CQ

April 1960

50¢

The Radio Amateur's Journal

Collins KWM-2

a complete mobile and fixed station transceiver

If you want a mobile ham rig for your car and also want to operate a fixed station in your home, the answer for you is Collins KWM-2 Mobile Transceiver. This compact unit with fixed station power offers you the most for your dollar in a mobile and fixed station transceiver.

Designed for equally efficient operation as a fixed station or as a mobile transceiver, Collins 18-pound KWM-2 is easily and quickly moved from the desk top of your ham shack to the mounting bracket of your car. There's no bolting or unbolting, no complicated, time consuming tasks for you to perform when you go mobile with your Collins KWM-2. It automatically connects to the power supply, antenna, antenna selector and speaker. VOX circuits permit operation of the KWM-2 without holding the mike button. You've got a completely versatile 80 through 10 meter band SSB station if you own a Collins KWM-2.

The permeability tuned and crystal oscillators provide stability; the Mechanical Filter insures selectivity. Automatic Load Control and RF inverse feedback give you a clean, undistorted signal and 175 watts PEP on SSB or 160 watts on CW give you fixed station power. Collins design, craftsmanship and generous warranty assure you of constant, faithful service from your KWM-2.

Visit your Collins Dealer. See for yourself why the Collins KWM-2 gives you the most for your dollar in a mobile and fixed station transceiver.

COLLINS

For further information, check number 1 on page 126.

It pays to insist on PR *crystals*

STANDARD OF EXCELLENCE SINCE 1934

Z-2

Z-9A
Z-9R

Z-1

2XP

AMATEUR TYPES

40 and 80 Meters, PR Type Z-2

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

2 and 6 Meters, PR Type Z-9A

Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24000 to 24666, and 25000 to 27000 Kc., ±3 Kc.; .050" pins.....**$4.95** Net

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Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$6.95** Net

CITIZENS BAND CLASS "D"
Type Z-9R, Transmitter

FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225; calibrated to .005%. (Be sure to specify manufacturer of equipment).....$2.95 Net

CITIZENS BAND CLASS "D"
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Specify I.F. frequency, also whether I.F. is above or below transmitter frequency. Calibrated to .005%. (Be sure to specify manufacturer of equipment).....$2.95 Net

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

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

12001 to 25000 Kc. (3rd Overtone) ±10 Kc.....**$4.45** Net

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED.
ORDER FROM YOUR JOBBER.

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Type Z-1, MARS and CAP

Official assigned frequencies in the range. Calibrated to .005%.
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Type Z 1, TV Marker

Channels 2 thru 13....**$6.45** Net

4.5 Mc. Intercarrier, .01% ..... **$2.95** Net

5.0 Mc. Signal Generator, .01% ..... **$2.95** Net

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

Type Z-6A, Frequency Standard

To determine band edge. To keep the VFO and receiver properly calibrated.
100 Kc. . . **$6.95** Net

Z-6A

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EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

For further information, check number 3 on page 126.

CQ—The Radio Amateur's Journal

April 1960
vol. 16, no. 4

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

Branch Advertising Offices:

Ted E. Schell, 2700 West 3rd Street, Los Angeles 57, Calif. DUnkirk 2-4889.

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

publisher **S. R. Cowan**
general manager **Dave Saltman**
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circulation manager **Harold Weisner**
editorial production **Robert Jordan**
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CQ—(title registered U. S. Post Office) is published monthly by Cowan Publishing Corporation. Executive and editorial offices at 300 West 43rd Street, New York 36, N. Y. Telephone JUdson 2-4460. Second-class Postage paid at New York, N. Y.

SUBSCRIPTION RATES: U. S. A. and Possessions, APO, FPO, Canada and Mexico; one year $5.00; two years $9.00; three years $13.00. Pan-American and foreign: one year $6.00; two years $11.00; three years $16.00.

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

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From the engineering team that developed the incomparable HT-32A comes a transmitter that brings SSB within reach of all...

HT-37

The price: $450.00. Here, for the first time, is a moderately priced SSB transmitter that retains the essential performance characteristics which made its big brother the most wanted single sideband transmitter of all.

Same power. Same rugged VFO construction. Identical VOX. And a smooth, distinctive speech quality that insures excellent on-the-air reports.

You can judge — and own — the HT-37 now. Your distributor will soon have it on featured display.

Technical Details

VFO employs double reduction disc drive, fixed T.C. **Sideband suppression** 40 db. at 1000 CPS. **Power rating:** 70-100 watts P.E.P. output CW or SSB. 17-25 watts carrier on AM phone. Two 6146's in the final. 3rd and 5th order distortion products down 30 db. **Carrier suppression:** 40 db. or better. **CAL System:** Instant CW CAL signal from any transmission mode. **Cooling:** convection with final operated at low dissipation in standby. **Size:** 9½" high, 18¼" wide, 16¾ "deep.

the new ideas in communications are born at . . .

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For further information, check number 4 on page 126.

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

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

CQ CERTIFICATES:

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

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

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

TECHNICAL INFORMATION:

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

DISCLAIMER:

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

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

Gonset continues to offer you big SSB values!

First, GSB-100, SSB transmitter/exciter . . . then GSB-101, the powerful 1000 watt P.E.P. linear amplifier. Now . . . to complete the SSB combo . . . *G-63 a communications receiver of exceptional value!*

G-63, modern in every respect, has many operating features usually found only in receivers priced substantially higher. Example: Sensitivity less than 1 microvolt for 6 db signal-plus-noise/noise ratio. And . . . *a 6 meter band that is really "live."*

For SSB reception . . . compare G-63 with other receivers in the same price Bracket. G-63 is stable, has low-drift HF and BF oscillators. *There are two second detectors: Product* type for better SSB/CW reception and *diode* type for AM. *Full vision drum dial* spreads each amateur band fully for easy tuning—vernier tuning knob has flywheel for smooth operation. This modern receiver covers six amateur bands—80, 40, 20, 15, 10 and 6 meters.

Other features: Double conversion—peaking-type "Q" multiplier gives adjustable band widths down to 100 cycles for CW. Bandpass I-F circuitry provides desirable steep-shoulder selectivity for AM and SSB reception. Also . . . "S" meter . . . AVC . . . Automatic noise limiter . . . plug-in crystal calibrator is available as an accessory.

G-63 communications receiver **239.50**

GSB-100, 100 WATT P.E.P. SSB TRANSMITTER/EXCITER .. 499.50

GSB-101, 1000 WATT P.E.P. SSB LINEAR AMPLIFIER 459.50

For further information, check number 6 on page 126.

GONSET **GONSET** *Division of Young Spring & Wire Corporation*
801 SOUTH MAIN ST., BURBANK, CALIFORNIA

EXPORT SALES: WESTREX CORP., 111 EIGHTH AVE., NEW YORK 11, N.Y.

In Our Opinion . . . .

The FCC recently announced that effective March 10th, 1960 at 0001 EST the 20 meter phone band would be extended to include the segment 14.3 to 14.35 for radiotelephone (including SSB). In the last seven weeks, I have received a great deal of both letters and on-the-air comments regarding this decision. The consensus seems to indicate that the move was a desirable one. There have been quite a few comments pointing out disadvantages arising from this move, the majority of which come from Canadian and foreign amateurs.

If we examine the situation and keep in mind that the majority of amateurs in the world are in the United States, we can easily see that the present congestion of the twenty meter band certainly deems additional frequencies necessary. Just how much QRM will be alleviated by the addition of 14.3 to 14.35 for phone remains to be seen. The courtesy arrangement that has prevailed for the past several years whereby SSB stations utilize 14.26 or so to 14.3, and AM stations operate from 14.2 to 14.26 has worked out fairly well. However, we know that more SSB signals can be squeezed into a given area of spectrum than can AM signals, so if we consider the working arrangement of the past, we can see that SSB has, in effect, had as much or more space on the 20 meter band than has the AM group. One would naturally expect the additional 50 *kc* to be distributed evenly between AM and SSB, probably about 25 *kc* apiece. One factor, however, has been overlooked. What will the effect of this change do to SSB DX stations? Will DX stations be covered with QRM? Will they find it difficult to work other DX stations due to the onslaught of W's? From my experience I would say that they will.

Working Agreement . . .

There are several ways to preserve SSB DX. We can, as a group, allot a 15 or 20 *kc* segment (e.g. 14.330-14.350) to be used exclusively by DX stations outside the USA. This would reduce the frequency expansion from 50 to 30 *kc*, but would be a fair compromise. Remember, however, that DX minded amateurs do not represent the majority of the ham populace. These individuals may find it difficult to rationalize a 20 *kc* reduction for a group whose interests do not parallel their own. There will also be those who (particularly in DX contests and in the midst of pileups for a new country) would violate the working agreement. After all, they would tell themselves, I am not doing anything illegal and the only penalty will be a few other people's opinion of me. This they would feel, is a small price to pay for a higher contest score or a pasteboard from that new country.

There is another problem here. Assuming the above arrangement was put into practice, would this cause a further rift between AM and SSB? Assuming the SSB boys decided to allot 15 or 20 *kc* at the top end, wouldn't they be giving this from the 25 *kc* expansion allotted to them? This would leave them with a mere 5 or 10 *kc* additional chunk of band while AM received the full 25 *kc* expansion. We can see that this compromise will have to be absorbed by *all* 20 meter phone operators and not just those using SSB. I strongly doubt that the arrangement can be carried through without a good deal of bickering.

As I see it, there is only one way to effect a solution to this problem that might be mutually acceptable. In order to make it work we will have to live with the idea that foreign SSB stations will either work in the US band or operate between about 14.1 and 14.130 and tune above 14.250 for US contacts. In this way, DX station can work DX station in the lower part of AM DX segment with a minimum of mode clash and still avoid the W onslaught. For working US stations they can either stay in this portion and tune up or QSY to 14.3 or so and work us on our own frequencies. I, for one, have worked many DX stations on SSB in the American band and quite successfully at that. If, however, SSB DX stations operate between 14.2 and 14.15, and the SSB boys in the states QSY to the low end of our phone band, war between AM and SSB is inevitable. One thing which can do nothing more than deteriorate our reputation for successful self-regulation is a rift of this type.

Comment . . .

There are undoubtedly many of you who have worthwhile ideas on this problem. Why don't you take pen in hand and drop us a line spelling out these thoughts. After we have a good sized collection we will print some of these letters and ideas and see what the future brings. Until such time as a definite working agreement is reached, we will just have to make the situation as pleasant as possible by mutual cooperation and courtesy.

A Gripe . . .

As long as we're talking about people's comments regarding amateur problems, there has been one other issue rearing its ugly head in the *CQ* mailbag, namely, "Why are so many CW stations operating between 14.1 and 14.2 *mc?*" I am in a position to personally comment on this and can do so by recounting a situation which arose on 20 meters the other night. After calling CQ DX, I heard a ZS6 calling me on about 14.120. About ⅓ through the

[*Continued on page 94*]

FROM HEATH ...9 NEW RADIO AMATEUR KITS-

GC-1
$99.95
$10.00 dn.,
$9.00 mo.

TEN-TRANSISTOR "MOHICAN" GENERAL COVERAGE RECEIVER KIT (GC-1)

An excellent portable or fixed station receiver! Many firsts in receiver design for outstanding performance . . . ten transistor circuit . . . flashlight battery power supply . . . ceramic IF transfilters. The amazing, miniature transfilters used in the GC-1 replace transformer, inductive and capacitive elements used in conventional circuits; offer superior time and temperature stability, never need alignment and provide excellent selectivity. Other features include telescoping 54" whip antenna, flywheel tuning, tuning meter, large slide-rule dial and attractive, rugged steel case in gray and gray-green. Covers 550 kc to 30 mc in five bands. Electrical bandspread on five additional bands cover amateur frequencies from 80 through 10 meters. Operates up to 400 hours on 8 standard size "C" batteries. Sensitivity: is 10 uv, broadcast band; 2 uv, amateur bands for 10 db signal to noise ratio. Selectivity: 3 kc wide at 6 db down. Measures only 6½" x 12" x 10". 20 lbs.

Heathkit XP-2: plug-in power supply for 110 VAC operation of GC-1. (optional extra). 2 lbs. **$9.95**

HD-20
$14.95

100 KC CRYSTAL CALIBRATOR KIT (HD-20)

Align or check calibration of your communications gear with this versatile ham aid. Provides marker frequencies every 100 kc between 100 kc and 54 mc. Transistor circuit is battery powered for complete portability. Accuracy is assured by .005% crystal furnished. Measures only 2½" x 4½" x 2⅝". 1 lb.

7 more kits on following pages

HEATHKIT® . . . WORLD'S FINEST HAM GEAR

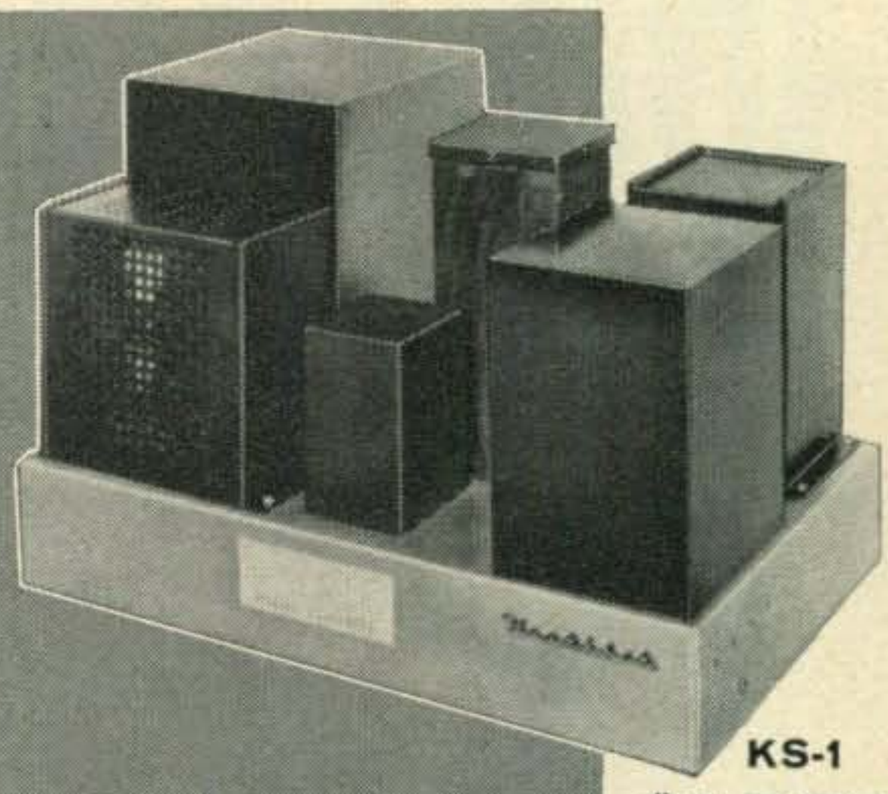
KL-1
$399.95
$40.00 dn.
(Write for time payment details)

"CHIPPEWA" KILOWATT LINEAR AMPLIFIER KIT (KL-1)

Here is a top-quality kilowatt rig with all the features you've been looking for. Operates at maximum legal power input on all bands between 80 and 10 meters, in SSB, CW or AM linear operation. Premium tubes (4-400A's), forced air cooled with centrifugal blower. Grid neutralized, continuous plate current monitoring, extensive TVI shielding. Features both tuned and swamped grid circuits to accommodate all popular exciters. Operates class ABI for SSB and AM linear service and high efficiency class C for CW service. Convenient panel controls include power switch, tune-operate switch, HV on/off switch, final bandswitch, meter switch, grid bandswitch, grid tuning, mode switch, plate tuning, plate loading and bias adjust. Accessory connectors are provided on the rear apron of the chassis for complete compatability with all control circuitry in the Heathkit "Apache" Transmitter. Two meters provided; one monitors final plate current; the other indicates switch selected readings of final grid current, screen current, and plate voltages. Send for complete specifications now. 70 lbs.

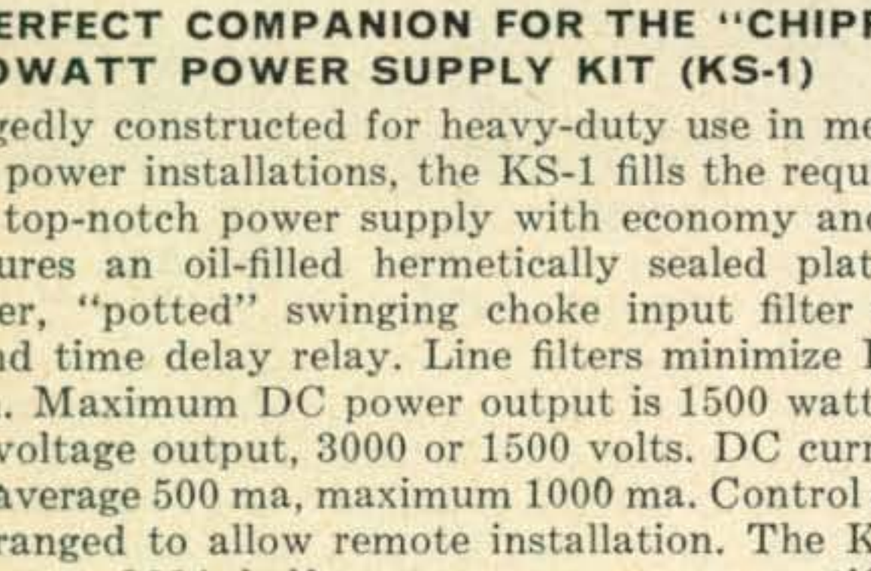
A PERFECT COMPANION FOR THE "CHIPPEWA" KILOWATT POWER SUPPLY KIT (KS-1)

Ruggedly constructed for heavy-duty use in medium to high power installations, the KS-1 fills the requirements of a top-notch power supply with economy and safety. Features an oil-filled hermetically sealed plate transformer, "potted" swinging choke input filter and 60-second time delay relay. Line filters minimize RF radiation. Maximum DC power output is 1500 watts. Nominal voltage output, 3000 or 1500 volts. DC current output, average 500 ma, maximum 1000 ma. Control circuitry is arranged to allow remote installation. The KS-1 employs two 866A half-wave mercury vapor rectifiers in a full-wave, single-phase configuration. Power requirements: 115 V, 50/60 cycles, 20 amperes; 230 V, 50/60 cycles, 10 amperes. 105 lbs.



KS-1
$169.95
$17.00 dn.,
$15.00 mo.

XC-6
$26.95



XC-2
$36.95

6-METER CONVERTER KIT (XC-6)

Extends frequency coverage of the Heathkit "Mohawk" and most other general coverage receivers into the 6 meter band. Converts 50-54 mc signals to 22-26 mc. 3-tube circuit provides two RF stages and low-noise triode mixer. Calibration accuracy assured by .005% overtone crystal supplied. Provision for external RF gain control. 6 lbs.

2-METER CONVERTER KIT (XC-2)

This top-quality 2-meter converter may be used with receivers tuning any 4 mc segment between the frequencies of 22 and 35 mc when appropriate crystal is used. Converts 144-148 mc signals to 22-26 mc with .005% overtone crystal supplied. High quality parts used throughout. Silver plated chassis and shields. 7 lbs.

IN KIT FORM TOPS IN TRANSMITTING POWER

TWO BRAND NEW MODELS
HEATHKIT 10 & 6 METER TRANSCEIVER KITS

Complete ham facilities at low cost! The new Heathkit transceivers are combination transmitters designed for crystal control and variable tuned receivers operating on the 6 and 10 meter amateur bands (50 to 54 mc HW-29 and 28 to 29.7 mc for HW-19) in either fixed or mobile installations. Highly sensitive superregenerative receivers pull in signals as low as 1 microvolt; low power output is more than adequate for "local" net operation. Other features include: built-in RF trap on 10 meter version to minimize TVI; adjustable link coupling on 6 meter version; built-in amplifier metering jack and "press-to-talk" switch with "transmit" and "hold" positions. Can be used in ham shack or as compact mobile rigs. Not for Citizen's Band use. Microphone and two power cables included. Handsomely styled in mocha and beige. Less crystal. 10 lbs.

VIBRATOR POWER SUPPLIES: VP-1-6 (6 volt), VP-1-12 (12 volt). 4 lbs. Kit; **$8.95** each, wired; **$12.95** each.

HW-19 (10 meter)
HW-29 (6 meter)
$39.95 each

HD-19
$34.95

HYBRID PHONE PATCH KIT (HD-19)

Add the thrill of phone patching to your ham hobbying, while rendering valuable public service during emergencies and in countless other instances. The HD-19 puts a top-flight phone patch in your ham shack at the lowest price anywhere! Features: voice control (VOX) or manual operation; large, easy to read VU meter for continuous monitoring of output to 600 ohm line; specially designed hybrid transformer providing better than 30 db isolation between receiver and transmitter circuit; separate receive and transmit gain controls. Switched circuitry allows VU meter to be used as null depth indicator. Provides effective match for 3 to 16 ohm speaker impedance. 4 lbs.

ORDER DIRECT BY MAIL OR SEE YOUR HEATHKIT DEALER*
*The convenience of Local Heathkit Sales and Service costs but a few dollars more.

HEATH COMPANY
a subsidiary of DAYSTROM, INCORPORATED
Benton Harbor 12, Michigan

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only. Dealer and export prices slightly higher.

HEATHKIT®

FREE CATALOG!
Describes over 150 easy-to-build electronic kits in HI-FI, Test, Marine, and Ham radio fields. To get yours, fill in this coupon and mail today!

ITEM	MODEL	PRICE

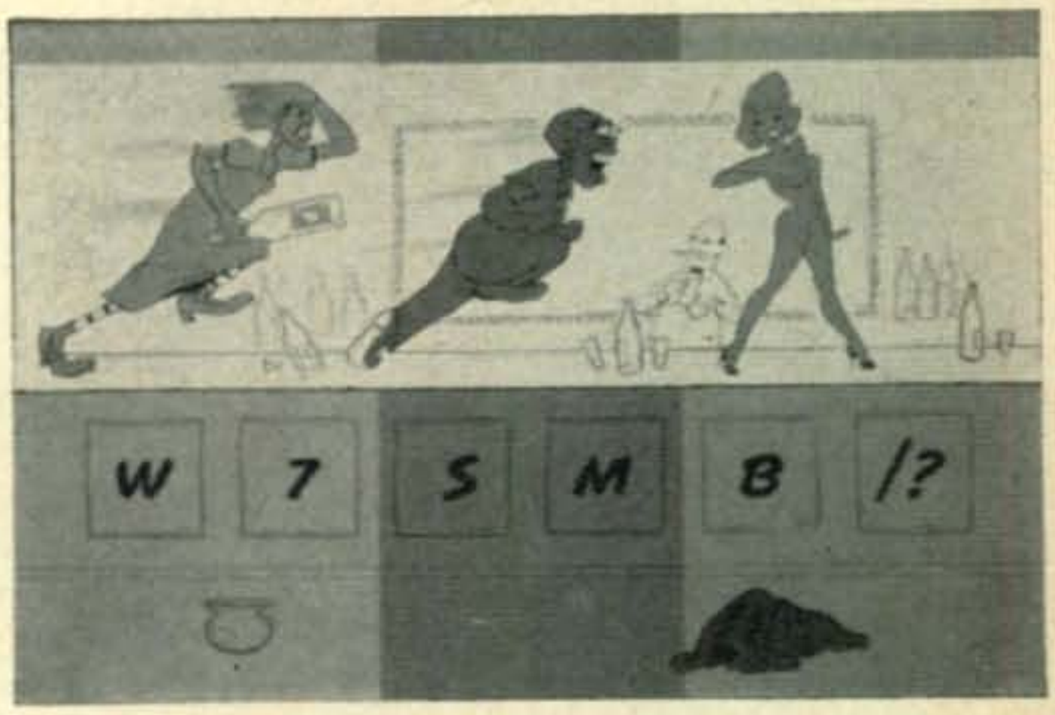
NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

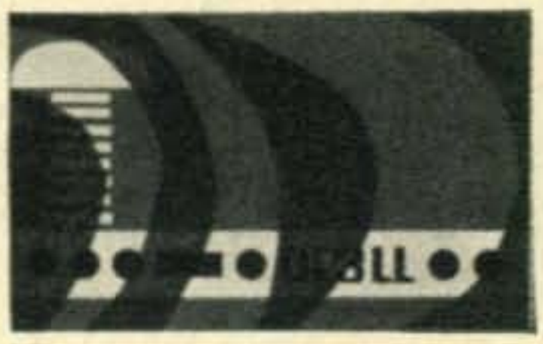
For further information, check number 7 on page 126.

QSL contest



Winner

Runners Up



DL3LL

Announcements

Correction

Stabilizing The Heath AR3 RECEIVER, Jan., 1960—p. 47— The ends of oscillator coil "DO" shown grounded should not be grounded but should remain connected as indicated in the Heath manual, namely to points XC6 and XD7 on the bandswitch. The two points on the schematic marked "to bandswitch" should be connected together. The center tap of the high voltage winding of the power transformer should be connected to terminal 3 of the CW-Standby-Phone switch as shown in the Heath Manual.

Bob Moren, W4INL

New England Hamfest On May Day

Heightened by the tremendously successful Hamfest of last year the Federation of Eastern Massachusetts Amateur Radio Associations will hold a repeat performance. The FEMARA is sponsoring another New England Division ARRL Convention on Sunday May 1st, 1960, at the New Ocean House in Swampscott, Mass.

The New England Hamfest, which last year gave away almost $12,000 in fabulous prizes, expects to top even that value this year. Amongst the prizes will be a special Mink Stole, this for YL's only.

One of the featured speakers (barring unforeseen emergencies) will be Lt. Gen. Francis "Butch" Griswold, KØDWC, Vice Commander of SAC, who will speak on communications in SAC. The technical talks will cover SSB and Citizens Band amongst other subjects. Milt Chaffee of the ARRL will hold an open forum. The QSL Bureau will be present. F.C.C. exams will be given. There will be NET meetings and YL meetings. The mobile hunts on 2, 6 and 10 meters will start promptly at 11:00 AM.

Early bird registrations (postmarked no later than April 18) will receive a free phenolic badge with their call letters engraved. In addition they will participate in an Early Bird prize drawing.

Third Party Messages Between Amateur Stations Of United States And Haiti

In accordance with an official communication from the Department of State, the Commission announces that a bilateral agreement between the United States and Haiti directly affecting licensed amateurs of the two countries has been concluded by an exchange of notes. Effective February 5, 1960, under the terms of this agreement, amateur radio stations of Haiti 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. Such communications shall be limited to conversations of a technical or personal nature for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. To the extent that, in the event of disaster, the public telecommunications service is not readily available for expeditious handling of communications relating directly to safety of life or property, such communications may be handled by amateur stations of the respective countries."

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

"4. This agreement shall be subject to termination at any time on six months' notice by either Government, or by further arrangement between the two Governments dealing with the same subject, or by the enactment of any legislation 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, Liberia, Mexico, Nicaragua, Panama, Peru and Venezuela.

Syracuse, N. Y.

The Radio Amateurs of Greater Syracuse now plan their first annual Hamfest. It will be known as "RAGS" Spring Party. It will be held at Three Rivers Inn, just outside of Syracuse, all day Saturday and Saturday evening, April 23, 1960.

Tickets at five dollars each are in charge of Harry J. Miller, W2WNO, 315 Loma Avenue, Syracuse, New York.

Three Rivers Inn, just northwest of Syracuse, is easily reached on route 57 north of Liverpool, New York and is at exit #38 of the New York State Thruway.

Birmingham, Ala.

The Birmingham Amateur Radio Club will hold its Seventh Annual Hamfest at the State Fairgrounds on May 1st, 1960. The committee expects 2500 Hams, XYL's, and Harmonics to this popular family affair which always kicks off the season in the Southeast on the First Sunday in May. Contact Birmingham Amateur Radio Club, P. O. Box 603, Birmingham, Ala. or any Alabama ham for further details.

Plains, Kansas

The 11th Hi-Plains Amateur Radio Club Hamfest is to be held Sunday, May 15, 1960 at Plains, Kansas. A Basket dinner will be held at the noon hour with drinks being furnished by the Club. There will be entertainment for the XYL's and everyone is welcome.

South Jersey QSO Party

The South Jersey Radio Association is sponsoring a QSO Party to be held on all amateur bands from 1300 hours, EST, Saturday, May 7, 1960, to 1800 hours, EST, Sunday, May 8, 1960.

This event is being held to aid amateurs in their pursuit of the South Jersey Radio Association Achievement Certificate. To celebrate this occasion the current rules have been modified slightly.

Non-member stations within continental U.S. must contact 35 members. Stations outside U.S. need contact only 25 members. On this special occasion, stations working the required total number of SJRA members during the contest need only send log extract and business-size, self addressed, stamped envelope.

Those not working the required number during the period of the contest must comply with original rules (QSL cards and return postage).

The certificate will be awarded as follows:

(1) For 25 contacts from stations outside the continental limits of the United States.

(2) For 35 contacts from stations within the continental limits of the United States (this includes Hawaii and Alaska).

Send award applications to: QSO Party Chairman, SJRA Box 316, Haddonfield, New Jersey.

Tulsa, Oklahoma

The Oil Capitol Mobile Club of Tulsa, Oklahoma, will hold its 3rd Annual Hamfest on Sunday, May 1st. Prizes for all, hidden transmitter hunt; bring your own food. Registration fee: $1.00. For details, contact Garver, W5ZBI or Sam Goldish, W5TVG.

Trenton, N. Jersey

The 15th Annual Old Timer's Nite Round-Up and banquet, sponsored by the Delaware Valley Radio Association, will be held on Saturday evening, April 30th, in the Grand Ball Room of the Hotel Stacy-Trent in downtown Trenton. As usual the party will be *STAG*. A turkey dinner will be served *PROMPTLY* at 6:30 o'clock. Old Timers W6EA of DX spark fame, and Ex-20M Hoover Cup winner of the early 20's will be on hand to greet the OT's.

A silver cup award will be presented to the radio operator present, with the longest service in the wireless game. Tickets are by reservation only, and may be obtained by mailing $6.00 on or before April 25th to Ed G. Raser, W2ZI, the General Chairman, 19 Blackwood Drive, Trenton 8, New Jersey. Latecomers may be able to buy a ticket for $7.00 at the door, W2ZI's famous collection of antique wireless gear will be on display.

DON'T BUY ANY TRANSMITTER TILL YOU SEE THE FABULOUS HAMMARLUND HX-500...

the first SSB transmitter with the best of all at the right price!

READY IN MAY!

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MANUFACTURING COMPANY, INC.
460 West 34th Street, New York 1, N.Y.

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

For further information, check number 10 on page 126.

Feenix, Ariz.

Deer Hon. Ed:

Boy oh boys, are I just getting 1/c shock. No needing to worrying, Hon. Ed., on acct. it not shock you getting from volts and amps. No indeedy, this shock I getting are coming from figures. No, Hon. Ed., not the kind of figures you thinking about, ether.

You see, Scratchi are being asked to making speech before local amchoor club next week. I wanting to talk on my fayvrit subject—bootlegging—but they saying no, they wanting me to talking on how many amchoors we having these days, and what a grand and gloryus group of peeples amchoors being.

Saying okey, then thinking better digging up some facks. So, getting out my FCC Report for 1959 (I always getting one, on acct. I like to know what the enemy is doing). Looking up amchoors, and finding out that if you counting RACES we having over 200,000 stayshuns on air.

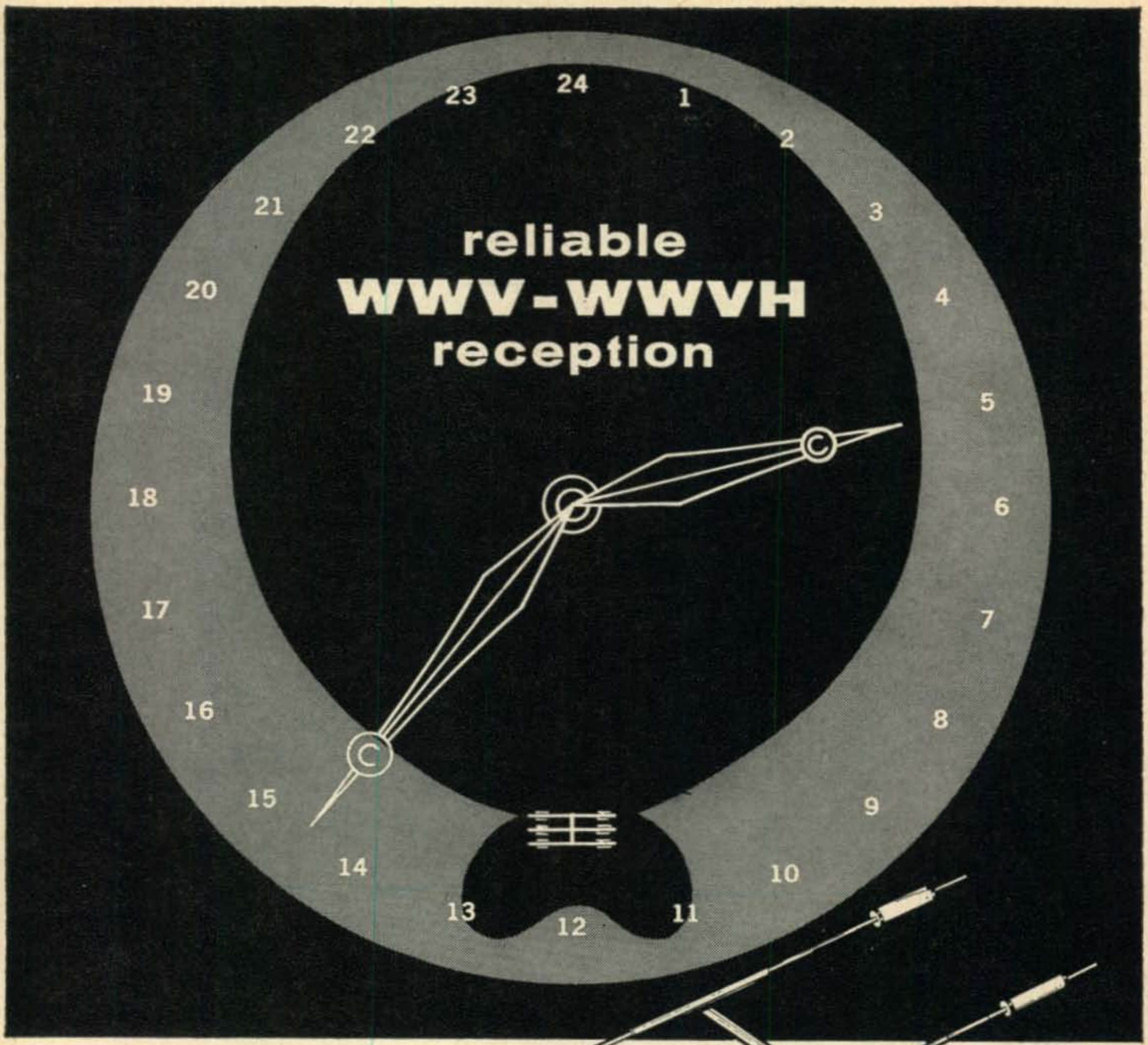
This making me swelling up with old Hon. Pride. Probably amchoors are biggest group of peeples able to grabbing mike in Hon. Hand and talking over raydio. Howsumever, before bragging about that, figyouring better checking more facks.

After all, there are cupple police cars around with raydio. So, looking up under Public Safety. Hackensake!! Hon. Ed. are you buleeving!! There are 329,000 authorizayshuns for stayshuns and mobiles. Not all police, on acct. this figure including Fire, Forestry Conservation, Highway Maintenance, Local Government, and State Guard and stuff like that there.

Quick-like I looking up under Land Transportation. Sacremento Boulevard!! Hon. Ed., it even worse. Here there being 442,000 authorzayshuns. Approximately 200,000 of these being Citizen's Band. Others are including suchlike things as Highway Trucks, Railroad, Taxi and Auto Emergency.

At this point I almost afraid to looking up any more, than my eye falling on Industrial Services. Holding your Hon. Hat. Authorizayshuns for bases and mobiles here are totalling 525,000. Over half-million peoples can gabbing up mike and making like disk-jockey!! Peeple

[Continued on page 26]



with a

MOSLEY WWV-33

3-ELEMENT BEAM ANTENNA

Specifically designed to provide improved long path reception of Bureau of Standards' time, tone and frequency signals on 10, 15 and 20 mc. Uni-directional pattern achieves high forward gain with excellent side and back rejection. Beam is of hurricane construction . . . 100% rust and corrosion proof.

For locations where a bi-directional pattern is permissable, the new Mosley TD-WWV Dipole is the ideal antenna. Completely factory assembled, including 100' RG-58/U coaxial line, antenna features high strength copper-weld wire, ceramic end insulators and weather-stable trap assemblies. ½ wave length resonance at 5, 10, 15 and 20 mc.

Data sheet free on request

MOSLEY ELECTRONICS Inc.

4610 N. Lindbergh • Bridgeton, Missouri

For further information, check number 12 on page 126.

Letters..... to the Editor

VFO Coil

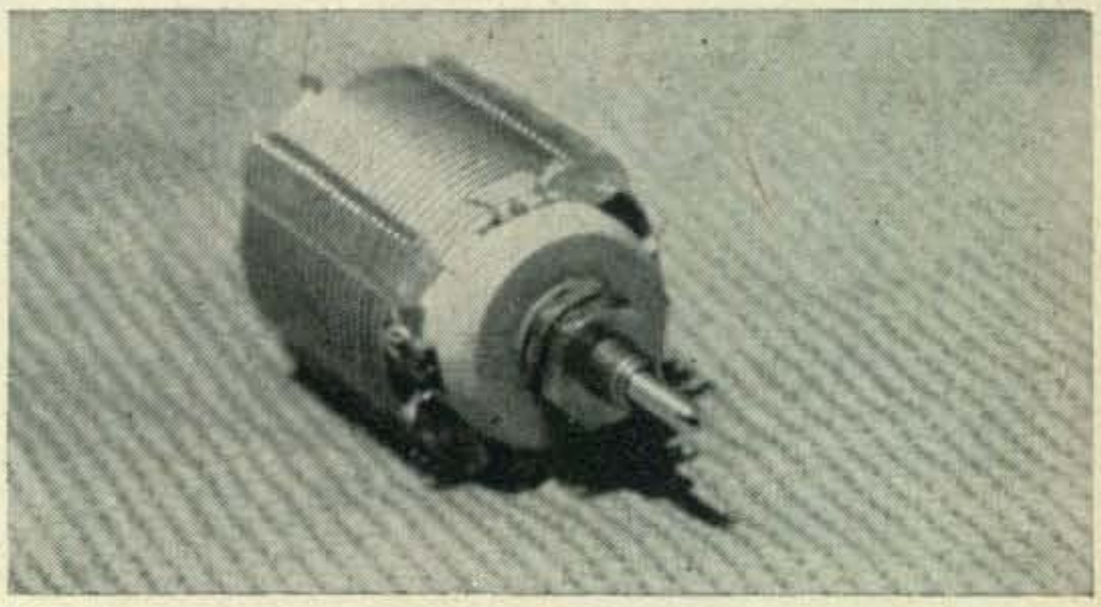
Editor, *CQ:*

Experimenting I was very pleased to find that the Air-Dux coil #1016 1¼" diameter will slip over a National XR-62 ceramic coil form with an iron tuning slug. The end lugs must be first pressed down flat. The XR-62 form is not grooved and is difficult to wind wire on and retain the proper spacing. Using bulk coil material simplifies the whole operation.

The advantages are as follows: the iron slug enables us to vary the inductance, maintain *vfo* stability, and is an easy way to mount the coil.

I find 18 turns of #1016 bulk coil is just the correct amount for a 5 *mc* SSB *vfo* inductance in series with 120 mmfd of capacity for the Clapp circuit oscillator Other values of Air-Dux do not fit over the coil form unless the plastic is reamed out.

Ed Marriner, W6BLZ



Home Brew

Editor, *CQ:*

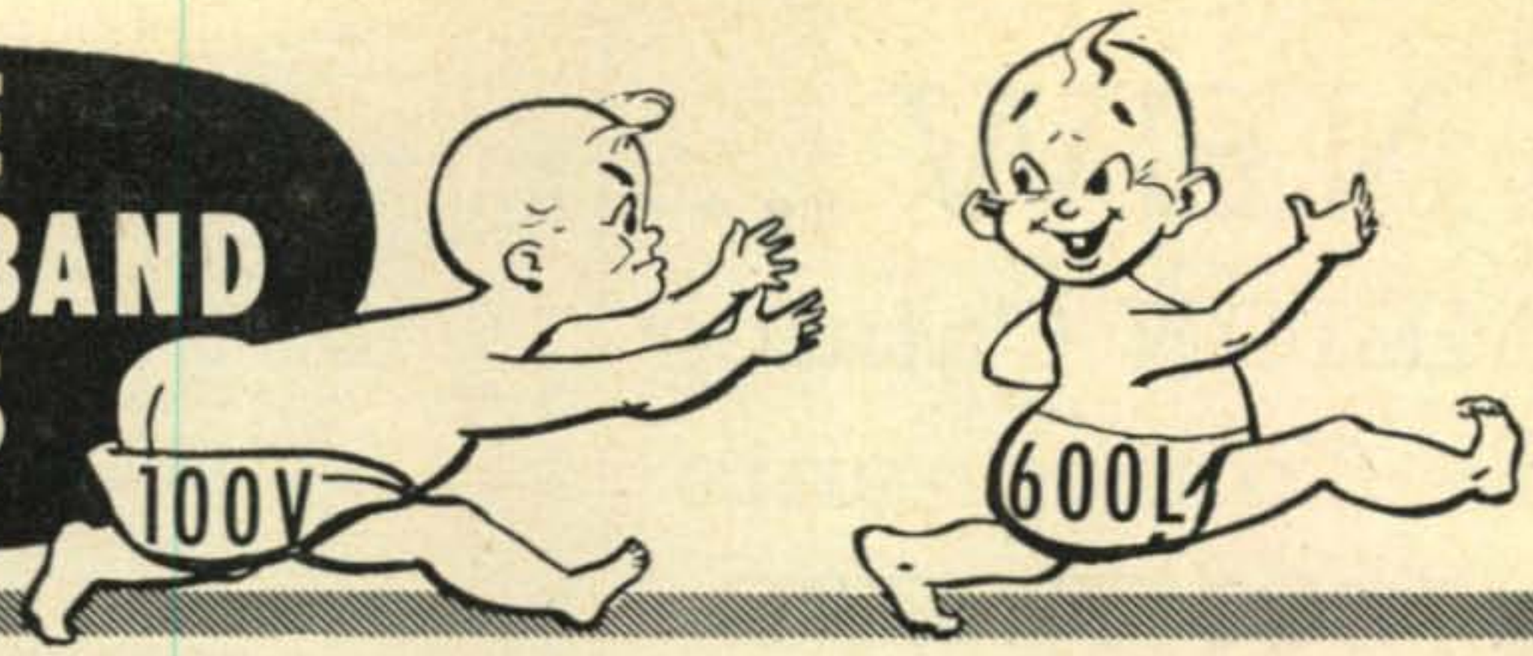
From time to time I read, in your magazine and the "other" one, items expressing concern over the current tendency in Hamdon to prefer store boughten gear to home manufacture. In my opinion, sad and true. It's quite a rarity these days to have a contact who comes back "xmtr is hmbrw". And when the reply is "rcvr is hmbrw", mark it in the log in red pencil!

I wonder if it wouldn't be a more enjoyable hobby to all of us if it wasn't mandatory for a part of the original license requirements to be that our first rigs be entirely homebrew? Be that as it argumentively may, here is a report from a guy who did, and does, get an additional wallop out of building his own. . . .

I learned my code in the army way back in 1938 and even took out exam papers for a ticket . . . and finally got my license twenty years later! I built the receiver and xmitter out of the instruction manual, but not because I had to but simply to see if I could make them work. They did . . . fb. Then I graduated to some used gear, and finally to what I now have. The receiver is an HQ-100, simply because I can't make the present in-the-mill homebrew receiver work! I knew what I wanted so I brought a Globe Chief kit (a real fb job by the way), putting it together and adding all the kinks I wanted. It's so changed I call it homebrew! It has its own *vfo*, separate final tanks for all bands, built-in antenna relay and lo-pass, and an antenna tuner. The modulator is homebrew with clipper-filter. . . .

I kicked around with all kinds of antennas (to learn a bit) and found they all are efficient, if *resonant*. The present one is an all-band vertical trap, not because it's

THE BROADBAND TWINS



THE REVOLUTIONARY NEW 100V EXCITER-TRANSMITTER

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

PRICE $795.00

FAMOUS MODEL 600L BROADBAND LINEAR

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

MODEL 20A

THESE MULTIPHASE EXCITERS PIONEERED AMATEUR SSB

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

Wired.....$179.50 Kit.....$139.50

MODEL 20A — 20 watts PEP. Bandswitched 160 thru 10 meters. SSB—DSB—AM—PM and CW. Magic eye monitors carrier null and peak modulation. Ideal for driving AB1, AB², and most Class B linears.

Wired.....$279.50 Kit.....$219.50

MODEL 10B

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

KIT....$49.50 Wired....$59.50

MODEL MM-2. 3" RF analyzer scope for use on SSB—DSB—AM—PM and CW. MONITORS RECEIVED AND TRANSMITTED SIGNALS thru new electronic switching circuits. NO TUNING — BROADBAND response 1MC to 55MC at power levels of 5 watts to 5 KW. SIMPLE CONNECTIONS. Built-in 1KC oscillator for exciter alignment. Plug-in IF adapters available for 450-500 KC, 80 KC and 50 KC.

IF adapter RM-455 or RM-80 or RM-50 .....$9.95
MM-2 (less adapter) wired.$129.50
Kit $99.50

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A SUBSIDIARY OF ZENITH RADIO CORP.

For further information, check number 14 on page 126.

better but simply neater . . . and pleases the the esthetic taste of the XYL!

I feel so strongly about the personal pride felt when a QSO comes back to me "ur rig fb hr, OM" that I don't like to teach a Ham-to-be until he promises to build at least a one-tube xmitter for a start!

In my small three years of operating I still don't have WAS. And with 97 more countries will have DXCC! But my 75 watts is *my own* except for the receiver. Pass the word around (for what it may be worth), telling the other guys there are few things more pleasant than the other guy saying "ur rig fb hr" . . . and it's all your own.

Harry E. Blomquist, K6JSS

Ed. Note: You've got some points there, Harry. We should at least do some building before we buy all the gear in the shack.

No Indians?

Editor, *CQ:*

Please help to do something about this senseless practice, peculiar to the American radio amateur, of addressing QSL cards to "The Chief Operator".

I am the sole licensee of this station and I do not employ a staff of assistant operators. I QSL 100% and it is not necessary to resort to soft-soap methods to get my card.

Amateur radio may be only a hobby but let us continue to use our brains nevertheless and not be like sheep, copying this nonsense from others who should know better.

73, F. Allan Herridge, G3IDG

5/8 Wavelength Antennas

Gentlemen:

Thoroughly enjoyed the article on the 5/8 wavelength vertical. Can take no exception except possibly to the method of tuning. Who can afford 3—count-em—3 rf ammeters. An SWR bridge between the line and the tuning box will suffice for most adjustments checking the LC ratio by feeling the coil for heating.

There does need to be some additional data on the ground plane. (1) #14 wire is sufficient for the ground plane—there being no appreciable difference between #14 and #2.

(2) A square of copper wire may be 9 or 10 feet on a side, soldered to the ground system will make an appreciable difference, especially when the number of wires is less than the 120 usually agreed necessary for BC practice.

(3) Using 15 wires and operating on 80 meters (where the antenna is slightly shorter than a quarter wave), you may expect to lose nearly half of your power in the lossy ground. On 160 meters 3/4 of power input will be lost. On 20 meters, where the antenna is 5/8 lambda, losses will be considerably smaller and 12 or 15 wires, plus the ground screen, will approach a perfect ground quite closely.

(4) It is possible to circumvent most of these losses by using the radials as a ground plane rather than a ground system. The lossy earth between the wires soaks up the power very rapidly and very little current will flow beyond a quarter-wave length. If the base of the antenna is raised above surrounding objects, and the radials, now acting as guy wires for the supporting mast, are laid out so they are not in the fields of any surrounding objects that would tend to take on the characteristics of lossy earth, the ground plane will approach closely a perfect ground system. The guys—or ground plane—*must* be oriented so that antenna currents prefer to flow through them rather than through trees or house roofs. The ends of the ground plane should be jumpered together and should be at least 6 or 8 feet above the ground (otherwise they will act as a low capacity to ground).

With a good ground plane such as this, directional beams are quite within reason, even on 160 meters. Given enough room, 4 verticals could be laid out in a square, half wave on a side. If two diagonal verticals are fed in phase, the third 180 degrees out of phase the system will produce a narrow lobe of radiation in the direction of the antenna that is fed 180° out. If you arrange them in a triangle a half wave on the side, dropping the 90° phased antenna, a bi-directional lobe will results. The phase changing can be done quite simply with remotely controlled relays and the beam width is sufficient to give 360° coverage. On 20 meters, this should result in much better actual received signal strength than a 3 or 4 element beam unless the beam is at least one wavelength *IN THE clear.* Since in the

You Asked For It . . . Here It Is!

COSMOPHONE "1000"

▲ A Self-contained 1 KW Transmitter-Receiver
▲ A True Table-top Station with NO Sacrifice of Performance

SPECIFICATIONS

TRANSMITTER

INPUT: Full 1 kw on Voice Peaks (Meters Read 2500 V at 400 ma) into a pair of 4 x 300 A's
UNWANTED SIDEBAND: 42 db down
DISTORTION (SSB): Third order products approx. 32 db down
FREQUENCY STABILITY: Drift less than 100 cycles.

CALIBRATION: Built-in 100 kc marker
AUDIO CHARACTERISTICS: 200-3100 cps

MIKE INPUT: High impedance
VOX: Built-in
LEVEL: Automatic level control
METERING: Screen, plate, and grid current, plus RF output
RF OUTPUT: 52 ohms
VFO's: Dual VFO's permit transmitting on the receive or any other frequency
CONTROLS: Vox, Qt, ALC, Grid Tuning, Plate Tuning, Antenna Loading, Audio Gain, Band Switch, Meter Switch

RECEIVER

SENSITIVITY: 1 microvolt for 6 db S/N
SELECTIVITY: 3.1 kc mechanical filter plus a T-notch filter
STABILITY: Drift less than 100 cycles from a cold start at room ambient
TUNING KNOBS: Coarse gear ratio of 20:1, fine gear ratio of 100:1 gives a 1 kc dial reading per division
CALIBRATION: Built-in 100 kc marker
IMAGE AND IF REJECTION: Better than 50 db
AUDIO DETECTOR: Balanced detector for SSB and CW, diode detector for AM
MODE SWITCH: Selects up or low SSB, or up low AM, or CW
DUAL RECEPTION: Two VFO's permit reception of any two frequencies on one band with the flick of a switch
BFO: Crystal controlled
METERING: S-meter
CONTROLS: T-notch filter, audio gain, RF gain, antenna trimming, tune selector, phone jack, tune A and B

"The **COSMOPHONE 1000**"—a complete Station, Receiver, and Transmitter.
Dimensions: 17 inches wide, 12 inches high, and 15 inches deep.
Power Supplies packaged separately, can be placed under operating desk.
Price: "The **COSMOPHONE 1000**" with Power Supplies...**$1,550.00.**

A Product of

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For further information, check number 16 on page 126.

average installation 66′ is a nearly impossible height above ground to say nothing of in the clear, 2, 3 or 4 of these verticals 10 or 12 feet above the ground would be a real asset to a DX man. They will never replace 5 kw, and the ground system or ground plane can get expensive enough so that higher power is cheaper. Something to play with anyway.

Dick Carruthers, K5HDB

Butterflies

Editor, *CQ:*

I'm sure you've all, at one time or another, joined in a "round table", where the current topic was "When I went up to take my General. . . ."

I remember one OM saying "I don't care how good you are at code and theory, there's something about those marble halls that makes strong men weak."

The other day I stopped by the FCC office to pick up a change-of-address form, and as I walked down the hall, I murmured in wonderment, "It is marble!" Funny, I hadn't noticed it on my previous visits. Guess I was so nervous then it could have been gold studded with diamonds and rubies, and I still wouldn't have seen it.

The point I'm trying to make is "It's all in your mind!" But, I haven't figured out how to overcome weak knees and butterflies in the stomach.

Lillian D. Hanley, W6WIU

Publications

Editor, *CQ:*

I am certain that many of your readers are unaware of the many excellent electronic publications available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.

These publications include Air Force Manuals, Navy Training Course Manuals and military Technical Manuals. Information on available publications may be obtained by requesting a free copy of Price List 82, RADIO, which also covers electronics, radar and communications.

Also available free is a biweekly list of Selected U.S. Government Publications, which covers a variety of subjects. While the GPO has a form card for requesting inclusion on this mailing list, I am certain that your request on a post card will suffice. To avoid any error, please print or type your name and address.

The following are examples of some of the many publications available that are now a part of my technical library:

Basic Electricity	
Catalog No. D 208.11:E1/2/3/956	$2.25
Basic Electronics	
Catalog No. D 208.11:E1/2/10/955	$2.25
Basic Theory and Application of Electron Tubes	
Catalog No. D 101.11:11-662	$1.25
Basic Theory and Application of Transistors	
Catalog No. D 101.11:11-690	$1.25
Guided Missiles Fundamentals	
Catalog No. D 301.7:52-31	$3.50
Radio Receivers	
Catalog No. D 301.7:100-5	$2.50
Radio Transmitters	
Catalog No. D 301.7:100-6	$2.00
Theory and Use of Electronic Test Equipment	
Catalog No. D 101.11:11-664	$0.75
Troubleshooting and Repair of Radio Equipment	
Catalog No. D 101.11:11-4000	$2.00

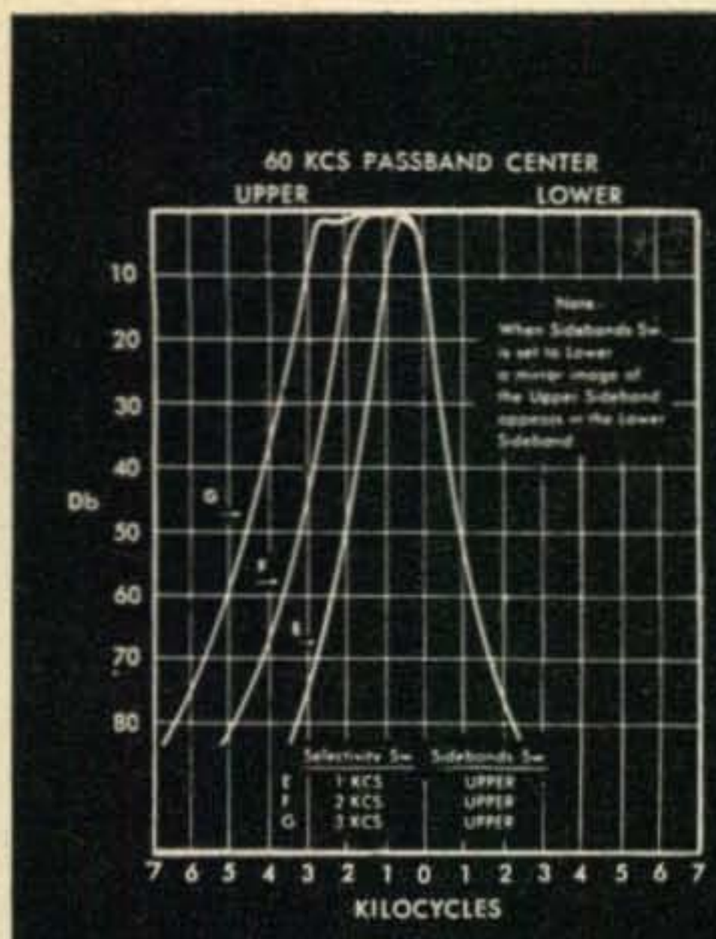
Requests for publications should include both the catalog number and title. Order blanks are included as part of the price list. Check or money order should be made payable to Superintendent of Documents.

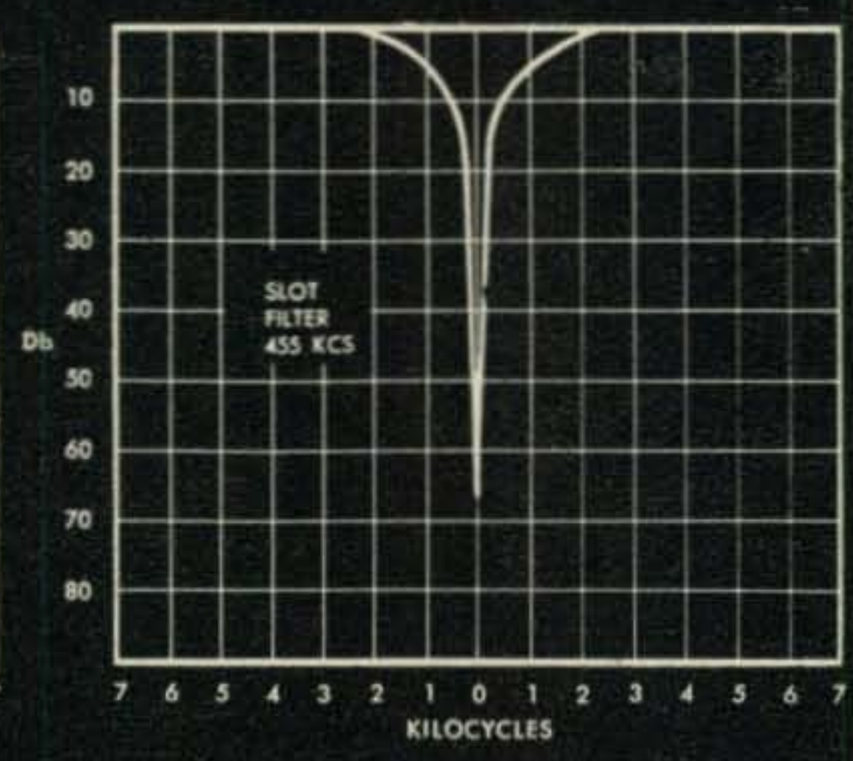
Einar H. Morterud, W5FPB

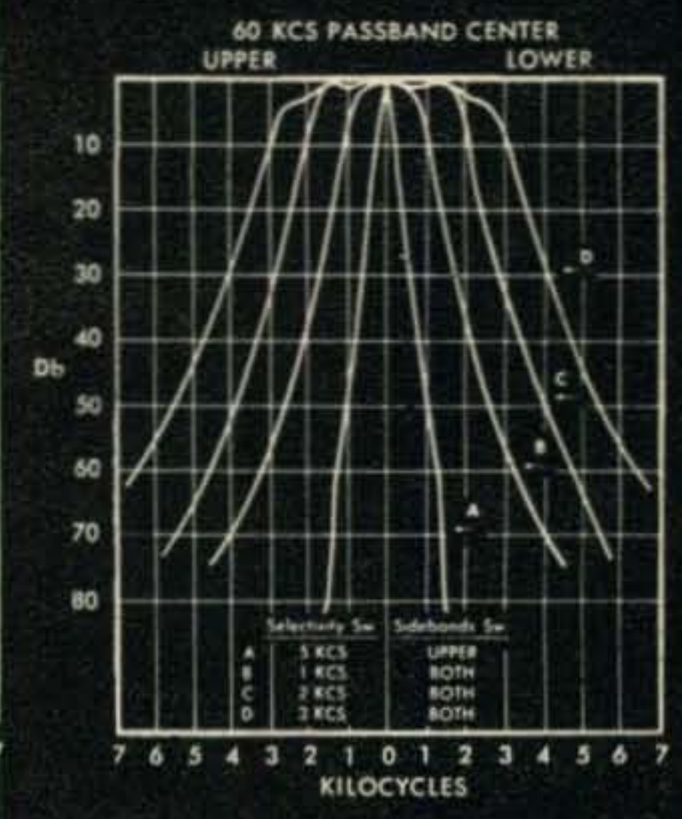
Transmitter Control

Editor, *CQ:*

I have stumbled on to one of the cheapest and most flexible methods of transmitter control that I have seen. There has been developed, for commercial wiring of lighting for homes, a small relay to be operated on 24 volts *ac.* This relay requires a momentary pushbutton to actuate it and another momentary button for off. The relay is manufactured by GE and is designated as remote control relay RR-3. List price on this relay is around $3.50 and the double pushbutton is designated as RFS-3 and sells for $.50.







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SSB at its best

Complete tuning versatility to meet any SSB reception problem—that's performance you can hear—and that's what you get in a Hammarlund HQ-180.

The general-coverage SSB HQ-180 offers true professional performance at an amateur price. It offers more features, more real quality and far more listening pleasure per dollar than any receiver in its class. Prove it to yourself—see and try the HQ-180 at your Hammarlund dealer.

HAMMARLUND HQ-180

- Triple conversion, 18-tube superheterodyne.
- Full dial coverage from 540 KCS to 30.0 MCS.
- Bandspread calibration for 80, 40, 20, 15 and 10 meter amateur bands.
- High frequency crystal filter for improved selectivity and shape factor of 1st IF amplifier.
- Razor-sharp, adjustable slot filter for up to 60 db attenuation.
- Separate linear detector for CW and SSB reception.
- Adjustable IF amplifier for maximum selectivity.
- Selectable sideband, upper, lower or both.
- Built-in crystal calibrator.
- Selectable AVC obtained from 60 KCS IF.

$429.00

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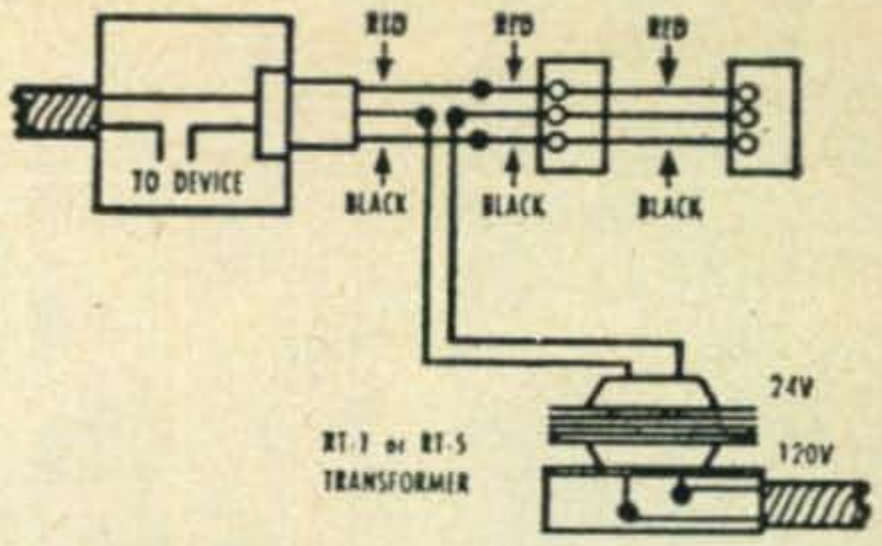
Canada: White Radio, Ltd., 41 West Avenue, North., Hamilton, Canada.

For further information, check number 18 on page 126.



Both relay and pushbutton have color coded wires. The relay will handle 20 amps on 115 VAC on the contacts. The relay, when actuated, stays on without application of voltage to the coil and then when pushed for off also requires no vtalge after the momentary contact to actuate the off coil. This relay mounts in a ⅞ inch hole and is only 2½ inches overall in length. The relay may be used for on and off filaments in the transmitter and another for on and off plate voltage. The beauty of the system is that it requires no latching contacts and can be wired for parallel switches on one or as many operating positions as is desired. The box that the relay comes in has the circuit printed right on the box but diagram is shown above.

Felix W. Mullings, W5BVF

W3AWA

Gentlemen:

We would appreciate it if you would notify your readers of the recent death of Major E. Burton, W3AWA. Ed was well known by many amateurs throughout the country and we are certain that some will wonder why he has not been on the air recently.

Major E. Burton was also trustee of the Mobile Sixers Radio Club call K3ERL.

Mobile Sixers Radio Club
William T. Clark, Secretary

Ham Standards

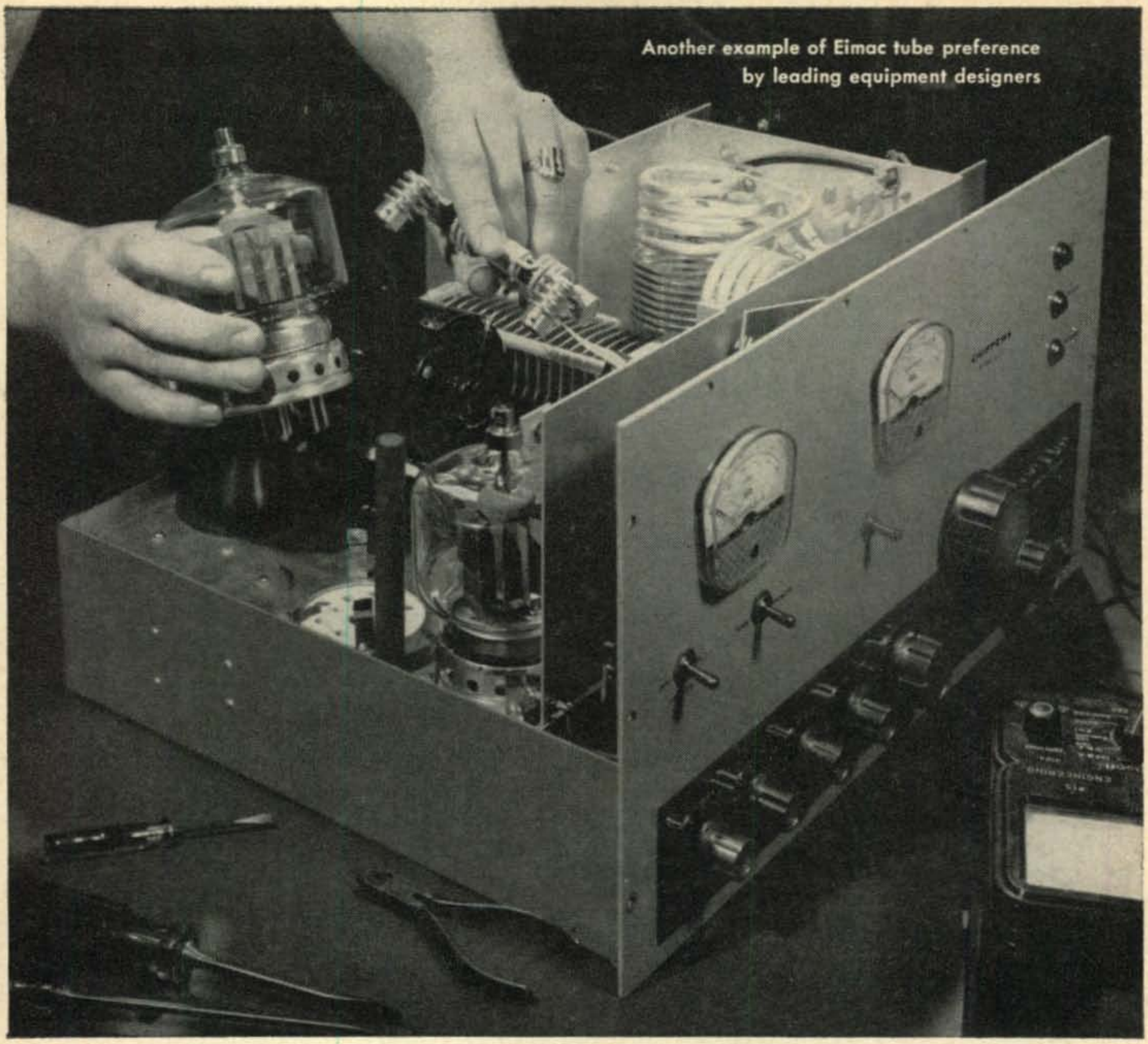
Editor, CQ Magazine:

It should be evident to most hams by now that our present low standards make it possible for any nincompoop to acquire an amateur license. As a direct consequence of the juvenile requirements attached to the license, we have managed to populate the amateur frequencies with speechmakers who lack any knowledge of good operating procedures and whose technical competence is confined to turning pages of the wholesale catalog. They fire up their kilowatts and are well into the tenth CQ before the receiver is operational; they engage in monstrous SSB roundtables with others of similar ilk and the prima topic of conversation is discussing who talks next; on occasion they ask each other how they sound—since all KWS-1's sound alike, they sound like all other KWS-1's, that's how they sound! And if they don't they send it back to the factory for repairs since most of them haven't even located the fuse-holder.

