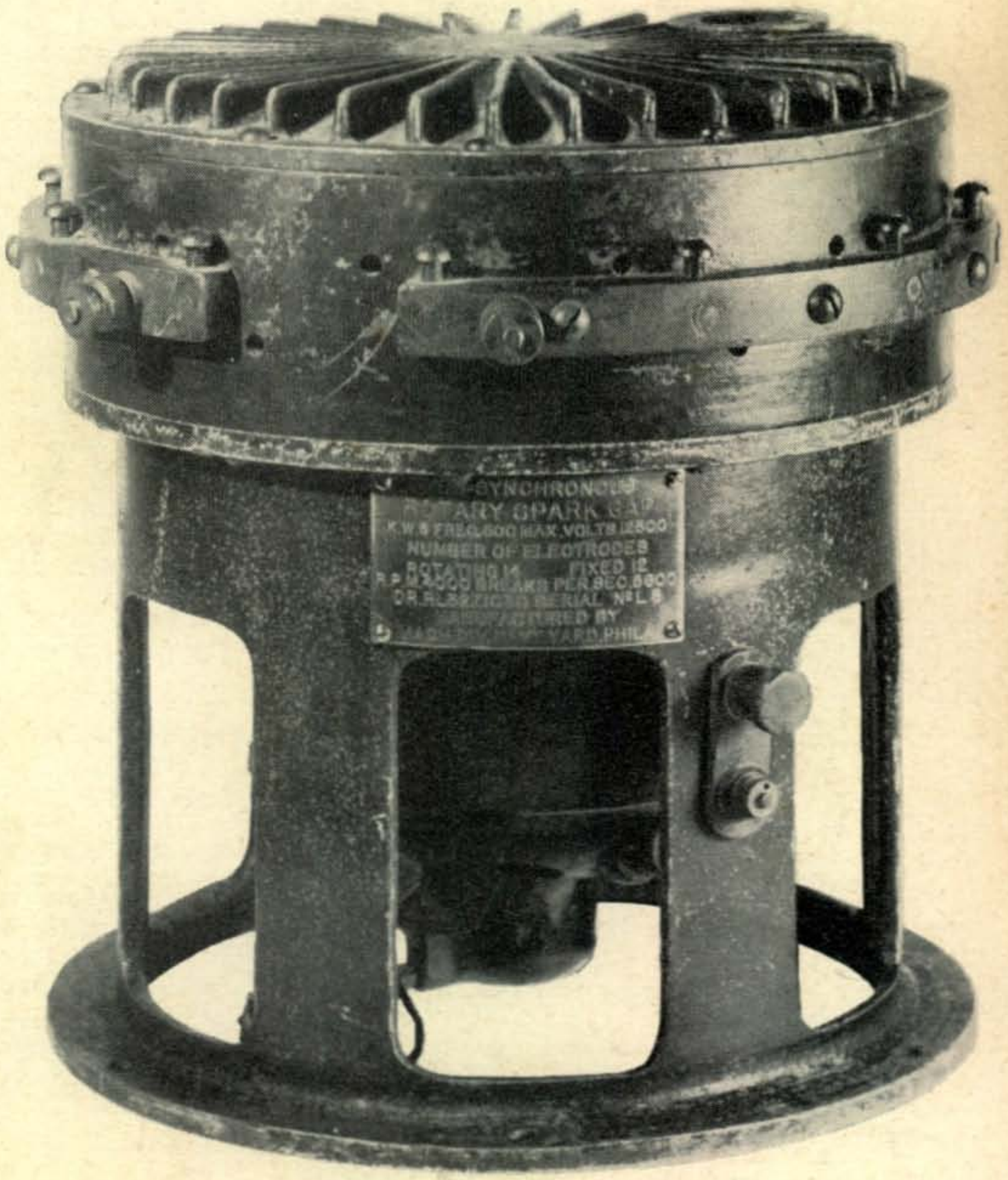
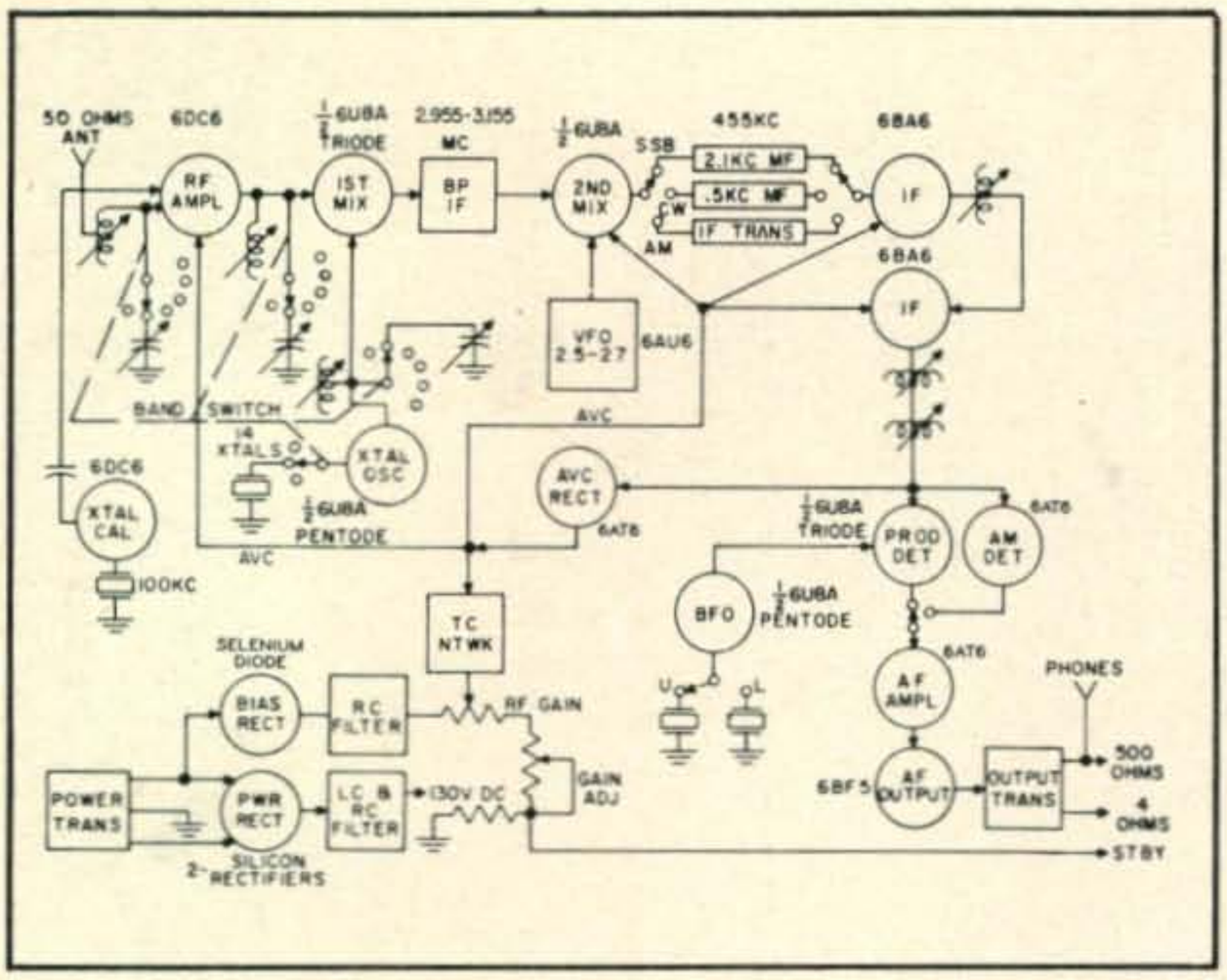
CQ

February 1959
50¢

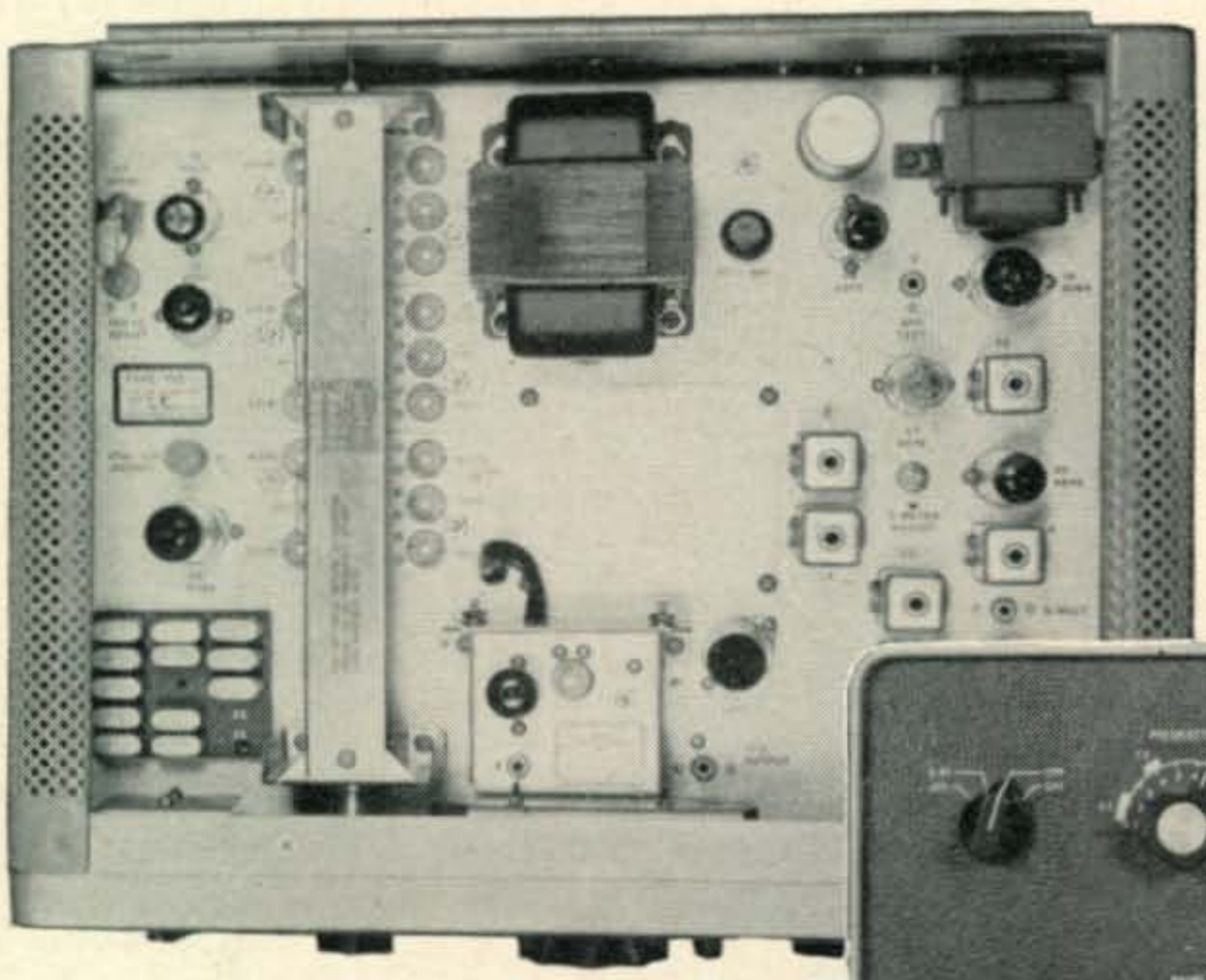


The Radio Amateur's Journal



Units of the new S/Line (First of a Series)

Circuits include new design low noise mixers for improved S/N ratio, HF crystal oscillator and low frequency VFO for maximum frequency stability, and Mechanical Filters for optimum selectivity.



Major components are arranged in an orderly manner with attention given to heat dissipation, a major requirement for high reliability. Note the pleasing appearance and simplified front panel arrangement.

Collins 75S-1 Receiver

Surpassing in Performance . . . Simplified in Operation

New criteria of performance, compactness and operational simplicity have been achieved in the new Collins S/Line Receiver — the 75S-1. The highly accurate linear dial, coupled with extremely stable circuits, provides maximum ease in tuning in the frequency you want for keeping a sked or checking into a net. A bonus feature of the S/Line enables the 75S-1 to control the frequency of its companion 32S-1 Transmitter, putting the transmitter right on the received signal frequency without zero beating.

Other new highlights of the 75S-1 design include AVC with a very flat characteristic for optimum SSB performance; 150 volts on vacuum tube plates for reduced heat dissipation and increased reliability; silicon power rectifiers; control of three degrees of selectivity — 2.1 or optional 0.5 kc with Mechanical Filters, or 4.0 kc conventional IF transformers for AM.

Time-proven features of its Collins predecessors incorporated in the new receiver include dual conversion with a crystal controlled first injection oscillator; bandpass first IF; RF amplifier with low cross modulation products; stable, permeability-tuned VFO, product detector for SSB, and diode detector for AM.

The 75S-1 offers reception of SSB, CW or AM signals on all amateur bands between 3.5 and 29.7 mc, with coverage of any frequency in the 3.5 to 30 mc range, except 5.0 to 6.5 mc, possible by substituting crystals.

See the 75S-1 and other units of the S/Line — 32S-1 Transmitter, 30S-1 1 kw (Average Plate Input) Linear Amplifier and accessories — on display by your Collins distributor.

COLLINS

For further information, check number 1 on page 126.

There's a PR for every Service!

AMATEUR

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

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

20 Meters, PR Type Z-3

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

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

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

$4.95 Net

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

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

$6.95 Net

SPECIAL TYPES

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

Type Z-1, AIRCRAFT

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

Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range.

Calibrated to .005%. 1600 to 10000 Kc. $3.45 Net

Type Z-6A FREQUENCY STANDARD

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

100 Kc. . . . . $6.95 Net

PR PRINTED OSCILLATOR KIT

Has many uses—

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

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

Each . . . . . $4.50 Net

Type 2XP

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

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

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

VHF Type Z-9R, Aircraft

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

Each . . . . . $4.95 Net

Type Z-9A RADIO CONTROLLED OBJECTS

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

Type Z-1 TV Marker Crystals

Channels 2 through 13 . . . . . $6.45 Net

3100 Kc. . $2.95 Net

4100 Kc. . $2.95 Net

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

5.0 Mc. Sig. Generator, .01% 2.95 Net

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

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

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

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

CQ CERTIFICATES:

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

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

TECHNICAL INFORMATION:

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

DISCLAIMER:

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

<For further information, check number 4 on page 126.

CQ—The Radio Amateur's Journal

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HEATH *hams work to bring you*


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SENIOR HAM ENGINEER
HEATH COMPANY

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!

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 50 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. 19 lbs.

HEATHKIT "APACHE" HAM TRANSMITTER KIT

- Newly Designed VFO—Provision For S.S.B. Adapter
- Modern Styling—Rotating Slide Rule Dial

MODEL TX-1 **$229.50**

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

Fresh out of the Heath Company laboratories, the brand-new "Apache" model TX-1 Ham Transmitter features modern styling and is designed as a handsome companion to the also-new Heathkit "Mohawk" receiver. The "Apache" is a high quality transmitter operating with 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, the "Apache" features built-in switch selected circuitry providing for single-sideband transmission through the use of a plug-in external single-sideband adapter. These Heathkit adapters will be available in the near future. A compact, stable and completely redesigned VFO provides low drift frequency control necessary for single-sideband transmission. An easy-to-read slide rule type illuminated rotating VFO dial with vernier tuning provides ample bandspread and precise frequency setting. Simple band-switching control allows flip-of-the-wrist selection of the amateur bands on 80, 40, 20, 15 and 10 meters (11 M with crystal control). The "Apache" features adjustable low level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL-34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation. The final amplifier is completely enclosed in a perforated aluminum shielding for greater TVI protection and transmitter stability. Cabinet comes completely preassembled with top hatch for convenient access without taking chassis out of cabinet. Die-cast aluminum knobs and front panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. Incorporates all the refinements necessary with many "plus" features for effective and dependable communications. Shpg. Wt. 115 lbs.

...top quality at lowest prices!

HEATHKIT "MOHAWK" HAM RECEIVER KIT

- All Critical Circuits Prewired and Aligned
- Crystal Controlled Oscillators for Drift-Free Reception

MODEL RX-1 **$274.95**

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

Outstanding results can be expected with the new "Mohawk" receiver which is designed to combine all the necessary functions required in a high quality communications receiver. A perfect companion for the Heathkit "Apache" transmitter, the "Mohawk" features the same wide-band slide rule type vernier tuning and covers all of the amateur bands from 160 through 10 meters on seven bands with an extra band calibrated to cover 6 and 2 meters using a converter. External receiver powered, accommodations are available for these converters which will be available in Heathkits soon. The "Mohawk" is specially designed for single-sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled, wired and aligned front end assures ease of assembly. All critical wiring is done for you insuring top performance. This 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc. Five selectivity positions from 5 kc to 500 CPS. A bridged T-notch filter is employed for maximum heterodyne rejection. Complete accuracy is obtained with the use of a built-in 100 kc crystal calibrator and the set features 10 db signal-to-noise ratio at less than 1 microvolt input. S-meter and many other fine features built-in for top-notch signal reception. Shpg. Wt. 90 lbs.

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

HEATHKIT PHONE & CW TRANSMITTER KIT

MODEL DX-40 **$64.95**

The 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, control-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 that the buffer stage can be pretuned before the final is switched on. A switch selects any of three crystals, or a jack for external VFO. High quality D'Arsonval meter for tuning. Shpg. Wt. 26 lbs.

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. Copper plated 16-gauge steel chassis, ceramic switch contacts, etc., are typical of the kind of parts you get, in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11 and 10 meters with a single bandswitch, 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. 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. Designed exclusively for easy step-by-step assembly. No other transmitter in this power class combines high quality and real economy so effectively. Here is a transmitter that you will be proud to own. Time payments are available! Shpg. Wt. 107 lbs.

more fine ham gear from the pioneer

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, designing new coils, 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.

MODEL GD-1B **$21.95**

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**

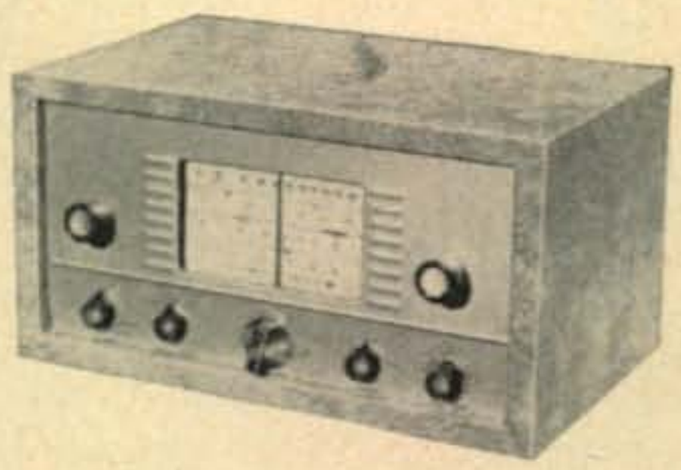
HEATH COMPANY A Subsidiary of Daystrom, Inc. BENTON HARBOR 12, MICH.

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



ALL-BAND RECEIVER

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

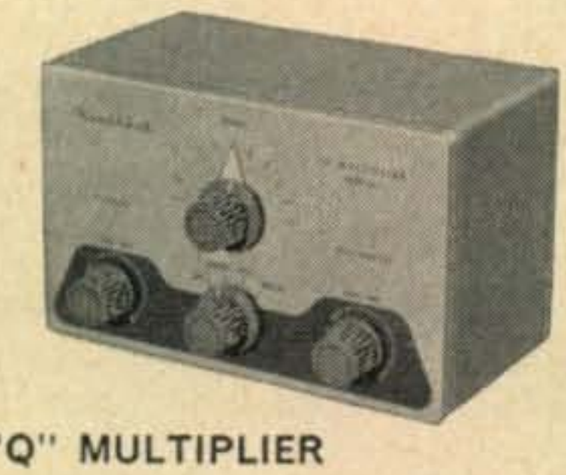
ELECTRONIC VOICE CONTROL

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



"Q" MULTIPLIER

NOTE: $10.65 WHEN ORDERED WITH AR-3 BECAUSE OF EXCISE TAX.

...in do-it-yourself electronics!

HEATHKIT "AUTOMATIC" CONELRAD ALARM KIT

Designed to give instant warning whenever a monitored station goes off the air, the CA-1 automatically cuts the AC power to your transmitter, and lights a red indicator. Works with any radio receiver; AC-DC—transformer operated—battery powered, so long as the receiver has AVC. A manual "reset" button is provided to reactivate the transmitter. Incorporates a heavy-duty 6-ampere relay, a thyratron tube, and its own built-in power supply. A neon lamp shows that the alarm is working. Simple to install and connect with complete instructions provided for assembly and operation. Shpg. Wt. 4 lbs.

MODEL CA-1

$13.95

"AUTOMATIC" CONELRAD ALARM

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

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

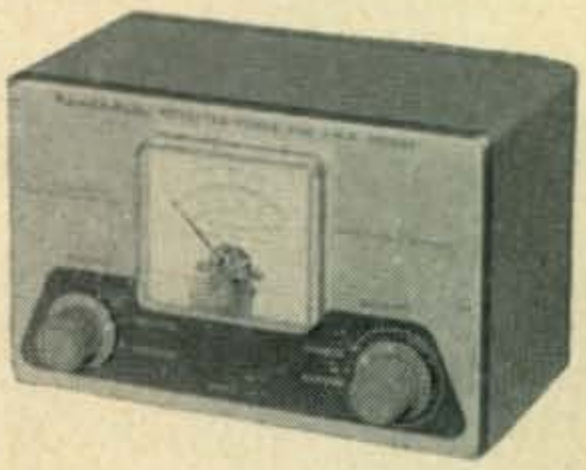
HEATHKIT BALUN COIL KIT

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.

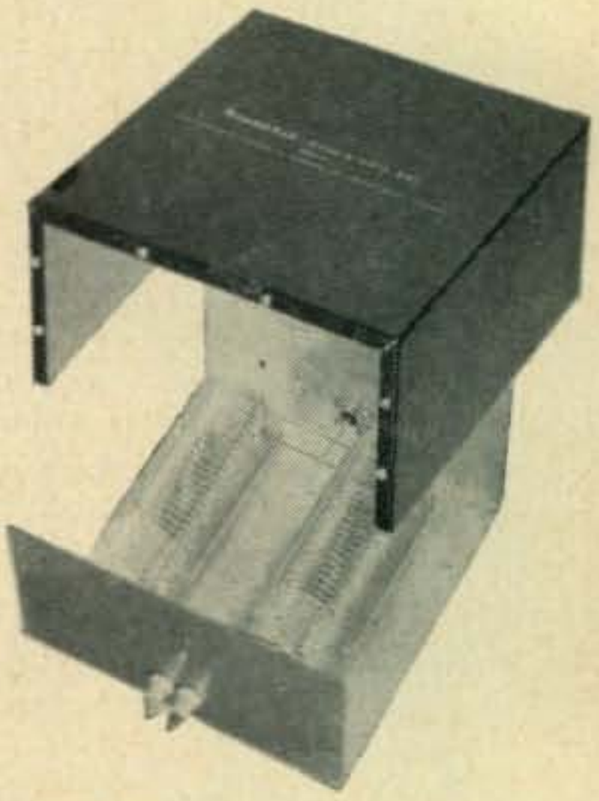
MODEL B-1

$8.95

VARIABLE FREQUENCY OSCILLATOR



REFLECTED POWER METER



BALUN COIL

save ½ or more . . . with HEATHKITS

FREE 1958 Catalog

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

☐ Rush Free 1958 catalog.

HEATH COMPANY

BENTON HARBOR 12, MICH. a subsidiary of Daystrom, Inc.

name _____

address _____

city & state _____

QUAN.	ITEM	MODEL NO.	PRICE

$_____enclosed. Parcel post, include postage—express orders are sent shipping charges collect. All prices quoted are Net F.O.B. Benton Harbor, Mich. and apply to Continental U.S. and Possessions only. All prices and specifications subject to change without notice.

For further information, check number 5 on page 126.

. . . de W2NSD

never say die

A trip through Europe is quite an experience. We hear a lot about How Things Are over there, but no amount of DX QSOs and hearsay can give you the understanding of a personal visit. I recommend it.

Visiting Europe had been nagging me for a long time and the problems of the approaching Geneva frequency conference later this year meant that I couldn't delay much longer. With the big November issue out of the way we went to work and completed the December and January issues of the magazine in time for me to leave early in November and allowing for a full month on the trip. Since the plans were made at the last moment there was no way to announce an itinerary in CQ.

Getting around Europe at minimum expense was a problem. I considered flying, renting a car, railroads and buying a car. The latter seemed to be the best deal so I arranged for the delivery of a Porsche at the factory in Stuttgart, Germany. "I arranged for the delivery" is so simple to write and took so much finagling to accomplish.

November 3rd I left Idlewild by Pan Am Jet, starting in the evening. The darned thing takes off at about a 45° angle and I expected it to flutter into a spin at any moment. . . . I know my plane would have stalled out at that angle! I kept remembering that they still had no agreement with their pilots and that they had vice-presidents out doing the flying until everything was straightened out. After dinner we stopped at Gander for gas. Seems that New York City won't allow them to use full power for take off (noise) so they have to carry only a partial gas load. Even so, leaving at 8:30 pm, stopping an hour at Gander, six hours' time difference, and we still arrived at Paris at 9:30 AM, about 6½ hours flying time. Smooth and quiet too. They fed me all the food I could ask for even though I was traveling Economy Class ($550 round trip to Hamburg).

Every city I visited was a whole story in itself: Paris, Stuttgart, Wiesbaden, Munich, Vienna, Venice, Milano, Genova, Nice, Geneva, Bern, Zurich, Rotterdam, the Hague, Amsterdam, Hamburg, and Kovenhagen. The amateurs in each town were just wonderful and I was able, in spite of the very short notice, to speak to groups in many of the cities.

The car was a dream, a bright red convertible Porsche Super (80 hp), and ideal for the European roads. It was easy to average well over 100 mph on the Autobahns of Germany and Netherlands, giving an indication of what driving could be in our country if we had better drivers and no speed limits. The drivers over there are, for the most part, much better than here. I'm not sure I'll ever get used to passing a police car at 115 mph, even when it is legal.

On the radio side I was surprised to find that it is possible for an American to get a license in several of the European countries, though this is being discouraged by some of the nationals. I tried to explain to the foreign amateurs that there is no purpose in taking out their bitterness over the U.S. non-reciprocal licensing by refusing to license American amateurs over there, that everyone over here wants very much to have reciprocal licensing and we are only being hampered by our red tape filled system whereby we have to get Congress to act to make the change.

I was almost dumbfounded to find that no representatives of the U.S. amateurs have yet gotten in touch with the American group at Geneva. They were quite concerned over this obviously disinterested attitude, particularly in the face of the positions of the foreign governments that have so far made their new frequency allocation proposals public. One "representative" of the U.S. amateurs was just a few hundred miles away at an I.A.R.U. (ARRL's international name) meeting and still did not visit Geneva.

European Proposals

The European Common Market countries are together on many other things besides prices and cutting of import restrictions . . . like their radio frequency proposals. And their proposals are pretty important to us, being an agreement between twelve countries (12 votes) and not just one (us with two votes, one for the U.S. and one for our territories).

What do they want? Hold your hat! They propose that Eighty Meters be reduced to 3500-3750 kc. We are darned sure that a lot of the South and Central American countries are with them on this. What does this mean? This could be the end of the Novice band there. The traffic nets would probably have to go too. The present 200 kc phone band is filled to the brim most of the time and certainly couldn't be cut much without severe distress to lower

[*Continued on page 14*]

Feenix, Ariz.

Deer Hon. Ed:

The Hon. Ruckus are dying down, and things are getting back to normal here, but things being reel harey here while it lasting. Even Hon. Ant Fuji now getting big horselaff out of hole thing, altho it not so funny when it happening.

It just goes to showing how little things like pushing plate switch to going on air can reely starting things off in 1/c stile. It all starting when, cupple weeks ago, I walking in shack, pushing magazines off chair, sitting down, grabbing Hon. Mike, and calling seek-you just like always.

Standing by, and amchoor from back east coming back to me saying: "Old buddy, ur on the Clam, Lobster and Fish Net freakwency. How many messages you having, and where they going?" Hon. Ed., you could nocking me over with a ten-thousand megacycle half-wave antenna, on acct. I not planning to sending any messages.

I telling him so, and he saying I gotta sending message, and I saying no wanting sending message, but after cupple more argewments I desiding I mite as well sending message to Hon. Ant Fuji, who alreddy back east and not heering from me for some time.

So, giving him message: Deer Hon. Ant Fuji—Hope you having fine time in fifty-nine —no resolushuns broken here—love Scratchi. You not thinking that pretty good message to thinking up on spur of moment, Hon. Ed? I thinking so to.

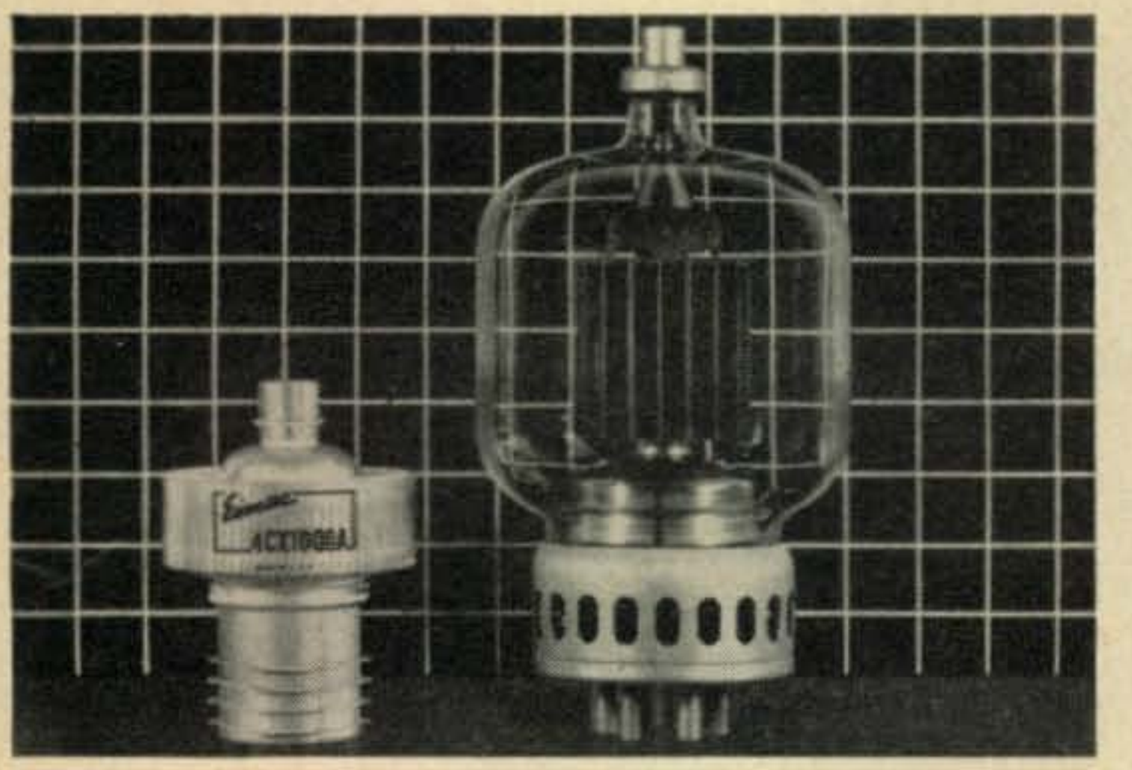
Other guy not thinking same likewise as us. No indeedy. Back he coming: "Ole boy, observe net regs; gimme proper serial number; Ant Fuji's real name; Ant Fuji's address; etc. etc." Making me little mad. I going back and telling him to forgetting hole idea, on acct. I not knowing Ant Fuji's favorite flower, and surely he be wanting that next.

Back he coming: "No dice, sending message as I are asking for it." Hon. Ed., he reely are asking for it, but desiding to going ahed anyway. So, starting over again. "Serial number one; message going to Ant Fuji—A as in Anthony Adverse; N as in Never the Hon.

[*Continued on page 24*]

Only EIMAC gives you ceramic "extras"

in more than 40 tube types



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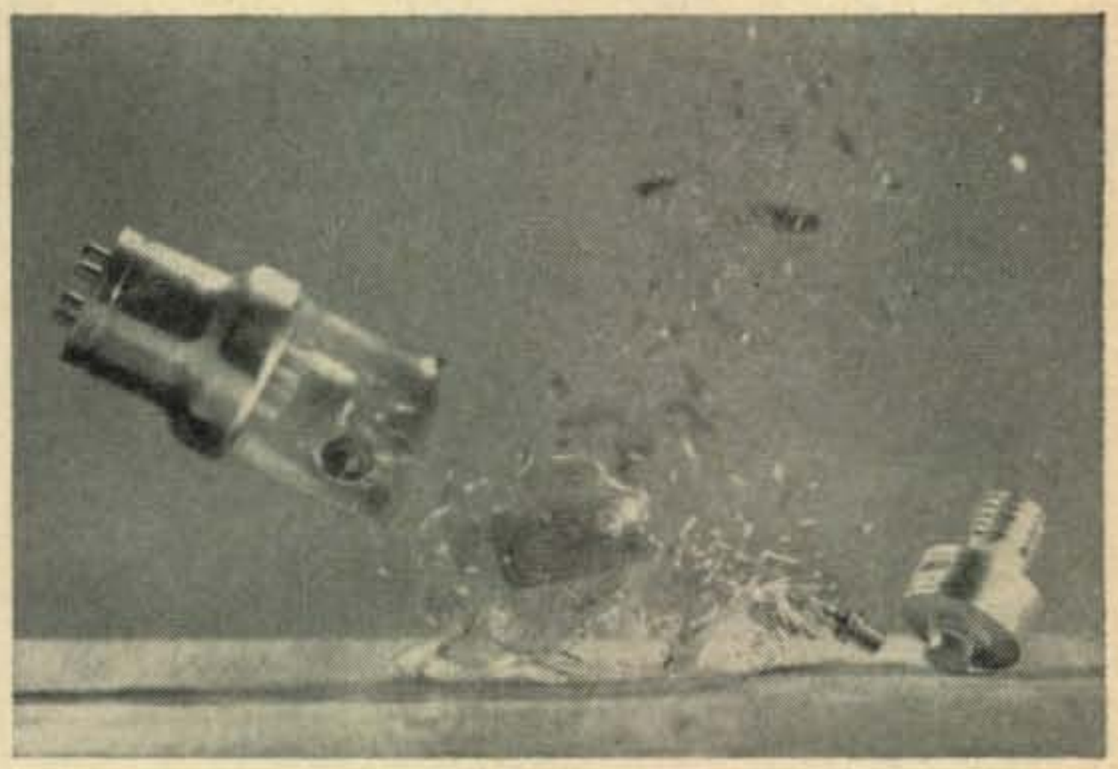
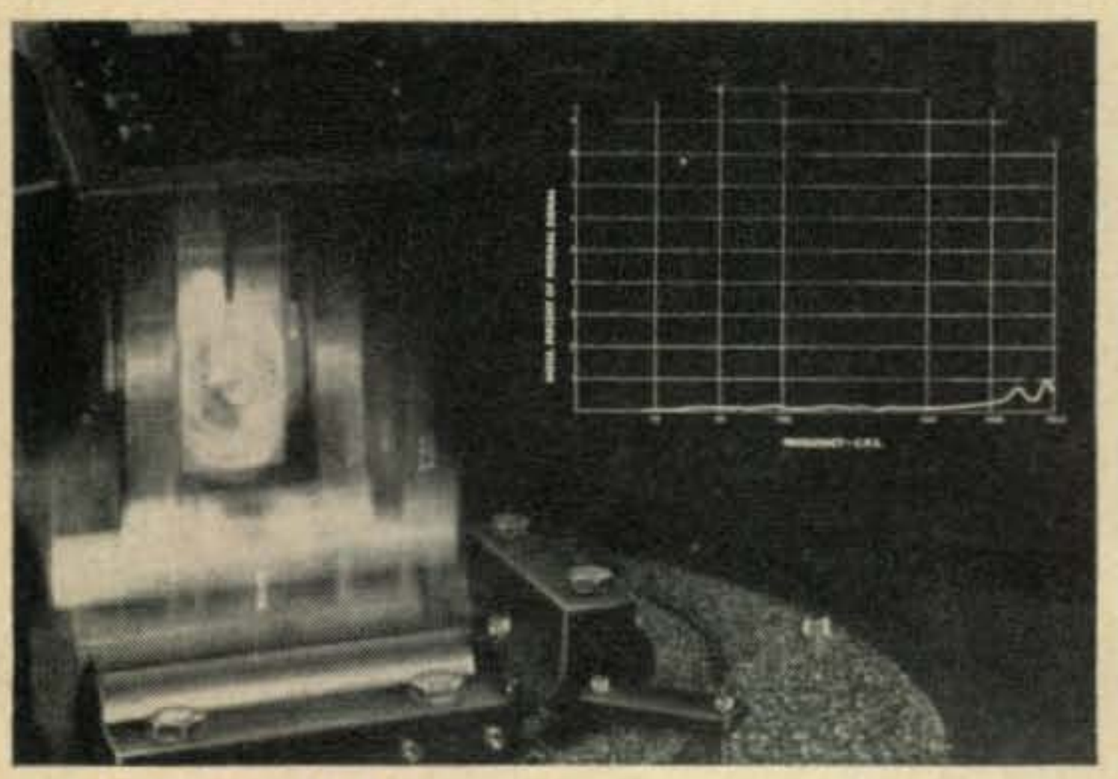


IMPACT SURVIVAL



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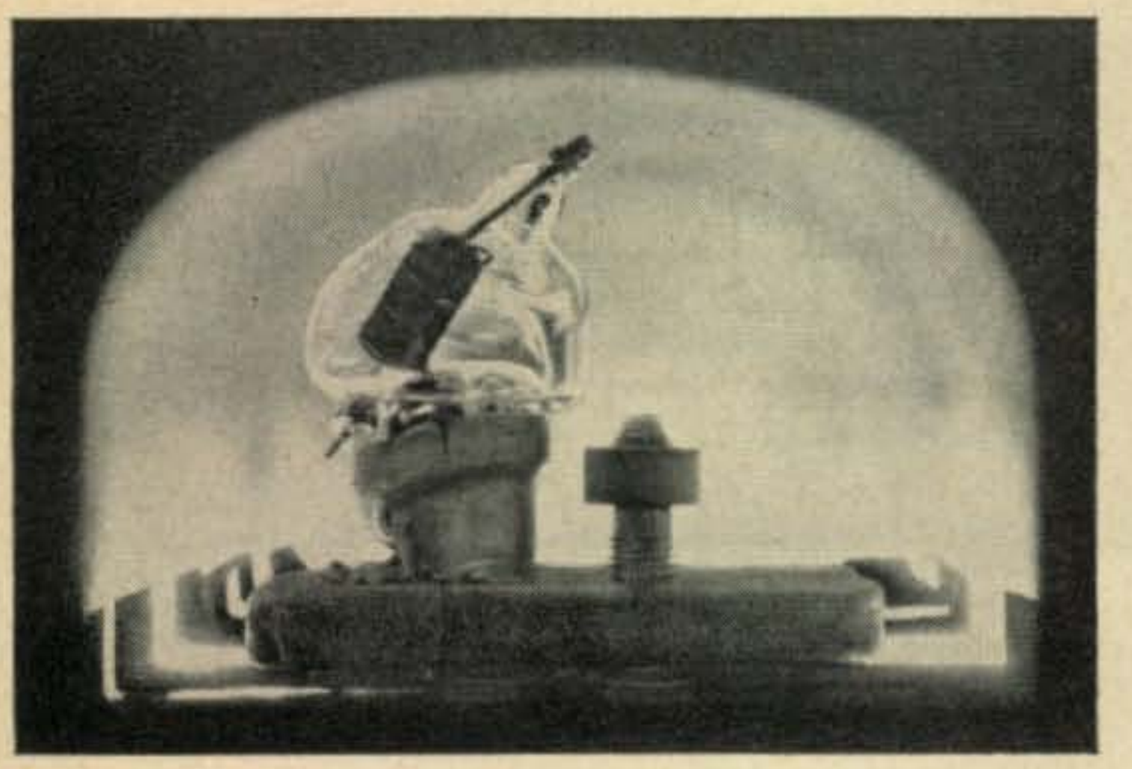
EXACT DIMENSIONAL UNIFORMITY



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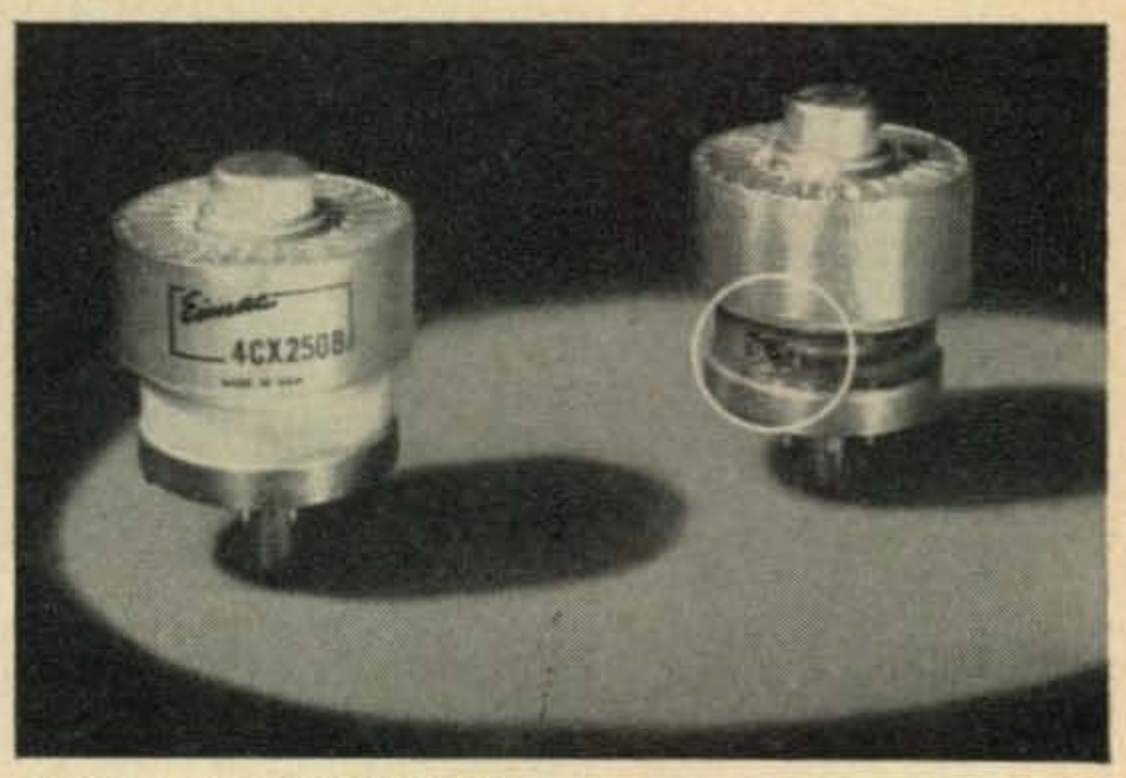

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For further information, check number 7 on page 126.

CLUB BULLETINS

Marvin D. Lipton, VE3DQX
311 Rosemary Road. Toronto 10, Ontario, Canada

Every week, I receive a bulletin from Rahway, N. J., that is produced by a group that call themselves the Channel A Radio Club. They meet nightly on 50.25 mc to rag chew and provide emergency communications should the need arise. Their paper, QSO, goes to about 50 local hams who comprise the membership of the organization.

One of our British correspondents sent in a letter explaining the meaning of the various suffixes often attached to G call letters. Here is a brief resume: A station licensed for TV transmission signs /T, whereas a station that is operated from alternate QTH's (business and home) has an /A added when using the location not on the license. Mobile and portable operated stations are designated in the same manner in Britain as in North America, but an extra license fee is levied upon /T and /M stations. Two letter G2 calls were issued prior to the war, and G3 plus three letter calls were issued post war. All six G prefixes are interchangeable so that if G3HKX were to move from England to Wales, he would become GW3HKX.

Random notes: Auto-call, Washington Mobile Radio Club Inc., went all out on its Christmas edition and ran a multi color cover. Before the cover was ready for distribution it ran through the press five times. The Fort Meyers Amateur Radio Club Inc. now certifies any ham that contacts 5 club members. Qualifying amateurs should send QSL cards to the Secretary-Treasurer at 1448 Byron Rd., Fort Myers, Fla. A similar prize has been created by the Niagara Radio Club, but in order to win a certificate, one must QSO 10 club members. Address your correspondence to W2SSJ, 570 81st Street, Niagara Falls, N. Y. As a final note, we report that W1VVI has resigned as editor of the **Yankee Radio Club Ham News.**

New members in the News Service that joined in the past month are: LARK, Livermore A.R.K., RF, Lower Yakima Valley R.A.C. Inc., Polhems A.R.C., Sweden, VE3SRC CALLING, Scarboro A.R.C., HAM MONITOR, Marquette, Kansas, QRM, Corning A.R.A., CIRCULAR LETTER, Radio Soc. of East Africa, ELK CITY R.C., Assoc. Member, and SHORT CIRCUITS, Electric City R.C.

73, Marv. VE3DQX.

New! hallicrafters "2 and 6"

Also available—
A. C.—only model

World's first complete two and six meter radio station... features transistorized, built-in power supply

Make reservations now for annual SSB dinner, New York City, March 24th.

COMPLETE SPECIFICATIONS

General description: The SR-34 is designed for either AM or CW and combines, for the first time in one compact package, the complete functions of a two *and* six meter radio station. It operates on 115-V. A.C., 6-V. D.C., or 12 V. D.C. and features a highly efficient transistorized power supply for the 6 and 12 volt operation.

Exclusive features: The perfect unit for short-range portable, fixed or mobile communication, the SR-34 meets—and exceeds—F.C.D.A. matching-fund specifications. The crystal sockets and transmitter tuning controls are concealed behind a panel which may be sealed to prevent tampering. Instantaneous selection of desired voltage possible and also "crossbanding" between the two and six meter bands. The specially designed cover has mounting clips for two-band antenna, owner's microphone, and cords.

Both receiver and transmitter may be used for C.W.; key jack and adjustable B.F.O. are provided. Drip-proof case is specially designed for safe outdoor use.

The transmitter is crystal-controlled; up to four crystals may be switch-selected. A fifth position on this switch permits external V.F.O. operation. Band selection also is front-panel controlled.

The receiver is a double conversion superheterodyne, having a quartz crystal controlled second oscillator. This offers outstanding selectivity and high image rejection. Highest stability is obtained through separate oscillator and R.F. sections for each band.

All receiver functions provided—S-meter B.F.O., ANL, etc. Sensitivities average 1 microvolt on both bands. Transistorized power supply eliminates noisy, erratic operation encountered with vibrator-type power supplies.

Front Panel Controls: *Receiver:* Band Selector (49-54 mc., 143.5 to 148.2 mc.); Main Tuning; Sensitivity; Audio Volume; B.F.O. Pitch; Squelch Level; Headphone Jack. *Transmitter:* Function Switch (P.A., Rec., Cal., AM, CW); Power On/Off; Band Switch; Crystal Selector and V.F.O.; Oscillator Tuning; Doubler Tuning; Tripler Tuning; Final Tuning; Final Loading; Meter Switch.

Power output: 6 to 7½ watts on 2 meter, and 7 to 10 watts on 6 meter AM or CW, 100% mod. negative peak clipping. *Rear Apron:* Speech input level control; key jack; P.A. speaker terminals; mic. selector (high Z or carbon); mic. input; A.C. and D.C. fuses; power plug.

Available with convenient terms from your Radio Parts Distributor.

Export Sales: International Division, Raytheon Manufacturing Co., Waltham, Massachusetts
For further information, check number 8 on page 126.

The new ideas in communications are born at . . .

hallicrafters

Chicago 24, Illinois

In our 25th year of service

W2NSD [*from page 9*]

powered stations. Cutting the band in half would really hurt our hobby.

And they want most of Forty Meters too. They recommend that the band be limited world-wide to 7000 to 7100 kc. Picture that one! That would throw out phone entirely, beyond any doubt. And the Novices would have to go too. Cutting the band down to that size might well make it follow the badly amputated 160 Meter Band into limbo.

Twenty and Fifteen are still intact, as of this writing. But Ten . . . ouch! Chop! They want that one to be knocked down to 28-29 mc.

And keep in mind that this is just the position of the European countries, we haven't even heard from Russia and all her accompanying yes men yet. We do know, from reading the Russian magazines, that they are pushing ham radio for the VHF's primarily and have little interest (apparently) in encouraging short wave ham radio. I don't think we will get any help from Russia.

As you can see, no matter how firm the U.S. is in its stand to hold on to our frequencies (and they are very firm on this), we still may be in trouble if we are not well represented at the Conference by responsible amateurs. The fellows in Geneva stressed the importance of our having amateurs at the Conference to act as observers and advisers . . . to lobby for our hobby. They brought up time and again the incident where one of our representatives disgraced himself and the U.S. amateurs in public. This was also mentioned by amateurs in Germany, Holland, Denmark, Austria, France and Italy. They all asked if there was some way to keep the incident from being repeated.

You may have noticed in the Overseas Echoes column that Australia and New Zealand are taking up a collection to send an amateur radio observer-adviser to the Conference. They consider it quite important to do all they can to help preserve our amateur frequencies.

While in Geneva I suggested to the I.T.U. group that they establish an amateur radio station for the use of the delegates to the convention, thereby bringing amateur radio more favorably to their attention. This was enthusiastically supported by everyone there and, it was recently reported, they have received approval for the handling of third party messages from the station to the United States, a luxury not permitted the regular Swiss amateur station.

Thanks

If any of the fellows that I had the pleasure to meet while in Europe happen to read this I would like to pass along my deepest appreciation for the wonderful time that they showed me . . . I'll be looking for them on the air.

The DX Column will be back next month without fail. 73, Wayne

take your choice!

$189.00 •

HQ-100

True Hammarlund quality at low cost! General coverage, 540 KCS to 30.0 MCS. 10-tube superheterodyne with automatic noise limiter. Electrical bandspread. Q-multiplier.

Optional Telechron clock-timer $10

EVERYONE A WINNER!

$249.00 •

HQ-110

A true amateur receiver at a low price! Dual conversion. 6, 10, 15, 20, 40, 80 and 160 meter ham bands. Crystal calibrator. Q-multiplier. Separate linear detector for SSB and CW. Separate BFO.

Optional Telechron clock-timer $10

$269.00 •

HQ-145

Brand-new general-coverage receiver! 540 KCS to 30.0 MCS. Dual conversion. Adjustable 60 db slot filter. Crystal filter. 11-tube superheterodyne with automatic noise limiter.

Optional Telechron clock-timer $10
Optional plug-in 100 KCS calibrator $15.95

$359.00 •

HQ-170

Best for the amateur at any price! Dual and triple conversion 17-tube superheterodyne with automatic noise limiter. 60 db slot filter. Separate vernier tuning. Selectable sideband. Tuned IF amplifier. Crystal calibrator.

Optional Telechron clock-timer $10

$379.00 •

HQ-160

Everything you could wish for in general-coverage! 13-tube superheterodyne with automatic noise limiter. Dual conversion. 540 KCS to 31.0 MCS. Crystal calibrator. Electrical bandspread. Slot filter. Q-multiplier.

Established 1910

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460 West 34th Street, New York 1, N.Y.
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For further information, check number 10 on page 126.

Letters ..... to the Editor

Delinquents

Dear Sir:

At 1205, 13 December, K4HKD/Mobile 5, K5PAT Mobile and K5DKX, all of El Paso, were in a QSO when K4HKD Mobile/5 saw two teenage boys loosening guy wires on a utility pole along busy Sand Hill Freeway east of town. Pulling off to watch from a side road through binoculars, he asked K5DKX to phone patach into police headquarters. After completion of the call it was determined that the pole was a feeder line for high voltage wires crossing the highway to a sand-pit, and that the boys were pulling it down. Noting that the power lines would fall into the Saturday noon hour traffic, which at that point traveled at 60 mph, K5PAT mobile was routed to an intercept point to permit the two mobiles to cut the boys off and hold them for the police. Police arrived just as K4HKD was leaving his car, and he and the two police officers chased the youngsters down in the sand hills.

Examination of the pole showed that two of the three cables holding it up had been severed and the boys were working on the third. It is estimated that in ten more minutes they would have had the power line down in the highway, with resulting wrecks as the highspeed traffic hit the wires. Several fatalities would probably have occurred as the poles on either end of the downed wires would have caused the wires to throw cars out of control. Emergency traffic ended at 1245.

El Paso hams have been active in many local emergencies, and have organized two amateur radio clubs, the El Paso Amateur Radio Club and the Sun City Radio Club. Local hams congregate on 3828 kc for ragchews and emergency traffic.

Miriam Sheldon—K4HKD/5
8648 North Loop Road
El Paso, Tex.

Contest

Gentlemen:

Please tell Green that I still am runner (W5) up in the last grand final II meter contest in which "CQ" scores showed W5AUT in this position *in error.*

73 anyway,
W5AUJ (J, not T)

Tower Approved

Dear Wayne:

The City of Los Angeles, Department of Building and Safety, has approved a tower made by the Triex Co. of Fresno, for use in this city. All elements galvanized. Stranded cables.

Engineered plans and calculations and building permit required for towers over 45' or costing more than $100.00.

Dick Morris, K6DSH

Another Fam Hamily

Dear Editor:

We have more hams in our family than Ray, K6QPE.
Son Irwin, K2VGU—Daughter Bunny, K2ZCS
Wife Jean, KN2OKH—Nephew Bert, KN2OVR
Wife's brother (Bert's father), KN2PKX
and myself, Joe (Pop), K2VGV

Let's see some other family top that.

We all read and enjoy CQ from cover to cover. Bunny is a member of Brooklyn College Amateur Radio Society—K2APZ. Irwin is President of Thomas Jefferson H. S. Radio Club—W2BVH.

Joe (Pop) Schwartz

For further information, check number 12 on page 126.

Announcements

SSB DINNER

The Eighth Annual Side Band dinner will be held on Tuesday, March 24, 1959 at the Statler Hilton Hotel in New York City. This is an all day affair starting at 10:00 A.M. and prominent manufacturers will have their products on display. Tickets are $8.00 in advance and $9.00 at the door. Tables are also available for group reservations for the dinner. Please contact Irv Binger, W2CMM, 1741 Andrews Avenue, New York 53, New York.

TRANSISTOR CLASSES

Beginning April 1st, and continuing for the next five Wednesdays, New England hams will have an excellent opportunity to learn transistor fundamentals from demonstration-type lectures by top men in the field. The IRE is setting it up, and they've nailed six speakers who not only know their subject but can *teach* it. This is a really high-powered job—study notes supplied a week before each lecture, interesting demonstrations, Boston's plush John Hancock Hall for a meeting place, strong backing by six transistor manufacturers—a thing like this gets sold out quite easily, so if you're interested, drop a line to the Boston Section of IRE, 73 Tremont Street, Boston 8, for the whole story. Oh, yes; the whole lecture series will cost IRE members and students $7.00, non-members $10.00.

NOVICE CLASSES

The Uniondale Adult Education Program on Long Island is offering an Amateur Radio Operators Course (Novice) for anyone interested. Upon successful completion of the final examination the students will receive a Novice license. Classes are held Thursday, 7:20-10:00 P.M. The registration fee is $3.00 for residents and $4.00 for non-residents.

JOIN A CHICAGO CLUB

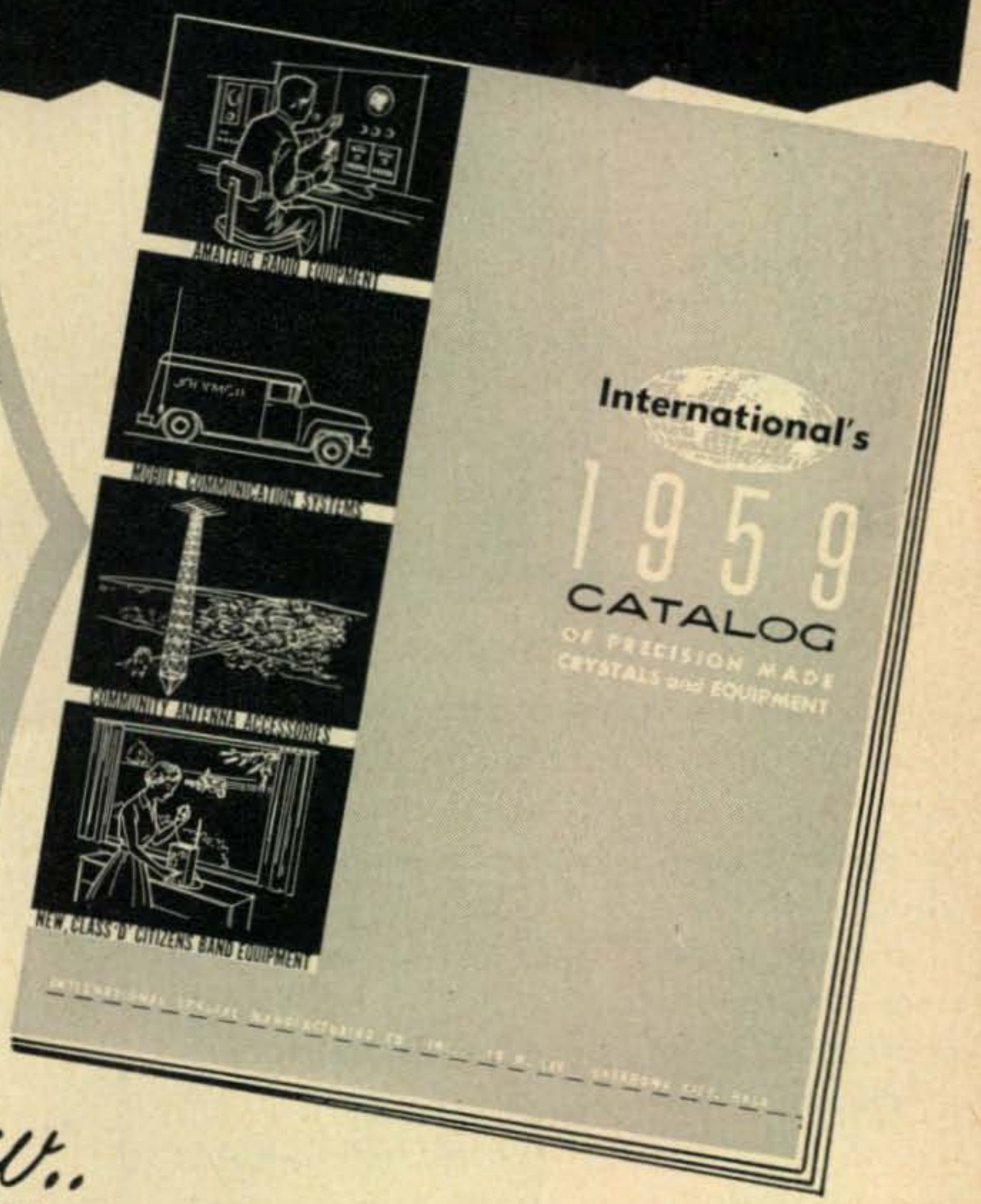
To help everyone interested in amateur radio locate a club that features their special interests, a Free Directory of all member clubs has been published. It is available at the Amateur RADIO Supply Stores in the Chicagoland area, or by sending a self addressed envelope to W9MSG, Ray Birten, 702 Spring Road, Elmhurst, Illinois, or Geo. Boyd, 3540 N. Seely Ave., Chicago, Ill.

Send for your FREE COPY

INTERNATIONAL'S

1959 CATALOG!

- **AMATEUR and COMMERCIAL CRYSTALS**
- **PRINTED CIRCUIT COMPONENTS**
- **COMMUNITY ANTENNA ACCESSORIES**
- **TECHNICAL DATA**



and the New..

CITIZENS BAND TRANSCEIVER

INTERNATIONAL
Crystal Manufacturing Company, Inc.

18 NORTH LEE
OKLAHOMA CITY, OKLAHOMA

Gentlemen:

Please send me my free copy of International's 1959 catalog.

NAME _____

ADDRESS _____

CITY _____ STATE _____

C-259

For further information, check number 14 on page 126.

George K. (Red) Rollins, W3GA

The death of Red Rollins, Chief of the Public Safety and Amateur Division of the F.C.C., shortly before Christmas came as a sad blow to all amateurs. Red had a tremendous interest in ham radio and since his appointment to office in 1947 (originally the "Radio Operators and Amateur Division") he, with Bill Grenfell, W4GF, guarded and guided ham radio with a zeal unequalled by any other ham or group, against tremendous odds, and with little organized assistance from within our own ranks.

Red was born in 1905 in Minneapolis, was brought up in Springfield, Massachusetts, and found himself getting embroiled in the radio hobby in Birmingham, Michigan in 1922 . . . rotary sparks, UV-202's, loop modulation, and the call sign 8HW. He entered Michigan State and worked his way through pounding brass summers on the Great Lakes and filling in on the state owned broadcasting station on the college grounds.

After graduating he passed the exam for Federal Radio Inspector and was assigned to the Detroit Field Office of the Radio Division of the Department of Commerce. The Department moved him out to Grand Island for a while and in 1934 he was transferred to the monitor-

You'll want to own this brand new hybrid

GLOBE electronics

Patcher

MODEL PH-1
in the Modern
"book-shelf" package

Complete!

NOTHING ELSE TO BUY!

