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CQ

RADIO AMATEURS' JOURNAL

OCTOBER
1954
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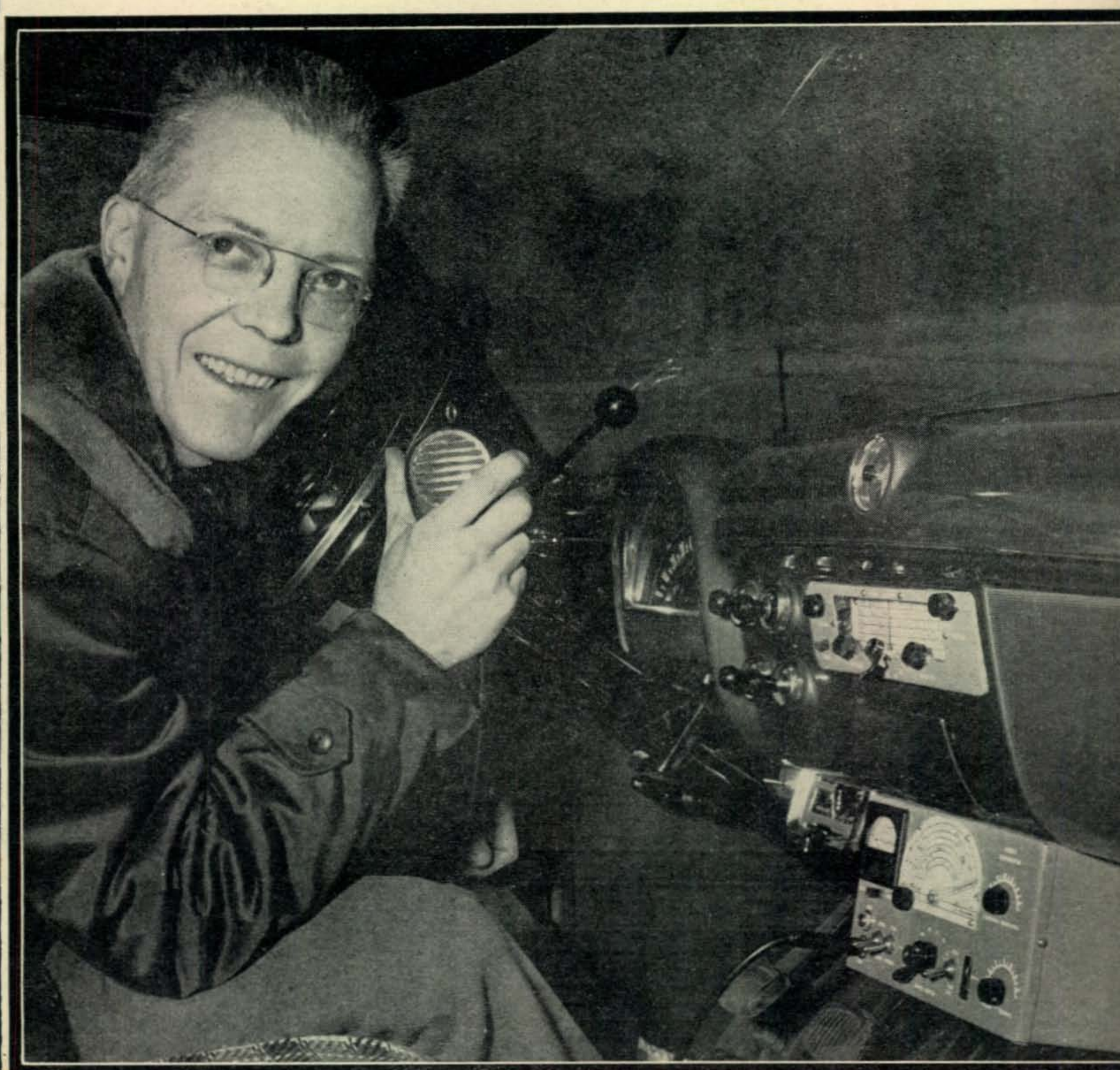

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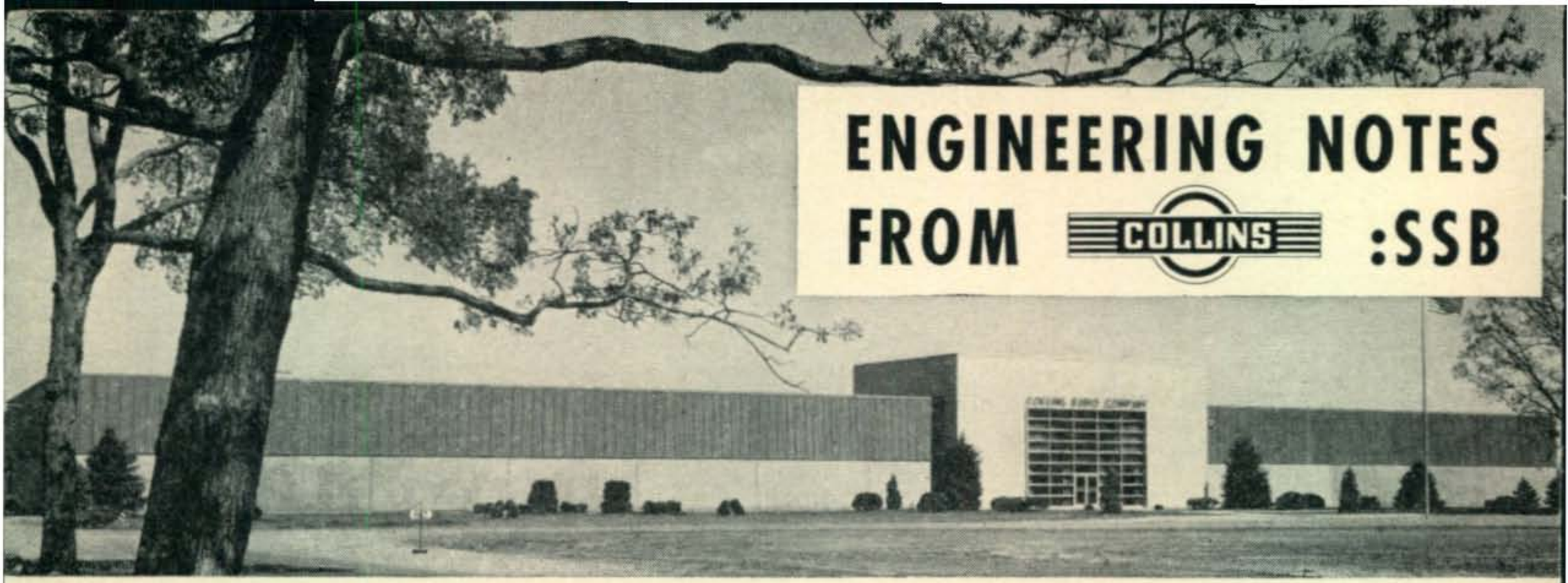
"Powder Puff" Derby . . VK1EG Photo Story



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.

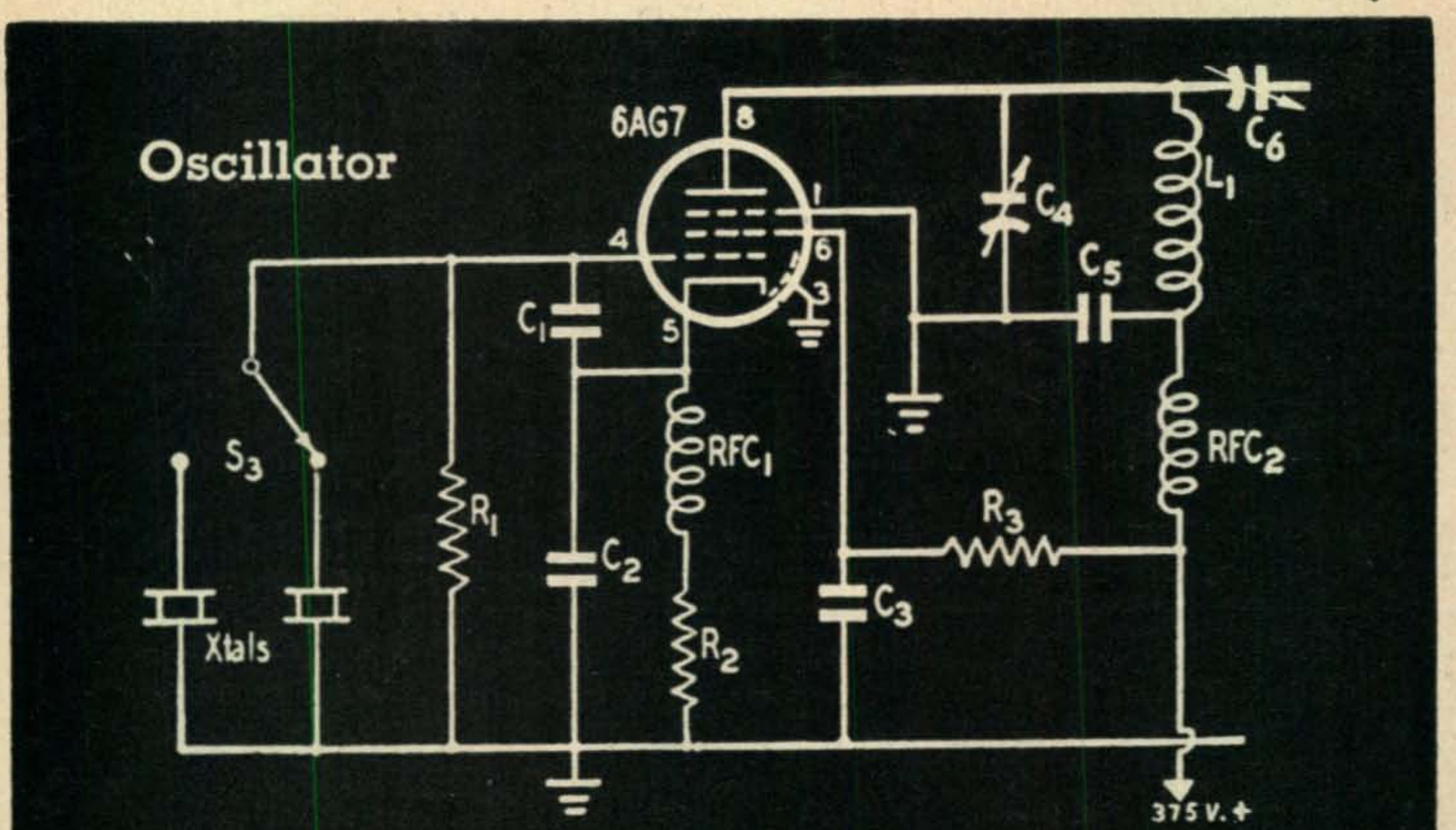
While much has been said about SSB and its advantages, little has been said about the actual performance characteristics of the SSB communications circuit. Just what performance is obtainable and what are the limiting factors? The characteristics with which we are most concerned are the transmitted bandwidth, 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 uses 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 the proper operating voltages and to limit the plate voltage swing to the linear portion of the grid voltage-plate current curve. You simply cannot "soup-up" the amplifier or drive it harder to get more output because the distortion will increase rapidly as you approach the non-linear portions of the E_g-I_p characteristic curve. When discussing power output, we 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 keep 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) are required to reduce the level of the spurious signals generated in frequency mixers. Frequency mixing systems should not be used having lower than 5th 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 many advantages and will give the amateur the full improvement to be expected from a single sideband communications circuit.



C1—15-uufd. mica
C2—50-uufd. mica
C3—0.002-ufd. mica
C4—100-uufd. variable
C5—500-uufd. mica
C6—7 to 35-uufd. 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)

FOUR BAND COVERAGE with ONE PR Crystal!

Never underestimate the driving power of a crystal oscillator . . . providing *you have the right circuit* and the right crystal. Here's one that will give ample output on 40, 20, 15 and 10 meters, utilizing a low-cost PR 7 MC. Crystal! It will drive a 2E26 or even an 807 clear down to 10 meters. *The circuit is not tricky.* Crystal oscillates at all times regardless of whether plate circuit is at resonance. The inductance L1 should resonate at the frequency on which output is desired. Do not substitute another tube for the 6AG7. Use a minimum of 375 volts and as high as 390 volts for best results when doubling, tripling or quadrupling. Try this oscillator. Additional copies of the circuit may be obtained from your PR Jobber, or directly from the factory.

You can get high-quality, low-cost PRs for all amateur bands (exact integral frequency) at no additional cost. It's good to *know where you are with a PR!* They're unconditionally guaranteed!

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CQ

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October, 1954
Vol. 10, No. 10

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.

Feature Articles

Departments

Miscellaneous

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Feenix, Ariz.

Deer Hon. Ed:

This are time of yeer when Scratchi are holding his regular pursonal Convenshun Hamfesty. You recalling, I'm surely, what I are normally doing. Scratchi inviting all local amchoors to coming partaking of hospitality at Hamfesty on Hon. Brother Itchi's ranch. I defraying expenses by collecting to bux from each person attending. In returning I furnishing free cacktus jooce, are running contests 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 likesame former yeers. I starting out the same. Having 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 onvolopes, and Lil are addressing same. After putting stamps on, giving them to Brother Itchi one day when he going into town in jeep for mailing.

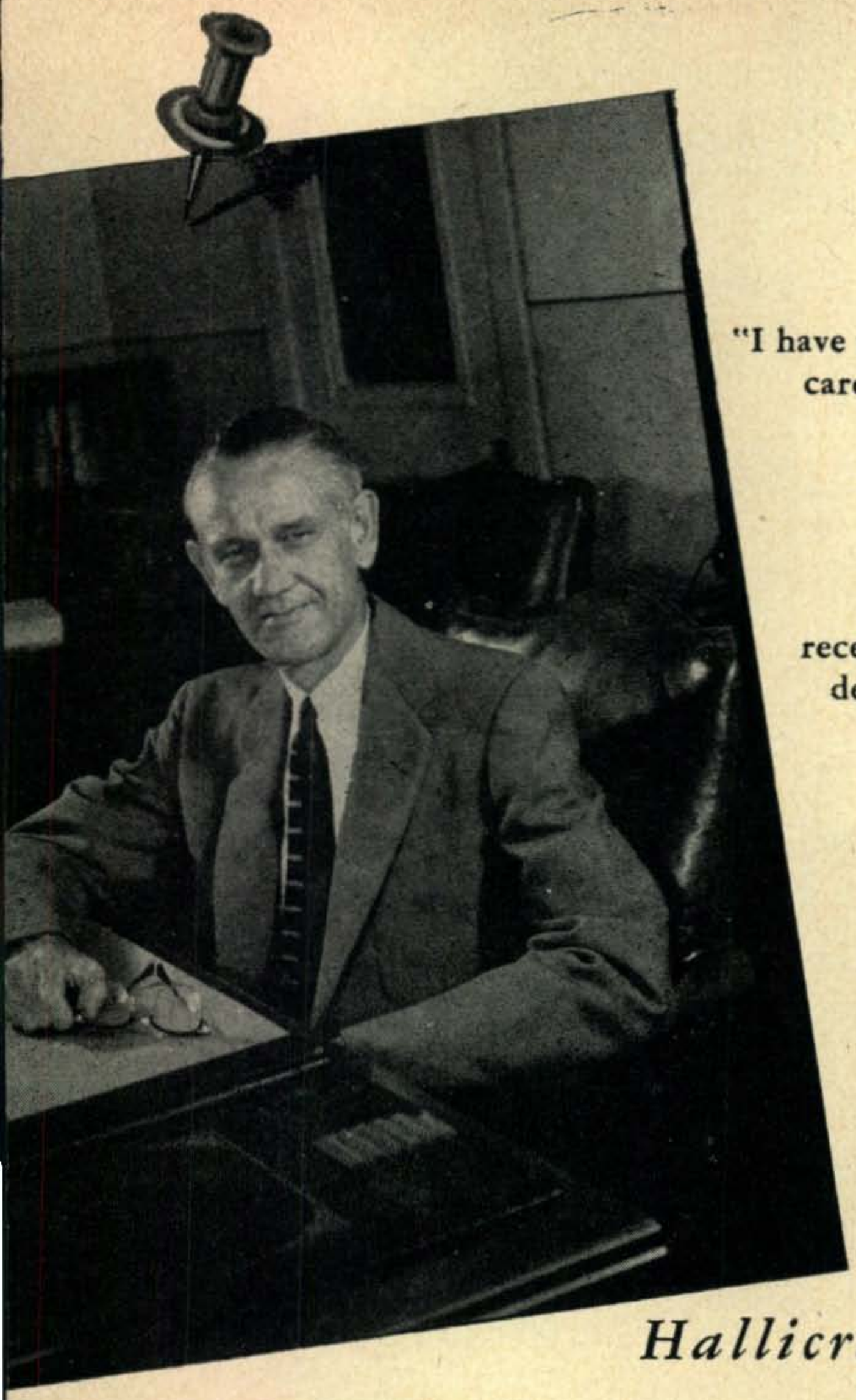
Next few days spending getting reddy for big afair. Brewing several tubs Cacktus Jooce Deluxe (this are kind I leeving to age for one weeks). Getting equipment reddy for see-w contest. Even making big sines saying "Convenshun This Way" with arrows on them. Day before Hamfesty Scratchi going out in car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

Next day are dawning brite and cleer—a peechy day for having Convenshun Hamfesty. After lunch young kid from next ranch arriving, so everything all set. He not amchoor, but wanting to be, so 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, so deciding everything hunky-dunky. Sure enuf, pretty soon have 1/c crowd around. I greeting them, pointing out where keeping cacktus jooce, telling them to making themselves homely. At time it are seeming 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 skedyule calling for this time to get ackwainted and getting

(Continued on page 6)



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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)

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☐ Ham (call letters_____) ☐ Listener

Occupation_____

Hallicrafters equipment I would like to know about:

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Used by 33 governments, sold in 89 countries.

(from page 4)

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

For next cupple hours Itchi and I in water and greese up to Hon. Armpits, changing bushing in motor what driving pump. Times are passing so quick-like I not reelizing it, so when getting cleened up after trubble with pump, and going out to see Hamfesty in operayshun, finding out peeples are about to leeve. 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 most unyoushuawl he ever tasting. He going on to saying that everybuddies are so happy because they discovering Asiatic Owl in big old ded cacktus, and it are first time anybuddies ever seeing that kind-like owl in Yewnited States. In fackly, he saying they so happy they are making me Honorary National Member with dues paid for life. With that he handing me a membership card and leeving.

Scratchi are so flabbergast I not saying word until 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 of National Birdwatchers Society of America."

Then Brother Itchi are rushing in house and bringing me evening paper. It saying that the Maricopa 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. That olves that mistery.

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

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

It also no mistery why Scratchi are broke. Young 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 I Birdwatcher for life, what are happening to me if 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

$19.50

Ship. Wt. 7 lbs.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 7 Band coverage, 160 through 10 meters—10 Volt RF output.
- Copper plated chassis—aluminum cabinet—easy to build—direct keying.

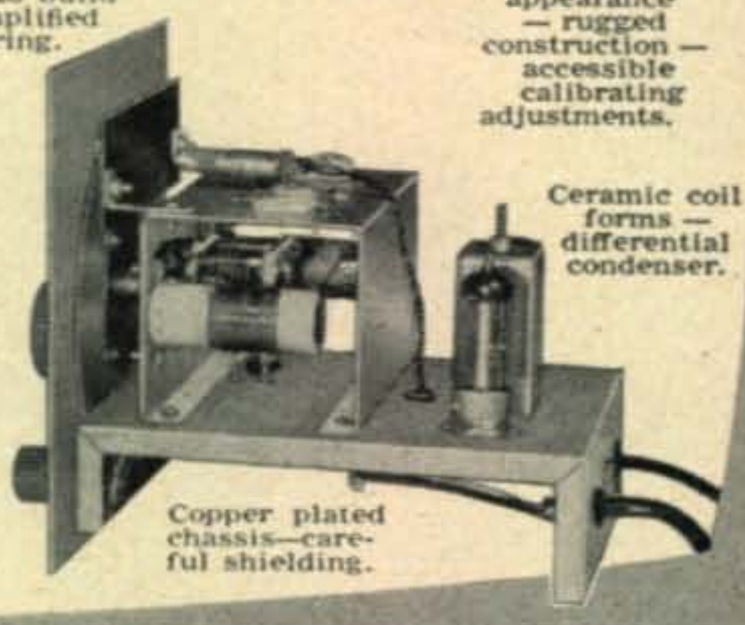
Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design 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 ½" crystal holder. Construction is simple and wiring is easy.

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.

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MODEL AT-1

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Ship. Wt. 16 lbs.

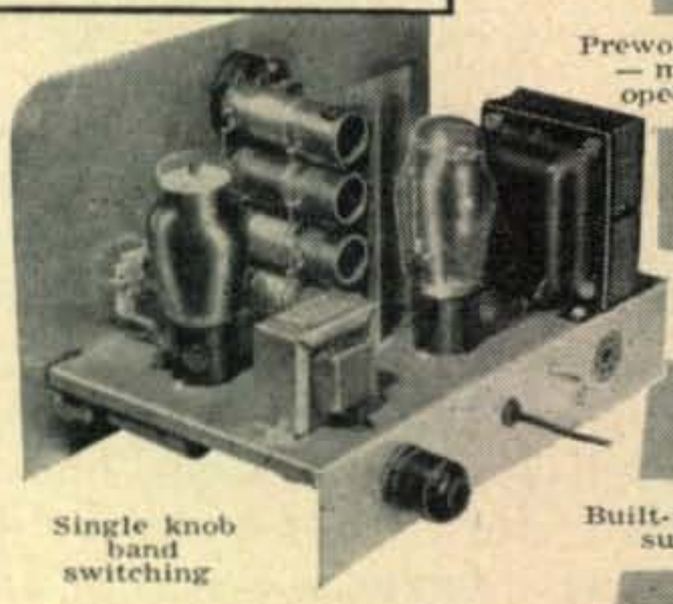
SPECIFICATIONS:

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: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.

Crystal or VFO excitation.

Prewound coils — metered operation.

Rugged, clean construction



52 ohm coaxial output.

Single knob band switching

Built-in power supply

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring 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

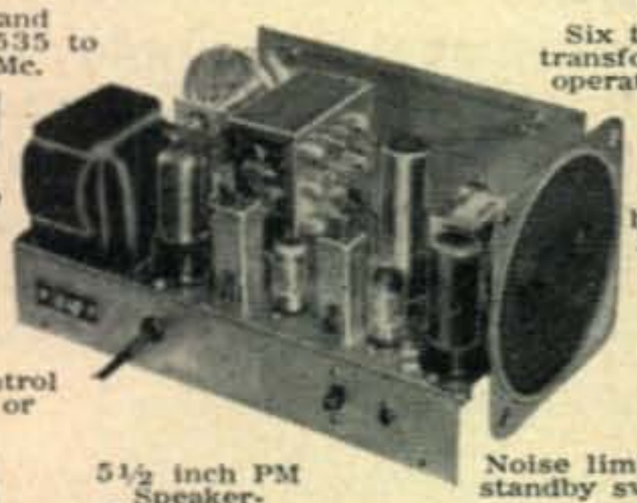
Four band operation 535 to to 35 Mc.

Six tube transformer operation.

Stable BFO oscillator circuit.

Electrical bandspread and scale.

RF gain control with AVC or MVC.



5½ 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

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CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

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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

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, 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.

