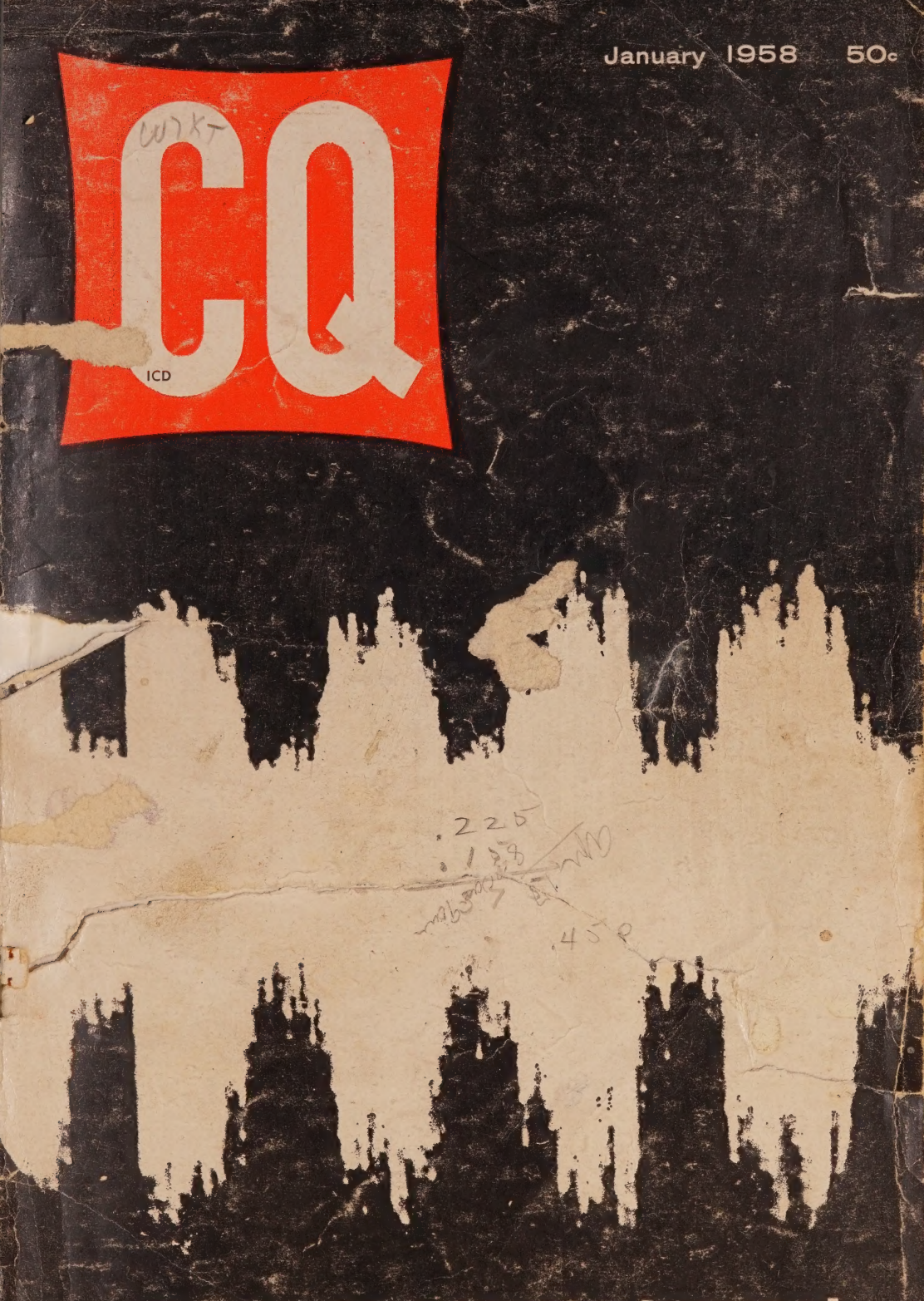
January 1958 50c

CQ



The Radio Amateur's Journal

COLLINS





Collins the amateur rig that stays young

The amount you spent for your 75A-1, A-2 or A-3 in years past will not buy a better receiver, *even today.* Through the years Collins Amateur equipment has kept well ahead of the field in design and performance.

And it's ahead today. Collins 75A-4 receiver and KWS-1 transmitter have exclusive advanced features that will give you performance, now and tomorrow, unmatched by any other rig. Features like: *automatic load control* in the KWS-1—allowing full use of maximum power without distortion; *passband tuning* in the 75A-4 — providing the most effective method of dodging interference from neighboring signals; *rock-like stability* in both the A-4 and S-1 . . . stability that is unmatched by any other Amateur equipment.

Here is further assurance that your Collins rig will stay young: next month or next year our continuous research and development program may suggest improvements which will be incorporated in newer production models of the A-4 and S-1. When and if this happens, a parts kit will be made available to you so that you can incorporate these improvements in your A-4 or S-1. Or, you may send your unit to the factory for modification.

See your distributor soon for the Amateur equipment that stays young. And, remember, too, high resale value in the future makes a Collins rig cost less per day to own and operate.

COLLINS

CREATIVE LEADER IN COMMUNICATION

For further information, check number 1 on page 126.

There's a PR for every Service!

AMATEUR



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

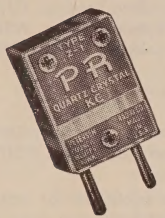
Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed.....**$2.95 Net**



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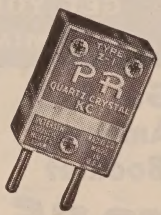
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COMMERCIAL



COMMERCIAL, PR Type Z-1

Designed for rigors of all types of commercial service. Calibrated .005 per cent of specified frequency. Weight less than ¾ ounce. Sealed against moisture and contamination. Meets FCC requirements for all types of service.



SPECIAL TYPES

Type Z-1, AIRCRAFT

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Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range.

Calibrated to .005%. 1500 to 10000 Kc. **$3.45 Net**

Type Z-6A
FREQUENCY STANDARD



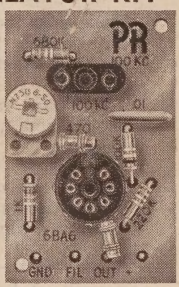
To determine band-edge. To keep the VFO and receiver properly calibrated.

100 Kc. . . . . **$6.95 Net**

PR PRINTED OSCILLATOR KIT

Has many uses—

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



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

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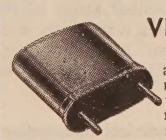


Type 2XP

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

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

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



VHF Type Z-9R

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

Each . . . . . **$4.95 Net**

Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .04% . . . **$3.95 Net**



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4100 Kc. . **$2.95 Net**

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

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

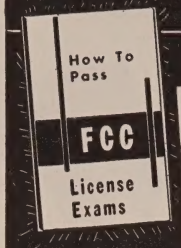
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EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y. U.S.A.

For further information, check number 4 on page 126.

How To Pass FCC COMMERCIAL RADIO OPERATOR License Exams

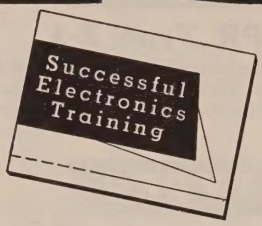


Free . . .

Tells where to apply and take FCC examinations, location of examining office, scope of knowledge required, approved way to prepare for FCC examinations, positive method of checking your knowledge before taking the examination.

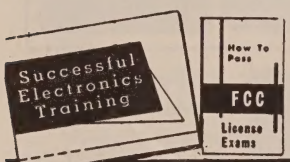
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I want to know how I can get my FCC ticket in a minimum of time. Send me your FREE booklet, "How to Pass FCC License Examinations" (does not cover exams for Amateur License), as well as amazing new booklet, "Successful Electronics Training."

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CQ-32

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Contributing Editors

Printed Circuits:	E. L. Klien, W4UHN
Grounded Grids:	Norman McLaughlin, W3LNT

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

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

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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 and 1957 CQ yearly indexes will bring you up to date. Most back issues are available at 50c from us. Check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free.

For further information see the Ham Clinic column.

Disclaimer:

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

CQ, The Radio Amateurs' Journal

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

January, 1958

Vol. 14, No. 1

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Charles W. Gardner, Jr. ..... Production Manager
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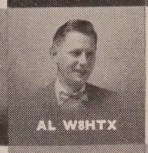
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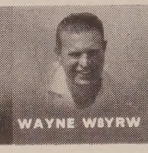


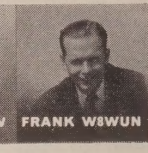
All of these licensed radio amateurs make important contributions to the Heath line of fine ham kits. In a sense, they are your personal representatives within the company, because their design ideas and performance preferences reflect not only their own "on-the-air" experiences, but those of the amateur fraternity with which they are in constant contact. With this kind of representation in Benton Harbor, you can continue to rely on high-performance Heathkit amateur radio equipment designed by hams, for hams!













HEATH *hams work to bring you*



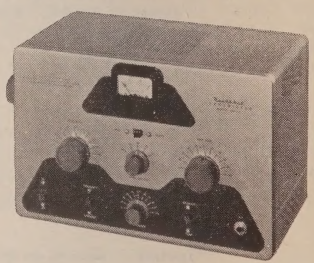


ROGER MACE (W8MWZ)
SENIOR HAM ENGINEER
HEATH COMPANY

HEATHKIT 50-WATT CW TRANSMITTER KIT

MODEL DX-20

$35.95



If high efficiency at low cost in a CW transmitter interests you, you should be using a DX-20! It employs a single 6DQ6A tube in the final Amplifier stage for plate power input of 50 watts. The oscillator stage is a 6CL6, and the rectifier is a 5U4GB. Single-knob band-switching is featured to cover 80, 40, 20, 15, 11 and 10 meters, and a pi network output circuit matches antenna impedances between 500 and 1000 ohms to reduce harmonic output. Designed for the novice as well as the advanced class CW operator. The transmitter is actually fun to build, even for a beginner, with complete step-by-step instructions and pictorial diagrams. All the parts are top-quality and well rated for their application. "Potted" transformers, copper-plated chassis, and ceramic switch insulation are typical. Mechanical and electrical construction is such that TVI problems are minimized. If you desire a good clean CW signal, this is the transmitter for you! Shpg. Wt. 18 lbs.

For further information, check number 5 on page 126.

HEATHKIT DX-100 PHONE & CW TRANSMITTER KIT

MODEL DX-100

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit required on C.O.D. orders.



You get more for your transmitter dollar when you decide on a DX-100 for your ham shack! Recognized as a leader in its power class, the DX-100 offers such features as a built in VFO, built in modulator, TVI suppression, Pi network output coupling to match a variety of antenna impedances from 50 to 600 ohms, Pi network interstage coupling, and high quality materials throughout. Copperplated No. 16 gauge steel chassis, ceramic switch and coil insulation, silver-plated or solid silver switch contacts, etc., are typical of the kind of parts you get, to use in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11, and 10 meters with a single band switch, and with VFO or crystal operation on all bands. RF output is in excess of 100 watts on phone and 120 watts on CW, with a pair of 6146 tubes in parallel for the final Amplifier, modulated by a pair of 1625 tubes in parallel. Other tubes featured are: 6AL5 bias rectifier, 5V4 low voltage rectifier, 2-5R4GY high voltage rectifiers, OA2 voltage regulator, 12AX7 speech amplifier, 12BY7 Audio driver, 6AV6 VFO, 12BY7 crystal oscillator-buffer, 5763 r.f. driver, and a 6AQ5 clamp tube. VFO tuning dial and panel meter are both illuminated for easy reading, even under subdued lighting conditions. Attractive front panel and case styling is completely functional, for operating convenience. The DX-100 was designed exclusively for easy step-by-step assembly, and no other transmitter in this power class combines high quality and real economy so effectively. Listen to any ham band between 160 meters and 10 meters and make a mental note of how many DX transmitters you hear! This kind of acceptance by the amateur fraternity testifies to the performance and quality of the rig. Its the kind of a transmitter you will be proud to own, and one that will give you a very respectable signal on the air. Time payments available! Shpg. Wt. 107 lbs.

...top quality at lowest prices!

NEW HEATHKIT PHONE & CW TRANSMITTER KIT



MODEL DX-40

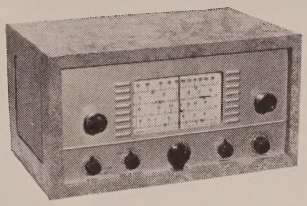
$64.95



The new DX-40 incorporates the same high quality and stability as the DX-100, but is a lower powered rig, for crystal operation, or for use with an external VFO. Plate power input is 75 watts on CW, permitting the novice to utilize maximum power. An efficient, controlled-carrier modulator for phone operation peaks up to 60-watts, so that the rig has tremendous appeal to the general class operator also. Single-knob switching covers 80, 40, 20, 15, 11 and 10 meters. Pi network output coupling makes for easy antenna loading, and Pi network interstage coupling between the buffer and final amplifier improves stability and attenuates harmonics. A line filter is incorporated for power line isolation. The efficient oscillator and buffer circuits provide adequate drive to the 6146 final amplifier from 80 to 10 meters, even with an 80 meter crystal. A drive control adjustment is provided, and the function switch incorporates an extra "tune" position so the buffer stage can be pretuned before the final is on, and so the operator can locate his own signal on the band. Tubes used are a 6CL6 Colpitts oscillator, a 6CL6 buffer, a 6146 final amplifier, a 12AX7 speech amplifier, a 6DE7 modulator, and 5U4GB rectifier. The modulator, incidentally, has plenty of "punch" for clear, strong phone operation. A switch selects any of three crystals, or a jack for external VFO. A high-quality meter with D'Arsonval movement mounts on the front panel for tuning. Whether you are a newcomer or an old-timer, you will find the DX-40 an ideal rig in its power class! Shpg. Wt. 26 lbs.

HEATH COMPANY A Subsidiary of Daystrom, Inc. BENTON HARBOR 12, MICH.

For further information, check number 6 on page 126.



ALL-BAND RECEIVER

HEATHKIT ALL-BAND COMMUNICATIONS-TYPE RECEIVER KIT

Ideal for the short wave listener or beginning amateur, this Receiver covers 550 KC through 30 MC in four bands. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer type—power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—internal 5½" speaker—head phone jack and AGC. Has built-in BFO for CW reception. An accessory power socket is also provided for connecting the Heathkit model QF-1 Q Multiplier. Will supply 250 VDC at 15 ma and 12.6 VAC at 300 ma. Shpg. Wt. 12 lbs.

Cabinet: Fabric covered cabinet with aluminum panel as shown part 91-15A. Shpg. Wt. 5 lbs. **$4.95**

MODEL AR-3

$29.95



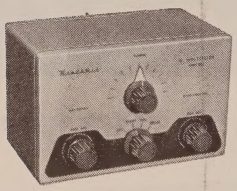
ELECTRONIC VOICE CONTROL

HEATHKIT ELECTRONIC VOICE CONTROL KIT

Here is a new and exciting kit that will add greatly to your enjoyment in the ham shack. Allows you to switch from Receiver to Transmitter merely by talking into your microphone. Lets you operate "break-in" with an ordinary AM transmitter. A terminal strip is provided for Receiver and speaker connections and also for a 117 volt antenna relay. Unit is adjustable to all conditions by sensitivity and gain controls provided. Easy to build with complete instructions provided. Requires no transmitter or Receiver alterations to operate. Shpg. Wt. 5 lbs.

MODEL VX-1

$23.95



"Q" MULTIPLIER

HEATHKIT "Q" MULTIPLIER KIT

This fine Q Multiplier is a worthwhile addition to any communications, or Broadcast Receiver. It provides additional selectivity for separating signals, or will reject one signal and eliminate a hetrodyne. Functions with any AM Receiver having an IF frequency between 450 and 460 KC that is not AC-DC type. Operates from your Receiver power supply, and requires only 6.3 VAC at 300 ma (or 12.6 VAC at 150 ma), and 150 to 250 VDC at 2 ma. Simple to connect with cable and plugs supplied. Effective Q of approximately 4000 for sharp "peak" or "null". A tremendous help on crowded phone or CW bands. Shpg. Wt. 3 lbs.

MODEL QF-1

$9.95

more fine ham gear from the pioneer



GRID DIP METER

HEATHKIT GRID DIP METER KIT

A Grid Dip Meter is basically an RF Oscillator used to determine the frequency of other Oscillators, or tuned circuits. Numerous other applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, designed procedures, etc. Features continuous frequency coverage from 2 MC to 250 MC, with a complete set of prewound coils, and a 500 ua panel meter. Has sensitivity control and a phone jack for listening to the "Zero-Beat". It will also double as an absorption-type wave meter. Shpg. Wt. 4 lbs.

Low frequency coil kit: two extra plug-in coils extend frequency coverage down to 350 KC. Shpg. Wt. 1 lb. No. 341-A **$3.00**

MODEL GD-1B

$21.95

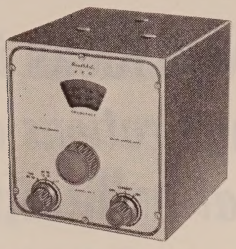
For further information, check number 7 on page 126.

HEATHKIT VARIABLE FREQUENCY OSCILLATOR KIT

Enjoy the convenience and flexibility of VFO operation by obtaining this fine variable frequency oscillator. It covers 160-80-40-20-15-11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a, available on most transmitters. It features voltage regulation for frequency stability, and has illuminated frequency dial. VFO operation allows you to move out from under interference and select the portion of the band you want to use without having to be tied down to only 2 or 3 frequencies through the use of crystals. "Zero in" on the other fellows signal and return his CQ on his own frequency! Shpg. Wt. 7 lbs.

MODEL VF-1

$19.50



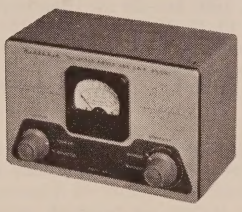
VARIABLE FREQUENCY OSCILLATOR

HEATHKIT REFLECTED POWER METER KIT

A necessity in every well equipped ham shack, the model AM-2 lets you check the match of the antenna transmission system, by measuring the forward and reflected power or standing wave ratio. Handles up to one kilowatt of energy on all bands from 160 to 2 meters, and may be left in the antenna system feed line at all times. Input and output impedances for 50 or 75 ohm lines. No external power required for operation. Meter indicates percentage forward and reflected power, and standing wave ratio from 1:1 to 6:1. Shpg. Wt. 3 lbs.

MODEL AM-2

$15.95



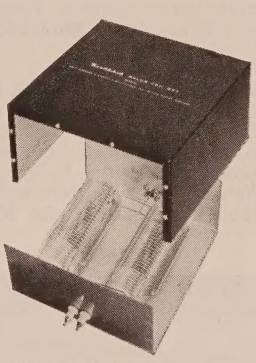
REFLECTED POWER METER

HEATHKIT BALUN COIL KIT

This convenient transmitter accessory has the capability of matching unbalanced coax lines, used on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance. Design of the bifilar wound Balun Coils will enable transmitters with unbalanced output to operate into balanced transmission line, such as used with dipoles, folded dipoles or any balanced antenna system. Can be used with transmitters and Receivers without adjustment over the frequency range of 80 through 10 meters. Will handle power inputs up to 200 watts. Shpg. Wt. 4 lbs.

MODEL B-1

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FREE 1958 Catalog

Send for this Free informative catalog listing our entire line of kits, with complete schematics and specifications.

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QUAN.	ITEM	MODEL NO.	PRICE

$_____enclosed. Parcel post, include postage—express is shipped collect.

For further information, check number 8 on page 126.

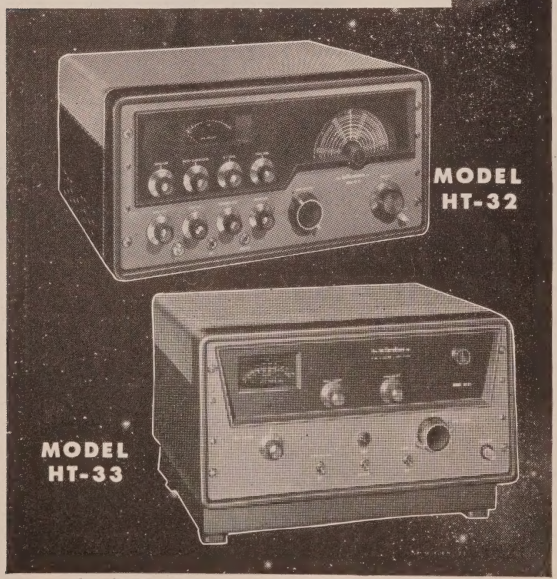
The New Ideas *in communications are born at* hallicrafters

Brilliant performance! The SX-99 receiver features broadcast coverage 540-1680 kc plus three S/W bands, 1680 kc—34 mc. Bandspread calibrated over 10, 11, 15, 20, 40, 80 meter amateur bands. Antenna trimmer, "S" meter, crystal filter. Seven tubes plus rectifier. Black cabinet, silver trim, piano hinge top. **Model SX-99—$149.95**

Incomparable value! SX-100 Selectable Sideband Receiver proved best for your money by far in its field. "Tee-Notch" filter provides stable nonregenerative system for rejection of unwanted heterodyne. Notch depth control; antenna trimmer; 100 kc quartz crystal calibrator. Logging dials for both tuning controls. Freq. range: 538-1580 kc; 1720 kc—34 mc. **Model SX-100—$295.00**

New heavyweight champion! Rugged is the word for the SX-101 receiver—and it's all amateur. Heaviest chassis in the industry. Full gear drive. Complete coverage of 7 bands: 160, 80, 40, 20, 15, 11-10 meters. Special 10 mc. pos. for WWV. Tee-notch filter. S-meter functions with A.V.C. off. Selectable side band. **Model SX-101—$395.00**





Cleanest signal on the air! Hallicrafters new HT-32 transmitter brings you a new standard of clarity with two exclusive features: (1) 5.0 mc quartz crystal filter—cuts unwanted sideband 50 db. or more; (2) new bridged-tee modulator, temp.-stabilized and compensated network provides carrier suppression in *excess* of 50 db. SSB, AM or CW output on 80, 40, 20, 15, 11-10 meter bands. High-stability gear-driven V.F.O. 144 watts peak input. Ideal CW keying and break-in operation. **Model HT-32—$675.00**

New ceramic tubes! Ultra-compact new HT-33 kilowatt amplifier accents *performance* and *dependability* with costlier ceramic tubes—another Hallicrafters first. 100 watts greater plate dissipation. Greater overload safety. Unsurpassed ruggedness. *More features:* six amateur bands, 80, 40, 20, 15, 11-10 meters; simplified tuning; low drive requirement; quieter operation from low speed blower. All control leads filtered. **Model HT-33—$775.00**

Export Sales: International Operations
Raytheon Mfg. Co., Waltham, Mass.

Available on convenient terms from your radio parts distributor

The hallicrafters Company
Chicago 24, Ill.

For further information, check number 9 on page 126.



. . . de W2NSD

never say die

Last January I carried on at length about the coming international frequency allocation conference in 1959 and the possible inroads that might be made into our present amateur frequencies. Nothing has happened in the interim to make the outlook any brighter. You might go so far as to say that nothing has happened. All of us have been so busy enjoying our hobby that we have pretty much ignored the bleats of a few isolated harbingers of doom. We all know they can't take our bands away. It'll never really happen. And so our happy crew drifts down towards the falls with no one pulling at the oars.

Let us review for a moment the reason for our existence. (1) Radio communication started primarily with amateurs and we have always been able to hold on to some frequencies for this type of operation. We are there because we've always been there. (2) Amateurs, by virtue of their number and freedom, can investigate engineering possibilities that few labs could afford to try because of the probability of failure . . . we are experimenters. (3) Disasters and emergencies find amateur radio is almost always the first means of communication. Most military, private, police, CD, etc., communications system are not flexible enough to step in under the variety of conditions encountered. We furnish valuable public service. (4) The amateur market runs to some $30,000,000 per year and is expanding rapidly. Quite a few manufacturers have a strong interest in keeping us going. (5) We furnish a manpower pool for war time of skilled and trained communications personnel. Unfortunately this aspect of ham radio has been in recent years almost completely ignored by some of the armed services. More on that in a moment. (6) Our frequencies are essentially being "kept on ice" for the military in war time. If they were to be turned over to commercial and broadcast use then they would be all filled up and the military would be in quite a fix when they wanted to expand their operations. Did I forget anything? Oh, (7) We have our ham bands so we can talk to each other day and night about nothing much and have a good time.

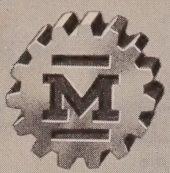
Number seven is just about the only thing we have been paying much attention to.

Back to #5. During the last war . . . you remember, the *big* war . . . as I recall, about 60% of the amateurs went into the armed services. My personal experience was with the Navy. I went through the Navy school at Treasure Island and found that just about every instructor there, from the time it opened, was a ham. Ham graduates of the school were given considerably more responsibility upon graduation. Hams were held in tremendous regard at that time. You would find call letters scratched on the doors of chow halls where hams had been waiting in line . . . written in the corners of blackboards, and even carved into the benches in classrooms. For some obscure reason I made a note which has followed me down through the years of the calls engraved on a bench in room 9B at the Radio Material School on Treasure Island back in 1943: W1MWY, W1MOL, W1KQF, W1MA, W2JDT, W2NSD, W3HZM, W3HYL, W3IXD, W3FGA, W4HVR, W4EXG, W4BAD, W5GYK, W5ATC, W5IRR, W5IIA, W6FUK, W6ECB, W6UKE, W6LLS, W6EQS, W6SJB, W6ERM, W6ECB, W6QEH, W7FOP, W7EWM, W7FHM, W7HSL, W7IZL, W7HAD, W7GOF, W7EXB, W8CXY, W8TWT, W8RVX, W9LSX, W9AUQ, W9XER, W9OCX, W9YAL, W9KKA, W9GED, W9KLR, W9AOP, W9CSE. No, without us the military would be in a serious bind, or worse.

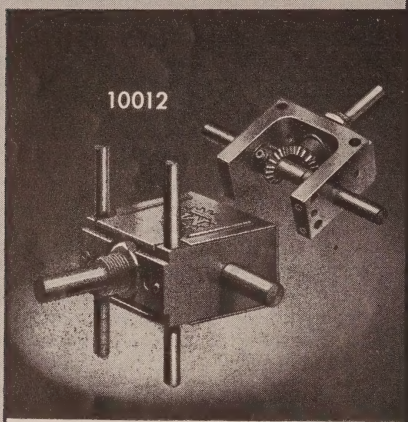
The Air Force seems to be aware of this for they have been doing quite a lot to encourage hamming. Just about every base has a ham club and quite a few have several ham stations. Fellows have written that all they have to do was ask for permission to get on the air and they'd get immediate cooperation. They certainly don't seem to lack good equipment. The Air Force Mars is an extremely active setup under Captain McElroy, a real ham and one of the nicest guys you could ever hope to meet. And I don't say that just because he came back to my call on two meters a few weeks ago . . . me mobile and he at 35,000 feet over New York on his way up to Westover to join Gen-

[*More on page 10*]

Designed for



Application



The No. 10012

RIGHT ANGLE DRIVE

"Designed for Application." Extremely compact. Case size is only 1½" x 1½" x ¾". Uses bevel gears. Mounts on adjustable "standoff rods," single hole panel bushing or tapped holes in frame. Ideal for operating switches, potentiometers, etc., that must be located, for short leads, in remote parts of chassis.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS

MORE W2NSD

eral LeMay for his record breaking trip to B.A.

What To Do?

Let's get back to the problem . . . what can we do to help ourselves? Well, there are several things that are important right now. Of prime importance is that we get the general public to understand a lot more about our hobby. This means publicity and promotion. A lot of this can be handled by radio clubs . . . every club MUST have a publicity chairman who has the responsibility of getting items about members and club doings in the papers. This has been sort of a nobody-wants-it deal with most clubs and little has been accomplished in most areas. We are apathying ourselves right out of existence this way. Every activity of the club should be considered from the publicity point of view . . . get in the public eye, stay there.

The Washington Mobile Club helps the local sports car clubs to run their rallies, other clubs help with polio telethons, heart fund telethons, election results, and dozens of other events and public service affairs. Become conscious of these possibilities and offer to help here and there. Every sports car club, motorcycle club, antique car club, etc., needs fast communications for their rallies. The boy scouts are sitting ducks for amateur propaganda. Arrange to have a local patrol visit one of your club members who operates SSB and watch their eyes bug out as they are put on the mike to talk to South Africa and Honolulu. A couple of shots of that and they will be hard at work on their radio merit badge . . . and the Novice license.

Reciprocation is still a terrible thorn in our side. The Communications Act of 1934 says that only U.S. Citizens are permitted to operate a radio station in this country. This section of the Act was held over from previous legislation as was originally written in at the request of the Unions to prevent cheap foreign labor from being used to operate our commercial stations. At the time it was written in there was no thought of the limitations this might put on amateurs in years to come. The result of all this is that foreign amateurs that visit the U.S. or work here for a short time are unable to operate ham rigs. Their countries in turn will not license U.S. Hams to operate while abroad. Quite a few DXpeditions have been scotched for this reason.

Discussions and correspondence with the various interested agencies in Washington indicate that none of them have any reasons for opposing the changing of the 1934 Act. All of this background took dozens of letters, phone calls and visits to get straight. There still is a lot of work to be done before the Act will be changed. Several fellows have been working their way through the gobbledegook to try to pin this one down . . . the main one being Walton R. Taylor, W9XXX, City Manager of

[*Continued on page 102*]

For further information, check number 10 on page 126.



..and Now
'he New Eimac Ceramic 4CX250B

or all bands through 420 Megacycles

nac's new ceramic 4CX250B now joins the 4CX300A as a emium quality power tetrode for the best in ruggedness, rformance and reliability. The 4CX250B is interchangele in most cases with the Eimac-developed 4X150A, and s the same socketing and basic electrical characteristics the 4X250B.

Eimac-pioneered ceramic-metal design gives the 4CX250B mpactness and mechanical ruggedness. Higher tempera- e processing produces an internally cleaner tube that n withstand greater temporary overload without dam- e. This advanced processing, coupled with an efficient egral-finned anode cooler and the elimination of glass-to-metal seals, keeps the cooling air requirements of the 4CX250B at a minimum. The Eimac SK-600 series air system sockets meet these requirements with minimum blower size. Operation at full ratings through 500 Mc. is made possible by the low dielectric loss characteristics of the ceramic used in the 4CX250B.

In designing your next transmitter, fixed or mobile, on any band through 420 Mc., you can't do better than a modern Eimac ceramic tube... the conventionally socketed 4CX250B or the breechlock socketed 4CX300A.

For further information, check number 11 on page 126.

Write our Amateur Services Department for a copy of the new explanatory booklet "Advantages of Ceramics in Electron Tubes."

EITEL-McCULLOUGH, INC.

SAN BRUNO • CALIFORNIA

"Eimac First with ceramic tubes that can take it"

Eimac®

MAXIMUM RATINGS TO 500 Mc.

	FM	AM	SSB		FM	AM	SSB
DC Plate Voltage	2000	1500	2000	Screen Dissipation, watts	12	8	12
DC Screen Voltage	300	300	400	Grid Dissipation, watts	2	2	2
DC Plate Current, ma	250	200	250	Plate Dissipation, watts	250	165	250

"Phasemaster II-A"

IMPROVED AND ADVANCED OPERATING FEATURES

SSB or DSB suppressed carrier or with carrier, PM and CW.

6146 power amplifier delivers 65 PEP watts output, giving sufficient power to drive nearly all types of linear amplifiers INCLUDING grounded grid finals.

Calibrate control allows variable control of signal for zero beating VFO to receiver frequency or TOF (talk on frequency.)

Voltage Regulation of 6146 Screen and 9MC OSC. Temperature compensating condensers in critical 9MC circuit for improved stability.

ALL BAND OPERATION

FRONT PANEL OPERATING CONTROLS

Emission switch with 5 positions for selecting CW PM — AM or DSB — Sideband 1 — Sideband 2

Indicator Switch —
Position 1. Tuning eye indicates R.F. output.
Position 2. Tuning eye indicates when flattoping occurs.

Valuable aid for tuning up on AM and as a Distortion indicator for SSB.

"Phasemaster 11-A" complete $329.50
"Bandhopper" VFO complete $139.50
P-400 Grounded Grid Linear Amplifier $269.50

Price and design subject to change without notice.

See Your Dealer or Write Today

Lakeshore INDUSTRIES

MANITOWOC, WISCONSIN

MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

For further information, check number 12 on page 126.

Feenix, Ariz.

Deer Hon. Ed:

Maybe can doing your Hon. Reeders a service. Yes indeedy, if they having same problums I having, then they mite be intrusted in how Scratchi handling same.

This idea coming to me as I are taking down Hon. Xmas Tree. Are rapping ornaments carefooly, putting Xmas lites away in proper boxes, cleening up mess of pine needles, then are faced with putting away Xmas presents.

You know the kind I meening, Hon. Ed. The presents from all your Hon. Uncles and Ants what are not seeing you for eleventeen yeers, and on acct. not knowing you they just feeling they got to sending something, so you ending up with six dozen hankercheeves, cupple dozen assorted ties, and so forths.

Now what are any self-respecting amchoor going to doing with all this stuff?? Aha, that are the problum, and that are eggsactly the same problum I going to now solving for your Hon. Reeders. If you not getting amchoor equipment for present, at leest can yewsing all this stuff for something around shack.

Like taking hankercheeves. They making reel peechy rags for dusting equipment or wiping soddering flux off floor, or cleening soddering iron. Also, if having cranberry sawse left over from Xmas dinner, can putting hankercheeve in sawse to dying it red, then having nice red flag to tying on long ladders or stuff what hanging behind car.

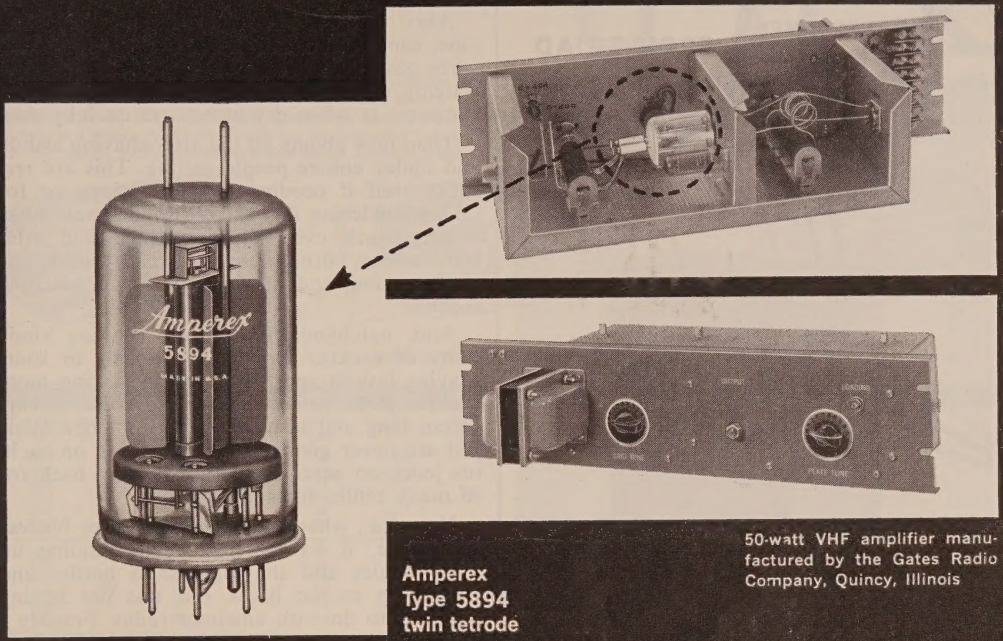
Of coursely, if XYL are handy with sewing needle, can making 1/c dust cover for mike or key. Likewise, can be yewsing hankercheeves for packing material when sending toobs to somebody you selling them to. Also, if having trubble with birds on rotery beems, cutting hankercheeves into strips and tying to beem. Not only keeping birds off but telling which way wind are blowing.

Or taking shaving creem. Scratchi are getting enuf shaving creem this Xmas to shaving King Kong, even if figyouring he not standing still and are wasting some. I are admitting that I not thinking of to many things to doing with

[*Continued on next page*]

For further information, check number 13 on page 126.

CIRCUIT BY GATES



Amperex
Type 5894
twin tetrode

50-watt VHF amplifier manufactured by the Gates Radio Company, Quincy, Illinois

POWER BY Amperex®

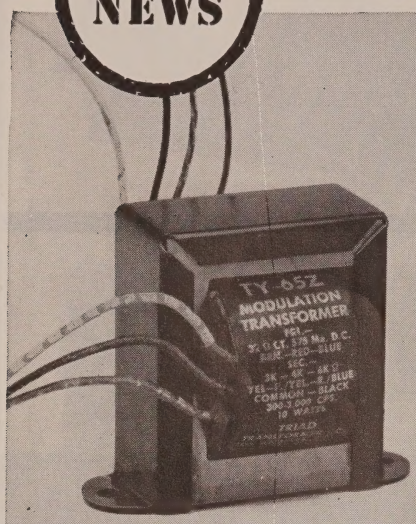
There are good reasons why the VHF amplifiers built by the Gates Radio Company, now celebrating its 35th anniversary, are outstanding for their design efficiency and trouble-free operation. One such reason is the Amperex Type 5894 twin tetrode, used in the output stage of the 50-watt Gates amplifier shown here. Internal neutralization in the Amperex 5894, combined with the wide strap for connecting leads and isolation between the grid and plate circuits, makes neutralization in the amplifier unnecessary. With the grid drive and output load connection removed, there are absolutely no "birdies" as the plate and grid tune controls are varied. Tuning range is from 125 to 185 Mc, with other frequency ranges easily available by changing only the grid and plate tank coils. Required driving power is of the order of 3 watts. Efficiency approaches 65%, and up to 60 watts output power may be obtained with 600 plate volts.

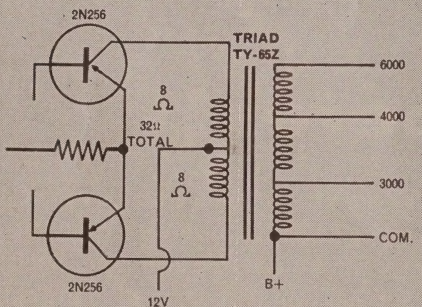


ask **Amperex**
about tubes for communications applications

AMPEREX ELECTRONIC CORP., 230 Duffy Avenue, Hicksville, L. I., N. Y.
In Canada: Rogers Electronic Tubes & Components, 11-19 Brentcliffe Road, Leaside, Toronto 17, Ont.

TRANSFORMER NEWS FROM TRIAD





All-transistor modulator circuit for low-power mobile transmitters. Triad TY-65Z Transformer is used in conjunction with the new 10-watt transistor (CBS Hytron 2N256).

TRANSISTOR TRANSFORMER for the advanced amateur

Our experience in building miniature transformers for military use led to the development of this new transistor transformer for you. The Triad TY-65Z is designed especially for amateur use. See your distributor, or write to us.

PRIMARY IMPEDANCE	SECONDARY IMPEDANCE		
32 CT. (575 Ma.)	6000	4000	3000

MAXIMUM LEVEL	DIMENSIONS, INCHES			
	H	W	D	MW
10W	2-5/16	2-7/8	2	2-3/8
WEIGHT, OUNCES				
20				

TRIAD TRANSFORMER CORP.

4055 REDWOOD AVENUE, VENICE, CALIFORNIA
812 E. STATE STREET, HUNTINGTON, INDIANA

A SUBSIDIARY OF LITTON INDUSTRIES

For further information, check number 14 on page 126.

it, but for instance can yewsing it as sowp to cleening operating table, or cleening glass face in meters.

Also, if ever having to snake wires thru pipe, can putting on plenty shaving creem and wires going thru more easily. Not advising to wateing to long after putting on creem, howsumever, as when dry creem are on icky side.

Then how abouts all the after-shaving loshun and ohdey colone peeple getting. This are reel slicky stuff if needing to cleen relays, or for taking soddering flux off old toob bases. Also, if on. Shack ever smelling kinda bad after transformer burning up, you can sprinkeling stuff around and having reel nice smelling shack.

And, natchyourally, if ever running kinda short of cacktus jooce, can pooring in some shaving loshun and you not only having more cacktus jooce to serving to peeple, but having certan tang and taste that cacktus jooce alone just are never giving. Also are saving on cacktus jooce on acct. peeple not coming back for so many refills, for some reeson.

Hon. Ed., what can doing with razor blades? Of course, if having mice, can grinding up razor blades and shaving loshun bottles and stuffing in mouse holes, but this not having anything to do with amchoor radio. Frankly I not knowing how to yewsing them. Howsumever, are also getting first-ade kit for Xmas, so maybe I figyouring out how to yewsing razor blades.

Everybuddy are getting ties for Xmas, but not everybuddy can wearing ties they getting. After all, who are having soot that can matching red, purple and yellow tie, for examples. So, try tying them to beem to keeping birds away, or yewse them like red hankercheeve for warning flag.

I getting one reel snappy tie which are so pretty that I taking foxtale off car antenna and going to tying tie on antenna insted. In case amchoor frend getting married, can also tying tin cans on back of car with Xmas ties—making wedding much more colorful.

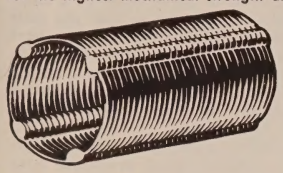
The hole idea are that you shouldn't be wasteing anything. If after all these 1/c ideas you still having some stuff left over, try trading with it. Maybe some amchoor not getting any hankercheeves or shaving loshun for Xmas. Maybe he ackchewally needs some. Trade him for some resistors, or something.

Of course I not reely kicking. I did get one Xmas present that Hon. Ant Fuji sent me for my rig. She sending me a microphone. Carbon type. Dubble button. I think it coming out of radio stayshun what buying it forty years ago. It waying forty-five pounds and are about same size as my reseever. You thinking some Hon. Mewseem liking to having it? Happy New Yeer.

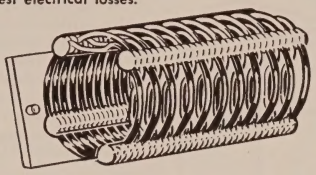
Respectively yours,
Hashafisti Scratchi

air dux®

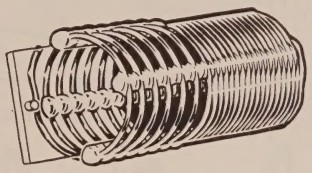
Illumitronic Engineering has developed a complete, versatile series of air core inductors designed especially for the amateur rig, or for prototypes of RF transmission equipment. These coils may be used for pi output circuits, conventional LC output circuits, interstage and oscillator circuits. The series consists of a standard coil type, a variable pitch type, and an indented type, in a range of diameters from ½ inch to 3 inches. All Air Dux® coils are constructed of tinned (silver or formvar) copper wire wound on large low loss polystyrene rods for the highest mechanical strength and lowest electrical losses.



air dux®



indented air dux®



vari-pitch air dux®

air dux coils

Cat. No. "T" or "F"	Diameter in Inches	Turns per Inch	Length of Coil	Wire Size	Total L	Net Price
404	½	4	2	18	0.18	.35
406		6		18	0.39	
408		8		18	0.71	
410		10		18	1.1	
416		16		20	2.87	
432		32		24	11.3	
504	⅝	4	2	16	0.27	.40
506		6		18	0.61	
508		8		18	1.1	
510		10		18	1.6	
516		16		20	4.3	
532		32		24	17.3	
604	¾	4	2	16	0.38	.45
606		6		18	0.86	
608		8		18	1.52	
610		10		18	2.38	
616		16		20	6.08	
632		32		24	24.2	
804	1	4	3	16	1.02	.60
806		6		18	2.33	
808		8		18	4.1	
810		10		18	6.47	
816		16		20	16.3	
832		32		24	66.3	
1004	1¼	4	10	14	5.8	1.45
1006		6		14	13.0	
1008		8		16	23.3	
1010		10		18	36.5	
1016		16		20	94.0	
1204	1½	4	10	14	8.3	1.55
1206		6		14	18.6	
1208		8		16	33.6	
1210		10		18	52.0	
1216		16		20	134.5	
1404	1¾	4	10	14	11.2	1.65
1406		6		14	25.1	
1408		8		14	45.0	
1410		10		16	70.0	
1416		16		18	179.0	
1604	2	4	10	12	14.3	1.75
1606		6		14	33.1	
1608		8		14	57.5	
1610		10		16	89.5	
1616		16		18	232.0	
2004	2½	4	10	12	22.3	1.90
2006		6		12	49.6	
2008		8		14	88.6	
2010		10		16	142.0	
2404	3	4	10	10	31.5	2.85
2406		6		12	71.0	
2408		8		14	127.0	
2410		10		14	198.0	

Silver and formvar available at additional cost

pi air dux coils

indented air dux®

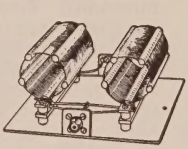
Cat. No.	Dia. in "	Wire Size	Length of Coil	Mtg. Centers	L uh.	Net
816A	1	18	3 3/16	3¾	18	.98
1014A	1¼	18	2 25/32	3⅜	18.3	1.25
1212A	1½	16	2¾	3⅜	18.3	1.50
1411A	1¾	14	2⅜	3⅜	18.0	1.70
1609A	2	14	3	3⅜	18.1	1.85
2007A	2½	12	3¼	4	18.6	2.25
2406A	3	10	3 5/16	4¼	18.7	2.85

vari-pitch air dux®

820D10	1	18	3¼	3¾	18	1.05
1212D6	1½	14	3 13/16	4⅜	18.6	1.75
1608D6	2	12	4⅛	4⅞	18.1	2.45
2008D5	2½	12	3¾	4⅜	18.2	2.80
2408D4	3	10	3¾	4⅝	18.6	3.50

air dux balun

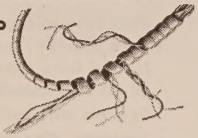
Air Dux® Balum coils may be used for impedance matching in both transmitters and receivers without adjustment from 10 through 80 meters.



No.	Description	Net Ea.
B2009	Coil with hardware	3.36
MB2009	Mounting Plate	1.95

spiral wrap

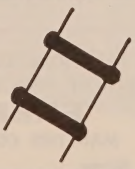
SPIRAL WRAP



Spirally cut polyethylene tubing for cabling loose wires into neat cables for production or prototypes. Available in ¼" and ⅜" O.D. in four colors: white, black, red and blue.

ladder line

LADDER LINE®



Extremely low loss transmission line for TV, amateur, and commercial use. Formvar copper wire molded by exclusive process in polystyrene spacers for maximum strength. In individual self-reeling cartons in lengths from 30 ft. to 250 ft.

Write for complete brochure

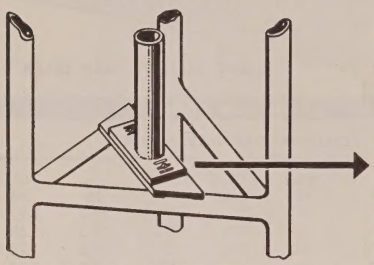
illumitronic engineering
sunnyvale california

For further information, check number 15 on page 126.

New TOWERS

. . . added to the Tele-Vue line

Rotor mounts inside top section on Adjustable Rotor Post



NOW 17 MODELS

Rotor mounting bearings to accommodate AR22—TR2—TR4—(and others) standard equipment on models 40R and 50R hinged base or pipe base layover towers. New models are larger overall . . . Top section 9½", bottom 12½" (outside dimensions). Tele-Vue's telescoping towers are used by hams all over the world. Spring loaded rachet winch allows tower to be telescoped easily by one man from ground. Constructed of husky aircraft type tubular steel, with tough three coat finish. Hoist cable is 1270 lb. test aircraft cable.

Pipe base eliminates concrete
Eave Bracket simplifies installation
Hinged base easy to service
20-30-40-45-50-60 ft. sizes
Layover with extra crank available

PRICES START AT $40.25

Monthly payment plan

Tele-Vue Towers, Inc.
701-707 49th St., So. ST. PETERSBURG, FLORIDA

FREE BROCHURE CQ-1

MAIL THIS COUPON FOR FULL INFORMATION

Name_____

Address_____

City_____ State_____

Prices subject to change without notice.

Export: Minthorne 15 Moore St. New York

For further information, check number 16 on page 126.

Letters . . . to the editor

Socketpunch Savy

Gentlemen:

1. When using a socketpunch to make holes in a chassis, the punch should be set up if possible so that the male part is on the outside of the chassis, with the female part and the bolt head on the inside. The reason for this is that the punch produces a rounded edge on the hole on the side where the female part was. The result is much neater and more professional looking if the rounded edge is toward the outside.

2. In constructing apparatus with commercially built chassis bases and bottom plates, the usual procedure is to mount the circuit on the chassis and use the bottom plate to cover the open bottom of the chassis. However, in units where all the parts would normally be mounted on the top surface of the chassis and none on the sides, it is advantageous to reverse the usual order and build the circuit on the bottom plate, using the chassis, inverted, as merely a box. There are important advantages to this procedure. First, drilling, punching, parts mounting, and wiring are greatly facilitated by working with a flat plate instead of with a chassis box. Secondly, if the unit is ever rebuilt, the only part which needs to be discarded and replaced is the bottom plate, instead of the whole chassis. This represents quite a saving in material and labor.

Charles Erwin Cohn

Chess Anyone?

Dear Wayne,

When I read your report on the CQ survey, I was surprised to see chess listed. To add a little variety to our hobby, I would like to hear from anyone interested in having a chess tournament over the air. Anyone interested (haven't I said that before?) should drop me a line saying your frequency (If VFO, say so), the best night for a sked, and how well you class yourself, i.e. wonderful, average, and not so hot. If I get enough replies, I will try to arrange skeds and keep a list of all games played. I propose to use the standard system of abbreviations. (If you don't know them, you ought to!)

Larry Whitman KN3BWH
2206 Audley Avenue
New Castle, Penna.

P.S. I read "MAD" too.

Subminiature TNS

Dear Wayne,

I would like to obtain a copy of your authors guide and an idea as to what type of material is in demand. At present I have just completed a subminiature redesign of the TNS unit which appeared in the Mobile Handbook. The physical size of the unit (3½ x 3½ x ¾) allows it to be mounted within my 1957 Chevrolet radio. I am working on a modular receiver which might be of interest to the readers and will give you further details if you desire.

Dave Metal, W2FTH
New York City

Anything miniature is in demand, so shoot 'em along Dave. Try to get 'em in soon so we can make the special May Mobile Issue.

Love That November Issue

Dear Wayne,

I just thought I would drop you a line to let you know how much I enjoyed the November issue of CQ magazine. It was jam packed with articles that helped me in many ways. Keep up the good work.

Marvin Golson, KØBJB
Milburn, Nebraska

Bless you.

[*Continued on page 18*]

FROM A COUPLE OF SEASONED HAMS

. . . comes the ultimate in versatile rigs

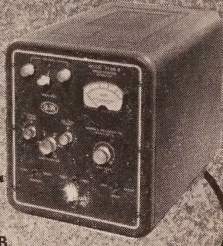
W3BZ

B&W

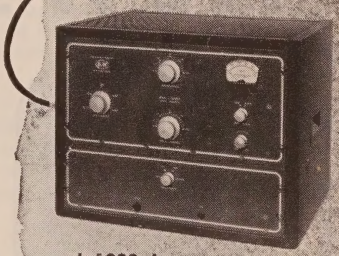
W3GC



5100-B $525.00



51SB-B
$265.00



L-1000-A
$495.00



Complete Assembly

The B&W 5100-B TRANSMITTER was conceived by well seasoned amateurs *for* amateurs. These men *know* from long personal experience, just what you as an amateur need.

Since your need was their need—and every true ham can appreciate this burning desire for fulfillment—they turned loose their company's engineering staff to develop their ideas. The result is a transmitter that's the ultimate in flexibility and performance.

The thousands who have proved the dependability of the B&W 5100-B over the years will attest to its unparalleled advantages, including 145 w. input AM, 180 w. input CW, 180 w. PEP SSB with 51SB-B.

For the oldtimer, or the novice, B&W's 5100-B will put you on the air with a top quality rig at a minimum expenditure. And when you're ready, you can add this:

B&W SSB GENERATOR*—Just plug it into the 5100-B transmitter and the 51SB-B immediately assures an outstanding signal. At your fingertips you have VOR, selectable sideband and speaker deactivating circuit (anti-trip). Then when you're ready for full power you can invest in the:

B&W L-1000-A GROUNDED GRID LINEAR—Final stage of a complete rig, this 1-KW Final with a pi-network output offers precision tuning and loading from 80 to 10 meters. Rating, 1000 watts peak envelope SSB power, 875 watts CW, and 375 watts linear AM phone.

Here is a complete package that you can pit against any on the air. And it won't break you to start, then add as you progress. For real operating pleasure—whether you are a novice or a seasoned amateur—use a rig, with all of the latest features, designed by skilled engineers who are well-seasoned amateurs. Write for B&W's catalog today . . . it's free!

*Use Model 51SB for Viking I, II; Collins 32V series or other commercial or ham rigs. Information supplied on request.

For further information, check number 17 on page 126.

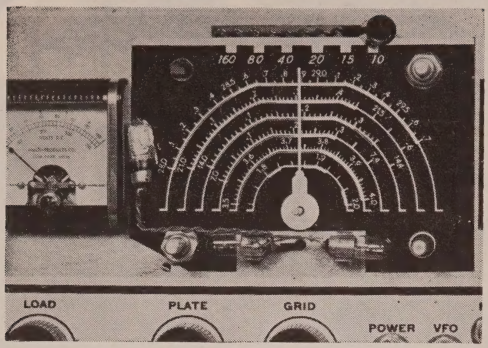
B&W

Barker & Williamson, Inc.

Canal Street and Beaver Dam Road • Bristol, Penna.

OTHER B&W AMATEUR EQUIPMENT: Transmitters AM - CW - SSB • Single Sideband Generators • Single Sideband Receiving Adapters • Dip Meters • Match Masters • Frequency Multipliers • Low-Pass Filters • T-R Switches • R.F. Filament Chokes • Transmitting R.F. Plate Chokes • Audio Phase Shift Networks • Band Switching Pi-Networks • Cyclometer-type Counters • Antenna Co-axial Connectors • Baluns • Variable Capacitors • Fixed and Rotary Type Coils • Band Switching Turrets • Standard Inductor Materials • Miniductors • Complete line of Amateur Air-wound Plug-in Coils • Variable Plug-in Links • Faraday Shielded Links • Misc. Coil Mounting Assemblies • Misc. Frequency Marked Dial Plates • Misc. Knobs • Ceramic Jack and Plug Bars

Lights for the AF-67



Gentlemen:

Many of us Elmac AF-67 owners have been a bit irritated by the lack of light on the meter for night operation. The modification to correct this is simple.

Remove the four knobs and bolt and nut at the top left that hold the plastic VFO cover in place. Solder two solid wire leads to a 6V bulb, twist, and run down the side and over to the pilot bulb connections and solder. The stiffness of the wire will hold the bulb in position. Shield the right side of the bulb with a piece of tinfoil so the light will be directed through the meter case. Replace the plastic cover and knobs . . . you will have to notch out a small piece of the plastic from the lip inside the cover to allow the wire to pass next to the meter switch shaft. A small piece of tape on the cover will conceal the bulb.

Marty Feins, K2RXH
Newark, N. J.

Poison ! ! !

Dear Never (?) Say Die (?),

You probably killed off a few more subscribers with some statements appearing in "How To Grind Crystals" in the November issue. (Perhaps I should address my remarks to the subscription staff rather than the editorial board.)

Ammonium bifluoride is dangerous! It is wrong to say "this solution is practically harmless." It is wrong to say "the solution attacks only glass and stone . . .". Ammonium bifluoride is a dangerous poison and must be handled carefully.

Let me quote from "Handbook of Dangerous Materials" edited by N. Irving Sax, Toxicologist, General Electric:
"Hazardous properties:

Very irritating to the skin, eyes and mucous membranes. Also a poisonous compound.

"When handled in any quantity personnel exposed to dust from this material should wear respiratory protection and chemical safety goggles and should avoid skin contact as much as possible."

Definitely not a food.

If, however, this article is part of a campaign to make rock-bound hams really rock—(headstone)—bound forget I mentioned it.

Alexander P. Marion, W2CUE
Great Neck, N. Y.

P.S.—I enjoyed the issue.

