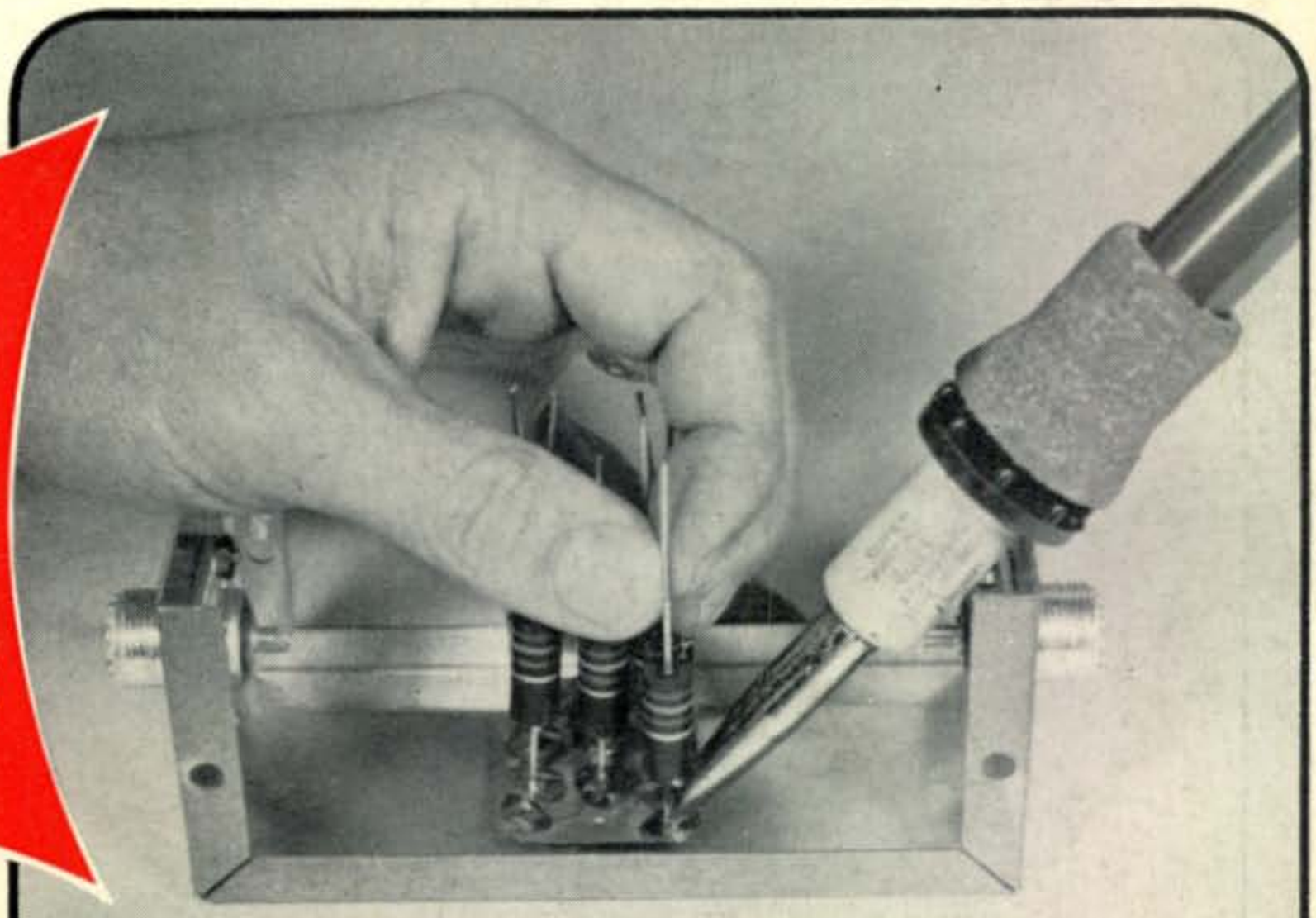
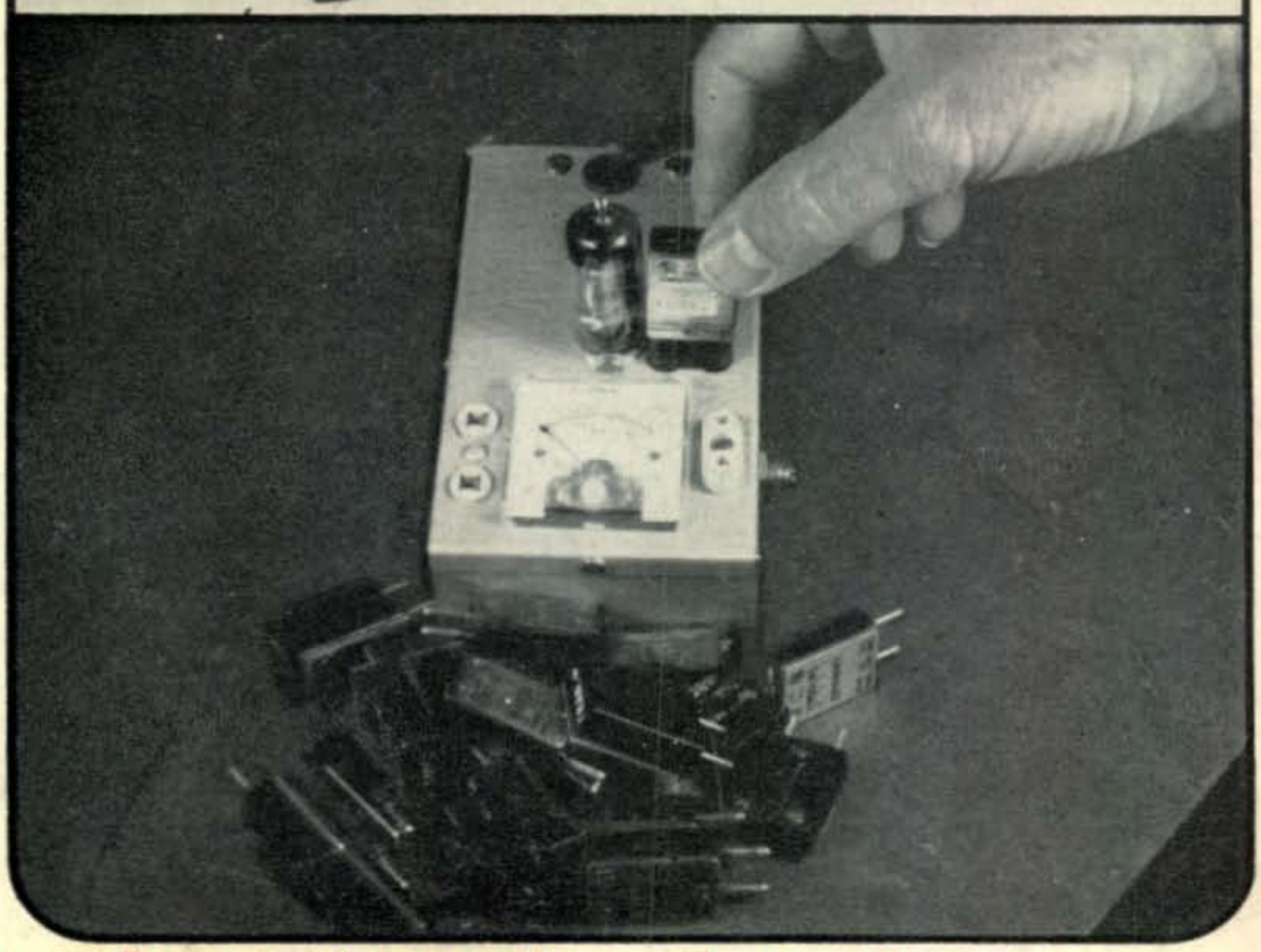
July 1964
50¢

CQ





this issue:

.F. T-Pads

onverter "Pre-Heater"

he Crystal Checker

lso featuring:

963 DX C.W. Results

he '6BLZ Special

mateur Radio Tomorrow?

The Radio Amateur's Journal

1959

10

KWM-2
75S-3B
32S-3
30L-1
62S-1
312B-4

NUMBERS GAME!

You'll recognize most of the numbers as Collins S/Line equipment. The 1959 is the year the S/Line was introduced. And 10? That's the number of reasons why you still get more features from S/Line equipment than any other. Just look. 1. *Complete station compatibility.* 2. *Light weight.* 3. *Simplicity and styling.* 4. *Frequency stability.* 5. *Frequency calibration.* 6. *More QSO's per kilocycle.* 7. *Mechanical filters.* 8. *Dual or single PTO control.* 9. *Automatic load control.* 10. *Negative R-F feedback.* 11. *The sincerest form of flattery.* Four years ago each of these 10 points was exclusive with Collins amateur equipment. We can't make that statement today because many of these original exclusives have been incorporated as standard in all amateur rigs. However, Collins is still the only equipment which offers you *all* these features — and is still unexcelled in any of them. □ Get complete information on S/Line equipment and prices at your Collins distributor. See how little it costs to own the finest.

COLLINS

For further infomation, check number 3, on page 110

EVERY PR CRYSTAL is UNCONDITIONALLY GUARANTEED

Unconditional Guarantee is proof of the maker's absolute confidence in his product... and PR Crystals have been UNCONDITIONALLY GUARANTEED SINCE 1934. You're not taking the slightest chance when you put PRs in your rig, for you'll have the finest radio frequency control that money can buy! PR Crystals are made to PERFORM... under good conditions and bad. They have that extra measure of stability and dependability BUILT-IN, that guarantees years of outstanding performance. Get PRs today from your jobber.

AMATEUR TYPES

Fundamental, PR Type Z-2

Frequency Ranges in Kcs.: 1750 to 2000 (160M); 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M).

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

(All Z-2 Crystals calibrated with a load of 32 mmfd.)

AMATEUR TYPES

Third Overtone, PR Type Z-9A

Hermetically sealed; calibrated 24,000 to 24,666 and 25,000 to 27,000 Kc., ± 3 Kc.; .050" pins. . **$3.95** Net

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ± 15 Kc.; .050" pins. . . . . **$4.95** Net

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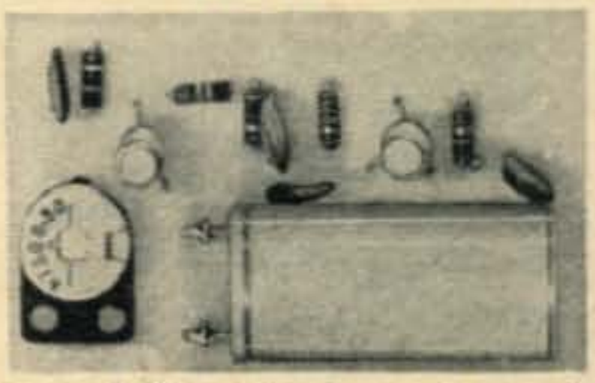
Official assigned frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc. . . **$3.45** Net

Type 2XP

Suitable for converters, experimental etc. Same holder dimensions as Type Z-2. 1600 to 12000 Kc., (Fund.) ± 5 Kc. **$3.45** Net

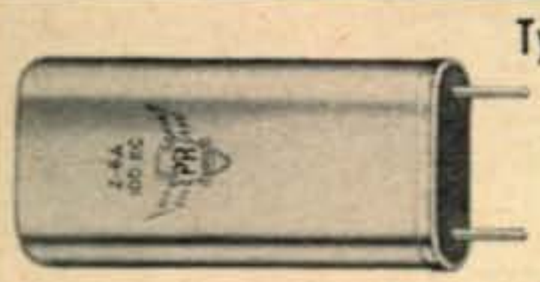
12001 to 25000 Kc. (3rd Overtone) ± 10 Kc. . . . . **$4.45** Net

PR-100 Transistorized Oscillator



With PR-100 you can check harmonics at 100 Kc. intervals through 54 Mc. A precision oscillator, fully wired, ready to install. Includes a Z-6A Crystal. Power requirements: 12V DC @ 14 Ma. Oscillator output connects to receiver antenna, high side. Base is 1-7/8 x 2-13/16 inches. Negligible mounting space required. Weighs 2 ounces. . . . . **$12.95** Net

Type Z-6A, Frequency Standard



To determine band edge. To keep VFO and receiver properly calibrated. .050" pins. 100 Kc. . . . . **$6.95** Net

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COMMERCIAL CRYSTALS AVAILABLE FROM 100 KC. TO 70 MC. PRICES ON REQUEST.

For further information, check number 1, on page 110

Champion of independence...

or slave to your needs!

HT-44 SPECIFICATIONS

Versatile compact amateur band transmitter for independent operation or slaving with SX-117 receiver for function as transceiver. SSB, AM, or CW on 80 through 10 meters. Features Hallicrafters stabilized phasing system for sideband generation with —40 db of sideband suppression @ 1 kc and carrier suppression of —50 db. Distortion products, —30 db. VOX/CW break-in and PTT operation. Panel-adjusted VOX/CW delay for maximum Phone-CW flexibility. Exclusive AALC gives greater talk power with speech compression up to 12 db. Power input 200 watts DC on CW and SSB, 50 watts AM. Same size and style as SX-117. Furnished with crystals for 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, and 28.5-29.0 mc. Less transceiver cables, $395.00. P-150 AC power supply, $99.50.

For sheer excellence of design as an independent transmitter, we'll put our money (in fact, we have) on the effortless performance of our new HT-44 SSB/AM/CW Transmitter. You get 200 watts DC input, SSB and CW . . . Hallicrafters' exclusive stabilized phasing system . . . Amplified Automatic Level Control (AALC) . . . VOX/PTT and dozens of other solid value features specified in detail above. Interconnected with our SX-117 Receiver, the HT-44 becomes the slave, and you're the master of every situation with transceive operation available at the flip of a switch. Either way, you can't duplicate the value, as your distributor will prove.

the NEW **HT-44** *Transmitter by* ***hallicrafters***

Fifth & Kostner Aves., Chicago 24, Ill.

...where the new ideas in communications are born.

Export: Hallicrafters, International Div. **Canada:** Gould Sales Co., Montreal, P.Q.

For further information, check number 2, on page 110

CQ

The Radio Amateur's Journal

Vol. 20, No. 7 July 1964

OFFICES

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Port Washington, L.I., N.Y. 11050
Telephone: 516 PO 7-9080

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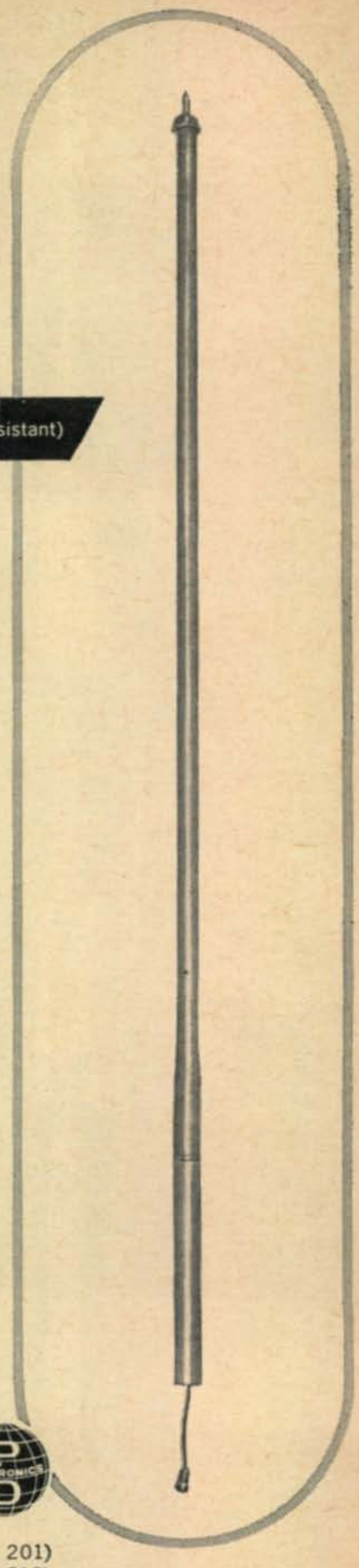
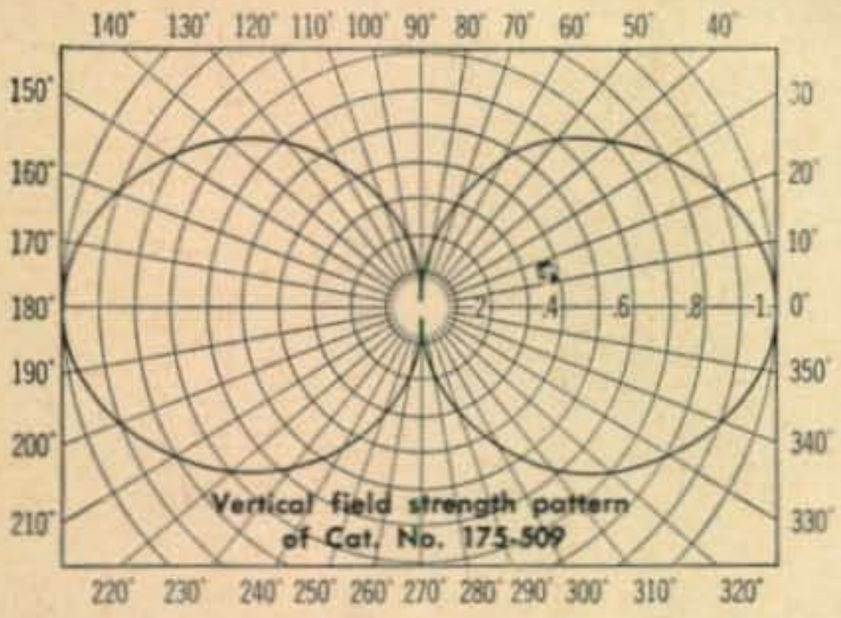
C-P COMMUNICATION ANTENNA SYSTEMS

—mean CERTIFIED PERFORMANCE!



BASE STATION STORM CHAMPION† UNITY-GAIN ANTENNA (Heavy-Duty, Precipitation-Static Resistant)



Vertical field strength pattern of Cat. No. 175-509

Cat. No. 175-509 Frequency Range 30-50 MC*

Cat. No. 175-509 STORM CHAMPION Antenna is designed for service in areas where maximum physical strength and/or resistance to precipitation static is required. The antenna consists of a galvanized steel element support tube running from the grounded antenna base through the entire structure to a lightning arresting device at the extreme top. The shunt-fed coaxial radiating element is mounted on this element support tube and the entire structure inserted into a fiberglass tube which is permanently sealed. This design results in a reduction of precipitation static interference in the order of 20 db. This noise reduction will permit a communication system to render effective service when nearby installations with exposed radiators are completely inoperative.

Electrical Specifications:

Nominal input impedance	50 ohms
Maximum power input	500 watts
Internal feedline	RG-8A/U
Flexible terminal extension	18" of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Direct ground

Mechanical Specifications:

Radiating element	2" dia. red brass tube
Radiating element housing	3" dia. fiberglass tube
Support pipe	4" dia. hot-galvanized steel, 24" length available for mounting
Rated wind velocity	100 MPH with ½" of ice
Lateral thrust at rated wind and ice load	150 lbs. at 30 Mc
Bending moment 6" below top of support tube at rated wind and ice load	1400 ft. lbs. at 30 Mc
Weight	80 lbs. at 30 Mc

*Exact frequency must be specified †Formerly STORM/MASTER

SINCE 1933

COMMUNICATION ANTENNA SYSTEMS FOR AMERICAN BUSINESS

Communication Products Company

DIVISION OF

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MARLBORO, NEW JERSEY – Telephone HOpkins 2-1880 (Area Code 201)

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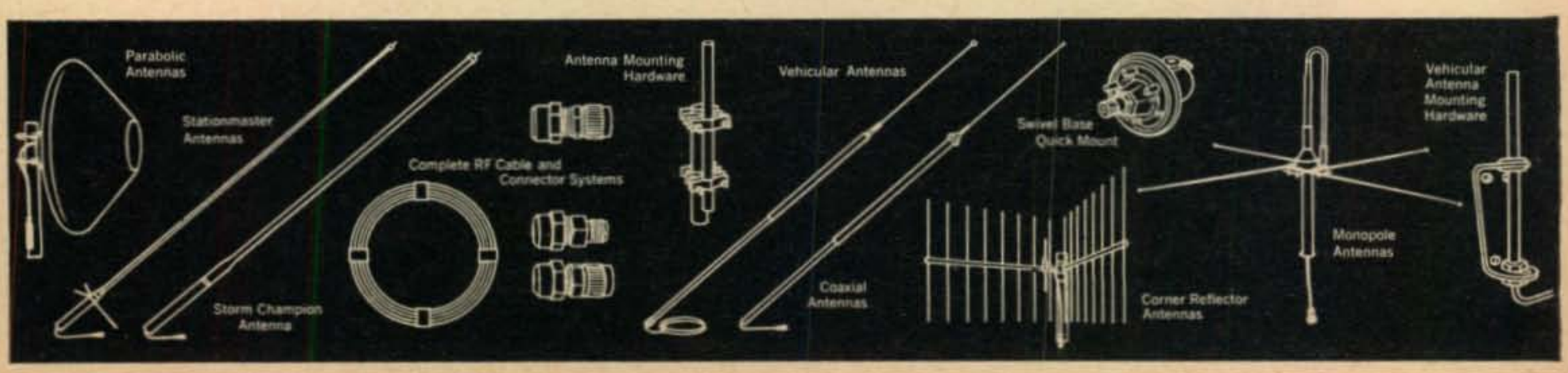
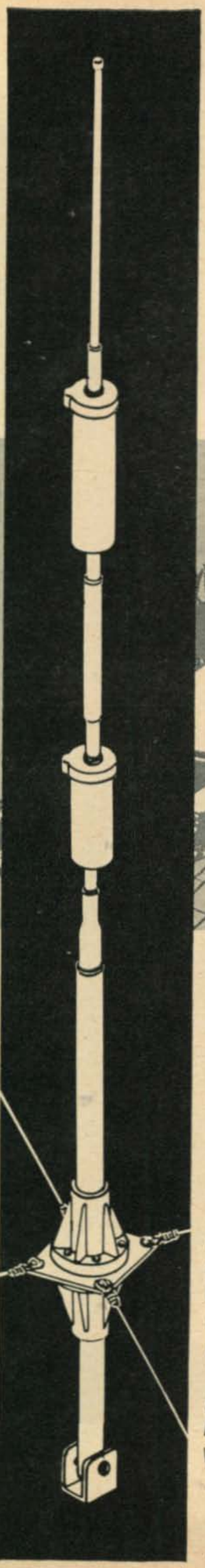
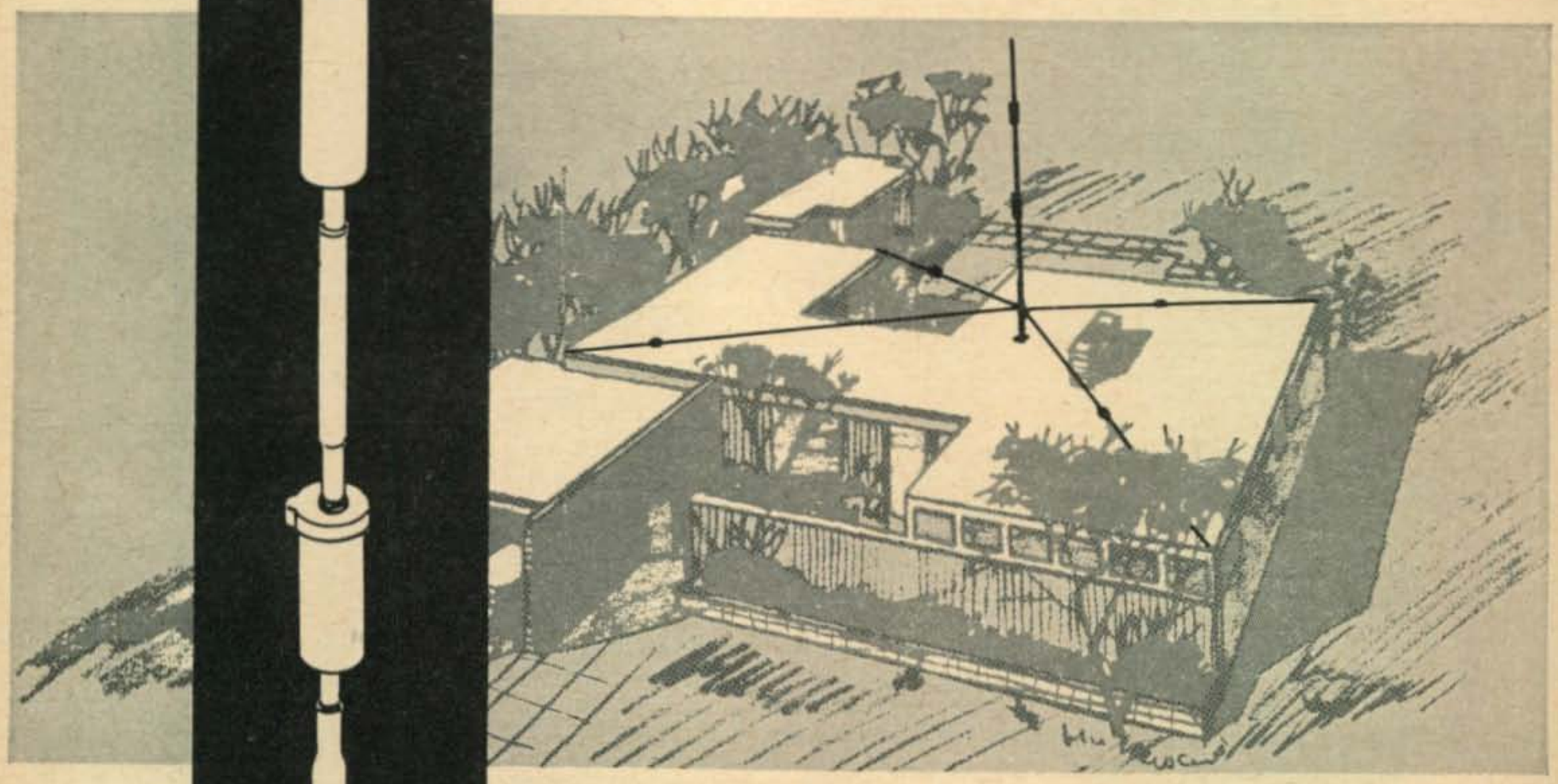




What's New in Verticals?



Setting the pace in 10, 15, 20 and 40 meters is Mosley's new RV-4 vertical antennas. These outstanding performance giving antennas can now be mounted on any roof as well as on the ground. They operate as a quarter wave vertical antenna on all four bands. The RV-4 features the Mosley slim line Trap-Master traps that have earned user acclaim through daily use in tens of thousands of installations throughout the world. These antennas have automatic band switching for 10 thru 40 meters. The RV-4 antennas are self-supporting and completely factory pre-tuned to maintain low SWR over entire range. The RV-4RK kit for roof mounting includes radial wire mast and hinged mounting. No radials required for ground mounting if a good ground connection can be provided within a few inches of the antenna base. Maximum power rating 750 watts on AM phone, 1000 watts CW and 2000 watts P. E. P. on SSB, input to final amplifier, Uses single 52 ohm coax line. Antenna height 20' 8-5/8" above insulator, with roof mount 25' 2-5/8" Weight of antenna 10 lbs., with roof mount 14½ lbs.

(In request of further information write for literature code # (8)

Mosley Electronics, Inc. 4610 N. Lindbergh Blvd. Bridgeton, Mo. 63044

For further information, check number 6, on page 110

ZERO BIAS

A PROBLEM has been growing within the amateur ranks during the past year or so that bothers us greatly. It has to do with politics, not everyday politics as the average reader knows it, but politics in the sense that a certain group is out to "take over" amateur radio.

Ham radio is, has been, and probably always will be composed of many different groups with varying degrees of interest. But, the DXer has been able to live in some sort of harmony with the ragchewer, the s.s.b.'er with the a.m.'er and so on. Each of us realizes that the other guy has a right to operate on the band of his choice, in the mode of his choice, and in the specific interest of his choice. This is not the point at hand.

Basically our point is this. A small group of individuals has been attempting to cause dissention within the amateur ranks. This group has attempted to smear the American Radio Relay League, and to spread discontent with ARRL to the uninformed masses. They have done so by on-the-air harangues against ARRL policies and procedures. They have seen several unsuspecting local ham publications and club bulletins open their pages in the interest of "a free press," thus providing outlets to expand their hate campaign. They have been responsible for the formation of numerous associations and societies whose primary aims are to weaken ARRL's prestige.

They have even wormed their way into the ham equipment industry. Once in, they have exerted steady pressures on certain manufacturers. To do this, they have attempted to be influential in DXpeditions, regional amateur conventions, club activities, and have even hampered a major international exposition. They have stooped to outright intentional QRM on the air. They have sold several manufacturers and publishers a bill of goods that what they are doing is for the best interests of ham radio.

They are a small but powerful group with a single common purpose—to set themselves up as the "official" spokesmen for ham radio. To accomplish this, they must first weaken and eventually destroy ARRL. They will accuse ARRL officials of being corrupt or inept. They will attempt to convince the public that the league has not done a good job in important areas. Their attacks will be ruthless and will cover many areas.

The particular individuals behind such activities are known to most informed leaders within the hobby, but to the average amateur they have managed to remain anonymous. To openly accuse them in print or at public meetings would be foolhardy, since they have managed to hide behind a cleverly spun web of on-the-surface legality. Nevertheless, the plot is there. The question arises, what are we to do?

A complex problem cannot have a simple answer. One thing we can do is keep informed. We urge our readers to become more aware of the politicking on the air and in print. Support the ARRL, not only through your membership, but actively through your support of league functions. If you hear a fellow ham disparaging the League, challenge him to be specific; force him to back up his charges with facts. But, know the facts yourself. Most important of all, learn to recognize the difference between an honest criticism and a malicious attack. All of us make mistakes. Our League officials are only human, and will make their share. But like it or not, the League is our strength, and defend it we must.

Reciprocal Licensing

As we go to press in late May we have just been informed that Senate Bill S-920 has been passed by the House of Representatives and signed into law by President Johnson. The Bill, of course, provides for reciprocal operating privileges to aliens. It's a great stride forward for international amateur radio, and long overdue. Our sincere and heartfelt thanks to the Congressmen and amateurs who so diligently labored for its passage.

Moonbounce

It's rather a shame that the inherent delays in printing a magazine prevented us from bringing to you any sooner news of the remarkable feat of W6DNG and OH1NL on April 12th. A QSO from California to Finland is not bad DX on one of the h.f. bands, but try it someday on 2 meters! Try it, they did, and they succeeded too! This is amateur experimenting at its best. It serves to show some of the "appliance operators" that there *are* still things to be discovered, contributions to scientific knowledge to be made, and new fields to be explored, even with billions of dollars being spent by governments and industry for basic research.

A rundown on the W6DNG-OH1NL moonbounce QSO begins on page 77.

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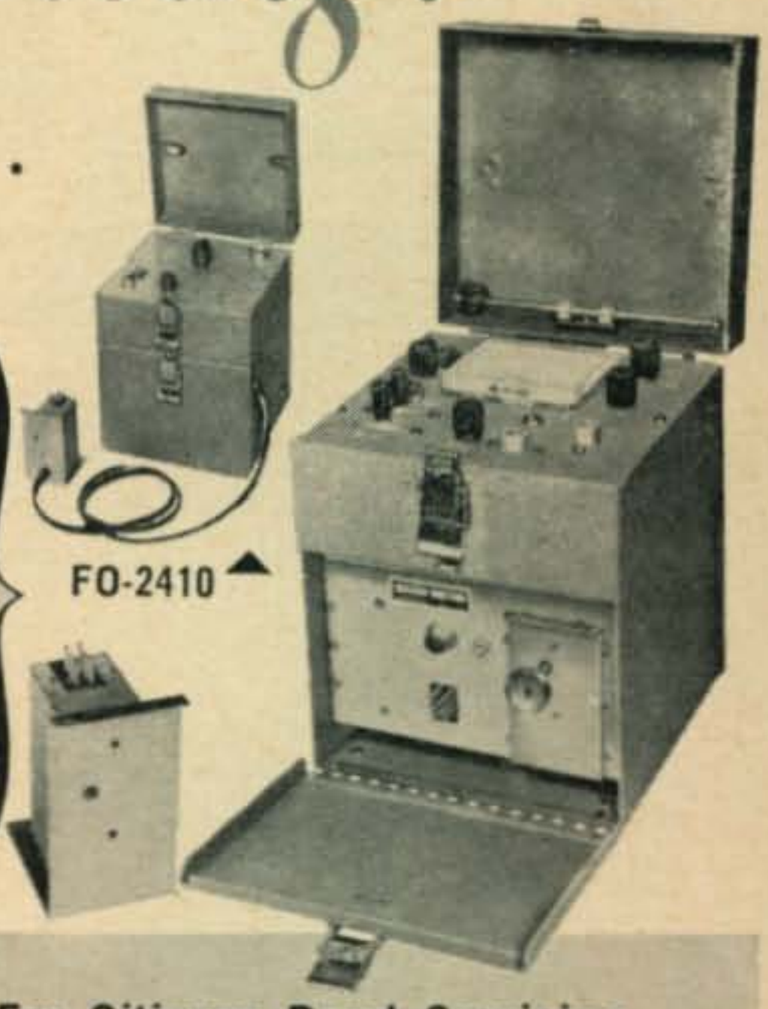
Equip your lab or service bench with the finest . . .

Discover new operating convenience.



FM-5000 FREQUENCY METER 25 MC to 470 MC

The FM-5000 is a beat frequency measuring device incorporating a transistor counter circuit, low RF output for receiver checking, transmitter keying circuit, audio oscillator, self contained batteries, plug-in oscillators with heating circuits covering frequencies from 100 kc to 60 mc. Stability: ± .00025% +85° to +95°F, ± .0005% +50° to +100°F, ± .001% +32° to +120°F. A separate oscillator (FO-2410) housing 24 crystals and a heater circuit is available. Dimensions: FM-5000, 10" x 8" x 7½".

FM-5000 with batteries, accessories and complete instruction manual, less oscillators, and crystals. Shipping weight: 18 lbs. Cat. No. 620-103 . . . . . $375.00
Plug-in oscillators with crystal $16.00 to $50.00

C-12B FREQUENCY METER For Citizens Band Servicing

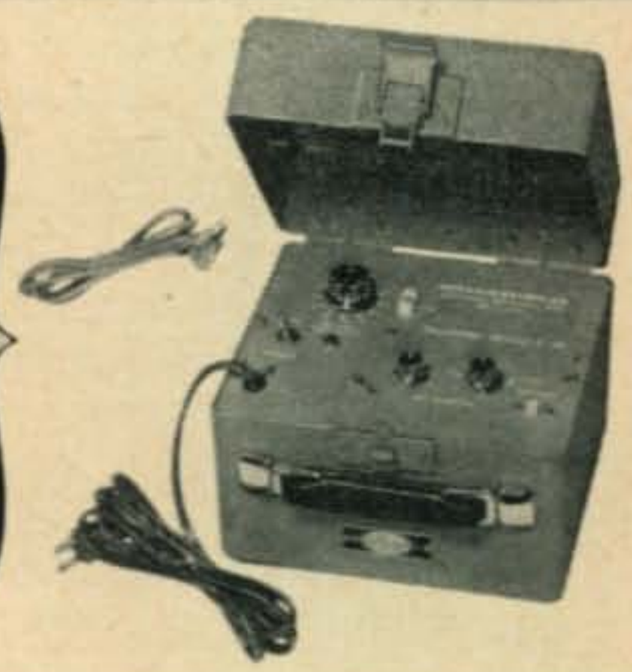
This extremely portable secondary frequency standard is a self contained unit for servicing radio transmitters and receivers used in the 27 mc Citizens Band. The meter is capable of holding 24 crystals and comes with 23 crystals installed. The 23 crystals cover Channel 1 through 23. The frequency stability of the C-12B is ± .0025% 32° to 125°F, .0015% 50° to 100°F. Other features include a transistorized frequency counter circuit, AM percentage modulation checker and power output meter.

C-12B complete with PK (pick-off) box, dummy load and connecting cable, crystals and batteries. Shipping weight: 9 lbs. Cat. No. 620-101 . . . . . $300.00

C-12 CRYSTAL CONTROLLED ALIGNMENT OSCILLATOR

The International C-12 alignment oscillator provides a standard for alignment of IF and RF circuits 200 kc to 60 mc. It makes the 12 most used frequencies instantly available through 12 crystal positions 200 kc to 15,000 kc. Special oscillators are available for use at the higher frequencies to 60 mc. Maximum output .6 volt. Power requirements: 115 vac.

C-12 complete, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-100 . . $69.50



C-12M FREQUENCY METER For Marine Band Servicing

The International C-12M is a portable secondary standard for servicing radio transmitters and receivers used in the 2 mc to 15 mc range. The meter has sockets for 24 crystals. The frequency stability is ± .0025% 32° to 125°F, ± .0015% 50° to 100°F. The C-12M has a built-in transistorized frequency counter circuit, AM percentage modulation checker and modulation carrier and relative percentage field strength.

C-12M complete with PK (pick-off) box and connecting cable, batteries, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-104 . . . . . $235.00
Crystals for C-12M (specify frequency) $5.00 ea.

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For further information, check number 8, on page 110

12 NEW AMATEUR BEAMS

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5 New 6 meter beams
3 New 2 meter beams
1 New 1¼ meter beam

SEND FOR NEW TECHNICAL INFORMATION CATALOG #20-226

THE FINNEY COMPANY

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For further information, check number 9, on page 110

From The Publisher

As this issue of *CQ* goes to press, our staff is just getting settled into spacious new quarters in Port Washington, Long Island. And as we reflect on the many good points the move means to the *CQ* organization, we do regret that the move is costing us a fine employee, Arne Trossman, W2DTJ, who's done an outstanding job as editor for the past four years. Having just settled into a new home up in Rockland County, Arne has told us that the commuting would be too much of a strain on his family; his parting is on the best of terms with the understanding that he's welcome back at any time.

Looking back over the past four years, we can find many features in *CQ* directly resulting from Arne's efforts. The SPACE COMMUNICATIONS column was introduced by him, as well as the original contacts that enabled *CQ* to scoop the field with the original Project OSCAR series. Arne can take credit for planning and expanding the USA-CA Program, and for generally promoting the concept of better awards and contests for the amateur fraternity. In addition, he can proudly point to a most congenial working liaison with the staff at ARRL headquarters, always keeping well-informed and up-to-date on major amateur events. *CQ* will undoubtedly miss Arne's able leadership, and we want to wish him well in whatever field he may choose to settle.

Stepping into the editor's shoes is a name that should be quite familiar to *CQ* readers, Dick Ross, K2MGA. Dick has been with the *CQ* editorial staff since early in 1960, having served two years as Assistant Editor, then moving up to Managing Editor for the past two years. A licensed amateur for more than ten years, Dick has proven most versatile in numerous amateur radio areas, and we're quite certain that he'll continue to turn out a magazine of fine quality in the future.

For further information, check number 14, on page 110

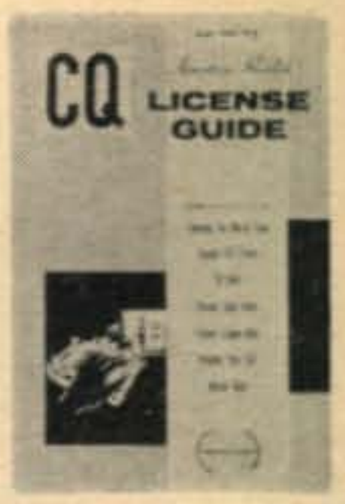
CQ TECHNICAL BOOKS

CQ ANTHOLOGY I

We've looked back through the years 1945-1952 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out and are unavailable.

CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator.



ANTENNA ROUNDUP

A common denominator for all ham stations is the antenna. Here at last is the cream of antenna information packed into a 160 page book. Forty-seven information-packed articles that will dispel much of the mystery surrounding antennas.

THE NEW RTTY HANDBOOK

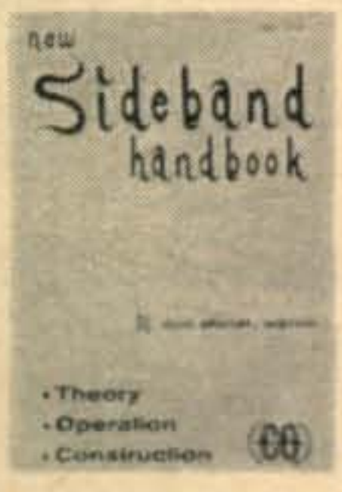
A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section in getting started, all written by Byron Kretzman, a well known authority in the field. First printing sold out. Second printing on hand.

CQ ANTHOLOGY II

Top favorite CQ articles from 1952 to 1959 . . . including some you may have missed . . . compiled into one new information-packed book! No more need to try to locate sold out back copies of CQ. This Anthology includes past articles of lasting interest to every amateur radio enthusiast. Over 250 pages of text. Over 75 different articles. A definite Must for your shack!

MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from top experienced mobile operators. Written for advanced, as well as beginning mobile operators, much of this information cannot be found anywhere else. This is NOT a collection of reprints.



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, who was almost one full year in the preparation of this terrific volume. This is **not a technical** book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff gadgets, receiving adaptors, exciters, amplifiers.

VHF FOR THE RADIO AMATEUR

If you are, or are planning to be a VHF operator, you can't afford to be without this dynamic new handbook written especially for you. Filled from cover to cover with all new and original construction material presented so you can understand it. Written by Frank C. Jones, W6AJF, nationally acclaimed for his VHF pioneering.

SURPLUS SCHEMATICS

This is a book literally loaded with schematics for all the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available. Trying to figure out the circuitry cold turkey can be many-times more difficult than the most involved puzzle, and purchasing a single instruction book can run as high as $3.50.

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Port Washington, L.I., N.Y. 11050

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Zero Bias Scores a Bull's Eye

Editor, *CQ:*

Congratulations on your editorial (ZERO BIAS) in the May issue of your magazine. Possibly a few more questions might have been asked such as "Who elected the Board of Directors to this Fly-By-Night organization, and who authorized printing the names of a few dedicated Hams that refuse to have anything to do with it?"

Keep up the good work. As one Director of ARRL it is nice to know that people like you and your staff believe in fair play.

Ray E. Meyers, W6MLZ
717 Anderson Way
San Gabriel, California

Editor, *CQ:*

Congratulations on making *CQ* once again a responsible voice in ham radio, as well as a fine technical publication! Your June editorial, shedding much-needed light upon the character and *modus operandi* of the individual behind *73* magazine, is a great service to those of us who would rather *know* than operate on prejudice, opinion, and heresay.

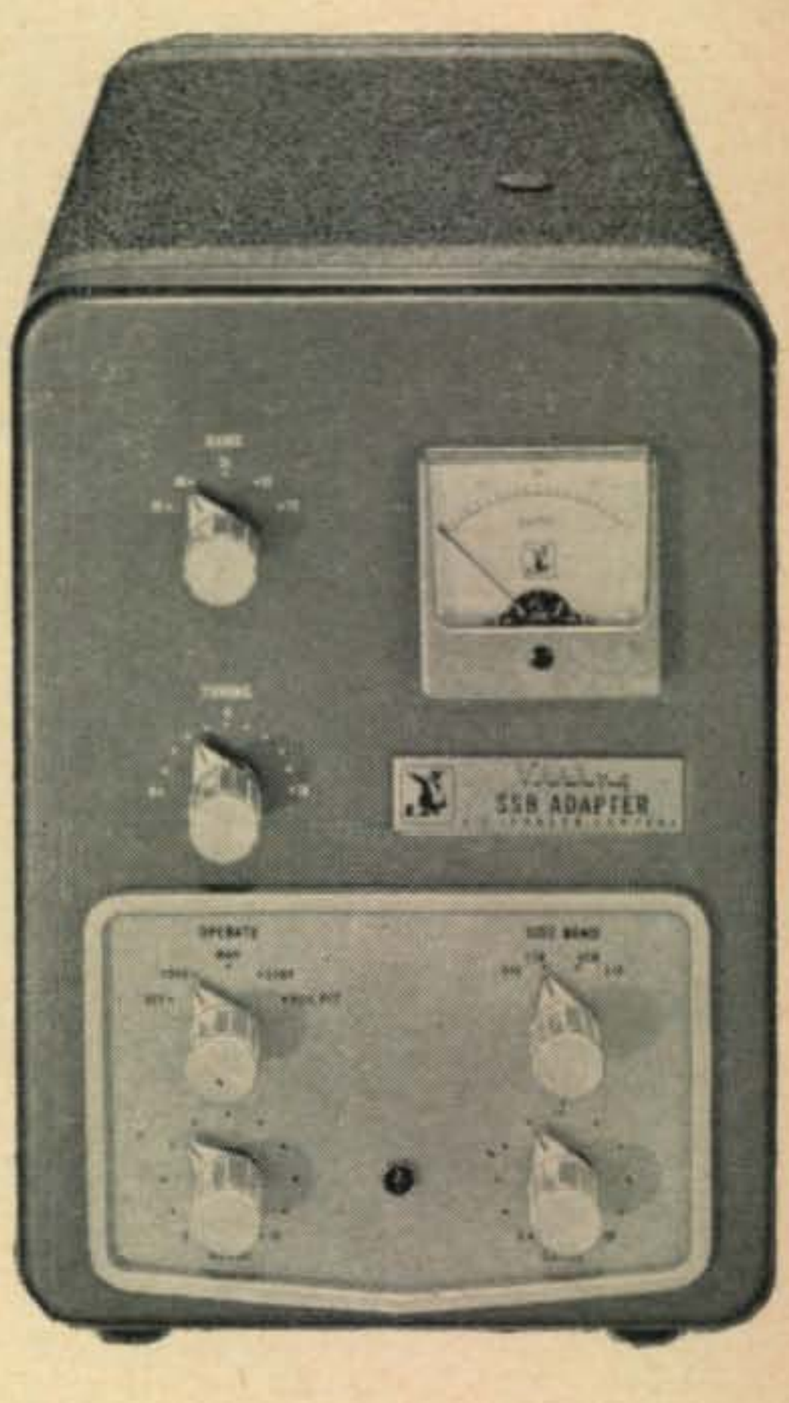
My first exposure to Wayne Green came some time after his disastrous tenure at *CQ*, and shortly after he initiated publication of *73*. I responded to an editorial appeal for technical articles (which clearly defined payment policies), and to two articles which were published in *73* concurrent with the launching of an advertising campaign to promote sale of the device discussed by the author. I suggested a tutorial technical piece, which I noted would tend to contradict the highly optimistic performance claims made by author and advertiser alike.

"Go ahead!" said Wayne, to my surprise. I really thought that this guy might put principle before profit. Haw! My initial clean draft was in the mail within the month. A couple of months later, back came my draft with a request to tone it down (*i.e.*, back off on contradicting those performance claims—weasel word it more) and shorten it. With timeliness rapidly fading, I rushed to modify the copy as requested and got back in the mail two days later.

Wayne never bothered with the courtesy of acknowledging receipt, notifying me of acceptance, or paying for the article. He didn't answer inquiries. Editorially, he carried on about the *73* work load and the lack of financial advantage. After he got back from Europe, however, he apparently dug my article out and decided that it no longer threatened his profits. Interest among hams had subsided, the relevant advertising had been terminated, and two full years after submission, my article was published exactly as submitted. A few weeks before that particular issue of *73* appeared, I received a check from *73* for a small fraction of what Wayne's published pay-

Thinking about going to SSB?

. . . if you own a Viking "Valiant", "Valiant II" or "Five Hundred" . . . here's a deal for you!



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Save $100 by going to SSB now! Offer expires August 1, 1964!

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Certificates are available only through your authorized Johnson Amateur Equipment Distributor. See him soon and save $100.00 by going to SSB now!

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For further information, check number 13, on page 110

ment schedule indicated it to be worth . . . no explanation was ever forthcoming.

So much for Wayne Green's honest, forthright, crusading policies in publishing *73*. I think it urgent that the (apparently) large number of followers of this "Pie-Eyed Piper of Peterborough" be given some indication of the type of individual whose ranting, raving, grossly intemperate, inaccurate, and flagrantly biased attacks on the ARRL they are swallowing hook, line and sinker. The future nature of ham radio may very well depend upon such enlightenment. *73* permits no real criticism of itself in its own pages (except for letters from a selected few who can be conveniently tagged as biased or incompetent through editorial rebuttal—Wayne always gets the last word). *QST* has chosen—perhaps wisely, perhaps not—not to engage in editorial battle with this self-seeking eccentric.

It should be obvious to all *73* readers by now that to disagree in any way with Wayne Green is to be not only WRONG but to be stupid, paranoic, irritating. Long before RM-499, and even before my evperience as a *73* contributor, I sent Wayne several letters expressing my opinions on matters previously mentioned in his editorials. Unfortunately, I was uncivil enough to disagree (however politely) with some of his comments. Not a word of mine ever appeared in the *73* letters columns: the same was true of others who wrote letters along the same general line of comment. I did, however, get a couple of my letters back with insulting comments scribbled in the margins.

Many thanks to *CQ* for giving us some insight into the Green phenomenon. For the sake of ham radio, I sincerely hope that you will now carry on until the foul garbage which *73* has heaped on us for these many months has been properly identified and disposed of by those misguided brethren who have mistaken a vicious parasite for a noble crusader.

Please feel free to use any, all, or none of this letter in *CQ*, as you see fit This *73* saga has been by far the most disillusioning, disgusting episode in my 17 years of hamming.

R. W. Ehrhorn, K6CTV/WA4NGO
Box 12248
1501 72nd Street, No.
St. Petersburg 33, Florida

Editor, *CQ:*

It is about time that someone exposed the editor of *73* magazine and your May ZERO BIAS editorial is timely. Probably most mature hams have already formed their own opinion of Mr. Green, and your editorial should bring his policies out into the light. It is too bad that he did not follow his originally announced plan of publishing a technically sound amateur magazine.

G. L. Countryman, W4JA
75 East Bay Street
Charleston, South Carolina

Editor, *CQ:*

Your June editorial is a masterpiece! Factual to-the-point, hard-hitting. Yet it shows restraint and freedom from ego-generated extremes. Amateur radio can use intelligent leadership. Although I wholeheartedly support the League, I recognize that a constructive "loyal opposition" serves to bring out the best efforts. *CQ* is providing an important service, both in the technical and the "political" aspects of amateur radio. Substantiated facts are vital in each of these areas.

Carl C. Drumeller, W5EHC
5824 N.W. 58th Street
Oklahoma City, Okla.

Editor, *CQ:*

You are to be congratulated for a most straightforward and effective editorial in your June issue. It is greatly to the credit of the magazine and its editor when you speak purely for the cause of TRUTH, and not for some supposed pecuniary advantage.

This, of course, is in the true spirit of amateur radio. Keep it up—and the best of luck in your new quarters!

George H. Goldstone, W8MGQ
Northland Towers
Southfield, Michigan

Editor, *CQ:*

I surely was glad to note in your editorial in the May issue of *CQ* that you had the courage to properly describe

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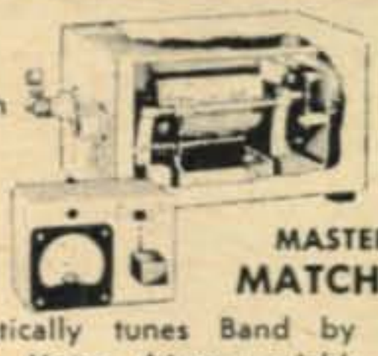

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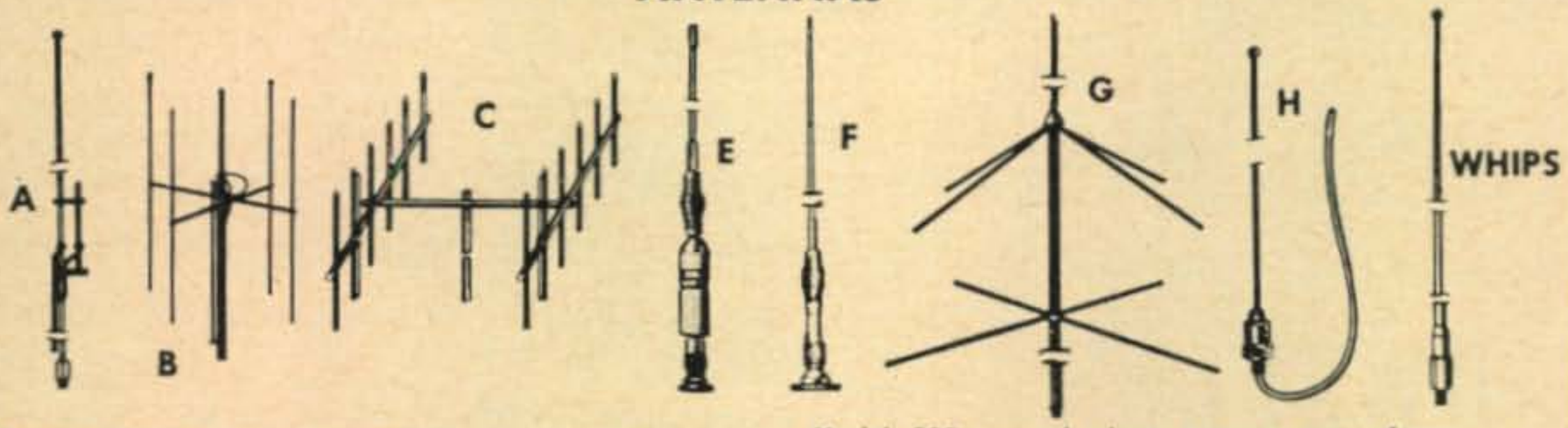

A AM-28 2-meter "J" mobile-fixed antenna provides 2 db gain. 86" hght. **14.95**

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C AM-5 twin six 2-meter beam with 12 db forward gain. Pre-tuned, aluminum, heavy duty. **16.95**

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E AM-7 Sentry "Shorty" 2 meter 1½ wave top loaded fiberglass antenna with mount for CB use. **16.75**

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G Model 300 ground plane antenna outperforms any type verticle dipole. Ideal for CD and defense nets. **12.95**

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WHIPS All with Threaded ⅜" stud to fit all mounts. **100-60S 60" 4.95; 100-72S 72" 4.95; 100-78S 5.00; 100-86S 86" 5.15; 100-90S 90" 5.20; 100-96S 96" 5.25; 100-103S 103" 6.95.**

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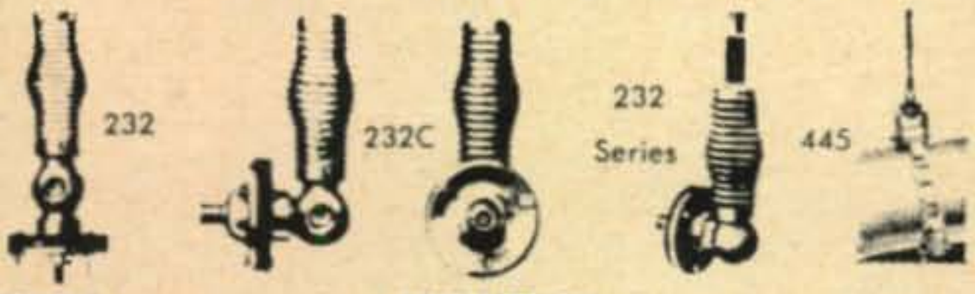

BASE MOUNT	DESCRIPTION	NET
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232C	D'ble Tapered Spring—Swivel Base Coax. Conn.	8.75
232SS	D'ble Tapered Spring—Spec. Stainless	12.95
232SSC	D'ble Tapered Spring—Spec. Stainless — Coax. Conn.	12.95
232X	Heavy Duty—D'ble Tapered Spring—Swivel Base	9.85
232XC	Heavy Duty—D'ble Tapered Spring—Coax. Conn.	9.85
232XSSC	Heavy Duty—D'ble Tapered Spring—Spec. Stainless — Coax. Conn.	14.95
232XSS	Heavy Duty—D'ble Tapered Spring—Spec. Stainless	14.95
232XX	Extra Heavy Duty Spring	10.85
232XXC	Extra Heavy Duty Spring—D'ble Tapered—Coax. Conn.	10.85
232XXSS	Extra Heavy Duty Spring—D'ble Tapered—Spec. Stainless	15.95
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him. I suppose there is no way to stop him, he and he alone will be responsible if we do lose any amateur bands in the next frequency allocation.

Harley D. Harris. W8DCT
111 Pine Street
Manistee, Michigan

Editor, *CQ:*

Congratulations on your May editorial reference to Mr. Green. He sure is a money hungry individual and I'm happy to see someone has the guts to say so. He has been doing everything to cause dissention in the amateur ranks with silly and untruthful articles and what is so sad he comes out the next month and has to retract his statement.

His magazine is nothing but trash of his trips to Europe with his wife and Porche and trying to sell his gobbliegook to some unsuspecting Ham, so he can fly to Europe free of any charge to himself.

Karl Rosenbaum, W2MZB
37 Hickory St.
Islip, N. Y.

Editor, *CQ:*

Well, you and your staff finally redeemed yourself with your editorial in the May issue. Bravo, I wish you people kept correspondence on file for a long period. It was during the "Reign" of Green several years ago that I finally blew my top and with a scorching letter to him, cancelled my subscription to *CQ*. What with sexy pictures, tests of NC-300 with a Steam Roller, "the right way and the Navy's way "type of krud, and just any ole smartaleky remark about my hobby, I just got damned mad and on this very mill, let him have both barrels.

Instead, I put my money into membership in the RSGB and received a journal about ham radio that took it seriously with an air of dignity that it deserves, like Perry Ferrell did for *CQ* before, and the boys in West Hartford always have.

So, about a year ago at a newsstand, I again looked at *CQ*. Was pleased to find you people back on the track again. My subscription will stay with you so long as you treat my sacred hobby with the respect it deserves And this, you are doing very well.

Waste not a line on "Never Say Die" in your magazine. The lid isn't worth the printer's ink!

John A. Oliver, W6LZS
10744 Danube Avenue
Granada Hills, Calif.

Editor, *CQ:*

I've just read your editorial in May *CQ*. Three cheers for having the guts to put Mr. Green in his place. I note that "Never Say Die" has two new call-signs. From all of his actions, rantings, and ravings, it appears that he should drop the K1FYP and merely sign 2W3519—that is the group he most accurately typifies.

Again, congratulations on ZERO BIAS. And, I like both your proposals for incentive licensing, and well as ARRL's. Guess I'm sort of half-way between on the points which differ.

William R. Gary, K8CSG/K8KLI
1204 Crown Drive
South Carleston, W. Va.

Editor, *CQ:*

Just a short note to congratulate you on your editorial which appeared in the May issue of *CQ*.

Donald L. Stoner, W6TNS
Baseline and Hellman
Alta Loma, California

Editor, *CQ:*

As an ex-employee of "that magazine in the hills of New Hampshire," please let me say that I most emphatically agree with ZERO BIAS for May, 1964. I particularly agree with the ninth paragraph in this editorial. This is as apt a description of Mr. Green as could possibly be found.

I have to compliment Mr. Green on some of his technical articles, but his egotistical editorials are something else altogether. Since he was once an editor of *CQ*, you know what type of individual he is. I don't know about help turnover at either *CQ* or *QST*, but I don't believe it could possibly be as bad as it is at *73*. Wayne is impossible to work for, to say the least. During the time I was there, I was the highest paid employee there, but many of the help were not paid at all. They were told

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Band-Spanner Top-sider antenna including 80-40-20-15 meter coils
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Webster, Electro-shield system including: coil shield, distributor shield, harness shield, spark plug shield and generator or alternator noise supression kit. (Full instructions)
21 feet, RG-58/U coax complete with plug
Booklet: "Mobile antennas, "Simple steps to peak performance"
Booklet: "Auto radio noise reduction techniques"
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COMMUTER PACKAGE

$41.00 savings on the "Commuter"
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SB-1MB Mounting plate
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Band-Spanner Top-sider antenna including one (1) coil for any band desired. (80-40-20-15)
Band-Spanner H-215 mount
Band-Spanner spark plug and generator suppression kit.
21 feet, RG-58/U coax complete with plug
Booklet: "Mobile antennas, "Simple steps to peak performance"
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that as they learned and acquired skills they would be paid. Their only pay consisted of room and board, which could be gotten only with extreme effort. One of these individuals was Al Shapiro, WA2WIQ, who left at the same time I did, for the same reasons.

To give you an idea how economically the magazine is run, Wayne keeps QSL orders which are sent to people in his employ for possible future use of his own. At least this is the only logical reason I can find for his having kept a 300 card order that was sent to me, there. He also must be planning to use my 6 meter mobile antenna, so that he won't have to buy one.

His "humor" in his editorials has also been responsible for his losing help. Ted, K3LNM, referred to in Wayne's January editorial as "Goat Boy" has left for this reason. How any person can have the unmitigated gall to continually slander people, both friend and foe, and claim to be in the top two percent of the intelligencia of this country, is beyond me. One thing that soured me on Wayne Green from the start was his statement, "It is very foolish to argue with me, because I am always right." Does this ring a bell with any *CQ* employee?

Enough of Wayne Green. You know, as well as I, what he is. I only hope you will print this, so that others may know him for what he is.

Your magazine has been excellent for years, and continues to be. My own personal collection goes back to 1953. Keep up the good work!!

W. L. Hall, Jr., WA2TGC
11 Pine Street
Oneonta, New York

Editor, *CQ:*

Thank you for your excellent editorial in the May '64 issue of *CQ*. It is for your stand in this matter that I recently renewed my subscription for another 3 years.

When the man you refer to held your present job I had the "privilege" of seeing him in action at a testimonial banquet given to QSL Manager W2SN in New Jersey. His "hustler" actions (then on behalf of *CQ*) were indeed an eye-opener, and an indication of the lengths he was willing to go to, to "make a fast buck." Perhaps he made a few, but he also caused at least one amateur present to become slightly nauseated by his methods!

Col. Fred J. Elser, W6FB
1189 Tamarisk Road
Palm Springs, California

Editor, *CQ:*

Re—ZERO BIAS, May, 1964 . . . AMEN!

Charles M. Cotterell, WØSIN
430 So. Swadley St.
Lakewood, Colorado

Editor, *CQ:*

I have just finished reading your ZERO BIAS in my June issue of your magazine. As far as I am concerned *CQ* has been a "Me Too" magazine for the past several years. Your ZERO BIAS in the June issue is without a doubt the most rotten editorial I have ever read in any publication, and they talk about "smut" in the girlie magazines. [?]

I just recently, thanks to my employer, who is headquartered in Hartford, Conn. had the opportunity of visiting both ARRL, of which I am a member, and *73* magazine. I was a little dubious of the boy from New Hampshire and a little displeased with Newington before my visit. Now about 30 days later I am more displeased with ARRL and a little more inclined favorably toward the magazine *73*. I talked to Wayne Green and I also talked to Dick Baldwin and Gary Foskett at ARRL.

As for the future of *CQ*, I would say that unless you modify your editorial thinking, or at least modify your editorial publishing, you are also going to be the target of many "ham criticisms. These would probably be in the form of cancelled subscriptions.

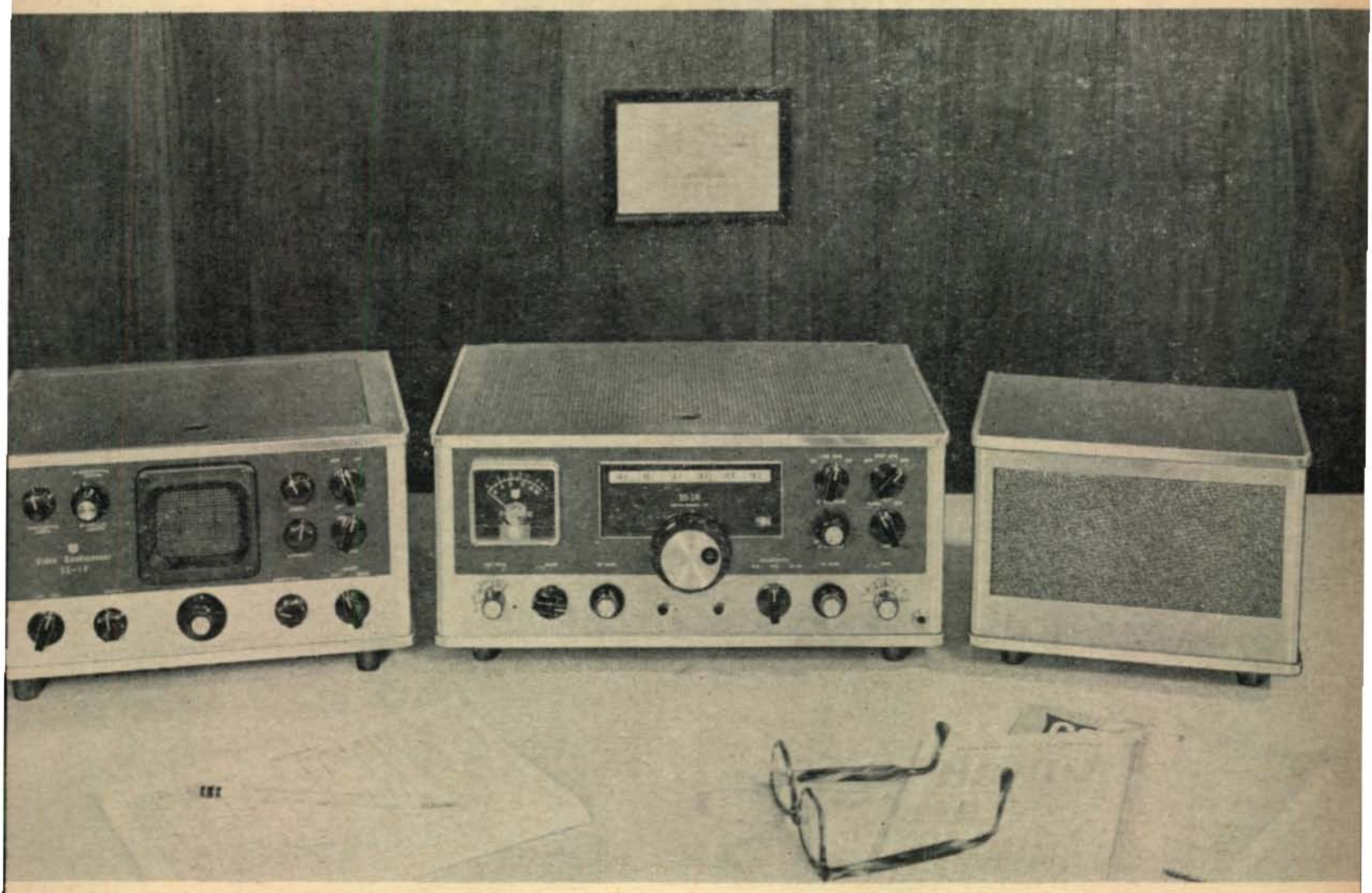
For your information I am neither a teen-ager or a newcomer to the ranks of "ham" radio, I am on the Board of Directors of our local radio club and am at present the Editor of our monthly publication.

Incidentally I just bet a fellow ham at 2 to 1 that you wouldn't have either the courtesy of answering this letter, much less printing it in *CQ*.

Don't cuss me too bad, because in the past some of my editorial comments have found their way into the pages of *CQ* as well as *RTTY* and *Monitor*.

Boris R. Council, KØATZ
2450 South Quitman Street
Denver, Colorado

SS-1R, SS-1S, SS-1T, SS-1TF . . . . .



THE SQUIRES-SANDERS family of HF amateur equipment—which started with the announcement last fall of a genuinely new approach to HF receiver design and performance (SS-1R) and original developments in noise silencing techniques (SS-1S) continues to grow. The original objective of a complete HF amateur *system* which is unsurpassed in quality and performance will soon be realized. The SS-1R receiver, SS-1RS matching speaker, and SS-1S noise silencer are currently available. The superb performance of this receiver and silencer—especially in frequency accuracy, rejection of strong adjacent signals, and the spectacular elimination of impulse noise (plus really fine construction)—has been talked about by hams the world over.

The SS-1V Video Bandscanner (see photo, left) is just as unusual as its predecessors. This unique oscilloscope display unit, when used with the SS-1R, shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the *signals displayed do not move as the receiver is tuned*, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier. In addition provision is made for transmitter monitoring or analysis with automatic switching on "transmit."

The matching transmitter—SS-1T—has been released for production also and will be available shortly after the Bandscanner. Designed for transceive mode operation with SS-1R receiver frequency control, SS-1T will operate at 200 watts PEP input and will embody still other unusual Squires-Sanders developments which provide operating features not available in similar equipment. Complete specifications and operating characteristics will be published shortly. For those operators who prefer separate receiver/transmit frequency control, the separate transmit frequency unit (SS-1TF) will be available. Keep in touch with your distributor or write for further detail.

AMATEUR NET PRICES: SS-1R Receiver, $895; SS-1RS Speaker, $35; SS-1S Noise Silencer, $135; other prices to be announced.

Squires-Sanders, Inc.

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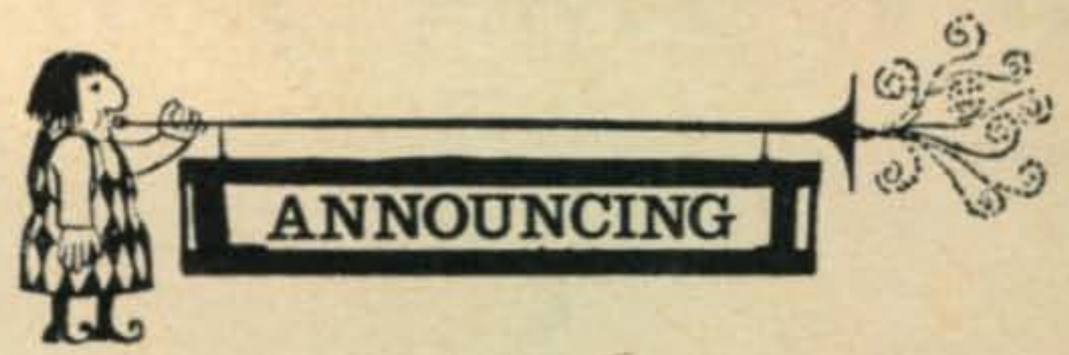
For further information, check number 19, on page 110



Gloucester Co., New Jersey

The hamfest of the Gloucester County Amateur Radio Club will be held at Crystal Birch Lake, Chapel Hts., N. J. Sunday, July 26. Tickets are $2.00 per family; $1.50 single For further information contact Gil Hillman, WA2ZJY, 25 South Glassboro Ave., Woodbury Hts., N. J.