IN WIRED AND TESTED FORM ONLY

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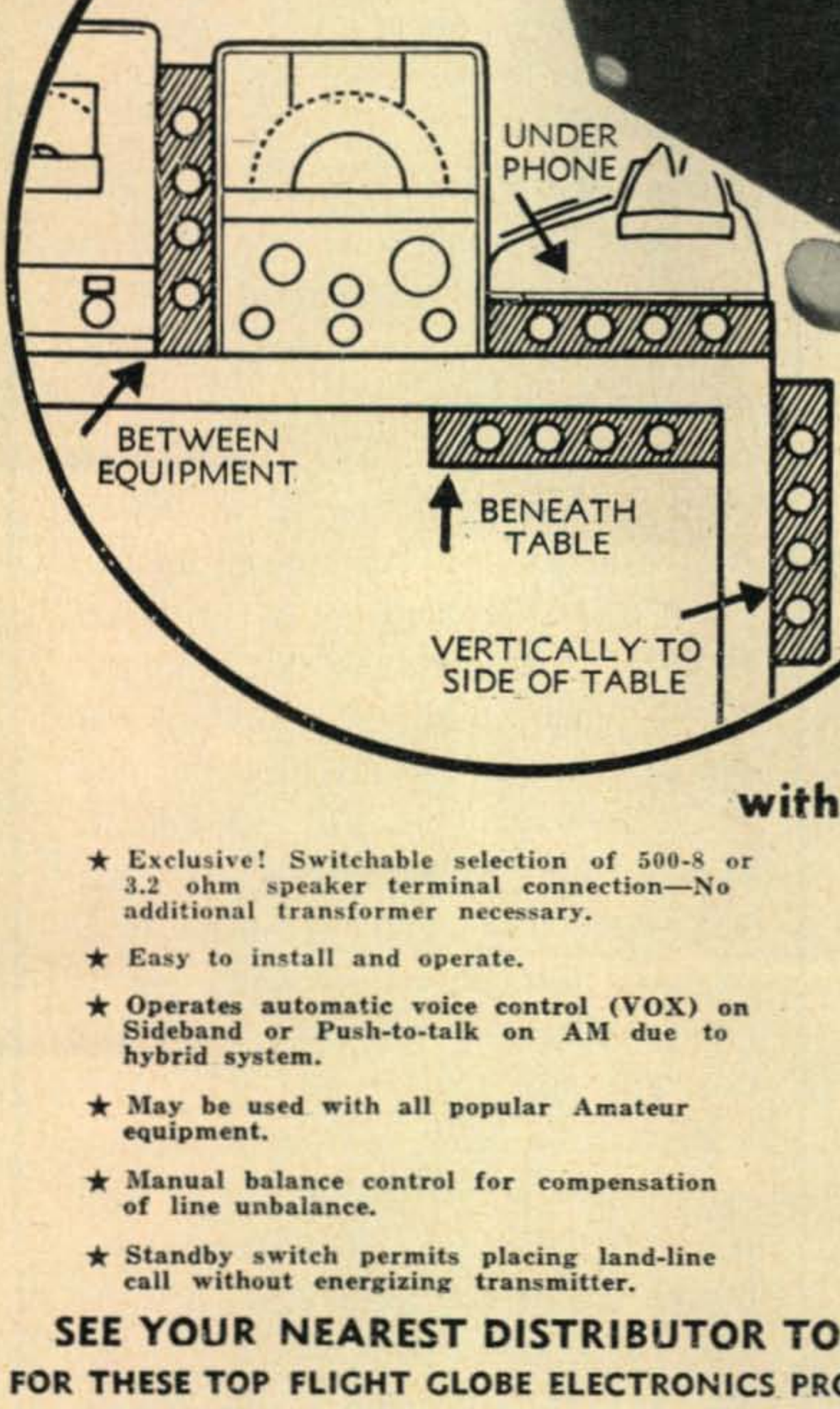
Size: JUST 5 3/8 x 1 5/8 x 9

Mounts Anywhere!



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Phone-Patch for Fun with these Exclusive Features

- ★ Exclusive! Switchable selection of 500-8 or 3.2 ohm speaker terminal connection—No additional transformer necessary.
- ★ Easy to install and operate.
- ★ Operates automatic voice control (VOX) on Sideband or Push-to-talk on AM due to hybrid system.
- ★ May be used with all popular Amateur equipment.
- ★ Manual balance control for compensation of line unbalance.
- ★ Standby switch permits placing land-line call without energizing transmitter.
- ★ Separate gain controls for receiver and transmitter permit proper adjustment and balance.
- ★ Completely shielded and RF by-passed to eliminate RF feedback.
- ★ Receiver speaker disconnected when phone patch is turned on. Audio comes through handset.
- ★ Steel cabinet of "book shelf" design needs only minimum space. All necessary connectors supplied for either SB or AM.
- ★ All necessary connectors supplied for either SB or AM.

SEE YOUR NEAREST DISTRIBUTOR TODAY

FOR THESE TOP FLIGHT GLOBE ELECTRONICS PRODUCTS

Globe King, Globe Champion, Globe Scout, Globe Chief, Sidebander, Hi-Bander, VOX and QT-10, Power Booster, Globe Linear, Power Attenuator, 6-Meter Converter, Universal Plate Modulator, Screen Modulator Kit, Globe Matcher, Sr. and Jr., Speech Booster, VFO Models 755A, 6-2; and 666, many in kit as well as wired and tested form.

GLOBE electronics
3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

For further information, check number 16 on page 126.

ing station in Atlanta, Georgia, where he stayed until 1936.

Next he went into business as a broadcasting consultant with a partner: "Haley & Rollins." After two years of consulting work the C.A.A. managed to lure him into their pioneering air-navigation project (some still with us today), the Simultaneous Radio Range Stations and the 75mc Marker Beacons. This project was completed in 1939 and Red returned to the F.C.C., working in the Broadcast Division. Later he worked on national defense operations at the Laurel Monitoring Station. In 1941 Red was brought back to Washington as Chief of the Aviation Section of the F.C.C.'s Safety Services Division.

Came the War and Red, like most of the other amateurs, joined up. He took flight training (Navy) at Pensacola. They also presented him with the remains of a Cub propeller that they dug out of the runway after one of his "special" landings. He was then sent up to Banana River where he was top kick on the very secret Radio Development Project Baker. In 1945 Lt. Commander G. A. Rollins, USNR, returned to the F.C.C. as Assistant Chief of the Aviation Division. When the Radio Operators and Amateur Division was established in 1947 Red was made Chief, a really fortunate choice for us for certainly no one with a greater interest in helping ham radio could have been chosen.

Red's ham shack, next to his family, was his main interest and he ran a Viking II/NC-183, with a Gonset Communicator II both mobile and fixed. Red's first call was 1CHO, before there were any "W's." Next he was 8HW, then W8JO, W9GR, W4EJP and finally W3GA.

Amateur Radio has lost one of its staunchest advocates and greatest leaders.

GONSET

G-43

An entirely modern all-band Communications Receiver *offers you . . .* FULL DOLLAR VALUE

A fine, new all-band receiver, offering the radio amateur or advanced short-wave listener, so many highly desirable electronic features . . . handsome industrial-designer styling . . . at a price that is—by the most careful point-by-point comparison—a bigger, better, dollar value.

G-43 is a velvet-smooth-operating, highly stable receiver. Since the wide frequency range of 540 kcs to 30 mcs is divided into six bands . . . L/C ratio is more favorable . . . gain equalization is better from band edge to edge . . . performance on the higher bands is better . . . the receiver is less susceptible to microphonics, particularly on the higher frequency bands.

G-43 offers better "read out" because the long-scale, well-lighted drum dial displays only band in use. Tuning and dial mechanisms are precision made. Tuning knobs are inertia flywheel weighted for smoothest tuning "feel." Dial scales are calibrated separately for amateur bands.

SENSITIVE — STABLE.
Gonset exclusive printed circuit tuner design uses high "Q" permeability tuned coils . . . reduces connecting and switch leads to negligible length. Performance is extra high on high frequency bands. Highest mechanical stability for HF oscillator which is also temperature compensated and electrically stabilized to ensure very low frequency drift. Sensitivity is 3 microvolts or better throughout the entire frequency range.

IMPROVED SIGNAL-TO-NOISE RATIO
Efficient front-end design and single conversion I-F system provides very good signal-to-noise ratio, high rejection to spurious responses.

SPECIAL HIGH FREQUENCY I-F.
Features six, double-tuned high "Q" transformers at 1650 kcs. Selectivity is 6 kcs at 6 db down, 24 kcs at 60 db.

G-43 receiver #3241 . . . **159.50**

OTHER BIGGER-DOLLAR VALUE FEATURES

6-bands: .54-1.6, 1.8-5.7, 5.7-13, 13-20, 20-25 and 25-30 megacycles.

8 TUBES: . . . . . .

BFO . . . stable, compensated. For CW and SSB.

SIGNAL STRENGTH METER, calibrated in "S" units.

CRYSTAL CALIBRATOR. Receiver has provisions for 100 kc crystal calibrator for setting band edges. Available as an accessory.

VHF CALIBRATIONS. Band 6 calibrated for 2 and 6 meter bands permitting G-43 to be used with crystal controlled VHF converters having outputs of 26-30 megacycles.

BUILT-IN SPEAKER . . . headphone jack

AUTOMATIC NOISE LIMITER. . . . . .

EXTERNAL SPEAKER . . . optionally available where full fidelity audio is required. Cabinet matches receiver. Has tone control.

GONSET

GONSET

DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIF.

SCRATCHI [*from page 10*]

Twain Shall Meet; T as in Hon. Teehouse of August Moon; F as in Forscore and Twenny Yeers Ago; U as in You; J as in Joon in January; I as in I wonder if You Getting all This OK"; then I standing by.

Boy are he mad. It are then I knowing he having reel good quality rig, on acct. I can heer his teeth grinding. He finely calming down, howsumever, and telling me if wanting to use funnyetics ok, but using reel kind, which he then proceeding to giving me. Sounding like lineup of Greek football teem, so desiding to giving him message without funnyetics.

He getting message next try, or at least that what he telling me. After this Scratchi are bit on thirsty side, so killing filaments on toobs and going and getting nice long drink cacktus jooce to forgetting hole thing.

In fackly, not remembering much about it until cupple days later, when getting telegram from Ant Fuji, in which she saying: "Don't worrying about fire—stay away from Indians —I'm on my way to help you in your hour of need."

Reeding it over cupple times, but it still not making sense. Calling Hon. Telegram office, and they reeding it again over fone. Still same message!! I not wondering about it long, Hon. Ed., on acct. that afternoon Hon. Ant Fuji herself in person riding up in taxi-cab.

She rushing in and telling me to telling her all about it. When I saying all about what, she reeching in purse and bringing out postcard on which are message she getting via amchoor radio. When I reeding it carefooly I seeing why she so disturbed.

Here are what message saying: Deer Ant Fuji—Hope you helping—having fire—nine more revolushuns—broken hart—in love—Scratchi.

I wanting so much to laffing, but knowing if I laffing, Hon. Ant Fuji giving me crack on Hon. Hed, so all can do is try to explaneing what happening. She thinking Indians are setting fire to ranch in big Indian revolushun, but she not figuyouring out how I can being in love with broken hart with all the Indians around.

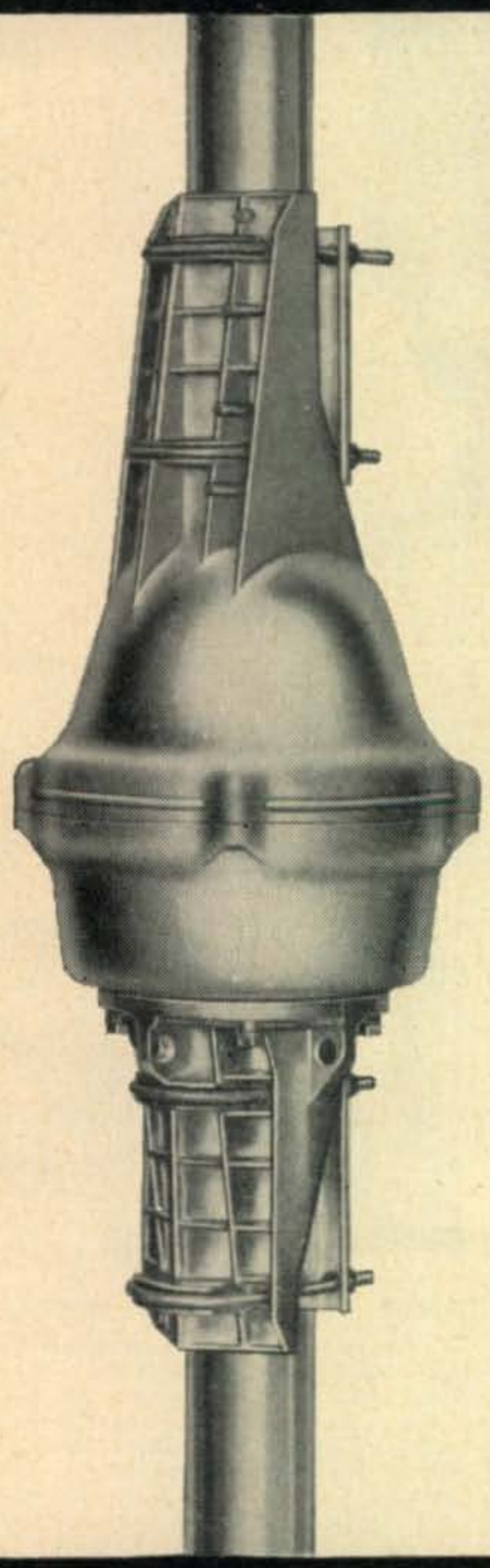
It not until Hon. Brother Itchi coming home and helping explane that finely Hon. Ant Fuji are understanding everything. Then she laffing and saying as long as coming out to Feenix she mite as well having long visit. Which are okey with me on acct. Ant Fuji got plenty bux and maybe I can getting new reseever if she staying long enuf.

Howsumever, next time I calling seek-you and getting on some Hair Net freakwency, I not sending message. No indeedy.

Respectively yours,
Hashafisti Scratchi

"HAM-M" BY CDR

America's most popular ham antenna rotor



Preferred because:

EXTRA HEAVY-DUTY

Holds heaviest commercial arrays — ice-proof, wind-proof, moisture-proof!

WON'T DRIFT

Provides 3500 in.-lb. resistance to lateral thrust.

EASIEST TO INSTALL

It's complete! Mounts on shaft or flat on plate in 30-minutes.

CONTROL CABINET: Pin-point calibrated in 5° units. Needle operates without activating rotor. Built for 8-wire cable.

ROTOR MECHANISM streamlined to resist moisture, "ice-lock." Actually stronger than your antenna itself. 98 ball bearings for smooth action. Positive brake ends drift.

YOU CAN'T AFFORD LESS! WHY PAY MORE? In only a few months the new CDR "Ham-M" Rotor has become the "pet" of hams from Coast to Coast. Costs less than rotors that won't give you any better performance, won't hold heavier antennae, won't give you any more resistance to the elements. It's the complete rotational system—no extras to buy. At your distributor's: only $119.50!

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

CDR

HAM ANTENNA ROTOR

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

The Radiart Corporation, Indianapolis, Ind.

For further information, check number 20 on page 126.

XYL OR OM... THEY'LL ALL TELL YOU...

Viking transmitters

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

"RANGER" TRANSMITTER/EXCITER

This popular, superbly engineered transmitter also serves as an RF/audio exciter for high power equipment. 75 watts CW or 65 watts phone input. Built-in VFO or crystal control—instant bandswitching 160 through 10. 6146 final amplifier—wide range pi-network output. Timed sequence keying. TVI suppressed. With tubes, less crystals.

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

"VALIANT" TRANSMITTER

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

Cat. No.	Amateur Net
240-104-1..Kit	$349.50
240-104-2..Wired and tested	$439.50

"FIVE HUNDRED" TRANSMITTER

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

Cat. No.	Amateur Net
240-500-1..Kit	$749.50
240-500-2..Wired	$949.50

E. F. JOHNSON COMPANY

2901 SECOND AVENUE S.W.

outsell all others!

"COURIER" AMPLIFIER

This power-packed Class B linear amplifier is rated 500 watts P.E.P. input with aux. SSB exciter—500 watts CW and 200 watts AM! Continuous coverage 3.5 to 30 mcs. May be driven by the Viking "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: 5 to 35 watts. Employs two 811A triodes in parallel—wide range pi-network. TVI suppressed. With tubes.

Cat. No.	Amateur Net
240-352-1..Kit	$244.50
240-352-2..Wired	$289.50

"THUNDERBOLT" AMPLIFIER

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

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

"KILOWATT" AMPLIFIER

Here's the most exciting unit you've ever seen . . . the unit that puts the whole world at your fingertips! Brilliantly designed and engineered, the Viking "Kilowatt" is the only power amplifier available which will deliver full 2000 watts SSB* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mc. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No. 240-1000..Wired and tested.....**$1595.00 Amateur Net**

Cat. No. 251-101-1..Matching top, back and pedestal..FOB Corry, Pa. **$132.00 Amateur Net**

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

"PACEMAKER" TRANSMITTER/EXCITER

An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input . . . 35 watts AM. Highly stable built-in VFO. Instant bandswitching 80, 40, 20, 15 and 10 meters. VOX and anti-trip circuits. Wide range pi-network output. Effectively TVI suppressed. With tubes and crystals.

Cat. No. 240-301-2..Wired .....**$495.00 Amateur Net**

Viking

FIRST CHOICE AMONG THE NATION'S AMATEURS

WASECA, MINNESOTA

For further information, check number 21 on page 126.

In The Beginning

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

Part I

Have you ever wondered how amateur radio came about?

Amateurs who became "hams" in 1930 or later must often wonder just how it all started. And hundreds of "hams" whose calls pre-date 1930 find the beginning equally puzzling. Of the thousands in this latter group, many didn't start activities until the late teen years or twenties.

Today, if you have held an amateur license for twenty-five years, you are considered an "old-timer." Reaching such a milestone rightly stimulates pride as well as some fine old memories. But twenty-five years service in amateur radio is like twenty-five years service with the Telephone Company—you are really just a youngster. Scattered among us are many hams who can better that performance by twenty-years; while still other active amateurs have service several years beyond that. Those are the *real* old-timers.

When you review that far back, you discover that early experimenters were not licensed. Not only weren't the amateurs licensed; neither were the commercial operators. Licenses didn't exist in those days. What then, you ask, did the "gang" use for calls? Well, most of them used their initials, while others picked a combination of two or three letters that was easy for them to send.

And what did the fellows hear in those early years? Sometimes, nothing; sometimes only that old demon static; sometimes, if you were lucky, a few of the commercial spark stations providing they were close by. On *rare* occasions they heard each other; especially if they lived in the same town, dwelt in the same block, and their antennas *almost touched*. Nothing much was understood about tuning, wavelengths, and the instruments for controlling them. These were the days when you hand made everything.

No wavelengths existed for amateurs in the beginning. Experimenters consisted mostly of fellows whose curiosity was aroused by the

The author. Wireless operating aboard the SS Munardin.

AMERICAN
MORSE CODE

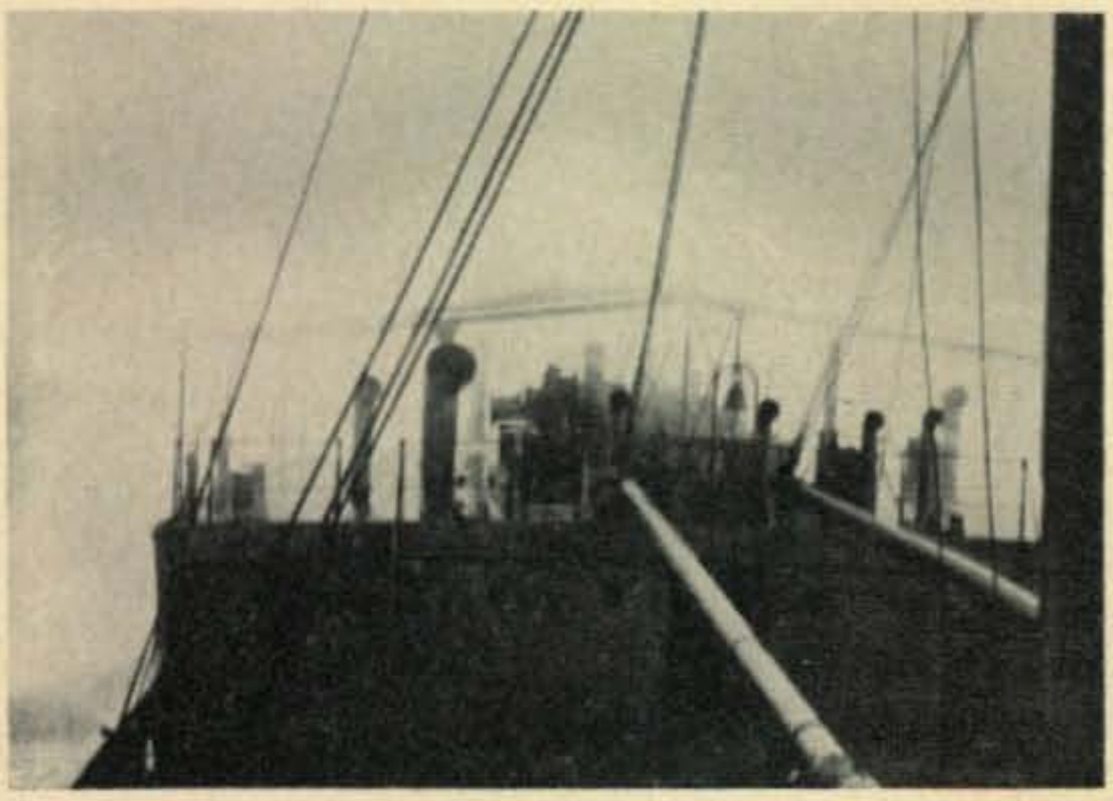
A	.—	N	—.	1	.— — —	6	— . . . .
B	— . . .	O	— — —	2	. . — — —	7	— — — . .
C	— . — .	P	. — — — .	3	. . . — —	8	— — — — .
D	— . .	Q	— — . —	4	. . . . —	9	— — — — —
E	.	R	. — .	5	. . . . .	0	— — — — —
F	. . — .	S	. . .				
G	— — .	T	—				
H	. . . .	U	. . —	PERIOD		. — . — . —	
I	. .	V	. . . —	COMMA		— — . . — —	
J	. — — —	W	. — —	INTERROGATION		. . — — . .	
K	— . —	X	— . . —	COLON		— — — . . .	
L	. — . .	Y	— . — —	SEMI-COLON		— . — . — .	
M	— —	Z	— — . .	QUOTATION MARKS		. — . . — .	

Fig. 1—American Morse code—the original wireless code.

fascinating articles they read in periodicals such as "Popular Electricity." Some, though, were telephone and electric company men. Gear, hastily made, was "haywired" together; antennas made high and long; and away you went to compete with the atmospherics.

As all operating was "spark" transmission, the atmosphere really got disturbed. But, as we learned in physics, a noise doesn't exist unless someone is there to hear it; so, inefficient and off-wavelength receivers kept the true din from being heard. Not all the noise came through the headphones though; old-timers remember the racket created inside their shacks; fat jumping sparks never were known to soothe the nerves.

Different, too, was the code utilized during those early years. Wireless operators used the



Experiencing high seas in foul weather.

same one sent over landlines by telegraphers—the Morse Code. It prevailed for many years before succumbing to the International Morse used today. Every so often when some of the "Old-Timers" are in contact, they mistify "hamdom" by transmitting in American Morse.

This article is an expedition into the past wehere our grand old hobby was born. It's a story for everyone. Climb aboard and watch for the point where you begin to remember. Stir up those old memories long forgotten. To the "Old-Timers," it will be a reverie; to later hams, an active history. Come on! Let's re-live those pleasant moments together.

In the Beginning

Crackling sparks, thunderous static and lawsuits ushered in Amateur Radio. Excitement ran high about 1900. Ships, bobbing miles apart on the high seas, communicated with each other; from beyond the horizons sprang ship-to-shore traffic; land stations relayed and exchanged messages—all without wires. *Wireless* was a mystical and fascinating word; it lured the adventuresome while engulfing our "young scientists."

Flashing through the air came blow-by-blow accounts of thrilling sea rescues. Tales of exciting heroism mingled with stark disasters. Ships were sinking! Passengers and crews were

Seas pouring over main deck.

being saved! Live drama jammed the ether.

Land stations rushed these dramatic accounts to newsrooms. Soon newspapers hit the streets carrying the gripping events. The stories dripped with realism. Not only was it "hot" news; it was "fresh" news. It had just happened; and was till happening. Perils of the sea took on a "you-are-there" atmosphere. Reader interest was electrified.

The Public hung on every word. Tensely they awaited latest reports. Suffering the terrors along with the victims, they *saw* the stricken ship; *felt* lifeboats scrape down listing hulls and smack into the sea; *heard* oars splash in the dark as crews plucked surviors from the water and steered toward floundering cries. Would they master the sea? Would rescue ships arrive in time? How many were on the way? How near were they now?

Wireless operators were heroes. Every adventuresome boy dreamed of being an operator: To possess the magical power to send and receive those staccato rhythms streaking through the skies; to "pick up" the cries of stricken ships; to guide a ship to the rescue . . . How they craved to perform those deeds. To them they were deeds that had no equal. Big boys (dads) were afire with interest too. Though tied down with families and too old to start following the sea, they overflowed with restless energy to participate in this new science. The big question of the day was: How can we, too, take part in this new adventure?

Listening Stations

Gradually they learned that little more than a coil of wire and a sounding device was needed to capture, first-hand, these thrilling events. For the outlay of just a little money, the mysteries of the ether could be theirs. Fired with a natural curiosity to eavesdrop on other's conversations, plus a desire to receive intriguing messages from unseen distances, interest in wireless developed into listening stations.

The growth of listening stations spread rapidly. Every neighborhood in coastal areas soon had someone playing with the new toy. People now listened to the strange atmospheric noises right in their own homes. Women eyed this intrusion with skepticism. Menfolk pampered it like a crystal ball. With it they shared the

tantalizing rhythmic buzzes flying through the air.

But the content of wireless messages evaded many of them. Some hadn't mastered the code; others found their speed too slow. Now a burst of enthusiasm arose to conquer those dit-dahs. Chores about the house went untended. Yards soon showed lack of care. But, though wives fussed, men and boys continued practicing. The code succumbed to their concentrated attack. Interpreting wireless messages became a fascinating pastime. Constant listening developed that dreamy far-away look we notice among a "certain fraternity" today. Soon, "Listeners" discovered that some heard things others didn't. Some heard farther away; others received certain stations more dependably. All asked the same question,

What a gigantic "Why" this proved to be. Until now, operators of listening stations concentrated on capturing distant messages and improving their ability to copy code. Suddenly the picture changed. They craved to know "why". It started Amateur Radio.

At the start, experiments consisted of "cut-and-try". Something they heard, they tried; something they read, they followed up; something good about a neighbor's set, they copied. Always, the insatiable curiosity to understand strange phenomena forced them on. And the "why" still goes on—it will always go on. Experimentation is the life-blood of Amateur Radio.

While QRM was not great, atmospherics were. Competing with low note spark transmissions, was the ever present static. On the long wavelengths in use, thunderous static boomed consistently. It made a merry mess in the broadband receivers where the strongest "spark" usually took over.

Reception consisted mainly of messages between various man-o-wars. Gradually, more merchant marine traffic appeared. "Listeners" found commercial messages much more interesting than the formal Navy jargon. Then, there also was the other end of these traffic loops—the land stations. These provided much of the enjoyable listening source. Hearing both ends of a conversation highlighted the eavesdropping. Steadily commercial activity grew. Before long, the air contained plenty of code to excite a listener's evenings.

Invention of Wireless

You weren't an Amateur long before you learned the word Hertz. This word immediately crops up when you study radiation. In 1887, however, it was magic among scientists experimenting in electrical phenomena. That was the year the brilliant young German scientist cracked the secret of wireless waves. Utilizing an oscillating circuit, Hertz showed he could send out electric waves at will. He also proved that electromagnetic waves travelled through space at the speed of light.

Hertz proved his theory by placing two hoops of wire some distance apart. One was a broken hoop. Across the break a spark jumped whenever the current was turned on. The spark, he found, excited like currents in the opposite closed loop. He could get the same effect with the hoops spread several hundred feet apart. His later experiments proved that radiated waves travelled at the speed of light.

At this point of development Marconi jumped in. Still in his teens, this eager experimenter believed wireless telegraphy was possible. First, he used Hertz' broken coil and duplicated radiation over short distances. Then he opened the coil forming two rods in line. The adjoining

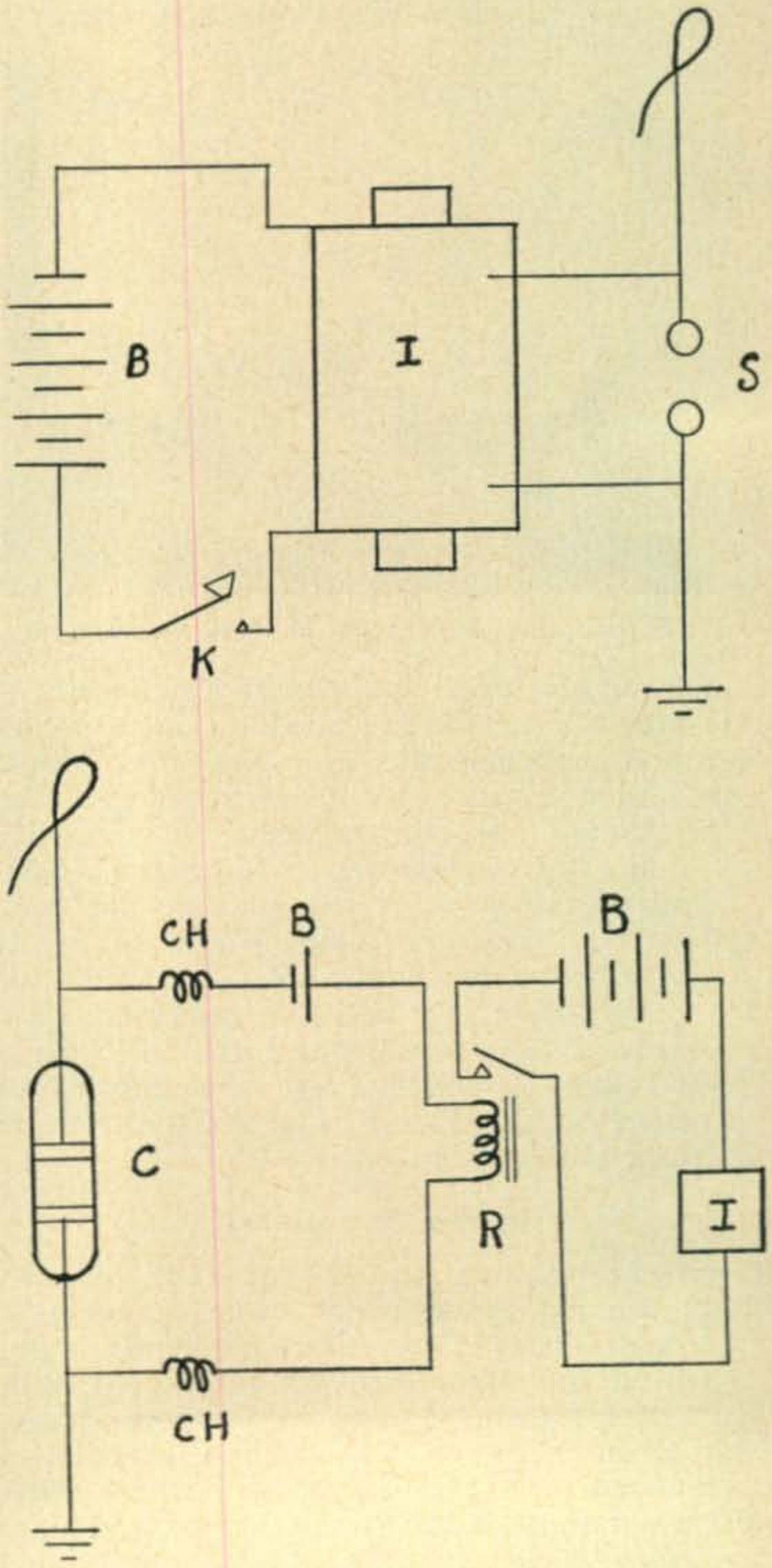
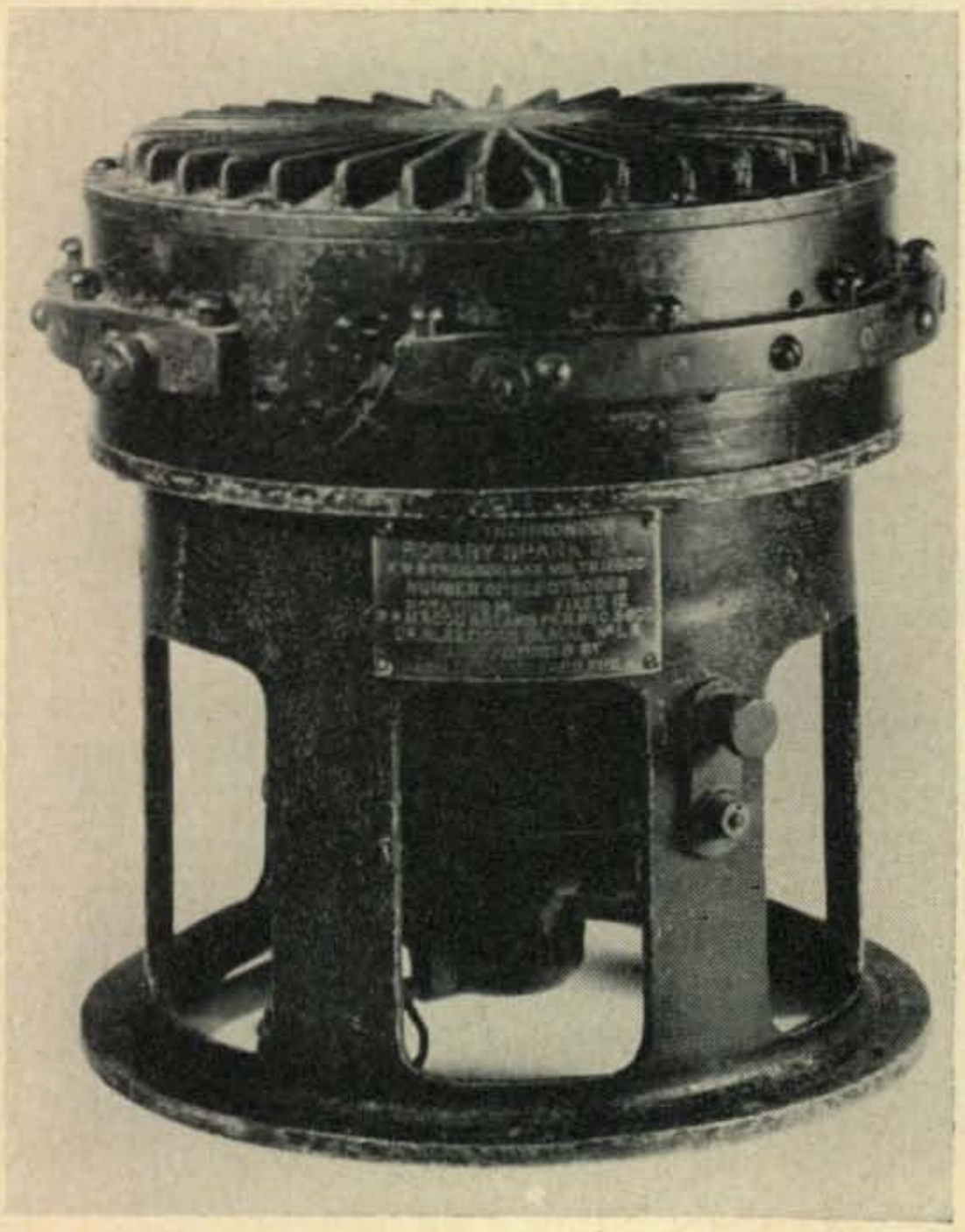


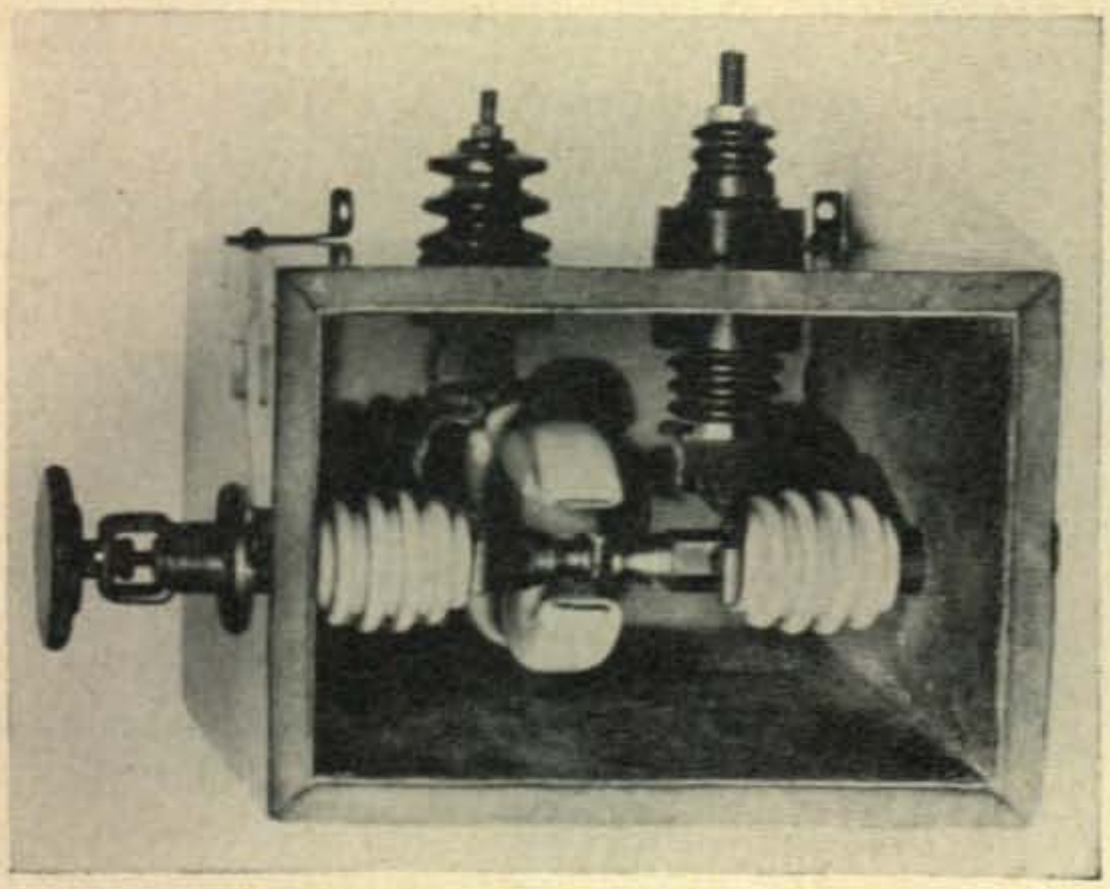
Fig. 2A—Circuit of Marconi's original spark transmitter: B-battery; K-key; I-induction coil; S-spark gap. 2B-Circuit of Marconi's original receiving set: C-coherer; CH-chokes; B-batteries; R-relay; I-Morse recorder.

ends formed the spark gap. With this arrangement he obtained extra distance.

Here Marconi showed a touch of genius. He added a Morse telegraph instrument in the circuit. With it he regulated the jumping spark at his slightest touch. For the first time Morse Code was applied to wireless waves. Dots and dashes flashed into the air. Finally, Marconi connected one-half of the radiator to ground. The other half was elevated and extended into the air. Immediately signals leaped across the bean and cabbage patches of his father's farm. Soon his signals travelled more than a mile. *Practical wireless telegraphy was born!* The year: 1895.



Non-synchronous spark gap from the USS Rowan. *Courtesy of the Henry Ford Museum, Dearborn, Michigan.*



Adjustable air cooled spark gap used by the US Navy. *Courtesy of the Henry Ford Museum, Dearborn, Michigan.*

Growth of Foreign Commercials

Marconi really invented commerical wireless. Ceaselessly he strove to extend wireless communication over great distances. If he achieved one mile, he tried for two. When he conquered one-hundred miles he sought two-hundred. No sooner did he set a record than he broke it. Greater distances constantly succumbed to his efforts. Then on December 19, 1901, he succeeded in spanning the Atlantic with his wireless.

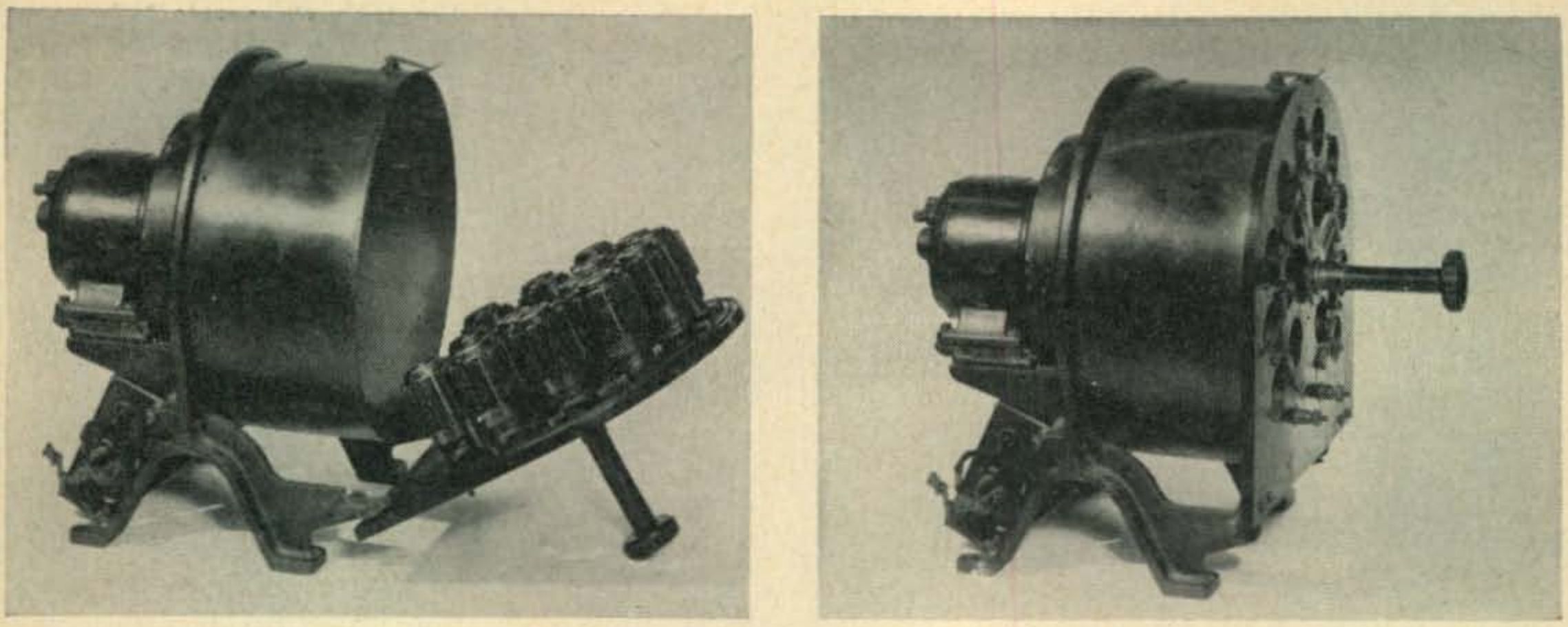
The first patent ever granted anywhere in the world for wireless telegraphy went to Marconi. Marconi took it out in England in 1896. Cooperating with the English, he experimented on an intensive scale. Experiments conducted on land and sea proved to Marconi's satisfaction that wireless worked far better over the ocean than over the land. This suited him fine. Telephone and telegraph were common conveniences on land. But ships at sea had no means of communication.

English capitalists immediately smelled business. Ship to shore communication filled a natural ready market. They formed Wireless Telegraph and Signal Co., Ltd. acquiring all Marconi's patents in all countries except Italy and its dependencies. This first wireless company in the world later became popularly known as British Marconi Company.

As Marconi conquered distances, commercial wireless stations followed in his wake. In 1897, with the help of the Italian Navy, he sent messages twelve miles. Later in the year for Lloyd's Corporation of London, he established communication between two lighthouses on the North Irish Coast. Accomplishment of dependable communication between these two lighthouses gave commercial wireless a tremendous spurt. Shippers now saw the tremendous value wireless offered. They could re-route ships still at sea to ports where prices were highest. Marconi became in great demand. Orders for wireless equipment swamped his company. British ships rode their hawsers awaiting wireless installation.

In August 1898 Marconi erected a station on the Isle of Wight. By means of this station Queen Victoria maintained daily contact with the Prince of Wales whose yacht also carried wireless. On November 15th of the same year, the American liner St. Paul communicated over a distance of 66 miles with this station on the Isle of Wight. The next year Marconi extended communicating distance to 200 miles. Again British capitalists snapped into action. They formed the Marconi International Marine Communications Company and quickly set up shore stations in England, Ireland and also on the continent.

A marine disaster focused the public's attention to the importance of wireless. Early in 1889 a freighter accidentally rammed the lightship on Goodwin Sands near Dover, Eng-



Open and closed views of spark gap with cooling motor from Navy's USS Rowan. Rated 5 kw at 12,500 volts and 500 cycles. *Courtesy of the Henry Ford Museum, Dearborn, Michigan.*

land. By means of wireless the lightship summoned aid. In the next few months, calls from this lightship saved so much life and property that demands for wireless arose in naval circles throughout the world.

In February 1900, the first German commercial wireless station opened up on Borkum Island. At LaPanne, Belgium (near Ostend) Marconi interests completed a station in November. The first sea-going passenger ship to carry wireless left port in February. This ship was the S.S. Kaiser Wilhelm der Grosse. Borkum Island heard it sixty miles away.

In 1901 at Poldhu on the Cornwall coast, Marconi interests erected a powerful station. They were ready to attempt to span the Atlantic. On December 12, 1901 signals leaped across the 1800 miles of space from this station. Marconi and his assistant heard them at their listening post in Newfoundland.

Wireless fired popular imagination beyond anything before in the history of inventions. *Mechanically minded individuals began to construct amateur wireless sets.*

Growth of American Commercials

Late in 1899 Marconi came to the United States. Under U.S. naval auspices, he tried out his wireless on two of their ships in November. With Marconi wireless aboard, the New York and Massachusetts exchanged messages across thitry-six miles of ocean. Immediately British business ingenuity sprang into action. Marconi's business associates formed the Marconi Wireless Company of America. Soon it became known as the American Marconi Company.

Orders for marine equipment now poured into the American Marconi Company. They had demonstrated the ability of ships on the high seas to maintain continuous contact with land stations. Every marine disaster boomed wireless. Operators flashing distress calls to ships and land stations greatly reduced loss of life and property. Soon such incidents were common occurrences.

By Christmas 1902 the U.S. Navy had two land stations operating. One was at Annapolis, the other at the Washington Navy Yard. Lee de Forest set these up at the Navy's request. His company called itself the American Wireless Telegraph Company.

Professor Reginald A. Fessenden was a contemporary rival of de Forest. Fessenden's company was called the National Electric Signalling Company. This company erected three experimental transmitting stations. They located them at Old Point Comfort, Cape Charles and Ocean View in the Chesapeake Bay area. Fessenden's ability can be gathered from his feat in 1900: He transmitted voice over a spark station at Cobb Island, Virginia.

American naval authorities never installed Marconi equipment on our ships. The Navy wanted to purchase the equipment. Marconi interests insisted on renting for a definite time plus other restrictions. So the U.S. Navy veered from Marconi gear.

In 1903 the United States Navy decided the German Slaby-Arco equipment was the best for them. They ordered a dozen sets for installation aboard Atlantic Fleet battleships. Also during 1903 the U.S. Navy established six experimental stations.

The American Marconi Company completed its Wellfleet, Massachusetts station in January 1903. This station succeeded in spanning the Atlantic. President Theodore Roosevelt and King Edward VII exchanged greetings via it. Further expansion by the American Marconi Company placed various land stations on the Pacific coast as well as the Atlantic.

At the close of 1904, the U.S. Navy had twenty shore stations operating, ten more under construction, and plans underway for fifty more. The Navy was equally active afloat: Twenty-four warcraft carried wireless, *orders* existed for more apparatus to equip another

[*Continued on page 125*]

A Quick Substitute for an Audio Generator

Allie C. Peed, Jr., K2DHA
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Rochester 20, New York

Late one night while putting the finishing touches on a SSB exciter unit your writer found at the crucial moment that his venerable and previously trusty audio generator had "gone west" sometime since it was last used. A quick check of the tubes revealed that they weren't the source of the difficulty and the generator was put aside for a later trouble-shooting session since the SSB exciter was the real project of the hour.

No doubt about it though—the continuation of the exciter alignment required an audio input signal. Of course, the microphone could be connected and the old whistle or ahhhhhhhh routine could be tried; but did you ever try to balance signal voltages at two separate points while holding a whistle to a steady tone and amplitude? In fact, did you ever try holding a whistle to a steady amplitude—period?

Now, the question of the moment was: where to get a steady audio signal of approximately known frequency and amplitude. After some head scratching, an idea dawned. Using the station receiver tuned to WWV had been rejected early in the deliberations because a tone in the neighborhood of 1,000 cycles was required and WWV doesn't provide that.

The germ of the idea came when we considered turning on the *bfo* with WWV and adjusting it to give a thousand cycle beat. This was discarded due to the complicating effect of the mixture of audio tones from WWV's modulation which would also be present in the signal. What was needed was a stable, unmodulated carrier for the receiver to tune in. When considered from this angle, a multitude of possibilities occurred immediately.

The *rf* generator, the BC-221 frequency meter, the grid dip oscillator, the receiver's crystal calibrator, or even the station *vfo* (properly disconnected from the transmitter) all could serve as a signal source. The BC-221 was chosen because of its known stability although the receiver's crystal calibrator would have been an equally good choice.

It was only necessary to tune to the signal or a harmonic, turn on the receiver's *bfo*, and "voila!" an audio tone issues from the speaker or headphone jack. And, the tone is continuously variable from the *bfo* tuning knob of the receiver! Perfect!

Now, the next question was how to recognize the approximate frequency that was needed. (Most of us can't guess the frequency of a pure tone within 25%.) Again, a bit of reflection revealed a fairly practical solution. The sweep oscillator of the oscilloscope on the bench was roughly calibrated on its panel control. So, it was only necessary to set the sweep control for 1000 cycles; feed the signal from the receiver 'phone jack to the scope and tune the *bfo* to obtain a single sine wave on the screen. Then the frequency of the sweep oscillator was the same as the audio signal—about 1000 cycles. At the same time we could measure the amplitude of our signal using the voltage calibrator with the 'scope. (A vacuum tube voltmeter could have been used for this level determination if the 'scope had not been calibrated.)

Now, all that was necessary was to patch the signal from the receiver 'phone jack to the audio input jack of the exciter unit undergoing alignment and we were in business. We took advantage of the fact that our audio signal was also available through a power amplifier and speaker to go one step farther with the alignment. To assure the proper working of the circuit with the microphone after completion of the alignment, the mike was placed in front of the speaker and the audio tone was fed from the speaker through the mike to the exciter unit. Then by varying the frequency of the audio signal (by tuning the *bfo*) we also made a rough check of the audio frequency response of the exciter unit with its microphone.

So, the next time that you need an audio signal and a generator is not readily available, don't overlook the receiver in the shack. It's a pretty versatile piece of gear! ■

Neon-Actuated Monitor

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Toronto, 5, Ontario, Canada

Probing with a small neon bulb is the time-honored test for large *rf* voltages. What is perhaps not so well known is that a few volts *dc* appears at its terminals when the bulb is struck. Furthermore, in the presence of amplitude modulated *rf* voltages, the output voltage is *dc* with an *ac* component, the latter being derived from the modulation. This certainly suggests that, providing we can get the bulb and its leads into an area (say around the antenna leads) where the bulb will light without introducing TVI problems, a simple and effective broadband monitor for both AM and CW can be built.

For CW, it will be necessary to amplify the *dc* and use it to key an audio oscillator, but this is not a serious problem. Admittedly this will not give us a reproduction of our emitted signal note but it will provide a check on keying. On AM, the highest frequency output required will be the modulation frequency so *rf* filtering can be applied if necessary.

Figure 1 shows one possible setup based on these ideas. The neon bulb is poled so that it produces a negative voltage with respect to ground when it is struck. This negative voltage cuts off the keyer tube and decreases the voltage drop across the 100K resistor, allowing the cathode coupled audio oscillator to function. When the neon bulb goes out on key up, the keyer tube conducts and pulls down the oscillator plate voltage again and the tone stops. For AM, the *ac* component is not much smaller than the oscillator output voltage so nothing more than *dc* blocking is required. It might be wise to cut off the supply voltage to the tone oscillator when on phone or some tone may be coupled through the Phone-CW switch.

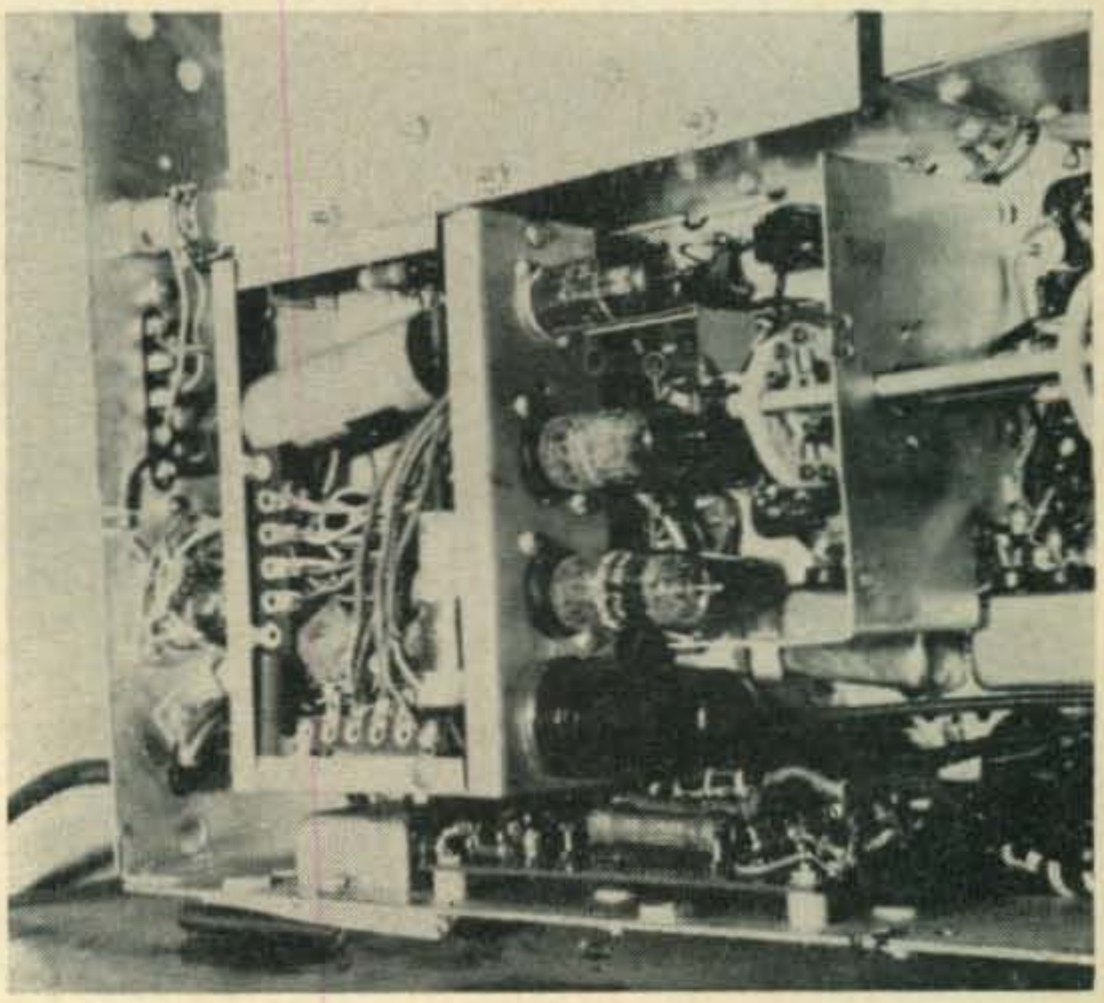
The monitor signal is then mixed into the receiver audio channel—my mixer follows the 6SJ7 amplifier which in turn follows the second detector. This enables the monitor to put a signal into the phones or speaker when transmitting without any other switching operations since only the front end of the receiver is cut off on "transmit."

Two tubes (four triodes) may seem a bit extravagant for this monitor. After struggling to find a transformer or choice that could be coaxed to oscillate (let alone key gracefully) as a Hartley or Colpitts at these frequencies, it was sheer delight to go back to this circuit which behaves so beautifully and is so manageable. The cathode coupled circuit disposes of two triodes and indicates a minimum of two envelopes. Strapping the two halves of the keyer tube is not always absolutely necessary but it doubles the effective gm giving cleaner *dc* amplifier operation.

While typical values are given in the schematic, L_1 is likely to be nearly any sort of large inductor or audio transformer winding that floats to the top of the junk box. L_1, C_1, R_1 and to a certain extent R_2 affect the frequency. To get the oscillator going, remove the keyer tube and if nothing happens decrease R_2 or increase R_1. If L_1 has very low Q, it may also be necessary to increase C_3. Best waveform results if the unit is just comfortably oscillating so R_2 should be left at the value such that a higher resistance will stop oscillation.

If the tone frequency is far too low or high, C_1 will have to be decreased or increased and this may call for trimming R_2 again. If the keying clicks are too pronounced, increase C_2 but don't overdo it—this capacitance controls the time constant of the voltage changes on the tone oscillator plate.

As for tube substitutions, a 6J6 would likely perform well both in the oscillator and keyer positions. A 12AX7 or 6SL7 would likely work quite well as an oscillator. The NE30 is in a



The neon monitor and 1 kc band edge marker located in a crevice of an AR88LF.

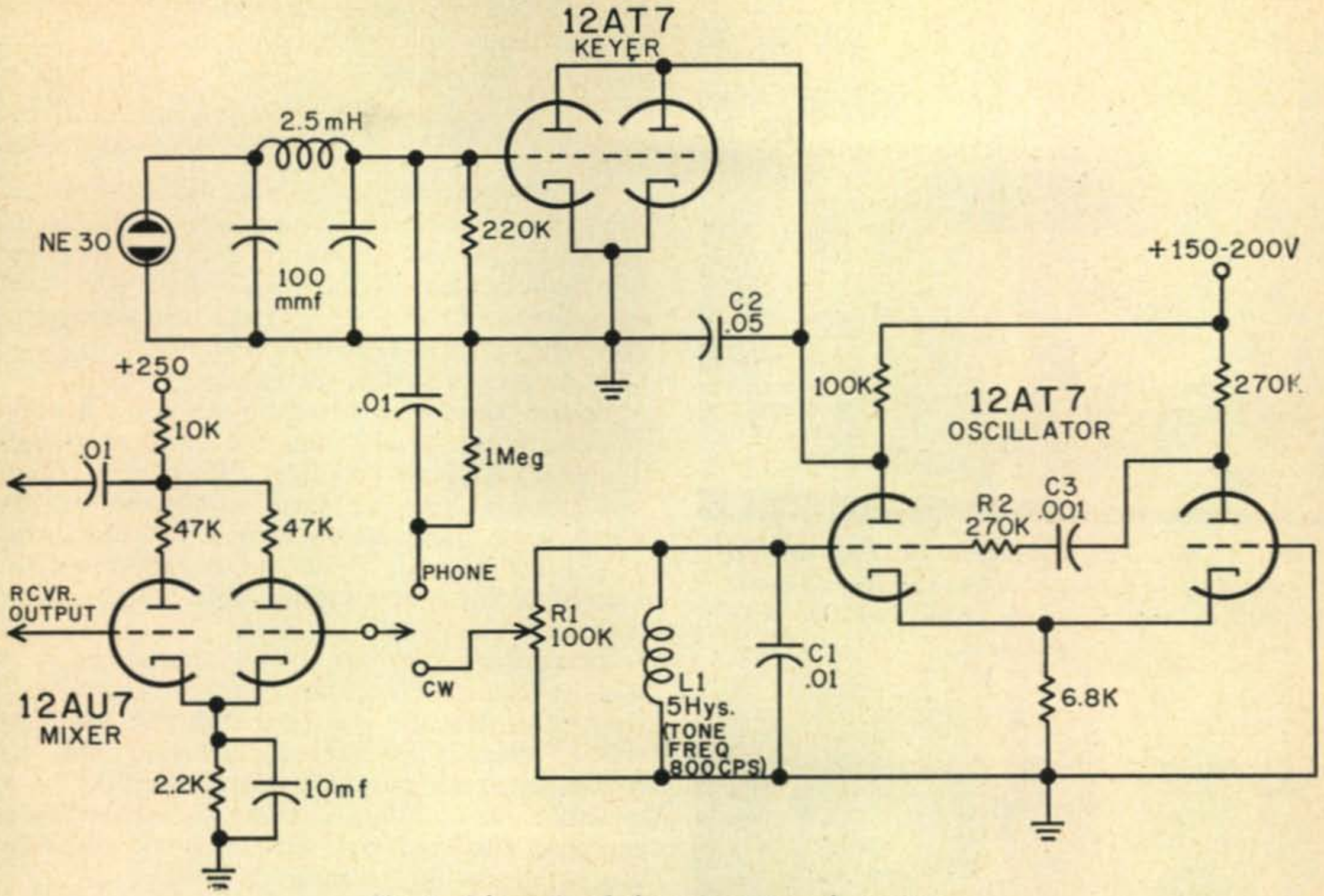


Fig. 1—Schematic of the neon-actuated monitor.

class by itself as the *rf* detector; however the NE45 works tolerably well. The 991 and the voltage regulator family—OA3, OA2 etc.—can be made to work but are rather erratic. ■

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Make A Dial For That Pile!

Photographic Project Creates Accurate, Professional-Looking Dial for Home-Built Amateur Equipment

Your home brew gear doesn't have to *look* home brew! You'll find top-notch equipment designs described in other CQ pages. But the giveaway is that inaccurate, ugly scramble of lines and figures that you inscribed on the face of your new gear. You always need a dial, and you always have to make and calibrate your own.

For only about $5 expenses, depending on what you can find or borrow, plus a couple hours time and some ingenuity, you can make an accurate slide rule or circular type dial with professional-looking white markings on a black field, or with standard black markings on a white background.

For simplicity, the circular type, white on

Fig. 1—Accurate, professional looking dial in place on a home brew all-band receiver. S-meter dial face was made the same way the main dial was.