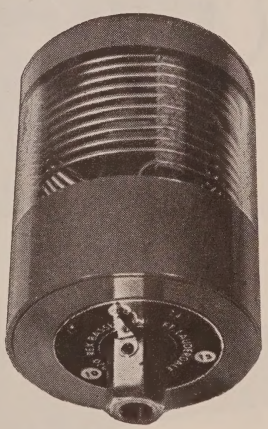
Dear Mr. Green:

As a chemist I must disagree with the description of the properties of ammonium bifluoride as given by Mr. Robert B. Kuehn in his article "How to Grind Crystals." I believe the point should have been made that this is a dangerous chemical. *It is a poisonous compound.* It is very irritating to the skin, eyes, and mucous membranes. Ingestion of this material could lead to death. Check on me if you wish (Handbook of Dangerous Materials by Sax is a good place) but please print a warning on the safe use of this

[*Continued on page 107*]

NEW!

BASSETT VC-1020/KWM-1
Complete Antenna System
For Use With The KWM-1 Mobile



- Bassett Vacuum Coil Antenna for 10-15-20 meters
- A 52 ohm antenna requiring no matching devices
- Feed direct with RG-58/U or RG-8/U cable
- The ultimate in mobile antenna efficiency
- Complete antenna including B-36 base rod and F-60 top rod
- Positive locking heavy silver plated switch contacts
- Hermetically sealed and helium filled
- Engineered to handle 1 KW input pep
- Factory engineered for resonance and minimum VSWR
- No field adjustment required for optimum performance
- Unconditionally guaranteed with any mobile equipment



See your Distributor or write for brochure and pricing information on the BASSETT All Band Model VC-1075 Vacuum Coil, and other mobile accessories.

Model VC-1020/KWM-1—$48.50 Amateur Net
Complete Antenna, Vacuum Coil, Base Rod, and Top Rod

REX BASSETT, INC.
Basset Bldg. • BOX 7127 • Ft. Lauderdale, Fla.

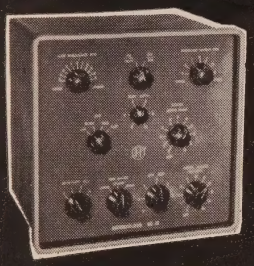
For further information, check number 32 on page 126.



HQ-110



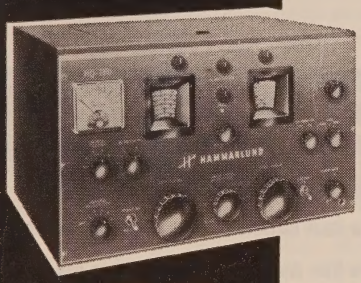
HQ-100



HC-10

MOST FOR YOUR MONEY...

There's no trick to it . . . just down-to-earth facts . . . Hammarlund receivers are designed to incorporate better circuitry and components in such a manner that labor is held to a minimum. The result is a better performing, longer lasting receiver at a lower price. Compare — and see for yourself . . .



HQ-150

HQ-100 GENERAL COVERAGE RECEIVER. Continuously tunable from 540 KCS to 30 MCS. Electrical bandspread. 10-tube superheterodyne with noise limiter. Q-multiplier. Exclusive Auto-Response for optimum listening under all conditions. **$169.00***

HQ-110 AMATEUR RECEIVER. Full coverage of 6, 10, 15, 20, 40, 80 and 160 meter amateur bands. 12-tube dual conversion superheterodyne. Separate linear detector for SSB and CW. Q-multiplier. Separate stabilized beat-frequency oscillator for SSB and CW reception. Built-in 100 KCS crystal calibrator. 2nd conversion oscillator crystal controlled. **$229.00***

HC-10 SSB/CW or AM/MCW CONVERTER. Completely self-contained with own power supply and audio system. Works with any receiver having IF between 450 KCS and 500 KCS. Connects in seconds. Tuned IF with seven selectivity positions. Vernier type tuning. Razor-sharp filter, adjustable over passband. **$149.00**



HQ-140-XA

HQ-150 GENERAL COVERAGE RECEIVER. Continuously tunable from 540 KCS to 31 MCS. 13 tube superheterodyne. Q-multiplier. Crystal filter. Electrical bandspread. Built-in 100 KCS crystal calibrator. Extra stable BFO for SSB and CW reception. **$294.00**

HQ-140-XA GENERAL COVERAGE RECEIVER. Continuously tunable from 540 KCS to 31 MCS. 11 tube superheterodyne. Crystal filter. Electrical bandspread. Extra stable BFO for SSB and CW reception. **$249.00**

*Telechron clock-timer $10 extra.

Established 1910

HAMMARLUND

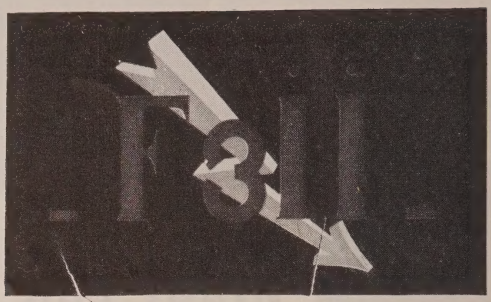
HAMMARLUND MANUFACTURING COMPANY, INC., 460 W. 34th ST., N. Y. 1, N. Y.

Export: Rocke International, 13 E. 40th St., N. Y. 16, N. Y.
Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

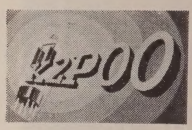
For further information, check number 18 on page 126.

QSL contest

winner



Winner this month is F3II, whose black card with green letters won our QSL Contest Committee's hearts. Mostly it was the original and artistic design that swung it. Paul wins the usual two year sustained attack of CQ Magazine mailings that all of our Contest winners have to withstand. Runner up this month is K2POO. How'd you like to have *that* call?



loser

NEW, IMPROVED **PIERSON KE-93** communications receiver



- Dual conversion, crystal second mixer.
- Dial displays only the band in use.
- Extreme selectivity and sensitivity.
- Receiver Size: 6″ wide, 5″ high, 9″ deep.
- Highly effective noise silencer and squelch circuits of new design.
- Function switch provides ideal settings for A.M., C.W. and S.S.B. operation.
- Versatile, 7 position turret band switching.
- 6 or 12 V.D.C. or 110 V.A.C. power packs.

Write today for complete detailed information and address of your nearest dealer.

The Pierson KE-93 is a full-fledged, 12-tube all-band communications receiver of superior performance for *any* purpose. It readily meets and conquers all of the rigid requirements for a quality mobile receiver – such as shock and vibration, temperature and humidity extremes, noise conditions and power regulation – thanks to military, miniaturization techniques. Most important, in actual "side-by-side" tests, the Pierson KE-93 has been proven capable of meeting or beating many high-priced receivers of the table top variety! Your local dealer will be happy to arrange a complete demonstration of this "little giant" at your convenience.

AUTOMATION ELECTRONICS, INC.
1500 West Verdugo Avenue, Burbank, California

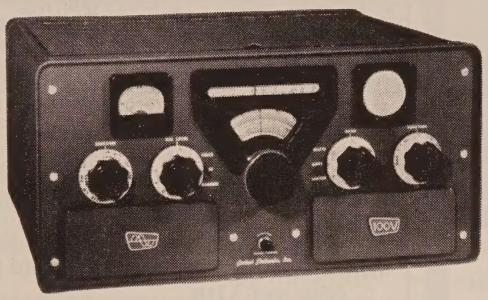
For further information, check number 19 on page 126.

We can't hold back any longer!

WE HAVE BEEN DELUGED WITH REQUESTS FOR INFORMATION ON THE NEW 100V, SO WE ARE RELEASING THE FOLLOWING DATA IN SELF DEFENSE—AHEAD OF SCHEDULE.

Central Electronics....





....Proudly Presents

The NEW MULTIPHASE MODEL 100V Exciter-Transmitter

RF OUTPUT: 100 watts average before grid current on all bands using a pair of ultra-linear 6550 tubes in final. Separate POWER OUTPUT CONTROL continuously adjustable down to 10 watts. Drive any linear or use it "barefoot".

FREQ. RANGE: 80, 40, 20, 15 and 10 meters with spare position on bandswitch for 160 meters or other frequencies such as Mars, CAP, commercial, etc.

PRECISION LINEAR VFO BUILT IN: Direct reading 1 KC calibration all bands. Separate .1 MC slide rule dial and KC window. Two speed tuning knob turns precision leadscrew in new Patent Pending permeability tuned two tube oscillator circuit. Fast tuning 100KC per turn; Slo tuning 750 CYCLES per turn!

NO TUNING CONTROLS (other than VFO): Broadband circuits throughout, as introduced in our 600L Broadband Linear. Separate crystal controlled mixers.

NINE POSITION EMISSION SELECTOR: Lower sideband, upper sideband, double sideband, all with suppressed carrier; lower, upper or double sideband (AM) with preset carrier; Phase Modulation (PM), CW and FSK with preset carrier. FSK frequency deviation adjustable.

ONLY FOUR OPERATING CONTROLS PLUS VFO ON FRONT PANEL: Seldom used "set and forget" controls on front panel behind magnetic doors.

METER READS: Watts input 0 - 200, RF amps output and suppressed carrier level. Has input marked at 100 watts for AM and 170 watts for CW, PM and FSK.

2" RF ANALYZER SCOPE BUILT IN: Monitors RF output wave to show flat topping and prevent TVI.

CALIBRATE LEVEL CONTROL: Choice of either voice or carrier for calibrating signal.

ADVANCED PHASING GENERATOR: With inverse feedback and new PS-2 network. Sideband suppression with new network in excess of 50 db. Built-in audio filter. Narrow signal, plus naturalness, coupled with long term stability are features of new generator.

SIZE AND STYLING: Equal to 600L PRICE: $595.00

PLACE YOUR ORDER NOW—THE BACKLOG IS INCREASING DAILY.
WE ARE ALMOST READY FOR PRODUCTION.

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

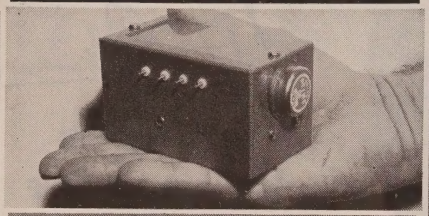
1247 W. Belmont Ave. Chicago 13, Illinois

MULTIPHASE THE OVERWHELMING CHOICE OF HAMS EVERYWHERE

For further information, check number 20 on page 126.

YOU CAN BUILD A TOROID TRANSISTOR POWER SUPPLY*

(D.C. to D.C. Converter)



*using this

TOROID TRANSFORMER

$16.00*

*Plus 50c for packing and mailing
Quantity prices on request

Delivers 225 and 450 volts D.C. simultaneous. Available in 12 or 24 volts. Maximum power 90 watts (transmitter intermittent service). 40 watts continuous.

AND

TRANSISTORS

2 Recommended Types—Both for

$11.00

MORE EFFICIENT! (80-90%)

LESS WEIGHT! (1/10 weight of equivalent Dynamotor Power Supply)

LESS SPACE! (90-watt output from 2" X 2" X 4" unit)

LOW HEAT GENERATION!

GREATER RELIABILITY!

- Designed especially for mobile and portable equipment.
- Each transformer tested in actual power supply unit and FULLY GUARANTEED!
- Complete construction details furnished.
- Special TOROID units and components to specifications on request.
- Manufactured by makers of world-famous Sun Air Aircraft Transceivers.

SUNAIR ELECTRONICS, INC.
Dept. 06
Broward International Airport
Fort Lauderdale, Florida

I am enclosing ☐ check ☐ money order in the amount of $16.50 for a TOROID TRANSFORMER, or in the amount of $27.50 for a Toroid Transformer and two matching power Transistors. ☐ 12 volts ☐ 24 volts

Name .....

Address .....

City .....Zone.....State.....

For further information, check number 21 on page 126.

PUZZLER

Each month we brazenly dip our sticky fingers into that excellent bulletin of the Washington Mobile Radio Club

AUTOCALL

and come up with a few frustraters. In case you can't take it, the answers to the puzzlers may be found on page 137. Then again, they may be found on page 104.

#1. Here is an anagram puzzle that was given by the WAYLARC at the MEPN picnic (translation: Washington Area Young Ladies Amateur Radio Club and Maryland Emergency Phone Net, we hope). The following are made up from the names of common items you might find in the ham shack. Each is two words, but the letters are all scrambled, not word for word.

1. ONE SPEAHR
2. NAILS CLUBO
3. PECAN POTHH
4. LOITER CHEFK
5. SPANISH HUSCC
6. TREEUR CLCICT
7. GOLDENNIR SUN
8. WIGGLE THCOST
9. PUPPY SLOWER
10. BLEACIX LOCAA
11. SIXTEEN CONDOR
12. MENTION TOGALL
13. RIVER DRESSCWET
14. QUEERY FENCTERM
15. AANNNNN RCCEEOOTT
16. TRAIN ROOMERDAUFS
17. TRAVELR LUGAGETOO
18. DRIVECAR BLASENONE
19. RAININGTH GLOSTERR

#2. A party at a restaurant agreed to have everything put on one check. When it came time to pay it was discovered that two of the party had already left. This upped the bill 50¢ each for those left. The check was $12.00. How many were in the party originally?

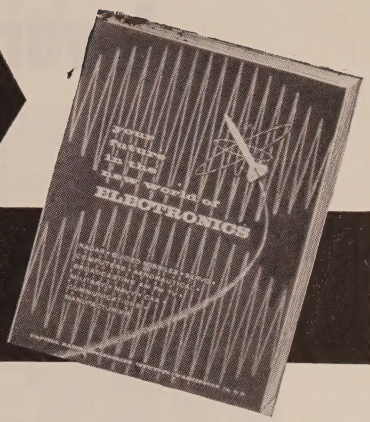
#3. A man buys some filter, by-pass and mica condensors. The filter condensers cost $4.00 each; the by-pass cost $1.25 each and the micas cost 50¢ each. He notices that he has exactly 100 and that they have cost him exactly $100.00. How many of each did he buy?



you saw it in CQ

This book is a Gold Mine
Send for it immediately!

FREE



REVEALS HOW YOU CAN GAIN QUICKER SUCCESS OR TURN YOUR HOBBY INTO A WELL-PAID CAREER IN ELECTRONICS

Whether you're an amateur . . . a hobbyist . . . or already in electronics . . . let us show you how to have a bright career in

ELECTRONICS • TELEVISION • BROADCASTING • GUIDED MISSILES • INSTRUMENTATION RADAR • COMPUTERS • AUTOMATION • ASTRONAUTICS • SERVOMECHANISMS AERONAUTICAL ELECTRONICS • TELEMETERING • COMMUNICATIONS • MANUFACTURING

TURN YOUR HOBBY INTO A HIGH-PAY CAREER!

Today thousands of electronics hobbyists have an opportunity to turn their hobbies into profits. It's the "Age of Electronics"! Trained men are in crucial demand! If you are employed "outside" the electronics field or if lack of technical knowledge on your present electronic job is holding you back, why not awaken to your opportunities – now!

ELECTRONICS HAS GOOD PAYING JOBS FOR MEN LIKE YOU!

But you must have advanced technical knowledge. You can get your share, if you take time now to gain that indispensable knowledge.

CREI offers you advanced, professional home study training in Electronic Engineering Technology, including SERVO-MECHANISMS; COMPUTERS; RADAR; AUTOMATION; AERONAUTICAL ELECTRONICS; BROADCASTING; COMMUNICATIONS AND MANUFACTURING, and the ELECTRONIC PRINCIPLES ASSOCIATED WITH GUIDED MISSILES, TELEMETERING, ASTRONAUTICS AND INSTRUMENTATION. You can choose your preferred course of training.

YOU NEED ADVANCED TRAINING

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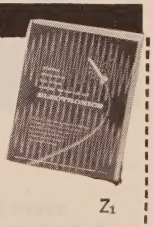
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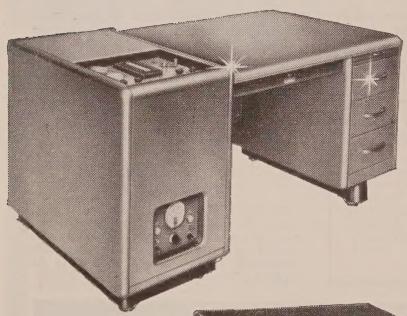
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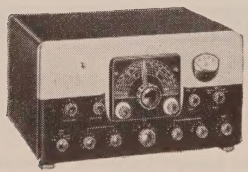
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For further information, check number 22 on page 126.

Award winning amateur







HERE'S AN INTERESTING NOTE—
Lt. Col. Colvin purchased his Viking "Kilowatt" from Dave Marks, W2APF, head of Ft. Orange Radio, while Dave was on a trip around the world. They got together in Germany and Dave had the equipment shipped from Ft. Orange stock.

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. . . does it again with the Viking "Kilowatt!"

Lt. Col. Lloyd D. Colvin, W6KG, one of the world's most active radio amateurs has done it again! Holder of more than 75 certificates, Lloyd was just awarded the first WPX—Worked All Prefixes.

When asked about the performance of his Viking "Kilowatt," here's what Lt. Col. Colvin said:

"During the past two years, I've transported my Viking "Kilowatt" over 10,000 miles, using it extensively first under the call DL4ZC in Germany and most recently as W6KG in California. During this period QSO's were had with more than 10,000 amateurs, and my equipment has helped me win more than 20 operating awards including the CQ World-Wide DX Contest and the ARRL International DX Contest for Germany; DXCC and WAS Certificates from 2 continents; and most recently the first WPX. With all of this traveling and operating I have never had a mechanical or electrical equipment failure of any kind—and my only replacement—one tube at a cost of $2.30."



MORE THAN 30,000 QSL CARDS . . .

Shown at right—Lt. Col. Lloyd Colvin with just a few of his more than 30,000 QSL cards. In addition to the Viking "Kilowatt," Lloyd also uses a Viking" Ranger"—Kilowatt "Matchbox" and "Signal Sentry."

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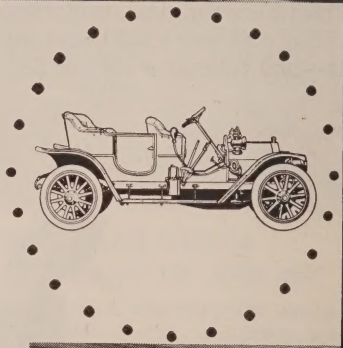
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Donald L. Stoner, W6TNS
P. O. Box 137
Ontario, California



A RADAR SPEEDMETER RECEIVER

With the invention of the electric chair and the lie detector, a new era was launched in the field of crime detection and punishment. The "state of the art" (If I may call it that) has progressed through ingenious wire tapping devices, long range microphones, and wireless "snoopers". Now we have reached the "ultimate weapon", the radar speedmeter.

The radar speedmeter is a marvelous device when it comes to detecting the speed of an oncoming automobile and it is even more efficient and energetic than the now outmoded officer in the patrol car. The radar speedmeter uses the doppler principal for measuring speed. You no doubt remember the classic example of the train whistling through the railway station. The whistle has a higher pitch as it approaches. As the train passes, the pitch will suddenly drop. In a similar manner, as your automobile approaches a radar speedmeter (which is emanating an unmodulated 2.455 kmc signal), the reflected signal will be shifted slightly in frequency. The number of cycles depends upon the speed at which you are traveling toward the radar source. The outgoing rf is heterodyned against the returned signal and the beat difference (representing the doppler shift) is applied to a frequency sensitive amplifier. The amplifier, in turn, drives a meter that converts the doppler shift to MPH.

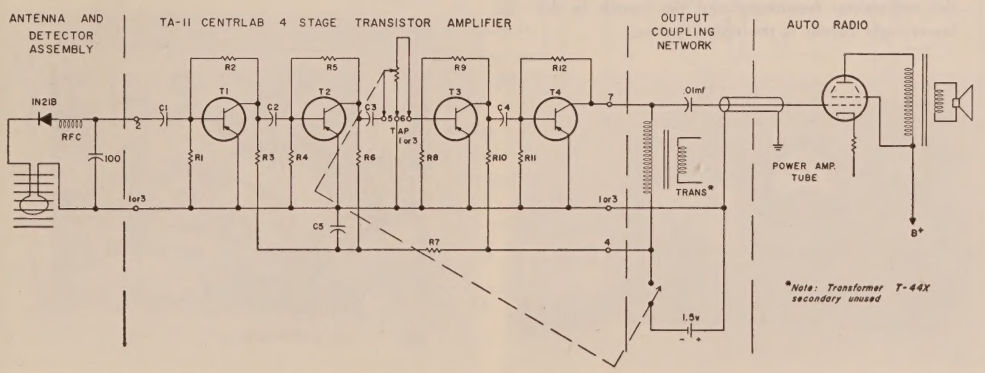
However, the author would like to state at this point that he does not approve of jamming the radar speedmeter. Not only is it highly illegal, but it is also very un-sportsmanlike!

No, the radar speedmeters are a good thing. That sign that reads "Speed checked by radar" strikes fear into the strongest of hearts and the heaviest of feet. And this is as it should be. Todays terrible accident rate is in part caused by excessive speed and must be checked. However, it would seem to the author that "a word to the wise is sufficient". In this case, the word is a deep "burp" from the auto radio upon approaching a radar speedmeter, thereby reminding the driver to check his speed.

The Receiver

The receiver uses the principle that I call "breaking the crest". If you have ever been out mobiling around town, you have heard the characteristic flutter that accompanies mobile operation. As you move toward the source of the signal, you pass through crests and valleys of signal strength a half wave length apart. On

[*Continued on page 105*]



by DON STONER, W6TNS

CQ reports on:

the BLACK WIDOW

The Black Widow is currently creating quite a sensation on the West Coast, with the vhf fans and mobile operators. Frankly, we couldn't understand why anyone would put such an obnoxious moniker on a piece of ham gear. After a few days of testing, the reason was apparent, this little fellow has a tremendous sting! Out of 13 CQ's one Sunday afternoon, 10 stations on the East Coast were worked, along with one VK and one ZL. Only one of the calls brought no response!

The Black Widow is a complete delux transmitter/receiver wrapped up in a compact package measuring only 9 inches wide, 5 inches high, and 6 inches deep and weighs only 7½ pounds. While designed primarily for mobile operation, the Black Widow will perform ideally as a fixed station or in Civil Air Patrol installations. Push-to-talk is incorporated on all models. These units are available for 10 meters, 50, 144, and 220 mc. The filaments are wired for quick changeover from 6 or 12 volts.

The manufacturer, Rogers Electronics of Los Angeles, developed the Black Widow by including the best features of the newest communications equipment. The block diagram shows a 6BZ7/6BQ7 used in a high gain cascade pre-amplifier in all models. The output of this stage is link coupled to a 12AT7 oscillator/mixer which converts the incoming signals to the first i.f. A 6BE6 again converts the signals, this time to 1.5 mc, the 2nd i.f. Dual conversion in the Black Widow virtually eliminates image interference. Following the second mixer, 3 6BH6's are used as the i.f. amplifiers. The 6T8 tube contains the detector, noise limiter, and first audio amplifier. A heavy duty dual triode, type 5687, functions as the second audio and output. This circuitry completely divorces the receiver audio from the transmitter modulator. The front panel meter also serves as a calibrated "S" meter.

In the transmitter section, the Black Widow uses a 12AT7, the first half operating as a 7 mc oscillator and doubler to 14 mc. This 14 mc energy is again doubled in the second 12AT7 triode section, which in turn drives a 2E26 straight through on 10 meters. The power output of all models is approximately 8 watts. A built in relay accomplishes the antenna and B plus change over functions. Drive on all stages can be checked by the built in front panel meter. In addition, the transmitter frequency can be spotted with the front panel calibrate switch.

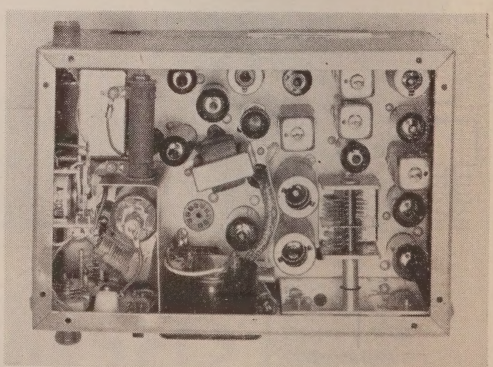
The modulator line-up consists of a 6AU6 speech amplifier driving a 12AU7 phase inverter, which drives a pair of 6AQ5's in AB^2 delivering about 9 watts of audio to the final amplifier. The audio system appears to have plenty of sock even when using low level dynamic microphones. A switch under the louv-

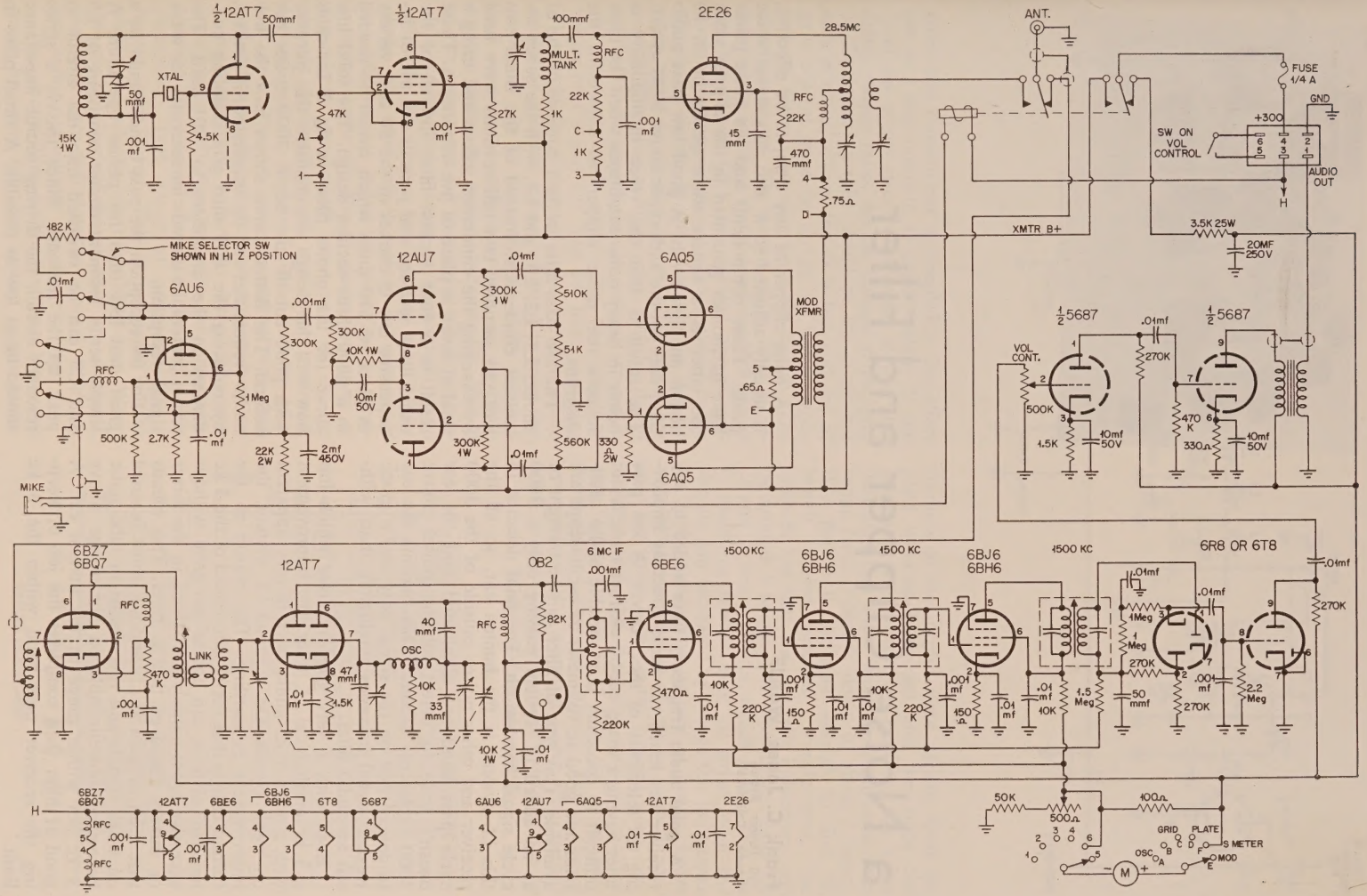
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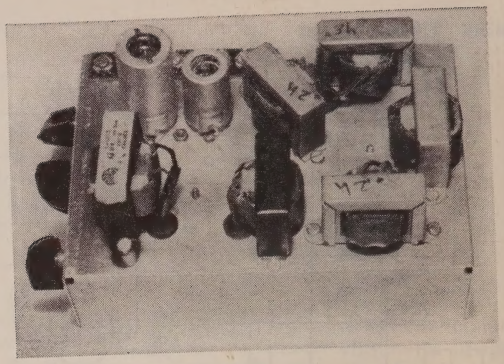
A tremendous packaging job to get the full fledged transmitter/receiver into a 5 x 6 x 9 cabinet. The switch to the left of the meter spots the transmitter frequency and the switch in the lower right corner is the noise limiter.



Interior view of the Black Widow. The empty tube socket is for the 5763 doubler used in the 144 and 220 mc models.




½12AT7
50mmf
½12AT7
100mmf
2E26
28.5MC
ANT.
XTAL
50 mmf
MULT. TANK
RFC
22K
1K
.001 mf
27K
47K
15K 1W
.001 mf
4.5K
15 mmf
470 mmf
.75Ω
FUSE 1/4 A
GND
+300
SW ON VOL CONTROL
AUDIO OUT
182K
MIKE SELECTOR SW SHOWN IN HI Z POSITION
XMTR B+
3.5K 25W
20MF 250V
.01mf
6AU6
12AU7
6AQ5
.001mf
300K
10K 1W
10mf 50V
300K 1W
510K
51K
560K
330Ω 2W
MOD XFMR
.65Ω
1Meg
500K
2.7K
.01 mf
22K 2W
2mf 450V
MIKE
½5687
VOL. CONT.
270K
500K
4.5K
470 K
330Ω
6BZ7 6BQ7
12AT7
0B2
6 MC IF
6BE6
1500 KC
6BJ6 6BH6
6R8 OR 6T8
RFC
470 K
LINK
OSC
40 mmf
47 mmf
1.5K
10K
33 mmf
82K
.001mf
470Ω
220K
40K
220 K
150Ω
1.5 Meg
50 mmf
2.2 Meg
270K
10K 1W
H
6BZ7 6BQ7
12AT7
6BE6
6BJ6 6BH6
6T8
5687
6AU6
12AU7
6AQ5
12AT7
2E26
50K
500Ω
100Ω
GRID
PLATE
S METER
OSC
MOD
M



a Noise Clipper and Filter

Frank C. Jones, W6AJF
950 Donner Avenue
Sonoma, California

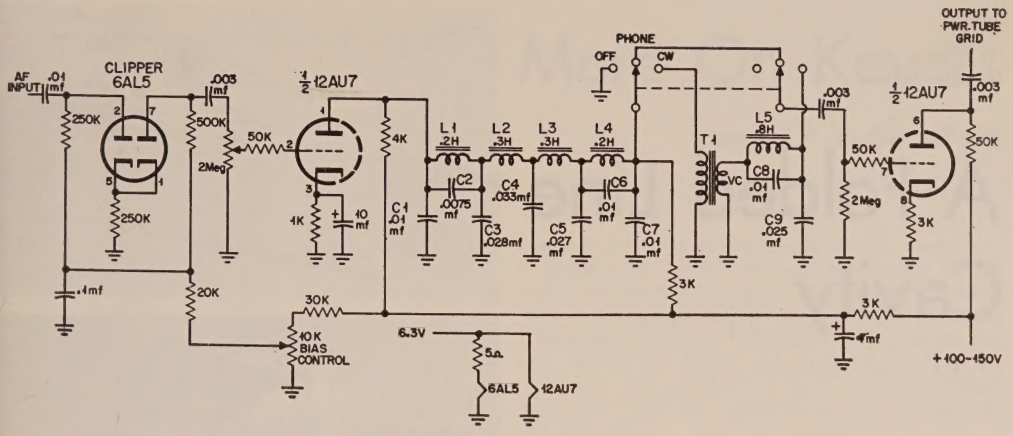
A good audio frequency filter added to any receiver has much the same effect as improving the selectivity of the receiver. A low pass filter having a sharp cut-off characteristic is not difficult to construct if a variable audio oscillator and good ac voltmeter or oscilloscope are available. This type of filter can be thought of as an added i.f. system passing only a 3000 cycle signal band-width. The final detector in this i.f. system is the human ear, so all the receiver and other noises outside of the 3000 cycle pass band are eliminated and the ear doesn't have to detect all the noises above 3000 cycles per second. This permits the ear to concentrate on the signal only and a much weaker signal becomes intelligible than without an audio filter.

Even with a very good receiver which has a 3 kc mechanical i.f. filter, the improvement with a good 3 kc audio filter is very apparent on weak signals. On a broad i.f. system, the improvement is startling. The reason in the former case is that the rf gain ahead of the 3 kc mechanical filter can not be too great without excessive cross modulation effects in the mixer or mixers ahead of this if. filter. This means that a lot of gain at i.f. and a.f. must be used on weak signals and this results in tube noise becoming objectionable in the range above 3 kc but within range of the human ear. A good af filter then completes the job of keeping the receiver pass band within the 3 kc limit.

A noise clipper of any type, to be effective, is usually adjusted so it also cuts signal voice peaks. These components and the noise peaks have harmonics generated in the clipper since the latter is a square wave generator in its action on high levels. A good low pass audio filter cuts out the harmonies above 3000 cycles. The result is that the voice intelligibility is better in heavy noise conditions when the filter follows the noise clipper as shown in the diagram.

The low pass filter in fig 1 consists of the af chokes L1, L2, L3, and L4, with the seven attendant condensers. Instead of the usual two half-end sections, two full sections were used by changing the condenser values and using a total of seven in place of five condensers. These result in a four section filter instead of the usual three sections and permits the use of inexpensive low Q chokes of the 50 cent variety in place of $10 units which would be needed in a good three section design. The solid line curve for the phone filter in fig 2 indicates how well this design accomplishes this purpose with good cut-off just below 3000 cycles per second. The dotted curve shows how the low audio frequencies can be attenuated, if desired, by reducing the .003 mfd grid coupling condensers in the amplifiers to .001 mfd. The writer prefers the dotted characteristic for weak signal reception.

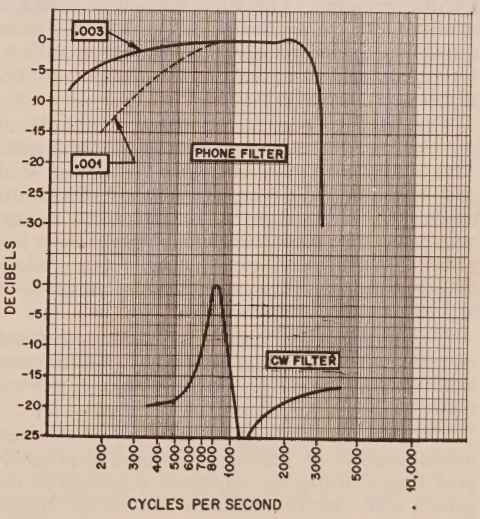
For cw reception the pass band should be a great deal less than for phone operation. A simple series resonant circuit consisting of L5 and C9 can be switched into the circuit to peak up the response. Since this is a series resonant circuit, the driving source impedance should be as low as possible. A small plate to



voice coil transformer accomplishes this effect but at a step down in af signal voltage. If the Q of the series circuit was equal to this step down voltage ratio, the cw voltage at the grid of the following tube would be the same; but in a practical circuit the Q is less and the af gain control must be turned up higher when this cw filter is switched into the circuit. The effectiveness of this simple series filter is increased by adding a shunt condenser C8 across the inductance L5. This parallel circuit produces a high impedance at a few hundred cycles higher, as shown in the large dip in the cw filter curve at about 1200 or 1300 cycles per second. The peak at 800 cycles, and this dip at the higher frequency, can be moved around to suit the operator's desires by changing the values of C8 and C9. The cw filter including T1 should be connected to a variable audio oscillator and the values adjusted to give this peak and dip in the response curve using a high impedance indicator such as an oscilloscope across the series condenser Cq. The Q of the inductance L5 should be a high as possible, which means from an economical stand point. In this filter a small power supply filter choke was modified to reduce its inductance to a usable value and at the same time to greatly increase the Q. The C clamp mounting of this choke was pried loose and all of the straight laminations of iron core removed, leaving only the E-shaped pieces and the original coil. The C-clamp mounting was then replaced and the whole unit mounted up on ½-inch stand-off collars to keep the open ended core well clear of even the aluminum chassis. The original choke can be of the "replacement" type rated at approximately 5 henrys, and 50 ma. The dc resistance of the winding should be less than 200 ohms. When the straight laminations of core are removed, the inductance will drop to about 1 henry or less making it suitable for this cw filter.

The phone filter, a 3kc low pass type, was made by using four low priced output transformers of the surplus store variety. Only the plate winding is needed and the voice coil leads can be clipped off. Checks by the writer indicated that these units have an inductance range from 3 henrys down to about 1 henry. If a person is fortunate enough to find the lowest priced smallest transformers, the chances are that the primary inductance will be around 1 henry. The filter design calls for .2 and .3 henry chokes, which means that the C mounting frames must be pried loose and the air gap increased to reduce the inductance to these values. The writer's .2 henry chokes required about 7 pieces of writing paper slipped into the space between the straight sided laminations and the E-shaped ends to increase the "air-gap" and so reduce the inductance from about 1 down to .2 henry. The .3 chokes required about 5 pieces of paper. The method used to determine this experimentally was to

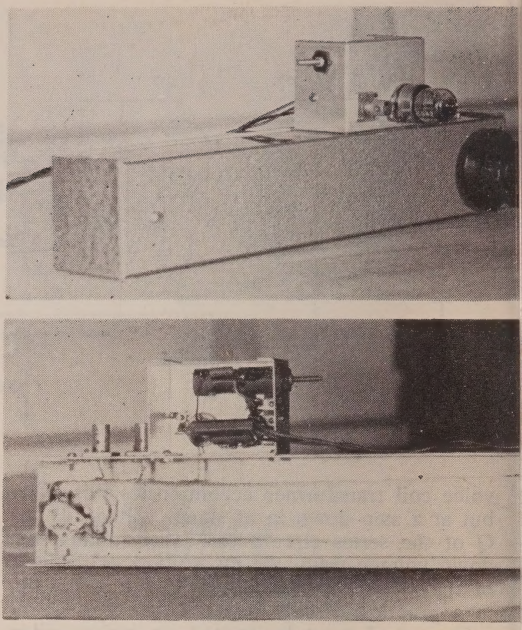
[*Continued on page 100*]



For Six Meters . . .

A Folded Line Cavity

Robert H. Main, W1ZAW
30 Livingstone Avenue
Beverly, Massachusetts



The "cavity," fore and aft.

Be not led astray by the term "cavity." Dismiss visions of precision machining being required. This gadget was built primarily for experimental purposes and to stimulate, possibly, others to think along these lines.

All figures were by ear and "S" meter readings as there was no noise generator available. As is, the gain realized from this front end with pre-amp was 12 db with no rise in noise setting of the "S" meter. The input and output connections can be varied until optimum noise figure is obtained.

Most constructional details are evident in the pictures and drawings. A Bud CU-2114 chassis was used for the cavity. The "line" was made from a strip of copper 23 inches long, 5/8 inches wide, and .032 inches thick. One end of the "line" was trimmed to fit the condenser.

A home-made chassis was used originally for the pre-amp. The tube used was a 6BC4 medium mu triode designed for uhf television tuners . . . this being cheaper than a 417-A. (A second unit using a 417-A showed no appreciable gain in performance.)

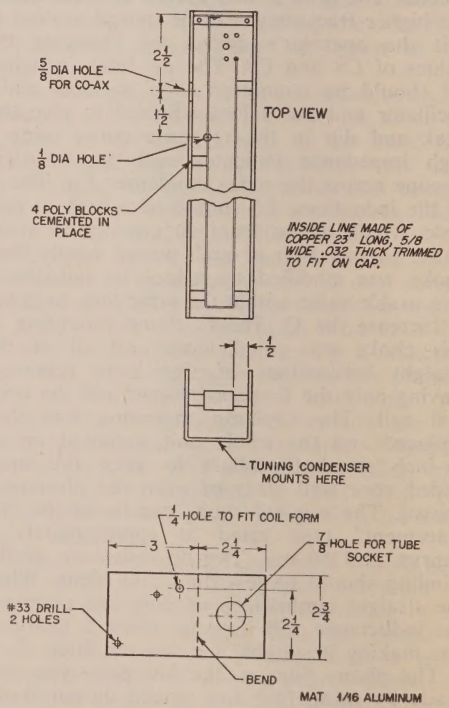
The high Q line is fed through a hole in the mini-box through a .001 mmfd condenser. The output coil, tapped 2 turns from the cold end, is coupled to a coax fitting with a 50 mmfd condenser. From here the output is fed to any converter. The tuning capacitor has a shaft for panel mounting or you could tie a gear reduction knob to it. This capacitor can be padded to broaden the six meter band.

A separate power supply was used with rated maximum voltage being tried first. (Continuous use not recommended.) Final adjustments were made at the specified 150 volts—14.5 mils.

Possible means of improving the performance might consist of adding additional grounded-grid stages; using the cavity as a complete receiver with the rf oscillator and other stages being ganged, etc.

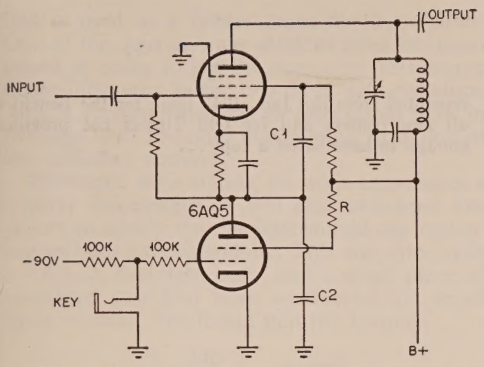
I'd like to thank Bob Pendelton, W1IO, and Jim Benjamin, W1URT, for their help in engineering the project and William Blodgett, W1LIU, for the pictures. ■

[*Schematic on page 102*]



More On Keyers

Howard F. Bates, W7VDB
EE 201
University of Washington
Seattle 5, Wash.



In the usual vacuum-tube keyer circuit the pulse shaping is done in the grid circuit of the keyer; such a network is described in the May *CQ (Shaklee, "Goodbye Key Klix for $1.50", CQ, May 1956)*. With this method the "make" time-constant is necessarily shorter than the "break", so that the leading edge is sharper than the lagging edge of the pulse.

The basic idea *(Bates, "Another Vacuum-Tube Keyer", QST, May 1953)* of the following keying circuit was evolved to key a crystal oscillator (which it did very well). The original reason for the pentode was to reduce the voltage drop across the keyer tube; with a 6V6 (miniature equivalent: 6AQ5) this was about 10 volts for a plate current of 10 to 30 milliamperes. The most striking result of the experiment was the discovery of the control of the pulse-shape by the bypass capacitors. The pentode keyer in a typical amplifier stage is shown above.

The leading and lagging edges of the pulse are shaped by the bypass capacitors C1 and C2 respectively. Increasing C1 increases the rise time of the leading edge; the screen resistance of the keyed tube governs the charging of C1, which in turn affects the gain of the amplifier, possibly through the cathode-to-suppressor voltage. The effect of C2 on the rise time is negligible since the keyer-tube plate-resistance is very low.

The control of the decay time of the pulse by C2 is not at all obvious. Apparently the cathode-to-suppressor voltage controls the gain and hence the lagging edge of the pulse. The rise of the cathode of the keyed tube during the offtime is mostly controlled by its screen resistance and C2.

The input frequency to the amplifier shown was about 5 megacycles. It was keyed at 100 cycles by a *Tektronix* 105 Square Wave Generator, and the rise and decay times were measured using a *Tektronix* 545 Oscilloscope. The rise time of the square wave was less than a microsecond.

For the values of .01 and .02 μfd for C1 and C2 respectively, the rise and decay times were about 2 milliseconds, corresponding to roughly a 10 kilocycle bandwidth. The keyer-tube voltage was 10 volts as measured by the scope.

From past experience values smaller by an order of magnitude give satisfactory results. This is not surprising because the class C stages following the keyed amplifier will change the rise and decay times. As a starting point, try .001 and .002 μfd for C1 and C2. These values will vary with the application, but should do the first trial.

The keyer-tube can be any power pentode or beam tetrode that will handle the amplifier cathode current with a sufficiently small voltage-drop. This voltage-drop can be used as additional bias, and can be adjusted by the screen potential. A 6V6, for example, will key a 6AG7; better results are obtained by keying amplifier tubes of lower power levels, such as the 6AV7 (6AH6) or similar tubes. Several other miniature pentodes can be used satisfactorily for the keying—the main criteria are the plate current and the voltage drop.

To insure positive keying the keyer-tube grid must be held well below cut-off. The amplifier cathode must be allowed to rise towards the supply voltage; this rise does the pulse-shaping.

The value of the keyer-tube screen-dropping resistor is somewhat critical. At low plate voltages the screen tends to take the entire tube current, resulting in a burned-out screen. For the 6AQ5 or 6V6, 12 to 15 kilohms per 100 volts of plate-supply voltage is sufficient to protect the tube.

The amplifier-tube should have a separate suppressor connection. This can be connected to either ground or between C1 and C2, depending on the amplifier-tube and voltages. Connecting the suppressor to the cathode markedly changes the keying characteristics, since much of the shaping seems to be done by the cathode-to-suppressor voltage.

With this keying method there is no need for brute-force filters in low impedance networks. Reliable keying is accomplished without the expenditure of a lot of power. The rise and decay times can be adjusted independently to any reasonable value. Since the keyer-grid is a high impedance point, no relays need be used for automatic keys, and so the automatic key can be made much simpler and more reliable. Furthermore, no shaping need be done in the key, nor is the pulse shape very important since the keyer-grid will do the necessary clipping and clamping. Finally all but a small fraction of the supply voltage is applied to the amplifier, so that its power gain is not greatly affected. ■

reprinted from the Jan., 1947 issue for the benefit of all new comers and for Old Timers not provident enough to have saved a copy . . .

the TRIPLE DUPLEX BEAM

by ALAN BIGGS, W8LO/W2ZW/?

It is the general amateur practice to consider the current loop resistance of a center-fed half-wave dipole as being of 70 ohms impedance. However, when a second half wave length of wire is located parallel to the first, and fed in phase, the close spacing tends to increase the current loop resistance. When a third half-wave very closely spaced radiator is added, the loop resistance reaches a value wherein the method of feeding and matching may be greatly simplified. John D. Kraus, W8JK, developed this idea of very closely spaced half-wave radiators into what was called the *Twin-Three Flat-top Beam.*

The advantages of the Twin-Three were: (1) broad band frequency response (greater than the folded dipole), (2) excellent matching characteristics, necessitating no tuning adjustments other than accomplished with a yardstick, (3) very high radiating efficiency and (4) good wet weather performance. Although quite a few Twin-Three beams were erected a disadvantage arose from the time-consuming and tedious job of cutting and laying out of 600-ohm feeder lines—not to mention the occasional requisition of neighbors to aid in extricating the constructor from a hopeless tangle of feeders and antennas. With the current developments in twin-lead feeders, there is no reason why the advantages of the Twin-Three should not now far outweigh its disadvantages.

Modernizing The Twin-Three

The first step in modernizing the Twin-Three is to provide for using the common 300-ohm twin-lead. An examination of *Fig. 1* shows that if two half-wave dipoles are fed with a phase difference of 180 degrees and spaced 1/6th wavelength apart, their center impedance will be approximately 16½ ohms. The use of three closely spaced dipoles instead of the simple doublets will raise this center impedance by a factor of nine, or to 150 ohms.

A quarter-wave matching section made of 300-ohm twin-lead may be used to match that 150 ohms to a 600-ohm line. However, this 600-ohm termination in parallel with the 600-ohm termination of the quarter-wave section from the other three-wire section results in 300 ohms, or a perfect match if a 300-ohm twin-lead

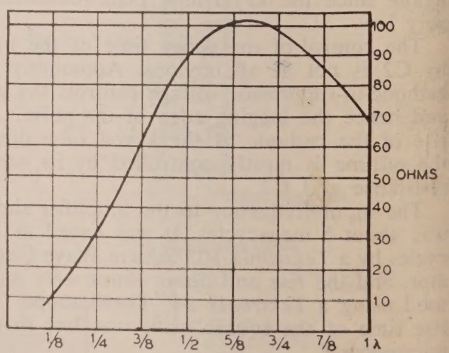


Fig. 1. Effective Center impedance of two dipoles in free space fed 180 degrees out of phase.

line is used as a feeder from the transmitter. One of the quarter-wave sections must be transposed in order to get the necessary 180-degree phase difference in the two three-wire radiators. This is accomplished by an intentional twist in the twin-lead 300 ohm line coming from one of the radiating sections.

Published information on what constitutes a quarter wavelength of 300 ohm twin-lead line differs so widely that we determined our matching sections experimentally. This was done with a v.f.o., a flashlight bulb, and a small piece of twin-lead that had been weathered for about three months. We found that the formula

$$\frac{246}{f\,(\text{in mc})} \times 0.835$$

gives the length of a quarter wave section in feet, or 14′ 3½″ for the 20-meter band.

There is little difference in performance whether the ends of the three-wire doublets are open or closed. In view of the simplified construction, it was decided to use the three-wire doublet with the three wires connected together at each end. Since a verbal description is then, "a three-wire folded doublet with ends shorted," and is confusing, Arthur Lynch, W3DKJ, has suggested that such a radiator be called a *Triplex* element. The twin three, with all the modifications which we are suggesting, could then be called the Double Triplex.

Construction

Laying out the beam is simplicity itself. First, obtain two 12′ lengths of 2″ x 1″ redwood or similar hardwood for the spreaders. Stake the two spreaders approximately 33 feet apart on the ground. About 3 inches from the end of one spreader tie the insulator and the first half-wave element. Thread the wire through the lucite center spacer as illustrated in *Part A* of *Fig. 2*. The center element is cut in half and is threaded through holes drilled in the ½-inch round solid piece of lucite, thus breaking the center of the dipole as per usual. The distance between the two holes in the round lucite piece is about 1½″. The third half-wave is threaded on the spacer and the same entire procedure repeated for the twin radiator section.

The quarter-wave matching section is best made of one continuous piece of 300-ohm lead 29 feet long. Each end of this matching section length is cleaned for about 1½ inches and exactly in the center a one-inch space (i.e., ½″ either side of center) is cut out and cleaned. The separation of the plastic insulator in the center is drawn up by twisting the wire off at right angles. This twist is then brought around the outside of a porcelain insulator and joined on to the 300-ohm twin-lead coming in from the transmitter. The insulator is left in place and the whole arrangement as shown in *Part B* of *Fig. 2* is carefully taped. Don't forget that one length of the matching section has an intentional twist for the 180° phasing.

Because the twin lead is so easy to handle, very little time will be lost in getting the whole antenna into the air. The feeders should be made as rigid as possible as this antenna may have a tendency to swing. Generally, however, when the dimensions are followed the array is fairly steady.

The general figure eight horizontal pattern of the Triplex is shown in *Fig. 3*. Naturally, on DX the pattern may appear sharper, but on local contacts it will appear rather broad. At the 40-degree points the power is about 6 db below that of the nose. The height of the beam follows the adage, the higher the better. Probably this has much to do with the angle of radiation since the VSWR does not vary to any great extent with various heights above ground. The Triplex does have one peculiarity, since unusually heavy loading is required. At W8LO, four turns in the coupling link were required, but brought no ill effects. Shortening, or lengthening the feeder by a quarter wavelength may also benefit the loading by taking advantage of the standing wave ratio, which should be less than 2/1.

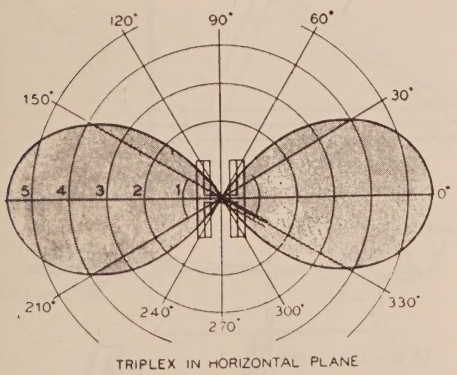


Fig. 3. The horizontal pattern of the Triplex beam. At the 40 degrees points the power is 6 db down from the nose.

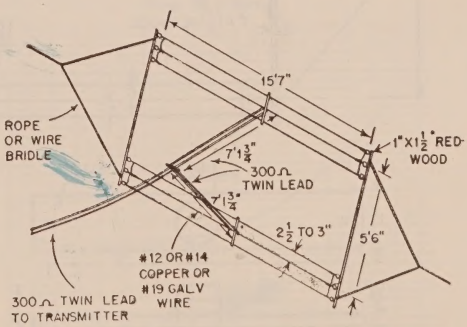


Fig. 4. Dimensions of the 10 meter modernized Twin-Three. The matching section from the lower three element dipole is twisted for the 180 degree phasing.

Performance

One of the most frequent questions we have had regarding the antenna concerns its wet weather performance. Contrary to expectations, the 300 ohm twin-lead performed very well over the four-month period of operation. No rain storm has ever caused the loading to fall off more than 15%. This characteristic has been confirmed by other users of the antenna. W8QQN/5 of San Antonio reported a reduction of only 10% in loading during a downpour. It has been our belief that this reliability under wet weather may be accounted for by the rather unusual quarter-wave "Q" used in this antenna. When the twin-lead becomes wet, its impedance is lowered. As the "Q" section impedance is simultaneously lowered, the over-all mismatch is less.

In order to test the possibility of mounting a 10-meter Double Triplex inside a similar antenna for 20 meters the arrangement was made. For comparison, a 10-meter Double Triplex was erected at the same height with the same orientation. Tests made on the air showed there to be no difference. The one in the clear, however, had less standing waves on the feeders, and its resonant frequency was much broader than the other. The 20-meter performance was in no way altered.

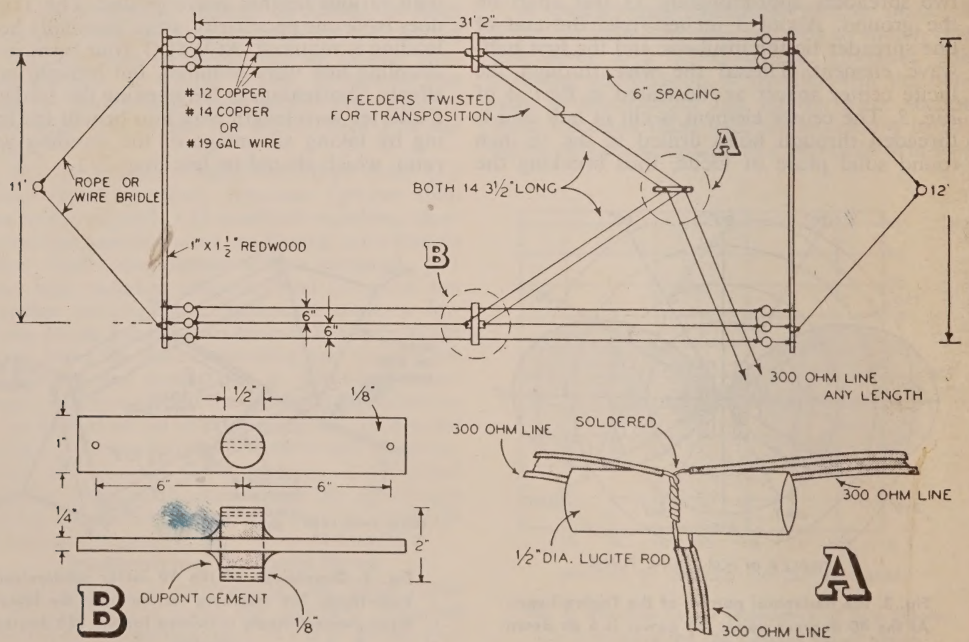
Ten-meter Triplex

To determine the effect of using metal spreaders, a 10-meter Double Triplex was erected with 1" diameter dural spreaders 6' long. Apparently, the capacity effect was such that the Triplex elements had to be shortened to 15' 2½" from the 15' 7" in *Fig. 4*. This indicates that if dural spreaders are used, the 20-meter antenna elements would also need to be shortened slightly.

Two identical ten-meter antennas were set up using #19 galvanized wire and the other using #14 enameled copper. No difference in loading or standing waves could be detected. Checks on the air also showed no difference. Galvanized wire being stronger, cheaper and having less tendency to stretch can be used with complete satisfaction. It may also be easier to obtain than currently scarce copper wire.

