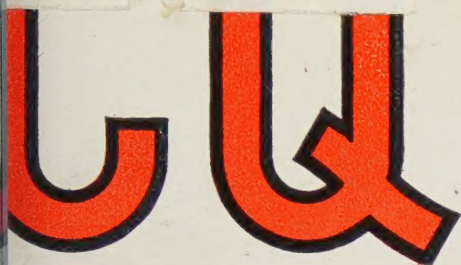


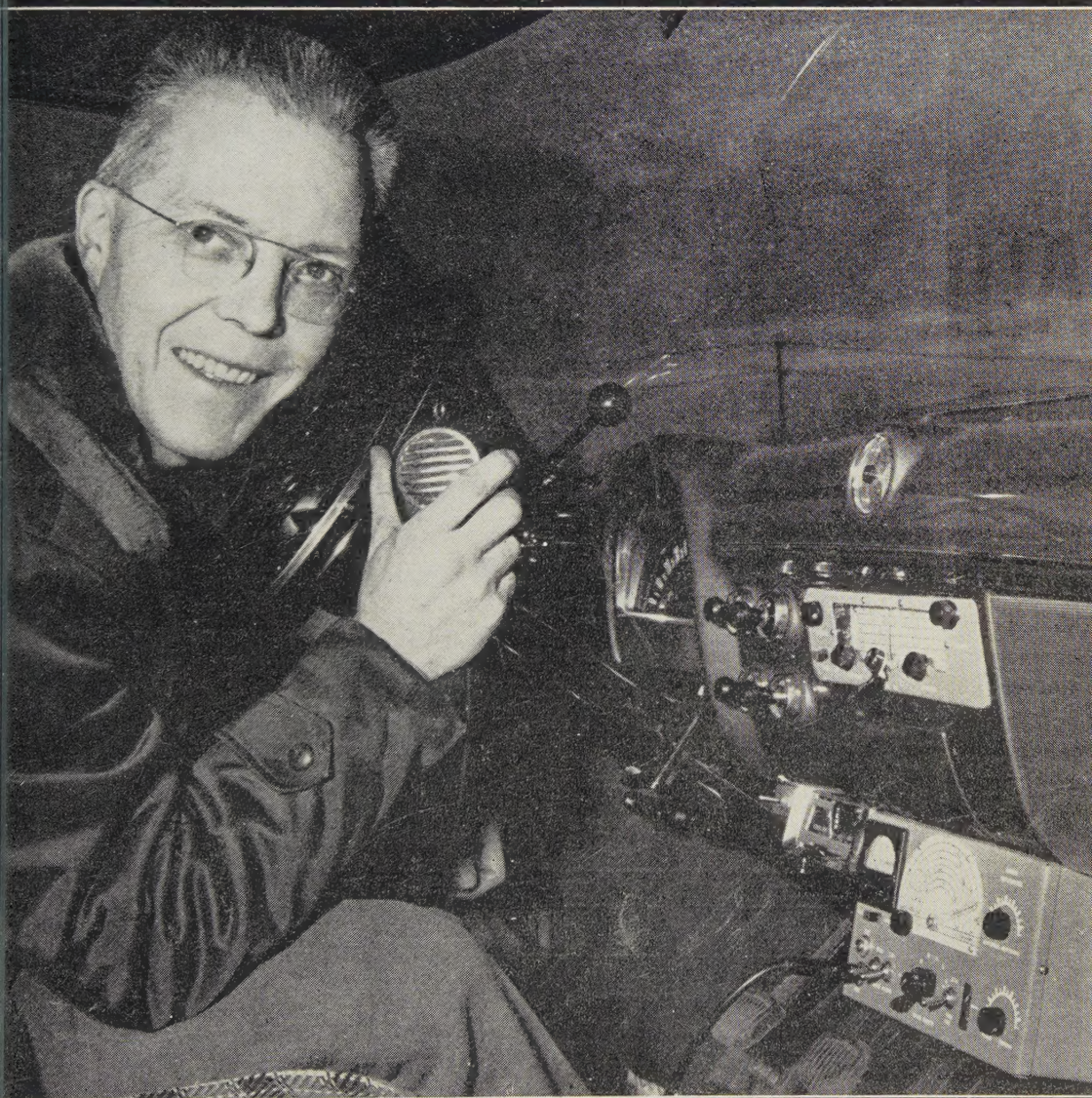
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RADIO AMATEURS' JOURNAL



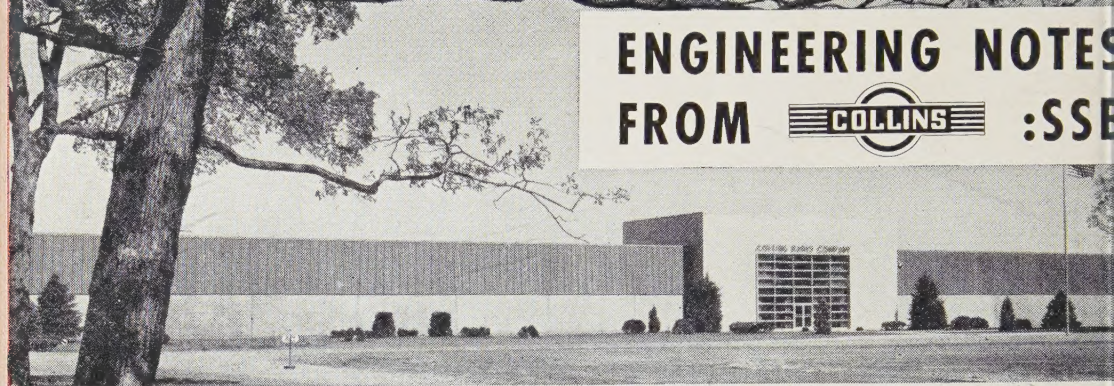
In This Issue =

The "Six Bander" Mobile . .

Put Your Viking on SSB . . 60 Watt VFO XMTR . .

"Powder Puff" Derby . . VK1EG Photo Story

ENGINEERING NOTES FROM :SSB



The impact of single sideband is now being felt all over the world. It has opened up an entirely new field for the phone operator and, at the same time, has offered the promise of relieving, to a considerable extent, the highly congested phone bands. SSB presents many advantages over existing systems that just cannot be obtained by any other means. Most of these advantages have been discussed at length in the literature but because of their importance, we would like to repeat some of them here for emphasis. The principle advantages are, of course, the narrower bandwidth required for a voice communications channel and the effective power gain. The amount of improvement achieved by these advantages depends on many factors. Some of these factors are: (1) the actual "talking" power used in the systems being compared, (2) the propagation characteristics over the communications path, (3) the bandwidths of the systems being compared, to mention only a few. Because of these varying conditions, there is no single number that can be used to indicate the relative advantage of single sideband over amplitude modulation (AM). It can be shown that the relative advantage will vary between approximately 3 and 12 db depending upon the conditions under which they are compared. The advantages, however, are real and can be utilized to provide more effective phone communications in the crowded amateur bands.

While much has been said about SSB and its advantages, little has been said about the actual performance characteristics of the SSB communications circuit. Just what performance is obtainable and what are the limiting factors? The characteristics with which we are most concerned are the transmitted bandwidth, distortion and spurious radiations.

A "filter" type SSB exciter using the mechanical filter automatically limits the bandwidth of the transmitted signal without any additional filtering, and permits maximum use of our available frequencies. An audio bandpass filter would be required in a "phasing" SSB exciter to assure limiting the transmitted bandwidth to the same extent. Unless this is done, the higher audio frequencies will be transmitted and will cause interference in adjacent channels. Practice has shown that a transmitted bandwidth of

approximately 3500 cps is satisfactory for communications circuits. Anything greater than this just more of our spectrum and produces little or no additional intelligibility.

Distortion is generally associated with the operating conditions of linear amplifiers. To maintain good linearity, of course, it is necessary to use proper operating voltages and to limit the plate voltage swing to the linear portion of the grid voltage-current curve. You simply cannot "soup-up" an amplifier or drive it harder to get more output, cause the distortion will increase rapidly as you approach the non-linear portions of the E_g-I_p characteristic curve. When discussing power output must include distortion to properly define our performance characteristics. It is essential that we do not overdrive linear stages and produce excessive distortion. Under proper conditions, it is possible to reduce the 3rd order distortion products down as much as 35 to 40 db. If we overdrive stages in an attempt to "get the most out" the 3rd order distortion products may be down only as little as 6 to 10 db. This amount of distortion will cause considerable adjacent channel interference. Perhaps we should consider our maximum distortion level to be at least 25 db below the desired signal.

In producing SSB signals, it is necessary to use frequency mixing systems to get to the desired output frequency. Considerable care must be used in choosing the correct frequencies for mixing in order to avoid generating undesirable spurious signals. Considerable filtering (numerous hi-Q tuned circuits) is required to reduce the level of the spurious signals generated in frequency mixers. Frequency mixing systems should not be used having lower than 3rd order mixer products. Enough filtering should be used to keep the spurious responses (mixer products) at least 60 db down. This may mean as many as 3 or 4 tuned circuits with Q's of between 75 and 100.

A well-designed "filter" type SSB exciter, using the 455C-31 mechanical filter, will provide these advantages and will give the amateur the full improvement to be expected from a single sideband communications circuit.

COLLINS RADIO COMPANY • Cedar Rapids, Iowa

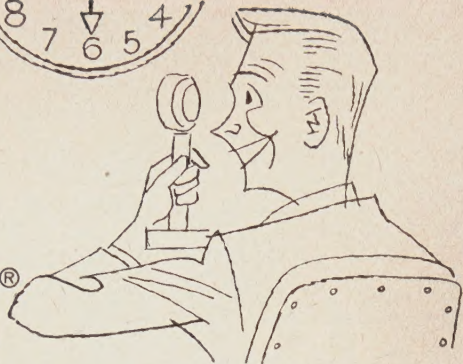
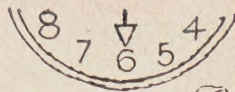
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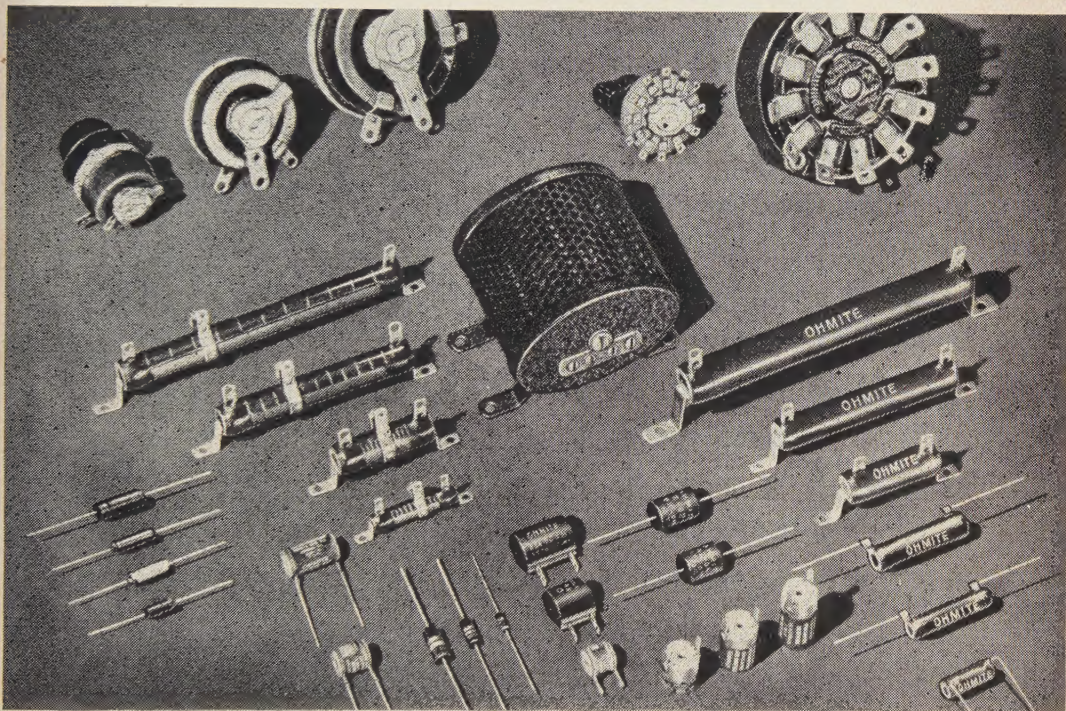
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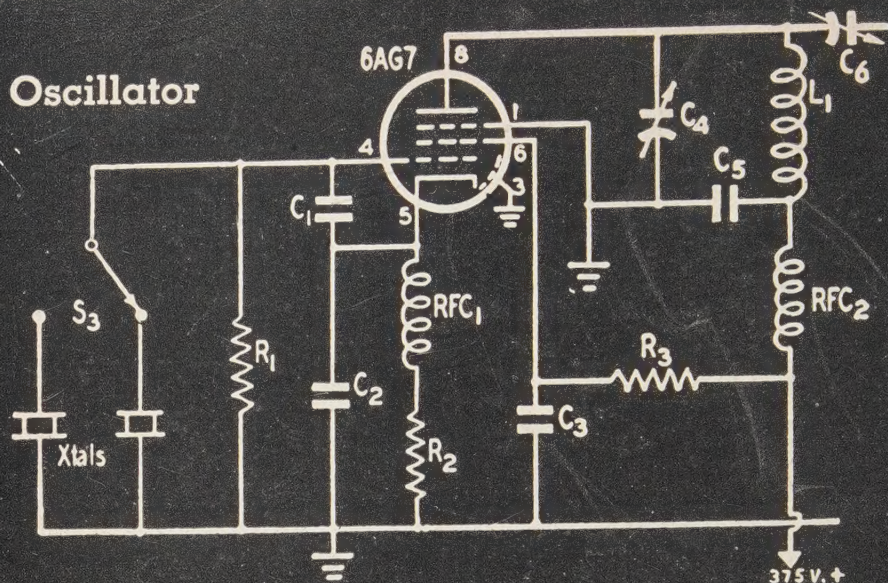


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C3—0.002 ufd. mica

C4—100 ufd. variable

C5—500 ufd. mica

C6—7 to 35 ufd. variable

R1—68,000 ohms, ½ watt

R2—500 ohms, 1 watt

R3—47,000 ohms, 1 watt

RFC1, 2—2.5 mh choke

S3—S.p.d.t. snap switch

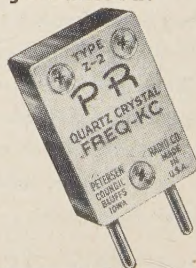
L1—(see text below)

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al copies of the circuit may be obtained from your PR Jobber, or directly from the factory.

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TYPE Z-2

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Managing Editor

Oliver P. Ferrell

October, 1954

Vol. 10, No. 10

E. Miles Brown, W2PAU

Technical Consultant

Herbert S. Brier, W9EGQ*

William I. Orr, W6SAI**

Assistant Editors

Our Cover Photo

Cliff Johnson, WØURQ is shown at the mike of his "Six-Bander" mobile transmitter described in this issue. It is mounted under the dash of a 1952 Ford. Built into the dashboard, in place of the usual auto radio, is a "tailored-to-fit" mobile version of the "Double Con-6" receiver from the January 1954 issue of CQ.

CQ

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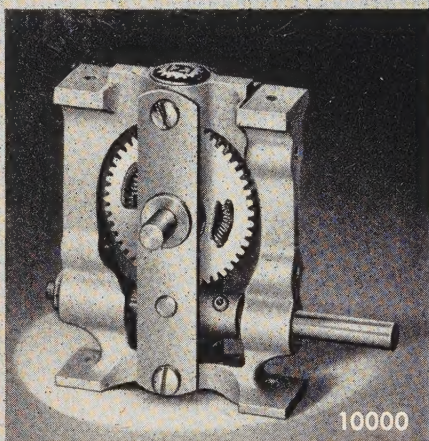
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71 ADVERTISING INDEX

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The No. 10000 WORM DRIVE UNIT

One of our original Designed For Application products, tried and proven over the years. Rugged cast aluminum frame may be panel or base mounted. Spring loaded nickel plated cut brass gears work with polished stainless steel worm to provide low back lash. $\frac{1}{4}$ " diameter stainless steel drive and driven shafts. Available in two ratios, 16:1 and 48:1. Specify ratio in ordering.

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Feenix, Ariz

Deer Hon. Ed:

This are time of yeer when Scratchi are holding his regular pursonal Convenshun Hamfesty. You re calling, I'm surely, what I are normally doing Scratchi inviting all local amchoors to coming partaking of hospitality at Hamfesty on Hon. Brothe Itchi's ranch. I defraying expenses by collecting to bux from each person attending. In returning furnishing free cactus jooce, are running contest and giving away prizes. Reel reason for doing same are that each yeer are managing to ending up with many bux left over, so can investing in lots more new Ham geer.

Well, this yeer are doing same, holding regular Hamfesty. Only one thing—it not turning out like same former yeers. I starting out the same. Havin' XYL-to-be Lil Watanabe going thru callbook, getting names and addresses of amchoors in and round Feenix. Printing up cheep type invitayshuns, putting in onvelopes, and Lil are addressing same. After putting stamps on, giving them to Brother Itchi on day when he going into town in jeep for mailing.

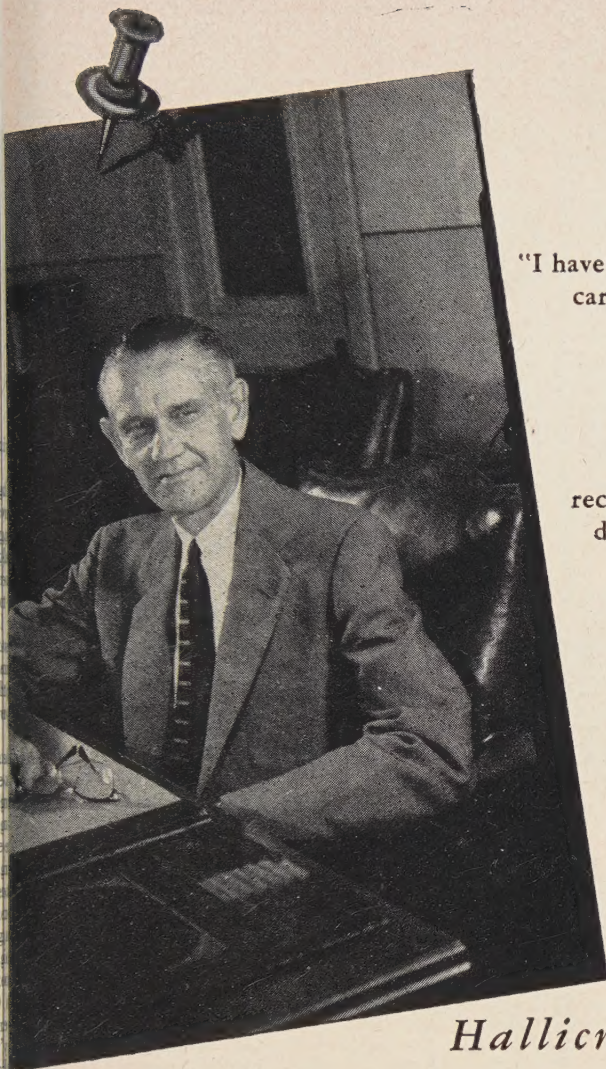
Next few days spending getting rededy for his affair. Brewing several tubs Cactus Jooce Delux (this are kind I leeving to age for one weeks). Getting equipment rededy for see-w contest. Ever making big sines saying "Convenshun This Way with arrows on them. Day before Hamfesty Scratchi going out in car and posting sines on all road leading to Itchi's ranch. Scratchi not taking any chances on things going rong, no indeedy.

Next day are dawning brite and cleer—a peech day for having Convenshun Hamfesty. After lunch young kid from next ranch arriving, so everything all set. He not amchoor, but wanting to be, se telling him I giving him sum radio parts if he standing at gate and collecting to bux from each amchoor what coming.

At to-thirty, and nobuddies there, I beginning to wondering what happening, as all invitayshuns say festivities starting at to pm. Howsumever, few minutes later seeing sum cars coming up road, se deciding everything hunky-dunky. Sure enuf, pretty soon have 1/c crowd around. I greeting them, pointing out where keeping cactus jooce, telling them to making themselves homely. At time it are seemng funny I not meeting anybuddies I noing, but thinking this are on acct. lots of new amchoors in Feenix.

First hour not having much to do, as skedyula calling for this time to get ackwainted and getting

(Continued on page 6)



W9KVO* says,

"I have used Hallicrafters throughout my entire career as a radio amateur with high regard and confidence."

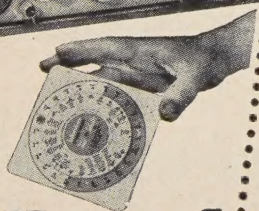
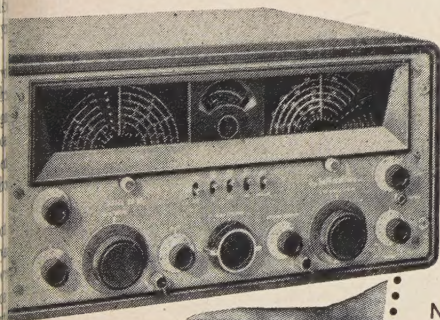
MODEL SX-88,

the most talked about and wanted receiver in years, is typical of the advanced design and understanding of the amateur needs that have won Hallicrafters this high regard for over 20 years.

*

Mr. Leslie G. Morey, Vice President of the Chicago Technical College, 2000 South Michigan Avenue, Chicago and trustee of the Chicago Technical Radio Club—W9RJA (Real Jolly Amateurs)

*"I have used
Hallicrafters throughout my
entire career..."*



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Heathkit GRID DIP METER KIT



MODEL GD-1B

\$19.50 Ship. Wt.
4 lbs.

with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

The invaluable instrument for all Hams. Numerous applications such as retuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1 1/4 meter Ham bands. Complete frequency coverage from 2—250 Mc. using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at \$3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial

Heathkit ANTENNA COUPLER KIT

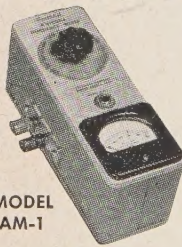
The new Heathkit Antenna Coupler Model AC-1 was specifically designed to operate with the Heathkit Amateur Transmitter and will operate with any transmitter not exceeding 75 watts RF input power. Rugged design has resulted in a sturdy, well shielded unit featuring a copper plated chassis and shield compartment. Coaxial 52 ohm receptacle on the rear of the chassis connects to a three section Pi-type low pass filter with a cut-off frequency of 36 Mc. Tuning network consists of a variable capacitance and tapped inductance in an impedance matching unit. Capacity coupled neon lamp serves as a tuning indicator and will also provide a rough indication of power output.



MODEL AC-1

\$14.50 Ship. Wt.
4 lbs.

Heathkit IMPEDANCE METER KIT



MODEL
AM-1

\$14.50 Ship. Wt.
2 lbs.

The Heathkit Antenna Impedance Meter is basically a resistance type standing wave ratio bridge, with one arm a variable resistance. In this manner it is possible to measure radiation resistance and resonant frequency and antenna transmission line impedance; approximate SWR and optimum receiver input. Use it also as a monitor or as a field strength meter where high sensitivity is not required. Frequency range of the AM-1 is 0-150 Mc and range of impedance measurements 0-600 ohms. The circuit uses a 100 microampere Simpson meter as a sensi-

tive null indicator. Shielded aluminum light weight cabinet. Strong self supporting antenna terminals.

HEATH COMPANY
BENTON HARBOR 6, MICHIGAN

(from page 4)

cool with cactus juice. Are noticing that ever buddies are making themselves at home, walking around ranch, thru cactus garden, among trees drinking and laffing. One thing seem little funny tho. All peeples looking up in trees, peering in cactuses, and sum even having field glasses looking in trees. Are abouts in mood to investigate reason for field glasses when Hon. Brother Itchi running up and saying he needing help. It seemin Hon. Water Pump not pumping.

For next cupple hours Itchi and I in water and grease up to Hon. Armpits, changing bushing motor what driving pump. Times are passing quick-like I not realizing it, so when getting cleene up after trubble with pump, and going out to see Hamfesty in operayshun, finding out peeples as about to leave. Are getting reddy to apologize for not being there to running contests, when one fellow are coming over to me, shaking my hand, telling me that it are most successful convenshun he ever attending. And the fruit punch, he saying, are mo unyoushuawl he ever tasting. He going on to saying that everybuddies are so happy because the discovering Asiatic Owl in big old ded cactus, and it are first time anybuddies ever seeing that kind like owl in Yewnetted States. In factly, he saying they so happy they are making me Honorary National Member with dues paid for life. With the he handing me a membership card and leevng.

Scratchi are so flabbergast I not saying word unt Hon. Brother Itchi coming out of house and asking what happened. All I can doing are handing him card. He taking one long look at card, one long look at me, and starting to laffing like furies. Not that I blaming him, Hon. Ed. On card it saying "In recognition of outstanding service to Bird Watchers all over the world, this certifies that Hashafisti Scratchi are hereby made Lifetime Member National Birdwatchers Society of America."

Then Brother Itchi are rushing in house and bringing me evening paper. It saying that the Matcopa County Birdwatchers are holding surprise convenshun neer Feenix. Nobuddies know where convenshun are to be held, but members will follow sines to getting to convenshun meeting place. Tholves that mistery.

I not needing to solving mistery about Asiatic Owl That are old Xmas present from Grate Ant Fuie old country. We not wanting old stuffed owl house, so I wiring it to old cactus in cactus garden as joke.

Only other mistery are why no amchoors show up, but this are explaned easy by asking Itchi whether he mailed my invitayshuns. He admittin he forgetting, and they still in back of jeep.

It also no mistery why Scratchi are broke. Your kid collecting monies not getting any, on acct, each person telling him that all expenses being paid out of club treasury already.

Hon. Ed., I having one questshun. Now that Birdwatcher for life, what are happening to me, it not watching for birds, espeshally if my minds are on other subjects? Can they demoting me to Birdwatcher Third Class?

Respectively yours

Hashafisti Scratchi

New

Heathkit VFO KIT



MODEL VF-1

\$1950

Ship. Wt. 7 lbs.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical

and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

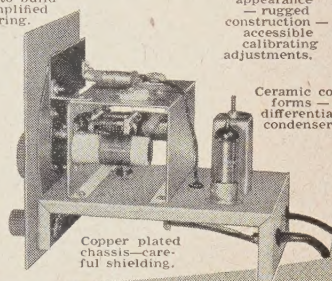
This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at 45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard 1/2" crystal holder. Construction is simple and wiring is easy.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OAZ voltage regulator.
- 7 Band coverage, 160 through 10 meters—10 Volt RF output.
- Copper plated chassis—aluminum cabinet—easy to build—direct keying.

Open layout—easy to build—simplified wiring.

Smooth acting illuminated dial drive.

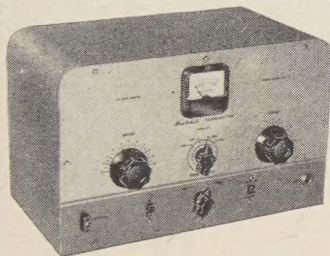
Clean appearance—rugged construction—accessible calibrating adjustments.



Ceramic coil forms—differential condenser.

Copper plated chassis—careful shielding.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

\$2950

Ship. Wt. 16 lbs.

SPECIFICATIONS:

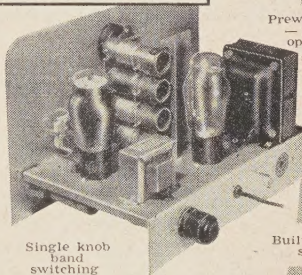
Range 80, 40, 20, 15, 11, 10 meters.
6AG7 Oscillator-multiplier.
6L6 Amplifier-doubler
5U4G Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8 1/8 inch high x 13 1/8 inch wide x 7 inch deep.

Crystal or VFO excitation.

Prewound coils—metered operation.

52 ohm coaxial output.

Rugged, clean construction



Single knob band switching

Built-in power supply

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

NEW Heathkit COMMUNICATIONS RECEIVER KIT

Four band operation 535 to 35 Mc.

Six tube transformer operation.

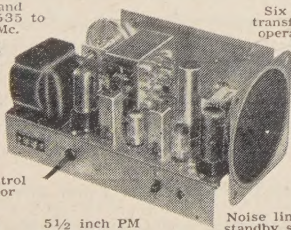
Stable BFO oscillator circuit.

Electrical bandspread and scale.

RF gain control with AVC or MVC.

5 1/2 inch PM Speaker-Headphone Jack.

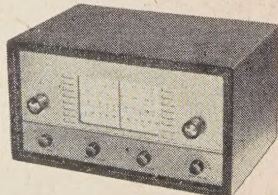
Noise limiter—standby switch.



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 Mixer-oscillator
12BA6 I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ...B. F. O. oscillator
12A6.....Beam power output
5Y3GT Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.



MODEL AR-2

\$2550

Ship. Wt. 12 lbs.

CABINET:

Proxylon impregnated fabric covered plywood cabinet. Ship. weight 5 lbs. Number 91-10. \$4.50.

HEATH COMPANY
BENTON HARBOR 6, MICHIGAN



Long Run Economy and Performance with an Eimac 4-125A

MORE watt-hours per dollar plus unchallenged performance can be counted on with an Eimac 4-125A radial-beam power tetrode. For reliable, trouble-free operation, the Eimac 4-125A offers a simple internal design that includes a rugged thoriated tungsten filament, non-emitting grids, a pyrovac plate that can take momentary overloads, low inductance leads, and the elimination of internal insulators. High power gain, low driving power and low inter-electrode capacitances allow uncomplicated circuitry permitting easy suppression of TVI-producing harmonics. As for band freedom and all around versatility, the Eimac 4-125A gives a signal with a wallop from 160 meters thru 2 meters and has been proved in all types of military, commercial and amateur application. All of these features add up to more watt-hours per dollar,

EIMAC 4-125A RADIAL-BEAM POWER TETRODE

Typical Operation

	To 120 Mc	2 Meters	
	FM Phone or Class-C CW	AM Phone	AM Phone
Plate Voltage	3000v	2500v	2000v
Driving Power	2.5w	3.3w	4.0w
Plate Power Input	500w	380w	300w
Plate Power Output	375w	300w	200w

real long-run economy achieved through 20 years of Eimac specialization in the design, development and production of transmitting tubes. To be sure of Eimac quality, ask your distributor for Eimac—the mark of excellence in electron-power tubes.

Write our Amateur Service Bureau for further information.

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TUBES

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SAN BRUNO, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

the Powder Puff



Derby

LOUISA B. SANDO. WØSCF/5

Dulce, New Mexico

On July 3, some 50 light planes—*Pipers, Stinson Voyagers, Bellanca Cruisaires, Stinson 180-3's, Navions, Temco Swifts, Luscombe 8F's, Ercoupes, Taylorcrafts, Beechcrafts, and Cessnas*—took off from Long Beach, California. All piloted by women, and all bearing identifying numbers, they were on the first leg of the 2000-mile *All-Woman Transcontinental Air Race* sponsored by *The Ninety-Nines, Inc.*, international organization of women pilots founded by Amelia Earhart. Perhaps better known as the "Powder Puff Derby," the race ended four days later at Knoxville, Tenn.

Long before the planes took off, during every minute of their flight sun-up to sundown, and even after they had reached their destination, 75 and 20 meters hummed with AWTAR traffic. This was the 8th annual *Powder Puff Derby*; the third in which amateurs assisted with a transcontinental radio net.

Many months earlier **W2JZX**, Vi, started setting up this net, organizing chairmen in each of the stopover cities, as she had done the two previous years. When **W6NZP**, Evelyn,

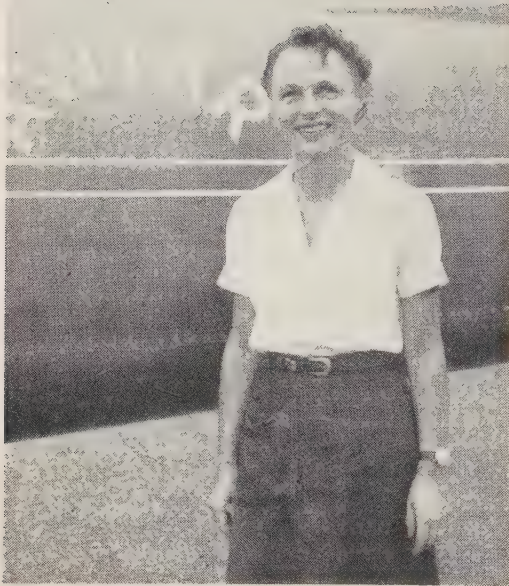
returned from her African tour in late March, she took over many details since the race was to start at her home city. **K6CDB**, Eileen, did much preliminary work in lining up and briefing the Hams along the course of the race. **W4YYJ**, Lois Anne, organized Hams for the relay net in Chattanooga and Knoxville, Tenn.

Chairmen for the stopover cities were:

These YLs gave invaluable help in the "Derby."

L to r.: **W6LMO**, Eleanor Souter, who relayed traffic (from **W6MWO**) from daylight to dark continuously for the four days of the race, and **K6CDB**, Eileen O'Connell, who spent many hours prior to the race lining up and briefing operators from Long Beach to Knoxville. Eleanor has had her license since early 1951 and she and her OM use an 800-watt home-built rig. Eleanor is secretary of the Assoc. Radio Amateurs of Long Beach. Photo by **W6GAU**.





Betty Gillies, W6QPI, YL and member of the Ninety-Nines, is over-all chairman for the All-Woman Transcontinental Air Race. Betty is standing beside her family 260 Navion. Photo by WIPFA at Lawrence, Mass., during last year's race.

W7LEE, Blythe, Calif.; **W7BFA**, Prescott, Ariz.; **W7PJY**, Winslow, Ariz.; **W5LFT**, Albuquerque, N.M.; **K5FGI**, Amarillo, Tex.; **W5SLS**, Oklahoma City, Okla.; **W5VAI**, Ft. Smith, Ark.; **W4TIE**, Margaret, and **W4UDI**, Lenette, Memphis, Tenn.; **W4BND**, Chattanooga, Tenn.; **W4ZZ** and **W4TYU**, Knoxville, Tenn.

Plan of Operation

Working with them to handle the traffic were over 80 Hams. They had plenty to do. Take-off time, destination, and estimated time of arrival for each of the 50 planes was transmitted from each stopover city back to Long Beach and on to Knoxville. By sundown each evening every plane had to be down and accounted for. Dozens of personal messages to the families and friends of pilots and co-pilots were handled. And, of course, there were the inevitable emergencies.

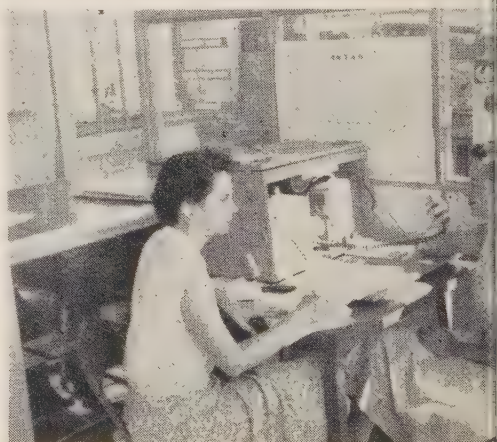
At Long Beach, **W6MWO**, club call of the Los Angeles YLRC, was set up in the airport tower and operated on 75 phone by **W6NZP**, Evelyn, chairman for the entire radio net, with the help of **W6CEE**, Vada; **W6PJU**, Mildred and **W6TDL**, Clara. **W6RAR** operated mobile at the starting line, giving split-second take-off time to **W6MWO**. With only 125 watts at their disposal the girls transmitted to **W6LMQ**, Eleanor, who with her 850 watts relayed all the traffic. Eleanor operated continuously during the race hours for the entire four days, getting to her mike as early as 4 a.m. When the going

got rough, **W6UXW**, **W6HO**, **K6PCX**, Mari **W6WRT**, Ruby, and **W6NAZ**, Lenore, relay reports and traffic on 20 meters.

Start of the race was delayed for three hours because of fog. First "casualty" was a plane reported by **W7YZU**, Naomi, as down at Blythe, Ariz. with engine trouble. Thanks to **W6N** at San Diego, **W6LMQ** was able to contact the pilot with her husband, who flew to Blythe with a generator and the girl was able to continue in the race. Naomi and her OM, **W7LI**, operated from Parker, Ariz., relaying on since it was too hot to operate mobile from the airport. Naomi said the temperature was 110 at Parker, and worse at Blythe!

More traffic poured in via **W7BFA** at Prescott when one plane was "scratched" when it ran out of gas and landed west of the airport. Operating at the airport was **W7RJK** using portable equipment furnished by **W7EAW**.

At Winslow, **W7PJY**'s mobile transmitter was used at the airport with a **BC-348** receiver. The first day this proved to be adequate power, but on the 4th the *Elmac* was used to transmit messages to his home where **W7P** relayed with his *Collins*. **W7WKG** operated a portable station at the airport; **W7REO** and **W7LYS** assisted in setting it up and relaying information to **W7WKG**. **W7APE** and **W7L** were the maintenance men who repaired the radio gear for a couple of the fliers and checked over several more rigs.