The writer favors the abolition of the novice license. For who said he had a home-brew station. He then disclosed he was using a 75A4 receiver, an HT32 SSB exciter, a commercial phone-patch, two hy-gain beams and a Thunderbolt final with a standby final of his own making. So it goes.

In view of the fact that I have logged nearly one-hundred novices above 14.3 *mc* plus about ten AM phones calling CQ ten meters it appears that the time is fast approaching when we begin to tighten the requirements and make the ham ticket worth a little study and work.

The writer favors the abolition of the novice license. For those people who are flatly unable to learn the code we should issue a license after a comprehensive examination and permit them to operate phone on any ham frequency above 6 meters. Two licenses in addition to this one would suffice for all other types of operation. One of these would be a 1st Class telegraph ticket with a 25 *wpm* code requirement plus a good technical examination. The last license would be a first class telephone ticket permitting operation on any ham frequencies using AM or SSB (or CW since the same code requirement would be in force). The present CW/Phone allocations would be observed. All licenses would have much tighter technical requirements.



HEATH Chooses EIMAC Tetrodes For First Build-It-Yourself High Power Linear Amplifier

When pioneering manufacturers get together, exciting new progress is bound to result. For example, take this new high power "Chippewa" linear amplifier designed by Heath — leader in build-it-yourself electronics — with two 4-400A power tetrodes produced by Eimac — pioneering electron tube specialists.

This new amplifier makes possible operation at maximum legal amateur power inputs in SSB, CW or AM service. It adds to the group of Heath ham equipment full power capability along with complete versatility in the present day modern amateur station.

Heath's choice of Eimac 4-400A radial-beam tetrodes was a natural one. These time-proved tubes complement the amplifier's simple, clean, straightforward design. And their low grid-plate capacitance and low driving-power requirement aid in considerable simplification of the associated circuit and driver stage — to make do-it-yourself construction even easier.

You can always depend on Eimac tubes to meet standards of high performance and reliability demanded in exacting amateur and commercial applications such as this. For complete information on Eimac tubes write our Amateur Service Department.

EITEL-McCULLOUGH, INC.

Eimac

San Carlos, California

For further information, check number 20 on page 126.

Very likely this letter will bring some irate replies. If you care to address them to me please do so, but I should mention that my XYL reads my mail and she may write the reply in which case you will be scalded but good. I operate mostly on 14 *mc* SSB in case you'd care to call. However, 90% of my listening is above 14.3 *mc*. See you there, particularly if you're a nice new country for my log.

Bob Moren, W4INL

TXK TTK

Editor, *CQ:*

I have been having a lot of trouble trying to neutralize my 813 final but thanks to my good friend, ZL3IA who sent me a copy of CQ for August 1950, all my troubles are now over.

The article by Warren B. Breune, WØTTK page eleven certainly put an end to my neutralization problem.

Wishing your magazine every success,

H. McLENNAN, ZL2LW

20 Meter QRM

Editor, *CQ:*

I'm just wondering how much longer we hams will have to put up with the commercial QRM on twenty meters, particularly from 14,200 *kc* down. It seems that every week or so there is another non-amateur station operating in the 14mc ham band, either RTTY or CW. Probably a lot of you chaps who only operate fone on twenty only notice the bothersome RTTY station on about 14,199. However, this morning the band was in fairly good shape, and there appeared to be more commercial than amateur stations below 14,200. I started to boil, though, when, right in the middle of a QSO with a ZL3 and on the same frequency, a commercial station (ident. RFU) started calling (on CW) RFJ. This station seemed not at all concerned with the very poor quality of his signals, nor did he mind covering 40 *kc* of ham band with his key-clicks. A local VE3 suggested that perhaps these stations have a right to operate on twenty. Keeping this in mind, it would be only a matter of time before our band is cluttered up with commercial stations. Fat chance my 75-watter has against these few-KW-plus rigs.

Presuming that these commercial stations have no right at all to be on twenty meters, let's get together and have them chased off by the proper authorities. It must be a concentrated effort by all amateurs interested, and we all should be interested. The QRM on the bands from the large number of amateur stations creates a problem by itself without all this commercial QRM in addition.

Let's do something about it, and *now!*

R. D. "Dave" Kimpton, VE3CFK

More QRM

Editor, *CQ:*

There's no excuse for putting up with QRM. A few regulations would do away with the whole problem:

1. Get rid of novices. They take up space on the spectrum, and when anybody does that (except me) it's a disgusting imposition.

2. Next, abolish CW. This obsolete nonsense is only a hurdle to most hams who have their eyes (or larynxes) aimed at phone even while taking the exam. Much of our spectrum assigned to CW is not being used.

3. Another obsolete yokel who should be knocked off is the AM operator. Anyone so ignorant as to stay with AM isn't well enough informed to operate anything safely.

4. Now for single sideband—it's not perfect. The round tables are so large, there's no use checking in. All you need is a receiver for listening—and who needs a license for that in this country?

These few regs would quickly wipe out QRM. If the above seems drastic, remember that the intelligent elite—the only folks who really matter, spend their time building equipment. They don't talk to anyone—they only want to build equipment with which they could talk if they did want to talk.

Thus, we could get rid of the whole mess, get reacquainted with the family and friends without wires in their heads, and resume two way conversations with people.

George A. Bowman, W7FIQ

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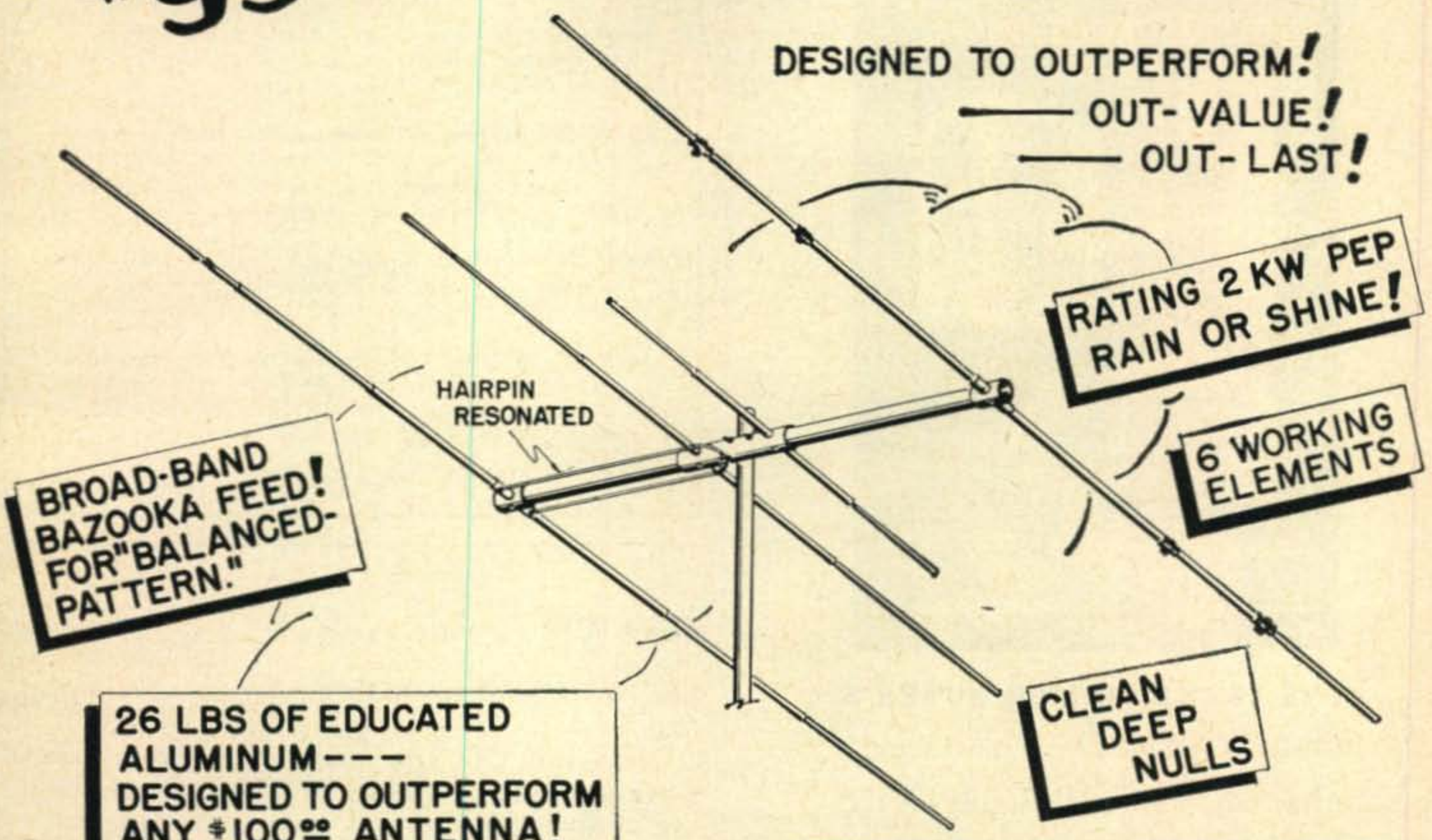

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For further information, check number 22 on page 126.

MARS BULLETINS

First Army Mars Technical Net

Wednesday evening at 9 PM (New York Time) on 4030 KC upper sideband.

Arrangements have been made by Ted Mathieson, A4FJ, the state MARS Director of Virginia, to use First Army tapes in setting up a Second Army Technical Net with its nucleus around the Washington, D. C. area.

April 6—Filter Design And Applications" by James L. Prather, Instructor, Radio Division, USASCS, Fort Monmouth, New Jersey.

April 13—"New Semi-Conductors For High Frequency Circuits" by W. A. McCarthy, Chief Applications Engineer, Semi-Conductor Division, Raytheon Mfg., Co., Boston, Massachusetts.

April 20—"Modern Trends In Electronic Instrumentation" by Walter A. Knoop, Jr., Partner, Gawler-Knoop Company, Roselle, New Jersey.

April 27—"Tacan And Similar Aircraft Navigation Systems" by William Loebel, Project Engineer, Olympic Radio & TV Division of the Siegler Corp., Long Island City, New York.

SCRATCHI [*from page 14*]

like in Business, Manufacturing, Petroleum, and Power.

Hon. Ed., can you imagining!! Everybuddies getting on the air. Diaper Delivery service having two-way raydio so if Junior running out of dry pants, truck can rushing there with cupple extra dozen post-hasty. Refrigerator Repair service having two-way raydio so if refrigerator broken down they can rushing out and fixing before cacktus jooce getting warm.

Furnace repair ditto so can rushing out and fixing before house getting too cold. Drive-In Restaurant having two-way portables so carhops can transmitting orders to kitchen without having to running pretty little legs off. Forest Products peeples having portables too, so can yelling TIMBER and meening it.

Hon. Ed., you reelizing this are total of 1,300,000 two-way authorizayshuns!! And, this not counting Marine or Aviation. Not only that, it not counting the Military. Of coursely, this only counting Yewnited States, also.

So what am I going to talk about in my speech. Amchoors not biggest group. In fackly, they looking more like smallest group.

Maybe if not being able to saying amchoor group is the biggest, I just telling everybuddys that the amchoor group is the BEST. OK?

Respectively yours,
Hashafisti Schratchi

ONE MAN *tells* MANY OTHERS!

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DKC-TRP

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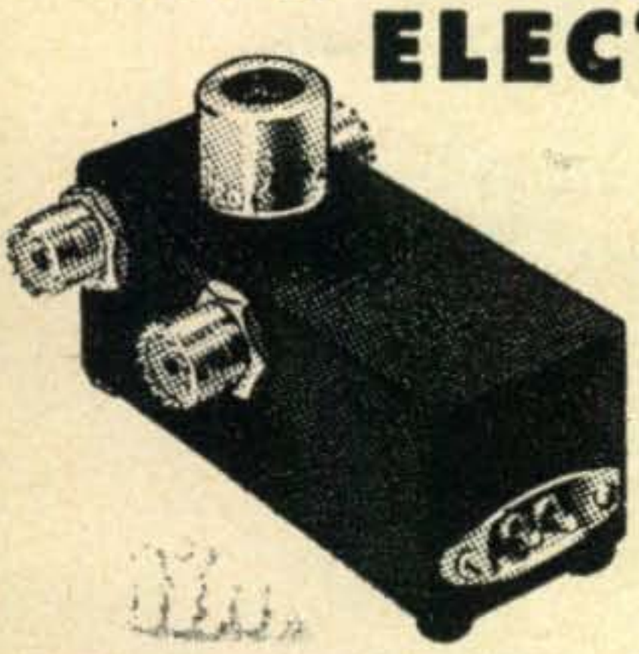

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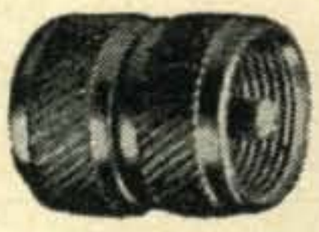

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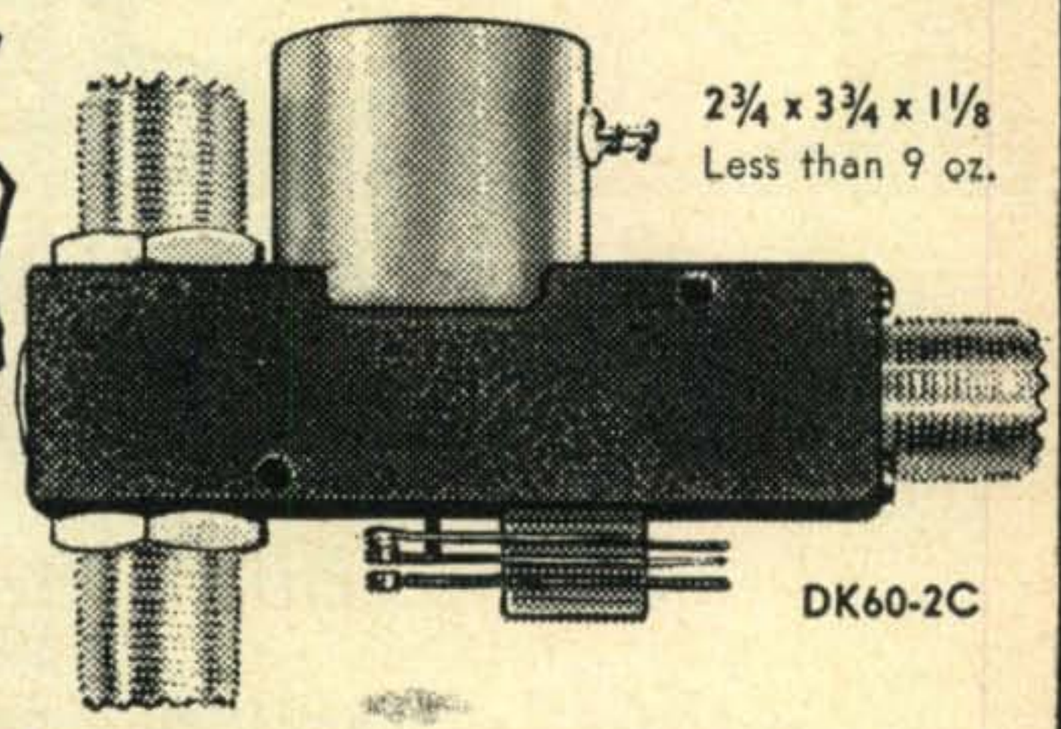

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- Single pole double throw r.f. contacts.

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- LONG LIFE EXPECTANCY — greater than one million operations.
- Continuous Duty.
- Available in various type Connectors.
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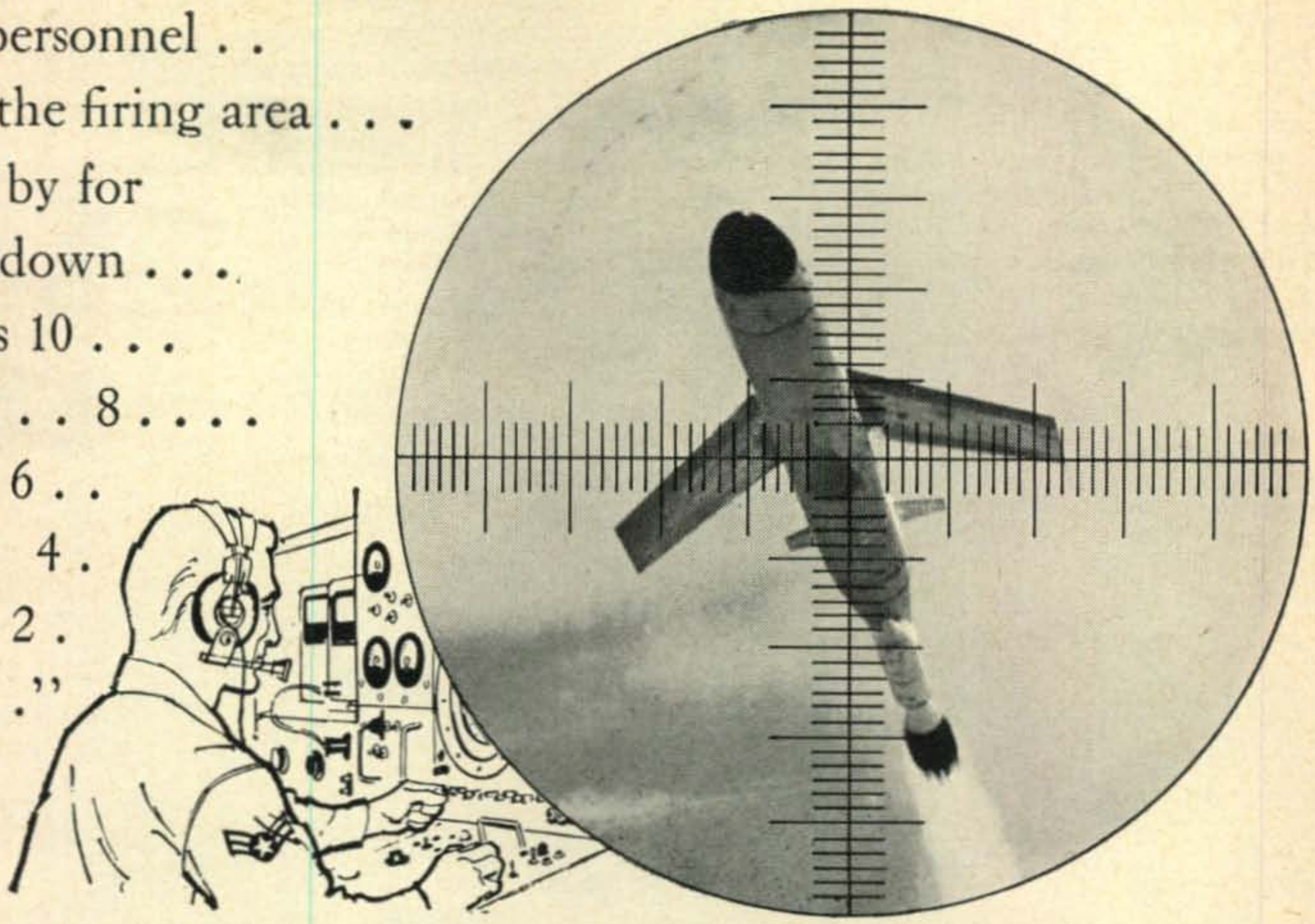

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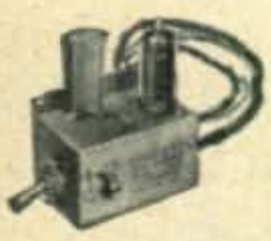

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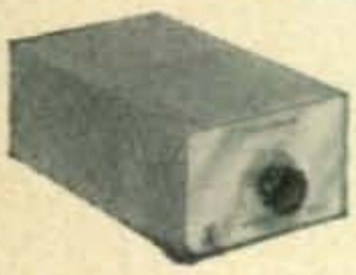

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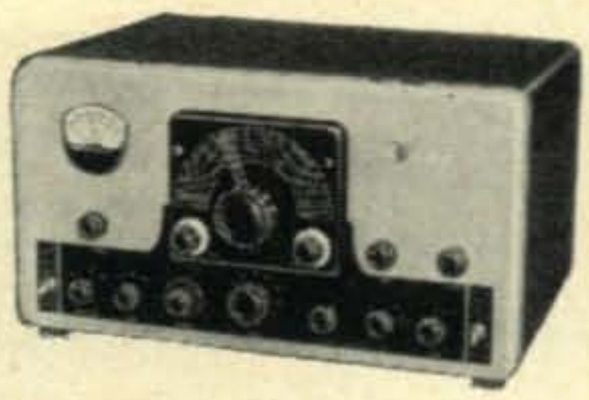

"VALIANT"–Instant bandswitching 160 through 10. 275 watts input CW and SSB (P.E.P. with aux. exciter) 200 watts phone. With tubes.

Cat. No.		Amateur Net
240-104-1	Kit	$349.50
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240-500-1	Kit	$749.50
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Cat. No.		Amateur Net
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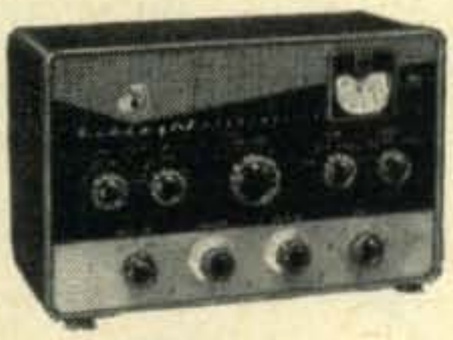

"6N2"–Instant bandswitching coverage of both 6 and 2 meters. Power input rated at 150 watts CW, and 100 watts AM phone. With tubes.

Cat. No.		Amateur Net
240-201-1	Kit	$129.50
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"6N2" THUNDERBOLT AMPLIFIER– Input rated 1200 watts P.E.P.* SSB and DSB, Class AB_1; 1000 watts CW, Class C; 700 watts AM linear, Class AB_1. Continuous coverage 6 and 2. With tubes.

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

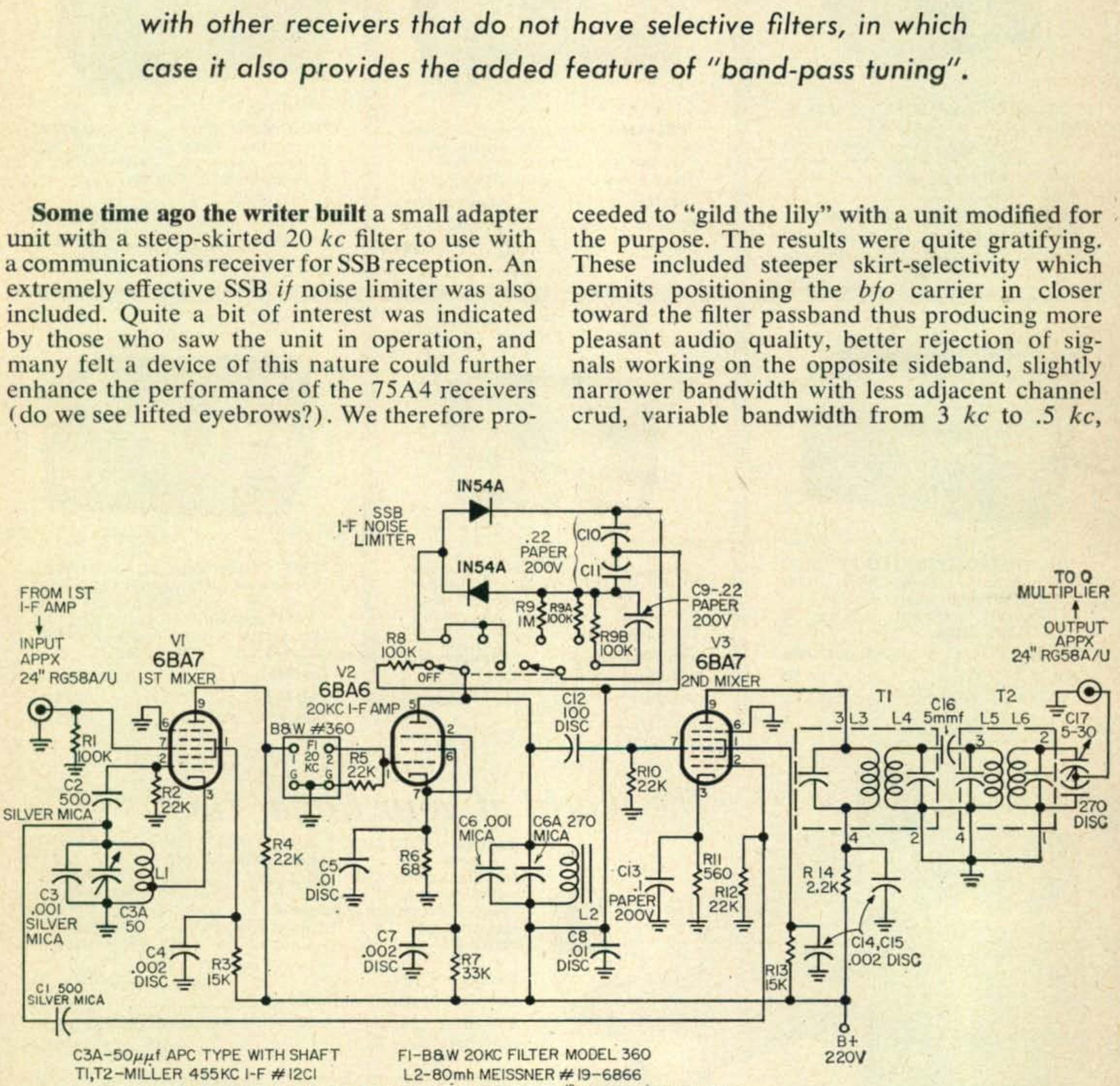
For further information, check number 25 on page 126.

20 Kc Filter Adapter and SSB I-F Noise Limiter for the 75A4

Wilfred M. Scherer, W2AEF

Here is a device which may be used to improve the skirt selectivity of the 75A4. It also furnishes continuously variable bandwidth down to .5 kc. A simple and effective SSB Impulse Noise Limiter is also included. The unit may be used for fixed 3 kc selectivity with other receivers that do not have selective filters, in which case it also provides the added feature of "band-pass tuning".

Some time ago the writer built a small adapter unit with a steep-skirted 20 *kc* filter to use with a communications receiver for SSB reception. An extremely effective SSB *if* noise limiter was also included. Quite a bit of interest was indicated by those who saw the unit in operation, and many felt a device of this nature could further enhance the performance of the 75A4 receivers (do we see lifted eyebrows?). We therefore proceeded to "gild the lily" with a unit modified for the purpose. The results were quite gratifying. These included steeper skirt-selectivity which permits positioning the *bfo* carrier in closer toward the filter passband thus producing more pleasant audio quality, better rejection of signals working on the opposite sideband, slightly narrower bandwidth with less adjacent channel crud, variable bandwidth from 3 *kc* to .5 *kc*,



C3A-50$\mu\mu$f APC TYPE WITH SHAFT — FI-B&W 20KC FILTER MODEL 360
T1,T2-MILLER 455KC I-F #12C1 — L2-80mh MEISSNER #19-6866
L1-OSC COIL (BROADCAST BAND) MILLER #A5496-C (MOUNT IN $1\frac{1}{8}$ SQ. CAN WITH C2 & C3)

Fig. 1—Circuit of the 20 kc filter and SSB noise limiter. Condenser under C17, that is unmarked, is C18.

and excellent noise limiting on SSB or CW which is also applied to the *avc* system to minimize loss of receiver gain during trains of noise pulses.

The circuit of the 20 *kc* adapter, as used in the 75A4, is shown in fig. 1. The circuit of the 75A4 is opened between the first *if* stage and the Q-Multiplier, with the first *if* output being fed to the first 6BA7 mixer in the 20 *kc* adapter. Since the signals at this point are received after they have passed through the mechanical filter in the receiver, the 3 *kc* input bandpass frequency range is approximately 453.5 to 456.5 *kc* (at the 6 *db* points). With the mixer oscillator tuned to 473.7 *kc*, the difference between these frequencies will appear at the output of the mixer, and will result in a bandpass range from 17.2 to 20.2 *kc* (473.7-456.5 and 473.7-453.5) which is the 3 *kc* bandpass spread of the B & W model 360 filter.

The low frequency signals are then passed through the 20 *kc* filter where any signals outside of the passband of the filter (which may result from the mixing of signals at the sides of th 455 *kc* mechanical filter passband) are further attenuated. The output of the 20 *kc* filter is then amplified by the 6BA6 stage, and is next fed to the second 6BA7 mixer where it is again combined with the 473.7 *kc* oscillator (from the first mixer) to produce output signals from the adapter which are in the same passband range applied to the first mixer (453.5 to 456.5 *kc*). The output from the adapter is finally fed back to the Q-Multiplier of the 75A4.

Thus we have taken the signals through both the 455 *kc* mechanical filter of the receiver and the 20 *kc* filter of the adapter. By combining the characteristics of the 455 *kc* filter, fig. 2A, with those of the 20 *kc* filter, fig. 2B, the composite result will be that indicated by the curve of fig. 2C, where it will be seen that the overall slope of the skirts has been steepened thus making better filter performance possible.

As may be seen from the curves, the 3 *kc* bandpass range (453.5 to 456.5 *kc*) of the mechanical filter is that using the 6 *db* points as the reference. The B&W model 360 20 *kc* filter range, using the same reference points, is slightly less than that of the mechanical filter, being about 2.8 *kc*. This results in a slightly narrower overall bandpass in addition to the steepening of the skirts. The combination also offers some improvement (over a single filter) when a 2.1 *kc* mechanical filter is involved in place of the 3.1 *kc* one.

The 473.7 *kc* oscillator originally was crystal controlled; however, it was found that the exact mid-frequency of the various mechanical filters differed somewhat, which resulted in an unsymmetrical passband in some instances. This possibility is eliminated by the use of the variable self-excited oscillator which permits the selection of the exact frequency required in each case to exactly center, or superimpose, the passbands of the filters in the receiver and the adapter. Oscillator stability is no problem at this frequency, and, in fact, extreme oscillator stability is not required, as far as the received signal is concerned, for the reason pointed out at the end of the following paragraph.

Variable Bandwidth

The use of a variable oscillator, in the adapter, leads us to another possibility. If we change the oscillator frequency from 473.7 *kc*

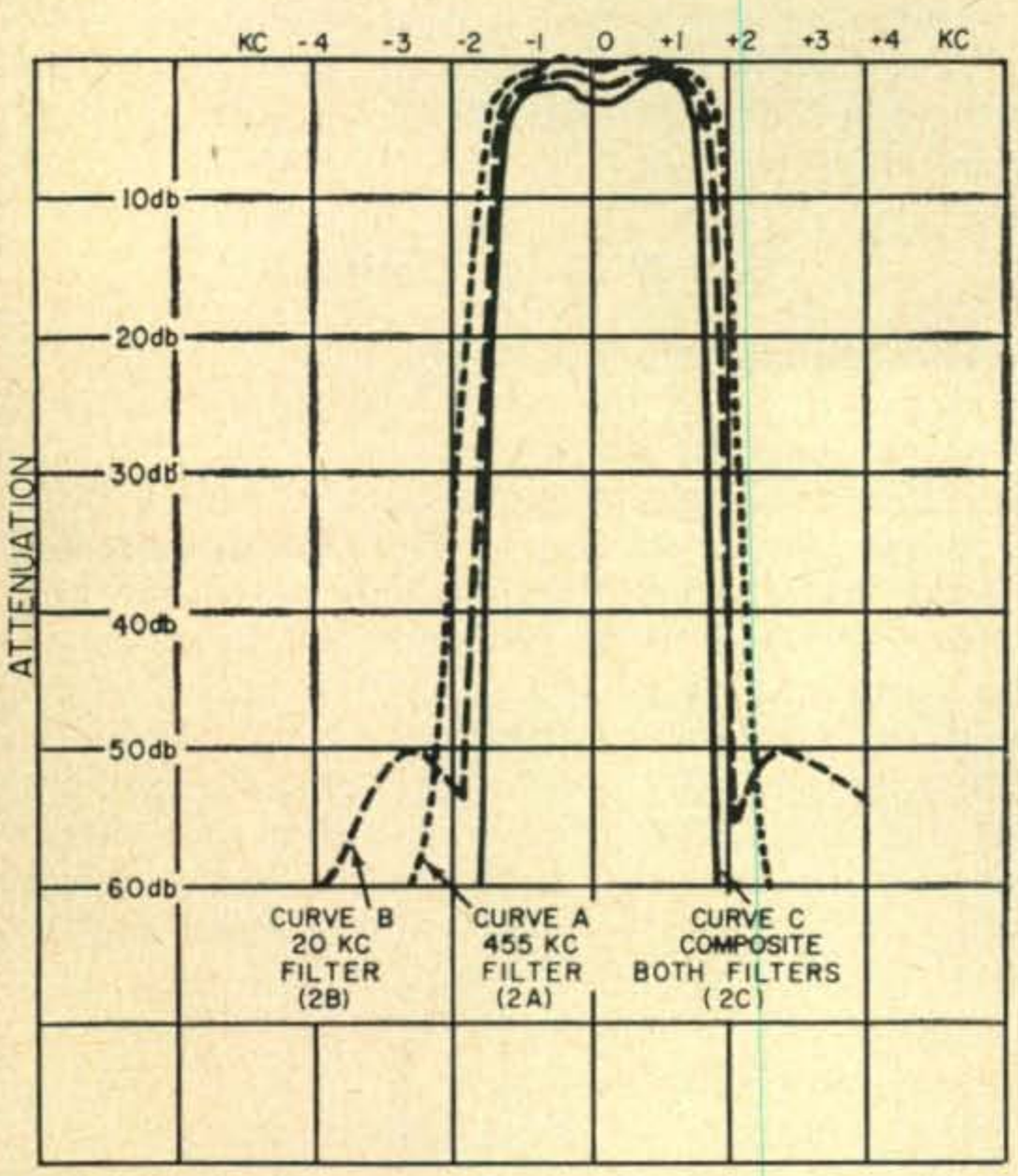


Fig. 2—Combined curves of the 20 and 455 kc filters produce the resultant shown in C.

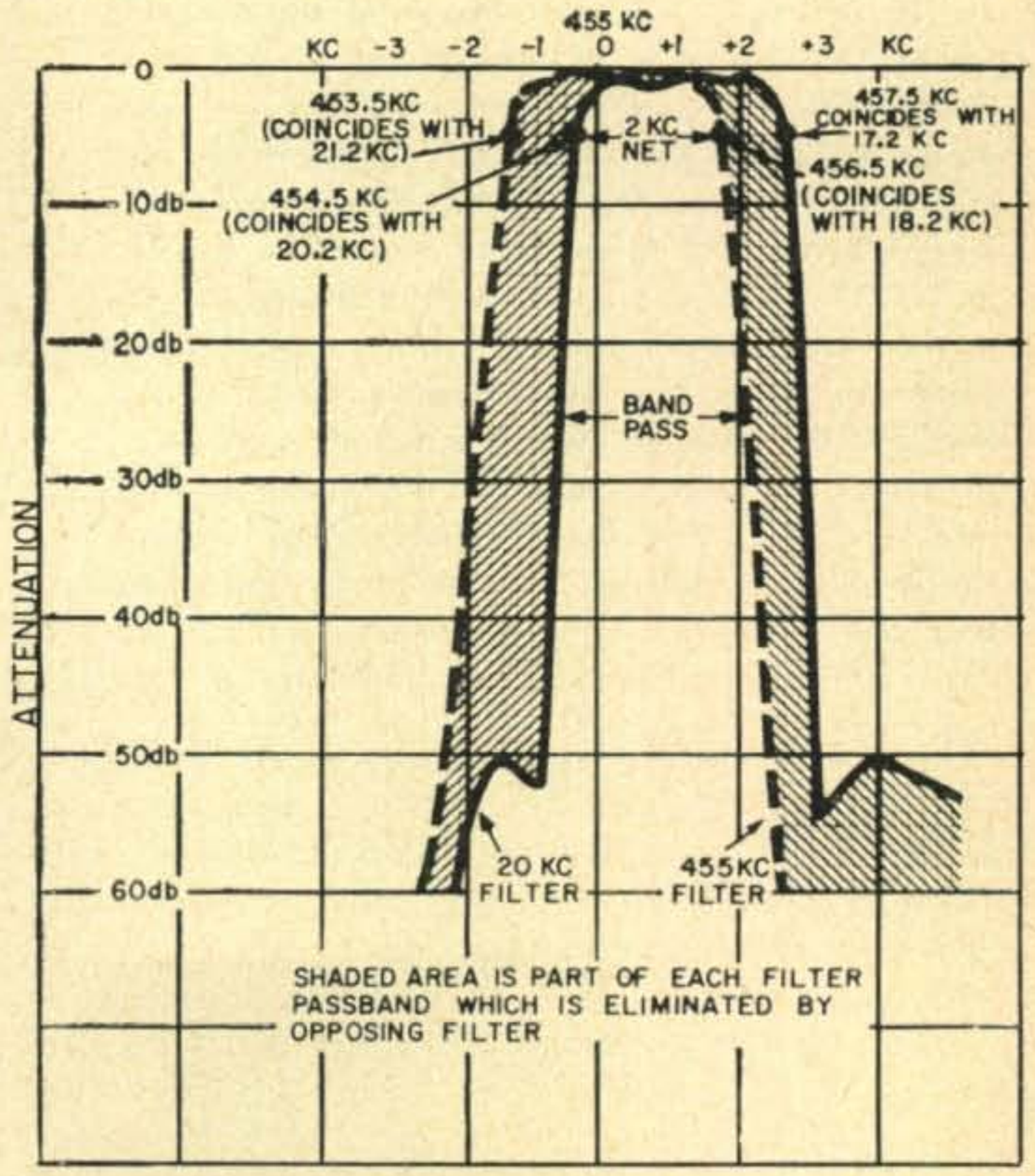
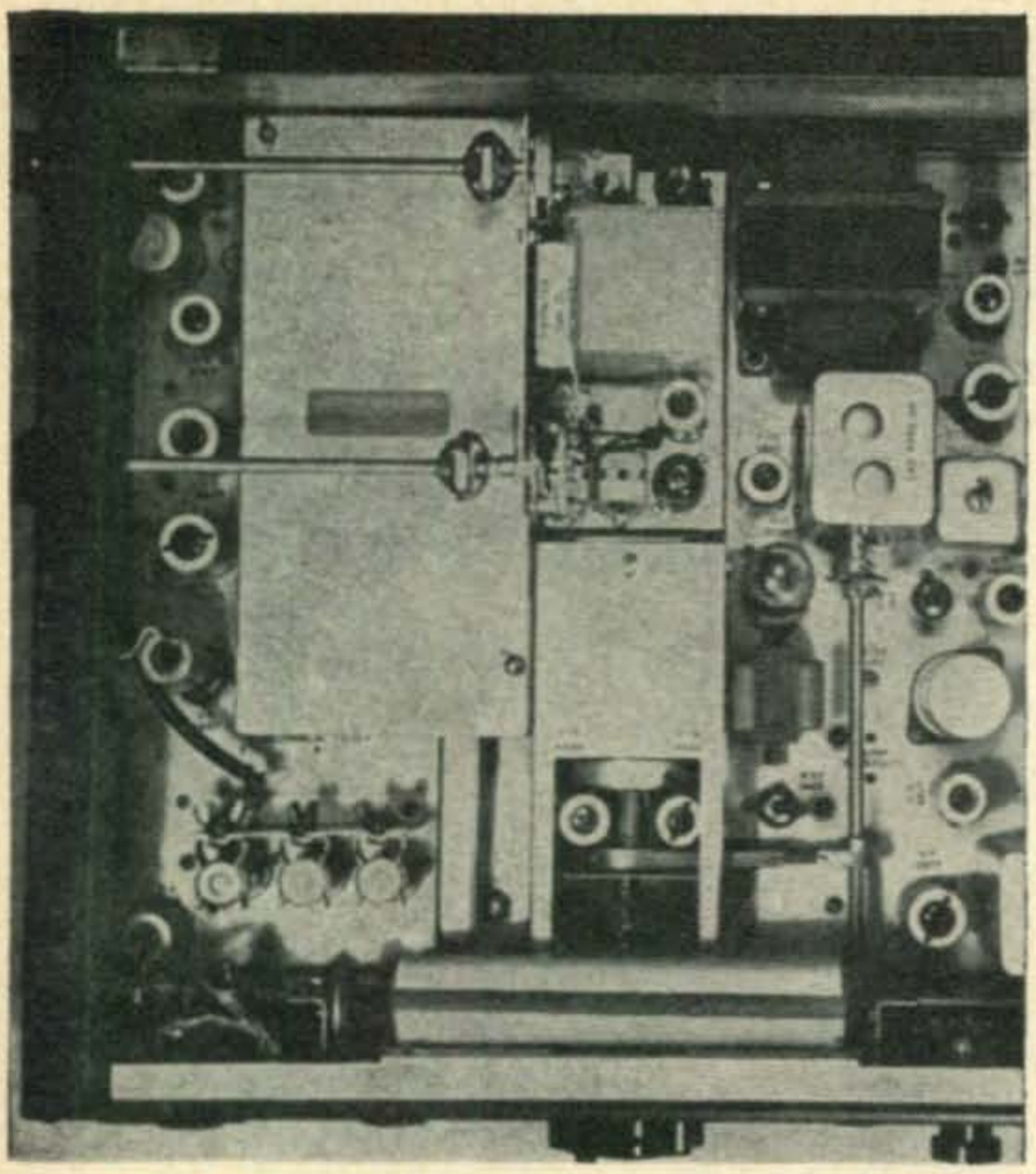


Fig. 3—Variable bandwidth characteristics for 2 kc bandpass—454.5 to 456.5 kc.



The 20 kc adapter is built on a chassis which is mounted at the rear center shelf behind the vfo in the 75A4. The square can near the center of the chassis is the B&W 20 kc filter. At the rear is the 1st mixer tube, next to which is the can which contains the slug-tuned oscillator coil L1. A lead is brought out of the top of this can for a connection to the oscillator trimmer C3A which is mounted immediately above the oscillator can, and on a panel which is fastened to the left side of the chassis. In front of the 20 kc filter are the 20 kc if amplifier and 2nd mixer tubes, together with the 455 kc if transformers T1 and T2. T2 cannot be seen, since it is under the noise limiter switch which is mounted above it on the side panel. The capacitor at the left top of the 20 kc filter is C9. C10 and C11 are mounted vertically along the panel between the if transformers and the 20 kc filter. The crystal diodes are also mounted here. L2 is mounted under the chassis, as is C17 which is placed so that it may be adjusted from the bottom. All the adapter leads come out of the rear of its chassis, and they run through the slot at the rear of the receiver's chassis. The control shafts for the oscillator trimmer and the noise limiter switch pass through the ventilation slots on the side of the 75A4 cabinet where they are held in place by panel bearings which neatly fit the slots.

to 474.7 *kc*, the bandpass output of the *first mixer*, (before the 20 *kc* filter) in the adapter, will be 18.2 to 21.2 *kc* (474.7-456.5 and 474.7-453.5). Then if we superimpose the curves of the two filters accordingly, (see fig. 3), we will find that they overlap at opposite ends, with the 20 *kc* filter taking over the resulting skirt selectivity at 454.5 *kc*, and the 455 *kc* filter taking over at the 456.5 *kc* skirt. The composite result is a bandpass output from the adapter of 454.5 *kc* to 456.5 *kc*, or a net spread of 2 *kc*. Since the process involves mixing and remixing with the same oscillator, no retuning of the receiver is required to keep the signal on frequency.

From this it can be seen that we now have a system whereby the bandpass spread can be continuously varied from 3 *kc* down to about .5 *kc* simply by changing the frequency of the adapter's oscillator. When the bandwidth is narrowed however, the steepness of the skirts is not as good as when the effects of both filters are equally superimposed on one another to produce the widest bandwidth. It will approach that of one of the filters alone as the bandpass is narrowed below 2.6 *kc*. In the case cited above, at 454.5 *kc* output, the skirt will follow the curve shown at the 20.2 *kc* side of the 20 *kc* filter, but at 456.5 *kc* output, it will follow the curve of the 455 *kc* filter shown at its 456.5 *kc* side. Nevertheless, the variable bandwidth feature can be helpful under adverse conditions of QRM, especially in cases where the 75A4 is not already equipped with 2.1 *kc* or .8 kc mechanical filters.

In the first model of the adapter, which did not include the 20 *kc* amplifier, some difficulty was experienced with the 473.7 *kc* oscillator signal's leaking through the second mixer, and passing through the 75A4's 455 *kc if* strip (even though a degree of selective isolation was provided by the loosely coupled *if* output transformers in the adapter). This affected the *avc* system, and biased the AM circuits to a point where a considerable loss in audio level resulted during AM reception. Inclusion of the amplifier raises the overall resulting 455 *kc* output level of the adapter sufficiently to permit the reduction of the oscillator signal (which leaks through the second mixer) by means of overall attenuation which is accomplished with C17 and C18. The amplifier is also needed to furnish ample operating level for the SSB *if* noise limiter.

SSB IF Noise Limiter

The SSB noise limiter employs two crystal diodes connected in a full wave arrangement in shunt with the output circuit of the 20 *kc if* amplifier (see fig. 1.), and as such is an *if* type of noise limiter (IFNL). The diodes are self biased by the rectified potential developed across R9. The time constant, resulting from the combination of R9, C9, C10 and C11, is such that the bias varies nearly at a syllabic rate with an SSB signal. This tends to prevent any limiting action, and thus allows the signal to pass on virtually unhindered, but when a short noise pulse is received, the bias cannot rise rapidly enough to prevent limiting, and the amplitude of the pulse is then reduced by the action of the diodes.

The usual type of noise limiter which follows the detector not only clips the noise peaks, but also tends to clip off the tops of the audio peaks as well. This squares off the audio wave, and

causes severe distortion when the clipping level is set for satisfactory noise limiting action. Considerably less distortion is experienced when the SSB *ifnl* is used, since the most severe limiting takes place only on short steep fronted pulses. Besides this, its action tends to compress the limited signal instead of squaring it off by clipping. Because of the self-bias, which is developed when an SSB signal is received, little limiting of the signal is found, except at the first impulse of a syllable, usually the one at the start of a word.

Because the *ifnl* is installed ahead of the detector and the *avc* rectifier, the effect of limiting at the start of a word softens both the audio and *avc* attack at that period. This permits the use of maximum *rf* gain with full *avc* action without the hard popping attack on strong signals which is usually experienced with the 75A4.

Another advantage of a noise limiter installed ahead of the *avc* rectifier is that it helps to prevent a succession of noise pulses from activating the *avc* system which would result in an attendant loss of receiver gain during such periods.

High back-resistance crystal diodes, type 1N54A, are used in the *ifnl*. Vacuum tube diodes are not satisfactory in this particular application of the *ifnl*. SW1 is the noise limiter on-off switch. It also selects different degrees of limiting by changing the time constants and the self biasing resistors. When the switch is at off, *R8* is placed across the amplifier circuit to hold the gain down to near that realized when the noise limiter is in use.

Construction

The adapter unit is built on a 6⅛" x 1¼" x 3" open-ended chassis (Bud #1628) which allows it to be mounted in the 75A4 directly behind the *vfo*. A panel is fastened on one side of the chassis to permit mounting of the noise limiter switch and the trimmer for the variable oscillator, so that they may be controlled by shafts passing through the ventilation slots on the side of the 75A4 cabinet, thus eliminating "butchering" of the front panel. The only holes required in the 75A4 are four small ones for screws used to secure the adapter to the shelf on which it is mounted. The location of the components and guide dimensions may be found in fig. 3.

Power is derived directly from the 75A4, and although the B plus drain is approximately 30 *ma*, no adverse effects on the power components of the receiver have been found. However, if the constructor is apprehensive in this regard, a small power supply, for the adapter, can be installed underneath the shelf on which it is mounted.

Because of the mechanical and physical complications which might become involved, no provision has been included in the adapter to switch it in and out of the circuit, so any use

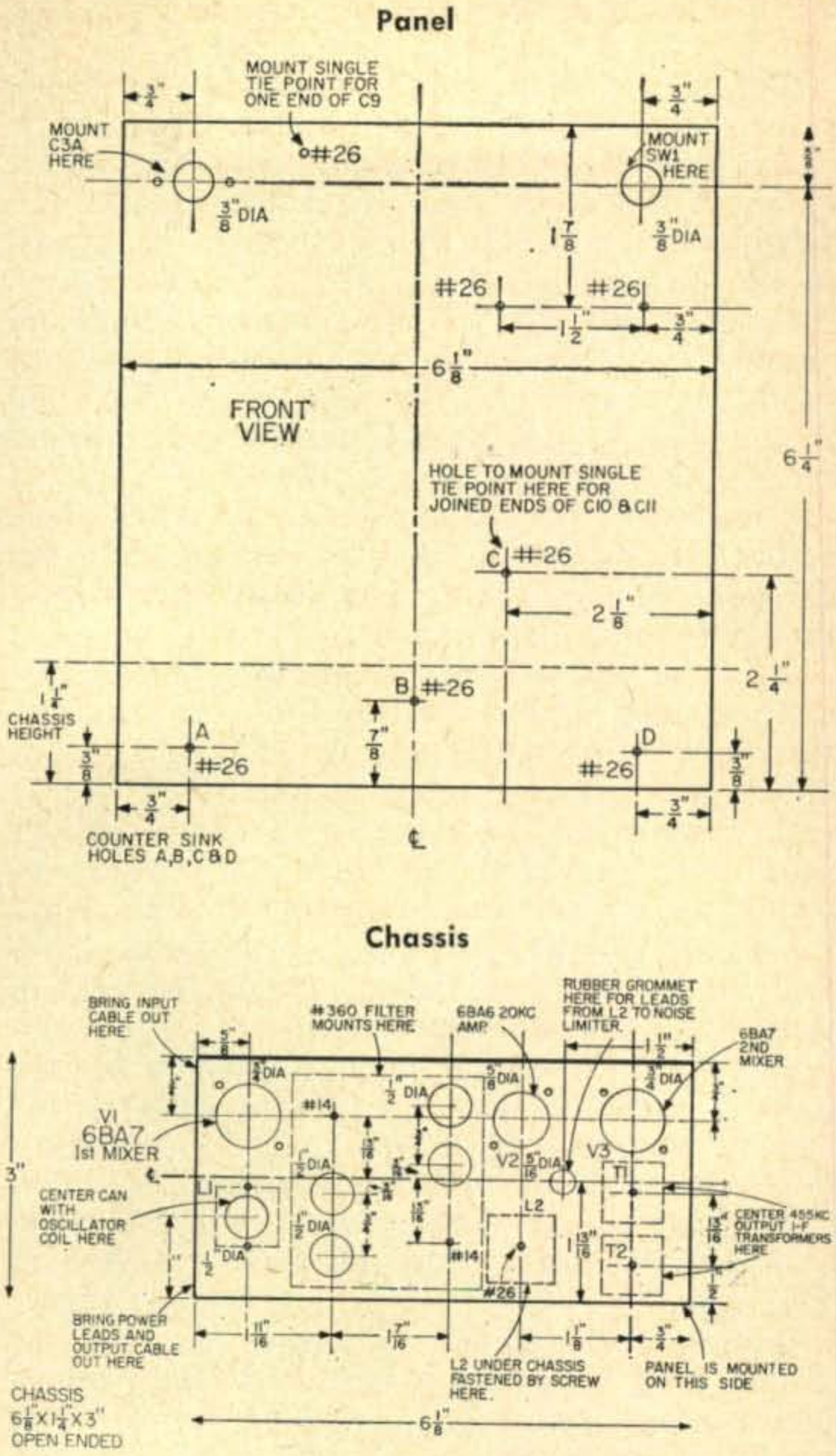


Fig. 4—Dimensions and component location for the chassis and panel.

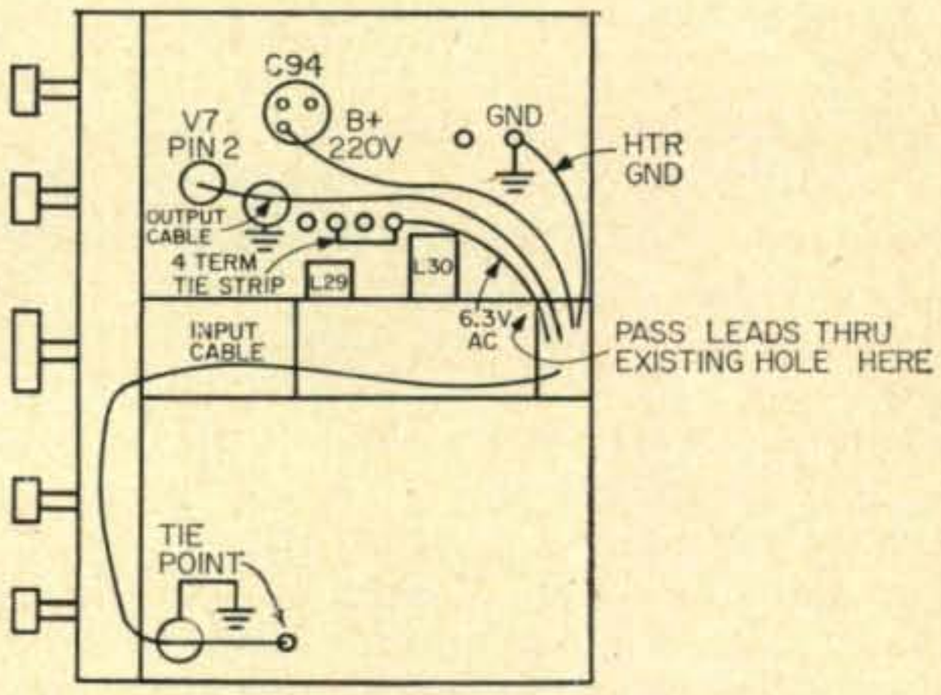


Fig. 5—Adapter connection points.

of the 6 *kc* mechanical filter would still restrict the overall bandwidth to that of the adapter. If a switch is added, the input and output circuits should be well isolated from one another at the switch to prevent leakage around the unit. In this case it would also be more expedient to build the adapter as an outboard unit with its connecting leads passed through the ventilation slots at the rear of the 75A4 cabinet.

Installation and Adjustment

Before the adapter is installed in the 75A4, several adjustments must be made.

Remove the bottom plate from the 75A4. Connect the coax and power leads from the adapter and place it in the receiver as shown in the photograph. Run all the leads through the slot at the rear of the shelf on which the adapter is placed. If not already done so, mounting holes may be marked and drilled in the shelf at this time. Then use self-tapping screws to fasten the unit to the shelf. Trim all the leads for the correct length to reach their respective connecting-points, (see fig. 5), but do *not* connect them. The leads should run under the chassis as shown.

Remove the adapter from the 75A4. Disconnect any antenna from the receiver, and then stand the latter on its left side. Now, check the *bfo* alignment as described in the instruction manual for the 75A4 (item 7 under Maintenance). Then, as a matter of interest, check the normal maximum possible sideband suppression and bandwidth (Passband Tuning at 1.5 *kc*) as described later in this text in steps 1 and 2 under Operation.

Next, set the *avc* at *Fast*, Selectivity for the *3.1 kc* filter, *Bandswitch* at the second *10-Meter* position, *AF Limiter* at *Off*, *Detector* for *SSB*, *Passband Tuning* at Zero. *Rejection Tuning* at *Off*, *RF Gain* at *maximum*, *AF Gain* at about *9 o'clock*, and the *Power Switch* at *Calibrate*.

Tune in the crystal calibrator at 28.6 *mc* until a zero beat-note is obtained. Then adjust the *Antenna Trimmer* for a *minimum S-Meter* reading, which will be around S-5. Turn off all *ac* power, but leave all the other controls set as just described above.

Referring to fig. 5, on the 75A4 disconnect the inner conductor of the coax lead from pin 2 of V7. Disconnect the other end of this coax inner conductor from the tie-point near the front wafer of the *selectivity* switch.

With the adapter unit placed outside of the 75A4 cabinet, *temporarily* connect its coax and power leads to their respective points as follows:

Connect the inner conductor of the output coax lead to pin 2 of V7. Connect its outer shield to the nearest ground lug.

Connect the inner conductor of the input coax lead to the tie-point from which the internal 75A4 coax lead was just disconnected as described above. Connect its outer shield to the nearest ground terminal.

Note that the internal 75A4 coax lead is left disconnected at both ends. Stray leakage is minimized by making the connections as just described, rather than by making them through only one break directly at the tube socket.

Connect the power leads as indicated in fig. 5.

Now, on the adapter set the *noise limiter* switch at off, the *variable oscillator* trimmer at the center of its range, and turn the tuning slug of the oscillator coil all the way in (clockwise).

Apply power with the 75A4 *power* switch set at *on*. Slowly rotate the adapter's oscillator tuning slug counter-clockwise until a low pitched background noise is heard. The oscillator will now be tuned to approximately 436.3 *kc*. Rotate the slug control further counter-clockwise until a loud beat-note is heard. Adjust for zero beat. The oscillator frequency will now be about 455 *kc*, and the S-Meter will read almost full scale. Again rotate the oscillator slug counter-clockwise until a low pitched background noise is heard. The oscillator frequency will now be about 473.7 *kc*. Turn on the crystal calibrator, and adjust the oscillator slug for a maximum S-Meter reading. Be sure the adjustment of any of the other controls has not been disturbed during the above steps.

Peak up the S-Meter reading by means of the slugs in the *if* output transformers of the adapter. (L4, L5, L6 and L7). Alternately adjust C17 and the slug of L6 (this should be the one controlled from the top of the *if* can) until the S-Meter reading is the same as, or just slightly lower than, that obtained at the time when the antenna trimmer was adjusted for the minimum S-Meter reading before the adaptor was connected into the circuit.

The overall gain has now been adjusted for the normal receiver gain. The preceding steps may also be performed when the adapter is permanently installed if suitable holes are made in the shelf of the 75A4 to enable one to adjust *C17* and the slugs at the bottom of the *if* cans in the adapter.

Next remove all *ac* power from the 75A4, and disconnect the adapter's coax and power leads from the receiver. Mount the adapter unit in the 75A4, and this time *permanently* connect its leads back on the receiver. Put the bottom plate back on the 75A4, and stand the latter in its normal position. Connect the control shafts to the adapter with suitable knobs placed on them at the side of the receiver cabinet.

Place the adapter's noise limiter switch at *off*, and its *variable oscillator trimmer* control at the center of its range. Apply power to the receiver with the *power* switch at *On*. Adjust the adapter's oscillator frequency to near 473.7 *kc* by tuning its slug for a low pitched background noise as described above. This should be at or near the point found when the unit was initially tuned outside of the cabinet.

Turn on the *crystal calibrator*, and tune the signal to zero-beat. Peak up the S-Meter reading, first by means of the adapter's *oscillator slug*, and then by adjustment of the *antenna trimmer*.

With the signal at zero-beat (be sure the *passband tuning* is still set at zero), adjust the *zero set* so that the hairline coincides exactly with the zero on the 75A4 dial. Check the

S-Meter reading when the dial is set 1.5 *kc* each side of zero. The S-Meter reading should be identical at these two points. If it is not, slowly readjust the adapter's *oscillator slug* to the point which results in identical meter readings with the dial 1.5 *kc* each side of zero. Note that this step is similar to the one given in the 75A4 instruction manual for its *bfo* alignment.

With the *calibrator* off (*power switch* at *On*) the pitch of the background noise should be approximately the same at equal settings of the *passband tuning* each side of its zero. If at any time the oscillator frequency is shifted by drift or adjustment of the oscillator trimmer for variable bandwidth operation, this aural check may serve as a rapid means of finding the correct setting of the oscillator control for normal bandwidth use. This method may also be used, instead of that described in the preceding paragraph, for the initial alignment.

Operation

On the 75A4, the setting of the passband tuning determines the attenuation at frequencies adjacent to the passband of the mechanical filter. Attenuation of signals on an unwanted sideband increases as the passband tuning is set further away from zero, while at the same time the effective bandwidth at the upper limit of the passband (in the vicinity of 3 *kc*) increases. When the 3.1 *kc* filter is used for SSB reception, most operators set the passband tuning at 1.5 *kc*. Under ordinary conditions this may be quite satisfactory, but if good rejection of a signal on the opposite sideband is needed, the passband tuning must be moved out further but as already pointed out, the effective bandwidth will increase at the same time. For example, if the passband tuning were moved out an additional 500 cycles to 2 *kc*, the upper cutoff will occur at approximately 3500 cycles instead of 3000 cycles.

These same principles follow when the 20 *kc* adapter is used; however, due to the increased steepness at the skirts of the overall bandpass characteristics, the bandpass tuning may be brought closer to zero for a given amount of opposite sideband rejection, while at the same time the effective overall bandwidth may be kept within the desired limit. When the 3.1 *kc* filter is used in conjunction with the 20 *kc* adapter, passband tuning settings of from 1.25 to 1.5 *kc* will result in excellent sideband suppression with pleasing audio quality and less adjacent channel crud. If the 2.1 *kc* filter is used with the adaptor, the passband tuning may be set at 1.25 to 1 kc with similarly improved results over the use of the mechanical filter alone.

The degree of attenuation for any frequency deviation from zero-beat, at any setting of the passband tuning, may be checked by ear, or by noting the S-Meter readings as the dial is tuned from one sideband to the other while the crystal calibrator is used for the test signal. Examples of how this may be done are as follows:

1. Turn the *rf gain* to maximum with the *avc* at *Fast*. Set the *Passband Tuning* at zero, turn on the *crystal calibrator*, and tune the receiver to zero-beat. Align the *Zero Set* with the zero on the dial. Then set the *Passband Tuning* at 1.5 *kc* on the *Upper* side. Rotate the *Main Dial* towards the *low* frequency side of zero, tuning for a maximum S-Meter reading which will occur over nearly a 2 *kc* spread, from about .5 *kc* to 2.5 *kc* on the *low* frequency side of zero-beat. Now rotate the dial back towards zero, noting the S-Meter readings as the dial is tuned to various degrees of frequency away from zero. Go past zero-beat on to the other side, at which time the S-Meter readings should drop sharply, indicating the possible amount of suppression on the other sideband for a given deviation from zero. Repeat the above steps with the *Passband Tuning* set at 1.5 *kc* on the *Lower* side, where the maximum readings will now occur when the tuning dial is on the *high* frequency side of zero-beat. These general procedures also may be followed with the Passband Tuning placed at settings other than 1.5 *kc*. The suppression should be the same for either sideband when the Passband Tuning is set at the same point on the related side in each instance. If it is not so, slightly readjust the oscillator trimmer to produce this result.

2. The same procedure may be carried out by ear instead of using the meter as an indicator. To do this, follow the above steps, except turn the *AF Gain* nearly all the way on, and back down on the *RF Gain* to a point where a beat-note of about 1000 cycles can be comfortably heard on the wanted sideband. If the Passband Tuning is set for *Upper*, the beat-note will be heard when the main dial is tuned to the *low* frequency side of zero-beat, or on the *high* frequency side when the Passband Tuning is at *Lower*. Then rotate the dial toward the other side of zero-beat, and audibly note the drop in level of the resulting beat-note. It should be barely perceptible, if heard at all, at any beat-note of from 100 cycles up.

Either one of the two above methods may also be used for checking the effective overall bandwidth by observing the attenuation near the 3 *kc* sides of the passband. Operation and adjustment when the 2.1 *kc* mechanical filter is in the circuit may also be carried out in a similar manner, in which case the Passband Tuning may be set closer to its zero for a given degree of unwanted sideband suppression.

Best sideband rejection and less adjacent channel crud will be experienced when a minimum amount of *avc* is used. (The Rejection Tuning of the 75A4 is also more effective under this condition.) The degradation of selectivity when maximum *rf* gain and *avc* are used may be demonstrated by comparing the skirt atten-

[*Continued on page 124*]

1959 Edison Award To W8AEU

Presentation of the eighth annual Edison Radio Amateur Award for public service was held at a banquet on Feb. 25 in the Sheraton-Carlton Hotel in Washington, D. C.

The award was received by Walter Ermer Sr., W8EAU, of Cleveland, Ohio. Mr. Ermer was selected from among more than 30 candidates as having performed the most outstanding public service during 1959. He organized and directed a 300-man voluntary emergency radio communications corps which served the city on 23 occasions during the past year—including flood and storm alerts, searches for lost children, traffic assistance to the police department in parades and other community affairs, and help to fund drive campaign workers. Walt received a trophy and $500.00.

George Metcalf, ex 9XE of Washington, a General Electric vice-president, was master of ceremonies. The award presentation was made by L. Berkley Davis of Owensboro, Kentucky, who is general manager of the company's electronic components division and acted as chairman of the Edison Amateur Award Council.

The principle speaker at the award presentation was Major General Earle F. Cook, W4FZ, deputy chief signal officer of the U. S. Army, who discussed the significance of the role of licensed radio amateurs in both peace and war. The text of his speech follows.

Excerpts From Address By Major General Earle F. Cooke

Mr. Chairman, Mr. Ermer, distinguished guests, fellow amateurs:

It is a pleasure and a privilege to have the opportunity of addressing this audience on the presentation of the annual Edison Radio Amateur Award.

I find it a particular *pleasure* because radio has always been of such consuming interest to me. It has played an important part in my life, both as a hobby—which is a ham's way of saying he takes his meals by his rig—and as a part of my profession. Since radio figures so prominently in modern military communications, it has been closely interwoven with my military career.

I consider it a *privilege* to have this opportunity of speaking to you because of the great respect I have for the Award and what it represents. The General Electric Company and its officers are to be congratulated upon their sponsorship and management of this contest. Within the short timespan of eight years the Edison Award has acquired such prestige that it is often referred to as "the Nobel Prize of amateur radio." The many deserving nominees from all over the country and the eminent men who have served on the judging panels are evidence of the high national regard in which it is held. One does not wonder that the Award has so quickly become one of our finest amateur traditions.

It is most significant that the Edison Radio Amateur Award for Outstanding Public Service during 1959 should go to one whose activities have resulted in the provision of a 300-man voluntary emergency communications corps. The mission of such a corps might well be defined in the same terms as that of our military services—"to provide for the common defense, to promote the general welfare . . ." What this emergency communications service means to the Cleveland community, or might mean in times of disaster or other circumstance, does not need elaboration for this audience.

My congratulations and warmest personal wishes to Mr. Walter Ermer, W8AEU, the 1959 Edison Award winner, for the accomplishments which have brought him this distinguished recognition. I also congratulate the recipients of the special citations for their meritorious performances. That three of these citations should be for service in providing emergency communications, one for the promotion of international good will, and one for service performed in relaying messages for military personnel overseas, is fine testimony to the caliber of men and women you find in that group known by that seemingly inelegant but endearing term—"hams."

While all the military services have the highest respect and admiration for the radio amateur, this is especially true of the Army Signal Corps. Our communications tasks give us a close affinity with other communicators and an appreciation of their jobs. It may be of interest to know that there are four major generals and one brigadier general among licensed amateurs in the Army Signal Corps. I am proud to be one of these.

It is particularly important to me that an Army Signal Corps representative should be invited to address this group tonight because this is our Centennial Year. On June 21 of this year we mark a Century of U. S. Army Signals.

We all know that the methods and techniques of communication have undergone profound changes in that hundred years since the adoption of Major Albert J. Myer's comparatively simple wig-wag system for the Army.