Repeated checks have shown the Double Triplex performance on 20 meters to be everything that could be asked of it. The signal compares favorably with those of other stations using the same power and three element beams. At W8LO/2, two twenty-meter Double Triplex beams at right angles to one another afford world coverage. An eight-hour thirty-five minute WAC was accomplished within twelve hours after the second antenna was erected. W5KTL's signal increased an average of two Rs in New York over the folded dipole he had been using. W4HOK's signal with medium power is comparable in New York City to any stations in his area. The first week, using 600 watts and the Double Triplex WAC was worked on ten meters. This included an R 8-9 from India. ■

Fig. 2. Dimensions for the 20 meter Triplex beam shown in plan view. The twin lead junction is illustrated in the closeup view *A*. The Q sections are made from one continuous 29 foot length of 300 ohm line. The dipole center insulator in the closeup view *B* is made of lucite.



2-Elements on 10 From a TV Conical

Bob Perthel, W9MWD
2408 North 83rd Street
Wauwatosa 13, Wisconsin

Numerous things have been appropriated and converted for use in the amateur bands. The latest seems to be to adapt TV antennas for use on 10 meters. Here is how to make a 2-element 10-meter beam, with full size director and radiator, out of a conical TV antenna.

A TV conical consists of a 32-inch boom and 10 pieces of 7/16-inch aluminum tubing. Eight of these pieces are 48 inches long and 2 are 15 inches long. The 48-inch pieces are each cut down to 47 inches to remove one of the flattened ends. The 15 inch pieces are cut up to provide 2 sections 1 inch long and 2 sections 7 inches long. The 1-inch sections are used to add between two 47-inch pieces that make up the director. The 7-inch sections are used to make up the radiator. The remaining flattened end of the four 47-inch pieces to be used nearest the boom, are each drilled to clear a ¼-inch bolt. These pieces are then reenforced with 3-foot lengths of 5/16-inch wood doweling. Eighteen inch pieces of doweling are then added to support the small sections and the remaining 47-inch pieces. Sanding the doweling slightly and lubricating it with soap permits it to slide into the tubes easily. The junctions are then wound with aluminum foil and taped. The antenna mounting plates are straightened so that the elements will form a straight line. When assembling the antenna, the center bolts in the mounting plates are passed thru the holes drilled in the 47-inch pieces. These dimensions result in a 16-foot director and 17-foot radiator. Resonance is at 28.5 mc.

The 32 inch boom results in a spacing of .08 wavelength on 10 meters. At this spacing the gain will be almost 5½ db., the F/B ratio about 17 db. and the radiation resistance about 30 ohms.

As long as the driven elecent was split in the original TV antenna advantage of this was taken to use a simple quarter-wave matching section of RG-58/U coax at the antenna with RG-59/U coax for the rest of the feed line. This resulted in a 1.15 to 1 s.w.r. at the design frequency. A quarter-wave section of RG-58/U at 28.5 Mc. is 5 feet 6½ inches long.

Although this beam has been in use only a few months it has been successfully exposed to winds in excess of 65 mph. It is no heavier than the TV antenna it was made from and any TV-type rotor will turn it.

The DX performance of this antenna has been beyond all expectations. With 100-watts input to the transmitter and the antenna at a height of 40 feet 8-hour WAC and 10 and 20 db over 9 reports have become quite common. ■

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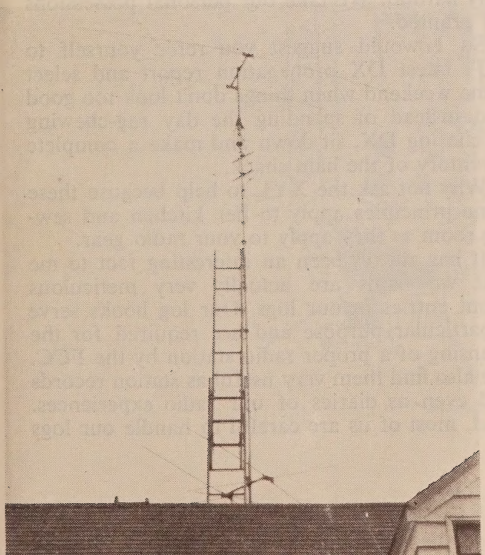
1. For resonance at other frequencies the following formulas:

$$\text{Driven element length (feet)} = \frac{485}{F(mc)}$$

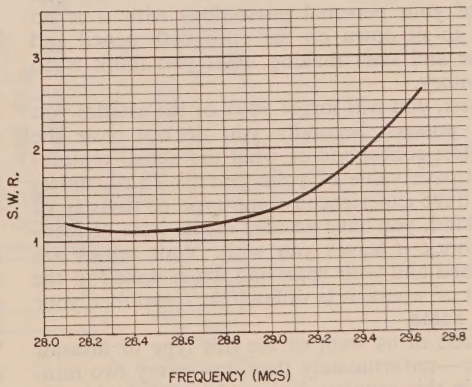
$$\text{Director length (feet)} = \frac{456}{F(mc)}$$

$$\text{¼-wave section coax (feet)} = \frac{240}{F(mc)} \times .66$$

The complete installation.



Measurements made by W9ZDU using a Universal Service Coax Ratiometer antenna design freq. 28.5 Mcs.



the Cheapest Way Out—II

Richard L. Nelson, K6OLS
246 Broadway Avenue
Chula Vista, California

Have you ever made an inventory of your ham shack? I don't mean just a mental note of a few large articles, but rather a real honest "pencil and paper" inventory, putting down the article, when it was purchased, its cost, its present condition and its present replacement value. If not—you should! Now before you fall through the VFO in laughter at the prospects of such a ridiculous enterprise let us take a look at some of the reasons why you should do just this.

If you read "The Cheapest Way Out—I," you know that I am an insurance agent. If you didn't read it—this is fair warning. I am establishing the case that it is far cheaper to purchase proper insurance for your hobby of amateur radio than it is to chance fate, temptation and natural disaster. And by so doing, cushion the family budget against outright loss. It's good sense—good business—and a good investment.

The next time you dig the family fire insurance policy out of the desk, or for that matter, any policy that you think covers your ham gear, look it over and I am sure you will find the following quotation or its equivalent: "The insured shall . . . furnish a complete inventory of the destroyed, damaged and undamaged property, showing in detail quantities, cost, actual cash value and amount of loss claimed. . . ." When the family mansion is a standing stack of ashes, or when it has been blown away and all of your personal possessions with it is no time to sit down on the curb with pencil and paper and start making what you think is an inventory.

First, you will forget 50% of the articles you now possess. Secondly you do not have the slightest conception of what the actual replacement cash value of your gear is. Third, unless you have experienced some type of disaster of this kind, you have no idea of the state of mental shock it leaves you with. Your senses are numbed and your sparkling wit is dulled to the point of where it is difficult to remember your own name.

None of us want to see this type of disaster occur—unfortunately they do—every two minutes in this country. Every 120 seconds there is a fire in a residence. And we are saying nothing of natural disaster such as hurricane, tornado, lightning—or crime losses of burglary, robbery, theft and hold-up. Unless you have been in one of these horrifying episodes it is difficult to imagine just how you would react. Of course, you do not just think of your hobby equipment when one of these disasters occurs. But perhaps by relating these perils to your hobby you can see the good sense in coveting what you have worked hard to acquire and collect and you will protect it properly.

Never—Never—Never take an insurance policy as a matter of fact. Avail yourself of the bone-dry, hard, cruel facts. Find out what is covered and what is not. If you do not have an insurance agent—get one now. Sit him down with you and go over your entire situation with him—and don't leave until you have a clear picture in your mind of where you stand. Sure it's going to cost you some money—but look at the bargain you are getting in peace of mind—protection for the budget—the knowledge that if one of these disasters hits you that you are going to be back in business without having to go into hock. It is the cheapest way out.

And the place to start all of this is with an inventory. If you don't think so you just try to list all of the personal property you now own in your attic, or your basement, or the garage—or the living room for that matter, and I will wager that you will miss a good 50% of it. It is only natural. We take our personal possessions for granted.

So I would suggest you refer yourself to CQ's latest DX propagation report and select some weekend when things don't look too good and instead of spending the day rag-chewing or chasing DX, sit down and make a complete inventory of the ham shack.

Why not ask the XYL to help because these same principles apply to her kitchen and sewing room as they apply to your radio gear.

It has always been an interesting fact to me that we hams are actually very meticulous about entries in our logs. Our log books serve a particular purpose and are required for the licensing of a proper radio station by the FCC. We also find them very useful as station records and even as diaries of our radio experiences. And, most of us are careful to handle our logs

properly. Well, the inventory we are speaking of is just as important a document, required by your insurance policy, and lets you know exactly where you stand in the valuation of your shack. So the next time the static crashes are so bad you can't copy the guy down the block, don't put the lock back on the shack—rule off some paper and start with the receiver and make yourself an inventory. And make it in duplicate.

Put one copy of it where you put all of your other valuable papers—in the safe-deposit box —in the office safe—always some place safe from fire and where it won't be misplaced. Keep the duplicate in your shack in the back of your current log book. As you add or dispose of equipment, enter it in the duplicate copy of the inventory. Once or twice a year bring the original up to date. You now have a document that is priceless in the event of a loss. Then when you complete it and show it to the XYL with pride, perhaps she will do the same thing to the rest of the household—which is exactly what should happen.

One ham I know has put little adhesive-backed numbers on all of his station equipment. This is the way he identifies all of the articles on his inventory. As he disposes of gear he no longer uses that number, but continues to add from the last number on the list. This sounds easy for the receiver and the transmitter and the VFO but how do you handle the loose articles such as resistors, condensers, etc? All of these articles should be in some type of container such as cigar boxes. You should then mark and number the container, estimating the value of the article in it and enter it in the inventory, i.e., "Resistors, ½ Watt, misc," etc.

You may feel that all of this is just so much QRM—that it is up to the insurance company to determine how much money you are going to get from a loss. If so—sorry OM but you are receiving from the wrong side of the xtal. Here's why. An insurance ciompany is in only one line of business—the money business. They will not buy you anything and they will not replace anything and they will not rebuild anything—they can't because they don't know how. They have to go to the experts. They will, however pay the cash value to accomplish these ends. If you were going to sell the family residence, you wouldn't go to an insurance company to find out what that residence was worth. And if you were to buy the XYL a nice fur coat you wouldn't take an insurance adjuster along with you to determine whether the price was right or not. When an insurance loss occurs, the insurance adjuster must call upon the building contractor or the furrier to determine the values for him. This is why certain types of insurance policies require that the articles be appraised before they are insured.

As you can see, the insurance company is only in the money business and they are no more experts in the price and value of radio equipment than they are on the price of bubble gum at the north pole. When you present your claim to the insurance adjuster with an inventory of the exact equipment, when it was purchased, its condition and your opinion of its fair "replacement value" you have 9/10ths of the battle whipped. Further you will gain the undying gratitude of the adjuster because after all, he is just a guy trying to get along in his job too. And he never heard of a Super-Bandbuster Z-37XQ with a phonic front end triple side band adapter, matched to a vertical rotatable omni-directional folded dipole. But when you start showing him an intelligent approach to its value—he will start reaching for his check book.

Next time, let's go into the matter of how to establish value of your equipment. By that time you should have your inventory done. ■



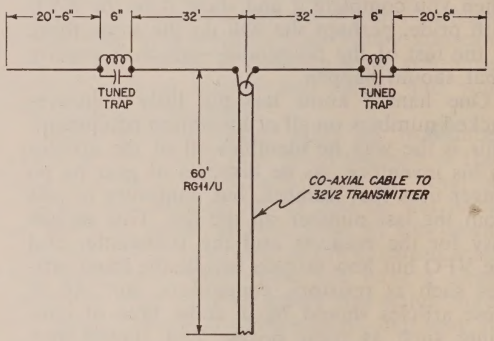
Tuned Trap Multi-Band Antennas

David Talley, W2PF
130 Martense Street
Brooklyn 26, N. Y.

The wide-spread use of band switching and automatically tuned radio transmitters for amateur, commercial and military communication purposes has focused increased attention on multi-band antenna systems. Antennas for operation over a wide range of frequencies have been employed since the days of Marconi. Rhombic, "V" and center-fed tuned transmission line antennas have long been utilized for multi-band operations. Many of the vehicular mounted antennas currently used for mobile radio work can cover the 10 to 75 meter amateur bands.

Recent developments in resonant trap antenna systems have[1] aroused the interest of many amateurs. It was at first believed that this type of antenna provided satisfactory automatic coverage of all amateur bands (80 to 10 meters inclusive) using 72 ohm coaxial cable or twin-lead as the transmission line. Unfortunately, this assumption is not entirely correct. The addition of tuned traps in the antenna may make it resonant on the 2nd, 3rd, 4th and other harmonics of the resultant antenna frequency, but it does not necessarily produce a broadband antenna system. It will be necessary, therefore, to change the antenna length, adjust the tuned traps or both to obtain optimum performance and a low standing wave ratio for a particular desired frequency segment of a band.

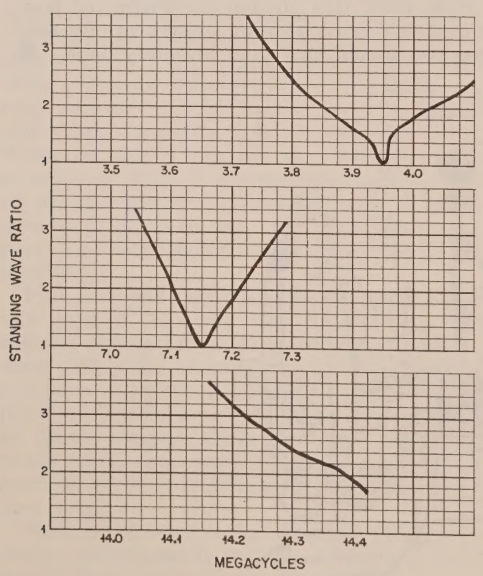
A resonant trap multi-band antenna has been in use at W2PF for the past several months, and it is the purpose of this article to summarize the results obtained which will also, it is believed, substantiate the above remarks. Fig. 1 is a schematic of the antenna which shows the overall dimensions. A pair of *Reyco* coils[2] are used for the resonant traps in this aerial system. They have similar characteristics to the ones previously described by W3DZZ[1] and W2CYK.[3]



The transmitter used with this multi-band antenna was the *Collins* type 32V2 which was adjusted for operation in the 80, 40, 20, 15 and 10 meter bands. The standing wave ratio measurements were made with a *Jones* Model #261 Micro-Match coupler inserted in the RG-11/U antenna cable at the output terminal of the low-pass filter that was installed on the rear of the transmitter. A sensitive home-made field strength meter was utilized to check for radiation from the RG-11/U coaxial cable leading to the antenna.

The antenna shown in Fig. 1 was installed on the roof of the apartment house, about 70 ft. above the street level. Most of the antenna length was only about 10 to 12 ft. above the roof of the building. The fundamental frequency of this antenna was found to be 3945 kc. The 32V2 transmitter loaded to its normal input on all amateur bands without difficulty.

[*Continued on page 98*]



1. "The MultiMatch Antenna System"—C. L. Buchanan, W3DZZ, March, 1955 QST
2. Manufactured by W2VS, Reyco, Rochester, N. Y.
3. 'Simple Trap Construction for the Multiband Antenna"—Arthur Greenberg, W2CYK, Oct. 1956 QST and "Multimatch Antenna for Phone"—Pemberton, W9YJH, Dec. 1955 QST

Helen Harris, W1HOY
P.O. Box 2502
Medfield, Mass.

Christmas at our house is a most wonderful occasion. We go one step further than a great many people because added to the regular fuss, shush and hush of the occasion it has become Tradition (with a capital "T") to try to find something in the radio gear line for the O.M. without him suggesting it in the first place.

I will admit that he usually knows beforehand just what he is going to get, and for all that, there have been times when he brought something home, said it was his Christmas gift from me, and then proceeded to open the "gift" and show me what I had purchased for him. A couple of times I really was surprised too; such as the time when he brought home his NC-240D. I might go so far as to say that *that* was a shock. When he received his 32V2, the pins were slightly knocked out from under me too, but all in all this kind of gift doesn't show up very often, and in all cases has proved to be the best for all concerned.

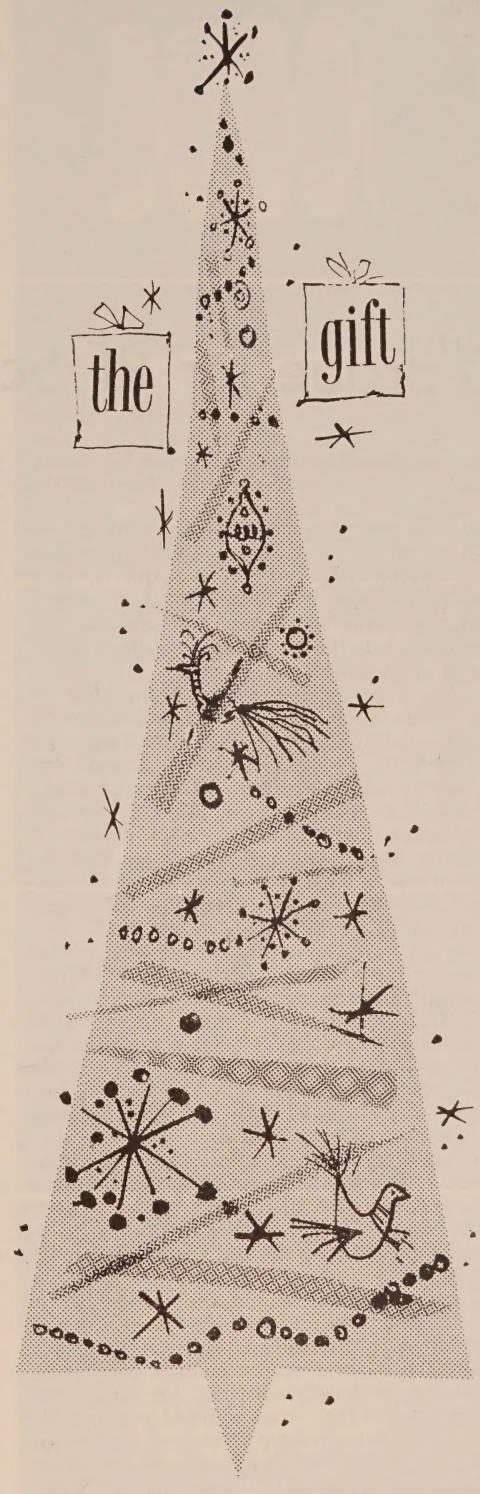
The first Christmas that I knew Sam was one time when I knew quite a long time beforehand just what it was that I wanted to give him. I didn't know a thing about "ham radio," but he had said once that the great desire of any ham was to actually *own* a "Meissner Signal Shifter." You understand that this was a long time ago, much longer than I like to think of in terms of years.

My first problem was to find out what the "thing" was, then try to find out where to buy it, and last and by far *not* the least, to find out how to pay for it. We weren't married very long and I was working in an office as a stenographer. My weekly take-home pay was something like thirteen dollars and eighty-six cents.

I contacted the head of the radio department at the place I worked and asked him about the Signal Shifter. Naturally he'd never heard of such an animal and was sure that I had misunderstood. However, when I insisted that that was what I wanted he finally agreed to inquire around about it. After a couple of weeks he discovered that there *was* such a thing after all, and while he couldn't figure out what anyone would want of it, he agreed to buy it through the store for me. In this way I could put it on my store account and pay for it on time payments. Believe it or not I was very disgusted that I wasn't allowed my regular employees discount too.

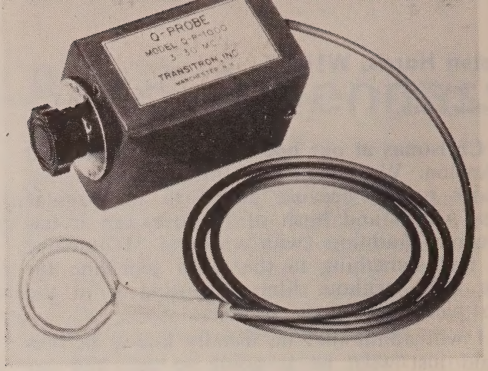
At last!, after wondering and worrying for a month about getting the Shifter I finally had the whole thing figured out and would be getting the wonderful piece of equipment for *the boy*. However, it was the Christmas

[*Continued on page 106*]



Ralph H. Baer

Transitron, Inc.
186 Granite St.
Manchester, N. H.



Q-probe for RF Scoping

Are you checking that transmitter for modulation percentage or looking for hum on the carrier? Do you suspect that there are harmonics in your interstage coupling tank circuit because you haven't got enough C? Is that poor phone quality due to an rf parasitic in your final? Or is some component breaking down? Then how about looking at that suspicious rf waveform with the little unit described below instead of guessing?

Seeing is believing—that's why most of us have gone out and bought an oscilloscope or put a 'scope kit together. But now that we've got one sitting on the shelf, what's it doing for us? Sure, it will help fix that TV set or check our mikes or modulator. It also may mystify the occasional visitor to the shack or service shop, but how about all those pesky rf problems at low or high levels like the ones mentioned above? What about bringing our scopes to bear on those in a painless manner?

It is no news to us that connecting a wire to one of the vertical deflection plates of our scope will make it possible to view rf carriers; check their envelopes and many other things. But we also know that it takes something like 50 or 100 volts peak-to-peak to get a usable display about an inch high in this manner. Furthermore, hanging an open wire between the scope and a high voltage, and, usually, fairly high-impedance rf point changes the conditions at that point beyond all recognition and is often downright dangerous.

The answer lies in taking a sample from the field surrounding the coil carrying the current we are interested in 'scoping. A one-turn pick-up loop, about ¾ inch in diameter, is just about right; it will get into tight places and can be oriented to discriminate between the fields surrounding several nearby coils. A coax cable a few feet in length will take our sample of information to the 'scope without any trouble from extraneous pick-up; the low impedance level due to the one-turn loop will minimize capacitive (bypassing) losses due to cable shunt capacity. But, alas, what have we got at the output of our cable? We are lucky if we can find three or four volt of rf when 'scoping the grid tank coil of that 5763 final; trying to get some signal level out of the cable around the area of the crystal oscillator is like trying to squeeze water out of a stone. In view of the need for at least 50 volts at the 'scope deflection plates, we aren't doing so well, as yet.

To get something usable out of our cable, we need voltage multiplication and the only way to get that without the use of amplifiers is through tuned circuits with good Q's. *Fig. 1* shows how our loop and cable can be tied into a tuned circuit resonating at the frequency of the signal we wish to look at or any other whose presence we suspect. Since our loop is a low impedance source, we can redraw *fig. 1* as in *fig. 2*, which shows the equivalent circuit. Inspection of *fig. 2* shows our source to be in series with L and C. Basic theory tells us that the voltage across either L or C will be Q times the applied voltage e_{in}, or

$$e_{out} = Q \times e_{in}$$

In our hookup, Q depends primarily upon the quality of the coil L used, and to some smaller extent, the characteristics of the loop and cable used, especially at 21 mc and above. If we now mount the coil L and variable capacitor C near our oscilloscope deflection plate connections, we have a workable means for observing rf waveforms.

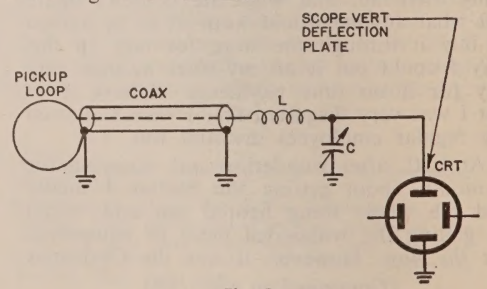
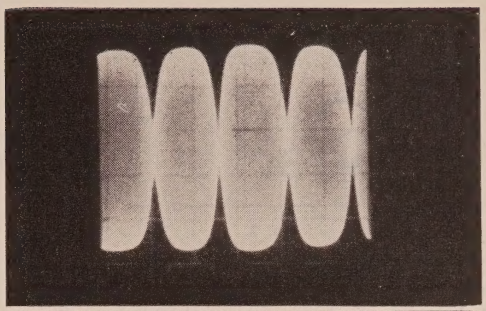
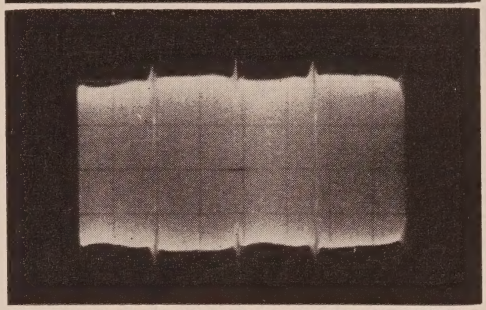


Fig. 1.

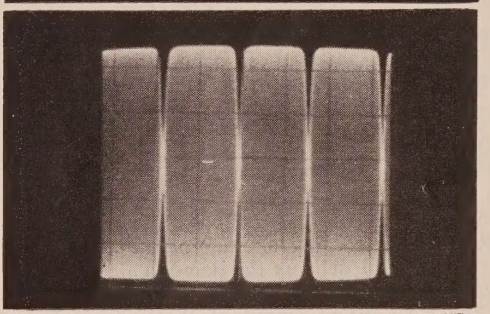
Two tone pattern obtained from SSB transmitter showing inadequate rejection of carrier and non linearity at max input. Note flattening of modulation peaks.



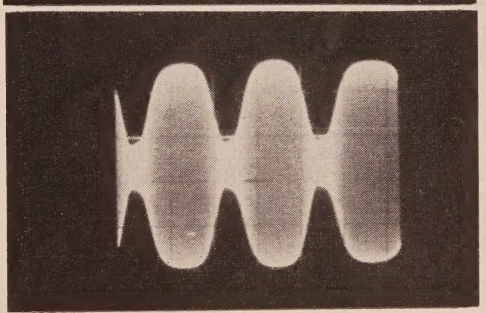
Output from mobile transmitter showing traces of vibrator power supply hash.



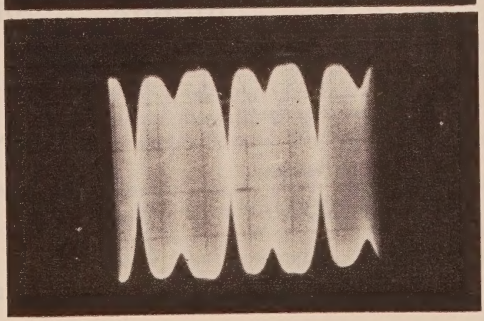
DSB modulated at 1000 cps, with heavily speech-clipped audio signal. Note well rounded corners indicating proper functioning of low pass filter following speech clipper stage.



Output from amplitude modulated final amplifier overloading modulator due to improper tank tuning and loading.



Ovedriven Class B. Linear amplifiers in DSB final amplifier.



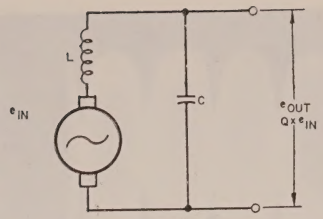


Fig. 2.

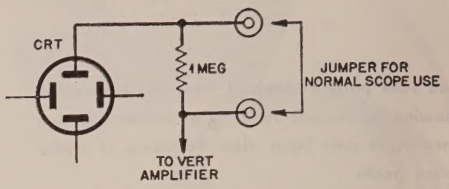


Fig. 4.

So far so good—but here is what happens when we start using this often described gadget: First, we find we want to shield the coil to prevent hand-capacity detuning effects. Next, we find that two or three coils are required to cover 80 through 10 meters. Plug-in coils or bandswitching, here we come! Things are getting messy already without even giving a thought to synchronizing our scope sweep with the modulating signal for stationary displays. There goes more haywire, trying to extract a sync signal from the modulator or signal generator, or whatever audio source happens to be in use.

To make our rf scoping a pleasure instead of a pain, two things must follow our pickup loop:

1. A fully shielded all-band tuned circuit requiring no plug-in coils or bandswitching.

2. A built-in detector capable of developing a sync signal. A look at the schematic of the Q-PROBE in *fig. 3* shows that it combines both of these features. L^1 & L^2, C^1 & C^2 constitute an all-band tuner capable of continuously resonating from 3 to above 30 mc. Crystal diode CR-1 detects a small amount of the rf signal across L^1, and delivers the demodulated audio signal to J1 through an rf filter. A short jumper to the EXT SYNC input of the 'scope takes care of the synchronizing problem. A set of bus wire jumpers from the output terminals T^1 & T^2 to a vertical deflection plate and ground will feed the rf signal to the CRT. Allowing the Q-PROBE to sit on top of the 'scope to shorten the bus wire to a few inches will result in loading the Q-PROBE output with less than 10 mmfd. Hence, it will give full frequency coverage with most commercially or home-assembled scopes having externally available binding posts for the deflection plates. Those 'scopes which haven't can be easily modified with a couple of binding posts and a few inches of wire connected to the CRT socket as shown in *fig. 4*.

A look at the accompanying photographs will give you some idea of the handiness of the Q-PROBE. There's nothing like it for adjusting a side-band linear amp. It's no strain to get two-tone patterns on the 'scope from any point following the SB driver unit. And that audio oscillator will finally come off the shelf for overall equipment tests from mike to antenna, instead of an occasional wrestling match with the hi-fi set. Speech-clippers, carrier control circuits, key-click filtering can be best handled by watching the effects of adjustments on the rf waveform. Waveform distortion of individual rf cycles, which means harmonic content, is readily seen by bright lines or bands parallel to the horizontal axis. If your sweep is fast enough, individual cycles will be observable on 80 or 40 meters through use of the Q-PROBE. It is unadulterated pleasure to SEE that rf parasitic squegging waveform in a tetrode final stage, and even more pleasant to SEE IT DISAPPEAR after a plate suppressor has been wound that does the trick. It's a pleasure to say goodbye to headscratching when the final is running at less than 50% efficiency, when you see the parasitics that are burning up your input power, and incidentally, your final tube. In short, if you are the kind of guy who swears by his grid-dipper for work around the shack or service lab, the Q-PROBE is likely to prove a gadget you will want to have around when the going gets rough. ■

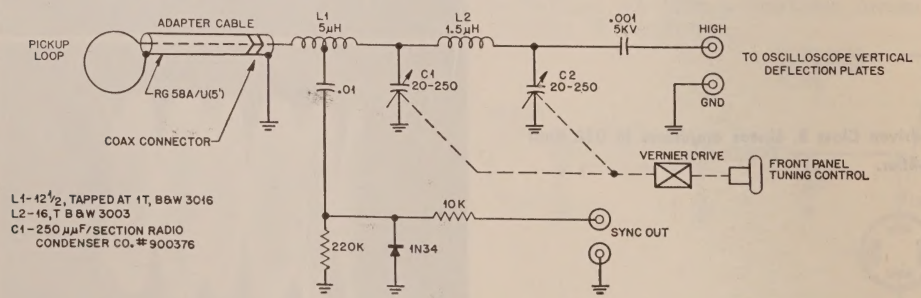


Fig. 3.

Mobile Radio Reaps a Harvest

Paul M. Cornell, W8EFW
1340 Ford Rd., Lyndhurst
Cleveland 24, Ohio

While driving on a business trip in the early winter of 1948, W8EFW/mobile, 28 mc, had an unforgettable ham radio experience. Having repeated this tale at various times, it appears that it is a story unusual enough to be passed on via this article.

On the afternoon of November 12, 1948, while driving along Route 22, between Cadiz and Steubenville, Ohio, on the way to East Liverpool, a CQ from our mobile rig was answered by WØEZE, Rapid City, South Dakota. He immediately asked if we were anywhere near Hopedale, Ohio?

(In case Hopedale, Ohio sounds familiar, magazines have reported that Clark Gable was born there.)

As Hopedale is a small group of buildings along the highway, we buzzed through it, coincidentally, in the few seconds that he took to phrase his question. Stopping beyond the town, we were told by WØEZE, that he was from Hopedale and that his old home was just three miles north. He further stated that we were the "closest station he had ever heard" to Hopedale. He asked if we would go to a phone and call his sister and pass on his greetings. The nearest roadside restaurant had a phone, but the sister didn't.

WØEZE, George, then requested that we follow his instructions and drive to the old homestead. Though somewhat in a hurry, the situation fascinated us and so we agreed to do what we could to establish direct radio contact.

With George giving us instruction via ham radio from Rapid City, S. D., we retraced our route to an intersection in Hopedale, then north on a road which wound its way out of town. It was most amazing to us as George would give instructions to watch for a big tree at the next turn, and it would be there, or a red barn around the next corner, and it too, would be there. He knew right where we were every foot of the way. At one point he cautioned not to go too fast, or we would pass a dirt road to the right and come to a railroad track. We came to the tracks, turned around, and proceeded east on the dirt road. As George described a white farm house on a hill beside the road, we turned into the drive of this house, pulled up in the back yard and cranked down the car window to talk to a pleasant faced woman who came up to see what we wanted . . . WØEZE was still transmitting.

The amazed woman stood transfixed for a moment as her brother's voice came from the speaker of my auto radio. She had had some experience with her brother's ham radio, so she understood a little about what was going on. After a bit more explanation, she climbed in the car and carried on a conversation with George, and George's family, who had now joined the proceedings.

The sister's husband was working at a point about a half mile away, so I drove there and gave him a chance to talk to the relatives. I don't think he ever quite figured out just what was going on . . . he thought I was with some radio network pulling a stunt, but he enjoyed the communication.

Returning to the farm house, the farm wife started tossing all kinds of farm produce into the back seat of my car. I protested vigorously, citing the rule that amateurs can't accept pay for providing communications. I then asked George to explain to his sister . . . but it did no good . . . as George explained to me that any farm family will do as much for people they like. I wasn't being paid for providing communications . . . just getting the usual farm gifts to visitors. Any farm family will do as much for any kind stranger, George told me.

I was then invited into the house for coffee and cake. As I left the house, the lady carried out the rest of the cake, which was half of a large one, and put it in the car. Also there were three pumpkins, two squash, a can of home canned beans, a jar of home prepared peach preserves, a package of several frozen roasting ears of corn, a package of frozen old fashioned cottage cheese, a package of frozen raspberries, farm grown, . . . and a bundle of winter flowers (for the XYL)! Some haul!

For about an hour after we left we were still in contact with WØEZE, and he gave us instructions on back roads, which provided a short cut to our destination. We didn't get there in time for business, but we chalked up the day as a most successful one. ■

by KEN GRAYSON, W2HDM

CQ reports on:

the HAMMARLUND HQ-100

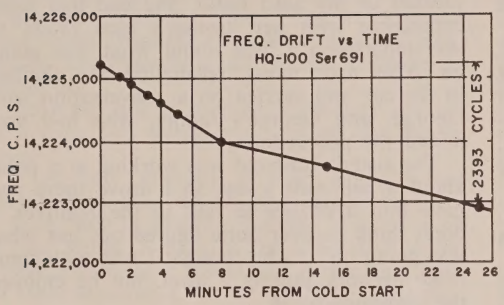
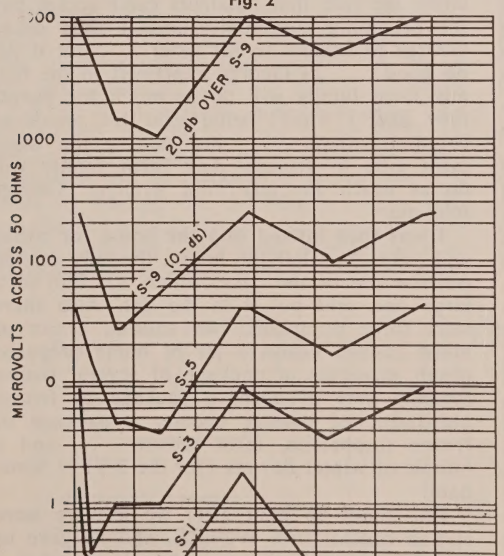


Fig. 1. Warm-up drift

Fig. 2



The proper evaluation of any equipment requires that certain standard test conditions be established and certain techniques be employed so as to have reproducible results and some basis of comparison. The HQ-100 is the second receiver of its type to undergo the new CQ standardized tests. The first receiver tested indicated such poor performance that its tests were discontinued and a review made of the method of evaluation. Since nothing appeared wrong, the HQ-100 was also subjected to these tests. While CQ will refrain from publishing reports of a detrimental nature, we will make an honest attempt to discuss a serious shortcoming of a receiver or transmitter, with a recommendation as to what can be done. This is done in the interest of fair play. The mere fact that a piece of equipment has not been reported on by CQ should not be construed as a failure to meet our standards, if for no other reason but that the backlog of gear to test is almost overwhelming.

The fancy trim which surrounds a receiver is rarely an indication of quality within. The old cliche' "You can't tell a book by its cover" applies even more to equipment. The trim and finish of the first receiver tested led us to be a little optimistic as to what lies beneath. As we have already said, we had to discontinue the tests because of poor performance. By the time we got around to measuring the Hammarlund HQ-100 we were pretty sessimistic. About half-way through the tests we were ready to go out and buy one for ourselves.

Since only numbers properly correlated and accurately obtained can be considered data, a great deal of effort went into the obtaining of these numbers. For example, all measurements were made in a screen-room to prevent interference which gives false readings. All frequency measurements were made with a counter type of frequency meter which would read with the accuracy of one cycle out of each ten megacycles measured (QST where is thy contest). Our signal generator enabled us to read voltages from 1/10 microvolt to 1 volt with good accuracy over the entire frequency



range of the equipment. We could further vary the modulation frequency and percentage to any degree we desired. Our audio output was constantly monitored by a VTVM calibrated in decibels. In other words our tests were as ideal as we could get them.

Our initial examination of the receiver showed it to at least feel like a communications receiver. The knobs turned smoothly and without any perceptible backlash. The die-cast front panel gave a feeling of rigidity and the easily read dials were neat and clean, well lit and finely printed. A large "S" meter and an alarm radio type clock finished off the panel without too much fruit-salad.

We all know that you have to hear them to work them. Well, when a signal of three and a half microvolts can produce an output of one watt at the speaker on ten meters, and a signal less than one microvolt can produce a useable signal on all bands, then you have something. Figure 2 is a curve of the "S" meter readings versus the signal input to obtain them on all bands. Note that although lines are used to connect the various points on the curves they should not be considered as part of the data presentation, their only function being identification of signal levels.

We have added a new test of interest to the single side band boys. That is on-off stability. We had expected that the oscillator would drift about one kilocycle on twenty meters when the B+ is switched off and on again. Over a period of one half hour of switching from receive to send, the oscillator did not drift more than ten cycles. Warm-up drift is another problem which is not only confined to SSB, but to all operations. From a cold start the warm up drift did not exceed 2400 cycles over a half hour. By using the radio-alarm feature of the clock this can be reduced even more by setting the receiver so it goes about an hour before that important sked and then leave for work, knowing with pride that you will be right on frequency when you get home at night.

The Q-Multiplier is real sharp. As an example you can set it on a carrier and measure the bandwidth of a station with some accuracy since the Q-Multiplier dial is calibrated at 1kc per division. The Q-Multiplier also serves as a BFO control for CW and SSB stations.

The noise limiter is quite effective. Its insertion loss is much less than average for its type, being only 4.3db. It is capable of 6.5db loss to noise which is exceptionally good.

When the audio response was tested it appeared that there must be a filter somewhere in the audio circuit and sure enough there was —but even better than that the filter was of the RC type and together with negative feedback was used to provide some very interesting characteristics. For, besides limiting the audio pass band weak signals caused less feedback and more audio selectivity whereas strong signals have the opposite effect. In essence this will increase the signal to noise ratio for weak signals where this effect is needed. As for selectivity, the manufacturers curves appeared to be extremely close to the model under test—possibly differing only in so far as our set was aligned within certain tolerance and nicely too. ■

A Practical Front End For A 1215mc Receiver

by Henry H. Cross, W100P
and Wayne C. Taft, W1WID
National Co., Inc.
Malden, Mass.

During the past few years, there has been a decided increase in the popularity of the vhf and uhf bands. One has only to read the results of the many vhf contests held each year to arrive at this conclusion. As six and two meters have become more populated in some areas, many of us have given the higher bands a try. To be sure, contacts on 220 and 432 mc are not too plentiful in most areas, but there are many of our experimentally inclined brethren who now have equipment for these bands. The number is large enough so that operation on these bands is a must for the serious contester. Many of the gang who have used 220 and 432 mc for some time now are asking, "Why not go higher; what about 1215 mc?" Apparently, the lack of readily convertible surplus gear combined with the lack of data for "rolling your own" has kept progress on this band very slow. Although a description of a tripler for use with 432 mc transmitter appeared last year, no information is available on receiving gear for the 1215 mc band.[1] It is therefore the purpose of this article to describe an easily built and aligned converter (front end) for 1215 mc.

In the design of a front end for this frequency, many factors must be taken into account. First comes the question of oscillator stability. Most likely, any serious work on the band will be done with crystal-controlled transmitters. A crystal-controlled receiver oscillator is therefore also in order. With a tunable oscillator, trying to find a signal in the middle of the 85 mc wide band would be like trying to find a rowboat in the middle of the Atlantic Ocean! Then comes the problem of what kind of a mixer to use and whether or not to use an rf stage. Of course, whatever the choice, it should provide the lowest possible noise figure; signals will be weak enough so that every db helps. From previous experience with rf stages at this frequency, the authors feel that an rf stage would not be a worthwhile addition. Even using a new Western Electric 416B, noise figures of only 8db or so were obtained at 900 mc. This means that 9.5 db might be expected at 1300 mc. Any other types, including the 6299, would probably be no better. The alternative approach to a low noise front end would be to use a good mixer crystal and hope for the best. Since a crystal mixer has no gain, however, many factors enter the overall noise figure. The largest single factor is that of the if noise figure. The overall noise figure for a crystal mixer is given by the equation:

$$F = \frac{1}{W} \quad (F_2 + t - 1) \qquad \text{where}$$

W is the available power "gain" of the mixer itself (about 0.2 — .3)
F_2 is the noise figure of the if amplifier following the mixer
t is the equivalent crystal temperature (1.2 for modern crystals)
and all quantities are expressed as pure ratio.[2]
W and t are properties of the crystal and are constant for any given type; the designer has no control over these values. It can be seen, however, that the noise figure of the if amplifier is quite significant, and since the designer has some control over this factor, he should keep it as low as possible. The crystal to if matching network should also have low loss for the same reason.

Another factor affecting the overall noise figure is the insertion loss of any frequency-selective networks placed before the mixer. Actually, the small amount of rf selectivity necessary for a converter of this sort can be managed with an insertion loss lower than one db. One further question that may be asked concerns noise produced in the local oscillator. Although in some radar applications it has been necessary to use a balanced mixer to eliminate oscillator noise, the crystal oscillator-multiplier circuits tried produced a noise level that was insignificant even with the single-ended mixer used.

The choice of an if frequency for a converter of this type is not difficult. It should be low enough so that the lowest possible noise figure of the if tubes may be realized, but high enough so that the excess noise of the mixer (which is inversely proportional to Intermediate Frequency) will not be large. A good compromise would probably be 50 mc, this choice being further influenced by the fact that most vhf men have good six meter receivers already. The 4 mc tuning range thus afforded would be

1—R. W. Robertson, "A tripler for the 1215 mc Band", July 1955 QST Page 20

2—M.I.T. Radiation Lab. Series, Volume 18, Chapter 13

adequate for most work since most of the gang will be tripling from 432 mc and will most likely end up in the 1296 to 1300 mc portion of the band.

Taking the above considerations into account, a converter was built and tried. The uhf circuitry is contained in a brass box, 6¾" x 2" x 1". The tuned circuits at signal and oscillator injection frequencies are made of ⅜" copper tubing. They are tuned with 8-32 x 1½" brass screws which turn in and out of the tubing axially varying the capacity. See Figures two through eight for mechanical details. These tuned circuits are basically ¼ wave resonant lines. With the unplated and unpolished copper tubing in the unplated brass box, first used, an unloaded Q of about 1100 was obtained. The tuning range was about 900 to 1400 mc. The input circuit was symmetrically loaded to a Q of 250, giving a 3 db bandwidth of about 5 mc and an insertion loss of about 1.0 db. This value of loading would give a calculated image ratio of 30 db with a 50 mc if; the measured value was 29 db. Coupling in and out of the input circuit was obtained with loops; the amount of coupling was adjusted experimentally using a slotted line, with a method described by W1NRY.[3]

The crystal oscillator-multiplier chain starts with a 34.6 mc overtone crystal used in the Butler oscillator circuit. The 12AT7 used for this stage and the 6AK5 following it are used to multiply the crystal freuency up to 311.5 mc. Mixer injection is controlled by a pot in the 6AK5 screen. The output stage of the oscillator chain is a CK715 crystal diode which quadruples to 1246 mc, the LO injection frequency. These diodes cost about the same as a IN34A, which does not work as well.

Coupling to the mixer crystal is provided by two loops, one coupled to the signal tuned circuit, and the other to the LO tuned circuit. Although any crystals in the 1N21 series could be used with varying results, a 1N21E crystal, recently made available by Microwave Associates, is probably the best mixer crystal available for this frequency. Excellent noise figures have been obtained with it at these frequencies; in this case, the NF of the crystal alone is probably less than 6.0 db. A small brass plate mounted on the side of the main filter-mixer box, but insulated from it by a layer of teflon or polyethylene, serves as part of the crystal holder as well as the hot side of the crystal by-pass capacitor. An RF choked connected to the crystal holder serves as the dc return for the crystal. A meter inserted in this dc return is used for continuous monitoring of mixer current.

The meter used for measuring crystal current should have a very low internal resistance, 50 ohms or less; any voltage drop across the

3—*DeWitt, Klein, Potts, "Resonant Cavity Band Pass Filters: Practical adjustment to predicted performance." Radio Receptor Co., Inc., Brooklyn, N. Y.*

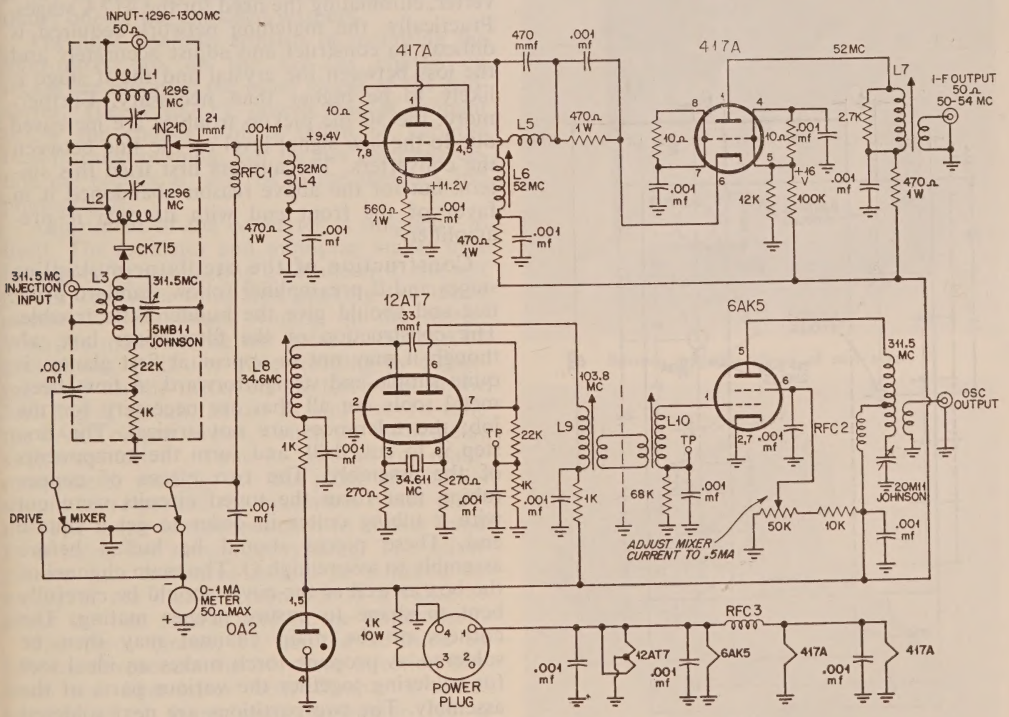


Fig. 1. Scatter Front End with Single Tuned Circuit Filter-Mixer.

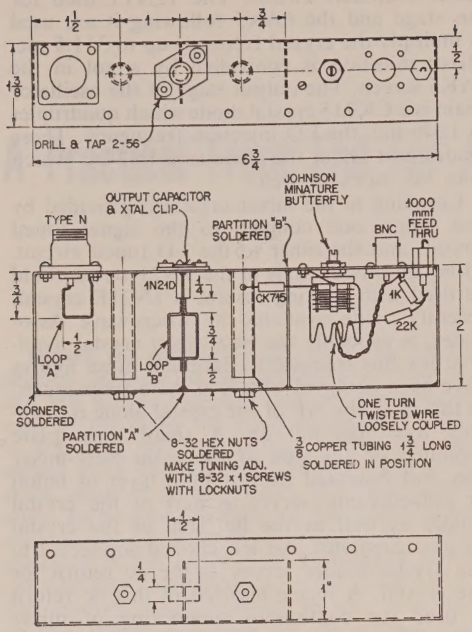


Fig. 2. Assembled Filter-Mixer Parts.

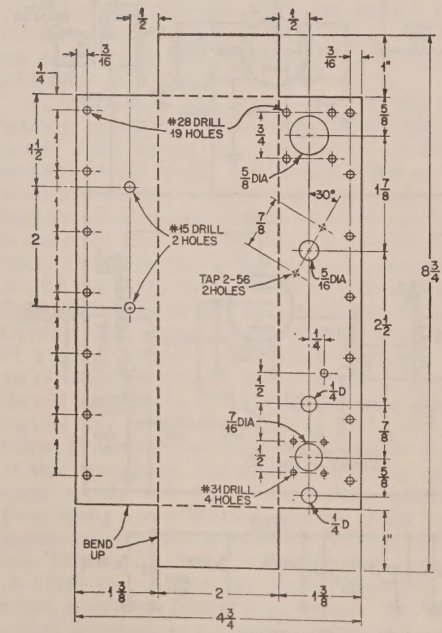


Fig. 3. Filter-Mixer Main Channel Detail.

meter due to crystal current will produce a back bias on the crystal. This bias tends to ruin the noise figure of the mixer. The mixer current should be monitored during operation of the converter to be sure that it is not excessive. Any currents much greater than about 1.0 ma could burn out the crystal. Be sure that no rf from the transmitter gets into the receiver during transmit periods; excessive mixer current could easily be realized.

The remaining portion of the converter is the low-noise i.f. preamplifier. This stage uses a pair of WE417A's in a cascode circuit. The noise figure of this stage alone was measured and found to be in the vicinity of 1.0 db, which is about as good as could be expected. Needless to say, these tubes are the most expensive single items in the converter. A pair of 6BC4's could be substituted for the 417A's, with only minor circuit changes; the noise figure, however, would not be quite as low.[4] Although the input and interstage tuned circuits in the preamplifier are normally quite broad, the output tuned circuit must be loaded to obtain the necessary 4 mc bandwidth. The power requirements for the converter are 150 volts regulated @ 70 ma and 6.3 volts @ 1.1 amp. Signal impedances are both 50 ohms.

It should be pointed out that theoretically the if output of the crystal mixer could be fed by a suitable matching network directly to the 50 ohm input of a good low-noise 6 meter converter, eliminating the need for the 417A stages. Practically, the matching network required is difficult to construct and adjust accurately and the loss between the crystal and the if stage is likely to be higher than necessary. Furthermore, the 50 mc pickup troubles are increased due to the low signal level on the line between the converters. The authors first tried this system, but for the above reason abandoned it in favor of the front end with its own if preamplifier.

Construction of the oscillator-multiplier stages and if preamplifier follow standard practice and should give the builder little trouble. The construction of the filter-mixer box, although it may not so appear at first glance, is quite simple and straightforward. A few sheet-metal tools are all that are necessary for the job; the tolerances are not critical. The first step is to cut, drill, and form the components of the assembly. The two pieces of copper tubing that form the tuned circuits were cut with a tubing cutter in order to get a square end. These pieces should be buffed before assembly to assure high Q. The main channel of the box as well as the cover should be carefully bent to shape to ensure proper mating. The corners of the main channel may then be soldered. A propane torch makes an ideal tool for soldering together the various parts of the assembly. The two partitions are next soldered in to the channel, followed by the two 8-32 nuts used to hold the tuning screws. The nuts

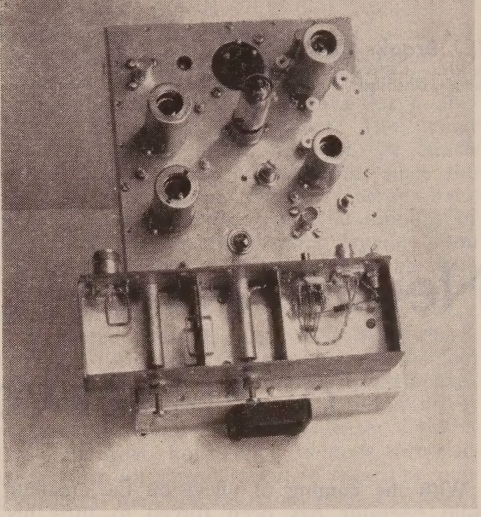
are soldered to the outside of the box, over the appropriate holes. With these nuts in place, the box is tipped on its side so that the nuts are on top. The copper tubing inductors are then set in place. With the 8-32 tuning screws in place, the centering of the inductors may be checked and they may be soldered in place. The screws and tubing should be concentric. In order to facilitate tapping the CK715 diode on the LO inductor, a small hole is drilled in the copper tubing, ¼" from the cold end, and a ⅜" piece of #16 wire is soldered into the hole. The diode may then be soldered to the wire during final assembly. The soldering in place of coupling loop "B" with its crystal holder clip (made from a pin removed from an octal socket) then completes the sheetmetal assembly. Before the remainder of the parts are added, it would be well to have the whole assembly copper-plated and lacquered. This operation gives a good finish and at the same time, reduces the losses in the input and mixer circuits. Copper was used instead of silver because it is cheaper and it plates on smoother. The crystal by-pass capacitor plate is separated from the outside channel wall by two sheets 0.005" teflon and held in place by two extruded ceramic washers (National XS9) with 2-56 x ⅜" screws. Pieces cut from a polyethylene parts bag could be used also if the teflon sheet is not available. The crystal is held firmly in place by a small brass finger secured under one of the extruded washers.

The final assembly consists of mounting the filter-mixer box on the *See-Zak* chassis on which are mounted the other stages of the converter. The crystal i.f. output lead is brought below the chassis with a teflon or ceramic feed-through bushing. For further assembly detail, the builder is referred to the sketches and photographs.

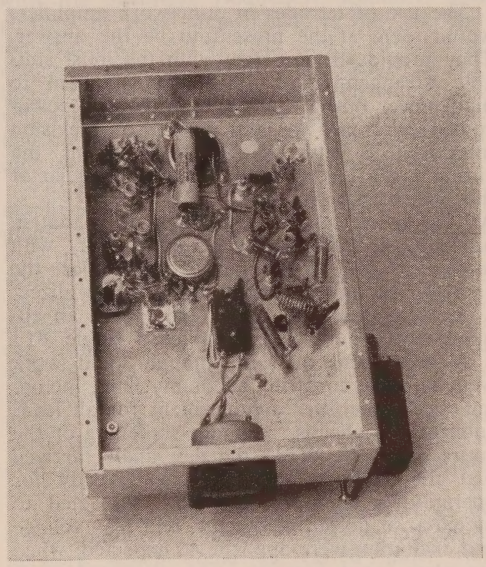
Adjustment of the converter is simplicity in itself. The oscillator and multiplier stages may be aligned by connecting a voltmeter to the test points, one at a time, and peaking the tuned circuits for maximum reading on the meter. With the meter on the test point in the 12AT7 grid circuit, peak the meter reading by adjusting L_8. With the meter on the test point in the 6AK5 grid circuit, adjust L_9 and L_{10}. To tune the 6AK5 output circuit, switch the milliameter switch to "drive". Tune L_{11} and L_3 for maximum meter reading. At this point all circuits should be re-peaked for maximum meter reading. The meter is then switched to "mixer" and L_2 is tuned for maximum reading. The mixer current thus measured should be adjusted by means of the 6AK5 screen pot to a value of about 0,5 ma. crystal used in the Butler oscil-

The input circuit, L_1, can be adjusted as follows. Disconnect the 311.5 mc injection link from the filter-mixer box. Couple a *small* amount of rf from your transmitter (or a signal generator if you have one) to the input jack. Then tune L_1 for maximum mixer current.