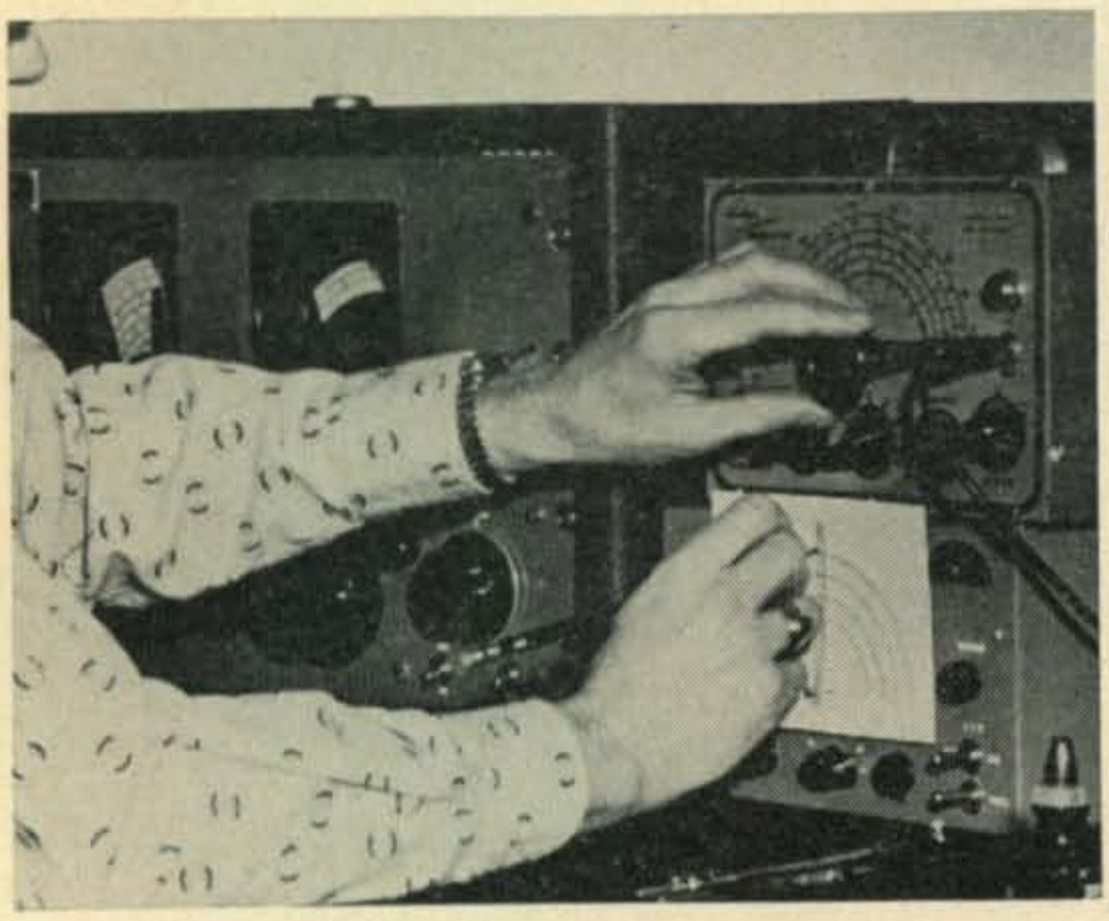

Fig. 2—When the signal generator is heard on both receivers, mark the spot on the work dial with a light blue colored pencil. Proceed across each band.

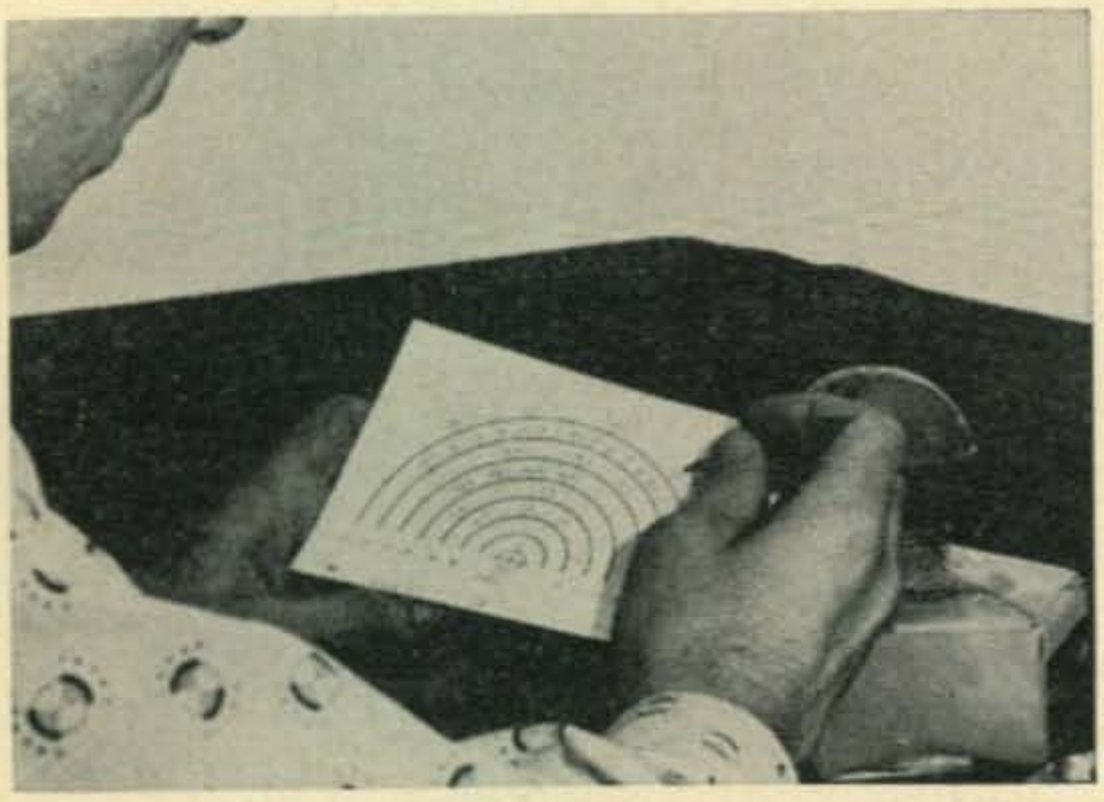

Fig. 3—A variety of numbers are available for the finished work dial. Electric typewriter numbers are shown being glued into place on the work dial, but a sheet of artype numbers worked out better on later dials for other gear.

black, all-band receiver dial shown in fig. 1 will be described. You will easily see how to make dials for other gear.

Make a "Work Dial"

On a work dial of white, heavy drawing paper make concentric, equidistant half circles in India ink for the bands on your receiver. The half circles can be larger than you want them on the final dial, to make a neater, more accurate job of calibration. The entire dial can later be reduced to proper size.

At the focus of the half circles make a small circle slightly larger than the condenser-shaft diameter on your receiver. From the focus make guide lines at what would be exactly north, east, and west on a map, as seen in fig. 3. Cross the small circle but do not cross the nearest half circle. Carefully cut out the circle with a razor blade.

Temporarily but immovably, attach the work dial to the receiver face in the exact position in which the finished dial will go. Use rubber cement or Scotch tape that has adhesive on both sides. Using the guide lines, see that the condenser shaft is in the exact center of the small hole, and that the dial sides are parallel with the receiver sides.

Be sure the work dial covers all of the receiver face area the final dial will cover. If you reduce a large work dial to proper size later, keep the work dial background large enough.

For a pointer, use a strip of clear plastic which is long enough to cross all the half circles on your work dial with enough to spare for mounting it on the condenser shaft. Carefully etch a ruler-straight line down the pointer face with a drawing-compass point. Fill the line with red ink for clarity.

The pointer on the example receiver was mounted by drilling one hole in the end of the condenser shaft and another through the pointer near one end. A small screw and washer were used for attachment. Mount the pointer close to the dial for accurate calibration-sighting. A spacing washer will keep the pointer from rubbing on the dial. Drill a small hole through the pointer on the red line where it crosses each half circle.

Connect a signal generator to the calibrated receiver and to the new receiver, as pictured in fig. 2. Place the signal generator on cw, leave the *bfo* on and in the same position for all calibrating, and keep the volume at a barely audible level. *Important:* To reduce error, allow all equipment involved to warm up for one hour before attempting calibration, in order to obtain standard operating conditions.

Set the bandswitches of both receivers on the band corresponding to the upper half circle on the work dial. Tune the calibrated receiver to a marked frequency on the band. Feed a signal generator signal into the two

[*Continued on page 124*]

A Transistorized "Third Hand"

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The integration of voice control in a mobile radio installation would, to most amateurs, appear to be a complex addition to a branch of our hobby already complicated by the very basic nature and requirements of such an installation. The transistorized voice control relay herein described can be added—with a minimum of time, labor and complexity—to any transmitter presently utilizing push-to-talk operation.

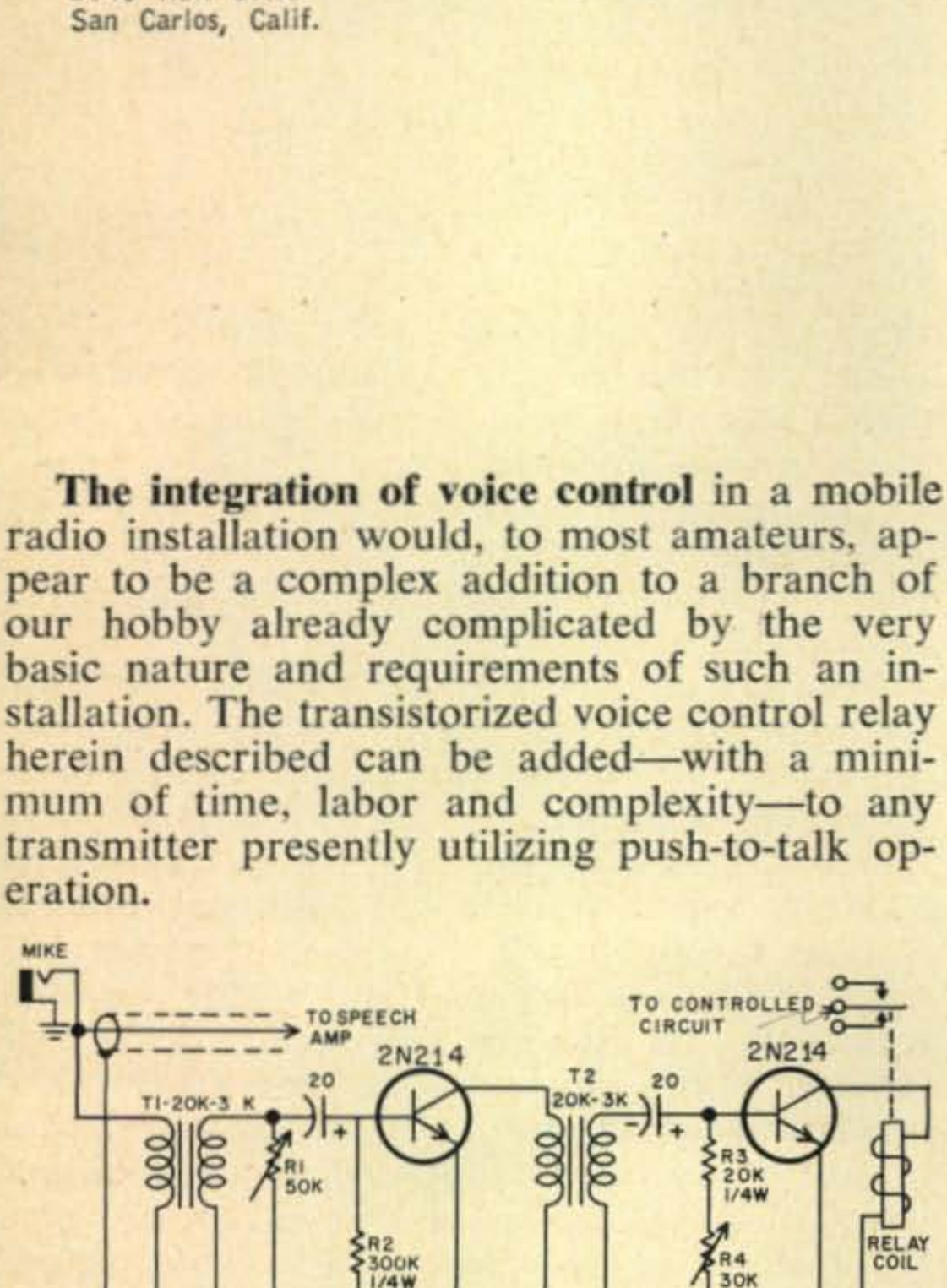
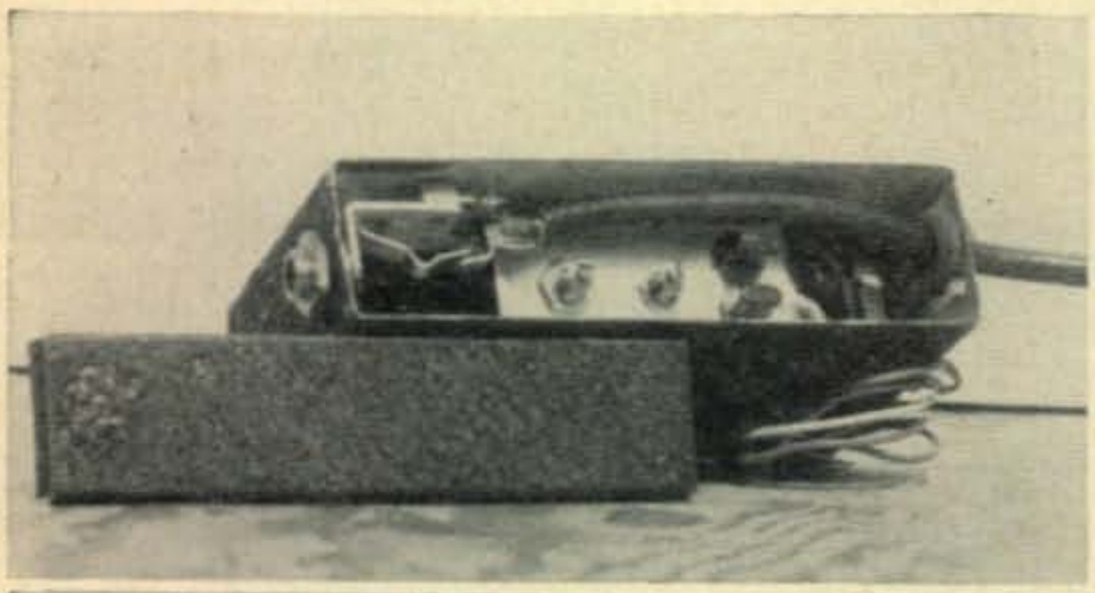


Fig. 1—Simple transistorized vox unit for mobile operation.



An analysis of the requirements involved in the operation of mobile equipment would indicate that most human faculties are in constant use while operating a motor vehicle. The voice, though used occasionally, is not essential and becomes a natural for turning equipment "on" and "off." Though there have been tremendous advances made towards simplifying the operation of an automobile, there has as yet been no substitute for both hands on the wheel and eyes front. In effect, using voice control is comparable to possessing a third hand.

Examination of the circuit shows a conventional amplifier utilizing two 2N214 NPN transistors. The first stage, operating in class A, draws about 1.0 ma and in turn is coupled through a 6.6:1 impedance ratio transformer to the base of a dc amplifier which draws a quiescent current of 1.5 ma. The network C2, R3, R4, form an RC network with a time constant sufficient to keep the relay from operating at a syllabic rate. This time constant can be varied from zero to about two seconds by adjustment of R4.

R1 is a level control which reduces the sensitivity of the amplifier to that required for close talking in mobile operation; otherwise traffic and car noises would easily trip the relay.

T1 has the same impedance ratio as T2, but in the prototype model considerable departure from this ratio was possible before adverse effect on the operation was noticeable. T1 matches the high output impedances of crystal and dynamic microphones to the comparatively low base impedance of the class A stage, minimizing insertion loss.

When voice energy is applied it is amplified by the first stage, then coupled to the base of the dc amplifier whose collector draws as much as 2.7 ma through the coil of the relay. This closes the relay contacts which in turn completes the circuit to the transmitter relay. The relay used in this particular model was a BK-7, but there are many model control relays on the market which are physically smaller and op-

[*Continued on page 124*]

Zanzibar Hush-Hush

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An SSB trip had been planned for mid November among the VQ4 hams, when rumors began to come up from ZS, VQ3, etc., that a rival party might come up quietly in the meantime and pip us at the post!

PANIC STATIONS—ground planes or dipoles—by road or plane—the time factor and the boss, who and when and how and what about the cost of a plane to VQ1???!!

After the preliminary flutter was over it was discovered that most of the rumors were in fact rumors, but not all of them!

Eventually one week after the flap VQ4ET Jim, and VQ4ERR Robby got the rig together and tested and onto a charter plane.

We left on Monday September 15th and arrived at Zanzibar at midday. Still no accommodation available at the only Hotel and the alternate arranged QTH was next to a large diesel plant and the noise level was S9. After a frantic tour around we discovered all Robby's pals were in tiny flats or had no ac power. Back to the hotel and found a little shelter on the flat roof with open sides covered by mosquito netting. Cool and no need to worry about keeping the residents awake—an "earth" close by from the roof water cistern and a 15 foot pole lying there—believe it or not!

After the hotel staff were persuaded that that was just what we had dreamed of and that it was perfect, they went to a deal of trouble to make us as comfortable as possible and gave us the run of the place and of course the roof!

Whilst erecting the ground plane we noticed some very pretty flimsy garments on a line and later a small voice called up "she had left something on the roof; could she come up a moment." We replied "Too late, we have seen them, and that Red Heads shouldn't wear black nylons anyway!!!"

The radio intrigued the staff a lot and we were told "anytime radio amateurs like to repeat the expedition, they would be made very welcome."

We were on the air by the tea time but found for some reason that 15 metres was very poor indeed but 20 metres was quite good and these conditions prevailed over the two days we were there. TI2HP was the first contact and then VQ4GU and then came the SSB deluge!! We worked through to 2.30 am, in the morning when the band collapsed. At 5 in the morning it opened up a little and USA came in and lasted until 9 am—between 9 am and tea time the bands were dead and we had a pleasant swim on one of the beautiful beaches of the fabulous island of cloves, cinnamon and vanilla. The perfume of cloves and cinnamon is quite noticeable and makes up the bulk of the island's export.

Zanzibar is nearest to Dar-es-salaam and Tanga on the African shore but only one boat a week on Sundays—and that my friends—was why we had to fly there!!!

At teatime, on Tuesday the band really opened up and the W6's rolled in and we were at it with intervals until the small hours while it lasted. On Wednesday the band opened up again at 6 am and we got in three hours more and the band faded out at 9 am. We were packed and in a car by 9:30 am, on the plane at 10 am and back in VQ4 by lunch time. In

VQ4ET and VQ4ERR.

VQ4ERR-Robby says it's hot in Zanzibar

all, 190 contacts, and 35 countries. The first five stations were K6LAS, W6OBH, W6IAL, W6SJ, W6UOU who passed the word around and phoned USA pals that a NEW SSB country was on. The last words heard on the loud speaker were "Say — did you work that VQ1ERR—I just let him have one *blast* and brother he came straight back at me, yessir!!!!"

This sent us into hysterics—I really don't know why it struck us so humorously—perhaps it was the pride of achievement in the voice, anyway it pleased us a lot!! and we felt our backaches were well worth while after that one!!

The amateurs were very cooperative and only too glad "to go to 14290" or "spread out more please." I think it is just a matter of telling them what frequency to call on and asking them politely to do what you want them to do.

We all had one thing in common, to fix up as many as one could in the short available time we were in Zanzibar. We were sorry we had to keep 'Hush Hush,' but as soon as our very portable KWM-1 arrives we expect to go again for a week and also take in a few days in VQ3. In the meantime we have three amateurs, VQ4ET, VQ4EV and VQ4ERR all booked for sailing to VQ9 next August for a three weeks SSB and CW expedition of which more anon. ■

Modifying the NC300 for WWV

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Yes, it can be done and very cheaply too. No, National doesn't think you should, inasmuch as the Eleven Meter section is going to citizen band and you just might be interested in it. So, I whipped out the receiver manual and checked circuit constant coil and condenser positions and then a bit of thinking and some reasoning.

1. I could rewind the coil but no, that is a lot of work. That was out right there.
2. Give it some extra conversion. That's too much work too.
3. The answer—padding the condenser.
4. Does it work? You better believe it does.
5. Which WWV freq. did I want? Well that was an easy one, 10 *mc* of course, it being the most constant here.
6. So with all the above information at hand the rest was simple. I grabbed a hand full of various value condensers and started in.

The coils to be padded are T22, T23 and 24. So with the trusted grid dipper in hand, I started in and here are the results.

Oscillator coil, T24, 230-240 mmf ceramic zero temperature added. This should be a 5% condenser. It then will tune to 12215 *kc* somewhere on the dial scale of 11 meters. Mixer coil T23, 240 mmf mica. This coil will now tune to 10,000 *kc* (WWV). Peak it with C 69B.

T22 and coil also takes 240 mmf mica. Don't worry about this one for the antenna trimmer will help you there. With the soldering guns they have today, the oscillator padder can be soldered across the condenser C75. The mixer padder has a 6/32 bolt, nut and soldering lug added directly across from C69B. There are three holes in the compartment; use any one of the three. The antenna coil padder is soldered directly across the coil and that is it.

I used the existing Xtal calibrator to align C69B before I stuck the antenna on. I then put the wire to it and guess what. WWV at this QTH comes in at 27,410 on the dial. I probably could get it to 2.70 on the dial but what for? I wanted WWV and I got it. The total cost was roughly 75¢. Not bad for the job it does.

All I can say now is heat up the iron and have at it. It should take about an hour and you'll have a useful spot again, not just a little streak on the drum of a mighty fine communications receiver. ■

Vacuum Tube Keyed Oscillator

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The strong desire for the soft yet firm keying which can be had with a vacuum tube keyer led me to search for a system having the characteristics of a vacuum tube keyed circuit without all of its additional bulk.

After looking at oscillator circuits of all types for some time, it seemed logical that a good way to stop an oscillator would be to increase resistance loading across the proper place in a tuned circuit at a rate consistent with good keying—the reverse being true for starting.

A Clapp oscillator was chosen as a most likely subject because of its high degree of decoupling of tube from tuned circuit and the cathode circuit seemed to be an appealing place to apply a keyed variable resistance to turn the thing on and off. Also, the small amount of reactance that may be reflected with keying would have small effect in producing a chirp.

The Clapp circuit was chosen as a matter of convenience only. Any of the other basic oscillators would undoubtedly work in a similar manner if one has the patience to tap coils. The circuit in fig. 1 shows the basic idea.

The next problem was in finding a way to effect this change of resistance in a manner consistent with good keying. A grounded grid amplifier immediately came to mind for this service. The fact that a grounded grid amplifier has an input resistance that can be made to change from very low to very high with a small change in grid bias led to the circuit in fig. 2.

The only basic change made in the oscillator circuit section is found in the addition of R2. This was added to provide safety bias on V1A because no bias is developed across R1 when oscillations are squeezed off under key up conditions and, at the same time, to protect V1B. As luck would have it, degeneration improved the overall function, hence a bypass capacitor which would have been applied across R2 was not required.

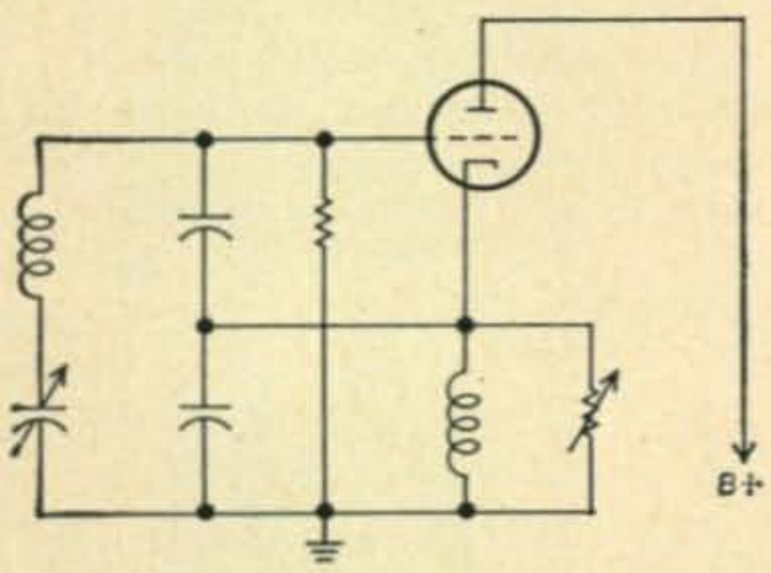

Fig. 1

Keying Time Constant

The network determining keying shape is R3, R4 and C6. A close look at the circuit will show that the time constant is compounded in that as bias builds up on V1B under key down conditions, the portion of bias across R2 caused by V1B is decreased. This allows an increase in the transconductance of V1A to assist in the start of oscillation. It is interesting to note that as bias is decreased across R2, it is increased across R1 tending to enable the plate current of V1A to remain nearly constant under key up or down conditions; a very desirable condition for a keyed oscillator.

Amplification & Isolation

In addition to serving as a keyer, V1B serves as a stage of isolation and moderate amplification. In the circuit shown, a gain of 4 was realized between the output of the oscillator at RFC1 and output of V1B. A definite compromise is involved here in that V1B must be biased into a low to moderate transconductance area to let the oscillator start and R5 must not be made too large if V1B is to reflect a resistance sufficiently low across C5 to stop oscillation under key up conditions.

Construction & Adjustment

Fabrication of this unit requires the ever-present mechanical rigidity requirements. Since mechanical problems usually center around the mounting of the inductance, the easy way out

[*Continued on page 123*]

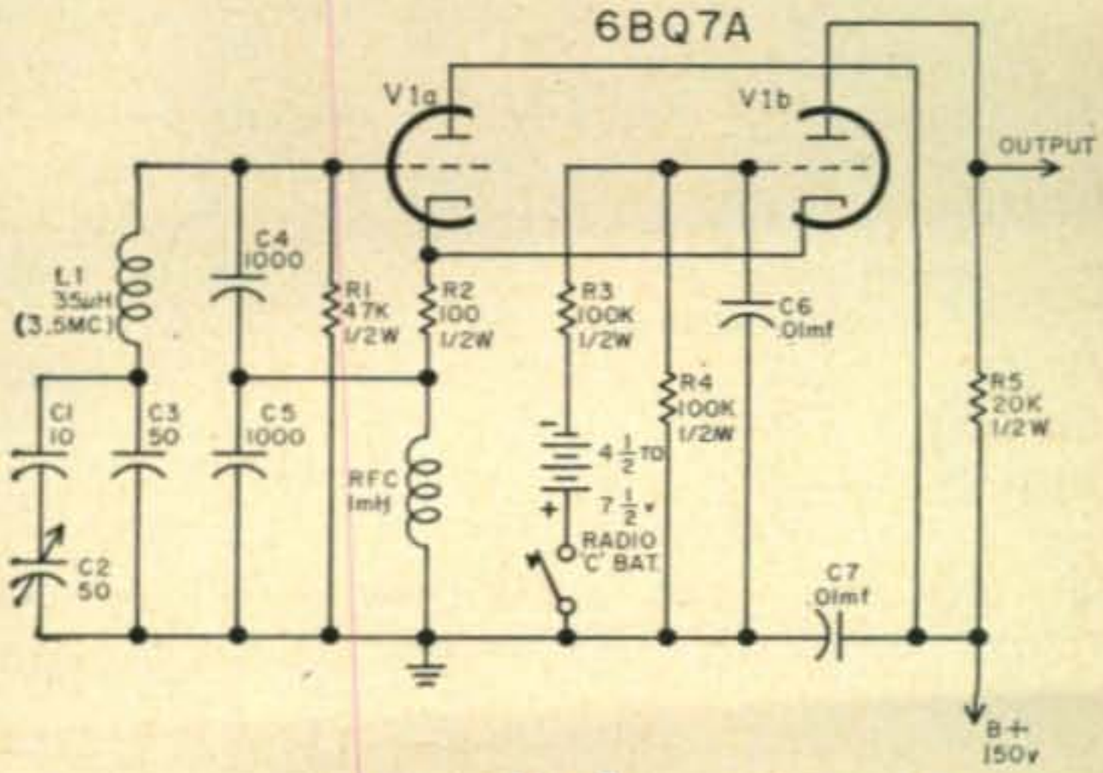

Fig. 2

Trite Trivia Modulated by Vitriolic Vituperation

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Considering the vast amount of money presently invested in Amateur Radio gear and the high degree of efficiency attained by the art of communication, one might reasonably expect to enjoy interesting and intelligent conversations with fellow amateurs.

But what does a cursory excursion across the various bands disclose? The same old hackneyed *cliches* and inane expressions from "Henry Aldriches," "Space Cadets," "Characters" and self-appointed philosophers.

Before you rush out and buy a six hundred dollar receiver, expecting to enjoy scintillating repartee flashing back and forth through the ether, take a look at these excerpts from QSOs on the 15-meter band one rainy afternoon.

"*. . . and the antenna is a two-element beam pointed in your general direction . . .*"

Chances are it wouldn't make any difference if the so-called "beam" were pointed straight up. Besides, it is common practice to point the beam toward the station we want to work.

"*. . . You are 30 db over 9 on a stingy S-meter . . .*"

Why are all S-meters "stingy"? Looks like once in a while we would run across a fellow with a "liberal" meter. At any rate, it is the "Q5" that really counts.

"*. . . I make your frequency to be 21,320 kc . . .*" (Actually, the frequency in question was *21,337* kc.)

Why risk getting some poor devil in Dutch with the FCC, if you can't come any closer than that? Or yourself, for that matter.

"*. . . I've got to run downstairs and see what the XYL wants. Go ahead and make a transmission . . .*"

Make a transmission? To whom? Or perhaps this bird-brain has a portable loud-speaker strapped to his shoulders for such occasions.

"*. . . and 'we' would appreciate it if you would send 'us' a QSL . . .*"

These "two-headed" lids give me a deep-seated pain. After all, what is wrong with the personal pronouns "I" and "me," when only one person is involved?

"*. . . Come here, Judy, and say something to Harry. Judy is only two years old but she loves to talk over the mike . . .*"

Sure, Judy is a jewel to you, but to your bored victim she is more than likely just another mumbling infant. A 1-year-old parakeet would be more interesting.

"*. . . Your signals are Q5 and S9 but I missed your handle and QTH . . .*"

Translation of Q5 S9: "I received you solid. Your signals are extremely strong." Why advertise your apparent lack of operating "savvy" by putting out such obviously phoney reports?

"*. . . The QTH is 30 miles west of Chicago and about 18 miles south of Joliet, blah-blah-blah . . .*"

After all this rigmarole, your contact still has a blank space in his log for your location. Why not say "Mudville" and get it over with? If your contact is interested in pin-pointing Mudville, he will doubtless request more specific information.

"*. . . Well, Old Man, I really must shove off. I have to be at the button factory in ten minutes . . .*" (This, after having chewed your ear for fifteen minutes, without a station-break, or giving you a chance to get in your two-bits worth.)

Provided you have the intestinal fortitude, you would be fully justified in coming back with something like this: "Well, shove off. Get lost. *Good*-bye."

"*. . . signing over, off, and in the clear . . .*"

Mother-of-Pearl! How redundant can you get? Surely you can come up with something more original to signify the termination of a QSO.

"*. . . and-aah . . . this spring I may-aah . . . put up a beam so-aah . . . I can work some-aah . . . DX, but-aah . . . er-aah . . .*"

This poor guy's brain is out of "sync" with his tongue. Perhaps he should save his halting speech for the XYL when he comes home at 2 am after the club meeting adjourned at 11 pm.

"*. . . and if you hear me again, give me a shout and I'll do likewise . . .*"

This is probably one of the most glaring examples of "rubber-stamp" triteness heard on the bands today. It sounds even worse when uttered by two-headed operators.

"*. . . Thanks for the nice report. My receiver doesn't have an S-meter and I can just barely hear you. Must be one-way skip . . .*"

No, Mortimer, it isn't one-way skip. Your contact has a good receiver and you are trying to get by with a *Dickey-bird 38*. You can't do a good job without good tools.

"*. . . Heard you calling 'CQ Akron, fone-patch,' but you are coming in so good up here in New Jersey thought I'd give you a call, blah-blah . . .*"

This poor lost soul has no respect for directional CQs. In this instance, he would probably

[*Continued on page 123*]

A Simple and Inexpensive Phone Patch

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Reader's Digest in a recent article, brought to the attention of the general public, the ham use of phone patches. Evenings on twenty meters bring home the idea of how much the sidebanders use them. Phone patches may be used on any rig by any ham, and *do* improve the convenience of amateur operation.

In most areas phone patches exist by the unspoken permission of the telephone company, for the company does profit in tolls from the amateur line that otherwise would not be received, as, for example, from the antarctic. Before any phone patch operation is considered, the ham should *quietly* and *unofficially* feel out the local telephone company attitude. There are a few basic requirements that any phone patch must meet to be tolerated on a telephone line, and these should be understood before any conversation with the telephone company takes place.

First: a phone patch must not disturb the *dc* conditions of the telephone line. This means that only capacitive coupling may be used and that the line circuit be completely ungrounded, so far as the phone patch is concerned.

Second: the alternating current circuit should be completely floating to permit the phone patch accommodating itself to the telephone line, rather than altering the line characteristics through stray resistances and capacitances.

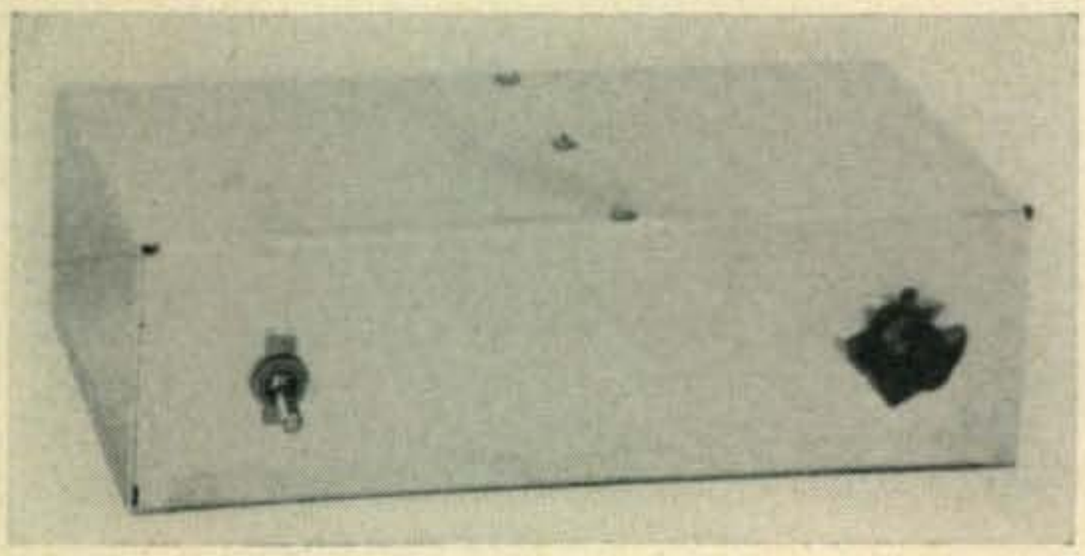
Third: the signal put into the telephone line by the station receiver must not exceed a few milliwatts, often not more than 1 milliwatt. While the satisfactory level can be set by adjusting receiver output for comfortable output level in the headphone of the handset, hams must watch out for noise pulses. Ordinarily, a ham with a few years' experience has grown accustomed to ignoring unwanted signals and noise. Telephone equipment cannot learn from experience and will overload on any strong signal. An instantaneous level indicator such as an oscilloscope or magic eye must be used for monitoring unless the amateur consciously listens for noise and interference and adjusts his receiver level accordingly.

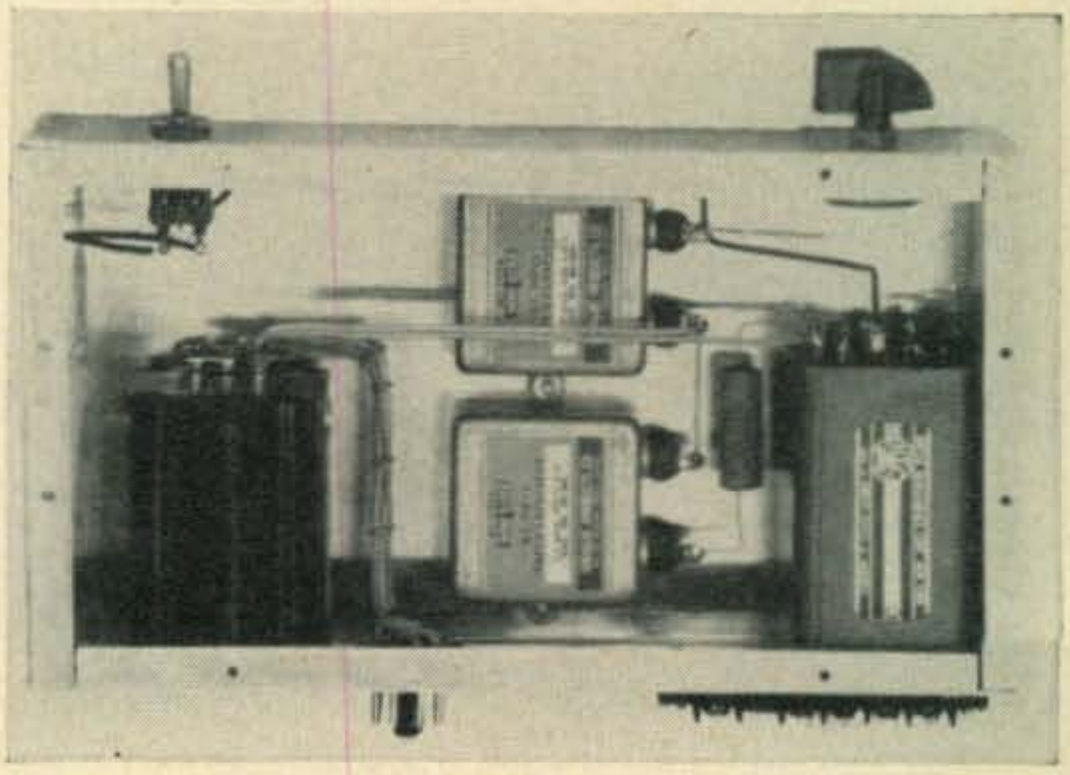
Fourth: no possibility of audio oscillation can be permitted to exist. Oscillation inevitably builds up a signal level to maximum possible amplitude with line overload resulting.

The phone patch to be described was designed with these ideas in mind, and, except for human errors, does a fair job of avoiding them all. No design originality can be claimed, for with only two minor exceptions the device to be described has been used on communications lines for years.

The Ideas Behind the Phone Patch

The purpose of a phone patch is to permit feeding the audio output of a receiver into a line and feeding the incoming audio on the same line into a radio transmitter. Theoretically this can be done without interaction at one





and the same time, though good practical reasons usually prevent its accomplishment. This patch was designed on the theoretical basis, however, so a simplified discussion is in order.

Incoming and outgoing signals on any line may be separated by use of a bridge circuit. Customarily, such a circuit will dissipate as heat, half the incoming and half the outgoing power.[1] These circuits are easily made by use of transformers at audio frequencies, the impedance of the transformer windings being proportioned to the line impedance. Two transformers are required, one having a winding of half the line impedance, the other having a center-tapped winding of twice the line impedance. A resistance equal to the line impedance completes the basic parts necessary for the bridge.

For the purposes of this design, the line impedance was assumed to be 600 ohms. The chances of a line impedance being exactly this value and a pure resistance at *any* frequency are very slight, but a starting point must be chosen. In this case, the center tapped transformer primary should have an impedance of 1200 ohms and the other transformer should have a secondary impedance of 300 ohms.[2] A 600 ohm resistor should be used as the dummy.

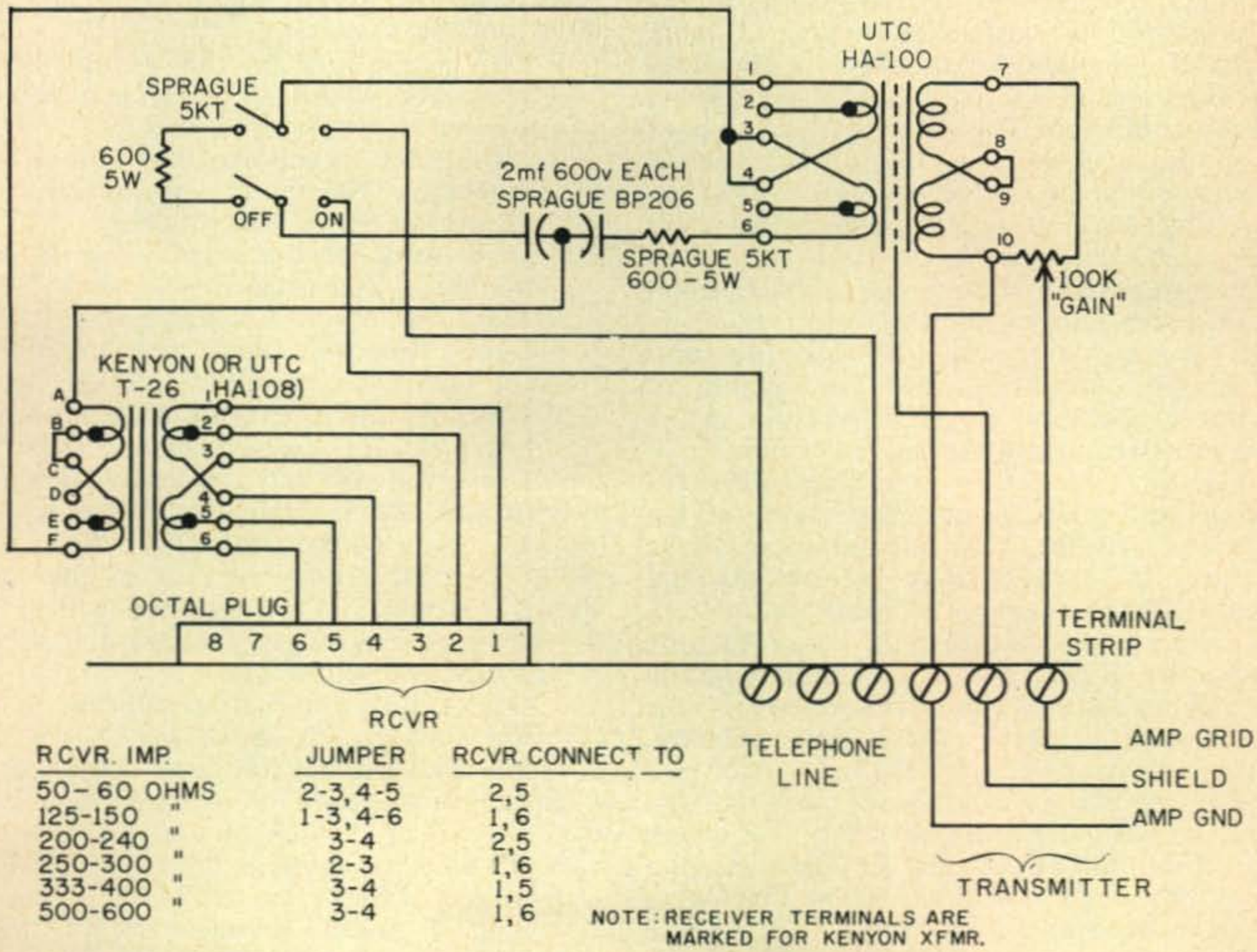
The practical circuit is shown in fig. 1, including other features mentioned in the precautions of the preceding section. The 2 mfd capacitors are to provide dc blocking so that the *dc* characteristics of the telephone line are no disturbed, while the electrostatic shield in the HA-100 is to assist in preventing *rf* from entering the telephone line. The transformer connected to the transmitter section is a 600 ohm to 60,000 ohm ratio, and terminating the high impedance secondary in 100,000 ohms gives a primary impedance of 1000 ohms, a close enough match to the desired 1200 ohms to prevent serious signal loss. While this procedure cannot be followed in high-fidelity cases, the low-frequency response of the transformer is only slightly affected considering the low fidelity of telephone transmission. This technique also permits signal transfer through a gain control to the crystal or high impedance audio input of a transmitter without transmitter modification.

The second transformer is of the line-to-line variety and is (as used here) somewhat less expensive than the transformer discussed above. Multiple primary taps make possible matching to a wide variety of line impedances, but there is no reason why any transformer whose secondary will present an effective impedance to the bridge of 300 ohms cannot be used.

[*Continued on page 115*]

1. An exception to this condition is discussed by Geiser, "Degradation of Signal-to-noise Ratio when Using a Directional Coupler for Duplexing", Tenth Southwestern I.R.E. Conference, April 10, 11, 12, 1958

2. W. L. Everitt and G. E. Anner, Communications Engineering, Third Ed., McGraw-Hill, N.Y., 1956, page 206



RCVR. IMP.	JUMPER	RCVR CONNECT TO
50–60 OHMS	2-3, 4-5	2,5
125-150 "	1-3, 4-6	1, 6
200-240 "	3-4	2,5
250-300 "	2-3	1, 6
333-400 "	3-4	1,5
500-600 "	3-4	1, 6

Fig. 1—The practical circuit of a simple patch.

DX-100 Modernized For SSB, AM And CW

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After considerable investigation (snooping that is), I decided to modify my DX-100 for AB-1 linear operation of the 6146's. And being a CW hound at heart I naturally wanted to clean up the keying. After a few weeks of checking on this and that, it was decided to really modernize the DX-100. I spent a lot of time on this job but truthfully it was time well spent.

For best results, tetrodes in linear operation must be operated in AB-1 or AB-2. This will also kill some of your TVI troubles. The DX-100, as originally designed, clicked all over the place. The method, or should I say the acrobatics, required to "zero" in on a signal was just plain confusion. The screens of those poor 1625 modulators were taking a real beating and the low voltage power supply of 400v unloaded was mistreating the speech amplifier tubes.

The requirements broken down were: operation of tubes and components near their intended ratings. Good clean CW keying plus break-in. The amplifier must be capable of AB-1 linear operation for SSB. AM phone operation must remain in the rig. A minimum of switching to "zero" in on a frequency. All operating conveniences must be right on the front panel. All the above requirements have been met. In addition there is now filament and plate voltage available at the Remote Control Socket for that Single Side Band Adaptor

Schematic, fig. 1, shows all changes in the circuits. The pictures show placement of the new regulator tubes, bias potentiometer, switches, and coax receptacles.

To simplify the explanation of re-wiring details I have used the marking symbols that are used in Pictorial 10 of the DX-100 instructions. A few new terminal strips that were added have been given new symbols and these are designated as we get to them. "RCS-1" will be terminal 1 of the Remote Control Socket. "N-9" will be terminal 9 of the Phone/CW switch. "KK"—"XX" and "ZZ" are symbols for new terminal strips in the rig. Before you start any work, dig out Pictorial 10. The following sequence was followed in making the changes in my DX-100. For those that like to follow the Heath method for assembly of kits I have attempted to break it down to a 1, 2, 3, operation. Also remember (S) means "solder" and (NS) means "do not solder." After kicking this little article around, I developed a healthy respect for the Heath Engineers.

Now for the details.

( ) The lacing cord on the wiring harness is removed, starting at HH clear around to FF.
( ) Drill holes for the driver *rf* output SO-239 receptacle. See fig. 2, and picture.
( ) Mount an SO-239 in this hole.
( ) Drill holes for the amplifier grid SO-239. See fig. 2 and picture.
( ) Mount an SO-239 in this hole.
( ) Drill a hole for the key jack directly above the driver *rf* output SO-239. See fig. 2.
( ) Unsolder the *rf* coil at N-9. Remove the key jack and *rf* coil from the front panel. Leave the coil and condenser on the jack.
( ) Mount the key jack in the hole on the rear skirt of the chassis. See fig. 2.

Note: The picture of the rear of the DX-100 shows a 4-terminal microphone socket where the key jack should go. Disregard this part of the picture and follow fig. 2.

( ) Drill a hole for the "zero beat" switch in the front panel, above the chassis and in line with the old key jack hole. See fig. 3.

Use extreme caution in drilling the panel for the "Zero Beat" switch so that you don't damage the filter condensers.

( ) Mount a SPST switch in the "zero beat" hole. I prefer a toggle switch for this operation, but some may prefer a push-button. It's your choice.

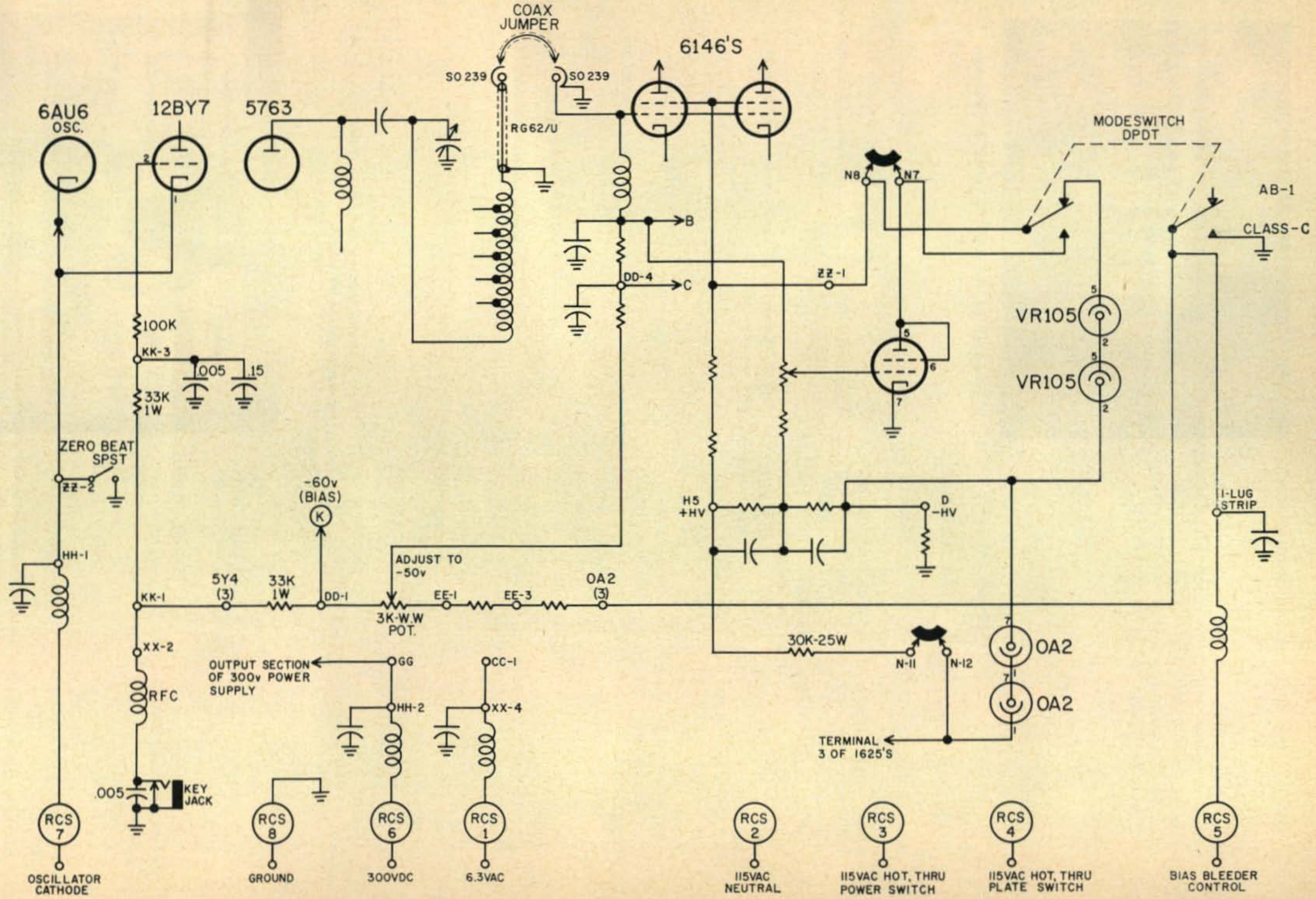


Fig. 1—Circuit areas of the DX-100 modernized for SSB, AM and CW.

( ) Ream out the hole in the front panel, where the key jack was removed, to hold a DPDT toggle switch.
( ) Mount a DPDT Toggle switch in the above hole. A switch insulated for 250v is satisfactory since the voltage is regulated to a maximum of 210v. *This switch will now be called* "MODE SWITCH."

Coax Jumper

The following steps are required to get the exciter *rf* out of the back of the rig and back in to the amplifier grids, through coax cable and fittings.
The single Side Band Adaptor will use these fittings.

( ) Run a length of RG62/U (outside diameter .242") from the end of the 10-15 meter coil, where it is attached to the feed-thru insulator, down into the corner behind the 5763 and 12BY7 sockets—drill a hole to pass this cable into the high voltage compartment near the left hand 5R4GY socket—continue the run back in the high voltage compartment to the SO-239 below the key jack. Connect the center conductor of the cable to the solder lug at the end of the 10-15 meter coil after you have unbraided some of the sheath on both ends to make pigtails to ground. Connect the opposite end of the center conductor to the SO-239 center contact. Now solder all connections to the cable and ground the sheath at both ends.
( ) Locate the wire running from the 10-15 meter coil, in the amplifier compartment, to the 1.1mh rfc of the grid circuit. Cut this wire out of the circuit at both ends. In the future the drive for the amplifier grids will be fed through the RG62/U cable and the SO-239 receptacles on the rear skirt of the chassis.
( ) Mount a 0.001 mfd mica condenser between the center contact of the SO-239 receptacle mounted directly behind the 6146 sockets, and Terminal 5 of the rear 6146 socket. Solder both connections.
( ) Make up a jumper of RG62/U with PL-259 plugs and adaptors at each end. Make the jumper long enough to reach from the SO-239 in the exciter output to the SO-239 in the amplifier grid circuit. This jumper will feed the exciter output to the amplifier grids until you get that SSB Adaptor.

This completes that part of the work required to get the *rf* from the exciter to the amplifier via the rear end of the rig but to complete the modernization continue as follows:

( ) Spread the turns of the 10-15 meter coil apart as much as possible and yet still be able to tune to the top and bottom ends of

Rear panel of the DX-100 after modification.

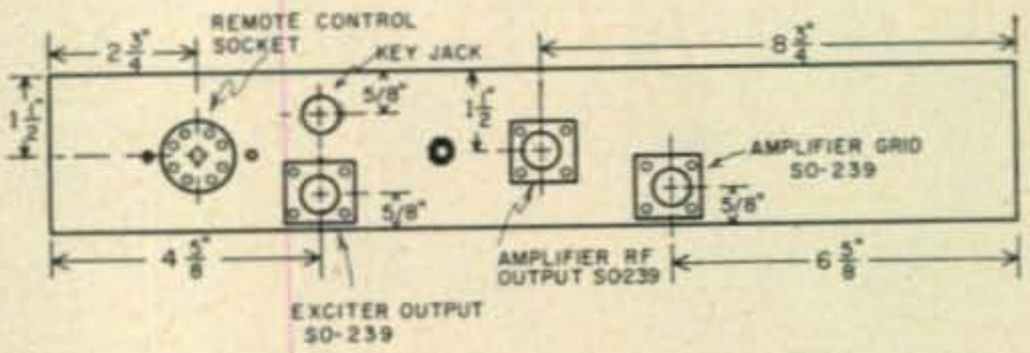


Fig. 2—Placement of coax receptacles and key jack on rear skirt.

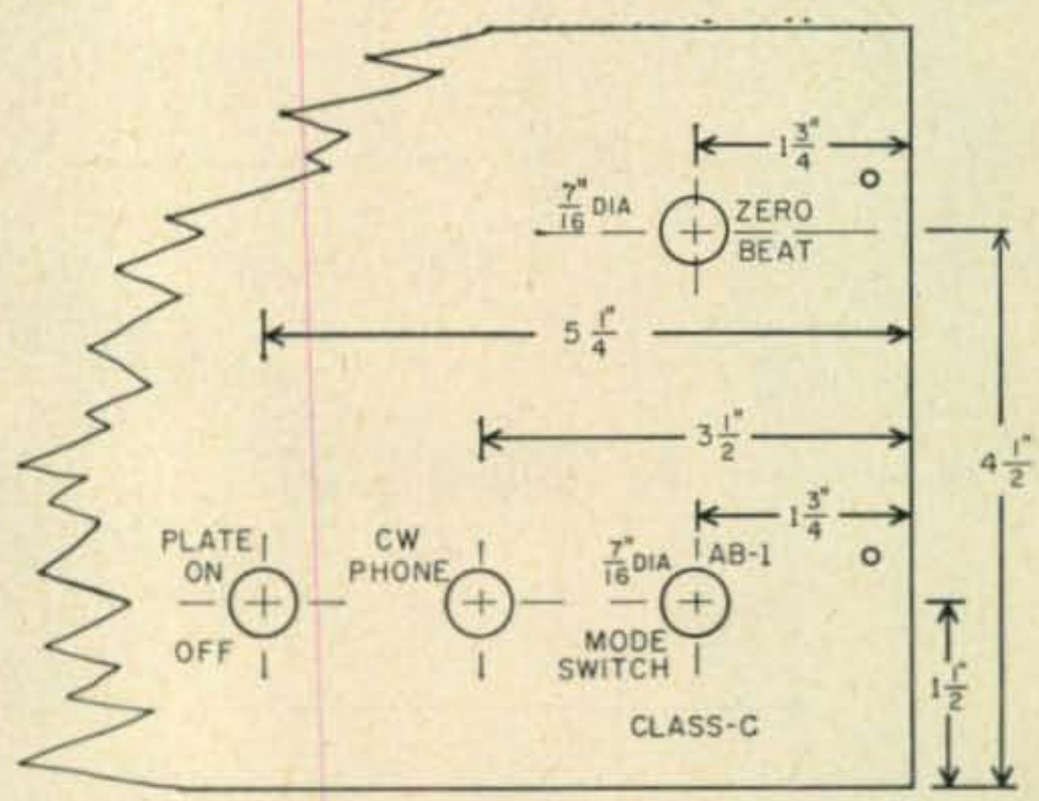


Fig. 3—Hole location for "zero beat" switch in lower right hand panel.

Front panel of DX-100 after modification.

these bands. This slight adjustment will improve the drive on these bands.

( ) Disconnect the *rf* coil and wire attached at the 1-lug terminal strip in the rear corner of the high voltage compartment.

( ) Replace the above 1-lug with a 4-lug terminal strip. *Label this strip "XX" and number the terminals from top to bottom.*

( ) Mount the 1-lug strip, removed in the two steps above, near the hole in the chassis for the power transformer leads. Use one of the screws that secure the transformer.

( ) Connect the *rf* coil, just unsoldered from the 1-lug strip, to XX-4 (NS). The other end of this coil remains connected to RCS-1.

( ) The wire that ran to M-1 from the 1-lug strip is removed from M-1 (plate switch).

( ) Remove the ground wire to M-2.

( ) Remove the wire between M-1 and N-7.

( ) Parallel M-1 and M-4 (S). Parallel M-2 and M-3 (S).

( ) Connect wire to XX-4 (S). Run in harness to CC-1 (S). Make wire heavy enough to carry the filaments for the adaptor. Gauge No. 16 is heavy enough.

( ) In the high voltage compartment mount a 4-lug terminal strip about 2 inches behind grommet hole "A". Use the front screw holding the filter choke. *Label this strip "ZZ" and number front to back.*

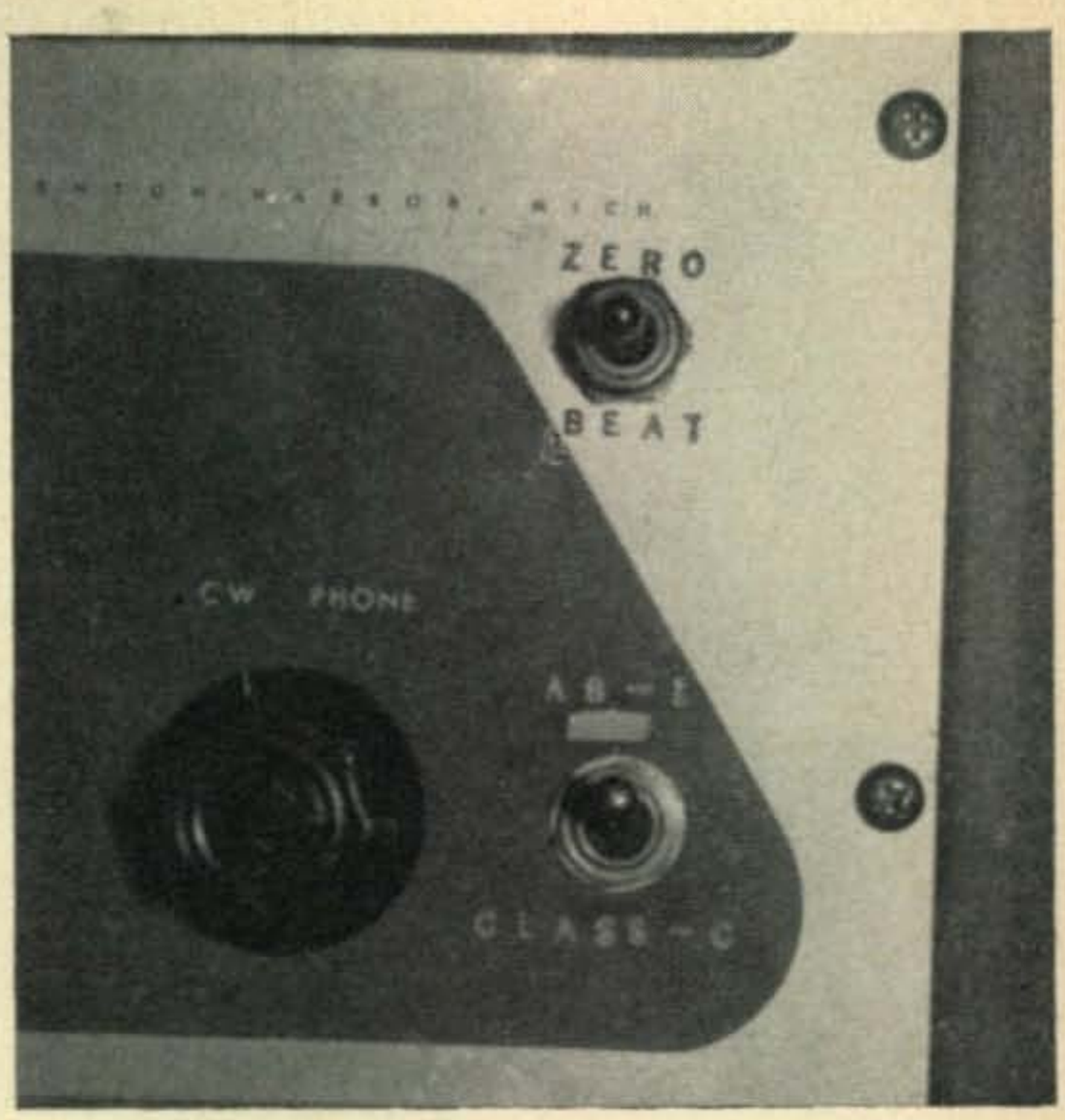
( ) Mount a 30K. 25 watt resistor on a long screw, similar to the mounting for the high voltage bleeder. Mount it 2" behind the bleeder and on a level with it.

