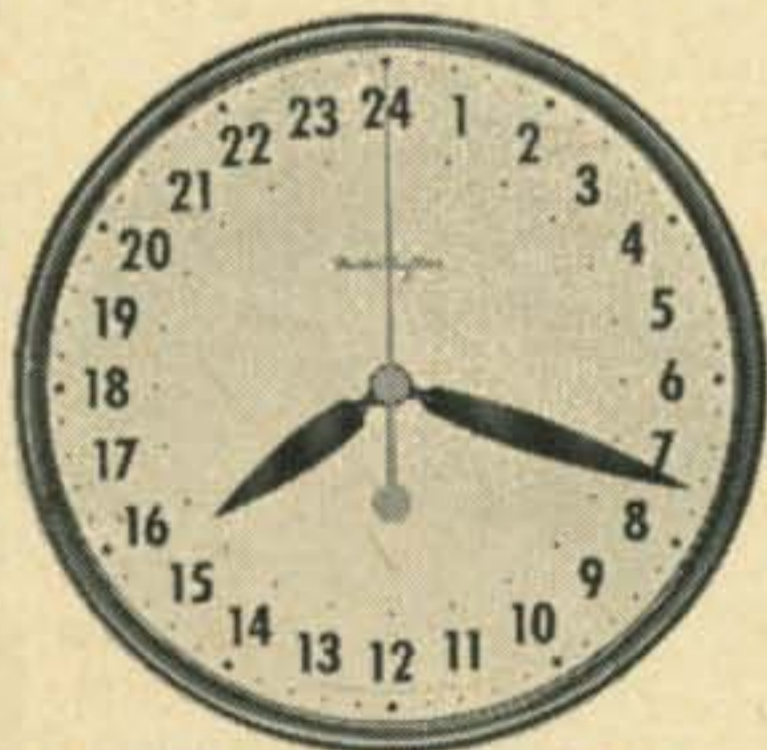


DK211

For further information, check number 37, on page 110

NEW!

24 HOUR CLOCK



Dependable, Accurate, Made in U.S.A.

Wonderful addition to any "Ham" Shack—provides accurate time reading without confusion. Dependable, self-starting U.L. Approved electric movement. 13 1/2" black case, 12" white dial, black hands and numerals with red sweep second hand. Operates on 115 volts AC, 60 cycles.

ORDER TODAY Only \$14.95

Enclose check or money order—we prepay shipping and insurance charges!

COMMUNICATIONS EQPT. CO.

518 State St., La Crosse, Wis., 54601

Please send me _____ 24-Hour Clock(s) for which

I have enclosed \$ _____

by: Check; Money Order.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

For further information, check number 39, on page 110

European observers rated the day as "beginning somewhat below normal, rapidly becoming normal, and remaining so throughout most of the day, but declining slightly during the late evening."

Observations indicate that the h.f. bands opened pretty much as predicted in the *CQ* charts. Ten meters opened to southern and tropical areas, 15 meters opened in all directions, and 20 meters was open from sunrise until well past sunset. During the hours of darkness, 40 and 80 meters behaved as predicted.

October 25 (phone period): *CQ* forecast "below normal" conditions, ranging between poor-to-fair.

CRPL observed "normal conditions on north-Atlantic and north-Pacific circuits, with quality varying between fair and good."

European observers rated the day as "normal throughout."

Observations indicate that 20, 40 and 80 meters behaved pretty much as predicted. Although overall propagation conditions were reported to have been better on the 25th than on the previous day, neither 15 nor 10 meters opened as well as on the 24th.

It appears as if the *CQ* forecast may have underrated conditions slightly on the 25th.

November 28 (c.w. period): *CQ* forecast "normal" conditions, ranging between fair and fair-to-good.

CRPL observed "fair-to-poor conditions on north-Atlantic and north-Pacific circuits for the first few hours. Conditions improved in both areas to fair-to-good, or better during most of the day."

European observers reported, "conditions below normal and generally poor until daybreak, then they improved to normal for the remainder of the day."

The bands behaved as predicted. A few north-south openings reported on 10 meters, 15 meter openings in all directions, and 20 meters remaining open from sunrise until well past sunset. Both 40 and 80 meters opened for DX during the hours of darkness as predicted.

November 29 (c.w. period): *CQ* forecast "below normal" conditions, ranging between poor-to-fair.

CRPL observed "fair to good conditions on all circuits." European observers reported, "conditions began poorly, but improved to normal after daybreak, remaining at this level throughout the day."

All bands behaved pretty much as predicted, with the *CQ* forecast underrating conditions slightly on this day.

It appears as if the *CQ* forecast for the 1964 Contest was right on the nose for October 24 and November 28, but may have underrated conditions slightly on October 25 and November 29.

73, George, W3ASK

WRL OFFERS YOU A FREE TWO-WEEK TRIAL IN YOUR HOME ON EITHER THE GALAXY III OR GALAXY V!*



WRL GUARANTEES SATISFACTION! YOU BE THE JUDGE AFTER A TWO-WEEK FREE TRIAL . . . NO OBLIGATION. GALAXY TRANSCEIVERS OFFER YOU MORE FEATURES PER DOLLAR THAN ANY COMPARABLE TRANSCEIVER ON THE MARKET • 300 Watts SSB/CW Input • Best Filter Available • Transistorized AVC/AUDIO/VOX • Most Compact Transceivers With 5 or 3 band Full Coverage • New VFO Side View Dial • Selectable USB or LSB • Portable For Mobile or Fixed Operation.

*WRITE FOR DETAILS ON FREE TRIAL OFFER!

GALAXY III

80-40-20 Meters

only **\$349.95**

No down payment
\$17.00 monthly
WRL Charg-A-Plan

GALAXY V

80-40-20-15-10 Meters

only **\$469.95**

No down payment
\$21.00 monthly
WRL Charg-A-Plan

NEW DELUXE CW MONITOR



only **\$29.95**

Monitor and improve your CW. A must for every CW operator. Use with any transmitter or transceiver.

NEW Rejector NOTCH FILTER

Tunable — Transistorized — Powerful suppression of heterodynes and QRM. Use with any receiver or transceiver. Just connects between receiver and PM speaker.



only **\$34.95**

"Got Our 1965 Catalog?"

FINEST SELECTION OF HAM EQUIPMENT EVER ASSEMBLED

ALWAYS the TOP TRADE allowance

ALWAYS the best in terms from

"the house the hams built"

Leo I. Meyerson-WØGFQ
President



WRL

WORLD RADIO LABORATORIES

3415 West Broadway
Council Bluffs, Iowa 51504

- | | |
|---|--|
| <input type="checkbox"/> Send details on Galaxy FREE Trial offer. | <input type="checkbox"/> Ship Rejector for \$34.95 + postage. |
| <input type="checkbox"/> Ship CW Monitor for \$29.95 + postage. | <input type="checkbox"/> Send Reconditioned "Blue Book" prices |
| <input type="checkbox"/> Send 1965 Catalog | |

Name _____

Address _____

City _____ State _____

Zip _____ Call _____

For further information, check number 36, on page 110

WORLD'S FINEST 5-CORE SOLDER

ERSIN MULTICORE

NEW EASY DISPENSER PAK ONLY 50¢

BUY IT AT RADIO-TV PARTS STORES
MULTICORE SALES CORP. PORT WASHINGTON, N. Y.

For further information, check number 53, on page 110

CALL-IDENT TYMETER®

10-MINUTE STATION CALL REMINDER

#124

22.50

Plus applicable taxes



10-minute repeating timer buzzes warning to sign in your call letters. Walnut or ebony plastic case. H4", W7 3/4", D4". Wt. 3 lbs. 110V, 60 cy. 1 year guarantee.

At Your Dealer, or WRITE TO

TYMETER ELECTRONICS

PENNWOOD NUMECHRON CO.

7249 FRANKSTOWN AVE., PITTSBURGH 8, PA.

For further information, check number 54, on page 110

102 • CQ • April, 1965

Announcing

A BREAKTHROUGH in RTTY converter design

NOW—a low priced unit for the person who wants to put his RTTY printer to work copying news and weather for the serious RTTY enthusiast who wants a flexible unit.

WALTER LABORATORIES TU-1 Filterless Terminal Unit

1. No toroids to adjust
2. Copies standard and narrow shift automatically
3. Receiver tuning not critical
4. A quality unit in kit form

\$54.00 (postpaid)

California residents add 4% sales tax

Walter Laboratories P.O. Box 2382
Riverside, Calif.

For further information, check number 56, on page 110

Durward Tucker [from page 51]

Engineers and has been active and held executive posts in each through the years.

He is a member of the Dallas Technical Club, member and active in both the IRE and AIEE, before their merger, and served two years on the national Board of Directors of the I.R.E. One of the founders of the Dallas I.R.E. section, being President several times. Headed the large annual electronic Southwestern I.E.E.E show one year and is presently on the Board of Directors of the I.E.E.E. region of several states organization that controls the show and Chairman of the FCC North Texas Industrial Interference Committee for a number of years.

Durward has been active in amateur radio through the years, having obtained his first license in 1924. He has been an active contributor of numerous articles throughout this time. Being a DX man, Durward is a member of that fraternity that operates his transmitter only five to ten minutes for every hour that he operates his receiver. He is a member and past President of the West Gulf DX Club. With the declining sun spots Durward temporarily abandoned his nightly search for DX for things with more activity such as RTTY. He has been an avid phone DX man up until now, switching only to c.w. for those that never showed on phone. You can bet that when the sun spot count climbs back to respectable numbers, he will be back, and with RTTY as well as phone.

What does he do in his spare time? He is an enthusiastic fisherman and hunter (along with his two sons, George, 15, and Glenn, 13) most of which is done on their ranch 100 miles south east of Dallas, where he often goes for relaxation with the boys and Lee, his wife, who completes the family. ■

CQ TECHNICAL BOOKS



CQ ANTHOLOGY I

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.



ANTENNA ROUNDUP

A common denominator for all ham stations is the antenna. Here at last is the cream of antenna information packed into a 160 page book. Forty-seven information-packed articles that will dispel much of the mystery surrounding antennas.



CQ ANTHOLOGY II

Top favorite CQ articles from 1952 to 1959 . . . including some you may have missed . . . compiled into one new information-packed book! No more need to try to locate sold out back copies of CQ. This Anthology includes past articles of lasting interest to every amateur radio enthusiast. Over 250 pages of text. Over 75 different articles. A definite Must for your shack!



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, who 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.



VHF FOR THE RADIO AMATEUR

If you are, or are planning to be a VHF operator, you can't afford to be without this dynamic new handbook written especially for you. Filled from cover to cover with all new and original construction material presented so you can understand it. Written by Frank C. Jones, W6AJF, nationally acclaimed for his VHF pioneering.

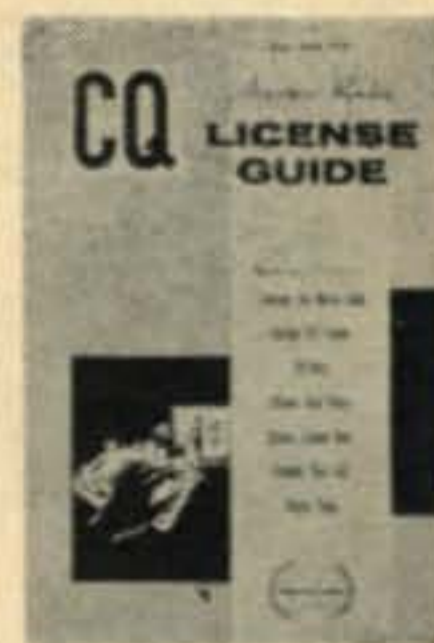


SURPLUS SCHEMATICS

This is a book literally loaded with schematics for all the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available. Trying to figure out the circuitry cold turkey can be many-times more difficult than the most involved puzzle, and purchasing a single instruction book can run as high as \$3.50.