Apart from our common bond of interest in radio, our esteem for the amateur is also that which one holds for a prime national reserve asset. Amateur radio operators are an invaluable and indispensable American source of operational and technical skills in time of war or other emergency need. Under various sponsors they also provide auxiliary systems or means of communication which can be made available to miiltary commanders as required.

One of the most important values inherent in the amateur service today is an ever-increasing willingness of its members to devote themselves and their equipment to civil or military emergency type communication services. This is shown by the number of amateurs engaged in these activities and by such programs as the Amateur Radio Emergency Corps or AREC, sponsored by the American Radio Relay League, and the Radio Amateur Civil Emergency Service or RACES, which is sponsored by the Office of Civil and Defense Mobilization. In the same category are the many hundreds of naval reservists, who are radio amateurs and maintain their own personal equipment at their homes.

More closely associated with the U. S. Army Signal Corps is MARS—the Military Affiliate Radio System. The MARS program is jointly conducted by the Army and the Air Force as a training and auxiliary communications facility. The foundation of the MARS system is the approximately 13,000 licensed radio amateurs throughout the nation and at certain overseas locations. Today's MARS program contrasts greatly with the early beginnings of joint military and amateur activities.

It was early in 1925, at Camp Alfred Vail, now Fort Monmouth, New Jersey, that affiliation between the Army Signal Corps and the radio amateur was first discussed. Major George L. Van Deusen, now Major General retired, then the Commandant of the Signal Corps School, directed Captain Tom Rives of the School to prepare a study on the subject. The study by Captain Rives, now Brigadier General, USAF, retired, recommended the establishment of an Army Amateur Radio System.

The system was approved by the Chief Signal Officer and in August 1925 Capt. Rives met with the late Hiram Percy Maxim, Jr., then President of the American Radio Relay League, and Ed Handy, a former Colonel in the Signal Corps. In October 1925 QST magazine published the agreement between the Army Chief Signal Officer and the ARRL in establishing the new Army Amateur Radio System or AARS.

The AARS was redesignated as the Military Amateur Radio System in 1948 and was renamed the Military Affiliate Radio System, or MARS, in 1952.

Volunteer amateurs operating MARS stations have participated in numerous Army communications exercises. The success of these proved that MARS must be considered as one of the country's important communications assets.

The radio amateur performs many selfless services for his own community, his state, and his country and its military services, that go far beyond simple self-enjoyment of a hobby. He is a dedicated man with a strong creed of helpfulness and assistance to others—a communications "Minuteman"—who stands ready to lend a competent hand in times of local disaster, national emergency or war.

On a lighter note, it has often seemed odd to me that we should still use the term "amateur" for those so thoroughly professional in ability. I realize it has to do with the accepted distinction between those in business to make money and those simply following a hobby for enjoyment. Yet I might say here I have known a couple in the former category who often swear they must be following the latter.

In any event, radio amateurs are coupled with success—whether it is making a new beam load the first time or getting a Christmas message back from some remote spot to the sender's family.

We are glad when opportunities arise in which we can return such loyalty and support to amateur radio. One such area is in the maintenance of the frequency allocations for the amateur service. Without appropriate allocations, there could be no amateur radio.

We are all aware that whenever a change in frequency allocations is considered, the amateur bands invariably get a "hungry look" from those desiring to expand. Much like an untuned transmitter, these factions have a tendency to spread. The military services have always vigorously opposed any proposals to cut down on the size of the amateur bands.

All of you recognize the significance of the World Conference of Governments in Geneva, Switzerland, which ended last December, as it affects a new international radio treaty. The treaty which resulted provided for continuation of the size of the frequency allocations for amateurs—*without reduction*. What many may not know are the difficulties which arose and the real victory that keeping the "status quo" represented. You might be interested in hearing something of the behind-the-scenes effort that made this agreement possible.

As you know, the frequency bands which amateurs have been using for a number of years are derived from an international radio treaty negotiated in Atlantic City in 1947. This treaty came up at Geneva for review and possible revisions. The allocations for all uses of radio were under scrutiny.

During the three years of preparatory work for the Geneva Conference, military representatives on State Department committees adhered to the position that there should be no change in the allocation to amateurs. Consequently, the official position of the United States at the Geneva Conference last year was to staunchly defend and preserve the amateur bands.

At the beginning of the Conference, it appeared that delegations of many countries were anxious to reduce the size of the principal long-distance amateur frequency bands. Inroads on these bands have been made at previous conferences of the International Telecommunications Union. Every U. S. amateur can be proud and gratified that the United States delegation to this Conference took a very strong stand and insisted on maintaining the present status on all of the long-distance amateur bands below 30 Mc.

The 80-meter band was in jeopardy early in the Conference because of proposals of countries within our own hemisphere. After informal discussions between our delegation and the other delegations concerned, this crisis was smoothed over and no changes whatsoever were made to the Atlantic City allocations.

"Forty meters" was in the most serious trouble in its history. Several groups of countries, with some encouragement from some delegations from the Americas, wanted to introduce short-wave broadcasting between 7100 and 7300 kc. This is, of course, the existing allocation outside the American Hemisphere, with some sharing in some countries by amateurs between these frequencies. The United States delegation organized a series of consultations with the other delegations involved. When the decisive moment came at the Conference, we succeeded in obtaining votes to maintain the entire 40 meter band. The frequencies btween 7000-7300 kc would remain exclusively for amateurs throughout the American Hemisphere. Moreover, 7000-7100 kc is maintained world-wide exclusively for amateurs. Outside the Americas the band 7100-7300 kc is exclusively for broadcasting, except in South Africa where it will still be available to amateurs.

The Conference set a precedent in adopting a Resolution which calls for the discontinuance of the outlaw broadcasting stations now operating between 7000-7100 kc. Some of the countries engaged in this type of operation took formal reservations and indicated they would not remove their broadcast stations from this band. The same Resolution which focuses on these broadcasters also looks toward the confinement of interregional contacts in the 40-meter band between 7000-7100 kc. This restriction cannot of course be implemented until the broadcasting service vacates the band 7000-7100 kc. The hard achievement is that the entire 300 kilocycles are maintained for amateurs throughout the whole American Hemisphere.

The 20-meter band was seriously endangered at the Geneva Conference. Certain countries proposed drastic reduction in its size in order to expand the allocations for short-wave broadcasting. The U. S. Delegation's firm position prevented any change in the Atlantic City allocations.

Attempts were also made to slice a very few kilocycles off the low frequency end of the 15-meter band to accommodate certain of the space research projects now being planned. The United States Delegation insisted that the proposed transmissions from space vehicles could be made on a non-interference basis without mention in the treaty just as the Russian Sputniks now use the 20 Mc standard frequency band. We were successful and the treaty makes no change of any kind in the Atlantic City allocations for the 21 Mc or 15-meter band.

A number of countries proposed reductions in the 10-meter or 28 Mc band. Most of the proposals were to reduce the size of this band by 700 kc so that the amateur band would only be one megacycle wide between 28 and 29 Mc. The United States Delegation was not able to find the answer to this problem until almost the end of the Conference when finally the French Delegation withdrew its proposal. In response to an appeal of the United States Delegation, all of the other countries involved followed suit.

The outcome of the Geneva Conference, as far as amateurs are concerned, is far better than any of our frequency experts had dared to hope. I am proud to say that the United States spokesman on the United States Delegation responsible for this outcome was the Army Frequency Manager, a senior Signal Corps employee.

I am grateful for having been asked to address you on this important occasion which recognizes the spirit and achievement of radio amateurs by honoring the Radio Amateur of 1959—Mr. Walter Ermer. Both as a fellow amateur and as a representative of the United States Army, I am most appreciative of this opportunity. I am sure that I express our collective feelings when I extend to Mr. Ermer our heartiest congratulations for his outstanding accomplishment and distinguished award.

The G4ZU "Bird Cage" Aerial

Dick Bird, G4ZU
Sumner House
26 Upfield
East Croydon, England

A new array giving high gain in limited space. It is similar in some respects to a cubical quad but it has a much improved mechanical structure, higher gain, and facilities for multiband operation without using interlaced elements.

This project started in 1957, the object being to discover some simple structure which would give a power gain of up to 10 *db* in the 20-metre and possibly the 40-metre bands.

A 5-element *wide-spaced* Yagi can provide such a performance, but requires a boom length of at least 57′ on 20-metres and over 110′ on 40-metres. In the hope of achieving a reduction in physical size, tests were conducted with inductively loaded elements, but when an attempt was made to use more than three elements the gain did not increase according to the book. It was found that even the best loading-coils have an effective *rf* resistance of at least 20 ohms. Although the feed impedance of a loaded beam may seem to be around 45 ohms, and although the measured *swr* with a 52 ohm feeder appears satisfactory, the unpleasant truth is really as follows. The 45 ohm impedance at the feed point is made up of two components, the 20 ohm loss resistance in the coils plus the 25 ohm radiation resistance of the beam itself. In other words, only half the transmitter power is radiated. The rest goes to waste in the form of heat. These figures refer to measurements on a typical wide-spaced 3 element array. With closer spacing, and more elements, the position becomes even worse! A 5 element array has a radiation resistance of less than 10 ohms. With 20 ohms loss resistance more than two-thirds of the transmitter power is wasted. There seemed little hope of achieving the power gain desired by such methods. Tests were then made on loop type elements e.g. the Bruce, Bi-square and simple Quad. When used with a second element of similar type, suitably phased, such configurations are capable of quite appreciable power gain. Ten *db* gain would probably be a rather optimistic estimate, but 8½ *db* gain can be realized without much difficulty. There is, however, the disadvantage that the adjustment which provides maximum back-to-front ratio, does not coincide with that for maximum gain. A double loop array also poses numerous mechanical and structural problems. Bamboo rods or wire are all very well for a temporary lash-up, but the appearance could hardly be called professional! The problems to be solved seemed to fall under the following main headings.

1. To devise an entirely new mechanical structure and so position the elements in space as to achieve a sound and clean looking engineering job.
2. To endeavor to arrange that the tuning positions for maximum gain and maximum front-to-back ratio are as far as possible coincident.
3. To find some means for providing additional gain with the object of attaining an overall figure of 10 *db*.
4. To flatten the somewhat sharp tuning and increase the band width by using tubular elements of a reasonable diameter and at the same time to eliminate wood or insulators at high voltage points as these cause serious loss in wet weather.
5. To make provision, if possible, for multiband operation without using interlaced elements.

Keeping all these points in mind, it seemed that the best approach would be to build up an entirely new structure in space starting from first principles, and giving special consideration to item 3—Increased gain. The diagrams show how the array began to take shape. Figure 1 is an ordinary half-wave dipole with a bi-directional pattern. Figure 2 shows a "V" dipole. Such an arrangement, when used with a reflector of similar construction, gives considerable power gain and the front to back ratio greatly exceeds that which can be obtained with a normal two element array.

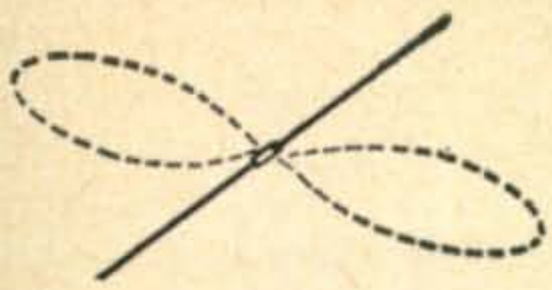


Fig. 1—Half wave dipole with bi-directional pattern.

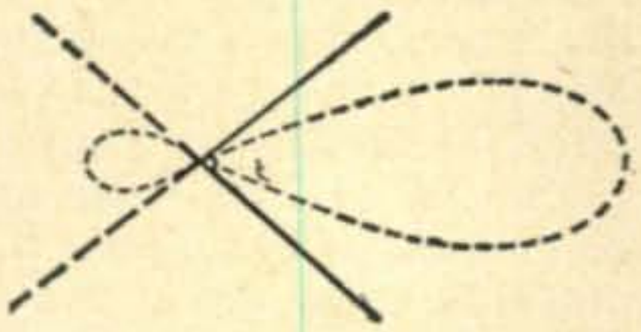


Fig. 2-A V-dipole provides an increase in gain in one direction.

needed. Figure 3 shows two "V" dipoles stacked vertically and fed in phase so as to provide additional power gain. Figure 4 shows the end eighth-wave of each element bent inwards until

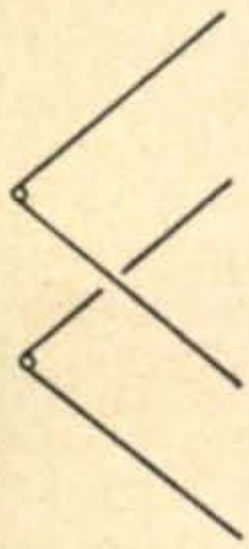


Fig. 3—Stacked V-dipoles fed in phase will provide a power gain.

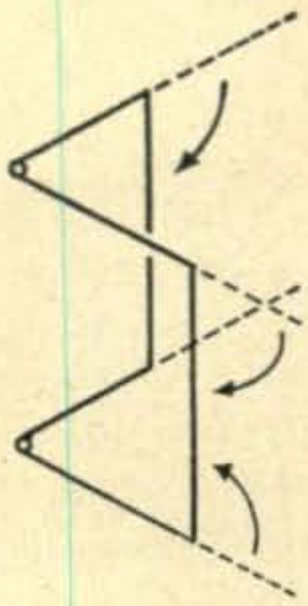


Fig. 4—The end ⅛ wave of each element is bent in.

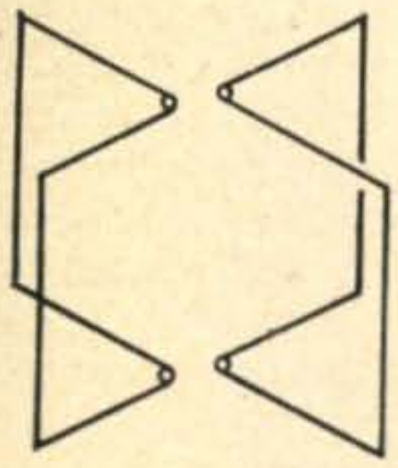


Fig. 5—A reflector is placed in rear of driven element.

they meet. Power can now be fed to the closed loop at a single point either at the top or at the bottom. The next move is to put a similar structure, operating as a reflector, back-to-back with the first (fig. 5).

Construction

Coming now to the actual physical construction Fig. 6 shows one possible approach. Eight radial elements each only one-eighth wavelength long are arranged symmetrically in two stacked bays around a vertical mast. These elements can conveniently be made of ordinary dural tubing. To maintain a correct phase relationship between the two bays, the tips of the elements are joined together with vertical wires approximately one-quarter wavelength long. This incidentally helps to brace the elements against vibration, and ensures a very low wind

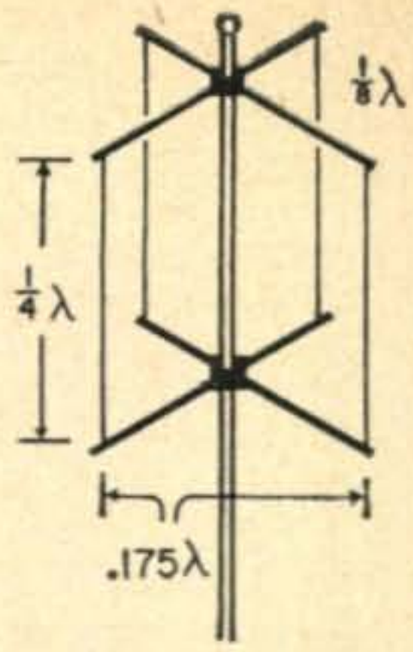
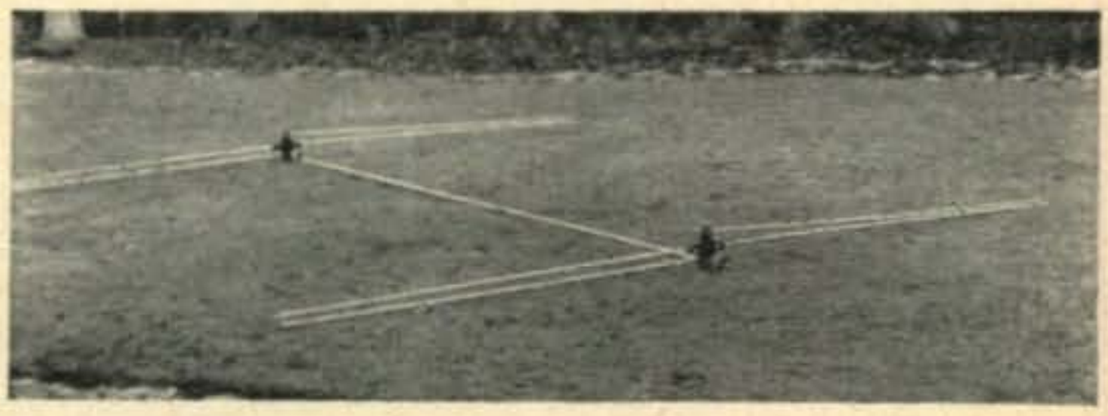


Fig. 6—A possible method of construction.

resistance. It will be immediately apparent that such an arrangement is much more attractive from a structural point of view than the normal cubical quad. Fig. 7, A & B. Due to the "V" dipole effect the power gain is also 1-1½



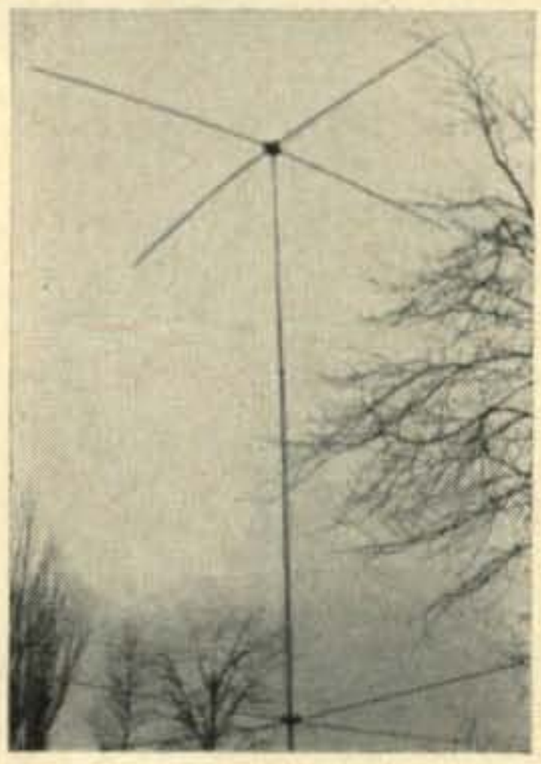


Fig. 7A—(Above) Before erection.

Fig. 7B—(Left) After erection, with radial arms disposed at right angles.

db better. Further, it was found that, quite by chance, the side lobes with this type of arrangement are practically non-existent and the adjustment for maximum gain coincides very closely with the adjustment for maximum front-to-back ratio. It will be seen that the spread of the array and the spacing between the vertical wires is approximately .175 of a wavelength so that it can rotate in a circle of 8′ radius. With such a spacing the feed impedance comes out to quite a convenient figure of 40/50 ohms depending upon tuning and height above ground. The general performance was so promising that in February 1958 a Patent Application was filed under serial 4083/58. A number of additional developments were then completed, to give more flexible methods of feed and to provide multi-band operation, and these improvements were incorporated in a further Patent Application filed in January 1959 under serial 187. Some of these modifications are shown in figs. 8, 9 and 10. Fig. 10 in particular should prove attractive to those with limited

space as it is effective not only on 20 metres but also on 40 metres, with a turning circle radius of 8'! The stub which in the drawing is shown flapping in the breeze would of course in actual use be passed down inside the tubular mast.

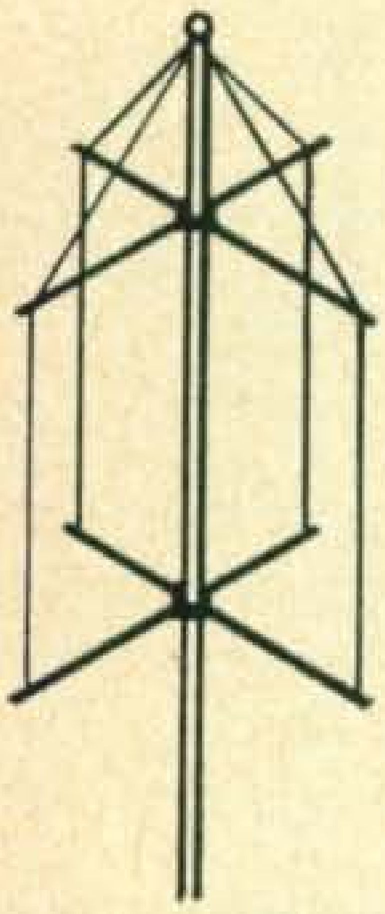


Fig. 8—Vertical wires extended to brace the radial elements.

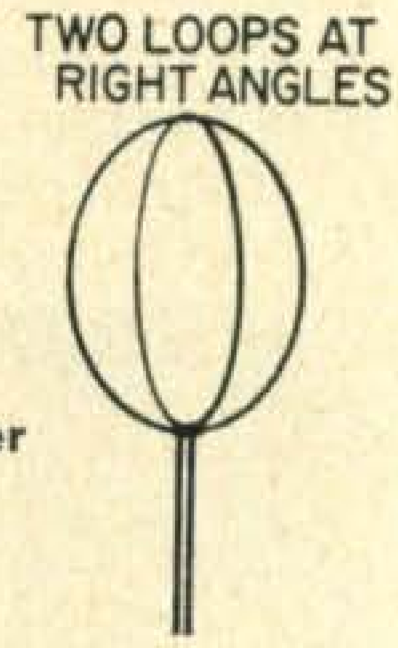


Fig. 9—Two loops at right is another form of birdcage.

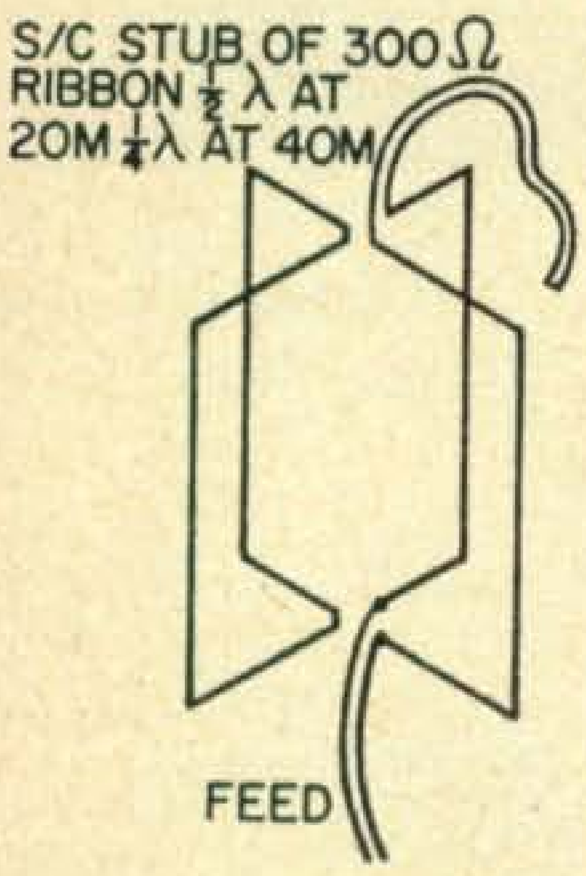


Fig. 10—This construction is ideal for 10 and 20. The stub may be inserted in the mast.

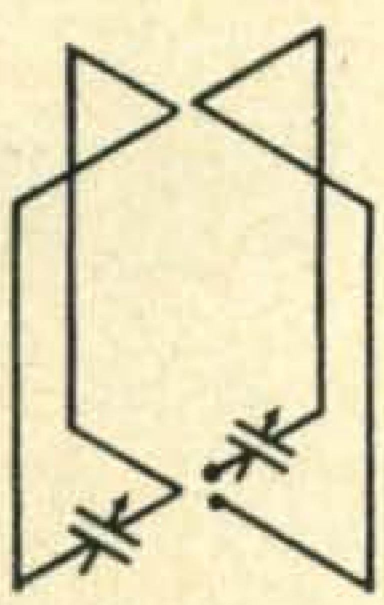


Fig. 11—This single band job uses a condenser to tune the reflector for maximum gain. The condenser in the radiator is tuned for minimum swr.

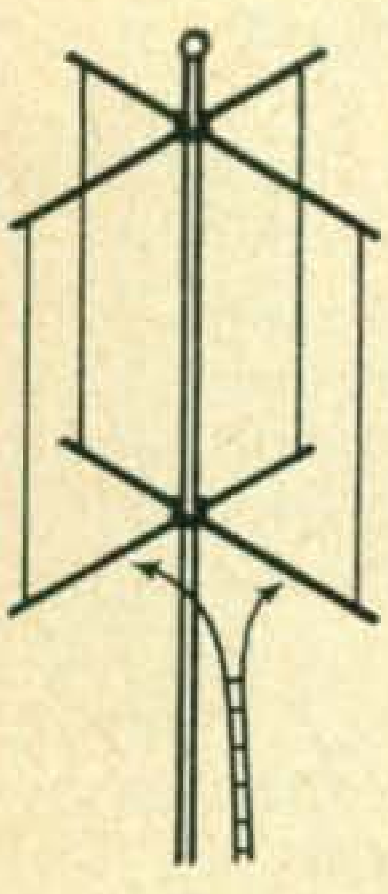


Fig. 12—Tapping points along the radiators permits selection of impedance from 50 to 600 ohms.

Single Band Operation

For those who are only interested in single band operation fig. 11 shows another interesting arrangement. The height of the array is increased to just over one-quarter wave-length so as to be resonant outside the low end of the band. The series condenser on the reflector loop then permits precise adjustment for maximum gain at any point *in* the band. The series condenser on the radiator feed provides adjustment for the lowest possible standing-wave ratio in the feeder. Another approach would be as per fig. 12. Tapping points on the radiator rods after the style of a T-match would permit selection of an impedance to suit anything from co-ax to a 300 ohm or 600 ohm open wire line.

Credit must go to the little girl next door for christening the array. When tests were first being made on a scale model at 145 *mc* she asked if the thing on the pole was a "Bird-Cage?" The label seems to have stuck and all things considered it is perhaps not inappropriate.

For the benefit of those who would like to give the Birdcage a try, dimensions are given in the appendix which should enable anyone to construct the single-band version without difficulty. The dimensions are for 20-metres but can of course be re-scaled for other bands.

Technical Appendix And Constructional Details

For 20m. Horizontal elements: all ⅛ wave long. 8ft—8ft 8 ins
Vertical wires. all ¼ wave long. 17ft approx.

Precise length of vertical wires can be adjusted for resonance and lowest SWR at the desired frequency, or the series condenser method of fig. 11 can be used.

The reflector should be tuned for max F/B ratio. The easiest way of doing this is terminate the lower end of the reflector loop in an open wire stub and slide a shorting bar along the stub for minimum radiation off the back. This setting will be very close to the adjustment for maximum gain.

The eight radial rods can be supported by blocks of insulating material or ordinary harwood dipped in wax. The *rf* potential is low and no leakage problems will be encountered.

Total distance round radiator loop is approximately one wavelength or $2 \times \frac{495}{f}$

Reflector loop is 5% longer due to extra wire in the stub.

It is an advantage when using coax cable to feed the radiator loop at the *top* taking the feeder up *inside* the quarter wave vertical mast. This gives perfect Balun Action thus avoiding loss or pattern distortion due to feeder radiation, and is much more satisfactory than so called gamma matches which are critical in adjustment and likely to introduce power losses.

Radiation is entirely horizontally polarized. There is a phase reversal at the centre of each vertical wire with zero current flowing. The vertical wires fulfill the same function as the

[*Continued on page 117*]

A New Twist In Broad Band Converter Design

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Most of today's mobile converters fall into either one of two categories. The first includes the tunable converter, which is simply a new "front end" designed to cover the desired short-wave bands, its output being fed into the regular car broadcast receiver which in this case acts as a fixed IF amplifier, detector, and audio amplifier. The second category includes the broad-band or "fixed-tune" converter, which consists of a non-tuning front end, usually employing a crystal-controlled high frequency oscillator. In the latter type of circuitry, the automobile bc set acts as a tunable *if* system, allowing a bandwidth coverage of just over one megacycle (550-1600 *kc*).

The crystal-controlled converter offers many advantages, including the greater simplicity in mechanical design resulting from its lack of a dial. It may therefore be located in any out-of-the-way spot, adding to its convenience in the modern automobile. But probably its greatest asset, and the reason it came into such popularity, is the frequency stability which crystals are noted for. The result is that such a converter lacks drift, which is sometimes so noticeable in other kinds of receiving equipment, and enables its operator to keep a station tuned in while driving over the roughest road.

Recently the author, in need of a broad-band converter with these attributes, decided to see what could be done in the way of modernizing his old (vintage 1940) Philco SW-1 four-band fixed-tuned converter, which lacked crystal control and showed it. After a little experimenting, a circuit was discovered which gives very nearly the performance of a crystal-controlled converter, but at lower cost and with much less rebuilding effort. This article was prepared with the thought in mind that others, both hams and SWL's like the author, might share this need for improvement in their present equipment.

Figure 1 shows a portion of the original schematic, and is roughly comparable to some other manufactured units plus—no doubt—a good many home-made ones. In the particular unit we modified, both original tubes are triodes, 7A4/XXL's, which are very nearly the same electronically as the octal 6C5 or 6J5, or the newer miniature 6C4. Some sets have used a dual triode alone, such as a 6SN7GT or 12AU7, or a 7N7 or 7F8 in the loktal series. In any event, the oscillator often proves to be quite unstable, due in large part to the way it is coupled to the mixer.

In the author's original converter, any slight change in the plate voltage from the car receiver's vibrator supply caused a noticeable frequency variation, so that the most stable CW signal was imparted chirps that sounded not only weird but were almost impossible to copy. Even worse, mixer pulling was so severe that the set could not even be aligned properly, since adjusting an *rf trimmer* would greatly alter the oscillator frequency!

Something had to be done, and the result is shown in fig. 2. The triode mixer could have been retained, but the 6SB7Y has excellent characteristics in this type of service and so was incorporated in the final modification. However, the heart of the improvement is the dual-triode, cathode-coupled oscillator, a 6SL7GT (many other tubes could have been

[*Continued on page 117*]

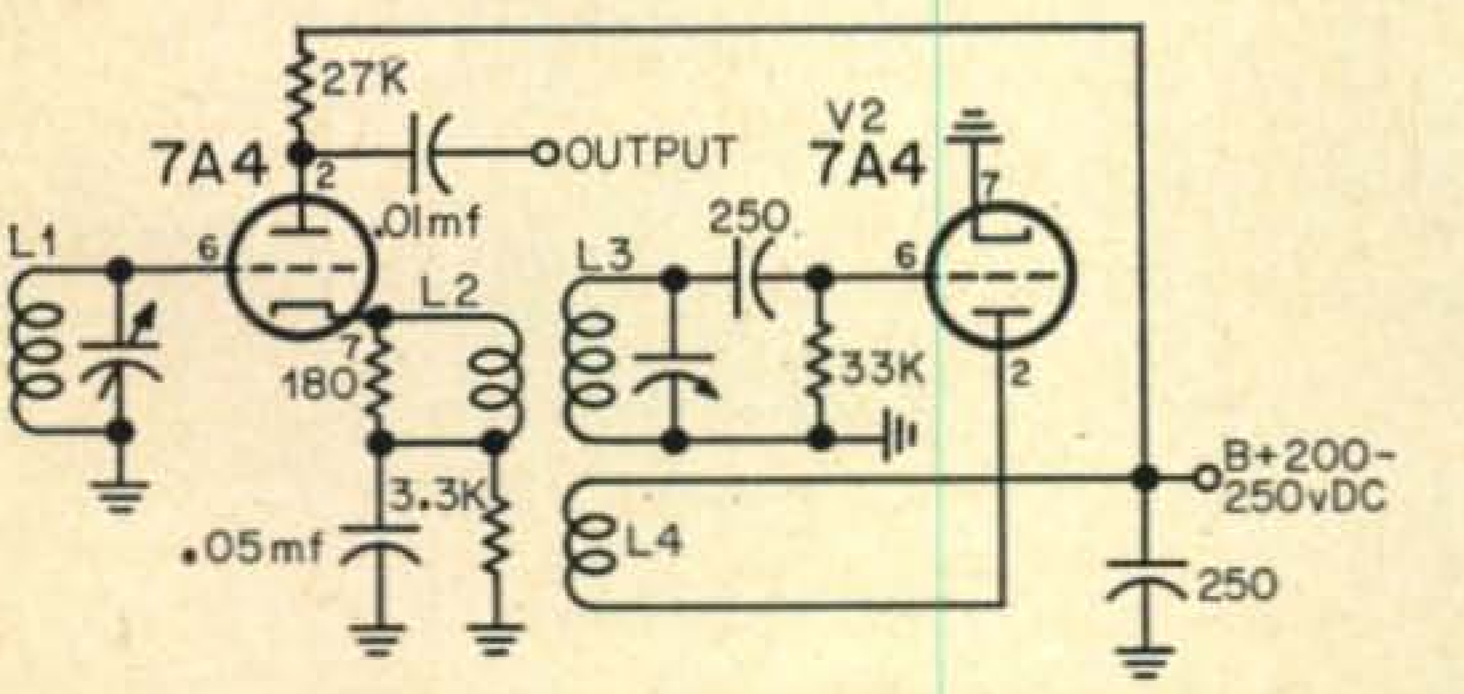


Fig. 1—Converter circuit before modification.

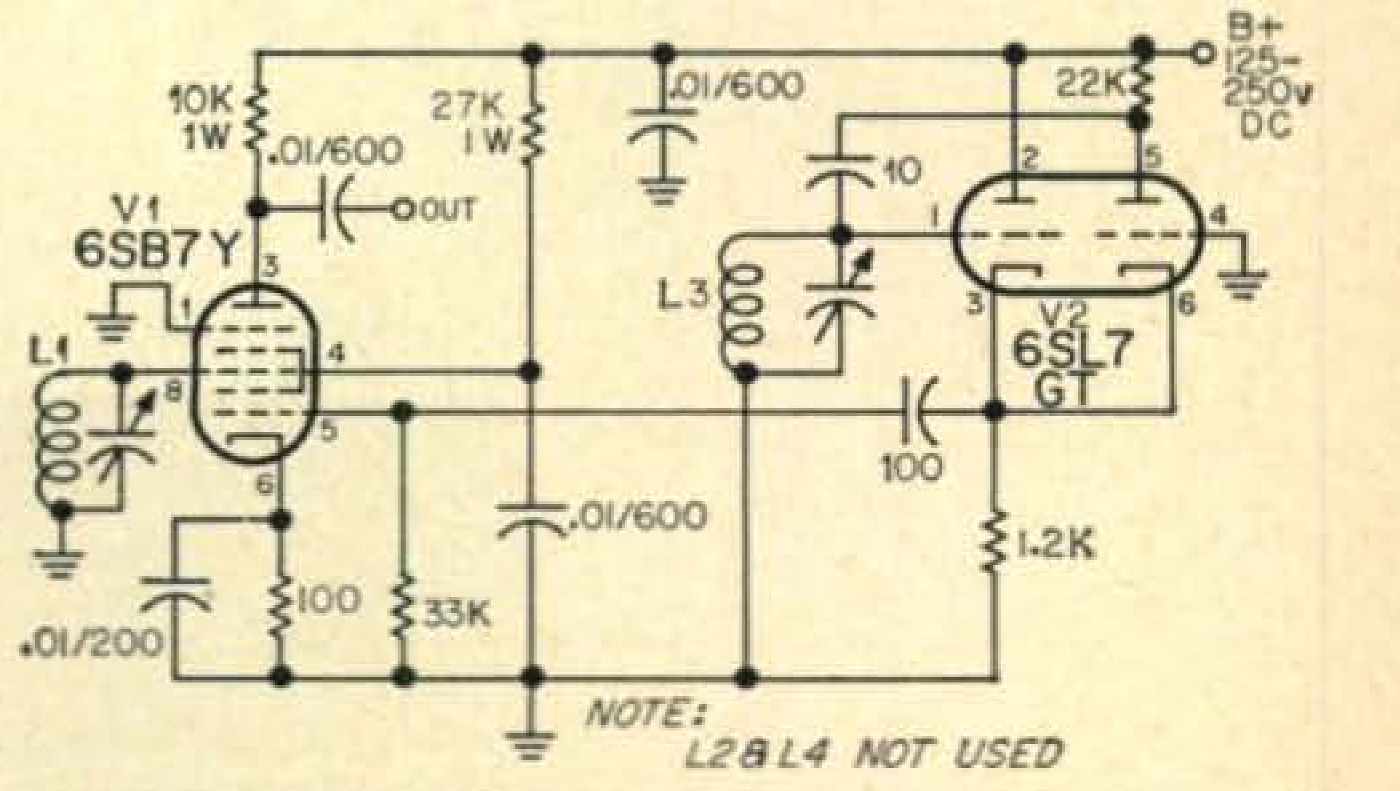


Fig. 2—Converter circuit after modification.

THE ANTENNA FARM

Dr. J. G. Gibbs, K7ISE
513 2nd Street West
Billings, Montana

A Guest In The Shack

"And this, Fred, is my shack. Here is the receiver, and over here is the transmitter, and this little box is the variable frequency—"

"Hey, I'll bet a setup like this costs a lot of dough, huh?"

"Well, I probably have seven or eight hundred dollars tied—"

"EIGHT HUNDRED BUCKS!"

"Shhh, Freddie, Ethel's just upstairs. Now this is the oscilloscope which is used to check the amount of modulation imposed upon—"

"Let's talk to China."

"Pardon?"

"Let's talk to some babe in China, or maybe one of them Russian broads. Yeah, call up Russia."

"Well, it doesn't work quite like that, Fred. You see, the bands have to be just right and the atmosphere has a lot to do with—"

"Eight hundred bucks and you can't talk to a Russian broad?"

"Say, here's something you'll find very interesting, Fred. My QSL collection. I have over one thousand cards from every corner—"

"Can we talk to one of them Mexican senoritas, maybe? Mexico's not far away."

"This is a bad time of the day for Mexican contacts, Fred, but look at this. You see, by reading this meter I can tell precisely what the standing-wave-ratio on my antenna is and—"

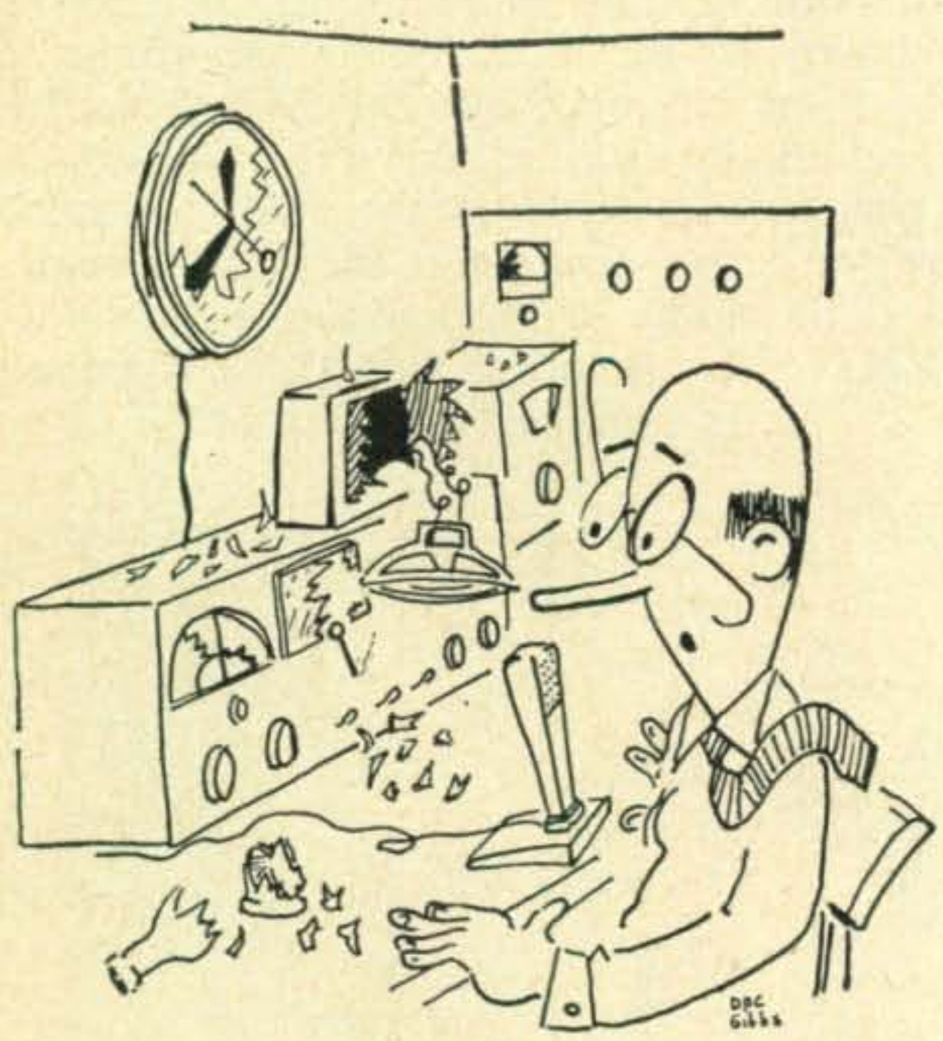
"How about Memphis? I know a chick in Memphis."

"I haven't had much luck with Tennessee stations, Fred."

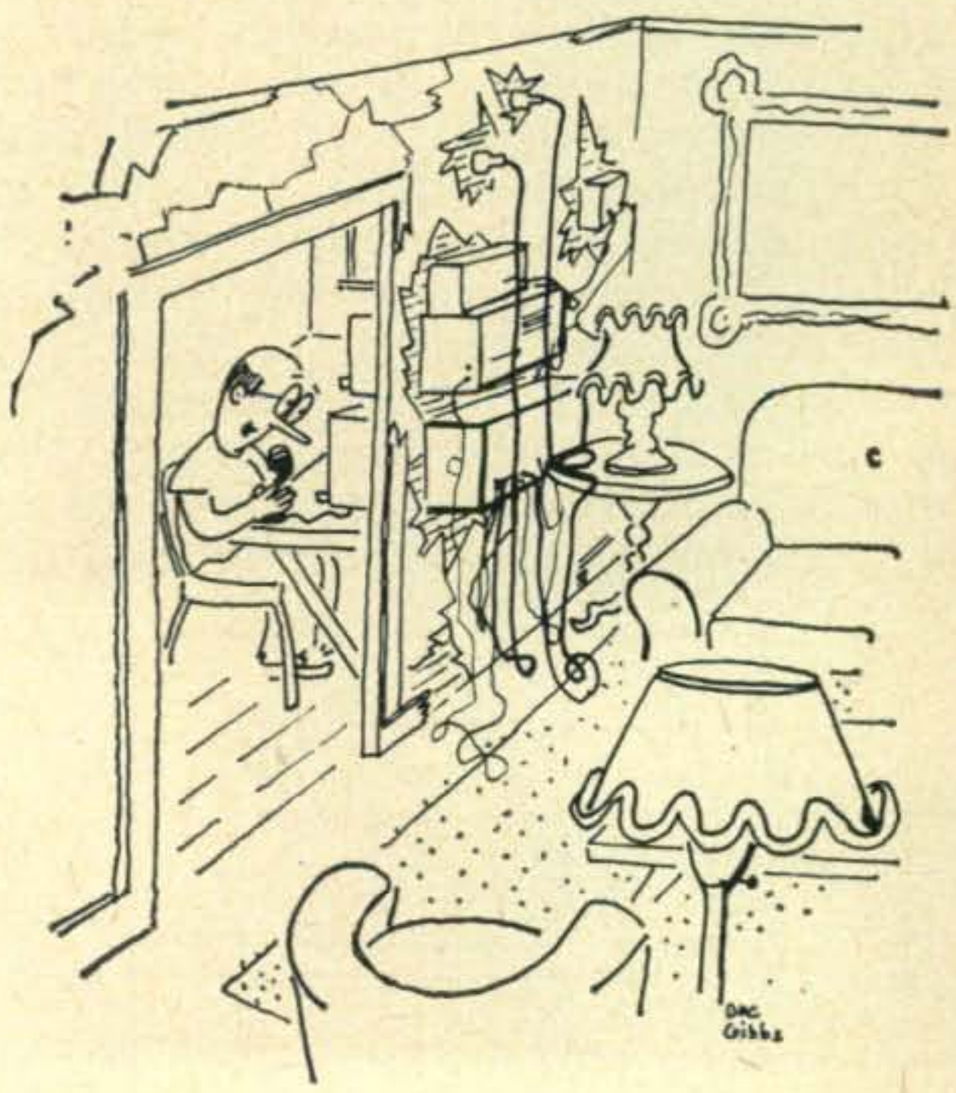
"There was a girl named Shirley I went to high school with down in Denver, Colorado."

"Well, with the bands the way they are, Fred, I don't think Denver would—where you going, Fred?"

"Back upstairs and talk to my wife." ■



That's a pretty good signal you've got there.



"And, Honey, wait 'til you see the shack. I've built the equipment into the wall.

"Oh, he's not a licensed ham, but he is a very enthusiastic SWL."

"Tell Father Kelly the Bishop would like to see him."

"..... CQ ..... CQ ..... CQ ....."

"You need more audio, old man."

The Role Of Marriage In Modern Amateur Radio

I have recently made up some statistics which seem to indicate that marriage for the average amateur radio operator is completely out of the question.

According to these statistics (based upon tedious hours of coin-flipping), less than fourteen and three-quarters of a ham are able to conduct a satisfactory marriage and a reasonably active station. In fact, it is possible by means of complicated graphs and obtuse triangles to formulate an equation that will accurately predict the precise loss in station power the amateur will suffer on the day he becomes engaged. This law is called (by a remarkable coincidence) Gibbs-Law and it is stated simply: $PL = \frac{W}{C}$ where PL is equal to the power loss, W is equal to the transmitter watts and C represents diamond carats.

We have also recently compiled the results of a nation-wide survey in which the wives of two radio amateurs were questioned, and these findings tend to confirm the grim aspects for marital and electronic coexistence. A typical question from our questionnaire together with a typical answer is as follows:

Q: Can you honestly say that the stimulating hobby of amateur radio demands time from your husband that you personally feel might be more gainfully employed in other pursuits?

A: What husband?

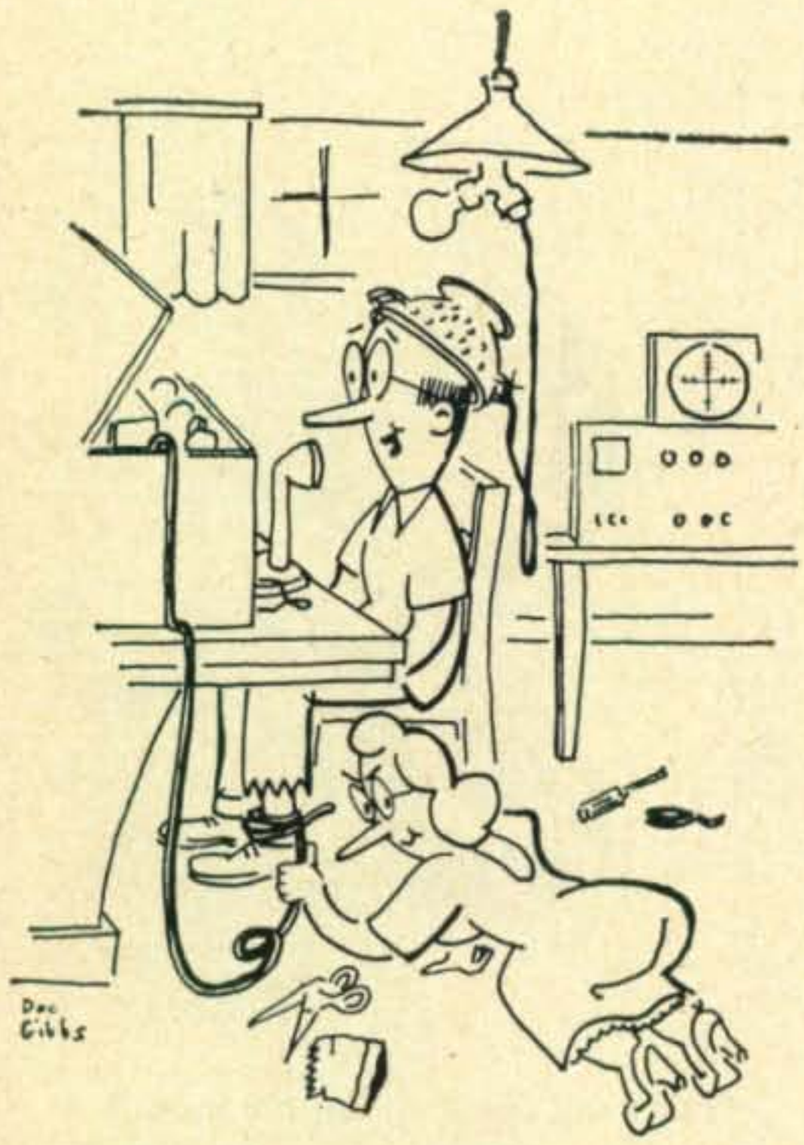
Now then, for those of us already possessed of both the marriage and F.C.C. licenses, the outlook is not completely hopeless. The situation need not end in divorce with a pair of 6L6's named as co-respondent. More and more hams are finding that they can initiate the XYL into the fascination of amateur radio and thus preserve their marriages. They find that radio forms a common bond—a mutual interest that they and the wife can fight over.

For example, I have a good friend whose marriage was on shaky ground. He introduced his distraught wife to amateur radio. She has completely re-done the shack in gold-flecked chartreuse. There are cunning doilies for the *vfo* and *swr* bridge, and clinging ivy adds a touch of festivity to his KWS-1. Not only that, but imagine the pride of this man when he returns one evening to find that the rig has been completely re-wired from AM to SSB!

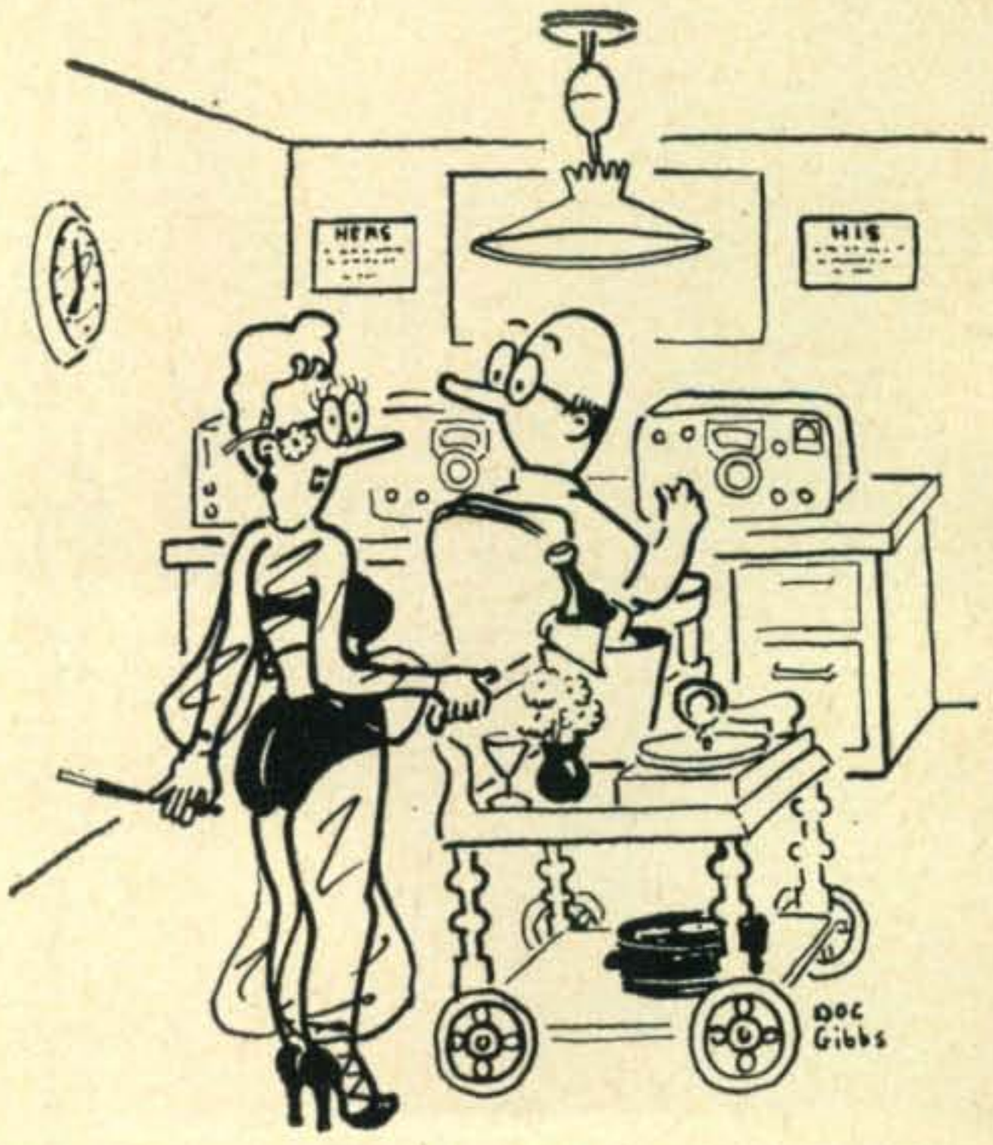
This marriage has been saved. Not only has Ethel won her Century award, but Fred's pot roast simply melts in your mouth. I recently sent Fred a questionnaire. A typical question together with Fred's answer is as follows:

Q: Since your wife has become a ham, can you honestly say your marriage has assumed more depth and meaning?

A: What wife?

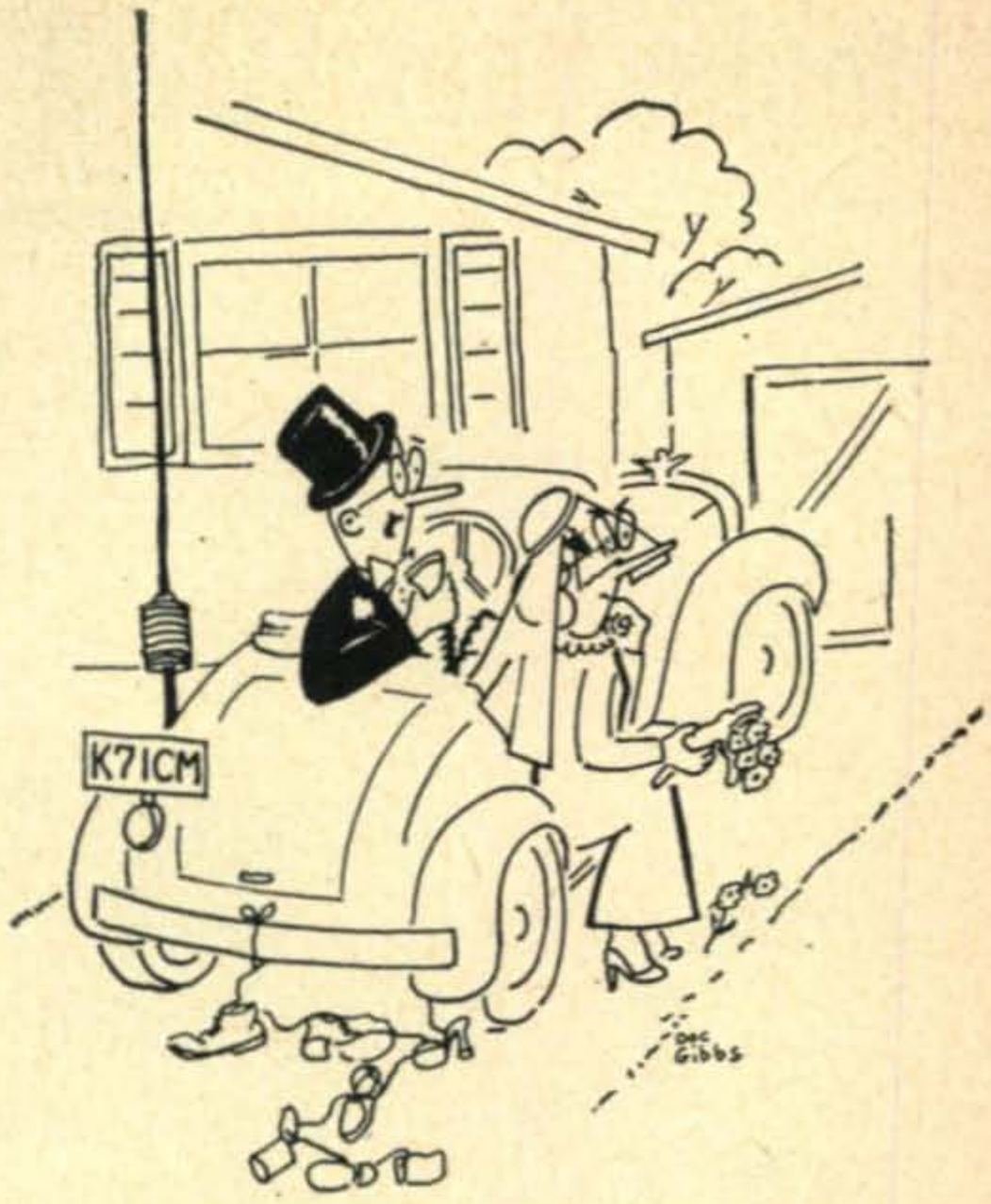


"And, Fred, you'll never guess who's finally got the bug and is working on some big secret project."

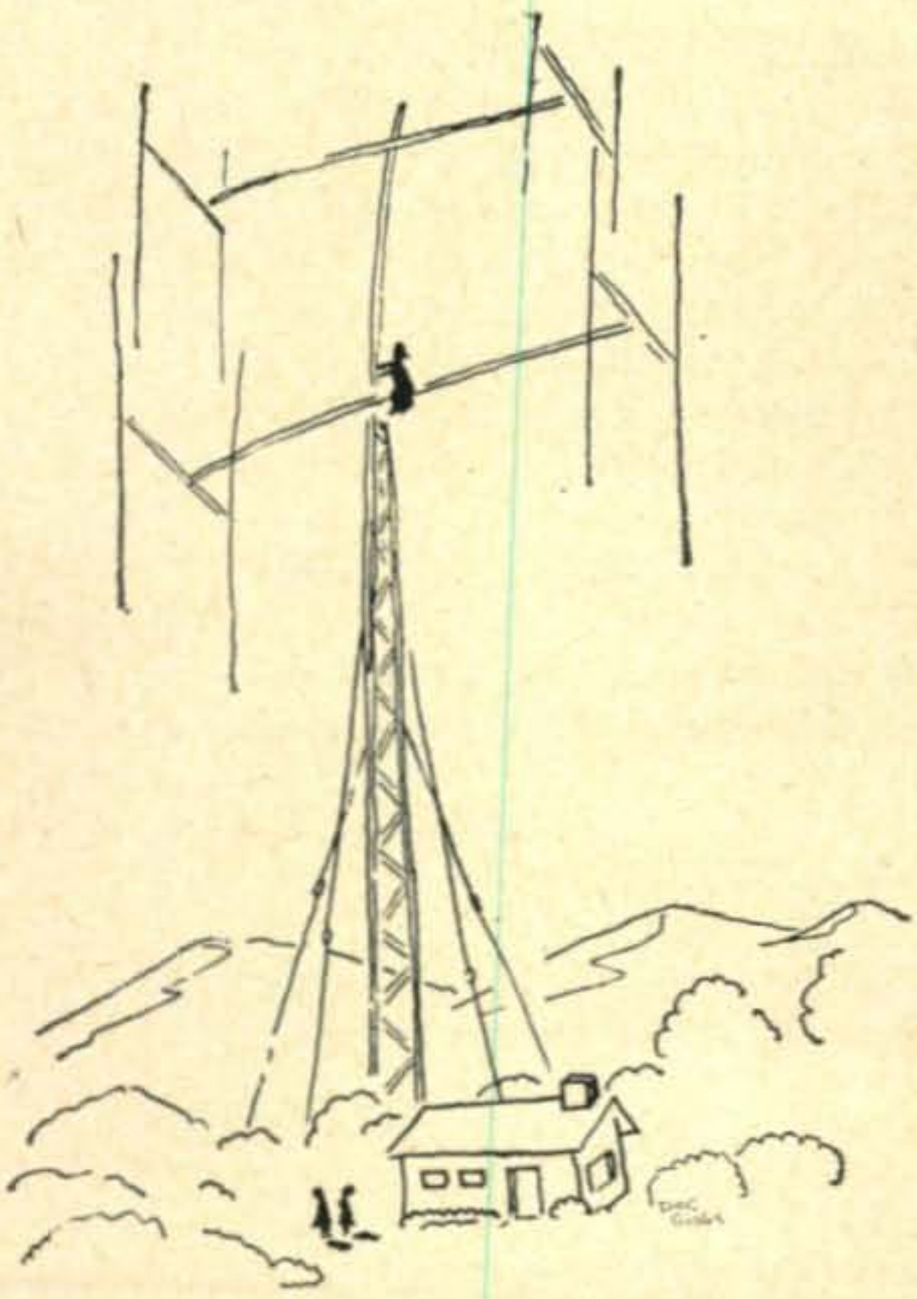


"Would you QRT, dear? It's time for my Paris sched with Raoul."

"Your rotator is eating my hyacinths again."



"Okay fellas, just a couple more go-rounds."

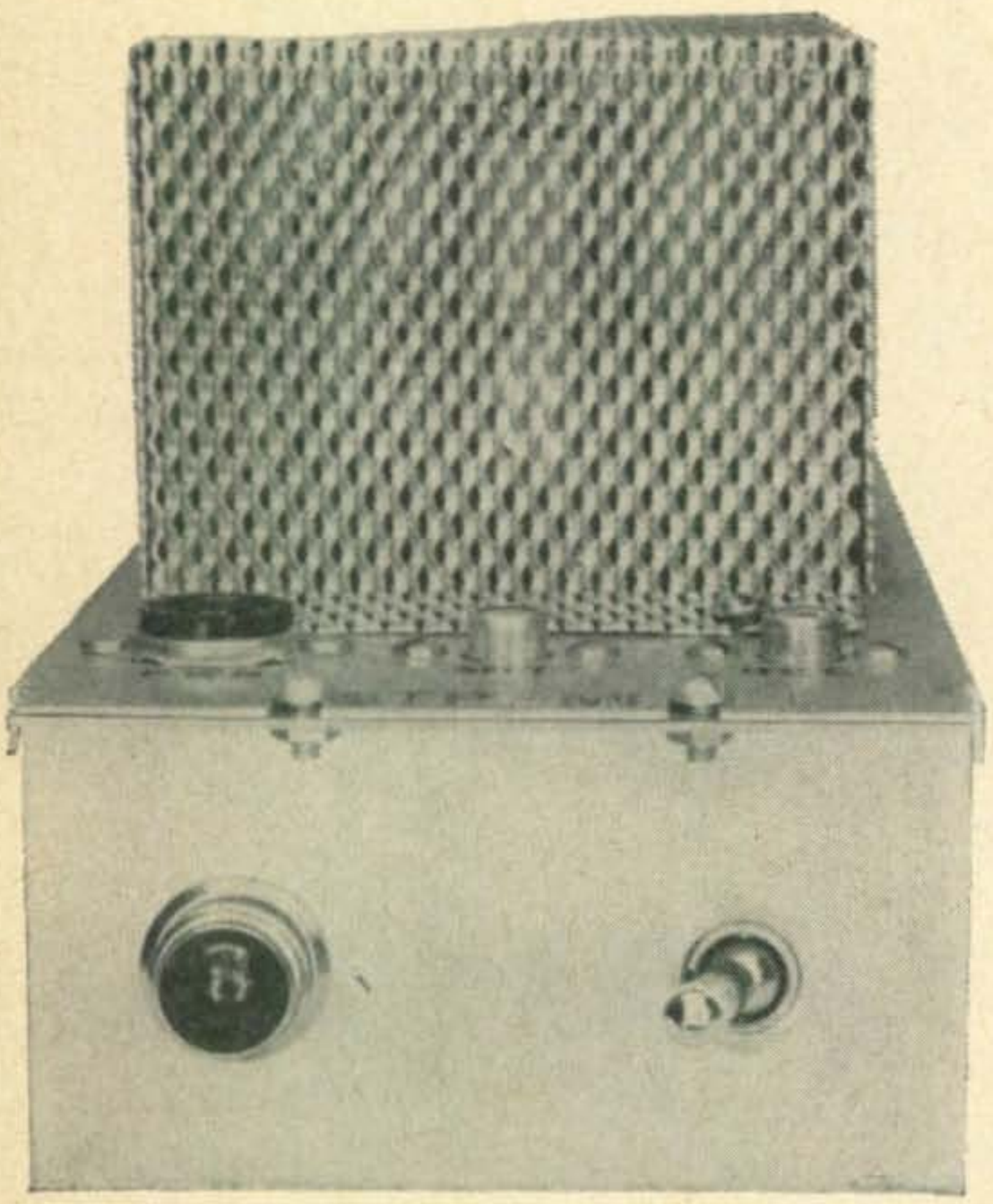


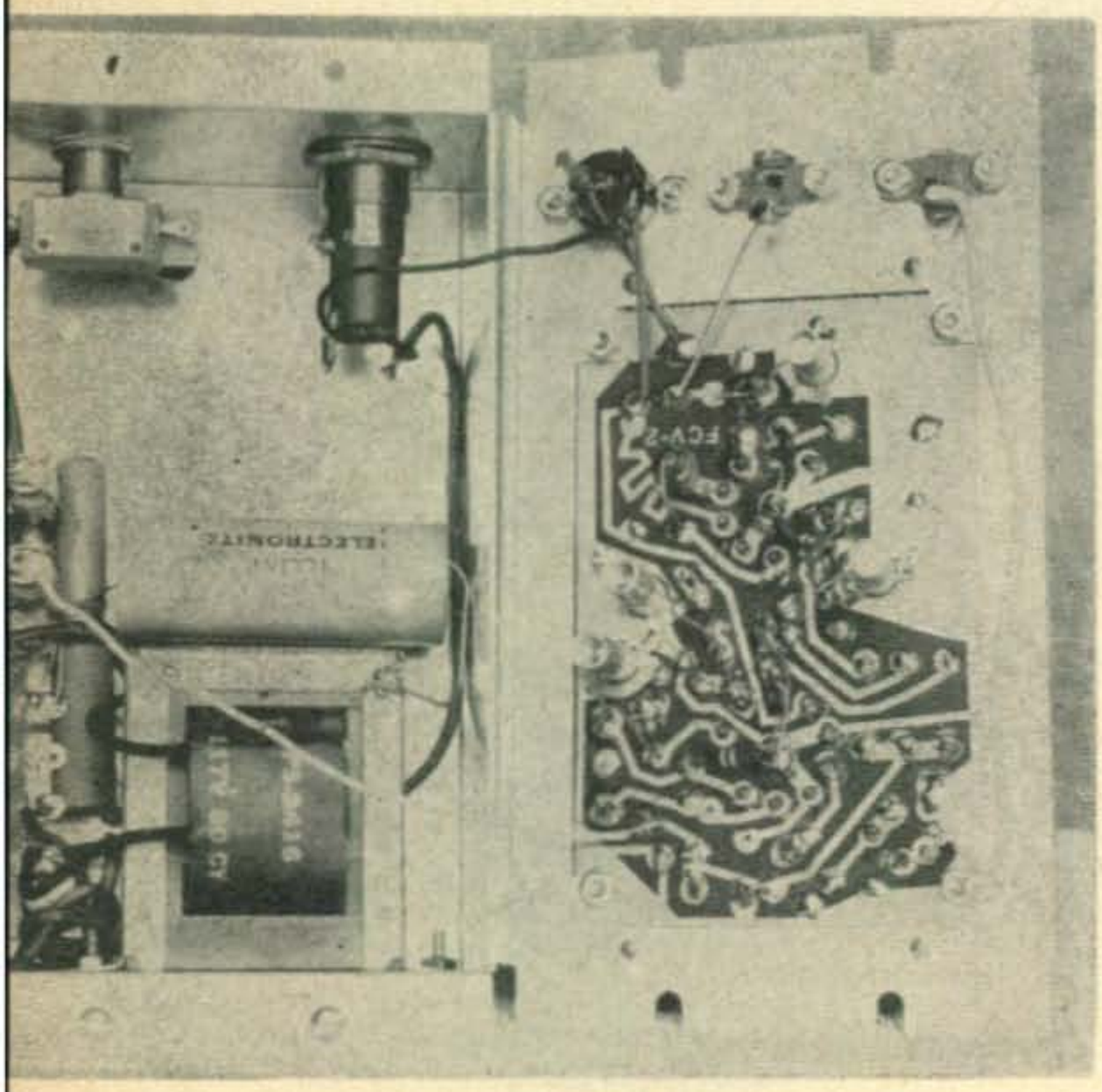
"Sometimes I almost wished he drank or chased women like other men."