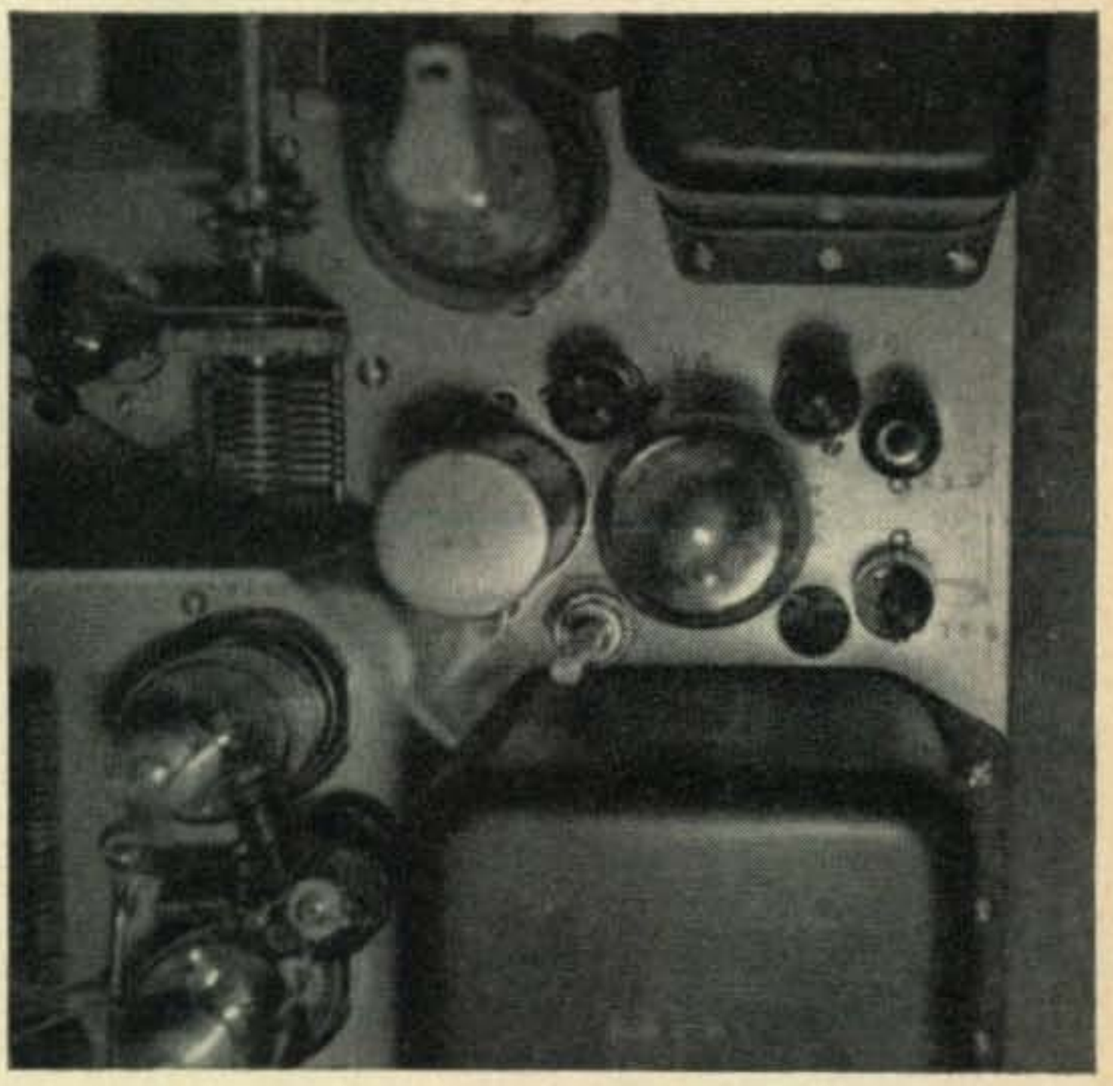
( ) Mount a 3000 ohm wire wound potentiometer in the vent hole at the rear of the 5V4 socket. See photos for layout details.

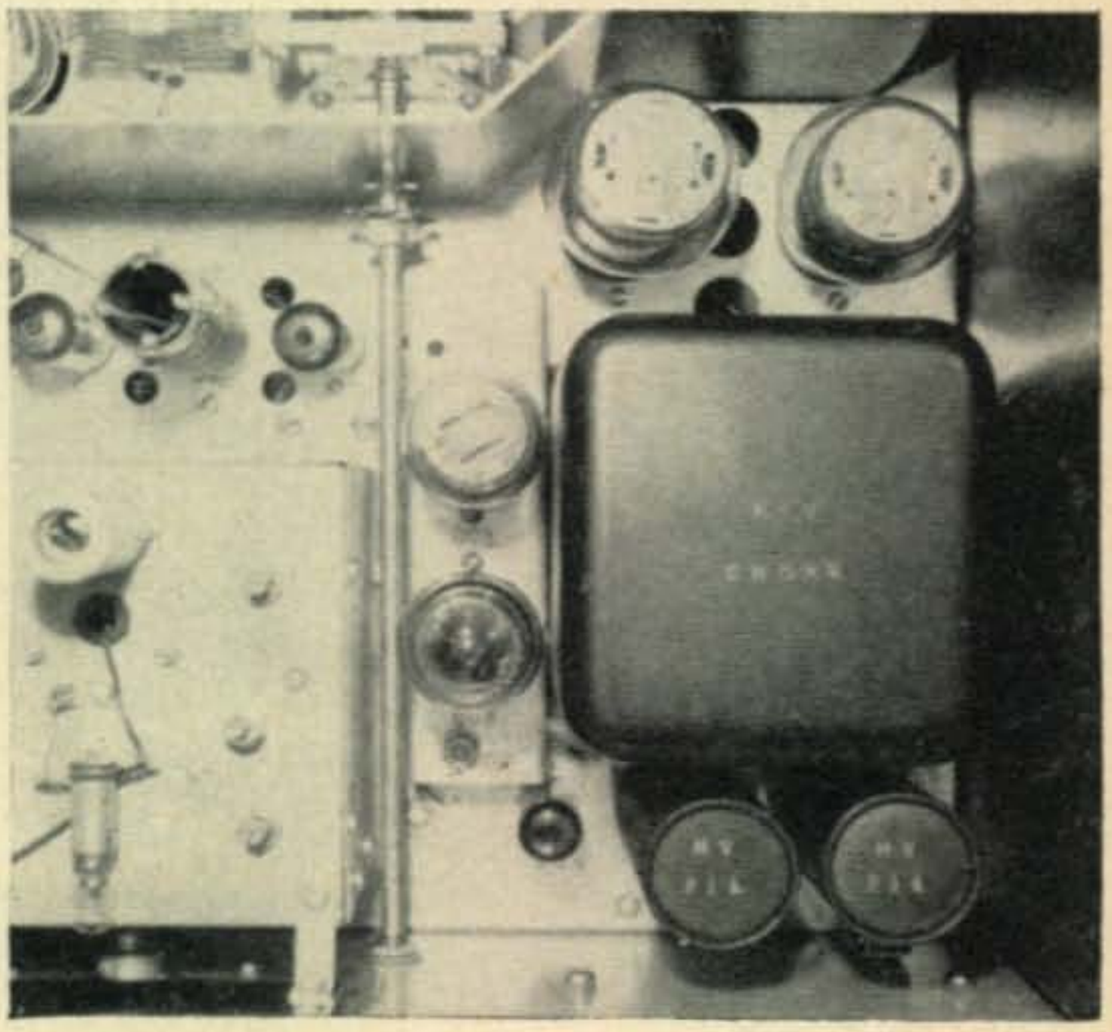
( ) Mount a 7-pin miniature socket in each of the two vent holes in front of the 5V4. These are for OA-2 regulators in the 1625 screens. See picture of layout around 5V4.

( ) Make up a subchassis as shown in fig. 4. It is made of aluminum, 5½" long, 1¼" wide with the sides turned down for rigidity. The mounting holes are off center to permit using a pair of holes in the chassis. Mount the octal sockets and connect them in series for a pair of VR-105s. See fig. 1. Connect two 10" leads to the outside terminals of this VR string. These will be terminals 5 and 2. Code the leads for identification. Solder all connections at the sockets. The subchassis is mounted on 1" studs above the regular chassis top. See photos for location of this subchassis in the DX-100. Locate two screws in the chassis top, that are spaced 5" apart and to the rear of the clamper tube and clamp adjust potentiometer. Remove these screws and use the holes to mount the subchassis. Pass the two 10" leads down through the vent hole behind the 6AQ5.

( ) The wire attached to N-8 is disconnected from that terminal and connected







to ZZ-2 (NS).

( ) Run a wire from ZZ-2 (NS) up through a vent hole behind the filter condensers to one terminal of the "zero beat" switch (S).

( ) Connect a wire to the other terminal of the "zero beat" switch (S) and run it to ground (S).

The improved keying is similar to the Heath Company pamphlet *"Improved Keying For The DX-100* with changes that permit break-in and zeroing with the oscillator only. The oscillator cathode and buffer grid block leads are brought to the rear of the rig. A differential keyer unit, using a pair of surplus high speed relays from the Marker Beacon Receiver, is used to key these circuits. The oscillator comes on first and goes off last. This method gives clean, clickless keying. Tests were run with W9PDS, just one block away, and he was unable to tell the difference between keying with the differential keyer or when the oscillator was running continuously. Previous to this change I was referred to as "Big Click" by W9IOP and W9PDS. Larry moved to W2 land to get away from me and Art is going to move across town. Come on back boys, my clicks are gone now.

To modernize and clean up your keying, go on from here.

( ) Mount a 3-lug terminal strip, with the center lug grounded, to the vertical panel between the exciter and amplifier compartments. Use the screw that goes into the base of the support insulator for the 3-section loading capacitor to mount this strip just above the 12BY7 socket. Run the terminals vertically and number them from top to bottom with terminal 3 nearest to the 12BY7 socket. *Label this strip "KK".*

( ) Mount a 33K 1 watt resistor between KK-1 (NS) and K-3 (NS).

( ) Mount a .005mfd disc condenser from KK-3 (NS) to KK-2 (S). This terminal should be ground.

( ) Lift the grounded end of the 100K resistor in the grid circuit of the 12BY7 from ground and connect this end of the resistor to KK-3 (NS).

( ) Mount a .15mfd condenser in any convenient place and ground one terminal (S). (I used a triple .05mfd from the rear of a command transmitter and paralleled all sections.)

( ) Connect a wire to KK-3 (S), run this wire to the ungrounded terminal of the condenser that you mounted in the last step. (S).

( ) Locate the blue wire on strip GG that runs to HH-1. Cut this wire from GG and pull back through the harness to grommet hole "A". Form and cut the wire for connection to ZZ-2 (S). This will place the oscillator cathode at RCS-7.

( ) Locate strips DD and EE. Remove the 2.2K 1 watt resistor now mounted between DD-1 and EE-1.

( ) Lift the upper end of the 2.2K ½ watt resistor at DD-1. Leave the other end of this resistor connected at DD-4.

( ) Connect one end of a 33K 1 watt resistor to DD-1 (NS).

( ) Connect the other end of the above resistor to terminal 1 of the 5V4 socket (NS).

( ) Connect a wire to terminal 1 of the 5V4 socket (S) and run this wire through grommet "C" to KK-1 (NS).

( ) Connect a wire to KK-1 (S) and run this wire to XX-2 (NS).

( ) Connect the *rf* coil on the key jack to XX-2 (S). This puts the grid block keying of the 12BY7 on the key jack tip.

( ) In the sixth step back you lifted a 2.2K ½ watt resistor from DD-1 and left the other end connected to DD-4. Now add enough wire to the pigtail on this resistor to reach the center terminal of the 3000 ohm potentiometer mounted by the 5V4 socket. Slip an insulating sleeve over the extended pigtail and connect to the center terminal of the potentiometer (S).

( ) Remove the end of the 2.2K 1 watt resistor now connected at DD-2. Leave the other end tied to EE-3. Bend this resistor around and connect the end that you removed from ground (DD-2) to terminal 3 of the OA2 socket (NS).

( ) Connect a wire at terminal 3 of the OA2 socket (S) and run it along the wiring harness to the DPDT switch now mounted in the old key jack hole—the Mode Switch. Connect this wire to one of the center terminals on the switch (NS). This pole of the switch will be the bias control.

( ) Throw the Mode Switch to Class C position. Check for continuity from terminal 3 of the OA2 socket to one of the outside terminals on the Mode Switch. Connect a wire to the terminal just located (S) and connect the other end of the wire to a good ground (S). You should now have

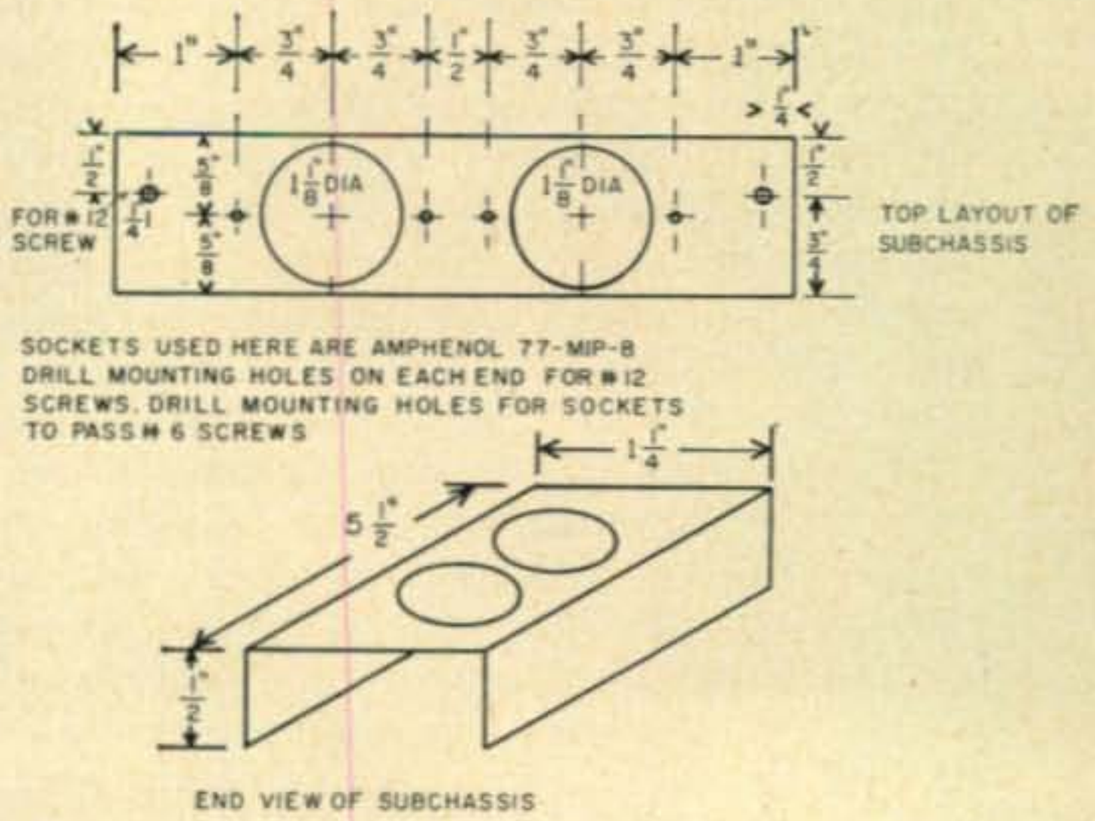


Fig. 4—Construction details for VR105 subchassis. A 2¼" x 5½" x 1/16" piece of aluminum is necessary.

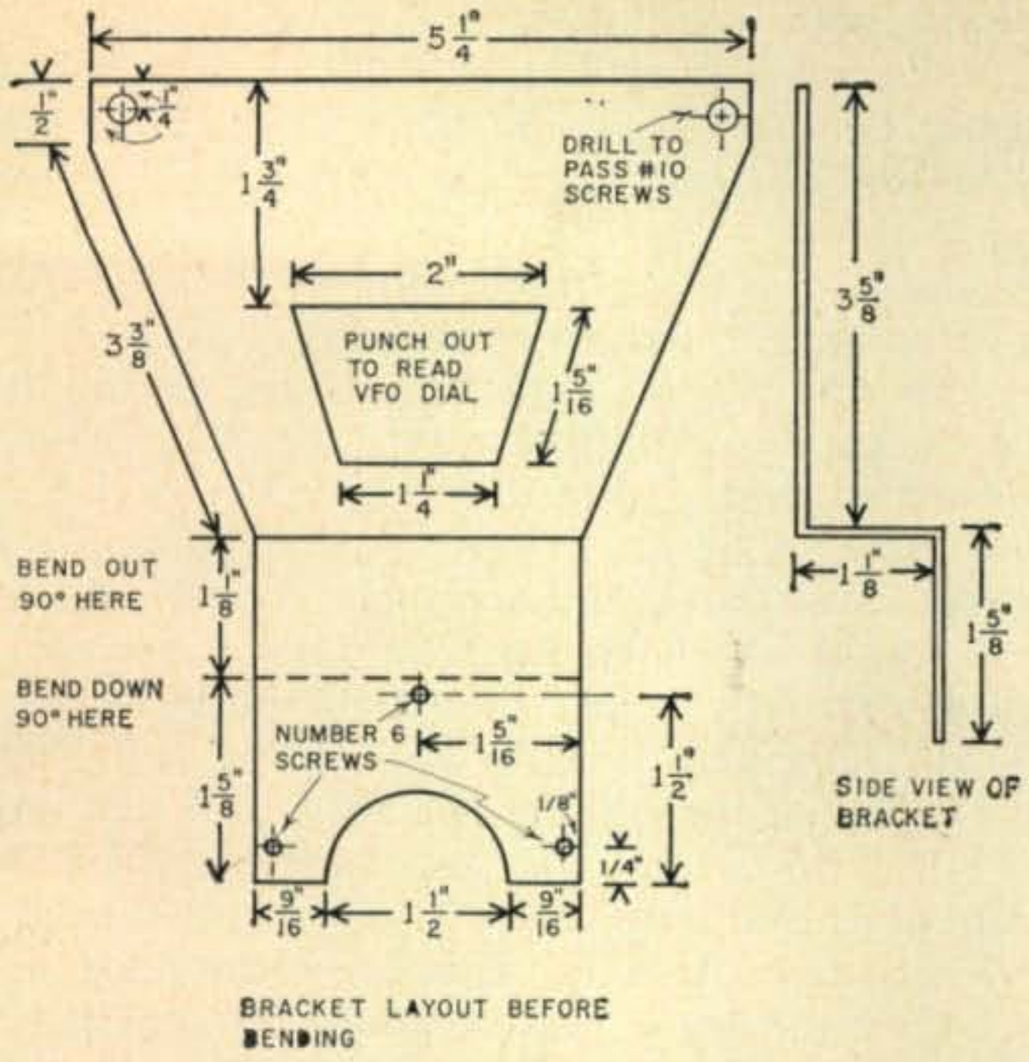


Fig. 5—Sketch of bracket needed to mount a Velvet Vernier Movement on the vfo shaft. No holes need be drilled in the panel since the bracket is secured to the two existing screws at the top center. The bracket is formed from 1/16" aluminum.

a ground appear on the bias bleeder string when the Mode Switch is in Class C position and the ground should disappear with the switch in the AB-1 position.

( ) Connect a wire to the same center terminal of the Mode Switch that you selected in the second step back (the bias control pole). Solder this connection. Now run this wire to the 1-lug terminal strip mounted in front of HH and near the power transformer leads (NS). Mount an *rf* coil between the above 1-lug terminal and RCS-5. Solder both connections. This places control of the bias bleeder string at RCS-5 for AB-1 operation.

( ) Connect a wire at DD-1 (S), run this wire to one of the ouside terminals on the 3000 ohm potentiometer mounted by the 5V4 socket (S).

( ) Connect a wire at EE-1 (S), run this wire to the other outside terminal of the 3000 ohm potentiometer (S). This potentiometer replaces the fixed resistor in the bias bleeder string and permits adjustment of the 6146 fixed bias from —60V to approximately —35V.

( ) At the 6AQ5 clamp tube, terminals 5 and 6 are jumpered and an orange wire connects to this point. Lift the orange wire from this point and run it to ZZ-1 (NS).

( ) Connect a wire to ZZ-1 (S), run this wire to N-8 (NS). (N-8 is the Phone/CW Switch terminal 8—remember?)

( ) Connect a wire at N-8 (S), run this wire to the unused center terminal of the Mode Switch (S). This will be the screen voltage control side of the Mode Switch.

( ) Identify the wires that you fed down under the chassis when you mounted the VR-105 subchassis. Select the wire that is soldered to terminal 2 on the negative end of the regulator string. Connect this wire to the negative end of the regular high voltage bleeder (NS). *Do not ground this wire or your metering circuit will be incorrect.*

( ) Select the wire from the positive end of the VR-105 string (terminal 5) and connect this wire to the outside terminal of the Mode Switch that shows continuity to ZZ-1 when the mode switch is in AB-1 position.

( ) Throw the Mode Switch to Class C position. On the screen voltage control side of the switch, check for continuity of the other end terminal to ZZ-1. Connect a wire to this terminal (S) and run this wire to N-7 (NS).

( ) Connect a wire to N-7 (S), run this wire to the junction of terminals 5 and 6 of the 6AQ5 clamper tube socket (S).

Should you accidentally attempt AM phone operation with the mode Switch in AB-1 position the finals will automatically have their screens cut back on the clamper tube circuit by contacts 7 and 8 of the Phone/CW switch. But the bias bleeder string will still be ungrounded and you will have trouble getting enough grid current on the final. The manual switch on the SSB Adaptor will take care of this little detail. Here I use an extra contact on my Push-to-Talk relay just in case I happen to forget.

The resting plate current on the 1625 modulators normally ran about 90 *ma* whereas it should have been about 60 *ma*. It was found that the screen of these tubes was operating at 340v. To correct this condition, proceed as follows:

( ) Disconnect both wires attached to N-11.

( ) Connect the center tap of the high voltage bleeder and the connection between the two high voltage filter condensers together (S).

( ) Connect the two OA2 regulators that you have added in front of the 5V4, in series. See fig. 1 for connections. (S).

( ) Connect a wire to terminal 7 at the negative end of the OA2 string (S), run this wire back along the wiring harness and connect it to the negative end of the regular high voltage bleeder (S). *Do not ground this wire or your metering will be incorrect.*

( ) Connect a wire to terminal 1 at the positive end of the OA2 string (S), run this wire over to terminal 3 of the rear 1625 socket (S).

( ) In the high voltage compartment you have mounted a new 30 K 25 watt resistor just behind the regular bleeder resistor. Connect a wire to the top end of the 30 K 25 watt resistor (S). Run wire to the positive end of the high voltage bleeder (S).

( ) Connect a wire to the lower end of the new 30 K 25 watt screen dropping resistor (S) and run this wire to N-11 (S).

Now we still need some high voltage (250-300V) at the RCS to hook into that new SSB Adaptor.

( ) Locate the terminal on GG that shows continuiy tto HH-2 and RCS-6. Connect a wire to this terminal on GG (S), and run it over to the output section of the low voltage filter condenser (S). The low voltage will now appear at RCS-6.

Running anywhere from 350 to 400 volts on the exciter and speech amplifier looked rather odd to me as there was drive to spare on all bands. The low voltage or exciter power supply output was reduced by changing to choke input filter.

( ) The black wire from the filter choke is connected directly to terminal 8 of the 5V4 (S). The jumper between the 5V4 terminal 8 and the input section of the filter condenser is cut out of the circuit. All 3 sections of the filter condenser are paralleled.

At this time you are ready to adjust the fixed bias on the final amplifiers. Place the Mode Switch in Class C. Check the voltage between terminal 5 of the 6146 paralleled final amplifier and ground. Adjust the 3000 ohm wire wound potentiometer over by the 5V4 until you get –50v. Now flip the Mode Switch to AB-1 and the voltage should rise to about –75v. You will also be able to find about –75v at RCS-5 now, but when you flip the Mode Switch back to Class C the voltage at RCS-5 will drop to zero as this point is grounded by the Mode Switch in this operating position.

Tuning Up

For tune-up tests it is suggested that you make up a plug for the Remote Control Socket (RCS) that has pins 5 and 7 tied to pin 8. This plug will ground the oscillator cathode circuit and the bias bleeder circuit. Also plug a key or shorted phone plug in the key jack. Now install the RG62/U jumper cable between the exciter output SO-239 and the amplifier grid SO-239.

Set the switches for Class C and CW. Tune up just as you have done in the past. You will find the Driver tuning requires a little more capacity, particularly on 10 and 15 meters. The power output will be the same. You may require a higher setting of the Drive Control in the center of the crystal VFO switch. This is expected due to the reduced voltage on the exciter but there was still plenty of drive here. Now you can open the key and check for CW keying characteristics if you wish. You will hear a signal from the oscillator as long as the plug is in RCS. If you wish to check the "zero switch" at this time remove the plug from the RCS, close the "zero switch" and tune in your oscillator.

Replace the plug in the RCS and switch to Phone. *Caution must be used for AM Phone operation. The oscillator cathode and grid block keying circuits must be closed to a ground at the same time your high voltage comes on or the modulation transformer may break down.* For the AM phone man who is not getting an SSB adaptor and still wants good CW keying I would suggest getting the Voice Control Unit from Heath Co. This unit has a relay that will control these circuits on phone. By this time I must sound like a Heath Company salesman—well I am not—I just like their gear.

Well, let's get back to the phone test. You have replaced the plug in the RCS and switched to Phone, *and closed the key jack circuit*. Tune it up just like you have done before and it works the same way, except your poor old 1625's now have a resting plate current down around 50 to 60 *ma*. Turn up the Audio Gain and do a little talking. You can still kick the Modulator Plate Current way up past the required amount and just remember you are treating the audio tubes like they were designed to be treated. Maybe those 12AX7's will last a little longer.

Check the final amplifier for AB-1 operation now. Tune up the rig on CW and Class C. Load the final to 250 *ma*. Kill the high voltage, *reduce the Drive Control to zero*, throw the Mode Switch to AB-1 and turn the high voltage back on. Put the meter switch on "PLATE" and slowly increase the drive control until the meter reads 225 to 230 *ma*. Check the grid current—there should be none. Remember AB-1 requires no grid current. Now open the key or reduce the drive control to zero and the amplifier resting plate current should be around 60 *ma* maximum. This resting plate current depends on the bias adjustment at theh 3000 ohm potentiometer.

The VR-105's used to regulate the 6146 screens should remain lit up at all times. If you happen to advance the drive control too far the VR-105's will extinguish. In SSB operation you will bump the final up to 250 *ma* normally, but should you get excited or turn the gain up too high the VR-105's will tell you real quick. If you are not able to drive the amplifier plate current up to at least 250 *ma* without the regulators going out, then you are not loading up heavy enough in the preliminary tune-up.

In conclusion a few hints are passed on. In AB-1, when the bias bleeder is ungrounded, as on standby, the bias soars to approximately –75v and cuts off all plate current flow in the final, therefore you get no tube noise when using a T-R switch.

To key this rig I use a pair of high speed relays in a differential keyer.

On 40 meters the drive control for AB-1 operation is at minimum drive for 250 *ma*. All other bands require some advancement in this control. In fact, tests were conducted before

Additional Parts Required
To Make The Complete Madernization

1. SPST Switch. (The "zero beat" switch.)
1. DPDT Switch. (Mode Switch. 250v insulation.)
2. 4-lug Insulated terminal strips. ("XX" & "ZZ".)
1. 3-lug Insulated terminal strip. ("KK".)
1. 3000 ohm wire wound potentiometer. (Bias adjust potentiometer).
1. 30K, 25 watt Resistor. (Modulator screen dropping resistor).
2. 33K, 1 watt resistors. (Grid block keying).
1. 0.15 mfd Condenser. See text. (Grid block Keying).
2. 0.005 mfd disc ceramic condensers. (By-pass).
1. RFC. Similar to chokes at RCS of DX-100. (To be used at RCS-5).
3 ft. Coaxial Cable, type RG62/U.
2. SO-239 Coax Receptacles.
2. PL-259 Coax Plugs.
2. Adaptors for RG62/U to PL-259 plugs.
2. Sockets, Amphenol 77-MIP-8. (For VR-105s).
2. Sockets, Amphenol 147-504. (For OA-2s).

The above list does not include the dial and knobs used on the front panel as it was felt that the individual preferences and junk boxes would vary from ham to ham.

Before Modification

	CW	Phone	No Load
H.V. Ep.	740v	720v	800v
6146 Ip	250*ma*	230*ma*	—
6146 Esg	157v	155v	150v
1625 Esg	—	380/340v	—
1625 Ip	—	90/150*ma*	—
L.V. Ep	370	360	400

After Modifications

	CW	Phone	No Load	AB-1
H.V. Ep	740v	720v	800v	740v
6146 Ip	250*ma*	230*ma*	—	250*ma*
6146 Esg	157v	155v	150v	210v
1625 Esg	—	300v	—	—*
L.V.Ep	285v	285v	310v	290v
1625 Isg	—	50/150*ma*	—	—

making the exciter power supply a choke input job and it was necessary to slightly detune the driver tuning to keep the plate current below 300 *ma* on 40 meters. If all your tests came out and you are not adding a few ideas of your own, this is the time to take some lacing twine and replace the wiring harness. Mark the controls so you can find them next week.

Voltage measurements taken before and after modifying this DX-100 are listed here.

Finally, the front panel was dressed up by the installation of different dials and knobs. A chart holder was taken from a BC-375 Tuning Unit. It holds a tuning chart for the rig on all bands, every 100 kc, except for 10 meters. On this band it was necessary to make the chart for every 200 kc.

An alumuinum bracket was designed to mount a National Velvet Vernier dial on the *vfo* shaft. This gives a 5 to 1 reduction in addition to the built in vernier. It takes all of the slop out of the *vfo* tuning and is almost a necessity to zero in on SSB. Fig. 5 gives the dimensions of the bracket. ■

Link South Pole Personnel To Home Folk

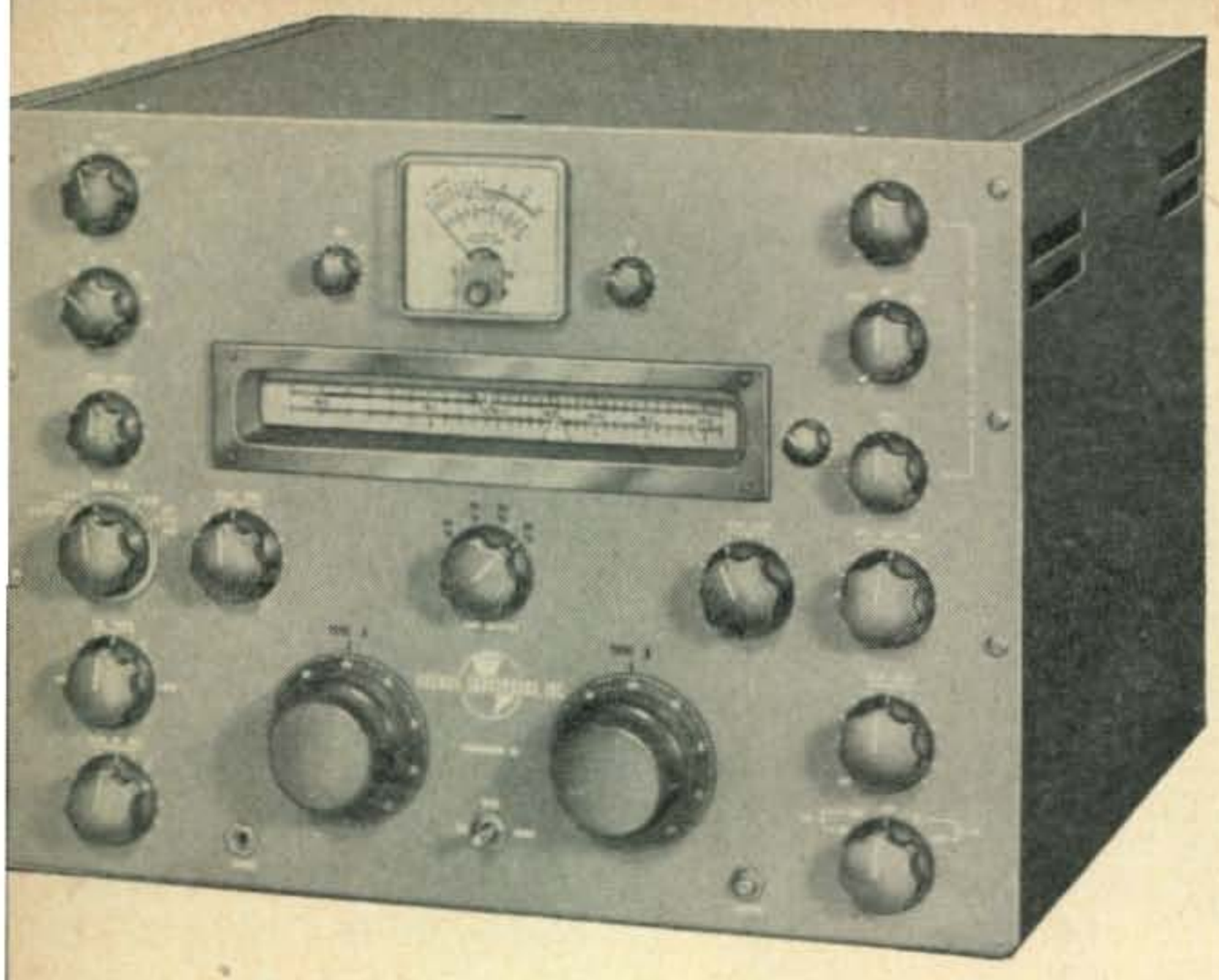
The greatest morale booster for some 250 Navy personnel stationed aboard the USS Glacier in the frozen wastes of Antarctica are George E. Dixon, storekeeper first class, of Nashua, New Hampshire and Robert J. Fuller, radioman second class, of Saginaw, Michigan, operators of the ship's ham radio set.

The men, who volunteered to operate the radio during their off-duty hours, explained: "All we do is contact a ham radio operator back in the States and have him place the call through the local telephone company. Actually, the men are speaking to their family via radiotelephone." Dixon added, "the fellas really get a kick out of it—makes them feel like they were just around the corner from home."

The $2,500 radio set was loaned to the Glacier by the courtesy of the Hallicrafters Corporation of Chicago. Designated KC4USG, the radio station operates on the 15 and 20 meter bands and is capable of receiving signals from almost anywhere in the world. "The men are apt to become depressed, wondering about their families and how things are at home," added Fuller. "However, the ear-to-ear grins appear as each sailor says, 'Hi Honey, I'M calling from the South Pole.'"

The Glacier is the Navy's largest and most powerful ice breaker. She has steamed from the South to the North Pole in less than a year and arrived at the South Pole in mid-November to be the first resupply ship into the area again this year.

The Glacier left Boston early in October and is not scheduled to return next spring. This will make a total of four voyages to the South Pole in four years, a proud record for her crew. ■



The Cosmophone

Ken Grayson, W2HDM
Associate Editor of CQ

First, let me give you a little of the background on how the Cosmophone came to be. The circuit basics were first developed by Butch Mason, W3MGG and sold to Cosmos Industries in late 1954. It took several months to work out the preliminary model of the unit and then in the August and September 1955 issues of CQ Cosmos ran ads to see what the demand would be for it. The response was so overwhelming that they went right to work getting the unit ready for production.

Tests on the preliminary model indicated some shortcomings that needed fixing before full scale production could be started. Cosmos hired Gerry Harrison, W2ZGA, one of the three fellows who had put out the Harristahl six and two meter transmitters a few months previously (others were myself and Kurt Stahl). Since I was working for Cosmos on some military equipment I put my two cents in at every opportunity. By November 1956 Gerry had the pre-production model working to his satisfaction and we hooked it up to a fifteen meter antenna to see what would happen.

Our CQ was answered by KV4BB on St. Croix with Wayne, W2NSD at the mike. Both of us were surprised at this coincidence. Wayne gave us a nice report on the rig and asked that we keep him informed on the progress.

The dial mechanism was giving a bit of trouble and needed redesigning. We wanted to be sure that the unit would tune easily and accurately. What was the use of building in the super-stable dual VFO's if the dial mechanism would not give the desired control? Finally, by late 1957, after more difficulties and discouragements than we ever thought possible, ten units were run through the production line to see what would come out the other end. Morale picked up considerably when they worked just fine.

Full scale production was started in mid-1958 and the advertising department started trying to let hamdom know about this new transceiver that was available. It was demonstrated at the National Convention in Washington and impressed many with its versatility.

How It Works

The idea behind the Cosmophone is novel. Basically it is a complete transmitter-receiver unit with two separate VFO's. By switching between the two VFO's you can transmit and receive on the same frequency or on separate frequencies, either of which is controlled by its own accurately calibrated dial. Just the same as if you had two completely separate transmitters and receivers. After a few minutes you get used to the idea and then you wonder how come everybody isn't doing this!

The transmitter will of course send CW and AM, though it is primarily designed to provide a good clean SSB signal. Many of the transmitter circuits are also used in the receiver, making for a compact piece of equipment and keeping the price down somewhat over what it might be otherwise. The VFO's and crystal oscillators are in common use between the two, as is the mechanical filter.

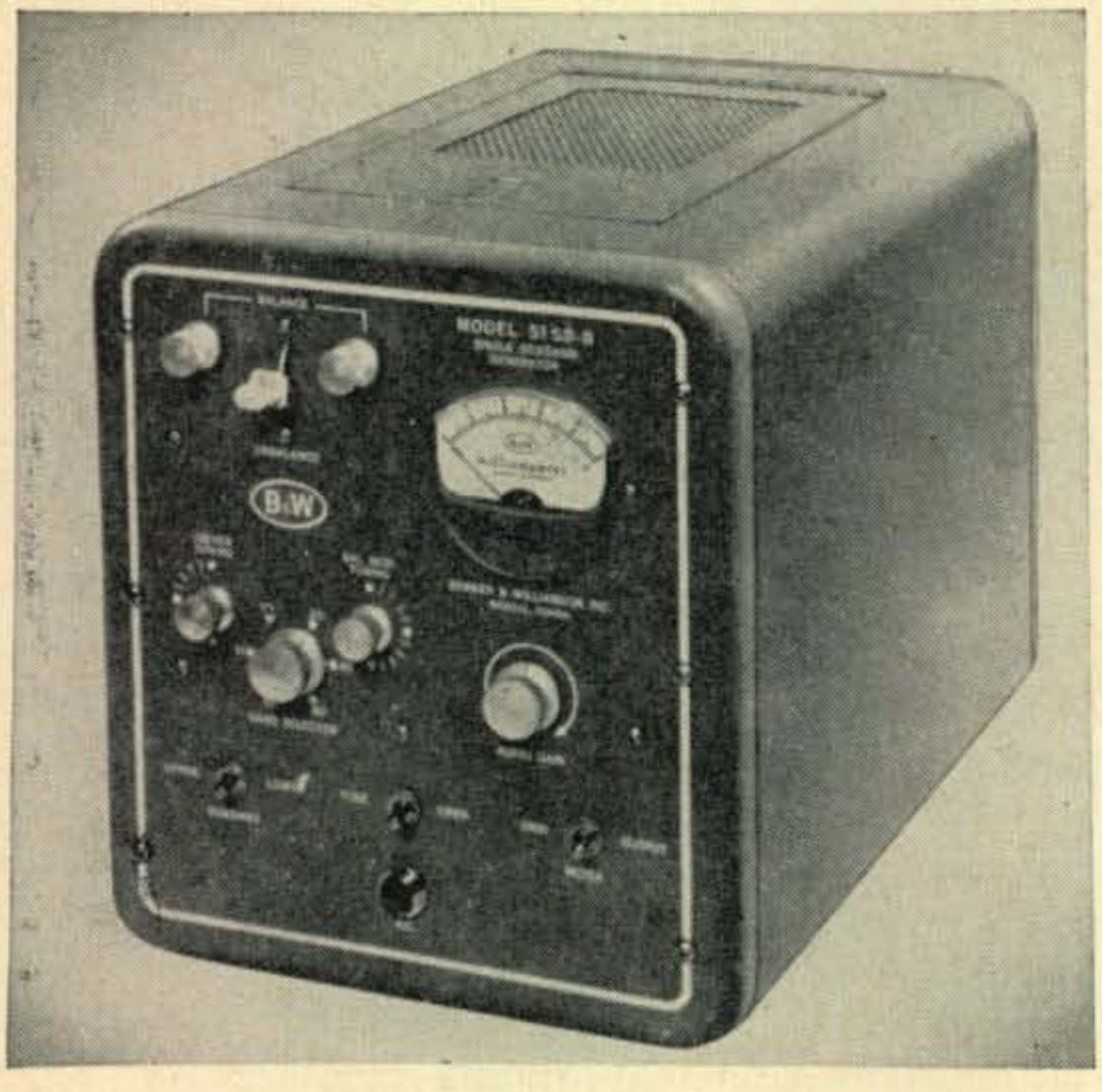
The receiver uses a 6CD6 *rf* amplifier and a 6BA7 mixer. The VFO then is used to mix the signal down again to 455 *kc* where it goes through two *if* stages, a mechanical filter, and a Q-multiplier. Separate detectors are used for SSB and CW/AM. "S" meter of course. The tuning dials provide 12 *kc* per revolution in fine tuning and 60 *kc* per turn in coarse tuning, making it easy to zero in on a channel or to flip to the other end of the band. Upper or lower sideband can be selected for either transmitting or receiving.

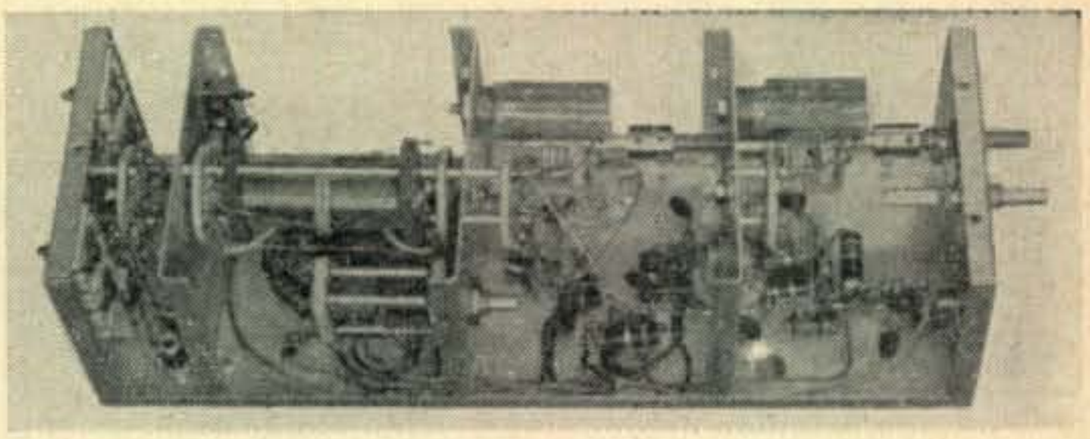
One of the big problems facing the engineer on a design project such as this is the elimination of spurious signals so common in many other receivers. Gerry achieved almost the ultimate in this respect, but it took a lot of calculator work plus weeks in the lab, shielding and by-passing.

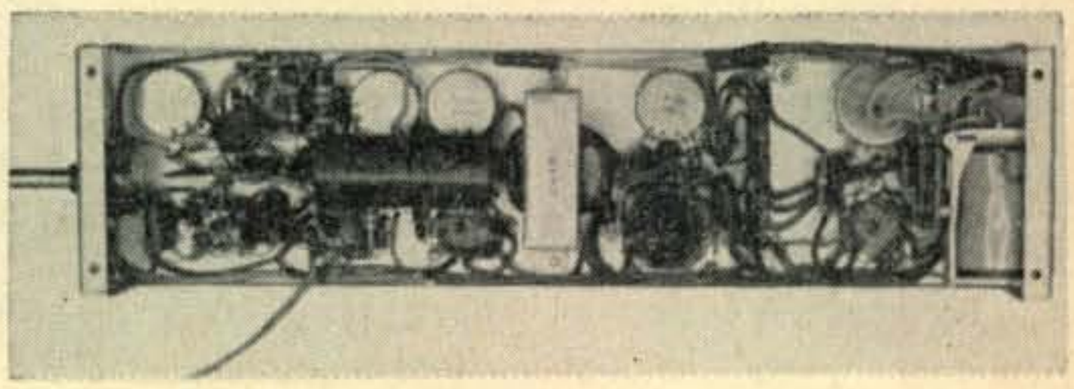
[*Continued on page 114*]

CQ Tests The

B&W 51SB-B







Bottom views of the *rf* and audio chassis.

In looking over the list of DX stations, it was somewhat annoying to discover that more and more of the real rare spots were operating on SSB only. Being a DX chaser from way back, it became apparent that if I wanted to keep up my standing in the DXCC, I would have to go on SSB. Since I already had a B & W 5100-B transmitter (see Dec. '58 CQ), all I now needed was a single sideband generator.

The Barker and Williamson new 51SB-B single sideband generator is the ideal companion unit to the 5100-B since it can be connected without making any modifications to the latter.

Unpacking the carton revealed that it was housed in an attractive matching cabinet the same height and depth as the transmitter and slightly less than half the width. Opening the top cover showed the same clean and sturdy construction as we had found in the 5100-B.

Like its companion unit, the 51SB-B is assembled into separate basic units that can be easily disassembled for servicing. These include the *rf* unit, the audio unit and the main chassis. The latter consists of the front panel and the bottom chassis which contains the necessary wiring, receptacles and terminals for connections between the *rf* and audio units as well as the transmitter.

The SSB generator should be placed at the right of the transmitter and provisions are made that permit the two units to be bolted together, making one integral piece of equipment. When mounted in this position, matching holes on the sides of the two cabinets will permit the passing of two *rf* connecting cables and a power cable.

Filament and plate voltages are taken from the 5100-B. Terminal strips at the rear of each unit provide for making connections to the voice operated relay circuits and receiver control, if so desired.

All operating controls are of course located on the front panel, except those requiring infrequent adjustment; these being located within the cabinet.

The phasing principle of generating a single sideband suppressed carrier is utilized in the 51SB-B. The sideband signal is generated at the operating frequency, thereby eliminating any heterodyning stages and simplifying the operation and adjustment of the equipment.

Connections between the two units are made in such a manner that the output of the multiplier in the 5100-B is fed to the *rf* input of the 51SB-B, which in turn is fed back to the transmitter and drives the grids of the final 6146s in the 5100-B. Thus the Generator combines the *rf* input with the audio output of the microphone to produce a single sideband suppressed carrier signal. A switch on the front panel permits the selection of either the upper or lower sideband.

The combination of the 5100-B transmitter and the 51SB-B generator provide a full 180 watts of SSB on all amateur radiophone bands, 10 thru 80 meters, and does not in any way affect the normal AM or CW operation of the original transmitter. This is more than

[*Continued on page 113*]

VHF

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

by Sam Harris, W1FZJ
P.O. Box 2502, Medfield, Mass.

After thirty years of associating with ham radio (20 years as a licensed amateur), I am amazed to find that there are still some people who just don't seem to know what ham radio is all about. Quite a long time ago when we were all kids, T.O.M. set down a set of rules known as the amateur's creed. Seems like a lot of the old timers have forgotten it, and a lot of the youngsters never heard of it.

If you fit the old timers nomen how about boning up on the creed for New Year's? A few quotes to remember: 1. You didn't know everything when you started in the ham game. 2. They didn't have a Novice class when you started, but you qualified. 3. The low end of the band is reserved for active hams. Owning a band edge crystal for twenty years does not give you squatters' rights. If your operating techniques and equipment haven't improved with the times don't blame it on the newcomer. 4. That miserable signal you hear is not the result of loop modulation. He just doesn't know how to tune the thing. But—he's learning how, the same way you did. And he doesn't sound any worse than you did either. The only difference is that this time you're on the listening end. 5. That guy with the Gonset may be covering up your 48th state but the guy he's calling may be *his* first. 6. Being too old to belong to the Boy Scouts doesn't mean you should stop being helpful, courteous, kind, etc.

Now on the other hand if you don't feel that you qualify as an old timer, there are just a few things, in addition to the amateur creed that you should know. 1. Get your operating procedure from a handbook. Not by listening on the air. 2. Make a determined attempt to set a good example for the rest of us. Heaven knows we need it. 3. Call as many "CQ's" as you want but be sure to give your call as often as you call "CQ." When you call someone else don't forget that he already knows his call. The object is to acquaint him with your. The best way to accomplish this is to mention your call at least as often as his. 4. When the band is open don't hold local rag chews on the low end of the band. It is just plain discourteous. 5. The term "73" is an antiquated but popular way of saying "very best regards." It originated as a cw abbreviation and as such it requires no plural. It is hardly necessary to precede it with "very best." A careful log of present phone usage indicates that 68% say "73's" and 50% say "best 73's." 10% say "very best 73's" and 2% say "very best 73's and best regards." Proper usage on phone is to finish your last transmission with "73 and good luck (or good dx or some such) WØAA this is W2ABU signing clear!!" Kindly notice that it appears only once per QSO and having said it you should sign clear. Don't drag it out with after-thoughts. Save them for the next time. 6. Don't be afraid to discuss your equipment problems on the air. Remember, however, the most reliable information is in your handbook. If you don't have one you shouldn't be on the air. No station is complete without a radio amateur's handbook and an antenna handbook.

Contest winner on 50 mc last August was Gerald Kemler, K8AKQ.

Clubs, Nets, Etc.

Speaking of same, I'm sure most of you have read something about the "Roger Williams VHF Society" of Providence, Rhode Island. If you haven't you ought to do so. Here is an up and coming VHF Club, newly

organized, but so well set-up, that there seems to be no chance of failing interest and thus no activity. Always something doing.

The club is connected with the Red Cross and has thus acquired an operating and club room in the Red Cross Building, plus some additional equipment which would have taken them a little longer to acquire on their own.

Among extra-curricular activities recently was a Christmas party with gift exchange (Helen came out way ahead on this one) at which I was guest speaker. Next on the agenda is installation of officers in January, with Ed Tilton, W1HDQ, as guest speaker and installation officer.

If you're interested in C.D., Red Cross, etc., it's almost a must that you get in touch with President "Smitty" Conn, K1BWX. You'll be hearing more from this club, that's for sure.

Pasgoula, Mississippi, has organized a six meter net meeting at 50.1 mc. Either K5LMQ or K5HUW will be glad to make schedules with anyone needing Mississippi. Rig at K5HUW/K5LMQ is an Elmac AF-67 converted as article in "CQ" recommended. Receiver is an NC300 with converter, and the beam is a six element high gain. The rig at K5JPG is also an Elmac and HQ110 receiver and 5 element beam. Rig at W5RIP is Techcraft transmitter with Gonset 6 meter converter and the antenna is the "Halo." These net members are working hard at it, hope for additional members and in the near future a club to go along with the net.

Another Pennsylvania VHF Club has come into existence as of an October meeting. At that time the "Chester County Amateur Radio Emergency Net" started out with twenty members and election of officers. Officers—President, K3BFP; Vice President, W3VXJ; Secretary, W3DBN; Treasurer, W3ZAT.

Finland Reino "Ray" Janhunen (OH2HK) emits with a bit of news, via Hank (W2UTH) who worked Ray on six meters and then was kind enough to mail us the letter he received from Ray.

"Thanks a lot, Hank, for the first QSO on six meters between the U.S.A. and Finland. Heard you again and many others too, on the 16th of November but could not raise anyone."

"I now have a crystal at 50.017 and hope to have many more QSOs soon." *Hank contacted Ray on November 1, 1958. Ray is using a 350 foot long wire antenna, and is running 30 watts. The contact was made on 51 mc. Ray also mentioned that he has been improving his equipment since that contact. Take notice, boys! An OH on six meters!*

Argentina Another very interesting, and to the point letter from Michael Czysch (LU3DCA):

"After reading a notice of ZE2JV saying that his QSL return was about 30%, I was quite shocked and wanted to express some ideas about the problem."

"I like VHF and I like VHF-DX, and consider every new operator I contact a new friend. Most often I know him even before I get a contact from hearing about him or seeing his call-sign in one of the ham magazines. So after a short QSO (it must necessarily be short) what is more natural than to fill out a QSL, along with some additional information which could not be passed during the contact, put a stamp on it and send it down its way to make a new friend happy? At least I am happy if I receive a card and I think it is not too much effort. Airmail is not necessary; after a good opening there are too many cards to be sent, to send them all airmail."

"Maybe someone is not interested in QSLs. Well, why not say so during the contact, this way nobody will be disappointed. But it's not fair to collect cards for WAS, WAC, or what have you, and not return cards as some seem to do."

"One other important thing. Don't forget that many of the DX stations do not speak English! Use clear phonetics! And speak slowly! Otherwise they will not understand you or your call-letters." *We can't add anything to what Mike says; it's true, both the good and the bad, and he put it in words better than we could. Mike also listed nineteen different stations which he has not QSL-ed because he does not have thir QTH. Call books are very expensive in South America and not many of the gang have them.*

Anchorage, Alaska Received a letter from Jack Reich (KL7AUV) dated November 9th, concerning some of the openings to Alaska.

"Wednesday morning KL7AH got the jump on us while I was carefully listening to Beacons, and phoned that the BAND WAS OPEN. This was at 0850 or 1850 GMT. I worked 44 contacts until 2216 GMT including all call areas except W1. Even got a new state, Georgia. JAs were in rather spotty with lots of QSB."

"Thursday, conditions were almost identical, except heard K1BIL in Stoneham, Mass., but didn't raise her. JA signals were again present, but very spotty. Managed another state—West Virginia."

"Friday, things were real spotty. We heard 5s, 8s, 9s, and 6s, but only managed to grab off three 6's. An interesting fact is that the same as last year, the first signals we hear in the morning are practically always

Margie, KL7BLL, doesn't look at all uncomfortably cool at her Alaska hang-out.

Operating position of Margie's O.M. Oh yes, he's Jack Reich, KL7AUV. We've all talked to him.

Fives, with W5SFW usually doing the honors." *Yeah, Slew-Foot-Willy does get through, doesn't he?*

"Saturday was another real fine day, starting at 1937 GMT but with considerable QSB and signals shifting from one area to another. At 2128 GMT, KH6UK came boiling in for the first time this year. Margie took over about that time and made contacts with KH6UK, a number of contacts in the States and then worked sixteen JAs. During half of the time that the JAs were coming in, we were copying W9s and WØs off the back of the beam."

"This was by far the best opening we have heard, including last year. We note conditions seem to be occurring about one half hour earlier this year than last. Also openings are about two weeks earlier than last year."

"Those now active include KL7ANV, Emmett; KL7CDS and CHV, Kenny and Evelyn; KL7AH, Jack; and one or two Amateurs at Fort Richardson. One of them is KL7CRB, Frank. Have heard of no activity outside the Anchorage area, although KL7AYZ should be back on real soon."

We received another letter from Jack dated 11/28/58 in which he tells us that he now has his states up to forty-four, with only Louisiana, S. Carolina, Delaware and New Hampshire to go. You fellas start-a-lookin'.

Sointula, British Columbia I don't believe that anyone needs to be told who sent us the dope from this territory—Ike (VE7AQQ) of course.

"Six meters has been even better than last year. We have heard VK, LU, DU, EI2W, CT3AE and have been told that we have been heard in England, South Africa and Australia. The only difference in the rig this year is that I now run 135 watts input with 230 watts of audio, ultra modulation."

"Have worked a Japanese XYL, JA1AEQ and hear that there is one other on six meters, JA7NE." *Thanks, Ike, all we have to do is listen to you and have our mouths water from the juicy things you're doing and hearing on six.*

Arlington, California Some 220 mc news from Wm. Locy (K6GTG):

"Since March, 1958, I have worked 85 stations on 220 mc and have been copied in Porterville, California, on cw and have also copied bursts from W6FZA."

"I will be on 220 mc with 700 watts cw and 88 element beam 85 feet up by January 15, 1959. Will be looking for interested skeds on 220. Polarization either vertical or horizontal."

"Will be running my automatic keyer from 0600 to 0700 beam east, Monday through Saturday. 0700 to 0800 beam north Monday through Saturday. No Sunday schedules. (Automatic keyer reads, 2 V's, de K6GTG, K6GTG, QSL. Runs at approximately 15 words per minute.)" *Fine work, Bill. Nice power, very good antenna, skeds everyday—what more can any of the 220 mc boys want?*

Grand Haven, Michigan Good news from Joe (W8ESZ):

"On 11/8/58 we had the pleasure of working our first JA contact, JA8AO. On 11/24/58 we worked K6HEZ/7 mobile near Reno, Nevada for State #47. On the same date we worked KH6UK for our WAC, and also KH6NS and KH6AR. On 11/27/58 we worked KH6IJ, and the happiest day at this QTH was on 12/1/58 when we had the great pleasure of working W7UGN for State #48 and WAS on six meters."

"As far as we know, we are the first station in Michigan to work WAS and WAC on six. By 'we,' I mean the XYL and myself. A great deal of the credit should go to my XYL who through her constant listening on six meters helped me to get these honors while sleeping (?)." *That's the way it goes, Joe. I think the gang realizes that the better half frequently does more than half of the work when operating six. Congratulations and now get At DX CC.*

East Point, Georgia Ezelle (K4DLE) also reports on recent good band conditions:

"We have been having daily openings to Oregon, California, Washington and VE7 land, and several of the local gang have worked Switzerland, Sweden, Great Britain and Scotland in the past two weeks."

"We have several new-comers on the band here bringing the total in the Atlanta Metropolitan area up above sixty active members, consisting of W4 two letter Amateur Extra Class Calls, Advanced Class W4A—W4B —on through the W4Z alphabet, and of course the K4 calls from K4A—through K4Z."

"We have quite a few technician operators of course. By Gosh, I am one and proud of it, having built and repaired transmitters for the other boys for the past 25 years, and am helping everyone that is interested in ham radio get on the air as much as possible." *And we're proud of you, Ezelle! Congratulations to the six meter population down thar in Georgia.*

Omaha, Nebraska They are still on the map and John Snyder (WØWRT) lets us know about it:

"Some VHF activity from Omaha area—In last month (November) have been working KL7's on 50 mc. Worked Marge, KL7BLL; KL7ANV/KL7; and Kenny, KL7CDS."

"Activity slow on 144 mc here lately but C.D. Net on 145.3 mc and VHF MARS Net 143.99 mc." *Guess when six opens up then two meter activity slowly declines. It'll come back up there John.*

Yakima, Washington John Fredericks also sent a short resume of Washington conditions.

"On 11/27/58 the following stations were heard: KH6UK, JA8BIR, JA1BLZ, JA7GB, JA1AAT, JA1ASO. (*Stop it! Helen just passed out!*) On the 28th: K4SCS, W4GJO, CO2GX, no Ja's. On the 29th; K4HIL, CT1CO, K3GME, K3EYU, W2MKS, W1ADA, W2OCM, K1BVH, JA8AO and JA8GH."

"Wonder if someone could send me a diagram for REALLY HOT six meter pre amp?" *Well, gang, any of you going to send him yours? Congratulations John, hope you worked all this fine dx, you didn't mention that.*

Spartanburg, South Carolina From transplanted Russ Brown (K9DYE/4) we hear that South Carolina has been in on things too.

"The six meter band has been open every day since November 8th. (Letter dated November 28th.) States heard are Oregon, Washington, California, British Columbia and KH6 stations were heard November 24th with good signals."

"Transmitter here is a converted AT-1 2E26 final, 16 watts input. Receiver is an FCV-1 converter fed into an NC88 plus Regency signal booster. Present antenna is a two element V beam, 20 feet high." *Nice to hear from South Carolina again, Russ, do it more often.*

Baldwinsville, New York Gordon Hullin (K2ZBU) sends his report:

"The band has been hopping with all kinds of DX. In addition to the west coast, I have heard Ireland (*I wonder who*), Sweden, Southern Rhodesia, Mexico and Portugal. Most of this was heard on the mobile rig (Communicator 2B and Halo). Only ones heard at home were EI2W in QSO with Hank, W2UTH (didn't get a chance to work him), and XE1GE (worked him)."

"The rig here is a home brew job running 130 watts input to an 829B, modulating with a pair of 807's triode connected, and is VFO controlled. The antenna is an 8 element yagi 65 feet high. For receiving I use a home brew converter using two 417A's grounded grid, into a 404A mixer. This feeds into an HQ129X. I am building another converter using 417A's cascode, and a 417A as a grounded grid mixer. How it will compare with what I'm using is the big question. *Let us know when you find out Gordon.* Present plans call for a larger an-

[*Continued on page 92*]

Adding Break-In Operation To Your Ham Station

Lt. Jack Harris USN, W8HJN/6
Box 1442
U.S. Naval Postgraduate School
Monterey, California

Here is a simple but effective way to add break-in operation to your station, requiring no physical connection to your transmitter. This powerless, self contained unit keeps your receiver continuously disabled, even through the pauses of cw transmissions, but will automatically release at breaks and ends of transmissions. As an added feature, it will double as a phone monitor and transmitter power output indicator.

Operation

In standard break-in circuits, a tie-in with the tranmitter keying circuits is normally involved. For this unit, operation depends on the transmitter's radiation energizing a receiver-disabling relay. This is fed from an *rf* pickup source through a IN34A crystal rectifier. The release time of the relay is delayed by the discharged current of C1. Variable time delay is introduced by R1, which is in parallel with C1 and the relay and can vary the time constant. This delay control should be adjusted so that the receiver will remain disabled 3 to 5 seconds after transmissions have ceased. The exact amount of delay will be determined by the operator's individual cw requirements. Additional use is made of the rectified radiation voltage to provide a means of phone monitoring and, through a meter, a relative indication of transmitter power output. Meter sensitivity is varied by a potentiometer, similar in fashion to the variable time delay potentiometer.

Connecting the unit into the circuits is simple, with only three wires for external connections necessary. Special caution must be observed by making the receiver antenna and ground shorting wires of short lengths to prevent stray pickup. This is especially true on the higher frequencies.