Nashville, Indiana

The Indiana Radio Club Council, Inc. will hold its hamfest and family picnic at Brown County State Park on Sunday, July 12. Pre-registration is $1.50; after June 15th it is $1.75. Tent or trailer camping is available (bring your own gear). Door prizes and awards are promised. Send pre-registration to: Hoosier Hills Ham Club, P. O. Box 375, Bedford, Indiana.

State of Washington

The Okanagan Valley International Hamfest will be held this year at Conconully State Park, Conconully, Wash. on July 25 and 26. Registration fee is $1.00 and camping gear is in order. Mary Lou Brantuer, K7AZH, Rte. 1, Box 280A, Omak, Wash will supply further info.

Burlington, Vermont

An International Field Day will be held on Sunday, July 26 at the Cliffside Country Club in Burlington, Vermont. Prizes, contests and auctions will be featured. W1SCJ will supply details.

Terre Haute, Indiana

Sunday, July 26 from dawn to dusk at Turkey Run State Park is the time and place for the annual Wabash Valley Amateur Radio Assn. VHF Picnic. The park is located 40 miles north of Terre Haute on US 41 and Indiana 47. Registration on the spot at $1.00 per person. Plenty of activities along with free coffee and doughnuts are promised.

Memphis, Tennessee

The Mid-South Amateur Radio Assn. and the Mid-South VHF Club are holding a hamfest in Memphis, Tenn. on Sunday, July 21, 1964 with a hootenanny Saturday night the 20th. For information, write Pat Lane, W4OQG, secretary of the MARA.

Saskatchewan

The 1964 Saskatchewan Hamfest will be held in Regina, Sask. on July 3, 4 and 5, 1964 and will be sponsored by the Regina Amateur Radio Association. There will again be featured the hidden transmitter hunt, liars contest and many other new activities. Contact VE5SC for more specific information.

Hartford, Wisconsin

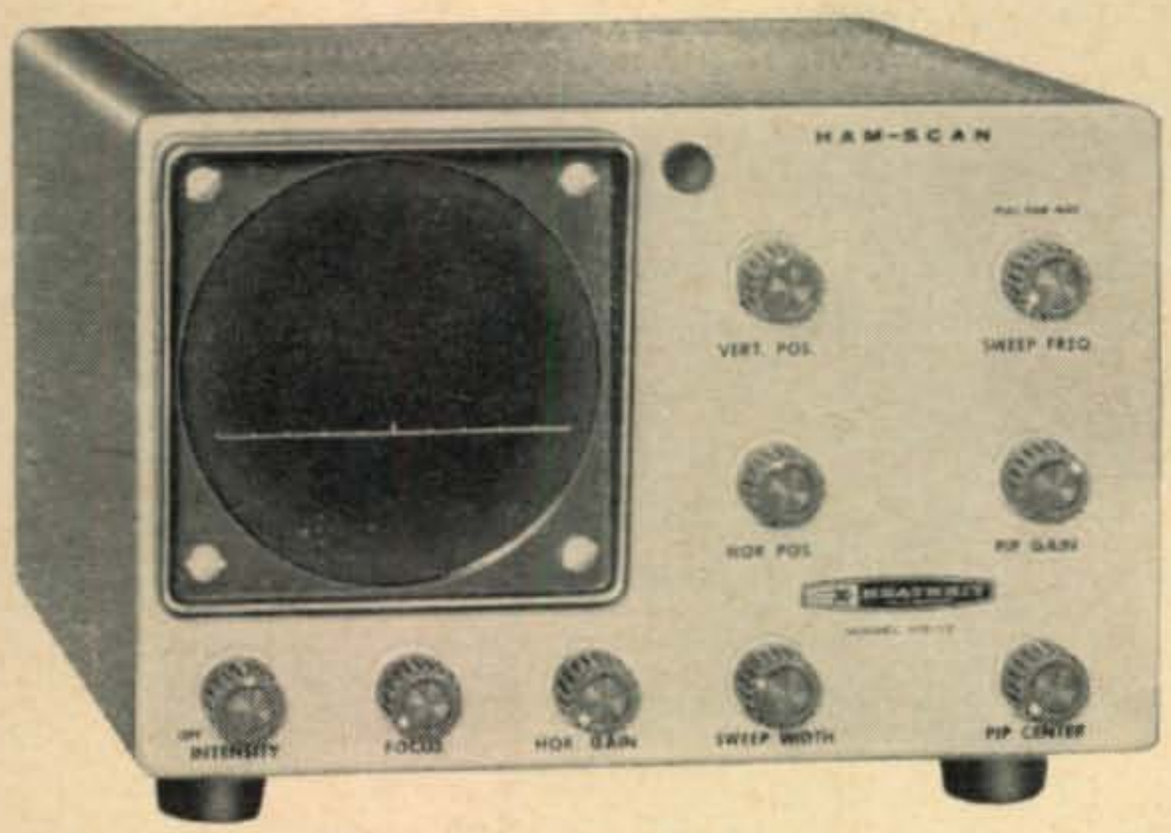
The Wisconsin Nets Association (WNA) picnic will be held at East Park in Hartford, Wisconsin on July 12. Registration begins at 10:00 A.M. and is one dollar per person or two dollars for family tickets which includes XYL and children. Refreshments will be served, but bring your own lunch.

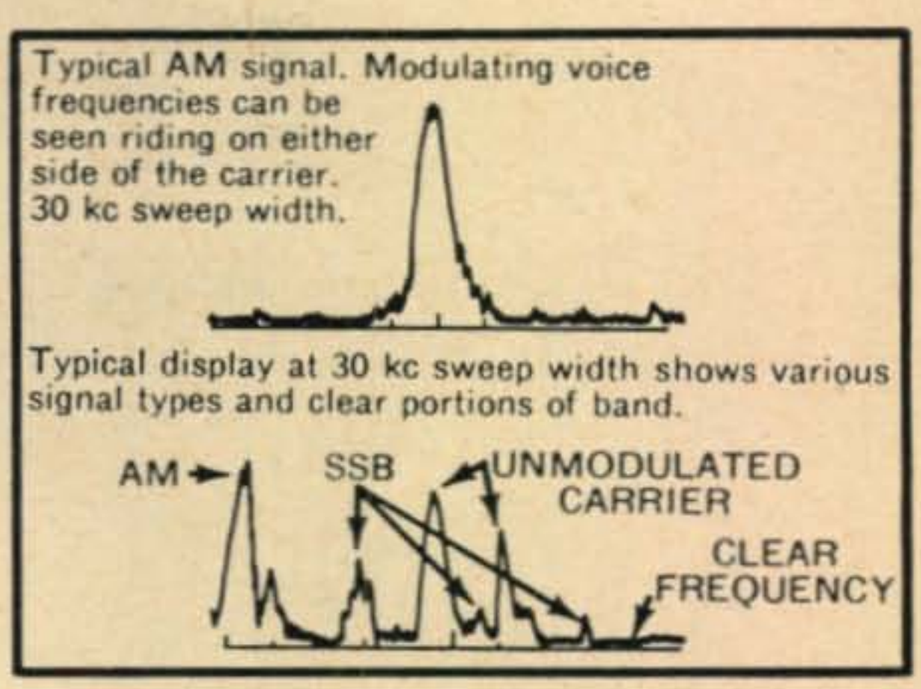
Charlotte, North Carolina

The Charlotte Hamfest on July 5 will be held at the Army National Guard Armory at Douglas Municipal Airport. There will be a hospitality dinner July 4 at the airport's Dagwood Restaurant featuring Gus Browning as guest speaker. W4FHI can supply info.

[*Continued on page 86*]

WATCH IT!... WITH THE





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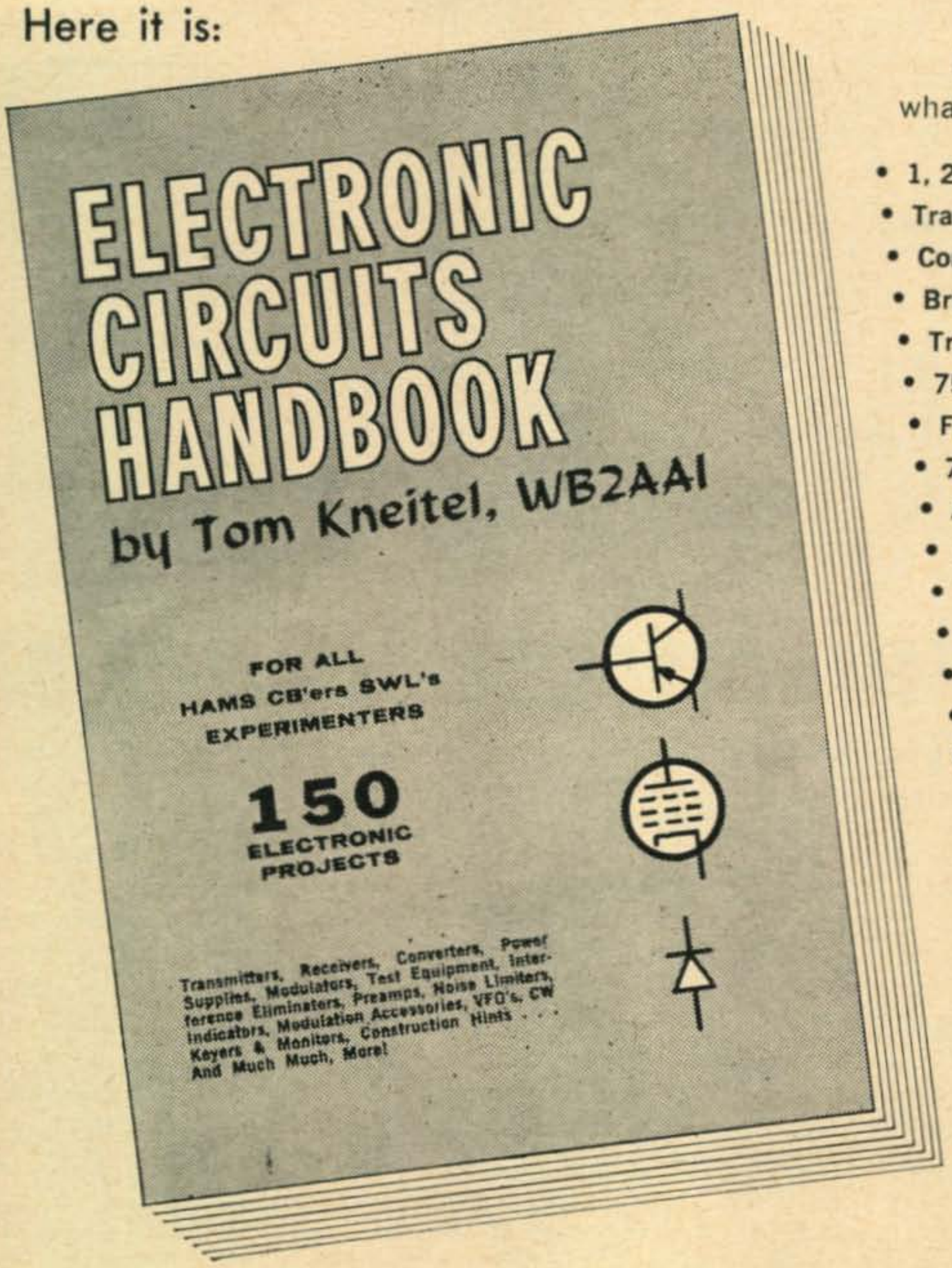

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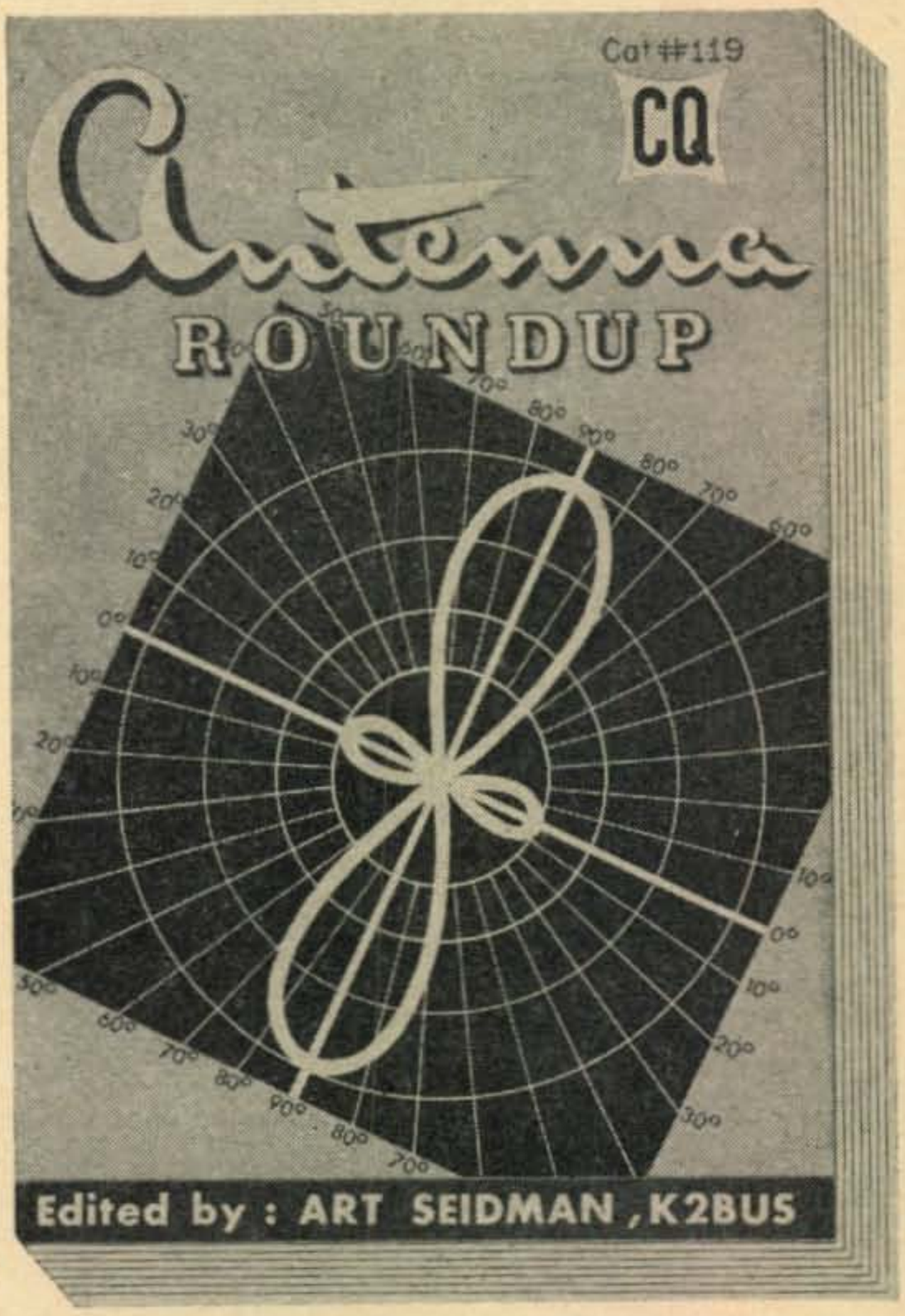

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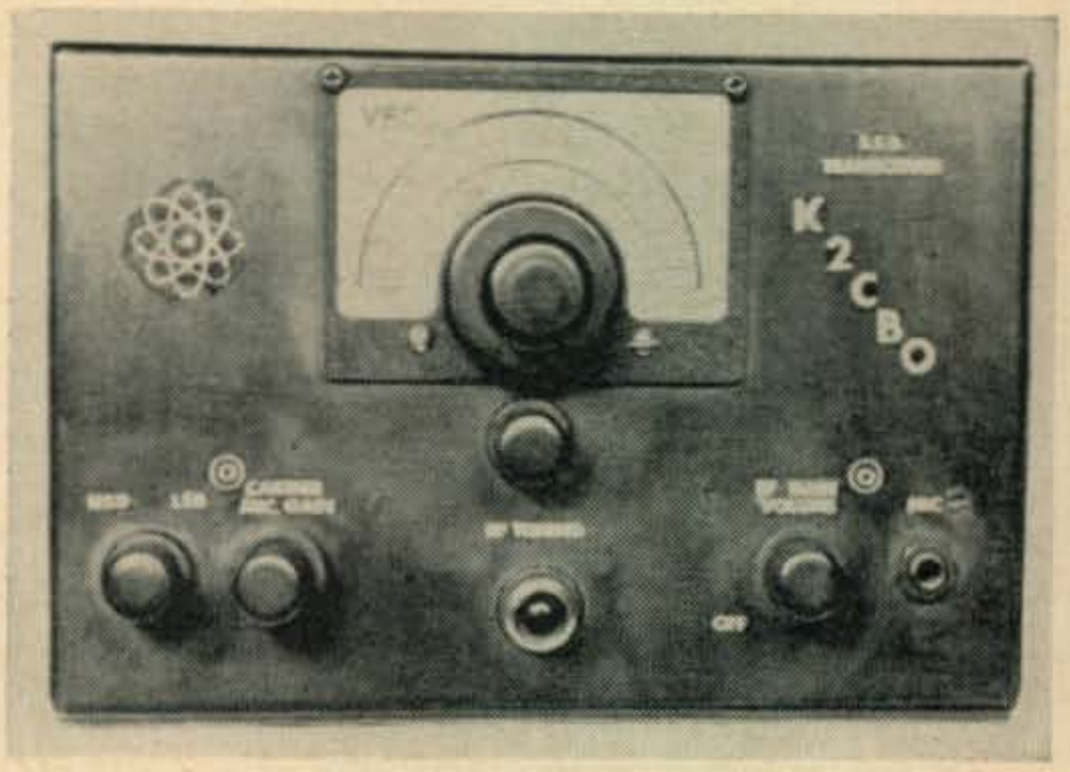
A Unique 75 Meter S.S.B. Transceiver

Unusual Circuits For Fixed or Mobile Use

BY MURRAY GELLMAN*, K2CBO

This 75 meter mobile s.s.b. transceiver has an output of 50 watts p.e.p. into a 50 ohm load with a fixed tuned broadband tank or 100 watts p.e.p. with a tunable tank. Some of the unusual features are Varicap tuning of the receiver r.f. section, diode switching, delayed voltage-doubled a.v.c., a stabilized balanced modulator and a cup-core ferrite tank inductor.

ORIGINALLY this 75 meter transceiver was designed as a CD fixed frequency mobile unit and worked so well that it was decided to convert it to amateur use. The output of the transmitter section is 50 watts p.e.p. into a 50 ohm load. With a two tone test the intermodulation, without feedback, was measured at 35 db down. Increasing the power output increased the distortion products. A vast improvement can be made in output (up to 100 watts p.e.p.) by replacing the fixed output tank circuit with a tunable one. The push-pull circuitry used reduced the second harmonic output of the transmitter.



Front view of the 75 meter s.s.b. transceiver. The controls are, from left to right, SIDEBAND SELECTOR, CARRIER INJECTION—MIC. GAIN (concentric), R.F. TUNING, R.F. GAIN—AF GAIN (also concentric). The v.f.o. dial is calibrated down to 2 kc points.

Circuit Operation

A block diagram of the transceiver is shown in fig. 1 and the complete circuit in fig. 2. The transmitter signal begins with V_1 at a frequency determined by Y_1 or Y_2. Although the oscillator is not fully temperature compensated, C_1 corrects the positive drift of C_2 and the r.f.c. The total drift of the circuit is less than four cycles.

The output of V_1 is fed to three points. One is to the product detector in the receiver section for which it acts as the b.f.o. The second point is to the CARRIER INSERTION control, and the third is to the balanced modulator, V_2.

The oscillator, V_1, must be carefully shielded as well as all its components and associate wiring to prevent any of its signal from reaching the grid of V_3, the 6GM6 i.f. amplifier.

*Senior Project Engineer, Technical Material Corp., Mammaroneck, N.Y.

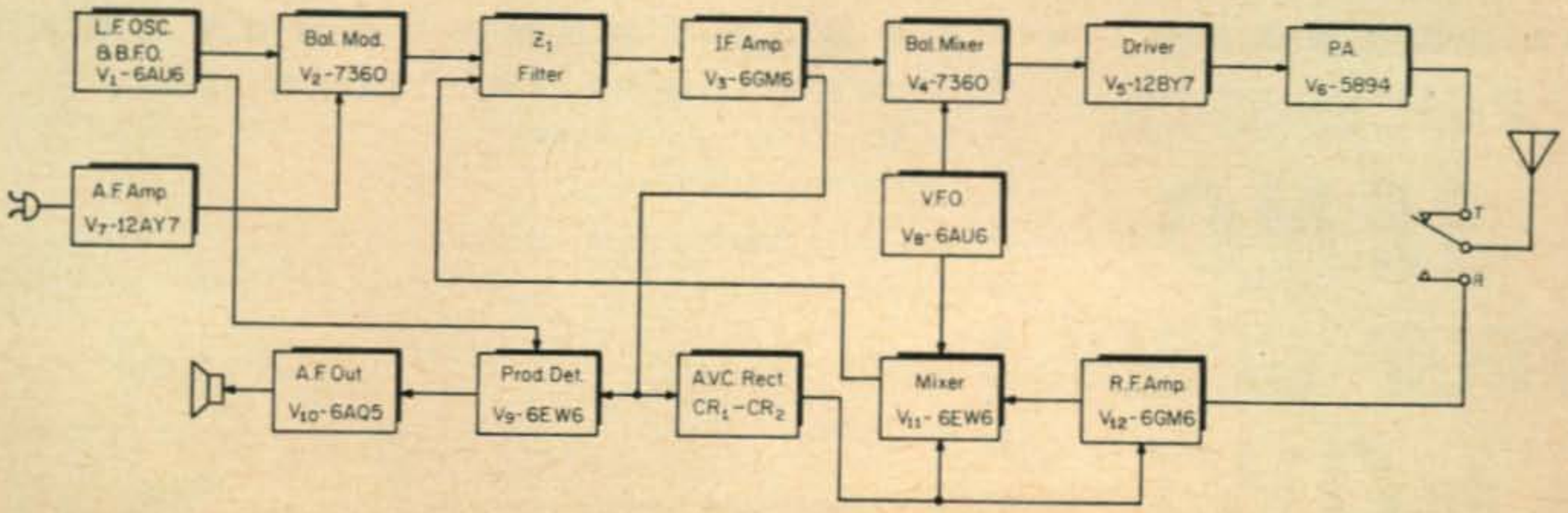
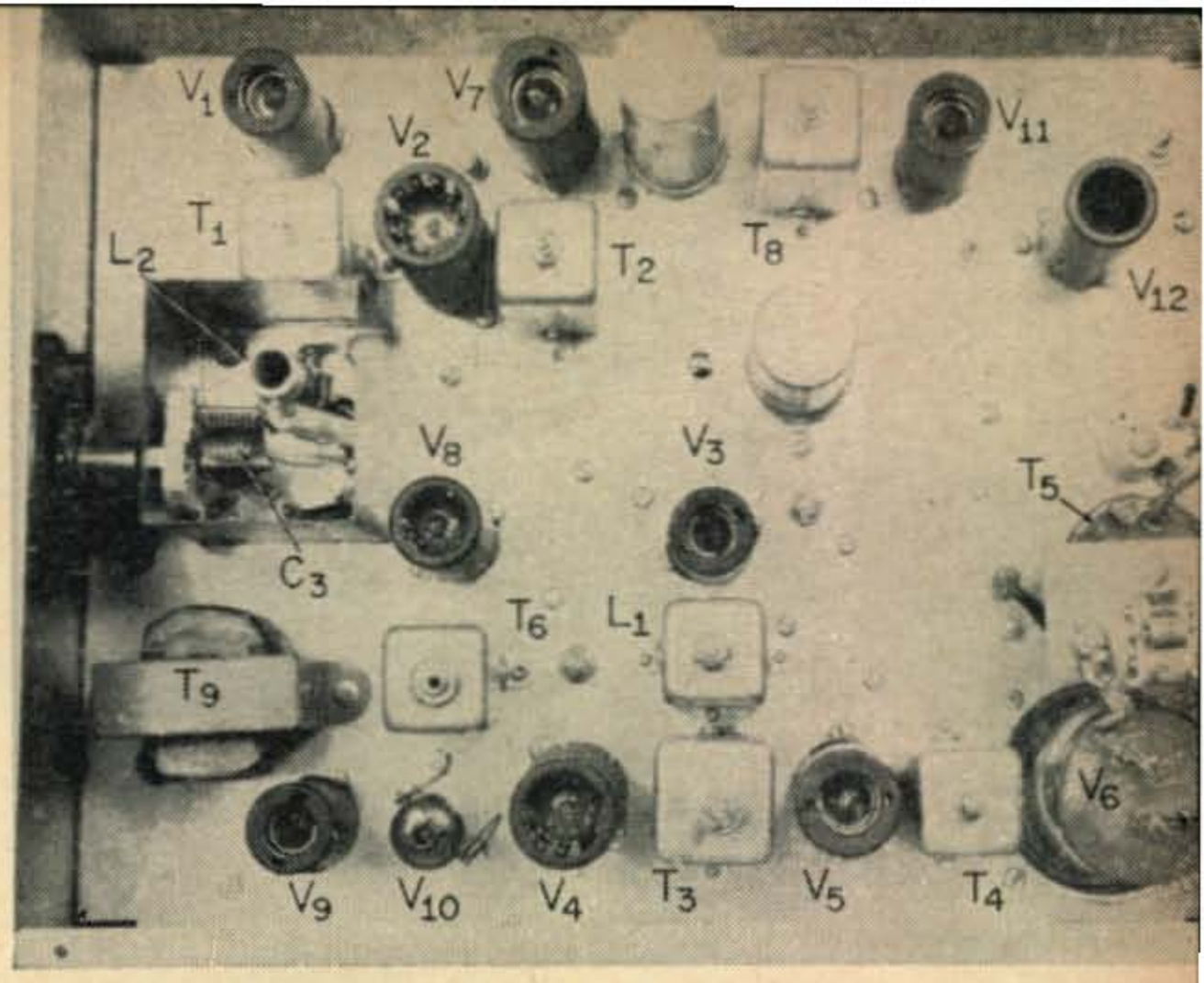


Fig. 1—Block diagram of the 75 meter transceiver. The l.f. osc, i.f. amplifier and v.f.o. are common to both the receiver and transmitter sections.



Top view of the 75 meter mobile s.s.b. transceiver showing the location of major components and tubes.

Balanced Modulator—The balanced modulator, V_2, modulates the r.f. output of V_1 with the a.f. output of V_7, producing a d.s.b. signal that is applied to Z_1, the filter. Note that the potentials applied to the electrodes and screen of V_2 are from a regulated source. Note also the unusual cathode circuitry. This was developed to overcome serious unbalance caused by filament voltage variations in mobile operation. The cathode emission helps stabilize the balance of V_2 and the carrier is suppressed (in this stage alone) a minimum of 40 db. The output winding of T_2 is bifilar wound and the secondary feeds the filter where one sideband is removed.

Filter and I.F. Amp—The original transceiver used a crystal filter that is unobtainable by the amateur. A mechanical filter can be used and a suitable type is the Collins 455 kc type Y (455Y21). The output of the filter, Z_1, is fed to V_3, the i.f. amplifier. The output of V_3 is fed to the product detector (for the receive function) and to V_4 the balanced mixer.

Balanced Mixer—This stage receives its signals from two sources; first the sideband signal at 455 kc which is fed to the deflection plates. The second signal is from the v.f.o., V_8, and serves to heterodyne the sideband signal into the 75 meter band. The oscillator signal is a minimum of 65 db down (at 3.8 mc) at the output of the bifilar wound primary of T_3.

Driver and Final—A sideband signal in the 75 meter band is fed to V_5, the 12BY7 driver. Some audio degeneration takes place in this stage since the screen and cathode bypass capacitor values are chosen so as not to bypass all audio to ground. The intermodulation products decrease somewhat due to this degeneration. The output of V_5 is coupled to the final through T_4. The secondary is bifilar wound. The output of V_6 is fed to T_5 wound in a ferrite cup core. The primary is tuned to 3.9 mc by a 23 mmf capacitor made up of one 20 and one 3 mmf 5 kv unit. The ferrite transformer presents an approximate 12K plate to plate load primary to a 50 ohm secondary.

V.f.o.—The v.f.o., V_8, is a fully temperature compensated Colpitts e.c.o. The drift from a cold start is less than 300 c.p.s. To reduce the effects of filament voltage variations and aging problems, R_2 is used to degrade the transconductance of V_8. The v.f.o. frequency, determined by C_3, has a range of 215 kc. This covers the band from 3785 to 4000 kc.

Special care must be taken to mount every component in this circuit rigidly including all wiring associated with V_8. When these precautions are not taken, a gargling sound will be heard in the receiver due to frequency modulation (in mobile operation only).

Receiver Section

The tuning of the front end of the receiver is accomplished with Varicaps, CR_5 and CR_6. The actual tuning control is the potentiometer R_3 marked R.F. TUNING. It derives its voltage from the 150 volt regulated line through a voltage divider circuit. The minimum voltage is established by the 330 ohm resistor and insures that the Varicaps will not conduct.

The noise figure of the receiver increased from 3.5 db to 5.6 db due to the use of Varicaps and this increase was most likely due to their diode characteristics. However, this can be overlooked because the noise figure is still fair for 75 meters. The atmospheric noise and that noise generated in mobile operation exceeds the receiver noise figure.

The selectivity is also decreased by the Varicaps but it is still better than most commercial receivers employing one r.f. stage. It could be improved in this receiver, if desired, by raising the Q of the tuned circuits or using higher Q Varicaps. This would prove more costly and was found to be unnecessary for 75 meter operation.

Varicap CR_5 might possibly conduct if the front end of the receiver is overloaded or if the high frequency oscillator injection fed to the mixer is too high. A low level high frequency oscillator signal is desired for several reasons. A strong r.f. voltage might leak around the front end and degrade the sensitivity. Also, it would be almost impossible to supply a.v.c. voltage to the mixer due to grid conduction in V_{11} supplying its own bias. Still a third reason is that the ΔC of the Varicaps would be limited due to the high oscillator voltage as a higher back bias would be needed to prevent conduction.

I.F. and A.V.C. circuit—The output of V_{11}, the mixer, is fed to an i.f. transformer whose secondary is stepped down to match the impedance of the mechanical filter. The output of the filter, Z_1, is coupled to the grid of V_3, the i.f. amplifier. The output of the i.f., for the receive function, is fed to V_9, the product detector.

The output is also fed to the a.v.c. circuit through C_3 a 200 mmf blocking capacitor. The signal is fed to two diodes which form a voltage doubler circuit which is delayed by the back bias from the A.V.C. THRESHOLD control. The signal is not rectified until it exceeds the back bias and thus we obtain delayed a.v.c. Resistor

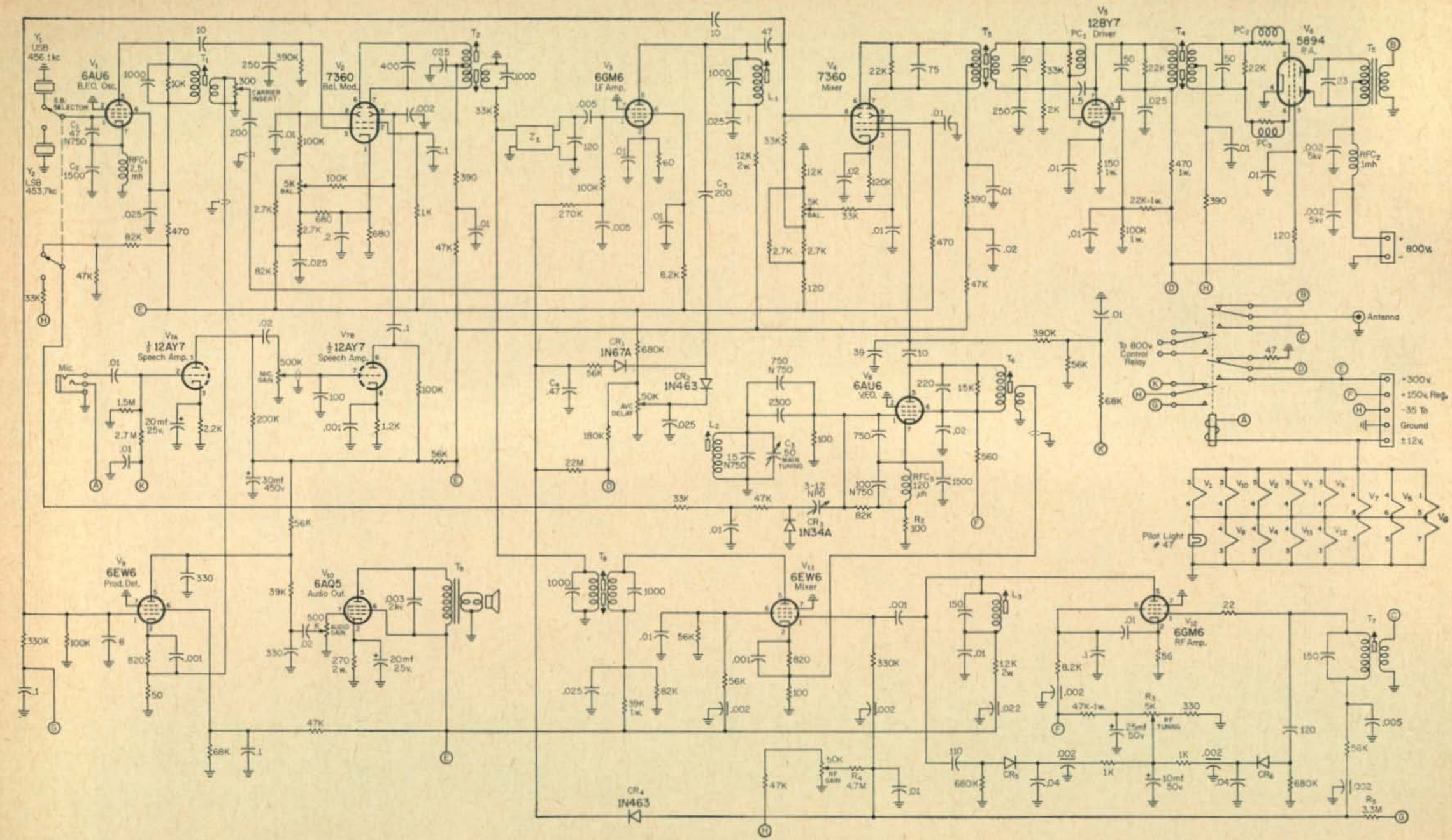


Fig. 2—Diagram of the complete 75 meter transceiver. All power is supplied from external sources. Resistors are ½ watt unless otherwise specified. All capacitor values one or greater are in mmf and less than one are in mf unless otherwise indicated. Disc ceramic capacitors should be used where possible and feedthrough capacitors should be used where indicated.

CR_5, CR_6—V47E Varicap, Pacific Semiconductor.
PC_1, PC_2, PC_3—5t. #22 e. on a 47 ohm ½ watt resistor.
T_9—5K to 3.2 ohms, output transformer, Stancor A3309.
Z_1—Mechanical filter, Collins 455Y21.

R_3 and capacitor C_4 determine the attack time for the a.v.c. and the slow discharge time is controlled by C_4 discharging through R_4 and R_5 in the front end returns.

Product Detector—The 6EW6, V_9, acts as the product detector. The output of V_3 is capacitively coupled to the grid of V_9. The b.f.o. output from V_1 is coupled into the cathode circuit of V_9 (approximately 1.2 volts r.m.s.). When an incoming signal arrives at V_9 it is demodulated to an audio rate by plate detection. The b.f.o. signal and any other high frequency component that appears in the output is attenuated through the *R-C* low pass filter. The audio is then fed to the grid of V_{10} which drives the speaker.

Sideband Selection

Crystals Y_1 and Y_2 are set on the slopes of the filter response and are 456.1 and 453.7 kc. Assume that you are receiving an upper sideband signal at 3900 kc. The v.f.o. would be tuned to 4356.1 kc (3900 kc plus 456.1 kc.).

If you want to go to the lower sideband, the carrier must be placed on the 453.7 kc slope and for the same 3900 kc signal the new v.f.o. setting would have to be 3900 kc plus 453.7 or 4353.7 kc; 2.4 kc lower. This means retuning the v.f.o. for a proper signal. In order to avoid this undesired retuning, components CR_3 and C_5 form a frequency shift network similar to that used in teletype. When the SIDEBAND SELECTOR is placed in the LOWER SIDEBAND position (crystal Y_2) a positive voltage is applied to CR_3 causing it to conduct. This places C_5 at ground potential. The amount of ΔC required to shift the v.f.o. is then adjusted by C_5.

When the switch is in the UPPER SIDEBAND position CR_5 is back biased (with voltage taken from the bias supply) and cannot conduct. Thus C_5 is removed from ground and the v.f.o. returns to its original frequency.

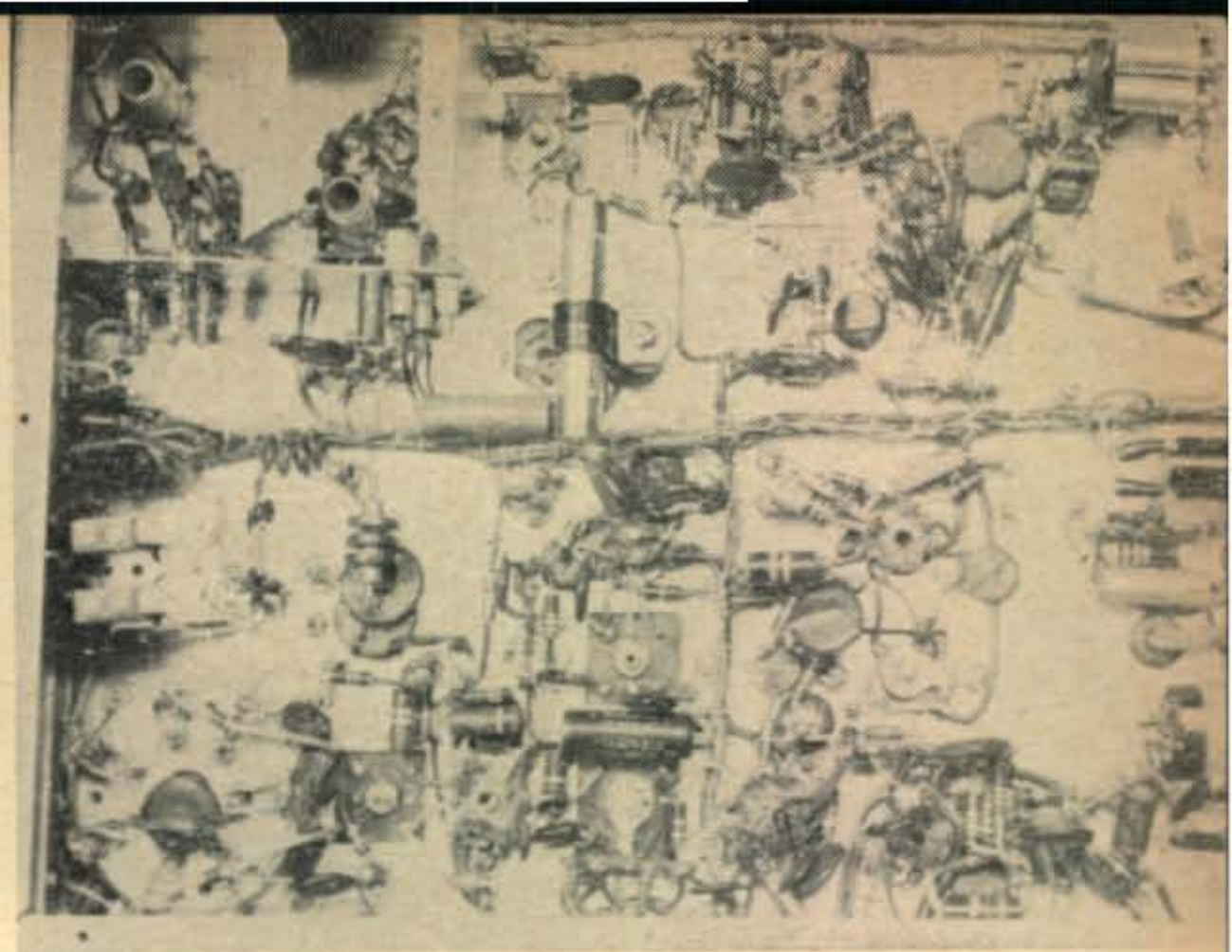
Muting

When the transmitter is placed in operation by depressing the p.t.t. button, relay K_1 is energized. The negative voltage applied to relay terminal *H* is fed to *G* and biases V_{12}, V_{11} and V_9. This negative voltage biases these tubes to cut off so that they cannot conduct. Diode CR_4 prevents this negative voltage from appearing at the grid of V_3, the i.f. amplifier, as it must still function in the TRANSMIT position. At the same time, B plus, applied through the relay to *D*, back biases CR_2 (through R_6) in the a.v.c. circuit. This prevents a.v.c. voltage from being developed due to the transmitter r.f. voltage at V_3.

When the p.t.t. button is released the relay is de-energized and no B+ is applied to V_5 the 12BY7 driver and V_6 the 5894 p.a.; these tubes are then cut off. A negative voltage, through relay terminal *K*, is applied to V_{7A} and V_4.

Power Supplies and Metering

The power supply requirements are as follows: 800 volts at 200 ma, 235 to 300 volts at 100 ma, 150 volts regulated at 25 ma and minus 50 volts.



Bottom view of the 75 meter s.s.b. transceiver shows the shield compartment for the r.f. stage in the upper left corner. The antenna coil T_7 is in the left compartment and the plate coil, L_3, is in the right section. The mechanical filter is located to the right of the r.f. compartment and the relay, K_1, is below the compartment. The 5894 final is in the lower left hand corner of the chassis. The b.f.o. crystals are located in the upper right hand corner on the sideband selector switch.

The minus voltage was obtained from a 100 volt supply and adjusted to the correct value with a potentiometer.

If the fixed tuned broad-band final tank is used, a plate meter is not required. However, if the alternate tuned circuit is used, a plate meter of 0-200 ma is mandatory.

Vox and S-meter circuits were not included in this unit for a variety of reasons. If either circuit is desired, they may be added by using any of the suitable circuits that appear in various publications.

Coils

The final tank circuit can either be a fixed tuned or conventional variable type. The construction of the fixed tuned type of tank is shown in fig. 3(A). General Ceramics of Keasbey, New Jersey, makes the cores, part #CF215 type Q1 and the nylon forms, part #6204.

Wind 7 turns of #20 Formvar on each of the nylon bobbins. Be sure that both are wound in the same direction so that when they are placed together they will provide 14 turns. Place five layers of Scotch tape over the Formvar windings. Now, place the two forms together and wind one turn for the secondary in the center. Actually one half of the turn should be on one form and passing the wire through one of the slits, wind the second half of the turn on the second form. Tape the secondary down with three turns of Scotch tape and insert the bobbins into the core halves. Pass the six wires through the small holes in the core and place a 2½" 6-32 headless screw through the center. Place a fibre washer and nut on each end leaving the excess screw length on one end for mounting. Dip the entire transformer in Q Dope and air dry. The end of the first winding and the start of the second are connected together for the center tap connection.

The other coil and transformer data is listed

in the coil chart. The construction of those units requiring pi windings will be most difficult for anyone not having access to a coil winding machine. Those coils that operate at or near 455 kc and are pi wound, but not bifilar wound, may be taken from old 455 kc i.f. transformers. Those forms marked phenolic may also be scavenged from an old TV chassis. All coils and transformers except T_7, T_5 and L_3 are shielded.

V.F.O. Alignment

Connect the proper voltages to the transceiver and let it warm up for at least one hour. Loosely couple a lead to the secondary of T_6. This lead is connected to either a frequency meter (BC-221) or an accurately calibrated, stable receiver tuned to 4356.1 kc. Set capacitors C_3 and C_5 at 50% of rotation, set the S.B. SELECTOR to UPPER S.B. and all other front panel controls counter clockwise. Adjust the slug in L_2 so that it zero-beats at the receiver or frequency meter setting, 4356.1 kc.

Connect a v.t.v.m. with r.f. probe to the secondary of T_6 and adjust the T_6 slug for maximum output.

Tune the v.f.o. to 95 on the National dial and set the frequency meter or receiver to 4456.1 kc; adjust L_2 for zero beat. Reset the dial to 5 and set the frequency meter to 4248.1 kc. A beat note will be heard indicating that the v.f.o. is covering the needed range.

Retune the v.f.o. and frequency meter to 4456.1 kc and calibrate the dial every 2 kc. To mark off the points insert a #1 lead pencil through the hole located at the top of the pointer. When completed subtract 456.1 kc (or the b.f.o. crystal used) from the frequency meter readings. Mark off these frequencies every 10 kc and small lines every 2 kc.

Receiver Alignment

Connect a signal generator (50 ohm output impedance) from the grid of V_3 to ground. Place a 2.5 ohm resistor across the secondary of T_9 and connect a low scale a.c. voltmeter across the resistor. Adjust the a.v.c. threshold control for maximum positive voltage at the arm. Temporarily, ground the a.v.c. line at the junction of C_4 and R_3 and connect a jumper across the plates of V_2. Turn the AUDIO and R.F. GAIN controls fully clockwise; turn the MIC. GAIN and CARRIER INSERTION controls fully counter clockwise. Place the S.B. SELECTOR in the UPPER position and tune the signal generator to 455 kc, unmodulated. Adjust the generator output to produce a reading on the output meter. Peak L_1 for maximum out-

Table I—Winding Data

	Winding	*Turns*	*Wire*	*How Wound**	*Pri.-Sec. Separ.*	*Form*
L_1	—	100	#5/41 Litz	Pi	—	CTC PLS62C4L/O
L_2	—	16	#24e.	Space-Wound	—	CTC PLS72C4L/K
L_3	—	60	#36 d.s.c.	Close-Wound	—	CTC PLS52C4L/B
T_1	Pri.	105	#5/41 Litz	Pi	3/16"	CTC PLS62C4L/F
	Sec.	35	#38 d.s.c.	Pi		
T_2	Pri.	100	#5/41 Litz	Bifilar Pi	3/16"	Form—¼" × 1¾" Phenolic Core—CTC 20063F
	Sec.	100	#5/41 Litz	Pi		
T_3	Pri.	23	#38 d.s.c.	Bifilar Pi	3/16"	Form—¼" × 1¾" Phenolic Core—CTC 20063E
	Sec.	50	#38 d.s.c.	Pi		
T_4	Pri.	50	#5/41 Litz	Pi	¼"	Form–0.375" × 1¾" Phenolic Core—CTC 20063K
	Sec.	19	#5/41 Litz	Bifilar Pi		
T_5	See Text					
T_6	Pri.	105	#5/41 Litz	Pi	3/16"	CTC PLS62C4L/F
	Sec.	35	#38 d.s.c.	Pi		
T_7	Pri.	3	#36 d.s.c.	Close-wound	⅛"	CTC PLS52C4L/B
	Sec.	65	#36 d.s.c.	Close-wound		
T_8	Pri.	125	#5/41 Litz	Pi	⅜"	Form—¼" × 1¾" Phenolic Core—CTC 20063F
	Sec.	100	#5/41 Litz	Pi		

*All pi windings are ¼" wide.

put while reducing the generator input.

Reconnect the signal generator to the grid of V_{11}. Set the output of the signal generator as needed while adjusting the slugs of T_8 for maximum output.

Move the signal generator to the grid of V_{12}. Set the R.F. TUNING control clockwise to 95% of its rotation. Tune the v.f.o. to 3999 kc and the signal generator to the same frequency and retune slightly until an output reading is obtained on the meter; peak L_3. Remove the generator and replace the shield over the r.f. section.

Connect the generator to the antenna terminal, peak T_7 and touch up T_7 and L_3 again with the generator output at 2 microvolts.

Retune the v.f.o. and generator to 3.8 mc and rotate the R.F. TUNING control for a peak. If no peak is obtained at the low end, a decrease in the 330 ohm resistor is necessary.

Adjust the signal generator for 2.5 microvolts output. Remove the ground from the a.v.c. line; in its place connect a v.t.v.m. (low d.c. scale) and adjust the A.V.C. THRESHOLD control for a ¼ volt reading.

Return the generator and v.f.o. to 3.9 mc and peak the R.F. TUNING. Turn the audio gain down and replace the 2.5 ohm resistor with a speaker and readjust the audio gain for comfortable listening. Tune the V.F.O. for zero beat at 3.9 mc. Shift the S.B. SELECTOR to LOWER S.B. (453.7 kc) and adjust C_5 for a zero beat. This completes the receiver alignment. Note that the jumper is still across the plates of V_2 and will remain there until a portion of the transmitter alignment is completed.

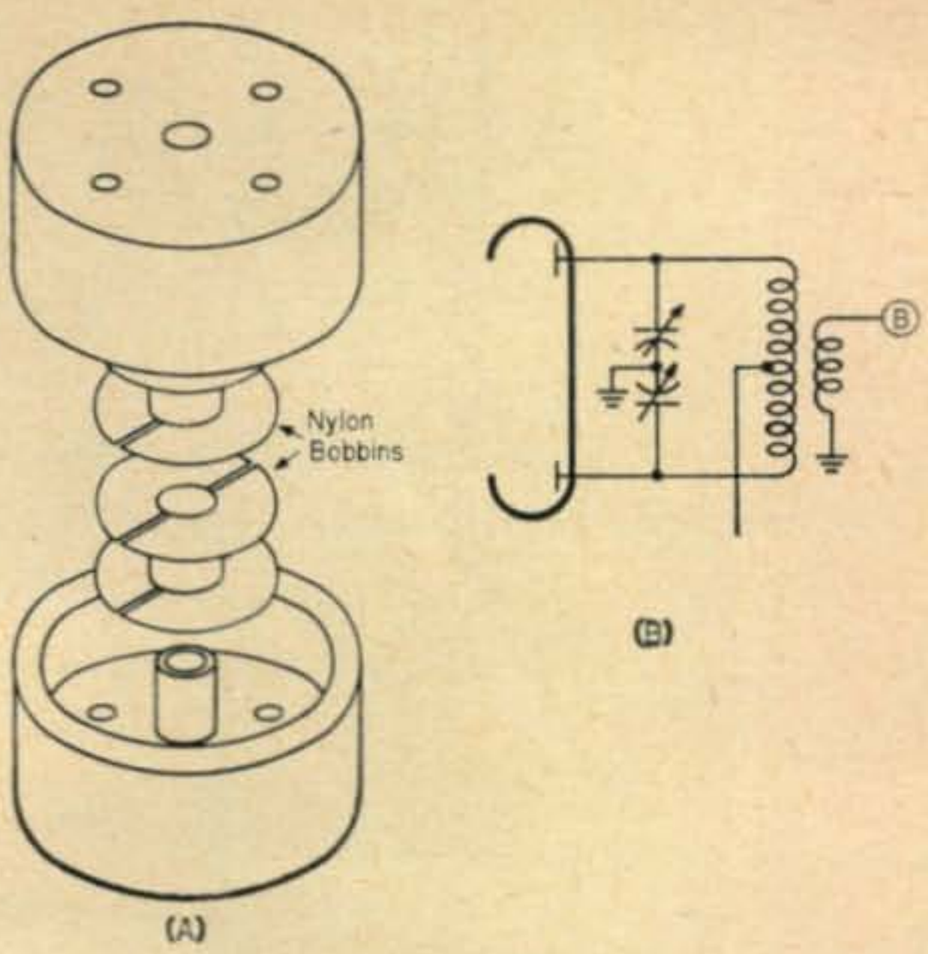


Fig. 3—Details of the fixed tuned final tank described in the text are shown above in (A). The variable tuned tank shown in (B) consists of 29 turns of #20 e., center tapped, 1" in diameter and 2½" long. The link consists of 3 turns wound around the center of the coil; the tuning capacitor is a 150-150 mmf split stator.

Transmitter Alignment

Connect a 50 ohm dummy load to the antenna and place an output indicator across it. This indicator can be a v.t.v.m. with an r.f. probe, a Micro-match, Mono-match or a 1 amp r.f. meter in series with the dummy load.

Temporarily insert a 200 ma meter in the 800 volt line. Adjust the bias supply to —50 volts.

Connect a signal generator, with the output control set at zero, to the control grid of V_5, the 12BY7. Key the transmitter and adjust the bias so that 5894 draws 40 ma. Set the generator to 3.9 mc and adjust the output until the current of the 5894 rises to 60 ma. Tune T_4 for maximum plate current as shown on the meter, but cutting the signal generator output down so that the plate current drops to 60 ma whenever the current exceeds 70 ma. Swing the sig gen ± 100 kc; the output indicator should not drop more than 2%. Now unkey the transmitter.

Connect the generator to pin #8 of V_4 through a 0.005 mf capacitor; temporarily ground the control grid, pin #3. With the generator still at 3.9 mc adjust T_3 in the same manner that T_4 was adjusted. At ± 100 kc the drop in output should not exceed 5%. Un-key the transmitter, disconnect the signal generator and remove the ground from pin #3 of V_4.

For maximum v.f.o. suppression the balance control in the V_4 circuit should be adjusted. To do this, tune the transmitter to 3.9 mc. Loosely couple a wire from a receiver antenna to the transmitter output. Tune the receiver to 4356.1, and key the transmitter. Retune the receiver or the v.f.o. for a maximum S-meter reading. Now adjust the BALANCE control for minimum indication from the receiver. Un-key the transmitter, shut off all power and remove that jumper from the plates of V_2 (forgot it, eh?).

Connect an audio oscillator to pin #7, V_{7B}, set at 1000 cycles with its output control at zero and the MIC. GAIN control at 30% of rotation. Key the transmitter and advance the audio generator output to about 1/10 volt. Peak the cores of T_2 for maximum output as shown on the r.f. indicator in the dummy load circuit. Keep the audio low so as to balance easily (do not exceed 5 watts of r.f. output). Un-key the transmitter.

Set the BALANCE control in the V_2 circuit to the center of its rotation. Tune the receiver (still loosely coupled to the transmitter output) to 3.9 mc and key the transmitter. Tune the receiver slightly for a maximum S-meter indication and adjust the BALANCE control for a minimum S-meter reading. Unkey the transmitter and disconnect the receiver from the dummy load.

Plug in the microphone and depress the p.t.t. button; turn the CARRIER INSERTION control clockwise until the plate current indicator reads about 160 ma to be sure that this control functions and adequate power is available. Reset the control counter clockwise and use it for tune up only. Turn the MIC. GAIN up about 30% and talk into the microphone, in a normal voice. Adjust the MIC. GAIN until the average plate current is about 130 ma. This corresponds to a p.e.p. output of approximately 80 watts.

Remove all the equipment, place the top and bottom covers on the transceiver, hook up the antenna and go! ■

The Crystal Checker

BY E. H. MARRINER*, W6BLZ

The simple device described below was built to determine the condition of the many crystals around the shack. It may also be used as a calibrator for band-marking and as an accurate signal generator for aligning i.f. frequencies since it is designed to function at the low end of the spectrum as well as the high end.

SURPLUS crystals are cheap! Every surplus store has a crystal grab table set aside, piled high with surplus crystals. They come in every size, shape, frequency and holder. Mail order catalogs and flyers are filled with crystal advertisements. Some dealers sell nothing but surplus crystals which they have bought by the car-load lot.

These crystals, now available, may be good, bad or broken but at a bargain price of ten cents each. There are still plenty of them on the markets. Now would be a good time to stock up for future use. They can be used later in transmitters, receivers, oscillators, mobile converters and many other projects.

As the buyer is aware, these crystals have been around a long time but are generally in good condition. Some may need only cleaning of the crystal to make it work. The best way is to check them out before you buy them. You can either take a plastic bag-full home with you or check them at the store with this crystal checker. Just ask the clerk if you can plug into the wall outlet, insert in your selected crystals and check them out before you buy. You might be surprised by the enjoyable afternoon you can spend searching for these goodies at ten cents apiece instead of $3.00 each at a regular store.

Someone is sure to ask, "Why not a transistorized crystal checker? Why bother with a checker that has to plug into the wall socket?" Many crystal oscillators using transistor circuits are very critical to the frequency. Parts have to be tailored for just that frequency and generally they do not oscillate over a large frequency span. This tube type crystal checker is much more versatile, not only checking crystals through the 2 to 30 mc range but also testing the ones in the 200 kc to 500 kc range, or fundamental crystals.

After all, the tester isn't much bigger than a transistorized unit and what could be easier than just plugging it into the wall sockets, inserting your crystal and reading the meter?

*528 Colima Street, La Jolla, California.

Operation

This circuit employs a 6AH6 tube in a modified Pierce oscillator circuit. By using a large radio frequency choke in the screen lead, the circuit will oscillate at very low frequencies besides the

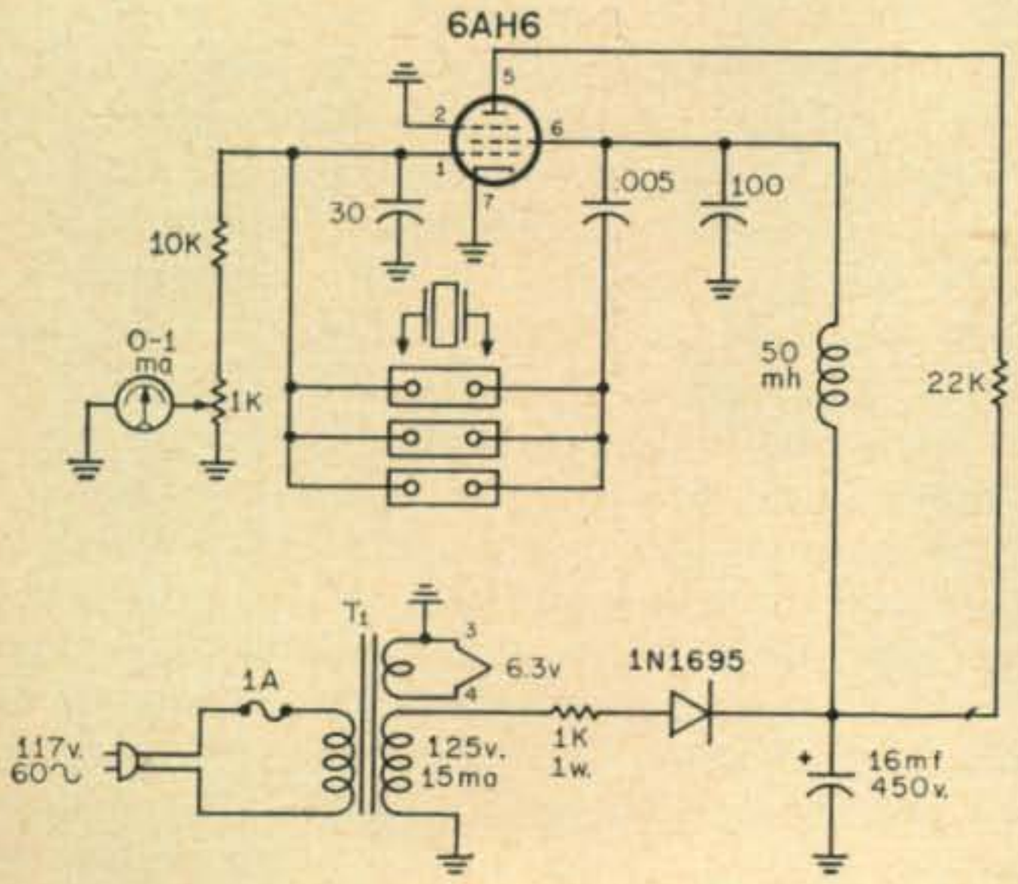
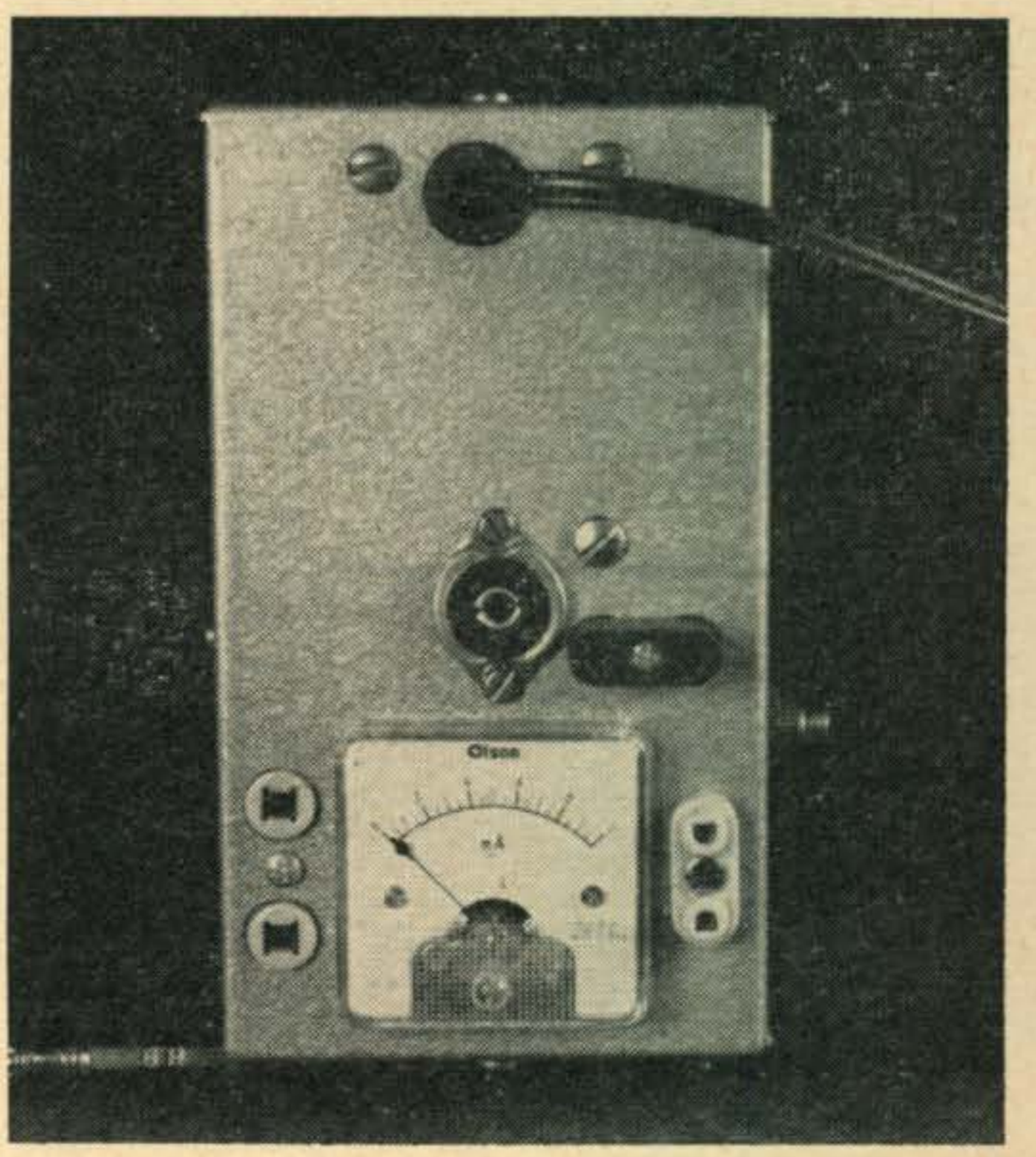


Fig. 1—Circuit of the crystal tester. The crystal sockets used are Cinch-Jones KB, Millen 33302 and Millen 33002. Transformer T_1 is a Stancor PS-8415. All resistors are ½ watt unless otherwise noted and all capacitors less than one are in mf; greater than one are in mmf.



Front view of the crystal checker showing the parts location. Note sensitivity pot on the right side of the box.

high frequency range. When the crystal is plugged into the socket and the circuit oscillates, the grid circuit will draw grid current which can be read on a meter.

A good oscillating crystal will cause from 0.5 ma to 1 ma of grid current. By taking a good crystal and checking the current, you will see that this can be used as a reference for other crystals. A bad crystal will produce a low current and the following is a scale of activity.

0.0 to 0.2 ma—Bad crystal.
0.2 to 0.3 ma—Fair crystal.
0.3 to 1.0 ma—Good crystal.

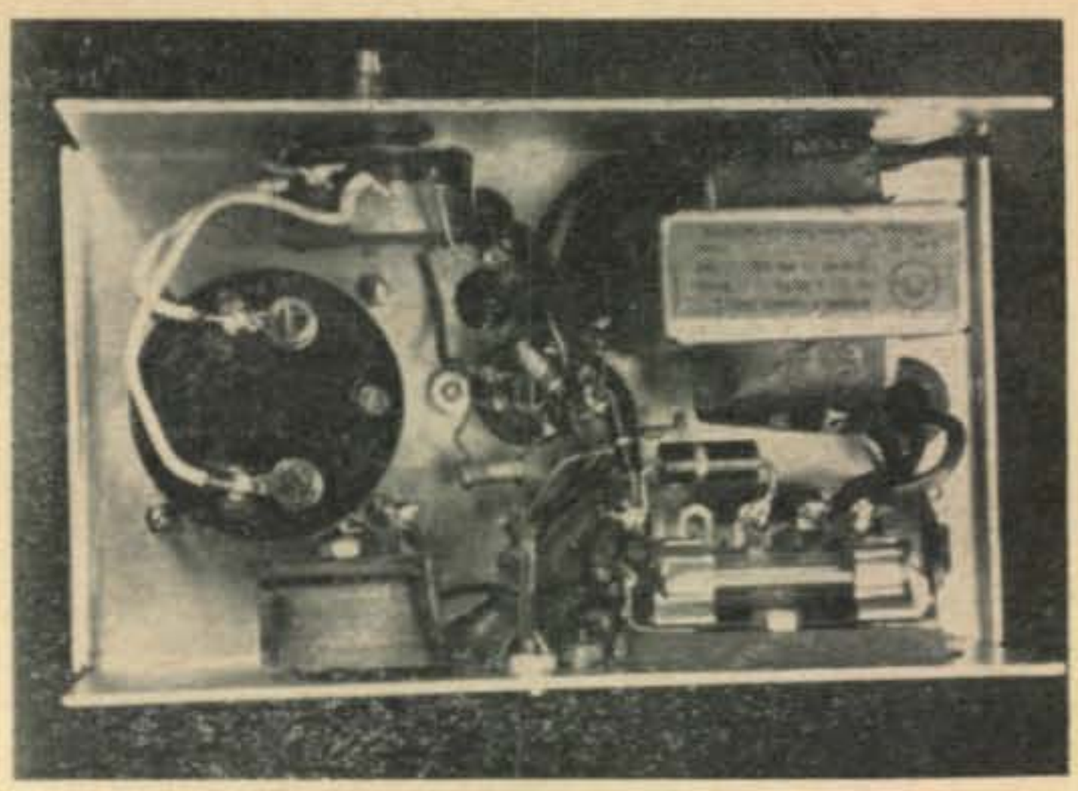
Construction

There are no particular precautions to be observed in building this circuit. All of the parts fit nicely into a type #136 LMB chassis box, 3" wide, 5" long and 2" high. The only thing to watch out for is to select a crystal socket or sockets for the type of crystals you think you might like to test. The FT-243 is the most common type. Just leave enough room when locating the crystal sockets so they can be inserted without hitting the tube or meter.

Testing

When the circuit is finished, select a crystal that you know is active. Put it in the circuit and set the 1000 ohm potentiometer so that the meter reads 1 ma. When other crystals are put into the circuit they can be compared with this meter reading.

Test gear like this is worth having around the shack since it can be used for a calibration oscillator as well as a crystal checker. There are all kinds of possible uses such as aligning receivers, keeping a check on amateur band edges, or even keyed in the cathode lead and used as a code oscillator when listening to the crystal frequency in a reciver with a bfo. Why not give it a try? ■



Bottom view of the crystal checker showing parts location. Picture was taken before the extra crystal sockets were added. Note the simple but compact wiring.

T Pads for R.F. Circuits

BY KEN "JUDGE" GLANZER*, K7GCO

Radio frequency T pads have many uses, particularly as attenuators between exciters and linear amplifiers. The amount of desired attenuation between the exciter and final depends on how much power is needed at the final grids, the efficiency of the grid circuit and the excess power of the driver. With a T pad in the line the exciter can be loaded at or near its full output while not overloading the final grids so that when the grid impedance changes (when the final goes from AB_1 to AB_2), the impedance change reflected back to the driver is reduced by the number of dbs of loss inserted by the T pad. The driver then essentially sees a constant load.

The T pad has other uses such as between exciter and low power s.w.r. bridges, at the input to a field strength meter in case of strong fields, or on the output of signal generators.

T Pad Design

The circuit of a T pad is shown in fig. 1. Also shown are the circuits of H pads which can be used for balanced lines. However, in most instances the T pad is usable and simpler.

A chart for determining the value of resistances needed for any particular value of db attenuation is shown in Table I. Since the chart values are for a 500 ohm impedance, to determine the resistance value for a 52 ohm pad each value must be multiplied by 52/500 or 0.104. For a 72 ohm pad the factor is 0.144.

For example, to calculate a 6 db attenuator (which results in a power loss of 75% look up the 6 db loss on the chart which shows resistance value for R_1 as 83.08 ohms and 669.4 ohms for R_2. Now multiply each value by 0.104 to convert it to 52 ohm impedance values.