"Well, Fred, I can't remember when I've had a more enjoyable QSO."

Make Your FCV-2 Converter Complete

Donald A. Smith, W3UZN



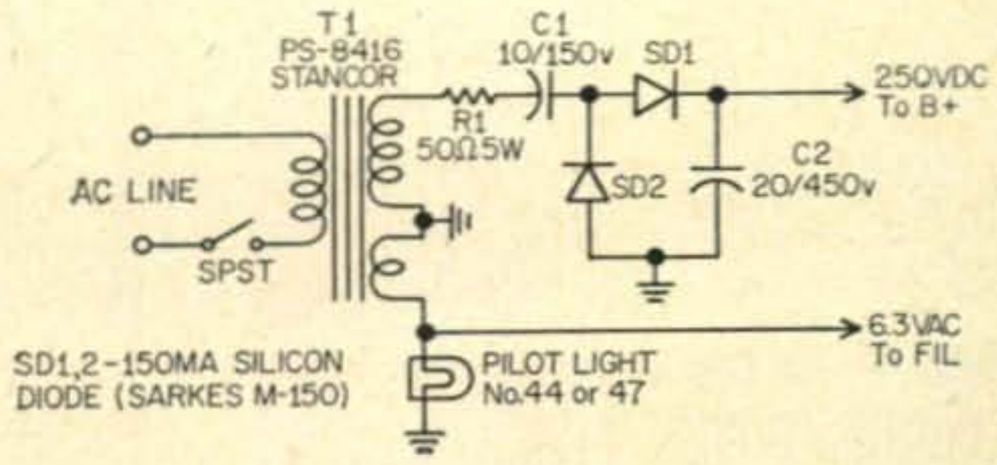


Probably the most popular crystal converter in use today is the inexpensive FCV-2, by International Crystal Co. Many amateurs use the STP-1, base and shielding kit to mount and shield the unit, but the base can be used for more than just mounting the unit!

A complete *ac* operated power supply can be built into the base as shown in the pictures. Adding the supply to your FCV-2 will give you a number of benefits. Among them are; 1. No power need be "robbed" from the receiver or other equipment to power the converter. 2. Full B+ voltage of 250 *vdc* is supplied to the converter by the built-in supply. 3. No increase in the size of the complete converter, as all new parts for the supply are IN the case. 4. A pilot lamp is included to show when the converter is on and the complete unit is an attractive addition to the "shack."

The total cost of the "Complete FCV-2," (not including the converter or base and shield kit), will be less than $10.00, if you must buy all of the parts new. The convenience of the unit will far offset the small cost.

Two 150 *ma* silicon diodes are used in a voltage doubler circuit which will furnish 250 *dc* volts at approximately 50 *ma*, though the converter does not require that much current. Because of this, the supply runs cool and does not heat up under long use. The pilot light socket and switch are mounted on the front of the converter base and the line cord is brought out the back, as can be seen in the photograph. Note the location of the power transformer. If placed in the location shown, it will not interfere with the converter when it is put in place above the base. The two silicon diodes are mounted on the side of the base, as is one terminal strip. The strip is used to furnish con-



Improving The Speech Characteristics Of The 20A Exciter

E. J. Mitchell, K6VTQ

Does the unwanted sideband of your 20A sound like a backyard cat fight when a receiver is tuned to it? Does the signal seem excessively broad? It is possible that both of these conditions exist.

Anyone who has had occasion to inspect the specifications of the 20A phaseshift network knows that any frequency between 300 and 2700 cycles will be split into two components, equal in amplitude, and 90 degrees out of phase. Not so apparent, however, is what occurs when a signal is applied that is *outside* the design range of the phaseshift network. Now the two signals are no longer 90 degrees apart, causing degradation of the unwanted sideband rejection and generation of spurious sidebands. This condition exists in the 20A since the audio frequency response was not sufficiently limited when the exciter was originally designed. To prove it, overall frequency response measurements were made using a calibrated audio oscillator connected to the mike input, and an *rf* voltmeter connected across the output terminals of the 20A.

The result of these measurements is shown in fig. 1. Note that the original response (dotted curve) is nearly 8 *kc* wide at 6 *db* down. By changing the value of two condensers and adding a third, a worthwhile improvement can be realized. Note the solid curve on fig. 1; the overall response is now less than 3 *kc* wide at 6 *db* down and drops at better than 6 *db* per octave from 3 *kc* to 15 *kc*. Change the condenser values as shown in fig. 2.

The modification takes but a few minutes and the fellow operating on an adjacent channel will thank you. ■

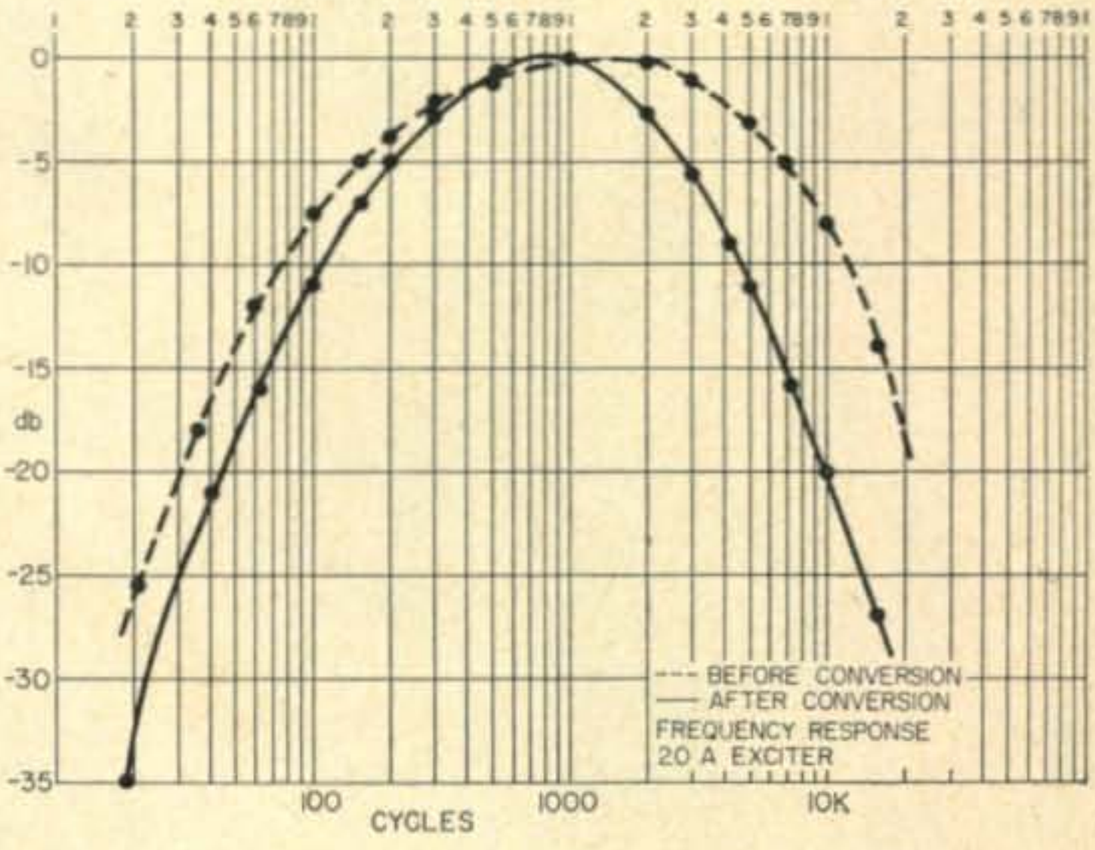


Fig. 1—Measured response of the 20A audio section before and after the modification.

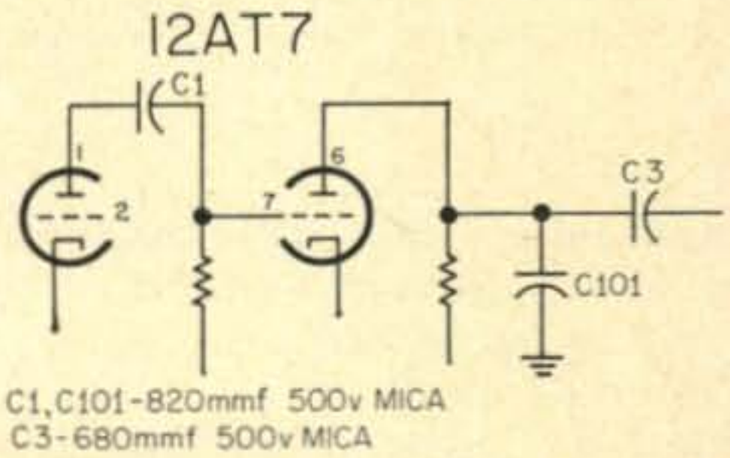


Fig. 2—Simple modifications to reduce the audio bandwidth of the 20A.

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necting lugs for C1, R1, the line cord and so on.

When all parts are installed and wired up, connect one end of a 5 or 6 inch piece of wire from the plus end of the filter, C2 to the terminal on the FCV-2 converter marked, "B+." Connect a second wire, about the same length, from the 6.3 volt (green) lead of the power transformer to the terminal marked "Fil." The other green, 6.3 volt lead of the transformer is grounded, as shown in the diagram. No ground connection need be run from the supply to the converter, as the converter printed circuit board is grounded to the chassis, which is bolted to the base.

When all wired up (to make sure), make a resistance check from B plus to ground with an ohmmeter. If the reading is higher than 50,000 ohms, install the converter on its chassis and mount the chassis on the base in the usual manner. Then install the top shield.

You now have a complete 6 or 2 meter converter which is not dependent on your receiver for operation. You can feed the output of the converter into other receivers, or take it with you from place to place, with no trouble at all. Best of all, there is no external power supply to take up room on your desk, or get in the way. ■

John Reinartz Honored At Amateur Radio Gathering

Lt. General Francis "Butch" Griswold, KØDWC, Bill Eitel, W6UF, John Reinartz, K6BJ, and Herbert Hoover Jr., W6ZH.

Two hundred amateur radio operators, many prominent in business and the military, gathered in San Mateo at a banquet honoring radio pioneer John Reinartz.

The guest list included Herbert Hoover, Jr., toastmaster, Lt. General F. H. Griswold, Vice Commander of the Strategic Air Command, Arthur Collins, WØCXX, President of Collins Radio, and others who gathered to greet Reinartz who is retiring as manager of the Amateur Service Department of Eitel - McCullough, Inc., after more than 50 years in radio as an amateur, in military and business.

Hosts for the evening were William W. Eitel, President and co-founder of Eimac and Jack A. McCullough, W6CHE co-founder and chair-the board of the firm which itself was originally established twenty-five years ago because of amateur radio interests.

Mr. Reinartz, who first became interested in radio in 1908 has kept his interest active through the years and is recognized as one of the real pioneers. He has held radio calls 1QP, 1XAM and K6BJ. Among his own amateur accomplishments is participation in the first United States-European two-way contact in 1923 and first daytime trans-United States contact in 1925. He also established the first daily radio communications for an arctic expedition in 1925. During World War II he was a Navy Captain which included a term as head of the radio and radar Division of the Naval Research Laboratories.

He holds 28 patents many of which were significant advancements in radio techniques and are still in use today.

Guests from across the country included Vice Admiral Maurice E. Curts, USN; Lt. Col. Wayne W. Woodward, AF6ZJN, Director of MARS and communication, 4th Air Force; Rear Admiral Frederick R. Furth, USN, Retired; Frank A. Gunther, W2ALS, Executive vice president and general manager, Radio Engineering Labs.; Ralph M. Heintz, K6RH, Founder of Heintz & Kaufman; Frank Matejka, W2BB, Project Manager, St. Lawrence Power Project; Jo Emmett Jennings, W6EI, President, Jennings Radio Manufacturing Corp.; Dr. Oswald G. Villard, W6QYT, Professor of Electrical Engineering, Stanford Uni-

versity; Bandleader, Alvino Rey, W6UK, and John H. Rubel, Assistant Director of Defense Research and Engineering.

Biography

John L. Reinartz was born in Krefeld, Rhine Province, Germany, March 6, 1894, the oldest of seven children. In 1904, the family settled in South Manchester, Connecticut, where Reinartz' father was a farmer.

Mr. Reinartz first became interested in radio in 1908, while browsing through the magazine racks at a small candy store near school. He read of wireless and its fundamental equipment and practices in *The Electrical Experimentor*. Saving the 10 cents a day he earned working for a blacksmith, he bought the secondary of a one-inch spark coil which he saw advertised.

He used iron wire for the core and bell wire for the primary. The electrolytic interruptor for the spark coil was homemade, he made a coherer from a quarter-inch glass tube, filled with the nickel filings "from Uncle Sam's nickels" and iron filings from a nail.

Using his own initials, he went on the air as "JL" via the spark transmitter and a 600-foot antenna tacked to the tops of trees.

Reinartz married Gertrude Hazen, the daugher of a neighboring farmer, in 1916. They are still married.

In 1916 he trained at Camp Upton, L.I., and then taught code to military operators.

When the American Radio Relay League was formed in 1915 by Hiram Percy Maxim, Reinartz was one of the first members. At the time, he was employed by the local power company, where he became superintendent.

By 1921, Reinartz developed the Reinartz tuner. It was given wide publicity, thousands were built, and it was the predecessor of most current receiving set tuners. In 1921, Reinartz was also publishing a magazine, distributed free, on *How to Build Receivers and Transmitters at Low Cost*. His writings on the tuner and its improvements were published in *QST* in June, 1921, March, 1922 and October, 1922. He published on a new circuit for a transmitter in June, 1923, and was the A.R.R.L.'s assistant division manager for Connecticut in 1923.

A major achievement of Reinartz' early radio work was the first successful two-way trans-Atlantic communication, November 27, 1923. Three men took part in the attempt—Reinartz, F. H. Schnell, Hartford, Connecticut, traffic manager for the A.R.R.L., and M. Leon Deloy, at 8AB, Nice, France. All used a Reinartz circuit developed on the base of a Westinghouse 50-watt tube. Reinartz had developed a single tuner able to sweep from 200 meters down to 28 or 29 meters.

Reinartz had given Deloy the circuit when Deloy was in Chicago for a convention of the A.R.R.L. The men then made arrangements for the trans-Atlantic contact, which broke the record for short wave radio.

Five messages were received by Schnell and Reinartz, Schnell at 1MO in Hartford and Reinartz at 1XAM in South Manchester. Two messages were received by Deloy. The two-way messages were handled for a period of two hours. They worked on a wave length of 100 meters, from 9:30 to 10:30 on two successive nights.

Through 1923 and 1924 he worked on the problem of "skip" in short wave communications. His experiments, published in the April, 1925 issue of *QST* credited the "Heaviside" with bouncing back radio signals. This "Reflection Theory of Short Waves" explained the phenomenon whereby a low-power transmitter could send shorter waves to its immediate area, and then, after passing a "dead space," could be received again at longer distances.

Using this theory in his experiments, he was able to communicate across the nation for a daylight record. In 1925, he reached Ed N. Willis, at 6TS Santa Monica, with a 20-meter transmission sent at high noon, rather than during night hours.

His work attracted the attention of then Lt. Cdr. Richard E. Byrd, who asked him to handle communications for the first attempt to fly over the North Pole. Reinartz achieved the first daily communications with civilization from an arctic expedition. Some of his transmissions were received by Arthur Collins, of

[*Continued on page 116*]

John Reinartz served as radio operator for the MacMillan Polar Expedition in 1925. The above photograph, taken aboard the Bowdoin, shows the special radio apparatus for station WNP, designed by Mr. Reinartz for the trip. It was the first time in history that any such expedition was kept in constant contact with the mainland.

A Dynamic Transistor Tester

C. L. Henry
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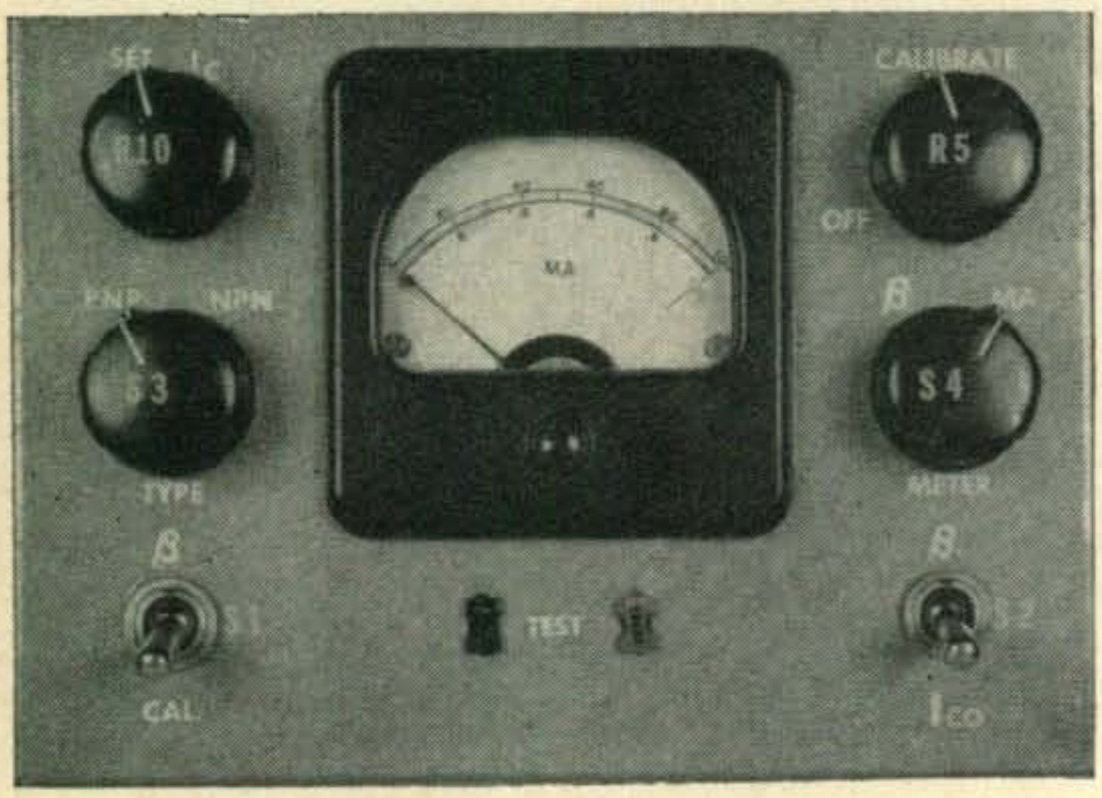
Chattanooga 4, Tenn.

Since the introduction of transistors in the electronic equipment field, there has been a need for a comprehensive tester that would function on the order of a tube tester and give a qualitative analysis of transistor characteristics. The instrument described in this article will give a complete test of any transistor's characteristics by checking two parameters. The first check made on the transistor under test is a measurement of the saturation or collector cutoff current, measured from the collector to the base with the emitter open. The quality of the transistor and also the expected life span can be judged from this test. The second and most important check made on the transistor is a test of the small signal current gain, common emitter connection. With these two tests the condition of the transistor can be definitely determined, and the operation of the instrument is simpler than the operation of a tube tester.

Design

The design of the transistor tester is fairly straightforward. On the first test, a 1.0 milliampere meter is connected from a 7.5 *vdc* battery to the collector pins of the test sockets. The base pins of the test sockets are connected to the other side of the battery, and the emitter pins of the test sockets are left open. The PNP-NPN switch, S3, changes the polarity of the battery and the meter as required for the different types of transistors. When a transistor is inserted in the test socket and the tester turned on, the saturation or collector cutoff current is read by the meter. On the second test, the current gain, common emitter connection (Beta), is read directly on the meter. This is done by first adjusting the output of an internal audio oscillator to read full scale (1.0 *vac*) on the meter. The oscillator output is then switched in series with a 100,000 ohm resistor and the base of the transistor under test. The meter reads the output across a load resistor in the collector circuit of the transistor. If the meter reads full scale, the current gain of the transistor is 100.

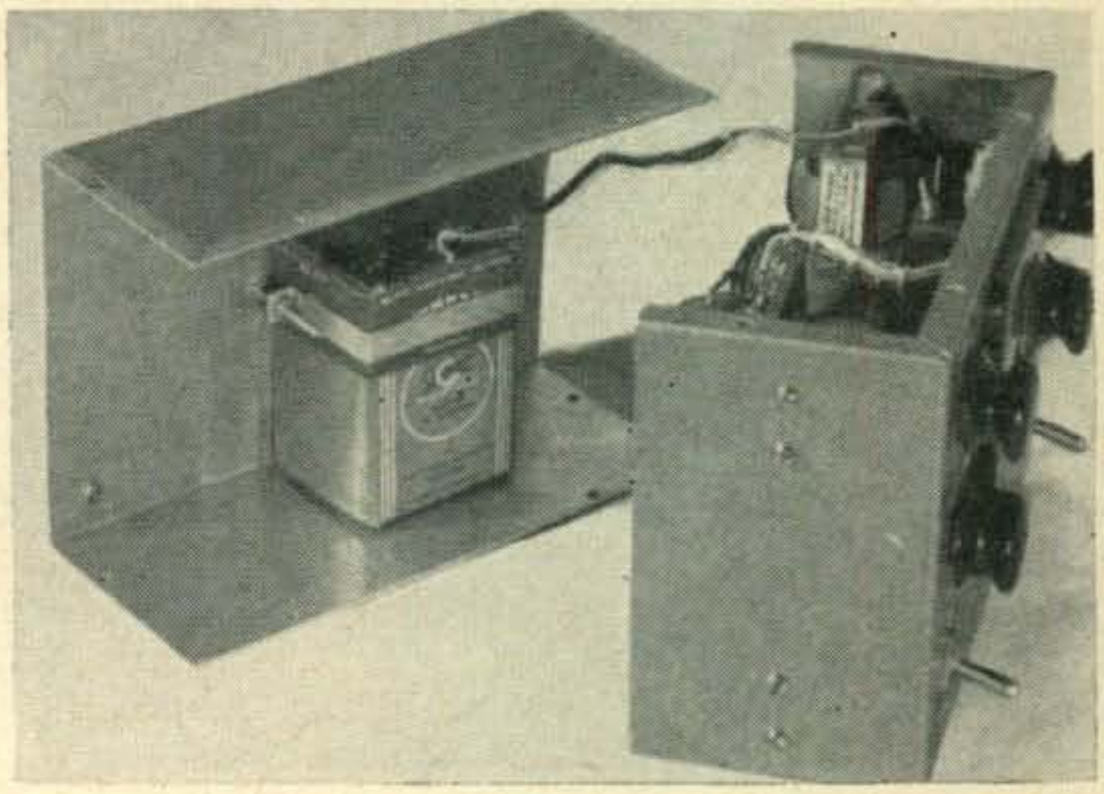
Front view of the transistor tester. The meter scale has been relettered to make operation easier. The top scale, current gain, is 0 to 100. The bottom scale is 0 to 1 ma for collector current and saturation current measurement. Notice that one test socket is polarized and the other is not. The lettering of the front panel was done with water transfer decals.



Construction

In the construction of the tester, placement of the components is not critical. The output of the oscillator must be a good sine wave. In connection with this it is interesting to note that if ten percent harmonic distortion exists in the

View showing location of battery.



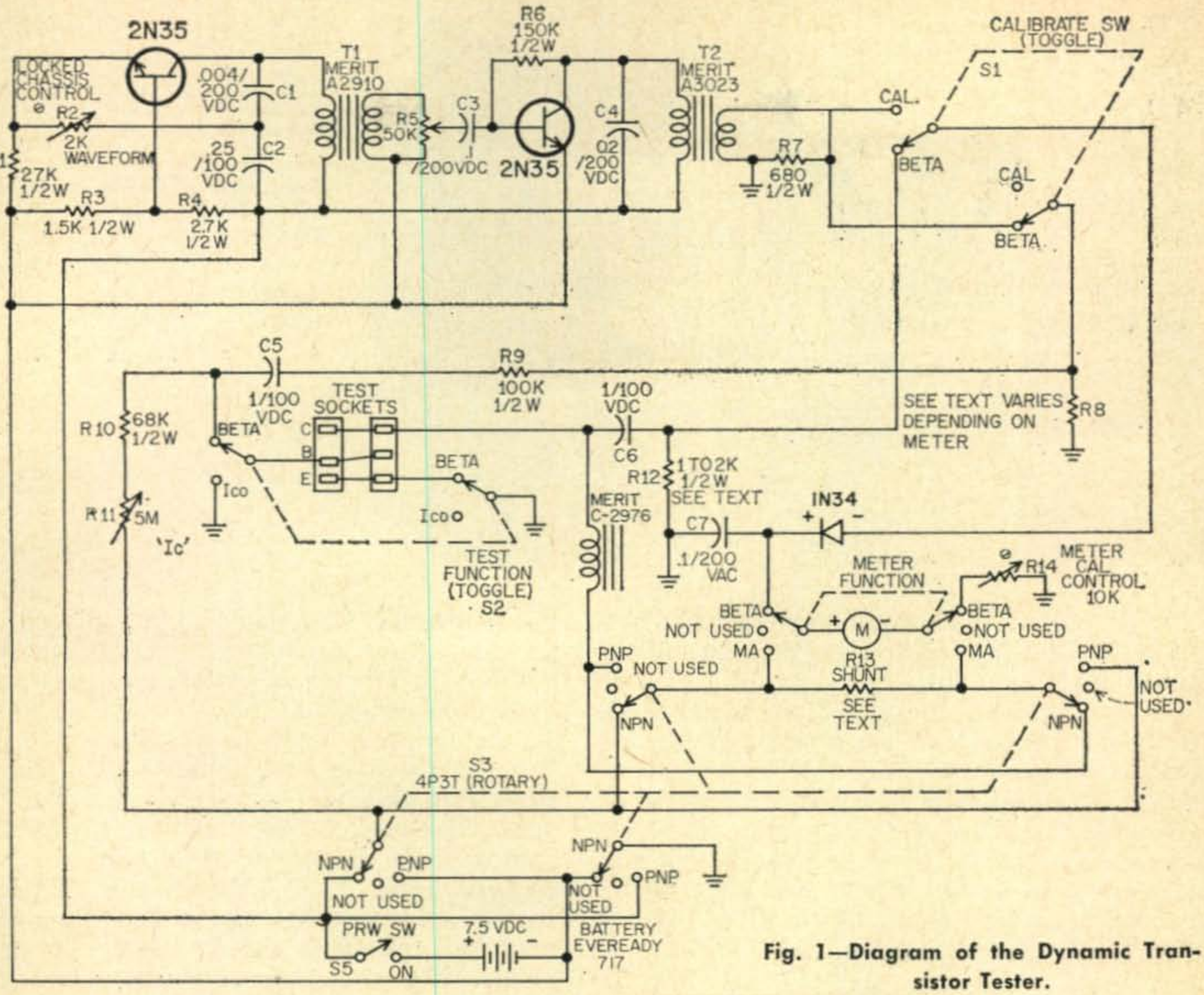


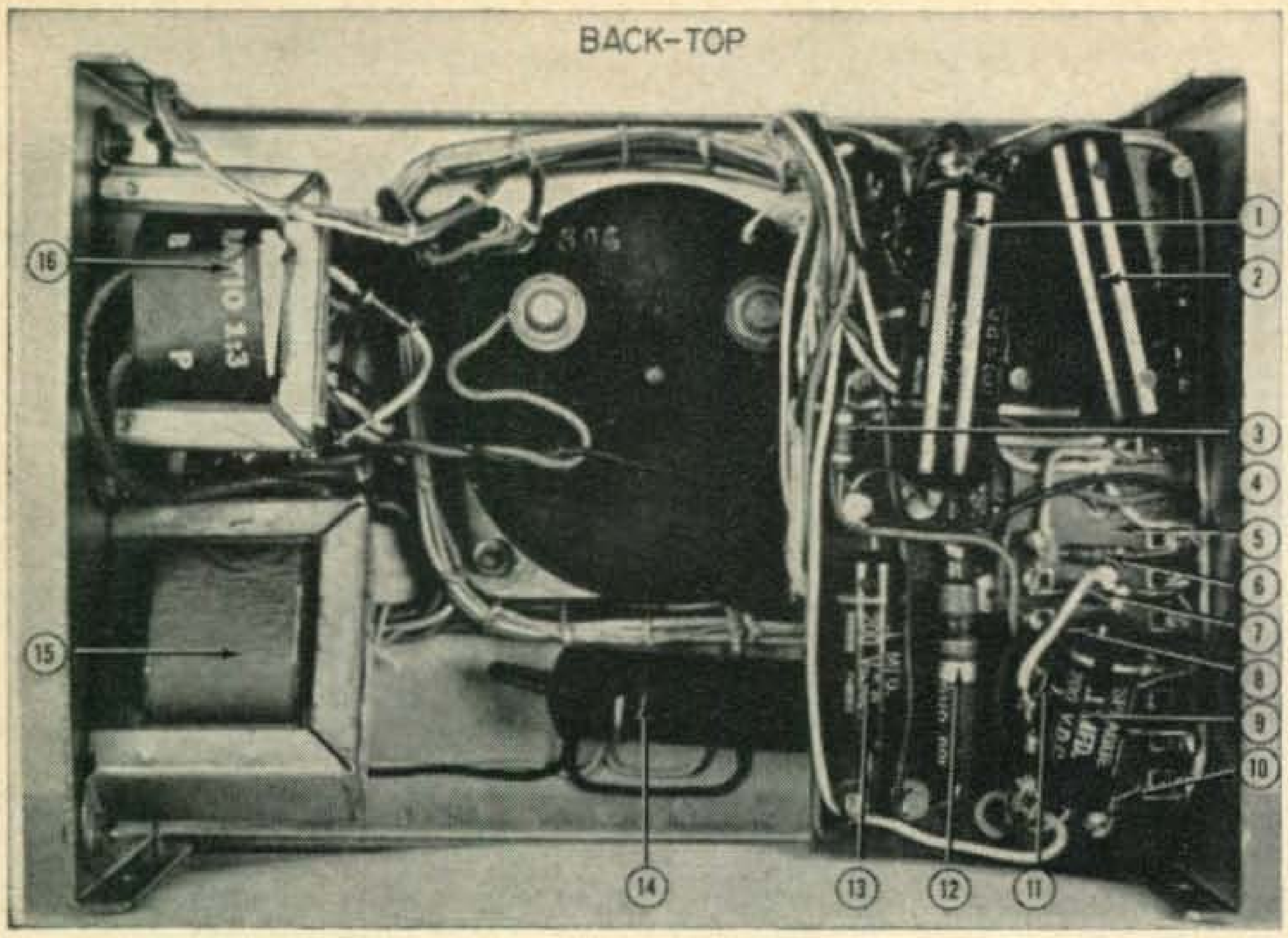
Fig. 1—Diagram of the Dynamic Transistor Tester.

audio signal, the meter may read as much as ten percent off. For this reason, the primary of the output transformer is tuned to the frequency of the oscillator by C4. This by the way, also boosts the output voltage of the amplifier. The coupling capacitor between the oscillator and the amplifier should be a small paper (C3). This will prevent overloading the amplifier and also act as a buffer for the oscillator. *Sylvania* type 2N35 transistors were used in the oscillator although any similar type should give good results. This is an NPN type, so don't forget to reverse the battery polarity if PNP types are used. The output of the oscillator has less than five percent distortion and a maximum power of four milliwatts. If the output distortion exceeds five percent, the tester will not indicate properly, as previously stated. The frequency of the oscillator is approximately 1000 *cps* although an octave difference in frequency will make little difference in the operation of the tester. If the frequency used for the oscillator is much different from 1000 *cps* however, a different value of collector load and/or different value of inductance for CH1 will have to be used.

The tested is built in a *Bud Minibox*, whose dimensions are 5x7x3 inches. *Stancor* and *Merit* transformers are used, but a more compact unit could be built using *UTC Ouncer* transformers, with a corresponding increase in cost. All capacitors used in the tester should be paper or metalized paper. This is because the NPN-PNP switch, S3, reverses the battery polarity in the test circuit and polarized electrolytics cannot be used. The two rotary switches, NPN-PNP (53) and Meter (54), are 4P3I. The extra position in the center of each switch may be used to adapt the tester to other types of transistors that are developed at a later date. The battery used in the tester is an *Everyready* type 717, 7.5 vdc. This battery will give 300 hours of operating time. If you wish, you could use a mercury battery, which occupies much less space, but costs more. All the components in the tester, with the exception of the transformers, choke, and meter, are mounted on a terminal board which can be seen in the photograph of the rear of the tester. The meter used is a 150 μ amp unit but any meter in the range of 50 μamp to 300 μamp could be used. The shunt resistor shown on the diagram will increase the range of the meter to 1.0 *ma* and if a different meter is used a different shunt resistor must also be used to make the meter read 1.0 *ma* full scale. Meters with ranges in excess of 300 μamp should not be used since they put too much load on the audio oscillator.

The meter scale may be redrawn as this one was or you may use a meter with a 0-100 scale. A 100 μamp meter should be about right for this.

The resistor, R8, that parallels the 680 ohm



Rear view showing parts location.

1—C4	6—R1	12—Shunt
2—C5	7—R12	13—C7
3—R8	9—C3	14—C6
4—R4	10—R6	15—CH1
5—R3	11—R2	16—TJ

oscillator output load when the toggle switch S1 is in the BETA position must be adjusted experimentally to equal the load put on the oscillator by the metering circuit. For the meter used, 1200 ohms was found to be correct.

Sufficient space has been left on the front panel to accommodate several other types of transistor sockets that you may want to add later on. Binding posts could be added so that the transistor to be tested would not have to be completely removed from it's circuit but could connect to the tester with clip leads.

Calibration

After construction is completed, it is necessary to calibrate the tester. The first step is to get the audio oscillator working properly. With an oscilloscope and *vtvm* across the output of the oscillator, set the CALIBRATE control to the center of its rotation. Then adjust the WAVEFORM potentiometer for best waveform and approximately 0.5 *vac* on the *vtvm*. The total distortion should be less than five percent. This can be judged on the 'scope or measured with a distortion checker. The WAVEFORM potentiometer can then be replaced with a fixed resistor if desired. The METER switch, S4, should then be set to BETA, the BETA-CAL switch, S1, set to CAL, and the meter should be adjusted with the meter calibration potentiometer to equal the reading on the vtvm. This potentiometer, R14, can also be replaced with a fixed resistor if desired.

Once the meter is calibrated the transistor load resistor should be adjusted as follows: 1—Temporarily connect a 1000 ohm resistor between the base and emitter pins of the transistor test sockets. Connect an amplifier whose gain is known to be 100[1] between the 1000 ohm resistor and the collector circuit of the test sockets. (Fig. 2) 2—Switch the BETA-CAL switch (S1) to CAL and adjust the meter to read full scale with the CALIBRATE potentiometer, R5. 3—Then turn the switch S1 to BETA and adjust the meter to read full scale with the test socket load resistor, R12.

Operation

The tester is now ready to use. To test a transistor, proceed as follows. Insert the transistor

[*Continued on page 115*]

1) To set any variable gain amplifier available to exactly X100 use the following method: a 40 *db* pad (X100) is first constructed as shown in Fig. 2 (if one is not already available). This pad is placed on the input of the amplifier, and an audio signal is applied to the input of the pad. A voltmeter is used to measure the audio signal at the input of the pad, and then placed on the output of the amplifier. The gain of the amplifier is adjusted until the voltmeter reads the same on the input of the pad and the output of the amplifier. The gain of the amplifier is then equal to the loss of the pad, which was X100. The X100 gain is as accurate as the loss of the pad. The accuracy of the meter is not involved.

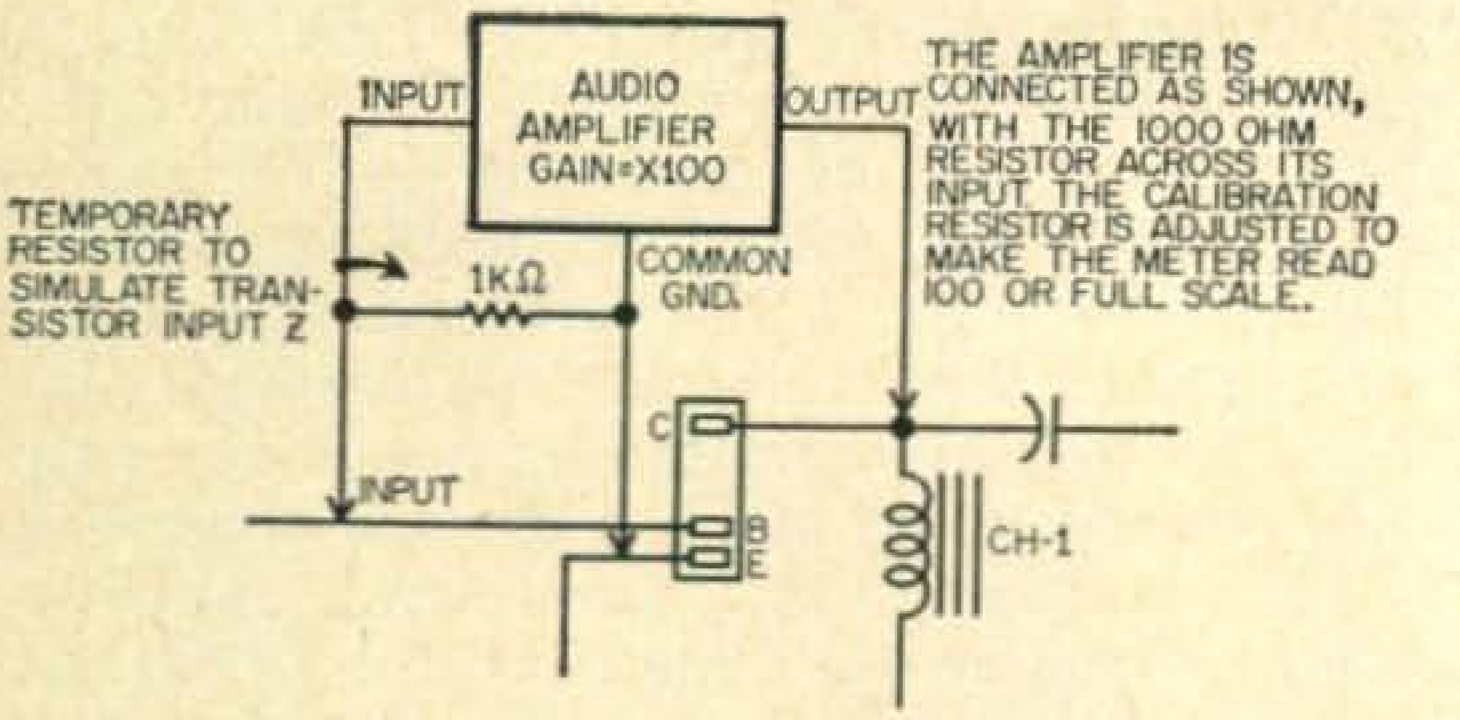


Fig. 2—Set-up used to adjust an amplifier for a gain of 100 or 40 db.

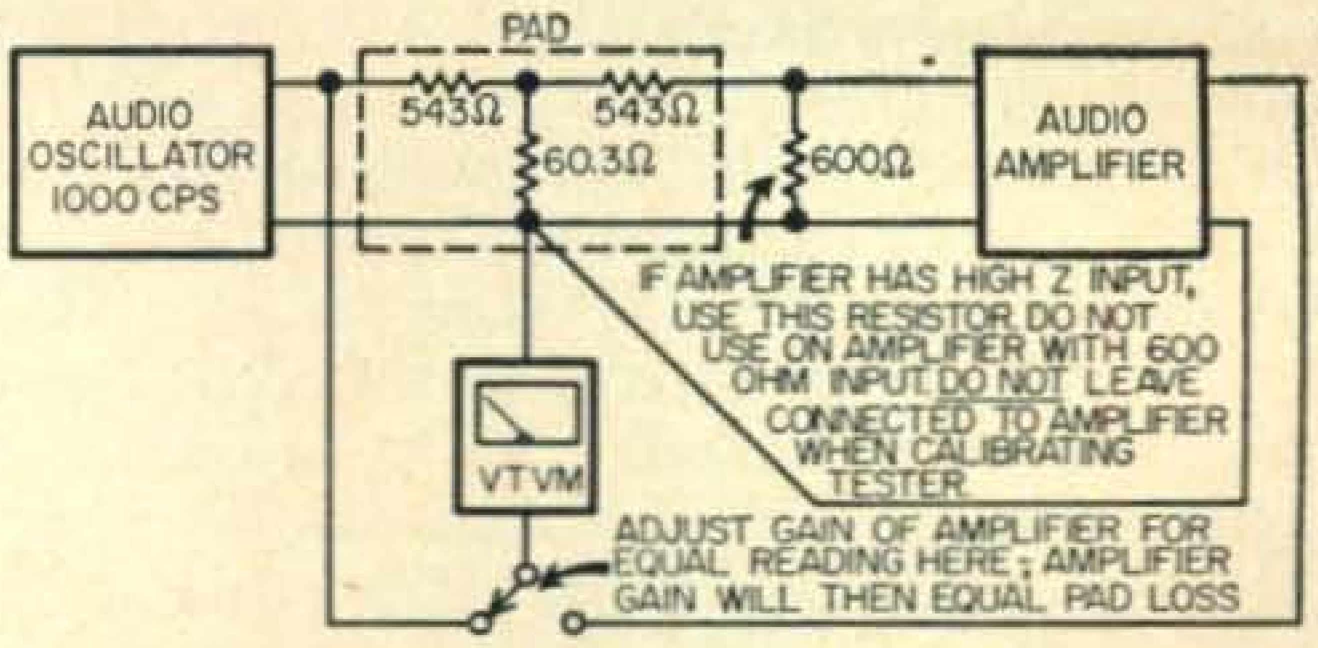
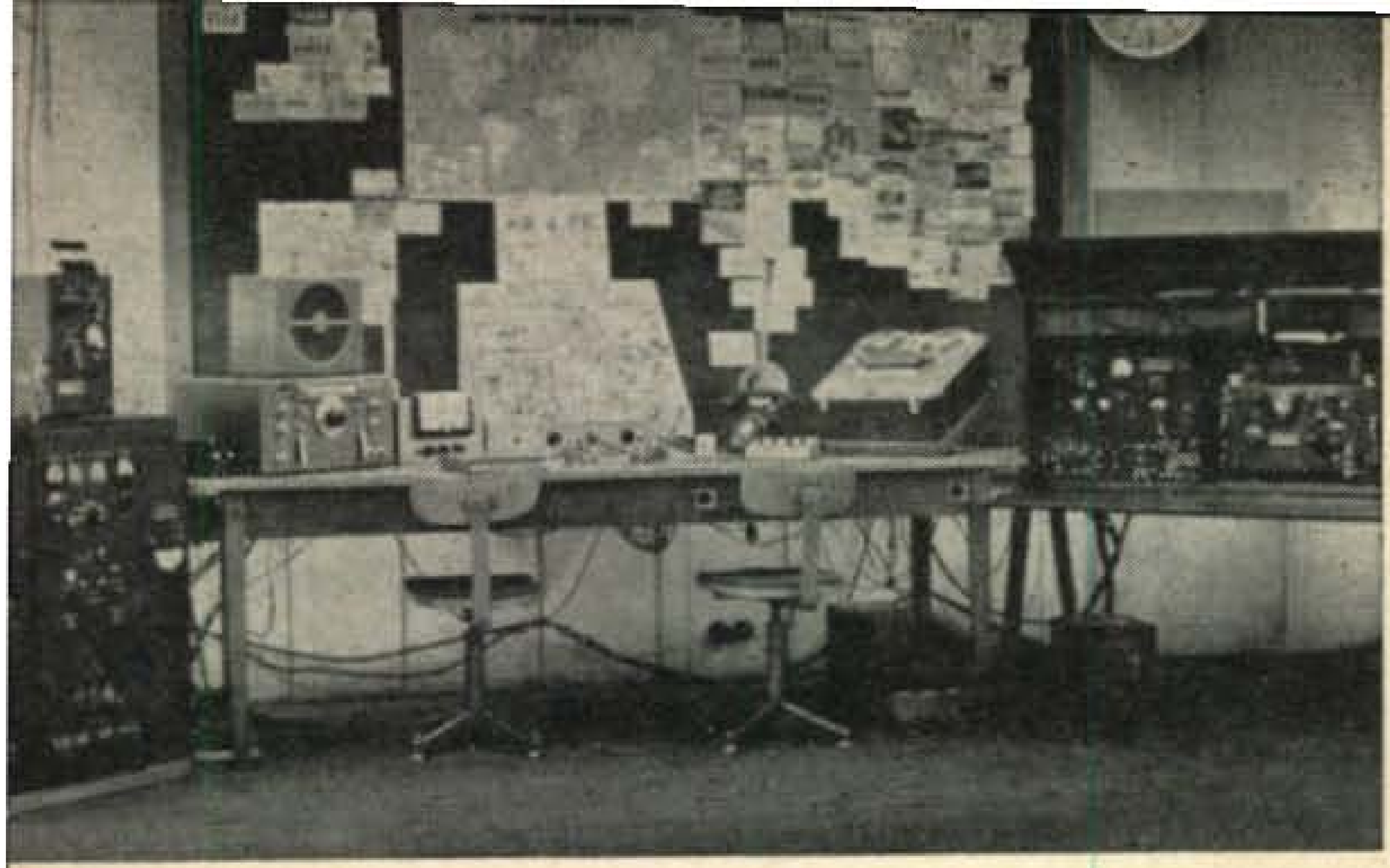


Fig. 3—Block diagram illustrating the temporary connection of the 1000 ohm resistor and audio amplifier with a gain of 100.



HB4FE

Hans Gabathuler, HB9TE
Tödistrasse 34
Wallisellen-Zürich
Switzerland

Many of you have worked HB4FE and some might be interested in knowing a little more about this station.

You may hear the following callsigns from Switzerland, which are allowed to operate on the amateur bands:

HB9 Regular call signs, using the following letters: A-Z, AA-ZZ and shortly AAA-ZZZ.

HB1 same "owner" as HB9 call, but away from regular QTH. This call sign is normaly followed by the 2-letter abbreviation of the Canton he is working from, e.g. HB1ET/ZH, or P (portable) if working enroute (HB1ET/P).

HB4 Swiss military stations, working on Amateur-bands, FA-FZ.

By far the most active of the Swiss Military-Amateur stations and the only one active during contests is HB4FE. Its location is some 8 miles NE of Zürich at the old civil airport of Zürich, Dübendorf.

HB4FE was installed primarily as an Instruction center for basic training and refresher courses for a certain category of Swiss military personnel. For those who do not know, every young Swiss man, considered physically and mentally fit, has to enter military service after the age of 20 years for a period of approximately 17 weeks. Thereafter, he will be called every year for a 3 weeks repetition course, which keeps him up to date on new weapons. From 32 to 48 years of age, these courses are somewhat shorter and are no longer "yearly," but he is not released from active duty until he reaches the age of 60.

In the military communications sector, most of those young "students" also work in their civilian jobs as radio engineers, technicians or as radio operators for commercial communication companies and civil aviation. To keep them interested in their training and to help them apply their theoretical knowledge, the best are chosen to operate HB4FE at specific hours. Under normal circumstances this is:

March-May	0700-0900 GMT and
July-October	1800-2100 GMT, 14040 *kc*

Operating that station is considered a privilege, and Chief Operator and Instructor Walter (HB9GK) carefully selects his people. Not all of them have calls, and those who do not, start their training with shortwave listening, monitoring the amateur bands and copying calls and transmissions. Only when they are more experienced in reading code and familiar with amateur traffic, abbreviations and Q-code, are they selected to go on the air for the first time.

Up until now, CW has been used exclusively, mostly on 14 *mc*, but there is a possibility that in the near future phone and SSB may also be used.

The lineup at HB4FE is as follows:

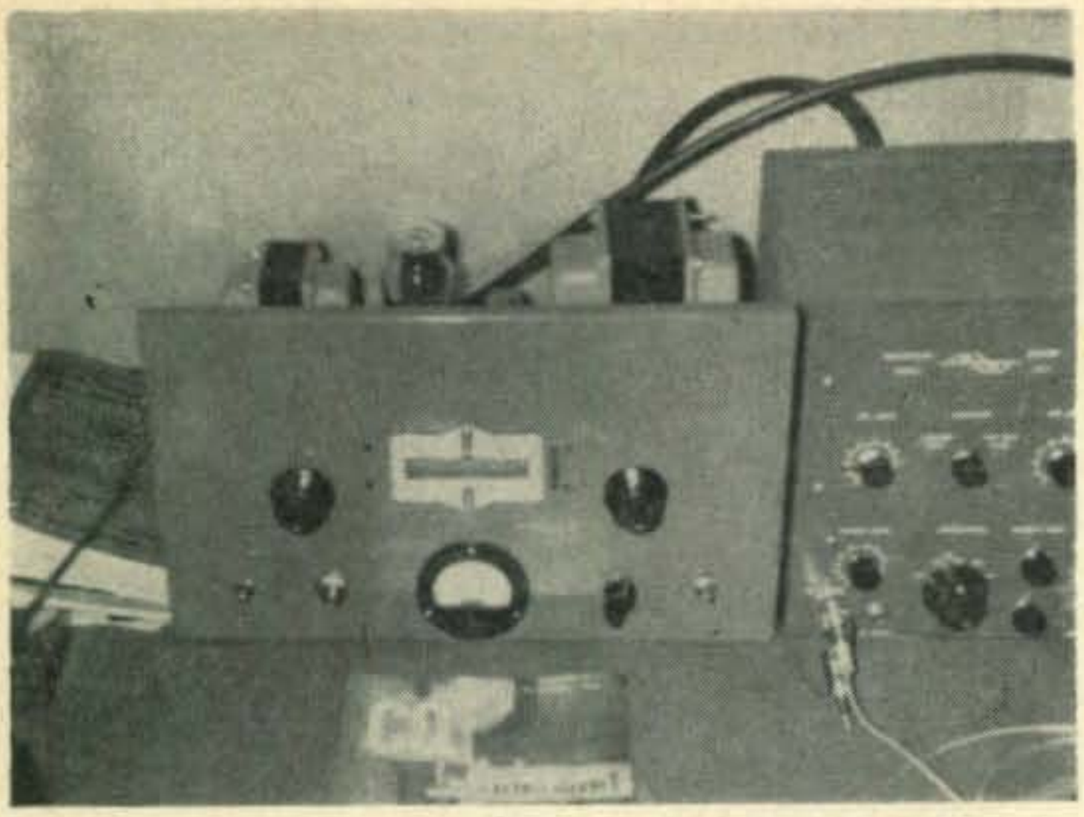
Transmitter	— BC 610
Antenna	— two element beam type HB9CV
Receiver	— HRO 50

During a recent DX contest, Chief Operator HB9GK reached the highest score in Switzerland (127764-36-1183).

As you may see from the above, HB4FE is a fully legal station, contrary to the letters Walter has received from abroad, asking him funny questions regarding his license. HB4FE will QSL 100% as soon as your card has been received. By the way, more than one W-om

[*Continued on page 114*]

Chief Operator Walter, HB9GK, at work at HB4FE.



Little SSB Linear

E. C. Sherrill, K6JFP
4745—49th Street
San Diego 15, Calif.

Now that you have that SSB exciter, be it the ever popular Central Electronics series or the "Do it Yourself SSB," you will need some more *rf* to cut the mustard. Well, why not build this twin sister to the 20A, the case can be ordered from Central Electronics with blank front panel, postpaid for $21.00, or other cabinets can be used. The completed unit makes a mighty beautiful little power package.

Layout of parts can be seen from photographs or you can move parts around to suit your taste. I suggest that the power supply parts be mounted across the back of the chassis, as you will note. The power transformer is on the right, filter choke on the left and the three rectifier tubes for the bridge circuit in between. The "Economy Power Supply," by E. H. Marriner, W6BLZ, *CQ*, September 1957, was used as a basic schematic, with the exception of more filter condensers and the filter choke was placed in the positive lead. Either way will work and use what you have available. Wait on mounting the filter condensers.

Next, I suggest that the ARC 5 antenna loading coil, the one with the roller be utilized and placed in the center of the chassis and held in place where the roller bar can contact the exact center of the coil. Make some marks and mount it. The cut out will be the same as the front panel of the ARC 5 transmitter. Now you can see the roller wheel, make sure that the bakelite bar that the roller is mounted on is raised above chassis by at least two washer thicknesses or you will be looking for the *rf* short all night, just like I did.

After the roller coils and slider arrangement is mounted and works, set the two pi-network condensers (from another pair of surplus ARC 5 transmitters) on the chassis and push them around until satisfied with the location and secure them to the chassis. A couple of ⅜ inch holes can be drilled at the back near the terminals for feed thru connections for *rf*.

Coupling and panel bearings and knobs can be centered on the panel, drilled and mounted. The condenser on the left is for plate load

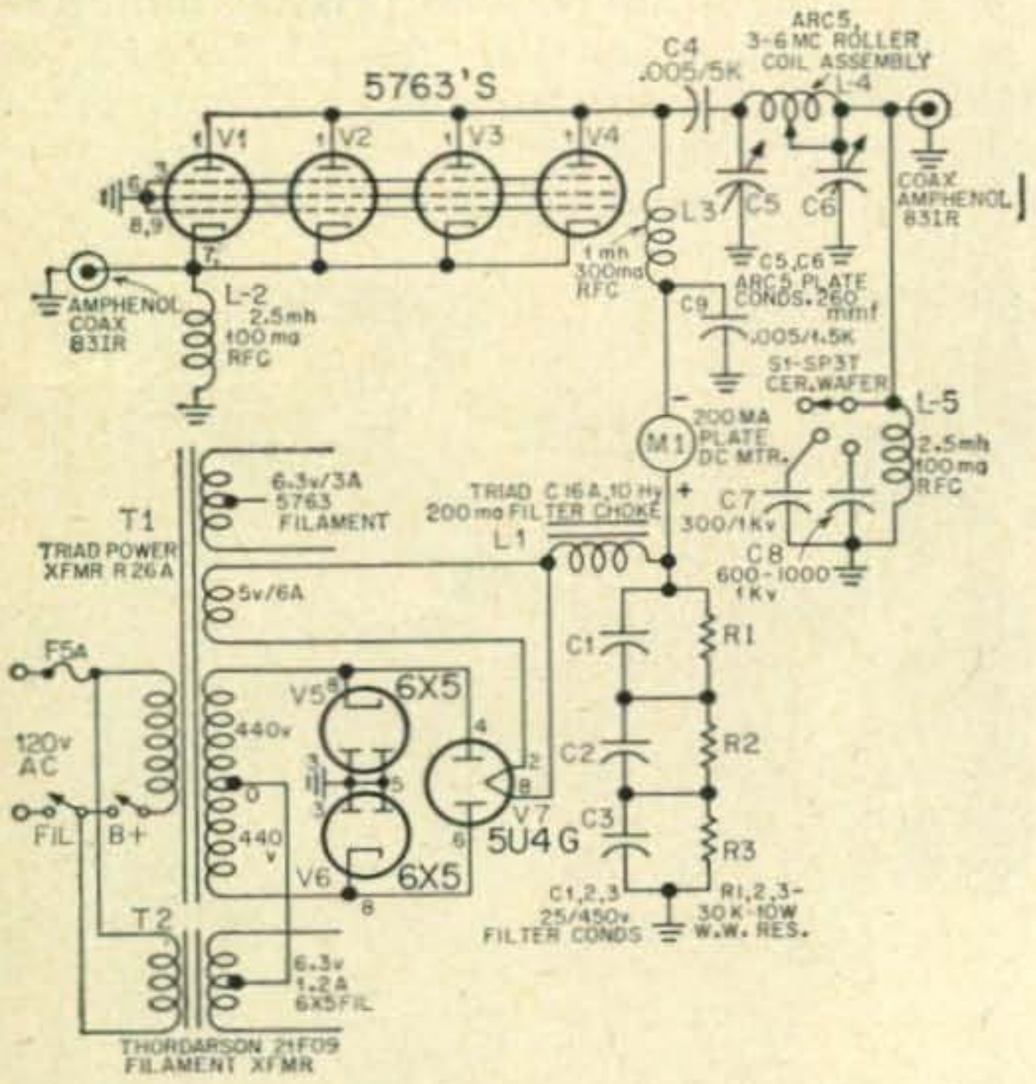
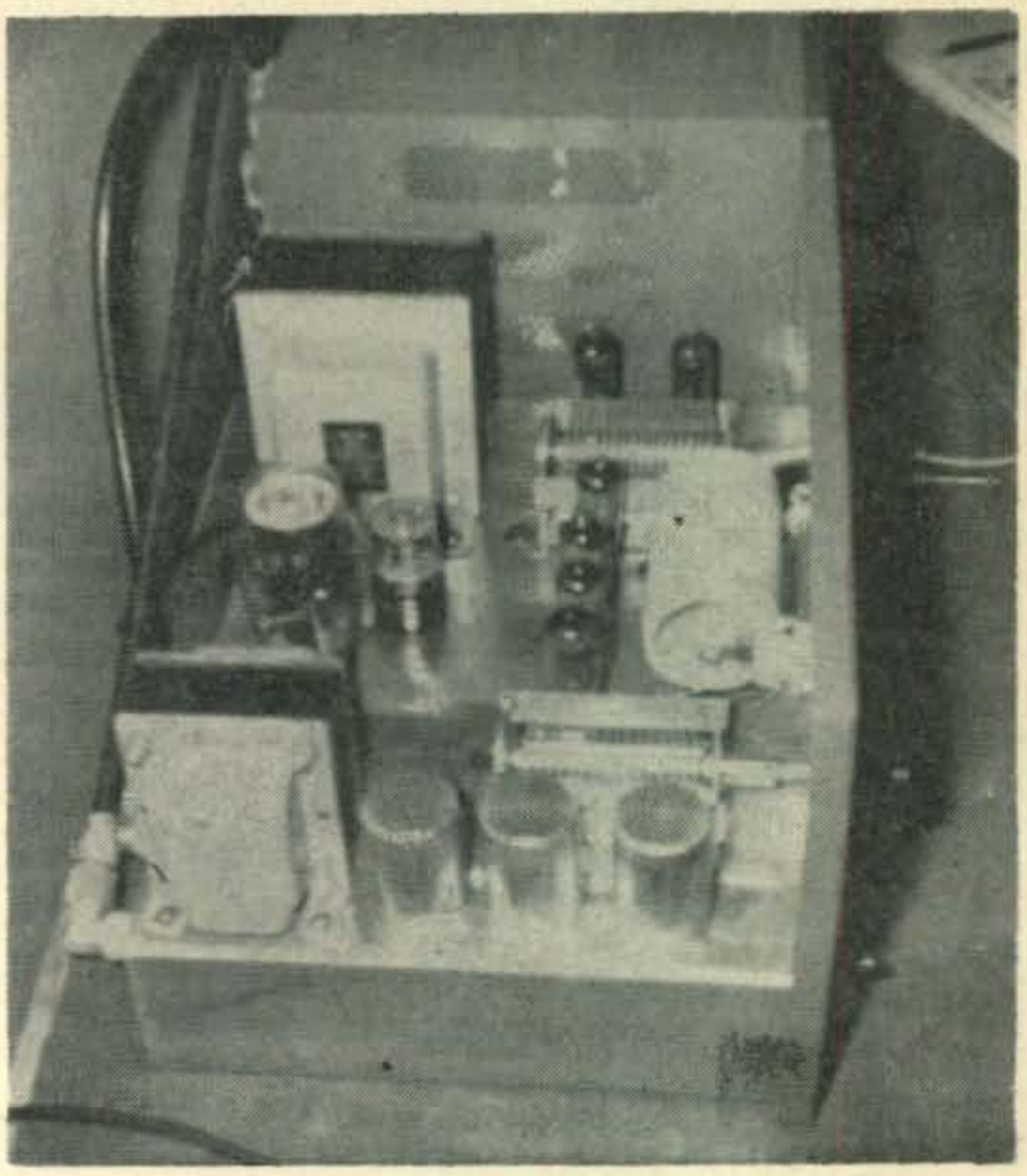


Fig. 1—Simple linear SSB final using ARC-5 parts.

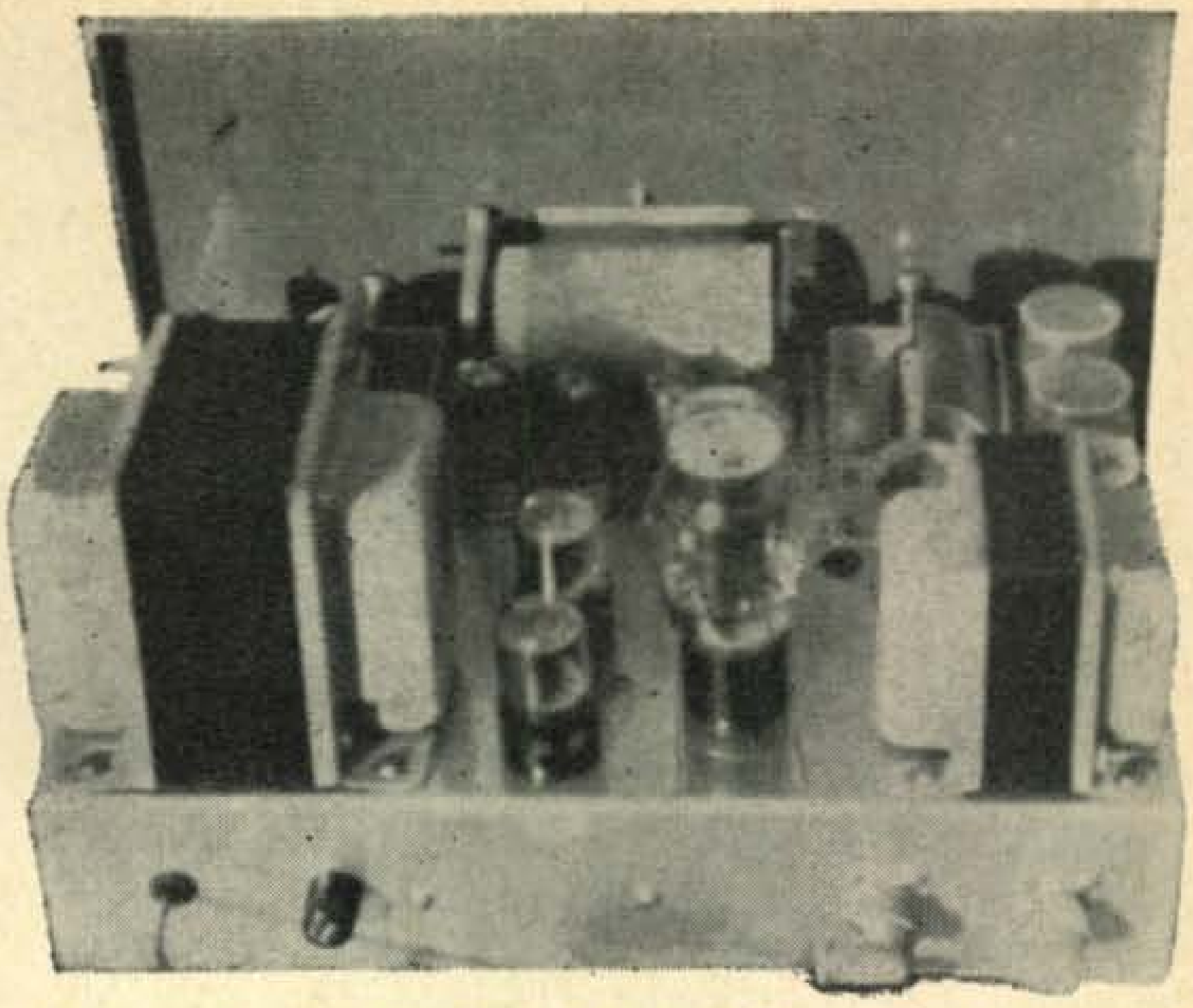


tuning and should be pruned by removing about 6 plates in the rotor (original capacity about 260 mmf, now will be about 150 mmf). The condenser on the right is ok; don't modify it. This is used for fine load, antenna tuning. The switch just below it can add capacity to suit different antenna systems. The plate milliameter was centered just below the roller coil.

Filter condensers are next placed on the left side of the chassis, this way they are near the filter choke and room is left in between for the equalizing resistors for below chassis mounting. Over on the right side of the chassis, between the edge and the fine load antenna condenser, the two VR tubes and their dropping resistor are placed and mounted, these are to be used for "future" final changes, that I am sure will take place. They are not shown in the diagram.

Final Location

Now, that you have all the parts either layed out or mounted, there is lots of room between the two pi-network condensers and the roller coil assembly and the rectifier tubes. If layout worked real well, there is about 3 inches by 5 inches, leave a ¼ inch margin around this and cut out the chassis. Aluminum plates can now be screwed on or removed as "future finals" are tried out. My first final as shown, consists of 4 each 5763's in grounded grid, Class B. With the power transformer listed, the voltage is 910 volts. The 20A will drive this to average 100-150 ma, with voice peaks hit-



ting 200 *ma* mark. The static resting current of the final is just 20 *ma*, enough for a real bleeder resistor.

Equalizing resistors were tied into the circuit to equalize voltage across the three condensers and act as a bleeder resistor, the total drain should be kept below or near the 10 *ma* mark. My drain is just 10 milliamperes with the three resistors shown.

This unit has been tested on 75, 40 and 20 meters to date, with equally good success. No claim for originality, but I like the layout, design and the way the "Little SSB Linear," works out and it looks real good in the 20A cabinet. ■

Amateur Population Of The World

Henry G. Elwell, Jr., W2JKH
392 Lafayette Ave.
Westwood, N. J.

With over 200,000 amateurs in the United States, we may take it for granted that other countries have large ham populations. However, there is no other country that has even 10,000 amateurs. Great Britain approaches it with approximately 9,400, but only 14 other countries have over 1,000 amateurs. In fact there are only 54 DXCC countries in the world out of about 295 with over 100 licensed amateur stations.

It may be thought that the average amateur can get on the air and knock off those 54 countries with no trouble at all. However, not so! W2JKH, an average ham, has a DXCC certificate dated 1954, and yet in 1959, CE, HC, OA, and VU have not been confirmed, or in the case of VU, even worked. So, if 100 hams to a country seems a reasonable number, think how much more difficult it is to work the rest of the approximately 240 countries that have less than 100 hams.

To give you an idea of the number of amateurs in each DXCC country of the world, the following tabulation obtained from a recent issue of the Radio Amateur Call Book Magazine is offered. Perhaps when you see how many countries have less than 25 hams, about 120, it may give you some consolation for finding it difficult to work so many new ones.