W4EM/4, the AWTAR amateur station located at Memphis, Tenn., Municipal Airport. **W4TIE**, Margaret Pearre, left, and **W4UDI**, Lenette Mewber, right, were co-chairmen and were assisted by several other YLs in operating the station. Margaret first went on the air as a Novice in July, 1951 and got her General six months later. Most of her operating is on 40 and 80 CW and she is active in the local 2-meter AM phone net. She holds RCC, WAS, ORS, and is a member of the Tennessee Net. Lenette received her Novice license in Nov., 1951, followed by a Technician's and then her General. **W4UDI** is active in the 2-meter AM and FM nets and on 10 meters, monitoring the frequencies used by the mobiles to relay for them, make landline calls and generally render assistance.

First Crackup

There was much excitement at Albuquerque when a Bellanca nosed forward on landing and twisted the prop. **W5UOC**, assisted by **W5WVX**, operating **K5NRX/mobile** at the West Mesa airport were pleased to send messages that the girls were uninjured, and the plane was soon under repair. Also operating at Albuquerque were **W5LFT** and **W5OIA** on 75 and 20. **W5RFK**, Delores, relayed on 20 from Alamogordo. With the long haul into Amarillo, **W5NUN** at Tucumcari was pressed into service.

When **W5IGU** reported *Plane No. 42* down in a wheatfield $5\frac{1}{2}$ miles west of Amarillo, **W6LMQ** took the traffic to the plane's co-owner in Hawthorne, Calif., and aided in straightening out the situation. At Amarillo, **K5FGI**, **W5IGU** and **W5UBW** were the only ones on deck to handle the AWTAR traffic. **W5IGU** and **W5UBW** did most of the operating as **K5FGI** blew out both his *BC610* and *32V-2* the first day of the race. After struggling part of the first day using landline between **W5IGU** and the Traidwinds Airport, **W5IGU** took his *ELMAC* mobile rig to the airport and his son, **W5UBW**, operated the fixed station using a *Viking II*. Located beside the judges stand, as soon as a ship arrived or departed, **W5IGU/5** passed on the information to **W5UBW** or **K5FGI** who relayed on 3980 to Oklahoma City or Albuquerque. In addition to covering all the flight information and the emergency traffic for the girls that crashed, they handled messages for a Dallas newspaper and for the CAP. Each morning they were on the air by 5 a.m. and stayed on until all flight operations had stopped for the day, sometimes 'till 8 p.m.

W5SLS "spark-plugged" the whole operation at Oklahoma City and handled traffic when **W5PAA**, the station of the *Aeronautical Center Amateur Radio Club*, was not manned. Operating **W5PAA** were **W5s: HXL, BKN, TMY, EHC, AGM**. When a mobile rig failed to cover the airport, **W5PAA** monitored the airport's transmissions and thus kept track of incoming and departing AWTAR aircraft. In addition, there was much running to the nearest telephone (two blocks away), but they got the job done! Other Oklahoma amateurs who co-operated were **W5SVR** at Mangum, **W5TNW** at Norman, **W5RST** at Sulphur, and **W5WQ** at Canton.

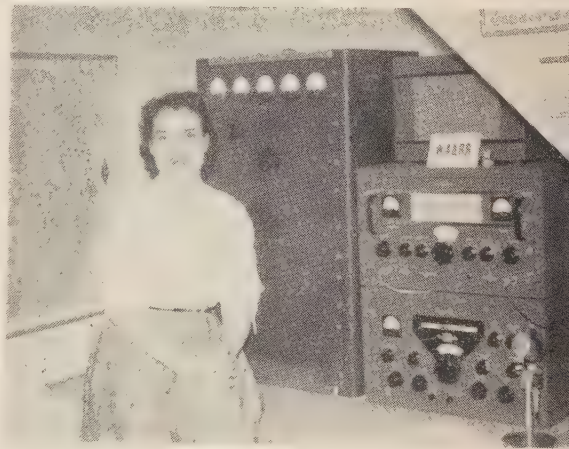
W5VAI held down the communications job alone at Ft. Smith, Ark. On July 4, he operated continuously from 7 a.m. to 7:40 p.m. CST; on the 5th from 6:30 a.m. to 5:20 p.m. Traffic then eased up and on the 6th he was only on a couple of hours. On the 5th when QRM was bad, **W5BCZ** at Little Rock relayed to Memphis for him for several hours. Since he was working alone at Ft. Smith, **W5VAI** relied on landline for reports from the CAA at the airport and traffic from the fliers.

The Tennessee Stations

At Memphis, Tenn., **W4UDI**, Lenette, and **W4TIE**, Margaret, were co-chairmen for the net. They and other Memphis YLs had the local club's 2-meter FM station, **W4EM**, set up at the Municipal Airport to relay traffic to fixed stations in Memphis operating on 75 and 20 meters. The following YL-OM wife and husband teams assisted in the operation: **W4's: TIE-TIZ, UDI-BAQ, WTJ-WTI, UDQ-HHK, AFE-YMB, ZEG-ZEE, WN4DMN-W4DQH**. A mother-daughter team, since licensed as **WN4HMJ-WN4HMI**, also assisted. Other OM's helping relay traffic from Memphis were **W4CV** and **W4JU**.

At Chattanooga the airport station was **W4BND/4** operated by **W4s: BND, SVL, HHU** and **UNS**. Fixed stations operating on 75 were **W4s: QT, SVL, IIB**, and **W4QT** was also on 20 meters.

At the Knoxville Municipal Airport, destination of the race, **W4BXC/4** was set up on 3980 with an *ART-13* and on 145.2 with an *ARC-4*. Assistants were **W4s: VTT, NLJ, FHT, BXQ** and **WN4FEP**. In Knoxville **W4s: ZZ, HHQ, TZD, RRS, FY, TYU** and **TZJ** were on 3980 and **W4s: NBV** and **FY** on 14,240 kc. The 2-meter net was used when QRN was high or when 3980 was busy. **W4ZZ** was the Knoxville end of the link. On the afternoons of the 3rd, 4th and 5th thunderstorms made 3980 almost unreadable, but with in-state relays from **W4s: VJX, AEE, ZJA** and others they were able to keep in touch with **W4DHQ** and **W4BND**. The



W4YYJ, Lois Anne Crane, who shares this station with her OM, **W4ARR**, helped organize the amateurs for the radio net in Chattanooga and Knoxville, Tenn. Lois Anne started with a Novice ticket, Jan., 1953 and got her General the end of the year, in spite of three Harmonics. Her 15-year old son is **W4AVY**. OM **W4ARR** claims to be a "YL chaser" (he holds **WAS-YL #3** and **YLCC #11**, plus one endorsement). Lois Anne lacks only five cards of **YLCC**, but spends most of her time chasing DX, with over sixty countries worked to date.

first day of operation lasted until 10:45 p.m., the next two nights until 9:00 p.m., and on the 6th airport operation was closed down at 5:30 p.m. after the last planes were in. Besides all the airplane position reports, the Knoxville group handled 80 messages for the pilots on their completion of the race.

99s are YLs

Though far from our Colorado QTH, we had the fun of observing about one-third of the planes taking part in the race land and take off at Albuquerque on July 4—watching the cocky little planes rolling to a stop, the dash of pilot or co-pilot to punch the time clock; the enthusiasm and swapping of experiences. As we watched we couldn't help



W2JZX, Vi Grossman, general radio chairman for the AWTAR not the last two years and this year did the preliminary organizing. Vi has been active on most bands, phone and CW, since she was licensed in 1936. At present much of her work is for the Braille Technical Press (see CQ July, 1954), of which she is a member of the Board of Directors.

marvel at these women pilots. Though our signals may travel far we, for the most part, sit snug and secure in our home QTH. These members of *The Ninety-Nines* must travel right along with their hobby; a hobby they find every bit as exciting as we do our own.

Of course, there are some among the 99s who share both hobbies. First among them is W6QPI, Betty Gillies, who is chairman for the entire AWTAR. Betty has had her General Class license since April '53, and prior to that operated as a Novice for about six months. At present she uses a *Philmore* transmitter which her son, W6SBK, put together for her, and she has a *National 183-D* receiver. She is on 80-meter CW and hopes to be on 40 and 20 shortly.

Betty's flying history dates back to 1929—she has been an active pilot for the past 25 years. She has about 2,800 solo flying hours and holds the following ratings: Commercial, multi- and single-engine land and sea, instrument and instructor. She was assigned to the Ferrying Divi-

sion of the Air Transport Command during World War II and served as WASP Squadron Commander at New Castle Army Air Base. For two years, 1939 to 1941, Betty was president of *The Ninety-Nines*. Her son, 21, and daughter, 19, both are licensed pilots and, of course, her OM has been flying even longer than she. They have a family airplane, a 26 *Navion*, from which Betty hopes some day to operate W6QPI/aeronautical mobile.

Another 99er and YL is W6PEB/7, Melba Beard. Melba also learned to fly in 1929 and received her first pilot's license in that year. Subsequently she obtained a commercial pilot's license, carried passengers for hire, gave student instruction, operated a flying school, did aerobatics and raced at air shows. For several years she owned her own plane, a Warner-powered *BIRD* biplane. Melba did not take part in this year's race, but flew via American Airlines to watch the end of the race and then went on to Asheville where she and about six others were honored as charter members at the banquet celebrating the *Ninety-Nines* 25th anniversary.

Melba received her amateur radio operator's license about twenty years ago, and her call is W6PEB (she hasn't had it modified for her present QTH of Scottsdale, Ariz.). Her transmitter is a pre-war *HT-6* 25-watt phone and CW rig. Favorite pre-war band was 160 phone now it is 80. Melba was first written up in the "*YL's Frequency*" (April, 1952) when her became an all-Ham family—OM W7QGR, son W7QLN, and daughter WN7PXU.

Another Arizona YL, W7NAF, Camille

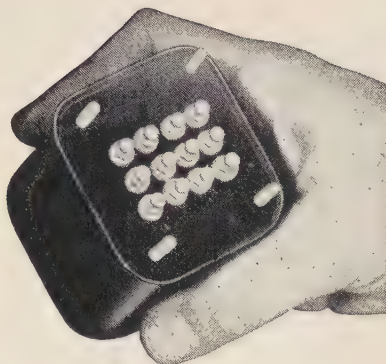
(Continued on page 64)



W6MWO, station call of the Los Angeles YLRC, in operation at the Long Beach airport in the AWTAR net. L. to r.: W6NZP, Evelyn Scott, general radio chairman for the 8th annual AWTAR, and W6CEE, Vada Letcher. Evelyn, who has worked a good bit of DX in person in South America and Africa, has been licensed since 1936. Most of her operating is on 1 and 20 meters. Vada, recently elected president of the international YLRL, was written up in the July 1954 CQ. Photo by W6GAU.

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HIGH VOLTAGE A.C. Volts	SECONDARY D.C. Ma.	RECTIFIER Volts	FILAMENT Amps.	OTHER Volts	FILAMENTS Amps.	CATALOG NUMBER
270-0-270	55	5.0	2	6.3 CT	2	4PHC-55
335-0-335	70	5.0	2	6.3 CT	3	4PHC-70
375-0-375	120	5.0	3	6.3 CT	4	4PHC-120
440-0-440	165	5.0	3	6.3	7.5	4PHC-165
				6.3	3	
				6.3	3	
450-0-450	200	5.0	2	6.3	0.6	4PHC-200A
				6.3	4	
				6.3	4	
				6.3	0.6	
550-370-75-0- 75-370-550	300	5.0	6	6.3 CT	5	4PHR-300
				6.3 CT	1	

FILTER REACTORS

INDUCTANCE (henries)	MAXIMUM D.C. Ma.	D.C. RESISTANCE (ohms)	INSULATION VOLTS RMS	CATALOG NUMBER
2.0	55	160	2,500	4RH-255
2.0	70	240	2,500	4RH-270
2.0	120	105	2,500	4RH-2120
2.0	165	80	2,500	4RH-2165
2.0	200	77	2,500	4RH-2200
2.0	300	49	2,500	4RH-2300

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SEC. VOLTS	SEC. AMPS.	INSULATION VOLTS RMS	CATALOG NUMBER
6.3 CT	3	2,500	4FH-63
6.3 CT	5.5	2,500	4FH-65
6.3 CT	10	2,500	4FH-610
6.3 CT	20	2,500	4FH-620

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Adding SSB

to the VIKING

THOS. R. HALLER, S.J., WØGPT

Father Haller is a Jesuit priest and mathematics teacher. He became interested in Ham radio as a result of the network that links the Jesuit schools throughout the Midwest. A "General" was obtained in 1951 and a "Class A" the following year. WØGPT found it difficult to decide whether his interest was principally in building or 75-meter net and SSB operation. Apparently the latter won out—to a certain extent. Besides the rig described in this article, a 10A is used to drive an 811-304TL kilowatt of SSB. Father Haller has also built the "SSB, Jr." and a home-designed crystal filter rig. His duties will require him to be inactive until next spring, his address during that period: 2601 N. Union, Decatur, Ill.



Do you have a *Viking*? How would you like to put it on the air single sideband without a carrier? You think I'm crazy? Well, you're not far from the truth, but that's neither here nor there, because you *can* put the *Viking* on SSB. What's more, you can do it on all bands, and if yours is a *Viking II*, you can use it SSB on 160, 75 and 40 meters without so much as changing a single screw. Does your breath come a little faster now? Then read on, friend, and allow me to explain how a commercial transmitter, supposedly operated in class C, may suddenly become a bandswitching linear final or driver, without losing any of its original functioning or versatility.

A few months ago someone discovered,¹ in true Ham fashion, that he could couple his SSB exciter to the VFO input of a *Viking II* transmitter and get good SSB signal reports with the arrangement. The author heard about this experiment and duplicated it successfully, to his utter astonishment. Only three things

were necessary in the procedure (which took only four minutes): 1) couple the SSB exciter to the *Viking* VFO input, 2) operate the transmitter in CW position, 3) and back off the drive control until no grid current shows when the final is under excitation. The ordinary tuning procedure was followed by inserting a carrier from the SSB exciter, or by using crystal excitation. It was later discovered that a 500-ohm resistor in the key jack cut down the standing current in the oscillator stage from 15 ma. to 1 ma. Modulation peaks drew 200 to 240 ma. plate current, and the average plate current held between 140 and 175 ma. without flattening of the peaks on the monitor 'scope.

This discovery was followed by two months of incredibly successful SSB operation in the 75-meter band, and contacts reported that the signal had good quality, was narrow and easy to tune, and compared favorably with any other good SSB signal. Many other owners of the *Viking II* have since followed suit with the same happy results.

Not the Very Best—But It Works!

All this does not necessarily mean that the *Viking II* puts out the best possible SSB signal. As a matter of fact the manufacturer has already made this experiment and reported that, when the *Viking II* is used with this kind of excitation, there are some splatter components present in the spectrum, although they must be hard to evaluate on a receiver. This splatter is far more serious with the *Viking I* unless some modification is made in the bias system. With this in mind the changes given below were devised. They make it possible to operate either the *Viking I* or the *Viking II* on any band, using CW, PHONE or SSB excitation. The author has made all but one of the changes on the *Viking II* and has demonstrated to his own

1. "On the Air with Single Sideband," QST, January, 1954, p. 46.

satisfaction that they work out as planned on 75, 40 and 20 meters. At present there is no means available at WØNAA for generating SSB output on 160, 15 or 10 meters, but it is expected that future results there will be just as gratifying as present experience on the other bands.

Basic Requirements

SSB amplifying technique requires that the input signal to any stage be faithfully reproduced in the output. A doubler stage anywhere in the lineup is therefore out of the question, since multiplication of voice frequencies would result. (Would you like to sound like Donald Duck's grandson?)

Now, let's take a look at the *Viking*. An examination of the tuning curves given in the manual shows that the plate circuits of the oscillator and buffer stages are tuned to the same frequency for 160, 80 and 40-meter output, but that they are tuned to different frequencies for 20, 15 and 10-meter output. SSB output is therefore possible when the band-switch is in the 160, 80 or 40-meter positions, but quite impossible on the other three bands. Our problem, then, becomes one of obtaining straight through amplification on 20, 15 and 10 without upsetting the usual multiplying functions needed for conventional operation. Two things can be done that will solve this problem: (1) get a bandswitch with more positions so that it will be possible to select the needed combinations of plate coil taps in the oscillator and buffer circuits; (2) add a small coil in series with the oscillator plate coil to effect the 15/10-meter tuning in that stage (see Fig. 1). The steps for making these changes are detailed in a later section.

Another consideration that must be met is

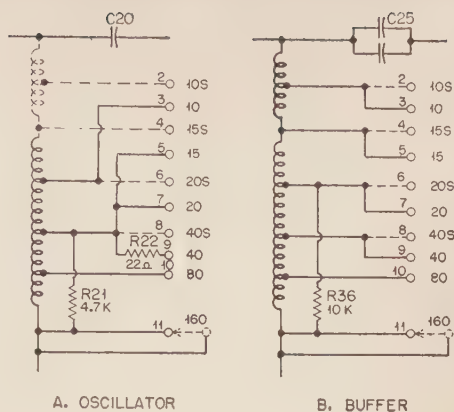
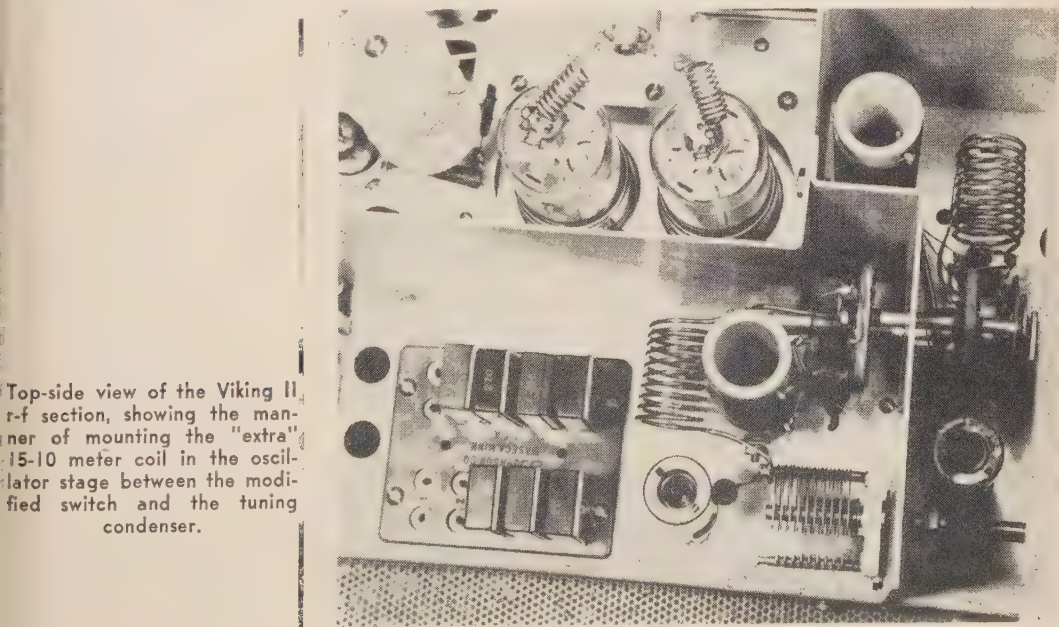


Fig. 1. Modified plate circuits in the oscillator and buffer stages. Additional, or new wiring is signified by the dashed lines.

linearity, or, looking at it from a different angle, bias voltage level. The final in the *Viking* develops its rated power output by operating in class C, that is, the tubes (or tube) are biased beyond cut-off so that current flows during less than half the excitation cycle. The cut-off point is reached by a combination of fixed and grid leak bias, but the 75 volts of fixed bias is the determining factor in SSB operation. If this voltage is less than cutoff, and if no grid current is allowed to appear in the final, then the tubes can operate in class AB1; and if the tube characteristics are linear for this degree of bias, then distortion will be negligible in the output. This is where the *Viking I* parts company with the *Viking II*. In the *Viking I* the fixed bias is too steep to allow for linear operation, and good SSB output can



Top-side view of the Viking II r-f section, showing the manner of mounting the "extra" 15-10 meter coil in the oscillator stage between the modified switch and the tuning condenser.

only be obtained by changing the bias. This has actually been done by several Hams (with excellent results), but unless some provision is made for restoring the original fixed bias for CW and PHONE operation normal output cannot be reached in these positions.

The characteristics of the 6146's used in the *Viking II* are somewhat different. Little distortion is present even when the tubes are biased to -75 volts. For this reason we can get by with SSB excitation in the *Viking II* without making any changes; nevertheless, as the manufacturer has pointed out, some change for the better could be made even in this transmitter.

An obvious solution suggested itself here. Take out the CW-PHONE switch and replace it with a three-position, six-pole unit. Then we could have a CW-PH-SSB selector. In the first two positions all voltages and operations are normal. In the third position this switch lowers the bias on the final and the buffer, cuts in a cathode resistor in the oscillator stage, and might even be made to change over the screen voltage of the 4D32 or the 6146's to a different value of regulated voltage. A Mallory 178C switch was used in this application and it occupies exactly the same amount of space under the chassis as the original CW-PHONE switch. The indexing is also the same so that even the panel markings for CW and PHONE remain functionally the same.

The bias voltage divider had to be modified to obtain the intermediate values, but this was easily accomplished by cutting out two of the resistors and inserting four others of the right values. (See Fig. 3)

The author did not install the screen regulators, principally because the scheme was not worked out until after the other changes had

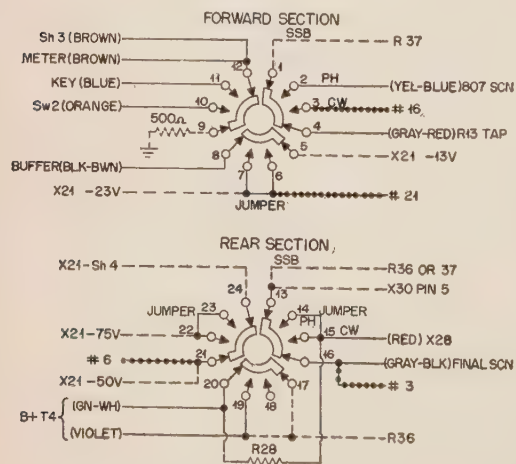


Fig. 2. Wiring diagram of the new CW-PH-SSB switch (Sw-3). In the VIKING I the dotted lines are made, but the jumper from 14 to 15 is omitted.

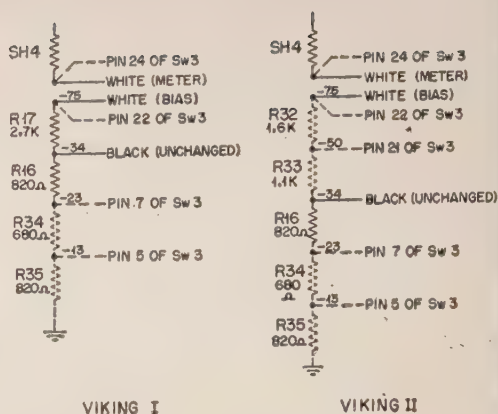


Fig. 3. Diagrams of the modified voltage dividers at X-21 in both VIKING models. Additional parts and wiring appear as dashed lines.

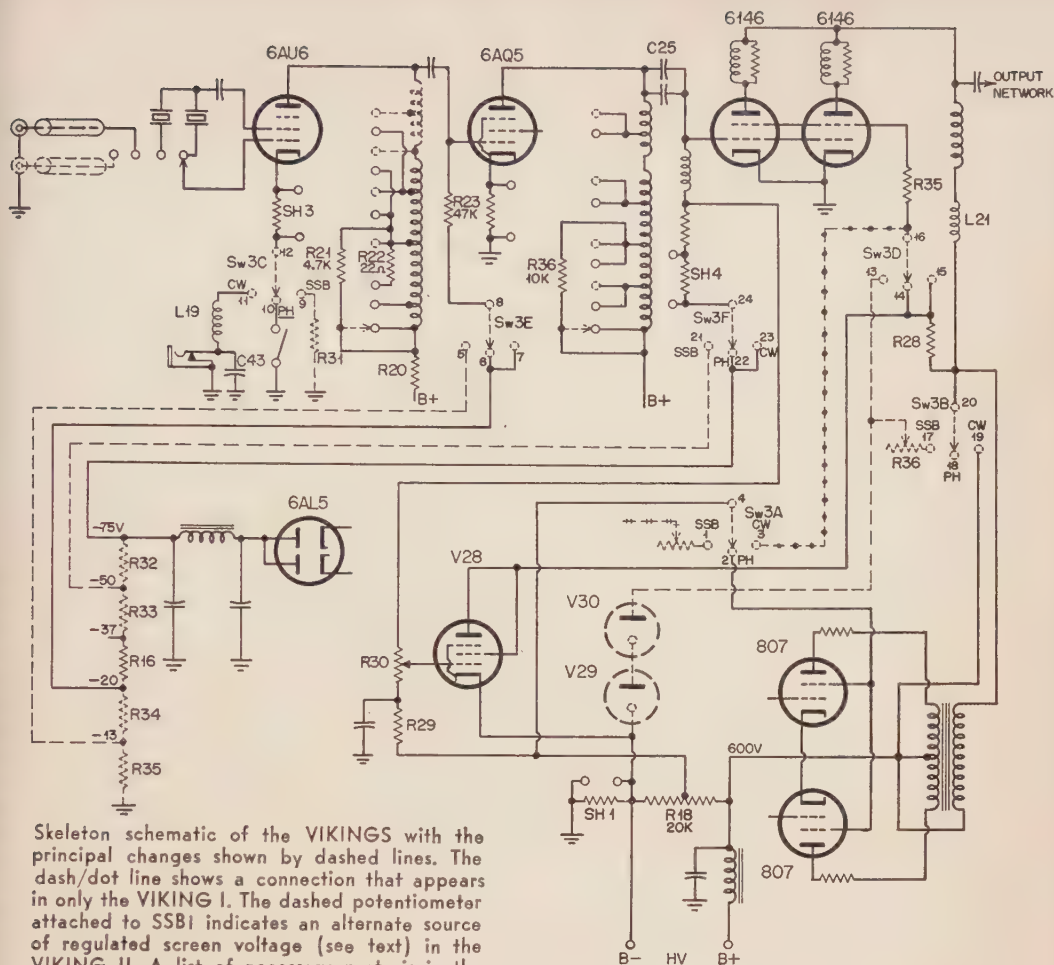
already been made. However, the voltage regulation in the *Viking* is excellent and no difficulty has been discovered that can be traced to unstable screens. Actually a higher screen voltage for SSB use should increase the plate loading to maximum. At any rate the details are given here for those who wish to make the change. In SSB operation the 6AQ5 regulator and the associated screen resistor (R-28) remain across the high voltage as a constant load. (This is the same condition that we have with excitation failure in CW or PHONE operation.) The voltage regulators are OA2's in the *Viking I* and OB2's in the *Viking II*, and in both cases these regulators are disconnected in the CW and PHONE positions of the switch.

There is an alternative way of obtaining the regulated screen voltage in the *Viking II*. About 275 or 280 volts are needed to fire the OB2's, and this could just as well come from the 807 screen supply which is available at the switch. In this case a smaller dropping resistor can be used. The leads to R-37 (see Fig. 2) come from terminals 1 and 13, instead of 12 and 13, and R-37 can be a 5000-ohm, 10-watt adjustable instead of the larger value. The difference in expense is negligible so the other system can be used in order to have uniform conversion in both the *Vikings*.

An extra co-ax connector for SSB input was installed and connected to the crystal selector switch, so that it takes only a flick of the wrist to select crystal, conventional VFO, or SSB excitation. A slight disarrangement of parts on the back skirt of the chassis made this addition possible (see Fig. 4). The convenience and versatility gained are well worth the extra twenty or so minutes needed to make the installation.

Modification of Sw3 to CW-PH-SSB

- Remove the cabinet, meter shield and front panel.



Skeleton schematic of the VIKINGS with the principal changes shown by dashed lines. The dash/dot line shows a connection that appears in only the VIKING I. The dashed potentiometer attached to SSB1 indicates an alternate source of regulated screen voltage (see text) in the VIKING II. A list of necessary parts is in the next column.

b) Clip all wires close to the terminals of Sw3 and remove the switch.

c) At the bias voltage divider (X21), find the black-brown tracer between R15 and R16. Clip this wire and fish it out of the harness as far as Sw3.

d) Salvage R28 from the old switch. In the *Viking I* this is 10,000 ohms; in the *Viking II* it is 20,000 ohms. Mount R28 between terminals 14 and 20 on the new switch (Mallory 178C). Terminals on the new switch are numbered by viewing the switch from the rear, tie rods positioned at one-thirty and seven-thirty (Fig. 2), two of the six poles at twelve o'clock. Count clockwise beginning at one o'clock on the forward section.

e) In the *Viking I*: connect jumpers from 6 to 7, 6 to 21, 22 to 23, 3 to 16, (NOT FROM 14 to 15). Do not solder.

e) In the *Viking II*: connect jumpers from 6 to 7, 14 to 15, 17 to 19, 22 to 23, (NOT FROM 3 to 16 and 6 to 21). Do not solder.

f) Connect new 15" leads at 5, 7, 21, 22, 24. In the *Viking I* also at 17. In the *Viking II* also at 1. Connect two more leads at 13 in both transmitters. Solder at points where no further connections are indicated (Fig. 2).

J1—Co-ax chassis connector, Amphenol 83-1R.

R31—500 ohms, 1/2w.

R32—1600 ohms, 1w.

(VIKING II only).

R33—1100 ohms, 1w.

R34—680 ohms, 1/2w.

R35—820 ohms, 1w.

R36—20,000 ohms 25w. adjustable (VIKING I only).

R37—5000 ohms, 10w. adjustable (VIKING II only).

Sw-3—2-section, 6-pole, 3-position rotary, Mallory 178C.

Sw-4—2-section, 2-pole, 10-position rotary, Mallory 180C, see text.

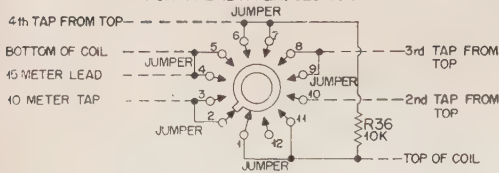
X29, X30—7-pin miniature sockets. V29, V30—see text.

g) Install the switch, but don't tighten it up yet. Dress the new leads along the harness toward X21, except any from points 1, 17 and 13. Connect all wires as shown in Fig. 2 (color coding is the same in both transmitters): two browns to 12, blue to 11, orange to 10, black-brown tracer to 8, green-white to 20, violet to 19, gray-red to 4, gray (or black) to 16, red to 15, yellow-blue to 2. Check and solder all connections. Secure the switch firmly in place. Connect and solder R31 (500 ohms) from 9 to a nearby ground lug. Leave a little slack.

Modification of the Bias Voltage Divider (X21)

a) At X21, separate the meter shunt (SH4)

FORWARD (BUFFER) SECTION



REAR (OSCILLATOR) SECTION

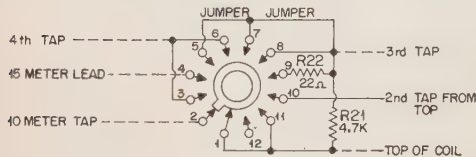


Fig. 5. Wiring diagram of the bandswitch (Sw-4) with new wiring shown as dashed lines.

and the white meter lead, (not the white lead from the bias supply), from R17 (2700 ohms). Tie them to the new lead which comes from Sw3, pin 24. Solder and tape this connection. Connect the new lead from Sw3, pin 22 to the point from which Sh4 and the white lead were disconnected.

b) In the *Viking II*: lay R32 (1600 ohms) and R33 (1100 ohms) side by side and twist one end together. Clip out R17 (2700 ohms) and replace it with this pair, but do not solder yet. At the junction of R32 and R33 connect the new lead from Sw3, pin 21. Solder.

c) In both *Vikings*: lay R34 (680 ohms) and R35 (820 ohms) side by side and twist one end together. Clip out R15 (1500 ohms) and replace it with this pair. Do not solder yet. At the junction of R16 (not R35) (820 ohms) and R34 (680 ohms) connect the new lead from Sw3, pin 7. At the junction of R34 (680 ohms) and R35 (820 ohms) connect the new lead from Sw3, pin 5. Check and solder all connections at X21.

d) Turn on the low voltage. Turn drive control completely counterclockwise. Turn Sw3 to the CW (counterclockwise) position. Voltages should now read as follows: -75 volts at the grid of the final; -25 volts at the grid of the buffer. Turn Sw3 to the PHONE (middle) position. Voltages should be exactly the same. Turn Sw3 to the SSB (clockwise) position. In the *Viking I* voltages should read as follows: -25 volts at the grid of the final; -13 volts at the grid of the buffer. In the *Viking II* voltages should read: -50 volts at the grid of the final; -13 volts at the grid of the buffer.

Extra Co-ax Input

In the *Viking I* it may not be necessary to displace anything for this installation. In the *Viking II* space on the skirt is at a premium.

a) Loosen X23 (three-point terminal strip). This is designated X17 in the *Viking I*. Turn it at right angles to the original position so that it can be secured in place above the VFO input (toward the top of the chassis). A new hole can be drilled for the free end.

b) Loosen one end of the line filter to make room for the new connector directly adjacent to the VFO input. Drill the skirt and mount the new connector. The line filter will now be slightly askew. Enlarge the one mounting hole a bit and secure it in place again.

c) Connect the new input by co-ax (RG-29/U or any other type will do) to one of the positions on the crystal selector switch.

Bandswitch (Sw-4)

For want of a better substitute, a *Mallory 180C* 3-section, 11-position switch was used here. One section was removed, the remaining two correctly spaced, the shafts on either end cut to length, and the extra length of the tie rods clipped off. It would be better to have all the contacts of each section of the switch confined to a segment of 180 degrees so that the coil taps could be shorter, but the only switch we could find like this was of the shorting type. The shorting feature in itself is desirable, but in this particular bandswitching arrangement it introduces other complications. Only a specially designed switch can give a complete solution to this problem.

a) Remove the oscillator condenser shaft extension and the mounting nut.

b) Remove the ground connection on the tuning condenser (oscillator).

c) Remove the shield section straddling Sw4.

d) Clip all tap wires between the switch and the two plate coils. Remove the oscillator plate coil.

e) Carefully unsolder the leads which pass up from under the chassis to each section of the switch.

f) Disconnect the 15-10 meter winding in the buffer stage and remove the switch.

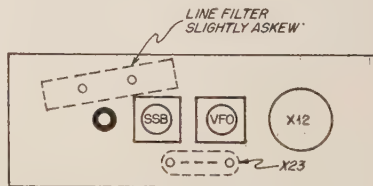


Fig. 4. Mounting details inside the skirt of the extra co-ax socket input on the VIKING II.

g) Salvage R-21, R22, R36; mount these resistors on the modified *Mallory 180C* switch; connect the jumpers as indicated in Fig. 5. (Sw-4 terminals are numbered by viewing the switch from the rear with tie rods in a vertical line, the common tap to the lower left side, and counting clockwise from this point.) R36 is not in the *Viking I*.

h) Using #14 bare wire, form an airwound 15-10 meter tank coil just like the one in the buffer stage (10 turns, 1" diameter), and tap it at the 6th turn. Leave the leads and the tap 6 inches long.

i) At the oscillator plate coil remove 6 turns from the 20-meter section and re-space 6 of

[Continued on page 60]

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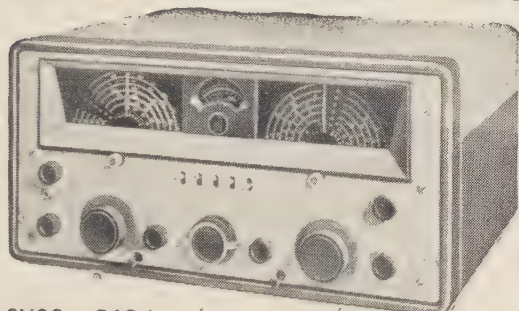


Bob Henry,
 W0ARA
 Butler, Mo.



Ted Henry,
 W6UOU
 Los Angeles

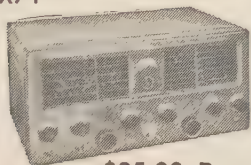
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In the March 1954 issue of *CQ* (page 13) we discussed some of the problems facing the establishing of Bill Storer, VK1EG, on the Antarctic continent. Reports already received from Bill, by the headquarters of the Australian National Antarctic Research Expedition in Melbourne, indicate the greatest hindrance to successful radio communication from the new base is the almost endless ionospheric storms and auroral activity. But VK1EG is determined to make as many contacts with as many countries as his spare time and conditions will allow.