The value for R_1 is now 8.64 ohms and R_2, 69.6 ohms. However, according to fig. 1, the T

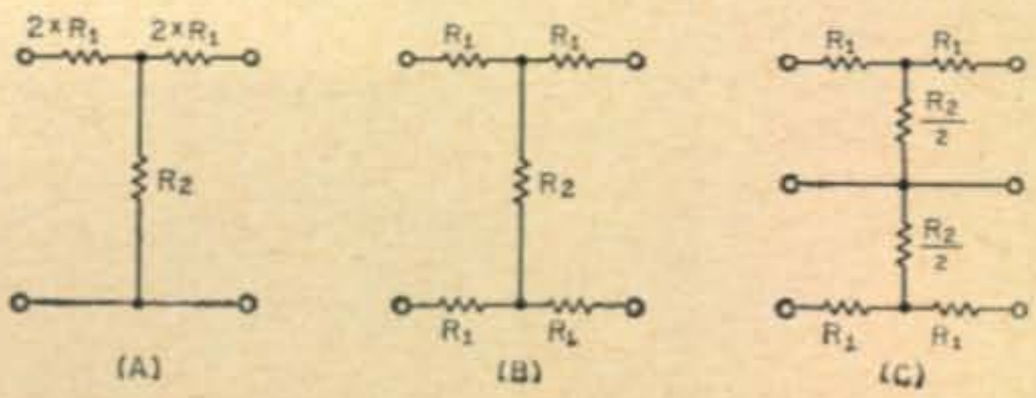
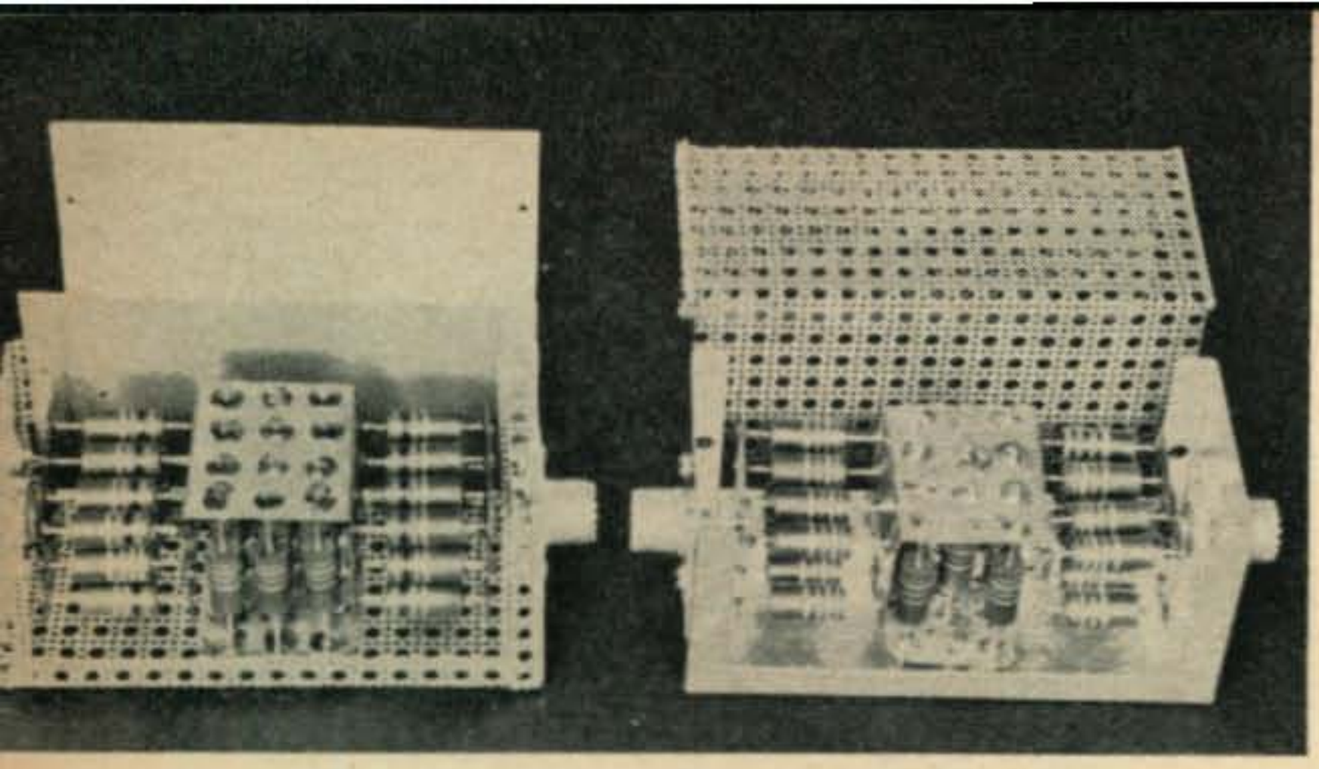


Fig. 1—The T pad shown in (A) is suitable for most attenuation circuits but the H pads in (B) and (C) are used for balanced lines.

202 South 124th Street, Seattle 68, Washington.



View of the 6 and 3 db T pads attenuators designed for 52 ohm coaxial cable.

pad configuration employs values of 2 × R_1 and thus the values shown in fig. 2 are required.

Pad Values

The first problem in construction of the T pad is to find carbon resistors of sufficient power rating and of proper resistance value. The easy way out is to use 2 watt carbon resistors (10%) paralleled to develop the precision resistance values that will be required and at the same time to build up the power dissipation capabilities. The method of mounting the resistors to keep the T pad as resistive as possible was suggested by W7JNC and is shown in the photograph.

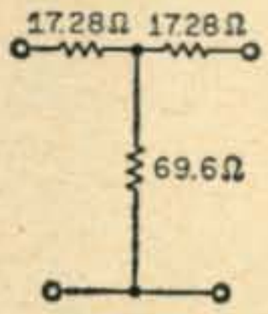


Fig. 2—The 6 db pad, calculated as an example in the text, is shown above.

The first step is to determine how the desired values of resistance can be arrived at. In the example being discussed a value of 18 ohms can be obtained by paralleling ten 180 ohm resistors. The 69.6 ohm resistor bank was made up of ten 680 ohm resistors. (Eleven 750 ohm resistors would have given 2 watts more dissipation to that leg and left the twelfth hole for a parallel correcting resistor if it was necessary). In actual practice, due to resistor tolerances, there will be some variation. Since the mounting plates will hold twelve resistors this allows room for paralleling another resistor if final value is above 18 or 69.6. The actual values obtained were 18.1, 17.95, and 79.45. For all practical purposes this is close enough but if it is desired to have it exact, measure all three arms of Tee pad with an accurate resistance bridge or ohmmeter and add a correcting resistor.

The method of determining the required value of the correcting resistor R_x, for each branch, employs the parallel resistor formula:

$$R_t = \frac{R_1 \times R_x}{R_1 + R_x}$$

Solving for R_x, we get

$$R_x = \frac{R_t \times R_1}{R_1 - R_t}$$

where: R_x = Unknown parallel resistor required.
R_t = 17.28 ohms (desired value).
R_1 = 18.1 ohms (actual value).

Thus: $$R_x = \frac{(17\ 28)(18.1)}{18.1 - 17.28} = \frac{312.7}{0.82}$$

$$R_x = 381 \text{ ohms}$$

Therefore a parallel resistor of 381 ohms would lower the final value of the 18.1 resistance to 17.28. The value needed in this case for the 17.95 branch was 462 ohms.

The resistance values required for a 3 db pad are 8.9, 8.9, and 147.8 ohms. Eleven 100 ohm resistors connected in parallel should give 9.1 ohms and twelve 1800 ohm resistors should give 150 ohms. The actual values obtained were 9, 9.1 and 161 ohms. The parallel correcting resistors are (in this case) 801, 396 and 1800 ohms. The first two were installed in the 12th hole but the 1800 ohm resistor had to be squeezed in as all 12 holes were used.

T Pad Housing and Assembly

The two T pads, the 6 and 3 db units, are each made in one half a Bud box 2¼ × 2¼ × 5 inches (CU2104A). This Bud enclosure was particularly suited for this application and as shown in the photo one half of the box contains the

Table I—Pad Resistor Values

Loss in db	R_1	R_2
0.1	1.440	43420.0
0.2	2.878	21720.0
0.3	4.318	14480.0
0.4	5.758	10850.0
0.5	7.193	8685.0
0.6	8.635	7232.0
0.7	10.07	6198.0
0.8	11.51	5421.0
0.9	12.95	4818.0
1.0	14.38	4333.0
2.0	28.65	2152.0
3.0	42.75	1420.0
4.0	56.58	1049.0
5.0	70.03	822.4
6.0	83.08	669.4
7.0	95.65	558.0
8.0	107.7	473.1
9.0	119.1	405.9
10.0	129.9	351.3
15.0	174.5	183.6
20.0	204.5	101.0
25.0	223.5	56.40
30.0	234.7	31.65
35.0	241.3	17.79
40.0	245.1	10.00

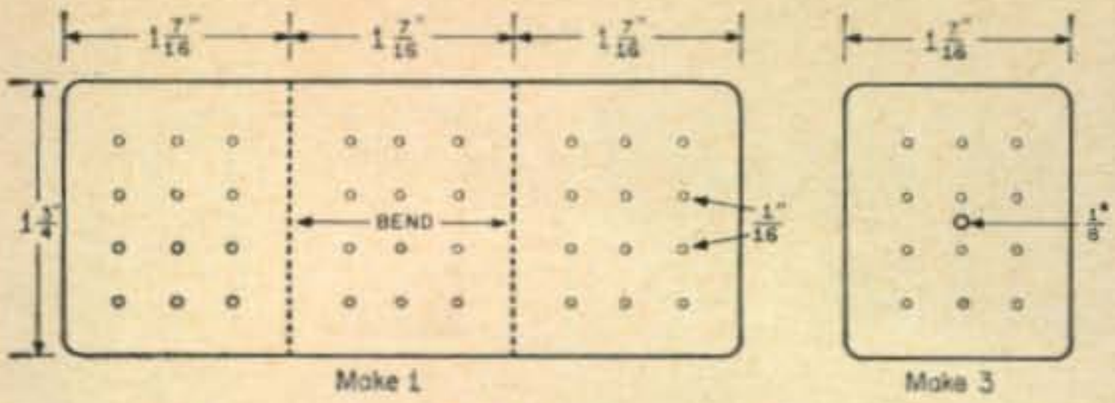


Fig. 3—Dimensions for the copper sheet end, bottom and center connectors. The bottom and the two end plates are identical.

pad and the cover is made from Reynolds Do-It-Yourself perforated aluminum. The second pad utilizes the other half of the box and more perforated aluminum for ventilation.

The coax jacks are first mounted in the middle of the end pieces of the box. The four copper pieces are cut, drilled and bent, as shown in fig. 3. The resistor leads are trimmed to 5/8" and are now soldered to the bottom plate as shown in fig. 4. With the top leads trimmed to 5/8", the U sheet is soldered to the vertical resistors.

Next, solder two resistors in the right and left corner of one side with the resistor leads trimmed to about 3/16". Then slip on the end sheet and note where the center post of the coax touches. Be sure the resistors are horizontal and then mark the contact point. Drill the coax connector hole and mount and solder the rest of the resistors and also the connector pin.

Repeat the procedure for the other end of the T pad.

General

When using the 6 db pad with 100 watts input (25 watts output) to drive the grids of a final amplifier there is about 33 watts dissipated in

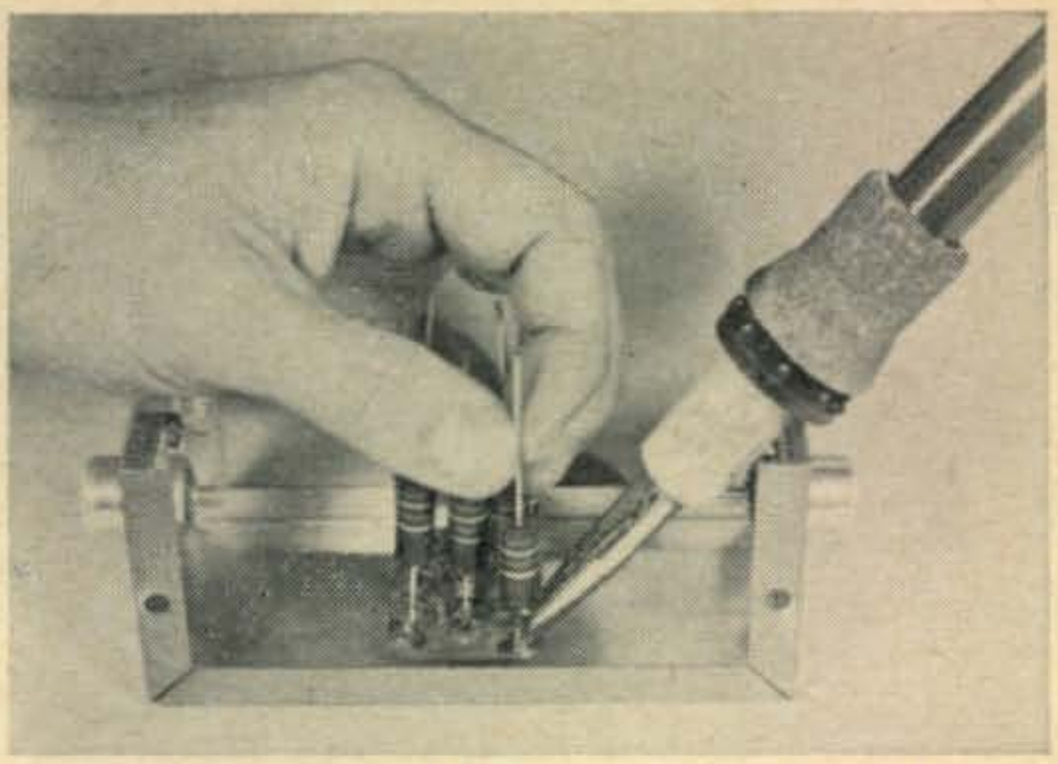


Fig. 4—Method used to solder the resistors to the bottom plate. The shorter the resistor leads the better.

the input 17 ohm section and 8 watts in the other. About 34 watts will be dissipated in the 69 ohm branch. Since the power dissipated is not continuous for a.m. and even less on c.w. and s.s.b., the pads handle 100 watts s.s.b. or a.m. input quite well.

Six db is about the maximum for a 100 watt output rig driving tetrodes with multiband tuners. The inefficiency of the grid circuit on 10 meters is the maximum db design consideration. The unique construction of the pads makes them almost purely resistive even at 10 meters.

The copper plates also act as heat sinks. For even greater dissipation capabilities the "T" pad can be mounted in a sealed can of oil.

The pads can also be used for audio work and the 500 ohm impedance of the design chart given in Table I can be shifted by calculating the multiplying factor required in the exact same manner. ■

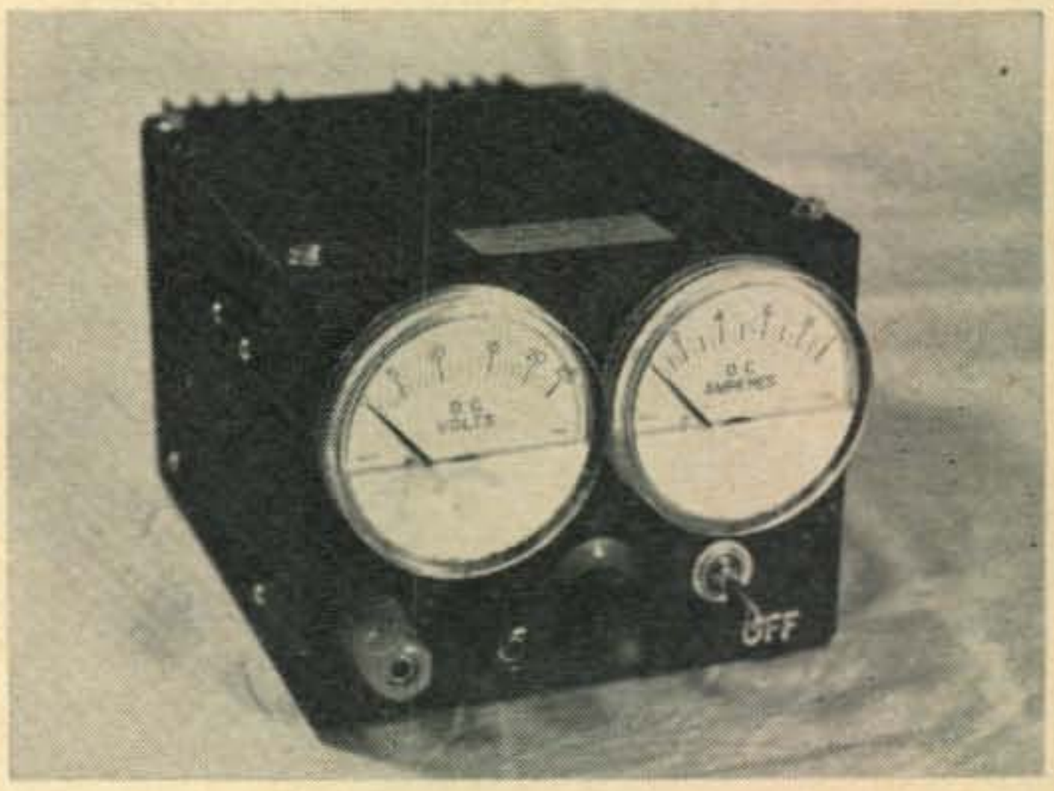
Chesapeake Bay R241A Regulated Power Supply

THE Model R241A solid-state power supply is an inexpensive unit for use wherever a well-regulated and variable-voltage source of between 0 and 24 volts d.c. is required. Maximum rated output current is one ampere and the no-load to full-load regulation is 950 millivolts. This is quite adequate for the majority of typical laboratory applications. Maximum a.c. ripple is 5 millivolts.

Seven semiconductors are used to make the Model R241A an efficient and effective device. It is ruggedly constructed and small in size, measuring 6" × 5" × 4". Weight is 5 pounds.

Other features of the unit include built-in short-circuit protection, a voltmeter, an ammeter and floating output (not connected to case).

A power supply of this sort is not restricted to laboratory use alone; in fact, its low price should make it attractive also to the amateur for use in conjunction with the design, development, testing and operation of transistorized equipment, Varactor frequency multipliers and parametric amplifiers, for supplying filaments in very



low-noise u.h.f. and Hi-Fi applications, charging low-duty batteries or dry cells, operating surplus relays, etc.

The Model R241A regulated power supply is priced at $49.95 and is available from Chesapeake Bay Enterprises, P.O. Box 351, Hyattsville, Md. 20781.—*W2AEF*

Announcing ...

The Summer 1964 CQ V.H.F. Contest

August 22-23, 1964

Of the two v.h.f. contests sponsored by *CQ*, our August affair always seems to be the best received. And the time has come once again for our big one—the fourth weekend in August. Mark your calendars, gather the equipment together and compete! In this contest only *one* band may be used and only *one* operator will be permitted, so send the recruits home.

This is a single band, single operator affair, designed for the average v.h.f. man. You'll be competing only against other operators on your chosen band in your own state, and awards will be presented on that basis. Please note: A 144 mc Novice division has been added to the fun.

We highly suggest you write today for your supply of contest logs (at the address shown in the Rules). Each log sheet will hold about 40 contacts; if you think you'll need more than three sheets, let us know. All requests should be made in letter form, including a self-addressed stamped envelope.

Contest rules are simple and to the point. If you are gathering counties for the USA-CA or other awards, you won't want to miss this contest! Judging by past response in our contests in the single-band, single-operator division, this summer's competition promises to be one of the biggest ever.

RULES

CONTEST PERIOD: The duration of this contest is 24 hours, starting at 1 P.M. local time Saturday, August 22, 1964, and ending 1 P.M. local time, Sunday, August 23, 1964. Contacts between time zones will count only when both time zones are participating in the contest.

BANDS: Any single amateur band, 50 mc and up may be used.

COMPETITION: This is a single band, single operator contest *only!* Divisions are: 50 mc *only;* 144 mc *only;* 220 mc *only;* and 432 mc *only*. Novice entries will be scored individually from other 2-meter competition.

EXCHANGE: Exchanges on the air will consist of the following information: Signal Report, Serial Number, County and State. Serial number on each band shall consist of the signal report followed by a three digit number beginning 001. Failure to start with 001 will result in disqualification. Typical exchange for phone. "You are 58001 in Reno County Kansas Over" and for c.w., "589001 RENO KAS K"

CONTACT POINTS: Contacts between stations worked for the first time will count one (1) point. One-way contacts do not count. Mobile-in-motion contacts of any kind will count only for contact purposes and *not* for county multipliers.

MULTIPLIERS: COUNTY: A multiplier of (one) 1 will be allowed for each new county worked. All counties can be checked with the *CQ* USA-CA Record Book.

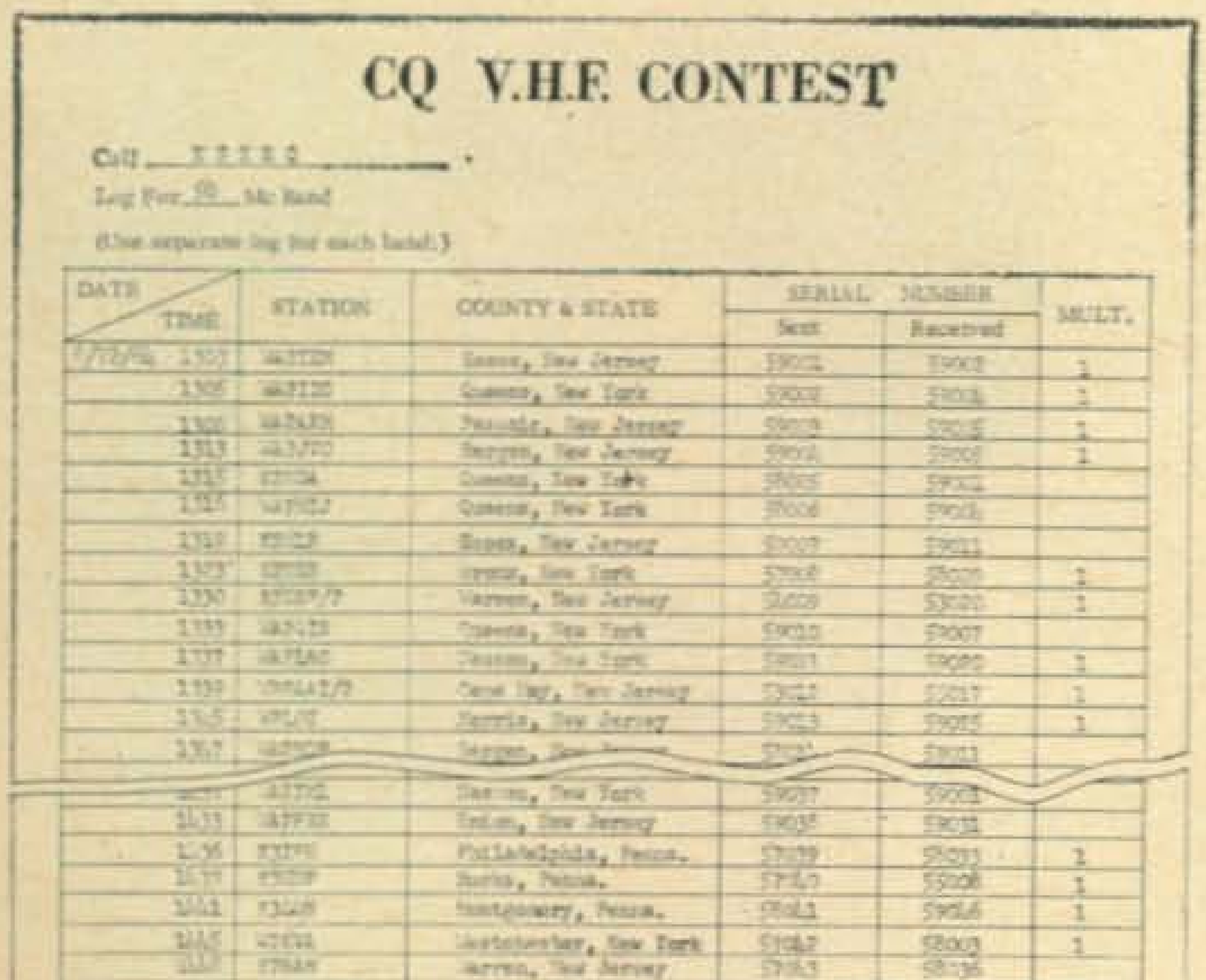
HOUR: A multiplier of (one) 1 will be allowed for each hour of station operation during the contest where at least *one* contact is logged.

POWER: A multiplier of 1.25 will be allowed for stations which at no time during the contest period run in excess of 50 watts input. Stations exceeding 50 watts input will use a power multiplier of one (1).

LOG INSTRUCTIONS: Logs are available from *CQ;* please enclose a large self-addressed stamped envelope and request number of logs (40 contacts per sheet). All times are to be kept in local time. Fill in the date (required only once), time, call, county and state, serial number sent and received: PRINT *or* TYPE.

All contestants are expected to compute their own scores. Log should be checked for duplication and

[*Continued on page 102*]



CQ V.H.F. CONTEST

Log For 50 Mc Band

(Use separate log for each band.)

DATE / TIME	STATION	COUNTY & STATE	SERIAL NUMBER Sent	SERIAL NUMBER Received	MULT.
[illegible]	[illegible]	Essex, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Queens, New York	[illegible]	[illegible]	1
[illegible]	[illegible]	Passaic, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Bergen, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Queens, New York	[illegible]	[illegible]	
[illegible]	[illegible]	Queens, New York	[illegible]	[illegible]	
[illegible]	[illegible]	Essex, New Jersey	[illegible]	[illegible]	
[illegible]	[illegible]	Bronx, New York	[illegible]	[illegible]	1
[illegible]	[illegible]	Warren, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Queens, New York	[illegible]	[illegible]	
[illegible]	[illegible]	Nassau, New York	[illegible]	[illegible]	1
[illegible]	[illegible]	Cape May, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Morris, New Jersey	[illegible]	[illegible]	1
[illegible]	[illegible]	Bergen, [illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	Nassau, New York	[illegible]	[illegible]	
[illegible]	[illegible]	Union, New Jersey	[illegible]	[illegible]	
[illegible]	[illegible]	Philadelphia, Penna.	[illegible]	[illegible]	1
[illegible]	[illegible]	Bucks, Penna.	[illegible]	[illegible]	1
[illegible]	[illegible]	Montgomery, Penna.	[illegible]	[illegible]	1
[illegible]	[illegible]	Westchester, New York	[illegible]	[illegible]	1
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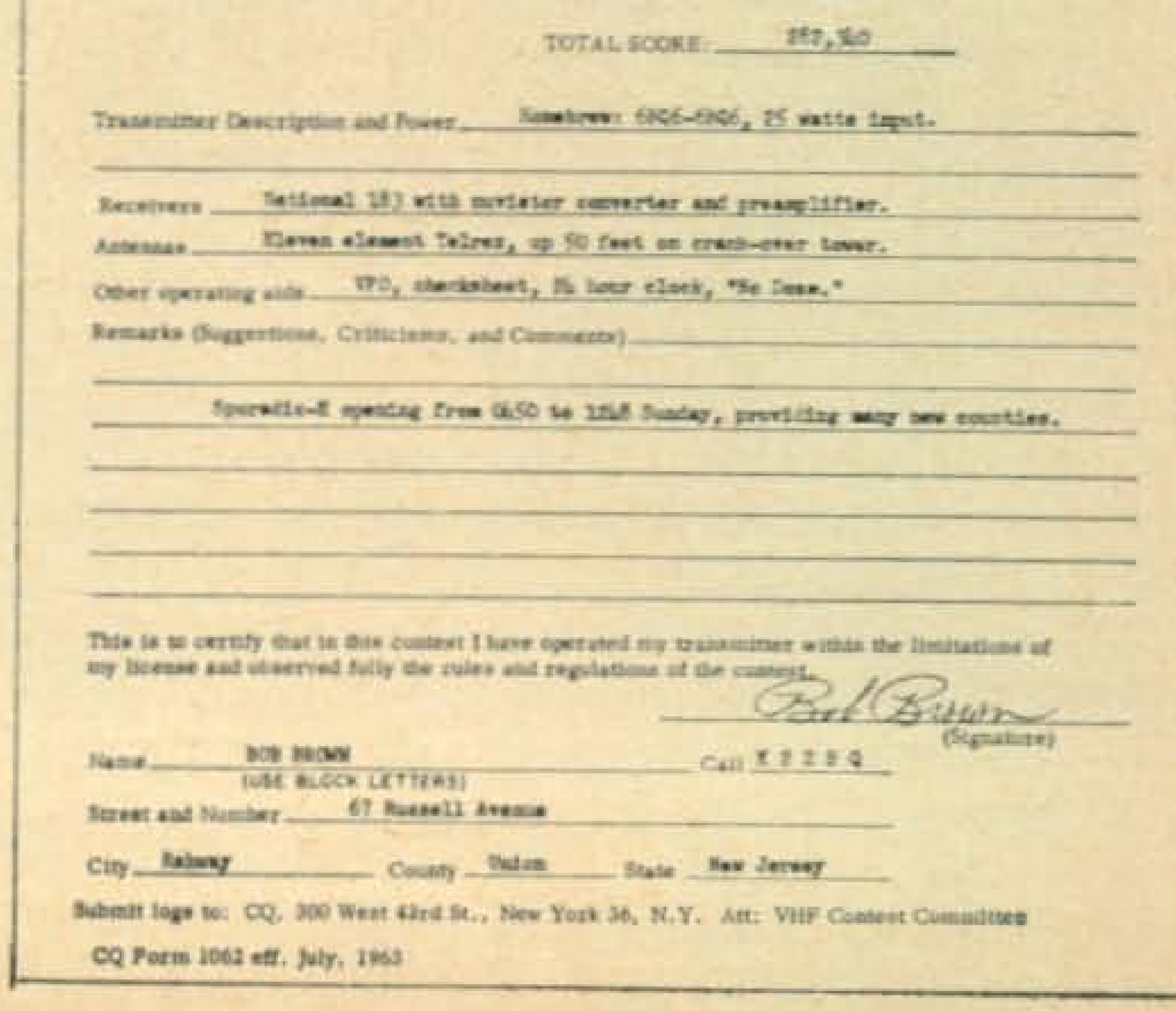


CQ SUMMER V.H.F. CONTEST

SCORING

TOTAL SCORE

Transmitter Description and Power

Receivers

Antennas

Other operating aids

Remarks (Suggestions, Criticisms, and Comments)

This is to certify that in this contest I have operated my transmitter within the limitations of my license and observed fully the rules and regulations of the contest.

(Signature)

Name BOB BROWN

(USE BLOCK LETTERS)

Street and Number 67 Russell Avenue

City Rahway County Union State New Jersey

Submit logs to: CQ, 300 West 43rd St., New York 36, N.Y. Att: VHF Contest Committee

CQ Form 1062 eff. July, 1963

Typical log and cover sheet for the Summer, 1964 CQ VHF Contest, August 22-23.

Maintaining VHF Converter Performance

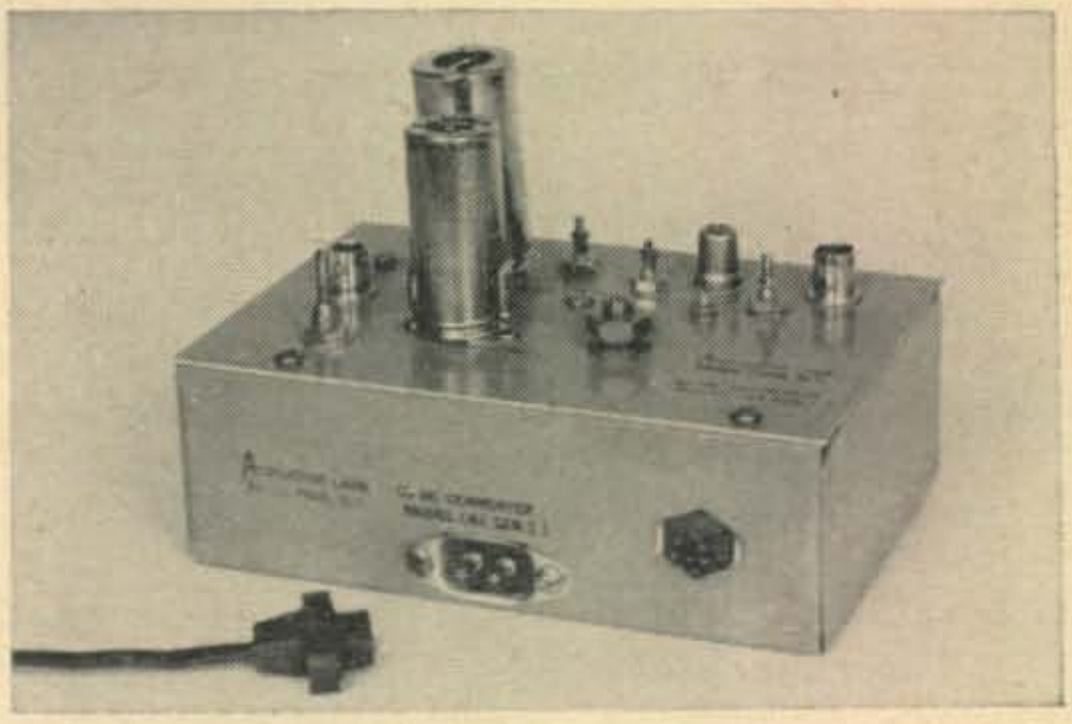
BY WILFRED M. SCHERER*, W2AEF

Not long ago a v.h.f. enthusiast dropped by the office and during the conversation he complained that his v.h.f. converter performance seemed to deteriorate at various times, so much so that often weak signals were were no longer readable, even though others could copy them. After finding out that our visitor was from Long Island, N.Y. where the humidity generally runs higher than it does in inland areas, we felt that such moisture might be the cause of his trouble, since our past experience has indicated that the noise figure of a *given* converter can vary considerably from day to day, depending on the environmental conditions of temperature and humidity. No doubt, the resulting absorption of moisture can affect the quality factor of components, such as coil forms, tube sockets, capacitors, resistors and r.f. connectors, sufficiently so as to cause not only a deterioration of noise figure, but also an attendant loss of sensitivity and a decrease in signal-to-noise ratio.

It was therefore suggested that our friend "bake" his converter for an hour or so in the oven at a low temperature to dry out any possible moisture. A few days later a happy telephone call reported that the baking had done the trick and the converter was back up to top performance!

As a result, we rigged up a "drying resistor" (dryister, if you will) as a scheme whereby converters, subject to conditions of high humitity or dampness, may be kept free of moisture and thereby maintain peak performance at all times.

The arrangement simply consists of a 3500 ohm 5 watt power resistor mounted in the bottom of the converter case and which is continuously powered directly from a 117 volt a.c. source. The small amount of heat radiated from the resistor is sufficient to keep the "innards" of the unit dry and thus eliminate the absorption of moisture by the vital components underneath the chassis.



Cheater-cord receptacle mounted on a v.h.f. converter case for use with a drying resistor.

A receptacle for a 117-volt "cheater" line cord is mounted on the converter case near the bottom edge with the resistor soldered directly to the receptacle terminals as shown in the photographs. The resistor also is positioned toward the bottom of the case to prevent its interfering with the components mounted under the chassis and to allow the upward movement of the radiated heat to cover the largest possible area within the unit.

Any 5 watt resistor between 3000 and 4000 ohms will do, but it is recommended that the type be the Sprague Koolohm (5 NIT) which has an insulated covering (in the event the resistor body should touch the case) and which will provide more dependable service than will composition type resistors.

The cheater cord should be left plugged into the converter receptacle and a 117-volt a.c. outlet at all times to constantly maintain warm dry air within the unit. No r.f. filtering is provided at the receptacle, so it is possible that unwanted signals could be induced through the cheater cord. If this should occur, each receptacle terminal should be bypassed to ground with a .002 mf disc capacitor, or the line cord may be pulled out of the receptacle only during operating periods.

No special ventilation holes should be needed, as any excessive heat buildup will be dissipated

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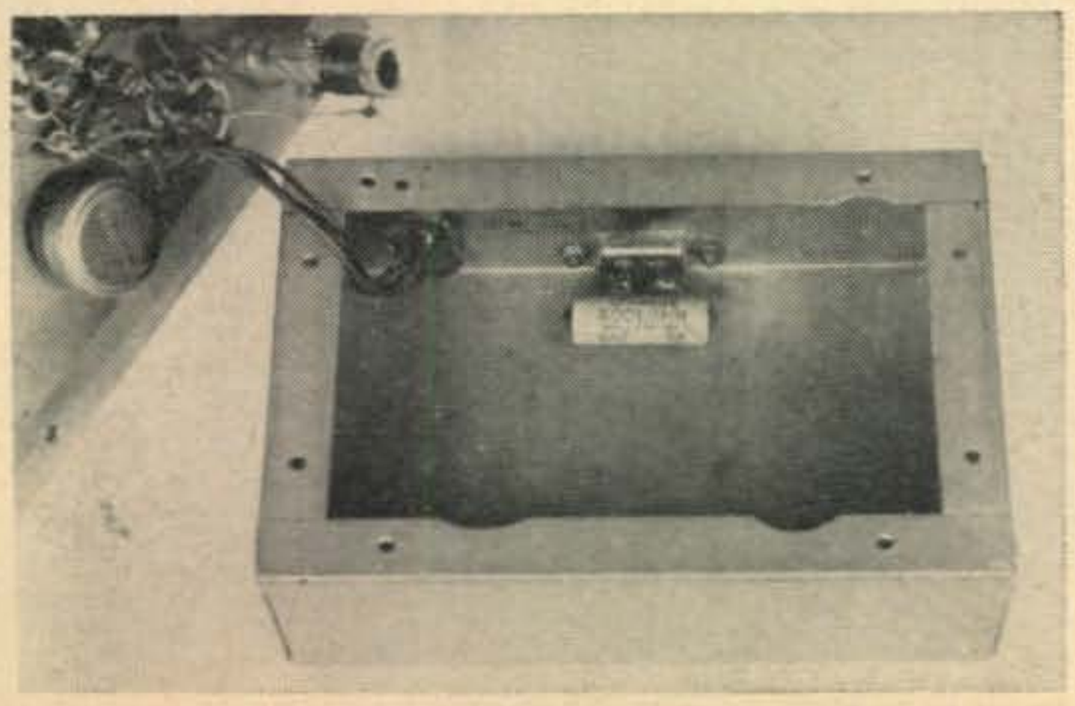
*c/o *CQ*, 14 Vanderventer Ave., Port Washington, L.I., N.Y.



Interior view of v.h.f. converter case showing 5 watt power resistor soldered directly to terminals of cheater-cord receptacle.

Results of the

1963 CQ World Wide DX C.W. Contest

BY FRANK ANZALONE*, W1WY

OUR hearts were not in this one, the news of the tragic death of our President a few hours before the start of the contest put a damper on the whole operation.

Many of us who did continue in the contest did so with the feeling that we were carrying on President Kennedy's tradition of his world wide interest in people of all nations.

It was impossible to call off an activity of this world-wide scope on such short notice, so carrying on in his memory was the only logical thing we could think of doing.

This sad burden is reflected in the 12% decline in the returns from the USA, while the rest of the world was showing an 8% increase.

We were constantly made cognizant of the tragedy that befell our nation, by the personal condolences from fellow amateurs from all corners of the globe, who interrupted their rapid exchange of serial numbers to offer their words of sympathy, proving what we already know, that there are no separating boundaries in amateur radio. We like to think that our World Wide Contest strengthens this tradition.

Now, getting to the contest itself. Conditions were equal to those we experienced for the phone week-end and far better than last year, this in spite of the lower sun spot numbers.

The trophy winners and top scorers are appropriately listed in their respective boxes, therefore we will not elaborate on the details.

The winner's circle is once again occupied by 5A1TW, making Gene Walsh a double winner in the all band category for 1963. Even with a desirable geographical location it still takes a lot of doing to be the Top Man in this contest. Congratulations Gene.

Without taking any credit away from Gene, I think the outstanding performance this year was turned in by W3GRF. Len Chertok should be justly proud of his score. Increasing your multiplier on the lower frequencies does not come easy from this side of the Atlantic, and without that you're not in contention.

Don't let the call 9Q5AB fool you, its none other than Harry Lilienthal, DL7AH who has also made appearances from other equally exciting locations.

As in the phone contest, KP4AOO had a very high contact total, but Roger has got to come with a healthier multiplier to be a top contender.

The rest of the calls in the Top Ten as well as those who didn't quite make it, are to be congratulated for their fine showing in a very competitive category.

Turning to the multi-operator section we find VK5NO leading the field in the single transmitter division. The call had us fooled for a minute, but it was VK5NQ that was a Trophy winner a few years ago. It's still the same team however, Jeff and Tubby Vale, but from a new location.

A couple of west coast boys tried to win a permanent memento for KG6AAY but didn't quite make it.

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TROPHY WINNERS

Single Operator, Single Band (14 mc)
Potomac Valley Radio Club Trophy
won by Peter Hobbs, VP8GQ

Single Operator, All Band
The W9IOP, Larry LeKaskman Trophy
won by Eugene Walsh, 5A1TW

Multi-Operator, Single Transmitter
The W3AOH, Tony Susen Trophy
won by VK5NO (Ops.: VK5NO & VK5ZP)

Multi-Operator, Multi Transmitter
The K2GL, Buzz Reeves Trophy
won by CX2CO (Ops.: CX2CO & CX7CO)

World High Club Score
CQ Club Plaque
won by the Deutches DX Team

Terry K6SDR and Mike, WA6EHL, of multi KG6AAY, runner-up for world honors. Hope you fellows can take another crack at it in the next one.

And Roger Mace with an abbreviated crew took it easy this year and put W6RW in the junior division.

The planning, work and effort that goes into a multi-transmitter set-up is a whole story in itself. The total number of operators involved in this division could almost start a contest of their own.

But strangely enough it was the "CO" two-some, CX2CO and CX7CO from the phone contest, that again made it a double win for CX2CO. The Sierra organization has now completed the cycle as Trophy winners, so the boys will probably relax for the next few years.

The crew at W3MSK was also an abbreviated group, three operators on three individual bands. Ed Bissell, the chief operator was over in India monitoring his station's activities. He should have stayed home and given the boys a hand on some of the other bands.

Here again I feel that without taking any credit away from CX2CO or W3MSK, the outstanding performance is not always turned in by the leading stations. Dale Hoppe and his fine crew at W6VSS, have the admiration of all contest men who appreciate what is involved. Making over a million points from the west coast is a heap of operating.

The operation at UA9KDP was supervised by Vladimir Semenov, UA9DN a Trophy winner in 1960 and 1961. We found it necessary to reclassify this station and put it in the multi transmitter division. Perhaps a more detailed explanation of what constitutes a single transmitter and a multi transmitter station is in order for future contests. There seems to be some misunderstanding on this point.

I suggest you closely scrutinize the breakdown of the scores of the "Big Guns" in the new summary listing. This really tells the story of the kind of operating that goes on at a top notch multi station. It also will show you "single banders" how your score stacks up on the individual bands, against the top stations in the world. Most of us would be out of the money.

And now, turning to the Single Band division we find that 14 mc is still the winning band. Don Miller was out to make it a double win for HL9KH before he shut down his operation from Korea but was stymied by the fine performance of Peter Hobbs, VP8GQ. Pete's contact total overcame Don's higher multiplier, and he will find an attractive Trophy waiting for him when he returns to his home in England.

Other fine performances on this band were turned in by CE3AG, ZL1AIX, 4X4FA, PY4GA and K2UVU, to mention a few that were overshadowed by the Continental Leaders. My vote for the outstanding performance on this band goes to W4KFC, a typical Vic Clark effort.

Conditions on 21 mc must have been unusually good for southern Africa. The score turned in by ZS6IW is in a class by itself and VQ2W proved that it was not a fluke. I sometimes wonder why the boys down that way don't take more advantage of these band openings that are ob-

	Band	Contacts	Zones	Countries	Points
CX2CO 1,456,380	18	2	1	2	1
	35	7	3	5	6
	7	207	17	29	598
	14	748	32	79	2191
	21	592	27	63	1757
	28	162	13	19	469
	TOTAL	1718	93	197	5022
W3MSK 1,304,797	18				
	35				
	7	276	32	78	798
	14	542	37	113	1594
	21	363	30	87	1069
	28				
	TOTAL	1181	99	278	3461
W6VSS 1,288,008	18	7	3	2	4
	35	80	15	21	198
	7	294	33	62	828
	14	501	37	112	1412
	21	247	28	58	680
	28	40	14	17	82
	TOTAL	1169	130	272	3204
UA9KDP 1,274,085	18				
	35	264	12	42	744
	7	414	28	62	1153
	14	413	30	76	1116
	21	265	24	71	680
	28				
	TOTAL	1356	94	251	3693
K2GL 1,097,168	18	7	3	3	3
	35	94	11	23	259
	7	163	28	61	473
	14	438	34	96	1286
	21	297	28	74	867
	28	14	7	8	28
	TOTAL	1013	111	265	2918
DJ3JZ 1,036,980	18	18	2	9	16
	35	156	9	40	211
	7	236	25	45	552
	14	563	34	74	1486
	21	369	26	49	1027
	28	1	1	1	0
	TOTAL	1343	97	218	3292

Along the same lines as the multi-phone breakdown last month, the c.w. equivalent is given above.

viously superior to those from other parts of the world.

Here on the East coast the band was wide open to Europe on Saturday morning, but it petered out on Sunday and visions of a record score went out the window. It seemed I had the band practically to myself, except for the multi stations, so W1WY's appearance in the "Box" is sort of by default. Maybe my move to W1 land finally paid off. (Voice from the back room: "Or being chairman of the Contest Committee." OK Toby, no more pictures in *my* column!)

There was plenty of stuff to work on 7 mc if you were equipped for it, that is. W8FGX was not only equipped but Jake also has the "know how" of getting the most out of the band. Altho

The gang at DJ3JZ before activities started. L. to r. DL1CR, DL3AO, DJ1BP, DL9CI and DJ3JZ. Hardi claims there was only orange juice in the bottle. Maybe champagne after the contest?

9Q5UC—Harry, DL7AH and the boys who manned the station during the Phone contest. (Photo received too late for last month's issue.)

his score is second to 4X4DH, his Zone/Country total is far superior to any other contestant on the band.

A note to the Israel Radio Club; if Ami is not eligible for your 7 mc Trophy because of membership in your club, then you know where to send it. Jake Schott is your man.

Practically all the 80 meter activity was over in Europe, and a look at the scores will prove it. "Sounded like a foreign sweepstakes," remarked K2DGT. "Called 'em 'til I was blue in the face, was only able to raise a few; they were too busy working each other." Maybe you should have stuck to 40 as in previous years, Bob.

Even 160 was given a play this year, with most of the activity concentrated across the Atlantic. Over here VE2UQ made the best showing. Gordon was one of the first to note the band was open to Europe in the early evening. If others had been aware of this phenomenon, there might have been more activity on the band.

As for 28 mc, forget it, the MUF just doesn't go down that far anymore, altho HK7ZI and W6ID managed to show a score on that band.

Space only permits me to touch the high spots in this report. Any omission in no way reflects on the fine job done by many other contestants. In reality, the life blood of any contest is the thousands of small participators without whom there would not be a contest. So our thanks to all you fellows, even though only a few of you sent us a report of your activity.

It was "no contest" in the battle for the *CQ* Plaque. The Deutsches DX Team had its full membership out for this one and ran away with it. Already we have heard cries of "break up the DDXT." Maybe it's something we should investigate.

There are several DX Clubs in the USA who could give the DDXT a run for its money, but outside the Potomac Valley and the Southern California, the few listed clubs have only made a half hearted attempt. As a matter fact, we know of one outfit that actually avoids participation in our contest and concentrates on a less competitive activity.

A count shows 1223 logs from 110 countries for this one. Add this to the 717 received in the

[*Continued on page 83*]

United States Club Scores

Potomac Valley Radio Club	5,644,223
Southern California DX Club	3,959,000
Virginia Century Club	2,095,092
Northeast DX Association	1,270,859
San Diego DX Club	511,602
North Jersey DX Association	456,061
Ohio Valley Amateur Radio Ass'n	433,562
Order of Boiled Owls (N.Y.)	433,234
U.S. Naval Academy A.R.C.	427,281
Florida DX Club	343,636
Northern California DX Club	341,572
West Gulf DX Club	249,894
Lockheed Employees A.R.C. (Calif.)	198,116
Long Island DX Association	121,278
Willamette Valley DX Club (Wash.)	118,268
QCWA DX Club (N.Y.C.)	80,857
Missouri School of Mines	30,072
Seven-Eleven A.R.C. (N.J.)	13,115
Suffolk A.R.C. (N.Y.)	9,400
Rochester DX Association	5,978
West High School A.R.A. (Ohio)	5,625
Nashua Mike & Key Club (N.H.)	720

Foreign Club Scores

Deutsches DX Team	**8,935,230**
Uruguay DX Club	2,986,985
Far East DX-ploiters (Japan)	2,109,639
Swiss DX Club	1,429,942
Radio Club of Costa Rica	595,358
Kharkov Radioclub DOSAAF (Ukraine)	532,648
Okinawa Amateur Radio Club	527,824
Guayaquil Radio Club	499,722
Radioklub Der DDR	484,862
Turun Radioamatoorit R.C. (Finland)	483,336
Venezuela DX R.C.	451,605
Ural Polytechnic Institute R. C. (USSR)	433,780
Radio Club of Armara (Ethiopa)	389,844
Lodzki Klub (Poland)	344,448
Kakkosten Kermo R. C. (Finland)	297,620
Amateur Radio Club of Vicenza (Italy)	289,674
Radio Club of Gijor (Hungary)	220,626
Chalmers Univ. of Tech. R.C. (Sweden)	211,768
Central Radio Club of Budapest	210,125
Harstadgruppen A.R.C. (Norway)	195,858
Radio Club of Locos Del Aire (Ecuador)	173,824
Lvov DX Club (USSR)	162,724
Central Radio Club (Czechoslavakia)	152,111
Royal Air Force A.R.S.	150,781
Michael Pupin Radio Club (Yugoslavia)	126,885
SP DX Club (Poland)	93,850
Kiel-Canal Activity Group (Germany)	88,086
LOK Radio Club (Poland)	87,200
Antejonic Radio Club (Yugoslavia)	52,206
Japan DX Radio Club	43,698
Radio Club of Maribor (Yugoslavia)	37,418
JLPDXC (Japan)	23,426
QRJ Club (Japan)	23,227
King (Japan)	16,800
Shizuoka Club (Japan)	15,656
Radio Club of Kherson (USSR)	11,088
Yokosuka Club (Japan)	8,541
Radio Society of Bermuda	7,917
Sixth Signal Squadron (RCAF)	4,675
ORC (Japan)	3,516
Santander Radio Club (Colombia)	2,925
Mimasaka A.R.C. (Japan)	1,425
Miyadai A.R.C. (Japan)	1,012
Nagano Radio Club (Japan)	308

Top Ten
ALL BAND—SINGLE OPERATOR

5A1TW	**871,750**		
W3GRF	712,640	JA1BRK	516,906
9Q5AB	663,310	UB5CI	512,652
KP4AOO	601,084	VK6RU	509,615
W4YHD	550,536	W4DHZ/4	502,124
	OK1ZL 474,978		

Top Six
MULTI-OPERATOR
SINGLE TRANSMITTER

VK5NO	**945,248**	K4LIQ	482,630
KG6AAY	730,598	LZ1KSZ	468,540
W6RW	526,960	YV5AJ	451,605

MULTI-OPERATOR
MULTI-TRANSMITTER

CX2CO	**1,456,380**	UA9KDP	1,274,085
W3MSK	1,304,797	K2GL	1,097,168
W6VSS	1,288,008	DJ3JZ	1,036,980

U.S.A. Runners-up

All Band	W8JIN	377,456
28 Mc	K4HPR	399
21 Mc	W8UMR	31,951
14 Mc	K2UVU	175,311
7 Mc	K1NOL	55,692
3.5 Mc	K6BPR	3,645
1.8 Mc	W2EQS	180

Continental Leaders
SINGLE BAND

28 Mc		**7.0 Mc**	
HK7ZI	2,925	4X4DH	150,499
W6ID	1,375	W8FGX	88,061
21 Mc		OK2KOJ	80,926
ZS6IW	261,120	YV5ANT	58,459
4X4LC	98,904	ZS2HI	49,419
PY4ABH	90,528	VK3XB	16,887
DJ1ZG	77,794	**3.5 Mc**	
W1WY	56,776	UB5MZ	24,072
W7UXP/KH6	35,244	4X4DI	20,459
14 Mc		K2DGT	9,400
VP8GQ	356,760	ZL2GS	4,368
HL9KH	339,920	**1.8 Mc**	
VK3APJ	264,775	DJ3KR	2,688
W4KFC	261,513	VE2UQ	1,521
ST2AR	140,610		
DJØIK	132,600		

Number groups after call letters denote the following: Band, (A-all); Final Score; Number of QSOs; Zones and Countries. Certificate winners are listed in **bold face.**

C. W. Results

SINGLE OPERATOR

North America

United States

W1BIH	**A**	**257,796**	**365**	**83**	**169**
W1CKA	"	74,745	170	62	103
W1UUK	"	43,930	139	41	74
K1EWL	"	6888	50	26	30
W1JTD	"	3444	31	18	24
W1PLJ	"	2077	25	15	16
W1OJR	"	1125	15	10	15
W1WY	**21**	**56,776**	**212**	**28**	**66**
W1GDQ	"	21,172	107	22	45
K1VWL	"	6579	64	17	26
K1IJU	"	4180	33	15	29
W1BPW	**14**	**95,823**	**287**	**31**	**86**
W1AGS	"	26,788	124	23	51
K1NHR	"	21,483	96	22	55
W1GYE	"	21,112	93	25	49
WA1ANR	"	21,087	106	20	51
W1AWE	"	16,836	84	22	47
K1ITU	"	1820	22	10	18
K1NOL	**7**	**55,692**	**229**	**22**	**62**
K1ZND	"	1128	20	9	15
W1SWX/1	**3.5**	**720**	**17**	**9**	**11**
WA2OJD	**A**	**224,908**	**347**	**84**	**152**
K2DNA	"	74,480	170	55	97
W2GGE	"	67,693	150	53	86
WA2IEK	"	62,916	153	55	92
W2AZS	"	30,800	105	31	69
W2JKH	"	5800	36	25	33
W2HL	"	3720	33	17	23
WA2ZEZ	**21**	**19,728**	**98**	**23**	**49**
K2KFP	"	13,115	77	22	39
WB2CRX	"	11,554	78	20	33
W2LYO	"	1161	17	13	14
W2JB	"	66	4	2	4
K2UVU	**14**	**175,311**	**397**	**39**	**112**
K2HWL	"	162,996	396	36	105
W2AIW	"	131,709	354	36	93
K2LAF	"	50,149	179	28	69
W2WZ	"	33,761	124	29	62
W2RDD	"	12,544	67	21	43
W2ODZ	"	10,098	53	21	45
WA2YJN	"	420	10	5	9
W2CKR	"	400	10	7	9
K2DGT	**3.5**	**9400**	**70**	**18**	**32**
WA2RUB	"	2916	43	9	18
W2EQS	1.8	180	14	3	3
W3GRF	**A**	**712,640**	**734**	**107**	**233**
W3MCG	**A**	**156,378**	**273**	**71**	**130**
W3FDH	"	107,690	212	60	118
W3KA	"	104,098	242	48	98
W3ZKH	"	95,370	202	61	109
W3ZVJ	"	75,848	175	62	90
W3QQL	"	66,612	161	60	96
W3FRZ	"	64,680	163	50	90
W3MSR	"	56,068	174	49	82
W3AYD	"	52,688	129	54	94
W3MVB	"	13,629	66	32	45
W3JTC	**14**	**134,144**	**350**	**36**	**95**
W3DAO	"	89,024	287	30	77
W3AFM	"	76,260	216	34	90
W3UVH	**7**	**1755**	**24**	**11**	**16**
W4YHD	**A**	**550,536**	**582**	**112**	**227**
W4DHZ/4	**A**	**502,124**	**573**	**97**	**219**
W4LSG	"	210,936	364	81	123
W4KXV	"	147,188	406	35	89
W4OPM	"	107,087	214	61	112
W4LRN	"	51,584	148	42	82
WA4CGA	"	28,290	98	49	66
W4ZYS	"	27,555	99	36	59
W4ZM	"	18,655	73	39	52
W4HOS	"	9108	55	32	34
W4KMS	"	3827	30	19	24
W4GF	"	3080	38	16	24
W4OMW	"	2400	31	14	18
K4HPR	28	399	10	10	9
K4YFQ	**21**	**18,848**	**110**	**23**	**39**
K4VFY	"	2475	34	15	18
W4ZQK	"	2190	26	12	18
W4KFC	**14**	**261,513**	**605**	**36**	**111**
W4BCV	"	89,930	252	35	80
K4PDV	"	78,600	226	34	86
W4PLL	"	69,920	213	32	83
W4LVV	"	66,216	189	34	90
W4HKJ	"	25,110	109	26	55
W4OM	"	8880	48	24	36
K4WVP	"	7144	53	16	31
WA4DAA	"	1392	18	14	15
K4VWH	**7**	**27,951**	**127**	**26**	**51**
W4DLA	"	3024	26	17	25
WA4APG	"	112	7	4	4
W4WHK	**3.5**	**3399**	**41**	**13**	**20**
W5BBR	**A**	**170,323**	**269**	**93**	**140**
W5BUK	"	84,266	175	69	113
WA5CBE	**21**	**22,480**	**103**	**26**	**54**
W5KC	**14**	**49,086**	**174**	**33**	**68**
K5STL	"	7448	53	18	31
W5WZQ	**7**	**54,832**	**212**	**29**	**63**
K5JZY	"	7740	67	18	27
W6IBD	**A**	**281,082**	**424**	**97**	**140**
K6ASL	**A**	**230,582**	**382**	**90**	**133**
WA6GFY	"	161,090	322	71	107
W6GRX	"	154,912	289	76	112
W6KG	"	134,298	294	67	95
WA6HRS	"	133,488	299	67	95
WA6QGW	"	77,087	172	63	94
W6NKR	"	23,562	87	45	54
K6HOR	"	17,812	99	25	36
WA6VAT	"	8710	53	32	35
W6BIL	"	1780	24	14	16
W6ID	**28**	**1375**	**23**	**12**	**13**
W6BSY	**21**	**28,944**	**144**	**26**	**46**
K6MQG	"	25,704	130	25	43
W6ISQ	"	21,420	120	25	38
W6TMX	"	1482	27	10	9
W6EPZ	**14**	**93,000**	**267**	**37**	**83**
W6LCX	"	67,424	207	37	75
W6MSM	"	58,651	226	30	59
W6PQW	"	34,554	155	28	50
W6KNE	"	26,404	113	31	51
W6VNJ	"	15,275	84	25	40
WA6OZL	"	5600	58	12	20
W6ILP	**7**	**50,138**	**207**	**30**	**56**
W6JZH/6	"	47,460	234	26	44
WA6TEV	"	658	21	7	7
K6BPR	**3.5**	**3645**	**52**	**12**	**15**
W7PQE	**A**	**133,815**	**297**	**70**	**95**
W7MX	"	61,161	193	47	64
W7BTH	"	49,324	148	44	74
W7DIS	"	48,564	158	53	61
K7UCH	"	42,704	173	39	49
W7POU	"	2550	29	14	16
W7VY	**14**	**72,590**	**252**	**29**	**56**
K7CPS	"	1536	26	12	12
W7DLR	"	168	6	6	6
W8JIN	**A**	**377,456**	**432**	**102**	**210**
WA8CZH	"	20,394	84	43	56
W8DUS	"	19,303	70	28	44
W8YGR	"	6272	39	23	33
W8TRN	"	968	17	10	12
W8UMR	**21**	**31,951**	**128**	**29**	**60**
W8TTN	"	31,291	132	28	55
WA8EWT	"	5625	46	18	27

Part of the K2GL crew right after it was all over. W1GYE, K1ZVU, W2DTJ, W2IWC, and K2GL. The mic.? Buzz was comparing scores with some of the other "Big Guns."

A recent photo of Luis, CE3AG the big 14 mc signal from Chile. Luis was the single band Trophy winner in 1959 and placed 3rd world high this year.

OK1MG—Tonik was high scorer on 3.5 mc for Czechoslovakia.

ZP9AY—Most of the equipment is home made and powered from a gas generator. Robert only operated the second day of the contest. In respect for President Kennedy he kept his station silent on the 23rd.

W8EW	14	11,773	69	24	37
WA8ENO	"	11,658	76	21	37
W8FGX	7	88,061	285	31	76
K8WVF	"	14,941	82	25	42
K8NMG	"	4368	39	17	25
W8AJW	3.5	2142	48	9	12
W8BAR	1.8	32	5	2	2
W9EWC	A	300,045	432	92	157
W9IOP	"	267,810	402	80	157
W9KXK	"	59,340	151	54	84
W9GMS	"	17,776	81	39	49
K9WTS	"	15,522	77	37	41
W9TCU	"	594	12	9	9
W9QQG	28	110	9	6	5
K9PPX	21	21,052	101	26	50
W9VSO	"	19,886	111	21	40
K9LIO	14	46,550	178	30	68
W9QM	"	5565	56	19	34
K9DWG	"	1500	21	9	16
W9AQW	7	6468	50	19	30
W9PNE	3.5	3103	47	11	18
W9YYG	"	190	11	5	5
WØEQN	A	24,910	103	42	52
WØGUV	"	23,005	87	50	57
KØJPL	"	5115	50	27	28
WØTCX	21	27,262	115	29	57
WØCUC	"	5106	46	18	28
WØEEE	14	30,072	145	29	55
WØCRY	"	875	15	13	12
KØMIC	7	19,028	103	27	40
W8GKB/Ø	"	7296	61	20	28
KØZBO	"	4472	41	18	25
Barbados					
VP6AT	7	4896	135	7	11
Bermuda					
VP9BO	7	16,416	214	13	23
Canada					
VE1EK	A	3680	36	19	21
VE1TG	21	14,744	169	14	24
VE1YB	"	1404	18	11	16
VE2NV	A	250,408	428	81	145
VE2BV	"	50,932	159	43	76
VE2WA	"	19,998	77	44	55
VE2UQ	1.8	1521	79	5	4
VE3BMB	A	14,235	90	35	38
VE3AU	14	28,875	136	28	49
VE3AHU	7	216	10	5	4
VE5UF	A	6560	73	20	20
VE6TP	14	20,880	101	24	48
VE7PU	14	66,258	335	29	52
VE8RG	A	105,791	399	53	66
VE8RH	A	21,216	177	23	28
VE8DX	14	12,121	185	10	21
VE8CD	"	990	35	8	7
Canal Zone					
KZ5LC	A	87,091	350	48	61
Dominican Republic					
HI8MMN	A	196,342	707	51	76
Greenland					
OX3AY	A	28,202	226	28	31
Mexico					
XE1VT	A	9456	195	14	10
Puerto Rico					
KP4AOO	A	601,084	1246	68	141
KP4CC	"	73,899	269	44	75
KP4BJU	"	6225	119	10	15
KP4BOJ	21	21,828	314	15	19
KP4BJM	"	3515	84	11	8

Africa

Angola					
CR6DX	A	48,672	232	29	43
Basutoland					
ZS8JJ	A	144,275	354	56	89
ZS8JO	"	62,812	275	36	46
Egypt					
SU1IM	A	15,903	99	17	40
Ghana					
9G1FB	14	35,283	209	21	36
Kenya					
VQ4IQ	14	101,640	326	31	79
Kerguelen Is.					
FB8XX	14	1218	20	9	12
Libya					
5A1TW	A	871,750	1195	75	175
5A3TX	14	29,960	182	20	36
Morocco					
CN8FW	A	264,990	778	39	71
CN8FE	14	129,010	465	31	64
CN8GB	"	42,504	258	17	39
Malagasy Republic					
5R8AI	A	63,147	237	31	66
Mozambique					
CR7IZ	A	189,474	480	49	89
Nigeria					
5N2CKH	A	53,400	190	32	68
5N2JWB	14	51,198	332	18	35
Nyasaland					
ZD6OL	A	218,094	477	51	112
Republic of Congo					
9Q5AB	A	663,310	1020	69	157
Reunion Island					
FR7ZD	A	135,978	373	41	90
Rhodesia, Northern					
VQ2BC	A	19,908	119	30	33
VQ2W	21	173,727	614	26	71
Rhodesia, Southern					
ZE4JS	A	160,204	525	40	81
ZE2JE	14	88,605	324	30	69
ZE1BF	"	21,120	135	22	38
Saint Helena					
ZD7BW	A	29,841	130	35	52
Sierra Leone					
9L1TL	14	60,162	293	22	52
South Africa					
ZS6ARU	A	73,815	299	34	61
ZS2RM	"	66,300	275	38	47
ZS2U	"	9858	60	24	38
ZS1O	"	5656	70	13	15
ZS6IW	21	261,120	866	25	77
ZS2E	"	10,116	96	12	24
ZS5UP	14	23,048	111	24	62
ZS2HI	7	49,419	334	18	33
Sudan					
ST2AR	14	140,610	347	30	79
Swaziland					
ZS7M	14	4365	37	19	26
Tanganyika					
5H3HZ	A	69,993	225	43	58

Asia

Aden					
VS9AAE	A	5508	44	21	33
Cyprus					
5B4JF	A	33,594	174	22	44
5B4BA	21	12,075	116	10	25
India					
VU2AJ	14	50,400	263	26	54
VU2CK	"	32,436	212	22	46
VU2ND	"	19,592	143	18	44
Israel					
4X4LC	21	98,904	468	22	56
4X4MR	"	94,332	400	25	59
4X4FA	14	244,488	715	30	92
4X4DH	7	150,499	596	23	66
4X4DI	3.5	20,459	174	8	33
Iran					
EP2AV	A	6834	87	20	47
Japan					
JA1BRK	A	516,906	806	94	140
JA1FSL	A	262,416	573	70	98
JA1YL	A	228,712	473	76	109
JA7AD	"	89,010	289	50	65
JA1DMX	"	39,375	135	57	68
JA1ELX	"	33,840	171	44	50
JA1VX	"	30,600	99	53	67
JA3ASF	"	29,481	134	45	48
JA2TH	"	15,656	117	34	42
JA2AIR	"	14,355	104	23	32
JA3BEA	"	11,696	81	31	37
JA2WB	"	10,710	74	31	32
JA7MJ	"	10,075	70	30	45
JA5IP	"	8480	72	25	28
JA6ACZ	"	8442	94	20	22
JA1AIU	"	7920	81	21	23
JA1EFE	"	6747	72	20	19
JA1BK	"	4675	38	23	32
JA1CXC	"	4521	59	15	18
JA1CUM	"	4140	52	18	18
JA3XY	"	3430	59	17	18
JA1BUI	"	3264	44	16	16

JA1AS	"	2844	35	17	19
JA1NLS	"	2744	48	14	14
JA3CEV	"	2475	33	16	17
JA3ASU	"	2442	37	16	17
JA1BYM	"	2160	31	14	16
JA6AKL	"	1836	26	13	14
JA9NB	"	1694	31	12	10
JA9ZM	"	1175	21	13	12
JA1DUH	"	1078	20	11	11
JA7BGU	"	360	12	9	9
JA7XV	"	252	9	7	7
JA5FQ	**21**	**49,819**	**244**	**29**	**48**
JA0SU	**21**	**39,547**	**203**	**27**	**44**
JA1EM	"	35,640	198	25	41
JA6BXA	"	23,659	158	24	35
JA6AKW	"	23,426	162	21	32
JA6PY	"	21,038	121	26	41
JA1DFQ	"	14,625	121	20	25
JA6HW	"	13,393	84	24	35
JA1ACA	"	8742	72	24	23
JA3FGE	"	6650	71	18	17
JA3EBE	"	6300	69	16	20
JA1DCY	"	5346	58	16	17
JA6PL	"	4140	45	18	18
JA4ACH	"	2875	45	10	13
JA1IRS	"	2860	52	10	10
JA1FAK	"	1288	24	12	11
JA1KXW	"	1248	23	13	11
JA3CZA	"	595	16	9	8
JA9FB	"	234	8	7	6
JA8BI/JA1	**14**	**174,500**	**617**	**35**	**65**
JA1BWA	**14**	**141,546**	**548**	**33**	**60**
JA2ANX	"	62,894	282	28	54
JA1BN	"	33,440	228	23	32
JA7JI	"	30,114	169	25	38
JA3AA	"	26,208	184	23	33
JA2JW	"	24,948	151	27	39
JA8GR	"	18,603	147	23	30
JA2DN	"	17,490	105	25	41
JA1BLC	"	16,740	130	21	24
JA6PN	"	16,320	120	26	38
JA1IFP	"	16,120	129	22	30
JA2PY	"	15,960	125	23	33
JA1CFD	"	13,413	97	22	29
JA1HOM	"	8541	101	19	20
JA1IZ	"	7650	80	20	25
JA8BB	"	7560	77	19	21
JA1HP	"	3975	61	13	12
JA1AJM	"	2592	46	12	15
JA1FHF	"	2574	32	16	17
JA6YBR	"	1012	22	10	12
JA0HC	"	308	30	7	7
JA4AQR	"	24	2	2	2
JA1AEA	**7**	**76,125**	**329**	**25**	**50**
JA3DDG	**7**	**16,800**	**139**	**21**	**27**
JA7XF	"	12,720	116	21	27
JA1FOP	"	10,120	103	18	32
JA2DCN	"	8844	88	19	25
JA3YBQ	"	8385	95	17	22
JA1CWZ	"	8073	91	17	22
JA7AKQ	"	7315	92	16	19
JA3CAF	"	5133	72	13	16
JA1IBX	"	3840	61	14	16
JA1YDU	"	3502	46	16	18
JA7BGT	"	2832	51	10	14
JA2BVS	"	2496	49	12	14
JA4AKL	"	1425	39	7	8
JA1FTL	"	700	24	7	7
JA2CBK	"	528	22	5	6
JA6BCV/1	"	80	4	4	4
JA1HLR	"	72	5	4	4
JA3JM	**3.5**	**1701**	**33**	**10**	**11**
JA1HGY	"	735	16	9	12
KA7TB	**14**	**19,894**	**151**	**22**	**36**

Korea

HL9KH	**14**	**339,920**	**910**	**37**	**103**

Lebanon

OD5LX	**A**	**60,066**	**156**	**45**	**96**

Malaysia, West

9M2GJ	**14**	**9568**	**83**	**20**	**32**
VS1LP	**7**	**9090**	**92**	**18**	**27**

Mongolia

JT1CA	**21**	**48,100**	**310**	**22**	**52**
JT1AG	**14**	**23,000**	**218**	**20**	**30**
JT1KAA	"	12,831	153	17	30
JT1AD	"	420	29	6	6

Pakistan, East

AP5AH	**A**	**3588**	**64**	**17**	**22**
AP5CP	**14**	**7987**	**81**	**20**	**29**

Ryukyu Islands

KR6ML	**A**	**383,568**	**696**	**95**	**149**
KR6BQ	"	144,256	380	72	112
KR6GA	"	26,873	194	34	43
KR6FG	**21**	**21,982**	**151**	**25**	**33**
KR6AH	**14**	**36,334**	**241**	**28**	**46**

Saudi Arabia

HZ1AB	**A**	**227,700**	**534**	**40**	**110**

Union of Soviet Socialist Rep.