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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.: W6LMQ, Elleanor 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. Elleanor has had her license since early 1951 and she and her OM use an 800-watt home-built rig. Elleanor 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 W1PFA 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,** Elleanor, who with her 850 watts relayed all the traffic. Elleanor 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,** Marian; **W6WRT,** Ruby, and **W6NAZ,** Lenore, relayed 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 **W6NPV** at San Diego, W6LMQ was able to connect 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, **W7LEE,** operated from Parker, Ariz., relaying on 75 since it was too hot to operate mobile from the airport. Naomi said the temperature was 123° 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 **W7PJY** relayed with his *Collins.* **W7WKG** operated the portable station at the airport; **W7REO** and **W7LYS** assisted in setting it up and relaying information to W7WKG. **W7APE** and **W7LIJ** 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 the Memphis, Tenn., Municipal Airport. W4TIE, Margaret Pearre, left, and W4UDI, Lenette Mewborn, right, were co-chairmen and were assisted by seven 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 5½ 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 cooperated 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 OMs 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, **W4BXG/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 net 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 Division 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 *260 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 acrobatics 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 hers 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 10 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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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	
				6.3	0.6	
450-0-450	200	5.0	2	6.3	4	4PHC-200A
				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	

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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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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 standby current in the oscillator stage from 15 ma. to 7 ma. Modulation peaks drew 200 to 240 ma. of 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 also 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 a *Viking II* and has demonstrated to his own

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

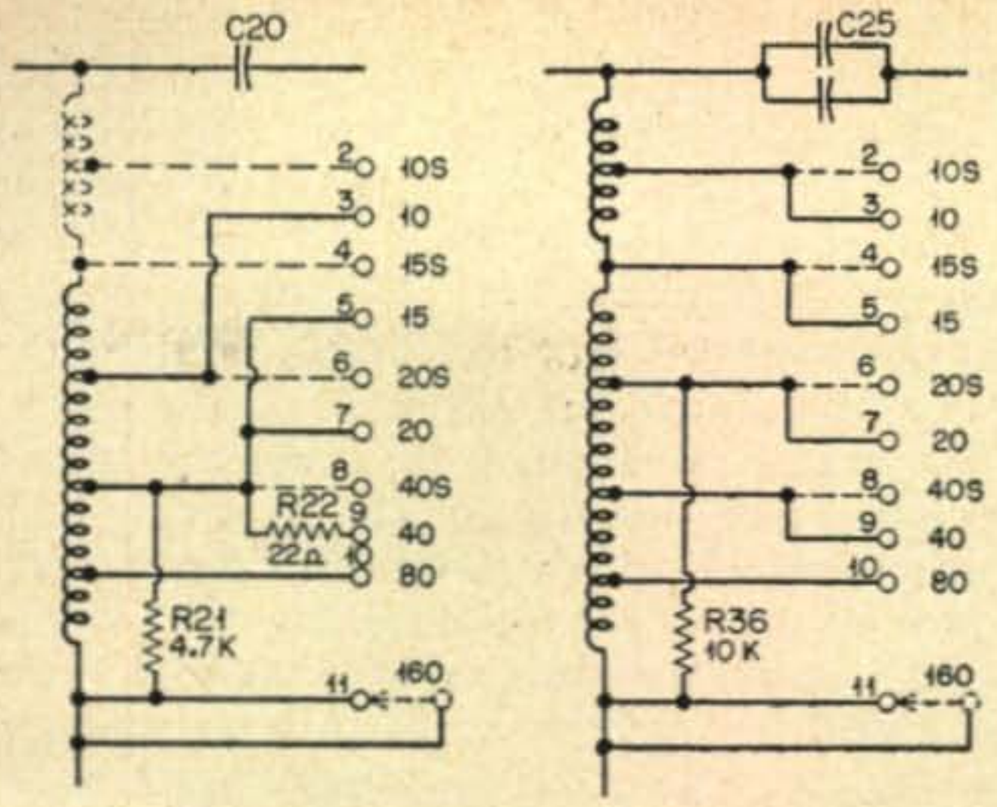
satisfaction that they work out as planned on 75, 40 and 20 meters. At present there is no means available at WØNAA for generating SSB output on 160, 15 or 10 meters, but it is expected that future results there will be just as gratifying as present experience on the other bands.

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 bandswitch 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.

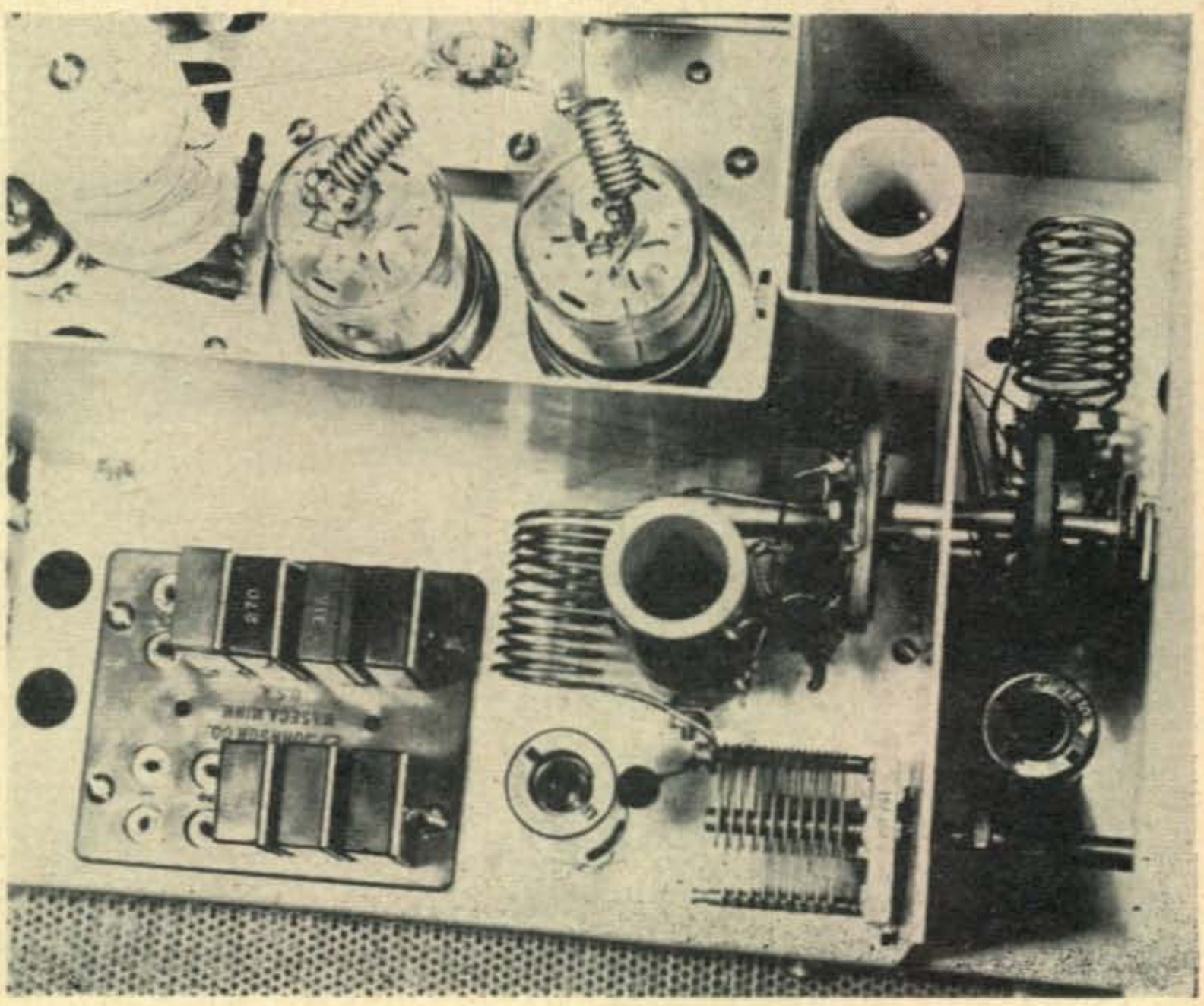
Another consideration that must be met is



A. OSCILLATOR B. BUFFER

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

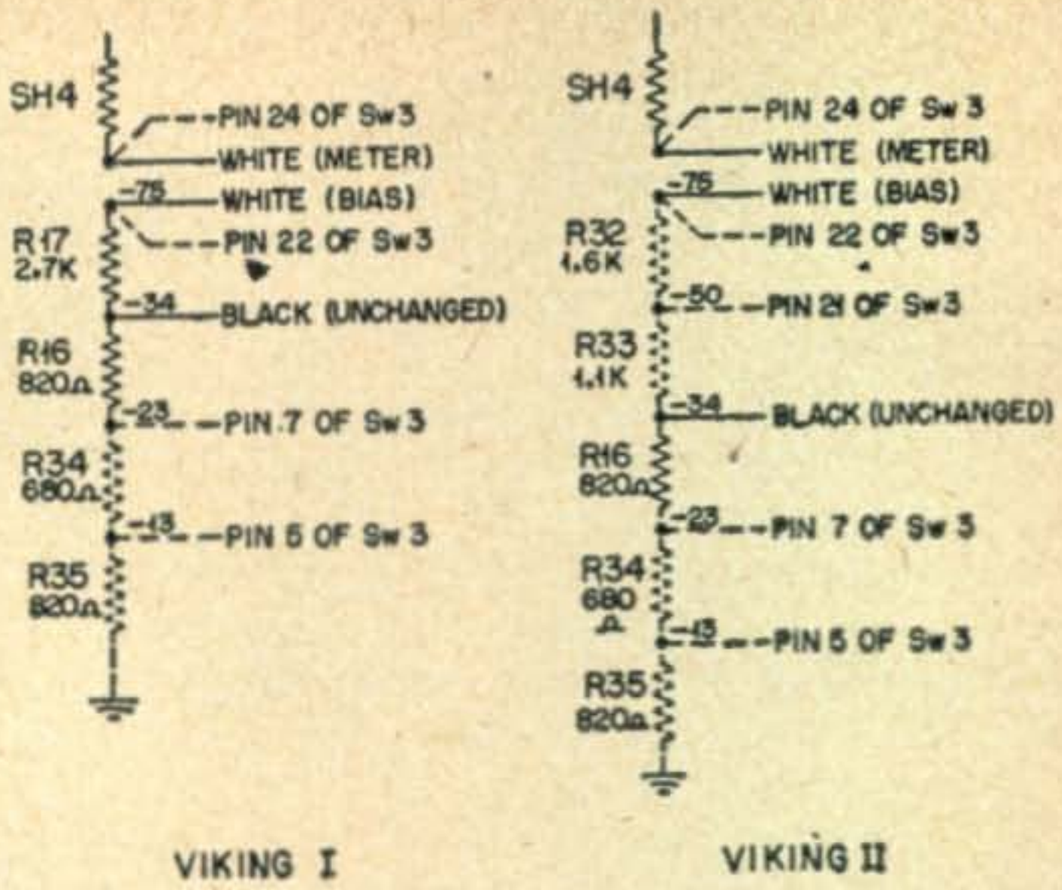


Fig. 3. Diagrams of the modified voltage dividers at X-21 in both VIKING models. Additional parts and wiring appear as dashed lines.

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,* 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 *17* 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.

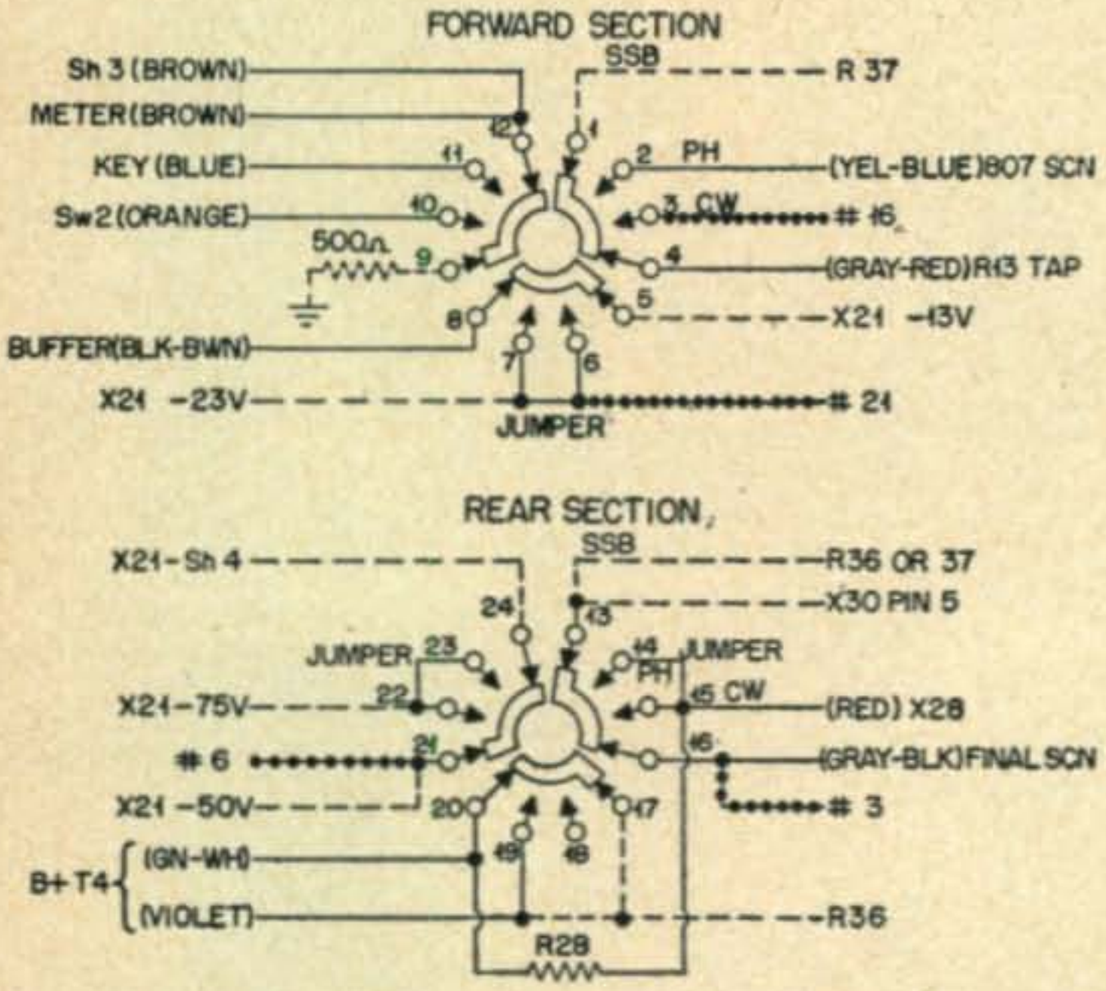
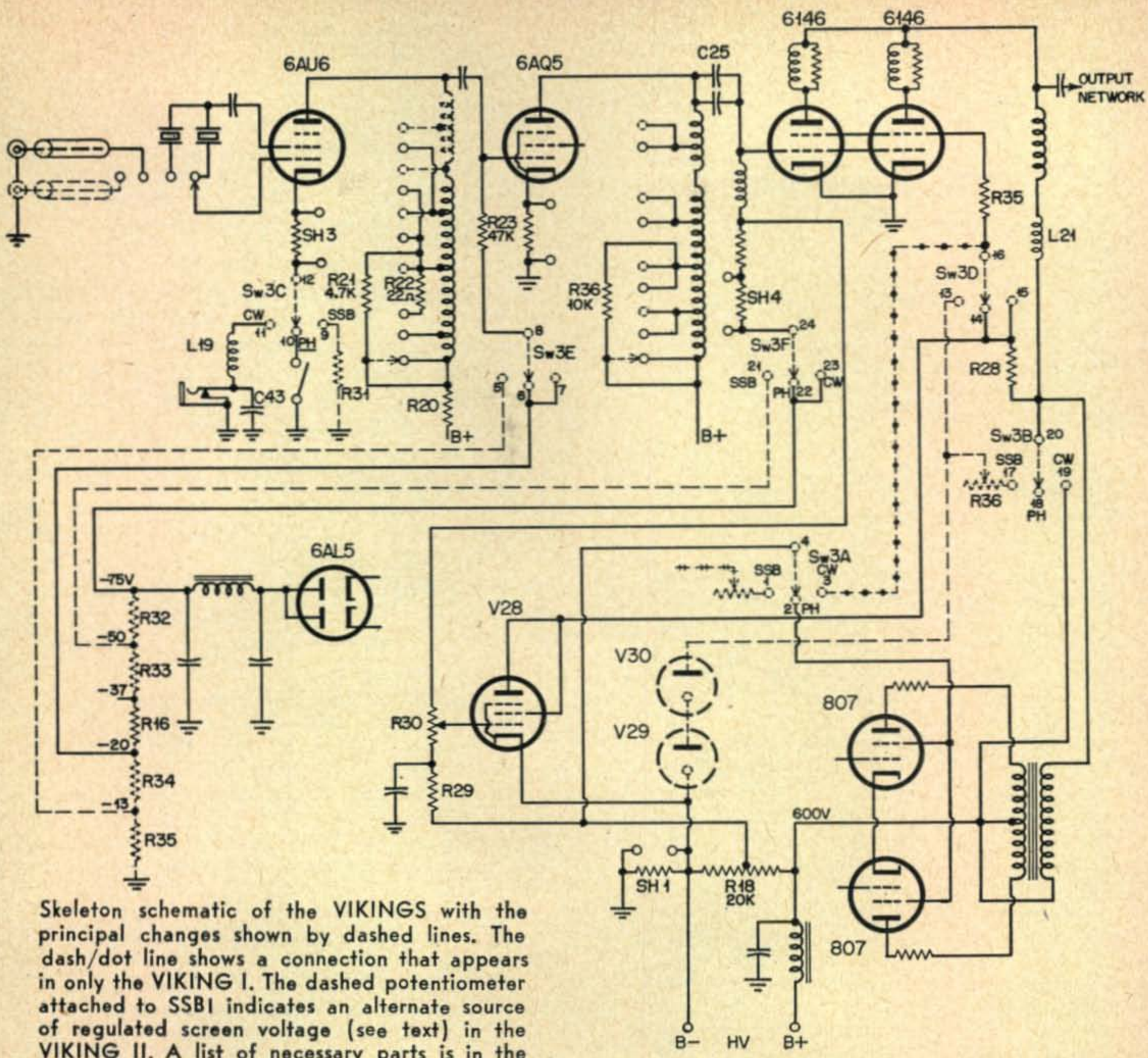


Fig. 2. Wiring diagram of the new CW-PH-SSB switch (Sw-3). In the VIKING I the dotted lines are made, but the jumper from 14 to 15 is omitted.

Modification of Sw3 to CW-PH-SSB

a) 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, ½w.
R32—1600 ohms, 1w. (VIKING II only).
R33—1100 ohms, 1w.
R34—680 ohms, ½w.
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, Malory 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)

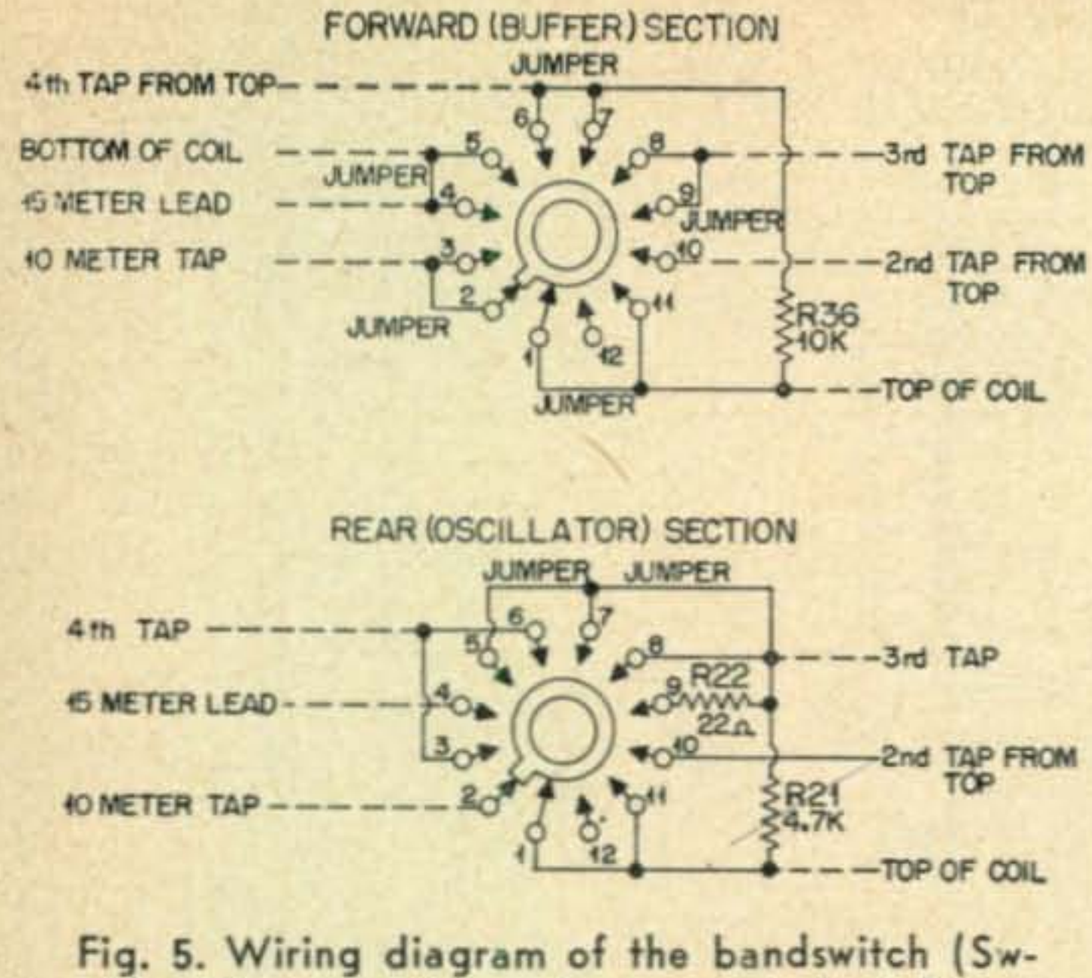


Fig. 5. Wiring diagram of the bandswitch (Sw-4) with new wiring shown as dashed lines.

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.

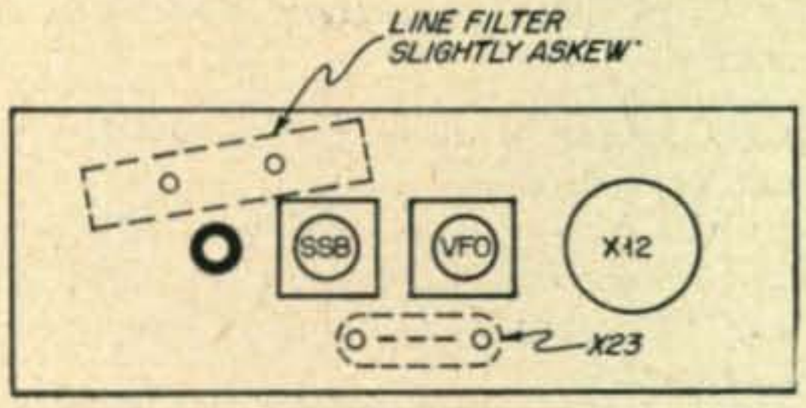


Fig. 4. Mounting details inside the skirt of the extra co-ax socket input on the VIKING II.

