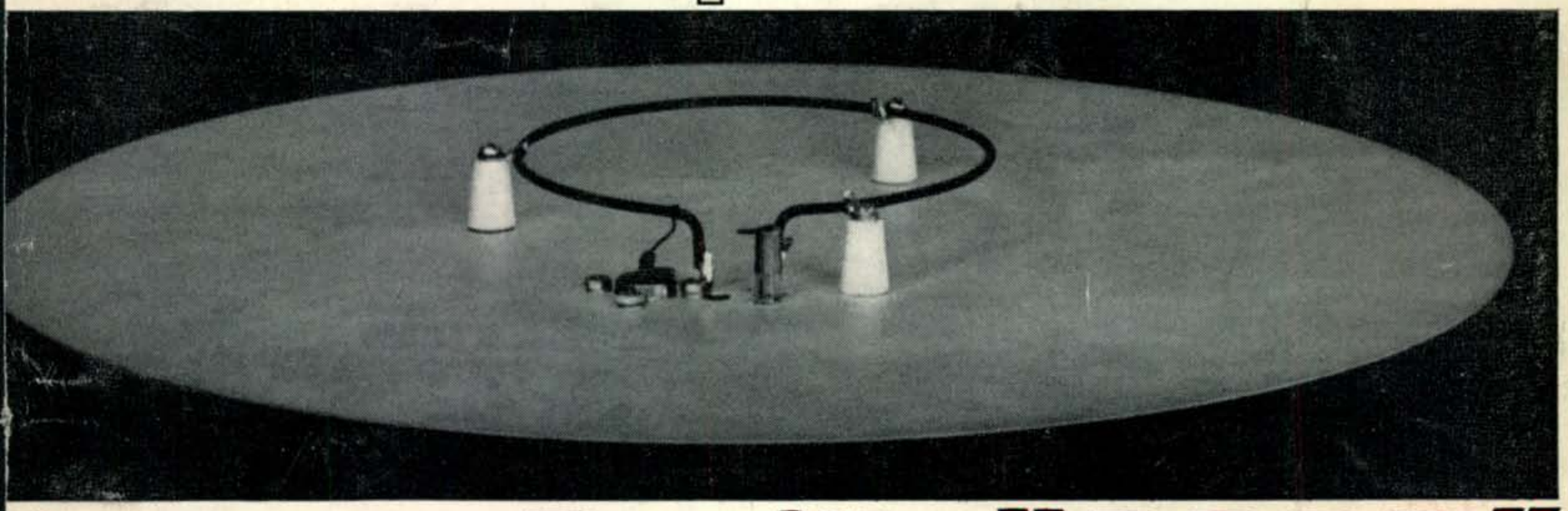
June 1964
50¢

CQ

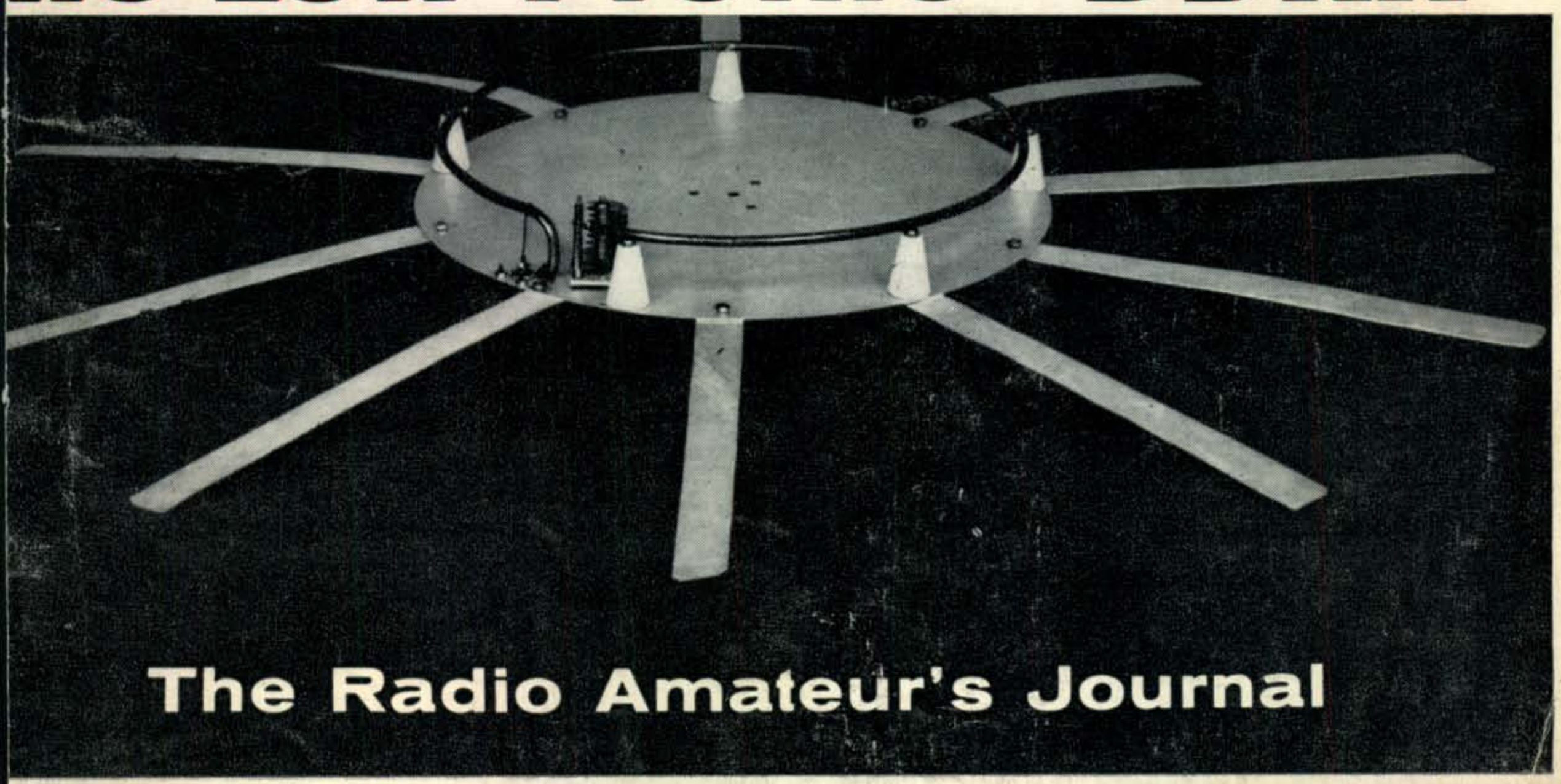
ICD

1963 DX Phone Results
SSB on 220 Mc
The M1M Story

New Concept in Antennas



The Low Profile "DDRR"



The Radio Amateur's Journal

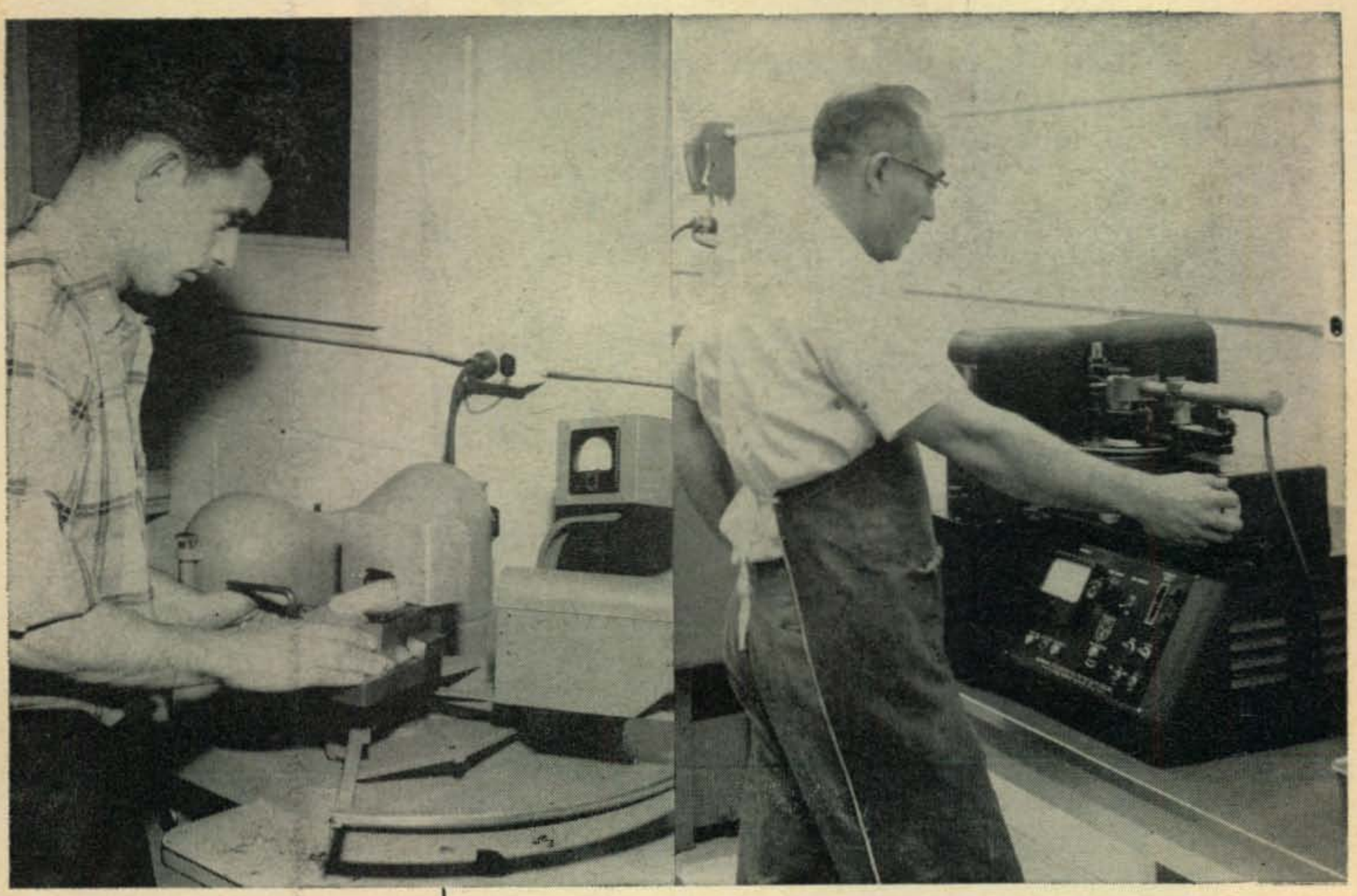
WELCOME HOME, GUS!

DXPEDITION: Gus Browning, W4BPD • NUMBER OF CONTACTS: Over 200,000 • PARTIAL LIST OF COUNTRIES: Monaco, 3A2BW • Seychelle Is., VQ9HB • Seychelle Is., VQ9A • Assumption Is., VQ9A/AN • Cosmoledo Is., VQ9C • Aldabra Is., VQ9AA • Mobile at Sea, VQ9A/MM • Aldabra Is., VQ9A/7 • Chagos Is., VQ9A/8C • Diego Is., VQ9A/8C • Rwanda, Africa, 9U5BH • Burundi, Africa, 9U5ZZ • South Africa, ZS6IF/ • Swaziland, Africa, ZS6IF/7 • Basutoland, Africa, ZS6IF/8 • South Africa, ZS10U • Tristan Da Cunha, ZD9AM • Bouvet Island, LH4C • Durbin, So. Africa, ZS5JY • French Somaliland, FL5A • Reunion Is., FR7ZC • Reunion Is., FR7ZI • Comoro Is., FH8CE • Comoro Is., 5R8CE/FH8 • Tromelin Is., FR7ZC/T • Europa Is., FR7ZC/E • Glorieuses Is., FR7ZC/G • Juan De Nova Is., FR7ZC/J • Aden, VS9AAA • Kamaran Is., VS9KDV • Yemen, W4BPD/4W1 • Bhutan, AC5A • Tibet, AC5A/4 • Sikkim, AC3PT • Nepal, 9N1MM • Afghanistan, YA1A • Aden, VS9ASS • Bhutan, AC7A • Kenya, VQ4ERR • Malagasy Republic, 5R8CM • Mauritius, VQ8AI • Yemen, MP4QAR/4W1 • Laos, XW8AW • Peoples Republic of China, XW8AW/BY • Kuria Muria, VS9HAA • EQUIPMENT: Collins S-Line: 32S-3 Transmitter, 75S-3 Receiver, 30L-1 Linear Amplifier, CC-2 Carrying Cases for each, PM-2 AC and MP-1 power supplies.

COLLINS

See Gus' equipment at your next ARRL division convention.

X-rays Preorient Raw Quartz for Making PR CRYSTALS...Orientation Verified By X-raying Blanks Coming from Cutter



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Photograph at left shows raw crystal being preoriented. Each bar of crystal must be placed in exactly the right position, as shown by X-ray. The crystal is then locked in place, and the entire jig with crystal is transferred to an automatic cutting machine. Photograph at right shows cut crystals being rechecked by X-ray, to verify precision of orientation.

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PR Crystals

Since 1934

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For further information, check number 1, on page 110

may we put in a plug for the transceive capability of the SX-117?

Before buying your next receiver, consider this fact: *The SX-117 alone* provides the built-in capability of transceive operation with the HT-44 transmitter, at the flick of a switch.

We hardly need list the circumstances under which such versatility is highly desirable, if not essential, to most amateurs.

This is just one of many good, solid reasons why the SX-117 is the most popular amateur receiver we've ever engineered.

For instance: You get all important coverage from 3.0 Mc. through 30 Mc. (five crystals provided) plus four positions from 85 kc.—3 Mc. for use with HA-10 low freq. tuner.

You get *three-step variable selectivity*, including a transmitter-type V.F.O. that can be *locked on frequency* . . . less than *1 μv* sensitivity . . . extreme electrical and mechanical *stability* . . . up to 50 *db.* attenuation to unwanted heterodyne in the pass band.

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SX-117 triple-conversion receiver by **hallicrafters**

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Export: Hallicrafters, International Dept., Commercial Div.

CQ

The Radio Amateur's Journal

Vol. 20, No. 6 June 1964

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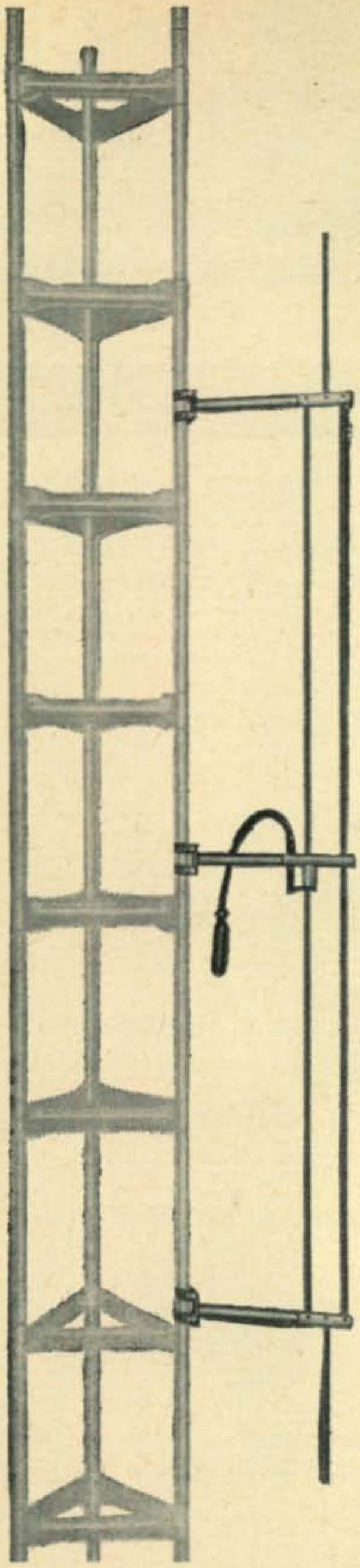

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CERTIFIED PERFORMANCE!

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BASE STATION SIDE-MOUNT ANTENNA

*Exact frequency must be specified

Cat. No. 320-509 Side-Mount 2.5 db Gain Antenna is designed for applications requiring an antenna which must be side mounted on existing or new towers. This antenna has essentially a cardioid pattern and has approximately 2.5 db gain in the forward direction. High strength aluminum alloy is used for all antenna parts, except the mounting clamps, which are made of stainless steel. All insulators are made of the best available materials for the various uses involved. Each antenna is supplied cut to the desired operating frequency and is assembled ready for installation.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	±1.0%
Maximum power input	500 watts
Flexible terminal extension	18 in. of RG-8A/U
Termination	Type N male with Neoprene housing
Lightning protection	Direct ground

Mechanical:

Radiating element material	6061-T6 aluminum
Insulated support material	Phenolic
Feed point insulator	Polycarbonate
Overall length	10 ft. at 50 Mc, 16½ ft. at 30 Mc
Spacing from tower	8"
Rated wind velocity	100 MPH
Lateral thrust at rated wind	45 lbs. at 30 Mc
Weight	15 lbs. at 30 Mc

Stainless Steel Mounting Clamps supplied to mount antenna on round tower legs 1 in. to 1½ in. diameter.

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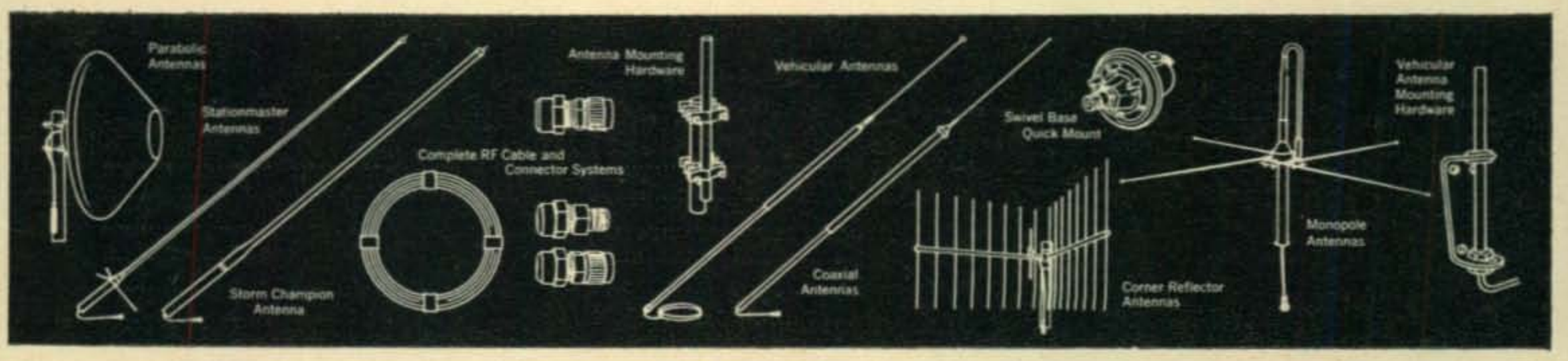

NEW ..... for 20 meter operation

Mosley A-203-C

MOSLEY HAS THE OUTSTANDING THREE ELEMENT ARRAY FOR TWENTY METER DX OPERATION.

The new clean-line A-203-C will give you that DX punch that will over-ride QRM. The A-203-C is a three element twenty meter beam using swaged tubing elements to give this antenna rugged durability. The antenna has a special new type element design that virtually eliminates element flutter and boom vibration. A-203-C is a wide spaced, gamma matched, full size beam that every ham needs for the tough competition enforced by the present conditions on the DX bands. This antenna will equal the performance of many four to six element beams without the headaches of large size and heavy weight necessary for these big beams.

- *GAIN (8 db. or better) (F/B 24 db.)*
- *HANDLES MAXIMUM LEGAL POWER*
- *BOOM LENGTH 24 ft.*
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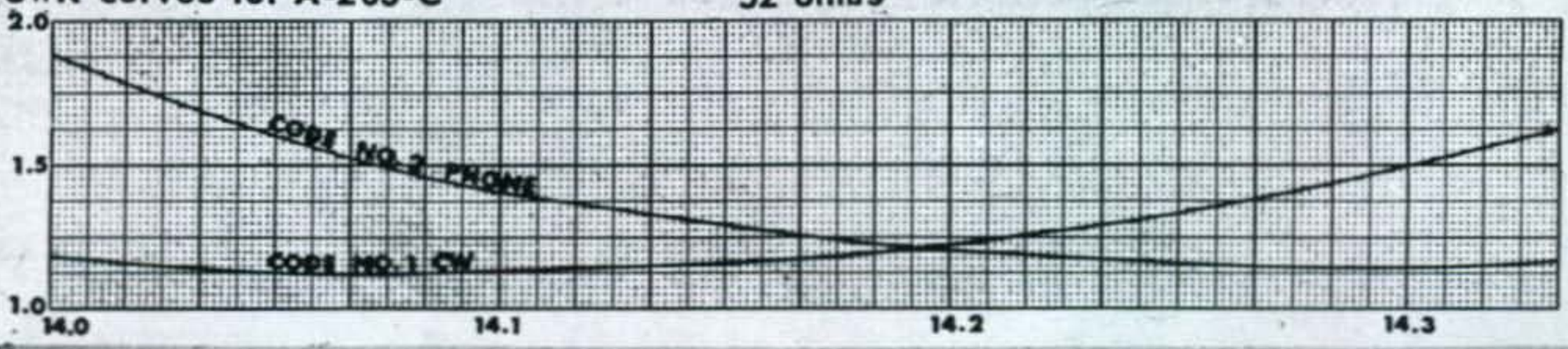
- *SHIPPING WEIGHT 49½ lbs.*

SWR curves for A-203-C 52 ohms



MOSLEY ELECTRONICS INC. 4610 N. LINDBERGH BLVD. – BRIDGETON MO. 63044

For further information, check number 6, on page 110

ZERO BIAS

ALAS—our noble vice-presidential candidate from New Hampshire has done it again—stuck his big foot in his very big mouth, that is. Although his April editorial quietly backed off on his March innuendos, in May he was back at it insisting that *73* contains: "a lot more flagrant information than flagrant misinformation."

We were almost in hysterics, when directly under this memorable quote we noted that *Auto-Call* (a very fine Washington, D.C. club paper, edited by W3NL): "devoted considerable space to my editorial, including many quotes from it." Dear readers, *Auto-Call* not only quoted K1FYP, they tore him up in little pieces and dragged the remains from one side of his country barn to the other. If we've ever seen anyone taken apart with the English language, *Auto-Call* did the trick. It is indeed interesting to note how *73*, by innuendo, turns disparaging criticism into blissful kudos. For those who didn't read *Auto-Call*, we suggest writing Andy for a copy.

Another slur by *73* in May cast shadows on ARRL Headquarters and its General Manager through an attack on the National Convention to be held in August. Knowing fully that it was the Convention Committee and not League Headquarters that refused *73* permission to attend commercially, the editor very carefully insinuates that Mr. Huntoon was the culprit. Our illustrious New Hampshirite has been persuing a two-year personal vendetta against the Hudson Amateur Radio Council, sponsors of the 1964 National Convention. His insulting remarks left them no other alternative but to turn down his request for attendance. To quote the ex-New Yorker: "My heart renders [sic] when I think of the hundreds of dollars we will save in not driving all the way down to rotten old New York in the middle of ghastly August." While only twenty short lines down the column we read: "If you really want to see *73* at the Convention and promise to buy a subscription, some books, or maybe an Institute membership, then first you've got to convince Huntoon to change his mind." We really can't tell if that's sour grapes or sour "dough," can you?

Another unscrupulous bit of insinuation contained in *73* for May was a suggestion that *QST* and the ARRL be split up. "It is not possible for one man to do a good job of running both," says the editorial. "You'll get a lot more output from two $12,500 men than from one $25,000 man." It continues. Well—we'd like to know where he got his information? We read *QST* once in a while too, and we vaguely remember Mr. Huntoon's salary as being considerably less than $25,000. We hope *73*'s comments won't cause Mr. Huntoon any undue hardship with the Bureau of Internal Revenue. By the way—couldn't *73* and the "Institute" operate more effectively as a two-man team?

73's editor has, in past issues spoken of the abundance of his rejected manuscripts showing up in *CQ*. It is rather ironic that an article prepared for *CQ* has now shown up in *73*. *CQ* required that this article, written by one of his "Institute" Directors, be held over a while to correct some of the inaccuracies contained therein. Impatient for its publication, however, the author recalled it, only to have it appear in *73* for April. As positive proof the editor didn't even read that article of which he claims to be so proud, (at least he didn't get to the end), we refer you to the last paragraph on page 78.

Speaking of "Institute" Directors, we understand that at least one of those mentioned in the May editorial knew nothing of his appointment. This obviously casts doubt on the validity of all the Directors appointments and while we're at it, we wonder why minutes of the "meeting" were omitted from the two free pages our gracious benefactor is allowing the "Institute?"

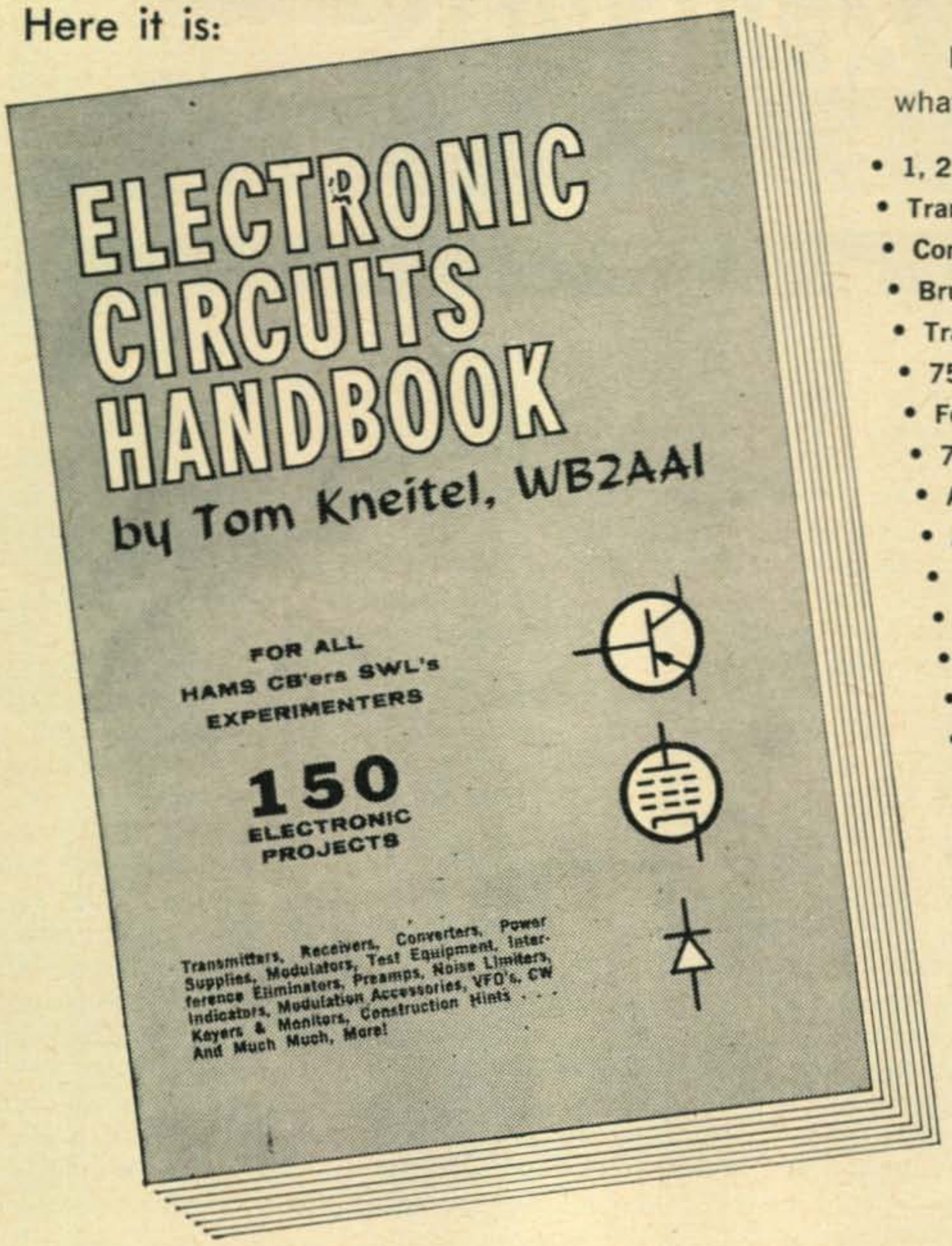
Vulgar is the only word we can find to explain *73*'s exposé of the so-called "ARRL booze party" held at the Chicago Parts Show. We've been there ourselves and the only thing we can remember seeing at the suite was a sterling silver kettle of hot coffee and a variety of delicious Danish pastry.

The prize contained in the May issue of *73*, and that which prompted us to choose this subject for this month's editorial, is *73*'s answer to a letter appearing on page 75 of that issue. The writer, K2KAM wrote: "In your criticism of ARRL, however, I ask that you try to be charitable and constructive at all times and consider that a careless innuendo or the mention of an unfounded rumor, other than discredit it, may sow seeds of hatred among the ranks." Mr. Green's reply to these level headed comments were: *"Regarding unfounded rumors, please remember that these* [are] *basic tools for any writer who wants to influence events without suffering law suits."*

Here we have it—a frank admission that *73* openly uses unfounded rumors to influence his readers. Need we say more? With this we rest our case against flagrant *mis*information and hope we never again have to open it.

YOU ASKED FOR IT!

Here it is:



Here's just a sample of what you'll find in its chapters:

- 1, 2 and 3 tube transmitters
- Transmitting tube rejuvenator
- Comprehensive coil winding data
- Brute force power line filters
- Transistorized CW monitor
- 750 watt linear amplifier circuit
- Four good VFO circuits
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- Complete sub-miniature ham rig
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- One tube receiver circuit

Here is the book we've all been waiting for! Tom Kneitel, WB2AAI, has compiled a book which presents and discusses in detail 150 of the most often needed circuits around the shack. Novices and old-timers alike will find many valuable circuits here ideal for construction projects. Its eleven chapters cover: construction, modulation circuits, transmitters, power supplies, frequency control, CW, receivers/converters, receiver accessories, test gear and indicators, interference eliminators, and experimental circuits.

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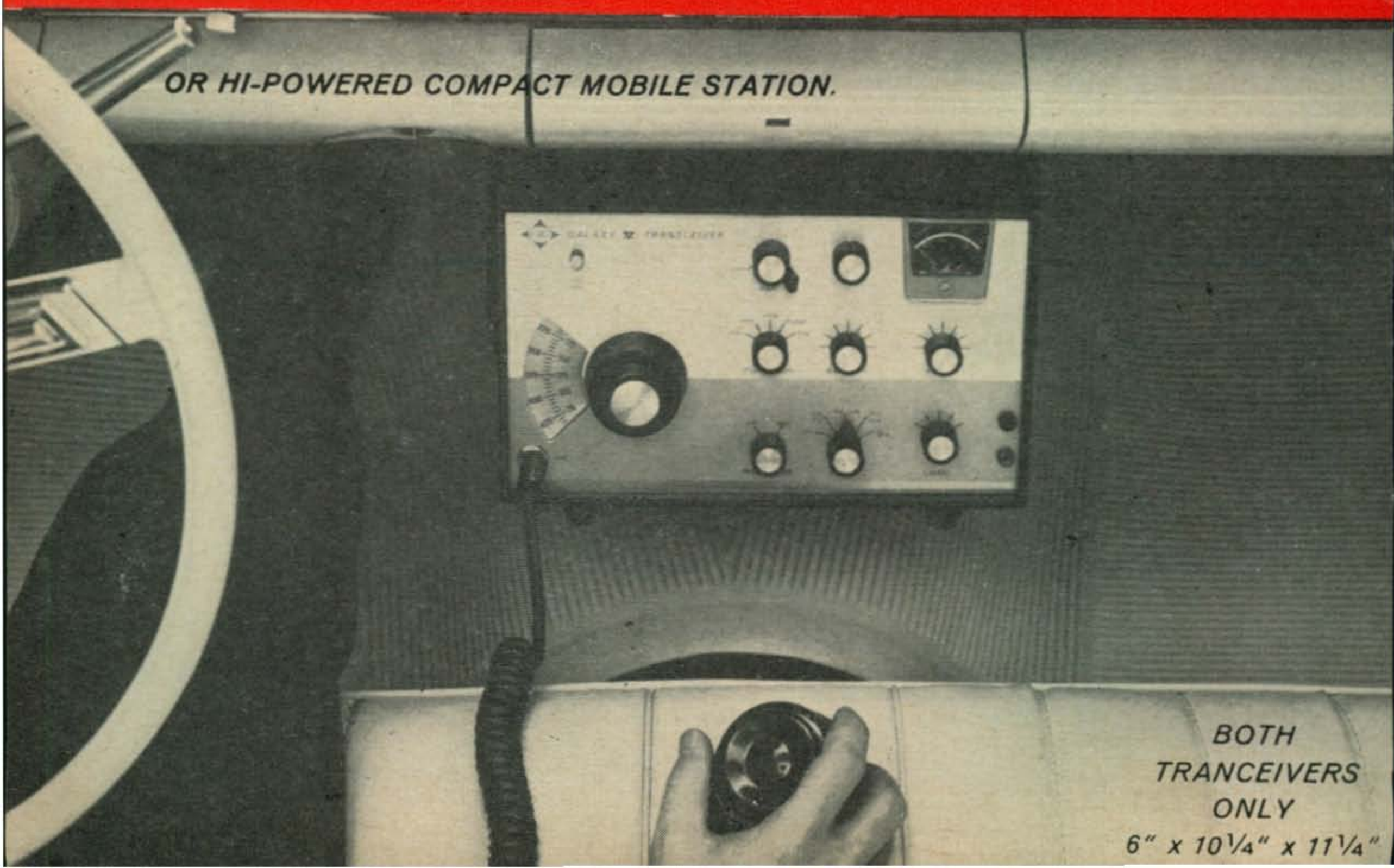
OR HI-POWERED COMPACT MOBILE STATION.



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★ 300 WATTS SSB/CW INPUT conservatively rated
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★ TRANSISTORIZED DC SUPPLY $119.95
★ UNIVERSAL MOBILE BRACKET $7.95

For further information, check number 11, on page 110

The "Ostermond" Syndrome

Editor, *CQ:*

Checking my logs for 1933-39 I find several entries of "RX4MY," followed by question marks. Is is possible that the ionosphere also reversed the continuity?

Ross Hansch, W9RBI
302 East Dean Avenue
Madison 16, Wisconsin

Editor, *CQ:*

I read with great interest the article by Jerzy Ostermond-Tor in the April issue of *CQ*.

I could hardly wait to disconnect my linear and cut the output of my 20A to the optimum one watt output. I gave a quick CQ on the top end of 20, and was instantly deluged by a horde of DX stations. I quickly snapped off a dozen or so exchanges, and then stopped long enough to rig a coax switch that enabled me to go from 1 watt to 1 kilowatt almost instantly. All stations reported that the one watt was at least 10 over 9, but few could even copy the kw.

Not content to wallow in my new found role as DX king, I reread the article to see if Tor's theory could be improved. Tor, in those pre-atomic years preceding the war, had mistakenly attacked the problem on a macroscopic scale. Then it was reasonable to explain the phenomenon on the basis of the thermal inertia of molecules. Dussel, however, saw to the heart of the effect and in his letter explained it in the light of modern Quantum Mechanics.

One major question remained: Why use regular electromagnetic radiation to take advantage of those few antiparticles? Wouldn't it be far better to use the billions upon billions of everyday particles to amplify anti-energy?

Luckily I have a friend with access to a particle accelerator, and by waxing on our debt to science, he consented to treat my rig.

I can now be heard daily (with proper gear of course) on all the negative frequencies. Unfortunately my transmitter now absorbs energy (minus one watt for best results) which I must dissipate in a #47 bulb. The vox had to be modified in order to make it cut on when I stop talking. It is rather unhandy to talk into the speaker while listening to the mike. At any rate you can see the advantages to this type of operation and I hope that others will take the plunge soon.

I expect to be an anti-c.w. as soon as I figure out what *not* to key.

Allen C. Ward, W5FIP
2103 Winsted Lane
Austin 3, Texas

Our sincere apologies to the many readers who took the Professor's story seriously. We really didn't think it was *that* convincing.—*Ed.*

If you, like many of today's amateurs, find yourself with your interest fairly equally divided between working AM/CW and SSB, there's a real feeling of frustration with most available equipment. Why? Because most AM rigs require extensive modification to operate SSB—and no SSB rig offers high level AM and Class "C" CW—and the end result is compromise in one mode or the other!

Not so with the Viking SSB Adapter/Valiant II combination, for here's the package that gives you 275 watts CW and SSB plus 200 watts high level AM phone! Now, keep your contacts and work old friends no matter what portion of the band they are operating in, and no matter what mode they are using—and do it with maximum punch!

VALIANT II
SSB ADAPTER

SSB ADAPTER

Filter-type SSB generator—bandswitching 80 through 10 meters—more than 50 db sideband suppression—more than 45 db carrier suppression. Features built-in multiplier requiring VFO input only—design and front panel make operating practically foolproof!

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For further information, check number 13, on page 110

"Incentive"

Editor, *CQ:*

Today I received your March issue of *CQ* and I read your article on incentive proposal and it leads me to believe you have gone out of your mind. 2000 watts, are you crazy? . . .

James D. Smith, W4CQQ
5666 Flagstaff Rd.
Jacksonville, Florida

Editor, *CQ:*

Upon reading ZERO BIAS in the March issue, a prominent question has entered my mind. How do you propose the Advanced Class operator be identified in regards to call sign? If he is to be an advanced class by examination only, what will keep other General Class operators from occupying frequencies allotted exclusively to advanced amateurs? Is this to be a test of honesty on the part of all "General" class amateurs?

I applaud you on your proposal toward decreasing the Novice band from its present 150 kc spread to 21.100-21.200 mc, but heaven-forbid if fone operation by U.S. amateurs is permitted in the now "DX-section", below 21.250 the QRM on foreign stations will make QSOs impossible.

D. Willoughly, WA6ZWM
207 Garden Way
Yuba City, California

Editor, *CQ:*

I just finished reading the March issue of *CQ's* ZERO BIAS. I would like to take this time to make a few comments on your proposal for Incentive Licensing.

I agree with your proposal except for the power limitations. I feel the power for the Advanced Class should stay at 1000 watts d.c. input and chop the power for the General and Conditional to 500 watts d.c. input.

James Lewis, W7ZGA/6
1307 Leafwood Dr., Apt. 10
Novato, California

Editor, *CQ:*

I received my March issue of *CQ* and having read your proposal to take segments of all bands and allocate them to the Advanced amateur licensee. I desire to inform you that I support your stand on this 100%. However, you neglected to mention the Amateur Extra Class licensee. I presume you meant they automatically are included but you neglected to so state. I am certain you will have the support of all amateurs in your proposal.

Marvin L. Drelich, WA2OWT
2483 West 16th Street
Brooklyn, New York 11214

Editor, *CQ:*

In your proposal for incentive licensing I was shocked to see that you propose an increase in maximum legal power to two kw input. Your other proposals sound logical, but this makes no sense at all. What would help alleviate all the QRM on our crowded bands would be a *reduction* in power input.

I'll admit that there is perhaps some argument for higher power on the v.h.f. bands, but on the lower frequencies I doubt that you can work anything with 2 kw that you could not work with 1 kw, unless it is just to cut through the QRM, and if everyone reduced power, there would not be so much QRM. . . .

John H. Hartsook, K3HXC
Fildes Lane
Wallingford, Pa.

Editor, *CQ:*

I think your proposal for incentive licensing sounds very good to me. I am for everything you wrote in the March '64 *CQ*, except the increase in power. It should be cut to 500 c.w. and a.m. and 1000 p.e.p.

Raymond A. Forman, W5EMZ
706 Comer Street
Carthage, Texas

Editor, *CQ:*

As long as ARRL is right 51% of the time, I will support wholeheartedly their policies, plans and philosophies. They are human beings and error accordingly but their errors cannot be allayed to blatant flippancies nor psychotic meanderings. Your support is welcome as well as your constructive criticism . . . My check attests to my respect for the editorial policy of *CQ*.

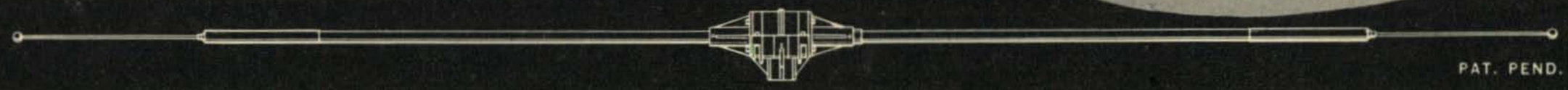
Richard C. Littler, W8JRG
640 Snowhill Blvd.
Springfield, Ohio

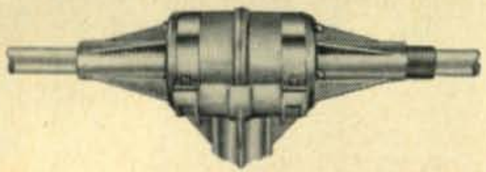
For further information, check number 14, on page 110

FIRST and ONLY.. remotely tuned ROTATABLE DIPOLE!