Country	Ham Population
AC3–Sikkim	2
AC4–Tibet	2
AC5–Bhutan	1
AP–Pakistan	44
C–China	*
CE–Chile	922
CE9–Antartida Chilena	12
CE9–So. Shetland Isl.	13
CEØ–Easter Isl.	3
CM-CO–Cuba	524
CN2–Tangier Zone	30
CN8–Morocco	173
CP–Bolivia	110
CR4–Cape Verde Isl.	11
CR5–Portuguese Guinea	4
CR5–Principe & Sae Thome Isl.	2
CR6–Angola	49
CR7–Mozambique	116
CR8–Goa (Portuguese India)	2
CR9–Macao	3
CR10–Timor	1
CS3–Azore Isl.	1

[*Continued on page 112*]

International Amateur Radio Convention

August 11, 12, 13, 14th, 1960

You have probably noticed that the last two or three issues of CQ contained some mention of the International Amateur Radio Convention which we plan to hold on August 11th through 14th, 1960 at the Statler-Hilton Hotel here in New York City. A convention of this size, is by necessity, a great deal of work. We have been going at it persistently, trying to assure that the show will be a highly successful one; one which will cater to every phase of our hobby. To do this, committees had to be formed, technical sessions and speakers arranged for and programmed and exhibitors solicited. Although we still have not approached completion of the arrangements (and probably won't until convention time) we feel that enough details are available to present you with a pretty fair overall picture of the show that we plan.

Why in New York?

We selected New York City for the location of the International Amateur Radio Convention for two main reasons, one being the simple fact that there has not been a large amateur show in New York City for many years, and secondly because New York offers a wide variety of tours and entertainment for the entire family. We know that a vacation in New York can be a most interesting one. Broadway is literally teaming with the best in theatrical entertainment and recent motion pictures; the area also boasts a preponderance of restaurants and night clubs which have become famous the world over for both varied cuisine and tantalizing atmosphere. The sights to be seen, in themselves, draw millions of sightseers each and every year.

All in all, we feel that if you plan your vacation or at least part of your vacation in New York City this year you will not only be able to come to what we expect to be the best amateur convention ever held, but also to take advantage of the many other vacation bonus' that this city has to offer.

To insure this, we are arranging to provide services which will; 1)—make theatre tickets available upon request. These of course, are not free but just being able to get good seats can be a problem; one which the Convention Committee is prepared to eliminate. 2)—arrange for tours, such as boat trips, museums, art and music centers, the United Nations and many, many others. 3)—recommend fine eating and entertainment spots based on your individual preferences. This latter service has been arranged by the Convention Hospitality Committee. This Committee will be at the convention and is made up of amateurs who know New York's secrets cold. 3)—There is a Housing & Accommodations Committee which is designed to help you get settled for your stay in the city by arranging for hotel reservations, transportation to and from points of interest etc. This committee is also prepared to help foreign and out-of-town amateurs to take advantage of staying with the many local hams who have offered their homes and hospitality for the period of the show.

Exhibitors

When you come to the International Amateur Radio Convention, you may expect to see exhibits of just about *all* the amateur gear currently on the market. Transmitters, Receivers, Antennas, VHF & UHF gear.... Whatever interests you, can be seen at the show. There will also be representatives at each exhibit to answer your technical questions regarding the gear on display.

Prizes

The convention is prepared to give away a wealth of prizes. Aside from a myriad of smaller gifts, there will be 25 or more major prizes.... Items which range in price from $25 to $1200 dollars. These awards will be made daily with the exception of the drawing for the major prizes which will be held on Saturday evening, August 13th. Selection for all prizes will be made by drawing ticket numbers so that everyone who has a ticket has a good chance of being a lucky winner.

Technical Sessions

There will be Technical Sessions held during each and every day of the convention. These talks will vary in both length and subject matter. All phases of amateur radio will be covered by technical sessions including: Antennas, Novice, Technician, VHF & UHF, Propagation, YL, SSB, DX, etc. These talks will be conducted by leading amateurs from all walks of life, many of whom have been and are responsible for the many wonderful engineering accomplishments that make todays fine commercial equipment what it is.

Other Features of Interest

Aside from the above, there will be a raft of other fine events at the convention. We will have, for example, a room devoted to operating ham stations. Two or three separate stations are planned which will operate on all amateur bands including VHF with AM, SSB, CW and RTTY being used. These stations will be made up from the best gear available and will be open to all, should you care to have a few QSO's from the Convention. There will also be equipment construction contests, QSL Contests, Code Practice runs, Mobile Judging contests and an exam room where you SWL's can take your Tests.

[*Continued on page 75*]

CQ Reviews:

The Hammarlund HQ-180-C Receiver

We can truthfully say that we "enjoyed" testing the new Hammarlund HQ-180-C communications receiver. The receiver is interesting and well designed, both mechanically and electrically, and certainly appears to fullfill its advertised promises.

The HQ-180-C is an eighteen tube superhetrodyne (which features double conversion from 540 *kc* to 7.8 *mc* and triple conversion above) that has been designed to provide excellent performance for the reception of CW, AM and SSB signals.

Our initial glance at the receiver showed that the bandspread dial allows calibration in 5 *kc* divisions from 3.44 to 21.6 *mc*, and 10 *kc* divisions from 27.89 to 29.7 *mc*. A built-in crystal calibrator gives the operator a check point every 100 *kc* and the bandspread dial pointer is adjustable within a range of 30 *kc* or so. These two features seem to guarantee a high degree of accuracy in dial readings.

The S-Meter on the HQ-180 is large and softly illuminated, making it quite easy to read. This meter, which is calibrated to a maximum reading of 40 *db* over S-9, is factory adjusted so that a signal of approximately 50 microvolts gives a meter reading of S-9. Each S unit indicates about 6 *db* increase in the strength of the received signal. Both the meter sensitivity and zero set are adjustable by means of potentiometers located on the rear chassis apron of the receiver.

The panel and cabinetry are typical of the current Hammarlund style; the panel being strong aluminum and the cabinet an attractive and durable wrap-around perforated stock affair with a cast front escutcheon. The metalwork of the HQ-180 is certainly indicative of the mechanical stability we found the unit to possess.

Circuitry

A 6BZ6 functions as a first *rf* stage. This stage is plus an antenna trimmer assure good sensitivity and signal to noise ratio. The *RF Gain* control varies the bias on this first *rf* stage, thereby controlling the output level of the amplifier. The output of the first *rf* stage feeds a 6BE6 pentagrid converter which operates as the first mixer. This, in turn, feeds a second 6BE6 which functions as a converter to reduce the incoming signal to a frequency of 455 *kc*. From here, the signal is mixed down to a frequency of 60 *kc* (in a third 6BE6) and is amplified by two 6BA6 *if* amplifiers to drive the 6BV8 double-diode-triode which performs as an AM detector and AVC amplifier. In the SSB positions, a 12AU7 replaces the AM detector section of the 6BV8 as a Product Detector. A single 6C4 triode is used as the High Frequency Oscillator in the HQ-180. The circuitry of this stage is so designed as to give a good degree of both mechanical and electrical stability. Other tubes perform the following functions:

12AU7 —60 *kc* BFO and S-Meter Amplifier
OA2 —Voltage regulator
5U4GB—Rectifier
6AV6 —Delayed AVC and First AF Amplifier
6AQ5 —Audio Output
6BA6 —455 *kc* Gating Tube.

Some of the most prominent features of the HQ-180 are to be found in its SSB selection and selectivity devices. A sideband selector switch enables the operator to select Upper or Lower Sidebands for SSB reception or both Sidebands for normal AM reception. Selectivity is available in 4 preset degrees: 3 *kc*, 2 *kc*, 1 *kc* or 500 cycles. These filters are quite good and compare favorably with mechanical filters with regard to skirt selectivity.

One special feature of the HQ-180 is a built-in, panel-controlled "Slot Filter" for the elimination of adjacent channel interference and heterodynes. When properly placed with regard to its slot and depth controls, this device will provide a notch of about 60 *db* depth for the elimination of the undesired interference.

The HQ-180 possesses an Auto-Response (Gating) feature which automatically narrows or widens the frequency range of the audio output, according to the gain required. This circuit is also of value in the damping of the audio power in the speaker voice coil, preventing hangover.

We feel that the HQ-180 provides an excellent receiver in its price range and that the operator will derive a great deal of pleasure from owning and operating the receiver.

CQ Reviews:

The National NC-400

One afternoon last week I noticed some uniformed gentlemen trying desperately to drag a rather large cardboard carton into the CQ office. About an hour later (the daily telephone siege having ebbed slightly) I meandered into the mail room and found, to my pleasant surprise, that the box contained a new National NC-400 communications receiver. At 5 o'clock I cornered Igor Sovern, K2MIB, CQ's new Art Editor and fast talked him into helping me drag the new receiver down to my car for the trip to the CQ Lab.

The testing of the NC-400 required the better part of three evenings. The receiver, like most new units, requires that the operator familiarize himself with the proper use of the various features it has.

First Glance

If you take a look at the photo at the top of the page, you can easily see that the National NC-400 is designed to be both attractive and functional with regard to panel and cabinet. The front panel is cast aluminum with the controls and dials being both slightly recessed and sloped. The "S"-Meter and tuning dials are well lit and the calibration is set up for real "ease-of-operation". Dial settings for the amateur bands are in red on the black and white dial, and a 1 *mc* and 100 *kc* crystal calibrator is available to assure a high degree of accuracy in calibration. The calibration control is located just to the left of the "S"-Meter and the antenna trimmer just to the right. As the bandswitch is rotated, small red pointers indicate just which segment is being used on both the main tuning and bandspread dials.

The receiver is housed in a two-tone metal cabinet and all operating controls and indicators are on the front panel. Terminals and test jacks are on the rear apron of the receiver.

Electrical & Mechanical Features

I compared the NC-400 with several other communications receivers and found that it met just about all the requirements. In some ways, I found that the unit was a decided improvement over other receivers in the lab.

The sensitivity of the NC-400 is excellent, being in the order of 1 *uv* for a 10 *db* signal-to-noise ratio. RF circuits are designed to maintain a constant stage gain when tuned through a band or switched from one band to another. Both the electrical and mechanical stability of the NC-400 are excellent. After a 15 minute warmup period the receiver was calibrated at 14,200 *kc*. One hour later I rechecked the calibration and found that the total error was less than 500 cycles. The handbook specification calls for a frequency stability of 0.002 percent long-term drift after warm-up. After two more hours of operation, I found that the total error was less than 300 cycles. Dropping a bound volume of 1959 CQ on the cabinet seems to have little or no effect upon the stability, so from both points of view the NC-400 is tops in this test.

In today's crowded amateur bands selectivity is often the keynote to a good communications receiver. National has arranged the NC-400 to meet just about any selectivity requirement. The built in Crystal Filter assembly provides 5 instantly selectable passbands:

Broad	16 *kc*
Medium	8 *kc*
Sharp	4 *kc*
Very Sharp	3.5 *kc* to 150 *cps* using crystal filter.
SSB	3.5 *kc* at 6 *db* down, 10.0 *kc* at 60 *db* down.

In addition, the crystal filter housing can be plugged out and a mechanical filter adapter added in its place. This adapter will accept three mechanical filters for selectivities from 6 *kc* to 500 *cps*.

SSB

The NC-400 does quite a nice job of receiving SSB signals. In the SSB position of the mode switch, the *bfo* and heterodyne detector are used, and the audio amplifier section is connected to the manual noise limiter stage following the heterodyne detector. The *agc* circuit from the AM detector is still in operation, but is modified for SSB reception. A unique circuit provides fast attack and slow decay of the *agc* voltage. The diode detector for AM operation operates constantly in all positions of the mode switch, and a small *dc* voltage is applied to the diode circuit providing a small amount of delayed *agc*. With the mode switch in the SSB position, a silicon diode is shunted across the *agc* filter resistor. The diode polarity is such that the resistor is effectively shorted during an SSB audio peak, rapidly increasing the *agc* voltage. A comparatively large *agc* filter capacitor is quickly charged at this time. The capacitor slowly discharges through the filter resistor due to opposite polarity of the diode. The resultant *agc* voltage rises quickly during SSB audio peaks and decreases slowly preventing the characteristic audio thumping and background noise usually associated with SSB reception.

In the way of an interesting note, the *bfo* in the NC-400 may be used as a crystal controlled oscillator by removing a plug and inserting the proper crystal.

In the event that the operator desires fixed frequency operation of the receiver for Net purposes, the NC-400 provides 5 crystal positions for these purposes. These channels are selected by a front-panel switch. The crystals must be 455 *kc* above the desired channel frequency.

All in all, we feel that the NC-400 fulfills its promise and makes an ideal General Coverage communications receiver for the amateur should the price be of no object. It is, however, a little high priced for the average ham.

Barry Briskman, K2IEG

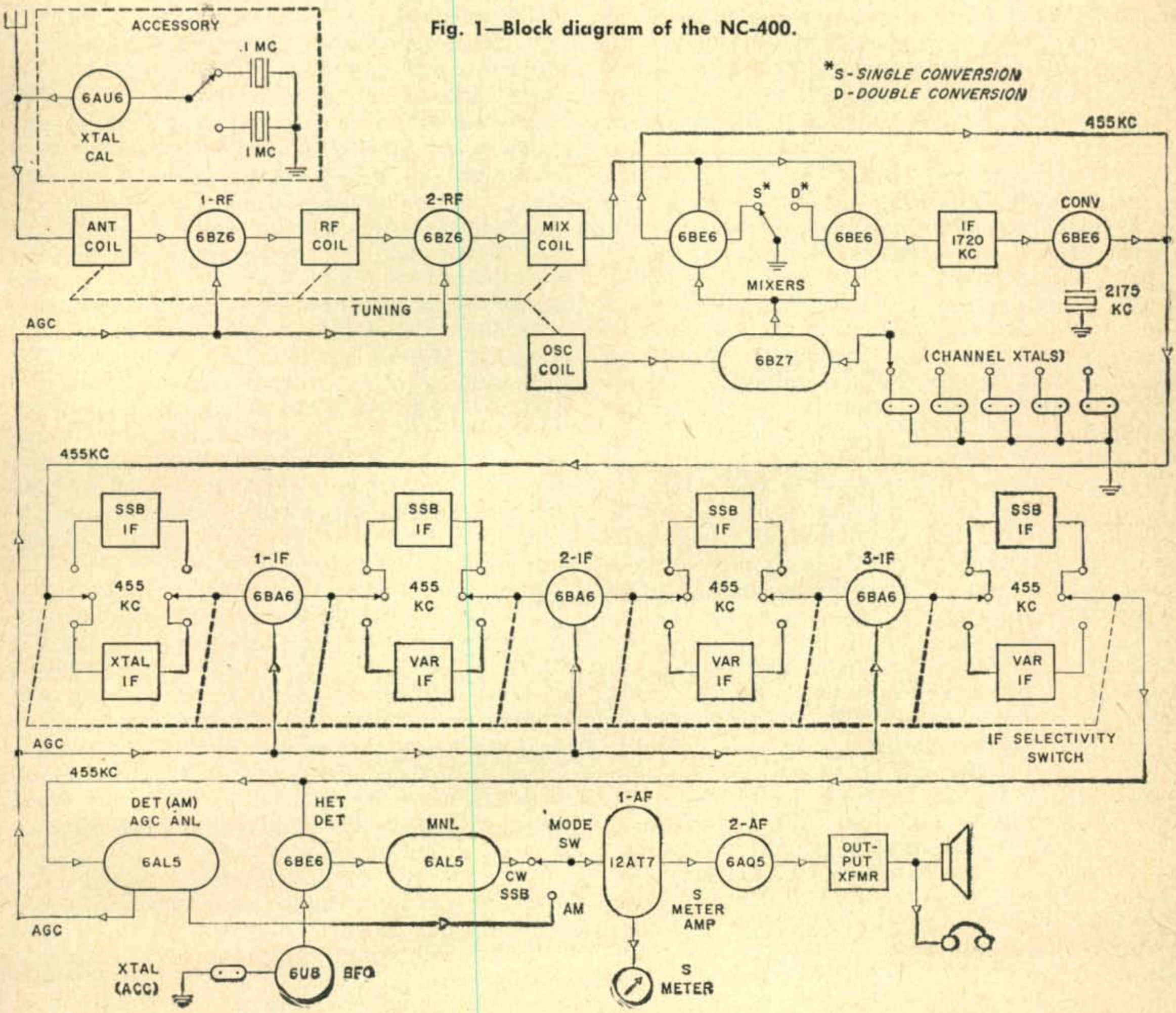


Fig. 1—Block diagram of the NC-400.

Preliminary Report
On The 1959 World Wide DX Contest

Frank Anzalone, W1WY

"Wa hoppened?", "Que pasa?" If you were to listen to the CW gang this was just about the worst contest ever when measured by past conditions. This is reflected in the returns this year, in spite of above normal activity. On the other hand the Phone boys were not too unhappy. Conditions for the Phone week-end were about average, although 10 was not up to last year's level, and there were local complaints that 40 and 80 were of little value.

As in past years we find that what happened in a contest is always best illustrated by a cross section of the remarks and comments we receive with the logs. Following are a few picked at random from the Phone returns.

W1RWU—*Very good contest in spite of erratic conditions; many more DX stations participating.* That's right Charlie, there was plenty of activity, even on the lower bands, although most of the latter was confined to the European area.

K4QIJ—*The SSB boys really tried hard this year.* That they did John. As W8TTN, Phil put it, SSB is really starting to catch on in contests. Many stations used SSB exclusively and ran up commendable scores. TI2HP and ZS5JY being two of the more successful ones although there were many others. I cannot understand why Pierre, ON4SZ wants our contest activity confined to AM only. Or W9NZM's remark, "Still no SSB activity in the contest." Where were you listening Bob?

There were many gripes, especially from the W/K contingent. **W3SOH**—*Why don't DX stations state what frequency they are tuning?* Some of the smart operators do, Phil, but I agree it puts us at a disadvantage when we are confined to a specific band and the overseas stations don't even tune down into our section. W1OKG gives a cheer for DX stations that specify the frequency they are tuning, and a double hip, hip when the frequency is not in KW alley. W2UTH pointed to the frustrating hazard of a pile-up on a DX station's frequency. As an example, HV1CN got angry and left the air. What a pity. Of course as you said Henry, all he had to do is work stations 10 *kc* or more off his frequency and the situation would have corrected itself.

Imagine the frustration of VR3X who called and called but because of his QRP only managed to complete one QSO; and W5NGW wasn't even in the contest. That's nothing Roy; imagine their consternation when the fellows find out they missed a phone QSO with Christmas Island.

K6QPG/KW6 had her headaches too. Mary complained that the boys did not stick to her call long enough to realize it was a KW6.

Turning to the CW week-end; everybody was most unhappy. As W3MFJ put it—*Who turned out the lights Friday night?* They forgot to turn them on Saturday morning too, Bill. Things didn't begin to sound normal until Saturday night and Sunday morning. **K7APJ**—*Just about the lousiest conditions I have ever heard.* You're right Dale, you can't work 'em if you don't hear 'em. But pity poor W6BYH; Leon finally managed to get off for a full weekend only to run into a black-out. Swears he will never enter another one of these slugfests. Wanna bet?

We were not the only ones plagued with these frustrating conditions. The whole Scandanavian block moaned of complete "black-outs." VS1EA didn't hear a single American continent station, and he operated on all bands. KH6DLF bemoaned the lack of European contacts for a multiplier. Ed is ex-KL7PIV and had expected much better pickings on 21 *mc* as a KH6.

A certain watchman up at the University of New Brunswick is not going to be very popular with the boys at VE1RK. The station is located in one of the school buildings and the boys were chased out after 6 P.M. Don't worry Dick, we'll wave the 24 hour rule in your case.

In spite of our extensive publicity campaign we still haven't reached some of the boys. PY3-AFO sent his log to the International DX Club. (Boy, where has he been?) And quite a few came via the ARRL. (Thanks John.) But the one that took the cake was one that was simply addressed, Central Radio Club, ARLL, Washington, D.C. Yes! That's right ARLL.

Of course there are always the suggestions and criticisms. W2DEW suggested that the DX stations spread out on the low end of 40 and 80. You can say that again Jack. A few hours trying to dig the weak ones out of that mess and your head feels like someone has been working on it with a compression hammer.

K2DCA wants us to eliminate the necessity of US stations having to work Ws for Zone credit. Well Paul, you can always work VEs for Zone 3, 4 and 5 credit.

TI2CAH thinks that North American stations are at a disadvantage with so many 1 point W/Ks calling them. Well, you've got a point Jose, but this is a World Wide Contest and a change of rules for one area would bring down the wrath of another area on our heads.

W3KA thinks we should hold the contest later in the season. Did you ever take a look at the Contest Calendar, Ralph? We certainly could not hold it in the Spring where ARRL has been established for the past 25 years.

PAØRE wants to know why we still include 1.8 and 27 *mc*. A check of the 1959 rules will show that the 27 *mc* band was not included this year. As for 1.8, the activity is so small that it contributes very little to the all band scores, and where it does it generally acts as an equalizer for stations that are under a handicap. And besides, we have a soft spot for the Top Band.

CN8JF thinks 48 hours is too long a period and K8HTM would like to see more than 12 hours of operating time. Regarding the latter, the rule states that a minimum of 12 hours of operation is required to be *eligible* for an award, and not that you are limited to 12 hours of operating. If you do not put in 12 hours, for Heaven's sake don't use that as an excuse for not sending in your log.

The operating technique of some of the US stations did not prove too popular with the boys in the Caribbean area. Most all of them complained that they were severely hampered in trying to work the 3 pointers by the incessant breaking-in of the W/Ks. An understandable gripe.

OH5NW had a power failure that kept him off the air for 7 hours. Axel was last year's Single Band champ on 28 mc Phone. (See photo.)

And speaking of power failures, practically all the CX contingent was knocked off the air during the CW section due to a major breakdown of electric facilities. That clears up the mystery of the lack of signals from down Uruguay.

However I'm still wondering what happened to the XE boys. They were fairly active during the Phone section and had promised to be back in force for the CW week-end, but hardly a signal was heard from Zone 6.

And the KR6 boys were also out of business for long periods because of power failures.

VU2BK pleaded with us not to ever think of discontinuing or in any way changing this contest. Don't worry Kab, very few changes are anticipated and CQ should be around for a long time.

Logs

All the gripes don't come from the contestants. We on the committee also have a few pet peeves. If you should see the condition of some of the logs we receive you would probably throw up your hands and go back to collecting stamps. Even so, its not the hours of seemingly endless work that gripes the boys and myself as much as it is the uncalculated number of guys who find our contest interesting enough to participate but can't be bothered to send in a report. That gives us the impression that our work is not appreciated. The fact that a majority are calls that are well up in DX standings, "Big Shots" who like to flex their muscles and show how easy it is for them to knock off that rare DX in a pile-up, makes it just that more aggravating.

The negligence of some Clubs failing to provide us with a list of participating members, is also a sore point with us.

With that sour note we return to our thankless job of preparing the results. The Phone section scores will appear in next month's issue. ■

Col. J. R. Williams (right) presenting the W9IOP Trophy to Maj. Glenn H. Luse of the USAF. CN8JX was World Champ on All Band CW in 1958.

Paul Mandeville, F8PI receiving the W2SKE Trophy for World High All Band phone score in 1958. Left to right—F3PB, President of club; F8NA, Old Timer who made presentation; F8CH, Pierre, the 1957 winner and F8PI the champ himself.

You think you had troubles? This is what happened to VE7FO's tower just before contest time.

Urban Le Jeune, Jr., W2DEC
416 North 15th St., Kenilworth, N. J.

DX DX DX DX DX DX DX DX

The following certificates were issued between January 15th to February 14th, 1960:

WAZ

#1270	W6IPH	Fred Fiedler
#1271	W8RSW	Frank Koval
#1272	OH8QA	Viktor Nitroneu
#1273	WØDEI	Francis C. Kramer
#1274	F9TX	Jean M. Legeay
#1275	G3DQO	A. L. Cawley
#1276	OH1SN	A. Gronroos
#1277	W7DET	William Vandermay
#1278	OH3QC	Rauno Saresalo
#1279	W4JII	John F. Larkin
#1280	W9RH	Emil R. Felber
#1281	G3GCD	Ben Bowyer
#1282	LA6U	Anton Bakke
#1283	OH3SE	Leonard Kokko
#1284	W5KF	F. K. McKesson
#1285	W1BGW	Jack Berman
#1286	SM5BFE	J. Tollin
#1287	W9HTY	Anthony J. Porto
#1288	W9WJH	Allan F. Houston
#1289	W7ZAS	Larry Sweeney
#1290	K4ICK	Joe Brooks

All-Phone WAZ

#50	UR2BU	Karl Kallemaa
#51	ON4RC	Louis M. Boccar
#52	FA8RJ	H. Grossin

CW WPX

#97	EA4CR	Santos Yebenes Munoz
#98	W1IUU	Walter Sakawicz
#99	WØMCX	Arthur A. Jablonsky
#100	DL3RK	Walter Geyrhalter
#101	K5JZY	Jim Hambright
#102	K4IEX	Robert R. Beatty

Phone WPX

#12	SM3BIZ	Curt Westling

SSB WPX

#19	W2VZV	William H. DeWitt
#20	K2JFV	Jack Williams
#21	W3VSU	Lyle Quinn
#22	XE1AE	Fernando L. Vallarta

The certificate numbers assigned to last month's CW WPX winners were listed erroneously. They should have been listed as follows: W3GHD #93; W8RSW #94; VE3CIO #95; W9QTR #96.

WPX Box Score

CW WPX

W2HMP	553		W5BRR	311	
W6KG	511		W8RQ	311	
K6CQM	455		PAØLY	310	
W5KC	455		W3GHD	310	
W8KPL	453		W9BPW	310	
W2EQS	429		W3AYD	309	
OK1MB	428		DJ3BB	308	
W5AFX	407		SM5BCE	308	
W1NLM	400		W9YNB	307	
W2MUM	400		DL1QT	306	
W9UXO	390		K4IEX	306	
W1EQ	387		K5LIA	306	
W4OPM	387		OK3DG	306	
W3BQA	385		UA9DN	306	
K6SXA	376		W8RSW	306	
W2PTD	374		K4HFX	305	
W9YSX	368		SM5AHJ	305	
W9DYG	367		VE3BWY	305	
W4AZK	365		W5AZB	305	
W9QGR	361		WØGUV	305	
VE3DIF	357		K5JZY	304	
DL7CS	356		W1BFT	304	
W5OLG	356		W6RLP	304	
W6WO	356		OK1AEH	304	
W8LY	354		SM5CCE	304	
W5AWT	353		W1FZ	304	
WØPGI	353		W8UMR	303	
W5DA	351		W9VIN	303	
VK3KB	350		K9CLO	302	
W8JIN	350		W3DBX	302	
W1IJB	349		W5LGG	302	
W9IU	344		WØDMA	302	
K2PFC	330		JA2JW	301	
W6YY	330		K9AGB	301	
WØSNL	327		LU5AQ	301	
K2UKQ	325		PY4OD	301	
DL3RK	324		SM5AJU	301	
K9EAB	319		W2DGW	301	
EA4CR	318		W4HYW	301	
G3EYN	318		W4IMI	301	
DJ1VS	316		W8IBX	301	
VK6WT	316		W8TTN	301	
W2GT	316		WØGUV	301	
F9MS	315		WØQYE	301	
PAØVO	315		K4JVE	300	
W1IUU	313		K4KOY	300	
SM5WI	312		KL7MF	300	
SM5AHK	311		PY4AO	300	
W2HO	311		VE3CIO	300	

W1HWH	300	WØMCX	300
W2FXA	300	W3UXX	389
W3BCY	300	OK1BY	207
W3LMA	300	W4OMW	207
W4GXB	300		

Phone WPX

W8WT	475	DL3TJ	305
G3DO	414	SM3BIZ	304
CT1PK	409	F8PI	302
PAØHBO	363	PY1NC	302
PY2CK	354	W9UZC	302
W5ERY	315	VE1ADE	275
ZP5CF	306		

SSB WPX

TI2HP	231	W3VSU	154
K9EAB	204	W2OTZ	153
K2MGE	203	W2TP	153
W1GR	183	W2VZV	153
W6BAF	170	K2JFV	152
W3MAC	165	W5RHW	152
VE3MR	164	W8YBZ	152
K2HEA	160	WØFUH	151
TG9AD	160	W5DA	150
MP4BBW	158	W6TNS	150
WØCVU	155	XE1AE	150

QSLs In The Mail

In the past there has been quite a bit of confusion concerning the submission of QSLs for the WPX certificates. When the award was originally conceived, examination of all cards was not required. After much consideration it was decided that in order to give the award high validity, all cards would have to be submitted to the DX Committee for examination. Anyone who has received a WPX certificate or received a subsequent endorsement has had all his cards checked. This system has worked out to the satisfaction of everyone concerned and it is universally agreed that if the award is to maintain the validity which it now enjoys, all cards must continue to be checked. This does create one special problem. There has been an understandable reluctance on the part of many DXers to package and mail 300 or more cards for inspection to the DX Committee. The reasons for this being the high cost of postage and the unwillingness to send rare cards through the mail any more than is absolutely necessary, which is understandable.

I have had repeated requests from persons desiring the award, and who are fully willing to have their cards checked, stating that because of their reluctance to send the cards through the mail, they would like to have an inspector authorized to check their cards on their own particular continent. I have also had several offers from individuals and groups, who now check QSLs in conjunction with the issuance of their own certificates, who would be willing to act as inspectors for cards in their own area.

I would appreciate if all of you would give this idea some thought and let me have your opinions, either pro or con. If the majority of opinion is in favor of this method, then I shall endeavor to make the necessary arrangements to install inspectors and will list them in a future issue.

Letters

The following letter was received this month from J. C. Putnam, Deputy High Commissioner of the Trust Territory of the Pacific Islands:

"Contrary to popular belief, FCC rules and regulations do not carry force in the Trust Territory of the Pacific Islands. In short, an FCC amateur radio license is not valid for the installation and/or the operation of an amateur station. We do, however, recognize a valid FCC license as evidence that the holder has passed an examination equivalent to that issued by the Trust Territory for the particular class of license held. In such cases, a photostatic copy of the license must accompany the application.

Military and civilian amateurs assigned to military posts are required to file applications through the commanding office of the post. Civilian amateurs assigned by government agencies to other islands may file their applications direct with the Office of the High Commissioner, Trust Territory of the Pacific Islands, P. O. Box 532, Agana, Guam. Prompt attention is given to applications.

Because of the far-flung network of islands, scattered throughout an area larger than the United States, examining officers for Trust Territory amateur license are available at practically every military post. At isolated Coast Guard Loran Stations, the examining officer may be the commanding officer and the code-speed examiner may be the radio operator assigned to the station. New amateurs are encouraged, but they are reminded that a Trust Territory license automatically expires with their departure from the Territory. Further, only U. S. nationals and Trust Territory citizens are eligible for licenses.

The Trust Territory Government issues calls within following blocks of call letters:

KC6AA through KC6WZ; KC6YA through KC6ZZ—Eastern and Western Caroline Islands;

KG6RA through KG6RZ—Rota Island, Mariana Islands;

KX6NA through KX6WZ; KX6YA through KX6ZZ—Marshall Islands, less Kwajalein and Eniwetok areas."***

Soapbox

As you are all undoubtedly aware, the upper limit of the phone portion of the 20 meter band was extended to 14.350 *mc* on March 10, 1960. This, of course, creates a very serious problem. The portion of the band from 14.300 to 14.350 has always been used by DX SSB

stations. Obviously, very few DX stations will be heard when the W boys move into this portion of the band.

Our new sideband editors, K2MGE and K2HEA have come up with an idea which I think is very good. They suggest that the frequencies from 14.335 to 14.350 be set aside for the use of DX stations. If we can effectively carry out their proposal, I am sure we will all work DX that might otherwise be covered by a maze of QRM.

The situation is also discussed in the Editorial column this month.

Dayton Convention

Yours Truly will be one of the speakers at the DX forum at the Dayton Convention on May 7th, 1960. Also participating in this particular forum will be Jonesy, W3DHJ, who was the second operator of W3ZA/3W, and the North Jersey DX Association. May I suggest that everyone make a special attempt to be at the convention this year as I understand it will be the best one thus far.

Who—Where—What

HI Dominican Republic—George, HI8GA, has been elected president of the Radio Club of Dominicana. (Tnx K2KPM)

FR7 Reunion Island—There is a new ham on Reunion. His call is FR7ZE and his QTH is Robert Bedier, 3 Rue St. Bernard St. Denis, Reunion Island. (Tnx WGDXC)

SU Egypt—SU1MS new has a SB10 SSB adapter. A new super pro has also been added to the station equipment. He will be active for about 3 more months and then will go to Germany to continue his studies. Mahmud wants his QSL to go *only* to his QSL manager, W6QNA. (Tnx K2UYG)

TA Turkey—K4GEV, who is now in Turkey, states there is no authorized hamming at present. Any activity there is illegal.

Col. Jack F. Hudson, KR6QM, on the left, hands the gavel over to the new president of the Okinawa Amateur Radio Club for the first half of 1960, ATC Edward F. Salter, KR6HL, at their annual banquet on 8 January 1960.

VKØ Heard Island—From VK4FJ via Adrian Fallert, we hear there will be no operation from Heard Island in the foreseeable future. There is no one there and it is now only a base for ships on the way to Antarctica should they run into difficulties. There are stores of supplies on the island but all operations have ceased.

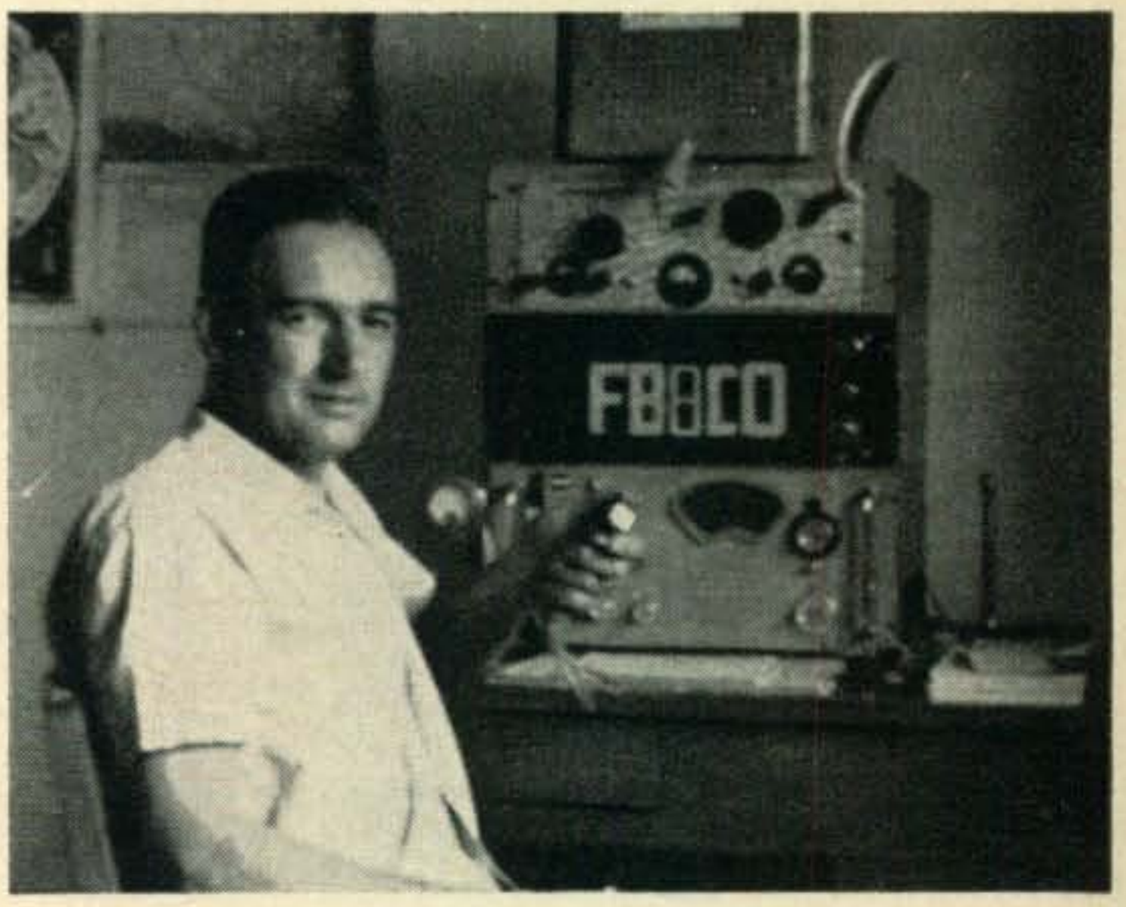
VR6 Pitcairn—W4TAJ and W5OLG want to thank everyone who contributed to help buy VR6TC a new HQ 145C receiver. Tom will be returning to Pitcairn in May at the latest, and will be very active with his new receiver.

Vermont—K1EFI, K1IVT and K1LST are going to operate from the state of Vermont the week-end of May 13-15. The frequencies to be used are as follows:

BAND	CW	AM
80	3.540	3.840
40	7.010	7.270
20	14.040	14.215
15	21.040	21.280
10	28.040	28.575

QSL the fellows at their home QTH.

XZ2 Burma—Aung Myint, XZ2OM, is taking a course at Keesler AFB in Biloxi, Miss. He has brought his logs and a supply of blank QSLs and will be glad to oblige anyone needing his card upon receipt of a SASE. His address is Capt. A. Myint, BAF 1064, ORM #17, Sqdn 3401; Keesler AFB, Biloxi, Miss.



One of the most active FB8's on ten & 15 meter phone, Roland, FB8CO (exF9IY) uses a 4D32 and cubical quads. (Tnx KH6BPF).

"AMERICA" AWARD

L.M.R.E.,A.C. has established the AMERICA Award for all Radio Amateurs in the World under the following bases:

1.—Confirmed contacts with at least 40 "Countries" of America and with 20 XE stations, are valid all contacts made after the 1st. of January, 1957.
2.—Applications along with confirmations and a list of same must be sent by Registered Mail to L.M.R.E., A.C., Post Office Box 907, México 1, D.F. including U. S. Dolls $1.00 or equivalent to cover return postage.
3.—The award is issued in CW A-1, Phone A-3 or S.S.B.

(2 Ways) A-3a. No. combinations are allowed.

4.—All stations contacted must be "Land Stations". Contacts with ships, Aircraft or any mobile stations are not valid for the Award.

5.—List of "Countries" that count for the AWARD:

CE	Chile	PYØ	Fernando de Naronha
CE9, KC4, LU-Z, VP8	Antarctica	PYØ	Trindade
		PZ1	Surinam
		TG	Guatemala
CEØ	Juan Fernández Islands	TI	Costa Rica
		TI9	Cocos Island
CEØ	Easter Island	VE,VO	Canada
CM.CO	Cuba	VP1	British Honduras
CP	Bolivia	VP2	Anguilla
CX	Uruguay	VP2	Antigua, Barbuda
FG7	Guadeloupe	VP2	British Virgin Islands
FM7	Martinique		
FP8	St. Pierre & Miquelon	VP2	Dominica
		VP2	Grenada and dependencies
FS7	St. Martin		

Sam, W1MGP, as can be seen from the wall, has worked his share of DX. All worked on 10 meters with less than 60 watts. The interesting thing is that with 107 countries worked and 103 confirmed, Asia is yet to be entered into the log.

FY7	French Guiana & Inini	VP2	Montserrat
		VP2	St. Kitts, Nevis
HC	Ecuador	VP2	St. Lucia
HC8	Galapagos Islands	VP2	St. Vincent and dependencies
HH	Haiti		
HI	Dominican Republic	VP3	British Guiana
		VP4	Trinidad and Tobago
HK	Colombia		
HKØ	Archipiélego of San Andres	VP5	Turks and Caicos Islands
HP	Panama	VP5	Jamaica and Cayman Islands
HR	Honduras		
KG4	Guantanamo Bay	VP6	Barbados
KL7	Alaska	VP7	Bahama Island
KP4	Puerto Rico	VP8, LU-Z	Falkland or Malvinas Islands
KS4	Swan Island		
KS4	Serrana Bank	VP9	Bermuda Islands
KV4	Virgin Islands	W,K	United States
KZ5	Canal Zone	XE,XF	México
LU	Argentina	XE4	Revillagigedo Islands
OA	Peru		
OX,KG1	Greenland	YN	Nicaragua
PJ	Netherlands West Indies	YS	San Salvador
		YV	Venezuela
PJ2M	Sint Maarten	YVØ	Aves Island
PY	Brazil	ZP	Paraguay

MEXICO AWARD

L.M.R.E., A.C. has established the MEXICO Award for all Radio Amateurs in the World under the following bases:

1.—Confirmed Contacts with at least 15 different States and the Federal District (México City).

2.—Confirmed Contacts with 50 XE Stations including those in point 1. Are valid all contacts made after January 1st 1957.

This neat shack belongs to Heinz DM2ADN. Some of the wall paper includes, OK1OO, WDT, DXCC, FMT and WAE. (Tnx K2SBW)

3.—The Award is issued in A-1 or A-3.-Combination of both is not allowed.

4.—Applications along with confirmations and a list of same must be sent by Registered Mail to L.M.R.E., A.C., Post Office Box 907, Mexico 1, D. F. including U. S. Dolls. $1.00 or equivalent to cover return postage.

5.—All contacted stations must be "Land Stations". Contact with ships, aircraft or any mobile stations is not valid for the Award.

6.—List of States and Territories:

STATES

Distrito Federal	Cuerrero	Querétaro
Aguascalientes	Hidalgo	San Luis Potosí
Baja California	Jalisco	Sinaloa
Campeche	México	Sonora
Coahuila	Michocan	Tabasco
Colima	Morelos	Tamaulipas
Chiapas	Nayarit	Tlaxcala
Chihuahua	Nuevo Leon	Veracruz
Durango	Oaxaca	Yucatán
Guanajuato	Puebla	Zacatecas

Federal Territories COUNT IN LIEU OF STATES
Baja California del Sur, Quintana Roo

"WAXE" AWARD

L.M.R.E., A.C. has established the WAXE AWARD for all Radio Amateurs in the World under the following bases:

1.—Confirmed contacts with:

15 Stations in Zone 1 (XE1)
5 Stations in Zone 2 (XE2)
5 Stations in Zone 3 (XE3)

2.—Applications along with confirmations and a list of same must be sent by Registered Mail to L.M.R.E., A.C., Post Office Box 907, México 1, D. F. including U. S. Dolls. $1.00 or equivalent to cover return postage.

3.—The Award is issued in A-1 or A-3. Are valid all contacts made after January 1st., 1950.

(Thanks to XE1AE for the above info.)

WASC Certificate

Worked All State Capitals WASC Certificate is being issued by H. L. German, W3IMN, 129 North 30th Street, Camp Hill, Pennsylvania for working the capital cities of all 50 states. Same general rules as the ARRL WAS certificate. A charge of $1.00 is made to applicants from the U. S. and possessions, or 12 IRCs from foreign countries. Foreign cards will be returned by first class mail only.

While on the subject of certificates, I have just received the new issue of The Directory of

[*Continued on page 94*]

ham clinic

CHARLES J. SCHAUERS, F7FE/W6QLV

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

Some Thoughts On Extending Tube Life

As pointed out in this column sometime ago, the majority of electronic equipment failures are usually caused by *defective tubes*. Contrary to what the advocates of all-out transistorization say or think, we are going to have tubes *and* tube failures for a good long while yet.

The care and feeding of tubes receives a lot of consideration by electronic equipment designers. Whenever they can, they design their circuits so that tubes will (in most cases) be gently fed and not subjected to high temperatures. But no matter what they do they will always have HEAT—because a tube's cathode must get hot in order to operate properly. Now when high voltages are applied to plates and screens (especially those in power tubes) we have still *more* heat—and so it goes.

Some years ago I conducted some experiments relative to the effects of high temperatures on tube operation and longevity. Although my test setup was crude and so were my test results, I assured myself of one thing: tubes do have longer life spans if they are NOT subjected to voltage and current overloads AND *high* temperatures.

Every tube has its own specific critical operating temperature point. This cannot be quickly determined without many hours of environmental testing using special equipment. How a tube is mounted and where it is mounted has a lot to do with how long a tube will continue to operate satisfactorily.

Heat is a major problem with tubes containing many elements such as pentode-triodes, double triodes, dual diode-triodes etc., because the elements must of necessity be so close together. At this point, tribute must be paid to tube manufacturers for being able to come up with multi-element tubes that operate so well over such a wide range of temperature variance.

Over-driving a tube (with *rf*), line voltage surges, etc., take their tolls of tubes, but the one big "bugaboo" that receives so little attention is H-E-A-T spelled in large letters!

Sometime ago, I was fortunate to get a copy of a real fine report titled "Heat Dissipating Electron Tube Shields and Their Relation to Tube Life and Equipment Reliability" prepared by John C. McAdam of *International Electronic Research Corporation* (IERC), 145 West Magnolia Blvd., Burbank, California. After reading it, I was convinced (as I know you will be if you read the whole report), that too little attention has been given to the conservation of tubes through heat reduction — this being especially true in ham radio equipment.

Few people realize that the ordinary JAN shield actually makes a tube *hotter* than it would be if operated without one. Take a look at fig. 1 to see what I mean! This graph (taken from Mr. McAdam's paper) really shows the *difference* when an ordinary shield, no shield and IERC's special heat dissipating shields are considered. Note the curves for the TR and B type shields. Now look at fig. 2 and note how much longer the tube operated before going "sour" when properly constructed tube shields and/or sockets were used. Amazing isn't it?

The findings of various research organizations indicate that the evolution of gas within a tube due to elevated temperatures is the principle cause of tube failure. Other high temperature caused failures are: getter migration, grid emission, glass failure, inter-electrode leakage, contamination, grid loading and loss of emission.

Of course now, forced air cooling is a solution to the hot tube problem and is generally used when possible to obtain maximum cooling efficiency; but the mere direction of air over or under a set of tubes is not always the answer because ALL tubes do not get the proper or the same amounts of air due in part to *forced* mechanical design and circuit layout. Then too, forced air cooling is not always an expedient measure in ham equipment nor is it inexpensive!

The shiny surface of the JAN shield also reflects heat back into the tube—nothing better for raising tube temperature (except a close-by hot transformer). This is the main reason why all good tube shields are *black* inside and out—for heat absorption. Too the captive air space found in the average JAN shield does not help the heat matter either.

Referring to fig. 3A, you will see IERC's effective heat dissipating tube shield. It dissipates the heat by radiation, conduction and convection. It grasps the hot tube bulb and distributes the heat from the hot spot over a large surface area. This way, it not only reduces the general temperatures present on the tube glass but also greatly reduces the temperature gradient along the surface of the tube.

In fig. 3B is shown a retrofit type shield which was developed by IERC to meet the problem of using the old JAN type base. It merely snaps onto the old type base. It is capable of reducing the temperature of the tube bulb well below bare bulb temperature—and MORE than 100° below JAN shield temperatures. This is the shield most amateurs can obtain for the tubes in their equipment which use the old type JAN tube bases.

To increase tube life then, a tube must be fed properly; this means current and voltages as low as is consistent with proper operation. A tube filament (and cathode) does not "like" voltage surges at all—so if it is at all possible, use a surge voltage limiting device (variable transformer, Surgistor etc.). Some amateurs (who can afford it and desire the utmost in stability) turn on their receivers and leave them on, in this way the tubes are not subjected to starting surges—but, they still are affected heat-wise if they are covered with old type heat shields. Forced air cooling is fine if (and this is a BIG *IF*) the air can be directed so that there are no "outstanding" hot spots. Why cool a tube's base when its envelope is boiling? (If the base is of the heat-sink type—all well and good—but otherwise you're wasting power).

Remember that heat rises—"top mounted" ventilation systems *are* best.

Sooner or later, most electronic manufacturers will get around to giving more consideration to the use of the various varieties of SPECIAL effective heat shields. I seriously hope that those who make amateur radio equipment will give this some special attention. Even with properly fed and cooled tubes we will still have the replacement problem, so tube manufacturers can take heart. They may have to wait just a little longer for replacement orders and tube prices might rise slightly, but even the best cared for tubes (like humans) do not last forever.

Thanks To You For "72"

No one ever (in my presence anyway—without challenge) can say that American hams are not generous nor are interested in International goodwill on a very personal plane!

The response to my appeal to send foreign hams your old issues of CQ, QST, WRA, CRA, QSO etc., is heart warming! Bravo!

I am sure that the recipients of your magazines and call books will not look on your gifts as "charity" but rather as your contribution to solidifying International ham friendship. There will be some reciprocation, I know, and I sincerely hope that you will take out the time to thank the donor (whoever he may be).

Some foreign hams will be surprised and wonder what brought on this "sudden" generosity—all I can say in reply, is "72" to you—"Peace and Friendship in Freedom".

Again, if you have old call books, magazines

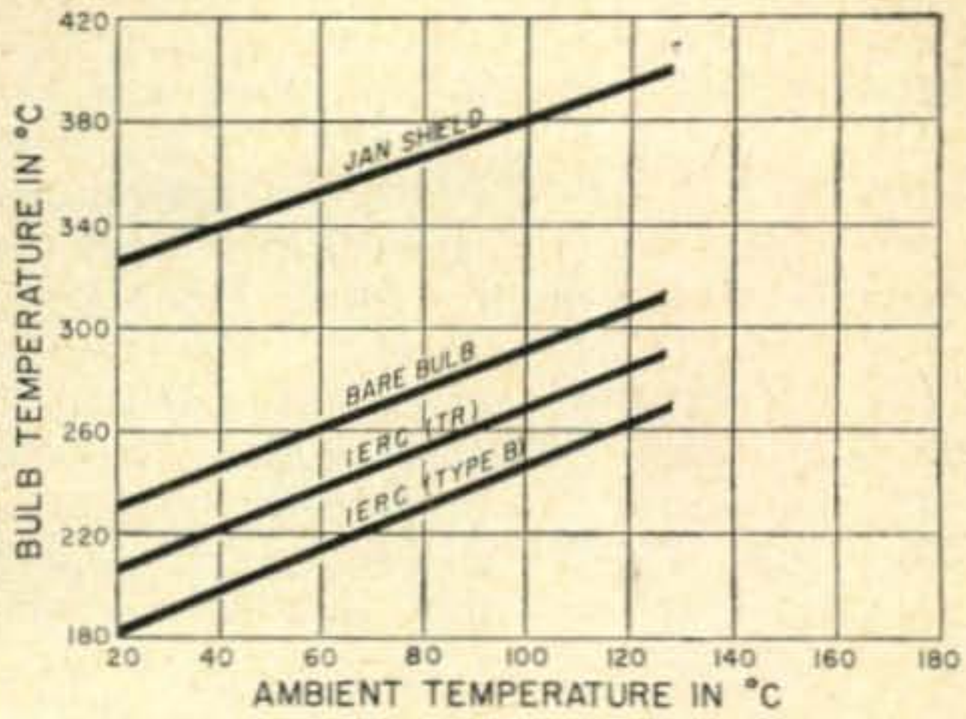


Fig. 1—Graph showing the temperature effects when a tube is operated bare or with various types of shields.

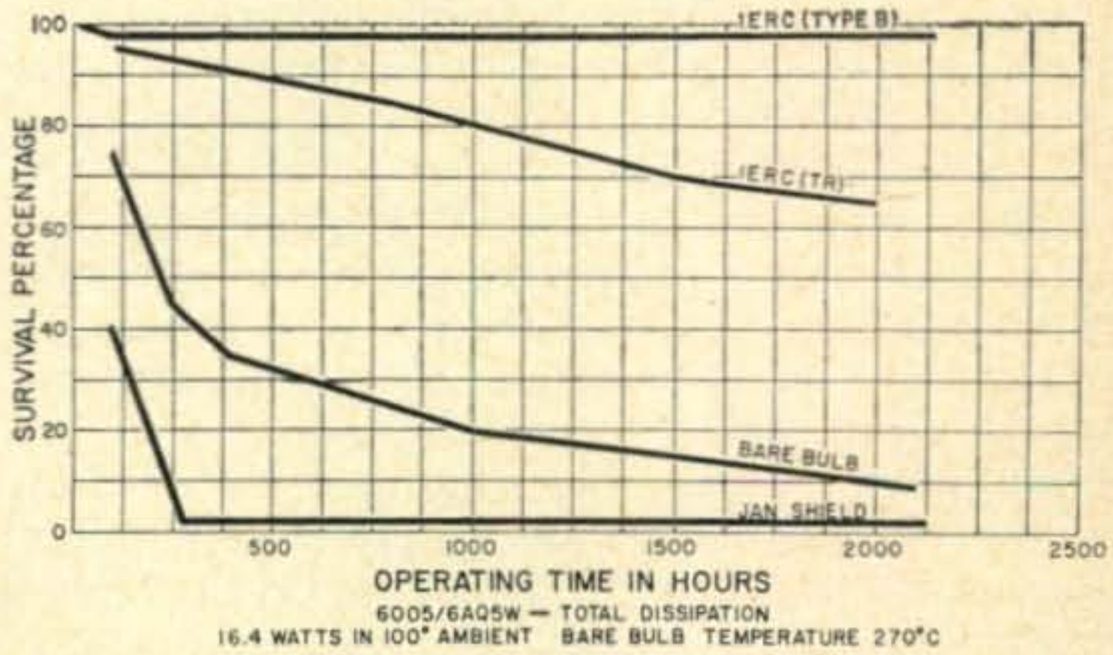


Fig. 2—Graph depicting tube life span when used bare or with various shields.

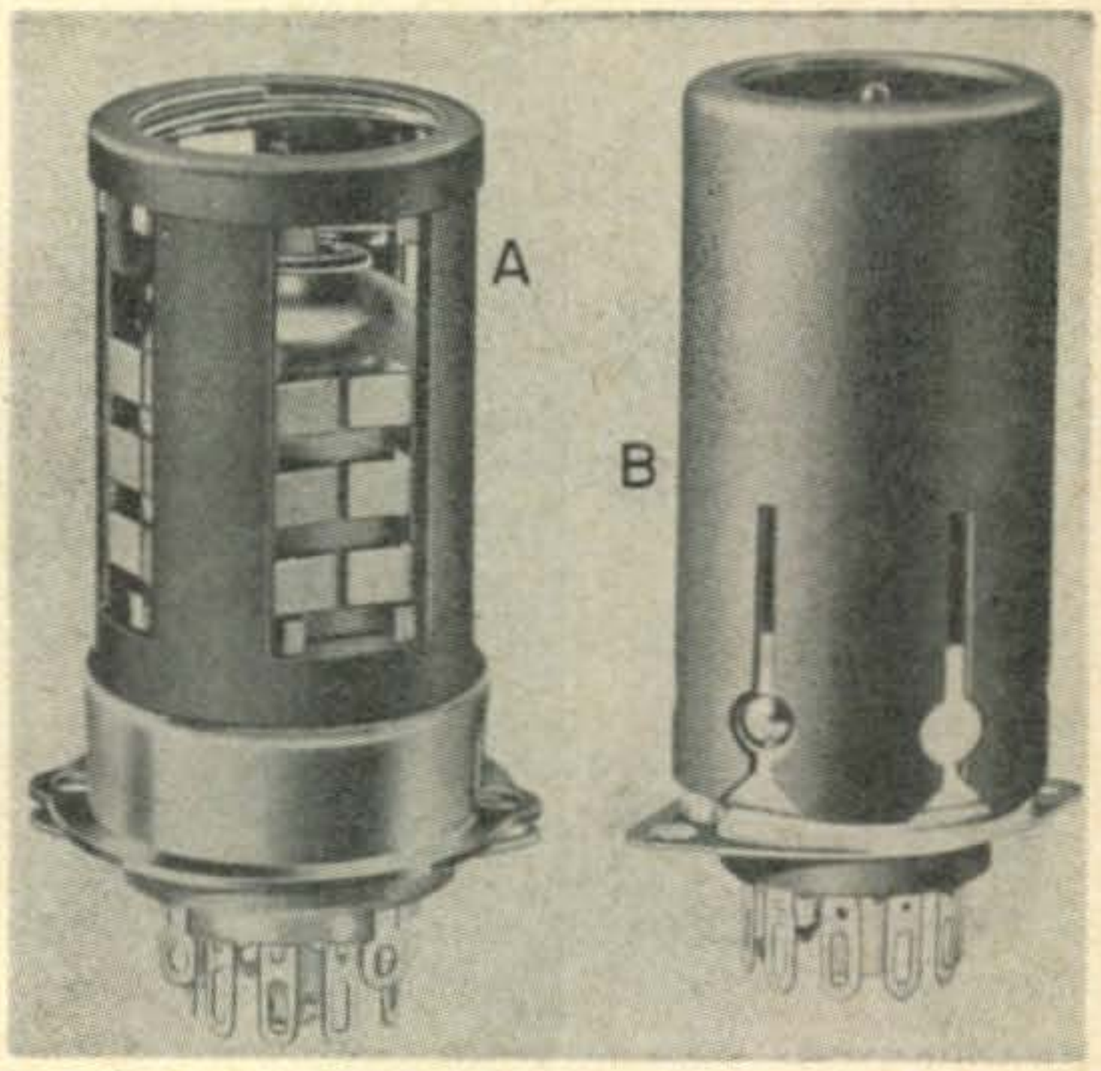


Fig. 3A—IERC's heat dissipating tube shield. B—The IERC retrofit type shield. While not as effective as type A, it *will* fit on the JAN type base.

etc., that you no longer can use, send me your name and QTH (*NOT* the items) and I will, by return mail send you the name and QTH of a worthy ham—somewhere in the world. Remember: you pay the little postage required. DO NOT seal the packages if you wish them sent at the printed matter rate—which is very low.

72 and 75 to all of you who are participating in this worthwhile venture. Incidentally, Western US hams are outnumbering the Eastern, Southern and Mid-Western hams 3 to 1 in this "magazines for friendship" drive! How about you?

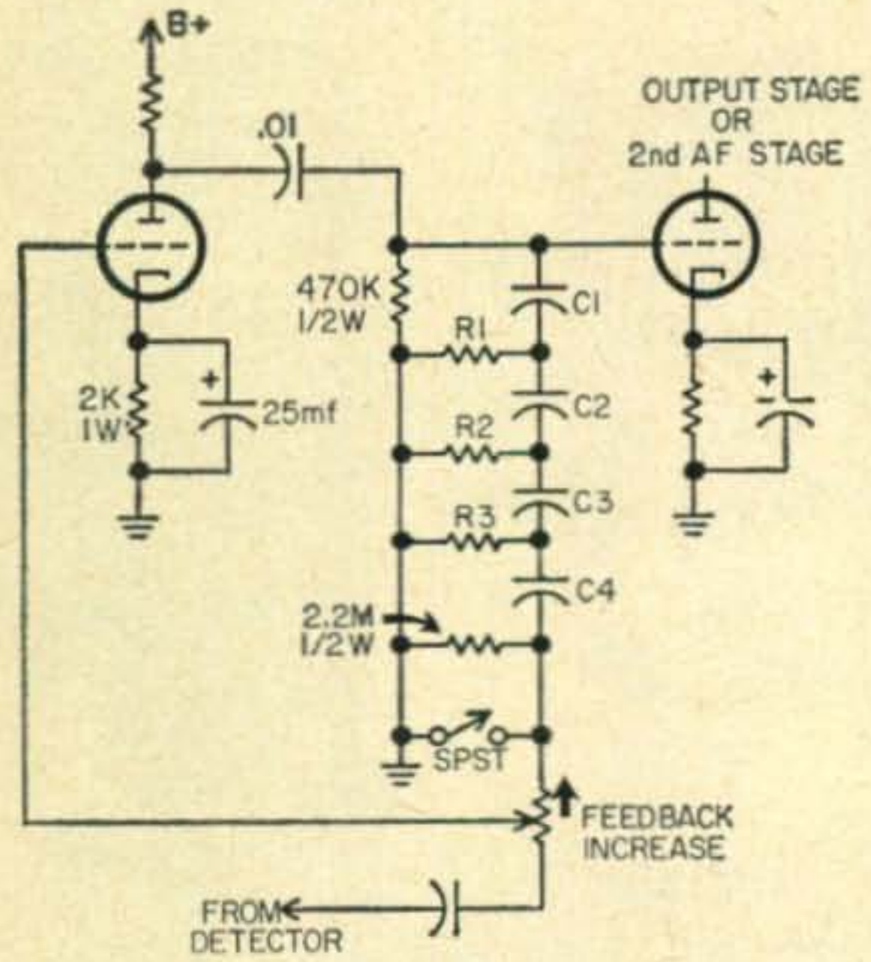
On License Renewals

Recently I found myself with two commercial licenses and my Extra Class ticket up for renewal. I processed them and then thought of the many hams who sometimes forget about this all important matter due to various circumstances (including inactivity).

Remember that the FCC is doing the best it can to get your licenses back to you (whether they are renewals or modifications) in the shortest possible time. You who are waiting for your first licenses have patience—you'll receive them in due time. Don't bombard the FCC with letters requesting action or information—this just slows up the issuance processes.

Commercial licenses are renewable anytime within the year of expiration, but not so the ham tickets. Hams have up to 120 days to apply for license renewal before expiration of their current license. (Rules 12.27 (e) and 12.67 (a).)

If there are no changes to station location and personal data, FCC Form 405-A-1 is used; if there are changes (or you lose your license), then FCC Form 610 must be used. The latter may be filed anytime during the time your license is valid.



C1, 2, 3, 4, 270 mmf
R1, 2, 3, 470 K

Fig. 4—Simple RC AF filter that can be added to any receiver.

QRRR and SOS

One of the suppliers of surplus technical information (schematics, books etc.) the Dave Rumph Co. is out of business (evidently). Anyone having information on any other good reliable sources for this information (and prices) that I can pass on to CQ readers? Please!

Questions And Answers

How much?

"How does one go about setting a price on a used ham item? How much would you say is a fair price for a used KWM-1?"

The average ham is not out to "scalp" anyone—believe me! (Except of course, an occasional mother-in-law.)

Generally, the average ham scans the ads in CQ and other magazines for "going" prices and sets his within the "accepted" range.

How old a set is (serial number group); appearance; modifications and the *general demand* will determine the price.

Sometimes (contrary to opinion), a modification will *increase* a set's net worth if it is properly done and DOES improve performance. The modification may consist of the addition of a crystal filter, Q multiplier, anti-surge circuitry, additional band (in the case of a transmitter) etc.

A dealer's used price is usually a bit higher than a private individual's for the same equipment. However, I have known the opposite to be true.

A ham purchaser can usually go back to a dealer with a complaint but this is sometimes difficult with an individual, except when there is real evidence of gross misrepresentation.

Actually, there is no "cut and dried" formulae for used set price fixing.

Used KW-1s are going for anywhere from $500.00 to $850.00 depending on Serial Number and use. If you see a used one around for about $250.00 let me know! (Hi!)

5D21 Info

Thanks to all of you who were so kind to send me the data on the 5D21 tube. I can just hear the shouts of, "I been robbed"; of those

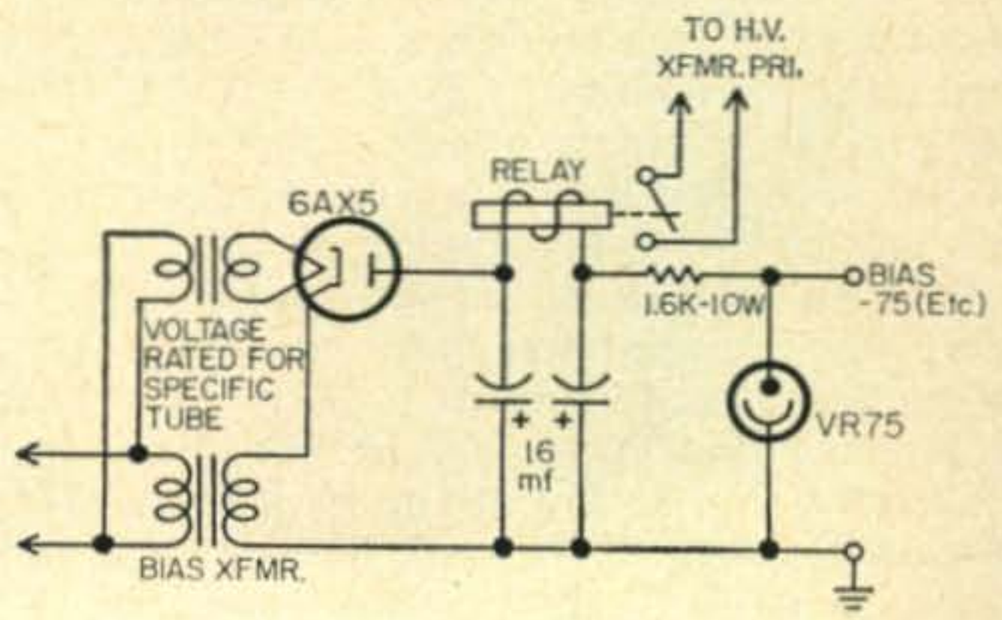


Fig. 5—Delay system for use with mercury vapor type OD rectifiers.

who have acquired the tube for possible ham applications. Unless one figures on doing some radar work he has had it; the tube is quite useless for *practical* ham applications.

Technical Tips from Yugoslavia

Mirko, YU1AD sent HAM CLINIC two fine technical tips that he swears by. Thank you friend and a big 72 to you!

He writes: "this RC AF filter can be attached to any existing receiver, providing that it has at least two *af* stages. The only change to the receiver is that the cold end of the *af* pot has to be removed from ground and the network and switch added. *Mallory* pots (they're known in Yugoslavia too—*my note*) having the push-pull off-and-on switch are ideal for the purpose. If the receiver has negative feedback, this must be removed or attenuated to a degree which will allow the first *af* stage to oscillate when the pot is in its extreme *ccw* position. A small amount of *af* feedback is desirable because it will result in better oscillation of the audio stage. If the *af* stage has an unbypassed cathode resistor, this must be bypassed with a small value electrolytic condenser.

"Operation is simple: just open the switch and rotate the pot for best *af* 'selectivity'. It is terrific for receiving CW." See fig. 4 for the diagram and part values.

Here is Mirko's second tip: "thought you might be interested in this delay system used by me for mercury vapor type OD rectifiers. It acts simultaneously as a safety device and a bias rectifier. If the bias disappears for any reason, the relay will cut off the high voltage. The relay should close at 20 mils and should have the proper contacts to handle the current for the primary of the HV transformer." See fig. 5 for Mirko's idea.

More Questions

Measurement of Power

"How can I measure the *actual* power output of an *af* amplifier (modulator) with the simplest setup?"

Terminate the amplifier in its characteristic load (a resistance capable of taking full power output—roughly figured). Feed a 1000 cycle note into the amplifier; turn up the gain slowly, and with a VTVM connected across the resistor increase gain to full meter range—then reset meter for maximum voltage. Then by using the formula, Output Watts $= E^2/R$ you can calculate the output quite accurately. By changing frequencies, you can actually plot a fairly good response curve for the amplifier too. You can check for distortion by connecting a scope across the af amplifier output.

Parallel Rectifiers

"Can I connect two rectifiers (866s) in parallel for more current capacity?"

Yes. But do not forget to put an equalizing resistor of between 50 and 150 ohms in series with each tube plate. The resistor tends to equalize current distribution to each tube.

Tube Markings

"I have a group of surplus tubes whose markings are indistinct or are completley gone. What can I do to determine what I have?"

It depends upon the *type* of marking. Generally, by viewing a partially obliterated marking through the opposite side of the envelope (against a strong light) you can "recover" the number. In some cases if you use an ultra-violet light, this works better. Next (if you have no luck) try dipping the tube in vinegar or in ammonia—allow it to dry and then view against a light again. You have to be quite a "tube hotshot" to determine the type of tube by examining its "innards".

Screen Modulation

"How much higher should the peak modulating voltage be as compared to the screen voltage itself in a screen modulator? What's the main cause of distortion when employing screen modulation?"

The *pmv* should be in the vicinity of about 10-15% higher. Remember that the *af* power for full or 100% modulation is around 25% of screen input power.

Over-modulation (or over-driving) is one of the main causes of distortion. Theoretical cause —poor stable screen loading. This is hard to overcome entirely because the modulator load varies at the audio frequency rate. Some *af* feedback has been suggested to lessen this instability, but usually is not necessary if the screen modulation transformer is properly matched (loaded) and one maintains proper *af* drive.