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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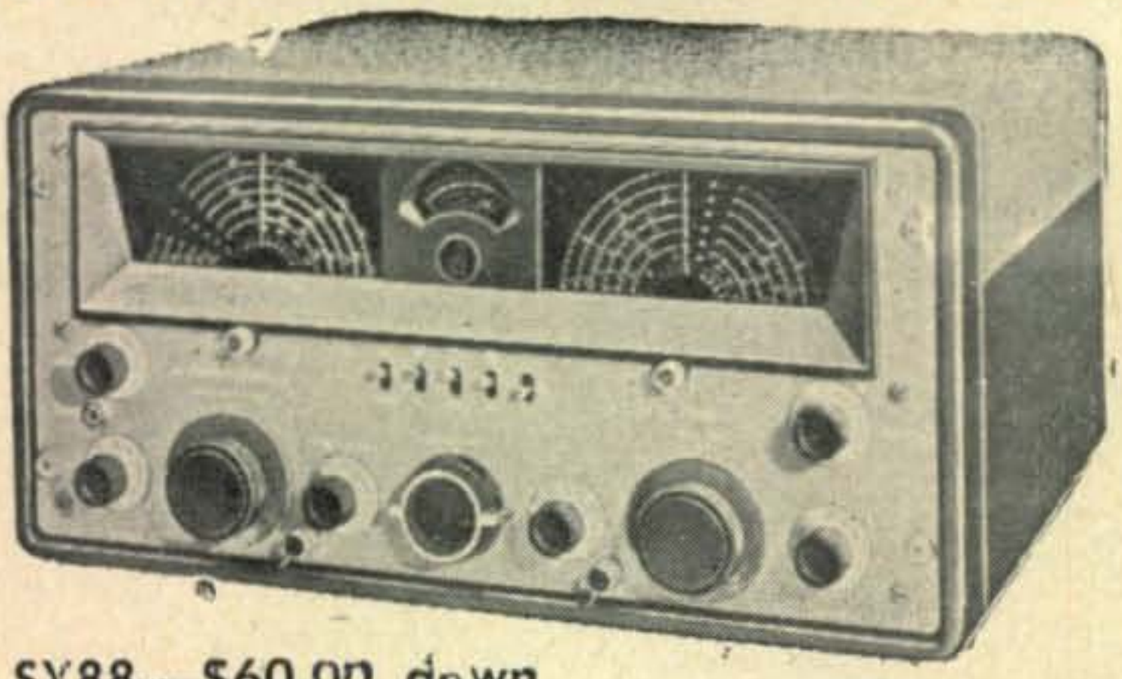

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HT20	45.00	24.50	449.50

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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!

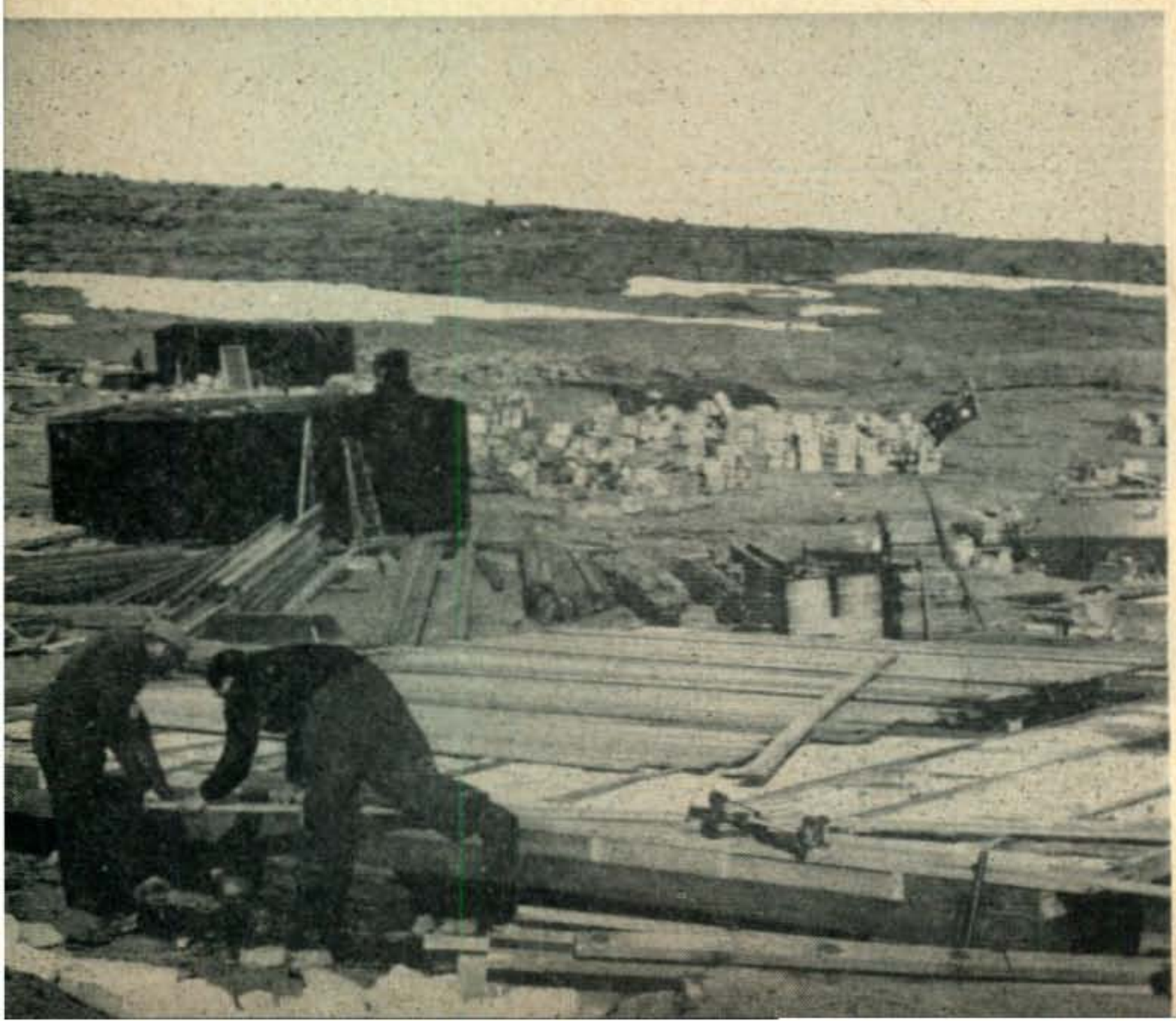
The photos on these pages were brought back by the Danish polar ship *Kista Dan* after it had successfully landed VK1EG and his nine colleagues.

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-VK3OY (see front cover, March 1954 CQ) is also in this group.

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

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.

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
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)
Southern Europe & North Africa	0830-1430 (3)	0600-1300 (3) 1300-1500 (3-4) 1500-1730 (1-2)	1630-2100 (3-4) 2100-0200 (2)	1800-0100 (2-3)
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 (2-3)	1900-0000 (2)
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)	1930-0400 (2)
South East Asia	Nil	0700-1000 (1) 1600-1900 (0-1)	0300-0700 (0-1)	Nil
Australasia	1600-1900 (0-1)	0700-1030 (2) 1600-1900 (1) 1900-2030 (2)	0030-0730 (2-3)	0200-0700 (2)
Guam & Pacific	1400-1800 (1)	0730-1100 (2) 1500-1800 (1) 1800-2000 (1-2)	2300-0700 (2-3)	0000-0600 (1-2)
Japan & Far East	Nil	0700-0900 (1-2) 1600-1900 (1-2)	0100-0700 (1)	0200-0600 (0-1)

ALL TIMES IN E S T

TAMPA, FLORIDA TO:				
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)
Central & South Africa	1000-1500 (1-2)* 0730-1300 (1-2) 1300-1630 (3)	0100-0230 (1-2) 0600-1300 (1) 1300-1600 (1-2) 1600-1800 (3)	1700-0100 (3)	1830-0030 (2)
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)
South East Asia	1830-1930 (0-1)	0630-0900 (1) 1700-2000 (1)	0300-0700 (0-1)	Nil

ALL TIMES IN E S T

TAMPA, FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Australasia	1800-1900 (0-1)* 1500-2000 (2)	0700-1000 (2) 1400-1700 (1) 1700-2200 (2) 0200-0400 (1)	0130-0730 (2-3)	0300-0700 (1-2)
Japan & Far East	1630-1900 (2)	0700-0900 (1-2) 1530-2100 (2-3)	0100-0700 (1)	0200-0600 (0-1)

ALL TIMES IN C S T

CHICAGO, ILLINOIS TO:				
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)
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)
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)
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	1400-1700 (1)	0700-0930 (1-2) 1300-1700 (1) 1700-2000 (2)	0100-0800 (1)	0200-0600 (0-1)
South East Asia	1500-1830 (0-1)	0700-1000 (1) 1500-2000 (1)	0230-0800 (1)	Nil
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)
Australasia	1600-1800 (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)

ALL TIMES IN C S T

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 (1-2)
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.)	15 Meters	20 Meters	40 Meters	80 Meters
South America	1300-1700 (2-3)* 0700-1400 (2-3) 1400-1800 (4)	0600-1300 (1-2) 1300-1600 (2-3) 1600-1800 (3-4) 1800-0300 (1-2)	1830-0600 (3-4)	1930-0400 (3)
Japan & Far East	1500-1830 (2-3)	0700-0900 (1) 1300-1700 (2) 1700-2100 (3)	0100-0400 (2) 0400-0700 (1)	0200-0600 (1)
South East Asia	1730-1900 (0-1)	0700-1000 (1) 1700-2100 (1)	0230-0730 (1)	Nil
Australasia	1700-1830 (1)* 1400-1900 (2-3)	0700-1100 (1-2) 1400-1700 (1) 1700-2100 (2) 0200-0400 (1)	0100-0700 (2-3)	0200-0600 (1-2)

ALL TIMES IN M S T

DENVER, COLORADO TO:				
Europe & North Africa	0900-1200 (0-1)	0700-1100 (1) 1100-1500 (1-2)	1630-0030 (1-2)	1800-2300 (1)
Central & South Africa	0800-1200 (1) 1200-1600 (2-3)	0600-1200 (0-1) 1200-1500 (1-2) 1500-1800 (2-3)	1700-0000 (2-3)	1800-2230 (1-2)
South America	1200-1600 (2)* 0700-1200 (2-3) 1200-1700 (3-4)	0600-1500 (2) 1500-1800 (3-4) 1800-2000 (1-2) 2200-0300 (1-2)	1800-0500 (3-4)	1900-0330 (2-3)
Japan & Far East	1300-1800 (2-3)	0600-1000 (1-2) 1000-1500 (2) 1500-2200 (3)	0030-0700 (2-3)	0100-0630 (1-2)
South East Asia	1530-1730 (0-1)	0530-0730 (1) 1500-1800 (1-2)	0200-0600 (1)	Nil
Australasia	1500-1800 (1-2)* 1300-1700 (2) 1700-1900 (3)	0600-1000 (1-2) 1300-1700 (1) 1700-2000 (2-3)	0100-0700 (2-3)	0130-0600 (1-2)

ALL TIMES IN P S T

LOS ANGELES, CALIF. TO:				
Europe & North Africa	1000-1230 (0-1)	0700-1100 (1) 1100-1400 (1-2)	1600-2330 (1-2)	1900-2200 (0-1)
Central & South Africa	0900-1200 (1) 1200-1500 (1-2)	0600-1400 (0-1) 1400-1700 (1-2)	1630-2200 (2-3) 2200-0000 (1)	1730-2100 (1-2)
South America	1000-1530 (2)* 0700-1200 (2-3) 1200-1600 (3-4)	0600-1500 (1-2) 1500-1700 (3-4) 1700-2000 (1-2) 2300-0300 (2)	1730-0400 (3-4)	1830-0230 (2-3)

ALL TIMES IN P S T

LOS ANGELES, CALIF. TO:	15 Meters	20 Meters	40 Meters	80 Meters
Guam & Mariana	1300-1800 (1)* 1100-1700 (2) 1700-1900 (3)	0730-0900 (1) 1000-1800 (2) 1800-2100 (3)	2300-0630 (3-4)	0000-0600 (2-3)
Australasia	1500-1900 (1-2)* 1100-1730 (2) 1730-1900 (3)	1000-1800 (1) 1800-2100 (2-3)	2300-0630 (3)	0030-0600 (2)
Japan & Far East	1300-1700 (2) 1700-2000 (3)	1200-1800 (2-3) 1800-2200 (3-4)	2300-0730 (3-4)	0030-0600 (2-3)
South East Asia	1400-2030 (1-2)	0700-1100 (1-2) 1300-1900 (0-1) 1900-2300 (1-2)	0200-0600 (1-2)	0300-0500 (1)
Hong Kong, Macao & Formosa	1400-1900 (2)	0700-0900 (1-2) 1330-1800 (1-2) 1800-2200 (2-3)	0100-0600 (2-3)	0200-0500 (1-2)

ALL TIMES IN P S T

PORTLAND, OREGON TO:				
Europe & North Africa	0900-1200 (0-1)	0800-1300 (1)	1600-2100 (1)	1800-2200 (0-1)
Central & South Africa	1200-1400 (1)	0800-1400 (0-1) 1400-1700 (1-2)	1600-2100 (1)	1730-2000 (0-1)
South America	1300-1500 (1-2)* 0800-1200 (2-3) 1200-1600 (3-4)	0600-1100 (1) 1100-1400 (1-2) 1400-1800 (3-4) 1800-2300 (1-2)	1800-0300 (3)	1900-0200 (2)
Australasia	1500-1800 (1)* 1200-1730 (2) 1730-1900 (3)	1200-1700 (1) 1700-2100 (2-3)	2300-0600 (3)	0030-0530 (1-2)
Japan & Far East	1300-1830 (2-3)	1200-1800 (2-3) 1800-2100 (3-4)	2300-0630 (3-4)	0030-0600 (2-3)
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—

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The Midget with a Mighty PUNCH

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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.

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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

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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

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SOUTHBRIDGE, MASSACHUSETTS, U.S.A.

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.

The Six Bander

CLIFFORD C. JOHNSON, WØURQ

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 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 transmitter 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 dial drive being done by means of concentric discs 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 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.

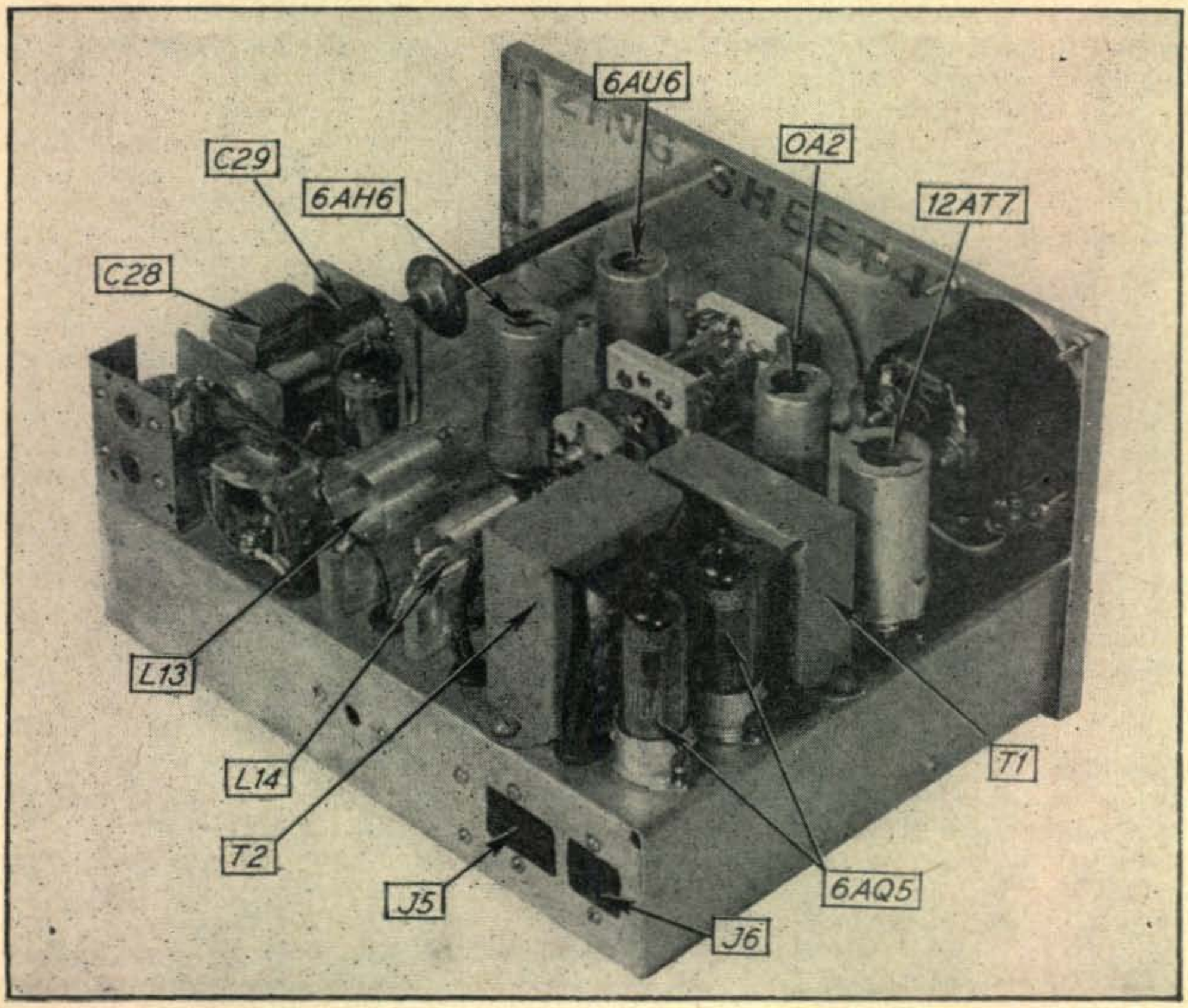
The tube line up is a 6AU6 v.f.o or crystal oscillator, 6AH6 buffer-doubler, and a 5763 final which runs straight through on all bands. An OA2 is included on the chassis to regulate the v-f-o voltage supply. The modulator is a pair of 6AQ5's in class AB_1 with a 12AT7 speech amplifier from a carbon microphone. Speech frequencies are emphasized by a small coupling condenser *(C31)* and a low capacity cathode by-pass condenser *(C32)*.

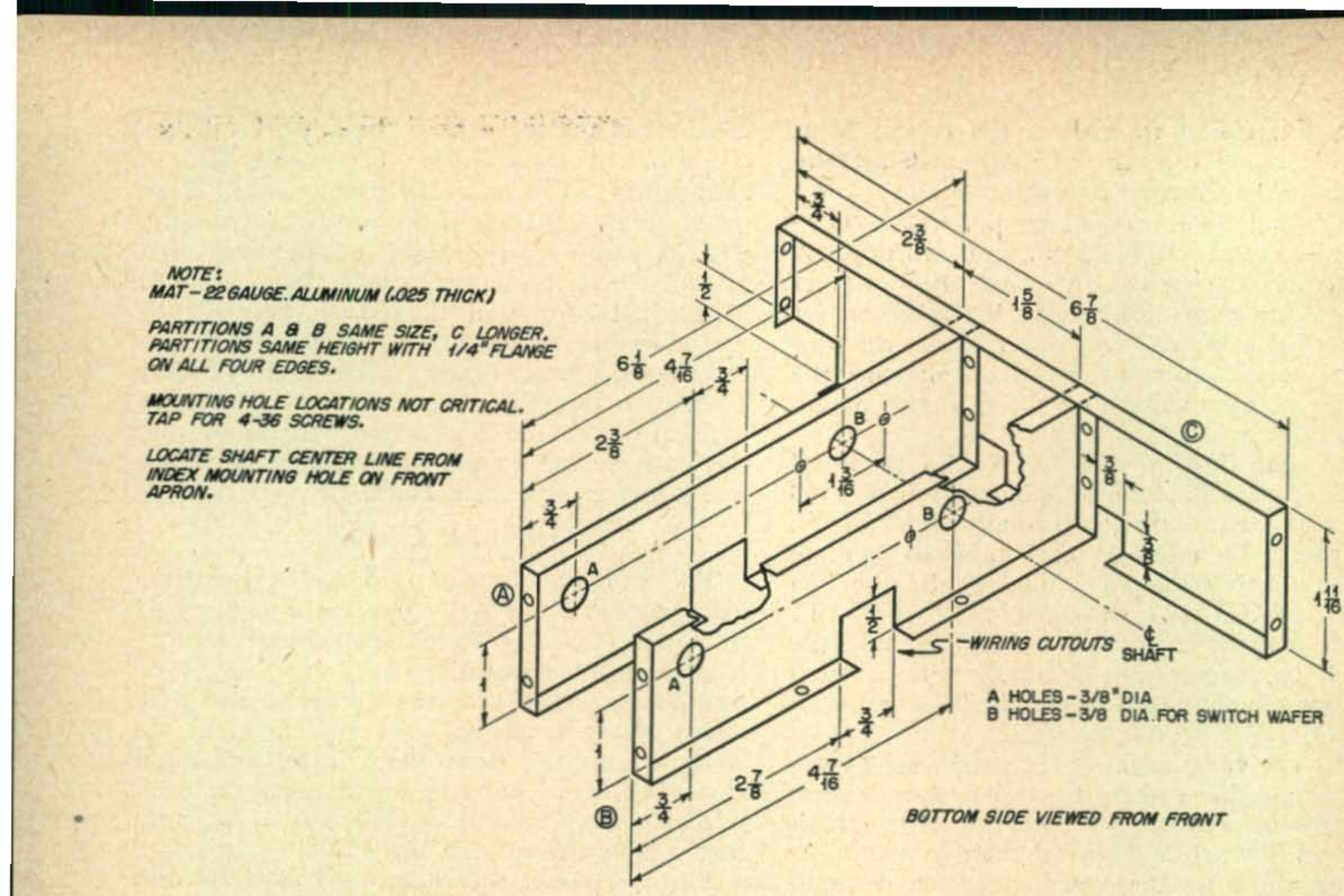
Why not gang tuning? No need to shy away from single dial control because it sounds complicated—in a transmitter of this type circuit tracking is much less critical than in a receiver tuning the same frequency spectrum. Even if a tuned circuit is not exactly on the nose, the power loss is mostly in tube 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 $\mu\mu$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





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 μμfd. 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 ½ of the dual condenser (25 μμfd.) 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 ¼" thick bar of polystyrene stock ½" wide and

COIL DATA

Coil	Turns	Wire Size	Diameter	Winding Length	Tuning Range
L1	36	24	¾"	1"	3500 - 4000 kc.
L2	19	24	½"	¾"	7000 - 7425 kc.
L3	17	24	½"	¾"	8333 - 9000 kc.
L4	53	30	½"	¾"	Resonates 6900 kc.
L5	12	24	⅜"	¾"	14 Mc.-14,850 kc.
L6	6	20	⅜"	¾"	25 Mc.-27 Mc.
L7	95	32	½"	⅞"	3500 - 4000 kc.
L8	45	30	½"	¾"	7000 - 7425 kc.
L9	25	24	½"	¾"	14,000-14,850 kc.
L10	16	24	½"	¾"	21,000-22,275 kc.
L11	15	24	⅜"	¾"	28,000-29,700 kc.
L12	7	20	¾"	¾"	50,000-54,000 kc.
L13	31	B&W 3016	1"	1"	80 meters
L14	32	B&W 3012	¾"	1"	40-20 meters
		(Tapped 17 turns from cold end)			
L15	12	B&W 3011	⅞"	¾"	15-10 meters
		(Tapper 5 turns from cold end)			
L16	6	16	½"	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 1¼" 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 ¾ 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.