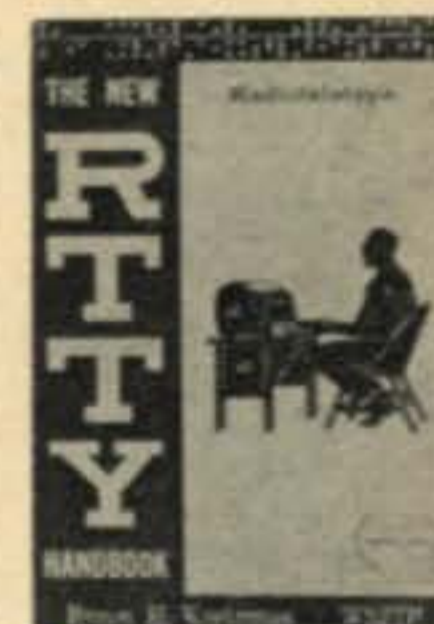
CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator.



THE NEW RTTY HANDBOOK

A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section in getting started, all written by Byron Kretzman, a well known authority in the field. First printing sold out. Second printing on hand.



MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from top experienced mobile operators. Written for advanced, as well as beginning mobile operators, much of this information cannot be found anywhere else. This is NOT a collection of reprints.



COWAN PUBLISHING CORP.

Book Division
14 Vanderventer Avenue
Port Washington, L.I., N.Y. 11050

CQ ANTHOLOGY I	\$2.00	<input type="checkbox"/>
CQ ANTHOLOGY II	3.00	<input type="checkbox"/>
ANTENNA ROUNDUP	3.00	<input type="checkbox"/>
SIDEBAND HANDBOOK	3.00	<input type="checkbox"/>
VHF FOR THE RADIO AMATEUR	3.50	<input type="checkbox"/>
SURPLUS SCHEMATICS	2.50	<input type="checkbox"/>
CQ LICENSE GUIDE	2.50	<input type="checkbox"/>
"NEW RTTY HANDBOOK"	3.95	<input type="checkbox"/>
MOBILE HANDBOOK	2.95	<input type="checkbox"/>
ELECTRONIC CIRCUITS HANDBOOK	3.00	<input type="checkbox"/>
SHOP & SHACK SHORTCUTS	3.95	<input type="checkbox"/>
SURPLUS CONVERSION HANDBOOK	3.00	<input type="checkbox"/>
UNLIGHTED GLOBE	19.95	<input type="checkbox"/>
ATLAS	15.00	<input type="checkbox"/>
CODE RECORD	3.50	<input type="checkbox"/>
REGULAR LOG SHEETS (100)	1.00	<input type="checkbox"/>
SSB LOG SHEETS (100)	1.00	<input type="checkbox"/>
HAM'S INTERPRETER	1.50	<input type="checkbox"/>
TVI HANDBOOK	1.75	<input type="checkbox"/>
BINDER—YEAR WANTED	4.00	<input type="checkbox"/>
DX ZONE MAP	3.00	<input type="checkbox"/>
DIODE SOURCE BOOK	2.50	<input type="checkbox"/>
USA-CA RECORD BOOK	1.25	<input type="checkbox"/>

SIRS: My check (money order) for \$_____ is enclosed. Please send the following items to:

Name _____

Address _____

City _____ Zone _____ State _____

HERE IT IS FROM ENGLAND!

As Beulah Electronics, Ltd.

Promised In Our Previous Advertisements . . .

The Revolutionary

WESGROVE VIDEO TAPE RECORDER

Using Only 1/4" Recording Tape

TRANSISTORIZED KIT FORM **\$450.00**

WIRED BY SPECIAL ORDER ONLY **\$650.00**

"BEUKIT" TRANSISTORIZED TV CAMERA KIT

Complete with Vidicon (less lens) **\$226.75**



All Prices Above F.O.B. Bayonne, N.J.

For full information write to:

P.A.F. ENTERPRISES



32 EAST 22nd STREET
BAYONNE, N.J. 07002

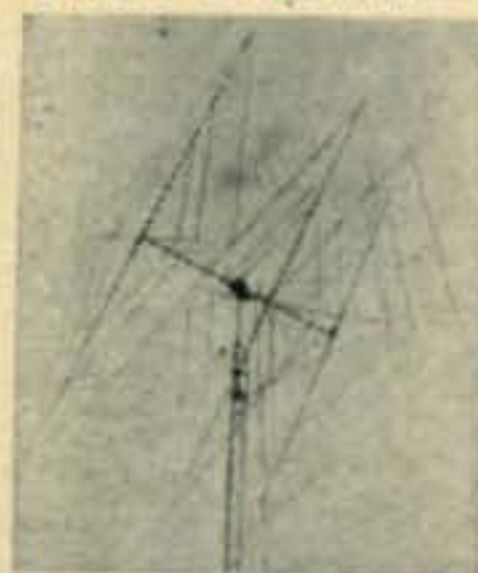
Distributors for Beulah Electronics, England
Complete line of Video Cameras and Lenses

For further information, check number 30, on page 110

10-15-20M QUADS

* Pre-Cut	* Pre-Tuned	* Triband
	Bamboo	Fiberglass
Two Element →	\$59.95	\$99.95
Three Element →	\$85.95	\$149.95

New



- ROTATE WITH TV ROTOR
- HIGH F/B RATIO
- VERY LOW SWR
- LOW Q BROADLY TUNED
- HIGH GAIN
- EASY TO MATCH
- LOW WIND RESISTANCE
- ONE FEED LINE FROM XMTR FOR ALL 3 BANDS - NO SWITCHING

WRITE DEPT. "B"

406 Bon Air Dr.
Temple Terrace, Florida
Phone 988-4213

Skylane PRODUCTS

For further information, check number 31, on page 110

ALL BAND TRAP ANTENNA!



Reduces interference and Noise on All Makes Short Wave Receivers. Makes World Wide Reception Stronger. Clearer on All Bands!

For ALL Amateur Transmitters. Guaranteed for 600 Watts AM 1200SSB Pi-Net or Link Feed. Light, Neat, Weatherproof.

Complete as shown total length 102 ft. with 96 ft. of 72ohmbalanced twinline. Hi-impact molded resonant traps. (Wt. 3 oz. 1" x 5" long). You just tune to desired band for beamlike results. Excellent for ALL world-wide short-wave receivers and amateur transmitters. For NOVICE AND ALL CLASS AMATEURS! NO EXTRA TUNERS OR GADGETS NEEDED! Eliminates 5 separate antennas with excellent performance guaranteed. Inconspicuous for Fussy Neighborhoods! NO HAYWIRE HOUSE APPEARANCE! EASY INSTALLATION! Complete Instructions. 75-40-20-15-10 meter bands. Complete\$15.95
40-20-15-10 meter. 54-ft. (best for swl's). Complete\$14.95

SEND ONLY \$3.00 (cash, ck., mo) and pay postman balance COD plus postage on arrival or send full price for postpaid delivery. Free information on other all band antennas. 160-6 meters. etc. Available only from

WESTERN RADIO • Dept. AC-4 • Kearney, Nebraska

For further information, check number 32, on page 110

Ham Shop

Advertising Rates: Non-commercial ads 10¢ per word including abbreviations and addresses. Commercial and organization ads, 25¢ per word. Minimum Charge \$1.00. No ad will be printed unless accompanied by full remittance. Closing Date: The 10th day of the second month preceding date of publication.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchandise listed therein.

ELECTRONIC CHASSIS PUNCHING and drilling service. Panels cut, etc. Build that magazine article! Send chassis or request estimate. Hole (16ths) diameters to 1/2", 5¢; to 1 1/2", 25¢; to 4", 50¢; sq., 5¢ perimeter inch in aluminum to 3/16. Steel 20 ga. add 50%. Mark sizes and centers, allow clearances. Payment with material, minimum \$2.00, under 2 lbs returned postpaid. Metalwerk, P.O. Box 1372, Cedar Rapids, Iowa 52401.

DETROIT area Swap 'n' Shop: Sunday, April 25, 10 to 4 at K of C Hall, Grand River at Lesure. No dealers; just hams!

FREE! Giant bargain catalog on transistors, diodes, rectifiers, components, valuable parts, equipment. Poly Paks, P.O. Box 942P, Lynnfield, Mass.

RTTY GEAR for sale. Write for list 88 or 44 mh Toroids. Five for \$1.75 postpaid. Elliott Buchanan, W6VPC-1067 Mandana Blvd., Oakland, California 94610.

BEST KILOWATT on Market! 2-8122's! 80-2 meters! s.s.b.-a.m.-c.w.! Write for info. \$450., f.o.b. SRS Electronics, Box 267, Newark, Delaware.

WANTED: Commercial or Military, Airborne or Ground Equipment and Testsets Collins, Bendix, others. We pay Freight. . . . RITCO Box 156, Annandale, Virginia.

BUILD transistorized battery power-supply 350V 100 ma under \$10. Plans \$2. Herco International Box 113 Willowdale, Ontario.

PRINTED CIRCUIT KIT—complete: two copper clad boards 2 3/8 x 5, etch tray, etchant, etching resist, layout grids, cleaning pad, instructions. \$2.98. Deltronic Labs, Box 128, Horsham, Pa.

RTTY'ers: Stop searching, here is your bargain basement! Paper, 12 rolls to case: Single copy \$8.00, carbon \$9.50 brand new. Nontyping reperfs \$25. Typing reperfs \$45. (Synch motor OR E-O-L add \$5). Reperfs shipped in good working order. 5WRF frequency shift exciters (Navy Type FSA), write for details. James E. Cooper, W2BVE, 834 Palmer Ave., Maywood, N.J.

RTTY CHANNEL FILTERS. Octal mounted, tuned 2125/2975 cps \$5.95 pair, Toroids 88mh, like new, uncased, 5 for \$4.00. WA6JGI, 3232 Selby Avenue, Los Angeles, California, 90034.

QSL's?? CB's?? WPE's?? Largest variety samples 25¢. (refunded). Sackers, W8DED, Holland, Michigan. (Gospel QSL samples 25¢).

QSLs. Samples, dime. Print Shop, Corwith, Iowa.

QSL's . . . 18 sharp samples 10¢ . . . Filmcrafters . . . Martins Ferry 2, Ohio.

100.00 Kc. crystal in HC-13/U Holder—same pins as FT-243. Only \$3.00 each with Free Bonus 200 Kc crystal—postpaid, USA, Quaker Electronics, Hunlock Creek, Pa.

Technical Manuals—lowest prices USA, teletypewriters, receivers, transmitters, text equipment and etc. Large lists. Send 10¢ coin-stamps. Quaker Electronics, Hunlock Creek, Pa.

CB RUBBER STAMPS. Finest quality. Stamp cards, letters, equipment with your Call, Name, Address, Zip. Unconditionally guaranteed. 1 day service. \$2.50 postpaid. ROYER LAMINATING, Taylor, Texas.

CRYSTAL BARGAINS. Free list. Nat Stinnette W4AYV, Umatilla, Fla. 32784.

QSL CARDS—100 3-color glossy \$3.00. World globe in silver; report form on reverse side; free samples. RUSPRINT, Box 7575 Kansas City, Missouri, 64116.

DAYTON HAMVENTION—April 9 and 10, 1965. Forums, FCC General Class Examination, Exhibits, Prizes. For information write: Department B, Box 44, Dayton, Ohio 45401.

ELIMINATE Mobile Vibrator Noise. Revolutionary device outmodes noise-creating vibrator. Completely transistorized unit plugs directly into vibrator socket. No moving parts. Same size as vibrator. 12 Volts. Not a kit. Comes completely wired ready to use. For negative ground only. State make and model of transceiver. \$11.95 PPD.-\$5.00 deposit on all C.O.D. orders. Tel-Trol Systems, 2180 Bronx Park East, Bronx, N. Y.

Looking? Shopping? Trading? Trying to save money? Write Bob Graham for Special Deals on New and reconditioned used gear. Cash or Budget. Graham Radio, Dept. B, Reading, Mass. 01867, Tel: 944-4000.

QSLs \$2.00 per 100 postpaid. New style glossy 2-colors. Free sample. Hobby Print Shop, Umatilla, Fla. 32784.

PICTURE of yourself, home, equipment etc. on QSL cards made from your photograph. 250—\$7.50 or 1000—\$14.00 postpaid. Samples free. Write Picture Cards, 129 Copeland, La Crosse, Wis.