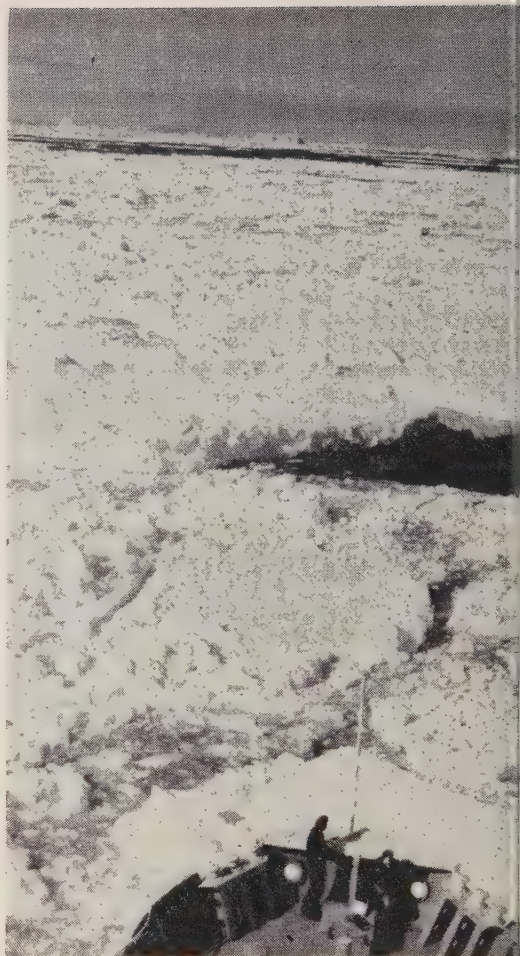
The Australian flag was raised at Mawson Base on February 13 and the present party, including VK1EG, will be relieved in February 1955. If you want this rare DX spot—take this as fair advance warning!

The photos on these pages were brought back by the Danish polar ship *Kista Dan* after it had successfully landed VK1EG and his nine colleagues.

VK1EG

by Roth Jones, VK3BG

"The Age," Melbourne, Vict., Australia



Heading south towards VK1. This photo was taken from the crow's nest of the KISTA DAN as it made its way through heavy pack ice.



Summertime on the Antarctic continent and the huts that will house the men and equipment begin to take shape. Unlike the northern polar regions, which is a mass of ice, Antarctica is a huge continent with mountains, plains and not a little snow and ice.



Bill Storer, VK1EG is also the Mawson Base Postmaster. This photo shows Bill hard at work stamping some of the 23,000 letters—nearly all from philatelists—before setting up his Ham equipment.

When conditions are good to VK1EG ask Bill about the Adelie penguins. They must walk 20 miles from their rookeries on the continent proper, across the frozen sea to open water to seek food. They set up a tremendous racket as they move along in a mass as far as the eye can see.



The Australian flag is raised by Dr. P. G. Law at Mawson Base, Antarctica on February 3, 1954. Dr. Law has done much to further the use of Ham radio with these expeditions. Mr. Macey, ex-VK30Y (see front cover, March 1954 CQ) is also in this group.

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Propagation Conditions

Predicted by

GEORGE JACOBS, W2PAJ

144-40 72nd Ave., Flushing, L. I., N. Y.

General Propagation Conditions

- 6 Meters:** Only an occasional short skip opening expected during October, possibly co-incident with auroral activity.
- 10 Meters:** There is a sharp decrease in sporadic-E propagation during the fall and winter months and only a few short-skip openings are expected during October. Not much DX expected this year, but a few openings possible during daylight hours to South America, Africa and Australasia during the latter part of October and early November.
- 15 Meters:** Conditions improve on this band during the fall and winter months. Fairly good DX to many areas of the world is expected during the daylight hours.
- 20 Meters:** This band is closing somewhat earlier in the day as winter approaches. Fair to very good DX conditions are expected to most areas of the world from shortly after sunrise to a few hours after sunset.
- 40 Meters:** DX conditions should be fair to good to many areas of the world from a few hours before sunset to shortly after sunrise. Atmospheric noise level is decreasing on this band.
- 80 Meters:** Night time propagation conditions to many areas of the world will improve as static levels decrease and the band becomes quieter. Band should be open for DX from a few hours after sunset to a few hours before sunrise.
- 160 Meters:** DX conditions on this band still rather poor, but improving as atmospheric noise levels and summer time absorption decrease. DX conditions on this band may be optimum this year.

This overall picture of band conditions is intended to indicate qualitative changes in each band from month-to-month. For specific times of band openings for a particular circuit, refer as usual to the **Propagation Charts** on the following pages.

Sunspot Cycle

This month's **Charts** are based upon a predicted smoothed sunspot number of 9, centered on October, 1954. The observed monthly Zurich sunspot number for July, 1954 was 4.5, resulting in a smoothed sunspot number of 6.3 centered on January, 1954 (See graph in last month's column).

This past May I discussed the fact that the first sunspots of the new cycle were observed on February 8, 1954. These new cycle sunspots appear at high latitudes on the face of the sun and have a magnetic field whose polarity is reversed from that of the sunspots of the present cycle. The appearance of these new cycle sunspots are a positive indication that the minimum of the present cycle is very near. It now appears, from the latest trend of the monthly sunspot numbers, that the actual minimum of the present cycle may have been reached during the month of May, 1954. There is good reason to believe that the smoothed sunspot number for May, 1954 will be on the order of 5, and will represent the lowest smoothed sunspot number of the present

cycle. It is still too early to estimate how fast the sunspot numbers will increase.

New DX Season

October is usually considered as the start of the new DX season. It is the month of the **International DX Contest** (formerly the **World-Wide CQ DX Contest**) which is scheduled for the weekends of October 23 and 30, starting at 0200 GMT on Saturday and ending at 0200 GMT on Monday. For this reason, the **Propagation Charts**

Last Minute Forecast

Moderate ionospheric disturbances are forecast for the periods October 17-18 and 22-23, with somewhat unstable conditions forecast for October 1-4 and 30-31. The forecast for the contest weekend: October 23rd poor to fair, the 24th fair, the 30th and 31st fair but unstable.

have been considerably increased in scope, with forecasts centered on New York City, Tampa, Chicago, San Antonio, Denver, Portland, Oregon and Los Angeles.

Despite the fact that we are at the very bottom of the present sunspot cycle, a review of the **Charts** indicates that a considerable amount of DX can be expected on 15, 20, 40 and 80 meters, with possibilities of some openings on 10 and 160 meters.

If you intend using the **Charts** as a guide during the Contest period, I would suggest that you re-arrange the forecast data into a "work plan" based upon your operating conditions. For example, if you intend operating only on 20 meters, you would make up a "work plan" indicating the times for working the most countries, continents and zones as possible. The following is an example of such a plan devised from the forecasts centered on New York City:

Time (EST)	"20-Meter Work Plan New York City" Continents Workable
0600-1100	Europe, North Africa, South America, South East Asia, Australasia, Guam and Pacific Islands, Japan and Far East.
1100-1800	Europe, North, Central and South Africa, Near and Middle East, South America.
1800-2030	South America, Australasia, Guam and Pacific Islands, Japan & Far East.
2030-2200	South America.

Similar "work plans" can be readily devised from the **Propagation Charts** for other QTH's and operating conditions.

DX Contests are good opportunities for checking the accuracy of these forecasts. Based upon logs and other reception information received after the contests of the past three years, it appears that the previous forecasts were quite accurate during the contest periods. I would appreciate any comments, based upon observations made during the 1954 contest period, regarding the accuracy or inaccuracy (as the case may be) of these forecasts.

Good luck to all during the contest period. I expect to take part in this one with a new **Viking Ranger** transmitter. Next month I will discuss some interesting observations made during the total eclipse that occurred this past June.

ALL TIMES IN E S T

NEW YORK CITY TO:	15 Meters	20 Meters	40 Meters	80 Meters	TAMPA, FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe	0930-1330 (2-3)	0630-1300 (3) 1300-1500 (3-4) 1500-1700 (1-2)	1630-2200 (3-4) 2200-0400 (2)	1730-0200 (2-3)	Australasia	1800-1900 (0-1)* 1500-2000 (2)	0700-1000 (2) 1400-1700 (3) 1700-2200 (2) 0200-0400 (1)	0130-0730 (2-3)	0300-0700 (1-2)
Southern Europe & North Africa	0830-1430 (3)	0600-1300 (3) 1500-1500 (3-4) 1500-1730 (1-2)	1630-2100 (3-4) 2100-0200 (2)	1800-0100 (2-3)	Japan & Far East	1630-1900 (2)	0700-0900 (1-2) 1530-2100 (2-3)	0100-0700 (1)	0200-0600 (0-1)
Near & Middle East	0930-1200 (1-2)	0600-1130 (1) 1130-1430 (2-3)	1800-2000 (2-3) 2000-2200 (1-2)	1900-2230 (1-2)					
Central & South Africa	1200-1500 (0-1)* 0900-1400 (1-2) 1400-1600 (2-3)	0630-1400 (1) 1400-1530 (1-2) 1530-1800 (2-3)	1730-0100 (2-6)	1900-0000 (2)	CHICAGO, ILLINOIS TO:				
South America	1030-1700 (2)* 0700-1500 (2-3) 1500-1700 (3-4)	0600-1600 (2-3) 1600-1800 (3-4) 1800-2000 (1-2) 0000-0330 (1-2)	1800-0500 (3-4) 0500-0730 (2-3)	1830-0400 (2)	Western & Central Europe	0900-1200 (1-2)	0700-1300 (2-3) 1300-1430 (3-4) 1430-1600 (1)	1630-1930 (2-3) 1930-0300 (1-2)	1800-0100 (2)
South East Asia	Nil	0700-1000 (1) 1600-1900 (0-1)	0300-0700 (0-1)	Nil	Southern Europe & North Africa	0900-1300 (2)	0600-1200 (2-3) 1200-1430 (3-4) 1430-1630 (1-2)	1630-2000 (3-4) 2000-0200 (1-2)	1800-0030 (2-3)
Australasia	1600-1900 (0-1)	0700-1030 (2) 1600-1900 (1) 1900-2030 (2)	0030-0730 (2-3)	0200-0700 (2)	Central & South Africa	1200-1500 (0-1)* 0800-1300 (1) 1300-1600 (2-3)	0600-1300 (1) 1300-1600 (1-2) 1600-1800 (2-3)	1730-0030 (2-3)	1830-2330 (1-2)
Guam & Pacific	1400-1800 (1)	0730-1100 (2) 1500-1800 (1) 1800-2000 (1-2)	2300-0700 (2-3)	0000-0600 (1-2)	South America	1200-1600 (2)* 0730-1400 (3) 1400-1700 (4)	0600-1500 (2) 1500-1800 (3-4) 1800-2000 (1-2) 2330-0230 (1-2)	1800-0600 (3-4)	1900-0430 (2-3)
Japan & Far East	Nil	0700-0900 (1-2) 1600-1900 (1-2)	0100-0700 (1)	0200-0600 (0-1)	Japan & Far East	1400-1700 (1)	0700-0930 (1-2) 1300-1700 (1) 1700-2000 (2)	0100-0800 (1)	0200-0600 (0-1)

ALL TIMES IN E S T

TAMPA, FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters	TAMPA, FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0800-1400 (3)	0700-1200 (2-3) 1200-1500 (3-4) 1500-1700 (1-2)	1700-2200 (3-4) 2200-0300 (2-3)	1800-2330 (3)	South East Asia	1500-1830 (0-1)	0700-1000 (1) 1500-2000 (1)	0230-0800 (1)	Nil
Central & South Africa	1000-1500 (1-2)* 0730-1300 (1-2) 1300-1630 (3)	0100-0930 (1-2) 0600-1300 (1) 1300-1600 (1-2) 1600-1800 (3)	1700-0100 (3)	1830-0030 (2)	Hawaii	1100-1900 (2-3)	0900-1030 (2-3) 1030-1700 (1-2) 1700-2030 (3-4)	2100-0300 (3-4) 0300-0800 (2)	2200-0700 (3)
South America	0900-1300 (1-2)* 1300-1800 (3)* 0730-1500 (3) 1500-1900 (4)	0630-1500 (2-3) 1500-2000 (4) 2000-0300 (2-3)	1700-0500 (4) 0500-0730 (3)	1800-0400 (3-4)	Australasia	1800-1800 (0-1)* 1500-1900 (1) 1900-2100 (2)	0700-1100 (1-2) 1400-1700 (1) 1700-2100 (2)	0100-0730 (2-3)	0130-0630 (1-2)
South East Asia	1830-1930 (0-1)	0630-0900 (1) 1700-2000 (1)	0300-0700 (0-1)	Nil	SAN ANTONIO, TEXAS, TO:				
					Europe & North Africa	0900-1330 (2-3)	0600-1200 (1-2) 1200-1530 (2-3)	1730-0200 (2-3)	1900-0100 (1-3)
					Central & South Africa	1100-1500 (1-2)* 0800-1200 (1-2) 1200-1700 (3)	0600-1300 (1) 1300-1600 (1-2) 1600-1900 (2-3)	1800-0030 (2-3)	1900-2330 (1-2)

ALL TIMES IN C S T

SAN ANTONIO, TEXAS TO:

(Cont.)

80 Meters

South America

1300-1700 (2-3)*
0700-1480 (2-3)
1400-1800 (4)
1800-0300 (1-2)

Japan & Far East

1500-1830 (2-3)
0700-0900 (1)
1300-1700 (2)
1700-2100 (3)

South East Asia

1730-1900 (0-1)
0700-1000 (1)
1700-2100 (1)

Australasia

1700-1830 (1)*
1400-1900 (2-3)
0700-1100 (1-2)
1400-1700 (1)
1700-2100 (2)
0200-0400 (1)

DENVER, COLORADO TO:

Europe & North Africa

0900-1200 (0-1)
0700-1100 (1)
1100-1500 (1-2)

Central & South Africa

0800-1200 (1)
1200-1600 (2-3)
0600-1200 (0-1)
1200-1500 (1-2)
1500-1800 (2-3)

South America

1200-1600 (2)*
0700-1200 (2-3)
1200-1700 (3-4)
1800-0500 (3-4)
0600-1500 (2)
1500-1800 (3-4)
1800-2000 (1-2)
2200-0300 (1-2)

Japan & Far East

1300-1800 (2-3)
0600-1000 (1-2)
1000-1500 (2)
1500-2200 (3)

South East Asia

1530-1730 (0-1)
0530-0730 (1)
1500-1800 (1-2)

Australasia

1500-1800 (1-2)*
1300-1700 (2)
1700-1900 (3)
0600-1000 (1-2)
1300-1700 (1)
1700-2000 (2-3)

LOS ANGELES, CALIF. TO:

Europe & North Africa

1000-1230 (0-1)
0700-1100 (1)
1100-1400 (1-2)

Central & South Africa

0900-1200 (1)
1200-1500 (1-2)
0600-1400 (0-1)
1400-1700 (1-2)
1830-2200 (2-3)
2200-0000 (1)

South America

1000-1350 (2)*
0700-1200 (3-4)
1700-2000 (1-2)
1200-1600 (3-4)
0600-1500 (1-2)
1500-1700 (3-4)
1700-2000 (1-2)
2300-0300 (2)

ALL TIMES IN P S T

LOS ANGELES, CALIF. TO:

15 Meters

40 Meters

80 Meters

Guam & Mariana
1300-1800 (1)*
1100-1700 (2)
1700-1900 (3)

Australasia

1500-1900 (1-2)*
1100-1730 (2)
1730-1900 (3)

Japan & Far East

1300-1700 (2)
1700-2000 (3)
1200-1800 (2-3)
1800-2200 (3-4)

South East Asia

1400-2030 (1-2)
0700-1100 (1-2)
1300-1900 (0-1)
1900-2300 (1-2)

Hong Kong, Macao & Formosa

1400-1900 (2)
0700-0900 (1-2)
1330-1800 (1-2)
1800-2200 (2-3)

PORTLAND, OREGON TO:

Europe & North Africa

0900-1200 (0-1)
0800-1300 (1)
1600-2100 (1)

Central & South Africa

1200-1400 (1)
0800-1400 (0-1)
1400-1700 (1-2)
1600-2100 (1)

South America

1300-1500 (1-2)*
0800-1200 (2-3)
1200-1800 (3-4)
0600-1100 (1)
1100-1400 (1-2)
1400-1800 (3-4)
1800-2300 (1-2)

Australasia

1500-1900 (1)*
1200-1730 (2)
1730-1900 (3)
1200-1700 (1)
1700-2100 (2-3)

Japan & Far East

1300-1830 (2-3)
1200-1800 (2-3)
1800-2100 (3-4)
2300-0630 (3-4)

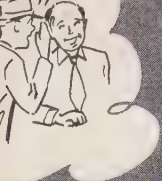
South East Asia

1600-2000 (1-2)
0700-1100 (1-2)
1100-1600 (0-1)
1600-2300 (1-2)
0300-0630 (1-2)
0330-0600 (1)

Symbols for Percentage of Days of Month Path Predicted Open:
(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

* Indicates time of possible ten-meter openings.

The Propagation Charts are based upon a radiated CW power of 150 watts and are centered on the areas indicated. These forecasts are, for the most part, based upon basic ionospheric data published by the CRPL of the National Bureau of Standards, and are valid until November 15th.



The Rumors ARE TRUE —
there's BIG NEWS.
A New SUPER BANDMASTER TRANSMITTER
— TVI SUPPRESSED —

The Midget with a Mighty **PUNCH**

No. T-90

90 WATTS
CW

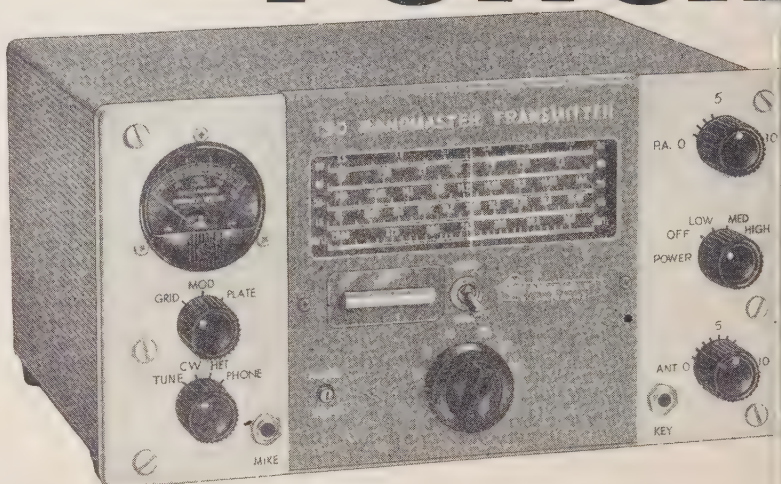
75 WATTS
PHONE

Only

$12\frac{3}{8}'' \times 10\frac{1}{2}'' \times 6\frac{3}{4}''$

\$179.50*

Factory built and Tested
 complete with tubes
 less power supply
 (NOT A KIT)



The T-90 is the result of our long study concerning the operating requirements of most amateurs. Sufficient power to "get out" on all bands, either fixed or mobile, under today's QRM conditions, plus space limitations of the average home, has been the prime objective in its design. The many refinements contributing to smooth and efficient operation which have been incorporated in the T-90, have up to this time been found only in transmitters selling at a much higher price. A close study of the following features will provide convincing evidence that the T-90 is the transmitter YOU WANT for your shack or car.

FEATURES

1. TVI Suppressed
2. Complete band-switching; no plug-in coils
3. Complete Break-in Keying — or keying of exciter stages only
4. VFO Spot Frequency Tuning without carrier on
5. Cathode biased Exciter tubes and clamp tube control of Final Amplifier Screen Voltage
6. Initial tuning at reduced power
7. Three position excitation control
8. Antenna loading flexibility
9. Selector switch allows metering of PA Grid, PA Cathode and Modulator currents
10. Remote Break-in and Receiver muting provided by relay control
11. VFO voltage regulated and temperature compensated
12. Illuminated VFO dial and Meter
13. Crystal door on front panel
14. Filament Operation 6 or 12 volts AC/DC
15. Low average Modulator current
16. Built-in provision for either Carbon, Crystal or Dynamic microphone and push-to-talk

NOW IN PRODUCTION SEE YOUR DEALER

Send for Complete Technical Details to

Harvey WELLS ELECTRONICS, INC.

from **Harvey-WELLS!!!!**

and a **DOUBLE CONVERSION MATCHING RECEIVER**
— WITH HIGH SELECTIVITY —

Packed with Performance on **EVERY BAND**

No. R-9

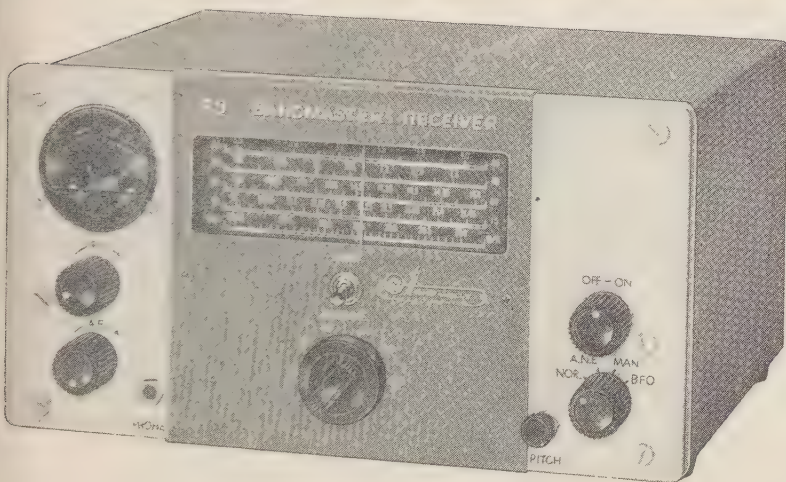
9 TUBES

**MOBILE
OR FIXED**

*Same Size
cabinet as
Transmitter*

\$149⁵⁰*

**SPEAKER IN MATCHING
CABINET AVAILABLE**



In our further studies of amateur requirements, we found that the ultimate desire of all was to have equipment which "went together". The difficulty of installing odd sizes of cabinets has always been a source of irritation to the neat and efficient operator. The R-9 is physically an identical twin to the T-90. Now at last without any reservation you can have fixed station performance either in your shack or in your car. This highly stable all-band double conversion receiver has a versatility and a number of refinements which have never before been offered in such small space.

FEATURES

1. Double conversion on all bands
2. Three tuned circuits on each band, in R.F. section
3. All coils slug tuned, giving high "Q" circuits
4. Separate oscillator coils for each band (no spurious response)
5. Bandwidth:
Two kilocycles wide at the 6 db point
6. Complete with tubes and your choice of built-in power supply for 6-12 V. DC or 115 V 50/60 cycles AC
7. Crystal control for net operations
8. Approximately 6" of dial spread on all bands. Accurately calibrated
9. Rigid Steel construction. (Vibration-Proof)
10. 6" height enables easy under dash mounting for mobile installation

NOW IN PRODUCTION SEE YOUR DEALER

*Prices subject to change without notice.

WØURQ really got started in the 1920's, although his first ticket did not come along until 1935 (class A in 1936). Since then has been busy either building equipment — everything from the antenna to the power transformer — or investigating the higher frequencies. Cliff is proud of his 43 states on 6 meters and his citation for "Project RASO." President of the St. Paul Mobile Radio Club. For past 13 years has been Police operator with local department. Married to WØKJZ. Home Address: 1258 Van Buren, St. Paul E-4, Minn.



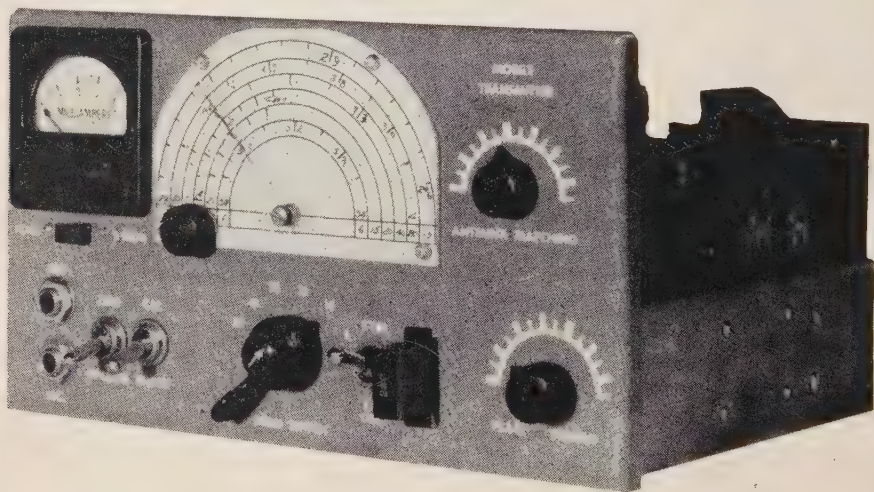
CQ

Mobile Feature

ter are powered from any separate source putting out about 300 volts at 100 ma., or the entire rig can be operated from a single 300 volt supply if the 160 ma. current is available.

The entire transmitter is built on a 7"x9"x2" chassis with a front panel 5 inches high. It slides into a home-made cabinet that is fastened under the dash of the car. All controls are on the front panel. The main dial is calibrated on a piece of white cardboard, covered with a sheet of plexiglas to protect it from damage or warping and fastened to the front panel with small bolts. The pointer is attached to an extension of the tuning condenser shaft protruding through the front panel. The drive being done by means of concentric disc taken out of a surplus beacon receiver. The meter is a surplus unit shunted to read 0-75 ma. full scale and it is switched to read modulator

This rig was built small so it would fit under the dash of the family automobile, yet it includes almost all of the operating features of the rig in the shack. Six-band operation, fone or CW, v.f.o. or crystal control, with provision for zeroing-in on a signal, push-to-talk, complete band switching, and single dial tuning, up to the pi-network output.



The Six Bander

CLIFFORD C. JOHNSON, WØURQ

The power input is a clean 15 watts that requires no elaborate power supply. So the battery drain is low and the ordinary car generator can easily take care of it. It is designed to operate from two small vibrator power supplies, or dynamotors, or one of each, or what have you? One supply can be the auto receiver—it is not used for anything when transmitting anyway. The final and modulator of the transmit-

and final plate current—very necessary in tuning up a pi-network. The two jacks on the lower left side are for mike and key, the mike jack being the small shaft type and the key jack a standard ¼-inch size so no mistake can be made in putting in the plugs. One toggle switch (Sw8) is for zero-beating a signal (it applies voltage to the oscillator only) and one (Sw9) is for fone-CW operation. The crystal

socket is recessed to protect the crystal from being bumped out of the socket. Below the dial is the bandswitch and the two controls on the right side of the panel are plate tank (C25) and pi-network (C28/C29) output tuning. A switch on the mike energizes the antenna change-over relay. This relay has a second set of contacts to apply receiver voltage to the low-power stages while an external relay on the dynamotor puts voltage on the final and modulator.

The tube line up is a 6AU6 v.f.o or crystal oscillator, 6AH6 buffer-doubler, and a 5763 final which runs straight through on all bands. An OA2 is included on the chassis to regulate the v-f-o voltage supply. The modulator is a pair of 6AQ5's in class AB₁ with a 12AT7 speech amplifier from a carbon microphone. Speech frequencies are emphasized by a small coupling condenser (C31) and a low capacity cathode by-pass condenser (C32).

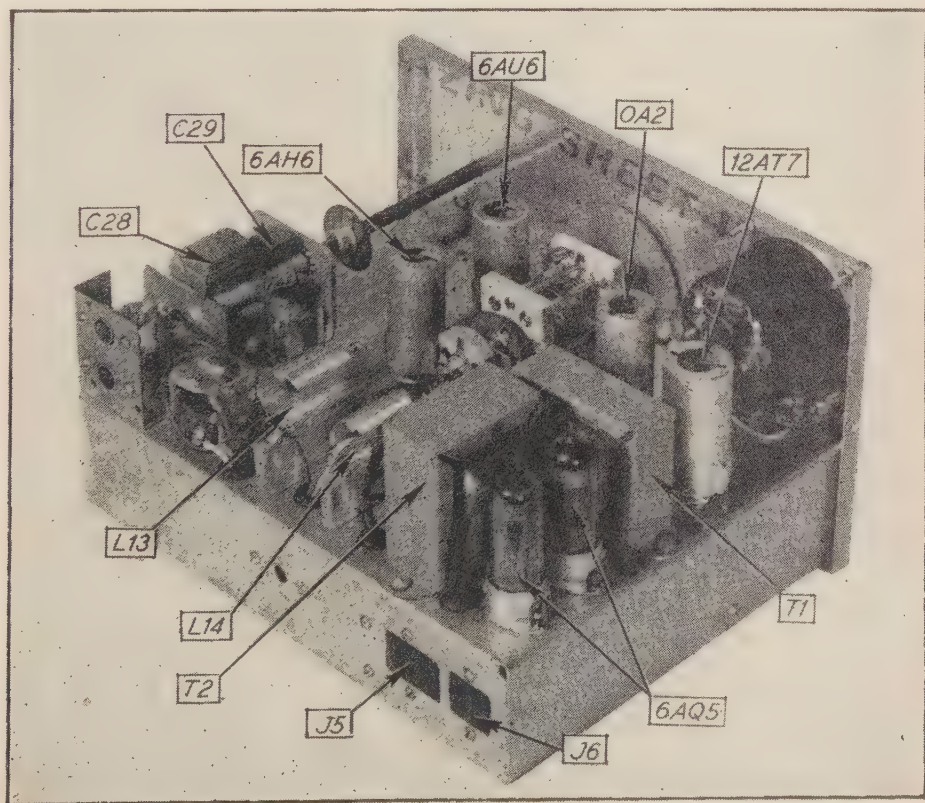
Why not gang tuning? No need to shy away from single dial control because it sounds complicated—in a transmitter of this type circuit tracking is much less critical than in a receiver tuning the same frequency spectrum. Even if a tuned circuit is not exactly on the nose, the power loss is mostly in tube plate dissipation and hardly shows up in grid drive to the following stage—which is what we are interested in. The final stage is tuned separately for ease

in antenna matching over the wide frequency range of the transmitter. The whole idea of gang tuning is to maintain uniform grid drive to the final over the entire range of each band. This is easily accomplished on the lower frequencies with broad-band coils, but above 21 Mc. actual tuning of the circuit becomes essential—hence the additional of the third condenser (C3) to the gang. This small variable capacity is just sufficient (about 10 μ fd. maximum) to tune the higher frequencies so that the grid current to the final remains constant when tuning an entire band.

Oscillator Circuitry

The v-f-o circuit used is one that is particularly suited for mobile operation or limited coil space. Coil "Q" is not critical and stability is achieved by using silver mica and NPO type condensers as well as a ceramic switch and tube socket. As with any v.f.o. care is taken to use heavy connecting wire, short leads, and rigid mounting of all parts to insure freedom from vibration. Experience has shown it to be more stable than any present day mobile receiver.

Three separate oscillator coils (L1, L2 and L3) are used to simplify setting the tuning range and enable the use of common crystals—the crystal used corresponding to the frequency range of the grid coil. For "crystal" operation the dial is set to the approximate frequency of

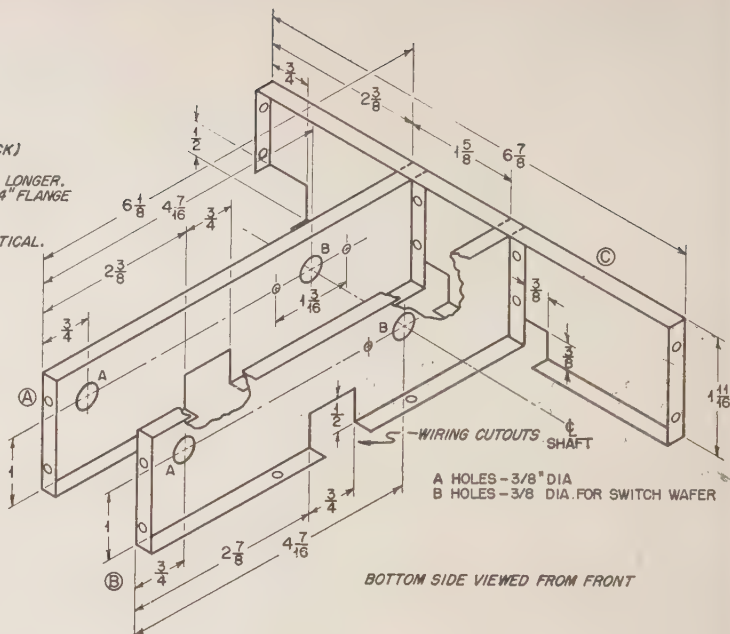


NOTE:
MAT—22 GAUGE ALUMINUM (.025 THICK)

PARTITIONS A & B SAME SIZE, C LONGER.
PARTITIONS SAME HEIGHT WITH 1/4" FLANGE
ON ALL FOUR EDGES.

MOUNTING HOLE LOCATIONS NOT CRITICAL.
TAP FOR 4-36 SCREWS.

LOCATE SHAFT CENTER LINE FROM
INDEX MOUNTING HOLE ON FRONT
APRON.



Partition dimensions. See the photo at the bottom
of page 33 for exact placement under the chassis.

the crystal, the switch placed in the "crystal" position, and all circuits right up to the final are then completely tuned and ready to operate. It will be noted from the schematic that the tuning condenser (C1 and C2) is used for two purposes. The two sections are switched in parallel to make 50 $\mu\text{fd.}$ capacity to spread the 3500-4000 kc. range over 180 degrees of the dial. The next oscillator coil (L2) tunes from 7000 to 7425 kc. using only $\frac{1}{2}$ of the dual condenser (25 $\mu\text{fd.}$) so that the ten-meter band is spread over the 180 degrees of the dial. This range is used for the 40, 20, 15, and 10-meter bands frequency multiplication being done in the plate circuit of the oscillator or the buffer-doubler stage as required. These bands are all in harmonic relationship so the calibration on the dial for 40 meters is about 120 degrees and for 20 and 15 meter bands somewhat less than 90 degrees.

The third oscillator coil (L3) operates from 8333 kc. to 9000 kc., tripling in the oscillator plate to 25-27 Mc. and doubling in the 6AH6 stage to 50-54 Mc. Note that the second half of the dual condenser (C2) is switched over and used as a plate tuning condenser for the two highest ranges covered by the plate circuit of the oscillator, thus maintaining uniform grid drive to the buffer stage. Coil L4 is untuned, but made broadly resonant just outside the 40-meter band so that adequate drive is delivered to the 6AH6 for doubling to 14 Mc. and tripling to 21 Mc.

The use of separate coils for each band in

the plate of the 6AH6 buffer-doubler makes the construction easier and simplifies adjustment for tracking. Any one band can be worked on without affecting the others and since the drive will vary from band to band, it permits loading the individual coils with resistance values to obtain the proper amount of grid current to the final for each band. The same thing is done in larger rigs by varying the screen voltage of the driver tube with a potentiometer. Once the final grid current has been adjusted for each band, it requires no further attention and no provision is made to read grid current on the meter. However, in order to make the initial adjustments, provision is made to read the grid current of the 6AH6 and the 5763 by dividing their grid resistors in two parts (R3/R4 and R11/R12). The two resistors are pig-tailed together, this junction being made to project up from the socket to form test points "T" for the attachment of an external test meter to read grid current during the lining up process.

Final Amplifier Coils

The final tank coils (L13 through L16) are made from B&W Miniductors using a combination of single and tapped coils. The 80-meter coil (L13) is separate so additional capacity can be added directly to the circuit to obtain the proper L and C ratios for antenna matching. The two low-frequency coils (L13-L14) are mounted on the top of the chassis using a $\frac{1}{4}$ " thick bar of polystyrene stock $\frac{1}{2}$ " wide and

COIL DATA

Coil	Turns	Wire Size	Diameter	Winding Length	Tuning Range
L1	36	24	3/4"	1"	3500 - 4000 kc.
L2	19	24	1/2"	3/4"	7000 - 7425 kc.
L3	17	24	1/2"	3/4"	8333 - 9000 kc.
L4	53	30	1/2"	3/4"	Resonates 6900 kc.
L5	12	24	3/4"	3/4"	14 Mc.-14,850 kc.
L6	6	20	3/4"	3/4"	25 Mc.-27 Mc.
L7	95	32	1/2"	7/8"	3500 - 4000 kc.
L8	45	30	1/2"	3/4"	7000 - 7425 kc.
L9	25	24	1/2"	3/4"	14,000-14,850 kc.
L10	16	24	1/2"	3/4"	21,000-22,275 kc.
L11	15	24	3/4"	3/4"	28,000-29,700 kc.
L12	7	20	3/4"	3/4"	50,000-54,000 kc.
L13	31	B&W 3016	1"	1"	80 meters
L14	32	B&W 3012	3/4"	1"	40-20 meters
		(Tapped 17 turns from cold end)			
L15	12	B&W 3011	7/8"	3/4"	15-10 meters
		(Tapper 5 turns from cold end)			
L16	6	16	1/2"	1"	6 meters

L1 is wound on a ceramic form that has threaded holes at both ends for mounting.

L2 through L12 are wound on 1 1/4" lengths of polystyrene rod drilled and tapped at one end to take a 4-36 mounting bolt. A small hole is drilled at the opposite end through the diameter of the form to hold the end of the wire and a similar hole is drilled 3/4 inches down the form to hold the opposite end of the winding.

L7, L8 and L9 have a second set of holes drilled next to the wire mounting holes for the loading resistors.

L13, L14, L15, and L16 are mounted on polystyrene bars which bolt to the chassis, as explained in the text.