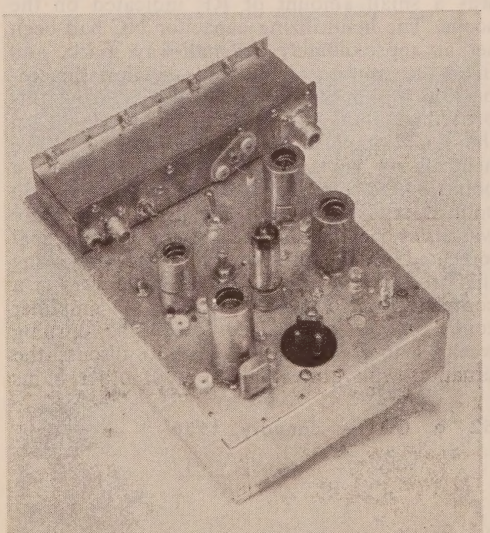
[*Continued on page 94*]



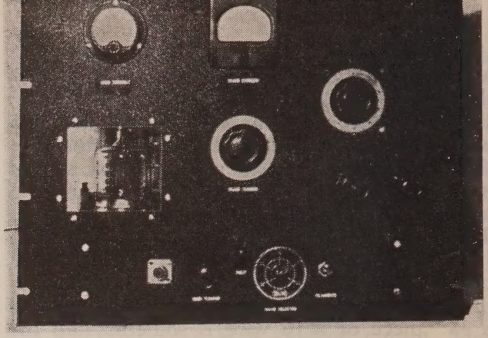
Top view of converter showing interior of filter-mixer.



Bottom and top views of converter.



T. J. Brooks, Jr., W5OSL
University of Mississippi Medical Center
Jackson, Mississippi



Neutralization of Pi-Network Tetrodes

With the coming of television the amateur radio operator has been forced to turn his attention toward the elimination of all spurious radiations from his rig.

The use of tetrodes in pi-network amplifiers would seem at the present to be the answer. They provide the amateur with the most suitable arrangement for obtaining medium to high power output with a minimum of power consumption *and the least amount* of television interference. With minor modifications the circuit in fig 1 is probably the most popular at the present time.

All the articles on these finals mention that in order to function properly, particularly with respect to the suppression of harmonics, the amplifier should be *very* accurately neutralized.

Approximately two years ago I built an all-band final amplifier employing a single 813

A great deal of time, thought, and work went into the construction of my final, including a separate filter compartment for all leads entering the chassis, complete screening of the entire unit, etc. When the day finally arrived that the unit was completed and ready for operation an oscilloscope was connected to the co-axial output connector, and bias voltage and excitation were applied. As expected, when the plate input capacitor was resonated there was a small amount of RF indicated on the scope. The neutralizing capacitor NC had been set at approximately the half-way mark, and in an attempt to effect neutralization this capacitor was opened to full value. During this procedure there was no apparent change in the signal indicated on the oscilloscope. The neutralizing capacitor was then closed to a point where the two plates were almost in contact, and to our utter consternation there was *still* no change in the amount of r-f signal indicated on the oscilloscope! After repeating this procedure a number of times we were at a complete loss to understand why the amplifier could not be neutralized. Over the ensuing weeks I took the opportunity to discuss the situation with quite a number of other hams and to my surprise many of them stated that they had had similar experiences.

In desperation the entire amplifier was dismantled and a new one built, this time using a single 4-125-A as the amplifier tube. Most of the components employed in the original amplifier were replaced by new ones. Needless to say, when the 4-125-A final was finished and preliminary neutralization tests were made the same difficulty was encountered as with the previous rig!

This constituted a situation entirely unexpected, and for which I was grossly unprepared. In-so-far as could be ascertained I had on both occasions followed published circuit data closely enough to have insured satisfactory performance in all respects. In desperation, all sorts of neutralizing condensers were tried, including everything from a small piece of wire extending through the chassis to a large receiving type variable condenser. Although this latter unit could obviously not be employed in a circuit with high voltages I merely wanted to try to find out *how much* capacitance would be required to effect neutralization. None of the values employed would produce *any* diminution in the amount of rf indicated on the scope.

Somewhere there had been a serious mistake in the construction of the two final amplifiers, and in order to find it I made a careful study of the circuit and its components. Eventually, of course, the answer was found, and if more time had been spent studying and less time building the answer would have been found *much* sooner.

It is necessary to neutralize amplifier tubes in rf service because of their interelectrode capacitances. The difficulty arises primarily from the fact that the C_{gp} or feedback capacitance of the tube produces oscillation within the tube. In the modern beam tetrodes this capacitance has been reduced to a very small figure. Oscillations are generally not a serious problem even without external neutralization, especially when the tube is oper-

ated at low frequencies. This does not mean that parasitic oscillations may not be present. It merely means that the harmonics generated are not of sufficient amplitude to produce instability in the circuit to the point where it does not function satisfactorily. Therefore, in general, these tubes may be used without neutralization. However, if the goal is complete neutralization *all* the interelectrode capacitance must be cancelled out in some manner.

A second look at the circuit employed in fig 1 will disclose that the grid by-pass condenser C_1 and the neutralizing condenser *NC* constitute, in effect, a capacitance bridge with the grid-plate and the grid-cathode capacitances within the tube. No current will flow in this bridge when the components bear the following relationship:

$$\frac{NC}{C_1} = \frac{C_{gp}}{C_{gk}}$$

If this ratio is not exactly maintained some current *will* flow within the bridge and harmonics will be generated. This being the case we must now realize that not only is the value of NC very critical, *but the value of C_1 is equally as critical.* Looking back to the diagrams from which the two final amplifiers were constructed I found that a by-pass capacitor of 470 mmfd had been specified for C_1. In the construction of the two rigs I had been a little casual about the importance of this value and not having had one available had substituted a 0.01 condenser! It now became obvious that no practicable value of NC could possibly have corrected for an error of such magnitude in the value of C_1. The truth of the matter is that in practice the proper selection of C_1 is really more critical than the selection of NC, for an error of perhaps no more than 100 mmfd in the value of C_1 might produce an imbaliance in the bridge which could not be correctible within the range of NC!

Realize also that interelectrode capacitances which are published for each tube type represent only the *static* values for the different electrodes. In actual operation of the tubes as a power amplifier these values are not always the same. Under typical operating conditions into a resistive load the grid-to-plate capacitance is the same as the static value, and this is also true of the output capacitance. The actual *input* capacitance may, however, be much greater than the static capacitance, since the grid-plate capacitance couples energy back from the plate to the grid. The amount of energy fed back in this manner depends upon a number of factors including the plate load impedance, the feedback capacitance, *and the gain of the stage.*

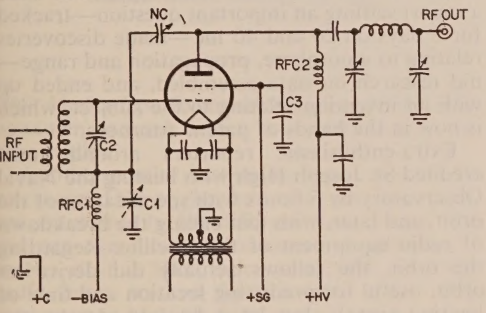


Fig. 1. Circuit of a typical plate-neutralized tetrode amplifier having a pi-network plate tank circuit.

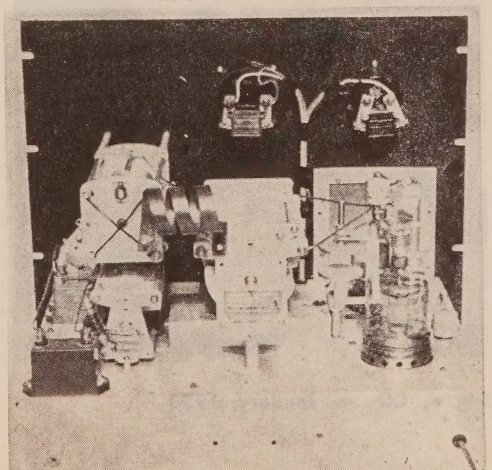
Remember that the screen feeds energy back to the grid in exactly the same manner as does the plate. The amount of energy fed back from this electrode is kept to a minimum by making the screen by-pass condenser C3 very large. In order, however, to remove this electrode from all consideration in regard to neutralization the by-pass condenser C3 would have to be of infinite value, and this is impossible. Furthermore, its reactance will vary with the operating frequency. Secondly, and perhaps of equal importance, is the fact that the reactance of the grid choke RFC_1, also changes with frequency. This means in the final analysis that no neutralization adjustment will hold for all frequencies, and it also means that precise neutralization can be accomplished *only under normal operating conditions.*

Virtually all instructions for neutralizing an amplifier say that it should be done with the plate voltage removed. The reason for this is that manipulating a neutralizing condenser with 2,000-3,000 volts applied to it is a very hazardous procedure and *is to be avoided.* Actually, neutralization without plate voltage can usually be carried out to a point which will be close enough to provide satisfactory operation, and in most cases we "get by" in this manner. Even if an amplifier can be perfectly neutralized at one frequency, a change in the operating frequency will slightly alter the neutralization.

I now began to wonder if there were not some component in the bridge neutralization network which could be varied under full load conditions but which would not entail

[*Continued on page 114*]

Rear view of final



Fame and Fortune Via "Sputnik" I

Michael Stimac, W8KTZ
St. Joseph High School
18491 Lake Shore Boulevard
Cleveland 19, Ohio

Many amateurs listened to Sputnik I. Logs were kept and spot information given to news channels, with unprecedented results in publicity for the cause of ham radio. The St. Joseph High School Radio Club joined the scramble to do its bit for fun and for whatever help somebody might get. Little did the gang realize what they would give to ham radio, and what they themselves would enjoy!

The list of events publicity-wise reads as follows: 6 TV shows, all or part on the St. Joseph High R.C. work; a review on a New York TV show over national hookup; 30 radio accounts, and 20 newspaper articles or reports, before count was lost in both cases, and a science movie backed by two foundations. This latter job is in the hands of Ted Coleman who did the film for Wide Wide World when Cleveland was included recently. Ted has rated the assignment ideal.

What did the SJH gang do that was so special, if anything? It did several things. One, the fellows cracked the secret of the orbit—then, began to pick it up on schedule—kept it located to as close as 90 miles—established a reputation so that newspaper men relied for last minute news on the SJH observers—fed teletype services—caused the Bureau of Standards to issue a report settling an important question—tracked for 8 days on 20 and 40 mc—made discoveries relating to ionosphere, propagation and range—did research on data assembled, and ended up with an invention relating to the subject, which is now in the hands of patent attorneys.

Extra-enthusiastic reporters around town credited St. Joseph High with beating the Naval Observatory by 5 hours with specification of the orbit, and later, with first calling the breakdown of radio equipment of the satellite. Regarding the orbit, the fellows actually did derive an orbit, useful for predicting location and time of hearing signals, but let it be said clearly, the work was not considered remotely trustworthy nor complete by us as what we'd expect out of the Naval Observatory!

Nevertheless, the St. Joseph High method is very interesting. It depends on a solid geometry theorem which says: a great circle on a sphere can be fixed by two points. The SJH radio club discovered by observation that the 20 mc signal range was a consistent 5100 miles; they succeeded also in spotting fairly sharply the fade-in and fade-out directions. This was sufficient to locate 2 points 5100 miles from Cleveland in directions about 100 degrees apart—which fixed a great circle—one orbit!

Since Sputnik traveled always in the same plane, and the earth turned under it, the boys used a model orbit and holding it in a fixed position, rotated the globe for about 23 degrees under it—and there was the next orbit! Having traced out a flock of orbits in this way, they went to work with calipers and arithmetic, and figured when and where Sputnik I would sign in and out. This system worked so well that the signal was in there plus minus a minute or two for orbit after orbit. In fact, the closest measurement was off the predicted fade in by only 18 seconds; i.e. the boys predicted a signal appearing at 4:01 pm est Sunday Oct. 6. It came at 4:00:42—18 seconds early. This translates into 90 miles off predicted location, if the ionosphere were to be considered perfectly uniform.

K8GKB, W8UYZ, and KN8EGZ plot orbits and deduce such observations as below horizon reception, range of reception, times of fade-in and fade-out, and calculation of satellite altitude, besides constant determination of position.





KN8EVB, W8BYU, KN8EHP, K8FF, K8GCB, W8VNE, Jim Kitzmiller, K8EHA, KN8EHO, and Dennis Tomasone. Equipment used was Concertone recorder on left, HRO-60 hidden in center, and NC-109 on right. Visable also are many parts of the ham station W8KTZ used by the club.



KN8EVB, W8AKH, K8EHA, K8DTS, KN8EHP, K8BFF, Jim Kitzmiller, Tim Dziak, KN8EGZ, K8DUD, Ray Grubiss, Dennis Tommasone, and Jim Grubiss do antenna work around beams for 14, 28, 40, and 50 mc during the Sputnik Tracking. All boys have taken their tests but some are still awaiting their call letters.

This kind of performance happened also with newsmen around, which was quite handy for ham radio!

Another result, startling to hams, was the 40 mc range. One might think that the 40 mc signal should not be too different from 50 mc. But did you ever hear of consistent reception of 6 meters over a 3600 mile range? Yet, the SJH radio hams tracked Sputnik orbit after orbit thru a range of 3600 miles on the 40 mc signal.

This fact, plus the 5100 mile range for 20 mc gave a beautifully consistent picture of refraction thru the ionosphere. On 20 mc, the satellite had to drop about 35 degrees below the horizon before fading out, and on 40 mc it faded out at 26 degrees below. Drawn to scale, considerable curvature is nicely evident.

Consistent tracking revealed another startling fact: no skip was occurring! Now, this was a real discovery to hams. Why no skip? The boys don't have the answer, but in 20,000 feet of recording, there is not even 200 gotten while the satellite was outside the ranges mentioned above, and the boys did record everything. The signal just didn't bounce.

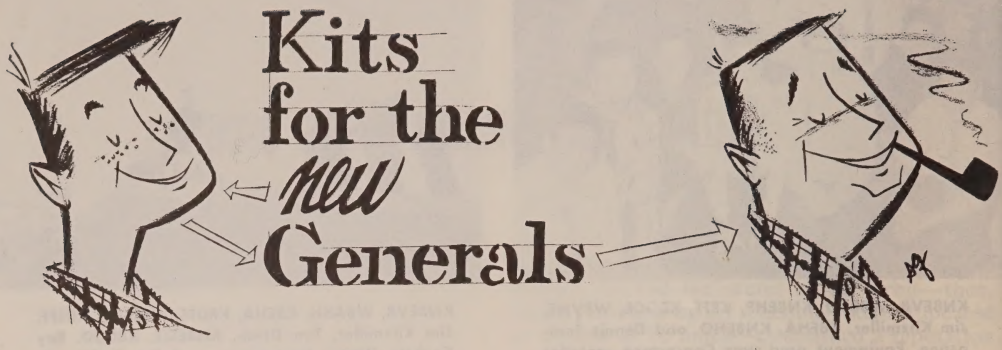
Another real discovery: the range and no-skip characteristics stayed constant for day and night! But hams know the ionosphere changes, so here is something else to think about.

The boys went on tracking for 8 days. Except for Monday night, the early morning orbits were omitted. Monday night, however, the boys called the radio failure for the radio services and news wires, and since at that time nobody was sure if the gadget was was going to stay up, the boys tracked thru the night. It was a real thriller, being Cleveland's first-hand source of information, having access to the press wires, and keeping up with the satellite. The last beeps were heard at 1:45 Tuesday morning, on the 20 mc frequency. On 40 mc, the last beeps recorded were heard on the following Saturday, Oct. 12, around 8:30 p.m.

This last recording of beeps brought a thrill of its own, in another scientific observation. The beeps were noticeably more rapid. This was due either to Doppler effect, or to equipment in the satellite changing. The SJH boys are at present working equipment into shape to measure the intervals, among other things. If the beeps slow down on that same tape, then it will be a beautiful show of doppler effect. This effect had been noticed in change of tone when continuous wave was being received, especially on 40 mc, but it is hard to convince people of the principle and demonstration with that. Fast and slow beeps they understand!

St. Joseph High school, where all this took place, is a modern Catholic high school, dating from 1951. Student capacity is 2300, courses are academic and vocational, and the staff is composed of a Catholic religious teaching order, the Society of Mary, plus many laymen. Radio and Electricity is one course, with a lab and shop well equipped. Naturally, the Radio lab grew a ham station, and a club sprang into being. As many as 100 boys have been enrolled in some years, but that is too many. 80 members are listed now; 30 have tickets ranging from Novice to General, and the numbers of tickets level off at about 40 most years.

Only the licensed fellows were allowed to track and do the shows. It was thought that the SJH story would be finished when Sputnik II went up. But when the radio fizzled, the St. Joseph High Radio Club story strangely became of great interest. It is nice that it happened that way, for perhaps the fellows had an experience that rivalled that of Columbus and his crew as they gazed upon a new world. These lads rode the first satellite into a new world, literally, for themselves! ■



R. W. Jones, W6EDG/KR6JH
735 Donax Ave.,
Imperial Beach, Calif.

The radio ham newly promoted to the ranks of the Generals has no trouble finding a reasonably priced kit that will emit a good signal on the phone bands. What he needs—heed this Mr. Heath—is a kit to be used with his new phone transmitter that will make him sound like he had been on the phone bands for years. If the distributors of paper bags full of radio parts and the "Solder-no solder" instruction books will produce the kits suggested in this paper they will give to ham radio the counterpart of the hot rodder's squirrel tail: something not functional nor necessary, but nice.

Newcomers to the phone bands frequently expose themselves with their choice of personal pronouns. Every seasoned phone operator says "We." This indicates, I guess, that he represents a private newspaper that his wife is helping him operate or that he is cohabiting with a tribe of fleas.

My remedy for this offensive "I" habit in the newcomer is a special personal pronoun anticipatory circuit that will illuminate a large neon sign spelling the word "We" everytime the operator is thinking of saying "I." For the incorrigible, a super model—incorporating physical correction methods—would forcefully remind the errant radio telephonist of his errors. A large gloved fist will spring from a black (or grey, depending on the station's decor) cabinet and hit the operator alongside the head everytime he said "I." This equipment could be equipped—at slight extra cost—with a special chrome safety interlock switch. If the gloved fist comes in contact with any chrome plated metal object, ie, microphone, it will immediately withdraw itself into the cabinet, but not before beating a tattoo on the cabinet side to call the operator's attention to his use of the pronoun "I." This instrument is a necessity. We all know how offensive it is to hear a phone operator use the word "I."

After the embryonic phone operator has dropped the "I" habit he wants to sound like an older person. A trade in of the "I" corrector will permit the ham to own an aging circuit. This device—inserted in series with the mike cable—will lower the operator's voice about two octaves and make him sound like, at least, a high school senior. An advanced model—know as the advanced ager—will add pauses to the dialogue that give it the sound of wisdom, and it will also give transmissions that studied indifference of the experienced voice communicator. A special repeater would be a good item. A circuit that will repeat every phrase and clause—odd words repeated twice, that is total of four times—would be easily salable to the DXCC deceiver. A DXCC deceiver is a 75 meter phone operator who wants to be mistaken for a 20 meter phone DXer.

The ubiquitous tape recorder could be used to add authenticity to this age deception. Special tapes should be marketed for those who want to appear older and sophisticated or—I'll never know why—married. A tape recording of background of tinkling glasses, incoherent chatter and shrill feminine laughter would give any ham station a sophisticated sound. The dialogue on this tape should be low enough to be unintelligible but high enough to effectively modulate the transmitter. A tape of this type, known as Model Esquire, would be popular with all the young men. Another model for bachelors who like to appear married will provide a background of children's voices, yelling adult females, slamming doors and the recording should be climaxed in a loud slap and a child's scream at 40 db above average room noise. A recording of this type played as background while the operator was telling lies about his years experience would lend verisimilitude to the deception. ■

Simple but Versatile

C. A. Rambow, W6RIJ/7
NAD Bangor
Bremerton, Wash.

A mobile rig is a handy thing for field day, vacations, and emergencies, but it is good only as long as the car battery holds up. Running the car engine for an extended period of motionless operation to charge the battery, frequently boils away one's antifreeze; at best, it uses a lot of gas. A good solution to this impasse is the use of a separate engine-generator, or putt-putt.

The engine of such a unit may be easily borrowed from the family power lawnmower when needed. If an extra engine can be had for permanent assignment to the generating unit, so much the better. This was the case with the outfit shown. The engine is a ½ horsepower washing machine job. The generator is mounted in front of the engine, and

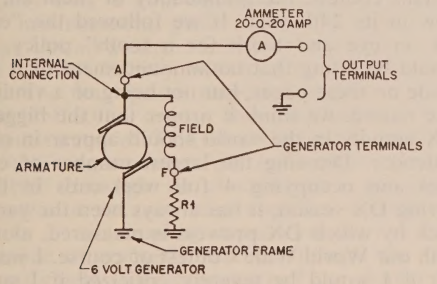


Diagram of hook-up.

connected by a V-belt. The frame is made of bolted aluminum angle. This material was free, and easily cut and drilled; steel would usually be cheaper and could be used just as well. The unit as shown weighs 60 pounds.

A couple of ¼"-20 brass bolts with insulating washers are mounted on the frame for terminals, and the power cord to the battery of the car is equipped with matching terminal lugs on one end. Wing nuts are used on the terminals for convenience. The other end of the cable is equipped with battery clips. You could use a fancy plug to fit a mating socket on your car, but then you couldn't use the unit on anyone else's car. The generator itself is an ordinary 6-volt model. Be sure you have it turning in the proper direction. Virtually all generators rotate clockwise when viewing the pulley end.

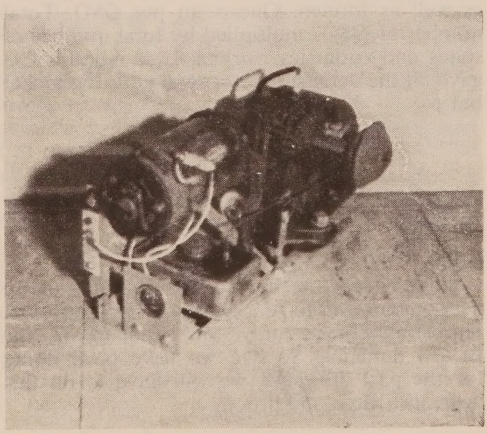
Now comes the neat part. Wth the utterly simple circuit shown in fig 1 I can use this generator on either a 6 or 12-volt battery. The charging rate is easily controlled from zero to maximum, which is about 18 amps at 12 volts. No switching is involved.

How does a 6-volt generator work on 12 volts? The answer comes from fundamentals of D-C machinery and a little thinking about the design of the generator. We know that, other things being equal, the voltage of a d-c generator will be proportional to the rpm, and also to the field current. In a car, the rpm varies widely; the voltage regulator, in turn, varies the field current inversely to the rpm to maintain constant voltage output.

OK; suppose you are driving 20 mph, and generating 6 volts. Now hold the field current constant, but speed up to 40. Result: 12 (count 'em) volts. This doesn't burn out the generator because the field current, armature current, and rpm are all within the design range.

Since the series circuit consisting of the field and R_1 is purely resistive, the field current will be proportional to the voltage across

[*Continued on page 98*]



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

CONTEST CALENDAR

January	3- 5	DARC WAEDC CW
January	18-19	CQ 11 Meter
January	25-26	BERU
February	7- 9	ARRL DX Phone
February	21-23	ARRL DX CW
March	1- 2	REF Phone
March	7- 9	ARRL DX Phone
March	15-16	CQ SSB
March	21-23	ARRL DX CW
April	4- 6	DARC WAEDC Phone
April	12-13	REF CW

DARC WAEDC

The 3rd WAEDC, streamlined to two week-ends, was fully covered in our December issue. Briefly, the contest is the usual exchange of progressive serial numbers. The addition of a QTC feature makes it a bit more complicated, so it is suggested the rules in our last issue be reviewed. The QTC applies to the CW portion only. Five bands 3.5 thru 28 mc can be used on CW. Phone operation is limited to three bands, 14, 21 and 28 mcs. It was also noted that this year the Single Band Classification (Class A) has been dropped.

The DARC is supplying a very complete log form. Five IRC's will get you a supply via air mail pronto.

CQ 11 Meter

As previously reported, this contest was brought about by the success of the 11 Meter Party last June and to stimulate activity on that band. Work as many stations as possible, USA as well as foreign. One point per QSO. Total number of QSOs multiplied by total number of states and countries worked. Last month's CQ gave all the details. Do *not* send your log to CQ but to

Eleven Meter Contest
P.O. Box 584
Hohokus, N. J.

W2VCZ will take care of the scoring and the awards.

BERU

Once a year the boys of the British Empire get together and have a DX party of their own. Unfortunately its only for residents in the British domains. So like we have been doing for the past 20 years, we will have to do this year, just listen and drool.

OV Munich

DL1YA has advised of a modification of the rules regards awards. Each U.S. district will now count as a country for the purpose of awards, so therefore ten certificates will be awarded instead of only one as originally announced. Tks for info W10JR.

ARRL DX

This contest, the granddaddy of them all, is now in its 24th year. If we followed the "eye for an eye and tooth for a tooth" policy, it would be fitting that no announcement of it be made on these pages, but not being of a vindictive nature, we think it proper that the biggest DX activity in the world should appear in our Calendar. Drawing the largest number of entries and occupying 4 full week-ends in the Spring DX season, it has always been the yardstick by which DX prowess is measured, along with our World Wide Contest of course. I wonder if I would be severely criticized if I suggested that 4 week-ends is too long a period for one contest. Especially now that other organizations are finding it more and more difficult to locate a spot for their activities. All details of this contest will be found in the current issue of QST.

REF DX

Dates for this contest are on the same week-ends as last year. This year however the order of Phone and CW has been reversed. The Phone section now takes place in March and the CW in April. Details next month.

CQ SSB

It's over a year since the "sidewinders" had

[*Continued on page 105*]



transistors

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

Since last month's column, I have received a lot of data on new products, the inside dope on some low cost transistors, and a new device that will be seen in quite a bit of remote tuned ham gear.

This month's construction project is a completely transistorized modulator that is capable of delivering 10 watts of audio power. Although it is intended for mobile applications, it will work just as well as part of the station gear, if a 12 volt power source is available. 10 watts of audio power is just right for 6L6 or 2E26 mobile rigs in the 20 watt class. In addition, it can be used as a screen modulator for 100 watt rigs or as a control grid modulator for higher power transmitters.

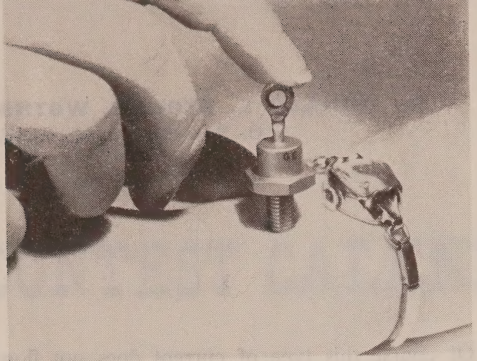
Two type 2N256 power transistors are used in a class B output stage. The economy of this type of circuit more than offsets the fuss and bother of using transistors. Under static conditions (no modulation) the modulator draws roughly .22 amps at 12 volts. When you speak into the microphone the current kicks up to slightly over 1 amp on voice peaks. Actually, the instantaneous peak current is about 1.6 amps but an ammeter connected in series with the 12 volt battery will tend to average this out. The first speech amplifier stage is a CBS type 2N180 in a bias stabilized circuit. The output circuit of T1 (the collector) is coupled the to *swinger* of the 10K audio taper volume control through an electrolytic capacitor. Whereas a vacuum tube amplifier would use .01 to .1 mf coupling capacitors, the low impedance of transistor circuits dictates the use of extremely large capacitors. T2 is similar to the input stage and uses a decoupled form of the bias stabilization circuit. Transistor T3 is connected as a cathode follower so that the input impedance of T4 may be properly matched. These two stages are dc coupled. The 47K resistor between T3 and T4 is a form of negative feedback to increase the frequency response of this stage. The driver transformer TR-1 matches the output impedance of T4 (100 ohms) to the input (base) of each power output transistor (approx. 50 ohms per). Transformer T2 is a "multi-match" type, that is, it will match a variety of impedances from 1,000 ohms to 6,000 ohms. There is only one precaution with regards to the circuitry and hookup. The wire that connects the modulator to the automobile battery should be large enough to carry at least five amps continuously. Of course this type of current does not flow in the wire, but it is important to keep the resistance of this lead low. Also, the fuse should not measure more than a small fraction of an ohm. Make sure that you have the battery polarity correct, or all the transistors can be ruined the first time you turn it on.

The complete modulator was crammed in and on a small LMB box measuring 3 × 1¼ × 5¼ inches. Naturally the modulator can be laid out on a larger chassis such as the popular 5 × 7 × 1½ size. However, for the purpose of experimentation, I decided to see just how small I could make it. As you will note from the photos, there is a lot of "wasted" room! If the size of the chassis is increased, keep the audio wires associated with T1 and T2 as short as possible. In a vacuum tube type of modulator you can pick up hum if the leads are excessively long. However, long leads in the mobile modulator can result in "hash" from power supplies or even ignition noise pickup!

If you have examined these power transistors you may have noted that the collector is connected directly to the metal case. This is to aid the transistor junction in dissipating heat. Because of this feature of power transistors, it is necessary to insulate the case from the chassis, while maintaining a good thermal bond to the chassis. In other words, you can't mount the power transistor on ceramic stand-offs for it will be unable to dissipate as much heat. The transistor can be mounted in one of two ways. You can obtain mica insulation with about 2 mils thickness and cut it to the required size like a gasket. If the mica is too thick, the mica can be "sliced" endwise with a good sharp knife. The mica washer is usually given a coat of silicone grease to improve the thermal bond, but this is only necessary when the transistors are run near their maximum ratings. It is also possible to make a "gasket" out of aluminum. Cut it to the right size, drill it, and then remove all burrs. The next step is to anodize the aluminum in a lye bath. This is somewhat dangerous and I usually take the washers to a plating company. Anodizing the aluminum places a thick oxide coating on the surface, with a very high resistance, but allows the heat to transfer to the chassis. I prefer this method of insulation because the washers are not as delicate as the mica.

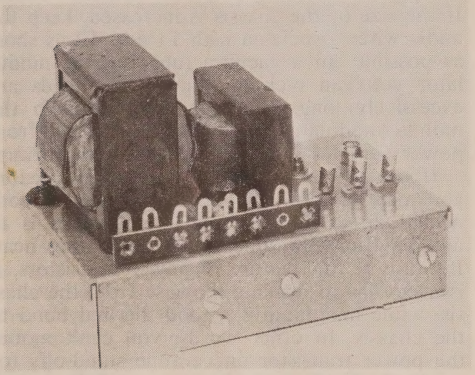
Transistor News

Many many bargains this month. I've had



How would you like to design your next California Kilowatt around this little gem? The new General Electric series of 20 ampere stud-mounted 200°C silicon rectifiers are thought to be the smallest rectifiers for their current rating now on the market. They have been JETEC type-designated 1N1301, 1N1302, 1N1304 and 1N306. They have peak inverse voltage ratings of 50, 100, 200 and 300 volts respectively.

The complete 10 watt Mobile Modulator is self contained on a 3 x 1¼ x 5¼ inch chassis. The power transistors are located under the chassis below the transformers.



Bottom view of the 10 watt Mobile Modulator. Most of the small components are mounted on terminal strips on the side apron of the chassis. Note that the power transistors are insulated from the mounting brackets by two mil mica washers. A circuit suggested by "Ole" Rube Reisland, W6HTN. This Mobile Modulator is designed for use with a carbon microphone and eliminates the three pre-amplifier stages of the 10 watt Mobile Modulator. Power output of this unit is the same.



my ear to the ground and found out that quite a few companies have bargains, from the experimenters point of view.

The 2N256 and 2N255 used in this month's construction project were the first power transistors to appear on the commercial market at a low cost. This was about a year ago. CBS-Hytro has kept ahead of the pack with several price reductions and they are still the lowest cost power transistors available to the experimenter. The 2N255 sells for $1.35 amateur net, and the 2N256 costs $1.50 amateur net.

Sylvania has introduced an experimenters power transistor called the 2N307. A pair of 2N307's operated in class B will deliver about 8 watts of audio. The 2N307 seems to be stocked at all Sylvania distributors and nets for $1.50.

RCA has introduced the 2N384. This is a VHF drift transistor with a very high frequency alpha cut-off, averaging around 100 mc. The unity gain cut-off frequency is 250 mc and 2N384 may be used successfully in oscillator circuits up to that frequency I have been fortunate enough to obtain one of these VHF transistors and have built several working circuits around it. These include an FM band receiver, a two meter transceiver, and a one transistor two meter transmitter. Naturally, six meter circuits are a "snap" for the 2N384. By the time you read this you should be able to purchase the 2N384 at your local RCA distributor at a net cost of $12.50. Not too expensive when you consider what it is, and what it can do. Increased production should bring the price down eventually also.

When a transistor manufacturer goes into production of a certain type, they set up specifications, known as parameters. In the course of producing the transistor, some of the units fall outside of the specifications, as would be expected. Several companies are selling these transistors at reduced cost to experimenters. These transistors are not to be confused with rejects or inferior types, they simply do not fall within the parameter spread. As one company puts it, "We would like to stress that these transistors are not seconds or inferior units. They are not sold as standard units only because their input resistance falls outside a specification range that is not as wide as the range of acceptable manufactured units. The transistor manufacturers loss is our gain.

As an example, Minneapolis-Honeywell, who has the enviable reputation of producing some of the finest semiconductors in the industry makes available to experimenters and manufacturers units that fall outside the input resistance specification. These transistors are called the S5B2, S6B2 and S7B2 and they correspond to the H5, H6, and H7 in the Honeywell line, with the exception of the input resistance. These SB2 types will work very well in amplifiers, switches, and similar circuits whenever the input resistance is not a critical factor. Minneapolis-Honeywell sells the S5B2,

S6B2, and S7B2 for a unit price of $6, just half of the cost of the H5, H6, and H7. Write M-H at 2753 Fourth Avenue, South, Minneapolis 8, Minn. or the local sales office for these units.

Philco also has a good deal for experimenters. The Philco T-1017 is a heavy duty power transistor and has a slightly higher input resistance than the specifications call for, like the M-H units just described. The dissipation of the T-1017 is 5 watts, which puts it in the rugged class. In class B audio service a pair of T-1017's will deliver about 25 watts of audio. Connected as a d-c power converter a pair of these transistors can switch approximately 80 watts of DC. To order these transistors, write the Philco Transistor Div., Lansdale Tube Co., Lansdale, Pa. The cost of the T-1017 is approximately $2.25. A real bargain!

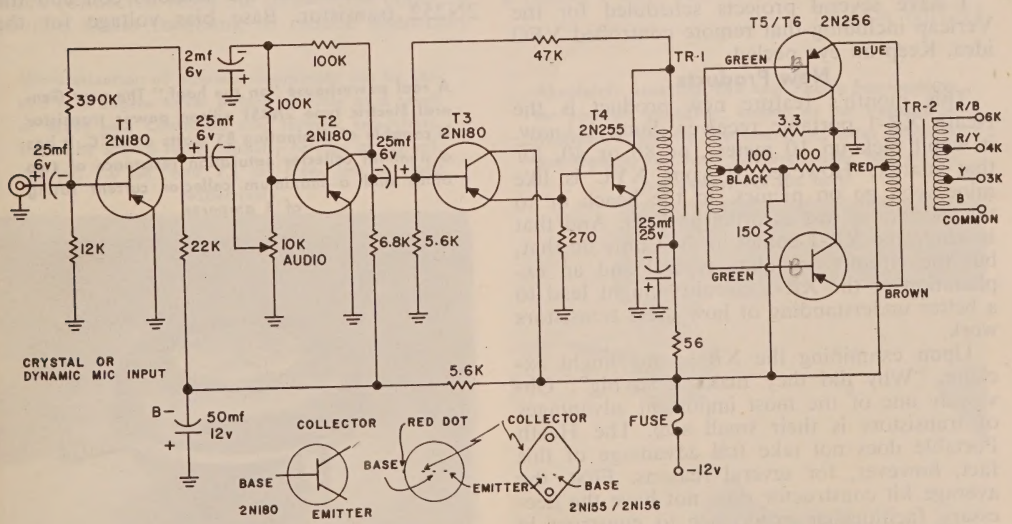
General Electric has just announced their new 85 watt silicon power transistor the 2N451 operates from a collector supply of 65 volts, with a max. collector current of 5 amperes. The nominal collector saturation resistance is two ohms. Frequency of Beta cut-off is 400 kc.

Although it is not a transistor, the new General Electric stud mounted 200°C silicon rectifier should be of interest to many amateurs. These 20 amp units are available with a peak inverse voltage rating of 50, 100, 200, and 300 volts respectively for the 1N1301, 1N1302, 1N1304 and 1N1306. Look for this type of silicon rectifier (with smaller current ratings) in the new ham gear. Silicon rectifiers provide much longer operating life and less IR loss (about 1 ohm internal resistance).

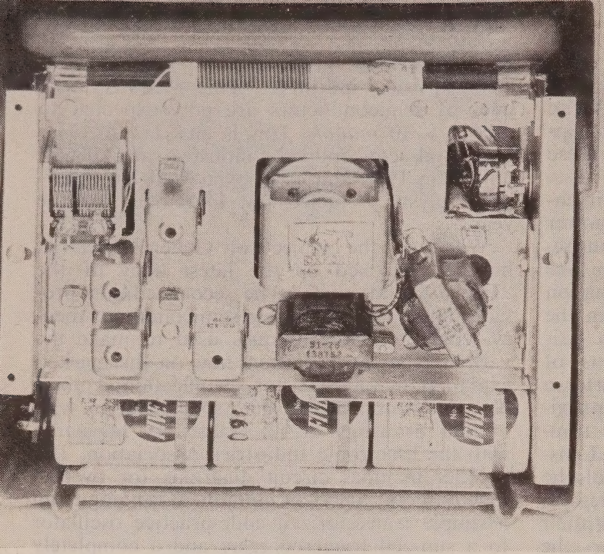
I also note GE's comments on the growth of the transistor industry. "This years (1957) sales of semiconductors are now expected to exceed $140 *million*. This is an 82% increase over total semiconductor industry sales of $77 million in 1956 and 40% over what most market analysts predicted last December for the year.

While on the subject of General Electric, have you picked up the latest copy of the "Transistor Manual"? The second edition provides information on basic semiconductor theory, construction techniques used to make the various types of transistors now on the market, explanations of transistor specification symbols now in common use and specifications with outline drawings of all transistors registered with the Electronic Industries Association. The booklet includes circuit diagrams for twenty-nine different pieces of equipment ranging from a simple transistorized code-practice oscillator to a sun-cell triggered relay and a completely transistorized high fidelity amplifier system.

One of the recent electronic marvels is the variable capacity diode. The Pacific Semiconductors, Inc. have announced a commercial version with the trade name of *Vericap*. The new component is another member of the solid state device family, which includes transistors, semiconductor diodes and rectifiers. Its capacity can be varied by changing an applied bias voltage. The semiconductor variable capacitor is not a new invention. The phenomenon of changing capacitance across a semiconductor junction with changing voltage has long been known to solid state physicists. It has also plagued engineers in designing equipment with semiconductor diodes. However, to the best of my knowledge, Pacific Semiconductors, Inc. is



Schematic diagram of the Mobile Modulator. The circuitry includes a high gain preamplifier which includes more than adequate gain for all types of microphones. The power transistors (T4, T5, T6) are the new low cost CBS-Hytron types. 2N107 transistors may be substituted for the 2N180 type if the unit is not subject to high temperatures.



The new Heath Transistor portable radio, model XR-1. This receiver features high sensitivity and excellent audio quality. The 4 x 6 oval speaker overcomes the disadvantages of the smaller "pocket sized portables."

the first company to mass produce a controlled, reproducable variable capacity diode. The advantage of the Varicap is the great size and weight reduction. Component and installation costs can be substantially reduced. As an example, in the AFC circuits of an FM receiver, the Varicap, a resistor and a mica capacitor can perform the same function as twenty four displaced parts! The Vericap has no filament to heat and wear out as does the reactance tube.

Great things can be done with the Vericap from a hams point of view. For instance, the Vericap can be used to remotely tune the VFO of a mobile transmitter located in the trunk. It can be used as the modulator in a 10 meter or VHF fm transmitter. It should find application in the RTTY field for frequency shift keyers.

I have several projects scheduled for the Vericap including that remote controlled VFO idea. Keep an eye peeled.

New Products

This month's feature new product is the Heath XR-1 portable receiver. Sure, I know, it won't pick up 10 meters, or 80 or 40, for that matter. However, if your XYL is like mine, you go on picnics, to the beach or to the mountains just as often as I do. And that is where the XR-1 comes in. Not only do that, but the circuits are quite typical and an explanation of the XR-1 circuitry might lead to a better understanding of how these transistors work.

Upon examining the XR-1, one might exclaim, "Why did they make it so big"? Obviously one of the most important advantages of transistors is their small size. The Heath Portable does not take full advantage of this fact, however, for several reasons. First, the average kit constructor does not have the necessary facilities or experience to construct in confined spaces. Second, for best sound reproduction, it is desirable to make the speaker as large as possible, within reason. The space requirements for the batteries also dictate a case size somewhat larger than the "pocket portables". Miniaturization of other components such as the if cans will only result in reduced performance because of lower "Q".

The Heath XR-1 is a six transistor superheterodyne receiver and is similar to a vacuum tube receiver in many respects. The 2N252 transistor is a combined oscillator and mixer similar to the pentagrid converter in a vacuum tube receiver. Signals picked up by the antenna coil are tuned or selected by the large section of the variable capacitor and fed to the base of the 2N252 by the small coupling coil wound on the ferrite antenna bar. The small section of the variable capacitor tunes an oscillator circuit consisting of the shielded coil and the 2N252 transistor. Base bias voltage for the

A real powerhouse "on the hoof." The new General Electric type 2N451 silicon power transistor is capable of dissipating 85 watts at 25°C. It has a nominal collector saturation resistance of two ohms and a maximum collector current rating of 5 amperes.



transistor is provided by the 8.2K and 39K voltage divider resistors. The 3.3K resistor provides emitter bias voltage. The .005 mf capacitor couples oscillator signals to the emitter but prevents shorting of the emitter voltage. This oscillator mixer beating action produces an if signal of 455 kc in the collector circuit. This signal is transformer coupled to the base of the first if amplifier (2N253). The diode connected from the transformer primary winding to the emitter of the transistor provides strong signal overload protection by conducting when the signal exceeds a certain level. The first if stage greatly amplifies the signal. It is then transformer coupled to the second if amplifier, a type 2N254. Both amplifier stages use voltage divider networks to supply bias voltage to the transistor base. Emitter bias resistors are also employed to increase the stability of each stage. The output of the second if amplifier stage drives a diode detector. The detected output of the diode appears across the volume control. The dc voltage across the volume control is a direct function of signal strength, thus this voltage can be used as avc (automatic volume control). It is applied to the base of the first if amplifier.

Audio output from the detector is coupled to the first audio amplifier via a 10 mf electrolytic capacitor. The volume control enables selection of any portion of the detector output according to the desired volume. A 2N238 transistor is used as the first audio amplifier. A voltage dividing network consisting of the 2.2K and 15K resistors provides base bias voltage. Here again, an emitter resistor is provided to increase stability. The amplified output of this stage is transformer coupled to the output amplifier which consists of two 2N185 transistors operating in class B. The 15K resistors connected from the base to the collector provides audio feedbank to reduce distortion. Very little current is drawn from the batteries by the class B stage until signal is applied. This results in maximum battery life. A 4 × 6 oval speaker provides excellent audio quality.

After using the XR-1 for a while, I was impressed with its performance. The sensitivity and signal to noise ratio are top notch. Pick up one of those dinky pocket jobs sometimes and listen to the frying noise even on the loudest stations. Sounds like a superregenerative receiver! Not so with the XR-1, the signal to noise ratio is excellent even on weak stations.

I was a little disappointed in the life of my first set of batteries. The Heath Company claims 500 to 1000 hours for the six size "D" cells. My first set only lasted 150 hours roughly. Of course the fact that they were war surplus and dated for use before July 1945 might have some bearing on it! I installed a new set of Eveready batteries and they are well over the 500 hour mark and still going strong.

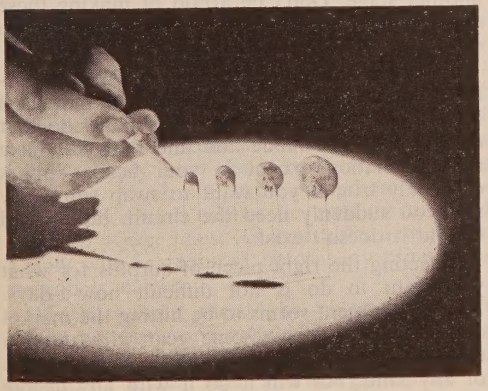
The circuitry is excellent in the XR-1. Heath doesn't "push" any of the six transistors near their maximum ratings, in an effort to obtain maximum gain. No one should have trouble getting the receiver to work the first time if the well written instruction manual is followed. The alignment instruction are so clear that a signal generator is unnecessary for peaking up the receiver.

I recommend the XR-1 highly if you want a simple, but professional project to "get your feet wet" in transistor circuitry. If you just want a portable to take on picnics next summer the XR-1 is a bargain at $34.95. Its performance is equal or superior to receivers costing up to twice as much.

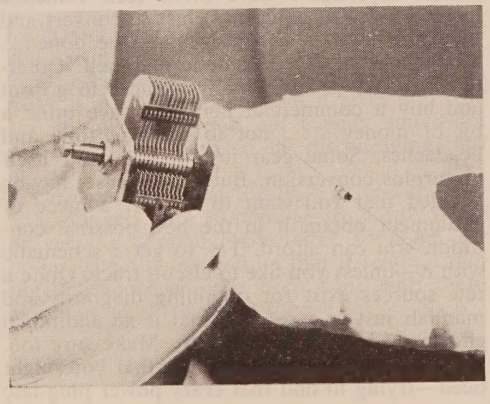
Well, that biases us to saturation again this month. Best wishes for a Merry Christmas and a Happy New Year.

73, Don W6TNS

Miniaturization of amateur equipment can be carried to a degree never before possible as a result of these new Centralab disc ceramic capacitors. The units shown have capacity ratings of .22 mf, .56 mf, 1.0 mf, and 2.2 mf from left to right respectively.



Absolutely amazing. The new Pacific Semiconductor variable capacitor, known as the Vericap, is dwarfed in size by the tuning capacitor which it can replace. For more information on this amazing device, see the text.



by KENNETH B. GRAYSON, W2HDM
110-20 71st St., Forest Hills 75, N. Y.

SURPLUS

an introduction to surplus equipment

The use of surplus equipment for amateur purposes seems to be endless. Every letter, it seems, that we receive here at CQ requests a conversion of some piece of equipment. Of course in a magazine with only twelve issues a year this would be an endless task. Only equipments which are readily available and of general interest can be published with fairness to all. However we will be only too glad to answer your inquiries and to assist with special problems. To date the equipments planned for future publications include the TBX-8, the six meter conversion of the BC-1335, the TCS and such old favorites as the BC-312, BC-348 and the SCR-522, to name a few.

One of the biggest problems confronting the surplus addict is how to convert when no information is available. It seems a shame that you might have a perfectly good piece of equipment and find that you don't know how to get it on the air. This is the general case—or so our mailbag leads us to believe. Converting surplus equipment is not difficult providing certain procedures are followed. For the most part, test equipment is simple and not expensive. A good volt-ohm-milliammeter and perhaps a grid-dip oscillator are the basic instruments. Occasionally a signal generator and an oscilloscope may be required, but these are usually easy to borrow.

Of course the first step in converting any surplus is to select the equipment. This may sound silly, but I have often seen someone select a piece of equipment just to convert and then find that the job just cannot be done . . . as a matter of fact I've done it myself. Other-times it may prove actually cheaper to go out and buy a commercial item and save quite a bit of money . . . not to mention time and headaches. Some gear just doesn't lend itself to surplus conversion. But in any case, having decided that you want to convert a piece of equipment obtain it in the best possible condition you can afford. Try to get a schematic with it—unless you like to circuit trace. Quite a few sources exist for obtaining diagrams and manuals just in case—but that is an additional effort you have to go through. Make sure too, that you get all tubes and plugs that you might need—trying to find that crazy power plug late some Sunday evening just to let you get on the air isn't conducive to happiness.

The second step in surplus conversion is to get the equipment working. The usual answer to this is that, "I'm not using it for the original purpose," well so much more the reason. Maybe some critical part is faulty and you never knew it. Of course you can also find out the power supply requirements and the tuning range as well as other feature which will allow you to modify with a lot less effort. Once operating, you can modify the equipment by sections and check each change as you go along by turning on the power—unless an extensive alteration is underway.

The third step in any conversion is to decide exactly what it is that you want to convert. You can refer to handbooks, magazines, your own experience or other hams to find out how to do it. Perhaps one article showed a conversion, some section of which you want to use. Well then disregard all but the section that you want and do just what has to be done.

The fourth step is to verify your conversions. Check the circuit for shorts and correct wiring and apply the rated voltage. Tuning and many other adjustments may be made by means of the grid-dip oscillator. Once the circuit is working try and optimize your work. Perhaps a resistor somewhere can be slightly changed to increase the gain and perhaps some feedback will help out in stabilizing the operation of another stage. Don't be afraid of making these changes but always have some mean value to start with.

The fifth step is the one that is usually overlooked. Keep a log. You would be surprised how often you may want to refer back to that change that you made and find that you have no information except in your head. This is especially true if you want to swap some day and you suddenly need the circuit, but lo and behold it doesn't exist.

Selecting the right piece of surplus for what you want to do is not difficult now-a-days. More equipment seems to be hitting the market every day. Of course some gear will function right in our ham bands without modification of any kind, but will it do it with any degree

Set or equipment indicator letters

type of installation	type of equipment	purpose
A Airborne (installed and operated in aircraft)	A Invisible light, heat radiation	A Auxiliary assemblies (not complete operating sets used with or part of two or more sets or sets series)
B Underwater mobile, submarine	B Pigeon	B Bombing
C Air transportable (inactivated, do not use)	C Carrier	C Communications (receiving and transmitting)
D Pilotless carrier	D Radiac	D Direction finder and/or reconnaissance
	E Nupac	E Ejection and/or release
F Fixed	F Photographic	
G Ground, general ground use (includes two or more ground type installations)	G Telegraph or teletype	G Fire control or searchlight directing
		H Recording and/or reproducing (graphic meterological and sound)
	I Interphone and public address	
	J Electro-mechanical (not otherwise covered)	
K Amphibious	K Telemetering	
	L Countermeasures	L Searchlight control (inactivated, use "G")
M Ground, mobile (installed as operating unit in a vehicle which has no function other than transporting the equipment)	M Meterological	M Maintenance and test assemblies (including tools)
	N Sound in air	N Navigational aids (including altimeters, beacons, compasses, racons, depth sounding approach, and landing)
P Pack or portable (animal or man)	P Radar	P Reproducing (inactivated, do not use)
	Q Sonar and underwater sound	Q Special, or combination of purposes
	R Radio	R Receiving, passive detecting
S Water surface craft	S Special types, magnetic, etc., or combinations of types	S Detecting and/or range and bearing
T Ground, transportable	T Telephone (wire)	T Transmitting
U General utility (includes two or more general installation classes, airborne, shipboard, and ground)		
V Ground, vehicular (installed in vehicle designed for functions other than carrying electronic equipment, etc., such as tanks)	V Visual and visible light	
W Water surface and underwater	W Armament (peculiar to armament, not otherwise covered)	W Control
	X Facsimile or television	X Identification and recognition

of efficiency. Is it worth spending a couple of hundred dollars on a fifty watt transmitter for 220 Mc when the input will be almost a kilowatt and you have to supply all of that power? Sometimes it definitely pays to buy a piece of gear just to use some section of it. Perhaps a power supply may lend itself to something you have. Much 400 cycle equipment is available today which cannot be used on standard 60 cycle power lines. As a result a new power supply will be required before any other conversion is started.

Much thought should be given to surplus which performs one special function only. For example one beautiful VHF receiver has been around for several years and at a good price . . . for parts. One look at the schematic will tell you that it is a superhet and requires a separate local oscillator (from some other gear) to make it work. On top of that it gives only 150 and 90 cycles output, not exactly suited for voice. I don't mean to be discouraging, just practical.

On the other hand the BC-312 and the BC-348 receivers once so popular are hardly heard of yet still around. They offer so much per dollar with the least effort that it seems amazing that more has not been done with them. We hope to correct that too.

Designations

One of the things which is highly misunder-

[*Continued on page 96*]

YL

by LOUISA B. SANDO, W5RZJ
212 Sombrio Drive, Santa Fe, N. M.

YLRL

While introducing YLRL's new officers for 1958 (December CQ) we somehow neglected to include the Publicity Chairman, W9RUJ, Mary Meyer. (Sorry, guess we still hadn't gotten over that convention!) Mary had been interested in Ham radio for many years and came up with her ticket in 1952. W9RUJ runs 130 watts, B&W transmitter, NC-300 receiver, using a beam, and works all bands up to and including 2 meters. The EC for Waukesha Co., she is the first YL to be appointed EC in Wisconsin. She also is CD radio officer for Brookfield, her home QTH. NCS of the 20-meter Tangle Net and a former D/C, she has worked hundreds of YLs. Mary modestly disclaims any awards but *is* proud of being a grandmother.

When our report of the 2nd YLRL Convention got squeezed out of November CQ for lack of space, along with it went the full listing of 1958 YLRL officers. The other officers have since been introduced, but for the record we want to include the District Chairmen. Send your D/C news of your activities for *YL Harmonics*. D/C's: W1CEW, Mary Hinterland; K2DXD, Eve Reid; W3DBN, Florence Collins; W4TVT, Claire Bardon; K5BNQ, Doris Anderson; K6KCI, Irma Weber; W7GXI, Marge Frazier; W8VRH, Mary Frist; W9YWH, Evelyn Tibbits; KØBTV, Kay Barclay; KL7-ALZ, Geraldine Nichols; VE3DMX, Della O'Shea.

Applications and confirmations for YLRL's WAC/YL award should now be sent to the custodian, Barbara Houston, KØLYZ (ex W3OQF), at 1385 Northview Dr., Marion, Iowa.

With the Clubs

Welcome to the latest YL club—HAWK of Indiana. On Oct. 6, 1957 during the Indiana Radio Club Council meeting at Purdue University the Hoosier Amateur Women's Klub came into being. Object of the club is to promote interest and friendly cooperation among YLs in Indiana and to encourage YLRL membership. The only requirement for membership is that a YL belong to YLRL. Dues are $2.50 a year ($2 for non-residents). Club symbol is the Hawk and the club is publishing a monthly newsletter named *HAWK's Eye View*. Club colors are green and silver and the slogan is QRL (are you busy?).

Officers of HAWK are: president, W9RTH, Adah; v. president, W9JYO, Thelma; secretary, KN9IXD, Doris; treasurer, W9LYU, Betty; publicity, K9CIH, Jinx; editor, K9HMJ, Irma. In addition to the above, members include W9AQB, Norma; W9OSH, Frances; W9PFO, Esther; W9IMT, Elzenia; W9YWH, Evelyn. New members are invited.

The Camellia Capital Chirps, YL club of Sacramento, is offering a "Chirp-tificate" to any amateur who provides confirmation of contacts with six members of the 3C's club. QSLs should be mailed to Gerry Metke, K6GKR, 511 Oak St., Roseville, Calif., with a self-addressed stamped envelope for return of the cards. Members of the Camellia Capital Chirps include: W6's HTS, VHT, QMO, PJF, GQZ, VHV; K6's ENK, HHD, UZA, HOI, GKR, DPM, DPN, PWH, JXX, EJE, TYJ, CWK; KN6's ZVX, ATI.

This column in December CQ called attention to the certificate offered by the Floridora YLs to any licensed amateur who submits proof of contact with 10 or more members of the Floridora YLs. Current members of this club include: W4's BAV, BGF, BIL, BWR, GAL, GAN, GGQ, GXZ, HRC, JCR, KOH, LKM, PIK, TDK, UF, WPD, ZVW, ZXK; K4's BQI, GWF, IDQ, IRZ, LCD, LEG, LFA, LPV, OYB, QOS, HXB; KN4's OEP, OJD, PPX, RNS, ROO. QSL and 15¢ in coin or stamps should be sent to the custodian, Shirley Hill, W4WPD, 1710 E. South Lambright, Tampa, Florida.