WANTED: Hallicrafters S-51 receiver covering 132 kc. to 13 mc. State condition and price in first letter. Peter Spiliotis, 6 Brentwood Circle, Danvers, Mass.

PROFESSIONAL ANNOUNCING, newscasting techniques! Highly-effective, low-cost, taped home training. Hal Fisher, Broadcasting Consultant, 678 Medford, C, Patchogue, New York 11772.

Free Specimens Station Call Rubber Stamps with name, address, Zip. Distinctive selections, lowest prices. Royer Studio, Box 391 Taylor, Texas.

HUNDRED QSL's: \$1.00. Samples, dime. Meininger, Jessup, Iowa.

CREATIVE QSL CARDS free, new catalog and samples. Personal attention given. Wilkins Creative Printing. P.O. Box 787-2, Atascadero, California.

QSL's Samples free. Little Print Shop, Box 9363, Austin, Texas.

RUBBER STAMPS for QSL Cards. Kits available. Free sample impressions. E & R Stamp Co., 50 Gerald Rd., Rantoul, Illinois.

QSL CARDS \$2.50 per 100 in three colors. Samples and catalog free. Garth, Box 51C, Jutland, New Jersey.

QSL CARDS. As low as \$2.50 per 100. Samples free. Radio Press, Box 24C, Pittstown, New Jersey.

QSL's 3-color glossy. 100 \$4.50. Rutgers Vari-typing Service. Free Samples, Thomas Street, Riegel Ridge, Milford, N.J.

QSLs SWLs XYL-OMs (Sample assortment approximately 93/4¢) covering designing, planning, printing, arranging, mailing, eye-catching comic, sedate, fantabulous. DX-attracting. Protopay, snazzy, unparagoned cards. (Wow!) Rogers, K0AAB, 961 Arcade St., St. Paul 6, Minn.

QSLs Samples 25¢. Rubber Stamps; Name Call, Address, \$1.55. Harry Sims, 3227 Missouri Avenue, St. Louis, Mo. 63118.

BUY, SELL, TRADE Ham, CB Directory. 12 issues \$1.00 Philupi. 1225 Hillside, North Bergen, New Jersey.

PLASTIC HOLDER frames and displays 20 QSL cards. 3 for \$1.00 or 10 for \$3.00, prepaid. TEPABCO, Brown Ave., Gallatin, Tennessee.

PRINTED CIRCUIT BOARDS Hams, Experiments. Many different projects. Catalog 10¢ P/M Electronics, Box 6288 Seattle, Washington 98188.

HAMS Convert any television to sensitive, big-screen oscilloscope. Simple changes. No electronics experience necessary. Illustrated plans, \$2.00. Relcoa, Box 10563, Houston, Texas.

ATTENTION HAMS! We buy, sell ham gear. Repair and alignment facilities available. Hold Advanced and First phone. Used Gear always reconditioned. Money back guarantee. KitKraft Company, P.O. Box 406—Canal St. Station, New York N.Y. 10013.

FOR SALE Complete instructions including 28 page booklet and 22" x 36" schematic for converting the ART-13 transmitter to a.m. and s.s.b. Satisfaction guaranteed. \$2.50. Sam Appleton, 501 No. Maxwell St., Tullia, Texas.

WANTED—An APR-14, 13 receivers. SG-13, H-p4, SG-1, SG-2, MD-83, 479 Collins, in any condition. T-368-C xmtrs. R-390, 390A, R-388, 389, 391. Receivers. RT-66 thru 70 Rt units RT/77-GRC-9, GRC-10, GRC-19. RCA, Bendix, Collins Aircraft Radio and Radar Equip. Hewlett Packard, General Radio, Tektronix, etc., Test Equipment. GRC, PRC, GRR, TCC, ARC, sets ARM, PRM, URM, UPM, URM, SG Test sets any and all types. You name it. Call E. Charol, Tech Systems Corp., 42 W. 15th Street, N. Y. 11, N. Y. CH 2-1949 Collect.

REMOTE CONTROL UNIT, brand new \$5.00. Postpaid. (Cost Navy \$125.00) MDC, 923 W. Schiller, Phila. 40.

ELECTRONIC TUBES—TOP BRANDS SOLD at substantial savings! (Minimum Order \$15.00). Authorized GE distributor. Send for FREE Buyers' Guide for all your Tube Requirements. Top Cash paid for your excess inventory (New Only—Commercial Quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016, 212-MU 6-2834.

ANTENNA tuning unit, brand new \$3.00 postpaid (cost Navy \$85.00). MDC, 923 W. Schiller, Phila. 40, Pa.

WANTED: Commercial or Military, Airborne or Ground, Equipment and Testsets Collins, Bendix, others. We Pay Freight . . . RITCO, Box 156 Annandale, Virginia.

QSL's CB, WPE Samples 10¢ Nicholas & Son Printery P.O. Box 11184, Phoenix, Arizona 85017.

personnel for a new product to be distributed shortly. \$10.00
THIS COMPANY is looking for Ham & CB cartoon artists and ideas per idea IF ACCEPTED. For information, write AMBRU PRODUCTIONS. 10 Burbank Street. Yonkers, New York 10710.

FREE CATALOG: Wholesale electronics, Hundreds of items. Why pay more? ROYAL, Box 2591, El Cajon, California.

MANUALS for surplus electronics. Stamp for list. W3IHD, 4905 Roanne Drive, Washington, D.C. 20021.

TELETYPE RIBBON modification kit for Model 15. New surplus. Special nylon ribbon automatically re-inks, outlasts 250 ordinary ribbons! \$4.95, postpaid. Telemethods 3075 E. 123 Street, Cleveland, Ohio 44120.

FREE! BLUE BOOK LIST. Leo offers hundreds of Bargains on re-conditioned gear. Viking II \$97.70; NC300 \$189.00; Collins 62S-1 \$625.50; King 500 A \$259.00; SP600 \$296.65; HT-37 \$254.15; DX-40 \$40.50; Cheyenne \$49.18; CE-10B \$69.00; SX-101 \$160.65; PRO310 \$229.00—Many More. Also, Free 1965 Catalog. WOGFQ, WRL, Box 919, Council Bluffs, Iowa.

LEARN CODE

**THE
MODERN
ATKO
WAY**

Literature
Available



Model A complete as illustrated.

\$4950

Model B identical to model A except contains no tone source or speaker.

\$3950

AUTOMATIC TELEGRAPH KEYS CORPORATION

275 Madison Avenue, New York 10016

For further information, check number 40, on page 110

FREE Catalog OF THE WORLD'S FINEST ELECTRONIC GOV'T SURPLUS BARGAINS



**HUNDREDS OF TOP QUALITY
ITEMS** — Receivers, Transmitters,

Microphones, Transformers, Power Supplies, Inverters, Meters, Phones, Antennas, Test Equipment, Indicators, Filters, Amplifiers, Headsets, Converters, Control Boxes, Motors, Dynamotors, Blowers, Cable, Keyers, Chokes, Handsets, Switches, etc., etc. Send for FREE CATALOG—Dept. C.Q.

FAIR RADIO SALES
2133 ELIDA RD. • Box 1105 • LIMA, OHIO

For further information, check number 41, on page 110

New from Philco: an up-to-date handbook for [SSB] Communications

Comprehensive treatment of SSB Systems for the Radio Amateur. Sections of SSB Modulation, Transmitter Theory, Receiver Theory, and much more. Price, only \$4.50

Send orders with remittance to:
PHILCO TECHREP DIVISION DEPT. L
P. O. BOX 10, FORT WASH., PA. 19034

VHF-UHF

CONVERTERS & PREAMPS.

50 thru 432 Mc.

Write for literature

PARKS ELECTRONICS • Rt. 2 • BEAVERTON, ORE.

"HOW TO MAKE MONEY IN Mobile Radio Maintenance"

AUTHORITATIVE GUIDEBOOK
ABOUT THE BOOM IN TWO-WAY MOBILE-RADIO:
GIVES FACTS, FIGURES, PAY RATES,
WRITE TODAY!

FREE



LAMPKIN LABORATORIES, INC. Electronic Div. BRADENTON, FLA.

BARRY ELECTRONICS

- **Heineman 5 Amp. Circuit Breaker S.P.S.T. .90¢.**
- **Hammarlund 250 Mmf. Variable Ceramic Capacitor. 4" long. .95¢.**
- **200 Watt/70K Pwr Resistor. .95¢.**
- **829B Socket w/by-pass caps \$1.00.**
- **Amphenol 5 Prong ceramic socket for 807, etc. 12¢.**
- **BC-221AA Freq. Meter. 125 to 20,000 Kcs. These units are brand new. Never used. "Mint" \$135.00.**
- **TS-173 Freq. Meter. 90 to 360 Mcs. W/modulation. Excellent \$250.00.**
- **TS-175/U Freq. Meter. 85 to 1,000 Mcs. W/modulation. Excellent \$150.00.**
- **NC-400 Receiver. Last one in stock. Brand new. Sld factory carton. Never opened. Reg. net is \$995.00. Price \$695.00.**
- **Last Pair . . . Clegg Zeus and Interceptor. Factory gty. \$895.00 the pair.**
- **Hewlett-Packard TS-403 U Sig. Generator. 1800 to 4,000 Mcs. Brand new. Complete, (like HP616 Sig. Gen.) \$550.00.**
- **ARC-48 UHF Transceiver. New. Operates near 220 Mcs Band. Xtal controlled. 4 Channels. Plug-in modules \$250.00.**
- **TBW Westinghouse Xmtr. Converted to 115 VAC/60 CPS operation. 2,000 VDC P.S. included. A beauty. Call or write for further details.**
- **Dow-Key DK2-60B Coax Transfer Relay. 52 Ohms. 115 VAC. Switches in & out a Linear between exciter & antenna \$19.00.**
- **HQ-180. Like new. All-Band Receiver. W/Xtal Switch for 11 positions (HQ180AX) \$229.00.**
- **BC-1031A Panoramic Adapter. Plus or minus 100 Kc. 3" C.R. 15 VAC/60 CPS. IF-455 Kcs. Like new. \$95.00.**
- **B & W OA-65A/MRC-2 Receiver. Unused, like new. 1500 to 18,000 Kcs. Looks like BC-342. With built-in 115 VAC P.S. \$69.50.**
- **Collins RT-298/ARC-2A Transceiver. 2 to 9 Mcs. Manual and/or 8 channels auto-tune. Brand new. A beauty for Marine, Ham or Mobile use. (Operates from 26.5 VDC) \$275.00.**
- **Gonset Communicator IV. For 2 Meters. Very good operating condition, with mike. 115 VAC/or 12 VDC \$190.00.**
- **Cardwell Type TH1072-US Var. Capacitor. Ideal for hi-pwr antenna loading, etc. 1,000 Mmf. \$9.95.**
- **Dumont type 304AR 5" rack mtd 'scope. Lab-tested O.K. Good condition \$125.00.**
- **Boonton Type 170-A "Q" Meter. 30 to 200 Mcs. Very good condition \$175.00.**
- **Silicon Rectifiers: 600 PIV @ 1 Amp. @ .36¢; 800 PIV @ 750 Ma. @ .56¢; 400 PIV @ 750 Ma. @ .30¢; In lots of 40 . . . Deduct 10% (may be mixed).**
- **CV-253 ALR Electronic Freq. Converter. Tunes from 38 to 1,000 Mcs. in APR Receivers \$150.00.**
- **2.0 Mfd. @ 7500 VDC oil Capacitor \$13.50.**
- **Cole Decade Resistance Box. 5 ranges. From .1 to 11,111 Ohms, Similar to G. R. #1432-N. Brand new, orig. Gvt. sld pckg. \$49.50.**
- **Vantron 300 Watt PEP GG Linear Amplifier. Brand new. Orig. ctn. W/blt-in 115 VAC P.S. 10 thru 80 meters \$69.00.**
- **Eimac SK-400 Air System Socket (less hardware) \$6.95 (reg. \$17.50).**

● **COME IN AND BROWSE . . .** Thousands of items that we cannot list in an ad. Mon. to Fri. 9 to 6. Saturdays 10 to 2 PM (Free parking on Street Sat.) Mon. to Fri. parking lot 501 Broadway. If it's **TUBES** that you need, check with **Barry**. First-quotations answered same day. We also buy tubes; must be *unused* only, send details!