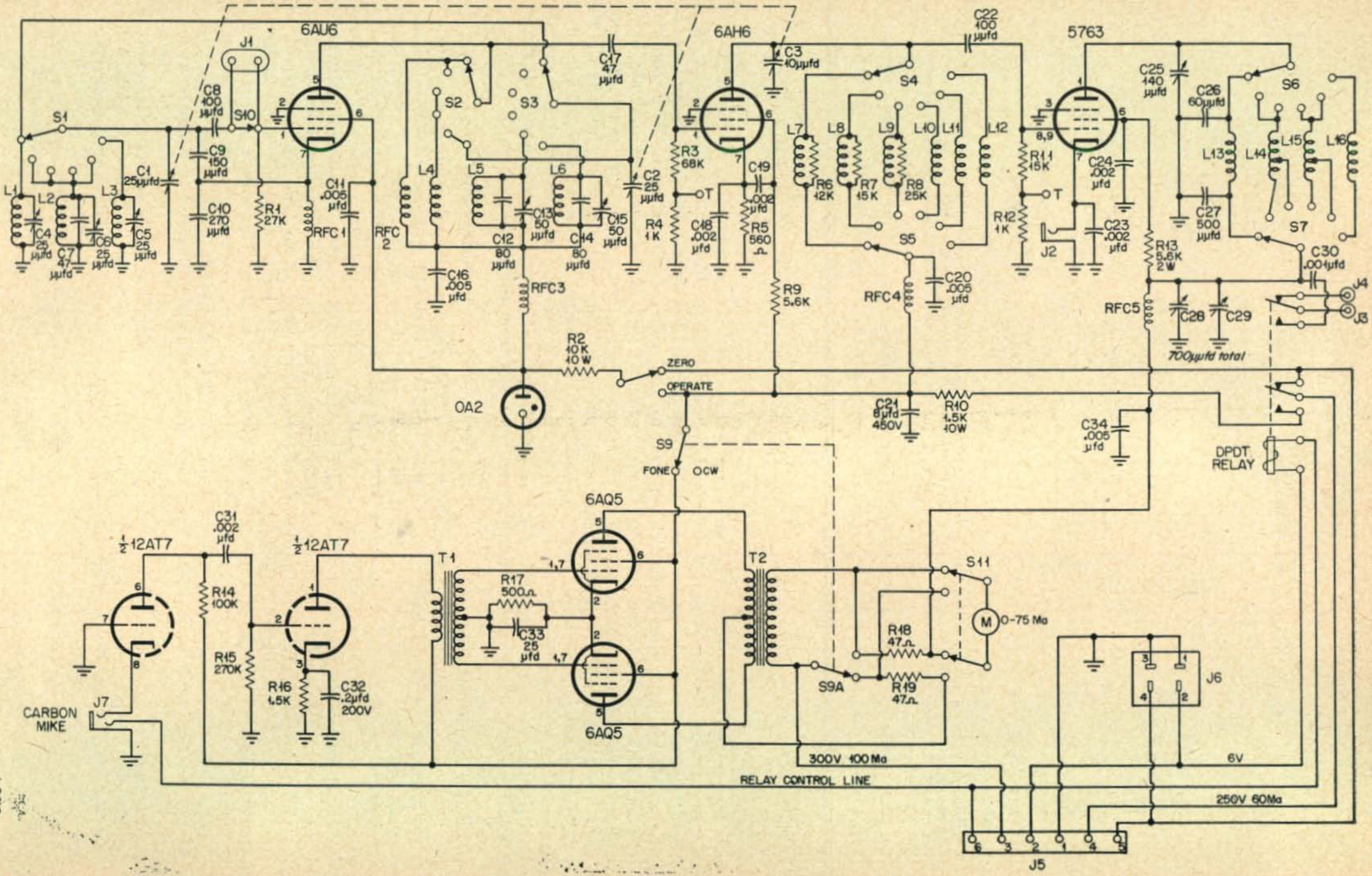
L13, L14, L15, and L16 are mounted on polystyrene bars which bolt to the chassis, as explained in the text.

slightly longer than the coils. The coils are glued 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 more 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 midget broadcast type with the sections in parallel (and the trimmers removed) to make a total capacity of about 700 μμfd. The mounting of the final tank and antenna loading condensers was carefully figured out for short leads and direct ground returns to the cathode of the final tube. The loading condenser is mounted on top of the chassis, but it is insulated from the surface 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

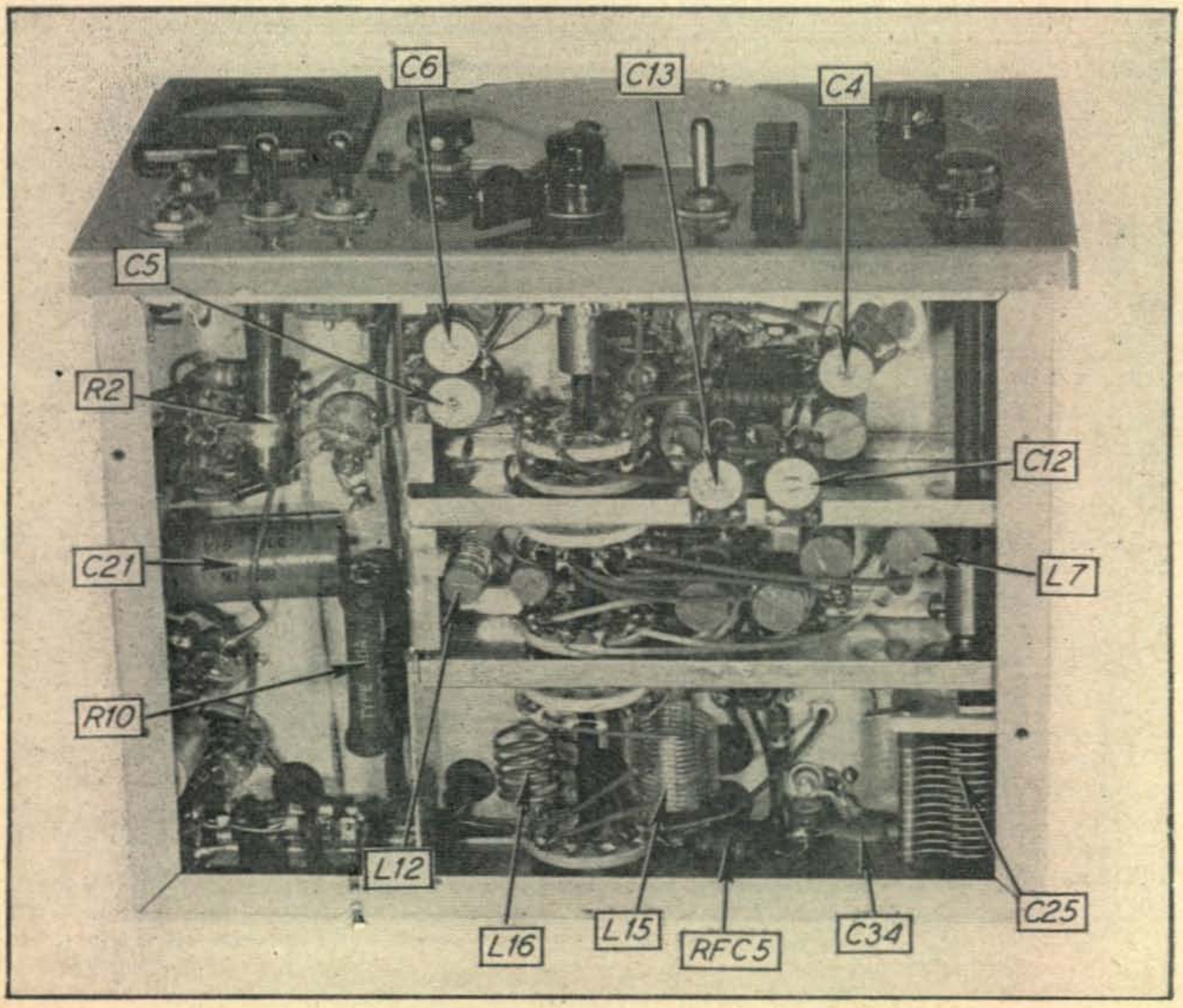
This rig is small and compact, but not complicated to build. The small size is obtained by careful layout and the use of many new small components. The bandswitch is made from individual ceramic wafers of *Centralab's miniature 2000 series,* each section having one pole and 12 positions, although only 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 ¼" 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.


6AU6
6AH6
5763
J1
S1
S2
S3
S4
S5
S6
S7
S8
S9
S9A
S10
S11
C1 25μμfd
C2 25 μμfd
C3 40μμfd
C4 25 μμfd
C5 25 μμfd
C6 25 μμfd
C7 47 μμfd
C8 100 μμfd
C9 150 μμfd
C10 270 μμfd
C11 .005 μfd
C12 80 μμfd
C13 50 μμfd
C14 80 μμfd
C15 50 μμfd
C16 .005 μfd
C17 47 μμfd
C18 .002 μfd
C19 .002 μfd
C20 .005 μfd
C21 8 μfd 450V
C22 100 μμfd
C23 .002 μfd
C24 .002 μfd
C25 140 μμfd
C26 60μμfd
C27 500 μμfd
C28
C29
700μμfd total
C30 .001μfd
C31 .002 μfd
C32 .2μfd 200V
C33 25 μfd
C34 .005 μfd
R1 27K
R2 10K 10W
R3 68K
R4 1K
R5 560Ω
R6 12K
R7 15K
R8 25K
R9 5.6K
R10 1.5K 10W
R11 15K
R12 1K
R13 5.6K 2W
R14 100K
R15 270K
R16 1.5K
R17 500Ω
R18 47Ω
R19 47Ω
RFC 1
RFC 2
RFC3
RFC4
RFC5
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
L15
L16
0A2
ZERO
OPERATE
FONE
OCW
½12AT7
½12AT7
6AQ5
6AQ5
T1
T2
M 0-75 Ma
J2
J3
J4
J5
J6
J7
DPDT RELAY
CARBON MIKE
300V 100 Ma
6V
250V 60Ma
RELAY CONTROL LINE

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 μμfd., NPO type variable ceramic trimmer (Erie 557).
C7—47 μμfd., silver mica.
C8—100 μμfd., silver mica.
C9—150 μμfd., silver mica.
C10—270 μμfd., silver mica.
C11, C16, C20—.005 μfd., disc ceramic.
C12, C14—80 μμfd., ceramic Erie GP.
C13, C15—8-50 μμfd., N750 ceramic variable, Erie 557.
C17—47 μμfd., mica or ceramic.
C18, C19, C23, C24, C31—.002 μμfd.
C21—8 μfd. 450v., electrolytic.
C22—100 μμfd.
C25—140 μμfd. variable (Bud MC-1856).
C26—60 μμfd. tubular
C27—500 μμfd. mica.
C28, C29—Midget BC condenser, 2-section, 700 μμfd. paralleled.
C30—.001 μfd. 3000 V. TV disc ceramic.
C32—.2 μfd. 200v.
C33—25 μfd., 50v., electrolytic.
R1—27,000 ohms, ½w.
R2 -10,000 ohms, 10w.
R3—68,000 ohms, ½w.
R4, R12—1000 ohms, ½w.
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, ½w.
R13—5600 ohms, 2w.
R14—100,000 ohms, ½w.
R15—270,000 ohms, ½w.
R16—1500 ohms, ½w.
R17—500 ohms, 5w.
R18, R19—47 ohms, ½w.
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 ¼" 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 ¼" 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

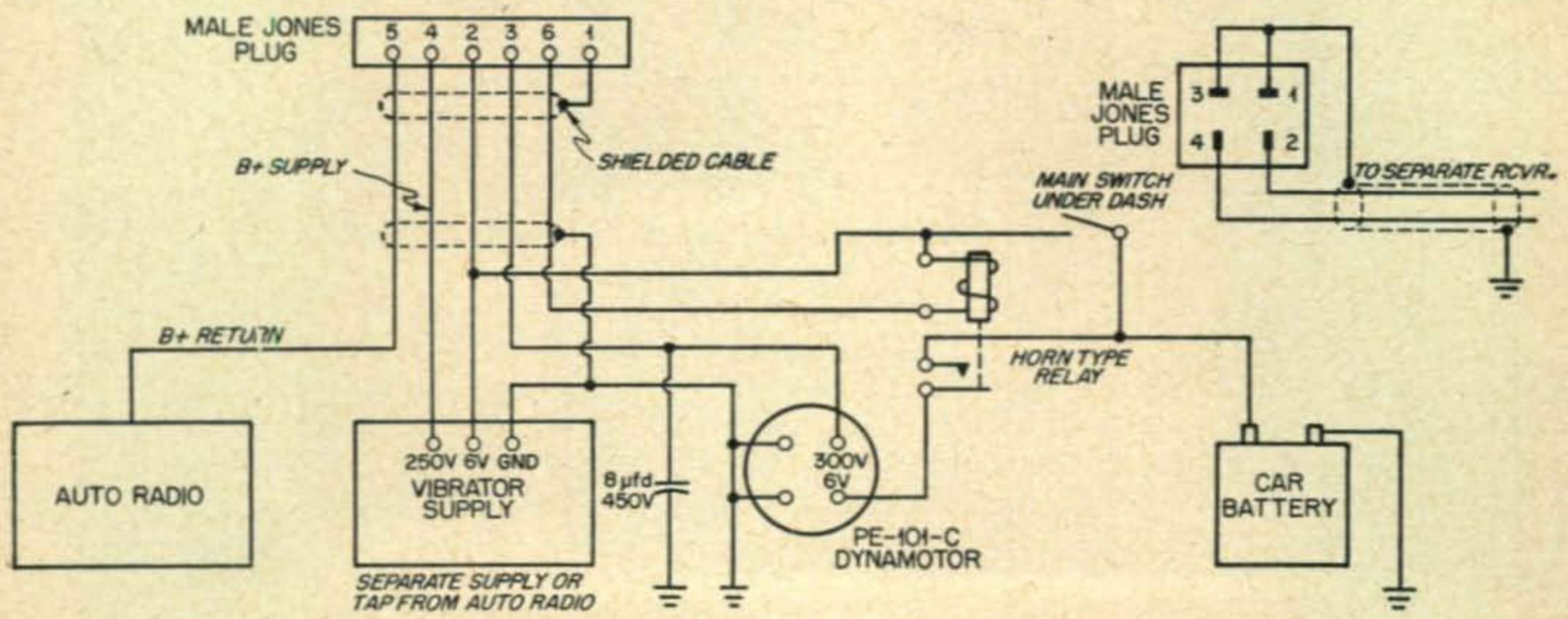
The *Bud* dual "Tiny-Mite" has two substantial mounting feet and these are used to fasten it to the chassis right down the center line with enough of the shaft extending beyond the front of the chassis to attach a pointed after the panel is put on. For this particular dial drive system, a slot is cut 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 the chassis. The mounting holes in the front apron of the chassis are used as a template to mark the panel, which is fastened to the chassis by 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 to the underside of the chassis through grommetted holes, as are the leads to the meter switch *(Sw11)*, relay, and the tuning condensers. 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 part of 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 coils 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 test 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.

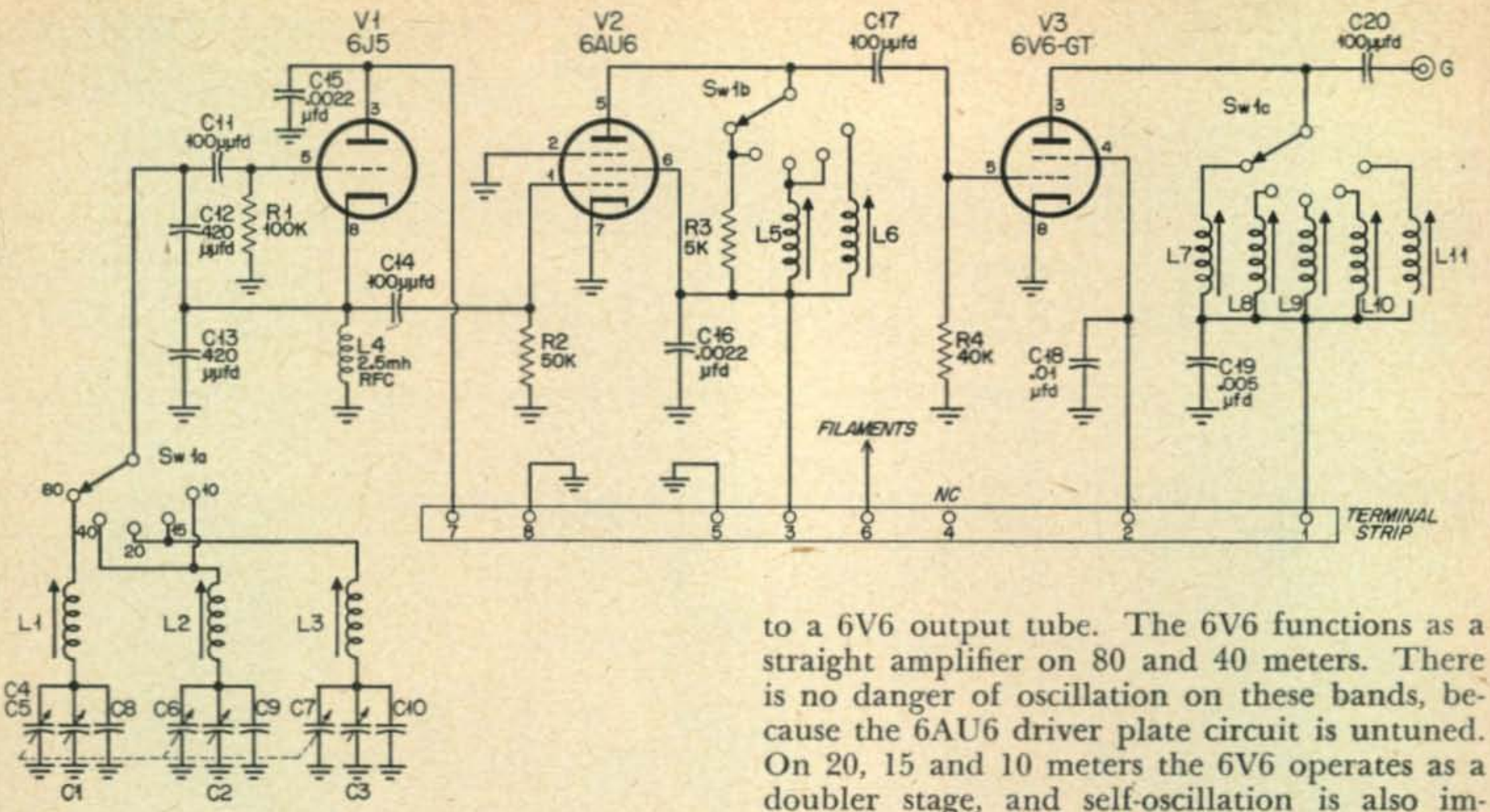


Fig. 1. Basic schematic of the GELOSO v.f.o. unit.

tor, frequency multiplier unit of exceptional stability. It is approximately 5½"x6½" in size, with an overall height (including tubes) of 5½". 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 midget 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 a 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 a doubler stage, and self-oscillation is also impossible. The plate coils of the 6V6 (*L7-L11*) are slug-tuned, and resonate to the center of each amateur band. Output from the 6V6 is exceptionally constant across the bands. By 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-105 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 6½, 7½ and 8½ 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 system[2] 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)*

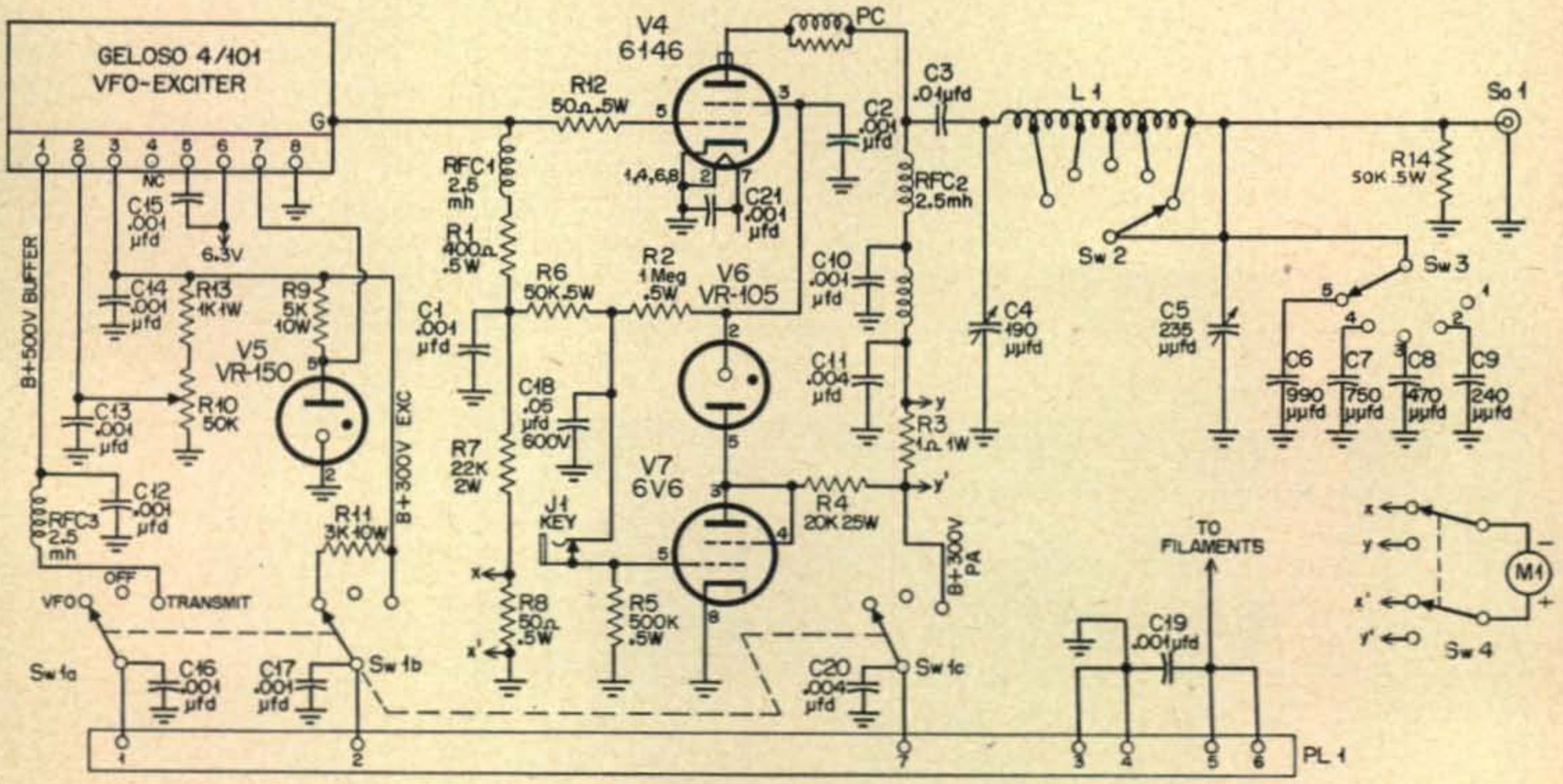


Fig. 2. Parts list and schematic of the 6146 power amplifier.