Book

I just bought a copy of RCA's transistor booklet for 30¢. What an amazing amount of information for such little money! The circuits section is terrific and should be of real interest to the experimentally minded ham. Congrats RCA on your fine little book.

Observation

It is quite exasperating to me to receive letters requesting information on old or surplus equipment that I know I cannot provide. Why? Let me tell you.

Some of the requests pertain to equipment whose manufacturers went out of business years ago, or if they are still in business, their files no longer carry the old information. This is a sorry state of affairs!

Gosh, we hams ALL KNOW that most ham equipment seldom finds its way to the garbage dump but is passed on from ham to ham. Some hams I know are using receivers produced in 1935!

Ever hear of the Breting 12 (15); KP 81; FB7A etc.? No doubt you haven't if you are not an old-timer! But these sets are still in use!

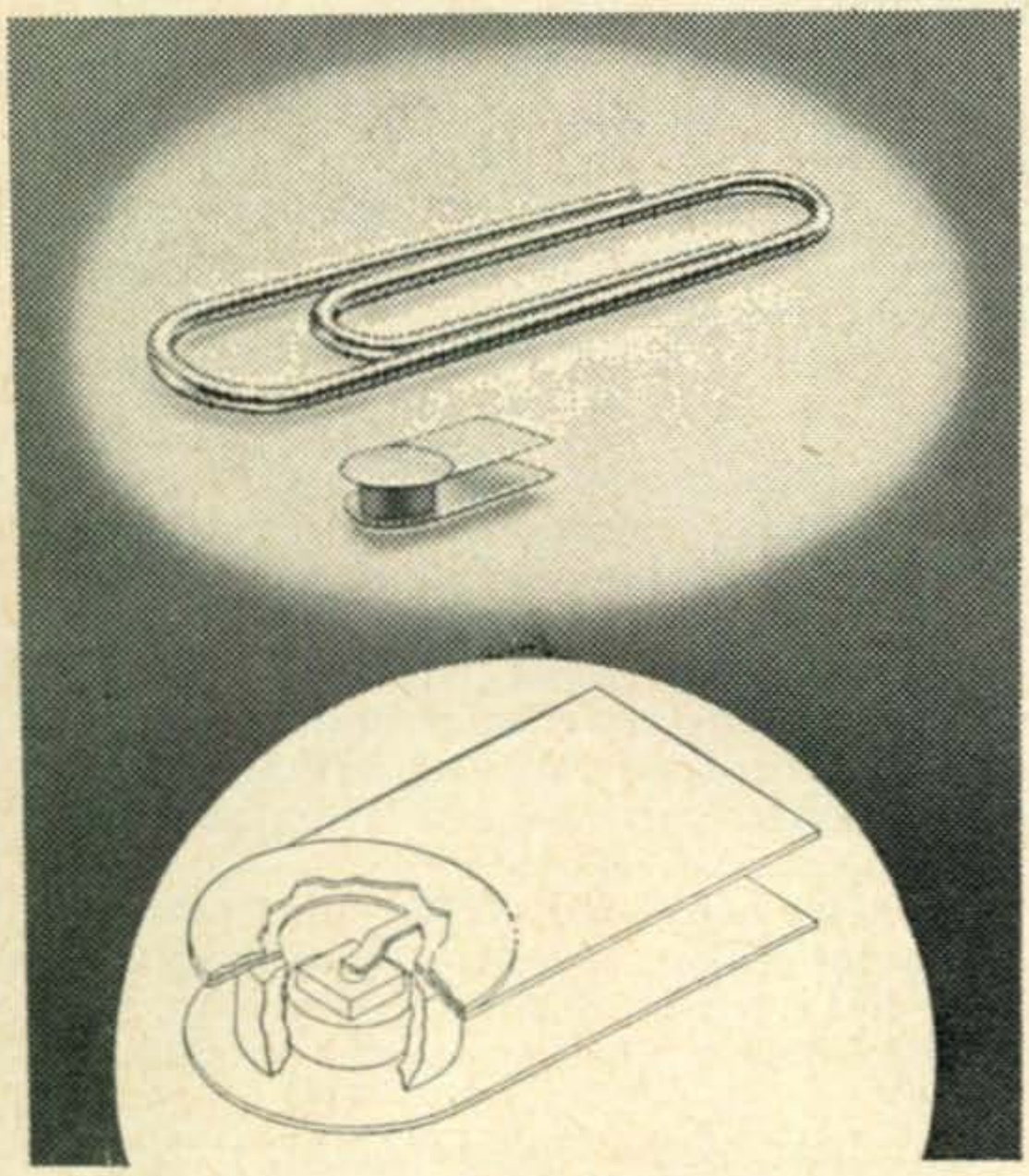
Perhaps there should be a law on the books on equipment, requiring those who make it to

[*Continued on page 98*]

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

semiconductors

The big news this month, as it has been for some time, is the *tunnel diode*. A new "break through" by General Electric is really making history. More about this advance in a moment.



The new RCA tunnel diodes are encased in a unique, RCA developed, low inductance ceramic package that makes possible ultra high frequency operation over a wide temperature range.

The tunnel diode operation and application was described by K2IEG in the November, 1959 issue of *CQ Magazine*. I might add to his comments that although this is a very low power device, it will find wide application in amateur communications in addition to industrial equipment. The tunnel diode is ideally suited for *rf*, mixer, and oscillator applications up to 1,000 *mc*. Your conductor is currently working on an autodyne *vhf/uhf* converter for 144, 220, and 420 *mc*. Construction details will appear in the new *CQ Transistor Handbook*, to be released soon. Also a *vhf/uhf* tunnel diode transmitter will be featured.

Technical–The tunnel diode is so named because of the way electrons seem to "tunnel"

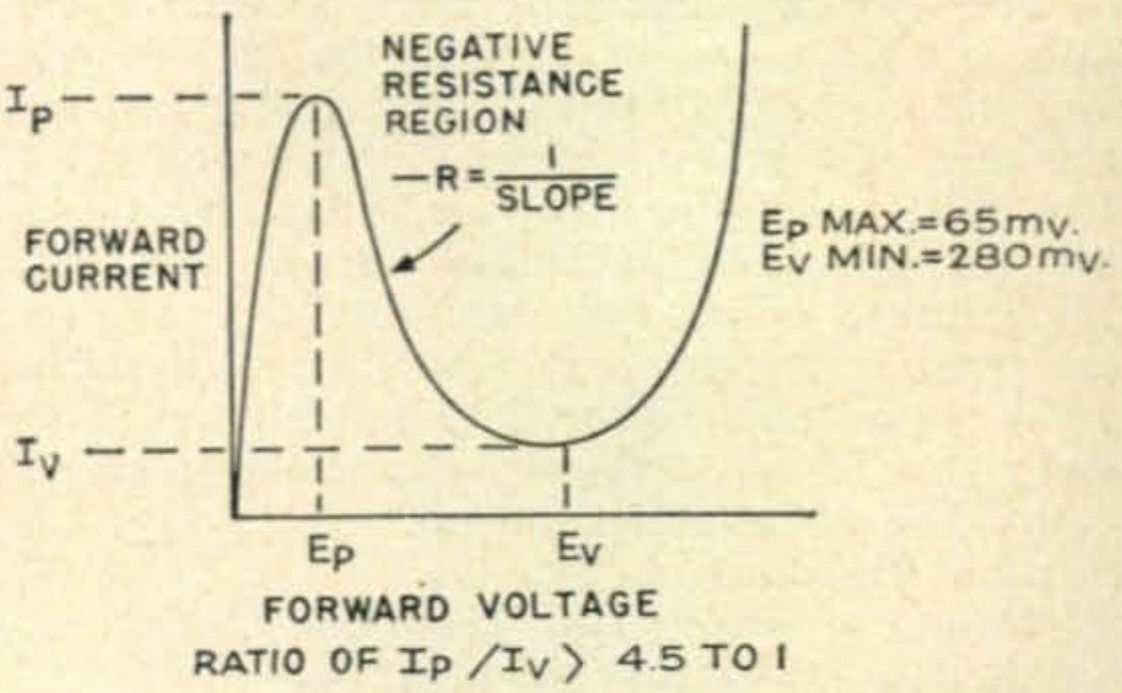


Fig. 1—Typical current-voltage characteristics of RCA tunnel diodes.

through the device at the speed of light. The tunnel diode functions 100 times faster than a transistor. The principle of operation was first described by the Japanese scientist, Dr. Leo Esaki, in 1958. Since that time companies have been scrambling to produce tunnel diodes in quantity. So far only RCA and General Electric have managed to provide an extensive line of engineering samples. They were priced at 60 dollars since each diode had to be virtually constructed by hand and the rejection rate was enormous. Here's a short recap of the state of the art as of today.

RCA—RCA's initial sample types include 12 tunnel diodes designed for operation up to 1,000 *mc* with power consumption ranging from 0.75 to 3.0 milliwatts. The nominal tunnel currents range from 1.8 to 6.8 *ma*. The negative resistance characteristic (the ratio of peak current to minimum current) is in excess of 4.5 to 1.

RCA claims to have the smallest mesa device available for the industry. It consists of a PN junction only 1/1,000 of an inch in diameter and 80 angstroms in width (about 1/150th the wavelength of visible light). The junction is mounted in a low inductance ceramic package for maximum *uhf* performance.

A photograph and cutaway drawing of the RCA tunnel diode is shown in the accompanying picture. The curve is shown in Fig. 1.

General Electric—GE has sampled several thousand tunnel diodes since September while their engineering department worked to develop production techniques. A pilot manufacturing line is now practical and GE has *reduced* the price of their units *to* $10.00 and $12.50 each! This new price represents a considerable decrease from the former prices of $60.00 and $75.00 each which engineering departments were charged. The new low price makes it financially possible for amateurs, experimenters, and schools to work with these new electronic tools. The diodes should be available soon, through GE distributors or directly from the Semiconductor Products Division, Syracuse, New York.

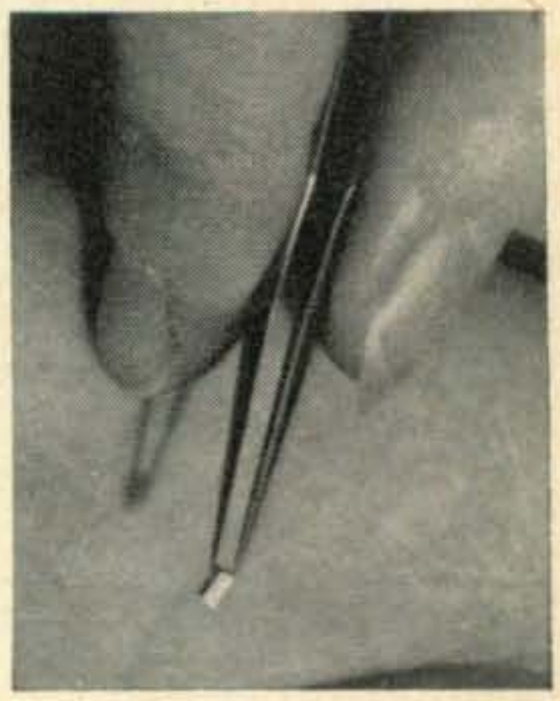
Actually these diodes may soon become obsoleted by the new GE gallium arsenide tunnel diodes which are now in the experimental stage. These new "GA" units are capable of high performance at 4,000 *mc* and should work very well at 10 *kmc*.

The gallium arsenide tunnel diodes are only in the lab stage now, but sample quantities should be available early this fall according to all available information. The peak to valley current ratios run as high as 60 to 1, as compared to 14 to 1 in the better germanium tunnel diodes. Another advantage is the voltage swing of 1.2 volts for gallium arsenide. Germanium has a voltage swing of 0.45 volts and silicon tunnel diodes have a peak of 0.75 volts swing. The difference is shown in the accompanying photograph. Several other shots taken in the GE labs provide additional information on these amazing devices.

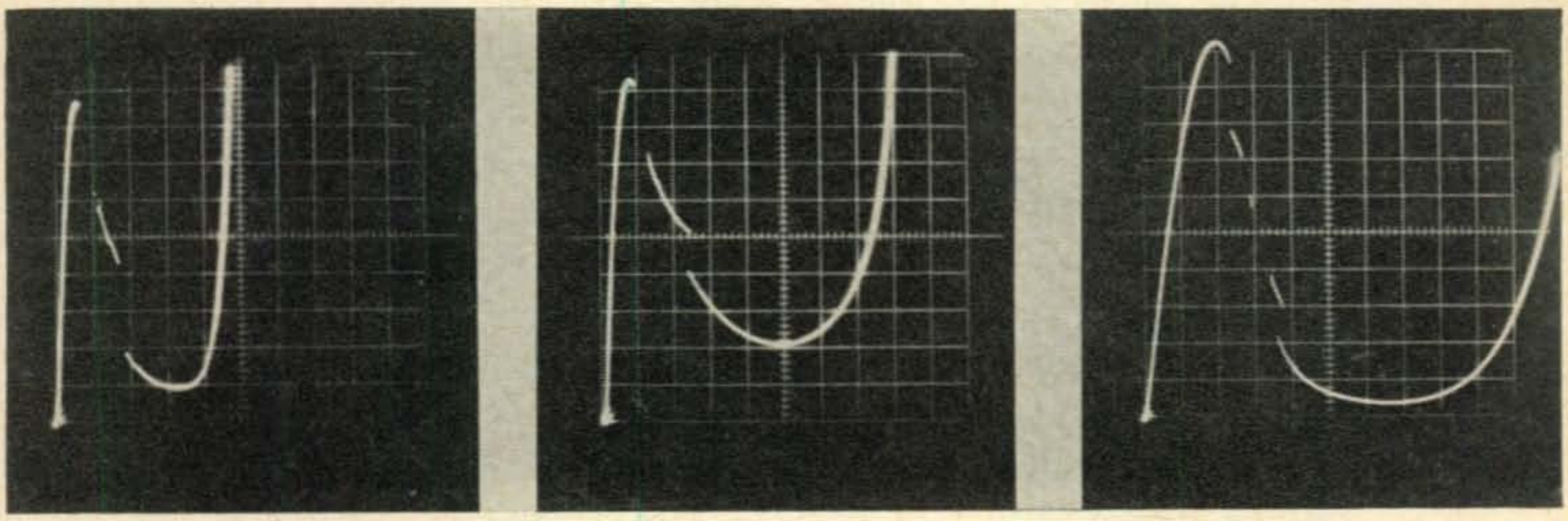
Transistorized Sideband Rigs

Look for quite a few transistor sideband exciters and tranceivers (both commercial and homebrew) to put in an appearance in 1960.

Transistors are a "natural" in this application since the general philosophy of sideband is to generate and form the signal at low levels and then amplify the operating frequency in a linear stage(s). It is possible to construct a 20



An engineer displays General Electric's new gallium arsenide tunnel diode. Soon amateurs will require a microscope as part of the well equipped ham shack!



Germanium **Silicon** **Gallium Arsenide**

These oscillographs of the E-I curves show the comparison between the germanium, silicon, and gallium arsenide tunnel diode peak to valley ratios.

and 75 meter exciter using only 5 or 6 transistors if the sideband is generated at a high frequency which requires only one conversion to the operating frequency.

The McCoy Electronics SSB-9 package (consisting of a four-section xtal filter and two carrier crystals for USB and LSB) is such a filter. The method of applying it to transistor circuits is shown in fig. 2. Since filters are usually low impedance devices, they must be properly matched. The capacitive divider system (40 and 330 mmf) places an "artificial tap" on coil L1 to provide the match. This is much simpler than experimentally moving the tap up and down the coil. The emitter impedance of Q2 is considerably lower than the collector impedance of Q1 and the circuit shown is utilized to obtain a proper match.

You can obtain additional information on the SSB-9 filter by writing Mr. Edward Boise at McCoy Electronics, Mt. Holly Springs, Pa.

Transistorized "S" Meter

Most transistor "S" meter circuits have one or more faults. Predominant among these is *drift*. As the transistor temperature increases, or as the battery voltage changes, the "S" meter zero tends to change.

Another consideration is that the audio circuit requires a low impedance diode connection, while the *avc* and "S" meter need a large voltage swing.

A solution to this dilemma is shown in fig. 3. The audio is wired normally, but the *avc* diode is connected to the "hot" end of the last *if* transformer secondary (not normally used).

The "S" meter amplifier is a bridge circuit with the Q1 section controlled by the *avc* voltage. Transistor Q2 serves no other purpose than to balance the bridge. Voltage and temperature variations will affect both transistors equally, which tends to stabilize the meter zero point. For best results, the beta of both transistors should match as closely as possible.

The circuit has enough gain so that it may be used with existing detector circuits in transistor radios. If a positive *avc* circuit is used, simply reverse the meter connections.

Semiconductor News

Allied Radio Corporation, 100 N. Western Avenue, Chicago 80, Ill.—Your conductor wishes to correct an erroneous impression that may have been created by the drift transistor article which appeared in the Feb. 1960 issue of *CQ Magazine*. Although Allied is one of the world's largest suppliers of semiconductors and related items, it is impossible to keep their large catalog up to date, since it is issued yearly. Their *Semiconductor Directory*, however, is revised periodically to keep the industry informed as to the latest transistor types, and prices. Although the drift transistors mentioned are not listed in their 1960 Catalog, they are of course available from Allied.

Bendix Aviation, Red Bank Division, Long Branch, New Jersey—Bendix has just announced a military type germanium PNP power transistor, number 2N2011. This transistor has a maximum collector/emitter voltage rating of 70 volts, a current rating of 5 amperes, and will readily dissipate 35 watts at 25°C. It is useful in high current switching, audio and servo motor applications.

Clevite Transistor Products, Waltham 54, Mass.—Clevite is now marketing a new transistor package, called the "Spacesavers", in eight, 3 ampere, high power types. The new transistors require less mounting area than the customary package and are available in breakdown voltage rating of 40, 60, 80 and 100 volts.

Fairchild Semiconductor Corp., 545 Whisman Rd., Mt. View, Calif.—A mesa transistor, type 2N699, has just been announced by Fairchild and features a collector to base rating of 120 volts. The gain bandwidth product is 120 *mc* which permits high performance in *vhf* oscillator amplifier applications. The device has a 2 watt dissipation at 25° C!

General Electric, Semiconductor Division, Syracuse, New York—GE has reduced prices on nine military low current silicon rectifiers by 28 to 61% as a result of improved manufacturing technique and increased volume.

Hoffman Electronics Corporation, Semiconductor Div., 930 Pitner Ave., Evanston, Ill.—An informative brochure on the Hoffman Semiconductor line, HSD-3-659, is available by writing the above address. Also new from Hoffman is a silicon microminiature photovoltaic detector capsule type EA-7. It is primarily designed for reading holes in punched

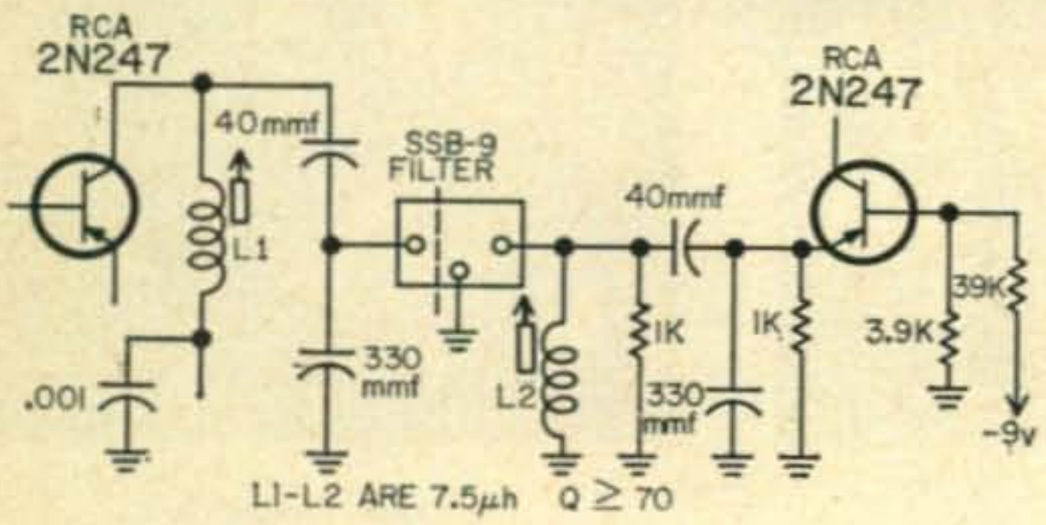


Fig. 2—A method of employing the McCoy 9 mc xtal filter in transistor circuits.

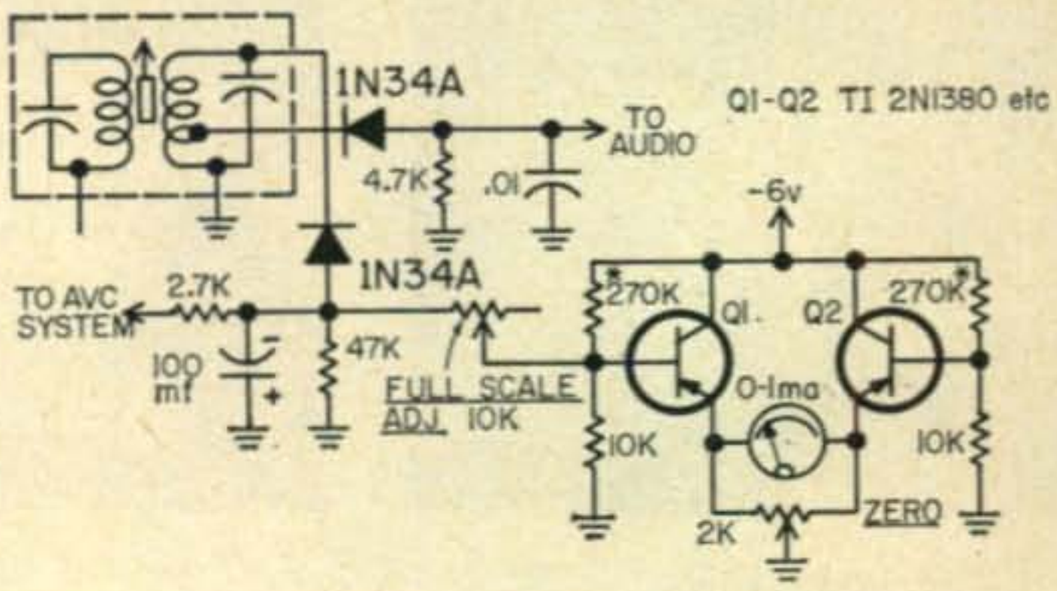


Fig. 3—A bridge type "S" meter circuit with excellent drift and linearity characteristics.

cards and tape, but is useful in other applications such as light detection, infrared sensing, programming circuit, counting devices and others

International Rectifier Corporation, El Segundo, California—The winter 1959 issue of *International Recifier News* contains an interesting article on the properties of semiconductor devices affecting voltage division. If you are not on the mailing list, request it on your company letter head. Also available is the comprehensive bulletin (SR-260) describing the line of 1584 hermetically sealed zener diodes.

Motorola Inc., Semiconductor Div., 5005 McDowell Rd., Phoenix, Arizona—Motorola has recently introduced a new series of ¼ watt silicon zener diodes suitable for computer applications. Some 43 separate voltage types from 6.8 to 200 volts, in 20%, 10% and 5% tolerance types are available.

Radio Corporation of America, Semiconductor Division, Somerville, New Jersey—RCA is now marketing a new family of intermediate power transistors. Types 2N1183, A and B and 2N1184, A and B are described in a new bulletin (1CE-206) by RCA. Another bulletin, (1CE-205) describes industrial silicon power transistors for switching and amplifier service in industrial and military applications. This group includes types 2N1479 through 2N1490. Also new from RCA is a comprehensive family of 10 industrial drift transistors, types 2N274, 2N384, 2N1023, 2N1066, 2N1224, 2N1225, 2N1226, 2N1395, 2N1396, and 2N1397. They are capable of operating at 50 *mc* in *rf* amplifier service and 125 *mc* and above in oscillator circuits. This transistor group features a dissipation rating up to 240 *mw* with a heat sink. The 2N1226 has a –60 volt collector rating and is intended for high voltage applications. Recently announced by RCA is a "prestige line" of drift transistors, types 2N1425 and 2N1426, which feature more than double the sensitivity of most battery set types, which permits 7 transistor performance with only 6 transistors.

Silicon Transistor Corporation, Carle Pl., Long Island, New York—This company is marketing an interesting line of silicon diodes and transistors. If you use these devices, drop them a line for an excellent brochure.

Sylvania Electric Products, Semiconductor Div., 100 Sylvan Rd., Woburn, Mass.—A new transistor characteristic and interchangeability guide is now available at your local distributor for 10¢ Sylvania recently announced a price reduction in the "micro-min" diode series due to high volume production. Price reductions are from 10 to 30% on the entire line. Also new is a new series of high frequency low-loss microwave diodes of the "varactor type", useful in microwave up-converters, amplifiers, limiters, harmonic generators and switches. These diodes require a minimum of pump-power to secure gain, and are useful in low noise parametric and amplifiers.

Texas Instruments, Inc., P. O. Box 312, Dallas, Texas—TI has just announced a new series of controlled rectifiers rated at one ampere from 50 to 400 volts. These rectifiers are the first in the JEDEC TO-5 case. New products from T1 also include the 1N914 and 1N916 diffused silicon computer diodes which feature a 4 millimicrosecond maximum recovery time and very low junction capacity. TI is also marketing a new series of diffused silicon power regulation types, 1N1816 through 1N1836. These 10 watt zener diodes are available from 13 to 91 volts and feature anode to stud cathode to stud, and double anode case configurations.

Transitron Electric Sales Corp., 168-182 Albion St., Wakefield, Mass.—Transitron has just introduced a new series of silicon diodes, silicon regulators, silicon rectifiers, and heavy duty stacks in addition to their recently announced silicon transistors. Also new from Transitron is their silicon voltage variable capacitors.

That brings us to the bottom of the stack once again. If you have built a transistorized device that would be of interest to your fellow amateurs, why not send it to the above address for use in the column?

73, De Don, W6TNS

INTERNATIONAL AMATEUR RADIO CONVENTION

[*from page 58*]

We have asked both Army & Air Force Mars and Civil Defense to accept booths at the convention. If you are interested in these aspects of our hobby, rest assured that they will be amply represented at the show.

Don Stoner, W6TNS, who heads up CQ's Novice & Semiconductor columns will be at the show. Don promises he will have a real surprise innovation to display and discuss. We can't tell you yet but this one is perhaps the most interesting thing to happen to amateur radio in many years.

Show Schedule

A complete listing of programs will appear in our July issue. However we have the days broken down into show hours now, so take a peek at the following:

THURS.	*FRI.*	*SAT.*	*SUN.*
10 am-6 pm	11 am-10 pm	10 am-10 pm	10 am-3 pm

Note that the show ends early on Sunday afternoon. This will give convention goers a chance to start home before the big rush.

Be sure to watch *CQ* for more detailed information on the 1960 International Amateur Radio Convention. ■

SURPLUS

by KENNETH B. GRAYSON, W2HDM
Care of CQ 300 West 43rd Street, N. Y. C. 36, N. Y.

The ads lately have been showing a great change as far as surplus equipment is concerned, although the trend isn't recognizable immediately, unless you know what to look for. Some of the more complicated equipment of relatively late vintage has been released, especially in the *vhf* and *uhf* bands. The IFF sets, such as the APX-6 are beginning to show up as are the TDZ-RDZ* sets, which is what we are going to discuss this month. The TDZ-RDZ is a general purpose transmitter-receiver set used by the Navy for communications in the 200-400 *mc* band. The equipment operates on ten predetermined and crystal controlled channels which can be selected by means of a telephone type dial, which makes it a remote control unit. While the transmitter makes a less than desirable unit, from both the waste-of-power standpoint and the very heavy weight for the fifty some odd watts generated, the receiver is definitely worth looking into. Built like a battleship, the receiver has many features which would make it desirable, if only for parts. It is a super-het with a 15.1 *mc if*. The *if* has a BROAD selectivity characteristic of 250 *kc* bandwidth at 6 *db* down while the NARROW selectivity is 125 *kc* at 6 *db* down. Both a squelch and noise limiter is used. The equipment operates directly from 115 volts 60 *cps*. The local oscillator operates at a frequency 15.1 *mc* above the signal frequency.

Probably the biggest problem associated with the RDZ is determining just how to use it. The crystal controlled oscillator is very difficult to replace with a variable oscillator at the 200 *mc* band because of the stability required. This is somewhat alleviated by the relatively broad band *if* stages, so that drift in the local oscillator is not as severe as it would have been in the case of very sharp *if*'s, where you could drift right out of the bandwidth. Probably the biggest use the RDZ will find itself is in CD and point to point communications on fixed frequencies. Ten preset channels can be set up, and the crystals used are in the 4.5 to 7.1 *mc* range (multiplied 48 times) for frequencies to be received in the 200 to 326 *mc* band, and in the range of 5.3 to 6.5 *mc* (multiplied 64 times) for the 326 to 400 *mc* band. Crystal ovens are provided for stable operation. For the 220 to 225 *mc* band (1¼ meter), crystals in the range of 4.89791 *mc* to 5.00208 *mc* are used. The exact frequency is determined by adding 15.1 *mc* to the desired receive frequency and then dividing by 48. We decided against the use of a low frequency oscillator, at first, because of the adding of extra units, but finally decided that it would be the best approach from the beginners point of view, since it will be easier to build and calibrate such an oscillator. The *uhf* oscillator would be very difficult to calibrate and would have a greater tendency to drift. Figure 2 is the oscillator circuit that we finally came up with. It is connected by means of a coaxial cable which is run to the crystal socket assembly and connected across the crystal socket for crystal number 1. The shield is grounded at the grounding lug which is wired in common to one side of the crystal socket bank. An old crystal holder may be used as a plug should it be desired not to have to dig into the equipment. The oscillator is made as rugged as possible, for stability, and tuned so that it just covers the 4.89 to 5.002 *mc* band. This can be checked by means of a receiver or a BC-221 type frequency meter. The frequency meter can be used to calibrate the RDZ as well, since the local oscillator will determine the receiver frequency. Besides the band edge frequencies alrady given, 221 *mc* would require an oscillator of 4.91874 *mc*, 222 *mc* would require 4.93957 *mc*, 223 would require 4.96040 and 224 *mc* would require 4.98123 *mc*. Careful adjustment of the trimmer will bring the oscillator into the range required.

*RDZ schematics are in *Surplus Schematic Handbook*, Cowan Pub.

Operation

To use the receiver, turn on power and turn the remote-local control to LOCAL, the channel control to CHANNEL 1, and the AF control and IF control to BROAD. Turn the AVC on and the others to where they give the best signal results. Set the local oscillator to the frequency where a signal is known, or if no signal is known or available, use a signal generator operating on the tenth harmonic of 22.1 *mc*, setting the local oscillator to 221 *mc*. Now that the tuning mechanism has set itself to channel 1, turn the power off. Pull the unit out of the cabinet by depressing the latch handle release buttons and lifting the handles. The unit can be pulled directly out of its case now, making further adjustments a little easier. Remove the dial cover plate on the left side of the receiver, giving access to the tuning dial and multiplier tuning knobs. The crystal oven assembly fits in here and may be removed to gain access to the socket for connecting the

[*Continued on page 100*]

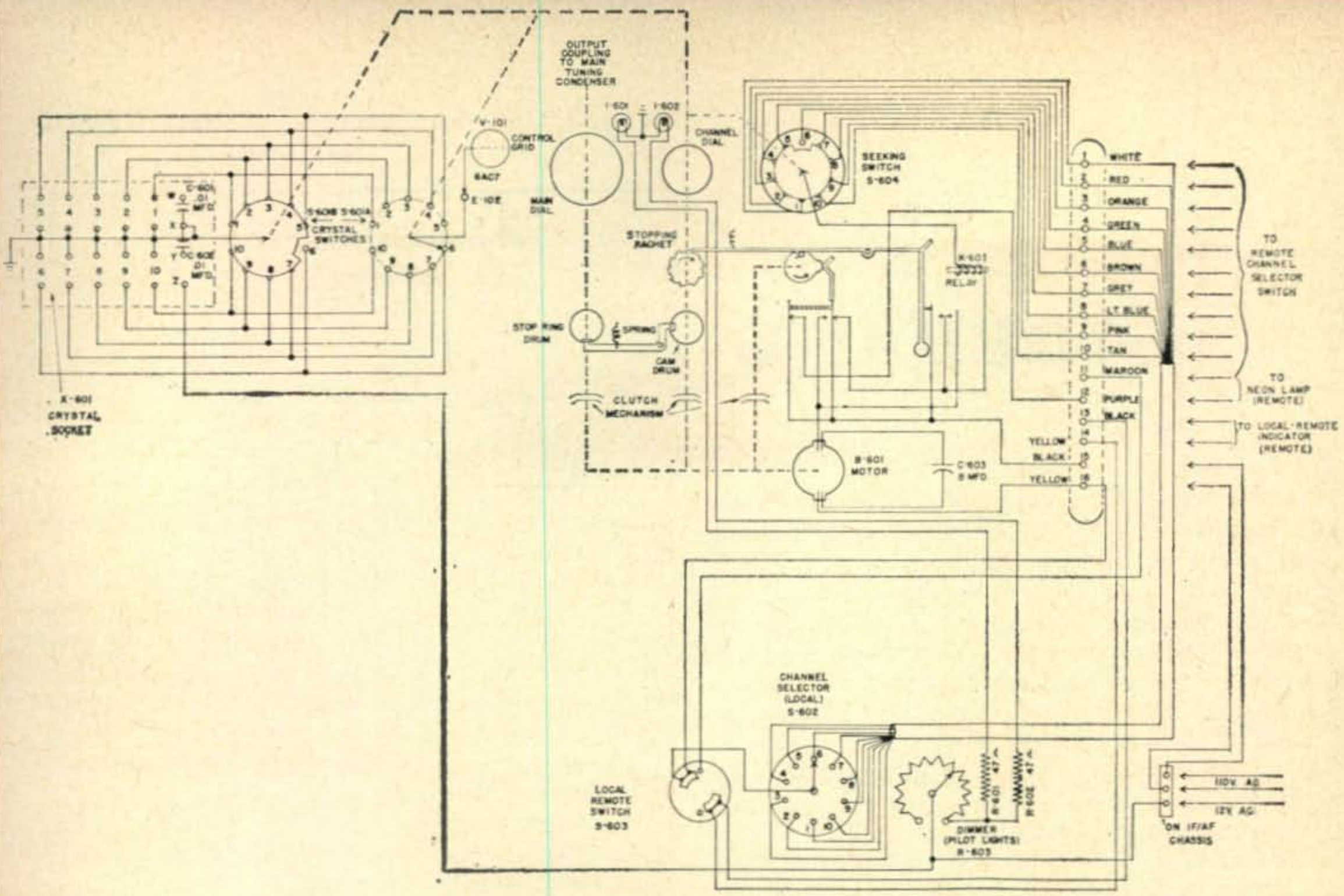


Fig. 1—RDZ automatic tuning unit. Circuit switches receiver crystals and permits remote control.

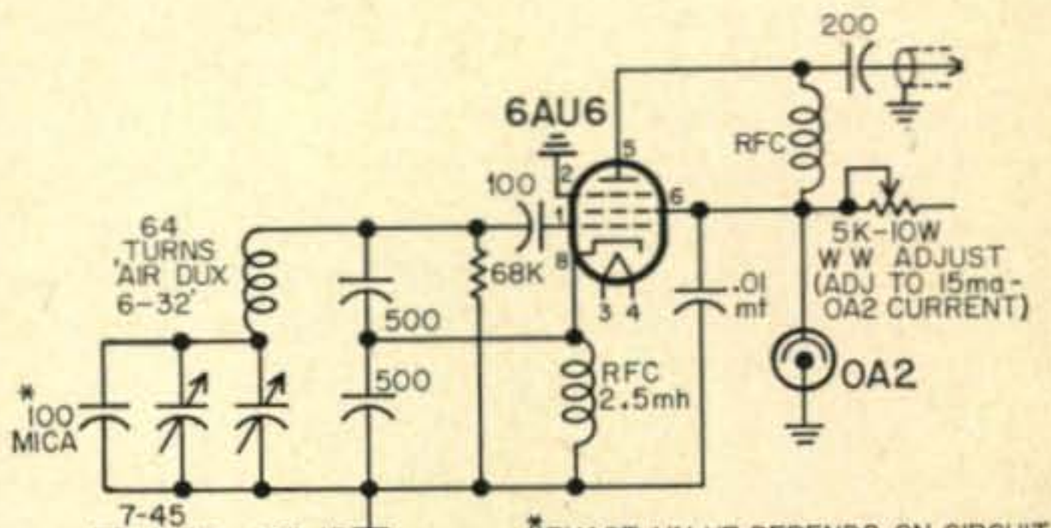
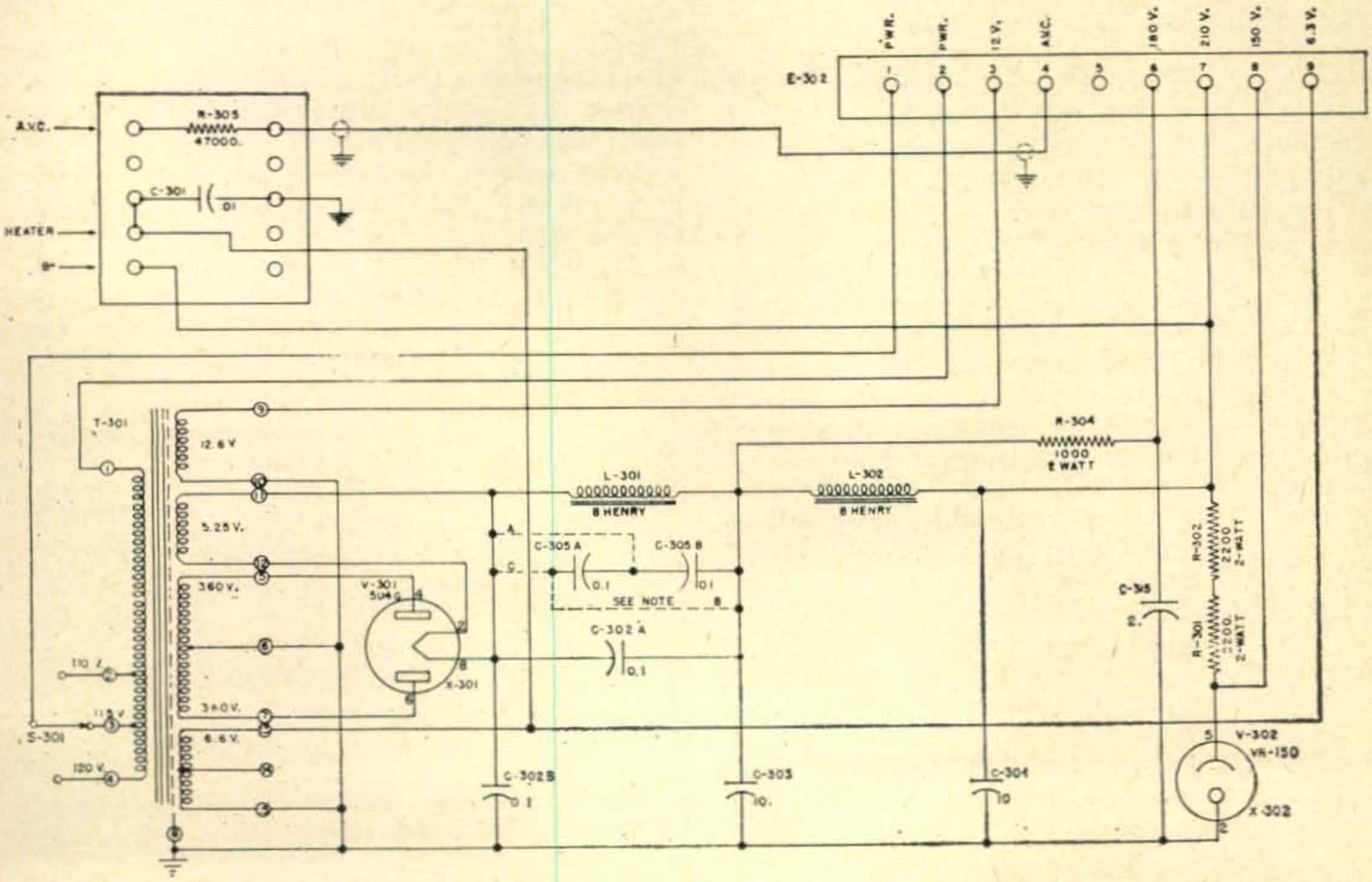


Fig. 2—Right—Oscillator circuit for use with the RDZ. Output plugs into crystal socket. (See text)

Fig. 3—RDZ power supply circuit.



sideband sideband sideband

SIDEBAND

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

WORKED 100 COUNTRY CLUB
Two-Way SSB
(Certificates issued Jan.-Feb.)

W1JSS
W2QKJ
VE4CP
W5IYU
XE1AE
TI2IO
W9WIO
DL4AS
W4BYU

We are happy to greet you as the new Sideband Editors of CQ Magazine. Since the first evening four years ago, when we excitedly put our first SSB rig on the air, we have been avid, active Sidebanders. During this time, sideband has grown from a novelty to the most rapidly increasing mode of ham communication. It now encompasses many varied interests: DX, ragchewing, technical talk, message handling, band hopping and nightly fraternal roundtables. It is our intention to cover as many of these various activities as space permits each month.

To Bob Adams, W3SW, our predecessor, we join with our fellow Sidebanders in thanking him for the wonderful job he has done to popularize sideband over the past several years.

From the tremendous activity evident during the weekend of the Fourth Annual SSB DX Contest, we expect a deluge of hundreds of logs. We hope to check these out in record time and bring you the results as soon as possible.

The biggest news of the moment is the extension of the 20 meter band to 14.350 *mc*. This move has been long overdue; the phone segment has been filled to the bursting point for years, making 20 meter operation work rather than fun. By now, you have had the first taste of operating in that heretofore forbidden territory. It must seem strange to flip the VFO above 14.300 and we'll bet that it sometimes takes an effort to remember that it's legal now! In our exultation, let us remember that we are roaming in what was somebody else's back yard. For many years, the DX stations over the world have looked upon this segment as their special province. Operating with low power, for the most part, the uncluttered frequencies permitted them to work us and each other. With the advent of the American stations, their operating capabilities will suffer, and there is talk that they will move down below 14.200 to carry on their DX activities. This would be a most unfortunate move for everyone concerned. The DX station would suffer having to fight the heterodynes and the DX'ers in the States would find themselves forced to do battle with the AM'ers at the lower edges of the band. No one would like to see this change take place. Experience on 10 and 15 meters has shown that we can all operate on the same portion of the band if we cooperate. With patience and understanding, we can succeed in doing exactly the same on 20 meters.

We would like to suggest that the top 15 *kc* of the band be kept free for the use of DX stations when the band is open. This will give the DX operator a chance to work; you can hear him without having to dig him out of the QRM and he can work you in the same manner as he is accustomed to doing. Burying him under several kilowatts will not help one bit.

We also propose that the W/K stations, mindful of the QRM which their higher power can cause, listen more carefully before occupying a frequency. In the past weeks, we had been conducting a little experiment, working DX stations on frequencies below 14.300 (this, of course, before the band extension). It was amazing to note the number of American stations who came on the frequency, testing and calling "CQ", because they did not hear a 40 over 9 signal coming through. If we are to encourage DX stations to work among us on 20 meters, it is imperative that we mind our operating manners and give our fellow amateurs the courtesy they deserve.

Scope Monitor

Every SSB operator should have some type of instantaneous peak indicator to monitor his transmitted signal. The scope is, of course, the best means of doing this as you can see what a meter cannot show you: the instantaneous peak output signal. With this indicator, you can see flat-topping and sideband suppression down to about 35 *db*. With a two-tone audio signal or with a single audio tone and inserted carrier at the microphone input, you can spot the type and degree of distortion you may be encounter-

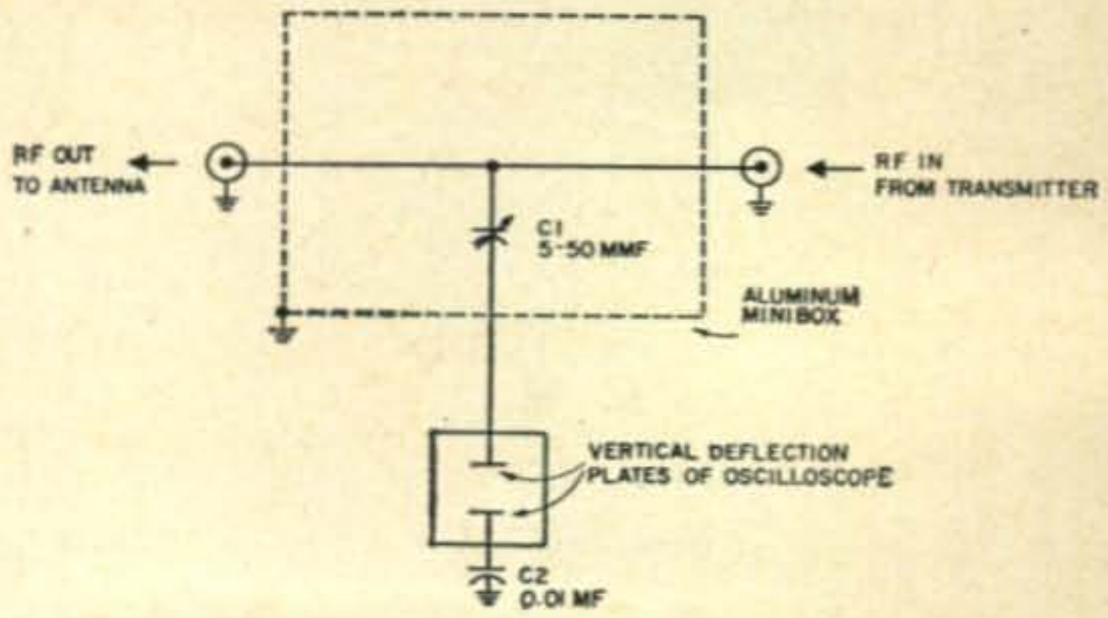


Fig. 1—Oscilloscope monitor schematic diagram.

ing in your SSB system.

Thanks to Ed, W2KPQ, President of the SSBARA, here is a cheap and simple way of using your scope to monitor your output signal. The diagram in fig. 1 shows the basic circuit which can be used with any scope.

The capacity of the variable condenser in series with the capacity of the vertical plates of the scope acts as an adjustable voltage divider. This is used to set the peak *rf* amplitude on the scope face. The reactance of this divider is high enough that it will not detune a 52 ohm line even at 30 *mc*. If your output is fairly constant throughout the 3.5 to 30 *mc* range and your line is reasonably flat, it will not be necessary to reset the tuning when switching bands.

Mechanically, the coupler is built in a 4"x2"x1⅝" minibox. The two SO-239 coaxial chassis connectors are used to feed the *rf* to and from the box which is mounted on the rear of the scope. The *rf* transmission line must go through the coupler—do not use a "T" connection in your line. The 5-50 mmf condenser, C1, which can be of the receiving type (isolantite insulation), must have both the rotor and the stator insulated from ground. The shaft should be brought through the box by means of an insulated shaft coupling to eliminate hand capacity effects when tuning.

The *rf* from the coupler is fed to the deflection plates directly; the hot lead to the ungrounded plate and the other plate connected through a .01 mf condenser, C2, to ground.

With full output to your antenna, adjust the variable condenser, C1, so that your peaks take up about 80% of the full scope vertical deflection. Adjust the scope horizontal oscillator frequency so that sharp voice peaks can be seen. This will normally occur between 50 and 150 *cps*. Flat-topping will be instantly noticeable when the scope is set up in this manner.

SSB DX Listings

There will be a change in the listing of DX worked on SSB as soon as our records are more complete. A "SSB DX Honor Roll" will head the column, listing those stations who have confirmed over 150 countries on SSB. Please send your list of countries confirmed, verified by another amateur, to us as quickly as possible to start the ball rolling. Certificates for working 50, 75, and 100 countries will still be issued as well as stickers for working each additional 25 countries. As in the past, send your QSL cards, with an alphabetical listing by prefixes, for the "Worked 100" and "Worked 200" awards. Send only the alphabetical listing, verified by another amateur, for the stickers and other awards. When sending cards, include sufficient postage for their speedy return.

Band Hopping

Bob, K4AJ, spent a miserable few weeks, thinking his license had expired and that he had been operating when he shouldn't have oughter. Seems that in moving to the new QTH, Bob ran across his change of call license from Ohio to Florida. The expiration date said "1957", and though he vaguely remembered renewing it, Bob couldn't find the new dating anywhere. He quickly called his local FCC, then wrote to Washington, meanwhile suspending all operation. Then, like a bolt from the blue, Bob leafed through an old log and there was the precious renewal—till 1962!! . . . Gene, W2BAK, who produces the amateur programs on the "Voice of America" is a regular on 40 meters. . . . We hope that Jim, K4KCV, who has won many honors for his KC4 phone patching, will be well on the road to recovery from the serious operation that hospitalized him early this year. . . . In 5 months of operating, Ham, VE3BWY, has worked 100 countries with a 10B, 458 *vfo* driving a Valiant! Ham is hep to the fact that *amateurs* should occupy the space between 14.300 and 14.350. . . . Several active DX SSBers will be visiting the States during the coming months including

[*Continued on page 102*]

Ham, VE3BWY, ex-G6WY, one of Canada's most active sidebanders, has worked 100 countries in only 5 months.

Fred, VP9FR, who has been putting out such a strong signal from Bermuda since getting on SSB six months ago.

VHF

Sam Harris, W1FZJ
P. O. Box 334 Medfield, Mass.

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

Six Meters

Propagation conditions on the six meter band during the past few years have been unprecedented in the history of *vhf* radio communication. Those of us who were fortunate enough to participate in this "heydey" of six meter activity, may well be thankful that we didn't miss this golden opportunity to observe *vhf* propagation at the highest sun spot cycle ever recorded in the history of man. The descending sun spot counts have taken their toll on six meter openings and an increasing number of six meter operators are moving down to lower frequencies, to greener pastures. The true *vhf* operator, however, is readying his equipment and girding his loins for a real effort to prove that six meters, without the benefit of the easy come, easy go, DX type of openings, is still a band to contend with as far as reliable communication is concerned. As the sun spot count fades lower and lower, and the *muf* recedes to the netherlands, the use of tropospheric and ionospheric scatter type propagation becomes more and more attractive. The art of predicting and making use of Sporadic E openings once more come to the forefront. The likelihood of moon bounce or artificial satellite bouncing is greatly enhanced as the heavyside layer becomes less densely ionized*. Furthermore, with the sudden increase in interest in the likelihood of communication with worlds in outer space, it should be pointed out that the six meter band is as likely a frequency range as any for the first out of space signals to be received. To put it bluntly, anybody can work the band when it's open, but the real thrill of accomplishment comes when you make your own openings.

Project Moon Bounce

It seems like there is an awful lot more work connected with getting a moon bounce project on the air than just talking about it would indicate. The pictures published some time ago in this column, showing the polar mounting efforts for the eighteen foot parabolic dish, might have served to give some small idea of the amount of antenna work involved. However, in truth, the antenna mount and directional controls are the smallest part of the effort. The construction of a crystal controlled exciter capable of maintaining frequency stability sufficient to allow the use of 100 cycle filters in the receivers is no little problem for an amateur with limited budget. Obviously, the converters involved must use crystal multiplier strings of equal accuracy and stability. The low noise parametric preamplifier which must be located as near the feed horn as possible, while easy to build, is much more difficult to house. Feed line from the output of the kilowatt input transmitter to the feed horn with negligible loss is difficult to handle and to mount. Rotary joints for the inch and five-eighths coaxial feed line which is being used, are so far impossible to obtain. In order for the project to be successful, the feed line loss from the transmitter to the feed horn must be kept below a ½ *db* maximum. Duplexing or switching the feed horn from the transmittter feed line to the paramp input is as yet an unsolved problem. To put it bluntly, the ingenuity of the RSVHFS is being taxed to the utmost. Nevertheless, by the time you read this column, we'll be listening on our dish. Another month should see the transmitter in operation. We still haven't heard from anyone else who appeared interested in participating in the 1296 moon bounce effort. Don't be bashful, if you're working on it, let us know how you're coming so that possibly we can all schedule a common completion date. Just imagine how nice it would be to hear some QRM on our first attempt. If you can make it to Dayton Hamvention, we'll be there complete with a movie of our efforts to date, and a wild desire to talk over the problems involved.

*See this month's propagation column.

April VHF Contest

What: A *vhf* contest primarily designed to give the *vhf* operators a chance to compete on an even basis, and have fun doing it.
When: 8:00 P.M. Local Standard Time, April 23rd, 1960, to 8:00 P.M. Local Standard Time, April 24th, 1960.
Who: All amateurs throughout the world.

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

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

How: Just fire up on your favorite *vhf* band

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

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

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

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

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

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

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

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

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

Contest logs must be post marked by the 16th of May in order to be eligible for certificate.

Address contest logs to Log Department, Microwave Associates, Burlington, Massachusetts. Have fun and mail in those logs!

Letters

Chicago, Illinois Hugo C. Wenzl (W9LX) has sent some real 420 *mc* operating news:

"I'd like to report the following stations actively engaged in the operation of the 420 *mc* band in Chicago and neighboring towns: W9SQE, W9PVO, W9PWH, W9QVO, W9ITL, W9LX, W9ALE, W9KKU, W9AYM, W9AGM, W9FHS; W9DRN, Des Plaines, Illinois; W9OKB, Niles, Illinois; and W9OJI, Wheaton, Illinois. *I'd say this is probably the largest 420 mc group, actually active, in the country*. These stations can be heard on weekday nights at 2100 and 2200 except on Saturday, also 1000 Sunday mornings."

"While some of the boys are using modulated oscillators, others are crystal controlled and the spot frequency for all is 432 *mc*. Eleven element yagis and long john antennas are being used and doing a fine job. Receivers are converted 'ASB's' and crystal controlled converters."

"We are desirous of stimulating even greater interest on 420, and would be pleased to hear

UP She goes! Top section of W1FRR's new 110 foot high tower (Rohn) being sped on its way by Fred (W1FRR) and Paul (W1PYM).

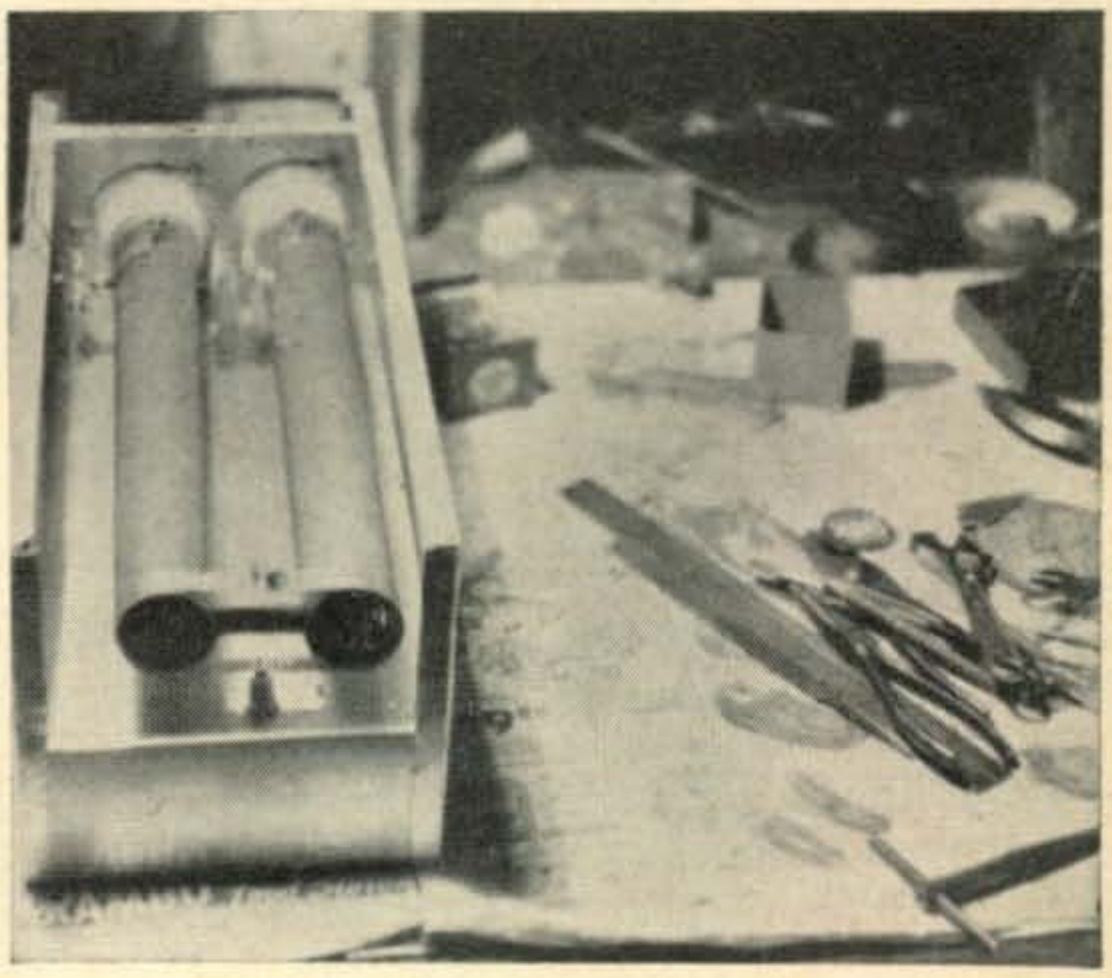


Plate lines and socket mountings (W9JFP).

Birthday gathering for Frank (W1TQZ) in his ham shack. Standing, from left to right: Southard, W1DDN; Ted, W1LUN; Freddie, W1FRR; Hank, W1OOP. Contented lounger is Frank, W1TQZ.

from anyone who wants to join in the fun; or better still, why not get acquainted with the fine bunch of fellows at the Chicago Amateur Radio Club who meet at Horner Park, California Ave., at Montrose, the second and fourth Tuesday of the month. *Gee, I'd like to!* Speakers are available from time to time to give talks on subjects of interest." *This sounds to me like a really go-gettin' group. Can you imagine having a 420 mc contact any night in the week? Congratulations, gang, and keep with it.*

Tulsa, Oklahoma From John Morris (KN5WNQ) we hear: "By the time you read this I'll be well into my tour of duty with the Air Force and will have received my Technician's ticket. When I return home in March I'll have some additional equipment for the shack. I have just ordered one each Tapetone 6 and 2 meter converters, and am in the process of obtaining 75' of #30 Rohn tower. Also hoping to have a Heathkit 'Seneca' by June."

"Do you happen to know of any 2 meter *rtty* stations using *afsk* in my area? I have been unable to learn of any and was wondering if any were around. Of course getting on 2 is a job much less trying to do it *rtty*." *Don't know of anyone John, but if there is anyone, I'm sure they'll get in touch with you now.*

Canoga Park, California A dependable correspondent, Denny Williams (K6UMM) sez: "On January 11th at 1952 PST I worked K7-GQE Pocatella, Idaho, for state number forty six on six meters; and KØGJX/Ø Rapid City, South Dakota for State 47 at 2019 PST on the same date. *Two new states in one day when you get that high in "states worked" is practically unbelievable.*

"The 50 *mc* band was very good to the fellows in the Los Angeles area on 11th of January with a swell five hour opening to at least ten states in the 5, 7, and Ø call areas. This station worked between 1815 and 2315 PST: during that period worked W7ZXQ, Arizona; W7VTB, Wyoming; K7GQE, Idaho; KØGJX/Ø, South Dakota; W7CJN and W7JIZ, Montana; W7DYD, Washington, and numerous stations in Texas and Colorado. Signals were 5/8 to 5/9 plus 40 in most cases."

"On the 10th of January we had the KH6 boys in for an hour or so with fine signals."

"Have heard teletype stations from the Pacific several days during December and January, and suggest that the west coast boys swing beams to the S.E. to listen for ZLs." *Hope your gang on the west coast has very good luck with the DX. Can't say much for the east coast luck.*

Susquehanna, Pennsylvania The 'Quaker State' is heard from through George Vacca Sr. (K3HRF): "Six meter work in this area is picking up as winter winds are setting in on us."

"K3JUW, Bob Redden, a new six meter station is active and on the air every evening with his Globe Hi Bander. K3IHJ, Carlton Esterbrook, is all set to go and should hang his Taco 10 element beam on his sixty foot tower very soon, weather permitting. K3ABC, Lyle, is still doing a bang up job on six and working on a double side band rig, 120 watts for six. K2-RRM ran up over 13,300 points in the January SS contest. W3LDA is back on six again and very active in the evenings. Bob, K3JUW and myself are considering a hill-top site and should be setting up for next contest." *Now that's what I like to hear! Lots of activity, SSB on six meters, and hill-top sites—all good.*

Wichita Falls, Texas First experiences on 50 *mc* as told by Bob Naglee (K5WKQ):

"After two weeks of trouble shooting on my new Seneca, I was able to get on the air Saturday, January 9th. What a pile up, or it seemed as though I were rare DX. All stations were tuning up for the *vhf* contest and I made many fine contacts in Arlington, Lake Dallas, Fort Worth, Denton, Dallas, and Duncan, Oklahoma."

"Then it was 1705 and the band opened up with many fine contacts in the east, W3's, W4's, W5's and W8's, but nothing from the west at all. The band stayed open until about 2000 and I can really say my 1st day on *vhf* was quite memorable." *You've probably found out by this time that it isn't 'always like that,' but it is fun, isn't it.*

"Sunday was a big disappointment, no activity at all until the Fort Worth-Dallas gang came on and said they'd been working DX all afternoon. We are about 120 miles away, so what gives? Does the edge of the skip act crazy like that? I couldn't hear anything at all." *Yep! You've been initiated to six meters all right Bob; six can work that way, or of course there's always the possibility that your antenna relay burned out, or some other bit of equipment went on the fritz temporarily. Hope you're continuing to have the same good luck.*

Rahway, New Jersey Distinguished editor of 'The VHF Amateur,' Bob Brown, K2ZSQ, has imparted some of his bits of information to us: "Everyone is looking for Maine contacts but we never see much about who's on. Guess they're all too frozen up thar to write. K1CXX tells me (via K2UGM) that K1GPJ is on from Lewiston; K1HAU, Gardner; W1GKJ, W1-LZT, K1HWM and W1WAS from Portland; W1FNI, Sanford; and W1WXI, Dixfield. Wish some of these six meter men would get on during aurora. Shore could use Maine!" *More than half of them are new calls to me Bob.*

"Hugh, W7MKV, tells me that JA1BTH was heard by W7VOG (Leave it to Max!) and VE7AIZ reports a couple of Florida contacts around 1000 PST the middle of December."

"I'm getting a Johnson 6N2 on soon, so will be active once again on two meters. Have already completed a W2AZL converter for that band." *Welcome back to two meters Bob.*

Anyone interested in receiving "The VHF Amateur" (a darned good publication) should write to Bob Brown, K2ZSQ, at 67 Russell

[*Continued on page 103*]

Novice

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

You press the key, the needles on the transmitter quiver, and *rf* energy spurts up your transmission line, into the antenna and radiates through the great unknown.

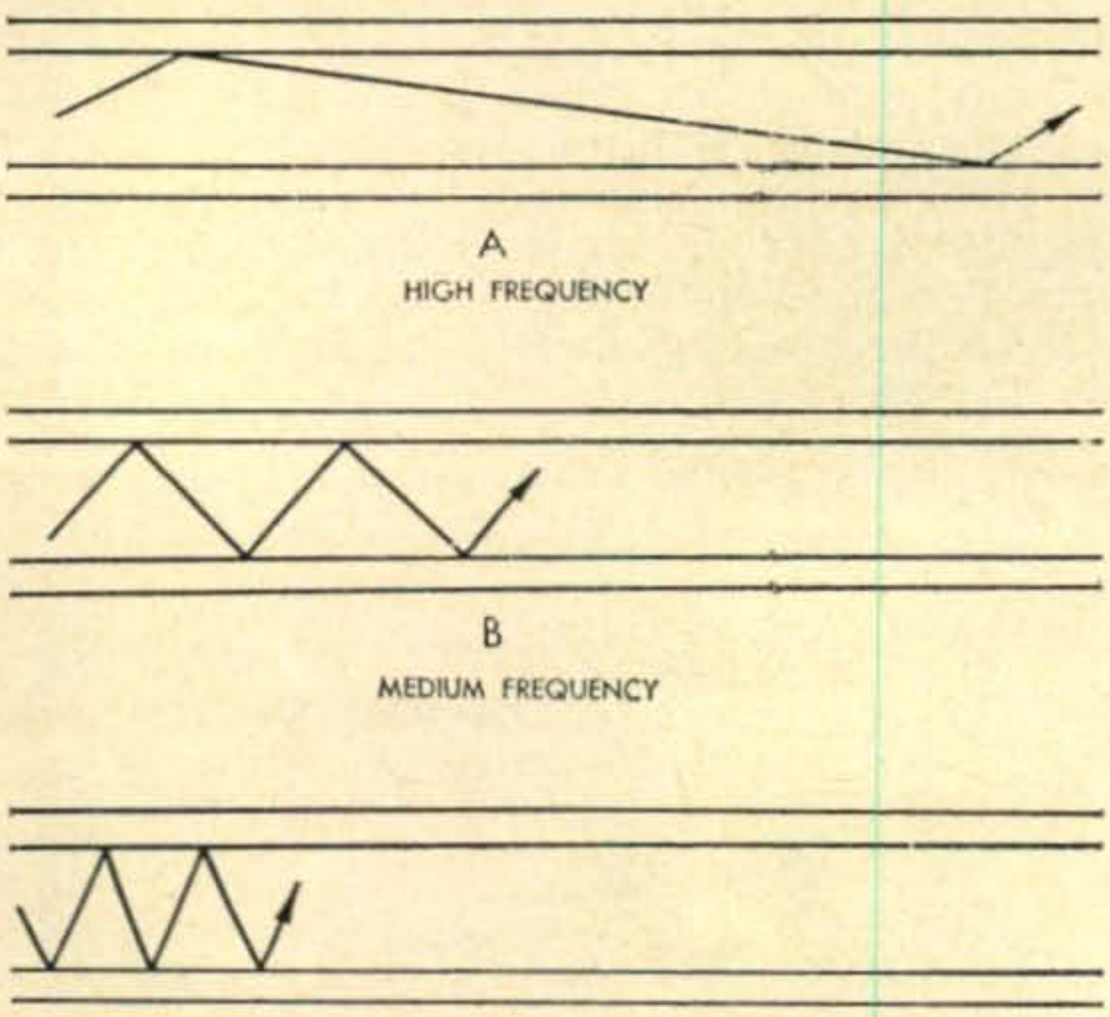
Actually we know quite a bit about the "great unknown". When radio was a lot younger than it is now, the scientists of the day were sure that it was not possible to communicate over long distances. Even if the signals could be bent over the horizon, they reasoned, they would soon die out due to absorption by the air. Marconi threw the boys a curve when, in 1901, he sent and received a signal across the Atlantic ocean.

Sir Oliver Heaviside wondered how this was possible and in 1902 he speculated "There may be a sufficiently conducting layer in the upper air". He didn't know it at the time, but old Oliver hit the nail right on the head! Experiments confirmed the now accepted fact that a region of ionized gases exist in our upper atmosphere which affects radio waves. This region is named the *ionosphere*.

