CQ

December 1960

50¢

The Radio Amateur's Journal

Season's Greetings To All

Night falls and you are alone in your ham shack. With just a touch of your fingers and turn of a dial your call of goodwill spreads afar. It surges beyond the Baltic and the Sulu, over the Pyrenees and the Andes, across the Sahara and the Mojave. Your message penetrates curtains of iron and bamboo; it transcends blinds of prejudice and nationalism. And from Collins Radio Company go the best wishes of this season to you and to all your fellow members in the world-wide fraternity of amateur radio operators.

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For further information, check number 1 on page 120

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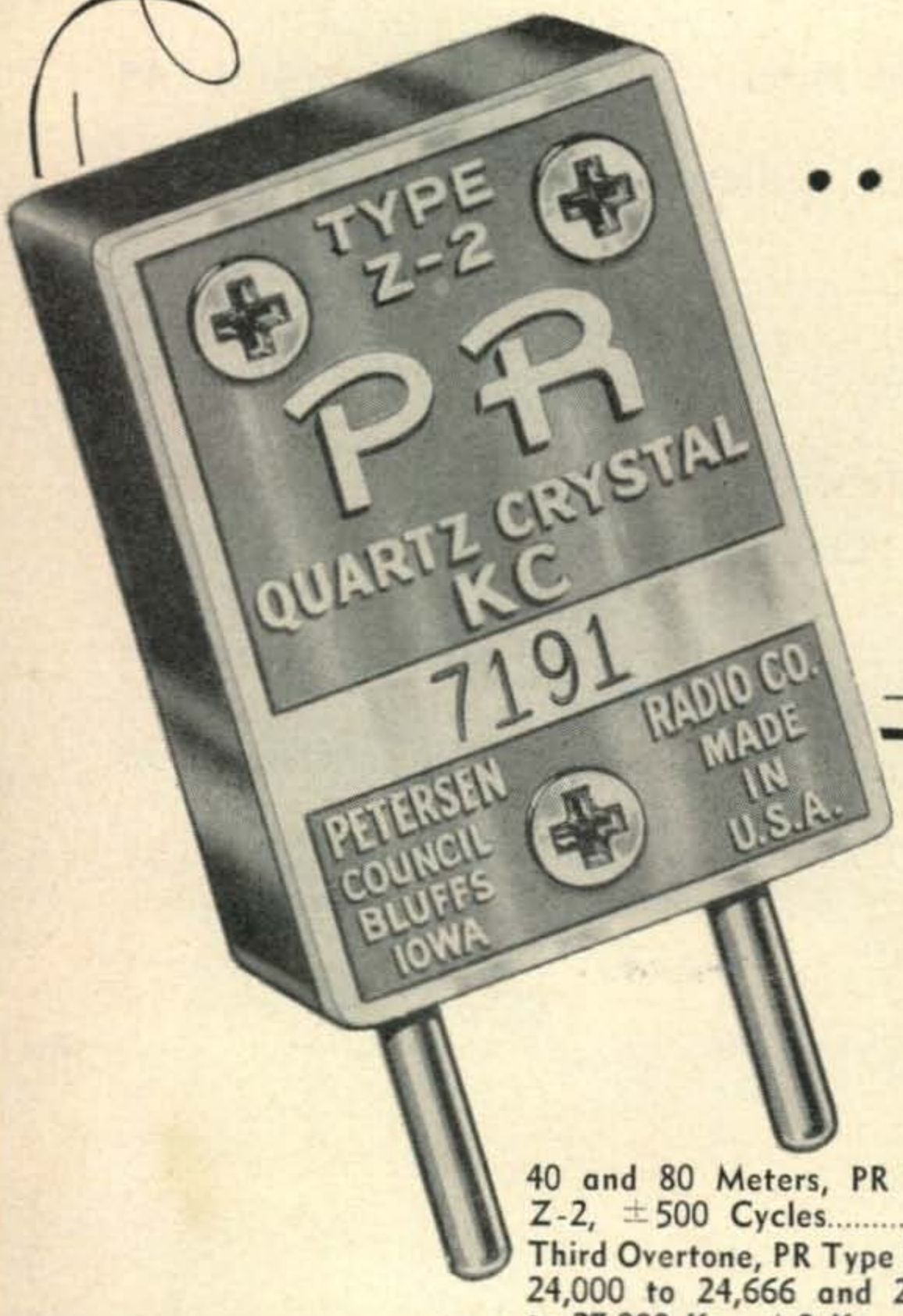

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For further information, check number 3, on page 120

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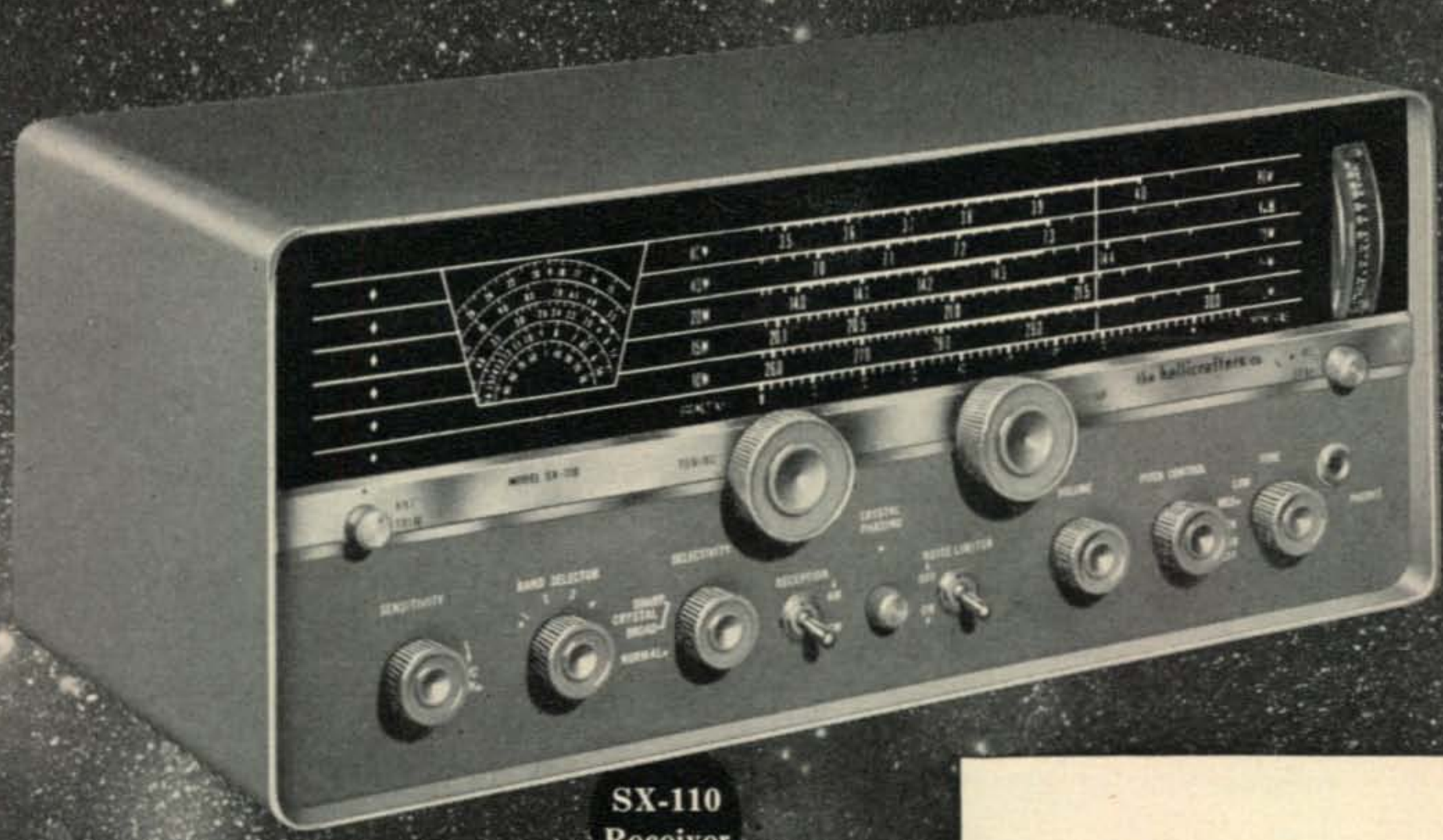

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S-120

S-38E

S-107

SX-110 Receiver. Advanced features and design make the SX-110 an exceptional value for the radio amateur and short wave enthusiast alike. Standard broadcast plus three short wave bands (540 kc-34 mc). Slide rule bandspread dial, calibrated for ham and citizens' bands; built-in "S" Meter, antenna trimmer, crystal filter. Seven tubes plus rectifier.

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For further information, check number 4, on page 120

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For further information, check number 4, on page 120

Designed for Application

TONE MODULATOR
FOR GRID DIP METER

The Millen "Designed For Application" No. 90751 Tone Modulator is a small package, containing a transistor audio oscillator and its mercury battery, which plugs into the 'phone jack of a Grid Dip Meter to modulate the signal at approximately 800 cycles for applications requiring a modulated signal. Modulator is automatically turned on when plugged into a Grid Dip Meter jack.

In addition to its prime use in modulating a Grid Dip Meter, the No. 90751 may be used in other ways. The Tone Modulator has sufficient power output to drive a pair of headphones without amplification. Therefore it may be keyed for code practice or it may be plugged into the mike jack of a 'phone transmitter to provide a tone for modulation checks and for modulated C.W. emission.
Dimensions: only 4 x 1 5/16 x 1 5/16 in.
Weight: 4¼ oz.

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CQ, the Radio Amateurs' Journal is published for active hams by active hams. CQ endeavors to be a true and honest reporter for those interested in the hobby. Suggestions for improvement are welcomed.

Manuscripts submitted to CQ should be typewritten double spaced on 8½ by 11 inch paper with adequate margins on both sides of the typewritten copy. Photographs and drawings should be clear and contain adequate explanations. All manuscripts should be accompanied by an envelope and sufficient postage for its return.

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

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

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

TECHNICAL INFORMATION:

CQ's 15-year cumulative index may be obtained free from our circulation department by enclosing a stamped, self addressed envelope (8¢). Most back issues are available at $1 from us. Check our "Back Issue" ad for details on those not available.

THIS MONTH'S COVER:

If you haven't already turned to page 45, it's not likely you can guess right off, what this little gadget is all about. After you've tried your luck, you can take a peek and find out what a versatile instrument this can be, for the stationary as well as the mobile shack.

For further information, check number 5, on page 120

on the air tonight

HAMMARLUND HX-500 TRANSMITTER

Tonight, and every night to come, more and more Hammarlund HX-500 SSB transmitters will be operating and serving as the topic of conversation. This new transmitter is rapidly setting the standards by which all other transmitters will be judged.

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For further information, check number 6, on page 120

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NEW COMPLETE MOBILE OR FIXED 2-METER TRANSMITTER, RECEIVER COMBINATION . . . ALL IN ONE COMPACT UNIT

- Tracked VFO and Exciter Stages for single knob tuning
- Up to 10 watts RF output to antenna
- Built-in Low Pass Filter
- Built-in 3-way Power Supply for 117 V. AC, 6 V. DC or 12 V. DC operation
- Push-to-talk Ceramic Element Microphone

"PAWNEE" 2-METER TRANSCEIVER KIT (HW-20)

More features, quality, performance and versatility are designed into the new "Pawnee" to bring you the finest in *complete AM and CW facilities* on the 2-meter amateur band. The transmitter section features a built-in VFO with all frequency determining components mounted on a "heat sink" plate for temperature stability . . . plus, *four switch-selected crystal positions* for novice, CAP and Mars operation. VFO and all exciter stages are tracked for convenient *single knob tuning* over any 500 KC band segment (greater excursions require simple re-peaking of final). A *VFO "spot" switch* is provided for zeroing-in signals with transmitter off.

A *6360 dual tetrode final* RF amplifier provides up to *10 watts of power output* to the antenna and a *built-in low pass filter* is incorporated to suppress harmonics and other spurious radiation which might reach the antenna. The *dual purpose modulator* provides a full 10 watts of audio for *high level plate modulation* of the final RF amplifier or 15 watts of audio for *public address operation*, selectable with a push-pull switch.

The receiver is a *superheterodyne* using *double conversion* with the first oscillator *crystal controlled* for high stability. All oscillators are *voltage regulated*. The large, slide-rule type dial with *vernier tuning* provides ample bandspread for both receiver and VFO tuning. Also featured is an RF gain control, BFO, ANL, squelch, AVC on/off switch and *front panel tuning meter*. Meter is automatically switched to read received signal strength or relative power output. Meter and tuning dial are *edge illuminated* for high visibility.

A unique *built-in 3-way power supply* allows 117 VAC fixed station operation or 6 or 12 VDC mobile operation simply by using either AC or DC power cables furnished. The power supply uses heavy-duty vibrator system with silicon type rectifiers in bridge circuit configuration. All sections of the unit are *completely shielded* for maximum stability and noise-free operation.

The "Pawnee" comes complete with *built-in speaker*, two power plugs (AC & DC), heavy duty power cables, primary fused relay for mobile installation, mounting bracket and *push-to-talk* ceramic element microphone with coil cord and mounting clip. Cabinet measures 6" H x 12" W x 10" D.

Model HW-20...34 lbs....
..... $20.00 dn., $17.00 mo. **$199.95**

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NEW PHONE AND CW TRANSMITTER KIT (DX-60)

Model DX-60

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Model DX-60...27 lbs....$8.30 dn., $8.00 mo..**$82.95**

SPECIFICATIONS—Power input: 90 watts peak carrier controlled phone or CW. **Output impedance:** 50-72 ohm (coaxial). **Output coupling:** Pi-network. **Operation:** CW or AM phone—crystal or VFO control. **Band coverage:** 80 through 10 meters. **Power requirements:** 117 V 60 cycle AC, 225 watts. **Dimensions:** 13¾" W x 11½" D x 6½" H.

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Model GC-1A

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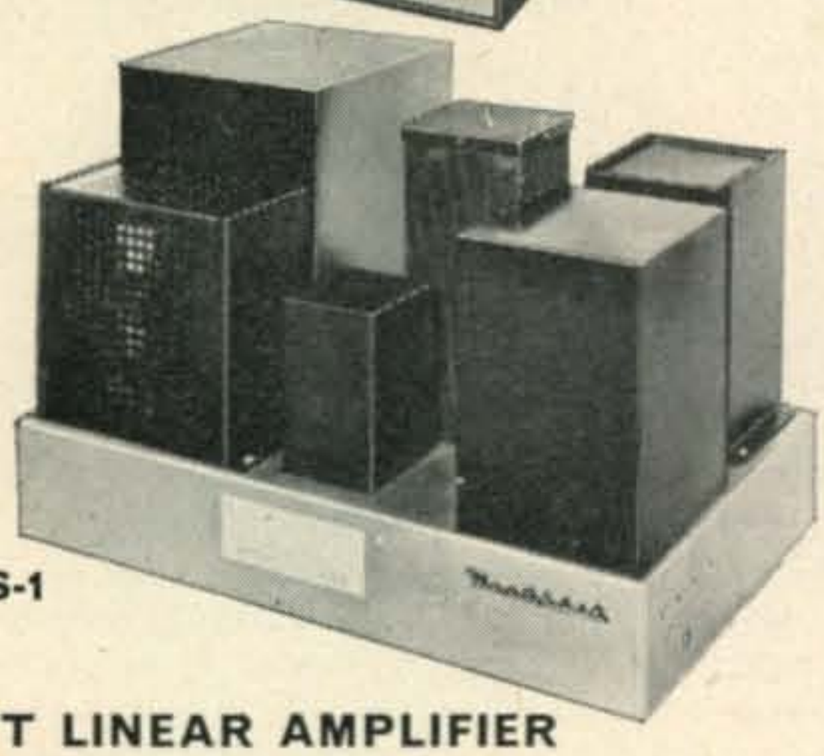

Model KS-1

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Many firsts in receiver design bring you complete portability, high sensitivity, selectivity and stability in this outstanding communications receiver. Features ten-transistor circuit, flashlight battery power supply, ceramic IF "transfilters," Zener diode voltage regulation front end, telescoping 54" whip antenna, S-meter, flywheel tuning and large slide-rule dial. Covers 550 kc, to 32 mc in five bands with calibrated bandspread scales (oscillator tuning) on amateur bands 80 through 10 meters, including 11 meter citizens band. Sensitivity is better than 2 uv for 10 db signal-to-noise ratio on amateur bands. GC-1A quickly converts from battery power to 117 VAC operation with plug-in power supply XP-2 for fixed station operation. 20 lbs.

Model GC-1A (kit)...$11.00 dn., $10.00 mo...**$109.95**

Model GCW-1A (wired)...$19.35 dn., $17 mo.**$193.50**

Model XP-2: 117 VAC power supply for GC-1..... 2 lbs.....**$9.95**

100 KC CRYSTAL CALIBRATOR KIT (HD-20)

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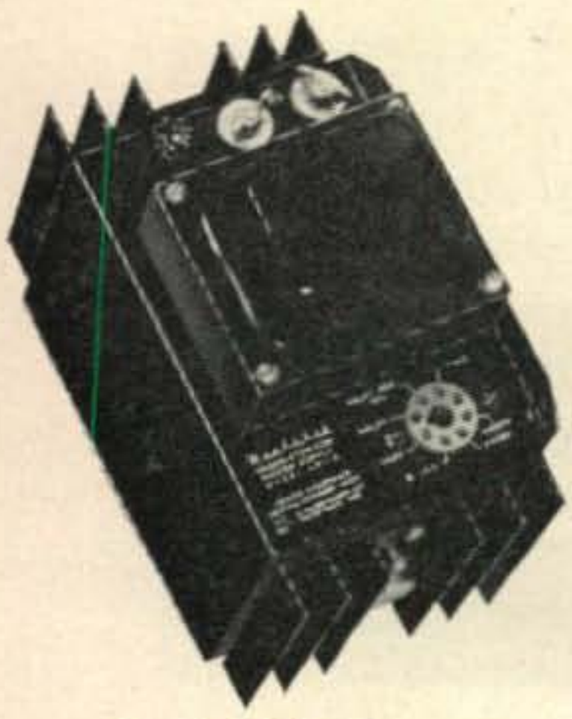

Model HP-10

UTILITY AC POWER SUPPLY KIT (HP-20)

Furnishes filament, plate and bias voltages for converting Heathkit and other mobile amateur gear to fixed station operation. Delivers 120 watt ICAS DC plate power of 600 VDC @ 200 ma or 600 VDC @ 150 ma & 300 VDC @ 100 ma plus bias of —130 VDC @ 30 ma. Less than 1% AC ripple. 6.3 VAC @ 8 amps or 12.6 VAC @ 4 amps for filaments.

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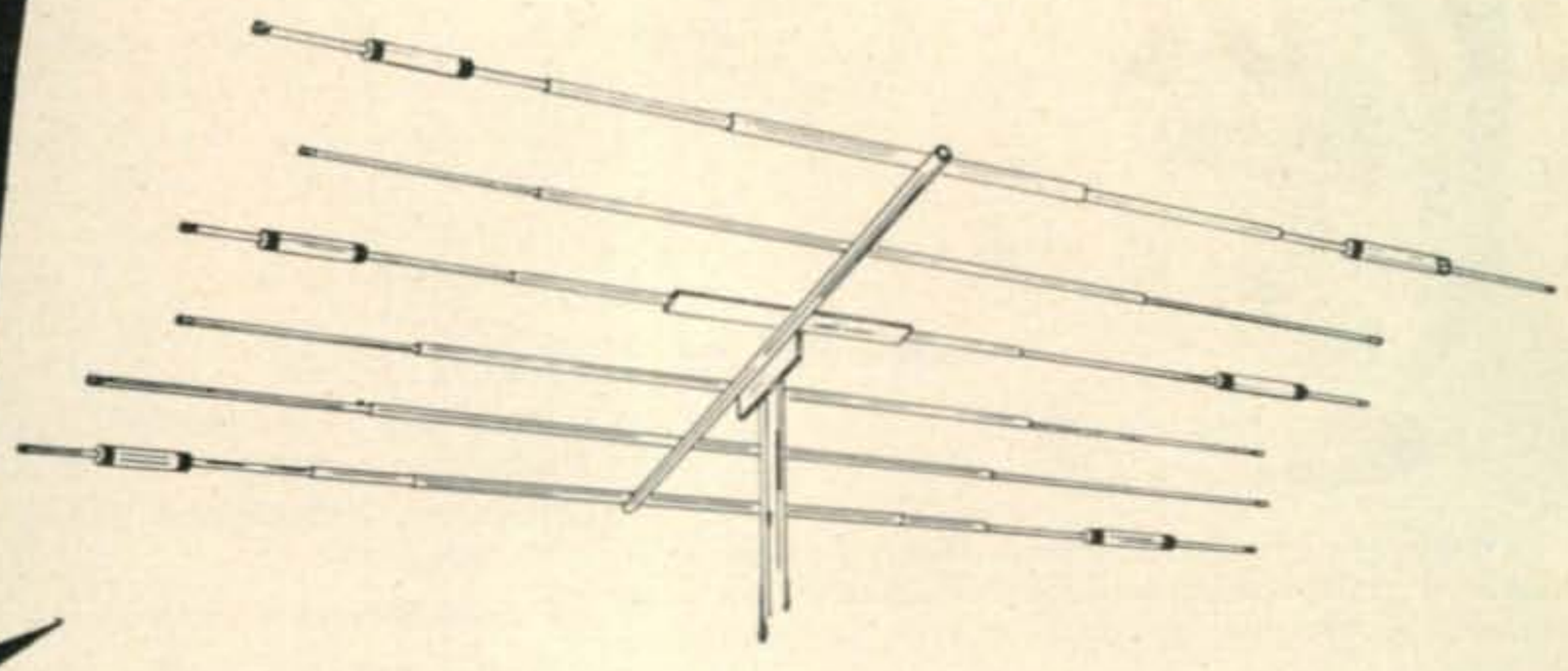
For further information, check number 7, on page 120

NEW!



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For further information, check number 8, on page 120

In Our Opinion . . . .

With this issue, *CQ* brings to a close fifteen years of service to the amateur fraternity. These past years have been growth years for our hobby, and, as we reflect upon these years, we realize that they have been trying years, as well.

When *CQ* first appeared on the scene in 1945, many eyebrows were raised. Never before had a commercial publisher, whose obvious intention was to make a profit, dared to invade the amateur ranks and survive. But *CQ* was destined to survive, if for no other reason than it dared to offer something a little new and a little different to amateur radio. Those early years for *CQ* were hectic ones, and the little orphan was finally tolerated and adopted.

During these past fifteen years, we at *CQ* have certainly had our ups and downs. If we made mistakes, they were honest mistakes, born out of ignorance rather than intent. If we were loudly outspoken, we were so as a child who needs to be recognized. We tried to drive home many strong points: in some cases we were successful, in others not, but we were fortunate to have the power to speak out that only a free press can allow. Perhaps we were a bit too radical for many of the old-timers in our hobby. If so, we gradually learned the difference between liberalism and fanaticism.

And always we have tried to experiment, for only through trial and error could we be certain what our hobby needed and wanted.

But, *CQ* is no longer the orphan stepchild of 1945! It is a growing publication in a still faster-growing hobby, a publication which, more than ever before, must recognize the needs of its readers. We feel that *CQ* has attained a certain dignity of late which only comes with maturity. A greater hobby looms before us, and the opportunity to serve this hobby is a task which we undertake with vigor and enthusiasm.

And, if our organization must still be categorized as a commercial enterprise, we think our readers recognize that the hobby has prospered through the planning and pioneering of many similar commercial firms. Yet, despite all these things, our staff is made up of amateurs whose devotion to their hobby is foremost.

Next month this space will be renamed ZERO BIAS, a name which will be familiar to many old time readers as that used by our first editors. ZERO BIAS will appear when, and only when, we have something we feel holds sufficient interest to our readers. This space will be used to neither arouse controversy nor initiate sensationalism, but will be our means of expressing opinion or constructively criticizing key matters of importance to radio amateurs.

On Writing For CQ

Incidentally, *CQ* is growing and we are anxious to receive articles pertaining to amateur radio. We realize the importance of the amateur writer and you won't be brushed off because your copy is not quite what it should be.

All inquiries will receive prompt and courteous attention.

We want to bring you, the radio amateur the best there is in the ham radio sphere, and we intend doing just that.

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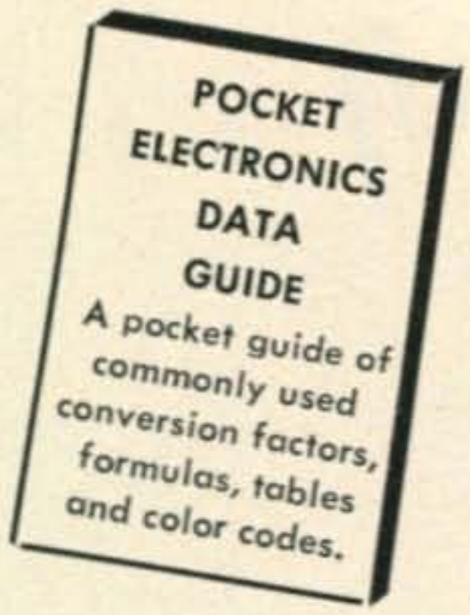

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CQ 71

Letters..... to the Editor

Space Communications

Editor, *CQ:*

. . . I feel that your Space Communications column is really fine. I think that this material is too good to pass by unnoticed by the majority over here who cannot read English. I wonder if it would be alright if I could make, now and then, some extractions for our magazines here in Germany? . . .

Alfred Schädlich, DL1XJ
Posthorn 8, Dramstadt, Germany

Editor, *CQ*:

Congratulations on the Space Communications column. It's really FB. I believe that the amateurs here in France would also be very interested in these new events. With your permission, I would like to translate some of your Space Communications material for publication in *RADIO REF*, the official Journal of the French Amateur Radio Association (Réseau des Emetteurs Francais) . . .

Serge Canivenc, F8SH
28 Ave. Buffen Miry Le Neuf, S&O France

Editor, *CQ:*

. . . *CQ's* hit the jack-pot again. I really enjoyed September and October's Space Communications column . . . It lends dignity to Amateur Radio and to *CQ* . . . Congratulations.

Al Marcus, K6TQB
176 Belcrest Ave., Daly City, Calif.

Editor, *CQ:*

. . . I would like to congratulate you on your column "Space Communications." I am looking forward to reading many more. The best way that I can express myself on this subject is to say that it really is my meat!

Edwin F. Ernst, K3KPF
3561 Jasper Street, Phila. 34, Pa.

Editor, *CQ:*

. . . I read your "Space Communications" column and enjoyed it very much. Please don't fail to include a few construction articles on antennas, amplifiers, etc. I'm looking forward with much interest to future columns. Congratulations on a job well done.

Tommy Darsey, K5PYS
308 Third Ave., Meridian, Miss.

Editor, *CQ:*

. . . I am truly flabbergasted to note your new Space Communications column in *CQ* . . . I am dumbfounded at the perfect timing with which it appeared. . . ."

Fred H. Hicks, W6EJU
Project OSCAR
Sunnyvale, Calif.

Series Modulation

Editor, *CQ:*

Reading the article "Series Modulation or Ultra Modulation the Easy Way" in the June 1960 issue of *CQ*. The author said that he hoped some one could further perfect the system for higher power. Please check the November 1957 issue of *Electronics*. There is a circuit of a Series Gate Modulator which may prove very interesting to your readers and would be simple for construction.

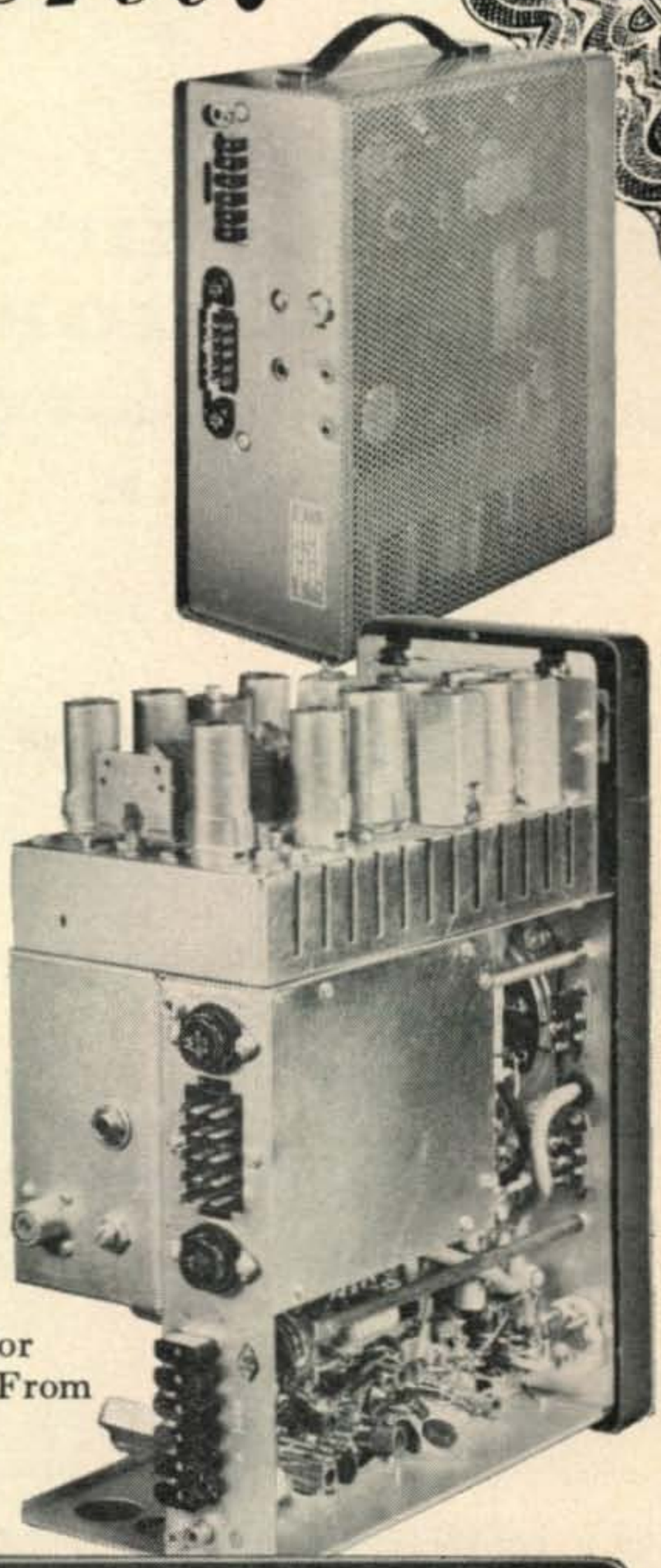
M/Sgt. Richard M. Thompson, KØGSN
Shaw Air Force Base, South Carolina

Sgt. Thompson is right! The article referred to here actually described Gate Modulation and was erroneously called "Ultra Modulation."—Ed.

COMMUNICATOR IV...

Blue-chip Investment.

Many of the thousands of Communicators on the air today were purchased a number of years ago. A substantial number of these units have changed hands several times over the years. Basically well designed and constructed, they continue to perform . . . retain their resale value. Any Communicator owner can find a good market for his old gear whenever he decides to step-up to a newer, more advanced model. And COMMUNICATOR IV gives any VHF man the best of reasons for taking this step . . . *today*.



Now . . . higher input power . . . greater "Talk" power. A fine modern-design receiver using the latest VHF frame-grid, front-end tubes for a noise figure of 4-5! Triple conversion with *first conversion* quartz crystal controlled . . . your assurance of high stability of the frequency range where stabilization is most important—and usually most difficult to obtain. Receiver is continuously tunable, 143.7-148.3 mcs.

Add other "dividend" features: adjustable "squelch", noise limiter, "S" meter, earphone jack, 6-switchable crystal positions plus provisions for external VFO . . . transistorized universal power supply built-in, no strapping—merely use proper plug/cable supplied to change from AC to DC.

All-in-all, features for greater range and flexibility . . . for a new high order of operating pleasure and convenience. From any viewpoint . . . *a blue-chip investment.* **369.50**

For further information, check number 9, on page 120

OTHER MODELS:

COMMUNICATOR IV IS CERTIFIED FOR OCDM SPECS WHEN SUPPLIED WITH #3361 C-D KIT.

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SOON . . . COMMUNICATOR IV MODELS FOR 50 MCS AND FOR 220 MCS.

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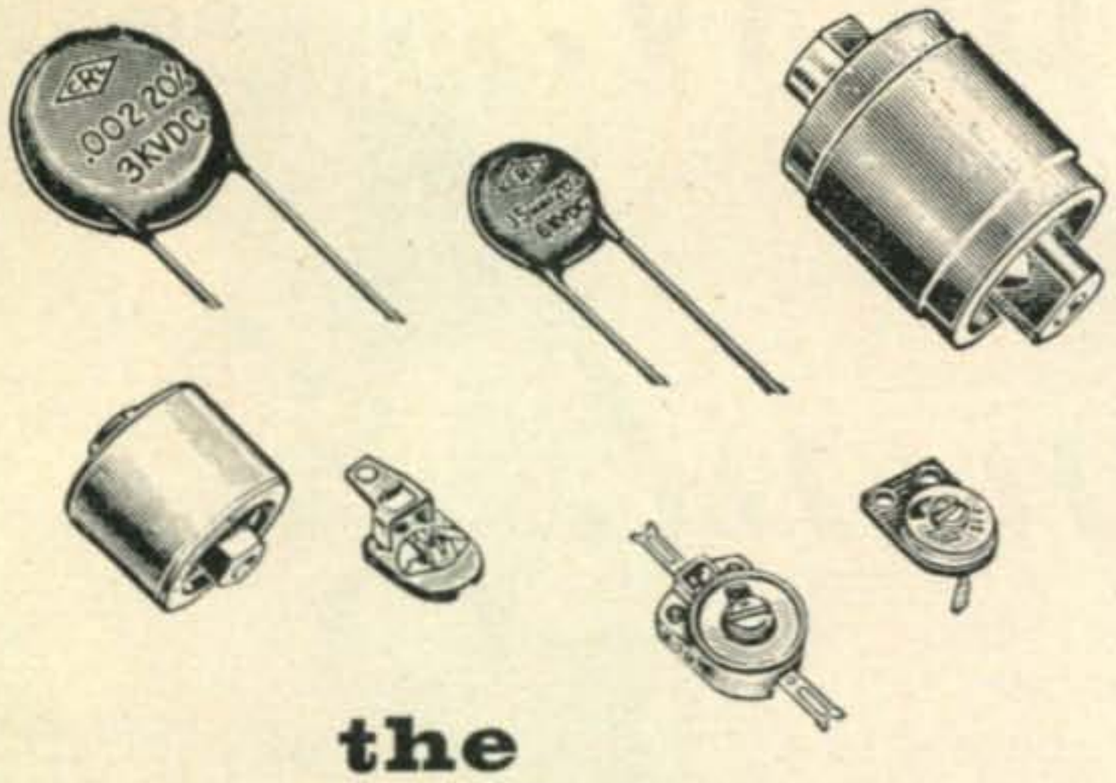

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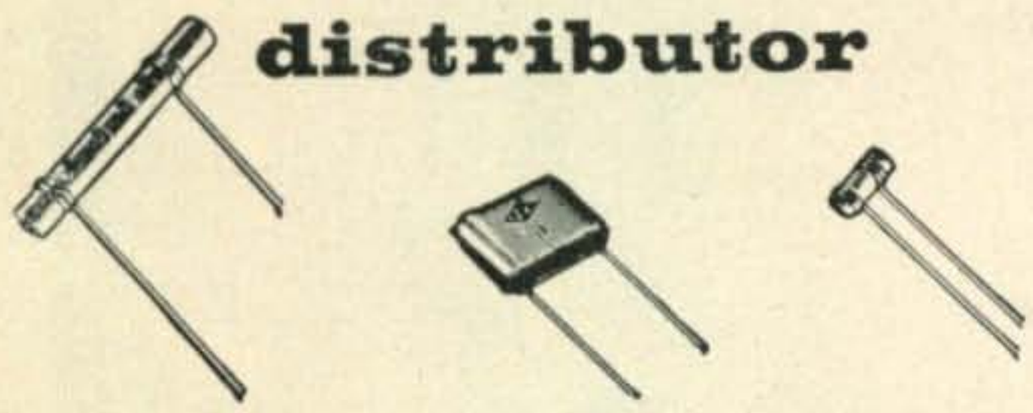

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You'll find all these ceramic capacitors listed in CENTRALAB's Catalog 31. If you don't have this catalog, write us or ask your distributor for a free copy.

All CENTRALAB products are listed in *The Radio-Electronic Master.*

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VARIABLE RESISTORS • SWITCHES • CERAMIC CAPACITORS
PACKAGED ELECTRONIC CIRCUITS • ENGINEERED CERAMICS

For further information, check number 10, on page 120

Stolen Equipment

Editor, *CQ:*

Sometime during the evening of 7 October, some thieves broke into my car and stole a new Collins KWM-2. It was the work of professional thieves who may try to "fence" the unit anywhere. I am offering a $100 reward for information leading to its recovery. The stolen equipment included one Collins KWM-2, serial #484, one KWM-2 mobile mount with cut leads, one noise blanker, installed, serial #245, and one Shure dynamic mike (mobile).

The KWM-2 had a placque on top saying, K1MOQ-W8IWK. If anything turns up, contact Lt. Rourke, Brookline, Mass., Police, Tel: RE 4-1212.

Frank H. Duffy, K1MOW, W8IWK
Brookline, Mass.

Blackmail

Editor *CQ:*

About a year and a half ago I had the nerve to write a postcard to your most honorable organization to complain about the name used on the mailing strip in your advertisement to remind subscribers to be sure and notify you of change of QTH. I then found that my name was on the advertisement. This was all well and good. Finally some of your honorable subscribers took a second look at the mailing strip and found that my subscription had expired. Then the mail started to flood the QTH asking why I quit your honorable magazine. I was called everything from a lid (shudder) to a traitor. The strain has become unbearable and I have finally broken down.

Thought you might like to know how much your honorable readers spent on pestering me . . .

47 letters (1st Class) @ 4¢	$1.88
13 letters (air mail) @ 8¢	$1.04
Paper & ink (estimated)	$1.20
	$4.12

Of course this does not count the time spent in writing the letters, post office expenses, etc. I would consider it a great favor if you would tell my poor story to the other members of the honorable amateur society who subscribe to the greatest publication of them all, *CQ*.

I am looking forward to my next issue of your wonderful, interesting, exciting, informative, magazine.

John W. Cummings, W6SFI
752 Pico Ave., San Mateo, California

ET2US

Editor *CQ:*

This is to advise all amateurs world-wide that the proper address for ET2US is – ET2US Amateur Radio Club, Kagnew Station, APO 843, New York, New York.

Secondly, ET2US is awaiting an order of QSL cards from the States. As soon as the cards are received an ET2 card will be sent to all hams awaiting a card. Unfortunately, all club records and logs prior to 22 February 1958 have been destroyed. We will QSL 100% from that date to present for anyone who has not received their card, as long as our logs indicate a contact at the date indicated.

We will QSL 100% in the future upon receipt of QSL card. So OM and XYL, please be patient; your ET2US QSL will be on its way soon.

Lastly, for all Middle East and East Africa countries—ET2US is able to put a transmitter on 80 meters if there is adequate reason. If any of the above countries indicated can forward necessary information to the above address we of ET2US will comply.

Jack Hannigan, W4GVM
Secretary, A.R.C. ET2US

The Author Speaks

Editor *CQ:*

Reference is made to "Operation 'Suicide' ", page 18, October 1960 issue. It is noted that you gave credit to *Auto-Call* for this article. *Auto-Call* swiped it from *The Collector and Emitter*, the publication of this club. I know: I wrote the article!

Carl C. Drumeller, W5EHC
Aeronautical Center, A.R.C. Inc.
Box 1082, Oklahoma City 1, Okla.

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CITIZENS BAND TRANSCEIVER

that meets FCC regulations*

*EICO premounts, prewires, pretunes, and seals the ENTIRE transmitter oscillator circuit to conform with FCC regulations (Section 19.71 subdivision d). EICO thus gives you the transceiver in kit form that you can build and put on the air without the supervision of a Commercial Radio-Telephone Licensee!

#760: 117 VAC Kit $59.95 Wired $89.95

#761: 117 VAC & 6 VDC
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incl. mtg. bracket (Pat. Pend.)

Kit $69.95 Wired $99.95

designed by Hams . . . for Hams . . .

to the highest Ham standards

Highly sensitive, selective SUPERHET (**not** regenerative) receiver with 5½ dual function tubes and RF stage. Continuous tuning over **all** 23 bands. Exclusive **Super-Hush®** noise limiter. AVC. 3"x5" PM speaker. Detachable ceramic mike. 5 Watt xtal-controlled transmitter. Variable "pi" network matches most popular antennas. 12-position **Posi-Lock®** mounting bracket. 7 tubes and 1 xtal (extra xtals available). Covers up to 20 miles. License available to any citizen over 18 — no exams or special skills required; application form supplied free.

Antennas optional.

Additional crystals $3.95 each.

Most EICO distributors offer budget terms.

NEW! 60-WATT CW TRANSMITTER #723
Kit **$49.95** Wired **$79.95**
Ideal for novice or advanced ham needing low-power, stand-by rig. 60W CW, 50W external plate modulation. 80 through 10 meters.

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90-WATT CW TRANSMITTER* #720 Kit **$79.95** Wired **$119.95**
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"Top quality" — ELECTRONIC KITS GUIDE. Ideal for veteran or novice. 90W CW, 65W external plate modulation. 80 through 10 meters.

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Kit **$29.95** Wired **$49.95**
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Kit **$49.95** Wired **$79.95**
Delivers 50W undistorted audio. Modulates transmitters having RF inputs up to 100W. Unique over-modulation indicator. Cover E-5 $4.50.

RF SIGNAL GENERATOR #324 (150kc-435mc)
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TV-FM SWEEP GENERATOR & MARKER #368
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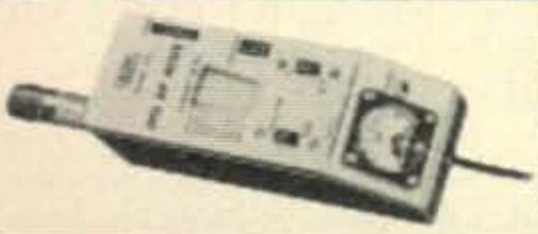

GRID DIP METER #710
Kit **$29.95** Wired **$49.95**
Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.

DYNAMIC CONDUCTANCE TUBE & TRANSISTOR TESTER #666
Kit **$69.95** Wired **$109.95**

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CQ-12

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Add 5% in the West.

ENGINEERS: Excellent career opportunities in creative electronics design. Write to the Chief Engineer.

For further information, check number 11, on page 120

COMPACT FILAMENTS...

Minimum size is characteristic of Triad filament transformers, yet minimum temperature rise is achieved under continuous operation. Good regulation and long life are also built into them. Write for Catalog TR-61.

TRIAD TRANSFORMER CORPORATION
A DIVISION OF LITTON INDUSTRIES
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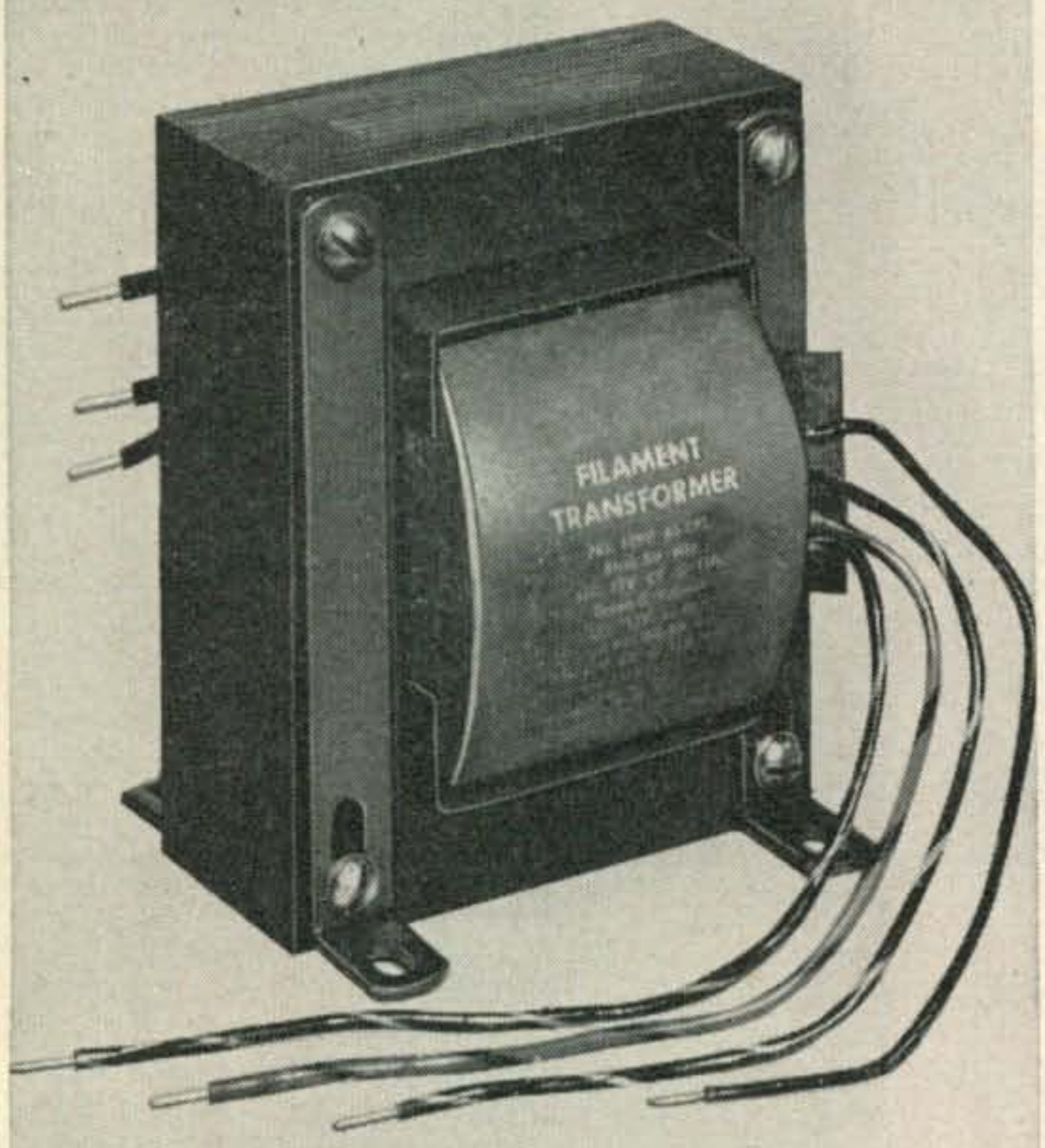


Type No.	Secondary Volts	Secondary Amperes	Test Volts	Net Price
F-12X	5CT	8	2500	$4.80
F-15U	5CT	15	3000	6.99
F-19X	6.3/6CT	6	2500	5.25
F-20U	6.3/6CT	11	2500	6.84
F-24U	7.5/6.3CT	8	2500	7.11
F-28U	7.5/6.3CT	25	3000	13.80
F-29U	12/11/10CT	11	3000	9.00
F-45X	24CT	1	1500	3.39

For further information, check number 12, on page 120

CQ DX Contest

Editor *CQ:*

Today I had the great pleasure of receiving your certificate for the '59 *CQ* Contest. It was certainly a nice surprise, my first such award from overseas. I have got a few local ones, (VK and ZL DX Contests), and without decrying our own competition I consider the *CQ* contest is a more important one. The scores, of course, indicate this and also it does give one the opportunity for QSO's with any any other country in competition with other countries. I am amazed by the number of countries worked by some of the boys; over 200 by quite a few and the 1277 QSO's by CN8JX is really something. The tally of 108,774 points by K2DGT is also incredible from our country. If I worked every station I heard, I think I could have obtained 71 countries on 7 *mc.* Heartiest congratulations to them all; certainly must be f.b. operators and have their gear in tip-top condition also.

Judging from your comprehensive report, particularly as compared to other contest reports I have seen (overseas and local) your own contest committee lads must have a pretty solid job of work in checking and compiling the logs and result sheets. I would like to congratulate them also for the fine job they have done. . . .

Reg Ross, VK3YD
471 Buckley St.
West Essendon, Victoria, Australia

Contests

Editor, *CQ:*

I write in reference to the letter of W9FB in the October issue. He writes to express his agreement with a previous letter denouncing strongly any and all contests.

My comments to him are simple and straight-forward.

Although contests have no real practical value, they offer the primary function of ham radio . . . enjoyment. If W9FB happens to take his hobby seriously enough to want to eliminate enjoyment, perhaps he would recommend to the FCC that all QSO be made illegal and only purposeful and absolutely essential transmissions be allowed. This would reduce the radio amateur to the level of a citizen's bander.

It is most obvious that W9FB has never had the thrill of a real contest effort; he has never had the reward of seeing his call in the listings of contest results.

May I suggest to him that he try the contests; if he still maintains his position, let *him* go down to 160 meters if he wants peace and quiet, not the contest operators as he suggests. After all fellows, the majority rules, and the great majority are all for the great contests.

Pete Pollock, WA2GDP
19 Elm Street, Lincoln Park, N.J.

Tank Arc Over

Editor, *CQ:*

Re: "Tank Arc Over," (HAM CLINIC, *CQ*, Aug. '60, p. 80) we have found most difficulties originate with poor antenna systems. In other words, *lots* of r.f. is in the tank circuit and not out in the antenna where it belongs. I am sure few amateurs *really* check an antenna but rather cut according to various formulas.

We have found that, at least with Multi-Elmac gear, the best system on the low frequency bands is this:

Set the *load* control to the minimum (counter-clockwise). Be sure you have grid drive and then dip the final in the usual way. Then slowly rotate the v.f.o. control across 80 meters, for example and you will find some spot where the final current will be very high with no loading at all. *This* is the resonant frequency of the antenna. You can operate a little above this frequency, but not below. A mobile antenna must be adjustable in length one way or the other for best results.

For your information, the ship *Hope* will be using Multi-Elmac transmitters, receivers, power supplies and Citizens Radio equipment. Hallicrafters furnished the high power gear.

Harry E. Stewart, Sales Engineer
Multi-Products Company
21470 Coolidge Highway, Oak Park 37, Michigan

EIMAC FIRST... for all band transmission

CW SSB AM

4-65A

4-65A Radial-Beam Power Tetrode

Smallest of the Eimac internal-anode tetrodes, the 4-65A has a plate-dissipation rating of 65 watts and is ideal for deluxe mobile as well as fixed-station service.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	1.7w	2.6w	0
Input Power	345w	275w	195w

4-400A

4-400A Radial-Beam Power Tetrode

Ideal for high power amateur rigs, it will easily handle a kilowatt per tube in CW, AM or SSB application. Forced-air cooling is required.

	CW	AM	SSB
Plate Voltage	3000v	3650v	4000v
Driving Power	6w	4w	0
Input Power	1000w	1000w	1000w

4E27A/5-125B

4E27A/5-125B Radial-Beam Power Pentode

The Eimac 4E27A/5-125B is intended for use as a modulator, oscillator or amplifier. The driving-power requirement is very low, and neutralization problems are simplified or eliminated entirely.

	CW	AM	SSB
Plate Voltage	3000v	2500v	4000v
Driving Power	1w	2w	0
Input Power	500w	380w	360w

4CX1000A

4CX1000A Ceramic Power Tetrode

Specifically designed for SSB operation, the ceramic-metal 4CX1000A Class AB, linear-amplifier tube achieves maximum rated output power with zero grid drive.

	SSB
Plate Voltage	3000v
Driving Power	0
Input Power	2700w

4CX250B Ceramic Power Tetrode

A compact, rugged tube unilaterally interchangeable in nearly all cases with the famous 4X150A, with the advantages of higher power and easier cooling.

	CW	AM	SSB
Plate Voltage	2000v	1500v	2000v
Driving Power	2.8w	2.1w	0
Input Power	500w	300w	500w

4-125A Radial-Beam Power Tetrode

The versatile tube that made screen grid transmitting tubes popular. This favorite for commercial, military and amateur use is radiation cooled.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	2.5w	3.3w	0
Input Power	500w	380w	315w

4-250A Radial-Beam Power Tetrode

A high power output tube with low driving requirements. A pair of Eimac 4-250A's easily handle a kilowatt input in AM, CW or SSB service.

	CW	AM	SSB
Plate Voltage	3000v	3000v	4000v
Driving Power	6w	3.2w	0
Input Power	1000w	675w	660w

4CX300A Ceramic Power Tetrode

A new ceramic-metal high power tetrode designed for rugged service. Will withstand heavy shock and vibration and operate with envelope temperatures to 250° Centigrade.

	CW	AM	SSB
Plate Voltage	2500v	1500v	2500v
Driving Power	2.8w	2.1w	0
Input Power	625w	300w	625w

Information on these popular tubes for amateur applications is available from our Amateur Service Department.

EITEL-McCULLOUGH, INC.

SAN CARLOS, CALIFORNIA

The World's Largest Manufacturer of Transmitting Tubes

Eimac®

4CX250B

4-125A

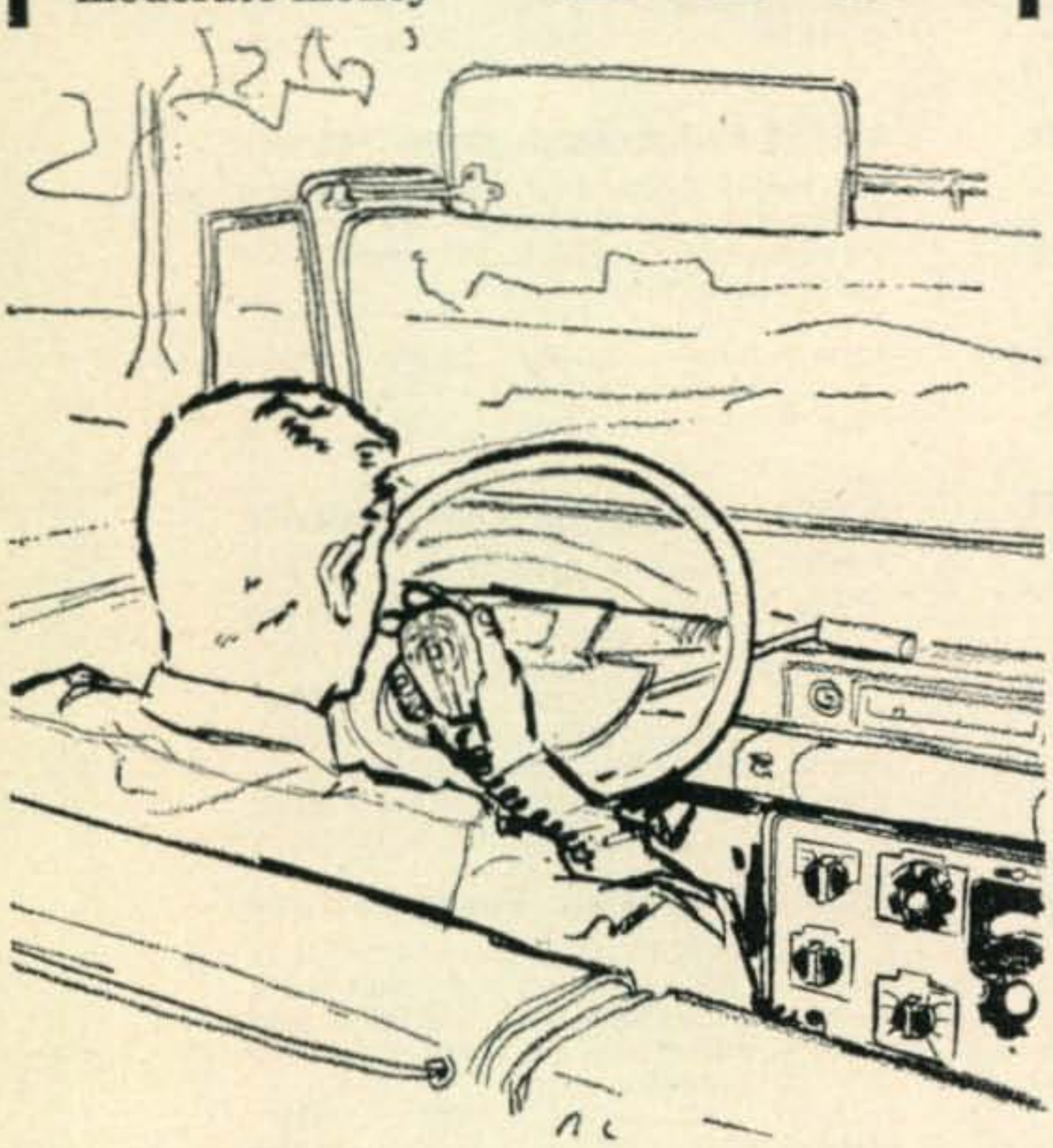
4-250A

4CX300A

MAKE SURE YOUR STATION-ON-THE-GO— GOES FIRST CLASS

THE TURNER **350's**

magnificent mobile microphones for moderate money



This reasonably priced, hand-held microphone is the perfect mike for amateur mobile rigs. Its price range fits the typical amateur's budget but its performance is strictly professional. Prices for the three microphones in the 350 series range from $16.80 through $19.00. All models are wired for relay operation, and feature extra-tough plastic case; hanger button and standard dash bracket for easy mounting; 11″ retractable, five-foot extended Koiled Kord; and handy, momentary on-off switch. The 350's also excel as citizen's band and paging microphones.

TYPE	350X crystal	350C ceramic	350R carbon
RESPONSE	60-8,500	80-7,000	200-4,000
OUTPUT	—48 db	—54 db	—38 db
LIST PRICE	$16.80	$16.80	$19.00

For complete specifications write:

THE TURNER MICROPHONE COMPANY

909 17th St. NE, Cedar Rapids, Iowa

For further information, check number 13, on page 120

Explosive Detonators

Editor, *CQ:*

It has come to my attention that a certain piece of surplus radio equipment, a part of the AN/DMQ-2 system, contains an explosive detonator which is not being removed prior to sale and shipment. According to a local amateur who obtained this item, the part number on the detonator is 805210 and resembles a power diode semiconductor.

Fortunately he realized the use of this component, removed it, and exploded it on his driveway by applying a voltage between the leads. The resultant blast dug a considerable hole in the drive and cracked the surrounding earth.

I would suggest that a warning notice with regards to this device be placed in the earliest possible issue of your magazine as someone is able to be seriously injured if this fact is not known. I understand that one source of this item is Barry Electronics in New York, and you might check with them for more specific information.

Bradford O. Van Ness, K7HJO
President, P.V.H.F.R.C.

Barry Electronics is aware of this situation and has removed and destroyed these detonators.—Ed.

Re: "Box Tops"

Editor *CQ:*

After writing to you concerning the Conditional Class, "Box Top" license of John Halser, K9MTM, I also wrote to FCC to verify my assumption that Conditional Class license had to be replaced with a General Class when the Conditional Class licensee moved to a permanent address within an FCC examining district, and subsequent to the expiration of the Conditional Class license.

To my surprise, I was informed by the Commission as follows:

". . . Specifically, you query whether or not a licensee, who received a Conditional Class license because he did not reside within a regular examination area, but who has moved to such an area, is required to pass a Commission supervised examination as a pre-requisite to renewal of his license.

"With the exception of certain physically handicapped persons, Conditional Class licensees have evidenced to voluntary examiners the same technical knowledge and proficiency as is required of General Class licensees. There is, therefore, no apparent basis for requiring further proof of their ability. Recognition of this fact resulted in Section 12.43 (b), which is cited in your letter, and which exempts such licensees from routine re-examination. Consequently, Section 12.27, relating to a license renewal, makes no provision for such an examination. The Commission does, however, retain specific control over the Conditional Class licensees in connection with further examinations. Pursuant to the authority set forth in Section 12.45, the Commission requires supervised re-examination of any Conditional Class licensee who is suspected of fraud, improper operation, or lack of qualification. In addition, a systematic plan of re-examination is conducted as an effective means of reviewing the voluntary examiner program and included re-examination of many licensees involved in the circumstances which you have set forth.

"Your comments concerning an area of the Amateur Radio Service which may be misunderstood are appreciated.

Very truly yours,
s/ Ben F. Waple,
Acting Secretary"

From the foregoing, it would appear that K9MTM can go on forever as a Conditional Class licensee, provided he is not guilty of improper operation, etc., which might induce the FCC to call him in for re-examination.

I am still somewhat curious as to whether K9MTM gives exams including the code test. Did he get a General Class or Extra Class ticket when he moved to Milwaukee, or does he have to call in some ham for code tests who doesn't hold the "box top license?"

George H. Goldstone, W8MGQ
2609 W. 13 Mile Road, Royal Oak, Michigan

[*Continued on page 104*]

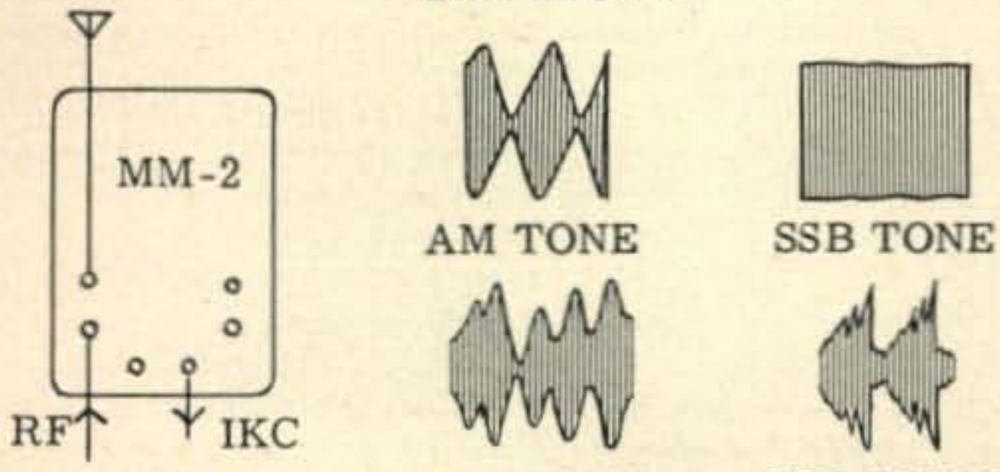
THE MULTIPHASE MODEL MM-2
RF ANALYZER

- Monitors the RECEIVED and TRANSMITTED signals. Shows flat-topping, overmodulation, parasitics, keyed wave shape etc. Silent electronic switching keyed by transmitted RF.
- No tuning required. Broadband response flat 1 MC to 55 MC at power levels of 5 watts to 5 KW.
- New variable sweep control for transmit and receive.
- RF attenuator controls height of pattern. Calibrated in 3 DB steps.
- Function selector for ENVELOPE, TRAPEZOID and BOW-TIE patterns on transmit. For SSB, DSB, AM and CW.
- Built-in 1 KC audio oscillator, less than 0.5% distortion. With 3" scope, is ideal for complete alignment of SSB exciters.
- For use in series with 52-72 ohm coax lines. A short pickup antenna may be used with other systems.
- Plug-in adaptors available to match 50 KC, 60 KC, 80 KC or 455 KC receiver IF systems. Only one simple connection to receiver.

MM-2 Kit . . . (less IF adaptor). $119.50
Wired . . . (less IF adaptor). $149.50
Plug-in IF adaptors (wired only) . . . . . .
RM-50 (50 KC), RM-80 (60-80 KC),
RM-455 (450-500 KC). . . ea. . . $12.50

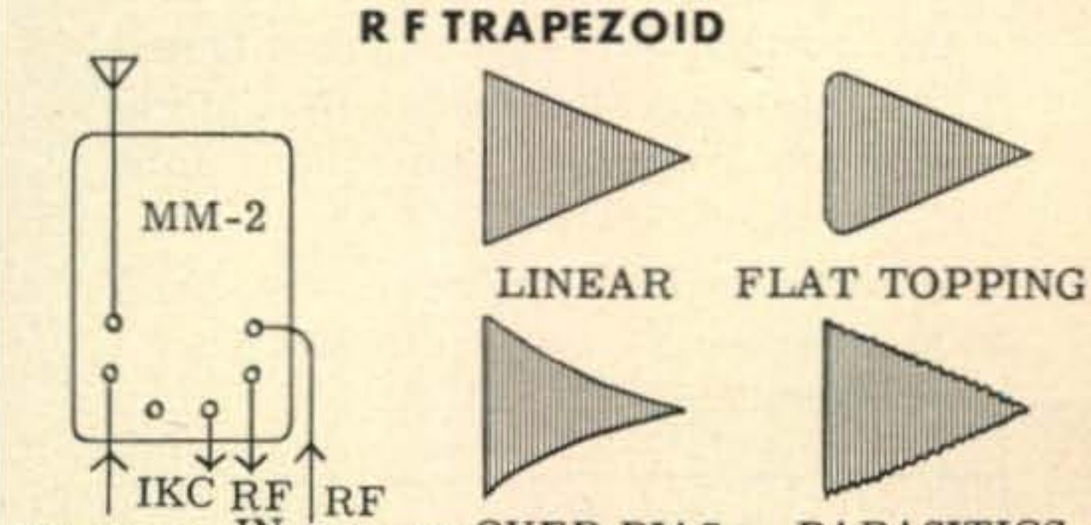
THERE IS NO SUBSTITUTE FOR A SCOPE IF YOU WANT THE CLEANEST, MOST PERFECTLY MODULATED SIGNAL YOUR TRANSMITTER CAN PROVIDE. THE MM-2 IS BY FAR THE MOST DEPENDABLE and EASIEST TO USE, SINCE IT WAS DESIGNED STRICTLY FOR THIS PURPOSE.

ENVELOPE



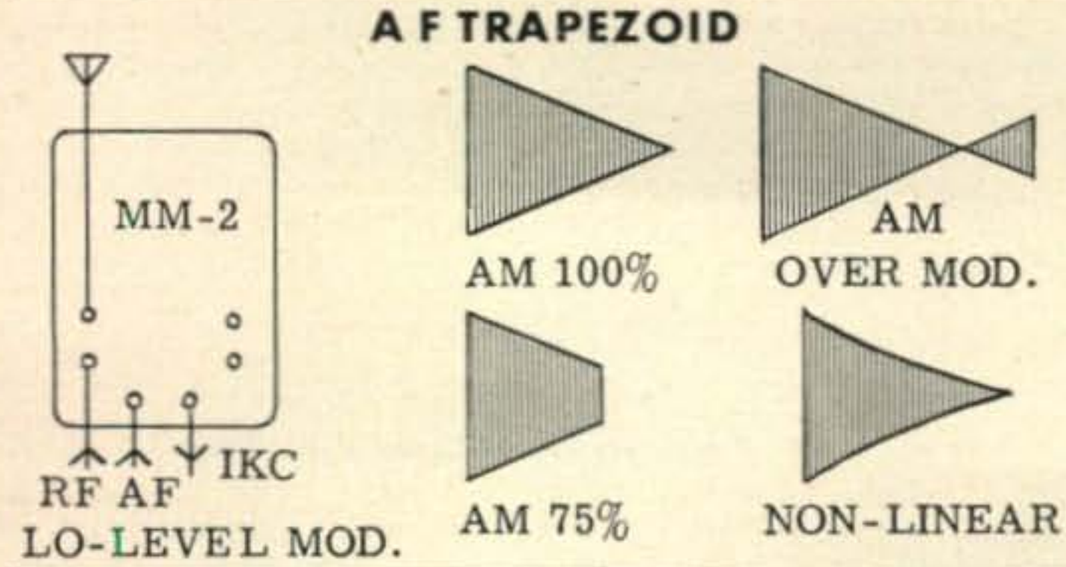
SSB-AM

R F TRAPEZOID



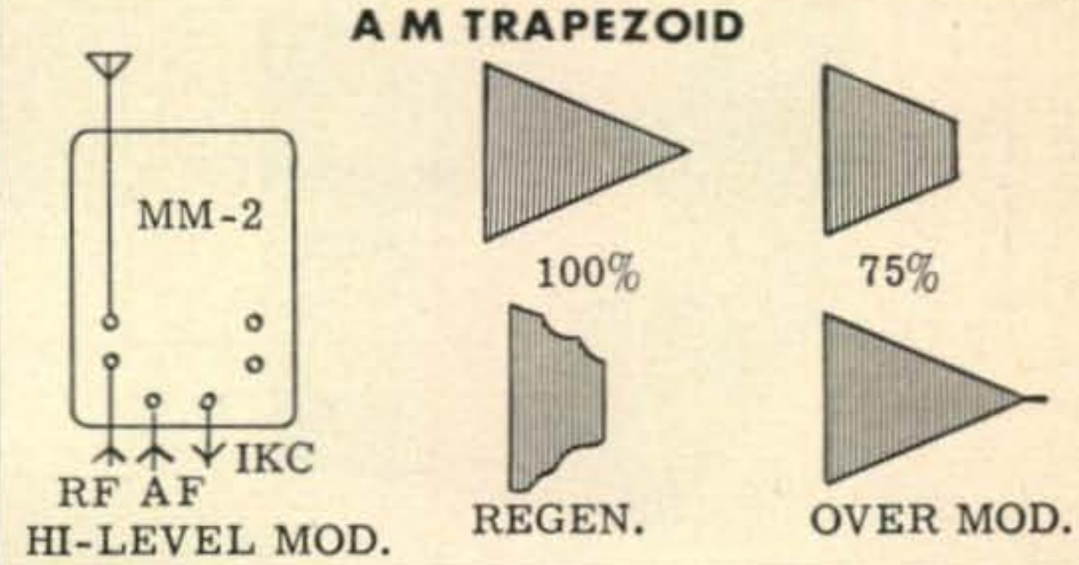
RF OUT IN EXCTR.

A F TRAPEZOID



LO-LEVEL MOD.

A M TRAPEZOID



HI-LEVEL MOD.

OTHER FINE C.E. PRODUCTS

Model 100V	New 100 Watt Broad-Band Exciter-Transmitter ..	$795.00
Model 600L	Broad-Band Linear Amplifier	$495.00
* Model 20A	Bandswitching SSB Exciter	$299.50
* Model 10B	Multiband SSB Exciter	$193.50
* Model GC-1	Gated-Compression Amplifier	$ 66.50
* Model B	Sideband Slicer with Q Multiplier	$104.50

* Also available in kit form
AND MANY OTHERS . . . WRITE FOR LITERATURE

THE SSB PIONEER

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois
A subsidiary of Zenith Radio Corp.