C1, C2, C12, C13, C14, C15, C16, C17, C19, C21—0.001 μfd. ceramic, Centralab DD-102.
C3—0.01 μfd. ceramic, Centralab DD16-103.
C4—190 μμfd., BUD MC-1858.
C5—235 μμfd., BUD MC-1859.
C6—990 μμfd., Centralab TCN-750 and TCN-240 in parallel.
C7—750 μμfd., Centralab TCN-750.
C8—470 μμfd., Centralab TCN-470.
C9—240 μμfd., Centralab TCN-240.
C10—0.001 μfd. feedthru, Erie-327.
C11, C20—0.004 μfd. ceramic, Centralab DD16-402.
C18—0.05 μfd., 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, ½w.
R2—1.0 meg., ½w.
R3—1.0 ohm, 1w.
R4—20,000 ohms, 25w.
R5—0.5 meg., ½w.
R6—50,000 ohms, ½w.
R7—22,000 ohms, 2w.
R8, R12—50 ohms, ½w.
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.

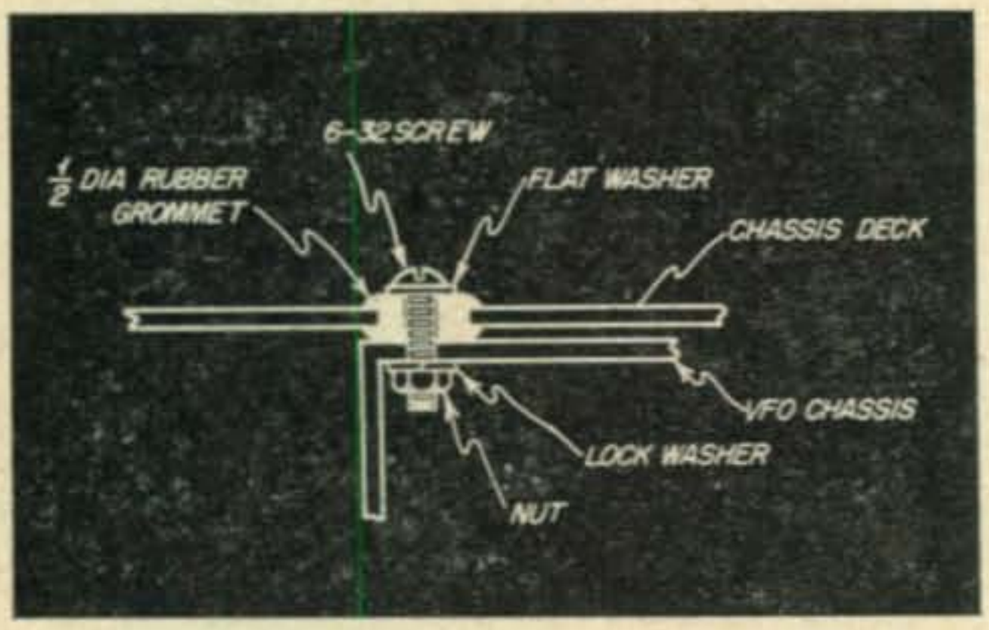


Fig. 4. The shock mounts for the v.f.o. are homemade as shown above. Four are required.

The voltage applied to the Clapp oscillato is regulated by a VR-150 tube *(V5)* and th full 300 volts is applied to the 6AU6 buffe 550 volts is applied to the plate of 6V6GT.

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 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 milliampere 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 150 milliamperes on *M1*.

The correct grid current to the 6146 is 2.0 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*.

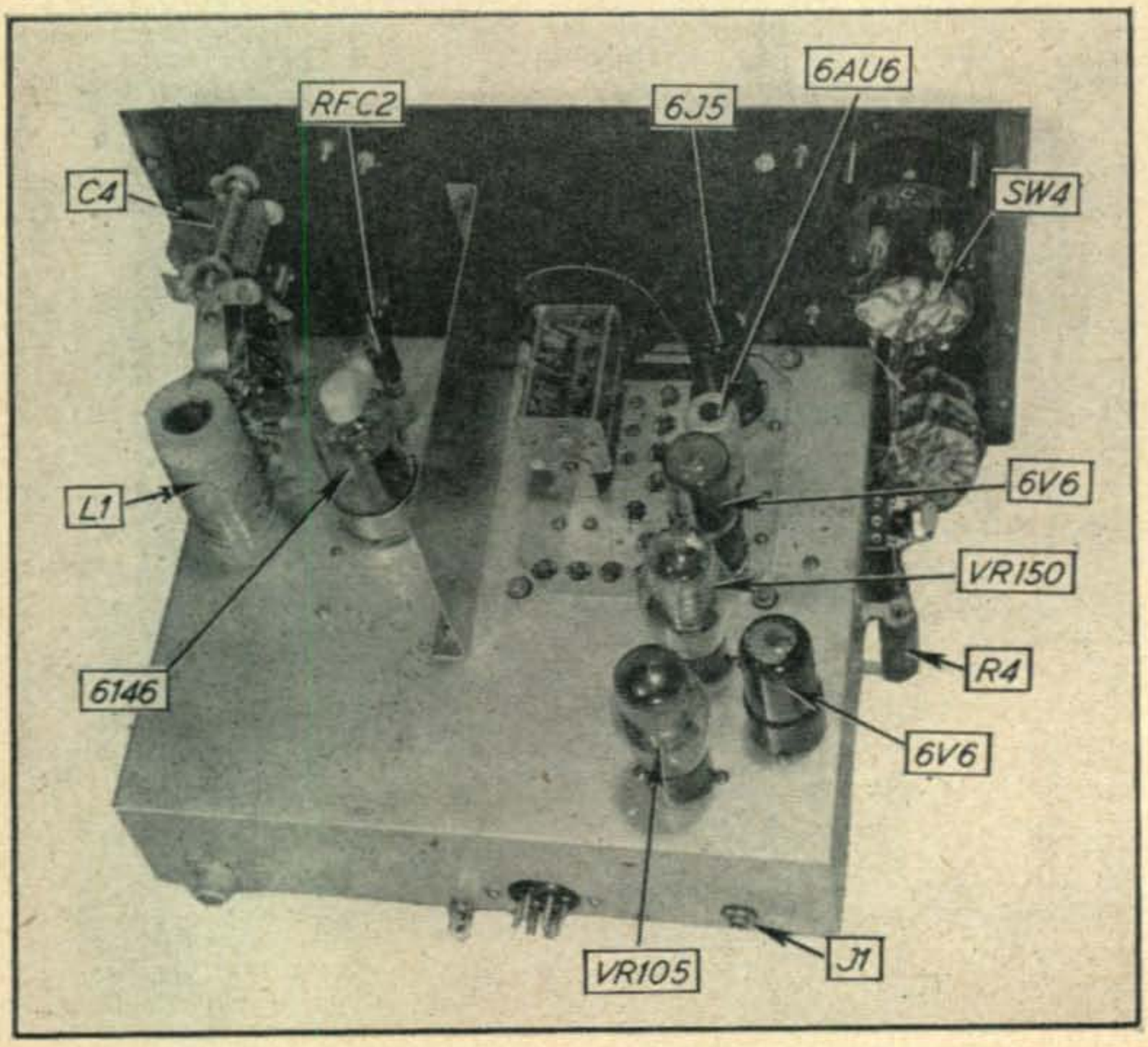
The keying jack, *J1*, is mounted on the back of the chassis. Both sides of the jack are "hot," so the jack must be insulated from the chassis. There is no danger of shock from touching the key contacts, since the voltage across them is very low.

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 *J2*, mounted on the back lip of the chassis.

Mechanical Layout

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

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.



In this transmitter top side view the displacement of the chassis is clearly shown. It was 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).

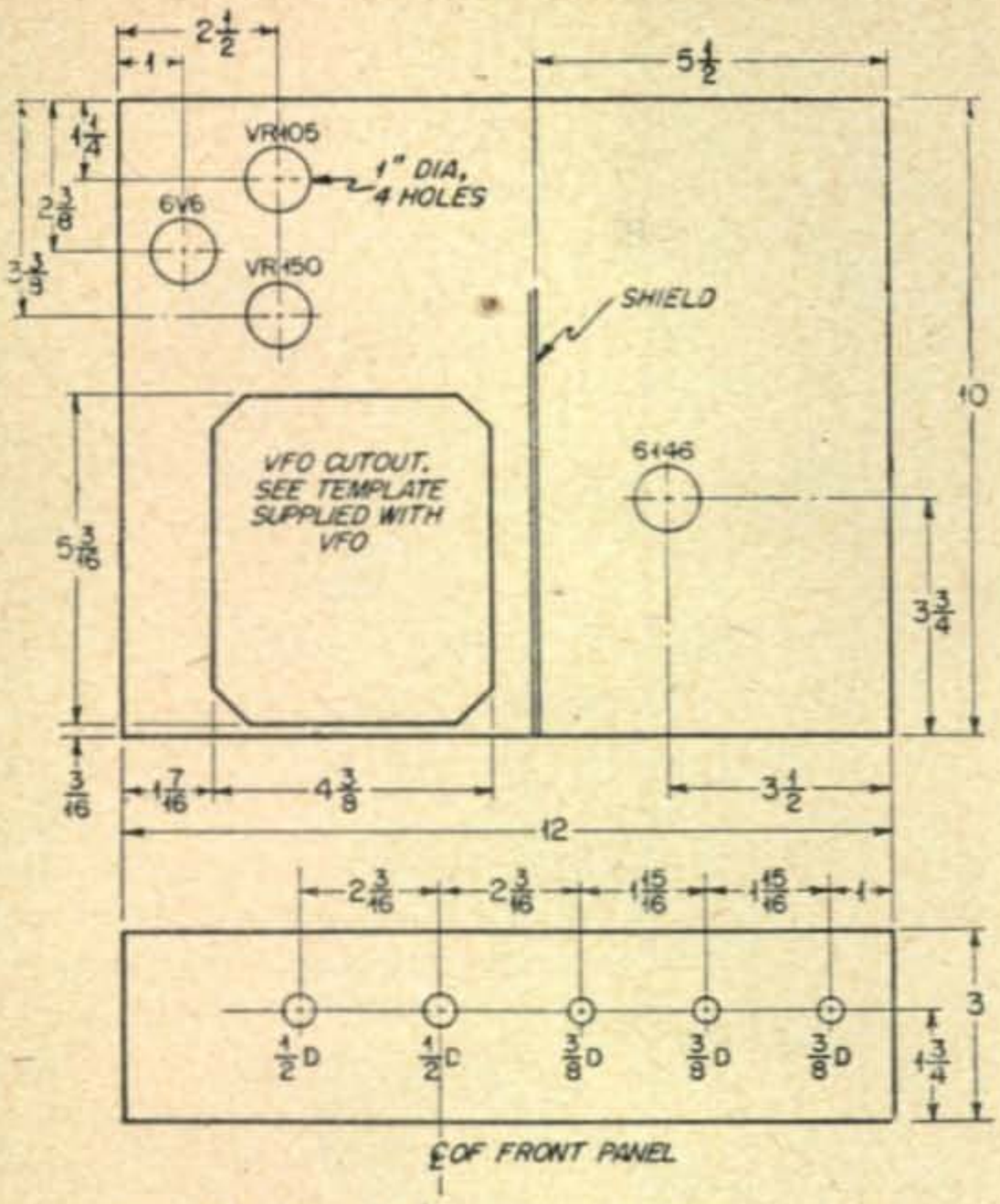


Fig. 5. Chassis layout and drilling plan.

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-413,* 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.

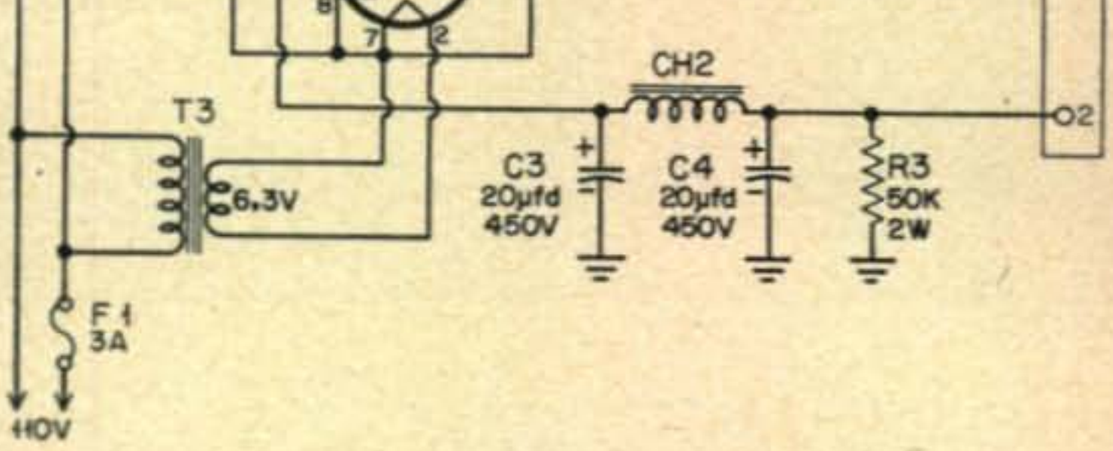
A *Bud #C-975* cabinet is used, measuring 11"x15"x9". The critical dimension in this case is the cabinet height. A minimum of 8½" clearance is required to clear the top of the v-f-o dial. A panel drilling layout is shown in *Fig. 6*. A small shield plate *(Fig. 7)* should be mounted between the *4/101 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"x½" aluminum strap grounds the rear end of the frame of *C4* to the metal frame of the pi-network assembly, *Sw2/L1* which is grounded in turn to the chassis by its mounting bracket. *J1, J2* and *Pl1* 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.

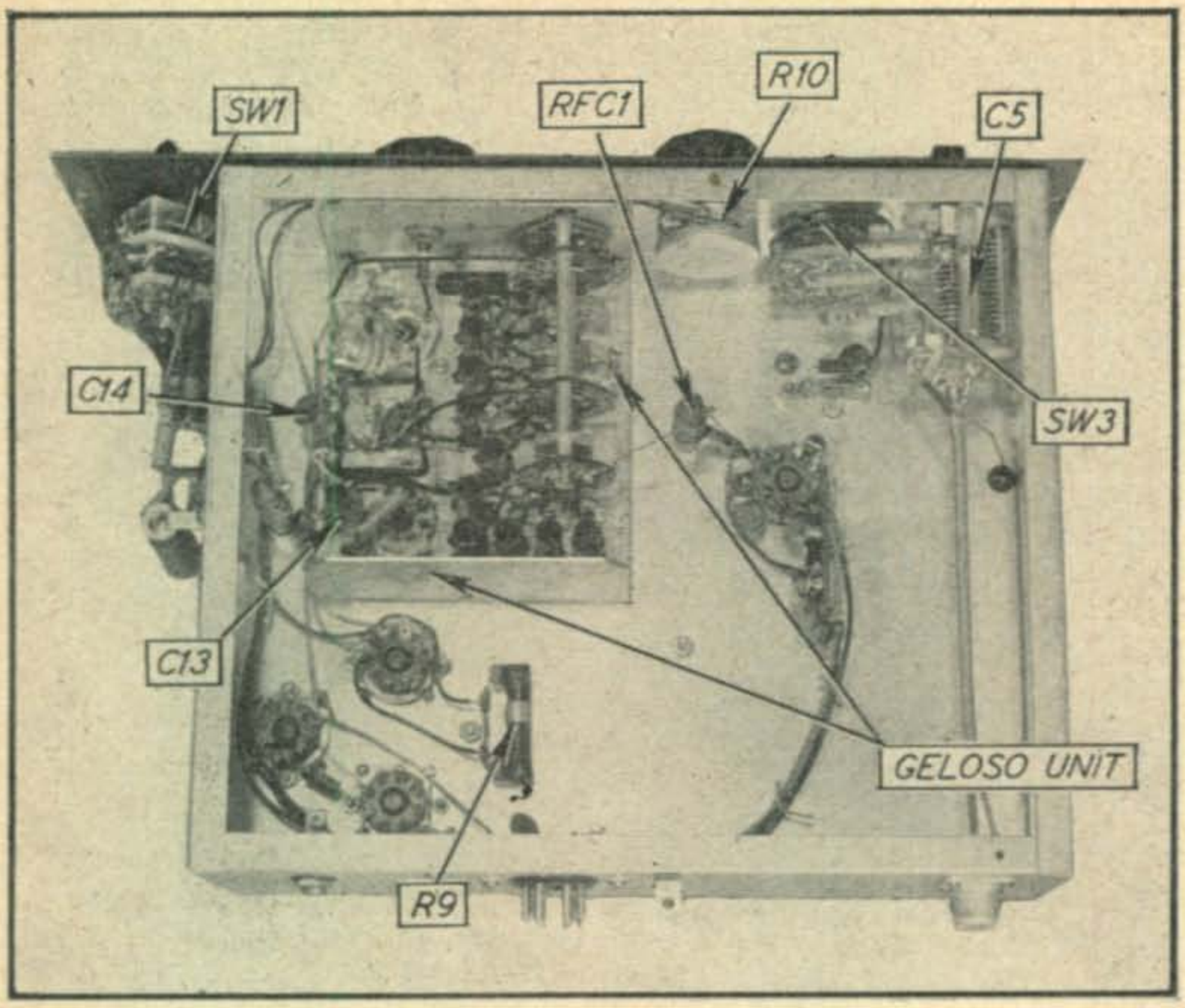
Electrical Assembly

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-



C1, C2, C3, C4—20 µfd., 450v., tubular.
Ch1—10 henries, 110 ma., Stancor C-1001.
Ch2—4.5 henries, 50 ma., Stancor C-1706.
F1—3a., 3AG fuse.
So1—7 prong socket, or Millen 37304 terminal strip.
R1, R2—20,000 ohms, 10w.
R3—50,000 ohms, 2w.
Sw1—SPST toggle switch.
T1—360-0-360v., 120 ma., Stancor PC-8410.
T2, T3—6.3v., 1.2a., Stancor P-6134.
Chassis—BUD #CA-699 with dust cover.
I1—6.3v. pilot and jewel.

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



The wiring of the transmitter can be made extremely clean since the major portion of the "nasty" wiring is in the pre-assembled v.f.o.

sulated tie-point and *pin 4* (ground) of the 6146 socket. Condensers *C16, C17, C19* and *C20* mount on the rear of the power plug, *Pl1*. *R2, R6, R7* and *R8* mount on a small phenolic board next to the 6146 socket. *RFC1* and *RFC2* mount on their insulated terminals. *R1* connects between the bottom end of *RFC1* and the insulated tie-point holding *C1*. R12 goes between the top of *RFC1* and *pin 5* of the 6146

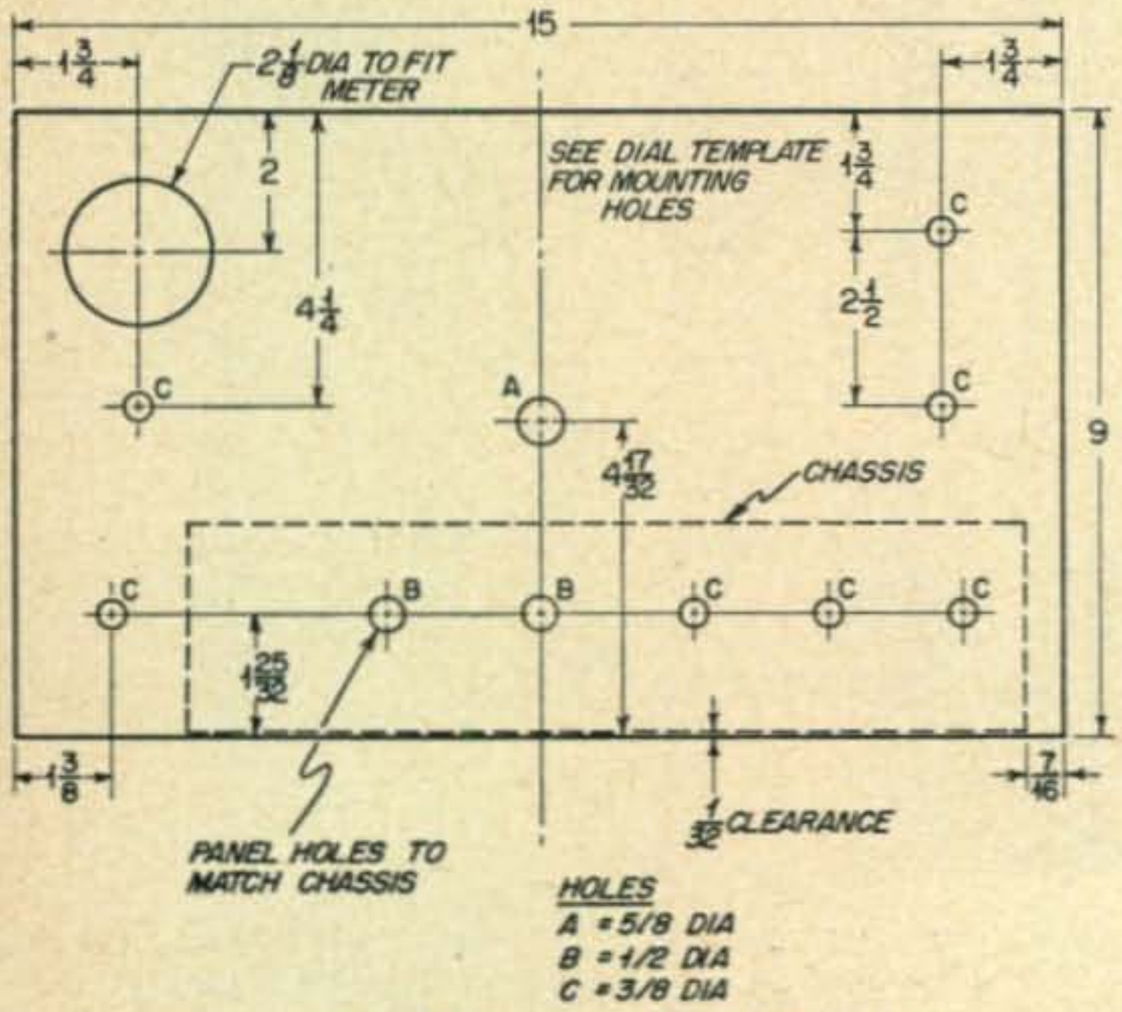


Fig. 6. Panel layout and drilling plan.

socket. The leads to *pins 3* and *5* of the 6146 socket are made of shielded wire, as are all leads to the v-f-o exciter. *C18* mounts between *J1* and a ground lug on socket *V6*. *J1* is mounted in place with insulating washers. *C10* is a v-h-f feed-thru condenser, mounted in a ½" hole in the chassis. *VHF-1* and *C11* are mounted on a two terminal tie-point next to *VHF-1*. Condensers *C6, C7, C8* and *C9* are mounted by their leads directly between the lugs of *Sw3* and the ground terminal on *C5*. The connection between *C5* and *J2 is* made with a short length of *RG-59/U* coaxial cable, with the shield grounded at both ends. *R13* is mounted across *J2*.