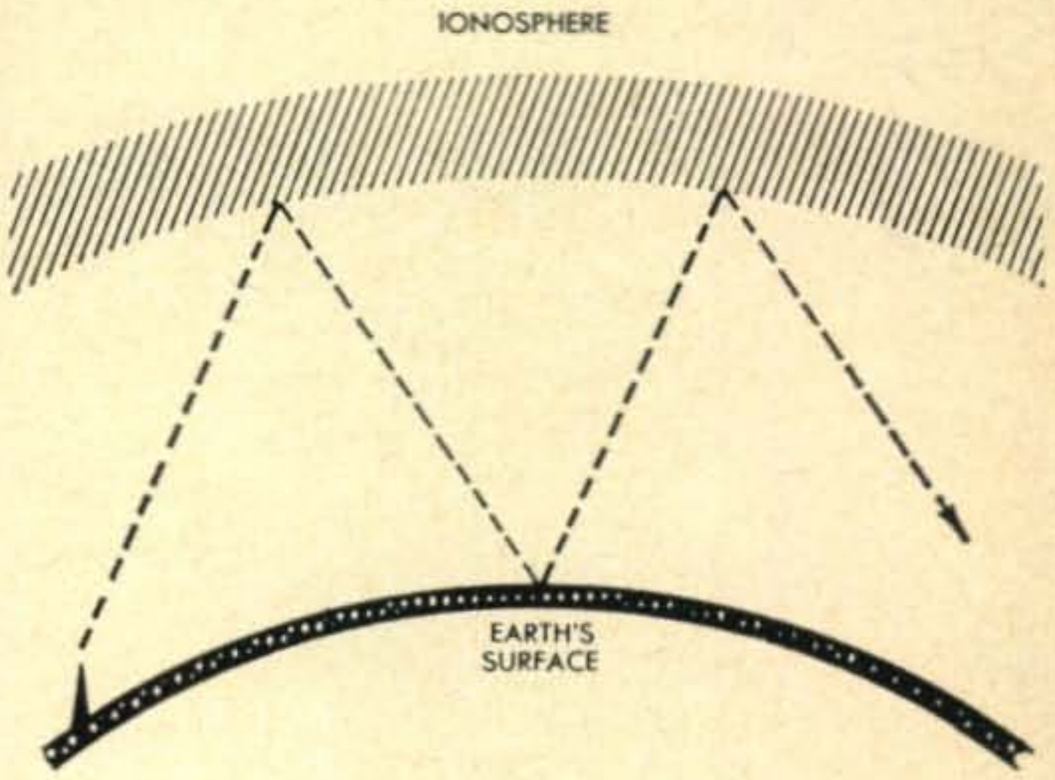
Meet Mr. Ionosphere—We know that our sun sprays visible light, infrared and ultraviolet radiation on the atmosphere blanket surrounding the earth. When this happens (during daylight hours) the upper atmosphere gases will ionize and they act as a giant reflector for your transmitted signals. The *rf* leaving your antenna (at many angles) reaches up into the Ionosphere and is immediately reflected back down to some other point on the earth's surface.

Mr. Ionosphere has four distinct "faces", you might say, each one higher than the next. These are called, from bottom to top, the D, E, F_1, and F_2 layers. Because the source of ionization is the sun, it is natural to expect that radio conditions would vary with the position of the sun. During the night, when the sun's radiation no longer strikes the atmosphere near you, the D and E-layers disappear entirely and the two F-layers merge together. Thus the 15 meter Novice band, which is greatly affected by the D and E, becomes unusable at night. On the other hand, the angle of reflection for 40 meter Novice signals lengthens out at night and communications over great distances are possible.

The position of the sun, with respect to the earth, varies from week to week, month to month, and so on. Therefore we have seasonal variations quite similar to the day to night changes. As an example, 15 meters seems to pick up in the summer, while 40 meters gets rather noisy. In the winter the conditions appear to reverse. Actually there are four classes of band behavior based on the action of the sun, the daily, monthly, seasonal, and the 11-



Different frequencies reflect at different angles from the ionosphere which helps to explain why some bands may be better than others at any given time.



Radio frequency energy is confined by the earth and the ionosphere.

Look for Jeff, KN1MME, on 15 as soon as he gets that 40 meter dipole loaded up.

Dan, KN9SMQ, is quite proud of his wallpaper, as well he might be.

The Edwards brothers, Jim and Bob, K1IMJ and KN1KOG respectively.

year cycle. The reasonably predictable action allows our Propagation Editor, Mr. George Jacobs, W3ASK, to compile his accurate band condition reports.

I wonder how many of my readers also look at these propagation listings so carefully worked out by George? Do you? Glancing at a random issue I note among other things "40 meters- . . . Static levels are expected to remain relatively low during the early part of the month . . .". Also you will find the last minute forecast, usually inserted just before press time. Here's an example, "Storms of at least moderate intensity, with adverse effects upon shortwave propagation are forecast for Feb. 2-4, 12-14, and 23-25."

What does all this mean to you, Sam Novice? Well, let's say you wanted to stay home from that camping trip to pick up a few states that you might need for WAS. If you consulted the propagation reports, and saw the above notice, you could be quite sure that band conditions would be rather lousy on the days mentioned. Or possibly you might want to stay up 48 hours with a buddy to work a contest. If the contest period fell on one of the dates likely to be bad for radio propagation, you might better get your sleep or catch up on your homework. At least you would know roughly what to expect in the way of conditions.

Radio station WWV also transmits radio forecast notices as explained in this column several months ago. Learn to use these two operating aids to keep a close watch on Mr. Ionosphere and you will obtain great pleasure from your operating hours.

New Book

Your conductor recently had the opportunity to look at the *New CQ License Manual*. I find it very well done and contains a wealth of valuable information for the prospective Novice or General Class amateur. Particularly recommended are the sections dealing with the code and the question guide. The new book sells for $2.50 and is available directly from CQ or at your local radio store.

New Transmitter

A new transmitter is currently being adver-

Introducing the new Jelectro QRP-60 transmitter. For more information, see text.

tised and should be of interest to Novices and Generals alike. The *Jelectro QRP-60* is shown in the accompanying photograph, and is selling at $59.95. You can obtain more information by writing JELECTRO, 200 La Paloma Ave., in Alhambra, Calif.

Who's DX?

A nice letter from Per Sjostrand, SM7BAU, Hasselg. 3 B. Ystad. Lan; M. Sweden, serves to advise the Novices that he would like skeds for the 40 meter band. Per says their transmitting band is between 7.00 and 7.05 *mc*, but he listens up as high as 7.2 for answers to his CQ. He continues, "I have been calling many of the 15 meter Novices, but they don't come back too often. Perhaps the QRM is heavy there or it might be that my 500 watts is too weak". You can sked Per by writing to the above address.

Our friend Tima Popovic, YU1-RS-357, Banat Novo Selo, Yugoslavia, heard quite a few stations during December and January. He sends along the following list of stations heard. As always, times are in GMT and on 15 meters, unless otherwise noted.

Dec. 20, 1512-1734; KN1KZH, MBH, WV2DPB, WV2FCD, FJW, FMS, FMU, GRE, GRT, GWT, HZO, IJB, KN3HZO, JIV, JLH, KN4FTL, ISK, JSY, MZS, NAO, OLG, PFB, SEF, KN5VBI, KN8NKQ, OQE, PBX, PMY, KN9ROL, TBD, UCG, KNØVLZ. Dec. 25, 1838-1922; KN1KTP, LIH, LKP, WV2DPS, GPH, IGW, IRP, KN4FJO, FPA, HJJ, IEF, IQR, MPJ, OOB. Dec. 26, 1552-1640; KN1LWI, LXC, LZK, MJD, WV2FHU, KN4PYV. Jan. 10, 1617-1738; KN1KBV, KHW, LNB, MBA, MEV, MMH, WV2DAK, DMC, FWC, GAD, GRW, HRP, HZT, IUP, JSW, KN3JGP, KN4MLD, KN9TZD, UTM, KNØVJO. Jan. 17, 1626-1852; KN1KOG, LJL, LLQ, LVE, LWZ, MJD, MTN, NED, WV2FVC, FWC, HSW, IBD, ILW, JZF, KN3HLP, JAQ, JGP, JKV, KN4OHI, PLR, KN8PZX, QIO, KN9UIV, UIY, KNØVBX, VUV.

Larry Manson, WA6BKQ/SWL-KA2, our correspondent in Japan reports hearing the following Novices on 15 meters. Jan 1, 0150; WV6EAH, Jan. 25, 0050-0230; WH6DMV, WV6HZI, NKK(?), KN7IPI, JPN. Jan 29, 0150; WV6GTI. Jan. 30, 0130-0230; WV6EAH. Jan. 25, 0050-0230; WH6DMV, VVV. Larry advises the Novices that he will be pleased to confirm reception of the stations heard this month and earlier, by sending a QSL to Larry Manson, c/o Capt. W. N. Manson, AO-2080417, 6102nd Supply Sqdn., APO 328, San Francisco, Calif.

Also from the Far East, Tom, KR6ZT, OARC, APO 331, c/o PM, San Francisco, Calif., writes to tell the following Novices they were heard on Okinawa Island. Jan. 11, 2200-2230; WV6GWM, JFM, KN7HXI. Jan. 13, 2200-2230; WV6ILP, WL7DCC, DCG. Jan. 16, 0030-0300; KN5VRX, WV6FKA, HAE, IEA, IVP, IQY, JIV, KN7KNM, KN9RIR, KNØYEL. Jan. 17, 0300-0400; WV6HAE, JFS, KN7HOF, JMB, KHQ. Jan. 22, 2200-2230, KN1KST, KN5TMV, VZY, WV6HNZ, KN7IPI, JRP. Jan. 23, 0330-0400; WH6DIT/5, WL7DEM, *WV6GTI, HNE*. Jan. 23, 1615; on 40 meters—WV6HNG, HNT. Jan. 24, 0100-0430, KN5VDS, WH6DIT/5, DKN, WV6FUC, FVL, FWX, GIN, GTI, GUP, *HZI*, IDZ, IFJ, IJN, IPY, *IQY*, JIV, HRH, KN7HOR, IQI, JOA, JYU, KTD, KN8OHG. Jan. 25, 2200-2230; WV6FQB, IEA. Jan. 26, 2200-2230; WV2GRE, WV6HGR, ISM. Jan. 30, 0300-0400; KN3JDJ/7, KN5WSE, WV6HZD, JLL, KN7KAH. Jan. 31, 0130-0330; KN5VZO/5, VZY, WH6DMV, WV6HSF, IQY, *IVP*, WL7DAF, DEF, KNØVVV. Italicized stations were worked by KR6ZT.

At the risk of starting another who worked who hassle, Tom, KR6ZT, wonders who was the first Novice to work the VU2ANI/VU5 expedition. Tom picked him off at 1145 GMT on Jan. 6.

One last note from KR6ZT. If you would like a contact listen for him on 21.102, 111, and 155 *mc*.

Now for a quick switch to the other side of the world, we hear from Plt. Officer Gerry Smillie, Officers Mess, RAF WYTON, Huntingdonshire, England. He has been off to VQ4 land, but returned in time to intercept the following Novices. Jan. 16, 1750-1826; KN1LLJ, LNT, WV2EWN, ITI, KN4OUE, KN8PTM, RBB, KN9RFC, TPQ. Jan. 17, 1534-1555; KN1LIH, WV2AEP, FKK, KN3IXH, KN4KGL, KN8PCZ, PFE, QDG, KN9QNB. Jan. 20, 1815-2233; WV2GUB, HUB, KN3IHR, JHG, KN4KTM, PZR, WV6HSF, KN8NPJ, KNØTZS/9.

My good friend Volta, DU7SV, has been calling Novices quite often on 21.105 *mc*. Keep an ear peeled for him.

Here's another DX tip! You can tell quite closely what time the 15 meter band opens to the various areas of the world simply by observing what times our reporters hear the Novice stations. If you're trying to work into a particular area, concentrate your efforts during the periods when stations in your area are heard.

Help Wanted

The following fellows need assistance with their Novice licenses. Can you assist them?

- W1—Robert Haberein, 230 McKee St., Manchester, Conn.
- W2—Willard Morgan, Box 622, Englewood, N. Jersey
- W5—Lee Frank Mullins, Rt. 1, Box 72, Diboll, Texas
- W6—John Feuling, 8322 Orchard Ave., La Mesa, Calif. (HO 6-6687)
- W8—Frederick Himes, Box 1001 Franklin, Chagrin Falls, Ohio

[*Continued on page 104*]

PROPAGATION

George Jacobs, W3ASK
607 Beacon Road, Silver Springs, Md.

Last Minute Forecast

Except for the possibility of moderate disturbances during the periods April 3-5 and 10-12, short wave propagation conditions during April are expected to be stable. Exceptionally good conditions are forecast for the last week of the month.

[Propagation charts on page 88]

General Conditions

Typical spring propagation conditions continue through the month of April. Fewer 10 meter openings are predicted as daytime maximum usable frequencies decrease in accordance with seasonable variations. Fifteen meters is forecast to be the optimum band for long-distance daytime propagation during April, with 20 meters optimum during the evening hours. Seasonally higher static levels and increased solar absorption are expected to result in somewhat weaker signals on 40, 80 and 160 meters. Sporadic-E propagation, capable of reflecting signals as high as 6 meters over distances of upwards to 1300 miles or so, begins to increase during April.

Sunspot Cycle

The sunspot cycle continues to decrease. The Swiss Federal Observatory reports a Zurich monthly number of 139 centered on January, 1960. This results in a 12-month running smoothed number of 152 centered on July, 1959. A smoothed number of 122 is forecast for April, 1960.

Navy's Moon Relay System Demonstrated

On January 28, 1960 another great step forward was taken in the use of *uhf* for long distance radio communications. On that day the U.S. Navy gave its first public demonstration of its "moon relay" communications system recently established between the Washington, D.C. area and Pearl Harbor, Hawaii. Teletypewriter messages and radio-fascimile picture (see fig. 1) were sent successfully over the circuit by using the moon as a passive reflector for the 435 to 445 megacycle range signals. While the direct circuit between Washington and Pearl Harbor is approximately 5,000 miles long, the moon relay circuit is nearly 480,000 miles (see fig. 2). Because of this great distance the lag between reception and transmission is nearly 2½ seconds.

The Washington and Pearl Harbor terminals of the moon relay system both utilize separate transmitter and receiver facilities, each employing a fully steerable, high gain, parabolic or "dish" type antenna 84 feet in diameter. The transmitter antennas are coupled to 100 kilowatt transmitters, producing an effective radiated power of more than *400 megawatts* concentrated in a 1.5 degree beam automatically kept in focus on the moon. The frequency used is in the 435 to 445 megacycle range. The bandwidth of the system is 16 kilocycles, and accommodates four two-way multiplexed teletypewriter channels or one two-way facsimile or radiophoto circuit. The circuit is also used experimentally for two way voice communications. For reception, similar high gain directive antennas are used with extremely sensitive, low noise receivers capable of receiving signals as weak as one one-thousandth of a micro microwatt.*

The great advantage of the moon relay system is the fact that it is not affected by radio disturbances in the ionosphere which often cause "blackouts" in the high frequency range. (It is interesting to recall that when the Japanese launched their surprise attack on Pearl Harbor on December 7, 1941, Pearl Harbor was out of communication with Washington as a result of an ionospheric blackout!) The new system is also considerably less susceptible to interference than *hf* circuits, and relieves the traffic congestion on lower frequency bands.

*Approximately one quarter of a micro-volt across a 50 ohm terminal.

Continued development of the system is expected to eventually permit communications between ships and man made satellites, and the transmission of television signals over great distances. The disadvantage of the system is that its use is limited to that period when the moon is simultaneously visible at both terminals (see fig. 2,) ranging from a few hours up to a maximum of about 12 hours daily, depending upon the orbital position of the moon in relation to the earth. Operating schedules are established by determining the time of moonrise at the westward terminal and moonset at the eastern terminal.

Although still under "operational evaluation" the moon relay system has been placed in readiness for transmitting operational traffic when solar disturbances disrupt conventional radio communications. It has already been used successfully for this purpose during recent blackouts.

The moon relay project is the outgrowth of discovery by the Naval Research Laboratory in Washington dating back to 1951. The system was developed at an announced cost of five and a half million dollars.

While in itself a feat of great significance, the Navy's moon relay system is considered to be a curtain raiser for transoceanic radio and television communications through the use of man made moons in the form of huge aluminized balloons which are scheduled to be put into 1,000-mile high orbits sometime this spring by the National Aeronautics and Space Administration. Such an orbiting balloon (at a height of 250 miles) was used successfully this past January for reflecting 960 megacycle signals along the east coast of the USA. The use of properly orbiting man-made moons for passive reflectors could permit extremely reliable around-the-clock long distance *uhf* communications. It is conceivable that in the not too distant future, the bulk of the world's radio communications may be carried out by such systems.

The moon relay system is of considerable significance to amateur radio, not only for the communication possibilities it offers, but the fact that it points to a lessening of the present congestion in the *hf* spectrum. It is only by means of lessening this congestion that international pressure to cut back *hf* allocations to amateur radio can be reduced.

Trans-Atlantic Moon Relay

Early in February the use of a moon-relayed *uhf* trans-Atlantic circuit was announced. This is an experimental voice circuit between M.I.T., near Boston, Mass. and the Jodrell Bank Observatory in central England. The circuit was discussed and demonstrated on a national-wide TV program on Sunday, February 7, 1960 (Conquest, CBS). The voice quality of the circuit demonstrated seemed exceptionally good.

73, George, W3ASK

Fig. 1—First official photograph transmitted by Navy UHF moon relay system from Hawaii to Washington, D. C. Officers and men of the USS Hancock, Pacific Fleet, spell out "MOON RELAY". (Credit: Official US Navy Photo)

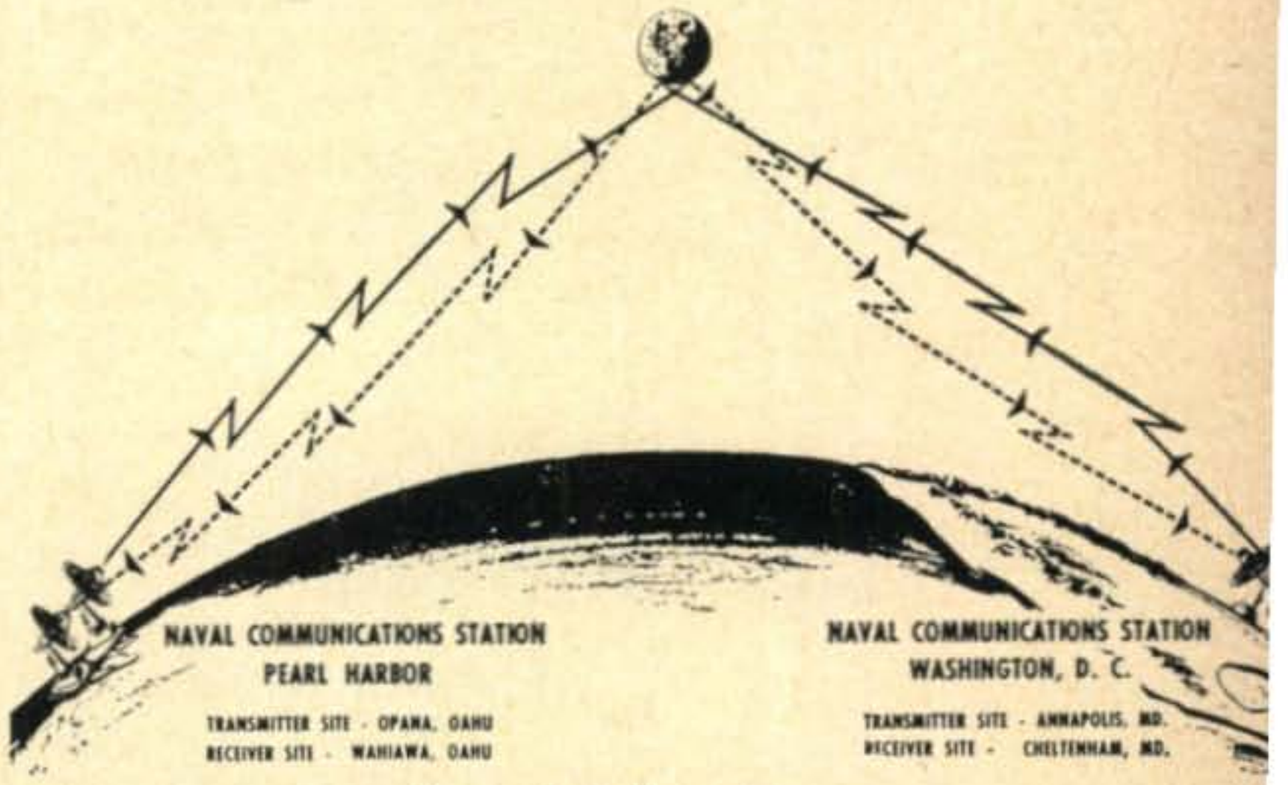
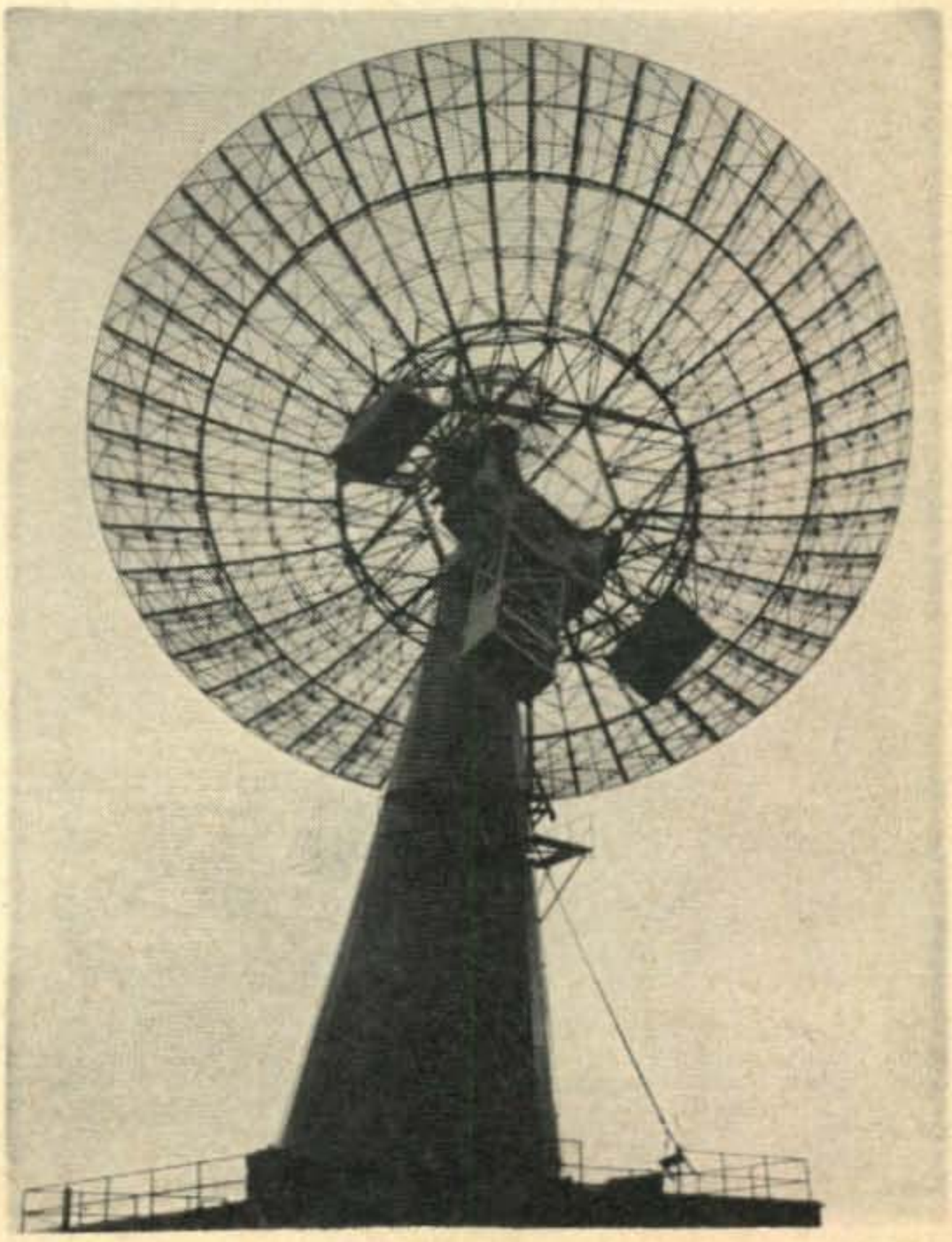


Fig. 2—480,000 mile path followed by moon relayed UHF signal between Hawaii and Washington, D. C. (Credit: Official US Navy Photo)

Fig. 3—The 84 foot dish antenna used on the U.S. Navy's UHF moon relay system. The antenna has a power gain of 4,000, and focuses a 1.5 degree beam on the moon. The antenna is tuned to the 425-435 mc range. (Credit: Official US Navy Photo).



All Times In E. S. T.

EASTERN USA TO:

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

All Times in C. S. T.

CENTRAL USA TO:

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

All Times in C. S. T. (cont'd.)

CENTRAL USA TO:

	*6/10 Meters	15 Meters	20 Meters	40/80** Meters
Central & S. Asia	2P-6P (1)	7A-9A (1) 12N-3P (1) 3P-6P (2) 6P-8P (1)	12M-6A (1) 6A-8A (2) 8A-11A (1) 5P-8P (1)	NIL
Antarctica	11A-3P (4) 3P-7P (3) 7P-9P (2)	11A-2P (1) 2P-4P (2) 4P-6P (3) 6P-8P (4) 8P-10P (2)	3P-5P (1) 5P-8P (2) 8P-11P (3) 11P-1A (2) 1A-4A (1)	9P-10P (1) 10P-1A (4) 1A-6A (1) 12M-4A (1)**

All Times in P. S. T.

WESTERN USA TO:

	*6/10 Meters	15 Meters	20 Meters	40/80** Meters
Northern & Central Europe	11A-2P (1)	7A-9A (1) 9A-11A (2) 11A-1P (3) 1P-2P (2) 2P-3P (1)	2P-4P (1) 4P-6P (2) 6P-9P (1) 9P-12M (2) 12M-2A (1)	7P-10P (1)
Southern Europe & N. Africa	9A-11A (1) 11A-1P (2) 1P-2P (1)	6A-9A (1) 9A-12N (2) 12N-3P (3) 3P-4P (2) 4P-6P (1)	6A-8A (2) 8A-2P (1) 2P-4P (2) 4P-9P (3) 9P-12M (2) 12M-6A (1)	8P-11P (2) 9P-10P (1)**
Central & S. Africa	7A-10A (2) 10A-1P (3) 1P-3P (4) 3P-5P (3) 5P-7P (2)	7A-9A (1) 9A-1P (2) 1P-3P (3) 3P-5P (4) 5P-7P (3) 7P-10P (2) 10P-12M (1)	12N-2P (1) 2P-6P (2) 6P-9P (3) 9P-11P (2) 11P-1A (1)	6P-9P (2) 7P-9P (1)**
South America	10A-1P (2)* 5P-8P (1)* 6A-12N (3) 12N-4P (4) 4P-6P (3) 6P-9P (2) 9P-12M (1)	5A-1P (2) 1P-3P (3) 3P-6P (4) 6P-9P (3) 9P-12M (2) 12M-2A (1)	8A-2P (1) 2P-4P (2) 4P-6P (3) 6P-10P (5) 10P-4A (4) 4A-8A (2)	7P-10P (2) 10P-12M (2) 12M-5A (2) 9P-2A (1)**
Guam & Pacific Islands	10A-1P (1) 1P-4P (2) 4P-6P (3) 6P-8P (2) 8P-9P (1)	7A-9A (2) 9A-11A (1) 11A-1P (2) 1P-6P (1) 6P-9P (3) 9P-10P (2) 10P-2A (1)	8P-10P (2) 10P-3A (3) 3A-6A (2) 6A-9A (3) 9A-11A (1)	2A-7A (2) 4A-6A (1)*
Australasia	8A-12N (2) 12N-3P (1) 3P-5P (2) 5P-9P (4) 9P-11P (4)	7A-12N (2) 12N-5P (1) 5P-7P (2) 7P-10P (4) 10P-1A (2)	4A-9A (3) 9A-11A (2) 11A-7P (1) 7P-9P (2) 9P-2A (4) 2A-4A (2)	12M-4A (2) 4A-6A (3) 6A-8A (1) 3A-6A (1)**
Japan, Okinawa & Far East	12N-2P (2) 2P-4P (3) 4P-7P (2) 7P-9P (1)	11A-1P (2) 1P-5P (1) 5P-6P (2) 6P-10P (3) 10P-12M (2) 12M-2A (1)	6P-8P (1) 8P-10P (2) 10P-2A (3) 2A-4A (2) 4A-7A (1) 7A-10A (3) 10A-12N (2)	2A-6A (2) 3A-5A (1)**
Southeast Asia	8A-12N (1) 12N-4P (2) 4P-6P (3) 6P-8P (2) 8P-10P (1)	8A-12N (2) 12N-6P (1) 6P-9P (3) 9P-2A (1)	12M-5A (1) 5A-6A (2) 6A-8A (3) 8A-10A (2) 10A-1P (1)	3A-6A (1)

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

(1) Less than five days, with openings occurring only during periods of better than normal propagation.

(2) Between 5 and 11 days. (3) Between 12 and 22 days.

(4) More than 22 days.

* Indicates possible six-meter openings, which are most likely to occur during periods of better than average propagation conditions.

** Indicates possible eighty-meter openings. Openings on 160-meters may also occur during this period, when atmospheric noise conditions are quieter than average.

Time Symbols: A - A. M. N - Noon
P - P. M. M - Midnight

The CQ Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees, and are centered on the Eastern, Central and Western areas of the USA. They are valid through May 15, 1960. These forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

RTTY

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

Many letters are received from fellows building audio-type terminal units (converters), such as the W2JAV TU, which was fully described in the April 1958 issue of *CQ*. They run something like this: "How in the blazes do I get those 'standard' tones of 2125 and 2975 cycles? My audio oscillator isn't that accurate!" The answer I usually give is, "Build a 425-cycle fork standard to check your audio oscillator." Then the letters start flying back and forth. Maybe some bad cases of writer's cramp can be prevented this month, so read on.

The "magic numbers" of 2125 and 2975 were chosen years ago by some pretty sharp telephone engineers who were standardizing tones. Note that 2125 is the fifth multiple of 425 and that 2975 is the seventh. (Also, conveniently, the standard shift of 850-cycles is the second multiple.) Now, these engineers were fooling around with a lot of other frequencies, too, so it became very easy to check all these frequencies by setting up a 425 cycle standard and using it with a 'scope and Lissajous figures. Mighty sharp, huh?

Well, we can do the very same thing, easily. Tuning forks (they must not be an aluminum alloy) can be purchased at most any music store for $1 to $2. You should ask for one marked "A440," which means that it is a 440 cycle fork. This is about the closest you can get to the desired 425-cycles, unless you can find a real old one marked "A435." Small ones are about 4½ inches long with a 3/16" diameter handle. Larger ones that are available are about 6½ inches long with a ¼" diameter handle. (I've found that the larger one is more convenient to work with.) Moving the frequency down to 425 is easier than moving a crystal frequency. All you do is file it in the crotch with a sharp round file. The easiest way to check the frequency is to compare it with another fork that you know is on 425 cycles. More about this later—read on.

W2JCM, John Litfin, Landing, New Jersey

Building a Fork Standard

Building a tuning fork oscillator is a lead pipe cinch, in the words of a well known W4. All you need, besides the fork, is one headphone from an old high impedance headset, a couple of tubes, and a handful of resistors and capacitors. Oh yes, and a slug magnet from a little old PM speaker. Don't let the mechanical part of the job phase you. There are just two important things to remember: 1—Clamp the handle of the fork real tight. I threaded mine and bolted it to a ½" thick piece of steel plate which in turn I firmly screwed to the ⅛" thick aluminum plate used as a chassis. 2—Make sure that you have a good magnetic circuit. The small PM magnet, with iron bolt extensions, is made to connect to each pole piece of the headphone magnet. The mounting of all the elements in this magnetic circuit should be as rigid as possible. Make sure that the fork does not hit the headphone magnet pole piece when it oscillates.

Figure 1 shows the schematic diagram of a simple fork oscillator using vacuum tubes. If it doesn't oscillate and you are certain that your wiring is correct, try reversing the connections to one of the headphone magnets. Such an oscillator is slow starting, by the way, so don't be fooled.

Using the standard is very simple. You don't use *it* to line up your TU; you use a variable audio oscillator, checked against your tone standard. Here is how you do it: Connect the fork standard to the horizontal input of your 'scope, and your audio oscillator to the vertical input. Set gain controls to provide about equal horizontal and vertical deflection. Now, slowly move your audio oscillator until you get a circle on the 'scope. This means that you are on 425-cycles. Now, again, slowly raise the oscillator frequency until you get a stationary Lissajous pattern with a 2 to 1 ratio

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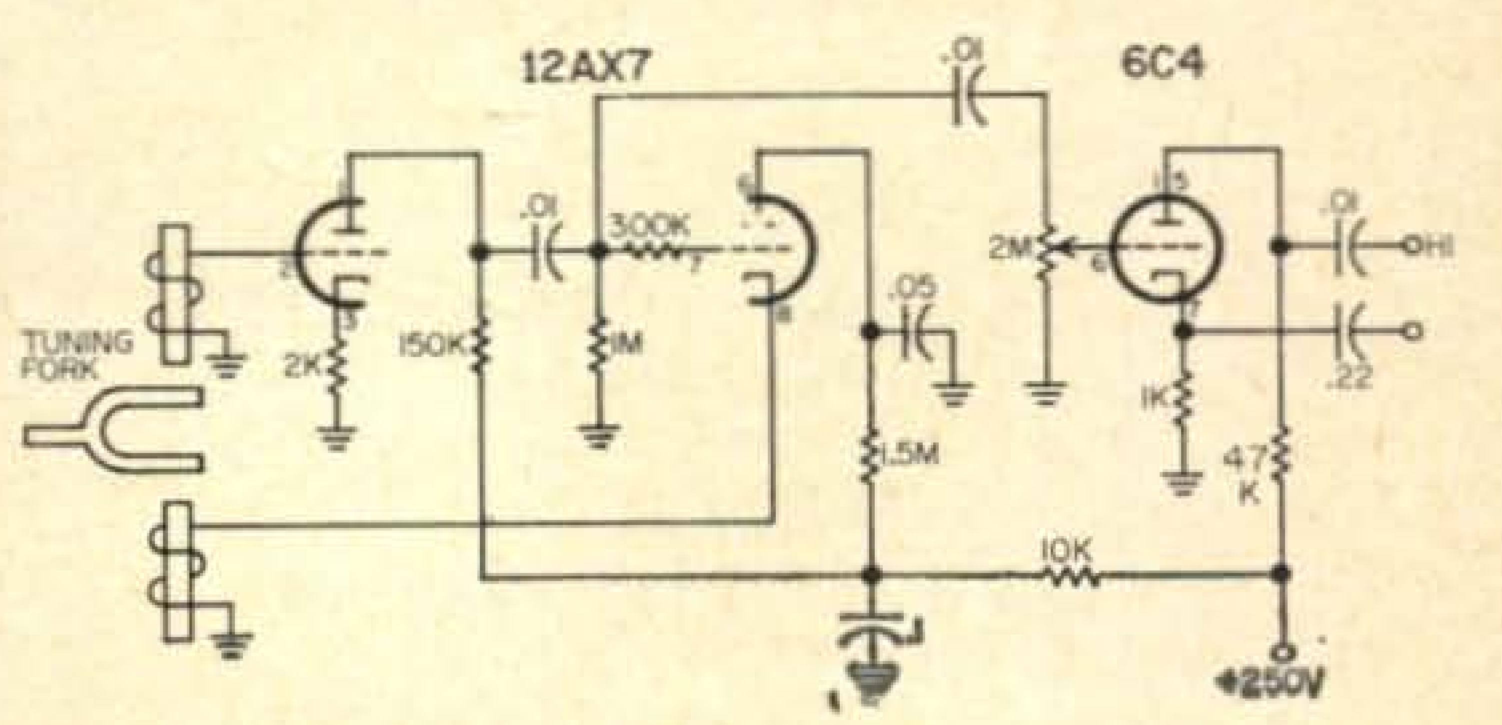
Fig. 1—Fork Oscillator Schematic Diagram



CONTEST CALENDAR

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

April 2-3	Helvetia 22
April 9-10	REF Phone
April 30-May 1	PACC CW
May 7-8	PACC Phone
May 7-8	USSR DX

Helvetia 22

Starts: 15.00 GMT Saturday, April 2nd
Ends: 17.00 GMT Sunday, April 3rd.

Work as many Swiss stations as you can in each of the 22 cantons, Phone or CW, all bands 3.5 thru 28 *mc*. Don't forget, your contest QSOs can be applied for credit for the attractive Helvetia 22 certificate.

Check last month's Calendar for details on the rules.

Get your logs in the mail no later than April 18th and send them to: The USKA Contest Committee, Knutwil/LU, Switzerland.

Look for operation on all band by HB1PV/VS from the rare canton of Valais. This station is being set up by the Lausanne group to help foreign stations win the coveted HELVETIA 22 Award.

R E F

Phone Starts: 13.00 GMT Saturday, April 9th.
Ends: 21.00 GMT Sunday, April 10th.

The rules have been greatly simplified this year, 3 points per contact, no multiplier. Use all bands and work all the Frenchmen you can, in France, its possessions and the French Union.

The CW Section took place a month ago. If you're a phone man check last month's Calendar for the rules. Your logs go to the REF Contest Committee, B.F. 42-01, Paris R.P., France.

P A C C

CW Starts: 12.00 GMT Saturday, April 30th.
Ends: 20.00 GMT Sunday, May 1st.
Phone Starts: 12.00 GMT Saturday, May 7th.
Ends: 20.00 GMT Sunday, May 8th.

This is the 5th Annual PACC Contest held by the VERON. The object of the contest of course is for stations outside the Netherlands to work as many PA stations as possible.

1. Activity on all bands, 3.5 thru 28 *mc*.
2. Usual five and six digit serial numbers, RS or RST report plus a progressive QSO number starting with 001.
3. Three points per QSO, and each station can be worked once on each band.
4. The multiplier is determined by the number of provinces worked on each band.
5. The final score therefore will be the sum of QSO points multiplied by the sum of provinces worked on all bands.
6. Certificates will be awarded to the highest scorer in each country. In the case of CE, PY, VE/VO, W/K, ZL and ZS, each district will receive an award.

The PA stations will identify their provinces by two letters after their number. The provinces, eleven in all are:

FR — Friesland	UT — Utrecht
GR — Groningen	LB — Limburg
DR — Drente	NH — Noord-Holland
NB — Noord-Brabant	ZH — Zuid-Holland
OV — Overijssel	ZL — Zeeland
GD — Gelderland	

Contest contacts can also be applied toward the PACC Certificate which requires proof of having worked 100 different PA stations.

Mail your logs to: P.v.d.Berg, Contest Manager, Keizerstraat 54, Gouda, Netherlands.

USSR DX

Starts: 21.00 GMT Saturday, May 7th.
Ends: 21.00 GMT Sunday, May 8th.

The USSR Radio Amateurs Federation has organized an international DX contest to be known as "Peace to the World" event.

For the first time rules have been made available to us, and I hope my interpretation of them is basically correct.

1. You can operate the full period of the contest but only 12 consecutive hours out of the 24 hour contest period will be considered for competition.
2. Use all bands, 28 thru 3.5 *mc* CW only.
3. The usual six digit contest number exchange, RST plus a progressive contact serial number starting with 001.

[*Continued on page 108*]

Citizens Radio

Lee Aurick, W2QEX/2W2870

Even before starting this review it's apparent that space will not permit full details of International Crystal Manufacturing Company's new "Executive" C/B transceiver. It's loaded with features and it will be an achievement merely to list them.

The "Executive" has now been in daily use, fixed and mobile, for about two months and this time has been spent profitably in getting acquainted with this extremely flexible unit.

The accompanying photograph provides an indication of the compactness achieved by International. It measures just 6 x 9 x 10 deep, and weighs 15 pounds.

The trend to push-to-talk operation has been widespread and this unit is no exception. It makes for speedier and more efficient control, and is a real asset in mobile installations.

Receiver

In addition to tuning manually all 23 C/B channels, there are two crystal-controlled receive positions. More about this later.

The receiver is a double-conversion superhet, and the only C/B unit using this principal, to our knowledge. The advantage of increased selectivity that this affords will be most appreciated in populated areas where adjacent-channel interference is great.

A gated noise limiter, *avc,* and variable front-panel squelch control are additional receiver features. Audio output is rated at 2.5 watts.

Transmitter

The transmitter, of course, compiles with the five watt limitation, and the 6CL6 *rf* power amplifier operates into the popular pi-net output circuit.

A high-impedance ceramic microphone, with the push-to-talk switch integral, provides a rugged appearance. Modulation reports have been enthusiastic and highlight the communications quality of the output signal.

Three crystal controlled transmit positions provide a choice of channels for dodging interference or working with units operating on other frequencies.

Power Supply

As far as can be determined, the Executive incorporates the same heavy duty power supply used in the previous model, the CTZ-5 Citizen Bander. This power supply operates on 6 volts *dc,* 12 volts *dc,* and 115 volts *ac.* Again, this is the only unit, to our knowledge, that includes this three-way convenience. For the industrial user whose mobile applications are many and varied, this arrangement offers complete interchangeability of units between vehicles. It is only necessary to connect the proper cable to the unit. All wiring changes are made within the cable plug. Units are shipped with an *ac* power cord, and one crystal installed in the transmitter.

A total of 10 tubes and one diode provide the equivalent of 15 tube performance.

10 Meter Conversion

In discussing the receiver, we said we'd get back to those two crystal-controlled receiver positions. The more contacts that were made on the C/B, the more we itched to try the complete rig on ten. The transmitter only required a 14 *mc* crystal, and this was no problem, but the receiver . . . !

The first *if* oscillator crystal proved to be 20.1 *mc,* and a little arithmetic determined that the second oscillator had to be in the 6-7 *mc* region. A *gdo* confirmed this and the frequency of the two fixed-channel crystals was further substantiation.

With some trepidation, we began removing turns from the coil of the tuneable oscillator. Approximately ten turns did the trick, and we were tuning then from 29.2 *mc* to 29.7 *mc.* When the crystal-controlled receiving channels are used, this oscillator coil is removed from the circuit, by the switch, and the crystal replaces it.

The next step was to move the coil connection

[*Continued on page 108*]

YL

by Louisa B. Sando, W5RZJ
212 Sombrio Drive, Santa Fe, N.M.

DX YLs

High time we devoted a little space to some of the DX YL's.

From HB9TT, Fred, we hear that for over a year now there has again been an active YL station in Switzerland—that of his XYL, Anny Jenk, HB9YL. The first YL station there was that of HB9F, but for some years Madeleine has not been active. HB9YL is QRV on all bands, 3.5—28 *mc*, mostly on CW, using a 50-watt transmitter. Receiver is a Geloso 207 BR; antennas, a dipole and G4ZU beam. Anny is always on the lookout for DX and especially likes to QSO the W/K stations.

Inge Ehrmann has been active since 1948—from that time until Aug. '54 operating under the call OE5YL. When Austria became a free country again her license was changed to OE-2YL. Inge operates phone only on 10, 15 and 20 and has worked close to 200 countries. OE2YL is the first YL to earn the WAZ award all on phone. Other certifiates include DXCC, WAS, WBE, WAC, BERTA, DX-YL, RCC, TPA and a number of contest awards. OE2YL runs about 100 watts, uses a G4ZU beam, and the receiver is a modified HRO-5. Inge's OM is OE2EK and her father also is a Ham, OE3HW.

G3LWY, Frances Woolley's, first experience with radio came during WW II when she was in the Women's Royal Air Force, 1942-46, and received training as a Signals Officer, covering all forms of communications. It was when she was a Signals Officer that she found herself working for Joe, G3ESR, and she has been working with him ever since! Family life was too pressing the first years, but in '57 Frances got her license. G3LWY runs 25 watts, *vfo*; receiver is an 8-tube superhet, and the antenna is a multiband trap dipole. For the h.f. bands she uses her OM's 150 watt rig. Four young Woolleys compete for Frances' time.

DJ1TE, Christl Huber, works 20, 40 and 80 cw and phone, but she's a working gal so look for her in the evenings or on Sunday a.m. Formerly editor of "YL-Ecke" in the German Ham magazine *DL-QTC*, Christl became too busy to continue writing the column after her engagement to a non-Ham—hi! YL-Ecke is now edited by DJ3TP, Ella. Christl became interested in radio at age 14 when attending a technical school. However, in DL one has to be 18 years old to hold a Ham license so it was several years before she got her own call. Her father is an engineer and helped her build her rig. In May she will have had her license for 7 years. Christl works as a technical assistant in the laboratory of a factory making TV and BC receivers. Other

Enjoying a "ground contact" (as Kuni, JA1YL, expresses it) are, left to right, JA1CIJ, Yoshiko Yoneda; JA1YL, Rebecca Kuni Kan; KA2HA/K4HWR, ex-K2IWO, Hilda Andrew, and KA2YL/K4CXJ, Lois, Jennings.

hobbies include visiting DX countries, music ("hot" and classic), dancing, swimming and photography. She adds there are 70 or 80 DL YL's with licenses, though many are not active.

XE2LI, Laura de Arpee, at Monterrey, Mexico, is very active on all bands from 10 through 40 and since she speaks fluent English as well as Spanish she has FB QSO's with all who call her. Her station consists of a Valiant on AM, an HQ-170 receiver and doublet antennas. Laura's OM is XE2LR and XE2PAY (mobile), and they have two sons, Richard, who is active as XE2KO, and 2 year old, Bobby.

The accompanying photo of KA2YL/K4CXJ, KA2HA/W4HWR, JA1YL and JA1CIJ was taken on the occasion of the two Japanese YLs' visit to the U.S. gals' QTH. Hilda says they had a wonderful time despite the difference in languages.

Rebecca Kuni Kan, JA1YL, has been very active in contests since she got her license, only within the last two years. Look for her on 80, 40, 10 and 6 phone. Her OM is JA1CO, a radio engineer. Yoshiko Yoneda, JA1CIJ, is the XYL of a prominent JA OM, JA1ANG, but is not very active because her 4 year old jr. YL doesn't appreciate mother's spending time in the shack.

This last year the Andrew's, Hilda and Joe, had full page write-ups and photos of their ham radio hobby in the Tokyo area paper, *Comet*, and in *Pacific Stars & Stripes*. Hilda adds that it has been fun being rare YL DX, but she and her OM are looking forward to coming home. They will be at McGuire AFB in N. J. in April, and Lois and her OM expect to return to the States in June.

3rd YLRL International Convention

Members of WRONE are going full speed in preparing for YLRL's Convention to be held June 17-19 at Cambridge, Mass. From K1IZT, Blanche, we hear the souvenir bedspread is going together nicely with most of the YL club certificate replicas in and the header, "1960 YLRL Third International, Boston, Mass.," completed in royal blue satin stitch on white. Get your tickets for the spread from Chata Swenson, W1RLQ, Box 193, Morningdale, Mass. — 25¢ each, or 5 for $1. Remember, there is a second drawing on these tickets for the handmade hairpin lace afghan. (You don't have to be present to win.) Check this column in back issues for more convention details; Sept. CQ listed registration, hotel data, etc.

With the Clubs

The new club in San Antonio, Texas, ALAMO YLs, invite Hams to try for their certificate. As of Nov. 1, 1959, only 3 contacts are required by out of state Hams and 4 for Texans. Custodian is W5WXT, Inez Cole, 320 Meadowbrook. Send list showing date, time, call and frequency of contact and include 10¢ for han-

[*Continued on page 110*]

XE2LI, Laura de Arpee

HB9YL, Anny Jenk

OE2YL, Inge Ehrman, ex-OE5YL

G3LWY, Frances Woolley

Some of the German YLs meet. L. to r., DJ3YF, Anna Maria; DL3LG, Sigrid; DJ1YL, Renate; DJ1TE, Christl.

IN OUR OPINION [*from page 6*]

QSO a CW station (WØ) opened up dead zero beat with the ZS and began calling CQ DX with a 589 signal. OK, he can legally operate on that frequency, but it certainly shows a lack of respect for other amateurs. Just for the fun of it, I signed with the ZS6 and tuned down to the CW band. There were no less than 45 clear frequencies in which this WØ could have called *CQ* without disrupting a fone QSO. Needless to say, the ZS6 was crystal controlled and his only other crystal was in a mass of QRM from South America. I wouldn't care to repeat his comments regarding the selfish actions of some W and K stations. I signed with him somewhat because of the QRM but mainly because I was just a bit ashamed of being a K at that moment.

We should try to remember that 20 meters or any other band for that matter is not ours alone. A little courtesy for the other fellow practised by each and every one of us can result in improved hamming for all. Let's try and keep CW in the CW bands and fone in the fone bands.

New England Convention . . .

The 1960 New England Division ARRL Convention will be held on Sunday, May 1st, 1960 at the New Ocean House in Swampscott, Massachusetts. This should be a most successful affair with about 3000 amateurs expected to register. There will be a large number of exhibits with virtually all the new commercial ham equipment displayed; programs of importance to all amateurs regardless of your specific interest and a bevy of valuable prizes. CQ will be there and we certainly are looking forward to having an eyeball QSO with you at the convention. Hats off to Ernie Coons, W1JLN, Eli Nannis, W1HKG, Eugene Hastings, W1VRK and many other hams working together to make this affair the big success that it will be.

72-73-75,

Barry, K2IEG

DX [*from page 67*]

Certificates and Awards which is published by W3RPG. Over 350 awards from more than 50 countries are listed. After reading through the directory, I think that it is definitely worth the price of $2.00 to anyone who is interested in certificates. It may be obtained from Bill Clark, W3RPG, 8 Francis Drive, Harrisburg, Pennsylvania.

QTHs

Thanks to WØVXO, W2MUM, W8UWT, W9YSQ, K6VUH, W3KVQ, W7ZAS, and the WGDXC for the following:

The Ultimate

Wesley L. Chestnut, W5ODO
P.O. Box 252W
Oklahoma City 12, Oklahoma

Harry Techniker frowned as he sat down at his work bench. With his left hand he stabbed savagely at the power control switch for his bench-installed Multi-talkie Mark VI.

He sighed and glanced at the work schedule for July 16, 1995. Item 1 on the schedule was a digital voltizer to be repaired. He noted it was already on his bench. He sighed again.

"Good Morning!" The sudden voice from the Multi-talkie, feminine, high, and syrupy, brought him around.

As always, Harry Techniker felt a quick anger as the machine intoned, "I am warmed up now. And are we ready to go to work this morning?"

"Oh, shut up," Harry murmured, knowing it wouldn't. The talking test equipment had been designed with the pseudo-personality of a human female. It talked.

Techniker had taken about all he could from the various models of talking test equipment. This latest model, which had been on his bench for two months now, was too good.

The Multi-talkie Mark VI was programmed with the complete theory of electronics. It was infallible.

But as far as Harry Techniker was concerned the thing was a Know-It-All. It hurt his professional pride. No machine should be smarter than the human who operated it—and talk about it.

Still, it was all he had to work with. He was forced to accept help from the thing.

Resigned to his fate, he centered the faulty digital voltizer on the bench and opened its case. From the Multi-talkie's face he selected a pair of retractable test probes and pulled them out.

Again, with the soft voice of a woman, the Multi-talkie spoke. "What kind of equipment are we checking today?"

Harry growled, "A model 21 digital voltizer."

"Lovely," the Multi-talkie said, and Harry winced.

The test equipment went right on talking. "We should first check the supply D.C. voltage. It should be—"

Harry Techniker interrupted bitterly. "Just a darn minute!" The accursed think talked too much. "Why don't you keep quiet and let me check what I want to check?"

The Multi-talkie protested, "But I am designed to help—"

Harry broke back in. His face was beginning to redden now. "I don't care what you were designed to do. I'm the technician here. You're the test equipment."

He stabbed one of the probes into the voltizer. "What's the reading here?" he demanded.

"Negative 36.81 volts. D.C. of course," the Multi-talkie replied quickly.

"What?" croaked Harry. "It can't be. There aren't over twelve volts in the whole unit. You've made a mistake."

The Multi-talkie's voice sounded almost hurt. "I have a stability factor of one-hundred percent. My accuracy is unsurpassed in the field of electronic test units."

"And you talk too much," Harry Techniker added.

"I was designed to talk," the machine noted.

Harry pounded the bench with his tightly clenched fist. "You talk like a female. But you're still just a piece of test equipment."

"I was given a pseudo-personality and voice of the human female. My designers felt this would be an excellent selling point."

The Multi-talkie's voice was emotionless, but Harry Techniker's voice had become an angry snarl. "That voltage reading. You made a mistake. Try it again."

He stabbed the probe into the voltizer once more.

"The reading is no different—36.81 volts," the Multi-talkie replied.

And that did it. "No! It isn't!" he shouted. "It can't be. There is something wrong with you."

"Not with me," the Multi-talkie retorted cooly. "I am infallible. There must be something wrong with *you*."

"ME?" Techniker screamed. "Why you infernal monster! I'll show you!"

He grabbed a heavy wrench from the bench rack. He lashed out at the Multi-talkie's electronic face. It caved inward with a tinkle of delicate parts breaking.

When his destructive rage had consumed itself, the Multi-talkie lay a shattered mass of wreckage.

"That," Harry croaked, breathing heavily, "should silence you."

But from the wreckage of the Multi-talkie came a weak voice. It seemed to hold a note of triumph as it said, "I am a valuable piece of test equipment. You will be charged exactly $465.98."

And Harry Techniker could only stare at the wrecked machine in silence. After all, what could he say?

The female-like Multi-talkie had had the last word. ■

BV1US	USTDC—MAHG, APO 63, San Francisco, Calif.
CN8JF	via W8UWT
CR4AH	via W2CTN
CR4AV	via W2CTN
CR4AX	via W2CTN
CR6CP	Box 305, Lobito, Angola
EA9DE	via W2KUW
EA9IA	via U.R.E.
ET3MA	via ET3 Bureau
FB8XX	via FB8BC, Box 587, Tananarive, Madagascar
FB8ZZ	via FB8BC
FK8AT	via W2CTN
FK8AU	Box 63, Noumea, New Caledonia
FK8AW	via W2CTN
FM7WP	via W2CTN
FM7WU	via W2CTN
FO8AX	via WA6DFH
FQ8HE	Raymont, C.M.T. Brazzaville, Republic du Congo.
FR7ZD	Guy Hoarau, Tampon, Reunion Island.
FY7YF	via W2FXA
GB3GD	via W9ELT
HC2IU	Heinz Jirsak, Box 5200, Guayaquil, Ecuador.
HC5CN	Caesar, Box 219, Ecuador.
HK6IC	Box 584, Bogata, Columbia
HKØAI	via W9WHM
JT1AB	via OK1KX
JZØDA	via W2CTN
JZØHA	via W2CTN
KAØIJ	opr. Mark, APO 815, San Francisco, Calif.
KAØIJ	opr. Vince, Vincent M. Davis, 2553 Parkwood Ave., Toledo, Ohio
KC4AT	via K4IHN
KC6AT	via W3AFM
KC6ZZ	via ARRL
KG4AD	Box 32, M. B. N. B., Navy 115, c/o Fleet P. O., N. Y. C.
KR6GY	OARC, APO 331, San Francisco, Calif.
KW6CP	via W2CTN
KW6CU	via W2CTN
LU9AH	via LU1EC
LC3PF	via DL9PF
OA3D	Box 168, Chimbote, Peru
OA8K	via W8HWN
OQ5BC	via W2CTN
OQ5IG	via W2CTN
OX3RH	via W2CTN
OY3PF	via OZ Bureau
OY8RJ	Box 184, Torshavn, Faeroes Island
PX1DE	via W2KUW
PX1PF	via DL9PF
PY7CP	Box 1043, Recife, Brazil
PY7SC	via PY4TK, Box 43, Belo Horizonte, Brazil
PYØNA	via PY2CK
SU1MS	via W6QNA
SU1MS	Harold T.
SVØWAE	Cogburn, 2414 Cone St., Mobile, Ala.
TF5TP	via W2MUM
TG9TI	via W9YSQ
TI2WD	via W2CTN
UAØLA	Box 29, Vladivostok, U.S.S.R.
VK2FR	via W2CTN
VK9BW	via W2CTN
VK9GK	via W2CTN
VK9NT	via W2CTN
VKØCC	via VK4FJ
VKØTF	via VK3YS
VP2AR	via W3KVQ
VP2GAK	via VP2GW
VP2KJ	via W8MXS
UP5AB	Jim, c/o PAA Comm. S. Caicos Island
VP5EB	via VP7CA
VP6PJ	via W2CTN
VP7CA	Detachment 3-1, Mobile Construction Battalion #7, FPO, N.Y.C.
VQ2EW	via W2CTN
VQ2RB	via K6VKX
VQ3CF	via W2CTN
VQ3HH	via W2CTN
VQ4AQ	via W2CTN
VQ5GK	Box 1803, Kampala, Uganda
VQ6AB	via RSGB
VQ6LQ	via K6KII (QSO's after 20 July 1959)
VQ8BA	via VQ8AL
VQ9AIW	via WØDVN, Box 5938, Kansas City 11, Mo.
VQ9ERR	via W4IYC
VR1B	via VK2EG
VR2DA	via W2CTN
VR2DK	via W2CTN
VS4BA	via W5UX
VS4JT	via K6GMA
VS5AD	Box 124, Brunei Borneo
VS5BY	via W6ZEN
VS9MB	via K2QXG
VU2RM	via W3KVQ
W2MET/MM	via K6VUH
XZ2BB	via XZ2TH or Box 449, Rangoon, Burma
YA1AO	via DL6YI
YA1AW	via W6DXI
YA1PB	via W6DXI
YV3CD	Box 199, Barquisimeto, Veney, Venezuela
ZB2I	via W2CTN
ZC4BE	via W8DPF/4, Box 13154, Tampa, Fla.
ZC5AF	N. M. Fender, RAF, La Buan, British North Borneo

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For further information, check number 26 on page 126.

ZD2DCP	via W2CTN	4S7MG	44 Cambridge Terrace, Colombo, Ceylon
ZD2CKH	via Box 38, Jos, Nigeria	4S7FJ	via W5GHK
ZE1JV	via KØDQI	7GIA	via OK1PD
ZK1AK	via W3GJY	8J1AA	via JARL
ZK1BS	via W7ZAS	9M2GB	Ronald W. Gray, 7 Roseberry St., Christchurch, SWL, New Zealand
ZK2AB	via W6ZEN		
ZP5CF	Box 512, Asuncion, Paraguay via WØVXO		
ZS3B			
ZS7M	via W2CTN		
3A2AE	via RSGB or G3ATU	9G1BQ	via W2CTN

73,es DX, Urb, W2DEC

HAM CLINIC [*from page 71*]

provide a "perpetual file" available at nominal cost. But this is impractical because companies do merge or go completely bankrupt. Who would handle the central depository? Hi!

After writing 4 or more letters on each request, and getting nowhere trying to track down technical information on old equipment, I have decided to devote a couple of paragraphs in future columns requesting information. Perhaps somewhere out "there" someone has the data that so many hams are hunting. So don't get discouraged if your inquiry does not bring results—we are doing the best we can.

Observed: there is a crying need for up-to-date information on old equipment. Anyone have any suggestions?

For further information, check number 54 on page 126.

Thirty

Again, letters coming to HAM CLINIC with self-stamped addressed envelopes carrying air-mail return get priority handling.

I strongly recommend to the manufacturers of Civilian Band equipment that they obtain reprints of the article in the January issue of the CQ Club Bulletin relative to CB operation. These reprints should go out with each set. No better way than this to create good-will and the prevention of violations with the resultant loss (in some cases) of CB licenses. When a CB operator loses his license he can (*wrongfully*) point his finger at the manufacturer and say, "*you didn't tell me.*"

Finally, when I receive a letter taking me to task for a statement I make in this column I treat it with deep respect; because I for one, realize that I'm human, do make mistakes and that there are many readers who know more than I do about any one subject.

So those of you who wish to be critical, by all means go ahead—shoot the works. I welcome corrections, constructive criticism and encouragement . . . and I do THANK YOU for taking the time out to write to me.

For now, 72 (Internationally) and 73 and 75.

Chuck W6QLV/F7FE

SURPLUS [*from page 77*]

new oscillator. Loosen the wing nut at the center of the main tuning dial and turn the main tuning knob in one direction until the knob engages with the tuning mechanism. Then, turn the knob until the dial corresponds to the middle of the band (222.5 *mc*) or any particular frequency in the band that you are most interested in. The bandwidth of the *rf* tuned circuits should be sufficient to cover the entire 220 *mc* band. Again turn power on and turn the multiplier tuning switch (also behind the cover) to MULTIPLIER TUNING. This switch is a screwdriver adjust type and is located at the lower left side of the front panel opening. Now retune the receiver tune knob until the INPUT meter begins to read. This should read about 0.2 *ma* with the multiplier tuning switch in position 3. In positions 1 and 2 the meter should read 0.15 and 0.3 *ma.* Erratic readings mean that the input (crystals or oscillator) is erratic or inoperative. Turn the switch back to the receiving position. The output meter will read now, due to noise getting through the receiver due to proper alignment. Tighten the wing nut, which will secure the stop ring.

The other nine channels may be used for fixed frequency operation, such as netting and teletype reception, by selecting the proper crystal and tuning the set as described above, for each channel. When completely tuned, reassemble the cover and the set is ready to go. These sets are properly aligned when you get them, or at least close enough for general use.

No adjustments other than the one described should be attempted without a complete handbook unless you are thoroughly familiar with this type of equipment.

The RDZ has some interesting features, which we haven't mentioned yet, such as the frequency scanning amplifier, which provides an output to a panoramic adapter, by means of a cathode follower located before the first *if* amplifier. A video output is also available from the detector, for analyzing received signals, if desired. The output meter is in the audio stage and measures the output of the receiver, so the technician can set a given audio level, even though he cannot hear the output. The power supply is husky enough to provide the necessary current for a converter, or oscillator, such as we have described.

The low price of the RDZ together with the high quality should make it worthwhile for the technician as well as the general VHF interests, considering its low price. Again, we make the warning to consider the shipping costs when ordering, since the RDZ weighs 150 pounds uncrated.

Mail

As you know, we don't answer questions via the column, for several reasons, but mainly because each letter requires a special answer, and little room would be left for conversions. We do answer every letter received, usually by postcard. It takes about a month right now to get an answer out, mainly because of the volume of mail. You can help speed up the mail by being as concise as possible, and by including all information, including addresses. It is surprising how many letters are received without names or addresses. For handbook requests, allow two months for the request to get into print.

W1OQA is in need of a handbook on the RCA Radiomarine ET-8023-D1 transmitter. Ed Linskey, 1088 Carroll St., Brooklyn 25, N. Y. needs a handbook on the TS-133, and can give a manual on the PP-282/GRC and PP-448/GRC power supplies. Joe King, P. O. Box 53, Delmont, Pa. needs a handbook on the RU equipment. Capt. Joe E. Cooke, Hq. 1st BG, 30th US Inf, APO 36, N.Y.C., N.Y. needs a handbook and "S" meter for the BC-787B. From Canada, J. H. Downer, 27 Wanless Crescent, Toronto 12, asks for information about the BC-348 and where to get replacement *if* transformers. Richard Adams, Box 98, Chrisney, Indiana needs a manual on the BC-433. Lee Mesenhimer, 2146 Olive Avenue, Lakewood 7, Ohio wants information on the AN/APX-6. John Cooper, Petal, Mississippi wants a handbook for and a conversion to six meters for the AN/TRC-1. J. R. Noel, 8221 11th Avenue South, Minneapolis 20, Minn. wants a manual for the Navy MS transmitter-receiver and conversion information for 1-3 *mc*.

John McCarty, 3807 W. Hazelwood, Phoenix, Arizona needs a manual for the ARB re-

ceiver. Peter VonHagen, 1201 Tower Grove Drive, Beverly Hills, California wants data on the URC-4 equipment. L. E. Jessen, 1623 48th Street, Des Moines 10, Iowa wants conversion data and manuals on the BC-1306 and RS-6. Arthur Ideker, 1505 W 14th Street, Pine Bluff, Arkansas needs information on the I-177 and the TS-34A oscilloscope.

Heard that S. Lowry, 915 Madison St., Manchester, Tennessee needs a book on the BC-1158A. If you have a manual on the TS-175U send it to Ray Donovan, 16614 Monica, Detroit 21, Michigan. Dick St. Amant writes that he will gladly swap a BC-1335 manual for a BC-659 handbook. His address is 3650 White Bear Avenue, White Bear Lake 10, Minnesota.

Next Month

In the May issue we will convert another receiver for the 220 *mc* band. This is the AN/TRC-8 which is an FM receiver with a lot of promise. This equipment is new in the market and operates directly from 110 volts *ac*. Fully tuneable, it should make the 220 *mc* band worth looking into.

73, Ken, W2HDM

SIDEBAND [*from page 79*]

Stan, ex-ZC4DA; Art, ZS6AQQ; Jean, HB9J; and Bob, VK3SK. We hope that many of you get a chance to meet them in person. . . . John, ex-K2GC, is now F7GC and would like his friends to listen for him. . . . Damon, W3QKW, who is an elementary school teacher of instrumental music, has recently returned to 75 meters with a new HT37. . . . Jim K5SVJ, worked 147 contacts with about 2 watts from an SB10 barefoot. . . . At this moment, there is still a wild race between Humberto, TI2HP, and Myron, W4IYC, to be the first to get 200 countries confirmed on 2 way SSB. Humberto has 206 worked, 198 confirmed while Myron has 205 worked, 195 confirmed. There may be a dark horse in this race so we are eagerly awaiting the mail each day. . . . You too can get more QSL cards by sending along a stamp of his country to the DX operator. It saves him the trouble of redeeming IRCs (which are not acceptable in some countries) and comparison will show that you can purchase foreign air mail stamps for less than the necessary number of coupons. Write to Sax, W2SAW, for his listing of available stamps. We have found the results of using this method highly gratifying. . . . Marvin, W3AKG, is looking forward to visiting some of the European sidebanders when he and XYL, Mildred, take a fast flight in May while Bob, W3SW, and his Lucille, will follow suit in June. It certainly gives one a warm feeling to know that, through amateur radio, friends are waiting to welcome you in virtually every country visited. . . . With the opening of the 20 meter band, we can't help wondering where we'll find some of our

Clyde, W4DUZ, and Leal, W4ERK, in Leal's shack in Miami. Leal looks as good as he sounds.

friends who have crystals for only one frequency. . . . Les, K2GCP, has hit the jackpot: his daughter, Patricia, married Pete, W2FDU, son of Pete, W2MDQ, nephew of Bill, W2KG, and Lou, W1BE, and cousin of Pete, K2LAA. Can you imagine the ham talk when the family gets together? . . .

We'll welcome your comments, your news and your photographs. We want this to be a column that all sidebanders will enjoy.

73, Irv and Dorothy

VHF [*from page 82*]

Ave., Rahway, New Jersey.

Milwaukee, Wisconsin Old contester Vic Weissbrodt (W9JFP) sez and sends: "Enclosed are pictures of a 144 *mc* rig which was made by K9DOE and myself. The whole job, exciter and kw final are in a 7x7x17 package. Two 6CL6s and two 636D drivers to a pair of 4CX250B Ceramics, and runs 800 watts phone and 1 kw *CW*; 75% efficient.

"The 220 *mc* band was really open here on January 30, 1960; open all evening into Kansas, and Nebraska, both of which I got. Two meters was also open all through the middle west into Kentucky, Tennessee, Ohio, Missouri, Kansas, Nebraska." *Glad to hear of it Vic. Never would have known if you hadn't bothered to write me.*

"Am on 220 *mc* every night at 2000 looking east; 500 watts, same rig as on two meters; 30 element spiralray, CW or Phone."