For further information, check number 14, on page 120

PRICE $525.00

THE SPARKLING PERFORMANCE YOU WANT...WITH THE 5100-B

Packed with features that *count*, the B&W 5100-B is unbeatable on AM-CW or SSB. Input power 180 watts CW-SSB, 140 watts AM phone...80 through 10 meters...bandswitched throughout with integral VFO or crystal control... Pi-network final and integral low pass filter.

Get on the air with this great transmitter and enjoy the pleasure of trouble-free operation, ease of control and tuning, top signal quality.

Have your B&W dealer show you the 5100-B, or send now for literature.

PRICE $265.00

In half an hour you can add the 51SB-B sideband generator to your 5100-B. You'll have outstanding SSB with voice operated control, push to talk, speaker deactivating circuit. (Also available—51SB with integral power supply for converting other transmitters. Price $279.50. Send for data.)

Write today for the new B&W catalog.

Barker & Williamson, Inc.

Bristol, Pa.

For further information, check number 15, on page 120

U.S.A. and Paraguay OK Third Party

In accordance with an official communication from the Department of State, the Commission announces that a bilateral agreement between the United States and the Republic of Paraguay directly affecting licensed amateurs of the two countries has been concluded by an exchange of notes. Effective November 5, 1960, under the terms of this agreement, amateur radio stations of Paraguay and of the United States may exchange internationally, messages or other communications from or to third parties, provided:

"1. No compensation may be directly or indirectly paid on such messages or communications.

"2. The messages shall be of a character which would be sent through no other system of existing telecommunications, or which would not justify the use of public telecommunications services, for reason of their unimportance. In the event that the public telecommunications services are not readily available for expeditious handling of communications relating to the safeguard of life or property, such communications may be handled by amateur radio stations of the respective countries.

"3. This agreement shall apply to the entire territory of the Republic of Paraguay and to the United States of America and its territories and possessions, including Puerto Rico, the Virgin Islands and to the Panama Canal Zone. It shall also be applicable in those cases of amateur stations licensed by the United States authorities to United States citizens in other areas of the world in which the United States exercise licensing authority.

"4. This agreement may be terminated by either of the Governments on sixty days' notice to the other Government, by further arrangement between the two Governments dealing with the same subject, or by the enactment of legislation in either country inconsistent therewith."

As a matter of related interest, amateur stations licensed by the Federal Communications Commission heretofore have been able, under and in accordance with the terms of previously effected arrangements, to exchange internationally, messages or other communications from or to third parties with amateur stations of Canada, Chile, Costa Rica, Cuba, Ecuador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Peru and Venezuela.

Radio Rifle Team

The Michigan Tech Amateur Radio Rifle Team would like to fire radio or postal matches against other indoor small-bore rifle teams with ham membership. Our team is composed of Michigan Tech students who are all licensed amateurs, and are out for the Varsity rifle team. We will challenge any and all teams to rifle competition. Contact Robert Ahonen, K8IFL at 504 Lake St., Ironwood, Micihgan, for further information.

We believe that we are the first 100% "ham" rifle team and would like to find out if there are any others that could fire against us.

Lewiston-Clarkston A.R.C.

In connection with the Lewiston, Idaho Centennial, starting May 13, 1961, the Lewiston-Clarkston Radio Amateur Club Inc. will issue a certificate to any amateur who qualifies under the following rules:

1) Contact any two amateurs living in the Lewiston, Idaho-Clarkston, Washington valley area.
2) Contacts may be made on any band.
3) Contacts must be made between November 1, 1960 and September 1 1961.
4) QSL's must be sent to L-C.A.R.C. Inc., P.O. Box 383, Lewiston, Idaho.

You'll find ten performance-proved RCA transistors

Here is Heath's first all-transistor communications-type receiver for general coverage from 550 KC to 32 MC.

And for this all-important "first", available both as a kit and as a factory-wired and tested receiver, Heath chose ten performance-proved RCA transistors, including six RCA Drift-Field types, to assure high gain, outstanding selectivity, sensitivity and ruggedness.

For extra dependability and stability in your new designs you'll find too, that RCA performance-proved transistors are the best choice. They are available "off the shelf" from your RCA Distributor. Call him or your nearest RCA Field Office. For further technical information on RCA transistors, write RCA, Commercial Engineering, Section , Somerville, N. J.

PERFORMANCE-PROVED RCA TRANSISTORS "MOHICAN" TRANSISTOR COMPLEMENT

Type	Description
RCA 2N1396*	RF Amplifier
RCA 2N1225*	Mixer
RCA 2N1225*	Oscillator
RCA 2N373*	1st IF Amplifier
RCA 2N373*	2nd IF Amplifier
RCA 2N373*	3rd IF Amplifier
RCA 2N407	Audio Driver
RCA 2N407	Audio Output
RCA 2N407	Audio Output
RCA 2N409	BFO

*Drift-Field Transistor

RCA SEMICONDUCTOR & MATERIALS DIVISION FIELD OFFICES
EAST: 744 Broad St., Newark 2, N. J., HUmboldt 5-3900. NORTHEAST: 64 "A" St., Needham Heights 94, Mass., HIllcrest 4-7200. EAST CENTRAL: 714 New Center Bldg., Detroit 2, Mich., TRinity 5-5600. CENTRAL: Suite 1154, Merchandise Mart Plaza, Chicago 54, Ill., WHitehall 4-2900 • P.O. Box 8406, St. Louis Park Branch, Minneapolis, Minn., FEderal 9-1249. WEST: 6355 E. Washington Blvd., Los Angeles 22, Calif., RAymond 3-8361 • 1838 El Camino Real, Burlingame, Calif., OXford 7-1620. SOUTHWEST: 7905 Empire Freeway, Dallas 7, Texas, FLeetwood 7-8167. GOV'T.: 224 N. Wilkinson St., Dayton 2, Ohio, BAldwin 6-2366 • 1725 "K" Street, N.W., Washington 7, D. C., FEderal 7-8500.

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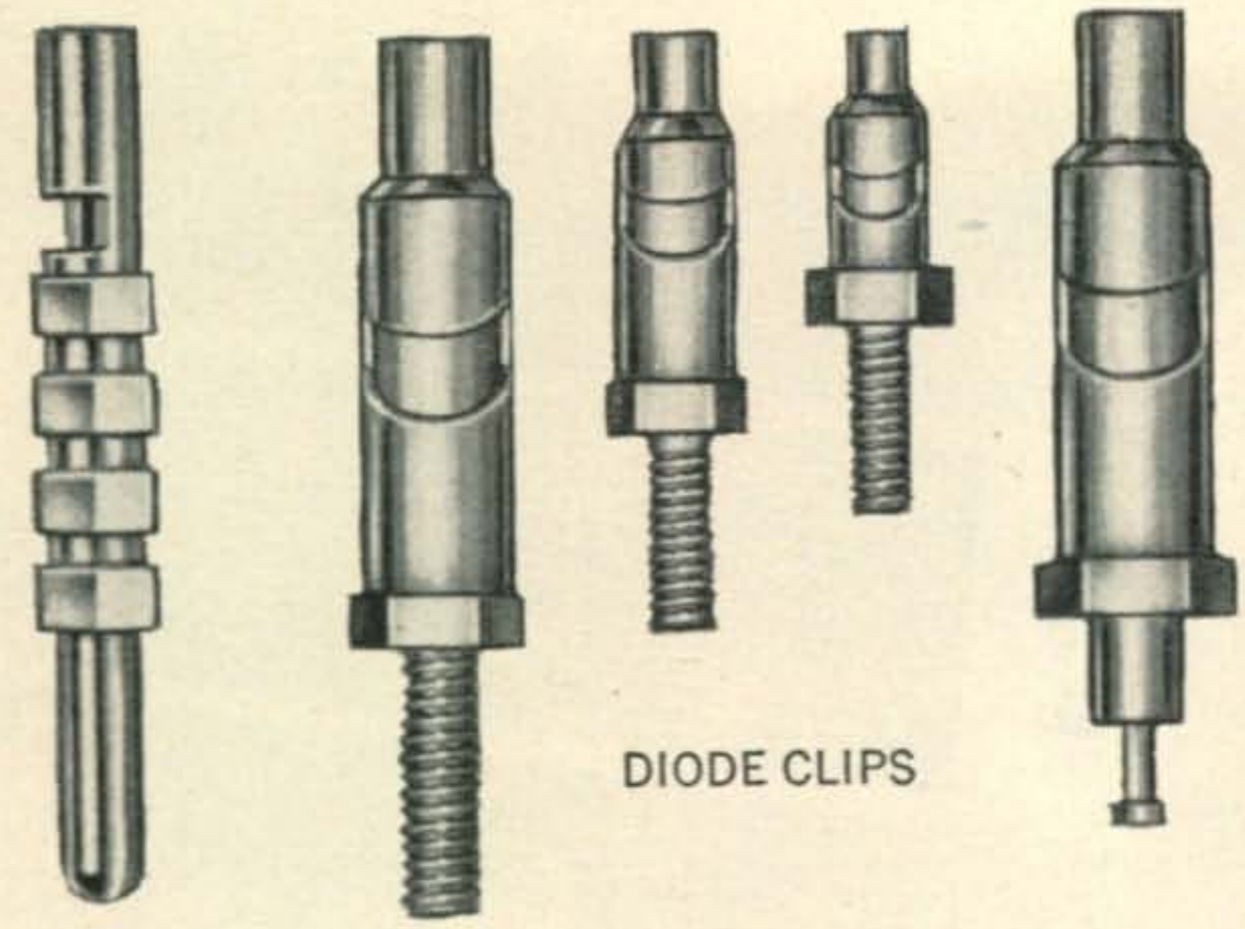
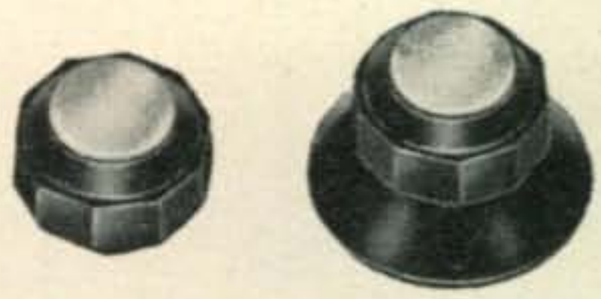
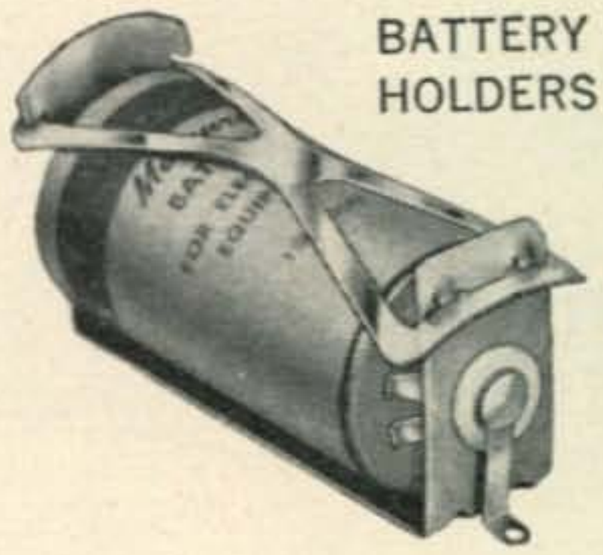
The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA



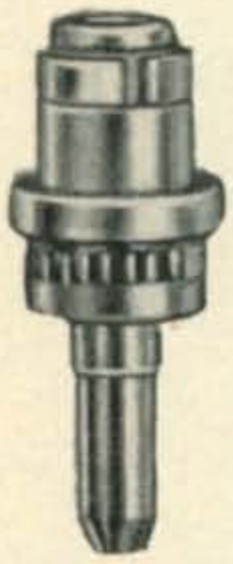
DIODE CLIPS



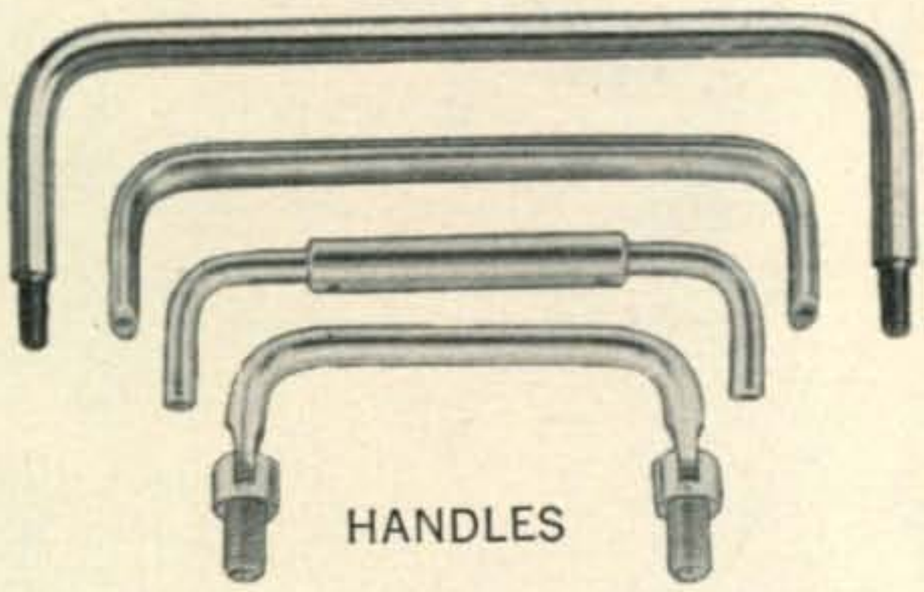
KOLLET KNOBS



BATTERY HOLDERS



PLUGS AND JACKS



HANDLES

TUBE CLAMPS

Everything you need QUALITY GUARANTEED!

You can do a neat, professional job on your rigs with dependable CAMBION® components . . . they're *all* unconditionally *quality-guaranteed*. Each tailored to your needs, too. Take a look at these versatile features in CAMBION's complete line of panel hardware:

- **Kollet Knobs** — with built-in gripping power, skirts and indicating lines optional, available for shafts ⅛″ or ¼″, ten code colors.
- **Diode Clips**—7 different types, including spring-loaded units, rivet-mounted and Teflon-insulated clips. Holds fragile pigtail leads from .005″ to .085″.
- **Handles** — 36 type and finish combinations. Fixed, full-folding and 90° folding types.
- **Tube Clamps** — 4 types for tube base diameters from 1.136″ to 1.377″.
- **Mercury Battery Holders** — vibration-proof. Suitable for all types of circuits.
- **Plugs and Jacks** — 35 types. Perfect electrical connections and lasting low-resistance contact.

For best results, choose CAMBION components. For detailed information on any product, write Cambridge Thermionic Corporation, 451 Concord Avenue, Cambridge 38, Massachusetts.

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CAMBRIDGE THERMIONIC CORPORATION
CAMBION®
The guaranteed electronic components

For further information, check number 16, on page 120

EE WHIZ! THEY'RE REAT

AND YOU CAN ET 'EM!

FOR HOLIDAY HAMMING . . .
ORDER YOUR
GLOBE EQUIPMENT
TODAY !

Globe Chief DELUXE

The new **Globe Chief Deluxe,** is a self-contained 90w transmitter for CW, band-switching 10-80M. 75w meter indication for Novice use. Modified grid block keying or cathode keying with VFO. Provision for plate or screen modulator by simple plug in. Built-in power supply. Standard coax antenna fittings. 3-color kit diagrams. Pre-punched chassis, all parts and tubes included in kit. Rotary switches throughout.

wired **$79.95.** kit **$59.95**

AND SPEECH MODULATORS

The UM-1 Universal Modulator is a Class A or AB-2 modulator, driver for higher power modulator or PA amplifier. Matches output impedances 500-20,000 ohms. Uses carbon or crystal mike. Supplies up to 40w audio with proper tubes. Can add external meter for monitoring modulator cathode currents. Wired, **$45.95,** with tubes. Kit **$34.95,** less tubes.

The **SM-90 Screen Modulator** permits radio telephone operation at minimum cost. All self contained. Printed circuit board, all parts and complete instructions. Ideal for use with Chief Deluxe and similar transmitters. In kit only, **$11.95.**

Globe Scout Deluxe, Model SD-75A is a modern new bandswitching 6-80M transmitter for 90w CW, 75w phone input power with relay controlled circuitry. Final amplifier works straight through on all bands, panel control for antenna loading on all bands, high level plate modulation, pi-net output on 10-80M — tuned link on 6M, matching into low impedance beams, built-in power supply for 115 VAC. Extensive TVI precautions including separate shielding of final amplifier and meter. Convenient rotary switches. Functional design. 15¼x6¼x1¼". Wired **$159.95.**

The **Globe VFO 755A** comes complete with well-filtered power supply with voltage regulation. Output: 40 and 160M. Vernier Drive. 13:1 tuning ratio. Approx. 50 RF volts output. Temperature compensated for utmost stability for DSB, AM & CW. Wired, **$59.95.** Kit, **$49.95.**

Globe Champion

The **Globe Champion 350** is a completely revised 10-160M bandswitching transmitter for 450w SSB/DSB (PEP) with external 10/20 watt exciter, 350w CW, 275w AM. High level Class B modulation with new compression circuit. Built-in VFO. Pi-net 48-300 ohms. Push-to-talk, TVI-suppressed, filtered and by-passed, time sequence keying. Wired only **$495.00.**

Speech Booster

Globe's FCL-1 Speech Booster is a peak limiting audio pre-amplifier, increase modulation intensity for most penetrating audio, with harmonic suppression. Adapts to most transmitters. Wired **$24.95,** Kit form **$15.95.**

GLOBE'S NEW 2-WAY RADIO *Pocketphone*

New portable high styled two-way radio that actually fits into your pocket. Actual size, 1⅝x2⅜x6¼. Exclusive "power-pak" rechargeable battery that lasts a year or more. For factory, surveying, construction, department stores, stock-yards, hospitals, firemen, policemen, golf, office, and home. When used in conjunction with a radio paging system, the whip does not have to be extended, thus permitting "pocket" operation. To transmit, or for longer range of reception, whip must be extended fully. Range ½ to 1 mile. Globe's new Pocketphone can also be used with the company's CB-100 two-way radio or CB-200 Broadcaster Deluxe two-way Citizens Band radio for longer ranges. Requires no license, pocketphone to pocketphone.

SEE YOUR NEAREST AMATEUR RADIO DISTRIBUTOR

GLOBE ELECTRONICS

A DIVISION OF TEXTRON ELECTRONICS, INC.

COUNCIL BLUFFS, IA.

For further information, check number 17, on page 120

AMATEURS

CITIZEN LICENCEES

MOBILETTE 61

MOBILETTE 61, International's *new improved* all transistor, crystal controlled converter provides a "quick and easy" way to convert your car radio for short wave reception. MOBILETTE 61, units cover a specific band of frequencies providing a broad tuning range. Mobilette units are miniature size and quickly interchangeable.

Check these all New features . . . New and improved circuit for increased gain . . . New internal jumper for positive and negative grounds . . . New RF amplifier, mixer/oscillator . . . New separate input for broadcast and short wave antennas . . . Mounting bracket for under dash installation.

MOBILETTE 61, is available in a wide choice of frequencies *covering* the Amateur bands 75 through 6 meters, Citizens band, Civil Air Patrol

CIVIL AIR PATROL AMATEURS CITIZEN LICENCEES

...with improved circuit for mobile short wave reception

Write for International's complete catalog of precision radio crystals, and quality electronic equipment—yours for the asking.

INTERNATIONAL
CRYSTAL MANUFACTURING CO., INC.
18 NORTH LEE • OKLAHOMA CITY, OKLA.

low band frequencies, WWV time and frequency standards. Any frequency in the range 2 MC to 50 MC available on special order.*

Designed for 12 VDC, **MOBILETTE 61** will operate on 6 VDC at reduced output. Power connector plugs into cigarette lighter socket.

See the **MOBILETTE 61** at Your Dealer Today.

Mobilette 61 units cover these short wave frequencies.

Catalog No.	Frequency
630-110	6 meters (Amateur) 50-51 MC
630-111	10 meters (Amateur) 28.5-29.5 MC
630-112	11 meters (Citizens) 26.9-27.3 MC
630-113	15 meters (Amateur) 21-21.6 MC
630-114	20 meters (Amateur) 14-14.4 MC
	15 MC (WWV)
630-115	40 meters (Amateur) 7-7.4 MC
630-116	75 meters (Amateur) 3.8-4.0 MC
630-117	10 MC (WWV)
630-118	CAP (Low Band)
630-119	Special Frequencies 2 MC-50 MC

Complete, ready to plug in and operate . . . . only $22.95

**Special frequencies 2 MC -50 MC.....only $25.95*

For further information, check number 18, on page 120

● Edison Award trophy and $500 check are presented to the 1959 recipient—Walter Ermer, Sr., W8AEU—by L. Berkley Davis, General Electric vice-president. Ermer (at left) took the initiative in organizing Cleveland's big, well-equipped Amateur Radio Emergency Corps. The ceremony highlighted a banquet at Washington, D.C., which was attended by members of the Government and Armed Forces, the electronic communications industry, and the press.

JAN. 2 DEADLINE FOR EDISON AWARD NOMINATIONS

Nominating letters for the 1960 Edison Radio Amateur Award must be postmarked not later than January 2, 1961.

Please remember that the judges will consider only candidates whose names are submitted in writing by you and others. There is no other source for Edison Award nominations.

Therefore, between now and January 2, canvass in your mind the activities of amateurs you know, in order to make sure no deserving OM or YL fails to be represented. If you uncover such a candidate, by all means send in his name promptly.

For help with your nominating letter, and for rules of the Award, see the October issue of this magazine, or write to *Edison Award Committee, General Electric Co., Electronic Components Division, Owensboro, Ky.*

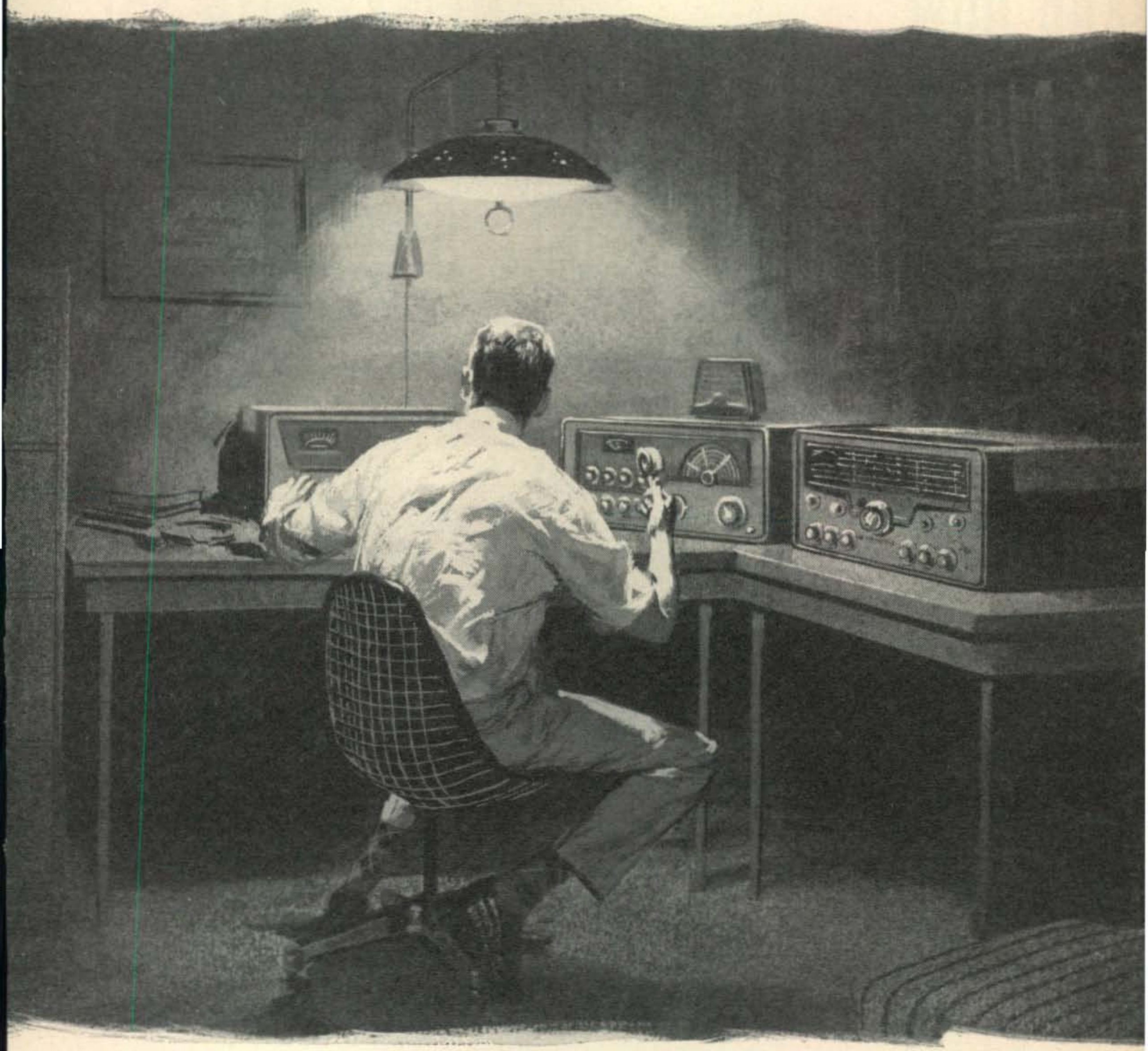
HERE ARE TYPICAL ACTIVITIES THAT CAN QUALIFY FOR THE AWARD:

- Emergency communications work in a disaster, such as a flood, hurricane, tornado, or explosion.
- Helping amateurs and others with their specialized problems, through professional knowledge and experience.
- Community service in organizing mobile and fixed communications to promote the success of fund drives and other public events.
- Helping disabled or physically handicapped persons.
- Relaying messages from remote points for the benefit of isolated servicemen and civilians.
- Designing and constructing radio equipment for use by persons in remote parts of the world, who do not have access to regular commercial communication channels.
- Civil-defense organization work; weather reporting; radio assistance to state or local traffic and police authorities; cooperation in forest-fire prevention and control.
- Teaching basic electronics to young people.

GENERAL ELECTRIC

624-402

Man's desire to communicate still offers our greatest opportunity to achieve peace on earth and good will toward all mankind



Merry Christmas and

Happy New Year

hallicrafters company

. . . and 73 from

W J. Hallgan W9AC Bud Hallgan Jr.

10 15 20 40

AND NOW 40 METERS WITH THE NEW hy-gain "hy-seven"

40 METER MONOBANDER WITH THE REVOLUTIONARY NEW "LINEAR LOADING"

NO COILS

Now you can make 40 meters come alive with true beam performance for your rig. For the first time the Hy-Gain Hy-Seven two element 40 meter beam develops excellent forward gain and front to back in a reduced size, light weight antenna without the use of lossy loading coils. Reduction in element length is accomplished by the introduction of the new concept of linear loading. It results in three important new advantages:

1. A small easy to install antenna, that stays up!
2. Much higher efficiency than coil loaded types.
3. Virtually impervious to all weather conditions.

Like all Hy-Gain beams, the Hy-Seven is factory pretuned ready for quick and easy assembly. It's also tops in mechanical construction — with a 1 year guarantee to prove it!

SPECIFICATIONS

Mechanical: Boom, 16' x 2" O.D.; Longest Element, 43'; Material, all aluminum, high impact; Cycolac plastic and irridite treated steel hardware. Net weight only 24 pounds.

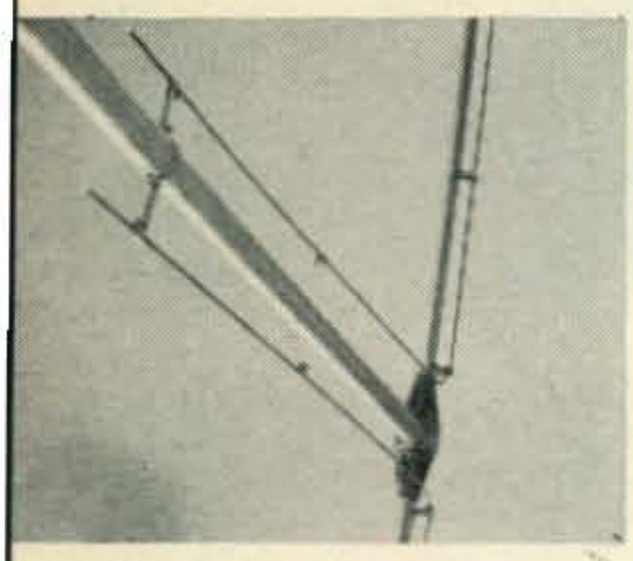
Electrical: Element spacing .13 wave lengths; Matching system, adjustable Beta; SWR at 52 ohms. 1.0 to 1; Gain 5.2 DB; Front to back ratio 15 to 30 DB.

in stock at leading jobbers everywhere

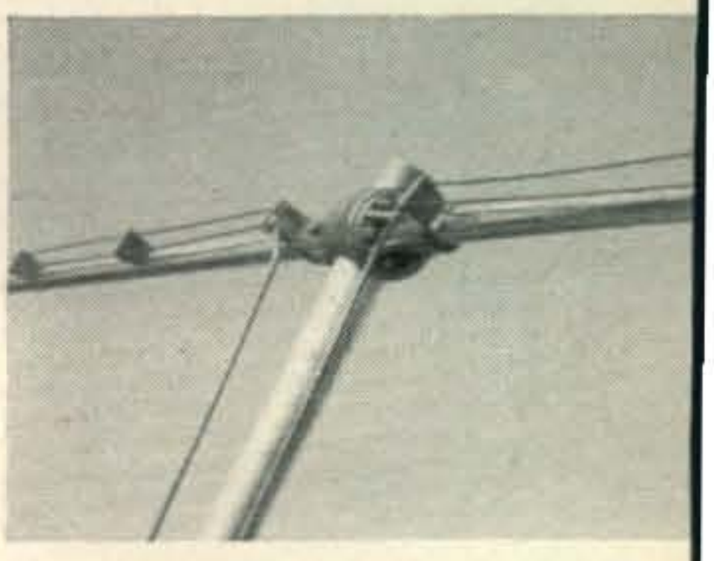
hy-gain antenna products

send for free technical bulletin

1135 NO. 22nd ST.
LINCOLN, NEBRASKA



The Beta Match — The famous Hy-Gain Beta matching system is factory pretuned. SWR guaranteed less than 1.5 to 1. Without further adjustment.



Linear Loading—The new linear loading concept reduces element length and maintains higher efficiency than coil loading.

Stacking—because of its light weight and convenient size, the Hy-Seven may be easily stacked with your existing tri-bander installation. Complete data furnished for proper installation.

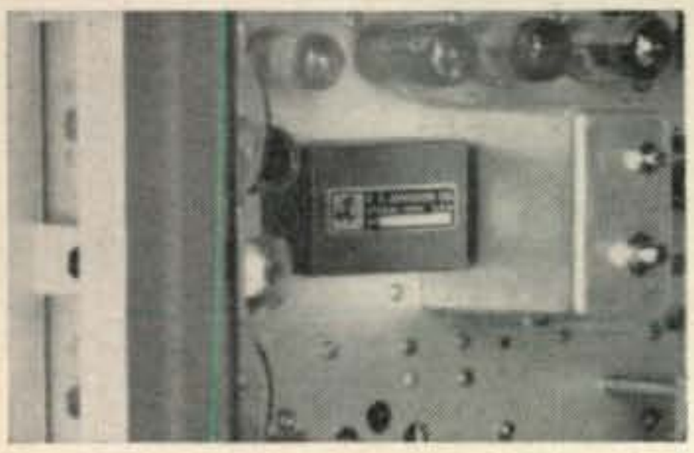
For further information, check number 21, on page 120

available on commercial frequencies, write for details

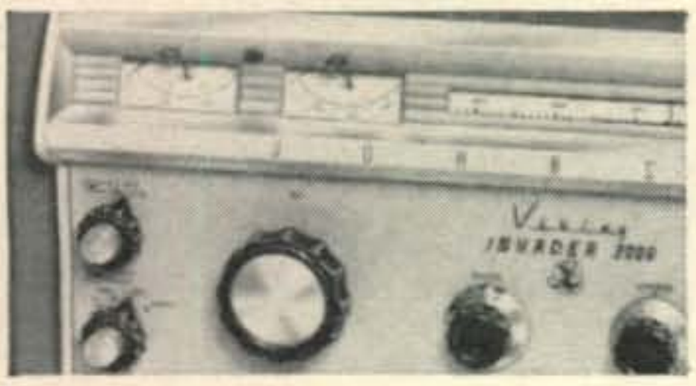
the very finest **SSB** equipment you can buy!

INVADER AND INVADER-2000

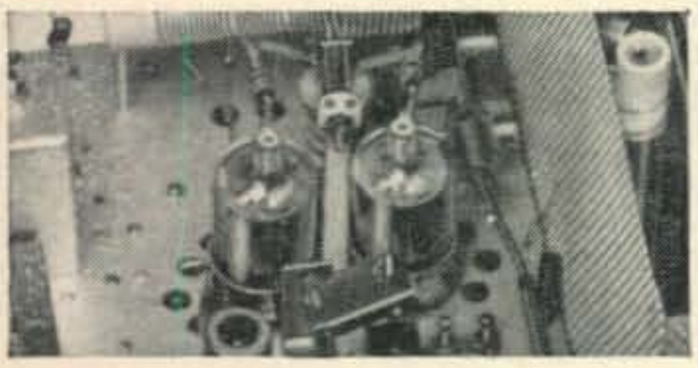
A superbly engineered SSB Transmitter/Exciter . . . add hi-power conversion for 2000 watts P.E.P. (twice average DC) input SSB!



CRYSTAL FILTER-TYPE SIDEBAND—Exclusive high frequency bandpass crystal filter gives you more than 60 db of unwanted sideband and carrier suppression! Select upper or lower sideband instantly.



SIMPLIFIED OPERATION—Extremely easy to tune and operate! Tune for maximum on the meter and you're ready to go—just a few front panel controls give complete flexibility!



FREQUENCY CONTROL—Instant band-switching coverage 80, 40, 20, 15 and 10 meter bands. Built-in VFO is differentially compensated and factory adjusted for maximum stability—"keep warm" heater element keeps VFO at operating temperature even with equipment turned off . . . NO WARM-UP DRIFT!

Free 8-page "Invader" brochure with detailed specifications and photographs!

INVADER

The transmitter you've been waiting for—with more exclusive features than any other Transmitter/Exciter on the market today! Instant band-switching 80 through 10 meters—no extra crystals to buy—no retuning necessary. Rated 200 watts CW and SSB input; 90 watts input on AM. Unwanted sideband and carrier suppression is 60 db or better! Wide range pi-network output circuit. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested with tubes and crystals.

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

INVADER-2000

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

Cat. No.	Amateur Net
240-304-2	$1229.00

HI-POWER CONVERSION

Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader-2000"—a solid 2000 watts P.E.P. (twice average DC) input SSB, 1000 watts CW and 800 watts input AM. Completely wired and tested—includes *everything* you need—no soldering necessary—complete the entire conversion in one evening!

Cat. No. 240-303-2. . Hi-Power Conversion, complete . . . . . **Amateur Net $619.50**

FIRST CHOICE AMONG THE NATION'S AMATEURS

Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA

choose your features....pick your power.... from the nation's most popular transmitter line!

VIKING "KILOWATT" AMPLIFIER (Above)
The only transmitter that provides maximum legal power in all modes—SSB, CW, and plate modulated AM. Class C final amplifier operation provides plate circuit efficiencies in excess of 70% with unequalled broadcast-type high level amplitude modulation. Two 4-400A tubes in Class AB_2 easily deliver 2000 watts P.E.P. (twice average DC) in SSB mode—provides 1000 watts input AM with two push-pull 810 tubes in Class B modulator service. 1000 watts input Class C CW. High efficiency pi-network output circuit will match 50 to 500 ohm antenna loads.
Pedestal contains complete unit. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB. With tubes. **Cat. No. 240-1000**..Wired and tested.....**Amateur Net $1595.00**
Matching accessory desk top, black and three-drawer pedestal. **Cat. No. 251-101-1**.. **FOB Corry, Pa. $132.00**

★★★★ *popular transmitters...*

"ADVENTURER" TRANSMITTER

"CHALLENGER" TRANSMITTER

"NAVIGATOR" TRANSMITTER/EXCITER

"6N2" TRANSMITTER

"ADVENTURER" TRANSMITTER
Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . instant bandswitching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.
Cat. No. 240-181-1..Kit.....**Amateur Net $54.95**

"CHALLENGER" TRANSMITTER
70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW on 6 meters. Two 6DQ6A final amplifier tubes. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes, less crystals.
Cat. No. 240-182-1..Kit.....**Amateur Net $114.75**
Cat. No. 240-182-2..Wired.....**Amateur Net $154.75**

"NAVIGATOR" TRANSMITTER/EXCITER
40 watts CW input . . . also serves as a flexible VFO Exciter. 6146 final amplifier tube—bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes, less crystals.
Cat. No. 240-126-1..Kit.....**Amateur Net $149.50**
Cat. No. 240-126-2..Wired.....**Amateur Net $199.50**

"6N2" TRANSMITTER
Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with the Viking I, II, "Ranger", "Valiant" or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.
Cat. No. 240-201-1..Kit.....**Amateur Net $129.50**
Cat. No. 240-201-2..Wired.....**Amateur Net $169.50**

3 ★★★ *feature-packed transmitters...*

"RANGER" TRANSMITTER/EXCITER

This popular 75 watt CW or 65 watt phone transmitter will also serve as an RF/audio exciter for high power equipment. Completely self-contained—instant bandswitching 160 through 10 meters! Operates by built-in VFO or crystal control. High gain audio—timed sequence keying TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No.		Amateur Net
240-161-1	Kit	$229.50
240-161-2	Wired and tested	$329.50

"VALIANT" TRANSMITTER

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

Cat. No.		Amateur Net
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"FIVE HUNDRED" TRANSMITTER

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

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"COURIER" AMPLIFIER

Rated a solid 500 watts P.E.P. input with auxiliary SSB exciter as a Class B linear amplifier; 500 watts CW or 200 watts AM linear. Self-contained desk-top package—continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts depending on mode and frequency desired. TVI suppressed. With tubes and built-in power supply.

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"THUNDERBOLT" AMPLIFIER

The hottest linear amplifier on the market—2000 watts P.E.P. (twice average DC) input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs.—instant bandswitching. Drive requirements; approx. 10 watts Class AB_2 linear, 20 watts Class C continuous wave. With tubes and built-in power supply.

Cat. No.		Amateur Net
240-353-1	Kit	$524.50
240-353-2	Wired and tested	$589.50

"6N2 THUNDERBOLT" AMPLIFIER

1200 watts (twice average DC) input SSB and DSB, Class AB_1; 1000 watts CW, Class C; and 700 watts input AM linear. Continuous bandswitched coverage on 6 and 2 meters. TVI suppressed. Drive requirements: approx. 5 watts Class AB_1 linear, 6 watts Class C CW. With tubes and built-in power supply.

Cat. No.		Amateur Net
240-362-1	Kit	$524.50
240-362-2	Wired and tested	$589.50

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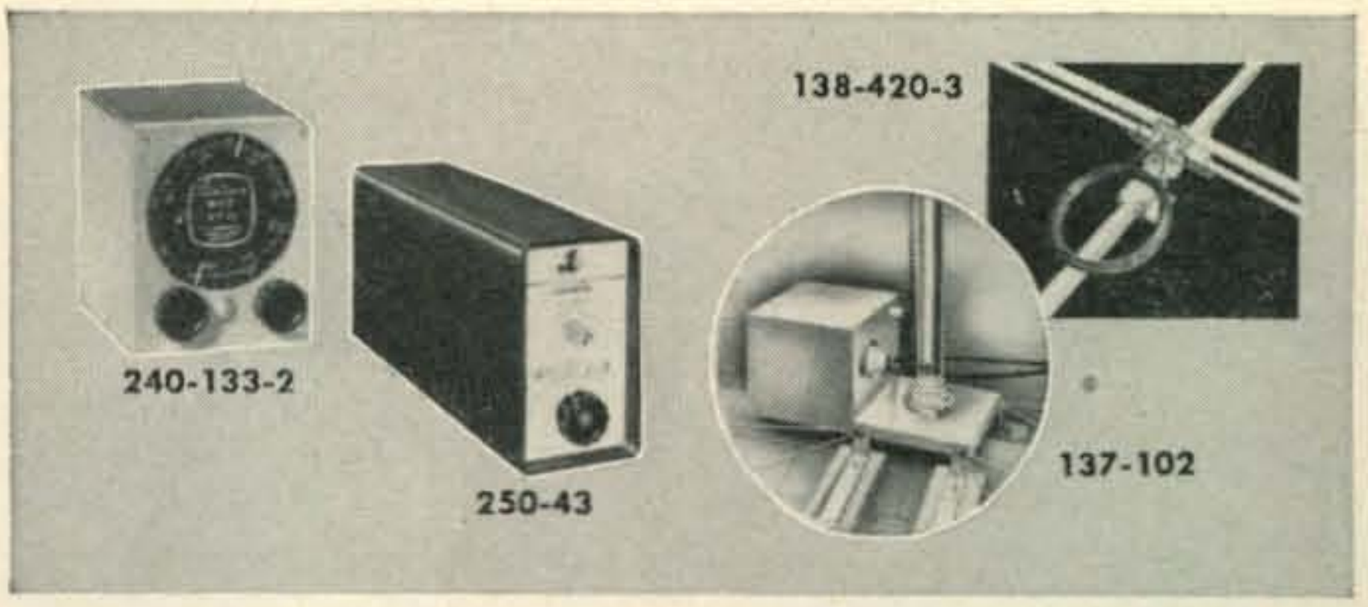

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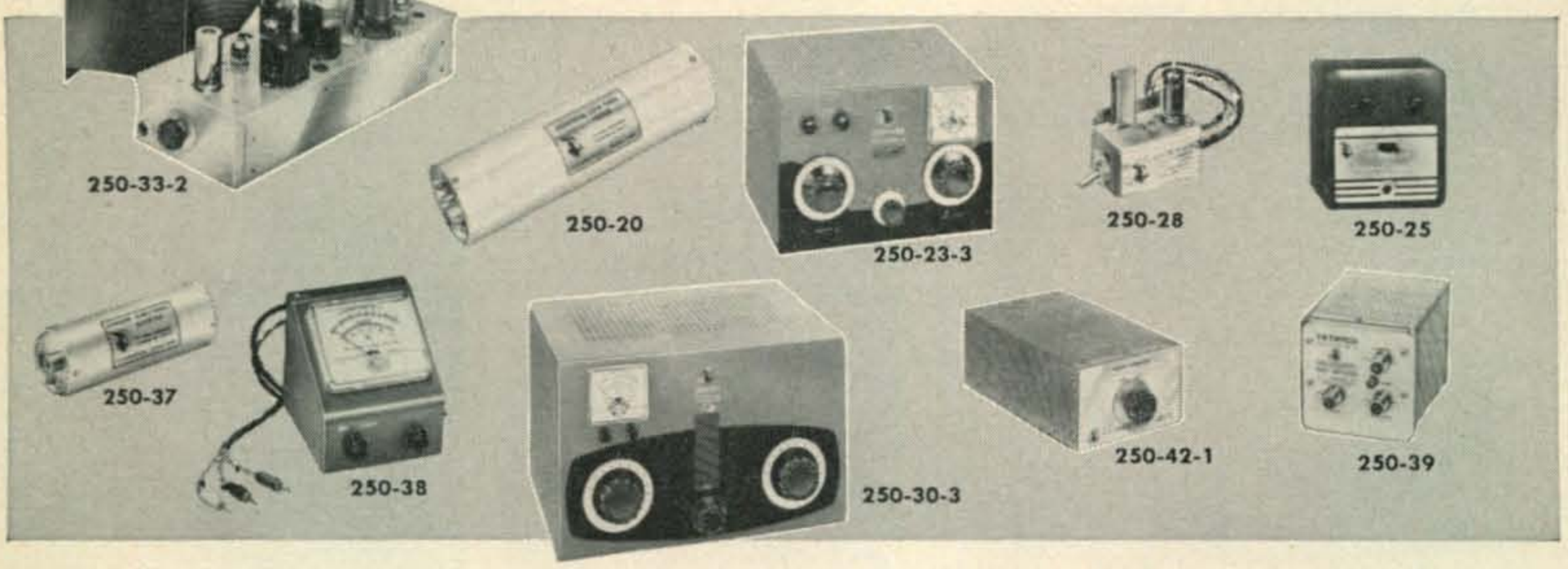

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Cat. No. 250-33-1..Kit.....**Amateur Net $73.50**
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Cat. No. 250-20..52 Ohms Impedance.....**Amateur Net $14.95**
Cat. No. 250-35..72 Ohms Impedance.....**Amateur Net $14.95**

CRYSTAL CALIBRATOR—Provide asccurate 100 kc check points to 55 mc. With tube and crystal.

Cat. No. 250-28..Wired and tested.....**Amateur Net $17.95**

"SIGNAL SENTRY"—Monitors CW or phone signals up to 50 mc. With tubes.

Cat. No. 250-25..Wired and tested.....**Amateur Net $22.00**

T-R SWITCH—Instantaneous break-in on SSB, DSB, CW or AM. With tube, power supply and provision for RF probe.

Cat. No. 250-39..Wired.....**Amateur Net $27.75**

"MATCHBOXES"—Completely integrated antenna matching and switching systems for kilowatt or 275-watt transmitters. Bandswitching 80 through 10 meters.

Cat. No.	Amateur Net
250-23-3..275 Watts, with directional coupler and indicator	$86.50
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250-30-3..Kilowatt, with directional coupler and indicator	$149.50
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For further information, check number 22, on page 120

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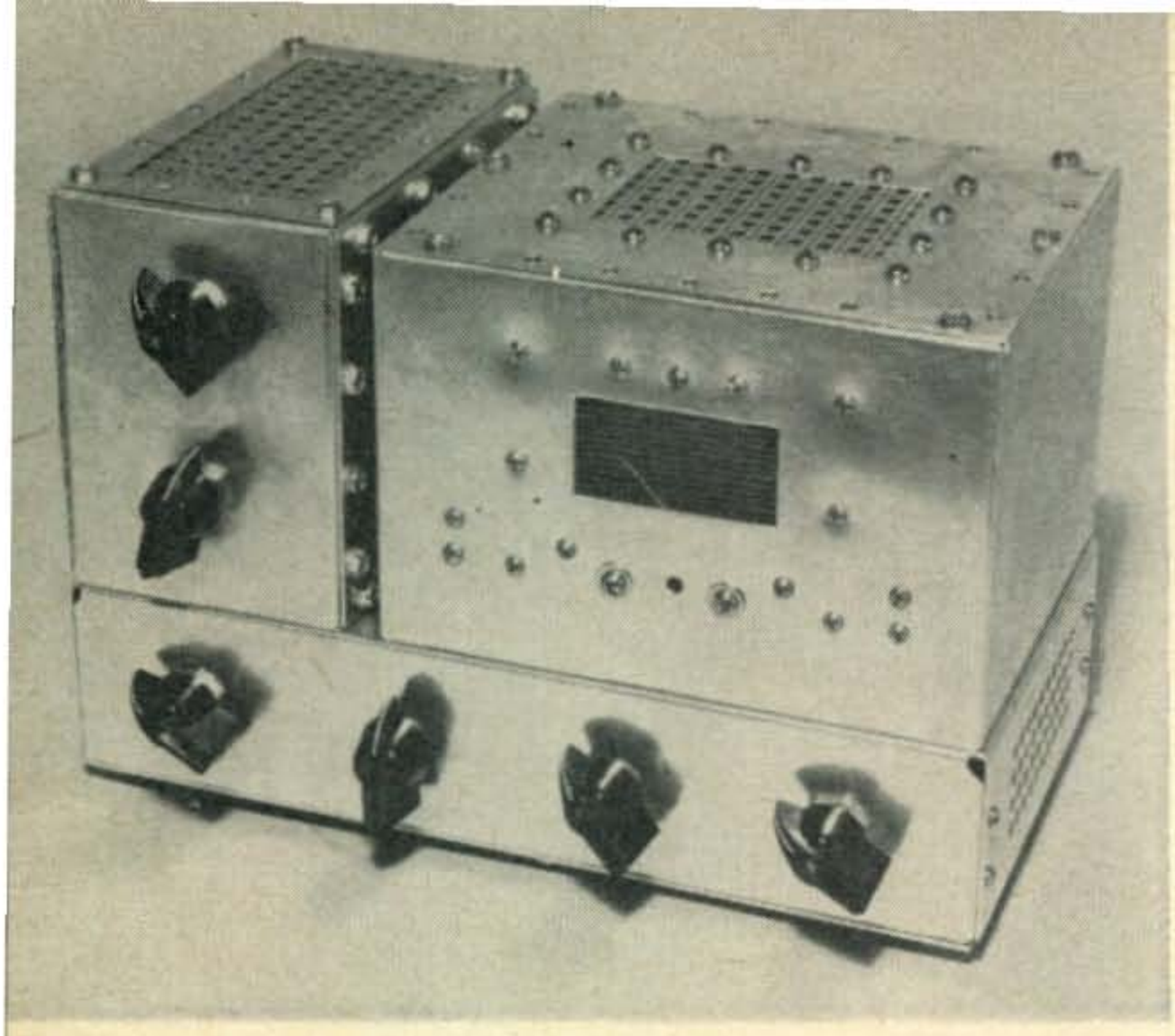
W3ASK

W5RZJ

W6QLV

W6TNS

KØWMR



Front view of the 50 *mc* exciter showing arrangement of tuning controls and three major elements of the unit. Controls, from upper left to lower right are; 6146 plate tuning, antenna loading, meter switch, 5763 plate tuning, 6AG7 plate tuning and crystal-v.f.o. switch. The 4 × 5 × 6" utility cabinet on the right houses the crystals, low level stages, meter and clamp tube. The left hand utility cabinet, 3 × 4 × 5" houses the 6146 r.f. amplifier circuit components. The basic chassis is only 5 × 9½ × 2".

A 50 Watt, 50 Mc. Exciter

A Neat Installation For the 6 Meter Enthusiast

Irving B. Mickey, W2LCB
1247 Baker Avenue
Schenectady 9, New York

The following pages describe a 50 watt exciter for 6 meters using the popular 6146 in a well shielded, pi-network amplifier. The final is not neutralized and besides an unusual method of parasitic suppression, careful consideration has been given to produce a clean, stable c.w. signal.

ALTHOUGH prospects for any further long-haul, *F*-layer DX on 50 *mc* are diminishing rapidly in most parts of the world due to the decline in solar activity, the 6 meter band continues to enjoy increasing popularity. This is not at all surprising if we consider the opportunities which it has to offer: consistent, QRM-free local communications; aurora reflection; sporadic-*E* skip openings; the challenge of extended groundwave coverage; and several somewhat more exotic modes of propagation whose possibilities have scarcely been explored.

Sadly and readily apparent to the discriminating operator is the fact that all too many 6 meter signals fall far short of the standards of performance expected of us. A few moments of *critical* tuning with a good receiver, particularly with the b.f.o. switched on, will reveal the indisputable truth of this statement; drifting, wobbulating, ripple-laden carriers; chirpy c.w. notes; excessive audio splatter, and a rash of thoroughly illegal spurious signals. The cause almost invariably can be traced to unsound or skimpy transmitter design, usually associated with cost-cutting measures. And this, for the benefit of both the uninitiated and the unbelieving, holds true for commercial as well as homebrew equipment.

The 50 watt transmitter-exciter unit described in this article is of straightforward design, but no effort has been spared to insure that it be stable, clean, and trouble-free. It is exactly that, and, as a direct result of the precautions taken to make it so, it is also a remarkably efficient and smooth-functioning piece of equipment. Cost was a secondary consideration throughout.

Circuit Details

Heading the tube lineup is a standard Tri-tet oscillator using a 6AG7 and crystals in the 8 *mc* region. Its cathode circuit is tuned to approximately 12 *mc* by the Z-144 choke, RFC_2 and 91 mmf silver mica capacitor, C_1 and output is taken off at 25 *mc*. A miniature ceramic switch, S_1 provides a selection of four crystals or v.f.o.

In this day of miniature tubes, the choice of a 6AG7 may seem a bit old-fashioned, but it is a feature well worth retaining. The old metal 6AG7 is still one of the finest tubes ever made for Tri-tet service, giving high harmonic output with low crystal current. In this unit, with only 105 volts regulated on the screen, it delivers nearly two milliamperes of drive to the following stage, and it is rock stable. A weak parasitic in the 225 *mc* region was easily killed by a small grid suppressor, PS_1.

Screen Grid Keying

The 6AG7 oscillator-tripler in turn drives a 5763 doubler, which is also operated at extremely conservative ratings and which is screen keyed for c.w. Since this type of keying is somewhat uncommon

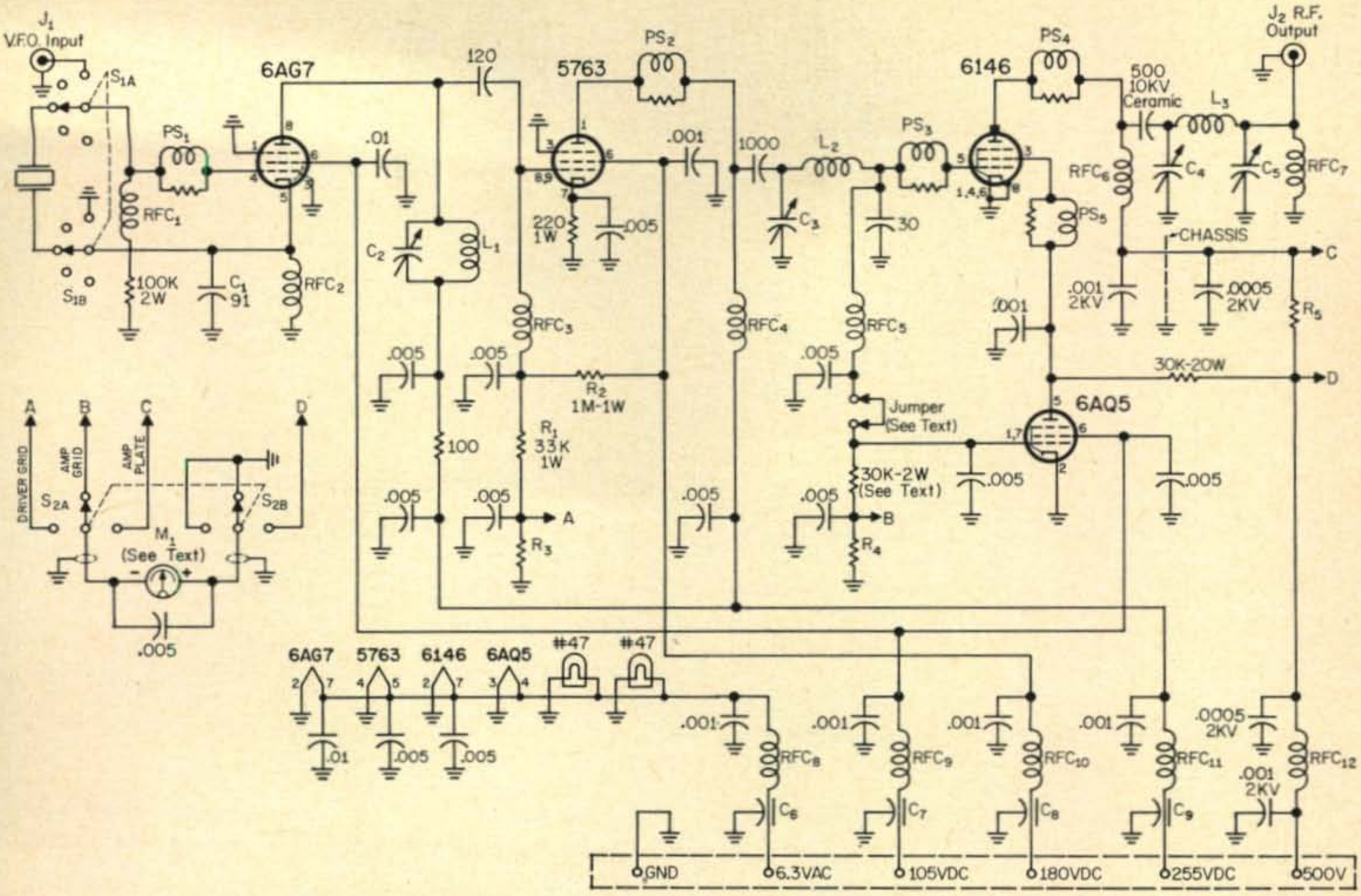
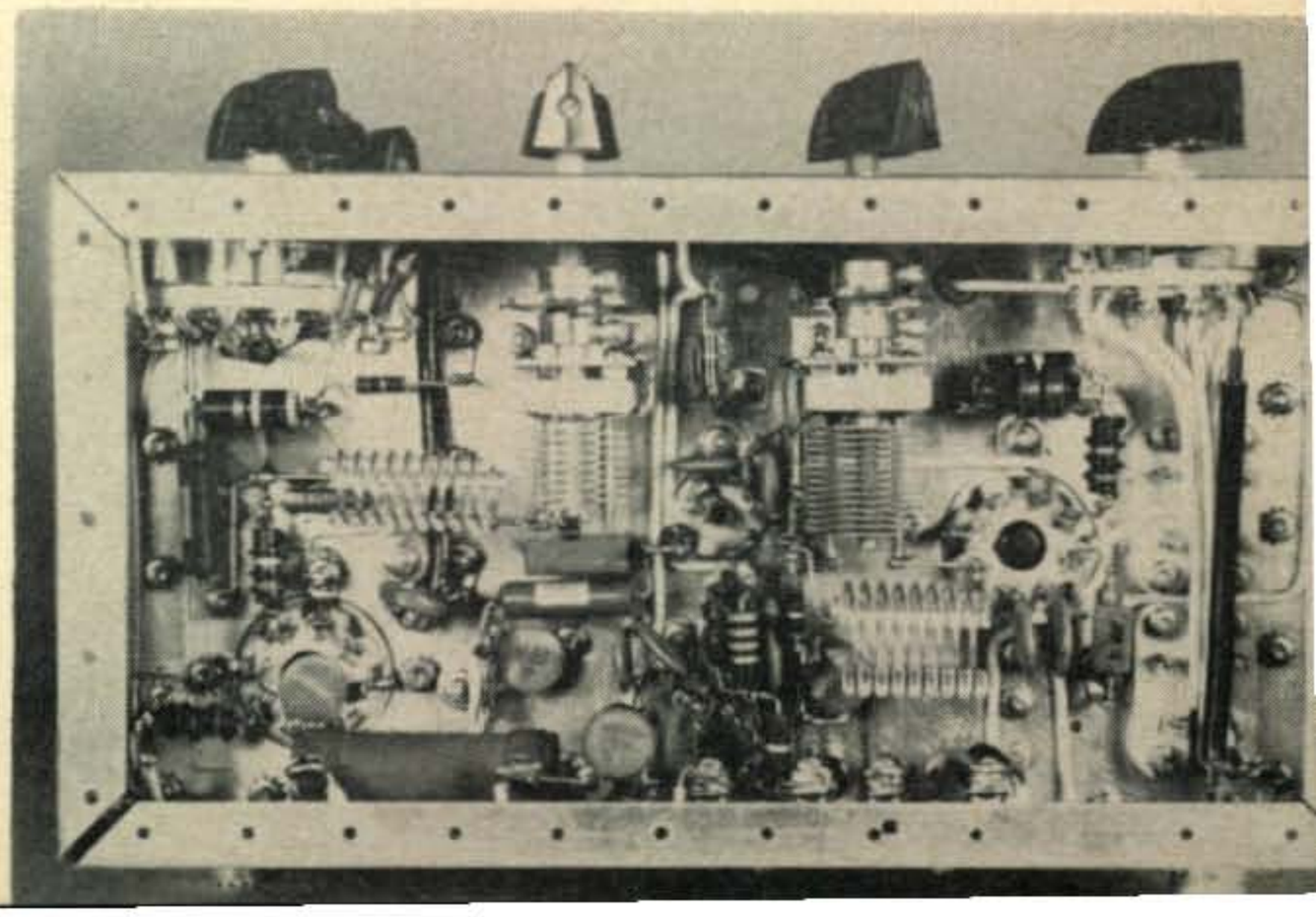


Fig. 1—Schematic of a 50 *mc* exciter using v.f.o. or crystal input. All resistors are ½ watt unless otherwise specified. Decimal value capacitors are in mf and are disc ceramic. All others are mmf and are silvered mica unless otherwise noted.

C_2—100 mmf variable, Hammarlund APC-100.
C_3—50 mmf variable, Hammarlund APC-50.
C_4—35 variable, double spaced, Hammarlund MC-35-SX.
C_5—300 mmf variable, receiver spacing, National STH-300.
C_6, C_7, C_8, C_9—.0015 mf ceramic feedthrough, Centralab FT-1500.
L_1—8 turns #18 ¾" diam., 8 TPI, Air Dux #608.
L_2—9 turns #18 ½" diam., 8 TPI, Air Dux #408.
L_3—5½ turns #12 ¾" inside diameter, approx. 1¼" long.
PS_1, PS_3—3 turns #18 wound on 56 ohm, 1 watt resistor.
PS_2—2 turns #18 wound on 56 ohm, 1 watt resistor.
PS_4—1½ turns #18 wound on 47 ohm, 2 watt resistor.
PS_5—2½ turns #18 wound on 56 ohm, 1 watt resistor.
R_3, R_4, R_5—Meter shunts (See text).
RFC_1—750 microhenry, 75 *ma*, National R-33.
RFC_2—1.8 microhenry, Ohmite Z-144.
RFC_3—50 microhenry 75 *ma*, National R-33.
RFC_4, RFC_5, RFC_6, RFC_7, RFC_{12}—7 microhenry, Ohmite Z-50.
RFC_8—15 turns #18 enam. close wound on 1 megohm, 2 watt resistor.
RFC_9, RFC_{10}, RFC_{11}—15 turns #24 enam. close wound on 1 megohm, 1 watt resistor.
S_1—2 pole, 5 position steatite rotary switch, Centralab PA-2003.
S_2—2 pole, 3 position steatite rotary switch, Centralab 2505.

and since the keyed stage of this particular transmitter incorporates one rather unusual feature, some questions may arise as to what transpires during c.w. operation and how the process is accomplished.

Screen grid keying of low-powered stages has won favor here at W2LCB, because it is uncomplicated circuitwise, breaks a very small amount of current, and is capable of producing excellent keying characteristics. To utilize this method successfully, two conditions must be met: 1) the keyed screen voltage must remain reasonably constant under varying load; and 2) a negative potential



Under chassis view of the 50 *mc* exciter illustrating component layout and wiring. Crystal sockets and oscillator components are at the right, with the 6AG7 tank circuit made up of the air inductor and variable capacitor located right center. The doubler tank circuit is mounted directly to the left of the 5763 which can be seen between both variable capacitors. The large resistor at the bottom left is the 6146 screen dropping resistor. Note the individual solder lugs used to ground the various pins of the 6146.

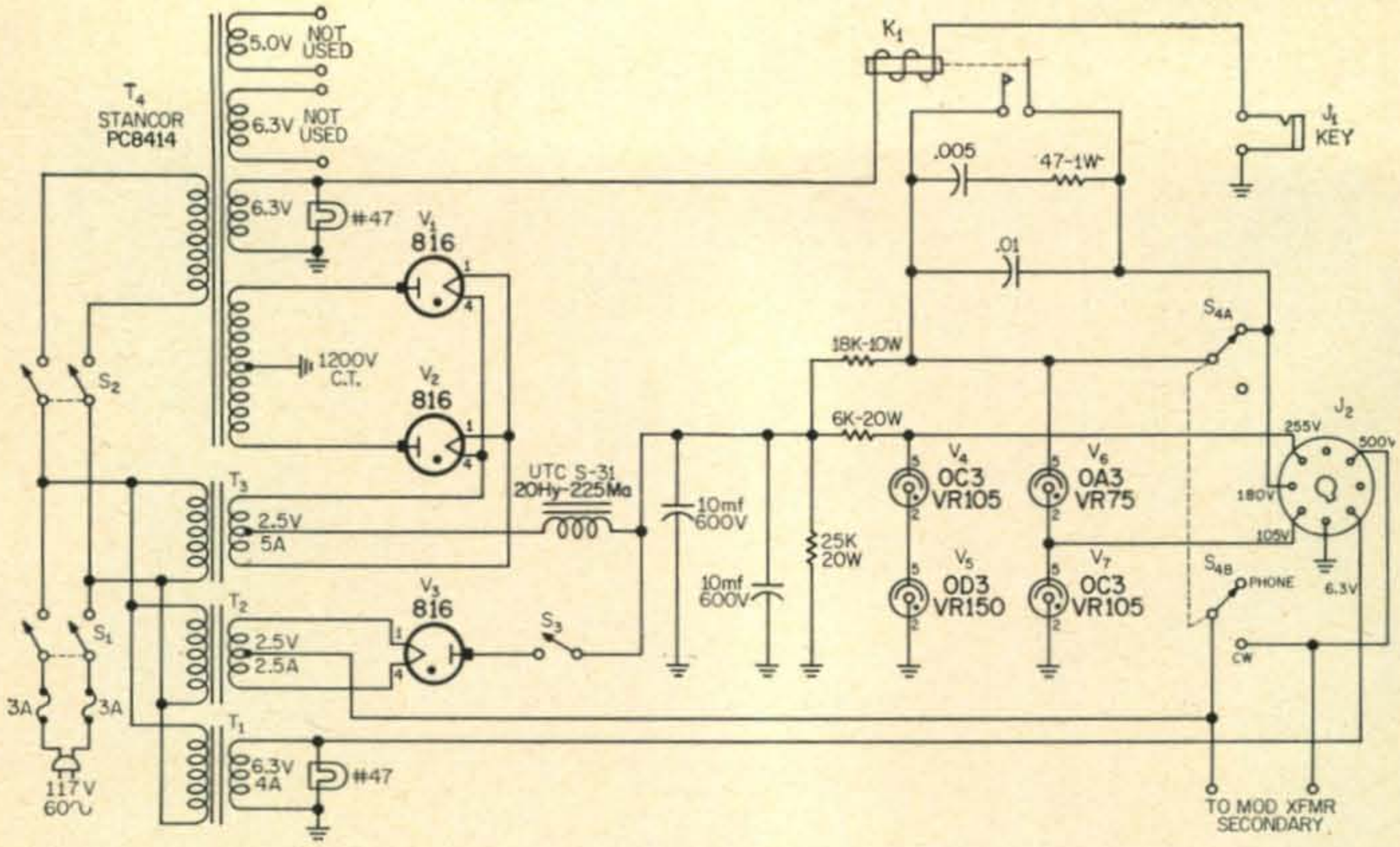


Fig. 2—Circuit of a suitable power supply to be used with the 50 *mc* exciter. Capacitors marked with decimal values are disc ceramic. The operation of V_3 is explained in the text.

K_1—Single-pole, 6.3 volt a.c. relay (capable of following keying)
S_1, S_2—D.p.s.t. toggle switch
S_3—Single-pole, two-position (or more) steatite rotary switch
S_4—Two-pole, two-position (or more) single-section steatite rotary switch

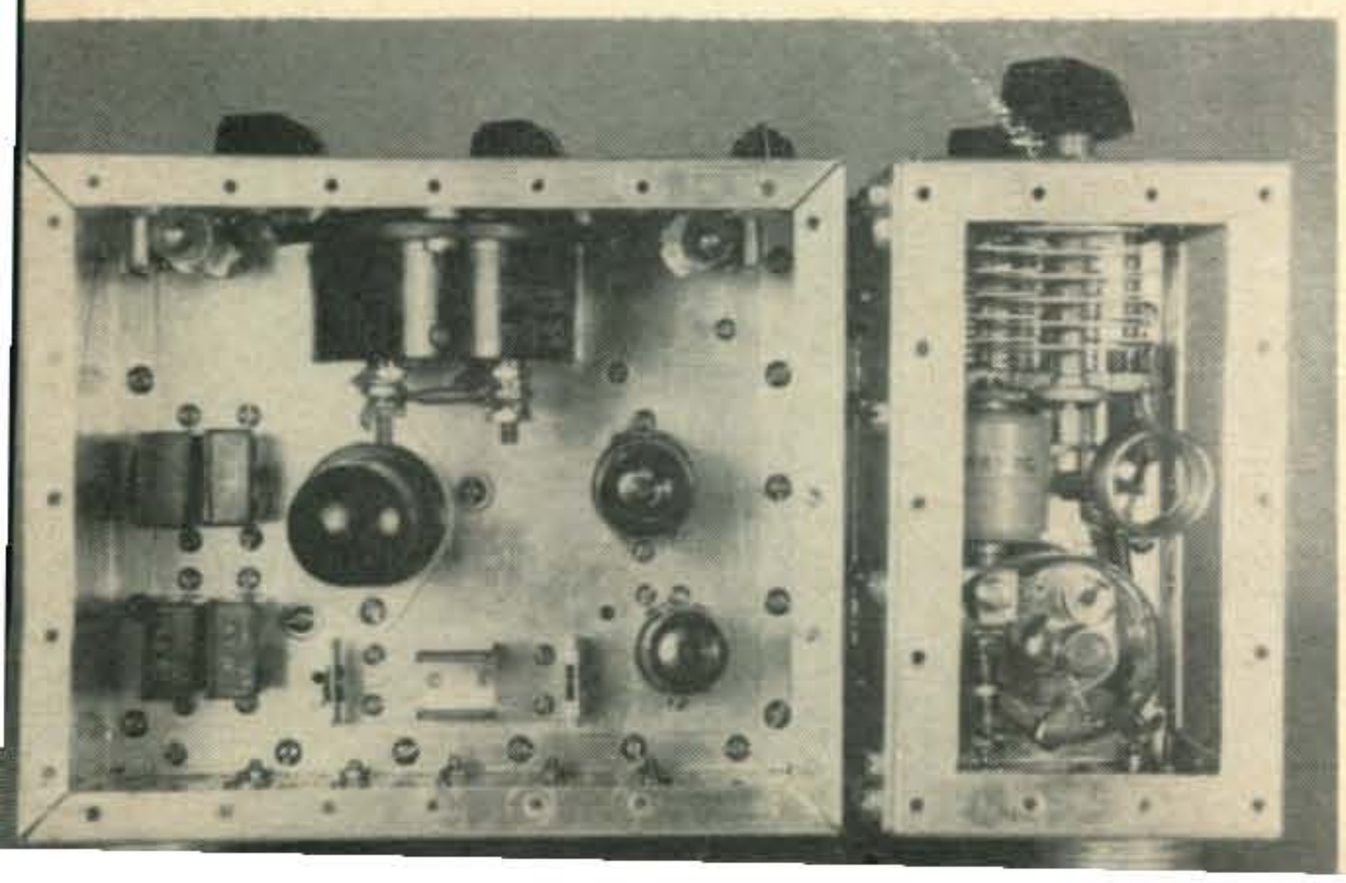
must be applied to the screen, under key-up conditions, if complete plate current cutoff is to be achieved.