BARRY ELECTRONICS DEPT. C-4
512 BROADWAY, NEW YORK 12, N. Y.
WALKER 5-7000 (AREA CODE 212)

Enclosed is money order or check and my order. Prices FOB NYC. Shipment over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overcharge will be refunded. Fragile tubes shipped via Railway Express. Minimum order \$5.00. (Any orders under \$5.00 add 50¢ service charge)

Send 15¢ for Spring/Summer "Greensheet Catalog #16."

Name Title

Company

Address

City State

For further information, check number 33, on page 110

HAMVENTION NOTICE: The Dayton Amateur Radio Association invites you to the 14th Annual Dayton Hamvention, Friday evening, April 9, and Saturday, April 10, 1965, Wampler's Ballarena, Dayton, Ohio. Banquet Speaker—Bill Leonard, W2SKE, Vice President, News, CBS, Forums: VHF, DX, SSB Antennas, RTTY, Army MARS: Hidden Transmitter Hunt; Homebrew Contest; exhibits; Women's Activities; General Class FCC Exam—Make examination application in advance to 8th District Engineer in charge at Detroit. FCC will issue examination papers. Registration and exhibits—Friday evening and Saturday. Saturday: Forums 09:00-17:00; Banquet 19:00. For information, write: Dayton Hamvention, Department G, Box 44, Dayton, Ohio.

INTERESTING OFFERS GALORE in the new "Equipment Exchange—Ham Trader"! Rush \$1 for next 12 issues. Brand, WA9MBJ, Sycamore, Illinois.

BRAND NEW 5894 \$18.00; 6442 \$15.00; 6DQ5 \$2.00; 7027 \$1.00. Johnson Low Pass #250-20 \$10.00. WA9NKT 1235 Hillcrest Lane, Freeport, Illinois.

FOR SALE—Gonset Communicator III 6 meters, 12v., complete with mike and book. Like new. Local sale only. \$165.00 K2EEK, 75-15 177 St., Flushing 66, N.Y.

WANTED: Complete set or bound volumes of CQ for 1945 and 1946 for private collection. Write Scott Cowan, 73-62 Bell Blvd., Bayside, L.I., N.Y. 11364.

WANTED early issues of QST. 1922—Jan., Feb., Mar., 1921—all but May and July, 1920—all but April, May and June. K2EEK, CQ, 14 Vanderverter Ave., Port Washington, L.I., N.Y., 11050.

BOUND VOLUME 1964 CQ for sale. Order now and be sure to receive your copy. Limited quantity. First come first served. Send \$15.00 to Dept. H.W. CQ Magazine, 14 Vanderverter Ave., Port Washington, L.I., N.Y. 11050.

FOR SALE—Clegg Zeus transmitter \$475; Clegg Interceptor Receiver \$300; both for \$750. or what do you have to trade. W1ZZF, 18 Fairview Ave., Trumbull, Conn.

Swan SW-240 \$220 with Heathkit DC supply \$245 HQ-170C \$175, both excellent. W4SDC.

No Time to Ham, HT-32A, D-104 mike w/PTT stand, NC-303, make offer, singly or package, W7PMC, Phillipsburg, Montana.

FOR SALE: Complete shack—National NC-98, Speaker, Xmtr Viking II Heath Kit VF-1, v.f.o., Pre-selector RME DB-23, Speech Clipper RME, Q-Mult., like new, in operation \$325. W2JGQ, Isaach, 231 E. 11th St., N.Y. 881-7737.

FOR SALE: New Viking "Courier Linear Amplifier 500 Watts, Factory wired, \$125; used Viking II Transmitter, \$70; Art-13 Transmitter; PRC-14 Transceiver 200-400 mc, \$20. Bill W0 TEM/4 Box 248, Waxhaw, North Carolina.

SELL—Hickok xtal controlled microvolt signal generator 10XD, 90kc-144mc; built-in meter, dual freq. standards, 8 in. vernier dial. Cost \$875—sell \$150 or swap for CB xcvr or gen. coverage receiver. Martin Gary, 807 Westham Pkwy, Richmond, Va.

MUST SELL—New Hallicrafter HA-5 v.f.o. Extremely stable. \$45. WA2RFH, 227 N. Jackson, Endicott, N.Y., ST 5 6763.

WILL TRADE: Heathkit FM Stereo Radio—Multiplex GR-21-GR-21-1 for Heathkit HW-32 20m Transceiver. Will pay \$30.00 for ACPS. WA4EDK, 12904 N. 15th St., Tampa, Fla.

PENTAX, 35mm SLR, S1, f2.2 AutoTakumar, w/detachable Pentax meter, flash and cases, hardly used, immaculate. Will trade for T-150A/K3FJT. 1510 Naudain St., Harrisburg, Pa.

FOR SALE: Complete home or mobile station, HE-45B six meter transceiver, Cushcraft Squalo, 5 element Hy-gain beam, mike, and several crystals for \$120. You pay postage or pick up. Jon Wood W0UHL, 403 Sunset, Olathe, Kansas.

HALLICRAFTERS Model CRX-2 FM receiver, 152-174 mc, Excellent Condition \$70. John Wrenn, 1204 Central Ave., Albany, N.Y.

WANTED: Any Command receiver available. Send prices and details to: Oscar Zuniga, 3302 Frost, Laredo, Texas.

WONDERFUL OFFER HQ 100-A receiver, HT40 transmitter, Ameco Nuvister six meter converter, novice rocks, all like new for only \$220, Postage Paid, K3SUH, Robert Kares, 516 Lafayette St. Easton, Pa.

SELL: Revere T11 professional tape recorder \$75; Precise 635 sine-square-pulse audio oscillator \$25; Underwood Portable Typewriter \$25; Eico 488 electronic switch \$20; Astatic crystal mike \$4; RCA 45-rpm automatic record changer \$4. V. R. Hein, 418 Gregory, Rockford, Illinois 61108.

THREE Raytheon 4-D-32 Tubes, \$25 each. postpaid in USA. W2RXW.

WANTED Citizen band radio, 22 rifle or gun, also other items. Let's Swap Club, 1610 S. Dunsmuir, Los Angeles 19, Cal.

WANTED Chassis less Modules for CV-89 RTTY converter K1AJE, Box 829 Haley Rd., Kittery, Maine.

SELL Model 15 Complete table power supply \$90. K1AJE, Box 829, Haley Rd., Kittery, Maine.

CANADIANS, Wanted a 2 Meter Transceiver or Transmitter with or without v.f.o. No less than 15 Watts input. Write M. Picov, VE3FIA, 283 Betty Ann Dr., Willowdale, Ont.

WANTED MORROW RTS-600S AC power Supply. Keith LaChapelle, 9000 Congdon Blvd., Duluth, Minn.

FOR SALE Knight-Kit, T-150 xmtr \$75 ARC-5 rcvr 3-6 mc. \$5. K1ZKR.

75S-3C for sale, like new, \$550. Wanted Collins 62S-1, Fred Moore K2BRH, 377 Glen Rd., Rome, N.Y.

FOR SALE, good transmitter with an interesting history. HX-50 used at MIM (CQ, June 1964, page 48), DJ0HZ. All factory recommended modifications, ZBZ, set of spare tubes, excellent condition. \$300 pickup, \$310 fob. Al Brogdon, K3KMO, 3504 DePauw Place, College Park, Md. 20741. Phone 301-935-6186.

RTTY—Model 15—immaculate condition—recently rebuilt—complete with case, table—Paint (green) like new—will deliver within 250 miles or ship at cost—\$150—Stephen Burns, WB2CTU, RD#2, Kirkville, New York (near Syracuse).

KWM-2 for sale with noise blanker, mobile MP-1 power supply, mike antennas, mobile mount and speaker. Best possible condition. K6DUL, Ed Price, 2758 Forrester Dr., Los Angeles, Calif. 90064 (VERmont 8-9334)

FOR SALE: Apache, excellent condition—\$185.00, HQ-110, needs alignment on six meter band only—\$120.00, Globe 755 v.f.o. \$20.00, Lafayette HE-50 10 meter transceiver \$70.00. Will ship 50 miles of N.Y.C. K2ZCU, Box 192, Nesconset, L.I., N.Y. (516) 588-6255.

SELL Lafayette HE-80 with matching speaker \$89, Collins F455FB21 2.1 filter \$21. Seppo Hurme. 2523 Amherst Ave. Los Angeles, Calif. 90064.

SELLING Hammarlund HQ-100. Make offer. Jack Elias, 2416 South 7th St., Phila., Pa. 19148.

MUST SELL Hallicrafters SX-96 \$110; Hammarlund HQ-129 \$100. Keith Wishmeier, 6434 Sweet Briar Lane, Dayton, Ohio 45459.

COLLINS 310B/13. Excellent condition. Bandswitching as W6SA article in June 1953 CQ. First \$150 cashier's check. Val Johnson, 32 River Drive, North Pekin, Illinois.

KWM-2, 312B-5, PM-2 MP-1, CC-2. Package deal/Save, Less than 100 hours old. D. Dunlavy, 919 So. Fifth Ave., West, Newton Iowa 50208.

FOR SALE: 75A-4 like new #3193, 3.1 kc. filter, matching speaker, vernier dial, only \$400. W8CXK.

SELL—Eimac 4CX1000A, SK-810, SK-806, all together \$150. B&W 825A \$30. All new. Watkins, WA4NPA, Route 1, Box 118, Melbourne Beach, Florida.

SX-111, perfect condition, \$125; Knight T-50, 50 Watts, \$25; Relay rack cabinet, doors, interlock \$65. K9VHA, 819 Lincoln, Freeport, Illinois.

CLEGG ZEUS and Interceptor both for \$595. Individually \$395 and \$240 respectively. No trades. Mint condition, am going to 2M FM. C. Schroeder, 21 High Acres Dr., RD2, Poughkeepsie, N.Y. GL 2-5136.

WANTED: Plug-in coils or forms for SW5 Thrill-Box receiver. Write indicating condition and price to W5MDI, 2820 McMillan Circle, Bethany, Oklahoma.

S.R.R.C. HAMFEST: June 6, 1965. See Announcement section of "CQ" in the May issue or write for details after April 1, 1965. Starved Rock Radio Club W9MKS/W9QLZ, FRD #1 Box 171, Oglesby, Illinois 61348.

COLLEGE BOUND: Brand new Heath HX-30 6 meter SSB Transmitter assembled but never used, APX-6 Transponder converted for 1215 mc—mint condx, ART-28 Transmitter for Ham TV-600w, ART-26 Transmitter with solid state power supply—converted for Ham TV, 420 mc Transceiver, 2,000v power supply, 220 mc filter, cabinet for 6 meter, 1.6-5.2 mc vfo, new 4 cx 300A with socket. Stan Nazimek, 506 Mt. Prospect Ave., Clifton, New Jersey—7012, 201-777-4168 WB2GKE.

WANTED—HE 62 10 meter vfo for HE 50A transceiver. State condition and price. Frank Andrei, W3OEL, R.D. 1 Saltsburg, Pa.

TELEPLEX teaches CODE

TELEPLEX performs no miracles. It just seems miraculous when compared to any other method. Get the facts. Don't waste your time and money. Write today for descriptive literature. It's free and interesting.

TELEPLEX CO. • 739 Kazmer Court • Modesto, Calif.