The Washington Area YL club, WAYLARC, has a new slate of officers. They are: president, W3RXJ, Irene; v. president, W4TVT, Claire; secretary, W3TSC, Camille; treasurer, W3CDQ, Elizabeth; executive committee rept., K4LMB, Ethel.

Here and There

Congrats to K6OQD, Jean, for making BPL in August for the first time. . . . To K6EXV, Lucy, on receiving WAC/YL. . . . To K6OWQ,

W2ZYM, Capt. Kurt Carlsen. Look for her on 15 and 20 until mid-January. . . . A number of YLs also have worked Evelyn, W6NZP, who has been operating as KS6AF while in American Somoa.

More Young YLs

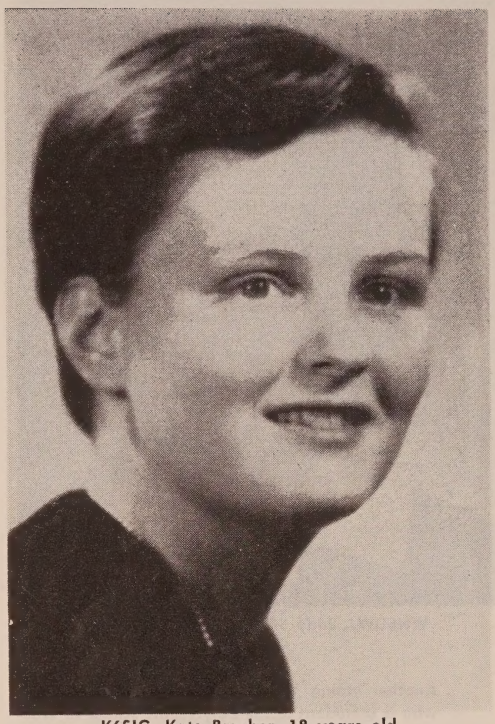
Response to the feature articles on some of the younger YLs (CQ, July & August, 1957) has been so rewarding that we bring you more of these teen-age YLs.

K2DSL, Merceda Pilla, of Trenton, N. J. is 16 years old and a senior at Cathedral High School. "Bunny," as she is known over the air, got her Novice license in July '53, a few weeks before her 12th birthday. With the help of her brother K2ART and encouragement from W2ZI, Bunny earned her General before the year was over. She in turn helped her dad get



his ticket, K2JID. K2DSL uses a Harvey Wells transmitter and a BC-348Q receiver. She spends 99% of her time on cw, mostly on 80. She loves traffic handling and operating for CD. She holds two PSC for work during floods and other certificates include RCC, NJN, RACES and DVRA. An honor student and president of her student council, Bunny also enjoys horseback riding, ice skating, dancing, piano and teaching.

K2JIR, Nancy Townsend, is an 18-yr. old freshman at Sarah Lawrence College in Bronxville, N. Y. Her home QTH is Buffalo, where her mother, Jane, and her dad are K2DJN and K2DJO. Her rig is a Viking II with an HQ-129X receiver and a Q multiplier, a Match box and a long-wire antenna. Nancy started with a Novice in 1953 at age 14. She works strictly



K6SIG, Kate Bracher, 18 years old.

K2ZXP, Sheila Anne ("Sandy") Sandman, age 17.

KN6SMY, Ann Nichols, age 16.





WN6UWJ, Judy Stirnkorb, 12 years old.

Another young YL is SP5YL, Sofia Mazurkiewicz, who is a student at the Polytechnic School in Warsaw. Pictured here as an SWL, Sofia got her ticket last May. Running 25 watts to a homebuilt rig, SP5YL is on evenings on 14 or 7 Mc cw.

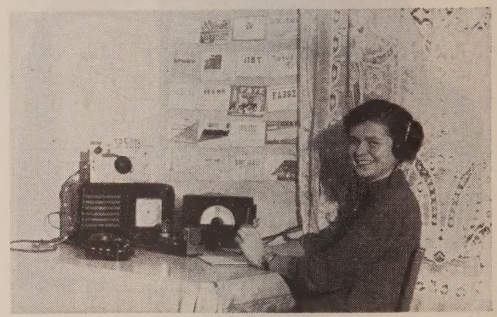
W9RUJ, Mary Meyer, YLRL Publicity Chairman.



Mary; K5BGT, "Chic"; W5JCY, Bertha; W3-BIW, Eleanor, on making DXCC. . . . Condolences to ZS6GH, Diana, who fractured an ankle while visiting GC and GD lands, thus bringing her globe trotting to an abrupt end.

Many YLs have been working W6GAI, Fran, who is operating MM on the Flying Enterprise II while on a world cruise with cw and enjoys DX, traffic and rag-chewing on 80 and 40. At the 1956 Rochester Hamfest Nancy walked away with the straight-key code sending contest against plenty of competition. Other interests are sports of all kinds, music and T. S. Eliot.

K2ZXP, Sheila Anne Sandman, 17 years old, is a freshman at Cortland (N. Y.) State Teachers College. With no space in the dorm, "Sandy" had to leave her station at home in Brooklyn—a Gonset Communicator with a doublet antenna—but she's looking around Cortland for other Hams. Sandy started with a Novice call last year when a senior at James Madison High School in Brooklyn and now holds Technician. The school radio club, as well as operating K2UXR, gave instruction in code and theory and three other girls passed



their exams with Sheila—Dorothy Vazquez, Carol Clegg and Judy Stout, who hold KN2ZX calls. Carol graduated with Sheila, while Dotty and Judy are still working with K2UXR.

W3CAI, Ann Hammonds, 15 years old, holds a Technician license. Ann is the jr. YL of W3BIW, Eleanor; their QTH, Bryn Mawr, Pa.

K6CSM, Elaine Pedersen, 15 years old, of Huntington Beach, Calif. is a sophomore in H.S. Elaine got her General ticket when 12 years old with the help of her dad W6MRP.

Joy Colvin, 17 years old, operates W6KG at Alameda, Calif. along with her dad and mother, Lloyd and Iris Colvin. Licensed at age 12, Joy formerly was W4ZEW.

K6MHC, Dale Diane Ross, aged 16 of Fresno, Calif., started as a Novice when 14 in 1956. Her dad is W6JPS. Look for Dale on 40 or 80.

K6RHZ, Marilyn Morgan, 14 years old, of Burbank, Calif. has had her General ticket for a year and held Novice for some 6 months before that. Her mother is K6RLU, Jacky. Marilyn operates mostly cw and can be found

on 10, 20 and 40 where she enjoys DX, rag-chewing and transmitter hunts. Station set-up is an Adventurer (50 watts) and an NC-300 receiver. Marilyn attends John Muir J.H.S. where she is a commissioner on the student council.

K6SIG, Kate Bracher, 18 years old of Pacific Grove, Calif. is currently a long way from home as a sophomore at Mount Holyoke College in Massachusetts. Kate started with a Novice ticket in May 1956 and got her General a year later to the day. K6SIG sticks to cw mostly on 15 meters, using an AT-1 and S-40B which she shares with her brother K6RFZ. Kate's other interests are astronomy and folk music.

KN6SMY, Ann Nichols, is 16 and a junior in H.S. She has been using a homebrew Novice rig but has an AT-1 with modulator and a BC-348Q all set for her General. Ann's other interests include sports, music, photography and languages. She speaks French and German and is studying Spanish and Italian. She also is a semi-pro roller skater and teaches tennis. Ann is looking for a "pen pal" in the Eastern U.S. or in any DX country. Address her at 523 So. Winchester Rd., Campbell, Calif.

WN6UWJ, Judy Stirnkorb, is 12 years old and located at La Jolla, Calif. Judy got interested in Ham radio through her brother, K6ZRK, and her father, WN6UUP. The station they share is a Globe Chief and an NC-125 with a 3-element beam. Judy would be happy to make skeds. Her QTH: 411 Dunemere Dr.

K9CMZ, Charlene Treve, is a 17-yr. old H.S. senior in Chicago. Charlene became interested in radio when her dad, K9CDL, gave her a 20-yr. old receiver which she promptly took apart. Charlene's present equipment includes an SCR-522 and Knight 50 transmitter, an HQ-129X receiver and a converter for 2 meters. At school Charlene belongs to the swim leaders club, diving team and ballet team. She is a member of RAMS and is a Camp Fire Girl. Recently the Chicago Area Council of Camp Fire Girls recommended Charlene for a National Life Saving honor. An assistant to an instructor of a beginning swim class at Independence Park, Charlene rescued a 14-yr. old boy who had dived into deep water and was unable to swim to safety.

KN9GNQ, Lynn Hirshman, 14 years old, is a junior at Evanston Township H.S. in Evanston, Ill. where she is president (and one of two YLs) of the school radio club. Her dad is KN9EGU and they share a Gonset Communicator II, Ranger, DX-35, and SX-100 receiver, operating on 2 meters mostly and occasionally on 40. Lynn also is secretary-treasurer of SCEDS, an organization of teen-age Hams in Skokie, Chicago, Evanston and Des Plaines. She is a member of the Midwest VHF Club, the 2-meter Watch Dog net, and is active in Chicago Civil Defense.

33, Louisa, W5RZJ



K2DSL, Merceda ("Bunny") Pilla, age 16.



K2JIR, Nancy Townsend, 18 years old.



KN9GNQ, Lynn Hirschman, age 14.

by **BOB ADAMS, W3SW**
919 McCeney Road, Silver Springs, Md.

sideband
sideband
sideband

SIDEBAND

Harry, W2JXH continues to lead the way in the Countries Worked list closely followed by a newcomer W4IYC whose total of 95 was reached by working ZC4DA, and HC2AGI this week. F7AF, Charlie hooked ZC4DA, and GD3GMH, KX6BQ, DU7SV and VS4JT to reach 86.

According to Ron, G6LX we learn that YI2RP was phoney. This has been confirmed by several others. Bob, K2GMO, had to deduct YI2RP but hooked CR9AH, FP8AR, KH6AED/KW6, HS1A and SVØWQ (Crete) to make it 83.

Mick, ZL3PJ who has worked 88 countries has 47 of the forty-eight States confirmed and his Vermont QSL is in the mail. Congrats!

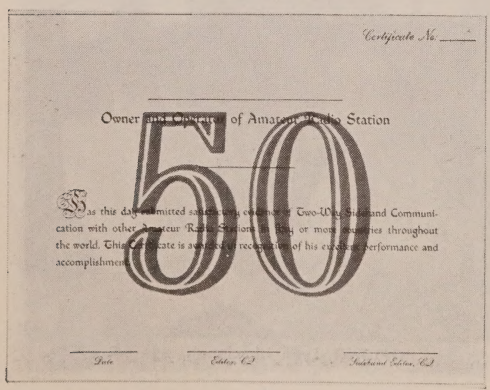
Mickey, W8YIN who is still using his HT-32 without "shoes" contacted HP1RB, KAØSC, VS6AZ, TI2CHV, UA1DZ, HS1A and TG9AD to total 65 countries. FB Mickey!

HG2AGI is with IGY in Ecuador and has a new KWS-1. He is mostly on 15 meters as is GI3CWY.

Bob of AP2BP has reappeared after several months vacation in Europe. He has been on 21,418 frequently. Others heard and worked on Fifteen include VS4JT, VQ4EO, VQ4EU, SVØWQ, OQ5GU, HS1A, KX6BQ, DU7SV, VS6AZ, GD3GMH.

From Mirko, YU1AD we learn the following:

This is it . . . .



Stan, formerly VS6DA is now on Cyprus signing ZC4DA using a crystal filter and 200 watts. VU2RM, Rao is on 14 megs with 25 watts. He is building a new linear. EI3J has been testing his new SB rig on twenty. Several have contacted UB5UW including 5A5TH.

Sam, OH2OJ and his XYL, OH2QJ, are leaving Finland November 1, and will live on Aland Island. Their new calls will be OHØNC and OHØND. Good luck in the new QTH. Its a new country for those who did not work Sam on his recent d/xpedition.

Mirko, YU1AD has a new mechanical filter exciter and is driving two EL34 in grounded grid to 200 watts. He is active on 10, 15 and 20 meters.

Bruce, W2OGE has worked most of his 75 countries with his exciter only. He also reports fifteen is his best DX band.

Arrangements were completed by Paul, VQ4EO to have his QSLs while on the safari across Africa, handled by the Richmond Amateur Radio Club, P. O. Box 1985, Richmond, Virginia. Confirmations will be mailed after receipt of VQ4EO's logs. All W/K's should send their QSLs with a stamped, self-addressed envelope. Cards may also be sent to W4IYC who made the arrangements. VQ4EO expects to start between December 15 and January 10th. See the October column for countries to be visited and the unusual method Paul will use for contacts.

John, G2MF has been ill with the Asian Flu, and also lost his beam in a recent storm.

Norb, F7BN has requested permission to operate SB in Turkey, and hopes to put TA3AF on the air on SSB. He has been there several weeks and this accounts for the absence of F7BN. He has a new SX-101 receiver.

JA1ANG, Harry, writes to say that he is spending most of his time on 10 meters around 28,650 and is having some wonderful contacts. Look for him between 1800 and 1900 EST. VS6JT is building a new 813 linear a la G2MA. This amplifier is becoming very popular and we will show the circuit and details next issue.

Jerry, GD3GMH using a new HT-32 operates around 21,425 according to Bruce,

W2OGE. Sam, W3HN has been on fifteen lately and worked VP2AZ, GI3CWY, CR9AH, EL4D and GD3GMH to bring his total to 83.

Hal, KR6HN has a new HT-32 and is active on all bands. He is building a new linear with 833A's and putting a new HyGain beam ninety feet in the air. Hal wants to see more activity on ten SB.

All who have qualified have now received the "Worked 50" certificate. We are ready to send the "Worked 75" to those who have received the necessary QSLs. It is not necessary to send me the cards for the fifty country certificate. Prepare a list of the stations in the countries you have received showing two-way contacts and have another amateur certify that he has checked the list. This procedure will also be followed for the "Worked 75", but the QSLs must be sent in for verification to qualify for a "DXCC SB".

General Curt LeMay, K4RFA, was awarded the Distinguished Flying Cross for breaking the existing record for long range jet flying without refueling. Curt operated mobile while en flight from Westover Field in Massachusetts to Buenos Aires, and worked most of the SB gang. The plane was a KC-135 jet refueling tanker and averaged 500 miles per hour. The radio gear was a new Collins ARC-58, a one kilowatt transceiver with electronic tuning in one KC steps.

Bradenton Florida is well advertised now with the kilowatt signals of Fred, W4CF, Danny, W2GG/4 and Bob, W4CDY. They all seem to get along fine too.

Claude, W9HLF believes there must be something about the more personal contacts enjoyed by single sidebanders that gives them the urge to meet each other. What started out as a gathering of a few of the local 40 meter SSBers at the shack of W9HLF, "Snob Hill", in Pekin finally became an unscheduled hamfest with representation from four midwest states, during a two day (October 4-5) get together which included many XYLs.

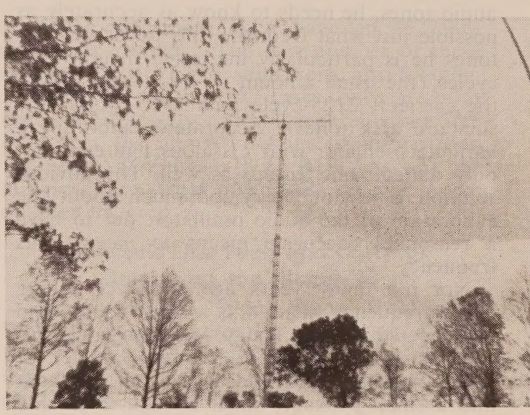
Dick, W9KEC "crutched" it in with a broken leg in a cast, which everyone autographed. Brownie, W9ROQ, who had been hospitalized for two months with serious burns resulting from getting tangled in his high voltage supply, talked his doc into releasing him in time to attend the shindig.

During a fire-side forum a plan was devised to keep SB roundtables to a reasonable and more enjoyable size. Although most of those present operate around 7250 it is hoped the idea will be adopted by other groups. This is the plan: When a roundtable gets to six participants, two will pull out and go five KC higher or lower and start another one. With practice and understanding and a liberal "visiting" of all of the roundtables, SB should be far more enjoyable.

[*Continued on page 116*]



The Snob Hill Hamfest, below W3SW's new 70 footer.



HR2WC (The Kilowatt final with the water cooled tubes is not shown.)



by BYRON H. KRETZMAN, W2JTP
16 Ridge Drive, High Hills, Huntington Station, N. Y.

RTTY

RTTYers build. It is a well established fact that those under the strong influence of the RTTY virus are inveterate experimenters. It is equally indisputable that RTTY is the "last frontier" of amateur radio, where that all-powerful urge to create something cannot be satisfied by visiting "Happy Hap's Used Reseever Emporium on Sixth Avenew in Feenix." Consequently, the RTTYer builds his own somewhat specialized gear: Converters (Terminal Units), bias distortion measuring sets, etc.

Since the RTTYer makes extensive use of audio tones, he needs to know as accurately as possible just what frequency his tones are. The tones he is particularly interested in are, 850-cycles (the usual amount of frequency-shift of the carrier), 2125-cycles and 2975-cycles (the standard afsk tones). Accurately calibrating a variable oscillator with Lissajous figures is not only difficult but tedious as well. The obvious solution is to not worry too much about the calibration of the audio oscillator, but to have a reasonably accurate means to *measure* its frequency.

Not too many years ago, a direct-reading audio frequency meter was a cumbersome and complicated device. Today, with the advent of the transistor, an audio frequency meter of more than sufficient accuracy can be built into a small package, small enough to fit into a coat pocket.

W2JAV Audio Frequency Meter

Those of you who were lucky enough to attend the ARRL convention last September, and the Chicagoland RTTY Meeting, saw such a handy device demonstrated by Phil Catona, W2JAV, one of the most prolific of the RTTY gang.

It is the W2JAV Audio Frequency Meter that is the feature of this month's RTTY column. Modestly, Phil claims no originality for any of the circuitry. The fundamental principles of this "counter" type of circuit have been well established for a long time; and various versions of audio frequency meters have previously appeared in past issues of *QST* and *CQ*. This version, though, was especially worked up by Phil for RTTY.

Completely self-contained in a 4 x 3 x 2 inch aluminum "utility box," it is powered by small "model" batteries or penlight cells. As shown in the accompanying photo, only two knobs are on the panel alongside of the meter. One knob is one the 4-position RANGE switch *S3* and the other is the calibration control *R* used to compensate for battery aging.

Fig. 1 shows the schematic diagram. Note that the W2JAV Audio Frequency Meter is designed to accept either 500-ohm or high-impedance input. (The input switch *S1* and HI-INPUT jack *J2* are not visible in the photo.) The input transformer is a small surplus line-to-grid job with something like 15k to 20k-ohm secondary impedance. Two type 1N69 germanium diodes are connected back-to-back to act as a limiter. Each diode is biased by a single cell—in opposite polarity. The first 2N109 *pnp* transistor (RCA) is operated as a limiter-amplifier and the second 2N109 provides further amplification. The incoming sine wave has therefore been squared off, or has been converted to pulses with the same repetition rate as the frequency of the applied sine wave.

The two other 1N69 diodes and the capacitor selected by the RANGE switch *S3* form a counter circuit whose d-c output is proportional to the number of "counts" or pulses received. The dc is then read on the 0-100 microampere meter. While the meter face has only two scales, 0-50 and 0-100, the RANGE switch provides four ranges: 0-100 cycles, 1-1000 cycles, 0-5000 cycles, 0-10kc, and 0-50 kc. Observe that a calibrate line at *60* is drawn on the scale to enable the user to set the supply voltage to the initial value (arbitrary) by varying the 500-ohm rheostat *R*. (Actually, *R* is a potentiometer, but I'm getting old.)

The capacitor values associated with the RANGE switch *S3*, as indicated on *Fig. 1*, are only *approximate*. You will have to adjust these to make the scales read correctly by feeding in known tones, such as those from an audio oscillator set to harmonics of 60-cycles (Lissajous, again; but just once this time!) and possibly the tones from WWV.

Operation

Operation of the W2JAV Audio Frequency Meter is, ". . . a leadpipe cinch," to use a phrase coined by K4LIB. Put the battery switch *S2* in the ON position, the calibrate switch *S4* on CAL, and adjust the calibration knob *(R)* to put the meter pointer on 60. (The RANGE switch should be on the range that you intend to use.) Put the calibrate switch back on

READ and you are ready to go. Just feed in the signal at either *J1* or *J2* and read its frequency on the scale. Always make sure, though, that you have enough audio input to saturate the limiters. This is easy: Start with no level, increase the level of your source just a little bit beyond the point where the meter reading no longer increases. That's all there is to it.

By the way, if you have any question about the Audio Frequency Meter, Phil asks that you do not write him directly, but that you send your letters to me.

QRM, Notch Filter, etc.

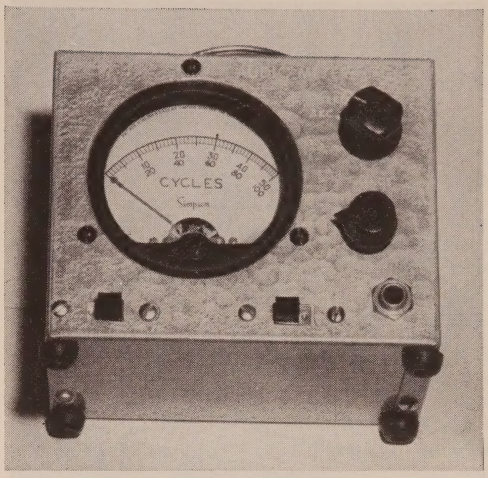
Last month we began the "how-to-do-it" series on battling QRM with the RTTY "Notch" Filter. For those of you interested, we now have available a set of response curves of this filter taken with the control set at the *mark*, center, and *space* frequencies. Just drop W2JTP a line and we will gladly mail a copy to you. Please enclose a stamped, self-addressed envelope, business size.

Also mentioned last month in connection with the battle against QRM was a converter, ". . . that permits copying from mark or *space*, as well as normally from both." What we were hinting at is now scheduled for publication as an article in the March 1958 issue. This is the really *good* "improved" TU described and shown at the CHI-RTTY Meeting last September by W2JAV. Watch for it, and in the meantime stash away a couple of those 88-mhy loading coil toroids.

Toroids

Speaking of toroids, those "88-mhy" telephone loading coils that are so extremely useful to RTTYers can be found in several places. The army surplus C-114-A loading coils for field wire are more apt to be found on the west coast than on the east coast. Details on unpotting these are found on page 72 of the *RTTY Handbook*.

A friend, who prefers to remain anonymous, says that quite a few loading "pots" of the 95A, B, and C types are being junked by some of the



A Neat package for this month's "Build-it"... the W2JAV Audio Frequency Meter.

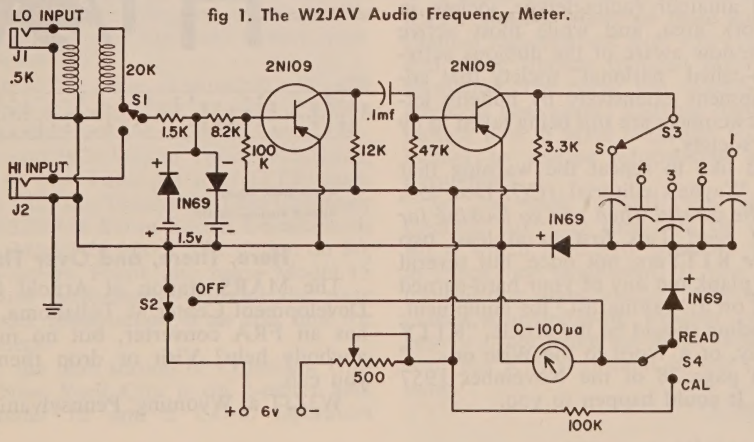
telephone companies. These have ten #622 88-mhy coils in them. (The new number of these coils is #632.) #637 loading coils, also 88-mhy, are found in number 177 cases, only. He adds that a #177 case is a #110 apparatus box. We trust that the above confidential information will be of some use to those RTTYers who are in a position to track down this excellent source of filter material.

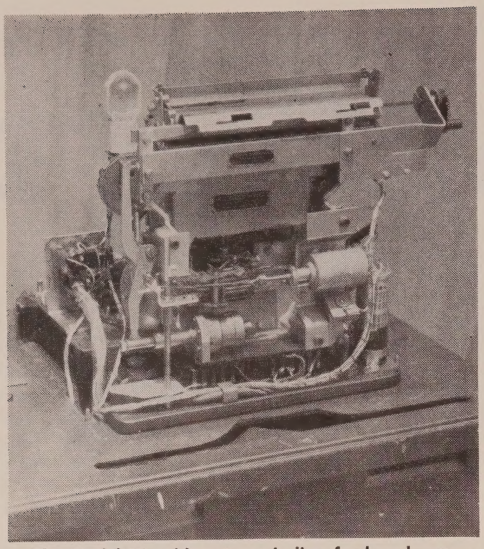
Automatic Line Feed and Carriage Return for the Model 26

Back in March 1956, Elwin J. O'Brien, W6LDG, demonstrated at a meeting of the RTTY Society of Southern California his system of automatic carriage return and line feed for the ubiquitous Model 26. It should not be difficult to imagine how useful this feature might be in amateur RTTY operation.

The force for this automatic operation is obtained from a *Cannon* #4673 solenoid, 28-volt, and the accompanying photograph shows it

fig 1. The W2JAV Audio Frequency Meter.





The Model 26 with automatic line feed and carriage return.

mounted on the machine at W6LDG. Elwin has prepared a rather complete set of instructions, parts list, and detail drawings, but unfortunately we don't have the space to print it all here. The instructions did, however, appear in the August 1957 issue of *RTTY*, the organ of the RTTY Society of Southern California. (Subscription $2.50 per year via W6AEE, 372 West Warren Way, Arcadia, California.

W6LDG has a supply of the solenoids available at $2 each. Also, he will supply a set of instructions and drawings for 50¢. His QTH is 11110 So. Colima Road, Whittier, California.

Societies

Last month we reported on the incorporation of the Midwest Amateur Radio Teletypers Society. Here is a legitimate source of equipment for the midwest, organized along the lines of the nationally-known RTTY Society of Southern California, also a legally incorporated source of equipment. There is *no* legally incorporated amateur radioteletype society in the New York area, and while most active RTTYers are now aware of the dubious activities of a so-called "national" society that advertises equipment extensively by bulletin letters, many newcomers are *still* being taken in by a one-man "society."

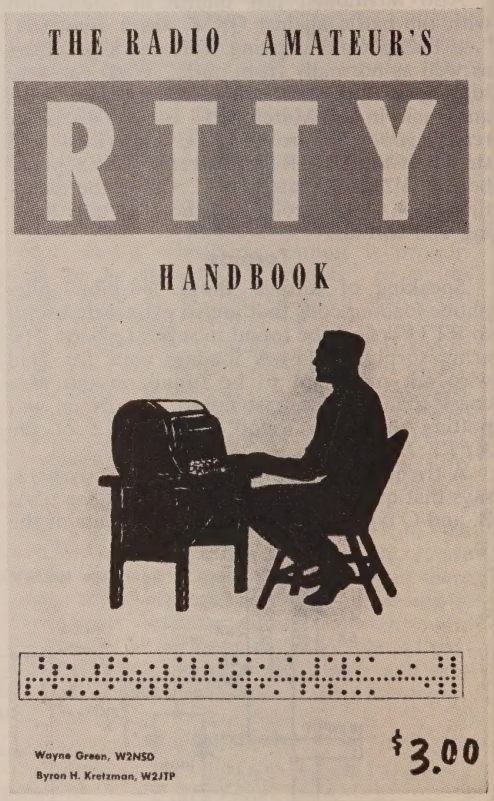
We would like to repeat the warning that appeared in Wayne's editorial (*CQ*, Dec. '56, page 112): *Be careful when you go looking for radioteletype gear!* Talk first to at least two nearby *active* RTTYers, not once, but several times. Don't plank out any of your hard-earned dough to get on a "waiting list" for equipment. Required reading should be the article, "RTTY the Easy Way, or a Word to the Wise on . . ." This was on page 38 of the November 1957 issue of *CQ*. It could happen to you.

RTTY Handbook

Illustrated this month is the cover of the *RTTY Handbook*. (Did you get yours yet?) There are seven large sections to the book, containing such vital information as basic principles, machines, converters, autostart, filters, tone standards, afsk oscillators, fsk exciters, and dozens of other fascinating aspects of RTTY.

"Why doesn't the *RTTY Handbook* contain any advertising?" That is a question asked many times. The answer is that almost nobody manufacturers *amateur* RTTY gear. Secondly, the *RTTY Handbook* was dreamed up and put together by the extracurricular efforts of W2NSD and W2JTP. Advertising would have just complicated and delayed its publication. Remember, this is the very *first* handbook on RTTY, and it was a long time coming.

To get your copy, send $3, check or money order made out to "RTTY Handbook," to RTTY Handbook c/o W2JTP, 16 Ridge Drive, High Hills, Huntington Station, New York.



Here, There, and Over There

The MARS station at Arnold Engineering Development Center at Tullahoma, Tennessee, has an FRA converter, but no manual. Can anybody help? Visit or drop them a line if you can.

W3ZJT at Wyoming, Pennsylvania, has some

Amateur Radioteletype Channels

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.
National, AFSK 27.2, 147.96, 144.138 mc.

Area Nets:

California	147.85	Mc.	AFSK on AM
Chicago, Ill.	147.70	Mc.	AFSK on FM
Detroit, Mich.	147.30	Mc.	AFSK on FM
Washington, D.C.	147.96	Mc.	AFSK on AM
	147.495	Mc.	AFSK on AM
New York City	147.96	Mc.	AFSK on AM
Livingston, N.J.	146.30	Mc.	AFSK on AM
Buffalo/Niagara	147.50	Mc.	AFK on AM
Boston, Mass.	147.96	Mc.	AFSK on AM
Seattle, Wash.	147.00	Mc.	AFSK on AM
Spokane, Wash.	147.15	Mc.	AFSK on AM
Minneapolis, Minn.	144.90	Mc.	AFSK on AM

surplus CV-31B/TRA7 "Dual Diversity Converters" that he would like to sell or swap. Larry Parker, W3AAB (ex DL4FC), recently returned from Germany, forwards a very formal communication from the Deutsche Bundespost that says that ham-band fsk and radioteleprinter operation is not permitted. Larry is looking for a 14 typing reperf. (*Who isn't?*)

Bob Clark /KL7 in Anchorage, Alaska, has a Model 15 for sale. Address: Box 1244, 5050 Comm Maint Sq, APO 942, Seattle, Washington.

W1WAS of Portland, Maine, another member of the keyboardless-12 club has a PAT converter getting good copy, but he wishes that he could transmit. (*Another* one? Ed.) Can anybody help?

W6YNS at Lakewood, California, is building a 4-250 band-switching rig for RTTY. Chuck has a G4ZU beam and is building a traveling wave antenna for 2-meters. K6LFJ is building a W9KLB converter. (Page 40, *RTTY Handbook*) W6CQK has returned to sunny California with a packed trailer after a year or so on RTTY from Summit, New Jersey. Jack hopes to be active on 20-meter RTTY as soon as he can get settled in a new place in Redwood City. QTH: PO Box 815, Redwood City, California. K6GOK in Ontario, California, is looking for dope on autostart. (*We hope to publish a new autostart circuit soon, Mel. Watch for it.*)

W8IJH in Malta, Ohio, is working a BC-458 as a VFO into a 20-A exciter to drive a Viking II. Dick was first licensed in 1920.

W5TVG and W5RMQ in Tulsa, Oklahoma, are ready to put Tulsa on the RTTY map. W5RMQ is with the Texas Pipe Line Company in Tulsa. W5ZSP in Baton Rouge, Louisiana, is running his Model 26 into a SSB station on 80, 40, and 20-meters. Frank also has a Model 15 keyboard and perforator — without the page printer! Under construction is an afsk unit for 2 and 6-meters.

W2AEE, the club station of Columbia University in New York City is on 2-meter afsk with a Model 12 and a CD-2. Operators K2DPG, W1SDO, and W2AIP were recently worked by W2JTP.

KR6AK in Okinawa is operating RTTY on 7147 kc weekends. Cas has worked W8NIY in West Virginia and Bob, W6MTJ.

VR2AC, Jack Patton, has returned to the Fiji Islands with a Model 26 machine. Ken, W6WIS, says he got a note from Jack that he is about all set to get on the air with RTTY.

BeeP, WØBP, reports that another "Narrow-Shift Party" is contemplated for the entire weekend of March 14th. Get the gear ready and watch for further details.

The New "Forty RTTY Net"

There have been numerous requests for a time that many RTTY stations in the upper mid-west can contact each other to exchange messages; that a net be organized to handle the huge volume of emergency traffic as only RTTY can, for bulletins, and for social and technical exchanges of information (after traffic). Now the "Forty RTTY Net" has been organized. WØBP acted as net manager to get things started, with elections planned for later; and while it is planned to rotate net control, WØBP will be NCS for the time being. To cover the wide areas involved, 40-meters seemed to be best, and the most leisure time with a minimum of DX-QRM indicated Sunday afternoons best for meeting times. So let's pass the word and get on 7140 kc at 2 p.m. Sundays.

Comments

Many times we receive requests to publish a list of stations and frequencies of commercial (press) stations using RTTY. The object, of course, is to have a source of test transmissions to try out TU's and machines. Well, this we have not done for several reasons. First of all, most commercial stations use multiplex and/or narrow shift, so most of us wouldn't be able to copy them anyway. Secondly, they take a dim view of anybody copying their "private" traffic. So, if you want to copy a commercial, you will have to dig for one using single-channel transmission *and* 850-cycle shift.

A much better bet is to look for a military RTTY station. Many of these still use single-channel radioteletype *with* 850-cycle shift. Several Navy stations transmit flight weather information. The Navy, too, takes a dim view of anybody (us, again) copying their traffic even though it is in plain language, so they are reluctant to release information in regard to frequencies.

So, just look around; you will find 'em. Chances are that they will be only running RY's, which is exactly what we want anyway to check our equipment! If you hit a station transmitting flight weather information to machines equipped with weather symbols, your copy will not make too much sense, unless you read the RTTY column in the October 1956 issue.

73, Byron, W2JTP

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



Novice

As you may have noticed, we had a nice vacation during November because of the introduction of the huge first CQ Annual issue. Consequently, the letters have piled up to huge proportions. In order to squeeze them all in this month, I'll dispense with the usual chit chat and get right down to business. The additional letters to "ye olde editor" will also necessitate a slight change in the format in the letters section. Back to the usual next month though, unless you flood me with more mail. Believe it or not, but I actually WAS-WL. That's Worked All States—With Letters, in case you didn't get the drift.

Looks like I'm going to have to get after you guys again! Jim O'Connell, W9JZK, (Novice QSL Bureau manager for the 9th call area) writes that the QSL's are piling up. He says, "I have about 300 cards to dispose of at present, with more arriving every day". So how about it men? Send your QSL Bureau manager a self addressed stamped envelope and sit back and wait for the cards to come rolling in. You can find the address of the particular district listed under the W/K heading in the ARRL Call Book. If you live in say the 6th district, you will find the listing for the district manager right there at the beginning of the W6/K6 calls. By the way, there is no reason for not QSL'ing 100% even if you don't have the QTH. You can send the card to the fellow's QSL Bureau and it will get to him, assuming that he sent in his envelope like a good fellow!

Irma J. Heylmann, KN9HMJ, and XYL of KN9HMK, sent us a cute poem which tells the story of her first DX contact and possibly the first contact of many other Novices. It's The Saga of the 15 Meter Band and can be found hereabouts someplace.

I received a nice letter from F. Allen Herridge, G3IDG, 95 Kanseen Road, London S.W. 12, England. Allen sends some very interesting data on the British stations. He writes: "A lot of the boys seem to be under the impression that the various numbers in our call-signs (G2-G3 etc.) indicate different areas of the country, as they do in the States. Several of them have told me that I'm their first G3. This means nothing, geographically speaking. What it can tell them is roughly when the station concerned was licensed. For example, all stations, whether G, GC, GD, GI, GM, or GW beginning with a 3 will be a post war license. In 1946, when we began issuing new licenses over here a sequence beginning with G3AAA was brought in. From there we are at the point of issuing G3MAA etc. There are a few exceptions of course. As for other calls, G2's are the oldest, followed by the 5's, then 6's, 8's, 3's, with two letters following and finally the 4's. Some old calls have been re-issued and the above is only intended to serve as a guide. The G2 calls with three letters following are the pre-war "Artificial Aerial" amateurs, who were allowed to build gear for experimental and adjustment purposes and test same on a dummy aerial. No QSO's were allowed. After the '39-'45 war, the authorities here granted full radiating licenses on passing a test in the Morse Code (12 wpm)."

Allen also suggests that Novices be a little more careful filling out their QSL cards. Recently he had one with no date and the other with the wrong month written in! Such a QSL card is useless for it does not agree with the station log. Don't forget that stations overseas like to make WAS too. And the QSL cards must be correct to do so. Allen also mentioned that a card arrived from one ham that he had received in England. The "heard ham" requested Allens' QSL card for DXCC! Gad, fellow, it must be a two way QSO, for a legitimate QSL card confirmation. Nice try anyway!

Looks like I started something with my comment on "sub-harmonics" a few columns ago. Mike Fern, KH6ARL, Box 107, Lihue, Kauai, Hawaii and Malcolm J. Stevens, W8IWG 1541 Belvidere, Detroit 14, Michigan both jumped down my throat! Mike says "I have heard a W6 calling CQ 10 meters but pounding in on 7150. A Honolulu ham was calling CQ 15 meters but putting out on both 15 and 20 meters. Cases of Novices tuning up on 15, but radiating on 20 are quite common". Mike also mentions that many hams buy "ham band only" receivers and have no way to check for out of the band radiations. Good point Mike. This is contrary to the regulations. You should have a good frequency meter or inexpensive communications receiver to check for this sort of thing.

Malcolm has heard signals on 160 meters when fellows were transmitting on the higher bands.

Well, what I meant, but didn't say very well to WN6ORZ, was that a pure output from a transmitter will contain no sub-harmonics. If you build an oscillator that generates a signal of say 4 mc. you can probably hear the second harmonic on 8, the third on 12 and so on. But you can't hear a so called sub harmonic on two mc. An oscillator can put out harmonics, but not sub harmonics. Now, let's put a doubler on our 4 mc transmitter. Now it puts out on 8 mc from the doubler stage but you will still hear the 4 mc oscillator. Maybe you can call the 4 mc signal a "sub harmonic" now. Anyway, to be sure, when a transmitter or antenna tuner is incorrectly tuned, all kind of weird things can happen as the gentlemen have mentioned. And so my apologies to KN6ORZ for not being very clear in my explanation.

Harry E. Blomquist, Major, Signal Corps, 5341 Normandie St., Oakland 19, Calif. who holds the call of KN4PGV/6 sent along a fine business letter and I only wish that there was room to print it all. He writes "I've heard some really smooth young ops on the Novice bands who really know how to operate. Gary Morgan, WN6RAG (!) and Gary Angerson, WN6NLF, 13 and 15 years old respectively, are two whom I've worked that do a fine job. But some hurt themselves by their operating faults. Do not call more than twice when the other guy gives anything from a 489 to a 599 RST. It just isn't necessary. When giving your QTH and name send at the speed that you want to copy. Use this speed on every opening call and you'd be surprised at the number of repeat transmission that you will save. Give a good listen before sending those CQ's. I've gotten five contacts from guys calling CQ to every one that answers my CQ. And please limit those CQ's to a reasonable length. The old formula of three CQ's and three call signs repeated three times and sign twice is enough to bag a call most every time." Always good advice Harry, and thanks for writing.

Say, is my face red! Don't do as I do, do as I say, that's me! I'm supposed to set a good example and look what I go and do. L. G. (Tommy) Tompkins, W1ZWV, 62 Bracewood Lane, Stamford, Conn. writes: "Please don't sign your column 'Best 73's Don, W6TNS'. This is properly translated as 'Best best regardses', which is sloppy operating. Just stick to 73—we should set good examples". And you know what, he's 100% correct. Frankly, I had never thought of it, but that is just what it means. I'll change my ways, and thanks Tommy. Come to think of it, how come no one has called me on this before, hummmm.

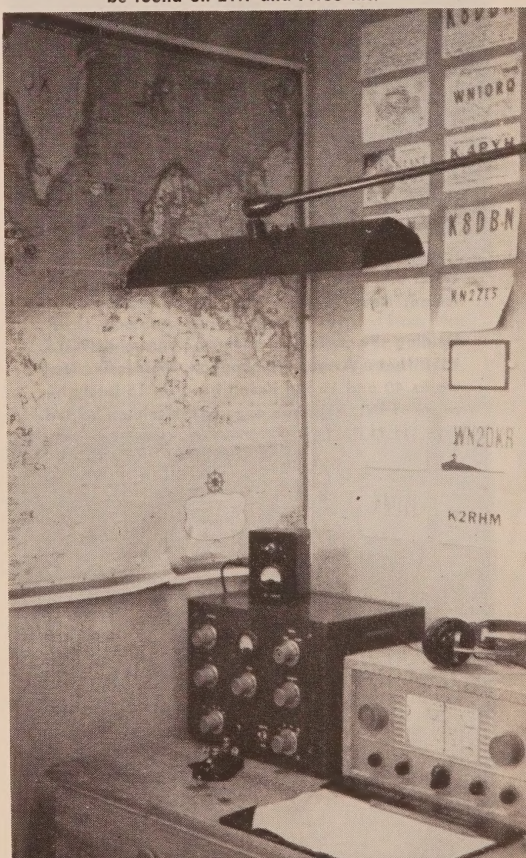
Do some of those abbreviations confuse you newcomers? When you stop and think about it, VHF, QSO, QSL, VFO, Rig, shack, XLY etc. can be pretty confusing to the newcomer who picks up a copy of CQ at the local news stand. He would probably think we were all nuts and take up building model airplanes or collecting stamps. I am getting together a list of these terms and will print them in an early issue.

William Stokenburg, KN6VFG, 1521 Santa Rosa, San Luis Obispo, Calif. suggests something that I and a lot of other hams did when they took their tests. He says: "The thing that makes waiting for your ticket so hard is that you don't know if you failed or passed. I think the solution to the problem is to take along a self addressed post card, marked passed/failed. If I had some word if I passed or failed, the waiting would have been easier." The FCC examiners are pretty busy, but I think that almost any of them would not mind taking the time to mark your card and put it in the mail. Good idea!

Who's DX?

Comes time to find out how all the big Novice DX "guns" are. Remember, guys, if you write any of the overseas reporters for skeds or confirmation—in fact, anything that requires a postal reply, be sure to send International Reply Coupons. They are available at the post offices and don't cost you much. But just think of what it costs the chap overseas who receives 50 or 100 letters. Wow! Our old friend Tima

A beautiful homebrew rig graces the shack of George Korper, KN1ALU, Northrop Road, Woodbridge, Connecticut. He has worked a Ge and 29 states which attests to its performance. George will sked anyone needing Conn. for WAS and can be found on 21.1 and 7.155 mc.





Complete in every sense of the word, right down to the comfortable chair. The only thing missing is the op, George Lindquist, KN6VUV, 308 Channing Rd., Burlingame, Calif. George has snagged DL1, DU7, VK, ZL, KA, LU1, CE3, and T12. Vermont, New Hampshire, and Maine are needed for WAS.



Intently searching for new DX is Louis Schmitt, Jr., WN2PVM, 110 Bleeker St., Port Jefferson, Long Island, New York.

Holding the junior op is Jerry Hansen, KN9GYZ, 1418 Huron Avenue, Sheboygan, Wisconsin. Jerry works 40 and 15 but hasn't been on 15 lately because of TVI. Hope the dope in the column helped.

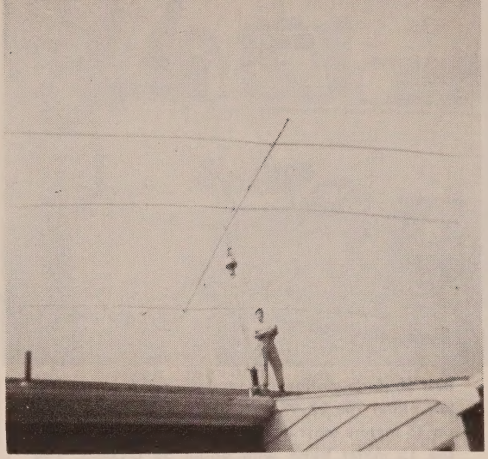


Popovic, YU1FR, Banat, Novo-Selo, Yugoslavia is back in the fold. Tima has been ill for a while but is now feeling somewhat better and again sending reports. He writes: "Here is what I have logged since I last wrote to you: 21 mc band, August 18, 1900 to 2145 GMT: KN1BHB, WN2BHW, BUZ, KN2UQD, VGR, VVF ZDL, KN3AHB, AHK, AIJ, AKO, APD, BCE, WP4AIT, KN4AHM LDI, LDJ, LEV, MOJ, MPI, MUW, OKA OKY, ORN, OUE, PFS, POZ, PPR, PUZ, QHG, QIG, RBV, KN5DLA, HJV, IJU, JNY, JOI, JRD, JWT, KBH, KNG, KNZ, KQZ, KYO, WN6UQM, KN6ZZB, KN8DPD, EJB, ENX, EUT, GHG, GOJ, GVK, KN9EOO, GRQ, KNØIVJ, JPN, JTB, JUR, JVP, JWD, KDJ, and KIQ. August 24, between 1830 and 2115 GMT: KNLAWT, BAO, BBI, BFX, BIS, BZK, CCA, CNZ, WN2BKZ, FOB, ONQ, OSU, QEI/2, RFS, KN2YJT, ZGF, KN3AFP, AUA, AZC, SHK, KN4MON, MUT, OUY, PQR, RDV, KN5JRQ, KN8DJC, DVO, EAA, EET, EHR, KN9GZF, HAI, HDS, HEK, HFQ, IKT, IRF, IUU, KNØHRF, IYC, JPT, KMX, KTY. August 25, between 1545 and 2300 GMT: KN1ANG, ATK, AUQ, BHI, BZL, CAU, CBV, CPB, WN1NHE, NVW, OIH, OQA, WN2BUZ, KN2CJK, WN2LAG, LAW, LOJ, OSO, QEI, RIE, DTQ, KN*UDL, UOD, VZL, VZQ, YXY, ZOK, KN3AHT, AJD, AXH, WN3IGK, JSK, KN4OPR, OVE, QBJ, QIE, RJJ, KN5LCB, LZO, KN6ZJV, KN8DUV, DZW, EEV, EVG, EZJ, GUW, IJB, KN9GUW, GVV, GZI, HCU, HEK, HWW. August 27, at 1853 to 1856: GMT: KN4RJJ, KN5JQG. August 28, 1906 to 1916 GMT: KN1ATC, CVH, KN2VWI, KN4PHY. September 8, 1830 to 2355 GMT: KN1ASJ, BOM, BUH, WN2ITT, KLN, SXX, KN2VPR, VUA, VWZ, ZSG, KN3AHN, AHP, AJB, ARG, WN3JWH, WP4AHQ, KN4AKU, LSP, MLV, MPY, OID, OIE, OII, QHS, QZB, RJE, KN5IXH, KFR, KJS, KN8EIJ, GDV, GPI, GST, HEE, HEJ, HMS, KN9GGZ, IGP, IWS, KNØJJT. September 15, 1630 to 2200 GMT: KN1AAV, ADA, AJB, AOK, BGM, BKE, CDF, CMI, CQV, WN1RFS, KN2BZK, WN2CQQ, PVM, QEI, REH, SGA, TOD, KN2ZNB, KN3ATP, WP4AJJ, KN4KXX, LLI/MM, OHP, OWT, PPC, PUI, QDV, QFO, RAF, KN7ABV, KN8EIJ. September 18, 2300 to 2330 GMT: KN1BDL, WN2NGE, PSZ, PVM, KN4LMR. September 19, 1830 to 2020 GMT: KN1ANO, CJO, CLT, CVP, CZH, KN2BGH, WN2DIG, SGA, KN2ZUZ, KN3AIT, BKU/MM, WN3KXG, KN4OTG, PBD, PUJ, PUO, PWB, KN5KNK, KN8DIO, EEW, HAB, KN9AIX, HIZ, HOL. September 22, 1734 to 1738 GMT (conditions very bad): KN2UZV, KN8GHG. September 24, 1820 to 2030 GMT: KN1AIU, ALV, BCP, CZG, DHU, KN2HCV, VDC, YSV, YTK, YZI, WN2HSG, PIP, KN3ANU, AWU, KN4PYH, KN8DSL, GZE. September 25, 2000 to 2030: KN4LMX/4, KN8EHS. September 27, 1740 to 2100 GMT: KN1ABX, ADB, AWR, AYI,

BAZ, BGT, BUK, BUX, BZM, CDD, CDN, CJV, CNQ, DIW, WN1OQD, KN2AAC, BLE, GRG, WN2NHD, NPN, RRN, KN2VUI, VYY, YJN, YTB, ZBZ, ZOZ, KN3AUT, AXR, KN4LMX ODB, ORQ, QEL, QNX, RCW, RKV, KN5IVA, JRH, LTK, KN8DJC, DYJ, EAG, EZN, GVD, HKU, KN9GCP, GTR, IJA. September 28, 0015 to 0140 GMT: KN1ABX, ALU, CSV, WN2AZO, KN3AIT, ARG, KN4LLI/MM, MEQ, MVE, OAQ, OVA, QCR, QCT, QHN, RID, KN8DIO, GWM, KNØJUP, KUS, LGZ. October 1, 1814 to 2000 GMT: KN1AND, BAK, WN1BKN, KN1BNO, VZL, KN2APG, WN2CQQ, PZV, RFC, RLO, KN2VDC, VGL, YZI, KN3ALJ, WN3JQL, WP4AKJ, KN4MHK, ORK, KN9IJB, JWU. October 2, 1700 to 2130 GMT: N1AMC, BGA, BGI, BMM, BTP, CBX, KN2BVS, WN2CQT, HLL, KRN, PQU, N2STZ, VHU, VPB, VQQ, ZDY, ZMH, KN3AFS, BIX, BTT, KN4IIE, LWZ, OES, OIT, QXD, RDV, RJH, RWV, KN5JRY, KN6YZO, WN7HJY, KN8DTF, EGX, EQC, EQK, EZK, EZU, KN9HQM, IIW, IYZ. September 26 *7Mc. band* 0214 to $250 GMT: KN1BZD, CBO, CKD, CSV, CSY, KN2BIG, WN2HLD, MZR, KN2QFV, UKQ, YUB, ZDU, KN3BIZ, CFU, KN4PPN, QOO, RNU. Tima says "The best stations on the 21 mc band are KN8GHG and WN2OSO. They are coming through even when the band is dead. When conditions are good they are coming in with tremendous strength. 73 for this month, Tima".

From the African continent, Al Simpson, CN8ID, USN COMM-FAC, Navy 214, Box 50, FPO New York, N. Y. wteirs of stations heard. Dear Don, I thought I'd write and let a few of the Novice boys know that they are putting a signal here in Morocco. September 28, 21 mc, 001 to 0700 GMT: KN1BGM, KN2ZMX, ZMY, WN2JKK, ONQ, KN3ARG, KN4MZL, OAQ, QIG, RHI, RID, KN5JGI, WN6UGV, N8GWN, KN9JHF, IUF, KNØHNG, KUS, LQB and WP4AKP. Same time on the 7 mc band: KN2YQK, WN2FDK, KN3AEC, AHJ, BME, WN3JQR, N4MKA, OHT, OTV, PUZ, RHQ, KN8DTZ, KN9GSS, IIJ, JLR. Same time on 3.7 mc. KN2AKD, KN4PFK, QIJ. September 29, 0001 to 0700 GMT-21 mc: N1AYQ, BJI, BNV, DDC, KN2VZE, WN2LAG, KN4LQR, QNL, KN5LZO, KN8EHS, KNØLFA. Same time, 7 mc band: KN1APY, CKC, KN2YIO, KN3AXF, AZH, WN3JQI, KN4FNB, OOB, PHL, RNU. I'm sorry I was not able to work any of these stations but as yet the rig here is only good for 14 and 28 mc. Soon we will be on 21 mc and possibly 7 mc at which time I expect to work a lot of Novices. 73 es DX, A1, CN8ID. Many thanks Al and I will look forward to working you myself on 15 meters when you get up there. Tnx for the calls heard.

Our old friend George, G2DHP sends a list from England that were heard on August 17,



Here's a trick shot of Paul Sellito, WN2MDF, 232 John St., Oradell, N. J. From the angle taken it looks like a 40 meter beam, but Paul says that it's for 15.

Dig that wall paper in the shack of Eino (Walt) Kangas, KN7AGU, P. O. Box 165, San Jose Branch,

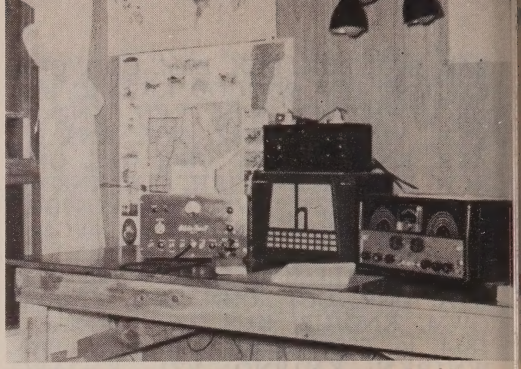


Mike Grimes, KN5MLG, P. O. Box 992 Gladewater, Texas operates on 80 and 40 meters from this neat station. He will sked anyone for any reason and he has the good old habit of Qsl'ing 100%.





Bob Shafer's station is complete, right down to a hot plate! The SX-99 and Globe Scout perk away on 15 meters most of the time. Bob scoots all over the 15 meter band with about 50 crystals. You can sked him for any reason by writing KN7AHM, 707 15 Street, Ogden, Utah.



Here's the one you need for that WAS. Marshfield, Vermont is represented by Jeri Healey, RFD #1. Jeri works 80, 40, and 15 meters and will make skeds with anyone needing Vermont. QSL's 100% natch.

on the 15 meter band: WN2OSO (QSO'ed), KN2UKN, KN2VZQ, KN2YKY, KN2YXY (QSO'ed) KN2ZKA, KN3AFP, WP4AIW (?), KN7AEY, KN8EGD, KN8LHM. George says, "If they had listened better I would have QSO'ed the lot—Hi. I will soon be on A3 and hope to have A1/A3 QSO's with the Novices." 73 George. Righto George and thank you so much for the list. Hope to have the pleasure of working you someday, myself.

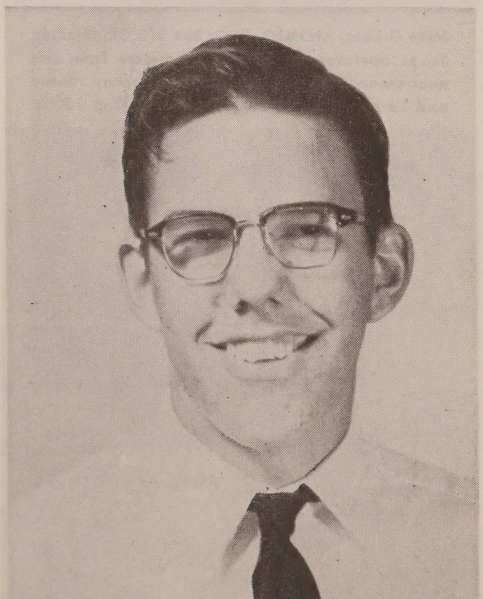
Net News

John Sorrentino, KN2ZHK, 900 Orange Avenue, Cranford, N. J. informs of a new Eastern net. John says that they are looking for members. The net uses the frequency of 3748 kc at 6:00 PM (EST?). It is for new or slower speed operators but does handle traffic locally. Anyone interested, please contact John.

Ray Jarboe, KNØKMZ, 2622 Crawford, Parsons, Kansas would like to start a Midwest net. Contact Ray if you would like to join.

Bud, KN5KAY, 5188 Huckleberry, Houston, Texas would like to know if there is a traffic handling net for Novices on the 15 meter band. What say men?

Florida is represented by Bart Fay, K4CEF, 1110 Magnolia, Panama City, Fla. Bart likes to work the 15 meter Novice band and usually operates in the mornings between 7 and 8 AM.



Help Wanted

Peter Crosby, 108 Waverly Street, Cattagajus, New York says that there are no hams for miles around. He would like help with the code and theory and for someone to give him his examination.