The *rf* pickup antenna is any wire or antenna array which will give enough voltage to operate the relay. DC voltages between 3-10 volts to the relay will normally be required. A ten meter folded dipole, made out of twin lead tacked to the side of the shack, was used here with good results on all bands. It worked in conjunction with a 50 watt transmitter feeding a vertical. If operation is confined to one band, a tuned circuit shown dotted in the diagram, will greatly increase the sensitivity of the unit so that a short piece of wire will suffice for *rf* pickup. Values for the tuned circuit can be found in any good radio handbook.

It was found with the high powered rig that some receivers were insufficiently shielded to prevent stray electromagnetic and electrostatic energy from coupling directly into the receiver's antenna coil. When this happens, an alternate system of disabling can be used. The receiver's B-plus line can be relay controlled during transmissions, causing complete disabling. Many commercial receivers already have this provision incorporated. Even if the modification has to be made, it only involves breaking the B-plus line after the filter system and bringing the two leads to the normally closed relay contacts. ■

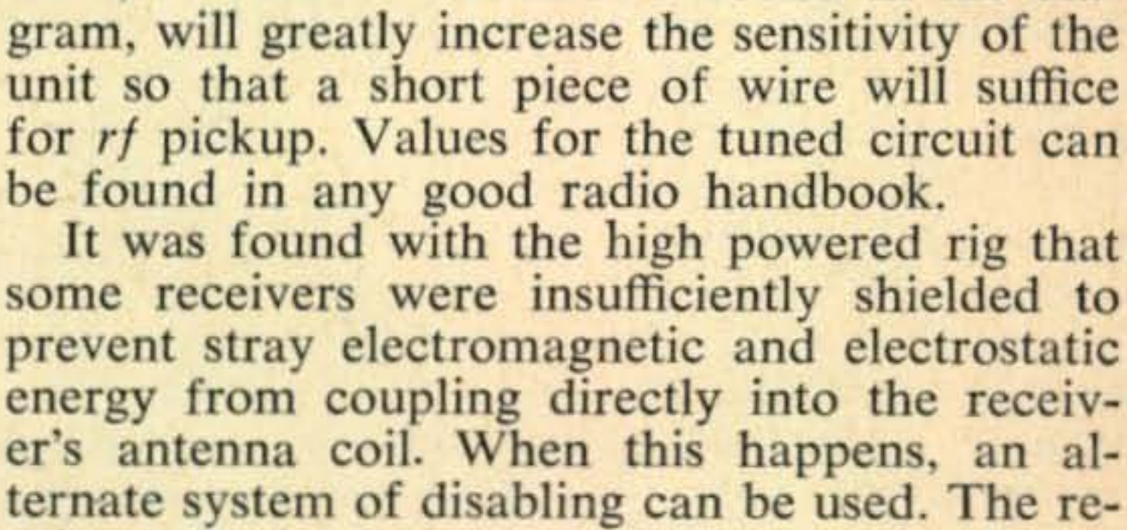


Fig. 1—This unit, requiring no transmitter connection or power, will provide break in operation.

Calibrate Your VFO With Only Your Receiver

J. S. Podger, VE3DNR
4 Argyle Road
Galt, Ontario, Canada

The usual procedure for calibrating a VFO is to use ham band crystals near the band edges or a frequency standard. Both of these items cost money. My Heathkit VF-1 was purchased because of its low price. It seemed foolish to throw away this advantage on an expensive method of calibration.

The method of calibration which was used is a bit more complicated than the old procedures, but the cost is nil. The only equipment needed is a receiver that receives 14 mc., your favorite ham band and WWV at 10 mc. Propagation conditions may make it more convenient to use WWV at 20 mc. instead of 10 mc. plus 28 mc. in place of 14 mc.

The accuracy of the calibration of the receiver is of little importance. If the frequency of the high frequency oscillator will stay within a few hundred cycles for a minute or two, the receiver is stable enough for the job. In other words, any old inhaler will do. The accuracy of the method depends only on your patience.

The general principle of the procedure is as follows. The 2 mc. end of the VFO's 160 meter band is calibrated against WWV at 10 mc. The receiver is then calibrated against the VFO's harmonic at 14 mc. The 1.75 mc. end of the VFO's 160 meter band is then calibrated against the receiver. All the other bands are then calibrated against the 160 meter band. After repeating the procedure many times the accuracy of calibration will become dependant on the accuracy of the dial markings on the VFO.

The 80 meter band of VFO's with no 160 meter band may be calibrated using WWV at 20 mc. only. In this case, the receiver is calibrated at 28 mc. instead of 14 mc. The rest of the procedure is similar to that outlined above. The detailed method for calibrating your VFO can be derived from the following procedure for the Heathkit VF-1.

160-80-40 Band

1. Before beginning the calibration, allow the VF-1 and the receiver to warm up for one-half hour or more.
2. Tune the receiver to WWV at 10 mc., BFO off.
3. Set the VF-1 dial to 2000 with the VF-1 bandswitch in the 160-80-40 meter position.
4. Insert an insulated screwdriver type tuning tool through the right-hand hole on top of the cabinet, as viewed from the front, and engage the trimmer capacitor under the hole. Using the trimmer capacitor tune the VF-1 for zero beat with WWV's carrier. This can be done more easily when WWV's tone modulation is off.
5. Leave the VF-1 set in this position and turn the receiver BFO on.
6. Tune the receiver for zero beat with the seventh harmonic of the VF-1 at 14 mc. Leave the receiver in this position for the next two steps.
7. Tune the VF-1 dial to 1750.
8. Insert the tuning tool through the hole in the back of the cabinet on the same side as the hole mentioned above, and engage the tuning slug. Tune the slug for zero beat with the receiver BFO.
9. Insert the tuning tool through the hole at the rear of the top of the cabinet and engage the tuning slug under it. Then proceed to tune this slug for the maximum output at the frequency in the 160, 80 or 40 meter band that you use the most. The author did this by feeding the output of the VF-1 to a Heathkit AT-1 transmitter. The tuning slug was adjusted for maximum grid current in the transmitter at the most used frequency.
10. The high end of the VF-1's band will now be off calibration. Repeat steps 2 to 8 several times until both the high end and the low end of the band are calibrated at the same time.

40-20-15-10 Band

11. Tune the VF-1 to 1856.
12. Tune the receiver, with the BFO on, to zero beat with the VF-1 near 29.7 mc. Leave the receiver in position for next two steps.
13. Change the VF-1's bandswitch to the 40-20-15-20 position and turn its dial to 29.7.
14. Using the trimmer capacitor at the top left of the VF-1, tune the VF-1 for zero beat with the receiver BFO.
15. Change the VF-1 bandswitch to the 160-80-40 position and turn the dial to 1750.
16. Tune the receiver for zero beat near 28 mc.

[*Continued on page 82*]

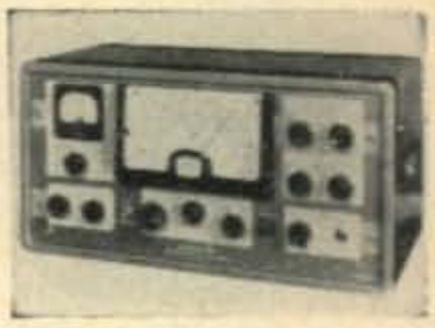
New Amateur Equipment

Radio Handbook . . . 15th Edition

The new fifteenth edition of the Radio Handbook really surprised me when I got a look at it the other day. Instead of following the usual "handbook" procedure and working in a few modifications and changes to bring it up to date it is a completely new book. All of the construction articles are brand new, never printed anywhere before . . . and most of them are worth more than the price of the entire book. Just looking through makes your mouth water . . . a two meter transceiver, a two and six meter transceiver, a midget sideband rig for mobile use . . . and so on for over 800 pages . . . well over twice as many editorial pages as any other ham handbook. Amazingly enough the price has remained the same: $7.50. This certainly is one of the most outstanding bargains in ham radio. Published by Editors & Engineers . . . available at most ham distributors and the Radio Bookshop. For further dope circle D on page 126.

New Receiver

This is the new Geloso Model G-209 receiver for amateurs. Measures 20½" x 10½" x 10¼" in size. This short-wave set is being offered to American "hams" at $299.75 net. Manufactured by Societa per Azioni Geloso, in Italy, it is the first European-made equipment ever to enter the highly specialized ham market in this country. For more information circle B on page 126.



New Transmitter

This Geloso Model G-212/TR Transmitter for amateurs has its own built in Variable Frequency Oscillator, Model 4/104. Now being offered to American "hams" at $249.75 net, it is the first European-made equipment to enter the highly specialized ham market in this country. The manufacturer, Societa per Azioni Geloso, of Italy, is Europe's largest integrated electronics equipment manufacturer. For further data circle C on page 126.

Tube Checker

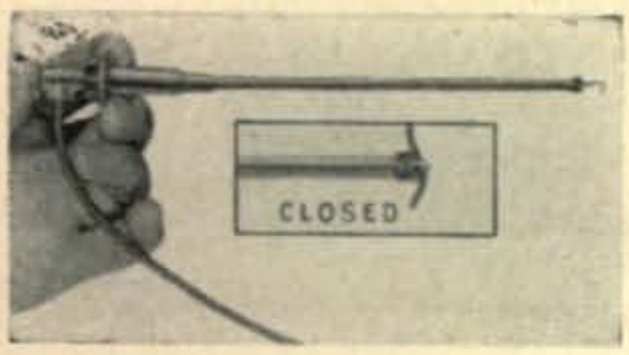
The Shell P-18 Test-O-Matic is a portable tube tester housed in a cowhide finished case. It tests more than 800 tubes with only three control settings. Multiple switching is eliminated by the use of 18 sockets. For more dope circle A on page 126.

Meter Guard for Simpson 260

Electronic Development Labs has a dandy plastic cover for the popular Simpson 260, 303, 276, and 880 test meters. It costs $2.50 and will save you many times that the first time you drop something on the meter or bang it while carrying it around. Distributors have it in stock. Catalog sheet for free if you circle U on page 126.

Amperex 4X500A

All you low power boys will be interested in this new air-cooled tetrode rated at 500 watts dissipation up to 110 mc. You can run a cool 1400 watt kilowatt to this baby. Specs and all that if you circle H on page 126.



Shockproof Probe

This new plastic probe has a little hook on the end and an insulated plastic push button to operate it. To hook onto a wire down there among the high voltage you just stick the probe in and, "blip", you've got your connection without getting knocked on your, er . . . ear. Costs 89¢, but if you are frantic for a one color 8½ x 11 data sheet on it, circle X on page 126 and we'll oblige.

K5BJU, Harriett, being greeted at Tyler, Tex., by hostesses for TYLRUN 4th anniversary party Nov. 8. Seated, l. to r., K5IHF, Kathy; K5IMD, Betty; W5LGY, Helen; W5YAJ, Peggy. K5BJU made second high score in phone section of the YLRL A.P. and placed third in the YLRL membership contest. She is president of GAYLARK, YL club at Houston.

YL

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

YL-OM Contest

Dates for the 10th annual YL-OM Contest are: Phone—Feb. 28, Mar. 1; CW—Mar. 14-15. Complete rules are given in the accompanying box. This is your chance, OMs, to work the gals just for the fun of it, or for the many certificates offered by YLRL and the YL clubs, as well as having a crack at the top contest awards. We'll be looking for you!

Results: 19th YLRL A.P.

Congratulations to the winners in YLRL's 19th Anniversary Party held Nov. 12-13 (phone) and 19-20 (cw).

1st cw—K6OWQ, Mary Schultz, 3376, cup.

2nd cw—KØIKL, Joyce Polley, 3195, certificate.

3rd cw—K2JYZ, Lillian Byrne, 2434, certificate.

1st phone—W4SGD, Katherine Johnson, 11,180, cup.

2nd phone—K5BJU, Harriett Woehst, 10,962, certificate.

3rd phone—K5BNQ, Doris Anderson, 10,750, certificate.

Novice award—KN3SPD, 213, certificate.

Club award—Floridora YLs, 4,241.70 average, gavel.

Complete scores, by districts, are given below. For a complete listing with number of contacts, sections and power multiplier if used, see *YL Harmonics*. W4SGD, K5BJU, K6OWQ and K2JYZ are pictured here. K5BNQ last appeared in this column for June '58.

W4BLR, Kay, YLRL's V.P. for '58 (and currently president) who handled the contest, reports the 166 phone logs received indicated that 550 YLs participated in that section. All 49 States, plus 3 VE districts and 15 different countries were represented. 70 cw logs re-

10th Annual YL-OM Contest Rules

Phone:

Start Sat. Feb. 28, 1959 at 1:00 p.m. EST. End Sun. Mar. 1, 1959 at 12 midnight EST.

CW:

Start Sat. Mar. 14, 1959 at 1:00 p.m. EST. End Sun. Mar. 15, 1959 at 12 midnight EST.

Eligibility:

All licensed OM, YL and XYL operators throughout the world are invited to participate.

Operation:

All bands may be used. Cross-band operation is not permitted.

Procedure:

OMs call "CQ YL." YLs call "CQ OM."

Exchange:

QSO number; RT or RST report; name of state, U. S. possession, VE district, or country.

Scoring:

(a) Phone and cw contests will be scored as separate contests.
(b) One point is earned for each station worked, YL to OM, or OM to YL. A station may be contacted no more than once in each contest for credit.
(c) Multiply the number of QSOs by the number of different states, U. S. possessions, VE districts and countries worked. Maryland and the District of Columbia count as one state.
(d) Contestants running 150 watts input or less at all times may multiply the result of item (c) by 1.25 (low-power multiplier).

Logs:

Copies of all phone and cw logs, showing claimed score, must be postmarked not later than March 31, 1959 or they will be disqualified. Please file separate logs for each mode of operation. Send logs directly to YLRL Vice President Gladys Eastman, W6DXI, 735 Glen Ave., Glendale 6, Calif.

Awards:

First place phone YL—cup
First place phone OM—cup
First place cw YL—cup
First place cw OM—cup
Winner of phone cup is also eligible for cw cup. Certificates will be awarded to high place cw and phone winners. The highest scoring contestant in each district will receive a certificate.

YL VHF Nets

Freq. (Mc)	Day	Time	NCS	Net
50.4	Tues.	2100	W3ERK	Petticoat Operators of Six
51.007	Tues.	2100	Rotates	R.I. YL 6-m net
50.185	Thurs.	1330	K8IYW	Hen Net of Ohio
146.1	Wed.	1900	Rotates	Los Angeles YLRC 2-m net
145.3	Thurs.	2030	W1CFT	R.I. YL 2-m net

K6OWQ, Mary Schultz, top cw scorer in YLRL's 19th A.P. Mary earned DXCC a year after she started working DX with a General (July '56). Also has WAS (earned in first 6 mo. as Novice), WAC, RCC, AJD, WAS/YL and YLCC (both on cw). K6OWQ also works RTTY. OM is W6CG.

K2JYZ, Lillian Byrne, made third high cw score in the A.P. Licensed in '54, Lil holds YLCC (250), DX-YL, WAC, needs only Nev. for WAS/YL and is awaiting QSL from KA2KA for WAC/YL. Works phone and cw; is alt. director in CD communications. Lil and OM K2JYM have 6 jr. ops; son John is K2UNO and daughter Maureen is K2ZUX.

W4SGD, Katherine Johnson, made highest phone score in YLRL's 19th A.P. Custodian of the YLCC award. Katherine has 750 confirmed YL contacts on her own YLCC. Licensed in '50, she also holds WAC/YL, WAS/YL and is active in nets and CD work. OM is W4PZE, son is W4UJI.

The DX-YL certificate awarded by YLRL to any YL submitting confirmed contacts with 25 different DX YL operators.

ceived showed 161 YLs participating, including 15 Novices.

YLRL

As the 19th anniversary passes and we enter the 20th year of its existence, YLRL is fairly bursting at the seams—both with new members and achievement awards it is offering.

At the time this copy is being prepared (mid-Dec.), YLRL membership is just reaching an all-time high of 900. Of this number more than 1/3 have joined the ranks this year as new or reinstated members. Betty, WØTYB, 1958 secretary, announced the winners of YLRL's membership contest as follows: 1st, Midge, K6BUS, with 72 new members to her credit; second, Fran, W4BIL, 29; Harriett, K5BJU, third with 12. Beth, W7NJS, '58 president, who disqualified herself from the contest, brought in 15. In the course of the contest, membership chairmen W8OTK, Alice, and K6BUS, Midge, checked the '57 Winter Call Book for YL calls and came up with a total of well over 4,000. Allowing, then, for the discrepancy in names (how *can* one tell from many names if the licensee is YL or OM?), the total YL calls in the U.S. appear to be somewhere between 4 and 5,000.

YLRL has announced this new award—Continuous Membership Certificate for those YLs with long-standing membership in the League. It will be issued to any YL applying who, at the time, has a record of 5, 10, or 15 years (and this year 20) of continuous membership in YLRL. The certificate is blue with the girl-on-the-globe in silver. Custodian is K7BED, Bettie Mayer, 2015 S.E. Grand Ave., Portland 14, Ore. To apply for certificate give Bettie your name and present call, any earlier calls under which you are claiming membership, and approximate date of joining (if you remember). Actual date will be secured from the treasurer or secretary. For any YLs wishing to pay up back dues, 1956 on $2; before that, $1 a year. Send back dues to the treasurer, W9YWH, Evelyn Tibbits, stating their purpose.

Another new YLRL certificate is for affiliated YL clubs. Beginning in Jan. '59, requirement for affiliation is 50% YLRL membership (previously 75%). Apply for the certificate to YLRL secretary, K6EXQ, Connie Hauck. Clubs affiliated in '58 included: Chicago YLRL, HAWK (which has 100% YLRL membership), San Diego YLRC, WAYLARC, GAYLARK, Los Angeles YLRC, N.Y.C. YLRL and Floridora YLs.

Three more DX-YL certificates for confirmed contacts with 25 different DX YL ops have been issued by W4BLR, Kay; #3, Dena Morgan, W5DRI; #4, Evelyn Wickoff, W4VCB/3; #5, Nell Corry, G2YL.

Nov. CQ listed YLRL District Chairmen for Alaska and Hawaii as KL7BHE, Sheila, and KH6BGE, Flo. Sheila is changing QTH and another D/C will be appointed here. KH6CKO, Kay Bloom, president of a newly formed Hawaiian YL club, will act as the D/C for this area.

"CQ YL"

Not a contest—"CQ YL" is the one and only book devoted exclusively to telling the part the YLs have played in Ham radio. 165 pages, 500 photographs. Order direct from author, W5RZJ, Louisa Sando, 212 Sombrio Dr., Santa Fe, N.M., $3.50, postpaid and autographed if you wish.

With The Clubs

The San Diego YLRC sponsored the YL-XYL activities at the Southwestern Div. Convention Oct. 10-12. Nearly 100 gals attended the Sat. luncheon, 68 of them licensed YLs. Highlight of the afternoon was the YLRL Forum with panel including W6's CEE, QGX, DXI, MWU; K6's KCI and EXQ. SDYLRC members who helped on the convention: W6's WDL, VSL, MWU, GGX; K6's VRH, MGL.

Custodian of the Lads n Lassies certificate offered by the Los Angeles YLRC is W6WRT, Ruby Word. . . . Custodian for TYLRUN certificates is the V.P., W5JCY, Bertha Watson. . . . Certificates for working their members are now offered by the new YL club in Hawaii, by the Loaded Clothes Line YL Net (Mon. 0900 MST, 7235), HAWKS of Indiana, and the Petticoat Operators of Six. Further details and new club officer listings will have to await next month—we've run out of space. . . .

33, Louisa, W5RZJ

YLRL A. P. Scores (TAB)

Phone

KIADY	195	WIZEN	8125
WICEW	7534	K2CUQ	553
KIDGZ	6426	W2EEO	743
WIICV	5050	W2EWO	5311
WIYPT/1	4305	K2JYZ	10,183

W2OWL	878	K6EXV	7706	KØDHA	2772	W4PPQ	(Conf.)
K2TXM	800	K6ENK	940	KØEDH	100	W4RLG	1813
W2VMQ	96	W6GGX	9685	WØERR	2480	K4SAF	431
K2ZLN	70	K6HHD	2975	KØGIC	5738	W4SGD	1250
K2ZQG	3700	K6HOI	820	KØGRG	3613	K4TFL	638
W3APT/4	6462	K6JCL	2010	KØHEU	3943	W4WPD	88
W3GEN	5558	K6JPY	4485	KØIGU	4056	K5BJU	252
W3GTC	1380	K6JZA	(Conf.)	KØIKL	3290	W5EGD	2080
W3MDJ	(Conf.)	W6JZA	5700	KØJUW	798	K5HTO	1696
W3NNS	(Conf.)	K6KCI	6192	KØLQS	1528	K5LIU	2015
W3RXJ	473	K6KLN	4363	KØLYV	8528	K5PFF	325
W3TNP	7260	K6OAI	7056	WØTYB	6950	W6AAX	630
W3UKE	(Conf.)	K6OQD	3500	WØZWL	2228	K6BUS	1014
W3URU	9555	K6PWH	1380	G2YL	2288	K6ENK	1248
W3UTR/3	775	W6QGX	9753	G8LY	360	W6GGX	60
K4BKT	1581	K6QPG	1035	JA1AEQ	(Conf.)	K6HOI	135
W4BIL	4973	W6QYL/4	(Conf.)	KA2HA	1210	K6KLN	2120
W4CWV	7131	W6UHA	3696	KH6AUJ	(Conf.)	K6OWQ	3376
K4CZP	2720	K6UHI	266	KH6BGE	2988	W6PCA	2351
K4EUG	1093	W6VSL	2380	KH6CKO	3608	W6QYL/4	(Conf.)
K4IFF	6469	W6WDL	4703	KL7ALZ	(Conf.)	W6UHA	1457
K4KKR	6498	W6WRT	7073	KL7BHE	8100	W6WDL	866
W4KYI	7076	K6ZCR	(Conf.)	KL7BLL	1950	W6WRT	46
W4KZT	4024	K7ADI	300	KP4APX	2325	W6WSV	936
W4PPQ	(Conf.)	K7AJB	210	KX6CM	3924	K6ZCR	1523
K4RBU	(Conf.)	K7BED	(Conf.)	OH5SM	3230	K7ADJ	70
W4RLG	608	K7BQI/7	3168	VE3AJR	1657	K7BQI/7	1242
K4RNS	3760	K7CPB	1000	VE3DGV	808	W7FDE	100
W4SGD	11,180	W7CPV	326	VE6MP	(Conf.)	W7GUQ	(Conf.)
W4UF	1914	W7CSQ	2720	VE6YW	607	W7HXE	1170
W4VCB/3	3183	W7DIC	2306	VE7ADR	4331	W7PTX	1486
W4WPD	2393	W7DRU	4700	VP1OLY	2250	W7PUV	1565
W4BLR	(Conf.)	W7FDE	1781	ZS6APG	563	W7WHV	1094
K4MQN	(Conf.)	W7GRC	(Conf.)	OE2YL	(Conf.)	W8HWX	2025
K5ALF	(Conf.)	W7HHH	2975			W8RIR	971
K5BJU	10,962	W7GUG	(Conf.)	**Club scores:**		W8WQE	1140
K5BNQ	10,750	W7NJS	260			K9AVK	225
W5DRA	(Conf.)	W7QKU	4025		average	K9BWJ	1219
W5DRI	8125	W7QME	3294	Floridora YLs	4,241.70	K9IWR	15
W5ECF	(Conf.)	W7RVM	8343	GAYLARK	4,144.7	W9MLE	1824
W5EGD	7830	W7TGG	5248	LARK	1,398.5	W9USR	1281
W5ERH	6081	W7WHV	892	L.A. YLRC	4,104.	KØEDH	1156
K5GYZ	2880	W8DNF	368	Portland Roses	3,231.8	KØGIC	1890
K5HTO	9570	W8EIR	1392	S.D. YLRC	3,099.1	KØIKL	3195
K5IHF	924	W8HUX	4095	WAYLARC	690.	KØLYV	2175
W5JCY	5328	W8RZN	5751			KA2HA	124
K5JGC	30	W8VRH	2846	**CW**		KH6AUJ	(Conf.)
K5LIU	4408	W8WUB	4770			KH6BTX	792
K5MIZ	601	K9CMZ	6	KIADY	195	KL7ALZ	863
K5PFF	2364	K9CQF	6611	WIKYT	(Conf.)	KL7YG	1530
K5PIO	5273	W9GME	6270	WIUVV	(Conf.)	VE3AJR	1200
W5RZJ	(Conf.)	K9IVG	1500	K2CUQ	760	VE3DDA	(Conf.)
W5SPU	6738	W9LDK	850	K2JYZ	2434	VE3DKY	1392
W5WUX	2558	K9LYG	360	K2ZLN	123	VE5DZ	1674
W5YSJ	1984	W9RUJ	7763	K2ZQG	1855	VE6YW	356
W5ZPD	897	W9UXL	743	W3TSC	2280	VE7ADR	689
W6AAX	5334	W9VNG	1823	W3UTR/3	775		
K6ANG	4400	W9YWH	2368	W4BIL	998		
WA6AOE	1581	KØACC	8288	W4GAN	784	**Novice winner:**	
W6CEE	2835	KØATT	990	K4HXB	2018		
W6DXI	1512	KØBTV/m	(Conf.)	W4KZT	1656	KN5SPD	213

Novice

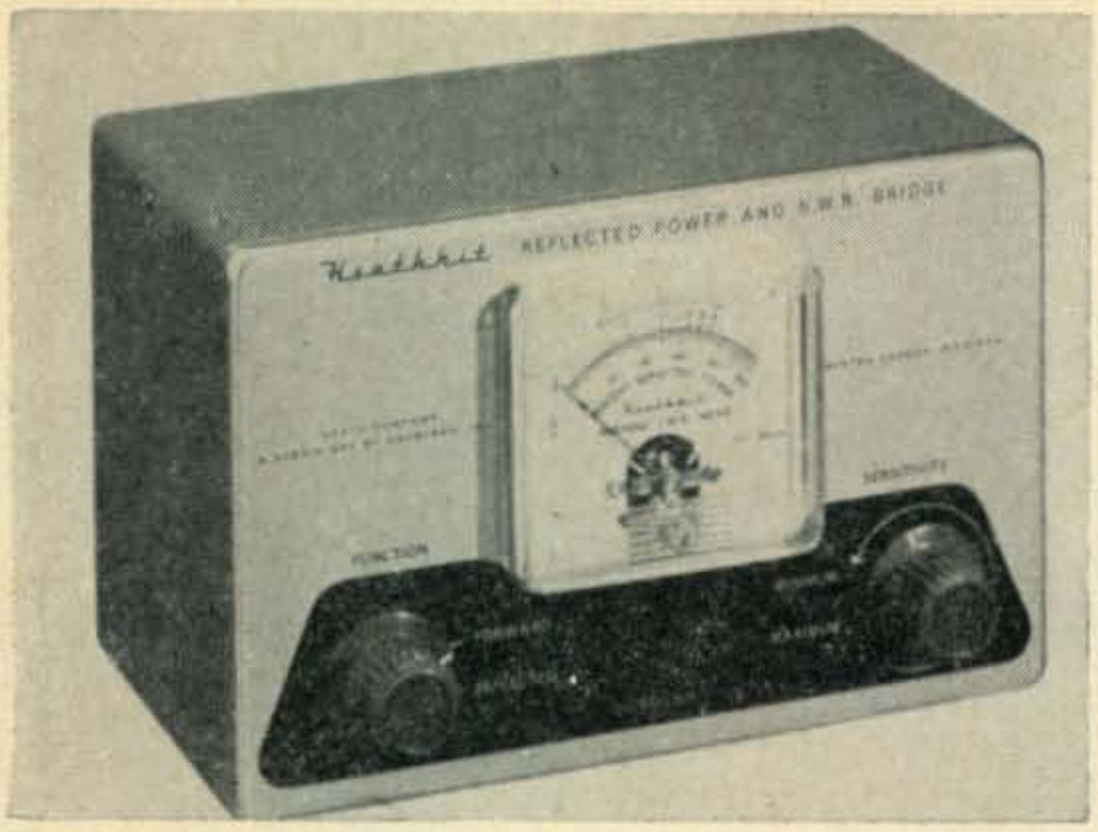
by **DONALD L. STONER, W6TNS**
P.O. Box 137, Ontario, Calif

Did you ever hear of the Novice Phenomena? Probably not, for it's a term that I coined myself to describe a period that almost every Novice passes through. The new Novice often tells me, "I can't hear those other call areas, all I ever work are the sixes and sevens. I have the same receiver, transmitter, and antenna as Joe Novice across town, but he has ten times as many states worked as I have."

Then, some time later, my Novice friend may tell me that he finally snagged a station over the Rockies, later a station east of the Mississippi, and after a few months have passed, I am sure to hear about the first East Coast contact.

The phenomenon is in the mystery of what happens. Does his receiver suddenly get more sensitive, or does the transmitter put out more power as time goes by? Maybe the antenna ages like a keg of cider.

Actually the East Coast stations were coming through the first day that my Novice friend sat down to work his rig, but he had not learned to hear them. The signal strength of a station gets weaker as the distance increases and the East Coast stations were buried under zillions (or so it seems) of very strong local stations. But after a while, my friend's ears (and brain) learned "not to hear" the strong stations but only to accept the weak sta-



The Heath Reflected Power Meter (Model AM-2) will help you put out a better signal by accurately measuring your standing wave ratio.

Wayne Dunlap, K5MDZ, 136 Pike Avenue, Jacksonville, Arkansas, attends Ark. State Teachers College and can only sked on the week ends, but will be glad to look for anyone needing Ark. The gear is pretty obvious from this excellent photo.

tions way in the background. And after a while he got so skillful at it that it became commonplace to work the Mid-West, and he then listened for the extremely weak stations (the ones buried under the weak stations).

Of course, we should not overlook the acquired skill of operating a communications receiver. The crystal filter, or "Q" Multiplier can be a great aid in digging out the weak stations. But when you do not have these devices on your receiver, you must learn to "tune your ears" to the desired station. After a few months of operation, you will discover that you can copy a very weak station that is under six or seven very strong stations. Your brain will simply ignore the other dots and dashes.

Of course some Novices never learn this talent. It certainly is not required when you take your General code examination. You only hear the one signal coming from the tape machine. But the fellows who have learned to copy the weak ones are usually the same ones who stay on cw even after they make the General Class.

You must be able to copy the weak ones, if you expect to work DX too. Remember, if the signal is coming half way around the earth, it will be mighty weak by the time it reaches your inhaler. And many of the DX stations who write to this column report "I called KN4XXX but he went back to a much stronger station." Don't lose sight of the fact that if the DX stations can hear you, then you can be sure of hearing them *if you listen carefully*.

Next month, we will discuss how to make sure that you are "getting out." An excellent piece of equipment to insure that you are getting all your oats into the antenna is the Heath AM-2 Reflected Power and SWR Bridge. This amazing device will check your antenna match by measuring the forward and the reflected power or standing wave ratio from 1:1 to 6:1. It will handle well over a kilowatt from 160 through 2 meters and can be used either on 50 or 72 ohm coax. No external power is required for operation. The cabinet measures 7⅜" x 4 1/16" x 4⅝" and is available for $15.95 directly from Heath Co.

DX News

Marion Wise, W4PRO, of the Hampton Roads Radio Club advises us that interest in the Half Century DX Certificate is high and that many Novices are working for it. The first certificate was awarded to Chuck Coleman, KN5LZO (now K5LZO), of Houston, Texas. More information on this fine certificate can be obtained from Marion by writing her at 15 Willow Road, Hampton, Va.

November was a good DX month for some Novices, but unfortunately, their prowess showed up on the high end of 20 meters. The following stations were received on the dates shown, around 14.3 to 14.35 *mc;* KN6KLW, 569, Nov. 6—WV6ATY, 446 (chirp), Nov. 7—WV6BTK, 569, Nov. 14—KN9PXZ, 579, Nov. 25—WV6CDD, 539, El Cajon, Dec. 2, 11:30 PST.

Our friend Tima Popovic, YU1RS-357, reports the following stations were heard in Yugoslavia in the month of October, on the 15 meter Novice band. All times are in GMT.

Oct. 27, 1700-1840: KN1EHU, WV2AAU, KN2TQB, KN3ESA, EXM, GCS, KN4UNN, VHF, YXC, KN5RNN, KN8JSY, LCG, LKF, KN9KPG. Oct. 28, 1440-1740: KN1HWD, WV2BBH, KN4ZLM, KN5QXU, KN7CUO, KN8IDR, KQW, LCG, LDC, LJJ, KNØPVV. Oct. 29, 1800-2000: KN1DHZ, HUI, IMO, WV2ALC, BDV, KN2HPL, HTI/1, KQS, LOX, MBM, MHX, OMQ, OST, TDJ, TNB, KN3DML, EQI, KN4KWQ, UTM, VUU, YTC, KN5QDR, KN8IRU, LCZ, LDF, KN9LUI, ORZ, KNØPPO, RLZ. Oct. 30, 1700-1845: WV2ALC, AWH, CBB, KN2OHT, KN3EIZ, MQS, KN4AMY, BOD. Oct. 31, 1725-2150: KN1GBJ, GMC, GRJ, HML, HTN, IEM, IMA, INU, IWE, WV2ATV, BFA, BQA, KN2BQX, GGF, JOK, JXY, PEQ, PMY, RYB, SMX, TNB, KN3CWT, DPQ, ECD, ELM, EWH, EYQ, GMT, KN4ACJ, BRZ, JTW, TIA, UTM, UUS, VIC, VWK, YBN, YCT, YEP, YNX, YWQ, YWZ, YXA, YXK, ZDT, ZNK, ZUH, ZYS, KN5RWF, SPD, KN7DXA, KN8IHP,

ham clinic

by **CHARLES J. SCHAUERS, W6QLV**
CQ Magazine, 300 West 43rd St., New York 36, N. Y.

The electronic transmit-receive switch (TRS) has been the main subject of a number of letters received by **Ham Clinic** during the last couple of months. So this month we thought that some space devoted to it would be worthwhile.

In 1952 this writer experimented with various receiver isolation devices and attempted to use the radar TRS system on the lower frequencies without too much success. About 1955 the vacuum tube was used with fair results; then B&W came out with their 380 TRS which proved quite popular. Since then a number of TRSs have appeared on the market and seem to be gaining in popularity.

Taking the place of noisey electro-mechanical relays, the TRS enables quite an effective break-in operation. In reality it is not a switch per se, but an isolation device and does no switching. The antenna is *always* connected directly to the transmitter input (unless a filter is used) and the TRS prevents (or is supposed to) hot *rf* from getting into the receiver when the transmitter is operated.

Unlike the TRS system employed in radar (which incidentally can be used in some *shf* ham equipment applications), the ham TRS is generally an aperodic device. That is, it operates on all ham frequencies; and depending upon the type used, may enhance a signal received on the lower bands as much as 6 *db* or more.

So far, four distinct types of TRSs, in which the radio amateur is interested, have made their appearance. The first is one which uses a triode tube whose input (grid) is connected to the antenna at the transmitter through a capacitor of small value. Rectification takes place and this current is used to bias the tube so that cut-off or *rf* isolation takes place. The output is usually connected to the receiver through a condenser in the cathode circuit. Little or no amplification takes place and there is usually a very slight loss at the receiver input. If the tube elements short out or the coupling input condenser should fail, sufficient *rf* leak-through *may* take place (depending upon transmitter power) to burn up a receiver antenna coil.

The second type of TRS operates in about the same manner except that receiver input connection is made to a very broadly tuned circuit connected to the plate of a pentode tube. There is some amplification of the received signal. Input to the grid circuit of the TRS tube is affected by means of a condenser connected directly to the plate of the transmitter's final *rf* stage. This type is preferred to the first because of the amplification available and because it can readily be designed to "fail-safe."

A modification of the second type is possible by using a dual triode and double-gating it. This is the type I prefer.

In the third type of TRS, mechanical considerations restrict its use to the *shf* bands. Designed usually for a single frequency or a very, very narrow band of frequencies, it makes use of ¼ and ½ wavelength resonant lines. Radio frequency "switching" takes place by shorting and opening these lines. Figure 1 is self-explanatory; it can readily be seen that this is the basic radar switching system.

The fourth type of TRS utilizes diodes which are connected (back-to-back) to ground across the receiver input in conjunction with a limiting device (a 5 or 10 watt light bulb) which is lightly by-passed. The September 1958 issue of *Western Radio Amateur* (a California publication) contains a diagram of such a device.

Excessive *rf* leak-through and receiver silencing must receive some consideration if the design of a TRS is contemplated. To minimize leak-through, careful shielding of input and output circuits is mandatory. Short sections (the shorter the better) of coax should be used for connection to the receiver and transmitter. The metal case of the TRS should be well grounded. Where 100% receiver silencing is desired, a small low-current relay actuated by rectified *rf* may be used. But sometimes even complete shorting of receiver antenna terminals (with gain open) will not prevent receiver overloading.

TVI may or may not be a problem when a TRS is used. Harmonic radiation through power feeders can be minimized by the judi-

Dennis Jeck, KN9OUO, 10940 Dickens, Westchester, Ill., likes to be called "ole man" for obvious reasons. Dennis's Mother (KN9OUS) and Father (KN9OUY) are also hams. Do you have to make appointments to use the rig, Dennis?

This is the neat station of Steve Moore, KN5SZV, 1504 Panhandle St., Denton, Tex. Steve runs an AT-1 modified with a 6146 in the final and an AC-1 antenna coupler. The receiver, as you can see, is an SX-43 with a Heath QF-1 for selectivity. Home brew QSL's are sent 100% if anyone wants a sked.

IHR, IRU, JCT, JPR, JSO, LGY, LRK, MJI, KN9KQV, OFD, OMI, OZY, KNØPVT, RGF.

Bud Lafferty, KG1CK, has been pretty busy up there in Thule, but he did have time to advise us that he heard the following stations call CQ, Nov. 28, on the 15 meter band: KN3GIT-1957 GMT, KN4VUU-1938 GMT, KN4ZUU-2003 GMT, KN8LEI-1949 GMT, KN8LKF-1944 GMT, KN9MMK-1937 GMT. Don't forget fellows, I have been handling KG1CK's QSL cards. If you worked Bud, and didn't get a card, send yours, along with a self addressed, stamped envelope, and I will see that you get one.

Net News

John Sorrentino, K2ZHK, 900 Orange Ave., Cranford, N. J., would like to inform the readers about the New Jersey Slow Speed Net which will give N.J. Novices a chance to handle traffic at a speed that is enjoyable. Drop John a line if you would like to get in on this interesting phase of ham radio.

The Sundown Novice Net meets on 7152 *kc* on Sat. and Sun. at 1800 CST with KØLCF and LGZ as NCS's. Anyone that can read the NCS is invited to check in. Those wishing to join the SNN should write to KØKMZ, Ray Jarboe, 2622 Crawford, Parsons, Kansas.

Bob Brown, K2ZSQ advises us that Channel "A" is more of a society than a net, since traffic is not of primary interest. The frequency is constantly monitored and you can almost always have a rag-chew by checking in on 50.25 *mc*. See address below for more information.

Help Wanted

Bob Brown, K2ZSQ, 67 Russell Ave., Rahway, N.J., again offers to help prospective hams. He may be contacted any time, but a group usually meets there at 7:00 PM EST on Tuesday evenings. The following persons have requested help with the exams.

Shown here is the pride-and-joy of Bob Brown, K2ZSQ, 67 Russell Avenue, Rahway, N. J. It is a homebrew rig running 35 watts on AM and CW, with a switch to operate 75 watts double sideband.

John Champa, 1542 Wyandotte Rd., Columbus 12, Ohio, phone HU 8-1698.

James Dziewior, 422 30th Avenue N., Minneapolis 11, Minnesota, phone JA-16458.

Letters

Donald Friedrich, KN8LPV, 3319 W. Nelson St., Midland, Michigan, is still planning on issuing the Novice bulletins on 80 and 15 meters, but has changed dates to Sunday evening and will alternate bands each week. The frequencies to be used are 21.111 *mc*, and 3.738 *mc*.

[*Continued on page 69*]

cious use of *rf* chokes, proper by-passing and lead shielding. Normal TVI reduction measures must be taken when putting together a TRS of *any* type.

At the present time, the tubes most widely used in TRSs are the 6AH6 and the 6BL7. There are no doubt other tubes which will work all right; however, these tubes are used by the majority of TRS manufacturers such as *B&W*, *Johnson*, *Dow Key*, *Van Norman*, *Lynmar* etc.

Yes, a TRS is worth having and especially if you are a SSB man. One less relay "banging" away is certainly something to think about.

Observation

Much has been written about operating practices in the pages of CQ, QST, WRA, RSGB Bulletin and other amateur radio publications. However, little has been said about the difficulty experienced by many amateurs (especially foreign) in understanding Q signals and call signs first time around.

After much scientific study, a phonetic alphabet utilizing words understood by ALL people who use the English (or slightly modified) alphabet has been in existence for quite some time. Used at present by our military forces, aviation agencies and commercial communication companies, it has been found very effective in reducing repeat transmissions—especially during periods of poor propagation.

Why the world's hams do not eagerly take to it and use it more extensively is hard to understand. If you twirl your receiver dial over any ham band you can hear many amateurs (especially American) using words in their phonetic spelling which are often confusing; especially to the DX amateur just startting out. MARS stations have been using the new alphabet with great success for over two years. When and if their services are required in an emergency they will be accustomed to using the system with minimum effort.

You will have better communication if you learn and use the alphabet given here: ALPHA, BRAVO, CHARLIE, DELTA, ECHO, FOXTROT, GOLF, HOTEL, INDIA, JULIETTE, KILO, LIMA, MIKE, NOVEMBER, OSCAR, PAPA, QUEBEC, ROMEO, SIERRA, TANGO, UNIFORM, VICTOR, WHISKEY, X-RAY, YANKEE and ZULU.

Using some of the terms commonly employed by many amateurs, it can be readily seen that by changing the first letter of these words, a different word is easily made and *often* misunderstood. For example: "D" for dog, "H" for hog, "B" for bog; "L" for love, "D" for dove; "Q" for queen, "G" for green and so on.

Try doing this with the new alphabet. It is apparent that TANGO, WHISKEY and MIKE are about the only possibilities, viz, mango, risky, dike etc. So let's **all** start using the alphabet more easily understood by all hams!

Questions

CE-20-A

"I bought a Central Electronics 20A SSB exciter from a friend of mine. I understand that various circuit changes have been made by its engineers to improve its operation. Are these available from you?"

We have changes on CE's equipment only for trouble-shooting purposes. You can obtain all changes from the company, located at 1247 West Belmont Ave., Chicago 13, Illinois.

Speaker

"Any way to economically convert an old

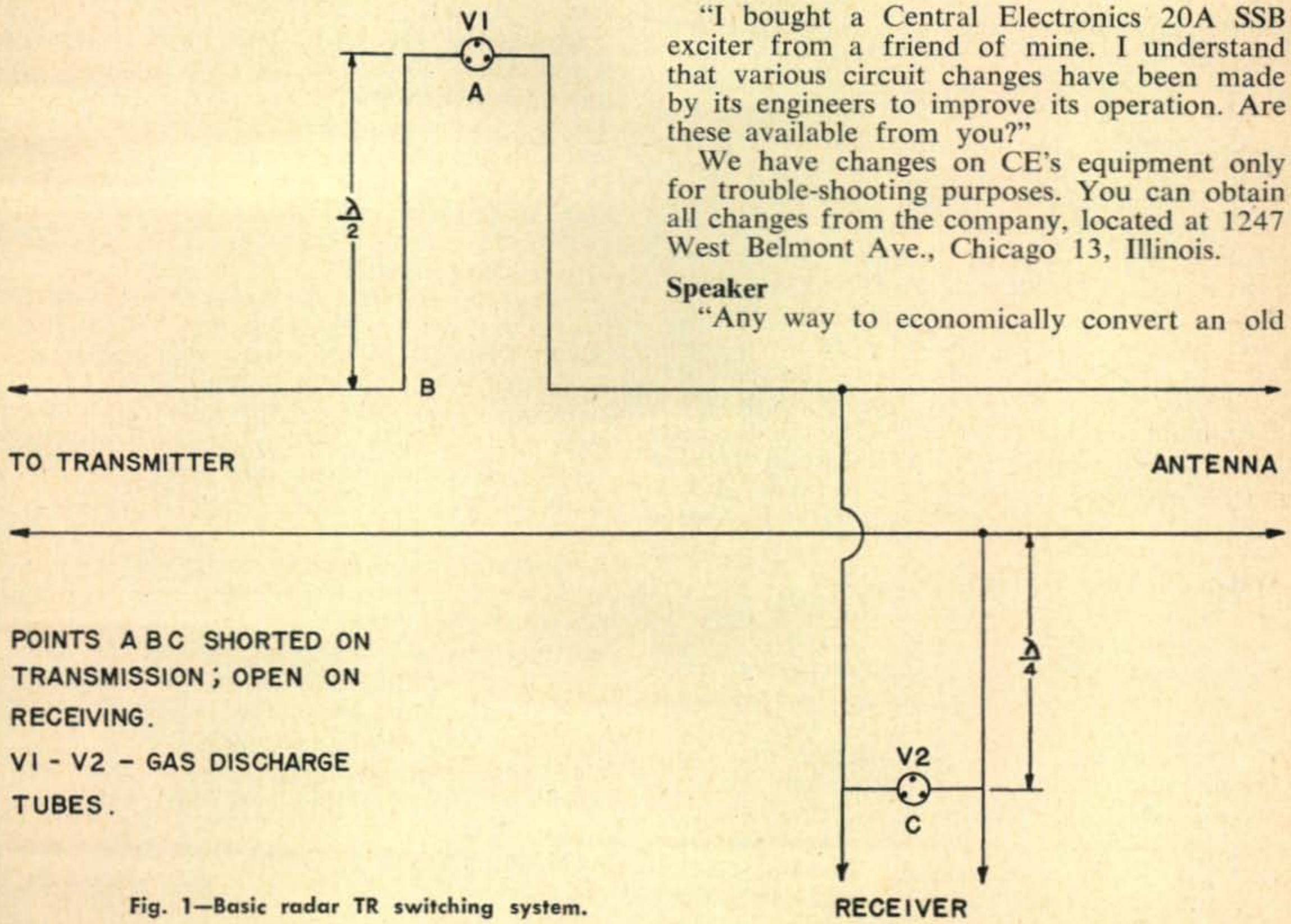


Fig. 1—Basic radar TR switching system.

Majestic EM speaker for PM Operation?"

No.

NC-98 Receiver

"I have an old NC-98 receiver which oscillates when in the C band position (11-14 mc). What can I do to remedy this? I plan to buy an NC-303 and want to keep the NC-98 as a second set."

You certainly cannot go wrong buying the NC-303—a terrific set. Your set's oscillation can no doubt be cured if you replace the 220 mmf capacitor (C-43 on the NC-98 diagram) with a 100 mmf ceramic capacitor.

BC-458 VFO

"Any information available on making the BC-458 used as a *vfo* more stable?"

Yes. Thanks to the change notice supplied by *Central Electronics* dated 3-21-57 here is the info: in order to achieve good stability in a reasonable period of time, the *average* BC-458 requires a 10 mmf P-100 type temperature compensating capacitor (C-26) inside the oscillator can. Be sure to remove the 3 mmf negative 750 and change the 1626 tube grid capacitor to 180 mmf zero temperature coefficient. Some units may require 20 mmf P-100 for positive compensation. High drift after 20 minuntes: (on 40 meters) add another 10 mmf P-100 in parallel with the one already installed. Low drift: remove the 10 mmfd P-100 capacitor.

GG-813s

"My 813s grounded grid *rf* amplifier seems to be plagued with parasitics. What suggestions do yuo have to offer?"

Barker and Williamson Inc. who make the FC-15 filament choke used in some of the best GG amplifiers say that they have found that the screen in tetrodes or pentodes should be fed through a center tapped coil ¾" diameter of 10 turns of #14 solid wire; a 360 ohm 2 watt resistor connected directly from screen to screen and each screen by-passed to ground with a .005 mf ceramic condenser mounted directly on the tube socket. This should help remedy the parasitic situation if normal precautions have been taken, viz., short leads; a minimum number of ground terminals for each separate circuit; a 100 ohm carbon resistor upon which is wound about 8 turns of #18 wire and inserted in series with each tube plate etc. Good luck!

Viking I Mod Distortion

"Recently I have been getting on-the-air reports that my speech is distorted. I use a Viking I. I notice that the 807 modulators both contain a blue glow. Could this be the reason, or what (sic)?"

It is hard to find an 807 operated at nearly maximum ratings which does not have a "gassy" type of bluish glow. Unless the 807s you have are exceedingly old I doubt that they are the *direct* cause of your modulator's distortion. Suggest you check the bias on the 807s as well as plate and screen voltages and currents. Also check the speech tubes and their operating voltages and currents. ALSO: if your final is not properly loaded you COULD be over-modulating.

Surplus Tubes

"I've got the chance to buy some high power triodes for practically 'peanuts.' However, I can't return the ones I pick out if they don't work. Any suggestions for choosing a few with a good chance of getting at least three that'll work?"

Bet you're talking about 304s or something similiar! Well, first visually inspect the tubes for loose bases, pins etc. Then thump them near your "good" ear for loose elements. Then turn them up-side-down and look for flaked cathode oxide. Take an ohmmeter along with you and check for filament continuity and inter-element shorts. Last but not least, take another look to see that internal elements are not bent. This is about all you can do. Good luck to you too!

Choke

"What's the value and current rating for a *Millen* RF choke number 34107?"

1 millihenry at 300 mils.

Coax

"What is the attenuation per foot of *average* RG59U coax cable at 100 and 400 megacycles?"

At 100*mc*, about 3.75 *db;* at 400 *mc*, about 8.30 *db*.

Gonset G-66B

"I have a *Gonset* G-66B mobile receiver. After taking it out of its case to check the tubes (which were all good) the set won't work. All I get is noise. Connecting the antenna and disconnecting it doesn't seem to cause a click as it once did. I took the set apart again and looked for disturbed or broken wires; everything seems to be in order. You tell me Mr. HAM CLINIC!"

The G-66B *Gonset* is a fine receiver if treated properly and care is taken not to bend the ANTENNA TRIMMER plates in the process of taking it out of and putting it back in its case! Also, sure you got the right tubes in the right sockets? Too, you might check the little neon bulb across the antenna input for shorted connections.

Short

"Sometime ago I built up a power supply using a 6X5 tube as its rectifier. The last time I turned it on, the power transformer hummed and the tube seemed to be flashing internally. I checked the tube, it's ok. What's cooking?"

A shorted filter condenser. No fuse?

Size

"I have a small variable capacitor marked 'UM-100' and it has 28 plates. What's the maximum capacity?"

100 mm. It's a *National.*

DX35

"Any easy way (please) to add a tune-

operate switch to my *Heath* DX35 transmitter?"

Remove the B plus from pin 3 of the 6146 tube and connect it to one side of a SPDT switch. Connect the other side of the tune switch to ground and connect the lead from pin 3 of the 6146 tube to the center connection of the tune switch. Very simple!

Hallicrafter SX28A

"I would appreciate any old service notes or modification data on the SX-28A. Have any?"

No, we are sorry to say. Our *Hallicrafters* file at the present time is pretty thin. With the help of the people at *Hallicrafters* we hope to remedy this. I do have an old manual however which I am shipping you—gratis.

Pi-Tank

"What commercially available pi-tank inductor, which will cover 3.5 to 28 *mc*, do you recommend for a kw final (class C)?"

B&W's Model 850

Tech Tip

If you use a lot of fuses in your equipment, the easiest way to determine which one is gone is by paralleling each fuse with a small ¼ watt neon bulb (in 110 volt *ac* circuits). The neon bulb will light up when the fuse goes. In 6 or 12 volt *dc* circuits such as are found in mobile installations, fuses may be paralleled with a 6 or 12 volt light bulb to perform the same job. This is not a new idea. Fuses are now available on the market which incorporate a neon bulb to indicate a blow out.

Thirty

A number of letters relative to surplus equipment have been received by **Ham Clinic**. As stated in one of our past columns, we are not reluctant to help anyone with *any* problem. However, there are other departments in CQ headed by very capable *specialists* who will be glad to hear from you concerning the field in which they are engaged. Although we have answered a number of questions pertaining to transistors, SSB, RITTY, etc., **Ham Clinic** does not *concentrate* on any of these but applies itself to a broad and very general field.

But regardless of your question shoot it in. But *do* look through CQ's various columns *first*—if you do not feel that your question falls within the purview of any other column *we'll take it*.

The "oddest" request for assistance we have reached thus far is the one from a very serious gentleman, age 33, well to-do financially and a very enthusiastic ham. He wanted the names of some eligible young YLs (age 20-30) interested in matrimony. Somehow or other we think we "missed the boat." We never gave a thought to this particular field of endeavor—but *how* did he get us confused with Ann Landers?

73, Chuck, W6QLV/F

NOVICE [*from page 65*]

Jeff Smith, WV2CBQ, is cranking on with a Globe Chief 90 and a Heath AR-3 into a half wave dipole. Jeff is a soph at Archbishop Molloy High, and lives close to a store that has bargains on communications receivers. Sorry you forgot your QTH, Jeff.

Pat Barrett, WV6AJI, 324 Cabrillo Rd., Arcadia, Calif., has changed rigs, and now has an AT-1, running 40 watts, and an SX-25. Pat also put up a new antenna, but says it didn't help in the new states dept. He will make skeds with anyone needing a QSO.

Richard Panosh, 717 Front St., Lisle, Ill., would like information on using his Globe Chief on six meters. Can anyone help him?

Donn Woodman, 2629 Turner Ave., Schenectady 6, N.Y., has a receiver that he calls a "DX dud." So he added an *rf* stage, and antenna coupler from the Novice and Tech. Handbook, and followed this up with the transistorized "Q" Multiplier from the same book. Now he is sucking the DX in. (Anyone want a copy of the book? I just happen to have a few thousand at $3.00 each postpaid —plug-plug.)

Sanford Hutson, K5QHS, Box 27, Stuttgart, Ark., has a WAS total of 33 and best DX of KS4 (Swan Island—WOW!). Sanford would like skeds with Nev., Del., and R.I.

Bob Vincent, KN3DTO, 217 State St., Grove City, Pa., will be a General by the time he reads this. He knocked off 37 states with an RME-69, DX-20 and a 40 meter folded dipole. Bob's tip to new Novices is to spend your money on a used receiver which he feels are better than the new ones.

Art Cheshire, 426 Elm St., Jonesboro, La., holds the call KN5RFL and has totaled up an impressive list of DX contacts, including a CR6 (Angola) with his HQ-110, DX-40, and Windom antenna. He would like to sked Colo., Ida., Kan., Maine, Mont., N.H., Utah, and Wyo. Write to the CQ DX Editor (W4KVX) if you can't obtain IRC's locally, Art.

Missouri is represented by Larry and Gary Wilson, KNØRWL and KNØRWK, 1455 S. Barnes, Springfield, Mo., have a joint station consisting of a homebrew 6AQ5 rig and an RCA-5Q55 receiver, connected to a 40 ft. wire. Both boys will sked anyone needing Mo. and QSL 100%. Look for them on 40 and 15.

Both Harvy F. Holt, KN4YWW, 94 N. E. 99th St., Miami 38, Fla., and his father are hams. Harvy worked 30 states and a KZ5 for DX with a homebrew transmitter for exhaling and an SX-101 for an inhaler. A Gotham vertical antenna is used to tickle the ether.

That's the news and views for another month, fellows. You may have noticed quite a few "regulars" in here this month. How about hearing from you?

73, Don, W6TNS

PROPAGATION

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

Last Minute Forecast

A period of exceptionally good short wave propagation conditions is forecast for February 1-6. Radio storms of at least moderate intensity are most likely to occur February 10-12 and 25-27.

February's Highlights

During February, as spring propagation conditions begin, fewer *six-meter* openings will occur on east-west paths (i.e. from the USA to Europe and Japan), but an improvement is expected on paths following more or less of a north-south direction. Conditions on *10-meters* are expected to remain excellent for world-wide DX from shortly after dawn, through the late afternoon hours. With increased hours of daylight, the *15-meter* band is forcast to open to almost all areas of the world during the daylight hours, and to remain open somewhat later into the evening than during the winter months. Excellent propagation conditions are forecast for *20-meters* from the late afternoon, through the night hours, and until a few hours after sunrise. During the daytime hours the skip on *20-meters* should not be as short as during the winter months. Fairly good propagation conditions are forecast for *40-meters*, with openings to many parts of the world expected from shortly before sundown, through the hours of darkness, and until shortly after dawn. During the hours of daylight the skip will vary from a few dozen miles to a few hundred miles. A few DX openings are also forecast for *80 and 160-meters* during the hours of darkness. Beginning in late February, and lasting through March and early April, propagation conditions between the USA and Australasia improve considerably. This improvement should be especially noticeable from a few hours before, until a few hours after sunrise on *20, 40 and possibly 80-meters.*

1958 In Review

The year 1958 will go down in scientific history as the year in which the most intense solar cycle ever recorded reached its peak. The year began with a smoothed sunspot number of 198, rising to an unprecedented peak of 200.5 in March, then slowly, but steadily declining to an estimated smoothed number of 166 by December.

The *smoothed* sunspot number—determined from a twelve-month running mean of monthly numbers—has never, prior to the present cycle, exceeded a value of about 159. This previous level of maximum intensity (which occurred only during one month in the more than 200 years that sunspot records have been kept) was exceeded *every month* during 1958.

As a result of this extraordinarily high solar activity, the ionization in the principal ionospheric layers were much enhanced, and usable frequencies for short wave communications were higher during 1958 than ever observed previously. During the winter and late fall months the maximum usable frequencies from the United States to Europe exceeded *50 megacycles* almost daily. Similarly, MUF's rose above 50 megacycles from the USA to almost all other areas of the world on a large number of days during the winter, early spring, and fall of 1958. The *10, 15, and 20-meter* bands were also favorably affected by the intense ionization. The *10-meter* band, usually dormant in all but the winter months during periods of moderate solar activity, was usable for long distance communications throughout the entire year. *Fifteen-meters*, usually limited to daytime openings, was open to many areas of the world until late into the evening hours throughout the year, and at times, around-the-clock. *Twenty-meters*, a daytime DX band during lower periods of the sunspot cycle, was the best *night-time* DX band during the past year, being open to almost all areas of the world from late afternoon until a few hours after sunrise.

The increased absorption also associated with the extraordinarily intense solar activity

FEBRUARY, 1959

ALL TIMES IN E. S. T.

EASTERN USA TO:

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

ALL TIMES IN C. S. T.

CENTRAL USA TO:

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

ALL TIMES IN C. S. T. (contd.)

CENTRAL USA TO:

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

ALL TIMES IN P. S. T.

WESTERN USA TO:

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

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

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

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

of 1958 caused weaker signals, and generally poorer propagation conditions on the *40, 80, and 160-meter bands,* as compared to previous years. Long distance propagation was possible, however, to many areas of the world on these bands during the night-time hours of the winter, early spring, and late fall months.

A further interesting example of exceptional high frequency propagation during this past year is given by the frequent reports of reception (except during the late spring and summer months) of BBC television broadcasts* (41.5 mcs sound and 45 mcs vision) in the United States, and in most other areas of the world. Several American TV stations (on frequencies as high as 60 mcs) were also received* from time-to-time in Europe, South America and other areas of the world.

From the technical data already on hand, it appears as if 1958 will most certainly go down as the best year for long-distance transmission and reception in the history of amateur radio!!

* Reception in this case usually meaning aural identification of TV signals, since the difference in technical standards and channel allocations, co-channel interference, and distortion from multi-hop propagation, would in most cases, preclude the reception of good TV pictures.

Forecast 1959

Figure 1 shows the course of the present sunspot cycle, cycle 19. The decline in the cycle, which began during the late spring of 1958, is expected to continue until the cycle ends several years from now.

Based upon an analytical study of previous solar cycles, this column forecasts 1959 to begin with a smoothed sunspot number of 163, with solar activity slowly declining to approximately 130 by the end of the year. Despite this decline, the smoothed sunspot numbers forecast for 1959 will be higher, on the average, than the peak intensity recorded during all but perhaps one of the previous 18 cycles. This decline in solar activity is, however, expected to produce some changes in radio propagation conditions. Considerably fewer *6-meters* openings are expected to occur next fall as compared to the world-wide openings of 1957 and

[*Continued on page 96*]

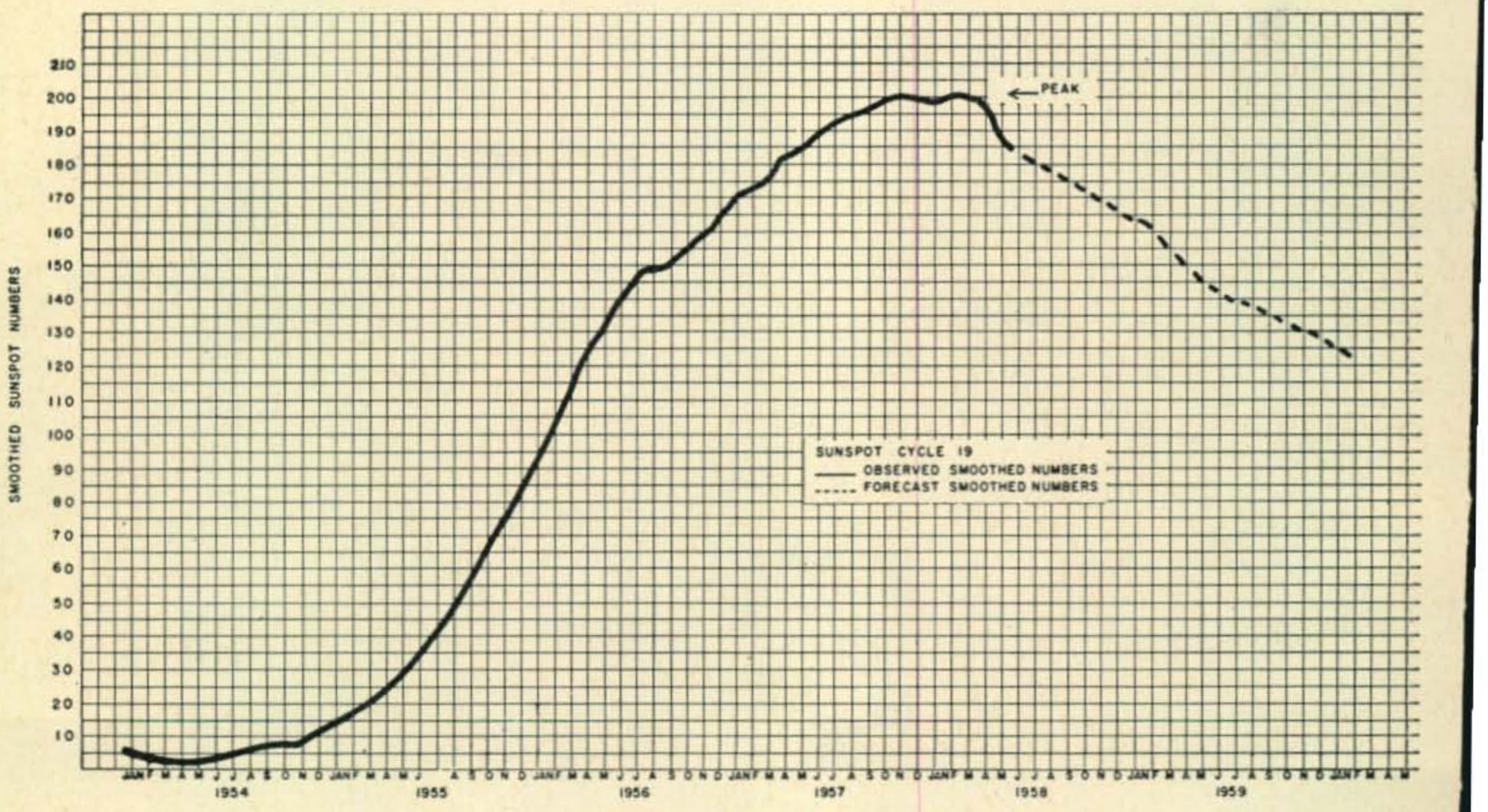


Fig. 1—Sunspot Cycle 19—it's course since 1954, and a prediction for 1959.