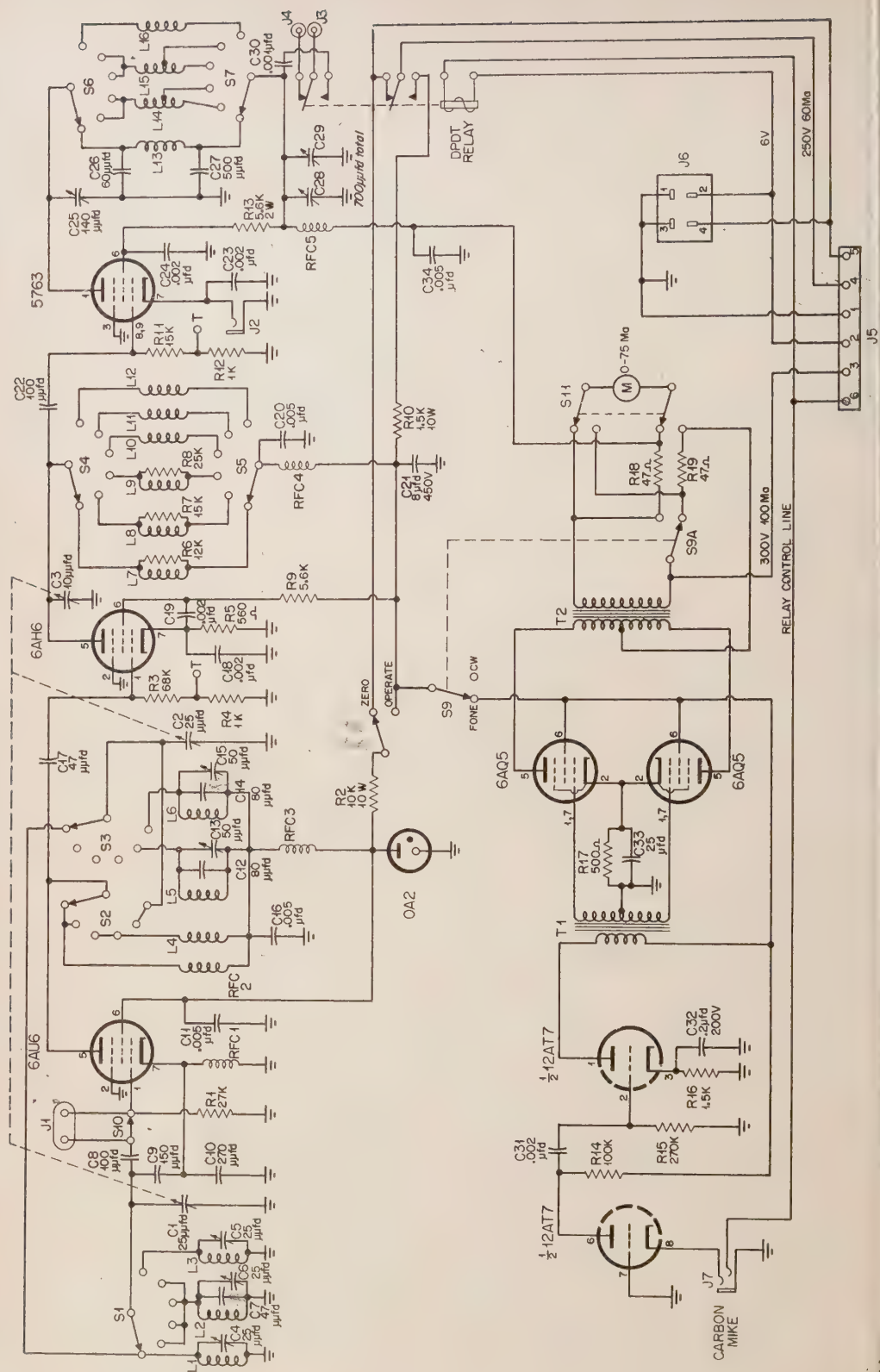
ightly longer than the coils. The coils are tied into a slot in the bar with coil dope and the bar drilled and tapped for mounting bolts and the whole assembly then bolted down to the chassis. The coil leads are brought down through grommetted holes in the chassis to the bandswitch just below. The two high-frequency coils (L15-L16) are mounted in the space between the switch wafers under the chassis, being fastened right to the switch contacts. They also have small polystyrene blocks glued between coil and chassis to support them and take the strain off the switch contacts.

The final tank condenser (C25) should have pre capacity for the lowest bands, but a compromise is necessary to make tuning of the higher bands less critical. The antenna loading condenser (C28-C29) is a dual section mid-broadcast type with the sections in parallel (and the trimmers removed) to make a total capacity of about 700 μ fd. The mounting of the final tank and antenna loading condensers is carefully figured out for short leads and direct ground returns to the cathode of the final tube. The loading condenser is mounted on the back of the chassis, but it is insulated from the chassis with a thin sheet of bakelite. It is fastened with bolts coming from the underside of the chassis through holes large enough so that the bolts do not touch the metal, but make contact only on the underside of the chassis. The tank condenser is directly under the antenna condenser and right next to the final tube socket. The Cardwell condenser used in

this model is mounted on a home-made bracket, but a *Bud* or *Hammerlund* condenser of the same kind has mounting legs that can be bolted to the side of the chassis. The condenser grounds and the screen and cathode by-pass condensers connect to one common ground point on a lug under the bolt holding the tube socket. Keying is done in the cathode of the final and switch, *Sw9*, shorts out the secondary of the modulation transformer and removes voltage from the modulator.

Assembly

This rig is small and compact, but not complicated to build. The small size is obtained by careful layout and the use of many new small components. The bandswitch is made from individual ceramic wafers of *Centralab's* miniature 2000 series, each section having one pole and 12 positions, although only six positions are used. Two pole sections could have been used, but the wiring job is lots easier with one pole wafers. The wafers are mounted on the coil partitions with bolts and spacers. A shaft for the switch is made from a 7-inch length of 1/4" diameter fiber rod filed flat on two sides to fit the slot in the pole piece of the switch wafers. Flat fiber shafts are made commercially, but they may be a little hard to find. A metal shaft is not advisable since undesired coupling between driver tube and final should be avoided. Also, we want as little metal as possible in the field of the final coils that mount between the switch wafers.

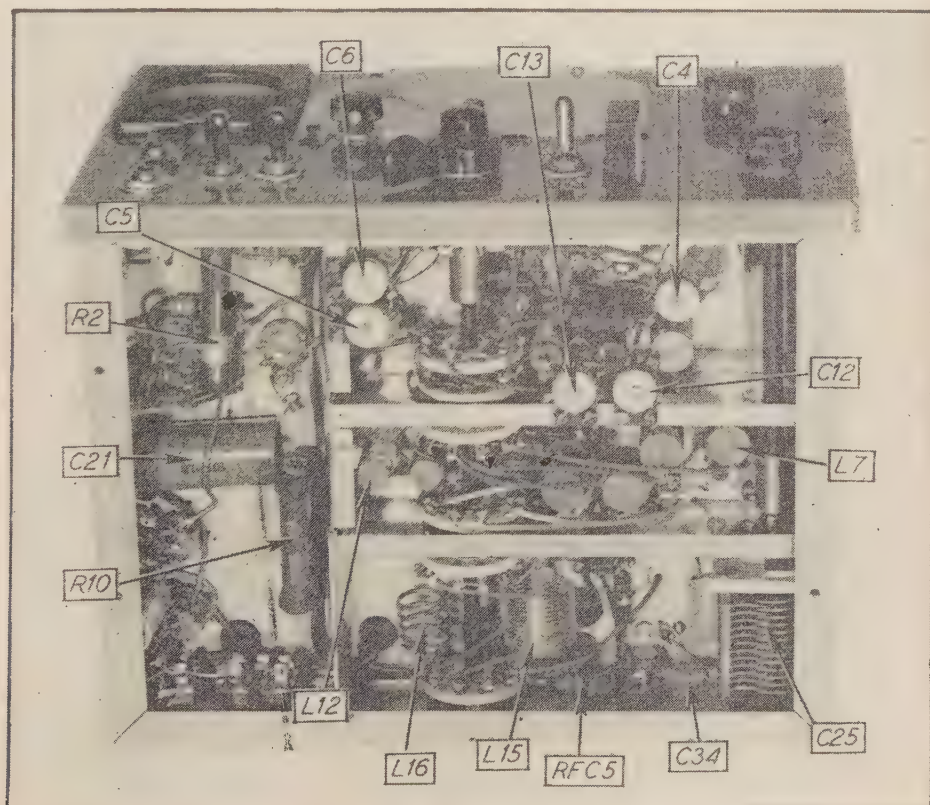


C1, C2—Bud dual 25 uufd. per section Tiny-Mite, LC-1661.
C3—APC air padder cut down to one rotor, one stator, ganged to C1-C2 with shaft coupling.
C4, C5, C6—5-25 μ fd., NPO type variable ceramic trimmer (Erie 557).
C7—47 μ fd., silver mica.
C8—100 μ fd., silver mica.
C9—150 μ fd., silver mica.
C10—270 μ fd., silver mica.
C11, C16, C20—.005 μ d., disc ceramic.
C12, C14—80 μ fd., ceramic Erie GP.
C13, C15—8-50 μ fd., N750 ceramic variable, Erie 557.
C17—47 μ fd., mica or ceramic.
C18, C19, C23, C24, C31—.002 μ fd.
C21—8 μ d. 450v., electrolytic.
C22—100 μ fd.
C25—140 μ fd. variable (Bud MC-1856).
C26—60 μ fd. tubular
C27—500 μ fd. mica.
C28, C29—Midget BC condenser, 2-section, 700 μ fd. paralleled.
C30—.001 μ d. 3000 V. TV disc ceramic.
C32—2 μ d. 200v.
C33—25 μ d., 50v., electrolytic.
R1—27,000 ohms, $\frac{1}{2}$ w.
R2—10,000 ohms, 10w.

R3—68,000 ohms, $\frac{1}{2}$ w.
R4, R12—1000 ohms, $\frac{1}{2}$ w.
R5—560 ohms, 1w.
R6—12,000 ohms, 1w.
R7—15,000 ohms, 1w.
R8—25,000 ohms, 1w.
R9—5600 ohms, 1w.
R10—1500 ohms, 10w.
R11—15,000 ohms, $\frac{1}{2}$ w.
R13—5600 ohms, 2w.
R14—100,000 ohms, $\frac{1}{2}$ w.
R15—270,000 ohms, $\frac{1}{2}$ w.
R16—1500 ohms, $\frac{1}{2}$ w.
R17—500 ohms, 5w.
R18, R19—47 ohms, $\frac{1}{2}$ w.
J1—Crystal socket for FT-243 holders.
J2—Closed circuit key jack.
J3, J4—Motorola type pin jacks.
J5—6 prong Jones socket, chassis mounting type.
J6—4 prong Jones socket, chassis mounting type.
J7—Two circuit mike jack.
S1, S2, S3, S4, S5, S6, S7—Centralab miniature switch, 6 positions.
S8—S.p.d.t. toggle switch
S9, S9A—D.p.d.t. toggle switch. Fone—CW.
S10—S.p.s.t. toggle
S11—D.p.d.t. slide switch Meter changing.
RFC1, RFC2, RFC3, RFC4, RFC5—2.5 mh. Grayburne F-25, ferrite core choke
T1—Class AB1 driver transformer (Merit A-2922).
T2—10-watt modulation transformer (Merit A-3008).

Three partitions are made from sheet aluminum about 22 gauge, or cookie sheet material, the heavy kind. One partition fits the entire length of the chassis (inside length slightly less than 7") and has $\frac{1}{4}$ " lips bent on all sides for strengthening and providing mounting legs. Where this lip passes the oscillator compartment it is used for mounting two of the oscillator trimmer condensers. This partition is made only 1-11/16" high so the trimmers will not extend beyond the depth of the chassis. The two partitions dividing the coil compartments are made exactly the same way except that they are shorter. Cutouts are made on the bottom side of these partitions for the wiring to pass through where required. The front apron of the chassis is drilled to match mounting holes for the controls. The coil partitions are marked accordingly for mounting the switch wafers in line with the switch index which mounts on the front apron. A hole is drilled through each partition to allow the extension shaft of the final condenser to pass through. Cutouts made in the bottom in line with the tube sockets for the filament wiring and the coupling condensers.

Accuracy is required in mounting the switch wafers on the partitions so that the switch will operate smoothly. A $\frac{1}{4}$ " hole is drilled in the rear apron of the chassis directly in line with the index mounting hole so that the switch



shaft can be inserted from the rear, slid through all the wafers and fastened to a shaft coupling on the index. Switch *Sw7* is also mounted on the rear apron with bolts and spacers. All switch wafers are oriented so that the six contacts used appear on the top where they can be easily reached with the soldering iron for making connections to the coils.

A small bracket is made of some aluminum sheet material to mount the recessed crystal socket behind the cutout in the front apron. Fastening this bracket requires countersunk flat head bolts, so the panel will fit flush against the front apron of the chassis when it is put on. An aid in fastening all partitions and brackets is to tap the mounting holes drilled in them so that they may be attached to the chassis with stud bolts—saves a lot of time and trouble trying to put on nuts in tight spots.

Dial Drive

The *Bud* dual "Tiny-Mite" has two substantial mounting feet and these are used to fasten it to the chassis right down the center line with enough of the shaft extending beyond the front of the chassis to attach a pointed after the panel is put on. For this particular dial drive system, a slot is cut out in the chassis large enough for the large disc to extend below the surface. The little driving disc mounts through a bushing on the panel itself. Its exact location must be found by trial since the tuning knob has to be out of the way of the calibrations on the dial, yet the discs must be close together to get a smooth turning drive. A small bracket is made to mount the modified *APC* condenser in line with the rear extension shaft of the "Tiny-Mite." They are ganged together with a regular insulated shaft coupling. Another small bracket is made to mount the two pin type jacks flush with the rear of the chassis behind the antenna loading condenser. Mounting holes for the tube sockets, transformers, and final coils are then made and

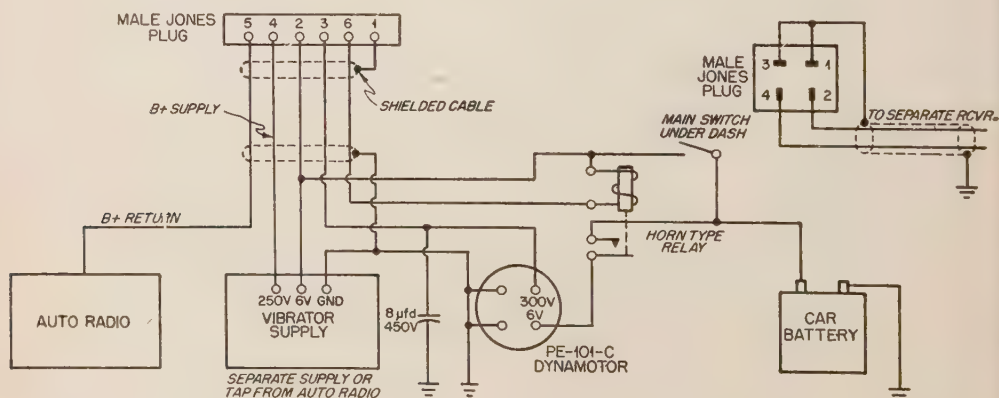
all components mounted on the top of chassis. The mounting holes in the front apron of the chassis are used as a template to mount the panel, which is fastened to the chassis with the same nuts holding the controls.

Wiring

The wiring is done next, putting in all voltage supply circuits, by-pass condensers, and resistors. Most of these mount right at the tube sockets. The cathode by-passes in the modulator (*C32* and *C33*) are mounted vertically along the side of the chassis. The audio system is simple and requires no particular caution in wiring. The transformer leads are brought through the underside of the chassis through grommetted holes, as are the leads to the meter switch (*Sw11*), relay, and the tuning condenser. The long partition is installed and much of the wiring is placed along the modulator side of this partition while the r-f voltage supply leads run through the holes cut in the bottom of the partition over to their respective parts in the r-f section. Tie points are used where required so that all parts are securely fastened—always a good idea in a mobile rig.

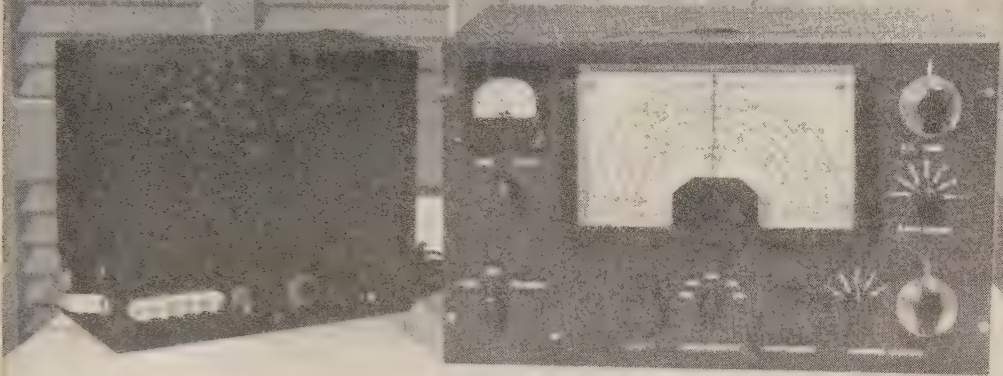
Before putting in the coil partitions, the oscillator coils are installed and this whole section wired up. The first partition is then bolted in place so that the oscillator plate coil may be wired to the switch contacts. At this point voltage can be applied to the oscillator using a test bench power supply with enough voltage to ignite the *OA2* regulator tube. Using a receiver as a monitor, the tuning range of the oscillator coils can be set by adjusting the trimmers. With the *6AH6* tube in place (but with no plate voltage on it) a 0-1 milliammeter is attached to the *6AH6* grid to point and the oscillator plate coils checked for tracking. 80 and 40 meters present no problem.

(Continued on page 62)



Power and control wiring for the "Six Bander."

The GELOSO 60 Watt V.F.O.



WILLIAM I. ORR, W6SAI/FP8AC

Assistant Editor

This story starts "Believe It or Not" in the tiny principality of Andorra, during the Summer of 1951. I was lucky enough to be one of the operators of the first legitimate Andorra amateur station, 7B4QF, which operated for a short time in June of that year.¹

Taking the bitter with the better, I volunteered for the 3 a.m. to 9 a.m. operating shift in an effort to keep 7B4QF on the air 24 hours a day. It was necessary to struggle out of bed in the unheated hotel room, dress in the freezing blackness and walk across the unlighted village square to the home of Yves Ramond (PX1YR) in whose basement 7B4QF was located.

On the particular morning this story starts, I had just taken over the operating position from SM5UM and gave the 14-Mc. band a quick once-over. It sounded *very* dead. A CQ from 7B4QF brought a reply from my old friend DL7—, and a QSO was started before the morning rat-race would get under way. I had worked the DL many times from various DX QTH's so a real rag-chew was begun, revolving around DX operation and the use of VFO's.

The DL7 told me he was using a "Geloso" v-f-o exciter, which he liked very much. It was an all-band affair, with a Clapp oscillator, two buffer stages and sufficient output on all bands to drive an 807 tube. Further conversation on

this interesting unit was broken up by a G2 calling in to inform 7B4QF that the W stations were breaking through and that we had better attend to business.

When I arrived back home after this fascinating trip, the QSO with the DL and the remarks about the *Geloso* v-f-o intrigued me. *Geloso*? I had heard that name before—somewhere. Suddenly I remembered! John Geloso of "Pilot Super-Wasp" fame of the late twenties! Every old-timer looks back on those golden days of short wave radio, and particularly to the "Super-Wasp" receiver with fond memories.

Further inquiries brought forth the fact that the *Geloso* factories in Italy are now one of the largest producers of electronic equipment in southern Europe. Since John Geloso is an ardent amateur, it would not be unusual to assume that his company would be producing some types of amateur equipment. The little v-f-o units looked interesting, so two of them were ordered over mountains of red tape, and eventually arrived in W6-land.* They performed in an outstanding manner, and this article is the story of the little *Geloso* 4/101 v.f.o. and its operation.

The Geloso 4/101 V-F-O Exciter

The 4/101 Exciter is a compact Clapp-oscilla-

1. "Operation Andorra," William I. Orr, W6SAI, QST, October, 1951, p. 34.

* Now available through GILFER Associates, Box 239, Grand Central Station, New York 17, N.Y.

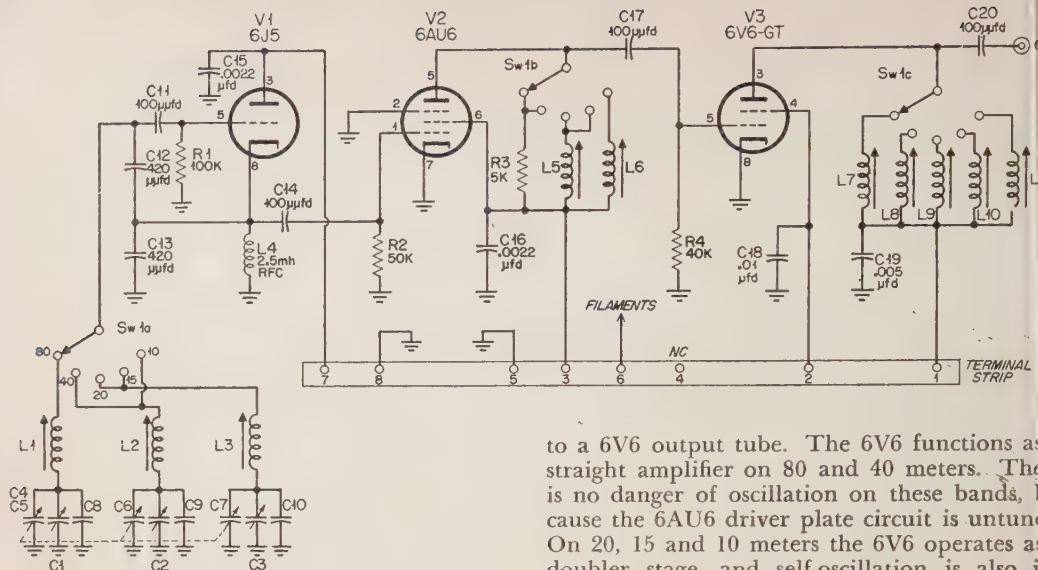


Fig. 1. Basic schematic of the GELOSO v.f.o. unit.

tor, frequency multiplier unit of exceptional stability. It is approximately $5\frac{1}{2} \times 6\frac{1}{2}$ in size, with an overall height (including tubes) of $5\frac{1}{2}$ in. The schematic of the v.f.o. is shown in Fig. 1. The unit uses American tubes (6J5, 6AU6 and 6V6GT), and is designed to provide ample grid drive to an 807 or similar type tube on all amateur bands. The use of such a complete unit would certainly take a lot of the strain and pain out of the building of a transmitter! Most of the nasty wiring and alignment would be done, in a neat package!

Three tubes are used in the 4/101 V-F-O Exciter: The first tube, a 6J5 triode, is used as a Clapp oscillator. Bandswitch section Sw1a selects the proper combination of oscillator coils and silver mica condensers to provide full bandspread on all amateur bands. The Clapp oscillator covers 3.5-4.0 Mc. for 80-meter operation; 7.0-7.45 Mc. for 40 and 10-meter operation, and 3.5-3.6 Mc. for 20 and 15-meter operation. High stability midjet air padding condensers are used in the frequency determining circuit of the oscillator to keep operational drift to a minimum. The output from the Clapp oscillator is taken from the cathode circuit of the 6J5 and capacity coupled to a 6AU6 isolation stage. The 6AU6 is chosen because of its low grid-plate capacity, its stability, and freedom from parasitics. On 80 and 40 meters, the 6AU6 functions as an aperiodic amplifier, with a 5000-ohm resistor as the plate load circuit. On 20, 15 and 10 meters, the 6AU6 operates as a doubler, the correct plate circuit determined by the setting of section B of bandswitch S1. The 6AU6 coils (L5 and L6) are broadly tuned to cover the whole amateur band in use.

The 6AU6 isolation stage is capacity coupled

to a 6V6 output tube. The 6V6 functions as straight amplifier on 80 and 40 meters. There is no danger of oscillation on these bands, because the 6AU6 driver plate circuit is untuned. On 20, 15 and 10 meters the 6V6 operates as doubler stage, and self-oscillation is also possible. The plate coils of the 6V6 (L7-L10) are slug-tuned, and resonate to the center of each amateur band. Output from the 6V6 is exceptionally constant across the bands. It means of a potentiometer in the screen circuit of the 6V6 tube, it is possible to adjust the actual output to match the driving requirements of the following stage.

The main tuning condenser (C4, C5, C6 and C7) of the v-f-o circuit employs ceramic insulation and consists of four separate gangs. The plates of these gangs are shaped to provide almost linear bandspread across each amateur band. The tuning condenser is directly coupled to the dial pointer to eliminate any slipping or calibration error at this point. The dial pointer and tuning condenser are driven by a 7:1 ratio drive pulley and cable from the tuning knob located on the left of the bandchange switch.

Power Requirements

The 4/101 V-F-O Exciter requires a filament source of 6.3 volts (a.c. or d.c.) at 1 ampere, and a plate power source of 400 volts at a current drain of 35-55 milliamperes, depending upon the setting of the bandswitch. For maximum stability of the Clapp oscillator, a regulated source of 150 to 210 volts is recommended. A VR-10 or two VR-105 tubes in series may be used to regulate the plate voltage of the 6J5 oscillator.

The Dial

No. v.f.o. is any better than its dial! The most accurate instrument can be rendered useless because of a poor dial. The precision dial of the 4/101 makes full use of the large amount of bandspread inherent in the instrument. The 80-meter band has 5 linear inches of calibration with markings every 10 kilocycles. The 40, 20 and 15-meter bands have 10 kilocycle markings with $6\frac{1}{2}$, $7\frac{1}{2}$ and $8\frac{1}{2}$ inches of dial calibration.

respectively. The 10-meter band has calibration markings every 50 kilocycles, with almost 10 inches of calibration. Thus, the dial can be read to about 2 kilocycles on all bands except ten meters. On this band, the dial can be easily read to within 10 kilocycles. Since the Clapp oscillator employs miniature variable air padding condensers and slug-tuned inductors, it is possible to make the dial track "on the nose" across each amateur band, and the important band edge points may be set with close accuracy.

Incorporating the 4/101 in a 60 Watt V-F-O Transmitter

It was decided to build a 60-watt transmitter using the 4/101 Exciter to drive a 6146 in a class C amplifier stage, running at 550 volts and 120 milliamperes. W6DTY's keying system² was chosen as the most satisfactory one for use with the 6146, since it combined an efficient screen clamping system with vacuum tube keying (V6 and V7). Actually, with all of the exciter wiring done by merely dropping the 4/101 into the chassis, the completion of the transmitter boils down to merely wiring up the power and control circuits (see Fig. 2).

2. "No Clicks—No Backwave," Williams, W6DTY, CQ, February, 1953, p. 60.

The tank circuit of the 6146 uses an all band pi-network coil (also a *Geloso* product) which is capable of continuous tuning from 3.0 to 32.0 Mc. A v-h-f filter network is included in the plate supply lead to the 6146 to minimize harmonic currents flowing back into the power wiring and causing unnecessary TVI. As a final TVI precautionary measure, all supply leads to the exciter unit and the 6146 stage are shielded, with the shield grounded at both ends of the leads. The use of low inductance "oystershell" bypass condensers on all power leads also helps to lick the TVI problem.

The power supply for the transmitter is mounted on a separate chassis apart from the transmitter for several reasons: First, any vibration caused by the power transformer or chokes would impart a ripple to the note of the v-f-o. Physical separation between v-f-o components and power supply components is a "must" in any design. Secondly, a power supply of the capacity to run this transmitter would generate enough heat to create a thermal drift problem with the v.f.o. And finally, a separate supply could be placed under the operating table, leaving more room on the table top to clutter up with books, pencils, ash trays, QSL cards, etc.

The power supply is a bridge system (Fig. 3)

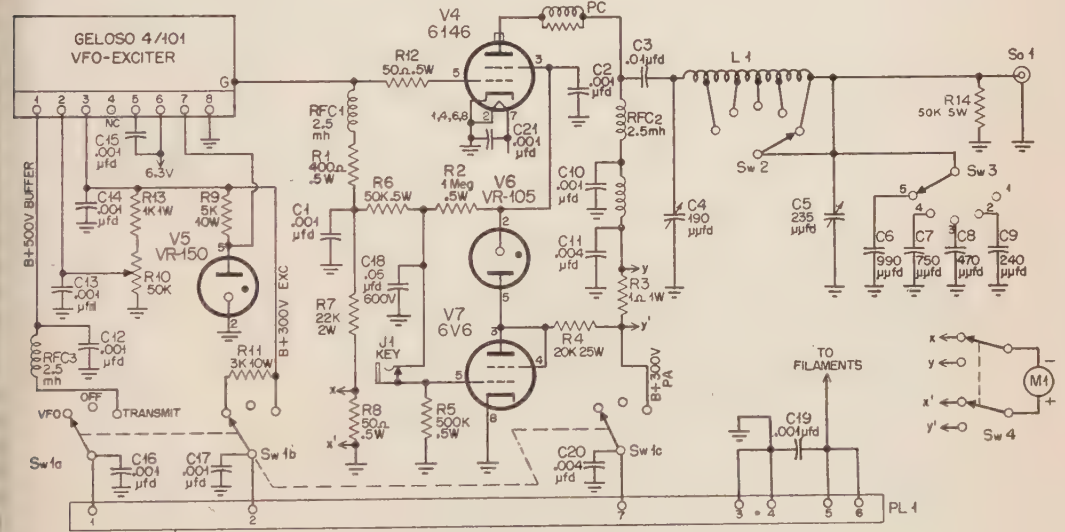


Fig. 2. Parts list and schematic of the 6146 power amplifier.

- C1, C2, C12, C13, C14, C15, C16, C17, C18, C21—0.001 μ fd. ceramic, Centralab DD-102.
- C3—0.01 μ fd. ceramic, Centralab DD16-103.
- C4—190 μ fd., BUD MC-1858.
- C5—235 μ fd., BUD MC-1859.
- C6—990 μ fd., Centralab TCN-760 and TCN-240 in parallel.
- C7—750 μ fd., Centralab TCN-750.
- C8—470 μ fd., Centralab TCN-470.

- C9—240 μ fd., Centralab TCN-240.
- C10—0.001 μ fd. feedthru, Erie-327.
- C11, C20—0.004 μ fd. ceramic, Centralab DD16-402.
- C18—0.05 μ fd., 600v., paper.
- M1—0-15 ma. meter.
- PC—Parasitic choke, 50-ohm, 1w., wound with 10 turns #22 enam.
- PL1—Seven prong male plug.

- R1—400 ohms, $\frac{1}{2}$ w.
- R2—1.0 meg., $\frac{1}{2}$ w.
- R3—1.0 ohm, 1w.
- R4—20,000 ohms, 25w.
- R5—0.5 meg., $\frac{1}{2}$ w.
- R6—50,000 ohms, $\frac{1}{2}$ w.
- R7—22,000 ohms, 2w.
- R8, R12—50 ohms, $\frac{1}{2}$ w.
- R9—5000 ohms, 10w.
- R10—50,000-ohm potentiometer, Mallory M50MP.
- R11—3000 ohms, 10w.
- R13—1000 ohms, 1w.
- RFC1, RFC3—2.5 mh., r-f choke, National R-100.

- RFC2—2.5 mh., r-f choke, National R-100U.
- Sw1—Three pole, 3 position, ceramic switch, Centralab 2515.
- Sw2/L1—GELOSO #4/110 all-band output tank.
- Sw3—Single pole, 5-position, ceramic switch, Centralab 2501.
- Sw4—Two pole, 2-position switch, Centralab 1401.

using two 6X5 tubes (*V8*, *V9*) and one 5V4G tube (*V10*). It delivers 550 volts at over 120 ma. and 300 volts at 55 ma. simultaneously. This type of supply has been described previously^{3,4} and the only modification in this particular design is to provide two separate filament transformers for the two 6X5 tubes to lessen the possibility of heater-cathode breakdown.

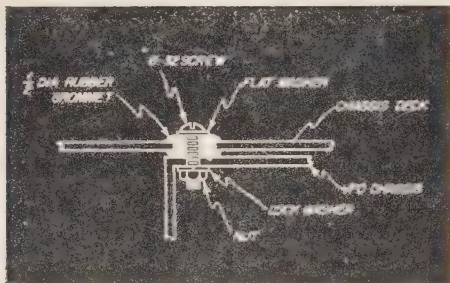


Fig. 4. The shock mounts for the v.f.o. are home-made as shown above. Four are required.

The voltage applied to the Clapp oscillator is regulated by a VR-150 tube (*V5*) and the full 300 volts is applied to the 6AU6 buffer. 550 volts is applied to the plate of 6V6G1.

Control Circuits

Complete transmitter control is accomplished by switch *Sw1* (VFO-OFF-TRANSMIT). In the "VFO" position, switch section *Sw1b* energizes the oscillator and exciter stage through dropping

3. "Radio Handbook," 12th edition, p. 190, published by Editors & Engineers, Santa Barbara, Calif.
4. "More Effective Utilization of the Small Power Transformer," Geo. Grammer, W1DF, QST, November, 1952, p. 18.

resistor *R11*, providing sufficient signal in the receiver for zero-beat with an incoming signal. In the "OFF" position, the high-voltage leads to all stages are broken, and the transmitter is in standby position. The "TRANSMIT" position of *Sw1* applies full plate voltage to all stages of the transmitter.

Grid and plate currents of the 6146 are read on meter *M1* which is connected across shunt resistors *R8* (grid current), and *R3* (plate current). The meter *M1* has a 0-15 milliamperes movement and the grid shunting resistor *R8* is sufficiently high in value so that it does not alter the meter range when the meter reads the grid current of the 6146 stage. When plate current is read, however, *R3* acts as a "ten" multiplier producing a full scale reading of 15 milliamperes on *M1*.

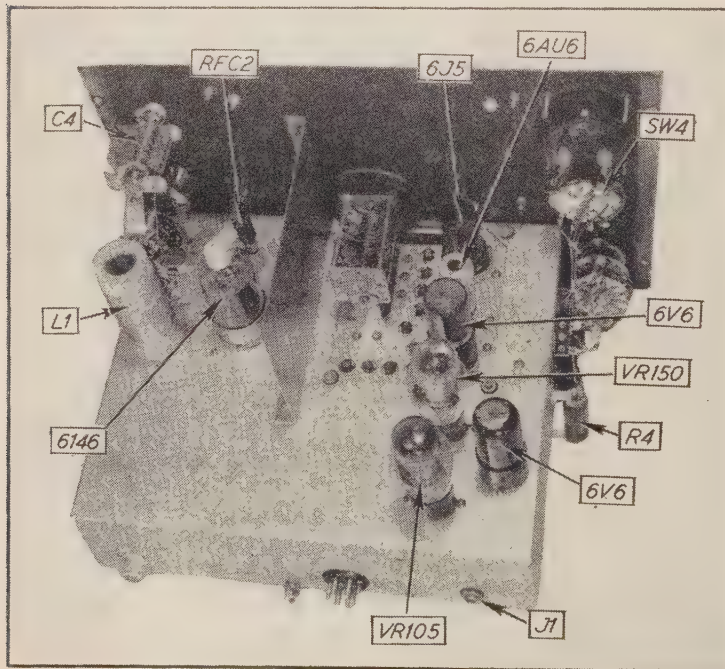
The correct grid current to the 6146 is 2 to 3.0 ma. under full plate load. This current may be adjusted by the "Grid Current" control *R10*, to give the proper value, as read on *M1*.

The keying jack, *J1*, is mounted on the back of the chassis. Both sides of the jack are "hot" so the jack must be insulated from the chassis. There is no danger of shock from touching the key contacts, since the voltage across them is very low.

The "P.A. Tune" condenser, *C4*, resonates the tapped plate tank coil, *L1*, to the proper band, while *C5* and *S3* comprise the "Antenna Loading" controls. R-f output is taken from the pi-network circuit through coaxial connector or *J2*, mounted on the back lip of the chassis.

Mechanical Layout

The 4/101 V-F-O Exciter has a chassis depth of 2½". It is mounted in a cut-out in an al-



In this transmitter top side view the displacement of the chassis is clearly shown. It is arranged in this manner to provide a symmetrical panel layout. The chassis has been cut out and the v.f.o. held in place with rubber shock mounts (see Fig. 4).