When all wiring is completed, it should be carefully checked, and tied in place at various points with light lacing twine. *No* floppy leads can be tolerated in a v-f-o transmitter!

Power Supply Assembly

No great amount of finesse is required in the assembly and wiring of the power supply. The top view shows the general placement of parts.

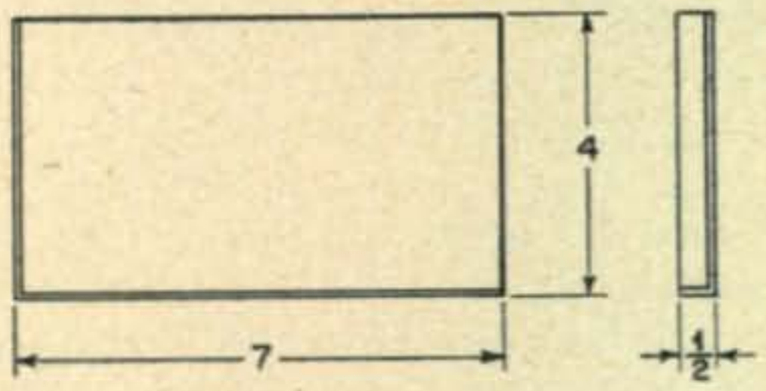


Fig. 7. Shield plate design. A BUD type #IS-1246 shield plate may be substituted if one-half inch is trimmed off the top.

The filaments of the 6X5 tubes come on when the unit is energized. The pilot lamp (red) and the 5V4G filaments come on when the primary switch, *Sw1* is closed. The output voltages appear on a *Millen 37304* terminal strip, and a six-foot power cable connects the power supply to the transmitter. To prevent excessive filament voltage drop in the cable, a 6 wire cable made of *#14* stranded wires is used. Two wires are paralleled for the filament and ground leads, thus cutting the voltage drop in the cable to a minimum.

(Continued on page 66)

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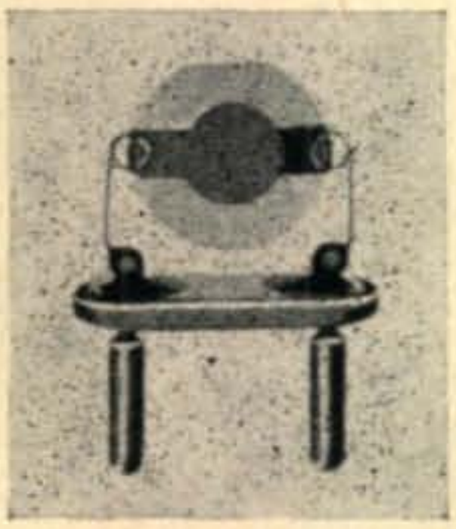

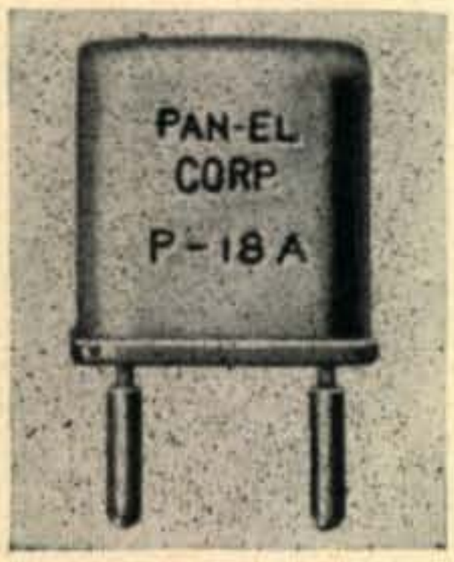

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Box 403, St. Thomas, Virgin Islands

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, CR1ØAA: 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 CR1ØAA'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.

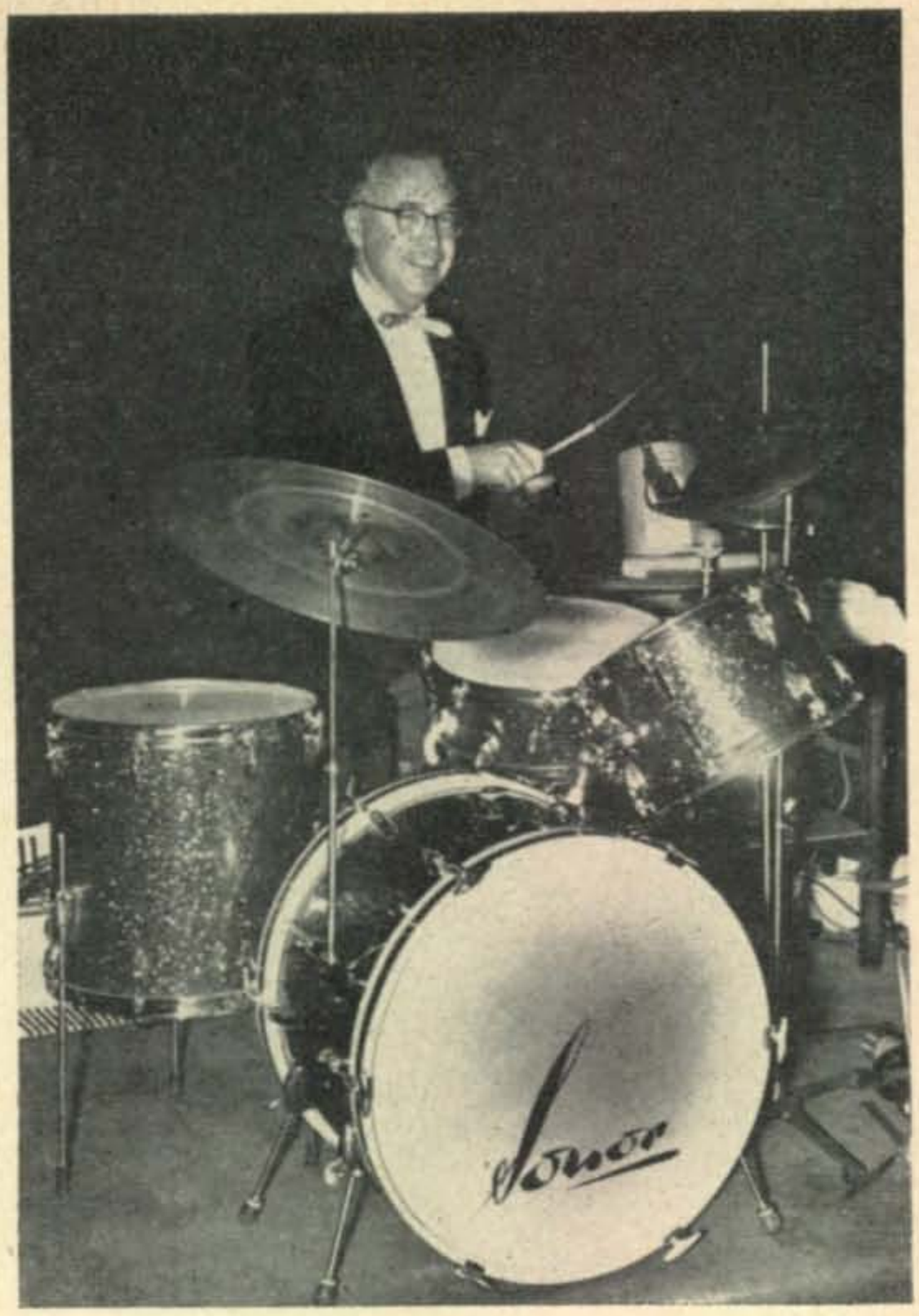
SAN ANDRES ISLANDS, HKØAI: This station has been on 7 Mc. quite frequently, 7015 to 7040, 0100/0300 GMT, with 5-kc. drift. Victor is a bit QRS and has a poor receiver but a much better one should be in his hands as this is read. QSL to Victor Abraham, San Andres Island, via Colombia, S.A.

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 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."



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."

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.

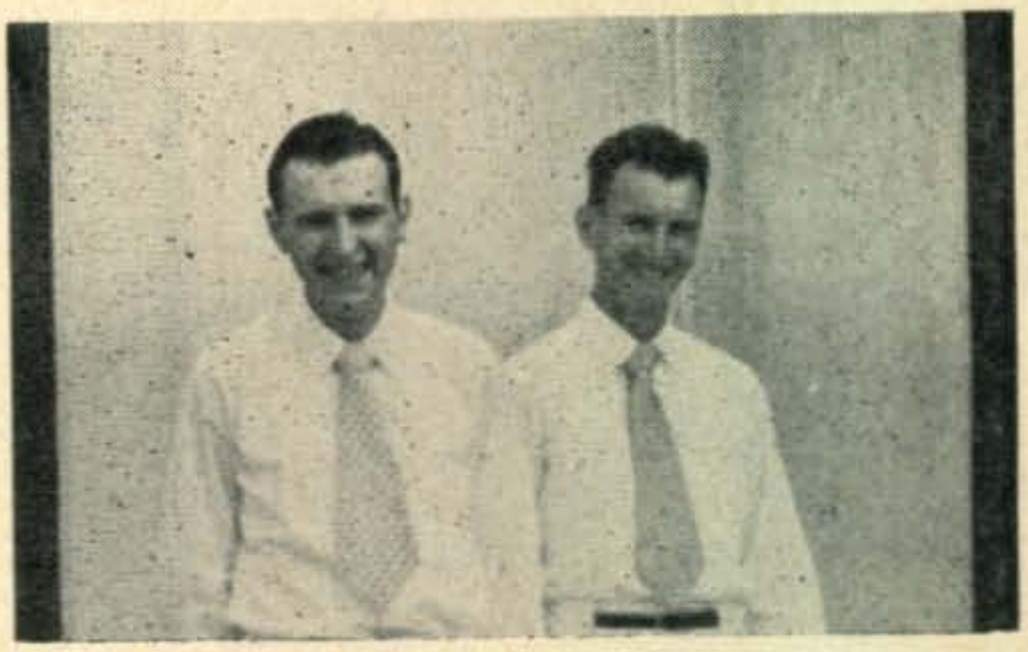
NAVASSA ISLAND, KC4AB: This expedition sailed from Santiago de Cuba on August 16, at 2400 GMT (after a few "red-tape" delays) and arrived at Navassa, some 90 miles distant, at dawn. The gear was set up and KC4AB came on the air at 1557 GMT,

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 Icione. . . . 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———!). 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).

August 17. News of this trip had received wide coverage and there was plenty of "ye old DX addicts" on hand to give them a busy welcome. Contacts were logged, during the first 70 minutes in this order: KV4AA, KV4BB, KP4TF (KC4AC?), KP4KD, W5RX, W9HUZ, W4GHP, W5VNL, W6AOA, KZ5WZ, W9QLH, KP4UE, W6LW, PY2CK, W9NDA, W5UUK, W4RBQ, W5GXP, W1TYQ, WØMLY (FL8MY, etc.), W6CAE, W4CTL, W8JJW, W4LRN, PJ2AI, W3KT, W8BKP, W5CEW, W9APY/5, W3OVV, W9FDX, WØBCJ, LU6DJX, W9TQL, W5ADZ, W5IX, W8DAW, W8JIN, W4INL, W8MWL, CP5EK, W8KIA, EL2X, W3EVW, W6TXL, W8DMD, W3JNN, W8FGX, W5TTB, 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. As this is written Don, W4VZQ, and Bob, W4QCW,



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 KC4AB and over 600 contacts have been made! Guided by the tactics used by FO8AJ and other expeditions these 19-year-old Hams must be highly complemented 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* TBS-50-D transmitter, 40/50 watts, was used on all 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 Club, 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 W4QCW. Cards should be out by the last half of September. The unforeseen eleven-day stay in Santiago caused additional financial strain and contributions, while not necessary for QSL's would be thankfully received. We hope to have a complete story of this venture in a later issue. THANKS BOYS FOR A 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	W6DI	204	JA2KG	160	W8SYC	209	PY4IE	215	W1RAN	150
W8HGW	251	VK2DI	204	KH6MG	160	VK4FJ	209	W2HMJ	206	W2AZS	142
W6VFR	250	W6AVM	204	W6ONZ	160	W2HHF	208	W1HA	202	W6ZZ	135
W6ENV	250	DL7AA	204	WØFFV	158	W8HFE	207	GM3EST	201	W4DHZ	132
PY2CK	248	W4CYU	203	WØOUH	157	VE3QD	206	CM2SW	198	W9CKP	132
G6ZO	247	W6HJT	203	G3TK	157	W1ZL	205	W8KPL	188	W1MRP	130
W6SN	247	LU8EN	203	W6BUY	157	KP4KD	205	WØTKX	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	245	W6AOA	202	W7BE	156	W3KDP	202	W2SHZ	180	W9RQM	119
W2BXA	244	G2MI	202	KH6IG	156	W9IU	201	W2GVZ	178	CO6AJ	119
W6SYG	244	W5GEL	201	DL1DC	155	W2HZY	200	W8FJN	173	WØGBJ	116
W3GHD	243	G3DO	200	VK5KO	155	W3JKO	200	W8EYE	172	W9GDA	115
G6RH	243	W9KOK	200	W6BUO	155	W2EMW	198	W3FYS	172	W9FNR	114
WØYXO	243	VK5JS	200	G3AAM	154	W9MXX	197	W1BFT	166	W8AVB	113
W2AGW	242	W7CY	200	G2IO	154	W7PGS	197	GM2UU	165	I1ER	112
W8NBK	242	W6MHB	200	W6RLQ	154	W4RBQ	197	VE2BV	163	KZ5IP	108
W3KT	242	ON4QF	200	W6KEV	153	SM5WI	196	7CNM	163	W6HJ	104
W8BHW	242	VK3KB	200	OK1RW	153	W6GPB	193	F9AH	163	KL7CZ	80
W6MX	242	PY1GJ	199	W6FHW	153	W2CWE	192	W6TXL	161	**PHONE ONLY**	
W3EVW	241	W6RLN	198	G3YF	152	VE3AAZ	192	I1UV	160	**WAZ**	
W6ADP	241	W6SRF	198	KP6AA	152	W2IMU	192	ZL3CC	159	VQ4ERR	220
W3JTC	240	W6UCX	198	W6ID	152	W2AGO	191	W3LVJ	157	**39 ZONES**	
W3GAU	239	W2IOP	197	OH5NK	152	W1AWX	191	W2UEI	156	PY2CK	228
VE4RO	239	KH6QH	197	VK2QL	151	OK1VW	190	LU7CD	155	XE1AC	217
W8JIN	238	W6BAX	197	VK2AM	151	GM3CSM	190	DL1YA	153	W3LTU	206
W6DZZ	238	PY1AJ	196	W6LEE	150	OE3CC	189	W4LQN	152	W6DI	203
W3JNN	237	W6WB	196	W6FHE	150	WØEYR	186	W5MET	150	G8IG	188
W6GRL	237	G2FSR	196	W6EYR	150	VE3IJ	186	ZL4DO	147	W6VFR	179
W6MEK	236	I1KN	196	W6LER	150	W8RDZ	184	W6ETJ	144	PK4DA	175
W3CPV	235	W6LW	196	W6NZ	148	W9TQL	184	W8ZMC	143	W7HTS	161
W7AMX	235	W5KC	195	OK1CX	147	W4INL	183	WØAZT	143	W8HUD	161
LU6DJX	234	OK1FF	194	W6LS	147	W2MEL	183	ZL3AB	143	F9BO	158
CE3AG	234	W6NTR	194	W7KMC	147	W1DQM	181	W9FKH	135	VE7ZM	145
W6AMA	233	W6GAL	193	KH6PY	147	W2CNT	181	MP4BAD	135	DL1FK	125
SM5LL	233	W6EHV	193	W7DXZ	146	W2RDK	180	W4FPK	131	**38 ZONES**	
G2LB	232	WØSQO	192	W6AYZ	146	W4AZK	180	W2PQJ	130	W9RBI	202
G4CP	232	W6NGA	192	VE6GD	146	VO6EP	179	W3ZN	129	W2BXA	201
W6GDJ	232	W6WWQ	192	VS6AE	146	VK4DO	179	EA1AB	129	SM5KP	199
W7DL	232	VK2NS	191	W9NRB	145	W9ABA	179	W9MZP	126	W9NDA	173
W7GUI	229	W6SRU	190	W6MUC	145	VE8AW	178	FE8AB	126	W6AM	173
W7BD	229	VK3JE	189	OK2SO	145	W2RGV	178	W9TB	122	W6KQY	171
W8BRA	228	ON4JW	189	ON4TA	144	W8VLK	177	GW4CX	120	W4CYU	160
ZL2GX	228	WØNTA	188	G3BI	144	W8CVU	172	WØFET	118	ZL1HY	157
W6EBG	227	W8SDR	186	W6BIL	144	W4DKA	172	KL7PJ	117	W1HKK	153
W6PFD	226	VK6RU	186	W7LYL	143	W4VE	171	W7EYS	107	**37 ZONES**	
VK2ACX	226	W6DFY	186	KG6GD	143	W9LM	170	VK6DX	103	W3JNN	199
W6TS	225	W4CYY	186	W3IXN	141	KL7PI	170	C1CH	84	ZS6Q	192
W6SAI	224	W2CZO	185	W6AOD	140	W6CTL	169	**37 ZONES**		W3BES	190
W6TI	224	W1AB	185	VK2PV	140	W1NMP	169	W6KYG	200	W1JCX	189
DL1FF	223	W6IFW	185	ZC1CL	138	W3JTK	169	KP4CC	195	CE3AB	186
VK3BZ	223	W6SA	184	OK1WX	135	OZ7EU	169	W1KFV	177	W8BF	183
W6VE	223	KH6VP	184	W7BTH	135	HC2OT	169	OZ7BG	174	W3GHD	181
W3LOE	222	W6LRU	184	G3AZ	133	PY2AC	168	W2OST	169	W8REU	176
W6FSJ	222	W2JVU	183	W6TEU	133	W2CYS	167	W3WU	162	G3DO	175
W3BHV	222	DL1IB	283	W6RDR	133	W8LEC	166	VE3LJ	161	VK3BZ	173
W6DLY	222	LA7Y	182	W6AUT	133	W6WO	166	W2ZA	160	W7MBX	164
W6MVQ	221	VK4EL	182	VE7KC	133	VK3XO	166	IS1AHK	160	W9HB	161
W6PB	221	W6LN	181	W6OBD	131	W6LGD	165	W2WC	158	W6PXH	159
G6QB	221	W7ENW	181	ZS2CR	131	SM7MS	164	W4EPA	158	GM2UU	158
SM5KP	220	PY1BG	179	CR9AH	131	W4BRB	162	W9LI	151	W6WNH	157
W6YI	220	W9VND	178	W6IDZ	130	G6QX	162	W4IWO	149	W6TT	143
W6ITA	219	WØUOX	177	W7ASG	129	W4OM	158	W9WCE	149	WØHX	143
W6TT	218	VE6KW	177	W7GBW	127	SM7QY	158	OE1FF	145	F8VC	124
WØNUC	218	W6UZX	177	G8IP	127	W6KYV	158	W6YK	144	W7MBW	112
W6PQT	218	CX1FY	176	G5BJ	126	WØAIW	157	W4ML	140	C1CH	83
G2PL	218	KH6CD	176	VK6SA	126	I1AY	157	ZL1QW	138	**36 ZONES**	
KH6IJ	218	W6LDD	176	PK6HA	124	W8WWU	157	W1APA	138	W1MCW	212
WØDU	218	PK4DA	175	G5VU	124	WØRBA	157	W2AYJ	133	W1NWO	206
W6EFM	218	W8HUD	175	W6NRQ	123	W9NZZ	157	W7HKT	130	TI2TG	182
W6PKO	218	W6WKU	174	W6MLY	123	DL1AT	156	W4DIA	129	W1BEQ	164
WØPNQ	217	W6CIS	174	ZL1GX	122	W9YNB	155	VE5JV	126	GM2DBX	163
W9DUY	217	W7FZA	174	VK5MF	121	DL1FK	155	W9LNH	122	W4ESP	159
W9NDA	216	W6PCS	174	ZL2CU	120	I1AIV	154	OH3OE	118	W2DYR	140
W2PEO	215	W6KUT	174	ZS2EC	116	DL1KB	154	W6YX	117	W9BZB	139
W3IYE	214	W6TZD	173	ZS6CT	113	W6CUL	154	VE1EA	116	W9HP	139
PY1DM	214	W6JK	173	W7KWA	98	G3AKU	150	G3BPP	112	W8AUP	131
ZS2X	214	G5YV	172	W6DUB	89	VE7VC	150	W6AX	110	W8PDB	130
KH6BA	214	OK1LM	172	W7IYA	59	W1ZD	150	WØFFW	108	VE3BNQ	130
ZL1BY	214	OK1HI	171	**39 ZONES**		W2GUR	146	W7PK	104	W4INL	129
W6EPZ	214	ZS2AT	171	W5ASG	240	W6CAE	146	W8HSW	104	W1FJN	128
W6OEG	213	W6BAM	170	KV4AA	239	TF3SF	145	W2BLS	99	G6BW	127
W4AIT	213	DL1AB	170	W8KIA	238	OK1AB	144	W6WWW	99	VE7HC	123
KH6CT	213	W6PZ	170	W2WZ	232	W6MUF	144	KL7KV	88	W8CYL	112
VK4HR	213	W5AFX	169	W1CLX	232	TF3EA	142	**36 ZONES**		W3DHM	96
W6RBQ	213	G2VD	169	F8BS	232	VS7NX	140	W5JUF	206	W6SA	92
CE3DZ	213	W6JZP	168	W2NSZ	232	W6KYT	135	W4HA	182	F8DC	87
PY1AHL	213	W6ANN	167	W9RBI	230	W7HXG	134	WØAIH	175	**35 ZONES**	
W6HX	212	VK3CN	167	W3DPA	230	W7ETX	132	W2ZVS	167	HC2JR	175
VE7HC	212	W6BVM	167	W3EPV	229	W9ALI	132	GM2DBX	165	W4HA	173
OE1CD	212	I1XX	167	W8DMD	225	W6TE	131	W3AXT	156	W5ASG	173
G8IG	212	W6ATO	167	W1ENE	225	W6WJX	131	W3AYS	151	W5JUF	171
W6NNV	211	W6DUC	166	4X4RE	224	W5CPI	130	W3MZE	150	W3EVW	166
W6BPD	210	KH6MI	166	W3OCU	224	KL7UM	129	I1IT	140	WØNCG	158
W6MJB	210	W6CEM	166	W2QHH	224	DL1DA	127	WØCU	139	W9RNX	155
W6IBD	210	VE7GI	165	W9LNM	223	W6EYC	126	F9RS	139	W6PCK	152
W9VW	209	W6BZE	165	W1BIH	221	VR5PL	124	OA4AK	128	W9BVX	148
W6RW	209	W6PM	164	W1GKK	219	DL3DU	118	VE1PQ	128	W2RGV	148
W6UHA	209	ZS6A	164	W1JYH	219	W6NRZ	117	I1IZ	128	WØANF	142
W2AQW	208	W6EAK	165	W1HX	218	W6JWL	114	F8TM	124	PY2JU	140
ZL1HY	208	W6YZU	165	W9FKC	216	W6FBC	114	W2BF	115	W2GHV	137
W6BUD	208	G5GK	163	W9HUZ	212	W6VAT	110	4X4BX	112	W6CHV	135
W6SC	207	VE7VO	162	W3DRD	211	WL3AB	107	W5CD	108	WØPUE	135
VE7VM	206	ZS6DW	162	W5MPG	211	W7GXA	105	W2JA	102	HC2OT	134
W4BPD	206	I1IR	162	W5FFW	211	W6LEV	103	**35 ZONES**		WØEYR	131
WØELA	206	W6PDB	161	W4GG	211	W6FXL	93	KV4BB	182	WØPRZ	124
W6SR	206	OK1SV	160	W3DKT	210	W7LEE	91	KG4AF	182	W9CKP	124
W6ERI	205	VE3EK	160	W2BJ	210	**38 ZONES**		W5FXN	169	G8QX	123
W6ZCY	204	W6PUY	160	W5LVD	209	TI2TG	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.