Smoothed Sunspot Numbers Cycle 19

	1954	1955	1956	1957	1958	1959	1960
Jan.	6	14	89	170	198	163*	125*
Feb.	5	16	98	172	200	161*	122*
March	4	19	109	174	200	155*	
April	3	23	119	181	196	150*	
May	4	29	127	186	189	145*	
June	4	35	137	188	184*	141*	
July	5	40	146	191	180*	139*	
Aug.	7	46	150	194	177*	137*	
Sept.	8	56	151	196	175*	135*	
Oct.	8	64	156	198	172*	133*	
Nov.	9	73	160	200	169*	130*	
Dec.	12	81	164	199	166*	128*	

SURPLUS

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

This month we have a lot of information on extending the range, and getting the BC-348-BC-312 series of receivers on the air. Specifically we are going to add a power supply and a series of crystal controlled converters. Next month we'll discuss adding the Q multiplier and the TNS plus several additional features.

W2HHZ was the designer of the series of converters shown this month. They have been in use for several years, providing very satisfactory service. We haven't seen any set of converters like them so we feel some step forward is being made. The nice thing about them is that they are all in one place with no additional wiring strewn all over. But first, on with the conversion.

The BC-348 is essentially an aircraft receiver. It has bandswitching and covers from 200 *kc* to 18 *mc*. The receiver *if* is 912 *kc* and since it lies in what is our broadcast band, that band, from 500 *kc* to 1500 *kc*, is omitted. The receiver is relatively broad although a crystal filter is used to sharpen things up a bit. It's difficult to tune a receiver very close in a vibrating aircraft when wearing heavy gloves, so this is probably the reason. The *if*'s can be sharpened up a bit, although we are making it sound very much worse than it is. Power was 24 volts, supplied by a dynamotor, but we'll go into the BC-348 power supply next month. The BC-312 is similar to the BC-348 except it covers 1.5 *mc* to 18 *mc* and operates directly on 12 volts. (A 110 *vac* model was known as the BC-342.) A suitable power supply can be built up either on the original dynamotor chassis (if you are lucky, an RA-20 power supply can be obtained for a direct replacement) or you can build up a separate power supply. If you run this mobile on 12 volts, no changes are required at all, except to check that the negative and positive leads of dynamotor agree with your car battery polarity and ground. Having removed the receiver from its case, swing the dynamotor on its hinges to gain access to the 9 pin terminal board. For a self contained power supply, remove the dynamotor power supply components,

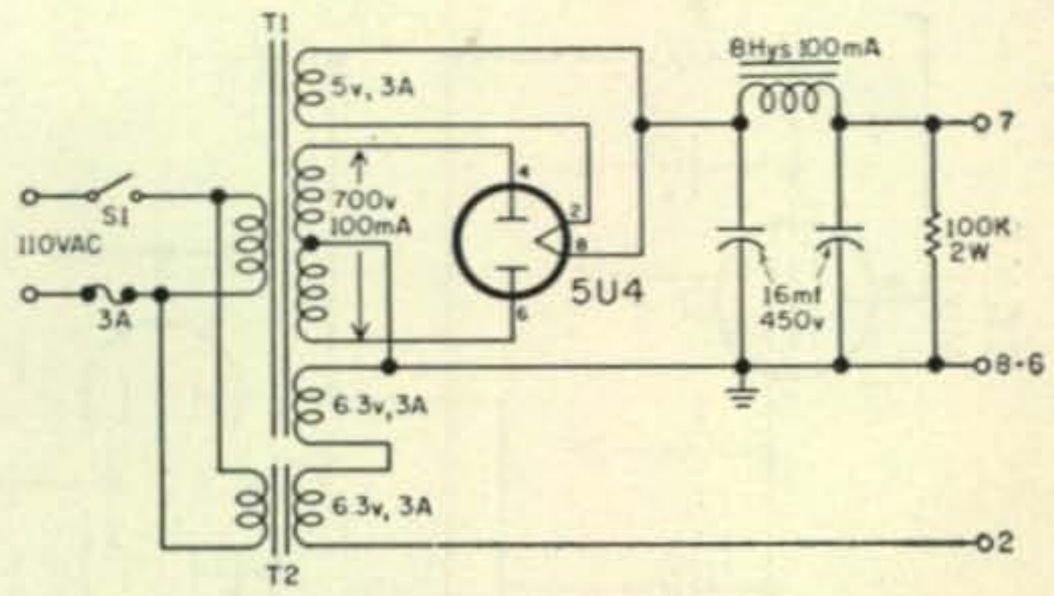


Fig. 1—Power supply for the BC 312, BC 348. **(Fig. 5 page 76)**

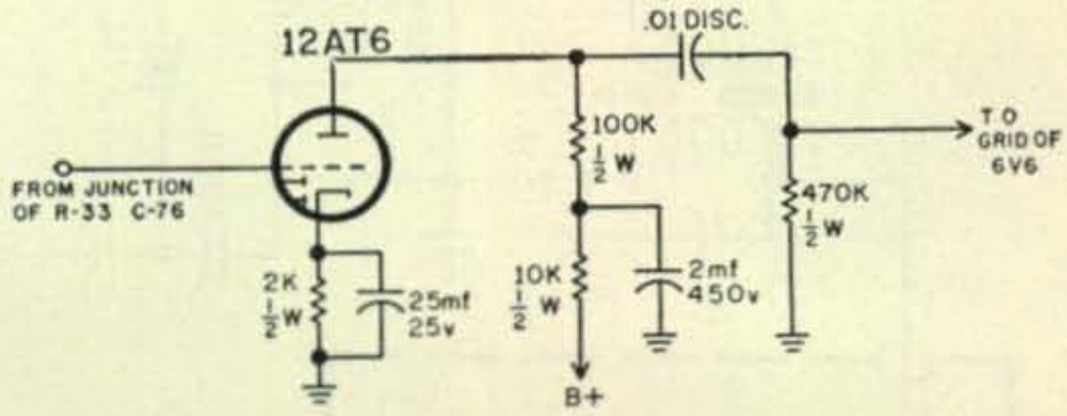


Fig. 2—Audio voltage amplifier for the BC 312 or 348, shown in fig. 5.

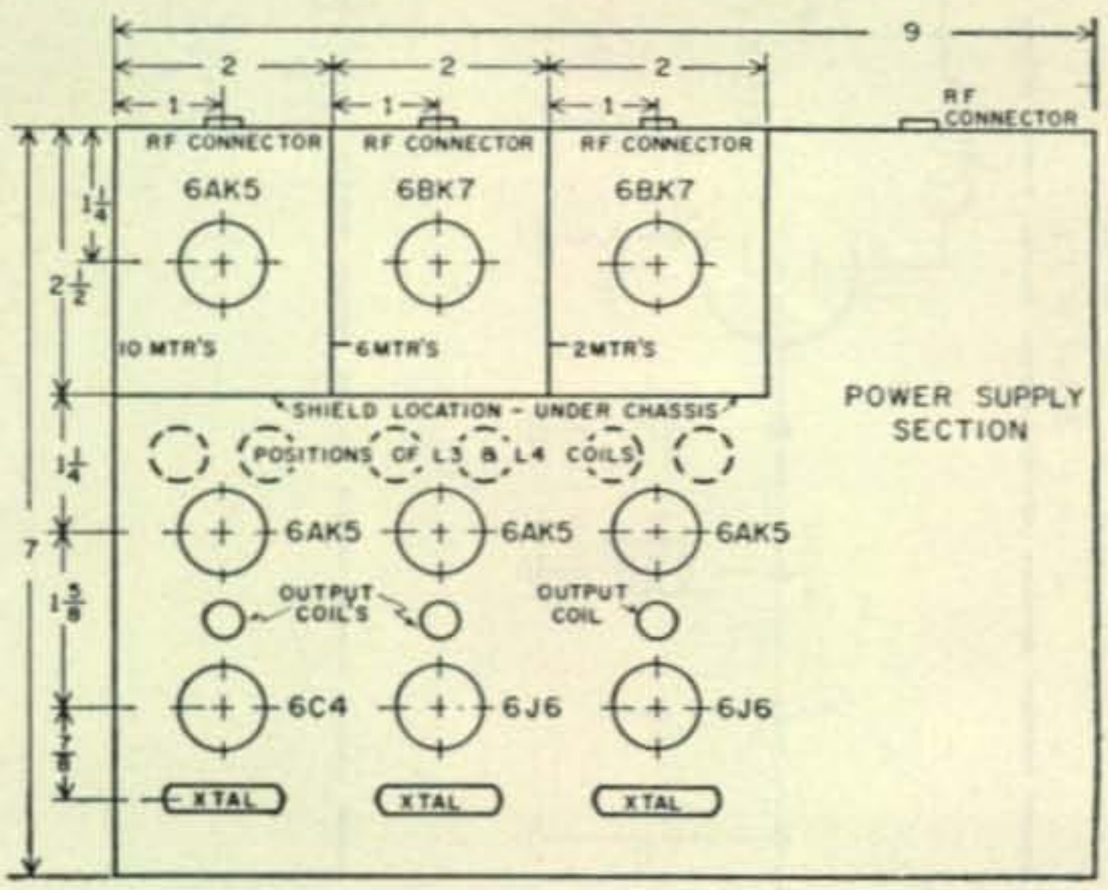
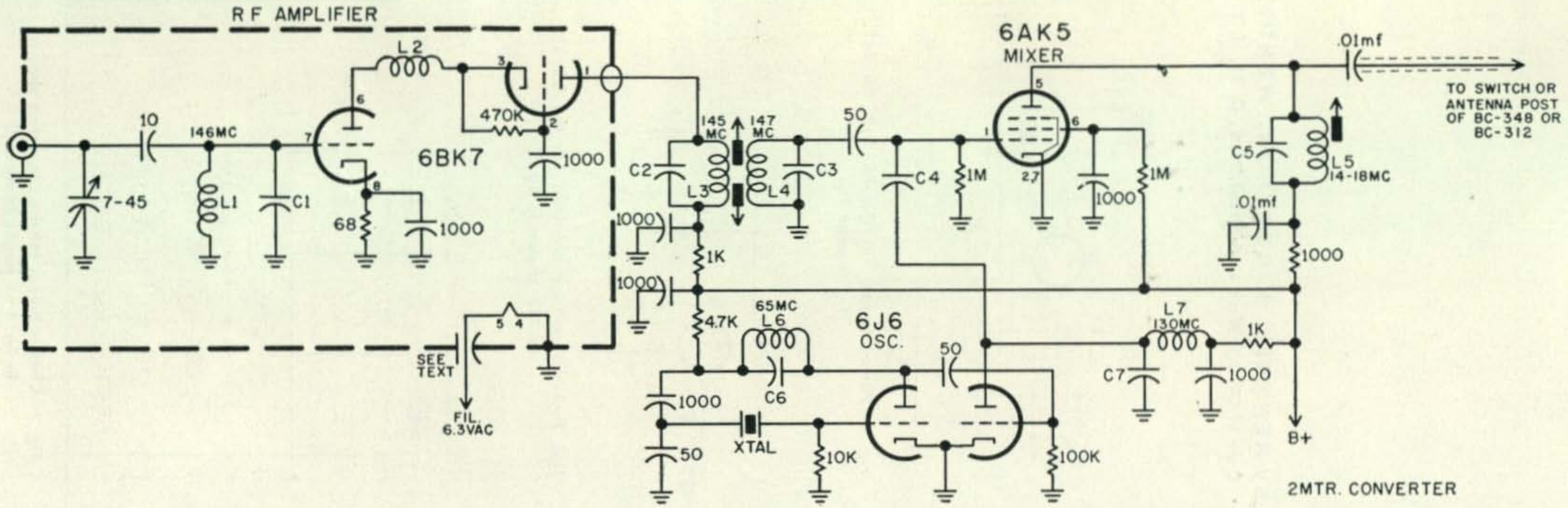
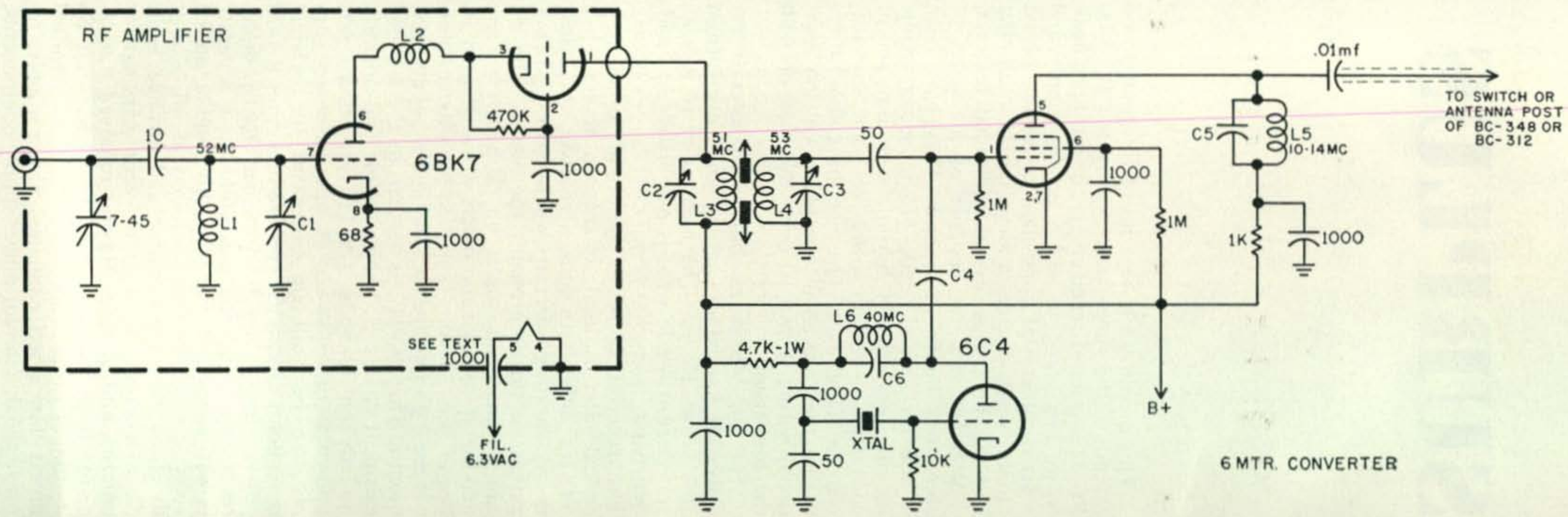


Fig. 3—Chassis layout for the converters shown in fig. 4 on pages 74 and 75.


R F AMPLIFIER
L2
10
146MC
7-45
L1
C1
6BK7
470K
1000
68
1000
SEE TEXT
FIL. 6.3VAC
145 MC
147 MC
C2
L3
L4
C3
50
C4
1M
6AK5
MIXER
1M
1000
.01mf
TO SWITCH OR ANTENNA POST OF BC-348 OR BC-312
C5
L5
14-18MC
.01mf
1000
1000
1K
1000
1K
65MC
L6
4.7K
6J6
OSC.
50
L7
130MC
C7
1000
1000
C6
1000
50
XTAL
10K
100K
B+
2MTR. CONVERTER


R F AMPLIFIER
L2
10
52MC
7-45
L1
C1
6BK7
470K
1000
68
1000
SEE TEXT
1000
FIL. 6.3VAC
51 MC
53 MC
C2
L3
L4
C3
50
C4
1M
1M
1000
.01mf
TO SWITCH OR ANTENNA POST OF BC-348 OR BC-312
C5
L5
10-14MC
1K
1000
L6 40MC
4.7K-1W
6C4
C6
1000
1000
XTAL
50
10K
B+
6 MTR. CONVERTER

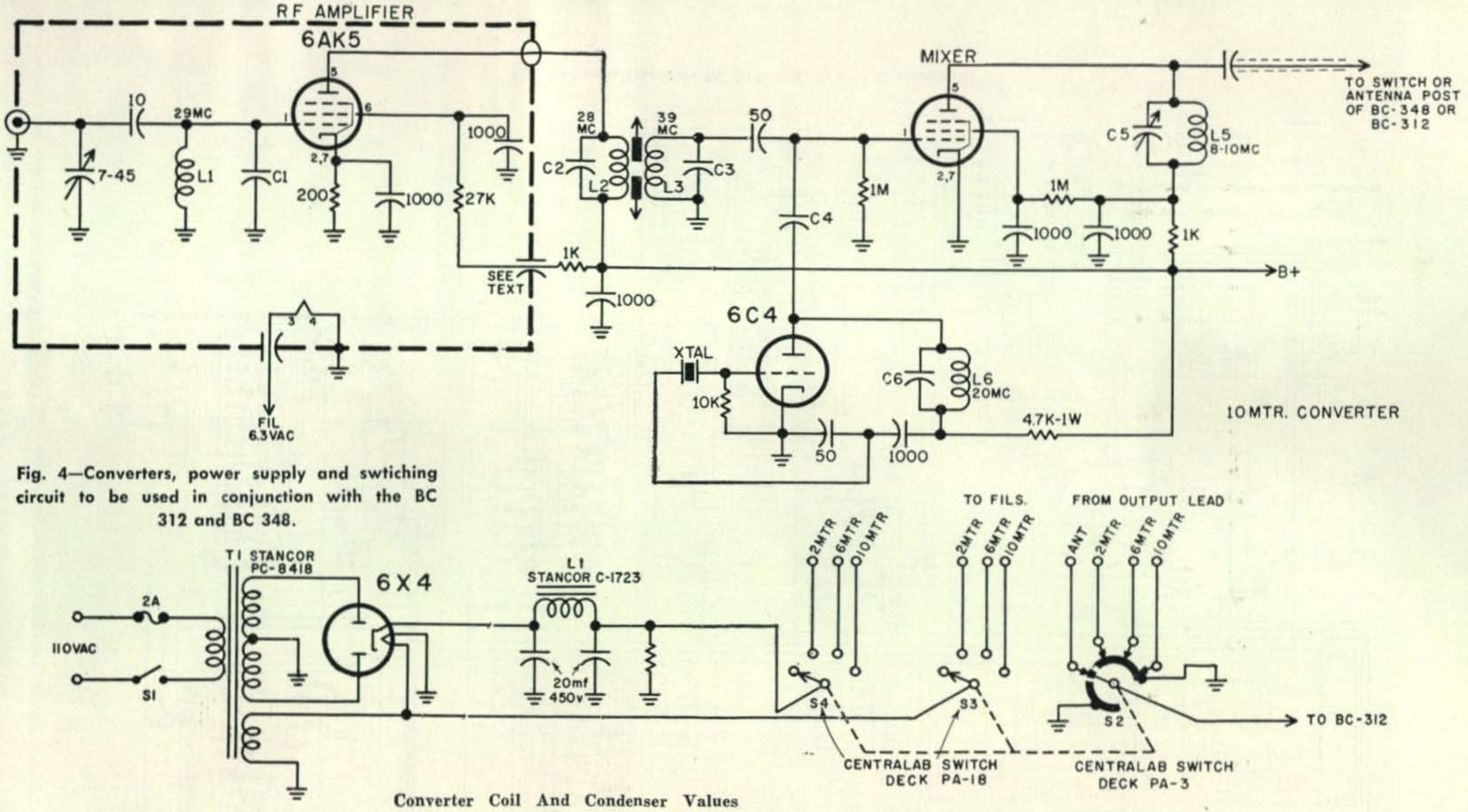


Fig. 4—Converters, power supply and swtiching circuit to be used in conjunction with the BC 312 and BC 348.

Converter Coil And Condenser Values

	2 Meters	6 Meters	10 Meters							
C-1, 2, 3	3-12 mmf trimmer	4-30 mmf trimmer	7-45 mmf trimmer	L-1	4 turns #16 ¼" dia spaced 1"	7 turns B and W #3003	2-3 μh coil North Hills #120A		North Hills #120D	North Hills #120D	North Hills #120D
C-4	2 mmf	5 mmf	5 mmf	L-2	5 turns #22 ¼" dia spaced close	7 turns #22 ¼" dia spaced close	not used	L-6	9 turns B and W #3003	8 turns B and W #3003	3-5 μh coil North Hills #120B
C-5	7-45 mmf trimmer	7-45 mmf trimmer	6-45 mmf trimmer								
C-6	3-12 mmf trimmer	7-45 mmf trimmer	7-45 mmf trimmer	L-3, 4	4 turns #20 ⅜" dia 5/16 long	7 turns B and W #3003	2-3 μh coil North Hills #120A	L-7	4 turns #16 5/16" dia ¾" long	not used	not used
C-7	3-12 mmf trimmer	not used	not used	L-5	9-18 μh coil	9-18 μh coil	9-18 μh coil	XTAL	6.500 *mc*	8.000 *mc*	6.666 *mc*

Note: B&W #3003-Air Dux 416T ½" Dia, 16 Turns per inch.

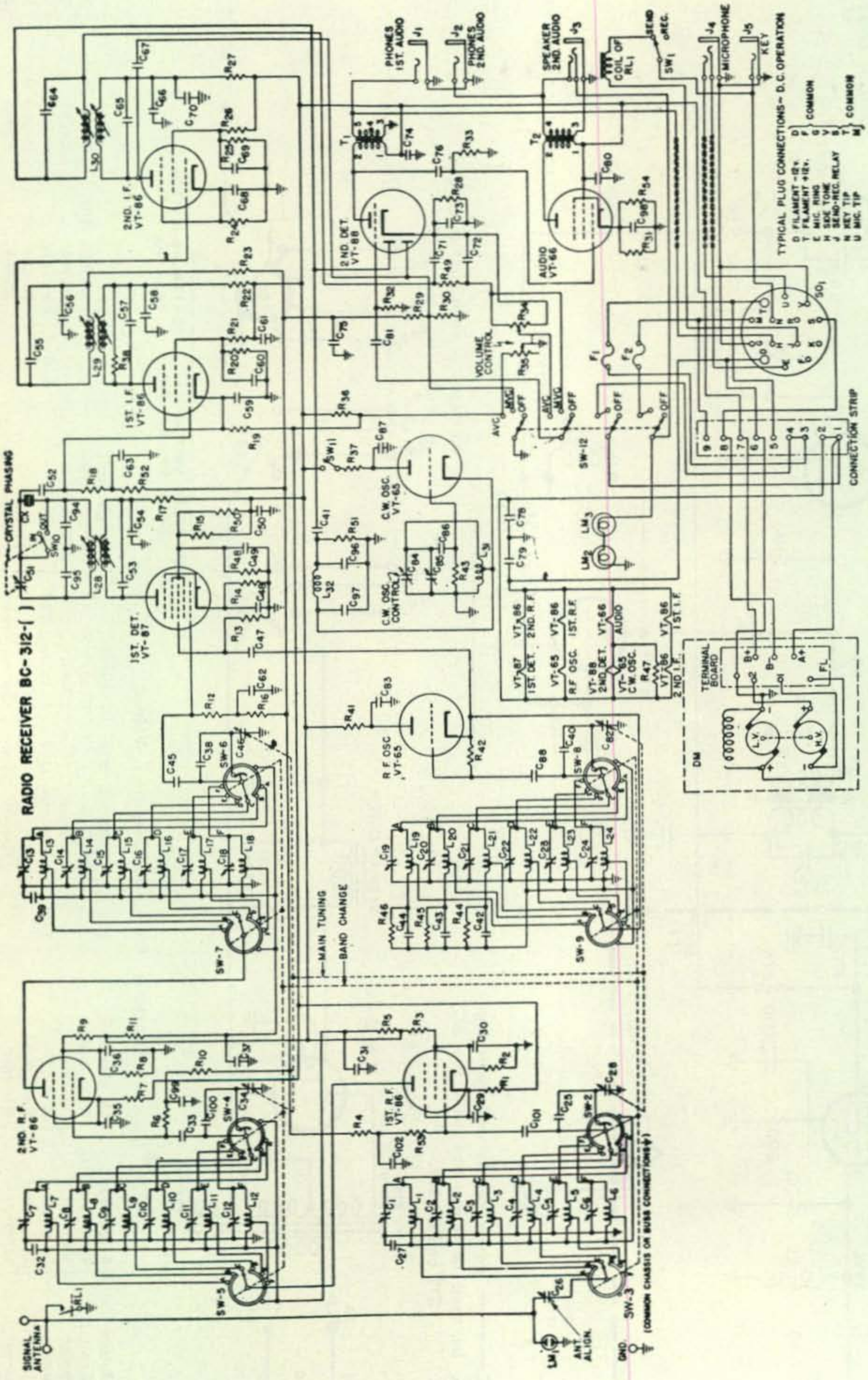


Fig. 5—Radio receivers BC 312-D, E, F, and G schematic

RTTY

Byron H. Kretzman, W2JTP
16 Ridge Dr., High Hills,
Huntington Station, N. Y.

News and Views take precedent this month. The big news is that by the time this appears in print, or shortly thereafter, W2JTP will have become W2JTP/Ø, having moved, lock, stock and Model 26, to the Minneapolis-St. Paul area, "The center of RTTY activity," according to the head-RAT WØBP. As this is being written several months ahead, we as yet have no mailing address in Ø-land, so if answers to your letters seem slow, please forgive us. We will answer as quickly as possible.

RTTY Sweepstakes

The November RTTY Sweepstakes held by the RTTY Society of Southern California, Inc., was quite a RAT-race, as we mentioned in last month's column. We haven't space to list all the scores, but here, as of November 18th from W6AEE, are some of the top ones:

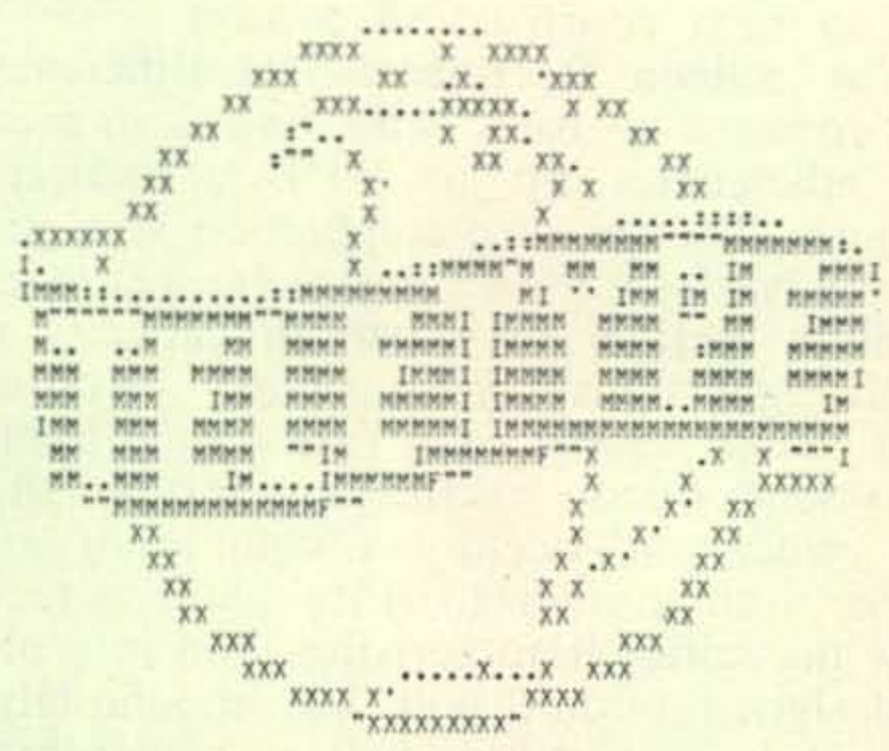
VE7KX	Lulu Island, Vancouver	9,212 (!)
WØBP	Minneapolis, Minnesota	7,722
W2RUI	Lockport, New York	7,600
W2JAV	Hammonton, New Jersey	5,780
W2TKO	Buffalo, New York	5,600
K4RRG	Winston-Salem, N. C.	5,120
KH6IJ	Honolulu, Hawaii	4,050

Notes of interest in the contest: K4RRG is ex-W9OCV from the Chicago area, and KH6IJ, a well-known old-time dx man, enters for the first time and racks up a mighty fine score. Other dx stations participating included KR6AK, KL7BK, KL7MZ, and ZL1WB.

Dual Identification

Last May, the ARRL Board of Directors had a motion on the floor to eliminate Dual Identification, the extremely bothersome requirement of the FCC that we identify with Morse (or 'phone where applicable) every time we sign or at least once every ten minutes in net operation. The Board gave this problem to Mr. Budlong, the General Manager, to determine its "feasibility." Unfortunately, the motion was too broad as it encompassed "odd-ball" FAX and

[*Continued on page 106*]



CONFIRMING OUR RADIOTELETYPE QSO AS FOLLOWS:

RADIO: TIME: DATE: FREQUENCY: RST:

RECEIVER: COLLINS 75A-4
TRANSMITTER: COLLINS KWS-1
TERMINAL UNIT: HOME BUILT WITH AUTOMATIC FREQUENCY CONTROL, BUILT IN WØHZR TUNING INDICATOR, AND GATES FILTERS.
TELETYPE GEAR: MODEL 26, MODEL 26, MODEL 14 NON-TYPING REPERF, AND MODEL 14 TRANSMITTER DISTRIBUTOR.
ANTENNA: 40 METER DOUBLET COAX FED AND MOSELY 10-15-20 METER TRI-BAND BEAM.

ROBERT B. SPRINGER
WØYKZ

RTTY Taped QSL from Bob Springer, WØYKZ (Teletype is the Trade Mark of the Teletype Corp.)

WØYKZ-AFØYKZ in Wichita, Kansas. RTTY—SSB —ARRL—MARS—ROWH—RCC. Operator: Robert B. Springer, Equipment: See RTTY Taped QSL, 420-mc TV with RCA ATK

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

semiconductors

You have been hearing about silicon rectifiers for some time now. I have used them, along with several other authors, in several construction projects. My correspondence indicates that amateur interest is at an all time high. These tiny rectifiers are so superior to vacuum tubes that there really is no comparison. Let's examine these amazing devices a little closer to see why you should use them in your next construction project.

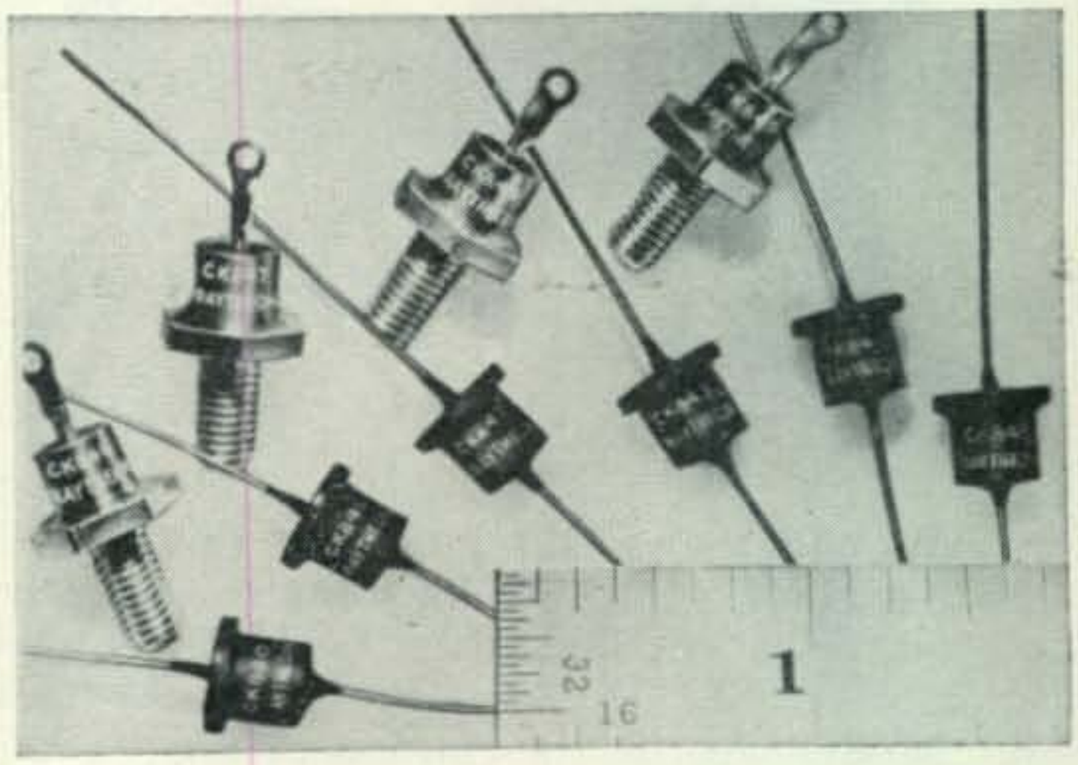
Why Silicon Rectifiers?—(1) Efficiency—A high forward to back ratio results in rectification efficiencies up to 99% at power frequencies. The forward conduction voltage drop is usually less than one volt. (2) Size—A selenium rectifier of a certain capacity might weigh eight ounces and occupy a volume of eight cubic inches. On the other hand, an equivalent silicon rectifier might weigh one-half ounce and occupy a volume of a fraction of a cubic inch. (3) Life—Silicon rectifiers show no aging characteristics, and in a properly designed circuit will last indefinitely! (4) Cost—Silicon rectifiers will cost slightly more than vacuum tubes (about $1.50 each), but their advantages more than off-set this.

How Are They Made?—Silicon products start out as "monocrystal" which is grown in an induction furnace, through a process known as "pulling." When the intrinsic silicon is heated to 1420° C it will melt. Then it is doped with a controlled amount of impurity atoms. Then the melt is controlled at the critical temperature between melting and freezing (around 1400° C) and the "seed" of silicon is dipped in and withdrawn at a very slow rate. The crystals form on the seed and it "grows" as it is pulled. The grown crystal looks much like a cigar. The monocrystal is then sliced up like a salami, and then each slice is diced into very tiny squares. The dice will have saw marks and they (and any dirt) must be removed by etching. The etched dice, which is type N material, is now ready for alloying.

The type N dice is fitted with a layer of group III (type P) material, and the assembly is placed in a carbon "boat" and heated to a very high temperature until the two materials fuse together. After this process, metallic contacts are placed on the rectifier, and it is assembled in the desired package.

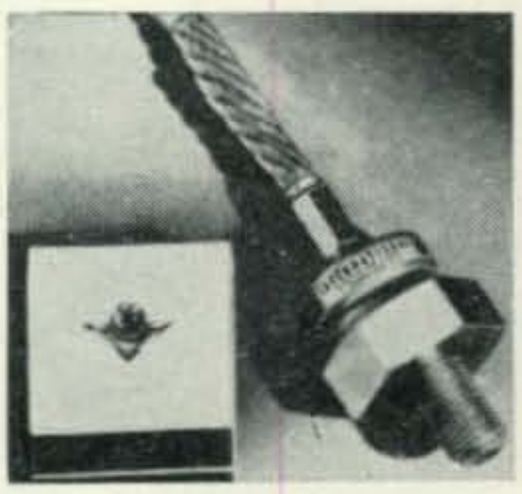
Rectifier Characteristics — The completed rectifier is a solid state device that will pass large amounts of current in one direction, but

[*Continued on page 108*]



Silicon rectifiers can take many forms, such as the stud mount and pig-tail lead types shown here.

There is really no limit to the size of a silicon rectifier. This unit shown, is manufactured by International Rectifier Corp. and is available for 70 to 250 amperes, with *piv* ratings between 50 and 500.



This silicon solar module, manufactured by International Rectifier Corp., can convert sunlight directly into electricity with conversion efficiencies in the order of 8%.

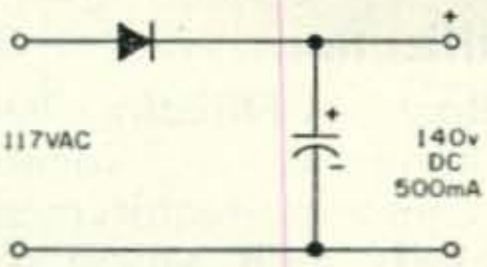


Fig. 1

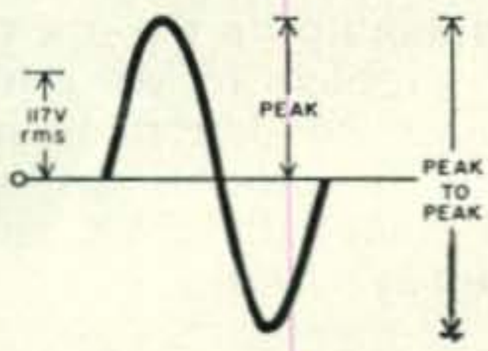


Fig. 2

sideband sideband sideband

SIDEBAND

By: Bob Adams, W3SW
P. O. Box 625
Silver Spring Md.

When you read this there will only be a few weeks remaining before the big Single Sideband Dinner to be held on Tuesday, March 24, 1959 at the Hotel Statler Hilton, 33rd Street and Seventh Avenue in New York City. I hope you have all purchased your tickets to ensure your attendance. This will definitely be the biggest and most interesting one held so far. It will be sponsored by the SSB Amateur Radio Association, and will in reality be a HAMFEST rather than just a dinner. There will be displays of all of the latest SB equipment and the exhibition hall will open at ten AM. The Dinner will start at 7:30 PM with Bill Leonard, W2SKE of radio and television fame acting as master of ceremonies. Several prominent speakers will address the gathering and as usual there will be some very valuable door prizes. Tickets which are purchased in advance are $8.00 each but if bought at the door on the day of the meeting the price will be $9.00. Send your check now for reservations to SSBARA, care of Irv Binger, W2CMM, 1741 Andrews Avenue, New York 53, N. Y.

Eva and Alex of CN8MM have spent several weeks in the States and have visited their ham friends in many places. They spent several days with me and we certainly enjoyed their visit. They have made their headquarters with Uncle Dave, W2APF in Albany.

Ian, of MP4BBW, has also been visiting many stations here, and we have a photo of this handsome lad operating W8GCN in Charleston, W. Va.

Harriett, K5BJU, qualified for the "Worked 50" certificate and wrote to say how much she now enjoys SSB. Seems that her OM, W5VWF, is an old timer in sidebanding, and her son, K5CKE, will soon operate SB also. Harriett writes, "I used to be a die-hard AM addict, but how times have changed. When I go on AM for the YL net each Thursday morning I feel that I am making the supreme sacrifice." We know what you mean.

Bob, ex OD5BZ, now W8BKO at Columbus, Ohio, has just obtained a new tower and a tri-band beam and is just waiting for a warm day to put the skyhook up. We will all be glad to hear from Bob again.

Ted, W6UOU, that magician in obtaining QSL cards just sent in a batch of 150 confirmations for two-way side band contacts. Looks like Ted is aiming to be the first one to obtain 200 countries confirmed as he was for the 100 and the 150. Wish he would tell us his secret in obtaining such a high percentage of QSLs. How about it, Ted?

As mentioned in last month's column, I have a large stock of rules and applications for applying for a SSB-WPX award. Just send in a self addressed stamped number six envelope and find out how simple it is to qualify for this award. I listed all of my QSLs in the book furnished free by CQ and was surprised to see that I had 186 different prefixes confirmed. It only requires 150 prefixes to get a SSB award.

Rundy, W3ZA/3W went up to Laos this month and made many of us happy with XW8AM. Hope you found him on 14,303. Cards are obtainable by the usual self addressed stamped envelopes to Harry, W2JXH. The XW8AM card is sure one to drool over on a cold Winter day.

Soe Ya, XZ2SY, is to be commended for the very prompt dispatching of his cards to all who worked him. Soe Ya sends his card thru the ARRL QSL Bureaus. To avoid what happened to me send a large envelope to your

[*Continued on page 111*]

Ian, MP4BBW at W8GCN

Bill, W8AKV.

Mickey, W8YIN.

Cliff—W8GCN.

Cliff, W8GCN, George, W8YBZ and Ian, MP4BBW.

OVERSEAS ECHOES

Thomas K. Aalund, K2VBI
Box 13
Roslyn, L. I., N. Y.

We receive about 50 foreign publications each month in the field of electronics and most of them have to do with amateur radio. In this column we have been trying to bring you some of the highlights of these magazines and thus keep you posted of the happenings around the world.

While most of the magazines are printed in a foreign language, there are several interesting magazines in English. Each month we shall try to highlight one of the magazines to give you a better idea of their contents and scope. Let us take a look at *"Amateur Radio,"* the Journal of the Wireless Institute of Australia, published in Melbourne.

Last month we referred to their 25th anniversary issue, but even their regular issues show us that they are very active "Down Under." A lot of things show up in "Amateur Radio" which we might not even suspect from reading our American magazines or even from casual operation on the air. In true British tradition they have an ad on the front cover. Who knows—maybe we might try this sometime?

The November issue, in its editorial by VK3ZS, Federal President of the W.I.A., states that a representative of the W.I.A. will be included in the Australian delegation to the Administrative Radio Conference starting in Geneva in August 1959. This ham, who will serve in the capacity of an adviser-observer, is being sent over at the expense of donations collected by the W.I.A. specifically for this purpose. The Australians feel that amateurs have been losing frequencies at every past conference and they want to do something about it. The goal of the donations is £2,500 (Australian) and they have collected £1,500 so far (about $3,400). This is quite an effort for a relatively small group and certainly sounds very encouraging. If amateurs lose more frequencies at the next conference, the chaps from VK and ZL certainly will not be to blame.

This is followed by an interesting article on transistorized *if* amplification. The article is part of a series to be continued later and covering the design of a triple conversion communications receiver which is fully transistorized and will operate from 6 volts, making the power choice either a 6 volt car battery or four flashlight cells. This month the 2 *mc* and the 455 kc *if* strips are described.

VK5JG discusses the selection of frequencies for emergency operation, pointing out the relative merits of the various ham bands in relation to the distance that might have to be covered.

VK6EC has a four-page article in his series on amateur television already mentioned in earlier issues of this column. This, the ninth in the series, gives design data for a 300 *mc* transmitter for video plus audio on a 5.5 *mc* subcarrier. A second, more complex transmitter is also described which provides for removal of the vestigial sideband by multiplexing of the video and audio.

From the above it can be seen that this relatively small magazine (usually around 24 pages) carries very advanced information and is definitely of great interest. Letters to the editor, a station description and photo of VK3OM, and a two page report of the W.I.A. annual meeting follow. Other club news includes a treasurer's report, listing donations received towards financing the trip of the representative to the Geneva conference. A short propagation chart is presented, similar to our Propagation Column, and they also have fine VHF, DX, SWL, and General Announcements columns, making it a very well-rounded publication.

Next month we shall feature another of the foreign magazines, not in any particular sequence but with the aim of introducing them to you.

Other Publications this month: *The Short Wave Magazine,* G, in their November issue carries a description of a self-contained three-band transceiver covering the 40, 80, and 160 meter bands. All seven tubes used are American types and the unit measures 6 x 6 x 9 inches. In as much as the unit is meant primarily for short

[*Continued on page 112*]

CONTEST CALENDAR

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

February	6-8	ARRL DX Phone
February	20-22	ARRL DX CW
March	6-8	ARRL DX Phone
March	13-15	QCWA QSO Party
March	20-22	ARRL DX CW

ARRL DX

The granddaddy of all DX contest. Been around for the past 24 years. QST will inform you what it's all about.

QCWA

The Second Annual QSO Party is again sponsored by the Northwest Chapter of the Quarter Century Wireless Association.

Activities start at:

1400 PST Friday, March 13th and end at 1400 PST Sunday, March 15th, 1959.

You will find the Ole Timers on the following frequencies:

BAND	CW	AM	SSB
80 M	3655 *kc*	3950 *kc*	
40 M	7125 *kc*	7210 *kc*	
20 M	14110 *kc*	14240 *kc*	14280 *kc*
15 M	21100 *kc*	21340 *kc*	21415 *kc*
10 M	28100 *kc*	28900 *kc*	28675 *kc*
6 M		502 *kc*	

Your log should show in this order: contact number, date, time, station worked, QTH, frequency, handle and QCWA National Nr. Don't expect to win any awards, as none are planned. However this is a wonderful opportunity to renew old acquaintances, so get in on the fun. Return your logs to the Sec. of the Northwest Chapter. Dr. F. Clifford J. Spike, W7OS, 1412 Medical Arts Bldg., Tacoma 2, Wash.

CONTEST RESULTS
OK DX 1957
Leaders in their respective countries

UA1DZ	16,270	W4KFC	5,400	UG6AW	1,602
OK3AL	15,345	SP8CK	5,343	HB9GJ	1,476
UB5WF	13,752	UH8KAA	4,416	UP2AT	1,305
UC2AX	13,482	YU3SQ	4,296	OZ4FF	1,188
UJ8AG	8,862	UA9CM	4,221	LZ2KSB	972
HA5BW	7,716	G2HPF	3,792	SM5AEV	816
YO3RF	6,990	UL7HB	3,168	F3AT	756
UR2AO	6,633	KL7PIV	2,358	UF6FB	444
DM2AIO	6,260	PAØVB	2,295	IT1AGA	396
UQ2KAA	5,427	LA1TE	1,776	OH3RU	255
W2EQS	1,908	W1FZ	1,636	W4LVV	930

WAE DC 1958
CW Continental Leaders

Europe	—DL1DX-161,766	Asia	—4X4CJ- 25,280
N. Amer.	—W3GRF-136,641	Africa	—CR6AI- 23,040
S. Amer.	—CE3AG- 34,237	Oceania	—KH6IJ- 12,390

Winners in their respective countries

Europe				KL7CDF	15,930
DL1DX	161,766	GC3HFE	1,564	KP4YT	9,751
OK1FF	98,648	I1BLF	1,064	TI2CAH	406
G2DC	84,283	GW3HJR	384	**So. America**	
SM3AKW	62,376	OY2Z	286	CE3AG	34,237
PAØLOU	46,920	CT2BO	200	PY7AN	15,840
SP3PL	44,398	LX2GH	42	**Asia**	
IT1TAI	43,734	**No. America**		4X4CJ	25,280
OH4NT	43,550	W3GRF	136,641	YK1AT	15,390
OE1RZ	39,360	W2WZ	73,324	JA1AA	11,376
EA4GA	37,275	W4KFC	67,165	ZC4CB	3,102
ON4AU	33,101	W8RQ	60,698	UAØKKB	2,618
OZ4FF	31,785	W9NII	32,897	UF6FB	1,780
F8TM	26,226	W1VG	32,682	**Africa**	
HB9MO	22,126	W5KC	21,762	CR6AI	23,040
TF3AB	13,410	W6UDR	18,283	VQ2AS	8,815
YO2BU	12,015	W7PQU	17,983	EA8BF	4,033
LA6CF	11,886	WØYCR	8,855	CN8FD	1,476
YU3OV	6,216	VE3BHS	25,668	FF8BF	384
UR2BU	4,025	VE2DR	8,619	CR4AD	88
EI7D	4,004	VE7ZM	6,331	**Oceania**	
GM8SQ	3,886	VE1EK	6,018	KH6IJ	12,390
ZB2I	2,475	VO1DS	1,896	VK2GW	11,412
LZ1KPZ	1,725	VE6VO	252	ZL1APM	2,688

[*Continued on page 113*]

W1BB (top) and W7ZVY tried to stir up some 160 meter activity in the contest with only fair success.

CALIBRATE [*from page 58*]

17. Change the VF-1 bandswitch to the 40-20-15-10 position and turn the dial to 28.

18. Using the tuning slug at the left rear of the VF-1 tune for zero beat with the receiver BFO.

19. Using the tuning slug at the rear of the bottom of the VF-1. Proceed to tune for maximum output at the frequency you use the most in the 40, 20, 15 or 10 meter band. If your favorite frequency is in the 40 meter band you must decide whether you use this slug to obtain maximum output or the slug in step 9. If your transmitter multiplies on 40 meters, as the AT-1 does, use the step 9 slug. If the transmitter only amplifies on 40 meters use the step 19 slug.

20. Repeat steps 11 to 18 for the 40-20-15-10 band until you achieve calibration at both 28 mc. and 29.7 mc. at the same.

11 Band

21. Change the bandswitch of the VF-1 to the 160-80-40 position and turn the dial to 1945.

22. Tune the receiver for zero beat with the VF-1 near 27.23 mc.

23. Change the VF-1 bandswitch to the 11 position and the dial to 27.23.

24. Tune the trimmer at the front of the bottom of the VF-1 for zero beat with the receiver BFO.

25. The job is done. ■

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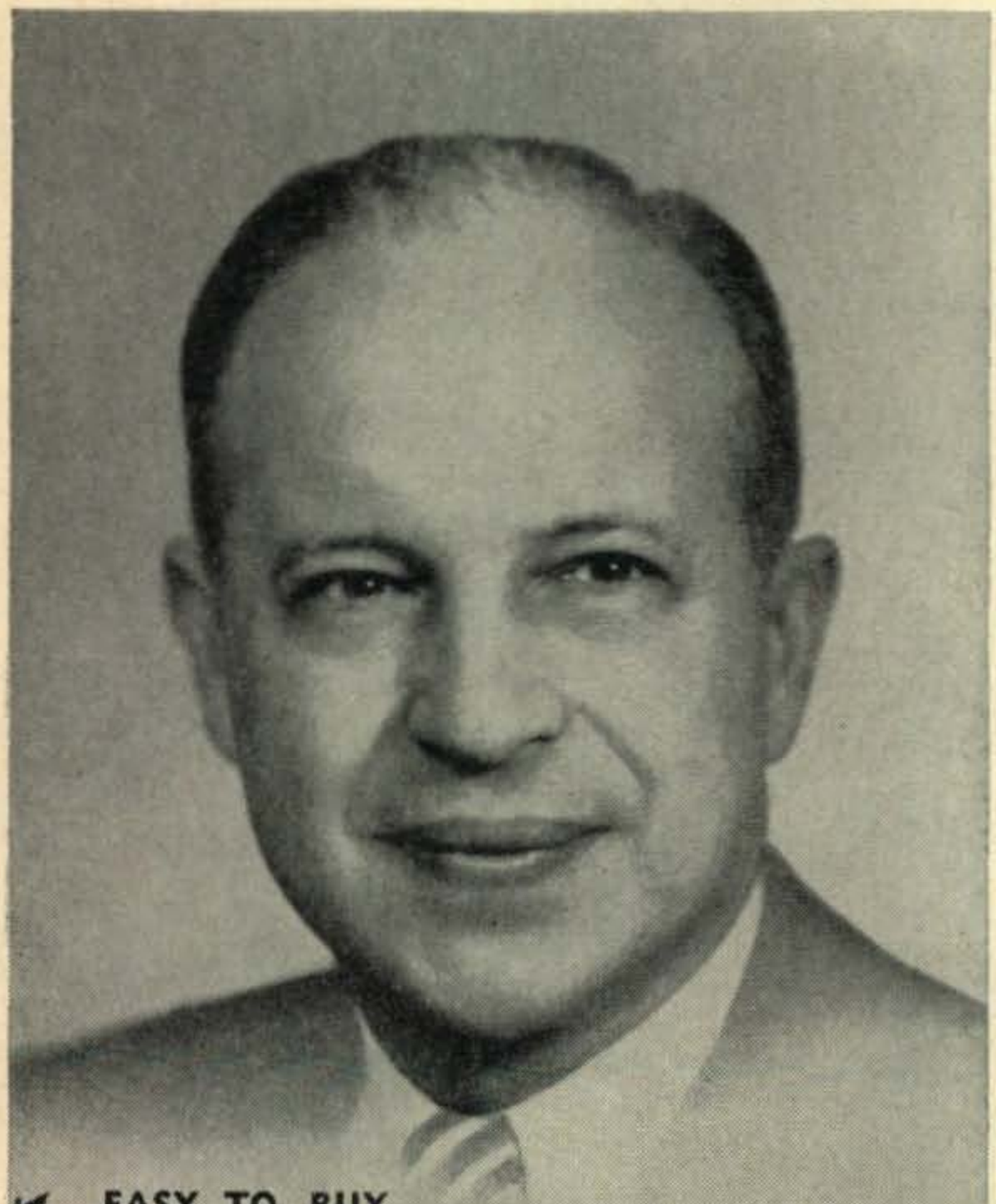
SAYS LEO I. MEYERSON, WØGFQ



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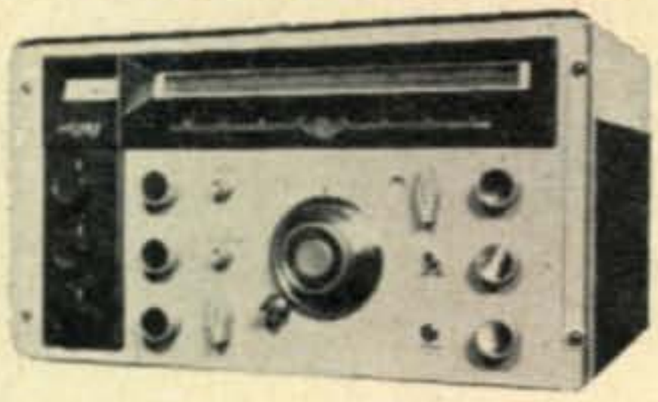

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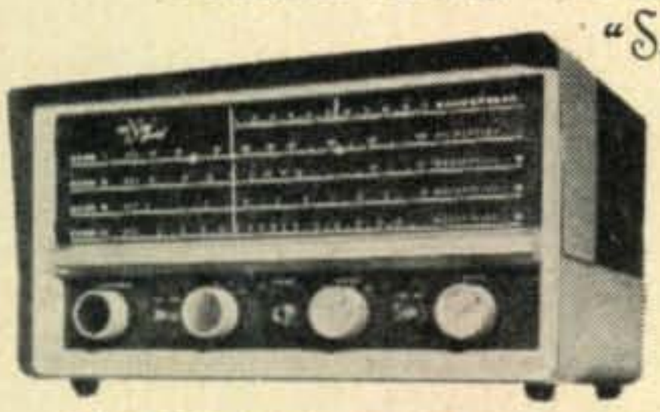

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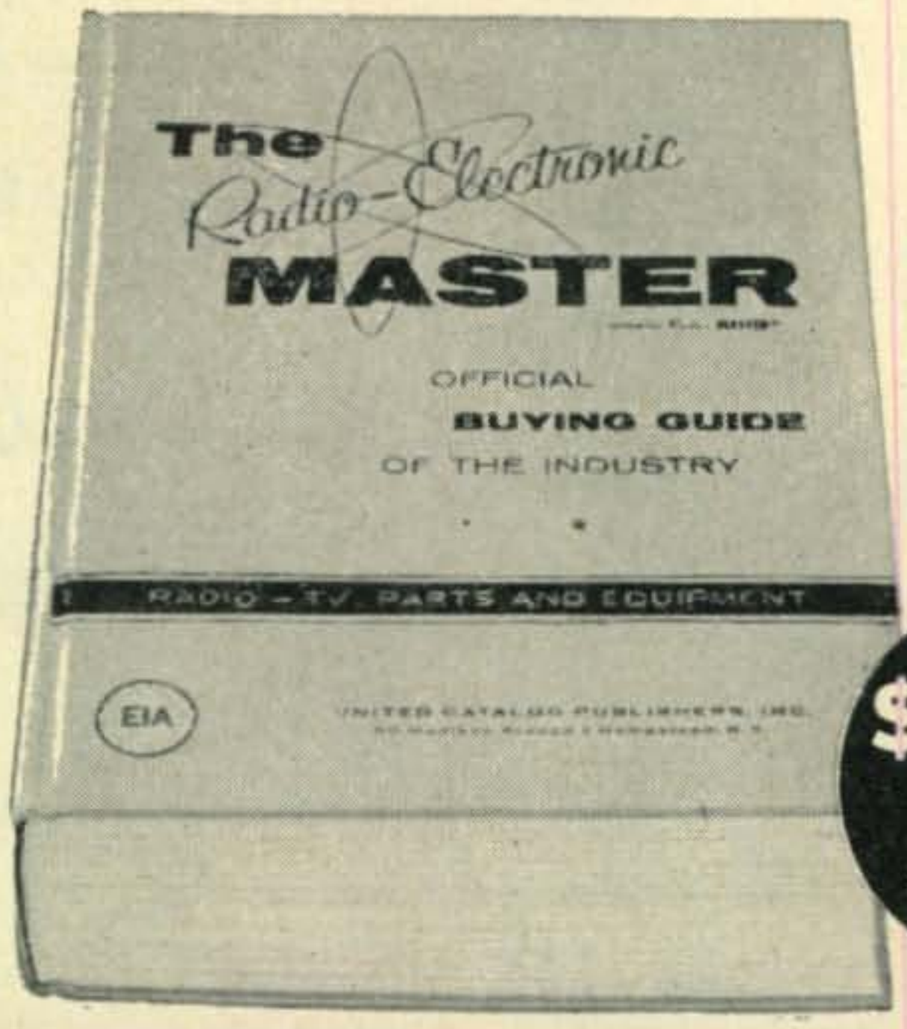

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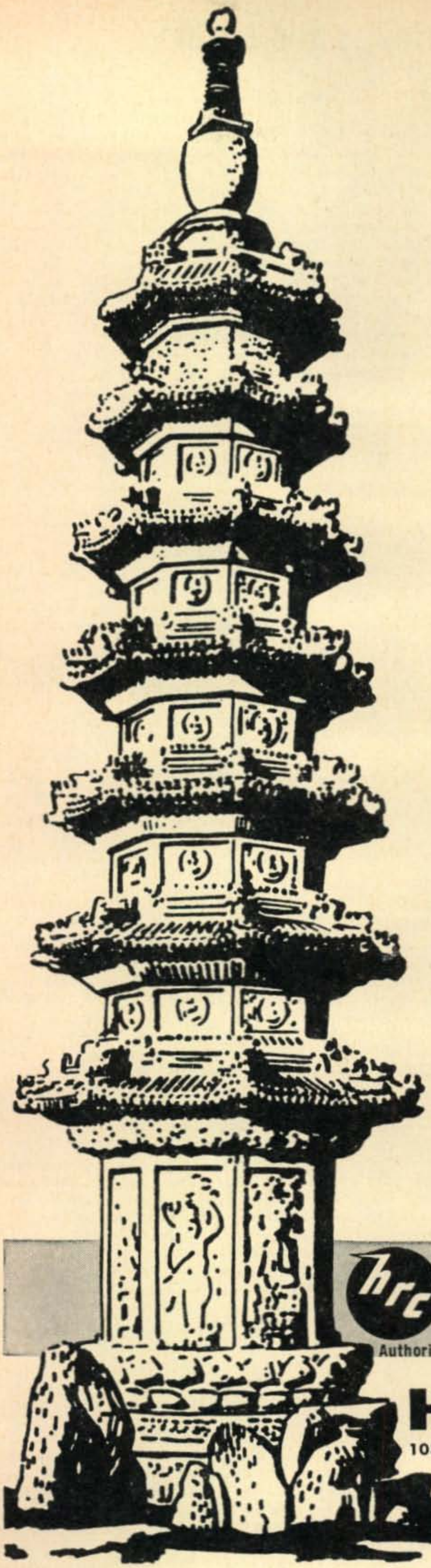

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OUR 31st YEAR

For further information, check number 24 on page 126.

LETTERS TO THE EDITOR

Michigan Law Change

Editor:

Please insert a notice in next issue of CQ to the effect that as of 1957, Act 242, of the Public Acts of 1957, law has been amended to the effect that a bona-fide amateur radio operator holding a Conditional General, or Advanced or Extra class amateur license issued by the F.C.C. is exempt from the requirement of securing a permit from the Mich. State Police before equipping a vehicle with a radio receiver set capable of receiving signals sent on frequencies assigned to police purposes.

This is as it should have been years ago in all states. A ham should never need a short wave permit. His license should suffice for all frequencies he desires to listen to. States cannot legally enforce laws that conflict with Federal controlled services in my opinion.

This should be good news for Michigan hams that red tape has been cut as it should have been years ago. Hams should not be liable to such state enacted laws at all.

Irving Davis, W8KJ

Please Note

Sir:

We would appreciate it if you could publish a notice in one of your columns to the effect that the U.S.A.F.E. CN8 Bureau has a lot of unclaimed cards from post CN8's who have gone back to the states and we would further appreciate it if the ones interested in their old cards would send us the dates of their operation over here along with their operation over here along with their CN8 call sign and mailing address. The U.S.A.F.E. Bureau mailing address is:

U.S.A.F.E. QSL Service
APO 118 Box 80
New York, New York

We also handle cards for Navy personnel over here.

73,
Don Schweitzer
CN8JC/K2KGL

MARS

Dear Wayne:

In October CQ's "Letters to the Editor" you printed two letters from dis-satisified service youngsters. I am quite sure that these are two of the meager minority of unhappy hams. Most hams in or out of service would be very happy to operate with a 32V2, a 51J and a beat-up 20 meter beam! And I've never met a dyed-in-the-wool ham who waited to be called upon to prove it!

While I'm being a little sarcastic, Wayne, isn't it a shame that those "terrible services" only trained one fellow to be a *qualified radio operator*, and the other received only *26 weeks of radar and computer training!* Terrible, indeed!