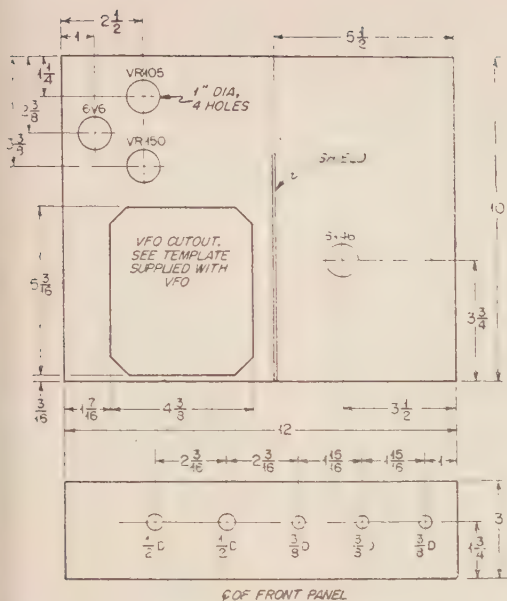


Fig. 5. Chassis layout and drilling plan.

minum chassis. To minimize vibration transmitted through the chassis to the v.f.o, it is suspended by midget shock mounts, made as shown in *Fig. 4*. Since the v.f.o is mounted slightly below the deck of the chassis, a total chassis depth of 3" is required. A suitable chassis is the *Bud #AC-113*, measuring 10"x12"x3". A drilling layout for this chassis is shown in *Fig. 5*. It will be noted that the v-f-o tuning control is not centered in respect to the v-f-o dial. The bandswitch is directly below the dial, with the tuning control to the left of the bandswitch. The v.f.o. is mounted on the chassis to center the dial and the bandswitch, and the "Grid Current" control, *R10*, balances the v-f-o tuning control to present a symmetrical panel layout. Control switch *Sw1*, and resistors *R9*, *R11* and *R3* are mounted on the left end of the chassis to allow short leads from the resistors to *Sw1*, and to keep the heat dissipation of *R9* and *R11* away from the v.f.o.

A *Bud* #C-975 cabinet is used, measuring 11"x15"x9". The critical dimension in this case is the cabinet height. A minimum of 8½" clearance is required to clear the top of the v-f-o dial. A panel drilling layout is shown in *Fig. 6*. A small shield plate (*Fig. 7*) should be mounted between the 4/101 V-f-O *exciter* and the 6146 stage. The shield provides isolation between the stages as well as providing a brace between the panel and the chassis. A *Bud* #IS-1246 shield plate may be used, provided ½" is trimmed off the top of the shield to allow it to pass into the cabinet.

The "P.A. Tune" condenser, C4, is grounded directly to the metal panel. However, to insure a short ground return for high frequencies, a

1½"x1½" aluminum strap grounds the rear end of the frame of *Ct* to the metal frame of the pi-network assembly, *Sw2/LI* which is grounded in turn to the chassis by its mounting bracket. *J1*, *J2* and *PI1* are mounted along the rear lip of the chassis, and 1½" holes are cut in the rear of the cabinet to allow access to these connectors.

For anti-TVI measures, the paint is removed from the front edges of the cabinet, and the corresponding rear edges of the front panel to allow a metal-to-metal contact between the two. In addition, a small angle bracket is mounted on the back side of the chassis which allows the chassis to be bolted firmly to the cabinet. This ties down the rear of the chassis, and materially increases the rigidity of the unit, as well as lessens the TVI-leakage out of the rear of the box.

Electrical Assembly

The electrical wiring is a "snap," to put it bluntly, as most of the work is done in the v-f-o exciter! Bypass condensers *C13*, *C14* and *C15* are mounted directly on the terminal board of the v-f-o exciter. *C2* and *C21* mount on the 6146 socket pins. *C1* connects between an in-

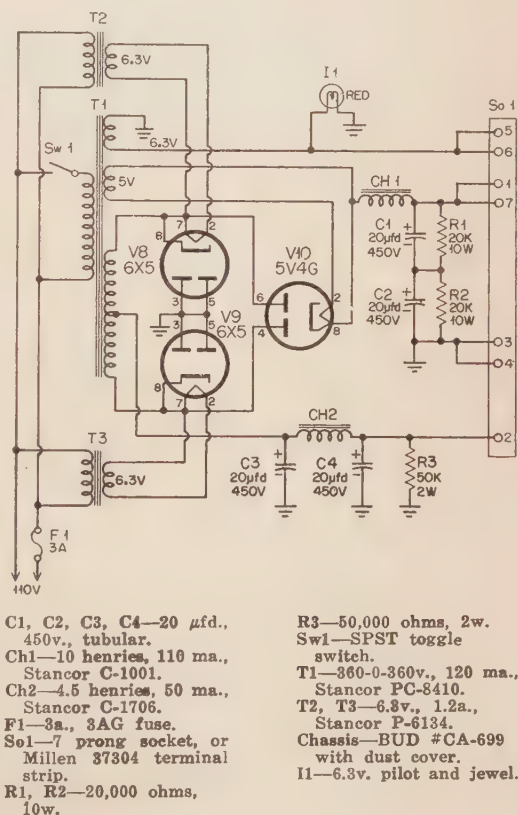
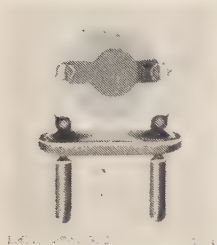


Fig. 3. Parts list and wiring schematic of the separate power unit used with the GELOSO/6146 transmitter.

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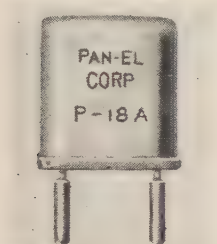


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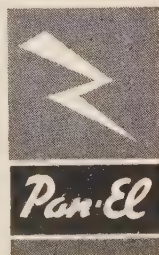
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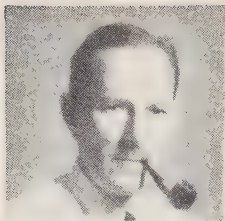
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Box 403, St. Thomas, Virgin Islands

TOKELAU ISLAND, VR2BZ/ZM7: This juicy morsel appeared on August 15, for a three-day stay at this QTH. As a result of requests by W6YY, ZL1BY and other W6's, Bari, VR2BZ, carried a QRP transmitter on one of his periodic flying trips to Tokelau and put this hitherto unrepresented, spot on the Ham map. Running a reported 5 to 10 watts, VR2BZ/ZM7 came on the air at 0830 GMT, August 15, 7005 kc., and was immediately nailed by W6NZW for a nice FIRST. This was followed by contacts with W6AM and W6MUR. Regular DX'expedition procedures were not followed during this jaunt, possibly due to press of other work, and contacts were relatively few. Other reported QSO's were with VR2CG, ZL1AH, ZL1BY, W6AOA, W6YY, W6CUQ, W6MX, W6GDJ, W6SYG, W6CYV, W6NTR, W6LDD, KL7PI, W7KVU, W6MHB, W4CEN, W4TO and KV4AA. A number of unknown WØ's were also hooked. It is hoped that this will be repeated on Bari's next trip to Tokelau. QSL's go to J. Bari Hogg, % R.N.Z.A.F., Laucala Bay, Fiji. ZK1BI has advised that there is a QRP station on Tokelau signing ZM7A on 7100 kc. but this one has not been heard in the U.S.A.

SEYCHELLES ISLANDS, VQ9NZK: We are advised that this, long awaited, expedition should materialize in December. We understand that several months will be spent at this QTH. Stop-overs or special trips to Aldabra Island, VQ7NZK, are distinct possibilities. . . . **LIECHTENSTEIN, HB1MX/HE:** W2SHC reports that HB9MX had planned to be on the air from this spot between August 28 and September 12 on 7, 14 and 28 Mc. CW and phone. . . . **PORTUGUESE TIMOR, CRIØAA:** It is hoped that a transmitter consisting of a 6AG7, parallel 807's and special pi-network, now being constructed by a well-known W6, will be in CRIØAA's hands around January.

CRETE, SVØWK/SV9: This trip, originally set for July 31, has been delayed. SVØWK, accompanied by DL4OR, should have been heard from this spot during the first or second week in September. . . . **COCOS ISLAND, TI9:** Plans by the Radio Club of Costa Rica to visit this island, using the call of TI9RCCR, have not materialized. However, a ship will sail for Cocos around September 20 and it is possible that a few TI2 Hams will be aboard. John, W6MHB, advises that the treasure expedition to Cocos, cancelled at the last moment early this year, will leave after December, he will be aboard. . . . **GAMBIA, ZD3BFC:** This station has been on the air daily from 1600 to 1800 GMT, near 14110 kc., with a 20-watt phone rig. Bill has now built 100-watt transmitter (813 final modulated by 807's). It is understood that he will be on with CW, as requested, to reach W6-land. His stay terminates in October. EL2X can help with skeds.



YN1WC has achieved a measure of fame for his single-sideband operation on 3999.25 kc., until the Nicaraguan ban on amateur radio went into effect on April 5. Operator Wayne Cooper, who holds the call W6EWC, has recently been transferred to Guatemala and hopes to be back on the air if a TG license can be obtained. A modified 10A exciter with various amplifiers was used at YN1WC.

SAN ANDRES ISLANDS, HKØAI: This station has been on 7 Mc. quite frequently, 7015 to 7040, 0100/0300 GMT, with 5-kc. drift. Victor is a bit QRS and has a poor receiver but a much better one should be in his hands as this is read. QSL to Victor Abraham, San Andres Island, via Colombia, S.A.

CORSICA, F8FW/FC: Pierre, HB9LA, did a bang-up job during his stay at this spot from July 30 to August 11. Over 2400 contacts were made and his 3.5-Mc. activity was very welcome. His Monaco trip has been postponed until next year.

ZANZIBAR, VQ1DT: Doug, VQ4EI (ex-ZC4DT), was on the air in July as scheduled. A QRP ten-watt rig was used but conditions were, apparently, quite bad and no W contacts are known to have been made.

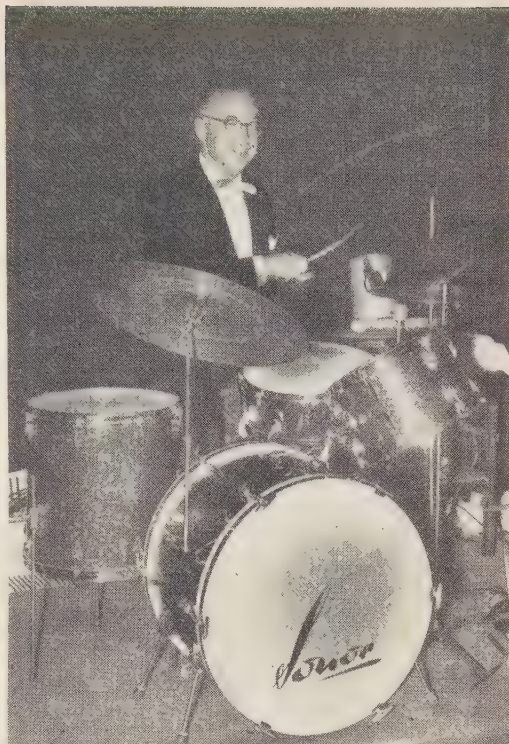
SPITZBERGEN, LH2P: Considerable time has been spent by many in search of this one. As far as we can ascertain, only a few LA stations were contacted (Dunno what the trouble was—mebbe one watt, or something). He was due to QRT August 20.

PITCAIRN ISLAND, VR6AY: This station, which was on the air June 10, is apparently genuine. W2WZ has received a QSL from him. Further

Last Minute Items

SVØWK/9, Crete, appeared on September 5, as scheduled, and pulled the big switch on September 8. Ted's QRQ CW on 14107 between 0700 and 1700 GMT helped many to their first Crete contact. A few QSO's were noted as follows: W3ECR, W8PQQ, ON4BA, OH1HI, OK1MB, G6ZO, HB9MQ, W8JIN and KV4BB. More details next month. . . . W9NDA reports that VR2BZ/ZM7 had a total of 54 contacts during his stay in Tokelau, Bari was running 100 watts to a long wire and getting about the same reports as when he used the 5-watt rig. QSL's should have been on their way by August 26. It is reported that another trip to Tokelau will take place in November. We also hear that ZM6AS plans Tokelau trip. . . . HR1AA advises that there are three big islands some 40 miles off the north Honduran coast, known as the Bay Islands, which have been given the prefix of HRØ. Jack is willing to put this area on the air should it be recognized as "separate." . . . G3JFF, Mike, ponders a QSO with I3AE who is running 5 watts and gave his QTH as Iclone. . . . W2WZ reports contact with VS4HK on August 25. He gave his name as Des and QTH as Kuching, Sarawak. QRG was 14097 and time 1545 GMT. QSL's should go via RSGB only. Many SM and OH stations also worked him at this time.

A further report from Bob, W4QCW, after his arrival home from NAVASSA, advises that a total of 1367 contacts were made. 1023 on CW and 344 on phone. KC4AB was on for a total of 67 hours and here are his "firsts" for each W district: W1TYQ, W2EQD, W3KT, W4GHP, W5RX, W6AOA, W7SGN, W8JIN, W9HUZ and WØNLY (A brief mixup occurred following the WØNLY QSO when "QLM ONLY" was sent—1). A total of 30 countries were worked. No Asians. VE3DTN was a first for Canada while G3AAM was "Johnny-on-the-spot" for G-land. 21 Mc. was disappointing, the only contact being on A3 with W3CHZ/MM. 20 QSO's were made on 3.5, all CW, with the first W being Howy, W2QHH. Contributions, to Sept. 1, have only amounted to one fifth of the amount hoped for. QSL's, of the photo type, should be circulating around the last of September. . . . QSL's to ZD6BX should go to Victor Thorne, Blantyre Airport, P.O. Chileka, Nyasaland. (Thanks to LU5AQ).



OE1FF, Frank Friedl of Vienna, at his rig—the one he uses at his job with a dance-band. Frank is well known to the DX fraternity and holds DXCC, WAS, WAE II, BERTA and DUF Certificates. His travels around Europe limit operations at OE1FF to three or four months per year but he appears as guest op at many stations in HB, LA, DL and LX. Frank's appearance at LX1AS last winter helped many W's to a "new one."

word comes from G3HRT who says, "I have every reason to believe that this call is O.K. as I have personally met Andy Young who is the proud owner of this call. His code speed is somewhat low and he may be recognized by the way he runs his A and N together to read P."

LOS CORANADOS ISLANDS; XE6XC: From the South Calif. Bulletin we learn that W6COH and friends were on from this spot during Aug. 14, 15 and 16. All bands including 2 meters were covered. XE6XC (We heard XE6AM) is not a new country but is a new XE district. It will probably be the last XE6 heard as this area is to become a Mexican penal colony.

TRINIDADE ISLAND, PYØ: PY2CK reports that he regrets delay on the PYØ expedition but says that there are definite possibilities that this will materialize when a naval training ship goes to this spot in September.

NAVASSA ISLAND, KC4AB: This expedition sailed from Santiago de Cuba on August 16, at 2400 GMT (after a few "red-tape" delays) and arrived at Navassa, some 90 miles distant, at dawn. The gear was set up and KC4AB came on the air at 1557 GMT,

amateurs know



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August 17. News of this trip had received wide coverage and there was plenty of "ye old DX dictis" on hand to give them a busy welcome. Contacts were logged, during the first 70 minutes, this order: KV4AA, KV4BB, KP4TF (KC4AC), KP4KD, W5RX, W9HUZ, W4GHP, W5VN, W6AOA, KZ5WZ, W9QLH, KP4UE, W6L, PY2CK, W9NDA, W5UUK, W4RBQ, W5GX, W1TYQ, W0MLY (FL8MY, etc.), W6CA, W4CTL, W8JJW, W4LRN, PJ2AI, W3KT, W8BK, W5CEW, W9APY/5, W3OVV, W9FDX, W0BQ, LU6DJX, W9TQL, W5ADZ, W5IX, W8DAW, W8JI, W4INL, W8MWL, CP5EK, W8KIA, EL2X, W3EV, W6TXL, W8DMD, W3JNN, W8FGX, W5TT, W9DGA, W9PGW and W8ZY. First 14-Mc. phone contact was with W9NDA and first A3 on 7 Mc. was CO8AO. No. 1 in New Zealand was ZL1BY. This is written Don, W4VZQ, and Bob, W4QC.



Alan (L.), VK9YY, and Keith, VK9EB. The occasion was the latter's marriage in which Alan acted as best man.

have just completed their first 24 hours at KC4 and over 600 contacts have been made! Guided by the tactics used by FO8AJ and other expeditious these 19-year-old Hams must be highly complemen on their excellent operating procedures and consistent refusal to answer calls on or near their transmitting frequencies. This resulted in a maximum contact total and sets a perfect example to be followed by future expeditions. A Harvey-Wells T1 50-D transmitter, 40/50 watts, was used on bands from 3.5 to 21 Mc. on phone and CW. The receiver, a NC-183-D was kindly donated for the occasion by the National Co. Power was supplied by a 350-watt gas generator. Last, but not least our thanks go to WN4HBC who played his considerable part as chief cook and bottle washer. Much credit must go to the A.R.A.O., CO8 CL who furnished marine transportation to and from Navassa and to the R.C.C. of Cuba who smoothed customs problems in Havana. Also to CO2BL and CO8CC through which home contacts and information were given. All QSL's should go via W4QC. Cards should be out by the last half of September. The unforeseen eleven-day stay in Santiago caused additional financial strain and contributions, were not necessary for QSL's would be thankfully received. We hope to have a complete story of the venture in a later issue. THANKS BOYS FOR JOB WELL DONE!!

(Due to its geographical location and separate prefix we see no reason why Navassa Island should not be considered a separate "radio" country. Until this is announced, however, do not submit KC4 for WAZ credit—KV4AA.)

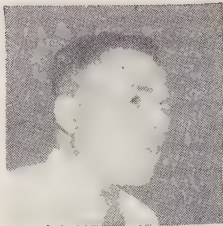
(Continued on page 56)

W.A.Z. HONOR ROLL

(To August 15, 1954)

CW & PHONE	CW & PHONE	CW & PHONE	CW & PHONE	CW & PHONE	CW & PHONE
W1FH 254	W6D1 204	JA2KG 160	W8SSYC 209	PY4IE 215	W1RAN 150
W8HGW 251	VK2DI 204	KH6MG 160	VK4FJ 209	W2HMJ 206	W2AZS 142
W6VFR 250	W6AVM 204	W60UN 160	W2HHF 208	W1HA 202	W6ZZ 135
W6SNU 248	DL7AA 204	W0FEV 158	GM3HE 207	W4DHE 201	W40HT 132
W6SNU 248	W4CVU 203	W00UH 157	VE3GD 206	CM2SW 198	W9CKP 132
W6SNU 247	W6HJT 203	G3TK 157	W1ZL 205	W8KPL 188	W1MRP 130
W6SNU 247	L8EEN 203	W6BUY 157	KP4KD 205	W0TKX 186	W5AWT 125
W3BES 246	W6RM 202	W6QD 157	W4LVV 205	W2PUD 181	OE5YL 122
W6AM 246	W6OMC 202	ZS6FN 157	F9BO 204	W5KUJ 181	ZL3CP 121
W8PQQ 246	W6AOA 202	W7BE 156	W3KDP 202	W2SHZ 180	W9RQM 119
W2BXA 244	G2MI 202	KH6G1 156	W9IU 201	W2GVZ 178	W6HJ 119
W6SYG 244	W5LDC 201	DL1DC 155	W2HZY 200	W5FON 173	W6GBJ 116
W3GHD 243	G3DO 200	VK5KO 155	W3JKO 200	W8EYE 172	W9GDA 115
W6R 243	W6KOL 200	W6BUO 155	W2EMW 198	W3FYS 172	W9FNR 114
W0YXO 243	VK5JS 200	G3AAM 154	W9MXX 197	W1BFT 166	W8AVB 113
W2AGW 242	W7CY 200	G2IO 154	W7PGS 197	GM2UU 165	1IER 112
W8NKT 242	W6MHB 200	W6RLQ 154	W4RBQ 197	VE2BV 163	KZ5PI 108
W3BK 242	ON4QF 200	W6KEV 154	SM5WI 196	7CNM 163	W6HJ 104
W88HW 242	VK3BK 200	OK1RW 153	W6GPE 193	W6TSL 161	KL7CZ 80
W6MX 242	W6SFK 199	W6FWH 153	W2CWE 192	W6TSL 161	
W6EUV 241	W6RLN 193	G3FY 152	VE3AAZ 192	I1UV 160	
W6ADP 241	W6SRF 198	KP6AA 152	W2IMU 192	ZL3CC 159	PHONE ONLY
W3JTC 240	W6UCX 198	W6ID 152	W2AGO 191	W3LVJ 157	WAZ
W3GAU 239	W2IOP 197	OH5NK 152	W1AWX 191	W2UEI 156	VQ4ERR 220
W6E4RO 239	KH6QH 197	VK2QL 151	OK1VW 190	LU7CD 155	39 ZONES
W8JUN 238	W6BAX 197	VK2AM 151	GM3CSM 190	DL1YA 153	PY2CK 228
W6DZZ 238	W6W 196	W6LEE 150	OE3CC 189	W3LTV 153	XE1AC 217
W3JNN 237	W6SWB 196	W6EYR 150	W0EYR 189	W5MET 150	W3LTV 217
W6GRL 237	G2FSR 196	W6EYR 150	VE3IJ 186	ZL4DO 147	W6DI 203
W6MEK 235	1IKN 196	W6RDL 150	W8RDZ 184	W6ETJ 144	GSIG 188
W3CPV 235	W6LC 196	W6N2 148	W9TQL 184	W8ZMC 143	W6VFR 179
W6WAX 235	W5K 195	OK1CX 147	W4JNL 183	W0AZT 143	PK4DA 175
UE6DJX 234	OK1FF 194	W6LS 147	W2MEL 183	ZL3AB 143	W7HTS 161
CE3AG 234	W6NTR 194	W7KMC 147	W1DQM 181	W9FKH 143	W8HJD 161
W6AMA 233	W6GAL 193	KH6PY 147	W2CNT 180	MP4BAD 135	F9BO 158
W6ML 233	W6SIL 193	W7DXZ 146	W2RDK 180	W4PPK 131	VE7ZM 125
W6L 232	W6SQO 192	W6AYZ 146	W4AZK 180	W2PQJ 130	DL1FK 125
W6CPC 232	W6NGA 192	VE6GD 146	VO6EP 179	W3ZN 129	38 ZONES
W6GDJ 232	W6WQQ 192	V5GAE 146	VK4DO 179	EA1AB 129	W9RBI 202
W6DL 232	VK2NS 191	W9NRB 145	W9ABA 179	W9MZP 126	W2BXA 201
W7GUL 229	W6SRU 190	W6MUC 145	VE8AV 178	FESAB 126	SM5KP 199
W7BD 229	VK3JE 189	OK2SO 145	W2RGV 178	W9TBE 126	W6NDA 173
W88RA 228	ON4JW 189	ON4TA 144	W8CVU 177	GW4CX 120	W6AM 173
W6GTX 228	W6NRA 189	G3BI 144	W8CVU 172	W0FET 118	W6KQY 174
W6EBG 227	W6SDR 186	W6BIL 144	W4DKA 172	KL7PJ 117	W4CYU 160
W6PFD 226	VK6RU 186	W7LYL 143	W4VE 171	W7EYS 107	ZL1HY 157
W6KACX 226	W6DFY 186	KG6GD 143	W9LM 170	VK6DX 103	W1HKX 153
W6TS 225	W4CYY 186	W3IXN 141	KL7PI 170	C1CH 84	
W6SAI 224	W2CZO 185	W6AOD 140	W6CTL 169	37 ZONES	W3JNN 199
W6TI 224	W1AB 185	W62PV 140	W1NMP 169	W6KYG 200	Z86Q 192
DL1FF 223	W6IFW 185	ZC4CL 138	W3JTK 169	KP4CC 195	W3BES 190
W6BZ 223	W6SA 184	OK1WX 135	OZ2TU 169	W1KVF 177	W1JXC 189
W6VE 223	KH6VF 184	W7BTH 135	OZ2OT 169	OZ7BG 174	CE3AB 186
W3LOE 222	W6LRU 184	G3AZ 133	PY2AC 168	W2OST 169	W8BF 183
W6FSJ 222	W2JVU 183	W6TEU 133	W2CYS 167	W3WU 169	W3GHD 181
W3BHV 222	DL1IB 283	W6RDR 133	W8LEC 166	VE3JL 161	W8REU 176
W6DLY 222	LATY 182	W6AUT 133	W6WO 166	W2ZA 160	G3DO 175
W6MVQ 221	VK4EL 182	VE7KC 133	VK3XO 166	IS1AHK 160	VK3Z 173
W6PB 221	W6LN 181	W6GSD 133	W3JTK 169	W2WC 158	W7MBX 164
W6GB 221	W7EAW 181	Z5ZCR 131	SM7MS 164	W4EPA 158	W9HB 161
W6SKP 220	W6YB 179	CR9AH 131	W4RRB 162	W9LI 151	W6PXH 159
W6YI 219	W6VND 178	W6IDZ 130	G6QX 162	W4IWO 149	GM2U 157
W6ITA 219	W6UOX 177	W7ASG 129	W4OM 158	W9WCE 149	W6WNH 157
W6TT 218	VE6KX 177	W7GBW 127	SM7QY 158	OE1FF 145	W8TT 143
W6NUC 218	W6UTX 177	G8IP 127	W6KYV 158	W6YK 144	W0HFX 143
W6PQT 218	W6UTX 177	GSBJ 126	W6AIW 158	W4ML 140	F8VC 124
W6PL 218	KH6GD 176	VK6SA 126	1IAY 157	ZL1QW 138	W7MBW 112
W6HJ 218	W6LDD 176	PK6HA 124	W8WUU 157	W1APA 138	C1CH 83
W6QDA 218	PK4DA 175	GSVU 124	W0RBA 157	W2AYJ 133	36 ZONES
W6EFM 218	W8HSD 175	W6NRJ 123	W9NZZ 157	W7HKT 130	W1MCW 212
W6PKO 218	W6WGU 174	W6MLY 123	DL1AT 156	W4DIA 129	W1NWO 206
W6PNQ 217	W6CIS 174	ZL1GX 122	W9YNB 155	VE5JV 124	T12TG 182
W6DUY 217	W7FZA 174	VK5MF 121	DL1FK 155	W9LNH 122	W1BEQ 182
W9NDA 216	W6PCS 174	ZL2CU 120	1IAY 155	OH3OE 118	GM2DBX 163
W2PEO 215	W6KUT 174	Z5ZEC 116	DL1KB 154	W6YX 117	W4ESP 159
W3YIE 214	W6TZD 173	Z56CT 113	W6CUL 154	VE1EA 116	W2DYR 140
W5ZDM 214	W6JW 173	W7WKA 98	G3AKU 150	G3BPP 112	W9BZB 139
W6BA 214	GSYV 172	W6DUB 89	VE7VC 150	W6AX 110	W9HP 139
W6HBA 214	OK1LM 172	W7IYA 59	W1ZD 146	W0FVF 108	W8AUP 131
W6LBY 214	OK1HI 171	39 ZONES	W2GUR 146	W7PK 104	W8PDB 130
W6EPZ 214	ZS2AT 171	W5ASG 240	W6CAE 146	W8HSW 104	VE3BNQ 130
W6OEG 213	W6BAM 170	KV4AA 239	TF8SF 145	W2BLS 99	W4IN 129
W4AIT 213	DL1AB 170	W8KIA 238	OK1AB 144	W6WVV 99	W1FJN 128
W6HGT 213	W6PZ 170	W2WV 232	W6MUF 144	KL7KV 88	G6BW 127
W6KAR 213	W5AFA 169	W1CLX 232	TF3EA 142	36 ZONES	W7HTC 123
W6BQD 213	G2VD 169	F8BS 232	V57NX 140	W5JUF 206	W8CYL 112
W6ED 213	W6JZP 168	W2NSZ 232	W6KXT 135	W4HA 182	W3DHM 96
W1AHL 213	W6ANN 167	W9RBI 230	W7HXG 134	W2ZVS 167	W6SA 82
W6HX 212	VK3CN 167	W3DPA 230	W7ETX 132	GM2DBX 165	F8DC 97
W7EHC 212	W6BVM 167	W3EPV 229	W9ALI 132	W3AXT 156	35 ZONES
OE1CD 212	1IXX 167	W8DMD 225	W6TNE 131	W3AYS 151	W5ASG 173
W8IG 212	W6ATO 167	W1BNE 225	W6WJX 131	W3MZE 150	W5JUF 171
W6NNV 212	W6DUC 167	W4XRE 224	W5CPI 130	W3MZE 150	W3EUV 163
W6BPD 211	W6GVC 166	W3OCU 224	KL7UM 129	1IIT 140	W0NCG 158
W6MJB 210	KH6MI 166	W2QHH 224	DL1DA 127	W0CU 139	W9RNX 155
W6IB 210	W6CEM 166	W9LNM 223	W6EYU 126	F9RS 128	W6PCK 152
W9VW 209	VE7GI 165	W1BIH 221	VR5PL 124	OA4AAK 128	W9BVX 148
W6RW 209	W6PM 164	W1GKK 219	DL3DU 118	VE1PQ 128	W2RGV 148
W6UHA 209	ZS6A 164	W1JYH 218	W6NRZ 114	1IIZ 128	W0ANF 142
W2AQW 208	W6EAK 165	W1JYH 218	W6JWL 114	F8TM 124	W2GHV 137
W1HY 208	W6YZU 165	W1JYH 218	W6PBC 114	W2BF 115	W6CHV 130
W6BUD 208	W6YZU 165	W9PKC 216	W6VAT 110	4X4BX 112	W6CHV 135
W6SO 207	VE7VO 162	W3DRD 211	W13AB 107	W5CD 108	W6PLX 135
W6ZVM 206	ZS6DW 162	W5MPG 211	W7GXA 105	W2JA 102	HC2OT 134
W6BPD 206	1IIR 162	W5FFW 211	W6LEV 103	35 ZONES	W0EYR 131
W6ABD 206	W6PDB 161	W4GG 211	W6LEV 103	KV4BB 182	W0PRZ 124
W6OLA 206	OK1SV 160	W3DKT 210	W7LEE 93	KG4AF 182	W9CKP 124
W6SR 205	VE3EK 160	W2BJ 210	W7LEE 93	W5FXN 169	GSQX 123
W6ZCY 204	W6PUY 160	W5LVD 209	T12TG 221	W1DEP 159	W8ZMC 122

the Novice Shack



Conducted by

Herbert "Herb" S. Brier, W9EGQ

385 Johnson Street, Gary 3, Indiana

Continuing our discussion of antenna transmission lines and low-pass filters, this month I have the *Bud* Model LF-601 low-pass filter on hand to illustrate some further remarks.

The *Bud* model filter, which is pictured on this page, is capable of handling the full power allowed amateurs on all bands up to 30 Mc. with negligible loss. Above that frequency, the attenuation to signals passing through the filter increases rapidly, reaching a minimum of 85 db. at all frequencies above 54 Mc. In addition, it can be adjusted to attenuate any two specific frequencies between 54 and 90 Mc.—which encompass TV channels 2 to 6—still more.

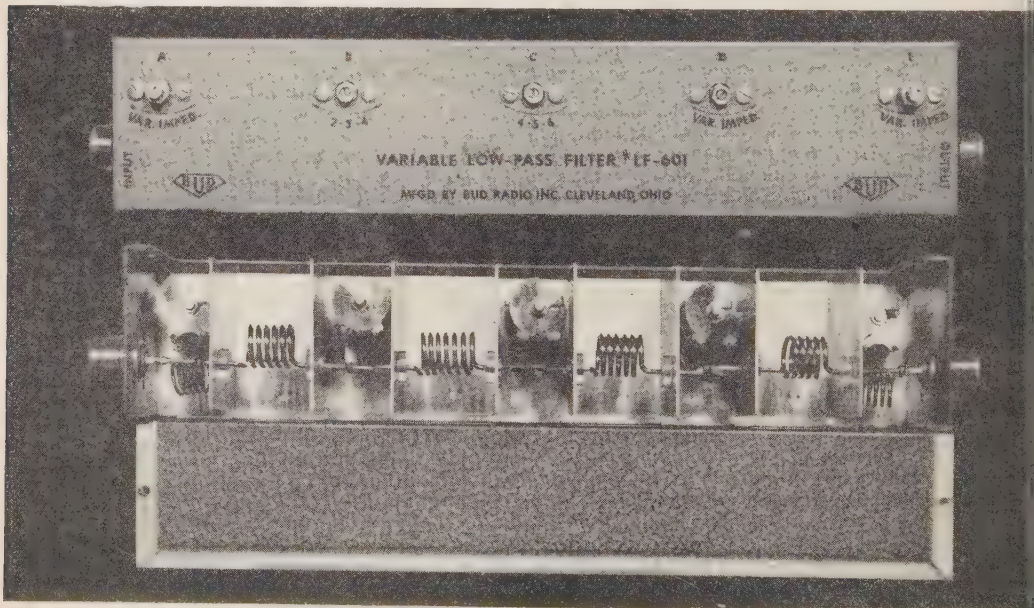
Electrically, the filter consists of three *M*-derived center sections, backed up by two impedance-matching "half" sections at the input and output terminals. It is assembled in a 12"x2¼"x23⅞" aluminum box, which is divided into nine compartments; so that all critical components are properly shielded. Input and output connectors are standard, chassis-type, coaxial fittings. Two brackets are furnished for mounting the filter firmly to the transmitter.

All capacitors are air-insulated midget variable. This insures low losses and permits adjustment of maximum TVI reduction in any two low channels as well as to modify the impedance characteristics of the filter slightly to match individual installations.

The filter is factory-adjusted for maximum attenuation between channels 2 and 6 for an impedance of 52 ohms. After testing it—just as it came from the factory—on several bands using a couple of antennas with a transmitter was putting out some really virulent harmonic signals in the TV channels, I am of the opinion that, unless the filter has been tampered with, there is little to be gained by changing the factory settings. In any event, they should not be changed haphazardly, only with the aid of a grid-dip oscillator, as outlined in the instruction sheet packed with filter.

Another big advantage of the air-insulated capacitors in the *Bud* 601 filter is that a flashover will not permanently damage the filter—if the power is removed immediately. A flashover is a rather

(Continued on page 48)



Two views of the BUD low-pass TVI filter discussed in the text.

Amateurs and Experimenters!

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International TYPE FA-9

(fits same socket as FT-243)

Pin Spacing .486 Pin Diameter .093

RANGE (kc)	TOLERANCE	PRICE
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2000-9999	.01%	\$2.80
10000-15000	.01%	\$3.90
Overtone Crystals		
(For 3rd overtone operation)		
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30 MC- 54 MC	.01%	\$3.90

HOW TO ORDER

In order to give the fastest possible service, crystals are sold direct and are not handled by any jobber. Where cash accompanies the order, International will prepay the Air Mail postage; otherwise, shipment will be made C.O.D. Specify your exact frequency and the crystal will be calibrated to .01% or better of this frequency with the unit operating into a 32 mmf load capacitance.

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DEPT. X

Price

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 _____ Crystals Freq. _____
 _____ Crystals Freq. _____
 TOTAL \$ _____

TO: Name: _____

Address: _____

City: _____ Zone: _____ State: _____

Enclosed: ☐ Check, ☐ Cash, ☐ M.O. for \$ _____, or
 Ship C.O.D. ☐

International/CRYSTAL Mfg. Co., Inc. 18 N. Lee Phone FO 5-1165
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UHF TRANSMITTER-RECEIVER

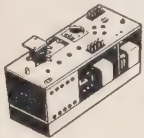
APS-13
Oct. Special!
\$395



Freq. range 415-420 MC. 5 stages of 90 MC. IF amplifier. Complete with R.F. and I.F. sections. Less dynamotor, tubes, and tube shields. With schematic. Excellent condition. A HOT BUY. Wt. 13 lbs.

ARB NAVY RECEIVER

105 to 9050 KC. Four Bands, Calibrated Dial, LF-Ship-BC—80 & 40 Meter.—Complete with Tubes and Dynamotor. For 24 Volt operation; easily converted to 110 V.—12 or 6 Volt. Size: 8 3/4" x 7 1/4" x 15 1/4". Excellent cond. **\$19.95**
DU-1 DIRECTION FINDER LOOP AMPLIFIER for ARB receiver. With tubes and loop. Excellent condition with schematic. Weight 10 lbs. **\$19.95**

**C.A.P. SPECIAL****BC-625 VHF TRANSMITTER**

Freq. range 100-156 MC. With modulation section and speech amplifier. Less tubes & crystals, with conversion dope. Used, good condition. (see Nov/53 CQ.) Weight: 16 lbs. **\$9.95**

ARC-5/R-28 2-METER RECEIVER

Here is the 2-meter superhet you have been looking for! Absolutely one of the BEST available today! Tunes from 100 to 156 Mcs. in four crystal channels. (Easily converted to continuous tuning.) Tube lineup is as follows: 717A—R.F., 717A—Mixer, 2—12SH7—1st and 2nd I.F. 16.9 MC. EXCEL COND. **\$17.95**
 See Dec./53 CQ for conversion. Weight: 17 lbs.

UHF TRANSMITTER

15 W. UHF Tunable Transmitter. Freq. range: 200-550 MC. AM. Two 388 RF tubes as push-pull oscillator. Wide band video amplifier. 100-3500 Kc. Blower motor cools RF section. Less tubes. **\$9.95**
 Excellent cond. Wt.: 45 lbs.