This particular transmitter is keyed by breaking the regulated 180 volt line to the 5763 screen, thus satisfying the first of these two requirements. Located within the separate power supply unit are a 6.3 volt a.c. keying relay for d.c. isolation and an *RC* network which, together with the bypass capacitors in the 5763 screen line, very effectively eliminate key clicks. Proper shaping of a keyed wave is a rather tricky business, the measures necessary being dictated largely by the design and operating parameters of the keyed equipment. It is strongly recommended, therefore, that any builder of this unit experiment with the keying circuit components until: 1) clicks have been satisfactorily suppressed and 2) the characteristic suits his own taste. Check the handbooks for full details on the design and adjustment of suitable filter networks.

Providing a negative voltage for the keyed screen might appear to be a thorny problem, but the answer to it is surprisingly simple. Since the 6AG7 oscillator runs continuously during c.w. operation, negative bias is present at all times at the high end of the 5763 control grid resistor, R_1. By connecting a one megohm resistor, R_2 from this point to the screen of the 5763, the full negative potential is automatically transferred to the screen as soon as the key is opened (since no current flows, there is no drop across the resistor). Resistor R_2 is so large that it has absolutely no effect upon the operation of the stage when normal positive screen voltage is applied. Use of an external v.f.o. in no way changes the picture, so long as it and the 6AG7 (now functioning as a straight multiplier) are permitted to run continuously and thus provide drive to the 5763. Backwave, otherwise strong enough to be annoying, is negligible with R_2 connected from grid to screen.

Doubler Coupling

Otherwise the circuitry of the doubler stage is perfectly straightforward. A slight parasitic in the u.h.f. region was disposed of painlessly by a suppressor PS_2 mounted directly at the 5763 plate terminal. Coupling between doubler and final is



Top view showing above chassis parts placement. Tubes, from left to right are; 6AG7, oscillator-tripler, 5763 doubler, 6AQ5 clamp tube and 6146 r.f. amplifier. The meter is recessed and supported by long screws and spacers. Indirect lighting of the meter is accomplished by means of the two pilot lamps mounted on each side of the meter. The battery clip behind the 6AG7 is provided for fixed bias and is explained in the text.

accomplished by means of a modified form of pi-network, with parallel plate feed to the former and a fixed silver mica capacitor serving as the output capacitor of the coupling network.

R. F. Amplifier

Employed as a final amplifier tube is a single 6146, running at approximately 50-60 watts input with 500 volts on its plate. Two of the design features of this stage—the lack of a neutralizing capacitor and the method of parasitic suppression—may elicit some surprise among those accustomed to working with tubes of this type.

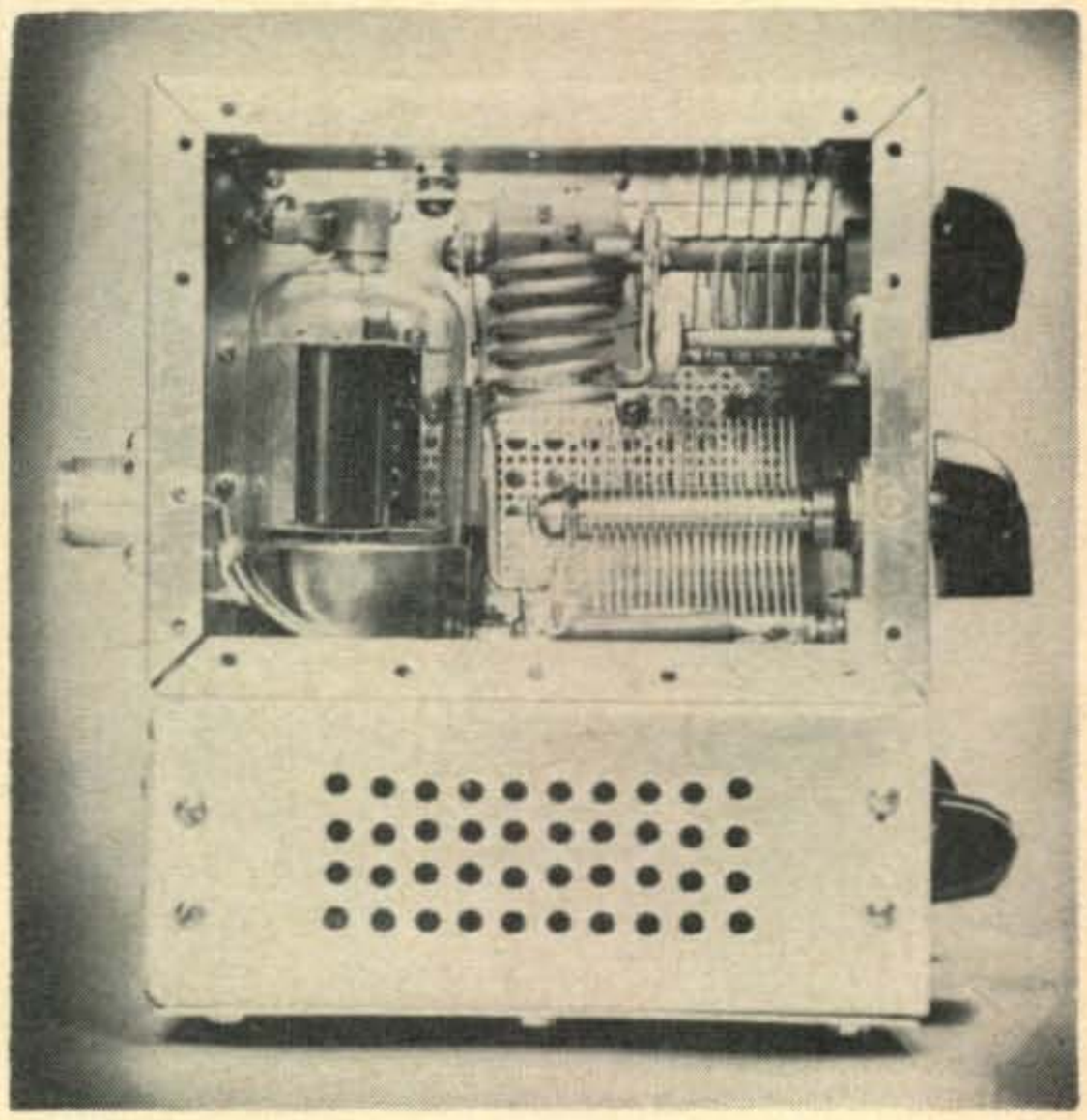
With regard to neutralization, this author has found repeatedly that a 6146 can indeed be operated in the 50 *mc* region and below without neutralization, *provided* that proper design and construction practices are followed. The secret lies in thorough physical isolation between grid and plate circuits and in adequate bypassing of all leads coming from both. The accompanying photographs speak for themselves so far as isolation is concerned. A bit less obvious is the fact that the plate lead to the 6146 is bypassed immediately above and below the chassis with disc ceramic capacitors, and that shielded wire is used between the chassis feed-through insulator and the meter switch. It was not necessary to shield the below-chassis grid circuit wiring.

The unusual combination of plate, screen, and control grid parasitic suppression in the 6146 stage will undoubtedly fracture somebody's curiosity, but don't be alarmed by it—it serves its purpose well. Previous experiments with parasitic suppression in tetrodes, including transmitters up to the 500 watt class, have firmly convinced the author that screen grid suppression is generally the most effective. In some cases, a combination of suppression measures proves most satisfactory, and this is one of those cases. Without the screen choke, a much larger plate suppressor was required, and plate suppressors are notorious wasters of fundamental power at these high frequencies. Contrary to popular opinion, a small screen suppressor has little or no effect upon fundamental stability of the amplifier stage.

As testimony to its good behavior, the final stage of the exciter has momentarily been run wide open—no excitation, no load, no fixed bias, and drawing nearly 100 watts of plate power—and not a single trace of instability, fundamental or otherwise, could be detected at any setting of the grid and plate tuning capacitors! Furthermore, with normal excitation applied and plate voltage disconnected, tuning the 6146 plate tank capacitor through resonance causes virtually no flicker in grid current. For a real thrill, just try that same test on your shiny new commercial rig.

6AQ5 Clamp Tube

The output circuit of the 6146 stage is a straightforward pi-network, designed to give a tank circuit Q of approximately 15, at a plate load impedance of 2500 ohms, when coupled to a flat coaxial line. The 6146 itself is protected by a 6AQ5 clamp tube,



Side view of the 6146 r.f. amplifier compartment with perforated shielding removed. The tank inductor is mounted between the stators of both plate tuning capacitor at the top and antenna tuning capacitor on the bottom. The plate r.f.c. is bolted to the junction of the plate blocking capacitor and is connected to a ceramic feedthrough bushing which supplies the high voltage. RFC_7 can be seen in the foreground.

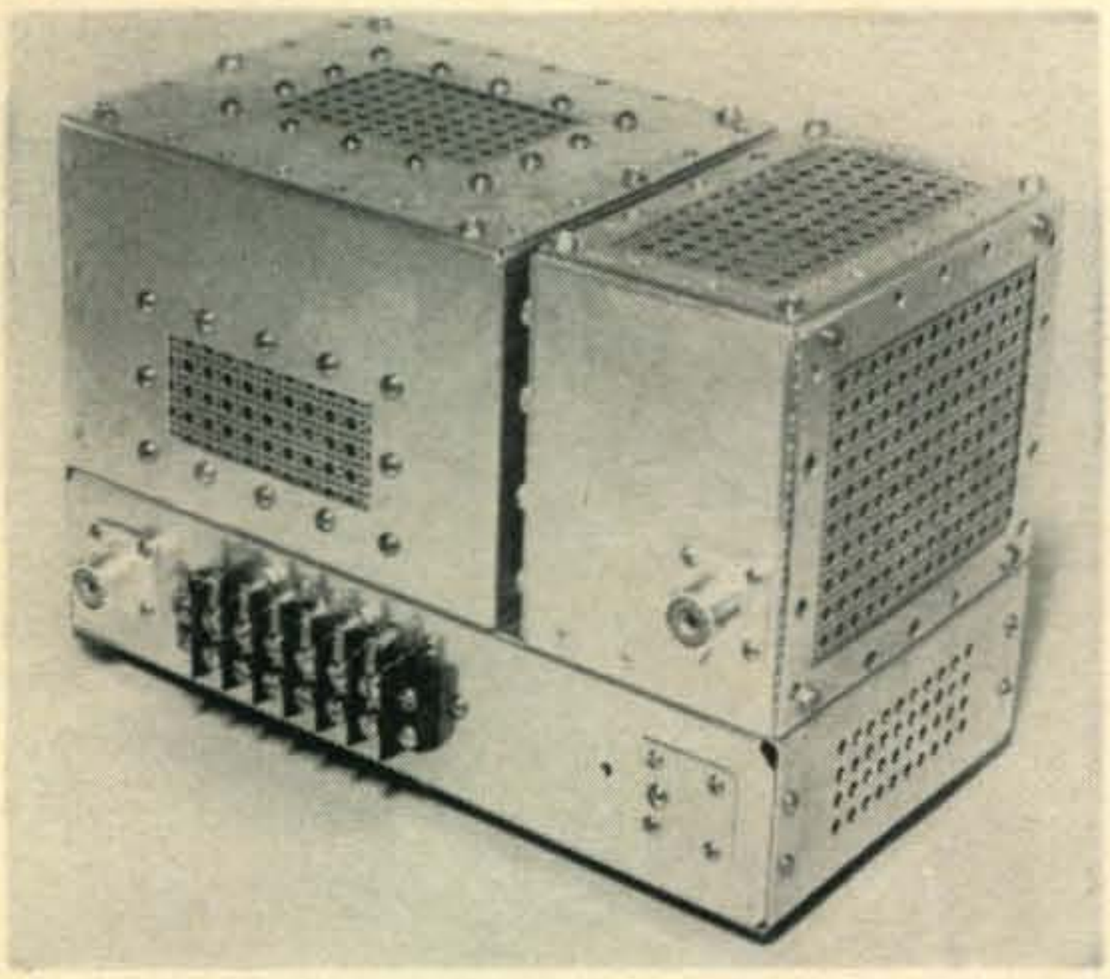
which, with the final operated from a 500 volt supply, holds plate current to a very safe value under key-up conditions. To provide proper clamping action and to prevent clamp tube conduction on modulation peaks, the screen of the 6AQ5 is fed from the regulated 105 volt source which supplies the oscillator screen.

Fixed Bias and Mounting Clamp

If maximum rated plate voltage is to be used on the amplifier, a small amount of fixed bias (22½ v.), should be applied to the control grid and the grid leak resistor decreased to 22,000 ohms. To cope with this eventuality, a mounting clamp for a miniature 22½ volt battery has been included in this unit and could be wired into the 6146 grid circuit in a matter of minutes. The jumpered connection shown in the circuit diagram indicates where the bias battery should be inserted. If operation under maximum ratings is not contemplated, the battery clamp may be omitted.

Meter Switching

A switch and appropriate shunts have been provided to permit metering 5763 grid, 6146 grid, and 6146 plate currents. The instrument shown is a surplus 0-1 milliampere unit, with an internal resistance of approximately 190 ohms. Standard 22 ohm, ½ watt, 5 per cent composition resistors (individually selected) proved to be perfect shunts for a 10 milliampere full scale range, while a 0.91 ohm, ½ watt resistor extended the range to 200 milliamperes for plate current readings. Different meters, of course, will require different shunting treatment,



Rear view clearly illustrates the steps taken to shield and ventilate the 6146 compartment shown on the right as well as the technique used to effectively bypass the power leads. The four ceramic feedthrough capacitors can be seen mounted directly over the terminal strip. The 6146 plate voltage lead (far right) is the only one which does not leave the chassis via a feedthrough capacitor, the lead is however, bypassed and filtered immediately inside the chassis wall. V.f.o. input jack is at the left and r.f. output is at the right.

but the procedure is described in any handbook and is not at all difficult. One possibility might be to use a 0-10 milliampere instrument, in which case both grid currents could be read directly, and an accurate shunt would only have to be provided for plate current measurements.

Construction Details

The transmitter is constructed on a 5" × 9½" × 2" aluminum chassis, with standard aluminum utility cabinets providing above-chassis shielding. Every possible precaution was taken to make the completed assembly r.f. tight. Overlaps of at least one-half inch were provided wherever metal meets metal, and generous quantities of screws (over 200) were used to fasten the various sections together, spacing between screws averaging three-quarters of an inch. All ventilation cutouts are covered with familiar Reynolds perforated aluminum stock.

Recessed Meter

The right hand compartment, a 4" × 5" × 6" utility cabinet, encloses crystals, low-level stages, and meter. The meter is sub-mounted (about one-half inch) behind a small piece of window screen, which has been cadmium plated for better electrical continuity and sprayed with dark paint to reduce glare. Additional light for the meter is provided by a pair of 6.3 volt pilot lamps.

6146 Compartment

The 6146 and its plate circuit components are housed in a 3" × 4" × 5" utility cabinet on the left side of the chassis. A rectangular cutout, approximately 2" × 4", is made in the chassis directly under the cabinet. This provides adequate metal overlap and also permits much of the associated wiring to be completed on the base of the cabinet before it is mounted. A heavy soldering lug is mounted beside each grounded pin of the 6146 and connections are made by bending the lugs in direct contact with the socket terminals. This cuts cathode lead inductance to a minimum, contributing to the stability of the amplifier.

The 6146 plate tuning capacitor shown in the photo is the only non-standard component in the entire transmitter. It is a surplus 35 mmf unit, identical in every respect to the double-spaced Hammarlund MC type, except that one of the stator lugs has been replaced with a heavy, vertical brass strap. The strap made an ideal mounting post for the pi-network blocking capacitor. In the absence of this ready-made support, the blocking capacitor can just as easily be mounted on a small ceramic stand-off insulator near the top of the amplifier compartment.

Space within the chassis itself is at a premium, and extremely careful layout planning is recommended. Where several mutually associated components must occupy cramped quarters, it is advisable to mount them first on a small terminal strip and then install the completed sub-assembly as a unit. Bypass and coupling capacitors should be thoroughly tested before installation, because in their final positions some of them are not easily accessible. The only other precaution to observe in the under-chassis wiring is to space the 6AG7 and 5763 plate coils as far apart as possible to minimize coupling between the two. To save wear and tear on the nervous system, mount the two utility cabinets early in the game, before their mounting holes become obscured.

Power Supply

Power supply requirements for the transmitter are approximately 500 volts for the 6146, 250 volts for oscillator and doubler plates, 180 volts regulated for the 5763 screen, and 105 volts regulated for the 6AG7 screen. The author uses a single 500 volt supply, which contains 0C3 and 0A3 regulator tubes in series for the screen voltages, and an 0D3 and 0C3 in series for a 255 volt plate supply. Also incorporated in the supply unit are a phone-c.w. switch and a single 816 mercury vapor rectifier tube which serves as a high level, negative peak "clipper" when operating a.m. The latter is extremely effective, permitting copious quantities of audio to be applied to the signal without any trace of splatter.

Tuning and Operation

Before placing any new transmitter in operation *it should be tested thoroughly, stage by stage, for instability and parasitic oscillations.* Follow the advice given in the handbooks—run each stage wide open, with no excitation or fixed bias, and look for any sign of grid current or for any fluctuation in plate current as its associated grid and plate capacitors are tuned through their entire ranges. The most sensitive points for parasitics will be the minimum capacity settings of both tuning capaci-

tors. *Do This Quickly*—a 25 watt bottle doesn't like to dissipate upwards of 100 watts for very long. In fact, it won't!

Once satisfied that everything is in order, the unit is ready to be placed in service. The 6AG7 plate capacitor should be tuned for maximum 5763 grid current (between one and two milliamperes). *Caution*: this oscillator tank circuit can be tuned to the second, third, and fourth harmonics of the crystal frequency; make sure that it is tuned to the third harmonic at 25 *mc*. The 5763 plate capacitor is in turn tuned for maximum grid current to the 6146, which should be between four and five milliamperes with no plate voltage applied to the amplifier tube. Excitation with the 6146 loaded should be in the vicinity of 3.0 to 3.5 milliamperes. If the latter value is substantially exceeded, either detune the grid circuit slightly or replace the 0C3 screen regulator tube with an 0B3. If, on the other hand, excitation is inadequate, replace one of the screen regulators with its next higher counterpart. The pi-network output tank is tuned in normal fashion, starting with the loading capacitor, C_5 at maximum capacity and alternately adjusting both C_4 and C_5 until the 6146 is loaded to an input of 50 to 60 watts.

Final Caution: use either an antenna coupler or a good low-pass filter with this transmitter (both if necessary). A pi-network tank alone will *not* provide adequate suppression of harmonics. A simple antenna coupler pays a double bonus: added selectivity for harmonic suppression and a means of presenting a pure resistive load to the final amplifier.

Good luck, and we'll be seeing you on 6. ■

How's Your "AH" Appeal?

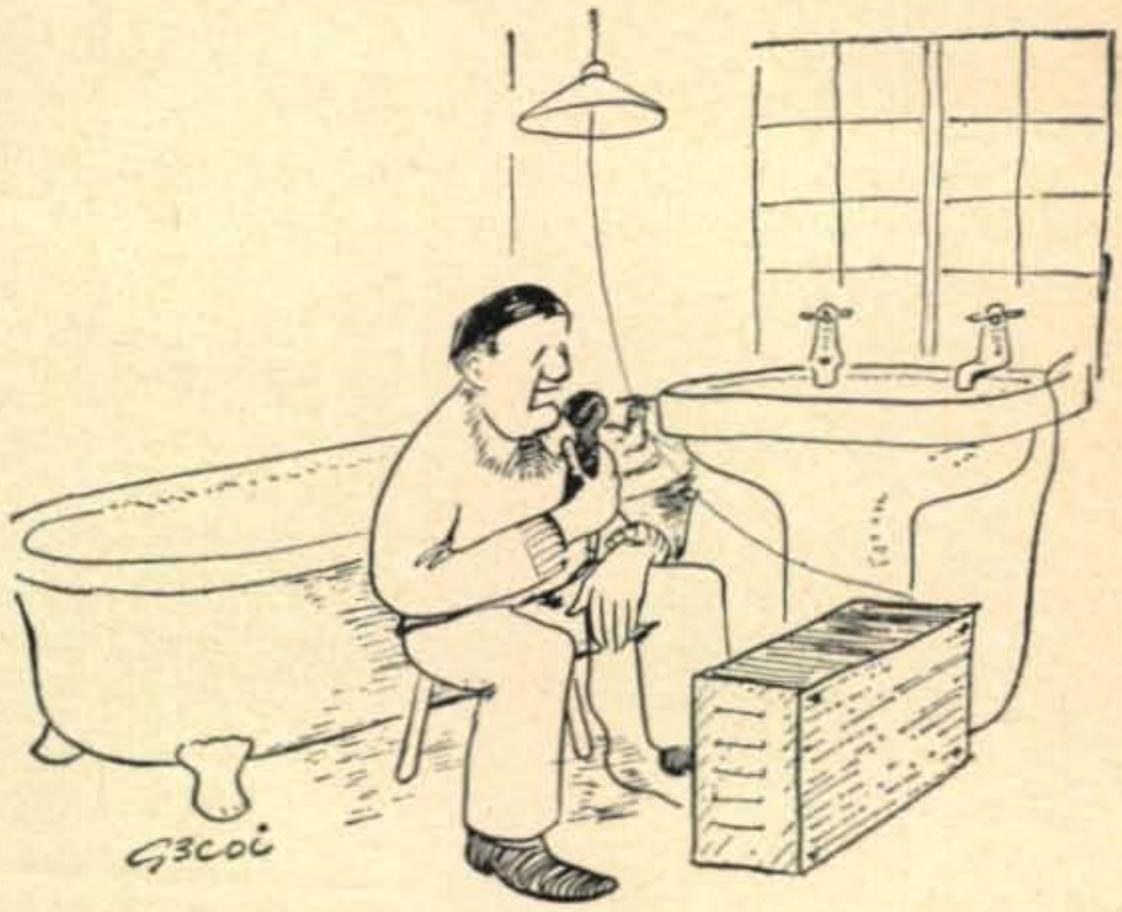
Ronald L. Phoenix, W9HFN
East Jackson Street Road
Macomb, Illinois

How many times have you been in QSO with a fellow who uses a crutch? The crutch I'm referring to is a verbal one, and probably 99.9 percent of us use this crutch in one manner or another. Take the following conversation for instance: "The *ah* rig here is *ah* a homebrew fifth running *ah* about *ah* 600 watts to a *ah* folded *ah* dipole about *ah* fifty feet up." If you haven't previously noted this phenomena, take a closer listen to any a.m. QSO in progress. You'll see what I mean. I mention a.m. specifically, because the *ahhhhhs* the s.s.b. boys use in conjunction with their *ahs* places them in a different category.

A few *ahs* scattered through a conversation are to be expected, but when they equal or exceed in number the words used to convey the desired information, it is time to take stock of the situation. The irony of it all is that we who use this crutch do so without realizing it, and for good reason. How can we know we are doing something annoying to the listener unless we are informed? Hence, the reason for this essay.

First off, why do we use the verbal crutch? The use of *ah* between words or phrases holds us up, so to speak, while we're thinking of what we're going to say next. Another common crutch is "and-*ah*," which lets us carry on a conversation interminably, sans punctuation.

Secondly, how can we minimize our use of these crutches? (Notice I said minimize, not eliminate!) The primary consideration is to realize we're using them; that's half the battle. The rest of the job consists of training ourselves to become better speakers. Be a good listener when the other fellow is talking, for he is supplying you with information and data with which you can build your return speech. Develop the habit of taking notes as the QSO progresses, and learn to organize your thoughts. With plenty of material to work with, you won't need to intersperse your phrases with *ah*, and your "A.A." rating will climb ever upwards. (A.A. meaning of course, "AH APPEAL") ■



We ahhhh are ahhh a little ahhhh crowded ahhh at ahhh our ahhh Q ahhh TH.

High Stability VFO's Of Recent Design

Tima Popovich, YU1FR, ex YU7BJ

YU1FR introduces amateurs to some new European ideas on extremely stable VFO's.

In spite of the wide commercialization of ham gear these days, there are still enthusiasts who prefer to build their rigs at home. But, if only for the sake of our own edification, it will do no harm to discuss a few of the recent improvements in oscillator design, in some detail.

The problem of obtaining high frequency stability in variable frequency oscillators always presents a hard nut to the constructor, and not only to the *amateur* constructor. No wonder that many efforts were made throughout the years, particularly since WW II (both by amateurs and manufacturers) to develop and improve oscillator design in such a way as to approach stability characteristics close to those of crystal controlled oscillators.

There are a few oscillator types, developed experimentally by the laboratories of some radio manufacturing firms, in which frequency stability in continuous operation goes up to $\pm$ 0.001%. Because of their great stability and relatively simple design, these devices are quite tempting to the amateur builder too. Of course, built with amateur resources, similar devices will be less perfect, but still superior to the conventional oscillators.

Basically, all these circuits are of the electron coupled type with certain experimentally developed improvements.

Czech Tesla Oscillator

The Czechoslovac "TESLA" laboratories have developed an oscillator which presents considerable improvements over the popular series tuned Colpitts (better known as the Clapp circuit). Just as in the case of the Clapp, the coupling between the oscillating tank circuit and the tube is very loose. However, an important improvement is the fact that, unlike the Clapp, not only is the input capacitance of the tube shunted by capacitors of large value, but also the other interelectrode capacitances. This results in better stability by eliminating tube interelectrode capacity changes, as well as changes due to fluctuations of electrode voltages.

This oscillator is characterized by a remarkable frequency stability and low harmonic content, as well as constant output power over an extended frequency range.

The high stability of the "Tesla" oscillator offers the possibility of building it for any desired band without resorting to frequency doubling or tripling, usually necessary in compact mobile equipments.

The schematic diagram and component data, as presented by the Romanian magazine[1] are shown in fig. 1. The tuned circuit data is listed in the table.

Tuning is accomplished by the variable capacitor C_9. Better results are obtained by using a ganged, double section capacitor, whose second section, C_{10} should be connected across C_1. This, however, involves more complicated construction. The range of bandspread depends upon the values of the capacitors C_1, C_2, C_3, C_4, and C_9.

Coil inductances are adjusted by powdered iron cores. The Table contains data for six different amateur bands, and the values for the 72-73 *mc* frequency range are given to make possible the coverage of the 144-146 *mc* band by doubling in a subsequent stage.

Tubes recommended are 6AK5, 6AC7 or similar types. Certain dual triodes may also be used. In this case, one of the triodes serves as the oscillator, while the other one is used as an amplifier. For good results, only high quality components should be used.

The tuned circuit is housed in a shielded box. Special care must be taken to provide mounting of the components to permit spacing the coils well away from the sides of the box (at least two times the diameter of the coil), to prevent drastic reduction of its Q by the shielding.

Resistor R_2 is chosen within the limits of 1000-10,000 ohms. Upon its value depends the coefficient of harmonics at the oscillator output.

The value of R_1 is chosen between 27,000-75,000 ohms. The coupling capacitor (from oscillator plate to the following stage) should not exceed 100 *mmf* in value.

For break-in operation the oscillator may be keyed in the cathode circuit.

For the 72-73 *mc* band, C_4 is the tuning capacitor.

[1] *Radioamatorul*, February, 1957, p. 24. Official publication of A.V.S.A.P., Bd. Dacia 13, Bucharest, Romania.

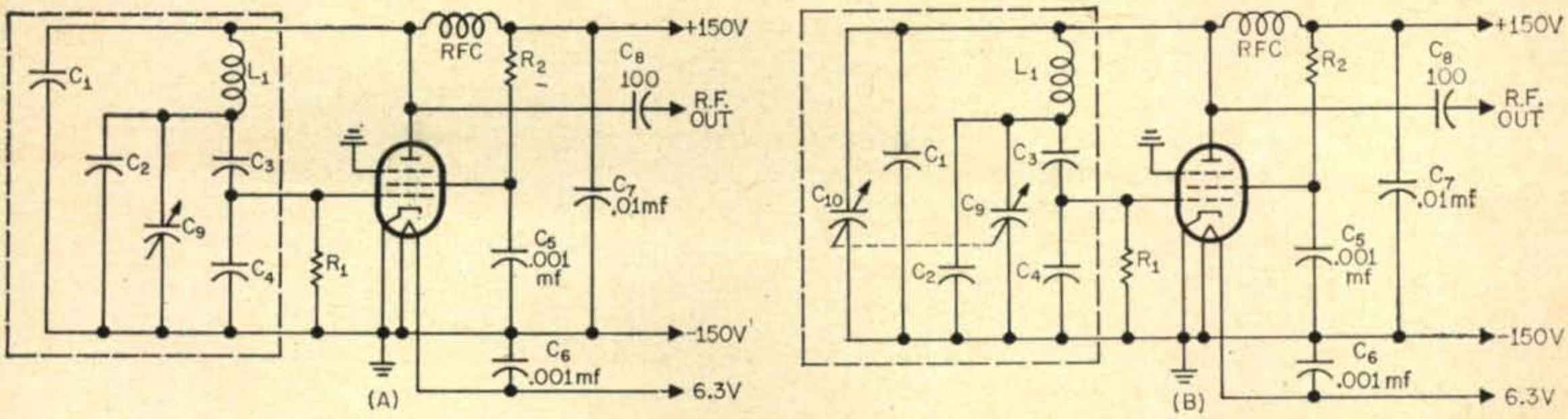


Fig. 1—The "Tesla" oscillator circuits and *L/C* charts developed in a Czechoslavac laboratory. Circuit A uses a single tuning capacitor while B employs a dual unit, C_9 and C_{10}.

Band Mc.	L_1† *uh*	No. of Turns	Wire Gauge No. B & S	Tuning with Single Capacitor C_9					Tuning with Two Gang Capacitor C_9–C_{10}				
				C_1 *mmf*	C_2 *mmf*	C_3 *mmf*	C_4 *mmf*	C_9 *mmf*	C_1 *mmf*	C_2 *mmf*	C_3 *mmf*	C_4 *mmf*	C_9 *mmf*
1.8– 2.0	25.0	46	30	565	30	4800	470	250	500	25	5000	580	115
3.5– 3.8	13.0	33	28	285	20	2600	250	125	245	12	2350	235	75
6.0– 7.15	7.0	24	24	140	10	1470	130	11.0	134	7	1250	125	0*
14.0–14.35	3.5	17	22	68	5	700	68	11.0	62	3	600	57	7
21.0–21.45	2.5	14	20	44	3	475	37	5.5	41	2	350	33	7
28.0–29.7	1.7	12	18	31	2	300	20	11.5	26	2	210	21	7
72.0–73.0	0.7	1.7	14	8.5	—	130	2-8	1.5	7	—	150	2-8	2

† L_1 wound on 15 mm. diameter form (0.5905 inches).
* Original article shows C_9 as 0 *mmf*. This is probably an error, suggests Tima, and should be in the vicinity of 10 *mmf*.

Table I—Component values for the single and double tuned Tesla oscillators shown in fig. 1. The 72-73 mc range is provided for doubling, in a subsequent stage, to the 144-146 mc band.

Clapp-Franklin Oscillator

Another factory conceived high-stability oscillator, successfully built and employed by some European amateurs, is the so called Clapp-Franklin oscillator, developed by the German Telefunken laboratories[2].

As the name itself indicates, this design combines the good properties of the Clapp and Franklin oscillators into one unit, tending at the same time to minimize their respective deficiencies.

The Franklin circuit, shown in fig. 2 (A) contains two tubes, one of which acts as the oscillator proper, while the second one serves as an amplifier and phase inverter. Values of the components are chosen so as to ensure a very loose coupling between the oscillating tank circuit and the tube, just as in any high stability unit. As a result of the negligible influence of the tube elements on the frequency generating tank circuit, the frequency stability of the Franklin oscillator comes comparatively close to that of a crystal controlled unit. The amplified feedback voltage is returned to the grid through a small capacitance.

In the Clapp circuit, shown in fig. 2 (B) a high *Q* circuit is assured in a somewhat different way. The tube is tapped across only a small portion of the oscillating tank circuit by means of a capacitive voltage divider consisting of three capacitors in series across the coil. The resulting tank circuit has a high *L/C* ratio, thus providing a low tank current. In addition, the values of C_1 and C_2 are quite high compared to the tube capacitances. Hence, possible changes of tube interelectrode capacitances during operation cannot appreciably affect the frequency of the tank circuit.

The greatest shortcoming of the Clapp circuit rests in the low value of the radio frequency output voltage generated, which is dependent upon the setting of the series tuning capacitor. This results in uneven excitation of the following stages. The broader the band, the more pronounced the undesirable effect.

This inconvenience is overcome in the Telefunken circuit by combining the Clapp and Franklin circuits.

As shown in the fig. 2 (C) the feedback voltage is not applied to the grid of the oscillator tube, as in the Franklin circuit, but to the junction of the two voltage dividing capacitors, C_1 and C_2. The use of the conventional parallel tuned tank circuit produces a constant output power over a broad frequency range. This in turn provides level excitation of the following stages.

[2] YO3FT, *Radioamatorul*, March, 1957, page 16.

The fig. 2 (D) shows the schematic of the tried and proven oscillator developed at Telefunken.

The resonant tank circuit is tuned to 3.5 *mc*. The output power is approximately 1 volt effective, and output impedance is 100 ohms. For better thermal compensation, C_1 is made up of combination of two parallel ceramic condensers, 15 *mmf* and 35 *mmf* respectively.

Tubes V_1 and V_2 may be triodes, or triode connected pentodes. A dual triode having separate cathodes can also be used.

Tube V_3 is a high conductance pentode in a cathode follower circuit. The plate of this tube is shorted to ground for r.f. by a 5000 *mmf* ceramic capacitor. Capacitor C_2 is also ceramic, while C_3, C_4 and C_5 are micas.

For the required inductance of 21 μh the oscillator coil should be 25.5 turns of #24 wire on a ceramic form 1½ inches in diameter.

For wiring, #18 (or larger) wire is recommended. Particular care should be given to mechanical stability and rigidness of the entire unit, as well as to the quality of the components.

The unit should be placed in a metal box, lined with 2 or 3 layers of heat insulating material.

Radoslav Circuit

The v.f.o. circuit to follow is an amateur design presented by Rakar Radoslav in the *Radioamater* magazine[3], the official publication of the Yugoslav Amateur Radio Union (SRJ).

Figures 3-A, B and C illustrate how subsequent improvements were developed in the famous e.c.o. and Clapp circuits, by retaining and combining their desirable properties.

The resulting oscillator circuit has a crystal clear note of constant pitch, excellent frequency stability characteristics and the device is easy to build.

The improvements in the e.c.o. and Clapp circuits are as follows:

a) In the Clapp circuit, the capacitive voltage divider connected between the grid and ground does consume a certain amount of the already small energy available at the grid. In the newly developed circuit the capacitive voltage divider is connected between the plate of the oscillator tube and ground. The amount of r.f. energy available at the plate being much higher, the possible effect of losses upon the circuit are of little consequence.

b) In the Clapp circuit the suppressor grid serves as an electrostatic shield inside the tube, provided a pentode is used. In this circuit this is accomplished by the control grid with improved frequency stability.

c) In the Clapp circuit the capacitances forming the capacitive voltage divider reach 1000

[3]Radoslav, R., *Radioamater*, p. 134, July-August 1954. Official publication of the S.R.J., Postanski fah 324, Belgrade, Yugoslavia.

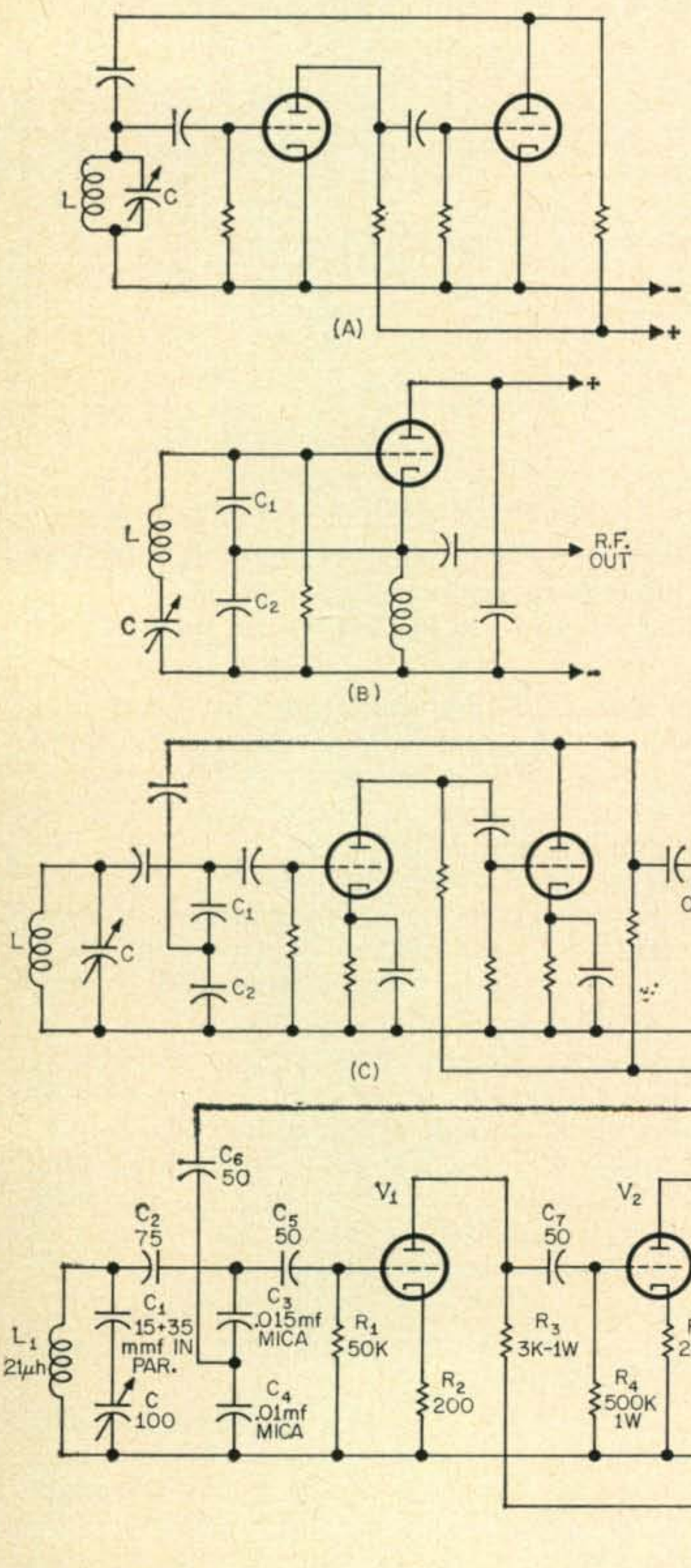


Fig. 2—A—The basic Franklin circuit. B—The basic Clapp circuit. C—Fundamental circuit of the combined Clapp-Franklin oscillators. D—The circuit of the Clapp-Franklin oscillator as developed at Telefunken.

mmf in value, while in this circuit they are of 2000 *mmf* each. This insures a better cancellation of the results of changes in interelectrode capacitances during operation.

d) In the Clapp circuit only the grid to cathode capacitance is shunted by a large capacitor, while in this circuit changes in all the interelectrode capacitances of the tube (grid-cathode, gridplate, plate-cathode) are cancelled out.

e) The working quality of the Clapp circuit, according to its designer:

$$N = 10\sqrt{\frac{9\,G_m Q}{fC_m}}$$

while in this circuit:

$$N = 10\sqrt{\frac{9\,G_{m\mu}}{fC_m}}$$

Where: N is quality of the circuit.

G_M is tube transconductance.

Q is the quality factor of the inductance.

f is the operating frequency.

C_M is the resulting capacitance of the capacitive voltage divider and minimal capacity of the series tank circuit.

μ is the amplification factor of the second tube.

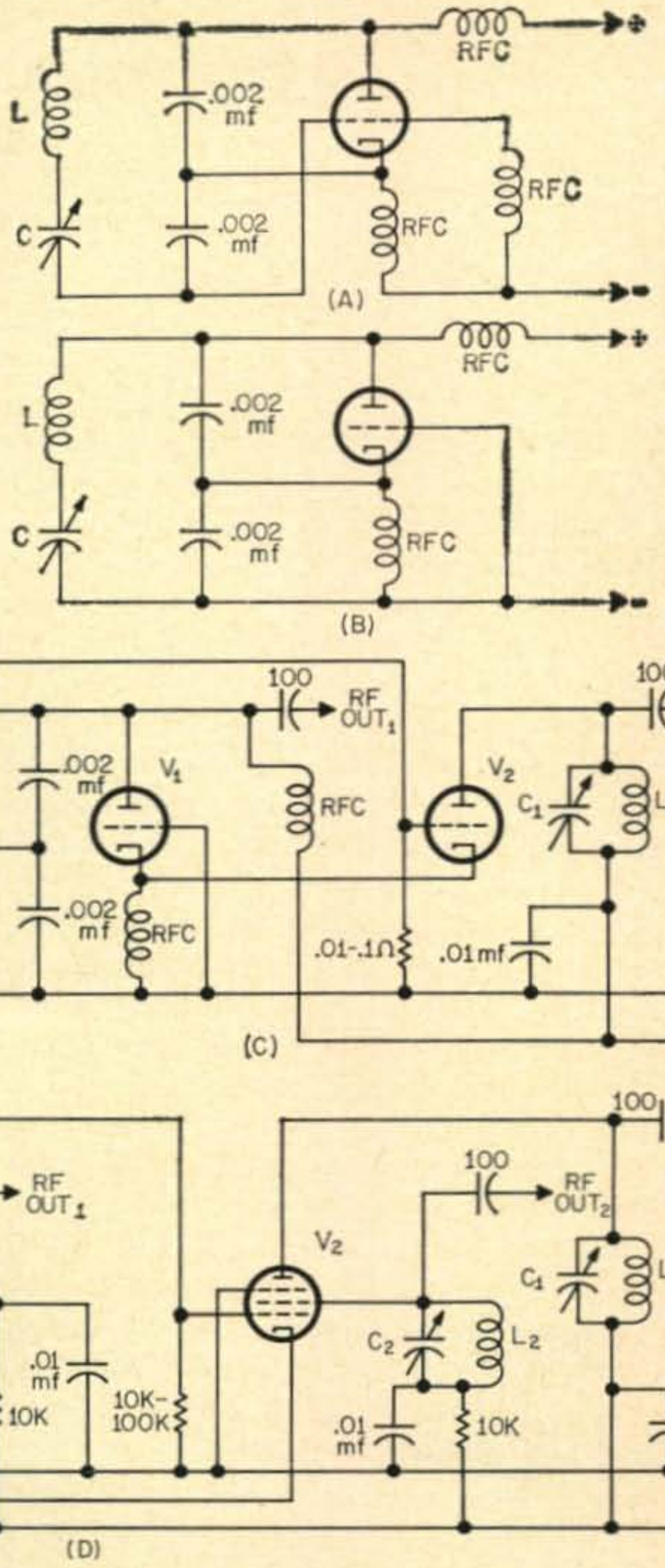


Fig. 3—A—B—C—The development steps in the oscillator designed by Rakar Radoslav. Output may be taken from V_1 or V_2 as explained in the text. D—A pentode version of the oscillator shown in C above.

Reference to the above equations indicates that, in this circuit, the highest usable frequency, conditions and quality of the components being equal, is considerably higher than with the Clapp.

Further advantages of this circuit in comparison with the conventional types of oscillators follow:

a) The cathode coupling system insures a very strong feedback of the current type, which is constant over a broad frequency range;

b) the output voltage has a medium amplitude of purely sinusoidal shape;

c) the separation is purely electronic;

d) the stability of the unit is comparable to that of a crystal controlled unit.

Figure 3 (C) shows the effective circuit diagram of the v.f.o.

It works on the following principles: When the high voltage is applied, oscillations will take place in the series tank circuit *LC*. Since the two 2000 *mmf* capacitors (which serve to nullify changes in interelectrode capacity) are connected across the tank circuit, a current flows through the resulting capacitive voltage divider, bringing about voltage drops equal in value but opposite in phase, across each of its elements. Thus, at the point at which the grid of V_2 is connected to the capacitive voltage divider the h.f. potential is zero. Since the voltages at the extremities of the series tank circuit are opposite in phase, the control grid of V_2 is opposite in phase with the plate of V_1.

The voltage at the control grid of V_2 changes its bias, and after being amplified in the cathode circuit, excites V_1, which inverses the phase and acts as a grounded grid amplifier. After the phase inversion, the h.f. oscillations are added to those of the plate circuit of V_1 and boost the oscillations in the *LC* circuit. The h.f. output can be drawn through a 100 *mmf* capacitor from either the plate of V_1, or that of V_2. If the output of V_2 is to be used, the tank circuit L_1C_1 can be tuned to any desired higher harmonic of the fundamental frequency. In this latter case, V_2 serves either as a buffer, or as a frequency multiplier. A resonant choke can be substituted for the L_1C_1 tank circuit if preferred.

Figure 3 (D) presents the same circuit using pentodes instead of triodes.

It is desirable, although not a strict necessity, to use voltage stabilization in power supplies with all the above v.f.o. units. ■

How's Your X-MAS Hint List?

Carole F. Hoover K9AMD
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Hillsboro, Illinois

CHRISTMAS is just around the chimney, but it's not too late to help Santa help you. Yep, that's what I said, and if you're interested, just heed the merry Yuletide carol, and "Lean your ear this way." With a little cool-Yule maneuvering, a thinking ham can fill the jolly man's pack with gear for his very own station, and he'll probably be doing his own family a favor. Look at it this way: How many times has your wife, mother, dad, or fond grandparent said after all the Christmas ribbons have been cut: "Well, I wanted to buy you something for your shack, but I just didn't know what to get."

As you choked back the tears last year and gazed over the pile of new ties and plaid socks, you vowed not to make the same mistake again. But, here it is almost Christmas again, and what's the story? Does your family know that your heart bleeds for a new mobile rig or a beam antenna? Can your XYL possibly come through with that gorgeous bandswitching single sideband exciter you've been eyeing, or will she helplessly thumb through the radio catalogs and give up. Remember, although those catalogs may be a ham's best buddy, they're Greek to almost everyone else.

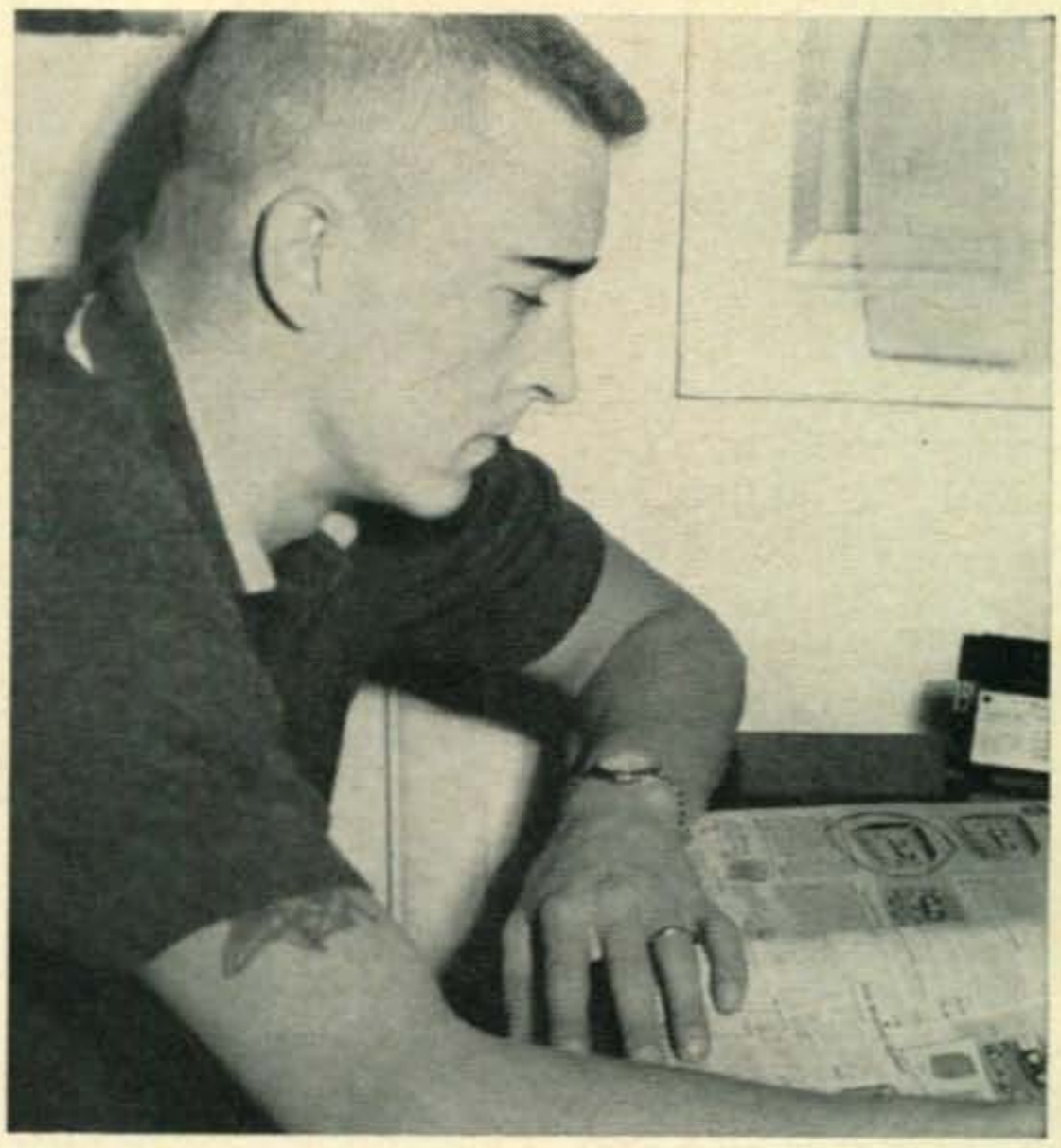
But don't despair; there are lots of shopping hours left, and nobody gets done before Christmas Eve anyway. Today, before it's too late, make another list of what you want for your shack. Now, make a second list of what the family can afford, and discard the first one. Pick a brochure from the firm with the best parking lot or the quickest mail service and grasp a red pencil firmly. Carefully encircle *the* big item, and don't forget to designate what model you want, which speaker, what voltage, or how many elements. (Those little extras are "musts.")

If you're really pushing your luck with something in the over $100 bracket, make pencil notations of the trade-in you can get on what you already own and leave them laying around in plain view. Without this collateral, the deal may be off. While you're at it, mark a second choice, but do it half-heartedly and leave the page without fingermarks or folds. Another "just in case" measure is to slip the word to your best friend, so he can answer the "what can I get him for Christmas" question after only a moment's headscratching.

A last-but-not-least step is to boldly name the item you hope you can afford after you pay for everyone else's presents. Then get your wife or the party-under-fire into the right price range by hinting about a gift you may purchase for her stocking.

Finally, after all this, if you still get ties, plaid socks, and Sunday shirts, well, Happy New Year, anyway. ■

Gladys, the XYL of W9LZE, Dick, and baby daughter, Lori Ann, are lost when it comes to Daddy's radio catalogs. They'd like to get him a "ham-type" Christmas present, but they don't know how to find it.



W9EZA, Dan, shows how a fellow can help Santa Claus help him! . . . By encircling his first choice Christmas present in the catalog and leaving it and his trade-in figures in plain view, he's improving his chances.

A Transistorized Aural-Visual Field Strength Meter

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General Radio Company
West Concord, Massachusetts

Here is another excellent use of the voltage variable silicon capacitor in a device which, besides giving visual indications of relative power, also produces an audio tone which increases in frequency as transmitter output increases. Because it is battery operated, it has excellent possibilities for mobile installations.

IN MAKING transmitter adjustments, there is probably no device quite as useful as the field strength meter. This is because it gives a positive indication that the various adjustments, up to and including the antenna, are such that maximum output is being obtained. In a mobile transmitter installation it is especially important that every last possible watt is *actually radiated*, since the power level is generally quite low. Mobile operation poses several problems in the design of a field strength meter which are not encountered in a fixed transmitter installation. The unit to be described was designed to fulfill the more rigid requirements of mobile operation.

The field strength meter may be either tuned or untuned, and may or may not contain an internal amplifier. The tuned meter has the advantages of sensitivity, and by proper design may also double as a wavemeter. It was decided to use the broad band untuned circuit to eliminate the use of plug-in coils or a band switching arrangement, and thus simplify multi-band operation. This also gives the added advantage that the meter need not be retuned as the transmitter operating frequency is shifted through a band. Since the untuned arrangement is less sensitive than the tuned, and the use of a less sensitive meter is desirable from the standpoint of shock and vibration, an internal amplifier is necessary. For the sake of versatility the amplifier must be independent of any external power sources, thus ruling out the use of vacuum tubes.

It is particularly difficult to attempt to retune a transmitter while driving in heavy traffic or in total darkness, and it is here that such a device is needed most. It was decided that during times when the human visual information circuits are busy, one's aural circuits are still available and could be employed. Two possibilities present themselves. First, an audio oscillator could be constructed and the output amplitude made to be a function of radiated r.f. power. Although the human ear is an exceptionally sensitive device, the amplitude response is logarithmic, and relatively large changes in the intensity of a constant frequency tone are required to discriminate between levels. On the other hand, the ear is extremely sensitive to very slight changes in the frequency of a constant amplitude tone, even under conditions of high ambient noise levels. Discrimination on the basis of frequency was thus selected.

Voltage Variable Capacitor

The block diagram of the instrument is shown in fig. 1. The heart of the audio system is the voltage variable capacitor, SC_1.

When a diode is back biased, the electric field is such that the so-called majority carriers of the material on each side of the rectifying junction are forced away from the junction instead of across it. The concentration of these carriers is sufficiently high to appear as two plane conducting surfaces. Because the reverse bias does not allow conduction by majority carriers, these "plates" are effec-

* This article was originally submitted by the author as a paper entitled "An Aural-Visual Field Strength Meter" for consideration at the A.I.E.E. student papers competition at Providence, Rhode Island on May 3, 1960, where it won third prize. It has been slightly rewritten for *CQ* and presented here as an amateur construction project.

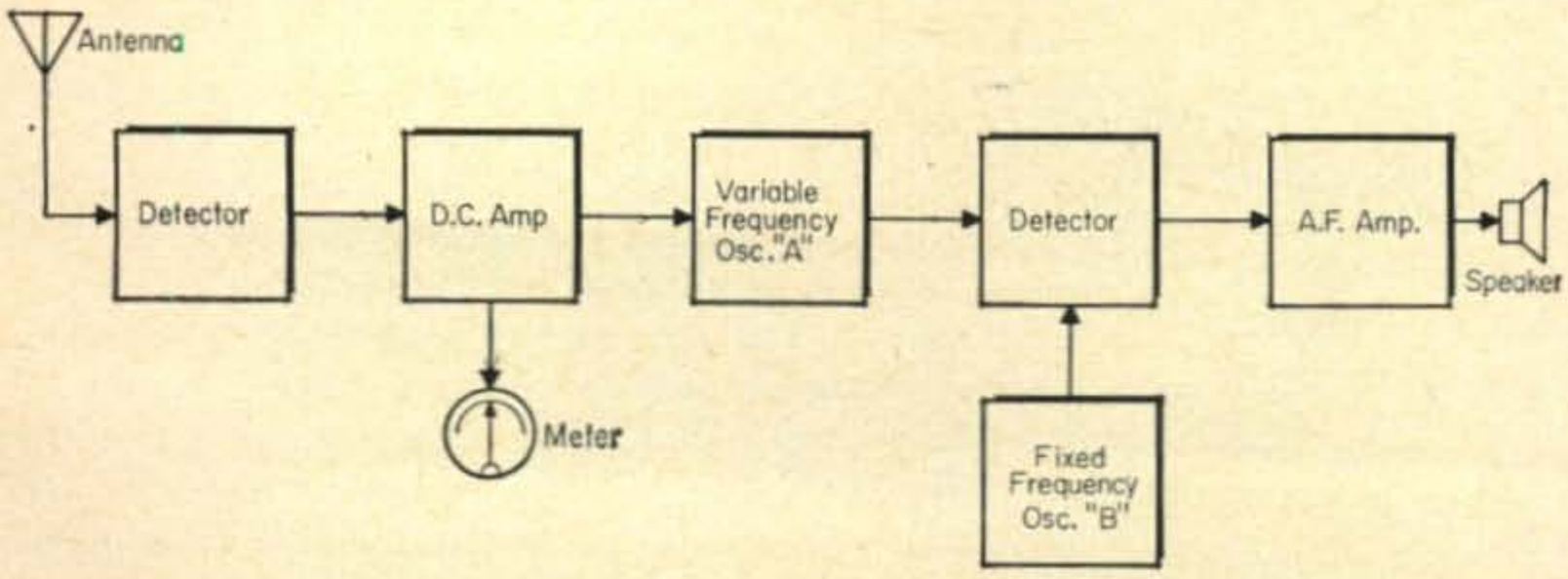


Fig. 1—Block diagram of the aural-visual field strength meter illustrating the functions of the variable, as well as the fixed frequency oscillator.

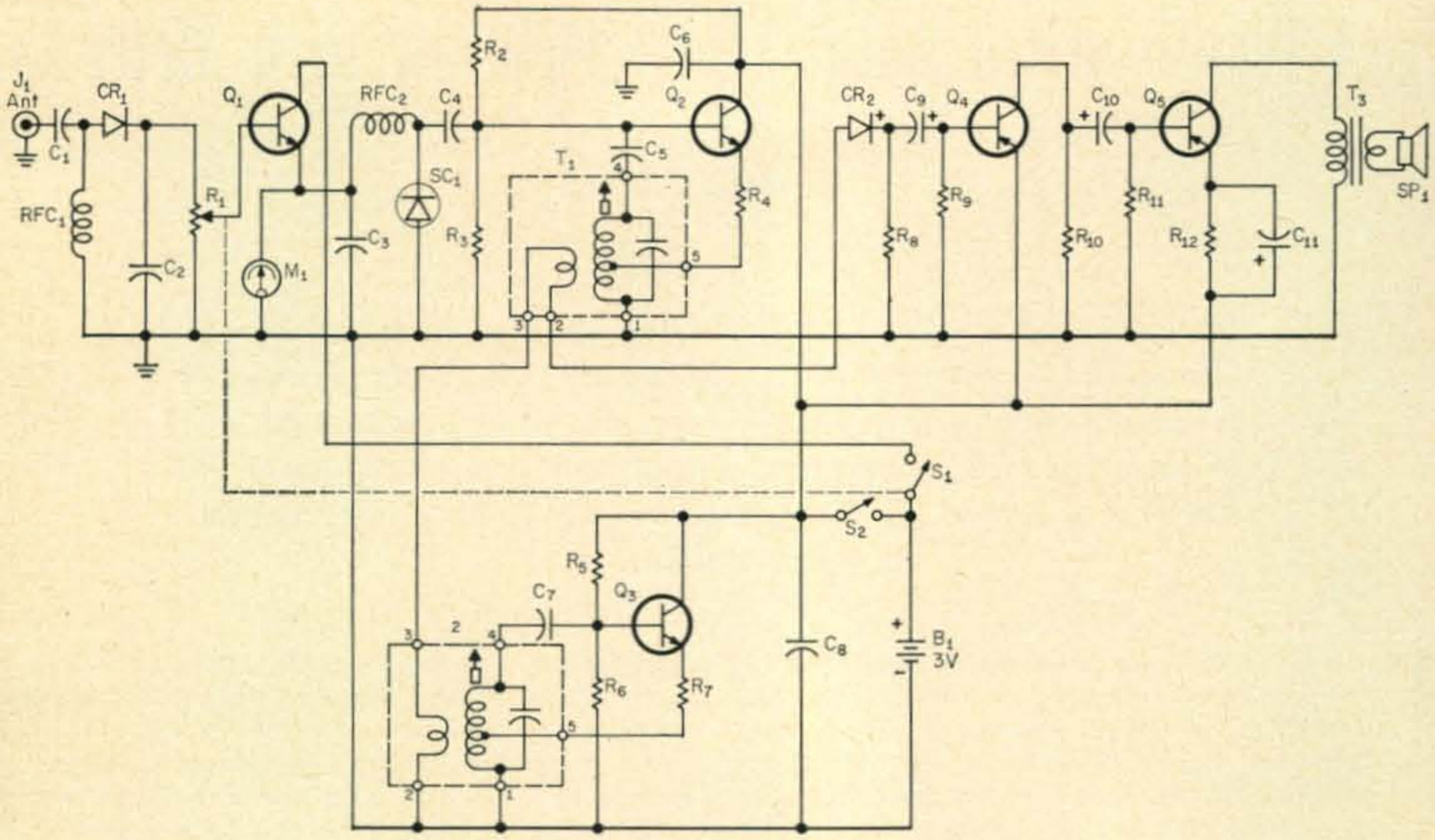


Fig. 2—Schematic of an Aural-Visual Field Strength Meter

R_1—10,000 ohm potentiometer.
R_2, R_5—560,000 ohms ½ watt.
R_3, R_6—100,000 ohms ½ watt.
R_4, R_7, R_{10}—2,200 ohms ½ watt.
R_8, R_9, R_{11}—47,000 ohms ½ watt.
R_{12}—250 ohms ½ watt.
C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8—.01 mf 600v.
C_9—1 mf 15v. elec.
C_{10}—1 mf 15v. elec.
C_{11}—10 mf 15v. elec.
J_1—phono jack.
Sp_1—p.m. loudspeaker (Lafayette Radio SK-62).
M_1—0-1 *ma* meter (Lafayette Radio TM-400).
RFC_1, RFC_2—2.5 *mhy* r.f. choke.
CR_1, CR_2—1N34A diode.
Q_1—2N229 transistor.
Q_2, Q_3—2N233 transistor.
Q_4, Q_5—CK-722 transistor.
SC_1—Voltage Variable Capacitor (International Rectifier Corp. 6.8SC2).
S_1—S.p.s.t. switch on R_1.
S_2—S.p.s.t. toggle switch
T_1, T_2—455 *kc* i.f. trans. (Lafayette Radio MS-341).
T_3—Output trans. 2,000 ohm collector to 10 ohm speaker (Lafayette Radio SK-62).
B_1—Two 1.5 v. batteries in series.

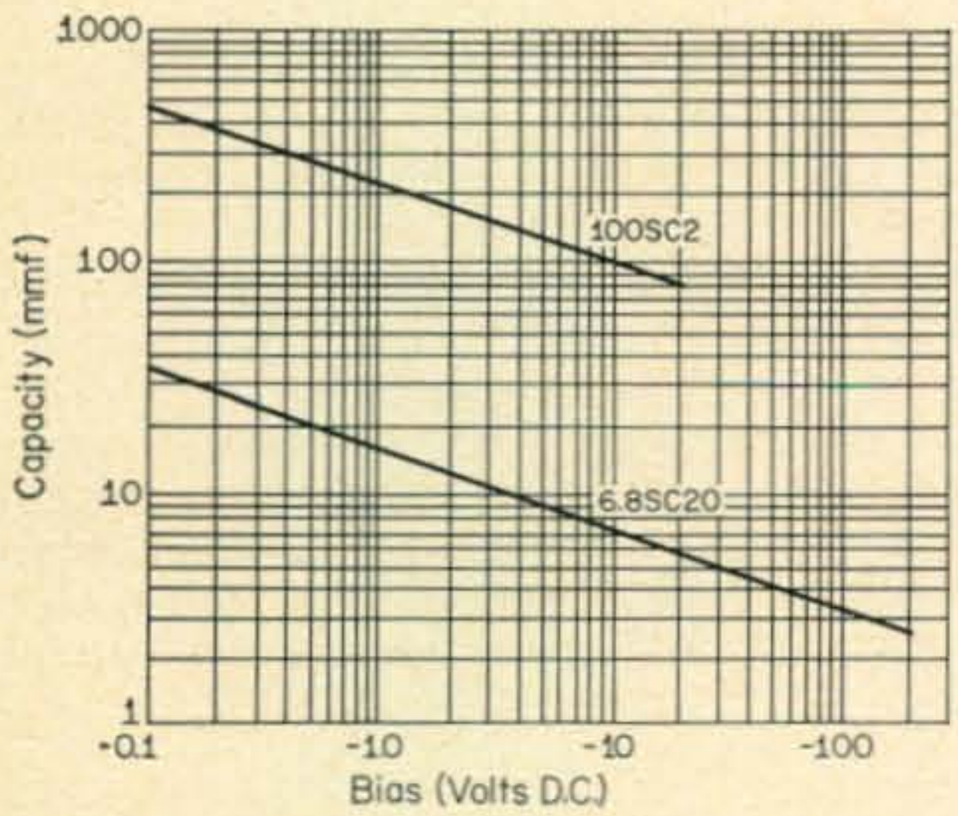
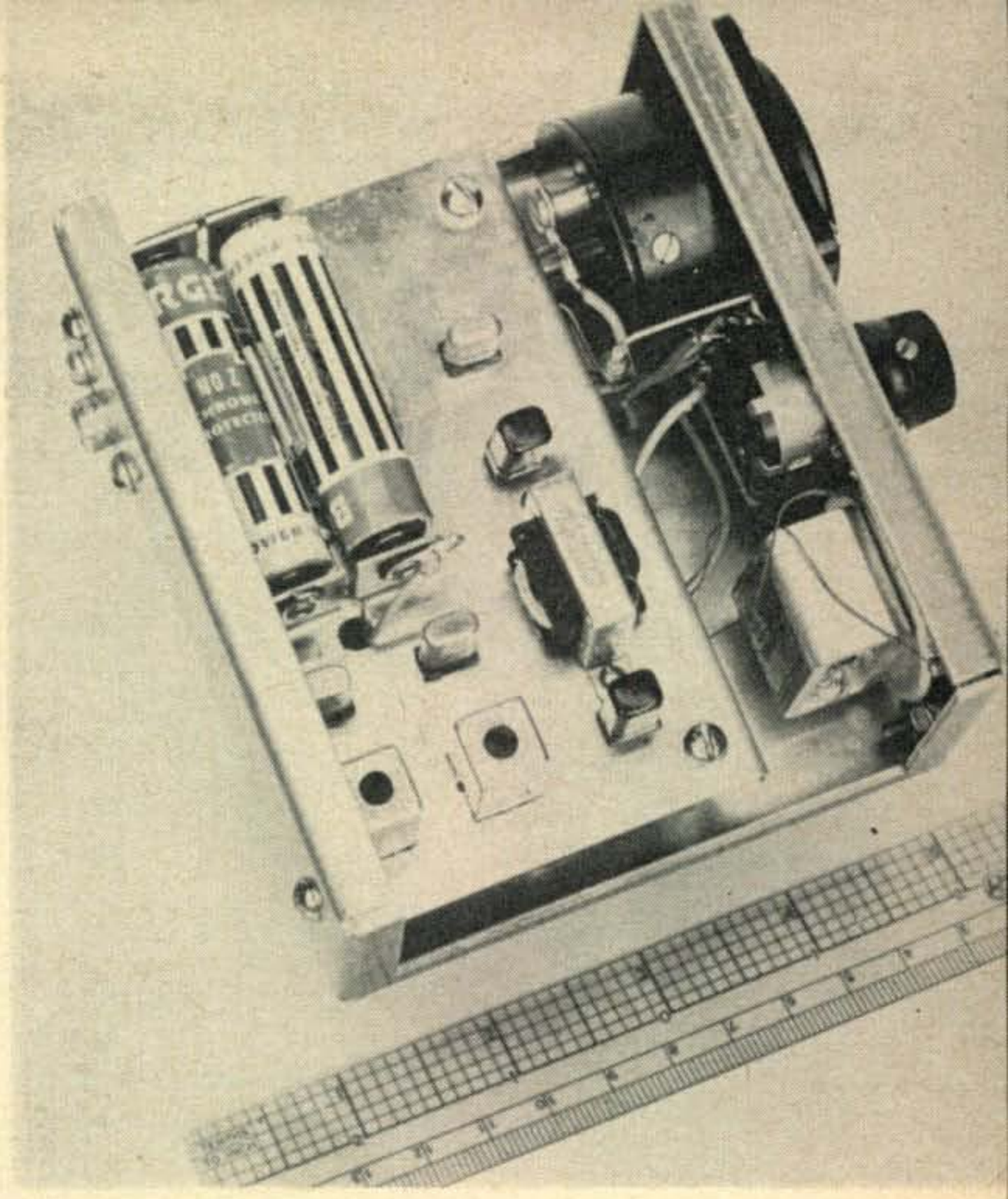


Fig. 3—CAPACITY VS BIAS VOLTAGE. Characteristics of the International Rectifier Corporation types 6.8SC20 and 100SC2 voltage variable capacitors. The capacity shift is used to change the frequency of oscillator A (fig. 1) resulting in an audio output.

tively separated by a dielectric. Thus, when back biased, the diode exhibits a capacitive characteristic. A small leakage current of minority carriers will flow which will contribute to a reduction of the *Q* of the capacitor, but the use of silicon as the semiconductor minimizes this effect. The effective separation of these planes of charge is proportional to the magnitude of the back bias. Therefore, the magnitude of the capacitive component is a function of the applied reverse bias. Figure 3 illustrates the capacitance vs. voltage characteristics for two types of "Semi-Caps" manufactured by International Rectifier Corporation.

It would be impractical to attempt to vary the frequency of an audio oscillator directly over a reasonably useful range. Instead, two r.f. oscillators are employed, each tuned to the same frequency (approximately 455 *kc*). The frequency of oscillator *B* (in fig. 1) is fixed. The voltage-variable capacitor is shunted across the tank circuit of oscillator *A*. The r.f. energy picked up by the antenna is detected and amplified to give a visual indication on the meter. The voltage drop across the meter is also applied to the voltage variable capacitor, changing the frequency of oscillator *A*.



Top view of the aural-visual field strength meter. Meter, potentiometer R_1, S_2 and speaker are mounted on the front lip of the U shaped chassis. Mounted on the right hand edge of the sub-chassis are from top to bottom, Q_1, Q_4, T_3 and Q_5. Transistors Q_2 and Q_3 are mounted next to the batteries and just below them are the associated i.f. transformers, T_1 and T_2.