Armenia

UG6DL	**14**	**7743**	**96**	**6**	**23**

Asiatic

UA9WS	**A**	**173,571**	**444**	**35**	**106**
UA9OM	"	32,336	151	32	54
UA9FM	"	17,812	102	25	48
UA9KXA	"	14,985	127	15	30
UA9FI	"	14,490	113	11	35
UW9OU	"	6784	72	20	33
UA9MR	"	4170	61	11	19
UA9VX	"	1080	47	8	12
UA9VB	**14**	**83,754**	**362**	**28**	**71**
UA9WJ	"	67,140	272	25	65
UA9BZ	"	37,449	180	19	54
UA9XG	"	26,901	166	19	44
UA9WC	"	13,938	128	13	33
UA9TS	"	9588	77	16	31
UW9CS	"	8918	82	12	37
UA9HA	**7**	**7175**	**99**	**12**	**29**
UW9WB	**3.5**	**6810**	**80**	**6**	**24**
UAØGF	**A**	**28,008**	**274**	**35**	**37**
UWØAF	"	22,260	140	26	44
UAØCE	"	4060	133	13	16
UAØSX	"	3108	132	12	16
UWØIK	**21**	**3040**	**91**	**10**	**10**
UWØIN	**14**	**23,920**	**202**	**15**	**31**
UAØYE	"	22,945	160	22	43
UWØIJ	"	17,850	163	15	27
UAØTD	"	4551	94	17	20
UAØGM	"	4400	56	16	24
UAØCA	"	3003	84	9	12
UAØGR	"	2068	57	11	11
UAØMK	"	1800	58	8	10
UWØIP	"	1710	45	8	11
UAØSU	**7**	**12,825**	**135**	**15**	**30**

Azerbaijan

UD6AM	**A**	**140,745**	**319**	**49**	**116**
UD6AX	"	13,900	102	16	34
UD6FA	"	11,603	103	11	30

Georgia

UF6FE	**14**	**27,236**	**224**	**9**	**35**

Kazakh

UL7HV	**A**	**40,950**	**232**	**15**	**50**
UL7CH	"	29,540	159	21	49
UL7GL	"	15,250	155	20	41
UL7CD	"	10,754	68	23	34
UL7JE	**14**	**13,115**	**130**	**14**	**29**

Kirghiz

UM8FZ	**14**	**27,728**	**101**	**30**	**82**

Tadzhik

UJ8AH	**A**	**10,920**	**125**	**13**	**25**
UJ8AF	14	935	21	7	10

Turkoman

UH8BO	**A**	**40,650**	**214**	**23**	**52**
UH8DA	**14**	**53,606**	**207**	**28**	**70**
UH8BT	"	5130	64	13	25
UH8AA	"	135	8	4	5

Uzbek

UI8AI	**A**	**24,416**	**161**	**19**	**37**
UI8LB	**14**	**75,936**	**348**	**22**	**62**

Europe

Aaland Islands

OHØNI	**A**	**3081**	**77**	**11**	**28**

Austria

OE5JK	**A**	**183,524**	**464**	**50**	**144**
OE1ET	"	11,396	52	36	41
OE1HGW	**14**	**15,663**	**138**	**20**	**49**
OE3LI	**7**	**23,310**	**248**	**18**	**52**
OE3TL	**3.5**	**12,936**	**261**	**8**	**36**
OE1WO	"	9264	158	12	36

Belgium

ON4XG	**A**	**20,817**	**156**	**26**	**55**
ON4CK	**21**	**56,052**	**254**	**28**	**53**
ON4CE	"	63	9	3	4
ON5AX	**14**	**19,529**	**179**	**19**	**40**
ON5AZ	**7**	**7276**	**363**	**5**	**29**

Bulgaria

LZ1CF	**A**	**52,126**	**280**	**37**	**97**
LZ1CW	**21**	**25,344**	**200**	**20**	**46**
LZ2BC	**14**	**31,396**	**319**	**22**	**62**
LZ2HK	**7**	**4455**	**112**	**7**	**26**
LZ2KRZ	"	2581	82	6	23

Channel Islands

GC4LI	**A**	**25,972**	**167**	**29**	**57**

Czechoslovakia

OK1ZL	**A**	**474,978**	**778**	**95**	**206**
OK1GT	**A**	**292,494**	**626**	**77**	**169**
OK3CAG	"	123,840	476	51	141
OK2PO	"	111,264	376	55	128
OK2QX	"	89,999	424	54	107
OK3SK	"	76,750	382	38	87
OK1SV	"	61,438	191	48	91
OK2LN	"	42,944	280	27	95
OK2BBJ	"	15,750	148	22	48
OK1OO	"	11,799	113	23	46
OK1AGM	"	10,335	109	24	41
OK1AAZ	"	10,304	93	18	46
OK3CDZ	"	9315	100	21	48
OK2FN	"	8113	84	21	40
OK1ZW	"	4059	87	15	26
OK1WV	"	3872	46	18	26
OK2KWC	"	3626	83	9	34
OK2BCI	"	3479	27	24	25
OK2ABU	"	2627	65	10	27
OK1AIR	"	1829	53	10	21
OK1AVE	"	777	17	10	11
OK2KFK	"	185	19	5	10
OK1LM	**21**	**50,464**	**224**	**27**	**56**
OK1AFC	"	43,134	207	26	52
OK3EA	"	17,784	90	25	53
OK1KSO	"	12,595	86	23	32
OK1ACT	"	2448	26	16	20
OK1DK	**14**	**91,840**	**409**	**35**	**77**
OK3KAG	"	88,655	416	35	84
OK3CDP	"	40,514	210	28	66
OK3IR	"	33,200	238	23	60
OK1VB	"	24,080	135	29	57
OK1ADM	"	13,824	118	21	43
OK1XM	"	10,030	119	19	40
OK1JX	"	3397	42	15	28
OK2KOJ	**7**	**80,926**	**513**	**25**	**61**
OK3DG	"	52,318	503	19	55
OK1GA	"	43,371	420	22	57
OK3SL	"	30,879	345	20	53
OK1AGI	"	24,150	247	20	50
OK1ARN	"	11,900	184	14	36
OK1KB	"	5831	81	16	33
OK2DB	"	4674	84	10	31
OK1KHG	"	1650	30	10	15
OK1AEH	"	304	20	4	12
OK1MG	**3.5**	**21,268**	**317**	**11**	**41**
OK2RO	**3.5**	**11,521**	**282**	**7**	**34**
OK1AMS	"	9504	217	7	29
OK1ABP	"	5644	164	6	28
OK2KGE	"	5168	116	7	31
OK1AHZ	"	4680	106	8	31
OK2BEC	"	3712	124	5	27
OK2BDY	"	3690	121	5	25
OK3CDY	"	3267	97	6	27
OK2BDE	"	3150	91	6	29
OK1AJC	"	3024	104	5	23
OK2BFV	"	2728	82	7	24
OK2CEG	"	2538	91	5	22
OK3IS	"	2050	101	4	21
OK2KOO	"	1410	44	7	23
OK1AFW	"	1242	29	7	20
OK2BEW	"	1058	63	4	19
OK3CCB	"	880	46	4	16
OK3BT	"	588	26	4	17
OK2BZR	"	322	24	4	10
OK3CEV	"	280	24	4	10
OK2KRK	"	16	2	2	2
OK1PG	**1.8**	**2249**	**198**	**2**	**11**
OK1WT	"	1488	131	2	10
OK2BCN	"	55	12	2	3

Denmark

OZ4RT	**A**	**112,047**	**405**	**53**	**116**
OZ7YH	"	106,134	441	37	110
OZ2NU	"	28,700	254	21	61
OZ1LO	"	28,028	251	22	69
OZ4H	"	11,970	116	22	41
OZ4DX	"	8968	134	16	43
OZ3LI	21	96	12	4	4
OZ6HS	**14**	**6400**	**99**	**10**	**22**
OZ3LR	"	2013	44	11	22
OZ4PM	"	1040	22	9	17
OZ8BZ	3.5	240	24	3	7

England

G3FXB	**A**	**425,216**	**700**	**75**	**181**
G3HDA	"	**190,848**	**551**	**59**	**133**
G2DC	"	155,008	411	49	124
G3PFB	"	89,920	347	50	110
G3PVS	"	43,890	273	32	63
G3JKY	"	38,728	235	29	65
G3FTQ	"	34,132	274	28	78
G3GGS	"	29,425	154	38	69
G2AJB	"	21,229	159	25	46

G3MWZ	"	13,419	116	23	40
G8DI	"	10,452	119	24	54
G3NVK	"	3608	89	12	32
G3HCT	**21**	**70,035**	**316**	**26**	**61**
G3NQD	"	9040	99	15	25
G3FLS	"	3654	54	12	17
G3POI	**14**	**48,438**	**268**	**22**	**56**
G3SEF	"	15,333	177	18	39
G3HCL	**7**	**29,323**	**317**	**19**	**52**
G3EYN	"	21,888	283	15	49
G3FKM	"	16,206	140	20	54
G3MOJ	"	11,638	177	10	36
G3LZQ	"	10,045	158	9	32
G3PIT	**3.5**	**6771**	**116**	**9**	**28**
G3NFV	"	6179	154	7	30
G3RBP	**1.8**	**1275**	**80**	**3**	**12**

Finland

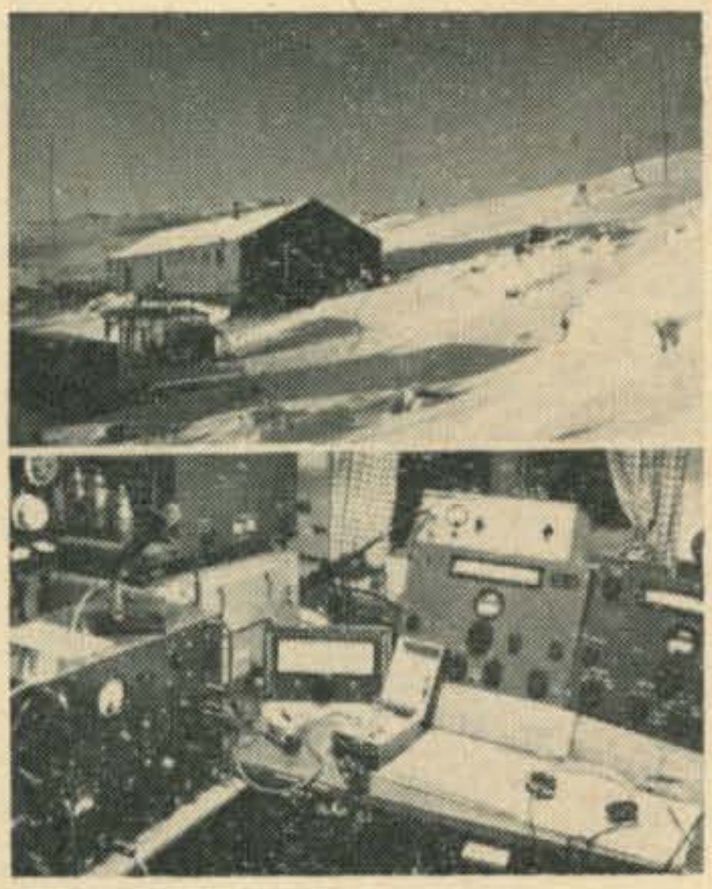
OH2FS	**A**	**185,744**	**412**	**64**	**144**
OH1SH	**A**	**142,494**	**464**	**59**	**128**
OH4OP	"	36,359	265	28	75
OH3TA	"	33,201	155	41	78
OH5UQ	"	25,752	163	38	73
OH5RZ	"	18,816	140	30	54
OH1VR	"	15,604	114	28	66
OH2YL	"	4420	30	22	85
OH3NE	"	3225	65	17	26
OH2VZ	"	1271	23	15	16
OH3XZ	"	532	10	10	9
OH2BDB	"	77	9	5	6
OH1TN	**21**	**36,714**	**181**	**25**	**62**
OH9QV	"	576	28	4	14
OH2WI	**14**	**18,088**	**142**	**22**	**46**
OH2BAC	"	17,325	168	18	45
OH2VA	"	16,000	172	16	34
OH3NR	"	6820	82	13	42
OH2BAH	"	1568	49	7	25
OH3XQ	"	1232	19	16	12
OH9NV	**7**	**8250**	**110**	**15**	**35**
OH2UG	"	902	40	5	17
OH2BDA	"	651	30	5	16
OH5TJ	"	315	19	4	11
OH5PG	"	154	13	5	6
OH3XW	"	63	6	3	6
OH2UQ	**3.5**	**13,818**	**260**	**9**	**38**
OH3NY	**1.8**	**576**	**65**	**2**	**7**

France

F8IH	**A**	**179,220**	**382**	**64**	**142**
F8TM	"	114,872	368	52	121
F3PK	"	63,468	248	44	79
F2PO	"	35,816	218	31	57
F3JL	"	22,344	136	32	44
F9BB	"	5320	69	12	28
F3BX	"	3297	89	15	27
F8VO	14	1421	31	10	19
F7DB	**A**	**90,016**	**415**	**34**	**82**
F7CP	"	4650	44	19	31

Germany

DL7AA	**A**	**337,595**	**503**	**89**	**180**
DJ2AA	**A**	**319,648**	**622**	**74**	**150**
DJ5BV	**A**	**183,799**	**438**	**68**	**149**
DL6EN	**A**	**130,530**	**433**	**39**	**75**
DJ2HH	**A**	**127,872**	**369**	**61**	**131**
DL8FR	"	115,992	343	59	120
DJ1QP	"	115,388	301	65	117
DJ4DN	"	115,368	355	57	127
DM2ATL	"	112,400	316	60	140
DL1JF	"	99,000	273	59	121
DLØMZ	"	97,188	400	53	103
DL9KP	"	85,512	257	54	114
DL7DF	"	84,711	214	62	125
DL8BS	"	82,467	337	46	107
DL7BK	"	79,980	223	58	128
DL7CW	"	73,786	285	48	110
DL7BQ	"	68,249	262	45	94
DM2ATD	"	66,040	370	41	86
DJ7IK	"	65,919	373	37	92
DM2AQL	"	53,448	241	46	85
DLØDX	"	48,060	288	39	69
DM2AND	"	47,740	227	46	94
DJ2IB	"	46,930	190	44	86
DL3JV	"	46,125	195	44	79
DL7CS	"	43,489	148	53	104
DJ5GG	"	39,165	171	40	65
DL7BA	"	37,506	148	38	56
DJ8IF	"	37,152	233	33	75
DJ3WU	"	33,660	193	30	69
DJ7HF	"	26,877	122	38	55
DJ2HI	"	26,448	160	35	52
DL8AJ	"	25,756	158	32	62
DL7CF	"	23,920	132	31	61
DJ1UE	"	21,146	166	24	73
DJ3XK	"	19,434	91	33	46
DL8DD	"	18,792	132	26	55
DJ7BM	"	18,565	150	22	57
DL1ES	"	18,480	161	26	62
DL3CM	"	18,392	103	30	58
DL1XS	"	17,458	121	29	57
DL1OW	"	15,836	127	27	47
DL3TW	"	14,336	88	29	35
DL8DL	"	13,846	139	24	62
DJ1WT	"	13,284	69	35	47
DJ6LN	"	12,656	113	21	35
DM4YPL	"	10,624	95	28	55
DL6OS	"	10,318	94	27	40
DL1IP	"	10,240	83	20	44
DL9XY	"	8052	71	28	38
DM4KL	"	7852	121	13	39
DM3PBM	"	6554	41	26	32
DJ1OJ	"	5883	85	19	34
DM4PL	"	5671	52	20	33
DL1EA	"	4592	40	19	22
DM3RBM	"	4176	31	21	27
DJ3BB	"	3840	45	18	30
DL7AU	"	3400	60	16	34
DM2CEL	"	2790	60	10	21
DM2BDH	"	2688	44	13	35
DM3LME	"	1824	39	10	22
DM3SBM	"	1680	31	13	22
DM3ZWH	"	1260	31	12	16
DJ2UU	"	728	25	9	19
DM3SF	"	476	24	6	8
DM3XD	"	380	18	5	14
DJ1ZG	**21**	**77,794**	**295**	**32**	**65**
DL1IA	"	14,632	90	23	36
DL3ZI	"	3914	44	17	21
DL6DF	"	3456	62	12	15
DL1QT	"	3003	35	14	19
DJ7RJ	"	2970	37	16	14
DJ4OP	"	1485	19	10	17
DL6PE	"	920	20	9	11
DJØIK	**14**	**132,600**	**464**	**36**	**84**



VP8GQ — Operating position and rhombic used by Pete to win the PVRC Trophy for the highest score on a single band. That's a mighty cold outlook, but oh those wide open spaces.

DJ5VQ	**14**	**38,994**	**200**	**31**	**66**
DL1GL	"	31,065	130	29	66
DJ1RZ	"	25,200	156	27	53
DM2AYK	"	24,618	188	20	46
DJ5DA	"	21,750	120	22	53
DJ6EV	"	17,385	168	15	46
DJ5IM	"	10,659	97	18	33
DL1LZ	"	7192	55	18	44
DJ1VI	"	6396	71	15	26
DM3MSF	"	4200	57	14	26
DL9NF	"	2584	47	11	23
DM2AOE	"	48	4	4	4
DL1EE	**7**	**47,502**	**331**	**25**	**62**
DJ5JH	"	28,274	310	18	49
DJ2SR	"	16,215	164	20	49
DJ1ZN	"	11,475	152	13	38
DL1KS	"	4700	59	14	33
DL1TA	"	1092	52	4	17
DL1JW	**3.5**	**22,513**	**325**	**8**	**39**
DJ2YA	"	19,488	327	9	39
DJ3KR	**1.8**	**2688**	**199**	**3**	**11**
DJ5GW	"	912	76	2	10
DL1YA	"	84	17	2	4
DL4XS	**14**	**15,870**	**116**	**22**	**47**

Greece

SVØWAA	**A**	**17,760**	**226**	**24**	**56**

Hungary

HA7LF	**A**	**41,352**	**190**	**20**	**61**
HAØHN	**A**	**26,986**	**170**	**23**	**80**
HA1SD	"	18,105	150	27	58
HA1VA	"	13,840	139	22	58
HA5KDQ	"	7614	114	7	40
HA5KFZ	"	7203	131	12	27
HA8CZ	"	7076	103	13	49
HA1LH	"	6368	104	8	40
HA6NC	"	5429	65	19	41
HA9PB	"	3861	97	12	27
HA4YL	"	3616	125	9	23
HA1KVM	"	3422	71	13	26
HA1ZB	"	3182	56	11	26
HA2MJ	**21**	**5320**	**60**	**6**	**34**
HA5KAC	**7**	**1740**	**29**	**6**	**14**
HA3GF	**3.5**	**5482**	**195**	**7**	**20**
HA9OT	"	4347	166	4	23
HA3GA	"	4176	141	5	24
HA9KPE	"	2700	107	5	20
HA5AI	"	2622	115	4	19
HA5DA	"	2300	86	5	20
HA9PH	"	1780	89	4	16
HA2MU	"	868	72	4	10
HAØLG	"	780	59	4	11
HA1SM	"	70	15	1	4

Iceland

TF3AB	**A**	**35,958**	**223**	**23**	**55**

Ireland

EI5AJ	**14**	**58,615**	**373**	**26**	**69**

Italy

I1KE	**A**	**75,348**	**350**	**40**	**86**
I1WSG	"	44,608	220	28	54
I1DFD	"	31,592	160	30	58
I1HL	"	3698	68	15	28
I1SF	**21**	**11,172**	**83**	**25**	**32**
I1GO	"	10,542	119	16	26
I1DBK	**14**	**21,252**	**102**	**29**	**63**

Malta

ZB1BX	**A**	**94,572**	**352**	**43**	**99**

Netherlands

PAØLOU	**A**	**104,463**	**328**	**52**	**107**
PI1PT	"	61,625	300	41	84
PAØPAN	"	27,144	165	32	55
PAØPN	"	16,400	156	18	64
PAØFLX	"	13,650	141	23	47
PAØSNG	**14**	**14,586**	**177**	**15**	**36**
PAØVB	**3.5**	**14,514**	**295**	**8**	**33**

Northern Ireland

GI3OTV	**14**	**11,818**	**202**	**11**	**27**

Norway

LA8D	**A**	**54,035**	**330**	**34**	**73**
LA5HE	**A**	**52,592**	**176**	**54**	**98**
LA6U	"	36,156	157	39	99
LA2Q	"	22,272	193	25	62
LA8SG	"	13,659	116	25	62
LA8WG	"	10,857	122	23	54
LA9AF	"	8325	93	25	50
LA7KI	21	1824	31	11	21
LA4LG	**7**	**2125**	**81**	**5**	**20**

Poland

SP6FZ	**A**	**132,158**	**451**	**53**	**116**
SP6RT	"	85,000	352	47	124
SP2IU	"	34,998	229	30	84
SP3PK	"	18,312	95	29	55
SP9PT	"	15,132	94	33	64
SP2BF	"	6060	69	20	44
SP9AGS	"	2697	46	8	23
SP6PH	"	1204	39	6	22
SP9RF	**21**	**36,980**	**163**	**28**	**58**
SP9ADU	"	16,147	102	22	45
SP5YC	"	15,190	83	29	46
SP5ZA	"	11,160	76	22	40
SP1AAY	"	1368	28	8	10
SP8YA	**14**	**48,160**	**311**	**26**	**60**
SP5AFL	"	39,520	276	24	56
SP4JF	"	22,507	198	23	48
SP3AK	"	13,328	133	17	39
SP6AEG	"	8918	129	18	31
SP6SO	"	4830	90	10	25
SP5AIB	"	3486	49	10	32
SP5AHW	"	2000	36	10	15
SP6AAT	**7**	**54,697**	**435**	**21**	**62**
SP4TW	"	16,986	269	15	42
SP2RS	"	4810	110	8	29
SP9QJ	"	2425	87	5	20
SP4AAZ	"	375	25	4	11
SP3AAI	"	231	19	4	7
SP5AHZ	**3.5**	**13,373**	**289**	**9**	**34**
SP7JX	"	9546	197	9	34
SP8MJ	"	7776	238	5	27
SP5AHL	"	1349	64	5	14

Rumania

YO2BU	**A**	**252,250**	**672**	**82**	**168**
YO3CR	**A**	**132,645**	**459**	**50**	**135**
YO6XU	"	111,322	381	51	103
YO6AW	"	107,361	524	43	108
YO2BB	"	96,396	298	57	117
YO7DO	"	71,455	325	45	109
YO8KGA	"	38,198	261	29	84
YO4KBT	"	34,515	222	28	89
YO5DH	"	16,065	138	24	39
YO4KCA	"	6174	100	17	42
YO8OU	"	4960	94	13	27
YO6EZ	"	3280	66	10	30
YO3JF	"	3116	120	12	29
YO7DL	**14**	**48,668**	**288**	**26**	**66**
YO4SA	"	16,240	196	16	40
YO4AH	"	8748	112	14	40
YO3JW	"	5029	107	12	35
YO8AP	**7**	**38,216**	**450**	**17**	**51**
YO9IA	**7**	**19,470**	**247**	**15**	**44**
YO6XA	"	17,010	286	14	40
YO3AC	"	9604	196	13	36
YO4XF	"	6292	121	12	32
YO4CT	"	6120	166	7	27
YO9HP	"	5652	149	9	27
YO5AF	"	5256	126	10	26
YO4YR	"	5069	118	7	30
YO5LP	"	2744	92	6	22
YO2IR	"	2675	110	5	20
YO7VS	"	2565	100	5	27
YO4ZF	"	1554	70	6	15
YO7VQ	"	1525	48	7	18
YO3ZM	"	1380	55	6	17
YO3QO	"	860	39	5	15
YO7VG	"	525	35	5	10
YO9CN	**3.5**	**3612**	**123**	**5**	**23**

San Marino

M1M	**A**	**435,830**	**1085**	**63**	**142**

Scotland

GM3JDR	**14**	**41,325**	**375**	**24**	**51**

Sicily

IT1AGA	**7**	**7980**	**156**	**7**	**31**

Spain

EA2CR	**A**	**7008**	**92**	**20**	**28**
EA3KT	**14**	**8325**	**178**	**9**	**28**

Switzerland

HB9JG	**A**	**398,336**	**594**	**78**	**178**
HB9ZY	"	222,578	418	70	148
HB9MO	"	140,544	363	59	124
HB9TT	"	58,022	305	40	94
HB9SJ	"	14,499	135	25	56
HB9UD	"	9000	75	29	46
HB9QA	"	1802	51	12	22
HB9DX	21	852	26	6	6
HB1AAI	**14**	**20,650**	**159**	**24**	**46**

Sweden

SM5BPJ	**A**	**418,170**	**732**	**86**	**232**
SM5CCE	**A**	**235,458**	**500**	**75**	**179**
SM5CEU	"	80,104	311	44	108
SM5AME	"	38,610	196	41	89
SM3AF	"	36,296	246	28	76
SM5CON	"	34,340	253	24	77
SM5API	"	29,498	251	28	70
SM7AXP	"	17,078	149	23	60
SM5AFE	"	15,876	126	22	62
SM5CIK	"	9656	88	20	48
SM2CZT	"	9291	114	16	41
SM5ACQ	"	7155	107	15	38
SM5UQ	"	6768	132	11	36
SM5AIO	"	6720	93	20	40
SM5BOE	"	2925	54	14	31
SM5CVH	"	2120	37	27	13
SM5KV	**21**	**25,520**	**136**	**24**	**56**
SM6CAW	"	7840	71	18	31
SM7TV	"	5814	59	15	23
SM3CNN	"	1269	21	13	14
SM5AJR	"	880	17	10	10
SM7BUE	"	336	10	6	8
SM5BEU	**14**	**51,085**	**314**	**26**	**59**
SM2ALU	**14**	**51,030**	**304**	**25**	**56**
SM7BNL	"	26,939	135	29	50
SM4AD	"	15,458	151	17	42
SM1CXE	"	10,812	118	18	35
SM6ARH	"	10,712	140	14	38
SM5CXF	"	7668	81	16	38
SM7TQ	"	7600	68	16	34
SM6WT	"	6431	57	21	38
SM3AU	"	2387	42	8	23
SM5DZH	"	2080	61	6	14
SM6JY	"	1836	52	7	20
SM6CZU	"	1242	33	8	19
SM3WB	"	713	28	6	17
SM5AWF	"	700	25	7	13
SM3TW	**7**	**30,459**	**259**	**20**	**51**
SM3PZ	**7**	**29,260**	**331**	**22**	**48**
SM5CAK	"	27,216	329	16	47
SM3VE	"	23,072	357	14	42
SM6DED	"	9945	170	10	35
SM5ARQ	"	7638	201	8	31
SM3DGE	"	2450	102	5	20
SM5UU	"	1566	36	7	22
SM5BUT	"	560	31	4	16
SM3BQH	"	468	25	5	13
SM5MX	**3.5**	**12,015**	**249**	**7**	**38**
SM5BHW	"	1288	55	5	18

Wales

GW3MRI	**A**	**8802**	**135**	**13**	**41**
GW3IOI	**14**	**12,087**	**105**	**18**	**33**

Yugoslavia

YU3NP	**A**	**4235**	**69**	**17**	**38**
YU3BHI	**21**	**2214**	**43**	**10**	**17**
YU4JOP	**7**	**34,866**	**318**	**20**	**58**
YU2NEG	"	9588	163	10	37
YU1SF	"	9495	202	9	36
YU3NET	"	7728	150	10	36
YU1DVW	"	7138	116	9	34
YU3NCP	**3.5**	**4080**	**136**	**5**	**25**

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European

UA1FJ	**A**	**87,435**	**408**	**45**	**100**
UA3YR	**A**	**44,814**	**172**	**44**	**110**
UA6YD	"	32,766	262	21	65
UA6MF	"	27,300	153	33	67
UA3TA	"	22,578	134	28	78
UA3RO	"	19,272	178	23	65
UA4QJ	"	18,012	141	24	55
UA1TL	"	16,875	103	30	45
UA3QI	"	14,999	193	15	38
UA1ND	"	8064	126	15	41
UW3NE	"	7750	76	23	39
UA3EU	"	4425	39	21	38
UA3BX	"	3159	71	11	28
UA1MA	"	2080	43	13	20
UA3OI	"	595	25	6	11
UA1KMF	"	510	10	7	10
UA1DY	"	168	12	5	8
UA6FJ	**21**	**22,995**	**251**	**19**	**44**
UA6FD	"	10,971	159	13	40
UA3NC	"	7000	100	15	35
UA1DI	"	936	23	10	14
UA4PA	**14**	**104,490**	**445**	**36**	**93**
UA3DV	**14**	**44,064**	**268**	**27**	**69**
UA4QA	"	23,529	170	19	50
UA4IB	"	16,640	182	20	45
UA1IN	"	15,886	231	14	33
UA3BK	"	14,674	175	17	41
UA1CI	"	11,816	111	16	40
UA3NG	"	10,392	122	14	44
UA4DF	"	8216	94	16	36
UA1NA	"	5625	66	14	28
UA4CN	"	4214	66	11	32
UA6FC	"	1643	33	11	20
UA1KAC	"	1276	32	9	13
UW3EE	"	828	23	6	12
UA1KMD	"	756	29	6	12
UA3QV	"	735	25	4	17
UA1DH	**7**	**32,629**	**311**	**20**	**47**
UA4AZ	"	3332	77	8	26
UA3JD	"	1944	72	6	21
UA6GJ	"	1224	72	5	12
UA1RV	"	551	21	5	14

Kaliningrad

UA2AC	**A**	**45,217**	**321**	**23**	**80**

Lithuania

UP2NR	**14**	**1052**	**48**	**6**	**13**
UP2AW	**7**	**3330**	**709**	**6**	**24**

Moldavia

UO5BM	**A**	**47,744**	**201**	**44**	**84**
UO5IT	"	17,080	204	21	49
UO5WS	"	5738	111	13	25
UO5RO	"	5184	74	18	36

Ukraine

UB5CI	**A**	**512,652**	**814**	**91**	**268**
UB5OD	**A**	**146,879**	**515**	**52**	**139**
UT5HP	"	68,760	376	31	89
UT5EH	"	55,692	402	23	79
UT5CJ	"	29,925	220	24	71
UB5ZE	"	21,985	283	11	46
UT5BP	"	9586	147	14	38
UB5VK	"	5621	65	8	21
UT5BX	"	2464	27	12	20
UB5QA	"	704	14	9	12
UB5CG	**21**	**43,104**	**237**	**29**	**67**
UB5WF	**14**	**123,299**	**514**	**35**	**86**
UB5LM	"	19,996	176	17	50
UT5EW	"	3654	57	14	28
UT5BW	"	1829	35	8	23
UT5RB	**7**	**30,312**	**331**	**19**	**53**
UB5EE	"	16,408	228	13	43
UB5IF	"	10,584	159	11	38
UB5DT	"	2900	92	7	22
UB5YN	"	81	9	3	6
UB5MZ	**3.5**	**24,072**	**426**	**9**	**42**
UB5WJ	"	12,341	283	7	34
UB5WO	"	5022	157	5	26
UT5TG	"	4824	124	6	30
UT5GS	"	2754	102	6	21

White Russia

UC2AR	**A**	**25,612**	**261**	**25**	**51**
UC2WP	"	5904	105	14	34
UC2BB	7	105	17	2	5

Oceania

Australia

VK6RU	**A**	**509,615**	**784**	**71**	**156**
VK2GW	**A**	**333,776**	**631**	**65**	**119**
VK2PV	"	151,996	344	60	98
VK4TY	**A**	**100,540**	**324**	**43**	**67**
VK7SM	**A**	**64,260**	**222**	**46**	**62**
VK3ZR	**A**	**40,743**	**183**	**34**	**47**
VK2RA	"	15,128	89	24	37
VK3RJ	**21**	**16,368**	**126**	**18**	**30**
VK5KO	**21**	**11,856**	**90**	**18**	**30**
VK4SS	**21**	**7935**	**115**	**10**	**13**
VK5JT	"	2128	60	9	10
VK3APJ	**14**	**264,775**	**798**	**33**	**87**
VK3TL	"	92,708	346	30	68
VK2APK	**14**	**47,520**	**204**	**31**	**59**
VK5WC	"	**5811**	**66**	**17**	**22**
VK4EL	"	**4600**	**38**	**17**	**29**
VK3XB	**7**	**16,887**	**151**	**16**	**23**

Caroline Is., East

KC6BK	**14**	**50,052**	**222**	**32**	**54**

Caroline Is., West

KC6BO	**A**	**351,925**	**703**	**72**	**103**

Cook Islands

ZK1AR	**A**	**175,560**	**526**	**51**	**69**

Fiji Islands

VR2DK	**A**	**102,442**	**297**	**51**	**80**
VR2EH	"	85,500	310	55	70

W2PCJ—Larry and his pardner Andy, WB2CKS, junior division multiwinner for the 2nd district. Andy was one of the operators at HA5KBA away back in our 1955 contest, and is very happy to be in our annual "brawls" again.

Guam Island

KG6AOX	**14**	**43,996**	**245**	**27**	**41**

Hawaii

KH6EPW	**A**	**417,783**	**1017**	**65**	**76**
KH6FAH	"	157,384	551	46	57
KH6EKO	**14**	**76,230**	**381**	**29**	**41**
W7UXP/KH6	**21**	**35,244**	**268**	**19**	**25**

New Zealand

ZL2AWJ	**A**	**361,200**	**728**	**72**	**103**
ZL1AIX	**14**	**255,397**	**692**	**35**	**92**
ZL2GS	**3.5**	**4368**	**67**	**12**	**12**
ZL4BO	"	3969	73	9	12

Papua Territory

VK9GL	**14**	**32,928**	**239**	**24**	**32**

Philippines

DU7SV	**A**	**132,699**	**525**	**39**	**50**

South America

Argentina

LU5AQ	**14**	**134,152**	**400**	**33**	**84**
LU6FA	"	39,552	219	24	40
LU2WL	"	3026	77	8	9

Bolivia

CP3CN	**A**	**9112**	**101**	**21**	**16**
CP5EZ	**14**	**123,497**	**404**	**31**	**78**

Brazil

PY1ADA	**A**	**113,752**	**331**	**47**	**71**
PY7ACQ	"	20,540	101	29	50
PY7GV	"	6174	86	18	24
PY7NJ	"	3990	47	13	17
PY4ABH	**21**	**90,528**	**400**	**27**	**55**
PY5EG	"	19,600	141	16	33
PY4GA	**14**	**243,880**	**641**	**35**	**99**
PY1NFC	"	59,328	291	22	50
PY4AYO	"	16,430	97	26	36
PY7KI	"	2838	43	10	12
PY2BNX	"	589	11	9	10
PY4AP	**7**	**14,720**	**113**	**18**	**28**

Chile

CE1AD	**A**	**210,840**	**606**	**51**	**69**
CE3AG	**14**	**271,250**	**740**	**36**	**89**
CE2CR	"	13,020	119	18	24

Colombia

HK7BE	**A**	**152,308**	**537**	**46**	**55**
HK3RQ	"	140,154	511	42	52
HK7ZI	**28**	**2925**	**68**	**8**	**7**
HK3HY	**14**	**20,650**	**202**	**17**	**18**
HK3NQ	"	5586	49	17	32

Netherlands Antilles

PJ2AE	**A**	**35,280**	**266**	**21**	**24**

Paraguay

ZP9AY	**A**	**50,987**	**264**	**31**	**36**

South Orkneys

VP8GQ	**14**	**356,760**	**1028**	**34**	**86**

Uruguay

CX1OP	**A**	**48,650**	**197**	**32**	**38**
CX1AAC	"	8253	109	30	32

Venezuela

YV1DP	**14**	**146,940**	**797**	**18**	**44**
YV5BOA	"	56,109	327	18	41
YV5ANT	**7**	**58,459**	**370**	**14**	**39**

MULTI-OPERATOR
Single Transmitter
North America

United States

W2PCJ	**389,890**	**448**	**96**	**211**
	(W2PCJ, WB2CKS)			
W3ADO	**362,881**	**484**	**89**	**180**
	(K6ILB, K8OTJ, K9BCK) K9MBQ, KØKHP, KØDQI)			
K4LIQ	**482,630**	**512**	**100**	**234**
	(K4LIQ, K4SXT)			
W6RW	**526,960**	**656**	**112**	**168**
	(W6RW, WA6HGC)			
WA6SBO	300,312	427	103	155
	(WA6SBO, W6HAW, WA6DNM, W6JVA)			
WA6EPQ	220,497	391	83	118
	(WA6EPQ, WA6IPY)			
W6DFY	204,268	333	91	132
	(W6DFY, W6ANN)			
W7BSW	**40,128**	**171**	**40**	**48**
	(W7BSW, W7DAN)			
W8UCI	**89,208**	**185**	**66**	**111**
	(W8UCI, W8IRY)			
W8SH	88,060	195	66	104
	(K8MFO, K8VQP, WA8AET)			

Alaska

KL7BZO	**175,848**	**755**	**45**	**58**
	(KL7BZO, KL7AQU)			

Canada

VE2CSS	**4675**	**88**	**11**	**14**
	(VE2BQT, VE2AZQ)			
VE4JB	**40,652**	**331**	**55**	**68**
	(VE4JB, VE4MF)			

Asia

Israel

4X4MJ	4360	52	16	24
	(Club Station)			

Union of Soviet Socialistic Rep.
Club Stations

Armenia

UG6KAA	**7884**	**80**	**12**	**24**

Asiatic

UA9KQA	**409,370**	**637**	**63**	**172**
UA9KTE	87,720	351	26	60
UA9HRM	16,492	165	11	27
UA9ML	4715	57	18	23
UA9KJA	2294	44	10	21
UAØKFG	**268,455**	**723**	**68**	**97**
UAØKSB	39,795	210	24	53
UAØKUV	21,402	192	24	34
UAØKCA	18,894	237	21	26
UAØKYA	5472	79	12	20

Azerbaijan

UD6KAB	**13,617**	**101**	**15**	**36**
UD6KGF	9102	94	10	27

Georgia

UF6KAE	**22,659**	**202**	**9**	**30**

Kazakh

UL7KBK	**98,910**	**307**	**40**	**86**

Kirghiz

UM8KAA	**405,720**	**736**	**62**	**168**
UM8KAB	63,632	364	31	66

Tadzhik

UJ8KAA	**226,219**	**685**	**32**	**87**

Turkoman

UH8KAA	**29,295**	**180**	**22**	**41**

Uzbek

UI8KHA	**3618**	**65**	**9**	**18**

Europe

Bulgaria
(Club Stations)

LZ1KSZ	**468,540**	**1396**	**71**	**203**
LZ1KSP	177,632	622	52	182
LZ1KPG	92,218	539	28	70
LZ1KBA	75,966	361	40	87
LZ1KSA	14,100	205	12	48
LZ2KAF	12,744	149	12	42
LZ2KKZ	7020	109	10	42

Czechoslovakia
(Club Stations)

OK1KUD	**251,505**	**735**	**62**	**145**
OK3KAS	**223,872**	**937**	**54**	**138**
OK1WR	160,782	450	64	147
OK2KMB	66,816	341	41	75
OK2KJU	46,860	208	41	91
OK2KOV	45,630	306	31	86
OK3KGI	20,286	199	21	48

KH6EKO—Hal shut down his station almost immediately after the contest and headed back to the States, 1490 Russell Way, Thornton, Calif. for those of you who need his QSL.

YV1DP, Greg takes time out for a coffee break during a lull in the 14 mc pile-up.

OK1KNT	16,296	160	23	61
OK1KTL	10,608	118	26	52
OK1KKH	5856	203	5	27
OK1KNH	4410	114	8	27
OK1KKG	3264	105	7	25
OK2KGV	682	77	2	9

England

G3SBI	**67,035**	**323**	**40**	**83**
	(G3SBI, K3RIK)			

Finland

OH5UX	**89,388**	**380**	**41**	**115**
	(OH5UX, OH5UY)			
OH2AF	18,105	101	32	53
	(OH2BG, OH2VB)			
OH6AA	5190	116	14	28
	(OH6OW, OH6TM, OH6UX)			

Germany

DL9VZ	**221,135**	**468**	**69**	**166**
	(DL9VZ, DL3BL, DL3UT, DJ2SK, DJ2VO, DJ6YT)			
DL3YQ	**171,045**	**481**	**59**	**122**
	(DL3YQ, DL9VN, DJ2JE)			
DL9JL	155,358	509	60	129
	(DL1CO, 9JL, DJ4XS, 4XW, 5PA, 8EQ, 8GB)			
DLØFT	151,096	391	64	124
	(DJ5HL, DL1GW, 1HA, 1HH, 3MN, 6GL)			
DJ7SW	143,325	413	62	133
	(DJ7SW, DJ5AZ)			
DJ4FZ	88,086	342	52	107
	(DJ4FZ, 4SO, 6TK, 6UK)			
DM3EN	68,838	289	55	94
	(DM2AVB, DM3MJI, DM3VDJ)			
DM3ML	66,920	288	43	97
	(DM3GML, 3JML, 3NBB, 3WML)			
DLØNS	53,580	304	36	78
	(DJ4AN, 6ZW, DL6QV, 9YP)			
DL9RP	50,760	192	45	90
	(DL9RP, DJ3YU)			
DLØBT	48,430	175	48	97
	(DL3AV, DJ1FE, 3BB, 6SU)			
DL8CM	36,900	161	40	60
	(DL8CM, DL8CH)			

Hungary
(Club Stations)

HA5KBB	**251,894**	**681**	**62**	**140**
HA1KSA	220,626	646	62	144
HA5KBP	210,125	664	58	147
HA5KFR	164,700	537	57	126
HA3KGC	155,880	587	55	125
HA6KVB	48,312	298	35	87

Italy

I1ALU	**67,328**	**312**	**38**	**90**
	(I1ALU, I1VN)			

Northern Ireland

GI3GAL	**188,442**	**603**	**50**	**121**
	(GI3GAL, GI3AXI, GI3HXV, GI3KYP, GI3JXS, GI5UR)			

Norway

LA1H	**195,858**	**704**	**43**	**119**
	(LA1LF, 3UH, 7KH, 9OI)			

Poland

SP7LA	**344,448**	**792**	**70**	**164**
	(SP5ADZ, SP5BR, SP7LA)			
SP8KAR	87,200	351	50	110
	(Club Station)			

Roumania
(Club Stations)

YO2KAB	**55,930**	**326**	**33**	**86**
YO6KAF	50,830	344	24	91
YO3KSD	47,502	322	37	80
YO6KBM	22,725	237	22	53

Sweden

SM5ARR	**321,280**	**681**	**69**	**182**
	(SM5ARR, SM5BDY, SM5CZQ)			
SM5BAU	316,160	717	78	182
	(SM5BAU, SM3AVW, SM5BCE, SM5BDS, SM5BTU)			
SM6CSC	211,768	564	70	136
	(SM6CSC, 6ADE, 6BJI, 6BSK, 6CAS, 6CKV, 6CWP)			
SL5DE	20,720	330	12	44
	(SM5AFH, SM7CUY)			
SL2AD	5220	142	7	29
	(SM2COT, SM3AFR, SM3CNN, SM4CIP, SM5XG)			

[*Continued on page 83*]

CQ Reviews:

The Westinghouse OZ-PAK

VACUUM tube rectifiers are fast giving way to silicon rectifiers in newly manufactured equipment because of the advantages afforded by the solid-state devices, especially in high-power transmitter applications. In many instances, home constructors have followed suit and probably a good many more would do so if more data or a suitable simple and dependable arrangement were made available for installation in new gear or for modifying existing apparatus.

Realizing this, K3OKX, Ozzie Jaeger of Westinghouse Electric Corporation, prompted his company into producing a completely packaged silicon rectifier assembly for amateur use in different circuits and under the most rigorous conditions. This called for a husky unit with a large safety margin. Fortunately, the production of such a device is "right down the alley" for the Westinghouse people, inasmuch as they are pioneers in the field of solid-state high-power rectifiers. The outcome is the OZ-PAK. (named for Ozzie, no doubt.)

Before discussing the OZ-PAK itself, let us take a look at some of the advantages gained by the use of silicon rectifiers. These devices are smaller than vacuum tubes, thus providing a saving of space and allowing additional room for other components. Mounting is not restricted to a particular location or to a specific position as needed with the mercury-vapor type tube rectifiers generally used in high-power applications.

Since they are used in place of vacuum tubes, silicon units eliminate the necessity for one to three filament transformers (depending on the circuit used), and two to four sockets, together with their associated wiring and insulation. Heat radiation from power-dissipating tube filaments is no longer a problem and heat buildup in cabinet enclosures is eliminated. Equipment runs cooler.

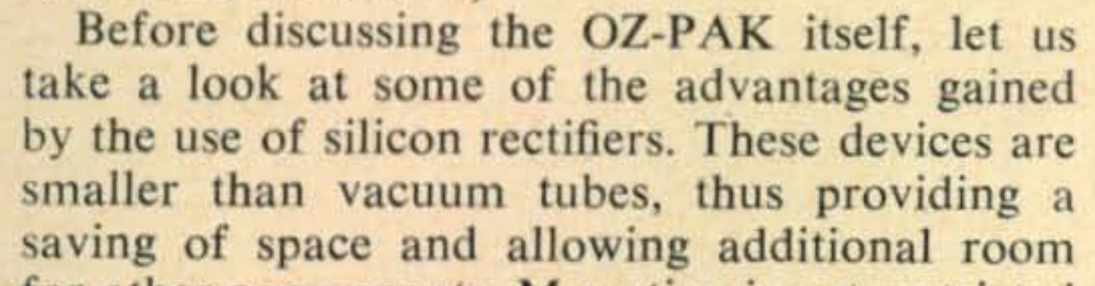
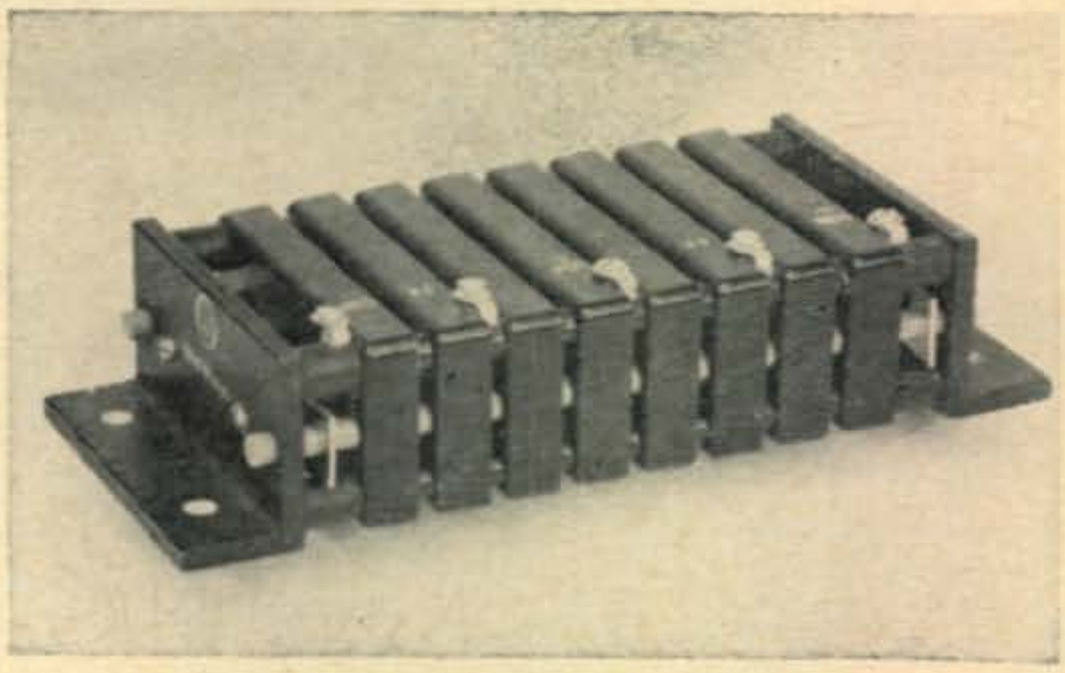


Fig. 1—Integrating network arrangement in the OZ-PAK stacks. Uniform shunt resistors and capacitors equalize the voltage across the individual diodes and thereby minimize excessive peak reverse-voltages, especially due to transients which might otherwise destroy the diodes, since without compensation, the stress across the diodes near the "Hi" end would be much greater than on those toward the "Lo" end. The integrating network elements are not arbitrarily selected, but are precisely engineered for optimum values using components of special quality.



The Westinghouse OZ-PAK 1 kw silicon rectifier assembly

There is no more need for aging-in new gaseous rectifier tubes, nor is pre-heating required prior to operating periods. Hot-weather arc backs or cold-weather hard starts also are eliminated.

The voltage drop across silicon diodes is extremely low, resulting in improved regulation, especially when they replace high-vacuum type tube rectifiers.

Rectifier hash, often the bane of s.s.b. and c.w. operation with mercury-vapor tubes, is eliminated.

When properly installed and operated, life expectancy and dependability are high.

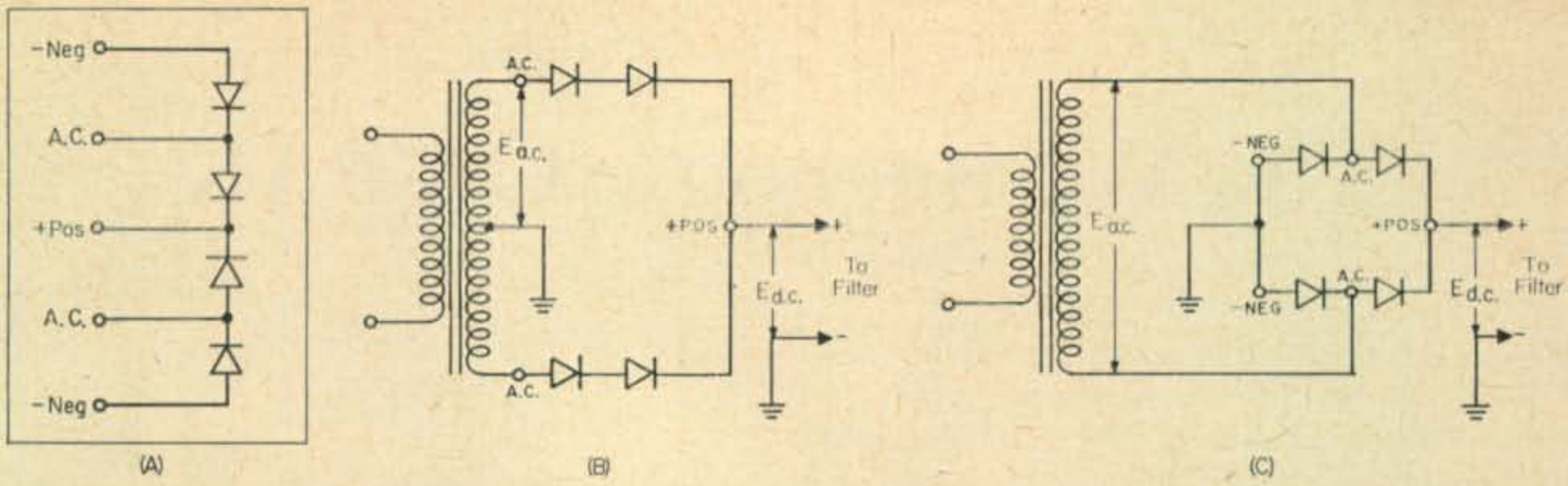
OZ-PAK Assembly

The Westinghouse OZ-PAK is a highly engineered silicon-rectifier assembly designed to operate at a full kilowatt under all environmental conditions of temperature, humidity, salt air, etc. It consists of eight separate stacks, each containing eight silicon diodes which are fully integrated with compensating networks to equalize the voltage distribution between the diodes and to minimize transient voltage peaks which might otherwise destroy the diodes. See fig. 1. The separate stacks are encapsulated in a hermetically-sealed assembly made of a high-voltage dielectric material. The unit may be mounted in any convenient mechanical position by means of mounting flanges included thereon. No insulators are required. The overall size of the unit is 2" × 4" × 9½".

The OZ-PAK will replace such tubes as the 816, 866A, 872A, 8008, 3B28, 4B32 and 575A. Five terminals are provided on the assembly to permit a choice of full-wave center-tap or full-wave bridge rectification.

Output Ratings

With *natural convection* cooling the OZ-PAK may be operated at ambient temperatures up to 100° F. to furnish a *continuous* power of one kilowatt with any combination of d.c. potential



(A) (B) (C)

Fig. 2—A—Internal arrangement of the diode strings in the OZ-PAK. B—Connections for full-wave center-tap rectification. C—Connections for full-wave bridge rectification.

up to 3500 volts and current up to 800 ma (with a grounded center-tap configuration)[1] which does not exceed 1 kw; however, tune-up and voice-operation at 2 kw p.e.p. may be *safely* conducted because of the low-duty cycle of such operations and the conservative rating of the OZ-PAK.

Another feature is that the B plus can instantly be applied directly into a filter capacity of up to 120mf without damage to the silicon rectifiers, thus eliminating the need for a filter choke in the usual type of application. It is not necessary to employ the often-used complicated system of automatically switching in a surge-suppressor resistor to limit the initial charging current during the first few seconds following the application of power.

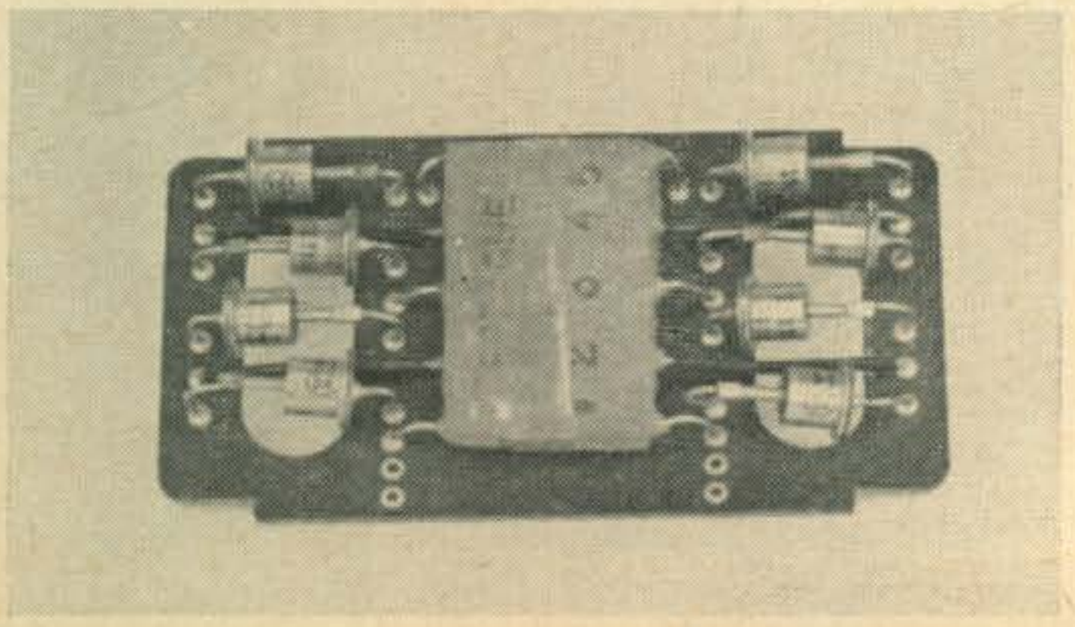
Circuitry

Screw-type terminals are mounted on the OZ-PAK assembly to provide the necessary connections for different rectifier configurations. The terminals are marked as shown in fig. 2 where the arrangement of the diodes and the connections for different circuits are indicated. Each diode in the diagram represents 16 series-connected diodes divided between two stacks.

Installation in Existing Equipment

In existing equipment, the vacuum tube rectifiers may be replaced directly with the OZ-PAK simply by removing the plate connections from the tubes and connecting these to the appropriate terminals on the OZ-PAK assembly. Also, the B-plus terminal on the OZ-PAK is connected to the input side of the filter choke. In the event a bridge circuit is concerned, the two negative terminals on the OZ-PAK are bridged together and connected to the negative or grounded high-voltage terminal of the power supply. Note that existing power supply leads do not have to be disconnected when the OZ-PAK is installed. Also, due to its compact size and unrestricted mounting position, it may usually be installed in existing gear without necessitating the removal of original components, thereby making it simple to restore manufactured equipment to its original state without deteriorating the resale value. Several typical modifications of this nature are shown in the photos.

[1]When a full-wave bridge configuration is used, the current capability is at least 1.6 amps d.c.



In case you are wondering what is inside each OZ-PAK stack, this is it.

Operating Precautions

The OZ-PAK is most conservatively rated for amateur use at the maximum legal power limits; however, it should not be operated above the specifications given earlier. This is of particular importance in relation to installation in home-built gear where the tendency often is found towards operating at higher than normally used voltages and at excessively high power levels. Let us now take a look at what is involved in this respect.

Referring to fig. 2, with a full-wave *center-tap* circuit, the r.m.s. voltage (E_{ac}) applied to each rectifier leg will be 1.11 times the d.c. output Voltage (E_{dc}) into the filter (choke input)[2] and the peak-inverse voltage (p.i.v.) will be 2.83 times the r.m.s. voltage (E_{ac}). Thus for a d.c. value of 3500 volts, E_{ac} will be 3500 $\times$ 1.11 or 3885 volts and the p.i.v. will be 3885 $\times$ 2.83 or almost 11,000 volts. (The p.i.v. also may be determined by: p.i.v. $= E_{dc} \times 3.14$).

Because of power supply inductances and capacitances, large voltage peaks or transients may occur when the power transformer is turned on and off or when drastic load changes occur suddenly. These voltages may be as much as twice the normal working voltages, so for the case in point, each rectifier leg must be capable of withstanding reverse-voltage peak values upwards of 20,000 volts!

Due to the integrating networks built into the OZ-PAK, transient voltage spikes are minimized so that a safety factor (Rated p.i.v.)/(Working p.i.v.) in the neighborhood of about 1.5 may be realized, in which case we may assume that the

[2]Conversely, E_{dc} will be equal to $E_{ac} \times 0.9$. Also, the d.c. voltage *applied to the load* usually will be somewhat less than E_{dc}, depending on the type filter used and the voltage drop resulting therefrom.

maximum instantaneous p.i.v. rating to be near 11,000 (the working p.i.v.) × 1.5 or 16,500 volts. What this boils down to is that the maximum allowable applied r.m.s. voltage is near 3900 volts.

Bridge Configuration

For a *given* d.c. output voltage with a full-wave *bridge* circuit, the requirements are not quite as stringent, since the working p.i.v. (E_{ac} × 1.41) is only half that of a full-wave *center-tap* arrangement. Besides this *the bridge configuration is less prone to producing power-transformer transients.* Thus a bridge-type rectifier will allow a larger margin of protection and will permit safe operation at somewhat higher currents. Another advantage of the bridge setup is that the transformer can be made physically smaller than one used for center-tap rectification.

Use of a *center-tapped* transformer with a bridge circuit is *not* recommended *unless* the center tap is insulated sufficiently to be operated above ground. Usually this is *not* the case, so if such use is contemplated, the transformer rating in this regard should first be determined. Also, if the full secondary of a center-tapped transformer is used with a bridge, the output voltage will be twice that obtained from a normal center-tap rectifier, but the maximum allowable d.c. current will be halved in order that the total power output will not exceed the normal k.v.a. or power rating of the transformer.

Current Rating

From the figures given aforehand, the maximum continuous-current rating is 800 ma with natural convection air-cooling at ambient temperatures up to 100° F.[1] No doubt, higher current may be safely handled, without danger of burning up the silicon elements, by employing forced-air cooling; however, it is suggested that the manufacturer be consulted before such a step is undertaken.

Now, what about a short-circuited load? Well, the OZ-PAK does have enough guts to take a momentary short during which time the current flow will be limited due to transformer and filter reactances, while it is more than likely that a more prolonged short will either blow a fuse or damage other components before harming the OZ-PAK. In fact, this was found to be the case during a number of graphic demonstrations with a screw-driver short held across the d.c. output circuit of a 3000-volt supply using the OZ-PAK. In this connection, fast-acting fuses should be employed at the input of the power transformer.

Capacitor-Input Filter

Elimination of the filter choke and working directly into a *high*-value filter capacitor will result in a somewhat higher d.c. output voltage (approximately equal to the applied r.m.s. voltage) and will still provide good dynamic regulation. Although high charging currents are thereby experienced, the OZ-PAK will take them in stride; however, the transformer must be capable of continuous operation into a capacitive load at the desired d.c. current. In this regard, the maximum allowable d.c. current drawn by the load will be equal to the normal r.m.s. current in the transformer which is 0.7 times the maximum rated d.c. current with a choke-input filter.

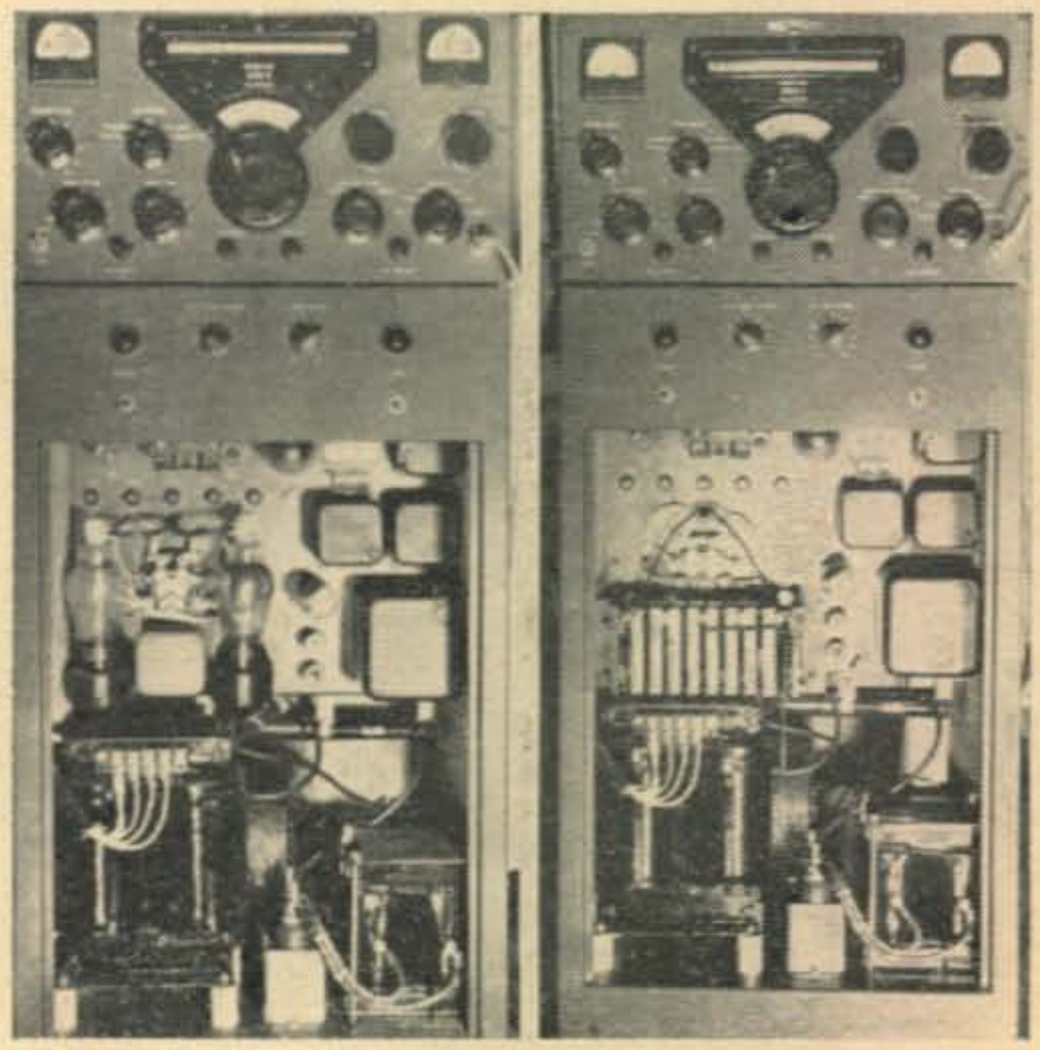
Other Considerations

Other normal power supply considerations relating to filter components, bleeder resistance, etc., may be found in the various radio handbooks. Another excellent source of helpful information is the High Voltage Silicon Rectifier Designer's Handbook published by Westinghouse and available at a cost of $2.00. A complete high-voltage power supply, using the OZ-PAK, will be described in a forthcoming article.

Conclusions

Observations made during bench tests and reports from amateurs using the OZ-PAK have indicated the unit well suited to fill the bill with the ability to "take it" as well as "give it;" nevertheless, this does not mean that it should be abused by operating it above the ratings and conditions given herein.

The Westinghouse OZ-PAK is priced at $69.95, a cost which no doubt would run higher if individual components were purchased separately for assembling an arrangement of comparable performance. Considering the outlay otherwise needed for rectifier tubes, filament transformers, sockets, etc., along with the improved performance and dependability gained by the use of the OZ-PAK, it should prove to be a worthwhile and reasonable lifetime investment. It is produced by the Westinghouse Electric Corporation, Youngwood, Pa., and is available from most amateur-supply houses.—*W2AEF*



Before and after views showing the OZ-PAK installed in the Collins KWS-1 transmitter where it is placed in front of the rectifier tube sockets above the power transformer.

Voice Of America

Radio Amateurs' Notebook

EVERY week the Voice of America broadcasts "The Radio Amateurs' Notebook" program to all areas of the world at various times throughout the day. The program consists of 15 minutes devoted to the latest gossip on the ham bands, interviews with radio amateurs around the world, propagation forecasts, and discussions of the latest technical news of interest to radio amateurs and shortwave listeners. The broadcasts are in the English language.

The program is written and voiced by Bill Leonard, W2SKE, one of America's leading news commentators and a very active amateur. Gene Kern, W2BAK, produces the program; and George Jacobs, W3ASK, prepares the propagation forecasts. Radio amateurs everywhere are invited to participate.

VOA's distinctive QSL card is available for exchange with listeners of this program. W2SKE and the gang are looking forward to receiving QSL cards from radio amateurs and shortwave listeners. Listeners may forward their QSL cards to: Amateur Radio, Box 922, Washington, D.C., 20004.

The complete world wide broadcast schedule for the VOA Amateur Radio program effective May 3, 1964 through September 5, 1964 is as follows:

Sunday, 0730-0745 GMT

Kc	*Station*	*Beam*
1259	Rhodes	Middle East
6015	Rhodes	Middle East
6040	Munich	Europe/Middle East
6055	Greenville	Europe
6080	Tangier	Europe/Middle East
7130	Rhodes	Middle East
9530	Tangier	Europe
9545	Munich	Middle East/South Europe
9560	Delano	Far East
9635	Greenville	Europe/North & West Africa
11830	Delano	Far East
15295	Tangier	Middle East
17735	Munich	East Africa

Sunday, 0800-0815 GMT

Kc	*Station*	*Beam*
6075	Liberia	West Africa
7150	Liberia	West Africa
9660	Liberia	West Africa

Sunday, 0845-0900 GMT

Kc	*Station*	*Beam*
5975	Okinawa	Central East Asia
6010	Okinawa	North East Asia
6130	Honolulu	East Asia
7155	Okinawa	North East Asia
7235	Okinawa	North East Asia
9650	Honolulu	Australia/New Zealand
11785	Philippines	Central East Asia
15210	Philippines	Central East Asia
15250	Philippines	North East Asia
15335	Philippines	Southeast Asia
15410	Philippines	East Asia

Sunday, 2245-2300 GMT

Kc	*Station*	*Beam*
5965	Tangier	Europe
11805	Tangier	Europe

Monday, 0330-0345 GMT

Kc	*Station*	*Beam*
6045	Greenville	Latin America
9565	Greenville	Latin America
9650	Bethany	Latin America
11770	Bethany	Latin America
11830	Greenville	Latin America
11890	Greenville	Latin America
15215	Greenville	Latin America

"CQ Washington" is a program in Spanish for Latin American radio amateurs. It is written and voiced by Carlos Benales, ex-CX4AP, a veteran radio amateur operator. This program is devoted to contests, propagation forecasts and new materials and developments in the field of amateur radio. The broadcast schedule for the VOA Spanish amateur program effective May 3, 1964 through September 5, 1964 is as follows:

Sunday, 0410-0425 GMT

Kc	*Station*	*Beam*
15325	Delano	Latin America
11955	Greenville	Latin America
9725	Greenville	Latin America
9670	Greenville	Latin America
9530	Bethany	Latin America
6190	Bethany	Latin America
5975	Greenville	Latin America
1180	Marathon	Caribbean
1040	Sugar Loaf	Caribbean

Sunday, 1245-1300 GMT

Kc	*Station*	*Beam*
15235	Bethany	Latin America
11890	Greenville	Latin America
9525	Greenville	Latin America
6190	Bethany	Latin America
1180	Marathon	Caribbean
1040	Sugar Loaf	Caribbean

Amateur Radio Tomorrow?

BY WILLIAM I. ORR*, W6SAI

Amid a rash of half-truths and false rumors about the upcoming ITU conference, we are fortunate to be able to present this vivid and factual article concerning these conferences. Don't skim over it; read it!

RECENT technical achievements point to a promising tomorrow for amateur radio. New low distortion tubes, better transistors, new circuits and improved techniques foretell bigger and better communication facilities and a higher order of circuit reliability for the radio amateur.

The only cloud on the horizon seems to be a forthcoming International Telecommunications Administrative Radio Conference, commonly called "The Frequency Conference" at which (it is claimed by some) unprepared and naïve representatives of amateur radio may lose their shirts, and at which time amateur radio will place its head on the chopping block! An interesting and pointed question, therefore, is: Just what is this Administrative Radio Conference? Who confers and why? What jurisdiction does it exert over amateur radio and what effect does this jurisdiction have on amateurs in the United States? Answers to these questions may also provide answers to other questions that are being voiced regarding the present events uppermost in the mind of many radio amateurs.

The International Telecommunications Union

The International Telecommunications Union (I.T.U.) is a 100 year old organization of *governments* through which agreements are reached concerning telecommunications, that is, "any transmission, emission or reception or signs, signals, writing, images, and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems."[1]

The basic agreements are accomplished at formal conferences of the Union held on a periodic basis. The Plenipotentiary Conference is the highest level meeting convened by the I.T.U. This conference is responsible primarily for reviewing the basic charter or convention under which the Union operates. Plenipotentiary Conferences are generally held every five years. The last one was held in Geneva, Switzerland during 1959, and the next one will be held again in Switzerland during 1965. Although the Plenipotentiary Conference has the power to consider frequency allocations, it has, more or less by tradition, given this responsibility to Administrative Radio Conferences. These meetings are responsible primarily for revising the by-laws of the I.T.U., formally called the Radio Regulations, which are annexed to the I.T.U. Convention and contain the Table of Frequency Allocations. Generally, this type of conference is called only when the state of the communications art has developed to the point where the Radio Regulations and the Table of Frequency Allocations may require revision. The first post-World War II Administrative Radio Conference was held at Atlantic City, N.J. in 1947, and the most recent one in Geneva during 1959.