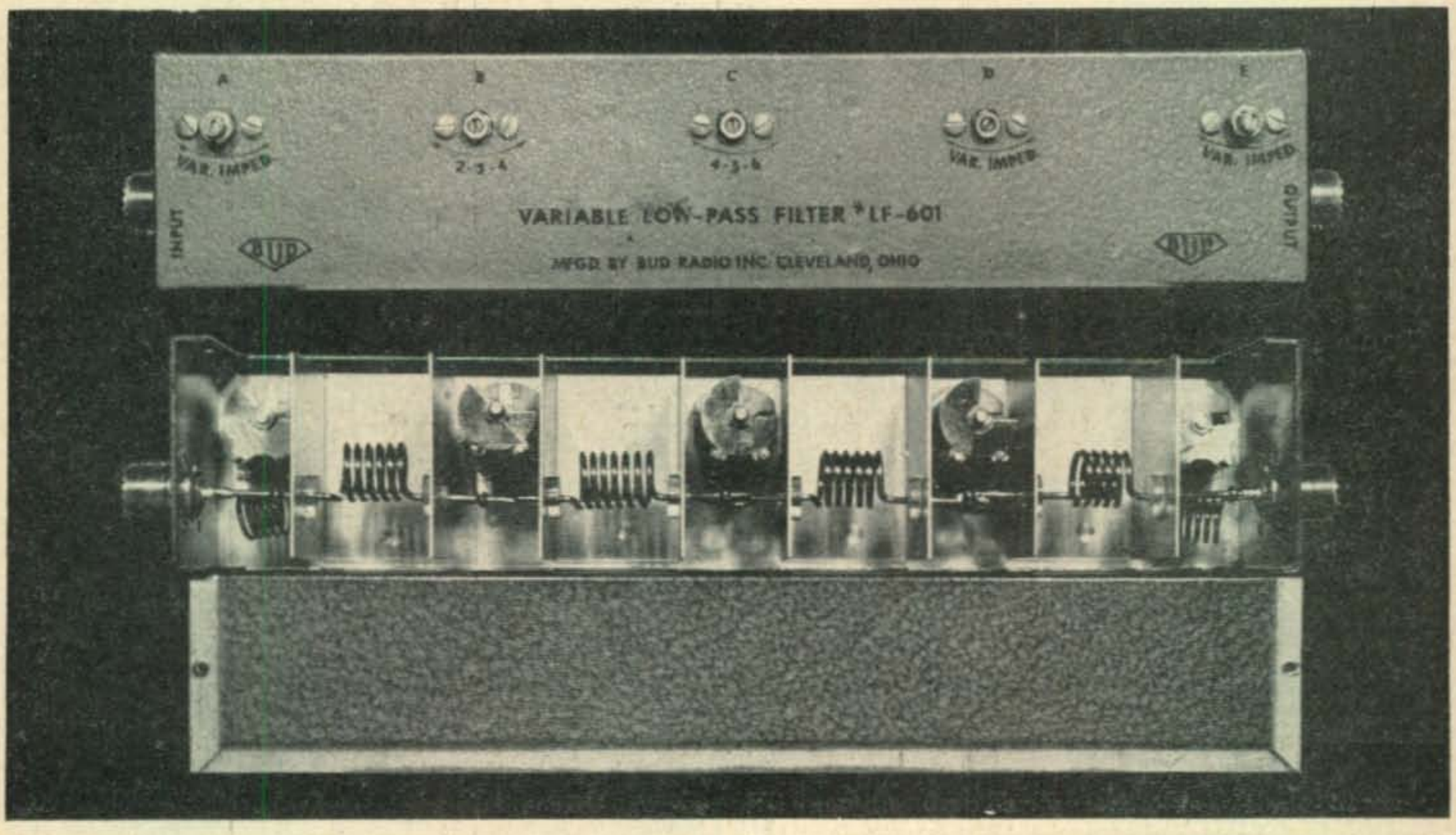
Electrically, the filter consists of three *M*-derived center sections, backed up by two impedance-matching "half" sections at the input and output terminals. It is assembled in a 12"x2¼"x2⅜" aluminum box, which is divided into nine compartments; so that all critical components are properly shielded. 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 variables. This insures low losses and permits adjustment for 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 and using a couple of antennas with a transmitter that was putting out some really virulent harmonics 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, but only with the aid of a grid-dip oscillator, as outlined in the instruction sheet packed with the 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 re-

(Continued on page 48)



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

Amateurs and Experimenters!

ONE DAY SERVICE!

2000 KC to 54 MC

ONE-DAY Processing

Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday thru Thursday will be shipped the day following receipt of the order. Orders received on Friday will be shipped the following Monday.

International TYPE FA-9

(fits same socket as FT-243)

Pin Spacing .486 Pin Diameter .093

RANGE (kc)	TOLERANCE	PRICE
Fundamental Crystals		
2000-9999	.01%	$2.80
10000-15000	.01%	$3.90
Overtone Crystals (For 3rd overtone operation)		
15 MC- 29.99 MC	.01%	$2.80
30 MC- 54 MC	.01%	$3.90

SPOT FREQUENCY

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency when operated into a 32 mmf load capacitance.

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.

International Crystal Mfg. Co., Inc. **DEPT. X**
18 North Lee
Oklahoma City, Okla.

Price

Please Send: _____ Crystals Freq. _____ _____
_____ 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 OKLAHOMA CITY, OKLA.

(from page 46)

mote possibility in a 1000-watt filter operated with a low-power transmitter, if the filter is operated into anything even remotely resembling a matched load. But it could happen, even with a 50 watter, if the filter were inadvertantly operated without a load and the coupling to the transmitter adjusted for full 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 1000-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 at 3.8 amperes across a 52-ohm load. ($E = \sqrt{P \times R}$; $I = \sqrt{P/R}$.) 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, these latter values will double, making the final peak values 560 volts and 10.6 amperes.

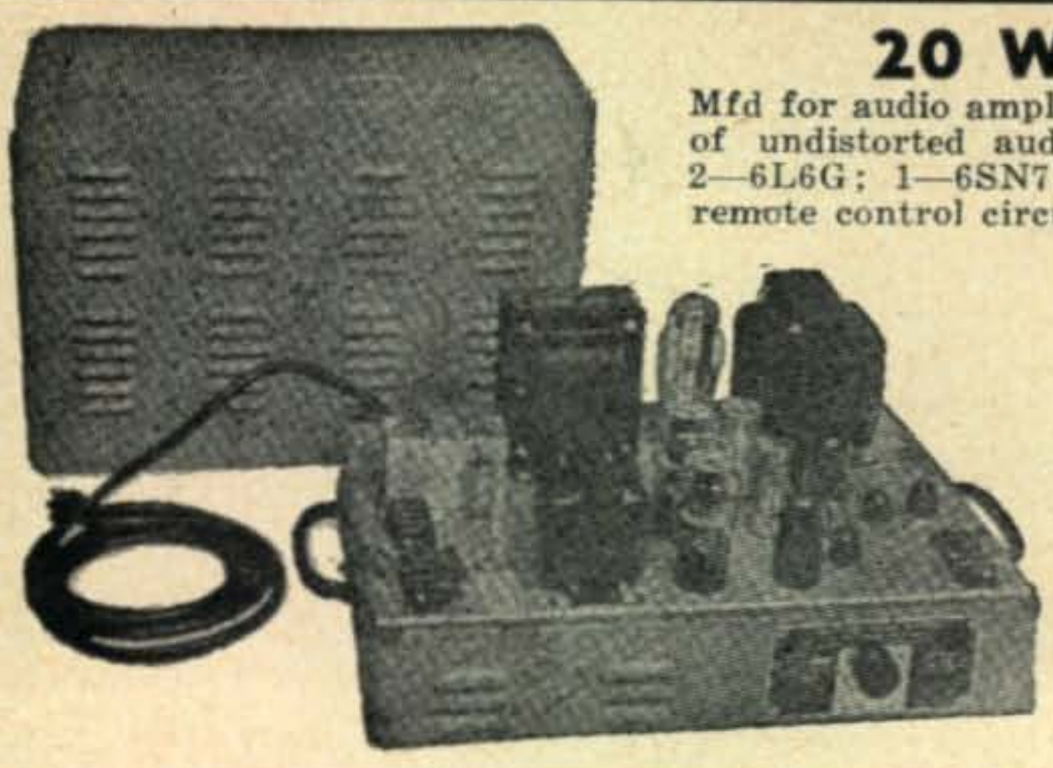
As it is not much of a problem to wind low-inductance coils of wire sufficiently large to handle any reasonable amount of current, the capacitors usually determine the power rating of a low-pass filter. The *Bud* filter is no exception. As it uses air-insulated capacitors, we do not have to worry about over-heating their dielectrics, and their plate spacing appears adequate to withstand up to 1000 volts. Obviously, the filter will easily handle its 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)

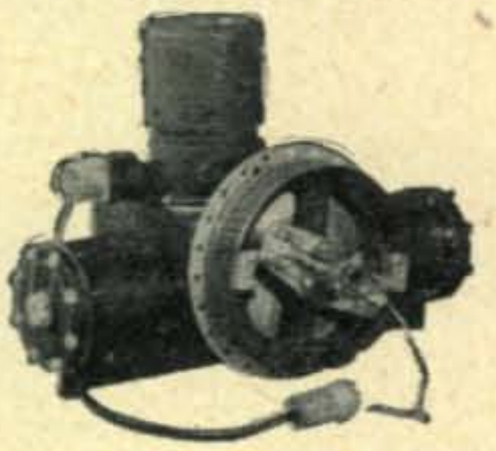


20 WATT AMPLIFIER: Brand New

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 9¾" x 12½" 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 solonoid 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. BRAND NEW—Only a few, order early **$4.95**

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 6¾" L x 3½" dia. 4" lead with 6 pin Jones plug. Shipping weight 7½ lbs.
New Price .....ea. **$2.75**

VARIABLE CONDENSER

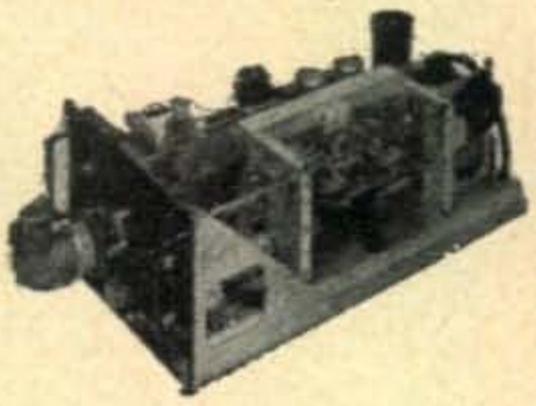
Freq. Meter type, 245 MMFD. 27 plate mdgt. type. Gold plated heavily constructed. Approximately 3"x2½"x1¾" overall size with 1¼"-¼" shaft extension. Shipping weight 1 lb.
New Price .....ea. **$1.25**

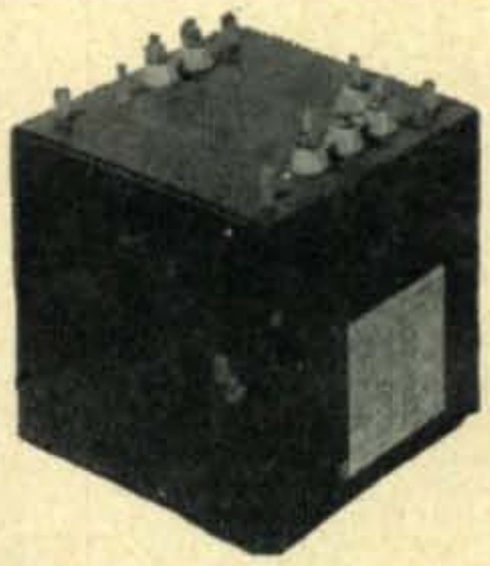
STORAGE BATTERY 6 V. 34 AH

3-TA5-9B—Manufactured by Exide Battery Co. for aircraft. Size 5" x 5" x9" overall. Shipping weight 15 lbs. New dry charged. Fill with 1.265 sp.g. sulphuric acid.
Price .....ea. **$6.25**

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.





TRANSFORMER PLATE POWER

355-0-355 Volts @ 325 Ma. Also 490 V. 325 Ma. Primary 117 Volts 60 cycle. Measures 5" x 5½" x 6". Shipping wt. 22 lbs. PRICE **$2.95**

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. ¾ 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.
NEW.....ea. **$4.95**

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.

(from page 48)

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

Connecting The Filter To Its Load

The July *Novice Shack* showed how to connect a low-pass filter to a shielded transmitter; so that all 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 solves all matching problems. I only wish that were true.

The coaxial cable is required, but what is connected 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-to-600 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 link 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 2 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 ill effects. The advantage of the substitution is this type of line is lighter than coaxial cable.

(Continued on page 52)

* See "Antennascope-54," by W. M. Scherer, W2AEF. Part I, CQ, June, 1954, page 23. Part II, CQ, July, 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

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	7610	8025
1129	2470	2815	3070	6006	6600	7620	8030
1150	2475	2825	3075	6025	6606	7630	8033.3
1195	2480	2830	3095	6040	6625	7640	8040
1525	2485	2835	3100	6042	6640	7650	8041.7
1900	2490	2840	3110	6050	6650	7660	8050
1915	2495	2845	3130	6073	7000	7666.7	8058.3
1930	2505	2850	3135	6075	7006	7670	8060
1940	2510	2855	3140	6100	7025	7680	8066.7
1950	2515	2860	3145	6106	7040	7690	8070
1965	2520	2865	3150	6125	7050	7700	8073.3
	2525	2870	3155	6140	7073	7710	8075
2015	2530	2875	3160	6142	7075	7720	8080
2017	2535	2880	3165	6150	7100	7730	8083.3
2020	2545	2885	3170	6173	7106	7740	8090
2025	2550	2890	3175	6175	7125	7750	8091.7
2035	2557	2895	3200	6185	7140	7760	8100
2040	2560	2900	3202	6200	7150	7770	8106.6
2055	2565	2905	3205	6206	7160	7780	8108.3
2060	2570	2915	3210	6225	7173	7783.3	8110
2065	2575	2920	3220	6235	7175	7790	8116.7
2090	2580	2925	3225	6240	7200	7800	8125
2105	2585	2930	3230	6250	7206	7810	8130
2125	2590	2935	3235	6273	7225	7820	8133.3
2130	2595	2940	3240	6275	7240	7830	8140
2135	2650	2945	3290	6300	7273	7840	8141.7
2140	2655	2950	3300	6306	7275	7850	8150
2195	2660	2955	3310	6315	7306	7860	8158.3
2300	2665	2960	3320	6325	7300	7870	8160
2305	2675	2965	3340	6335	7325	7880	8163.4
2320	2680	2970	3410	6340	7340	7891.7	8166.7
2350	2685	2975	3420	6350	7350	7890	8170
2355	2690	2980	3455	6362	7375	7900	8173.3
2360	2695	2985	3465	6373	7400	7910	8180
2365	2700	2990	3500	6375	7406	7920	8183.3
2370	2705	2995	3525	6405	7425	7930	8190
2375	2710	3005	3640	6406	7440	7940	8191.7
2390		3010	3655	6425	7500	7950	8200
2415		3015	3680	6440	7510	7960	8206.6
2430	2750	3020	3700	6450	7520	7970	8208.3
2435	2755	3025	3760	6473	7530	7980	8210
2440	2760	3030	3800	6475	7540	7990	8216.7
2442	2765	3035	3885	6500	7550	8000	8220
2450	2770	3040	3940	6506	7560	8006	8225
2455	2775	3045	3955	6525	7570	8008.3	8175
2460	2780	3050	3980	6540	7580	8010	

DC-34 & DC-35

PIN SPACING ¾"

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	2155	2435	2764	3161	3650	3895	4135
1720		2446	2775	3190	3655	3905	4150
1738	2175	2466	2776	3201	3665	3920	4155
1746	2195	2467	2807	3270	3680	3925	4175
1770	2202	2478	2816	3279	3695	3935	4177.5
1790	2215	2491	2831	3280	3700	3940	4192.5
1810	2220		2851	3297	3702.5	3950	4210
1830	2235	2510	2853	3311	3705	3960	4215
1850	2240	2514	2894	3317	3710	3965	4235
1870	2255	2527	2895	3365	3730	3985	4240
1890	2258	2540	2899	3385	3745	3995	4255
1910	2275	2559	2925	3390	3750	4012.5	4275
1930	2280	2586	2926	3395	3760	4015	4280
1950	2295	2587	2960	3412.5	3765	4020	4305
1970	2300	2605	2971	3422.5	3770	4030	4310
1990	2315	2625	2980	3462	3775	4035	4325
2010	2326		3000	3480	3790	4050	4335
2030	2335	2643	3010	3485	3792.5	4055	4345
2050	2340	2665	3023	3500	3807.5	4065	4350
2075	2355		3027.5	3520	3825	4080	4370
2082	2360	2685	3055	3540	3830	4085	4380
2090	2375	2710	3077.5	3550	3850	4090	4397.5
2105	2390	2711	3095	3575	3855	4095	4415
2106	2395	2725	3117	3580	3870	4097.5	4435
2131	2415	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**

		451	456	461	465	470	476
		452	457	462	466	472	477
446	448	453	450	463	468	474	479
447	450	454	459	464	469	475	480

NOVICE BAND FUNDAMENTAL FREQUENCIES FT-243

Individually. Ea. . . **$1.25** Lots of 10 or more. Ea. . . **99c**

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	2638 KC DC-34	$2.99
200 KC FT-241	1.99	2638 KC FT-243	2.99
200 KC Type DC-15 in octal tube holder	1.99	2642 KC FT-243	2.99
327.8 KC No. D-168342. (Used in TS-102/AP)	9.95	2647 KC FT-243	2.99
500 KC FT-241	1.99	2738 KC type 1-C	2.99
1000 KC FT-241	2.49	2738 KC FT-243	2.99
1000 KC Type DC-9, in octal tube holder	3.45	2738 KC MC-7	2.99
2000 KC FT-243	1.99	3000 KC FT-243	1.99
2142 KC DC-34	2.99	3088 KC FT-243	2.99
2174 KC DC-34	2.99	3093 KC FT-243	2.99
2182 KC FT-243	2.99	3098 KC FT-243	2.99
2500 KC FT-243	1.99	3103 KC FT-243	2.99
2632 KC FT-243	2.99	3188 KC FT-243	2.99
2637 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-5er"! 190-550 KC. With tubes. Used, good condition. NEW LOW PRICE. **$10.95**
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. New condition. Shipping weight: 35 lbs. **$49.95**
Used. **$39.95**

LELAND ELECTRIC MOTOR: With reduction gear box! 110/220 VAC, 60 cycles, 1725 r.p.m., ¼ h.p. Gear box reduces to 60 r.p.m. New! . . **$49.95**
UNIVERSAL ELECTRIC SERIES WOUND MOTOR: 1/40th h.p. 28 VDC, 1.2 amps. 6,000 r.p.m. Shaft diameter ¼ in. protrudes ½ in. Operates on AC or DC. New! **$1.49**

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 KEYER — **NEW REDUCTION CODE PRACTICE SET** 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. DEPT.C
805 S. UNION AVE., LOS ANGELES 17, CAL.

(from page 50)

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 can complicate things, but so does having your neighbors ring your telephone, because your transmitter is ruining 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 W9XXX, 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 a thing 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 Ilendorff, Jr., **WL7BCH**, Star Route Box 363, 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 WØ'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 we 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 wicked 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)

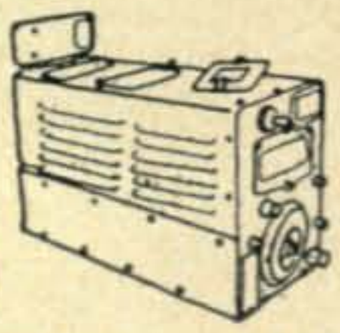
SAVE! . . . BARGAINS GALORE . . . SAVE!

COMMAND SETS

NEVER BEFORE!

NEVER AGAIN "Q"5'rs

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	ex.	1.00
BC-456 Modulator. Used with tubes		3.95
Sold as is, Less tubes		2.95
BC-696 Xmtr. As is, Less tubes		9.95
BC-457 Xmtr. 4-5.3 Mc. Used, with tubes		6.95
Sold as is, Less tubes		3.95
BC-458 Xmtr. 5.3-7 Mc. Used, with tubes		6.95
Sold as is, Less tubes		3.95
BC-459 Xmtr. 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 Xmtr. Control Box. Used		1.49
3 Receiver Rack. Used		1.49
2 Xmtr. 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	$ 1.95
I-81A Indicator. New	7.50
522—2 Meter Revr. & Xmtr—w/tube	s 49.50
ARC4—2 Meter Revr. Xlnt—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, current 0.75 amps. Brand new. **$9.95**

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. 2⅜" 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. New **$3.95**

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
0-15 Ma
0-50 Ma
0-100 Ma
0-200 Ma
0-300 Ma
0-500 Ma

$3.29 each

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 Ampmeter. 2" Sq.—0 to .5 Amp.	2.95
Ampmeter 2" rd.—0 to 50 Amp.	2.29
Ampmeter 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
2½" 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. **$9.95**
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 between set phone jack and speaker. New. **$1.89**

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. New **$1.19**

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 and TG-10 keyers. Comp. set. **$14.95**
Separate tapes for following lessons:

Tape #11—traffic	Tape #8—code groups
Tape #12—traffic	Tape #2—receiving

Each on 16 MM reel. Each. **$1.25**

I-82-A Radio Compass Indicator: 5". Ideal for beam indicators, new. **$6.95**

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 uufd. max and 20 uufd. min. 2000v. insul. New		.79
Power Supply & Modulater 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.**

(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 and would appreciate pen pals or skeds with those needing Illinois contacts."

Harvey, **WN3ZEW**, 436 Taylor St., Pittsburgh 24, Pa.: 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 me. He has 60 contacts in seven states and two VE3's. . . . We both use the same rig, a 6AG7 driving an 807 and an S-22R receiver. The antenna is a 135-foot long wire. . . . Bob is ten years old, and I am 14. We both failed the code test the first time, but we can copy 13 WPM solid now. We shall be glad to help anyone get his 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 had polio when I was 12 years old. Due to this handicap(?), I cannot work; therefore, I am on 3731 and 3746 kc. most of the day. I have worked 15 states with eight of them confirmed. Best DX is KN6GAL, California. But 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. See you on 80 meters. Any YL's around? Oh, yes, I am 17."

It's-a-small-world department. Tommy, **W4DUB** (14), who was visiting relatives in Gary, dropped into see me.

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 Reyman, 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, "W 9 E G Q! Gee, your call letters are an awful lot 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 a card. In the letter she asks a favor. "Please, Oh Novice 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-i-s-e! Leave that i in."