TELREX ROTATOR-INDICATOR SYSTEM MODEL TS250-RIS

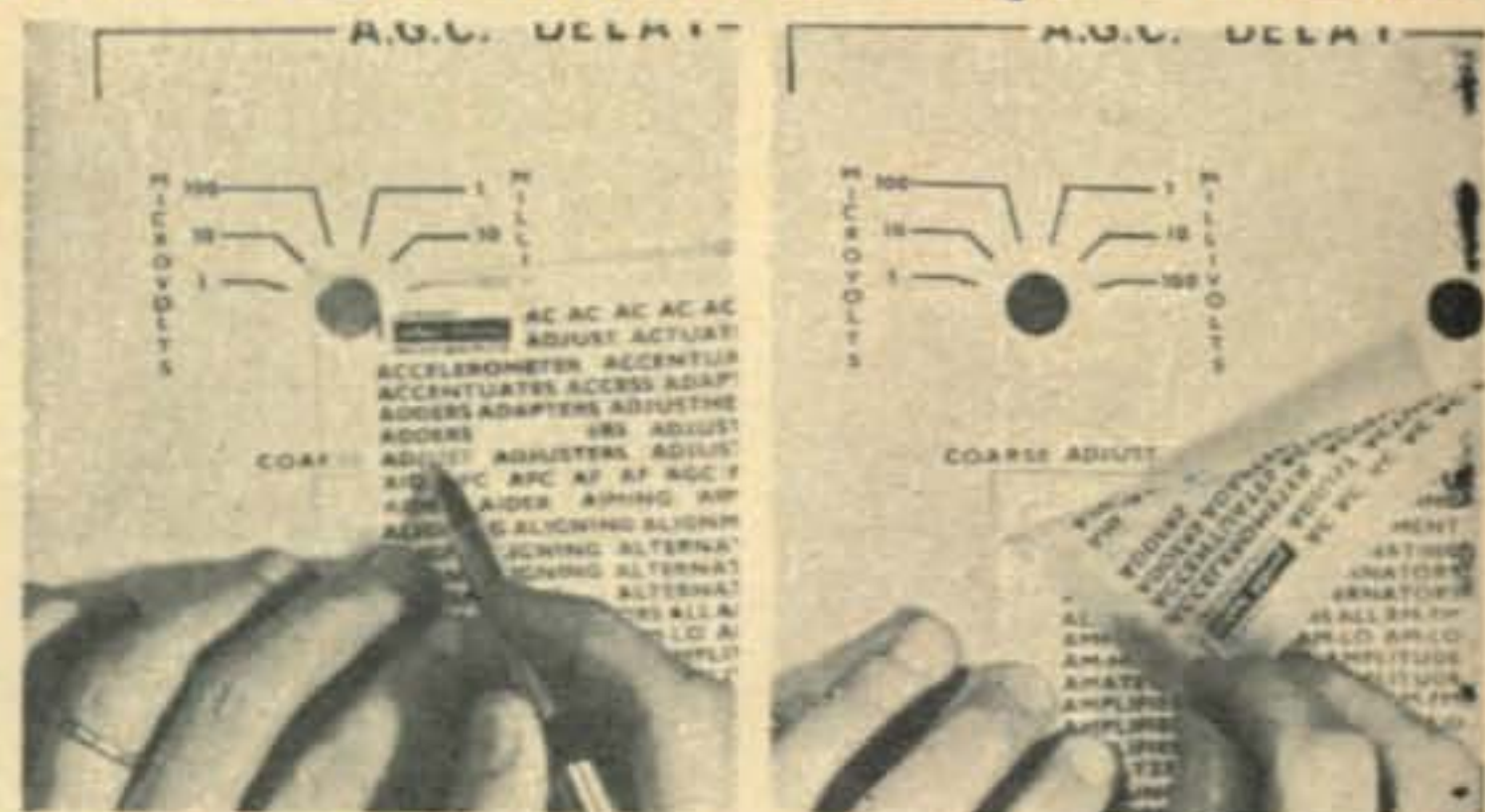
Mast Feeds Thru Rotator For Safe, Easier, Installation

- 1300 IN./LBS ROTATION TORQUE
- SELF LOCKING BY STURDY WORM GEARS
- SELSYN AZIMUTH INDICATION
- ACCOMMODATES 2" O.D. MASTING
- MALLEABLE CAST MASTING CLAMP SUPPLIED
- OUTPUT SPEED APPROX. 1 RPM
- WILL FIT INTO OR ONTO A 6" SIDED TOWER

Write for FREE PL65 Describing Rotators and Antennas

For further information, check number 44, on page 110

instant lettering[®] dry transfer MARKING KITS for ELECTRONIC EQUIPMENT



"Instant Lettering" marking kits contain all the necessary elements for completely marking electronic equipment, drawings, prototypes, schematics, etc., in a fast easy-to-use form.

Words, letters, numerals, switch patterns, arcs, etc., are printed on a special transparent carrier film. Rubbing over one of these elements with a ballpoint pen releases it from the carrier film and adheres it to your working surface.

Reproduction quality "Instant Lettering" transfers are clean and sharp, leave no background haze or film, make prototypes look like finished production equipment and give all equipment and drawings a professional look.

WRITE FOR FREE SAMPLE AND COMPLETE DETAILS

THE DATAK CORPORATION
63 71st Street Dept. 612 Guttenberg, N. J.

See our demonstration at Booth 4233 IEEE Show

For further information, check number 42, on page 110

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way—with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM. beats having someone send to you.



ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the Instructograph System. Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4711 SHERIDAN RD., CHICAGO 40, ILL.
4700 Crenshaw Blvd., Los Angeles 43, Calif.

For further information, check number 43, on page 110

BE SMART—BUY AND SAVE ON THE PLAN THAT FITS YOUR POCKETBOOK

Plan 1—Best terms—no finance charges—no trades!
Plan 2—Best Cash Price—No Trades!

"Don't Delay—Write Today!"

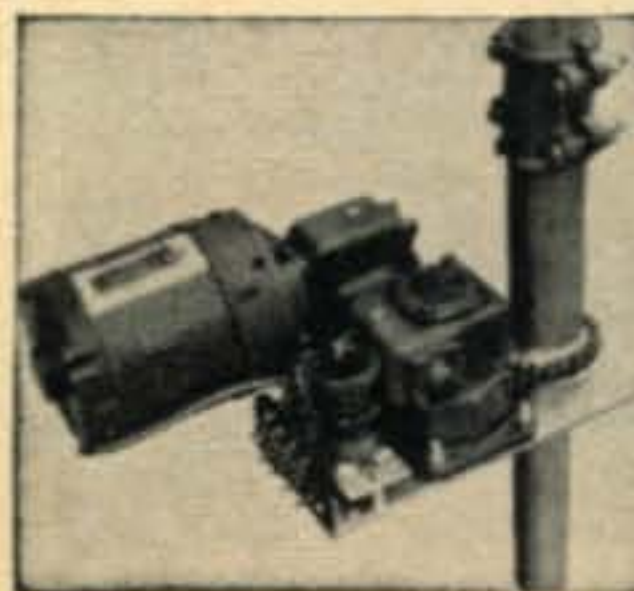
Drake-Hallicrafters-Hammarlund-Johnson

Ampex-Sony-Norelco

National-SBE-Swan, etc.

WILLARD S. WILSON, INC.

405 Delaware Ave., Wilmington, Delaware 19801
Est. 1920 Willard-W3DQ Tel. 302-654-5344



A Really Sturdy ROTATOR-INDICATOR SYSTEM—NOT a Modified TV Rotator! Designed To Out-Perform, Outlast!

\$250⁰⁰

F.O.B.

ALSO
TS325-RIS \$325
TS435-RIS \$435
TS535-RIS \$535
TS585-RIS \$585

TELREX LABS.

ASBURY PARK, N.J.



Announcements [from page 24]

97.311 Operating conditions

97.313 Station identification.

Subpart G—Operation of Amateur Radio Stations in the United States by Aliens.

§97.301 Basis, purpose, and scope.

(a) The rules in this subpart are based on, and are applicable solely to, alien amateur operations pursuant to Section 303 (1), (2) and 310 (a) of the Communications Act of 1934, as amended. (See Public Law 88-313, 78 Stat. 202.)

(b) The purpose of this subpart is to implement Public Law 88-313 by prescribing the rules under which an alien, who holds an amateur operator and station license issued by his government (hereafter referred to as an alien amateur), may operate an amateur radio station in the United States, in his possessions, and in the Commonwealth of Puerto Rico (hereafter referred to only as the United States).

§97.303 Permit required.

(a) Before he may operate an amateur radio station in the United States, under the provisions of Sections 303 (1), (2) and 310 (a) of the Communications Act of 1934, as amended, an alien amateur licensee must obtain a permit for such operation from the Federal Communications Commission. A permit for such operation shall be issued only to an alien holding a valid amateur operator and station authorization from his government, and only where there is in effect a bilateral agreement between the United States and that government for such operations on a reciprocal basis by United States amateur radio operators.

§97.305 Application for permit.

(a) Application for a permit shall be made on FCC Form 610-A. Form 610-A may be obtained from the Commission's Washington, D.C. office, from any of the Commission's field offices and, in some instances, from United States missions abroad.

(b) The application form shall be completed in full in English and signed by applicant. A photocopy of the applicant's amateur operator and station license issued by his government shall be filed with the application. The Commission may require the applicant to furnish additional information. The application must be filed by mail or in person with the Federal Communications Commission, Washington, D.C., 20554, U.S.A. To allow sufficient time for processing, the application should be filed at least 60 days before the date on which the applicant desires to commence operation.

§97.307 Issuance of permit.

(a) The Commission may issue a permit to an alien amateur under such terms and conditions as it deems appropriate. If a change in the terms of a permit is desired, an application for modification of the permit is required. If operation beyond the expiration date of a permit is desired, an application for renewal of the permit is required. Application for modification or for renewal of a permit shall be filed on FCC Form 610-A.

(b) The Commission, in its discretion, may deny an application for a permit under this subpart. If an application is denied, the applicant will be notified by letter. The applicant may, within 90 days of the mailing of such letter, request the Commission to reconsider its action.

(c) Normally, a permit will be issued to expire one year after issuance but in no event after the expiration of the license issued to the alien amateur by his government.

§97.309 Modification, suspension, or cancellation of permit.

At any time the Commission may, in its discretion, modify, suspend, or cancel any permit issued under this subpart. In this event, the permittee will be notified of the Commission's action by letter mailed to his mailing address in the United States and the permittee shall comply immediately. A permittee may, within 90 days of the mailing of such letter, request the Commission to reconsider its action. The filing of a request for reconsideration shall not stay the effectiveness of that action, but the Commission may stay its action on its own motion.

§97.311 Operating conditions.

(a) The alien amateur may not under any circumstances begin operation until he has received a permit issued by the Commission.

(b) Operation of an amateur station by an alien amateur under a permit issued by the Commission must comply with all of the following:

(1) The terms of the bilateral agreement between the alien amateur's government and the government of the United States;

(2) The provisions of this subpart and of Subparts A through E of this part;

(3) The operating terms and conditions of the license issued to the alien amateur by his government; and

(4) Any further conditions specified on the permit issued by the Commission.

(c) An alien amateur may operate on dates, at locations, or via an itinerary, significantly different from that specified in the application for his permit only under the condition that he has given advance notice of the particulars of such operation to the Commission in accordance with the requirements of 97.95 (a) or 97.99 (b).

§97.313 Station identification

(a) The alien amateur shall identify his station as follows:

(1) Radiotelegraph operation. The amateur shall transmit the call sign issued to him by the licensing country followed by a slant (/) sign and the United States amateur call sign prefix letter(s) and number appropriate to the location of his station.

(2) Radiotelephone operation. The amateur shall transmit the call sign issued to him by the licensing country followed by the words "fixed", "portable" or "mobile", as appropriate, and the United States amateur call sign prefix letter(s) and number appropriate to the location of his station. The identification shall be made in the English language.

(b) At least once during each contact with another amateur station, the alien amateur shall indicate, in English, the geographical location of his station as nearly as possible by city and state, commonwealth, or possession.

Contest Calendar [from page 71]

CHC/FHC/HTH QSO Party

Starts: 2300 GMT Friday, June 4.

Ends: 0600 GMT Monday, June 7.

Plenty of activity, awards and Trophies in this one so watch for the rules in full in next month's CALENDAR.

Winners 1964 VE/W Contest

Winners in the 1964 VE/W Contest. Listed by call areas and ARRL Sections.