Peter Woolwine, RA 14616231, Co B, 301ASA bn. APO 358 San Francisco, Calif. would like to learn about amateur radio and obtain a license. Any of you fellows over in Korea that can give Peter some help?

Jack Winter, 7422 Perrysville Avenue, Pittsburgh 2, Pa., Phone PO 1-5543 would like help with the code and theory.

Dick Mason, 22 Glendale Rd., Babson Park, Mass., Phone Wellesley 50342 would like to obtain an amateur license and needs help with the code and theory.

Thomas G. Orzech, KN9HTW, 78th Supply Sqdr. Box 813, Hamiliton AFB, Calif. would like help obtaining his Technician license.

Bob Sawille, 1206 Kansas, Peoria, Illinois needs help with the code and some of the theory.

James Lee Schmitt, 6605 S. W. Canyon Lane, Portland 1, Oregon would like to become a radio ham and needs help with the code and theory.

Neil Rasmussen, 45 Lincoln Avenue, N. Dighton, Mass. would like to obtain his license and also needs help converting a short wave receiver for amateur use.

Al Webb, P. O. Box 1894, Greensboro, N. C. Telephone Broadway 5-0369 or Broadway 5-7913 wants very much to obtain his license and needs help with the code and theory.

Darrell, 1209 (or 1809) "E" Warren, Bay City, Texas would like to become a Novice and needs help with the code and theory.

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

PROPAGATION

Exceptionally good shortwave radio propagation condition of forecast for the period January 12-17. Periods of ionospheric storminess and below normal reception conditions are most likely to occur January 1-3, 19-21, 27-30.

The following is an overall picture of propagation conditions forecast for each high frequency amateur band for January, 1958, with a brief discussion of the qualitative changes taking place in each band from month to month. For specific times of band openings for a particular DX or short—skip path, refer to the *CQ Propagation Charts* on the opposite page.

6 Meters:

Peak daytime values of maximum usable frequencies continue at record breaking levels. Six-meter openings, trans-continental and world-wide, are expected to be as numerous during January as they were during November and December when it was possible to work all continents from the U.S.A. There is a slight possibility that the trans-Atlantic MUF may on occasion rise to 70 megacycles, permitting cross-band QSO's with European amateurs using the four-meter band. Meteor scatter openings on this band should be quite numerous during the period of the Quadrantids meteor shower, January 1-4.

10 Meters:

Excellent world-wide openings can be expected almost daily from shortly after dawn through the late afternoon and early evening hours. Signals coming from the east and south should peak about noon time and those from the west and south during the late afternoon and early evening hours. Short-skip openings, between 750 and 2400 miles, are expected to occur daily from before noon until early evening. Propagation conditions on the 11-meter band should be similar to those forecast for 10-meters.

15 Meters:

On most days excellent world-wide propagation conditions are expected on this band. Fifteen-meters should open at sunrise and remain open through the early evening hours. When the MUF is exceptionally high, the band may remain open around-the-clock. Peak signal intensity on 15-meters occurs a few hours later than the peak on 10-meters, with signal strength exceptionally strong during peak periods. Short-skip propagation, between 600 and 2400 miles, should be possible on most days from a few hours after sunrise until after sunset.

20 Meters:

Seasonally lower values of ionospheric absorption and noise levels are expected to result in considerably *stronger* signals on 20-meters during the month of January. The band is expected to open shortly before sunrise and remain open until well into the evening hours. On many days 20-meters will probably remain open for DX around-the-clock. Optimum conditions occur on this band during the late afternoon and evening hours, with another peak occurring during the sunrise period. Short-skip openings are also forecast daily from shortly after dawn until about mid-night. At noon time the skip distance will be as short as a few miles, extending upwards to several thousand miles. For this reason QRM on 20-meters during most of the daylight period is expected to be of considerable magnitude

40 Meters:

With ionospheric absorption and static levels at low values, fairly good DX propagation conditions are forecast for 40-meters to many areas of the world. The band should open for DX an hour or so before sundown, remaining open through the hours of darkness until dawn. Short-skip propagation should be possible around the clock, with the minimum skip distance as short as a few miles during the daylight period, increasing as the hours of darkness approach.

80 Meters:

Propagation conditions are opti-

mum for 80-meter openings during the month of January. Noise levels are low, absorption at minimum values, and the hours of darkness are greatest. The band is expected to open for DX to some areas of the world from a few hours after sunset until dawn. Because of the intense ionospheric absorption associated with the present peak in the sunspot cycle, DX openings at best will generally be only fair with signal strengths relatively weak. During the day-light hours short-skip openings up to 250 miles should be possible, with the skip increasing during the late afternoon, evening and early morning hours.

160 Meters:

Intense ionospheric absorption prevents daytime skip on 160-meters. During the late afternoon and evening hours, as absorption decreases, 160-meter signals are reflected from the ionosphere. During January, night time skip, from sundown to sunrise, will usually extend out to about 1500 miles or so. When static levels are exceptionally low, the skip may extend to several times this distance. Propagation observations on this band reported last year by W1BB and many others helped considerably in shedding light on the influence of the solar cycle on this lowest frequency amateur band. This column would like to receive reports of 160-meter openings which exceed 1,000 miles again this winter. The reports should indicate date and time of band openings, signal report, description of receiving and transmitting equipment, etc. The reports should be sent directly to the Propagation Editor, CQ.

1957 In Review

Amateur Radio's Greatest Year!—began the CQ Propagation Column of last January. It continued: "*. . . The new year will witness more intense sunspot activity than ever recorded previously; the beginning of the International Geophysical Year . . . and man's first launching of an earth satellite . . . Their occurrence presents a stimulating challenge to amateur radio . . .*"

The outstanding scientific events which occurred during the year just ended certainly marks 1957 as one of the most important years of the century. These events have had an unprecedented influence on amateur radio.

During 1957, solar activity, as measured by spots on the face of the sun, reached a level higher than ever recorded previously. At the time of writing, the smoothed sunspot number, which is a measure of the ultraviolet radiation from the sun, reached 181. The cycle is still rising. This surpasses by a considerable amount the previous record high of 159 recorded during 1778.

Intense solar activity is believed to have an influence upon many natural phenomena, but probably most important of all, at least to the radio amateur, is the solar effect upon the *ionosphere*. The ionosphere is an electrified region in the earth's upper atmosphere responsible for reflecting radio waves over great distances. During 1957 the ionosphere was more intensely electrified, by ultraviolet radiation sweeping across the region from the sun, than ever recorded previously. This intense electrification resulted in unusual shortwave radio propagation conditions during 1957 . . . conditions which may only occur "once in a lifetime". WAC on 6-meters, year round world-wide DX on 10-meters, around the clock world-wide DX on 15-meters, year round night-time DX on 20-meters, new DX records on 2-meters, pole-to-pole amateur communication, record breaking DX contests, to mention the more sensational accomplishments of 1957.

Associated with the record breaking solar activity of this past year were a record number of brilliant auroral displays, resulting in an unprecedented number of auroral type openings on the amateur VHF bands. Because of the widespread extent of some of these auroras, many stations in the southern areas of the United States were able to communicate by auroral reflection for the first time in the history of amateur radio.

On July 1, 1957, one of the boldest and most imaginative scientific endeavor ever attempted

[*Continued on page 108*]

Amateur Radio Participation In The IGY; Photo shows the earth satellite tracking installation operated by the San Gabriel Valley (California) Amateur Radio Club. Dr. H. L. Richter (left) Cal. Tech. scientist is shown with Richard Major, an engineer with the Consolidated Electrodynamics Corporation who loaned some of the equipment shown to the club.



ALL TIMES IN EST

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

ALL TIMES IN CST

Central USA To:	*6/10 Meters	15 Meters	20 Meters	40/80 Meters**
Western and Central Europe	8A-11A (2)*	6A-8A (2)	4A-8A (2)	5P-2A (2)
	6A-8A (3)	8A-10A(3)	8A-12M (1)	7P-12M (1)**
	8A-12N (4)	10A-1P(4)	12N-6P (3)	
	12N-3P (2)	1P-4P (2)	6P-12M (2)	
		4P-6P (1)	12M-4A (1)	
Southern Europe and North Africa	8A-11A (2)*	5A-8A (3)	7A-12N (1)	5P-2A (2)
	6A-10A (3)	8A-11A(2)	12N-2P (3)	7P-12M (1)**
	10A-2P (4)	11A-3P(4)	2P-6P (4)	
	2P-4P (2)	3P-5P (2)	6P-12M (3)	
		5P-7P (1)	12M-7A (2)	
Central and South Africa	9A-1P (2)*	5A-11A(1)	12N-3P (2)	6P-12M (2)
	6A-10A (2)	11A-1P(2)	3P-8P (4)	9P-12M (1)**
	10A-3P (4)	1P-5P (4)	8P-3A (3)	
	3P-5P (2)	5P-7P (3)		
	5P-7P (1)	7P-9P (2)		
Eastern Mediterranean	6A-8A (2)	6A-10A(2)	11A-4P (2)	6P-10P (1)
	8A-10A (3)	10A-12N(3)	4P-10P (3)	8P-10P (1)**
	10A-12N (2)	12N-2P(2)	10P-12M(2)	
			12M-11A(1)	
South America	8A-11A (1)*	5A-9A (3)	1A-8A (3)	6P-4A (3)
	4P-7P (1)*	9A-2P (2)	8A-2P (2)	4A-7A (2)
	6A-1P (3)	2P-6P (4)	2P-4P (3)	8P-3A (2)**
	1P-4P (4)	6P-9P (3)	4P-9P (5)	
	4P-7P (3)	9P-2A (2)	9P-1A (4)	
	7P-9P (2)			
Japan and Far East	4P-6P (1)*	2P-4P (2)	1P-7P (2)	12M-7A (1)
	2P-4P (2)	4P-6P (3)	7P-11P (3)	
	4P-6P (3)	6P-8P (4)	11P-6A (2)	
	6P-8P (2)	8P-10P(3)	6A-9A (1)	
		10P-12M(1)		
Central and South Asia	5P-7P (1)*	8A-10A(1)	5P-9P (2)	7P-10P (1)
	7A-9A (1)	10A-2P(2)	9P-5A (1)	5A-7A (1)
	9A-12N (2)	2P-4P (1)	5A-8A (2)	
	12N-4P (1)	4P-7P (2)	8A-11A (1)	
	4P-8P (2)	7P-9P (1)		
Hawaii	11A-3P (2)*	8A-3P (3)	7A-3P (2)	8P-8A (4)
	3P-5P (1)*	3P-9P (4)	3P-6P (3)	9P-7A (3)**
	10A-2P (3)	9P-11P(3)	6P-12M (4)	
	2P-6P (4)	11P-1A(2)	12M-7A (3)	
	8P-10P (2)			
Australasia	8A-11A (3)	8A-10A(3)	8P-12M(2)	3A-8A (3)
	11A-2P (2)	10A-4P(2)	12M-4A(4)	5A-7A (1)**
	2P-7P (4)	4P-10P(3)	4A-8A (3)	
	7P-9P (2)	10P-2A(2)	8A-10A (2)	
Antarctica	8P-10P (1)	6A-8A (2)	3P-6P (1)	11P-5A (1)
		8A-2P (1)	6P-10P (2)	
		2P-6P (2)	10P-2A (4)	
		6P-12M(3)	2A-8A (3)	
		12M-6A(1)		

ALL TIMES IN PST

Western USA To:	*6/10 Meters	15 Meters	20 Meters

ALL TIMES IN PST

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

CQ PROPAGATION CHART (SHORT-SKIP)

Band (Meters)	Distance (Miles) 50-250	250-750	750-1300	1300-2400
10	Nil	11A-2P(1)	8A-11A (2)	10A-1P (2)*
			11A-3P(4)	7A-9A (2)
			3P-6P (3)	9A-5P (4)
			6P-8P (1)	5P-7P (3)
				7P-9P (2)
15	Nil	9A-3P (2)	7A-10A (3)	6A-9A (3)
		3P-7P (1)	10A-5P (5)	9A-3P (4)
			5P-8P (2)	3P-6P (5)
				6P-8P (4)
				8P-10P (2)
20	8A-10A (2)	7A-10A (3)	5A-7A (3)	1A-7A (3)
	10A-3P (4)	10A-3P (5)	7A-3P (4)	7A-9A (4)
	3P-5P (2)	3P-8P (3)	3P-7P (5)	9A-4P (3)
			7P-9P (4)	4P-11P (5)
			9P-5A (2)	11P-1A (4)
40	6A-8A (3)	7A-10A(5)	3A-9A (4)	2P-4P (1)
	8A-6P (5)	10A-4P(4)	9A-2P (3)	4P-7P (3)
	6P-8P (4)	4P-8P (4)	2P-4P (4)	7P-5A (4)
	10P- (3)	8P-11P(4)	4P-3A (5)	5A-9A (3)
	10P-6A (2)	11P-7A(3)		
80	11A-4P (3)	8A-11A(3)	3P-5P (3)	4P-7P (2)
	4P-11P (5)	11A-4P(1)	5P-6A (5)	7P-5A (4)
	11P-11A (4)	4P-6P (2)	6A-9A (3)	5A-9A (2)
		6P-8A (5)		
160	4P-6P (3)	4P-6P (2)	4P-6P (2)	8P-6A (2)
	6P-8A (5)	6P-6A (5)	6P-4A (3)	
	8A-10A (3)	6A-8A (2)	4A-7A (2)	

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

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

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

Time Symbols: A-A.M., P-P.M., N-Noon, M-Midnight

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees. They are centered on the Eastern, Central and Western areas of the USA. The DX forecasts are valid through February 15, 1958. The CQ Short-Skip Propagation Chart is based upon a radiated CW power of 75 watts, using a dipole antenna a half-wave length above ground. This chart is valid through February 28, 1958. All forecasts are based upon ionospheric data published by the CRPL of the National Bureau of Standards, Boulder, Colo.

by DON CHESSER, W4KVX
R.F.D. 1, Burlington, Ky.

DX DX DX DX DX DX DX DX

It's a brand new year, and included with the new is a new DX Editor for CQ (see above). I'm probably more surprised at this turn of events than you are, for the new position came to me suddenly out of the clear blue.

Like you, I've followed Dick Spenceley's DX Column in these pages for years, and, like you, considered him tops in his field. Over the years I've gained a healthy respect and deep admiration for Dick and his many talents. Dick's tremendous DX columns, his topflight DXing on his own, and the precision flow of DX information in and out of KV4AA give him proper rights to the title "Mr. DX, himself." He rates an overwhelming ovation for his contributions to DX, and for his many efforts on our behalf these many years.

For my own, I've been an avid DXer since 1934, but, until recent years, financial limitations kept me somewhat back in the ranks of the second squad, an economical situation I'm sure many of you have shared. The situation has not been completely without advantages, for it taught me how to work DX with only low power and a wire antenna. If I can somehow impart a bit of this information to you newcomers to DX, who haven't yet acquired a Kw and rotary beams, I guess my existence will have been justified.

For all of you, including those who occupy a front row position of the varsity team, I shall attempt to continue Dick's incredible flow of DX tips and information, in these pages and over the air. My editorship of the Ohio Valley DX Bulletins, a weekly or fortnightly news magazine dedicated to DX and contests, has resulted in DX correspondents on most of the continents. These and other sources of DX news information will be used fully to bring you the latest hot dope, as quickly and accurately as possible.

Even so, I can't over-emphasize the importance of your own assistance, for without your close support and help in supplying me with DX news and tips these pages will be mighty naked. Please keep your reports and news items flowing to me regularly and quickly, to the address at the head of this column. With Wayne's and Dick's blessing and moral support, and your active assistance, I'll do my level best.

Before I return to hide under the editorial "we" (my overworked Royal and me) please accept my apologies for an untidy DX column this month. Except for a few rush items air mailed, most of the records and files, including the WAZ certificates, are still enroute from the Virgin Islands via surface parcel post. Their arrival will no doubt create even greater confusion and chaos in this office, and it may take a little time to develop some degree of sanity and organization in these proceedings. I ask your indulgence in the meantime.

In this same vein, as CQ's new DX Editor and assigned the pleasant task of issuing future WAZ certificates, this writer is anticipating a huge increase in WAZ applications. Hundreds of you have worked 39 zones, but lacked elusive zone 23, from which there has been no ham activity, to our knowledge, since the days of AC4YN, AC4NC, and C8YR, before the Korean war. Now, with a thousand JT1AA, zone 23, cards in the mail, and more following, we expect to be flooded with WAZ requests.

Of course we'll do our very best to keep up with the demand, but we hope you'll be patient if we get momentarily inundated. All applications will be dated on receipt and will be processed and the certificates issued in that order. In cases of same day receipt the earliest postmarks will get first handling. We can't use postmarks exclusively because of the long transit time from foreign countries and the terrific backlog that system would create.

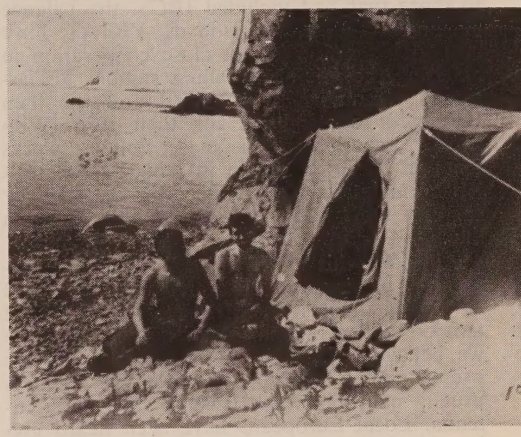
The very cause of our anticipated WAZ flood is one reason you've probably not heard JT1AA much lately. Ludvik is very busy with the prosaic but necessary and very tiring task of writing QSL cards—with the assistance of his XYL. He received 2,000 blank cards from Czechoslovakia, and to date they have written and mailed to OK1JX 1,000 of them, reports Beda, OK1MB. The first 1,000 are enroute Prague at this writing and were due to arrive in November. Beda says about three weeks will be required to assort and remail them to the addresses, some direct (to those of you who sent IRC's to OK1JX) but most of them via the various world QSL bureaus.

Beda views a rumor of some JT1AA cards received at the W6 ARRL bureau with some doubt. He said he knew of none sent directly from Mongolia, and none have yet come

F. Emmer, HA5AM, is VHF Mgr. for HA and very well known on the DX bands.



LU2ZS and LU3ZS enjoy a Summers day outside the "shack" at Half Moon Bay, South Shetland Islands. Running 100 watts they made 2500 contacts in 69 countries in two months time.



Neat set-up at W8OCT, Berkeley, Mich. Op Bill McNeil's happy expression seems to indicate that conditions are on the up-and-up———.



VU2SX, Bombay, India, is a club station owned by St. Xaviers College. 80 to 100 watts is run on 14 and 21 mc. 525 students attend 120 of which are studying to become radio officers in the Indian Merchant Marine. (Photo courtesy Mike Metzger)



through OK1JX. In discussions between OK1MB, OK1JX, and JT1AA, it was decided to send ALL JT1AA cards through OK1JX, thus easing Ludvik's postal problems. Beda said there was a remote chance of letters or notes sent directly by JT1AA to foreign stations, but he doubted if the data therein would be sufficient for DXCC or WAZ credit.

Further reason for Ludvik's relative inactivity lately is his excessively erratic AC line voltage, which makes reception very difficult, and QRM from an Asian teletype station on his usual 14062Kc frequency. For this reason he has been favoring other frequencies, such as 14093Kc and 14004Kc—mostly the former. A much better receiver, an SX28, is now enroute him from Czechoslovakia, due to arrive there at this writing.

Even at this writing (November 14) Ulan Bator is suffering typical Siberian weather, with heavy snow and 20 degree below zero (Centigrade) temperatures prevailing. Because of lack of antenna facilities in town, JT1AA set up his station 4 kilometers from his home, and he must wade snow-drifts that distance to get on the air. Ludvik is a commercial CW operator at Ulan Bator, and presumably his ham equipment is at the commercial station location. He is thus likely limited to hamming mostly during duty hours, and between his professional duties.

If you still haven't worked JT1AA, the best time to look for him is between 1400 and 1500 GMT, and again around 2400 GMT. The most used frequency at this writing is 14093Kc. At both these times he should be coming to the U.S. via short path—a few degrees east of north. He usually booms in with an excellent S7 to S8 T9 signal, and generally at a fine 20 to 25wpm clip. Be sure to call him 5 kc above or below his frequency; don't call on his own freq. Your best bet to work him is to set your VFO a few hundred cycles from the station he is working, and snap off a very short call when the SK's have been exchanged and you know he is listening. Don't give him a long, slow

call, for he is subject to impatience like the rest of us. If you don't get him the first time, keep trying with short, snappy calls only when he's ready for the next QSO. Patience is the greatest virtue of a DX hound, and is especially necessary if you don't happen to own a kw and a rotary beam. Above all, don't get overanxious or discouraged. JT1AA will be on the air for a year, yet, and everybody will get his chance at zone 23 in due time.

The first 200 QSL's from YK1AT, Damascus, Syria, have been assorted and remailed by OK1MB, YK1AT's QSL manager and "master of ceremonies", Beda informs us. Some were for W's, a few of which were mailed directly to those that had included IRC's, the balance via bureaus. Beda and Bohaus, YK1AT, have been doing a fine job of close cooperation in handling the pile-ups. Calling stations are assigned a number by OK1MB and are then requested to stand by for their turn. With Beda's occasional assistance, Bohaus works them in this order. Beda is doing an excellent job of maintaining control of the situation by keeping the frequency clear and the boys in line.

Although this system, the "master of ceremonies" bit, is rather slow and ponderous, and as used in the past has often resulted in frayed tempers and exhibited impatience, in this case we believe it is well justified. Even with his present power of 500 watts, YK1AT's signal is usually painfully weak because of a poor antenna. Local Europeans have been heard giving him reports of only RST449 and 559. Under these conditions, without some control or policing of his frequency, it would be impossible to successfully complete his present rate of QSO's-per-hour.

Like JT1AA, YK1AT is Czechoslovakian, and works in Damascus as a commercial CW operator. He will remain there for at least 17 months, yet. He has been devoting time in an effort to clean up the previous T6 and T7 QRI, and now has a clean, T9 signal. Efforts to raise and reorient his long wire antenna would not be in order. His receiver is an old Super Pro.

YK1AT operates daily, from 0545 GMT to 0830 GMT, on 14340, 14330, 14020, or 14010 kc—the preference in that order. In event of severe QRM on one frequency, everybody moves to the next. In this case, the exception to the rule, everybody works on YK1AT's frequency, so that good break-in between the three parties in each QSO can be maintained. To work him, find their operating frequency and snap a fast 1-by-1 call to OK1MB at an opportune moment, informing him you are QXR. He'll assign you a number, and you must then QXR for your turn, which he'll announce. In return for your cooperation Beda will do all possible to make your QSO with YK1AT successful and satisfying.

The soaring MUF these days is serving to plop Sam Harris' VHF Department squarely in our lap, insofar as 50 mc is concerned. Several DX stations are reported listening regularly for W's on that band, including ZC4IP, who, at this writing, is listening on 50 mc and transmitting on 28340 kc phone at 1400 GMT. ZL1HY advises New Zealand hams have been allocated 50.0-52.3 mc and 52.65-54.0 mc segments for the duration of the IGY year. VU2EJ writes India is now permitted the 50 mc band, with 25 watts limitation. He will have a 3-tube 50 mc converter operating by the time you read this, and wants to get VHF operations started with skeds on 28 mc. John, W8LPD, we're told, is having a Field Day working Europeans on 50 mc.

At the other end of the spectrum, G6QB reports ZK1HKO will be active on 160 meters through the winter.

While we're invading other CQ departments, John, W8PUD, reports he recently worked YA1AA, Pete, on 14305 kc SSB at 1800 GMT (our apologies to SB Editor W3SW), and heard him in QSO with AP2BP, also on SSB on 14313 kc, the next day (Nov. 3) at 1700 GMT. KA2NY advises there will soon be a SSB station active from Korea, reports Bob, WØQVZ.

Which reminds us Korea is off the ban list, by FCC action on October 18th. Now you can QSO Koreans to your heart's content—if you can find them. HL2AM is a good bet, active mornings on 14030 kc CW and 14130 kc phone with good signals on both.

Danny Weil, VP2VB/etc., is ready to sail from England to the Virgin Islands with his new boat, a yawl, writes Jim, W8JIN, and he should have arrived by the time you read this. The new boat is far from new—in fact it was built in 1912—but it's made of solid teak, and seems to be solid as a rock. It draws 7-feet, a bit more than Danny wanted, but apparently that's its only deficiency. It's got two new masts, a lead keel weighing seven tons, a new mainsail, and the very latest hydraulic deck winch. All he has to do to weigh anchor is move a lever. Best of all, it has a huge Diesel engine that allows the 50-foot boat to cruise at 7½ knots.

Danny is itching to set off on his adventures again. His new Hallicrafters station, HT-32 transmitter and SX-101 receiver, are installed aboard the new craft, and ready to go. When active, Danny can usually be found on about 14075 kc.

VK9JF, Cocos-Keeling, is very active on phone, 21122 kc and 14122 kc, with S9 plus signals, reports George. W8BKP. W8WFB snagged him Oct. 31st using a Johnson Ranger. And Chagos Islands are back on the active list in the person of VQ8AF, worked on 14043 kc CW at 1300 GMT by W8JIN. It sounds like VQ8CB's old rig, Jim says.

A new station in that part of the world, making his first appearance at this writing, is VQ8AS on Rodriguez Island, a 4x12-mile mountainous island honeycombed with limestone caves, located in the Indian Ocean about

360 miles east of Mauritius. Because of its location Rodriguez stands an excellent chance of attaining separate country status. VQ8AS has been maintaining skeds with W's at 0300 GMT and 0900 GMT on 14018 kc CW.

Mack, W1PNR, recently returned from a business and pleasure trip to Europe, visited Sweden, Italy, Moscow, and Leningrad primarily in the interests of amateur radio. After clearance with the U.S. State Department, Mack hopes to write an article about USSR amateur radio activity. He says the USSR is now engaged in compiling a roster of all Russian amateur stations, both the collective club stations with the three letter "K" calls and the two letter personal calls. The operators of UA1KBB, Leningrad, which station Mack visited, told him it would be published in 1958 and is expected to be made available to the Radio Call Book Magazine.

We have nothing definite to report on rumored Fernando da Noronha (PYØ) operation, but the pot is boiling, and something may be cooked up in the near future. John Beck, W6MB, who did such an excellent spot of operating as TI9MHB, Cocos, three years ago, is now with RCA's big missile program, and makes frequent trips up and down the "range," from Cape Canaveral to Ascension Island. You can bet that John, a crack operator and ardent DXer, won't pass up any opportunities to place one or more of those remote island-countries on the DXer's map.

The big hitch to U.S. nationals operating ham radio from those foreign owned or controlled islands, of course, is the rigid nonreciprocal attitude of our own government. We can't very well blame Brazil and Britain for refusing us permission to operate from their lands when we refuse them U.S. or U.S. possessions' radio privileges with such finality.

In spite of such artificial obstacles, W6MHB is still in there, pluggin'. We understand the RCA boys have received a firm refusal to operate from ZD8, but John is trying to coax a licensed ZD8 to become DX-minded. Also, it is rumored the Fernando da Noronha license request is still in the negotiating stage. If so, they haven't issued a flat denial, and there's still hope.

From VS1HU, the RAF station in Singapore, comes word of another Maldives expedition, this time by VS1HX, during the second week of December, advises Paul, K2GFQ. There's no news, to date, of further attempts at Maldives by VS1HJ. We understand he has phoned London for assistance, but so far no results.

SVØWN/Crete should be active again about the time you read this, reports W9GFF. We hear he was much inspired by SVØWQ's recent wild fling.

Fresh operators have just left Le Havre to relieve the operating staff of FB8YY, at Terre Adelie, Antarctic, F9FY informs us. It is hoped and believed the new staff will be more active on the ham bands.

VR3A, Fanning Island, has been attempting 28 mc lately, writes Bob, W3RZL, and he hopes to provide a better signal on that band with a new antenna now in construction.

Russ, VK9XK, who has faithfully placed Papua Territory in many DX contests the past few years, will be conspicuous for his absence this winter. He's now on four months' vacation, advises Ches, W8JJW.

Cayman Island should be back on the air by the time you read this, represented by "Sparky" Hanlan, VP5BH himself. In some measure of gratitude for his overwhelming hospitality when W40MW, W8EZF and Ye Editor operated from VP5BH last March, we promised Sparky we'd do our best to provide him with a new transmitter on our return to the States. Bob, W40MW, wired and recently shipped a new Heath AT-1 with VFO to him. On completion of our Cayman fling, we dismantled the antennas from the hotel roof and presented them to Sparky. Some time later he wrote that he had them reassembled at his home, and was eagerly awaiting the transmitter. When he does get on he should boast a quite respectable signal, both phone and CW.

Some Honor Roll report forms have been received from KV4AA via air mail, but we hesitate to summarize the scoring until the complete records and files have been received from Dick, and we can organize our own filing and computing system. We should manage an up-to-date summary in the next issue.

Ye DX Editor finds it a little difficult writing a news column to be published some weeks hence, but the delay can't be helped and must be tolerated. If you would like to get the news while it's happening, we recommend the Ohio Valley DX Bulletins, published three or four times a month and distributed only via first class and air mail. A card or note to W4KVX will bring you a complimentary copy and further details.

My thanks to you all for your indulgence during this trying period of breaking in a new DX Editor! I feel like a blushing bride! See you at 0000 GMT on 14010 kc most evenings, or in these pages next month.

73, Don, W4KVX

Call Sign Allocations for Russian Amateur Stations

(Courtesy SHORT WAVE MAGAZINE, September 1957.)

The table reproduced below is based on that which appeared in CQ (September 1955) with various amendments and additions bringing it up to date. Among the more important changes is the omission of the Crimea, which the Russians have now incorporated in the Ukraine for administrative purposes. Thus, former UA6S— and UA6KS— calls have become UB5S— and UB5KS—. The Amur region (capital Blagov-

[*Continued on page 110*]

VHF

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

by SAM HARRIS, W1FZJ
P.O. Box 2505, Medfield, Mass.

It's your own fault! We told you several months ago! If you won't do what you're told, what can you expect?

It's been done! WAC on six meters! The first station to make it was Bob Perry, K6GDI, and he made it when he worked Harry, EI2W for the European continent. Next on the list of WAC on six meters is another W6, and again the final continent was Europe, Harry, EI2W; this time it was Paul Bobert, W6BAZ who accomplished the feat. Congratulations fellas, you've surely worked for it.

Six meters has really been kicking up it's heels since the first of November. The first good opening came on that day, and the band quieted down only when nighttime came and also for a couple of days immediately following an aurora.

Knowing mostly information gathered from our own contacts and stations in the New England vicinity, here goes: Directly on six meters (both stations) from Europe so far we've heard and worked EI2W, Ireland; LA5YE, Norway; LA9T, Norway; SM7ZN, Sweden; in the other direction we've worked a number of VE7's including VE7AGG, VE7ND, VE7NM, VE7ACV. On the sixteenth and seventeenth of November the band opened for the first time to KL7 land from W1 land. KL7 CDG was our contact from Alaska but we heard a number of other stations also. Apparently the band was open for the KL's to the entire United States, and the stations they were hearing best were W9's and WØ's. How frustrating it can be to hear these rare ones S9 and then some, call them time after time, pull our hair, scream with rage, and finally get a contact with *one* of them. Among those we heard were KL7AZI, KL7AUV, KL7AH.

We also worked W7CIV/Maritime Mobile. Joe was aboard ship five hundred miles west of Spain. What country does that give us? For more than two hours we heard Joe working the stations to left and right, north and south. The unbelievable part of this is that a good many of his contacts we were able to hear both ends of the QSO. Backscatter accounted for it, and brother what backscatter! We heard his contacts in Massachusetts, Connecticut, New York, Ohio, Virginia, and others, and also heard the stations he was working off the back of the beam.

It took me quite a while (some time ago) to work Bob, W4UCH in Virginia. When I finally made it, it was during an aurora session, but I couldn't hear him on aurora, I had to do it the hard way, long ground-wave. I hate to say this, but I am getting so tired of hearing Bob, (that probably goes for him too), no matter where I turn the beam, there he is. If I'm working Europe, there is Bob; if I'm working California, there's Bob; if I'm working KL's, there's Bob. Wonder if he ever sleeps, and what his working hours are.

On the sixth of November we talked to Clair, W8CMS, on aurora and he told us that he had worked KL7CDG the day before, and that Vince, W8SSD had worked KL7AZI.

California has had a number of openings to Japan and also to Africa so far this year. Jayne, K6GMX told us that she had worked VQ2PL, and heard ZS3G. From the grapevine we heard that VQ4EU is on 50.126, listening for us daily. He is on SSB. Among others we've been told about, ZS2JE, SM5CHH, FF8AP, ZS1SW, ZC4IP, ZS6UR, KR6AF; the information also leaked through on an opening that KR6AF has heard stations as far east as W8 land, that VS6CJ from Hongkong and VU2EJ from India are around. These are rumors we heard on the band and haven't as yet been confirmed.

CT3AE, Jose, in the Madeira Islands has been making hay also. He arrived in W1 land on a morning when we were doing column and so help me we missed him. Anyway, he worked W1OOP, W1HDQ, W1ELP and one other W1 whose call we did not get.

Had a card from CT1CO that he had heard us on six meters, and that he would be on himself by the fifteenth of November.

G3FXB, A1, tells us that ZC4IP and

MP4BBL are both operating six meters. Rumor also sez that W4IKK, Bill, (now located in Tennessee) has worked two KH6's. Also that KH6UK has heard VQ2PL.

Now to the crossband dx. The G's are working across our continent and many of them will probably have WAS before we do.

Gordon, G4LX, has worked W1, W2, W3, W4, W8, W9, WØ and VO1 lands. He has heard W5's, W6's, VE1's and VE3's, but not worked them. G5BD. Arthur, not as active as he was last year, was heard working W5SFD; he heard W6NLZ and W7RUX but did not get them. G3XC has been hearing K6GDI and 6UXN. G3COG worked W9DSP and heard W7RUX, also W6NLZ. We heard LA5YE and SM7ZN both calling W4FPL. We heard the contact with W4FPL and SM7ZN but don't know how the other call came out. EI2W worked W5PDE (on six meters) and heard W7MAH and K6OXS.

Stations heard and worked crossband at this station (W1HOY) are: EA1EY, Spain; EI2W, Ireland; F9BG, France; G2BVN, G2CDI, G3BTA, G3BXI, G3COJ, G3FXB, G3IUD, G3XC, G4LX, and G5BD in England. GC2RS in the Channel Islands. Frank was receiving on a TV receiver only, and the last word we had was that he worked W4UCH and W1HOY. GM3EGW, Scotland; LA5YE and LA9T in Norway; OH5NW, Finland; PAØFM, Netherlands. That's about it to date for the crossband work.

Ike, VE7AQQ and Vic, VE7CN pass information along to us from their territory. Seems like they are working into Japan almost daily for something like ten days now. So far Ike has worked sixty, yep I said *sixty* JA's, he's worked all JA call areas except 9 and Ø. Must be some kind of award he can be looking forward to receiving. He has also heard SM7ZN but was unable to raise Ingvar; but he very definitely heard VS6CB calling him on six meters. One small trouble; the VS6 faded out at the end of his call and was heard from no more. Vic tells us that some of their openings into Japan start at 1600 GMT, and at that time it is pitch dark outside.

The grapevine has so doggone many rumors but you can be sure that anything is possible from here on in, at least for a few months. Last year word went out that 1956 would be the peak year for dx for possibly the next ninety-nine years. This year the word has gone out that 1957 is the peak year. Now I'm beginning to wonder, maybe it will turn out to be 1958. Who knows?

So long, keep your antennas up and good dx.

Berkshire, England Brian (G3COJ) sends lots of information from across the ocean.

"Here are some of the 50 mc highlights observed here."

"The band first opened for me on the 25th of October at 1300 GMT when W1GKE and W1QCC/VE1 were heard. It was open most, if not all days until the 5th of November when it was washed out for several days. Today, (11th) VE1PQ and W1QCC/VE1 were heard weakly around 1500 GMT. No W's."

"The band has been better this year than last and all W call areas have been heard, plus Channel 2 TV. Of course the best conditions have occurred when I have been listening at work in London, and unable to transmit!"

"Nov. 2nd. Worked W9DSP at 1500 GMT and audible until 1700. Very good signal but no trace of any other W9's. WØAKJ and KØGOG heard between 1515 and 1545, plus two unidentified WØs."

"Nov. 3rd. Ill in bed. *What a nerve!*" "Nov. 4th W7RUX heard between 1615 and 1640, signal S9 at times. W6NLZ heard on CW between 1625 and 1640 calling 'CQ', answer on ten" and calling G2BVN. Unfortunately I was not able to call him at this time. W5VY was a good signal most of the afternoon." *A number of the G's have heard W5VY and W7RUX.*

"Nov. 5th. Channel 2 TV resolved between 1250 and 1300 GMT—man playing a violin and woman singing. Multipath made picture very unstable. No sign of the sound."

"The signal came through the previous day but no picture was obtained. I could not listen on six on the afternoon of the 5th much to my regret."

"Nov. 6th. Weak snatches of TV came on 55.25 mc. East coast W's were heard."

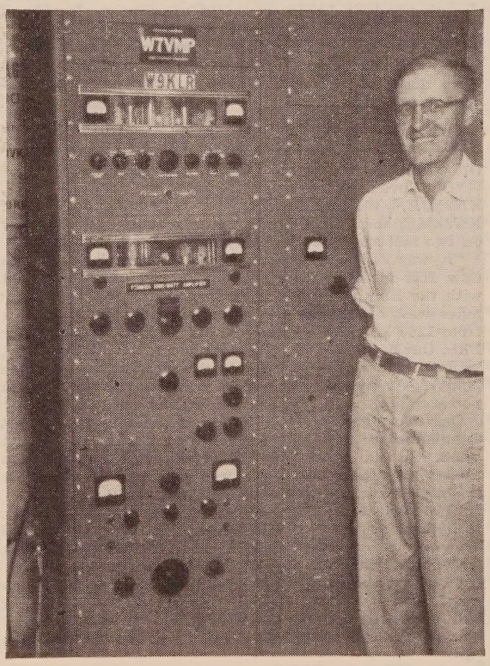
"I am looking for crossband contacts 28/50 mc and also 50/70 mc. I can change to 70.203 mc from 28 mc in a few seconds."

"Incidentally, Russian stations are heard very strongly here between 38 and 40 mc, especially the UA3's (or rather RA3's)." *Very fine report, Brian. We appreciate such a detailed account very much.*

Northumberland, England Another note from one of our English friends, Gordon Spencer, G4LX sez:

"Thought you might like to know that on November 5th, at 1650 GMT I heard K6GDI on six meter phone with nine plus signals calling 'CQ Six'. If he had only tuned ten

That grin means something. Bill Rose, W9KLR just worked his *36th* state on two meters, W5VWU, New Mexico.



meters then we may have made a QSO. *Sorry, Gordon, he was busy trying to be the first WAC on six meters. He made it too!* So far this week I have had cross band QSO's with thirty-three different W stations in W1, 2, 3, 4, 8, 9, Ø and VO1. I have heard but not worked W5, W6, VE1 and VE3. I'll be active on cross band most week-ends and often on week days." *Thanks for the information, Gordon. I'm sure there will be lots of the gang looking for you.*

Fife Scotland A few lines from Scotland and GM3EGW; Fraser;

"Usual operation here is two meters, on which band I run forty-five watts to six over six skeleton slot and crystal controlled. I've had a lot of luck and have twelve countries on that band with a couple of 'firsts'."

"The anticipated high MUF got me thinking and again my luck has held as our results show." *Yep, your thinking has surely paid off Fraser. I imagine you now have many more than three contacts crossband, six and ten meters.*

Pittsburgh, Pennsylvania From Bob Clayton (W3EBH), secretary of 'P6MN we received the following:

"We now have ninety members in the Pittsburgh 6 Meter Net, and we generally process about two members per week. *Where are they all coming from?* Six meters is really growing in the Pittsburgh area."

"We would like to remind all the six meter men, that to get our Pittsburgh six meter net certificate, just work six members of the Net, QSL with each one, then request the certificate from W3HFE, tell him the six members you worked and the dates that you worked them."

"We will be glad to furnish anyone any information on our net that they may desire. We have had many requests for sample material, such as rosters, newspapers, certificates, membership cards, etc. We will try to furnish this information to anyone sincerely interested in starting a VHF net, just request the information from this writer, W3EBH." *Glad to know that your club is doing so well, Bob. Good luck and good dx to all of you.*

Shellburne Falls, Massachusetts Ronny McCloud (W1DPT) sez:

"Just got my Viking 6 n 2 on the air last month and have been having a fine time on six. Heard two California stations yesterday (10/11/57) one of whom was W6NLZ." *See Jack, you are heard in New England.*

"I am interested in starting a 50 mc net with anyone else that might be interested, teen-agers preferably. I would like to hear other teen-agers here in New England, New York, Pennsylvania, and Canada."

"My frequency is 50.025, and am on around 1800 almost every night." *Thanks for the letter, Ronny, hope you get lots of answers.*

Jersey City, New Jersey From a 'Jerseyite', Matty Herman (KN2ZME) we also received a bit of news.

"On November 9th and 10th, 1957, our group, K2RLG, KN2YJE, WN2NKB, K2ZMF, K2VDK and myself KN2ZME, had a field day to try to perk up some activity on two and six meters. That we did."

"It was called operation 'Big Moo'. Our location was Cow Hill in Bernardsville, New Jersey, a line of sight with the Empire State Building, although we were forty miles west of the big city. We worked around the clock from 1200 EST, November 9th until 1600 EST, November 10th. Our occasional sleeping took place in tents and cars, while the thermometer read twenty-five degrees (at one point). At times we even had snow flurries." *Such perseverance!*

Our two meter contacts totaled 162. We used a Gonset Communicator with a linear amplifier to a seven element beam. On six meters we contacted 69 stations with a Gonset Communicator to a three element beam. We are issuing certificates to all stations that QSL."

"Many stations, from distances of forty miles away, took the trouble to attempt to track us. We were found by mobile stations W2FNM, WN2BIK, KN2YZD, KN2YUD, KN2ZWX and K2GLS."

"Everyone enjoyed themselves. The only adverse comment made was that the next time we have 'Big Moo' it will be in the summer months. Burr-rr-r—it was cold." *And I believe you too Matty, but it sure must have been fun.*

Glendale, Kentucky Tom, (W4HJQ) sends us a short one.

"Sure took a bad time to put in a new rig. I missed all the good openings in September, but I now have the Aplex VHF KW-62 on two meters. Receiver—75A-4 with the 'Spectralab' converter, 417A, 6AJ4 and 6AK5. NF near 3 db.

"Still have the old beam, but use RG 14U for feed line, beam, VHF Resonator 96 elements." *Well, at least you're ready for the next time Tom. Good luck with the new rig.*

Albany, Georgia Friend Ben (K4BLA) comes through for us with a bit of news from that southern state.

"The month of September did not give much of a showing down here."

"On the 29th of September from 1928 until 1937EST, I worked K9EEK and W9ROS and heard three other stations but the band closed down at that time. Nothing else for that month."

"W4CCA and I hold a nightly schedule at 2000 EST and most all day Saturday and Sunday when we can find something to talk about. *What ham can't?* Also K4LOZ is just about ready to get on six and W4OAT is building his six meter transmitter, should be on shortly."

"I've been on the air since the 5th of May and to date have worked 104 contacts and have received 84 QSL's. I've worked all call areas except 7 and I hope to have that soon." Have worked 23 states and have all confirmed." *Pretty good going I'd say Ben. When you make that Idaho contact, pass it along to Helen, huh!*

Chippewa Falls, Wisconsin "Willy" Moulton (W9DSP) sends a bit also:

"Just a note to let you know that November 2, 1957, Wisconsin broke the barrier to Europe on 50 mc. I worked G3COJ, G3IUD, G4LX, all crossband ten to six. Then wound up working EI2W in Dublin, Ireland, directly both ways on six meters. One G told me the band had been open for three hours over there previously to working me, so that would put the opening here as early as 6:30 to 7:00 A.M., CST. I didn't get up that early but wouldn't be surprised that maybe the eastern part of the seventh district would have a distinct possibility. *It's been done, Willy. W7RUX made it, and probably many more by the time you read this.* In the P.M. of the same day Alaskan tt's were in here very strong, but no amateur signals were heard, sob. *I know you've done it now Willy, 'cause we heard the KL7 calling you.*

"I suppose this European stuff is old for you fellows out there on the east coast, but to me in western Wisconsin, it was about the biggest thrill since receiving that first ticket in 1939 which said W9DSP on it. All of the above stations said I was their first Wisconsin on 50 mc, so I'm wondering if I really am first W9 in Wisconsin to work Europe on 50 mc. *As far as I know, you're that boy Willy.* Some said they had worked Indiana and Illinois last year but not Wisconsin. I know that KØAKJ in Minnesota worked EI2W following my QSO, so the Dublin lad picked up another state for himself! *What do you wanna bet that Harry gets WAS before we do? The last I heard he had something like nineteen states, since the first of November.* I understand that OH2NW was heard and possibly worked earlier than my QSO, but I'm not sure. Anyway, it was a day to remember."

Incidentally, I run 500 watts to VT127A's (old two meter final with a few modifications) 4 elements, wide-spaced, fifty-five feet high, homebrew crystal converter-75A2." *More power to you Willy, and keep up the good work. Incidentally, we're sick of hearing you on back-scatter too; working all that DX.*

Dallas, Texas Leroy May (W5AJG) shows his penmanship with the following:

"We got a small squirt of F2 on 50 mc yesterday, 11/6/57. Had quite a bit of commercial type stuff from 58 to 50 mc. Worked LA9THA in Norway."

"Report on the meteor showers of weekend of October 18-21st. Had skeds with W4ZXI which resulted in a QSO. Had sked with W2CXY and heard a few isolated pings only. Had sked with W8RMH whom I heard quite well several times but he did not roger my reports and it failed as a QSO. Sked and QSO with W4ZXI gave me

North Carolina for state no 20 and 8 call areas. Boy they sure come hard for me down here, (Two meters) I have to fight for all I get. Without tropo work it is tough going. Maybe I'll work you someday bouncing off of Sputnick." *Never can tell Leroy, we just might make it yet.*

Jackson, Mississippi One of the Jones Boys, Doug to be exact, (K5HDB) comes through for Mississippi.

"I just wanted to let the gang know that there are six six meter stations on here in Jackson. There are W5's IEO, and UTC, K5's KCH, DOZ, ALH and myself HDB. We have just started a net which meets on Tuesdays and Thursdays at 2000 and on Sundays at 1330 CST. The frequency varies, but most of us are on 50.1 mc. W5VPX and K5BMT near Union, Mississippi check in when conditions permit."

"We hope that this will entice some of you to point your beams in this direction *WE DO*, as there is always someone monitoring the band in the evenings and on the weekends. The rigs are mostly home-brewed, ranging from 100 watts and five elements to a few watts and halo's."

"There are various projects in the works such as, higher power, mobile rigs, better antennas, and hotter converters."

"My own rig consists of a modified DX-35 into a halo, thirty feet up. I have a five element beam nearly completed. The receiver is an RME-4350 with an International Crystal converter ahead of it. I have four brand new 417A's I would like to get rid of. If anyone is interested, make me an offer." *F.B., Doug, good luck to you and the Jackson gang.*

Forth Worth Texas Another contribution from the great big state, this time from Bill Bonnell (W5CVW).

"Six meters has been very quiet since September, however the lull has allowed all of the projects for 1957 to be completed. When the openings come, I'll be ready for both two and six meters." *They came Bill, glad you were ready.*

"The new two meter final is now operating beautifully. A 4x250B is giving 77% efficiency on two. It operates three hundred watts on phone and five hundred watts on cw."

"A new Tapetone Converter has been added to the receiving lineup. That National converter is now used on a standby basis."

"Antenna wise, two telrex long-johns are used for 6 and 2, and are 62' and 76' high respectively."

"The transmitter on six is a 4-125A VFO controlled 350 watt job."

"Two meter conditions are always good here, but not so the activity. This is of course the old story. It is no trouble to work up to 225 miles day or night now, as those with the proper equipment have found out. Night after night I work W5KTD over Shreveport way, with nary a soul but us on. Two meters is certainly no longer a short haul band. Maybe someday the gang will discover this!" *Never can tell Bill, they may all come back at once. Then you'll be busy.*

"Want to know how to forecast the good two meter openings? For a slight consideration (417A's?) I'll send anyone my schedule on days away from home. The openings always occur when I'm away. Simple as that." *Works that way for you too, eh, Bill?*

Tarpon Springs, Florida Dick (K4DMB) sends a quickie:

"Six meters opened to VE7 land on November 4th 1145 to 1230. Screamed my head off but no QSO. Heard VE7AQQ and VE7CN. They worked W4RMU and W4CQP here in Florida." *Better luck next time, Dick it opened to VE7 from here on November 2nd.*

Agua Dulce, Texas By golly, another one from the large state, this time from Freddie Gilmore (KN5JRI).

"I would like to get on six meters very soon, as soon as I get the other ticket. The rig here is a Lettine 240 and I would like very much to get some information on putting it on six meters. Have tried other sources but they didn't bring any results. Maybe some of your VHF readers can help me. I am planning a five element beam for an antenna. Want to put it up fifty feet if I can talk the 'big boss' into trading me the TV area for my little twenty-five foot one."

"I am a Junior in high school and 16 years old. I am the only ham in town (pop. 730) but have about talked another prospect into getting a license."

"By the way, I am giving away a new award. "WAD", WORKED AQUA DULCE. It is about 8½ inches by 11 inches mimeographed off. It's one of my hot ideas to tray and get more hams I work to QSL, as you have to confirm the QSO before you can get it." *Thanks for the letter, Freddie, and good luck with your prospect too. The award really sounds like sumpin'.*

Albany, Georgia Another one from Ben (K4BLA) pointing out some differences in dx.

"There wasn't any dx jere in South Georgia for the first five days in October, but on the fifth I heard W4UUF in Pensacola, Florida talking to a W5. On the 7th I made three new states up in your direction. *All right, what were they?* I also heard VE7CN on the 4th of November talking to a W3. Couldn't raise him. Actually I believe that he answered but there was so much interference that I couldn't copy." *Thanks as always Ben. Nice to know what Georgia is hearing.*

Argentina In a very round-a-bout manner we received the following information in a letter from Alfredo (LU3EX):

"At last I worked on six meters CT3AE in the Madeira Islands, on September 19th. Months before I worked him crossband, 6 and 10. The next day I worked him again with fine signals."

"Last month we made many tests for ZS, but negative."

"Yesterday, 7th of October, was a big evening, as I worked with S9 plus signals, Dakarm FF8AP, Louis, for my first African station on the continent. He uses 300 watts and a folded dipole."

"So I need only Europe for WAC."

"Now have twenty-one countries of six for 1956 and 57. We have every evening open to dx between 1800 to 0000 or later. So you can see what a dx band 50 mc is." *Congratulations Alfreda and thanks very much for the information. You'll probably have WAC by this time, but I'll still say good dx.*

Anchorage, Alaska Jack Reich (KL7AUV) remits:

"This is to report that a six meter opening between Alaska and Japan occurred today. The opening lasted almost exactly 45 minutes, and signals were weak to quite strong with fairly heavy QSB. I believe this is possibly the first KL-JA activity to be carried out on 50 mc." *Think you're right Jack.*

"At 2319 GMT, my CQ was answered by JA6JY, who reported my signals as R5 S5-8. His signals were R5 S6-9 with moderate QSB. At 2324 GMT, I was called by JA4HM, and given an R5 S3-7 report. His signals ran R3-4 S3-7 with QSB. A few minutes later, KL7CDS, Ken Wilsey, came on and worked the JA6. He was given a report of R3 S6 by the JA4, but was unable to make direct contact with him. No others showed up on the frequency, and at 0007 GMT, JA6JY was heard in a last and even better call asking me for QTH information, but dropped clear out just at the end of his transmission."

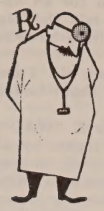
"We have not hit a KL-States opening yet, but now believe our 2115 to 2145 GMT prediction will be late. We plan to look for the States about forty-five minutes earlier, or from 2030 to 2115 GMT. The Japan opening was just 45 minutes earlier than our predictions based on KL-W contacts last year."

"Equipment here is LW-50 transmitter running 10 watts output to a five element Skysweeper Beam. Receiver is an NC100X fed by a home built converter."

"KL7CDS is using a Glove Scout, two element home-made beam, and an International Crystal Converter."

"We regret that our most ardent 50 mc fan, Jack White, KL7AH, happened to be in Chicago at a convention, and missed the fun. We bet he comes back in a hurry." *We've heard you all on Jack, but the East Coast must be the weakest call area getting into KL7 land. Good luck and good dx.*

73, Sam, W1FZJ



ham clinic

by CHARLES J. SCHAUERS, W6QLV
1461 38th Ave., San Francisco 22, Calif.

Although it is too early to judge response to *Ham Clinic,* there is every indication that it will help many amateurs with their technical problems and afford them a channel through which they can obtain badly needed information.

Many of the questions already submitted to the offices of CQ attest to the fact that most hams are interested not only in operating equipment they have built themselves or purchased in the commercial or surplus markets, but are anxious to learn all they can about the technical ramifications envolved. They are not as sometimes pictured, devoid of technical know-how.

Questions to *Ham Clinic* need never be accompanied with apologies for asking them. Every question received is treated as important and necessary. For remember, regardless of the field of endeavor, there isn't a person in the world who knows the answers to all questions or who can solve every one of his own problems without some outside assistance.

Although a rather complete file is maintained of the diagrams of commercial amateur gear it is quite impossible to have every circuit of every piece of equipment ever produced—this is asking too much. But if you are in a hurry for your information, please send the diagram of the equipment you are inquiring about with sufficient return postage; especially if you desire modification information such as the addition of an "S" meter to a receiver or TVI-ing a transmitter, etc.

Be sure to address your query properly. Where extra speed is essential, affix sufficient airmail postage to your self-addressed card or letter. Again, send all queries to the writer in care of CQ at 300 West 43rd St., New York 36, N. Y.

Questions relative to surplus or any other subject fully covered by any other department in CQ should be addressed to that department. They may forward your communication along to *Ham Clinic* and we'll do our best to help you.

Questions

Viking I. E. B. writes from Detroit: "I have a Viking I and I understand that the speech amplifier can be modified to give better audio response and more gain. Is there such a kit and what are the major changes?"

Modification kit B installed in the Viking transmitter will extend the usable low frequency audio range to 250 cycles and will further attenuate high frequency response above 3000 cycles. The change is accomplished by converting V2, the 6AU6 audio driver to a triode, removing the feedback circuit and changing plate and screen resistors of V1, the first audio stage, to higher values. Overall audio gain is slightly higher. The number of the modification kit which may be obtained is 23.1033. However, I am sending you under separate cover a circuit using 12AU7's which works beautifully.

Morrow MB 560-A. L. R. from Chicago sends in this question: "I installed the transmitter in my car and have trouble loading it on 75 meters. I use 52 ohm coaxial cable to the base of the whip which is center loaded. I do not seem to get the dip in final current I should. Any suggestions?"

Yes, first of all you must have a copy of the MB 560-A transmitter manual. If you do not have, one can be obtained for $1.00 from Morrow Radio Mfg., Salem, Oregon. Look on page 18. There, you will see that they recommend utilizing an impedance matching coil (Z connected) at the base of the *resonant* antenna. It consists of 10 turns of #16 wire tapped up from a grounded end 4 or 5 turns; they show the tap going to the bottom of the antenna and the top of the coil going to coax to the transmitter. This coil should be disconnected for 10, 15 or 20 meter operation and perhaps on 40. If this doesn't do the trick, check your grid drive to the final.

TBS-50. This question from A. S. Los Angeles is relative to the old Harvey-Wells TBS-50 transmitter. "I purchased my TBS-50 second hand and have no diagram of it, I've tried to obtain one without luck. Here's my question: in attempting operation on 2 meters I cannot get the final to load. Turning the load condenser does not seem to have any effect. What should I look for?"