ARC-4 MOBILE TRANSCEIVER

140-144 MC. Complete with control box, tubes, 12/24 VDC dynamotor with schematic. This is a special reduction for this month only. Like new. Wt. 38 lbs. **\$32.50**

RG-7/U CABLE—NEW: 97.5 ohms transmission cable. No. 19 single conductor, copper shielded. 100 ft. roll. **\$ 3.95**
 500 ft. reel. **14.95**

TG-10 CODE PRACTICE SET

Includes push-pull 6L6 amplifier, variable speed synchronous drive motor and rewind. Complete with tubes. **\$14.95**
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CODE PRACTICE TAPE. One hour reel. **95c**

ATB TRANSMITTER

25 watt phone-CW 5 tube transmitter. Frequency range 2-9 MC. Two 815 tubes in circuit. One as modulator and one as RF output. Ideal for C.A.P. Mobile. Excellent condition, with tubes. Weight 24 lbs. **\$12.95**
 LESS tuning units

GP-7 TRANSMITTER

120 watt CW, 40 watt phone, freq. range: 3-9 MC, 6 tube transmitter with 120 volt 800 cps power supply. Three tuning meters, power selector switch. Transmitter uses 803 in final. 120 volt cooling motor. With one tuning unit. **\$12.95**
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mote possibility in a 1000-watt filter operated with low-power transmitter, if the filter is operated in anything even remotely resembling a matched load. But it could happen, even with a 50 watt, if the filter were inadvertently operated without a load at the coupling to the transmitter adjusted for the transmitter input. At higher inputs, a less drastic mismatch could cause trouble.

Voltage And Current In A Low-Pass Filter

Knowing just what voltages and currents appear in a low-pass filter under different conditions will tell how much one can deviate from ideal conditions without damaging the filter. As most Ham low pass filters are rated to handle the output of a 100 watt, plate-modulated, phone transmitter, we will base our calculations on that premise.

On the optimistic assumption that a 1000-watt transmitter will deliver 750 watts to its output terminals, it will develop approximately 200 volts. 3.8 amperes across a 52-ohm load. ($E = \sqrt{P \times Z}$, $I = \sqrt{P/R}$.) This is a-c power; therefore, the peak values will be increased 1.4 times, or to 280 volts and 5.3 amperes. Also, on modulation peaks, the latter values will double, making the final peak values 560 volts and 10.6 amperes.

As it is not much of a problem to wind low inductance coils of wire sufficiently large to handle any reasonable amount of current, the capacitors usually determine the power rating of a low-pass filter. The Bud filter is no exception. As it uses air-insulated capacitors, we do not have to worry about over-heating their dielectrics, and their plate spacing appears adequate to withstand up to 100 volts. Obviously, the filter will easily handle the rated power when properly matched to its load.

The next thing to determine is how much of a mismatch it will tolerate without damage. An impedance match between a low-pass filter and its load affects the voltage and current distribution in the same manner that a mismatch between a transmission line and its load affects the current and voltage on the line. At some points, the voltage increases and the current decreases. At other points the voltage decreases and the current increases.

The voltage and current maximums caused by unmatched operation are equal to their matched values, multiplied by the square root of the ratio of the mismatch. On the basis of our figures, the Bud Model 601 filter will handle its maximum rated power with a mismatch that does not exceed about 3 to 1. Greater mismatches will require that the power fed to the filter be reduced proportionately. These conclusions are in good agreement with the manufacturer's warning that a mismatch of 4 to 1 may damage the filter.

In a 75-ohm filter operating under the same conditions, the voltages would be about 20% higher and the currents about 20% lower than the above values. The increased voltages appearing across high impedance filters is one reason why they are seldom used. To carry the same power with the same safety factor as this 52-ohm filter, would require 3500-volt capacitors in a 600-ohm filter!

(Continued on page 50)



20 WATT AMPLIFIER: Brand New

Mfd for audio amplifier in Measured Music Systems. Amplifier delivers 15 watts of undistorted audio or 20 watts maximum. Tubes used and included are 2—6L6G; 1—6SN7; 1—6SJ7; 1—5U4. Also 1—6AL5 and 1—2D21 used in remote control circuit. Treble, bass, vernier volume and master volume controls are provided. Sturdily built for continual operation in beautiful gray crackle cabinet 17" x 9 1/4" x 12 1/2" with carrying handles and key lock cover. Unit is foolproof and trouble free, ideal for use in skating rinks, dance halls, etc. Has Phono and 600 ohm line inputs. Circuit diagram provided with each unit. Original Manufacturer's price on this item understood to be \$129.50. Your price, brand new with all tubes, for 110-120 V. 60 cycle operation. Shipping weight 60 lbs..... **\$24.95**

Can be supplied for 110 V.

25 cycle operation..... **\$5.00** extra

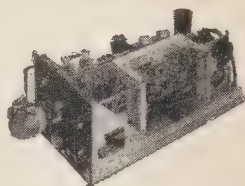
M-1 SERVO UNIT FOR BEAM ROTATION

Unit has self-contained hydraulic pump actuated by 27 V.—11 Amp. 1/5 hp. motor which pumps oil into either side of hydraulic piston giving better than a 100 lb. torque to cable drum. Unit is reversible by actuation of either of two self-contained solenoid hydraulic valves. Connect by cable around antenna beam for any desired rotation speed. Greater adaptability than any other surplus device on the market. Shg. wgt. 37 lbs. **\$4.95**
BRAND NEW—Only a few, order early



T-39/APQ-9 RADAR XMTR

Described in Feb. '50 "CQ" for conversion for the 420-450 Mc. amateur band and citizens band. Also contains many parts for the UHF experimenter such as 2—8012 tubes, fan and motor, switches, pots, gears, counter, etc. Equipment removed from aircraft. Our Close Out, quantity limited. **\$4.95** ea.
Shipping wt. 43 lbs.



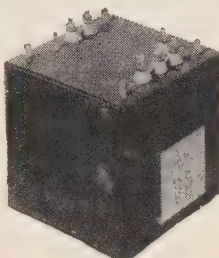
BRAND NEW 12 V. DYNAMOTORS

DM-40 Input: 12-14 V. 3.4 A. Output: 172 V. -138 MA. Here is an ideal dynamotor to adapt to mobile uses on the new 12 V. cars. Don't pass up this buy even if your intended uses are not immediate. Size 6 1/4" L x 3 1/2" dia. 4" lead with 6 pin Jones plug. Shipping weight 7 1/2 lbs. **\$2.75**
New Price ea.



TRANSFORMER PLATE POWER

355-0-355 Volts @ 325 Ma. Also 490 V. 325 Ma. Primary 117 Volts 60 cycle. Measures 5" x 5 1/2" x 6". Shipping wt. **\$2.95**
22 lbs. PRICE



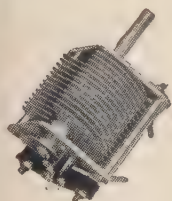
AN/ART-4 TRANSMITTERS & TARGET

6' x 30' plastic screen target containing two transmitters complete with microphones. One transmitter on 55.5 Mc., other on 56.75 Mc. 3/4 watt output using 3A5 tubes. Dry battery operated (batteries not included). Brand new, in wood box 10" x 12" x 75". Shipping Wgt. 75 lbs. Box or plastic screen alone worth price. **\$4.95**
NEW.....ea.



VARIABLE CONDENSER

Freq. Meter type, 245 MMFD. 27 plate mdgt. type. Gold plated heavily constructed. Approximately 3"x2 1/2"x1 1/4" overall size with 1 1/4"-1/4" shaft extension. Shipping weight 1 lb. **\$1.25**
New Price ea.



STORAGE BATTERY 6 V. 34 AH

3-TA5-9B—Manufactured by Exide Battery Co. for aircraft. Size 5" x 5" x 9" overall. Shipping weight 15 lbs. New dry charged. Fill with 1.265 sp.g. sulphuric acid. **\$6.25**
Price ea.



TUBES

FG-17 Thyratron, Reg. \$ 7.00, Our Price, ...\$1.00	
FG-32 Phanotron, Reg. 14.00, Our Price, ... 2.00	
6SN7GT 65¢	7193 10 for \$1.25
OC3/VR105 50¢	12A6 40¢ ea.
2051 65¢	VT25/10-Y 35¢
5R4GY 65¢	VT67/30 35¢
5Y3G 35¢	954 10 for \$1.70
5Y3GT 35¢	

THE ABOVE TUBES HAVE BEEN REMOVED FROM NEW DEMILITARIZED EQUIPMENT AND CARRY A 100% REPLACEMENT OR REFUND GUARANTEE. NO ORDERS ACCEPTED LESS THAN \$2.00.

Remit shipping charge & instructions with all orders; otherwise order will be shipped express collect.

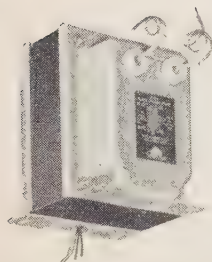
ESSE RADIO CO.

40 WEST SOUTH STREET
INDIANAPOLIS 25, IND.

FOR CLEAN LIFE-LIKE SIGNALS

under adverse conditions use

TRIAD TRANSFORMERS



Case A

There's a lot of QRM on today's crowded bands. Even so, these Triad Audio components will give you a brand new conception of what **good** audio is like. These transformers are built especially for amateur use and are identical in workmanship and manufacturing techniques to the most expensive Triad transformers. Try them!

INPUT Transformers

Type No.	List Price	Application	Frequency Response	Primary Impedance Ohms	Turn Ratio
A-1X	\$ 2.75	Line or single button mike to grid.	300-3000	100	31.4
A-3X	3.00	Line or D.B. mike to grid.	300-3000	400 C.T.	15.8
A-5X	4.00	Single button mike to p.p. grids—Hi gain.	300-3000	100	84

MODULATION Transformers

Type No.	List Price	Primary	Frequency Response	Secondary		Audio Watts
				Impedance	Ma.	
M-1X	\$ 3.80	10000 C.T. for 19, 1J6, 6N7, 6A6, etc.	300-3000	5000-8000-10000	50	5
M-3X	5.60	10000 C.T. for 6N7, 6A6, 6F6's, etc.	300-3000	3000-5000-8000	100	20
M-7A	14.45	4250 C.T. for 807's.	300-3000	3000-5000-8000	200	60
M-8A	21.20	Multi-match.	300-3000	4000 to 20000	200	80
M-12A	22.50	Multi-match.	300-3000	4000 to 20000	300	125

These and a wide range of other Triad amateur type transformers listed in Catalog TR-54E free on request.



4055 Redwood Ave. • Venice, Calif.



In low-pass filters using solid-dielectric capacitors the added current through them as a result of excessive mismatch may cause the dielectric to heat and melt or puncture. Of course, such filters are designed with that possibility in mind. It stresses the fact that any low-pass filter operating near its maximum power rating must be carefully matched to its load to avoid damage. For conservative operation, the mismatch should not exceed two to

Connecting The Filter To Its Load

The July *Novice Shack* showed how to connect a low-pass filter to a shielded transmitter; so that the transmitter output would flow through the filter. But there is still much confusion regarding what to connect to the other end. The most common misconception is that a length of coaxial cable between the filter and the antenna or antenna coupler will solve all matching problems. I only wish that were so.

The coaxial cable is required, but what is needed to the other end of the cable is even more important. Any mismatch there is reflected back to the input of the cable and causes an equal mismatch between it and the filter.

There is only one way to be sure that a low-pass filter is matched to its load. That is to use an *antennascope** or a fixed ratio SWR meter, which actually measures the impedance of the load. However, you can get by with a low-power transmitter without such a meter by observing a few precautions.

1. Do not attempt to feed an end-fed antenna of any type directly from a low-pass filter. Such an antenna may present an impedance of 3000 ohms or more to the filter.

2. Do not attempt to feed balanced, 300-ohm lines directly from the filter. There will be a large mismatch between the filter and the line, and between the line and the antenna. Furthermore, such an arrangement unbalances the transmission line, causing it to radiate badly. In addition, at certain line lengths, it will result in r.f. appearing in the strangest places, even including the neighborhood TV receivers.

3. If you use either of these types of antennas, use a link in your antenna coupler between the antenna system and the transmitter and install the low-pass filter in the line between the coupler and the transmitter.

4. A half-wave antenna fed in the center with either 50-ohm or 75-ohm coaxial cable will present a mismatch of not more than 1 to 1 to the filter when operated within one or two % of its resonant frequency, which is reasonably close to $fMc = 468/Lft$ in the average installation. Although it theoretically increases feeder radiation, 75-ohm ribbon may be substituted for the coaxial cable on the 3.5 and 7-Mc. bands without apparent effects. The advantage of the substitution of this type of line is lighter than coaxial cable.

(Continued on page 52)

* See "Antennascope-54," by W. M. Scherer, W. Part I, CQ, June, 1954, page 23. Part II, CQ, 1954, page 17.

CRYSTALS

Guaranteed to oscillate!
Your choice of frequencies!
Largest selection in the world!

NOTE! Every crystal tested for activity before shipment! All nos. listed are fundamental frequencies in kilocycles.

FT-243

FT-243

Lots of 10 or more.		Ea.		69c	
Lots of 5 or more.		Ea.		79c	
Individually.		Ea.		99c	
2785	3055	3990	6550	7590	8016.7
2790	3060	3995	6573	7600	8020
1110	2465	2795	3065	6000	6575
1129	2470	2815	3070	6006	6600
1150	2475	2825	3075	6025	6606
1195	2480	2830	3095	6040	6625
1325	2485	2835	3100	6042	6640
1900	2490	2840	3110	6050	6650
1915	2495	2845	3130	6070	7006.67
1930	2505	2850	3135	6075	7006
1940	2510	2855	3140	6100	7025
1950	2515	2860	3145	6106	7040
1965	2520	2865	3150	6125	7050
	2525	2870	3155	6140	7073
	2530	2875	3160	6142	7075
2015	2535	2880	3165	6150	7100
2017	2535	2880	3165	6150	7100
2020	2545	2885	3170	6173	7106
2025	2550	2890	3175	6175	7125
2035	2557	2895	3200	6185	7140
2040	2560	2900	3202	6200	7150
2055	2565	2905	3205	6206	7160
2060	2570	2915	3210	6225	7173
2065	2575	2920	3220	6235	7175
2070	2580	2925	3225	6240	7200
2105	2585	2930	3230	6250	7206
2125	2590	2935	3235	6273	7225
2130	2595	2940	3240	6275	7240
2135	2605	2945	3290	6300	7273
2140	2635	2950	3300	6306	7275
2195	2660	2955	3310	6315	7306
2300	2665	2960	3320	6325	7300
2305	2675	2965	3340	6335	7325
2320	2680	2970	3410	6340	7340
2330	2685	2975	3420	6350	7350
2355	2690	2980	3445	6362	7375
2360	2695	2985	3465	6373	7400
2365	2700	2990	3500	6375	7406
2370	2705	2995	3525	6405	7425
2375	2710	3005	3540	6406	7440
2390		3010	3655	6425	7500
2415		3015	3660	6440	7510
2430	2750	3020	3700	6450	7520
2435	2755	3025	3760	6473	7530
2440	2760	3030	3750	6475	7540
2442	2765	3035	3885	6500	7550
2450	2770	3040	3940	6506	7560
2455	2775	3045	3955	6525	7570
2460	2780	3050	3980	6540	7580

DC-34 & DC-35

PIN SPACING 3/4"

Your Choice
Ea. only 99c

See our ads Oct./54
Radio & TV News for
complete list of types
of crystals, frequencies
and prices.

1690	2422	2745	3155	3630	3890	4130
1705	2435	2764	3161	3650	3895	4135
1720	2446	2775	3190	3655	3905	4150
1738	2466	2776	3201	3665	3920	4155
1746	2487	2807	3270	3680	3925	4175
1770	2492	2816	3279	3695	3935	4177.5
1790	2515	2831	3280	3700	3940	4192.5
1810	2520	2851	3297	3702.5	3950	4210
1830	2535	2853	3311	3705	3960	4215
1850	2544	2894	3317	3710	3965	4235
1870	2555	2895	3365	3730	3985	4240
1890	2558	2899	3385	3745	3995	4255
1910	2559	2925	3390	3750	4012.5	4275
1930	2586	2926	3395	3760	4015	4280
1950	2587	2960	3412.5	3765	4020	4305
1970	2605	2971	3422.5	3770	4030	4310
1990	2615	2980	3462	3775	4035	4325
2010	2626	3000	3480	3790	4050	4335
2030	2635	3010	3485	3792.5	4055	4345
2050	2640	3023	3500	3807.5	4065	4350
2075	2655	3027.5	3520	3825	4080	4370
2082	2665	3055	3540	3830	4085	4380
2090	2675	3070	3550	3850	4090	4397.5
2105	2690	3111	3595	3855	4095	4415
2106	2695	3117	3580	3870	4097.5	4435
2131	2732	3149	3610	3885	4115	4440

FT-241 Single Side Band Low Freq. Crystals

Lots of 10 or more. Ea. 79c

Lots of 5 or more. Ea. 89c

Individually. Ea. 99c

446	448	453	454	456	461	465	470	476
447	450	459	464	468	474	478	482	487

NOVICE BAND

Individually. Ea. ... \$1.25

FUNDAMENTAL FREQUENCIES

Lots of 10 or more. Ea. ... 99c

FT-243

Frequencies in steps of every 1 KC: from 3701 THROUGH 3748. Examples: 3701, 3702, 3703, etc.
FOR DOUBLING INTO 7 MC BAND. Frequencies in steps of every 1 KC: from 3588 THROUGH 3599. Ex: 3588, 3589, etc.
All frequencies from 7176 KC THROUGH 7198 KC in steps of 1 KC, fractions omitted. Examples: 7176, 7177, 7178, etc.

MISC. & SHIP BAND FREQUENCIES

81.95 KC Octal tube type (Used in SCR-584 & SPM-1)	\$3.99
200 KC FT-241	1.99
200 KC Type DC-15 in. octal tube holder	1.99
327.8 KC No. D-168342. (Used in TS-102/AP)	9.95
500 KC FT-241	1.99
1000 KC FT-241	2.49
1000 KC Type DC-9, in octal tube holder	3.45
2000 KC FT-243	1.99
2142 KC DC-34	2.99
2174 KC DC-34	2.99
2182 KC FT-243	2.99
2500 KC FT-243	1.99
2632 KC FT-243	2.99
2637 KC FT-243	2.99
2638 KC DC-34	\$2.99
2638 KC FT-243	2.99
2642 KC FT-243	2.99
2647 KC FT-243	2.99
2738 KC type 1-C	2.99
2738 KC FT-243	2.99
2738 KC MC-7	2.99
3000 KC FT-243	1.99
3088 KC FT-243	2.99
3093 KC FT-243	2.99
3098 KC FT-243	2.99
3103 KC FT-243	2.99
3188 KC FT-243	2.99
3193 KC FT-243	2.99
3198 KC FT-243	2.99
3203 KC FT-243	2.99
5000 KC FT-243	1.99
10,000 KC Type SR-5	1.99

COMMAND RECEIVERS

THE FAMOUS "Q-Ser"! 190-550 KC. With tubes. \$10.95

Used, good condition. NEW LOW PRICE.

3-6 MC. With tubes. LESS DIAL ASSEMBLY.

Used, good cond. \$4.95

3-6 MC. With tubes. used, good condition. 7.95

6-9 MC. With tubes. Used, good condition. 4.95

COMBINATION POWER SUPPLY

BRAND NEW! COMPLETELY SHIELDED! HERMETICALLY SEALED! Schematic diagram affixed to each unit.

1 POWER TRANSFORMER: Input, 117 VAC, 60 cycles. Output, 600 VCT at 85 MA; 5 V. at 2 amps; 6.3 V. at 7.5 amps; 6.3 V. at 0.3 amps.

1 DUAL FILTER CHOKE: to match above transformer. 9.5 henry @ 85 MA. Comb. shipp. wt. 20 lbs. \$2.95

BOTH UNITS! ONLY

78-B MEASUREMENTS CORP. TEST SET

Modulation 400 and 8200 cycles. Two bands: 15-25 MC. and 190-230 MC. Operates on 110 VAC 60 cycles. \$49.95

New condition. Shipping weight: 35 lbs.

Used. \$39.95

LELAND ELECTRIC MOTOR: With reduction gear box! 110/220 VAC, 60 cycles, 1725 r.p.m., \$49.95

1/4 h.p. Gear box reduces to 60 r.p.m. New! ...

UNIVERSAL ELECTRIC SERIES WOUND MOTOR: 1/40th h.p. 28 VDC, 1.2 amps, 6,000 r.p.m. Shaft diameter 1/4 in. protrudes 1/2 in. \$1.49

Operates on AC or DC. New!

NEW! FREE CATALOGUES!

CRYSTALS: Send for detailed CRYSTAL CATALOGUE listing 5,000 frequencies ready for immediate shipment!

PARTS: Get your PARTS CATALOGUE listing hundreds of parts and accessories. Ask for free copies today!

JUST ARRIVED! 77 TONS OF MISCELLANEOUS ELECTRONIC ACCESSORIES—too much trouble to sort. Submit your own bid! NO REASONABLE OFFER REFUSED!

BRAND NEW CODE PRACTICE TAPE!

Reels No. 1 to No. 9, No. 11, No. 12, No. 15. Each ... \$1.25

Reels No. 10, No. 13, No. 14. Each. 99

TG-10

NEW REDUCTION

KEYER

Used, clean cond. Ship. wt. 80 lbs.

\$14.95

NOTE: All Above Items Other Than Crystals F.O.B. Los Angeles, Cal. Send 25% deposit with order. Balance C.O.D.

NOTE! All crystals subject to prior sale and change of price without notice. MINIMUM ORDER: \$2.50. All crystal orders MUST be accompanied by check, cash or M.O. WITH PAYMENT IN FULL. NO C.O.D. CALIFORNIA BUYERS add sales tax. INCLUDE APPROXIMATELY 5c PER CRYSTAL FOR POSTAGE. DEALERS & JOBBERS: WRITE FOR SPECIAL QUANTITY DISCOUNTS. Be sure to ask for FREE crystal catalogue giving complete list of frequencies. In ordering indicate second choice frequencies wherever substitutions may be made.

U. S. CRYSTALS, INC.

805 S. UNION AVE., LOS ANGELES 17, CAL.

DEPT. C



NEW BUD 2-TUBE CODE PRACTICE OSCILLATOR & MONITOR CPO-128-A

Here is a real money saver! While learning the code it can be used as a code practice oscillator. After the code has been mastered a flip of the switch converts the unit into a fine CW Monitor. It has a 4" built in, permanent magnetic dynamic speaker and will operate up to twenty ear phones. A volume control and pitch control permit adjustments to suit individual requirements. Any number of keys can be connected in parallel to the oscillator for group practice. Operation is possible on 110 volts AC or DC. An external speaker can be plugged in without the use of an output transformer. All controls are on the front of the unit and all jacks in the rear. The unit is $6\frac{1}{2}" \times 5\frac{1}{2}" \times 3\frac{1}{2}"$ and is finished in a beautiful grey hammer-tone.

Amateur net \$15.75

CPO 130-A Earphone model—same as above.

Amateur net \$14.10

See these at your distributors today or write for literature.

BUD RADIO, INC.

2118 East 55th Street Cleveland 3, Ohio

MAKE WAY! This boy's in bad shape!



Too bad the Ham who owned this receiver didn't get in touch with ALLIED before his ol' inhaler broke down. We'd have offered him an out-of-this-world trade-in allowance on a spanking new receiver. One moment, OM—a flash from the hospital! What's that, Doc? . . . the ol' inhaler's given up the ghost . . .

cataplexy of the capacitors, rheumatiz of the resistors, dysentery of the dials, burstitis of the bandswitch, cirrhosis of the shields, filariasis of the filters? Teh, tch, a pity . . . such a nice old receiver. Well, as we were saying, it's too bad it wasn't traded before it was too late. If your old receiver is creaking at the joints and can't seem to stand the gauntlet of present-day QRM and wearying

contest sessions, it'll pay you to drop a card to our Communications Equipment Division. Tell us the model number of the receiver you want and the receiver you'd like to trade—you'll be surprised at our terrific trade-in offer. By the way, if you don't have our latest 308 page 1955 Catalog, we'd sure like to send you a copy. Write Allied Radio Corp., 100 N. Western Ave., Dept. 16-K-4, Chicago 80. Ill.



The half-wave doublet described above radiates well over a wider frequency range than indicated, but such operation adds a reactive mismatch to any resistive mismatch that may be present between the antenna and the line. The combination causes the total mismatch to increase rapidly as the antenna is operated further and further from its resonant frequency.

Yes, adding a low-pass filter to a transmitter complicates things, but so does having your neighbor ring your telephone, because your transmitter ruins their television reception.

Letters And General News.

Bob, W9NN, a member of CQ's DX Committee, makes an excellent suggestion: "When sending QSL cards to confirm contacts, please don't address them to W9XX2 1234 Blank-blank St., Blank-blank, Illinois. Just put the man's full name and address on the card. Radio call letters mean absolutely nothing to the mailman."

"Many of the fellows you work live in large apartment buildings or hotels, especially in the large cities. When your card arrives with such an address, the delivering mail clerk is at a loss as to what to do with it. So he usually puts it up on the lobby bulletin board or some other public place for someone to claim. This immediately lets all the rest of the tenants know there is a radio Ham operating in the building! And take it from one who used to live in a large Chicago apartment hotel, this can lead to trouble!"

"So give your unknown friend a break. Don't be the cause of his having to give up his hobby just because you were too lazy to write his name on your card. He may be completely free of TVI, but that don't mean anything to the crank across the hall. Or to the building superintendent who says 'no dogs, no cats, no birds, no radios, no nothin.'"

A day or so later, Bob sent me a card addressed "Operator—, WN9—, Chicago, Illinois," which was delivered to broadcast station WGN! Bob reports that WGN did not need it. I'll bet the WN who sent it blames the other fellow for not answering his card.

Johnny Mears, Box 1813, Palmer, Alaska, says, "I've never seen any letters from Alaska in the Novice Shack so I thought I'd do my part. I am not a Novice yet, but I am working toward it. I know the theory, but my code speed is only about three words per minute. Are there any code-practice stations in Alaska or in western Canada I could pick up on my S-38C? I'd like to hear from some other SWL's."

Ed Ilendoff, Jr., WL7BCH, Star Route Box 36, Spenard, Alaska, writes as if to prove to Johnny that there are other people in Alaska reading the Novice Shack. "Rig here is a VIKING II and an NC-125 receiver. I work 80 and 40 and some 15, but I have not made a contact yet on 15, hi. So far, I have worked eight states, New Zealand, Hawaii, and Canada. . . . I would like to try a few schedules with W5's and W0's because I hear a few of them, but I have worked only Colorado and Nebraska, and I would like to add a few more states towards WAS (Worked All States)."

From Finland, OH1RX writes. His address is: Mauri "Mac" Luukkala, Kaskenkatu 1 A, Turku, Finland. "I have for a long time read the Novice Shack, and I've found it very interesting indeed. I've observed that the American Novices have some of the same difficulties as Finnish Novices have. . . . Yep, I'm a young schoolboy here in Finland, and I'll soon be a full 18 years. Next year, I'll write the student matriculation examination which is very difficult. I've owned my license a bit over one year, and I've worked my DXCC certificate nearly full; yet, I have only about 65 countries to confirm it. Let's hope I receive the lacking QSL's soon. I've worked also some 200 different 'W's, and 25 states. My wicker rig and 50 watts have done a good job. . . . I would be very delighted if I would receive a few letters from American Novice Hams and YL's in order to improve my English."

Bob Linker, WN9FNX, 1443 Elgin Ave., Forest Park, Ill., says: "I've never enjoyed anything as much as Ham radio. After four months of operating and 240 contacts I've worked 29 states and Canada. Best DX has been the state of Washington. . . . My rig is a Hammarlund

(Continued on page 54)

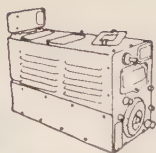
SAVE! ... BARGAINS GALORE ... SAVE!

COMMAND SETS

NEVER BEFORE!

NEVER AGAIN "Q"5's.

190-550 KC
LIKE NEW! XLNT COND.
274N and ARC5
EQUIPMENT **\$10.95**



Type		
BC-454 Revr. 3-6 Mc. Used, with tubes. Like New.		\$7.95
BC455 Revr. 6-9 Mc. Used, with tubes. Like New.		3.95
With Dynamotor	6x.	1.00
BC-456 Modulator. Used with tubes.		3.95
Sold as is, Less tubes		2.95
BC-696 Xmt. As is, Less tubes		9.95
BC-457 Xmt. 4-5.3 Mc. Used, with tubes.		6.95
Sold as is, Less tubes		3.95
BC-458 Xmt. 5.3-7 Mc. Used, with tubes.		6.95
Sold as is, Less tubes		3.95
BC-459 Xmt. 7-9.1 Mc. Used, with tubes.		9.95
Sold as is, Less tubes		5.95
BC-450 3 Revr. Control Box. Used.		1.49
BC-451 Xmt. Control Box. Used.		1.49
3 Receiver Rack. Used.		1.49
2 Xmt. Rack. Used.		1.49
ARC-5/R-28 2 MTR. Receiver: Tunes from 100-156 Mc. in four crystal channels. (Conv. to cont. tuning) Tube line-up. 717A-RF, 717A-Mixer, (2) 12SH7-1st & 2nd IF, 12SL7-Det./AVC/squelch, 12SL7-1st aud./squelch amp., 12A6-2nd aud., 12SH7-Osc./4th harmonic gen., 717A-Trip/12th harmonic gen., 717A-Dblr./24th harmonic. Used		\$15.95
BC-433-G Radio Compass: 3-band cover, of 200-1750 kc. Ideal for home or mobile revr. for long wave, broadcast listening or may be used with components listed below for automatic direction finding. All 17 tubes incl.		\$14.95

ACCESSORIES:

CD-365A Cord assem. New		\$ 1.50
I-81A Indicator. New		7.50
522-2 Meter Revr. & Xmt.-w/tube.		s 49.50
ARC4-2 Meter Revr. Xmt.-used w/tubes.		19.95
BC-1206-C Beacon Revr. Complete with 5 tubes. Tunes 195 kc. to 420 kc. IF frequency-135 kc., revr. sen. 3 Microvolts for 10 Milliwatts. Output imp. 300 ohms & 4000 ohms. Power supply 24-28v. Aero battery, \$9.95 current 0.75 amps. Brand new.		
MN-26 Compass revr. New-original crate.		\$14.95
12 & 24v.-2 amps filament trans. New		2.49
"S" Meter-Beautiful Instru. for an "S" meter. Ill. face with full scale reading of #5ma., a standard value for most "S" meter circuits. Face dia. 2 3/8" black bakelite case reverse set pointer-a beauty!		\$.89
Test Panel Meter-3" Rd. 0-3500 VDC.-New		3.95

OIL CONDENSERS

#2 ufd.-GE	7500 volt	new	\$14.95
#3 ufd.-Sprague	4000 volt	"	5.95
#2 ufd.-GE	4000 volt	"	3.95
#2 ufd.-Aerovox	2500 volt	"	2.49
#4 ufd.-CD	1000 volt	"	.97
#10 ufd.-Fast	600 volt	"	1.49
#2 ufd.-Aerovox or Solar	600 volt	"	3 for .59
#4 ufd.-GE	600 volt	"	.97

TUBES

Novice Band Crystal		.99
JAN-826 Tubes		.89
With \$5.00 order.	3 for	\$2.00
1625	3 for	1.00
With \$5.00 order.	6 for	1.00

TRANSFORMERS

Power Trans:-110v Pri. Sec #1-500v CT @ 150ma., #2 6.3v @ 5 amp., #3 5v @ 3 amp.		\$3.95
New		
Isolation transformers: 110v-new		.97
TV Power Trans: 110v Pri. Sec. 710v CT @ 225 ma., Fil #1 5v @ 3 amp., #2 5v @ 2 amp., #3 6.3v @ 10 amp., #4 6.3v @ 1.2 amp.-new		\$5.95

METERS — WESTON — SANGAMO

All New. All D.C. 2" Square.	
0-5 Ma	\$3.29 each
0-15 Ma	
0-50 Ma	
0-100 Ma	
0-200 Ma	
0-300 Ma	
0-500 Ma	
or	
3 for \$9.00	
0-2 Ma.	\$1.95
Voltmeter. 2" Sq. 0-20 Volts.	3.29



DC Voltmeter, 2" Sq.—0-300 Volts W/Ext. resistance. Complete.	\$3.95; 3 for 9.95
RF Ammeter, 2" Sq.—0 to 5 Amp.	2.95
Ammeter 2" rd.—0 to 50 Amp.	2.29
Ammeter 2" Sq.—0 to 50 Amp.	\$3.29; 3 for 9.00
3" Rd. Meters. DC. All New. 0-15, 0-30 0-100 Mills	\$3.95; 3 for 9.95
2 1/2" Rd. 0-30 Mills. Ea.	3.95
2" Rd. 0-50 Ma. 0 to 5 Ma. Movement.	
Each	\$2.95; 3 for 8.00
Thermocouple, 2" rd. 350 Mill. H.F.	3.29
Amp. Meter. No. 60-0-60.	.97

TRANSMITTERS

GP-7 Transmitter: 100 watt master osc. type—Can be used on any frequency 350-9050 kc. with proper plug-in tuning unit. Type 803 PA and built-in 400-cycle power supply using a pair of 1616 rectifiers. Three 2" panel meters: 0-300 ma., 0-9 RF amps. and 0-15 a.c. volts. Complete with 1 tuning unit and tubes. A gold mine of excellent usable components parts for building and servicing any high wattage rig.	\$13.95
XLNT condition	
220 or 420 Mc. Transmitter: 200 Mc.—450 Mc. 10 w. output. 2-388A type tubes as push-pull osc. Wide band video amp. Less tubes \$8.95.	\$12.95
With tubes.	

A REAL OSCILLOSCOPE DEAL!

ASB-7 Radar Ind. Unit: For conv. to test scope or for use as modulation monitor. Has standard test-scope CR tube. H-Cent., V-Cent., Bril., Foc., Gain, and range sel. switch. External power source used.	\$8.95
Tubes: 4-6AC7, 3-6H6, 1-5BP1. Like new.	
CW Filter Phone: Model FL-8—completely eliminates 1020-cycle CW signals when used on phone bands, or flip a switch and only 1020 cycle signals come thru! Neutral switch position cuts filter out of receiver circuit. No tubes or internal wiring required. Plugs between No tubes or internal wiring required. Plugs	\$1.89
between set phone jack and speaker. New.	
Model FL-5: Similar to above, less switch. Designed either to pass or reject 1000-cycle signals. Originally made for Army SCR274N and ARC-5 equip.	\$1.19
New	

PRACTICE CODE TAPES

Code training and practice inked paper tapes of 16 MM 400 ft. reels for telegraph and radio operation. 15 reels to set, in wood case, for use with TG-34A	\$14.95
and TG-10 keyers. Comp. set.	
Separate tapes for following lessons:	
Tape #11—traffic	
Tape #12—traffic	
Tape #8—code groups	
Tape #2—receiving	
Each on 16 MM reel. Each.	\$1.25
I-82-A Radio Compass Indicator:	\$6.95
5". Ideal for beam indicators, new.	
MN-20-E Loop: For MN-26-C or RA-10 receiver. Use as remote control loop, or mount a lightweight beam on the loop and feed it thru the slip-rings.	\$4.95
Inside gears—15:1 ratio. New.	
BC-929: Contains power supply 110v. 400 cycles, has 7 tubes such as 3CP1, complete with tubes.	\$12.95
Brand new	

PE-101C DYNAMOTOR 6 or 12 Volt

(Reprints of original CQ conversion articles—Oct. and Dec., 1952 issues furnished.)	
This is the Dynamotor the Hams have been talking about! Easily adapted to supply 625 V. @ 150 MA. and 325 V. 125 MA. at 12 Volts—or 300 V. 90 MA. and 160 V. 110 MA. at 6 Volts.	\$4.75
NEW	

TUNING UNITS FOR BC-375 or 191 TRANS.

TU-7 4500-6200 kc.	new	\$2.29
TU-8 6200-7700 kc.	"	2.29
TU-9 7700-10,000 kc.	"	2.29
TU-10 10,000-12,500 kc.	"	2.29
TU-26 200-500 kc.	"	2.29
IFF Radio Receivers BC-647: 500 Mc. Used.		\$ 4.95
AN-104A Antennas 100-150 Mc. New.		.97
BC-906C Frequency Meters. Used.		14.95
6VDC Keying Relays. 5 amp. contact. New.		1.19
Hammarlund Variable Cond. 135 ufd. max and 20 ufd. min. 2000v. Insul. New.		.79
Power Supply & Modulator Type MP-28: 28v. Input for Bendix TA-12 transmitter. New.		9.95
Novice Band Crystal		.99

CASH WITH ORDER. Include 4% sales tax with California orders—plus approximate postage. Excess will be refunded. Approximate shipping weight per unit: 15 lbs.

SAM'S SURPLUS

1306 BOND STREET LOS ANGELES 15, CALIF.

A... Always B... Buy C... Columbia

"OUT THEY GO! PRICES SMASH
CALL ON COLUMBIA! SAVE YER CASH!"