DESIGNED SPECIALLY FOR 40 AND 75 METERS IN LIMITED ANTENNA SPACE

NEW-TRONICS CLIFF-DWELLER™





Housing for motors and gear trains with mounting yoke

Resonance and band switching control

ELECTRICAL FEATURES

- Antenna resonance finger tip controlled from transmitter location in shack.
- VSWR: 1.1 to 1 or less across entire band
- Feed-point variable to compensate for antenna environment
- No traps . . . no baluns . . . no matching devices of any kind
- Feed direct with any length 52 ohm cable
- Power handling capacity — maximum legal limit

The CLIFF-DWELLER is another New-Tronics first. Here's a tuneable dipole ideal for hams who live in apartments or in homes on small lots. The CLIFF DWELLER will give you unbelievable performance even in limited space.

MECHANICAL FEATURES

- Approx. lengths
  - 28′-6″ — 26′ 7.0-7.3 mc
  - 30′-6″ — 26′ 3.5-4.0 mc
  - 31′-4″ — 26′ Two-Bander
- Self supporting, accepts 1¼″ threaded pipe for mounting in standard rotators
- Maximum turning radius approx. 15′-8″
- Sturdy aluminum die cast housing for motors and gear trains which drive end sections of dipole
- Heat treated aircraft type, 1¼″ heavy wall aluminum tubing
- Completely waterproofed resonators and housings

MODEL NO.	FREQ. MC	WEIGHT	NET PRICE
CD 40	7.0-7.3	Under 20 lbs.	$ 92.50
CD 75	3.5-4.0	Under 20 lbs.	99.50
CD 40-75	Two Bander	Under 20 lbs.	129.50

See the CLIFF-DWELLER and other fine NEW-TRONICS products at your distributor or write us for descriptive literature.

NEW-TRONICS CORPORATION

3455 VEGA AVENUE • CLEVELAND 13, OHIO

For further information, check number 15, on page 110

Editor, *CQ:*

I have just received my March copy of *CQ*, wherein you invite comments on your incentive licensing proposals. As they certainly affect my operation in Australia, I feel I should pass my comments to you. I only operate on 40 and 20 meters, and only on c.w. at that; I will therefore confine my comments to the proposals as they affect those two bands.

20 c.w.: As the DX generally tends to occupy the lower edges of the band, such DX as there is will be the easy picking for the Advanced class station. Furthermore, the strongest W signals will be in the most frequented section of the band, thus adding to the already high QRM level. Your 20 meter proposal will certainly offend both non-advanced class W's and DX alike.

40 c.w.: Although the allocation for USA is 300 kc, in many other countries it is only 150 kc or 100 kc. In addition, only the portion from 7000 to 7050 kc is useable after dark, and even then commercial stations intrude into this section. The allocation of this section to Advanced class licensees, would mean that they would have a complete monopoly of DX, and for my part, I would be deprived of working the many W stations that I do, at present, contact regularly.

Furthermore, the suggestion that the Advanced class license should carry a 2 kw privilege is appalling. The normal power limit in most countries is from 50 to 150 watts, and the general use of the kw by USA stations has caused much unfavorable comment in overseas countries. Many stations feel that this high power is unnecessary, and only makes the QRM problem more acute. Your proposal will do nothing to restore the popularity of USA stations, and will only add to the QRM.

In short, your proposals, if carried, will change the pattern of amateur radio completely, and deprive many of us "DX" stations of the many USA friends we have made. The many General class licensed amateurs will be deprived of DX contacts, particularly on 40, and your statement that the proposals deprive no one of their privileges is utter nonsense. . . .

I am sorry to see the magazine which I have enjoyed so much in the past, fall on such bad times, and come up with what I'm afraid I regard as a grade one crackpot proposal.

John H. Smith, VK3IQ
83 Bindi Street
Glenroy W. 9, Victoria, Australia

Editor, *CQ:*

Your March ZERO BIAS shook me up.

Its third paragraph ends with these words, "It is now quite obvious that the radio amateur of today is just not as versatile as he should be." This is true and I'm glad it's finally been recognized.

Paragraph seven ends thusly, "We are simply recognizing that phone operation has unfortunately become a 'way of life' for many amateurs and to deprive them of voice operation is to deprive them of amateur radio itself." This is pure hog-wash on no less than three counts.

First: If today's amateur is not as versatile as he should be, it is *his* fault; not the fault of existing regulations. Don't give in to human weakness by lowering standards, which is exactly what you're doing by your "compromise," but rather bring people up to the existing standards. Obviously the lower standards become the more egalitarian the group becomes! If the FCC wanted amateur radio to be egalitarian there would be only one class of license, not six.

Second: Even with the ARRL plan nobody is being deprived of phone operation. If he is General class he has *all* phone privileges above 50 mc. If amateur radio means no more to some than vocal communications, there are at least 2000 megacycles above 50 mc on which A3 emission is legal. And they could stand more use!

Third: Those to whom amateur radio means little more than having a station they may talk over, they are better off as CBers. Amateur radio would be better off without them! . . .

12 NEW AMATEUR BEAMS

from

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ALL GOLD CORODIZED

ALL GAMMA MATCHED

3 New combination 6 & 2 meter beams
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

34 West Interstate • Bedford, Ohio

For further information, check number 17, on page 110

In all, I view your plan with much the same mind as the League plan: 1) too soft; 2) too little too late.

Al P. LaPlaca, K2DDK
28 The Beach Way
Manhasset, New York

Editor, *CQ:*

I have just dug out the March, 1964 *CQ*, and reread the article on the ARRL incentive licensing proposal and the *CQ* proposal. Being a member of the ARRL, I cannot say that I disagree with them, and even if I weren't I would still agree with ARRL's proposal.

But, I will say this for the *CQ* proposal, it really is an incentive. . . .

Mark Hopkins, WN2JWS
Post Office Box 243
Sparta, New Jersey 07871

Editor, *CQ:*

Congratulations! You're way ahead of the ARRL. Your incentive licensing proposal is more ridiculous than theirs. I knew you could do it all the time!

Richard E. Fearns, K2JLE
3 Stafford Avenue
Woodbury, New York

Editor, *CQ:*

I feel that your proposal in the March 1964 *CQ* is not too "burdensome" on the present Conditional and General class amateurs.

As far as power is concerned I feel that the proposed advanced class may use 1 kw input and that the present Conditional and General class be only allowed 500 watts input. This is plenty of power for any one to enjoy the hobby of ham radio.

Leon Quimby, W9BCH
Neenah, Wisconsin

Editor, *CQ:*

I have been following the pros and cons of incentive licensing since *QST* printed in proposal. We here in Canada already have a good licensing plan. Two grades: amateur, theory exam, 10 w.p.m. code, operating on c.w. for one year from 160 to 15, after 6 months fone on 10, and fone all frequencies above 10; extra amateur, harder theory test, 15 w.p.m. code exam resulting all privileges all bands. A Novice class has been proposed but no word definite as yet.

How you in W/K land divide your bands between your classes of amateurs is no concern to me but your ZERO BIAS of March 1964 power proposal does concern me. Already when I'm working a DX station my receiver is blocked by some K8 or W4, etc. calling CQ DX right on top of him. What do you need an extra 3db on that for? By indications from correspondence from overseas hams you don't have to be next door to USA to have the same thing happen to your receiver. . . .

Jim Wade, VE2BQV
P. O. Box 125
Grindstone
Magdalen Islands, P.Q.

The Cambridge(burg) Address?

Editor, *CQ:*

Approximately fourscore and seven years ago our poor fathers brought forth on this continent a new station, who Wants to Outsmart Youngsters, conceived in liberty and dedicated to the proposition that only Class-A operators are created equal.

Now hamdom is engaged in a great civil war, testing whether that proposition, or any proposition so conceived and so dedicated can long endure. The hams are met on a great battlefield of that war; the low end of seventy-five meters. The Class-A bomb-the-band man has come to dedicate a portion of that sub-subband as a final testing place against those who here gave up their channel trying to QSO. It is altogether revolting and improper that he should do this. But in a greater sense he cannot dedicate, he cannot consecrate, he cannot pirate that ground on any grounds! The lives of those living and dead who struggled there have consecrated it far above his poor, high power and his innate inability to add or subtract. The world will little note nor long remember what he says on there, but it can never forget what he does on there.

It is for us the living amateur fraternity, rather, to be dedicated here to the unfinished work which this worthless Class A "ham" has thus far so nobly perverted. It is rather for us to be here dedicated to the great task

[*Continued on page 91*]

Professional Performance

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Deluxe Ultra High "Q" **COILS**

Designed for higher "Q" . . . with power units and SSB. Use with 3 ft base section and 60" whip. **15 or 20 meter, 6.95; 40 meter, 8.95; 75 meter, 9.95; 160 meter, 14.95**

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MASTER DELUXE ALL-BANDER

Covers 10 thru 75 frequencies. Silver-plated single turn contact, positive spring. Eccentric cam contact, easy selection of turn. Automatic lock prevents damage to coil.

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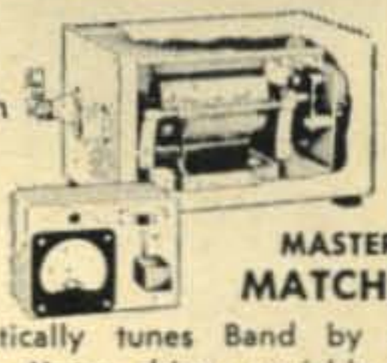

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Micrometer Impedance - Matching Inductance - Used on all bands with any type coax. cable to match any mobile antenna. Easily adjustable for minimum standing wave ratio (1:1). Complete with Coax. Adp. Kit

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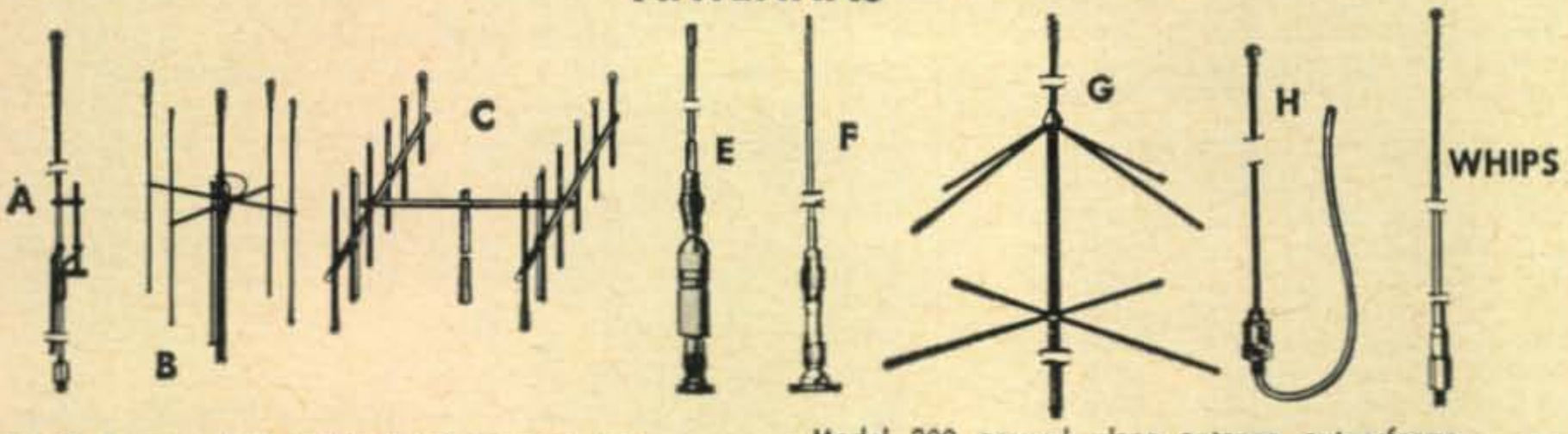
ANTENNAS



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

B AM-25 all aluminum "cloverleaf" factory pre-tuned 144-148 mc provides 3 db gain. **12.95**

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

D (Not Shown) AM-4 same as above except 6 element beam. **8.95**

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

F AM-10 "Shorty" as above except it's 6 meter shortened ¼ wave with mount. **10.95**

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

H No. 613 Master VHF rooftop antenna for 140-165 Mc. Comes with 10' coax. cable. **4.95**

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.**

FIBERGLASS WHIPS — Flexible, indestructible universal antenna with ⅜" x 24 thread base fitting chrome plated. **FG-60 60" 4.95; FG-72 72" 4.95; FG-84 84" 5.15; FG-96 96" 5.25; FG-103 103" 6.95.**

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CONNECTOR

Noise-free. Connect or remove loading coils, whips, or mounts without tools. No. E-Z 295.

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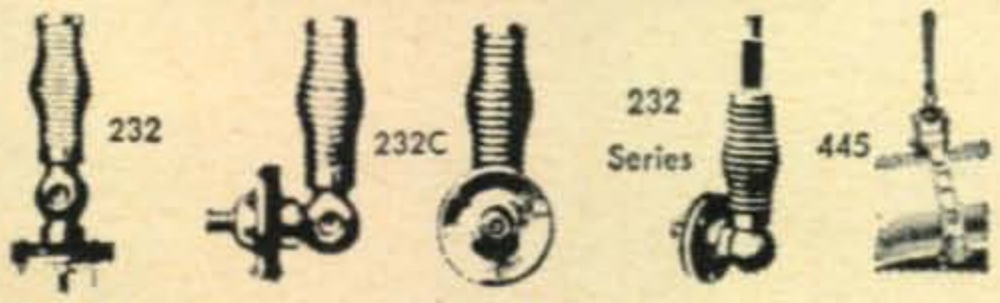
TENNAHOLD
Fits All Cars

1.00 NET

BODY AND BUMPER MOUNTS



BASE MOUNT	DESCRIPTION	NET
232	D'ble Tapered Spring—Swivel Base	8.75
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
232XXSSC	Extra Heavy Duty Spring—D'ble Tapered—Spec. Stainless—Coax. Conn.	15.95
445	Universal Mount—Threaded, ⅜"-24—Chain Mount	7.95

GUTTER MOUNT
CG-275

Eliminates hole drilling. Positive locking, retractable and adaptable for any ⅜" 24 thread whip.

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UNIVERSAL MOUNT

TM-1
is Chrome plated alloy steel mount for any antenna with ⅜" 24 thread.

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FOR TRUNK LID, COWL MOUNTING

MMM-75 is adjustable for any curved surface. Equipped with coaxial connector.

7.95 NET

BUMPER MOUNT

MM-520 with shaped links adjustable to any width surface. For spring or whip double mount.

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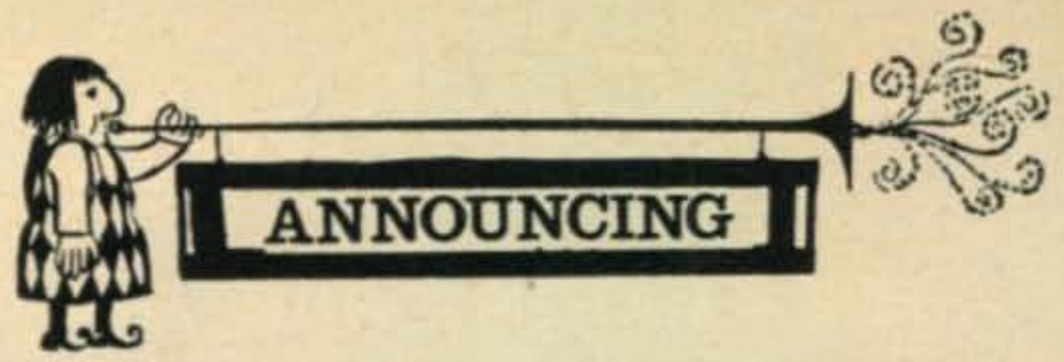
For further information, check number 19, on page 110



Rome, New York

On Sunday, June 4, 1964, the Rome Radio Club, Inc. will hold the annual "Ham Family Day." The festivities will be at Beck's Grove, 10 miles northwest of Rome. Reservations should be sent to the club at P. O. Box 721, Rome, N. Y. There will be door prizes, contests, transmitter hunts, auction and a grand raffle. The grand dinner of chicken and steak, served family style, will wind up the day on a happy note. All this for four bucks if you remember to write or phone in a reservation. It will cost you 50 cents more if you forget.

Missouri

The Ham-Butcher's Net will hold their annual picnic at City Park, Warsaw, Mo. Sunday, June 21st at the Shelter House. Those attending are requested to bring their own plates and hardware with covered dish of your own choice; drinks free. Advance pre-registration tickets are $1.00 per person. Tickets at the picnic are $1.25; children free. Ample Motel and Hotel accommodations. Tickets are now on sale for $1.00 from WØQJU, Elmer Cramer, 731 Lake Street, Lawrence, Kansas.

Ohio

The Buckeye Belles of Ohio will be hostess group to the 4th YLRL International Convention June 19, 20 and 21, 1964. Location is the Nationwide Inn, 4101 W. Broad St., Columbus, Ohio.

West Virginia

The Tri-State A.R.A. announces their annual ham radio picnic at Camden Park Amusement Center, Rt. 60 West of Huntington, W. Va. This will be a family outing from 12 noon to 6 P.M. on June 7, 1964. Bring your own picnic or eat at park food centers. There will be prizes for the XYLs, children and the old man. Admission will be $1.00 for one, or $1.75 for the whole family. This includes admission and prize drawings. For tickets write to Tri-State Amateur Radio Association, Inc., 2933 Auburn Rd., Huntington, W. Va.

Kansas

The Central Kansas RC will sponsor its 16th annual hamfest in Salina at Kenwood Park on June 7 rain or shine. Registration $1 per person—each person to bring a covered dish. Drinks to be furnished by the club. Bingo for the ladies and children; contests, prizes, and FCC examinations are items planned. For further info contact Duane Beichley, KØJKA, 716 Charles, Salina, Kansas.

Nebraska

The Northeast Nebraska Radio Club's annual family picnic will be held on Sunday, June 14th on the Fairgrounds at Stanton, Nebraska. All Hams in that area are welcome.

Virginia

The 5th annual Breaks Interstate Hamfest will be held at the Breaks Interstate Park, Virginia on June 14. Take along your family, friends and a basket lunch. Refreshments, food and lodging also available at the park. For overnight accommodations write Superintendent, The Breaks Interstate Park, Breaks, Va. For additional information contact Eva Cartwright, P. O. Box 576, Hazard, Kentucky.

Florida

The Whip-Snappers Mobile A.R.C. of Okaloosa County, Fla., will hold a Hidden Transmitter Treasure Hunt, as part of the Annual "Billy Bowlegs" festival, June 14, 1964, at Fort Walton Beach, Fla. Frequencies monitored 3836, 29.560, 50.25 and 145.2. For further information contact W4UXW, P. O. Box 294, Shalimar, Florida.

[*Continued on page 90*]

There is just no better way of getting started in VHF than with the newest of the new in the Clegg line — the 22'er two meter transceiver. This ready-to-go station combines many of the fine features that have made the Clegg name famous in VHF ham circles for years plus refinements to make 2 meter AM phone operation more interesting and challenging. It is realistically priced — your distributor will have complete information.

Amateur Net Price **$239.50**

Features

RECEIVER

1. Dual conversion with crystal controlled first injection oscillator
2. Crystal lattice filter providing selectivity of about 10 KC at 6 db and less than 16 KC at 50 db
3. Freedom from spurious responses, IF leak through and images
4. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up
5. Full 143.8 MC to 148.2 MC coverage with calibrated tuning dial
6. Fine tuning control with approximately 25 KC range
7. Excellent AGC performance
8. NUVISTOR RF stage and low noise first mixer provide .2 μv sensitivity (10 db S + N to N)
9. 3 watts audio output available with self contained high efficiency speaker for operation in high ambient noise associated with mobile operation
10. Effective Automatic NOISE LIMITER

TRANSMITTER

1. Broadband exciter stages to simplify rapid QSY
2. High efficiency straight through final amplifier with crystal controlled 18 WATT input
3. High level plate and screen modulation with speech clipping for typical Clegg "HIGH TALK POWER" performance
4. PUSH TO TALK with provisions to switch external LINEAR and VFO
5. TRANSMITTER frequency SPOTTING SWITCH
6. Self contained universal solid state power supply for 115 volts AC and 12 volts DC
7. Tube line-up

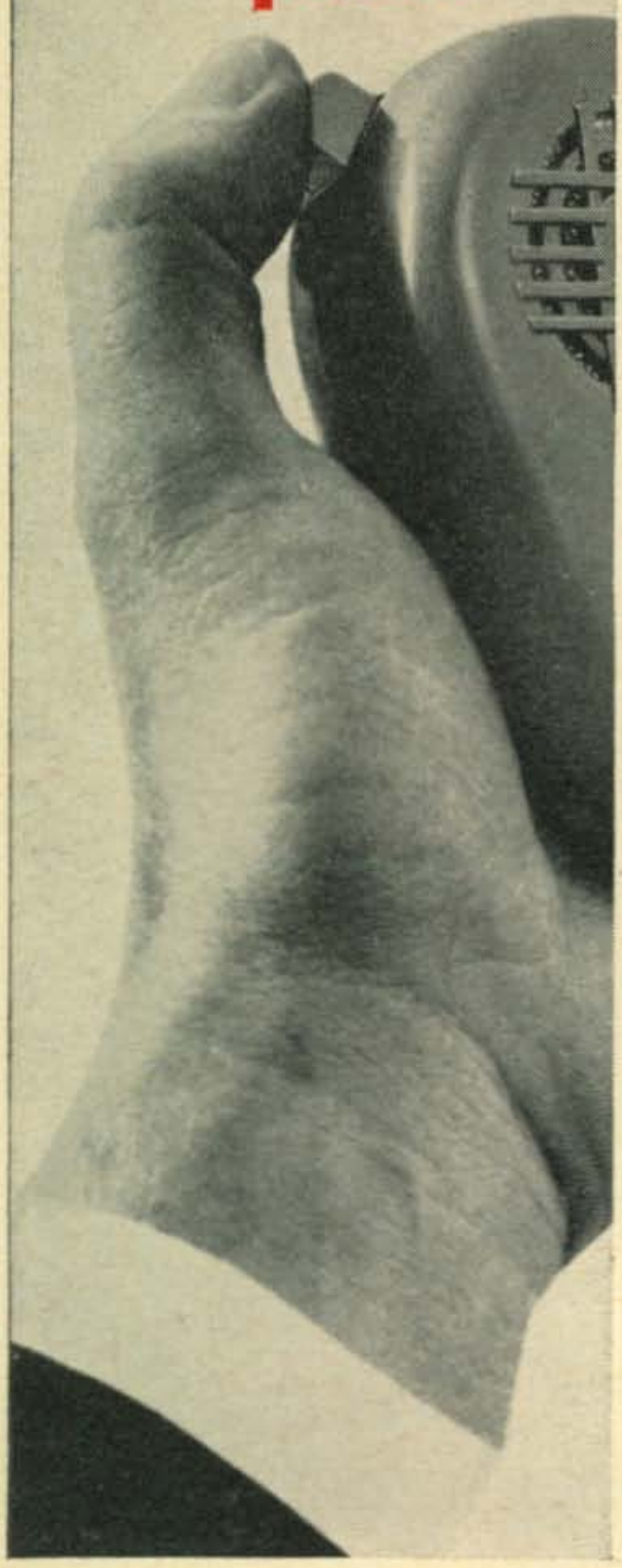
6CW4	Rcvr RF	12AX7	AF Amplifier
6KE8	Mixer/Xmtr Osc	6BQ5	Rcvr Audio Output/ Xmtr Modulator (2)
6KE8	VLO/Buffer		
6BA7	2nd Mixer	6EA8	Xmtr XLO/1st Multiplier
6AZ8	IF Amplifier		
6BA6	IF Amplifier	12BY7	Buffer Amplifier
6AL5	Diode Detector/ Noise Limiter	12BY7	Xmtr Driver
		2E26	Xmtr Final Amplifier

Squires - Sanders, Inc.

475 WATCHUNG AVENUE, WATCHUNG, N. J.

For further information, check number 21, on page 110

push



wait 100 milliseconds

talk

Harp cathode in new Amperex SSB twin tetrode permits full talk-power in 100 milliseconds!

Now the AMPEREX harp cathode—fastest-heating cathode ever produced—has been incorporated in a twin tetrode specially designed to provide excellent linearity in parallel for PEP outputs up to 158 watts ICAS, with third order IM distortion better than 30 db down!

With the AMPEREX Type 8300 RF linear amplifier tube—instant-heating version of the 8117—fast warm-up, excellent linearity and high efficiency are provided for mobile and portable SSB systems in the VHF range up to 175 mc. When operated under intermittent conditions, the 8300 has a plate dissipation rating of 34 watts per anode. Either forced air or heat sink cooling may be used when operating the 8300 at or near the maximum ratings.

TYPICAL OPERATION—AB, LINEAR RF AMPLIFIER, BOTH IN PARALLEL

Frequency	30	30 Mc.
D. C. Plate Voltage	1000	800 volts
D. C. Grid #2 Voltage	250	250 volts
D. C. Grid #1 Voltage	−34	−34 volts
Zero Signal D. C. Plate Current	50	50 ma
Effective RF Load Resistance	3100	2300 ohms
Average D. C. Plate Current*	131	130 ma
Peak RF Grid Voltage	34	34 volts
Average Plate Power Output*	70.5	56 watts
Peak Envelope Plate Power Output*	141	112 watts
3rd Order IM Distortion	30	30 db

*Conditions under two-tone modulation.

Also available: Indirectly-heated-cathode Types 8116 and 8117 with 26.5 V and 6.3 V heaters, respectively.

For detailed data on Type 8300 and other SSB tubes, write: Amperex Electronic Corporation, 230 Duffy Avenue, Hicksville, Long Island, New York.

In Canada: Philips Electron Devices Ltd., 116 Vanderhoof Ave., Toronto 17, Ont.

For further information, check number 23, on page 110

NEW FROM INTERNATIONAL

AOC*

SINGLE SIDEBAND FILTERS

- 9 mc center frequency
- Bandpass 6 db 3 kc (approximate)

ACF-4

ACF-2 Two-crystal filter circuit using low impedance link input and 2K resistive output load. Unwanted sideband rejection greater than 30 db. **$9.95**

ACF-4 Four-crystal filter circuit using nominal 600 ohm input and output. Unwanted sideband rejection greater than 40 db. **$18.95**

ACF-6 Six-crystal filter circuit using nominal 600 ohm input and output. Unwanted sideband rejection greater than 55 db. **$27.95**

MATCHING OSCILLATOR CRYSTALS for the ACF filter series. Recommended for use in OS-4 oscillator.
CY-6-9LO **$4.40**
CY-6-9HI **$4.40**

OS-4 Crystal Oscillator **$6.95**

SE-6F Mounting Case
Special AOC case for mounting filter plates. **$5.50**

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For further information, check number 20, on page 110

SB 33 SET FOR 15

lively, year-round DX band

SB-33 further supports its claim to being the **greatest SSB transceiver value available** by offering an exciting **fourth band,** 15 meters. Sun spot minimums not withstanding, 15 meters is frequently open for coast-to-coast and DX operation, proved this well during the recent phone DX contest by providing "pipe line" channels to South and Central America . . . to Europe from the East Coast . . . to JA, HL, VS1, VK and ZL from the West Coast. This band is ideal for SSB transceiver operation; the major activity being in the 21.25-21.45 mc U.S. phone band thereby allowing **all** stations—DX and otherwise—to be "zeroed".

Fixed or mobile, **SB-33** plays this band like a hot smash off the distant fences! The all-solid-state receiver performs in a manner that must be heard to be believed. Reminder: **SB-33** is **all-solid-state throughout** except for the RF driver and the husky, double PL-500's in the amplifier.

For those who want the **big** signal at modest cost, the **SB1-LA Linear Amplifier.** Delivers 1 KW P.E.P. on 80-40-20, 750 watts P.E.P. on 15.

VALUE CHECK LIST

Compare **everybody's** transceiver data and prices. **Read all the small print.**

	X	Y	Z	SB-33
Four bands: 80-40-20-15				✓
Built-in AC power supply				✓
Built-in speaker				✓
Panel-switchable sidebands				✓
Price . . complete as above				**389.50**

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So. San Francisco, Calif.

Please send full information on SB1-LA Linear and SB-33 Transceiver.

NAME

NUMBER STREET

CITY ZONE STATE

RAYTHEON

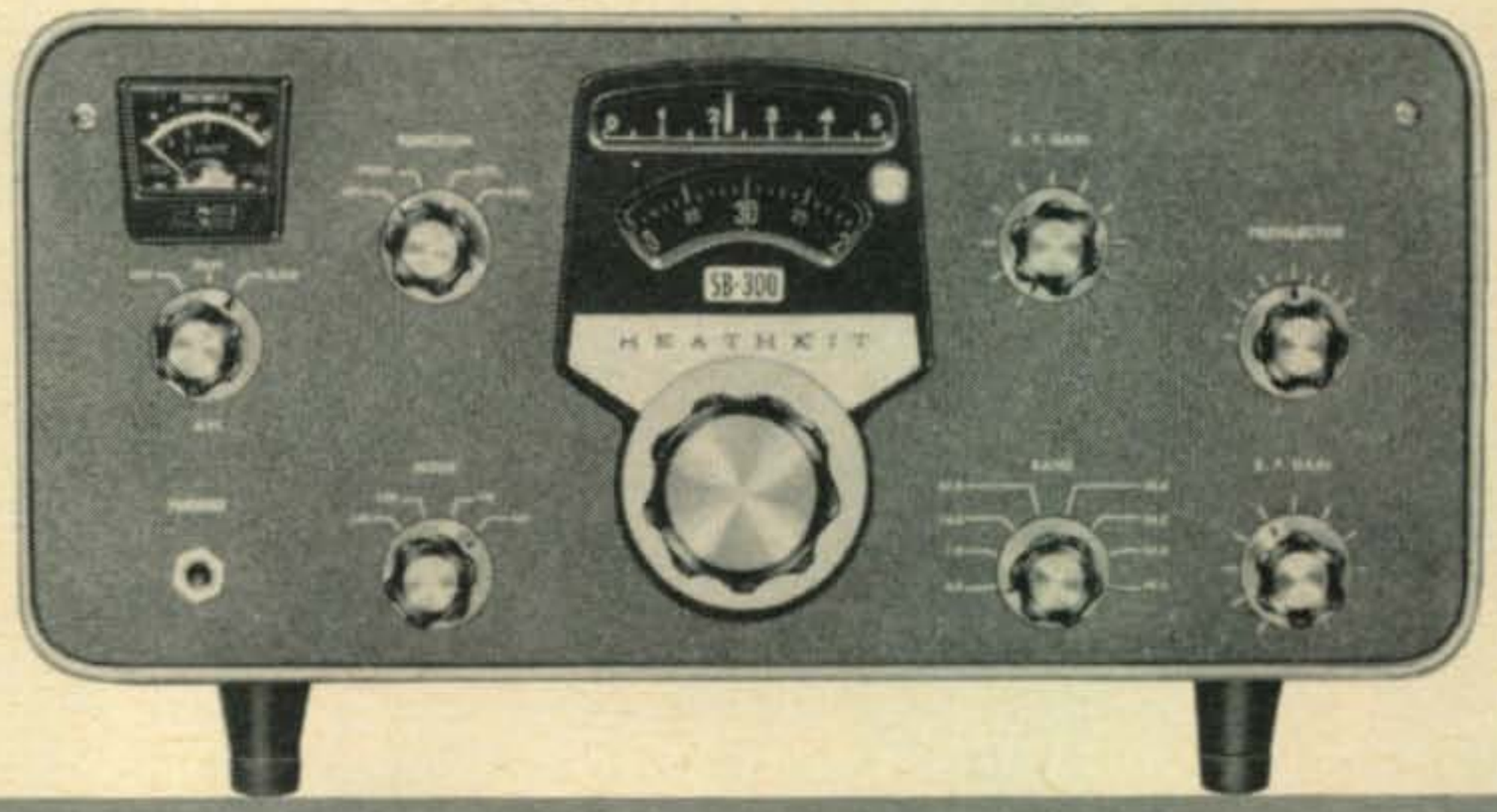
Export sales: Raytheon Company, International Sales & Services, Lexington 73, Massachusetts, U.S.A.

For further information, check number 25, on page 110

Now there are two in

#1

HEATHKIT SB-300 SSB-RECEIVER



• Everything you could ask for in a deluxe receiver and more! • Complete coverage of 80 through 10 meter amateur bands with all crystals furnished, plus provision for VHF converters • Crystal-controlled front-end for maximum stability on all bands • 1 kc dial calibrations—100 kc per dial revolution provides bandspread equal to 10 feet per megacycle—tuning knob to dial ratio approximately 4 to 1 • Provision for transceive operation with matching SB-400 Transmitter • Pre-built Linear Master Oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly • Professional styling and features at 60% savings

Good news travels fast! . . . especially on the amateur airwaves! Since its introduction, the Heathkit SB-300 has set the amateur world on its ear as one of the finest values in the industry! Deluxe styling and features now bring you a new dimension in quality, performance and dependability never before thought possible in kit form! . . . and by doing the easy assembly yourself you'll save 60% the cost of comparable units!

Experienced amateurs will quickly recognize the high standards to which this receiver was designed. Its many superb features include a crystal-controlled front-end for optimum stability on all bands, a pre-built Linear Master Oscillator (LMO) for linear tuning with 1 kc dial calibrations, a built-in crystal calibrator, hermetically-sealed 2.1 kc crystal band-pass filter, smooth non-backlash vernier dial mechanism . . . and many, many more! Order yours today!

Kit SB-300, less speaker
22 lbs., $27 dn., $22 mo.....$265.00
SBA-300-1 Optional AM crystal filter (3.75 kc) 1 lb.....$19.95
SBA-300-2 Optional CW crystal filter (400 cps) 1 lb.....$19.95
Export model available for 115/230 volts AC, 50-60 cps; write for details.

SB-300 SPECIFICATIONS—Frequency range (megacycles): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3,395 megacycles. **Frequency stability:** Less than 100 cps per hour after 20 min. warmup under normal ambient conditions. Less than 100 cps for ±10% line voltage variation. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** No more than 50 cps. **Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **Modes of operation:** Switch selected; LSB, USB, CW, AM. **Selectivity:** SSB: 2.1 kc at 6 db down, 5.0 kc at 60 db down (crystal filter supplied). AM: 3.75 kc at 6 db down, 10 kc at 60 db down (crystal filter available as accessory). CW: 400 cps at 6 db down, 2.5 kc at 60 db down (crystal filter available as accessory). **Spurious response:** image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Audio response:** SSB: 350 to 2450 cps nominal at 6 db. AM: 200 to 3500 cps nominal at 6 db. CW: 800 to 1200 cps nominal at 6 db. **Audio output impedance:** Unbalanced nominal 8 ohm speaker and high impedance headphone. **Audio output power:** 1 watt with less than 8% distortion. **Antenna input impedance:** 50 ohms nominal. **Muting:** Open external ground at Mute socket. **Crystal calibrator:** 100 kc crystal. **Front panel controls:** Main tuning dial; function switch; mode switch; AGC switch; band switch; AF gain control; RF gain control; preselector; phone jack. **Rear apron connections:** Accessory power plug; HF antenna; VHF #1 antenna; VHF #2 antenna; mute; spare; anti-trip; 500 ohm; 8 ohm speaker; line cord socket; heterodyne oscillator output; LMO output; BFO output; VHF converter switch. **Tube complement:** (1) 6BZ6 RF amplifier; (1) 6AU6 Heterodyne mixer; (1) 6AB4 Heterodyne oscillator; (1) 6AU6 LM osc.; (1) 6AU6 LMO mixer; (2) 6BA6 IF amplifier; (1) 6AU6 Crystal calibrator; (1) 6HF8 1st audio, audio output; (1) 6AS11 Product Detector, BFO, BFO Amplifier. **Power supply:** Transformer operated with silicon diode rectifiers. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14⅞" W x 6⅝" H x 13⅜" D. **Net weight:** 17 lbs.

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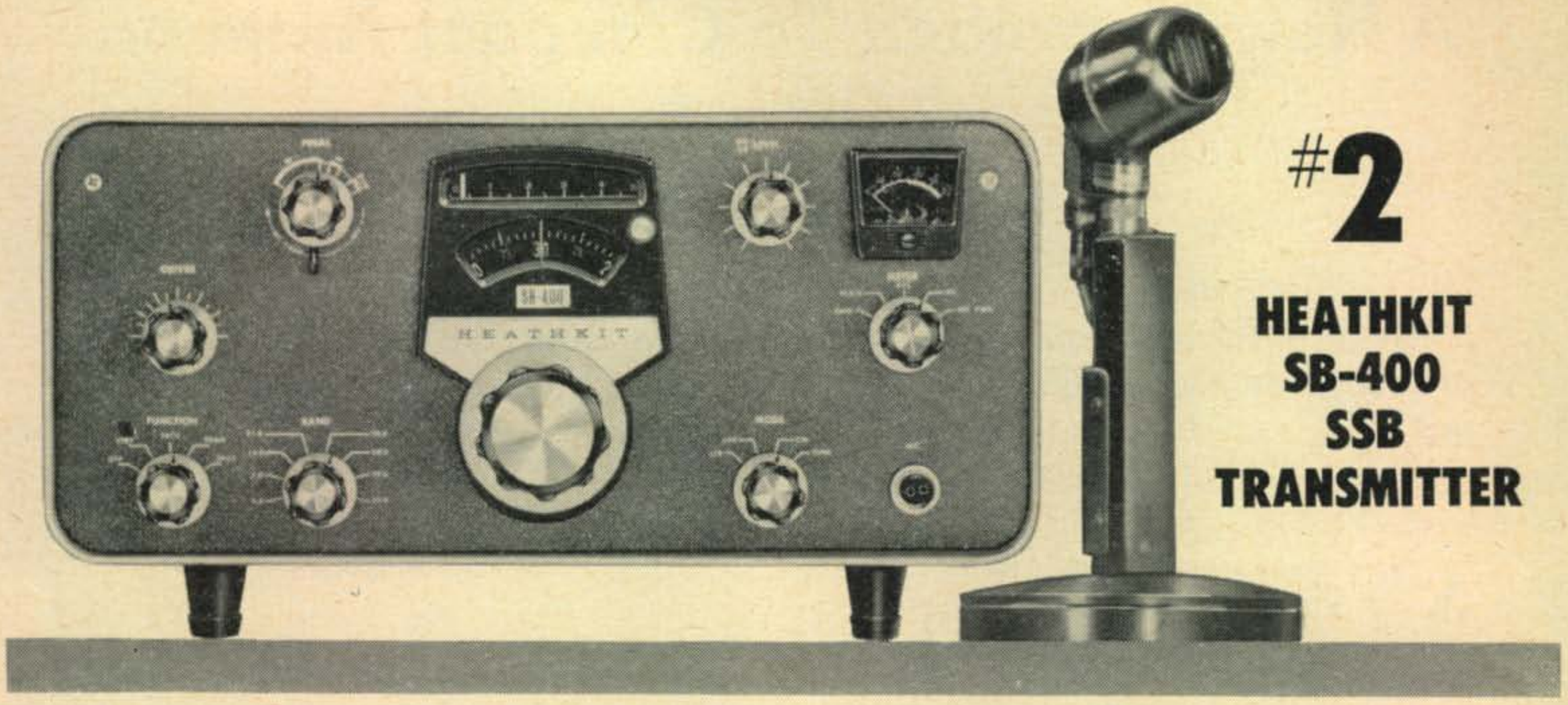
For further information, check number 26, on page 110

the HEATHKIT® SB series



#2

HEATHKIT SB-400 SSB TRANSMITTER

• Built-in power supply • Complete transceive capability with SB-300 Receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation • Operates SSB (upper or lower sideband) & CW • VOX & PTT control in SSB operation, VOX operated CW break-in using CW sidetone • CW "shift" transceive operation to eliminate transceiver chasing • Crystal controlled heterodyne oscillators • 1 kc dial calibration—100 kc per dial revolution • Dial bandspread equal to 10 feet per megacycle • 500 kc coverage per bandswitch position • Switched 120 V AC for external amplifier antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "low-boy" styling

Here it is . . . the new Heathkit SB-400 Transmitter . . . second in the exciting new Heathkit series of Deluxe SSB Amateur gear! Following the same high standards set by the Heathkit SB-300 Receiver, the new SB-400 Transmitter now offers a matching counterpart that permits complete transceive operation with a host of advanced engineering design features for unmatched performance, versatility and operating convenience!

Unique mechanical design . . . prebuilt Linear Master Oscillator (LMO) . . . built-in heavy-duty power supply . . . sturdy chassis construction . . . beautiful modern styling . . . and power-packed performance are just a few of the many features that make the SB-400 your best buy in an SSB Transmitter! Order yours today for "Deluxe" communications at tremendous do-it-yourself savings!

Kit SB-400. . .33 lbs. . . Write for credit details. $325.00 Export model available for 115/230 volts AC, 50-60 cps; write for details.

SB-400 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohm—less than 2:1 SWR. **Frequency range:** (mc) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. **Frequency stability:** Less than 100 cps per hr. after 20 min. warmup under normal ambient conditions. Less than 100 cps for ± 10% line voltage variation. **Carrier suppression:** 55 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kc. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **CW sidetone:** 1000 cps. **ALC characteristics:** 10 db or greater @ 0.2 ma final grid current. **Noise level:** 40 db below rated carrier. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** Less than 50 cps. **Oscillator feed-through/mixer products:** 55 db below rated output (except 3910 kc crossover which is 45 db). **Harmonic radiation:** 35 db below rated output. **Audio input:** High impedance microphone or phone patch. **Audio frequency response:** 350 to 2450 cps ±3 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅞" W x 6⅜" H x 13⅜" D.