W1ECH ...53806	K4JSZ .....28760	W9LNQ ....80635
W1GKJ .....22346		WA9ISM ..24552
K1HVV .....44550	WA5CBL ..24552	K9YBC ....53015
K1DFC .....23760	W5KC .....58410	
K1YRB/1 ..12128	W5AMZ .....29778	WA0HYI ....8316
W1FZ .....15246	K2EIU/5 ..61776	K0ZXE ....58608
K1EWL ....34650	K5OCX ....46887	W0HZC ....27720
	W5LGG ....64598	W0IEM ....46728
W2EXB ....69498		W0GNX ....43065
WB2EDU ....1815	WB6CEP ..29568	WA0GVJ ....4158
K2YEW/2 ..7920	WA6MSM 35375	K9GDF/O ..1386
WB2GRF ..50490	K6DQB ....15840	
K2KFP ....53460	K6RTK ....35640	KP4BBN .....891
	K6JIC .....29700	
W3YLJ .....76032	WB6GFZ ..26136	VO1AW ....11400
W3KDF ....25395	W6OUL ....31630	VE1DB ....18876
W3AYS ....68310		VE2WA ....68904
	W7EWR ....15939	VE3DUS 111532
K4LTA .....42240	K7ZNE ....21150	VE4ZX .....48495
WA4PGA ..12128	W7GYF ....3564	VE5UF .....79732
W4UWS ....47075	W7ZMD ....35640	VE6MC ....68556
WA4IKU ..42903	W7NPU .....9207	VE7BDP ..52326
W4HTV ....62964		
K2QIG/4 ..14850	W8YEK ....33858	(VE3DUS was the
W4PZV ....32356	W8CTN ....73508	Trophy winner.)
K4Vfy .....64152	WA8DGE ..45540	

Editors Note

Conditions on the week-end of our 160 WW Contest were real tough. The DX was coming thru but only the strongest stations were above the static level which was up to summer strength on both nights. Fading on local signals was also very marked, so that activity dwindled down to a minimum near the end of the contest. Some of the fellows however stuck it out to the bitter end so some good scores can be expected in spite of these obstacles.

Also because of the poor week-end for the c.w. portion of the World Wide DX Contest, the returns are running below those of last year's. The Phone section however shows a surprisingly good total.

There is still plenty of work ahead so . . .
73 for now, Frank, WIWY

Space [from page 73]

For each mode of operation, simultaneous transmissions will be conducted on each of the frequencies shown above.

W6EE plans to be in operation daily from 1600 to 0500 GMT during the period OSCAR III is in orbit and operating. Transmission periods will be extended, if required.

Flyover predictions for the OSCAR satellite will be given in reference to the 40th parallel, north for stations in North America; the 50th parallel, north for stations in Europe and Asia; the 32nd parallel, south for Australia and the southern hemisphere. The W6EE transmissions are expected to be relayed by several other amateur radio stations throughout the world.

73, George, W3ASK

Solution

Amateur Radio Countiesgram Puzzle

1. Orange County, New York.
2. Snohomish County, Washington State (World's Fair).
3. Brevard County, Florida (Cape Canaveral).
4. Coconino County, Arizona.
5. Kent County, Rhode Island.
6. Sumter County, S. C. (Gen. Sumter's Memorial).
7. Otero County, New Mexico (Proving Grounds).
8. Wayne County, Michigan (Detroit—Auto Center).
9. Hawaii County, Hawaii.
10. Jefferson County, Colorado.

[The Countiesgram appears on page 34.]

WHY GUESSAVERT IF U CAN TUNAVERT?

Now ur car and home radios can be tunable, calibrated ham receivers with a



TRP TUNAVERTER!

Models for 160 to 10 meters. Single band all transistor converters with large calibrated dials, 6-1 vernier tuning, mute connections provided. Postpaid\$19.95

NOW COPY S.B. & C.W.!

Tunavert with permability tuned B.F.O.\$24.95
Special I.F. injection model, 455 or 262 KC Exc. for Q5'r front end\$24.50 With B.F.O.\$29.50

TRP-50A All transistor 50 watt power supply and 35 watt modulator combination . \$84.50

Write:
HERBERT SALCH & CO.
WOODSBORO, TEXAS
Made in U.S.A.



For further information, check number 50, on page 110

Space Age Accessories

CPR SPEECH COMPRESSORonly \$14.95

- TRIPLE average power output
- Mounts on panel connector
- Powered by common battery
- Compression level adjustable
- For SSB or AM (not a clipper)
- Low distortion; for low & high impedance microphones
- Attack time 150 milliseconds; release time 1-3 seconds



FL-2 BANDPASS FILTER (2 meters)only \$6.95

DP-4 FREQUENCY DIVIDER (2&6 meters) only \$5.95

TR-9 SOLID STATE POWER SUPPLYonly \$5.95

(see Dec. 1964 and Feb. 1965 CQ for full descriptions)

(FLA. RESIDENTS INCLUDE 3% SALES TAX)

COMMUNICATION COMPONENTS COMPANY

P.O. Box 8721 Orlando, Florida

For further information, check number 51, on page 110

As shown in Dec. 64 CQ, p. 31

New Low cost hermetically sealed transformers for D.C. to D.C. converters. Ideal for medium or low power mobile.

Model	Voltage*	Current (ma)	Price
85	800	225	\$19.95
300	300	185	9.95
25-10	250/100	175/20	9.95
120	120	100	8.95

*All ratings shown are for 12 v.d.c. input.
Write for free brochure.

SYDMUR

P.O. Box 25 Midwood Station
Brooklyn, New York 11230



telrex "BALUN" FED INVERTED "V" ANTENNA KITS

SIMPLE-TO-INSTALL, HI-PERFORMANCE ANTENNA SYSTEMS:

- 1 KW P.E.P. Mono-Band Kit . . . 1KMB1V/81K . . . \$19.95*
2 KW P.E.P. Mono-Band Kit . . . 2KMB1V/81K . . . \$22.95*

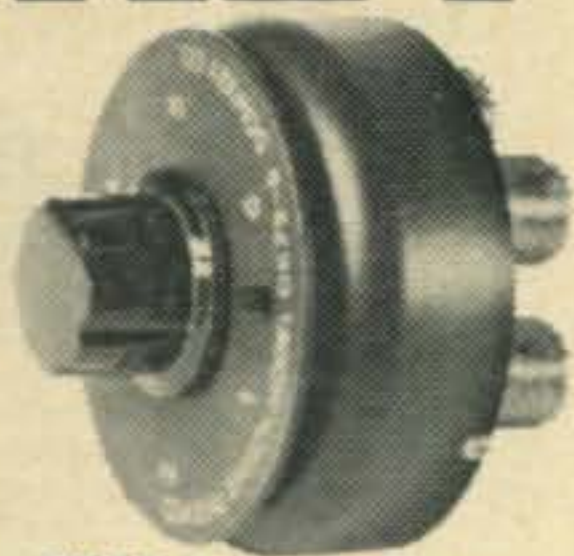
*Kit comprises, encapsulated, "Balun," copperweld, insulators, plus installation and adjustment instructions for any Mono-band 80 thru 10 Meters. Also available 2, 3, 4, 5 Band Models.



Mfd. under Pat. 2,576,929
Write for TELREX PL 65
TELREX LABORATORIES
ASBURY PARK, NEW JERSEY

For further information, check number 52, on page 110

DOW-KEY DK78 SERIES



DK78-6

NEW MANUAL COAXIAL SWITCHES . .

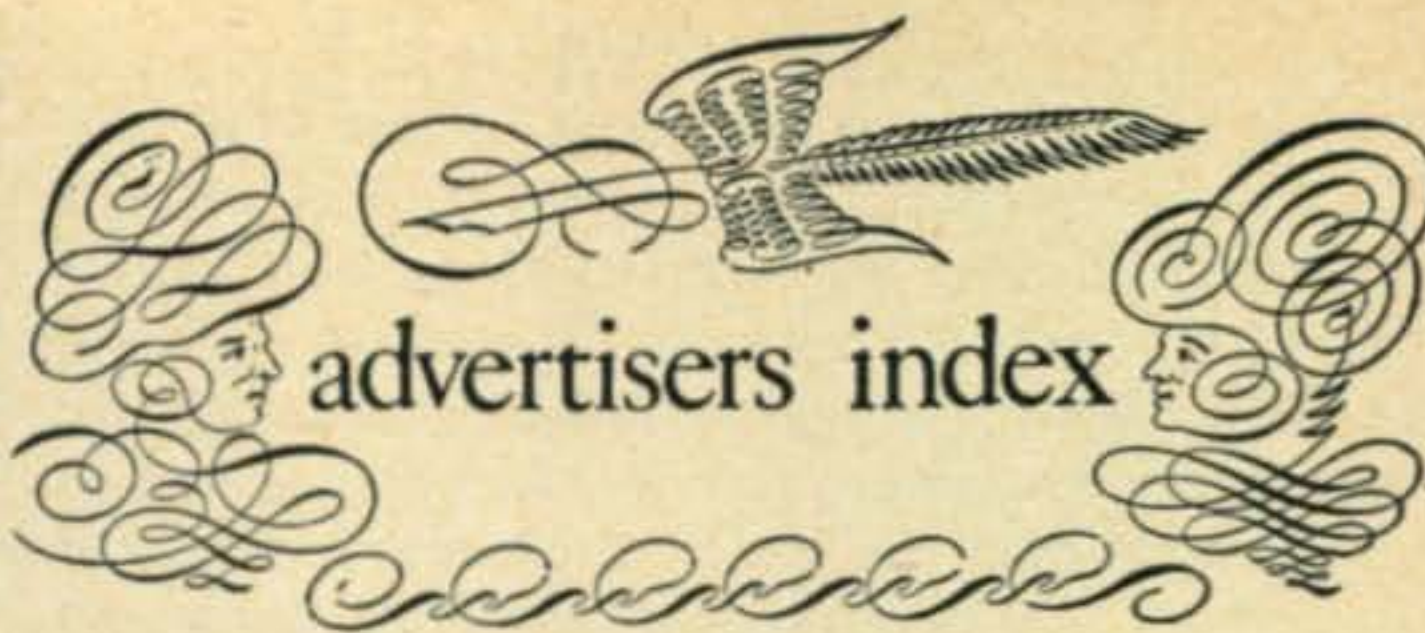
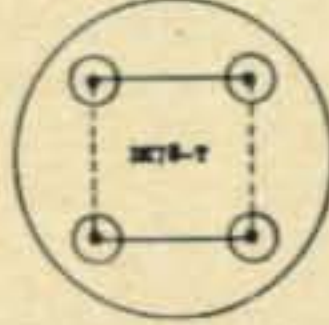
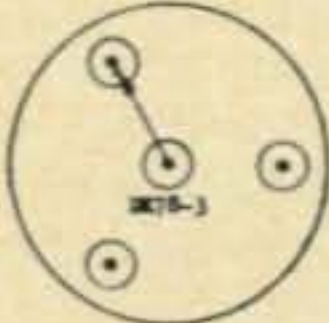
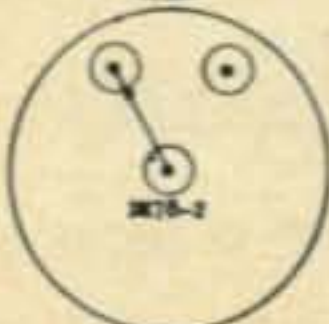
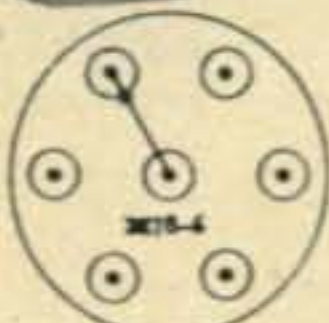
(Not Wafer Switches)

New manual DK78 series coaxial switches with excellent r.f. characteristics (not wafer switches). r.f. rating, 1 kw. 50 ohm impedance. VSWR less than 1.05:1 at 150 mc. Isolation greater than 50 db @ 500 mc. and greater than 80 db @ 30 mc. With dial plate and knob. Wt. 10 oz. Size: 3" dia. x 1 1/8" deep.

- DK78-2, single pole, double throw \$12.75
- DK78-3, single pole, three throw \$12.75
- DK78-6, single pole, six throw -- \$15.75
- DK78-T, transfer-crossover switch \$15.75

Available with types BNC, TNC, N and C Coaxial Connectors at slightly higher costs.