From time to time, special, or Extraordinary Administrative Radio Conferences are called to consider the problem of a particular world region, or a particular radio service, such as the recent Space Communications Conference held in Geneva during 1963.[2]

Plenipotentiary Conferences are attended by high-ranking officials and diplomats of member countries: Ministers of Communication, F.C.C. Commissioners, Ambassadors, etc. Such officials also, in part, attend Administrative Radio Conferences, as well as communication engineers and scientists. The main technical, engineering and operating problems confronting the I.T.U., however, are dealt with at conferences of the International Radio Consultative Committee (C.C.I.R.). Plenary Assemblies of the C.C.I.R. are held every three years, the last one being in Geneva during early 1963, with the next one scheduled to be held in France during 1966.

The Conference of greatest importance to radio amateurs is the Administrative Radio Conference, since it is at this conference that frequency allocations are considered. There has been considerable speculation as to when the next Conference may be held. Although *no* date has yet been set for the next Administrative Radio Conference, a look at the sequence of Conferences already scheduled for the next few years gives a reliable indication of the date of the next "Frequency Conference." A Plenipotentiary Conference will be held in 1965 and a Plenary Assembly of the C.C.I.R. is scheduled for 1966. It will take at least a year for the results of the C.C.I.R. Conference to be studied by member countries, and it requires at least two years to prepare for an Administrative Radio Conference. The *earliest* date the next such Con-

*48 Campbell Lane, Menlo Park, Calif.

[1]As defined in the Radio Regulations of the I.T.U., Geneva, 1959, Article 1, Section 1.

[2]The author attended the Space Communications Conference as a member of the Delegation of the International Amateur Radio Union.

ference could be held, therefore, is 1968, and chances are that it may not be before 1969 or 1970. This is a very important consideration to keep in mind: *no matter how serious the amateur radio high frequency allocation problem may, there is ample time to do something about it.* Bystanders who cry "panic" do nothing but create unnecessary tension, while helping not a whit.

I.T.U. Participation

Participation in I.T.U. Conferences is by *governments.* Each of the 120 member nations of the I.T.U. has one vote at these various Conferences. Except for the United States and a few other countries, delegations to these conferences consist entirely of government officials. Since the United States has a unique communications situation wherein most of the communications facilities are privately owned and operated, the U.S. Delegations consist of government officials as well as representatives from private communications interests. *The American Radio Relay League has been the spokesman for amateur radio on U.S. Delegations to all major Conferences held during the past 40 years.*

The I.T.U. has also authorized a small number of international organizations to participate in its Conferences on a consultative, no vote, basis. Among such organizations given this observer status are the International Red Cross, the International Civil Aviation Organization, the International Radio Maritime Committee, the International Broadcasting and Television Organization, the International Amateur Radio Union (I.A.R.U.), and others. It is of great importance to note that the I.T.U. recognizes the status of the I.A.R.U. as representing amateur radio on an observer basis, *free of the control of government delegations.* The I.A.R.U. can be a powerful organization for representing the frequency requirements of amateur radio at future Conferences.[3]

The Last "Frequency Conference"

The next Administrative Radio Conference will probably be held between 1968 and 1970. Amateur radio, as a Communications Service, *will not* be in peril of its life at this, or any other Conference. What will be at stake, are the present radio amateur frequency allocations between 3 mc and 30 mc. Whatever the outcome of the next Administrative Radio Conference may be, the Amateur Radio Service will continue to exist, and will continue to have some high frequencies, and its present v.h.f. and u.h.f. bands. The real question is: How *much* of the high frequency allocations will amateur radio be able to retain at the next Administrative Radio Conference?

It is instructive, then, in view of a forthcoming "Frequency Conference" to look back a few years and review some of the actions that took place before and during the 1959 Administrative Radio Conference. Perhaps it is possible to judge from the past what to expect in the future.

Obviously, the United States and other participating nations do not wait until they reach the conference table to review the old regulations and practices and determine what portions need revision in light of current techniques and policies. In this country, studies along these lines begin years before the expected conference, with groups of experts both within and without the government meeting frequently, studying the current and projected needs of communications and examining the old regulations and frequency allocations in terms of such requirements, and determining the exact language for their proposed revisions.

In the United States, serious planning for the 1959 Conference began during late 1956. A group of communications experts from government and industry examined the communications requirements in the United States in order to determine "pressure points" and areas in which regulation and allocation changes were to be proposed. A rough "priority ladder" was proposed, placing the various Radio Services within the country in a prospective that most accurately suited the public interest of the United States. "Safety of Life" Services (Maritime, Aviation, etc.) occupied a high position on the "ladder," followed by Fixed Services and International Broadcasting. *The Amateur Radio Service was not on the priority "ladder" at all.* This "ladder" was based solely upon national need and security, and not upon so-called engineering logic, economy of spectrum, or available facilities. The proposed U.S. pre-conference position was very plain: Safety, Fixed, and Broadcast Services were of vital importance to the national economy, security and welfare. Self-preservation was paramount, and no radio amateur could reasonably expect his government to support the Amateur Radio Service (still loudly called a "hobby" by many today) to the detriment of the more important Services!

In any event, each U.S. Radio Service, as a result of this priority "ladder" concept was on the spot, and was required to justify its continued use of spectrum space. Conferences and discussions then ensued between the Government committees and the various Services: Fixed, Aeronautical, Maritime, Land Mobile, Broadcasting, and Amateur. The spokesman for the Amateur Radio Service was the ARRL. In addition, a team of government communication experts visited other countries, conferring with their communications authorities to explain the U.S. position. *The principal objective of the United States at the 1959 Conference was to hold the status-quo for all Services in the 3 mc to 30 mc portion of the spectrum.* More experience with operations under the existing regulations was thought necessary before another conference could intelligently appraise their utility. The Amateur Radio Service, of course, was included

[*Continued on page 86*]

[3]See "Amateur Radio at the 1963 I.T.U. Space Conference," by George Jacobs, *CQ*, January, 1964, page 43 for an account of the decisive role played by the I.A.R.U. in obtaining an allocation for radio amateurs at this conference.

One Step Short

BY MARCUS A. FELT*, W2GYQ

Part I

Scientists and inventors are uncommon men; it is the few, not the many who make original contributions to scientific knowledge. But men are no less human for having achieved greatness; they make mistakes. Wise men of all ages have written: "To err is human." It often follows that the greater the man, the greater the mistake. Tales of great men abound with such stories. Perfection does not exist; greatness often consists of being—one step short!

THE history of invention is replete with examples of error or "blindness" on the part of early investigators into the art of any particular scientific field. Nowhere is this more evident than in the electrical and radio arts where only the effects of an invisible force are available for study and speculation. Early pioneers in these fields were bold explorers venturing into scientific territory so vast and uncharted as to provide complete freedom: freedom for discoveries, freedom for prediction, freedom for error, freedom to overlook the 'obvious'.

Franklin

Our first tale concerns a beloved figure of American history, one Benjamin Franklin, who in true renaissance style was impelled to curiosity and investigation not only in the realm of human concerns but in the field of natural philosophy. New developments always excited his interest. In January 1746 Pieter van Musschenbroeck of the city of Leyden in Holland invented the so-called Leyden Jar, a capacitive bottle device now rarely seen outside of physics laboratories. It had the ability to store an electrical charge and deliver it as a violent shock.

When word reached Franklin of this fascinating electrical device he immediately set to work to investigate its particular properties, and in so doing became curious as well about the entire field of electricity. At this point in history electrical science did not exist. So little was published about its known manifestations that many researchers wasted precious time repeating previous discoveries. Electricity was a plaything, a 'sleight of hand' trick to beguile the public. Most explanations bordered on the mystical. Men spoke of vitreous electricity and resinous electricity and of two electrical fluids based on the nature of the electrical charge being generated. All was confusion and mysticism.

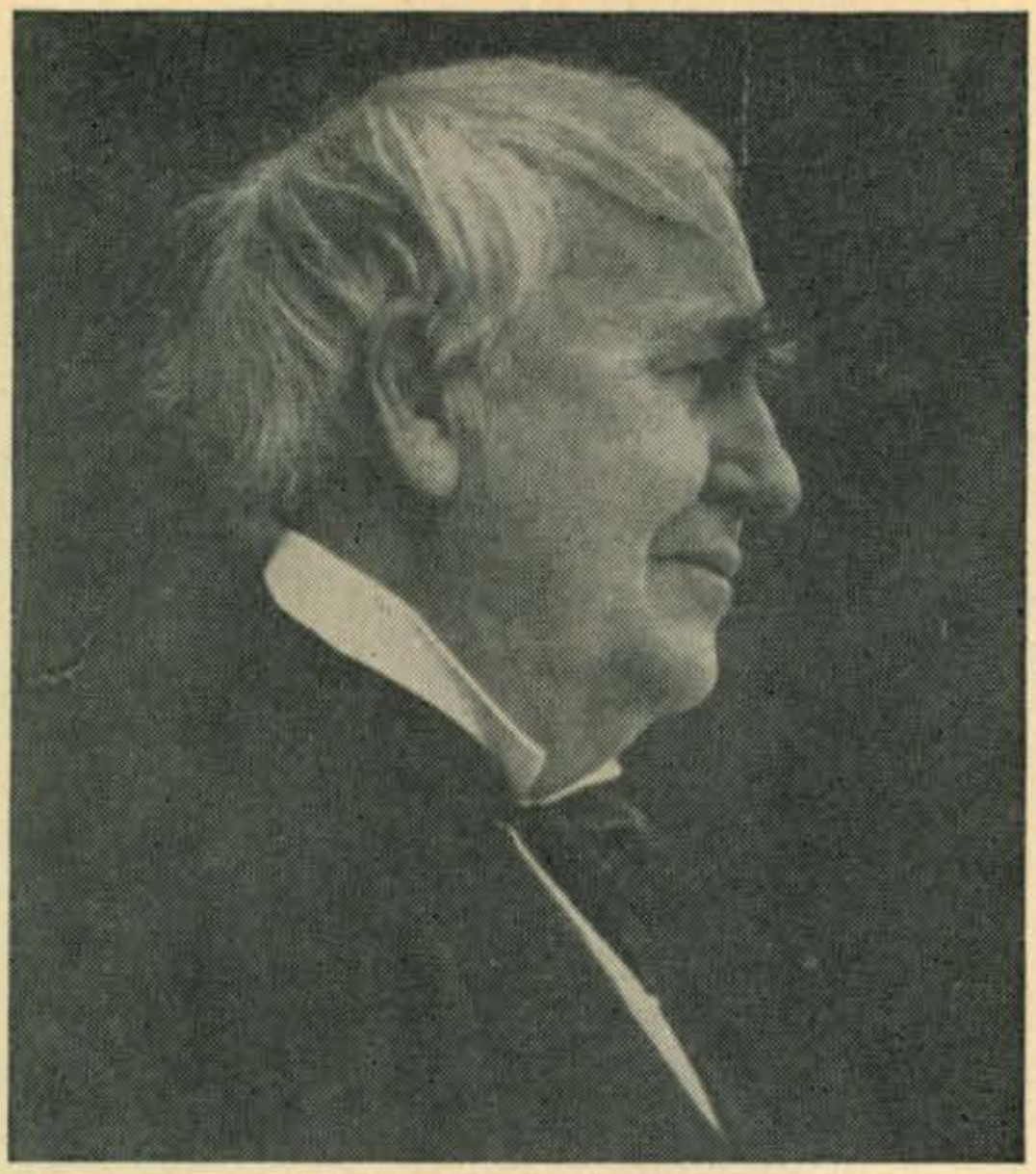
Franklin stepped into this impassé and in his characteristically precise way brought order to the floundering science. By fastidious experimenting with his primitive devices, a hand driven electrostatic machine, home-made Leyden jars, silk kites, and odds and ends of various metals and insulators, Franklin came to definite conclusions about electricity: lightning is identical with electricity produced by hand rubbed devices or by electrical machines; so-called vitreous electricity should be labelled as positive, and resinous electricity as negative; also, and most important, electricity is a single fluid in its nature.

Up to this point, our colonial savant had indeed made remarkable and original contributions to the science of the electrical art. When Franklin's findings were published, his well deserved fame as a man of electrical science spread fast through America and Europe. People commenced to press Franklin for more information about electricity and the so-called electrical fluid. Especially insistent was the question of the direction of flow of the single electrical fluid here postulated. Since there was now a positive electricity and a negative electricity, which type had the motion and in what direction? Franklin was reticent to speculate about a matter upon which he had no exact knowledge.

Further pressure was placed on Franklin for an answer. Reluctantly he agreed to express a

Benjamin Franklin

*50 Prince Lane, Westbury, N.Y.



Thomas A. Edison

tentative statement, what we would call an 'educated guess', and nothing more. His guess was that the electrical fluid traveled from positive bodies to negative bodies; that is to say he imagined that the electrical current flowed from plus to minus. Of course it was an erroneous conclusion. His contemporaries promptly forgot his warnings as to accuracy and conventionalized the positive to negative concept of electrical current flow.

Thereby lies the point of our first tale; Franklin's wrong guess was to cause considerable confusion when the true nature of electron flow was discovered through the cathode ray researches of J. J. Thomson in 1897. Unfortunately, by that time the error was embedded too deeply into electrical practice. The fast growing electrical sciences had to develop under the handicap of a dual conception about electric flow. The thermionic devices of radio and electronics with their associated circuitry demanded the accuracy of the actual negative to positive electronic flow. However all previous teaching, writing and practice utilized the reverse idea. Many electrical instruments were polarized for the older concept and certain right hand rules and so-called laws followed the erroneous thought. For a time there was considerable confusion and controversy.

The passage of the years has tranquilized the sharpness of the dispute. Today Franklin's error is no longer a source of bewilderment, except possibly to the beginning student. Modern radio and electronic practice has thoroughly assimilated the idea of electron flow. We can and have forgiven our beloved electrical pioneer his blunder.

Edison

Our next tale concerns one of the most famous inventors of all time and undoubtedly the most prolific inventor in history. The U.S. Patent Office issued 1,093 patents in the name of Thomas A. Edison over a period of time extending a half-century, a fantastic record of achievement.

Although Edison applied his aggressive inventive techniques to almost every field of technology, his primary contributions were in the electrical field. This is indeed understandable when we realize that in his fifteenth year, Edison was earning his living as a telegraph operator.

The first patent issued to Edison was for an electrical vote recorder. He was then 21 years of age; electrical invention had become his forte. He devised stock tickers, various types of telegraph systems, an electric pen, improved dynamos, the carbon microphone, and sundry instruments too numerous to catalogue.

His best known contribution was that of the incandescent electric lamp and Edison lavished considerable time and effort on this development. Other men had conceived of the electric lamp but all had failed to produce a practical device. After painstaking investigation of thousands of possible materials for use as a filament, he settled on a carbonized cotton thread. This vacuum type lamp burned for 40 hours and formed the basis for the famous patent No. 223,898 issued on Jan. 27, 1880. The electric light had arrived.

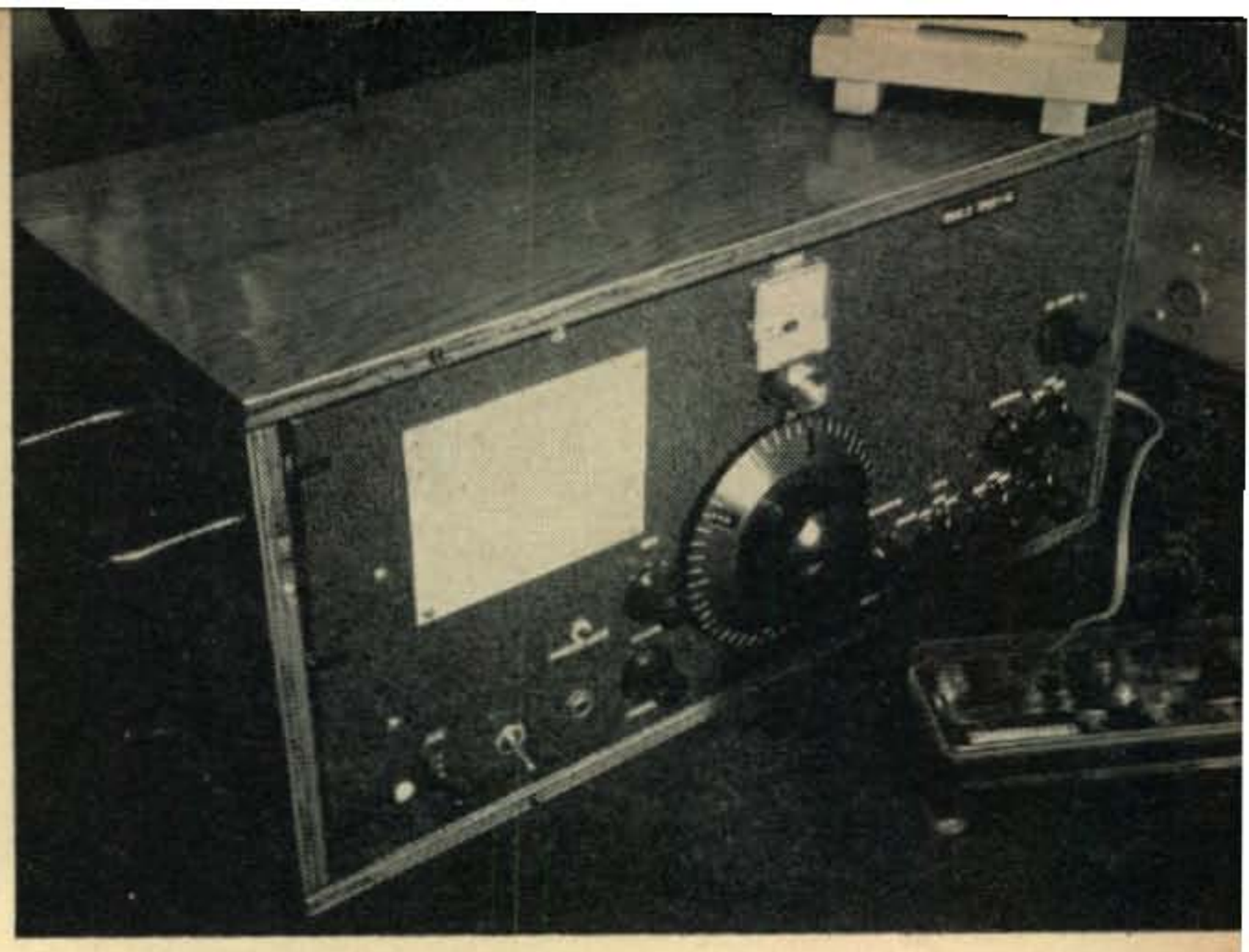
The inventor continued his investigations of the incandescent lamp directed toward longer lasting filaments and a higher vacuum. Early in 1883 while working with carbon filaments, Edison's attention was drawn to a deposit of carbon that had formed on the interior of the glass bulb; he also noticed that the carbon film was uniformly distributed except for one thin "white" line. Edison's curiousity was fully aroused. He observed that the clear line lay in such a position that it appeared to be a reverse shadow cast by one side of the filament. This was indeed intriguing; he surmised there might be a possible connection with filament burnout, a constant challenge at the time.

He gave considerable thought to this phenomenon and then decided upon an experiment. He ordered a special test lamp to be devised which would include a small metal plate suspended between the filament legs. The lamp was sealed with three wire leads emerging from the glass. The two filament wires were hooked to a battery and the 'plate' wire was connected to one side of a current measuring device called a galvanometer. The other side of the galvanometer was connected to a length of wire momentarily left free.

When the filament was illuminated Edison placed the free meter lead to the negative terminal of the filament battery; the galvanometer showed no indication. He then placed the wire lead to the positive terminal of the battery; the meter moved indicating a current flow. Increasing the lamp's brightness increased the galvanometer reading. An electrical current was flowing across the vacuum space between filament and plate as surely as if it were bridged with a solid wire.

Edison had stumbled upon the Aladdin's lamp

[*Continued on page 86*]



Front view of the homebrew c.w.-s.s.b. receiver shows the control groupings. On the right side, at the very top is the R.F. GAIN CONTROL. Below that is the ANTENNA TRIMMER and the ANTENNA BANDSWITCH. On the bottom row, closest to the MAIN TUNING dial we have the BANDPASS SWITCH followed by the CRYSTAL BANDSWITCH, the R.F. BANDSWITCH, and the R.F. PLATE (or MIXER) TRIMMER. The controls on the bottom row to the left of the dial are A.F. GAIN and B.F.O. PITCH. The remaining switches on the left are for ON-OFF, STANDBY and CALIBRATE. The dial calibration chart is attached to the front panel for ready reference.

The '6BLZ Special

A High Performance C.W.—S.S.B. Receiver for the Home Constructor

BY E. H. MARRINER,* W6BLZ

This c.w.-s.s.b. receiver can be built by any amateur with a drill, hole punch and money. An HRO-type dial provides an excellent tuning ratio and two mechanical filters produce the desired selectivity. More than adequate gain is provided by the r.f. and i.f. stages and the noise figure is low in the double superhet covering 80, 40 and 20 meters.

At last I can say that I am satisfied with a receiver that I made at home. No matter how many receivers we may think of, and build, it is hard to beat the Collins mechanical filter and an HRO dial for tuning in those signals. By eliminating complicated circuits and replacing mechanical gang switching with a few extra switches, I made a receiver that works *very* well on the 80, 40 and 20 meter amateur bands. With a few hole punches and a hand drill, it can be made, for the most part, right in your own workshop.

The receiver is selective both for c.w. and s.s.b. because it uses a 500 cycle filter for c.w. and a 2.1 kc filter for s.s.b. The b.f.o. pitch can be varied for best listening or if the alternate circuit is used, crystal stability is obtained. It has a good fast attack, slow decay a.v.c. system. Band switching is done with three switches: one each for the crystal, the mixer and r.f. stage input. The signals are peaked with an antenna trimmer and mixer tuning capacitor. An effort was also made to keep the filament and plate supply currents at a minimum so that a small power transformer could be used thus keeping the weight down. If this introduction has inspired you to want to build your own receiver, let's get on with the story!

*528 Colima Street, La Jolla, California.

How It Works

This receiver was designed to be used only with 52 ohm unbalanced inputs. The ham band signal of either 80, 40 or 20 meters is amplified by the 6BZ6 r.f. stage and then fed into the 6J6 first mixer. Half of the mixer tube is a crystal controlled oscillator furnishing a signal to mix with the r.f. and convert it to a band centered on 4500 kc. The broad-band 4.5 mc i.f. transformer couples the signal into a 6BE6 which is the second mixer. Here the signal is mixed with a 5055 kc to 4555 kc signal from the variable oscillator tuned by the HRO type dial. This mixing produces 455 kc which goes through the desired mechanical filter and is amplified by the 6BA6 i.f. stages. It is then demodulated in the product detector and amplified in the audio stages.

A.v.c. is obtained by rectifying the audio signal and applying it to the two 455 kc i.f. stages. The voltage which is rectified charges the 0.05 mf low loss capacitor very rapidly, and the low leakage holds the charge for a long period of time; this prevents listening to a chopped up voice signal on s.s.b.

Construction

Let's get started the easy way. Buy an 8 × 17

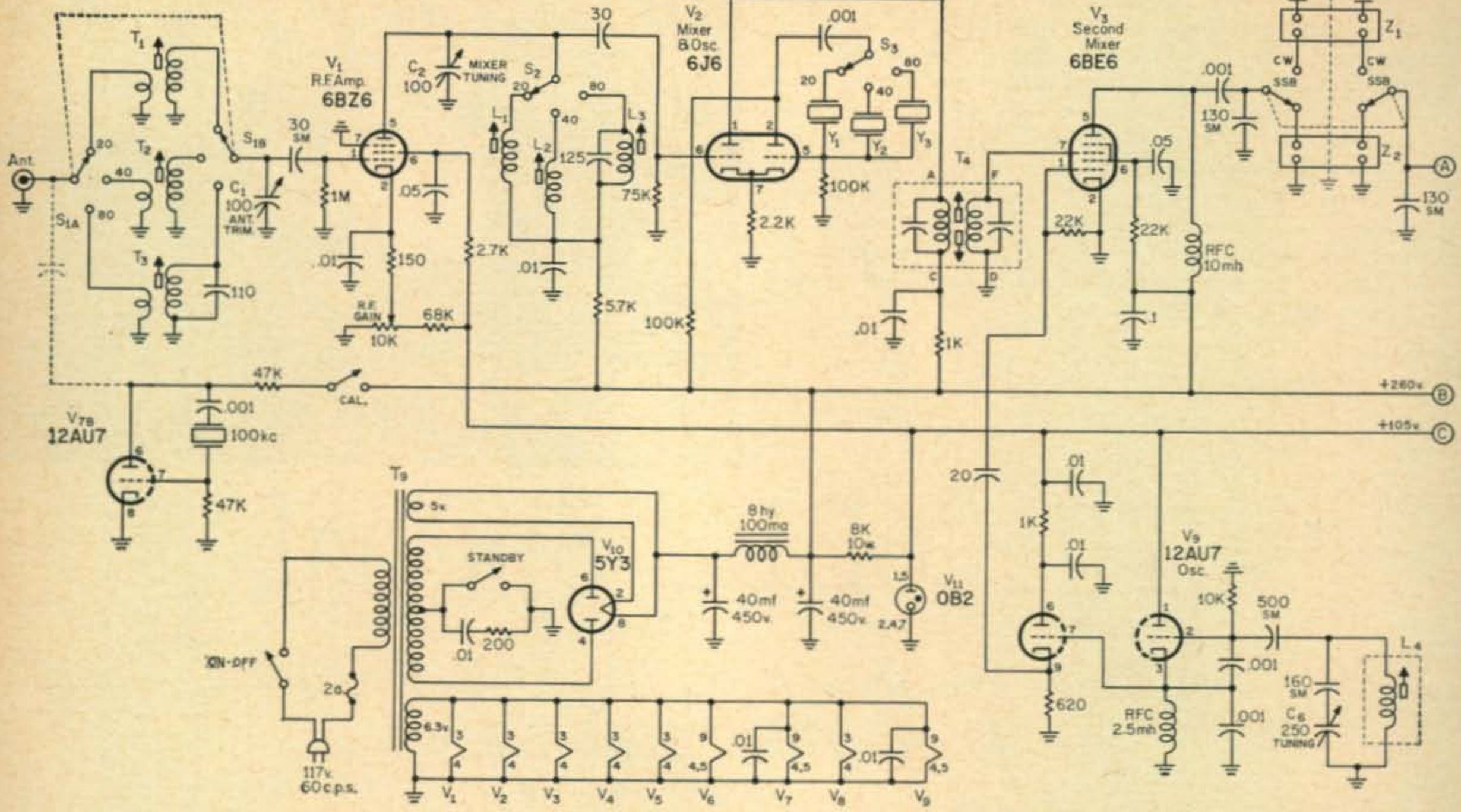
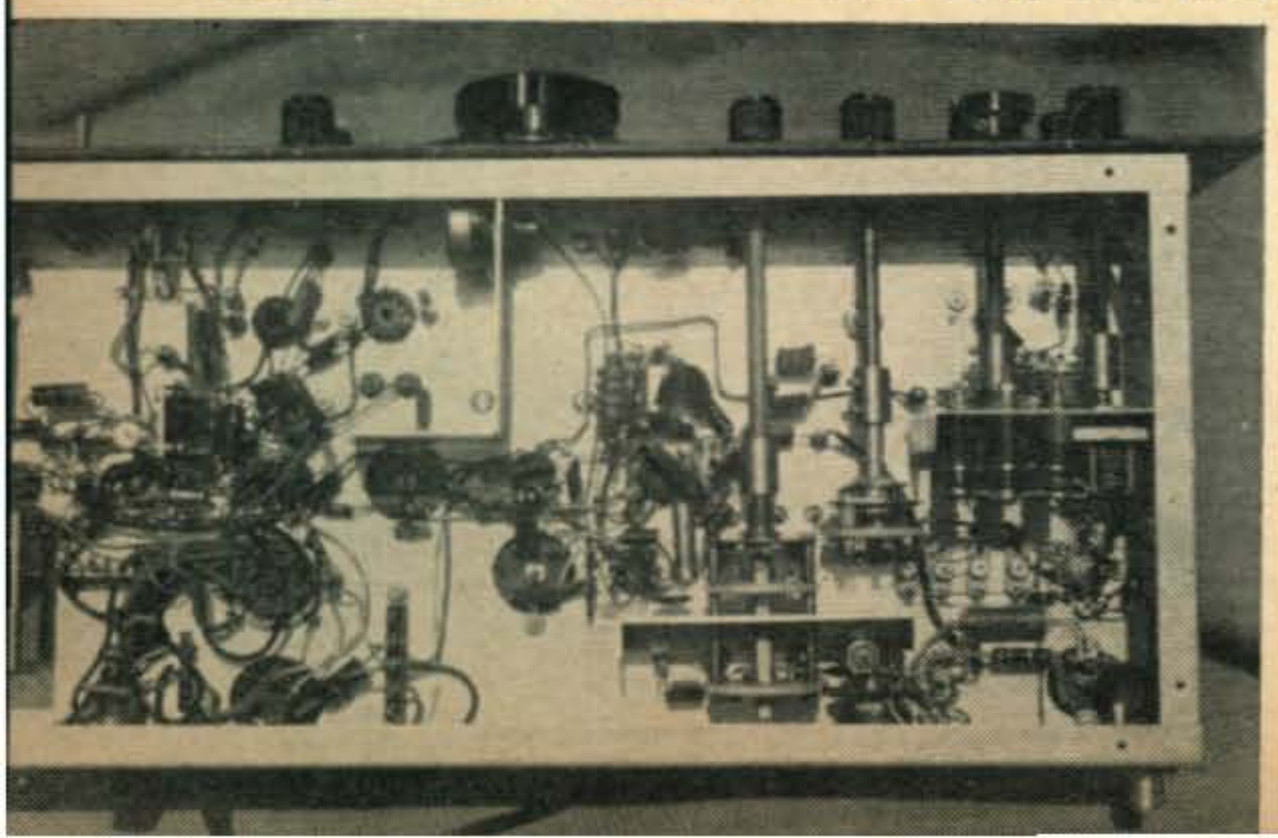


Fig. 1—Circuit of an s.s.b.-c.w. receiver for the 20, 40 and 80 meter band. An alternate b.f.o. circuit is shown in fig. 2. All resistors are ½ watt unless otherwise noted; all capacitors less than one are in mf and those greater than one are in mmf unless otherwise indicated. Silver mica capacitors are denoted by the suffix SM. Disc ceramics should be used where possible, particularly for r.f. bypassing.

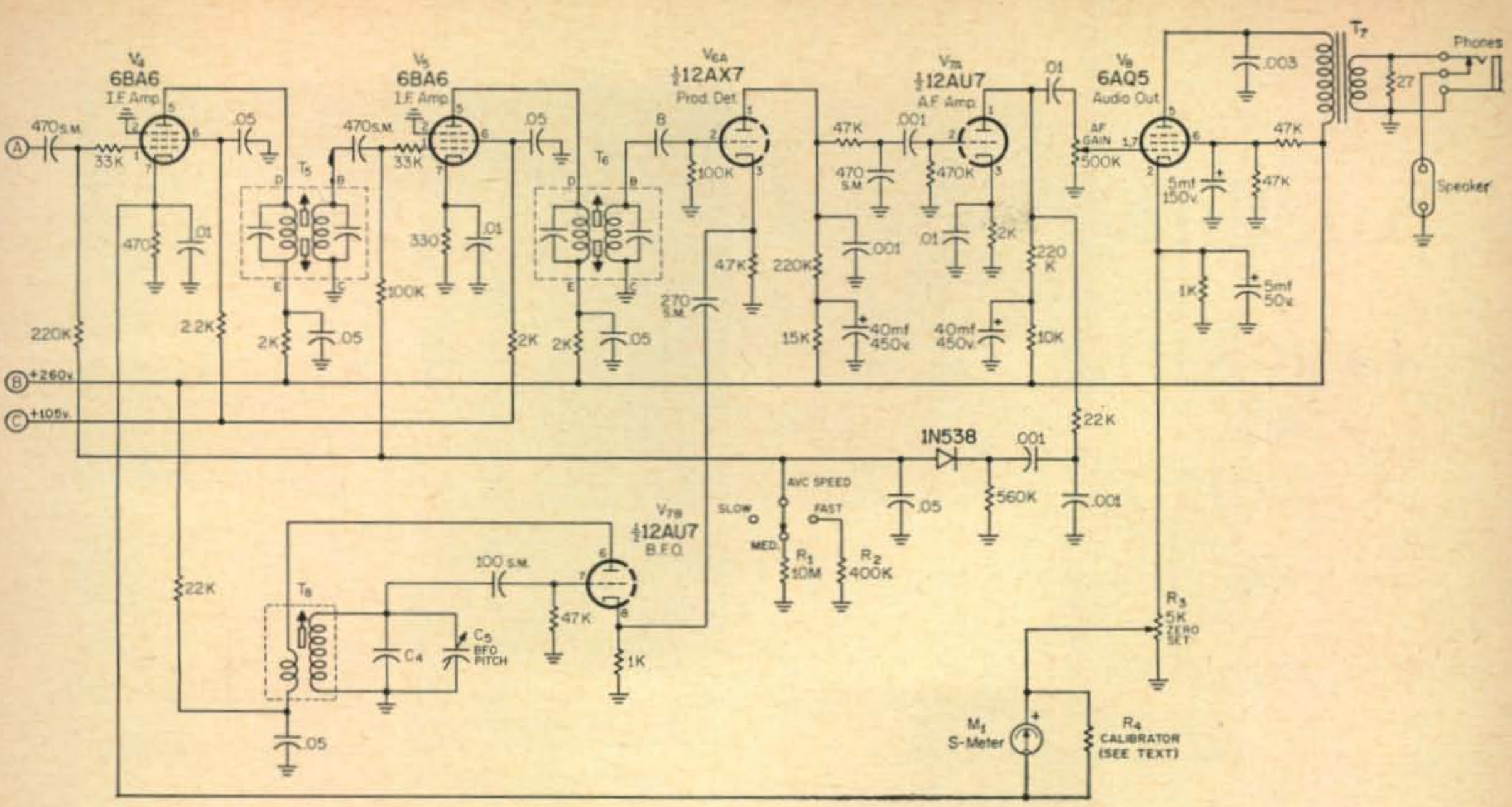
C_1, C_2—100 mmf, Hammarlund HF-100 or equiv.
C_3—20 mmf. Adjust value as explained in text.
C_4—120 to 150 mmf silver mica.
C_5—35 mmf APC type, 4 stator, 3 rotor plates.
C_6—250 mmf variable, part of National NPW assembly.
L_1—Miller #21A226RBI.
L_2—Miller #21A826RBI.
L_3—Miller #21A105RBI.
L_4—10½t Air Dux #1016 on National XR-62 form.
M_1—S Meter Lafayette #TM-11—Lafayette Radio.
T_1—20 meters — Sec. — 2 mh — Miller #21A226RBI. Pri. — 4t. #26e. wound on cold end.
T_2—40 meters — Sec. — 8 mh — Miller #21A826RBI. Pri. — 6t. #26e. wound on cold end.
T_3—80 meters — Sec. — 10 mh — Miller #21A105RBI. Pri. — 10t. #26e. wound on cold end.
T_4—4.5 mc TV sound i.f. transformer. Miller #1466 input or interstage or equiv.
T_5—455 kc input. Miller #913-C-1 or equiv.
T_6—455 kc interstage. Miller #913-C-1 or equiv.
T_7—Audio output transformer 7.6K to 3 ohms. Stancor A8114 or equiv.
T_8—B.f.o. transformer 455 kc. Miller type X-320-C or equiv.
T_9—Power transformer, 250-0-250 at 90 ma, 5v.-2a., 6.3 v.-3 a. Stancor PE-8404 or equiv.
Y_1—20m—18,600 kc. International Crystal Type FA-5 or equiv.
Y_2—40m—11,600 kc. International Crystal Type FA-5 or equiv.
Y_3—80m—8,100 kc. International Crystal Type FA-5 or equiv.
Z_1—Collins Mech. Filter #F455F05.
Z_2—Collins Mech. Filter #F455F2.1.

× 2 inch deep aluminum chassis; it is easy to drill and punch holes. That crackle black panel is aluminum also; that makes it easy to ream off the burrs.

After you work out your layout and punch the holes, you can mount all of your parts and test as you progress. It is suggested that the audio stages and product detector be wired first, and then the b.f.o. If you have a signal generator to work with, start at the back of the receiver circuit. A 455 kc signal can be fed into the product detector and you should hear an output. Next, wire in the i.f. stages and temporarily ground the grid return resistors while experimenting with the signal generator and tuning up the stages as you go along. Once you clean up the i.f. stages



Bottom view of the 80, 40, 20 meter receiver. The r.f. plate coils can be seen on the right center grouped around and obscuring the bandswitch. Alongside, on the metal bracket, is the trimmer capacitor for these coils. To the left of the coil bracket we have the CRYSTAL BANDSWITCH and to the left of it is the BANDPASS switch. Note that the metal plate that intersects this switch also acts as a shield across the mechanical filters isolating inputs and outputs. The L shaped bracket in the front center of the chassis has the S Meter Zero adjust control mounted on it and it shields off the first audio and crystal calibrator tube V_6. The power supply and power amplifier wiring occupies the left section of the chassis.



go ahead and jump right in and wire up the rest of it.

Testing

As soon as you are ready to test the receiver you can make a rough tune-up job with the a.v.c. jumped out. Peak up the antenna coil with the antenna attached and then the mixer coil. Now go on and tune the 4.5 kc sound i.f. with the receiver set about 7150 kc. As soon as all of the i.f.'s are tuned up, play around tuning the mechanical filters with a variable capacitor and then put a fixed mica across the terminals. Generally a fixed 130 mmf comes out about right.

Without a.v.c. the reciver has been running wide open. Let's connect it up. Now you should obtain between 15 to 30 volts of negative for a.v.c. control of the i.f. tubes. Resistor values R_1 and R_2 are optional and may be varied to suit your taste. If you want to use the S meter for peaking purposes it will follow the signal when switched to either of these values. In the open position the a.v.c. will hang for a long time and the meter cannot be used for tuning.

A lot of experimenting was done with the r.f. stage to find a layout that was stable. All coil sizes were tried and the ones specified worked the best. When winding the primaries on the antenna coils be sure to run them in the same direction as the main winding. The input coils have to be mounted topside and the plate coils underneath the chassis to prevent coupling which will cause oscillation. A shield was put across the 6BZ6 socket and insulated shafts used on the coupling to the panel. With the R.F. GAIN control wide open and antenna disconnected the r.f. stage should not oscillate.

The 6J6 was used as a mixer in place of a 12AT7 as better results were obtained from the standpoint of distortion. Distortion can also occur when there is too much drive to the product detector. The R.F. GAIN control was installed to reduce signals which were very strong.

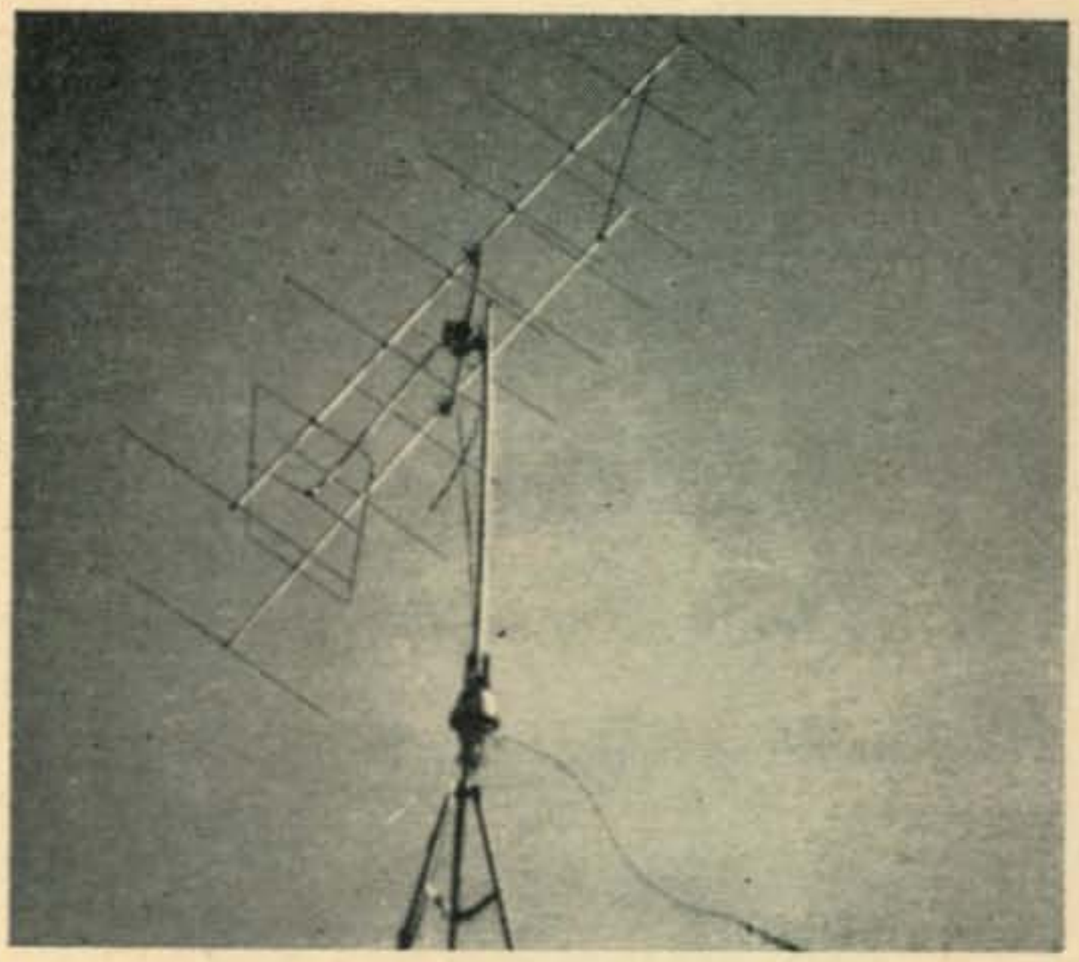
[*Continued on page 82*]

Top view of the chassis shows the National dial drive and the 250 mmf main tuning capacitor. The LMB box, (#776, 4" × 2" × 2¾") houses the v.f.o. coil, L_4. The r.f. amplifier, V_1, is on the left of the LMB box and the ANTENNA TRIMMER, R.F. GAIN CONTROL and ANTENNA BANDSWITCH are behind the shield plate. The rear corner of the chassis contains the 6J6 converter, V_2, the 4.5 mc i.f. transformer, the first mixer crystals and the 6BE6 second mixer. The v.f.o., V_9, is in front of the Collins filters and the 6BA6 i.f. amp is to the right of the filters. The 6BA6 i.f., V_5, may just be seen in front of the i.f. can, T_5, and the crystal calibrator and product detector, V_6, is to the right of the last i.f. can, T_6. The b.f.o., V_7, the transformer T_8 and PITCH CONTROL, C_5, are located between the front panel and V_6.

A Satellite Tracking Antenna

BY RONALD PITTS*, WA9EGU

With Oscar III soon to go up, interest is rising in tracking systems. Here is a simple and somewhat inexpensive tracking system using two rotors.



Close up view of the Alliance rotor used for elevation control. The cross-boom is run through the rotor and the clamp supplied with the J-Beam is used to secure to the vertical mast.

RECENTLY there have appeared a few plans for two meter antennas suited for satellite tracking, but there were many complications involved in putting one up. Since I was not very successful at constructing an array, I shopped around to find a commercially built antenna that could be mounted with elevation and azimuth rotors.

Antenna

The "Eight over Eight, J-Beam" by Gain Inc. seemed as if it were custom made for my situation. The "J-Beam" is popular on two meters and other v.h.f.-u.h.f. bands. The "double-eight" antenna that I chose has a beam width of 15 degrees between the half power points, which is not too thin nor too wide for finding and tracking satellites. However, a thinner lobe would be impractical with the rotors used in this set up. The antenna was designed to match 300 ohm line, but an optional balun can be bought to match down to 52 ohms.

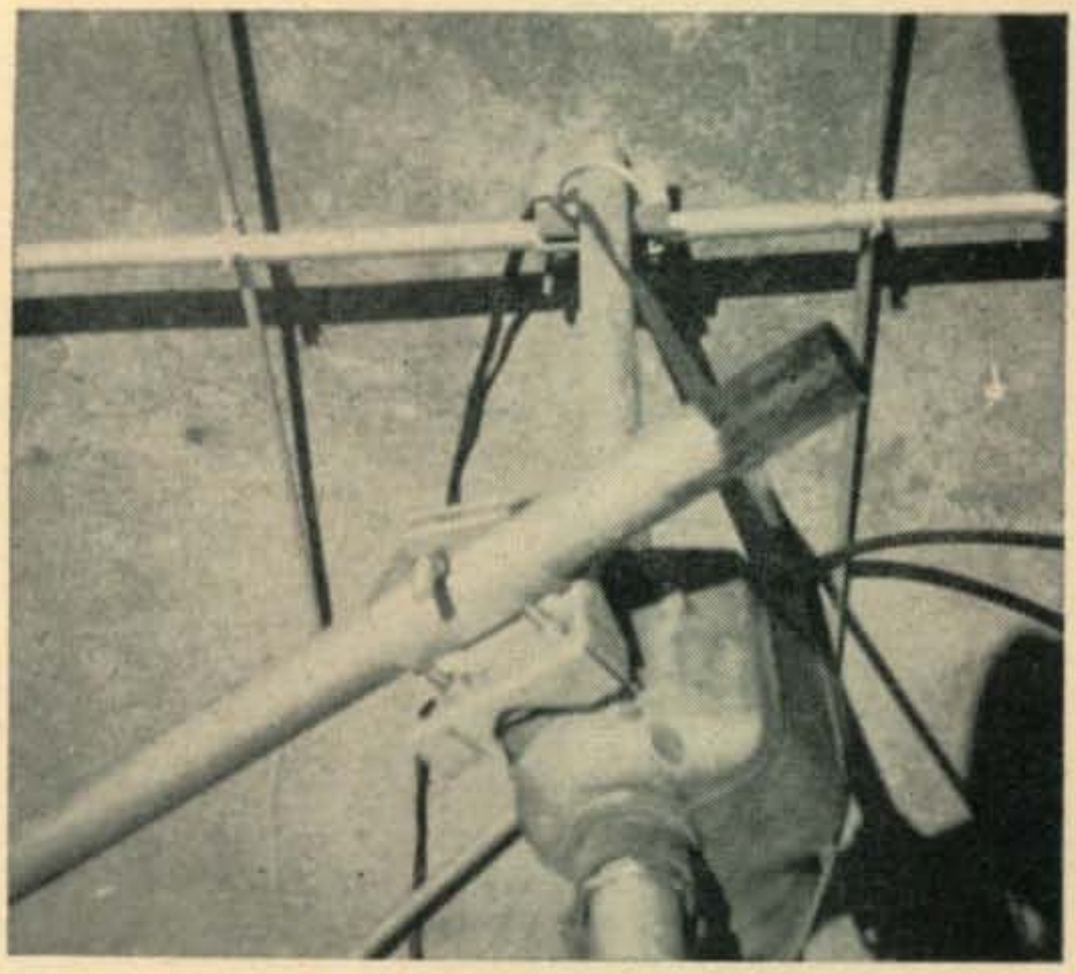
Rotors

Two rotors are needed to control the elevation and azimuth positions. For the azimuth control I used a CDR, model AR-22. This rotor will take the torque of the entire array without any difficulty. For the elevation control I used an Alliance model U-100. An Alliance model should be used for elevation, because the mast to be rotated can be slipped through the rotating mechanism.

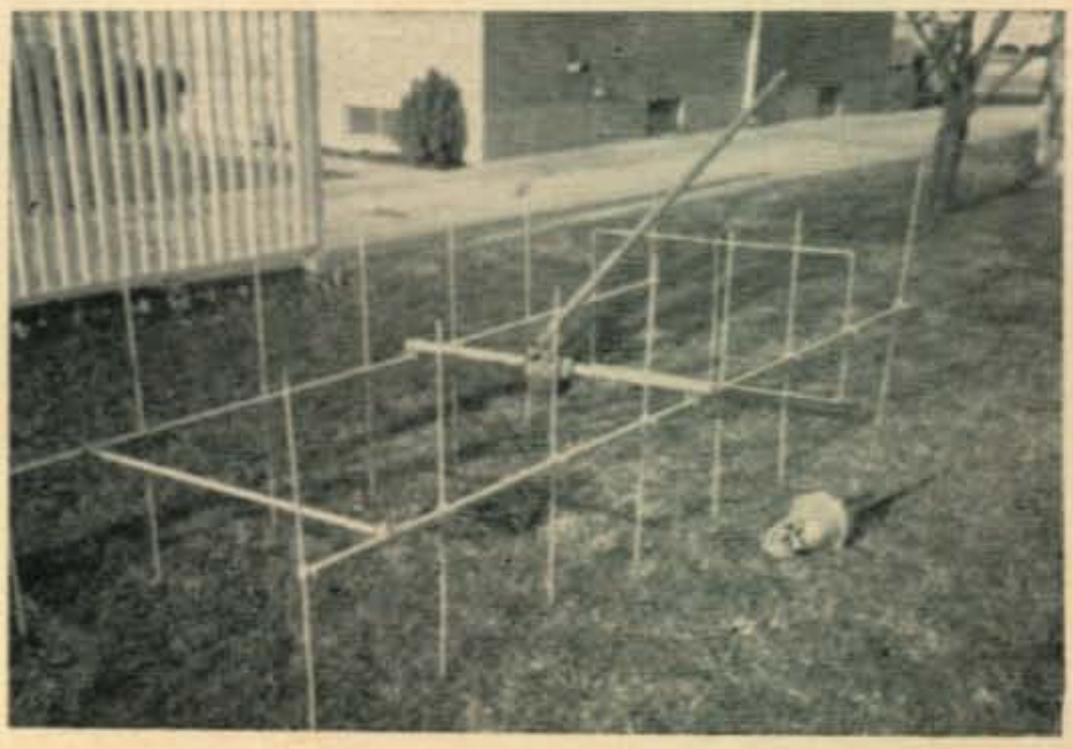
Construction

The construction is very easy, and you should be able to complete the job in an afternoon. First, mount the AR-22, or whatever rotor used for the azimuth control, on your mast or tower.

[*Continued on page 86*]



Complete array on the tripod mast ready for satellite tracking. More than 80 degrees of elevation is not possible due to the closed loop on the left end of the beam. Note that vertical polarization is used but does not matter since there is no polarization in space.



View of the complete assembly on the ground with the CDR rotor, used for azimuth, alongside the array.

*910 S. Summit, Villa Park, Illinois.

DX DX DX DX DX

URBAN LE JEUNE, JR.*, W2DEC

The following certificates were issued between the period from April 6th, 1964 to and including May 5th, 1964:

CW-PHONE WAZ

1962	UB5CG	Anatoly F. Zhurba
1963	UH8DA	Yuri Inozemtsev
1964	G5LP	Lionel Parker
1965	WA6GLD	Jerry Hagen
1966	G8JM	W. G. Hall
1967	EA3CY	Julio Anglada
1968	DJ5MX	Wolfgang Staudt
1969	K4TWK	William H. Jay
1970	ZS2CV	E. Gertenbach
1971	WA6GFE	Lawrence Beno
1972	WØCPM	W. J. Mashek
1973	W8KMD	Harold Beard
1974	W4JDR	W. M. Rowe, Jr.
1975	KP4AQQ	Osvaido Garcia
1976	5A1TW	Eugene Walsh
1977	SM7TV	Boris Goransson
1978	G3OZU	A. A. Brind
1979	W5AI	T. Frank Smith
1980	YO8CF	Jacob Ioan
1981	W6LDA	E. E. St. John
1982	DJ5VQ	Karl Kaul
1983	WA6KNE	John W. Renshaw
1984	W3EYF	D. J. Simpson

ALL-PHONE WAZ

239	WA2ELS	William E. Fieldhouse
240	ZS6LW	A. D. van der Watt
241	VE2YU	E. A. Welling
242	W2RGV	John F. Lee
243	ZS6YQ	Bushy Roode

TWO-WAY SSB WAZ

226	WA2ELS	William E. Fieldhouse
227	KØBJK	Charlene A. Franz
228	W2RGV	John F. Lee
229	ZS6YQ	Bushy Roode
230	W4RBZ	Robert E. Fitz

CW WPX

539	SP8EV	Peter Sliwiak
540	DL4BS	Russell L. Lawson
541	K2ZYR	Joseph Marshall, Jr.
542	UC2AF	Leonid Sherman
543	VE2IJ	Albert G. Daemen
544	G3HCV	C. F. Atkins
545	W4RBZ	Robert E. Fitz

SSB WPX

172	HA9OZ	Kiraly Attila
173	K9RNQ	Tava Franklin
174	VE2BCK	Ken Ellis
175	W4RBZ	Robert E. Fitz

MIXED WPX

89	PY1ADA	Walter W. L. Heininger
90	W1MQV	Robert A. Wallace
91	W4RBZ	Robert E. Fitz

In the competition for the K6MLS Trophies, the first three sidebanders in the world to meet the requirements for two-way sideband contacts with 300 countries were Humberto Perez, TI2HP, of San Jose, Costa Rica; E. (Robby) Robson, 5Z4/VQ4ERR, of Nairobi, Kenya; and Albert Hix, W8PQQ, of Charleston, West Virginia. The trophies were designed and executed by Dr. George Stauch, K6MLS, of Sacramento, California before his untimely death last year. The trophies were the same in design and differed only in size and finish. The first having a gold finish, the second, silver and the third, bronze.

The 300 QSL cards submitted by each competitor were checked out by Dorothy and Irv Strauber, K2MGE/K2HEA, who then received the complete cooperation of George's widow, Helen, in getting the trophies to each of the winners in time for formal presentation ceremonies at their radio club meeting.

Congratulations to Humberto, Robby and Al for their outstanding performance in achieving the first 300 confirmations on sideband and for winning the unique K6MLS trophies.

*Box 35, Hazlet, New Jersey 07730.

Here and There

CEØ Easter Island–CEØAC occasionally active on 14,00 or 14,110 s.s.b. *(Tnx LIDXA)*

CR8 Portuguese Timor–Bar, CR8AD, has been active around 14,050 kc c.w. and 21,030 to 21,050 kc. 7 mc c.w. is also used. The best time seems to be between 1600 and 1900 GMT *(Tnx WGDXC)*

F5 France–F5AR is a military station operating near Paris. This is the only active F5 station and a choice catch on 20 c.w. *(Tnx NEDXA)*

FH8 Comoros Island–FH8CD is now QRV on s.s.b. with new gear sent from France which include an HX-50, a Drake 2B and a TA-33 Jr. Andre has been heard on 14,275 kc. *(Tnx Fla. DX Rpt. es VERON)*

HC8 Galapagos Islands–WA2WUV of HC8CA Galapagos Islands fame was the recent recipient of a distinguished public service award given him in recognition and appreciation of his contributions to public safety and welfare while in the Santa Cruz Islands of the Galapagos Islands group. Virgil expeditiously handled well over

Glen, 9Q5GE, operating his neat station in Kapanga. He is quite active on s.s.b. preferring 14,190 kc. Glen is a doctor in the Piper Memorial Hospital in Kapanga.

one hundred messages pertaining to weather research between the Islands and the U. S. Weather Bureau. The award was presented for R. M. White, Chief of the U. S. Weather Bureau.

HV1 Vatican City–HV1CN operates almost every Sunday between 1100 and 1400 GMT on 14,105 kc s.s.b. *(Tnx WGDXC)*

KG6S Saipan–Jimmy, KG6SB is active Sunday through Monday between 0630 and 0800 GMT around 14,265.

KH6 Kure Island–Ray, KH6EDY, is active again around 14,260 s.s.b. beginning about 0700 GMT. *(Tnx WGDXA)*

KJ6 Johnston Island–W5HJ/KJ6 has been active on 15 meter c.w. *(Tnx NEDXA)*

JT Mongolia–JT1CA reports that JT1KAA, JT1KAG, JT1AD, JT1AE, JT1AG and JT4KAA are all active. The JT4 is a real FB catch for WPX.

LA/P Jan Mayen–There is quite a bit of activity from this spot lately. LA7IH/P, LA9PI/P and LA9MI/P are active daily on c.w. and LA9PI/P also operates on 20 meter s.s.b. around 2100 GMT. *(Tnx NEDXA)*

MP4Q Qatar–MP4QBF has been quite active around 14255 ±5 kc usually starting around 1500 GMT. *(Tnx LIDXA)*

TL8 Central African Republic–K2DCX/TL8 has been putting in a fine signal on 14,025 and 14,265 kc between 2100 and 2300 GMT. *(Tnx NEDXA)*

UAØ Zone 19–UAØKIF and UWØIN are now active on s.s.b. from Zone 19.

VP8 Falkland Islands, South Georgia & British Antarctica–

Falkland Islands: VP8AB, AH, AI, AS, AY, BJ, BN, DF, DJ, DK, DQ, DR, DU, DV, DW, DZ, ED, EM, EY, FF, FG, FH, FI, FJ, FK, FU, GB, GG, GL, GM, GN, GP, GU, GX, HC, HD, HJ, HO, HR, HS, HI, HK.

South Georgia: VP8GF, GK, GZ, HQ.

Antarctica: VP8GR, GV, GY, CW, GJ, HL, EF, GS.

South Orkney: VP8GT, DA, HB, HH, EG.

On Ships: VP8DH, DJ, FC, HF.

QSL for Falkland Islands, South Georgia and South Orkeny can be sent via CX2AM; for British Antarctic survey bases via RSGB CX2-AM, A. Mantegani, P.O. Box 806, Montevideo, Uruguay. *(Tnx CX2AM)*

VR4 Solomon Is.–VR4CM will be active for the next six months. Check 14,320 kc around 1200 GMT *(Tnx LIDXA)*

VS1 Singapore–According to VS1JY, all VS1's will soon become 9M1's. *(Tnx LIDXA)*

VU2 Andaman & Nicobar Islands–VS1LV accompanied by VS1LX, LU, and MC plus loggers and cooks will operate for a ten-day period using a KWM-2, dipole and vertical for around-the-clock operation. Frequencies will be 14,007, 012, 017, 022, 025 and 050 kc on c.w. They will listen ±5 kc. On s.s.b. they will operate on 14,112, 117, 122, 175 and 250 with listening frequencies to be announced. QSL via K8VDV. *(Tnx WGDXA)*

5N2 Nigeria–5N2JKO reports that U. S. signals on 75 meter s.s.b. are very good in Africa from 0530 to 0615 GMT *(Tnx Fla. DX Rpt.)*

8Z4/8Z5 Neutral Zones–Angus, HZ2AMS, will be returning momentarily to operate from both Neutral Zones. *(Tnx WGDXA)*

9Q5 Congo–Harry, 9Q5AB, will be in the States starting in July. *(Tnx LIDXA)*

Worked All VK Call Areas Award

This award, to be known as the WAVKCA Award, is offered by the Wireless Institute of Australia as tangible evidence of the proficiency of overseas amateurs in making contacts with the various call areas of the Commonwealth of Australia.

The award may be claimed by any amateur in the world who is a member of an affiliated society of the IARU but no Australian amateur will be eligible.

A handsome certificate will be awarded to any applicant who makes contacts with Australian Amateur Stations in the areas shown. The number of contacts required in each area is also shown.

Contacts between overseas stations and Australian station must have been made on or after the 1st January, 1946. Contacts may be made using any authorized frequency band or type of emission permitted to Australian Amateurs, but cross band contacts will not be allowed. No contacts made with ship or aircraft stations in Australian territories will be eligible, but land-mobile or portable stations may be contacted

WAZ and WPX

The WAZ and WPX certificates are awarded by the *CQ* DX department. WAZ is issued for proof of contact with the 40 Zones of the world as shown on the official WAZ Zone Map. WAZ is issued in three classes, *i.e.* Any mode, all phone and all s.s.b. For complete rules, see the January, 1962 *CQ*, page 50.

WPX is issued in four classes, *i.e.*, all c.w., all phone, all s.s.b. and Mixed. The number of prefixes required are: C.w.-300; Phone-300; s.s.b.-200; Mixed-400. For complete rules, see January, 1962 *CQ*, page 52. WAZ applications, Zone Maps and WPX applications may be obtained from the DX Editor at the address shown at the head of this column. Please send a self-addressed, stamped envelope or a self-addressed envelope and an IRC. All applications should be sent directly to the DX Editor.

A convention UR2-style. The last five fellows on the right are from l. to r.: UR2DZ; UR2BU, ex-ES7D; UQ2KAA, and UP2OK. (It looks like the NJDXA suite at the Dayton convention.) *(Tnx SM5WI)*

SSB DX HONOR ROLL

W2ZX	288	W6RKP	265	WA2IZS	240
W8PQQ	288	W3LMA	261	W1AOL	238
TI2HP	283	PZ1AX	261	PJ2AA	232
PY4TK	279	G8KS	261	W7DLR	232
K9EAB	279	G3FKM	261	K8NZD	232
K4TJL	279	W5IYU	260	WØCVU	229
W2VCZ	279	DL1IN	258	OZ7FG	228
W2BXA	278	MP4BBW	256	K4AJ	226
W8EAP	278	W3MAC	254	G2PL	225
WØQVZ	278	G3NUG	253	W4UWC	225
K8RTW	276	W6BAF	252	WA6EYP	222
W2TP	276	WØUUV	251	WØPG1	221
VQ4ERR	275	K1IXG	250	WA6HOH	219
K2MGE	272	G2BVN	249	W3VSU	217
W2FXN	272	W6WNE	248	W4RLS	210
W6UOU	270	W6PXH	247	DJ3CP	207
HB9TL	269	W8YBZ	246	W1ICV	205
WØQVZ	268	K6LGF	244	OH2NB	204
W4OPM	265	K6ZXW	243	W9SFR	203

ENDORSEMENTS

ZL3NS	100	DJ1BV	100	DL2OX	100

provided the location at the time of contact is shown on the confirmation.

The applicant must submit documentary proof, in the form of QSL cards or other written evidence, confirming that two-way contacts have taken place. Such verifications must show the date and time of contact, type of emission and frequency used, signal reports and location (in the case of portable or land-mobile operation) of the stations contacted.

Verifications must be submitted exactly as received, and forged or altered evidence may result in the disqualification of the station concerned.

A list, showing date and time, emission type, frequency, signal report and location must be submitted with the application for the Award.

All claims for the WAVKCA Award must be made by the submission of the confirmations together with the list direct to Awards Manager, Box 2611W, G. P. O., Melbourne, Australia. Sufficient International Reply Coupons must be enclosed to cover return postage of the confirmations to the applicant.

Where a reciprocal agreement exists between the WIA and the applicant's Society, the appointed officer of that Society will carry out the check, and if correct, will forward a written application for the Award on behalf of the applicant, together with the list.

Confirmations required: VKØ-1, VK1-1, VK2-3, VK3-3, VK4-3, VK5-3, VK6-3, VK7-3, VK8-1, VK9-1. In areas above where more than one confirmation is required, contacts may be made with any or all of the territories bearing the necessary prefix. A total of 22 confirmations is thus required.

Budapest Award

The Budapest Radio Club is issuing the Budapest Award certificates I and II on the occasion of the fifth anniversary of the club's founding. Rules as follows:

1. All licensed amateurs and short wave listeners are eligible to win certificate I of the Budapest Award who fulfill the requirements of the certificate with QSL cards.

2. All QSOs established with HA5 and HG5 stations after January 1, 1959 are valid.

3. Stations applying for the certificate have to verify the following number of points:

DX stations	8 points
European stations	15 points
Hungarian stations (h.f.)	40 points
Hungarian stations (v.h.f.)	20 points

4. QSOs established with Budapest Radio Club Stations—HA5KDQ and HG5KDQ—count for 3 points, those with members of the the Budapest Radio Club, 2 points and those with other Budapest stations (HA5-HG5) 1 point.

5. Any authorized amateur band may be used, including v.h.f. bands above 30 mc. The European v.h.f. stations, in the event they use the v.h.f. band, must verify the 8 points prescribed for DX stations.

6. The certificate may be obtained with the use of c.w., fone, mixed or s.s.b. method of operation.

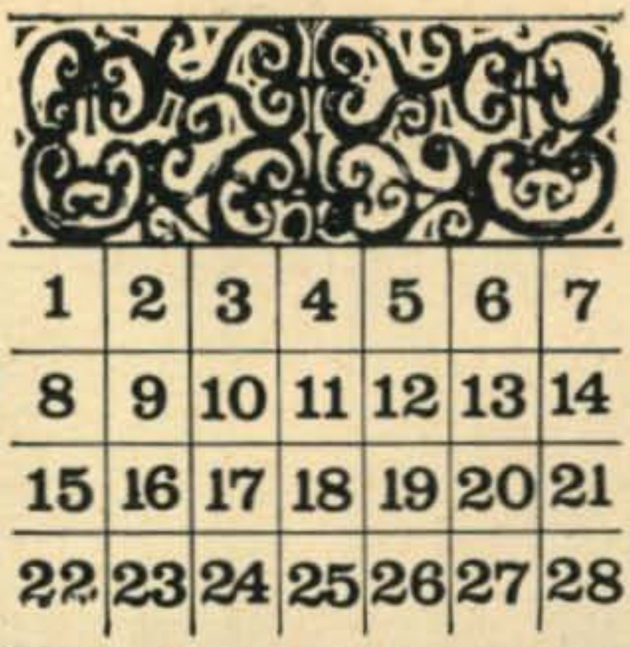
7. A list must be attached to the application which contains the most important data of the QSO, QSL cards and also 5 IRCs.

The Budapest Radio Club during the time of

[*Continued on page 88*]

I1AB was one of the original s.s.b. stations in Italy. Alf is shown here at the controls of his modern station. A 3-element beam completes the installation.

CONTEST CALENDAR



FRANK ANZALONE*, W1WY

CALENDAR OF EVENTS

July	17-23	Boy Scout Jamboree
August	1-2	Illinois Party
August	8-9	WAEDC C.W.
August	15-16	WAEDC Phone
August	22-23	*CQ* Summer VHF
August	29-30	All Asia DX
August	29-31	West Virginia QSO Party
October	24-25	*CQ* WW DX Phone
November	28-29	*CQ* WW DX C.W.

Boy Scouts

This is not a contest but a get-together on the air during the Scout Jamboree at Valley Forge. Listen for the activity on all bands, 2 thru 80 meters on c.w., a.m. and s.s.b. from reveille to taps.

Special QSL cards will be sent to verify all contacts. There are also two certificates you can start working for in the Boy Scout awards. WAS—BSA, worked all states—BSA; and WER—BSA, worked every region—BSA, (12 scouting regions)

So give the boys a lift and dig up a few during this activity. Send your QSLs to Boys' Life Radio Club, New Brunswick, N.J.

Illinois Party

Starts: 1600 GMT Saturday, August 1.
Ends: 2200 GMT Sunday, August 2.

This is the second annual QSO Party sponsored by the Illinois Chapter #17 of the Certificate Hunters' Club.

Bands: Use all bands, c.w. and phone, a.m. and s.s.b. being classified as phone. The same station can be worked and counted for a QSO point on each band and each mode. For example, a c.w. and phone contact on the same band with the same station is good for two points.

Points: Illinois stations, 1 point for each contact, including QSOs with other Illinois stations. All others, 1 point for each Illinois contact.

Multiplier: Illinois stations, multiply total QSO points by the number of different States, Canadian Provinces and Countries worked. All Others, multiply total QSO points by the total number of Illinois Counties worked.

Exchange: Illinois stations, QSO number, RS/RST and County. All others QSO number, RS/RST and State, Province or Country.

Frequencies: Suggested operating frequencies, 3600, 3900, 7100, 7220, 14,100, 14,300, 21,100, 21,300, 28,100, 28,700 kc.

Awards: In Illinois, single operator and multi-operator stations will compete in separate categories and certificates will be awarded to 1st, 2nd and 3rd place winners in each category. Outside Illinois, a certificate to the highest scoring station in each State, and each call area in Canada, and to each country.

Logs: Logs must show: Date and time in GMT, station worked, number sent and received, band, mode and claimed score. Illinois should also indicate if single or multi-operator.

Filing: Logs must be postmarked no later than September 15th and go to: Illinois QSO Party, c/o Cliff Corne, K9EAB, 711 West McClure Avenue, Peoria, Illinois, 61604.

DARC WAE

C.W.—August 8-9 **Phone**—August 15-16
Starts 0000 GMT Saturday, Ends 2400 GMT Sunday in each instance.

The 10th annual WAE DX contest again is being held on the 2nd and 3rd week-ends of August. The object of the contest as in the past is for non-European stations to work as many Europeans as possible, on all bands. (Note the WAE country list.)

Rules: 1. Use all bands, 3.5 thru 28 mc.

2. The usual five and six digit serial numbers, RST or RS report plus a progressive three figure QSO number starting with 001.

3. Each exchange of serial numbers will count 1 point, except on 3.5 mc where it will count 2 points.

4. The same station can be contacted once on each band.

5. The multiplier for non-European stations is determined by the number of European countries worked on each band. (See WAE list.)

6. European stations will use the latest ARRL country list to figure their multiplier. In addition each call area in the following countries will also be considered a multiplier. CE, JA, PY, VE/VO, VK, W/K, ZL & ZS. UA9 & UAØ will also count separately.

[*Continued on page 92*]

*14 Sherwood Road, Stamford, Conn. 06905.

PROPAGATION

GEORGE JACOBS*, W3ASK

LAST MINUTE FORECAST

Day-to-Day Conditions and Quality for July

	Forecast Rating and Quality			
Days	(4)	(3)	(2)	(1)
Above Normal: **1, 7, 10, 18**	A	A-B	B-C	C
Normal: **2-4, 6, 8-9, 11, 13-15, 17, 19-22, 27-31**	A-B	B-C	C-D	D-E
Below Normal: **5, 12, 16, 24-25**	C	C-D	D	E
Disturbed: **23, 26**	D	D-E	E	E

How To Use These Charts

The following is an explanation of the symbols shown above, and instructions for the use of the *CQ* propagation predictions:

1—Enter Propagation Charts on following pages under appropriate band and distance or geographical area columns. Read predicted times of band openings at intersection of both columns.