Seriously, Wayne, you've printed letters which do not represent the services in the true light. There are hundreds and perhaps thousands of fellows spread over the globe who will testify to the welcome which most commanders spread to the ham's morale boosting effort! All MARS efforts are representative of local ham interest, with the assistance of the command. For a good look at a good MARS program, I suggest the Air Force and Army MARS Schedules on page 83, October CQ Magazine.

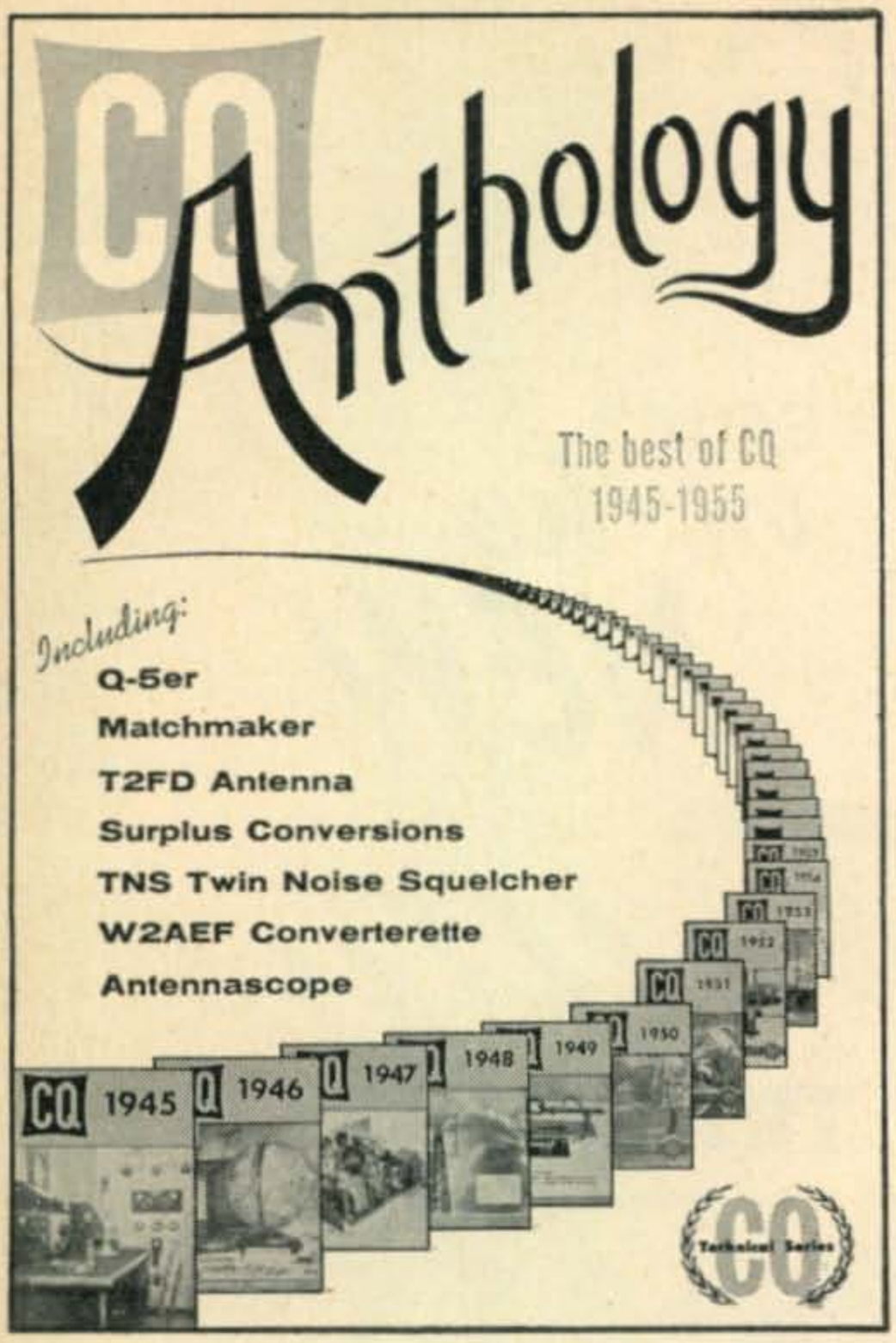
Thanks, Wayne, for your many interesting articles. I've enjoyed CQ for several years. Keep up the good work.

Sincerely,
Paul Hoover, W5UIE/AI4GD

P.S. I am interested in your efforts to advance the cause of reciprocal amateur privileges. I've been in the Philippines for nearly 19 months, and would dearly love to work some of the real DX I hear! MARS activity is the only amateur operation permitted here, and we are happy to be active in Far East MARS activities.

Paul

For further information, check number 65 on page 126.



JUST OUT!!

CQ Anthology

Down through the years CQ has had the honor of being there first with just about every major discovery in the amateur radio field. Unfortunately most amateurs do not have a good file of back issues of CQ to fall back on when they are interested in building up something or in improving their equipment. So we've looked back through the years 1945-1955 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out and are unavailable. The price is a paltry $2.00.

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CONTENTS

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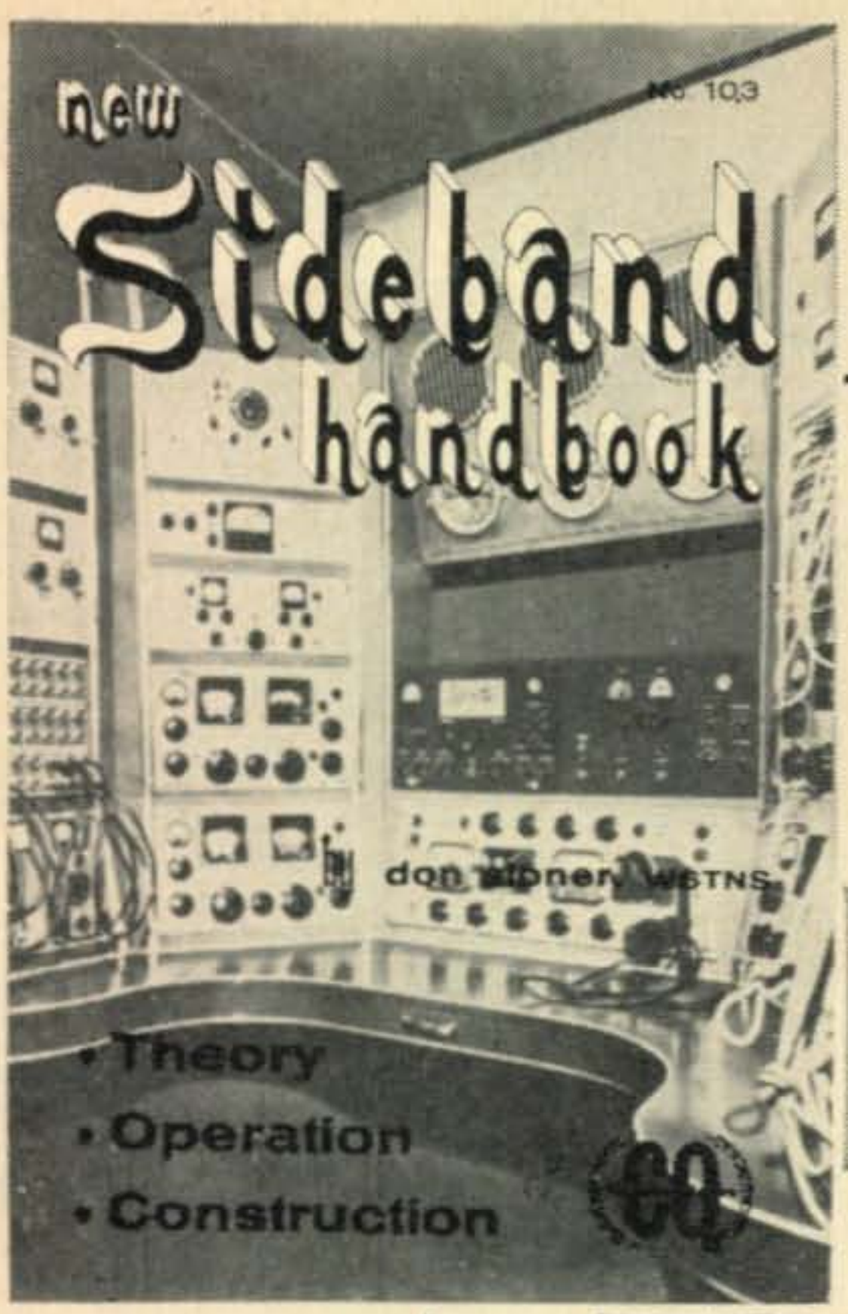

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tenna (two 8 element jobs) at a greater height. This to take place next summer: 220 mc gear will be built this winter, 100 watts and on the air next summer."

Falls Church, Virginia Tom (W4UMF) corrects an error on our part and adds some news too:

"In your December column you credit me with being on the south end of the Florida, New Hampshire two meter opening. I'm still in Virginia, not Florida. Actually it was W4RMU that was the Florida end of the path. The confusion must have come up when the New England gang heard me off of the back of my antenna working W4RMU (certainly I was hearing W1AZK S9 off of the back of mine)."

"Six meters has really been hopping. *Seems to have been doing that everywhere.* Openings have been stronger and more frequent than last year on the East-West path (Va. to Africa, Va. to Calif. and KH6, etc.). The Northeast path to Europe is about the same as last year or perhaps a shade poorer. The path to South America is always open judging from the signals below the band but there are no amateurs there (apparently). I keep an eye open dowa that way hoping to catch New Mexico on backscatter for state #48, but no dice." *Very good run-down Tom, and we find the paths much the same here in Massachusetts.*

Berwick, Pennsylvania Jim Warner (K3AJL) sez:

"The rig here is homebrew, 30 watts, 6L6 final (exciter). Am working on PP 6146's and will have it on cw by the middle of November. Receiver set-up is as follows: homebrew 2 tube rejective receiver, pre amp in front end and 1 tube converter into 4 tube 40 meter converter, into 5 tube broadcast receiver. 5 element hi gain beam 100 up." *Glad to know the set-up there in Berwick Jim.*

Arlington, Virginia Another transplanted ham, Joe Kessler (ex-WØEXT, now W4BXM) comes through:

"Am continuing my 50 mc activity from my new QTH at 804 N Wayne St, Apt 103, Arlington 1, Virginia. Would sure appreciate a shout from any of the multitude of friends I've made in the past from St Louis and Quincy, Illinois (K9BDW). Conditions certainly different out here, with the coast-to-coast openings and F2 which don't get into the Missouri, Illinois area." *Good luck at the new QTH Joe.*

73, Sam

Let's Look At Kits

Howard S. Pyle, W7OE
3434 — 74th Ave., S.E.
Mercer Island, Wash.

A new era in the 'American way of life' was ushered in not so long ago, when various "do-it-yourself" projects began to encroach on the field of completely finished offerings of the manufacturing industry. Just when and why this wave took off, I don't know. I do remember though, that for several years past, the larger mail-order houses and some of the smaller retail establishments were offering 'knocked-down furniture' . . . nail it together and paint it yourself at tremendous savings! Prior to that, completely assembled but 'unfinished' furniture had become an established

ANNOUNCEMENT

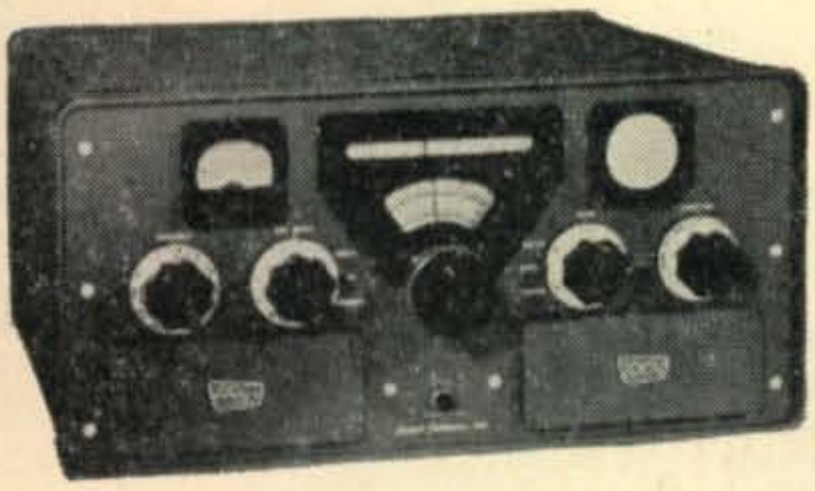
We are pleased to advise that Central Electronics, Inc. has become a wholly owned subsidiary of Zenith Radio Corporation.

The acquisition by Zenith, materially strengthens Central Electronics in its field of amateur, commercial and military electronics, and will enable it to expand its operation substantially.

Wesley R. Schum, who founded Central Electronics in 1950, will continue as a Vice President, and the balance of the personnel will remain as before.

In the future, you can expect the same satisfaction, service and leadership in creative engineering that we have delivered in the past.

Central Electronics fine quality equipment is a natural addition to the Zenith family of high quality products.



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MODEL 10B

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

For further information, check number 27 on page 126.

business with many.

It wasn't long before the metal manufacturers . . . notably those producing aluminum . . . were offering through the medium of display racks in the nation's hardware stores, metal sheets, rods, tubes, angles and other metal fabrications with which much home equipment could be readily constructed. Aluminum storm windows, screens and other household items were described and illustrated by step-by-step detailed fabrication and assembly procedures in various brochures, flyers and 'give-away' literature, by mail and at the stores.

Small wonder then, that the aggressive electronic manufacturers saw the 'hand-writing on the wall' and commenced to fall in line. "Do-it-yourself" electronic kits embracing test equipment, high-fidelity tuners and accessory items, amateur radio transmitters, receivers and associated equipment, appeared almost overnight in the advertising pages of a variety of publications.

It's a 'kit-age' and this is GOOD! The average man (and many boys in the 'teen-age' group together with a rather startling number of girls and older women) have a distinct aptitude for mechanics in one form or another. Be it mechanical, electrical, wood-working, electronics or similar handcraft, there are many who would LIKE to try out and improve their talents. A large majority are handicapped by confined living quarters where it is difficult, if not impossible to indulge their hobby. Imagine a lathe, drill press or power saw operating within the confines of a three room apartment!

Others, with the enthusiasm and the space for 'building something' cannot afford the multiplicity of power and hand tools necessary to create something 'from scratch'. Kits are their answer! Take amateur radio transmitters, receivers, test equipment, hi-fi gear, etc. All require machine work in the way of cutting and drilling metal chassis, panels and such like, were one to start with the raw materials alone. But . . . with the 'kit' for the item you have chosen, you receive panels, chassis and sub-assemblies already punched and drilled, panels neatly marked and finished and every last item you will require to produce a finished piece of equipment equal to a manufactured product. Even the coils, where such are required, are wound for you! ALL of the 'hard work' is done. Yours is a pleasant task and a quiet one. No noise of drilling, pounding or punching. No necessity for more tools than a soldering iron, screw-driver and a pair of pliers.

I have assembled and wired a good many 'kit' offerings, both for myself and others. These have embraced practically everything from rather impressive combination radio telephone and telegraph transmitters with all refinements, including built-in VFO's, multiple band-switching, etc., right down through simple grid-dip meter kits. I have yet to encounter a kit of which I could be critical other than in very minor ways. Sure, you may not get *exactly*

the tube line-up you would prefer . . . perhaps the arrangement of panel controls does not quite please you . . . but essentially you have a well-designed basic unit that goes together easily and is tuned and adjusted with a minimum of trouble. There is nothing in the world to prevent you from making minor modifications in the circuits, panel arrangements, etc., if you so desire. Remember though, that factory warranties are VOID unless you follow assembly and wiring instructions TO THE LETTER!

Most gratifying, in connection with practically ALL kits with which I have had to do, is to find the quality of the electronic components and parts to be of excellent grade. True, some of the lower amateur radio transmitter kits DO include an UN-damped milliammeter which is a bit difficult to read during adjustment . . . many kits include a rather cheap type of sliding switch for various functions, but the parts that really COUNT . . . that establish the real quality of the item as a whole, I've found to be generously above minimum requirements.

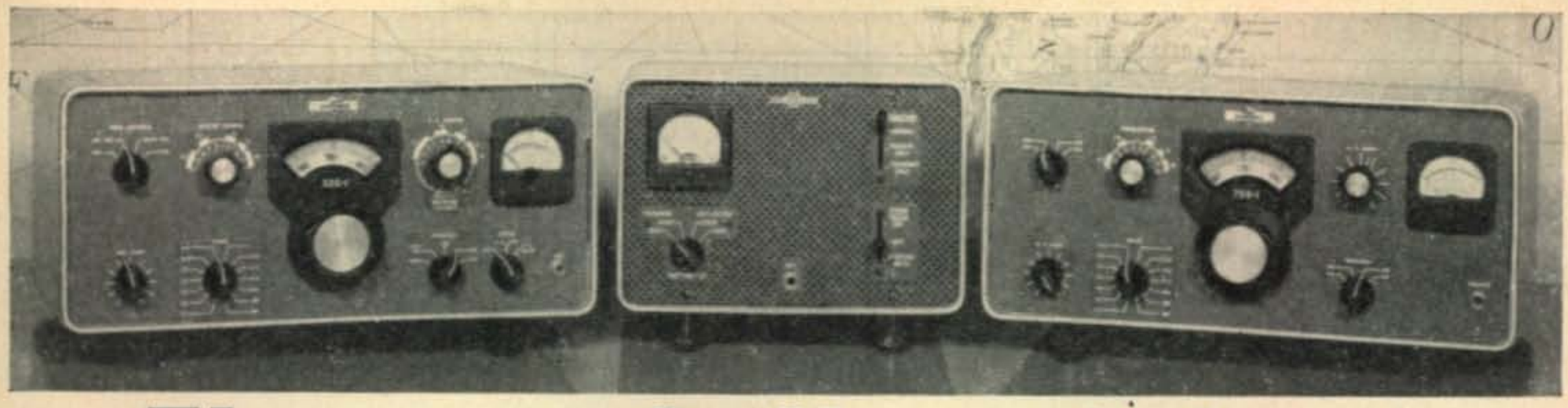
What we should all be grateful for is that the introduction of electronic and associated equipment in kit form has made possible the acquiring of a pretty generally GOOD piece of equipment at a most reasonable price. Equipment that would ordinarily be beyond the financial reach of many of us, can now grace our 'ham shack', service shop or living room at a substantial dollars-and-cents saving, simply by our being willing to accomplish a large part of the labor of assembly and wiring ourselves.

I *would* recommend however, that unless you have a pretty good background in construction, wiring and adjustment of electronic devices, that you stick pretty closely to the factory instructions if you want assurance of success. After you've become thoroughly familiar with a piece of kit equipment which you've assembled and wired, you may see minor changes which you think you'd like and which you feel confident that you can accomplish. Go to it . . . by that time the factory warranty has probably expired anyway! ■

PROP. [*from page 72*]

1958. Openings will favor north-south paths (USA to South America) rather than east-west paths (USA to Europe and Japan). Conditions on *10-meters* are expected to remain much the same as during 1958, except that the band will not be very useful for DX during the late spring and summer months. Except for fewer around-the-clock openings, conditions on *15-meters* should remain much the same as last year. On *20-meters*, fall and winter skip will not be as short as during the past two years, and late fall and winter night-time propagation conditions are expected to be somewhat poorer

[*Continued on page 100*]



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For further information, check number 32 on page 126.

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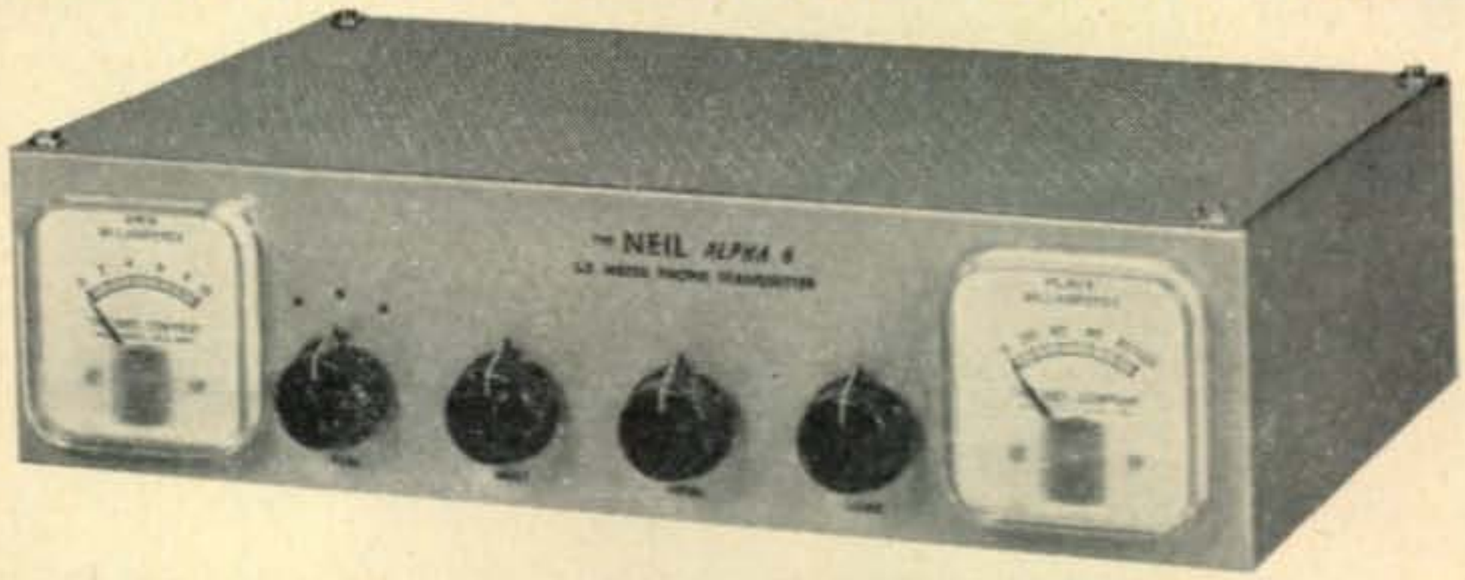

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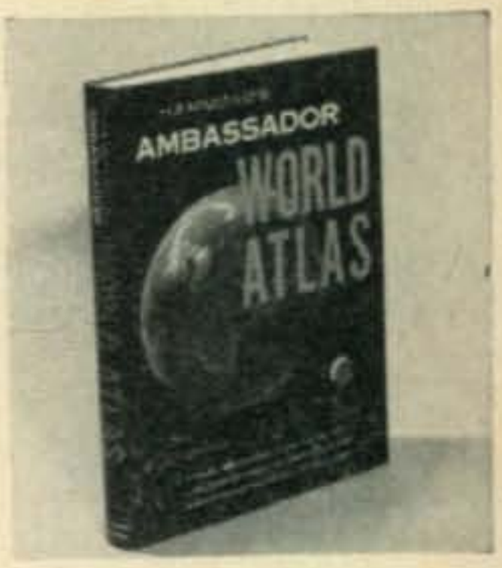

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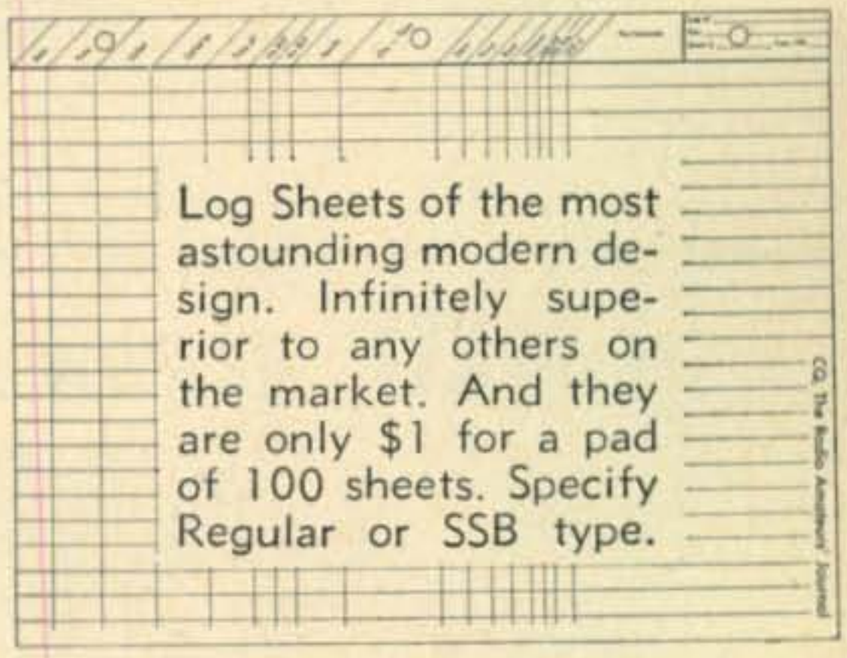

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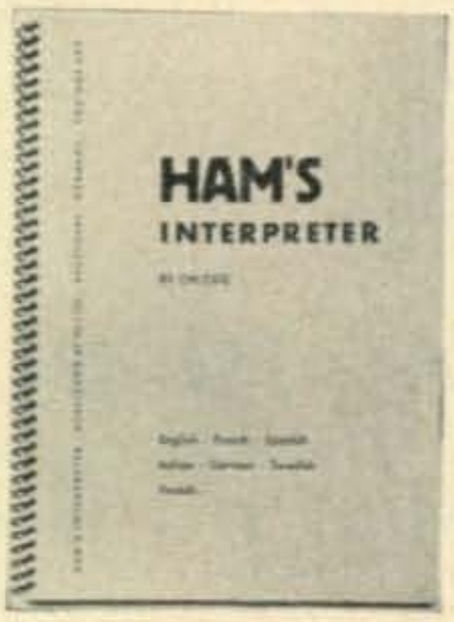
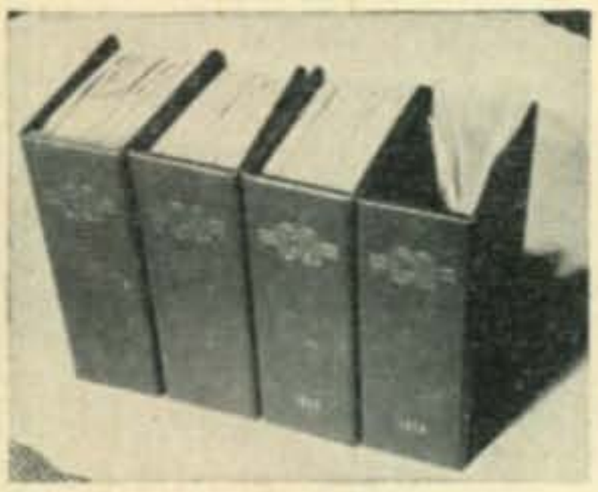


TVI HANDBOOK

W1DBM's newly written TVI book (no reprints) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2 and 6 meter TVI as well as Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price: $1.75 postpaid, USA. $2.00 Foreign.



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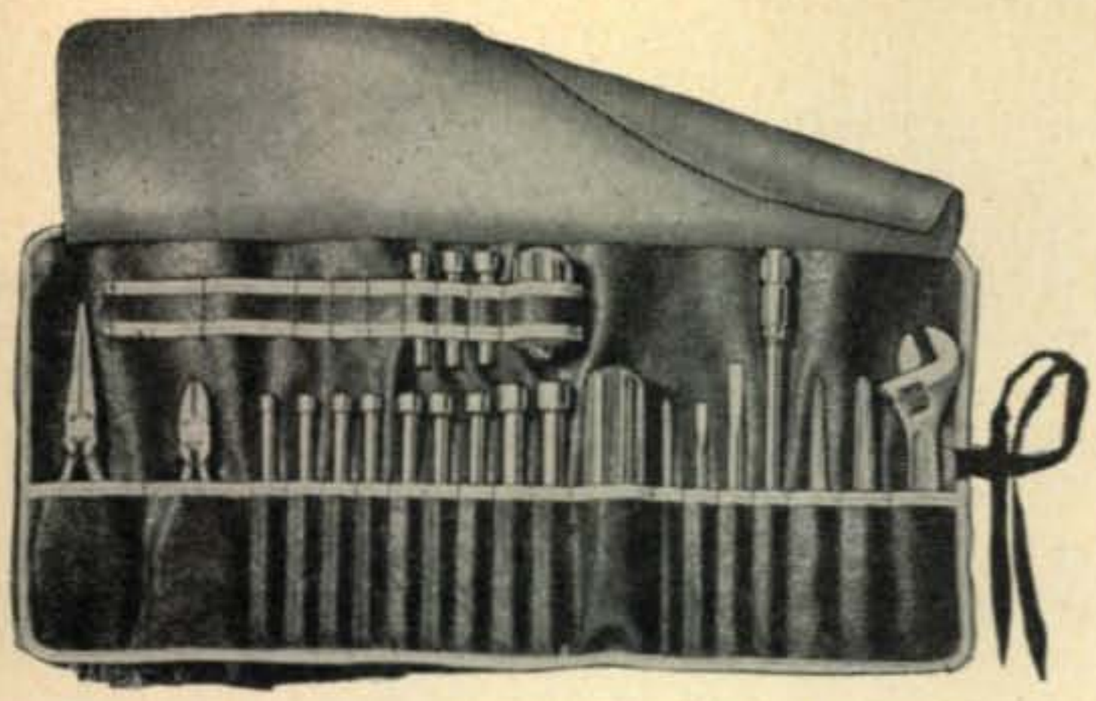

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Whether you are going to use this kit in the ham shack or take it in the car you will find it the most terrific set of tools you have ever owned.

Price? Ah, there's the catch, as you may have suspected. You send us $24.00 (lists for $33.50) and we send you the kit postpaid . . . plus (here is the hooker) a year's subscription or extension of your present subscription to CQ.

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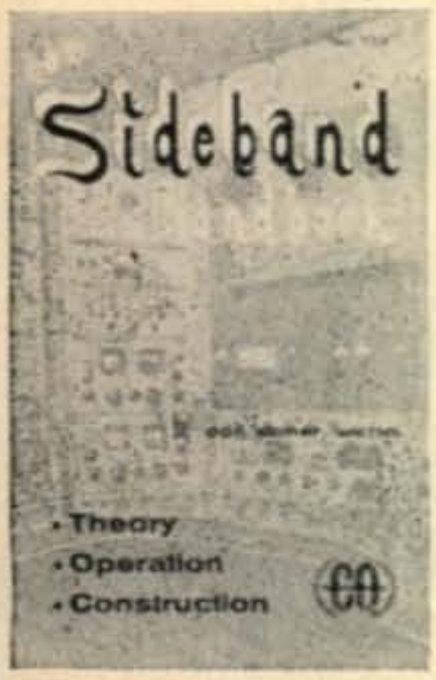

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Written by Don Stoner, W6TNS, was almost one full year in the preparation of this terrific volume. This is not a **technical** book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only $3.00.

C-2

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on east-west paths. Some improvement is expected on *40 and 80-meters*, with long-distance night-time signals somewhat *stronger* (especially during the fall and winter months) than during the peak of the cycle. Conditions on *160-meters* are expected to remain much the same as last year.

There is some scientific evidence available which indicates a sharp increase in the occurrence of auroral displays and ionospheric storms can be expected during the period immediately following the peak of the sunspot cycle. If this evidence is further substantiated during the present cycle, a significant increase in VHF auroral type openings, and HF blackouts, can be expected during the coming year.

Despite the slow decline in solar activity forecast for 1959, there is every probability that "quasi maximum" radio conditions will prevail throughout the year, and that it will be another very interesting one for amateur radio.

Sunspot Broadcasts

The relative *monthly sunspot number*, which is internationally used as an index of the general solar activity, is derived from daily observations of the Swiss Federal Solar Observatories at Zurich, Locarno and Arosa. These monthly numbers, as well as a six-month forecast of *smoothed sunspot numbers*, are broadcast in English to North America on the fourth day of each month by the Swiss Shortwave Broadcasting Service according to the following schedule:

Frequencies: 6185 *kc*, 9535 *kc*, 11865 *kc*.
Times: 8:35 PM and 11:20 PM EST
7:35 PM and 10:20 PM CST
6:35 PM and 9:20 PM MST
5:35 PM and 8:20 PM PST

The relative monthly sunspot number for November, 1958, as reported by the Swiss Shortwave Broadcasting Service, was 141.7. This results in a provisional smoothed sunspot number of 189 centered on May, 1958. This month's CQ propagation charts are based on a predicted smoothed sunspot number of 161, centered on February, 1959.

Contest Critique—CW

Good short wave propagation conditions prevailed during the entire CW period of the CQ DX Contest, from the early evening of November 28th, through November 30th. Conditions were much better than during the Phone period a month earlier. From early results it appears as if conditions during the 1958 CW period may have been as good as the record-breaking conditions of the 1957 Contest. Reports received so far rate the accuracy of the November Contest Propagation Charts from

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"pretty good" to "phenomenal." The "last minute forecast" sent by request to almost 150 readers of this column one week before the CW period, forecast conditions "right on the button" for the ten six-hour periods of the Contest week-end. My thanks go to Bill Dulin, W3ETT, an associate of mine who helped prepare the last minute forecasts for both Contest periods.

IGC

On December 31, 1958, the International Geophysical Year, one of man's greatest cooperative scientific efforts, came to an end. During this unusual year of 18 months (the IGY began on July 1, 1957), several thousand scientists from more than 50 countries (including significant contributions from radio amateurs) worked from pole-to-pole, under the sea, and high in the atmosphere, towards the common objective of learning more about man's environment—the earth, its atmosphere and oceans, and those solar and cosmic phenomena whose effects are felt on earth and upon which life itself may depend. During these 18 months, many of the mysteries of the world and the surrounding Universe began to unfold. But 18 months is hardly enough time to solve the mysteries of eons. In order to continue cooperative investigations in those areas that produced the most promising results during the IGY, a new program of international scientific cooperation (on a somewhat smaller scale than the IGY) began on January 1, 1959. Significant results of this program (designated "International Geophysical Cooperation—1959") in the fields of radio propagation will be discussed in this column from time-to-time during the coming year. 73, George.

SURPLUS [*from page 73*]

add a suitable sub-chassis for your transformer and choke and then wire it up as shown in fig. 1. Of course it is possible to build the entire power supply on a separate chassis external to the receiver. It will be necessary to add a power switch (S-1 fig. 1) or re-wire the switch on the BC-312. We feel it should be added to the front panel by choosing an appropriate place for the toggle switch and drilling a ½ inch hole. The fuse can be a fused plug instead of a standard panel fuse, although the front panel fuses of the 312 can be used for the power supply if you desire. If you're really enterprising, you can re-wire the filaments to six volts to eliminate the need for the second transformer (T-2) used to make the filament line 12.6 V. Make sure the filament windings are wired so the voltages add and do not cancel, if you use the second transformer.

The BC-312 was designed for the use of headsets only. A speaker may be added by

RADIO BOOKSHOP

When are you actually going to start learning something about radio? We've left out all the unnecessary stuff and concentrated on those books that are really top notch for hams. Beginners should have #11-13-23-24. The next step is #21-22-28-32. #16 will help make QSO's a lot more interesting. #1-2-5-25 are important for developing your technical education and giving you a good reference library. #9 will help you get a commercial license.

1 Electronics & Radio Eng. by Terman . $14.50
1078 pages. One of the most complete radio textbooks ever printed. All theory but not too heavy on math

2 E. E. Handbook by McIlwain
1618 pages. Mostly formulas, tables and circuits. With this, #13 & #32 you will have a complete source of data $10.00

5 Antennas by Kraus (W8JK) $10.50
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11 Old 14th Edition of Radio Handbook by W6SAI
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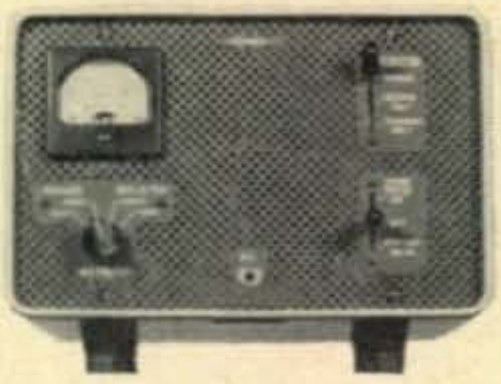

312B-4 — Speaker Console — $185.00

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For further information, check number 37 on page 126.

using a matching transformer of about 2000 ohms to speaker between the output phone jack and the speaker itself. Since there will barely be enough audio, an additional stage of audio should be added. This is done by adding a 12AT6 triode amplifier as shown in fig. 2. The tube can be located on a small bracket under the chassis near the 6V6. It is connected by breaking the lead going to the grid of the 6V6 and connecting it to the 12AT6. The output from the 12AT6 is connected to the 6V6 grid. This provides more than enough gain.

Some difficulty will be experienced trying to obtain a correct *rf* plug for the antenna. We solved this problem by changing the plug and socket to the more conventional SO-239 socket (*uhf* type). This allows everyday coax fittings to be used.

The converters are fairly simple to build. Being crystal controlled they operate by using the receiver to tune in the desired station and since the receiver has good bandspread, so will the converter, when used. Since the receiver tunes 8 to 10 *mc* for ten meters, merely add a 2 in front of the receiver frequency and you have the correct 10 meter frequency. Likewise add 40 to 10 to 14 *mc* and you have your six meter band of 50 to 54 *mc*. Two meters covers 14 to 18 *mc* on the dial and you read it as 144 to 148 *mc*. Although no dimensions are given for specific parts, the layout shown in fig. 3 will show the correct parts positions. The entire power supply for the converters, and the converters themselves, are built on a 9″ x 7″ x 2″ steel (cadmium plated) chassis. While aluminum can be used, it is far easier to solder the grounds and shields to steel.

The first thing to do is make the holes for the tubes, coaxial sockets and the other components. The shield is soldered into place, and is made from steel or even a piece of tin. One piece is "L" shaped and is 8½″ x 1⅞″ plus a ¼″ lip on each end. It is bent to form a 6″ x 2½″ "L." Two smaller pieces 2½″ (plus a ¼″ lip on each end) x 1⅞″ divide the chassis into three shielded *rf* compartments. Three holes (about ⅛″) provide clearance for output and power leads from each *rf* compartment. Input *rf* is from the coaxial socket on the back of the chassis in line with the *rf* tube. Since L-3 and L-4 are placed very close to each other, and are parallel, they should be mounted on terminals across which the tuning capacitors are connected (C-2 and C-3). Actually all of the B&W coils are mounted on suitable terminals. Keep all leads short and all power leads very close to the chassis. Use shield type of sockets and don't be afraid to make good solder joints to ground using a big enough soldering iron.

We've shown the converters as being three separate units. Well that is exactly how they were wired. Each one is on only when in use. The output leads of those not in use are grounded to prevent any possible stray pickup.

Adjustments are first made using the grid

dip oscillator. Set the grid dipper to the frequency given on the schematic for the particular tuned circuit and adjust the coil or the condenser or both till a dip is obtained. Make sure no spurious dips are caused by nearby circuits. When all circuits are preadjusted by this technique apply power and adjust the tuned circuits for the best signal to noise ratio obtainable on the receiver, as the receiver is tuned through its range. Special care should be taken when adjusting C-2, L-3 and C-3, L-4 since the coils must be moved to obtain the best coupling, and the capacitors must be readjusted for minor changes in loading. These circuits directly affect the bandpass of the converter and warrant as much adjustment as you see fit to obtain the desired results.

The mixer should develop about 3 v maximum from the oscillator at the grid of the 6AK5. If the coupling value given for C-4 causes too much oscillator injection decrease its value. You may find that stray capacity is all you need. Make this measurement with a *vtvm*.

Note that the plate coil of the *rf* stage is outside of the shield. This is to prevent oscillations from occurring as well as to prevent stray pickup. For additional improvement, bypass all filaments (hot lead) to ground with .001 disc capacitors using very short leads. The input capacitor is used to increase the signal to noise ratio and should be adjusted for maximum sensitivity of the converter. The entire set of converters are housed in a small metal cabinet. A rotary switch selects the band while a toggle switch controls main power and a pilot light dresses up the panel and serves as a power on indicator.

Ramblings

The mail this month has been rather heavy. Due to this, and many other reasons, we are going to ask that *all* requests for information go via the CQ office, which is the address now given under my byline. Mail addressed to any other point will invariably be delayed.

We have two particular requests to make of readers this month. First, drop us a card if you are interested in a CQ publication of surplus schematics. We have a big file here and would be glad to put the schematics and important information into a book for sale at a nominal price. Second, if anyone has surplus equipment, in usable, good condition and would like to donate it to a worthy cause, get in touch with Irv Tepper via CQ. Irv teaches electronics to youngsters who can't afford to buy the stuff and who would appreciate any donations.

Our handbook requests this month come from W4AYU who is looking for the BC-620 conversion. K4MBA has a Navy TCA-1 also known as a Collins 32T and needs data. E. K. Laskari of 79A Woodstock Ave., London NW-

TRADING POST

Again in this issue a new section appears in CQ where distributors may advertise trade-in and reconditioned equipment. This section, called the TRADING POST, will be confined only to legitimate ham distributors as a means of announcing the many excellent used items available. $15 per column inch.

11 wants handbooks on the TBS-7, R-3/ARR-2 and ARR-2X, the BC733D and the R-59/ARN-5. Will somebody send an RBM-5 handbook to K5EXW. KØDKB wants an APN-1 conversion. Steve Renovich, c/o SP Co., Room 1060, 65 Market St., San Francisco 5, Cal. wants any and all data on the RAX-1 receiver. K2TWY needs BC-222 info. KØHPJ wants PE-125 and SCR245 data and books. Another APS-2 indicator conversion request comes from Frank Warnoch, 1225 Franklin Ave., Portsmouth, Ohio. From Canada VE7ALS wants the ATB Navy aircraft transmitter handbook. K8LAR is looking for the BC-659 conversion. KN5SCD needs APN-4 and ASB-5 scopes for ham use.

Sam Dunne of the Murray Tube Works, P. O. Box 476, Elizabeth, New Jersey, wants publications on the BC-AP-229, BC-191F and the BC-221-T. K5JTP needs an HRO-M (military model) handbook.

We received a letter from W3ECP telling us that the Dept. of Commerce manuals on surplus are currently available only on microfilm and will not be in book form. Also heard from VE7CT regarding the ARB Receiver. We referred to soldering of centertaps of the filament supply. In particular we meant to solder the center taps of only one winding, and then only to prevent poor connections. They should be taped for insulation after soldering to prevent shorts. It is (or should be) obvious that when putting two windings in series, other taps on these windings should not be connected to each other or a beautiful short circuit will occur.

As a final reminder, please address all mail care of CQ, 300 West 43rd Street, New York 36, New York.

73, Ken, W2HDM

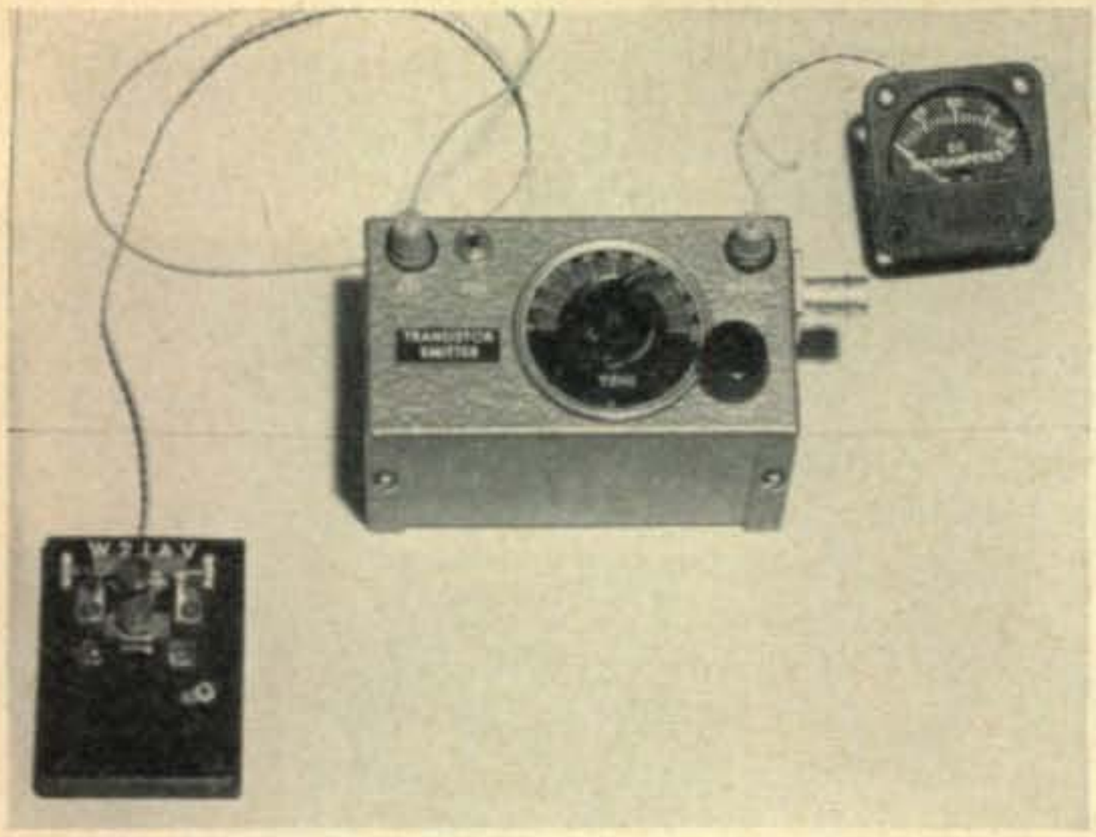
RTTY [*from page 77*]

TV transmissions where there are no FCC-stated standards. (FCC standards for RTTY are so definite that monitoring by the FCC is no problem, where it would be with other modes.)

Unfortunately, the ARRL Directors do not seem to be on RTTY, so they have no first hand information. It therefore becomes our job to educate these fellows in RTTY. Get to know your Division Director. Show him what you are doing with RTTY, and lastly, drop Mr. Budlong a card or letter requesting that Dual Identification be dropped for RTTY, but not for other modes.

W2JAV Converter

Many letters have been received from RTTYers all across the nation who have built the excellent RTTY converter or TU designed by Phil Catona, W2JAV, and described in the April 1958 issue of *CQ*. Most builders are



W2JAV's "Little Flea" transistorized RTTY transmitter for 40-meters

very enthusiastic, but a few have experienced some difficulty. Here are some additional words of wisdom, as passed along from Phil:

First of all, it is almost essential to operate this TU through a band-pass input filter. (This is because limiters are such good harmonic generators.) Secondly, this TU performs wonders when used with a notch filter such as described in the RTTY column in the December '57 issue. A simple band-pass filter was also described in this column. Also see page 72 of the *RTTY Handbook*.

While not emphasized in the article, it is important that a very "stiff" power supply be used. (The keying frequency is roughly 22.8-*cps*.) It is suggested that choke input, a heavy bleeder, and a large value (at least 80 mfd) of output filter capacitor be used. Also, it has been noted that in some cases the neon lamp *I-4* will not extinguish. This might be cured by increasing the plate resistor of V-4A to 1.5 Megohms. This is because of variations in the characteristics of some 12AU7 tubes. If at all possible, scrounge a military version or "ruggedized" equivalent, or check some tubes on a transconductance-type of tube checker for reasonably good balance of the two triodes.

Hits and Bits

W1JTL and W1FOX have built W2JAV converters, reports W1FVM, who has an AN/FGC-1 and AN/FRR-3A combination. W1BGW, NCS of the East Coast RT Net which meets Wednesdays at 7 pm EST, has set aside the 6th week in February as "Be-kind-to-BeeP-week."

K2FCD, USAF MARS in Syracuse, New York, reports K2RJK, K2UBB, K2RDY, K2UBL, K2LWI, and WØPVH/2, all have Model 15's and are ready to put Syracuse on the RTTY map.

W4KCR, another SSBer, has acquired a Model 26. W4RRH reports W4CVU, W4GHX, W4HKB, W4OFV, W4RVH, K4RRG, W4TLA, and W4UJR all active on RTTY from North Carolina.

W6NJE has both a Model 26 and a Model 12. K8DDC built the W2JAV TU and is now looking for a manual on the *WU* 401-A strip printer. K8ECK will be on from Canton, Ohio. W9ZBY has a model 12 without keyboard. (Caveat Emptor!) W9SHC is a TTY man. WØRX is now on 20 and was heard working W2PBG. WØJHS reports good copy of WØBP's 6-meter bulletin transmissions.

HH3DL hopes soon to be back on the air, government permitting, with a Model 26. KR6MD is on 14,017 with a KW-1 and a rhombic. He works SSB on 14,335 at 1300 GMT, reports W2HXG. CN8JC is limited to 100 watts, but hopes to provide many contacts. KH6BGS, the Kaneohe Amateur Radio Club, is getting set for RTTY. W6KUY/MM is quite active during his frequent runs between Japan and California. ZS6KD will be using the Model 15 that W2JTP had for several years, thanks to Don, K2AAA.

Comments

The Third Annual Narrow Shift party, spear-headed by WØBP, is set for the weekend of March 13, 14, and 15, Friday afternoon through Sunday night. Although there are no actual rules, the secondary shift standard of 170 cycles is fairly well established by gentlemen's agreement.

Does anyone have the manual, TM 11-2032, on the surplus regenerative repeater Type X66031A, or OA-3/FC? WØBP is looking for one, as is W2JTP. If you see this unit in surplus, grab one, or let me know where you saw it, will you?

73, Byron, W2JTP

SEMICONDUCTORS [*from page 78*]

not in the other. When the anode is positive (with respect to the cathode), current will pass. But when the anode is made negative (such as during the negative half cycle of *ac*) only a tiny "leakage current" will pass. A potential barrier exists in the junction that is between .4 and .7 volts. Beyond this point current increases exponentially with voltage. Since this potential barrier must be overcome, we appear to lose something less than a volt inside the rectifier. Compare this to the 10-50 volt drop inside the average vacuum tube rectifier!

The most common silicon rectifiers are rated at 120 v *rms*, 500 *ma*, and 400 volts peak inverse. Such a rectifier can be purchased in almost any radio store for about $1.50. If you connect the power line (one side please) to the anode, and a suitable filter to the cathode, you can obtain about 140 volts *dc* at one-half ampere! At this point you are probably confused about that term peak inverse voltage and how you can get more *dc* (out of the rectifier) than the *ac* input.

Ratings—Fig. 1 shows a typical half wave rectifier circuit operating directly from the

power line. Under normal conditions the power line will deliver 117 volts. Fig. 2 shows the waveform of this voltage. You will note that the 117 volts referred to is root-mean-square, or *rms*, which is .707 of the peak voltage. We can multiply the reciprocal of .707 (1.414) by the *rms* voltage, and find the peak voltage to be about 165.5 volts. However, the peak voltage is for only one half cycle of the input voltage, and the peak-to-peak voltage is twice this value or 331 volts. So, although the voltage entering your house is only 117 volts (*rms*) the peak voltage equals 331 volts.

Our half wave circuit, shown in fig. 1, uses only one-half cycle, so we can forget about the negative half cycle temporarily. During the positive half cycle a peak voltage of 165.5 volts will be applied to the filter capacitor in fig. 1. Unless this capacitor has an infinitely high capacity it will not charge up to the peak voltage. With reasonable sized capacitors, 140-150 volts is a more realistic output voltage. Thus by applying 117 volts (*rms*), we can obtain 140-150 volts from the rectifier circuit.

Peak Inverse Voltage—You must be very familiar with this rating if you are going to experiment with silicon rectifiers. It is a basic fact that if too much voltage is applied to a junction in the reverse direction (not conducting), the rectifier junction will break down and conduct either way. This is known as the Zener voltage and some rectifiers take advantage of this characteristic (Zener diodes). In our power rectifier circuits we must be careful to avoid Zener breakdown.

It was stated earlier that our typical rectifier had a peak inverse rating of 400 volts. This means that the maximum voltage that can be applied to the rectifier in the reverse direction is 400 volts. During the negative half cycle the anode will be 165.5 volts more negative than the cathode. Or will it? What about the positive potential on the cathode? In our typical rectifier circuit (fig. 1) we have around 140 volts on the cathode under load. The *piv* is the total of the peak voltage during the negative half cycle plus the rectified voltage or 305.5 volts. But what about the B plus voltage before the tubes in the load warm up? Until the load is applied, the full peak-to-peak voltage will appear across the rectifier junction, and it will be 331.0 volts. From the foregoing discussion you can probably interpolate and find that no more than 140 volts *rms* should ever be applied to a silicon rectifier with a 400 *piv* rating. Actually, 130 volts is a better figure to use since it will allow a little leeway for line voltage variations.

How can you use this information? Well, let's say that you want to replace that 5U4 rectifier in your transmitter with silicon rectifier. Also, let's assume that the transmitter has 350 volts *rms* on each plate of the 5U4. From the previous discussion we know that only 130 volts *rms* can be applied to the rectifier, so it

will be necessary to connect rectifiers in series. If each one is good for 130 volts, it can be seen that it will require three 400 volt *piv* rectifiers in series in each of the two transformer legs (where the plates of the 5U4 used to be), or a total of six rectifiers. Rapid calculations will also reveal that we have an extra 40 volts of *piv* as a safety factor. It should be pointed out that where the B voltage used to be 300 volts with the 5U4, it will probably be up around 380 volts with the silicon rectifier due to the increased efficiency. This may prove to be a disadvantage if you have to employ dropping resistors. However, if you need more power from your transmitter, this is an easy way to get it.

Next month we will discuss some of the more popular silicon rectifier circuits

New Literature

You can obtain much more information on silicon rectifiers by obtaining a copy of *The Silicon Rectifier Handbook* from Audio Devices, 620 East Dyer Road, Santa Ana, Calif. The cost is one dollar per copy. Recommended reading for experimenters.

Free from RCA are the following publications: Use of The RCA 2N384 Drift Transistor As A Linear Amplifier (publication #ST-1382), Broadcast-Band Amplifier Circuits Using RCA-2N544 Drift Transistor (AN-175), and Broadcast-Band Frequency Converter Using RCA Transistors 2N140, 2N219, 2N411, or 2N412. Write RCA, Semiconductor Division, Somerville, N. J.

Amplifier Corp. of America, Transformer Div., 398 Broadway, New York 13, N. Y. has a circular available on a new line of mu-metal transformer designed for transistor applications.

Semiconductor News

Fairchild Semiconductor Corp., 844 Charleston Rd., Palo Alto, Calif. has jumped on the MESA transistor bandwagon with their type 2N696 and 2N697. Either unit may be used as a switch (80 mulli-micro sec. rise time), amplifier (15 *db* gain at 30 *mc*) or as an oscillator (0.6 watts output at 70 *mc*). Literature is available along with a pamphlet titled Fairchild Silicon Transistors.

International Rectifier Corp., 1521 E. Grand Avenue, El Segundo, Calif. has announced a new silicon solar cell module which features conversion efficiencies up to 8%. Bulletin SR-276 describes.

Also new from International is their QM-50 selenium rectifier rated at 50 *ma* and 130 v max *rms* input. Its ability to withstand high current and voltage surges makes it a natural for experimenters.

As hinted in an earlier column, Pacific Semiconductors, Inc., 10451 W. Jefferson Blvd., Culver City, California is manufacturing VHF silicon power transistors. Six types (three osc,

three amp.) feature power outputs of .25, .5, and .75 watts at 108 *mc* and are currently being delivered to the government for use in satellites. Although these devices are of the MESA family, they are truly new units developed by PSI's engineering staff. You'll be hearing more about these gems later.

New from RCA this month is the 2N591, a germanium PNP alloy type designed for large signal audio applications.

Also of great interest from RCA is the announcement of their 2N647. This is the NPN counterpart of their 2N217 and is designed for complementary symmetry applications. In a C. S. circuit two transistors are connected in parallel (an NPN and a PNP) and fed with audio. No push-pull input or output transformers are required since each transistor amplifies one-half cycle. With these two transistors you can construct a push-pull Class B audio amp. stage with no transformers. There is no vacuum tube equivalent of this circuit.

Sarkes-Tarzian Rectifier Division, 415 N. College Ave., Bloomington, Indiana, is one of the country's greatest manufacturer of silicon rectifiers. Several new products will be of interest to you bargain hunters. Their new "F" series looks like a bump on a wire but are rated at 750 *ma*! The F2 is 200 volts *piv* and will cost you $1.20, the F4 is 400 volts *piv* and costs $1.35, and the F6 has a 600 volt rating and sells for $1.50. Also of interest is their M150, it looks like the popular M500 (400 volt *piv* cartridge style, 500 *ma*) and has the case style. However this unit is rated at 360 *piv* and 150 *ma*. The price is less than a dollar. Check Radio Shack's latest catalog.

Texas Instruments, Inc. new MESA is the 2N559. It features an alpha cut-off of 250 *mc* and can dissipate more than 150 *mw* in free air, and will operate up to 100° C.

A new series of switching transistors has been announced by Sylvania Electric. The 2N404, 2N425, 2N426, 2N427, and 2N428 utilize a hermetically sealed inverted base TO-5 package which provides heat dissipation up to 150 *mw* at 250° C. The 404 has a collector voltage of —25 volts, while the others are rated at —30 volts.

73, Don, W6TNS

SIDE BAND [*from page 79*]

bureau as the card is 5" x 7". (Mine was folded and has a crease in it.)

We are attempting to find an open date for our Third World Wide DX SSB Contest. A definite announcement will be made next month with the new rules mentioned previously.

Cliff, K9EAB, was awarded an honorary membership in the "Award Hunters Club." It couldn't have happened to a more deserving guy.

Unusually short skip on twenty during the past several months has certainly produced some exceptional contacts. On the East Coast stations are contacting each other as would normally only be possible on eighty meters. Ten has been opening up and good DX QSOs are a daily occurrence.

As I write this column, the year 1958 will soon be history and I cannot but marvel at the phenomenal growth in sideband activity. One has only to listen on twenty meters on a Saturday or Sunday afternoon in the top fifty kilocycles to see that we will really have a problem if the change over from AM to SB continues as it has so far. We are just going to have to move further down in the twenty meter band. Most of the remaining lower frequencies on twenty are being wasted by a few AM stations with the power wasteful carriers and objectional hetrodynes. See you at 14,205.

73, Bob, W3SW

ECHOES [*from page 80*]

range work the receiver section is a *trf* design, which also makes for simplicity. The transmitter section has crystal as well as *vfo* control. Two power supply designs permit operation from battery or *ac* and the design is by G3MAW and G3KEP. G3WW, who recently visited the states, describes a design of a two tube *vox* control box for mobile use, in this case installed in the designer's Vokswagen. All pertinent design data is given. G3CBE is mobile on a Lambretta scooter and describes his setup of about 8-9 watts output.

Funkamateur, DM, is published for the East German amateur. The October issue, as usual, starts out with a real 'hammy' article, "Long live the German Democratic Republic." We can't quite get their operating frequency. . . . No details of technical interest were noted except that they do a lot of training in the field of teletype, not however radio-teletype. Another article covers basic principles of transistors. The editorial of the November issue is entitled "Fight the enemies of Socialism!" This is followed by a transmitter hunt story and a description of the DM3IGY club station. Operation is continuous with 70 watts on 28 *mc* for the purpose of observing sporadic E propagation and they appreciate reports. DM2APM describes an 80-meter portable transmitter of about 10-15 watts.

Das DL-QTC, DL, is published by the German Amateur Radio Club of Western Germany. The November issue carries a thirteen-page article by DL9JD, an engineer with the Philips-Valve Co. (tube manuf.). "How does one judge an amateur receiver" is the title, and all possible aspects are covered in a manner which is technical yet easily understood. Each month a data sheet is published and

this time it covers design data and dimensions of corner reflectors. Design problems of crystal controlled converters are covered by DL6HA. An interesting method is described for increasing the sensitivity of neon lamps so that they can be used for checking transmitter operation. An interesting design is given for an all-band shortwave converter.

RSGB Bulletin, G, in their November issue, covers a high performance two-meter converter by VQ4EV, ex-G3GBO. The first stage is an ECC 84 which is a very sensitive twin triode, not yet available in this country. It should be possible to get it from European hams, however, on an exchange basis for what-have-you.

The same issue also carries a circuit description of the Racal RA 17 communications receiver, which the author of the article, G2FUX, describes as the ultimate in communications receiver design. The unit is very interesting and if someone gave us one we would be very glad to run a test and review of it for CQ. But then again—for how much and how do you get one?

QTH LISTINGS As usual, we are listing here the latest ones available. From DL we have a supplement of their list, giving all new calls and QTH changes. From ZS we have their *ZS Call Signs*, annual new listing giving the QTH of all ZS stations as of October 1958. This fills a 64 page booklet, and they also list requirements for the awards issued by the South African Radio League.

73, Tom, K2VBI

CONTEST CAL. [*from page 81*]

A Few Claimed Scores—CQ CW DX Contest

Multi-operator—All Band

K2GL	— 1,500,000	W3FYS	— 383,000

Single Operator—All Band

KH6IJ	— 842,000	KH6AYG	— 471,000
W8JIN	— 583,000	W2EQS	— 403,000
W2BXA	— 550,000	W9HUZ	— 339,000

Single Operator—Single Band

W3LSG	— 62,000—28 *mc*	VS9AS	— 69,000—21 *mc*
W2PTI	— 57,000—28 *mc*	W2AIW	—199,000—14 *mc*
SM5KV	— 46,000—21 *mc*	W1JYH	— 95,000—14 *mc*

Ed. Note:

The above are only a few claimed scores taken at random from the hundreds of logs already received. It must be remembered that all must still be checked. A final reminder to all club secretaries that a list of participating members and their scores must be sent to the Contest Committee in order that their club get credit.

73, Frank, W1WY

51SB-B [*from page 53*]

enough output to drive any Kilowatt final, even the grounded grid linears that have become so popular.

As mentioned before, the 51SB-B SSB Generator is a companion unit to the 5100-B Transmitter and is dependent on the latter for its power requirements. However another model, the 51SB, has its own built-in power supply and can be used with any of the current Viking I & II's, DX-100, and the Collins 32V series, as well as home-brewed jobs of like power. Appropriate kits and instructions are provided for this conversion.

Preparing the two units for SSB operation is an easy task and can be done in a comparatively short time, an hour at the most.

The B&W manual is very thorough and step by step instructions make equipment adjustments a simple operation. However the instructions indicate by inference what voltage and current values to expect for normal operation. I feel that typical meter readings should be given, as well as actual performance to be expected under average operating conditions. This might sound elementary but it would be very helpful to the uninitiated in SSB technique.

I strongly recommend that the instruction manual be thoroughly studied before you attempt to operate the equipment. And if this is your first attempt on SSB, it would be helpful if you got some pointers from a fellow ham who is versed in this new medium. If this is not possible, do a little eavesdropping on the multitude of sideband activity in the phone bands.