Watch for the new SB-100 All-Band SSB Transceiver and SB-2001 KW Linear Amplifier soon to be released!

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For further information, check number 27, on page 110

The DDRR Antenna

A New Approach To Compact Antenna Design

BY CLIFFORD E. HICKS*, W4MIP

This unique antenna design is extremely compact, yet provides exceptionally efficient performance on frequencies from 2 through 150 mc. Developed and produced by Northrop's Ventura Division, a DDRR array will be installed by the Navy for shipboard use. This type of antenna should be of interest to radio amateurs where antenna space is restricted.

A NEW approach to compact antenna design is Northrop Corporation's DDRR (Directional Discontinuity Ring Radiator) developed and patented by J. M. Boyer, W6UYH, a member of the electro-magnetic research staff.[1]

The DDRR is a highly efficient omni-directional vertically-polarized radiator which offers a considerable height reduction over that of a full quarter-wave vertical antenna, compared to which it performs most favorably. It also may be tuned over a two-to-one frequency range with an s.w.r. within 2:1, although the efficiency drops off at the low frequency end of the range for which its dimensions are cut.

A DDRR may be built for any of the amateur bands from 160 meters down. It should be particularly attractive for use when the erection of a resonant full quarter-wave vertical antenna is impractical. In this respect, a shortened antenna often is used with resonance restored by means of lumped constants, such as a loading coil; however, the radiation efficiency of such an arrangement deteriorates considerably. The DDRR, besides being exceptionally efficient, offers a number of other advantages in regard to portable or mobile work. These will be pointed out later.

*178 Watson Circle, S.E., Atlanta 17, Georgia.

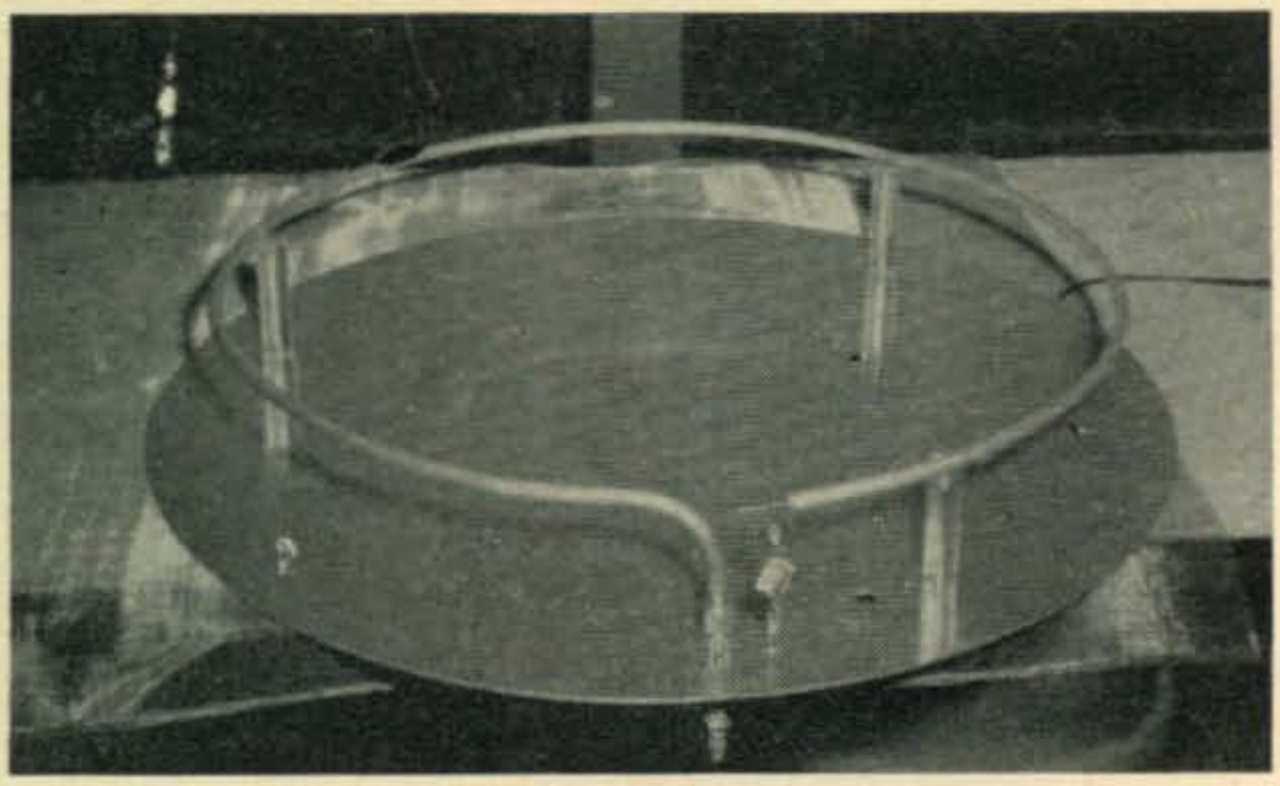
[1]J. M. Boyer, "Hula-Hoop Antennas: A Coming Trend?", *Electronics*, January 11, 1963, p. 44.

Dimensions

First, let us take a look at the physical and electrical properties of one type of DDRR. It consists of a single circular open-ended radiating element mounted in a horizontal plane a short distance above an electrical ground plane. See fig. 1. Best performance from this type of DDRR is obtained when the diameter, *D*, of the circular radiator is 0.078 wavelength (28 electrical degrees), in which case the electrical circumferential length will be a quarter wave and the element will be naturally resonant. The ring is mounted on insulators at a distance of approximately 0.007 wavelength (2.5 degrees) above the ground plane and it is left open for a short distance at point *A*. One end of this gap is connected to the ground plane at *B*.

In practice, where operation is at more than one frequency, the diameter of the ring is made slightly less than the aforementioned dimension (reducing the circumferential length) so that a variable capacitor, connected between the other end of the gap and the ground base, may be used to tune the system *exactly* to quarter-wave resonance.

A shunt-feed arrangement is used with the shield of the coaxial line connected to the ground plane and the inner conductor connected to an appropriate tap on the ring to provide the correct impedance match.



Overall bench-view of the 10 Meter DDRR antenna constructed by the author. Series feed is used directly to the ring radiator which is made of rigid coax. The small trimmer capacitor, used for tuning at the end of the ring, was eventually changed to a high-voltage type as it went up in smoke. Rigid coax may not be readily available, so it is recommended that ½ or ¾ inch copper tubing be used instead together with shunt feeding of the transmission line as shown in fig. 1.

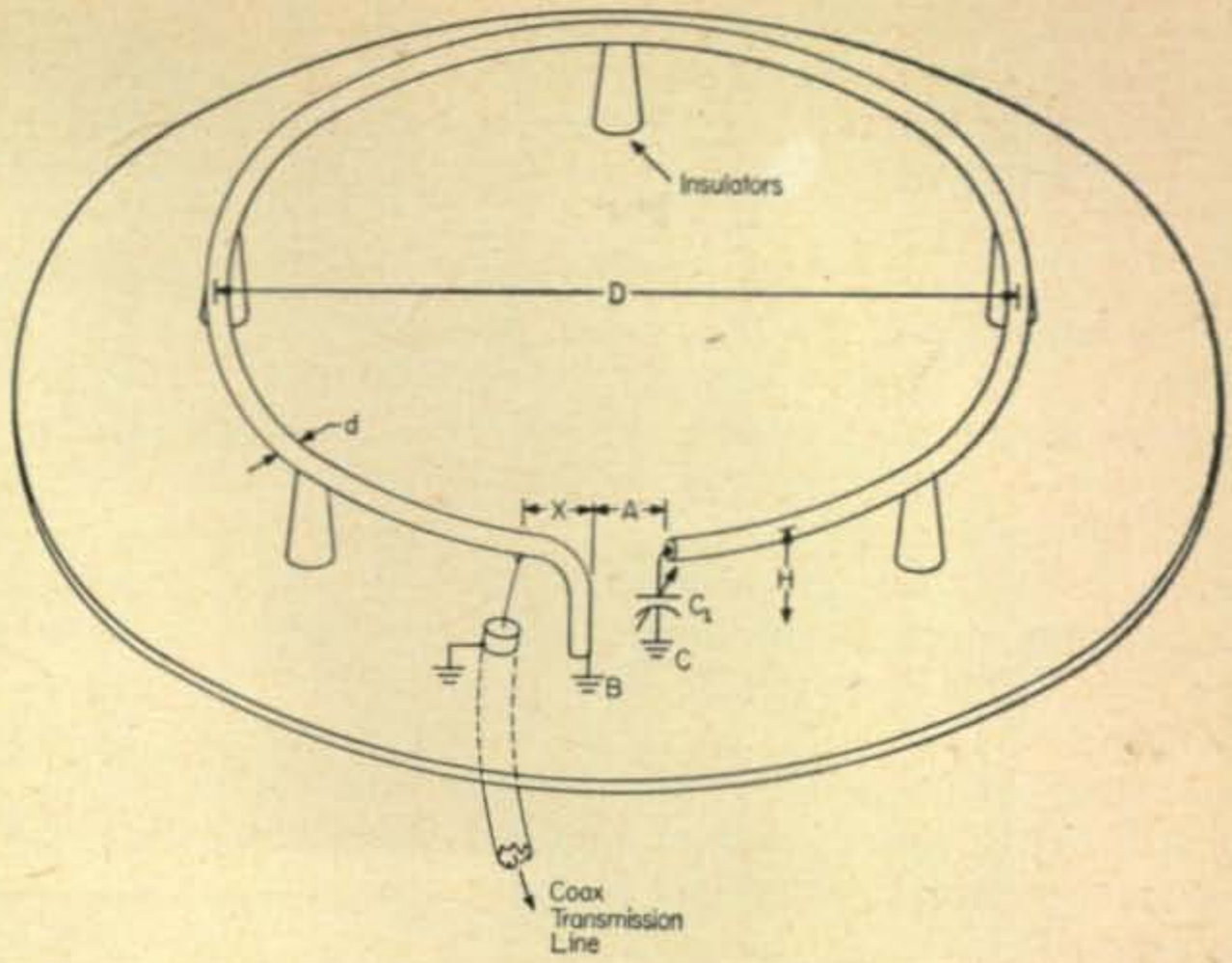


Fig. 1—Basic construction of the DDRR antenna. The critical dimensions illustrated are enumerated on a band-by-band basis in Table I.

Better performance and lower angle of radiation may be obtained when the ground plane is extended beyond the boundaries of the ring. This can be done by means of a large number of quarter-wave length radials; however, good performance was obtained with the high-frequency model, as shown here, using only a sheetmetal disc slightly larger than the radiator.

Operation

There appear to be some differences of opinion regarding the theory of operation for the DDRR, so no attempt to go into the matter will be made at this point; however, a version is given in the addenda. The important thing is that the antenna does work. The radiation is vertically polarized and an omni-directional field pattern is obtained from it.

By comparing the dimensions shown at fig. 1 with a quarter-wave antenna height of 68 feet for 4 mc operation, it can be seen that a height reduction of over 30 to 1 is attained. On the other hand, the dimension in the horizontal plane is increased, but not to impractical proportions.

The relative sizes of a DDRR and a quarter-wave vertical ground plane antenna also are indicated in the photographs of the two-meter models of both types which were built in *CQ*'s laboratory for comparative performance tests. A six-meter model is also shown with metal strips extended from the base to effect a better ground plane surface.

Efficiency

Radiation efficiency at 4 mc, measured by the originators of the DDRR, indicated it to be only 2.5 db less than that of a 68 foot quarter wave vertical antenna. When operated over a 2 to 1 frequency range, the efficiency dropped off gradually and at 2 mc was —15 db compared to a 110 foot quarter wave vertical for this frequency. The same DDRR was used in both cases. At 4 mc its diameter was 0.073 wavelength and its height was 0.008 wavelength, while at 2 mc its diameter was 0.036 wavelength and height was 0.004 wavelength. Thus, the efficiency is highest when the ring diameter approaches 0.078 wavelength and the natural circumferential electrical dimension nears a full quarter wave.

Portable and Mobile Applications

No doubt the major interest in the DDRR will probably pertain to low frequency fixed station operation, but its potentialities for portable and mobile work should not be overlooked.

First of all, its physical size is such that a DDRR, built for as low a band as 20 meters (diameter approximately 4½ feet) can easily be moved about and quickly set up for portable use, while one designed for mobile use may be mounted on top of the vehicle roof. Such a mobile setup will be more efficient than the usually used whip antenna. Also, the latter generally is quite directional, depending on just where it is mounted on the vehicle; the roof mounted DDRR is omni-directional.

Too, the wind resistance is low; there is no whipping around of the antenna and no signal-fluttering effect at high speeds and since the DDRR is grounded to the vehicle by direct connection, picked-up static charges are drained off to ground. Signal to noise ratio can thereby be improved. The DDRR is physically low, eliminating entanglement with tree limbs and simplifying garaging of the vehicle, as the antenna need not be lowered or removed.

Another advantage of the DDRR, for all types of service, is that it is a high *Q* tunable device

Table I—DDRR Antenna Dimensions

Band	*D*	*H*	*d*	*A*	*X*	C_1 (in mmf)
160	36′	48″	5″	18″	12″	100
80	18′	24″	5″	12″	6″	100
40	9′	12″	2.5″	6″	3″	75
20	4′6″	6″	1″	3″	1½″	50
15	3′4″	4½″	½″	2″	1″	35
10	2′3″	3″	½″	2″	¾″	25

which thus provides increased selectivity during reception, resulting in a minimization of adjacent-channel interference, image response and cross modulation.

10 Meter Model

The model built by the writer provided excellent results with 10 meter operation. The dimensions are as follows: ½ inch rigid coax line with a ring diameter of 30 inches and mounted on 6 inch high 1 inch round polystyrene pillars. The metal ground plane is one-quarter inch thick aluminum 35 inches in diameter. See Table I. Series feed, with a 52 ohm coax line, is used in this model instead of the shunt-feed arrangement. No feedline tap is needed, as the inner conductor of the transmission line is connected directly to that of the ring radiator.

The tuning capacitor, which is also connected to the inner conductor of the ring, but at the far end, is a modified Johnson 12G7 with all plates removed except two stators and one rotor. Maximum capacitance is about 6 mmf. Note that the spacing between the plates of the capacitor is quite large since the potential at this end of the ring is very high. (One of the photos shows a ceramic trimmer which quickly went up in smoke!) For 100 watts transmitter input, the capacitor should be rated up to about 4000 volts. A kw input would require a rating up to about 15 kv.

This model is not intended for mobile use, but when such installation is required, insulators on suction cups may be used to mount the ring on the vehicle roof, the latter then serving as the ground plane. If this is done, the ground connections for the ring, feedline and the tuning capacitor should be securely made. Paint should be removed at these points and connections soldered, if possible. Any resistance at these points can be fatal to DDRR efficiency.

The shaft of the tuning capacitor can pass through the top of the vehicle in order that the antenna may be tuned by the operator when the operating frequency is changed. A suitable non-metallic housing (polystyrene or plexiglass) also should cover the capacitor to protect it against various weather conditions.

Tune Up

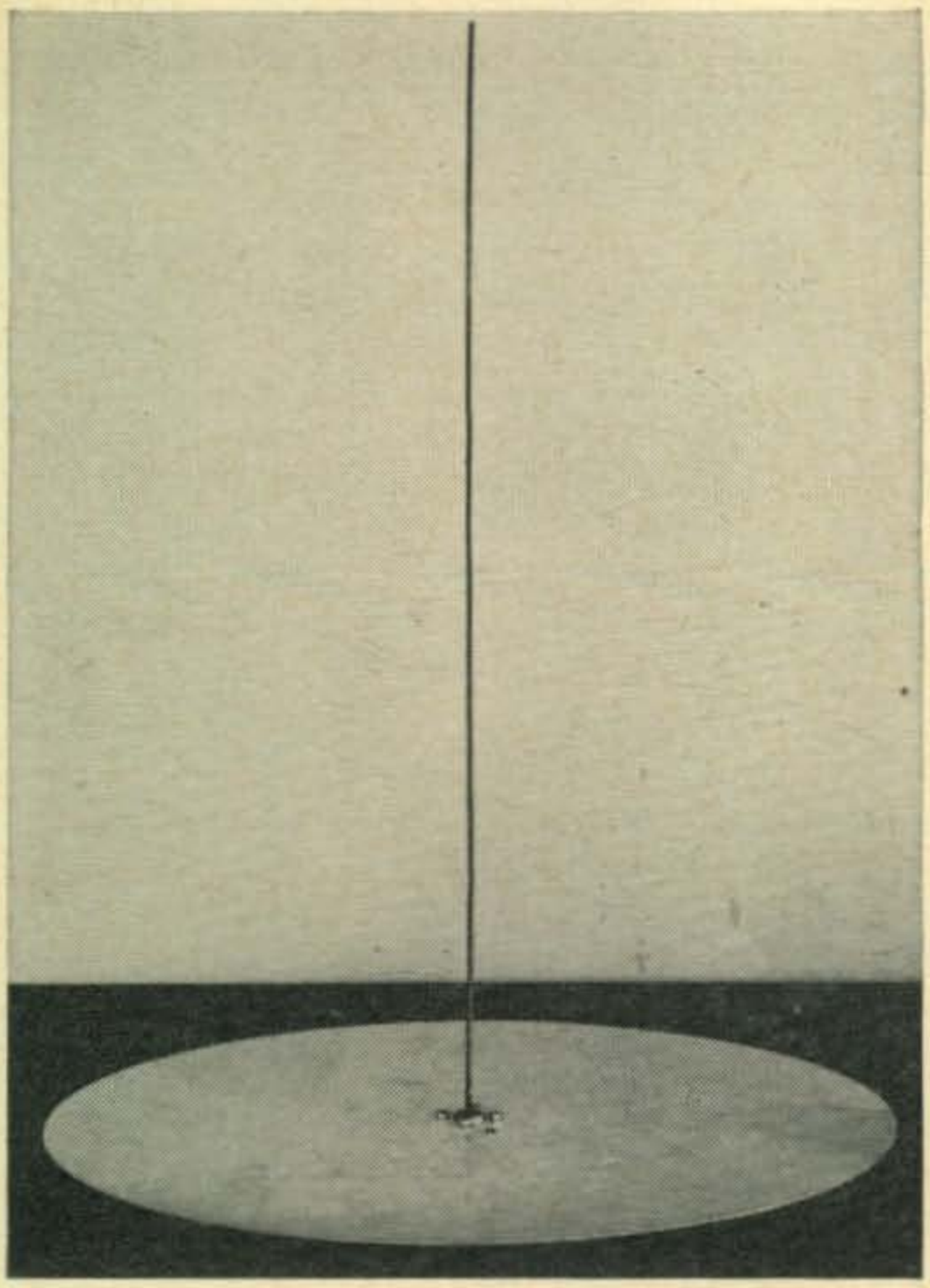
Tune-up simply involves the adjustment of the capacitor for a minimum standing wave ratio as indicated by an s.w.r. meter inserted in the transmission line. It should be possible to obtain an s.w.r. near 1.2 to 1; however, a ratio of up to 2 to 1 will still provide satisfactory results.

In the event a shunt fed DDRR is used, both the capacitor and the feedline tap should be adjusted for a minimum s.w.r. at the operating frequency. It may be found best to first adjust the capacitor for antenna resonance (no feedline connected) as indicated by a grid-dipper held inside the corner where the ring turns down for the ground connection.

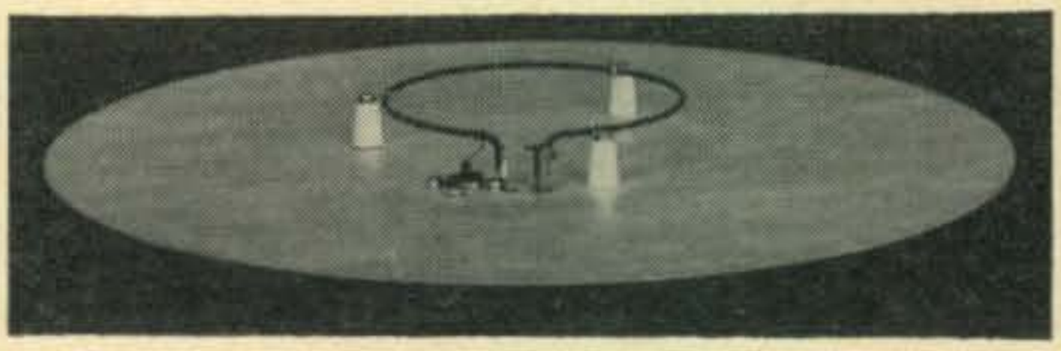
After the DDRR has initially been tuned and adjusted for a given frequency, a change in the frequency will require retuning. This may be facilitated by leaving an s.w.r. indicator (reflectometer type) in the line at all times for tuning to minimum s.w.r. as needed.

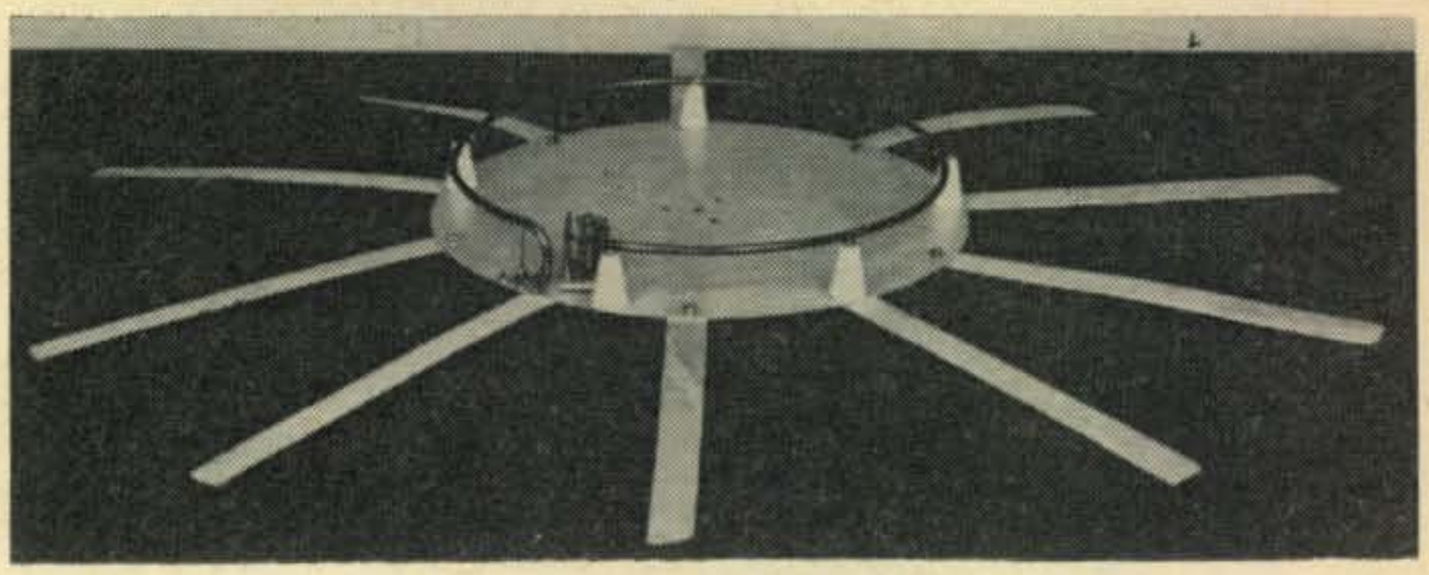
Another method is to peak up received signals with the tuning capacitor, after which the system will be tuned closely enough. If the DDRR is located where the capacitor cannot be conveniently reached for retuning, a remote control system using flexible shafting or a servo mechanism may be employed.

If two band operation is desired, the feedline tap must be selected for the lowest average s.w.r. This will be a compromise ratio to about 2:1 on both bands.



Size comparison of a typical DDRR antenna and ground plane for the same frequency. Both antennas are for the two meter band and are built on 16" aluminum recording discs.





A six meter DDRR built on a 16" recording disc with "spider web" extensions added to increase the effective ground plane area.

Construction

The dimensions for any one band given in the above table may be used for two-band operation with the next higher-meter band for a 2:1 frequency range. For instance, an 80 meter DDRR may be used on 160 meters also. In addition, a 10 meter antenna may be used for 15 and 20 meters too.

For maximum efficiency, the ring diameter, *D*, should be 0.078 wavelength at the highest frequency used; however, the given dimensions are slightly shorter than this in order that C_1 may be added to permit simple tuning to exact resonance whenever the operating frequency is changed.

The ring may be made from any good conductor such as copper tubing, aluminum conduit or copper leader pipe. If the latter is used, the ring element may be made with short lengths of the pipe, mitered and soldered together at the ends, to form a multi-sided polygon.

The ground plane may be made of copper, aluminum[2], galvanized sheet metal or hardware cloth. The diameter should be at least 25% larger than that of the ring. If the ground conductivity is poor, it will be best to enlarge the ground plane by soldering quarter-wave radials, made of copper wire, to the edges of the metal sheet.

The height, *H*, is not critical, as long as the minimum is that indicated. An increase in height will raise the efficiency slightly.

If single band operation is contemplated, the conductor diameter, *d*, may be reduced. When this is done, the bandpass over which a low s.w.r. may be maintained is decreased, so a reduction in *d* is not recommended for two band operation.

Dimension *X* is approximate. It must be determined experimentally, since the proper matching point will depend on a number of variables, including conductor diameter, ring height, transmission-line impedance and ground-plane configuration and conductivity.

Dual-band operation will require an increase in the value of C_1 of approximately five times.

[2]Aluminum is satisfactory but must not be permitted to oxidize or performance will deteriorate seriously.

Results

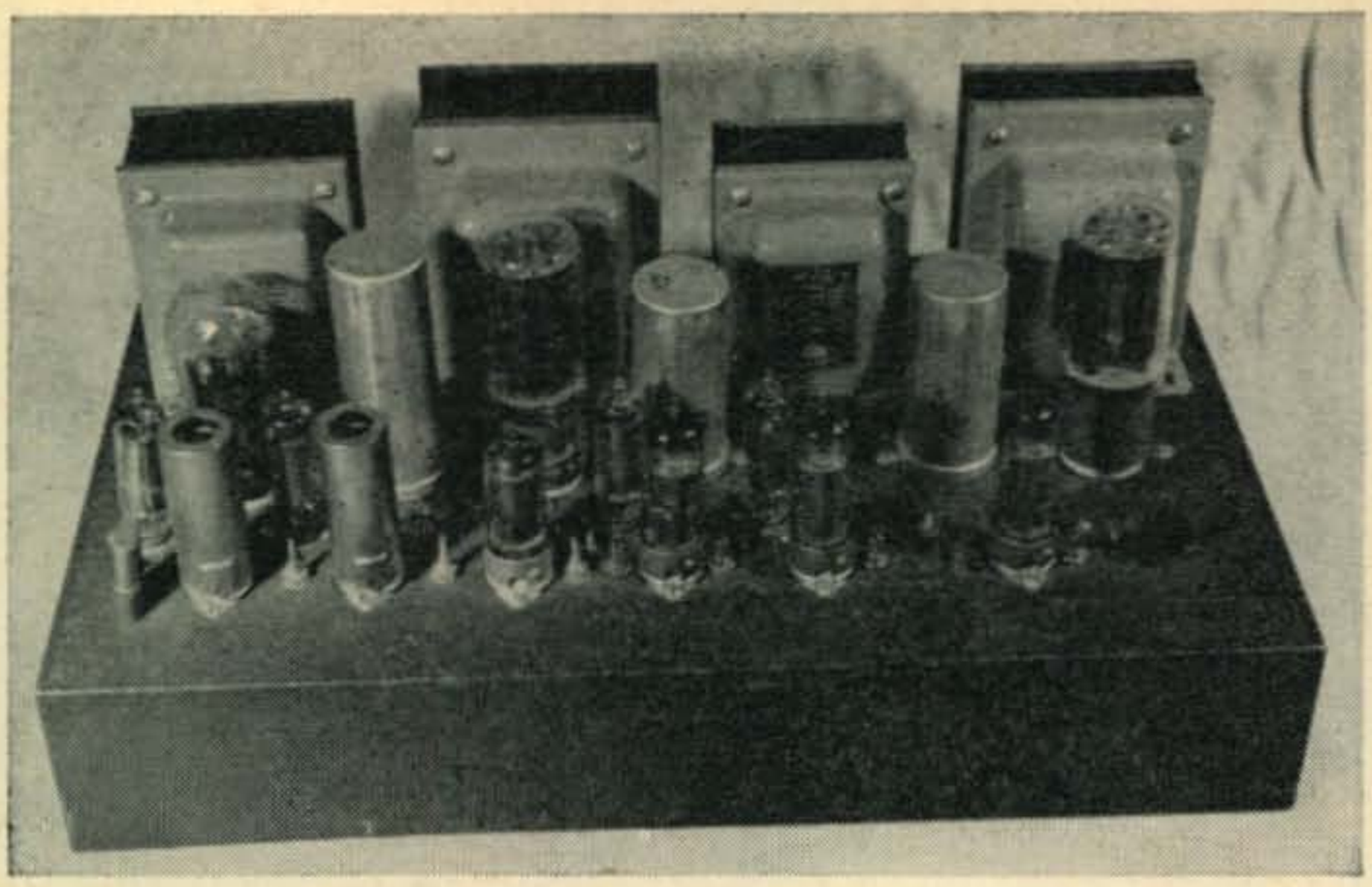
The performance of the 10 meter DDRR was found to be most gratifying. It also functions nicely on 27,575 kc which is the operating frequency for this Army Post. With a transmitter power of 30 watts, on-the-air reports from other base stations located in Phoenix, Arizona and in Seattle, Washington indicated reception of transmissions from the DDRR to be as good as that from a vertical quarter-wave ground plane antenna mounted 30 feet high. During these transmissions, the DDRR was located 2 feet above the floor of a cement-block building!

A larger model for low frequency work was not constructed, but from the information obtained thus far, the DDRR looks like a "natural" for restricted space use on the lower bands. ■

Addenda

The new DDRR may be regarded as a form of slot antenna. In the conventional slot antenna or magnetic dipole, a rectangular aperture is cut into a metal sheet and the resulting gap shunt fed.[3] In such conventional slot antennas, excitation of the slot sets up currents on the metal sheet which actually accomplish the radiation of fields into space. In the DDRR the "slot" is formed in the space between the ring and the ground plane immediately below. From figure 1 it can be seen that the feed launches a wave into the curved "transmission line" or slot, the wave moving toward the open end at the speed of light. When such wave reaches the open end of the ring it is reflected and now on the return trip interferes with the outgoing wave producing standing waves in the slot gap. On both the outgoing and return trip the wave radiates a part of itself to space. At the same time the ground post functions as a "second antenna" in the form of a short height, electrically loaded monopole. The combination of fields from both these sources form the effective radiation from a DDRR antenna. A horizontally polarized field, radiated directly by current flowing around the ring, is cancelled out by an equal and opposite field radiated by the image of the ring in the ground plane. Hence, what looks to us like a horizontally polarized loop antenna actually functions like a vertical dipole antenna.

[3]Kraus, J. D., *Antennas*, McGraw Hill, page 354.



Three quarter view of the 220 mc s.s.b. converter shows the crystal at the left end followed by three 6CL6s to provide an output of 205.998 mc. This is followed by three 6360s, the mixer, driver and final. The antenna tuning capacitor C_5 is on the extreme right. The three power supplies are arranged across the rear of the chassis.

A 220 Mc S.S.B. Converter

BY VICTOR H. ZIMINSKI*, W4LIP

The converter described below heterodynes a 14 mc s.s.b. signal to the 220 mc band. It can provide a single tone output of 5 watts. The generous power supply arrangement lends a high degree of stability.

SOMETHING of special interest is 220 mc single sideband. Analyzing the results obtained by the use of 50 mc and 144 mc sideband, causes small wonder at the increasing interest in its use on the higher frequencies. The mixer has been in use for some two years. It is responsible for the first two-way 220 mc single sideband contact in the State of Florida.

The circuits are straightforward without any trick or difficult circuits used. Components are such that can be easily obtained from any wholesale house. For this reason, no surplus items were used.

Anyone possessing a grid dip meter and some experience in v.h.f. construction can easily duplicate this mixer.

Circuit Description

A 6CL6 34.333 mc crystal oscillator is multiplied up to 206 mc in two 6CL6 stages. A 14 mc s.s.b. signal is mixed in a 6360 with the 206 mc for a resultant 220 mc s.s.b. signal. Another 6360 operating as a Class A linear driver followed by a 6360 operating AB-1 provides a single tone output of five watts.

Those accustomed to tube performance at the lower frequencies may not think of this as high power sensitivity, but few tubes do well at this frequency.

The mixer is of somewhat more complexity than is common in v.h.f. design in the interest of stable operation and adequate drive at 220 mc.

The power supply seems overly stiff and was used to insure a faithful reproduction of the 14 mc injection s.s.b. signal. The oscillator is arranged for harmonic output, although it was found unnecessary to use a lower frequency crystal. A resistive pad for swamping higher power exciters must also provide the cathode return for V_4. No swamping is required for the Central Electronics exciters 10A or 10B and the cathode return is through the tapped output tank coil. The output of this type exciter is just adequate for the V_4 mixer.

Construction

The converter is built on a 17" × 10" × 3" chassis. Power transformers and chokes are mounted across the back of the chassis. Tubes V_1 to V_5 are two inches on centers other than V_5 to V_6 which are 2½". This provides adequate spacing for the coil forms and variable capacitors. Usual v.h.f. precautions of short leads and bypass connections should be followed.

Tune Up

All coils should be grid dipped to frequency. Loosely couple coils L_5 through L_9. Remove rectifier V_{13} and tune coils L_1 to L_3 for maximum output as indicated with the grid dip meter set for r.f. output indication. With V_{13} reinserted, inject some 14 mc carrier from the s.s.b. exciter. With some type of r.f. indicator connected to the output of V_6, tune all circuits for maximum output. An Electro Impulse R.F. Wattmeter, ME-

*328 N.E. 89th Street, Miami, Florida.

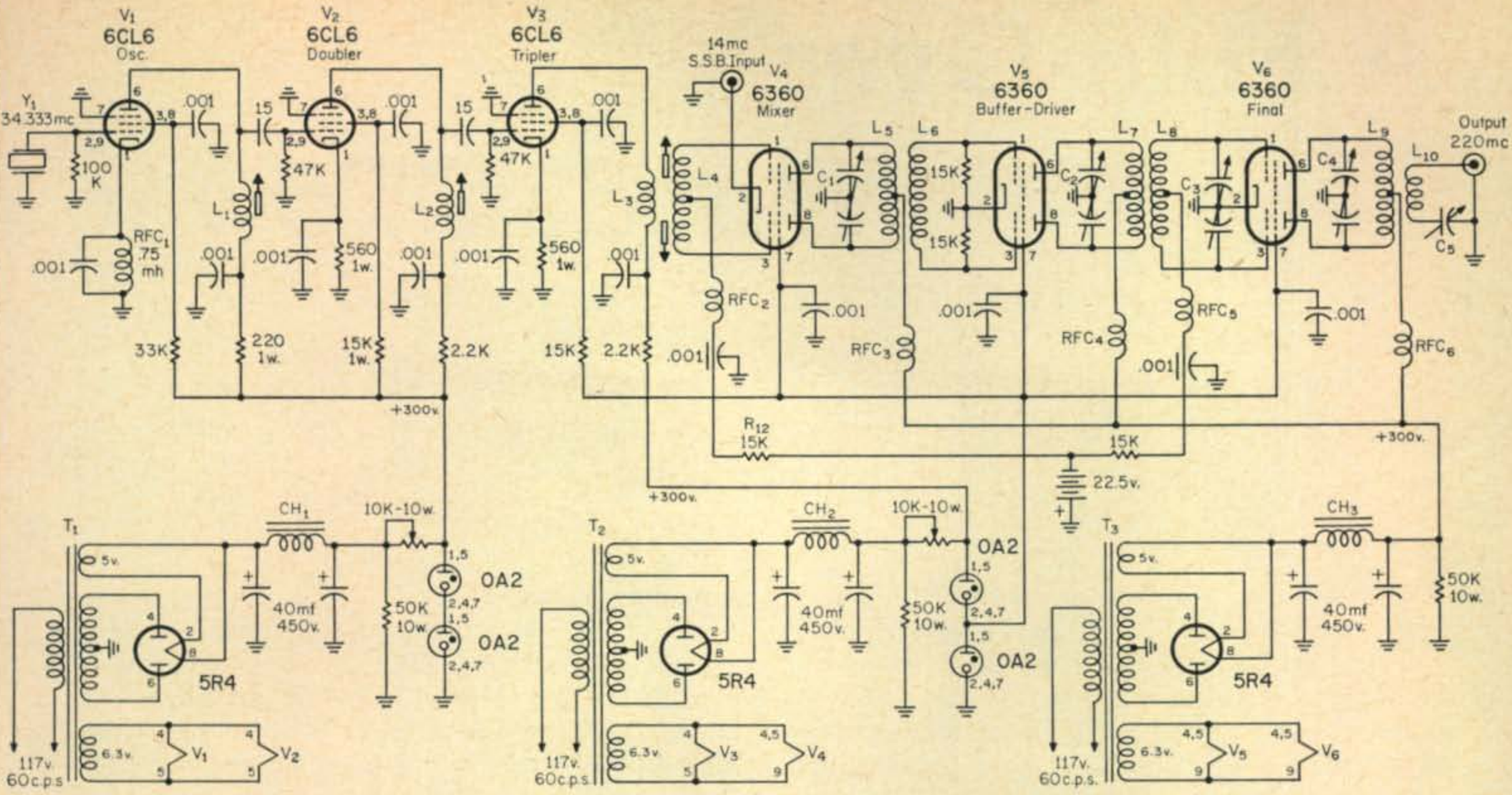


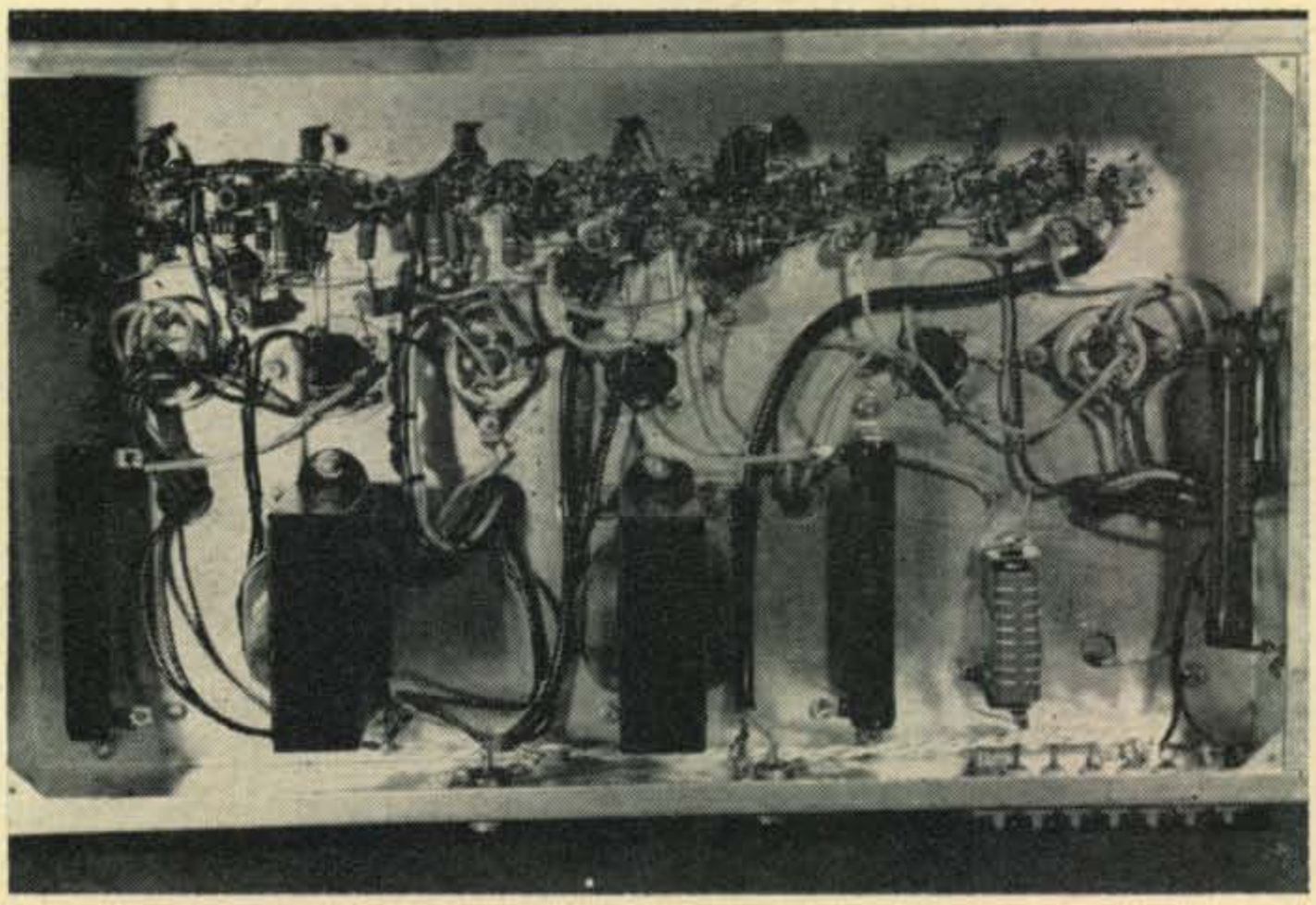
Fig. 1—Circuit of the 220 mc s.s.b. converter. All capacitors greater than one are in mmf, less than one in mf unless otherwise noted. All resistors are ½ watt and in ohms unless otherwise noted.