TG-10 CODE KEYS. Push-pull 6L6 amplifier, variable speed. Complete with tubes and reel. Approx. wt. 65 lbs. Excel. cond. \$14.95

TG-34 CODE KEYS. Used. \$14.95. New. \$24.50

CASE OF CODE TAPE. 15 rolls. \$12.50

WEATHER BALLOON RADIOSONDE TRANSMITTER. Approx. 365 MC. Has barometer, sensitive relay. Ideal for model toys and hobbies. Good cond. \$1.95

2-SPEED GEAR REDUCTION MOTOR. Easily converted to 115 VAC. With agitator arm. Ideal for hobby, photography and rotating small antenna beam. New. 115 VAC. \$5.50

24 VDC. 4.50

J-38 TELEGRAPH KEY. New, boxed. 89c

2 V. 20 AMP. HR. WILLARD WET CELL BATTERY. New, boxed. \$1.95

6 V. 15 AMP. HR. NAVY STANDARD BATTERY. 4 1/2" x 1 1/2" x 7" plastic case. New. Only. \$3.95

VERTICAL ANTENNA. 3 ft. sections. 5 sections taper to 15 ft. \$2.49

AN-75 ANTENNA. 7 ft. collapses to 12 in. New, boxed. With base. \$1.29

APN-1 FM WOBULATOR. Use for building TV. FM-AM sweep generator. With conversion dope. \$5.95

Go Mobile On 12 V. 12 V. DELCO-REMY GENERATOR. Brand new. 35 amps. Ea. \$9.95

6 V. CONTROL RELAY. Brand new! Ea. \$.99

3 for \$2.75

6 V. CONTROL RELAY. 7PDT. New. Stock up! Each. \$1.29

24 V. DPDT RELAY. Miniature. Excel. Only. \$.29

RG-80 CO-AX 52 OHM CABLE. 110 ft. long with 2 connectors. Brand new, boxed. \$5.49

HAM & NOVICE CRYSTALS. Written! Low prices!

PE-101C DYNAMOTOR. For conversion to 6 V. All data included. See writeup in May/54 CQ. New, boxed. \$4.95

T-17 MIKE. Good used. \$2.95

HS-33 HEADSET. Used. 1.95

REAR SEAT SPEAKER KITS. New, wired. Complete with hardware. 5x7" \$7.49 6x9" \$8.95

TRANSFORMER-CHOKE SPECIAL

CHOKE: 10 henry, 100 MA. PLUS.

TRANSFORMER: Pri. 117 VAC. 60 cycles. Sec. 5 V. at 2 amp; Sec. 6.3 V. at .3 amp; Sec. 6.3 V. at 7.5 amp; Sec. 330 VDC using 5Y3 rectifier. BOTH BRAND NEW. \$2.95

BOTH FOR ONLY

PLATE TRANSFORMER: Pri. 115 V. Sec. 2700, 2530, 2360, 2190, 2020, 1850 V @ 250 mtl's. Very compact. ONLY. \$3.95

ARC-5 OR 274-N TRANSMITTERS

All pre-tested & guaranteed!

2-1-3 mcs. Used. \$12.95 New. \$19.95

3-4 mcs. With tubes. 25.00

4-5-3 mcs. With tubes. 7.50

5-3-7 mcs. With tubes. 6.95

5-3-7 mcs. With tubes. I like new. 12.50

T-23 ARC-5 VHF TRANSMITTER. For C. P. with tubes 100-156 MC. Crystal control. \$22.50

ARC-5 OR 274-N RECEIVERS

Equipped with Tuning Knobs

19-55 kc. \$12.95

1.5-3 mcs. Like new. 14.50

3-6 mcs. 7.95

6-9-1 mcs. With tubes. Pair. 3.95

New. 19.50

6-9-1 mcs. Excellent condition. 6.95

BC-456 274-N Modulator. Less dynamotor, Excel. cond. 3.95

12 V. Command Receiver Dynamotor. New. 10.95

R-28 VHF ARC-5 Receiver. 19.50

Plus All Accessories Needed for Above.

SCR-183 12 V. RECEIVER & TRANSMITTER. Covers marine, aircraft & Ham bands with proper coil, WITH 2 coils, 2 control boxes, tuning head, flex cable, 12 V. dynamotor. Approx. 25 W. output. With schematic. \$12.95

RRAND NEW CONDENSERS. 8x8 MFD @ 600 VDC. \$.95

10 MFD @ 600 VDC. 1.29

8 MFD @ 1000 VDC. Ea. 1.95

4 MFD @ 1000 VDC. 1.75

2 MFD @ 1000 VDC. Ea. 95c. 6 for 5.00

4 MFD @ 500 VDC Ea. 49c. 3 for 1.00

ARC-4 2-METER TRANSCIEVER. You know this one! Complete with ALL tubes, Excel. cond. \$22.50

With 12 and 24 v. dynamotor. 27.50

LATEST FIELD TELEPHONE NEW. Sig. Corps release! Made of light-weight aluminum. Waterproof. Long range. Has bell or neon indicator for call signal. Uses a handset with P-1 button. Easily converted to terrific phone patch. With batteries. New! Per pair. \$19.50

Columbia

ELECTRONICS
2251 W. WASHINGTON BLVD
LOS ANGELES 18, CALIFORNIA

(from page 52)

—420 running 70 watts to a 40-meter folded dipole antenna. The receiver is an S-76. I have had 89 per cent return on my QSL cards. . . . I am 18 years of age; would appreciate pen pals or skeds with those needing Illinois contacts."

Harvey, WN3ZEW, 436 Taylor St., Pittsburgh 24, E writes for himself and his brother Bob, WN3WEG. I got my call two weeks ago, and I have made 47 contacts in seven states. Bob got his ticket ten days before. He has 60 contacts in seven states and two VE3's. . . . We both use the same rig, a 6AG7 driving an 807 in an S-22R receiver. The antenna is a 135-foot long wire. . . . Bob is ten years old, and I am 14. We both fail the code test the first time, but we can copy 13 W solid now. We shall be glad to help anyone get a license. He can write to us or telephone MA-12282."

From Jerrell Bedford, WN4GIR, Route 2, Ellenboro, N. C.; "I have had my license for two months. I I polio when I was 12 years old. Due to this handicap I cannot work; therefore, I am on 3731 and 3746 most of the day. I have worked 15 states with eight them confirmed. Best DX is KN6GAL, California. I I did not get his address; so I cannot send him a card. . . . My rig is an AT-1 transmitter, running 35 watts and an S-20R receiver the local Hams gave me. . . . you on 80 meters. Any YL's around? Oh, yes, I am I

It's-a-small-world department. Tommy, W4DUB. (T who was visiting relatives in Gary, dropped into see v

Help Wanted

Thomas Berry (14), 7023 Lemington Ave., Pittsburgh 6, Pa. Tel: Hiland 17359.

Ken Villaneva, 2938 Channel Drive, Ventura, Calif., Tel: Miller 3-1088. (Needs help in mastering the code and then later administering the code test when he takes the examination.)

Cal Kaylor, 250 Stratford Drive, Tucson, Ariz. Tel: 6-1896.

Ross Reymann, Jr. (15), 3578 30th St., San Diego, Calif.

Tommy Webb (15), 202 Lenoir St., Morganton, N. C. (Needs help with code and wants a few pen pals.)

Billy Rhoden, 623 1st Ave., S.E., Moultrie, Ga. Tom Biodek (15), 411 So. Sefton Ave., Monterey Park, Calif.

David Stamps, 27823 East River Road, Grosse Ile #1, Mich.

Allan Pellnot (15), 64 Galveston Place, Buffalo 11, N. Y.

Each month CQ lists those names and addresses of prospective Novices and Hams needing assistance with code or theory. To have your name listed, please address your request to Herb Brier W9EGQ, 385 Johnson Street, Gary 3, Ind.

After he had been here for a while, he stared intently at the call letters on my transmitter and said "W9EGQ! Gee, your call letters are an awful like those of that fellow who writes the Novice Shack."

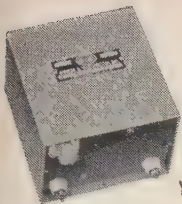
Terry Long, WN9HNJ; 40 West Harrison Ave., Wabash, Ave., writes; "I have been on the air 18 days and have had 51 contacts in 12 states. I hope this clears up my address for some of the fellows I worked."

Louise, WN3WRE, came through with a letter and card. In the letter she asks a favor, "Please, Oh Nov Editor, conduct a spelling lesson. I do not mind 'Louis' or 'Lois,' or even 'Loys,' but please tell all future Novices that 'Louise' is not spelled L-o-u-s-e! Leave that to it!"

On the card, Louise said; "As of August 9, 1954, I lost two Novices. Bill and I passed our General examinations. I suggest that all Novices use cast-iron pens when taking their General-class code examinations. The darn wooden ones jitterbug all over the place—not to hand you know. It was those nervous pencils."

Bob, KN6EYT, gets right to the point. "I spent two months fooling around with a single-wire antenna. Then I finally got wise and put up a 40-meter vertical. I had the vertical up one week. In that time, I have creased my best DX to 1100 miles and worked two new states. My transmitter is the AT-1 and my receiver is S-38A. . . . My biggest gripe is not getting QSL cards from out-of-the-state General-class amateurs."

Out of space once again. See you next month. In the meantime, tell us about your experiences. 73, Herb.



FOUND! The Missing Link

NEW **B&W** 1-KW BALUNS FILL THE GAP BETWEEN UN-BALANCED FEED LINES AND BALANCED ANTENNA LOADS

YOU DON'T HAVE TO BE AN ENGINEER
TO MATCH A COAX LINE TO YOUR ROTARY BEAM

Use these precision-built B&W 1-KW Baluns and take the guess work out of your *beam matching problems* for:

- MAXIMUM TRANSFER OF POWER
- LOW LINE RADIATION ON TRANSMISSION
- HIGH SIGNAL-TO-NOISE RATIO ON RECEPTION

Designed to match pi-network or other low impedance output of any transmitter with power ratings up to 1000 watts to beam type antennas, employing the popular "T" MATCHING SECTION.

Model 700 for 10 meters
Model 701 for 15 meters
Model 702 for 20 meters

Housed in heavy gauge steel, weather-proofed cases fitted with coax input connectors and ceramic feed-thru output terminals.

Impedance—75 ohms unbalanced, to 100 ohms balanced.

Size—approx.— $3\frac{1}{2}$ " x $3\frac{1}{2}$ " x 4". **\$16.50**
Weight—less than 3 lbs.

GET IMPROVED PERFORMANCE
WITH FOLDED DIPOLE ANTENNAS

Use these precision-built B&W 1-KW *single band baluns* for:

- MAXIMUM TRANSFER OF POWER
- LOW LINE RADIATION ON TRANSMISSION
- HIGH SIGNAL-TO-NOISE RATIO ON RECEPTION

Designed to match pi-network or other low impedance output of any transmitter with power ratings up to 1000 watts into half wave folded dipoles using 300 ohm feed lines.

Model 710 for 10 meters | Model 712 for 20 meters
Model 711 for 15 meters | Model 713 for 40 meters
Model 714 for 80 meters

Housed in heavy gauge steel, weather-proofed cases fitted with coax input connectors and ceramic feed-thru output terminals.

Impedance—75 ohms unbalanced, to 300 ohms balanced.

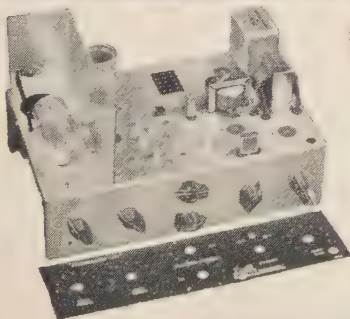
Size—approx.— $3\frac{1}{2}$ " x $3\frac{1}{2}$ " x 4". **\$16.50**
Weight—less than 3 lbs.

BARKER & WILLIAMSON, Inc.

237 Fairfield Ave., Upper Darby, Pa.



NOW... Single-Sideband for Everyone!



"Phasemaster-Jr."

Up to 50 watts output.
Fixed or mobile, 6-12v fil.
SSB, AM, PM or CW.
9 mc phasing circuit.
Less power supply
and tubes.

Kit **\$74.50**

Wired & tested **\$92.50**

Other Famous Items:

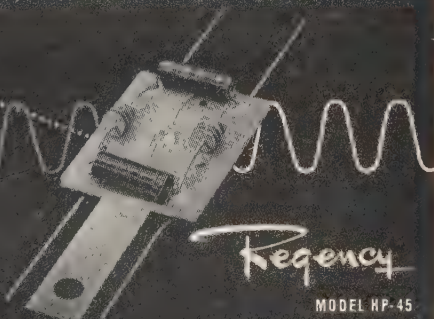
HETRODYNING V. F. O.
TENNA — SWITCH
SPECIAL SSB COMPONENTS

Write for literature



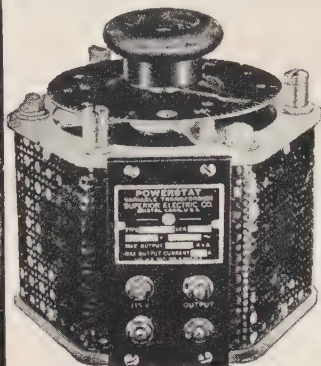
HERE IS AN EFFECTIVE HIGH PASS FILTER TO SUPPRESS TELEVISION INTERFERENCE!

The Regency Model HP-45 High Pass Filter is a constant "K" type filter with a cut-off frequency of approximately 45 mc. in a 300 ohm balanced line.
Attenuation at 29 mc. is approximately 20db. At frequencies of 14mc. and below, the attenuation is 40db. or more.
Signals above 55mc. are passed through the filter without loss.
Simple to install—full instructions included with each unit.



REGENCY Division of I.D.E.A., Inc., Indianapolis 26, Ind.

MODEL HP-45
AMATEUR NET. ONLY 99c



VARIABLE VOLTAGE TRANS- FORMER

POWERSTAT
TYPE NO. 1126

NEW
ORIGINAL
BOXES

\$33.95

Input 115 V. AC, 50/60 cycles. Output voltage 0-135 volts AC. Maximum amps output, 15 amps, 2 KVA. Overall size 8-3/16"x8-1/16". Complete with knob and scale. Send 30% deposit with order. Open accounts to rated firms.

**10%
OFF**

on any order totalling
\$30.00 or more on any
of the below items!

SLASH/PRICED TO GO!

COMMAND RECEIVERS

3-6 MC ATA ARA. Used. Xlnt.\$7.95
6-9.1 MC ARC-5. Used. Xlnt. 5.95

COMMAND TRANSMITTERS

4-5.3 MC. ATA/ARA. Used. Xlnt.\$6.95
5-3-7 MC. ATA/ARA. Like new. 5.95
7-9.1 MC. T-22/ARC-5. Extra clean. 9.95

BC-456 MODULATOR. Used, good cond.\$1.95

CO-AX SPECIAL!

110 Ft. roll RG-8/U Co-axial Cable with PL-259 on each end. Brand New. Per roll\$5.25

MOBILE DYNAMOTOR SPECIAL!

For 1953 & 1954 12 V. car system. Input, 12 VDC @ 1.1 A. Output, 250 V. @ 60 MA, used, excellent cond. Only\$5.95

TUBES

All new! All guaranteed!

Check these low, Low prices!

		69	723A/B	
1P30	.....	4.95	800	1.00
2AP1	.....	17.50	801A	2.25
2K25	.....	7.50	803	2.50
2C39	.....	7.50	805	2.25
2C44	.....	2.75	806	12.50
3BP1	.....	.89	807	1.00
3C24/24G	.....	7.50	808	1.50
3D22	.....	9.00	809	2.50
3E29	.....	1.00	810	8.95
3EP1	.....	15.00	811	2.95
4-65A	.....	17.50	812	2.50
4-125A	.....	8.95	813	7.95
4E27	.....	27.50	814	3.00
4X150A	.....	70.00	815	2.25
4X500A	.....	2.25	829	5.00
5BP1	.....	2.50	829B	8.95
5RP4	.....	.45	832	5.00
6AK5	.....	.33	832A	6.00
6H6	.....	.59	836	2.50
6SN7G1	.....	.69	837	1.00
7CP1	.....	4.95	866A	1.00
12AT7	.....	.89	872A	1.50
100TH	.....	4.00	954	.20
250TH	.....	1.00	955	.30
304TL	.....	4.00	956	.30
304TH	.....	3.00	957	.35
316A	.....	.29	958A	.50
446A	.....	.89	1625	.25
471A	.....	1.95	1629	.20
KU827	.....	15.95	2050	1.10
717A	.....	1.00	2051	.75

NOTE: Send full amount with order. Unless otherwise specified, material shipped via RR Express, shipping costs COD. Californians add 3% sales tax. All items subject to prior sale. Minimum order \$5.00.

V & H RADIO & ELECTRONICS

2033 W. VENICE BLVD. LOS ANGELES 6, CALIF.

Dept. Q-1

Phone: REpublic 0215

The second part of this story, originally scheduled for this issue, has been transferred to our November issue. We hope that the delay in presenting the concluding part of the RTTY "Junkeyboard" has not inconvenienced our readers.

DX NEWS

(from page 43)

DX Notes

VQ4CF will soon be VQ3CF. . . . (From GN8M PX1YR is still QRT as the 100 watt phone rig is ready. Only A3 will be allowed in Andorra. . . FB8ZZ is active again but only on 7 Mc. for moment. . . FB8XX has repaired his power supply and is in business again. . . FB8BK, Tromelin Island, too busy with official traffic, at present, to get on Ham bands. . . Rumors have it that VU5AB, Andam Islands, will soon be on A3 again. . . F9QV/FC active again on phone and CW. . . We hear there is still hopes for HV1AA in spite of much information the contrary. . . AC4NC is reported on each Sunday, 075, 0600 GMT. Others say 14120. . . W8BKP works FU8AA on 14168 A3 and reports VU5AB on phone 14140. . . C3AR, Formosa, has been feeding A3 QSO to W6's on 14280 around 0700 GMT. . . SU1BB, Agad Jordan, will soon change to ZC7BB. . . ZC7DO is again after 2 weeks' illness in MD5. QSL to both G4CP. . . The station signaling SV9UN/Crete is probably a phony and seems to be emanating from DL-land, was S9 at G4CP when YU's etc, couldn't even be heard.

W6LVN advises that Heard Island will be closing down at the end of the year so this will be your last chat

Our heartiest congratulations go to the following station upon his achievement of WAZ:

No. 302 VK3KB A.L.H. KISSICK 40-200

at them. Activities will be transferred to the Mawla Base, Antarctica presently inhabited by VK1EG (VK1BS). VK1EG was worked by KV4BB and AA July 25 at 1140 GMT, 14085, southern path. VK1EG worked 469C. . . FB8XX rolls into W6, over VK, between 04 and 0600 GMT, 14050. . . ZS5MP reports CR8A 14024. Also VQ8CB (Chagos Is.) on 14048 and 1530 GMT. . . SM5LL reported that one ZD8HJ would be found on 14029. Nothing has been heard yet. . . SM5LL also reports JAI1XR/JA9, Bonin Islands, has been on 1411 with a ten-ke. drift. . . IIA1V reports AC4LP running 500 watts from Lhasa, Tibet, on 14035 around 2130 GMT. . . ZC6UNS has been on 14100, 2040 GMT with 100-watter. QSL via ARRL. . . KV4AA works ET38 on 14062, 2000 GMT—slightly undercover station. . . CN8MM reports VS5GK, Brunei, on 14250 where VS1CZ says two stns. are active in Brunei. . . W5AV reports hearing VR5IP, Tonga, while W1CWX nabs ZM6AS, Samoa. . . Glen, W4PDZ, writes that the will soon be four new VP7's on the air when the following obtain licenses: Leo, W4BIM; Champ, W4SZL; Ken, W3RUZ and WAPDK. All will have around 100 watts and operate from Grand Bahama Island. . . Dick, W0MLY, of VQ6MY, FL8MY, 4W1MY fame, eye Great Corn Island and says he will make a trip the next spring should it be counted as a separate country. . . John, W6YY, reports VR3C is QRT for the rest of 1954, but VR3A still holds for from Fanning. FB8X VK1DY and VK1QP continue to be active around 0600 GMT. There is definitely no Ham activity from VJ stations on the British Canton/Phoenix group.

(Continued on page 58)

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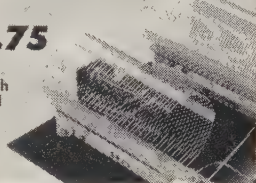
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(from page 56)

DX'ploits

Al, W8PQQ, went to 245 with HKØDT. . . . W6SYC is right behind, 244, thanks to FB8XX. . . . Horace W6TL, also added FB8XX for No. 224 while W6PKC came up to date with 14 additions putting him on 218. . . . G8IG A3'ed with ZD3BFC for No. 212, 188 or phone while Art, W6SR, added 26 with such as ZC2MAC VR3D, JZØKF and VS4RO to hit 208. . . . Jack W6NTR, came up with VS4RO, VK1HM/ZC2, LZ1KDP, FØ8AJ, etc. to reach 194. . . . W5ASG took over the 39 zone lead with HKØCV, FØ8AJ and VS5RO for 240. Bills phone score also rose to 173. . . . KV4AA tipped 239 with HKØDT and ZD3BFC while Glenn, W8KIA, went to 238 with VS5RO. . . . VS5RO also pushed Roy VK4FJ up to 209. . . . W3KDP jumped to 202 with VR3A and KJ6AR while Sergio, CO2SW, hit 198 with VS1DC, SV7AA, HKØHQ and MP4BBL. . . . W3KPI got back on with 15 watts after being grounded by TVI and nabbed LB8YB. This with 14 other additions put Bill on 188. . . . Roger, F9AH, submits AC4AK for zone 23 and goes to 163 with SV5UN, ZD7A, EA9DF, VP7NM and VP6CJ. . . . W6TXL reaches 161 thanks to F8FW/FC while Juan, KP4CC, ups to 195 with FØ8A, and ZK1AB. . . . Eric, OZ7BG, goes to 174 with ZD6BX while W4HA comes up to date with long list giving him 182 and 173 (phone only). . . . Dixie, W2ZVS, continues a steady climb with VR2CY and F8FW/FC for 167 while Bill, KV4BB, replaces FB8UU with VK1EG for zone 39 and rests on 182 with ZD3BFC and HKØFG.

Don, W6AM, hits 173, A3 only, with LB8YB. . . . W. have finished the unpleasant task of removing VQ7UU VQ9UU, ad nauseum. Hardest hit was KV4BB who lost seven countries. W8NBK lost four and G8IG, W5MPG SM5KP, W1CLX, W8DMD, G2LB and GM3EST lost three, each. . . . Phil, W3LEZ, has passed the DXCC mark and rests on 104 with ZB1AJX, IS1TAW, HA7OC, CX2AM and OE2WR. . . . Operation from W9WHM since his General was obtained last January has resulted in 60 countries on 14-Mc. phone which include; FM7WN, CT3AN, YUIAD, VP1GG, KR6KS, CX4AB, PJ2CA and KT1LU. . . . Big happenings at W6QHS in the past few months include: (1) 17th birthday, (2) graduation from high school, (3) WAS, (4) WAC, (5) DXCC, (6) new kw rig with 4E27's and (7) new Super-pro rx. . . . OD5LX's QSL was No. 200 for W6UJ. Nice going Chris. A card from EA6AW was No. 90 for Bob, W4QCW (KC4AB). . . . Graham, XE1MJ, added VP8AA on 14 Mc. . . . W9UKG went to 106 with 4X4BN. . . . Burt W4BQY (ex-W6EHV, KG4AF), is now up to 138 for his umpteenth DXCC. . . . Pete, W6PYH, added F8FW/FC. The same station gave W1WLW's 35-watter his No. 104. . . . VQ4CF was No. 116 for Oscar, HRIAT, who is now active again. . . . CR6AI gave W5UUK his No. 101. . . . John's new beam at GM3EYP (ex-VP8AP) accounted for VS6CT, KH6IJ, KL7BBQ, EA8BH, AP2KC VE8NP and ZC6UNS. . . . Ted, TI2BX (ex-CP1BX), backed into VK3ATN for No. 62. . . . FB8XX was 238 for W6CUQ. . . . VP8AZ and VP8AQ have been active around 3505. On July 12, VP8AZ knocked off W2PEO W1EF, W4YZC, W4YE, W1EPE and K2BZT while on the 13th, VP8AQ was heard working W2PEO, W2EQL and W1EF. . . . VK3CP hooked EA9DF on 7 Mc. around 0730 GMT. . . . W6NTR heard VS2RO working ZC5G. Jack broke in and was ZC5G's first W QSO. . . . KA2KS is active on 21 Mc. and asks for more activity on that band. He has contacted W2ZXP/MM, W3OZA, MM, W3JY/MM, W6KUY/MM, DU7SV, HZ1HZ, KX6NB, TA2EFA, ZS7WA and others.

Here and There

CR6AQ is QRT with all gear sold. . . . ZD4BK just returned from G-land vacation as ZD4BF took off on his. . . . The Indian A.R.C.I. has been wound up and the A.R.S.I. has been formed. Indian QSL bureaus will be consolidated under the QTH given in "New Addresses." Correspondence, other than QSL's, for the new Society, may be sent to Box 584, New Delhi, India. . . . Nev. officers of the West Gulf DX Club are: W5ALA, Pres. W5FT, Vice Pres.; W5FXN, Sec'y-Treas. The club's QTH is Box 764, Austin, Tex. . . . PY4IE seeks QSL's from VR1C, FN8AD, VR1G, VR1A, and KB6's AN, AQ, BA, AO and AY. . . . VK4FJ will handle QSL's for VK1EG. IRC coupons must accompany. VK1EG was one of a company of three who returned to the Mawson Base after a six-week exploration trip. All were lucky to return alive after the hazards met. VK4FJ still hopes for QSL from VP2LE and VP6AA. . . . VR4AE is

(Continued on page 60)

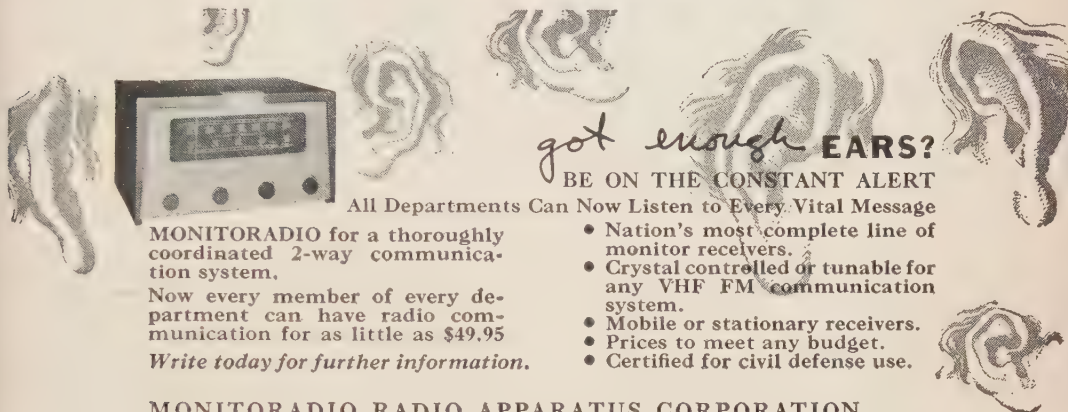
6-Meter Technician Proposal

As mentioned in "QUA de CQ" (September issue) a petition was filed by James Price, W5FXN and Tom Walker with the FCC to permit "Technicians" to operate on 6 meters. The CQ staff endorses this idea as a means to enlarge the use of the 50-Mc. band.

On 1 September 1954, the FCC released *Docket 11157* setting forth this proposal and requesting comments from interested parties.

It was apparent from this FCC *Notice of Proposed Rule Making* that the Commission was in favor of granting such privileges. In addition to the reasons given by Price and Walker the Commission added the fact that, "... the technician's value to, and participation in, Civil defense communications ... would be enhanced by the amendment proposed ..."

We hope all readers interested in the 6-meter band will file with the FCC (four copies by November 15), their comments.



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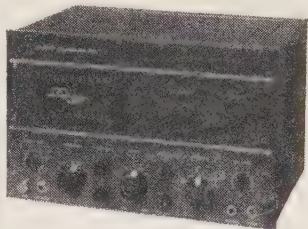
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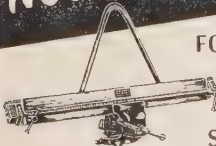
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(from page 58)

assuming a job in Alice Springs, Central Australia and will soon be heard as a VK5. . . . W5RX QSY's to KV4-land.

G2MI visits YU, OE and I in August. . . . Via W4RB4 we learn that all OD5L-calls belong to the Lebanese Army Signal Corps. Active are: Fouad, OD5LC, running a BC-610, three-element beam on CW and phone; Edward OD5LJ, runs 60 watts to an 815; Ted, OD5LX, runs 75 watts with HRO and 3-element beam. . . . Considerable excitement was evident during a QSO between W6NZV and CE0AD. The latter stated that a mysterious wind

New Addresses

EL3A—Thomas Curtis, c/o American Embassy, Monrovia, Liberia.

EL12A—(ex-W9GTX) Gene Forbes, c/o American Embassy, Monrovia, Liberia.

F8FW/PC—Via HB9LA.

I1ER—Via Raffaello Sanzio, 32, Milan, Italy.

KC4AB—(Navassa Island) via W4QCW.

VR2BZ/ZM7—(Tokelau Island) J. Barri Hogg, R.N.Z.A.F., Laucala Bay, Fiji.

VU QSL Bureau—Amateur Radio Society of India, VU2JP, Box 1, Munnar, P.O. Travancore, South India.

ZC5G—Box 401, Jesselton, British North Borneo.

ZD4BR—Bill Ashplant, Box 101, Takoradi, Gold Coast.

ZD3BFC—Box 285, Bathurst, Gambia.

ZS9AC—Box 3037, Capetown, Union of South Africa.

Thanks to EL2X, W6DZZ and W4DGW/MM.

jammer has been making passes at the island and attempts to contact it by radio came to naught. When a launch was put out the windjammer immediately headed seaward. . . . Doc, KR6AA, heads home on the first of October and we will hear W4VE again. . . . EA1BC seeks Nevada for WAS. . . . Wendell, W6FSJ, is now on a trip through South America. He was heard on A3 from HK3AB. . . . KV4AA logged a visit from W1MU. . . . W1JOJ handles QSL's for CR5SP. . . .

We regret to report the passing of Batista, PY7WS, on August 11. . . . W5HPV visited West Coast. . . .

W2BO is on from new QTH at Massapequa, L.I.

Frank, W1DSF, recently visited F, DL, PA and HF

lands. . . . Dave, PA0UN, returned home from K2GX

in August. . . . Tom, TI2TG, departed from Costa Rica

on Aug. 13 and arrived at Wilmington, Calif. on Aug.

22. A dinner was given in his honor by the Radio Club

of Costa Rica and he was awarded a bronze plaque

commending him for his all-around amateur cooperation.

Tom has fought an uphill battle with polio since he was

stricken in 1949 and we wish him all the luck in the

world. . . . New officers of the South California DX Club

are: W6YJ, Pres.; W6NZW, Vice Pres.; W6MBA, Sec.

and W6GFE, Treas. . . . The annual get-together of the

North and South California DX Clubs will be held at

the Hotel Californian, Fresno, Jan. 15 and 16. W6T1 is

joint Chairman. . . . Bob, W0NWX, has now replaced

the weight lost at F08AJ and is reported to be "fat

and sassy" again!

That's all for now.

73, KV4A

VIKINGS ON SSB

[from page 18]

the remaining turns. (Use coil dope or duco cement to hold these spaced turns in place.)

j) At the buffer coil remove 4 turns from the 20-meter section (bottom of the coil) to compensate for the added inductance of the long coil taps.

k) Install the switch, (with front shaft already cut to length). See Fig. 5 for positioning.

1) At the rear section of the switch, solder the lead coming from under the chassis to

terminal 1. Lay the new 15-10 meter coil horizontally behind the position of the oscillator plate coil. The tap should be four turns from the shield. Form the tap and the lead at this end around the position of the plate coil and the corner of the shield to the switch (see photo). Solder the 10-meter tap to terminal 2. Solder the end lead to pin 4.

m) Mount the plate coil in place again and connect the bottom to this 15-meter tap. Solder. Working from top to bottom now, connect the top of the coil to switch terminal 11, second tap to 10, third tap to 8, fourth tap to 6. Solder all connections.

n) At the forward section of the switch: solder the leads coming through the chassis to terminal 1. Connect (working from top to bottom) top of the coil to terminal 11 by the shortest path, second tap to 10, third tap to 8, fourth tap to 6, bottom of the coil to 4; reconnect the 15-meter coil to 4, 10-meter tap to 2. Solder all connections. Check to see that none of the tap leads are shorting to each other.

o) Replace the shield, remount the oscillator tuning condenser (and ground connection), and solder in place the free end of the 15-10 meter coil to the rear post of the condenser. This coil should now be self-supporting between the switch and the tuning condenser (see photo).

p) Replace the front panel and knobs, reconnect the meter, and check the tuning of both oscillator and buffer stages on all positions of the bandswitch. The original knob can still be used for the bandswitch, but the indexing is now extended and follows this order, clockwise around the skirt of the knob: 10S, 10, 15S, 15, 20S, 20, 40S, 40, 80, and 160. You will notice that an extra position has been provided for 40-meter operation. This was done to bypass a loading resistor (R-22) used in conventional operation. SSB operation is now available on positions 10S, 15S, 20S, 40S, 80 and 160. Ordinary CW or PHONE operation is available in positions 10, 15, 20, 40, 80, 160.

Installation of Screen Voltage Regulators

a) Mount two miniature seven-pin sockets X29 and X30 on the free chassis space (?) in front of L9, with pin 1 on each socket oriented toward the 5R4's, X29 being the closest to X9.

b) Connect pin 2 of X29 to the third terminal from the front of X22 (connection is between SH-1 and C10). Solder. Connect pin 5 of X29 to pin 2 of X30. Solder.

c) In the Viking I: mount R36 on the chassis near Sw3. R36 is 20,000 ohms, 25-watt, adjustable). Connect one lead from Sw3, terminal 13 to the slider on the resistor. Solder. Adjust the slider for about 13,500 ohms. Connect the lead from Sw3, terminal 17 to the end of R36 now and solder.

c) In the Viking II: mount R37 on the chassis near Sw3 and R13. (R37 is 5000 ohms,

[Continued on page 67]



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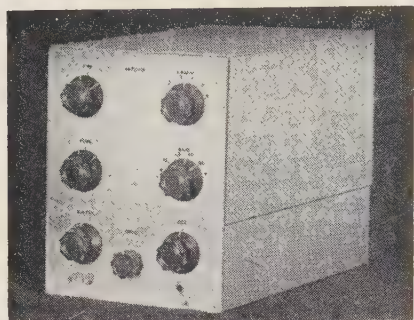


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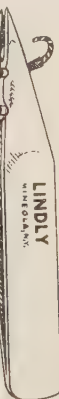
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THE SIX BANDER

[from page 34]

since there is a choke in the plate of the oscillator on these frequencies and any indication of grid current ($\frac{1}{2}$ -1 ma.) shows that it is working properly. The same is true for the 20 and 15-meter positions where the grid current may be even more than 1 ma. It is only necessary to determine with an absorption wavemeter that the output is on 40 meters. This coil should be resonant just below the 40 meter band and can be checked with a grid dip meter when no voltage is applied to the oscillator.

Coil L5 can now be adjusted for tracking to cover the frequencies indicated in the table. With the tuning condenser set at the high end of the band, the trimmer is peaked for maximum grid current to the 6AH6 and the condenser then tuned to the low end of the band. If the grid current does not change more than a few tenths of a milliamper, that is all there is to it. It is advisable to check with a wavemeter or grid dipper to be sure the right harmonic is being used. If the grid current falls off, the turns on the coil will have to be spread or compressed slightly to bring it back up to the original reading, and the tuning process repeated until the grid current remains constant. Coil dope is used to hold the windings secure when the alignment is completed. With the band switch in the 6-meter position, coil L6 is adjusted for tracking in the same way to cover a range of 25 to 27 Mc.

Before going ahead with the buffer coils, the dial is marked lightly in pencil at the band edges so the frequency coverage can be referred to during the balance of the alignment. The second switch partition is fastened in place and blank coil forms placed in position in the compartment so their mounting holes can be marked. An $\frac{1}{8}$ " hole is drilled through the chassis under the position for each coil to enable mounting with stud bolts. The final tank coils are installed and all final r-f wiring completed before going ahead with the alignment of the buffer coils. After the plate and B+ connections have been made to the buffer switch section arms, the buffer coils are installed and aligned—the easiest way being to take one band at a time starting with the 6-meter coil. A rough check can be made of coil tracking by using a grid-dip meter, but the best coil adjustment is made under operating conditions using the test bench power supply.

Since the rig is designed only for 6-volt operation, the relay contacts have to be closed with a piece of cardboard to get voltage through the

power plug. A 0-10 ma. meter is connected to the test point in the grid of the 5763 and about 250 volts applied to *pin 4* of the power plug. Switch, *Sw9*, should be in the CW position to keep voltage off the modulator. The dial is set about mid-scale (or about 52 Mc.) and the six-meter buffer coil turns spread or squeezed together as required to get a maximum grid reading to the final. This will be about 3 or 4 ma. The tuning condenser is then run over the whole band to check for uniformity of grid current. If there is any great variation, adjust the coil turns for uniform current for the full range of tuning.