The little TBS-50 is still a good transmitter. However, it was not specifically designed for 144 mc operation. The plate efficiency of the 807 in the final is very low because this tube doubles in this band. Further, the plate voltage must be limited to 300 volts when operating on 2 meters. On the TBS-50 terminal strip, connect #1 to #4; #2 to #3; #8, #9 and #11 together; #5, #12 and #13 together and connect

a ½ watt 4700 ohm resistor between #10 and #14 to reduce the voltage. If the APS-50 power supply is used, set the HI-LO switch to LO. A bulb attached to a coil of one or two turns is used to tune up on 2 meters. It should be coupled to the small coil in the 807 and the final plate condenser should be tuned for maximum brilliancy; the load condenser has no effect on tuning. (You will not see any particular dip in the plate current as the plate condenser is tuned.) If you desire to operate on the ends of the band you must adjust L3 and L10 (in the oscillator and buffer amplifier respectively) for maximum grid current to the final. L-3 is directly opposite the 6AQ5 used as the oscillator and L-10 is directly opposite the 6AQ5 used as the buffer-amplifier. Good luck.

AF Amplifier. "I have an af amplifier," writes K. G. from New York "that is supposed to have an output of 6 watts. The manufacturer says it has a gain of 40 db. Can you tell me what the input should be at 6 watts?"

.6 milliwatt or .0006 watt.

Observations of the Day

Radio amateurs as a group do not confine their activities only to helping one another. Their assistance during times of emergency requiring radio communication has been and will continue to be appreciated. However, there are times when an emergency does not exist when amateurs can add to their already established public service record.

In this International Geophysical Year (IGY) it behooves all of us to help our Government's efforts in obtaining the information it seeks in union with scientific agencies throughout the world.

If you possess a good receiver, oscilloscope and tape recorder, you can add your personal observations of radio phenomena or satellite telemetric information to those of hundreds of other interested scientific-minded people. However, you must know what to tune for and how to record the information.

Many of those who tuned to the Sputnik frequencies of 20,005 and "40,002" kc actually did not hear the Russian satellites at all. They were hearing the notes of WWV, the Bureau of Standards station on 20 megacycles or local noise.

Facsimile radio signals or those being emitted from commercial radio teletype stations (when idling) are quite similar to some types of telemeter signals. Listen in around 9650 kilocycles and you will see what is meant. In the late evening hours, stations in the vicinity of this frequency certainly sound like the signals from the Sputniks!

We respectfully suggest to IGY officials that tape recordings be made of signals in which they are interested and sent to certain strategically located radio amateurs with good transmitters who can put the information on the air at scheduled times so that all amateurs can acquaint themselves with the signals they are asked to look for and report on. Too, perhaps tapes could be sent to local broadcast stations to be aired for 30 seconds or so.

Nearly all telemetering transmitters utilize crystal control, so it is wise to use a dependable frequency meter to set your receiver. If you are fortunate enough in having a receiver such as the 75A4, GPR-90, SX-101, HQ-140 etc. you won't have too much trouble finding the proper signal.

Twists and Techniques

A remote control TV tuner that operates from 4 1½ volt flashlight batteries; is a "natural" for remote mobile transmitter tuning or for operating a base band-load coil; is obtainable from Olson Radio Warehouse, 260 S. Forge St., Akron 8, Ohio. It sells for only $4.94 (regular list at $19.95). The small control box may be screwed underneath the dash or another reversing switch substituted. That little dc motor has big torque and works like a charm. Very little modification is required to attach it to a coil shaft or a variable condenser. It is called "IT."

Radar Detector

In my spare time I have been working on a radar speed-trap detector, the antenna of which mounts on the front bumper. The second a signal is received from the transmitter a buzzer sounds in the driver's compartment and the right foot automatically hunts (unerringly) for the brake pedal. So far, we have had only limited success and are wondering if any reader might have a new idea. A broadband detector (usually crystal) is needed along with a broadband amplifier. We are not trying to beat the law—only make sure we don't violate it. Send in your ideas. (*See page 27 . . .* ed)

Questions

This question on TVI comes from V. B., Philadelphia: "I have TVI'd my home built transmitter which uses 807s in the final modulated by a 6146. I live in an apartment house occupied by 16 families and have had no complaints until recently from a new family who just moved in. Having a friend operate my set while I checked the TV set I found out that my transmitter was not at fault. One of the families on the first floor has the same type of TV set and no interference. What is your idea as to what may be wrong?"

You didn't say what type of interference was being experienced nor did you say how your neighbor found out you had a transmitter in the first place. Remember however, that another mal-functioning TV set and even one that is working properly can cause interference too. This is especially true if antennae are close together or both sets are operating from the same antenna or a central antenna system.

Heating pads, electric blankets, old light bulbs, refrigerator motors, defective door bell circuits, poor wiring, etc., to name only a few sources of trouble, should be checked as likely offenders. Suggest that you tell your neighbor to call in an experienced TV man; your power

[*Continued on page 125*]

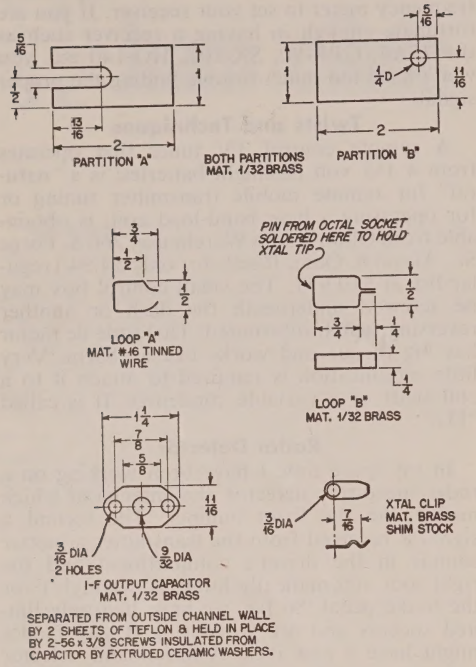


Fig. 4. Details of Filter-Mixer Parts.

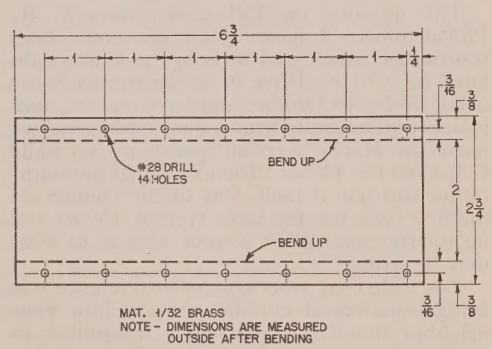


Fig. 5. Filter-Mixer Cover.

An alternate method is to leave the oscillator connected and with no signal input tune L_1 to the point where the oscillator frequency is "Sucked-out", indicated by a sudden decrease in mixer current. The band is then approximately 1½ turns of the input tuning screw out from this point.

The i.f. circuits, L_4, L_6, and L_7 may be tuned to 52 mc using a grid dip meter; the 2.7K loading resistor and i.f. output leads should be disconnected for this operation. These adjustments are quite broad and require no adjustment over the band. The final adjustment is to peak the input screw L_1, on a signal when actually on the air. This adjustment will also be quite broad.

Data obtained in the lab would indicate that excellent performance is to be expected from the converter. The noise figure at 1300 mc using a 1N21E mixer crystal was as low as 7.5 db with 0.45 ma of mixer current. The image ratio was approximately 29 db. Incidentally, it was felt that some image ratio was necessary since we are apparently sharing the 1215 mc band with radar and radar transmitters on or near the image frequency could give difficulty.

If a good L-band noise generator is available, some improvement in performance may be effected by carefully adjusting the coupling between the oscillator tank and the mixer. In one unit, a partial shield or fin 2" long and 9/32" high was soldered across the bottom of the filter-mixer channel halfway between the oscillator resonator pipe and the mixer pickup loop. A ½ db improvement in noise figure was the result.

Radar signals by the galore have been heard with the converter from several locations in New England. There were many evident on the image frequency (1200 mc), but the strongest one heard was on 1298.6 mc. The authors are somewhat concerned about what happens to our mixer crystal when we happen to look one of the big ones straight in the eye. So far the mixer crystals have stood up well, but we do disconnect the antenna when the receiver is not in use.

The authors wish to thank Mr. Tom Potts, W1NRY for his many helpful suggestions concerning the design of this converter. It is our hope that some of the problems in designing a receiver for these frequencies have been brought to light and also that some of the material contained herein will provide the basis for further amateur work on these frequencies. See you on 1215!! ■

4—Taft, W. C. "A low-noise Converter for 50 mc." July 1956 CQ Page 72

rfc 1—50T #26 dsc on ¼" polystyrene rod
rfc 2—6T #26 dsc on 1 meg ½w resistor
rfc 3—16T#20 enameled on 1w resistor
L 1—see fig 4
L 1—see fig 4
L 3—4T #18 tinned ½" long 5/16 i.d. center tapped i.t. link #22 polystyrene
L 4—7T #18 tinned ⅜" i.d. ⅝" long
L 5—40T #28 dsc on ¼" polystyrene rod
L 6—8T #28 dsc on CTC LS6 form Red slug
L 7—13T #28 dsc on CTC LS6 form Red slug — 3T link
L 8—15T #28 dsc on CTC LS6 form Red slug
L 9—11T #26 dsc on CTC LS6 form Brass slug
L 10—9T #26 dsc on CTC LS6 form Brass slug
L 11—3T #18 tinned ⅜" i.d. tapped 1 T up 1 T link #22



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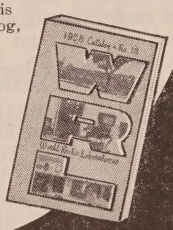
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For further information, check number 25 on page 126.

finding 108 Mc for operation — "MOONLISTEN"

George Bonadio, W2WLR
320 Winslow St.,
Watertown, New York

It's getting more and more embarrassing to say, "No, I can't tune in . . . " or "I haven't tuned in on a man made moon, yet".

I missed the first one. Then I converted the old Gonset 3-30 to ac and pumped it through for triple conversion to 21 mc. There is a thrill to taping it and getting a 5 minute plug on local BC for ham radio. I even heard one ham spiel on the BC band from Canada without the "moon" sound taped—just imitated by mouth

For 108 mc assume one has acquired a conventional FM tuner of some style. It has a poor front end. Its dial is not exact. It drifts. How to find a 108 mc moon?

First search out an old cascode TV booster. It may require repeaking for FM. The old Alliance is used here. Apparently the two 6J6's were not needed, and repeaking made little difference. Several other good boosters are available at TV dealers through old trade-ins. Just be sure it is cascode. Hook it up. If possible, use a turnstile antenna, or the big low frequency antenna.

Find 108 mc.

It's easy. Put a local signal on any frequency which has a harmonic on 108 mc, then reset and remark your dial, after a long warmup. A local oscillator on 54, 36, 27, 21.6, 18, 13.5, 12, 10.8, 9, 6.75, 5.4, or 3.6 mc will put out a usable harmonic on 108. Preferred, of course, is 27 mc. Get on 11 meters, near as you can to 27 mc (or on 80 near 3.6). If you have a 100 kc marker you can then zero to this marker harmonic, if band tuning past the frequency is to be avoided. Tuning near 108 on the FM dial will find the 4th harmonic of 27 mc quite easily.

If you have no 100 kc marker then QSO someone near 27 mc who has. Ask him to zero on 27 himself so that you may zero in on him. This doesn't give you a permanent marker, but should get you within 1 kc at 108 mc where the tuner is over 20 kc wide anyway. If you can't get on 27, to raise a contact, but have your oscillator there, ready, then 'phone a friend who can get on.

Just because you are TV-proofed don't overlook operating from 3.6 mc. The 30th har-

[*Continued on page 107*]

Surplus [*From page 65*]

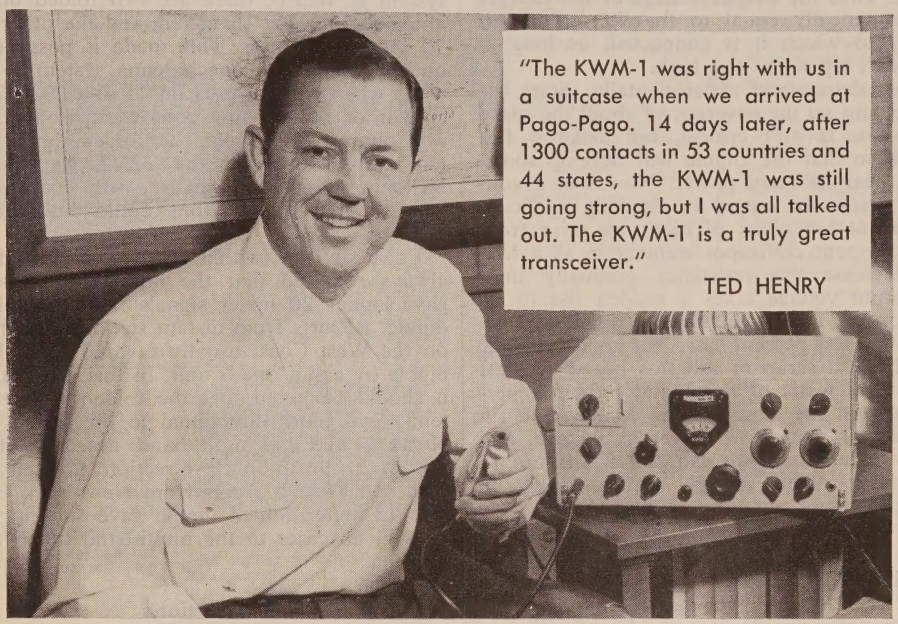
stood by most hams (and surplus dealers too) is the system of designating equipments in the Armed Forces. Several systems are currently employed, but only one is being continued. The modern method sometimes called the AN system follows a standard pattern lets the name of the equipment denote its usage. The ARC-5's are in this category. Officially they are known as the AN/ARC-5 (Some were known under the SCR-274N number). The AN designated it as military and the ARC-5 means *A*ircraft, *R*adio, *C*ommunications, fifth system. Table 1 is a complete breakdown on this nomenclature. Individual subdivisions of equipment are given titles as T-21/ARC for a transmitter and R-28/ARC for a receiver, for specific identifications.

Until the advent of this system the Signal Corps used a serial system such as SCR-522 (Signal Corps Radio model 522), which had basic components such as the BC-624, BC-625 (transmitter and receiver) and control box and a power supply each with their own number. The Navy used two systems simultaneously—one for identification and one for accounting purposes. Both have been supplanted by the AN system. Navy equipment could be identified as to usage by the first letter of the two or three letter identification. T would be indicitive of a transmitter, R for a receiver, D for direction finder and S was used for Radars. The letter "O" was for test equipment and L for frequency measuring or generating equipment. The "M" was applied to special equipments. For Aircraft the letter A was used as a prefix to any of the above.

The second system used by the Navy has caused much confusion. At one time all equipment in the Navy was designated by a two, three or four letter symbol and five digits. The first letter always being "C", and stood for the word *contractor*. The following letters identified the particlar contractor. CUT, for example meant that the United Transformer Company made that particular piece of equipment, while CRC stood for RCA and CG for General Electric. The first two numbers, in the following five digits, identified a particular equipment class such as 46 for a receiver and 30 for an electron tube. The following three numbers were serial numbers, thus several manufacturers may have made an identical part, the identity number would be the same for all but the "C" symbol would be different. Thus CRC 46136 would be an RCA manufactured receiver. To this day the Navy still identifies all manufacturers and contractors by this system.

Next month we will have a general roundup of what equipment is available and the approximate price on the current surplus market. So much mail has been received regarding equipment that this seems like the only way of answering all letters with the minimum delay and perhaps answer your questions before they are asked. 73, Ken, W2HDM

I flew to Samoa with my *Collins* KWM-1



"The KWM-1 was right with us in a suitcase when we arrived at Pago-Pago. 14 days later, after 1300 contacts in 53 countries and 44 states, the KWM-1 was still going strong, but I was all talked out. The KWM-1 is a truly great transceiver."

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For further information, check number 26 on page 126.

Simple [*from page 57*]

this circuit, which is the voltage of the battery being charged. Now connect the generator to a 6-volt battery instead of a 12-volt one. Half voltage will appear across the field circuit, and so half current will flow in the field. And behold! This is just the proper condition to develop half voltage (6 volts) in the armature circuit. Thus the output voltage of the charger is automatically equal to the voltage of the battery to which it is connected, as long as you don't try to go too high.

R_1 is determined experimentally. Start the engine, and set the governor to about the speed you want. It isn't critical, but make it fast enough so that the engine will develop somewhere near its rated power. Now, put a voltmeter across the output of the unit, and connect about ten ohms of nichrome wire from a replacement coffee-pot element in as a trial R_1. Decrease this resistance gradually until the output voltage takes a sudden rise to 30 volts or so. This is the critical resistance; decrease it a few percent more, for good measure, wind it on a scrap of asbestos board (it puts out several watts of heat) and mount it permanently in the circuit. Now connect the rig to your car battery, whatever its voltage, and you will find that you can run from zero to full charge by just a slight adjustment of the engine governor.

Disadvantages

Such simplicity does, of course, involve a couple of drawbacks, but they are minor. First, this rig will overcharge your battery if you let it, so best sink six bits in a battery hydrometer if in doubt. Second, you must be sure the engine is running at all times that the battery is connected to the unit. A stalled generator has a very low resistance, and a heavy reverse current would flow from the battery. However, you can change the polarity of the generator at will by stopping the engine and touching the leads momentarily to the battery, connecting the positive pole to the lead you wish to be positive. Residual field magnetism takes care of the rest; subsequent voltage build-ups in the generator will have the desired polarity.

Use heavy flexible 2-conductor cable for the leads (at least #12), and make the cable about 25 feet long, so you can get the noisy thing a respectable distance from the car when you are operating. If you get ignition noise or generator hash from the unit, treat it as you would in the car itself. Keep a can of gasoline and a little oil near the rig, so you will have everything together if you should need it in a hurry. My generator will run about 11 hours on a gallon when putting out 7 amps at 12 volts, which is the average drain of my rig when making only occasional transmissions. ■

Trap Antennas [*from page 40*]

The resultant standing wave ratio measurements are indicated in Fig. 2. It was not possible to reduce the SWR on the 15 and 10 meter bands below 5:1. The RG-11/U cable showed considerable radiation on the 15 and 10 meter bands and a small amount when the transmitter was operated on 20 meters.

In addition to the above multi-band antenna system at W2PF, there are two folded dipole antennas; one for 15 meters and the other for 20 meter operation. This made it possible to quickly shift from one antenna system to another when making tests on 15 and 20 meters. A pair of B&W balun coils were used in the 300 ohm feeders from the folded dipole antenna to couple to the 32V2 transmitter. Switching was accomplished with coaxial relays so that comparisons could be quickly made.

Local stations (within about 25 mile radius) always reported that the multi-band antenna gave louder 20 meter signals than the folded dipole. Reports from distant stations and those on the West Coast usually favored the folded dipole by about one S unit. In this connection, it should be noted that the folded dipole antenna was more directional to the South and North, while the multi-band antenna which ran in a North-South direction favored the East and West bearings from New York City. The 15 meter folded dipole gave superior results in all cases to the multi-band tuned trap antenna.

Conclusions

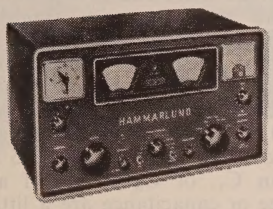
The resonant trap type multi-band antenna, it is felt, will give excellent results on the 80, 40 and 20 meter bands if properly designed and installed. The standing wave ratios are satisfactory only over a small portion of each band as illustrated in Fig. 2. By changing the dimensions of the antenna section from the resonant trap to the end of the antenna, it is possible to make the multi-band antenna resonant over other desired portions of the 80, 40 and 20 meter bands with an SWR in the order of 2:1 or less. For example, the antenna per Fig. 1 on 80 meters has a bandwidth of 150 kc (from 3850 kc to 4000 kc) on the basis of an SWR not exceeding 2:1. On the 40 meter band, its satisfactory SWR portion is about 125 kc wide (from 7100 to 7225 kc); while on 20 meters the SWR is over 2:1 for the 14200 to 14350 kc range.

Therefore, one should not expect to cover the entire portion of each amateur band with the resonant trap multi-band type of antenna system and obtain a low SWR; that is, below 2:1. However, as an automatic tuned antenna, it is quite satisfactory for general communication purposes if the transmitter can withstand a high SWR without damage. ■

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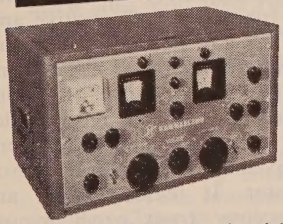


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From Long Island: Via Brooklyn-Battery Tunnel, right on West St. 9 blocks to Vesey St., right 2 blocks to Greenwich St., left ½ block.

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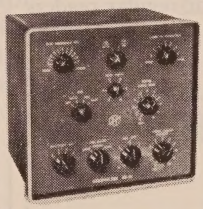
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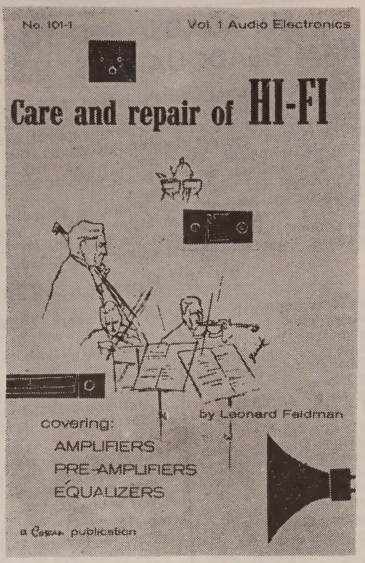
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NOISE CLIPPER [*from page 31*]

connect the choke in series with a .01 mfd condenser across a low impedance variable audio oscillator with an oscillosope connected across the condenser to measure the ac voltage. The audio oscillator was varied in frequency to determine the resonant peak. The "air-gap" was then changed until the resonant peak occurred at about 3000 cps for the .3 henry chokes and at 3500 for the .2 units. Any high resistance ac voltmeter can be used as the peak indicator in these tests. Once the two .2 units for the end sections and the two .3 middle sections are obtained, all that remains is to check a few paper or mica low voltage condensers on a condenser checker to get values somewhere near those shown on the circuit diagram. C_4 should be about 20% higher than C_3 and C_5. C_2 should be about 20 to 25% lower in value than C_1, or C_6 or C_7. If all values of inductance or capacitance are a little high, or a little low, the cut-off frequency will be moved a little, which doesn't seem to be objectionable.

Mounting of Parts

As shown in the photograph, all inductances were mounted on top of a 6x7x2 inch aluminum chassis along with the 6AL5 clipper tube and 12AU7 amplifier tubes. All condensers and other parts were wired underneath to tie point strips. A 2P3T small wafer switch disconnects the filters with an "off" switch dis-"phone" position with only the 3kc filter, and a "CW" position in which both filters are in the circuit. The whole unit can be wired into the SSB, or AM detector plate circuit with the unit's ouput connected to the grid of a power tube in the receiver. If it is connected between the receiver's first audio stage and the output tube, an AF gain control (usually in the receiver) will be needed ahead of the 6AL5 clipper. The bias control on the latter can be set so this tube clips both positive and negative peaks off at any desired point from less than 1 volt up to about 20 volts. This will take care of the normal range of output voltages from nearly any type of receiver detector. The audio gain, bias, and switch controls should be conveniently located for normal use by the operator. If these controls are mounted on a receiver front panel remote from the filter unit, shielded leads to the unit are necessary. The plate current drain from a 100 to 150 volt source will be from 5 to 10 ma and the heater supply will be .6a at 6.3V. The switch could be a DPDT "tone control" type since the 3kc filter will never be switched out except for demonstration purposes. The overall gain is about 20db or a voltage gain of 10 including the noise clipper loss and the losses in the phone filter. ■



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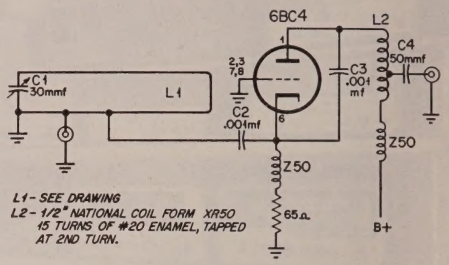
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6M Cavity [*from page 32*]



C 1—30 mmfd suggested
C 2—.001 ceramic
C 3—.001 ceramic
C 4—50 mmfd

Still More NSD [*from page 10*]

Superior, Wisconsin. Anybody else want to pitch in and help?

Our Biggest Selling Point

The recent Sputniks have suddenly brought to the public the revelation that the U.S. is falling rapidly behind the U.S.S.R. in education. Anyone who has been keeping up with the literature on the subject has been aware of this, it has been going on for some time. Why, even during the height of the last war Russia was spending vaste sums on basic research, while we were almost completely engaged in production engineering. The public awareness of the plight of our country can be used to the advantage of amateur radio since this is the most popular of the "science" hobbies. Few indeed are the boys who got into ham radio in high school who did not follow through and go into engineering and eventually into the electronics industry somewhere.

While the Russians are pounding science and engineering into their students we can be letting our children lap it up out of their own driving interest. This again falls in a large part on the local radio clubs . . . for it is from them that the virulent ham bug must spread.

I doubt if there is a high school in the country that wouldn't be tickled pink to turn over an assembly program to a ham club for a talk and demonstration. Many high schools have their own ham clubs . . . most colleges do too. These clubs must take it upon themselves to be super salesmen.

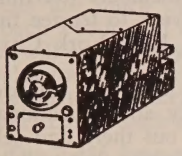
Here in New York we have an ugly situation. When I went to high school here at Erasmus Hall we had over 100 clubs for after school hours entertainment. I belonged to the Radio Club, W2ANU, to the Stamp Club, Photography Club, Book Club, Savoyards, Choral Club, etc. I was busy five afternoons and evenings a week plus weekends . . . and so were most of the other students. Today, if you walk by the school after hours you will see dozens of students sitting around on the steps taunt-

Keep Reading [*more on page 104*]

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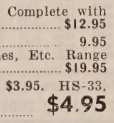
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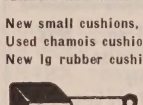
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GP-7 transmitter with all tubes less 803 tubes with 80 meter coil unit only 13.95
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TU-7, 4.5-6.2 MC; **TU-8,** 6.2-7.7 Mc; **TU-9,** 7.7-10 MC; **TU-10,** 10-12.5 MC; **TU-26,** 200500 Kc, choice, used, for BC-375 transmitter, each 2.29
T-30 Throat Mikes, used, 5 for 1.00
3' Mast Sections, MS-49 thru 52, 50¢ each. 53 and above, 75¢ each. Special 1 each MS-49 thru 54, makes 18' vertical 2.95
MN-26C direction finding Equipment
MN-26C Receiver w. dyna 14.95
MN-20E Loop 4.95
MN-52H Az Cont Box 2.95
All above new, special, 1 each for 21.95



Antenna Insulators, Bendix MT-48C, plated end caps, new 15¢ ea., 10 for 1.25
Control Box w/5 Ma S meter, special ... 1.98
SCR-522, exc. condition. Contains Receiver, Transmitter, Modulator, tubes, tunes 100-156 MC, covers 2 m w/o modification 29.50
522 Control Box—BC602 ..... New 4.50
New transmitters, GF-11 for 12 volts, or GF-12 for 24 volts, with tubes and built in modulator—less tuning unit, GF-11 $8.95 ..... GF-12 8.95
BC-223 Xmitter New With all Tuning Units 29.50
Used W/One Tuning Unit 18.95
Right Angle Coax Connectors. Type M-359 and M-359A (83-1AP) ..... .29

TG34 or TG10, 1 Hour Code Tapes

No. 10, No. 13 ..... New, ea. 1.25

2.00 Minimum Order. All prices Subject to Change without Notice. Canada & Mexico minimum 10.00. Cash with Order. Sorry, no COD. California Orders Include 4% tax. Prices FOB Los Angeles.

SAM'S SURPLUS, 1306 Bond St., Los Angeles 15, California

For further information, check number 29 on page 126.



FT-243—From 1005-1995. Steps of 5 KC ea.....$1.99
FT-243—From 2005-2999. Steps of 5 KC ea.....$1.99

NOVICE BAND FT-243 Fund. or DC-34 Freq.....**99c**
80 Met. 3701-3748—Steps of 1 KC. FT-243 or DC-34
40 Met. 7150-7198—Steps of 1 KC. FT-243 only
Dbl. to 40 Met. 3576-3599. Steps of 1 KC. FT-243 or DC-34
15 Met. 5276-5312—Steps of 1 KC. FT-243 or DC-34

Special! FT-243 Prec. Calibrated to 1st Dec.

2 Meters { Exam: *8010.6 x 18=144.190 / Exam: *8010 x 18=144.180
Note—Only 10 KC difference between the above

6 Meters { Exam: *8340.6 x 6=50043.6 / Exam: *8340 x 6=50040
Note—3.6 KC difference between the above

This is a *must* if you want exact freq. on these 2 pop. bands.

Hermetically Sealed for new Gonset.....ea. **$2.50**
Thin-Line FT-243for new Gonset.....ea. **$1.49**
Calibrated FT-243 as exam. above* spec. .....ea. **.99**
Don't take chances with uncalibrated surplus—Be sure of freq.

FT-241 SSB. Matched Pairs.....pr. $1.95
FT-241 Single Side Band low frequency Crystals —
370 KC to 540 KC.....ea. 49c
DC 34/35 from 1690 to 4440 KC.....ea. 75¢
AN/TRC-1 FT-241 holders from 729 to 1040 KC—
1000 KC excluded..... 75¢
FT-241 200 KC or 500 KC.....ea. $1.00
100 KC FT-249 RCA VC-5.....ea. 4.95
160 Meter—FT243 1005 to 1999 KC.....ea. $1.99

1000 KC-DC9-LM-BC 221 Std.....$6.25

Marine & C.A.P.—All Freq. Available
2009—2182—2637 etc. Tol. .005%.....ea. $2.99

OTHER FREQUENCIES AVAILABLE—SEND FOR CATALOG

Include 5c per crystal for postage and insurance. Calif. add 4% Tax. No. C.O.D'S. Prices subject to change. Ind. 2nd choice; substitution may be necessary. **Min. Order $2.50.**

U. S. CRYSTALS, INC.
1342 So. La Brea Ave., Los Angeles 19, Calif.

For further information, check number 30 on page 126.

More, More NSD [*From page 102*]

ing passers by, fighting, necking, and working up all sorts of mischief. A woman acquaintance of mine was attacked three blocks from there last year and beaten severely, just for the fun of it, by a gang of school girls. You see, they have *no* clubs today. The Board of Education won't pay the faculty members overtime pay to stay late one day a week to trustee the clubs. Delinquency here in New York City? Ha. What do you expect?

Ham radio could go a long way toward helping both the delinquency and educational problems. We've got to get out there and sell it, not just to keep our frequencies, but to help keep our counry.

Talked to KG1DT the other night on 20 sideband . . . feller named Chuck up on Fletchers' Ice Island, T3. I understand that 's Heaven, T3.

wayne

Quiz

Did you write the FCC re saving Eleven meters?
Do you have call letter license plates?
If you use 6M have you worked above 51 mc?
If you use 2M have you worked about 146 mc?
Have you used 11M?
Do you belong to a ham club?
Was your local club in the papers last year?
Did you help anyone else get a license last year?
Are you willing to spend time and money to keep our frequencies?

Unusual QSL's

Our QSL contest has brought forth a lot of unusual items . . . QSL's on glass, brass, printed circuit boards, and such, but the strangest so far came from W8UWS, Eddie Robinson of Cleveland. This is a musical score QSL which, when played on the piano, comes out in cw. Dashes are half notes; dots eighth notes. If Eddie QSL's 100% then he must turn out more music than any other composer in the country.

PLEASE, PLEASE, PLEASE tell 'em you saw it in CQ

Puzzler Answers . . . see page 22 for the problems, then come back here for a peek. You really should be able to figure these out without having to cheat. #1: ear phones; balun coils; phone patch; filter choke; chassis punch; circle cutter; soldering gun; toggle switch; power supply; coaxial cable; extension cord; alignment tool; screwdriver set; frequency meter; antenna connector; audio transformer; voltage regulator; variable condensor; crystal oscillator; lightning arrestor; parasitic suppressor. #2. Eight ate. #3. Ten filters, twenty by-passes and seventy micas. Shall we continue this department or shall we fold it up and let your poor tired brain rest? ■

SPEED METER [*from page 27*]

the lower frequencies the effect is less noticable because there is more distance between the crests. But if you observe the S meter as you are moving, you will notice it bob up and down at a sub-audible rate. At two meters the flutter becomes audible, around 30 cycles or so at normal highway speeds. At 2.455 kmc, the crests are much closer together. As you approach a source of cw energy, the receiver output will emit a very musical note, roughly 500 cycles for 70 miles an hour. Furthermore, the receiver to be described uses no automatic control circuity which enhances the effect.

The 2.455 kmc receiver is extremely simple to construct, should you desire to try for radar speedmeter dx, and so forth. I can just see it now. A WAORSMT, worked all Ontario radar speedmeter transmitting certificate. A printed circuit yagi antenna was used to receive a sufficient amount of rf from the radar transmitter. The antenna was mounted atop a small LMB box that contains a radar crystal detector, type 1N21B and a terrific high gain audio amplifier. In this manner, costly and complicated rf circuits have been avoided. Energy received from the antenna is rectified or detected in the 1N21 and filtered by capacitor C1. As stated earlier, the output of the detector, when moving toward the transmitter, is an audio tone. At several thousand feet from the source the reflected power is much too weak to register on the speedmeter, but by using a high gain amplifier in the receiver, the signal from the transmitter may be amplified to a usable level, and fed through your car radio. The amplifier used was a Centralab TA-11 four stage printed circuit transistor amplifier. Under normal reception, the output of the TA-11 is roughly 1 volt. This audio signal is coupled to the second (or power) amplifier in the car radio. When not in the field of a speedmeter, the speaker will emit the normal music, plus a low hiss. As soon as you approach a speedmeter, you will also hear an audio note that varies in pitch with your speed. If it is high in pitch, better slow down ole boy.

The speedmeter receiver can be mounted almost anyplace on the front of the car. It works equally as well behind the grill as it does on the dash board with the antenna pointed toward the windshield. RF goes through glass too, you know! The length of the shielded cable does not seem to be at all critical for it carries only audio information.

Since the receiver draws approximately 4 ma., it may be left on all the time and the battery life will just about equal shelf life. If desired, a voltage divider could be connected across the car battery. Such a divider consists of a 1K, ½ watter resistor and a 120 ohm, ½ watt resistor. This would divide the 12 battery down to the required 1.5 volts. However, make

[*Continued on page 107*]

CONTEST CALENDAR [*from page 58*]

their contest. They have been clamoring for a spot on an already crowded calendar. We finally dug up a spot for them. See the SSB Column this issue and Bob Adams will fill you in on all the details.

Ed. Comments

I have received a few complaints that certificates for the 1956 affair have not been received. Since all certificates were mailed out last July, it is quite evident that they have been lost in transit. Write to me if you're still lacking your "sheepskin" for your 1956 effort. We will fill that empty space on your wall at once.

If you have not already sent in your log for the 1957 W.W. please do so at once, time is running out. Large or small, we want everyone who participated to report their activity. Yours might be the log that will give credit to another's claim.

Somebody lost the caption for the picture in this column on page 57 last month. In case you're wondering what it's all about, that's yours truly presenting the Bill Leonard and Larry LeKashman cups to Mr. S. C. Hyman, the Israel Consul General of New York. Mr. Hyman, thru his office, delivered the trophies to 4X4DK and 4X4BX respectively, Phone and CW winners for the 1956 Contest. Wayne just happened to have his trusty camera with him when we made the presentation.

Trust you all had a very Merry and Happy Holiday season. May 1958 be a very productive DX year for you.

73, Frank, W1WY



Care to step in and see my etched circuit boards?



COLLINS RECEIVER OWNERS

New V-F-O-MATIC Keeps Transmitter Automatically Zeroed to Receiver Frequency!

NEW V-F-O-MATIC... plugs into 75A-2, -3, -4 Collins receivers; requires no rewiring or changes; does not affect calibration, sensitivity or adjustments. Collins precision VFO furnishes RF source for both receiving and transmitting. For all SSB phasing type exciters (10A, 10B, 20A, Phasemaster, Hallicrafter HT-32, etc.) using 9mc mixer frequencies. Automatically zeroes in Xmtr to exact freq. received. Operates both upper and lower SB on 75 and 20 meters. Stability: ± 50 cycles after 1 minute warm-up. Complete with power supply. (Model 80-10 ALL-BAND unit for use with KWS-1 also available.) Immediate delivery.

SATISFACTION GUARANTEED / *Model 8020 $149.50* / *Model 8010 $219.50*

P & H ELECTRONICS, INC.
424 Columbia, Lafayette, Ind.

For further information, check number 33 on page 126.

NOW AVAILABLE...

NEW BOOK ON SINGLE SIDEBAND COMMUNICATIONS



Just released by the Philco Technological Center . . . gives comprehensive coverage of the Concepts of SSB . . . Transmitter and Receiver Theory . . . Transmitter and Receiver Maintenance Techniques.

140 pages—easy to read and easy to understand with 127 illustrations. **Only $3.00** Postage Prepaid

Send check or money order to:

PHILCO TECHNOLOGICAL CENTER
PHILCO TECHREP DIVISION
22nd & Lehigh Avenue, Dept. TC-1
Philadelphia 32, Pa.

For further information, check number 34 on page 126.

BLACK WIDOW [*from page 28*]

ered cover adapts the circuit for carbon, crystal or dynamic microphones.

The Black Widow will operate from any supply capable of delivering 300 volts at 180 to 200 ma. It can also be operated at reduced power output with as low as 200 volt B supplies. In order to save space, the power supply is mounted externally from the transmitter/receiver. Power supplies are available for 6, 12, or 110 volts. One combination power supply manufactured by Rogers will operate from anyone of these sources, making the Black Widow truly universal.

Considering the many features of the Black Widow, it appears to be well worth the selling price of $165. Because of its adaptability, it is a natural for mobile operation, camping trips, field day outings or as a second rig in the ham shack. It can be easily removed from the automobile to do double duty for the ham without a ham shack. Its small size makes it one of the few rigs that will fit under the dash board of the small foreign automobiles without reducing your knees to a battered mass of epidermis.

For more information on the Black Widow, write, wire, or send a runner to the National distributor Arrow Sales, Box 3007, North Hollywood, Calif. ■

The Gift [*from page 41*]

season and everyone was rushed, including the boss of the radio department.

Another month passed and again I contacted Mr. Boss only to discover that agreeing to do a thing and actually doing it were two different things. He had decided to wait until *after* Christmas to put this particular deal through because of the pre-Christmas rush in buying. He decided that an employee couldn't very well object, particularly when he was doing me an extra favor. Far be it from me to say that any objections were heard from me. I just burst into tears on the spot and he would have promised me anything to get me away from the customers' view. These are tactics of which I do not approve, but there are times when they seem to be the only recourse available.

The day before Christmas arrived, still no *Meissner* Signal Shifter. Each department in the store was having its own party, everyone having a wonderful time ,and there I sat, the perpetual droop. Couldn't help it, just no Christmas spirit. About four-thirty in the afternoon the call came from the radio department that my package was there. You couldn't have held me down after that. Party! I was the life of it.

It took just about twenty feet of lugging

[*This story ends on page 108*]

LETTERS [*from page 18*]

material in an early issue.

Now on the other side of the picture—This material does do a very nice job etching crystals. I use it myself. I believe that it can be used quite safely if one is careful. Treat it like any poison. Keep it off the skin as much as possible and wash thoroughly any area that comes in contact with it. I handle the crystals with little wooden sticks or tongs cut from popcicle sticks. The little wire holder shown in the article looks good too.

If one in leading a crystal down a little goes too far, the solder can be removed easily by soaking the crystal in about 50% acetic acid (glacial acetic acid plus an equal volume of water). This will remove the solder quickly and I don't believe it will etch the crystal significantly. Acetic acid is a medium strength acid and it too should be handled carefully. Most drug stores can provide you with 50% acetic acid.

Don't want to have laid a bomb on Mr. Kuehn's very good article. Do hope the ammonium bifluoride is used carefully an no one is hurt. Sodium fluoride, a material in many ways like ammonium fluoride, is found in many rat poisons.

Ashby W. Spratley, Jr. W8TVO
Carbide Chemicals Co.
Nitro, W. Va.

Gentlemen:

I read with interest your article on grinding crystals in the last issue of CQ and would like to send along this information on experience here on the same subject.

In regard to crystals which have been in the etching solution long enough to cause them to quit, I found that grinding restored activity, and they could be ground on up to frequency.

I use nothing but "wet or dry" sandpaper which I obtain in this town from the automotive supply house.

I lay a sheet of it on a flat surface, put a small x with a pencil on one surface of the crystal, so I will not be grinding on two sides (in case of trouble, I know which side to work on), and start rubbing the usual way. To speed things up, I very slightly moisten the paper; and when ready to put in the holder, I wipe the crystal off with a piece of Kleenex or similar product.

No fuss, no muss, no cleaning solution, etc. If necessary due to grease from the fingers, slight soaping and rinse does the trick.

C. E. Hoover, WØKWY
Ames, Iowa

Or build a VFO.

MOON LISTEN [*from page 96*]

monic will be there enough to work a sensitive FM set. Any frequency error here will be magnified 30 times, so care should be taken to overcome this limitation.

If the moons are AM most FM sets will copy them ok by slightly detuning.

There should be a whole series of moons up operating on 108 mc. Some should have a real strong signal strength when within a thousand miles. I taped for BC use Sputnik II when it came no nearer than 4,000 miles. There may even be international QRM on the frequency . . . then they'll up the power . . . an interesting race to follow, firsthand. ■

SPEED METER [*from page 105*]

sure that you have a *positive ground* ignition system or you will ruin the transistor amplifier!

The TA-11 has approximately 73 db gain at 1 kc and is flat to almost 40 kc. These amplifier units are available from your local Centralab distributor or by writing directly to Centralab, 900 East Keefe Street, Milwaukee, Wis. ■

NAVY "HANDY-TALKY" TRANSCEIVER



Two way communication by voice or MCW up to 30 miles. Xtal controlled transmitter 140.58 Mc. Superregen. Receiver. Telescopic Antenna. Press-to-Talk Switch. Overall 15⅛" x 2⅝" diam. BRAND NEW, our low price, less batteries each **$22.50**

BC-929 3" SCOPE INDICATOR COMPLETE

For IFF and Radar Navigation. Complete with all tubes. Used with SCR-729 and AN/APN-2 Equipment. **$12.95**
Excel. Used. .....
As Above, BRAND NEW..... $14.95



LORAN APN/4 OSCILLOSCOPE

Easily converted for use on radio-TV service bench.

Completely Assembled
BRAND NEW!

Supplied with 5" Scope, type 5CP1 only. **$15.95**

SCR-274 COMMAND EQUIPMENT
ALL COMPLETE WITH TUBES

BC-457 TRANSMITTER—4-5.3 Mc. complete with all tubes and crystal. BRAND NEW..... **$7.88**
BC-458 TRANSMITTER—5.3 to 7 Mc. Complete with all tubes and crystal. BRAND NEW..... **$7.88**
BC-459 TRANSMITTER—7-9.1 Mc. complete with all tubes and crystal. BRAND NEW..... **$11.95**
ARC-5/T-19 TRANSMITTER—3 to 4 Mc. BRAND NEW complete with all tubes & crystal..... **$8.88**

110 VOLT AC POWER SUPPLY KIT
For All 274-N and ARC-5 Receivers

Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. Complete kit of parts with metal case, instructions **$7.95**
Factory Wired, tested, ready to operate..... **$11.50**

SPLINED TUNING KNOB for 274-N and ARC-5 RECEIVERS. Fits BC-453, BC-454 and others. Only **49c**

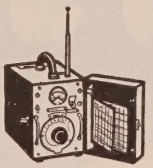
ARC-5/T-23 TRANSMITTER



Limited quantity ARC-5/T23 xmitters.
BRAND NEW, less tubes $7.95
Excellent Used, less tubes $5.95

DYNAMIC HANDMIKE, with "Press-to-talk" Switch, cord and plug—BRAND NEW, only $2.95

DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug. BRAND NEW, special..... $3.95

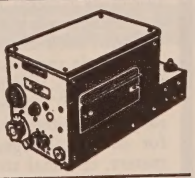


BC-906 FREQ. METER—SPECIAL!

Cavity type, 145 to 235 Mc. BRAND NEW, complete with antenna. Manual incl.

OUR LOW PRICE **$9.99**

234-258 MC RECEIVER
AN/ARR-2



BRAND NEW 11-tube UHF Tunable Receiver with schematic. Only a few at this low price! Complete with tubes **$9.99**

With 28V 1.6A Dynamotor, complete $12.98
110 VOLT AC POWER SUPPLY KIT for above $9.75

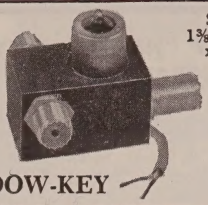
Please include 25% Deposit with order—Balance C.O.D. 50c HANDLING CHARGE on Orders under $5.00 MINIMUM. All Shipments F.O.B. Our Warehouse N.Y.C.

G & G Radio Supply Co.
Telephone: CO 7-4605
53 Vesey St., New York 7, N. Y.

For further information, check number 35 on page 126.

NEW!

SIZE: 1⅜" x 1⅜" x 2¾"



with a performance rating never before possible.

DOW-KEY

ANTENNA SWITCH

MODEL DKC-TR

The DKC-TR features a gain of Zero db at 60 mc to plus 6 db at 3.5 mc. Can be close-coupled to the transmitter for easy, compact installation with a Dow DKF-2 connector. Instantaneous recovery powered from transmitter accessory terminal. Matches 52 & 72 ohm impedance without insertion loss. Handles one KW with ease.

POWER SPECS: B plus 125-150 volts, consumption at 125 volts, 6.2 mils; .450 amps at 6.3 volts; uses 6AH6 tube.

GUARANTEED! Fully backed by factory warranty for unit replacement.

DOUBLE MALE-CONNECTOR (DKF2) for mounting relay directly onto output of transmitter.

See your local electronics dealer or write direct for complete specifications.

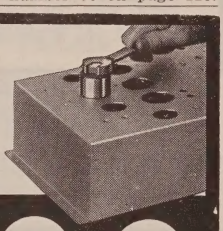


PRICE, $12.50
(price subject to change without notice)

DOW KEY CO., INC.
WARREN, MINNESOTA

For further information, check number 36 on page 126.

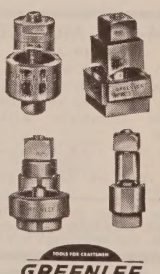
CUT CHASSIS HOLES FAST!





Smooth, accurate openings made in 1½ minutes or less with Greenlee Radio Chassis Punch

Quickly make smooth, accurate holes in metal, bakelite, or hard rubber with a GREENLEE Chassis Punch. Easy to operate . . . simply turn with an ordinary wrench. Round, square, key, and "D" types . . . *wide range of sizes* to make openings for sockets, plugs, controls, meters, terminal strips, transformers, panel lights, etc. Assure perfect fit of parts and professional finish to every job. Write for descriptive literature. Greenlee Tool Co., 2361 Columbia Ave., Rockford, Ill.



GREENLEE

For further information, check number 37 on page 126.

The Gift [*from page 106*]

that thing on the way home though, to slow me down; and by the time I finally did arrive home I was sure that it wasn't worth it. One little thing changed my mind. The look on the O.M.'s face when he opened the package. Never before or since have I given a gift that had such an effect. Everyone should at least once in their lifetime bring someone else's dream to life. It happened to me and it's a wonderful feeling. ■

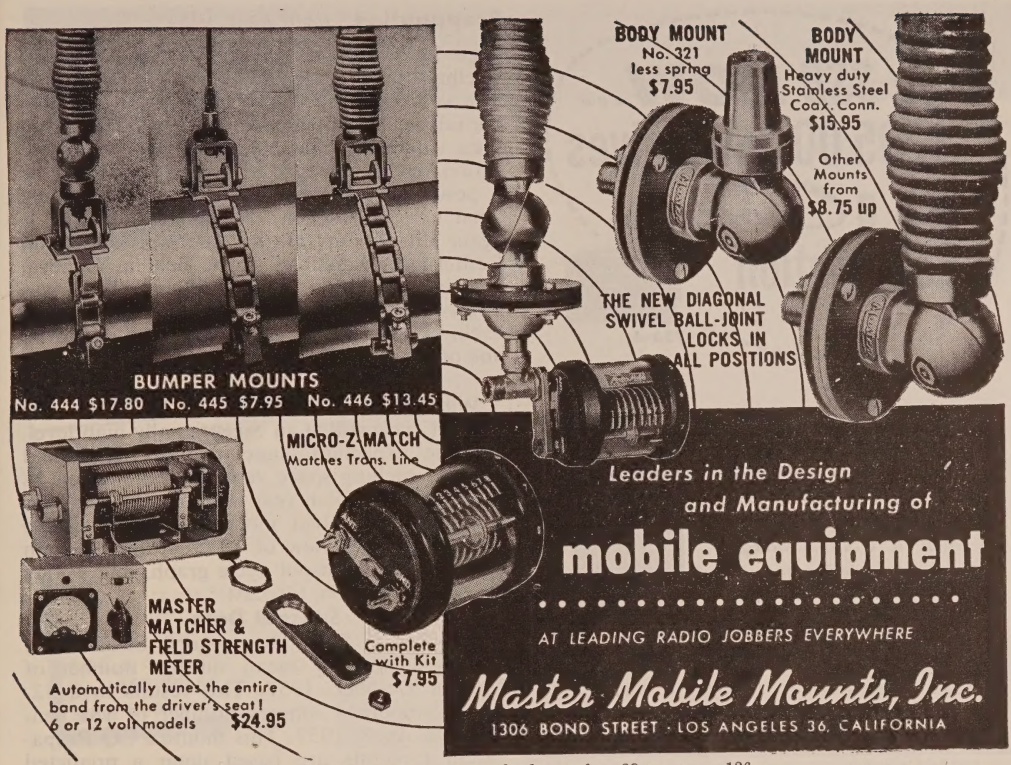
Propagation [*from page 83*]

by man began—the *International Geophysical Year,* Called a "year", it will actually last 18 months, ending on December 31, 1958. During this period there will be an unprecedented cooperative effort on the part of scientists in almost every nation of the world to combine their knowledge, technical skill and enthusiasm in a gigantic attempt to unlock the deeper mysteries surrounding the planet on which we live. The IGY also presents a stimulating challenge to amateur radio—an unparalled opportunity for radio amateurs to contribute towards increasing man's fundamental knowledge of the universe. The response of amateur radio to this challenge during 1957 was most encouraging. Thousands of radio amateurs in this country and abroad are participating actively in several IGY projects (dealing mainly with the ionosphere). During the past year radio amateurs collected much valuable data on the visible aurora, on VHF propagation, on magnetic storms, on man-made ion clouds (Operations Smokepuff), etc. Hundreds of amateurs assisted the IGY effort in another very important way by providing communication channels (in most instances this being the only available means of radio communication) between IGY scientists and technicians stationed in remote areas of the world from the poles to the equator, and their families back home.

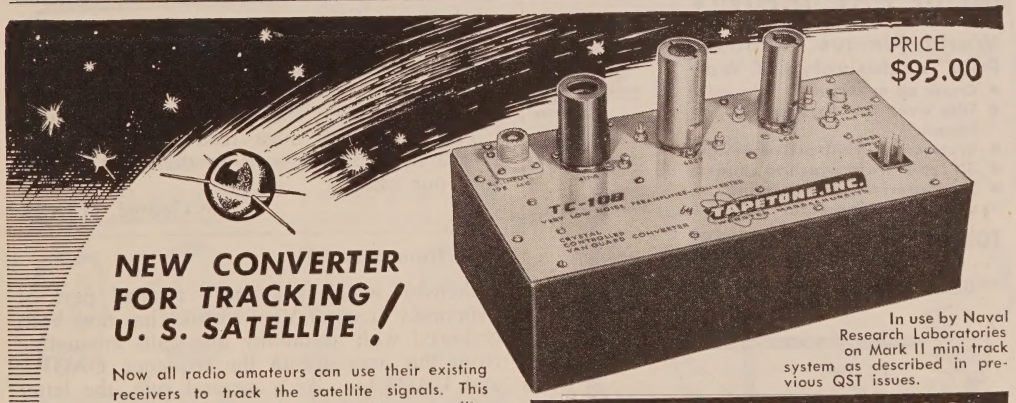
The year 1957 marked the formal beginning of the *space age* when on October 4th the U.S.S.R. successfully launched the first earth satellite, Sputnik. This was followed by a second successful launching of a much larger satellite on November 3rd. With the first announcement of the launchings, radio amateurs throughout the world began to monitor the radio signals transmitted from the satellites on 20.005 and 40.002 megacycles. Many radio amateurs participated in *Project Moonwatch,* in an effort to track the satellites visibly. Radio and visual observations by radio amateurs contributed significantly in tracking the satellites and predicting their orbits, as well as providing much data useful for ionospheric propagation studies.

Record breaking sunspot activity, radio propagation conditions which may occur only

[*Continued on page 110*]



For further information, check number 38 on page 126.



NEW CONVERTER FOR TRACKING U. S. SATELLITE!

Now all radio amateurs can use their existing receivers to track the satellite signals. This newest TC-108 converts the 108.000 mc satellite transmission to 14.4 mc standard output.

In use by Naval Research Laboratories on Mark II mini track system as described in previous QST issues.

VANGUARD, TC-108

- Power Gain: 2000 (33 db).
- Noise Figure: 2.1 db.
- Rejection of Signals at Intermediate Frequency: 90 db.
- Image Frequency Rejection: 65 db.
- Intermediate Frequency output: 14.4 mc.
- Rejection of all other Spurious Responses: greater than 65 db down.
- Matched Input Impedance: 50 ohms.
- Output Impedance: 50 ohms nominal.
- Output Bandwidth: 300 kc at ½ power points.
- Tube Compliment: 417A/5842, 6BQ7A/6BZ7, 6CB6, and 12AT7.
- Power Requirements: (a) 6.3 volts at 1.3 amperes. (b) + 150 volts DC at 60 ma. regulated.
- Dimensions: 9½" x 5" x 2½" shielded base. Maximum seated tube and tube shield height 2¼".

Write for free TAPETONE instruction booklet on how to assemble equipment for tracking U. S. Satellite.

New Regulated Power Supply Model PSR-150 available . . price 49.95

TAPETONE, INC.
10 ARDLOCK PLACE, WEBSTER, MASS.

For further information, check number 39 on page 126.

go SSB NOW...
$295.00 down gives you a Collins SSB station



75A-4

We have it! The complete line of Collins Amateur equipment and accessories . . . and the time payment plan to make it easy for you to own a Collins station! Ask about trade-ins, terms.



KWS-1

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2550 Delaware Ave. DE 9661 — 144 Genesee St. CL 1970

Buffalo, N. Y.

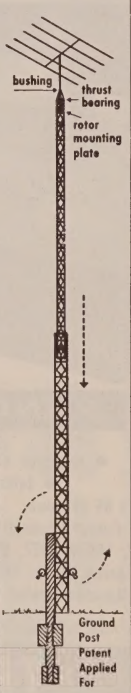
For further information, check number 40 on page 126.

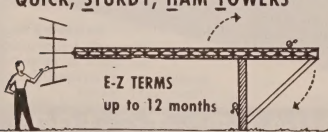
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For further information, check number 41 on page 126.

Propagation [*from page* 108]

once in a lifetime, the IGY, and the earth satellites, have made 1957 a year to remember. The year just ended also gave radio amateurs the unparalled opportunity to prove once again their value as a mass technical and communication reserve. A fact which may prove to be a powerful argument in favor of continuing amateur radio when the radio spectrum is again divided up at the International Radio Conferences scheduled to be held in Geneva, Switzerland during 1959. Certainly 1957 was a *great* year for amateur radio. In looking back, as time passes on, it may turn out to be one of its greatest years.

1958

With the IGY continuing in full force, the sunspot cycle still at an exceptionally high level, and the expectant launchings of bigger and further reaching space vehicles, 1958 looms as another spectacular year scientifically, and for amateur radio. Next month's column will be devoted to a preview of 1958—complete with an up to date sunspot cycle graph, and a long range propagation forecast.

Sunspot Data

The Zurich Solar Observatory, Switzerland, reports a monthly mean sunspot number of 263 for October, 1957. This results in a 12-month smoothed sunspot number of 181 centered on April, 1957. This month's CQ Propagation forecasts are based upon a predicted smoothed sunspot number of 170, centered on January, 1958.

Popularity Contest

It came as a pleasant surprise, and I was most gratified to learn from the results of the recent CQ readers survey that the Propagation Column was the most read feature column in the magazine. I want to thank all of you for your interest.