C_1, C_2, C_3, C_4—2.7-10.8 mmf butterfly variable. Johnson 160-211 or equiv.
C_5—1.5-5 mmf variable. Johnson 160-102 or equiv.
L_1—15t. #26 e. on Miller #4500 form.
L_2—6t. #20 e. on Miller #4500 form.
L_3—2t. #20 e. on Miller #4500 form.
L_4—2t. #20 e. loosely coupled to L_3.
L_5—4t. #20 e. ⅝" dia., 1" long.
L_6—4t. #20 e. ⅝" dia., 1" long. Close coupled to center of L_5.
L_7—4t. #20 e. ⅝" dia., 1" long.
L_8—2t. #20 e. ⅝" dia., 1" long. Close coupled to center of L_7.
L_9—4t. #20 e. ⅝" dia., 1" long.
L_{10}—2t. #20 e. ⅝" dia., 1" long. Close coupled to center of L_9.
RFC_1—.75 mh
RFC_2, RFC_3, RFC_4, RFC_5, RFC_6—20t. #26 on a 47 ohm 2 watt resistor.
T_1—700 v.c.t. at 125 ma. Triad R-14A or equiv.
T_2—700 v.c.t. at 200 ma. Triad R-20A or equiv.
T_3—800 v.c.t. at 140 ma. Triad R-72A or equiv.

11A/U was used with excellent results. Some care is necessary in adjusting the inductive coupling between stages.

Results

The mixer operates smoothly, putting out a clean stable signal. Due to the fact that two amplifier stages follow the mixer stage V_4, distortion products are down to a minimum. Forgetting s.s.b. for the moment, c.w. output by the heterodyne method is a new experience to those who have copied some of the present day 220 mc c.w. signals. C.w. contacts have been made with stations using receiver passbands narrowed down to 200 cycles without reports of drift. The ardent v.h.f. amateur who has been indoctrinated in the many advantages of s.s.b. will find much enjoyment in his ability to dispense with the slow a.m. monologue QSO's by the use of this mixer. The pioneering instinct of radio amateur's will soon make s.s.b. commonplace on all the higher frequency bands. ■



Bottom view of the 220 mc s.s.b. converter. The oscillator multiplier chain starts in the upper left corner and runs until the first 6360 mixer. Here the 14 mc s.s.b. signal, fed from the left connector on the rear, is mixed with the 205.998 mc signal. The butterfly variables tuning the 220 mc stages are placed between the 6360's and are tuned from the top of the chassis. The power supply components are located in the rear of the chassis with the bias battery to the right.

A Fold-Over Wooden Tower

BY FREDERICK E. WARTH JR.*, K4TZN

This 35 foot fold-over tower is built using a 20 foot 6 × 6 as the main support and a fold-over section made of two by fours. The total cost is less than $20.

THE old forty-foot wooden tower I had built some four and a half years ago was literally on its last leg. The other three legs, being held together with make-shift splints and the grace of God, were making only a token gesture at holding the tower up. The scars of several hurricanes that had passed through or near here during its lifetime were signalling that the end was in sight. Each year we found it necessary to add more and stronger guys until finally, along with the tri-band cubical quad topping the tower and the eighty and forty meter dipoles crossing the house, it looked as though a gargantuan spider was weaving its evil webb about the house in order to snare some unsuspecting jet passing on its way from the near-by Air Force Base.

The cubical quad was also as old as the tower, sagging badly, and the bamboo spreaders were split unmercifully, with gaping wounds running the entire length of some of them. Something had to give—and it did. Upon returning home from work one day recently, we discovered, when we took our daily apprehensive glance at this sacrilegious monument to Marconi, that one of the spreaders on the reflector had finally broken in two and the wires were drooping like the proverbial wet noodles. That did it! We couldn't back away any longer from the fact that our antenna system would have to be rebuilt from top to bottom as soon as possible. We had procrastinated long enough.

Fortunately, we had anticipated the coming of this point in the ever-flowing stream of time and had formulated some ideas on the subject. The next installation had to be a completely self-supporting fold-over tower, at least one quarter wave-length tall at 20 meters, and easy on the pocketbook. Of course, the ideal thing to do would be to order one of those fancy, self-supporting, telescoping, fold-over, steel towers, seventy-five or more feet tall, and have it installed by professionals. Since, however, we had very little excess funds that we could earmark for ham radio activities, the buying of even a thirty-foot tower was out of the question.

*1702 E. 50th St., Savannah, Georgia.

View of the cubical quad atop the partially tilted tower.

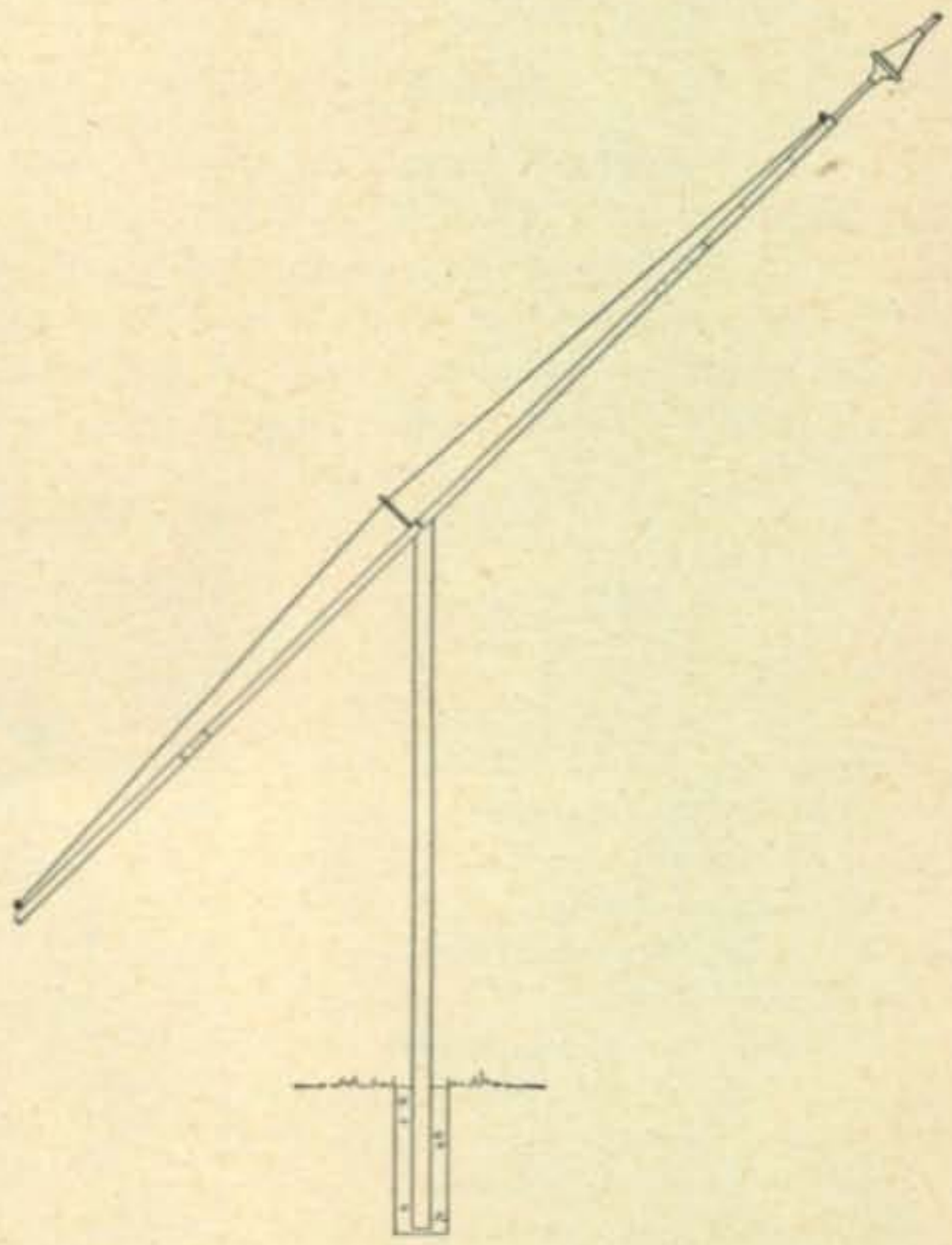


Fig. 1—Side view of the 35 foot fold-over tower built for less than $20. Stay wires run the full length of the fold-over portion to prevent bend.

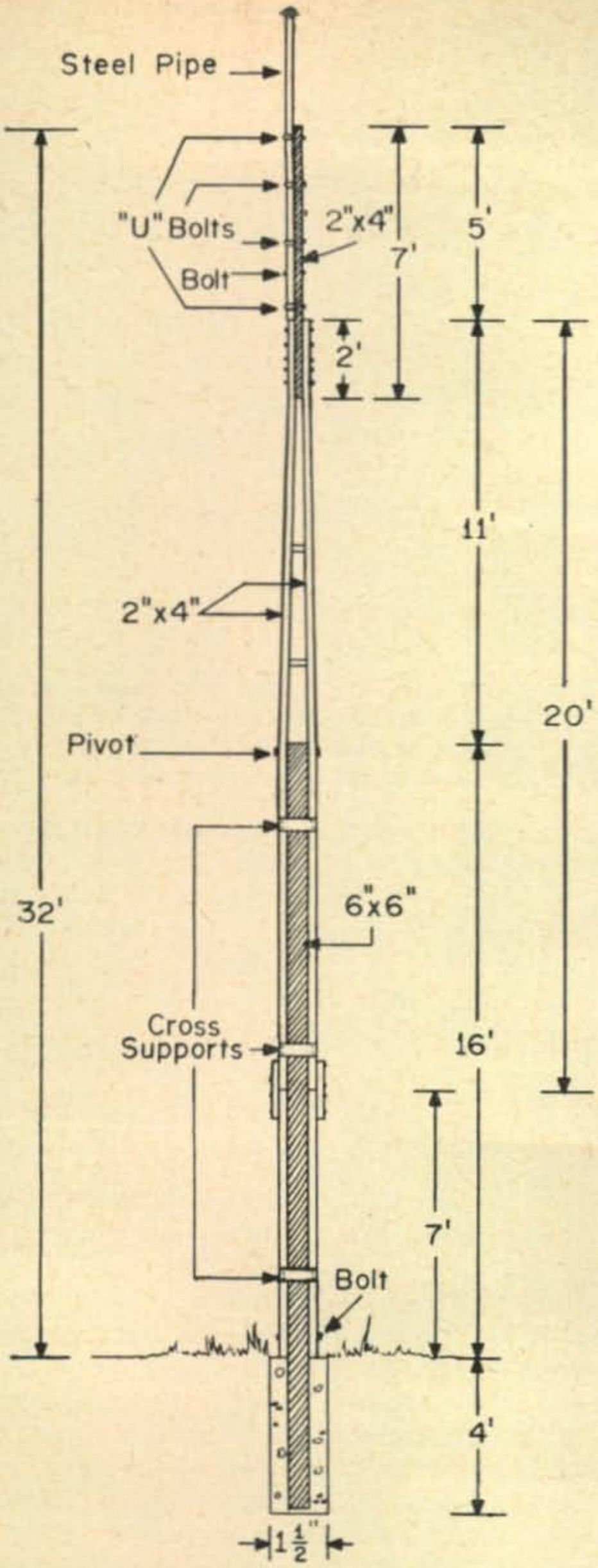


Fig. 2—Back view of the fold-over tower shows the dimensions. The 6×6 is firmly anchored in 4 feet of concrete. The cross supports between the two by fours are secured with galvanized nails.

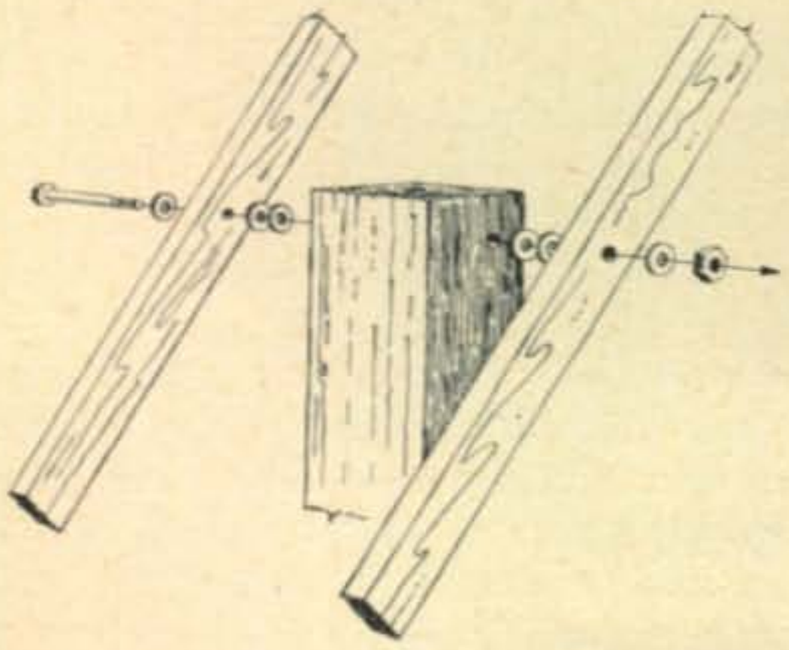


Fig. 3—Detail of the top pivot shows the use of a ½" carriage bolt 10" long.

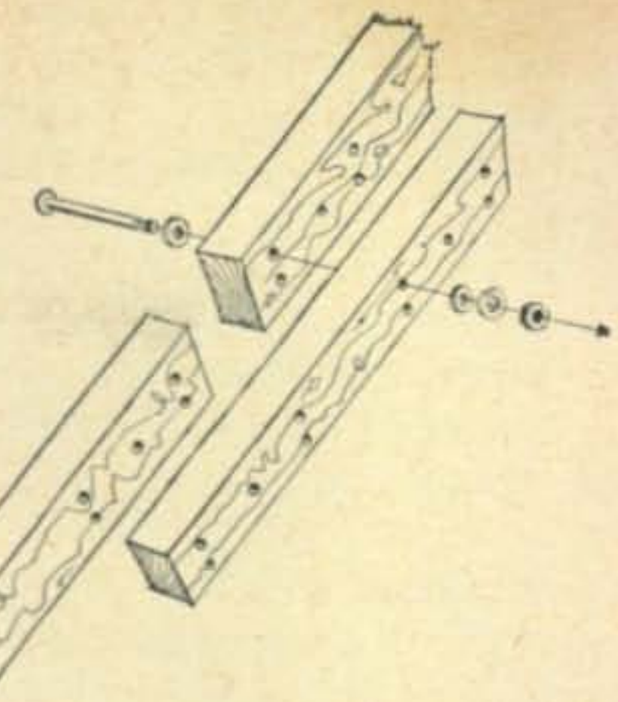


Fig. 4—Method of splicing the two by fours to get the complete length. For maximum strength the ends of the two lengths should butt square.

Construction

After some deliberation and several sketches, we finally came up with the following design: Figure 1 shows a side-view of the tower partially folded over. The main body of the tower is a 6" × 6" section of wood twenty feet long with four feet of it buried in a block of concrete 1½' × 1½' × 4'1". The one inch of concrete was poured before the 6" × 6" was dropped into the hole in an attempt to completely seal off the butt end of the tower with concrete. The fold over portion of the tower is made up of two by fours having a total length of thirty-two feet, as shown in fig. 1 and fig. 2. With the addition of steel pipe and a TV rotor, we were able to fasten the boom of the quad at the thirty-five foot mark. You will also notice in fig. 1 that stay wires

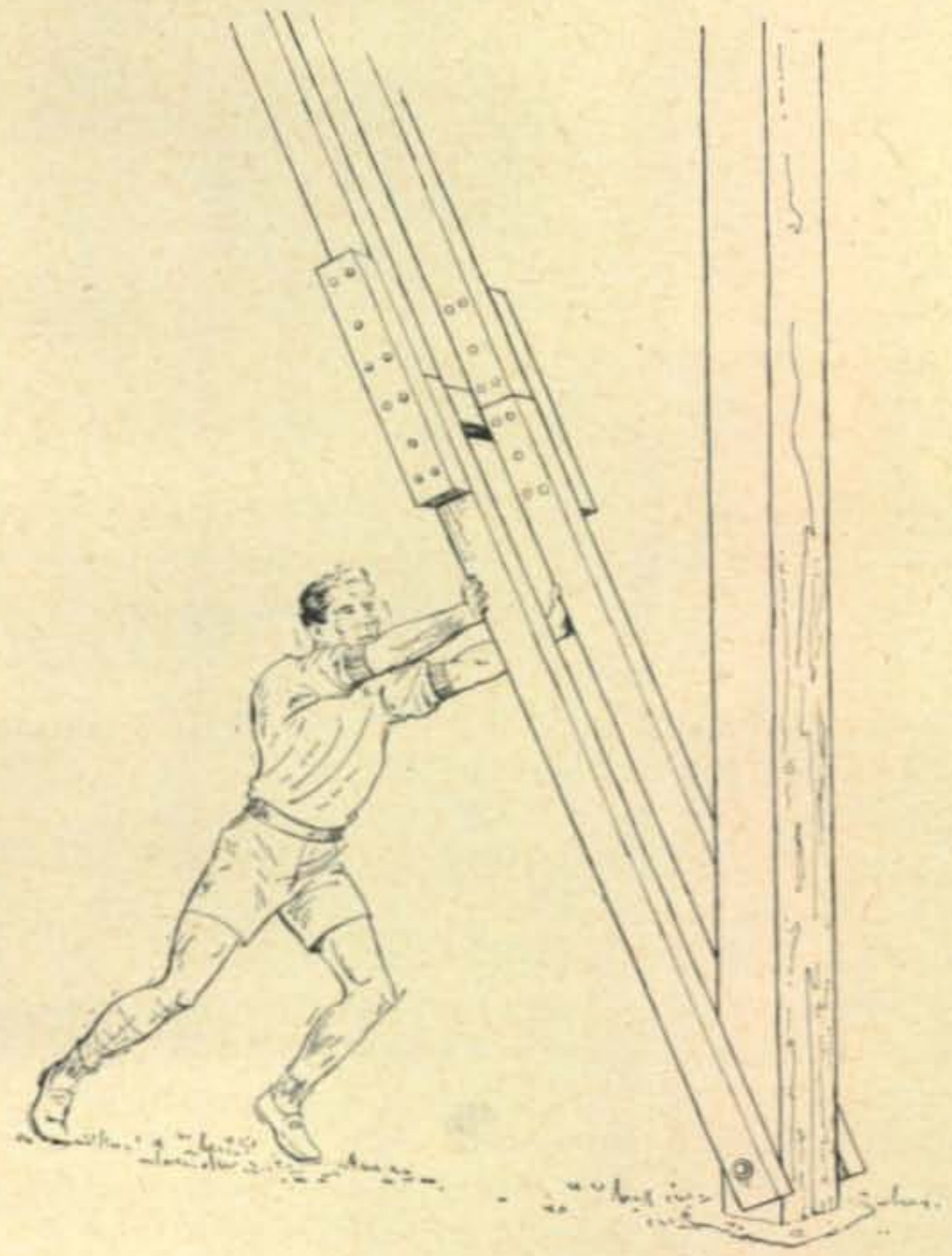


Fig. 5—Method of walking the mast up after inserting the base pin. Perhaps a few cans of liquid refreshment might get a few helpers.

run the entire length of the fold-over portion. The eye bolts at the center of the wires should be as long as possible, without causing the stays to come in contact with the quad (or whatever antenna you use). These wires were added as an afterthought when we discovered, upon rocking the fully loaded tower over, that the two by fours had more bend to them than we had anticipated. However, we folded the tower over several times before we decided that these stays would be necessary.

The whole tower is bolted together with the exception of the 2 × 4 cross supports (as can be seen in fig. 2) which are nailed on with galvanized nails. In fig. 3 you can see how the tower was fastened together at the pivot point. A ½" carriage bolt 10" long was used as the pivot and another carriage bolt the same size was used at the bottom of the tower to pin it in place. Figure 4 shows how the two by fours were spliced together to get the necessary length. When making this splice, be sure that the ends are squared off cleanly and butt tightly together. Quarter inch round head bolts were used for this joint and five-sixteenth inch bolts were used to secure the top section of the two by fours.

Needless to say, the best grade of wood should be used. We found, also, that lumber was not uniformly priced at the various lumber companies here in town and with a little shopping we were able to get wood at a reasonable price. For example, to our surprise, we were able to get the twenty foot six by six for only seven dollars.

We could not resist the temptation to get a little fancy with this tower, so we stained it with oak wipe-on stain and covered it with several coats of Spar varnish. The lower four feet of the 6" × 6" imbedded in concrete was first painted with about four coats of aluminum paint. The cost of this tower could be held down by painting it entirely with aluminum paint, but we felt that it would be much more attractive and less conspicuous to the neighbors if we used the stain and varnish.

Installation

Erecting the 6 × 6 was a simple matter with

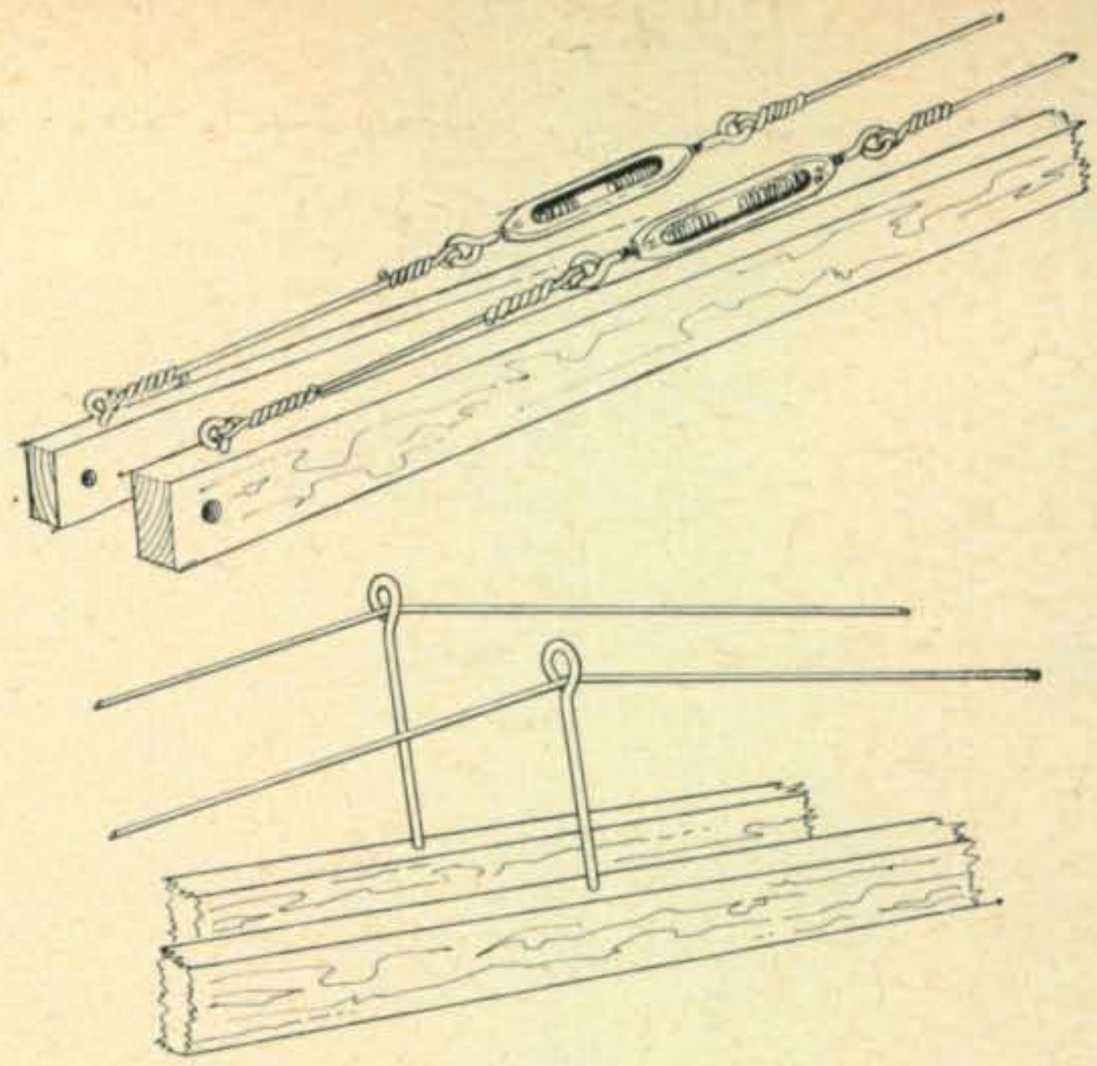


Fig. 6—(A) Details of how the turnbuckles are secured at the base end and (B) how they pass through the eyes at the center. The top eye bolts are located where the two by fours come together.

the aid of three friends. After the concrete was poured and allowed to harden for a couple of days, we were able to add the fold-over section using our own muscle power. The method used was to pin the bottom of the fold-over section to the bottom of the 6 × 6 and simply walk it up (see fig. 5). The cross supports kept it from falling past the 6" × 6". Once in position, a ladder was used to climb to the pivot point and insert the carriage bolt.

We must confess that with the addition of the rotor and the repaired quad, it is not easy to rock this configuration up and down by ourself although we do it all the time. The addition of something like lead bricks as counter weights and a crank would be a nice refinement and we highly recommend such. All in all, we are quite pleased with the tower and find a certain asthetic enjoyment in its simple clean cut, uncluttered lines, as you can see in the various views of the actual constructed tower. And best of all, it cost us less than twenty dollars to construct.

That's not bad for a thirty-five foot fold-over tower. ■

K3IOP Defense Fund

As reported in the May *CQ*, the K3IOP Defense Fund stood at $95.00. As of April 6th it was up to $206.00, with contributions from: W3AGT, W3RWQ, W3TDF, W3VZA, K3HRE (second time), K3IVE, K3NBD, K3PYJ, K3RLQ, K3SBE, ZL2GX, I1DFD, the Latrobe A.R.C., Greater Pittsburgh VHF Society, and the Allegheny-Kiski A.R.C. Individual contributions are still needed. If this case goes against Seaman, an appeal will be an absolute necessity. Just a few weeks ago the Council of Elizabeth Borough, Pennsylvania, appropriated $1200 more to fight their cause.

A pre-hearing conference was held February 26 in Washington, D.C., where attorneys representing K3IOP, FCC, Elizabeth and ARRL met to decide the course of the hearing. The Hearing Examiner ruled that the FCC order limited the hearing to technical matters. This has been appealed by the FCC itself and as of this date (mid-April) action by a Review Board is awaited.

Incidentally, on February 28 amateur station K3IOP got a going over by the FCC the likes of which no other amateur station ever got. And again everything checked out okay.

Contributions should be mailed to:

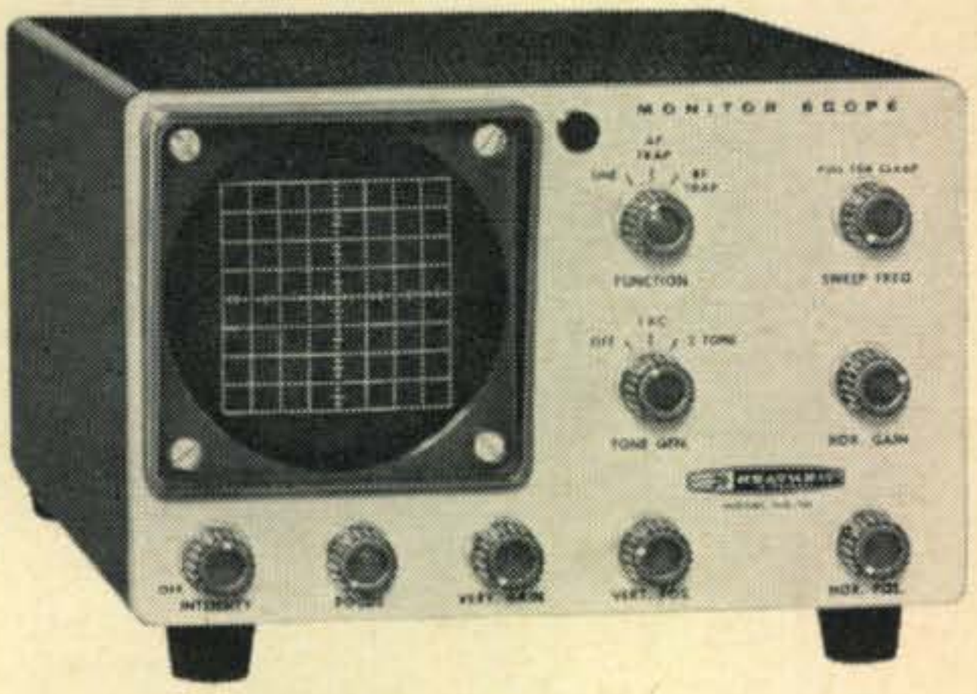
Edward C. Lipps, W3BWU
3302 Hazelhurst Avenue
Pittsburgh, Pennsylvania 15227

CQ Reviews:

The Heathkit HO-10 Monitor Scope

NO amateur phone station should be without a means of accurately monitoring the transmitter output in order to maintain proper operating levels and ensure a clean signal without distortion, splatter or other adverse effects. One of the most popular devices for this type of service is the Heathkit Model HO-10 Monitor Scope. It also may be used to check c.w. keying characteristics and RTTY operation.

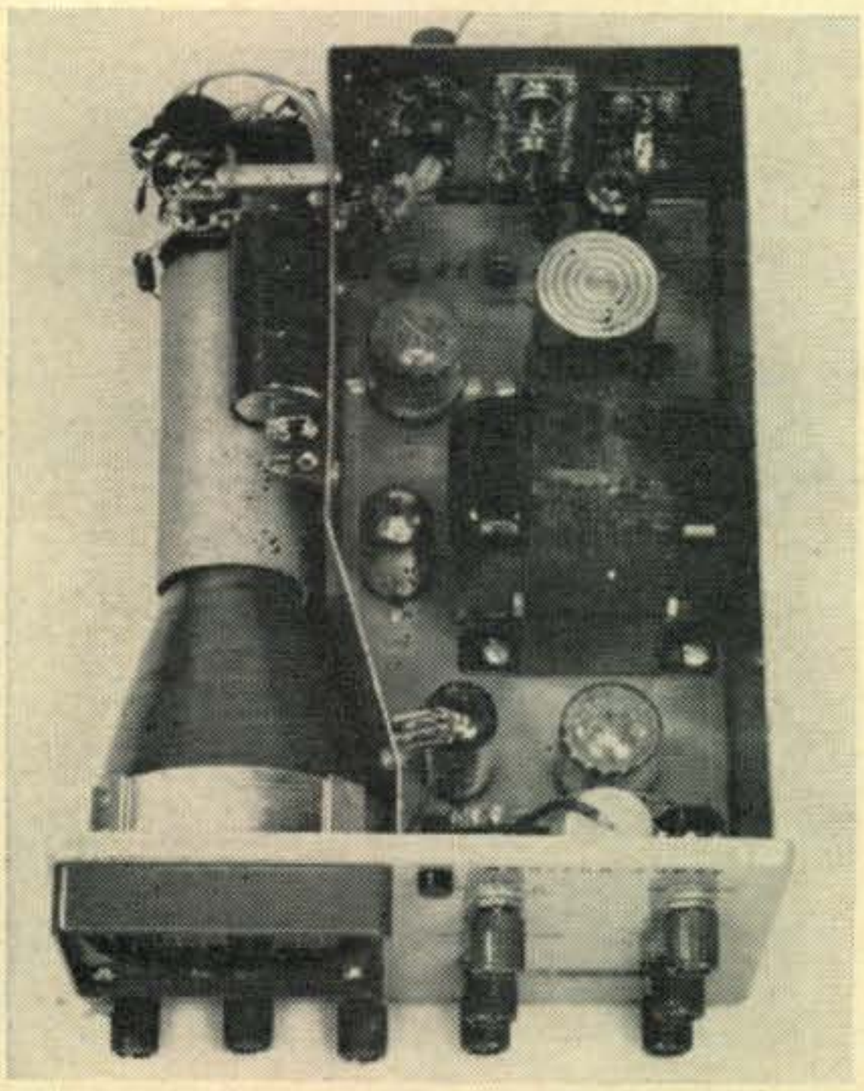
This unit is a 3" oscilloscope with complete facilities for testing and for monitoring on-the-air transmissions. It may be employed at the transmitter, connected directly in the transmission line, or it may be used in conjunction with a receiver, connected to the i.f. strip. An envelope pattern may be obtained for which a variable horizontal sweep is available. Trapezoid and bow-tie patterns also may be had, for which the HO-10 is equipped with an a.f. horizontal amplifier with gain control. The Monitor Scope includes an a.f. oscillator for testing purposes. This oscillator provides either a single tone of 1000 cycles or two simultaneous tones of 1000 and 1700 c.p.s. for two-tone s.s.b. observations. The unit may be used at power levels from 5 watts to over 1 kw and the specified frequency range is 160 through 6 meters.



The Heathkit Model HO-10 Monitor Scope. A 2" square graticule with ¼" grids is at the face of the c.r.t. Controls, reading left to right from the top are: FUNCTION, SWEEP FREQUENCY with CLAMP switch, TONE GENERATOR, HORIZONTAL GAIN, INTENSITY and POWER, FOCUS, VERTICAL GAIN, VERTICAL POSITIONING and HORIZONTAL POSITIONING. The attenuator switch, the SO-239 coax receptacles and phono jacks for other needed connections are on the rear of the unit.

Circuitry

Referring to the block diagram at fig. 1, two paralleled type SO-239 coax receptacles J_1 and J_2, are provided for the r.f. input signal. During use, one receptacle is connected to the transmitter, the other one to the transmission line (or dummy load). The transmitter signal is thus fed straight through. These receptacles also feed the vertical deflection section of the cathode-ray tube by way of a three-position r.f. attenuator which allows the signal level to be adjusted for the required visual amplitude on the c.r.t. screen. Each attenuator step provides a level change of about 6 db. Useable deflection accordingly can be obtained over a wide range of power levels. The input circuit is untuned and is essentially independent of frequency, making operation possible on any of the amateur bands up through 144 mc (see later comments).



Top View of the Monitor Scope.

An a.f. amplifier, V_{3C} (Compactron), feeds the horizontal deflection plates. A function switch, SW_1, provides a choice of three types of horizontal input signals. The SINE position provides a variable-sweep signal from a generator, V_{3A} and V_{3B} (Compactron), which operates as a free-running multivibrator sawtooth oscillator. The sweep frequency can be varied, by a panel control, from about 15 to 200 c.p.s. The SINE position is used when an envelope-type pattern is to be observed as in fig. 2A.

When the A.F. TRAPezoid position is used, a sample of the a.f. modulating voltage is applied to the horizontal amplifier for the reproduction of trapezoid or bow-tie modulation patterns to indicate the overall performance of the system. See fig. 2B and 2C.

When the R.F. TRAPezoid position is used, the modulated signal of an exciter-driver, connected to J_3 or J_4, is demodulated by diode V_{1A}. The resulting audio component is applied to the horizontal amplifier and a trapezoid display is obtained for checking the linearity of the linear final amplifier only. Note that J_3 and J_4 provide

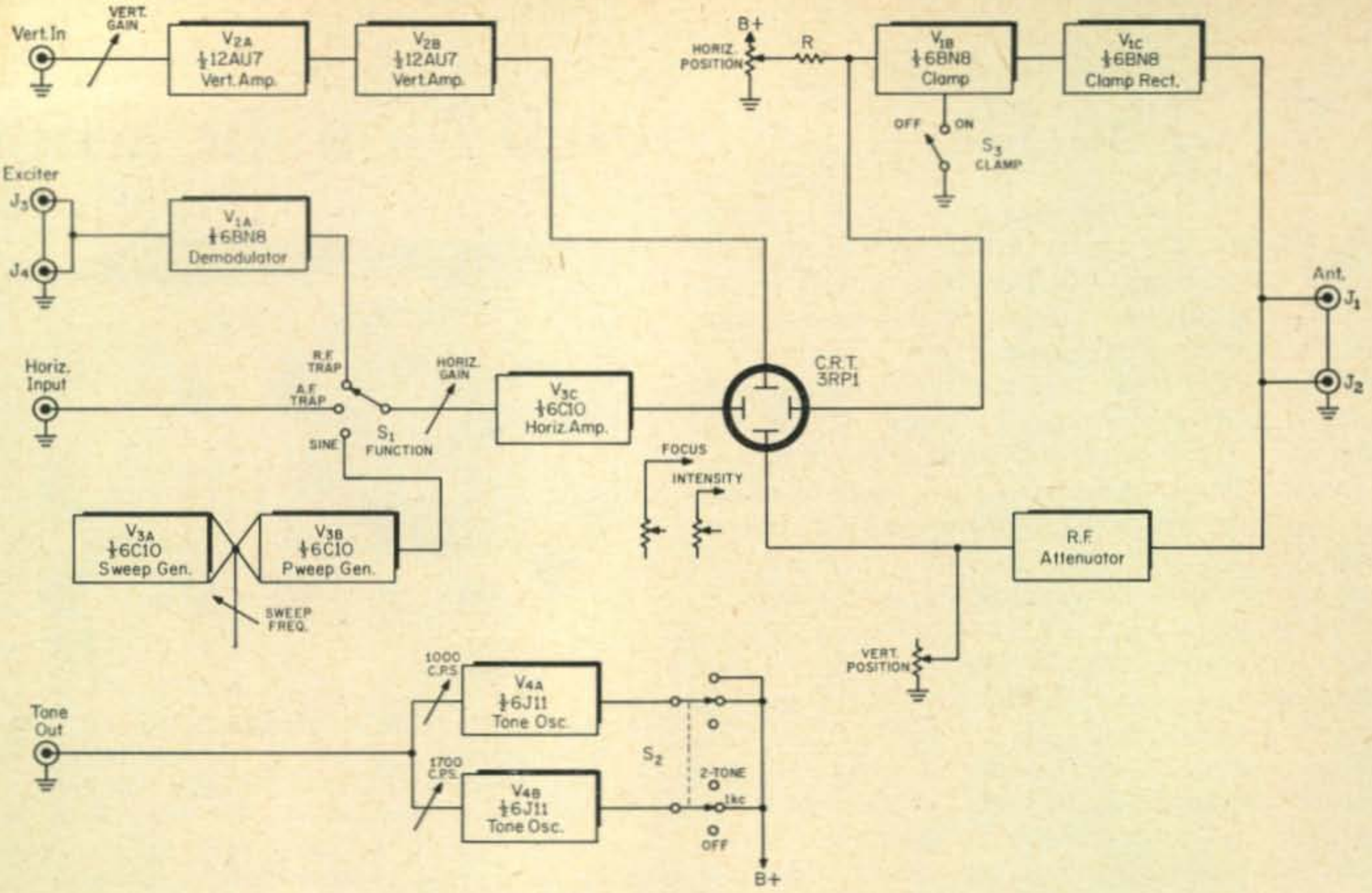


Fig. 1—Block diagram of the Heath HO-10 Monitor Scope.

a parallel connection so that the exciter may feed the Monitor Scope and the amplifier at the same time.

The three functions, thus far described, provide a varied facility for monitoring purposes. In this respect, when trapezoid or bow-tie displays are employed, a small spot of high intensity will appear at the center of the c.r.t. screen whenever an r.f. signal is not present, such as during receiving periods. This spot can burn the phosphor on the face of the screen if it is present for a prolonged period. To avoid this, V_{1B} and V_{1C} are arranged to furnish a clamper circuit which causes the spot to be automatically deflected off the screen during no-signal conditions. Clamper operation is available when either one of the TRAP positions is used.

Operation of the clamper is as follows: The horizontal plates of the c.r.t. obtain a spot-centering voltage through a series resistor, R, from the horizontal positioning control. V_{1B} is a triode the plate of which also obtains a voltage through the same series resistor. The cathode circuit of this tube is opened with SW_3 when the clamper is to be disabled, so the tube does not conduct and affect the normal positioning of the spot; however, when the clamper is engaged by grounding the cathode of V_{1B}, the tube conducts heavily, causing a voltage drop across R. This alters the positioning voltage, at the horizontal plates, sufficiently to cause the spot to be removed off the screen. When an r.f. signal is applied to J_1 or J_2, it is rectified by V_{1C} (a diode) to furnish a negative bias at the grid of V_{1B} which then cuts off this tube, thereby eliminating the high voltage drop across R and restoring the normal spot position.