The difference between the frequencies of oscillators *A* and *B* is detected, the resultant voltage filtered, amplified, and applied to the loudspeaker. There will be a zero beat, or no tone when the transmitter is not radiating, and the tone will increase in frequency as the transmitted power increases.

Circuit Description

The schematic diagram of the completed instrument is shown in fig. 2. When in the car the broadcast whip is employed as an antenna. Elsewhere, a stiff wire 1 to 2 feet long is sufficient. Capacitor C_1 blocks any direct potentials with which the antenna might accidentally come in contact. Choke RFC_1 has a high impedance to r.f., and the voltage developed across it is rectified by CR_1 and filtered by C_2. The potentiometer R_1 acts as a voltage divider, and is thus a sensitivity control for the d.c. amplifier. Transistor, Q_1 is a simple emitter-follower amplifier stage to drive the meter, and is biased at cutoff with no signal, or at the minimum sensitivity setting of R_1. Figure 4 shows the response of the visual portion of the field strength meter as a function of frequency at maximum sensitivity and with a constant level input. This is more than adequate for full scale deflection in the ten meter band with a 20 watt transmitter. A residual meter deflection may be noted on hot days due to the leakage of Q_1. This may be minimized by selecting a low leakage transistor.

The oscillators are basically identical, being the transistor equivalent of the series Hartley circuit. The transformers employed are standard transistor i.f. transformers, and no alteration was required. They are ideal for this application due to their small size, the tap in the tuned winding, the available untuned secondary, and the fact that they are slug tuned and well shielded. Resistors R_2 and R_3 provide the forward bias necessary for starting operation. Capacitor C_5 prevents shorting the base bias through the transformer. The voltage-variable capacitor SC_1 is connected across the tuned portion of T_1 through C_4 and C_5. Since the internal impedance of the meter is 100 ohms, the voltage drop across it is 0 to 0.1 v, depending upon the radiated power and the setting of R_1. Filtering of this voltage is provided by C_3 and RFC_2 to prevent any transmitter r.f. which may have "leaked through" to the meter from being applied to the voltage-variable capacitor. This voltage is the "bias" applied to SC_1. The d.c. bias circuits of SC_1 and Q_2 are isolated by C_4.

The untuned windings of T_1 and T_2 are connected in series and their output voltages are detected by means of CR_2. Transistors Q_4 and Q_5 form a simple two stage *RC* coupled amplifier, the output of which is coupled to a miniature loudspeaker by means of T_3. The amplifier is operated close to class AB in order to obtain maximum amplitude. This was done because of the very low efficiency of T_3 and the loudspeaker, which in this case measures only 1½" square. It should be noted that even with normal road noise the tone amplitude need not be too great. In fact, if any feed

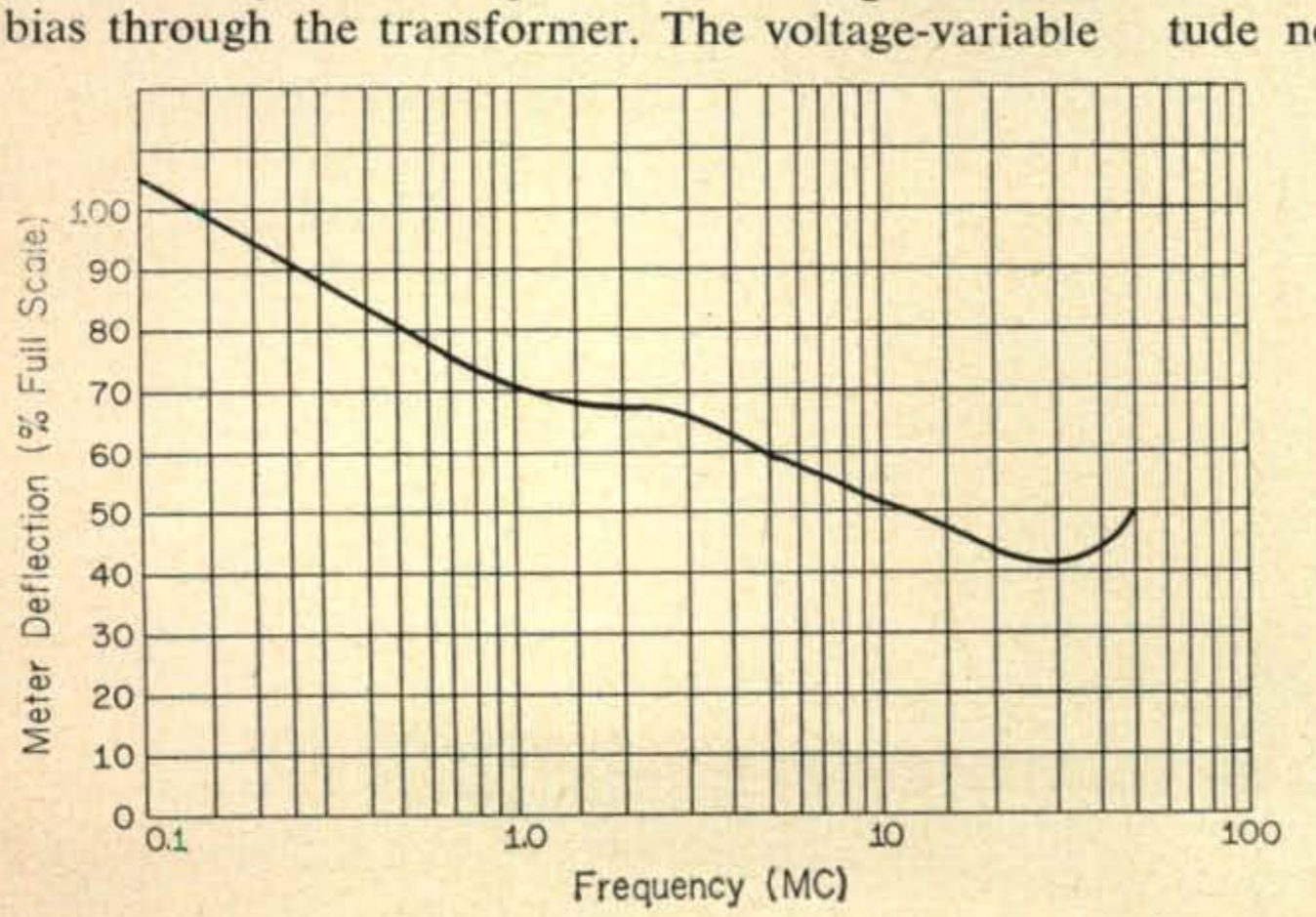
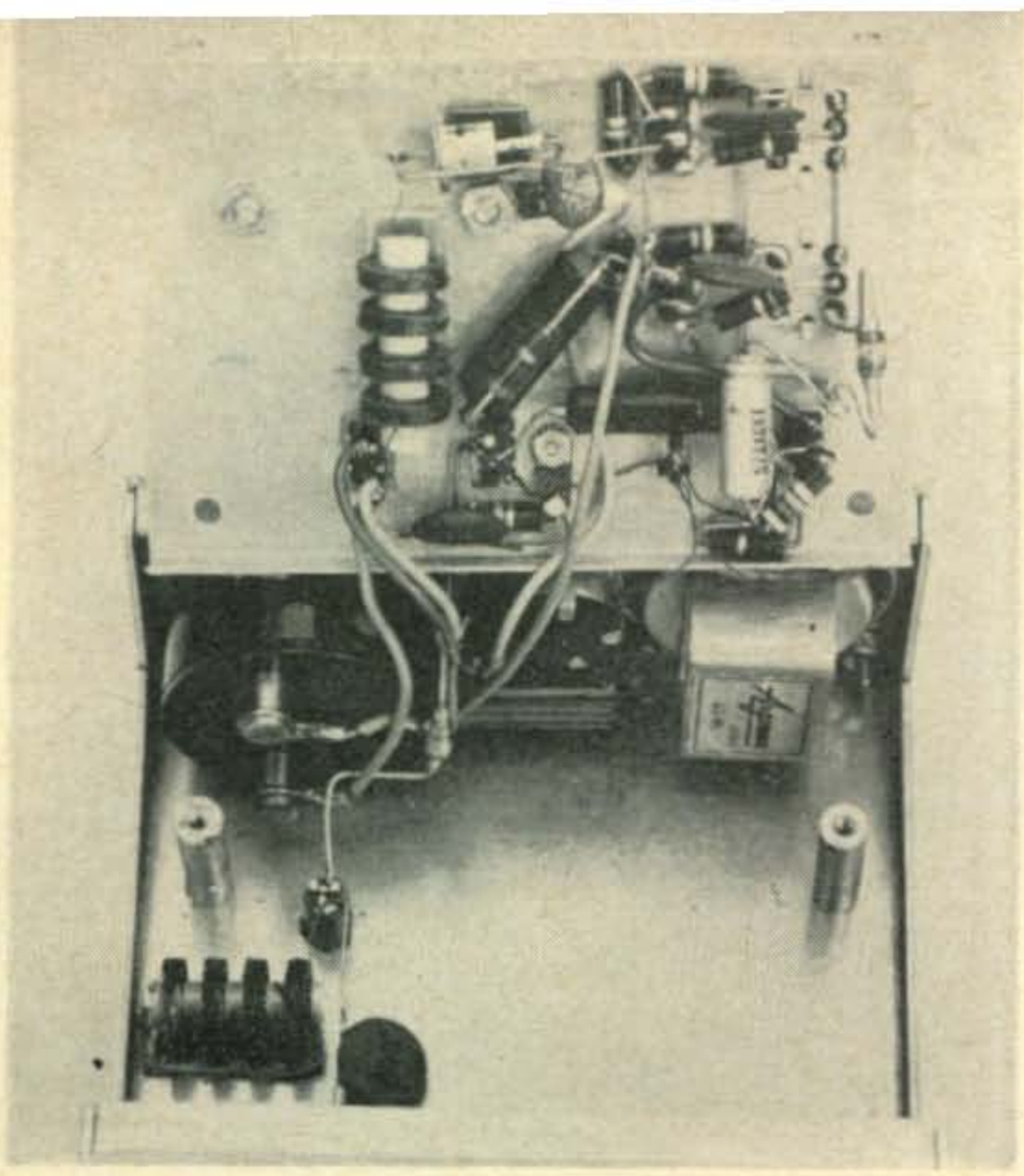


Fig. 4—VISUAL RESPONSE. Percentage of meter deflection as a function of frequency for a transmitter with a constant output power.



Rear View of the unit with sub-chassis removed. Capacitor C_1 and RFC_1 are mounted on the main chassis next to the input phono jack. The voltage variable capacitor can be seen top center, just above RFC_2.

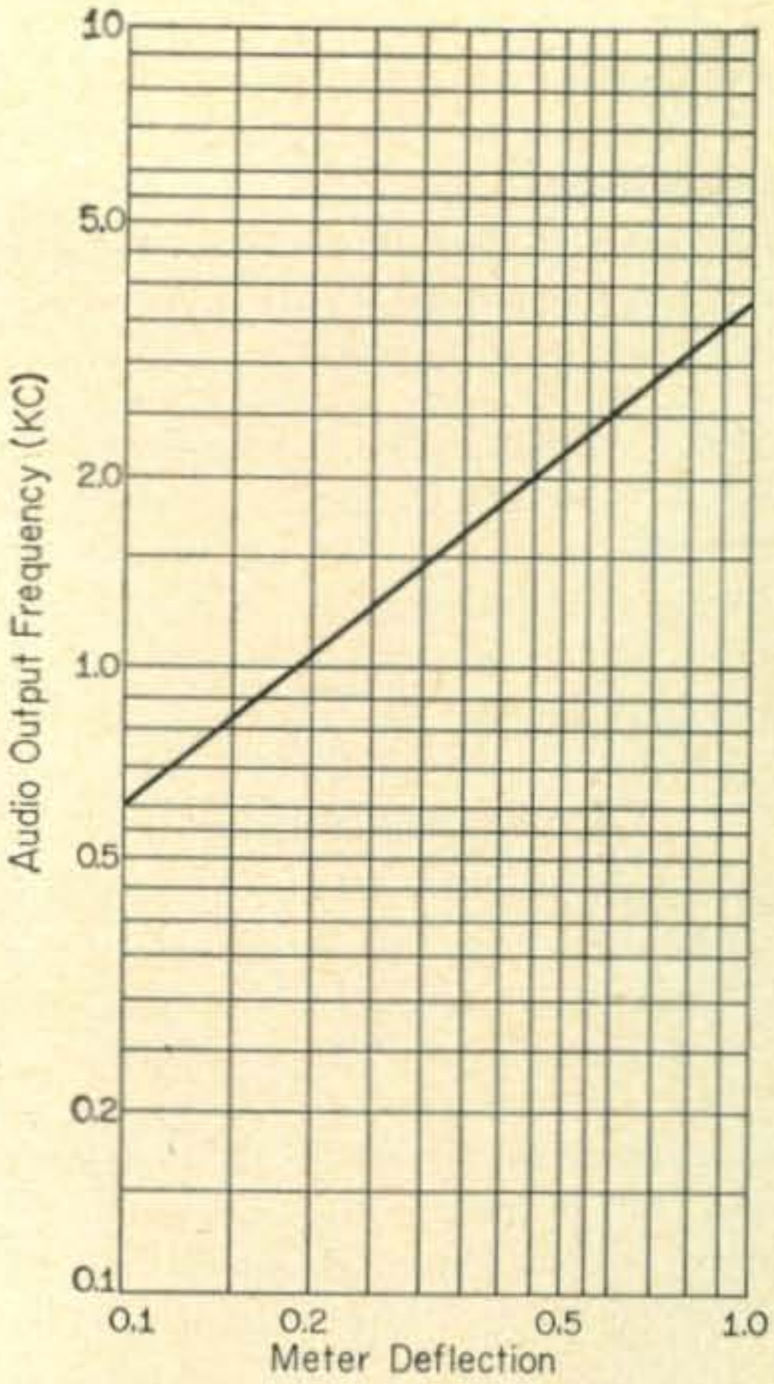


Fig. 5—AURAL RESPONSE. Tone frequency as a function of meter deflection.

through occurs (it may at higher frequencies, especially if care is not used in parts placement), it would be possible to cause the entire system to oscillate.

As with any oscillator, frequency instability may be a problem. Both oscillators may drift slowly. If the difference in the two drift rates is great, the audio tone will drift either up or down. By trying several different transistors for Q_2 and Q_3, a pair may be found which will cause the drift rates to be very nearly equal. There is sufficient stray coupling between the oscillator circuits to cause them to lock together at the same frequency as zero beat is approached. This is advantageous as it assures that there will be no tone when there is no radiated power. Figure 5 illustrates the measured output frequency as a function of the meter reading. The total audio frequency range covered may be increased or decreased by changing the operating frequencies of the oscillators (retuning the slugs), or by using a different type of voltage variable capacitor, such as the type 100SC2 shown in fig. 2.

Construction

The photographs illustrate the unit built by the author. Since this was definitely intended to be a Mark I model, a two part case was constructed of sheet aluminum which would be small yet leave sufficient room for possible changes. No particular effort was made to subminiaturize the unit beyond the use of transistors and transistor components. A contemplated Mark II model will employ one of the new smaller meters which has become available since this unit was built, as well as a printed circuit board now that the circuit has been finalized. The use of the latter should give an added margin of stability against the slight microphonic tendency the unit shows when vibrated violently. The size of the unit will also be markedly reduced through the use of miniature r.f. chokes, smaller capacitors, i.f. transformers, output transformer, and mercury batteries. It is interesting to note that the battery drain is only 1 *ma* for the visual section, and 2.5 *ma* for the aural section, indicating that in intermittent operation the batteries should last for their shelf life. The choice of supply voltage is not critical as this unit operates satisfactorily from 1.2 to 6 volts. The chief advantage of higher voltage is increased audio output and 3 volts seems to be a good compromise.

Reasonable care should be exercised in component placement, particularly in the input circuit to the visual portion. This will prevent the response from dropping off rapidly at higher frequencies. The use of a phenolic board rather than a metal chassis should also prove advantageous. Where it is felt that size is not an important factor, any of the standard metal boxes should be satisfactory for the cabinet. It is important that a metal case be used for two reasons. First, the use of a plastic case might lead to erratic operation due to detuning of the oscillator circuits by hand capacitance. Second, it is desirable to shield the oscillators to prevent direct radiation, as they operate near the i.f. frequency of most receivers.

Although commercial use of the semiconductor capacitor is rapidly increasing, its application by amateurs has been rather limited to date. Remote controlled v.f.o.'s, indicating instruments, a.f.c. circuits, f.m. generators, sweep generators and f.s.k. circuits are only a few of the many potential applications for this device. It is hoped that above all else, this article will help stimulate creative thinking, the quality which has enabled *amateur* radio to play such a significant role in the advancement of the field of electronics. ■

The Initial Phase

Lillian R. Andersen, K9TRM
Fifield, Wisconsin

In the beginning, I didn't pay much attention to the whole business. I knew that he disappeared at times into an inner sanctum in his home and practiced a sort of weird voodoo, which usually made him happy. That's just what I wanted, for him to be happy. Suddenly, we had said our "I do's" and were living in the same house. A station wagon appeared at our door and cartons of strange machinery, trappings, and props were installed in our living room. He climbed the roof to attach his magic wands to the ridgepole. He manipulated and persuaded until the apparatus responded with eerie colored lights and unearthly wails and screams. His mysterious chants were very audible and absolutely unintelligible.

"I have promised to share his life," I thought, "but he'll never explain all this to me, so I'll just listen and learn by myself." So I listened.

The first pattern that emerged from his obscure jargon was the invocation "CQ CQ CQ," followed by an expectant pause, and then repeated with embellishments. The fervent appeal in his voice was heartrending and the intent expectancy was breathless. A summons of some sort? Then I heard another practitioner's voice with the same chant and watched with amazement and growing comprehension the frantic efforts of my beloved. A summons? A command! An appeal that could not be ignored. "Come Quick! Come Quick!" and there was my hero putting on all possible speed. The last atom of proof I needed was to hear him sending the urgent message the following day. "CQ 10, CQ 10, CQ 10," and sure enough, judging by the tumultuous clamor that followed, a gallant ten, maybe more, "Came Quickly," and apparently triumphed.

So I listened again.

I heard a victim of the voodoo bemoan the fact that he wanted to join the ARRL but he wasn't that well heeled at the moment. Two and two together. "To be part of Aunt Ruby's Red Leggings, you must be a good heel." It was getting simple.

One evening I appeared at his conjuring table with coffee and sandwiches and he confided wistfully to me, "I'd sure like to try for that WAC award."

(Walk Across Canada! Good Gracious.)

"You couldn't do that, could you?"

"Sure I could," he grinned, "But you'd have to help me, of course." What could I do, follow in his footsteps and help him carry his knapsack? He's hardly the athletic type.

"Just keep on making me sandwiches like this one." My vision faded to disclose me meeting him at various crossroads along the way (aparently I could ride) with sandwiches and a canteen of coffee to succor the limping, famishing pilgrim on his weary way.

"Course, I could try first for the WAS award," he mused.

Walk across State? That's a little better. Oops, my mistake, Walk Across Street. Now we're getting reasonable at least. I patted his shoulder sympathetically and told him he could do anything.

And I listened.

Some poor soul was "outside the band" and the "FCC" had him. The Federal Concentration Camp! Is living dangerously the lure that attracts these daring adventurers?

And I listened, but tragedy awaited.

It began innocently enough. I was busily concocting a three decker ham, cheese and dill pickle super deluxe masterpiece, known as a hemlock sandwich and bearing it with coffee to the sacrifice when I was stopped dead in my tracks by his laughing voice.

"She's a doll, you should see her. Boy, that XYL of mine is one in a million."

My mind staggered, YL—Young Lover, he always called me that, but X? Oh, horrors! Extra! He's got another one, an *Extra* Young Lover. How could he? He said I was his one and only! He said he'd never look at another. I listened in dismay.

"She's cute, and sweet, and absolutely featherbrained."

Oh my stars! He approves? And I've been trying so hard to be sensible and efficient. I looked at the hemlock in my hand and leaned against the door.

"Honey," he called, "Where's my sandwich?"

Hot tears were dripping on it. The perfidiousness of the man!

"Why don't you get *her* to make you one?" I wailed. I walked blindly across the kitchen, out to the backyard, and called Hector. It's too good for a dog, but no one with *Extra* Young Lovers around is going to get hemlock sandwiches from me.

Skip the scene that followed, the accusations, the recriminations, the explanations, etc. Here, now, am I, having given my solemn promise, studiously listening to my OM (Outraged Master) explain in words of one syllable all about amateur radio. But, while most of my mind is concentrating on his detailed recital, one little corner of my brain keeps worrying about that poor, sick bunny—with my hero turning the Rabbit Fever Gain knob up and down and up and down. ■

Added Gain Using Vertical Antennas

H. W. Kasper, K2GAL*
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Did you know that a single vertical antenna has 3 db gain? Better yet, you can get 6 or 9 db gain by stacking them!

It is a well known fact that the radiation pattern of a quarter wave vertical operating against ground can be calculated by assuming the existence of an image antenna. The resulting structure as shown in fig. 1A is identical to a dipole antenna. Theoretically the radiation patterns are identical, but in practise the lower half of the figure eight pattern does not exist. Likewise, the field along the ground is not maximum, but drops considerably in magnitude depending on the extent and composition of the ground plane. (see figure 1B.)

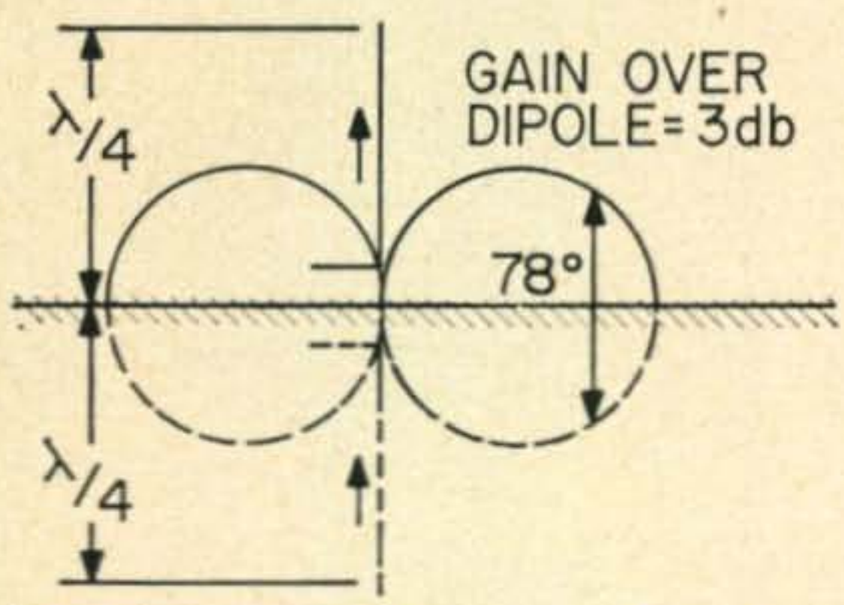

Fig. 1A—Theoretical field pattern for a ¼ wave vertical. Note that the addition of the image results in a dipole structure and pattern. Arrows show current flow.

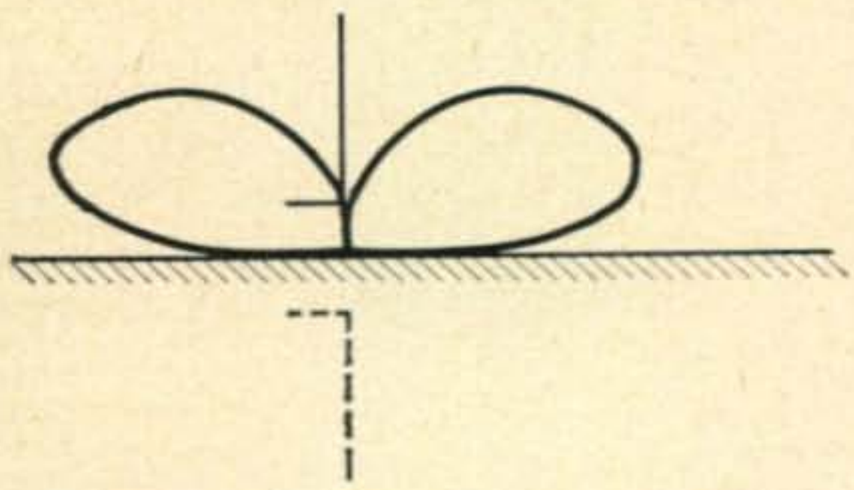

Fig. 1B—Effect of imperfect ground on the radiation pattern.

Less well known is the fact that the quarter wave vertical exhibits 3 *db* more gain than the dipole. The gain of an antenna is a function of its radiation pattern and in general the sharper the pattern (smaller the beamwidth), the higher the gain. For the quarter wave vertical it can be shown mathematically[1] that since the lower half of the radiation pattern (as shown in fig. 1), does not exist,[2] the gain must increase over that of a dipole by 3 *db*.

Why Vertical?

The 3 *db* increase in gain over that of a dipole is only one of the reasons why properly adjusted verticals perform so well, and in some cases outperform even a three element yagi. There are two other factors that play an important part in gaining this advantage; angle of maximum radiation, and polarization. For horizontal polarization at h.f., the angle of maximum radiation is a function of antenna height over ground. This effect is not as severe for vertical polarization except as noted in fig. 1B. The choice of polarization when selecting an antenna is an important point. Experiments have shown[3] that around 16 *mc*, the dominant polarization of downcoming waves is vertical and most of the waves have an angle of arrival centered about 8° and 15°.

The preceding paragraphs offer convincing reasons why a vertical antenna should be used. Mechanical ease and low cost considerations (or other considerations, if you are planning to build a beer can vertical) are further reasons for choosing a vertical. The purpose of this article is not to sell you on verticals however, but to show how more gain can be had if you are leaning in the vertical direction. (how else?")

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Birchwood Pk., Bricktown, N. J.

[1]Kraus, "Antennas", *1950* Edition, p. 16.

[2]Followers of Larson E. Rapp, ("A Compact All Band Antenna", *QST*, April, 1957.) disagree on this point, however they have not unearthed any factual evidence to support their theories as yet.

[3]"Arrival Angle of H. F. Waves", *Wireless Eng.*, Feb., 1956.

Added Gain

As we saw in fig. 1A, good old mother earth helps the vertical form its pattern. Now consider the arrangement shown in fig. 2. Here we have a dipole operating above ground. If the dipole height above ground is such that the center to center spacing between it and its image is about ¾ wavelengths, maximum gain occurs, and the result is an antenna having 6 *db* gain over a reference dipole. Going one step further, an additional 3 *db* of gain can be obtained by adding an additional dipole as shown in fig. 3. Note the resulting low angle of radiation. A pattern pull-in such as shown in fig. 1B can be expected due to imperfect ground. Such an arrangement would be quite attractive for ten meter operation.

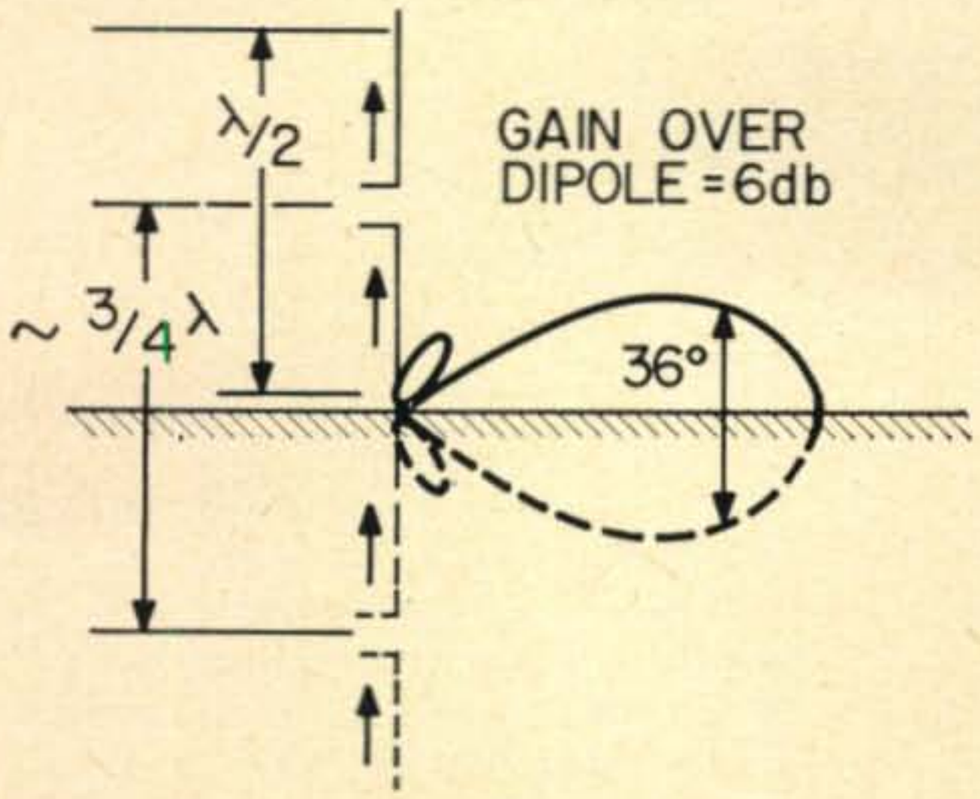

Fig. 2—Radiation pattern for a vertical dipole (half shown).

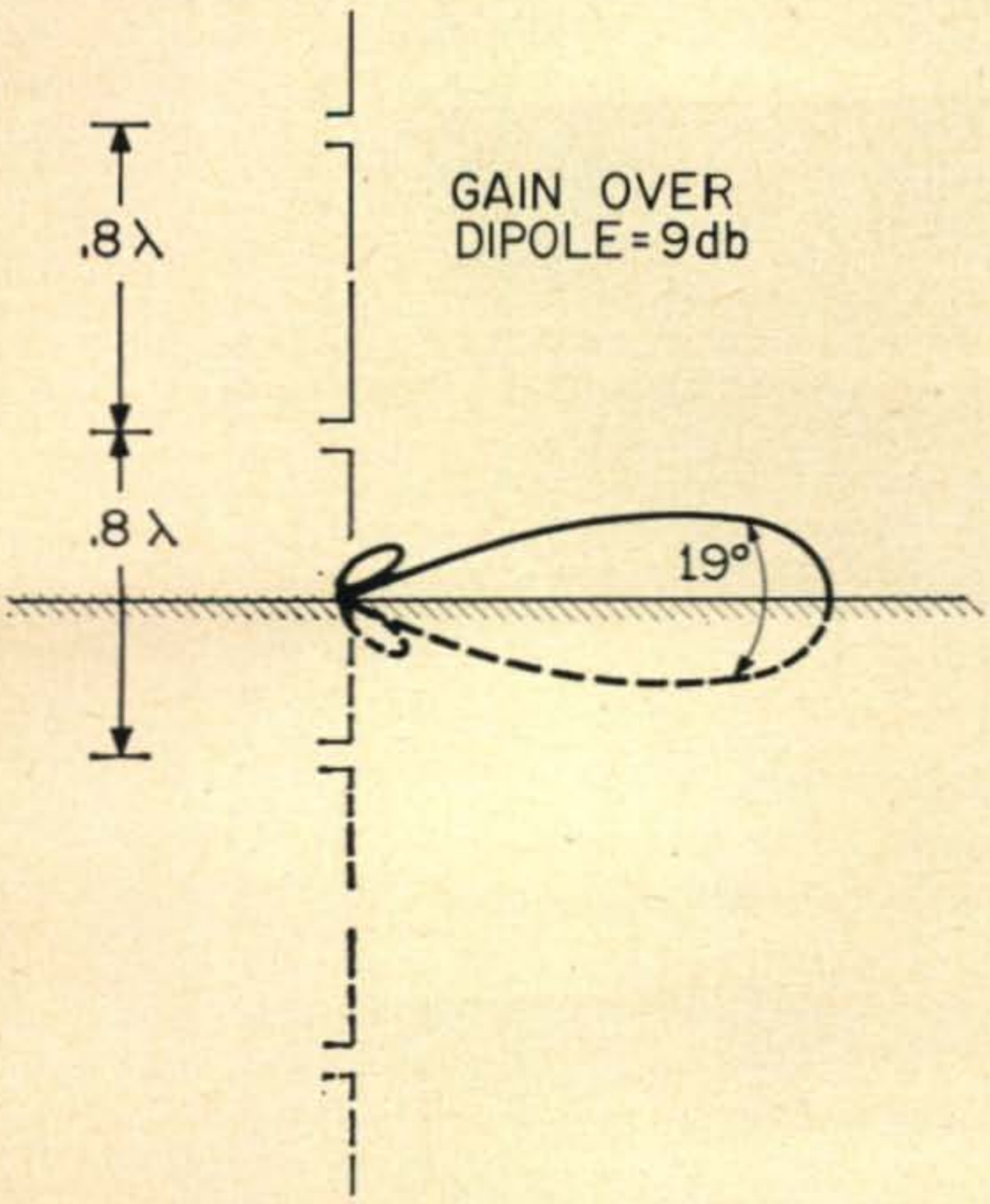

Fig. 3—Radiation pattern for 2 stacked vertical dipoles (half shown).

Impedance Matching

Most of us are familiar with the input resistance curve as a function of height over ground of a horizontal dipole. The resistance increases from zero to 98 ohms, and then follows an oscillatory form tending to the 72 ohm value. Figure 4 shows the input resistance variation of a vertical dipole as a function of height over ground.[4] Note that above a height of ⅜ wavelength, the radiation resistance of a half wave vertical antenna remains quite constant, and darn close to the 72 ohm free space value. This indicates that all the dipoles shown in figs. 2 and 3 should exhibit a radiation resistance close to 72 ohms. The simplest method of feeding the arrays would be to tie two 72 ohm feed lines (any length) in parallel, and connect the tie point to a 52 ohm line. If the resistance of one of the antennas departs considerably from the other, the two should be equalized before tieing to a common feed line, otherwise the antenna having the lower value will receive more power and the over all array gain will be lowered (Since the aperture illumination of the array becomes tapered). Bear in mind that the ground shown in the accompanying figures is perfect ground. Imperfect ground having low conductivity will alter the pattern and gain. The radiation resistance should remain relatively unaffected. Table I illustrates various soil conductivities, and leads one to suspect that living on a houseboat can be fun. ■

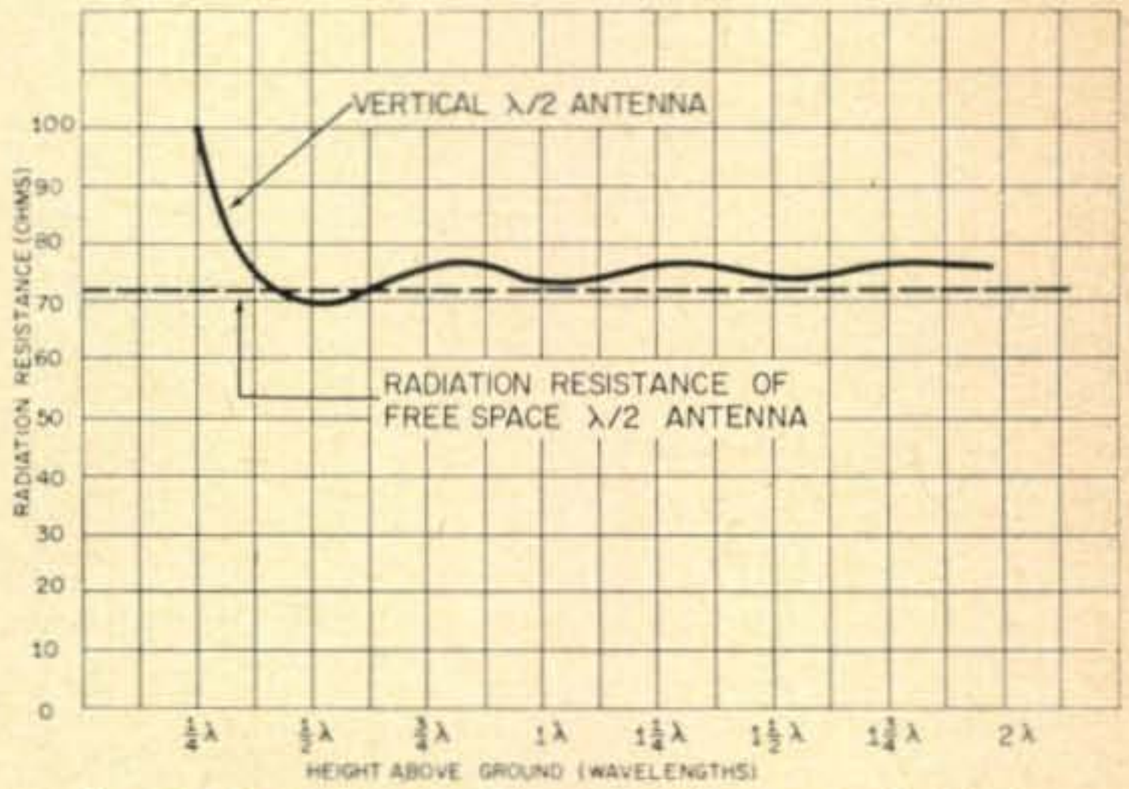

Fig. 4—Radiation resistance of a vertical dipole.

Table I

Ground Material	Relative Conductivity
Sea Water	4,500
Flat rich soil	15
Average flat soil	7
Fresh water lakes	6
Rocky hills	2
Dry, sandy flat soil	2
City, residential area	2
City, industrial area	1
My back yard	0

4"Antennas and Radio Propagation", *Dept. of the Army Technical Manual TM 11–666* p. 105.

Plate Modulating The DX-40

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Trenton, Michigan

A simple modification to plate modulate the DX-40 using an external modulator. The changes do not mutilate the unit, thus retaining the resale value.

After hearing a DX-40 that was plate modulated (it sounded good) I thought I would try my hand at making this modification. I set up a few requirements so that the resale value would not be completely lost.

1. No disfiguration of the front panel.
2. External modulation so that the original screen grid modulation could be put back into service readily—for resale.
3. Minimum of holes to be cut in the transmitter itself.

After a careful study of the DX-40 schematic diagram I drew up the diagram shown in fig. 1.

Adding Switch Section

In order to satisfy the first requirement, I had to add another wafer section to the function switch. This meant that a new indexing assembly with a longer switch shaft had to be installed. If the 6.8 K, 2 watt resistor is unsoldered from the existing function switch, temporarily, and the aluminum partition around the buffer and final tubes is partially removed, the function switch can be slipped out of its mounting hole without too much difficulty. Then proceed to remove the index assembly from the wafer section and replace with a Centralab Cat. #PA-300 index assembly, add spacers and a 2 pole 6 position ceramic wafer, Centralab Cat. #PA-3 to the index assembly and reinstall the switch. Note that only 5 of the 6 positions are used on this wafer.

Remove the wires on terminals 2 and 10 on the original wafer section. This, electrically, removes the speech amplifier and screen grid modulator from the circuit. Then remove the 12AX7 and 6DE7 from their sockets to reduce the load on the power transformer. Remove the wire on terminal #8 of the original wafer and reinstall on terminal #1 of new wafer as shown in fig. 1.

In order to modulate the screen grid, as well

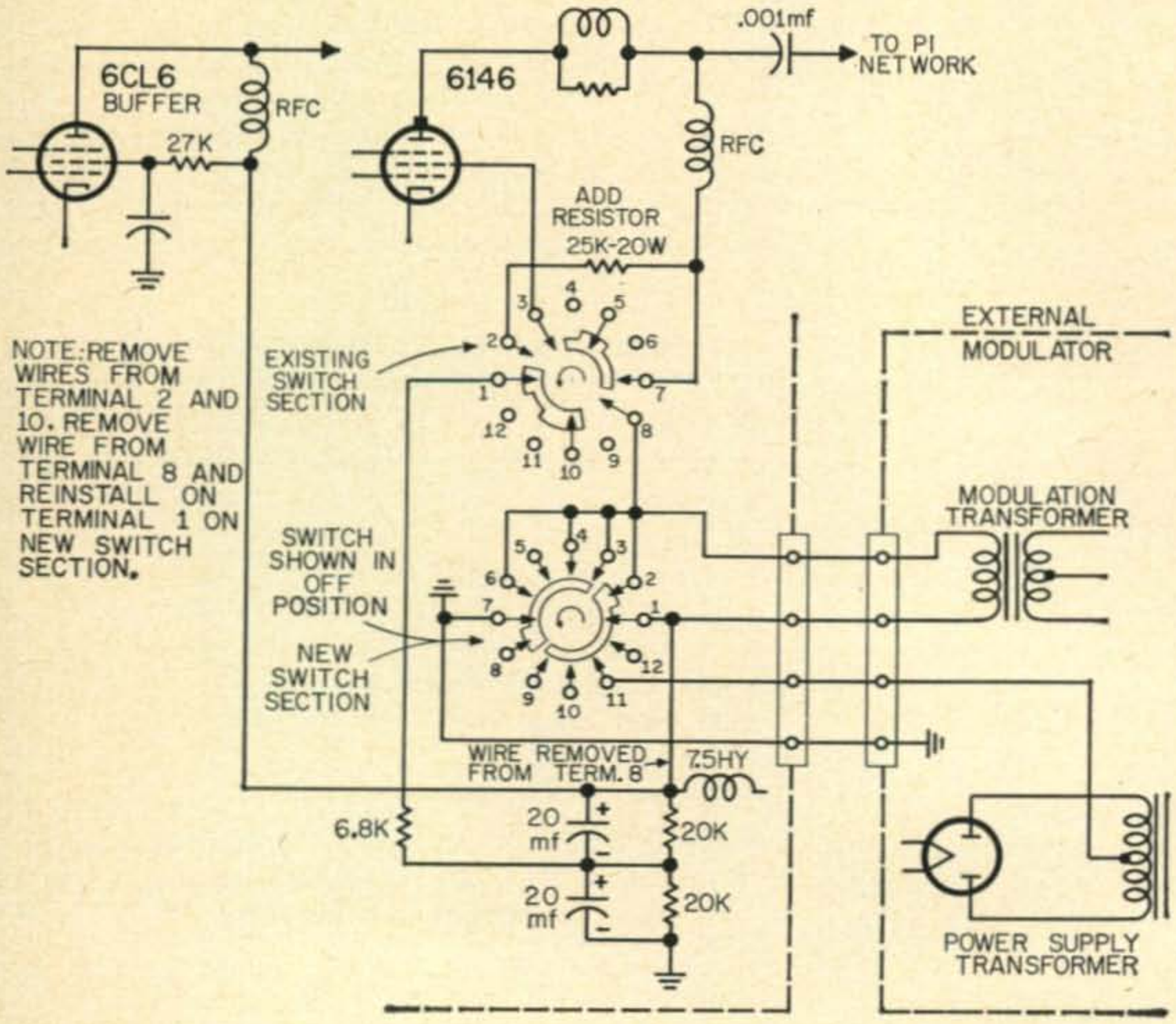

Fig. 1—Switching circuit to permit plate modulation when an external modulator is connected through a 4 prong Jones plug located on the rear of the chassis. Care should be exercised in handling this plug because the connector will be hot regardless of which end is made male.

as the plate of the 6146 in the PHONE position, add a 25000 ohm, 20 watt resistor between terminals 2 and 7 of the original wafer section (see fig. 1).

Cut a ¾" × ⅝" hole in the back apron of the chassis between the mic and coax connectors, for a 4 prong Jones plug. This is the only hole that has to be made in the DX-40.

Proceed to wire in the new wafer section as shown in fig. 1. This new wafer switch then operates to open the center tap of the external modulator power transformer and short the output of the modulation transformer in all positions except the PHONE position. This completes the modification to the DX-40.

Operation

I am presently using a modulator consisting of a 6AN8 speech amplifier and driver, transformer coupled to push-pull 6L6's. This modulator provides approximately 25 watts of audio. In operation set the DX-40 plate current (actually cathode current) at 100 *ma* in the PHONE position which is approximately 54 watts input to the 6146. Since no scope was available, I had to rely upon reports received from local hams to set my speech amplifier gain control. Very good reports on the quality of modulation have been received and some people have expressed surprise when told I was using a DX-40, plate modulated. The 6146 final could be loaded to 60 or 65 watts, but this would result in less audio punch. The circuit has been in operation for some eighteen months and no trouble has been experienced. ■

Ten KC Multivibrator for the Mohawk Receiver

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RR #1, Ossineke, Michigan

A simple 10 kc multivibrator may be added to the 100 *kc* calibrator in the Mohawk receiver. The circuit is nearly identical to that described by Perry Williams, W1UED, in the July 1959 issue of *QST*.

The circuit used is shown in fig. 1. The components enclosed in the dotted area comprise the 10 *kc* oscillator. As shown, the circuit will provide either 100 *kc* or both 100 and 10 *kc* markers. If the 100K resistor in series with the 5 megohm potentiometer is raised to 1 megohm it is possible to produce 5 *kc* markers.

With the 100K series resistor, the 5 megohm potentiometer is adjusted for clean and strong 10 *kc* markers. The check points were strong right up to 29.7 *mc*.

The push button switch formerly used is replaced by a single section, 3 position shorting type switch. The #1 position is off, #2—100 *kc* and #3 is 10 *kc* and 100 *kc*.

For installation in the Mohawk the following is done:

1. Mount the new rotary switch in place of the push button marker switch.
2. Install a 4 lug terminal strip (one ground) near the 3 lug strip marked "BB". Number it as follows: #1, #2 (ground), #3 and #4.
3. Connect the 33 mmf capacitor from lug #1 (N5-no solder) to lug #6 on the 6BA6 (S-solder).
4. Connect the NE-2 lamp from terminal #1 (NS) to #2 (S). Be sure #2 is grounded.
5. Connect the 100K resistor between terminals #3 (NS) and #4 (NS).
6. Connect the 5 megohm potentiometer between terminals #1 (S) and #3 (S).
7. Run a new wire from terminal #4 (S), through the harness to terminal A (as shown in fig. 1) of the new switch.
8. Reconnect the 6BA6 plate feed to lug B of the switch and the 150 volt line to lug C.

The final step is to dress up the panel of the Mohawk with decals for the calibrate switch. ■

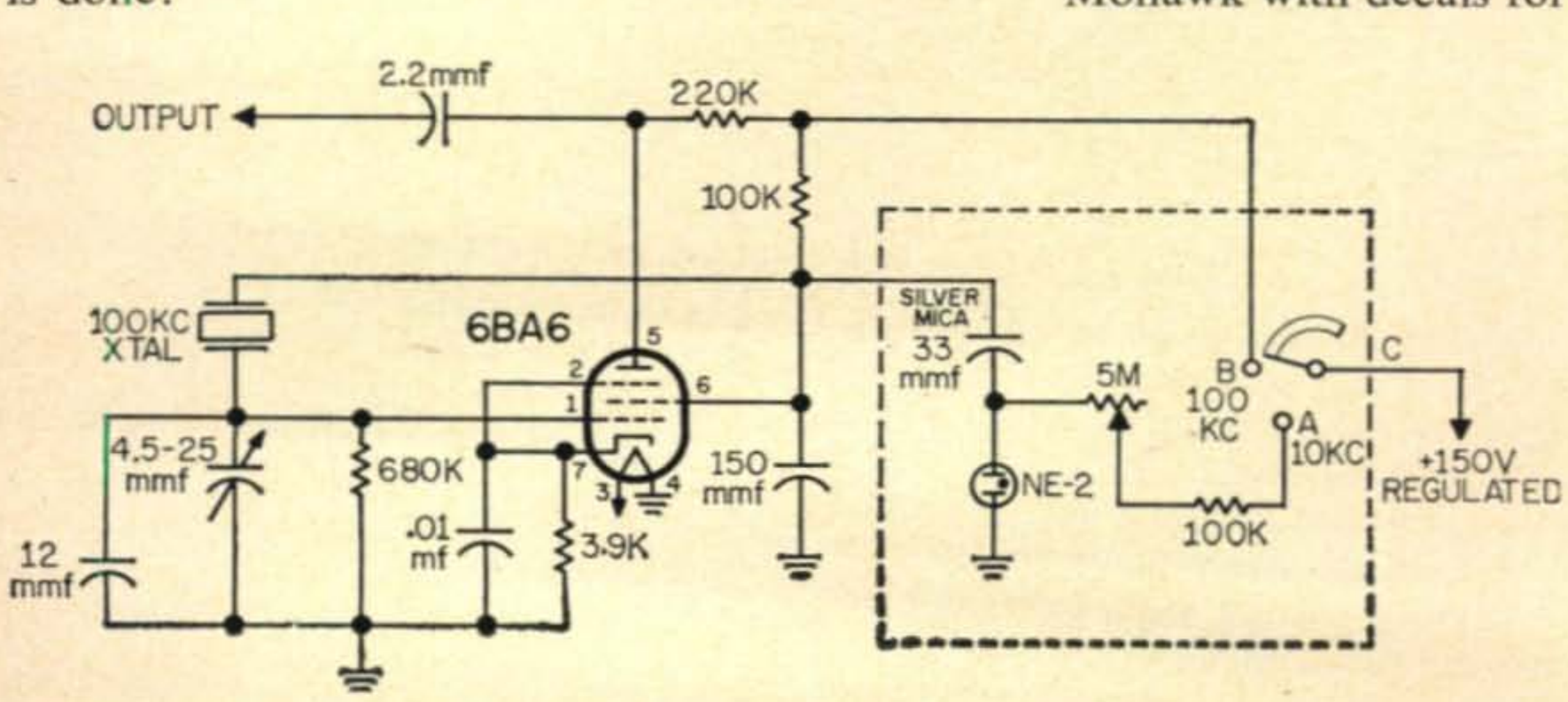
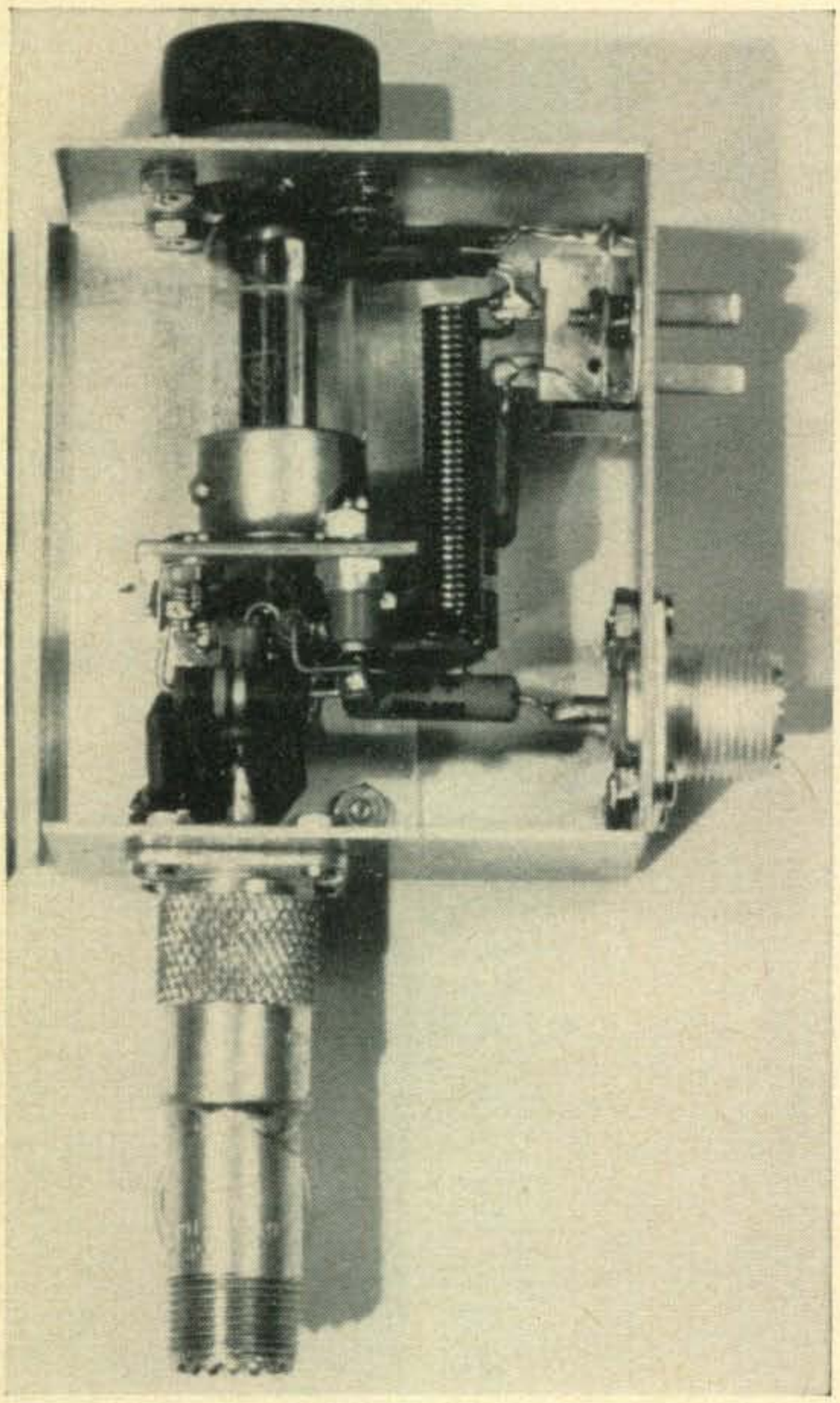


Fig. 1—The circuit in the dotted enclosure is a ten *kc* multivibrator that will, in conjunction with the 100 *kc* oscillator, produce markers every 10 *kc* on the receiver dial.

Compact Panadaptor Isolator

Ronald L. Ives
2075 Harvard Street
Palo Alto, California

A simple device to reduce Panadaptor loading of the receiver and permit Panadaptor use at a greater distance than usual from the receiver.



Inside view of the isolator. On the top is a stripped down AN connector cap to permit easy access to the tube. On the right flange is the Jones plug and output jack J_2. The coaxial tee input connector at the bottom is described in fig. 2. Mounted on the same bracket that mounts the tube socket is a standoff which supports the cathode circuitry. The filament chokes may be seen to the right of the 6C4.

Whenever a Panadaptor is used at a distance of more than three feet from the receiver connection, some sort of isolation is necessary, to prevent loading of the mixer plate circuit by the long shielded cable. When a *Q* multiplier is used with the same receiver, the pileup of connections at the mixer plate becomes serious, and slight changes in the characteristics of the connecting cords, due to flexure or temperature changes, reduce the utility of the *Q* multiplier, and makes operating difficult.

Cathode Follower

Electrical solution of this problem is a cathode follower, which isolates the receiver and *Q* multiplier circuit from the Panadaptor cable. Incidentally, and happily, because the cathode follower is a power amplifier (but not a voltage amplifier), signal loss due to Panadaptor cable capacitance can be greatly reduced.

Circuit

Circuit of such a Panadaptor isolator is shown in fig. 1. A wide variety of similar circuits can be used effectively. There is nothing "sacred" or "magic" about the exact constants shown. With

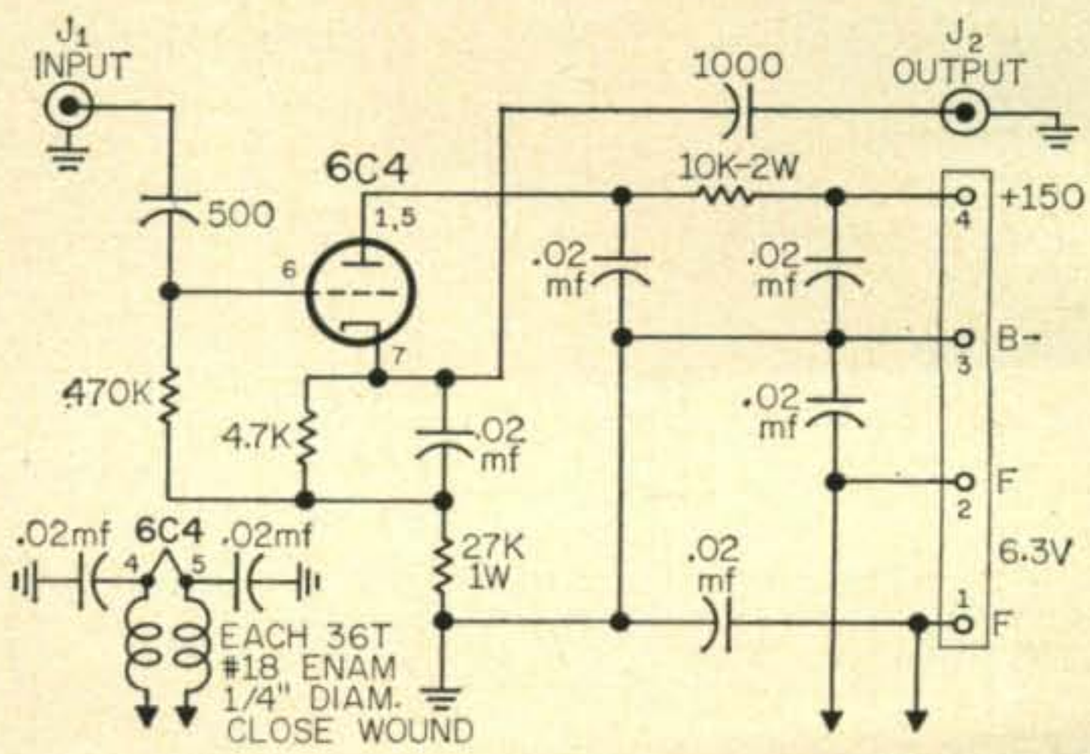


Fig. 1—Cathode follower Panadaptor isolator circuit.

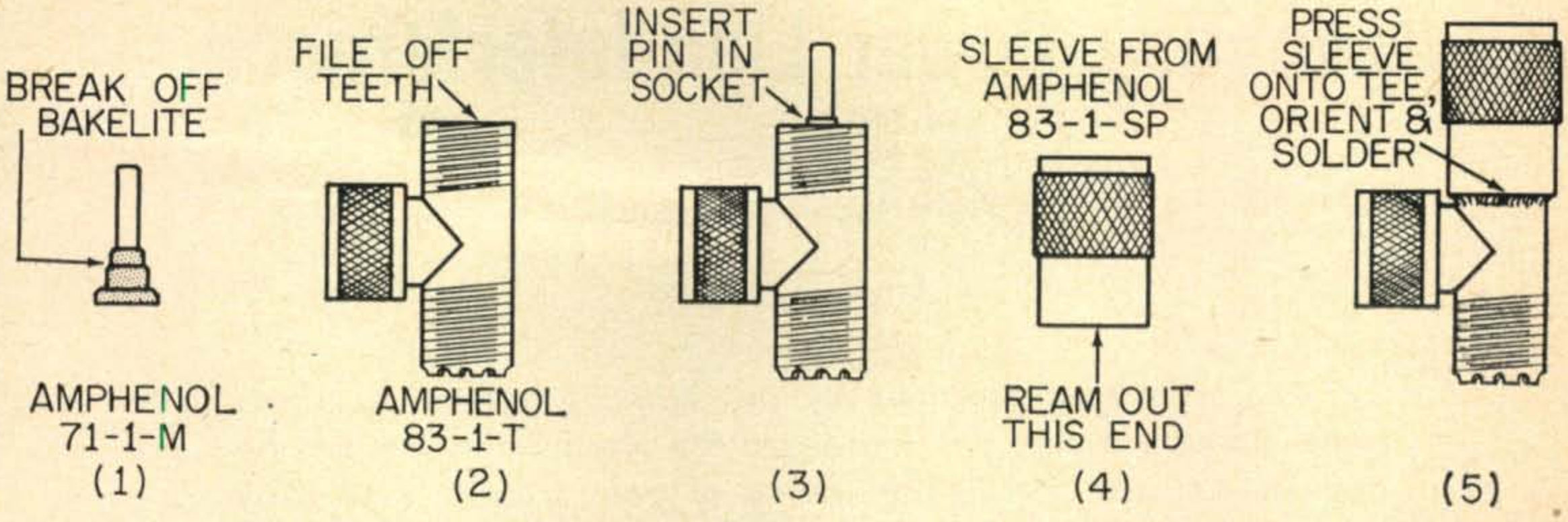


Fig. 2—Construction of a coax tee fitting strong enough to support the isolator.

this isolator in use, the Panadaptor functioned perfectly at the far end of a 10 foot coaxial cable (longer was not tried), and no adjustment or misadjustment of the Panadaptor had any adverse effect on the operation of the receiver or receiver Q multiplier combination.

Construction

Mechanically, an isolator of this type can be built in a variety of forms, all of which will work. When standard connectors are used, a minimum surface area of about 3½ square inches is needed for mounting; and standard components occupy about 4 cubic inches. The isolator illustrated was built in an LMB No. 221 side lock box, 2¾ × 3⅛ × 1⅝", which has more than enough surface area and volume for the purpose. General appearance of the isolator, with cover removed, is shown in the photograph. Input here is via the special coaxial fitting at the bottom, output through the side coaxial fitting, and power input through the four terminal Jones plug.

Tube socket is mounted on a small aluminum bracket, which also supports a ground lug and a standoff insulator to which the troublesome "four way" connection in the cathode circuit is made. The fitting at the top is a "degutted" AN connector and cap, mounted over a hole, so that the tube can be removed and replaced without performing major surgery on the assemblage.

Filament Chokes

The filament chokes were found desirable to prevent the feeding of very high frequency signals back into the system via the filament circuit. These undesired signals were found to be higher oscillator harmonics and sum frequencies from the mixer circuit.

Power for the isolator, is "stolen" from other equipment, and consists of 6.3 volts a.c. at 0.15 amps and 150 volts d.c., regulated, at about 6 milliamperes. If possible the filament center tap should be biased at 40 volts plus with respect to ground, to eliminate hum injection through the heater cathode system.

Mounting "T"

It was originally planned to mount this isolator at the rear of the *Q* multiplier, by replacing the coaxial L fitting by a Tee, and joining the Tee and the input connector of the isolator by a male-to-male coaxial fitting. Unfortunately, the only commercially available male-to-male coaxial fitting was not mechanically strong enough for the purpose, and a special fitting had to be made.

This was constructed by performing an operation on one arm of a standard coaxial Tee (Amphenol 83-1-T). General procedure, outlined in fig. 2, is as follows: File off the locking teeth from one arm of the coaxial tee. Break off the bakelite handle of an Amphenol 71-1-M plug. Insert the short end of the plug into the socket of the Tee. Next, take the sleeve from an Amphenol 83-1-SP fitting, and ream the unthreaded end until it will just slip over the arm of the Tee. Slip this in place, screw the sleeve onto the input fitting of the isolator, orient the fitting to the desired direction, and solder the sleeve onto the Tee, using a hot iron and a noncorrosive flux.

Although specifically designed to isolate the cable of a Panadaptor from the mixer circuit of a receiver, this isolator can also be used for a variety of other connections which require isolation, such as *Q* 5er connections, and low level audio circuits. It also has possible applications where the output of a converter must be "piped" a considerable distance to a main receiver. ■

"YOU'RE 'ARM-CHAIR' COPY HERE, OLD MAN"

Locating Power Line Interference

Wade H. Williams, K5ILG
2327 Wheeling Avenue
El Paso, Texas

If you are being plagued by powerline interference, don't tear up your ticket yet. Here are the means and method by which you can locate the source of your trouble and copy those S-2 signals at last. Seek and ye shall find!

One of the most common sources of radio interference is the electrical power distribution systems, particularly overhead power lines. Experience is an important factor in locating such interference but luck and a systemized method will greatly aid the investigator in his search. The necessary tools are a general coverage receiver, battery-operated portable or mobile equipment, loops for various bands, a sledge hammer and an output meter. The ear is not sensitive enough to detect slight changes in volume that a meter will readily indicate.

There are three means by which energy travels; conduction, induction and radiation. Figure 1 illustrates how interference can be radiated and inducted.

Conduction is the term used when energy flows along the lines, through the transformer and into the receiver power supply. Induction occurs when the power line carrying the interference is near enough to the antenna to couple the interference into the receiver. Radiation describes the energy sent into space from the overhead power line which then act as a transmitting antenna. In this way the signal can be radiated from a nearby fence, metal building, or other power lines. Radiated interference does not travel along a line any great distance but covers a broad area on both sides of the line. Conducted interference decreases with distance but in a more complex way and conducted and induced energy may follow a line for many miles. Interference of this type is common in rural areas.

Impedance changes in the line will cause noticeable changes in the width of the area affected by the induction field. Figure 1 shows, relatively, the area affected by direct radiation from the source of interference. Radiated interference does not rely on the power lines to carry the energy and consequently affects a broader area.

Power line noise is chiefly due to three factors 1. Defective insulation in a piece of equipment. 2. Loose connections in the primary or neutral circuit. 3. Leakage due to an ungrounded piece of hardware which is too close to a grounded item. The repair and correction of the trouble is the responsibility of the power company and no advice will be given here on that subject. *Warning . . . do not attempt to correct the trouble. Stay off the pole.*

No expensive gear will pinpoint a source of interference or identify the trouble. A plan usually must be followed, and at times it can be a long procedure. The isolation of an interference source is the result of gradually narrowing the suspected area. When a suspected pole is located hit it with a light tap of the sledge at first. Quite often the noise will disappear immediately. In all probability you have isolated the inter-

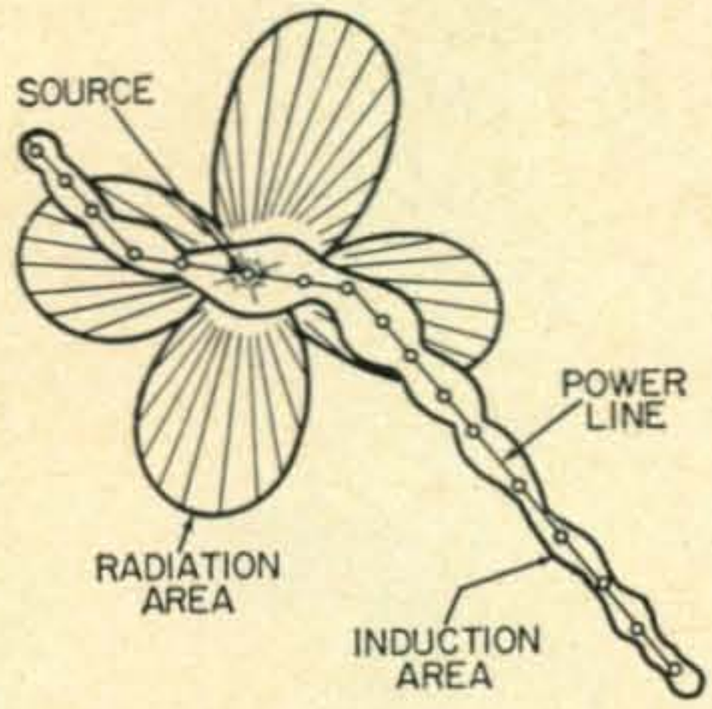


Fig. 1. Approximate areas affected by radiation and induction. This sketch originally used by Navy Civil Eng. Lab. publication.

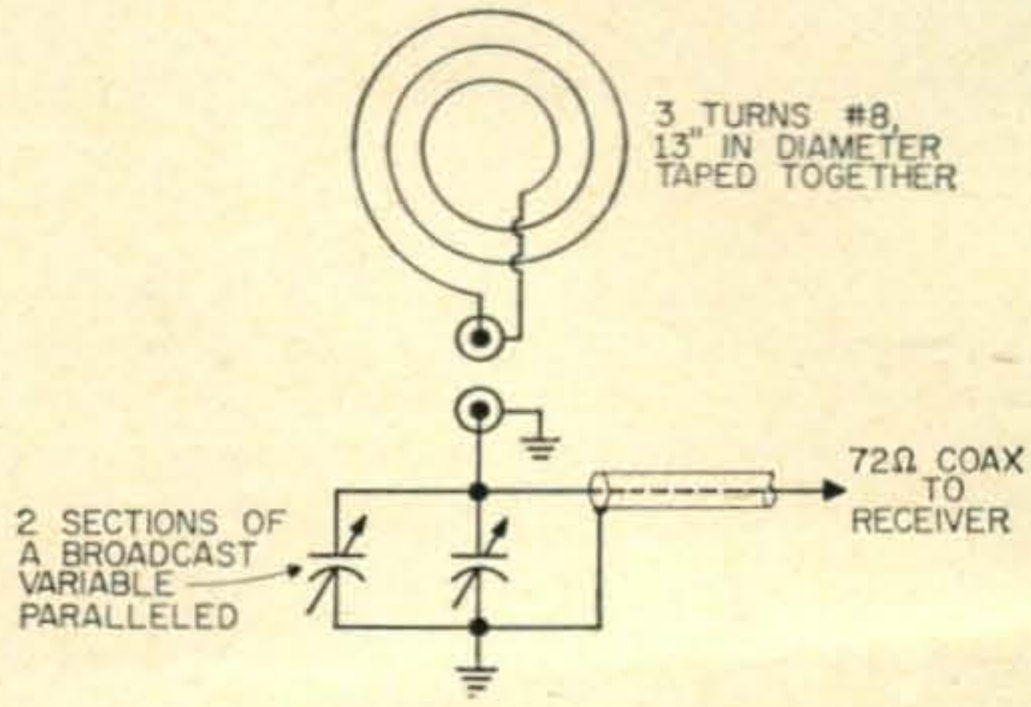
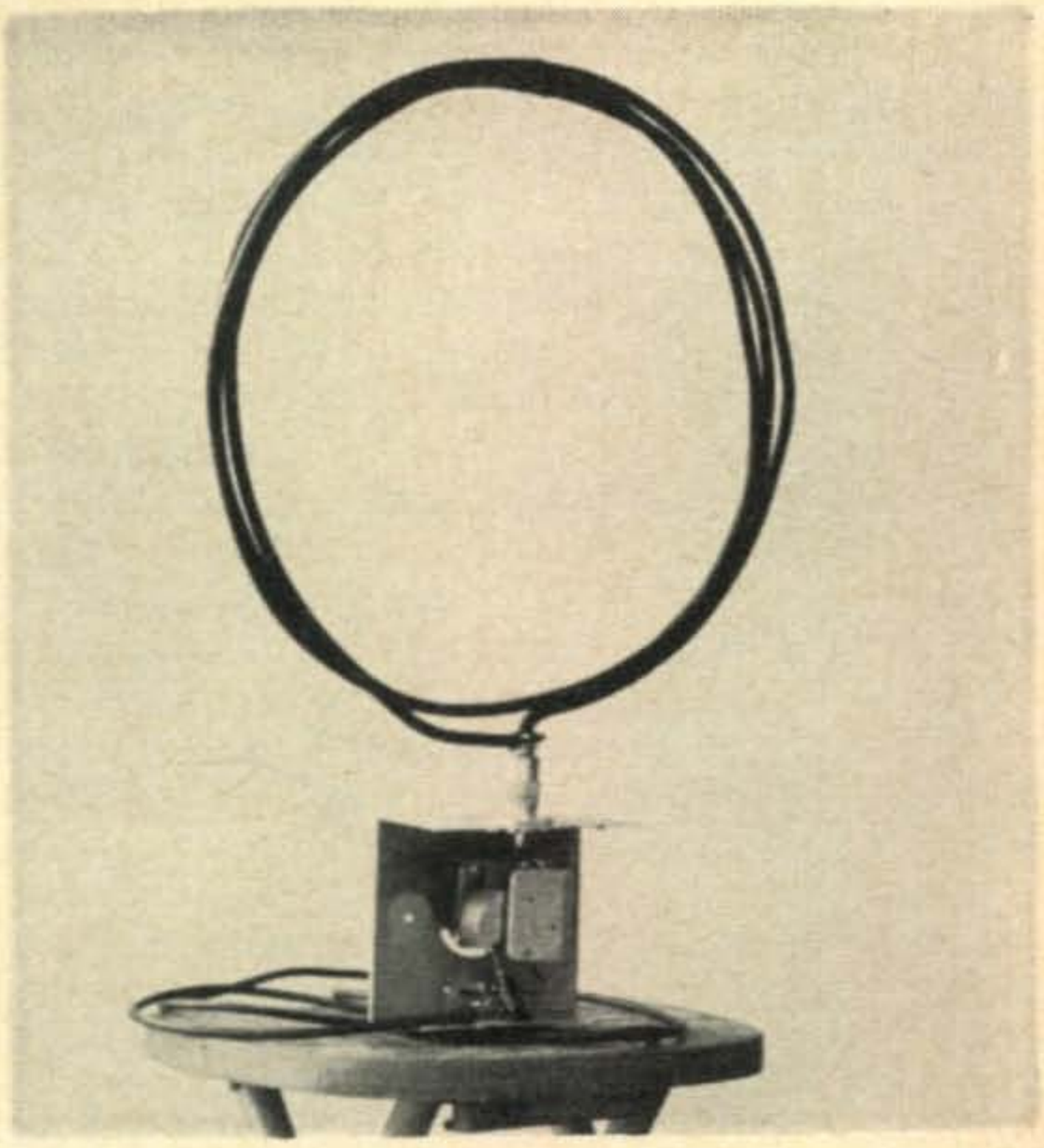


Fig. 2. Suggested arrangement for 80 meter loop.

ference source. If no change is noticed, strike harder, and observe any delay in response. If the trouble is not on the pole which you are striking, but a change is detected, it indicates that the shock affected a more distant pole. The longer the delay in response the more distant the faulty pole.