Products at your dealer or write:
DOW-KEY COMPANY
Thief River Falls, Minnesota



advertisers index

Automatic Telegraph Keyer Corporation	105
Barry Electronics	106
Cleveland Institute of Electronics	61
Collins Radio	Cover II
Communication Components Company	109
Communications Equipment Co.	100
Datak Corporation, The	107
Dow-Key Co.	100, 110
Electro-Voice Inc.	95
Fair Radio Sales	105
Finney Company, The	22
Galaxy Electronics	25
Gonset, Inc.	21
Hallett Manufacturing Co.	95
Hallicrafters	2
Harrison	112
Harvey Radio Co., Inc.	91
Heath Company	28, 29
Instructograph Company	107
International Crystal Mfg. Co., Inc.	17
Johnson, E. F. Company	15
Lafayette Radio Electronics	111
Lampkin Laboratories, Inc.	105
Linear Systems Inc.	111
Master Mobile Mounts	20
Millen, James Mfg. Co., Inc.	14
Mosley Electronics, Inc.	
Multicore Sales Corp.	102
National Radio Company, Inc.	Cover III
New-Tronics Corporation	9, 18
P. A. F. Enterprises	104
Parks Electronics	105
Partridge Electronics, Ltd.	24
Pennwood Numechron Co.	102
Petersen Radio Company, Inc.	1
Philco Techrep Division	105
Radio Amateur Callbook, Inc.	26
RCA Electronic Components and Devices	Cover IV
RF Communications, Inc.	23
Rohn Manufacturing Co.	16
Salch, Herbert & Co.	109
Sideband Engineers	4
Skylane Products	104
Space Electronics	99
Spera Electronics	99
Subscription News	81
Swan Electronics Corp.	19
Sydmur	109
Technical Books	103
Teleplex Co.	107
Telrex Laboratories	99, 107, 109
Texas Crystals	27
Walters Laboratories	102
Waters Manufacturing, Inc.	8, 9, 10, 11, 12, 13
Western Radio	104
Wilson, Willard S., Inc.	107
WRL World Radio Laboratories, Inc.	93, 101

—-READER SERVICE—-

NAME _____ CALL _____
(Please Print)

ADDRESS _____

CITY _____

STATE _____ ZIP CODE _____

Please send me more information on your ads in the April 1965 CQ keyed as follows:

WATERS MANUFACTURING INC.
Page 8, 9, 10, 11, 12, 13

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	Total Inquiries						<input type="checkbox"/>

Void after April 28, 1965

CQ MAGAZINE, Dept. RS

14 Vanderverter Ave.

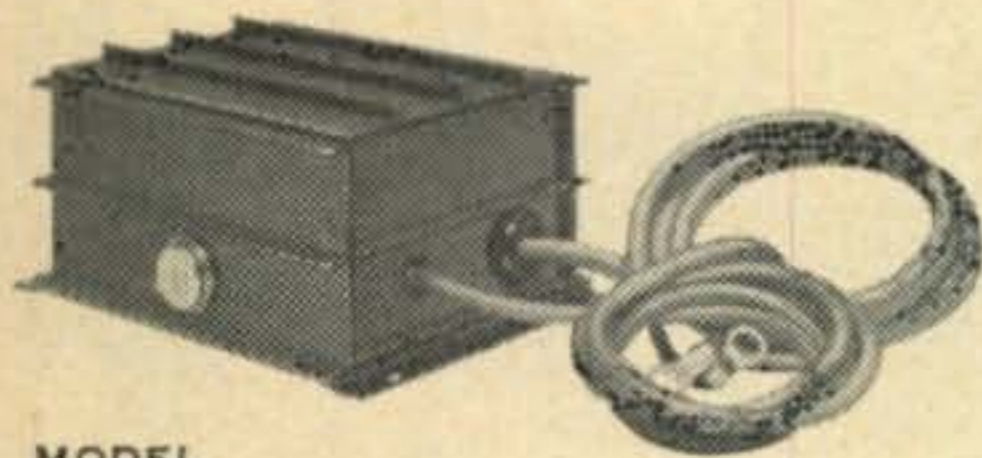
Port Washington, L. I., N. Y. 11050

WHEN YOU GO MOBILE

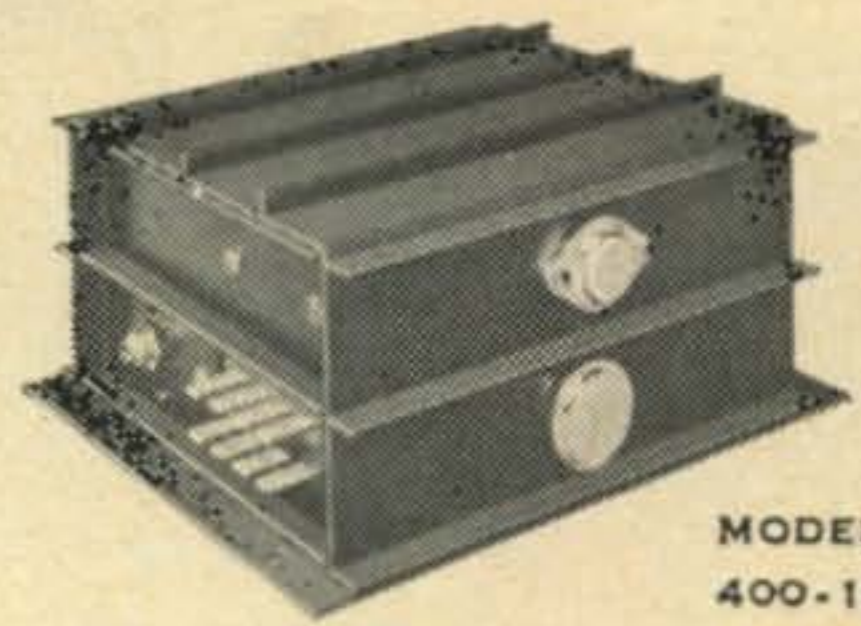
HOOK UP TO "THE BEST SUPPLY MONEY CAN BUY"

CENTURY*

MOBILE POWER SUPPLIES



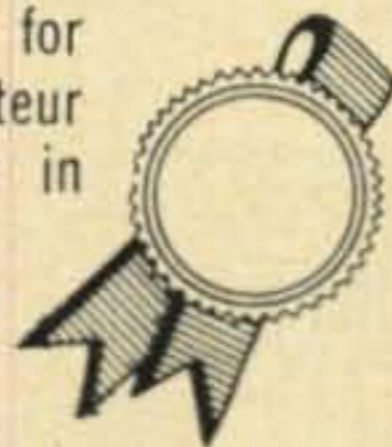
MODEL 350-12



MODEL 400-12

QUALITY COMPONENTS
EXPERT WORKMANSHIP
TOP PERFORMANCE

There is a CENTURY model converter made for your power requirements. No other converter on the market today can give you the many outstanding features assembled in these compact, solid-state CENTURY supplies. Backed by years of experience in the power supply field, engineers at Linear Systems designed the CENTURY series to provide the finest unit possible for powering commercial and amateur radio communications equipment in mobile service.



CENTURY MODEL No.	CONT. OUTPUT (WATTS)	PEAK OUTPUT (WATTS)	VOLTAGES	APPLICATION	PRICE
350-12	300	350	800 275/325 0 to 125	Most Mobile Transceivers 12 Volt	\$114.50
400-12	350	400	850/750/650 250/285/325 0 to 125	All Mobile Transceivers 12 Volt	\$145.00
500-12	400	500	1150 285/325 0 to 125	Hi-Power Mobile Transceivers Linear Amplifiers	\$165.00
1000-12	750	1000	2200 285/325 0 to 125	Mobile Linear Amplifiers	\$275.00

*PAT.
APPLD. FOR



PROVEN QUALITY GUARANTEE

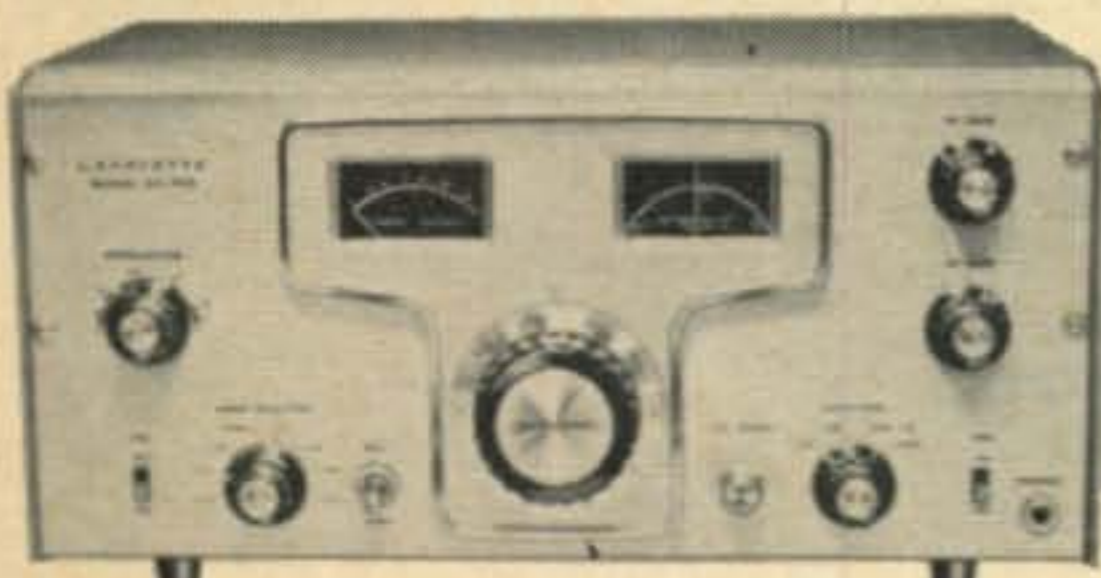
CABLES NOW SUPPLIED
WITH ALL CONVERTERS

LINEAR SYSTEMS INC.

605 UNIVERSITY AVENUE
LOS GATOS, CALIFORNIA

For further information, check number 45, on page 110

NEW! LAFAYETTE AMATEUR RECEIVERS



MODEL HA-350

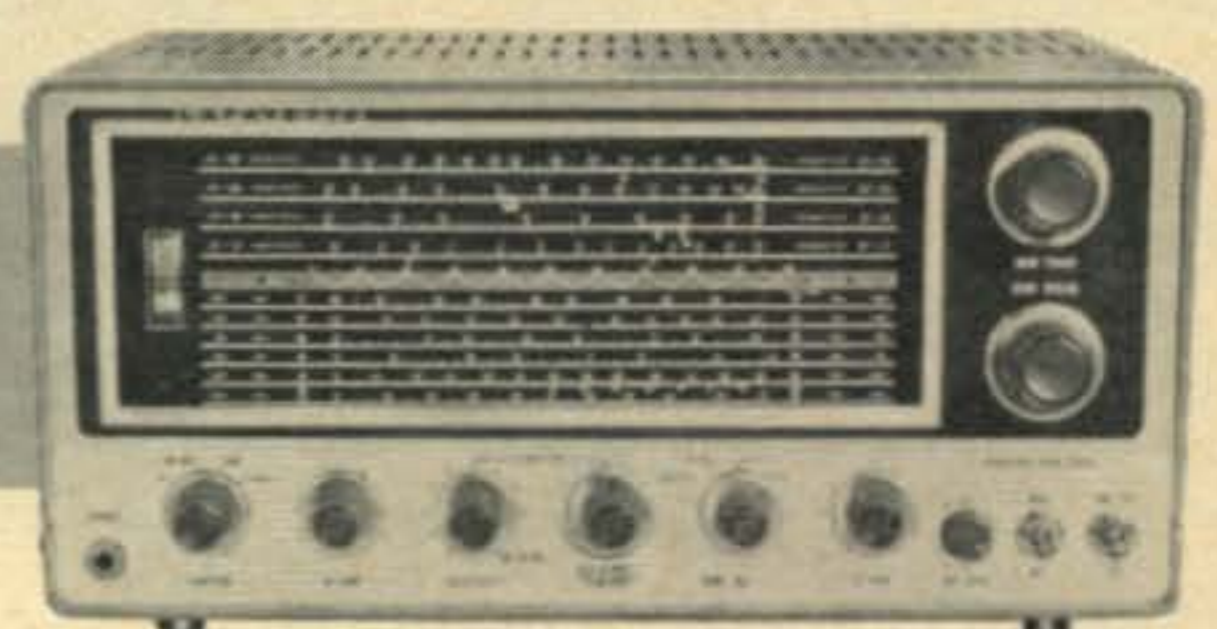
10-80 METER DUAL
CONVERSION AMATEUR
RECEIVER

Model HA-350
189⁵⁰
99-2524WX

Uses Mechanical Filter For Exceptional Selectivity—
Offers 2KC Bandwidth!