A dual-pentode Compactron, V_{4A} and V_{4B}, is used for the a.f. oscillators which provide either a single tone or a two-tone signal for testing purposes. V_{4A} produces a tone of about 1000 c.p.s., while V_{4B} delivers around 1700 c.p.s. The output of only V_{4A} or that of both V_{4A} and V_{4B} together may be selected by SW_1. Excellent waveform is obtained from the oscillators which are the phase-shift type. The output levels of both sections are balanced for two-tone operation by internal screw-driver-adjust controls.

V_{2A} and V_{2B} are cascaded triodes used as a vertical deflection amplifier. Sufficient gain is available to enable the signal voltage from a receiver i.f. to be brought up to a useable point for obtaining a received-signal display, providing a check on received signals. The vertical amplifier will be found handy for use in conjunction with RTTY cross patterns and for many a.f. testing applications where extremely high sensitivity is not needed. Sensitivity is 0.5 volts for a one-inch deflection. Frequency response is ± 3 db from 10 c.p.s. to 500 kc. This limits receiver use to i.f. systems below 500 kc.

The power supply incorporates solid-state rectifiers for the low B+ voltages. A 1V2 rectifier is used for the 1500 volts needed on the c.r.t.

Construction

It was necessary to put together *two* models of the Monitor Scope, because the first one built was stolen by a burglar who apparently liked

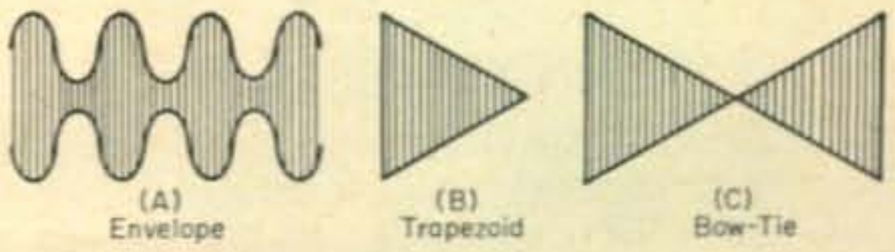


Fig. 2—Typical Monitor Scope patterns as described in the text.

it so much that he left many pieces of much more expensive equipment behind!

The time required for the assembly of a Monitor Scope in each case was 10 hours, following the steps outlined in the assembly manual. When one sets out to put together a kit, there often is some anxiety towards seeing what the final physical appearance of the unit will be like. A nice feature in this regard is that the mechanical and panel assembly (including installation of knobs) of the HO-10 is completed before any wiring is done.

The instructions are clear and involve no special problems except the following:

The indicated position of the cable clamp at location BN is contradictory in several of the diagrams. The initial instruction shows it to be mounted in a downward-hanging position toward V_4 socket (page 16 and diagrams 3 & 8). It was found better to mount it in an upward position as shown in diagrams 9, 12, 13 and 14. This allows easier access for the wiring of socket V_4.

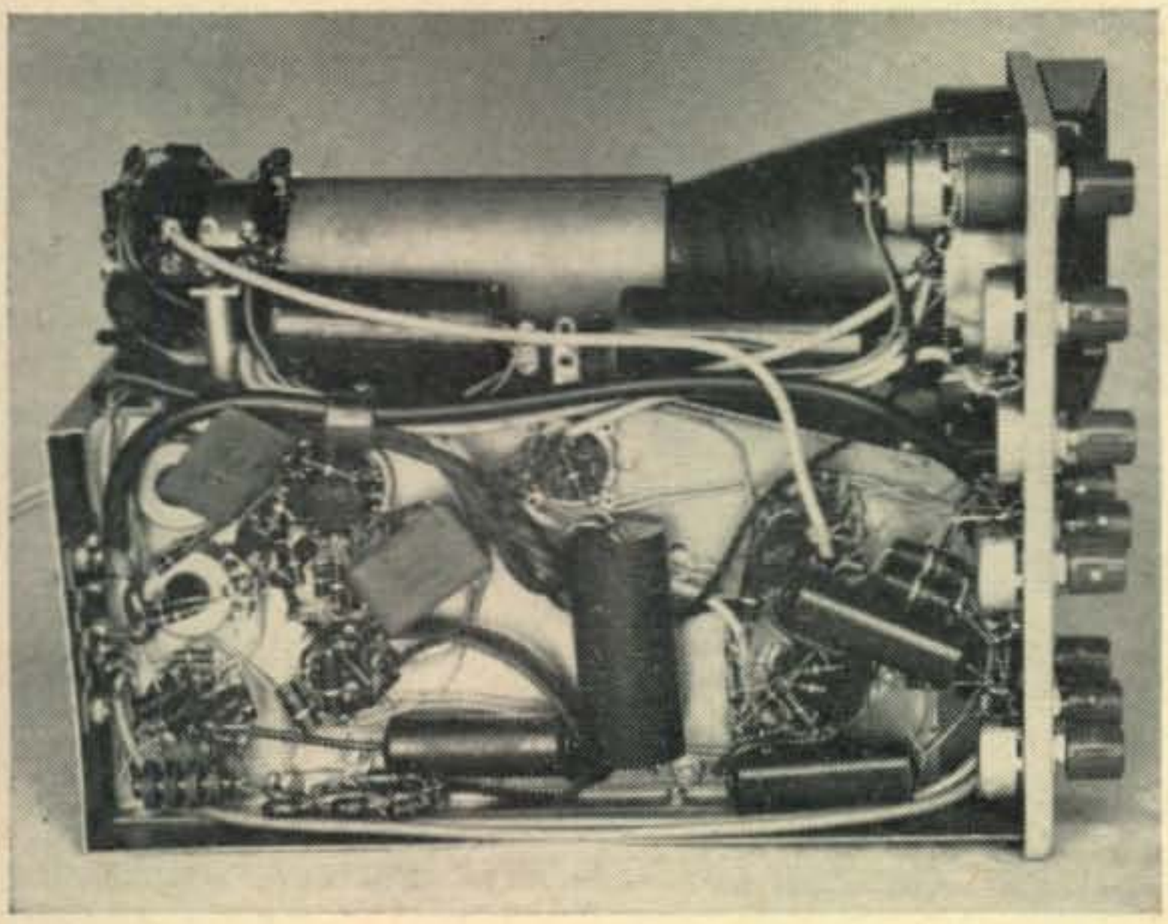
Last step, first column, page 22—it was found that the specified wire length of 9½" resulted in a rather tight stretch. An 11½" length provided more flexibility and neater lead dress.

Little can be more annoying to this writer than to have unconnected leads dangling around unnessarily during the work. Such is the situation when leads are connected to switches CG and CH and then are left free at one end, as instructed on page 19. For those who may also be finnicky, completion of the first five steps, column 2, page 26, will alleviate the situation before proceeding further.

Performance

An immediately seen feature of the Monitor Scope is that a sharp and very bright display pattern can be obtained, in fact, there is plenty of brilliance even in broad daylight. This is an unusual situation, especially when r.f. patterns are involved.

R.f. leakage between internal leads apparently is non-existent. No fuzziness of the traces was experienced nor were "loopy" phase-shift effects found due to stray coupling. On one model some "keystoning" was noted at the vertical edges of a pattern when it extended near the sides of the screen. This did not occur on the other model, so this effect was probably due to differences in the c.r.t. structure. Horizontal and vertical positioning is instantaneous and no trace-drifting was found.



Under chassis view of the Monitor Scope.

The manual clearly outlines the connections required for the various applications. No trouble was experienced in obtaining the correct types of displays. Over 50 patterns, showing proper and improper transmitter adjustment, are illustrated in the manual. These cover most phases of a.m., s.s.b., c.w. and RTTY observations.

When using a single tone for critical s.s.b. alignment work, occasional drift of the horizontal sweep oscillator prevented the pattern from standing still enough, so we added our own sync arrangement; however, for most applications such a step is not needed.

The oscillator output controls must be set for equal tone levels when two-tone patterns are displayed. Proper adjustment is specified as being that which "provides a clean 'trough' crossover, as illustrated in envelope pattern #10." To be more specific, the negative peak should come to the base line and cross over it practically in a straight line like the crossover point of an X. A display like pattern #12 in the manual is incorrect.

Different transmitters will vary in their a.f. passband characteristics, in which case readjustment of the oscillator amplitude controls may be required for a proper two-tone display. This also may be required when sidebands are switched if there is some non-symmetry in the sideband filter.

Another situation often encountered with a two-tone display is the presence of a ripple, particularly noticeable at the crests of the envelope. This can be due to poor sideband suppression, insufficient carrier suppression or intermodulation beats between the two oscillator frequencies. The latter usually occurs when the two-tone frequencies are too closely related. Such was the situation with one of the units. This could be fairly well corrected by selecting a horizontal sweep frequency which minimize the appearance of the ripple and by touching up the oscillator amplitude controls whereby the frequencies can be shifted slightly while still maintaining proper balance. This is best done after the instrument has thoroughly warmed up, since some oscillator frequency drift will occur during the warm-up period.

The oscillator level controls are accessible only when the instrument is removed from the case, so inasmuch as adjustment is required from time to time, a ⅜" access hole was made in the case immediately above each control. Removable snap-on hole plugs were inserted in these openings to maintain a neat appearance.

Difficulty was experienced in getting a trapezoid display to center properly on the screen

[*Continued on page 104*]

Results of the
1963 CQ World Wide DX (Phone) Contest

BY FRANK ANZALONE*, W1WY

THIS is the year we were prepared with a good alibi if we had a poor contest, but we must be living a charmed life or know the right people. Once again W3ASK called the shots and gave us a good week-end.

With over 700 entries this just about makes us the Number One phone contest in the world. To prove our point we are awarding 289 certificates to stations in 117 different countries.

Each one of us, I am sure, has been left with his own memories and impressions of this contest. A few individual experiences should make interesting reading.

Can you imagine WB2CCO's frustration when the Base lost power for 5 hours just when 20 was hot. That's the Air Force for you Bernie.

And W3PHL's perseverance in digging thru the megawatt jammers and propaganda stations on 40 and work 42 countries. Nice going Fred.

W5DQK forgot all about the contest and was shocked when he tuned across the band on Sunday morning. He never did catch up to K5FLD.

I am sure W6BSY will remember this one for a long time. Mac's wife presented him with a son 6 hours after the contest. We'll present him with a 21 mc certificate.

WØAIH (ex-VE3) found operating in the US phone band most confining. Rev. Paul could no longer wander around in the wide open spaces of the VE bands.

And VE3DXV sent in his log just for "laughs." His antenna was a 17-foot length of wire in a ground floor apartment. (We're not laughing Adam, at least you sent us your log.)

KP4BJD welcomed the chance of working DX which KP4's miss in other stateside contests.

You think you had troubles, VQ4RF had a real problem. Frank was invaded by a swarm of Safari Ants and had to operate with one hand while he manned a spray gun with the other.

5N2JKO found the going much easier using s.s.b. this year. Last year Dr. Mike was confined to a.m. only.

And I wonder what Susan was thinking as she was operating VQ2WZ at home. The OM, Eric was giving her competition with VQ2EZ from another location.

Both 5H3JR and 6O1WF found contest operating new and exciting but a bit confusing. They were induced to participate only a few days before the start of activities. The former was sponsored by K2MGE, who was good enough to figure out the score for Fr. Tardiff. Thanks Dorothy, but where was your report?

MP4BBW confined his operation to 7 mc only this year. Quite a change for Ian who was the single band "Champ" on 14 mc last year.

And it must have been a frustrating experience for VU2RM, Rao blew the power transformer to his linear and had to limp along on 80 watts for the rest of the contest.

It was an exciting week-end for EP2AU, Foy had received his ticket only 2 days before the contest; in two days he had 76 countries to his credit.

TROPHY WINNERS

Single Operator, Single Band (14 mc)
K2IEG, Barry Briskman Trophy
won by Don Miller, HL9KH

Single Operator, All Band
W2SKE, Bill Leonard Trophy
won by Eugene Walsh, 5A1TW

Multi-Operator, Single Transmitter
W6YY, John Knight Trophy
won by DL1KB (Operated by DL1KB & DL1JW)

Multi-Operator, Multi-Transmitter
W6AM, Don Wallace Trophy
won by CX2CO (Operated by CX2CO & CX7CO)

*14 Sherwood Road, Stamford, Conn. 06905

5A1TW—Gene Walsh took good advantage of his location and band conditions to "ride to victory" in the single operator all band category with a score of 662,546.

CE1FX—Ursula (CE1DD) rewarding the OM, Bernardo after a successful contest week-end. So you don't like contests, see what you guys are missing.

JA6YBS bemoaned the lack of W/K activity on 21 mc. We just weren't getting thru to you, Tad.

While KA2RJ did not complain about the lack of activity Ron did gripe about the "liddy" operation in the Far East. It's not confined to the Far East only OM, but on the whole operation was pretty clean.

Jan couldn't resist the temptation when he heard all the 80 meter activity in Europe and put OK1JX on the air for the last few hours.

G5ZT was determined to give it an all out effort this year, but lost his voice and title to G8FC after 44 hours of operating. You should have concentrated on three pointers, Harold.

And G3PZO must have bemoaned the fact that he was limited to a.m. on 21 mc when he heard all the s.s.b. activity, but don't worry Charlie, you still get the certificate.

Heavy QRM from the XYL was mentioned by DL3DW but he didn't go into any details. Most of us have those problems too, Rudy.

Our lone representative from Ireland, E18P was confined to his bed but managed to put in a few hours and give the boys a multiplier. Take care of yourself Joe, the gang hopes you will be up and about now with the warm weather.

GI6TK wants a 24 hour only contest so that non-contested minded stations can also operate. Well Frank, at least we only occupy one week-end.

Can you imagine VK3ATN having no intentions of operating more than a few hours with an antenna farm which includes five V beams, a Sturba and a rhombic. He did continue however and won himself a certificate.

And DU7SV never says anything, he just sends us a plain list of stations worked. Gives Ben fits, I've had it too, Volt, next time it goes in the "check list."

And so it goes, on and on. Reading the hundreds of comments, notes and letters is at least one enjoyable part of our work.

Some remarks and details regarding the Trophy winners and some of the high scorers should be in order.

This is not Gene Walsh's first crack at it from 5A1TW, but this year Gene was better equipped

	Band	Contacts	Zones	Countries	Points
CX2CO 1,026,086	1.8	3	2	3	2
	3.5	7	4	7	6
	7	29	9	13	62
	14	623	34	94	1776
	21	401	23	55	1160
	28	174	18	31	496
	TOTAL	1237	90	203	3502
K2GL 956,868	1.8				
	3.5	42	13	24	107
	7	65	21	41	170
	14	403	30	92	1147
	21	375	24	88	1089
	28	45	11	19	123
	TOTAL	930	99	264	2036
W6VSS 743,040	1.8	3	2	1	0
	3.5	44	9	9	104
	7	91	19	28	230
	14	421	36	97	1149
	21	271	24	67	747
	28	34	12	16	92
	TOTAL	864	102	218	2322
DJ3VM 605,710	1.8				
	3.5	54	6	26	61
	7	44	8	22	87
	14	507	32	65	1402
	21	333	20	46	974
	28	8	6	7	21
	TOTAL	946	72	166	2545
DLØWW 590,750	1.8				
	3.5	90	6	36	103
	7	62	8	29	76
	14	499	32	80	1328
	21	194	22	43	561
	28	23	6	16	57
	TOTAL	868	74	204	2125
OH5SM 412,848	1.8				
	3.5	107	6	31	117
	7	140	7	37	145
	14	467	26	76	703
	21	236	26	54	473
	28	11	9	10	26
	TOTAL	961	74	208	1464

Interested in finding out how your single-band, single-op score stacks up against some of the big guns in the multi-band, multi-op category? Here are a few of the biggest.

on 40 and 80 to take advantage of those juicy multipliers just north of him, and that's what paid off.

On the other hand Gerry Smillie, with a once-in-a-life-time call, was not equipped to span the 4000 mile jump to the 40 and 80 meter European activity and so lost valuable country multipliers. ZD7BW was also handicapped with only a trap dipole 12 ft. above ground.

Special mention must be made of the fine score submitted by K2HLB, a new high for the USA. Bob Stankus, W2VCZ was behind the mike. WA2SFP also beat the old record. Nice going Jim.

This year Don Miller concentrated on one band and HL9KH topped the field on 14 mc for the Single Band Trophy. However, it would have taken only a few more countries for VP7NS to have made his excellent contact total pay off. Don Thompson bemoaned the lack of stations from the Far East. The honors for the highest country total on a single band however goes to G3FXB, 113 countries in one week-end is quite an accomplishment.

Strangely enough both Trophies in the multi-operator groups were won by stations manned by a two man team only. We can understand two operators getting the most out of a single transmitter set-up, but only two operators at a multi-transmitter station takes a lot of doi ıg.

Hans Pazem and Hubert Esser was the team at DL1KB, while the sleepless wonders Ricardo

Sierra, Jr. and Daniel Sosa got the most mileage out of CX2CO. Congratulations fellows.

The Radio Club of Costa Rica organized TIØRC (many stations took extra country credit for this one, no good) and under the tudorship of TI2PI made an excellent showing in the Junior division.

While in the Senior division, Bill Leonard and Company made a tremendous bid for top honors at K2GL. The fellows ran up fine multipliers, especially on 21 mc, but even on the East Coast you don't have that locational advantage.

The "Big Gun" on the West Coast was W6VSS this year, Dale Hoppe was well equipped with a fine crew and a terrific antenna farm, but California is a long way from all those European multipliers.

DXpeditions, the frosting on the contest, were again in evidence. The most successful of these being 9A1AIJ, a four man crew headed by I1AIJ. Armando and the boys found weather conditions in San Marino extremely bad, with rain and high winds adding to the operating difficulties.

Once again Harold McBirney made his annual trip to Sint Maartin and improved his score from PJ5MC. Mac feels he can do even better. A little healthier multiplier would do the trick.

Ed Cushing, W4QVJ did a solo this year and made a trip to Juan Fernandez but the returns from CEØZI were less productive than what Ed and the boys made from HKØZU in last year's c.w. contest. "I called CQ on both 15 and 20 for long periods with no takers," said Ed, "was surprised that rare CEØZI would go begging." Conditions did not follow the pattern that existed on the mainland where CE's were working W/K's left and right.

W2YTH and a group of VP9's made a trip to the Caribbean and made an appearance as VP2KI on Anguilla where they ran up a nice contact total of W/Ks but not much of a multiplier.

The ever increasing popularity of the Single Band competition is again reflected in the many entries in that category.

G3FXB—Al had the highest country total (113) in the contest. Little Jackie is wondering if she should take up this crazy business.

Once again LU1DAB came up with his amazing score on 28 mc. The equipment he used is not extraordinary, 500 watts to a TA-33. With the N/S path open to the US and an occasional sprinkle of Africans and Europeans for his multiplier, Jaycee once again proved that 10 meters is not dead, at least not down South American way.

The 21 mc openings were both surprising and welcome. Surprising too was the fact that the top score on this band was made by a station in the US. W1RIL's equipment is all home brew, but Ken did not give any information as to the sky wire. In spite of the overwhelming use of s.s.b. there was also a.m. activity on 21 mc as well as 28 mc and both modes were necessary to buck the competition. W1HQV and some others were limited to a.m. operation only.

It was the 14 mc band that provided most of the activity and the high scores. The leaders on this band have already been covered, and you will note that all the top scores on this band were in six figures. A tip of the hat to K2HFX, Bob was the only W/K that was in this select group.

Activity in the 7 mc band was rather limited in this hemisphere and besides the already mentioned W3PHL who lead the world, K6AHV, W8JIN and WØGKB/Ø also bucked the QRM and came up certificate winners. Of course the all-banders took advantage of the additional multipliers on this band.

The 80 meter activity was almost non-existent over here which seemed strange since the multi-operator stations did well on this band. The Europeans however made good use of the band with GI3CDF taking honors but with a lower score than 4X4DK because of his locational handicap. You will note that Les had a higher contact and multiplier total but most all his contacts of course were 1 pointers while Ami was making hay with 3 pointers.

We are always happy and pleased to hear (and work) the YLs in the contest. This year we had a nice turn out. I have already mentioned Susan, VQ2WZ, then there was Molly, ZE1JE and in the multi-operator groups, Ursula at CE1FX, Hilda at CT1EY, Monique at FG7XL and Carola at OH5SM; just to mention a few.

We had our usual problems this year; unscored logs from stations in uninformed countries, wrongly scored logs from stations who should know better and some of our own indifferent operators who expect us to check for duplicates and correct their scores. They could take a lesson from Jan, 9M2JJ who discovered *one* duplicate after he had mailed his log and advised us by air mail to make the correction.

This year we put our Hon. Ed. Arnie Trossman to work but we suspect that most of the real work was done by Toby, his most efficient secretary. (See May CALENDAR) Not that Ben, W2JB and Andy, W1GYE have had it easy. I'm really the only one that has had it easy. If they think they have had it rough, wait 'til they tackle the c.w. logs.

73 for now, Frank, W1WY

Top Ten
ALL BAND—SINGLE OPERATOR

	5A1TW	**662,546**	
ZD7BW	598,647	K2HLB	324,352
5N2JKO	543,415	I1BAF	310,128
CX3BH	446,558	ZE1JE	295,095
4X4AS	402,391	WA2SFP	289,835
	JA1BRK	273,581	

Top Five
MULTI-OPERATOR
SINGLE TRANSMITTER

	DL1KB	**623,948**	
TIØRC	595,358	9A1AIJ	446,145
HC2JT	499,722	UA9KCF	433,780

Top Five
MULTI-OPERATOR
MULTI-TRANSMITTER

	CX2CO	**1,026,086**	
K2GL	956,868	DJ3VM	605,710
W6VSS	743,040	DLØWW	590,750

Continental Leaders
SINGLE BAND

28 Mc		**14 Mc**	
LU1DAB	95,353	**HL9KH**	**318,960**
W2TVR	2,464	VP7NS	308,175
UB5FG	378	G3FXB	270,692
JA1HGY	352	ZE4JO	170,800
		PJ2AA	163,817
		ZL1AAS	159,507
21 Mc		**7.0 Mc**	
W1RIL	59,373	W3PHL	10,980
5N2CKH	49,440	UB5KCA	5,289
4X4ON	44,325	MP4BBW	5,181
PZ1AX	41,410	ZL4BO	1,512
I1SF	35,322	**3.8 Mc**	
W7UXP/KH6	23,218	4X4DK	20,416
		GI3CDF	16,092

U. S. A.
Leaders and Runners-up

All Band	W4BVV	202,306
28 Mc	K6CT	2,268
21 Mc	K1OSY	33,777
14 Mc	K2HFX	121,278
7 Mc	K6AHV	8,188

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.**

Phone Results
SINGLE OPERATOR
North America
United States

W1JFG	**A**	**101,598**	**296**	**31**	**87**
K1IMD	"	25,500	111	26	59
W1WY	"	23,545	104	28	57
W1BIH	"	4018	34	14	27
W1PLJ	"	1400	22	8	17
K1IJU	"	63	4	3	4
W1RIL	**21**	**59,373**	**255**	**20**	**61**
K1OSY	"	33,777	150	21	60
W1HQV	"	15,552	110	14	34
K1VWL	"	2800	30	14	26
K1WJL	"	2574	33	4	22
W1FDL	"	1656	23	4	20
W1ZFV	**14**	**77,064**	**259**	**28**	**76**
W1PIV	"	61,920	220	27	69
W1DPJ	"	8862	74	14	28
WA1ANR	"	3069	34	12	21
K2HLB	**A**	**324,352**	**458**	**79**	**177**
WA2SFP	"	**289,835**	**442**	**75**	**170**
WA2IEK	"	76,880	192	51	104
W2QKJ	"	15,611	86	22	45
WA2OJD	"	11,008	66	24	40
W2SNI	"	5978	48	19	30
K2DNA	"	2556	27	16	20
W2JKH	"	1219	19	9	14
W2JB	"	480	13	6	10
W2TVR	**28**	**2464**	**32**	**13**	**19**
K2YFE	"	450	13	6	9
K2DGI	**21**	**11,774**	**76**	**16**	**42**
WA2QNW	"	11,628	78	18	39
K2MPS	"	9968	69	17	40
W2GKZ	"	7379	59	13	34
W2GRS	"	5320	50	13	25
WB2CAS	"	3132	46	13	23
WB2FJX	"	2695	30	15	20
K2KXW	"	2072	32	12	16
K2HFX	**14**	**121,278**	**345**	**32**	**90**
WB2CNA	"	81,196	269	30	76
K2JGG	"	69,966	224	34	83
K2JMY	"	20,370	103	22	49
W2WZ	"	2675	38	7	18
W2WE	"	2380	28	14	20
W3ZKH	**A**	**181,746**	**324**	**67**	**140**
W3OCU	"	66,672	180	48	96
W3ZAO	"	58,437	160	38	91
K3TPL	"	43,800	125	37	83
K3BNS	"	34,800	127	30	70
W3FDH	"	24,400	96	38	65
W3MCG	"	8316	55	24	39
W3EGD	**21**	**6360**	**57**	**10**	**30**
W3GKM	**14**	**73,290**	**247**	**28**	**77**
W3JTC	"	59,118	180	33	85
K3TBC	"	1012	21	10	12
W3PHL	**7**	**10,980**	**75**	**19**	**42**
W4BVV	**A**	**202,306**	**370**	**84**	**167**
W4OPM	"	48,906	154	38	76
W4NJF	"	48,888	143	42	84
W4ZYS	"	48,555	151	34	83
W4EEU	"	36,822	130	30	72
W4LSG	"	31,824	124	39	65
W4MUB	"	22,008	101	31	53
W4HVU	"	14,823	69	32	49
W4OM	"	14,124	76	23	43
W4LRN	"	11,385	62	23	46
WA4ARV	"	11,316	73	25	44
K4QWM	**28**	**2064**	**32**	**8**	**16**
K4HPR	"	594	14	10	12
W4RLS	**21**	**30,889**	**151**	**25**	**54**
K4IIF	"	15,600	96	17	43
K4QVK	"	6045	54	11	28
WA4AGC	"	2040	38	12	18
K4VFY	"	882	20	9	12
W4EEO	"	448	10	6	10
W4BCV	**14**	**65,730**	**224**	**30**	**75**
K4WHD	"	47,672	169	28	73
K4PDV	"	27,768	113	25	64
W4PRP	"	26,487	131	26	55
W4HKJ	"	16,566	94	22	44
WA4NGO	"	10,472	71	19	37
W4HA	"	4551	46	13	28
W4TUC	"	3298	39	11	23
K4VWH	7	196	8	7	7
K5MDX	**A**	**106,752**	**224**	**66**	**126**
W5EGS	"	14,359	71	34	49
K5FLD	**21**	**15,309**	**89**	**20**	**43**
W5DQK	"	12,915	76	19	44
W5JWM	"	11,926	66	21	46
WA5ALB	"	10,545	68	20	37
WA5CBE	"	6800	55	15	35
W5LCI	**14**	**20,054**	**104**	**23**	**51**
W5KC	"	9790	79	20	35
W5DNL	"	2052	25	14	22
WA6SBO	**A**	**111,315**	**232**	**67**	**114**
W6RCD	"	79,913	195	60	97
W6LCX	"	67,678	182	50	87
K6SEN	"	60,016	198	48	73
WA6GFY	"	37,026	140	35	64
W6GRX	"	35,828	126	39	67
K6AEZ	"	26,132	120	37	57
W6YMV	"	20,967	84	37	57
WA6QGW	"	19,780	84	33	53
K6HZU	"	6877	68	27	48
WA6AUD	"	2665	26	17	24
WA6WPG	"	585	16	7	8
K6CT	**28**	**2268**	**33**	**13**	**15**
W6BSY	**21**	**15,012**	**104**	**19**	**35**
W6FET	"	2414	28	14	20
W6YEJ	"	2030	27	12	17
W6RKP	**14**	**26,642**	**162**	**26**	**51**
WA6HGC	"	16,226	110	20	41
K6SOK	"	8480	64	22	31
WA6QWN	"	8404	70	16	28
WB6FGT	"	4972	43	17	27
K6AHV	**7**	**8188**	**56**	**18**	**28**
W7ACD	**A**	**48,387**	**151**	**49**	**73**
W7BTH	"	2870	31	14	21
W7DIS	**21**	**4216**	**53**	**14**	**17**
K7VYU	"	1518	24	9	14
W7KOI	"	96	9	2	2
W7DQM	**14**	**9555**	**71**	**17**	**32**
K7UKC	"	4785	49	11	22
W7DLR	"	4452	42	16	26
K8JWC	**A**	**69,412**	**187**	**42**	**92**
W8BQH	"	51,831	168	38	79
W8RXY	"	34,404	130	32	62
W8BKO	"	26,448	116	27	60
W8WUO	"	23,023	100	31	60
W8UMR	**21**	**24,092**	**118**	**19**	**57**
W8WT	"	12,925	85	17	38
K8NMG	"	7728	58	15	33
K8WOT	**14**	**33,033**	**131**	**26**	**65**
W8JIN	**7**	**4275**	**38**	**19**	**26**
K8WVF	"	1188	20	12	15
K9VFF	**A**	**12,719**	**67**	**33**	**46**
W9JJV	"	6048	52	21	33
K9ECE	**21**	**29,260**	**143**	**20**	**56**
K9PPX	"	21,097	110	22	51
K9OYD	"	6615	53	18	31
WA9BWY	"	5640	52	16	31
WA9EOS	"	1550	23	13	18
K9PNV	**14**	**22,630**	**118**	**22**	**51**
WA9ENB	"	9898	97	20	37
K9ZJV	"	576	19	9	9
WØGUV	**A**	**20,394**	**86**	**41**	**58**
KØJPL	"	1884	24	14	19

W0QFQ	21	12,180	77	16	44
W0AIH	"	4545	51	15	30
K0BFR/0	14	3534	41	15	23
K0CER	"	3344	38	14	24
W8GKB/0	7	3610	46	15	23
K0MQS	"	3150	49	13	22

Bahamas

VP7CC	A	93,615	550	30	49
VP7NC	21	33,464	225	18	44
VP7CX	"	23,535	235	14	31
VP7NX	"	17,900	148	16	34
VP7NS	14	308,175	1357	28	77
VP7BY	"	42,790	355	15	40

Bermuda

W1HJT/VP9	14	7917	134	9	20

Canada

VE1TG	21	6501	75	12	21
VE1CS	14	45,323	275	17	44
VE2WA	A	4005	35	16	29
VE2AFC	21	6864	75	11	22
VE2AMW	14	20,130	128	18	43
VE2BCK	"	9350	68	14	36
VE3PV	A	38,316	174	31	62
VE3BMB	"	20,935	117	31	48
VE3ES	"	13,144	88	21	41
VE3CBY	14	20,064	152	18	39
VE3RCS	"	15,974	136	14	35
VE3DYB	"	13,737	91	16	41
VE3EBU	"	10,780	100	12	32
VE3DXV	"	372	14	5	7
VE7MT	14	5846	61	13	24
VE8AH	14	24,624	182	20	34
VE8DX	"	360	12	3	7
VO1BR	14	35,926	189	18	53

Canal Zone

KZ5AZ	14	10,206	105	16	26

Cuba

CO8RA	A	32,224	190	30	46

Costa Rica

TI2JIC	14	74,172	351	27	57
TI2PT	21	10,934	242	11	11

Dominican Rep.

HI8MMN	A	72,680	435	28	51

Greenland

KG1BX	14	1768	50	9	8

Mexico

XE1ZE	A	146,278	636	42	67
XE2VY	14	3596	52	10	19

Panama

HP1JF	A	4428	76	12	15
HP1AC	21	868	30	6	8

Puerto Rico

KP4AOO	A	256,384	924	51	77
KP4BJD	"	28,567	252	19	34
KP4BBN	21	31,720	285	18	34
W7YMV/KP4	"	5925	110	10	15
KP4BJU	14	10,933	179	11	18

St. Vincent

VP2SY	21	47,472	268	19	50

Sint Maartin

PJ5MC	A	125,952	737	34	48

Africa

Angola

CR6DX	21	5986	58	13	28

Congo Republic

TN8AA	A	21,329	133	24	53

Ghana

9G1DV	14	2828	36	12	16

Kenya

VQ4RF	14	149,677	437	34	87

Libya

5A1TW	A	662,546	891	68	189

Mauritius

VQ8AM	A	1829	23	13	18

Morocco

CN8AW	14	45,187	213	20	53

Mozambique

CR7GF	14	12,474	76	24	39

Nigeria

5N2JKO	A	543,415	763	69	182
5N2CKH	21	49,440	282	19	61
5N2HJA	14	81,092	283	27	70

Republic of Congo

9Q5TL	21	3690	49	12	18
9Q5AB	14	630	15	7	11

Reunion Island

FR7ZD	A	589	15	8	11

Rhodesia, Northern

VQ2WZ	A	226,227	386	59	160
VQ2EZ	"	77,220	231	44	86

Rhodesia, Southern

ZE1JE	A	295,095	557	62	129
ZE4JO	14	170,800	549	29	85

Saint Helena

ZD7BW	A	598,647	1034	66	137

Somali Republic

6O1WF	A	164,049	397	45	104

South Africa

ZS6NM	21	21,600	215	13	23

Sudan

ST2AR	14	38,552	176	24	55

Tanganyika

5H3JR	14	1872	55	6	6

Tchad

TT8AN	14	102,912	394	28	68

Asia

Aden

VS9AMN	A	15,708	87	27	41

Bahrain

MP4BBW	7	5181	57	9	24

Ceylon

4S7IW	A	30,780	143	28	62

Cyprus

5B4JF	A	46,410	188	20	65

India

VU2RM	14	28,386	139	23	60

Iran

EP2AU	14	81,224	284	28	76

Israel

4X4AS	A	402,391	603	58	175
4X4ON	21	44,325	204	18	57
4X4HW	14	164,808	533	30	79
4X4DI	"	1638	24	9	17
4X4JA	"	1575	28	6	15
4X4DK	3.8	20,416	159	8	36

Japan

JA1BRK	A	273,581	522	67	120
JA1FSL	A	200,304	500	55	89
JA1DMX	"	12,320	92	20	35
JA7RH	"	6160	59	17	23
JA1BUI	"	4305	46	17	24
JA1EHA	"	2752	33	15	17
JA1HGY	28	352	9	7	9
JA1HKP	"	198	10	4	7
JA7UJ	21	19,095	118	22	35
JA2BGW	21	12,750	91	21	30
JA3BOY	21	9840	88	19	21
JA3EUA	"	3996	42	16	20
JA1GDE	"	2944	51	11	12
JA8ADQ	"	2675	38	12	13
JA9ZJ	"	2356	28	13	18
JA1GKB	"	2184	31	12	14
JA6PL	"	2156	31	13	15
JA1KVT	"	1550	24	12	13
JA6COP	"	1176	20	12	12
JA6YAX	"	1026	24	9	9
JA6AZQ	"	520	14	6	7
JA3BBG	"	375	10	7	8
JA6PY	"	364	11	7	7
JA6YBS	"	253	11	5	6
JA3DQH	"	104	6	4	4
JA1WA	"	70	5	3	4
JA1BK	14	150,311	487	34	75
JA1CWP	14	67,732	300	28	54
JA8BI/1	"	30,739	186	24	35
JA2ADH	"	25,200	173	21	35
JA2JW	"	17,500	102	27	43
JA1ALX	"	5984	71	13	21
JA1ANA	"	5453	53	17	24
JA3AVO	"	3636	41	14	22
JA0AC	"	3002	33	15	23
JA6ACZ	"	1269	22	13	14
JA1BWA	"	6	1	1	1
JA1INJ	7	2964	43	11	15
KA2RJ	14	49,059	227	27	52
KA2CM	"	28,014	177	26	43
KA2BW	"	26,565	171	24	31

Korea

HL9KH	14	318,960	826	37	107
HM4AQ	A	11,567	165	20	23

Lebanon

OD5LX	21	13,095	99	11	34

West Malaysia

9M2JJ	14	11,400	80	20	40

Mongolia

JT1CA	14	31,844	173	25	51
JT1KAA	"	12,544	110	21	35

Ryukyu Islands

KR6OF	14	13,166	118	22	36
KR6LJ	7	1890	43	10	11

Union of Soviet Socialistic Rep. Asiatic

UA0EH	A	40,824	231	34	47
UA9KQA	"	4329	53	11	26
UA0GF	"	2925	75	11	14
UA9XR	14	48,777	238	18	53

Azerbaijan

UD6FA	A	2247	42	5	16

Kirghiz

UM8KAA	A	16,491	109	24	45
UM8FZ	14	26,628	121	21	64

Turkoman

UH8BO	14	180	11	5	7

Uzbek

UI8AG	14	17,892	118	19	44
UI8LB	"	3540	46	10	20

Europe

Aaland Island

OH0NI	A	10,452	138	17	50

Austria

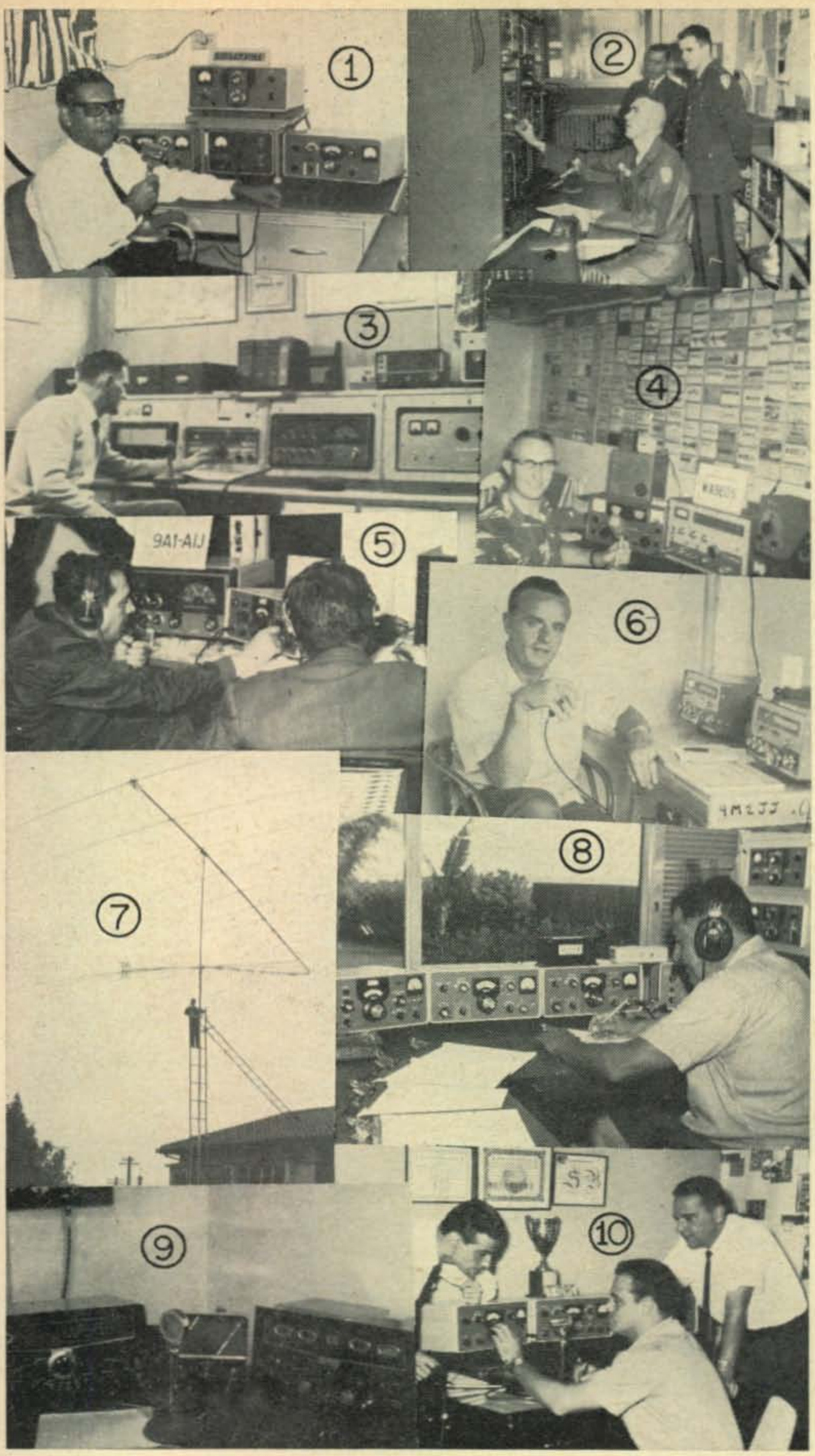
OE1WP	A	26,877	169	30	63

Bulgaria

L22KRZ	7	108	13	3	6

Czechoslovakia

OK3CDR	A	95,418	329	49	113
OK1ADP	"	26,460	213	25	65
OK1ZL	"	17,473	138	27	74
OK2QU	"	15,600	120	22	43
OK1AFB	"	6840	103	15	42
OK3IR	"	5457	97	11	40
OK1VK	"	2301	47	10	29
OK1GT	21	3996	47	14	22
OK2KJU	"	520	20	4	9
OK3CDP	14	5160	95	11	32
OK1AVT	"	2212	71	7	21
OK2KRO	"	1850	63	5	20
OK1VB	"	1296	45	5	19
OK1MP	7	2553	65	6	31
OK2KOJ	"	1092	55	4	17
OK2OP	3.8	4875	118	7	32
OK1JX	"	1120	50	4	18
OK3YE	"	819	39	4	17



1—YV5BIG, Raul at the compact lay-out with the BIG signal out of Venezuela. 2—DL4OV, "The Voice of the U.S. Signal Corp in Europe." Joe DL4XR at the controls, DL4DT in the background and Lt. Richardson giving his approval. 3—GM3BCL, Sandy has competed in every CQ DX contest since they started, 17 years he claims. 4—This was WA9EOS's first contest. Bet he will be back for more. 5—9A1AIJ, the San Marino DXpedition station, with Armando, I1AIJ, keeping the pile-up in line. 6—9M2JJ. It doesn't take much equipment to make a DX station, but Jan would like to have more than just a beer-can vertical. 7—JA1FSL. Man! Look at that crazy contraption. Sadahiro putting the finishing touches to his home made log periodic which covers 14 to 144 mc. 8—KH6EPW, Cam and the beautiful lay-out and location that produced the highest score out of the Pacific. 9—W1RIL's neat home made rig produced the highest score on 21 mc. 10—TIØRC. L to r. TI2SS TI2PI and TI2HGA. They just missed adding another trophy to the one TI2PI won in last year's s.s.b. contest.