2—Following each predicted time of band opening is a forecast rating which indicates the relative number of days the band is expected to open during each month of the forecast period. The higher the rating, the more frequent the opening, as follows: (4) band open more than 22 days each month; (3) between 14 and 22 days; (2) between 8 and 13 days; (1) less than 7 days.

On the "Short-Skip" Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. Note the forecast rating for later use.

3—With the forecast rating noted above, start with the numbers in parentheses at the top of the "Last Minute Forecast" appearing above. Read down the table for a day-to-day forecast of propagation conditions in terms of Above Normal (WWV rating higher than 6); Normal (WWV rating 5-6); Below Normal (WWV rating 4); Disturbed (WWV rating less than 4). The letter symbols (A-E) describe reception conditions (signal quality, noise and fading levels) expected for each day of the month and have the following meanings: A—excellent opening with strong, steady signals; B—good opening, moderately strong signals, little fading and noise; C—fair opening, signals fluctuating between moderately strong and weak; D—poor opening, signals generally weak with considerable fading and noise; E—poor opening, or none at all.

4—This month's Propagation Charts are based upon a transmitter power of 75 watts c.w.; 150 watts s.s.b., or 300 watts d.s.b., into a dipole antenna one quarter-wave above ground on 160, 80 and 40 meters and a half-wave above ground on 20, 15 and 10 meters. For each 10 db increase above these reference levels, reception quality shown in the "Last Minute Forecast" will improve by one level; for each 10 db loss, reception will become poorer by one level.

5—Local Standard Time for these predictions is based on the 24-hour system.

6—These Propagation Charts are valid through August 31, 1964. These Charts are prepared from basic propagation data published monthly by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

TWENTY meters is expected to continue to be the optimum band for DX during the daylight and early evening hours, with fair to good openings to one area of the world or another from shortly after sunrise to a few hours after sunset. Excellent short-skip openings are forecast for distances between approximately 400 and 2300 miles.

Very few 10 meter DX openings are forecast for July, but frequent short-skip openings, between distances of 750 and 1400 miles are expected as a result of sporadic-*E* propagation.

A few DX openings are forecast for 15 meters during the daylight and early evening hours, mainly to tropical and southern areas of the world. Very frequent short-skip openings are expected, between distances of approximately 600 and 1400 miles.

Fair to good DX conditions are forecast for 40 meters, with openings to many areas of the world possible from shortly before sunset, through the hours of darkness, until shortly after sunrise. Excellent short-skip openings should occur almost around-the-clock. During the daytime hours the skip will range between 150 and 750 miles; during the hours of darkness the range is expected to increase to between approximately 600 and 2300 miles, and beyond for DX openings.

Some DX openings are forecast for 80 meters during the hours of darkness, but conditions are expected to be considerably poorer during July than during the winter and spring months. Excellent short-skip openings are predicted for the daylight hours over distances ranging between 50 and 250 miles, extending to distances of 250 to 2300 miles during the hours of darkness.

Some fairly good short-skip openings are predicted for 160 meters during the hours between sundown and sunrise, for distances up to approximately 1000 miles. Some openings considerably beyond this range may occur, especially during the sunrise period.

Atmospheric noise (static) is expected to continue to increase during July, and should be high on all h.f. bands, especially 40, 80 and 160 meters.

This month's *CQ* Propagation Charts contain predictions for short-skip openings between distances of 50 and 2300 miles for *July* and *August*, as well as forecasts centered on the states of

*11307 Clara Street, Silver Springs, Md. 20902.

Comparative 50 mc Summer Sporadic-E
May 16—August 15

	1959	1960	1961	1962	1963
No. monitored days	91	91	91	91	91
No. days band opened	51	62	66	63	63
No. of band openings	63	89	94	93	99
Total minutes band open	10,157	9,556	18,785	16,870	20,345
Average duration of openings (minutes)	161.2	107.4	199.8	181.4	205.5
% open to monitored days	12.4	11.7	22.9	20.6	24.8
% open to total time	7.8	7.3	14.3	12.9	15.5
% open to monitored days	56.0	68.1	72.5	69.2	69.2
No. states heard/worked	36	28	46	43	39
No. foreign prefixes heard/worked	3	2	6	7	6
Average smoothed sunspot number	158	110	54	35	28 (app.)

Alaska and Hawaii. DX Propagation Charts for *July* appeared in last month's column. Instructions for the correct use of these Charts appear directly beneath the "Last Minute Forecast" at the beginning of this column.

Beginning with this month's column, the chart centered on Alaska is given in GMT rather than Alaskan Standard Time as previously was the case. This change has been made as a result of several letters received from readers in Alaska who point out that radio amateurs there prefer to use GMT rather than Alaskan Standard Time, since Alaska is divided into three different standard time zones.

VHF Ionospheric Openings

A number of good 6 meter openings, and possibly some 2 meter openings are likely to occur during July as a result of the seasonal increase in sporadic-*E* propagation. The 6 meter openings will generally range between distances of 1000 and 1400 miles, although some double-hop openings may be possible over somewhat greater distances. Two meter openings will range in distance between approximately 1200 and 1400 miles.

Meteor activity increases considerably during July. The *Aquarids*, one of the major meteor showers, is scheduled to take place between July 26 and 31. The *Perseids*, another major meteor shower, while generally reaching a peak during August is noticeable to a considerable degree

[*Continued on page 96*]

CQ SHORT-SKIP PROPAGATION CHART

July-August, 1964

Band Openings Given in Local Standard Time

AT PATH MID-POINT (24-HOUR TIME SYSTEM)

Band (Meters)	*50-250 Miles*	*250-750 Miles*	*750-1300 Miles*	*1300-2300 Miles*
10	*Nil*	07-09 (0-1) 09-13 (0-3) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	07-09 (1) 09-13 (3) 13-17 (1-2) 17-21 (2-3) 21-07 (1)	07-09 (1-0) 09-13 (3-0) 13-17 (2-0) 17-21 (3-0) 21-07 (1-0)
15	*Nil*	07-09 (0-2) 09-13 (0-3) 13-17 (0-2) 17-19 (0-3) 19-21 (0-2) 21-07 (0-1)	07-09 (2) 09-13 (3) 13-17 (2) 17-19 (3) 19-21 (2) 21-23 (1-2) 23-07 (1)	07-09 (2-0) 09-13 (3-0) 13-17 (2-0) 17-19 (3-1) 19-21 (2-1) 21-23 (2-0) 23-07 (1-0)
20	*Nil*	06-09 (0-2) 09-15 (0-4) 15-20 (0-3) 20-00 (0-2) 00-06 (0-1)	06-09 (2) 09-15 (4) 15-18 (3) 18-20 (3-4) 20-00 (2-3) 00-06 (1-2)	06-09 (2) 09-15 (4-2) 15-16 (3-2) 16-18 (3-4) 18-20 (4) 20-22 (3-2) 22-00 (3-1)
40	07-09 (1-2) 09-15 (1-4) 15-19 (2-4) 19-22 (1-2) 22-07 (0-1)	07-09 (2) 09-11 (4-2) 11-15 (4-1) 15-17 (4-3) 17-19 (4) 19-22 (2-4) 22-07 (1-3)	07-09 (2-1) 09-11 (2-0) 11-15 (1-0) 15-17 (3-1) 17-20 (4-3) 20-22 (4) 22-05 (3-4) 05-07 (3)	07-09 (1-0) 09-15 (0) 15-17 (1-0) 17-20 (3-2) 20-05 (4) 05-07 (3-1)
80	06-09 (3-4) 09-17 (4-3) 17-21 (4) 21-04 (3-4) 04-06 (3)	07-09 (4-1) 09-17 (3-0) 17-19 (4-0) 19-21 (4-2) 21-23 (4-3) 23-04 (4)	07-09 (1-0) 09-19 (0) 19-21 (2-1) 21-23 (3) 23-04 (4) 04-0[illegible]	07-19 (0) 19-21 (1) 21-23 (3) 23-03 (4-3) 03-04 (4-2) 04-05 (3-2) 05-06 (3-1) 06-07 (1)
160	17-18 (1-0) 18-19 (1) 19-21 (3-1) 21-23 (4-2) 23-05 (4-3) 05-07 (3-2) 07-09 (1-0)	18-20 (1-0) 20-21 (1) 21-22 (2-1) 22-23 (2) 23-05 (3-2) 05-06 (2-1) 06-07 (2-0)	20-22 (1) 22-00 (2-1) 00-02 (2) 02-06 (2-1)	20-22 (1-0) 22-00 (1) 00-02 (2-1) 02-05 (1)

ALASKA TO:

*Openings Given In GMT**

	15 Meters	*20 Meters*	*40 Meters*	*80 Meters*
Eastern USA	*Nil*	12-15 (1) 22-01 (1) 01-03 (2) 03-05 (1)	07-10 (1)	*Nil*
Central USA	02-04 (1)	13-16 (1) 23-01 (1) 01-03 (2) 03-05 (1)	08-12 (1)	*Nil*
Western USA	02-05 (1)	14-01 (1) 01-05 (2) 05-07 (1)	08-10 (1) 10-13 (2) 13-15 (1)	10-13 (1)

HAWAII TO:

Openings Given in Hawaiian Standard Time†

	15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Eastern USA	14-16 (1)	02-05 (1) 05-07 (2) 07-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-00 (2) 00-03 (1)	20-21 (1) 21-23 (2) 23-01 (1) 22-00 (1)‡
Central USA	11-13 (1) 13-16 (2) 16-19 (1)	04-05 (1) 05-09 (2) 09-13 (1) 13-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	18-20 (1) 20-02 (3) 02-04 (2) 04-05 (1)	20-22 (1) 22-02 (2) 02-03 (1) 21-02 (1)‡
Western USA	09-11 (1) 11-14 (2) 14-16 (1) 16-18 (2) 18-19 (1)	04-06 (1) 06-08 (2) 08-11 (3) 11-15 (2) 15-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-02 (4) 02-05 (3) 05-06 (2) 06-07 (1)	19-21 (1) 21-23 (2) 23-03 (3) 03-04 (2) 04-05 (1) 23-03 (1)‡

*GMT or Z Time is 5 hours *ahead* of EST; 6 hours *ahead* of CST; 7 hours *ahead* of MST; 8 hours *ahead* of PST and 9 hours *ahead* of Alaskan Standard Time in the zone between Skagway and 141 degrees west longitude, etc.
†Hawaiian Standard Time is 5 hours *behind* EST; 4 hours *behind* CST; 3 hours *behind* MST; 2 hours *behind* PST and 10 hours *behind* GMT.
‡Possible 160 meter openings from Hawaii.

the USA-CA PROGRAM

CLIF EVANS*, K6BX

EARL Harrison, K9UTI, was third person to bag USA-CA 2000 for contacting that number of different U.S. counties. Earl is one of the Net Controllers for the County Hunter's Net highly active around 7220 kc s.s.b.

Six other County Hunters bagged their USA-CA 1000 endorsement seals as shown below. And an even dozen others won their basic USA-CA 500 Award certificate as indicated below.

USA-CA HONOR ROLL

2000		500			
K9UTI	3	K5SBN	36	OK2QR	367
1000		K9LLX	37	HK3VV	368
K8KOM	32			K4IKF	369
W9QWM	33	K4MYO	362	WØ-10646	370
K4VOF	34	K3FFJ	363	K9LLX	371
W9CMC	35	K8IWI	364	W5ANE	372
		W6NAT	365	WA8CNN	373
		WB2HKZ	366		

Of the above, all were for mixed operations except OK2QR for all c.w., K4VOF for all 7 mc s.s.b. and K5SBN, a YL, for all A3. Additional endorsements given along with the above included K9UTI with USA-CA 1500 for all 7 mc s.s.b.; W9QWM with USA-CA 500 for all c.w., all 3.5 mc, all 7 mc and all phone; and K9ZXG added all 7 mc endorsement to his USA-CA 500. As we stated last month, it appears most new county contacts are being made on 7 mc s.s.b. followed next by 14 mc s.s.b. WØ-10646, John Reasoner, member of SWL-CHC, was second s.w.l. to win the USA-CA. We failed to mention last month that WN4LSU, was the second Novice to win USA-CA 500 Award.

We Get Letters

Ralph Miller, KP4BPH wrote, "Clif, I am one of the many (DX) stations avidly seeking to work U.S. Counties. While it is noted many more U.S. hams now name their counties on QSLs, many still do not. I am sure all U.S. hams would name their counties if they only realized this information is of considerable importance to most DXers. I know you run some kind of club whose members are willing to help others identify counties from name of cities and towns given on QSL cards. Am enclosing list of eighty QTHs for which I need names of counties. Will you ask a member of the club to help me? K6BX comment: Yes, the CHC handles this service. Orma Donkle, W9BJH, Box 271, Plymouth, Illinois, is CHC Administrator for this service. She maintains an up-to-date list of amateurs throughout the world who have a copy of P.O.D. #26 and are willing to help others in the identification of U.S. counties. All requests for such service should be sent to Orma who will insure some member of the CHC group provides this service. Those who possess P.O.D. #26 publication as described in USA-CA Rules and who desire to be placed on the list to help DXers in county ID, should notify Orma.

KP4BPH also commented, "I sure like *CQ* magazine because it has something for everybody. Seems most other ham journals are meant for the other guy whereas I find at least 75% of material in *CQ* of high interest. If you know anyone willing to part with old issues of *CQ*, I'd sure prize them."

Stan Reas, K4IKF: "Sure have enjoyed chasing the counties needed for my USA-CA 500 application herewith. In our opinion the USA-


1864 Montana 1964

Territorial Centennial Certificate

Here is the Montana Territorial Centennial (1864-1964) Certificate sponsored by the state of Montana for working Montana stations; Montana stations work 25 including one in Helena; other stateside stations work 15 and DX stations including KL and KH work 5. Contacts must be made after January 1, 1964 through December 31, 1964. No charge. Send copy complete log data to Custodian, Polly Badley, K7DCI, Star Rte. #1, Libby, Montana 59923. The award has gold border and background, carries the state seal and is signed by Tim Babcock, Governor of the State of Montana, John R. Hallowell, the Governor's Executive Assistant, and Polly, the Custodian. Here again you see example of state governor level recognition of the public relations part amateur radio awards serve our society and the public interest.

*United States of America Counties Award Custodian, Box 385, Bonita, California 92002.

Right off the press, here are both the New York State County Award and the New York World's Fair Award sponsored by the NYC-LI CHC Chapter #19. See last month's column for rules on both. The colorful 11×15" county award (above) has orange border, and is printed in red and black. Imprinted gold seals with multi-colored ribbons denote classes achieved in steps of 22, 32, 42, 52 and all 62 New York Counties. The World's Fair Award is for working 25 Long Island stations after January 1, 1964 with at least two being members Chapter #19. Harry Smith, WA2SAZ is Custodian.

CA Program is just what it took to revive the interest of many amateurs, especially in the ole timers. I also got a real bang out of going over into nearby Craig County, Virginia, to give out more than 100 pile-up QSOs from the New Castle International Gliderport. If we get enough requests for another expedition there, plan another this summer."

Letter from CHCer Harry Roylance, W7RZY, inviting me to be principle speaker at the 32nd Wyoming-Idaho-Montana-Utah Hamfest, August 7, 8, & 9 at Macks Inn, Idaho. Can't make it and real sorry, and I, like Harry, suggest all who plan visiting the Yellowstone Park during this period, to put the WIMU Hamfest on schedule. For further details, write Harry at P.O. Box 621, Harlowton, Montana 59036.

K6BX frequently gets letters asking how one is to know who is member of what club or organization for awards purposes. The answer is simple; it is expected that organizations which sponsor awards, the requirements for which include working members, have obligation to provide such member lists upon request. We would suggest that requests for such lists include s.a.s.e. Awards hunters should make it a practice to ask contacts the name of their county and if they are member of organizations for which the contact is credit. A majority of hams belonging to organizations which sponsor awards list this information on QSLs. As example, K6BX QSL card states, "Awards credit for CHC, HTH, FHC, QCWA, OOTC, San Diego County Century, all CHC Chapter awards, etc." We suggest that any QSL card will have infinitely more value to most recipients, especially DXers, if all pertinent awards information is set forth. Next time you have cards printed up, keep this in mind; in the interim, have a rubber stamp made which fills the bill.

County Hunting News

While the State of Delaware has only three counties, seems it is most difficult to make contacts into Sussex County. For this reason "Project Delaware" has been set up from Laurel, Delaware with operations commencing Friday August 14, 1700 GMT and running until 0300 GMT, Monday August 17, 1964. Members of "Project Delaware" are Robert Leuton of Bowling Green State University, Bainbridge Covell of Yale University and Michael Treister of Washington University Medical School. Operating schedule is set for 10m., K8LBQ/3 on 28.6 a.m. & s.s.b.; 15 m., K8PLJ/3, 21.31 a.m. & 21.41 s.s.b.; 20 m., K8GJM/3, 14.305 s.s.b. & 14.045 c.w.; 40 m., K8PLJ/3, 7,260 a.m., 7.210 s.s.b. & 7.045 c.w.; 80 m., K8LBQ/3, 3.935 s.s.b. & 3.645 c.w. It is planned to operate 20 and 40 meters all day and 40 and 80 meters all night with operations on 10 and 15 as bands permit. U.S. stations are requested to send s.a.s.e. for return QSLs. DX stations may QSL via W/K QSL Bureau. For further information write Michael Treister, 20942 South Woodland Rd., Shaker Heights, Ohio 44122.

Second Annual Illinois QSO Party

Sponsored by Illinois CHC Chapter #17 from 1600 GMT Saturday August 1 until 2200 GMT Sunday August 2, 1964. See CONTEST CALENDAR this issue for complete rules. The chapter has set up many 'rare' county expeditions during the period of the QSO Party. Already scheduled are: Carroll County by W9QQG, W9RQF, K9VTZ, using all calls; Clark County by K9LLX; Clay County by W9WGQ; Crawford County by K9SYR; Cumberland County by W9KSN; Edwards County by W9EOC; Jasper County by K9CSL; Johnson County by K9MMA (2nd op K9MFH); Kendall County by K9UCG (2nd op K9VKM); Ogle County by W8CXS; Scott County by W9OKI. W9EOC is the Old Post Amateur Radio Society club station. High participation by Illinois stations is promised.

New Radio Club Is An "Only"

The Only Operator YL Club sparkplugs its creation and being by sponsorship of the "TOO" certificate for working members; U.S. stations work five; others work three after January 1, 1964. AOMB/M (band/mode) endorsements. Send GCR list of log entries and 50¢ or 4 IRC to Custodian, Ruth Donnelly, K7ADI, 7826 N. Chautauqua Blvd., Portland, Oregon. For each additional 5/3 contacts, send only s.a.s.e.

The Only Operator YL Club, (TOO YL Club for short title) was organized in January 1964 with Charter membership closing in April 1964.

As we write this, the club has over twenty members. President is Tillie Curington, KØRGU. Secretary-Treasurer is Ruth Donnelly, K7ADI. Major purpose of the club is to bring together women amateur radio operators who do not have OM amateur radio operators to 'lean on,' and who must depend upon their own knowledge and resources to operate. Membership is open to all women hams who qualify by not having OM's who are hams. Member dues for U.S. citizens are $1 plus three s.a.s.e.; thereafter dues are 50¢ plus 3 s.a.s.e. per year. DX members pay no dues. Next in line is a "Never-Heard OM's Club" and we'd suggest prime requirement be proficiency in dishing out a good meal to the "TOO'ers."

Presidential Award Announced

The County Hunters' Net, under auspices of CHC Top Honors holders W5NXF, K8CIR, K9EAB and WØMCX, now sponsor The Presidential Award for working U.S. Counties bearing the names of U.S. Presidents. There are 244 such counties in 40 different states. The award is in four classes. Basic award, without any restrictions as to time, bands, modes, mobiles, etc. is; Class D for contacting 50 counties in a minimum of 10 states; Class C is for 100 counties in a minimum of 20 states; Class B is 150/30 and Class A is 200/40. Send alphabetical GCR (certified) list and $1 or 10 IRC to Custodian, Cliff Corne, K9EAB, 711 West McClure Ave., Peoria, Illinois 61604. Class endorsements are free but when requested separately, an s.a.s.e. or 1 IRC is required. No mode/band endorsements. The award is in design stages and is expected to be a beauty. We will bring a picture of it in later issue. Many Presidents have had counties named after them in several states. We suggest county hunters check the following listed 'Presidential' counties against all states (county listings) of the *USA-CA Record Book* used in the USA-CA Awards Program and available direct from *CQ* for $1.25. Counties are: Adams, Arthur, Buchanan, Cleveland, Filmore, Garfield, Grant, Harding, Harrison, Hayes, Jackson, Jefferson, Johnson, Lincoln, Madison, Monroe, McKinley, Pierce, Polk, Roosevelt, Taylor, Tyler, Van Buren, Washington and Wilson.

Here again is example of a good public relations award which promotes attention and increased knowledge of U.S. history and the geo-politics of our nation. Such awards promote both amateur radio interests and the public interest on international basis. We would like to again bring attention to the availability of the 108-page *USA-CA Record Book* which provides a state/county map for all 50 U.S. states and lists counties in each state alphabetically with provision for logging contacts. A real prize available direct from *CQ* for $1.25 postpaid. The *Record Book* contains complete USA-CA Program Rules which also are available from K6BX for s.a.s.e. For information on the hundreds of amateur and s.w.l. awards supported by the USA-CA Program, send s.a.s.e. to K6BX, publisher of *The Directory of Certificates & Awards.*

Pictured here is the Aloha State (county) Award for contacting the five major islands of the Hawaii group which constitute counties. At left of map is Kauai Island and Kauai County followed by Oahu Island which is Honolulu County; then Molokai Island which is Kalawao County; then Maui Island and Maui County; and the largest island of Hawaii which also is Hawaii County . . . maybe confusing to some . . . the famous grass skirt city of Honolulu is not on island of Hawaii at all, but is on Oahu as part of the Hawaiian group of islands. See text for major changes to Aloha State Award rules.

Minnesota County Award Rule Changes

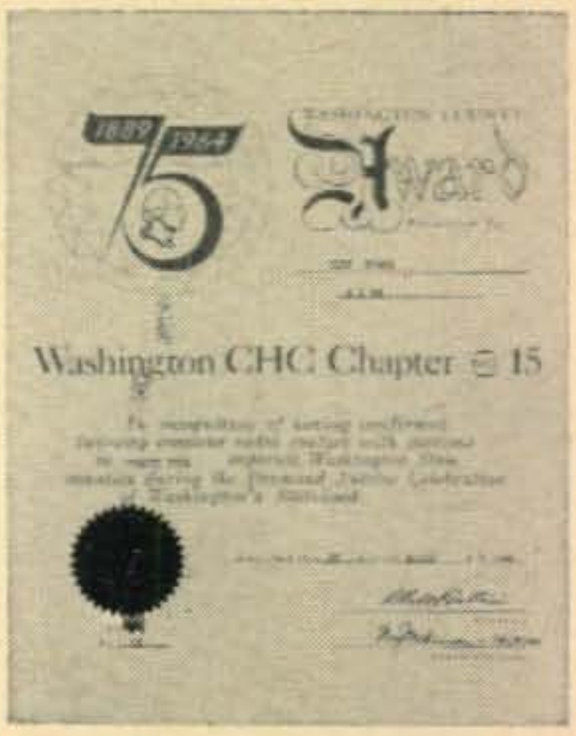
County Awards Hunters will be pleased to hear another sponsor has recognized the merits of the GCR honor certification system, and has dropped date limitations for contacts. New rules for the Worked All Minnesota Counties Award sponsored by the St. Paul Radio Club are: Basic award for working 50 Minnesota counties; endorsements for 60, 70, 80 and all 87. Send alphabetical GCR (certified) list and 50¢ to Custodian, James Stahnke, KØIDV, 1166 Burns Ave., St. Paul, Minnesota.

CQ congratulates the St. Paul Radio Club for making these changes which enhances the Public Relations 'value' of the award especially for DXers.

Hawaii 'Modernizes' County Award

Congratulations to the Kona Amateur Radio

[*Continued on page 98*]



Just from the printers, here is the Washington County Award sponsored by Washington CHC Chapter #15. See last month's column for complete rules. In addition to publicizing Washington's counties, the award helps celebrate Washington's Diamond Jubilee (Centennial) 1889-1964. If you look closely you will see that the Governor of the State of Washington, Albert D. Rosellini, signs each award along with the Custodian, Fred J. McKinnon, W7NNF who was the sparkplug in obtaining governor-level recognition and support of the chapter's public relations goals.

SPACE COMMUNICATIONS

GEORGE JACOBS*, W3ASK

As the late summer-early fall target date draws near for the OSCAR III launch, radio amateurs throughout the world are getting equipment in shape either to communicate through the radio amateur repeater satellite on 2 meters, or to participate in the world-wide radio amateur communications network being assembled for tracking the satellite.

The following information received from Denmark, by way of OZ9AC, Kaj Nielson of the Danish OSCAR III Committee, is typical of coordination now taking place in several dozen countries throughout the world as final plans are being made for the OSCAR III project.

Danish amateurs wishing to participate in the OSCAR III project have been divided into seven groups located strategically throughout the country. These groups report directly to the Danish OSCAR III Committee in Copenhagen. The Committee plans to establish direct communications with Project OSCAR Headquarters, either through an East Coast USA relay station, or through 4U1ITU, Geneva, Switzerland. Orbit data for OSCAR III, based upon observations of

*11307 Clara Street, Silver Spring, Md. 20902.

Table I—Transmitting Satellites

Freq. mc	*Name*	*Date Launched*	*Inclination Degrees*	*Period Minutes*	*Modulation*
19.430	ELEKTRON-2*	Jan 30 '64	61	1357	Beacon and telemetry
19.540	ELEKTRON-2*	Jan 30 '64	61	1357	Beacon and telemetry
19.895	POLYOT-2*	Apr 12 '64	58	92	Beacon and telemetry
20.005	ELEKTRON-1*	Jan 30 '64	61	169	Beacon and telemetry
30.0075	ELEKTRON-1*	Jan 30 '64	61	169	Beacon and telemetry
54.00	1963-49C	Dec 5 '63	90	107	C.w. tone
90.022	COSMOS-25*	Feb 27 '64	49	92	Beacon and telemetry
90.225	ELEKTRON-2*	Jan 30 '64	61	1357	Beacon and telemetry
108.012	VANGUARD-1	Mar 17 '58	34	134	C.w. beacon on only when in sunlight
136.020	ECHO-2	Jan 25 '64	81	109	C.w. beacon and continuous telemetry
136.050	TELSTAR-2	May 7 '63	43	225	C.w. beacon and command telemetry
136.077	ALOUETTE	Sep 29 '62	80	106	Command telemetry
136.110	EXPLORER-18	Nov 27 '63	33	5559	C.w. beacon and command telemetry
136.140	RELAY-1	Dec 13 '62	48	185	C.w. beacon and command telemetry
136.141	RELAY-2	Jan 21 '64	46	195	C.w. beacon and command telemetry
136.170	ECHO-2	Jan 25 '64	81	109	C.w. beacon and continuous telemetry
136.234	TIROS-7	Jun 19 '63	58	97	C.w. beacon and command telemetry
136.233	TIROS-8	Dec 21 '63	59	99	C.w. beacon and command telemetry
136.319	1964-1B	Jan 11 '64	70	103	C.w. beacon and continuous telemetry
136.406	ARIEL-1	Apr 26, '62	54	101	C.w. beacon and command telemetry
136.468	SYNCOM-2	Jul 26 '63	33	1441	Command telemetry
136.558	ARIEL-2	Mar 27 '64	52	101	C.w. beacon and command telemetry
136.593	ALOUETTE	Sep 29 '62	80	106	Command telemetry
136.620	RELAY-1	Dec 13 '62	48	185	Command telemetry
136.621	RELAY-2	Jan 21 '64	46	195	Command telemetry
136.651	1963-38C	Sep 28 '63	90	107	C.w. beacon and continuous telemetry
136.804	1964-1C	Jan 11 '64	70	103	C.w. beacon and continuous telemetry
136.887	1964-1D	Jan 11 '64	70	103	C.w. beacon and continuous telemetry
136.922	TIROS-7	Jun 19 '63	58	97	C.w. beacon and command telemetry
136.924	TIROS-8	Dec 21 '63	59	99	C.w. beacon and command telemetry
136.978	ALOUETTE	Sep 29 '62	80	106	C.w. beacon
136.980	SYNCOM-2	Jul 26 '63	33	1441	Command telemetry
136.992	TIROS-7	Jun 19 '63	58	97	C.w. beacon and command telemetry
136.995	SATURN-5	Jan 29 '64	31	95	C.w. tone
150.00	1963-49B	Dec 5 '63	90	107	C.w. beacon and continuous telemetry
150.00	TRANSIT 4A	Jun 29 '61	67	104	C.w. tone
150.00	1963-22A	Jun 16 '63	90	100	C.w. beacon and command telemetry
162.00	1963-49C	Dec 5 '63	90	107	C.w. tone
162.00	ANNA-1B	Oct 31 '62	50	108	C.w. tone
324.03	1963-49C	Dec 5 '63	90	107	C.w. tone
324.00	ANNA-1B	Oct 31 '62	50	108	C.w. tone
400.00	1963-49B	Dec 5 '63	90	107	C.w. beacon and continuous telemetry
400.00	1963-22A	Jun 16 '63	90	100	C.w. tone
400.00	TRANSIT-4A	Jun 29 '61	67	104	C.w. beacon and command telemetry
648.00	1963-49C	Dec 5 '63	90	107	C.w. tone

*Russian satellites, all others American

Table II—Expected Launchings

Freq. mc.	*Satellite Name*	*Modulation*
136.470	SYNCOM-3	C.w. beacon and command telemetry
136.980	SYNCOM-3	C.w. beacon and command telemetry
20.005	S-66 Ionospheric Research	Ground controlled c.w. beacon
40.010	S-66 Ionospheric Research	Ground controlled c.w. beacon
41.010	S-66 Ionospheric Research	Ground controlled c.w. beacon
136.170	S-66 Ionospheric Research	C.w. beacon and command telemetry
162.000	S-66 Ionospheric Research	Ground controlled Doppler transmitter
324.000	S-66 Ionospheric Research	Ground controlled Doppler transmitter
360.090	S-66 Ionospheric Research	Ground controlled Doppler transmitter
136.500	NIMBUS Weather	C.w. beacon and command telemetry
136.950	NIMBUS Weather	Continuous telemetry channel
136.710	OSO-B Solar Observatory	Continuous telemetry channel
136.350	S-48 Ionos. Topside Sounder	Command telemetry
136.680	S-48 Ionos. Topside Sounder	C.w. beacon and command telemetry
136.860	S-55 Research	C.w. beacon and command telemetry
136.125	S-74C Interplanetary Probe	C.w. beacon and continuous telemetry
136.200	OGO Geophysical Observ.	C.w. beacon, high power on command
145.900	OSCAR 3, Amateur Radio	Repeater communication channel
145.850	OSCAR 3, Amateur Radio	C.w. beacon and continuous telemetry

Danish radio amateurs and space listeners, will be fed to the Danish Satellite Tracking Center "Rude Skov," located near Copenhagen. Here, a computer has been made available for determining OSCAR III's orbit from data submitted by the Committee.

All groups and listening stations in Denmark will be supplied with special logs made for the project. As soon as OSCAR III is launched, the Danish OSCAR III Committee will receive and coordinate the completed logs. In the spirit of amateur radio, the results of the Danish observations will be made available to Project OSCAR Headquarters, the I.A.R.U., the Danish General Post Office, the "Rude Skov" tracking station, and all other amateur and scientific organizations that request the information.

Lots more information on OSCAR III will appear in next month's column.

Transmitting Satellites

As of May 15, 1964 radio signals could be received from 4 Russian and 22 American satellites orbiting in outer space. A total of 45 spaceborne transmitters, operating on frequencies in the 20 mc, 136 mc, and other space bands were in operation as beacons and telemetry channels. Table I contains a complete listing of these transmissions.

Table II contains frequencies that are expected to be used on satellites that the United States plans to launch during the remainder of 1964. The list is by no means complete, and some changes in frequency may be made before actual launch time. The list, however, can be used as a guide as new launches are announced. Russian satellites to be launched during the remainder of the year will probably continue to transmit on frequencies near 20 and 90 mc.

73, George, W3ASK

Court Decision Favors Ham

ON April 24, 1964 Judge Erwin Satterthwaite of the Bucks County, Pennsylvania judiciary released a decision in the case of *Afflerback, et al* vs. *Pete McManus,* K3DSF.

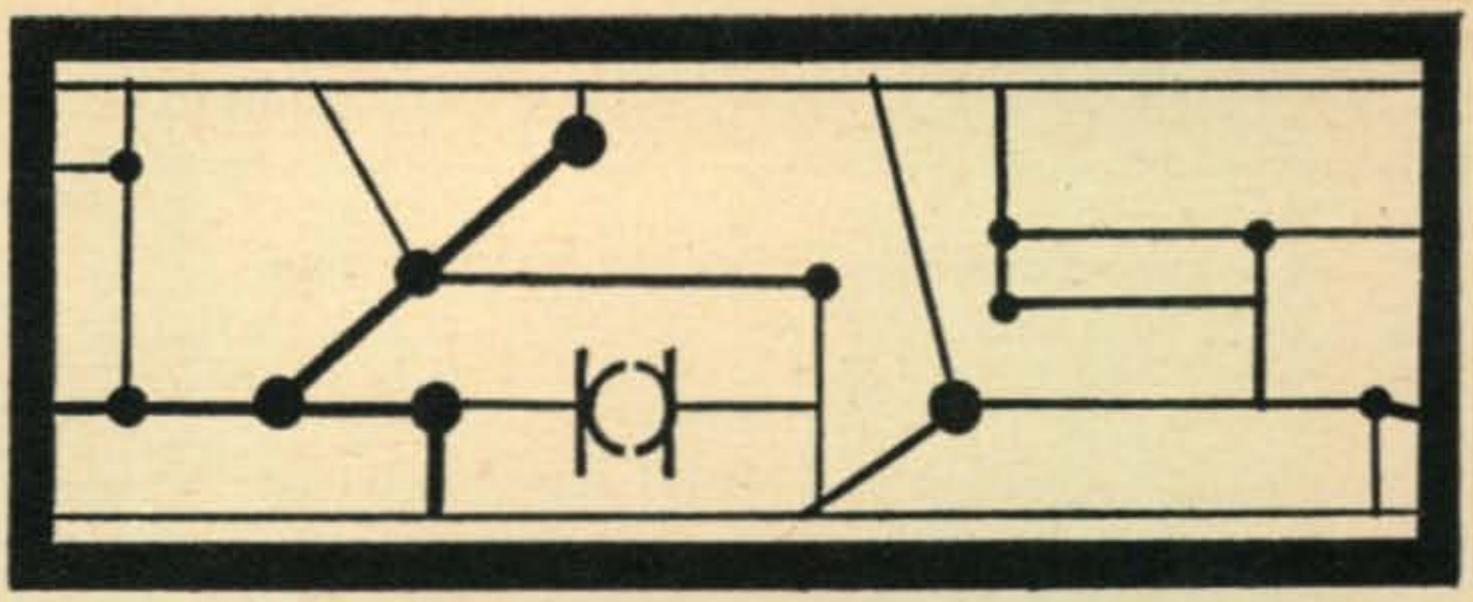
Pete had been charged with violation of a covenant in the deed to his Fairless Hills, Penna. home by maintaining several outdoor antennas for amateur radio and commercial TV reception. The covenant prohibits any form of outdoor antenna whatsoever.

Judge Satterthwaites' decision considers both the value of amateur radio operators in general and particularly K3DSF in rendering service to the community, and the recent rise of u.h.f. TV, for which outdoor antennas are mandatory for satisfactory reception, as more significant than the nebulous aesthetic considerations achieved by restricting antennas. He accordingly ruled in favor of Pete, K3DSF.

The opposing attorneys, however, have filed an appeal. Thus, the case is not ended, but the favorable results to date are encouraging.

If there is sufficient demand, copies of the decision will be made available to all amateurs within several months, at nominal cost, expected to be about 15¢ in single copies. Those interested may send a note including self-addressed postcard to K3HNP, 14 Darkleaf La., Levittown, Pa. (no money); when copies are available they will be advised of the cost. Preliminary ordering information is needed.—*K3HNP.*

NOVICE



WALTER G. BURDINE*, W8ZCV

On April 25 a large group of amateurs gathered at the Wampler's Ballerina to attend the Dayton Hamvention. The Hamvention is one of the largest gatherings in the world of amateurs, under one roof. It was my birthday (my 50th) and I didn't get any of the nice prizes, but I was very happy to know that one of our local hams was chosen as the Ham of The Year.

Each year, an amateur from the five state area of Ohio, Indiana, Kentucky, Michigan and West Virginia is chosen as the outstanding amateur of the year. Hyde Ruble, W8PTF, 3011 Athens Ave., Dayton was chosen this year.

Someone took home a complete station consisting of a Hallicrafters SX-117, HT-44, CA-44 and a P-150 a.c. power supply and speaker as the first prize, but Rube won his prize another way. Rube gave a large measure of his time and effort to ham radio through his speeches to local clubs and by helping amateurs and would-be amateurs to set up and adjust their sets for maximum pleasure. Very few hams in this area have never heard of or received help from Rube. I have never met a ham more deserving of the honor. I say "Well done Rube."

Hams with licenses covering a period of 52 years were present at Dayton. The oldest ham was over 80 and the youngest was 7 years of age. The rich and the poor were as alike as peas in a pod; all enjoyed the meeting. I will likely see you there next year if you can make it.

Getting Started

The fact that you are reading this column proves that you have an interest in communications in one way or another and this is the first requirement for becoming a ham. You *must* want to be a ham first, and you must be willing to take the time to study and prepare for the test. It takes effort on your part to be an amateur, but I'm sure that once you have passed the test and get on the air you will reap more enjoyment from that effort than any you have ever put forth before.

My friend Bob Kessler, K8VOT says that his license is his second birth certificate. I concur. However, you will only get as much out of this hobby as you put in it—this is one of the fundamental laws of life.

The easiest way to go about learning the requirements for becoming a ham is to do three things: 1—Subscribe to *CQ* for its fine articles on theory, construction and application of electronic circuits. We at *CQ* also try to instill the necessary ambition to become a good ham into you while teaching you the fundamental concepts of our hobby. *CQ* has many books available to help you in your quest for ideas and means of setting up a station. 2—Join the American Radio Relay League and get the ARRL's *Radio Amateur's Handbook*. 3—If possible find a friend who is also interested and enlist his aid in studying the code and gaining the necessary technical knowledge to pass the test and set up your station.

Check with the local broadcast station for any information on a local ham club, join it and be available for work when asked. You will need an amateur to give you your Novice or Technician test when you are ready. Some clubs give free, or for a modest sum, complete courses in amateur radio. They usually give the necessary examinations at the completion of the course. If you are unable to contact a local amateur to help you, let me put your name in our "Help Wanted" section. We rarely fail to find someone to help.

Equipment, Antennas and Surplus

An amateur station will consist of some method of receiving and sending intelligence by radio frequency waves. The receiver used will depend upon the type of signals to be received by the operator and the amount of money expended for that important part of the station. You can't work them if you don't hear them. Not too many hams build their own receivers, but many build their transmitters. The receiver can be anything from the simple transistorized regenerative set to the multi-band, many-tubed set. A usable receiver can be bought with almost any ham's pocketbook (as long as it isn't completely flat), prices ranging from about $20.00 for used receivers to around $1200 for new sets, but a very large percentage of us use receivers costing less than $150.

War surplus sets such as the BC-455, BC-454, BC-348 series, BC-1004, BC-779, BC-224, BC-312, ARB, BC-342, BC-344, BC-314, BC-652, RAS, RAO-7, RAX, RBH, RBM, RBS and many

*R.F.D. 3, Waynesville, Ohio 45068.

other such equipments are still available through surplus stores at practically any price you want to pay for them, depending upon the condition of the unit. Practically all require a good deal of conversion for use on the amateur bands. The cost of conversion must be taken into consideration when buying them. Many of these when properly converted make very good receivers and any of them can be used for a v.h.f. i.f. strip with a good converter. The re-sale value of some units make them a good buy.

If you can afford a new receiver, well and good, but not many of us can afford the best. I have seen many cheaper receivers that having been properly tuned and with all sorts of "outboard" circuits added, would outperform many higher priced models. The operator and his whims add a lot to the receiver's ability to please. If you need help, I will make a list of the conversion data in my files for the column. My file is quite extensive as I have most all of the electronic publications for the last 20 years. If I can find them at reasonable prices I will add the older issues of *QST, Radio News, Radio Craft* and *R-9* to my library.

Complete maintenance manuals for the more popular surplus equipments are often available. This is not conversion material, but diagrams and tuning or operating instructions for the original units. To use this information you will need a good knowledge of electronics and possibly be able to design your own power supplies and operating accessories. One such supplier of Technical Orders (TO) and Technical Manuals (TM) is Propagation Products Co., Tallahassee, Florida. I have bought several TMs from them and I'm well pleased with the service.

Surplus Transmitters

If you have a good, well stocked junk-box with plenty of power supply components in it, then you can likely come out ahead on many of the transmitters sold on the surplus market. Don't forget that many of these operated on d.c. power and used dynamotors for the necessary high voltage. The filaments were wired in series to use lower voltage tubes on a 12 or 26 volt supply. These may be hard to rewire for low filament voltage, but you can either rewind a filament transformer or buy one for the required voltage. If you must buy a filament transformer, it is just as cheap to buy a 26 volt job as a 6.3 volt unit.

Mrs. Mary Long, WA8HNZ, 2460 San Rae Drive, Dayton, Ohio is shown at the controls of AG1HE, the MARS station of the Defense Electronic Supply Center in Dayton. She and Janet Hartman, K8YMB are the two YL operators now left at the center, Ruby Rhude W8MDK, now a W3 in Middletown, was our first licensed YL. Mary can be found on two meters.

The necessary high voltages can often be obtained from the large transformers from defunct television sets that you can get from many a dusty attic, or from many second hand dealers for a mere pittance. Transformers that are exactly alike can be used in voltage doublers or in series to get higher voltages or lower voltages for one section with many filament voltages. They can be wired using any of the circuits previously published in NOVICE. Again, using the old noodle will save many pennies.

The transmitters of the 274-N series (BC-459 and BC-696) when converted to crystal control can be used very effectively on the 40 and 80 meter band and later used as a v.f.o. controlled transmitter. The ARC-3 and the SCR-522 (BC-625) are the units most used to put many on the two meter band. I have used both of them and they have performed beyond my greatest expectations. I especially like the crystal switching feature of the ARC-3 transmitter. The efficiency of the unit is very low; a lot of power is needed to get a small output. The modulation is good especially if a 12AX7 speech amplifier is used for a crystal mike pre-amplifier. Many of the six meter beginners converted the TU-75 from the BC-1158 or use the entire BC-1158 with varying degrees of success.

We should always take into consideration the cost of conversion, the cost of the parts required apart from those in the junkbox, the cost of the original purchase and the value of the unit after conversion.

The choice of using surplus, commercial or homebrew equipment is left in your hands. Your ability, the condition of your pocketbook and your own inclinations will determine the equipment in your station.

No matter what your decision, you are on your way to one of the greatest pleasures of life when you get your license and get on the air. Good luck to you, I'll be looking for you, and let *me* hear from *you*.

Help Wanted

Many of our readers have benefitted from a note in our column asking that someone help them. These folks need help. Will you give a little of your time so that they too may enjoy ham radio?

Dominick F. Dellaca, 1027 47th Street, Brooklyn 19, New York Telephone after 7:30—GE 6-7467. He has a complete station, but needs help in getting licensed.

Marvin L. Howe, 7447 Ida, Wichita, Kansas, telephone, JA 4-8515, needs some help with the

[*Continued on page 100*]

VHF REPORT

BY BOB BROWN*, K2ZSQ

W6DNG-OH1NL 144 Mc Moonbounce QSO!

At this writing the amateur fraternity (two-meter enthusiasts especially) is still very much excited about the recently announced QSO between Bill Conkel, W6DNG, in Long Beach, California, and Lenna Suominen, OH1NL, in Nakkila, Finland on 144 mc. The almost 6000 mile contact actually surprised but a handful of hams, since tests have been going on for almost a year toward this end, but the realization that this two-way communication had finally been established caught quite a number off guard and is harder to accept to more than a few v.h.f. men around the globe. But in spite of it all the fact remains that on April 12, 1964, perfectly readable signals were copied at both ends and a message was exchanged.

W6DNG W6DNG DE OH1NL OH1NL S2 S2 S2 K was heard in Long Beach at the rate of 3-4 w.p.m. on the low edge of two. Bill replied and was acknowledged. The OH1NL sigs are on tape as clear evidence to anyone who should doubt the validity of the contact. The ARRL is now in the process of contacting OH1NL for a copy of his tape of W6DNG.

As you are probably aware, this sets the all-time DX record for 144 mc amateur work and probably will stand for future generations of moonbouncers to try to conquer. In addition this makes the first time that an ocean has been bridged on this frequency and the very first time that North America and Europe have communicated on two meters.

Getting back to the QSO, however, you are probably wondering about gear, antennas, etc. Well, all we have at the moment is that Bill Conkel was employing eight 7 element Yagis in a conventional configuration, *not circular polarization*, and was running a kilowatt rig into it. It is interesting to note here that W6DNG constructed, tested and discarded 58 different antenna arrays, each capable of being rotated on the vertical as well as the horizontal plane and capable of tracking the moon. Numerous experiments with circular polarization in earlier work with Ned Conklin, K1HMU, proved that for what was gained through cross-Yagis, the costs of large and complicated arrays stifled the practicability of the entire operation. If for no more than mechanical simplicity, the final installation was moderate by comparison with *some* Bill and Lenna had concocted!

The front-end at W6DNG consists of a home-brew 416B preamplifier into a Parks Electronics Nuvistor converter. This, too, was the result of much experimentation, and like the antenna system, ended up simple and straight-forward.

W6DNG has been delving into moonbounce now for slightly over ten years. At that time he recorded his own echoes coming back from the moon. Last summer he and K1HMU tried to communicate via the moon on 144 mc, and both heard each other, but it was questionable if the time sequence involved really added things up to a valid QSO. Signals were perfectly readable, however, and tapes are on hand to back up the results of the work.

In Finland OH1NL has similarly been tinkering with antenna systems, although perhaps not quite as extensively as W6DNG. Lenna runs a kilowatt also and purportedly heard K1HMU once or twice during 1963, but was unable to establish contact at that time. OH1NL reports that the higher his moonbounce array was situated, the better his echoes and schedules were met. The reason? The troposphere and its tendency to invert in Lenna's locale attenuated his moonbounce signal greatly before it even reached the upper atmosphere. Consequently, antenna height was an important factor and remote mountaintop locations were explored.

The signals themselves as heard on W6DNG's tape are perfectly readable, although they tend to resemble aurora-type transmissions in tone. The signal/noise ratio and clarity of characters is said by many to be "the best amateur moonbounce efforts have ever produced."

After all the details have been sifted out and the amateur fraternity has once again settled into its normally quiet state, the real proponents of v.h.f. moonbouncing will return to their inevitable tinkering. Perhaps the most important thing learned through this startling achievement was that perhaps in the past too much accent has been placed on the size of the antennas. After

Here's a shot of what North Dakota looks like . . . close up. Meet Joe Pryor, WØDRJ, of Minot. His 50 mc signals have been "my first North Dakota" for many newcomers.

*481 West Grand Avenue, Rahway, New Jersey 07065.

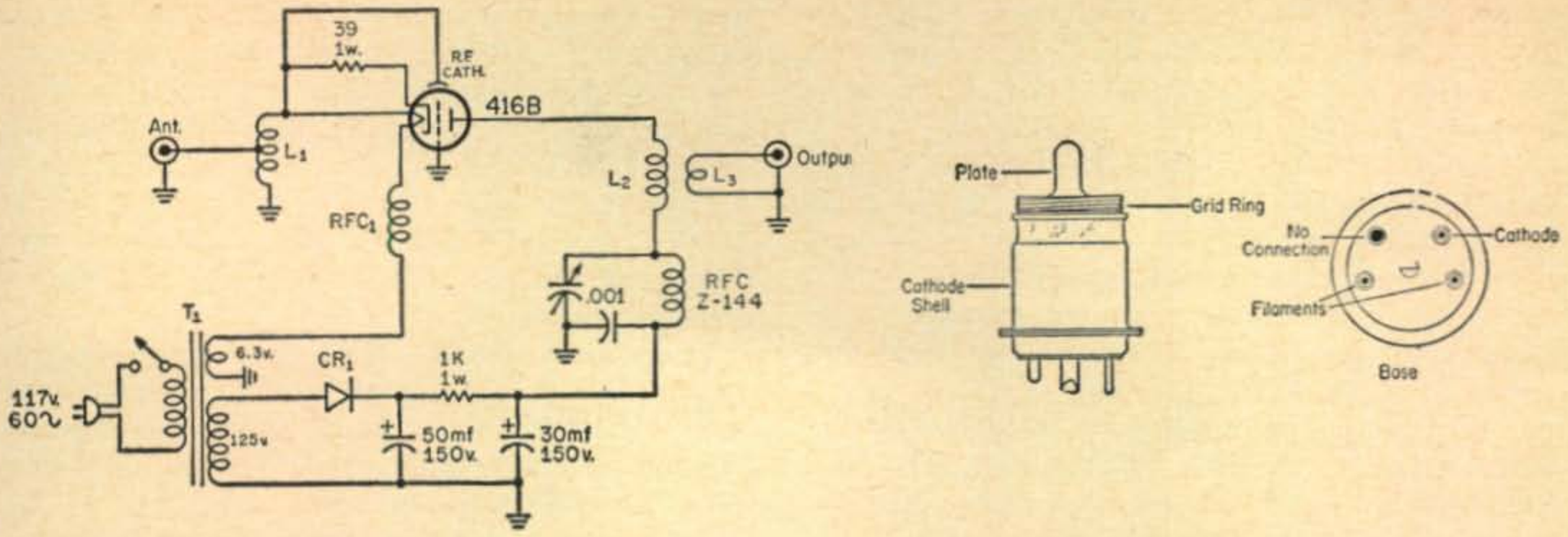


Fig. 1—The "Old Gold" preamplifier for 2 meters, utilizing the conventional 416-B circuitry with a built-in power supply. This version comes from the *VHFer*, and was constructed by W8HHS. Doug claims an increased gain of 22 db over his "barefoot" converter.

CR_1—Top hat rectifier, 400 p.i.v.
L_1—4 t. #16 wire tapped 1½ t. from cathode, ⅜" dia.
L_2—7 t. #16 wire, ½" dia., ¾" long.
L_3—2 t. #20 insulated wire in L_2.
RFC_1—470 ohm, 1 w. resistor, wound full of #30 e. wire.
T_1—125 v. 15 ma, 6.3 v. 0.6 a. power transformer. Stancor P-8415.

58 tries, W6DNG wound up with a moderate array. OH1NL did much the same. Rather than be concerned over an extra ¼ db, accent shifted to simple mechanical versatility. The array *must be able to track the moon*. Food for thought?

"Old Gold" Preamp for 144 Mc

With all the excitement about the W6DNG-OH1NL QSO, everyone's reconsidering two-meter's possibilities. One good way to start on your own private DX endeavor is to soup up your front end with the "Old Gold" preamp shown first in the *VHFer*. There is nothing new about the Western Electric 416-B gold plated planar triode. However, there will be something new about the performance of your 2 meter receiving set-up with this preamp ahead of it.

Availability of 416-B's can sometimes be a problem since only Western Electric Co. manufactures and uses them. Yet they always seem to be available at swap and shop sessions, etc. Often a friend who works for the phone company can secure used 416-B's for you that will deliver excellent performance at 144 mc.

The 416-B is designed to be used in grounded grid circuits. They are designed to be used with a 250 v.d.c. plate supply and normally draw about 25 ma. Operating at this power level, forced air cooling is necessary, but you can operate your 416-B with a 125 v.d.c. plate supply and eliminate the need for forced-air.

Plate current at this (125 v.d.c.) voltage is about 5 ma. The filament r.f. choke drops the 6.3 v. filament supply to 5.7 v. This also reduces tube heating, although it does not impair performance.

Allow sufficient air to circulate around the tube through use of ventilated shielding in your chassis enclosure. Perforated aluminum works well. Use a heat dissipating plate connector also. The grid connection on the tube is threaded. This will require a ¾" × 40 thread. A local machine shop turned out eleven of these threaded mounting rings for $3.00. They were made from 1/16" slices of brass stock, threaded on a lathe. The mounts can then be bolted or soldered onto the chassis.

Connections to the tube base pins can be made by pulling pins from a 7 or 9 pin miniature tube socket and using them for filament and cathode connectors. Easy? Yes! Beyond that, however, use conventional v.h.f. layout techniques (short, direct, well-soldered leads and quality components.

For DX work this preamp will serve you well. Noise figures on the one originally constructed was about 3.8 db. Overall gain over the "barefoot" converter measured 22 db. Other models of this circuit, build locally, gave similar results.

Make sure your coax relay doesn't allow high signal leakage to the preamp when transmitting. It could damage the 416-B.

Tune-up is simple: Tune the plate circuit for peak received signal on a weak station and adjust the position of the L_1 tap for best noise figure. That's it!

A Bit of Good DX?

K1WYS informs us that "Charlie, W1FZP, reports hearing KL7's around 0230 EST on April 24. Charlie is located on Lookout Mountain in Swampscott, Massachusetts." Just thought as long as we were plugging away at the July column you summertime DX'ers could make some use of it now, even though at this date unconfirmed. K1WYS promises more details in time for next month's VHF REPORT.

VHF Century Club News

WB2FZV's letter in the May column caused quite a sensation. Dave expressed the view that perhaps our Century Club Award requirements were a bit too stiff. Dave would have had us abolish our present rules and adopt a 500 contact per year plan—without QSLs, since he finds it next to impossible to get cards from v.h.f.ers. Here's a sampling of reader reaction:

Jack Bayha, W8BPY: "A look at the records will

show that K5OQN got five Century Club Certificates back in 1958. He did it in 9 months on six meters and had 565 QSL cards received in answer to his sent out.

"WB2FZV, who feels the 150 cards is high to get a CCC says he is 'active.' His notion of making 500 contacts rather than 150 confirmed cards is no challenge, not worthy of an award.

"A check of fellows who got the mammoth Texas QSL card from K5OQN will show that about 75% or more ultimately replied, but it did take over 900 initial contacts to swing the 500 cards needed for five CCC in 1958. The card used was designed to get a high return. It took extra effort, and it worked."

Dean Sever, K8RXD: "Don't let anybody talk you into making your Century Club awards easier to get, because if you do they will be just another one of those easy-to-get type awards—which are meaningless. Although I don't have the award yet, its requirements give me and other serious v.h.f./u.h.f. operators an award to strive for and an award that we can be proud of, once we have earned it."

That just about sums up the consensus of opinion on that one!

DX Doings

Ye Honorable Ed. has himself been rather inactive the past few months, at least prior to this writing. As you will note at the bottom of the first column page, our address has changed. And chances are that it will change again sometime in the Fall or perhaps next year when we move to Long Island. The new *CQ* headquarters is a long way from our old stomping grounds! In any case don't depend on me to get all the news by "reading the mail." You will just have to drop it all in an envelope.

Taking a peek at the two meter band lately reveals some interesting signals. In the W2 area, for example, s.s.b. is taking a real swing upwards. with new stations on all the time. Just last night at the QTH of WB2AOG we were listening to a QSO in which K3KEO in Magnolia, Delaware, talking to a Massachusetts station. Perfect Q5 copy all the way around.

WB2CCO at Plattsburgh, New York, is now on high power on 144 mc sideband, putting northern New York state officially on the nationwide two meter s.s.b. roster. He'll be looking for other s.s.b. stations nightly from 9 P.M. EDST 'till midnight and transmitting on frequencies 144.2 and 145.2. Anyone desiring a schedule should write: Bernie Welch, 5290-D Missouri Avenue, Plattsburgh, New York 12903.

Tom Neuhaus, WB2CLN, in Flushing, L.I., has been quite active during good 144 mc tropo conditions. Stations worked with a good deal of regularity are: W1AGQ, K1TRS, K1WHT, K1WME, K1WOM, W1ZEQ, K4WGQ/1, WN2LVW, WN2KOX, K3HHS and K3KUB. Tom would like skeds to the W4 area 6-8 A.M. EDST and after 8 P.M. daily.

Reliable Gary Fisher, K9WZB, our eager reporter from New Carlisle, Indiana, says two meters has been excellent recently (late March-early April). His DX list is entirely too staggering to run here for space reasons, but rest assured that he has been making the most of every available inversion. For example: K9WZB keeps *nightly* skeds with K8VMA on 145.008 mc at 2200 CST. That's 240 miles! Gary, too, would like skeds. His go to Tennessee and Maryland—anytime, any day.

Bandswitching now into the 50 mc position we find Collin Deakin, WB2CUD, still plowing away at the low edge. Most of his daily efforts are concentrated southwest. On March 9 Collin heard K3NNZ near Pittsburgh peaking S7; he was calling CQ. Signals took a dive, however, before WB2CUD could attempt to reply. Collin's list for the month includes such notables as: K3ASU, W3CAJ, K3EAV, K3IWK, K3RYQ, K3SFW, K3SZH, K3VMG, and W4VCJ. That last one, by the way, was to Bluemall, Virginia: 240 miles.

Ambling on down south we find Al Hemmalin, WA4IRX, as active as ever. On April 6 at 1500 GMT Channel 2 from Rhode Island was intermittently received where the local Memphis station should have been. On the 7th several W7's were heard working WØ's. Outstanding calls included K7BCW, K7TFL and K7VAB. On April 18th Al worked W4SCC in Hickman, Kentucky. Signals: 4×3. "Excellent ground wave 'till end of month. This Kentucky station is rare here and has been the first Kentucky for 8 or 10 Memphis stations," adds Al.

Shooting further north Vince Varnas, K8REG, in Dayton, Ohio, has been busy snatching six meter aurora signals. Contacts on April Fools Day included WA9FPH in Milwaukee and K9EVA in Chicago. Looking back further yet, however, on March 7 Vince reports hearing K7JUE in Tempe, Arizona, at 0138 EST on bursts. No solid contact this time, though.

Remember August 22!

Lest we tend to forget, August 22 and 23rd is the big weekend for the contest crowd. It marks the *CQ* Summer V.H.F. Contest, a bash you will not be likely to forget for quite a while if you intend to participate. All the rules are in this issue and a complete set of regulations and log forms can be had for a self-addressed stamped envelope to: *CQ* V.H.F. Contest Committee, 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050. See you in the contest!

73, Bob, K2ZSQ

New VHF Century Club Members

Six Meters

WA8GCE 243
K1KCN 244
JA3BBG 245
WA8BXS 246
WB2DCC 247
WB2FEQ 248
K8TSC 249
WA9ETE 250
K8ZXT 251
K8CKO 252
WA4ERT 253
WA2MGV 254
WA9IPX 255
K8ZGV 256
W3TFA 257
WB2HBC 258
K8WGF 259
K5DRF 260
W2SXO 261
WB2EEX 262

Two Meters

WA4MFG 156
WA8CNX 157
WB2ELL 158
K8ZQE 159
WN8IKN 160
PAØVDZ 161
PAØVDZ 162
WB2JKU 163
WA2RDE 164
W2RPZ 165
WB2GKF 166
DJ8TF 167
DJ5IH 168
J. I. Gibbs....169
WA9CNN 170

HAM CLINIC

CHARLES J. SCHAUERS*, W4VZO

MANY hams have the idea that they can write to a manufacturer of a piece of *surplus* gear and obtain full information on the item they have purchased. This is not true. When an item becomes surplus it has usually been superseded by another more modern piece of equipment and the manufacturers no longer stock spare parts or printed information on the old piece.

Equipment manufactured during World War II, used or stored, during or after that time and declared surplus, may have been assembled by two or more manufacturers. Furthermore, some of the manufacturers have since gone out of business.

Most reputable military surplus radio-electronics dealers carry manuals for the equipment they sell, or at least they will have available for their ham customers a list of possible sources where manuals and modification information are available.

There are still many fine pieces of surplus equipment on dealers shelves on which little information is readily available. These items are often bought for the fine components they contain by the wise ham who knows when he is getting a bargain.

Sometimes dealers do not know the real value of a few odd surplus items because these were purchased along with many other fast moving items in a lot deal; some of these items incidentally, are "new" surplus. Remember that military surplus equipment now available was not all manufactured during or right after World War II. Some of the stuff was made as late as two years ago! It was declared surplus because of a factory over-run, cancellation of a contract or because it was "obsolete" before it left the factory. (Yes, the radio-electronics art moves fast!)

One West Coast dealer is still biting his tongue because he did not take out the time to find out how valuable the parts on a little circuit board were. Some of the diodes on these boards which he sold for less than $2.00 were worth (at the time) about $9.00 each! The 5% resistors alone were worth much more than the two bucks asked for the board.

One cannot buy wisely and well if he does not know what he is looking for. Before you enter a surplus store looking for good military spec parts, look up the current prices in a good catalog for new items. For example if you should run into a 2N1724 transistor, remember the price in 1963 was $69.00. Maybe you can get it for $2.00, and if it is good, take it. On the other hand if you do not need a power transistor, it may not be a bargain to you.

One ham I know who dabbles in transistors always takes his tester along with him. One dealer told him he could have 50 transistors if he would check out a batch of 200 so that he could sell them as "tested units." Of course you know who got the best transistors in the batch!

It's fun to shop for surplus and there are still many bargains about, but do not expect manufacturers to answer your letters pleading for help on a surplus item, they simply do not have the manpower or the time *or* the information to handle surplus inquiries.

Complaints to Manufacturers

A straightforward courteous letter to a manufacturer's service manager or customer relations man from a ham experiencing trouble with his equipment will usually be answered. On the other hand, an insulting or threatening letter generally gets no results at all. No one (including the company from whom you bought your equipment) has any obligation to answer a nasty (and often unreasonable) letter.

In the event that you do not receive a reply to a courteous letter, write again—then if you do not receive an answer, do drop HAM CLINIC a line.

We have received copies of letters directed to manufacturers, and where we can, supply the information sought. However, we sometimes give the writer somewhat different advice or information than that proffered by the manufacturer. We have found out though during the last 7 years that we haven't missed too many times. In fact, we have given advice that paid off when the manufacturer's did not. This makes us feel good and we forward a copy of the "customers" letter to the manufacturer—and everyone is happy.

When we help you, let us know. When we do not, let us know. As we have said before, we are human. We do make mistakes and we continue to learn—even with 30 years experience.

*c/o *CQ*, 14 Vanderventer Ave., Port Washington, L. I., N. Y.

Questions

Water Cooling–"Tell me, how come I have never heard of water cooling in a high powered ham transmitter? It seems to me that this is a topic somewhat overlooked in the ham literature. What are your comments?"

Water cooling is gradually being replaced in high power commercial transmitters either by forced air cooling or vapor cooling. I have seldom heard of it being used in ham transmitters. With today's newest ceramic tubes, cooling is no problem. Forced air cooling is very practical in the highest powered ham transmitters. Even in the smaller compact final amplifiers used in s.s.b., only a small fan is required for adequate cooling. Water cooling is expensive and bulky. It requires a pump, pipes, a tank and distilled water.

RCA 6146B/8298A (Again)–Here are the answers to some of the questions regarding RCA's new beam power tube the 6146B/8298A. (See HAM CLINIC for April 1964)

Yes, the new tube can replace the 6146, 6146A and the 8298 unilaterally. The maximum grid current (i.c.a.s.) for class C telephony is 4 ma, if the d.c. grid voltage is —150 volts, the plate voltage is 600 volts and the screen voltage is 250 volts. Maximum plate power input is 85 watts i.c.a.s. in class C for one tube.

The zero signal d.c. plate current in i.c.a.s. with two tone modulation is 25 ma in class AB_1.

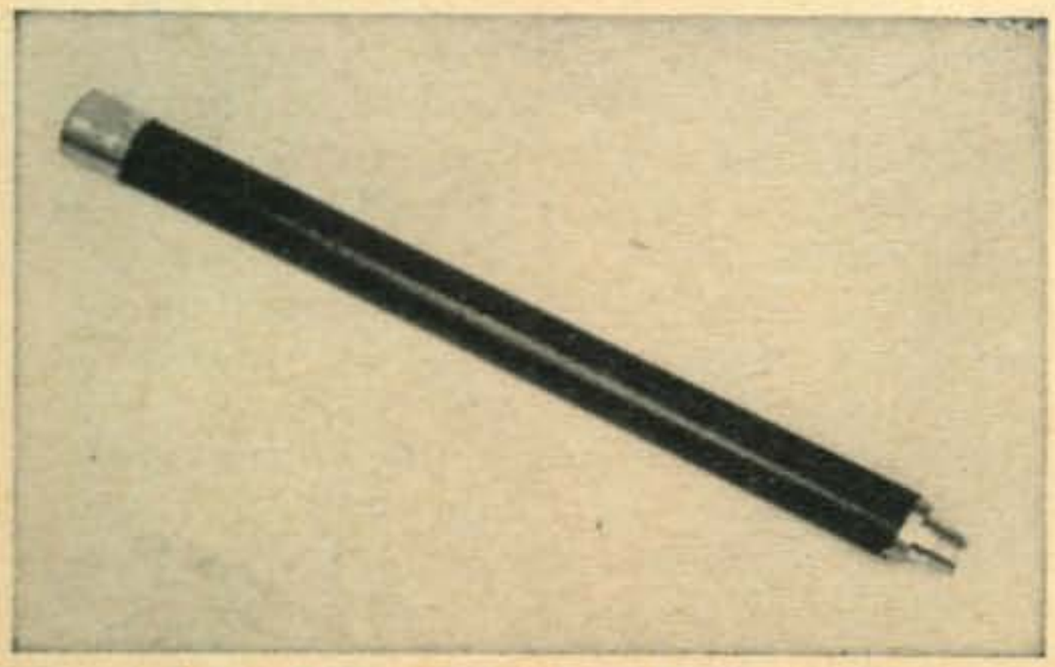
The d.c. plate current at peak of envelope in i.c.a.s. for a signal having a minimum peak-to-average ratio of 2, is 220 ma maximum, in class AB_1.

No, I do not recommend using the tube in the Heathkit TX-1 unless the power transformer is changed.

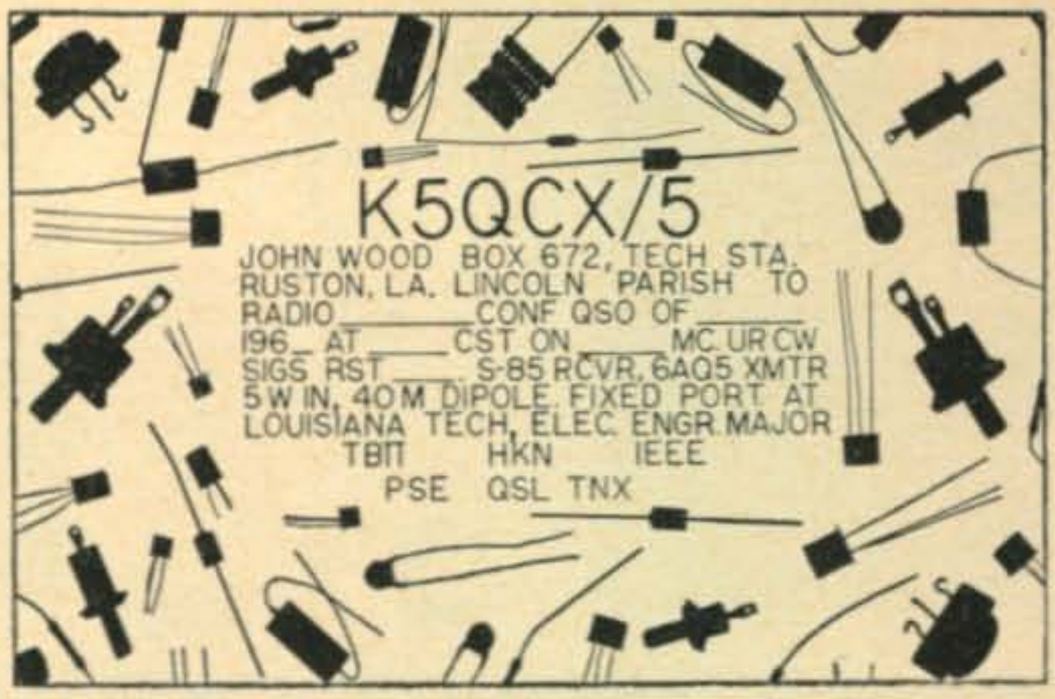
Yes, the tube is ideal for mobile transmitters. The heater has been designed to operate over a voltage range of 6.0 to 7.5 volts and will take excursions from 5 to 8 volts in battery operation.

To be on the safe side, the power supply should have a *dynamic* capacity of 350 ma at 750 volts.

In class AB_2, —46 volts is needed for bias (two tubes) for c.c.s. operation, with a plate voltage of 500, and regulated screen voltage of 200. Zero signal d.c. plate current is 50 ma. In c.c.s., the maximum signal d.c. plate current is 308 ma. Signal power output at these values is 100 watts, in a.f. power amplifier service. R.f. output will be close to the a.f. value.



The Carborundum 250 watt dummy load.



Photographic QSL card of K5QCX is an interesting project for the ham/photography bug.

Maximum power output will be obtained when the tube is operated under load conditions such that the maximum rated plate current flows at the plate voltage which will give maximum rated input.

If the plate shows any color at all, maximum ratings have been exceeded. The plate shows no color when the tube is operated at full ratings under either c.c.s. or i.c.a.s. conditions.

Before you decide to use the 6146B at maximum ratings, make certain that you have sufficient ventilation. The maximum bulb temperature is 260° C. (500° F.!) RCA recommends measurement by using temperature sensitive paint such as Tempilaq® made by Tempil Corp. 132 W. 22nd St., N. Y. 11, N. Y.