I haven't gotten around to chasing DX on SSB and conditions have been poor anyway. In the meantime I'm having a ball joining the many "round-table" QSOs that can be found on all bands. Eventually you will end up on single sideband, so why procrastinate—get in on the fun now. ■

COSMO PHONE [*from page 52*]

The transmitter starts out with the mike driving a balanced modulator, thus generating the upper and lower sideband signals. This is amplified and passed through the mechanical filter to remove the unwanted sideband then mixed with the VFO to provide the 2.2-2.8 mc second *if*. This is then heterodyned to the desired ham band and drives a second balanced mixer (6CL6) which in turn drives the 6146 final amplifier. Power output is about 25 watts to a dummy load or 50 watts PEP.

AM is provided by reinserting some of the output of the low frequency crystal oscillator on the output side of the mechanical filter, giving single-sideband plus carrier. This comes through the usual receiver fine and sounds like good old AM. On CW all audio is removed, the carrier inserted, and the final stages grid-clock keyed. On transmit the "S" meter becomes an *rf* voltmeter and measures your output.

Neither Gerry nor myself are employed by Cosmos, having gone on to greener fields now that our jobs there were successfully completed. But both of us agree that the Cosmophone is a big step forward and are proud to have been associated with its design. About the only thing you can hold against the unit is its name, but don't hold that against Gerry, he didn't like it when I suggested it in the first place. ■

PHONE PATCH [*from page 43*]

A 600 ohm resistor replaces the line on the switch "Off" position to check bridge balance and to prevent receiver feedback into the transmitter.

Cutting Cost

The most costly feature in any device such as this is the attempt to balance the bridge so that none of the received signal is fed into the transmitter. It is very improbable that an attenuation of more than 20 *db* (1/10th voltage) will be attained, so it is best to plan to use the phone patch with manual rather than voice control operation. The question then arises "Why use this type of patch?"

The one advantage of a bridge phone patch is that no signal circuits are made and broken. This permits easy use in a series of rapid conversation interchanges without clicking or popping noises and without the danger of hum pickup from the coil of the switching relay.

The pictured phone patch can barely be built for forty dollars, and probably by the time this appears in print fifty dollars may be a better estimate. An equally effective patch using the same circuit can be built for about $15, using Stancor A-4350 and A-4352 transformers and Sprague Products TC-10 capacitors instead of the broadcast and military styles used here. Slight changes are necessary. For instance the line impedance is assumed to be 500 ohms and the terminating high impedance resistor becomes 180,000 ohms instead of 100,000 ohms. Likewise, use of a fixed resistor instead of a volume control while using the *internal* transmitter gain control further cuts costs. The wire-wound resistors may be replaced with composition resistors. For the rare case of a high-quality telephone signal, these changes will degrade "Quality," but in 99% of amateur communication no change will be noted.

Acknowledgement

The work reported above was accomplished while in the employ of Sprague Electric Company and their assistance and that of Sprague Products Company is appreciated. ■

The Ham Shop

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MAIL: Your typewritten copy with full remittance should be sent to CQ Magazine, 300 West 43rd St., New York 36, N. Y.
Attention: Classified Ad Dept.
NOTE: The products and services advertised in this section are not guaranteed by the publisher of CQ.
Telephone orders not accepted.
Call letters only are undesirable. Please include name and address in all advertisements submitted.

FOR SALE

ART-13 transmitter good condition, $70.00. Model 15 teletype fair, $125.00. R. L. Ritter, 1422 Valleycrest Blvd., Falls Church, Virginia. JE 2-5805.

BARGAINS: Reconditioned & guaranteed, 32V-2 $349.00; 32V-3 $495.00; B&W 5100 $299.00; Viking I $145.00; Ranger $199.50; HQ-129X $159.00; HQ-140XA $199.95; HQ-100C $159.50; HQ-110C $215.00; SX-96 $199.00; NC-300 $319.50; NC-125 $139.00; NC-173 $139.50; NC-109 w/calibrator $179.50. Write for complete list. We trade. Complete stock of new gear. Terms with only 10% down. Write Ken, WØZCN or Glen, WØZKD for deal. Ken-Els Radio Supply Co., 428 Central Avenue, Fort Dodge, Iowa.

LOOK! $9.95 buys a high quality CW transmitter kit, complete with built-in power supply, and all parts except tubes and xtal. Send for literature. Greenray Industries, M. R., Mechanicsburg, Penna.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with $1. in stamps or cash for each item that you want preserved. 24 hour service. Send to Dept. HW, CQ Magazine, 300 West 43rd St., N.Y. 36, N.Y.

CRYSTALS GUARANTEED: 2 to 80 meters FT-243. Holders, 3 for $1.00. SSB crystals FT-241A, 10¢ each. Lists available. Quaker Electronics, 1040 West Main Street, Plymouth, Penna.

FOR SALE: Schematics for all military-surplus units $1 each. Dave Rumph Co., P.O. Box 7167, Ft. Worth, Texas.

ATTENTION MOBILEERS!! Leece Neville 6 volt 100 amp. system alternator, regulator and rectifier, $45.00. Also Leece Neville 12 volt 100 amp. system, alternator, regulator & rectifier $85.00. Perfect condition. Herbert A. Zimmerman, Jr., 115 Willow St., Brooklyn 1, N.Y. K2PAT, ULster 2-3472.

CALL PLATES: Deluxe 8" x 1¾" black phenolic laminate with engraved white letters. Only $1.00 pp. Polished plexiglass base $1.00 extra. L. and J. PRODUCTS Co., P. O. Box 122, Downers Grove, Ill.

THIS HALO ANTENNA makes VHF mobile operation worthwhile. Folded dipole elements. 2 meter Model H-144 comes with fitting for standard mounts and 20 feet of coax. Portable Model H-144P mounts directly on your Gonset. Either model only $13—$13.50 west of Denver L. and J. Products Co., Box 122, Downers Grove, Illinois.

BINOCULARS, 7x50 prism type. Made by expert optical craftsmen in Japan. Prisms and coated lens are the utmost in precision. Genuine pigskin carrying case with straps included. Indiv. focus, $18.25. Center focus, $21.75. Add 10% F.E. Tax and 50¢ postage. Ramson, 9905 63rd Road, Rego Park, New York.

HARVEY WELLS T-90 Transmitter, complete with matching power supply. Cost $259.00. All band VFO phone-cw rig. Getting married and she hates ham radio. First $150. Box 23, CQ, 300 West 43rd Street, N. Y. 36.

FOR SALE (Contd.)

TECRAFT CC-144 Deluxe two meter converter. Cost $44.95 new. It's still new, but I've had it for a while . . . never used. $30 buys it. Box 27, CQ, 300 West 43rd Street, N. Y. 36.

LAKESHORE Signal Splitter, still brand new, unused. $74.50 it cost me, $35 it cost you. Gives you really great SSB reception (455 kc *if*). Printed circuit construction. Box 29, CQ, 300 West 43rd Street, N. Y. 36.

TELETYPE Equipment. Model 12 printer in excellent working order, complete with table, power connectors, typing unit, keyboard, top, $50. Auto-start control unit and converter, the most elaborate type, with audio generator, polar relays, etc., $100. Typing perforator for tape punching, $60. Tape sending unit with distributor and power supply, $80. Test generator with synchronous motor and distributor, $35. Box 19, CQ, 300 West 43rd Street, N. Y. 36.

PANADAPTOR PR-1, cost $199.50 a couple years ago. Was used only a few months. In very good condition. $100. Box 37, CQ, 300 West 43rd Street, N. Y. 36.

GENERAL ELECTRIC YRS-1 in good operating condition. $45. The original, and still one of the best, sideband selectors. Box 22, CQ, 300 West 43rd Street, N. Y. 36.

BRAND NEW National SW-3 receiver with S-9er front end, Q-Multiplier, and mechanical filter. Best offer over $200. Box 265, CQ Magazine, 300 W. 43rd St., N. Y. 36.

SEVEN-ROOM house complete with 50 foot Vesto tower, Moseley Tri-Band beam, CDR Ham Rotator. Best offer, CQ Magazine Box 57, 300 W. 43rd St., N. Y. 36.

V-37, 10-75m antenna deluxe with accessories to highest bidder. Reynolds, 35 Elm Tree Lane, Pelham Manor, N. Y. PE 8-2165.

CRYSTALS AIRMAILED. Individually boxed new crystals. Novice, net, converter, general, FT-243, custom finished to .01%. Any kilocycle, 3500 to 8700, 99¢. Same range in small hermetic holders, .050" or .093" pins, $1.95. 1700 to 3499 and 8701 to 21,500 Kilocycles, FT-243, $1.95, small metal hermetic holder $2.50. Airmailing 9¢ per crystal. Write for additional frequencies and brochure. Crystals since 1933. C-W Crystals, Box 2065C, El Monte, California.

ALUMINUM for every Ham need. Write to Dick's, Cherry Avenue, Route 1, Tiffin, Ohio for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

SELL: Several surplus PW condensers gear drive, 0-500 dial ten rev. Mfd. National Co. New $5.75 P.P. C. W. Low, McDonough, Georgia.

SELL: Like new, 5 sets of power supply kits. Each kit includes the following components:—1000-0-1000/275 ma. plate transformer, 2.5v. transformer for 866's, two 300 ma. chokes, two 1500v. filter condensers, bleeder resistors, 866 sockets, 5 amp. 6.3 transformer and switches. $25. per kit. Stan, W8QKU 2748 Meade Street, Detroit 12, Michigan.

NEW: S38, S53, S86, SX99, S95, S85, SX100, NC60, NC188, HQ100, HQ110, HQ145, HQ160, HQ170, etc. USED: NC173 receiver transmitter, Mackay 167-BY813's in final best offer. Trade, terms. Write Jim W3VGZ, J. V. Stout Co. 4640 York Road, Baltimore 12, Maryland.

COMPLETE novice station: Heath QF1, AR2, AC1, $60.00 G.E. TBX2A $30.00. K2IPA/3, 275 S. Franklin St., Wilkes Barre, Pa.

BARGAINS—NEW GUARANTEE: SX-88 $449.00; Rotobrake $49.50; Leece-Neville 6 volt $35.00; Gonset 30-40 mc FM tuner $39.50; P.H LA400 linear $115.00; P400GG linear $199.00; BC610 with tuner $495.00; Gonset 500W linear $249.50; Elenco 77SSB $399.00; Elenco PA400 linear $99.00; KWM-1 $650.00; BC221 $49.50; James C1470 $49.50; DX-35 $55.00; Scout 680 $89.00; L-A-1 linear $89.95; NC183D $319.00; NC300 $299.00; Globe Chief 90 $44.50; Globe Champ 300A $399.00; King 500 $425.00; Johnson KW w/desk $1,150.00; HT-30 SSB $339.00; HT-31 linear $289.00; test and audio equipment, inquire. Trial, Terms, Write Leo, WØGFQ—Box 811 World Radio Laboratories, Council Bluffs, Iowa.

RUBBER STAMPS for hams, sample impressions, W9-UNY, C. W. Hamm, 542 North 93, Milwaukee, Wisconsin.

For further information, check number 56 on page 126.

FOR SALE (Cont.)

FOR SALE: Lakeshore P-500 linear amplifier with power supply parts. On air one hour. Will ship 100 miles from Chicago. Make offer. Al Stephens, K9KHU, 1958 Sheridan Road, Evanston, Illinois.

ART-13—Excellent condition, unmodified with calibration book and complete power supply for 115VAC., 60 cycles, best offer. W2NVO, R. F. Avrutik, 51 Grassy Sprain Road, Yonkers, N. Y. SPencer 9-5594.

FOR SALE: B&W 5100B transmitter with 51 SB-B SSB generator and supplementary equipment, cost $800.00. New condition in factory carton, $500.00 W4AD Box 793, Rome, Georgia.

RECEIVER BC342 like new, crystal filter, "S" meter, 110 VAC, $75.00. Dan Johnston, W2CMI, Viewmont Terrace, Little Falls, N. J.

CQ's, 1945 thru 1957 except Aug 45, Jul 53, Nov/Dec 57. Best offer for entire lot. W6PBV, 1075 Moreno Ave., Palo Alto, Calif.

FOR SALE: Heath VF-1 VFO $15.00—Heath AT-1 transmitter $20.00. Excellent. F.O.B.—Warren Lyon, 462 River Avenue, North Pelham, New York.

COLLINS 75A for sale, perfect working condition, $295.00. Bruce Travis, 760 43rd St. N.E., Cedar Rapids, Iowa.

MECHANICAL FILTER for sale. 455 Kcs. Ideal for SSB or receiver. Half Price. 250 watt modulation transformer, $12.50. 813 tube, socket, modulation and driver transformers, $15. KØMVR, 424 20th N.E., Cedar Rapids, Iowa.

FOR SALE: Viking KW with 4-400As in final $1,000.00. Ranger $175.00. Viking Audio Amplifier $80.00. KW matchbox $90.00. Telrex 3E1 20m 503A $90.00. All equipment in excellent condition, F.O.B. Ala. William Wood, 2002 Gorgas St., Montgomery, Alabama.

HOUSE FOR SALE: Huntington, Long Island. Split Level, 4 bedrooms, 2 baths, 2-car garage on one acre close to highest spot on L.I. Built-in intercom system, remote control wiring and antennas. $33,500. Call Byron, W2JPP, HA 7-9533.

FOR SALE: Plate transformers 220 and 440 60 cycles AC 3800 volt ct 2.7 amps. Original crate 300 pounds $50. Billy Bateman, Route #1, Box 256-A, Mineral Wells, Texas.

LITTLE GEM 6 meter phone transmitter, 100% Plate Modulation, 10 watts, 3" x 4" x 5", tested, shipped with Xtal, postpaid $27.50. Gem Electronics, 342 W. Grand, Springfield, Ohio.

TOROIDS: Uncased 88 mhy like new. Dollar each. Five $4.00 PP. DePaul, 101 Starview, San Francisco, Cal.

FOR SALE: Elmac AF-67 Xmtr with PS-2V, mobile rackmount included—excellent condition $150.00. James A. Hanson, KØSCY, 1238 West Center St., Rochester, Minn.

SCR-522 two meter transceiver, 115V power supply, fnlly converted, output 24 watts. Ideal for ham and C.A.P. $95.00; Collins ART-13 transmitter, perfect condition $60.00. APN-1 420 mc transceiver, has wobulator $9.50, ARC-5 receivers, BC-453 $10.00, BC-454 $8.00, BC-455 $8.00, transmitters BC-457, BC-458 $6.50. T-23/ARC-5 $14.50, control boxes $1.50, ART-13 modulation transformer with matching driver $10.00. Also ARC-5 mounts with plugs, SCR-522 parts, transmitter tubes, see back issues, COD's ok. Bill Slep, WrFHY, Box 178, Ellenon, Florida.

PARTS, CRYSTALS: SSB FT-241-A lattice filter crystals. All channels, tested, no duds 25¢ each. Matched pairs to 15 cycles $1.85. Sets of six 4.0 to 13.0 Mc. fundamental crystals for "SSB Package" June 1958 QST, FT-243 $9.95, or metal hermetic holders $12.95. Add 5¢ per crystal for mailing. (8¢ airmailing.) Write for list. Bob Woods, GIlbert 8-3139, w164 Parkway, El Monte, Calif.

KWS-1 and 75A4 with 800 and 3.1 filters all barely used, just like new $2,000. Take HT32 possibly other good gear in trade. WØBNF, Glen H. Byars, Box 105, Kearney, Nebraska.

New... COLLINS S LINE

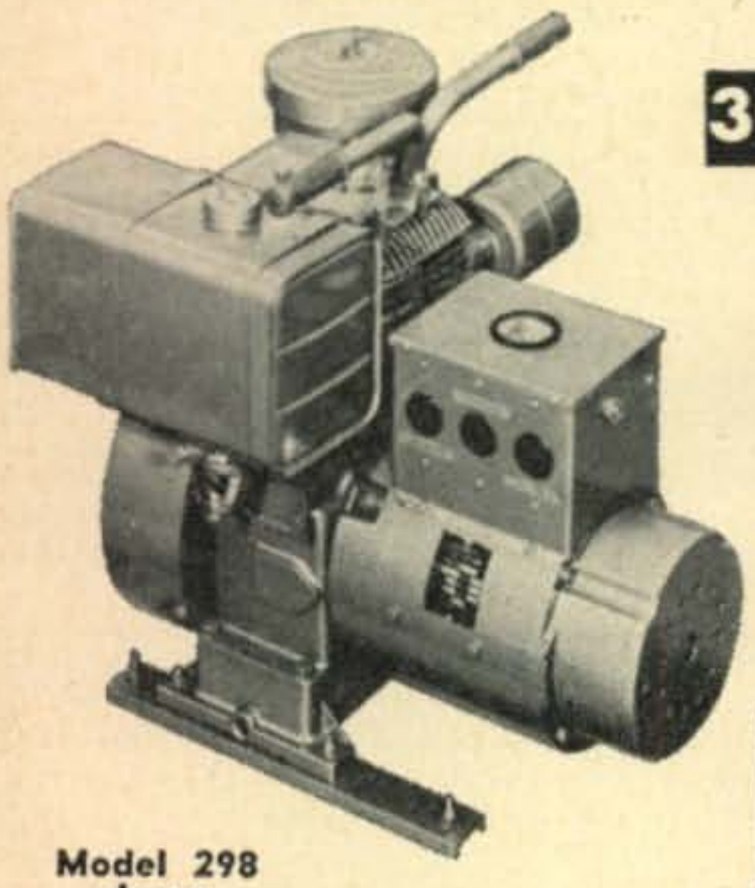
Now in Stock

in RADIO SHACK'S GREAT and EXPANDED Amateur Department

- Deliveries Made Now from our stocks!
- "Easy Pay Plans" —only 10% Down
- Bigger, Better Trades! Ask Al Coe W1RVQ

COLLINS

SALE! POWER PLANTS for field, farm, home!



Model 298 shown

3000 watt Generator with Gas Engine!

$279.95 Model 208

$28 Down, $17 Monthly

- 5¼ HP Briggs and Stratton Ball Bearing Engine
- Generator Directly Connected to Engine (Drip-Proof)
- Extra Large Capacity Fuel Tank — 6 Quarts

Order No.	Model	Starting	Choke	Down	Monthly	Sale!
RMF208	208	Manual	Manual	$28	$17	$279.95
RMF288	288	Push Button	Manual	32	19	319.95
RMF298	298	Push Button	Automatic	34	21	339.95

2000 Watt 4 hp

108

Regular Value $345

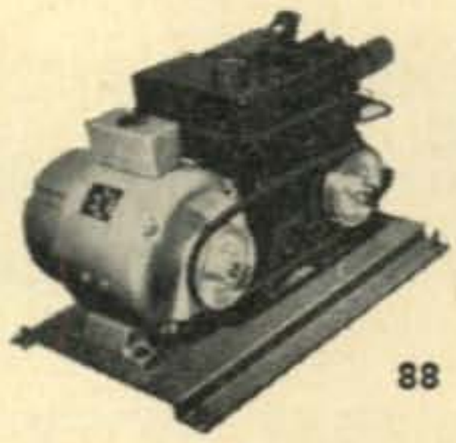
$199.95

$20 Down, $14 Monthly

- Clinton 4½ HP Engine #1200 Ball Bearing
- Voltmeter, Duplex Switch
- 2000 Watt Generator
- Pulley-Belt-Steel Base

Models 108 and 88
115 V.A.C., 60 Cycle
With built-in mechanical governors

1000 Watt 2¼ hp



88

- Briggs and Stratton 2¼ HP Engine #6B
- 1000 Watt Generator
- Pulley-Belt-Steel Base

Reg Value $225

$119.95

$12 Down, $10 Monthly

Save Money! Write for used equipment list!

RADIO SHACK CORPORATION Dept. 2C

730 Commonwealth Avenue, Boston 17, Mass.

Please send me:

Order No.	Model	Watts	Ship. Wt.	Sale
☐ RMF208	208	3000	189 lbs.	$279.95
☐ RMF288	288	3000	187 lbs.	319.95
☐ RMF298	298	3000	185 lbs.	339.95
☐ RMF108	108	2000	135 lbs.	199.95
☐ RMF88	88	1000	105 lbs.	119.95

Name _____

Address _____

City _____ Zone____ State _____

RADIO SHACK CORP.

730 Commonwealth Ave., Boston 17, Mass.
167 Washington St., Boston 8, Mass.
230-234 Crown St., New Haven 10, Conn.

For further information, check number 59 on page 126.

FOR SALE (Cont.)

FOR SALE: Authentic looking PRESS CARDS for sophisticated funsters. Will really make you feel important. Lots of fun and always good for a gag! Better order more than one . . . everyone who sees it will want one. $1.00 ea. 6 for $5.00. (With name filled in, and laminated in lifetime plastic, $1.50, 6 for $7.50.) Send check or M.O. to Fun Art, 676 8th Ave., New York City, N. Y.

SELL: Collins 32V3 serial #1328. Excellent $400.00. Deluxe home brew KW. Conservative components make offer: Olivetti page teleprinter and tape printing reperforator in excellent condition with manuals $240. Call Don, KElligg 1-1579, Deal, New Jersey, after 6:00 p.m.

WANTED

WANTED: TELETYPE TG-7 and Model 15 and parts, printers and reperforators, etc.; COMM'NS REC'V'RS AND XMTRS, e.g. BC-610-E, -I, BC-939A, Collins 51J, 17L3, -4; R-388 and R-390/URR; 18S-2, -3; ARN-14 and -30; APR-9, -10, ARC-21, 27, etc.; APS-31, -33; and TEST EQP'T, with TS- or I- prefix. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., N. Y. 13, N. Y.

WANTED: Skyrider Diversity receiver in new condition. Box 48, CQ Magazine, 300 W. 43rd St., N. Y. 36.

WANTED: Special purpose vacuum tubes: Klystrons, Magnetrons, Power Tubes, Lab Test Equipment: X, S, K bands, Signal generator, Slotted Lines, Aircraft Communication Equipment. I pay top prices fast! REpublic 5-0215. Bob Sanett, 2053 W. Venice Blvd., Los Angeles 6, California.

WANTED: All types of communications receivers, transmitters, test equipment, teletype equipment, factory built amateur gear. Cash or trade for NEW HT-32, Valiant, Thunderbolt, SX-101, NC-303, Fisher HI-FI, etc. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (RIchmond 2-0048) Store: 60 Spring St. Newport, R. I. (VIking 7-3435, Fred, W1JFF)

QSL

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's: Samples, dime. Print Shop, Corwith, Iowa.

CREATIVE QSL AND SWL CARDS. Are you proud of your card? If not, let us print your next order. Write for free booklet and samples. Personal attention given to all requests. Bob Wilkins, Jr., Creative Printing, P.O. Box 1064B, Atascadero, Calif.

SAVE TIME, SAVE MONEY, DX QSL's forwarded 2¢ each after membership. Free flyer, "DX QSL COOP," Box 5938, Kansas City 11, Missouri.

QSL (Contd.)

QSL's—Outstanding—Original—Fast service. Reasonable prices. Samples 10¢. Super quantity 25¢, refundable. VYS QSLs, 1704 Hale Avenue, Ft. Wayne, Indiana.

QSL SAMPLES, Dime, refundable. Roy Gale, Waterford, Conn.

QUALITY QSL's Samples. 10¢. Lee, W5CZA, Box 7171, Oklahoma City, Oklahoma.

QSL's-SWL's: That are different, colored, embossed card stock, and "Kromekote." Samples 10¢. K8AIA, Box 953, Hamilton, Ohio.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢, with catalogue, 25¢.

QSL's??? LARGEST variety samples 25¢ (refunded), CALLBOOKS (winter) $5.00. "Rus" Sakkers, W8DED, Holland, Michigan. (Religious QSL samples 20¢.)

QSL's-SWL's: High quality, reasonable prices. Samples. Bob Teachout, W1FSV, 204 Adams Street, Rutland, Vermont.

QSL's, Glossy samples 10¢. W1TBB Press, 807 Main Street, Winchester, Mass.

QSL's, OM-YL, AM-FM-SSB-CW, VHF-UHF, MARS, CAP, BCL-SWL, BC-SWBC, Samples 10¢. Onondaga Press, Onondaga, Michigan.

YOUR BEST CONTACT (spiritual side of ham's life) Folder free. "Rus" Sakkers, W8DED, Holland, Michigan.

QSL's-SWL's; $2.75 per 100, QSO file cards $1.00 per 100, Samples 10¢. Rusprint, Box 7507, Kansas City 16, Missouri.

MISCELLANEOUS

RADIO MAGAZINES. Buy, sell, trade. Bob Farmer, Plainview, Texas.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with $1 in stamps or cash for each item that you want preserved. 24 hour service. Send to Dept. HW, CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

DECORATE YOUR CAR WINDSHIELD WITH YOUR CALL LETTERS. Attractive 1" letters and numbers available in gold or black. Complete single set 75¢, two sets for $1.25. Include name, call, address and color preference. Money refunded upon return of unused decals if not satisfied. All orders must be prepaid. Send to Box RJ, c/o CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

SOPHISTICATED BOOK JACKETS: These are the most humorous book jackets you'll find on any bookshelf. Laugh provoking titles, on wrap-around book covers will intrigue your enemies and amaze your friends. No two alike. Look "for real" when wrapped around book on the shelf. Some of the titles available are: "How to Modulate your Wife," "Three Band Interlace for the Well Dressed Ham," "Propagation Without Sex," "How to Become a Bigamist," "Sure-Fire Blackmail Techniques," "Popular Hog Calls," and many others. 6 titles on each jacket, 5 sets available, 50¢ ea. All 5 sets for $2.00. Order today. Order for your friends! Order for your enemies!! Order!!! They make wonderful Xmas gifts. Box DF, c/o Cowan Pub. Corp., 300 W. 43 St., N. Y. 36, N. Y.

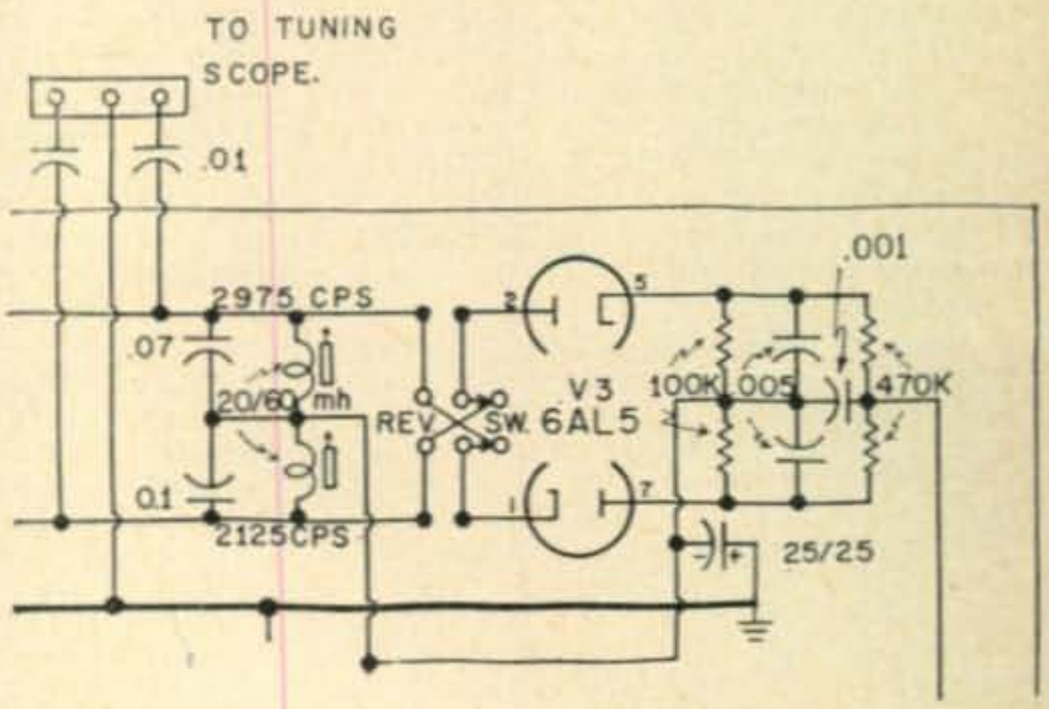
THE WINNER of the gold cup for verified 100th country Two Way SSB QSO with WØCVU is OK1MB and not WK1MB. Sorry for the mistake.

FIFTH ANNUAL Syracuse VHF Roundup, October 10, 1959.

HAM Licenses, resident courses, 3 evenings weekly. Prepare for Novice Class in 4 weeks. General class in 2 months. Delehanty Institute, 117 East 11th St., New York 3, N. Y. GR 3-6900.

Oops We Goofed

Teletype Without Tears, December, 1958. Correction of reversing switch circuit is shown below. (Fig. 1). The transformer is merit 2920, not 2190 as listed.



Patchmaster, December, 1958. The following are component value corrections for fig. 2.

R1-500 k.
R6—equal to the receiver impedance, 2 watts carbon.
R27—should read 2.2 k, not 22 k.

TRITE TRIVIA [*from page 41*]

". . . Hello KILOWATT-FIGURE BLANK-ROMEO-ALPHA-JULIET, this is WHISKEY-FIGURE BLANK - WHISKEY - SODA - HEARTBURN. Come in. Over . . . "

Meet the "Phoney Phonetic Kid." Just because some communicator dreamed up a set of impractical phonetics in the haze of a heavy hang-over, the Kid has to be a *sheep* and jump through the hoop. Same deal as if I had an XYL and caught her wearing a "sack" dress or shoes with cut-out toes. I'd belt her, so help me!

". . . and I've been on the air only three weeks . . . Heh-heh-heh. (Nervous giggle) . . . *Please send my QSL to RFD 1, Box 73 . . ."*

Listen, Junior. Don't you think it a bit brash to tell the man where to send the card, before you even find out if he is willing to QSL with you? Since you requested the QSL, it would seem to be in better taste if you originated the card, hoping your contact feels disposed to reciprocate. And, you don't have to tell him you have only been on the air three weeks—he already knows it.

". . . So that's the story . . . tck, tck . . . (business of sucking teeth and/or smacking lips) . . . *I'll turn it back . . . huff-puff . . . slurp-slurp . . .* (heavy breathing and blasting the mike with sibilants) . . . *to you for the final . . ."*

This character is difficult to describe with a typewriter, but it's about the same as having a drunk corner you on the street, blowing his whiskey breath in your face and splattering you with unwelcome moisture. Oh, Microphone Technique, where art thou?

Of course, I could go on, and on, *ad nauseam*, but after a quick listen in the cw section, and hearing the usual "HPE CUAGN OM 73" and similar tripe, I threw the switch and called it a day.

See you on fifteen some rainy afternoon. ■

Ed. Note:

"We'll let you start the old ball rolling old man, it's getting near time for us to modulate the old mattress . . . etc."

VT KEYING [*from page 40*]

was chosen. A B&W inductor was suspended in an aluminum shield can and "potted" in place with foam plastic. Reduction in Q through the use of this method was so slight as to be negligible and more than worth the added stability, both mechanical and thermal. If commercial potting compounds are not easily obtainable, well washed sand or other inert materials will do nearly as well.

In the event that the system should continue to oscillate under key up conditions, it could be remedied by increasing the capacity at C5. Should the opposite condition be found where

–7 or –8 volts is required in the keying circuit to turn the system on, decreasing the capacity will effect a cure. These conditions are apparent when considering the equation for oscillation:

$$\frac{1}{gm} = \sqrt{Z_G\ Z_P}$$

and that the keying method employed is such that the input impedance of the grounded grid stage shunts Z_P.

Conclusion

A review of this circuit shows that the potential across the key is only 4½ to 7½ volts through a resistance of 200K under key up conditions without the use of a relay! The keying current—on the order of 25 microampers—is so low that local clicks with no filtering at the key were not detectable. A second advantage is the facility of break-in keying. Conventional vacuum tube keyers are usually applied to a class A buffer or class C doubler because they are not easily applied to an oscillator without "chirp" complications. Such a procedure requires rather extensive shielding of the oscillator for break-in operation which, though effective, requires much more effort in construction than the circuit shown. Finally, the grounded grid keyer stage offers excellent isolation of the oscillator from the following stages as well as moderate gain. Here at W6NRW, the acid test is employed. The unit shown is fed into a triode amplifier without neutralization operating at the vfo frequency. No feedback complications have been detected. ■

THIRD HAND [*from page 37*]

erate beautifully at much less than a 2.7 ma differential. These small relays should only be used to control a larger relay, as their contact capabilities are limited.

The use of this little gadget need not be limited to mobile operation. It may be used at a fixed station, the only requirement being a source of 6 v dc. The several weeks that the "third hand" has been in operation has proved its worth, particularly in the car. But since it was "borrowed" from the car last weekend and used with the big rig during a recent contest, another one is being constructed for mobile use. When the vox unit was still in the breadboard stage, my young harmonic, not yet three, found that by talking, shouting, clapping hands, and making other noises, he could turn on lights, ring bells, or activate whatever was connected to the relay at the time. As can be imagined plenty of hand-clapping, shouting, and other racket was in order with a great deal of one-sided enjoyment on his part. As a result an idea was born for a small voice-activated toy using the transistorized relay. ■

DIALS [*from page 36*]

receivers, varying the frequency until it is heard on the calibrated receiver. Then tune the signal in sharply on the new receiver.

Make a light mark through the proper hole at each frequency when you have both receivers tuned to the same signal. A sharpened, light blue colored pencil should be used because light blue will not photograph with normal processes.

Proceed across the half circles for each band. When through, switch the receivers from band to band and double check random frequencies to be sure you get no variations from band-changing. Minor variations can be corrected later by readjusting the oscillator. Only when everything appears satisfactory should the work dial be removed from the new receiver.

Get It Ready For Photography

With a fine-tipped pen and India ink, neatly draw in the frequency markings on the work dial. There are several ways to put neat, small numbers on your work dial. Most can be found in your own home or place of work, or can be purchased from an offset printing house supplier. Recommended is *ARTYPE* in the ¼ or ⅛ inch letter size for $1 per sheet, offering enough numbers and letters to keep you in dials for a long time. Hand lettering can be done if your brand of lettering suits you.

Send the neat, clean work dial to a commercial photographer, or do the job yourself if you have knowledge of procedures and have access to equipment. In either case, the general steps involved will be described here so that you can instruct the photographer or do it yourself. Photographers' fees vary, but may cost you about $4 for this type of work.

Measure the exact size you want the dial in its final form. Tell the photographer what shape and size of dial you want. If done yourself, keep in mind any changes in size to be made between the work dial and the final print.

The work dial is photographed and a negative produced. The use of ground glass will aid sharp focusing. This negative should be viewed over a light source and all unwanted light spots on the negative covered with opaquing fluid. Otherwise, these light spots may show up in the final dial print.

If black markings on a white background are desired, a regular print of this negative is made to the exact size wanted.

If the more professional-looking white markings on a black field are desired, a print of the negative is made on transparent photographic paper, obtainable commercially. Then, to the same size, a print is made of these black markings on the transparent paper, producing

your white on black final print of the dial seen in fig. 1.

Carefully trim the edges of the dial print to the proper size and shape, including the hole for the condenser shaft, so it can be placed on the receiver. Mount it the same way the work dial was attached, as described previously.

Check that the etched line on the pointer aligns with all three guide lines and that the calibration of the comparison receiver and yours is identical on random frequencies. Serious variations may mean you will have to carefully peel off the dial and try mounting it again.

A sheet of ⅛ inch thick plastic may be put over the dial for protection. Permanently fasten it to the receiver with a frame and screws as shown in fig. 1, to add a final touch to the job.

Now aren't you glad you have a professional-looking dial? Somehow the rig just seems to work better with a pleasing, accurate dial on its face. ■

BEGINNING [*from page 32*]

ten, and complete Navy plans called for equipping another sixty-eight of their fighting crafts.

The National Electric Signalling Company abandoned its experimental station in the Chesapeake Bay area in 1905. They constructed a new station with a radical antenna design at Brant Rock, Massachusetts. A great metal tube insulated from ground extended skyward supported by a group of insulated guy wires. On December 11th phenomenal results occurred when this spark station "fired" up. The Navy station at San Juan, Puerto Rico, reported hearing the signals loud and clear.

At Machrihanish, Scotland a station similar to Brant Rock's was built. On New Year's Day, 1906, Brant Rock exchanged wireless signals with this Scottish station. Reception was excellent for three days. Suddenly communication ceased. For weeks messages failed to reach the British Isles though signals were sensational on this side of the Atlantic. This condition brought about studies of atmospheric effects.

Testing of Alexanderson's alternator occurred on Christmas Eve of 1906. This mechanical marvel produced 50,000 cycle oscillations. Tests taking place at Brant Rock, Mass., that night projected the human voice over hundreds of miles. This wireless telephony effort reached many ships at sea. They heard demonstrations of speaking, singing and musical solos.

The Brant Rock Christmas Eve broadcast stirred other interests than commercial listeners. The voice and music program startled a father-and-son amateur couple as it suddenly spilled from their headsets. Records exist today showing they received the Brant Rock program. *It is possible they were the first amateurs to receive fone.*

To be continued

Advertising Index

READER SERVICE

CQ Magazine, Dept. RS
300 West 43rd Street
New York 36, New York

Reader Service Coupon B
Void after Feb. 25, 1959

Please send me information on your ads in the February 1959 CQ keyed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66									

A B C D
H U X

Name _____ Call _____ Engineer ☐
(Please Print)

Address _____ Type of work (specify) _____

City _____ Zone _____ State _____

"TAB" THAT'S A BUY

since 1945 custom service!

"TAB" for NEW TRANSISTORS!

2N38	$.98	2N255	$1.30	2N441	$3.00
2N155	3.25	2N256	1.45	2N234A	1.36
2N156	4.45	2N277	4.50	CK721	2.35
2N180	3.65	2N362	1.31	CK722	.95
2N554	1.28	2N363	1.15	CK768	1.49

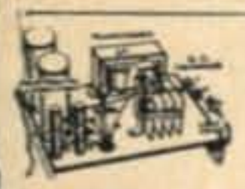
Postpaid 48 States Orders $10

New Transitron Zener Diode 1N474 Double Anode Silicon Junction Diodes Zener Range 5.2 to 6.4 V @ 200 Mw Excellent for Speech Clipping C/CQ/1/59/pg74
Regular $8; "TAB" Special $4 ea, 3/$10

WE BUY! SELL & TRADE
Send 25¢ for Bonus Catalog!

NEW BATTERY CHARGER!!! FOR 2V OR 4V OR 6V OR 12 VOLT BATTERIES, TRICKLE & FULL CHARGE 1 to 4 AMP KIT OR BUILT

Charges 2-4-6 & 12 volt batteries.
Kit BCK-1 ..... $11.00
Built $12.75



NEW DC POWER FOR TRANSISTORS!!
New low-cost 25 volt one amp filtered 1% ripple power supply. Same as specified in Transistor Manuals G.E., RCA. Ideal for powering transistor circuits. Rugged and small in size! Pre-assembled kit U-build B25V1ACK **$10**, or assembled B25V1AC **$12**.

TRANSFORMERS all 115V/60cy/1Ø

6V @ 8A, 5V @ 3A & 1200VCT@200ma $5
TPF/540VCT @ 30ma/6.3V @ 2A $2
TPF61/500VCT @ 70ma & 6.3V @ 4A $3
TPF62/550VCT @ 250ma & 6.3VCT @ 2.5A & 12.6V @ 3.5A, & 5V @ 2A $5
TF02/2.5VCT @ 10A/5KV $4
TR400R/2x16V @ 1A ea. $3.45
TF05/7.5VCT/12A/15KV KENYON $9
TF27 is 10VCT/5A or 220V Pri 20V @ 5A Kenyon H'sld ..... Special **$4.95, 2 for $9**
TPX is 4760 VCT @ 300 ma $16.95

FILTER & SWINGING CHOKES

CH1029 CHOKE 8 Hy @ 750ma $12
CH1030 CHOKE 6 Hy @ 1.25A $18
CH1031 CHOKE 0.6 Hy @ 3.2A $10
CH1034 CHOKE 5 Hy @ 500ma $6
CHOKE 8 Hy @ 150ma $2
UTC/CG40/10 Hy @ 200ma **$3 @ 2/$5**
CTC/RS8150/8 Hy @ 150ma/80Ω $3
CTC/RS8250/8 Hy @ 250ma/90Ω $5
CTC/RS8105/8 Hy @ 105ma/100Ω $2
STAN/C2700/2-12 Hy @ 200ma/80Ω $6
STAN/C2701/3-12 Hy @ 350ma/80Ω $10
KEN/T509/7-22 Hy @ 200ma/140Ω $8
KEN/T510/6-19 Hy @ 300ma/125Ω $9
CH1011 RCA/10 Hy @ 150ma **$2 @, 3/$5**
CH1003 UTC/10 Hy @ 125ma ..... @ $2

"IRISH" HI-FI RECORDING TAPE!
1200 Ft.—7" Reel **$1.45 @** *Lots of 12*
Money Back Gtd!
7" REEL, 1200 FOOT Highest Quality Precision Coated & slit. **FERRO-SHEEN** processed constant output, Noise Free. **Freq. 7½ IPS 40-15 KC Oxide Wnd. In. @ $1.69 ea. 3 for $5, postage 15¢ each.**

NEW SELENIUM Full Wave Bridge

DC AMP	18VAC 14VDC	36VAC 28VDC	72VAC 54VDC	130VAC 100VDC
½	$1.00	$1.90	$3.85	$5.00
1	1.30	2.00	4.90	8.15
2	2.15	3.00	6.25	11.10
3	2.90	4.00	8.60	13.45
6	4.15	8.00	18.75	31.90
10	6.10	12.15	26.30	41.60
12	7.75	14.90	30.95	43.45
20	12.85	24.60	49.90	76.75
24	15.00	29.45	57.50	81.15

New "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/winding $4.50
TR4002 @ 2 Amp† ea/sec/winding 6.90
TR4003 @ 5 Amp† ea/sec/winding 8.65
TR4005 @ 12 Amp† ea/sec/wnds 16.70
TR4006 @ 24 Amp† ea/sec/wnds 35.30
TR4007 @ 50 Amp†* ea/sec/wnds 57.45
†Wndgs in Series at Ratings shown: Parallel 2X Current. Voltage output. 0-9-15-18

GTD. RECTIFIERS 130V/RMS
HALF-WAVE
75Ma 49c, 5 for $2; 100Ma 59c, 6 for $3
150Ma 70c, 8 for $5; 250Ma 79c, 6 for $4
300Ma 88c, 5 for $4; 350Ma $1.00, 8 for $7
400Ma $1.10, 5 for $5; 500Ma $1.35, 5 for $5
Postpaid 48 states orders $10.

New Silicon 500ma./ 280V RMS/400 P.I.V. 100°C Hmt Sealed $1.50@, 4 for $5.40, 20 for $25

Tubes Wanted

0A2	.70	6BZ7	1.25	*We Buy & Sell*	
0A3	.85	6C4	.49	43	.75
0B2	.65	6C5	.69	45	.49
0C3	.70	6C6	1.08	50L6	.69
0D3	.70	6C8	1.08	RK59	1.39
0Z4	.60	*We Trade!*		RK60	1.17
1A7	.90	6CB6	.80	HY69	2.20
1B3	.78	6CD6	1.49	75	.81
1L4	.82	6CF6	.85	HY75	5.00
1R4	5/$1	6CL6	1.40	83	.95

We Swap Tubes! What Do/U Have?

1R5	.78	6CG7	.89	4PR60A	37.50
1S4	.78	6CG8	1.12	4-125A	27.50
1S5	.68	6CM6	.79	4X150A	2/$14
1T4	.85	6CS6	.70	4X250B	41.00
1T5	.95	6CU6	1.29	4-400A	41.75
1U4	6/$1	6D6	.99	4E27A	39.00
1U5	.75	6E5	.79	250TL	19.45
1X2	.75	6F4	2.49	307A	2/$1
2C39A	9.00	6F5	.63	316A	5/$1
2C40	5.50	6F6	.99	VR92	5/$1

Send 25¢ for Catalog!

2C43	7.00	6F7	.99	350A	2.45
2C51	2.00	6F8	1.39	350B	1.75
2D21	.68	6H6	.59	368A	4.59
2E22	1.75	6J4	1.72	371B	.95
2E24	2.00	6J5	.59	5146	3.90
2E25	3.25	6J6	.59	446A	2/$1
2E26	2.75	6J7	.99	450TH	43.50
2E30	1.70	6J8	1.39	450TL	43.50
2E35	1.60	6K6	.59	460	11.50
2K25	15.00	6K7	.79	701A	3.95

Wanted Receivers and XMTRS

2K26	39.00	6K8	.99	703A	1.00
2K28	30.00	6L6	1.19	707B	3.50
2V3	2/$1	6SN7	.72	715C	10.90
2X2	.48	6T8	.98	717A	5/$1
3A4	.70	6V6GT	.90	723AB	8.00
3A5	1.00	6X5	.49	725A	2.75
3API	3.95	12AT6	.59	801A	5/$1
3BPI	1.90	12AT7	.89	803	2.00
3C24	3.75	12AU6	.63	804	8.85
3D23	4.50	12AU7	.69	805	4.75

We Buy! *We Sell!* *We Trade!*

3E29	7.00	12AX7	.79	807	1.25
3Q4	.68	12AY7	1.29	808	.85
3Q5	.86	12B4	.95	810	12.75
4-65A	17.50	12BA6	.65	811	2.70
4-125	30.00	12BA7	.99	811A	3.30
4-250	34.00	12BD6	.59	812	3.30
4X150A	7.50	12BE6	.59	813	8.00
4X250	36.00	12BH6	.79	814	2.35
4X500	37.00	12BH7	.99	815	3.15
5API	2.95	12BY7	1.00	826	2/$1

Wanted Test Sets and Equipment

5BPI	5.00	12BZ7	.99	828	9.00
5BP4	5.00	12H6	.75	829B	8.00
5CPI	2.95	12J5	.69	832A	7.00
5CP7	9.00	12J7	.69	833A	36.00
5R4	1.00	12J8	1.35	837	2/$2
5T4	1.25	12K8	.89	866A	1.50
5U4	.59	12SA7	.69	954	10/$1
5V4	.89	12SC7	.89	955	3/$1
5Y3	.65	12SF5	.69	957	3/$1
5Z3	.89	12SG7	.89	958A	2/$1

Send 25¢ for Catalog!

15GP22	89.00	12SH7	.89	991	5/$1
6A7	1.00	12SJ7	.75	1614	2.00
6A8	.99	12SK7	.75	1619	5/$1
6AB4	.59	12SL7	.79	1620	2.00
6AC7	.79	12SN7	.69	1625	4/$1
6AG5	.69	12SQ7	.69	1626	5/$1
6AG7	.97	12SR7	.69	1629	4/$1
6AK5	.69	15E	1.19	2050	1.25
6AL5	.59	15R	4/$1	5517	1.25
6AQ5	.66	FG17	3.49	5608	3.95

Top $$$ Paid for 304TL tubes

6AR6	1.95	19T8	1.16	5618	3.25
6AS7	3.49	24G	3.75	5651	1.35
6AT6	2/$1	25A6	1.19	5654	1.20
6AU6	.79	25A7	2.19	5656	4.25
6B8	1.35	25C5	.81	5663	1.15
6BA6	.59	25L6	.72	5670	1.00
6BE6	.59	25T	4.00	5686	1.75
6BG6	1.49	25Z5	.72	5687	2.25
6BH6	.79	25Z6	.75	5691	4.70
6BJ6	.72	26A7	3.69	5725	1.95

Top $$$ Paid for XMTTR Tubes!

6BK7	.99	FG27	8.28	5732	2.00
6BL7	1.95	HV27	19.39	5736	85.00
6BN4	.69	28D7	.89	5749	1.95
6BN6	1.08	FG33	15.00	5750	2.75
6BN7	1.99	EL34	3.49	5751	1.25
6BQ6	1.19	35A5	.69	5814	1.20
6BQ7	.99	35L6	.59	5879	1.20
6BX7	1.11	35T	4.49	5894	$12.00
6BY5	1.19	35Z5	.89		
6BZ6	.91	RK39	2.99	No See—Write!	

"TAB" TERMS: Min Order $3—25% with order F.O.B. New York. Ten day guarantee, price of mdse. only.
Prices shown are subject to change.
111CB Liberty St., N.Y. 6, N.Y., RE 2-6245

"TAB" THE BEST KITS!

Kit 5 Mycalex Glass/HF Strips
Kit 35 Precision Resistors
Kit 10 Switches
Kit 75 Resistors ½/1/2W
Kit 150 Carbon Resistors
Kit 25 Panel Lamps
Kit 12 Electrolytic Cond's
Kit 15 Volume Controls
Kit 56 Tube Sockets
Kit 65 Tubular Condensers
Kit 500 Lugs & Eyelets
Kit 10 Bathtub Oil Cond's
Kit 5 lbs. Surprise Package
Kit 10 Transmit Mica Cond's
Kit Glyptal & Cement
Kit 3 Phone/Patch Xfmrs
Kit 3 Searchlights
Kit 4 AN/Reflector Lites
Kit 6 Insltd Tuning Tools
Kit 6 AN Plugs & cnnctrs
Kit 5 Asstd Screw Drivers

KITS! *Each "TAB" Kit Contains The Finest Selection!!!!*

Kit 5 Sub-Min Tubes
Kit 40 Standoff Insulators
Kit 35 Power Resistors
Kit 75 Mica Condensers
Kit 5 Crystal Diodes
Kit 200ft Hook Up Wire. 4 Rolls, 50ft/ea. Asstd. Color
Kit 100 Fuses, assorted types
Kit 100 Ceramic Condensers
Kit 50 Coil Forms
Kit 65 Inductors & Coils
Kit 5 Microswitches
Kit 10 Wheat Lamps
Kit 3 Transistor Xtmrs
Kit 8 Xtal Osc-Blanks
Kit 4 Asstd Rectifiers
Kit 12 Alligator Clips Astd
Kit 5 UG/Connectors
Kit 100 Self/Tap Screws
Kit Adj Wirt Striper & Cut

Kit 2 Bakelite Panels 6x12"
Kit 5 pcs Wrench Set
Kit 8 pcs Nut Driver Set
Kit Hi Gain Xtal Mike
Kit 5 Jeweler Screwdrivers
Kit 6 ea Phonoplugs & Jacks
Kit Silver Conduct Paint
Kit 6 Multi-Color Ball Pens
Kit 25 ft Lo-Cap Mike Cable
Kit 18' Lo-Cap 2 Cond M-Cable
Kit 20 ft RG59U Coax Cable
Kit 15 ft RG11U Coax Cable
Kit 2 pair SO239 & PL59
Kit 12 Binding Posts Asstd
Kit 5 Phone Jacks Asstd
Kit 3 Phone Plugs Asstd
Kit Long Nose Plier
Kit Side Cutter Plier
Kit 2 Xmttr Variables
Kit 5 of 2mfd @ 600wvdc/oil

Order Ten Kits We Ship Eleven!!!
ONE EACH ABOVE KIT ONLY **99c**

NEW TRANSISTORIZED "TABSTAT" KIT OR BUILT! HI-EFFICIENCY DC TO DC 12VDC TO 450VDC CONTINUOUS DUTY POWER SUPPLY!!!!

Output 450&TAP 250VDC **at up to** 150MA/Up to 70 **Watts** 80% efficiency; ripple 0.2%; low idle current 1amp silicon rectifiers, oil condensers, toroid transf, fused & short circuit proof. Regulation 5% at 20 to 100% load!! **Small in size! Quiet! Light wgt! Lo-priced gtd** "TABSTAT" TR1245CB built $35, **Pre-Assembled U-Build** kit TR1245CK **Only** $30.

"TAB"—*THAT'S A BUY!*—BARGAINS!!

BC696/3 to 4 mc's good condition $5.95
AN-ARR2/RCVR as is/good parts $1.59
RDZ/USN 200-400 Mcs Rcvrs As Is $25
RAX/MPN rcvr covers 4 bands 1.5 to 9 mc's 8 tubes has BFO superhet, Vernier Band Spread $24.00
60Mc's/IF-Strip $5.00
866A/2 Combo & Fil XFMR/7.5KV Ins 5.98

Xmtting Mica's .006 @ 2500V. 5 for $1.00
Relay 4PDT/3Acts/12 to 24VDC $1@, 6/$5
Hvy Dty 115V/60Cy Selsyns. 2 for $9.00
Miller 2.5MH/2.5&5Mtr Chokes ..... 8/$1.00
Vibrators 6 or 12VDC $1.49@; 4/ $5.00

Blower 24VDC/100CFM $2.98
Blower AC/Miniature 6&12VAC $1.00
Co-Ax Cnnctrs PL259A/SO239/40c ea. 6/$2
AN Voltmeter 0-30VDC $2.49@, 3 for $6.00

RF-MTR GE/475 Ma & 5 Amp $4@, 2/$7
DC-METER Dejur 800 Ma/3½" $3@, 2/$5
DC-METER One Ma/4" Rect $5@, 2/$8
RF-MTR Weston 750Ma ..... $4@, 2/$6
DC MTR 100Ma/2½" ..... $3@, 2/$5

5" USN-MUMETAL Scope Shield ..... $ 4.00
New Variacs/or equiv 0-135V/30A $41.65
New Variacs/or equiv 0-135V/7.5A $15.30
New Variacs/or equiv 0-135V/3 Amp $10.65
New Variacs/or equiv 0-132V/1.25A $7.25
BC312 less cabinet used good cdtn $60
BC779 Super-Pro—used less cabinet $75
ART13—Used Good Cond $59
TS34AP—W.E. scope used G/ctdn $69
G.E./YRS-1 Side Band Selector $45
829B Socket 85¢. 2/$1.50. 813 Socket $1
4x150 Socket 120-109 Johnson Air $3.75
4x150 Ceramic/LOKTAL ..... 2 for $1.00
CARDWELL Dual 110 mmfd or 220mfd/¼" gap $5
CARDWELL Dual 50mmfd or 100mmfd/.171 gap $4

Wanted 304TL Tubes & ALL TYPES!!!

For further information, check number 64 on page 126.

National News Dial

Published periodically by the **NATIONAL CO. INC., MALDEN 48, MASS.**

NEW NATIONAL NC-303 OVERNIGHT SUCCESS!

NATIONAL CO. DISTRIBUTORS OFFER FREE $17.50 SPEAKER WITH NC-109 OR NC-188 RECEIVER!

For a limited time only, most National Co. distributors offer an opportunity to buy now and save $17.50 on the purchase of either the NC-109 or NC-188 receivers. You get the receiver PLUS speaker . . . BOTH FOR THE PRICE OF THE RECEIVER ALONE! See your National Co. distributor now and save.

NC-109 covers 540 kc to 40 mc in 4 bands. Calibrated bandspread for 10-80 meter amateur bands. Exclusive "MICRO-TOME" filter provides 5 degrees of super-sharp selectivity. Sensitivity: 1-2 microvolts with 10 db signal/noise ratio. Separate high frequency oscillator with temperature compensated ceramic coil forms reduces drift to .01% or less. Separate product detector for SSB makes the NC-109 America's lowest priced SSB receiver.

NC-188 covers 540 kc to 40 mc. Directly calibrated for 4 general coverage ranges and 5 bandspread ranges for 10-80 meter bands. Has RF amplifier stage, two IF stages and two audio stages. Has tone control, antenna trimmer, S-meter, separate RF and AF gain controls, automatic noise limiter. Has temperature compensated and ventilated high frequency oscillator for increased stability.

Hams Throughout America Enthusiastic in Praise of New DeLuxe Receiver

Hams around-the-world have demonstrated their acceptance of the NC-303 since its recent introduction. Exceptional sales volume is being reported by National Company distributors. And as hams get on the air with their new NC-303's, interest continues to mount.

The NC-303 is a super-deluxe "ham band" receiver offering several exciting new features: Front panel SSB selector with exclusive, new "IF SHIFT" for instant choice of sideband . . . eliminates retuning or detuning. 5-position IF selector offers choice of sharp, SSB-1, SSB-2, medium and broad selectivity. New tone switch provides attenuation of highs, lows, or both for maximum readability.

New dual noise limiters . . . separate automatic noise limiter for AM, separate double-ended manual limiter for CW and SSB. New "Q" Multiplier with 60 db deep rejection notch, may be tuned continuously across the entire passband, has separate notch frequency and notch depth controls. New 40-1 tuning dial with logging scale, plus new fine tuning vernier dial drive for super precision CW and SSB tuning.

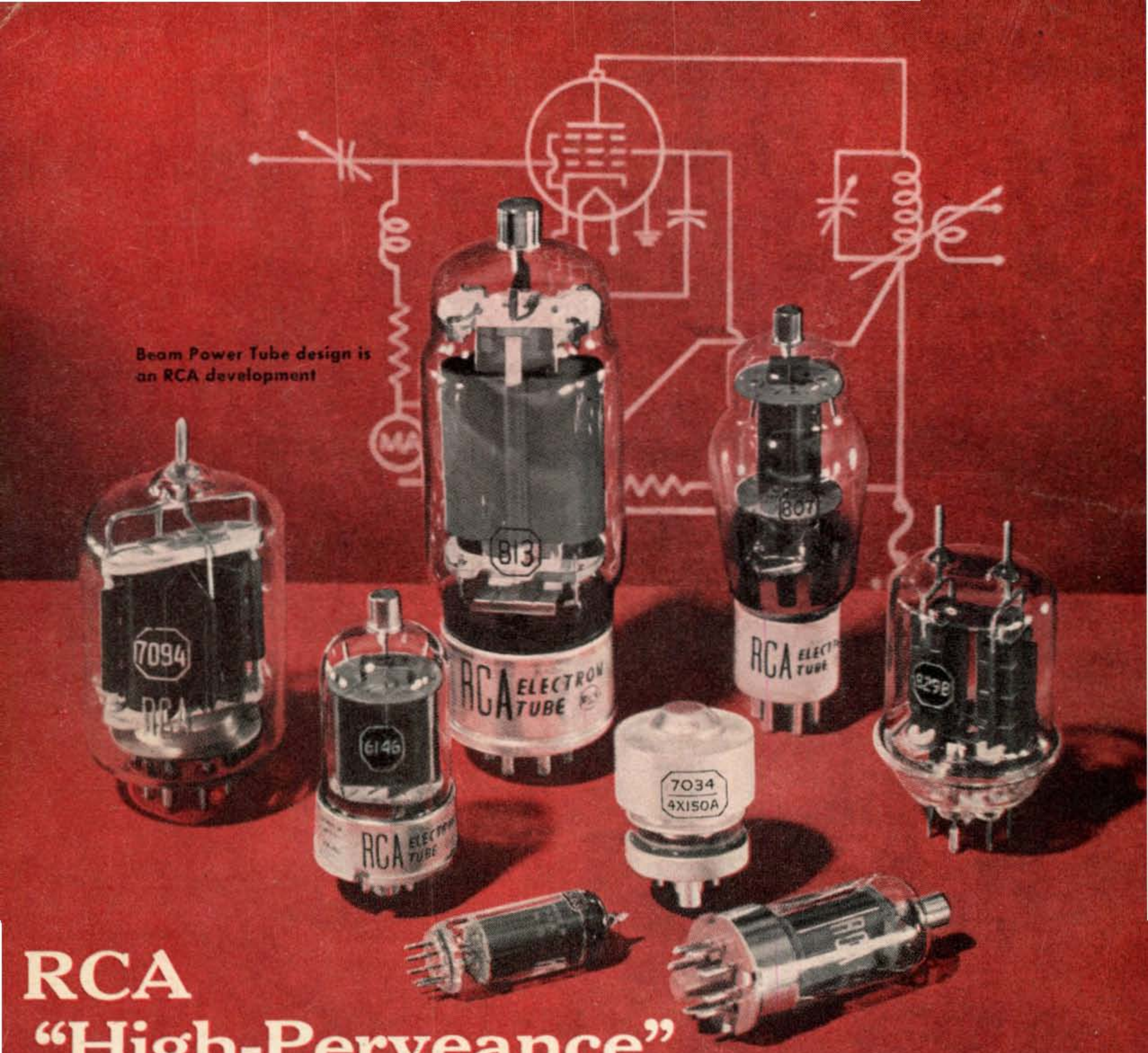
Exclusive new WWV converter provision . . . no interference with dial calibration or frequency coverage . . . accessory calibrator provides one microvolt sensitivity on 10 mc WWV. New "fast attack—slow release" AGC. Crystal controlled 2nd converter oscillator provides excellent inherent stability from cold start. Sensitivity less than 1.0 microvolts. 10 dial scales cover all amateur bands . . . exclusive converter provision for 6, 2, and 1¼ meters.

These are only a few of the many features. See your National Co. Distributor, or write for full specifications. Suggested list price $449.00.

For further information, check number 2 on page 126.

NC-109 PLUS NTS-1 SPEAKER Regularly $217.45
NOW ONLY $19.95 DOWN full suggested cash price $199.95

NC-188 PLUS NTS-1 SPEAKER Regularly $177.45
NOW ONLY $15.95 DOWN full suggested cash price $159.95



RCA "High-Perveance" Beam Power Tubes

...for the best transmitter designs

With power gains ranging up to 100 to 1 or more, it's remarkable how little grid power is required to drive an RCA beam power tube to full input. In most amateur transmitter designs, receiving tubes do it easily. That means your transmitter requires smaller, less expensive drivers...fewer stages...fewer components...fewer tuning controls...simplified bandswitching circuitry.

And that's not all! High-perveance design—an RCA development—makes it practical to get the power you want at lower plate voltage. This means that your transmitter design can get along with lower voltage-rated tank-circuit components...lower rated high-voltage plate transformers and filter capacitors...and more reasonable values of pi-network components.

So design that next rf power amplifier or modulator around RCA High-Perveance Beam Power Tubes—and get more watts for your "transmitter dollar". Your RCA Industrial Tube Distributor handles the complete line. He also has the RCA Transmitting Tube Manual TT4. Get your copy today.

Typical RCA High-Perveance Beam Power Tubes*

RCA Type No.	Max. DC Plate Input (watts)	Max. DC Plate Volts	Max. Freq. at Max. Ratings (Mc)
2E26	40	600	125
807	75	750	60
813	500	2250	30
829-B	120†	750	200
5763	17	350	50
6146	90	750	60
7034/ 4X150A	500	2000	150
7094	500	1500	60

* Maximum Amateur Ratings, Class C CW
†Twin-Unit Tube. Total for tube

RCA

RADIO CORPORATION OF AMERICA

Electron Tube Division **Harrison, N. J.**