Denmark

OZ4RT	**A**	**54,825**	**222**	**39**	**90**
OZ3KE	"	8294	91	18	40
OZ7FH	"	1350	48	7	19
OZ4DX	"	570	28	4	15
OZ4WR	"	220	17	7	13
OZ3Y	**14**	**60,160**	**262**	**30**	**64**
OZ5BW	"	41,082	205	27	55
OZ6WJ	"	1800	52	8	22
OZ3SK	**3.8**	**3296**	**95**	**6**	**26**

England

G8FC	**A**	**150,781**	**459**	**45**	**86**
G5ZT	"	121,342	423	46	123
G6RJ	"	93,170	315	44	66
G3NFV	"	56,025	249	39	96
G3MWZ	"	6864	72	16	28
G2AJB	"	6160	87	17	39
G3FXB	**14**	**270,692**	**695**	**35**	**113**
G4CP	"	185,640	545	36	104
G3LSF	"	108,019	414	32	77
G3MEA	"	36,524	172	29	63
G3LNO	"	14,213	154	16	45
G3MHV	"	1488	58	6	18
G3PZO	**21**	**7876**	**79**	**14**	**30**
G3PRP	"	6336	66	15	21
G3FLS	"	525	15	6	9

Finland

OH5TM	**A**	**66,110**	**284**	**32**	**78**
OH5YL	"	6030	127	10	35
OH2WI	"	1666	59	10	24
OH1VR	"	812	28	11	17
OH3VW	**21**	**16,576**	**136**	**19**	**37**
OH2BC	"	13,200	104	18	37
OH5UX	"	1020	51	5	12
OH2BS	"	120	8	5	5
OH2DX	**14**	**63,976**	**302**	**28**	**60**
OH2TJ	"	39,270	269	22	63
OH5OQ	"	12,528	225	10	38
OH5RZ	"	6370	159	7	28
OH2WI	"	2686	59	10	24
OH2BAZ	"	2233	63	7	22
OH5OD	"	2001	60	5	24
OH3XQ	"	816	20	8	16
OH3NY	"	527	31	4	13
OH2TH	**3.8**	**6216**	**135**	**6**	**36**
OH2RZ	"	1825	68	5	20

France

F2SI	**A**	**60,480**	**268**	**30**	**75**
F3PK	"	45,153	209	29	58
F2MO	"	26,488	127	34	52
F8WE	"	22,880	152	29	75
F8SC	"	12,234	77	29	50
F8TM	"	7965	82	16	43
F7BK	**A**	**196,474**	**522**	**48**	**145**
F7CP	"	82,797	273	47	96

Germany

DL3DW	**A**	**130,139**	**279**	**61**	**120**
DJ2QZ	**A**	**127,038**	**340**	**66**	**120**
DL9OH	**A**	**116,184**	**302**	**55**	**151**
DL7HU	**A**	**100,257**	**257**	**53**	**128**
DL7EN	"	69,384	211	49	119
DJ1QP	"	68,016	191	47	109
DL7DF	"	52,597	197	39	110
DJ6QT	"	50,315	222	35	110
DJ5VQ	"	43,924	182	40	99
DL8BS	"	42,714	191	35	78
DJ8EG	"	23,868	171	20	58
DL7BQ	"	20,604	130	30	72
DJ2HH	"	19,392	161	23	78
DL3RK	"	17,400	96	30	57
DJ2WN	"	12,328	109	23	44
DJ3OJ	"	9452	54	28	40
DL2BB	"	9170	68	26	44
DJ2UU	"	9052	118	16	57
DL9JL	"	6435	93	14	51
DL9KP	"	5644	64	22	46
DL3TW	"	5338	61	13	21
DL7JW	"	4752	44	21	33
DJ1UE	"	3825	59	13	38
DJ3LT	"	2880	31	15	21
DL1OW	"	2747	57	13	28
DJ2YE	"	1925	56	6	29
DL7BK	"	1482	26	14	24
DJ3BB	"	1480	38	12	28
DL9XY	"	210	12	6	9
DJ4OP	**21**	**8142**	**72**	**18**	**28**
DL6EN	**14**	**129,276**	**416**	**33**	**81**
DJØIK	**14**	**95,146**	**324**	**34**	**79**
DL9CT	"	78,692	286	31	72
DL8DX	"	42,085	189	31	64
DL9YX	"	29,200	129	30	70
DJ5LA	"	11,532	93	21	41
DJ2DW	"	4862	82	8	18
DJ3CP	"	4784	41	18	34
DJ3WP	"	2960	31	16	24

[Cont. on page 84]

CQ Reviews:

The Waters Model 349 Channelator

THE Waters Model 349 Channelator makes it possible for owners of a Collins KWM-2/2A transceiver to separate its receiving and transmitting frequencies to provide any of the following combinations; (1) A tunable receiver (using the KWM's internal v.f.o.) and crystal-controlled transmitter, (2) Crystal-controlled receiver with the transmitter tunable with the v.f.o. or (3) Crystal-controlled transceiver operation on the same channel for both receiver and transmitter. Normal v.f.o.-controlled transceiver operation can be retained as well. Instantaneous selection of any of the four arrangements may be obtained by means of a MODE switch. Crystal-controlled operation includes the choice of any one of six pre-set crystal frequencies.

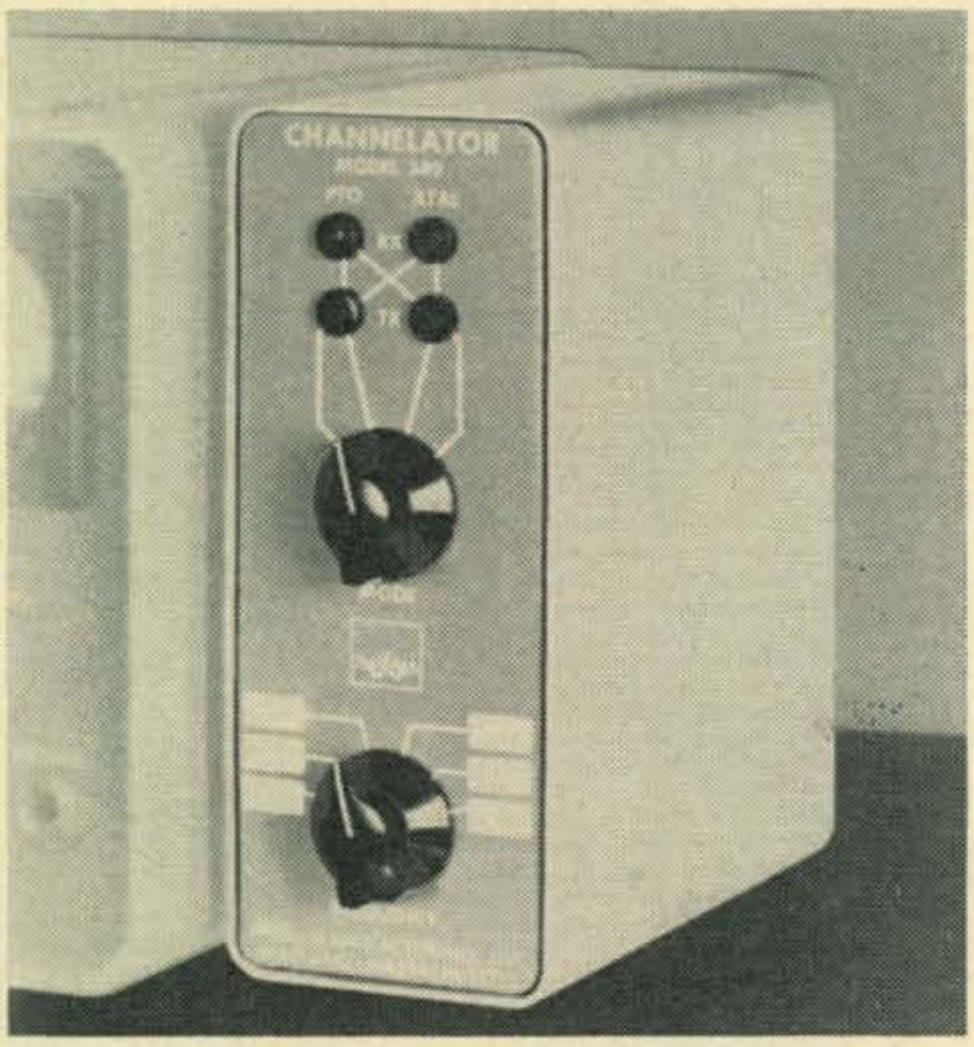
The flexibility offered by these various combinations makes it possible to conveniently conduct many types of split-frequency operation and to provide rapidly selected precise frequency control for network or round-table use.

Provisions also can be made for split-frequency DX operation where the DX station is working outside of one's own legal band. MARS Network frequencies may be included too.

The use of a separate v.f.o. instead could provide some different advantages, but the additional v.f.o. is more costly and where mobile operation is concerned, it takes up greater space and requires more manipulation.

Circuitry

A block diagram of the Channelator system is shown at fig. 1. The unit employs an electron-coupled type of crystal-controlled oscillator cir-



Waters Model 349 Channelator designed for split-frequency operation with the Collins KWM-2/2A transceiver.

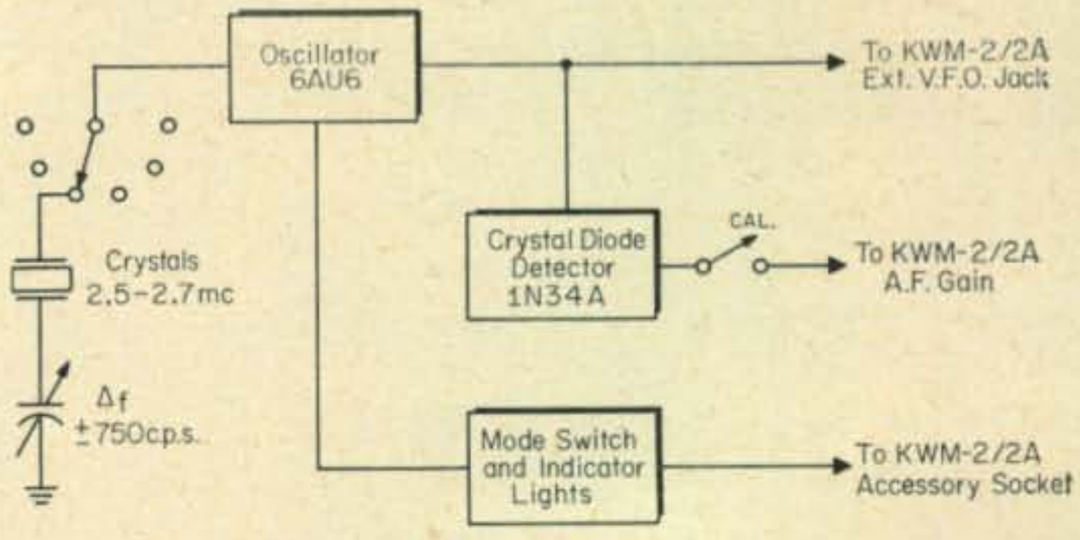


Fig. 1—Block diagram of the Waters Model 349 Channelator.

cuit operating from 2.5 to 2.7 mc, the same frequency range as that of the v.f.o. in the KWM-2/2A. It is used in place of the v.f.o. according to the function selected by the MODE switch, individually or simultaneously controlling the frequency of the transmitter and receiver. Each of the six crystal sockets has a series-connected variable trimmer for pulling the individual crystals ±750 c.p.s. for exact frequency adjustment. The crystals are special units engineered for this type of operation. They are available only from Waters. Standard type crystals will not meet the specifications required for this circuit arrangement.

The output of the oscillator, which includes a broadband circuit, is connected to an output cable that is plugged into the external v.f.o. jack of the KWM-2/2A, thus making it possible to substitute the Channelator's crystal oscillator for the v.f.o.

A unique feature is that the oscillator output also is connected to a crystal diode detector or mixer, the output of which can be switched to the a.f. gain control of the KWM-2/2A. This enables the Channelator crystal frequencies to be hetrodyned with the v.f.o. frequency when the crystals are to be adjusted to an exact frequency using the v.f.o. as a reference.

Switching

Power for the Channelator is obtained from the accessory socket of the KWM-2/2A. The MODE switch is also tied in with this socket in order to obtain the necessary circuit transfers controlled by the vox relays of the transceiver.

A nice operating convenience is that pilot lights on the panel of the Channelator provide an immediate indication of which mode of operation is in use. See fig. 2. Such an arrangement is particularly helpful when instantaneous recognition is needed, especially during mobile work.

A separate switch is used to select one of the six crystal positions. Identification tabs are supplied with the crystals. These are a self-sticking type which may be placed in the blank spaces on

the panel at the various crystal-switch positions. The tabs are marked with a Channel number that corresponds to the indicated reading on the KWM-2/2A v.f.o. dial. They also are marked with a "U" or an "L" to indicate upper or lower sideband. In this connection, it should be noted that when sidebands are switched during normal v.f.o. transceiver operation, both the b.f.o. and the v.f.o. frequencies of the KWM-2/2A are shifted 2.7 kc in order to maintain a given channel frequency; but when the Channelator crystals are used, only the b.f.o. is shifted the required amount. Thus, a given *lower*-sideband crystal will produce an output frequency 2.7 kc *lower* when it is used on *upper* sideband. Similarly, an *upper*-sideband crystal will produce a *lower*-sideband frequency 2.7 kc *higher* than for *upper* sideband.

Since the crystals operate in the same frequency range as that of the KWM-2/2A v.f.o., a given crystal may be used on any of the amateur bands to produce the same related frequency. For instance: a 95L Channelator crystal will produce the same frequency as obtained when the v.f.o. dial is set at 95 with the lower-sideband in use. Thus, the lower-sideband output frequency, using the crystal, for the 3.8-4.0 mc range will be 3895 kc; for the 7.2-7.4 mc range, 7295 kc; for the 14.2-14.4 mc range, 14295 kc; *etc.* *Upper*-sideband frequencies will be 2.7 kc *lower*.

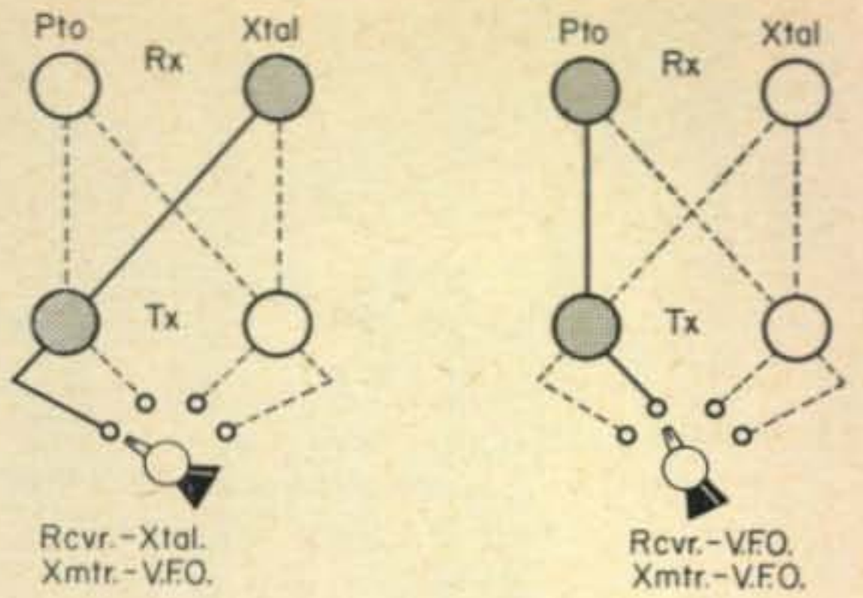


Fig. 2—Panel arrangement showing operation of indicator lights for the function selected with the MODE switch. The solid circles represent "light on". A separate switch is used for the six crystal positions.

Installation

Another feature of the Waters Channelator is that no holes need be drilled for installation or attachment to the KWM-2/2A. Resale value of the transceiver is not impaired. Mounting holes in the unit are spaced to line up with the perforation holes in the transceiver case, allowing simple fastening with screws passed through these holes at the required points. Usually, the Channelator is mounted vertically on the side of the case; however, in the event horizontal mounting on top of the case is desired, Waters has had the foresight of making the panel reversible to provide the proper positioning of controls together with horizontal nomenclature.

When vertical mounting is made, the transceiver must be removed from its case to provide access for fastening the Channelator to the side of the case. Removal of the transceiver is not required with horizontal mounting of the unit on the hinged cover of the KWM-2/2A.

Electrical connections are made via existing plugs or jacks already provided on the KWM-2/2A. One exception to this is a shielded lead from the calibrating detector which must be soldered to two terminals on the KWM-2/2A a.f. gain control, readily accessible at the rear of the transceiver panel. Plastic clamps are furnished to hold cables in place where needed. Detailed installation instructions, of course, are supplied with the Model 349.

In the event that a Waters Model 337-M2 *Q*-Multiplier has previously been installed, a separate socket and cable assembly (available from Waters at a nominal cost) must be installed to provide for the required accessory socket, inasmuch as the socket provided by Collins is already in use for the *Q*-Multiplier. Later model Waters *Q*-Multipliers are supplied with the needed attachment.

Adjustment and Operation

The only adjustment required is that of pulling each crystal to the exact frequency. This is done by setting the KWM-2/2A v.f.o. to the desired frequency, turning on the Channelator CALIBRATE switch and setting the crystal trimmer for zero beat which may be determined audibly with the receiver. After the crystals have been adjusted, placing the Channelator MODE switch to any of the positions, involving crystal operation, will then provide precise frequency control. Instead of referring to the exact dial calibration during the crystal adjustment, the KWM-2/2A may simply be tuned to the specific frequency of a station which is operating on the desired channel in order to zero the crystal to the same identical frequency. This method may be more desirable in connection with network or round-table operation.

Performance

No difficulties were encountered with the installation or operation of the Model 349. Initial adjustments can easily and quickly be made, while the instantaneous switching of crystals or the mode of operation is a handy operating convenience.

Split-frequency DX operation and MARS work may not be conducted on some bands where the

[*Continued on page 104*]

The M1M STORY

M1M's QSL card shows the author perched in front of his neat rig designed for transportation as well as operation.

BY AL BROGDON*, K3KMO

Every DX operator dreams of being rare DX himself. The difference between being the lone M1 on the air and being just another K3 can be amazing. No more hunting for contacts; no more poor signal reports and no more begging for QSL cards. The author describes how all this came about.

DURING my recent job assignment in Germany for two years, I made several attempts to operate from the rare DX countries. Each time I applied for permission to operate from such places as Luxembourg, Rhodes or Corsica, I was given the same general answer. I was politely told that I could not be granted permission to operate as long as the citizens of their country could not operate from my home country. This is the price one must pay when he comes from a country which does not join the other countries of the world in extending the courtesy of reciprocal licensing.

San Marino

However, I was determined to make one DXpedition, and I finally found the country—San Marino. I could, and did receive permission to operate from there, and made the trip during the c.w. weekend of the *CQ* World-Wide DX Contest. It was an interesting and enjoyable trip, with the results justifying the time and effort spent.

San Marino has been saturated with Dxpeditions over the past several years. For this reason, it is not so much in demand as some of the other European countries. However, I thought it would be a popular country as a new multiplier for the DX Test—and it was. In addition, there were still quite a few hams, including some OT's from the States with two-letter calls who sent QSL's saying I was the first M1 they had even heard in many long years of hamming.

There are several reasons for San Marino being such a popular DXpedition site. It is still in fair demand as a new country, it is possible to get permission to operate from there with no trouble, and it is readily accessible from Europe. Also, setting up a station there and erecting good antennas is quite easy, the trip can be made on a relatively low budget, and the country is very picturesque and beautiful. What more could you ask for?

Organizing

The logical place to start in organizing the DXpedition was to request permission to operate from San Marino. In inquiry to DL1VU (who had recently operated as M1VU) brought a reply with a wealth of information as to procedures and addresses. Following his instructions, I wrote

*3504 De Pauw Pl., College Park, Md. 20741.

the Italian Ministry for Post, Telephone and Telegraph, requesting permission to take my station to San Marino. This permission is necessary for two reasons. It indicates to the Italian customs officials that you have official permission to bring radio equipment into the country, and it tells the authorities in San Marino that you have permission to operate from there. Although San Marino is an independent country, they have agreements with the Italian government giving the Italian PTT authority over communication services in San Marino.

The letter to the PTT was written in Italian (through the help of a local language school), and was mailed almost four months in advance of the planned operation. As it turned out, this was certainly none too soon. After three months with no reply, I wrote the U.S. Consulate in Rome asking if they might possibly help me in determining what action was being taken on my application, enclosing an SASE and suggesting an informal reply, for their convenience. In the absence of the courtesy of a reply to this letter, I wrote an old friend, I1CWZ, and asked if he could help.

Mario enlisted the help of the Italian equivalent of the ARRL and was able to report to me that the request was receiving favorable consideration, and that I would receive the necessary permission in due time. With this heartening news, I went ahead full steam with all other preparations.

My home station at the time was put together for ease of portability. A wooden rack served both as equipment rack and carrying case. The entire complement of equipment (except the HX-50) was bolted in place in the cabinet. The HX-50 was not bolted in, so it could be removed when transporting the station, due to its weight. To re-assemble the station after it had been moved, it was necessary only to set the wooden case on the operating table, put the HX-50 in the top shelf, and make a half-dozen connections (antennas, ground, transmitter power plug and control cables) to be on the air. It took about ten minutes from the time the equipment was brought into the room until it was set up, tuned and on the air—if the antenna was already erected.

Preparations

Preparations, then, were quite simple. My theory in deciding what to take was to take everything I could get my hands on. Better too much than to get a thousand miles from home and find I needed an alligator clip or something, and didn't bring it. Equipment taken along as spares included a Viking Navigator, Collins R-390 and Eldico electronic keyer. Antennas and hardware consisted of a Hy-Gain 14AVS, a single-band 20 meter ground plane, several hundred feet of coax, a few thousand feet of Copperweld wire and assorted insulators, coax connectors and adapters. Several other boxes of tools, spare parts, a complete set of spare tubes for every piece of equipment in the shack, extension cords, Variacs, aspirin and a case of Dr. Pepper were laid aside to take. My car at the time was a Volkswagen Microbus, an ideal DX-pedition wagon. There was more than enough room in it for all the radio equipment, a suitcase, a bottle of Jack Daniels to present as a gift to the natives and all sorts of other junk.

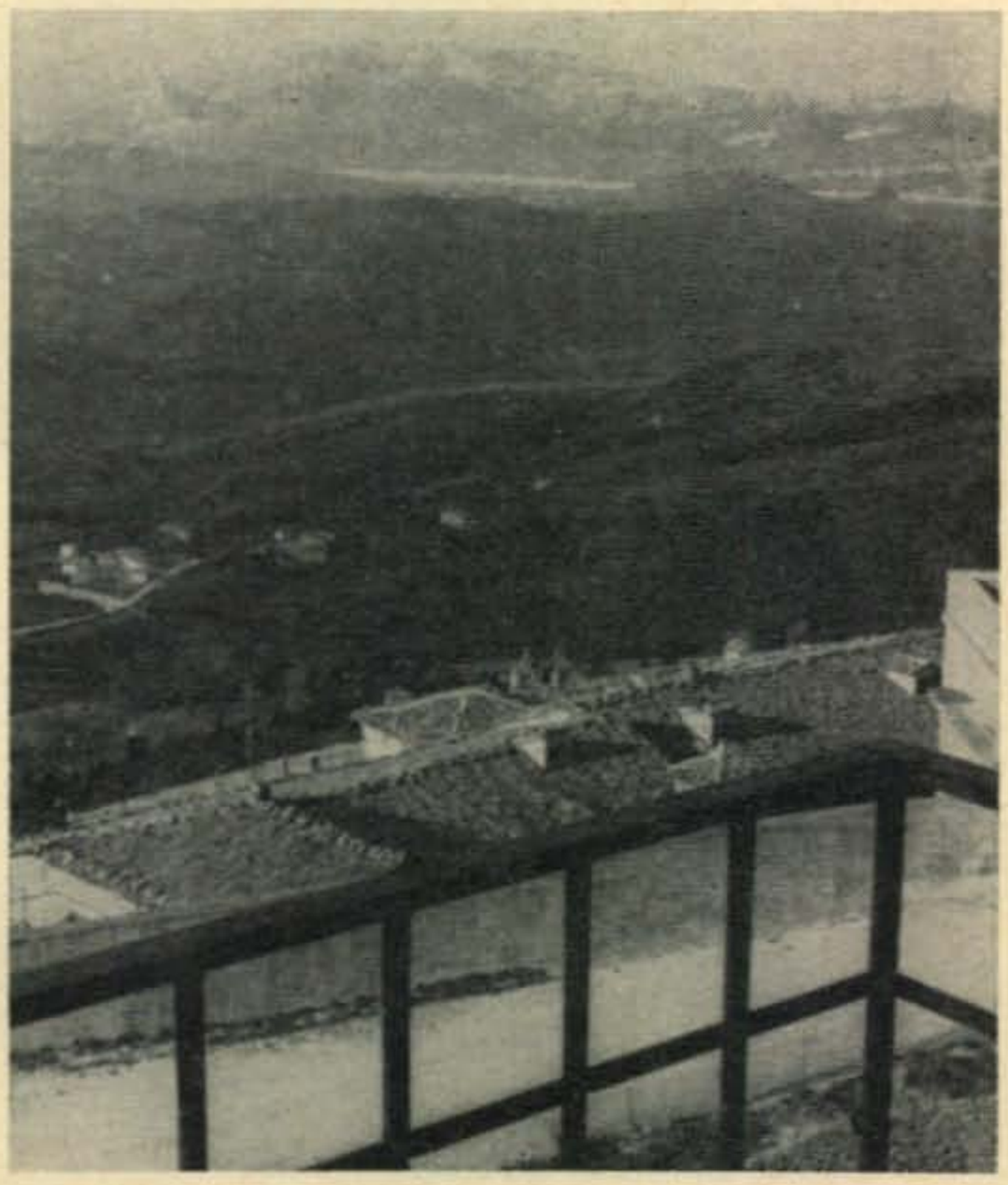
Karl, DL1VU, also suggested a hotel in San Marino—*the* hotel for DXpeditions. The Hotel Bellavista has had so many DXpeditions in one of its rooms that the room is now called the "Ham Radio Chamber." A short letter to the owner lined up this room for the period I planned to be in San Marino.

The ham radio chamber is a very comfortable double room with private bath, balcony and windows opening on two sides of the hotel. It is on the top floor, and is conveniently located for putting up a good antenna farm. Both 115 and 220 volt receptacles are located in the room, making it convenient no matter what voltage your equipment requires. Several small tables are available for use by DXpeditions, and may be arranged together to make an operating table of any size. The hotel is located very near the summit of the 2450 foot-high Mount Titano, with a beautiful view—good for sight-seeing and hamming.

Back at home, the letter from the PTT giving me permission to operate had arrived on schedule. Permission to operate, hotel reservation, all equipment and supplies ready to go, unseasonably good weather—little could have been done to improve the situation.

Under Way

Everything was loaded into the Microbus on the evening of Tuesday, 19 November. At 0400 local time the following morning, I got in the



View of the surrounding mountains from the balcony of the "Chamber" in the Bellavista Hotel in San Marino.

bus and headed South. The weather was cloudy with light rain, and scattered snow flurries in the Alps; road conditions fair to good. In spite of a delay in clearing through Italian customs (the officials found it difficult to believe that I was carrying a bus load of radio equipment for my own personal use), I arrived in Vicenza, Italy, in time to get to bed at an early hour.

After a good night's rest, I left the next morning in a thick fog. I should clarify that statement. The Italian countryside was in a thick fog. I became fogged over later in the trip. Anyway, I arrived in San Marino just before noon on Thursday. By this time, the fog had cleared away leaving a beautiful, warm, sunny, lazy fall day. Weather to match the high spirits of the moment.

Setting Up

Checking with the hotel to make sure the reservation was still good, I met Mrs. Barbieri Aldo, the wife of the owner, and her oldest son, Paulo. These two individuals proved to be extremely helpful in getting everything set up for me to operate from their hotel. Mrs. Aldo took me to the police office next where my presence and the purpose of the trip were registered. Once they saw the letter from the PTT, everything was routine and accomplished in a short time, leaving me free to go on the air.

Paulo and I started working at unloading the bus. That accomplished (easier said than done), we put up the antennas. The 20 meter ground plane fit nicely on the square hotel roof, and the 80 and 40 meter dipoles fit well between the hotel and adjacent buildings. No fifteen meter antenna was put up—later the 40 meter dipole proved to work very well on that band. The 14AVS was held in reserve, and was never needed.

By the time the station and antennas were ready to go, it was just after dark. Now, the moment I had been waiting for! But first I needed a call sign. None had actually been assigned for me to use. The letter from the PTT had suggested the 9A1 prefix, plus the suffix from my home call. However, I got the impression that this was only a suggestion. While the 9A1 prefix is the more recently assigned one for San Marino, the older M1 prefix has never been withdrawn (the country's only resident ham still has his old call of M1B). So after considering these points, I decided rather than dragging a millstone of 9A1HZ or 9A1KMO around for a whole weekend's operation, I would use a shorter call which would help on c.w. Thus, M1M.

View of the roomy interior of the Volkswagen Microbus used for transportation to San Marino.

Operating

At 1912 GMT on 21 November 1963, M1M sent out a short CQ on 3.5 mc c.w., with DL7AA rapidly snapping up the bait. Several more Europeans in rapid order showed that the antenna was working out OK. A shift to 14 mc c.w. rounded up 6W8AC, VP8GQ and several South American stations. Signal reports indicated I was getting out very well (or perhaps that they needed my QSL card). Then to 7 mc c.w., with a mob of Europeans worked, plus a W1 who gave me a 579 (90 watts, dipole) to his 459 (kw, beam). Fifteen meters was closed, but tuning up with the 40 meter dipole showed that the s.w.r. was reasonable (anything below 4:1 is reasonable to me), so that completed the antenna test.

It was interesting to note, if you will pardon me while I digress for a moment, that I received the usual DX signal reports. Almost invaribly my report would be better than the other station's (unless he gave his first and was committed early). I tested this a couple of times by giving a "high" signal report, and sure enough, mine would be even higher. As a final test, I gave one station a 599. He was so rattled that he started to give me a 699, but then thought better of it, and limited his report to a VY FB QSA 599X. The famous "DX Effect" was very much in evidence in San Marino.

After checking the antennas out on all bands, I decided to go on 75 meter s.s.b. to play around with my new transmitter (I had received it only about a month before, and was still having fun tinkering around with that s.s.b. jazz). I heard a roundtable of some of my German and GI buddies in Germany and gave a quick break, signing my call once. Immediately the size of the roundtable jumped from five to thirty hams. Then I proceeded to work most of the hams on the band. Had a nice chat with F9RY/FC, and when we signed clear there was a big pile-up on the frequency, half calling him and the other half calling me.

After getting tired of s.s.b., I dropped back to c.w. on 80 and 40 to work long runs of stations. The indications were this was going to be a wild weekend. Went to bed at 0200 GMT to get a good night's rest before the contest started.

Local Color

Friday was a wonderful day, so I spent most of the day sight-seeing, and a little more hamming around. It was so late in the year that the city was practically deserted of tourists, and the day was clear and sunny—a good combination for making color pictures.

The city of San Marino sits on Mount Titano, the tall mountain which dominates the small republic. The three peaks of the mountain are crowned by three fortresses which were built 500

years ago, with the city on the largest of these three peaks. San Marino is the smallest and oldest republic in the world—1655 years of independent rule and 22 square miles in area. The city of San Marino looks like something out of a fairy tale, or a Hollywood movie set. The buildings are usually made of grey stone with tile roofs. The streets passing between them are narrow, winding affairs just wide enough to accommodate one European car at a time. An American car could never drive around in the heart of the city. There are wide streets that go around the outside of the city for American tourists to drive their big boats around.

The sidewalks are about the same width as the city's streets, so it was difficult at first for me to tell which were streets and which were sidewalks. Finally, I found that a good rule of thumb was that if there were steps in the passageway, it was a sidewalk, and if there weren't any steps, it was a street. However, there are exceptions to every rule, and you can imagine my embarrassment the time a policeman politely saluted me and told me I was driving down a sidewalk. He was quite nice about it.

Contest

After a rather leisurely day, I went back to the hotel and got everything set up for the contest. When it started, things were very busy. And things stayed busy for the next two days. My total operating time in the contest was about 35 hours. If I had been in better physical shape, and well rested when the contest started, I might have put in more time. But the trip to San Marino and the work in putting the station up had left me tired, so I had trouble staying awake once the contest was well under way.

The contest was for the most part, routine. It turned out to be quite difficult to work through the European stations to get the real DX on most bands most of the time. Only when a band would be closed to short skip could I get runs of three-point contacts started. Since 80 meter c.w. is my favorite band, I had hoped to work many of my U.S. buddies there. But it was difficult to find holes in the local QRM. When a clear spot could be located, the U.S. stations could be worked with good readability. But this was seldom, keeping down my DX contacts on 80 meters.

Few discourtesies were noted from my end during the contest. Perhaps there were more going on, but I was too busy to notice. The most annoying one was the one eastern European station who kept disregarding my directional QRZ to another station and kept calling—long, drawn-out calls that drifted right across the station I was really trying to copy. By the time I was able to restrain the unwanted station, the one I had been listening for had given up and left.

The operation during the contest was in the lower ten kc of each band (3.5 through 21 mc), as had been announced. A few times, the pickings would get slim, and I would move up higher in the band for a while to stir up some more stations. With few exceptions, few stations were

Hotel Bellavista in San Marino. The "Ham Radio Chamber" is located on the top floor.

called—normally I would just call CQ and work the stations as they came. There were a relatively small number of duplicate contacts during the contest (12 out of 1097), although I made no effort to keep track of who had been worked. It would have been impractical to keep a checklist, so I had to depend on the other operators to remember whether or not they had worked M1M.

Ten meters was checked several times, and CQ's were sent, but no signals were heard on the band. With the operation confined to only four bands, I expected to work quite a few stations on all bands used. However, this was not the case. The only stations worked in the contest on all four bands were OH1AA, OH2BH, SM5ARR, SM5BAU, SM5BJP, SM5CCE, UA3UJ and W4BVV. Special QSL's will go to these stations.

After the contest was over, I had 1085 valid contacts, with a claimed score of 435,830 points. Contacts by bands were 140 on 3.5 mc, 227 on 7 mc, 437 on 14 mc, and 281 on 21 mc. Multipliers were 63 zones and 142 countries.

Although I've been a ham for a little more than twelve years, I have never done much more than dabbled in DX. Therefore, my DX knowledge is pretty low. If one of the competent DX operators had been using the same equipment I had, I think he could have easily topped 750K points, and with a little better antenna system and perhaps a little more power, it might have been possible to go over a million. This looks like a good place for DX contest operation, gentlemen!

DX Details

For those of you who might want to consider San Marino for a DXpedition, the address of the Italian PTT is:

Ministero Poste e Telecomunicazioni
Ispettorato Generale delle Telecomunicazioni
Direzione Centrale dei Servizi Radioelettrici
Divisione 1A
Roma, Italy

[*Continued on page 100*]

15 or 20 Meter Mobile Transmitter

BY STANLEY KAPLAN*, K1WTF

This 60 watt a.m. mobile type transmitter is a tightly packaged hybrid unit. The transistorized modulator provides for reduced battery power consumption. Construction data is given for 15 or 20 meters.

THE mobile transmitter to be described in this article is the product of much research, construction and that final ingredient, dollars. To clarify the title of this article it should be stated at this time that the transmitter is operational only on the band for which it is constructed, 15 meters. Should you desire operation on the 20 meter band, provisions in the form of coil changes and notes throughout the article have been checked and provided for. The transmitter was constructed with three key factors in mind, minimum size, maximum power and minimum power drain from the battery; to express it in one word, efficiency. The author does not claim the following transmitter to be the most efficient type ever constructed, however, by the use of a transistorized modulator and power supply it is a 100% improvement over previous installations.

Front view of transmitter, showing the loading control at the extreme left, followed by the final PLATE TUNING control, the HEATER switch, METERING switch for the P.A. grid, and P.A. plate, the switch for choice of CRYSTALS, X-1 or X-2, the AUDIO GAIN control, and the MICROPHONE jack. The pilot light on the left is green in color and indicates the heaters in the ON position. The pilot light on the right is red and indicates the final in the transmit position. The meter reads 0-5 and 0-200 ma.

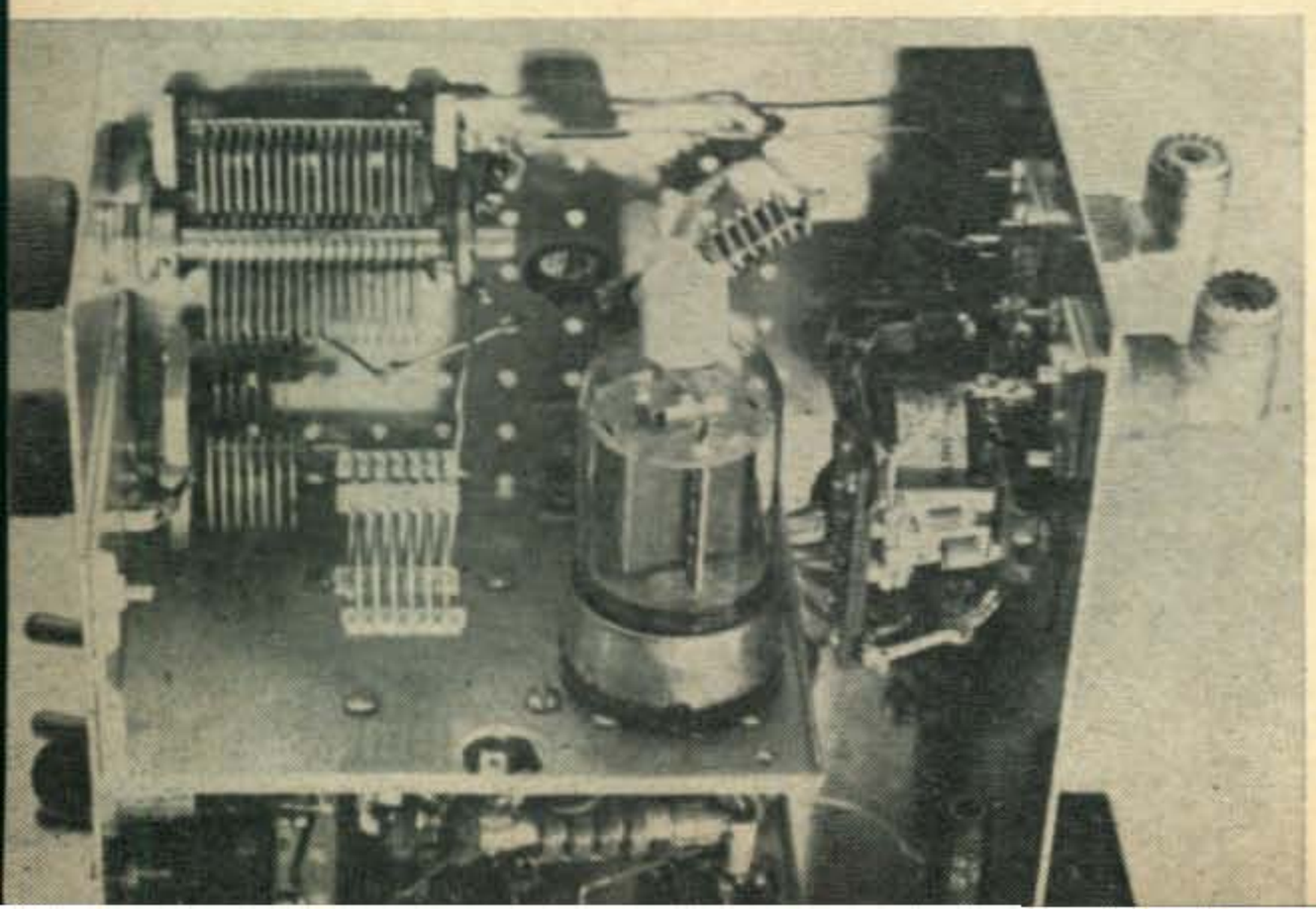
Circuit Description

The oscillator, V_1 a 6CL6, utilizes 7 mc crystals and multiplies to 14 or 21 mc in the plate circuit. This particular oscillator circuit will provide more than adequate drive to the next stage for either band. More about drive later.