"The two meter and 220 *mc* activity is growing in leaps and bounds here. Got on 220 the other night and worked eighteen stations in an hour and a half in Michigan, Indiana, Illinois, Wisconsin and Iowa. How's that for a dead band?" *Couldn't be better, Vic. Just imagine what you'll be working when activity really goes 'way up thar!'*

73, Sam, W1FZJ

NOVICE [*from page 85*]

W9—Howard H. Halseun, 9712 S. Merrion Ave., Chicago 17, Illinois

Letters

Paul Gregory, KN1MVM, 99 Botsford Rd., Seymour, Conn., cracks the letters dept. this month. Paul has had "that piece of paper" for a month now, and has 7 states under his belt with a Globe Chief and Allied "Space Spanner". He will sked anyone on 40 and desires ham pen pals.

Terry Travis, 732 S. Pine, Kermit, Texas, forgot his call, but did say the rig was a Heath AT-1 pumping 25 watts into a longwire along with a BC-348 receiver. Terry would like skeds on 80 and 40 with anyone needing Texas for WAS.

Bob Haberien, 230 McKee St., Manchester, Conn., SWL's with an S-53 and Harvey Wells R9'er and wrote in an attempt to locate the whereabouts of K8HTI, and K1DNQ.

Gary Charles Coon, K7HYB, 1424 Dalton, Spokane, Wash., "shed" the "N" from his call about four months ago and now operates 10 and 15 meters phone and 15 cw with a DX-40 and SX-99. Gary is working on a 2E26 mobile rig and should have it going soon.

Harry Schrieffer, KN5YVT, 1153 Southlawn Blvd., New Orleans 14, La., is 13 years old and plunks away on 40 and 15 meters with a DX-40 and HQ receiver feeding a doublet. Harry will be glad to look for you if you need La. for WAS, or not.

Francis D. Howe ("Dan"), KN9SMQ, 421 Oak St., Quincy, Illinois, writes to brag a little about the wall paper and working a WAS of 45/43 plus two KZ5's out of 144 QSO's. Dan would like contacts with S. Dak., Del., N. Hamp., N. Carolina, Hawaii, and Alaska to polish off the 50 required.

Bob, KN1KOG, and Jim Edwards, K1IMJ, are brothers and represent the "rare" state of Rhode Island from Middletown. Bob uses a Viking Adventurer and a surplus Hammerlund RB129. Jim's station, shown in the photograph, runs a Geloso 212 transmitter and an RME 4350A receiver.

Jeff Kaliss, KN1MME, 22 Forest St., Bar Harbor, Maine, has worked 16 states and tons of homework. Jeff will sked anyone needing Maine on 7.161 *mc*, and will assist prospective hams in his area. Your 40 meter dipole should load on 15, Jeff; try it.

And with Jeff's letter it is time to fold our tent, like the Arabs and drift away. Don't forget to keep those letters and photographs coming this way. For now. . . .

73, De Don, W6TNS

RTTY [*from page 89*]

of the loops. This is 850-cycles. And so on, up until the 5 to 1 ratio, which is 2125-cycles. The 6 to 1 ratio is 2550 cycles, the cross-over

point of your TU filters, and the 7 to 1 ratio is 2975 cycles. If your audio oscillator has a dial it might be a good idea to put markers at each of these desired frequencies, then you don't have to go through the 'scope routine every time you line up a TU.

The above is about as simple as you can get with a fork standard. A more complicated transistorized unit is described on page 56 of the *RTTY Handbook*. ($3 postpaid via KØ-WMR) The same type of fork is used in both units. If your local music store doesn't stock forks, and/or if you don't have a nearby RT-TYer with a fork standard with which you can compare yours, write to me—I might be able to help.

Across the Nation

W2TAM of Trenton, N. J., is struggling with an AN/FGC-1 but is putting a good signal into Minnesota on 80. W2GYG of Westfield, N. J., is an old timer (1916) who still likes to build. W3VVP of Easton, Maryland, is on with a TG-7B, a CV-71/URR, an SX-88, and a Viking. W3SMK is a source of paper and tape, in carton lots. W4MGT of Lexington, Ky., is QPO on 3620 *kc* as is KØWMR. W5CSN of Houston, Texas, has Model 15 troubles. W8-JIN, Cincinnati, Ohio, reports that the Ohio Valley Radio Association has about 15 Model 15's cooking on 6 meters. W7PHJ of Yakima, Washington, was heard working TG9AD of Guatemala on 14,340 *kc*.

W9UE, Ben Woodruff, 6140 North Harding Ave., Chicago 45, Ill., the inventor of the famous *Auto-Mate 26*, has done it again. This time it is a very beautifully styled cabinet kit for one of the popular electronic keyers; for *cw*, that is. Drop Ben a line and ask about his *Auto-Mate K 5/50*.

The RATS-nest, the Minnesota net, meets Thursday nights at 8 PM CST on 3620 *kc*. The NCS is WØJHS and regular check-ins are WØBWM, WØHAH, WØHTG, WØLFH, WØWTP, KØAKG, and KØWMR.

Comments

By now most of you know that we are losing the high end of 20-meters to the 'phone boys. While RTTY stations usually operated above 14,330 *kc*, we know that many dx *cw* stations kept skeds below us, so we are not the only losers in this ill-advised shift. The big question is, where do we move to on 20? 'Ole BeeP, WØBP, and your RTTY Editor had quite a discussion about this when the question first reared its ugly head many months ago. BeeP's suggestion, and I thought it a good one, was that we should move just below 14,100, say 14,090. This would get us just out of the hair of the foreign 'phones and yet not too low into the *cw* band. On 15-meters, RTTY operation has been quite successful just below 21,100. Maybe it will work here, too. What do *you* think?

73, Byron, W2JTP, KØWMR

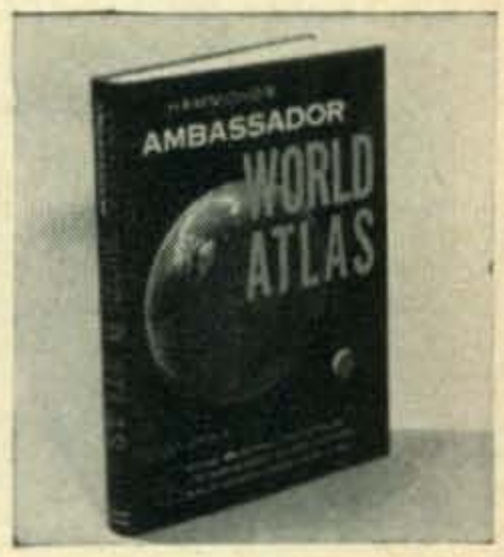
THE CQ HAM MART

19" GLOBE

Here is a chance to preserve your breath for posterity! This beautiful World Globe, made by Hammond, is a must for every hamshack. Plain for $19.95 or lighted for $24.95. The first 10,000 people who jump at this bargain will get a year of CQ at no extra charge.

ATLAS

What! You don't know where Nicobar Island is? Incredible! And with the CQ deal on the Hammond Atlas so reasonable too. This is a reference book that will get good usage around your house if you have any kids. 7 lbs. of colored maps and a gazetteer for only $12.50... and you get a year of CQ.



COMMAND SETS

This IS a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous, amazing terrific pages for only $1.50 postpaid.

MOBILE HANDBOOK

Anyone who tries to go mobile without getting this book should register for a sanity hearing. Bill Orr, W6SAI has put everything you need to know in this book. Build-its by the dozen...solutions to ignition problems, keeping the battery charged, noise...only $2.95 postpaid.

CODE RECORD

Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General License. $3.50 each.

HAM'S INTERPRETER

Now you can talk in broken French, Spanish, Italian, German, Swedish and Finnish. This handy little book gives all the popular ham conversation in seven languages, including letters and numbers. Only $1.50 postpaid.

TVI HANDBOOK

WIDBM's newly written TVI book (2nd edition) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2- and 6-meter TVI as well as Citizen's Band, Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price $1.75 postpaid, USA, $2.00 Foreign.

BINDER

There is no other good way to keep your back issues. Make 'em neat. We supply the binder, with the year embossed in gold, not merely a sticker which will come off later. Specify what year you want stamped on your binder. $3.50 each.

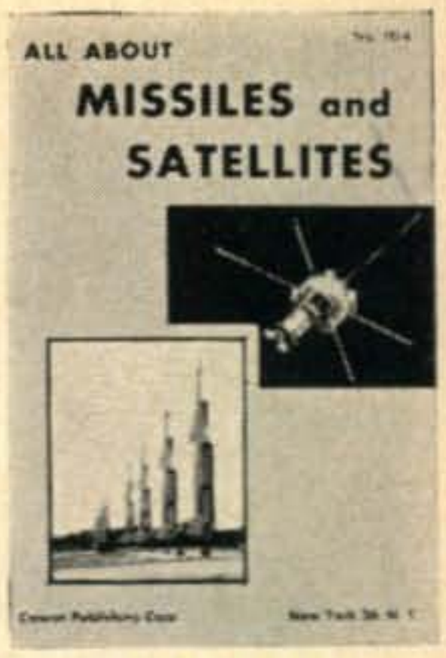
BOUND VOLUME

By far the handiest way to keep your library. Why not go first-class? This impressive volume is only $10.00. We only made a few of them this year, so don't expect to get one later.

CQ ANTHOLOGY

Most amateurs do not have a good file of back issues of CQ. So we've looked back through the years 1945-52 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out. The price is a paltry $2.00.

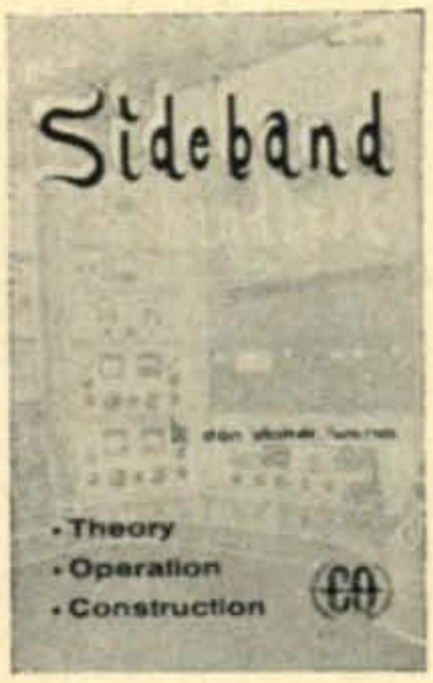
ALL ABOUT MISSILES & SATELLITES



Here's a book, written in down-to-earth language, which answers questions on missile maintenance, fire control, flight control tracking, testing, fuels, payload and many other achievements in rocketry and space for both scientific and military applications. Also, featuring the most up-to-date "Directory of 38 Most Popular Missiles and Their Photos," (supplied by Department of Defense) as well as a "Glossary of Missile Terms." $1.50 per copy.

HI-FI BOOK

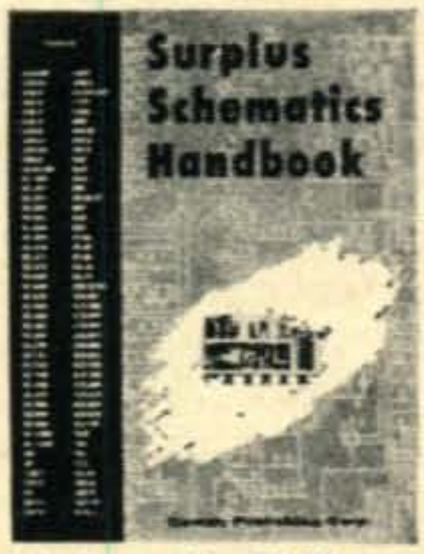
This nifty volume contains the latest dope on amplifiers, preamplifiers and equalizers plus a buyer's quide of component manufacturers! Over 150 — 5½" x 8½" pages of heavily illustrated descriptions covering Hi Fi Audio Components—the greatest publication value in its field today. Only $2.50 per copy.



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, was almost one full year in the preparation of this terrific volume. This is not a *technical* book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only $3.00.

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator. All this for only $2.50.



This is a book literally loaded with schematics for all the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available. Trying to figure out the circuitry cold turkey can be many times more difficult than the most involved puzzle, and purchasing a single instruction book can run as high as $3.50. Why knock yourself out when you can have a book with complete coverage on hand in your library? All this for only $2.50.

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LIGHTED GLOBE	$24.95	☐
UNLIGHTED GLOBE	19.95	☐
ATLAS	12.50	☐
COMMAND SETS	1.50	☐
MOBILE HANDBOOK	2.95	☐
CODE RECORD	3.50	☐
REGULAR LOG SHEETS (100)	1.00	☐
SSB LOG SHEETS (100)	1.00	☐
HAM'S INTERPRETER	1.50	☐
TVI HANDBOOK	1.75	☐
BINDER—YEAR WANTED	3.50	☐
BOUND VOLUME	10.00	☐
CQ ANTHOLOGY	2.00	☐
MISSILES & SATELLITES	1.50	☐
HI-FI BOOK	2.50	☐
SIDEBAND HANDBOOK	3.00	☐
CQ LICENSE GUIDE	2.50	☐
SURPLUS SCHEMATICS HANDBOOK	2.50	☐

SIRS: My check (money order) for $_____ is enclosed. Please send the following items to:

Name_____

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CONTEST CALENDAR [*from page 90*]

4. The same station can be worked once on each band.
5. No credit for working stations in your own country.
6. Each contact counts ONE point.
7. Your final score will be the total number of points on all bands multiplied by the number of different countries worked. (Different countries are the number of countries worked on all bands, not the sum total on each band as is the case in most contests. We were a bit confused on this point so we got an interpretation direct from Moscow.)

Awards will be made on the basis of all band operation. In addition, single band awards will also be made for operation on 3.5 and 7 *mc*. Awards will be made to both Single and Multi-operator stations in each country as follows:

1st Place—A 1st degree certificate and a contest badge.

2nd & 3rd Place—A 2nd degree certificate and a contest badge.

4th & 5th Place—A 3rd degree certificate and a contest badge.

In addition each operator of a winning multi-operator station will also receive a badge.

Additional certificates are available for:

1. W 100 U for working 100 different Soviet stations.
2. P 6 K for contacting all six continents.
3. P 150 C for contacting 150 different countries.

(The impression here is that these certificates are for contest operation only. However I'm sure they are also available for other operation. You just don't work 150 countries in 24 hours.)

The contest judging will be carried out by an International Jury composed of 3 representatives of the USSR Central Radio Club and 7 representatives from those countries which have the largest number of participants.

This is the last "brawl" of the season fellows, so let's make a good showing. (Maybe I'll get to go to Moscow. Hi.)

Send your logs, not later than May 15th, to: USSR Central Radio Club, Att: Chief Judging Board, P.O. Box 101, Moscow, USSR.

73 for now, Frank, W1WY

CITIZENS RADIO [*from page 91*]

on the switch so that the coil is *always* in the circuit. The two crystals were removed from their sockets and 3-12 mmf ceramic padders, with stiff wire leads, were inserted in place of the crystals. A little calibrating with the *gdo* and station receiver promptly brought the padders, now in parallel with the coil and variable capacitor, to a point of overlapping each other in frequency by about 10 *kc*.

Talk about bandspread . . . it takes 3-180°

rotations of the already geared-down tuning knob to cover 28.5 to 29.7 *mc*. Many local contacts and six midwest QSO's on ten have resulted so far. The best contact has been with an M/M in the Gulf of Mexico.

Now under consideration is a project to add an extra deck to the transmitter crystal-selector switch to select pretuned padder capacitors for resonating the final and output circuits for operation on widely separated frequencies.

C/B Or Not C/B

It's so important, we'd like to make this point again. Whether or not you're interested in C/B, as a ham there is a great deal to interest you in C/B equipment. New ideas in construction, and the commercial prospect of mass purchasing power by hundreds of thousands of C/B's combine to offer ever-increasing opportunities for hams to benefit from this new electronic bonanza. We're happy to see the general high quality of C/B units, and we'll continue to exploit their application to ham radio as well as citizen use.

New Antennas

Advance Electronics Co., 8510 North End Avenue, Oak Park, Michigan, let us check out two new C/B antennas.

Their ground plane antenna incorporates two unusual features. A small rod slides in and out of the vertical section and may be locked in place at the point of maximum radiation and lowest *vswr*. Holes are provided in the ground plane elements so that wire webbing may be strung between elements for improved ground plane operation. This antenna has done a noble job throughout a windy winter.

Their mobile antenna is a full ¼ wavelength whip of 2-section stainless steel rod. When the top 10-11 meter section is removed, the bottom section resonates at 6 meters! It is filled with a mounting bracket that should accommodate most car bumpers without drilling a single hole. Installed or removed in one minute. Both antennas are equipped with SO-239 coaxial connectors.

73, Lee, W2QEX/2W2870

YL [*from page 93*]

dling. . . . Officers of ALAMO YLs are: Pres. K5OPT, Ruth; V.P., W5WXT, Inez; S-T, K5OPS, Ethel. They have two nets in operation: Fri., 0900 CST, 7235, NCS K5OPS; Tues., 1900 CST, 145.2, NCS W5TSE.

WRONE members plan to meet for their Spring Luncheon on Sat., May 14 at Robin Hood Ten Acres, Rte. 20, Wayland, Mass., from 12 to 4 p.m. The price is $2.25 (includes tax and tip). Send your reservations to W1COL, Marie Welsh, Antrim St., Cambridge, Mass.

WAYLARC, YL club of D.C., offers a new certificate to anyone making on the air con-

Transpace — 6 channel Citizens' Band radiophone

You get every top feature in a TRANSPACE – the set that gives you the full possibilities of Class "D."

Six-channel operation. Choose up to 6 channels, by means of an illuminated front panel selector. The dial is direct reading – no interpolation needed.

Three-way power supply – operates from 115 volts ac, 6 and 12 volts dc. Only one Transpace Model for car or home.

Maximum legal power – a full 3 watts RF output.

One-microvolt sensitivity for maximum reception . . . 37 db selectivity.

Full 100% modulation, plus adjustable squelch and automatic noise limiter.

No retuning – the Transpace maintains full sensitivity and power output when you switch channels.

Rugged construction–withstands the roughest mobile use. Super-tough vinyl finish.

Immediate delivery from stock. Write for literature and name of local dealer.

Transpace **INC.,** For further information, check number 36 on page 126.

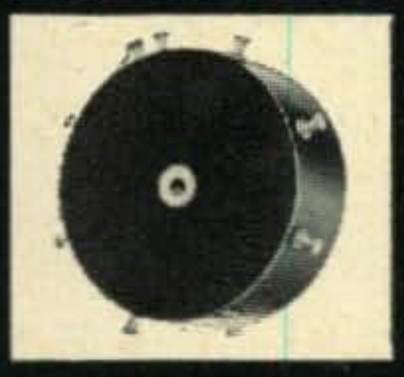
12902 Foothill Boulevard • San Fernando, California

TRANSISTORIZED D.C. POWER CONVERTERS & INVERTERS

These small lightweight units, feature low current drain, high conversion efficiency, ruggedness and no moving parts. They provide trouble free, economical operation of communications equipment and other related devices. Ideal for use in mobile, marine, aircraft, Citizen's Band and amateur equipment.

TRANSISTORIZED CONVERTERS AND INVERTERS 12 TO 14 VDC INPUT				
MODEL	TPC-25W	TPC-60W	TPC-120W	TPI-25W
RATING	25W	60W	120W	25W
PRICE	$32.50	$48.50	$57.50	$32.50
OUTPUT Voltage Current	 250V 100ma	 300/150V 200ma total	 500/250/—60V 200/100/10ma	 115/26V 25W—400cy
INPUT No Load Full Load	 0.5 amp 3 amp	 1 amp 7 amp	 1.5 amp 12 amp	 0.5 amp 3 amp
REGULATION Full Load/No Load Full Load/½ Load	 86% 92%	 88% 93%	 85% 91%	 70% 85%
OVERALL DIMENSIONS Width Length Height	 2¼ in. 3¼ in. 2⅜ in.	 3 in. 4¾ in. 3½ in.	 4¼ in. 5¼ in. 3¼ in.	 3⅜ in. 5 in. 3¼ in.

Precision wound Toroidal Transformers. For use in construction of Transistorized Power Converters and Inverters or as a replacement part. Encapsulated for ruggedness and long life. Easy to install and wire. Designed for operation in ambient temperatures from —55° to 130° C.



TOROIDAL TRANSFORMERS FOR 12 TO 14 VDC INPUT				
MODEL	TT-25W	TT-60W	TT-120W	TIC-25W
RATING	25W	60W	120W	25W
PRICE	$8.10	$11.25	$15.25	$14.75
TRANSISTOR POWER RATING	3 amp	6 or 12 amp	12 amp	3 amp
OUTPUT Voltage Current	 250V 100ma	 300/150V 200ma	 500/250/60V 200ma	 26 & 115 VAC sq. Wave

B & W *Barker & Williamson, Inc.*

Bristol, Pa.

For further information, check number 37 on page 126.

tact with at least 5 members of the club (DX stations need only 3). Contacts should be made on or after Jan. 1, 1960, and net contacts are not acceptable. Send QSLs to custodian, W3TSC, Camille Hedges, 2202 Culver St., Washington 21, D. C. Members of the club include W3's TSC, CDQ, RXJ, UTR, UXU, AKB, K5SPD/3, W5EGD/3, W4's DEE, TVT, K4's LMB, EAM, K7BGS, KL7AZJ, K5YIB. . . . Current officers of WAYLARC include: Pres., W4TVT, Claire; V.P., W3CDQ, Liz; sec'y, W3UTR/3, Meg; treas., W3RXJ, Irene; reporter, W3UXU, Betty.

Last call from HAWK of Indiana to attend the **10th Annual Midwest YL Convention** May 20-21 at Indianapolis. Check this column in your March CQ for details.

From W7NJS comes the report that W7GSR, Frances Morgan, has joined the Silent Keys.

Congratulations to K6OWQ, Mary, on joining the exclusive list of YLs to have earned the WAZ award. . . . Congrats also to W6NAZ, Lenore, who received a golden plaque from KG1FR, men of the Air Force Base at Sondrestrom, thanking her for three years of phone patches.

Are You Still . . .

Without your copy of "CQ YL"? It is the one and only book devoted to telling the story of the YLs in Ham radio—169 pages, over 500 photos. Order from this column editor (QTH at head of column), $3, postpaid.

33, Louisa, W5RZJ

AMATEUR POPULATION [*from page 57*]

Country	Ham Population	Country	Ham Population
CT1—Portugal	121	FO8—French Oceania	15
CT2—Azore Isl.	4	FP8—St. Pierre & Miquelon Isl.	6
CT3—Madeira	11	FQ8—Fr. Equatorial Africa	21
CX—Uraguay	1,451	FR7—Reunion Isl.	2
DJ-DL-DM—Germany	6,809	FS7—French St. Martin	1
DU—Philippines	80	FU8-YJ—New Hebrides	4
EA—Spain	779	FW8—Wallis Isl.	1
EA6—Balearic	10	FY7—French Guiana	6
EA8—Canary Isl.	34	G—Great Britain	9,324
EA9—Morocco (Sp.)	16	GC—Channel Isl.	39
EA9—Rio De Oro	2	GD—Isle of Man	30
EAØ—Spanish Guinea	5	GI—Northern Isl.	244
EI—Ireland	179	GM—Scotland	784
EL—Liberia	56	GW—Wales	410
ET2—Eritrea	36	HB—Switzerland	470
ET3—Ethopia	12	HC—Ecuador	123
F—France	2,097	HC8—Galapogos Isl.	1
FA—Algeria	124	HE9—Liechtenstein	3
FB8—Madagascar	29	HH—Haiti	70
FB8—Kerguelen Isl.	1	HI—Dominican Republic	12
FB8—Amsterdam & St. Paul Isl.	1	HK—Columbia	265
FD4—French Togoland	1	HL—Korea	16
FE8—French Cameroons	5	HP—Panama	53
FF8—French West Africa	33	HR—Honduras	81
FG7—Guadeloupe	4	HS—Thailand (Siam)	6
FK8—New Caledonia	14	HZ—Saudi Arabia	9
FL8—Somaliland (French)	1	I-IT—Italy	1,301
FM8—Martinique	9		

Country	Ham Population
IS–Sardinia	26
I5–Somalia	17
JA-KA–Japan	6,301
JY–Transjordan	2
KB6–Canton Isl.	7
KC4–Antarctica	6
KC6–Eastern Caroline Isl.	8
KC6–Western Caroline Isl.	8
KG1–Greenland	28
KG4–Guantanomo Bay Cuba	14
KG6–Marianas Isl.	54
KG6I–Bonin Isl.	1
KH6–Hawaiian Isl.	1,229
KJ6–Johnston Isl.	9
KL7–Alaska	1,062
KM6–Midway	11
KP4–Puerto Rico	472
KP6–Palmyra Isl.	1
KR6–Ryukyu Isl.	102
KS6–Samoa	6
KV4–Virgin Isl.	29
KW6–Wake Isl.	25
KX6–Marshall Isl.	18
KZ5–Canal Zone	177
LA–Norway	1,252
LU–Argentina	7,193
LX–Luxembourg	37
LZ–Bulgaria	7
M1–San Marino	2
MP4–Bahrain Isl.	23
MP4–Qatar	7
MP4–Trucial Oman	4
OA–Peru	335
OD5–Lebanon	49
OE–Austria	297
OH–Finland	1,090
OHØ–Aland	4
OK–Czechoslovakia	*
ON–Belgium	548
OQ5-Ø–Belgian Congo	209
OX–Greenland	20
OY–Faeroes Isl.	13
OZ–Denmark	1,565
PAØ-PI–Netherlands	958
PJ–Netherland Antilles	38
PJ2M–Sint Maarten	3
PX–Andorra	1
PY–Brazil	7,100
PZ–Surinam	15
SM–Sweden	2,138
SP–Poland	693
ST–Sudan	6
SU–Egypt	5
SV–Greece	44
TA–Turkey	1
TF–Iceland	39
TG–Guatemala	105
TI–Costa Rica	314
TI9–Cocos Isl.	2
U–Soviet Union	*
VE–Canada	7,845
VK–Australia	3,317
VK9–New Guinea, Papau, Norfolk Isl.	63
VKØ–Antartica	12
VO–Newfoundland, Labrador	144
VP1–British Honduras	21
VP2–Antigua	5
VP2–Dominica	12
VP2–Grenada	27
VP2–St. Kitts	6
VP2–St. Lucia	8
VP2–Montserrat	2
VP2–St. Vincent	5
VP3–British Guiana	16
VP4–Trinidad & Tobago	31
VP5–Cayman Isl.	4
VP5–Jamaica	26
VP5–Turks Isl.	9
VP6–Barbados	41
VP7–Bahama Isl.	31
VP8–Falkland Isl.	17
VP8–So. Georgia Isl.	5
VP8–South Orkneys	1
VP8–South Shetlands	3
VP8–Grahamland	10
VP9–Bermuda Isl.	39
VQ1–Zanzibar	1
VQ2–N. Rhodesia	76
VQ3–Tanganyika	23
VQ4–Kenya	63
VQ5–Uganda	20
VQ6–Somaliland	3
VQ8–Mauritius	11
VQ8–Rodrigues Isl.	1
VR1–Gilbert Isl.	1
VR2–Fiji Isl.	29
VR3–Line Isl.	2
VR6–Pitcairn Isl.	2
VS1–Singapore	45
VS4–Sarawak	3
VS5–Brunei	2
VS6–Hong Kong	33
VS9–Aden	11
VU–India	209
W-K–United States	200,000+
XE–Mexico	1,251
XV–Vietnam	1
XW8–Laos	6
XZ–Burma	25
YI–Iraq	1
YJ–New Hebrides	4
YK–Syria	9
YN–Nicaragua	101
YO–Roumania	22
YS–El Salvador	50
YU–Yugloslavia	874
YV–Venezuela	609
ZB1–Malta	41
ZB2–Gibraltar	8
ZC5–Cyprus	40
ZC5–North Borneo	5
ZD1–Sierra Leone	5
ZD2–Nigeria	14
ZD3–Gambia	1
ZD6–Nyasaland	8
ZD7–St. Helena	3
ZD8–Ascension Isl.	1
ZE–So. Rhodesia	140
ZK1–Cook Isl.	7
ZK2–Niue	2
ZL–New Zealand	2,828
ZM–Samoa, Western	6
ZP–Paraguay	308
ZS–Union of South Africa	1,919
ZS3–S.W. Africa	30
ZS7–Swaziland	4
ZS8–Basutoland	11
ZS9–Bechuanaland	9
3A2–Monaco	26
3V8–Tunisa	1
4S7–Ceylon	55
4X4–Israel	137
5A–Libya	67
8J–Antarctica	1
9G1–Ghana	33
9K2–Kuwait	9
9M2–Fed. of Malaya	46

*Not listed

Now if you've gotten this far, it's my sad duty to inform you that in some cases the population of the country in question may be inactive or may not be continually in residence. Anyhow, happy hunting! ■

HB4FE [*from page 55*]

Operating position, HB9TE.

brought him his card personally, taking the opportunity to visit his station.

Within a radius of approximately 3 miles of HB4FE there are 7 other HB9's (HB9U, GK, NB, QA, QQ, TE, XE). For those of you who are interested in the H22 certificate all of them and 25% of all Swiss amateur stations represent the Canton Zürich.

But do not believe that the pictures shown so far from HB4FE represent the average Swiss amateur station. Some of you probably know, that within Switzerland, there are power limitations which are valid for all stations and which differ considerably from the ones valid in US and many other countries. No California kw and I guess the Swiss PTT has had no trouble in this respect, so far.

When a student has passed the theoretical and practical examination, he must notify the PTT authorities about the general layout, power, etc. of the station to be operated and any changes of the station have to be reported immediately in order to keep the official files up to date. Fifty watts for the first 3 years and thereafter 200 watts maximum is the power limitation. This is not as bad as many of you kw-men might think at first. The author of this article has worked with his 50 watt rig. (shown in the picture) and a ground plane antenna tuned for 14 *mc*. During the first 2½ years, I obtained certificates for WAC, WBE, WAS and DXCC with 107 countries of which 103 are confirmed and many other smaller certificates. But many of us have done the same in half the time and with less than 50w. Most of us fellows over here are not at all unhappy with the low power regulation limit, and we sincerely hope that the day will not be far, where this will become valid all over the world, as for many of us it is more a financial problem than a technical one. Would it

not be more fair if everybody would fight with equal weapons?

May I take this opportunity to thank Fred (W3FMC) and his family for the wonderful stay I had with them during the 1958 ARRL Convention in Washington. It was for me not only the most impressive convvention I ever attended, but I also found there real Ham spirit, which knows no political borders. Thanks to all of you fellows! ■

TRANSISTOR TESTER [*from page 54*]

to be tested in the proper socket making sure first that the tester is turned off. Set the NPN-PNP switch to the type of transistor that you are testing. Set the BETA-Ico switch (S2) to Ico, the METER switch (S4) to MA, the BETA-CAL switch (S1) to CAL, and turn on the tester. The meter will now assume some value, usually less than 20 μamp. If the reading is greater than 50 μamp, do not turn the BETA-Ico switch to BETA, for the current in the collector circuit will exceed 1.0 ma and pin the meter pointer. A reading in excess of 50 μamp will in most cases indicate a defective transistor. Usually, a reading of from three to five times the manufacturer's rating will indicate a partially or totally defective unit. If a transistor checks slightly low on current gain and shows excessive saturation current, the transistor may still work in non-critical circuits but its operating life may be short.

If the transistor checks normally on the Ico test, switch the BETA-Ico control to Beta and set the collector current to full scale on the meter with the Ic potentiometer, R11. Now set the METER switch to BETA and adjust the meter to read full scale with the CALIBRATE potentiometer, R5. Set the BETA-CAL switch to BETA and read the current gain of the transistor directly from the meter in terms of 0 to 100. This procedure may sound lengthy and complicated but after you do it a couple of times you will probably be able to do it with your eyes closed. (Or at least with one eye closed.)

Precautions

In checking transistors with this tester, one precaution must be observed. The transistor to be tested must be inserted in the test socket before the instrument is turned on; and the tester must be turned off before the transistor is removed from the test socket. The NPN-PNP switch should be set properly before the tester is turned on. The transistor will not be damaged if this is not done, but the meter will not indicate properly.

Three things must be known about a transistor before testing. One, the type (NPN or PNP); two, the normal saturation current at room temperature; three, the normal current gain in the common emitter connection. All

[*Continued on page 124*]

REINARTZ [*from page 51*]

Collins Radio, then a high school boy who cut classes to get back to his rig for the communications.

For his work with Byrd, Reinartz was commissioned a lieutenant in the Naval Reserve in 1927. After the Arctic tour of duty, he experimented for the Navy and also worked at what is now the University of Connecticut. These latter experiments were on measurement of voltage generated by growing plants.

By 1933, Reinartz' work in radio won him a position with the Radio Corporation of America as "good will ambassador" to the 50,000 amateur radio enthusiasts. As a Naval reservist, he ran weekly classes, via radio, for the men of the Third Naval District.

In 1938, with war on the horizon, Reinartz was called to active duty in the Navy as a personnel officer, assigned to assemble eligible, experienced, radio personnel for training and research. By Pearl Harbor, he had assembled a list of 720 reserve officers and 3,500 enlisted reserves who were quickly assigned to communications duties.

Reinartz, himself, moved on to other Navy jobs, including a tour as head of the Naval Research Laboratories Radio and Radar Division. Later, on the West Coast, he was in charge of modification of airborne radar equipment used in the Pacific.

Reinartz served in the Navy until 1946, achieving the rank of captain. In 1946, he rejoined R.C.A.

Reinartz and his wife decided to seek a more pleasant climate than the northeast and in 1949 he came to California and joined Eimac as manager of the Amateur Service Department.

With RCA and Eitel-McCullough, Reinartz holds a total of 28 patents, several still in use today. Several aided in the development of communications for World War II.

He developed the loop antenna used in microwave radar, a super-generator receiver which makes radio reception more readily possible in very high frequencies and a "duo inductor" for increasing efficiency of shortwave transmission tubes.

He also developed radio equipment for aerological and meteorological studies made by the University of Michigan in exploring life on and above the Greenland land mass.

Reinartz' trail-blazing work in radio was recognized in 1958 when he was named a Fellow of the Institute of Radio Engineers. He is also a member of the Explorers Club of New York, the American Polar Society, the American Radio Relay League and is an associate member of the Naval Institute.

Reinartz credits a nature "lazily inclined" with his inventiveness, which in several cases sought the simplest, most practical method of achieving a radio instrument. He has always

been interested in the instrumentation which amateurs could make themselves, so as to better understand the principles and processes involved in radio.

Reinartz retired January 30 from his post at Eimac. He and his wife, who now reside in Burlingame, plan to retire to Aptos, where they'll continue to be active on the air—and Reinartz can get in plenty of fishing.

Mrs. Gertrude Reinartz, daughter of a South Coventry farmer, only recently gave up letting her husband be the only radio amateur in the family—after 43 years of marriage. She's now K6MJH. ■

CONVERTER [*from page 43*]

used equally well in this position, such as the 7F8, 6J6, 12AX7 or 12AT7). Recent articles in a number of magazines have shown dual-triode oscillators of this sort, but so far as is known they have not been used in broad-band converters.

The final result of this rather simple modification is a mobile converter that performs exceedingly well, being nearly as stable as a crystal-controlled converter. There is no longer any evidence of mixer pulling, thus making alignment a breeze by comparison. Changes in the B-plus voltage have almost no effect on the oscillator frequency. It may not be crystal-controlled, but it's mighty hard to tell the difference now. ■

BIRD CAGE [*from page 42*]

vertical wires in a Zerba or Lazy H and are used solely to provide correct phasing between the upper and lower bays.

The X construction brings the current loops in close proximity giving power transfer to the parasitic element more efficiently than with a Quad or 2 element yagi. The performance closely approaches that of an all driven array.

The main advantages over a cubical quad are as follows:

1) No horizontal boom to distort the pattern or absorb energy.
2) No insulators at high voltage points to introduce loss.
3) Tubing is used in place of wire for the parts of the array carrying maximum current. i.e. Less resistive loss.
4) Perfect balun action due to the quarter wave vertical mast. No matching to adjust—no line radiation.
5) The X type elements have higher Q than a quad loop. The gain is therefore improved. (See W6SAI antenna handbook)
6) The X elements give better F/B ratio.
7) The mechanical advantages are self evident.
8) Extremely low angle of radiation when used at normal heights. ■

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HAMS! In central Illinois it's KNOX ELECTRONIC SUPPLY, INC., where your trade-in is always worth more. 67 North Cherry St., Galesburg, Illinois.

SAVE ON ELECTRONIC, Radio and Communications Components and equipment for Hams and commercial use. See thousands of parts in stock—many more coming in daily, all at unusual savings. If you live in or near Philadelphia, visit our new warehouse at 31st & Grays Ferry, or send for free catalog. Selectronics, 1206 South Napa Street, Philadelphia 46, Penna., or Phone HOward 8-4645.

RADIO & TV TUBES at Manufacturer's prices! 100% Guaranteed! Brand new! No re-brands or pulls! United Radio, Box 1000, Newark, N. J.

TUBES, 4X150A, fully guaranteed, fully tested, interchangeable with 7034 and 4X250B. Large stock, $4.00 each, two for $7.00, sockets with order. $1.50. H & C Sales, 513 Wabash Ave., Matoon, Illinois.

ANTENNA TROUBLES? Watch Laurel & Hardy erect a roof antenna amid hilarious antics Kraus and Yagi never dreamed of. Low front to back ratio, but loads of laffs for all ages . . . especially the Jr. Ops. 200 ft, 8mm film. $5.50 postpaid; send check or M.O. (no cash or COD) to JAGFILMS, 1738- 201 St., Bayside 60, N. Y.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet-size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with $1 in stamps or cash for each item that you want preserved. 24-hour service. Send to C. Lee Co. P.O. Box 395, Grand Central Stn., New York 36, N. Y.

FOR SALE: Mosley 80-40 meter Vertical, $100.00 value. Best offer. K2IEG, 521 Ocean Parkway, Brooklyn 18, N. Y.

TOROIDS: Uncased 88 mhy like new. Dollar each. Five $4.00 PP. DePaul, 101 Starview, San Francisco.

LISTEN TO the Radiotrician Digest; Southern Calif. every Friday 7 PM, 860 kc.

COLLINS 75A-1 $249., 75A-4 $545., 51J-2 $4.95., 51J-3 $575., R390A/URR, 32B-1, AC Supply, Spkr. 75S-1, $975., 32B-1 $525., 516F-2 $89., KWS-1 $1095. Filters, $49., Eldico #100F $495., SX-99, $109., SX-101 $225., SX-101A $295., NC-183-D $239., HT-32A $519., Gonset 111 6 meters $219., GSB-100 $399., Technical Material PMO Oscillator, counter dial $245., Teletype Printers #14, #15, #19, #26, #28, T-D #14, #14 Reperf., Converters. Write Tom, W1AFN, Alltronics-Howard Co. Box 19, Boston 1, Mass. (RIchmond 2-0048).

NEW SERVICE for amateurs. List your equipment for sale, let us know your needs. No charge to buyer, small broker fee to seller after transaction. W2EEJ, Herbert Greenberg, 821 Rutgers Road, Franklin Square, N. Y. IVanhoe 6-0809.

CALL LETTERS may be applied to any surface. 2" set 60¢, 3" set 80¢. Send to C. Lee Co., P. O. Box 395, Grand Central Station, New York 36, N. Y.

FOR SALE: 400 W xmtr, Globe King 400B, all coils, spare tubes, 755 VFO $300. I want smaller xmtr, like Champion 350. Will consider swap. Want SX28. H. F. Cushing, W1EUS, 16 Preston Dr., Manchester, Conn.

FOR SALE: Cleaning house—Viking Valient, new in factory sealed carton $355; National NC183D original cost $450, sacrifice $210; HQ 170 new condition $275; DX40 used only 3 months $55; HT 32A mint condition $510. K2KPM, I. Boilen, 456 Schenectady Ave., Brooklyn, N. Y. PR 2-5612 after 6 P.M.

SELL: NC-300 in excellent condition with matching speaker. K2YZX/1, Les Margareten, 202 Commonwealth Ave., Boston 16, Mass. KEnmore 6-4638.

MOBILE STANCOR 10 Meter xmtr $25, Gonset Triband $25, Dynamotor $5, all 12V for $50. Also Allied Deluxe Allband Receiver with S meter and xtal calibrator $95. FOB Bill Kraemer, 14285 San Feliciano, La Miranda, California.

SELL: NC-98 with matching speaker and Heath Q-Multiplier $109.00; DX-100 $149; International Crystal 100 kc calibrator $6.00; FCV-2 6m. converter $12.50; Dow-Key TRM-1 relay $8.50; October 1958 QST 2E26 6m. rig with p.p. 6V6 modulator and power supply $20. All shipping extra. Robert Weisman, W3ZQG, 516 Washington, Cumberland, Maryland.

FOR SALE: Chief 90A, screen modulator, NC98, VF-1, ev mike. College. Best offer part or all. K9BTU, Dick Kesler, Olney, Illinois.

FOR SALE: KWM2 will take KWS1 in trade. 75A4 late serial excellent $535. WØBNF, Box 105, Kearney, Nebraska.

NEW repair parts for BC-348 models H, K, L and R. Stamped, addressed envelope for free list. Electroincraft, Box 399, Mt. Kisco, N. Y.

CRYSTAL CALIBRATOR: 500 Kilocycle FT-241-A standard crystal with circuit schematic that will zero crystal to WWV $1.95. Surplus Channel 70 FT-241, 500 kilocycles. .05% tolerance 99¢. FT-243 .01% of any frequency from 3500 to 8700 kilocycles 99¢. Add 5¢ per crystal for postage. All types of crystals available. Bob Woods, 2164 Parkway, El Monte, California. GIlbert 8-3139.

CRYSTALS AIRMAILED: SSB, Net, MARS, Novice, Marine, etc. FT-243 any frequency 3500 to 8600 $1.49 (10 or more 99¢), any quantity novice 99¢. 1700 to 30,000 $1.95. November CQ "Crystal Synthesizer" complete set of 31 crystals $39.95: November QST "Phasing Sidebander" $9.95; June 1958 QST "SSB Package" five FT-243 mixer $9.95, HC-6/U hermetic $12.95, matched filter $6.90; also many others including Collins hermetics. Be specific, ask. Crystals since 1933. Airmailing 9¢ per crystal. C-W Crystals, Box 2065C, El Monte, California.

SEVERAL Mercury wetted relays suitable for electronic bug. W. E. D171584 or D168479 similar to W. E. 276 series $4.95 each. Robert Adams, 18424 Winston, Detroit 19, Michigan, KE 7-0931.

ALUMINUM for every ham need. Write to Dick's, 62 Cherry Avenue, Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

FOR SALE: Superior tube checker $35; B&K pix tube rejuvenator $45; Heath signal tracer $19; Eico Model 232 VTVM $30; Blonder-tongue Converter $5. Jon Wood, WØUHL: 1322 Y2 Main; Parsons, Kansas.

RECONDITIONED! TERMS! TRIALS! FULL GUARANTEE! Mobile (and portable). Specify 6 or 12 volt; PMR-6 $59.00; PSR-6 $5.00; G-66 $149.00; 3069-PS $27.50; Commanche $139.00; MBR-5 $109.00; NC-66 $69.00; KE-93 $179.50; Vocaline JRC-400's pair $39.95; Super 6 $39.50; Super 12 $54.95; 3BR $24.95; 5BR-1 $39.50; Regency ATC-1 $59.50; Leece-Neville 6 volt complete $39.50; KWM-1's $699.50; Elmac A-54 $95.00; AF-67 $139.00; C-1050 $35.00; Cheyenne $129.00; Viking mobile $75.00; Palco 65 complete $119.00; Sonar SRT-120 $75.00; Stancor ST-203-A $32.50; Subraco MT-15X $37.50; Transcon 6 $69.50; PE-103 complete $19.95 Telecom 2D11 $49.00. Leo, WØGFQ, Box 811, Council Bluffs, Iowa—World Radio Laboratories.

FOR SALE, G-66B, G-77A with 12v. and 110 v. power supplies, Master Matcher, "Slim Jim" whip, mount, and Electro-Voice 600D microphone, Best offer over $500.00. Need money for school. Reginald Toumi, 2105 Knight, Helena, Montana.

For further information, check number 45 on page 126.

FOR SALE (Cont'd)

COLLEGE BOUND, for sale Johnson Viking II, Johnson VFO, Mosley TA-33JR, AR-22 rotor, and a 60 foot crankup tower. Prefer local sale. Norm, KØIPD, JA-1-2464.

CHANGED MIND about building KW final—for sale; 3000v—3000v @ 700 ma 2KW Plate Xmfr. $75.00, 2—Jennings Vari Vacuum Capacitors, 35 to 700 uufd, 7000 vdcw, $20.00 each. You pay shipping, CODs OK. W3CSF Ed Karsin, 2205 Ardmore Blvd., Pittsburgh 21, Pa.

KITS Constructed—20%—details write William Kapanke, West Salem, Wisconsin.

FOR SALE: 1 Heath Mohawk (RX-1); 1 Heath Apache (TX-1); 1 Heath SB Adaptor (SB-10) all units recently aligned and tuned up at Heath factory. Best realistic cash offer takes them. Box SRC, CQ Magazine, 300 W. 43 St., New York 36, N. Y.

GREAT SURPLUS VALUES!! BC-603 Receiver new $17.00—R-26/ARC5 Rec 306 mc New $12.95, used exc $7.95—R-27/ARC5 Rec 606-9 mc New $12.95, used exc $7.95—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 $39.00—Collins CF1 82-Q for 811-PP to 813 final $3.95—RA-62-C Power Supply A-C for SCR-522 VHF 110/cyc. New $59.50—Kits only for above, $17.00—Ground-plane VHF antennas 30-200 MC New $9.95—Hi-Mu Electronics—137 Hamilton St., New Haven, Conn. Store hours 10-5. Sat. 9-12.

HAVE 32V2 and HRO 7 with coils for $550.00 perfect condition. George A. Lafleur, 25 Queen Mary St., Ottawa, Ontario, Canada.

ONE THIN DIME brings 50 page eye-popping war surplus electronics catalog. Fabulous bargains. Meshna, Malden 48, Mass.

JOHNSON signal sentry and SWR bridge $20.00. WRL 65A xmtr. Excellent condition $50.00. RME DB23 preselector $30.00. Kent Bowron, 210 Roosevelt Ave., York, Pa.

VHF JOURNAL! At last—A magazine printed exclusively for VHF'ers. "The VHF Amateur" (formerly "QSO") is published on a non-profit basis by active VHF men for VHF consumption. We have just about everything for the VHF'er—DX news, construction articles, humor articles, and reports from all over the country on VHF activity. Send $1.00 now for six big issues—$2.00 per year. "The VHF Amateur," 67 Russell Avenue, Rahway, New Jersey. DX-100 transmitter, like new, $140 F.O.B. W3VBM, 1727 East 35th, Baltimore 18, Maryland. TUxedo 9-5243.

BASIC UNIT for boomless quad. Sturdy spider mounts at rotator. Arms protrude at precise angles providing optimum two tenths spacing for any band. Just attach your bamboo and elements for one, two or three bands. Result: properly spaced attractive hurricane resistant quad. Minimum fly wheel effect. Inexpensive rotator suffices. Spider on support pipe $14.95 express charges collect. Wild Goose Antennas, Box 573, West Fargo, North Dakota.

LOWEST Prices: Latest amateur equipment. Factory fresh sealed cartons. Self addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Ridge Road, Stamford, Conn. DA 2-0703.

SELLING complete station: Globe Chief w/modulator, Hallicrafters' S-85, Heathkit VFO, xtal mike, key, relays—$150. Write K4SAY, 3753½ Lentz, Louisville, Ky.

FOR SALE: Terado Converter, 6 volts dc to 110 volts ac, 60 watts. $18.00. Rev. Robert Mark, 823 Church Street, Hawley, Pa.

APACHE Xmitter, expertly wired . . . $200. SX-100 . . . $225. Both 1 year. Write Allen Wong, 1351 Menlo Ave., Napa, Cal. BA 4-6235.

FOR SALE: DX-100 perfect condition $180. NC-98 perfect condition $110. OR Will trade both for Collins 75A3 or 75A4. W3BCP, Morganza, Maryland.

CENTRAL ELECTRONICS Sideband slicer kit, 458 VFO kit, QT-1, etc., HQ-129X, BC-221, SX-100, 6 volt & 12 volt dynamotor, new Viking II, Elmac A-54, Heathkit AT-1, Meissner Disc Recorder-Radio, E-X Signal Shifter VFO, TV Radio Service Test Equipment. Bob Wolfe, W3HDT, 19 Virginia Ave., Baltimore 6, Md.

RECEIVERS, transmitters and test equipment serviced and calibrated. Low rates. Monarch Engineering, 3058 Lehman, Hamtramck, Michigan.

FOR SALE: Factory wired 20A Exciter and 75S1 receiver. Contact: P. M. Freeland, W5ZVB, 6021 N. W. 58 Terrace, Oklahoma City, Oklahoma.

GPR-90, Collins ART-13 with all 115 VAC power supplies, excellent, all for $300. Write for picture and details. Guler, 658 Wildwood Lane, Melbourne, Florida.

FOR SALE: Sacrifice KE93 receiver (BC thru 10 meters) w/mobile and ac power supplies plus extra tubes. N. Y. A. P. O. shipping only. $185.00. C. Schauers, Hqrs. 4th Log Command, APO 122, New York, New York (Query First).

Johnson Adventurer, wired, never used, $49.50. Johnson 250-23 Match Box, as new $39.50, Hallicrafters, S-76 Double Conv. Rcvr. very clean, $99.50; Budd, Cry, cal. $13.95; F.O.B. L. N. Chambers, 3019 Jefferson, Davenport, Iowa.

6 meter Communicator III For Sale. Complete with mike, crystals, and manuals $200. David Maxwell, R. 1 Box 139, Moorpark, Calif.

WANTED

WANTED TRADES NEW AND USED: KWS-1 $1250.00, 32S-1 $590.00, 75S-1 $495.00, 32V2 $350.00, HQ100 $149.50, HQ110 $209.00, HQ129 $129.00, HQ145 $269.00, HQ160, $379.00, HQ170 $359.00, Johnson Mobile $75.00, Thunderbolt $589.50, Valiant $439.50, Johnson Citizen Messenter $139.75, Courier $289.50, Hallicrafters 101 Mark III $395.00, HT33 new $495.00, SX99 $119.00, SX100 $295.00, HT32A $695.00, S107 $94.95, NC125 $139.00, NC183D $319.50, NC173 $139.50, NC57 $69.00, SW54 $35.00, CB100 Citizen $125.95, Globe King 500A $425.90, Chief $49.50, 90A $54.95, 680 $95.95, 680A $97.95, DSB100 $129.95, VGO $42.95, NC300 $299.95, NC2400 $169.50, CE20A $195.00, 10B $139.50, CE Slicer $37.50, WQ Multiplier $59.95, Heath DX35 $54.95, AT-1 $23.50, DX20 $34.50. Easy terms, Ken-Els Radio Supply, 4208 Central Avenue, Fort Dodge, Iowa, or 128 31st Street NE, Cedar Rapids, Iowa.

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 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: All types of receivers transmitters, test equipment & teletype, in trade for NEW Hallicrafters, Hammarlund, Johnson, National, Central Electronics, etc. Collins 51J2 $495., 75A-1 $239.00., 75A-4 $595., Hallicrafters SX-101 $225., SX-101 Mk 111A $295., SX-99, $109., SX-71 $169. National NC-60 $45, NC-188 $109., NC-109 $139., Eldico SSB 100F $495. Teletype converters, printers, etc. Write Tom W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (RIchmond 2-0048). Store: 60 Spring St., Newport, R. I.

WANTED: Hand crank GN-58 or engine driven GN-50 for BC-1306 (SCR-696) send price, condition K7AWI, Box 7155, Phoenix, Arizona.

WANTED: 3.1 kc and 6 kc Collins mechanical filter rectangular type. Motorola mobile test set and Hickok 533 or similar model tube tester. George Magera, W4YLT, Mullins, S. C.

WANTED: Tubes, diodes, transistors. Top prices for Klystrons, Thyratrons, Power, TV, and Receiving tubes. Mused be unused. WANTED: Laboratory-grade Test Equipment, Oscilloscopes, Bridges, Signal Generators (microvolters) RF & Audio, Recorders, etc. Commercial (Hewlett Packard, etc.) and military (TS and UPM prefixes). Write us detailed description. Bob Sanett, W6REX, V&H Radio & Electronics, 2053 Venice Blvd., Los Angeles 6, California.

QSL

QSL: 100 4-color $3.50. Others less. Glossy cards. Nice selection. Samples 10¢. Dick, W8VXK, 1018 Arthur, Mt. Pleasant, Michigan.

QSL's: Samples, dime. Print Shop, Corwith, Iowa.

QSL (Cont'd)

QSL's, SWL's, XYL-OM's. (Sample assortment approximately 9¾¢.) Covering designing, planning, printing, arranging, mailing, eye-catching, comic sedate, fantabulous, DX-attracting, prototypal, snazzy, unparagoned cards, (Wow!) Rogers KØAAB, 737 Lincoln Avenue, St. Paul 5, Minnesota.

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CHEAPY's. "Fill 'em in yourself." 100-$1.00, 200-$1.75, 500-$4.00, 1000-$7.75 Postpaid. Free sample. QSL Coop, Box 5938, Kansas City 11, Missouri.

QSL's. Samples 15¢. Sims, 3227 Missouri Ave., St. Louis 18, Mo.

GLOSSY 3-color QSL cards 100—$4.50. Free sampler. Rutgers Vari-Typing Service, 7 Fairfield Road, New Brunswick, N. J.

QSLs. Samples Free. Phillips, W7HRG, 1708 Bridge Street, The Dalles, Oregon.

QSL's-SWL's, samples 10¢. Malgo Press, 1937 Glendale Avenue, Toledo 14, Ohio.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢, with catalogue, 25¢.

QSLS-SWLS: 100 two color glossy $3.00; QSO file cards $1.00 per 100; Samples 10¢ Rusprint, Box 7507, Kansas City 16, Missouri.

Picture QSL cards of your shack, rig, home; made from your photograph. 1000 $12.00. Raum's, 4154 Fifth Street, Philadelphia 40, Pa.

QSL's??? Largest variety samples 25¢ (refundable). Callbooks (American) $5.00, (Foreign calls) $3.00. "Russ" Sackers, W8DED, Holland, Michigan.

QSLS 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.

SWAP OR SELL

75S1 Collins receiver never opened carton. Consider trade for 75A4, HT32 or ? WØNBF, Box 105, Kearney, Nebraska. BC-645; CWD-21AAX Dynamotor-Keyer; CPR-662CJ ASB Receiver (less GL-446's); All new surplus unmodified . . . Swap for antennas, test gear, mobile, but make swap offer, I'll answer. KØRIE, 211 North Market, Springfield, Missouri.

MISCELLANEOUS

"WYOMING SUMMER JOB for man with General Ticket. . . . Teacher, graduate student or college upper classman. Single man. Assist with radio club at Teton Valley Ranch. Good technician. Keep contact between ranches and pack trips. Contact: W. S. Wilson, 2619 Oak Knoll Ave., San Marino, California."

$50.00 reward for information leading to the recovery of my Collins—75A3-#515. Stolen New Years Eve. Pwr takeoff on back. Ivory enamel traces on cabinet. K6COB Chuck, 13554 Raven St., San Fernando, Calif. EM 7-7425.

EARLY BIRD registrations close on April 20th for New England Divisional Convention to be held at the New Ocean House Hotel in Swampscott, Mass. on Sunday, May 1st. If you want to attend the Largest Ham Convention ever held anywhere you must act NOW. Latest equipment by the manufacturers and their distributors with their representatives there to answer your questions. The countries best speakers, Net Meetings, etc., etc. Prices? Ask the ham who was at Swampscott last year. Early Bird $3. Banquet $5. extra. Make checks payable to FEMARA, mail to Box 88, Swampscott, Mass. before April 20th.

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the Globe Champion

$495.00 Net

A 10-160M single knob band-switching transmitter, 350 watts CW, 275 watts AM, 450 watts SSB with 10w external exciter. Time sequence keying circuit. Built-in, highly stable VFO with new non-slip dial drive. Adjustable bias control for SB operation. TVI-suppressed, bypassed and filtered. High level, Class B modulation. Pi-net output, 48-300 ohms. Other top features.

the AT-4 Antenna Tuner

Wired: $79.50

Kit: $69.50

Combination tuner with built-in SWR bridge. Handles transmitters with final RF input up to 600 watts, 80-10 meters. Fixed link coupling in output circuit. Coax input, 2-wire balanced output. SWR bridge constantly in circuit.

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and the Globe Chief Deluxe

Wired: $79.95

Kit: $59.95

Compact, modern design. 90 watts CW for the advanced CW enthusiast or novice (at 75 watts input). Choice of cathode or bias keying — no rewiring to use external 755A VFO, UM-1 or SM-90 modulators. Simply plug in. Built-in power supply. Husky parallel 807 final for time-proven performance. New design pi-net for extra wide range matching. Standard 3-color diagrams for ease in kit construction.

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GLOBE ELECTRONICS

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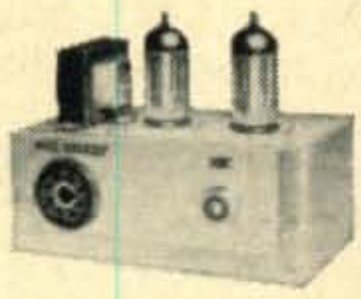
Kit: $11.95

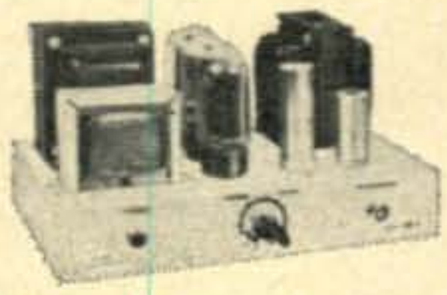


Ideal screen modulator for use with the Chief Deluxe. Permits radio telephone operation at minimum cost. Self contained. Printed circuit, all parts and instructions included. In kit form only.

the UM-1 Modulator

Wired: with tubes, $49.95

Kit: less tubes, $34.95



Class A or AB-2 modulator, driver for higher power modulator or PA amplifier. Matches output impedances 500-20,000 ohms. Supplies up to 40 watts audio, with proper tubes. Carbon or crystal mike may be used. Provisions for addition of external meter.

For further information, check number 57 on page 126.

TRANSISTOR TEST [*from page 115*]

these characteristics can be obtained from the manufacturer's data on the transistors that they produce. However, several general statements may be made concerning testing transistors with this tester. First, considering saturation or collector cut-off current, any low or medium power transistor (2N34, 2N35, 2N107, CK722) may be expected to read below 20 μamp if in good condition. If the reading is above 50 μamp, the transistor may be assumed to be bad. This test is similar to testing a vacuum tube on a tube tester. If the tube shows shorted, it may still work in many non-critical circuits. However, in both cases a good tube or transistor will work better.

In the relatively high power type of transistors, for instance 2N68, 2N95, 2N155, etc., the saturation should not exceed 500 μamp.

Second, concerning current gain, if the transistor shows at least two-thirds the manufacturers rating it may be considered to be satisfactory. The current gain Beta is equal to the current gain ALPHA by the following equation:

$$\text{Beta} = \frac{\text{Alpha}}{1-\text{Alpha}}$$

In general, if the saturation current reads below 30 μamp on low and medium power transistors and below 200 uamp on high power types, the transistor can be considered to be in good shape.

The cost of building this tester will be repaid the first time you use it to service any transistorized equipment. It is as definite as a tube tester, and will simplify servicing of transistors and their circuits. ■

20 KC FILTER [*from page 37*]

uation by ear, as described above, with the same procedure conducted by ear while the *rf* gain is wide open with full *avc* action.

When the variable bandwidth arrangement of the adapter is to be used for SSB reception, its oscillator must be tuned *higher* in frequency (decrease *C3A*) when the Passband Tuning is set for *Lower*, and *lower* in frequency (increase C3A) when the Passband Tuning is set for *Upper*. This will permit leaving the Passband Tuning set at one point as the bandwidth is narrowed, but as it is decreased below 1.5 *kc*, the Passband Tuning may have to be brought a little closer to zero. If sidebands are switched by changing the Passband Tuning from one side to the other, the adapter's oscillator will likewise have to be retuned as indicated above; however, under normal operation with the bandwidth fixed at maximum (centered with the 3.1 *kc* filter as described in the preceding paragraphs) no retuning of the adapter's oscillator will be required when sidebands are switched.

It is recommended that the adapter normally

be used for fixed bandwidth operation (maximum) during SSB reception, because a further narrowing of the bandwidth usually is not required, except in special cases of extreme interference; however, varying and narrowing the bandwidth for CW reception may be more desirable. In this case it is suggested that the adapter's oscillator trimmer be set near the maximum or minimum end of its range where it causes the overall bandwidth to narrow down to about .5 *kc*, although a loss of *rf* level (about 12 *db*) will be experienced at the same time. The Passband Tuning may be rotated to whichever side of zero produces the desired effect of peaking or rejection in a manner similar to that followed when a peaking Q-Multiplier is used.

When the noise limiter is in service, slight non-linearity can cause a small amount of distortion depending on the degree of limiting action which is used. Part of this is also due to a "hang-over" effect at the end of a word which is caused by the time constant of the circuit. These effects are minimized when the least amount of limiting is used. It will generally be found best to use only as much limiting as is needed to realize the best intelligibility of the signal during prevailing noise pulses. It will also usually be best to set the *avc* at *slow* and use a moderate amount of *avc* (back down on the *rf* gain).

As mentioned previously, the use of the *ifnl* also softens the attack at the start of a word, and thus smoother *avc* action and more pleasant listening is realized. The *ifnl* will also be found useful for noise suppression during CW reception. In addition, it will considerably reduce key clicks.

The *if* noise limiter is considerably more effective for SSB and CW reception than the existing noise limiter in the 75A4, and less distortion, for a given degree of limiting, is experienced together with little loss of level; however, the *ifnl*, as arranged in the adapter, is not as effective with AM reception as is the 75A4 noise limiter.

Conclusion

The 20 *kc* adapter, herein described, has been set up specifically for use with the 75A4. Similar type adapters, using the same general basic principles of the system, may be worked out for use with other receivers. If such a receiver does not already include any selective arrangement for SSB operation, a 20 *kc* adapter will provide the necessary selectivity to make an old receiver well suited for SSB. In addition, instead of providing variable bandwidth, varying the adapter's oscillator tuning control will furnish "passband tuning", thus making it possible to position the carrier at either side of the filter for lower or upper sideband reception. This eliminates the need to retune the receiver or the *bfo* when sidebands are changed. ■

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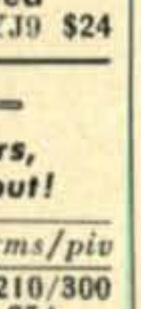

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The author argues himself — and maybe you, too — into a "kilowatt" that is comparatively inexpensive to build. The band-switching scheme, although possibly not entirely new, has had little application in amateur gear; it provides the convenience of separate finals in much less space and at lower cost.

The "Medium Power" Kilowatt

A Fresh Approach to the High-Power Question

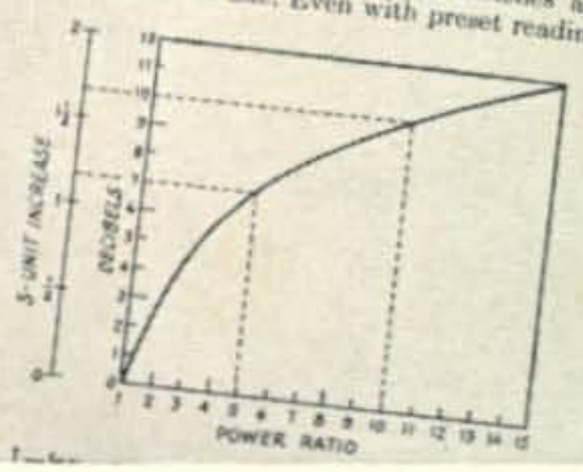
BY B. B. BLACKBURN,* W4DWU

There are a good many articles floating around these days on r.f. power amplifiers, linear and otherwise. Most of them give a little bit of philosophy as to how the particular design was evolved, plus considerable information on how to put the thing together and get it operating. There is also plenty of discussion of high versus low power, but there seems to have been a disproportionately small amount of agitation for the medium-power class of operation. No doubt others are mulling the "ideal rig" problem over, and perhaps some of them would like to know that they have company.

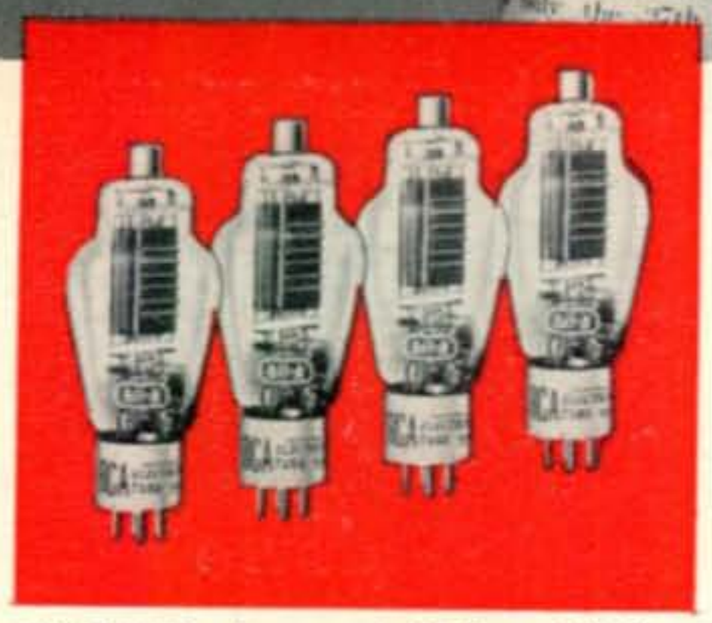
Let's assume to start with that you have a home-grown or commercial c.w./s.s.b. exciter, preferably an "all-band" job covering 80 through 10 meters with output in the order of 70 to 100 watts (input 100 to 150 watts). Such a rig is quite adequate for everyday home-station use, as thousands of satisfied operators of transmitters in this power class will confirm. Sooner or later, though, comes the urge for higher — or even HIGH — power. Where do we go from here?

I think it generally will be agreed that if we are presently running around 100 watts final input power we should go to at least 500 watts input to make the change really worthwhile. As may be seen from Fig. 1, this should lift the other fellow's S meter an additional 7 db., or about 1½ S points. If 500 watts are better than 100 watts, then 1000 watts must be better than 500 — right? Well, maybe. We'll see.

As long as we are cooking up a new final, it might as well be the *ne plus ultra*. Quite possibly you have gotten tired of twisting all the knobs on that all-band exciter of yours when changing bands . . . personally, I am not about to rassle an equal number of knobs on an all-band high-power pi-net final, what with roller or tapped coils, vacuum capacitors, loading switches and controls, and the like. Even with preset readings



* Attaché, American Embassy, APO 928, San Francisco, Calif.



W4DWU's low-cost "kilowatt" final uses 4 parallel-connected RCA-811A's in grounded-grid.

Designed and built by W4DWU—and described in QST, December 1959—this grounded-grid final does a "gallon" job using four low-cost RCA-811-A triodes in parallel.

Here's why the RCA-811-A power triode continues to be a favorite among the transmitter men who prefer to build their own. (1) High-perveance design—an RCA development—enables you to deliver rated power at moderate plate voltages. (2) High amplification factor permits zero-bias operation in class B SSB. (3) Grounded-grid operation is especially eas

RCA-811-A's are now available through your RCA Industrial Tube Distributor. For a technical bulletin on this type, drop a QSL to RCA. Commercial Engineering, Section D-15-M, Harrison, N. J.

Power Triodes—another RCA contribution to radio communications

RADIO CORPORATION OF AMERICA

Electron Tube Division ***Harrison, N. J.***