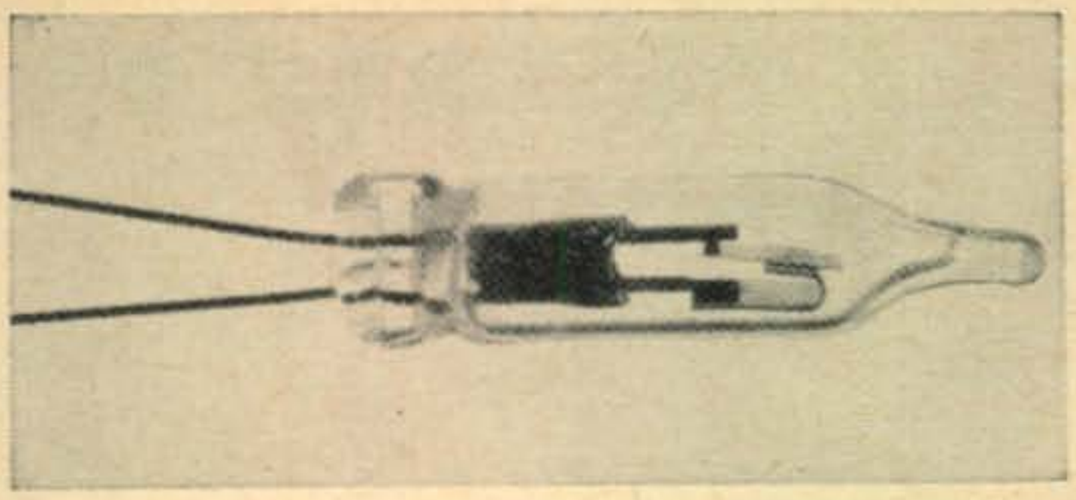
A tip: never handle any transmitting tube when it is hot. If you do handle a hot tube roughly the heated elements can be misaligned.

The 6146B is a real fine tube for ham work—especially with s.s.b. and you'll be hearing more about it.

250 Watt Dummy Load–Looking for a bargain? Harvey Radio in New York has one—a 250 watt Globar-type dummy load manufactured by the Carborundum Co. The gadget measures about a foot long and a little over an inch in diameter and is fitted with an SO-239 connector at one end. The 52 ohm load should handle a half gallon s.s.b. and well over the gallon mark with a little forced air or oil cooling. Only $12.75, too.

Unique Photo QSL Card–John Wood Jr., K5QCX/5 has come up with a QSL card which will appeal to those who have photography as a second hobby. It will also appeal to those who like a technical motif on their cards.

John writes: "the card was made photographically by exposing photographic paper on which small components had been scattered. I started by cutting a sheet of high contrast paper (Kodabromide F5) so that it was proportional to the desired 3½ by 5½ card but big enough to work with. I cut an 8 by 10 sheet to 6⅜ by 10 inches, then I placed the paper under an enlarger (no negative in the carrier) and placed the transistors, capacitors, rectifiers etc. in a pattern leaving the center space blank for letter stenciling. The sheet was then exposed and developed giving a black background and white components. This sheet was then used as a paper negative



Sylvania Mite-T-Breaker which can often be used to replace bulky electro-mechanical overload relays.

to contact print a positive, also on high contrast paper. I then put the paper on a drawing board and inked the lettering on the print using India ink and a lettering guide, using ½ inch letters for the call and 3/16 inch letters for the rest. Next I photographed the print using a 4 by 5 press camera. After development, this negative was used in an enlarger to make 3½ by 5½ prints. I used double weight matte paper (Medalist G3 and Ektalure G) so that the cards could be written on with a ball point pen and would be durable. I made 80 cards for less than $3.00." Thank you John, your card really appeals to me and I know it will to many others.

Sylvania Mite-T-Breaker—Needing a tiny circuit breaker I obtained a couple of Sylvania's MB-300 Mite-T-Breakers. About twice the size of the NE-2 neon bulb, these little breakers can be obtained in a range of sizes with a minimum rating of 500 ma.

The heart of the Sylvania automatic reset Mite-T-Breaker is the completely glass enclosed bimetal armature and compensator which is sensitive to current as well as temperature. These features provide excellent protection for nearly any appliance where it is extremely important to regulate internal temperatures.

The Breaker is series connected and can be used for a large number of ham applications. Why use a large electron mechanical relay when the little unit can be used?

For further information, write Sylvania Electric Products Inc. Special Products Plant, Ipswich, Mass (01938).

Class C Linear Monitoring—W. F. Eglit, W2KDB said he successfully monitors his ZL1AAX type class C linear amplifier with the scheme shown in fig. 1. The r.f. sample is placed on the vertical deflection plates and horizontal sweep voltage is obtained from the audio component appearing on the final amplifier screen grid. The pattern will be triangular and the sides of the triangle will be straight lines as long as the operation of the stage is linear. Non-linearity is of course indicated by curved or irregular sides and over-drive and other abnormalities will clearly show as radical departures from the ideal triangle. Thanks W2KDB.

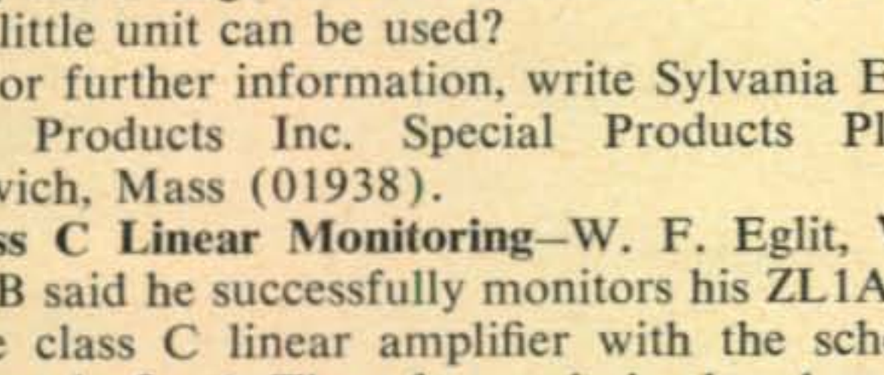


Fig. 1—W2KDB's hookup for monitoring a Class C linear as described in March and April CQ by W6HLY.

RCA 6JE6 vs. 6DQ5—"Can you recommend a tube to replace the 6DQ5 with one having higher plate dissipation?"

Yes. Try RCA's 6JE6. This tube uses a 9 pin novar button base and has 25 watts plate dissipation.

Improved A.V.C. for S.S.B. and C.W.—"Can you recommend a good article to me on an a.v.c. system for use on s.s.b. and c.w.? I'm not merely looking for one with a long time constant but rather one with fast attack and slow decay."

Yes. See *QST* for October 1957.

Time Delay Relay (Transistorized)—"How about a time delay relay circuit with variable time adjustment feature? It must be transistorized."

Sure. See fig. 2. This is a modification of the General Electric circuit contained in the *GE Transistor Manual* (6th Ed.).

The time delay of this circuit is quite independent of temperature and supply voltage. One set of relay contacts hold the relay closed and the second set is used for control functions. The relay must be a fast operating one. One second of delay is obtained for each 10K resistance of the pot shown. The transistor shown is a unijunction type.

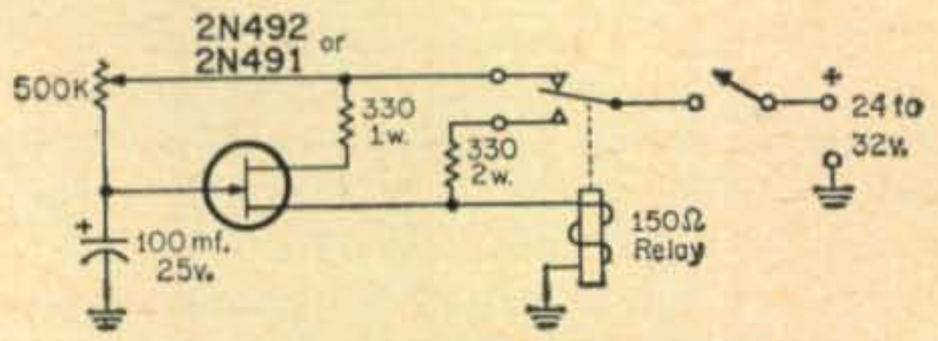


Fig. 2—Time delay circuit using a "unijunction" transistor. The pot allows variation of the delay time.

Joystick Antenna—"I am one of those hams unfortunate enough to live in an apartment house where I cannot use the roof for an antenna. I've tried all sorts of inside antenna contraptions, from a dipole draped around a room to a wire dangled out the window. Can you by the smallest chance help me with my antenna problem?"

I know what it is like to be a "cave dweller" and a ham. I would recommend that you try out the Joystick Antenna made by Partridge Electronics Ltd., 7 Sowell Street, Broadstairs Kent, England. This antenna (patents pending) was designed for indoor as well as outdoor use and has no U.S. counterpart.

The antenna, center loaded and only 7'6" long is fed with ordinary insulated wire and functions somewhat like an off-center fed or "Windom." A tuner is available and is used for feeding a coaxial line from a pi-network. The tuner sells for less than $5.00, the antenna for around $15.00 plus postage.

I tried the Joystick out with HB9ACN's help and found that it performed remarkably well. Four different receivers showed improved performance over a dipole when the Joystick was

[*Continued on page 100*]

UHF ROUNDUP

BY ALLEN KATZ*, K2UYH

GENERATION of high power on the bands above ¾ meters has always been a task for the amateur. Yet, it is on these bands, where every fraction of a db counts, that high power could be the most fruitful. An idea of the effort necessary to obtain a cool kilowatt on 1296 mc can be achieved by remembering the transmitters used to span the continent by moon bounce. Power klystrons over a foot high were used as final amplifiers on both sides of the path. Even on 432 mc, a true gallon is still a rarity.

With the advent of the varactor multiplier, the dream of a tube which could be driven by one of these devices to a full kw must have crossed the minds of many u.h.f. men. Well Eimac has developed just such a tube—the 4CX600A. It can be driven with 5 watts on 1296 mc, and can handle more than a full kilowatt input. Fantastic, eh? With specs like 3000 volts maximum plate voltage at 500 ma, and 25,000 μmhos, it is quite a big brother to the 4CX250! The tube's physical structure is no less a marvel. The external anode is only two inches in diameter. Too bad Eimac didn't include a picture along with their data sheet. The 4CX600 also features a integral screen-cathode by-pass capacitor which allows the tube to be bolted directly to the chassis.

One thing Eimac did not mention in their specifications is price. This factor is certainly important to most amateurs. We have no idea of the tube's actual value, but can imagine—it will probably be rather high. However, it will surely cost less than the klystrons used previously. It also offers the u.h.f. amateur hope, and for this we must salute Eimac.

Very Weak Signal Detection

In the May issue we ran some interesting information about K2TKN's "Flying Noise Lock" for detection of signals in the noise. Since that time, we haven't heard too much from Bill, except comments to the effect that he believes that he is on to something really hot. For those of you who can't wait, fig. 1 shows the schematic diagram of a unit which can be used in conjunction with the phase detector (February UHF COLUMN) to lock on weak signals. The component values shown are for a 455 kc i.f. However, the oscillator coil-capacitor combination is all that need be modified for use with another receiver i.f. range.

For those less hep on the exotic, it should be remembered that gain can be obtained by simple integration—with the sacrifice of time. In the crudest form, this means putting an a.c. voltmeter at the audio output of your receiver. A pen recorder would even be better. All these devices do is take the burden for determining the presents of a signal from your ears. This first step is very

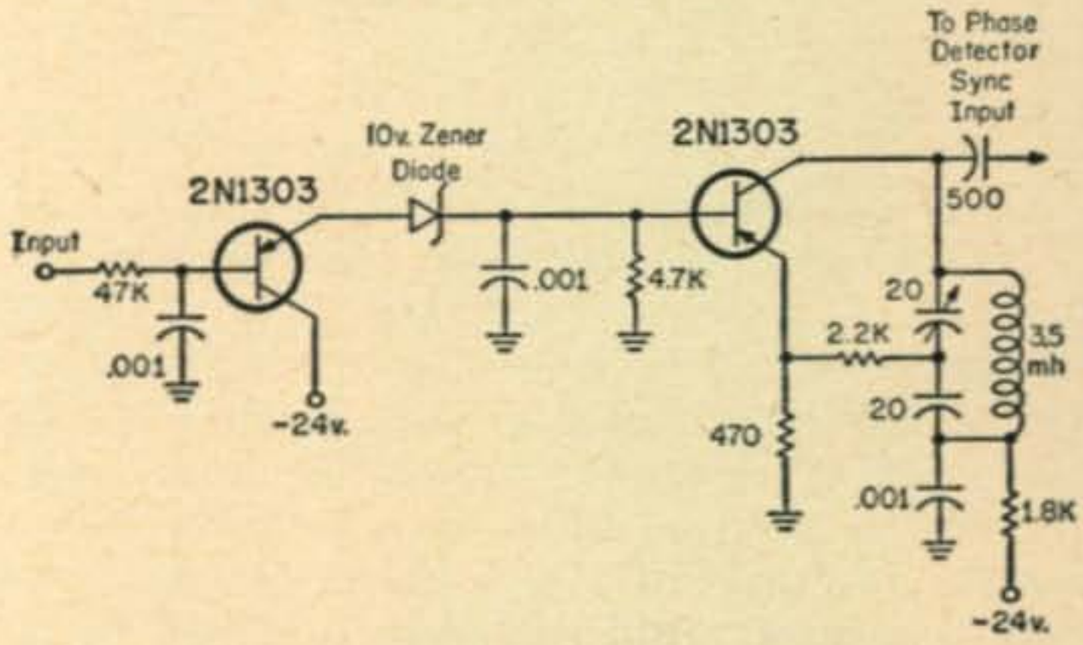


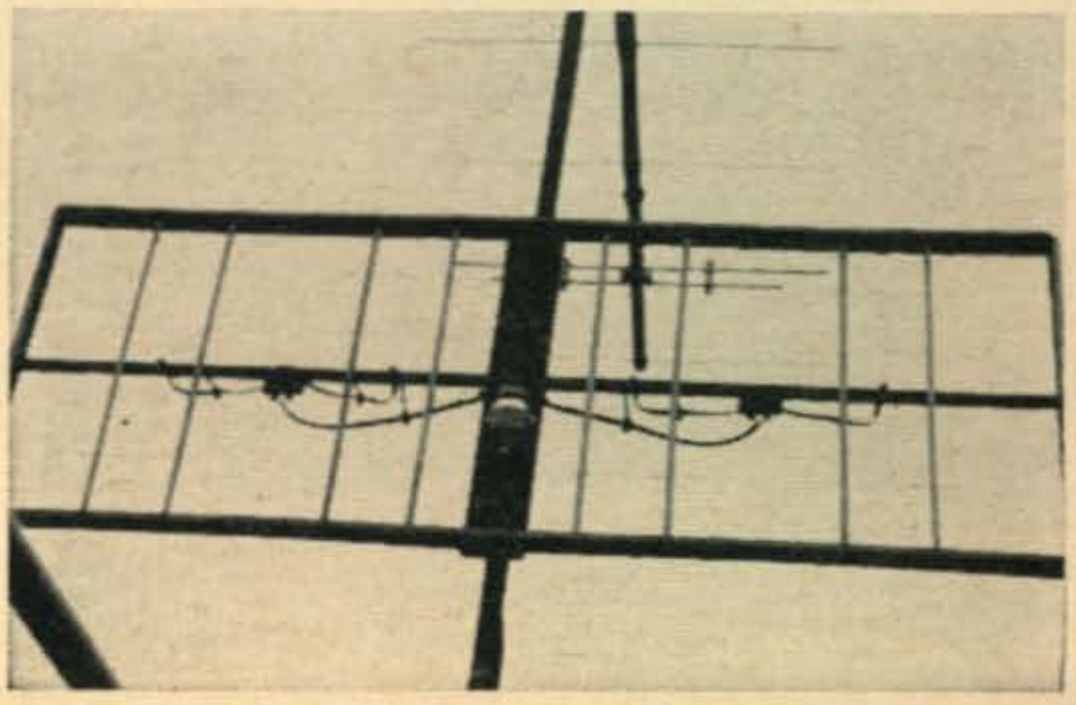
Fig. 1—K2TKN's reactance modulated oscillator used to convert the sync detector described in February column to "flying noise lock."

important when trading time for gain, since the ear can not detect frequencies below 50 cycles very well. Once the transfer is made, integration can be used to detect signals far below a one to one signal-to-noise ratio.

This topic is discussed in much greater detail in the December, 1963 column. Although we have learned much since then, the basics are still all contained in the December issue. With the added free time the summer brings, you can be sure we will be playing with this system and others. It should be interesting to see just how far a signal can be bulldozed under conditions of extremely long time constants. Anyone else interested in giving weak signal detection a try?

Activities

Grid, W4GJO reports on 432 mc operation in Florida: "Last Tuesday night, April 21, Lou, WA4BYR and I worked WA4FIJ in Panama City, our best DX to date. Distance from Panama city to Sarasota," (Grids QTH), "is about 275 miles. Other stations are reported to be building WA4FIJ is not too well set up on 432 yet; he has a 4X150 at 50 watts input, a corner reflector antenna, and a Nuvistor preamp into a surplus CU-253 and an NC-300, all of which he admits is in a rather haywire lashup. His sigs



Close up of WA2EWG's 32 element Collinear used on 1220 mc with an APX-6.

*48 Cumberland Avenue, Verona, New Jersey 07462.

were a good 579 on c.w., and conditions did not appear to be too good. Lou and I feel this could be a consistent contact from here, if Dick were really well equipped. I believe that he is planning to improve his set-up as soon as possible.

"Our regular contacts with K4NTD in Oakland and K4IXC in Melbourne continue, with consistent contacts over these paths up to 135 miles. Other stations are reported to be building in Jacksonville, Miami, Margate, and St. Petersburg, so we may soon have increased activity.

Lou is using 4X250B final and a 52 element yagi configuration (four 13's in a quad). I am using a 4CX300A at 600 watts c.w. input, and a 64 element collinear (four 16's stacked *horizontally*). We are both using converters with coaxially tuned 7077 r.f. stages." Keep up the good work of putting the Sunshine State on the u.h.f. map, and good luck with the trans-gulf tropo.

Texas u.h.f. activities via Vic, W5HPT: "Things going fairly well down Texas way. s.s.b. on 432 works real well. Very stable, and no problem in operation. We now have a total of 4 s.s.b. stations on the air from in Texas. K5SDM, W5LDV both at Houston, and W5AJG, Dallas, and myself.

"1215 continues to make progress via APX-6 route, we still haven't finished ours due to ATV activity, however several are going in the Houston area. If I got busy I could finish mine up, but you know how it is with so many projects. Acquired and converted a TRC-8 to 220 mc. It is a real easy conversion. I converted one for AJC also, however he has high power on 220. K5SDM converted one also. There was a real good opening last week, and LeRoy copied the TRC-8 barefoot in Dallas. This is quite a feat, as the TRC-8's output measures only about 6 to 8 watts.

"Had a nice visit this past month with W4-HHK, Paul Wilson, in Collierville, Tennessee. He is making great progress on his 28 foot dish and mount. He hopes to have it operational by the beginning of June. It should really do things as he has it on a hill and can put it at the horizon.

"Nothing else really new to report. Path to Houston still open and appears to stay the same despite winter, and fog at the Houston end. With the warmer temperatures here, perhaps DX will stretch out. I hope I am not out on the road during the openings. It sure is rough to be out all week and get back to learn the band was open to Florida." We know some Florida stations who would be disappointed too!

APX-6 News from K6KEG/7 in Las Vegas, Nevada: "There are nine in our group. We have been trying to get information on converting our APX-6 transponders. We have a total of 27 units. All of our group wants very much to get them on.

"We are presently active on all high bands through 432 mc and would like to get on 1296. We are also working on a TV camera, which we got from Los Angeles. We would like to give TV a try on 1296 when we get the APX-6's converted."

UHF Notes

Tom, WB2CLN of Flushing, New York is on 220 mc with a Tecraft transmitter, Criterion Nuvistor converter into a HQ-145X, and an 11 element yagi. He says the band's been rather quiet lately and therefore is looking for schedules. That doesn't sound right for this area. I guess we all will have to get busy. What say fellows?

John, WA8DXW of Marshall, Michigan appears to have a flying spot scanner on the air, and now wants information on a good TV transmitter. We suggest converting an ART-26. Another idea would be to convert some of the mobile f.m. radio gear around. We have not tried this yet, however, I believe some of the fellows in the Chicago area have tried the conversion with good results. Anyone have some ideas to add?

Ben, K2HUD has a TV beacon on 440 mc pointed toward New York City from his QTH in Clifton, New Jersey. Gear consists of Vidicon camera, ART-26 transmitter running 50 watts and 16 element collinear. Receiving equipment is also on hand. We will have more on this next month with exact times, although Ben mentioned that he will probably be on every week-day evening.

Alan, KØJFV located in Rochester, Minnesota is very interested in microwave experimenting. He is particularly interested in the 5700 mc band, and would appreciate correspondence from other amateurs operating in this range.

UHF Contest

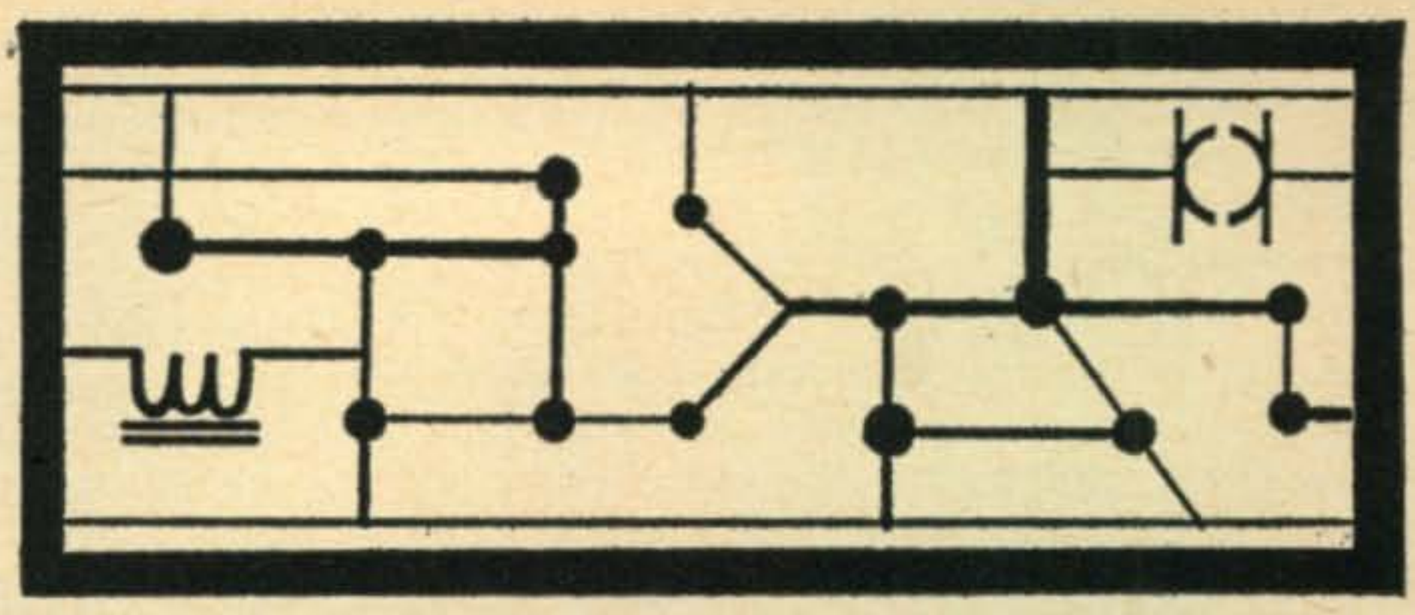
Well not really, but the *CQ* Summer V.H.F. Contest comes pretty close. It is a single operator single band contest. This means that you will be competing only with stations on the band you operate. Judging by previous u.h.f. response, anyone who turns on an APX-6 and makes one or two contacts has a good chance to win the 1296 award for his state, that is, if he sends in his log. Similar situations exist on the lower u.h.f. bands. This is a fine opportunity to collect some nice wallpaper. Remember you will only be competing with stations on the band you operate. Why not give this contest a try. There is nothing to lose, and who knows, you might even find some competition!

73, Allen, K2UYH

Remember...

All mail going directly to the *CQ* offices should bear our new address: 14 Vanderventer Ave., Port Washington, L. I., N. Y.

RTTY



BYRON H. KRETZMAN*, W2JTP

RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc on h.f.

80 meters	3620 kc
40 meters	7040 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.60 mc
2 meters	146.70 mc

THE Old Man often groaned and moaned about the lousy signals being emitted in the old days. He should hear 'em now! We radioteletypers like to think that we are not "appliance operators," but give a *careful* look (with a 'scope) at some of the f.s.k. signals on the air today. Ugh! Have we, as one old timer recently suggested, been so busy playing with converters, searching ever for the "best" TU, that we have neglected to pay attention to the fine details of properly keying a transmitter with that machine? The world's best and most esoteric dual-diversity TU can't make good copy from some of the putrid signals on the air today. Seems to me the time is ripe to take a long look at the situation, right now.

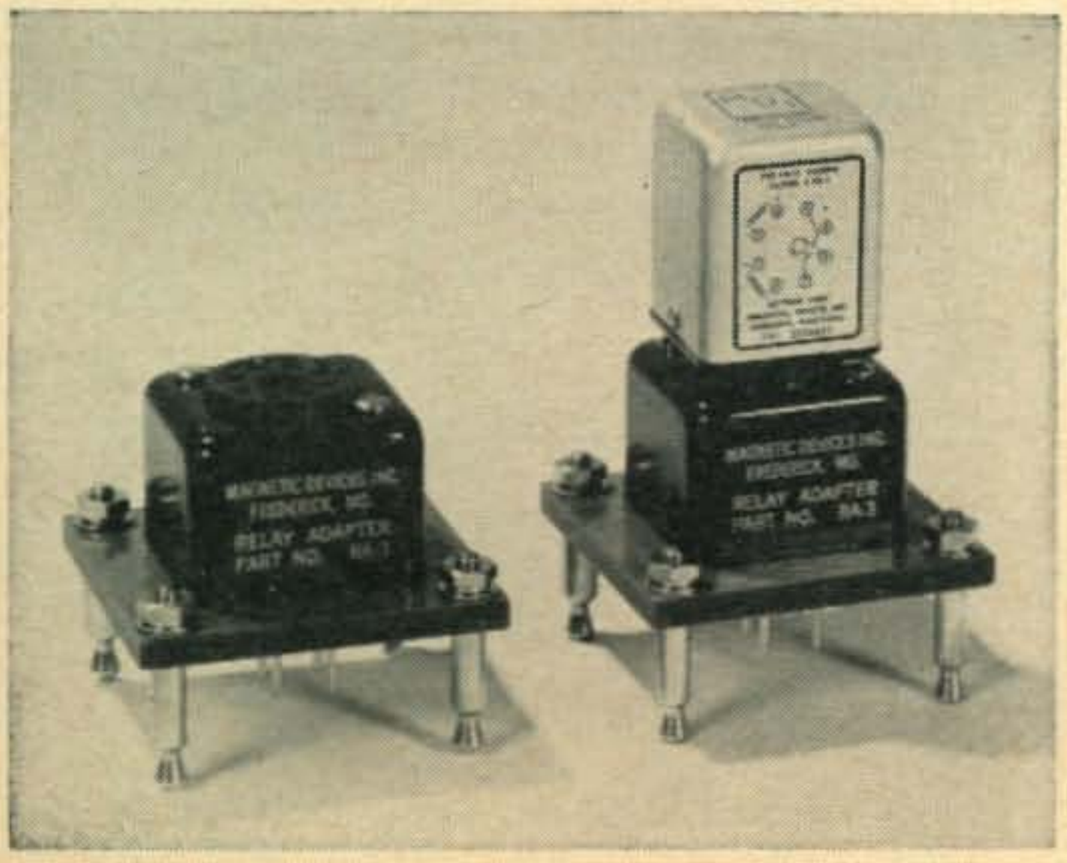
Bias Distortion

Simple bias distortion, that is unequal *mark* and *space*, can frequently be corrected for on the receiving end, either by a TU adjustment or by use of a regenerative repeater such as the TT-63/A now on the surplus market. But, it *should* be corrected at the sending end. From where does such distortion originate? Either in the machine keyboard sending mechanism, or by use of an incorrectly adjusted polar relay. The keyboard adjustment we will discuss in a moment. The polar relay adjustment is really simple and has been covered here many times in the past. (*The New RTTY Handbook*, page 71) It is *not* recommended that the machine range finder be played with while receiving signals by radio. The range finder should be set up on a local loop, then left alone. (*The New RTTY Handbook*, pages 15, 19, 36, 51.)

Fortuitous Distortion

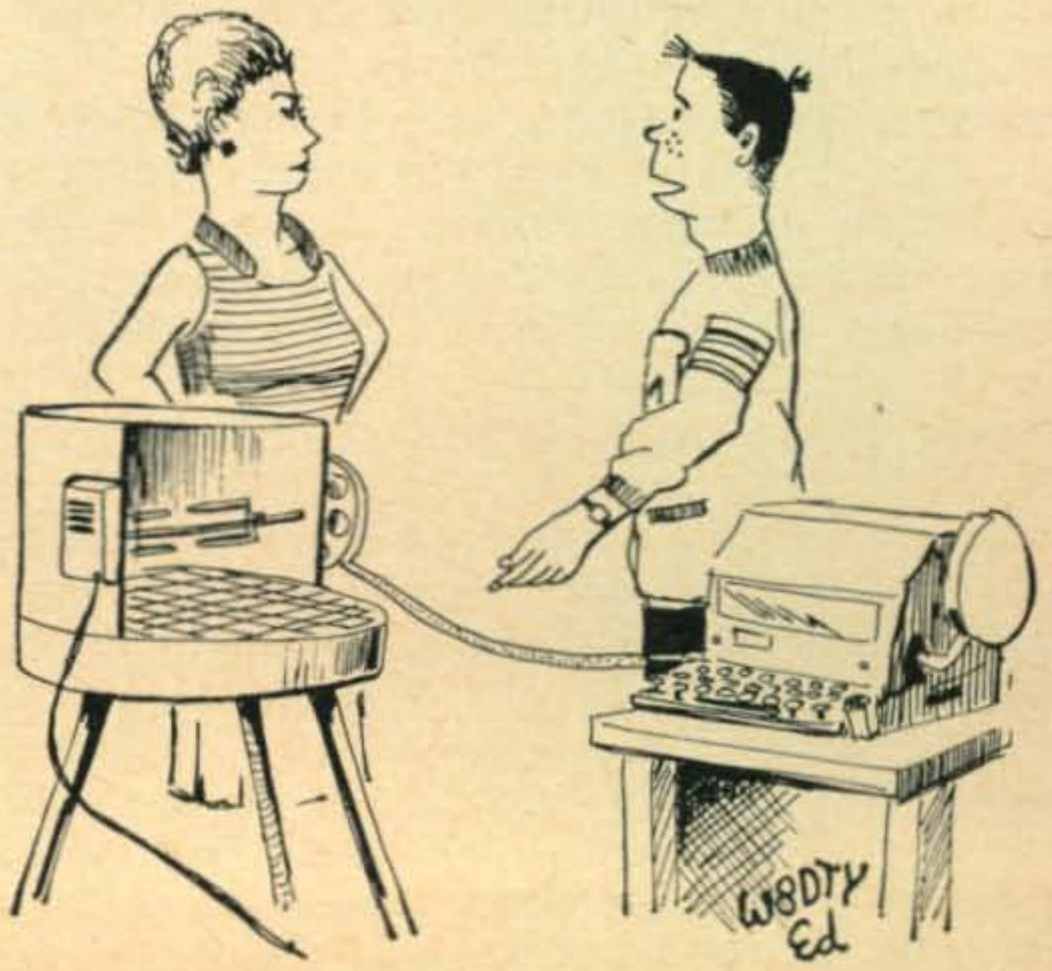
Errors from this type of distortion, where originating in the keyboard, are frequently

*431 Woodbury Road, Huntington, N. Y. 11743



Just in case you can't find any 255-A polar relays in surplus, there is a replacement available from Magnetic Devices of Frederick, Maryland. The very compact 300-series polar relay has an octal-plug base, and their RA-3 Adapter allows direct replacement into the 255-A socket, if required.

RTTY The Hard Way...No. 33



"But gee, Mom, it works real neat as a tape winder!"

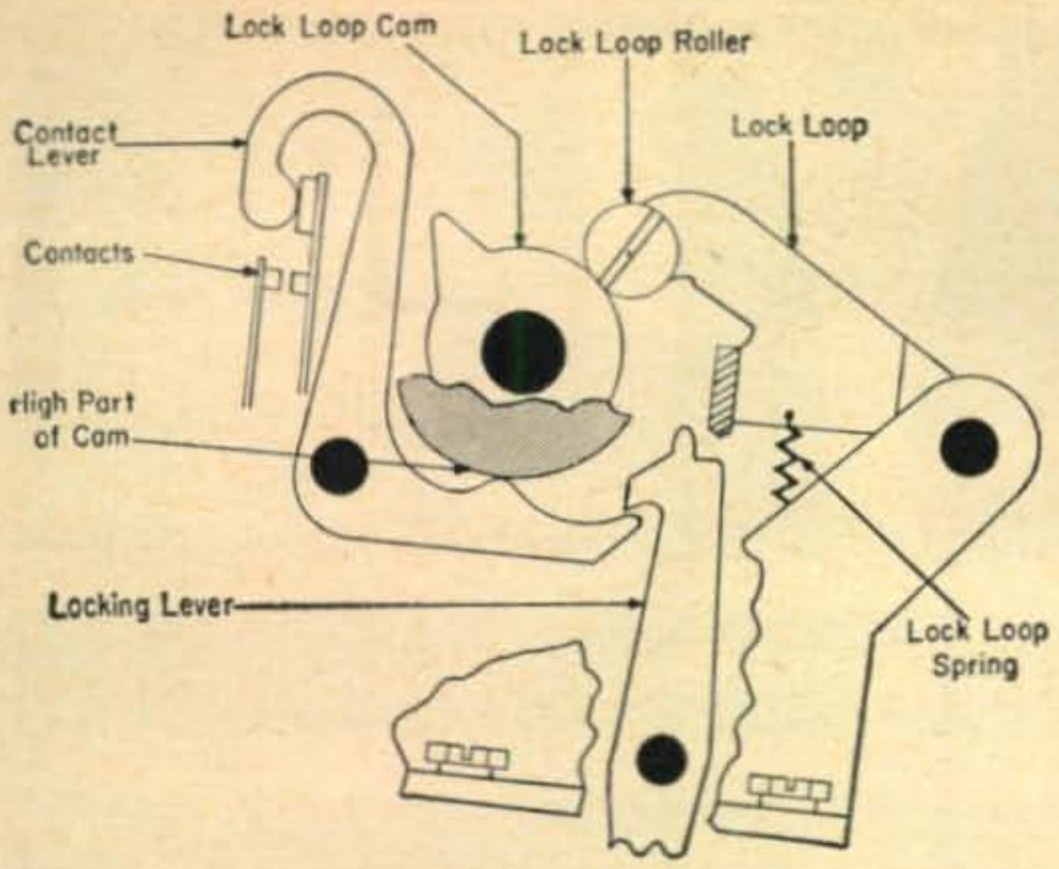


Fig. 1—Keyboard contact and locking lever mechanism of Model 15 Teletype machine.

caused by keying transients, the result of the contact mechanism being out of adjustment, and/or the result of keying the frequency shifter directly by the keyboard contacts. Yes, that is what I said. Sure, we know lots of RTTYers are scared of polar relays, so they take the easy way out, keying directly by the keyboard. The result? Keying transients. A putrid signal. So, it requires a little more effort to set up an a.f.s.k. local loop. (*The New RTTY Handbook*, Chapter 5) But remember, the polar relay has only *one* contact. Presto—no keying transients.

Keyboard Adjustment

Figure 1 identifies most of the parts in the keyboard contact mechanism of the Model 15. Tools required are an 8-ounce spring scale, a burnishing tool, and a feeler gauge. After removing the keyboard unit from the base, a good place to begin is to burnish all of the contacts. If they are badly pitted, take them down with an emery board or strip, then finish them with the burnishing tool. Next, rotate the transmitting cam sleeve (watch direction of rotation!) until the lock loop roller is resting on the low part of its cam. Hook the spring scale in the lock loop spring hole and pull in line with the spring. It should require 4 to 5 ounces to start the lock loop moving. Now, with each contact lever on the high part of its cam, there should be some clearance, not more than 0.010 inch, between the contact lever and the locking lever, when the locking lever is pressed downward by hand to make this clearance a minimum. Note that the locking levers should travel equally on either side of the lock loop blade when the letters and blank keys are alternately depressed. If an adjustment is necessary, add or remove shims between the locking lever shaft bracket and the keyboard casting to meet the first requirement; and, before tightening the bracket mounting screws, position the bracket laterally to meet the second requirement.

Each contact should have a gap of 0.020 to 0.025 inch with its contact lever on the high part of its cam. If necessary, bend the *shorter* contact springs to obtain this clearance. Check each contact lever on the low part of its cam. It should require 4½ to 5½ ounces to open the associated contact. (Use the push end of the 8 ounce scale, applied to the contact spring just above the contact point.) If an adjustment is necessary, bend the *longer* contact springs. Recheck the gap each time you do this. For keyboard contact adjustments on the Model 26, see page 43 in the *New RTTY Handbook*.

On the Bauds

W1OUG of Stamford, Conn., is trying narrow shift on 80. *(The east coast narrow shift gang is on 7140 kc Sunday mornings, Gordon!)* W1LLY of Arlington, Mass., uses a Model 26 with a Valiant, with home-brew f.s.k., and an SP-600 on 80. W1FGL of Falmouth, Mass., got up a new pole for his 80 meter antenna. W1ZQM of Somerville, Mass., got his rudder repaired. WA2HWJ of Huntington, Long Island, built a 'scope to go with his Twin City TU as a tuning indicator. W2GWL of Port Jefferson, L. I., is still using a Model 12 on 20 meters. W2IDX of Westbury, L. I., works 20. K2GQT of Asbury Park, N.J., just acquired a Klienschmidt AN/GGC-20 to go with his W2JAV TU.

K3ASI of Cambridge Springs, Pa., has two Model 15's (without keyboards!) and has built the W2JAV Terminal Unit. *(Anybody got a keyboard for Dave?)* K3AGG, W3CSG, and W3AVV of Carbondale, Pa., are building Twin City TU's. Joe, K3AGG, has a Klienschmidt TT-4G. K3JSX of Sunbury, Pa., works 80 meters. Have you copied the "Chamber of Commerce" spiel of W4AIS? ! W5GQV of Galveston, Texas, has a Model 15 and is building a W2JAV transistor TU.

W6VPC of Oakland, Calif., has a *new* Model 15 for sale. NCARTS, Inc., has elected W6ZVV President, W6VPC Vice President, W6PHS Secretary-treasurer; and, W6MTJ and K6MTX Directors. April *RTTY*, the monthly bulletin of the RTTY Society of So. Calif. ($3 per year via W6AEE), describes the TT-63A regenerative repeater. W7EJD of Seattle, Wash., has a pair of Model 26's for sale. Fred also has for sale a 250 watt (output) low-band (33-40 mc) f.m. base station for sale. *(Somebody grab it, quick, for 52.60)* W7NSU/K7NNG of Walla Walla, Wash., has a Model 26 now and has finished a TU. W7VKO of Phoenix, Ariz., heard working W6AEE and W4MGT on 20 on a Sunday afternoon.

W8GG of South Haven, Mich., now has a Model 19. K9AWV of Champaign, Ill., would like to know how to f.s.k. his new SR-160 *(Contact Fritz Franke at Hallicrafters, Don.)* K9UIM of Lebanon, Ill., is looking for a CV-89/URA-8A converter. K9HXX and K9BEF of Sterling, Ill., are on 80 with Model 14's. WØRMW of Topeka, Kansas, is looking for commercial 60 w.p.m. test signals. *(Try the Weather Bureau, Miami, on 14,395 kc, Ray.)* KØEQH of Minneapolis, Minn., now has a Model 15 and has started the "Hi-Lo" keyer from April *CQ*.

[*Continued on page 100*]

YL

LOUISA B. SANDO*, W5RZJ

CONGRATULATIONS to the top scorers in YLRL's 1964 YL/OM Contest. YLRL V.P. W6QYL, who checked the logs, commented that most of them were easy to check. She adds that many of the OMs said they'd like to have an idea of where to find the YLs, especially on c.w. Martha would appreciate your comments on setting some frequencies near which the YLs might operate—just a postcard to her will do. W6QYL also would like your ideas on a separate YL/OM contest on v.h.f.

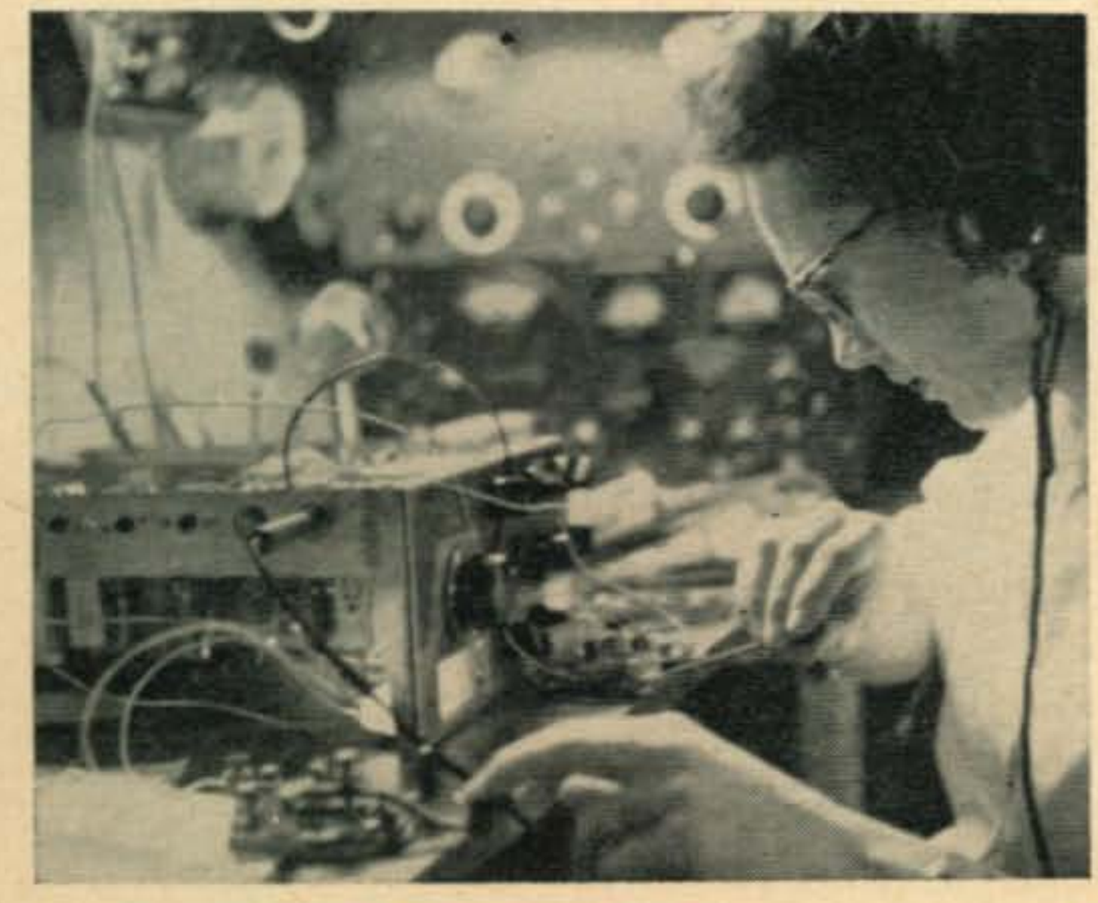
Limited space precludes listing all entries, but here are the top scores in each category and the high scores for each district.

YLRL A.P. Top Scorers

Belatedly (just no space sooner), some notes on top scorers in YLRL's 24th Anniversary Party (see A.P. results March *CQ*). KØIKL, Joyce, who made a clean sweep of the three top awards—1st c.w., 1st phone and Corcoran Plaque—has been written up in these pages before.

As so often happens, it was her OM's (Pete, WA6MWG) complete absorption in ham radio that inspired Jessie Billon to join him and she came up with her license, WA6OET, three years ago. Both are active on 20, and 15 when open,

*4417 Eleventh St., N.W., Albuquerque, New Mexico 87107.



WA4FJF, Ellen, finds trouble-shooting on gear as much fun as operating. She earned 2nd high score on phone in YLRLs' 24th A.P.

WA6OET, Jessie, who is very active on c.w. and also s.s.b., earned second high score on c.w. in YLRL's 24th Anniversary Party. She also placed second on phone in the 1964 YL/OM Contest.

and both work c.w. primarily, though Jessie also is very active on s.s.b. with the YL International SSB System. Jessie earned 2nd high score on c.w. in YLRL's 24th A.P. She holds DXCC, Al-Op, CHC (100 awards), member of CHC Chaps. 4 and 19, LAYLRC, etc.

Jessie reports many wonderful things have happened to them "since ham radio," from exchanging children for several weeks with WA2-NAY-NAZ, to sponsoring two Korean YL hams, to spending a couple of months in KH6-land. But the "hub" around which all their hamming activities revolve is the daily sked Jessie started as a Novice with KH6BIH and still maintains. Pete and Jessie have three harmonics, Shari, 17, Melissa, 12, and 10-yr. old Chip. Jessie is active with a Mariner Troop in Girl Scouts, is on leave from her Parent Education classes (working with mothers and pre-school children), and still retains a deep interest in the bacteriological research she did for several years while on the staff at Stanford.

K1UOR, Doris Young, says she used to pester the life out of OM K1WNE and Bob, Jr., K1-NWF, as to what they were saying on c.w., so they told her if she was so "nosy" to get her own ticket. She did, with Novice in April '62 and General that Sept. 10-yr. old Pam is practicing code and no doubt will soon be joining them on the air. Other family activities they enjoy to-

K1UOR, Doris, came in 3rd on c.w. in the '63 A.P., and 1st in New England on both c.w. and phone.

gether include golf, camping, swimming and boating. K1UOR spends much of her time on 20 c.w. In the '63 YLRL A.P. Doris came in 3rd in the country on c.w. and 1st in New England on both c.w. and phone.

Ellen Ackerman, WA4JF, likes nothing better than to "get something to work." She is a most active operator as well, being ANCS of the YL SSB net on Wed., co-net mgr. (with OM Dick, WA4FIJ) of W. Fla. Phone Net, ANCS for FAST Net, asst. RACES R.O. for W. Fla., plus handling traffic for KC4 and KZ5-land. She holds some 50 awards. Ellen enjoys the YL contests and earned 2nd high score in the country on phone in the '63 YLRL A.P. She also likes club work and is secretary of Floridoras as well as treasurer of her local club.

Ellen was first licensed in '59 as WV6IUS and later operated as K1OUI. Biggest incentive to get her General was so that she could talk to her OM operating maritime mobile on Navy ships (he's now on shore duty). Ellen and Dick have two jr. ops, Mark and Karen, aged 8 and 6.

With the Clubs

"The Only Operator YL Club," (TOO YL Club) was formed recently for any YLs whose OMs are not radio amateurs. President is KØRGU, Tillie, and secy-treas. is K7ADI, Ruth. Membership is $1 plus 3 s.a.s.e. the first year; 50¢ and 3 s.a.s.e. thereafter; DX members send IRC only. For further details send s.a.s.e. to K7ADI, 7826 N. Chautauqua Blvd., Portland, Ore., 97217. The group is offering a TOO YL certificate for 5 active member contacts by U.S., all others 3, after Jan. 1, '64. Send certified list of log entries and 50¢ U.S.; all others 4 IRC to K7ADI.

The KH6YL Club offers a certificate for working 4 members U.S.A. (and Hawaii); DX stations work 3 KH6YLs. Contacts must be confirmed and worked after June '58. Custodian: KH6AFL, Louise, 4825 Kahala Ave., Honolulu, Hawaii.

The following officers have been elected by the Loaded Clothes Line YL Net: Pres. & NCS, WØESD, Estelle; V.P., KØEVG, Pat; secy, W7GGV, Helen; treas., KØWZN, Annabelle; P/C, K7WVT, Phyllis.

The WRONE Week contest was won by K1MGP, Frances, who will receive 100 "Miss Wrone" QSLs.

33, W5RZJ

1964 YL/OM Contest Results

	Contacts	Section	Score
YL PHONE			
KØEPE, Martha E. Wessel	1101	90	99,090
WA6OET, Jessie W. Billon	613	82	50,266
WA9ENB, Frankye Prigg	531	86	45,666
OM PHONE			
K5MDX, David L. Thompson	95	45	5,343.75*
K4VFY, Mike Kirby	79	38	3,752.50*
K1NWE, Robert Young	52	31	2,015.00*
YL CW			
W3CUL, Mae Burke	425	69	36,656.25*
KH6BTX, Gladys T. Stickle	382	80	30,480
K8ONV, Sally Mary Ryden	367	82	30,194
OM CW			
W4CHK, Frederick Fraley } tied	72	39	3,510*
W5WZQ, David R. Blaschke }	72	39	3,510*
K6CJF, William M. Marriott	58	38	2,755.00*
W9LNQ, A. R. Truhlar	61	36	2,745.00*

Top District Scores

YL PHONE		K8ONV	30,194
K1LCI*	13,895.50	W9KSE*	28,760
K2JYZ	3,250	KØZSQ	18,880
W3VNN	18,119.75	KH6BTX	30,480
K4RNS	28,060	VE3EZI	26,492
K5FXX	18,240	VE6ABV*	14,918.75
WA6OET	50,266	VE7BBB*	4,250
K7SKR*	28,600	PY2SO	345
K8ONV	32,487	VK3KS*	1,063
WA9ENB*	45,666	DJ9SB*	1,820
KØEPE	99,090	OH5RZ	375
VE3BII	472.50	G3ORU*	292.50
OM PHONE		**OM CW**	
K1NWE*	2,015	W1PYM	2,457
WA2QHQ*	1,121.50	K2PXX*	2,053.75
K3TOQ*	1,885	K3NEZ*	1,267.50
K4VFY*	3,752.50	W4CHK*	3,510
K5MDX*	5,343.75	W5WZQ*	3,510
K6CJF*	1,235	K6CJF*	2,755
W7NKK	1,620	W7ULC*	1,747
W8TN	902	K8KFP	2,625
K9AKF*	1,552.50	W9LNQ*	2,745
WØBTD*	1,332.50	WØGWT*	1,920
VE1AFP*	275	W7UXP/KH6*	101.25
VE3EVK*	66	XE1FE*	400
VE4ZX*	101.25	JA2CKS	25
VE7AKB*	825	TF3AB	20
KP4RK	264	VE1AE*	641.25
G3NFV*	80	VE2AQO*	1,592.50
YV5BPG	154	VE3DXD*	1,772.50
PAØFAB	90	VE4ZX	1,069
K3ICK/VO1	204	VE6UP	1,518
SM7CIR/MM*	11.25	VE7BDJ	1,271
YL CW		HK7ZT*	625
K1UOR	24,427.50	G3NFV*	52.50
W2EBW	19,363	IT1AGA*	215
W3CUL*	36,656.25	KP4RK	1,881
WA4BVF	18,520	PJ2AE*	300
K5FXX	21,775	PY2CQ	1
WA6OET	31,450	SP6FZ	143
W7HXE	17,360	OH2OD*	1.25

*Denotes low-power multiplier.

Remember...

All mail going directly to the *CQ* offices should bear our new address: 14 Vanderventer Ave., Port Washington, L. I., N. Y.

'6BLZ Special [*from page 55*]

The variable oscillator, tuned with the HRO dial, should have about 1.2 to 2 volts output into the 6BE6 mixer grid. This oscillator signal voltage is mixed with the 4.5 kc band pass signal and the 6BE6 output is fed to the mechanical filters. The v.f.o. frequency spread can be changed by experimenting with the value of 160 mmf silver mica capacitor in series with the tuning capacitor.

The HRO dial is the NPW-O with a 250 mmf capacitor and can be obtained from National Radio in Melrose 76, Mass. The PW-O unit can be used with the variable to the right as shown in the photographs.

The HRO dial can be disassembled and the inner plate that contains the numbers removed from the assembly. It may then be faced off on a lathe and repainted white. When reassembled the new calibration may be made directly in frequency by writing in the numbers through the openings. This is recommended for brave souls only.

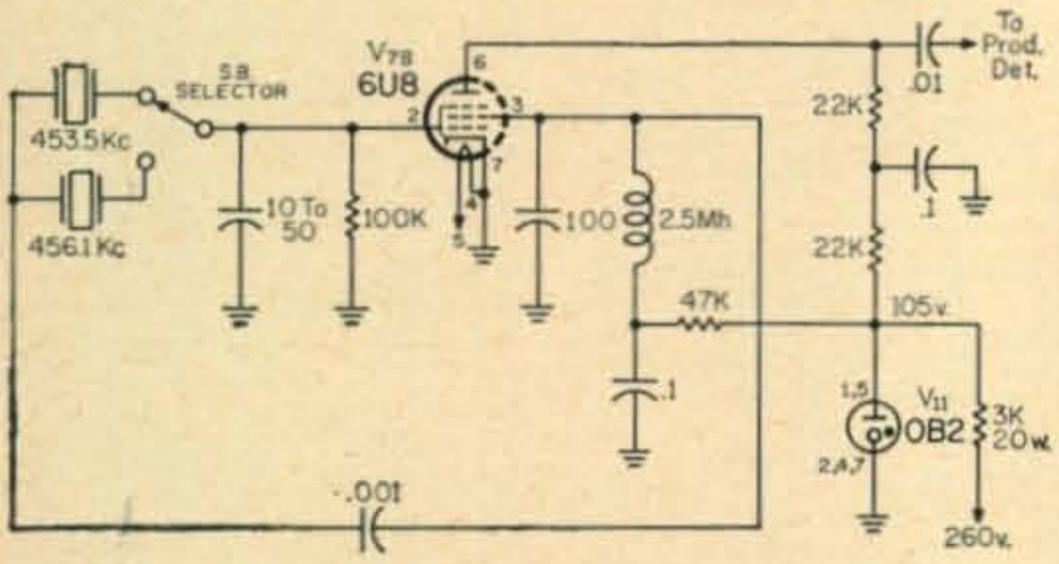


Fig. 2—Circuit of a crystal controlled b.f.o. that can be used to replace the variable b.f.o. shown in fig. 1. This circuit permits the use of inexpensive low frequency surplus crystals.

Oscillation

One of the big problems in any homebrewed receiver is oscillation. Of course, it showed up in this one too, but was cured. Some of the cures are outlined below so that should the problem arise you can go further in one of the directions. First, the grid return resistor (75K) from pin 6 of the 6J6 may be lowered to reduce oscillation as a smaller value will load down the r.f. plate circuit thus reducing the tendency for the r.f. stage to oscillate.

The 130 mmf capacitor across the input of the mechanical filters may be shunted with a 22K resistor if oscillation occurs when the capacitor is peaked. As described previously, a variable capacitor is used to determine the optimum capacitor value.

Be sure, also, that the screen grid of the 6BZ6 r.f. amplifier has no more than 100 volts on it. If necessary adjust the value of the dropping resistor.

Two resistors, 33K each, are placed in series with the control grids of the two r.f. amplifiers to suppress any tendency towards oscillation in these stages.

It is also desirable to place 0.01 disc ceramic capacitors across the filaments of the v.f.o. and b.f.o. stages to prevent these signals from running along the filament lines. The usual practice of running long audio leads only with shielded wire should also be observed.

Calibrator

The calibrator uses a 3.5 mc crystal for the band edges but the usual 100 kc crystal can be (used or both with a selector switch). No coupling is shown between the calibrator and antenna circuit. If the pickup is not great enough, connect a short piece of hook up wire to the plate of V_{6B} to increase the signal radiation.

Crystal Controlled B.F.O.

At first, the use of a crystal controlled b.f.o. was not considered because of the high costs of low frequency crystals. After giving it some thought the circuit shown in fig. 2 was developed. Its outstanding advantage is that it will operate with low frequency surplus crystals which are available for about 50¢ each.

If the crystal controlled b.f.o. is to be built, the following changes are necessary: Replace the 12AU7, V_7, with a 6U8 using the pentode section for the crystal oscillator and the triode section for the first audio. The 8K 10 watt dropping resistor for the 0B2 has to be changed to 3K, 20 watts, and the power for V_{7B} is now taken from the 105 volt regulated line. Replace the B.F.O. PITCH control, C_5, with a s.p.d.t. switch for sideband selection. Instead of the b.f.o. transformer, mount an octal socket for the crystals.

Should the b.f.o. tend to cut out, more capacity in the grid circuit may be required. The panel switch was wired with some RG-174/U miniature coax which provided adequate capacity. Add capacity as needed in your situation.

Another critical aspect of this circuit is the screen choke. Most circuits use a screen choke in the vicinity of 60 mh while this circuit functions normally with a 2.5 mh ferrite choke.

The Collins filters come supplied with a data sheet that indicates the exact crystal frequencies necessary for upper and lower sideband reception. These are 453.5 and 456.1 kc. Obtain a handful of Channel 45 and 46 low frequency crystals which will be around 453 and 456 kc. These crystals all vary in frequency and if you're lucky you might hit a pair on the head. If not, carefully sanding one edge of the crystal will move its frequency.

S Meter Adjustments

The "S" meter circuit was chosen to save tubes and current drain. The 5000 ohm potentiometer R_3 controls the zero setting of the meter when there is no signal or with the r.f. stage grid grounded with a clip lead. On maximum signals, R_4 is adjusted for maximum meter reading. A

fixed resistor can be used once the correct value is found. Make these adjustments with the R.F. GAIN control full on.

Conclusion

Most projects go through a de-bugging period and you may want to experiment and change the circuit. If more tubes are added it would be desirable to use the next size larger power transformer. The present circuit is operating at full capacity of the transformer now. Think twice before you change any of the circuits especially the r.f. stage. This is the most critical stage for oscillation. The i.f. stages are stable when used with the cathode resistors given and a 33K ½ watt in series with each grid. It was necessary to increase the cathode resistors to more than the values given in the tube manual because there is no tap on the i.f. transformers to lower the input grid impedance. There is more than enough gain and it maybe necessary to shunt a small value capacitor from the product detector grid to ground to prevent overload.

Remember to put a good ham band antenna on the receiver as it is a low impedance input and you will find it an inspiration to tune. It sure enabled me to get away from the QRM and have a nice QSO. I'm glad I built it! ■

1963 W.W. C.W. Contest [*from page 38*]

Phone contest we find ourselves a bit short of the 2000 goal we had set out to make this year. However this is still a 6% increase over last year so we are slowly getting there. Until somebody can prove different, and we defy anyone to do so, we still say this is the greatest DX Contest in the world. Not only in the number of entries, but also in the countries represented and the awards given out. There will be 357 sent out for this section of the contest, a total of 646 when added to the phone awards.

At this time it is also fitting that we again express our thanks to the Trophy donors whose generosity had added "Class" to our contest and given the top stations something to shoot for.

The last paragraph as usual is reserved for the members of our Committee, who have devoted so much of their time and without whose untiring help this contest would not be possible. This year we added a new member to the staff, Arnie Trossman W2DTJ, and of course the old reliables, Ben Lazarus W2JB and Andy Malashuk W1GYE. In turn, all of us are grateful to Toby Pollack for opening all the mail, answering your requests for log sheets and neatly filing all the logs in their proper order.

That's it for this year fellows, it's been a rough one. 73 for now, Frank, W1WY

C.W. Results

[*from page 44*]

Yugoslavia
(Club Stations)

YU1BCD	**126,885**	**510**	**47**	**118**
YU2AKL	52,206	313	31	82

Union of Soviet Socialistic Rep.
(Club Stations)

Estonia

UR2KAN	**28,124**	**226**	**24**	**65**

European

UA4KHW	**345,184**	**816**	**73**	**195**
UA3KWA	**232,804**	**588**	**67**	**175**
UA3KQB	**202,713**	**610**	**62**	**135**
UA6KTB	142,506	572	48	134
UA4KPA	64,629	377	31	98
UA3KFA	58,708	259	32	76
UA1KIA	45,252	308	31	77
UA3KND	44,105	302	35	83
UA3KNB	32,334	290	37	65
UW4KHW	31,824	240	31	71
UA3LO	28,536	234	21	66
UA3KYA	24,645	135	28	65
UA3KYI	18,540	217	14	46
UA3KFB	11,423	212	21	65
UA3KHA	9450	133	15	35
UA1KCU	8159	173	13	28
UA4KHA	7749	102	18	23
UA3KZO	7722	146	8	31
UA3KRO	6848	161	6	26
UA4KNA	6390	92	14	31
UA1KDJ	5600	110	13	22
UA1KAI	3252	55	8	20
UA3KBD	2550	51	10	20
UA1KDY	774	41	5	13
UA3KET	320	20	4	12

Kaliningrad

UA2KAW	**28,184**	**303**	**16**	**48**

Karelo-Finnish Rep.

UN1KAA	770	35	6	16

Latvia

UQ2KAE	**53,214**	**397**	**23**	**75**
UQ2KCC	16,006	309	15	38

Lithuania

UP2KCF	**50,512**	**336**	**25**	**87**

Ukraine

UB5KAI	**147,920**	**540**	**44**	**128**
UB5KED	127,368	448	47	136
UB5KFF	75,744	372	37	107
UB5ARTEK	22,041	155	34	59
UB5KDS	21,028	351	13	45
UB5KBA	17,499	205	14	43
UB5KHQ	2518	61	10	24
UB5KUJ	2072	45	13	24
UT5KGA	1711	57	7	22

White Russia

UC2UB	**13,280**	**285**	**9**	**31**
UC2KSA	11,764	129	18	50
UC2KAJ	3572	79	12	26
UC2KAD	3472	105	7	21

Oceania

Australia

VK5NO	**945,248**	**1199**	**86**	**185**

(VK5NO, VK5ZP)

Guam

KG6AAY	**730,598**	***048**	**89**	**153**

(K6SDR, WA6EHL)

Hawaii

KH6DSW	**52,128**	**360**	**25**	**23**

(KH6DSW, KH6BIF)

South America

Venezuela

YV5AJ	**451,605**	**944**	**58**	**107**

(Club Station)

MULTI-OPERATOR
Multi-Transmitter
North America

W3MSK	**1,304,727**	**1181**	**99**	**278**

(K3EST, W3FYS, W6HOH/3)

W6VSS	**1,288,008**	**1169**	**130**	**272**

(W6VSS, 6FAY, 6GFE, 6UED, K6EVR, 6JIC, W8BKP)

K2GL	**1,097,168**	**1013**	**111**	**265**

(K2GL, 2TXC, W1GYE, W2DTJ, 2GLM, 2IWC, W6KFV/K1ZVU

W4BVV	**744,820**	**778**	**107**	**227**

(W4BVV, WA4IVL W4NUC, W9SZR)

W3VKD	**614,433**	**664**	**97**	**230**

(W3VKD, W3AOH, W3LMM, W3UHN, K3DKD)

Asia

UA9KDP	**1,274,085**	**1356**	**94**	**251**

(UA9DN, UW9CP, UW9CK, UA9-9892)

Europe

DJ3JZ	**1,036,980**	**1343**	**97**	**218**

(DJ3JZ, DJ1BP, DL1CR, DL3AO, DL9CI)

OH1AA	**483,336**	**929**	**82**	**212**

(Club Station)

OH2AA	**297,620**	**850**	**58**	**172**

(OH2BR, 2KH, 2LP, 2SB)

4U1ITU	**55,545**	**305**	**34**	**71**

(HB9UD, DL1YJ, 4X4KK)

G3SNS	**41,030**	**339**	**26**	**84**

(G3MSV, G3OLN, G3PEO)

GW3KAB	**29,516**	**211**	**31**	**63**

(G3KAB, G3JUL, G3RYV)

SM5DKH	**28,866**	**230**	**25**	**77**

(SM5DKH, SM5BGK)

South America

CX2CO	**1,456,380**	**1718**	**93**	**197**

(CX2CO, CX7CO)

Our thanks to the following stations for sending us their logs, they were very useful for checking purposes: W1LB, W1RAN, W1RWU, K1VUT, W2AZX, W2GT, W2PEO, W2WZ, W3UHN, W4DLA, K4RQE, W9MXP, KØZBO, VE1AE, VE3AGC, VE6VO, OK1AAW, OK1ABP, OK1AHZ, OK1AIJ, OK1AMS, OK1ARN, OK1CC, OK1IJ, OK1IQ, OK1JX, OK1KHG, OK1KLX, OK1KOB, OK1TJ, OK1MG, OK1NK, OK1ZO, OK2BCB, OK2BEI, OK2BFT, OK2BFX, OK2OQ, OK2KJX, OK3KTO, OK2KZC, OK3QQ, OK3SL, OH6TM, OH5VA, OH5VD, OH8QJ/mm, F2GO, DM2ACB, DM2ADC, I1ER, LJ2S, LA5S, LA7H, SM3VE, SM5DXE, SM7MS, SM7QY, VK3QV, VK5KQ, ZL3IS, YO4-2526.

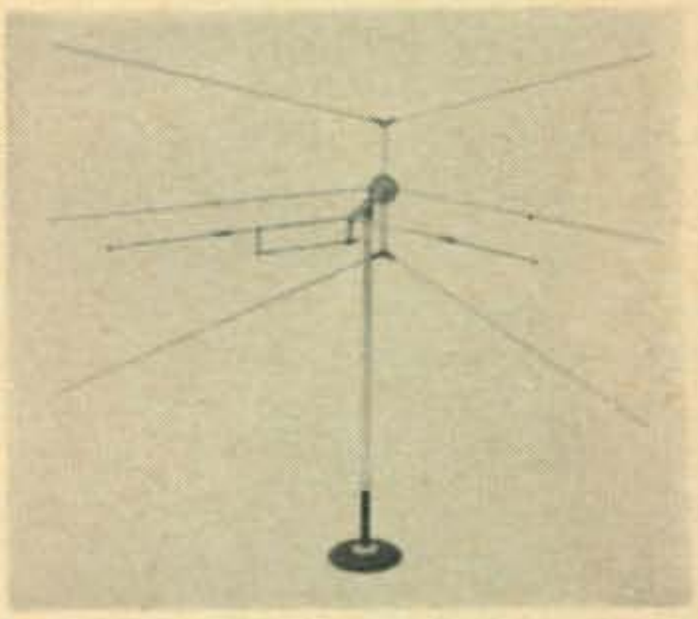
New Amateur Products

Simon Sideband Converter

For the h.f. operator looking to try his hand at v.h.f. or for the dyed in the wool v.h.f.er, the Simon Sideband SSB 6TRC transmitting converter is an interesting new product. It is built to commercial standards and runs 175 watts p.e.p. to an 8117 final. No external swamping is needed. An unconditional money-back guarantee is provided which should quell any fears about buying a new manufacturer's product. Even the color scheme is aimed to please, with a choice of either grey and white or two-tone grey. The SSB 6TRC is priced at $289.50 f.o.b. Oak Ridge, New Jersey. For further information circle A on page 110.

Coveya 6 Meter Antenna

One of the wierdest looking v.h.f. antennas to come along in quite a while is the New-Tronics "Coveya-6." The antenna is of a conical-type design with a gamma matched driven element. The Coveya should make quite a hit with the city dweller since it closely resembles an overgrown TV conical. It should blend easily into many a rooftop forest. But appearance is not the main feature. The performance alone makes the Coveya a desirable hunk of aluminum, with a 10 db forward gain and 25 db front-to-back ratio. The pattern is cardioid in shape giving good rejection of signals to the sides and rear. S.w.r. is 1.1 to 1 at resonance and less than 2 to 1 over a 1 mc bandwidth. The Coveya-6 is priced at $39.95. For more information circle B on page 110.



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Announcements [*from page 20*]

Credit Where Due

"A Coaxial Line Amplifier for 50 Mc" by W4GJO in the May issue has received excellent response and many of the letters noted the fine photo work. Credit for this goes to Joseph Steinmetz, W4YI, a well known commercial photographer.

Correction

On page 31, April *CQ*, the last part of equation 11 should read: (d.c. plate voltage) ÷ (27 × d.c. plate current) The last part of equation 12 would then be: (37 × d.c. plate voltage) ÷ (d.c. plate milliamperes).

On page 37, May *CQ* at the upper left hand corner, we erroneously give the log of 3 as 0.60. It should actually be 0.48.

Satellite Tracking [*from page 56*]

Next, remove the mounting bracket from the Alliance rotor, and replace it with the bracket that is furnished wtih the "J-Beam." Two holes must be drilled in this bracket in order to match up with the bolts on the Alliance rotor. Then, slip the short horizontal stacking mast, which comes with the beam, through the Alliance rotor. After centering the rotor on the mast, bolt it down. This in turn is U-bolted to the beam. Finally, obtain from your junk pile a short mast, two or three feet, and secure it to the bracket mounted on the Alliance rotor. The array is now carried or hoisted to the mounting place and is light enough to be handled by one person.

Operation

Only ¼ of the indicator dial is used on the elevation rotor. I set mine so that "East" was zero degrees elevation, and eight notches to the "South" was 80 degrees elevation. No more than 80 degrees is possible because of the physical characteristics of the beam, which can be seen in the illustrations. Besides, elevation to 90 degrees is unnecessary because it is almost impossible to track an overhead pass.

This—easy to put up—tracking system is ideal for Oscar III and future satellites. What's more, the array horrifies your neighbors and impresses fellow amateurs. ■

One Step Short [*from page 52*]

of radio and electronics. Here in this crude device he held the basic instrument for rectification and detection of alternating current waves; it was the acorn from which all subsequent electronic tube developments would grow; it was the seed that would generate hundreds of radio and electronic inventions.

To Edison puzzling over this discovery, no practical or immediate benefit was apparent. He placed the 'queer' lamp on the shelf, duly noted the experiment in one of his voluminous laboratory notebooks and in Nov. 1883 made application for a patent, which when issued as No. 307,031 became known as the "Edison effect" patent. The inventor turned his back on this phenomenon, his one unique electrical discovery and never returned to it; Edison had turned away from a 'golden nugget'; potentially the richest find ever unearthed by one man in the field of electrical invention.

[*To be continued*]

Ham Radio Tomorrow [*from page 50*]

in these discussions.