The buffer-driver stage uses a 6AQ5, an inexpensive type of tube likely to be found in the junk box. This stage utilizes conventional circuitry and bears little discussion.

*2 Herbert Ave., Peabody, Mass.

Side view of the interior of the mono-band transmitter shows the construction of the 6146 deck, the pi-network and the antenna relay, K_3. The oscillator-buffer deck may be seen below.



The final, V_3, employs a 6146 simply because it was on the shelf in the shack. A key jack (closed circuit, of course) is located in the cathode of this stage in the event this rig is used for field day operation. A meter is switched from the grid to plate circuit for purposes of tuning. The plate circuit is a conventional pi-network.

The modulator is driven by a carbon microphone, the voltage for which is taken from the 12 volt line through a 200 ohm pot and a 27 ohm resistor. The pot acts as the audio gain control. The driver and output stages are push-pull and the transformers T_1 and T_2 are conventional transistor types. The modulation transformer, T_3, is a 6.3 volt filament transformer with a current rating of 3 amps. Most any type will do but a Stancor P-5014 was used in the prototype. The 117 volt winding is used as the secondary and presents a good match to the 6146.

The two modulator transistors are placed on a surplus Delco heat sink which is mounted outboard. Almost any piece of substantial aluminum stock will do for a heat sink and if parts are juggled some room can be made inside the cabinet for these transistors. They do not run too hot so would not present a heat problem.

The filament circuit while very simple is carefully balanced so that all tubes receive 6.3 volts.

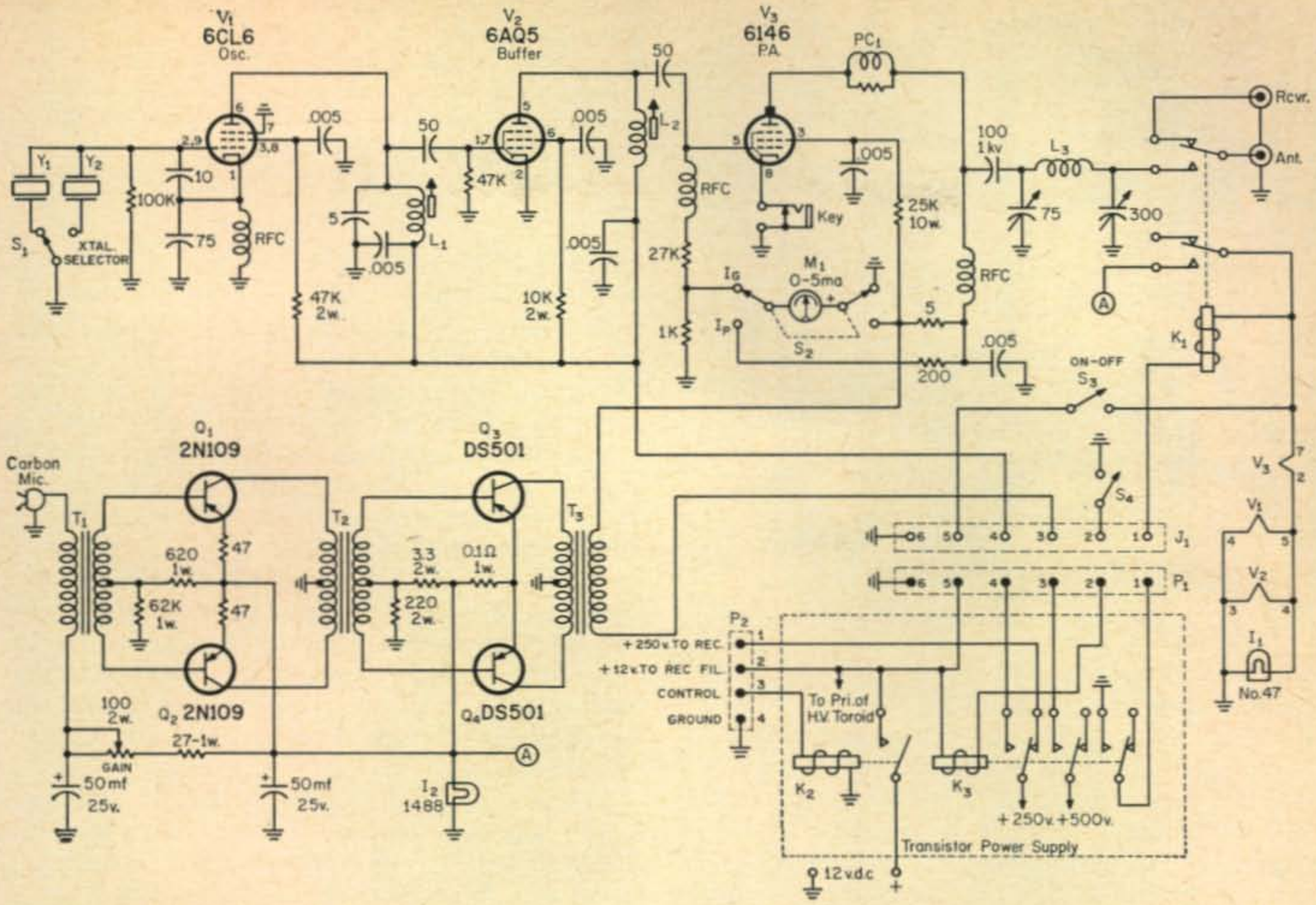


Fig. 1—Schematic diagram of the compact 15 or 20 meter mobile transmitter. All resistors are ½ w. unless otherwise indicated. Capacitors are in mmf unless otherwise indicated.

L_1—20M.—30t #24 e. closewound on ⅜" slug tuned form.
15M.—20t #24 e. closewound on ⅜" slug tuned form.
L_2—20M.—not used on this band. See text.
15M.—20t #16 e. closewound on a ⅜" slug tuned form.
L_3—20M.—20t #20, ¾" d., B&W-3011.
15M.—8t #16, 1¼" d., B&W-3018.
PC_1—7t #14 space wound on a 47 ohm 2 watt resistor.
RFC—20M—Ohmite Z-14.
15M—Ohmite Z-21.
S_4—Push-to-talk switch on microphone.
T_1—150 ohms to 490 ohms c.t., Thordarson TR-5 or equiv.
T_2—400 ohms c.t. to 16 ohms c.t., Stancor TA-41 or equiv.
T_3—6.3 v.c.t. at 3a to 117 v.a.c., Stancor P-5014 or equiv.

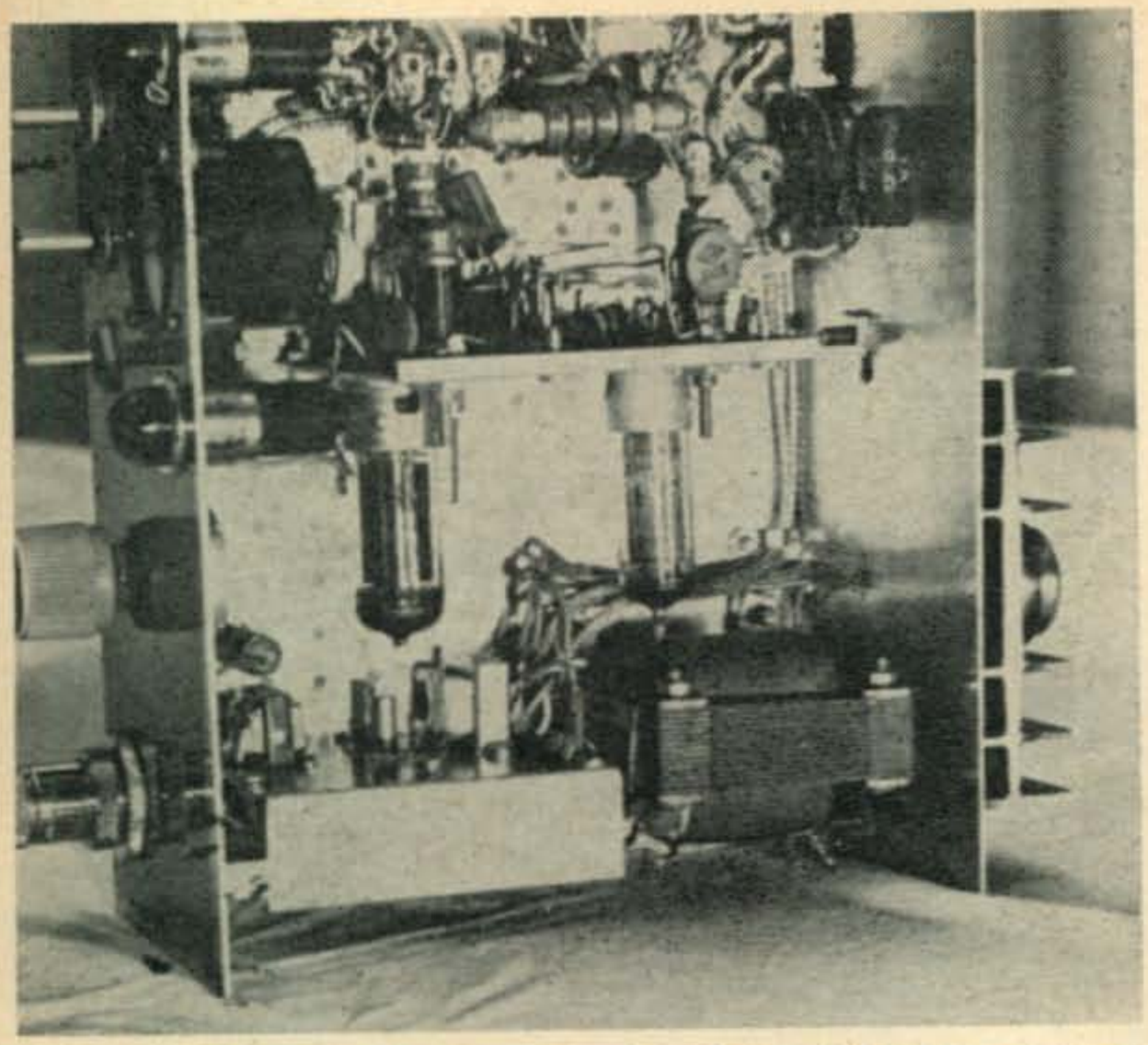
The indicator, PL_1, *must* be a #47 pilot lamp so that the combined parallel currents of V_1, V_2 and PL_1 equal the filament current of V_3 the 6146.

The power supply used is transistorized and is not shown. However, the control circuit *is* shown and rates a description. Relay K_2 controls the 12 volt feed to all units, the receiver filaments and power supply. Relay K_3 when deenergized feeds the 250 volt power supply output to the receiver but not the 500 volt output. When K_3 is energized through the microphone switch it transfers the power supply outputs to the transmitter and the third contact of K_3 energizes K_1 in the transmitter. Relay K_1 switches the antenna to the transmitter and energizes the modulator. The use of K_1, energized by K_3, introduces a slight delay allowing the p.a. to be energized before the modulator. In the original model K_1 was not used and after a week of operation the power transistors were completely destroyed. Since the addition of K_1 no difficulty has been encountered.

Drive Considerations

This simple transmitter was designed for single band operation on 20, 15, 10 or 6 meters. Since the drive becomes more difficult to obtain on the higher frequencies, the 6AQ5 was made a permanent part of the circuit although it can and should be bypassed for 20 meter operation. The 50 mmf coupling capacitor from the plate of the 6CL6 should be connected directly to the grid of the 6146. With this arrangement no trouble will be encountered driving the 6146 grid to 3

Rear view of the single band transmitter shows the heat sink and the modulator output transistors. The antenna and output connector to the receiver and the power plug are also visible. It would be preferable to use a male chassis mount plug so that the power feed has a safe type of connector.



Three-quarter view of the interior of the mono-bander shows the audio driver located on the upright chassis. Directly behind this chassis is T_3. One output transistor is just visible on the rear apron. The oscillator-buffer deck is to the left of the audio section. Note the use of shielded wire for interconnections.

mils using 7 mc crystals. If the 6AQ5 is omitted for operation on 20 meters be sure to add a resistor of 14 ohms 5 watts across the filament of V_1 to retain balance in the filament circuit.

When operating on 15 meters with the 6AQ5 buffer, enough grid drive is available to allow stagger tuning of the oscillator and buffer coils so that crystals can be used covering the entire band without loss of drive.

No attempt was made to operate on 10 meters because of the generally poor performance due to the sun spot cycle. Enough drive is available for 6 meter operation should such a modification be contemplated. A 6DQ5 could be used instead of a 6146 as it requires somewhat less drive.

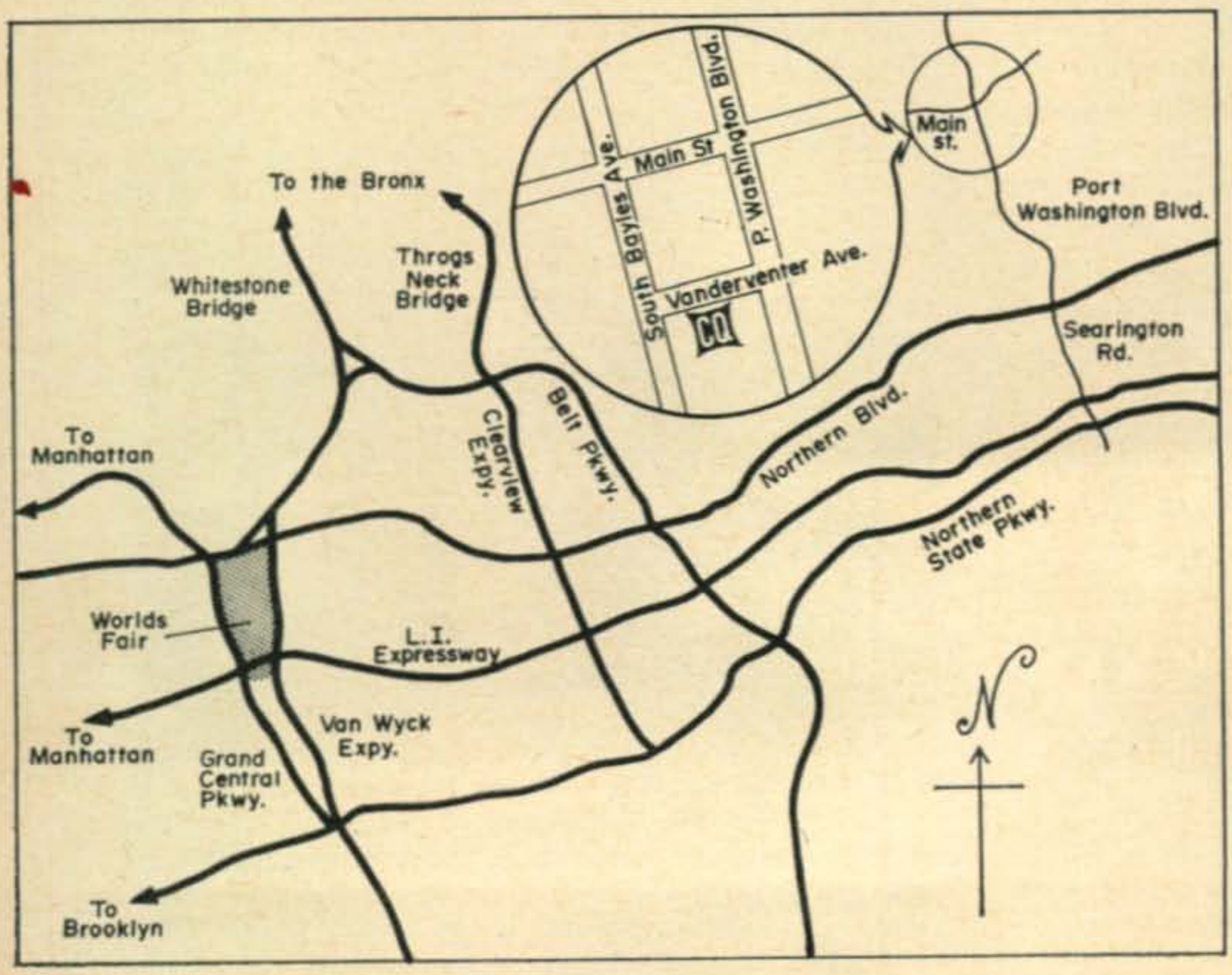
Construction

The complete transmitter and modulator, with the exception of the power supply is housed in a Premier Mini-Box, #PMC-1011, which measures 12" × 7" × 4". The complete rig makes a very nice installation in almost any automobile being only 4" high and thereby fitting under most dashboards.

The r.f. driver section is mounted on a flat piece of aluminum measuring 4" × 4" and is held to the bottom of the mini-box with one small bracket in each corner. The modulator audio driver components, (transformer T_1 circuitry though the output of transformer T_2) is mounted on a small utility chassis that was found in the junk box. However, any small aluminum base will do. The bottom of this chassis, similar to that of the r.f. driver assembly, is fastened to the bottom of the cabinet. No special layout of wiring or components is necessary as all circuitry is low gain.

Resistor R_{19} is a 0.1 ohm resistor and was hand made with appropriate resistance wire. Resistor R_{18} a 3.3 ohm resistor, was made by paralleling three 10 ohm resistors.

Wiring of the portion of the transmitter not carrying r.f. was accomplished with shielded wire. This is the fourth transmitter that the author has constructed using shielded wire and in each case it was found that neutralization was not required. The only precaution that should be stressed at this point is to not apply excessive heat to the shield when soldering it to the various ground points. This may tend to short the inner conductor to ground. The remainder of the transmitter is wired in a conventional manner and further comments are not required. ■



THE NEW CQ OFFICES

Our April issue contained an invitation to visitors to the New York World's Fair to also visit our offices at *CQ*. A number of fellows took us up on the offer. But we are now in the process of moving to new offices in Port Washington, N. Y., so our April map is obsolete. A new map is shown here based on the assumption that you are already at the World's Fair grounds. Hope we'll see you in Port Washington some time after June 15th.

Upgrading The Comanche Receiver

BY GEORGE HRISCHENKO*, VE3DGX

For less than ten dollars and an evening's work, your Comanche can out perform many of the higher cost receivers.

THOSE of you who own the Heath Comanche know that the MR-1 makes a fine little mobile receiver. The stability is excellent and the crystal filter has adequate selectivity. When used in the car it will usually "hear" as far as your 75 watts will reach. However, when you use the pair at home, especially with a linear on the transmitter, it becomes apparent that an improvement in receiver sensitivity would be very helpful. By adding another 6BZ6 to the i.f. strip an amazing improvement in sensitivity and a reduction of i.f. noise can be obtained. I find I can now give DX stations reports which compare favorably to an SX-101A down the road. Also, i.f. QRM from a commercial station on 3 mc was completely eliminated.

Comparing the modified MR-1 to another unmodified MR-1 showed an S meter reading of 20 db. over S-9 against S-8 on the unmodified version. The comparisons were with both r.f. gains up full and when the signal was removed the noise caused the modified MR-1 to show a reading of S-4 as against S-6 on the unmodified MR-1. I think you will agree this is a worth-while improvement.

It seems that the 6BZ6 1st i.f. can't develop maximum gain due to the 4.7K crystal load resistor in the grid circuit.

Procedure

It seemed if the crystal filter could be re-oriented the 0A2 socket could be used for an additional i.f. stage. Fortunately things worked out neatly and a minimum of work is required.

To start, remove all wiring from the 0A2 socket; unsolder and dismount the crystal filter. Make a paper template of the crystal filter mounting holes (punch a pencil thru a paper placed over the holes) and re-orient the filter so it heads back towards the old 0A2 socket. The 6EA8 plate lead hole is re-used so the template is located by this point. Take care to duplicate the spacing and diameters of the holes so you won't crack the glass seals of the filter. One mounting stud will go thru the lip of the compartment shield so watch your drill.

The i.f. transformer is hard to come by since it isn't a standard unit. I had to peel turns off a 455 kc unit until the grid dip meter showed a resonance at 3 mc with the slugs part way into the coils and the coils connected to the capacitors

*R.R. #2, Maidstone, Ontario, Canada.

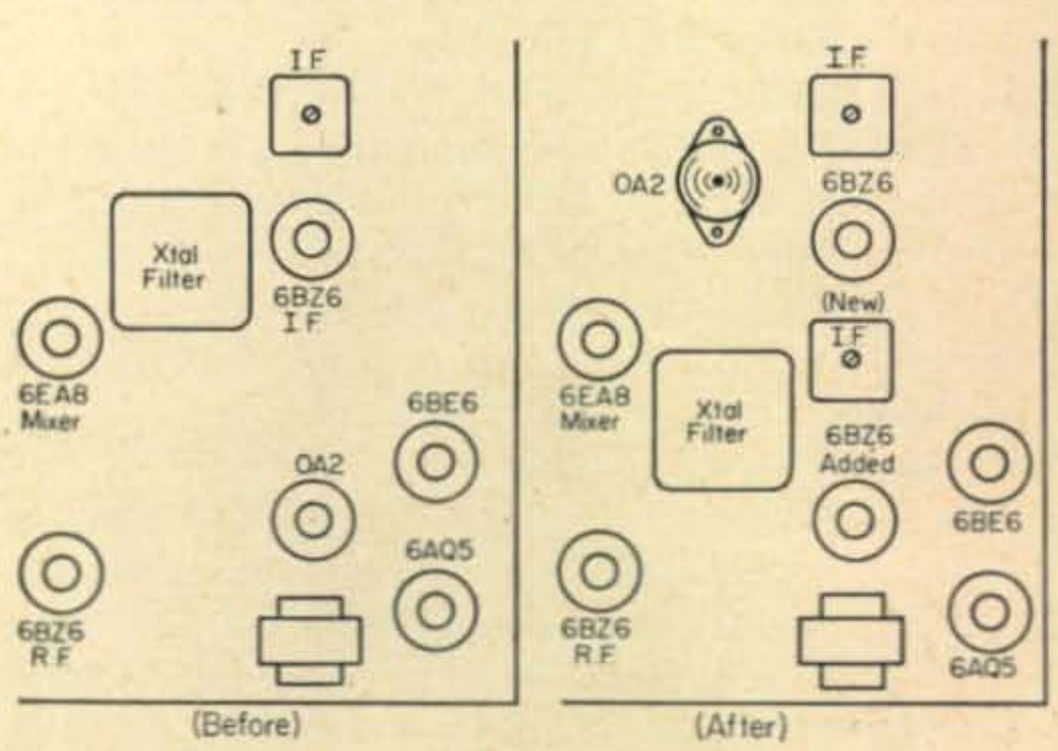
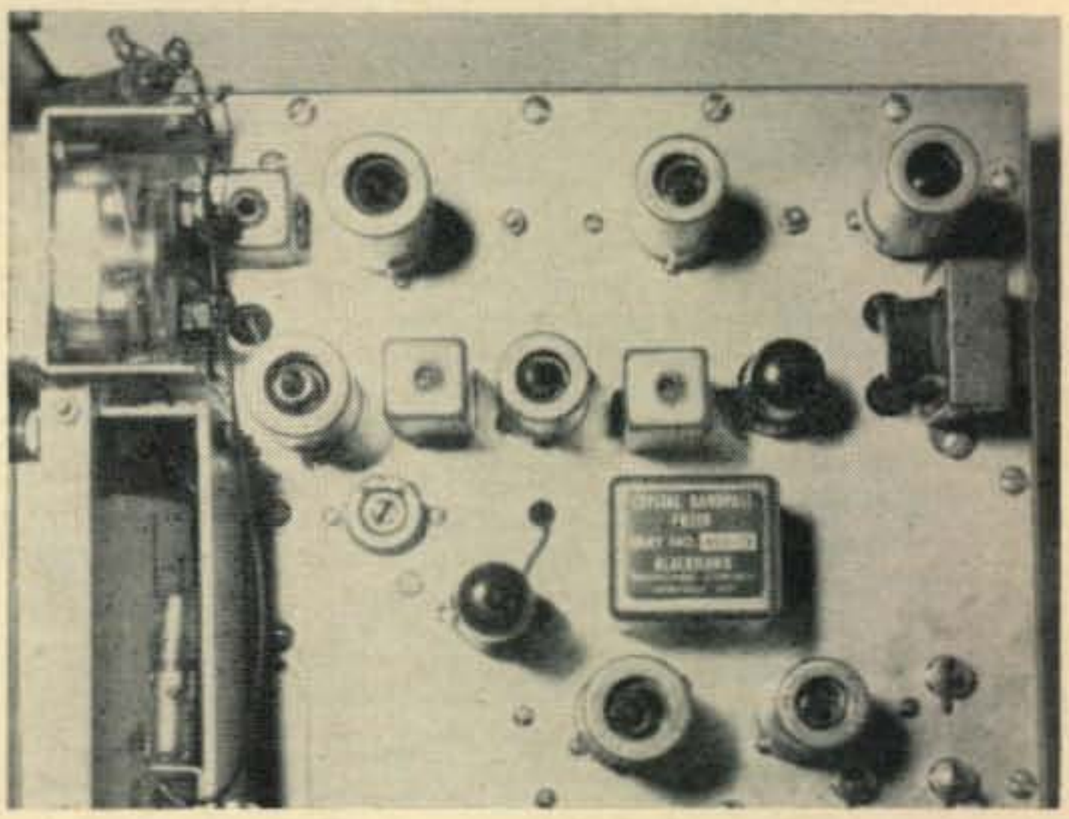


Fig. 1—Before and after of the corner of the Comanche mobile receiver in which the r.f. modification is done. The crystal filter is relocated as well as the 0A2 and the new 6BZ6 is located where the 0A2 was and a new r.f. is added as shown.

in the mounting base. Watch how many feet of wire you must remove from the one coil and remove the same amount from the other coil. Another way would be to add enough capacity to a 4.5 mc unit to get it to resonate to 3 mc. Use a transformer ¾ inches square, preferably with slug tuned coils. Hack out the mounting holes for the new transformer between the old OA2 socket and the old 1st i.f. tube socket. I found a series of in-line-holes for each mounting slot cut down on the filing time required. (See fig. 2.)

Wire the socket as shown in fig. 3, to nearby



Top view of the modified Comanche receiver shows the relocated crystal filter, the repositioned 0A2 and the added i.f. stage.

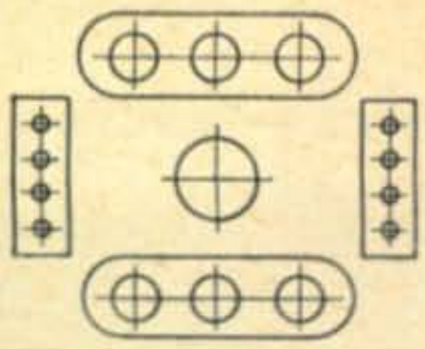


Fig. 2—A simple method of cutting the slots to mount the new i.f. transformer.

points. Don't forget to wire the other 6BZ6 (now the 2nd i.f. amp.) as shown. Refer now, to the circuit in the manual. The new 6BZ6 filament is wired across the other 6BZ6 pins #3 and #4. In order to rebalance the voltages for 12 volt operation the 43 ohm 2 watt resistor is removed and one of the #47 pilot lites is changed to a #44 type. Later you can test to see if the voltage has divided equally by connecting a voltmeter from the hot terminal of the pilot lites to ground. If the meter doesn't read half of the total filament supply juggle #44 pilot lites around until you get a fairly equal division. Allow the filaments to run about 1 minute after each change so they reach operating temperature.

The 0A2 tube is mounted above the chassis on spacers. Use a MIP socket and bend pins 1 and 5 in towards each other. Solder a red wire to this point. A black wire is soldered to pins 2 and 4 for the ground. A short brass sleeve was used to mount the socket on the chassis. Run a bolt through one socket mounting ear, through the sleeve then through the chassis. A hole is already handy in the chassis so use it. The other end of the socket is supported by the unused pins resting on the chassis. There is barely enough head room using this method so make sure your brass sleeve is no longer than 5/8". The red and black leads are wired to nearby points taking care that the red lead goes to the regulated line.

If you have made no errors you should be able to operate the rig and get some noise out of it. Put the MT-1 on spotting and tune the receiver for an S meter reading. Peak up the new i.f. transformer and the rest of the i.f. strip. If the new transformer doesn't show a distinct peak for each coil either you have a wiring error or the transformer isn't resonant to 3 mc. A little thought will indicate what has to be done to the coils to get them resonant.

Mixer Modification

Another quick modification for an increase of 3 S units is to inject the local oscillator into the screen of the mixer. This is done by removing all components from pin #3 of the 6EA8 mixer/oscillator and wiring pin #3 to #1 of the same

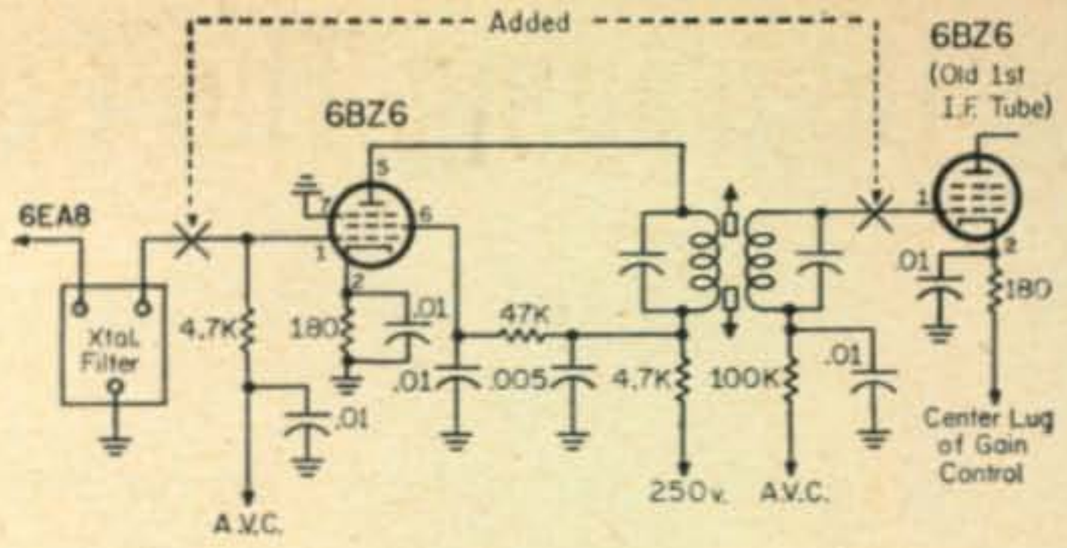


Fig. 3—Circuit of the added i.f. stage. The added circuitry is shown between the dotted lines. All resistors are ½ watt and all capacitors are in mf.

socket as shown in fig. 4. Unfortunately, this throws the oscillator tracking off and re-alignment will be required. First the oscillator will have to be adjusted to agree with the dial calibration and then the mixer slugs and trimmers will have to be peaked for maximum. If the thought of alignment frightens you this modification can be left out but the improvement is well worth the extra effort.

In case you're wondering what that extra tube is doing in the corner of the chassis—it's a BC convertor for my favorite BC station—the one I happen to work for. Contrary to what the boss thinks, I do listen to it even when I'm not being paid for it. It has nothing to do with these modifications. Also you may notice that two of the transformers are changed to different units. I thought that a double tuned 2nd i.f. transformer may improve something but, unfortunately, no benefit was noticed.

Results

Now, when operating mobile, I find the shoe is on the other foot. I can now hear stations that don't seem to be able to hear me, but then, that's life. ■

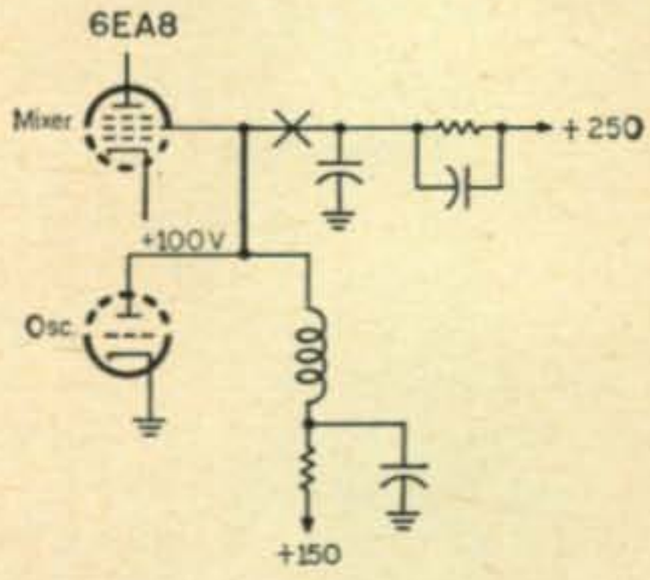


Fig. 4—The above modification of the mixer circuit provided enough gain for an additional 3 S units but required a realignment of the oscillator slugs.

An Important Reminder . . . to all *CQ* readers. After June 15 our new address will be 14 Van Derventer Ave., Port Washington, L.I., N.Y. Mail addressed to our old address will reach us, but will be delayed.

A Universal Vernier Tuning Aid

BY RONALD LUMACHI*, WB2CQM

Here is a vernier tuning aid made from an inexpensive surplus ARB tuning Head. With a few simple modifications and a stand it may be "connected" to the receiver for a 25 to one improvement in tuning ratio.

With the advent of single sideband, new horizons, which were heretofore unknown with conventional equipment and technique, were opened to amateurs. Needless to say, problems were confronted which in some cases could easily and inexpensively be resolved with a bit of thought.

For example, the problem of accurate s.s.b. tuning became a reality after a new Drake 2-B receiver was put on the air. Although the receiver is deserving of every superlative that may be placed upon it, the manufacturer seemed to place less emphasis on the physical properties of operational controls, and channeled his engineering skills in the direction of electrical refinement (In the interest of lower cost). I might add incidentally that this simple tuning assistant was intended as a universal device and by no means restricted to a specific receiver.

It would be safe to assume that many model receivers of various manufacture, which are still performing well, can be expected to tune more exactly with this project that does not require cabinet modification. Personally, I am somewhat inhibited when a situation demands "jiggling" delicate equipment since vibration can cause infinitesimal changes that might adversely affect tuner performance.

Finding commercial verniers prohibitive, costwise, I decided that a surplus vernier ARB tuning head might perform well. (Available from Jeff-Tronics, 4791 Memphis Ave., Cleveland 9, Ohio. 75¢.)

*73 Bay 26th Street, Brooklyn 14, N.Y.C.

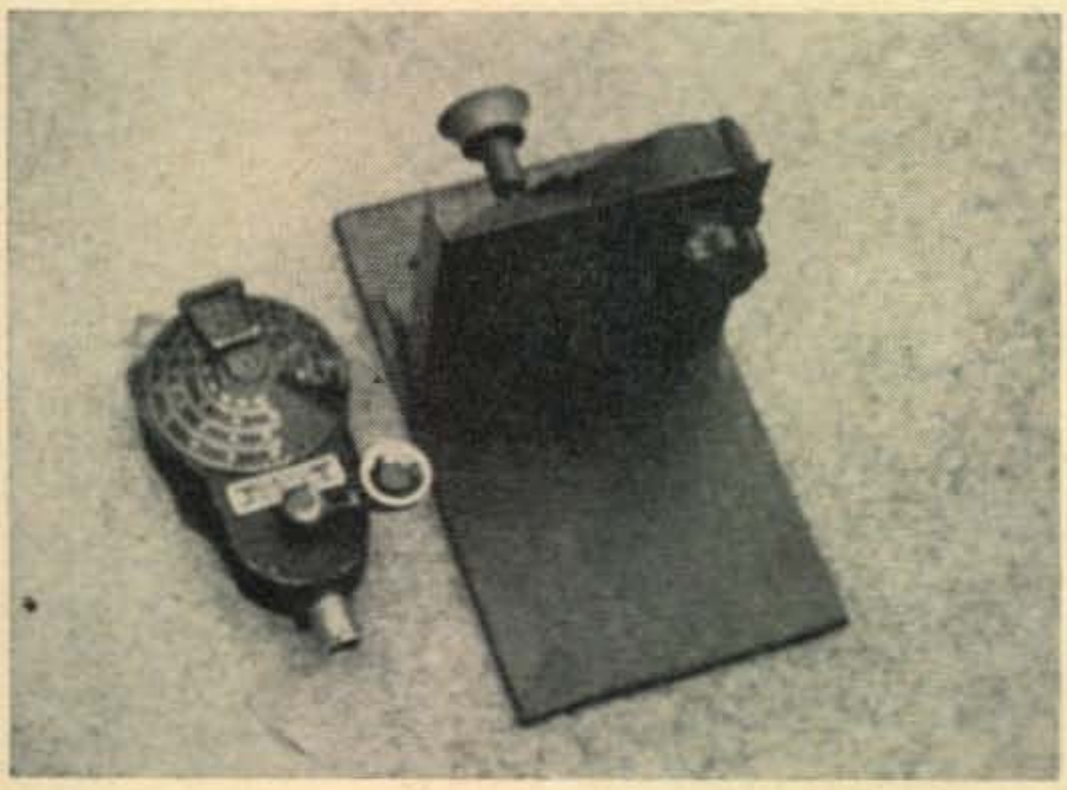
Dissection

The first order of business was a careful "dissection" of this interesting piece of government equipment. Two Allen head screws permit the removal of the handle, and two screws allow the vernier dial and hairline to be removed. With the removal of four additional screws, the gear mechanism becomes visible (no back-lash is present in the worm and gear train). Turning the vernier over, I discovered that the other end of the slow moving shaft protrudes and is flush with the rear casing. In order to keep the front dial intact, I decided to tap the rear shaft and thread on a shaft extension to operate a tuning mechanism. The dial was internally equipped with a 360 degree stop which was snipped off and ground smooth. The modification was completed with the replacing of the gear. The rear shaft was then drilled with a 9/64" drill bit and threaded. A nail of comparable diameter was threaded and inserted as the extension. A child's rubber arrow tip completed the pseudo-clutch arrangement. A 2" knob replaced the original handle control.

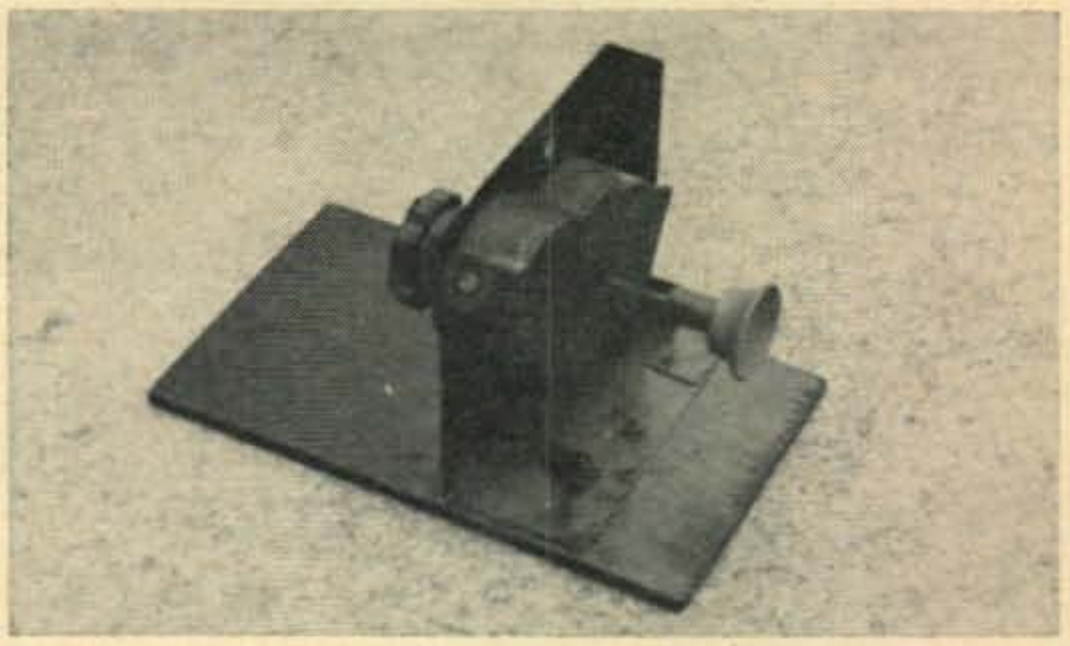
Stand

A simple right angle support was constructed from scrap metal and a base was drilled to accept the completed assembly. The front cover was "sandwiched" between the upright and the ver-

[*Continued on page 95*]



Front view of the modified and unmodified ARB tuning unit.



Rear view of the ARB remote tuning head modified as described in the text. Note the use of the rubber tip to couple to the tuning dial of any receiver.