Lafayette's newest! A dual conversion superheterodyne communications receiver covering the 10 through 80 meter amateur bands and offering a high order of electrical and mechanical stability for superior AM, CW and SSB operation. Check some of the exceptional features!

- Sensitivity 1 μ V or Better
- 7 Band-Switching Positions — 3.5, 7, 14, 21, 28, 28.5 and 29.1 MC, plus WWV on 15 MC
- Covers 600KC for Each Band
- 12 Tubes
- Crystal-controlled 1st Oscillator
- Transmitter-type for 2nd Osc.
- Preselector Tuning
- Crystal-controlled BFO (Dual frequencies)
- All Heterodyning crystals supplied
- Selectable Sideband
- Geared Tuning Mechanism
- 100KC Calibrator Circuit (crystal optional extra)
- Separate Diode AM Detector and CW/SSB product Detector
- Coax Antenna Input
- 8 and 500 ohm Outputs
- Imported



MODEL HA-230

Professional Quality
8 TUBE AMATEUR
RECEIVER

Model HA-230

89⁵⁰

WIRED
99-2522WX

Model KT-340

74⁵⁰

SEMI-KIT
VERSION
99-2521WX

Features "ALWAYS ON" FILAMENT VOLTAGE ON MIXER AND OSCILLATOR STAGES FOR FREQUENCY STABILITY . . . LONGER TUBE LIFE . . . FASTER WARMUP!

4 BANDS:

550-1600KC 4.8-14.5MC
1.6-4.8MC 10.5-30MC

- 8 Tube Superhet Circuit
- 1 RF + 2 IF Stages for High Gain
- Illuminated 10½" Slide Rule Dial
- Built-in Q Multiplier for Crowded Phone Operation
- Calibrated Electrical Bandsread on 80 thru 10 Meters
- Effective Automatic Noise Limiter
- Stable Oscillator and BFO for Clean AM, CW and SSB Reception
- AVC-MVC Selector on Front Panel
- Built-in Edgewise S-Meter
- Imported

FREE!

Lafayette 516—Pg. 1965 Catalog No. 650. Write:
Lafayette Radio Electronics Corp., Dept. CD-5, P.O. Box 10, Syosset, L. I., N. Y. 11791

For further information, check number 46, on page 110



Why is this Collins KWM-2 a Better Value



than this Collins KWM-2?

Because the ham who owns the top one is enjoying better performance, getting more satisfactory QSO's, a lot more solid pleasure from his investment.

How come? He got *his* Collins from Harrison... from men who are hams themselves, men qualified to give him full instructions in use and tune-up procedures. And they gave his transceiver an actual on-the-air check-out before his eyes. (Mail order purchasers: you get the same intensive check-out service, too, on request.) More... Harrison stands behind the manufacturer's guarantee with its own complete and modern facilities for servicing. And Harrison offers hams a full line of the latest accessories, plus top-flight professional advice in their selection.

When you see this label on equipment of *any* make, you know the ham who owns it got all these important extras. And Harrison's trade-in



HARRISON

For further information, check number 47, on page 110

deals are something special, too. Must be... because they've made us the biggest ham trade-in center in the nation!

Send in your order now for immediate delivery of your Collins KWM-2. With 19 most-wanted features that only Collins combines in a single unit, it's the very finest transceiver you can buy. It can be **YOURS FOR ONLY \$39 A MONTH***

Come in and see all the latest... at "HAM HEADQUARTERS, USA." Write for literature.

⁷³ *Bil Harrison* W2AVA

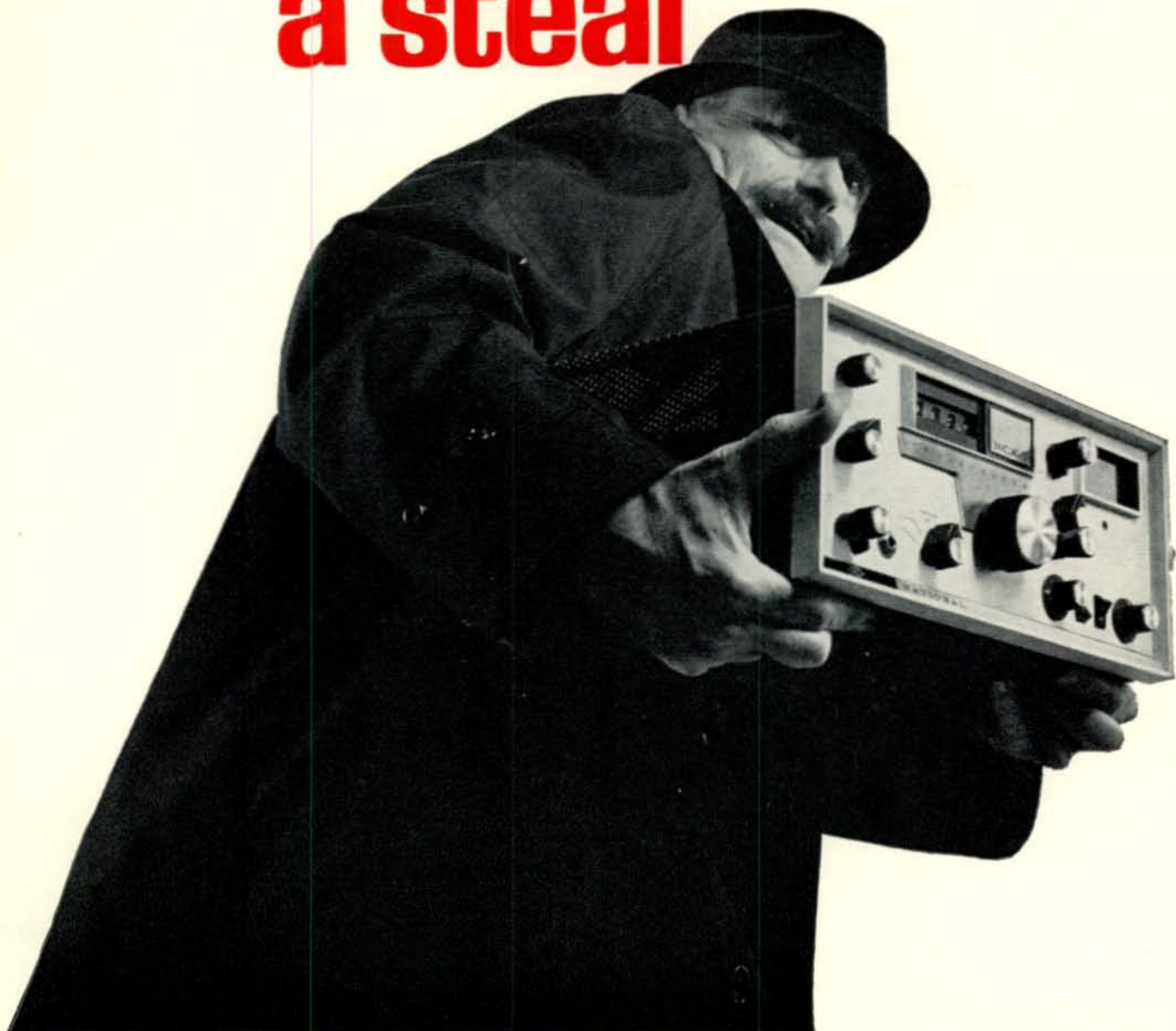
*Typical monthly payments for 24 months, after average trade-in allowance or down-payment. Terms to suit you!

REMEMBER... HARRISON GIVES YOU THE BEST DEAL IN EVERY WAY

Mail orders carefully and promptly filled.

227 Greenwich Street • New York, N. Y. 10007 • BA 7-7922
[In Long Island: Hillside Ave. at 139th St., Jamaica • RE 9-4101]

a steal



Feel like a little larceny? Go ahead. Take advantage of us. At only \$685.00, National's NCX-5 transceiver is a steal. Here's a total station transceiver for the 80 through 10 meter bands which gives you more features and performance than any other transceiver at any price. Judge the NCX-5 by any criterion: **Dial Calibration** using a digital counter with accuracy to one Kc and read-out to 100 cps—ten times better than any other amateur equipment available. **Stability** from a cold start with a linear solid-state VFO which eliminates tube-type warm-up drift due to electrode structure change with temperature. Each VFO individually temperature compensated and double-regulated against input voltage variation. Long-term stability from a cold start superior to most tube-type VFO's after warm-up. **Selectivity** with an 8-pole crystal lattice filter substantially superior to any filter of any type ever used in commercial amateur gear. 6-60 db shape factor of 1.7:1 and 2.7 Kc bandwidth assures superb sideband suppression and adjacent-channel receive selectivity with pleasing, natural voice quality. **Sensitivity** of $0.5 \mu\text{v}$ for 10 db S/N, using **two** RF stages on all bands. **Split-frequency operation** with built-in **Transceive Vernier** for ± 5 Kc independent receiver tuning. Also accessory VX-501 VFO console to provide completely independent control of receiver and transmitter frequencies as well as transceive operation controlled by either NCX-5 or VX-501. Console also provides choice of five crystal-controlled frequencies for net or novice use. **Complete AM and CW facilities** including separate high-quality AM detector and break-in CW with adjustable release time. **Quality and workmanship** you expect from National—one-year guarantee against component failure and the neatest wiring you've seen since the last sun-spot cycle . . . right-angle component dress, with even the resistor color-codes all lined up in the same direction. **And everything else** you want in a transceiver . . . precision styling that complements the NCX-5's performance . . . 200 watts PEP punch on SSB or CW . . . 10 db of ALC for maximum talk-power without flat-topping or splatter . . . front panel choice of VOX, push-to-talk, or manual operation . . . SSB/CW/AM AGC and D'Arsonval S-meter/PA meter . . . mobile mount included . . . even optional deluxe oiled walnut cabinets separately available for the NCX-5, NCX-A AC supply/speaker console, and VX-501 VFO console for custom home installations.

NATIONAL RADIO COMPANY, INC. 

37 Washington Street, Melrose, Massachusetts, 02176 World Wide Export Sales: Auriema International Group, 85 Broad Street, New York City, N. Y.; Canada Tri-Tel Associates, 81 Sheppard Ave. W., Willowdale, Ontario

For further information, check number 7 on Page 110

CREATED BY THE HAND OF EXPERIENCE



NEW LOOK IN RCA POWER TUBES FOR UHF!

All have one-piece,
precision aligned grids and use
coaxial-electrode design

Benefits:
higher efficiency at UHF,
rugged construction
for any kind of operation

Here they are—the latest RCA power tubes for modern transmitters. In a compact chassis they'll QRO for you with less driving power than many conventional types working on the lower bands. And, if you want to operate mobile, these tubes will deliver rated power over quite a wide swing in battery voltage.

High-perveance design enables you to get the power you want at UHF with lower plate voltages. Metal-ceramic construction provides remarkable cooling capabilities. Tube life is outstanding.

Why not let your RCA Industrial Tube Distributor bring you up to date on these and other power tube developments with a copy of the new PWR-506A Product Guide for RCA Power Tubes. Or, for additional technical information write: Commercial Engineering, Section D-15-M RCA Electronic Components and Devices, Harrison, N. J.

TYPICAL OPERATION
Class C Telegraphy or RF Telephony Service

Type	Cooling	Maximum Plate Dissipation (watts)	Plate Voltage (volts)	Frequency (Mc)	Useful Power Output (watts)
8072	Conduction	100*	700	50 175 470	110 105 85
8121	Forced-air	150	1500	50 470	275 235
8122	Forced-air	400	2000	50 470	375 300
8462 (Quick-heating)	Conduction	100*	700	50 175 470	110 105 85

*May be higher, depending on heat-sink design



The Most Trusted Name in Electronics