Standing waves on the line may mislead you in locating the source. This is characterized by the maxima and minima in signal strength as the car is driven along the power lines. (If possible, maintain the same distance between car antenna and power line at all times). Peaks appear in equal strength at intervals of 400 to 500 feet for 800 *kc* and closer together at higher frequencies. On ten meters the standing waves will appear every 25 to 50 feet and the distance between standing waves decreases as the source is approached. They will eventually appear every ten feet or so. However, in some cases the proximity of the interference source is not always indicated when closely spaced standing waves are apparent, but, it is the rule rather than the exception. Locating power line noise is tricky, and rules and theories cannot always be relied upon 100%.

There are many sources of power line interference and the most common are conductors, insulators, hardware, utility equipment and "foreign lines." Conductors include the line wire, the tie wire (they hold the power line to the insulator), ground wires and connectors. Lightning arrestors are also a common source of trouble, and are responsible for two types of interference. The first is the intermittent spark discharge



The 80 meter loop is made of 3 turns of #8 insulated wire terminating at coax connector. The mini-box houses a broadcast capacitor with both sections wired in parallel. Fig. 2 shows construction details.

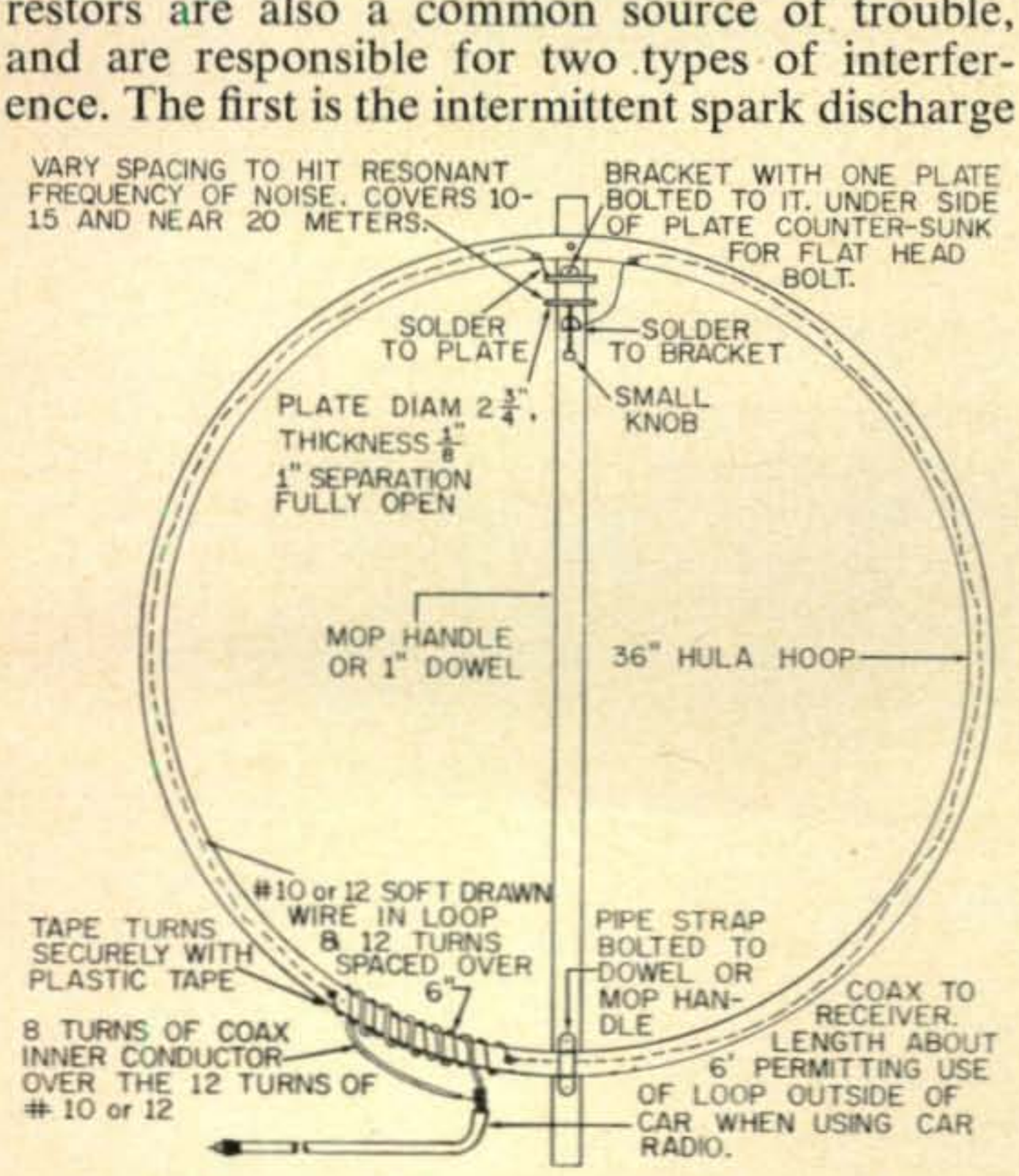
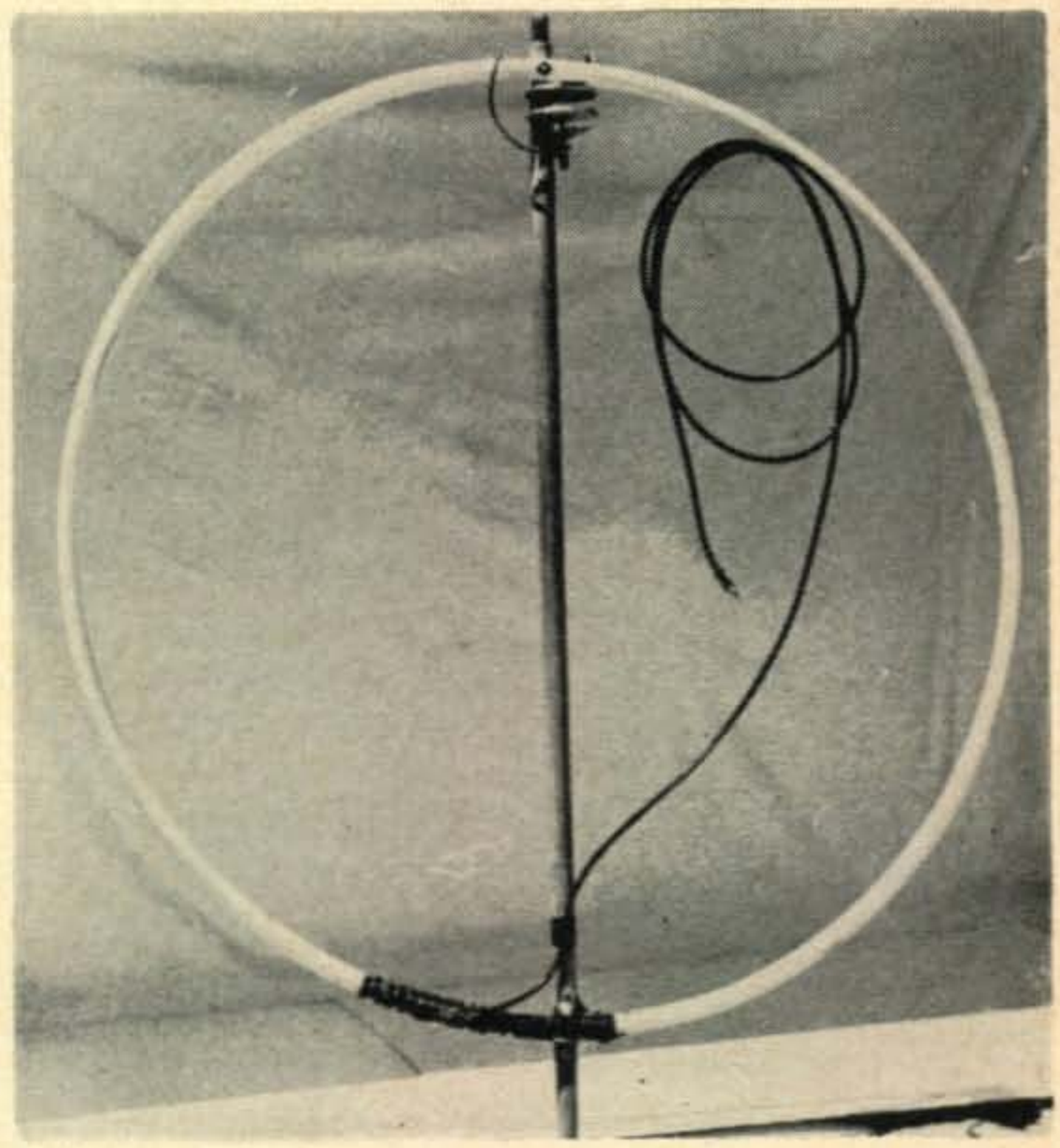


Fig. 3. Suggested arrangement for 10 meter loop. 8 turns of 72 ohm coax wrapped over the 12 turns of #12 rubber covered, soft drawn wire. Remove enough shield from coax for 8 turns. Do not remove center conductor insulation except at tip. This is soldered to end of shield at beginning of coax turns. The #12 wire is easily guided through holes drilled in hula hoop with aid of icepick. The loop will tune from 18 to 30 mc.



The 10 meter loop made of a hula hoop and the XYL's mop handle. Note neutralizing capacitor near top for tuning resonant frequency of noise. Inductive coupling of coax feedline to loop can be seen at bottom. See fig. 3 for construction details.

due to high-voltage breakdown at a given point. This condition frequently occurs during high winds. This type is not only very annoying but is also very difficult to locate due to its intermittent nature. The second type is a localized corona discharge due to the air becoming ionized in the vicinity of the conductor. It is much easier to locate due to its constant buzzing sound. Spark discharge also occurs when corrosive material such as salt deposits, sand or other foreign matter intrude and form a path between a conductor and some other metalized part on the pole. As the voltage increases during the cycle the value is high enough to cause the insulation to break down for an instant and discharge through the low resistance path. This type of interference is coupled into the line which will in turn conduct and radiate. Corona discharge occurs when the voltage at a conductor surface causes the air near the conductor to ionize. Other ions are formed and, since they are charged particles, their motion through the air establishes a current flow from the air to the conductor. This type of interference is not difficult to locate. In some cases it may even be visible at night.

Insulators

Interference due to faulty insulators is similar to that caused by conductors. Breakdown can occur in several ways; leakage paths caused by dirt, salt or moisture on the insulator, by a crack in the glazed material on the insulator, or when the insulator is loose on the insulator pin. Interference has occurred where a grounded neutral wire was installed on a bare metal bracket without an insulator. In factory and industrial areas, fumes, dust and other foreign material collect on the insulators and cause interference. In regions where there is sufficient rain to keep the insulators clean, interference normally does not develop.

And now, Hardware; one of the greatest causes of power line interference and creator of the most difficult types to locate. This includes crossarm braces, bolts, nuts, washers and staples or any other metal items on the pole. The noise is usually intermittent and due to a small gap, poor insulation or the corrosion previously mentioned. The hardware is located in the midst of a strong electric field. Often, correction can be made by merely moving a wire a few inches, tightening the bolts on the crossarm or driving a staple into the pole which may have worked loose from a ground wire.

Utility Equipment

This type of interference is caused by other than faulty construction or failure in poletop components. Vacuum cleaners, motors, household appliances and many other types of equipment can be the cause. Neon signs are the No. 1 source of radio interference in this category and quite easily located.

Also of concern are foreign lines not connected directly to the power lines; such as a military installation that might maintain their own power generating system. Interference from such a source can be detected for a considerable distance by radiation and induction but not by conduction as the lines are not tied in with the local power system.

Locating the Source

The writer has found most sources of trouble with an 80 meter loop and a 10 meter loop by circling a fairly large area and working toward the center. Triangulation is another method that can be employed. The sketches show the 80 and 10 meter loops in figs. 2 and 3.

If the source of interference is not on the power line, the directional antenna will indicate the direction from which the noise originates. If it appears that the noise is originating on the lines the loops will not indicate the direction from which the noise is radiated unless a strong signal is present. The use of the output meter, and traveling the neighborhood in your car will direct you to the general area. When the signal appears to be strongest change to other bands. Often the disturbance will be heard on more than one band. This is an excellent indication that the faulty pole is close by.

There are many confusing factors that must be contended with in hunting power line interference and one of the most misleading is the change in line impedance which will cause new standing waves, which in turn may cause an increase or decrease in interference voltage. This impedance change may be due to taps on transformer primaries, changes in the height of the line and "deadend" lines where an extension line has been constructed from the regular line of poles. Usually, but not always, the pole which seems to transmit the loudest signal is not the one from which the trouble is radiating. Your receiver and meter may indicate an increase in signal strength when you approach from opposite directions, and a notable *decrease* as the suspected pole is neared. This is due to the fact that a source on the line is placing interference into the line in both directions with the result that the impedance to the interference source is low at that point.

Be alert to pieces of wire that children have thrown into the air and that have become entangled in the wires overhead.

Familiarity with sounds will be helpful to the investigator although this comes with experience. A hissing sound might be corona. Defective insulators may sound buzzy or perhaps exhibit a heavy rasping noise. Loose hardware can cause both an intermittent buzzing and a popping noise, depending on the proximity of the offending wire and the wind gusts.

Most amateurs are familiar with neon signs and appliance noises.

I had one baffling experience which had no answer. The interference was traced to a particular home. The main switch was pulled, the noise ceased. Each and every individual appliance was disconnected but the noise continued.

After several exhaustive trips through the house the source was located in the fishbowl pump which was radiating for two blocks.

Another source was traced to an outdoor doorbell transformer that was faulty.

A high-voltage transformer in a TV set was the source of interference to a hi-fi set.

Be sure to check the electric meter outside the home. These have been found to cause trouble. Thermostats, Christmas-tree accessories, medical apparatus, traffic lights, etc. There are many sources of interference, many of which are unjustly attributed to the power company.

Interference can be caused by electrostatic discharges from unused power lines which are in the electrostatic field of a power system. Lines which are temporarily or permanently disconnected from the power system should be grounded at regular intervals.

Rainy Day Interference

A steady noise which increases in intensity during a rain might very well be originating on very high voltage lines and could be due to corona. You may find that the interference radiates from a low-voltage line, but the point of origin is likely to be on a high-voltage line and induced by running in parallel or crossing the other lines.

A constant noise which attenuates immediately with the beginning of rain can originate on high voltage lines. The noise may be caused by electrostatic discharge on the upper part of the insulator or from the tie wire to the line. If the noise increases soon after the sun shines the point of trouble is at points that dry rapidly such as the upper surface of an insulator. If there is a considerable delay in time before the noise returns it might originate where the dampness remains for a while, such as an insulator pin or sheltered wood of the pole. If the noise subsides gradually during rain it might be due to electrostatic discharge from the pole hardware through the wood of the pole.

Warning—

Never attempt to climb a pole. If you shake a guy wire do it gently. A slight shake will suffice and if the action is violent it can cause two wires to contact each other, burn in two and fall to the ground seriously burning or electrocuting a bystander or yourself.

After you believe you have located the trouble notify the local office. They are always cooperative and will have a line crew on the job as soon as possible. Remember, they want their lines clean, too. ■

Power Supply Protection Circuit

Ed R. Hill, W3FEG
12 Dover Street
Rehoboth Beach, Delaware

Amateurs using a short duty cycle power supply with no chokes and 20mf to 100 mf or more capacity are faced with the problem of firing up the supply without blowing the mercury vapor rectifiers. Some feel the Variac control is the only solution. However, in my case, the junk box held the answer.

The old a.m. power supply already had an overload relay in the high voltage center tap that would cut off the 117 volt primary if 500 *ma* were exceeded.

A 250 watt lamp was already installed in the 117 volt primary for the purpose of tuning up and low power work. Therefore, wiring in a surplus time delay relay found in the junk box was a simple matter. When the plate power supply switch is turned on the 250 watt lamp glows and the 866A's shows a slight blush of blue. As the time delay ticks off the 50 seconds before closing, the condensers gradually charge until the lamp is shunted out and the supply goes on full voltage.

The following advantages are realized:

1. Low Cost—most parts already on hand; some finals already have the delay in use to hold the plate transformer off until the filaments are warmed up.

2. Whenever the high voltage is turned off the time delay automatically re-sets for the next operation. You don't have to remember to crank back the Variac.

3. If your high voltage grounding switch is accidentally left closed the lamp will burn brightly and the resulting low voltage to the time delay motor prevents it from running. Therefore, it will not proceed to the second step—full voltage.

4. You can start transmitting on step #1—low voltage without damage to the supply.

This circuit has been used by the writer for several years without trouble or damage to rectifier tubes. ■

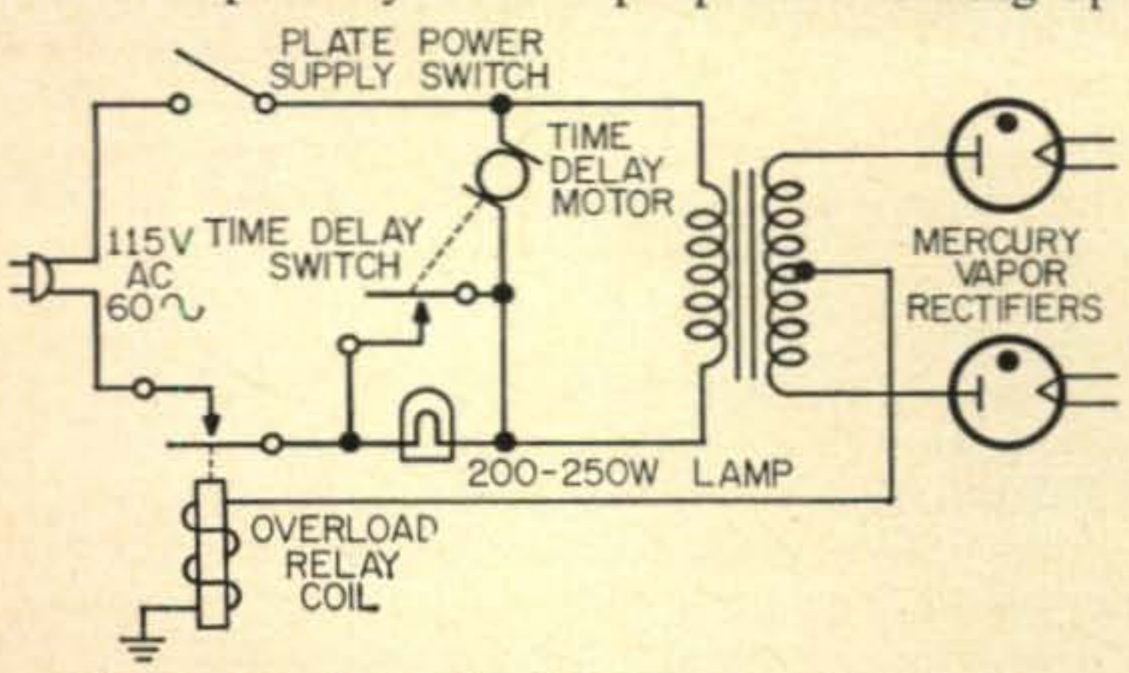


Fig. 1—Circuit of a simple power supply protective device using a motorized time delay relay and a 250 watt light bulb.

DX DX DX DX DX DX DX DX

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

The following certificates were issued during the period from September 12th, 1960 to October 15th, 1960:

WAZ

1433	OK1AWJ	Jaroslav Prochazka
1434	OK1JQ	Josef Stehlik
1435	W2BHM	J. H. Painter
1436	W2DEO	Jim DuPont
1437	VE3BMO	Roger Erskine
1438	ZL4AW	Bill Pickford
1439	JA6AK	Ikuo Shinohara
1440	W2FZY	Edwin L. Chinnock
1441	W9IVZ	R. S. Palmer
1442	W8IBX	Kurt Meyers
1443	DM2AEJ	Ehrenfried Scheller
1444	YU3OV	Bojan Kresnik
1445	VS1JF	Roger Brown
1446	VK3YD	R. W. Ross
1447	W9ETN	Ed Meyer
1448	PAØVDV	Joeke Van Der Velde

ALL-PHONE WAZ

65	SP7HX	Roman Izykowski
66	W2ZX	Dale Kentner

CW WPX

141	K9KDI	Gene W. Socher
142	G2GM	Frank Donald Cawley
143	SM2BCS	Eskil Gustafsson

SSB WPX

37	K2QXG	L. L. McMaster
38	VE3BKL	Homer T. Houser
39	W9YHE	Thomas B. Stogdill, M.D.
40	W2BLP	Rev. J. Healy
41	VE3BWY	Rev. H. A. M. Whyte

Letters

Vicenza, Italy, September 26—The official opening of the 1st U.S. Army Missile Command's Amateur Radio Club of Vicenza, last week, climaxed over two years of hard work and determination to establish a complete amateur radio station here for members of the command.

S/Sgt. Lauris A. Jacks, 110th Aviation Co., founder of the club, saw a dream come true when Col. Robert E. Coffin, Commanding Officer of the 1st U.S.A. Missile Command, commended him for a "job well done".

The Club has grown considerably since its beginning in Sgt. Jacks' room on the top floor of the old 16th Sky Cavalry's barracks. Using outdated equipment borrowed from the command and 5th ATAF, he obtained permission from command headquarters to operate an amateur radio station and was granted a station license by the Italian government.

Again dipping into the surplus pile and enlisting the labor of interested personnel, the structure for a 60 ft. antenna tower slowly grew between the NCO Club and the Craft Shop. Special Services contributed a three-band, rotary beam antenna which Sgt. Jacks and Sgt. Gordon Rosier of 5th ATAF placed atop the tower.

At one point, after working long hours at a time on the antenna, Sgt. Rosier weakened to the point where he could not unfasten his safety belt to climb down the tower and had to be carried down by Sgt. Jacks.

Through the efforts of 1st Lt. Werner A. Fehlauer, Wire Platoon Leader for the 124th Sig. Co. the Club gained access to an Army radio van and its shortwave radios during the time it was not needed for missions, keeping the equipment in condition on a minute's notice for military service.

Interest began to grow toward the radio club, with Lt. Col. Henry E. Bielefeld, Deputy Chief of Staff, becoming staff advisor for the station, Mr. Ernest G. Antonio (DAC), communications ad-

Vicenza, Italy, Sept. 26, Army on the Air—The 1st U.S. Army Missile Command's Amateur Radio Club of Vicenza goes into full operation with President, Sp4 Edwin R. Spurr, 34th USA Arty Det, at the controls listening for a station in the States. S/Sgt. Lauris A. Jacks (seated right), 110th Aviation Co, founder of the club, and Col. Robert E. Coffin (left), Commanding Officer of the 1st USA Missile Command, listen in.

Ken, EL4A passes along these three pictures. On the left is Ken himself operating EL4A/MM. In the center is Mary Knowles, EL4M. Mary is only 13 years old. Bev, EL4G, is another 13 year old YL. On the rights is Mary, EL4M, and Carol, EL4D, getting ready to go for a ride.

visor, and Lt. Col. Richard J. Dunn, Post Signal Officer and CWO Fred P. LeMaster of the 124th Sig. Co. also lending assistance.

Coordinating with Special Services, arrangements were made to order a complete line of radio and electronics equipment which the member could assemble from kit form.

Moving out of their temporary station in the radio van, the club became firmly established in two rooms of the new addition to the Craft Shop. Upon arrival and construction of the equipment this spring, an electronics craft shop emerged which is thought to be the first of its kind in Europe. Here, members of the 1st Missile Command, who are experienced in the use of electronic test equipment or would like to learn from competent instructors, may design sets, build equipment, repair radios or TV sets and work toward their amateur radio operator's license.

The operator's license and membership in the club enables the radio amateur to talk with other amateurs the world over. One of the privileges of becoming a member is the possibility of contacting an operator in your home town and talking with your parents. Last week, Sp4 Alex MacDonald of the 34th Arty Det happened to be in the shack when operator Sp4 Ed Spurr, 34th Arty Det, contacted a ham in Cranston, R. I., MacDonald's home QTH. His family was called and talked with him for about two hours.

Thanks to Marc, W2GYQ, for this picture of the Three Musketeers. They are (l. to r.) Gene, W6HYG, Luwo, DJ1IM, and Marc, W2GYQ. The picture was taken in DJ1IM's home in Bruchsal.

Although the club is not allowed to handle third-party traffic, any communication that would otherwise be conducted by special letter, telegram or telephone, it is often possible to contact a home town amateur and arrange for a chat with the family. So far, contacts have been made as far west as California, north to Vermont and south to Miami. Last weekend, operator Sfc Harley D. Scott, USAG, contacted 105 amateur stations all over the United States and Canada. Almost all of the stations contacted reported that I1DFD (Italy No. 1 Dog Fox Dog) was coming through far stronger than most of the other European stations.

Through its communication facilities an electronics workshop, the Amateur Radio Club of Vicenza, Italy is fulfilling one of the prime aims of amateur radio; always to be a "public service".

Thanks to the gang at I1DFD for the above story.

This is Endel in the driver's seat of UR2DZ, who, along with UR2BU, passes out a lot of UR QSO's. (Tnx K2UKQ)

Lew, K7MBD, the club secretary at I1DFH also dropped us a few lines this month and his letter should clear up a problem that has been perplexing a lot of the gang.

". . . Thought I would let you know that we are a new club station here on the Island of Sicily. As our QTH is not yet in the *Call Book*, we can be found on s.s.b. on 20 meters after the sun goes down and do a lot of c.w. and a.m. on 15, 20, and 10 when it's in.

This brings up one more problem. Being with the U. S. Forces here in Italy (and surrounding Islands), we have the Reg. I1DF call, the last letter being H. As far as our license reads, we are a Sicily station

(except they won't give us the IT1 prefix) so, hope this clears up what an I1 is doing here in IT1 land. . . ."

The following letter from Hal, K4ORQ/EP, EP1AD, speaks for itself.

". . . I work the east coast about 0200 GMT every morning (condx permitting) on 14016 *kc*. I work the west coast about 1400 GMT about 14090 or 14080 *kc*—usually 14090 unless a commercial station shows up, which often happens. Will had an Apache on the air, after repairs—was testing it (just finished building it) and a power surge (150 volts) blew out the rectifiers in the power section. So final testing and getting on the air will have to wait for new parts from Heath. Am using a DX-40 to a couple of dipoles. After I repair Apache, will put up beam—from local materials on 20 meters. I am the only EP prefix now but expect more next week. W2AYN/EP, K7GMZ/EP, W3ZA/EP, DL3RO/EP are all awaiting new EP prefix calls—any day now. I was lucky. There are more waiting for applications right now so should be more on the air soon. 2AYN, 7GMZ and I, are c.w. addicts mostly. 3ZA is s.s.b. when in town from Beirut, 3RO is fone only and usually works Europe—although will work anyone anywhere who calls on fone.

"Give me a call anytime condx permit—glad to work you. . . .

"It has been a long time since I have written to you. I believe the last time was from Italy. This time it is from Sauda Arabia. As you may know, at this time there is only one amateur station in Sauda Arabia that is operated by U. S. Military and that being HZ1AB. But at this time action is being taken to get authorization for a MARS/ and Amateur station at the Laif Det. of the U.S. Military training mission to Sauda Arabia and I will give you more information on this as soon as we get a call.

"There was an amateur station here in Laif in operation during 1955 and 1956, and if anyone that has worked that station, HZ1AEH, during that time and still needs a QSL, if you drop me a line I will do what I can to get a confirmation. Best 73 CUL. Sfc. Eber F. Diehl, Jr., U.S. Army Elm. Laif Det. USMTMSA, APO 616, New York, N. Y. W7AMM, ex DL4OV, DL4YK, DL4HE, I1DFB, PY7QE."

Thanks for the letter, Eber, and hope you get that license soon.

G3FXB and G2DPY working on the tri-band beam on G2DPY's roof. G3FXB must have a secret weapon of his own at home as he sports a 276/267 total. (Tnx G3FXB)

Active QSL Managers

Many thanks to Bob, K6CQM, the Editor of the *Northern California DX Club Bulletin* for the following list of QSL managers for some of the more active DX stations.

BV1USE	via W2CTN	**OY7ML**	via W6NJU
CN2BK	via W2CTN	**PJ2AE**	via W1YIS
CP5EL	via W1BAN	**PJ2ME**	via K2SWZ
CR4AH	via W2CTN	**PJ2MG**	via PJ2CE
CR4AV	via W2CTN	**ST2AR (s.s.b.)**	via W2JXH
CR4AX	via W2CTN	**SU1MS**	via W6QNA
CR5AR	via K3AMH	**SU1AL**	via K4IEX
CR6CA	via K5LXA	**SVØWZ**	via W7FTU
CR9AH	via W1DWH	**TA3UF**	via ZC4BS
CT2BO	via W6NJU	**TF2WFF**	via K4APM
CT3AV	via W3KVQ	**TF2WEG**	via K6VQQ
DL5AY	via KØRNR	**TF2WEW**	via K5QBG
EA8CG	via K1DCL	**TF5TP**	via W2MUM
EI9G	via W7VEU	**TG5HC**	via K5GOT
EL2AD	via W6ZRK	**TG9AL**	via W2CTN
ET2US	via W4YWX	**TG9TI**	via W9YSQ
FB8AA	via FB8BC	**TI2CMF**	via W2CTN
F7HC	via W5GZU	**TI2PZ**	via KØDQI
FB8CJ	via W6BAF	**TI2WD**	via W2CTN
FD8AMS	via ZD2AMS	**TI2WR**	via KØDQI
FE8AH	via K1IVT	**VK2PA**	via W2CTN
FG7XC	via W3KVQ	**VK5BP/8**	via VK5NO
FG7XF	via W2CTN	**VK2FR**	via W2CTN
FG7XG	via W3KVQ	**VK9BW**	via W2CTN
FK8AI	via W2CTN	**VK9DH**	via WA6HOH
FK8AT	via W2CTN	**VK9NT**	via W2CTN
FK8AW	via W2CTN	**VK9GK**	via W2CTN
FM7WK	via W4ZKE	**VK9TK**	via WA6HOH
FM7WU	via W2CTN	**VK9VM**	via K2QXG
FM7WP	via W2CTN	**VKØAB**	via VK3APV
FO8AC	via W4KWC	**VKØIT**	via VK3KB
FO8AU	via W3GJY	**VKØJM**	via VK2AZM
FO8AX	via WA6DFH	**VKØPM**	via VK4PM
FP8BF	via K4RSD	**VKØTF**	via VK8TF
FP8BH	via W1PFA	**VKØWH**	via VK2AWH
FP8BM	via K2VZJ	**VP1JH**	via WØNWX
FP8BO	via VE2AFI	**VP2AE**	via K1EFI
FQ8HO	via K6EC	**VP2AR**	via W3KVQ
FU8AJ	via FU8AA	**VP2DA**	via W8VDJ
FY7YF	via W2FXA	**VP2KD**	via K4LRA
FY7YE	via W5JLU	**VP2KH**	via W2CTN
HC1LE	via W2MUM	**VP2KJ**	via W8MXS
HC2CS	via W1CV	**VP2KW**	via K4LRA
HKØAI	via W9WHM	**VP2LS**	via W8QHW
HP1AO	via K4ASU	**VP2SL**	via K4LRA
HR2FG	via W2CTN	**VP2ML**	via K4LRA
HRØAB	via HR1AB	**VP2VA**	via WØNWX
IC1IN	via W4TO	**VP3RS**	via W4CAA
IM1RIF	via I1RIF	**VP4WI**	via W4ORB
JZØPC	via G3DYD	**VP5AB**	via W3AYD
JZØPO	via W2CTN	**VP5BH**	via W4OMW
KJ6BV	via WA6HOH	**VP6PJ**	via W2CTN
KC4US	via K1NAP	**VP7BI**	via W4ISH
KM6BT	via KM6BI	**VP7NO**	via WA2HOR
KP4VB	via W7ZAS	**VP8CC**	via G3JAF
KC4AT	via K4IHN	**VP8EZ**	via G2RF
KW6CP	via W2CTN	**VPØRT**	via PJ2MC
KW6CU	via W2CTN	**VQ1HT**	via VQ4HT/W2CTN
LX3EN	via DL6EN	**VQ1SC**	via W2CTN
LX3EQ	via DL6EQ	**VQ2AB**	via W6BAF
OA8K	via W8HWM	**VQ2EW**	via W2CTN
OD5CT	via W2JXH	**VQ3HH**	via W2CTN
OX3DL	via W2CTN		
OX3RH	via W2CTN		

VQ3CF	via W2CTN	ZD2JKO	via W4MCM
VQ4RF	via W4MCM	ZD2JM	via K9EAB
VQ4AQ	via W2CTN	ZE1JV	via KØDQI
VQ5FS	via W7VEU	ZE4JO	via WA6HOH
VQ9AIW	via W4TO	ZE7JZ	via K6MHO
VR1B	via VK2EG	ZE8JJ	via W7UNP
VR1D	via ZL2GX	ZE8JN	via K5DCO
VR2DA	via W2CTN	Zæ1AK	via W3GJY
VR2DK	via W2CTN	ZK1AR	via K4LRA
VR3KD	via K5ADQ	ZK1BS	via W7ZAS
VR3O	via G3EMY	ZK2AB	via W6ZEN
VR3Y	via G3EMY	ZL3VB	via ZL2GX
VS1KM	via W9ZRG	ZL4JF	via ZL2GX
VS4BA	via W5UX	ZL5AA	via ZL2GX
VS4JT	via K6GMA	ZL5AC	via ZL2GX
VS6AZ	via K6GMA	ZM6AS	via ZL2ANB
VS5BY	via W6ZEN	ZP9AY	via W2CTN
VS9ARF	via G3MJ1	ZS3B	via WØVXO
VU2JA	via W4YWX	ZS3C	via W8UMR
VU2NR	via WØZSZ	ZS3D	via W8UMR
VU2RM	via W3KVQ	ZS3M	via W8UMR
VU2XG	via G8VG	ZS3RO	via W8UMR
W3ZA/—	via W2JXH	ZS3X	via W8UMR
W4IHW/KS4	via K4BLM	ZS7M	via W2CTN
XEØQLT/XE5	via W1QLT	ZS7P	via W5INL
XZ2AD	via WØUUV	3A2BW	via W4TO
XZ2SY	via W4ANE	4S7FJ	via W5GHK
YA1BW	via DL8AX	4S7MY	via W3KVQ
YN1CK	via W1EQ	4S7WP	via W3KVQ
YN1CI	via W8QHW	4S7YL	via KH6BPF
YN4AB	via K4ASU	5A5TR	via KØDQI
YS1IM	via W2CTN	9G1BQ	via W2CTN
YUØE	via YU1VR	9M2BV	via VEBV
ZB1FA	via W2CTN	7G1A	via OK1PD
ZB1HC	via W4MS	9M2BV	via VA3BV
ZB2I	via W2CTN	9Q5HF	via DL4HF
ZB2N	via W2TTA	9Q5HW	via DL4HW
ZD1AW	via W3KVQ	9Q5IG	via W2CTN
ZD1CM	via W3KVQ	9Q5RL/5A2	via W8FTD
ZD2DCP	via W2CTN	9Q5YM	via DL4 Bureau

QSL Manager Addresses

W2CTN Jack Cummings, 159 Ketcham Ave., Amityville, N. Y.
K4LRA Box 85, Kendall, Fla.
W6BAF H. E. Spaulding, 3925 Osler Ave., Long Beach 8, Calif.
K6EC E. W. Thatcher, 3803 Liggett Dr., San Diego 6, Calif.
W3KVQ Edw. M. Blaszczyk, 3135 Rorer St., Philadelphia 34, Pa.
K4RSD J. J. May, 5054 Spring Hill Dr., Pensacola, Fla.
ZL2GX Jock White, 86 Lytton Rd., Gisborne, New Zealand
W3GJY John F. Wojtkiewwicz, 434 Glenwood Dr., Ambridge, Penna.
W8VDJ Robert E. Lora, Shady Acre Golf Course, McComb, Ohio
K5ADQ Nikki Boyd, 2271 34th St., Los Alamos, New Mexico
K2QXG Lauren McMaster, P. O. Box 206, Brightwaters, L. I., N. Y.
W4MS Edw. J. Collins, 103 E. Blount St., Pensacola, Fla.
W7VEU Bud Shearer, Jr., 3715 S.W. Marigold, Portland, Oregon
WØUUV Don Johnson, 3423 Eighth Ave., Council Bluffs, Iowa
WØRNR R. P. Weber, 409 Fifth St., Waite Park, Minn.
WØNWX Bob Denniston, Box 631, Newton, Iowa
K2VZJ W. Grim, Jr., 31 Winthrop Place, Hazlet, N. J.
VE2AFI Michel Moisan, 8353 rue Saint Andre, Montreal 11, Que., Canada
K4IEX Robert R. Beatty, 2025 Radcliffe, Charlotte, N. C.
W5UX Robert W. Carr, 154 County Lane, San Antonio, Texas
W4YWX Paul Newberry Jr., 3950 Bloomfield Rd., Macon, Ga.
W5INL Jack Spencer, 1524 Shirley Dr., New Orleans 14, La.
WA6HOH James Hanson, 2807 Malcolm Ave., Los Angeles 64, Calif.
K6GMA Walter Knight, 315 Neece St., Long Beach 5, Calif.
W2JXH Harry L. Whiting, 765 Park Ave., New York 21, N. Y.
W7ZAS Lawrence Sweeney, Sr., 2230 92nd Ave., N. E. Bellevue, Wash.
FQ8HT Pierre, Box 785, Bangui, Rep. Centre Africaine
FQ8AG Stan, Box 138, Brazzaville, Rep. Congo

G3FXB operating the G3CQE mobile rig. (Tnx G3FXB)

FQ8AE Camille, Box 467, Brazzaville, Rep. Congo
FQ8AW Serge, Box 298, Brazzaville, Rep. Congo
FQ8HO Robert, Box 138, Fort Archambault, Rep. Tchad
FQ8HL Henry, Box 449, Fort Lamy, Rep. Tchad
FF4AA BP 781, Ave Delafosse 34, Abidjan, Ivory Coast Republic W. Africa
FF4AB BP 1863, Abidjan, Ivory Coast Republic W. Africa
FF4AC BP 571 Abidjan, Ivory Coast Republic W. Africa
FF4AD BP 1475 Abidjan, Ivory Coast Republic W. Africa
FF4AE BP 1175 Abidjan, Ivory Coast Republic W. Africa
FF4AF QSL to ex FF8BK
FF4AG BP 4510 Abidjan, Ivory Coast Republic W. Africa
FF4AH BP 100 Agoville, Ivory Coast Republic W. Africa

Thanks to the *West Gulf DX Bulletin* for the above information.

Certificates

Thanks to Bob, ON4QX, for sending a copy of the revised rules for the WOSA certificate.

WOSA (1) and HOSA Award: The Antwerp section has decided to issue two diplomas known as the WOSA and the HOSA awards (Worked or Heard Antwerp stations) with the idea to foster International friendship and goodwill and also to draw your attention to our beloved city.

May we herewith remind you, that Antwerp is the third largest port in the World, the trading and cultural capital of Flanders and was, in the Middle Ages, the World's center of arts and learning.

The diploma depicts a view of the harbour at the beginning of the 16th century. It has been printed on old handscooped paper with an original block belonging to the World's oldest printing shop (1560), our actual Platin-Moretus Museum.

Rules and conditions in order to obtain the diplomas:—

1. Only contacts made after the 31 December, 1953 enter into consideration. All contacts prior to this date are non valid.

2. The minimum report during the QSO must be RST 448 in c.w. or RS 45 in phone, from both stations.

3. It is unnecessary to send your QSL's for confirmation. Send instead, an extract from your log showing date, time, reports, etc., to allow us to check your claim, and the QSL's from you, must be

sent again, to be sure that they are in our possession.

4. To obtain a diploma it is necessary that you contact in c.w. or phone:

a. For any country outside of Europe, a total of 5 Antwerp stations.

b. For any European country a total of 6 Antwerp stations.

c. For the Benelux countries a total of 8 Antwerp stations.

d. MM-4 Antwerp stations.

e. For all short wave listeners a total of 10 Antwerp stations heard and confirmed.

5. Your log should be accompanied with 7 IRC's or one dollar to cover the expenses of handling and postage.

6. Your application with an extract of your log should be forwarded to: ON4QX "Bob" L. TH. Berge, W.O.S.A. P. O. Box 33 I, Antwerp.

Bancroft Radio Club Award

Central Africa

The following Amateur Operators who operate on all bands are members of the Bancroft Radio Club:

VQ2AV VQ2DC VQ2TV VQ2TM VQ2JS

To qualify for the Award:—

1) Work any three of the above mentioned stations.

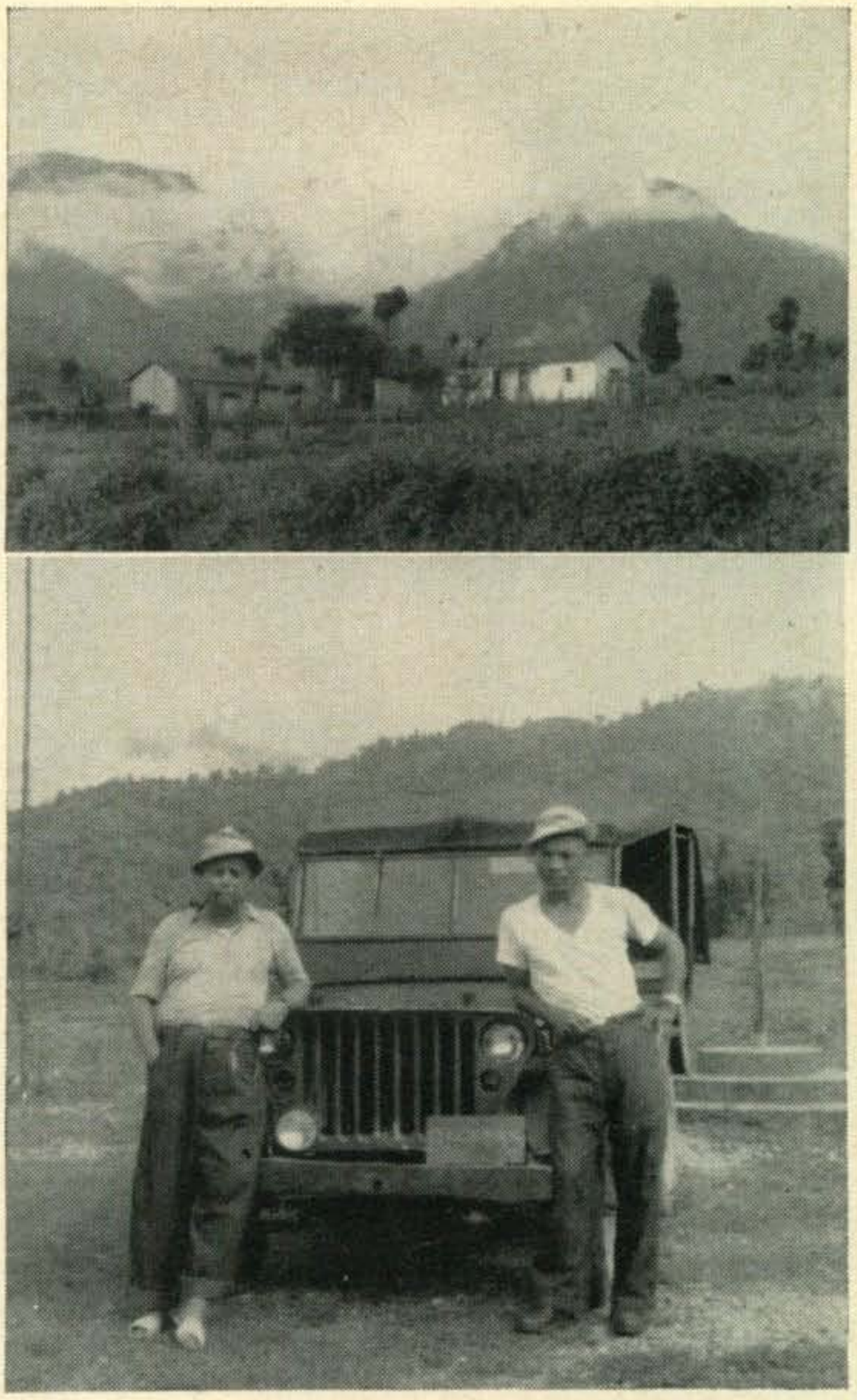
2) QSO's after 1 April, 1960 count.

3) QSL cards must be received by Bancroft Radio Club members or the Secretary (to check Log Books).

4) Enclose 5 IRC's or British Postal Order for 2/6d.

5) When claiming the award, apply to the Secretary at P. O. Box 239, Bancroft, Northern Rhodesia, giving details of stations worked.

The subject of 160 meters cannot come up without mentioning this fellow's call. He is K2BWR. Russ uses a 260 foot doublet over a salt ground on 160. During the recent hurricane, he had 24 inches of water in his shack. The high price of DX. (Tnx W1BB)



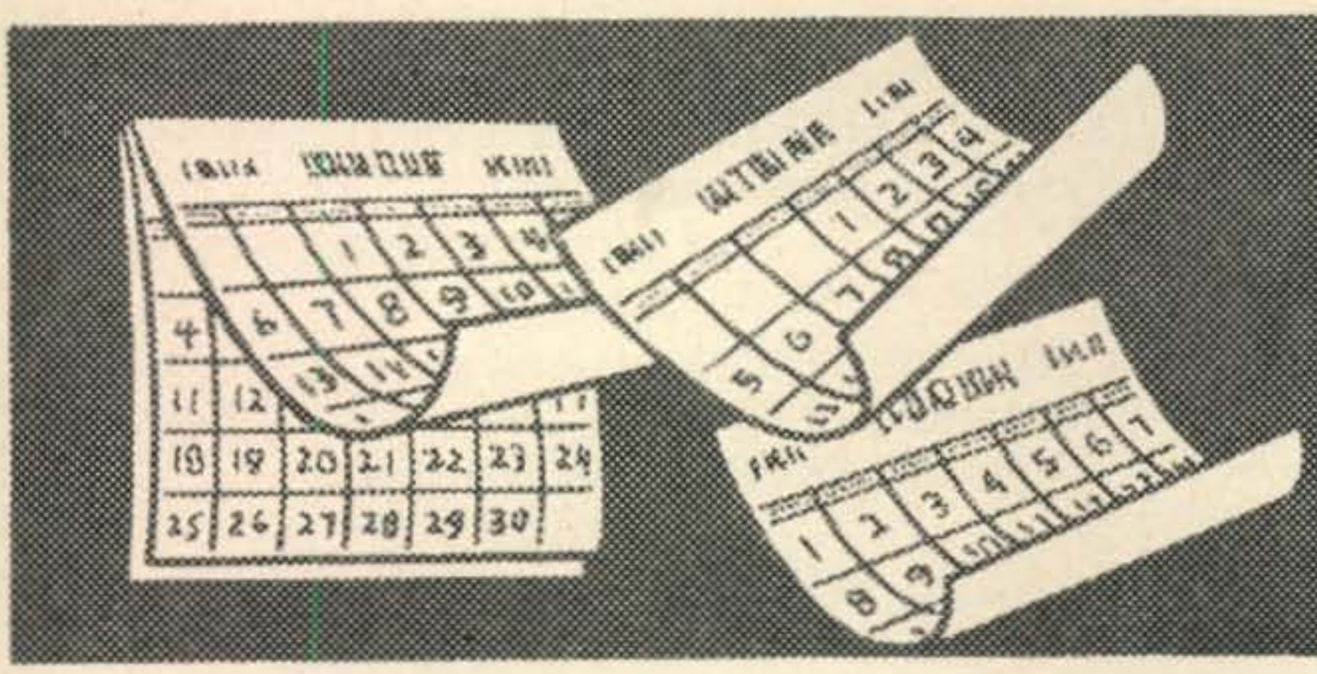
Mickey, VU2CQ made a quick trip to Bhutan in early September but due to many unforeseen events such as a monsoon, heavy fog, and snow and last but not least the b.f.o. in the receiver not working, only 1800 QSO's were made. Mickey promises to try again as soon as possible. The pictures show Mickey with Chhawna AC5PN and an idea what the top of the world looks like. Good luck on your next try Mickey.

160 Meters

Preliminary Announcement of the Annual Transatlantic and World-Wide "Top-Band" 160 Meter DX Tests is hereby given, with the dates set for December 4th and 18th, January 8th and 22nd and February 5th and 19th this coming season 1960/1961. Further details later, however, tests start at 0500 GMT each morning through 0730 GMT. During this period DX stations will endeavor to work W/VE stations. These TESTS are sponsored by an active group of English and DX amateurs, in cooperation with USA/VE hams, particularly interested in working DX the "Hard-Way", on 160!! However, the thrill of contacts on this band more than compensate for the effort.

Band Conditions: Band conditions predicted to improve with the reduced Sun-Spot activity already showing considerable improvement. W2TR has been heard in England on two occasions as early as September and East Coast stations have already worked W6 on 160 meters. Interest is picking up

[*Continued on page 108*]



CONTEST CALENDAR

by Frank Anzalone, W1WY
14 Sherwood Road, Stamford, Conn.

November	26-28	*CQ* WW DX C.W.
December	3-4	RSGB 21/28 Phone
January	14-15	DARC WAEDC
January	14-15	New Mexico Party
January	28-29	*CQ* WW DX S.S.B.
January	28-29	Kansas Party
February	3-5	ARRL DX Phone
February	10-12	QCWA Party
February	17-19	ARRL DX C.W.
February	24-26	*CQ* 160 C.W.
March	3-5	ARRL DX Phone
March	11-12	BERU
March	17-19	ARRL DX C.W.

CQ WW DX CW

Starts: 9.00 PM EST Friday, November 25th.
Ends: 9.00 PM EST Sunday, November 27th.

It will probably be all over by the time you receive this issue, but in case *CQ* gets off the press early this month, the above is a final reminder.

If you haven't mailed your Phone logs by this time, what's keeping you? Times awasting. And don't wait for the January 15th deadline to mail your c.w. logs. Do it and beat the Christmas rush. If you're too lazy to look up our address, it's 300 West 43rd Street, New York 36, N. Y., Att.: Contest Committee, of course.

RSGB 21/28

Starts: 07.00 GMT Saturday, December 3rd.
Ends: 19.00 GMT Sunday, December 4th.

A phone contest on 21 and 28 *mc* only, in which the boys of the British Isles will be working the rest of the world.

The October Calendar gave a complete rundown on the rules.

Your log must be postmarked not later than December 19th and goes to: The RSGB Contest Committee, New Ruskin House, Little Russell Street, London, W.C.1, England.

DARC WAEDC

Starts: 05.00 GMT Saturday, January 14th.
Ends: 23.00 GMT Sunday, January 15th.

This is the 6th annual WAE contest sponsored by the DARC. The format remains the same, only this year it was wisely cut down to a single week-end. It's a c.w. contest only and the object is for non-European stations to contact as many stations on the European continent as possible.

Rules

1. All bands 3.5 thru 28 *mc* c.w.
2. The usual six digit serial number, RST plus a progressive three digit QSO number starting with 001.
3. One point per QSO, except on 3.5 *mc* where it will count two points. (Same as in the WAE certificate rules.)
4. The same station can be worked once on each band.
5. The multiplier for non-European stations is determined by the number of European countries worked on each band. (Using the WAE country list.)
6. European stations will use the ARRL country list. In addition, each call area in the following countries will also count one point; CE, JA, PY, VE/VO, VK, ZL, and ZS. Also UA9 and UAØ count separately.
7. The final score will be the QSO points, plus the QTC points, multiplied by the sum of the country points on all bands.

QTC Traffic

A QTC can be sent only from a non-European station to a European station. The general idea being, that after a number of European stations have been worked, a list of these stations can be sent back during a later QSO with another station. An additional credit of one point can be claimed for each station reported.

1. A QTC contains the time, call and QSO number. ie: 1200/DL7AA/123. This means you worked DL7AA at 1200 GMT and received his number 123.
2. A QSO can be reported only once, and not back to the same station, even tho the contact was made on another band.
3. No more than a maximum of 10 QTC's can be sent to the same station.
4. Keep a uniform list of QTC's sent. ie: QTC 3/5. This means that this is the third series of QTC's sent and that 5 QSO's are now being reported.

Classifications

There are two classifications, Single operator and Multi-operator.

Awards

Awards are made on the basis of all band operation only. Certificates will be awarded to the highest scorer in each country or country/district. There will be additional awards to the top man in each

continental area. In case of sufficient participation, second and third place awards will also be made.

It is strongly recommended that contestants write to the DARC for official log forms and rules. Send a large self-addressed envelope and include 2 IRC's for regular mail and 5 IRC's for air mail.

Send your logs to: The DARC DX Bureau, Fuchsienweg 51, Berlin-Rudow, Germany.

New Mexico

Starts: 8.00 A.M. MST Saturday, January 14th.
Ends: 8.00 P.M. MST Sunday, January 15th.

This is the 2nd New Mexico QSO Party sponsored by the Sandia Base Radio Club. The object of the contest being for out of state stations to work as many New Mexico stations as possible. Falling on the same week-end as the popular DARC contest, this presents quite a challenge, especially on 14 *mc* and up.

1. Scoring: New Mexico stations: One point per contact, multiplied by the number of states, U.S. possessions, Canadian provinces and foreign countries.

Outside Stations: Three points for each New Mexico station worked, multiplied by the number of New Mexico counties worked.

2. All bands can be used and the same station can be worked once on each band for point credit but not multiplier.
3. Your log should show in this order: Time, station, QSO NR RST or RS and state, possession, province or country. (New Mexico stations will indicate their county.)
4. Awards: Certificates to the top 4 scoring stations in New Mexico, and each state, country, Canadian province and U.S. possessions. A Sandia Base Fellowship Award will be given to any station contacting 25 different stations in Albuquerque during the QSO party.
5. Frequencies to watch: 3600, 3835, 7050, 7250, 14050, 14250, 21050, 21300, 28100, 28600, 29000, 29200 and 29600 *kc*. Also 50.28 *mc*.
6. Logs must be postmarked not later than February 15th and go to: The Sandia Base Radio Club, c/o John Kanode, K5UYF, 408½ Cornell Drive S.E., Albuquerque, New Mexico.

CQ WW S.S.B.

Starts: 15.00 GMT Saturday, January 28th.
Ends: 21.00 GMT Sunday, January 29th.

Bet the "duck-quackers" turn out in force for this one. (Including yours truly.)

There are certificates to sectional winners plus two trophies. The K2HEA-K2MGE Trophy to the Head Man in the contest and a new one, the Mickey Unger, W8YIN Memorial Trophy to the station using 175 watts PEP or less, having the highest score in the contest.

Don't forget, you are only allowed 24 hours out of the 30 hour contest period. You had better check last month's S.S.B. Column.

Your logs should reach the *CQ* WW S.S.B. Contest Committee, 12 Elm Street, Lynbrook, N. Y. no later than March 30th.

Kansas

Starts: 08.00 CST Saturday, January 28th.
Ends: 17.59 CST Sunday, January 29th.

The Kansas Centennial QSO Party is being held in commemoration of the 100th anniversary of Kansas entering the Union.

This is a good one for you c.w. operators who will not be on s.s.b. this week-end. Details next month.

ARRL DX

The ARRL DX marathon pretty well dominates the months of February and March. *QST* will no doubt have the details for you soon.

QCWA

Starts: 16.00 PST Friday, February 10th.
Ends: 16.00 PST Sunday, February 12th.

The popularity of the QSO Party among the Ole Timers has increased to the point that it has been decided to make it an annual affair.

This year it will be sponsored by the Southern California Chapter of the Quarter Century Wireless Association. All the dope next month.

CQ 160 C.W.

Starts: 9.00 P.M. EST Friday, February 24th.
Ends: 9.00 P.M. EST Sunday, February 26th.

Last March the 1st Annual *CQ* 160 C.W. Contest was inaugurated, and was so successful that many of the regular occupants of the Top Band who came on that week-end, were scratching their heads in amazement. They just could not believe they were tuned to the right band. So great was the c.w. activity on this normally quiet band that the dominating phone men pulled the "big switch" and went to bed.

CQ plans to make this an annual affair the last week-end of each February. The slight modification of the rules will be explained at a later date.

Ed. Note

Unfortunately, we did not get this information in last month's Calendar. However in case you receive this issue before the c.w. week-end of our DX contest, look for LX3AH on all bands. DL7AH and DJ2KS will again put Luxembourg on the air, same as they did in our 1958 contest. (DL9PF cannot make it this year.)

You had better think up some good excuses for the XYL or be prepared to buy her a mink coat. There's lots of contest activity ahead to keep you burning the midnight oil. Have fun.

The Phone week-end of our WW DX Contest ended just as we were about ready to go to press. Looks like we ran into another punko week-end. No openings from the U.S. to Europe were evident during the whole contest period. The long path was open in the morning hours and in desperation some of the boys were heard working Europe the long way around on 20. In spite of this, Ricardo, CX2CO claims he ended up with around 300,000 points on 14 *mc*. That is approximately 850 contacts and a multiplier of about 130. Sheila, KH6DLD was also heard knocking 'em off at a fast clip on the 14 *mc* band. The gang at K2GL, DJ3VM and ET2US were all over the place.

A few choice ones, mostly on s.s.b., which was very popular, were FS7RT, HV1CN, HS1B, KR6-AF, VK6RU, VR3L, VU2NR, VU2RM, ZL1BY and 9N1SM.

Well, we shall see what the mail man brings.

73 for now, Frank, W1WY

ham clinic

CHARLES J. SCHAUERS, F7FE/W6QLV

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

Taylor Modulation— Something Old But New?

When my friend, Bill Brandt of Kutztown, Pa. wrote to me sometime ago relative to the Taylor System of modulation, I found that I had no information on it in my technical files. Letters soliciting information went unanswered and I came up against a proverbial "brick wall."

Bill told me that he had some information on the system but that it was not sufficient to do any practical work. As time went on, we both tried to obtain more information. Finally, Bill managed (with apparent hard effort) to come up with Patent #2,-282,347 and some other notes.

Putting two and two together, I discovered that Taylor had applied for and received a patent on his system of modulation. The patent grant dated May 12, 1942 is the most interesting discussion on his system that I have seen.

Essentially, the Taylor system of modulation is a *super* system of AM modulation that puts all others to shame—at least efficiency-wise.

With an *output* efficiency of 87%, it is nothing to sneeze at! This means that with 93 watts input power, it has an output power of 80.3 watts

In the Taylor system it is possible to completely modulate 50 watts of r.f. with only about 1 watt of modulation power!

If you glance at fig. 1, you may think that it is essentially a Doherty circuit, but it is not. Both modulating and carrier voltages are applied independently to appropriate simple input networks and the modulated and amplified components are superimposed in a simple straightforward output branch of the system.

In Taylor's circuit there are no high frequency phase relations to worry about (as in the Doherty circuit) and operational adjustments are easy to make.

Both tubes are operated as Class C amplifiers; one at low level and one at high level. The low level amplifier, V_1, delivers modulated r.f. up to a predetermined maximum at high efficiency while V_2 delivers the peak portions of the modulated wave beyond the maximum set for V_1. Both tubes operate at very high efficiency compared to the usual Class C or B r.f. amplifiers that are modulated by one of the systems described in most amateur radio handbooks.

Here is how the system is adjusted: remove V_2 and adjust the grid bias on V_1 to twice the cut-off voltage for an appropriate steady plate voltage. Tuning condensers C_1 and C_2 are varied until maximum power transfer is noted in the r.f. ammeter. Tube V_2 is then inserted and the negative grid bias is set at about eight times the cut-off voltage of V_2 when operating at rated steady plate voltage. Capacitor C_3 is then adjusted along with C_1 and C_2 so that the input and output will be in resonance. Under this condition, there is essentially the same power transfer to the antenna, since for such a high negative bias on the grid of V_2, V_2 is blocked. The grid bias on V_2 is then decreased until a small plate current begins to flow in V_2, as indicated by M_2. With the same amount of r.f. input applied to V_2 and no modulation, C_1 and C_3 are adjusted for a maximum plate current reading on M_2. The negative bias to V_2 is again adjusted (increased) until M_2 again reads zero. Modulation is now applied and increased until there is maximum current indicated in the antenna r.f. ammeter. The maximum current obtained will be about twice that obtained from V_1 alone.

Cathode modulation or modulation supplied through a choke condenser combination can be used with the Taylor system.

Resistor R_1 limits the carrier frequency voltage and regulates the low frequency peaks; while C_4 is used to adjust the carrier drive to the grids of V_1 and V_2 for maximum over-all efficiency; it is *not* used for producing a 90° phase shift (as in the Doherty system).

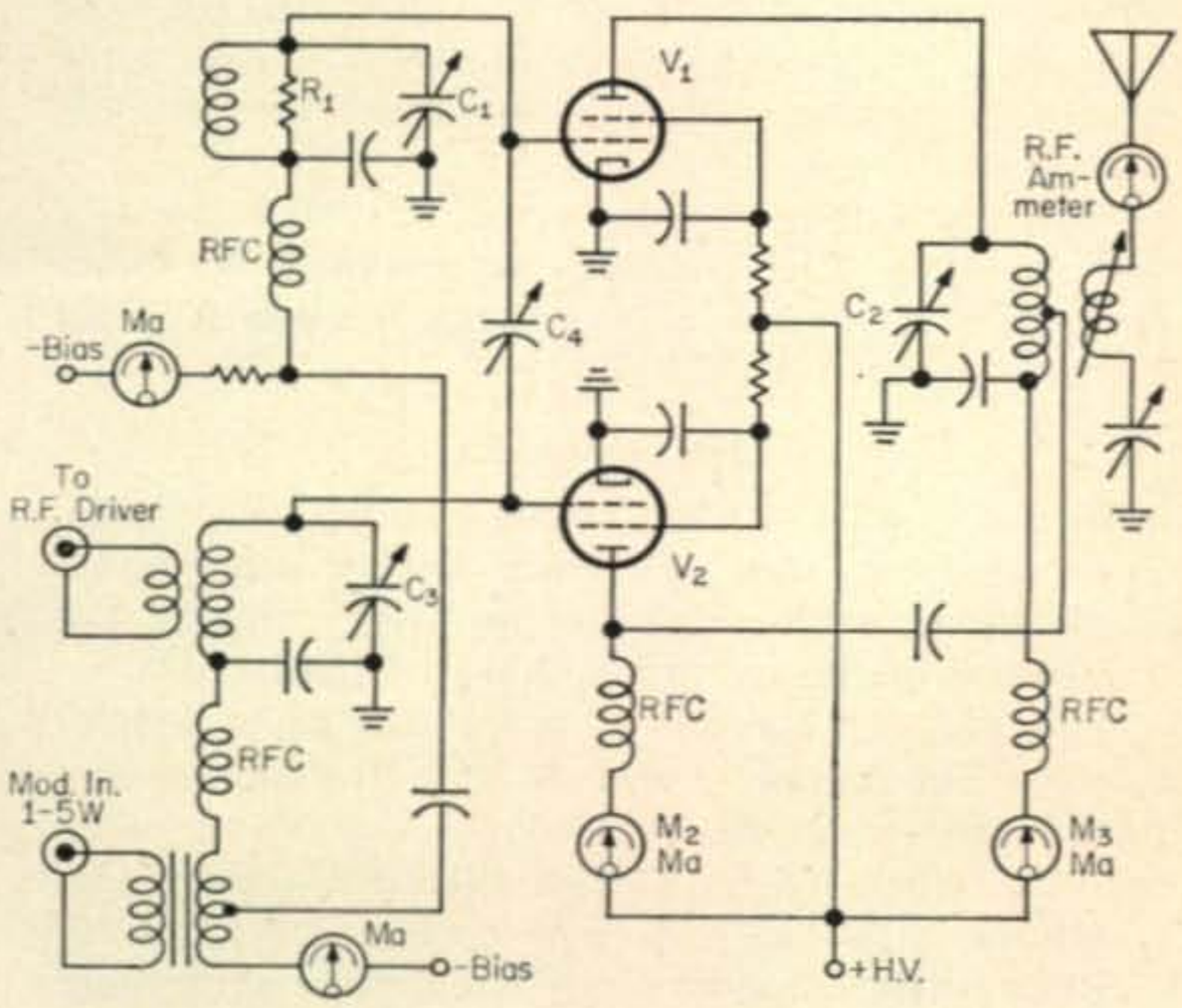


Fig. 1—Taylor Modulation system suitable for use with beam power tubes such as the 807, 6146 and 2E26.

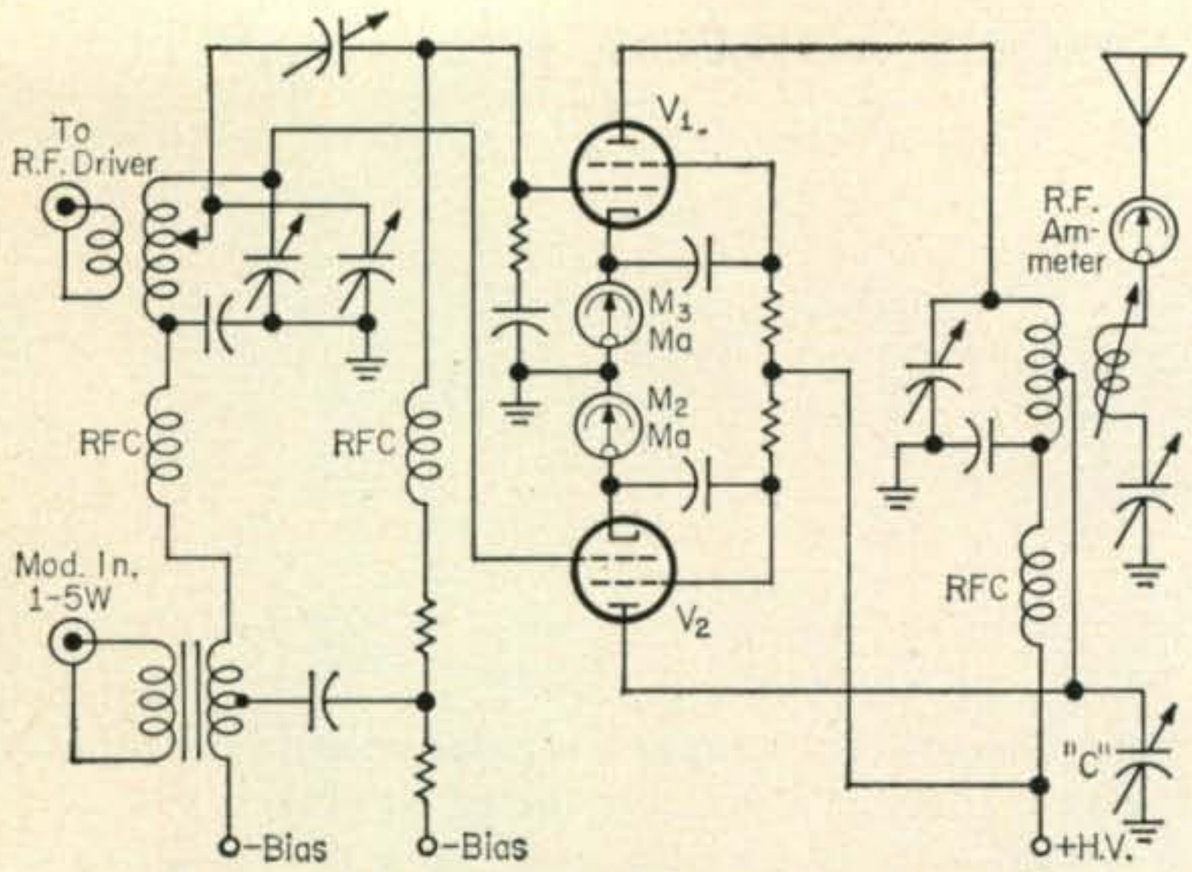


Fig. 2—Modified Taylor Modulation system capable of either suppressing the carrier to produce a d.s.b. signal or emphasizing one sideband of an a.m. signal.