Loading Up

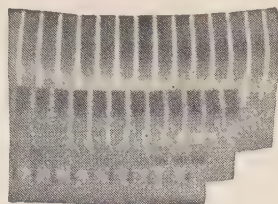
Before going to the next band, operating conditions should be checked with power applied to the final. A dummy load is used (15-watt light bulb on the end of a piece of co-ax plugged into the antenna jack) and final voltage is applied through *pin 3* of the power plug, using the same 250-volt supply. When the final is resonated and loaded, the grid current will fall off slightly and the turns of the buffer coil will have to be readjusted to bring the current back up to maximum. When all checks have been made, the grid current should be in the neighborhood of $2\frac{1}{2}$ to $3\frac{1}{2}$ ma.—the objective being to get 3 ma. operating current on all bands. Some variation one way or the other is not too important.

The 10-meter buffer coil can now be wired in place and the same process repeated to align this band, going to the next lower band and so on until all the bands are lined up. The three lowest bands are not at all critical and coil adjustment is made by adding or taking off a turn of wire. These coils are loaded with resistors to keep from overdriving the final. The operating grid current should be adjusted for the same 3 ma.

A metal bottom plate is used on the chassis so possible vibration of the cabinet will not affect the oscillator. This bottom plate should be in place when the final checking is done and the dial is calibrated. The trimmers are reached through holes made in the bottom plate. Dial calibration is made by putting voltage on the oscillator only and beating the signal on a receiver of known accuracy.

The cabinet is made from one long sheet of aluminum $7\frac{1}{8}$ " wide and 29" long bent to make the cabinet $9\frac{1}{4}$ " wide, 5" high and $7\frac{1}{8}$ " deep. It is slightly wider than the chassis to give clearance to the heads of the mounting bolts on the side of the chassis. The back piece for the cabinet and the panel are identical in size and made $5" \times 9\frac{1}{4}"$ with a $\frac{3}{8}"$ lip turned back on all four sides to fit over the outside ends of the cabinet. The back is fastened on permanently with rivets or bolts and cutouts

[Continued on page 64]



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[from page 63]

made for the power plugs and antenna connections. The panel is mounted on the chassis and when the rig is slid into the cabinet, bolts are screwed through the side lips on the panel to hold the transmitter in the cabinet.

Actual operating final current is 50 ma. with a 300-volt supply and modulator current is about 45 ma., kicking up to about 60 ma. with modulation.

EDITOR'S NOTE: Just before closing date we have noted that C34, a 0.005 μ fd. condenser has been accidentally dropped from the parts list on page 33. Also in the schematic on page 32, the "Tune-Operate" switch should be labelled as S8.

THE POWDER PUFF DERBY

(from page 12)

Shapley, of Phoenix, also holds a pilot's license. WIUPZ, Helen Wright, of Brookline, Mass., YL and 99'er, was written up in the "YL's Frequency" in the November, 1952 issue of CQ. Helen started flying in 1942 and got her amateur license in 1952.

Two other 99s who hold Technician Class amateur licenses are W2MYF, Murray Fisher, of Croton-on-Hudson, N.Y., and W1YUO, Jerry Gardiner, of Waterford, Conn.

W6QPI, Betty, has placed a query in the *Ninety-Nines* newsletter, and we may find there are others among the 99s who are licensed YLs.

Job Well Done

W6LMQ, who also assisted W6NZP in last year's AWTAR radio net commented that traffic was far greater this year. Although the CAA transmits official flight plans for the contestants, obviously the hundred women fliers rely heavily on the amateur radio network to handle their messages, and as an additional security.

Following the race AWTAR Chairman Betty Gillies complimented the radio net thus: "I don't have to tell you how superb the net was and how grateful we all were for the service rendered to the AWTAR by all the Hams along the route and at Long Beach and Knoxville. They did a marvelous job and everyone concerned with the race from coast to coast was terribly impressed with the effectiveness of amateur radio communications. I do hope the Hams will work with us again next year and in the years to follow as they have become an integral part of the AWTAR."

Next month we'll be back with the "YL's Frequency." In the meantime, please note our new QTH (yes, again!) for mail and contributions. Hardly had we become settled at Towaoc than the OM accepted a position as teacher-adviser in the Jicarilla Apache Indian school at Dulce, New Mexico. So we hope to be seeing you on the air soon as a W5 again. 'Till then, 33, WØSCF/5.

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GELOSO 60 WATTS

[from page 40]

Transmitter Adjustment

The 4/101 V-F-O Exciter is pre-tuned, little if any adjustment is necessary. Any alignment adjustments may be easily accomplished by following the instruction sheet supplied with the v.f.o. As a first step, the power supply should be turned on, and the supply voltage checked with *Table 1*. The transmitter tuning controls should be set as shown in *Table 2* of the band in use, and a 52-ohm dummy load of suitable low impedance antenna connected to the antenna terminals. A key should be plugged in *J1*, and the key turned to "Transmit." With the key open, a current of 10 or 20 milliamperes should be read on the meter switch in the "Plate" position. The meter switch should be turned to the "Grid" position, and the "Grid Current" control adjusted for a grid current reading of 10 milliamperes. The meter may now be switched to the "Plate" position, the key closed, and "P.A. Tune" resonated for a plate current of 500 mA. Depending upon the resistance of the antenna

LOW VOLTAGE	NO LOAD	410V
	FULL LOAD	310V
HIGH VOLTAGE	NO LOAD	730V
	FULL LOAD	560V

Table 1

load, the dip will be more or less than 120°. Adjustment of the "Antenna Loading" control, *C5*, will bring the loading to the correct value. As with any all-band tank, it would be wise to check the output frequency with a wavemeter to make sure that the plate circuit of the 6146 is not tuned to a harmonic frequency since the 6146 performs in an excellent fast as a frequency doubler.

Operation of the Transmitter

The little 60-watt transmitter has been designed for pleasure to operate. Keying is smooth, and the transmitter works well on all bands. TV

FREQ	ANT LOADING SW	ANTENNA LOADING COND	PA BAND SW	PA TUNING
3.7mc	2	40	1	7 1/2
7.2mc	2	2 1/2	3	5 1/2
14.2mc	1	6	4	2 1/2
21.2mc	1	4 1/2	5	2
28.6mc	1	3	6	1

Table 11

non-existent on all bands except 28 Mc., where a faint cross-hatch is apparent on channel 1 of the TV set in the next room.

The transmitter may be operated on plate by removing the screen clamping tube, *V7*, and connecting a 30-watt modulator in the B+

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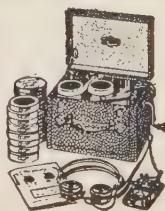
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to the 6146. The transmitter presents a 4000-ohm load to the modulator.

All things considered, the transmitter represents a tremendous return in pleasure for a minimum expenditure of money and time!

EDITOR'S NOTE: Some constructors, due to varying wiring techniques, may find it difficult to obtain full 6146 drive throughout the entire 10-meter band. This may be easily corrected by reducing the value of *R12*, in the 6146 grid lead, to 10 ohms. Keying characteristics may sometimes be improved by substituting a 6Y6 for the 6V6 (*V7*) clamp tube. This rig was experimentally tested during the ARRL Field Day by W2PAU for the South Jersey Radio Association where it gave a very good account of itself.

[from page 61]

10-watt, adjustable). Connect one lead from *Sw3*, terminal 13 to the slider. Solder. Adjust the slider for about 3000 ohms. Connect the lead from *Sw3*, terminal 1 to the end of *R37*. Solder.

d) In both transmitters: Connect a 50-ma. meter between pin 5 of *X30* and the free end of the other lead from *Sw3*, terminal 13. Plug in the regulator tubes, *OA2*'s in the *Viking I*, *OB2*'s in the *Viking II*. Turn the drive control to zero, *Sw3* to SSB position (clockwise).

NOW BE CAREFUL! Light the filaments, turn on the HIGH VOLTAGE. Observe the current through the regulators. If it is not 30 ma. then adjust *R36* or *R37* until it is, but TURN OFF THE HIGH VOLTAGE FOR EACH ADJUSTMENT!

Reassemble the cabinet, but before you replace the bottom plate get out the transmitter manual, turn to page *E*, and repeat the adjustment of screen voltages with *R13* and *R30*. (This applies where the 6AQ5 regulator circuit is incorporated in the transmitter.)

That's it. The whole program should not have taken more than two or three evenings or a long afternoon, but by making the changes we have hurdled one of the biggest obstacles to wholesale changeover to SSB—what to do with our present obsolete equipment. The answer, of course, was to bring it up to date! The talk power of the *Viking* is the same whether you operate it PHONE or SSB. The chances are that you will come to spend more and more of your time in this "new and superior medium of communication," but just in case you do get a yen to go back to the old-fashioned method, it's there at your fingertips, and it takes just four seconds to make the change.

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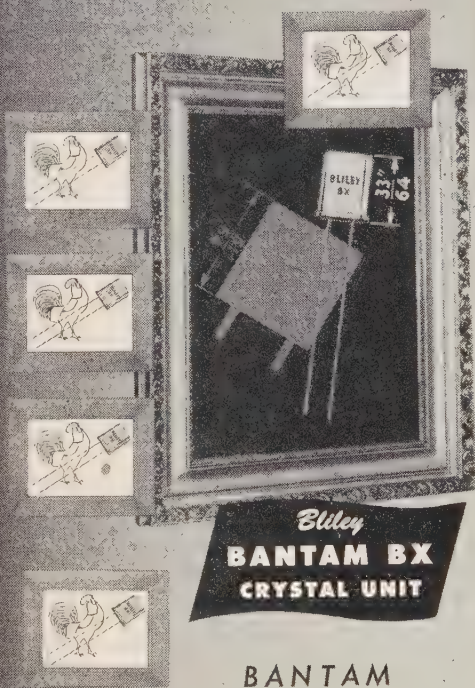


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Wanted: BC-348 receivers. Write James S. Spivey Inc., 4908 Hampden Lane, Washington 14, D.C.

Miscellaneous:

PRINTED CIRCUITS: Make your own printed circuits as seen in QST Aug. '54. Kit includes: two copper clad XXXP Phenolic circuit boards, ferric chloride etch, ink and instructions. \$2.95. Felix Dutko, 2078 Vyse Ave., Bronx, N.Y.

10, 15 & 20 METER BEAMS, aluminum tubing, etc. Perforated aluminum sheet for shielding. Radcliff's, Fostoria, Ohio.

TEST EQUIPMENT repaired and calibrated by factory staff. All makes. Hickok, Simpson, Triplett, Heath, etc. Prompt service, low factory prices. Our nineteenth year. Douglas Instrument Laboratory, Norfolk Ave. & Shetland, Boston 19, Mass.

TELESCOPIC ALUMINUM TUBING 2" to 3/8" .058 wall also .035 wall stocked. Handy Tool Inc. P.O. 142, Tilton, New Hampshire.

ALL makes TEST EQUIPMENT repaired and kits constructed by former factory repairman. Write for free information. Bigelow Electronics, 135 North Pioneer Road, Beulah, Michigan.

CLASSIFIED

QSL Cards:

ATTRACTIVE CLEAR PLASTIC COVERS for those rare QSL cards. 10 for \$1 p.p. Sample \$15c. Quantity discounts. Forrest Hothem, W8OVJ, Rt. 3, Coshocton, O.

QSLs PHOTOGRAPHIC. From your negatives or material kits. Write for sample. QSL Photo Service, W9IRE, 10728 S. Washtenaw Ave., Chicago 43, Ill.

QSLs! "America's First Choice!" Interesting samples 10c. Tooker Press, Lakehurst, New Jersey.

CANADIAN QSLs, real snappy. Stamp for samples. VE3WV, Collingswood, Ontario.

QSLs? "World's Finest!" Samples 25c (refunded). Sackers, W8DED, Holland, Mich.

QSLs. Save your money for that new rig. Ham's "Super-speed Specials" are \$1.00 under average price. Samples 10c. Robinson, W9AYH, Dept. K, 12811 Sacramento, Blue Island, Illinois.

Hamfest Announcements:

Federation of Long Island Radio Clubs will hold its Annual Hamfest on Friday evening, October 15th, 8 P.M. at the Lost Battalion Hall, 93-29 Queens Blvd., Elmhurst, L.I. There will be exhibits, \$1000 worth of prizes, exceptional music for dancing, areas set apart to meet special Ham friends you've worked on the air. Tickets in advance, \$2.00; at door, \$2.50. Contact—Secretary, Mrs. Viola Grossman, 18 Phipps Ave., E. Rockaway, L.I., N.Y., for reservations.

Instruction:

PORT ARTHUR COLLEGE. Port Arthur, Texas, provides training in radio, radar & television necessary to pass FCC exams for phone and tel. licenses. 12-14 months. Start any level, low tuition with board & room at cost in dorm. Advanced students on-the-job KPAC (500-watt station) training. Approved for Veterans. Write "Registrar" for catalog and info. New courses start every 5 weeks.

Trading Corner:

SWAP—Pair 4-125A's for .22 auto. pistol or 6" 16mm lens. WN9UDI, 1725 S. 69th St., West Allis, Wisconsin.

TRADE Harvey-Wells Bandmaster, de-luxe wired for push-to-talk and PE-103 dynamotor for 750-watt 8mm projector. W0AIO, Lewis West, 3414 West St. Louis, Wichita, Kansas.

WANTED: Dixieland Jazz style recordings; swap radio parts or will rent your records for tape recording here. Request detailed listing, complete descriptions: Collins 310B-1 exciter, modulator \$225; NC-125 speaker \$130; CCO-2A, 6146 final, 52-54 Mc. \$12.50; Triplett 1696-A modulation, carrier-shift indicator \$25; pair 3", 5" selsyns, plugs \$6; Mallory CRT-1 capacitor, resistor tested \$32.50; panel meters, chassis, cabinets, panels, transformers, chokes, condensers, tubes, crystals, transmitting variables, ETC, Meissner Signal Shifter, plug-in coils \$27.50; Command type transmitter 7-9.1 Mc., power \$22.50; 2.1-3 Mc. \$17.50; Johnson Matchbox \$42.50. Howard Severide, W9DPL, 2431 East Riverside Drive, Indianapolis 23. Telephone WAInut 4-2184.

NOMINAL TRADE-IN will bring you \$90. allowance on new Barker & Williamson transmitters or Concertone Tape recorders, \$60 on new Viking II, \$40 on Viking Ranger, or Elmac AF-67, \$30 on Elmac receivers or Pentron Tape recorders, 20% on Lansing, Stephens, Fisher, etc. hi-fi components. Telco, Azurelee Dome, Malibu, California. Tel: GLobe 6-2611.

QSL Cards:

QSLs—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pennsylvania. Samples 10c with catalogue 25c.

QSL's, SWL's. High quality. Reasonable prices. Samples. Write Bob Teachout, W1FSV, Box C124, Rutland, Vt.

QSL's SWL's. Sample free. QSL Press, Passaic, N. J.

QSLs. Free Samples. Print Shop, Corwith, Iowa.

QSLs of DISTINCTION. Three colors and up. Uncle Fred. Box 86, Lynn, Pennsylvania.

QSL samples. Dime, refunded. Gale Press, W1BD, Watford, Connecticut.

QSL's TWO COLORS, \$2.00 hundred. Samples for stamp. Rosedale Press, Box 164 Asher Station, Little Rock, Ark.

WESTERN HAMS order your QSLs in the West—Save time, save money. Personal Prints, P.O. Box 64553, Los Angeles 64, California.

For Sale:

FOR SALE: Navy ARB receiver, 195 kc—9005 kc. Used, excellent condition. Complete with two new control boxes, plugs, cables, 28-volt dynamotor \$50. Leith Mangels, 154 Franklin Turnpike, Ho-Ho-Kus, New Jersey.

SELL: BC-348 receiver, with power supply, audio stages, noise limiter, 1000-cycle C.W. filter, S-meter \$110. HRO-3, complete \$120. 120-watt CW, AM transmitter, band-switching, VFO, low-pass filter \$150. M. W. Woerz, K2ELX, 20-11 Shore Blvd., Long Island City 5, N.Y.

BC-348Q for sale. This is a beautiful receiver in beautiful condition, with AC power supply and speaker. \$65. Alen E. Gordon, W3RCD, 4623 N. Broad St., Philadelphia 40, Pa.

REAL BARGAINS; new and reconditioned Elmac, Gonset, Morrow, Collins, Johnson, Hammarlund, National, Hallicrafters, RME, Milen, Lyco, others. Reconditioned S-38 \$29; S-40A \$69; S-76 \$129; SX-71 \$169; SX-42 \$179; SX-62 \$179; SX-88 \$495; SW-54 \$29; NC-57 \$59; HFS \$79; NC-125 \$129; NC-183 \$199; SX-25 \$69; HQ-129X \$169; VHF-152A \$39; Harvey-Wells TBS-50C \$69; Meissner EX \$39; S-40B, HT-20, Collins 75A-1 75A-2, 75A-3, 32V-2, 32V-3, Viking I, Viking II, Viking VFO, many others. Shipped on approval. Easy terms. Satisfaction guaranteed. Write for free list. Henry Radio, Butler, Missouri.

BC610-E COMPLETE WITH COILS and BC614 speech amp. and BC939 ant. coupler \$550. FOB. Harvey-Wells TBS-50D with power supply and VFO \$175. 12-volt Carter inverter 110v AC @ 150-watt cont. \$25. RCA police rig, 807 final \$30. National NC156 receiver \$80. Meissner EX Signal Shifter \$60. 4 x 5 Speed Graphic with F 4.5 Optar lens and Graphley Gun Kalart range finder and Graphic "23" roll film adapter \$225. All letters answered. Jack Riley, W8LPZ, 12234 Triskett Rd., Cleveland 11, Ohio. Phone: CI 1-4618.

SELLING OUT: 6-meter converter \$15; 6-meter Bliley CCO-2A oscillator \$12; two power supplies 600 V-150 ma \$9 each; bug \$4; Multi-meter \$8; beam indicator, Selsyn & x-former \$7; mike and stand \$6; 8.8 MFD-600v. condenser 75c; 6-meter xtals 20c each; 300-ohm Hi-pass filter \$2; 2MFD-2000v. condensers \$1.60; 3 new 832A tubes \$5. each, (8) 807's \$1. each; many other tubes; 10# assortment of parts \$1. A. E. Zastrow, 829 W. Melin St., Port Washington, Wisconsin.

SELL National NC183D w/spkr \$275. Hickok 600 tube tester \$110. Both units positively A-1 W0ZJH, 2444 D, Lincoln, Nebraska.

More ads on page 70

For Sale:

SELL—Heath AR-2 communications receiver, with cabinet. Perfect condition, used about 8 hours. \$40. cash. Roy Barkind, Rt. #5, Wenatchee, Washington.

300-WATT PHONE-CW Eldico TR-1 extras \$200. SX-71 plus R-46 speaker \$200. Drenon, 4532 No. Teilman, Fresno, California.

UNUSED MB-150 \$18; 6v—110 AC Vipower 300v. 100 ma. \$12.50; 810 \$4; 723A/B \$5; Elinco tachometer generators F-35, F44D \$10 each new. HQ-129X \$125; 480 Mc. transmitter and receiver \$35; 12-24 volts transformer 90 VA. \$10; G.E. Running Time meter 110v. \$6. Steven W. Kocik, W8OPC, 3653 East 114th St., Cleveland 5, Ohio.

FOR SALE: Ameco advanced code course records \$4. W4EZM.

SELL: Gonset Tri-band, Micro Match, meters and misc. W9CYD, 6145 West Eddy St., Chicago 34, Illinois. Palisade 5-7367.

HEATHKIT TEST EQUIP.: Hallicrafters receiver S40A; Bandmaster Sr. transmitter, power supply, VFO; Heathkit transmitter, receiver, antenna tuner; Gonset Tri-band; Lyseo B-129; Carter Genemotor 6v. DC—425v. DC @ 375 ma. Gud condition & priced to go. W8IDI, 181 Trux St., Plymouth, Ohio.

VHF CHOKES: Kit of ten VHF chokes. 4 each 50 Mc. and 144 Mc. and 2 for 235 Mc. Postpaid for \$1.00. All types VHF coils made large or small quantities. IF's VHF neutralizing coils and heater chokes a specialty. Mfrs. invited to write. Lakeland Electronics Mfg. Co., Box 14, Warsaw, Indiana.

ELDICO MD40P. Modulate 100 watts. Excellent condition. Crystal mike included. \$50 FOB. Bill Nash, W9WOY, Neche, North Dakota.

SELL: BC-459A Transmitter (brand new, converted) and 500v @ 200 ma. voltage-regulated power supply. Also Heathkit AT-1 35w transmitter and AC-1 antenna coupler. Also BC-455A 6-9.1 Mc. receiver with plug-in power supply. Will sell all together or separately. What am I offered? Phil Clements, W5DWL, P.O. Box 59, Belton, Texas.

For Sale:

COLLINS 75A1 with speaker. \$225. Cash. Used about 100 hrs. Alfred Lang, 17 John Robert Homes, Alexandria, Va.

COLLINS 310B1, unmodified, all coils \$179.95; 32V1 modified to 32V2 \$475; 32V2 \$495; Deltronic CD-144 \$129.95; Eldico AM-40 \$39.95; MD-40P \$44.95; MT-2 \$39.95; Electro-Mechanical VX-101 Jr. \$34.95; DeLux \$59.95; Elmac A-54 \$109.95; PS-500 \$32.95 Hallicrafters HT-17 \$39.95, HT-18 \$75, SR-75 \$39.95; Hammarlund 4-11 \$39.95; Harvey-Wells TBS-50A \$79.95; TBS-50C \$79.95; TBS-50D \$89.95, APS-50 \$29.95, VFO \$37.95; Johnson Viking I 829B final \$199.95; Meissner EX \$44.95, FMX \$7.95; Millen 90-700 \$19.95, 90-800 \$19.95, 90-811 \$34.95; Sonar AMF-50 \$29.95, CFC \$29.95, MB-26 \$44.95; MB-611 \$19.95, VFX-680 \$39.95, XE-10 \$7.95; other used items available; write for latest list to W1BFT, Evans Radio, Concord, New Hampshire.

VIKING II \$270, Viking VFO \$38., D104 and EI stand \$12.50, trim F.W. phones and cushions \$5.00. PR. Balun coils \$5. F.O.B. J. R. Baxter, W4YNK, Union City, Tenn.
BEAMS, ball bearing rotary head's and components. Send post card for literature. Bernard Belt, 631 15th Ave., Menlo Park, California.

SELL: Brand new Sonar SRT-120P transmitter \$200 postpaid; General radio 916-A bridge w/standard R & C \$490 prepaid; Jackson 652 AF oscillator (used) \$45 FOB here; lots of transformers, tubes, parts, books, etc. State your wants. J. E. Howell, Box 126, Lumberton, N.C.

FREE LIST! New and reconditioned receivers, transmitters, etc. One hundred big bargains every month. Highest trade-in allowance. Write today! Dossett, W9BHV, 855 Burlington, Frankfort, Indiana.

SELL: Super Pro 200-RX and power supply, mounted in metal cabinet, with speaker in Acousti-Reflex cabinet. Best offer. R. E. O'Brien, Walworth Plantation, Eutawville, South Carolina.

HQ-140X RECEIVER and matching speaker only eight months old. Perfect condition. Original Carton. Am getting HRO. \$225. FOB Hackensack. K2BMV 235 Spring Valley Ave., Hackensack, N.Y. Phone HU 7-1726.

BARGAINS: WITH NEW GUARANTEE: R9-er \$15; Gonset Triband \$27.50; VHF-152A \$39.50; S-72 \$59.50; S-40 \$65; NC-57 \$65; RME-45 \$99; Lyseo 600 \$89; S-27 \$99; SX-43 \$129; S-76 \$149; SX-71 \$169; SX-42 \$189; HRO-50 \$275; HT-17 \$32.50; EX Shifter \$49; Globe Trotter \$49.50; Harvey Wells Sr. \$69; DeLux \$89; Viking I \$189; New SS-75 \$199; HT-9 \$159; Globe King \$2.95; 32V1 \$395; 32V2 \$495; 32V3 \$625. We need used revrs: highest allowances for S-20R; SX-71; NC-100; S-40B; NC-125; SX-24; SX-25; HQ-129X; and similar. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

FOR SALE: Novice Philmore 25-watt xmtr in cabinet, complete with all tubes less xtal and key. Send \$30 money order (or best offer). Colburn Ward, Box 495, Goldthwaite, Texas.

Harvey-Wells aircraft phone transmitter with 75-meter crystal, instruction manual, and 110-volt power supply. Ready to go on the air. \$30. Harvey-Wells 6-volt mobile Vibrapak, 350 volts at 250 miles. Perfect \$25. New L-W 2-meter converter with instructions \$12.00. First check takes. Ira Groff, W3ZLK, 5702 Beacon, Pittsburgh 17, Pa.

SELL: Crystal calibrator, ART-13 type, with octal base 200 kc. crystal and 12SJ7 \$4.50. Boehme automatic motor driven keyer for Morse code, uses perforated tape, also McElroy 3-key (dot, dash, space) tape perforator \$145. 32V3 \$645 like new. Want: APR-4 tuning units, TS-173, TS-174, TS-175. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. RIchmond 2-0916.

MOVING and must clean shack. Following for sale in new or A-1 condition: Eico 5" scope, model 425 wired. \$45. Millen Exciter \$18. Sonar VFX 680 NBFM VFO \$40. Meissner EX Shifter VFO \$45. SX-28 \$100. U-100 Army Morale receiver, tunes \$35-20 Mc., AC/DC/Battery. \$40. BC-1206 low freq. beacon receiver \$7. PS-225 dynamotor, 12v input, 375v, 150 ma. conservative out. \$10. MG-1A dynamotor (BC-522) \$6. PE-86N, \$3, with BC-347G amplifier \$6. Sealed beam airplane lamps, 600-watt, 28v, box of 8 \$5. 807's \$1 each. 717A's 60 cents each. 250-watt DC/AC converter \$14. All items shipped express collect. Box RP, CQ Magazine.

75 WATT TWO-METER STATION AX9903 final PP807 modulator, high-level speech, Turner U9S microphone, unused Vee-Dx 16-element antenna, Vee-Dx rotor, factory built Techcraft converter. Best offer. M. J. Fein. 5414 Arlington Ave., New York 17, N.Y.

CRYSTALS!

ALL HAM FREQUENCIES

In lots of 10. Each only.....\$.59
In lots of 5. Each only......69
Individually. Each only.....79
SINGLE SIDE BAND CRYSTALS. Each.....69

COMPLETE SET—80 CRYSTALS

Ranging from 370-516 Kc., 54th Harmonic. INCLUDING 500 Kc. & 455 Kc. crystals. **\$6.95**

Only.....Per set

COMPLETE SET—120 CRYSTALS

Ranging from 370-540 Kc., 72nd Harmonic. INCLUDING 500 Kc. & 455 Kc. crystals. **\$9.95**

Only.....Per set

200 KC. CRYSTAL.....Ea. \$1.45
500 KC. CRYSTAL.....Ea. 1.75
1000 KC. CRYSTAL.....Ea. 2.75

\$600 VALUE! SPECIAL! HOT!!

A TRANSCIVER WITH A RAFT OF USES! Makes an ideal 2-Meter transmitter. Only a few of its many parts include: miniature blower, gear reduction motor easily converted to 110 VAC, over 40 miniature tube sockets, 7 panel coaxial fittings, microswitches, & MUCH MORE! Excellent condition. Original cost over \$600! IT'S ALL YOURS FOR ONLY... **\$9.95**

O-1 THREE-INCH MILLIAMPER METER

270° indication. You just by-pass shunt and add scale. ONLY..... **\$1.95**

ARB NAVY RECEIVER,

Excel. condition. Reduced..... **\$18.95**
Covers 195 KC. to 9,000 KC.

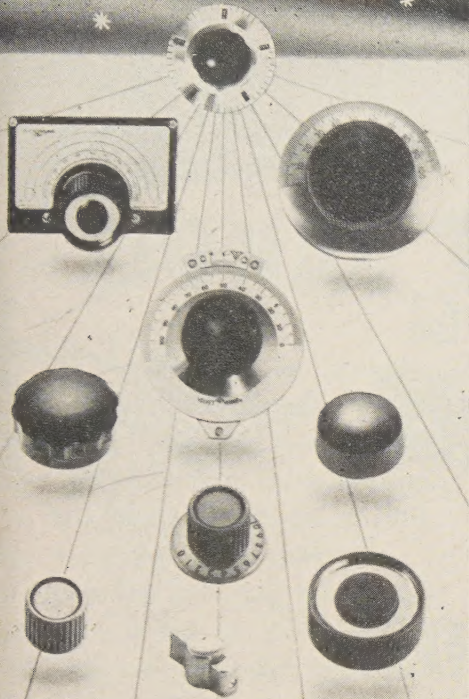
400 MICA CAPACITORS. Assorted. Mounted 10 to a strip. All 400..... **\$1.95**

ARW-2 REMOTE CONTROL RECEIVER. NEW..... 27.50
Items subject to prior sale. Send for FREE Catalogue!
All merchandise sold as IS

J. J. GLASS ELECTRONICS CO.

1624 S. MAIN ST. LOS ANGELES 15, CALIF.

PRECISION components *tuned to tomorrow*



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For years, NATIONAL dials and knobs have been the popular choice of amateurs, experimenters, and commercial users.

NATIONAL dials feature smooth, velvety action, easily-read scales and quality construction. Many dials, like the N and ACN dials shown, can be specially calibrated or supplied with blank scales for commercial applications.

NATIONAL knobs — distinguished by their clean, functional, chrome and plastic styling and sturdy construction — are the most popular of their type ever produced. All fit 1/4" shafts. For commercial applications, they can be supplied in special colors and with special calibrations.

Write for new NATIONAL catalog of dials and knobs to Dept. C-1054

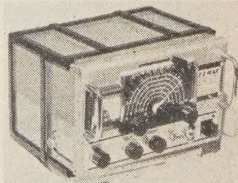
National
NATIONAL COMPANY, INC.
61 SHERMAN ST., MALDEN 48, MASS.

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A mobile mounting rack is now available for your model #AF 67 Elmac. Light weight steel, transmitter rests on rubber, universal mounting.

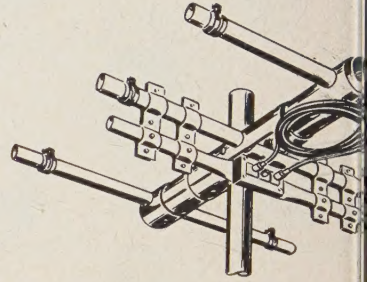
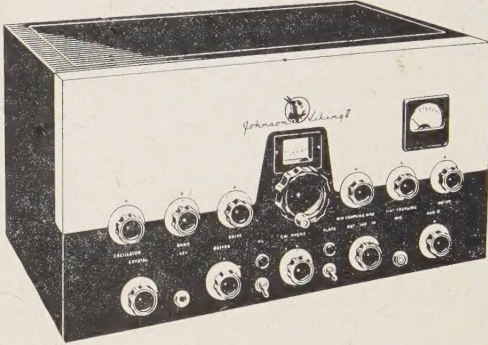
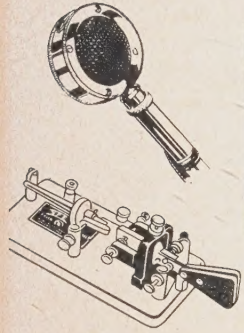
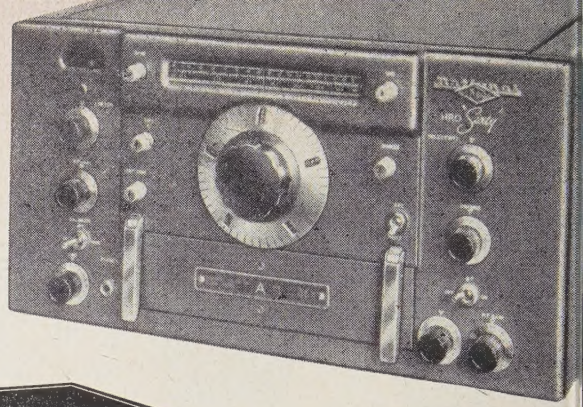
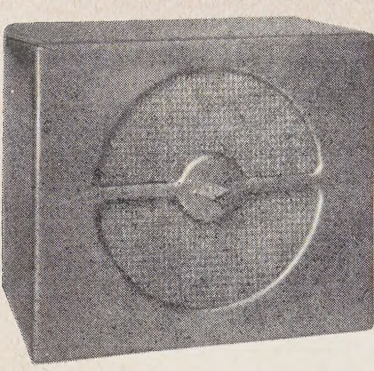


\$6.95
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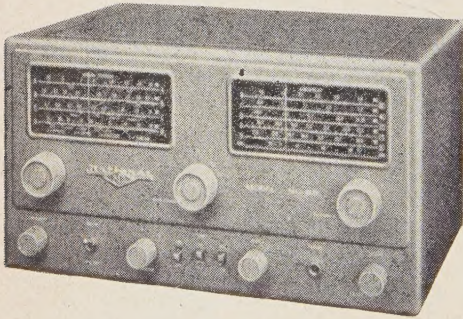
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928 6th Avenue North

Fort Dodge, Iowa



YOU MAY WIN THIS COMPLETE \$1,000 RADIO SHACK



OR A NEW NC-8
(one awarded each month)

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THIS "HONORARY NATIONAL
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NOTICE: This certificate is awarded to the winner of the
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achievement in the field of radio and electronics.
It is not a license to practice engineering or to
represent Radio Shack in any way.



John Allen

YOU DON'T HAVE TO BUY A THING

Announcing an exciting new contest! BECOME AN HONORARY NATIONAL ENGINEER!

In a very real sense, our company has always been **your** company. We've always tried to be a valuable friend of amateur radio and short wave listening. We've designed and built our products to meet **your** needs and desires.

To dramatize your big role in our company, we'd like to make you an official "Honorary National Engineer". We're going to run a contest and here's how it works.

Simply send us a suggestion you'd like included in your "dream receiver". The suggestion can be technical or non-technical — anything from a complete circuit design to the styling of a tuning knob or a practical way to cut cost and price. Your suggestion is limited only by your imagination.

Each month, an independent panel judges will select the best suggestion

and the winner will receive a brand-new NC-88. He will also be eligible to win the Grand Prize of a complete \$1,000 radio shack (including a Johnson Viking II transmitter with semi-automatic key, a National HRO Sixty with matching speaker, an Astatic microphone and a Telrex rotary antenna!) if his suggestion is judged best of all out of the winning monthly entries.

Even if you don't win, you'll get a handsome scroll certifying that you are an "Official Honorary National Engineer"!

Your National distributor has official entry blanks now.* Hurry and get one — start having fun with your "dream receiver"! Entries for this month's contest must be postmarked no later than midnight, October 24.

tuned to tomorrow



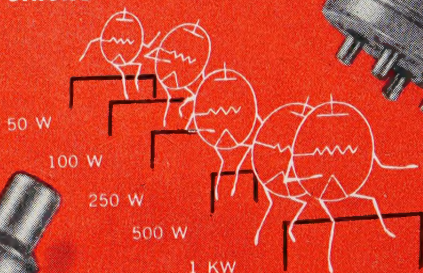
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NATIONAL COMPANY, INC., 61 SHERMAN ST., MALDEN 48, MASS.

*If there is no National distributor near you write direct to the company, attention Contest Dept. 1.

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for those prefer triodes

Known the world over for conservative ratings, large amount of emission, and high power output at reasonable plate voltages, power triodes continue to remain the choice of the transmitter man who favors triodes.

RCA has a modern line of power triodes to meet every power input requirement up to "a gallon"—phone and CW. Check the figures in the charts below—and take your choice.

For R.F. Amplifier Service		Max. Amateur Ratings, Class C Telephony		
Type No.	DC Plate Input (Watts)	DC Plate Volts	Plate Dissip. (Watts)	Max. Freq.* (Mc)
RCA-810	750	2500	175	30
RCA-811-A	260	1500	65	30
RCA-812-A	260	1500	65	30
RCA-833-A	1000	3300	350	30
RCA-8000	750	2500	175	30
RCA-8005	300	1500	85	60

*for Max. Plate Input and Voltage

For Class B Modulator Service (2 tubes)				Typical Output (Watts)
Type No.	DC Plate Volts	Max.-Sig. DC Plate Cur. (Ma)	DC Grid Bias Volts for Max. Rating	
RCA-805	1250	400	0	
RCA-810	2250	450	-60	
RCA-811-A	1250	350	0	
RCA-812-A	1500	310	-48	
RCA-8000	2250	450	-130	
RCA-8005	1500	330	-67.5	

RCA Power Triodes—as well as ALL types of RCA tubes—are readily available through your neighborhood RCA Tube Distributor. For technical information, write RCA, Commercial Engineering, Section G15 M, Harrison, New Jersey.



RADIO CORPORATION of AMERICA
ELECTRON TUBES
HARRISON, NEW JERSEY