The ARRL, being a member of the U.S. Delegation, agreed to this concept. The preservation of the status-quo in the radio spectrum between 3 mc and 30 mc would, of course, retain all existing bands for the radio amateur. League officials were active in attempting to present the U.S. positions to other amateur radio societies. ARRL representatives attended I.A.R.U. meetings in Italy, Germany and Mexico to outline the U.S. amateur viewpoint and to urge other radio amateur societies to engage in negotiations with their own governments to seek favorable treatment of amateur frequency allocations.

Geneva, 1959

Finally, by early 1959 the United States position for the Conference had been hammered out in all details. This position was contained in an official State Department document as instructions to the Delegation, and each member of the Delegation bore the responsibility of supporting the position. The U.S. Delegation to the Conference consisted of approximately 100 people; 30 government officials, 50 industry consultants and advisors, and a clerical and secretarial staff of 20. Some 90 other countries attended the Conference, and the total number of delegates to the Conference numbered nearly 900.

Amateur radio was represented officially on only four government delegations. A.L. Budlong and John Huntoon of the ARRL (with their expenses paid by the League) were full-time members of the U.S. Delegation. The ARRL Canadian Director, Alex Reid (expenses also paid by the League) was a member of the Canadian Delegation. The President of the Radio Society of Great Britain was a member of the United Kingdom Delegation, and a member of the Wireless Institute of Australia was a member of the Australian Delegation.

Incidentially, two dozen members of the U.S. Delegation were radio amateurs or former radio amateurs, and there were at least an additional three dozen radio amateurs among the other delegations.

Finally, a six-man team of European radio amateurs represented the International Amateur Radio Union at the Conference.

1959 Conference Proposals

At this epic Administrative Radio Conference which was in session from mid-August through December, 1959, various proposals by governments were put forth to reduce the spectrum space occupied by the Amateur Radio Service. If all these proposals had been approved by the Conference, our h.f. amateur bands would look something like this today:

No 160 meter operation permitted

80 meters: 3500 to 3550 kc
40 meters: 7000 to 7100 kc
20 meters: 14,000 to 14,250 kc
15 meters: 21,000 to 21,400 kc
10 meters: 28,000 to 29,000 kc

In other words, the danger existed that the Amateur Radio Service could possibly loose over one-half of its high frequency bands!

The service that created the greatest pressure in the h.f. bands was the International Broadcasting Service. Regardless of the radio amateur's less-than-charitable view of this Service and its effectness (or lack thereof), the International Broadcasting Service is a powerful force in the world and must be viewed realistically, in the light of today's political situation. The need for additional frequencies for propaganda purposes of the world's governments endangered the Amateur Radio Service, and threatened to disrupt the entire existing h.f. allocations! Extreme pressure, it seemed, could and would be placed on the various other services—including the Amateur Radio Service—by the demands of the Broadcasting Service, as voiced by the various countries who wished to expand their shortwave broadcasting activities. New countries desired a "voice" of their own in the spectrum for political purposes and, in addition, wished additional frequencies in the Fixed Services bands so that their traffic did not have to pass through the existing "colonial" traffic centers over which they could exert no control. Because of the so-called priority "ladder" scheme pressure applied by one Service would be reflected to the Services below it on the "ladder" and the Amateur Radio Service, occupying a position near the "foot of the ladder" would eventually bear the brunt of the pressure! The demands of the then 20 new countries for additional Fixed and Broadcasting channels pointed to an explosive situation that seemed to eventually require some sacrifice of frequencies heretofore held by radio amateurs!

The 1959 Frequency Solution

Working under heavy pressure, the U.S. Delegation to the Conference (in a sub-committee called 5B) derived and formally suggested a frequency coordination procedure for International Broadcasting that permitted a more effective utilization of the existing channels. Most Delegations realized that if such a solution could not be made to work, the insistent demand for additional spectrum space would have participated a violent reshuffle of spectrum allocations. (Lurking in the background, too, was the fear of radio amateurs at the Conference that in all likelihood the United States Government *might* have to vote against the Amateur Radio Service in favor of additional frequency assignments for the Fixed and Broadcasting Services if it came to a "show-down").

The Frequency Coordination idea was the birth of *Article Ten* of the Geneva Radio Regulations, dealing with time-sharing and pre-implementation for the high frequency broadcasting bands. As a result of this procedure, agreed upon during the heated closing days of the Conference, the pressure was removed for changing the high frequency allocations, and, for the most part, the status-quo was retained in the frequency range between 3 mc and 30 mc.[4]

Riding along on the shirt-tails of the victory for the status-quo was amateur radio. When the Conference had decided to accept the Article Ten procedure for broadcasting and preservation of the status-quo, the threat to the high frequency amateur bands ceased. Except for a partial loss of 50 kc to be shared with Broadcasting in the 40 meter band in some areas of the world, the Amateur Radio Service came out of the Conference with the same high frequency allocations it had before the Conference started. It is certainly ironic that a solution to the "broadcasting problem" led to a victory for amateur radio!

1959 In Retrospect

It seems obvious, viewing the situation in retrospect that the Amateur Radio Service was extremely lucky in 1959! High frequency broadcasting is a powerful political entity in many countries, and the Fixed Services represent the backbone of military and economic communication of the world. Truly, the radio spectrum must be viewed as a limited, but vital natural resource of the telecommunication world! Amateur radio—as we know it today—barely squeaked through the 1959 Administrative Radio Conference, threatened by forces over which it could exert little control: a Conference at which only 20 new countries were pressuring for additional channels for Fixed and Broadcasting Services. Today, over 50 new countries are represented among the 120 countries at the conference table! All look forward to possible expansion of these important Services and there doesn't seem to be enough spectrum space to go around! It seems unlikely that the Amateur Radio Service will again be as lucky in the future as it was in 1959. It seems doubtful if any government, including our own, will place the Amateur Radio Service higher in importance than other Services which affect safety, economy of the country, and national security. Especially so, when irresponsible voices within the ranks of the radio amateur espouse sedition!

So here is where the real problem lies! While the Article Ten procedure has been a stop-gap, the pressure for high frequency broadcasting allocations has sky-rocketed since the 1959 Conference. One can only deduce that the pressure against the Amateur Radio Service high frequency allocations will be considerably greater at the next Administrative Radio Conference than during the 1959 Conference. In addition, the importance of the "Safety of Life" Services and the Fixed Services has seemingly not diminished since 1959. One must assume, therefore, that the Amateur Radio Service remains—regrettably—at the "foot of the ladder."

[4] "The Geneva Radio Conference," by Budlong and Huntoon, *QST*, March, 1960, pages 55-64.

The situation is certainly pessimistic, but moves *can* be taken to strengthen the position of the Amateur Radio Service. Fortunately, time remains in which to take action. What actions can and must be taken by individual radio amateurs and by amateurs acting through national societies and the I.A.R.U. must be determined in the ensuing months. ■

DX [*from page 59*]

the traditional Budapest International Fair every year between May 10 and 20, holds Budapest Awards Days. Anyone fulfilling, within the given 10 days, the conditions prescribed, will be awarded the Budapest Award II as a newer certificate.

Upon issuing the Budapest Award II Certificate we shall also include a streamer bearing the inscription BIF/1964.

Starting in 1964, the Budapest Award II certificate will be available for winning. Those fulfilling the conditions again will in this case receive only a newer streamer (BIF/1965; BIF/1966, etc.) A list must be attached to the application for the Budapest Award II with the most important data of he QSOs, QSL cards to HA5 or HG5 amateurs as well as 8 IRCs. The deadline for sending in the application for the certificate is August 1 every year. The application should be sent in the following addresses: Budapest Award, Radio Club of Budapest, Budapest XIII, Dagaly u. 11/a, Hungary, or Budapest Award, C.R.C., Budapest 5, P. O. Box 214, Hungary.

Members of the radio club are: HA5KAG, KBC, KBF, KDF, KFZ, KDI, AA, AE, AN, AW, DQ, FE, FK, DA, DI, BM, HG5CQ, EG, CA, ES, EV, EW, KBC, KCC, KEB, KFZ, KEZ.

Ex stations are: HA5DD until 12/31/59, HA5AH until 6/30/62, HA5FQ/yl 12/31/62, HA5BY 12/31/62.

Antwerp DX Club

The well-known Antwerp (OSA) DX Club has announced the issuance of a new certificate, "The Benelux Award." This attractive certificate derives its name from the Belgian-Netherlands-Luxembourg Economical Union, which was founded in 1947, and is available to all licensed radio amateurs and/or shortwave listeners in the world. Rules as follows:

1. For licensed radio amateurs:

A. European: supply proof of confirmed contacts with 7 Belgian, 7 Netherlands and 2 Luxembourg stations.

B. Rest of the world: supply proof of confirmed contacts with 4 Belgian, 4 Netherlands and 2 Luxembourg stations.

C. /MM stations: same as for rest of the world.

2. For shortwave listeners (s.w.l.s): Supply proof that 7 Belgian, 7 Netherlands and 2 Luxembourg stations have been heard and confirmed.

3. Any mode of transmission and any band may be used, provided operation is in accordance with standard amateur service practice. Contacts

For further information, check number 4, on page 110

must be after January 1st, 1947. Minimum signal reports exchanged, c.w.: RST 448, phone: RS 44.

4. Contacts with Antwerp area stations solely count, provided an extra QSL card for these stations is included with the application.

A signed, dated letter must be included with the application containing: 1. A list showing stations worked or heard, date, time (GMT), freq. band, signal reports sent and received. 2. Each list must state callsign, name and full postal address of the applicant, preferably typed or else written in block capitals. 3. No QSLs (except those for the Antwerp area stations) must be included, but each application must be certified by either two other licensed amateurs, an official of a recognized radio club, or a qualified public official of a national league, with statement, that the entries listed have been seen and are in accordance with the application rules. 4. With the log excerpt, include 7 IRC, 50 Belgian francs, 4 Guilders (florins), 1 U. S. dollar or the equivalent thereof. No stamps are accepted. 5. All applications must be sent to: Benelux Award Manager, ON5AX, Antwerp (OSA) CW-DX Club, P. O. Box 331, Antwerp 1, Belgium.

JA2TH operating his very modern station in Shizuoka. All of the equipment with the exception of the receiver was built by Takashi.

QTH's and QSL Managers

CR4AD	Box 16, Praia, Cape Verde Islands.
CR6DX	via W2CTN.
CR7GF	via VE4OX.
CR8AD	Defensa Maritima, Dili, Portuguese Timor.
DL4FI	via K9YTP.
DL5AC	via K8UZA.
EA9EA	Miguel Munoz, Aragon 20, Melilla, Spanish Morocco.
ET3FF	Box 2014, Addis Ababa, Ethiopia.
ET3JF	Box 1141, Asmara, Ethiopia.
ET3PT	via W8IEB.
ET3RT	MAAG, APO 319, N.Y., N.Y.
FG7XP	Daniel Julien Esnard, Box 110, Pointe-a-Pitre, Guadeloupe.
FP8CV	via K2BLA.
FS7AA	via WA8CHU.
ex-FU8AD	now LU2AB.
FU8AG	Box 104, Santo, New Hebrides.
HK7BE	via K3EUK.
HL9TO	Warren MacDowell, Co. B 11th Engr. Bn (C) (A), APO 358, San Francisco, Calif.
HL9TS	1st Lt. O. J. Weiss, HQS. 4th Bn. 76th Arty, APO 51, San Francisco, Calif.
HZ1BF	via DJ4CJ.
HZ2AMS/ 8Z4/8Z2	via Hammarlund, Box 7388, General Post Office, N.Y., N.Y.
KAØIJ	(1959) now WA6EYZ.

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☐ HA-2, P-26 or ☐ HA-6, P-26 for $198.
☐ HA-2 or ☐ HA-6 for $149.

NAME:_____ CALL:_____

ADDRESS:_____

For further information, check number 24, on page 110

KX6DB	via WA6HRS.
K2DCX/TL8	via K2DCX.
K7VAX/KS6	Box 458, Pago Pago, American Samoa.
LU1ZC	via LU9DFB.
M1AC	via K8UZA.
OA4OG	Box 65, Lima, Peru.
PZ1CE	via K5YCP.
SVØWF	John Moss, 17 Gallias St., Rhodes, Greece.
ex-VK9AD	via VK3CX.
ex-VK9GP	via VK3AOM.
VP2AV	via W2CTN.
VP8HJ	via SM5BLA.
VS4IH	B. Shirlow, GPO, Kuching, Sarawak.
VS6EY	Vic Kershaw, 16-11 Conduit St., Hong Kong.
VS9MG	W's via WA2WUV, others direct to MSgt. R. Milton, VS1LX, 112-54 Wittering Rd., RAF Changi, Singapore 17, Malaysia.
VU2JA	via W2CTN.
ex-W2HMJ	now WA4STL, Aug Nickel, 3326 Sargeant Drive, Charlotte, N. C., 28210.
W4NXL/MM	W's only via K4MYZ, others via ZS1TZ.
W5HJ/KJ6	via K5WYY.
YS1JJG	Box 1210, San Salvador, El Salvador.
ZS6AP/Ant	via ZS6BDS.
ZS6TE	via W2PZS.
4W1B	via HB9YZ.
4W1C	via HB9AET.
5A	QSL Bureau, Box 372, Tripoli, Libya.
5A4TI	Oasis Oil Co., Box 395, Tripoli, Libya.
ex-5A5TW	Bill Williams, K4QOY, 3335 N. Dixie Hwy., Ft. Lauderdale, Fla. 33308.
5X5FS	via EI4J.
6W8CU	Pierre Goriot, Box 791, Dakar, Senegal.
7X2CT	via W2CTN.
7X3CT	via W2CTN.
9A1AC	via K8UZA.
9G1FE	Box 194, Accra, Ghana.
9Q5HD	Box 8123, Leopoldville, Rep of the Congo.

73, Urb, W2DEC

Contest Calendar [*from page 60*]

7. The final score is the total QSO points, plus the QTC points if any, multiplied by the number of countries worked on all bands.

QTC Traffic: Additional point credit can be realized by taking advantage of the QTC traffic feature.

A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to a European station.

It can only be sent from a non-European station to a European station. The general idea being that after a number of European stations have been worked, a list of these stations can be reported back during a QSO with another station. An additional one point credit can be claimed for each station reported.

1. A QTC contains the time, call and QSO number of the station being reported, *i.e.:* 1200/DL1FF/123. This means that at 1200 GMT you worked DL1FF and received his number 123.

2. Only a maximum of 10 QTCs per station per band are permitted, although several contacts with the same station are permitted in order to complete this quota. Only the original contact with any one station has QSO point value however.

3. A QSO can be reported only once and not back to the originating station, even though the contact was made on another band.

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For further information, check number 68, on page 110

4. Keep a uniform list of the QTCs sent, *i.e.:* QTC 3/5, which would indicate that this is the 3rd series of QTC sent and that 5 QSOs are being reported.

Classification: 1. Scoring will be determined on all band operation only.

2. There are both single operator and multi-operator divisions.

3. There is also a power classification; Class A up to 50 watts input, Class B up to 150 watts and Class C over 150 watts. It is therefore important that you indicate the power used.

Awards: 1. Certificates will be awarded to the highest scorer in each division, in each country and country/district as indicated under #6 in the Rules.

2. Continental leaders will be additionally honored, and 2nd and 3rd place certificates will be awarded in areas where sufficient participation warrants.

3. Contest contacts can be used for WAE certificate endorsement upon request, providing the log of the requested station has also been received.

It is strongly recommended that you use the official DARC log form. A self-addressed envelope with 1 IRC (3 for Air Mail) will get you a supply from the DARC.

Mailing deadline for your contest report is September 30th. Logs go to: Dr. H. G. Todt, DL7EN, Chlodwigstr. 5, 1 Berlin 42, Germany.

WAE Country List

CT 1, CT 2, DL/DJ/DM, EA, EA 6, EI, F, FC, G, GC, GD, GI, GM, GW, HA, HB/4U1ITU, HBØ/Liechtenstein, HV, I, IS, IT, LA, LA/Bear Island, LA/P Jan Mayen, LA/P Spitzbergen, LX, LZ, M 1, OE, OH, OK, ON, OY, OZ, PA, PX, SM, SP, SV, SV Rhodos, SV Crete, TA/European part, TF, UA/UW 1 through 6, UB/UT, UC, UN, UO, UP, UQ, UR, UA Franz Josef Land, YO, YU, ZA, ZB 1, ZB 2, 3 A, OHØ, GM Shetland Islands.

CQ Summer VHF Contest

Starts: 1 P.M. local time, August 22.
Ends: 1 P.M. local time, August 23.

Complete rules on this one can be found on page 34, this issue.

All Asia DX

Starts: 1600 GMT Saturday, August 29.
Ends: 1600 GMT Sunday, August 30.

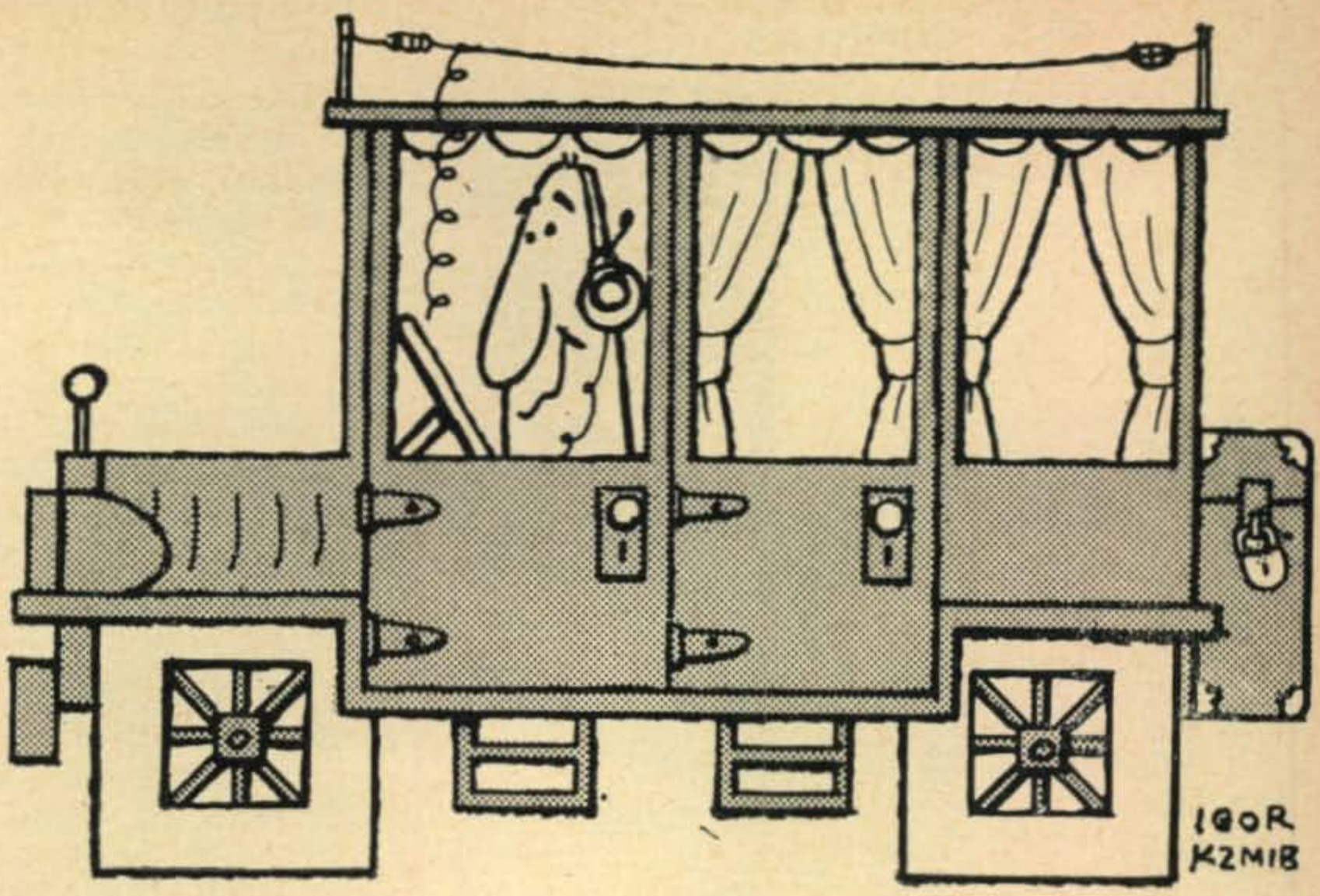
Above information is unofficial and based or details from previous years. We should have it in next month's CALENDAR.

Editors Note

Because of limited space and also a lack of official announcements for the Fall contest season, the information in this month's CALENDAR is somewhat curtailed. And besides, we still haven't gotten back to normal, that last contest really threw us for a loop. Have a good summer.

73 for now, Frank, W1WY

WHY DO THINGS THE HARD WAY?



Well, we know that there's always someone in a crowd who likes to do things the hard way. That's human nature. The same desire to learn by experience often leads to fantastic discoveries, so who are we to criticise.

One thing we do know, however, is that ham radio can and should be loads of fun. And here experimenting is a part of the hobby—an important element that's made hamming appeal to almost a ½ million Americans.

But experimenting must only go so far. It's a wise man who knows how to learn from the ground work that's already been laid by others. That's where *CQ* fits into the picture.

CQ is, and always has been, a magazine *for* active hams, produced by the efforts *of* active hams. It's the one monthly publication that serves your specific needs most closely, because there's a department for every phase of hamming activity.

So don't be fooled by the fact that *CQ* is an independent publication. We know that if you compare it to other ham magazines, you'll find that *CQ* offers you more of the information you want about your hobby. More construction articles, more columns, more meaty info. How about it? Is your *CQ* subscription up to date?

Propagation [*from page 62*]

during the last days of July. With this increase in meteor activity, considerable meteor-type ionospheric openings are likely to occur on 6 and 2 meters during the last week of July.

Very little auroral activity generally takes place during July, but some v.h.f. auroral-type ionospheric openings may occur during periods of below normal or disturbed propagation conditions. Check the "Last Minute Forecast" at the beginning of this column for the days that are forecast to be below normal or disturbed during the month.

Sunspot Cycle

The Swiss Solar Observatory reports a monthly mean sunspot number of 8 for April, 1964. This is the lowest monthly level reported since 1954. It results in a 12-month running smoothed sunspot number of 26 centered on October, 1963. A smoothed sunspot number of 14 is predicted for July, 1964, as the solar cycle continues to decline at a slow rate.

Radio Amateur Sporadic-*E* Research

One of the important reasons that amateur radio has achieved its present level of fame has been the many technical contributions made by radio amateurs in advancing the state of the art of radio communications during the past 60 or more years. It is indeed encouraging in these days of the hobbyist, the rag-chewer, the DX-chaser, etc. that some radio amateurs continue to devote most of their time in collecting data for increasing man's knowledge and understanding of the natural phenomena encountered in radio communications. A case in point is the excellent research being conducted by a husband and wife team, Morgan (K7ALE) and Dorothy (K7ALF) Monroe.

In the June, 1962 issue of *CQ* (page 37), the Monroes presented the results of a three-year radio amateur sporadic-*E* propagation research project in their report entitled "50 mc Propagation Effects; Mid-Point Report On A Six-Year DX Study."

The report, based on more than *20,000* hours of 6 meter observations made almost continuously during 1959-1961, identified daily, seasonal and sunspot trends in ionospheric propagation on this band. The report shed new light on the propagation of v.h.f. signals over considerable distances by means of ionospheric reflection. In the December, 1962 *CQ* Propagation column, the Monroes presented data which extended their study through another year. Soon to appear as a special article in *CQ* is another report by the Monroes, extending their observations through 1963. Following is a chart which compares the summarized data for 1963 with similar observations made yearly since 1959. A significant trend that can be seen in this chart is the fact that sporadic-*E* openings are occurring more frequently, at least in the southern areas

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CB-6 Conv	17	A-54H Xmtr	34	S-106 Rec	29	Ranger I	125	RVP-600 DC Sup	29	DB-23 Preamp	29
CN-144 Conv	29	AF-67 Xmtr	49	S-107 Rec	59	Ranger II	225			45 Rec/Spkr	59
CN-50 Conv	29	AF-68 Xmtr	99	S-108 Rec	79	Valiant I	199	MOSLEY		VHF-152A Conv	34
PS-1 AC Sup	7	PS 2V AC Sup	29	SX-110 Rec	89	Valiant II	299	CM-1 Rec	$119	4300 Rec	89
PV-50 Preamp	9	PMR-6 Rec	34	SX-111 Rec	149	500 (4-250A)	395	CMS-1 Spkr	9	4302 Spkr	9
TX-86 Xmtr	69	PMR-6A Rec	39	SX-117 Rec	269	500 (4-400A)	475			4350 Rec	109
		PMR-7 Rec	64	HA-10 Tuner	19	Pacemaker	149	NATIONAL		6900 Rec	175
B & W		PMR-8 Rec	89	S-118 Rec	69	Invader 2000	725	SW-54 Rec	$25		
5100 Xmtr	$119	PSA-500 AC Sup	19	S-120 Rec	44	Courier Lin	139	NC-57 Rec	49	S.B.E.	
51SB SSB Gen	119	PSR-612 DC Sup	19	SX-122 Rec	225	Thunderbolt	325	NC-66 Rec	49	SB-33 Xcvr	$299
51SB-B Gen	109	PSR-6 DC Sup	9	SX-140 Rec	69	6 N 2 Conv	39	RDF-66 D. F.	9	SB1-LA Lin	199
L-1000A Lin	149	PSR-12 DC Sup	9	SR-150 Xcvr	495	6 N 2 Xmtr	99	NC-88 Rec	59	DC Sup	39
370 SSB Slicer	24	M-1050 DC	29	P-150AC Sup	75	Mob Xmtr	25	NC-98 Rec	75		
650 SWR	24	M-1070 AC/DC	39	P-150DC Sup	79	Mob VFO	15	NC-98 Spkr	9	SWAN	
				MR-150 Rack	19			NC-109 Rec	89	SW-120 Xcvr	$149
CENTRAL ELECT.		GELOSO		FPM-200 /AC	1250	KNIGHT		NC-125 Rec	75	SW-140 Xcvr	149
10A Exciter	$59	209 Rec	$149	HA-5 VFO	54	R-55 Rec	$39	NC-155 Rec	119	SW-175 Xcvr	175
20A Exciter	125					R-100 Rec	59	NC-173 Rec	75		
QT-1 Anti-trip	9	GLOBE		HAMMARLUND		R-100A Rec	75	NC-183 Rec	119	TAPETONE	
BC-458 VFO	24	65A Xmtr	$29	HC-10 Adapt	$59	T-50 Xmtr	29	NC-183D Rec	149	XC-50 Conv	$29
BC-458/10M	39	65B Xmtr	34	HQ-100 Rec	99	T-60 Xmtr	39	NC-188 Rec	69	TC-220G	25
100V Xmtr	450	680 Xmtr	44	HQ-100C Rec	109	T-150 Xmtr	75	NC-190 Rec	149		
200V Xmtr	595	680A Xmtr	49	HQ-110 Rec	119	V-44 VFO	17	NC-270 Rec	149	TECRAFT	
600L Lin	219	LA-1 Lin	69	HQ-110C Rec	129			NC-300 Rec	169	PTR-2 AC Sup	$34
		Scout Deluxe	75	HQ-110A Rec	159	LAFAYETTE		NC-300 C6	29	CC 50 Conv	24
CLEGG		90 Xmtr	29	HQ-110AC Rec	169	HE-10 Rec	$49	NC-300 C2	29	CC5-144 Conv	24
99'er Xcvr	$99	90A Xmtr	34	HQ-120 Rec	59	HE-35A Xcvr	49	NC-303 Rec	269		
Thor VI w/AC	275	Chief Deluxe	39	HQ-129X Rec	89	HE-45 Xcvr	75	HRO-50T Rec	125	TMC	
Zeus Xmtr	425	Champ 350	225	HQ-129X Spkr	9	HE-50 Xcvr	69	HRO-60 Rec	225	GPR-90 Rec	$275
Interceptor	325	DSB-100 Xmtr	49	HQ-140X Rec	114	KT-390 Xmtr	49	NCX-3 Xcvr	269	GPR-90 Spkr	19
		755A VFO	39	HQ-145C Rec	149			NCXA Sup	79		
COLLINS				HQ-145XC Rec	169	LAKESHORE		NCXD Sup	69	UTICA	
75A-1 Rec	$169	GONSET		HQ-150 Rec	139	Sig Splitter	$19			650Xcvr/VFO	$125
75A-2 Rec	225	Comm III 2M	$169	HQ-160 Rec	189	P-400-GG Lin	99	P & H			
75A-4 Rec	375	Comm III 6M	149	HQ-170 Rec	199	Bandhopper	49	6-150 Conv	$159	WRL	
75S-1 Rec	325	GC-105	199	HQ-170C Rec	209	Phasemaster II	119	LA-400C Lin	109	SB-175 Xmtr	$49
75S-2/blanker	399	Comm IV 2M	269	HQ-180 Rec	275					Galaxie 300	225
75S-3 Rec	475	Comm IV 6M	249	HQ-180C Rec	289	MORROW		POLYTRONICS		PSA-300 Sup	75
32V-2 Xmtr	175	6M Lin (II)	89	SP-600 Rec	275	5-BR (AS-IS)	$25	62B Xcvr	$249		
32V-3 Xmtr	249	G-50 Xcvr	225	SP-600 JX-17	495	FTR (IF) (AS-IS)	20	PC-6B AC/DC	249		
32S-1 Xmtr	450	G-63 Rec	119	HX-50 Xmtr	289	MBR-5 Rec	49				
30S-1 Lin	995	G-66 Rec	59	HX-500 Xmtr	325	MB-6 Rec	59	PRECISION			
KWM-1 Xcvr	275	G-66B Rec	69			MB-560 Xmtr	49	E-200 Sig Gen	$39		
399B-1 Adapt	39	3-way Sup	24	HEATH							
KWM-1 Console	59	Thin-pak	19	HW-10 Xcvr	$169						
MP-1 Mob Sup	125	G-76 Xcvr	175	HX-11 Xmtr	29						
516E-1 12vDC	109	G-76 AC Sup	69	HX-20 Xmtr	149						
516F-1 AC Sup	75	G-76 DC Sup	59	MR-1 Rec	59						
PM-2 Sup	95	G-77 Xmtr	99	MT-1 Xmtr	44						
CC-2 Case	50	G-77A Xmtr	119	MP-1 DC Sup	29						
DL-1 Load	35	GSB-100 Xmtr	225	DX-20 Xmtr	24						
189A-2 Patch	35	Super 12	34	DX-35 Xmtr	39						
312B-3 Spkr	19	6M 12v Conv	29	DX-40 Xmtr	44						
312B-5 PTO	249			DX-100 Xmtr	99						
351D-1 Mount	39	HALLICRAFTERS		DX-100B Xmtr	149						
351D-2 Mount	79	SX-25 Rec	$49	TX-1 Xmtr	159						
		SX-28 Rec	89	SB-10 Adapt	69						
DRAKE		HT-32 Xmtr	319	HX-10 Xmtr	275						
1A Rec	$119	HT-32A Xmtr	349	HA-10 Lin	175						
2A Rec	179	HT-33A Lin	375	RX-1 Rec	149						
2AQ Combo	24	HT-33B Lin	595	HG-10 VFO	29						
2B Rec	209	SR-34AC	199	VF-1 VFO	17						
2BQ Combo	29	SR-34 AC/DC	225	Two'er	39						
2BS Spkr	12	HT-37 Xmtr	299	Six'er	34						
2AC Calib	12	HT-40 Xmtr	49	Ten'er	29						
		S-40B Rec	59	UT-1 AC Sup	19						
EICO		SX-42 Rec	119	HP-20 AC Sup	29						
147A Tracer	$19	SP-44 Scope	49	HP-23 AC Sup	39						
315 RF Gen	29	S-53A Rec	49	QF-1 Q-Mult	4						
324 RF Gen	24	SX-62 Rec	179	HD-11 Q-Mult	9						
460 Scope	49	SX-62A Rec	275	DF-3 Dir Finder	39						
720 Xmtr	49	SX-71 Rec	89								
722 VFO	34	SX-73 Rec	349	HUNTER							
723 Xmtr	34	S-76 Rec	69	Bandit 2000A	$425						
730 Mod	39	S-85 Rec	69								
944 Tester	14	SX-99 Rec	79	JOHNSON							
		SX-100 Rec	149	Adventurer	$29						
ELDICO		SX-101 Rec	159	Navigator	79						
SSB-100F	$325	SX-101 Mk III	175	Viking I	69						
SSB-1000F	225	SX-101 Mk IIIA	199	Viking II	89						

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For further information, check number 39, on page 110

of the United States, as the solar cycle declines. For establishing this trend alone, the Monroe report may prove to be a very valuable contribution to the field of radio communications.

Next month's column will discuss some interesting results of W1BB's propagation study on 160 meters.

73, George, W3ASK

USA-CA [*from page 65*]

Club for making rules changes to The Aloha State Award for working Hawaiian counties (Islands). New requirements for DX stations: Class A, work all 5 counties; Class B work 4; Class C, work 3 counties. U.S. (stateside) stations, Class A, work all 5 counties and Class B, work 4; no Class C for U.S. Contacts after 1947. Send GCR list and $1 or 10 IRC to Custodian, Harold Nakamura, KH6DIM, P.O. Box 263, Keaoakekua, Kona, Hawaii. Counties are: Hawaii, Honolulu, Kauai, Maui and Kalawae (Kalaupapa). See picture of award elsewhere this column.

New San Diego County (Calif.) Award

The San Diego County CHC Chapter #12 announces sponsorship of an award in five Classes for working San Diego County stations which includes a given number of chapter members (last figure). Class E is 25/3; Class D is 50/4; Class C is 100/5; Class B is 150/7 and Class A is 200 San Diego County contacts which includes 10 chapter #12 members AOMB/M (band/mode endorsements). Send GCR (certified) list and $1 or 10 IRC to Custodian, Betty Kuegeman, K6UTO, 8802 Glenhaven St., San Diego, California. The award shows an air picture of the new business district of San Diego with a score of sky-scrapers (for Calif.) erected within the past five years. San Diego, now with population over half million, is named the fastest growing city in the U.S. One may quickly meet requirements for working San Diego County chapter members by checking into CHC Service nets operating daily on 14075, 14230 and 14340 kc opening at 1800 GMT. All hamdom is invited to check into these nets, which when not engaged in handling emergency nature traffic, help all hunters to make whatever contacts for whatever awards purposes . . . thus combining 'service' with hobby fun.

What's Cooking Department

Most awards we list in this column are hot off the griddle even before the certificates proper are designed and printed . . . we'd rather bring the scoop news to you as it becomes available and then follow up with pictures later. While we have inclination to give new awards somewhat priority coverage, there are many of the older awards which have never been given adequate picture coverage, primarily because the sponsors have failed to provide us with sample certificates. If your club's award has not been given publicity in this column, it is quite likely your club secretary has been dragging his feet.

For further information, check number 23, on page 110

On the other hand, some awards just won't reproduce. We receive some which have been mutilated by having "SAMPLE" or "SPECIMEN" scrawled across face. These we throw in the ash can as received.

One of the major purposes of the USA-CA Program and this column by *CQ* is to provide publicity support to amateur radio clubs which use achievement programs as instruments of public relations seeking better rapport with those who control our destiny. To the extent of our capability and space available, we stand ready to serve . . . call upon us.

Old Man, K6BX

Novice [*from page 69*]

code and someone to give him the test. Can you help?

I have more than used my available space, but this has answered a large number of letters and I find that this is the easiest way to answer many that are written. Please write and let me know your desires. Thank you and 73.

Walt, W8ZCV

RTTY [*from page 79*]

HB9PL of Geneva, Switzerland, reports that about 10 to 20 Swiss stations have obtained Olivetti machines and are expected to be on the air soon. VE7DV is looking for a Central Electronics 100-V transmitter.

Comments

Do you have a question on RTTY? Well, don't hesitate, drop your RTTY Column a line. (We also appreciate receiving just news and photos of activity in *your* area.) But, if you would like a personal answer, *please* enclose a stamped, self-addressed, envelope. And please, some delay in answering is to be expected as we do have business responsibilities that occasionally interfer with our hobby!

73, Byron, W2JTP

Ham Clinic [*from page 75*]

mounted high on the outside of an apartment house. A little drop-off in signal was noted when the antenna was layed against the wall on the inside. For transmitting, the antenna will take a kw. When you write to the manufacturer for full information he will send you testimonials from many hams who have nothing but praise for the Joystick, among these will be a number from U.S. hams especially WØCJW and K5GDH. I recommend that if you do buy a Joystick that you also buy the tuner. Actually, the antenna could be used for mobile work too without much trouble. When you write Partridge tell them HAM CLINIC sent you.

SCR-274N to 10 and 20 M.—"Where can I obtain info on putting the SCR-274N on 10 and 20 meters?"

In the July 1948 issue of *CQ*.

Electronic Phone Patch—"I'd like to obtain a diagram of a phone patch which will operate

SEE Page 93 June CQ

automatically without throwing any switches and which would permit the party on the phone line to operate my transmitter vox control. Any help?"

Yes. See page 48 of the October 1960 *CQ*. This is what you (and many others) are looking for.

Thirty

This month we want to thank those considerate hams who have included postage in their communications to us.

We continue to be surprised at the number of *new* readers who write in requesting our help. Many of the answers they seek are in past issues of *CQ*. Again we say, we do our best to please you and answer as quickly as we humanly can.

72,73 and 75 Chuck

Converter Performance [*from page 35*]

by the metal chassis and case.

The power consumption of the Dryister is insignificant for continuous operation, its being no more than that needed for an electric clock.

The thought may occur to let the converter run continuously, instead of using a dryister; however, this will not necessarily be a satisfactory solution. Besides being a waste of more power than needed, such an expedient will not create sufficient warm air *under* the chassis where it is needed. ■

VHF Contest Rules [*from page 34*]

proper point and multiplier credit before submission. All logs become the property of *CQ* and cannot be returned. Be sure to retain your own station log copy for FCC purposes.

Include a signed pledge stating that all rules have been obeyed and that all logged data is accurate. This pledge is included on standard summary forms also available free from *CQ*.

SCORING: Scores will be computed by multiplying contact points × county multiplier, × hour multiplier, × power multiplier.

EXAMPLE:
100 Contacts
×10 Counties
1,000
×10 Hours
10,000
×1.25 Power Multiplier (If Used)
12,500 *Final Score*

AWARDS: Certificates will be awarded to the highest scoring station in each state on each band. Additional awards will be made in this category at the discretion of the Contest Committee. In addition, certificates will be issued highest scoring Novice stations in each state.

DISQUALIFICATION: Violation of the amateur rules, the rules of this contest, unsportsmanlike conduct, or insufficient log data will be deemed adequate cause for disqualification. Amateurs entering this contest agree to abide by the decision of the Contest Committee.

DEADLINE: All logs must be postmarked NO LATER than September 15, 1964. Logs received after this date will be used for checking purposes only. Send logs directly to:

CQ V.H.F. CONTEST COMMITTEE
14 Vanderventer Ave.
Port Washington, L.I., N.Y.

Ham Shop

Advertising Rates: Non-commercial ads, 5¢ per word including abbreviations and addresses. Commercial and organization ads, 25¢ per word. **Minimum Charge $1.00.** No ad will be printed unless accompanied by full remittance. **Closing Date:** The 10th day of the second month preceding date of publication.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchandise listed therein.

3-D QSL cards stand out everywhere! Cost a little more and show it. Details, samples, 25¢ (refundable). 3-D QSL Co., RR 1 Monson 4, Mass. 01057.

FINEST QSL's, lowest price. Samples 10¢—Rapin, Cedar Grove, Maine.

PERSONALIZE your correspondence. Your name, call, QTH neatly printed on gold gummed address labels. Set of 500 $2.00. H. J. Brown, 170 S. Benton, Denver, Colo.

QSL's? WPE's? CB's? Personalized made-to-order service. Large variety samples 25¢ (refunded). Sackers, W8DED, Holland, Michigan.

QSL's $2.50 for 100. New catalogue, samples 10¢. Longbrook Box 393-Q, Quakertown, N.J. 08868.

QSL's Samples 10¢. K. Kidd's, Rd 1, Box 254, Telford, Pa.

CREATIVE QSL CARDS free, new catalog and samples. Personal attention given. Wilkins Creative Printing. P.O. Box 787-2, Atascadero, California.

QSL's Samples free. Little Print Shop, Box 9363, Austin, Texas.

CREATE A QSL card with a "Sampler Instruction Kit" 25¢. Samco, Box 203-C, Wynantskill, N.Y. 12198.

QSL's . . . $1.90 . . . Dime . . . Filmcrafters . . . Martins Ferry, Ohio

RUBBER STAMPS for QSL Cards. Kits available. Free sample impressions. E & R Stamp Co., 50 Gerald Rd., Rantoul, Illinois.

QSLs At last! Something new in QSL cards! All orginal designs. Send 25¢ for samples. Yarsco Box 307, Yorktown Heights 2, N.Y.

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QSL's—Brownie, W3CJI—3111 Lehigh, Allentown, Pa. Catalog with samples, 25¢.

QSL's 100/$4.00 High gloss, three color. Free samples, quick service. B&R Printing, Box 8711, Orlando, Fla.

QSL's, CB, WPE samples 10¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Arizona. 85017.

QSL CARDS Largest selection-Lowest prices. Samples & catalog, 25¢. Refund or 25 extra cards with your first order. Debbeler Printing, 1309-C North 38th Street, Milwaukee, Wis. 53208.

QSL's-SWL's or what have you. You name it and we will do it for you as you wish. Expert art work at nominal cost, enough said? R. McGee, 6258-103rd St., Jacksonville, Fla. 32210.

PICTURE of yourself, home, equipment, etc., on QSL cards, made from your photograph. 250—$7.50 or 500—$10.00 postpaid. Samples free. Write to Picture Cards, 129 Copeland, LaCrosse, Wis.

QSLs SWLs XYL-OMs (Sample assortment approximately 9¾¢) covering designing, planning, printing, arranging, mailing, eye-catching comic, sedate, fantabulous. DX-attracting. Protopay, snazzy, unparagoned cards. (Wow!) Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLs free samples. Fast service. Bolles, 7701 Tisdale, Austin, Texas.

RUSPRINT QSLs—SWLs 100 2-color glossy $3 postpaid. QSO file cards $1 per 100. Rusprint Box 7507, Kansas City, MO. 64416.

QSL's 3-color glossy. 100 $4.50. Rutgers Vari-typing Service. Free Samples, Thomas Street, Riegel Ridge, Milford, N.J.

CALL CARDS Badges, decals, goodies, illustrated literature with samples 25¢. Errol Engraving Att: K1VRO, Westfield, Mass.

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1964 QSL catalogue. New Designs. 10¢. Longbrook, Box 393-Q, Quakertown, N.J.

QSL CARDS $2.50 per 100 in three colors. Samples and catalog free. Garth, Box 51C, Jutland, New Jersey.

QSL CARDS. As low as $2.50 per 100. Samples free. Radio Press, Box 24C, Pittstown, New Jersey.

TOP PRICES paid for AN/GRC-3 thru 9, GRC-26, 27 to GRC you name it. AN/URM, UPM, USM, SG-1, 2, 12, 13, any and all mil test sets. GR, HP, Meas. Corp, Boonton, ARC, Tektronix, all commercial sets, AN/ARC-27, 33, 34, 44, 52, 58, 65, etc. R-390, 389, 388, SP-600, BC-610, T-368, We pay shipping. Call, Write, Visit our store. Tech. Systems Corp. 42 W. 15th St., New York 11, N.Y. Call Ed. Charol, CH 2-1949.

TOROIDS uncased 88 mh 60¢ each or 5/$2.50. Fasold, WA6VVR, Box 34, Dixon, California.

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COMMUNICATIONS teletype, unusual surplus bargains. Free flyer, MDC, 923 W. Schiller, Phila. 40, Pa.

ANTENNA tuning unit, brand new $3.00 postpaid (cost Navy $85.00). MDC, 923 W. Schiller, Phila., 40, Pa.

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FOR SALE Complete instructions including 28 page booklet and 22" × 36" schematic for converting the ART-13 transmitter to a.m. and s.s.b. Satisfaction guaranteed. $2.50. Sam Appleton, 501 No. Maxwell St., Tulia, Texas.

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FOR SALE: G-76, SX-71, BC-459A, BC-645, ARC-5 3-4 mc Xmtr, BC-654A, A. Turo, 146-26 No. Hempstead Tpke., Flushing 55, N.Y.

FOR SALE SX-115 Receiver $350.00. Cash. Call 609-494-2518. W2FWY.

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HALLICRAFTERS SX-101A and SX-111 receivers, HT-37 transmitter, all new, write for exceptional prices. Charles W. Rogers, Manasquan, N.J.

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HQ-129X Great receiver, $89; Globe 90, w/am and improvements, $39; Globe deluxe vfo, $45. All, $160. Will Smith, K4SAY, 1003 Bluegrass, Louisville, Ky.

WANTED: AN/GRC-3 thru 10, -19, -26, etc., RT-66, -67, -68, -70; R108, R109, R125, T-125, etc. Also receivers: 51J-, SP-600-, R-388, -389, -390, etc., and ARC-27, -34, -55, -6. Test Equipment—Military: TS-, -UPM, -URM, -USM; and commercial: H.P., G.R., Tektronix, etc. we pay freight. Amber Industrial Corp., P.O. Box 2129, Newark 14, New Jersey. Sell confidently. Our 17th year.

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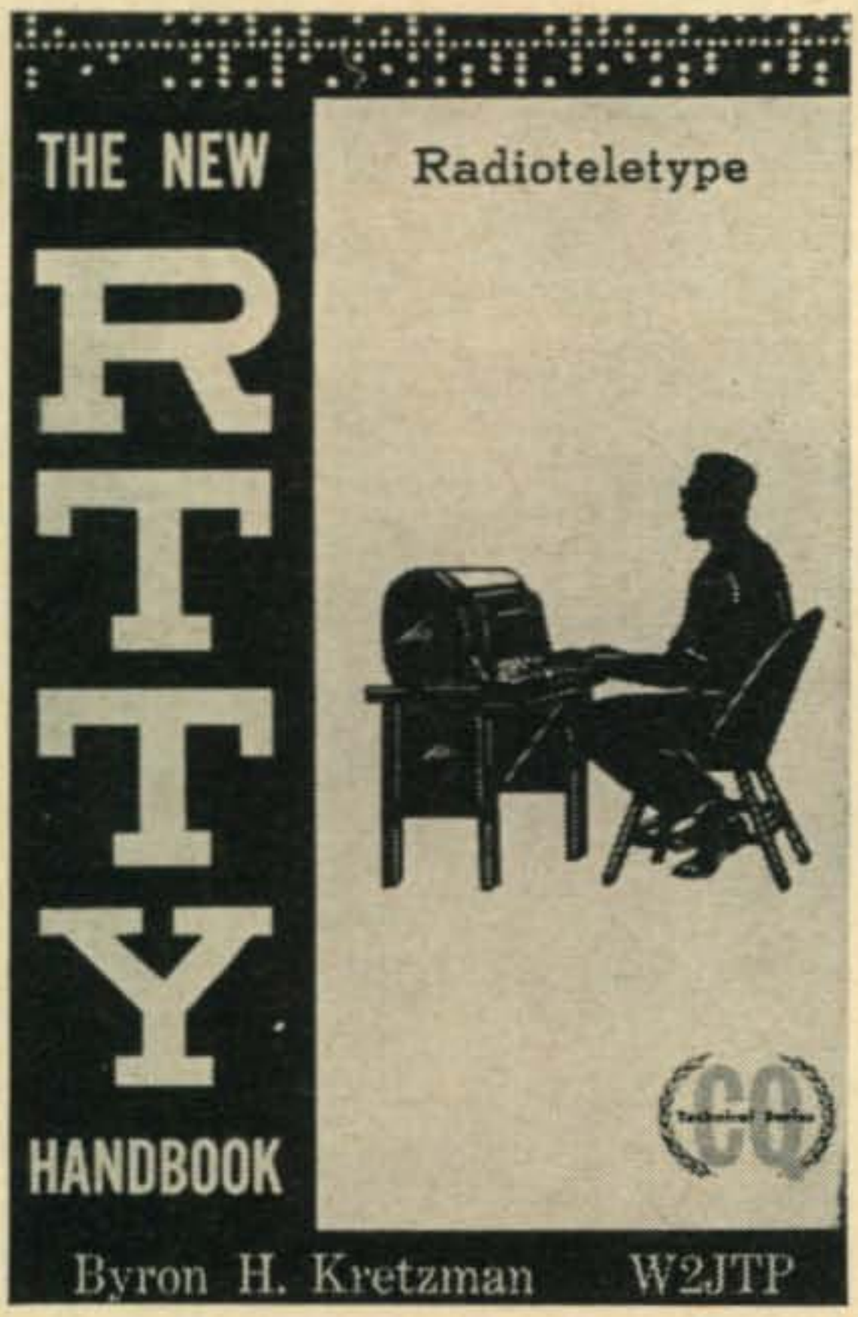

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SELL Lafayette HE-80 with speaker and crystal calibrator. Like new, must sell for expenses. Will take first bid over $99. KN1FTQ 84 Mt. Vernon St., Malden, Mass.

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KWM-2 new, 20 hours use, $850. 516F-2, $85. H. L. Dunlap, 199 Meadowbrook Dr., Marietta, Ga.

SELL AN/PRC-14 transceiver—four crystal controlled channels. Frequency 225 mc to 400 mc a.m.—1 watt output—used air-to-ground communications. Complete with power supply and crystals. $35.00 pre-paid. Also have technical manual on teletypewriter AN/FGC-25 and components. $2.00 postpaid. Al Yascavate, W3UGD, RD #1, Hunlock Creek, Pa.

HELP New ham needs any discarded equipment or usable junk. Help give me a start. No COD. WAØIHV; 2413 Golf Street, Sedalia, Missouri.

NOVICES! Will trade DX-20 50w transmitter for old battery radio and/or accessories. Write: Tom, K8VBL, 301 Sabin, Kalamazoo, Mich.

SELL Heath HX-11 xmtr—$25 and Mosley V-4-6 vertical with 80m loading coil—$15. Call or write to Larry Kraus, 147 Croydon Road, Yonkers, N.Y., 914 SP 9-4741.

COLLINS S-Line 32S-1, 75S-2 noise blanker, c.w. filter. Make offer. W5HXW, 1234 Glen Cove, Richardson, Texas.

HALLICRAFTER FPM-200 transistorized transceiver with two-vfo's. Sold new for $2650. Will sacrifice. Will send further information. WA6TLS, 7549 E. 4th Place, Downey, California.

COLLINS 75A-4 receiver. Perfect. $500. Cash. 2.1 kc filter. Tom Murphy, 7319 Raton Street, Houston, Texas, 77055, phone OV 2-3032.

COLLINS 32S-1 with power supply. Excellent condition. Various other equipments. W. J. Abbott, Box 505, Kearney, Nebr.

HIGH SCHOOL, college students . . . learn commercial radio announcing! 2,000 home-town radio stations need part-time disc jockeys, announcers, assistant play-by-play sports announcers! For books, magazines, write: Disk Jockey, Box 620-CQ, Pierre, South Dakota, 57501.

12 DB GAIN forward. 100 db front to back ratio. Our rhombic antenna is superior to any other antenna on the market. We challenge you to find an antenna on the market with as much forward gain. We do not guarantee good performace, just the best. Specifications: 2000 watts p.e.p. 600 ohms impedance, swr 1.3 to 1, low Q, easy to match. Complete with high tensil strength copper wire, insulators, and termination resistor. This is the same antenna used by telephone companies for overseas communication. Sold on a fifteen day money back guarantee. Exact frequency must be specified. Order now! 20 Meters $44.95, 15 Meters $37.95, 10 Meters $39.95. The Hilliard Laboratories, Box 2614, Macon, Georgia.

NEED SX-115 Sell-trade HT-9 100 watt am xmiter $80; with HT-18 vfo $100. SX-100 $159; NC-173 $99; new Browning LT-12 automatic shotgun $145, new 22 hp Scott outboard $249, 60w modulation xformer $8, tubes, make offer, 3B23, RK20, 100TH, 815, 829B, 832, 869, 5265, 8025. Walter Rabe, 233 No. Taylor, Oak Park, Illinois.

FOR SALE: Collins 30L-1, $375; Gonset Hybrid phone patch, $25; CE MM-2 analyzer, $60; GR impedance bridge #650, $100; GR counting meter #1500B, $75; Mosley portable antenna TT-1 including swr Bridge, $60. R. C. Littler, 640 Snowhill, Springfield, Ohio. Tel: 513-322-8722.

SELL: Link 120 watt fm Base Station. Fine for six meters $60; KWM-2, MM-1 Bandscanner, $1050. Excellent condition never mobile. FOB Dallas. W5EEY, Melton Goodwin, 11421 Fernald Ave., Dallas, Texas, 75218.

GLOBE CHIEF-90 watts phone, cw. Screen modulator, Heath vfo, WRL antenna tuner, dynamic mike. $55. Paul P. Graves, W1JJF, Northeast Harbor, Maine.

ANNOUNCING! The 30th Annual Hamfester Radio Club Hamfest and Picnic, Sunday, August 9, 1964 at Sante Fe Park, 91st and Wolf Road, Willow Springs, Illinois, near Chicago. For complete information and maps write John Chass, K9LOK, 5434 South Bishop Street, Chicago, Illinois, 60609.

WANTED Stromberg Carlson AU-35 Amplifier. Anyone with information, contact George Genrich, 19 Crescent Street, Farmington, Conn.

GOING Tranceive Ssb station for sale: HT-37 $350; S-101A $250; HT-41 $300. Late serial numbers, original cartons, manuals, excellent condition. Will ship guaranteed. WA4FEI, 311 West View Street, Harrisonburg, Virginia.

COLLINS 75A-3 receiver in A-1 shape with manual to first check for $260. W3BBV, 1375 Hill Street, York, Pa. 17405.

VIKING VALIANT Perfect condition $175; Drake 2B—all xtals and calibrator $180. Sten Gould, 460 Forest Ave., Paramus, N.J.

SX-110, $155; Webcor Regent stereo tape recorder, $185; both original factory sealed cartons; underestimated summer college expenses. W2RUK, 7 Charles St., Auburn, N.Y.

HICKOK 123 Cardmatic tube tester $100; Precise 300B 7-inch oscilloscope $50; Eico 360 sweep generator $30. V. R. Hein, 418 Gregory, Rockford, Illinois, 61108.

R55 RECEIVER w/xtal calibrator. Needs work, tubes ok $15; DX-20 new transformer & final; 3 novice xtals and key. Excellent condition $27; ARR-4, easily converted to 2 meters, 3 rf stages, 11 tube superhet. All tubes, dynamoter, schematic and conversion details. Excellent $11.00. ARC-5, 2-3.5 mc transmitter, new 1625's and CQ conversion manual. Good condition $8; Knight C11 CB tranceiver, good condition, ch. 7 xtal, $15; Heath GW-10, 12v, 4 xtals. Needs work. Tubes OK, $18. Pair C100 Walkie Talkies. Need minor parts, ch. 7 xtals $5. Wahle, WN9IFR/17WO42, Indian Hill, Bensenville, Ill.

COMMUNICATOR III Gonset six meter with six good crystals. Excellent. $150. Sixer with three good crystals $35. Heathkit reflected power meter $10. Robert Hutcheson, 705 Harding Pl., Nashville, Tennessee.

MAKE REASONABLE OFFER. Heath Apache, Mohawk and AK5 speaker, expertly wired. Send SASE for goodie list. KØWMV, Joseph Bau, 638 40th St., S.E., Cedar Rapids, Iowa, 52403.

SELL-TRADE electronic keyer. 3 mobile xmitters, 10 watts input for 10-75 and 160 meters. 75 meter mobile converter. 12v vibrapack 400v/100 ma 6 meter 15 watt xmitter. Universal supply 110v ac/12v dc—300v/100 ma. Plate transformer 4000 v ct 475 ma. Supplies 1000v 250 ma, 750v 250 ma. 160 meter mobile converter. Need grid dipper, tube tester, BC-348, I-777 tube checker, receiver. Stan, W8QKU, 2748 Meade, Detroit 12, Mich.

SWAN 12v mobile power supply $65. also Heathkit HW-12 sideband 75 meter transceiver $90, both excellent condition. Joseph Dubovy, 2890 Rouen Ave., Winter Park, Fla.

HT-40 transmitter, mint, factory wired, $75 or you make offer AR-22 rotor, 100′ cable $20, HG-10 vfo, 110 vac supply $25. Will ship. KP4BPH, 542 Carolina, Hato Rey, Puerto Rico.

75A-1—No dud. Very good condition inside and out. Best offer over $169. FOB K1NCB, 100 South Main, Unionville, Conn.

FORCED SALE: Collins kilowatt complete, perfect: KWM-2, 516F-2 312B-5, SM-2, 30S-1, extras. Practically brand new. Best offer to Prof. Weller, F&M College, Lancaster, Pa. 717-393-3621.

COLLINS 75S-3B, brand new in carton $570; 32S-1 $435; 516E-1 $150; 75A-4, excellent $425; Drake TR-3 $450; ac supply $65; dc supply, $95; RV-3 $65; Hallicrafters HT-41 linear, used 5 hours $265. May trade. W8WGA, 3451 Ridge Ave., Dayton, Ohio 4514.

WANTED SCR-274 Army type 1.3-2.1 mc xmtr, SCR-274 Army type 2.1-3.0 mc xmtr, Cardwell 410B 50 mf var. capacitor, Cardwell MR150BS 150 mf var. capacitor, RK-20/804 tubs and socket. T. W. Benbow, 2002 Ridgeway, Arlington, Texas.

813/811 MOD/PS $99; 813 linear/PS $90; Cheyenne $75; write info. Al Foskett, K1NTR, 800 Wolf Hill Road, Cheshire, Conn.

SELL: 1941 ARRL Handbook, excellent condition. New Eico grid dip meter model 710 complete $30. Two husky TV power transformers. Two rf meters, one milliameter. Two transmitting capacitors 2 mf 2000 wvdc. Tubes: 801As, 3E29, New RK20, 201As, 41, 42, 39/44s, 75s, 77s, 78s. Write: Jake Bara, W7JKP, Post Office, Greenough, Montana, 59836.

WANTED SX-71 receiver less speaker in good condition. State lowest price. Write WB6EJZ. 2224 Hawn Ave., Redding, California, 96001.

WARRIOR kw linear $175; BC-221 frequency meter with ac power supply $60, Heath Monitor Scope $40. All A-1 with manuals. WA2HSB, 5 Addoms St., Plattsburgh, N.Y.

75A-4 with three filters, slow speed dial, recent realignment, perfect condition, $425. B&W 5100 with 51SB sideband generator excellent $285. No shipping. CQ and QST 1954 through 1963, $3.00 year. K2EN A. Olson, 31 Jervis Road, Yonkers, N.Y.

SALE: Apache modified for push to talk; SB-10; Mohawk; all in perfect condition and operating. Going sideband mobile. Best offer over $400. No trades, cannot ship. Frank Travers, W3LNQ, 105 Landover Road, Bryn Mawr, Pa.

FOR SALE: Hammarlund HQ-110 receiver with automatic clock and Hammarlund S-100 speaker. Receiver contains 100 kc crystal calibrator and covers all bands, 160-6 meters. In A-1 topnotch condition. $150. Gerson May, W4HPE, 1201 Gamble Avenue, Jasper, Ala.

ANTIQUE TUBE collectors, UX-199, RCA original boxes, new no guarantee due to age, 55 on hand, $3.50 each PP. Les Rosenblatt, W7QW, 836 Whitaker Drive, Reno, Nevada.

ELIMINATE MOBILE vibrator noise. Transistorized vibrator substitute plugs directly into vibrator socket. Reduces battery drain. Same size as vibrator. 6 or 12 volts. Not a kit. Comes completely wired ready to use. For negative ground only. State make and model of transceiver. $11.95 ppd.—$5.00 deposit on all COD orders. Tel-Trol Systems 2180 Bronx Park East., Bronx, New York, 10462.

SURPLUS GOODIES ARC-1 $32.50, ARC-2 $45.00, ARC-3 transmitter $12.50, ARC-3 receiver $16.50, ARC-4 $12.50, T-23/ARC-5 vhf transmitter $12.50, R-28/ARC-5 receiver $18.50, Collins ART-13 $35.00, BC-639 vhf receiver with ac/ps $85.00, BC-221 $65.00. BC-779 Super-Pro with ac/ps $75.00, BC-348 with ac/ps $65.00, Command Receivers, 190-550 kc $12.50, 550-1500 kc $22.50, 3-6 mc $12.50, 6-9.1 mc $12.50. Command transmitters,, 3-4 mc $7.50, 4-5.3 mc $7.50, 5.3-7 mc $7.50, 7-9.1 mc $14.50. Hammarlund SP-600JX $385.00. APX-6 transponders $9.50, RBL 15 kc-600 kc vlf receiver $85.00. BC-669 with PE-110 p/s $65.00, RDO receiver with three tuning units 38-1000 mc $175. Kleinschmidt TT-119/FG page printer $250.00. TG-26A reperforator-transmitter $125.00. Satisfaction guaranteed. Slep Electronics Company, Drawer 178C, Ellenton, Florida, Phone 722-1843.

HUNDRED QSL's: $1. Samples Dime. Meininger, Jessup, Iowa.

BIG D HAMBOREE—August 15, 1964. Make plans now to attend a bigger-than-ever hamboree. Exhibits, goodies, family fun, swimming pool nearby. Pre-registration (which is $2.00) closes August 1. For details write Ed Youngblood, Dallas Amateur Radio Club, Box 30532, Dallas, Texas.

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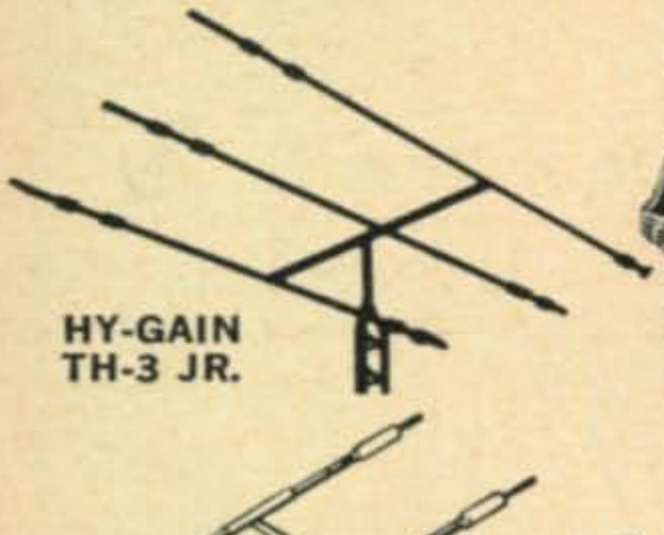

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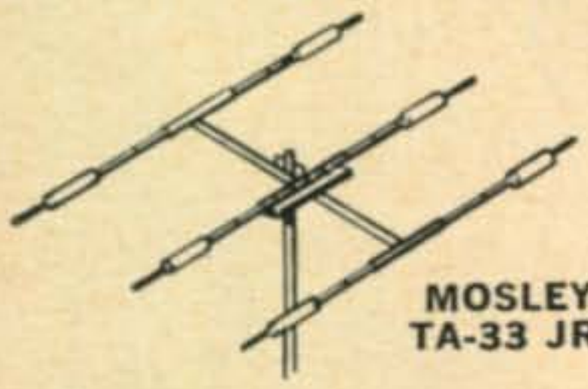

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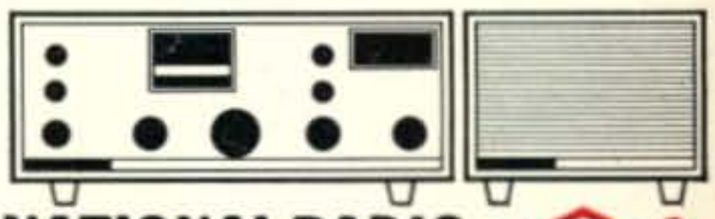

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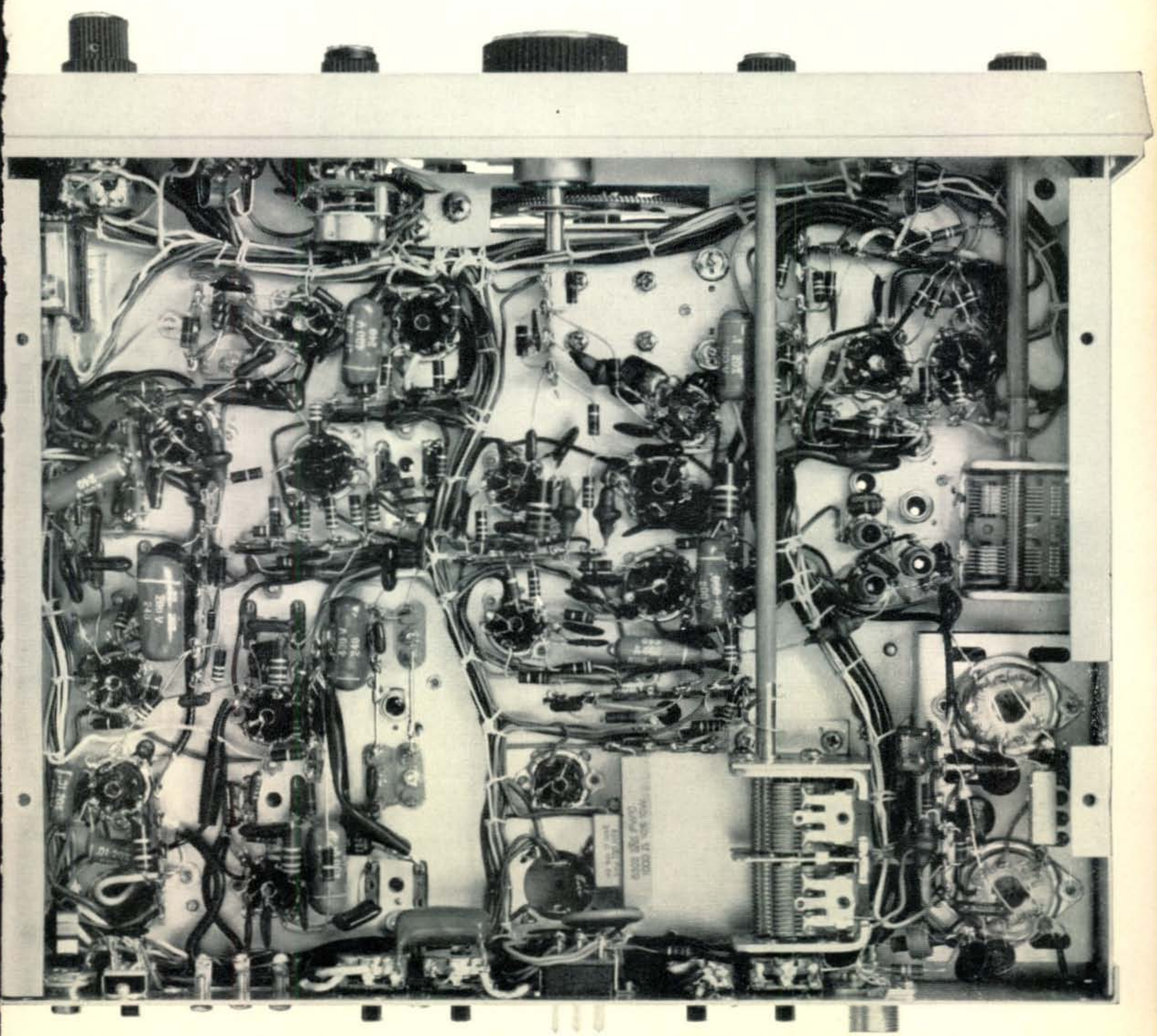

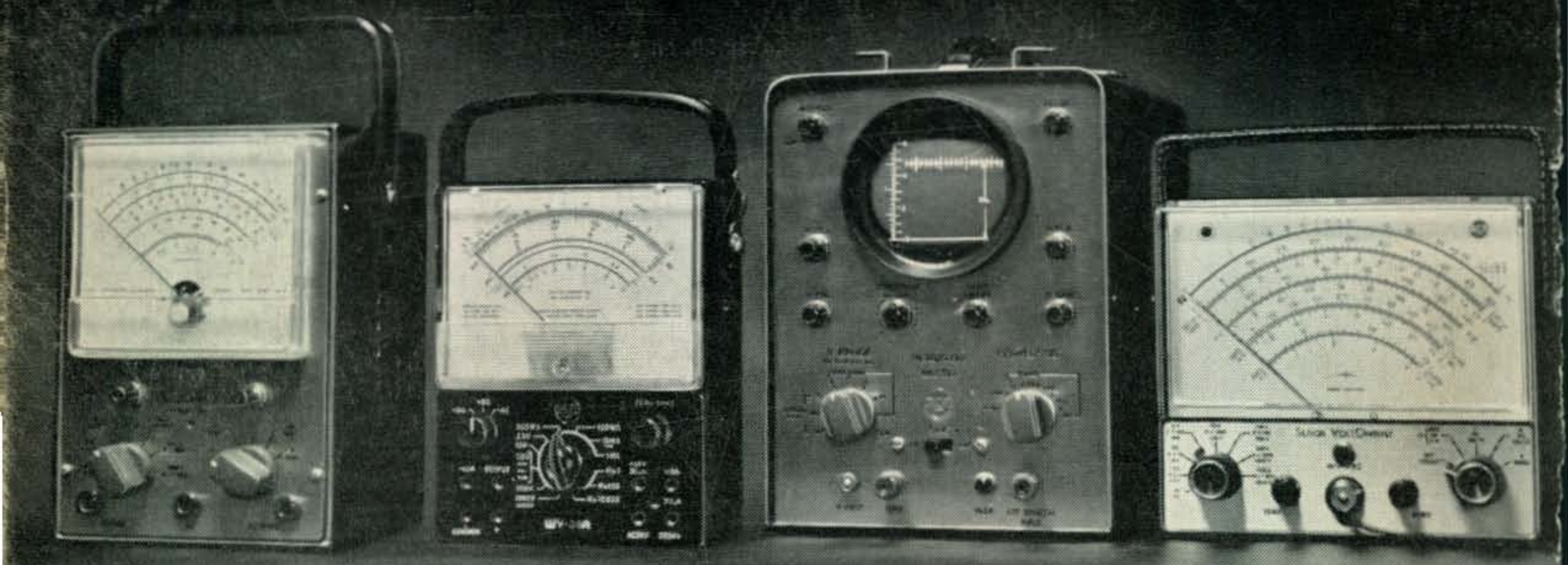

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