Figure 2 shows a modified form of Taylor's system. The variable capacitor labeled "C" can be adjusted to emphasize one sideband and can be omitted if double sideband transmission is used. By varying r.f. excitiation it is possible to produce both sidebands with nearly complete carrier suppression.

No practical values have been given in the diagrams because I have not yet tried out the system myself. When I do, the results will be published here.

In the meantime, any of you "lab hams" who have full *practical* information on the Taylor system, please send it in to HAM CLINIC. One informant tells me that some company started to put out a transmitter with this system of modulation but went out of business because of lack of interest.

"Paper analysis" indicates that this can be a real super-dooper system of modulation and if properly adjusted, will give other existing systems some tough competition.

Lack of interest I believe, was due to the lack of technical information. Like s.s.b. the Taylor system could come into its own if given the chance; but it will take some experimentation on the part of those who are willing and able to sit down and do some careful designing. I like the possible "carrier-less" aspects of the system.

I for one will try it out and will let you know how well it works. If it enables one to obtain an efficiency of 87%, that is good enough for me. At least I'll have some fun trying.

Observation

In the United States, phone patches are "tolerated" and often used prudently. On the other hand, some phone patches are *not* necessary and do not contribute to the overall welfare of ham radio.

The patches I refer to are those of a definite *commercial* nature. There is little reason for any ham businessman taking advantage of phone patch facilities when his budget provides for commercial telephone calls.

Some of the offenders may use mobile equipment for contacting business associates along their routes of travel. The hams who patch these "birds" through are as culpable as the guy who wants the patch.

Messages to loved ones, emergency patches that involve life and death, and traffic that really cannot be handled any *other* way (i.e., messages from *isolated* overseas Servicemen) will not be questioned. But when "Joe" calls "Jack" to tell him to ship 40 dozen oranges, then the line must be drawn!

Observed: self-policing on the ham-bands *is* necessary. Make certain before you patch anyone through that his message is *not* commercial. If it is, refuse it. Why risk your privileges?

Questions

NC-303—"On my NC-303, after switching from a three element beam (cut for 21 *mc*) to a multi-dipole, I notice that I hear many commercial stations on 21 and 28 *mc*. Any suggestions to either cut out or reduce these interfering stations?"

I would suggest that you use a bandswitching tuning unit ahead of the receiver. I had the same trouble and used a GP 50 all band tank obtained from Harrington Electronics. It worked like a million! The same circuit used by Harrington in his unneutralized grid circuit (fig. 1 in his instructions) was employed.

Auto Burglar Alarm—"Any ideas for a good simple 'burglar alarm' for my car? After all, when one has a KWM-2 installed, he would hate to lose it!"

You can say that again! See fig. 3. This is a very simple system and works like a charm. Anytime, anyone tries to open a door, steal a wheel (or your KWM-2), the weighted wire will swing against the copper ring and close the circuit to either a high pitched siren type alarm or your auto horn. As long as the car is moved or vibrated by an outside force (even a strong wind—so dont adjust it so that the ring is too close to the pendulum), the horn or siren will sound. No one will "stick" around a car that "hollers" when it is touched!

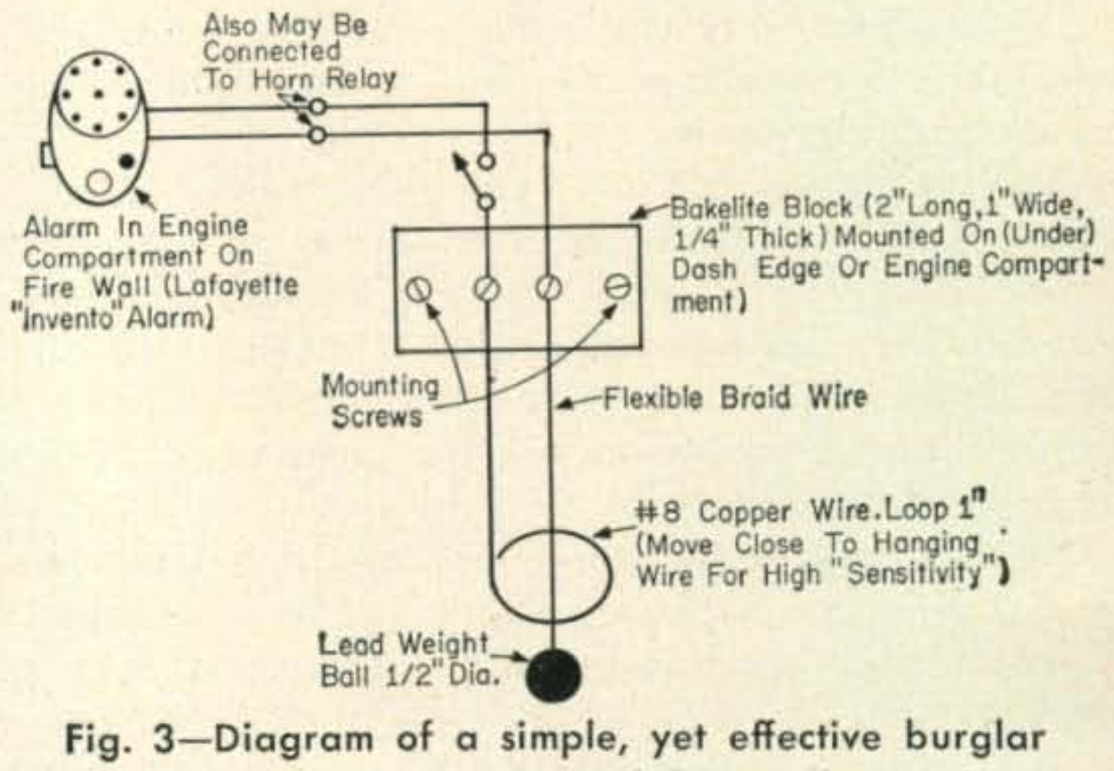


Fig. 3—Diagram of a simple, yet effective burglar alarm system for the mobile installation.

Scope Trace Compression—"I own a Knight scope and am wondering why traces seems to be compressed on the right side of the screen? The scope operates fine otherwise and I am very satisfied with it."

In the low-priced scope of which you write there is some non-linearity of the horizontal sweep because the manufacturer wanted to make available a wide horizontal range (15 cycles to 600 cycles).

To obtain an accurate indication, display 5 to 8 cycles of the waveform across the screen; the 3 or 4

cycles in the screen center will be linearly displayed.

Do not mistake apparent flicker for lack of sync, because *most* scopes use cathode ray tubes of medium persistence. Low sweep rates (60 cycles or less) will cause the trace to appear as if it is flickering—but this is nothing to worry about.

In nearly any wide band scope, a vertical trace of about 3" is the maximum that can be obtained before clipping sets in.

The sweep *can* be linearized but then your horizontal range will be cut. The changes *are* major and require more than a little knowledge of scope design. (Thanks Allied Radio!)

MT-1 FM—"Anyway to get rid of oscillator FM'ing at heavy modulation levels in the Heath MT-1 now mounted in my car?"

Before you start to do any "digging" check your battery to make sure it is up; then check your generator regulated output; make sure that the power supply you are using has some *reserve* current. If the FM'ing is serious I would suggest a separate transistorized power supply for the oscillator and/or buffer. You might try an Amperite voltage regulator tube in the filament of the oscillator using a *3AU6* instead of a 6AU6. The regulator for this purpose is the series connected 7HTF3 in series with a 15 ohm 1 watt resistor. Heater voltage fluctuation can often be blamed for FM'ing as well as poor plate and screen voltage regulation. Crystal control will help too. See page 79, August 1960 *CQ*.

On Again, Off Again HQ-110—"Lately my HQ-110, when turned on, will operate about 10 minutes and then go off. Merely flipping the on-off switch brings back operation. I've nearly torn out what hair I have left trying to find this illusive gremlin. All tubes check out okeh, voltages seem proper. Now what do I do?"

First get a bottle of hair tonic and some tranquilizing pills! (Just kidding!) Check the coupling capacitor between the detector and a.f. You may have some grid blocking. If this is not the trouble, then check *all* coupling and/or blocking capacitors. Usually an intermittent of this sort is due to a poor coupling capacitor. I trouble shot my first case of intermittent operation in 1933 (an old Philco) and I can tell you that intermittents are sometimes hard to find. Usually, when you can touch the grid of a tube and bring back operation you do have grid blocking. Replacement of the capacitors in the circuit will usually clear up the trouble. Also make sure that the 6BE6 (V_3) is an RCA tube.

Velocity Factor—"How much difference is there in the velocity factor of coaxial and open wire lines?" Solid dielectric coax velocity factor varies from .65 to .85. Open wire lines velocity factor is between .95 and .98. Velocity factor (for the un-initiated) is a ratio of the actual wave velocity along a transmission line to the wave velocity in air.

WO-33A RCA Scope—"I have an RCA WO-33A scope. I'd like to add a pot for vertical gain. Is this worthwhile? Any modifications out yet?"

I also bought a WO-33A (among others) and *do* speak from experience. The step attenuation circuit incorporated in the WO-33A is very effective and has a very wide range. There is little to gain by adding a pot. Furthermore, remember that the vertical input is frequency compensated. The addition of a pot *can* affect the fine high input impedance of this good little scope.

I suggest (as I have to others), replace the paper capacitors near the tubes with porcelain cased tubulars (like Lafayettes KI51). The heat from the tubes does cause the wax-filled capacitors to melt. This is the only worthwhile modification I can suggest at this time, other than the installation of a Surgistor to save the tubes. (Note to RCA: if you have any modifications on this scope, HAM CLINIC would appreciate them!)

Tone Correction—"I have a pair of magnetic phones having a d.c. resistance of around 4000 ohms. How can I obtain more uniform response from them? I notice that around 1000 to 1250 cycles that they seem to be rather resonant."

See fig. 4. This circuit will boost both treble and bass around 15 to 18 *db*. The 500 ohm pot can be used to adjust the circuit to suit yourself. When the total resistance is in, the boost mentioned will occur.

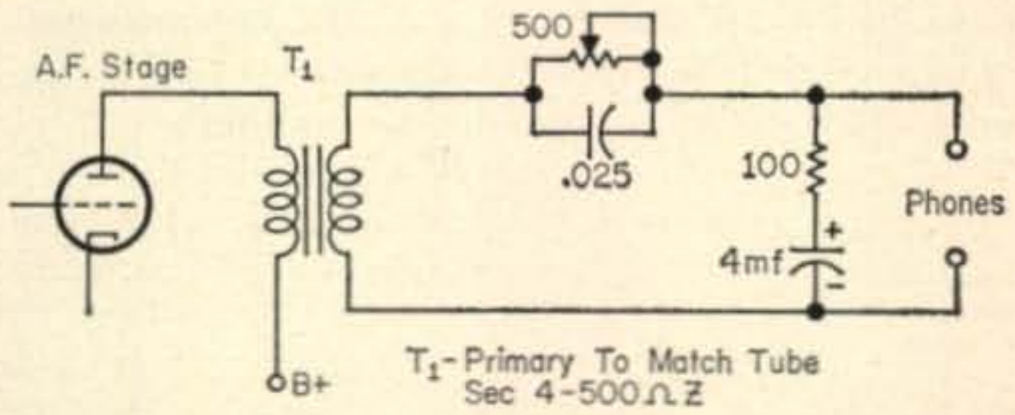


Fig. 4—Receiver audio modifications providing bass and treble boost of about 15 to 18 db.

Book Review

"Using and Understanding Probes" by R. F. Graf at $3.95 (Howard W. Sams Co.), is a book that consists of 190 pages of solidly packed information on probes. From direct and isolation probes to medical probes it indeed covers the subject for ham, serviceman, lab technician (ad infinitum) in a very clear manner. One needs no engineering background to understand the author on how and when probes are used.

Of interest to the ham is the chapter on demodulator probes and the "how to do it yourself" chapter. Well illustrated with drawings and photographs, the book contains much practical as well as theoretical information. I do recommend it for the hamshack library.

Non-Technical Department

"I have two sons and two daughters who are interested in ham radio. The two boys have general class tickets and the girls are studying to take the examination for their general licenses. My XYL does not like ham radio but is tolerant of the rest of her family's interests. But I do have a problem with only *one* station. I set up a schedule for the boys and myself but what am I going to do when the girls finally receive their licenses? A second station is out of the question financially and because of the lack of space. What are your ideas on my dilemma?"

Looks as if you will have a whopping electric bill too! Well dad, if I were you, I'd just "expand" that schedule to take care of the girls and when there is

[*Continued on page 110*]

PROPAGATION

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

LAST MINUTE FORECAST

The forecast Indices for the month of December, shown in the Propagation Charts by parentheses following the predicted time of openings, are expected to be related to day-to-day propagation conditions in the following manner:

Forecast Indices	Above Normal Dec. 10-13	Normal Dec. 3-9, 14-17, 25, 30-31	Below Normal Dec. 1-2, 21-24, 29	Disturbed Dec. 18-20 26-28
(1)	C	D-E	E	E
(2)	B	C-D	E	E
(3)	A	B-C	D-E	E
(4)	A	A	B-C	C-D

Where:

A—Excellent circuit, strong steady signals.
B—Good circuit, moderately strong signals, some fading and noise.
C—Fair circuit, moderately strong to weak signals, moderate fading and noise.
D—Poor circuit, weak signals, considerable fading and very high noise level.
E—Circuit not possible.

General Forecast

The following is an over-all picture of band conditions forecast for December, 1960. For specific times of band openings over short-skip paths up to 2300 miles, and from Hawaii and Alaska to other areas of the USA, see the Short-Skip Propagation Charts. For openings on a particular DX circuit, refer to the DX Propagation Charts appearing in last month's column.

6 Meters: Except for an occasional opening during the month, very little activity forecast.

10 Meters: Expected to be at season's best for long-distance propagation. Good openings forecast to almost all areas of the world during the daylight hours.

15 Meters: Also at season's best. Good openings forecast to almost all areas of the world from dawn to after sunset. Conditions are expected to peak during the late afternoon hours.

20 Meters: Good daytime conditions, especially during the late afternoon hours. Fair propagation conditions during the early evening hours, becoming poor later in the evening.

40 Meters: Static levels are generally very low during December, and fairly good propagation conditions are forecast for this band. During the daytime hours good conditions are forecast for distances up to approximately 750 miles. During the hours of darkness fairly good DX conditions are expected to many areas of the world.

80 Meters: Propagation conditions on this band usually peak during December. Static levels are very low, and signals much stronger than during other seasons. Good propagation conditions are forecast during the daylight hours for distances up to approximately 250 miles. During the hours of darkness, when ionospheric absorption decreases sharply, DX openings to some areas of the world should be possible.

160 Meters: Conditions are expected to be at season's best. During the hours of darkness band openings over distances of several hundred miles should be possible. When static levels are exceptionally low, openings over distances of a few thousand miles may also occur. During the daylight hours intense ionospheric absorption prevents skywave reflection, and transmissions are generally limited to the groundwave range of a dozen, or so, miles.

Sunspot Cycle

The Zurich Solar Observatory reports a monthly mean sunspot number of 125 for September, 1960. This results in a 12 month running smoothed sunspot number (upon which the sunspot cycle is based) of 120 centered on March, 1960. *CQ* forecasts a smoothed sunspot number of 96 for

CQ SHORT-SKIP PROPAGATION CHART

DECEMBER 1960 - JANUARY 1961

ALL TIMES IN LOCAL STANDARD TIME

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

HAWAII

TIMES GIVEN IN HAWAIIAN STANDARD TIME***

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

*** Hawaiian Standard Time is equivalent to:

Eastern Standard Time minus five hours;
Central Standard Time minus four hours;
Mountain Standard Time minus three hours;
Pacific Standard Time minus two hours.

ALASKA

TIMES GIVEN IN ALASKAN STANDARD TIME**

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

December, 1960. The present solar cycle continues to decline.

160 Meter Propagation Test

Word has been received from W1BB announcing the dates for the annual 160 meter Propagation Test.

ALASKA, Con't.

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

** There are four different time zones in Alaska. The chart is based on standard time in the zone from Skagway to 141 degrees west longitude. Time in this zone is equivalent to:

Eastern Standard Time minus four hours;
Central Standard Time minus three hours;
Mountain Standard Time minus two hours;
Pacific Standard Time minus one hour.

FORECAST INDICES

Circuits Forecast To Open:

(1) Less than 7 days during each month of forecast period.

(2) Between 8 and 13 days during each month of forecast period.

(3) Between 14 and 22 days during each month of forecast period.

(4) For more than 22 days during each month of forecast period.

Where two forecast indices are shown within a parenthesis the first applies to the forecast for the shorter distance range, and the second to the forecast for the longer distance.

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

See "Last Minute Forecast" in text for the relationship between the Forecast Indicies and the day-to-day propagation conditions expected during the month of December, 1960.

**Indicates times of possible 6-meter openings between Hawaii and various other areas of the United States.

*Indicates times for expected 80-meter openings from Alaska and Hawaii to other areas of the United States. On nights when atmospheric noise conditions are exceptionally quiet, 160-meter openings are likely to occur during these same periods.

The CQ Short-Skip Propagation Charts are based upon a CW effective radiated power of 75 watts from a half-wave dipole antenna, a half-wave above ground. The Charts are valid through January 31, 1961. These forecasts are based upon basic propagation data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

The 1960/1961 Test is scheduled to take place during the following three periods:

December 4th and 18th
January 8th and 22nd
February 5th and 19th

Test transmissions begin at 0500 GMT each morning, and end at 0730 GMT. During the test periods DX stations in nearly a dozen countries will be standing by to work W/VE stations. These tests are sponsored by an active group of amateurs particularly interested in working DX the "hard way" on 160 meters. The tests also serve as a means for collecting valuable propagation data concerning this band.

Interest in 160 meters is picking up in several European countries and in other areas of the world. Several new countries are expected to be on the air during this year's test.

Propagation conditions on 160 meters are improving as the solar cycle declines, and this year's Test promises to be more exciting than those held during the past few years of intense solar activity.

Further information concerning this year's 160 meter test can be obtained directly from:

Stew Perry, W1BB
36 Pleasant Street
Winthrop, Mass.

73 and Season's Greetings, George, W3ASK

RTTY

Byron H. Kretzman, KØWMR
108 W. Teresa Drive
West St. Paul, Minn.

In the June, 1960, RTTY column we showed you how to hook up your transmitter and receiver for radioteletype operation. This was the easy way to get going, and it required that you be able to tune in your own RTTY signal to make local copy. Well, now you have been operating for some time and have undoubtedly gained much experience, and probably a few more pieces of equipment; a tuning indicator perhaps, or perchance some tape equipment. The time has come therefore to devise a local loop and control system that will make your RTTY operation easier and more flexible; and, as a by-product, emit a cleaner keyed signal.

There are, of course, as many different ways of doing this as there are RTTYers. You have to be the judge. Which way is best for you? You could put everything on a d.c. local loop basis, or you could do all of your switching and/or patching on an audio basis; or, you could use a combination of both systems. Add up what you have in the way of equipment, add what you expect to have in the future, then try and decide how you might make your RTTY operation easy.

An RTTY Station Control System

Figure 1 is a detailed diagram of one method of controlling an amateur RTTY station. Bear in mind that this is just *one* way of doing it. Maybe it will give you some ideas that you can apply to your own lash-up. The set-up shown is a combination of both a d.c. local loop and an audio system. It assumes that you have an audio-type of converter (TU), and that the TU has polar output, such as the W2JAV TU described in the April 1958 *CQ*. If your TU has neutral output, such as has the W4TJU TU described in the December 1958 issue of *CQ*, the alternate polar relay circuit shown in fig. 2 can be used.

Examine fig. 1 closely. Note that a standard impedance of 500 ohms is used for the audio part of our system. All receivers, and the AFSK oscillator, should therefore have that same output impedance. A phone jack, or jacks, can be connected at the points "X" to allow patching in any other receivers, for 6 and 2 for example. (We could use any other standard impedance, if more convenient.) We should also standardize on an audio

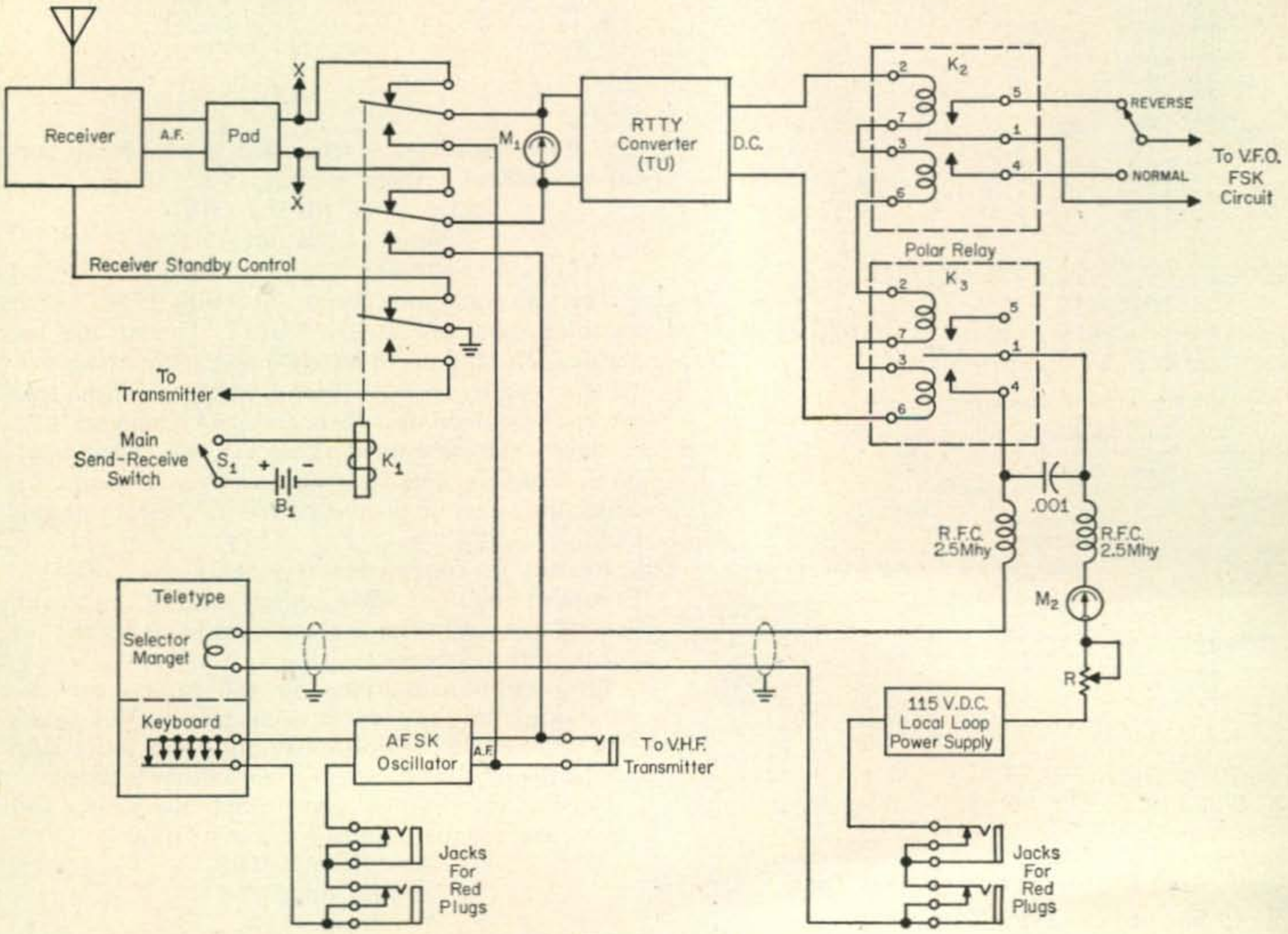


Fig. 1—An RTTY Control System.

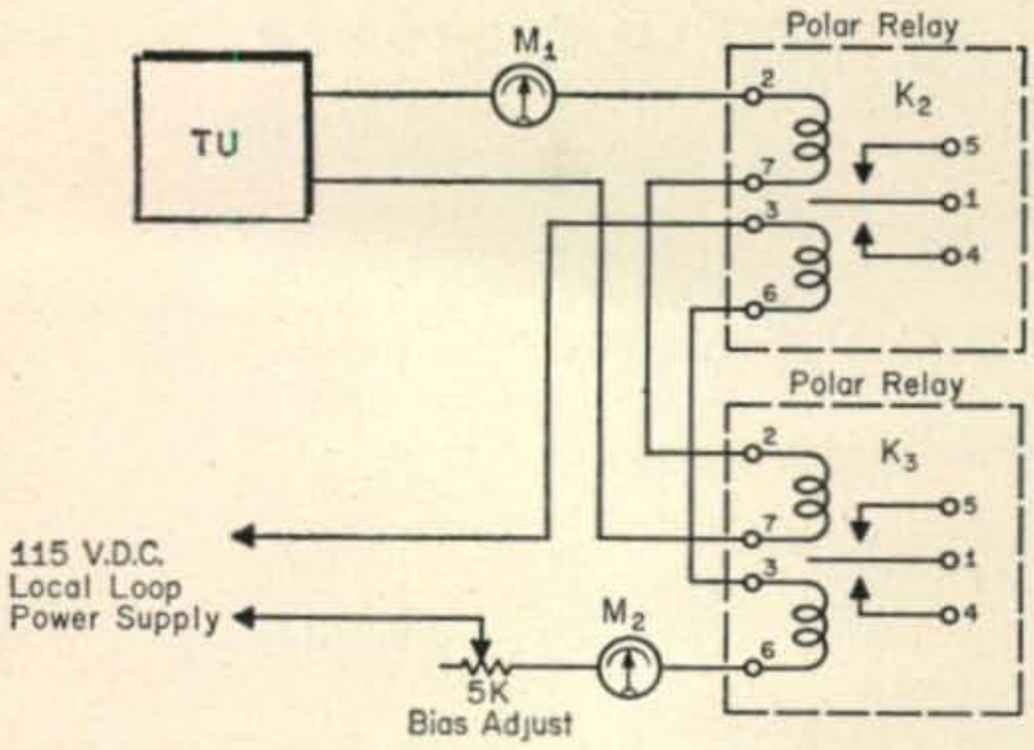


Fig. 2—Alternate Polar Relay Circuit.

line level, and some sort of volume indicator (M_1), *db* meter, VU meter, or a.c. voltmeter, should be used to properly set our receiver gain control. If an old *db* meter is found, 0 *db* is a convenient level to use. This is 1.73 volts r.m.s. on a 500 ohm line. If a broadcast-type VU meter is available, it should be used with 3600 ohms in series (two 1800 ohm resistors). 0 VU then is plus 4 *dbm*, or about 1.2 volts on a 600 ohm line. Since most communications receivers with 500 (or 600) ohm output connections put out much more audio than we need, a simple fixed attenuator or pad with about 10 to 15 *db* loss should be inserted between the receiver and the audio part of this control system.

Control

The heart of this control system is relay K_1. This relay reduces our complex switching to the operation of a little toggle switch S_1 to go from receive to transmit. For the sake of simplicity, this relay is shown powered from battery B_1. Actually, we can use almost any kind of a relay that has at least 3 poles and the required double throw contacts. If we use a telephone-type d.c. relay with about 1300 to 2000 ohms coil resistance we can use our 115 volt d.c. local loop supply as the power source. Relays with a.c. coils powered from any suitable a.c. source can likewise be used if available. Don't be afraid of substituting here.

Relay K_1 does three things, basically. First of all, it kills the receiver through the external control circuit usually provided in communications receivers. (This must be a grounding operation otherwise another set of relay contacts are required.) Secondly, when energized, K_1 operates the send-receive circuit of the associated transmitter. (This also must be a grounding operation for this diagram.) Third, the audio input to the TU is switched from the receiver to the AFSK oscillator when transmitting.

The AFSK oscillator is operated directly by the keyboard contacts of the machine. Closed circuit jacks, insulated from ground, are provided so that the sending "red" plugs of another machine, a Model 14 tape transmitter-distributor for instance, may be inserted. The audio output impedance should be standard for the system and a gain control is usually incorporated so that the level may be set to the standard level decided upon. An open circuit jack connected to the audio output circuit makes it convenient to feed the modulator of a v.h.f. transmitter for AFSK transmission.

Polar Relay Circuit

Two polar relays, either of the 215A or 255A type, are connected in series to the polar output of the converter. Relay K_3 is used to key a local loop to the receiving selector magnets of the machine. Care should be taken to assure complete shielding and filtering of the local loop to keep contact noise out of the receiver. It is recommended that this circuit be floating above ground. A meter, M_2 is shown connected in this circuit to keep a check on the loop current. Resistor R is of the slider-type and is rated at 20 watts or more. If the local loop is a 20 *ma* loop R should be 7500 ohms maximum, and if a 60 *ma* loop is used R should be 2500 ohms maximum. Closed circuit jacks, insulated from ground, are provided for the insertion of the 'black" plugs of another receiving machine, a Model 14 Typing Reperforator for example. The 115 volt local loop d.c. power supply, by the way, can be the small rectifier unit supplied for land line use with some machines, or it may be a supply specially constructed for the purpose. It only has to give 60 *ma* so it need not be complicated.

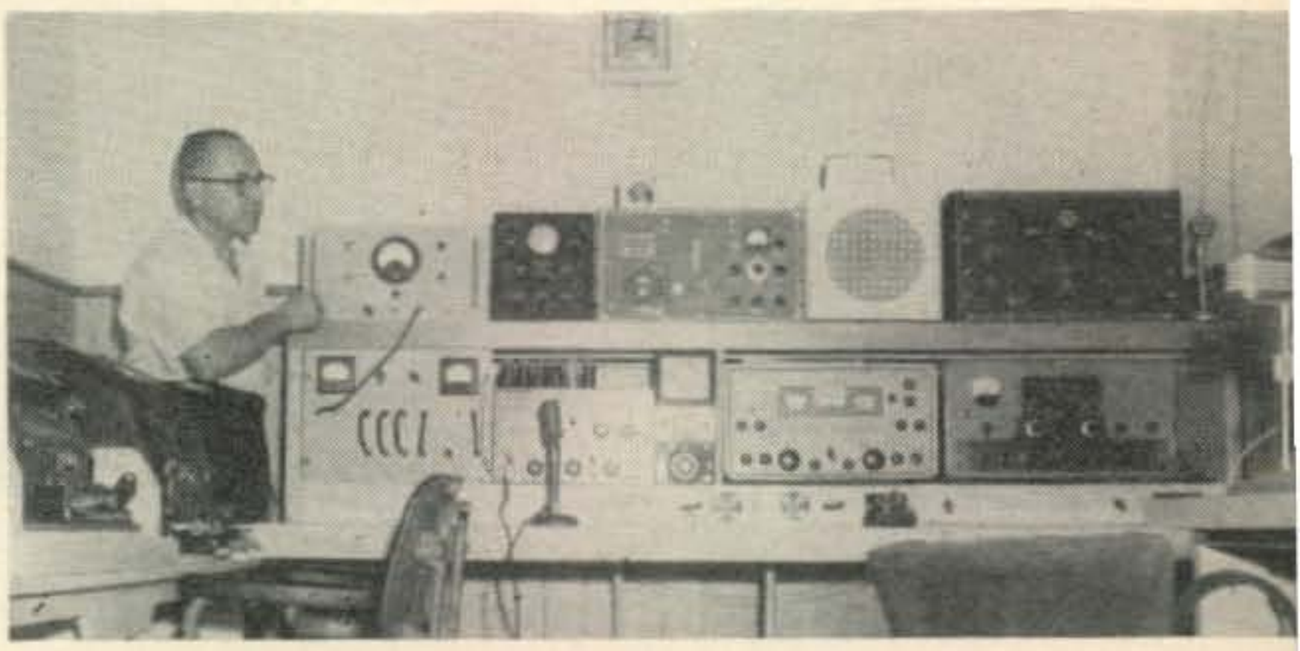
Polar relay K_2 is expressly for keying the frequency shift circuit of the v.f.o. The use of a polar relay in this manner, in conjunction with the reversing switch S_2, permits any type of shift circuit to be keyed right side up.

Figure 2 shows the alternate polar relay circuit used when the TU has neutral output. The contact connections are the same as in fig. 1, but only the 2-7 coils are put in series for use as the OPERATE windings connected to the TU. The 3-6 coils are put in series for use as the BIAS windings. Meter

[*Continued on page 111*]

W5APM—AF5APM, San Marcos, Texas

Operator:	Tom Serur
Machines:	Model TG-26A Typing Reperf./TD Model 15
Converter:	W2JAV, with 'scope indicator
Receiver:	Super-Pro
Transmitter:	Viking Valiant
Bands Worked:	40 and 20



Novice

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

In this day and age you seldom get "sompin' fer nothin' ". That's probably the reason my favorite power supply is the voltage doubler. Take a transformer which normally delivers 300 volts, connect it to a voltage doubler circuit and presto—600 volts d.c. Of course, there is a catch—let's see what it is.

A doubler is a circuit which is capable of delivering two times the peak voltage of the source which supplies the energy. It consists of two tubes or metallic rectifiers connected in such a manner that the inputs are parallel, but the outputs are in series (see fig. 1). The doubler is a useful circuit when high voltage and low current are required.

To learn how the doubler works, let's dig into fig. 1 a little deeper. First consider the upper half of the circuit. When the plate of V_1 is positive, current flows through the tube and charges the upper capacitor. During the next half cycle of a.c. the plate of V_2 is positive with respect to its cathode. Current flows through V_2 and charges it associated capacitor. Remember that the capacitors hold their charges longer than the individual alternations. The two rectifier tubes operate on opposite halves of the alternation but the two capacitors charge in the same direction. Since the capacitors are effectively in series, the voltage across both capacitors (the output voltage of the doubler) is about twice the peak transformer voltage or 2.82 times the r.m.s. value of the secondary voltage.

To discharge the capacitors when the equipment is turned off, there is a bleeder resistor connected across the output. It is made large to keep the capacitors from completely discharging between alternations. This circuit has more ripple than other power supply designs and therefor larger filter chokes and capacitors are required. As the load increases the voltage drops rather rapidly and ripple becomes appreciable.

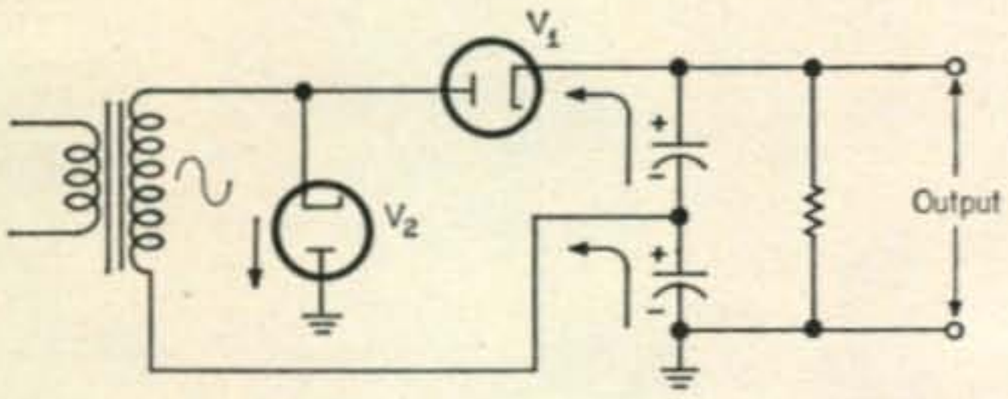


Fig. 1—A basic full wave voltage doubler circuit.

Metallic Rectifiers

Metallic rectifiers and voltage doubler power supplies seem to go hand-in-hand for the two can be used in an extremely simple power supply.

Certain combinations of thin films of metals permit electrons to flow more easily in one direction than in the other—which is the basic ingredient for a rectifier. One combination is a thin film of copper oxide on a copper plate. Another is an especially prepared film of selenium on a metallic surface such as iron. These devices are represented by the symbol shown in fig. 2, a practical voltage doubler supply. The triangular part of the figure may be considered to be an arrowhead but it points *into* or opposite the direction of current flow. What in a vacuum tube is the plate symbol, is the cathode symbol in the metallic rectifier.

Silicon rectifiers are another form of metallic diode rectifier. They have a high ratio of current flow in the forward and reverse direction (large front-to-back ratio) and efficiencies up to 99%. The forward voltage drop is usually less than one volt. Furthermore, they are very small when compared to vacuum tubes. A one-half ampere rectifier might occupy a volume of less than one quarter cubic inch (about the size of a pencil eraser) and weight less than one-half ounce. Silicon rectifiers do not weaken with age, and in properly designed circuits will last indefinitely. Although these rectifiers cost slightly more than vacuum tubes (about $1.50 each) they are far more reliable and compact.

Novice V.F.O.'s

Apparently I don't check the photos published in the column as closely as I should. One reader (a prospective ham, by the way) points out that in the past several pictures of *novice only* stations have showed v.f.o.'s occupying prominent positions!

Although the temptation may be strong, we should all play the game according to the rules set down by the FCC. However, rather than deliver sermons, this space might be used to tell you about some tricks for scooting out from under QRM.

Did you know that if you change the tension on the crystal material it will change its resonant frequency? Several years ago *QST* featured a neat method of applying this to Novice transmitters. Simply remove the crystal cover and drill and

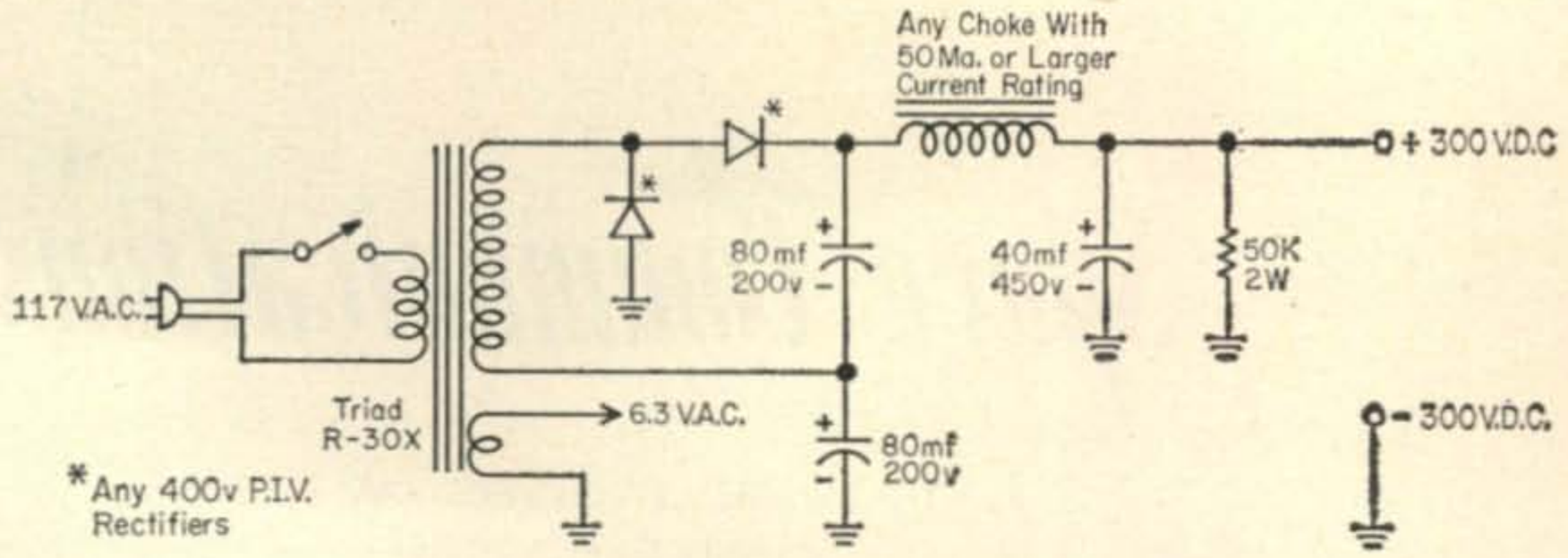


Fig. 2—A compact 300 volt, 50 milliampere doubler supply.

thread a hole to accept a 6-32 screw. A knob is attached to the screw threads, and this is used to adjust the pressure on the crystal plate. You can move your transmitter two or three *kc* this way. Be careful about those band edges, though!

Another trick is to connect coils and variable capacitors in *series* with the crystal. This will upset its electrical characteristics and "rubber" the crystal around several kilocycles too. Some transmitters may try to "take off" at a frequency other than the crystal controlled carrier, so be extremely cautious! Have a local ham check for these spurious emissions.

Certificate

Tom Harmon, WØIUB, 5019 Gramar, Wichita 18, Kansas, is issuing a certificate which will interest Novices. It is his "Worked United Nations Award" and the Novice class requires submission of proof of having worked ten UN member countries. If interested in earning this award, drop a self addressed stamped envelope to Tom at the above address.

Who's DX?

SWL Sven Elfving, Solgaardsgatan 15, Ornskoldsvik, Sweden is SM3-3104 and he reports hearing the following Novices during the period Sept. 12 to 20th: WV2KEN-0630 GMT- 7177- 559, WV20AC- 0641- 7178- 569, KN4BN0- 0640- 7171- 559, KN4CGQ- 0711- 7158- 559, KN4UFE- 0701- 7162- 549, KN4WTT- 0645- 7182- 449, KN8VYV- 0710- 7158- 549, KNØAZC- 0652- 7158- 559, KNØYBU- 0659- 7166- 559. Sven offers to listen for Novice transmissions in Sweden between 0400 and 0700 GMT. He also publishes a fb DX bulletin and sells USSR language QSL cards. For more information, or to make a sked, drop him a line at the above address.

Our reporter from England, Keith Lamonica, WA6CYT/G, 7500 ABRON, APO 125, New York, N. Y., has been having poor luck due to a dead band. However, Keith would like to "pen-pal" or exchange tapes with Novices.

Net News

Samuel Van Wyck, K7BWV, P. O. Box 187, Lapwai, Idaho, would like to advise you of the Northwest Slow-Speed Net which meets at 2100 PST every evening except Sunday on 3700 *kc*. Training is the primary function of the net and Novices are cordially welcomed. Net stations tune for Novices immediately after the roll call, on the high side of 3700 *kc*.

[*Continued on page 109*]

This neat and compact station is owned by Randy Kaeding, KN8TMK, 822 Harrison Avenue, St. Joseph, Michigan. With these goodies Randy has totaled a WAS of 12/10 in a short time.

Meet Wayne Light, KN7NCE, 804 N. 4th St., Yakima, Washington. On top of the DX-20 resides Waynes home brew 5 watter which he used to work beaucoup DX, including Georgia on 40 meters. He should have a Conditional ticket by the time you read this.

Space Communications

GEORGE JACOBS, W3ASK
11307 CLARA STREET
SILVER SPRING, MARYLAND

Project OSCAR

Project OSCAR, a planned satellite program designed for radio amateur participation, appears to be nearing reality.

A little more than a year ago Don Stoner, writing in *CQ*, suggested a satellite program designed to utilize the tremendous source of technical manpower that amateur radio could make available. He gave the name "OSCAR" to the project, deriving it from his proposal for an *O*rbital *S*atellite *C*arrying *A*mateur *R*adio.

Don's suggestion fired the imagination of many radio amateurs. A group on the West Coast, consisting of many professionals in the missile and satellite fields, created a Project OSCAR Committee for the purpose of guiding the project towards reality.

OSCAR I

The first step taken by the Committee was to have Don Stoner prepare a formal program for Project OSCAR. The program consists of two phases, with the initial phase conforming to the following specifications:

1. Frequency—144.00 *mc*
2. Power—About 20 *mw* output
3. Size—Canister, approx. 3″ diameter by 6″ long
4. Weight—Two pounds or less
5. Antenna—Turnstile dipole, 38″ tip-to-tip
6. Power Supply—Self contained silicon solar batteries
7. Range—In excess of 500 miles
8. Circuitry—Transistor oscillator, doubler, and power amplifier
9. Vehicle—Piggy-back with another planned satellite program

This satellite, although crude, would stimulate tremendous interest among radio amateurs. Its signals could be received with 2 meter equipment already available to a large number of amateurs, and it's safe to assume that amateurs around the world would make every effort to track "their" satellite. From the scientific point of view, the satellite's signal would provide valuable radio propagation data.

OSCAR II

Phase two of the Project OSCAR program would incorporate a more sophisticated device capable of radio relay operation between two v.h.f. amateur bands. Basic design details for OSCAR II would include the following:

Satellite Receiver—

1. Frequency—52.00 *mc*, crystal controlled
2. Bandwidth—10 kilocycles
3. Sensitivity—0.5 micro-volts for 1.0 volt a.g.c.
4. Antenna—38″ loaded dipole
5. Function—Reception of ground based amplitude modulated phone signals and command control of transmitter

Satellite Transmitter—

1. Frequency—144.00 *mc*
2. Power—50 *mw* output
3. Antenna—38″ dipole

Satellite Unit—

1. Circuitry—Superheterodyne receiver, and oscillator, doubler, power amplifier—completely transistorized
2. Size—Canister, approx. 6″ diameter by 16″ long
3. Weight—10 pounds or less
4. Power Supply—Mercury cells, 6 month terminal life (intermittent operation)
5. Range—Depends on power of ground station, and ground receiving equipment. For a power of 100 watts into an antenna with 12.5 *db* gain, and a receiving array with 16 *db* gain, the range should exceed 1,000 miles.
6. Vehicle—Piggy-back with another planned satellite program

OSCAR II would be a "communications satellite." It would receive amateur signals on 52 megacycles (6 meter band) and simultaneously re-transmit them on 144.00 megacycles (2 meter band). The satellite would "service" a ground area approximately 2,000 miles in diameter. A command system would be used to turn the satellite's equipment on and off in order to prevent excessive battery drain and unauthorized operation of the satellite. Using this system, OSCAR II would make ▲

possible for radio amateurs in this country to communicate coast-to-coast on the 2 and 6 meter bands. Amateurs in other countries would be able to use OSCAR II for communicating over similar distances.

Committee's Work

With Don Stoner's formal program to guide it, the Project OSCAR Committee began the enormous task of carrying the program through to eventual reality. The Committee has the know-how for designing the satellite, among its members being Jere Crozier (W6IGE) satellite design engineer, Tom Snyder (W4CAG) launch engineer, M. C. Towns (K6LFH) satellite design engineer, and Milt Caston (WA6MSO), Bob Sorenson (W6WCB) Bill Orr (W6SAI), Don Stoner (W6TNS), etc. They also have the space, tools, machinery and parts to build it. The big problem facing the Committee is trying to get permission for Project OSCAR to ride piggy-back with another planned satellite program such as TRANSIT, ECHO, DISCOVERER, COURIER, etc. The feasibility of piggy-back launchings has already been demonstrated when the GREB satellite was successfully launched piggy-back with TRANSIT 2A on June 22nd.

Fred Hicks (W6EJU), Chairman of the Project OSCAR Committee, reports in a recent letter to the Editor of this column that after many months of tireless effort, success appears to be near at hand. A leading missile and space company, actively engaged on a major satellite program, has assured the Committee that they will endorse and sponsor Project OSCAR, providing that it has the approval of appropriate government officials.

At the time of writing this column (late October), members of the Project OSCAR Committee have already held initial discussions with government officials in Washington, D.C. No decision has yet been made, but the Committee is generally optimistic that approval may be granted later this year (1960). If the government officials approve the use of a launch vehicle for Project OSCAR (as a piggy-back satellite to the main program now being developed by the company offering to sponsor the project), then the Committee expects to have OSCAR I ready for launch sometime during 1961.

As soon as approval is received to go ahead with the project, the Committee plans to publish a comprehensive series of articles dealing with the various technical aspects of the project, and the ways in which radio amateurs can contribute towards its success. Among those preparing the articles are such well known writers as Don Stoner, Bill Orr and Dr. Henry Richter. It is planned that some, if not all of the articles, will appear in *CQ*.

Amateurs interested in participating in the work of the Project OSCAR Committee can receive additional details from:

Fred. H. Hicks, W6EJU
Chairman,
Project OSCAR
Sunnyvale, California

Besides the many interesting facets of Project OSCAR, here is more tangible proof that the pioneering technical spirit of amateur radio is far from dead.

ECHO

As of late October, Project ECHO, the 100 foot aluminized coated mylar balloon satellite continued to orbit the earth once every 118 minutes.

Much to the pleasure of NASA scientists, ECHO is behaving considerably better than originally expected. This passive reflector of radio waves, approximately 1000 miles above the earth, has substantially retained its shape despite long periods in the earth's shadow. Latest calculations show that ECHO is losing altitude at the rate of approximately 3 miles a week as a result of sun pressure and drag from remnants of the earth's atmosphere. At this rate, ECHO is expected to remain in orbit for at least another six months. Once ECHO re-enters the dense areas of the earth's atmosphere friction will cause it to burn up.

Experimental ECHO radio circuits between the Bell Telephone Labs at Holmdel, New Jersey and NASA's Jet Propulsion Lab at Goldstone, California continue in operation on a routine basis. These circuits are made possible by reflecting 960 and 2390 megacycle signals from ECHO's reflective coating. Additional experimental circuits have also been put into operation between Holmdel and other laboratories in the United States.

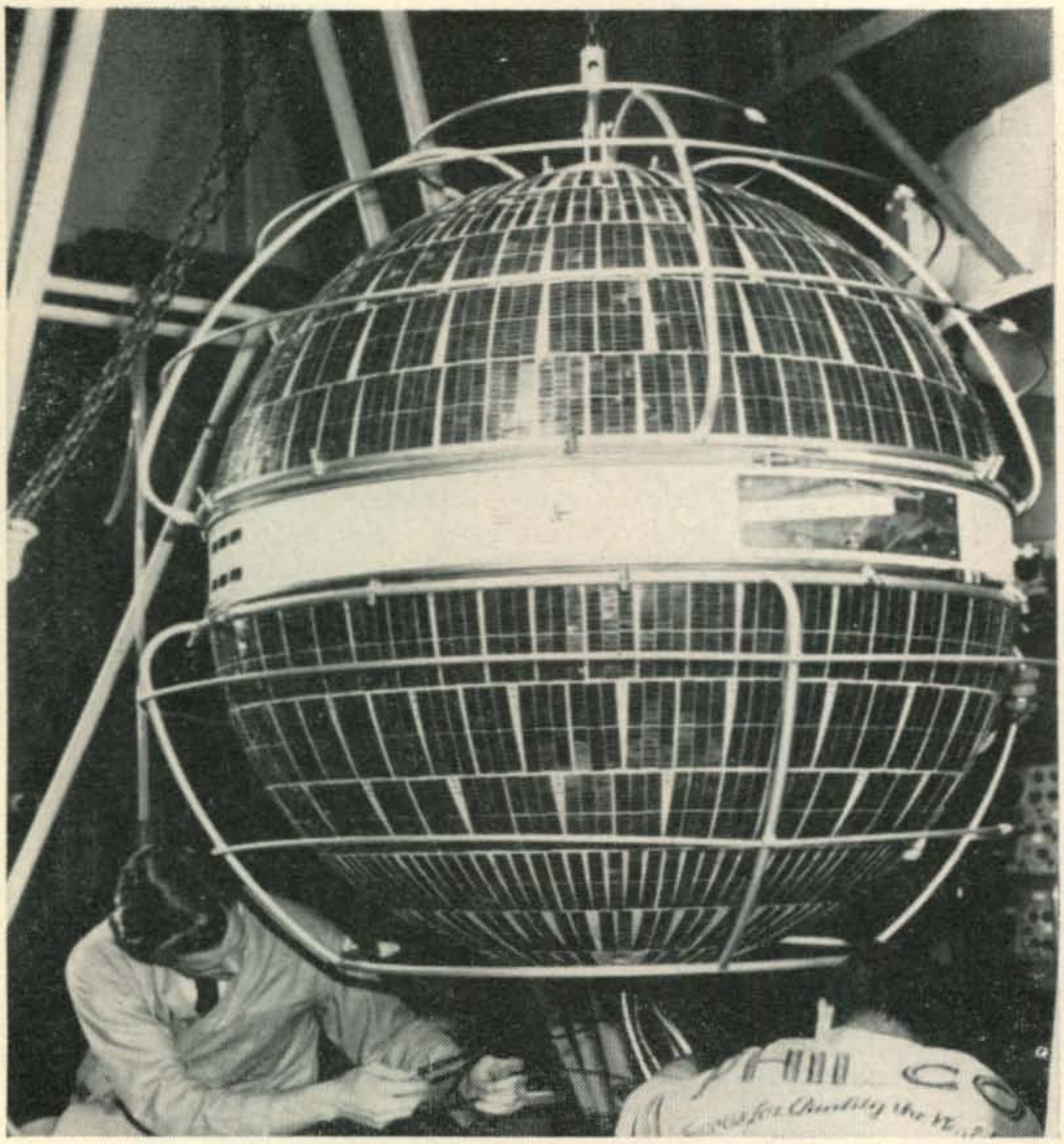
Reports of possible radio amateur communications by means of Echo-reflection continue to be received by the Editor of this column. Each report is being evaluated in terms of signal characteristics, the location of the satellite, transmitting power, receiving equipment, type of antennas used, etc. in order to establish whether or not the QSO actually took place by reflection from ECHO. A detailed summary of these reports is being prepared for discussion in this column in the near future. Meanwhile, keep sending reports of communications believed to have taken place via Echo-reflection directly to the Editor.

COURIER Successful

During early October the Department of Defense successfully launched its first COURIER satellite.

The COURIER, designed exclusively for military global communications, is an *active* automatic microwave relay station orbiting the earth once every 115½ minutes. Weighing 500 pounds, COURIER represents the biggest payload in terms of weight that the USA has so far sent into orbit. It was blasted nearly 700 miles into space by a Thor-Able-Star vehicle launched by the U.S. Air Force.

The COURIER functions primarily as a "delayed repeater" station. It records and stores messages from a ground transmitting station in one part of the world, and retransmits the information *upon command* while passing over another ground station. While it is designed primarily for delayed delivery of messages, provision has been built into



The 51" diameter COURIER satellite shown here is now in orbit. The COURIER is a space-borne microwave relay station being used for military communications. The outer shell of the satellite, which is made up of nearly 20,000 solar cells, supplies power for the complex communication equipment aboard. (Photo Credit: Philco)

COURIER enabling instantaneous relay of messages between two ground stations which can see the satellite simultaneously.

Unlike ECHO, which is a *passive* reflector of radio waves, COURIER contains a complete radio relay communications system consisting of no less than 38 different major components. Four microwave f.m. receivers with noise figures of 12 *db* are used for receiving messages from a ground transmitting station. The messages (which may be either *teletype*, voice, or facsimile) are stored on five tape recorders. Four microwave f.m. transmitters of 6 watts output are used to relay the messages back to another ground station. The design of the microwave transmitter is unique in that except for the final power amplifier tube, it uses solid state active circuit elements. The vacuum tubes in the microwave transmitters are the only ones aboard the satellite which contains nearly 1300 semiconductor devices.

The COURIER also contains two v.h.f. transmitters for telemetering purposes, and two v.h.f. receivers for command control. Extending from the equatorial belt of the satellite is a miniature antenna farm consisting of two microwave antennas and four whips. A 50 milliwatt transistorized v.h.f. beacon transmitter also aboard the COURIER provides tracking signals to ground tracking stations, and alerts and controls automatic antenna tracking systems at ground receiving stations.

The sun's rays are used to provide power for the COURIER's equipment. The 51 inch diameter outer shell of the satellite is made up of some 20,000 individual solar cells wired together, providing an unprecedented 62 watts of power—enough to illuminate a living room lamp bulb twenty-four hours a day. The solar power is used to recharge the nickel cadmium battery primary supply carried aboard the satellite.

The COURIER is to be used exclusively for military communications—and for this reason it is a *private* system. To maintain privacy of operation, the vehicle contains a command decoder which is used to control the entire operation of the satellite. The decoder tells the COURIER when to record messages and when to release them. Some experts consider the COURIER's complicated decoder to be a veritable flying computer, immune to intrusion. It is not possible, therefore, for radio amateurs to make use of the COURIER.

At present the U.S. Army Signal Corps is using the COURIER to relay radio traffic between signal centers near Ponce, Puerto Rico and Fort Monmouth, New Jersey. Other signal centers may be added later. The satellite is expected to remain in operation for at least a year.

Although strictly a military communication system at the present time, the COURIER concept will eventually be applied to civilian communications. The voluminous data capacity of the COURIER (68,000 words per minute) offers attractive possibilities for bringing about cheaper, more efficient world-wide communications in the future.

Seasons Greeting from W3ASK.

sideband sideband sideband

SIDEBAND

Irv and Dorothy Strauber, K2HEA/K2MGE
12 Elm Street, Lynbrook, New York

SSB DX HONOR ROLL

TI2HP	219	W4OPM	153
W4IYC	214	W3MAC	152
W6UOU	214	K6LGF	152
VQ4ERR	211	K4TJL	152
W8PQQ	206	K6ZXW	151
W8EAP	200	W2FXN	151
W6PXH	195	4X4DK	150
W7VEU	191	ON4DM	150
W2JXH	190	W5RHW	150
PY4TK	190	K2HEA	146
HB9TL	186	W5KFT	138
WØQVZ	185	K8RTW	138
K2MGE	182	VE3ES	136
W6RKP	181	W3VSU	136
K9EAB	181	KØCTL	135
W6BAF	180	W6YMV	130
W6WNE	179	DL4AS	128
TG9AD	176	W6VUW	126
MP4BBW	174	XE1AE	125
WØCVU	170	VE6VK	125
K2FW	160	W8ACT	124
W2TP	159	W2ATJ	121
W2LV	159	K6MLS	120
W5IYU	159	W6UPP	120
W1OOS	155	W4UWC	119

The *Directory of Certificates,* edited by Clif Evans, K6BX, is truly a necessary accessory in the shack of any ham who likes to collect certificates. The *Directory* lists information and requirements for over 350 awards from more than 50 countries and provides an efficient method for entering your confirmations so that you know where you stand toward achieving these awards. Clif, a most enthusiastic ham and prodigious correspondent, also publishes the *DX-QSL Newsletter* which is chock full of such information as a complete listing of QSL managers for rare DX stations the world over, the QSL addresses for rare DX stations, and all the world's official QSL bureaus. We'd suggest you write to Clif, K6BX, at Box 385, Bonita, California and get your copy of *The Directory of Certificates.*

Speaking of certificates, a number of the sideband gang received theirs this month. TG9AD, W6WNE, and W7VEU earned their "Worked 175" stickers; "Worked 150" stickers went to W5RHW and

MICKEY UNGER, W8YIN

After a valiant battle against cancer for almost two years, Mickey Unger, W8YIN, of Huntington Woods, Michigan, passed away on October 11, 1960. Although he probably knew that the cards were stacked against him, Mickey never admitted defeat—in spite of intense pain caused by a leg amputation in August, 1959, he continued to actively chase DX and fulfilled the post of DX Editor of *The Sidebander.* Mickey inaugurated and supervised a very popular series of DX Bulletin broadcasts during the early part of this year for which he enlisted the services of hams in various parts of this country to insure that all areas of the world would receive the Bulletins. He took great delight in the fact that he was a low power station and tried to encourage special awards for low power stations in ham contests throughout the world. In his memory, we are inaugurating the "MICKEY UNGER-W8YIN MEMORIAL TROPHY" to be presented to the station using *under* 175 watts p.e.p. who is the highest scorer in the Annual *CQ* Worldwide SSB Contest. The award will commence with this year's Contest on January 28-29, 1961.

To Mickey's wonderful wife, Lois, his three children, his mother, and the other members of his family, we extend our heart-felt sympathy and the sympathy of the thousands of hams who had the pleasure of contacting Mickey during his years in amateur radio.

W4OPM; while W6YMV was sent his sticker for "Worked 125 Countries" on 2-way single sideband. Shiny new certificates for "Worked 100" went to OQ5IE (the first YL in Africa to get this award), W3HCO, W8JIN, and W9EXY. While we're at this point of "Worked 100", we must mention that previous credit had not been given to K2TDI, K1IXG, and W3CGS who earned these certificates several months ago. Back to the present: W5PSB qualified for the "Worked 75" while Clif, K6BX, added another certificate to his vast collection with the "Worked 50". A look at the Honor Roll will convince you that the swing is to sideband; not a day passes that some new DX station doesn't appear on s.s.b. for the first time, making life more and more interesting for DX chasers.

World-Wide SSB Contest

Here's a reminder that the 5th Annual *CQ* Worldwide SSB Contest takes place from 1500 GMT, Saturday, January 28, 1961, to 2100 GMT, Sunday, January 29, 1961, with only 24 hours of operation permitted. Work as many prefixes and as many stations as possible on sideband—that's how you get a top score! See last month's column for all the details on this popular s.s.b. contest.

Only one addition—another award is being presented, the "Mickey Unger-W8YIN Memorial Trophy", to the station using *under* 175 watts p.e.p. who makes the highest score in the contest. All you low-power stations, join in the fun—this award was designed especially to encourage the "barefoot" boys!

Foreign QSL Verification

Having sent QSL cards long distances ourselves, we can understand the feelings of those who must part with the precious pasteboards for awards they would like to possess. We have felt for a long time that there must be some way to do away with some of the inconvenience of the old system of verification. To this end, we have secured the able services of "Steve" Stevens, G2BVN, who will handle the chore of verifying cards and lists for the "Worked 50, 75, 100 and 200" Certificates and the stickers for additional countries, for all G, GI, GW, GM, GC and GD stations **only.**

Send your alphabetical list, *plus QSL cards,* for the "Worked 100 and 200" Certificates and only the listing, verified by another ham, for the lesser awards and the additional "25 country" stickers. We reserve the right to determine the eligibility of any card or country submitted for this award and to make any changes in the rules that may be necessary from time to time.

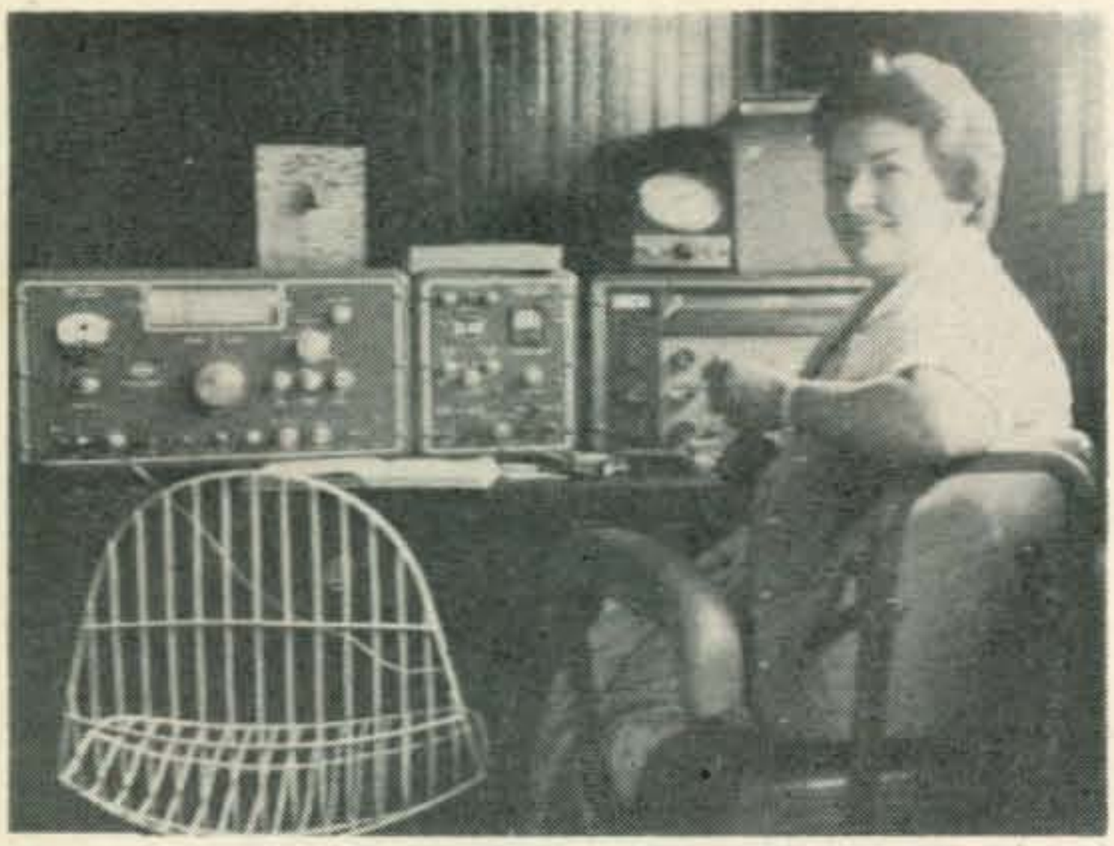
Send your verified lists and/or cards to R. F. Stevens, G2BVN, 51 Pettits Lane, Romford, Essex and be sure to include return postage for your cards; the certificate is free.

We are presently looking for qualified hams in other areas to perform this same service for the hams in their areas. It is hoped that we will be able to announce their names shortly.

George Bailey, W2KH

Dr. George W. Bailey, W2KH, Executive Secretary of the I.R.E. and past-president of the A.R.R.L., was honored at a dinner held jointly by the SSBARA and the QCWA on October 15th in New York City. He was presented with a beautifully hand illuminated scroll, the work of Vi, W2JZX, by Ed, W2KPQ, SSBARA president and a gold Lifetime Membership Card in the QCWA by John, W2FX, Association President. Don, K2AAA, presented George with a beautiful microphone on behalf of the Braille Technical Press. The "Skivvy Club", with Tom, K2CM, acting as spokesman, gifted George with a large model "Skivvy'er" for his Den.

On hand to pay homage to George for his many years of valuable contributions to ham radio and to the Government were many hams prominent in the electronics industry; among them Bill Halligan, W9AC; Wally Watts, W4VI, of RCA; Bil Harrison, W2AVA; Mort Kahn, W2KR and Harry Dannals, W2TUK, Director and Vice-Director of the Hudson Division respectively. We wish we had the space to mention everyone who was there but it would take the whole column! Suffice it to say, a good time was had by all!



Susan, YV5AFF, the first XYL in South America to earn a CQ SSB DX Certificate.

Les, W4CVO, discussing 20 meter operation with Harry, W2ISN.

Here is a new method of logging those long s.s.b. QSOs which should greatly increase the effectiveness of roundtables. The symbols are fully explained in the text.

A System of Sideband Log-Keeping

With many thanks to Mel, W3KET, here is a unique system of log keeping, particularly useful for 75 and 40 meter multi-station roundtables.

"The multi-station roundtable has become a popular facet of sideband operation particularly on the lower frequencies. It is not uncommon to hear as many as 10-20 stations participating in one roundtable. This sort of thing can be a lot of fun or a confusing nightmare depending on the logging system used to keep things straight. The following system has been in use at W3KET for over five years and others to whom we have shown it have liked it. Conventional log forms are confusing to the eye in that it must skip across a wide horizontal space and then drop vertically one line to see which stations are still in the roundtable and which stations have signed out. The new system keeps everything in a narrow horizontal space. The heart of the system is the ruled form as shown. It will accommodate nine stations in one QSO. This form may be drawn up and printed on a Mimeograph or Ditto machine. It may be possible to get together with several of your buddies at which time it would be economical to have a printer make them for you.

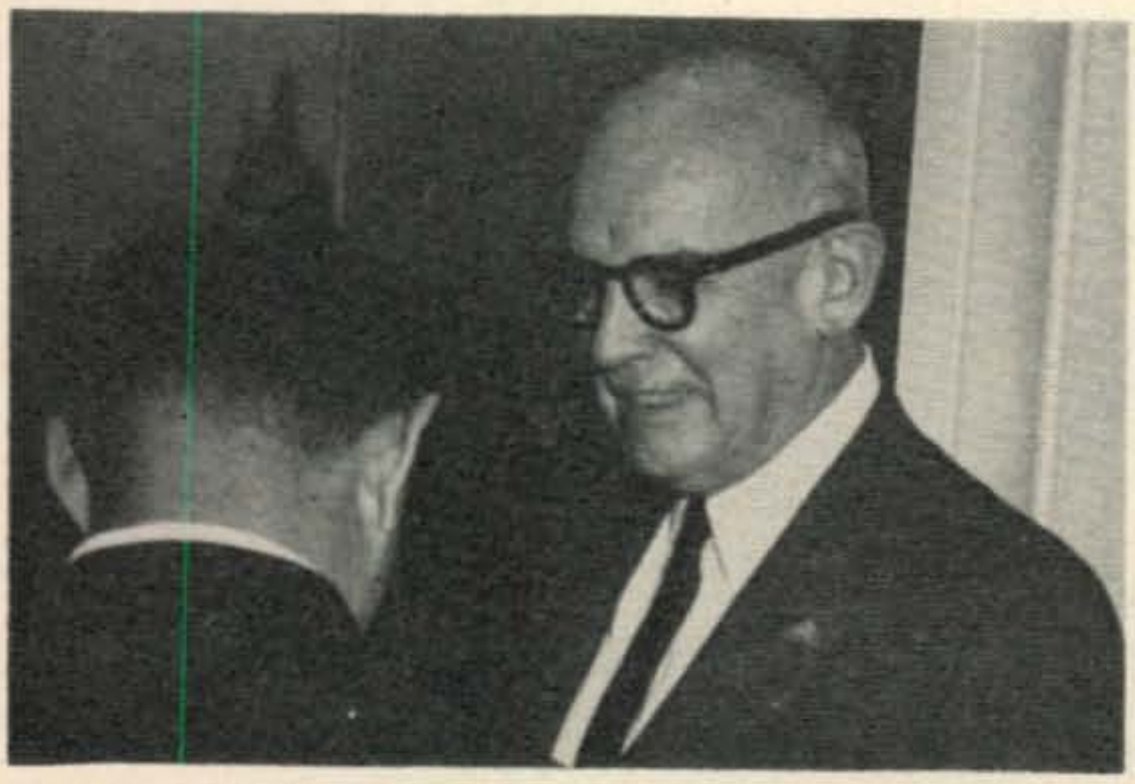
"The form is used as follows: The 'In' line refers to the time that you come on the air and enter a QSO. Listen for one go-around and enter the calls of the participating stations in the 'Call' boxes before you sign in yourself. The time is entered only once and an arrow is drawn over the top of all stations currently in. When others come in, the time for each is entered. When a station signs out, the appropriate time is entered in the 'Out' boxes. Enter the time that you sign out in the first empty 'Out' box on the left and draw an arrow through the remaining empty 'Out' boxes.