On the card, Louise said: "As of August 9, 1954, you lost two Novices. Bill and I passed our General examinations. I suggest that all Novices use cast-iron pencils when taking their General-class code examinations. Those darn wooden ones jitterbug all over the place—not my 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 have had the vertical up one week. In that time, I have increased my best DX to 1100 miles and worked two new states. My transmitter is the AT-1 and my receiver is an 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.*

the "Junkeyboard"

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 CN8MM) **PX1YR** is still QRT as the 100 watt phone rig is not ready. Only A3 will be allowed in Andorra. . . . **FB8ZZ** is active again but only on 7 Mc. for the moment. . . . **FB8XX** has repaired his power supply and is in business again. . . . **FB8BK**, Tromelin Island, is too busy with official traffic, at present, to get on the Ham bands. . . . Rumors have it that **VU5AB**, Andaman Islands, will soon be on A3 again. . . . **F9QV/FC** is active again on phone and CW. . . . We hear there are still hopes for **HV1AA** in spite of much information to the contrary. . . . **AC4NC** is reported on each Sunday, 075, 0600 GMT. Others say 14120. . . . W8BKP worked **FU8AA** on 14168 A3 and reports **VU5AB** on phone, 14140. . . . **C3AR**, Formosa, has been feeding A3 QSO's to W6's on 14280 around 0700 GMT. . . . **SU1BB**, Aqaba Jordan, will soon change to ZC7BB. . . . **ZC7DO** is on again after 2 weeks' illness in MD5. QSL to both via G4CP. . . . The station signing **SV9UN/Crete** is probably a phony and seems to be emanating from DL-land. He 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 chance at them. Activities will be transferred to the Mawson Base, Antarctica presently inhabited by VK1EG (ex-VK1BS). **VK1EG** was worked by KV4BB and AA on July 25 at 1140 GMT, 14085, southern path. VK1EG was 469C. . . . **FB8XX** rolls into W6, over VK, between 0400 and 0600 GMT, 14050. . . . ZS5MP reports **CR8AB**, 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 **JA1XR/JAØ**, Bonin Islands, has been on 14115 with a ten-kc. drift. . . . I1AIV reports **AC4LP** as running 500 watts from Lhassa, Tibet, on 14035 around 2130 GMT. . . . **ZC6UNS** has been on 14100, 2040 GMT, with 100-watter. QSL via ARRL. . . . KV4AA worked **ET3S** on 14062, 2000 GMT—slightly undercover stuff. . . . CN8MM reports **VS5GK**, Brunei, on 14250 while VS1CZ says two stns. are active in Brunei. . . . W5AVF reports hearing **VR5IP**, Tonga, while W1CWX nabbed **ZM6AS**, Samoa. . . . Glen, W4PDZ, writes that there will soon be four new VP7's on the air when the following obtain licenses: Leo, **W4BIM**; Champ, **W4SZH**; Ken, **W3RUZ** and **W4PDK**. All will have around 100 watts and operate from Grand Bahama Island. . . . Dick, **WØMLY**, of VQ6MY, FL8MY, 4W1MY fame, eyes Great Corn Island and says he will make a trip there 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. **FB8XX**, VK1DY and VK1PG continue to be active around 0600 GMT. There is definitely no Ham activity from VR1 stations on the British Canton/Phoenix group.

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

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

(Continued on page 58)

(from page 56)

DX'ploits

Al, **W8PQQ**, went to 245 with HKØDT. . . . **W6SYG** is right behind, 244, thanks to FB8XX. . . . Horace, **W6TI**, also added FB8XX for No. 224 while **W6PKO** came up to date with 14 additions putting him on 218. . . . **G8IG** A3'ed with ZD3BFC for No. 212, 188 on 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, FO8AJ, etc. to reach 194. . . . **W5ASG** took over the 39 zone lead with HKØCV, FO8AJ 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. . . . **W8KPL** 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 FO8AJ 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. . . . We 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, YU1AD, 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, **HR1AT**, 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, AP2K, VE8NP and ZC6UNS. . . . Ted, **TI2BX** (ex-CP1BX) backed into VK3ATN for No. 62. . . . FB8XX was 236 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, W2EQD 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 W2ZXM/MM, W3OZA/MM, W3JIY/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. . . . New officers of the West Gulf DX Club are: **W5ALA**, Pres.: **W5SFT**, Vice Pres.; **W5FXN**, Sec'y-Treas. The clubs' 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.

(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 **W4RBQ** 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 750 watts with HRO and 3-element beam. . . . Considerable excitement was evident during a QSO between W6NZW and **CEØAD**. 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/FC—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 **W1LMU**. . . . **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 HB-lands. . . . Dave, **PAØUN**, returned home from K2GXA 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: **W6YY**, Pres.; **W6NZW**, Vice Pres.; **W6MBA**, Sec'y 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. W6TI is joint Chairman. . . . Bob, **WØNWX**, has now replaced the weight lost at FO8AJ and is reported to be "fat and sassy" again!

That's all for now.

73, KV4AA

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.

l) 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 *S11-1* 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*]

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 (½-1 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 coil 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 milliampere, 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 ⅛" 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 2½ to 3½ 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 7⅛" wide and 29" long bent to make the cabinet 9¼" wide, 5" high and 7⅛" 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"x9¼" with a ⅜" 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*]

[*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 μfd. 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. W1UPZ, 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.

SINGLE SIDEBAND TECHNIQUES

by Jack N. Brown, W3SHY

This is the latest addition to the "CQ Technical Series." As a matter of fact, it is just being released as you read this. Over 2000 Hams took advantage of our pre-publication offer and are now probably sitting back enjoying Jack's breezy style of telling the full story of SSB. This book is a continuation of Jack's series "Getting Started on Single Sideband." In this book he goes on to describe two different SSB transmitters and several items of useful test equipment, and throws in a good background on how to keep your SSB signal clean. This is the only book of its kind on the market. Some may try last-minute imitations, but they'll never equal it.

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Radio Amateurs' *MOBILE HANDBOOK*

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New format, new cover, new material, better articles are the by-words at the CQ Editorial offices. Reacting to the hundreds of letters received during the past summer on "what I want in CQ," the editors put their heads together and came up with this NEW looking CQ. Next month we will feature a complete Ham station for the travelling man with a brief case! The VHF man will see something new in transmitting equipment when W2SPV describes his 2-meter transmitter ending in a 5894. But regardless of what month you chose out of the next 12 or 24, CQ will contain first-rate material from the best authors in the Ham game. Your subscription is a guarantee (a money saving one at that) you will be among the first to see these features.

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GELOSO 60 WATTS

[*from page 40*]

Transmitter Adjustment

The *4/101 V-F-O* Exciter is pre-tuned, and 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 voltages checked with *Table 1*. The transmitter tuning controls should be set as shown in *Table 2* for the band in use, and a 52-ohm dummy load, or suitable low impedance antenna connected to *So1*. A key should be plugged in *J1*, and *Sw1* turned to "Transmit." With the key open, only 10 or 20 milliamperes should be read on *M1* with 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 3 milliamperes. The meter may now be switched to the "Plate" position, the key closed, and "P.A. Tune" resonated for a plate current dip. Depending upon the resistance of the antenna

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

Table I

load, the dip will be more or less than 120 ma. Adjustment of the "Antenna Loading" condenser, *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 fashion as a frequency doubler.

Operation of the Transmitter

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

FREQ	ANT LOADING SW	ANTENNA LOADING COND	PA BAND SW	PA TUNE
3.7mc	2	10	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 II

non-existent on all bands except 28 Mc., where a faint cross-hatch is apparent on channel 2 on the TV set in the next room.

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

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.

RATES: 25c per word per insertion for commercial business organizations.
5c per word per insertion for individuals on a non-commercial basis.
CLOSING DATE: September 25, for the November issue.
MAIL: Your typewritten copy with full remittance should be sent to CQ Magazine, 67 West 44th St., New York 36, N.Y. Attention: Jeanne C. Gillespie.
NOTE: The products and services advertised in this section are not guaranteed by the publishers of CQ.

Wanted:

WESTON LABORATORIES of Littleton, Massachusetts, will purchase your BC-221 frequency meter. Conditions of purchase are that the original calibration book be provided, that the instrument not be altered, and that it be mechanically operable. Write: Weston Laboratories, Box 407, Littleton, Mass.

WANTED: ARC-1. Bill O'Connell, 4908 Hampden Lane, Bethesda, Maryland.

WANTED: Cash paid for BC-610 xmtrs. and BC-221 frequency meters. In addition we buy technical manuals. Also TCS sets, R5A/ARN-7 ART-13, DY-17, others. Amber Company, 393 Greenwich St., New York 13, N.Y.

Wanted GOOD USED 75A2 or 75A3. James Norton, W8SX, 4500 Penobscot Bldg., c/o WWJ-TV Transmitter, Detroit 26, Michigan.

WE WANT YOUR USED GEAR. Highest trade-in allowance on National, Hallicrafters, RME, Hammarlund, Gonset, Morrow, Johnson, etc. Write or Call: C & G Radio Supply Company, 2502-6 Jefferson, Ave., BR. 3181, Tacoma 2, Washington.

WANTED: Members for Missouri Teen-Age Net from Missouri and surrounding states. Contact WØQBX, California, Mo.

NEED BC-610E. C. Hoffman, 4908 Hampden Lane, Bethesda, Maryland.

AN/APR-4 receivers and tuning units urgently needed! Engineering Associates, 434 Patterson Road, Dayton 9, Ohio.

NEED BC-348 receiver. W. Richards, 4908 Hampden Lane, Bethesda, Maryland.

ALL SURPLUS equipment for cash. BC-221, I-56, TS-13, TS-148/AP, TS-263, etc.; and receivers, BC-348, BC-312, BC-342, AR-88, RBL, RAO, RBG; also TCS, BC-610, BC-614, R5A/ARN-7 ART-13, DY-17. We buy or swap technical manuals. Amber Company, 393 Greenwich St., New York 13, N.Y. BEekman 3-6509.

WANTED: AN/ARC-3. Write R. Ritter, 4908 Hampden Lane, Bethesda, Maryland.

WANTED: Govt surplus, amateur equipment bought or taken in trade for new Viking, Ranger, National, Gonset, Elmac, Hammarlund, Harvey-Wells, Barker & Williamson, Hallicrafters, Telrex, etc. Particularly need complete or any part: BC-610, BC-614, BC-939, BC-729, ART-13, DY-17, APR-4, APR-5, APR-6, APS-3, APS-15, BC-221, APN-9A, RTA-1B, ARC-1, ARC-3, TCS, TDQ, CU-25, BC-312, BC-342, BC-348, 75A-1, 75A-2, 32V, Teletype, Technical Manuals. Alltronics, Box 19, Boston 1, Mass. RIchmond 2-0048.

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.

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QSLs. Save your money for that new rig. Ham's "Superspeed 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. WØAIO, 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 Severeid, W9DPL, 2431 East Riverside Drive, Indianapolis 23. Telephone WAlnut 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. Telcoa, 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.

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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, Waterford, Connecticut.

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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, K2ELY, 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, Millen, Lysco, 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. Meisner 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: Cl 1-4613.

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 WØZHJ, 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 Barklind, 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; 430 Mc. transmitter and receiver $35; 12-24 volts transformer 960 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 Triband; Lysco 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 MD4OP. Modulate 100 watts. Excellent condition. Crystal mike included. $50 FOB. Bill Nash, WØOWY, 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; DeLuxe $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 AMP-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; Lysco 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; DeLuxe $89; Viking I $189; New SS-75 $199; HT-9 $159; Globe King $2.95; 32V1 $395; 32V2 $495; 32V3 $625. We need used rcvrs: 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.

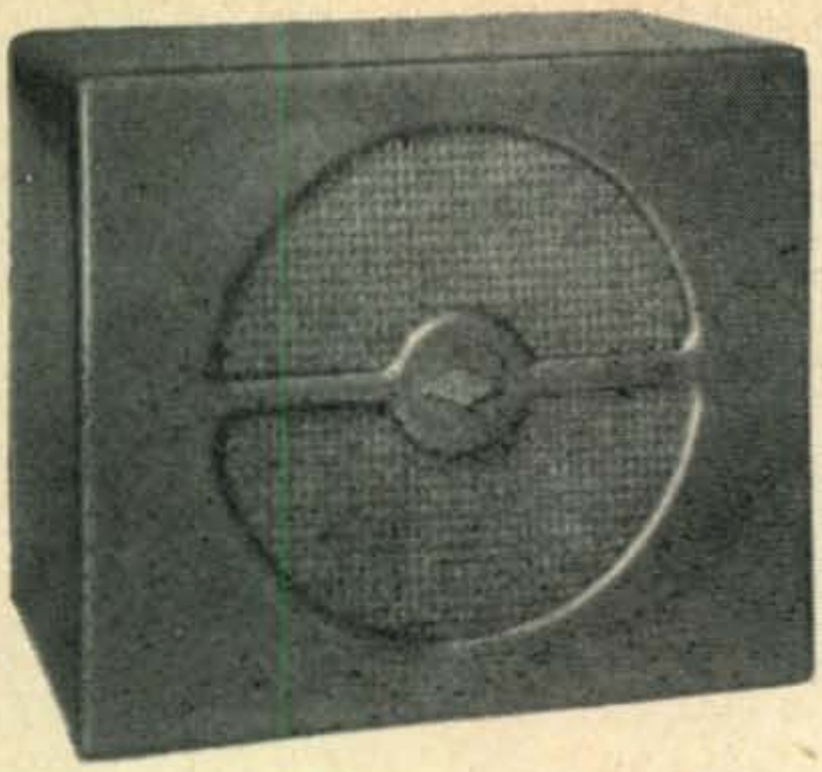
Harvey-Wells aircraft phone transmitter with 75-meter crystal, instruction manual, and 110-volt power supply. Ready to go on the air. $30. Harvey-Wells 6-volt mobile Vibrapack, 350 volts at 250 mils. Perfect $25. New L-W 2-meter converter with instructions $12.00. First check takes. Ira Groff, W3ZLK,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

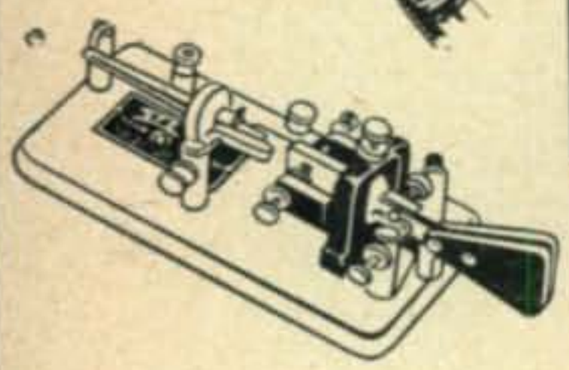
SELL: Crystal calibrator, ART-13 type, with octal base 200 kc. crystal and 12SJ7 $4.50. Boehme automatic motor driven keyer for Morse code, uses perforated tape, also McElroy 3-key (dot, dash, space) tape perforator $145. 32V3 $645 like new. Want: APR-4 tuning units, TS-173, TS-174, TS-175. Tom Howard,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

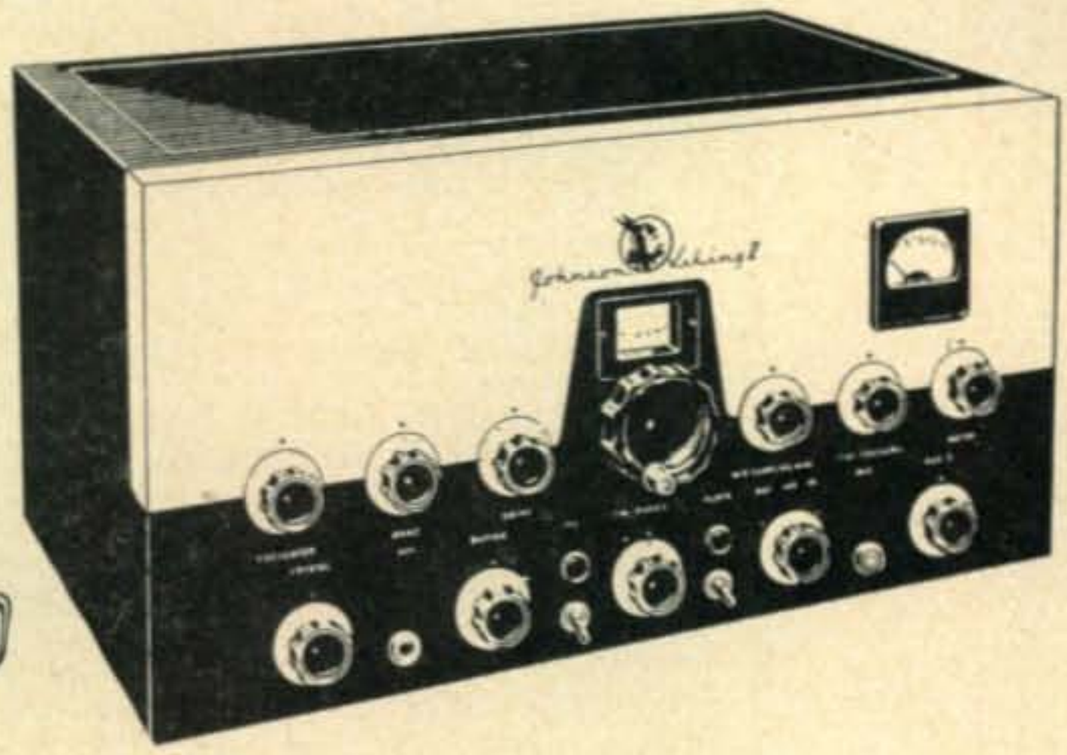
MOVING and must clean shack. Following for sale in new or A-1 condition: Eico 5" scope, model 425 wired, $45. Millen Exciter $18. Sonar VFX 680 NBFM VFO $40. Meissner EX Shifter VFO $45. SX-28 $100. U-100 Army Morale receiver, tunes .53-20 Mc., AC/DC/Battery, $40. BC-1206 low freq. beacon receiver $7. 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.

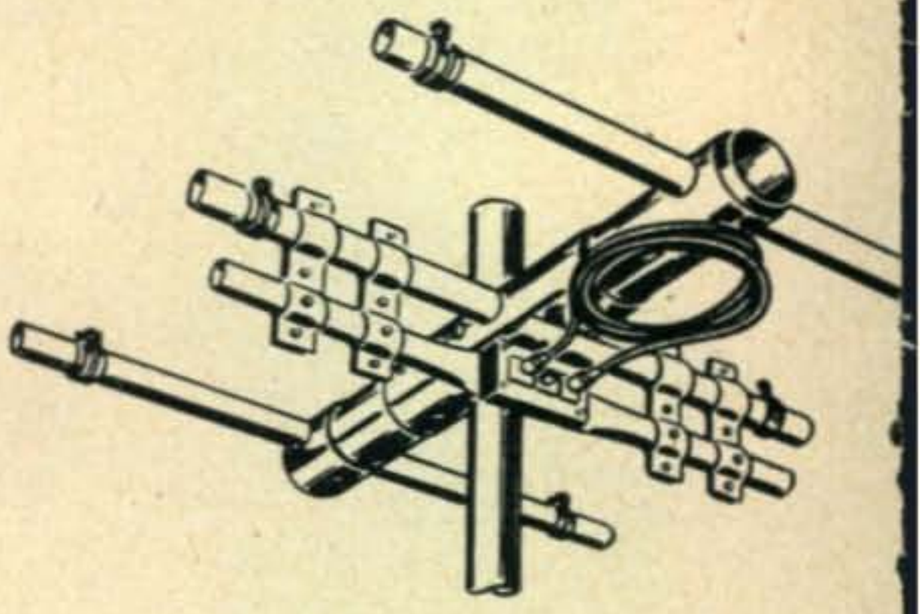
75 WATT TWO-METER STATION AX9903 final PP807 modulator, high-level speech, Turner U9S microphone, unused Vee-Dx 16-element antenna, Vee-Dx rotator, factory built Techcraft converter. Best offer. M. J. Fein, 5414 Arlington Ave., New York 17, N.Y.

CQ Ad Index





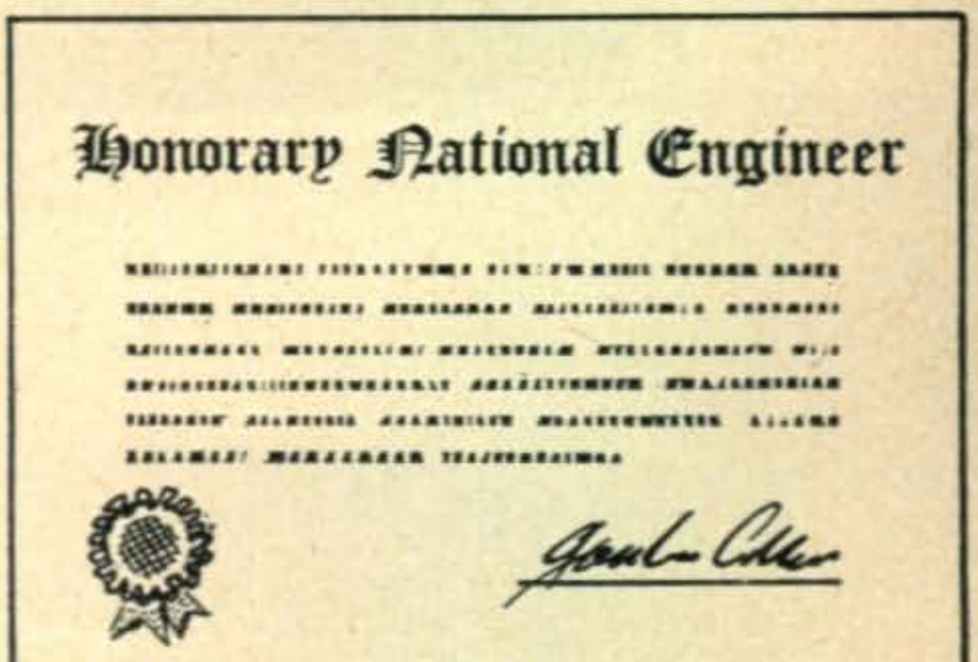




YOU MAY WIN THIS COMPLETE $1,000 RADIO SHACK.

OR A NEW NC-88
(one awarded each month)

EVERY CONTESTANT RECEIVES THIS "HONORARY NATIONAL ENGINEER" CERTIFICATE!



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 of 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 **National** NC

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.

RCA

for those who prefer triodes—

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

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

For R.F. Amplifier Service		Max. Amateur Ratings, Class C Telegraphy		
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 Operation Values	
Type No.	DC Plate Volts	Max.-Sig. DC Plate Cur. (Ma)	DC Grid Bias Volts for Max. Rating	Max.-Sig. Power Output (Watts)
RCA-805	1250	400	0	300
RCA-810	2250	450	−60	725
RCA-811-A	1250	350	0	310
RCA-812-A	1500	310	−48	340
RCA-8000	2250	450	−130	725
RCA-8005	1500	330	−67.5	330

RCA Power Triodes—as well as ALL types of RCA tubes—are readily available through your neighborhood RCA Tube Distributor. For technical data write RCA, Commercial Engineering, Section G15M, Harrison, New Jersey

RCA®

RADIO CORPORATION of AMERICA

ELECTRON TUBES — **HARRISON, N.J.**