73, George, W3ASK

DX [*from page* 87]

eschensk) which previously formed part of Primorsky (capital Vladivostok) has now been endowed with autonomy and calls emanating from this area are in the sequence UAØJ— and UAØKJ—. As a general rule, the letter following the numeral (or the letter K) in any UA call-sign denotes the province in which the station is located. The only exceptions are as follows

UA3MA to UA3ML are in Orel province.
UA3MM to UA3MZ are in Yaroslavl province.
UA3VA to UA3VL are in Ivanovo province.
UA3VM to UA3VZ are in Vladimir province.

It will be seen that this table is now practically complete with the exception of Pskov (UA1), Velikye-Luki (UA3), Khabardin (UA6) and Tuva (UAØ) in which there is, as yet, no regu-

[*Continued on page 112*]



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20 M	7000 to 7150 X2	FT-243
15 M	7033 to 7083 X3	FT-243
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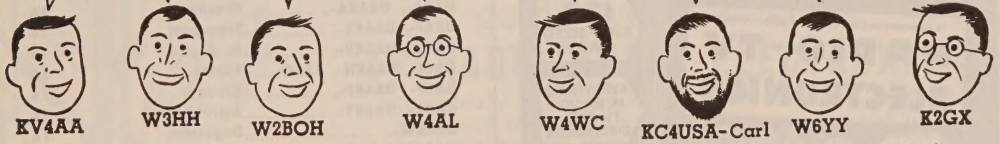
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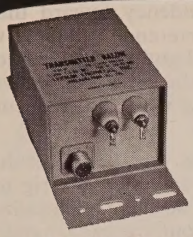
DX [*from page 110*]

lar activity. The initial letter K after the numerical indicates a "klub" station of which there are many in the Soviet Union.

		ZONE
UA1A-, UA1B-, UA1C-, UA1D-, UA1F-, UA1KA-, UA1KB-.	Leningrad.	16
UA1N-, UA1O-, UA1P-, UA1KE-, UA1KF-.	Archangel.	16
UA1Q-, UA1R-, UA1KI-.	Vologda.	16
UA1T-, UA1KM-.	Novgorod.	16
UA1Y-, UA1Z-, UA1KU.	Murmansk.	16
UA2A-, UA2KA-.	Kaliningrad.	15
UA3A-, UA3B-, UA3C-, UA3D-, UA3E-, UA3F-, UA3G-, UA3H-, UA3KA-, UA3KB-, UA3KC-	Moscow.	16
UA31-, UA3J-, UA3KE-.	Kalinen.	16
UA3KF-, UA3L-.	Smolensk.	16
UA3KG-.	Orel.	16
UA3KH-.	Yaroslavl.	16
UA3M-. (note)	Orel/Yaroslavl.	16
UA3N-, UA3KI-.	Kostroma.	16
UA3P-, UA3KK-.	Tula.	16
UA3Q-, UA3KL-.	Voronezh.	16
UA3R-, UA3KM-.	Tambov.	16
UA3S-, UA3KN-.	Ryazan.	16
UA3T-, UA3KO-, UA3KT.	Gorkiy.	16
UA3U-, UA3KQ-.	Ivanovo.	16
UA3V-. (note)	Ivanovo/Vladimir.	16
UA3KS-.	Vladimir.	16
UA3W-, UA3KU-.	Kursk.	16
UA3X-, UA3KW-.	Kaluga.	16
UA3Y-, UA3KY-.	Bryansk.	16
UA4A-, UA4KA-.	Stalingrad.	16
UA4C-, UA4KC-.	Saratov.	16
UA4F-, UA4KE-.	Penza.	16
UA4H,-, UA4I-, UA4KH-.	Kuibyshev.	16
UA4L-, UA4M-, UA4KK-.	Ulyanovsk.	16
UA4N-, UA4KN-.	Kirov.	16
UA4P-, UA4Q-, UA4R-, UA4KP-.	Tatar.	16
UA4S-, UA4KS-.	Mari.	16
UA4U-, UA4KU-.	Mordov.	16
UA4W-, UA4KW-.	Udmurt.	16
YA4Y-, UA4KY-.	Chuvash.	16
UA6A-, UA6KA-,	Krasnodar.	16
UA6F-, UA6KE-.	Stavropol.	16
UA6J-, UA6KV-.	N. Osetin.	16
UA6L-, UA6KN-, A6KO-.	Rostov.	16
UA6P-, UA6KP-.	Grozny.	16
UA6U-, UA6KT-.	Astrakham.	16
UA6KW-.	Dagestan.	16
UA9A-, UA9KA-.	Chelyabinsk.	17
UA9C-, UA9D-, UA9KC-, UA9KD-.	Sverdlovsk.	17
UA9F-, UA9KE-.	Molotov.	17
UA9H-, UA9KH-.	Tomsk.	18
UA9J-, UA9KJ-.	Tyumen.	17
UA9M-, UA9KM-.	Omsk.	17
UA9O-, UA9KO-.	Novosibirsk.	18
UA9Q-, UA9KQ-.	Kurgan.	17
UA9S-, UA9KS-.	Chkalov.	16
UA9V-, UA9KU-.	Kemerovo.	18
UA9W-, UA9KW-.	Bashkir.	16
UA9Y-, UA9KY-.	Altai.	18
UAØA-, UAØB-, UAØC, UAØKA-, UAØKB-, UAØKC-.	Krasnoyarsk. Khabarovsk.	18 19

[*Continued on page 124*]

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For further information, check number 46 on page 126.



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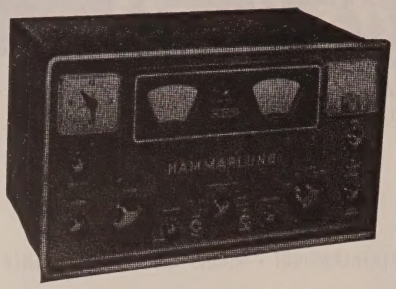
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Neutralization [*from page 53*]

was, however, some tendency toward the development of an interference pattern when C_1 was varied even slightly. One could, in fact, almost neutralize the amplifier by watching the TV screen along with the grid current meter.

After obtaining these gratifying results on the 20 meter band, we switched the rig to 40, 75, and 10 meters. The same neutralization procedure was carried out on each band, and a *different* setting for C_1 was found to produce precise neutralization on each band.

These settings were carefully marked on the front panel of the amplifier, allowing quick return to the proper setting for the band in use.

The operation of this rig over a period of several months was so satisfactory that mention was made of it to a number of other amateurs who were experiencing difficulty with neutralization of similar amplifiers. Such an arrangement has subsequently been used by a number of them with excellent results.

We now decided to build THE amplifier which we had been waiting so long to construct. It consisted of a pair of 4-125-A's in parallel with a band switching grid circuit and a variable inductor pi-network plate tank circuit. In due time this amplifier was finished using the same sort of variable capacitor for C_1, and at a full input of 750 watts I have no difficulty with neutralization. There are no vestiges of TVI anywhere in the neighborhood (so far as we know) or on the writer's TV set, even though this new rig is completely *un*-shielded! At the point of exact neutralization there is no interference even without a low-pass filter or any line filter components on the rig, and also without any line or antenna filtering units on the TV set. It is felt, therefore, that this technique of using a suitable variable capacitor for C_1 is a very satisfactory method for obtaining true neutralization of a high power tetrode amplifier, under operating conditions, on all bands.

The technique of employing a fixed neutralizing condenser and a variable grid by-pass has been used in some applications, but I feel that the apparent advantages of this method deserve increased attention. This isn't a "cure-all" for TVI. Shielding, filtering and by-passing should by no means be treated lightly. Good construction practices will always be a "must." For one thing, a final amplifier constructed in this manner might still pass harmonics generated in preceding stages. Also, failure to shield the ampifier and filter the AC leads will often result in overloading the AC lines with rf of the fundamental frequency, resulting in widespread interference to both radio and TV. Accurate neutralization will, however, be of great help in reducing interference due to harmonic radiation. ■

THE HAM SHOP



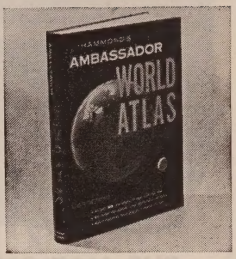
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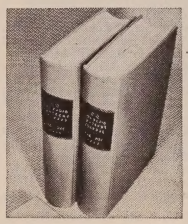


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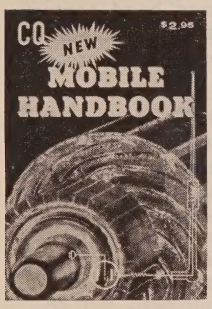
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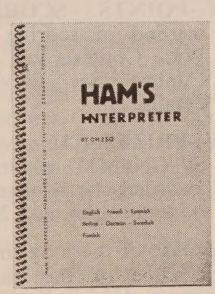
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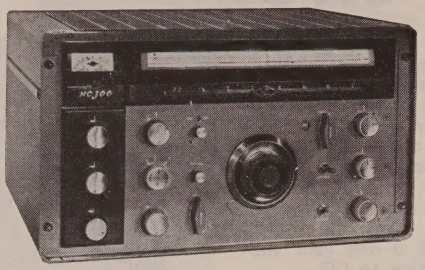
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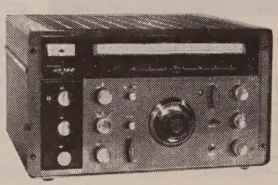
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WESTERN AMATEUR RADIO SUPPLY

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Sideband [*from page 71*]

Among those present were: KØBLP, KØBXJ, WØICW, W9CQN, W9ISG, W9YYM, W9VLR, W9ROQ, K9BTJ, K9BTI, W9ZVT, W9UWL, W9UWL, W9UNB, W9JLJ, W9IOG, K9CNS, W9KEC, W9BSG, W9AOV, W9BTT, K9BRM, K9DUI, W9VQJ, W9EDY, W9HB, W9SKO and W9HLF. We show a photo made by K9CNS taken while many of the fellows were inside yacking on the other sideband. It is planned to hold the affair on an annual basis.

In response to the many requests we have decided to sponsor another SB World-Wide DX Contest. Our first one was a huge success and this one should be much more so with the terrific increase in SB countries and stations now active. The following rules will apply:

I—Contest PERIOD: 1800 GMT, March 15, 1958 to 1800 GMT, March 16, 1958.

II—BANDS: The Contest will be in all Amateur bands with the regular multiplier point system for different band contacts applying. You can contact any station on as many bands as possible and receive credit for the QSO.

III—SERIAL NUMBERS: To qualify as an official contact each station will exchange serial numbers, the first two digits being readability and strength reports and the following digits being the number of the QSO by the station giving the serial, for example; 59001 indicating the first contact made and a Q5-S9 signal report.

IV—POINTS SCORING: The regular method of scoring used in CQ World-Wide Contests will also apply in this SB Contest. See Previous CQ issues for details.

V—PRIZES: The silver "W3SW Cup" won by CN8MM in the first contest will be awarded the winner, and certificates will be sent to the next 24 scorers.

Because of the long time required for CQ to reach some of the more distant countries, we will send details of this contest to various radio clubs through-out the world, and also to many of the active stations in remote places. Operators in the USA, Canada and other near-by countries should have plenty of notice from this issue and in the February CQ we will give detailed instructions for the Contest. Talk it up on the air when in QSO with DXers.

We wish to thank W9HLF, W2OGE, YU1AD, F7AF, F7BN, JA1ANG, and W4IYC for sending us information included in this column.

73, and Happy New Year—Bob, W3SW

CLUB BULLETIN

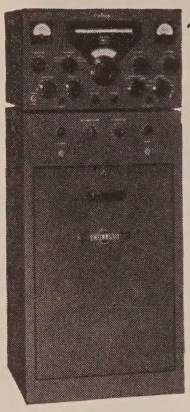
by Marvin D. Lipton, VE3DQX
311 Rosemary Road,
Toronto 10, Ont., Canada

The very first group of editors to request free membership in the news service consisted of: Dave K8BPX, of the Ohio State Traffic Net Bulletin, Judge John Gabbert, of the MONITOR, Riverside County A.R. Ass'n, Warren W1DOR, of the DDD dxer, Blackstone Valley A.R.C., Bob W9LNQ of HAM GAB, Hamfesters R.C., Cliff W9DGA, of TRI STATE SPARKS, Tri State A.R. Soc., and Fred W8IPB, of FEED BACK, Battle Creek Mich. Numerous other requests poured in a few days later and continue to come. As a matter of fact, the news service has appealed to so many club bulletin editors that we are sending them news flashes every month in the form of a multi-page bulletin rather than on the single sheet as initially planned. After reading the vast assortment of articles in the pages of associated club papers, I can honestly say that hams are just as skilled with their pens as they are with their soldering irons.

At the time our news service was getting started the Radio Amateur Mobile Society of Sacramento, California was celebrating its second anniversary. LeVaughn Shipley, K6CFF, edits RAMS NEWS the outstanding publication of this group. The neat little 1 man production with 125 circulation is published once a month and varies in length from 1 to 6 pages. The society president, George K6JNX, and activity chairman Jim K6BJU, contribute monthly columns, but all other articles for the bulletin are received only after a great deal of "arm-twisting". hi. The first copy of RAMS NEWS appeared in March 1956 and from the enthusiasm expressed over this club project by the members it's safe to say that RAMS NEWS will be around for a long time to come. Good luck and continued success to the boys of RAMS NEWS, Sacramento.

If you would like us to tell others about your club paper and if you haven't subscribed yet, just drop us a line and put us on your mailing list. We shall be glad to share the "pooled efforts" of our editors with you. What say?

BUY IT FROM "THACH" WØQV



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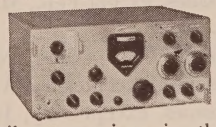
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Phone CE 3-3261

For further information, check number 50 on page 126.

the Collins 75A-4



Designed expressly for Operation on the 7 HF Amateur bands

This outstanding SSB receiver features AVC on SSB and CW, separate detectors for AM and SSB, passband tuning, rejection tuning, Gear Reduction Tuning Knob, superior selectivity and many other time-proven Collins features. **Net Price ----$695.00**

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Winston-Salem, N. C.

For further information, check number 51 on page 126.

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1947—All issues, except Jan., Nov., April, July.
1948—All issues, except Jan., Feb., April, May, June, July, Nov., Dec.
1949—All issues except Feb., June, Aug., Nov.
1950—All issues, except Feb., May, June, Sept., Dec.
1951—All issues, except May, Nov.
1952—All issues, except Jan., Aug.
1953—All issues, except May, July, Dec.
1954—All issues, except Feb.
1955—All issues, except Nov.
1956—All issues, except July.
1957—All issues, except Feb.*

50c per copy

*Gigantic Nov. issue $1.

CQ Magazine

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RADIO LIBRARY FOR THE BLIND

Announcing the SEARC Radio Library for the Blind (SRLB), with loan and personal services for any blind person in the U.S. and Canada. Loan services include: manuscript Braille articles on radio and electronics; complete back file of "The Braille Technical Press"; Readings on tape of books and articles on radio and electronics; and a taped monthly digest of articles from the leading radio magazines. Loans are mailed free to and from the borrower; normally, dual track, 3.75 IPS tapes and Standard English Braille Grade 2 are the media.

Personal services — for which a nominal handling charge is made — include: duplicated reference material in Braille; readings of articles from back issues of "The Braille Technical Press" (source of over 50 different instruments and devices especially designed for the use of blind electronics technicians); taped readings of articles from the leading radio magazines; and a complete listing of known literature on radio and electronics in Braille and on recordings. This listing, as well as a more complete information release on the Library, will be mailed to anyone sending a self-addressed, stamped return envelope to the Librarian.

The Library is sponsored by the South East Amateur Radio Club, Inc., of Cleveland, Ohio, and backed by Tape-Respondents-International, and was designed to augment — not compete with — the services of the present regional lending libraries for the blind. It is *hoped* that the Library will be self-supporting through the slight mailing or handling charge, but donations of cash, new and used tapes, code practice material, etc. is welcomed.

In the near future, a monthly hi-fi digest is envisioned if interest warrants. Tell your blind friends about SRLB and its services, and please include postpaid reply envelopes when writing for more information.

The material aid of Steffan Print Shop (W8RHZ), Minnesota Mining and Mfg. Co., the Cleveland Chapter of the Red Cross, Volunteer Services for the Blind, and amateurs W2IRU, W1DAZ, W3DD, W8ZWX and WØTYX, together with the willing permission of the publishers of "CQ Magazine", "QST", "Popular Electronics" and "Radio and TV News" made this library possible.

All comments, inquiries, donations, and requests in inkprint, Braille, or on tape should be sent to:

Warren Sladky, W8CTZ, Librarian
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As you read this you will find your self getting sleepy. Your eyes are tired, your head is heavy . . . heavy . . . heavy . . . you can hardly stay awake. Your eyes want to close, but you can't make them even though you are tired . . . tired . . . tired . . . tired. No matter how hard you try you can't close your eyes. Just relax and rest . . . rest . . . rest. You have been intending to send for a subscription to CQ for a long . . . long . . . long time . . . you will wake up in a few minutes feeling completely refreshed, alive and eager to get busy doing things. You will have an uncontrollable desire to send in a subscription to CQ. This will be more important than anything else to you. When I count three you will awake feeling wonderful . . . you will not remember having read this paragraph . . . you will not even look back over it . . . you will reach for your check book and send in your subscription to CQ . . . Alright now. One . . . two . . . three! Wake Up!

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- **Ohmite 200 Watt Bleeder Resistors**—Jobber boxed, Specify 2000 Ω, 3000 Ω, or 15,000 Ω, $1.00; 3 for $2.
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- **B&W Distortion Meter—Model 400**—New, $120.00.
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(Continued on next page)

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(Continued)

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- **Shallcross Kilovoltmeter** — 0-5, 10, and 20 Kv. Model 760. Brand new, $37.50.
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10 day guar. price of mdse. only

Write for complete tube list. All shipments F.O.B. Our Warehouse Rated firms (Dun & Brad. current F.3 or better) Net 10 Days.

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TWX: NY 1-3731 Phone: WAlker 5-7000

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Designed expressly for Operation on the 7 HF Amateur bands

This outstanding SSB receiver features AVC on SSB and CW, separate detectors for AM and SSB, passband tuning, rejection tuning, Gear Reduction Tuning Knob, superior selectivity and many other time-proven Collins features. Net Price $695.00

Complete line of Collins equipment and accessories.

EVANS RADIO

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Concord, New Hampshire

For further information, check number 54 on page 126.



TELEWRITER CONVERTER
FOR RECEIVING
RADIO TELETYPE

To receive amateur or commercial teletyped messages by radio, you need the following equipment: (1) Good communications receiver. (2) A TELEWRITER CONVERTER which plugs into the receiver phone jack. (3) A Polar Relay which plugs into the back of the Telewriter Converter. (4) A small 12 volt, 60 ma, d.c. power supply, to operate the selecting magnet(s) in the teleprinter machine. (5) a teleprinter (teletype) machine, which is an electric typewriter controlled by radio signals. (Used teletype machines are available from $75 up.) Telewriter Converter **$89.50.** Polar Relay **$14.75.** For additional information write: Tom, W1AFN.

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Box 19, Boston 1, Mass. *Tel. Richmond 2-0048*

2, 6, 10 — Meter
MOBILE EQUIPMENT

MOTOROLA, R.C.A., G.E., LINK, etc. 30-50 Mc., 152-172 Mc. Used Commercial F.M. Communications Equipment Bought & Sold. Complete two-way sets meeting F.C.C. Licensing Requirements for taxicabs, Police, Fire, etc. **$169.00** and up.

Motorola F.M. Receivers, Double Conversion ..... **$55.00** each

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COMMUNICATIONS ASSOCIATES
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Telephone: AVenue 2-8088

FOR SALE

NC-300 for $100 off dealer's net with or without two and six meter converters. In fb condx plus speaker. R. L. Gibbons, W1REP, 15 Everett St., Canton, Mass.

DX-100, $150; 75-A1, $200. Both good condition. Will not ship. Bill Blum, 316 E. College, Jacksonville, Ill.

XFORMER Input 115v/60v; output 1120v/0.6 amp C.T., 6.3v @ 3A and 0.3 amp; 5v @ 6 and 2 amp, $7.50; 1000, ½, 1, & 2w. Assorted resistors, $8. S. S. Brody, 211-10 73rd Ave., Flushing 64, N. Y.

EIGHT NEW GL813's, $40. Meissner EX signal shifter, $20. Lettine model 240 xmitter, $30. Oscar Sanden, K2VFG, 405 W. 118th St., New York 27, N. Y. RI 9-1435.

FOR SALE: HRO-7 receiver power supply and speaker, excellent condition with all coils including B.C. $225. Marc Glaser, K2GR, 226-07 137th Ave., Laurelton 13, L. I., N. Y.

FOR SALE: Complete station, NC-300 and xtal calibrator; Adventurer and Johnson modulator; key; xtals; week old 550-A switch; "Bay" 40 meter vertical. Goode, W7DJW, 1817 W. Octave, Pasco, Wash.

HEATHKIT AR-3 receiver with cabinet and Heathkit QF-1, $35. Used with the assistance of an AT-1 to WAS and WAC as novice. D. R. Lien, W7ECW, 540 E. Central, Missoula, Mont.

SX-43, $85; TBS-50-C, p.s., VFO, $85; 6v Tri-band, noise lim, sp. mount & 8' whip. $30; new spring mount & 5 band coils, $15; PE-103, $15; AR-2 receiver, $10; VTVM, $15; tube tester, $15; Rollei V w. 35mm, cost $200, only $90; SSB exciter, $60. Ron Rush, W9TGH, 250 S. Ritter, Indianapolis, Ind.

WIRE RECORDER, Webster 288, 11 hrs. receiving wire, microphone, extra take-up drums. Best cash offer. Charles Curran, K2DQD, Box 27, New York 5, N. Y. LO 7-0986.

SALE: Collins 75A4, $585; 32V2, $425; National NC 183D, $215; Morrow receiver MBR-5, $185; xmtr MB-560A, $175; AC power supply for both units RTS-600S, $75; mobile power supply RVP-250 and DM-35, $39; MLV-50 remote control antenna tuner, $18; Master mobile bumper mount and all band coil, $20; Bandmaster Z Match, $59; Millen GDO, $49; Johnson Ranger $195; Pentron tape recorder 9T3-C, $75; Simpson model #479 TV-FM signal generator, $235. 3 mc to UHF channel 83. Want: Measurements Corp. signal generator model 82. Sidney Gogel, W2FUR, 1096 Laux Place, No. Bellmore, L. I., N. Y. Sunset 5-6876.

Unused BC-429 receivers, complete with 6 tubes, mount. Schematic Circuit Diagram, coils for frequency 201-398 and 2500-7700 kc. Shipping weight app. 19 lbs. Send $2.95 money order with order and COD for postal chgs. G. C. Salyers, 112 Neal Ave., Dayton 5, Ohio.

FOR SALE: NC-183 and matching speaker, $175; SX-71 and matching speaker, $165; QF-1 with power supply, $10. Barclay Lee, 412 Akron Ave., Stuart, Fla.

SELL: Hallicrafters SX-99, good cond., $99. Lad Jelen, K8DEW, Route 4, Medina, Ohio

PARTS EQUIPMENT for sale. Meters, transformers, novice crystals, command transmitters and receivers, command racks, lots of parts. Write for list. R. E. Woods, W6KEG, 2164 Parkway Dr., El Monte, Calif.

TRANSMITTER: Latest DX-100 in perfect operating condition, $195. Vincent A. Schauler, W2IML, 3 Exeter St., Morris Plains, N. J.

CRYSTALS, NOVICE or general. Airmailed. On any kilocycle 3500 to 8600 kilocycles. All novice bands including 15 and 2 meters, $1.00. "Crystals since 1933." C-W Crystals, Box 2065, El Monte, Calif.

WANTED

WANTED: ARC-3, ART-13, ARC-1, BC-348, BC-221, BC-610E and other military surplus and commercial aeronautical equipment. You ship COD, we pay freight. Write, wire, phone. JAMES S. SPIVEY INC., 4908 Hampden Lane, Washington, D. C. Phone OLiver 6-8608.

WANTED: Used receivers and transmitters. Will pay cash or trade. 10% down with up to 24 months to pay. In stock new 75A4's, KWS1's, KWM-1 SSB mobile transceiver, Johnson, B & W, National, WRL Products, Hallicrafters, Elmac, Hammarlund, Gonset, Central Electronics, Mosley, Hy-Gain and Gotham Beams. Write for list of bargains in reconditioned receivers and transmitters with new guarantee. Shipped on approval. Write Ken, WØZCN or Glen, WØZKD for your best deal. KEN-ELS RADIO SUPPLY CO.. 428 Central Ave., Ft. Dodge, Iowa.

WANTED: All types receivers, transmitters, test equipment, teletype. Also especially AN/URA-8A converter-comparator, APN-9, APR-9, BC-348, BC-342, BC-610, BC-221, ART-13, ARC-1, ARC-3. Cash or trade for NEW Johnson Thunderbird, Courier, Navigator, Vadiant, Ranger, National, Hallicrafters, Hammarlund, B&W, Telrex, Elmac, Gonset, Fisher H-Fi, Bell, etc. Write Tom, W1AFN, ALLTRONICS-HOWARD CO., Box 19, Boston 1, Mass. Phone Richmond 2-0048. Store: 60 Spring St., Newport, R.I.

CASH PAID for TG-7 and Model 15 Teletype and parts. Also BC-312, BC-342, BC-610E, BC-614, BC-939, BC-221, RA-63, JB-70, JB-60 and APR-4, APR-9, ARN-6, 7 and 14, ARC-3, 21, 27 and TEST EQPT. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., New York 13, N. Y. CAnal 6-7455.

WANTED: BC-610E and up, BC-939, BC-614E and up, RA-63, BC-312 and BC-342 material. We buy all types of Electronic Surplus. RADALAB INC., 87-17 124th St., Richmond Hill 18, N. Y.

WANTED: Radio magazines, 1930 or older. Send list and prices. S. Morss, Route #3, Bradford, Mass.

WANTED: Universal-type modulation transformer, minimum 60w audio rating. State impedance at taps and lowest price. George Griebe, Jr., K8HCZ, 3220 Harrison, Rochester, Mich.

RECEIVERS WANTED: RAL-300kc to 23mc. RAK or other 15kc to 600 kc low-frequency job. BC-348, BC-342, BC-224. Must be good condition and really low priced. Sell: Regency RC600 UHF-TV converter. John Baker, R-9, Box 395, Oakville, Mo.

WANTED: Supreme AF-100 xmitter. Push-to-talk stand for D-104 mike. Sell: NC-173 cheap. E. L. Felder, Tylertown, Miss.

15 METER COIL FOR HRO-7 urgently needed. Steve McGrath, K2VLN, 300 Lucas Ave., Kingston, N. Y.

WANTED: Someone willing to sacrifice HT32 Pacemaker or equivalent SSB exciter. Quote price and condition. H. A. Voorhees, W4CPI, 1015 Wendover Circle, Winston-Salem, N. C.

WANTED: Hallicrafters model S-27 or S-36. Tunes 27-144 mc. State best price first letter. James A. Mose, Box 131, Sharpsburg, Md.

QSL

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSL's—Samples, 10¢. SPA Print, Box 181, Hot Springs, Ark.

DXer's: Reply-paid QSL's get results! 25, $100. Hart, 467 Park, Birmingham, Mich.

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QUALITY QSL's. Samples, 10¢ Lee, W5CZA, Box 7171, Oklahoma City, Oklahoma.

QSL's-SWL's samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSL's. Glossy. Samples 10¢ W1OLU Press, 30 Magoun Ave., Medford, Mass.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢ with catalogue, 25¢.

CREATIVE QSL & SWL CARDS. Are you proud of your card? If not, let us print your next order. Write for booklet and samples. Personal attention given to all requests. Bob Wilkins, Jr., Creative Printing, N6ZMT, P.O. Box 1064-B, Atascadero, Calif.

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QSL SAMPLES. Dime, refundable. Roy Gale, Waterford, Conn.

QSL's, SWL's, VHF's, XYL-OM's. (Sample assortment approx. 9¾¢.) Covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazzy, unparagoned, cards. Rogers KØAAB, 737 Lincoln Ave., St. Paul 5, Minn. Also glamorous, pulsating, super-passionate. (Wow!)

QSL???? LARGEST variety samples, 35¢. (refunded).

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QSL-SWLS. High quality, reasonable, prices, samples. Bob Teachout, WIFSV, 204 Adams St., Rutland, Vt.

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ODELL, ILLINOIS

For further information, check number 55 on page 126.

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(It's mobile operation with the greatest advance in antennas ever made!)

COMING SOON!
the MOSLEY
"TRAP-MOBILE"!

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TRANSFORMERS . . . all have 115v, 60 cy. primaries Scope special; 6.3v/1.8 a; 6.3/0.6; 700 ct/30 ma; 525/5 ma; 2.5/1.75; 6.3/0.6; 2000 and 3500 volts insulation; upright double shell type . . . 5 pounds.....$3.45
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6.3 v/1 amp; HV ins; Thordarson T48850 . . . 3 lbs.....$1.45
120 vct/10 mils; 120 vct/10 mils; HS . . . 1 lb.....3/$2.45

FILTER CHOKES . . . all are potted types 10 hy/500 ma; 100 ohm; 2000 v RMS test . . . 30 lbs.....$6.95
Dual 2.2 hy/550 ma; 27 ohm; 2500 RMS . . . 40 lbs....$6.95
10 hy/150 ma; 160/210 ohm; HS . . . 5 lbs.....$1.69.....2/$2.95
15 hy/100 ma; 240 ohm; 1500 volt . . . 3 lbs....$1.39....2/$2.45

ELECTROLYTIC CAPACITORS . . . all are can type tubulars Special dual 8/450; no mounting.....4 oz.....6/95c
Triple 20/400; octal plug in type.....4 oz.....2/95c
Triple 100/35; clamp mounting incl.....4 oz.....3/95c
Dual 20 mfd/450 volt; 1-hole mounting.....6 oz.....3/95c
80/450; octal plug-in type.....6 oz.....2/95c

CATHODE RAY TUBES 5JP2 . . . $3.45 3BP1 . . . $1.75
5GP1/5BP1XXX . . . $2.45; 3FP7 . . . $1.00 postpaid; 5FP7 . . . $1.19 postpaid . . . 7BP7 . . . $3.95

MISCELLANEOUS . . . all are excellent bargains . . . try some! 456 KC IFs; single air-trimmed ceramic...8 oz.....2/95c
6 pole; 3 position phenolic rotary switch.....3 oz.....4/95c
Ohmite AB; CU-1031 linear; 10 K ohm.....2 oz.....2/$1.19

MORE TRANSFORMERS . . . these have 220 volt primaries Filament; 10 vct/20 amps; primary and secondary taps allow range of 6 to 12 volts.....25 pounds.....$2.95
Plate; 1160 vct/710 mils; open frame.....60 lbs.....$17.45

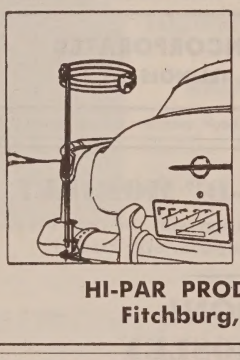
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For further information, check number 56 on page 126.



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If you expect to move, and IF you know your new address now, and IF you don't want to miss any issue of CQ here are three things you can do right now!

1. Tear your name and address label off the wrapper of this issue and paste it in this box right over these words, or make a complete and accurate copy of your old address label.
2. Print your name and NEW post office address in the lines below:

(Name)

(Number and street—or Route)

(City) (Zone) (State)

3. Cut out this whole box and mail it to: CQ Magazine, 300 W. 43 St., New York 36, N. Y.

QSL

ART WORK FOR OUTSTANDING QSL custom drawn to your order. Bigtown quality, hometown prices. Sketches and prices on request. Charles McGinnis, 220 Bissell, Oil City, Pa.

SELL OR SWAP

RADIO MAGAZINES. Buy, sell, trade. Bob Farmer, Plainview, Texas.

TRADE LEICA camera for 20A B&W or Phasemaster, factory wired SSB exciter. Edward Esbrook, W5YMX, 1311 Kabel Drive, New Orleans, La.

LIKE NEW SSB exciter Phasemaster II factory wired. Will trade for 32VI1 or 72A2. Phasemaster P-400-GG same condition, trade for 75A1 or sell for $175. Glen H. Byars, Box 105, Kearney, Nebr.

RADIO EQUIPMENT: Tubes remaining from clean-up. Send 2¢ stamp for list. Want UHF equipment. Bill Storey, 254 Fairgreen Ave., Youngstown, Ohio.

SWAP OR SELL: Pr. of Citizen Band transceivers (no FCC license necessary). Vocal line JRC-400-12 w/mike, cigar lighter plug, carrying case, roof antenna charger, 6v batteries, also operates in 110. Just tested, never used. Want late communications receiver or what-have-you. Call GLenmore 5-5000 or contact I. Gruber, W2MCA, 1388 Myrtle Ave., Brooklyn, N. Y.

COLLINS 30K-1 xmtr in excellent condition. Will accept old, quality violin. Owen Barton, 1609 W. 3rd St., Ft. Wayne, Ind.

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INSTRUCTION: 2 hour, novice, general, technician, advanced, code or theory courses on tape, $6 ea. 1 hour, $3.50. Sample, $1.50. Ridge Recordings Co. Box 15, Parkridge, Ill.

MISCELLANEOUS

OLD OLD TIMERS CLUB. 40 years in Ham Radio. Join this pioneer group. Write Cline, W4PPZ or Dick, W2ABC, Chattanooga, Tenn., for application form and Constitution.

JESUS SAVES: The gift of God is eternal life through Jesus Christ our Lord. Romans 6:23. Request free folder. "Hams for Christ", P.O. Box 218, Holland, Mich.

MEET YOUR Winter-Vacationing friends in Fort Lauderdale, Fla. at Broward Amateur Radio Club's second annual auction. Date: Saturday, Feb. 15th. QTH: 800 N.E. 7th Ave. Doors open 10 a.m. Lunch at noon. Auctioning at 1 p.m.

FLORIDA SKIP: New all Florida non-profit monthly amateur printed publication with pictures and for sale service. Only $1.00 for 12 issues. Andrew C. Clark, W4IYT, Asst. Editor, 41 Lenape Drive, Miami Springs, Fla.

HAVE BRAIN — WILL TRAIN

Young (22) Engineering Draftsman wants position in engineering department of aviation and missile field. Has wife, child, pilot's license, FCC radio operator's license and limitless ambition, equaled only by his professional skill. Reply to Box 22, CQ Magazine, 300 W. 4rd St., New York 36, N. Y.

DX [*from page 112*]

UAØF-, UAØG-, UAØKF-, UAØKG-.	.....	
UAØJ-, UAØKJ-.	Amur.	19
UAØL-, UAØKK-.	Primorsky.	19
UAØO-, UAØP-, UAØKO-.	Buryat-Mongolia.	18
UAØR-, UAØKQ-.	Yakutsk.	19
UAØS-, UAOKS-.	Irkutsk.	18
UAØU-, UAØV-, UAØKU-.	Chita.	18

U.S.S.R. Stations by ZONES:
Zone 15: All UA2, UP2, UQ2, and UR2.

[*Continued on page 125*]

DX [*from page 124*]

Zone 16: All UA1 except Franz Josef Land, Antarctica and Novaya Zemlya. All UA3, UA4, UA6, UB5, UC2, UN1 and UO5. UA9—Bashkir and Chkalov only.
Zone 17: UA1—Novaya Zemlya only. UA9—Chelyabinsk, Sverdlovsk, Molotov, Tyumen, Omsk and Kurgan provinces. All UH8, U18, UJ8, UL7 and UM8.
Zone 18: UA9 — Novosibirsk, Tomsk, Kemerovo and Altai provinces. UAØ—Krasnoyarsk, Buryat-Mongolia, Irkutsk, and Chita.
Zone 19: UAØ—Khabarovsk, Amur, Primorsky, Yakutsk and Northern half of Sakhalin Island.
Zone 21: All UD6, UF6 and UG6.
Zone 23: UAØ—Tuva only.
Zone 25: UAØ — Southern half of Sakhalin Island.
Zone 40: UA1—Franz Josef Land.

HAM CLINIC [*from page 93*]

company or local TVI Committee may be able to help too. Let us know how you make out.

Final Amplifier. G. T. of St. Louise writes: "I have a 10B Central Electronics SSB Exciter and want to drive about 500 watts. I'd like the rig compact and efficient, what tube would you use if you were me?"

Well George, I'd look into the 4X150A. It's a good tube and has a counterpart in RCA's 7034. It will take up to 2000 volts and only requires 1.5 to 2.5 watts driving power. You'd really have to swamp down your 10B output. The 7034 has about 100 watts greater plate dissipation than the 4X150A. EIMAC 4-400s are fine tubes too, a pair will give you up to 2kw P.E.P.

Kit. W. W., Kansas City, wants this information: "I don't like using a soldering iron and want to know where I can get custom wiring of kits such as Heath puts out, done" (sic).

Try Kalab Electronics Co. P. O. Box 8246, Tulsa 15, Oklahoma.

Volkswagon Special

The little transmitter in the Volkswagon works fine. A few of the stations worked include KH6AXH, WØAHH, WØIGZ, W3ERW on 10 meters; K6ESZ, K6BAQ, W6GHX, W6MIY every morning on 75. We are often stopped in our travels by fellow hams owning the little car to find out how we installed the transmitter and KE-93 receiver. We'll have some pictures made soon. It's all in the car fellows!

Thirty

As time goes on we will have many more questions to choose from for general publication and hope to make this column more interesting. Our main purpose, we reiterate, is to help you with some of your problems. So shoot them in!

73, Chuck, W6QLV

110 A.C. POWER "ANY PLACE" WITH THE NEW BENDIX PORTABLE POWER GENERATOR

C. D. Approved

$159.50

SPECIAL TO AMATEURS
FACTORY LIST
$215.00



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Free Freight U.S.A.

LIGHT WEIGHT (ONLY 50 LBS.)

750 WATTS, 2 H.P. Engine

MARCO PRODUCTS CO. Distr.

Foot of Jones St. Fisherman's Wharf
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For further information, check number 57 on page 126.

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Los Angeles 18, Calif.

ATTENTION MOBILEERS

Positive band change in an instant with *Autenna!*

See Page 94, Sept. 1957 CQ

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Western Radio 116
World Radio Labs, Inc. 95

Reader Service

CQ Magazine
300 West 43rd Street
New York 36, New York

Reader Service Coupon M
Void after Jan. 25, 1958

Please send me information on your ads in the January 1958 CQ keyed as follows:

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Address _____

City _____ Zone _____ State _____

"TAB"
THAT'S A BUY

Laboratories Insts—Write for Catalog!

WE BUY! SELL & TRADE!

TPF/540VCT @ 30ma/6.3V @ 2A $2
TPF54/150V @ 30ma/6.3V @ 1A $1.49
TPF55/4.5KV @ 10ma/650VCT @ 275ma/6.4V @ 10A & 5V @ 8A/2.5V @ 3A.....$7 @, 2 for $12
TPF56/900VCT @ 35ma/2x2.5V @ 2A $3
TP57/2500 @ 10ma/2.5V @ 2A $4
TPF58/5850. 5400. 5000VCT @ 40ma/$9 @
TF01/2.5V @ 2A $1 @ TF02/2.5VCT @ 10A/5KV $4
TR400R/2x16V @ 1A ea. $3.45
TF03/2.5VCT @ 10A/12.5KV $7 @, 2/$11
TF04/32V @ 1A/ $3.45
TF09/20V @ 4A/ $2
TF05/7.5VCT/12A/15KV KENYON $9
TF06/2X12V @ 2A/or 24V @ 2A $4
TPHI Isolation 110 to 220 & 440VAC/150W $4

MIL-T-27 TRANSF. Hermetic Sealed
TFMI0/6.3V/1.2A/ $2
TFMI1/5VCT @ 3A/6.3VCT @ 5A.....$5
TFMI2/2x5 @ 3A/&2x5V @ 2A.....$5
TFMI3/2x2.5V@6A at 3KV $5 @, 2 for $9
TFMI4/6.3VCT @ 9A/&2x6.3 @ 1.2A...$6
TP513 up to 1250VCT @ 1000ma has taps Primary .....Special $12; 2 for $20
TP514 Pri/110.220440V—Seed 880VCT @ 735ma G.E./USN Acq $9 @, $9 @ 2/$15
TP515XP Pri/115V-Seed 2000VCT @ 700ma Mil-T/H'sld & Companion Choke 1.8Hy @ 11Ω700ma.....Special $24
TSI2 Autobooster 300W/115 to 132V.....$3
CHOKE 1000 Hys. @ 750 ma.....$3
CHI029 CHOKE 8 Hy @ 750 ma.....$12
CHI030 CHOKE 6 Hy @ 1.25A.....$18
CHI031 CHOKE 0.6 Hy @ 3.2A.....$10
CHI032 CHOKE 10 Hy @ 350 ma.....$5
CHI033 CHOKE 2.5 Hy @ 800 ma.....$7
CHI034 CHOKE 5 Hy @ 500 ma.....$6
CHOKE 8 Hy @ 150 ma.....$2
CHOKE 20 Hy @ 75 ma/$1 @.....
CHOKE UTC/CG40/10Hy @ 200 ma/2KV .....$3 @, 2/$5

Write for Transformer Catalog!

STEVENS ARNOLD PRECISION DC-AC CHOPPER TYPE CH365

SPDT/COIL 26VDC800 Ω. IMP. 60Cys/830 Ω. 400Cys/1100 Ω. Use as Chopper. Reg$20@ SPECIAL ....$2.50@, 5for$10 —

New Variable Voltage X-frms

SUPERIOR-GR-STACO



0-132v-1.25A .....$ 7.23
0-135v/3A 10.63
Cased 0-135V/7.5A 19.55
Uncased/0-135V/7.5A .. 15.30
Cased/0-270V/3A 22.10
Uncased/0-270V/3A 17.00
Cased/0-135V/15A 39.10
Cased/0-270/9A 39.10
Uncased 0-135V@30A 44.10
Uncased 0-270V@12A 44.10
Uncased 0-135V@60A 113.00
Uncased 0-270V@30A 113.00
Uncased 0-270V@60A 189.00

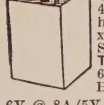
NEW 28VDC RELAY SUPPLIES

Cased Filtered Ready to Work

B24VAR 24VDC at 1 amp Filtered.....$6
B24VER 24VDC at 2 amp Filtered $11
B24VJR 24VDC at 5 amp Filtered $21

WRITE for HI-FI CATALOG

Guaranteed Phono Replacement Needles —Registered 1 Year Gtd. by the Mfr. **Single Diamond $7; Dual Dia. $14.00 Dia/Sapphire $8.00 @ Send Cartridge** Name & Number. Postpaid 48 States



450 MA CHOKE $3 @

W.E. Mfgr. for U.S.N. Rated 4 Hy 450ma/3KV/27 ohms hermetic Sealed & Cased 4¼ x3¼x4¼"x10 Lbs. ±CH1001 SPECIAL $3 @.....

TRANSFORMERS all 115V/60cy/10 PRIMARYS VAC. H'Sealed PWR&FIL/U.S.N.

6V @ 8A/5V @ 3A & 1200VCT @ 200ma. Tapped pri. ..... $6.50 @ 2 for $12
TP502/5500VCT @ G650ma/WST/USN $39
TPF52/773VCT @ 200ma/5V @ 3A, 6.3VCT @ 5A $4 @, 3 for 11, 25 for $70

Selenium & Silicon Rectifiers *manufactured by* TECHNICAL APPARATUS BUILDERS Distributed by "TAB"

***FULL WAVE BRIDGE & †C.T. • DATED & ONE YEAR GTD.**

Single Phase Full Wave Bridge							3-Phase Bridge							
MAX DC AMP	18VAC 14VDC	36VAC 28VDC	54VAC 42VDC	72VAC 56VDC	130VAC 100VDC	226VAC 217VDC	3-Phase 16VAC 20VDC	3-Phase 30VAC 36VDC	3-Phase 120VAC 150VDC	3-Phase 208VAC 256VDC
1 2	$1.50	$2.30	$3.75	$5.30	$8.75	$27.90	$3.75	$4.90	$21.45	$39.75
2 3	2.35	3.35	5.40	6.45	11.70	33.60	4.75	5.95	24.90	47.90
3 4	3.00	4.15	6.30	9.60	13.45	42.90	5.40	6.85	27.60	63.30
4 6	3.70	5.40	7.50	11.30	25.00	49.80	6.75	7.95	31.15	69.75
6 10	4.45	6.85	8.85	12.90	32.85	63.90	7.90	9.30	48.45	81.90
10 12	6.50	8.10	12.60	19.90	37.90	86.35	9.00	11.45	63.60	137.70
12 24	8.10	15.40	22.80	27.90	52.75	117.45	16.25	17.75	124.15	165.75
24 30	16.15	22.40	32.40	44.90	63.60	210.60	18.60	31.70	141.70	279.90
30 36	19.80	37.80	56.45	78.75	120.75	256.15	21.60	34.95	189.60	363.75
36 50	24.90	48.45	72.45	95.70	147.60	326.70	24.75	39.30	225.75	399.60
	33.45	63.75	121.50	135.75	192.75	445.90	31.60	46.75	297.90	591.75

BATTERY CHARGER STACKS*† REPLACEMENT OR CONVERSION. FAN COOLED

Type	CR20R	CR32D†	BR18C*	BR18R*	BN18R*
Input	10VAC/CT	16VAC/CT	18VAC	18VAC	18VAC*
Output	6VDC/100A	6VDC @ 100 Amp & 12VDC @ 50 Amp			6V/80A & 12V/40A
	$14	$20	$24	$26	$20

SELENIUM REPLACEMENTS

Halfwave			Center-Tap		
VAC	AMP	$	VAC	AMP	$
26	2	$1.75	13/26	4	$3.60
26	3	2.00	13/26	6	3.90
26	6	2.90	13/26	12	5.00
26	10	3.95	13/26	18	7.50

"TABTRAN" Rectifier Xfmrs

Sec'd Volts (DUAL†) 0-9-15-18-&-0-9-15-18. Series Sec'ds 0-3-6-9-12-15-18-21-24-27-30-33-36 Volts



TR4001 @ 1 Amp† ea/sec/w $4.95
TR4002 @ 2 Amp† ea/sec/w 7.20
TR4003 @ 5 Amp† ea/sec/w 9.45
TR4005 @ 12 Amp† ea/sec/wnds ... 16.70
TR4006 @ 24 Amp†* ea/sec/wnds ... 35.65
TR4007 @ 50 Amp†* ea/sec/wnds ... 59.65
TR4008 @ 100 Amp†* ea/sec/wnds ... 117.00

†Wndgs in Series at Ratings shown: Parallel 2X Current Voltage output. 0-9-15-18
*Dual Pri 115 & 230VAC/60cys INPUT

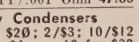
"TABTRAN" Rectifier Chokes

CR6001/ 1 Amp/0.1 HY/1.4 Ohm ...$3.50
CR6002/ 2 Amp/0.1 HY/.67 Ohm.... 5.45
CR6003/ 5 Amp/.07 HY/.6 Ohm..... 9.45
CR6004/12 Amp/.01 HY/.1 Ohm..... 14.75
CR6005/24 Amp/.001 HY/.025 Ohm 29.75
CR6006/50 Amp/.001 HY/.001 Ohm 47.85

New Hi-Capacity Condensers

CE156M 6000MFD 15V. $2@; 2/$3; 10/$12
CE502M 2000MFD 50V. $4 ea., 10 for $30
CE2005M 500MFD @ 200V.....$6 @
CE20025M 2500MFD @ 200V.....$12 @
Brackets for Capacitors @ 25c each

New 5-Way Binding "TEK-AP"® POSTS



Similar to Superior DF30* takes plugs, tips, lugs, wire. 1/16" to 1/4" panels.
BP30*, 30 Amp, 29c @ 12/$3.25.....100/$22
BP10*, 10 Amp, 18c @.....100/$15
BP60*, 60 Amp, 75c @.....50/$30
BP100, 100 Amp, $1 @.....24/$18

Mfrs. write quantity prices & Blue Prints



TUBES

WRITE FOR COMPLETE TUBE LIST

Tubes Wanted	INSPECTED	"TAB" TESTED GUARANTEED
0A2 ..... .70	12SR7 .... .69	6AC7 ..... .79
0A3 ..... .85	15E 1.19	6AG5 ..... .69
0B2 ..... .65	15R .....4/$1	6AG7 ..... .97
0C3 ..... .70	FG17 ..... 3.49	6AK5 ..... .69
0D3 ..... .70	19T8 ..... 1.16	6AL5 ..... .59
0Z4 ..... .60	24G $2	6AQ5 ..... .66
1A7 ..... .90	25A6 ..... 1.19	6AR6 ..... 1.95
1B3 ..... .78	25A7 ..... 2.19	6AS7 ..... 3.49
1L4 ..... .82	25C5 ..... .81	6AT6 ..... .49
		6AU6 ..... .59
1R4 ..... .88	25L6 ..... .72	6V6GT .... .90
1R5 ..... .78	25T 4.00	6X5 ..... .49
1S4 ..... .78	25Z5 ..... .72	
1S5 ..... .68	25Z6 ..... .75	12AT6 .... .59
1T4 ..... .85	26A7 ..... 3.69	12AT7 .... .89
1T5 ..... .95	FG27 ..... 8.29	12AU6 .... .63
1U4 .....6/$1	HV27 ..... 19.39	12AU7 .... .69
1U5 ..... .75	28D7 ..... .89	12AX7 .... .79
1X2 ..... .75	FG33 .....$15	12AY7 .... 1.29
	EL34 ..... 3.49	12B4 ..... .95
2C39A 9.00	35A5 ..... .69	12BA6 .... .65
2C40 ..... 6.00	35L6 ..... .59	12BA7 .... .99
2C43 ..... 7.00	35T 4.49	12BD6 .... .59
2C51 ..... 2.00		12BE6 .... .59
2D21 ..... .68	99I .....5/$1	
2E22 ..... 1.75	1614 ..... 2.00	35Z5 ..... .57
2E24 ..... 2.00	1619 .....5/$1	RK39 ..... 2.99
2E25 ..... 3.25	1620 ..... 2.00	TZ40 ..... 2.00
2E26 ..... 2.75	1625 .....4/$1	43 ..... .75
2E30 ..... 1.70	1626 .....5/$1	45 ..... .49
2E35 ..... 1.60		50L6 ..... .69
2K25 .....13.00	1629 .....4/$1	RK59 ..... 1.39
2K26 .....39.00	2050 ..... 1.25	RK60 ..... 1.17
2K28 .....30.00	5517 ..... 1.25	HY69 ..... 2.20
	5608 ..... 3.95	75 ..... .81
6BH6 ..... .79	5618 ..... 3.25	HY75 ..... 5.00
6BJ6 ..... .72	5651 ..... 1.35	
6BK7 ..... .99	5654 ..... 1.20	83 ..... .95
6BL7 ..... 1.95	5656 ..... 4.25	VR92 .....5/$1
6BN4 ..... .69	5663 ..... 1.15	100TH 6.39
6BN6 ..... 1.08	5670 ..... 1.00	200TL 11.29
6BN7 ..... 1.99		CV148 ..... 5.00
6BQ6 ..... 1.19	5686 ..... 1.75	703A 1.00
6BQ7 ..... .99	5687 ..... 2.25	707B 3.50
6BX7 ..... 1.11	5691 ..... 4.70	715C 10.90
	5725 ..... 1.95	717A .....5/$1
6BY5 ..... 1.19	5726 ..... .69	7232B 8.00
6BZ6 ..... .75	5732 ..... 2.00	725A 2.75
6BZ7 ..... 1.25	5736 .....85.00	801A ..... 5/$1
6C4 ..... .49	5749 ..... 1.95	
6C5 ..... .69	5750 ..... 2.75	803 ..... 2.00
6C6 ..... 1.08	5751 ..... 1.25	804 ..... 8.85
6C8 ..... 1.08		805 ..... 4.75
6C21 .....18.49	250TH 19.45	807 ..... 1.19
6CB6 ..... .80	250TL 19.45	808 ..... .85
	300B 4.90	809 ..... 2.40
6CD6 ..... 1.49	HF300 ....19.45	810 ..... 9.40
6CF6 ..... .85	307A ..... .49	811 ..... 2.50
6CL6 ..... 1.10	316A .....5/$1	812 ..... 3.30
6CS6 ..... .70	350A 2.45	813 ..... 8.00
6CG7 ..... .89		814 ..... 2.35
6CG8 ..... 1.12	350B 1.75	815 ..... 1.85
6CM6 ..... .79	368A 4.59	
6CU6 ..... 1.29	371B ..... .95	826 ..... .50
6D6 ..... .99	434A 1.95	828 ..... 7.50
	446A ..... .69	829B 8.00
6E5 ..... .79	450TH 43.50	832A 6.00
6F4 ..... 2.49	450TL 43.50	833A 36.00
6F5 ..... .63	460 .....11.50	836 ..... 1.20
6F6 ..... .99	701A 3.95	954 .....10/$1
6F7 ..... .99		955 ..... 3/$1
6F8 ..... 1.39	2X2 ..... .48	957 ..... 3/$1
6H6 ..... .59	2V3 ..... .50	958A ..... .50
6J4 ..... 1.72	3A4 ..... .70	959 ..... 1.25
6J5 ..... .59	3A5 ..... .55	
	3C24 ..... 2.50	5814 ..... 1.20
6J6 ..... .59	3E29 ..... 7.00	5879 ..... 1.20
6J7 ..... .99	3D23 ..... 4.00	6B8 ..... 1.35
6J8 ..... 1.39	3Q4 ..... .68	6BA6 ..... .59
6K6 ..... .59	3Q5 ..... .86	6BE6 ..... .59
6K7 ..... .79		6BG6 ..... 1.49
6K8 ..... .99	4-65 .....15.00	
6L6 ..... 1.19	4-125 .....30.00	12BH6 .... .79
6SN7 ..... .72	4-250 .....34.00	12BH7 .... .99
6T8 ..... .98	4X150 ....18.00	12BY7 .... 1.00
	4X250 ....36.00	12BZ7 .... .99
12J8 ..... 1.35	4X500 ....37.00	12H6 ..... .75
12K8 ..... .89	5R4 ..... 1.00	12J5 ..... .69
12SA7 ..... .69	5T4 ..... 1.25	12J7 ..... .69
12SC7 ..... .89	5U4 ..... .59	203A 2.35
12SF5 ..... .69	5V4 ..... .89	
12SG7 ..... .89	5Y3 ..... .65	3API 2.50
12SH7 ..... .89	5Z3 ..... .89	3BPI 1.90
12SJ7 ..... .75	5Z4 ..... 1.00	5API 2.95
		5BPI 1.49
CV148 .... 5.00	6A7 ..... 1.00	5BP4 ..... 3.25
12SK7 ..... .75	6A8 ..... .99	5CPI 1.95
12SL7 ..... .79	6AB4 ..... .59	5CP7 ..... 5.00
12SN7 ..... .69		
12SQ7 ..... .69		

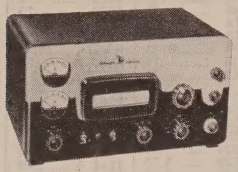
"TAB" TERMS: Money Back Gtd. $2 min. order F.O.B. N.Y.C. Add Shpg. charges or for C.O.D. 25% Dep. Tubes Gtd. via R-Exp. only. Prices shown are subject to change.

111CA Liberty St., N.Y. 6, N.Y., REctor 2-6245

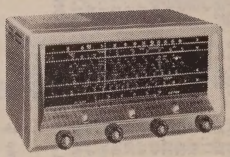
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ALLIED has it IN STOCK—*FIRST!*

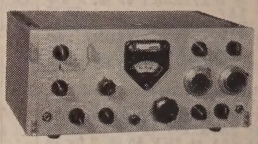
here's what's new:



Johnson Thunderbolt
2000 Watt P.E.P. Amplifier
$589.50 (wired). **$524.50** (kit)



Hallicrafters S-38E
All-Band Receiver
$54.95



Collins KWM-1
Mobile or Fixed Transceiver
$770.00



Gonset Communicator III
Complete VHF Station
$269.50



Vocaline AT-30
VHF Transceiver
$90.16

and:

Johnson Courier
500 Watt Amplifier
$289.50 (wired).
$244.50 (kit)

Transcon Conv/Xmitter
6 or 10 meters; 6 or 12 volts
$99.50

Lakeshore Phasemaster IIB
$459.00



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For further information, check number 59 on page 126.