"Ten minutes have now gone by and it is time for a go-around. This is where confusion enters with the old system. Who is still in the QSO? Who has signed out? Who has had a chance to sign his call? With this system your eye travels easily across the page. If the out box is blank, that station is still in the QSO. As each station signs his call a system of marks is placed in the wide blank space underneath the 'Out' line and underneath the particular station that has just signed. I use a dot for the first go around, a dash through the dot for the second go around, a vertical line through the dot for the third go-around and a circle around the whole works for the fourth go-around. Start over again with the dot for the fifth go-around. Thus, if you do not see the appropriate symbol underneath a particular call you know that you can turn it over to that station when it comes your turn to sign around.

"Let us consider an example as shown in the illustration. I signed in at 1900 as shown by that entry over W2LI and the arrow extending to W2QZ. At 1910, W3ATV signed in and W2LI signed out. There is only one dot under his call as he was in the QSO for only one round. I signed out at 1940 as shown by the entry under W2NCY and the arrow under the following stations to the right.

"There is sufficient room in the wide spaces for entering miscellaneous data about stations that you may not have worked before.

"The author feels that this system can add a great deal of enjoyment to the comeraderie that this type



George Bailey, W2KH, greeting one of his many admirers at the dinner held in his honor by the QCWA and the SSBARA.

The Oberdoesters: Lou, W3FWD; Elsie, W3ICQ; and Ron, W3HCO.

Herb, K2ZGZ; Kitty, K2TEX; Jean, K2ZGY; and Bill, K2AKR.

of Amateur operating can provide and if you have been avoiding this type of operation due to a lack of system, try this system and see what you have been missing."

Sideband Around The World

Steve, G2BVN, asks us to remind you that any amateurs in the London area are cordially invited to visit the RSGB London Members' Luncheon Club whose meetings are held the third Friday of every month. Further information may be obtained by calling G2FUX (Ruislip 2763) or RSGB (Holborn 7373). . . . We're looking forward to welcoming Fernando, CT2AH, about Nov. 1 as the first sideband station from the Azores. . . . If you can't decipher the rapid ham language exchange between Art, ZS6AQQ, and Joe, W4IMP, we'll tell you that they're all excited working on plans to make an all-band transistorized exciter which will also incorporate a v.f.o. in its design. . . . Jack, ex-KL7CQL, is now KP4AXB and real happy to be back with his family in Puerto Rico. . . . Any low power station who worries about how he'll get out ought to take a lesson from Bill, VO1EX, whose 15 watts from Ramea Island off Newfoundland packs a terrific wallop, even during a long ragchew. We've had the pleasure of working Bill on a busy Sunday afternoon on 20 meters for as long as 1½ hours with no repeats necessary. . . . Larry is one of the three operators at 9Q5US; the other two being Bernie and Tim, the latter our Ambassador to the Republic of the Congo. . . . As we have said many times, don't sell 10 meters short: heard recently on 10 were F7AB, PAØDV, XS2HX, ZS6AQQ, ZS6AFF, ZS6L, ZS6AMV, DL9EX, DL4JQ, OD5CT, GI3IVJ, G5GX, and G3ACQ—all these on a weekday—imagine the activity on a Sunday afternoon! . . . We heard that Jack, HB9TL, was trying to convince Socrates, SV1AE, to take Jack's exciter to Crete for some s.s.b. activity from that rarely heard island. . . . We had a very fine chat with George, I1CQD, just before George had to let the dust gather on his rig while he went back to his fur business in Florence. . . . The boys at Christmas Island, VR3L, were greatly appreciative of the sidebanders' cooperation in supplying extra postage for QSLing and also for their gifts of technical books and manuals which, it is hoped, will make hams out of some of the men stationed on the island. Actually, it was Ted, KH6DFC, who brought his s.s.b. rig to Christmas Island during his short stay, and after the regularly assigned men heard the activity, much interest was aroused by sideband operation. If you have not yet sent your QSL, make sure you note the correct date—24 hours later in GMT! . . . *Attention* PAØs: Leo, ZL2GY, is most anxious to work you since he originally comes from The Netherlands and would like to chat with you boys about the homeland. . . . You've got to hear it to believe it but OHØH1A is actually a call in use at this time—and that is a "one" following the "H", not a printer's error! Art, whom we contacted under that call, mentioned something about a special category. . . . HH9ES is another new one on sideband. . . . Joe, EI8P, should be about finished with the new shack he's been building in his garden. According to a reliable source, it will not only be heated but will also be furnished with sleeping and refrigerator facilities—a home away from home, Joe? . . . No wonder we didn't hear Juan, EA2CA, for so many months; he is Commodore of a Sailboat Racing Club which keeps him very busy. Then, too, television came to San Sebastian and Juan and Paula are quite enthralled with this form of entertainment. . . . Australia has had a fine strong signal aimed at it these past few months from the station of Chuck, W4RHE (W8DPF/4) who was busy cementing friendships with the VKs prior to taking up a year's residence in Darwin. . . . And speaking of Down Under, Les, ZL3AB, has offered his services as QSL manager for any rare DX station or DXpedition in his part of the world. Any takers?

Band Hopping

Our heartiest congratulations, and those of his many friends, to Lew, W3MAC, who was married in October and not only gained a beautiful bride but also a fine new ham shack. . . . Jonathan, W2WK, was "adopted" by Geri, WA6CNW, after a contact with her revealed that she had three girls and had always wanted a son who would have been named "Jonathan". Last we heard, Geri was forwarding the adoption papers! She's not only getting a new "son" but also a lovely "daughter-in-law", Marilyn, and two very fine "grandsons"! If our information is correct, Geri is the sister of Father Dan, W1HWK.

DX SSB XYLs

We are very pleased indeed to bring you a photograph of Susan, YV5AFF, of Caracas, Venezuela, who has become very well known to sidebanders since she received her license one and a half years ago. Susan is the XYL of Joe, YV5AES, but as she writes, "he does not get much of a chance to operate when I am around"! At the time she wrote her letter, Susan had worked 157 countries with 137 confirmed, using a 100V exciter, a homebrew *kw* linear amplifier, with a 75A-4 receiver and a Mosley tribander beam. She does most of her DX chasing from her weekend home, 20 miles from Caracas in San Antonio, where the wonderful climate, the high elevation, and the fact that there are no other hams around make DXing a real joy for her. But

the greatest joy for Susan and Joe is the sight of their three lovely little girls and the close family ties that bind them together.

Another s.s.b. DX XYL of whom we are also very proud is Ella, DL6VM, of Munich, whose photo appeared in last month's column. Ella celebrated her 10th year in ham radio last month. She and her OM, DL1OG, are busy setting up a mobile station in their Volkswagen but Ella did not write whether it would be s.s.b. mobile or not. She commented that their biggest handicap at the home station was their antenna, a ground plane, with no hopes at present of installing a beam. However, from her record of DXCC plus 90 on phone, we feel that she has made an excellent showing for herself.

There were a few anxious months following the incidents in the Congo after her departure when we feared that the confirmations of Jane, OQ5IE, (now ON4AD) were lost forever. But reach us they did and we were delighted to send Jane her well-deserved "Worked 100" Certificate. When we realize that Jane embarked upon her s.s.b. DX chasing not only as a newcomer to radio but also with a very limited command of English, we feel that she has certainly set a very fine example for other XYLs and also OMs to follow. Now that Jane is back in Belgium as is her OM Paul, ex-OQ5GU, and their three children, we hope to bring you a photo of this fine couple in a future column.

Three in One

One of the most remarkable, best known, and popular families on sideband is that of the Oberdoesters of Allentown, Pa.: Lou, W3FWD; Elsie, W3ICQ; and Jr. Op, Ron, W3HCO. Within the past six months, each one of them has earned a "Worked 100" Certificate and, if you think that's easy with 3 hams clamoring for the rig, you ought to try it sometime. But as active as they are in chasing DX, nothing compares with the great service they render in phone patching our servicemen home to their families. To quote Lou, "Only once did my XYL forget to make my dinner. It was on a Saturday, I had come home from work at 5 P.M. to find no dinner ready, and there she was—working the rig! I was tired and hungry and—Wow, was I angry! I was about to QRM her, but, when I walked into the shack, I heard her running phone patches for the ice breaker, KC4USG/MM. I not only forgot my anger and hunger but I also told her to keep on patching, went into the kitchen, made the dinner and took her food into the shack so she could eat while patching. To me, the phone patches come first before my, her, or the Jr. Op's chow!!"

When we asked them to tell us something about themselves, each of them wrote us a most interesting paragraph; limitations of space do not permit us to quote them all but we can assure you that each has a terrific sense of humor which is probably obvious to all their contacts. This is a real wonderful family—with well rounded interests in all phases of ham operation—and we are proud indeed to claim the Oberdoesters as "our people"—wonderful examples of the finest on sideband.

Irv, W7EUD, at his station in Astoria, Oregon.

. . . We had a most interesting contact with Buddy, K5USW, at the U.S. Hospital at Carville, La. Thanks to Collins, the Hospital received a KWM-2 and thanks to Mike and Ralph Ercolino, a Telrex beam. Buddy has been at Carville for 33 years, and, despite being sightless, recently earned his ham license. He is opening a new world to the other hospital residents through sideband. . . . Carl, W5QJ/MM, looks forward to retiring to a rocking chair in New Orleans in February. Actually, he retired 1½ years ago but he could not ignore the call of the sea and returned for "one more voyage". It was most enjoyable to be in a three-way with Carl and his son, Robby, K5RYB. . . . Lou, W2CLD, has sent out more than 100 certificates to stations who have worked his mobile in 10 or more states. . . . And speaking of mobiles, 14.305 is becoming a very active and popular frequency for the "sideband on wheels" gang, presided over by Murray, K2CBO, who runs a *kw* mobile. Not far behind Murray in power and signal is Ray, W2KSV, who uses a KWM-2 to drive a homebrew 500 watt final on 75 and 40 meters. . . . Pat, W4WAQ, "in the shadows of the Orange Bowl", is active on 6 and 2 sideband and promised us more information on v.h.f. activities. . . . Overheard a fascinating conversation between Milt, W5IXL, and Anne, K4QDR, on the subject of—of all things—*Soup!!* Wanted to break in because it was dinnertime and we were hoping to get Milt's recipe for "pasta fazool" but the band changed, darn it! . . . Wish we could have been in that trailer with Bill, K8KEC, as he followed Bob Adell's replica of a 1903 Oldsmobile across the country in late October. The trip was non-stop from New York to San Francisco with five drivers alternating in the 24 hour a day operation. Bill was the only ham along so we imagine that, between the hamming and the driving, he's been very happy to catch up on his sleep back home in Detroit. . . . The University of North Carolina re-activated its amateur station, W4WE, with a shackful of excellent sideband equipment. We contacted the station on 40 meters, with Jim at the mike, and from his enthusiasm about the new equipment, we hope his studies won't suffer from lack of attention.

We are grateful for this opportunity to wish our friends and fellow sidebanders a very Merry Christmas and a Happy, Healthy, and Prosperous New Year.

73, Irv and Dorothy

VHF

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

BOB BROWN, K2ZSQ
67 RUSSELL AVENUE
RAHWAY, NEW JERSEY

It was a chilly 4 A.M. when the OM, K2ZSP, and I took off en route to the Syracuse VHF Roundup. Kind of fuzzy about what happened in the next few hours. . . . A few cups of coffee at the next couple of stops on the New York Thruway did the trick, though. Remember seeing the sun come up. All told, we made it by about 10 A.M., just in time for the early bird registration.

Must mention here that the Syracuse VHF Club, Inc., couldn't have picked a better place for the Roundup than the Three Rivers Inn, which we found about eight miles or so north of the metropolis, on Route 57. There weren't too many of the boys there when we arrived. It was a good thing, though, as we snagged Charlie Sellwood, W2RHQ, chairman of the affair, and had a nice little chat. The way he was running around checking this and that in the next few hours it must have taken him weeks to recover!

One of the first persons we met was Verne, W1EGE, representing Tapetone, Inc. Saw quite a bit of the 'ole boy as time went on. Also ran into another fellow as soon as we walked in . . . Paul, W6BAZ, the man behind Filter-King converters. The others started coming around noon and the place filled up fast! Never seen so many v.h.f.'ers together under one roof!

CQ was there earlier, represented by Dick, K2MGA, our new assistant editor. K2MGA needs no introduction to the v.h.f. fraternity in the East Coast area, as we hear him on most every night on the low end of six meters.

Ran into Ed Tilton, W1HDQ, just a few minutes before his talk was scheduled to begin and had a nice chat. Ed's speech on "Antennas and Theory Problems" provoked a goodly amount of interest, with a question and answer period following. This was followed by D. W. Bray, K2LMG, and his discussion of "Amateur Participation in Space Communications" which fascinated most everyone in attendance. At 4 P.M. W2UKL wound up the talks with a most interesting description of "The World Above 20,000 Mc" with color slides of various experimental rigs and expeditions.

When everyone was seated, the raffle ticket winners were announced and the happy gang (who won some fabulous prizes) returned with arms full.

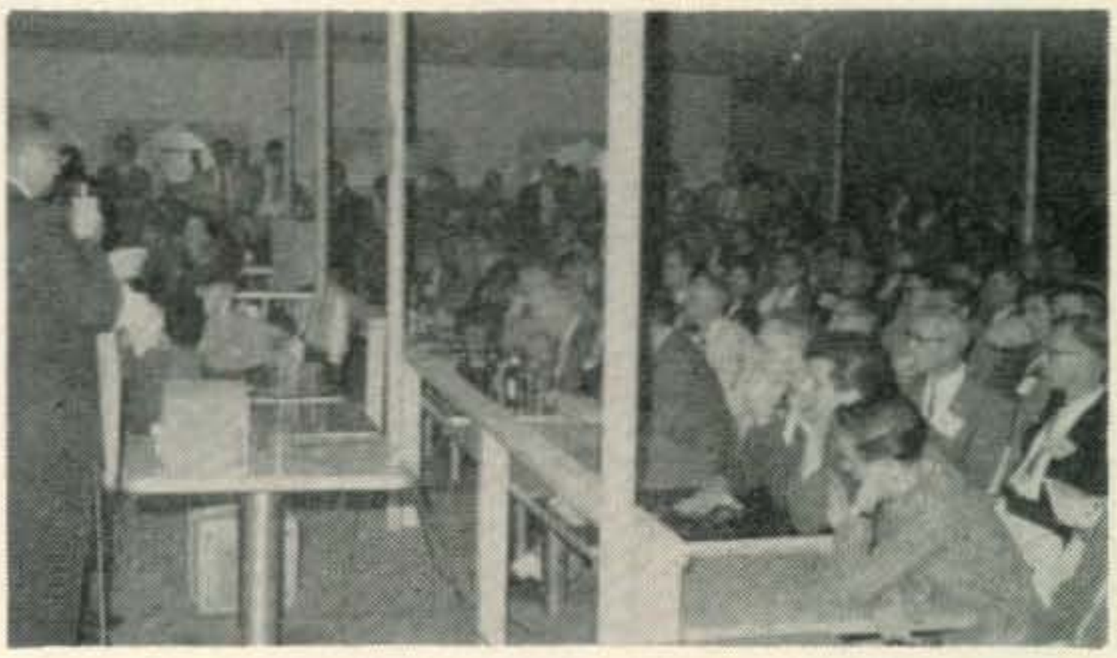
Might mention at this point there were an estimated 600 to 700 v.h.f. men in attendance with more coming in late. Had a long chat with Lane Jackson, KØKJX, of St. Louis, Missouri, who had taken a bus trip here just for the Roundup. W7LEE from Arizona was also introduced with his charming wife. Some of the more or less "local" group included K2ZBU, K2BVC, W1BVP, K2VDR, K2NYB, WA2IEZ, and K2IUV. All these calls are familiar I'm sure. And we musn't forget Vic, W9JFP, from Milwaukee. By the time he left, he had enough 2 meter and 220 *mc* skeds to keep him going 'till this time next year!

Herm, K2AVA, of Syracuse, was taking pictures and he promised us some real goodies for the next issue. He must have gotten a snapshot of everyone there the way he was running around and flash bulbs were popped.

After this interlude for conversation and cocktails, the Banquet got under way. Dick and I had quite a time finding a table, but some kind readers from the Rome, New York, Radio Club took pity on us poor souls and invited us to the two remaining seats. Must say that we thoroughly enjoyed the personalities and entertainment as it was really "first class". More drawings were made at this time and more triumphant winners returned to their seats, with us, watching eagerly. (No — I didn't win anything, hi!) Then we had a few well chosen words from the ARRL Atlantic Division directors re: the Geneva conference and its success followed by the Syracuse Radio Club sponsored trophies and awards. The outstanding v.h.f. man-of-the-year award went to Ed Tilton, W1HDQ, for his many services in the v.h.f. field.

Final bit of entertainment (following other acts and a singer) was Johnny Puleo and his Harmonica Gang, which threw the group into stitches.

All in all, a good time was had by everyone in attendance and we just can't wait until next year. Next year's Roundup promises to be bigger and better yet — Don't miss it!



Are they calling your number? Everyone is on the edge of his chair waiting to hear that they've become winners at Syracuse.

6 Meter QSO Roundup

As you may remember, in the October issue we announced the Clegg Laboratories 6 meter contest. Just a few days ago we received the revised rules and regulations. Even though the contest started last month, there are still two months left for you to get working on it. Here are the new rules:

1) *Eligibility:* Amateurs operating fixed or fixed portable amateur stations in any of the 50 states and operating in the 50 — 54 *mc* band are eligible to participate. Judges, members of the Clegg Laboratory Radio Club and employees of Clegg, Inc., are not eligible for prizes.

2) *Object:*

a) Participants should attempt to contact at least one station in as many countries or parishes in the 48 mainland states as possible. Contact with each country may be made on both phone and c.w. Total possible contacts would be 3,113 counties times 2 (1 phone and 1 c.w.).

b) Contacts must be phone-to-phone or c.w.-to-c.w.

c) C.w. contacts must be made between 50.0 and 50.1 *mc*.

d) Participants may combine their portable and fixed station logs for scoring purposes. (Let's hope some of the fellows will spend an occasional week-end at some of the less populated counties).

e) Contacts made in the course of other contests (such as the ARRL v.h.f. Sweepstakes) may be counted.

f) Stations may operate single or multiple operator throughout the contest period.

Bruce, K2VDR, displaying his QRP 6 meter rig at the Syracuse VHF Roundup.

There's Bruce, K2VDR, again. The only chap not paying attention to the guest speaker at the Syracuse affair.

3) *Contest Period:* The contest started at 2400 GMT on November 1, 1960, and ends at 2400 GMT on January 30, 1961.

4) *Contest Exchange:* Minimum information that must be exchanged to validate a contact shall include call letters, county, state, and signal reports. Information must be exchanged and acknowledged by both parties to receive contact credit.

5) *Scoring:* Each new county contacted on phone counts 1 point. Each new county contacted on c.w. counts 1 point.

6) *Logs:*

a) Logs must be in accordance with information in #4 above, including a number count, date and time, county and state, both signal reports, and type of emission. Log blanks can be supplied on request from the Clegg Laboratories Radio Club.

b) Logs must be kept with time in GMT.

c) Logs may be submitted monthly or compiled at the end of the contest period. Monthly logs should have been postmarked on November 30, and the rest on December 31, and no later (on the last) than February 12, 1961. Those submitting monthly logs post marked prior to the 5th of the month will be eligible for additional awards and honors. All final logs must be postmarked not later than midnight, local time on February 12, 1961.

d) Each month special bonus awards consisting of six month subscriptions to *The VHF Amateur* will be made to first 25 stations submitting logs with more than 15 eligible contacts.

e) Logs should be mailed to:
Clegg Laboratories Radio Club
Box 641
Morristown, New Jersey

7) *Awards:* Awards and prizes will be made on the basis of both monthly logs and combined three month logs as follows:

a) Monthly Awards:

1.) Highest point total for each monthly logging period in each of the ten call areas will be awarded a 2 year subscription to *The VHF Amateur*.

2.) Nationwide highest point total for each monthly logging period will be awarded a Clegg Model 343A Modulation Monitor valued at approximately $50.00.

3.) Each month the judges will select three "station of the month" winners. Selections will be based on general operating consistency and performance as reflected by the monthly logs. *No two awards for any given month may be made within a single call area.* Each participant in the contest is invited to submit a nomination for the "station of the month" in his own call area and in any one other call area. Each of the three monthly "station of the month" selectees will be awarded a $10.00 gift certificate.

b) Final Awards:

1.) First prize will be awarded to the station logging the highest point total for the entire contest period.

2.) Second prize will be awarded to the station logging the highest point total *excluding all stations in the same call area as the first prize winner.*

3.) Third prize will be awarded to the station logging the highest point total *excluding all stations in call areas represented by the first and second prize winner.*

4.) Seven additional prizes will be awarded to the highest scoring station in each of the remaining call areas not represented by the first three prize winners.

5.) Prizes will be:

First: Climaster Zeus Transmitter, valued at $495.00.

Second: Climaster Interceptor Receiver, valued at $345.00.

Third: Climaster Crystiplexer, valued at $329.50.

Fourth to *Tenth:* Three year subscription to *CQ*, and 3 years of *The VHF Amateur.*

8) *Judges:*

a) Judges will have final decision on all awards and prizes.

b) Judges will be: K2ZSQ, K2RRG, W4UCH, and W2HPV.

Take a good look at this picture! It shows some of LU3DCA's QSL collection.

Stan, K3GGZ, at the helm of his mighty Western—Pa. section 6 meter station. (Tnx K3HHC for photo)

CQ World-Wide VHF Contest

The next *CQ* WW VHF Contest will be on the week-end of February 25 and 26. This is going to be the biggest and best one of them all with more new stations and more new states than you ever dreamed of! Further details will appear next month in *CQ*. Mark your calendar! Don't miss it!

S.S.B. V.H.F. WAS Cup!

Rusty Bravman, K2UTN, is offering a Worked All States Single Sideband Cup to the first station to show written proof of contact with all fifty states on any or all v.h.f. bands complying with the following requirements:

1. Presentation of fifty written confirmations (one from each state).
2. Any or all v.h.f. bands may be used with a special endorsement for accomplishment on only one band.
3. All confirmations must clearly state two way SSB contact.
4. All contacts must be post-war.
5. All contacts must be made so that no two operating locations used are more than 25 miles apart.

Who'll be the first? Let us know how your coming along!

OA4AGI — Peru, South America

All six meter operators are asked to watch for signals from OA4AGI, Peru, South America. This station is operating continuously on 50.04 *mc*. A1 emission, and automatic keying. Reception of OA4AGI should be reported immediately to us for inclusion in this column. (Thanks to W4HHK for this note).

Australian DX

Once again we hear from Bill, VK4ZBE, on activities in his area on 50 *mc* . . .

"DX wise, the band is again showing good promise with JA's, KH6 and KR6's again active.

"Info from KG6AGL tells of antenna problems — a 300 ohm folded dipole, 8' high between two

buildings. However, a shift of QTH to KR6 land will enable the addition of a 5 element Yagi with 100 watts input. He is very interested in skeds with any 50 *mc* stations.

"Walt, K6HGP/KH6 asks me to tell you that he'll be writing soon, capably assisted by YL Alice, K6HGR/KH6.

"Latest experiments locally have centered on bouncing 144 *mc* signals off Echo I which is clearly visible in the early evenings. As yet, no success has been made but we are trying and hoping.

"Activity has increased in the area with the addition of four new stations in a QTH 70 miles to the south of here."

Many thanks for the news, Bill, and keep us posted!

West Coast Doings

Clyde Welch, WA6BZA, of San Leandro, California, writes on activities in his area . . .

"Went to the Oakland Radio Club for their meeting on Friday at 8 P.M., October 7, 1960, to view the Echo Bounce colored movies.

"A nice crowd of some 27 members and friends attended. After the meeting coffee and donuts were served; also a drawing with a 2 meter transmitter, call book, and other fine prizes given. The presiding judge on the bench was K6DOQ —Gordon. We also noted WA6CVI, A1 was making his plea when we arrived.

"WA6DPN, Marie held an amateur luncheon on October 23, 1960 at the Lazy — V in San Bruno.

"If you want certificates:

"Baylarks XYL and YL Club Monday at 2000 hours on 50.4 *mc*. Club call is WA6MAO. Work five for certificate and send proof to 2183-44 Avenue, San Francisco, California.

"Ranshees, Irish Wilches: Friday at 0000 to 0100 hours on 50.250 *mc* for certificate. Send proof plus 50c for mailing, etc., to . . . Frank, WA6CEX, P. O. Box 486, Calistogo, California.

John, W6TFZ, checks on the "California sunshine" during the April Contest at the K6TJL/6 six meter site. Note power cord in front of 6 meter tent. Location is Mt. Hamilton, 4,300 feet, Santa Clara County, California.

Some of LU3DCA's certificates. Look like real rare ones, too!

"The Caravaner's: Work five station members and send proof and 25c for postage, etc., for gold and black — beautiful certificate to: WA6FLX, Bert, 1231 Hahman Drive, Santa Rosa, California.

"Hayward: When in East Bay District call WA6BZA on 50.250 *mc*. Information station for Sacen Net. Out of East Bay station, stop in and register for certificate."

Many thanks, Clyde, for the interesting info on activity and certificates. We'll be in there trying for 'em!

John Booker, K2SKB, writes us from Stanford University, Stanford, California:

"If you can find some interested parties, I would like to attempt moonbounce on 144 *mc* again. This time in a big way. There is a 60′ dish here at school which is presently unemployed and there are enough two meter kilowatts and super receivers in the Bay area to put one h--l of a signal on the air!

"I personally have not been too very active this past summer, but I did manage to decide to scrap all my previous gear and completely rebuild the station, starting with the low frequency receiver. Needless to say, this is quite an undertaking and it will be some time before I get back on the air in a big way. I figure a troposcatter range of better than 500 miles with the new station!! I'm helped somewhat by having a father who is considered an expert on the subject.

"I have an idea for a communications system that might permit hams to work ionospheric scatter at 144 *mc* consistently. The idea is to send very slowly, perhaps one word over an hour. The output of the receiver is fed through an amplifier with a long time constant. Then the noise output of this amplifier is fed into a graphic recorder. By looking at the tape over a period of time it will be noticed that the noise output of the receiver follows a pattern representing the transmitted signal, even though the change in noise output is only very slight with signal. With equipment presently employed by hams, signals 20 *db* below the noise should be easy to interpret, and by using a long communication time and very narrow bandwidth like a couple of cycles (got to be pretty stable for that!) it should be possible to read down to 30 *db* below the noise. These

are similar to the techniques used in radio astronomy." *Sounds like quite some plan, John — Sure have me interested! How about some of our readers submitting opinions and maybe we can get it started! As mentioned last month, before too very long we'd like to start a Sporadic-E mapping system, and this idea of your's may come in very handy. Let us know how you make out . . . And send in a picture of that 60 foot dish!*

German Moonbounce!

Dr. Karl Lickfeld, DL3FM, of Klingenburg-strasse, Western Germany, edits the "VHF Review" in *Das DL-QTC* which, translated into German comes out "UKW — Rund Schau". Karl sent along nine issues of *Das DL-QTC* (which is an excellent amateur magazine, by the way) along with a letter, excerpts of which are reproduced below:

"I will be ready for moon bounce experiments in the spring of 1961. Here is my set-up: Antenna is a 10 foot parabolic dish on a polar mount, giving a gain of about 30 *db*. It is mounted on a wooden platform on the roof of my house. The transmitter is crystal controlled, of course, the crystal being in a temperature regulated oven; the final stage uses the RCA 7650 as a straight through amplifier, giving an output around 500 watts. The receiver has three sections: parametric amplifier with MA 450 F varactor and RH 7 C pump oscillator on about 7 *kmc* (the RH 7 C is a German disc seal ceramic-metal triode, usable up to 9 *kmc*), crystal controlled converter with 1N21 mixer in a cavity, selected from the oscillator by a high *Q* cavity, the crystal of the oscillator being in a temperature regulated oven; the main receiver shall be either a 75A-4, and NC-400 or NC-303. I am just trying to get hold of one of these receivers, a fairly difficult task in a country "suffering" from the 1:4 Dollar: Mark relations . . . hi!

"All things for my private moonbounce program must be done on week-ends. (I am assistant at the Institute for Electron Microscopy of the Academy for Science of Medicine, Düsseldorf — well known the world over as a place where special heart and lung operations are made; my special fields are electro-physiological measurements in living tissues and cells).

Big ARA Club House located near Towanda, Pennsylvania. Elevation—2,365 feet above sea level.

"There have been no results in Germany trying to use ECHO I as a reflector. A "G" station to have worked a French one via this satellite leaves me quite skeptical, since it can be shown mathematically that one needs very high power and very high antenna gains on 2 meters, beside the fact that both stations did not tilt up their beams." *See your point Karl. Looks like we'll be hearing big things from DL3FM in the near future! Good luck with your moonbounce project, and keep us informed with regular reports. Don't forget pictures!*

Report From W4 LTU

The following information was taken from one of the many fine magazines we receive each month, the *AUTO-CALL*. The writer is Walt Bain, W4LTU, who we met at Syracuse V.h.f. Roundup, incidentally . . .

"Some interesting results have come up on the nightly sked on 144 *mc* between K2LMG near Ithaca, New York, and W4LTU. Some time ago Dave changed over from a single long spiral yagi to stacked linear yagis and the change was phenomenal. One might expect 2 to 3 *db* improvement just from the stacking but actual numbers seem to be something like 10 *db!* At first it was thought there might have been an improvement in propagation conditions simultaneous with the change in antennas. However, the better signal has persisted for two months now and make K2LMG a solid copy signal rather than in-and-out as he was before.

"Propagation conditions in the late Summer — early Fall have shed no great favors on this area. A tropo bending opening existed over the Midwest from about August 31 to September 8 but only a little of it dribbled into this area. On August 31 to South Dakota with WQRSP heard as far east as Akron, Ohio, on 144 *mc*. September 8, W5RCI in Mississippi was also into Akron but no trace of him at W4LTU. Many strong Michigan stations were heard here on September 6. The only aurora of note was September 4 when WQLFE in Missouri was heard on 144 *mc* by W4LTU."

[*Continued on page 119*]

Walt, K6HGP/KH6 looking well pleased after working VK4ZBE.

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

semiconductors

I would like to devote this month's column to something which I consider to be a major breakthrough. By now we have all heard of the parametric diodes used in fantastically low noise amplifiers. These devices have made it possible to demodulate signals which were formerly buried in a sea of noise.

A similar techinque is now being used for *up*-frequency conversion. A paper delivered at the 1960 WESCON by Luettgenau et. al. described a new technique for generating high power at v.h.f. and u.h.f. using parametric diodes. Boiling down some 41 equations we find that if a parametric diode is back biased in such a manner that it does not conduct, and then driven by a source of r.f., it will generate enormous amounts of harmonic energy. The Pacific Semiconductor engineers used High "Q" "Varicaps" to generate 2.5 watts at 250 *mc* and 1 watt at 1,000 *mc*. Although the use of a diode for clipping r.f., for the generation of harmonics is not new, obtaining these power levels certainly is.

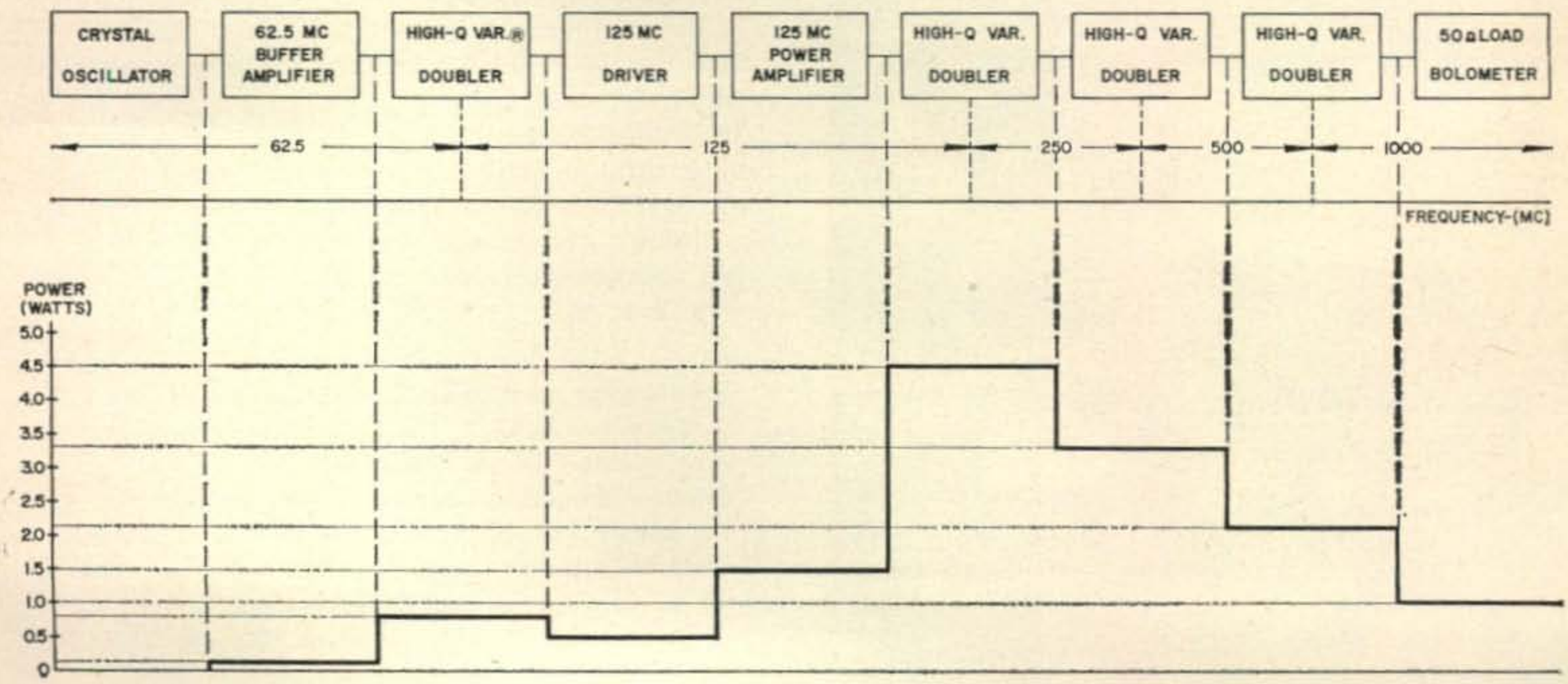
A block diagram of the unusual r.f. generator is shown in fig. 1. The circuit starts with a 31.25 *mc* crystal controlled oscillator delivering approximately 280 *mw* of r.f. power. A series type voltage-variable capacitor doubler circuit is then used to convert this power to 62.5 *mc*, delivering 200 *mw* to an amplifier. The amplifier provides approximately 1.5 watts to a shunt-type high-efficiency voltage variable capacitor doubler which, in turn, drives another amplifier with approximately 1.2 watts at 125 *mc*. This amplifier delivers 3.5 watts to the first of a string of three shunt-type doublers. The output of the final stage is 1 watt at 1 *kmc*. Notice the small power loss in the "Varicap" doublers!

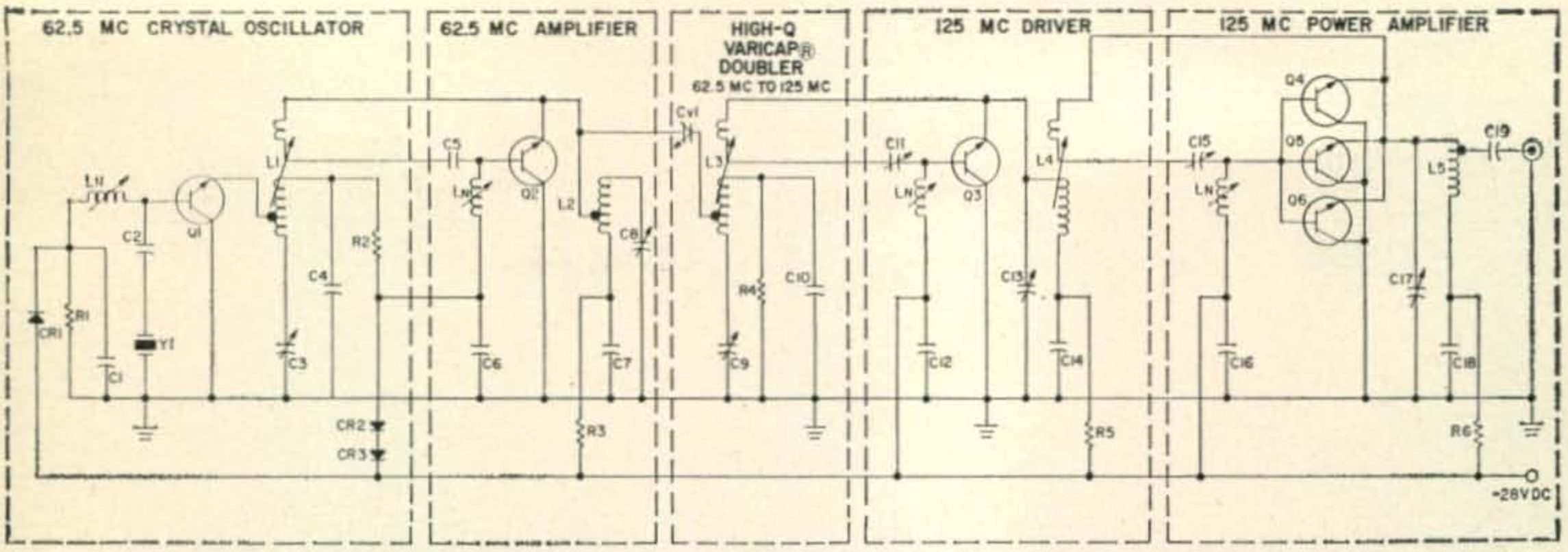
One might think the most satisfactory system would be to start with a 125 *mc* fifth overtone crystal-controlled oscillator. However, for stable operation only about 50 *mw* can be obtained from such a circuit. At high-power levels the delicate crystal will fracture or jump mode. For this reason the low fundamental frequency was used. Greatest efficiency is obtained through the use of doublers (as against quadrupling or octupling) in the "Varicap" stages.

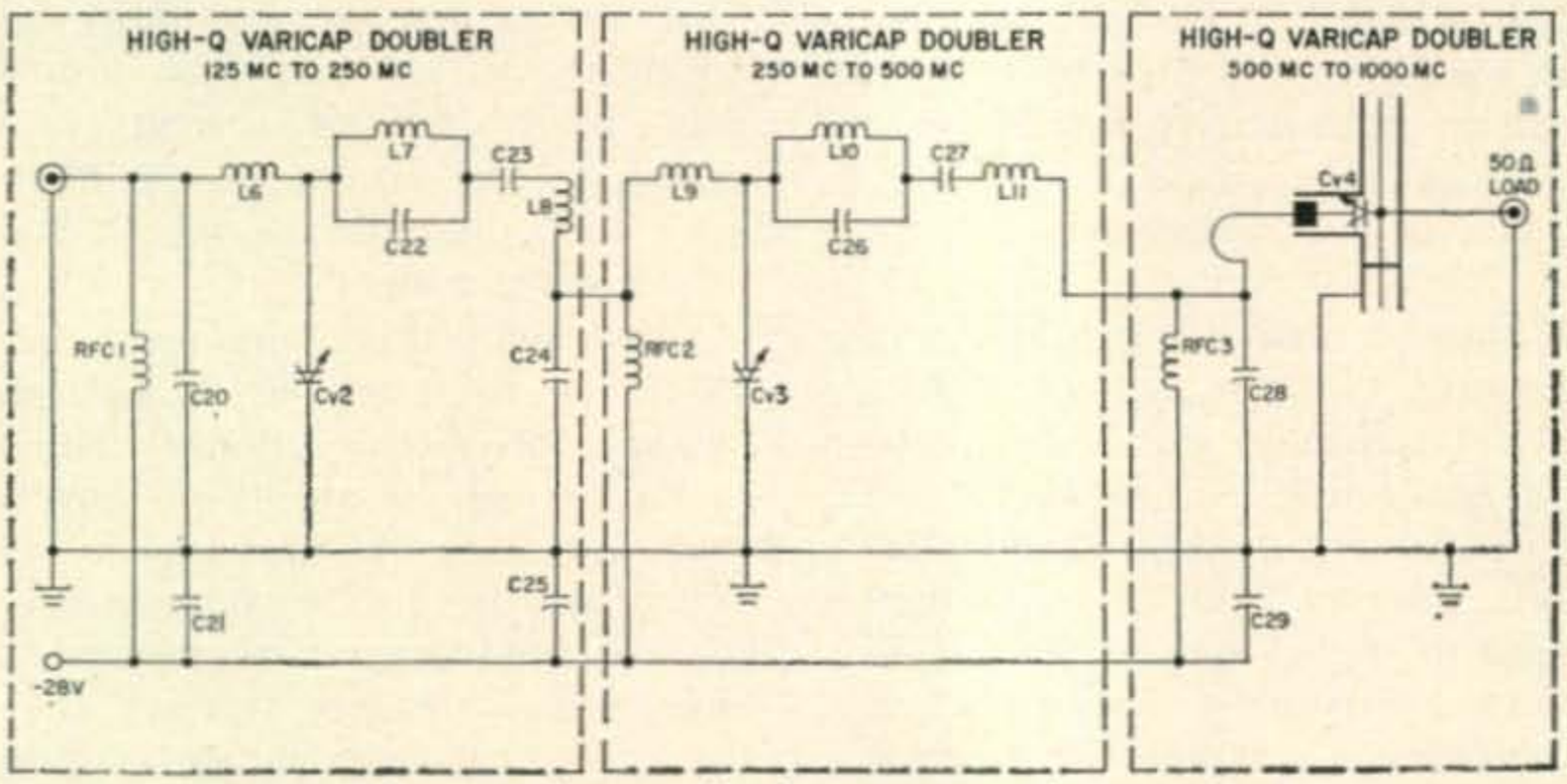
Although they operate in the common emitter signal mode, the amplifier circuits have been designed with the collectors at ground potential so that the transistors can be secured to the chassis for maximum heat sinking. Otherwise the oscillator and amplifier circuits are conventional (see fig. 2).

The remarkable performance of these circuits is directly attributable to the PSI transistors. The complement consists of a 2N1409 oscillator, a 2N1506 in the 62.5 *mc* amplifier, and a PSI PT530 125 *mc* amplifier. In each of these devices the dice is mounted on a molybdenum disc (used as a heat

Fig. 1—Block diagram of the solid state UHF power generator. Note the power level efficiency.







Cv1 = PC113-22
Cv2 = PC117-47
Cv3 = PC116-22
Cv4 = PC115-10

Q1, Q2 = 2N1505
Q3, Q4, Q5, Q6 = 2N1506

Fig. 2—Schematic diagram for the generator shown in fig. 1.

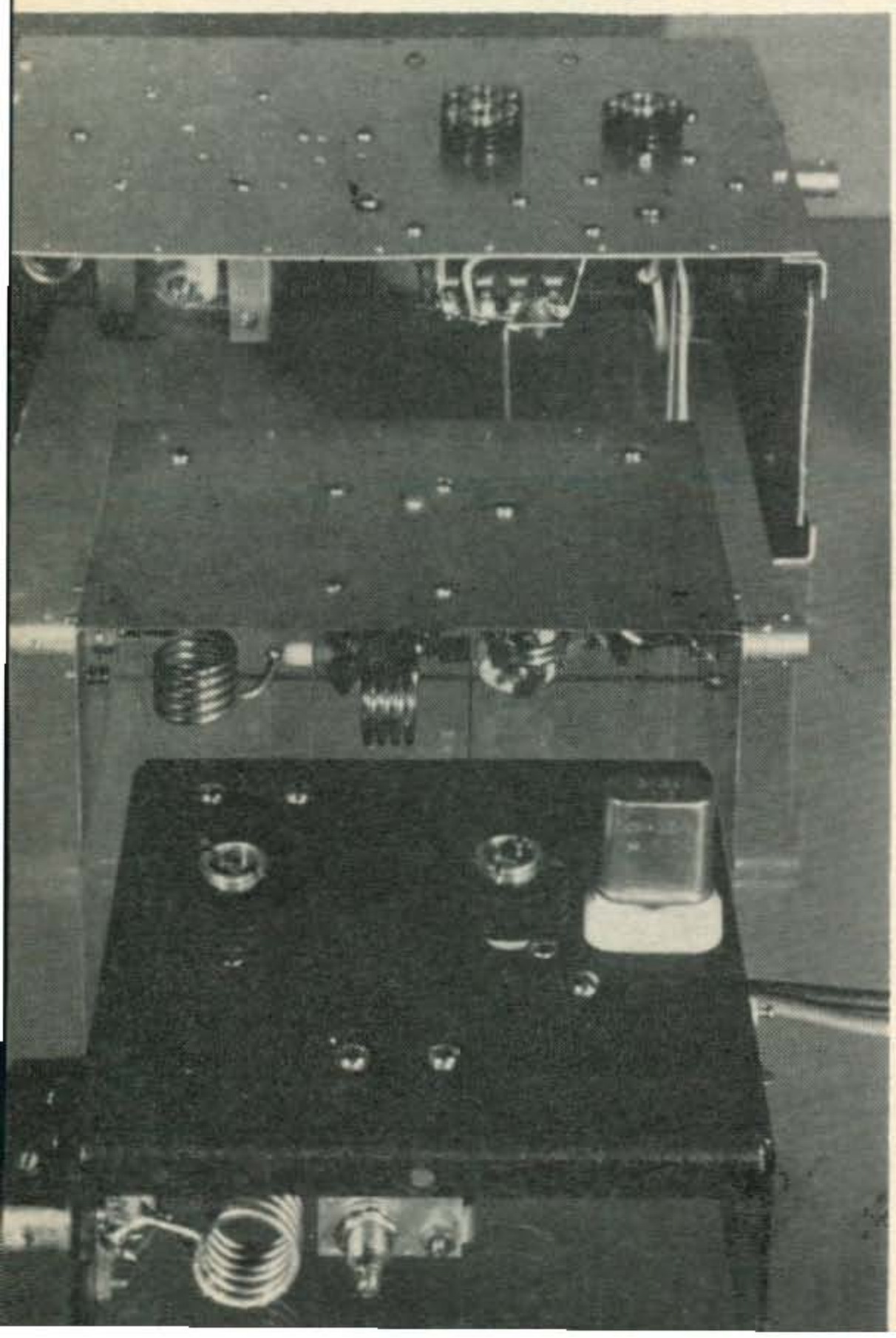
spreader) which is brazed to the Kovar header. In this fashion, an extremely low thermal resistance is obtained between collector and case. The transistors feature a long mesa length and narrow base. The diffusion process used to fabricate these transistors permits control of the base width to a practical tolerance of one-tenth micron!

An interesting feature of this circuit is the component connection which permits the grounding of the collector. The transistor is mounted in a heat sink which is bolted to the chassis. Extremely good heat dissipation is thereby assured. In spite of a collector current of 125 *ma,* the transistor case temperature rises to only about 40°*C* at room temperature.

Another interesting detail is the method of neutralization, which is accomplished by "tuning out" the base-collector capacity by an inductance *L*N. This method of neutralization is very satisfactory at high frequencies where it is quite difficult to obtain the 180° shift necessary for other methods of neutralization.

It should be pointed out that the strays in an "above ground" circuit such as this generator can cause severe detuning. Good short lead v.h.f. practice should, of course, be observed.

No component values are given in fig. 2, for the circuit has not yet been optimized. However, a



A solid state u.h.f. power generating system similar to that shown in fig. 2. The 31.5 mc crystal oscillator is at the right of the lower unit with the 62.5 mc amplifier transistor mounted in the left heat sink. The center unit is the 125 mc varacap doubler, while the top unit contains the 125 mc driver, 125 mc power amplifier and three varacap doublers to provide 1.0 watt output at 1000 mc.

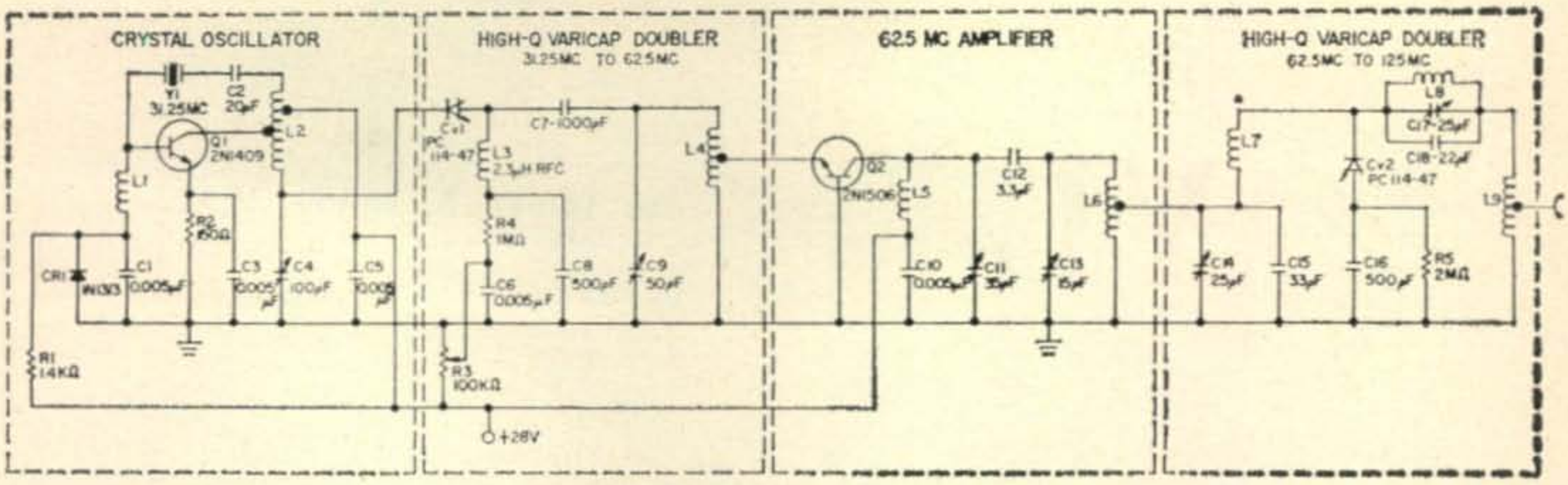


Fig. 3—Schematic for a vhf power generator which can be duplicated by experimenters, using germanium devices (see text).

practical 2.5 watt generator for 250 *mc* is shown in fig. 3. Although the silicon mesa transistors are quite expensive, experimenters can apply the same technique to high frequency entertainment type germanium transistors (about $2.00 each). A less exotic "Varicap" could be used with less power output. A starting point for experimenters might be the Philco T1832 series and a Pacific Semiconductors V-56 Varicap.

You can obtain a reprint of the IRE discussion, along with a revision, by writing PSI on your letterhead, at 12955 Chadron Avenue, Hawthorne, California.

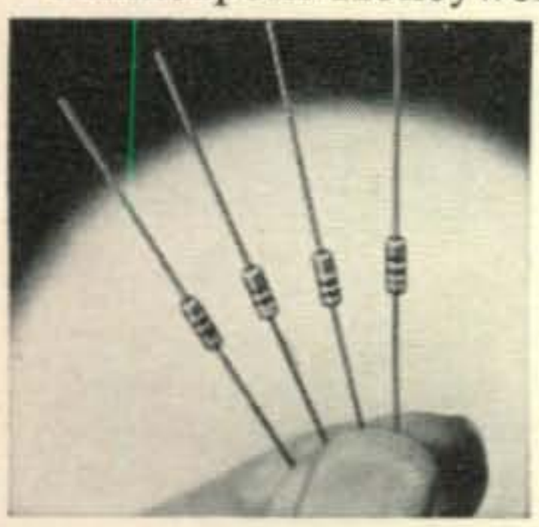
New Literature

RCA recently announced that *"Practical Transistor Circuits for the Hobbyist and Experimenter"* is available at local distributor for 15 cents. The manual provides construction details on nine projects using the RCA 2N307 ($1.50) transistor. Of particular interest to amateurs is the sine power oscillator, converter and inverter.

Transistor News

CBS Electronics is now supplying their famous 2N158 in JAN spec applications. The device is rated at 60 volts, 2 amperes, and 17 watts dissipation.

Minneapolis-Honeywell has just reduced prices markedly on seven germanium PNP types in addition to four power tetrodes. For example, you can now obtain the 3N51 for $6.85.



Low-cost silicon diodes for general purpose applications (Courtesy of International Rectifier).

Mini-Verters, 1881 Austin Avenue, Los Altos, Calif., have expanded their line to include 6 volt to 2,000 volt supplies for scintillation counters (4 megohm output Z), transistor chopper drivers with two balanced outputs for single or synchronous chopping, high voltage MiniVerters for keep-alive T-R voltage or portable cathode ray tube use, in addition to their regular line of subminiature power converters.

Pacific Semiconductors recently announced a line of "Micro Bridge" rectifiers incorporating the "Micro-Diodes" described in this column several months ago. The subassemblies, potted in a ¼" epoxy cube are available for voltages between 50 and 2,000. Micro high voltage rectifiers are also available for voltages between 2 and 10 kilovolts.

RCA recently introduced a particularly intriguing transistor. The device, a 2N1169, is described as a bidirectional germanium alloy-junction type, with a base and two emitters. It may have interesting applications in amateur service as a bilateral audio amplifier in telephone patch equipment (low line levels are always a problem, but bidirectional switching is quite complicated or as r.f. and i.f. amplifiers in transistorized s.s.b. transceivers.

Sperry Semiconductors has a short form catalog available on request to SS, South Norwalk, Conn.

Sylvania Electric has a new line of high frequency computer transistors, types 2N1302 through 1309. They should be useful in amateur transmitter applications for the free air dissipation is 150 *mw*, alpha goes up to 15 *mc*, and the most expensive unit is $4.80.

73, De Don, W6TNS

YL

by Louisa B. Sando, W5RZJ
212 Sombrio Drive, Santa Fe, N.M.

Pioneer YLs

This column in the March 1955, issue of *CQ* carried an article about some of the very early YLs, beginning with Emma Candler, who went on the air in January 1915, sharing with her OM the call 8NH. This article later became one chapter in the book *CQ YL*, together with a few footnotes supplied by ex-9HO on other early YLs. These included Mrs. F. B. Chambers of Philadelphia who was written up in the March 1913, issue of *Modern (Electronics &) Mechanics* as being the first woman to get an operator's license under the 1912 Act. Mrs. Chambers operated aboard the Merchant & Miners Line ships using 3XC, her OM's company call.

The March 1915, issue of the same magazine contained an article about Miss Cecil Powell, secretary to Hiram Percy Maxim (1AW, founder of ARRL), who had her own station. It reported that Miss Powell was the only woman wireless operator in the State of Connecticut, the second in New England, and the fourth in the U.S. Her call was 1WX.

Both the *CQ* article and the chapter in *CQ YL* aroused quite a bit of interest, especially on the part of some of the old-timers, and every so often we receive a note from one or another when he comes across some bit of information about one of the early YL pioneers who ventured into the strange land of wireless.

According to W7RD, the June 1911, issue of *Modern Electrics* carried a story and picture of Mrs. H. H. Birchard, QTH East of White Plains Ave. at 241st St., New York. Her station was quite complete and used an audion detector. She was an instructor in telegraphy. This was before licenses were required and no call letters were given.

Also from W7RD we learn that the *Marconigraph* for August 1913, carried a story about Alice McConaughy of Cincinnati, Ohio, who was recorded as being the first girl operator licensed in the Great Lakes region under the 1912 Law. She was 13 years old when she installed her wireless apparatus about the end of 1912. Her call was 8EZ.

Ex-9HO mentions an item in the May 1916, issue of *The Electrical Experimenter* about a Margaret Campbell of Rockport, Mass., who built her station, obtained a license and was going to use it on her father's yacht. No call was given.

Several wrote about Kathleen Parkin, who operated as 6SO, and was written up in the October, 1916, issue of *The Electrical Experimenter*. W6GH kindly lent us his copy of this magazine and with the permission of its Editor, Hugo Gernsback, pioneer in radio publications, we're reproducing the photograph of Kathleen operating the radio gear she put together herself. According to Mr. Gernsback's article, Kathleen operated 6SO at San Rafael, Calif., and, though only fifteen years old, was an expert radio operator and mechanician. Kathleen also held a first grade commercial radio operator's license. For the article Kathleen wrote: "I think wireless telegraphy is a most fascinating study and one which could very easily be taken

Miss Kathleen Parkin, pictured at the age of 15, operating her station, which she built herself, with the call 6SO at San Rafael, Calif. Reprinted from *Electrical Experimenter* for October 1916. Copyright 1916 by Hugo Gernsback.

up by girls, as it is a great deal more interesting than the telephone and telegraph work, in which so many girls are now employed. I am only fifteen, and I learned the code several years ago by practicing a few minutes each day on a buzzer. . . . You can gradually learn to make all your own instruments, as I have done with my ¼ kilowatt set. There is always more ahead of you as wireles telegraph is still in its infancy." (No longer an "infant," but still good advice!) After World War I, Kathleen operated under the call 6BP and was well known in the San Francisco area.

In this same article, "The Feminine Wireless Amateur," Mr. Gernsback wrote of a number of other early operators, such as Miss Graynella Packer, first sea-going YL operator, and of young women studying radio in Preparedness (military training) Camps. He also reported that the Hudson Navigation Company's vessels, *C. W. Morse* and the *Berkshire* had been equipped with Marconi apparatus and that women operators, dressed in natty blue uniforms, would do the receiving and sending on the steamers.

Another item reported that when the country-wide call was made by the Navy department for wireless operators who would be available in time of war, the first to answer in Duluth, Minn., was Mrs. Otto Redfern, wife of the manager of the Marconi station in that city. Mrs. Redfern was an expert operator and was considering opening a school for women to learn the profession.

The article also mentioned a Back Bay (Boston, Mass.) society girl as being the sixth young woman in the U.S. to receive an amateur wireless operator's license of the first class. And added that when Miss Baylies left for the National Service School she took her license along and qualified as a wireless operator in the field.

In the 20's

Moving into the 20's, Mary Texana "Tex" Loomis, 3YA, operated in the District of Columbia during this time. She had her own radio school for commercial operators. Tex claimed her OM "invented radio," according to W3CDQ, who reports a patent is filed on his inventions.

Another early operator was Sophie Heintz who first went on the air in 1928 as W6GI and operated c.w. only. Sophie says her principal contacts were with the Byrd Antarctic Expedition and one of the Philippine stations, KA1HR. She also worked with Byrd while he was flying over Antarctica and handled traffic from the plane. Her OM equipped nearly all of the early expeditions and Sophie wanted to follow them by radio. They included the yacht, Kaimiloa, which she believes was the first merchant ship to carry shortwave. Also the tragic flight of the Dallas Spirit, which was the first overseas plane to carry shortwave. This plane crashed during a search for other flyers down in the Pacific. She also followed the expeditions of Sir Hubert Wilkens in the Arctic and the Byrd, Wilkens and Elsworth Antarctic Expeditions. Sophie is now operating with the call W6SH.

YLRL Editor for '61

Since putting together the November column about the new YLRL officers, we have word that K6EXQ, Connie Hauck, of Pomona, has agreed to take on editorship of YLRL's bi-monthly magazine, *YL Harmonics*. Connie already has served YLRL as secretary for the last two years. You're jumping from the frying pan into the fire, Connie! Anyway, we all are grateful for your willingness to carry this very big job. Check your Nov. '58 *CQ* for write-up and photo of K6EXQ.

Here and There

Two new YL certificates available: The "Mermaid Certificate" offered by BAYLARC (Bay Area Young Ladies' Amateur Radio Club) of San Francisco, and the "YL Smile Certificate" available in the Oklahoma City area. The latter is offered by members of the Smile Net which meets on 6 meters and includes K5's LRE, QGO, TBW, URF, YQJ, POX, W5WIU, K7KLO. You need four contacts for this one.

Six contacts are required for the Mermaid Certificate, with contacts made after Sept. 1, 1960, being valid. BAYLARC members include: W6's ALL, BDE, DHV, DXI, JKC, PCA, PCN, QYL, SH, USE, WIU: K6's AIE, DEN, EEE, HIW, JHA, LPH, QCL, UDT, ZCR, ZKH; WA6's ALK, DPN, GQC, HDE, HSF, JCS, JGR.

WAYLARC (D.C.) held annual election of officers in September with these YLs elected: President, W3RXJ, Irene; V.P., W3UTR, Meg; secy, W4TVT, Claire; treas., K4EAM, Vi. To celebrate WAYLARC's fifth anniversary the members held a party in October at the QTH of K4LMB.

Our condolences to W4HLF, Arlie, whose son passed away. Also to W3PUG, Helen, on the loss of her OM, Roger.

[*Continued on page 113*]

W6UHA, Maxine, at mike, kept skeds with OM W6TS from station of VE3DTW, Ethel, and her OM, VE3TW, following the YLRL Convention in June. The Williamson's QTH is the Lighthouse on the locks at St. Catharines, Ontario. Maxine and Ethel have become fast friends after many years of contacts via Ham radio, and Ethel and Cy will soon be visiting in Calif. for the tenth winter. VE3DTW has been active on the air since 1949 and besides Hamming she does dress-making (even wedding dresses) and free lance writing. W6UHA has been on the air since 1941 and holds the record among YLs for DX worked—over 270 countries confirmed on her DXCC.

New Amateur Products

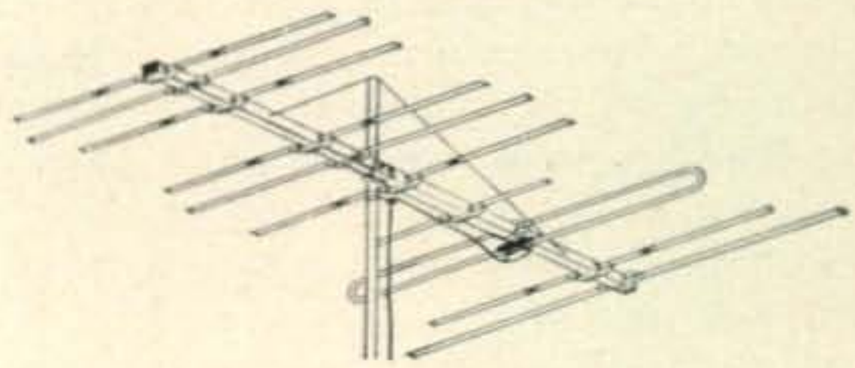
Component Substitutor

MERCURY Electronics Corporation of 77 Searing Ave., Mineola, L. I. N. Y. has just brought out, in a single unit, a componet sustitutor that does the work of three or four ordinary component substitutors. Designated the Model 500, it will substitute 20 values of resistors from 33 ohms to 10 megohms, 10 values of capicators from .0001 mf to .5 mf, 10 values of electrolytics from 4 mf to 330 mf, power rectifiers up to 55 *ma*, crystal diodes, power resistance continuously variable up to 5000 ohms, bias voltages continuously variable up to 15 volts either polarity.

The Model 500 is housed in a slope front hammertone finish steel case with specially designed metal carrying handle that folds back to serve as a rest for the instrument, so that it can be used in a convenient tilted position. For further information circle A on page 120.

V.H.F. Antennas

THE Finney Co. of 34 W. Interstate St., Bedford, Ohio, is now offering a new line of antennas for the 6, 2 and 1¼ meter bands featuring a combination six and two meter beam of unusual design. Designated Model A-62, the antenna uses four elements on a ten foot boom to give 8.0 *db* gain and a f/b ratio of 17 *db* at 50 *mc*. On two meters, a dipole driven element, a three element colinear reflector and four three element colinear directors combine to give a forward gain of approximately 15 *db* and f/b ratio of 20.5 *db*. Other antennas in the line include a four element 6 meter beam, a ten element two meter beam and a ten element 220 *mc* beam. For further information circle B on page 120.



Versatile Transmitter

THE American Electronics Co. (AMECO) of 178 Herricks Road, Mineola, L. I., N. Y. has announced a versatile new transmitter for mobile or home use. Measuring only 5" × 7" × 7", the unit runs up to 90 watts c.w. and 90 watts peak a.m. input on all bands from 80 through 6 meters. Housed in a perforated black cabinet with copper panel, it uses a pi-network output on all bands, has provision for crystal or v.f.o., uses a potentiometer type drive control and a combination push-to-talk mike and key jack on the front panel. The 6146 final runs straight through on all bands. A matching a.c. power supply is available. For more information circle C on page 120.

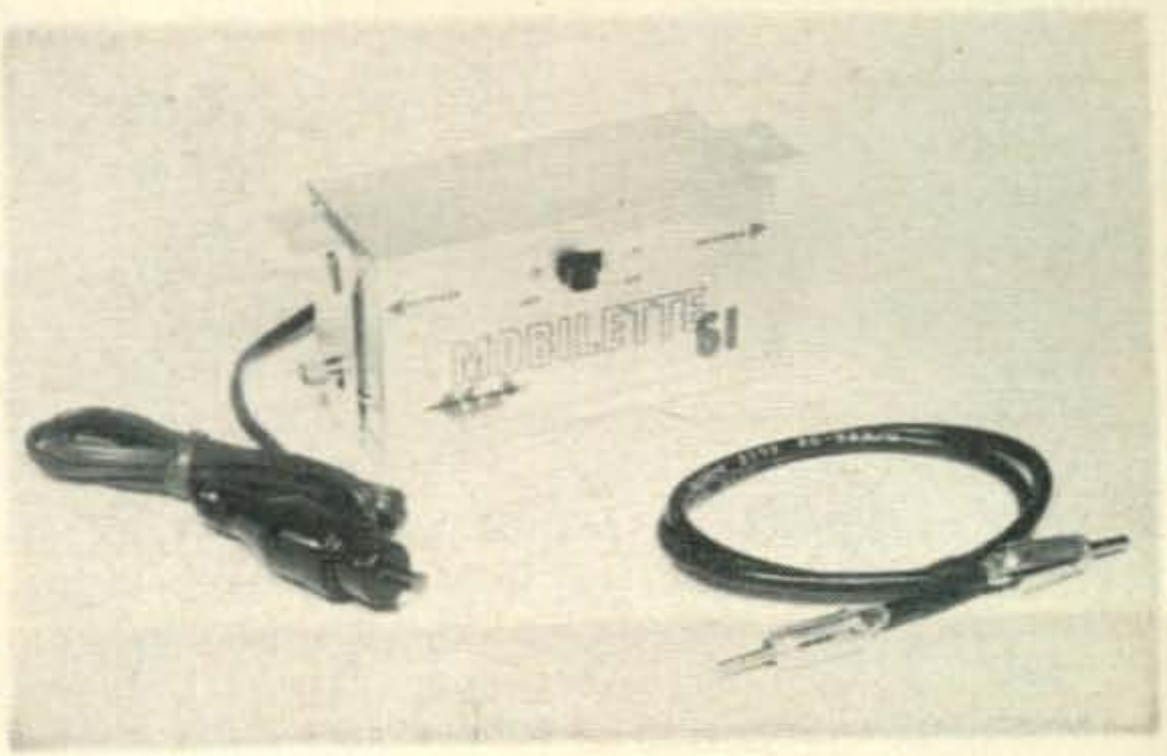
Mobile Converters

A NEW converter for standard automobile radios was announced by International Crystal Mfg., Inc., 18 North Lee, Oklahoma City, Oklahoma. Using three transistors and crystal-controlled, Mobilette 61 is an improved version of an earlier model manufactured by International. Added features include a signal peaking control for greater gain, separate inputs for amateur band and broadcast antennas, new r.f. amplifier, and internal jumper wires which allow operation, with minimum alteration of the unit in automobiles with either negative or positive ground systems.

The unit measures 4⅜" × 2⅜" × 1⅞". It is designed for easy installation under the dashboard.

A single switch places the unit in or out of operation. When not in use., Mobilette 61 allows the automobile radio to remain in its standard broadcast range. The new converter uses the 600 *kc* to 1600 *kc* i.f. Units are available for 75, 40, 20, 15, 10 and 6 meters. Frequencies specified by the user from 2 *mc* to 50 *mc* are also available on special order.

With power supplied through the cigarette lighter socket, Mobilette 61 is intended for use in automobiles with 12 v.d.c. systems but may be operated on 6 v.d.c. at reduced output. The unit is sold ready to plug in and operate with full installation and operating instructions. More information may be obtained by circling D on page 120.



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Collins KWM1 SSB/Mobile	595

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B & W 370 slicer	$ 49.00
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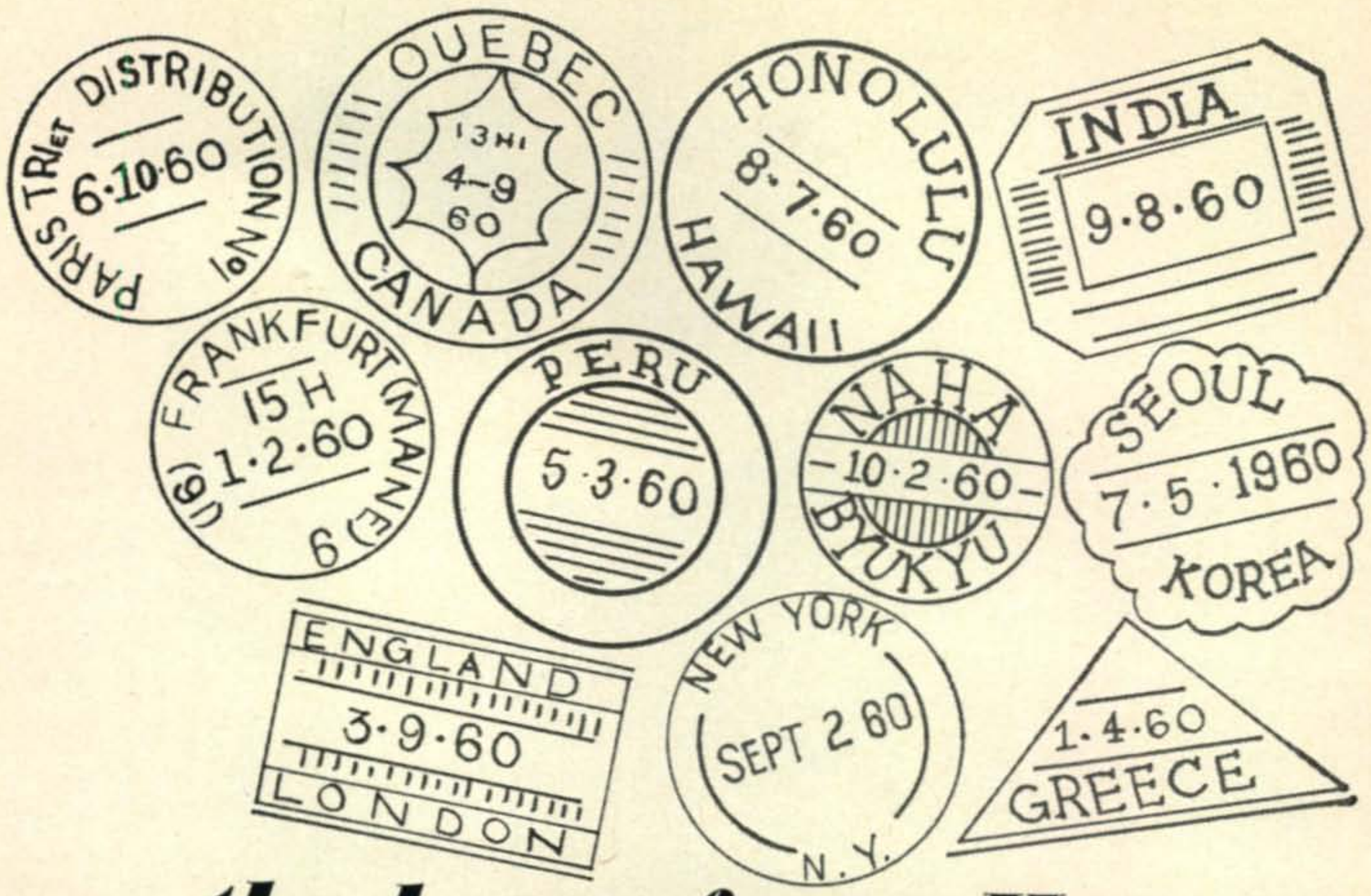
For further information, check number 23, on page 120

"Twas The Night Before...?"

'Twas the night before last and all through the shack
The equipment as always was still out of whack.
The fones had a bad spot someplace in the line.
And the rusty alarm clock refused to keep time.
My over-size ashtray was littered with snipes,
Gum-wrappers, stub pencils, a couple of pipes.
The trusty dot-maker all covered with dust
Was fighting but feebly the onset of rust.
My old Hallicrafters with a flat 6A8
Was trying to pull through a weak VE8.
While down from the window there happened to tumble
A dozen-odd wires; Egad! What a jumble!
A junkbox was bursting with mouldy old gear,
Neglected, but cherished, for many a year.
The logbook just bristled with sked, ads, and notes,
"The Loading of Pentodes," and "How to Raise Goats".
A trusty long skyhook swung under the stars
(a dandy emiter of black TV-bars).
I turned on the box that gives out the noise,
Thinking I'd hear all the usual boys.
Then out of the speaker came a whopping CQ,
A clean-sounding signal, I paused to see who.
His transmissions were brief, his words were so clear,
His procedure the kind, that a guy likes to hear.
I zeroed him quickly and flipped on the soup,
Never dreaming he'd answer a rig with no poop.
Said he: "The handle on this end is Sandy,
Just finished working your sweet rich old Aunty.
She's sending a gift with a value eternal
She's sending you *CQ, The Amateur's Journal.*"
And I heard him repeat: (noise here is infernal)
"All true, active hams need *The Amateur's Journal.*"
The moral is this; quick, send in your dough!
CQ gives *you* what you want to know.
However you do it, be it by key or mike,
You'll find in it, all of the things that you like.
And lest I forget it (my schedule's *so* tight)
Merry Christmas to all, and to all a Goodnight.



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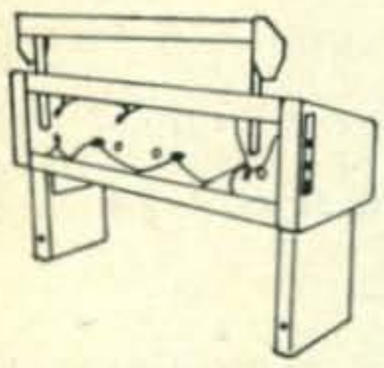

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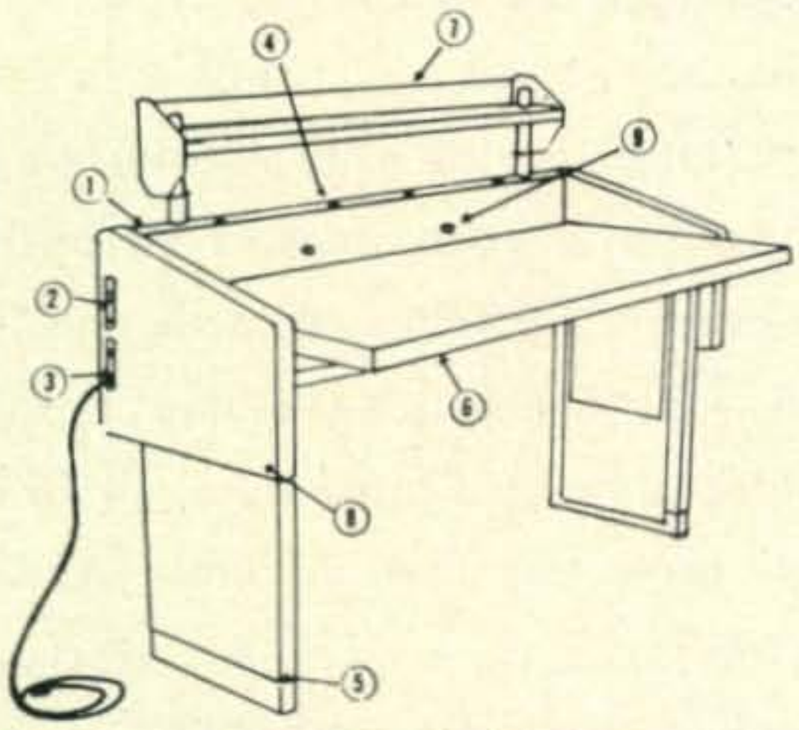

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Random Thoughts — — — —

From the Boys in the Back Room

THE power of the press is a sacred trust; it must not, dare not be abused. We, the staff of *CQ*, recognize with pride and with humility, the privilege we have been granted—the privilege to act as a vital source of communications within our hobby.

And, as we watch the dramatic growth of amateur radio, we realize more and more with each passing day, that ours is a serious hobby, a hobby for mature minds. It is a creative hobby, one that knows no economic or social barriers. We also recognize that as a major member of the free press, it is our duty to provide our readers with the information they need, both in the form of technical articles and news reports. It is our fortunate position to be able to express our views on many matters of interest to radio amateurs—and to provide our readers the opportunity to express their opinions as well.

And as we continuously remold our format to match the changing times, we are most aware that our biggest single objective must be to inform. This we pledge to do; to inform our readers to the best of our abilities, keeping in mind at all times that this *is* a serious hobby.

There is no place for levity in *CQ*, no place for sarcastic non-constructive criticisms of any sort, and certainly no place for the building of any individual's personal ego or selfish interests. There will be occasional humor in *CQ*, for humor too, has its place—but humor in *CQ* will be amateur radio in spirit, and will be a means rather than an end. This then, is the spirit in which we pledge to publish *CQ*. You, our readers, will be the judge as to our success.

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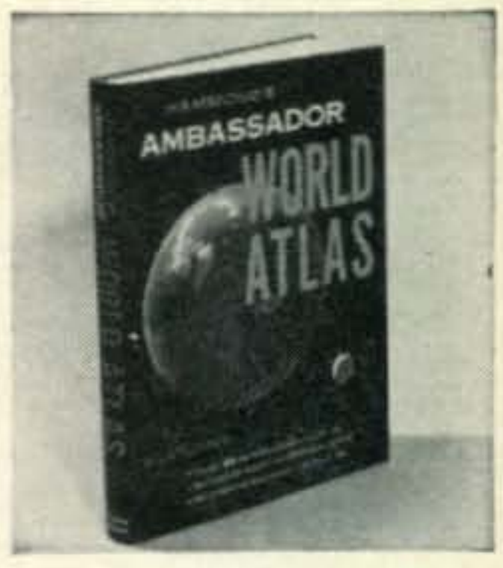

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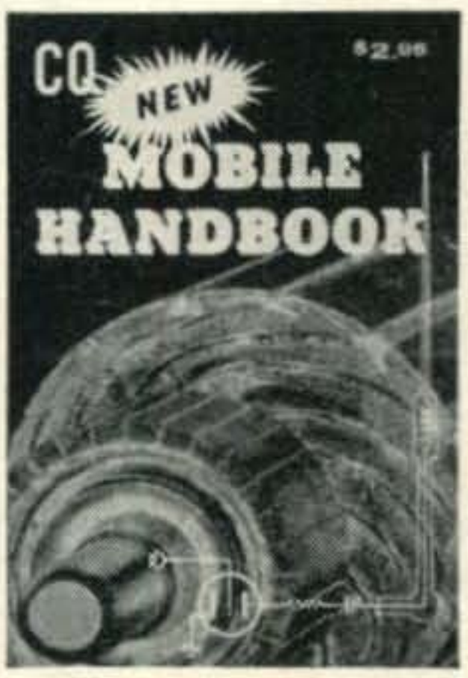

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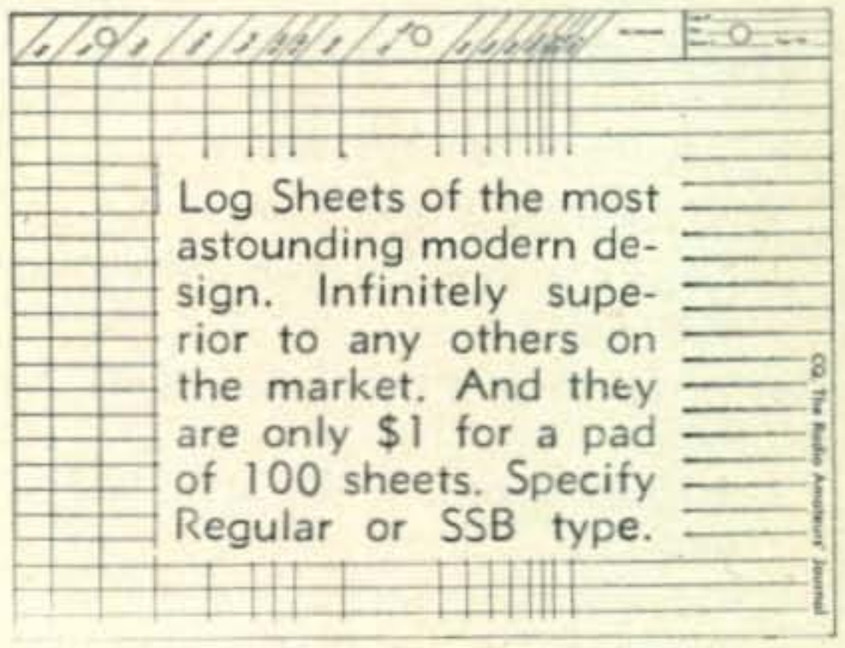

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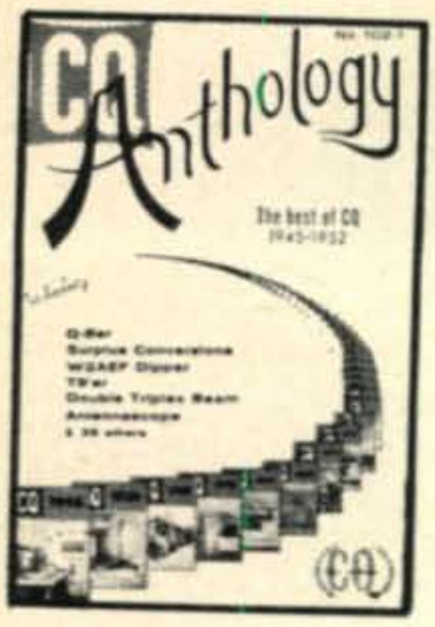

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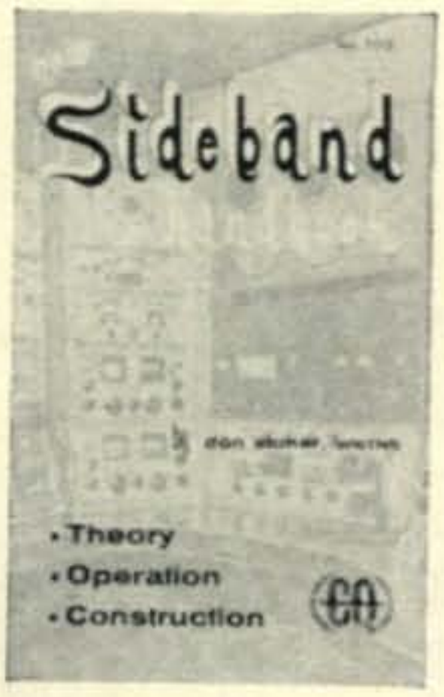

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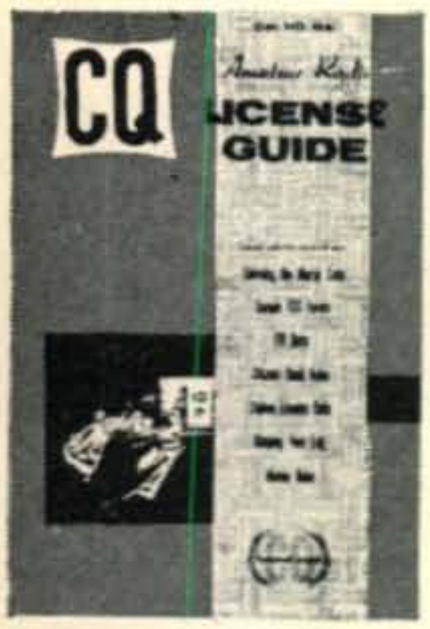

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For further information, check number 28, on page 120

LETTERS [*from page 18*]

Lone Voice On Tobago

Editor *CQ:*

After reading the article "Lone Voice on Tobago" in your September issue I feel that I must correct the statement in the leading sentence of the article that VP4WD operated the first amateur station in Tobago. To which particular ham that honour belongs I cannot say, but I do know that VP4MM has been on the air from Tobago and I have been told that there was a ham on the island in the thirties. As far as VP4MM is concerned I can speak with feeling, having transported the rig in my car from my home here in Trinidad to the hotel at which I stayed in Tobago. When I say that this trip involved an overnight journey by drive-on, drive-off car ferry it will, perhaps, throw the exploits of VP4WD into proper perspective. After all, Trinidad and Tobago are comparatively civilized places and the "DX Expedition" atmosphere which pervades the article in question is a little hard to understand when it is considered that Tobago is a flourishing little tourist trap with regular air and sea communications, tarmac roads and several excellent hotels. We are all past the "swinging from the trees" stage in this corner of the Caribbean!

Finding replacement electrolytics in Tobago must have been difficult, I admit; instead of nipping round to Lisle Street the drill in Tobago is to pick up the telephone and ring any one of at least three or four well stocked firms in Port of Spain—the replacements being sent across to Tobago within a couple of days. No, I must say I am on the side of the "famous firm" which refused to lend '5WD a receiver. After all, if they lent one to him, how could they refuse all the rest of us VP4's? And there must be something like twenty of us, mostly active. Certainly Eddystone didn't give me my 888A free so that I could put Trinidad on the map. I didn't expect them to, anyway.

It seems to me that the whole of this "Expedition" business has got a little out of hand lately. Speaking for myself, it is rather amusing to see characters turn up in boats, or what have you, announcing that they have arrived to give hams "another country" and arranging schedules, erecting aerials, fuming over licence delays, operating under enormous pile-ups and last (but not least) writing an absolutely fascinating account of the whole thing for the amateur press. And, of course, there is the occasional one who used up all his ready cash in the process, and would like you kind hearted people to please send one small piece of hard currency with your cards! And all the time there are one or two of the natives quietly operating in what spare time they have left after earning a living, piling up contacts with all sorts of interesting countries, including the occasional W!

No, I really think that it is time that the Caribbean was declared off limits for expeditions. All the habitable islands have a ham population of their own and I can't, for the life of me, see the object of going to an uninhabited island just to contact the folks you left behind! Half the fun in ham radio lies in talking to people of different countries. Who wants to talk to his next door neighbour just because he has traveled several thousand miles to a wind swept rock in the middle of nowhere?

Not that I want to stop people like VP4WD from operating here, far from it. Let them join the gang here on an equal footing with the rest but don't let's have any nonsense about "Lone Voices" in VP4 land. I might just as well stage an expedition to London S.W. 19 next time I am home on leave! Incidentally, I can't understand why cards are not being forwarded through the VP4 QSL Bureau. I have always received mine without trouble. When I get my aerial up again I must ask the rest of the gang what happened and see if we can't get some action on these elusive cards.

M. W. Berner, VP4TAM, ex VP5MB, ex VP1MB
P.O. Box 67, Port of Spain, Trinidad

A copy of this letter was sent to Jack Lambert, G3TA, and "Equal Time" is presented here with Jack's answer.—Ed.

Editor *CQ:*

Thank you for the photostatic copy of the letter from VP4TAM and the courtesy of space for a reply to what I

NC-270

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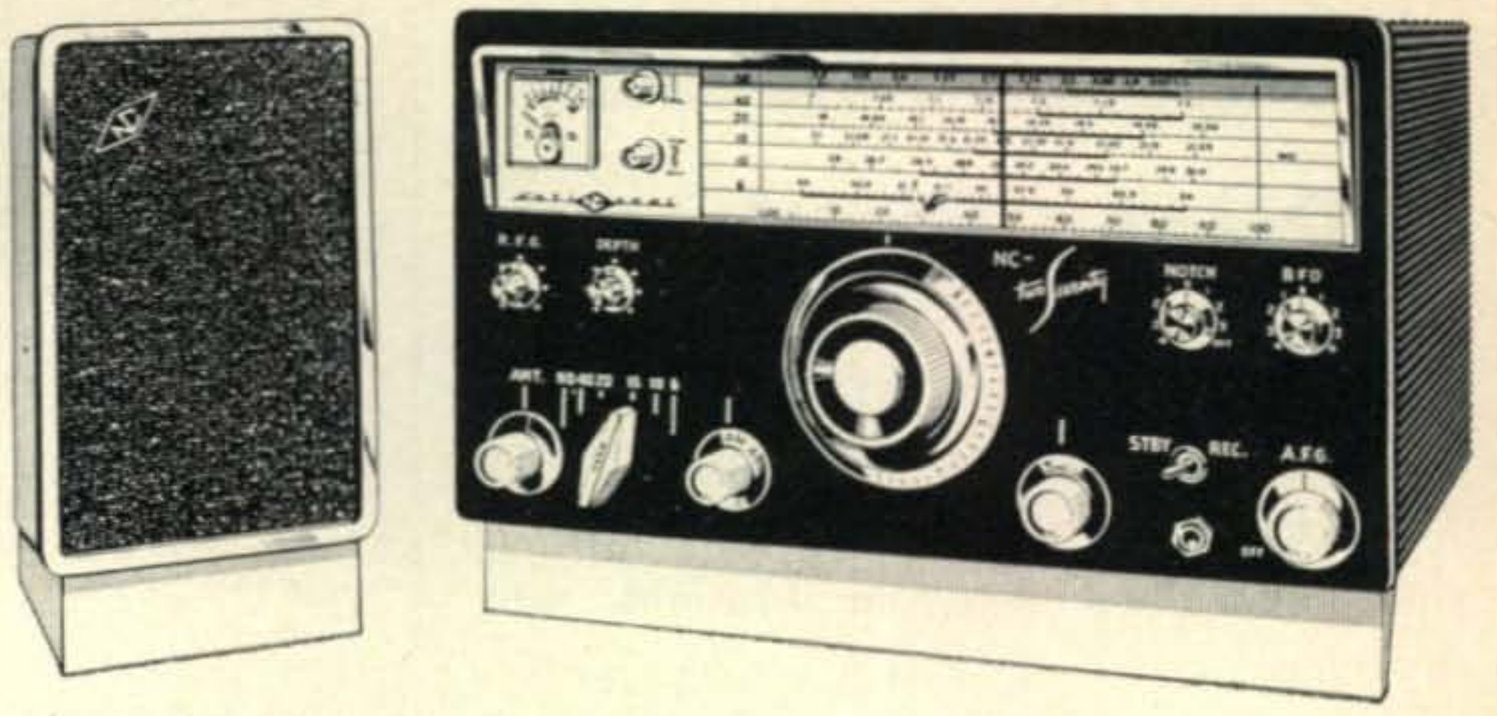

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QSL contest

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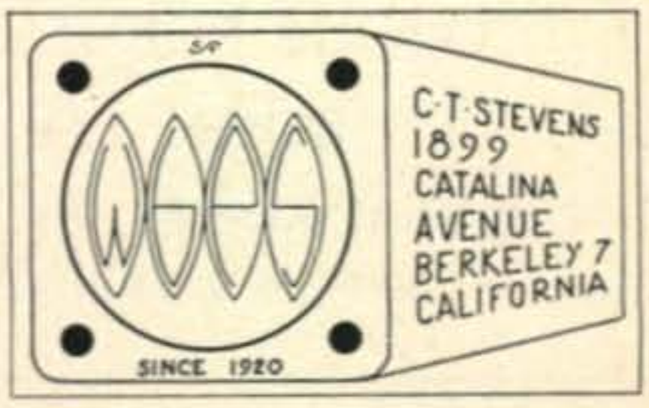

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consider a rather unjustified diatribe from a fellow ham and countryman.

However, at least someone has taken the trouble to write me from VP4-land, even though it does contain a shower of brick-bats.

I see the opening remarks of the letter concern the matter of the first active amateur station on Tobaga. I do think, in all fairness, that 'TAM should have fully qualified this by giving dates 'freqs' and countries worked by VP4MM during his operation there. Some definite information on the unknown ham's activity in the 30's would also be of great interest to everyone. All I can say is that I made several inquiries to folk resident on the island, from the few VP4's I worked on 40 meters and also from the Editor of 'This Month on the Air' of the RSGB *Bulletin* all with negative results of previous activity.

To suggest that I created a 'swinging from the trees' and a 'DXpedition' atmosphere in my article is, surely, a gross overstatement.

Bearing in mind my remarks on the electricity supply company, the comments on page 124 of the September *CQ* and the inset map. I quite agree that Trinidad and Tobago are "comparatively civilized places" and would suggest this is applicable to Trinidad to a far greater degree as far as facilities, utilities, and amenities apply. In any case surely it is obvious to 'TAM of all people (living on the doorstep as it were) that his reactions would be vastly different to operators and readers in New York, Berlin, Moscow or even London S.W. 19. VP4WD was most definitely not set up or operated as a DXpedition venture.

The gear was flown out in my personal luggage to provide some enjoyment and relaxation from the pretty strenuous business of location filming and (hopefully) as a means of contacting amateur friends back home in the U.K. and W-land.

The fact that I had modest success in doing just this with my very limited spare time, with simple makeshift aerials, a pretty well obsolete low power rig (by modern standards) and only a puny, unselective 4 valve RX with no refinements is surely no cardinal sin and a reasonably creditable effort.

VP4-land even in 1959-60 is still rather scarce DX and Tobago even more so. This is not just my opinion but the fact emerges from cards and letters received. These are from amateurs in several countries who wrote thanking me for QSO and QSL. In nearly every case VP4WD was both their first VP4 contact and in all cases their first Tobago QSO.

Quite a number of other stations enquired in QSO if I could do anything to help to get QSL cards for them for VP4 contacts made 12 months or more previously.

I'm not at all happy either about "this business of characters turning up in boats, or what have you" etc., etc. I went to Tobago because it happened to be part of my job to earn a living—the same reason I presume that VP4TAM is in Trinidad. If I want to operate a station on Tobago and folk who contact me wish to know how and why, what and when, I am at liberty to assume that a certain percentage of other hams are possibly interested in hearing all about it too.

Hence the "absolutely fascinating account of the whole thing for the amateur press." Mr. Berner! I'm so sorry I've upset you in the process. You didn't have to read it y'know!

It may be of interest also to hear that I did receive one QSL card together with a one dollar bill (U.S.) and another with a dime stuck to the QSL card—all entirely unsolicited, I assure you. Fortunately people appreciate that cards posted direct amount to quite a bit and I.R.C.'s were enclosed in most cases.

One other point, on the query of 'phoning Trinidad for spares. Seeing we left the hotel at 7 A.M. (and earlier) each morning, six days a week, and didn't return until 6 or 7 P.M. each evening, it wasn't all that easy and at close to one dollar for a call to Port of Spain, not very economical, as the Disney people discovered!

There is quite a lot more I could say in reply to VP4TAM's letter, but have encroached on your space for too long.

My thanks again to *CQ* from 'The Lone Voice from Tobago.'

Jack Lambert, G3TA, exVP4WD
327 Parkway, Iver Heath, Bucks, England

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Dec. 11—"Analog And Digital Computers." Mr. G. W. Davidson, American Bosch Arma Corp.

Dec. 18—"Design And Application Of Special Development Test Equipment." Mr. J. Foster, American Bosch Arma Corp.

Dec. 25—"Merry Christmas." No broadcast today.

Jan. 1—"Happy New Year." No broadcast today.

Jan. 8—"Exotic Applications Of Semi-Conductors." Mr. R. R. Darden, American Bosch Arma Corp.

DX [*from page 64*]

across the pond, and several new countries are expected to be heard from this year. Already the SWL's who have been so helpful are sending in reports to W1BB.

Information Please: Be sure to keep W1BB fully informed of any activities pertaining to 160 meter DX for correlating and sending of information to DX editors of various amateur magazines throughout the world.

1BB: Stew is working on a *new* antenna for W1BB/1 operation at the Winthrop Yacht Club where it is entirely over the Salt Tidewater and hopes to be putting out a real hefty DX signal on 160 this season, starting in November.

Typical of the feeling of the 160 meter "guns" is this letter from K8IUA.

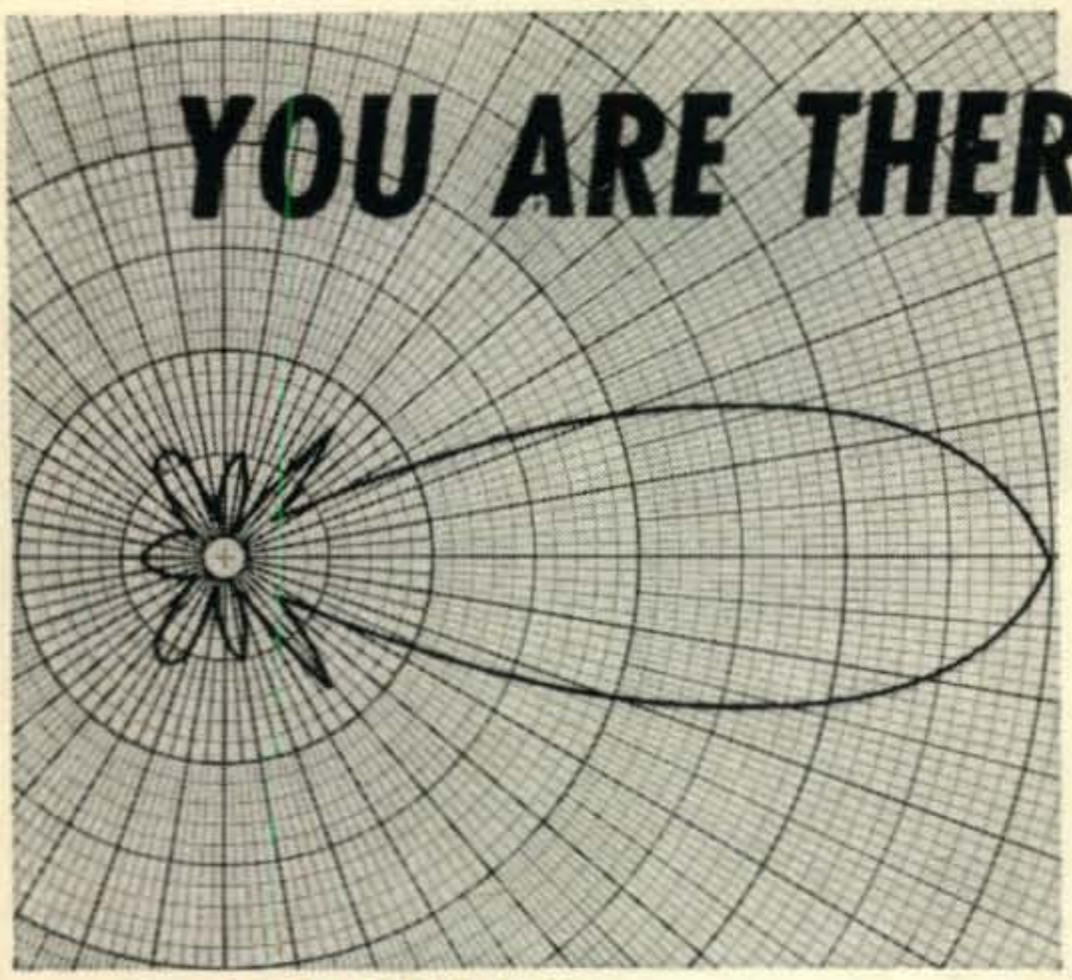
"...I have written about twenty different amateurs in quite a few countries to set up possible skeds on the "Top Band". So far the results have been quite good and the fellows seem to be interested in the project very much. Those who cannot operate are going to devote some time to SWLing for me if their time permits.

I am starting my skeds with Ern Orchard, G3PU, the first Sunday in October at 0500 GMT. I will be calling CQ DX all winter, every Sunday starting at 0530 GMT., and will tune from 1790 *kc* to 2000 *kc* for five minutes after each call."

Fred would like letters from anyone with 160 meter information.

Here And There

FQ8HP is active on 21046 *kc* around 1950 GMT QSL SVØWT (Crete) via K2RYP. Look for him on 21 *mc* fone around 1900 GMT. (Tnx W8JIN)—UA9CM, UR2AR, UP2CG, UL7BK, UB5FJ, UAØBQ, and UO5PK are new ones on s.s.b. (Tnx K6BX)—Bob, W2FXN, now has 39 zones worked



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For further information, check number 33, on page 120

NOVICE [*from page 75*]

Help Wanted

W7- Albert Hale, Route 2, Boise, Idaho.
W9- Jimm Fobes, 1131 So., 5th Ave., Wausau, Wisconsin.

Letters

Ray L. Mote, Jr., KN5FKT, 1110 East Caesar, Kingsville, Texas, leads us down the antenna covered path this month. Ray "bombs" 'em with a homebrew 50 watter built from the ARRL Handbook, along with his S-38E and compacted 40 meter doublet. Ray is a regular on 40 and would like skeds for any reason, but particularly to make the Rag Chewers Club. He's QSL's 100% and has a raft of crystals so drop him a card for a sked.

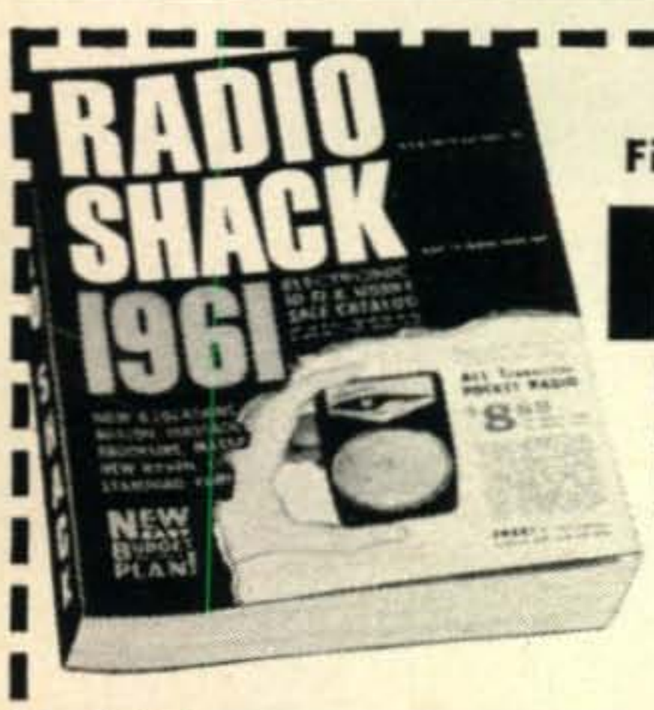
Ex-Novice Terry Travis, 732 S. Pine, Kermit, Texas, holds the call K5WNH and has been on the air for a year and a half. The WAS currently resides at 49/48 by spurting 65 wild watts on 40 and 15 meters with a DX-35. The hearing aid is an SX-71, which may magically turn into an SX-99 about Christmas time. Terry would like skeds with N. Dakota and Wyo., so he can forget about WAS.

Bob Chapko, KN9YKN, 1628 Monroe Ave., South Milwaukee, Wisc., exhales with an Eico 720 into a "Windom" off center fed antenna, and inhales with a S-107 and antenna tuner. Bob works all Novice bands and has picked up a WAS of 28, along with a VE3. He will sked for any reason and like all Novices QSL's 100%.

Harold G. Ward, KN7JZO, Route #1 West, represents the rare state of Montana from Whitefish by smoke signalling with a DX-20 and SX-100 into a two dipole antenna farm. Results so far are a WAS of 43/43 with VE's 3, 6, and 7 thrown in for good measure. Hal will sked anyone needing Montana or for rag chewing and sends out those paste boards 100%. You forgot to include the pix-Hal.

That blows our fuse for another 30 days or so. For now,

73, De Don, W6TNS



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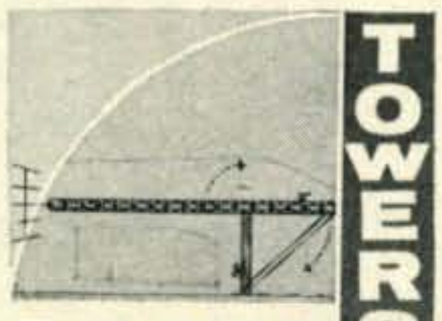

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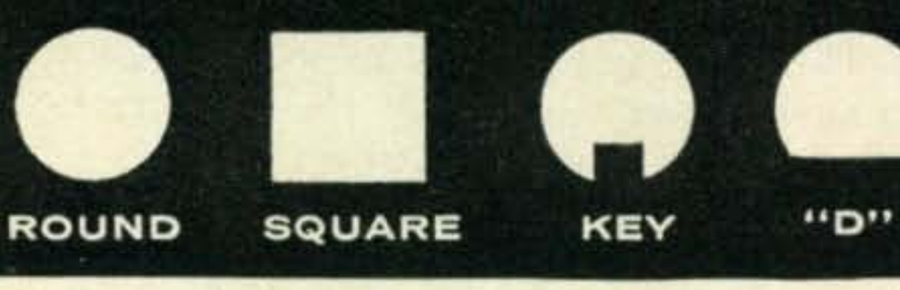

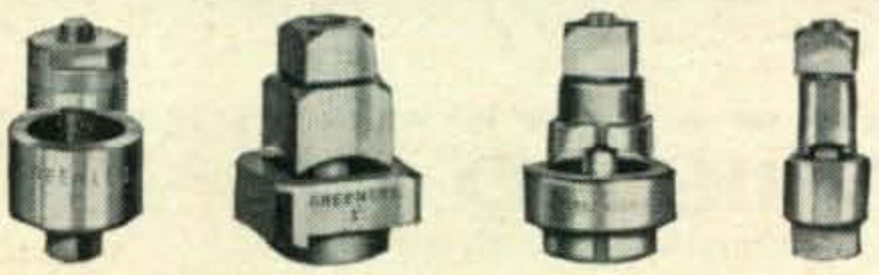

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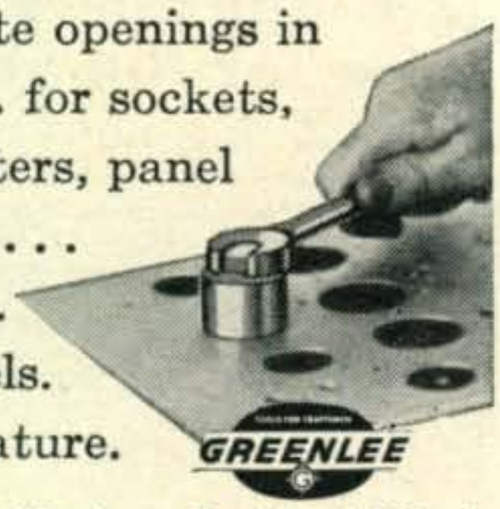

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on two-way s.s.b. thanks to UA9KOG and UAØBQ. He already has both cards—Don't forget W3ZA will be operating as FL8ZA from about December 8th to 12th—Would suggest you don't pass up any UA2's if you don't already have one. They have a very good chance of being a new country—Deane Laws ex VR3B is now VK3AMI — QSL's for XEØANP should go to K6ANP with the usual SASE. W6HVN was the second op on this trip —K4KTR is now QSL manager for XW8AL— CEØAD operates frequently on 14064 or 14080 around 03-07 GMT—QSL via CE3HL. (Tnx *DX News)*—EA6AW is very active on 14 *mc* a.m. around 1800 GMT—VQ8BFC was none other than VQ9HB. He will return to Chagos again in the future—VR3KD is ex 4S7KD and is very active on 14/21 *mc* c.w. QSL via K5ADQ. (Tnx *DX News)* —6O1TUF is very active on 21 *mc* fone and c.w. between 14-18 GMT most days. 6O2GM, likewise, on 21220 *kc* between 15-17 GMT. 6O2NG 21 *mc* fone and c.w. around 16-19 GMT. (Tnx *DX News)* —The boys at VR3L would appreciate unused U.S. stamps rather than IRC's for QSL return. Their QTH is Christmas Island ARC, British P. O. Box 170, c/o Post Master Honolulu, Hawaii. (Tnx K6BX)—The new secretary of the "Amateur Radio Mobile Society" is G3FPK, 79 Murchison Road, London, E. 10, England. Joe, K2OLG, who sent this info in has 97 countries worked on 28 *mc* mobile— The new HM calls belong to Korean Nationals. HL will continue to be used by Americans. HMØ is the club call—ex VS1FJ, 4S7FJ, VS9GT is now G3IRD and his QTH is F/Sft. Frank Johnstone, c/o Signals RAF Linton on Owse Nr York, Yorkshire, England—QSL VP2MB via W4CKB, Box 88, Lake Placid, Florida—K6BX reports that cards sent to the Radio Club of Cuba for one of their awards have been lost and that the Club is no more. Clif would also like to hear from any DX station that would like a QSL manager or from anyone who would care to become a QSL manager—KA2DE is now at 837th AB Gp, Shaw AFB, S. C. and will be glad to send anyone a QSL who didn't receive one of his—EL4A requests that all QSL's be sent directly to him. Ken would also like everyone to take a closer look at 40 meters—Don't forget the S.S.B. DX Contest in January. See the SB column for full details. Speaking of s.s.b., some of the better stations worked at K2TDI recently include LU9ZX, VU2RM, CT3AV, VQ9TED, VR1G, 9N1CJ, EAØAC, UA9CM, and 9Q5US.

For an up-to-date listing of all QSL Managers and QTH's of rare DX stations, drop a line to K6BX for information on his *DX QSL Newsletter*. Clif lists over 1000 QTH's.

73 es DX, Urb, W2DEC

HAM CLINIC [*from page 69*]

a hot band opening, I'd invite the whole "gang" to participate in the QSOs. Speaking of "togetherness" this is *it*. You're a lucky father! But what is mom going to do in the meantime—watch TV? No. I'd encourage your brood to operate all they wanted to and you spend some time with the XYL. I wish I had the "problem" you think you have!

Neighbors (Again)—"My neighbor's TV swamps my receiver with its noise making oscillators . . . or something. So I went next door and told them what was happening. 'Good,' he says, 'now you'll get a taste of your own medicine' and practically threw me out of the place.

"Is there anything I can do legally to make him have that set fixed?"

TV interference is just as serious as ham caused TVI. Court battles are expensive, and you certainly can't retaliate by knocking his TV programs out with your r.f. If you have no TVI Committee, I would suggest you drop a line to the FCC and explain the situation. Perhaps a letter from them to your neighbor might straighten out the situation. But there is no reason for any TV radiating such a strong signal.

Again, diplomacy will pay off. Do be courteous and if necessary suggest that you would be willing to call in a reputable serviceman to see what he can do. Emphasize the point that a set radiating as his does certainly must not be operating at peak efficiency.

Apparently however, you did give him some TVI at one time or other and his memory is pretty long. I am led to believe that the set *is* malfunctioning *if* you have never noticed the noise before.

Thirty

This column marks the end of three full years with *CQ*, and I have enjoyed every minute of it. Helping hams the world over with their technical and non-technical problems has required a lot of research, a lot of assistance from unselfish hams and manufacturers and many, many hours at the typewriters on week-ends and evenings.

During the past three years, thousands of communications were answered, and I would be remiss if I did not mention the fact that my XYL, Elfriede did the bulk of note transcription and literature research during the day while I was performing my regular duties. To her, I owe a debt of heartfelt gratitude.

No attempt was ever made to "gild the lily" because when we did not have the answer we said so. We made mistakes and some of our replies could have been much longer. But in the majority of cases, we did come through.

We appreciate the many letters expressing good wishes and interest.

During the coming year we hope to bring you information that will make the hobby of ham radio more enjoyable and meaningful.

So to all of you wonderful ham readers of HAM CLINIC, we say, thank you and a Very Merry Xmas and a Happy and Fruitful New Year. . . . 73 and 75, and to my DX friends, a big sincere 72.

Chuck

RTTY [*from page 73*]

M_1 is set to any convenient operating current, 30 *ma* perhaps, by the TU output current control, then the meter M_2 is set to one half that value (15 *ma*) by the 5000 ohm wire-wound BIAS ADJUST pot.

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Patching in other equipment is easy. Receivers are simply plugged in as required, using M_1 meter to set the level. If you wanted to be real fancy you could set up an audio mixing system so you wouldn't have to switch. If you are going to work 6 or 2, AFSK output to the v.h.f. transmitter is taken right from the jack connected to the AFSK oscillator output and fed to the modulator. Although a balanced audio line is preferred, as Although a balanced audio line is proffered, as shown on the diagram, an unbalanced (one side grounded) system could be used, *if* care in grounding is exercised.

When plugging in other teletypewriter machines, the keyboard or sending circuit and the receiving selector magnet circuits must be separated and connected to the usual red plugs and black plugs respectively. If any spark suppression *R-C* circuits are connected across keyboard or sending contacts they should be opened up so as not to possibly foul the keying circuit in the AFSK oscillator. A solid ground connection should be made to the frame and table of each machine used. It is suggested that shielded cables be used with the black plugs of any additional receiving machines.

Weather Bureau RTTY

We get many requests to print schedules and frequencies of commercial RTTY stations. To do this would be impractical for many reasons, such as the fact that very few use standard single channel shift and standard 60-speed. Many of the requests received are from amateurs who also have another hobby (or business): flying. These fellows are acquainted with the land line *Teletype* system, found at large airports, which provides NOTAM's and flight weather information. "Isn't this put out on RTTY?" is the usual question.

Well, generally speaking, the answer to the above question is no; except, the Weather Bureau has an RTTY station in Miami which transmits weather information for airmen to the Caribbean area, for the most part. Here is the schedule of operation of WBR as supplied by Fred DeMotte, Secretary of the Florida RTTY Society:

3225 *kc*	2030 to 1400Z
5937 *kc*	Continuous
8130 *kc*	Continuous
10,950 *kc*	Continuous
14,395 *kc*	Continuous
16,440 *kc*	1155 to 0500Z

This traffic, please note, is directed to machines with weather symbols; *and,* without unshift-on-space. Even if you are not an airman, WBR signals make awfully good test signals to check machines

and TU's. The 14,395 *kc* signal, particularly, is very strong in the upper midwest most of the day and into the early evening hours. It's a good check on band conditions, too.

Across the Nation

W2RUI, Lockport, New York, worked ZS1FD October 9th to complete his WAC. (*All he needs now is the cards!*) W3VJ, Salisbury, Maryland, has a TG-7B. W3PYW, Silver Spring, Maryland, worked WØPHM/VO1 in Argentia, Newfoundland, during a week-end early in October.

Arthur H. Lynch, W4DKJ (ex-W2DKJ), is about to activate his 32S-1 and 75S-1 on RTTY. (*See Collins modification bulletins 523000900 and 523001100 dated June 1, 1959.*) W4MGT, Lexington, Kentucky, keeps both 7140 and 3620 *kc* hot at KØWMR.

W5RKI and KØOFR have machines with weather symbols. W5APM puts in a walloping signal on 40 into the midwest (See photo.) W4YLH is building a fork standard.

WØLFI, KØAKG, and KØHZR represented the RATS at the CATS meeting in Chicago. They report the usual FB program with W9SPT at the helm. Ray Morrison, W9GRW, received a gift certificate for enough cigars to fill his famous basement.

Comments

With this last issue of 1960 I would like to wish you all a most Merry Christmas, and of course a very happy New Year. As we are about to enter 1961, we must reflect that 'ole 1960 was pretty generous to RTTY in general. More and more machines became available, mostly Model 15's, as more and more RTTY groups incorporated under state laws to legally procure equipment. And, MARS turned loose many TG-7B's. So, we haven't done too badly, and our prospects look good for the coming year. We would like to predict that more tape gear will become available in 1961. A happy and prosperous New Year to you all!

73, Byron, KØWMR

YL [*from page 93*]

Just in Time . . .

To get a copy of *CQ YL* for a gift for yourself, your OM, a friend, or for a DX YL. Read about and see photos of the very earliest YLs as well as the ones you meet on the air today. Several chapters are about the YLRL including its history, officers, conventions; others include YL Clubs; War Service; YL Marine Operators; Public Service; DX, VHF and Field Day work; Young YLs; DX YLs; Conventions and Hamfests. One and only book telling the part the YLs are playing in Ham radio. Order from W5RZJ (address at head of column); $3, postpaid.

As we write this, a new little jr. op (adopted) has come to add QRM to the W5RZJ QTH. He answers to the name of Matthew Barry Sando and was born on October 4th.

Vy 33—W5RZJ.

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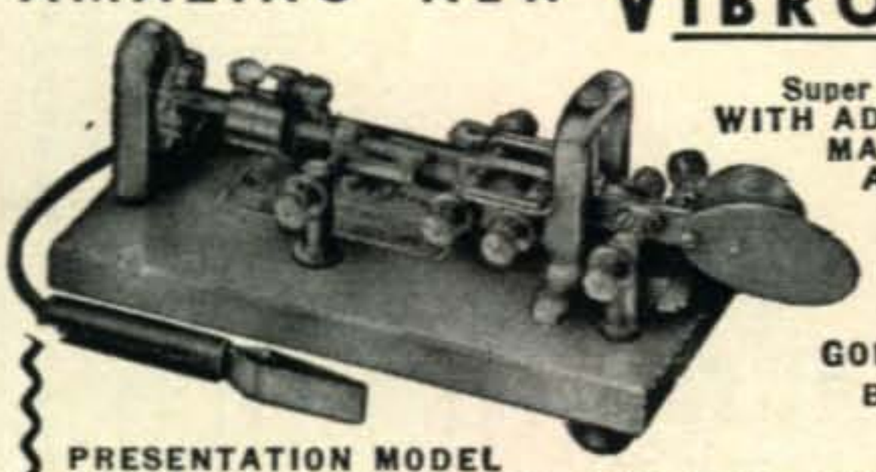

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For further information, check number 43, on page 120

FOR SALE (Cont'd)

SELL! NC-300 w/phones $260. Gary Tighe, 2909 W. Oak, Sioux Falls, S. D.

SELL: Hallicrafters SX-71 with matching speaker, Viking Ranger, CQ's in binders 1950 thru 1960 complete. Make an offer. Lowell Ray Anderson, Box 546, Riverton, Wyoming.

"Amateur-Band NC-300 with matching speaker, XCV-300 Crystal Calibrator, & NC-300 CZ (2 Meter) Converter. Like new condition. In San Francisco area & may be tried before delivery. Contact Thomas L. Ryan, Room O-306, Uni. of Santa Clara, Santa Clara, Calif. Total Combined price $295.00". Thomas L. Ryan, 23280 Montclair Way, Los Altos, Calif.

Call Rubin Freidman, 1064 Victory Blvd. S.I. 1, N.Y. ZU 1-2242 For Sale in perfect condition. Hallicrafter SX-100 Receiver, Viking Valiant Transmitter, Electro-Voice Mike No. 664 Micro-Match No. 262 Johnson Signal Sentry.

Communicators bought sold traded, Bayside Mobile Electronics, Box 104, Bayside, N.Y. Eimac 4-250A $25.00. Hammarlund XC-455 crystal-controlled BFO $10.00. Both new. K8HHZ, Mass., Michigan.

Sell Hallicrafters S-38E. Excellent condition, six month old. $40.00. Billy Haacke, 25 Park West, New Hype Park, New York Tele. PI 2-9342.

"Practice 1st Class Radiotelephone Examinations-Multiple-Choice—FCC Type Questions" New book new approach. Based on Element 4 of latest FCC Study Guide. Send $3.00 to Hilger Enterprises, Box 2798, Dept. B. Long Beach, California.

Great Surplus Values!! BC-603 Receiver new $23.00, BC-683 new $37.00, R-26/ARC 5 Rec 3-6 Mc new $15.00, R-27/ARC 5 Rec 6-9 Mc new $15.00, used exc $9.95, BC-659 Transceiver with PE-120 $19.95, T-47/ART-13 Transmitters $39.00, BC-603 AC-Supply $9.95, Synchroscopes Model TS-34/AP $49.00, Sound-Powered Dynamic Phones Pr. $4.75, Rec. Microwave R-111/APR-5 $49.00, Collins Mod. X former 100 watt 811-PP to 813 final $3.95 final $3.95, RA-62C Power Supply AC for SCR-522 VHF 110/60 cyc. New $59.50, Kits only for above, $17.00, Ground-plane VHF antennas 30-200Mc new $9.95, T-19/ARC-5 Transmitters 3-4 Mc $9.50, used T-20/ARC-5 new 4-5.3 $10.00, BC-458 5.37 Mc new $10.00, BC-459 7-9.1 Mc new $12.00. HI-MU Electronic Sales Company, 133 Hamilton Street, New Haven 11, Connecticut.

HRO-60 Receiver like new condition $320.00 Johnson KW-Match Box $80.00. Central Electronics Model B Slicer $40.00 Cesco (Phone Patch) $10.00 W. A. Barker, W5LLV —P.O. Box 1219—Denton, Texas.

Cleaning Shack. Offering Tubes, Transformers, Crystals, other components at savings to you. Send self addressed stamped envelope for list. WØAGP, 7525 Grover Street, Omaha 24, Nebraska.

GO SSB Johnson Pacemaker, used only a few hours. Works perfect, new condition $290.00 W. A. Barker W5LLV, Box 1219, Denton, Texas.

QSO Log, $1 postpaid. Easy way call and handle reference. Obsoletes card file. 60 indexed pages. Space for over 1800 diff. station calls. Ed K9HGB, 20 Lake Drive, West Chicago, Ill.

FOR SALE: Hallicrafters S-53A Receiver, Good condition, Best offer, Gray Shockley 326 Lake Hill Drive, Vicksburg, Mississippi.

Pierson KE-93 Power Pack 115 VAC 12 VDC built-in speaker & "S" meter, brand new in Factory carton $35.00. KW Matchbox 250-30 perfect $65.00. KW4M Coax Ratiometer perfect $30.00. Cash. FOB. Dick Klingler W4ISY 106 Dundee Dr., Smyrna, Ga.

75A-4 Receiver late serial number (3009) like new condition $515.00, W. A. Marker W5LLV Box 1219, Denton, Texas.

Facsimile, For Sale two TT-1C/TXC-1 facsimile transceivers complete with manual one ream Teledeltos paper, requires no darkroom processing. Also an adidtional transceiver minus motor, clutch and power supply, use for spare parts. All three machines for $600.00. Prefer not to ship, W9WKC.

PLEASE NOTICE: Hams south of Boston, Massachusetts —Bob Graham now has another exclusive amateur radio store at 1105 North Main Street, Randolph, on Route 28, 1 mile south of Route 128. Telephone: WO 3-5005.

Dear Hank: Please come home. I'm going to let you have your "Satellite 60" for Christmas. I must admit I like that crank up and down feature as I won't have to climb on the roof anymore. I can adjust the beam from the ground. W4EZWAY.

WANTED

WANTED: Teletype printers, perforators, reperforators, transmitter-distributors, test equipment: Model #14, #15, #19, #26, #28, GRC, TT, TGC, GGC, etc. All types Collins receivers, 51J, R-388, R-390, 75A, etc. Cash, or trade for NEW amateur equipment. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (RIchmond 2-0048).

ANY TUBES commercial test equipment, broadcasting equipment, and quantity. Diamond 749 W. End Avenue, New York City.

WANTED: Military and Commercial laboratory test and measuring equipment. Electronicraft, Box 399, Mount Kisco, N.Y.

WANTED: TELETYPE TG-7 and Model 15 and parts, printers and reperforators, etc.; COMM'NS and REC'V'RS AND XMTRS, e.g. BC-610-E, —I, BC-399A, Collins 51J, 17L3, —4; R-388 and R-390/URR; 18S-2, —3; ARN-14 and —30; APR-9, —10, ARC-21, 27, etc.; APS-31, —33, and TEST EQP'T, with TS— or 1—prefix. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., N.Y. 13, N.Y.

WANTED: cash for Boehm recorder driving unit c.w. ink tape recorder. Claude Sweger, 307 Norris, McCook, Nebraska.

OLDER equipment catalogs as general radio Hewlett-Packard, RCA, etc. Diamond, 749 W. End Avenue, New York City.

WANTED: Manuals or other complete information for Type CDF-60006-A RF Standard Signal Oscillator Unit LP-5. Write, KØYIA Chas. A. Bean, 609 S. Cedar, Abilene, Kansas.

WANTED: Early Wireless Gear. Grebe, Federal, Crosley, Kodel & other receivers. Also will trade some DeForest, Federal, AD, etc. for your duplicates. Especially want CR-1, CR-2 & Crosley Pup. Also Kodel xtal rcvrs. Collectors send me your needs & list of what you will dispose of. W4FEE/6 7734 Sterling Ave., San Bernadino, Calif.

WANTED: Electronic tubes, diodes, transistors, military, commercial lab-grade test equipment, components. TOP PRICES. Write details, Bob Sanett, W6REX, V&H Radio & Electronics, 2053 Venice Blvd., Los Angeles 6, California.

QSL

QSL Cards—6 designs, 100 cards $2.75. Sample brochure .05¢. Williams Printing, P.O. Box 2597, Van Nuys, California.

QSL's?? SWL's?? Largest variety samples 25¢. (refunded). CALLBOOKS: (Winter) American $5.00; Foreign $3.00. "Religious" QSL samples 10¢. Sackers, W8DED, Holland, Michigan.

QSL's 2¢ each 200 Minimum. Sample Free. KØMGX Press, 2306 E Street, Omaha 7, Nebraska.

QSL's economically with post card size rubber stamps of lasting quality. Save over 3¢ per QSL with your call, complete address, stock QSL information, set permanently in rubber. Wonderful gift for yourself, the OM, YL, junior op. Prompt, efficient handling of orders. Send for free sample now to: Jim, WØAYW, Will-Stamp, 1102 State, Brookfield, Missouri.

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QSL's-SWL's: That are different colored, embossed card stock, and "Kromekote." Samples 10¢. K8AIA, Box 953, Hamilton, Ohio.

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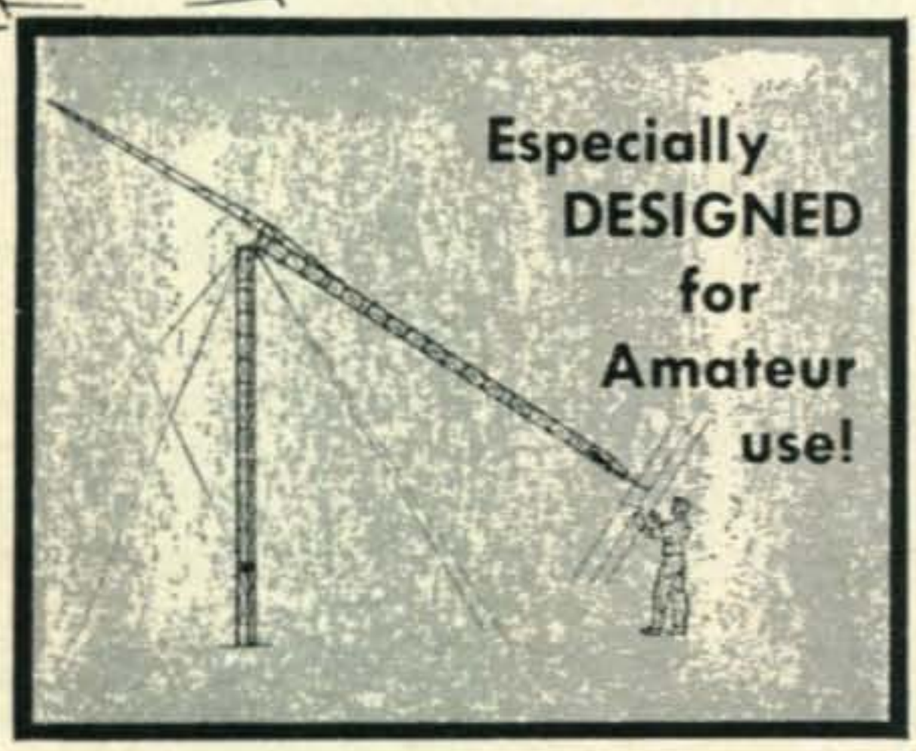

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For further information, check number 44, on page 120

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Custom-Engraved with YOUR CALL!

Dress up your rig with a deeply-engraved 1" x 4" plaque. Thick, handsome, black plastic, white letters. Adhesive backing . . . sticks anywhere. Specify call letters. Send with check or M.O. Ohio Res. add 3% Sales Tax.
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QSL (Cont'd)

QSL's. Samples Free. Phillips, W7HRG, 1708 Bridge Street, The Dalles. Oregon.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢, with catalogue, 25¢.

QSL's—Wide selection, styles, card stocks, ink colors, cuts. Also photo cards. Lowest prices. Fast service. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

QSL's-SWL's: 100 2-color glossy $3.00; 100 QSO file cards $1.00; Sample 10¢. Rusprint, Box 7507, Kansas City 16, Missouri.

COLORAMA QSL's . . . Dime . . . Filmcrafters. Martins Ferry, Ohio.

QSL's four colors glossy stock forty design send $5 for 200 and get surprise of your life. 48 hour service satisfaction guaranteed, Constantine Press, Bladensburg, Md.

QSL's. Samples 15¢. Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSL Cards printed. 24 hours service, send dime for samples.

QSL Printing Co., Box 12351, Houston 17, Texas.

QSL's—10 useable samples 10¢. Back issues CQ, QST, 75¢. Co-op, Box 5938 Kansas City 11, Missouri.

GLOSSY 3-color QLS cards 100—$4.50. Free sampler. Rutgers Vari-Typing Service, 7 Fairfield Road, New Brunswick, N. J.

QSL's-SWL's, samples 10¢. Malgo Press, 1937 Glendale Avenue, Toledo 14, Ohio.

QSL's: Samples, dime. Print Shop, Corwith, Iowa.

TRADE—Ham Radio-Citizens Band equipment for Hi-Fi equip. or vice-versa. Amateur Radio Exchange, Div. of Audio Exchange, 153-21 Hillside Ave., Jamaica 32, New York. AX 7-7577.

MISCELLANEOUS

Interrogation: Applications are now being accepted for Election into our Research and Administration staff. The function of the organization is non-profit in nature, and will work under contributions and grants. The purpose of the organization is Research in Extra-Terrestrial phenomena; i.e. Radio Astronomy, Propogation, Scatter, etc. If you are seriously interested and would like more information write: Radiometric Research, Ltd., P.O. Box 4335-Annex, Las Vegas, Nevada.

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MERRY XMAS AND A HAPPY NEW YEAR from WØCVU. Thanks for helping me to work and confirm 175 countries on Two Way SSB.

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BC-603 CONVERSION

BC-603 Conversion article (Sept. & Oct., 1958 CQ)
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CQ Magazine, Book Div.,
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New York 36, N. Y.

More W4LTU — Propagation Briefs

"It might be of interest at this time to give a quick run-down of the forms of propagation that are likely to be encountered by the casual operator who does not want to dive into aurora, meteors, and other things ionospheric:

1) **Diffracted wave:** This can probably be considered the true ground wave. It follows the curvature of the earth and would be experienced even *without* the atmosphere. It is a steady signal and is generally responsible for contacts out to 50 to 75 miles on 144 *mc*. It is always present.

2) **Tropospheric Scatter:** This results from scattering by bumps and "non-smoothness" in the atmosphere. It gives a fading signal from distances of 75 miles out to 300-400 miles if you have the power. It is always present.

3) **Tropospheric Bending:** Also known as ducting, this effect may give signals out to 1100 miles. It appears irregularly, most during the Summer, and is caused by bending within the atmosphere during unusual weather conditions. It forms most easily along the coast but often inland. When well formed it may persist for several days.

"Note that nowhere in the above is any mention of anything called "extended ground wave." This is a misnomer that is often used in reference to Item 3, tropospheric bending. If ground wave is considered to be Item 1, diffraction, which is independent of the atmosphere, then tropospheric bending can hardly be considered as an extended form of it when so grossly dependent on atmospheric conditions! You may consider this a semantic tempest-in-a-teapot but think of the confusion it can cause for the newcomer when he hears talk of "extended ground wave."

Seems as if this month we're a bit short of further news and letters so we'll have to close a little earlier. *Do your part!* Send in your pictures, news, club notes, and suggestions for improvement, by the 5th month (either December or January, which ever is convenient for you) to the address at the head of this column.

Meanwhile, very best wishes for the holiday season and be seeing you all next year.

73, Bob, K2ZSQ

THE NEW P&H LA-400-C
800 WATTS PEP SSB
LINEAR AMPLIFIER

NOW 800 WATTS PEP
FOR ONLY $164.95
THE "BEST BUY" YET

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LA-400-C Kit complete with tubes.....$164.95
LA-400-C Wired and Tested.....$219.95

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424 Columbia Lafayette, Ind

For further information, check number 45, on page 120

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¾ — 1¼ — 2 — 6 METERS
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2501 KC to 9999 KC	.002%	$3.00
15 MC to 32 MC TM	.0025%	$3.00
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For further information, check number 46, on page 120

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DIAMOND BASED MICA MTG KIT.....30
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DELCO POWER HEAT SINK.....$1.00

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	DC AMP	18VAC 14VDC	36VAC 28VDC	72VAC 54VDC	130VAC 100VDC
One Year Gtd!	½	$1.00	$1.90	$3.85	$5.00
	1	1.30	2.00	4.90	8.15
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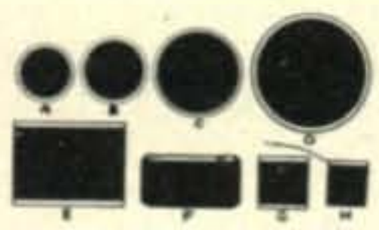

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0B2	.65	6C5	.69	45	.49
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0Z4	.60	*We Trade!*		RK60	1.17
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1L4	.82	6CF6	.85	HY75	5.00
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2C51	2.00	6F8	1.39	350A	2.45
2D21	.65	6H6	.59	350B	1.75
2E22	1.75	6J4	1.72	371B	.95
2E24	1.90	6J5	.59	5146	3.90
2E25	2.50	6J6	.59	416B	16.00
2E26	2.75	6J7	.99	450TH	43.00
2E30	1.70	6J8	1.39	450TL	43.00
2E35	1.60	6K6	.59	460	11.50
2K25	9.75	6K7	.79		
All Tubes Stocked at Low Prices!					
2K26	34.00	6K8	.99	703A	2.00
2K28	30.00	6L6	1.19	707B	3.50
2V3	2/$1	6SN7	.72	715C	10.90
2X2	.48	6T8	.98	717A	5/$1
3A4	.70	6V6GT	.90	723AB	5.00
3A5	1.00	6X5	.49	725A	2.75
3API	5.95	12AT6	.59	803	3.50
3BPI	3.99	12AT7	.89	804	8.85
3C24	3.50	12AU6	.63	805	6.00
3D23	3.95	12AU7	.69	*We Trade!*	
We Buy!		*We Sell!*		807 1.10 5/$5. 10/$12	
3E29	6.00	12AX7	.79		
3Q4	.68	12AY7	1.29		
3Q5	.86	12B4	.95		
4-65A	13.50	12BA6	.65	811	3.45
4-125A	27.50	12BA7	.99	811A	4.41
4-250A	34.00	12BD6	.59	812	3.30
4X150A	7.00	12BE6	.59	813	8.00
4X250	36.00	12BH6	.79	815	1.75
4X500	37.00	12BH7	.99	826	.59
5API	2.95	12BY7	1.00		
Wanted Test Sets and Equipment					
5BPI	5.02	12BZ7	.99	828	9.00
5BP4	5.00	12H6	.75	829B	8.00
5CPI	4.99	12J5	.69	832A	6.00
5CP7	9.00	12J7	.69	833A	36.00
5R4	1.00	12J8	1.35	837	2/$2
5T4	.90	12K8	.89	866A	2.45
5U4	.99	12SA7	.69	954	10/$1
5V4	.89	12SC7	.89	955	3/$1
5Y3	.60	12SF5	.69	957	3/$1
5Z3	.89	12SG7	.89	958A	2/$1
Send 25¢ for Catalog!					
15GP22	89.00	12SH7	.89	991	5/$1
6A7	1.00	12SJ7	.75	1614	2.75
6A8	.99	12SK7	.75	1619	5/$1
6AB4	.59	12SL7	.79	1620	2.00
6AC7	.72	12SN7	.69	1625	3/$1
6AG5	.65	12SQ7	.69	1626	5/$1
6AG7	.75	12SR7	.69	1629	4/$1
6AK5	.69	15E	1.19	2050	1.25
6AL5	.59	15R	4/$1	5517	1.25
6AQ5	.66	FG17	3.49	5608	3.95
Top $$$ Paid for 304TL, 726B Tubes					
6AR6	1.95	19T8	1.16	5618	3.25
6AS7	3.49	24G	3.50	5651	1.35
6AT6	2/$1	25A6	1.19	5654	1.20
6AU6	.79	25A7	2.19	5656	4.25
6B8	1.35	25C5	.81	5663	1.15
6BA6	.59	25L6	.72	5670	.90
6BE6	.59	25T	4.00	5686	1.75
6BG6	1.49	25Z5	.72	5687	1.15
6BH6	.79	25Z6	.75	5691	4.70
6BJ6	.72	26A7	3.69	5725	1.95
Top $$$ Paid for XMTTR Tubes!					
6BK7	.99	FG27	8.28	5732	2.00
6BL7	1.35	HV27	19.39	5736	85.00
6BN4	.69	28D7	.89	5749	1.95
6BN6	1.08	FG33	15.00	5750	2.75
6BN7	1.99	EL34	3.49	5751	1.25
6BQ6	1.19	35A5	.69	5814	1.20
6BQ7	.99	35L6	.59	5879	1.20
6BX7	1.11	35T	4.49	5894	$12.00
6BY5	1.19	35Z5	.89		
6BZ6	.91	RK39	2.99	No See—Write!	

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XTAL OVEN—115V&Thermostat $2
Blower 24VDC/100CFM $3.98
Blower AC/Miniature 6&12VAC $1.00
Xmitting Mica's .006 @ 2500V, 5 for $1.00

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Vibrators 6 or 12VDC $1.49@; 4/..... $5.00
New Variacs/or equiv 0-135V/7.5A $15.30
New Variacs/or equiv 0-135V/3 Amp $10.65
New Variacs/or equiv 0-132V/1.25A $7.25

RF-MTG GE/475 Ma & 5 Amp $4@, 2/$7
DC-METER Dejur 800 Ma/3½" $3@, 2/$5
DC-METER One Ma/4" Rd. $5@, 2/$8
RF-HTR Weston 750Ma/TC....$4@, 2/$6
DC MTR 100Ma/2½".....$3@, 2/$5

AN-ARR2/RCVR less tubes A-1 cndtn $1.95
829B Socket 85¢, 183 Socket.....$1
4x150 Ceramic/LOKTAL.....2 for $1.00

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Kit 5 pcs Wrench Set	Kit 35 Power Resistors
Kit 8 pcs Nut Driver Set	Kit 75 Mica Condensers
Kit Hi Gain Xtal Mike	Kit 8 Crystal Diodes
Kit 6 ea Phonoplugs & Jacks	Kit 200ft Hook Up Wire, 4 Rolls, 50ft/ea. Asstd. Color
Kit 25 ft Lo-Cap Mike Cable	Kit 100 Ceramic Condensers
Kit 20 ft RG59U Coax Cable	Kit 5 FT243 Xtal Holders
Kit 15 ft RG11U Coax Cable	Kit 5 Microswitches
Kit 2 pair SO239 & PL59	Kit 10 Wheat Lamps
Kit 12 Binding Posts Asstd	Kit 3 Transistor Xtmrs
Kit 5 Phone Jacks Asstd	Kit 8 Xtal Osc-Blanks
Kit 3 Phone Plugs Asstd	Kit 4 Asstd Rectifiers
Kit Long Nose Plier	Kit 12 Alligator Clips Astd
Kit Side Cutter Plier	Kit 5 UG/Connectors
Kit 2 Xmttr Variables	

99c *ONE EACH ABOVE KIT ONLY*.....

Kit 5 Myealex Glass/HF Strips	Kit 5 Precision Resistors
Kit 35 Precision Resistors	Kit 150 Carbon Resistors
Kit 10 Switches	Kit 12 Electrolytic Cond's
Kit 75 Resistors ½/1/2W	Kit 15 Volume Controls
Kit 150 Carbon Resistors	Kit 56 Tube Sockets
Kit 12 Electrolytic Cond's	Kit 65 Tubular Condensers
Kit 15 Volume Controls	Kit 500 Lugs & Eyelets
Kit 56 Tube Sockets	Kit 10 Bathtub Oil Cond's
Kit 65 Tubular Condensers	Kit 5 lbs. Surprise Package
Kit 500 Lugs & Eyelets	Kit 10 Transmit Mica Cond's
Kit 10 Bathtub Oil Cond's	Kit Glyptal & Cement
Kit 5 lbs. Surprise Package	Kit 3 Phone/Patch Xfmrs
Kit 10 Transmit Mica Cond's	Kit 4 AN/Reflector Lites
Kit Glyptal & Cement	Kit 6 Instld Tuning Tools
Kit 3 Phone/Patch Xfmrs	Kit 4 "Suncells" Asstd.
Kit 4 AN/Reflector Lites	
Kit 6 Instld Tuning Tools	
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