DX DX DX DX DX

URBAN LE JEUNE, JR.*, W2DEC

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

CW-PHONE WAZ

1946	W9FKH	Arthur J. Koda
1947	WØAIH	Rev. Paul E. Bittner
1948	W5EJT	Eugene A. Jank
1949	W4FUI	Terry Beeler
1950	EA1GZ	Jose Luis Gonzalez, De La Pena
1951	DJ5IM	Ernst Beau
1952	OE5LX	Leo Mis
1953	TI2LA	Luis D. Arce E.
1954	K2BZT	Hayden W. Evans
1955	W6OMR	Irv Astmann
1956	W5MCO	Victor G. Soens
1957	YU1KC	Boris M. Stambuk
1958	JA1FHK	Kazuo Kusakabe
1959	JA1MJ	Arihioro Otani
1960	W6CUF	James A. Maxwell
1961	DL6FF	Hans Mauder

ALL-PHONE WAZ

234	W7AUS	John B. Belongia
235	VE7HJ	W. G. Stunden
236	LU4DMG	Maria M. de Dantiacq
237	W8CUO	Harold Counts
238	G3FPK	Norman A. S. Fitch

TWO-WAY SSB

222	VE4XO	Charles E. Johnson
223	OK1MP	Milos Prostecky
224	PAØHBO	H. Bouwma
225	G3FPK	Norman A. S. Fitch

CW WPX

534	W2KXL	Jerome H. Fischer
535	G3FTQ	Alan Frost
536	PAØVB	P. v. d. Berg
537	G3HFP	Tom Worton
538	DJ7CX	Leonhard Poelt

MIXED WPX

88	KL7MF	Harold D. DeVoe

Here And There

BY China: As much as it is regretted, s.s.b. and WPX credit cannot be given for XW8AW/BY. Gus simply did not have permission to operate from China.

CN8 Morocco: The Kenitra Amateur Radio Club (formerly known as the Port Lyautey Amateur Radio Club) which is located on the Naval Air Facilities, Kenitra, Morocco held their annual election of officers for 1964 with the following results: *President*, H. L. (Tommy) Hall, CN8AW; *Vice President*, E. B. (Red) East, W4BJR; *Sec-Treasurer*, Al Parker, CN8GB; *Member of Board of Directors*, George Kimball, CN8GD; *Custodian*, Jake Ritzen, WØJHY. Any of the above-named officers are authorized to certify letters for awards when authorized by the award sponsoring activity.

The Kenitra Amateur Radio Club is registered with the A. R. R. L. and is also a member of the Association Royale des Amateurs Emitteurs du Maroc (A.R.A.E.M.) which is an affiliate of the I.A.R.U. of which Tommy Hall, CN8AW, is the representative in Morocco as well as being the Emergency Coordinator.

For any further information pertaining to the club or amateur radio in general in Morocco, please feel free to ask. Contact H. L. (Tommy) Hall, CN8AW, General Delivery, Navy 214, FPO, N. Y., N. Y.

The amateur radio society in Morocco (which corresponds to the ARRL in the U.S.) moved into their new club house on 8 March, 1964 at 24 rue Mohammed Sedki, Casablanca. A big celebration was held for all amateurs here in Morocco with an all-day party. The official club call is CN8MC and was used quite frequently at the celebration.

Election of officers for the year 1964 was also held with the following results: *President*, Mohammed Hamidallah, CN8AF; *President*

*Box 35, Hazlet, New Jersey 07730.

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.

Delegue, Mohammed Eltouni, CN8EM; *Vice President*, Abdelhamid Talby, CN8MT; *Secretary General*, Christian Soumet, CN2BS; *Asst. Secretary General*, Hans Hackenbruch, CN8AQ; *Treasurer General*, Joseph Pallas, CN8BP; *Asst. Treasurer General*, Moumni Driss; In charge of all relations with international Organizations, H. L. (Tommy) Hall, CN8AW.

The society is now stronger than ever and now has full government backing and support. Most of the officers hold high positions in the Moroccan government. Amateur radio is definitely on the upswing here in Morocco with many new licenses now being issued. Amateurs should have no trouble contacting CN8 now. I'm on almost every night and I take part in almost every big contest.

Tnx to Tommy, CN8AW, for both of the above.

CR5 Sao Tome: Hammarlund's "DXpedition of the Month" announces the following CR5 activity. Al Silva, CR5SP, will operate s.s.b. from Sao Tome commencing early summer. Al is now on a.m. and c.w. with 21 mc preferred. Al will also operate periodically during the second half of the year from Principe Island as CR5SP/P. This counts the same as Sao Tome for DXCC.

CR9 Macao: CR9AE is a new one on s.s.b. His usual frequency is 14,110 on usual operating time between 1100 and 1300 GMT. *(Tnx Florida DX Report)*

EAØ Annobon: "DXpedition of the Month" has set its sights on what should be a new country. CR5SP will journey to Annobon for six visits with each visit covering a period of three days. A second operator will accompany Al and operation will be continuous on all bands. *(Tnx W2GHK)*

EAØ Spanish Guinea: Al Silva, CR5SP, will operate from Fernando Poo for six visits of three days each. This counts as Spanish Guinea. A second operator will provide continuous operation for this "DXpedition-of-the-Month" operation. *(Tnx W2GHK)*

Sir Gus, W4BPD, about to enjoy his first "Coke" on the continental United States in two years. The scene was L.A. International Airport where a group of Southern California DX Club members were on hand to welcome Gus home. Seated with Gus is another DXpeditioner of fame, Don Miller, W9WNV/HL9KH. *(Tnx W6YMV)*

EP Iran: EP2DM on 14,080 daily between 1230 and 1430 GMT. Skeds may be arranged by W2IPB. *(Tnx Fla. DX Rpt.)*

FB8W Crozet Island: Marcel, FB8WW, continues to panic the entire twenty meter band at times. He works station anywhere in the band, phone as well as c.w. He has a good phone signal (a.m.) and usually operates between 14,125 and 14,145 kc on phone. Listen closely as he usually mentions where he's tuning. Vic, 5R8BC, has been doing a FB job getting out the QSLs.

FH8 Comoros Islands: Andre, FH8CD, ex-FB8CD, will soon operate on s.s.b. using equipment sent to him by F8LX *(Tnx W2FZY)*

HL Korea: Aug, K2UVU, is now HL9TS, and sends the following via the NEDXC: "Thought I would rattle off a few lines and let you all know what is new here in HL9-land. I've been very busy lately trying to scrounge up some goodies so that I can get a good antenna up and working. Right now I only have a dipole up and it's not working so good. Worked a lot of W6/K6 stations this past weekend in the contest but not much of anything else.

"Conditions are rough to the east coast, but I hope the soon-to-be-erected antenna changes things a bit. Need some poop on the Quad. Some goodies recently worked include VR1G, VS6FG, XW8AW, VS4RS, KO6AQ, and JT1CA sounds like he is right down the street along with the other USSR stations, Hi. Best time here for W1 and W2 is around 23/2400 GMT.

"Hope everything is OK on the homefront. Looks like ole' W4KFC beat me again (*CQ* WW DX CW Contest). Oh well, I'll romp and stomp at HL9TS, Hi. Best 73, Aug."

KC6 Eastern Carolines: Steve, W9SFR, would like to remind the gang that he cannot help with QSLs for the present KC6PE operation. These cards must go direct to Page Engineers Radio Club, Ponape, Eastern Caroline Islands. Steve, however, does have the logs of Carl Wells who

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

W6ZJY	200	TI2EH	100	K8BIT	50
W2EVV	100	W6ZJY	100	K7TCL	50
W4HA	100	K1AQI	75	KA2CM	50
G5DV	100	W5DNL	75	K1AQI	50
W5DNL	100	ZS6LW	75	W5DNL	50
S6LW	100	TI2EH	75	ZS6LW	50
				TI2EH	50

Arkady, UA9JH, checking the arrival of some new QSL's. *(Tnx SM5WI)*

Approximately 85 Korean and American amateur radio operators attended a recent get together in Seoul. Some of the distinguished guests are shown here. They include, from l. to r.: Dr. Eung Chon Cho, the ROK Minister of Communications; In Kwan Lee, President of the Korean Amateur Radio League; Miss Kwang Ja Park, HM1CA; Lt. Gen. Theodore J. Conway, HL9KA, Deputy Eighth Army Commanding General; Miss Soo Ja Cho, HM1CC; Col. C. E. Woodrow, HL9KW. The list of guests included amateur radio operators from Singapore, Okinawa and Formosa.

operated KC6PE from 28 Oct. 1959 to 5 June, 1960. Carl was killed in an airplane crash in the Islands.

KG6I Iwo Jima: KG6IF is now active from Iwo, 14 mc preferred. A TA-33 with a HQ-170 and B&W 6100/LP-1 are used. *(Tnx WGDXC)*

KG6 Marcus Island: Three stations are presently active from Marcus. They are KG6CGA who prefers 14,080 c.w. and 14,285 s.s.b. and KH6-CV/KG6/W5INO/KG6, both of whom operate s.s.b. between 14,270 and 14,300 kc starting at 0600 GMT.

KS6 American Samoa: K7VAX/KS6 will be active as often as possible on s.s.b. beginning around 0200 GMT. *(Tnx LIDXA)*

LX Luxemburg: Bob, ON4QX, and other members of the Antwerp DX Club will operate as LX3AA and LX3AB from July 18 to July 22. All-band c.w. and s.s.b. will be used. *(Tnx ON4QX)*

MP4 Das Island: Bing, MP4DAH, is now in HZ-land. He would like to apologize for the delay with MP4DAH QSLs. G5GH now has the logs and will take care of all outstanding cards. *(Tnx W5VA)*

OY Faroes Island: Hammarlund is going to furnish Martin, OY7ML with s.s.b. gear for use during the summer of 1964. This should be a good chance for all those who missed Martin's previous s.s.b. activity. *(Tnx W2GHK)*

PJ2M Sint Maarten: PJ2ME has been active on the low end of 7 mc while waiting for 20 meters to open. QSLs go via W2CTN. *(Tnx WGDXC)*

PK Indonesia: Rumors persist of operation by several stations in Indonesia. The most frequently reported is PK2ET with a drifting signal on 14,040 kc. He has been active on many occasions around 1000 GMT. Also reported is a station signing 8F2ER on 14,024 kc. This is the *correct* prefix block for Indonesia. Everyone is cautioned that Indonesia is on the ITU ban list. *(Tnx W2FZY, WGDXC, LIDXA)*

PX Andorra: F2MO and F2QX will DXpedition to Andorra again from June 12 to June 21. The same QTH as last year will be used. C.w. and s.s.b. will be used on all bands from 3.5 to 28 mc. W/VE cards for PX1MO and PX1QX via K2JFV.

UAØ-UM8 Siberia (Zone 19): Kirghiz–Uri, UA1KBW, will arrange skeds with UM8 and UAØEK. *(Tnx Fla. DX Rpt.)*

UH8-UI8-UL7 Turkoman, Uzbek, Tadzhik: UA2AW, 14,110 s.s.b., 1200 to 1300 GMT will arrange skeds with the above stations. *(Tnx Fla. DX Rpt.)*

VK4 Willis Island: After a period of inactivity, a well-deserved one, I might add, VK4JQ is now active on 14,240-14,250 s.s.b. Usual operating period is 0900 to 1200 GMT. He has been heard to call CQ without *any* takers! *(Tnx Fla. DX Rpt.)*

VK9 Christmas Island: We are informed by W2GHK that arrangements are being made for a permanent s.s.b. station to be installed and manned on this exotic island.

VP7 Bahama Islands: VP7NA is a man with a problem; let's hope this helps him out. "I have been called everything but a child of God for not sending QSL cards. O.K. That's true or nearly true anyway. Here's the rundown. For two years now I have been trying to have my QTH changed in the *Call Book*. I wrote them several letters, but no dice; so I wrote *CQ*, but no dice. I wrote *QST*. You guessed it, no dice. I'm still trying to correct the situation. The address that follows is the *only* one in which I receive cards." Harold North, Box 5041, Nassau, N.P. Bahamas.

VP8 South Sandwich: VP8HF did a fine job despite many difficulties on the most exotic of Hammarlund's DXpedition of the Month. Ken's beam blew down the first day and he was plagued by generally poor conditions. All told, about 1,200 QSOs were logged.

VQ1 Zanzibar: Willy, VQ1GDW, is very active on 14,100 s.s.b. almost daily at 1500 GMT. *(Tnx Fla. DX Rpt.)*

VS1 W. Malaysia: Ted, VS1MB, operates tranceive in the following order of preference 14,302; 14,270; 14,250 kc. He operates whenever possible between 1300 and 1530 GMT. Dave, K7GCM, who is Ted's QSL manager has a schedule on Saturday on 14,270 at 1530 and 1600

GMT and will help anyone needing VS1MB. K7CHT will assist accepting calls on 14,260 to prevent QRM on Ted's tranceive frequency. Co-operation will result in more and better QSOs. *(Tnx WGDXC)*

VS4 Sarawak: Ron, VS4RS, has recently been promoted to a position which puts him in charge of radio development in Sarawak. This resulted in a move from Sibu to Kuching (see new QTH in QTH section). He is now fired up from his new QTH.

XZ2 Burma: Tara, XZ2KN, relays the following information via W5VA. It is with regret that I have to inform you that all amateur activity has been stopped in Burma as of January 10th, 1964.

YK Syria: YK1AL is a new station somewhat active in Syria. He uses a 25 watt rig on 14,160 kc a.m. *(Tnx VERON)*

YVØ Aves Island: Anyone needing a QSL card from YVØAA could send for it to Radio Club of Venezuela, Apartado No. 2285, Caracas, Venezuela. If QSO was made during the last DXpedition (Nov. 8 thru 11, 1963) the card may also be sent to Hammarlund DXpedition, Box 7388, General Post Office, N. Y., N. Y. Many cards have been sent to the *Call Book* QTH which is incomplete. *(Tnx YV5BBU)*

ZB1 Malta: "Just a few lines to bring you up to date on events in ZB1-land. I am still quite active here using c.w./s.s.b. but with only simple wire antenna. ZB1A is also on s.s.b. using a TA-33 beam. Several other ZB1s are active using a.m./c.w. I am due to leave here in June 1964 and unless I sell my s.s.b. rig here, it will leave only ZB1A to represent Malta on s.s.b. ZB1BX also goes QRT about the same time as I do.

"From the second week of June, I and my family return to the U. K. and then we plan a short holiday in Canada. We should land at Buffalo, N. Y. about the last week in June, crossing to VE3 and then going to VE4 to visit my wife's family and relatives, returning to the U. K. by the same route about mid July. I would be pleased to meet any W/VE hams when possible during this visit but time will be rather short I think.

"My U. K. call sign is G3NKQ and from about say 5th June would appreciate it if all direct QSLs for ZB1CR operations were to be sent to my U. K. QTH. 109 Dartmouth Ave., Walsall, Staffs, England. QSLs sent via RSGB/ISWL or to ZB1E (Malta QSL Bureau) should always reach me o.k." *(Tnx to ZB1CR for the above)*

ZD Ascension Is.: ZD8WF and ZD8HB went QRT on Dec. 30, 1963 and have returned to England according to their QSL manager W3PN. Henry can furnish QSLs for ZD8WF for the period of August 6th, 1963 to December 30th, 1963.

ZL1 Kermedec: The following is from Jock, ZL2GX, via the NCDXC. "Ian, ZL1ABZ, has been very busy followed by a nasty accident when a whipping wire rope badly bruised (in fact nearly broke) his leg. He was unable to move for two weeks and was taken to the transmitting hut in a tractor-drawn trailer to keep his weekly skeds with ZL2GX."

Mal, ZE3JO, is no stranger to this column having authored several articles on his DXpedition exploits. These have included ZD6, ZS8 and VQ1. Mal has added a new one to his list of operating achievements when he added a first ZE/W QSO on 160 meters. After three months of scheduling, ZE3JO succeeded in QSOing W1BB. *(Tnx W1BB)*

ZL4 Campbell Is.: The following news comes from Jock, ZL2GX, via the NCDXC: "For a while in November, there were three active amateurs on Campbell, Bill, ZL4OG; John, ZL4JF; and Bill, ZL4LY—quite a ham factory. Bill, ZL4OG, returned to New Zealand leaving Bill, ZL4JY active on 20/40 c.w. and 80 s.s.b. with John, ZL4JF, operating similar bands. During January their activity was voluntarily severely curtailed because of difficulties with other electronic gear on the island. This has now been resolved and activity should increase under the call of ZL4JF but now operated by Bill who was ZL4LY.

"John Dasher who was ZL4JF returned to New Zealand in March and transferred the well known ZL4JF call to Bill to help overseas DXers recognize the island call.

"ZL4JF with Bill Cousins operating should be active until Nov. 1964 at least."

ZS2MI Marion Island: Wynad is now active on s.s.b. and Ray has returned to Africa. ZS1OU will handle QSL cards for Ray. This includes QSOs up to March 2nd. QSLs for Wynad will be handled by ZS5JY. *(Tnx W2TP)*

4WI Yemen: Beat, 4W1B, is active most days around 2130 to 2230 GMT. 14,115/125 and 14,250/260 kc preferred. He QRTs in June and will QSL when he gets back home to HB9YZ. *(Tnx WGDXC)*

6Y5 Jamaica: Jamaica is now using the prefix 6Y5 instead of 6YA. The use of 6YA was due to a misunderstanding. Please note WPX credit will *not* be given for 6Y5 if you have *previously* received credit for 6YA as 6YA will become obsolete.

9K3 Neutral Zone: Carl Kelly, LU3XL/9K3, is working for an offshore drilling concern and spends two weeks at work, then is off duty for

Part of the same UR2 convention. The three gentlemen with the "cans" are UB5UN, UF6FB, and UR2DX. *(Tnx SM5WI)*

CT1PK, the perennial leader of the phone WPX Honor Roll, Manuel, is a doctor in Lisbon.

one week and is on the air constantly during that time. An off-duty period began March 27th, so figure it out. He uses a KWM-2 and dipole operating about 14,270 s.s.b. *(Tnx Fla. DX Rpt.)*

QTHs and QSL Managers

Sax, W2SAW, 466 Weaver Road, Webster, New York and his XYL are planning a three-month trip in Europe starting in August so better get a supply of stamps. For those of you who are not familiar with the DX Stamp Service, it is absolutely the best way to obtain DX QSL cards. Sax has a complete stock of mint foreign stamps of the proper denomination. You simply send the DX station stamps from his own country which he can use for return postage. In most cases, it is less expensive than IRCs without the conversion problem for the DX station. A self-addressed stamped envelope will bring details and a price list.

We are advised by VERONA (Vereniging Voor Experimental Radio Onderzoek in de Nederlandse Antillen) that in addition to the QTH shown in January DX column, cards may also be sent to P. O. Box 392, San Nicolas, Aruba and P. O. Box 383, Willemstad, Curacao.

The Central Club of The Hungarian Radioamateurs wishes to inform all amateurs of the change in address for the QSL bureau. The new address is Postbox 214, Budapest 5, Hungary.

Please note that K8TBR is unable to furnish QSLs for HC5CN and HC5RG. Although many tries were made, log extracts were not obtainable.

W7BTH would appreciate any help with the present QTHs of CN8FU of 1961 or CN8JF of 1962.

CR4AY Box 12, St. Vincent, Cape Verde Islands
CR7GF via VE4OX
EL2AC via K5SGJ
EL2I via W9UC
EP2RW via W2CTN
FB8WW via 5R8BC
ex-FQ8AF now TU2AP
HB0ZT via HB9ZT
HS1P/ W4LCY Frank A. Phillips, SRI OSD/ARPA R&D Unit APO 146, San Francisco, Calif.
JA2JW via K6ZDL
K7VAX/KS6 Box 458, Pago Pago, American Samoa
KC4USB via W1UFW
KC6PE from 28 Oct. 1959 to 5 June 1960 *only*, via W9SFR. All other QSOs direct to Page Engineers, Radio Club, Ponape, Eastern Caroline Islands
KG6IF APO 315, San Francisco, Calif.
KW6ED Box 518, Wake Island
LA9PI/P via Norwegian Embassy, Iceland
LU3XL/9K3 via W5DOZ
LX3AX via ON5AX, Box 331, Antwerp, Belgium
PK2ET via DJ5QK
PX1MO via K2JFV
PX1QX via K2JFV
MP4DAH via G5GH
SV1BK Yanni Kalagi, Diacou nr 10, Athens 459, Greece
via W2PCJ
SV0WFF via ISWL
SV0WGG (Crete) via W5GMS
ex-TF2WIE Robert Hartley, K6MRR, 2505 East Monroe Ave., Orange, Calif. 92667
TF2WIN 932 A.C. & W Squadron, Keflavik Airport, Iceland
TG9RJ Box 115, Guatemala City, Guatemala
TI3AA Box 4589, San Jose, Costa Rica
TI9FG via VE4CP
TR8AB 4 March 64, 2015 GMT 14,185 kc.
TR8AD 25 Feb. 64, 1823 GMT 14,150 kc.
TR8AD P. O. Box 1025, Libreville, Rep. of Gabon
TT8AP P. O. Box 443, Ft. Lamy, Tchad
VK2AGH/LH via VK2AGH
VP2GAW Stanley Antrobus, La Bisque St. Andrews, Grenada
VP2KM Box 152, St. Kitts, B.W.I.
VP7NA Harold North, Box 5041, Nassau, N. P. Bahamas
VP7NY via DXpedition of the Month, Box 7288, General Post Office, N. Y., N. Y.
VQ5FS/ 5X5FS via EI4Q
VQ8BFC via G8KS
VQ9HJB via G8KS
VR1G viavia W6BSU
VR2DK via W2CTN
VR3O via WA6AYU
VR3S operator Martin, *only* via WA6AYU
VS1LP (ex-EP2BK) Bob Snyder, Mount Elizabeth Flats, 55E Nutmeg Rd. Singapore 9, Malaya
VS4RS Ron Skelton, A. C. T. (Radio) Telecomms Hq, Kuching, Sarawak
VS5CW W. O. John S. Francis, MBE, 3 Arabia Court, Wessex Estate, Singapore
VS5GS Gordon Scott, Box 300, Brunei Town, State of Brunei
ex-WA4LTX/ KJ6 C. H. Robinson, M. D., Box 1290, Pecos, Texas
YA4A via K4KMX
YK1AA Box 35, Damascus, Syria
YS1JP Box 1186, San Salvador, El Salvador
ZB1CD John Cubberley, Officers Mess, R. A. F. Luqa, Malta G. C.
ex-ZB1CR now G3NKQ, Clive Burchell, 109 Dartmouth Ave. Walsall, Staffs, England
ZC5AJ via WA2WUV, Box 296, Massapequa, N. Y.
ZD3A P. O. Box 285, Bathurst, Gambia
ZE4JS via W3HNK
7X2VX via W4UWC
9K2AN Nasir Hussain Khan, P. O. Box 736, Kuwait, Arabia
9Q5AB via W2HMJ/4 3326 Sergeant Dr., Charlotte 8, N. C.
9Q5GE Glen Eschtruth, M.D., Piper Memorial Hosp. Mission Methodiste, Kapanga via Elisabethville, Rep. of the Congo
9X5MH via DL1MC

73, Urb, W2DEC

PROPAGATION

GEORGE JACOBS*, W3ASK

LAST MINUTE FORECAST

Day-to-Day Conditions and Quality for June

Days	*Forecast Rating & Quality* (4)	(3)	(2)	(1)
Above Normal: **4, 8, 17, 27**	A	A-B	B-C	C
Normal: **1-3, 5, 7, 9, 12, 14-16, 18-21, 25-26, 28-30**	A-B	B-C	C-D	D-E
Below Normal: **6, 10-11, 13, 22, 24**	C	C-D	D	E
Disturbed: **23**	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.

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 and considerable fading and noise; E—poor opening, or none at all.

4—This month's DX Propagation Charts are based upon a transmitter power of 250 watts c.w.; 500 watts s.s.b., or 1000 watts d.s.b. into a dipole antenna a quarter-wave above ground on 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain 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—The Eastern USA chart can be used in the 1, 2, 3, 4, 8, KP4, KG4 and KV4 amateur call areas; The Central USA Chart in the 5, 9 and ø areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid through July 31, 1964, and 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 be the best band for both DX and short-skip openings during the period from sunrise until several hours after sunset. Very few 10 or 15 meter DX openings are expected during June, although frequent short-skip openings up to distances of approximately 1400 miles should take place, especially during the daylight hours.

Forty meters is expected to be the best band for both DX and short-skip openings from shortly after sundown until shortly after sunrise. Some 80 meter DX openings are forecast for June during the hours of darkness, while good short-skip openings should be possible on this band almost around-the-clock. Few 160 meter DX openings are predicted for June, but some short-skip openings should be possible during the hours of darkness and at sunrise.

Atmospheric noise (static) levels generally increase considerably during June, and should be quite high on all bands, especially during thunder storms.

VHF Openings

An increase in the number of 6 meter short-skip openings is expected during June as a result of the seasonal increase in sporadic-*E* propagation. These openings will most likely take place between 9 A.M. and 1 P.M., and between 5 P.M. and 9 P.M. local time, over distances of approximately 1000-1400 miles. During periods of unusual intense sporadic-*E* ionozation, 2-hop propagation over greater distances may be possible.

No major meteor showers are expected to occur during June, and very little auroral activity is expected during the month. Check the "Last Minute Forecast" appearing at the beginning of this column, since some auroral v.h.f. openings may occur during periods that are expected to be "below normal" or "disturbed."

Sunspot Cycle

The Zurich Solar Observatory reports a monthly average sunspot number of 15 for March, 1964. This results in a 12-month smoothed sunspot number of 27 centered on September, 1963. A smoothed sunspot number of 15 is predicted for June, 1964, as the sunspot cycle continues its slow decline.

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

This month's *CQ* Propagation Charts contain DX predictions to all areas of the world for June *and* July. Short-skip predictions for June, for distances between 50 and 2300 miles, and from Hawaii and Alaska, appeared in last month's Charts. Instructions for the correct use of this month's Charts appear directly below the "Last Minute Forecast" at the beginning of this column.

Next month's column will report on the latest results of two propagation research projects being conducted by radio amateurs. Stew Perry's (W1BB) observations of a record-breaking 160 meter DX season this past winter, and Morgan (K7ALE) and Dorothy (K7ALF) Monroe's observations of a record-breaking 6 meter short-skip season last summer will be discussed.

73, George, W3ASK

CQ DX Propagation Charts

JUNE AND JULY, 1964

Time Zone: EST (24-hour Time)

EASTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	15-18 (1)	05-06 (1) 06-09 (3) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	19-20 (1) 20-23 (2) 23-01 (1)	21-22 (1) 22-23 (2) 23-00 (1) 22-00 (1)*
Northern Europe & European USSR	*NIL*	06-10 (1) 14-20 (1)	20-00 (1)	21-23 (1)
Southern Europe & North, West & Central Africa	14-18 (1)	04-05 (1) 05-08 (2) 08-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-20 (2) 20-22 (1)	19-20 (1) 20-23 (2) 23-01 (1)	20-21 (1) 21-23 (2) 23-00 (1) 22-00 (1)*
Eastern Mediterranean & East Africa	*NIL*	05-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	19-23 (1)	*NIL*
South Africa	11-13 (1)	01-03 (1) 05-07 (1) 14-17 (1)	19-21 (1) 21-23 (2) 23-01 (1)	21-23 (1)
Central Asia	*NIL*	05-08 (1) 15-21 (1)	*NIL*	*NIL*
Southeast Asia	*NIL*	06-09 (1) 18-21 (1)	*NIL*	*NIL*
Far East	*NIL*	07-11 (1) 19-22 (1)	*NIL*	*NIL*
Pacific Islands & New Zealand	18-21 (1)	16-22 (1) 22-00 (2) 00-07 (1) 07-09 (2) 09-11 (1)	01-02 (1) 02-05 (2) 05-06 (1)	02-05 (1) 02-04 (1)*
Australasia	19-21 (1)	06-07 (1) 07-08 (2) 08-11 (1) 16-22 (1) 22-00 (2) 00-03 (1)	02-06 (1)	03-05 (1)
North & Central South America	15-18 (1)† 08-11 (1) 11-13 (2) 13-15 (4) 15-17 (3)	06-08 (3) 08-10 (2) 10-12 (1) 12-16 (2) 16-18 (3)	19-21 (1) 21-00 (2) 00-03 (3) 03-05 (2) 05-06 (1)	22-01 (1) 01-04 (2) 04-05 (1) 01-03 (1)*
Southern Brazil, Argentina, Chile & Uruguay	14-17 (1)† 08-12 (1) 12-14 (2) 14-16 (3) 16-18 (2) 18-19 (1)	05-06 (1) 06-10 (2) 10-14 (1) 14-17 (2) 17-20 (3) 20-22 (2) 22-01 (1)	21-00 (1) 00-02 (2) 02-06 (1)	23-04 (1) 02-04 (1)*
McMurdo Sound, Antarctica	14-17 (1)	14-16-(1) 16-18 (2) 18-22 (1)	03-07 (1)	*NIL*

Time Zones: CST & MST (24-hour Time)

CENTRAL USA To:

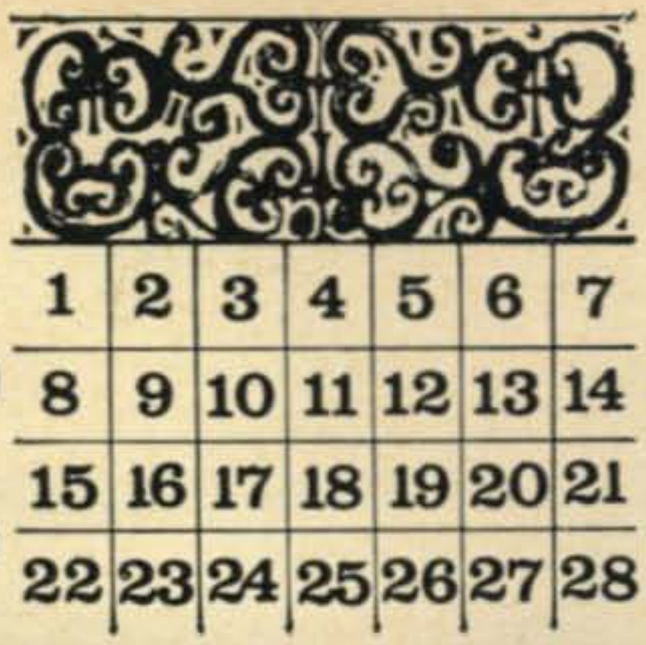
	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	11-16 (1)	05-06 (1) 06-08 (2) 08-12 (1) 12-14 (2) 14-16 (3) 16-18 (2) 18-20 (1)	20-23 (1)	21-23 (1)
Northern Europe & European USSR	*NIL*	05-07 (1) 15-21 (1)	20-23 (1)	*NIL*
Southern Europe & North, West & Central Africa	14-17 (1)	04-06 (1) 06-08 (2) 08-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-21 (1)	20-21 (1) 21-23 (2) 23-00 (1)	21-23 (1)
Eastern Mediterranean & East Africa	*NIL*	05-07 (1) 13-14 (1) 14-16 (2) 16-18 (1)	19-21 (1)	*NIL*
South Africa	*NIL*	00-02 (1) 05-07 (1) 13-16 (1)	20-23 (1)	21-22 (1)
Central Asia	*NIL*	05-08 (1) 15-20 (1)	*NIL*	*NIL*
Southeast Asia	*NIL*	06-11 (1) 18-21 (1)	*NIL*	*NIL*
Far East	21-23 (1)	06-07 (1) 07-10 (2) 10-20 (1) 20-22 (2) 22-00 (1)	04-06 (1)	*NIL*
Pacific Islands & New Zealand	12-18 (1) 18-20 (2) 20-22 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-07 (1) 07-09 (2) 09-13 (1)	00-02 (1) 02-06 (2) 06-07 (1)	01-06 (1) 03-05 (1)*
Australasia	16-19 (1) 19-21 (2) 21-23 (1)	14-22 (1) 22-03 (2) 03-07 (1) 07-08 (2) 08-10 (1)	00-03 (1) 03-06 (2) 06-07 (1)	02-06 (1)
North & Central South America	15-18 (1)† 08-12 (1) 12-14 (2) 14-16 (4) 16-18 (3) 18-19 (2) 19-21 (1)	06-09 (2) 09-14 (1) 14-16 (2) 16-19 (4) 19-21 (3) 21-23 (2) 23-06 (1)	19-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-06 (1)	22-01 (1) 01-03 (2) 03-05 (1) 01-03 (1)*
Southern Brazil, Argentina, Chile & Uruguay	13-16 (1)† 08-12 (1) 12-14 (2) 14-16 (3) 16-18 (2) 18-19 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-17 (2) 17-20 (3) 20-22 (2) 22-00 (1)	20-23 (1) 23-01 (2) 01-05 (1)	23-03 (1) 01-03 (1)*
McMurdo Sound, Antarctica	13-15 (1)	13-16 (1) 16-18 (2) 18-21 (1)	04-07 (1)	*NIL*

*Predicted 160 meter openings, all others in column are 80 meter openings.

†Predicted 10 meter openings, all others in column are 15 meter openings.

[*Continued on page 95*]

CONTEST CALENDAR



FRANK ANZALONE*, W1WY

CALENDAR OF EVENTS

May 29-June 1		CHC/HTH/FHC Party
June	6-7	National Field Day
June	6-7	ARRL V.H.F. Party
June	27-28	ARRL Field Day
August	1-2	Illinois Party

CHC/HTH/FHC

Starts: 2300 GMT Friday, May 29.
Ends: 0600 GMT Monday, June 1.

There are a lot of things going in this one, so of necessity the rules get a bit involved.

Win, lose, or draw, all you Certificate Hunters are bound to come out ahead. Even if you're not a certificate winner you can still fatten up your totals for the 1000 and 1 available awards that are listed in K6BX's *Directory of Certificates and Awards*.

Besides the multitudes of awards that can be won in this week-end activity, Clif Evans promises many attractive trophies.

We tried to simplify and outline the rules in last month's CALENDAR, hope you're not too confused.

Logs must be postmarked no later than June 30th and go to: Clif Evans, K6BX, Box 385, Bonita, Calif. 92002.

National Field Day

Starts: 1700 GMT Saturday, June 6.
Ends: 1700 GMT Sunday, June 7.

This Field Day competition has been organized by the RSGB for its members in the British Isles. In the past we have also heard plenty of activity from other European countries, especially HB-p calls. (I don't know if this is part of the same activity or if the Swiss boys have got something going at the same time. Anyway they seem very anxious to work you too.)

Although this activity offers no direct competition for overseas stations, there is one little item under awards that reads: "A certificate will be awarded to the chief operator of the overseas station whose check log shows that he contributed the most points to the competitors."

This might be an incentive to try and work as many of the British Isles portables as possible. Since they are limited to 10 watts input and power from a portable source, this should offer an additional challenge.

Of course there is no limitation to your power or other facilities, so operate from the comforts of your home. Operation is limited to c.w. only. If you also operate from a portable location your contacts have a greater point value for the competing station in the British Isles.

No special log form is requested but it is suggested that you list your contacts progressively (*e.g.* 579001, etc.) and also indicate the band of operation, and times in GMT.

Send your check list no later than June 21st to: RSGB Contest Committee, 28-30 Little Russell Street, London, W.C.1, England.

ARRL Field Day

Starts: 2100 GMT Saturday, June 27.
Ends: 2400 GMT Sunday, June 28.

This one creates a mass exodus to the fields and mountains and of course is fully covered in *QST*.

It's mostly a club competition although there are categories for individual or group operation. We couldn't begin to tell you what its all about.

And if you have any ideas of staying home and sneaking in a little DX while everybody is away, forget it, all you are going to hear from the v.h.f. bands down is "CQ FD DE W1XYZ/1" etc.

As if you didn't know, your inquiries for more information and your logs go to: ARRL Field Day, 225 Main Street, Newington, Conn. 06111.

Results 1964 QCWA Party

W6ZPX	225	W6NWI	135	W4HTV	96
W8NBK	223	W2ZM	123	W1AQE	95
W4FNQ	196	W9VZP	120	W3BIP	93
K6GIL	165	W2CDJ	107	W3AIZ	90

Above are the top twelve scores and represent QCWA contacts only. A real close one between the two top stations. W4FNQ failed in his bid for a 3rd win and the QCWA Plaque. This is W6ZPX's 2nd win so the Plaque still stays in circulation. (The station winning it three times retains it permanently.) W8NBK was the dark

[*Continued on page 96*]

*14 Sherwood Road, Stamford, Conn. 06905.

SPACE COMMUNICATIONS

GEORGE JACOBS*, W3ASK

MARCH 25, 1964 marked the occasion of the first "live" telecast from Asia to the United States. Japanese Premier Hayato Ikedo was seen on this 8-minute special program to the American people which was carried across the Pacific Ocean via the RELAY II communication satellite. The program, originating in Tokyo, was flashed to the satellite from a newly built ground station located north of Tokyo. On this side of the Pacific, the Bell ground station at Andover, Maine was used for reception from the satellite. As seen on a USA domestic television network, both the voice and picture quality of the satellite-relayed signal were excellent.

The first satellite-relayed television program in the other direction, from the United States to Japan, took place on November 23, 1963. Although satellite transmission on this long circuit is excellent, the orbits of RELAYs I and II are such that mutual visibility between Japan and the United States occurs very infrequently, and then for only very short periods of time.

S-66 Failure

S-66, an ionosphere beacon satellite, failed to orbit after a successful launch from Cape Kennedy on March 19. NASA scientists have traced the failure to trouble in the third stage of the Delta launch vehicle. This failure broke a string of 22 successful launch-orbits for the Delta vehicle.

The S-66 satellite was designed to probe the secrets of the ionosphere. It was to radiate telemetry and beacon data on seven frequencies between 20.005 and 360.090 mc. The satellite was to conduct the first laser communication experiment as well.

Scientists at 80 stations throughout the world, as well as a large number of space-listeners were set to tune in on S-66's signals when the satellite failed to orbit. This was one of the few satellites launched by the United States whose radio signals would have been received on a regular h.f. communications receiver. A duplicate of the S-66 satellite is now available, and will be launched from Cape Kennedy, probably during the late summer or early fall months.

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

One of the rewarding results from the OSCAR project has been the goodwill created for amateur radio. Models of the OSCAR I and II beacon satellites have been placed on display in all areas of the world. Shown here are two recently received photos which give further evidence of the goodwill created by the project. Above is the OSCAR beacon satellite display shown at a communications exhibit held recently in West Germany. OSCAR was one of the most popular exhibits at the show. Below, the model satellite is shown being held by Mr. John Gayer, a high telecommunication official with the International Telecommunication Union, Geneva.

SYNCOM III

If all went according to plan, SYNCOM III, NASA's latest communication satellite, should now be "hanging" in the sky in a true stationary orbit over the Pacific Ocean. Scheduled to be

Table I—Transmitting Satellites

Freq. (mc)	*Name*	*Date Launched*	*Inclination* (Degrees)	*Period* (Minutes)
20.005	ELEKTRON-1 USSR	Jan. 30, 1964	61	169
30.0075	"	"	"	"
19.430	ELEKTRON-2 USSR	"	"	1357
19.430	"	"	"	"
90.225	"	"	"	"
90.022	COSMOS-25 USSR	Feb. 27, 1964	49	92
136.744	OSO-1 USA	Mar. 7, 1962	33	96

launched by NASA during May, SYNCOM III is intended to remain in a fixed position 22,300 miles over the equator at 180 degrees longitude. From this position, the satellite's communication capacity of two duplex channels should make it possible to relay voice, and possibly video communications between the United States and Asia on a 24-hour basis.

SYNCOM III will be the first satellite to be launched into a true stationary orbit. SYNCOMs I and II were launched previously into synchronous orbits 22,300 miles above the earth's surface, but inclined to the equator rather than in an equatorial orbit. For this reason, they wander in the sky in a figure 8 pattern. SYNCOM III is expected to remain stationary in the sky.

SYNCOM III will carry two 2-watt beacon transmitters which will operate on 136.47 and 136.98 mc. The beacons will radiate a continuous c.w. signal as well as telemetry data on command. Another 2.5-watt continuous c.w. transmitter will operate aboard the satellite as a tracking aid on 1820.177 *megacycles*.

NASA has also announced recently that SYNCOM II, which has been operating over the Atlantic Ocean since July 26, 1963, is being moved to the mid-Pacific. This is being accomplished by letting the satellite drift westward, and then adjusting its final position by controlling gas jets aboard the satellite by ground control. The move is expected to be completed by early spring, when the satellite will be used for communication experiments between Asia and the United States.

SYNCOM II will continue to transmit continuous c.w. radiation and command telemetry on 136.980 and 136.468 mc, as well as c.w. on 1814.069 mc. This will place both SYNCOM II and SYNCOM III in the same area over the Pacific at the same time, but NASA officials claim that they will not interfere with each other. There is speculation that once in position, both satellites might be used as a system for bringing live telecasts to the United States and Canada from the Japanese Olympics later this year.

Transmitting Satellites

The following satellites, appearing on the list of transmitting satellites in the February and April columns, are no longer transmitting on the frequencies shown:

Explorer 14 on 136.440 mc
Explorer 18 on 136.915 mc
1963-30B on 136.890 mc
Explorer 19 on 136.621 mc

The additions shown in Table I should be made to the list of transmitting satellites.

73, George, W3ASK

More Lawsuits

From John R. Lange, Jr., K9ARA, we learn that over 25 amateur and CB operators in Chicago have been sent notices claiming violation of zoning ordinance "prohibiting radio and television towers in residential areas." K9ARA enclosed a copy of the notice he received, which reads as follows:

"Department of Buildings, City of Chicago, Room 401, Central Office Building, 320 North Clark Street, March 20, 1964—John Lange, 1703 N. Karlov Avenue, Chicago 39, Illinois: You are hereby notified as owner, agent, lessee or occupant of premises known as 1703 North Karlov Avenue to comply with the following requirements of the Municipal Code of Chicago at once —Discontinue the use of premises as a radio ham station and remove large antenna in accordance with the Chicago Zoning Ordinance. (Article 7.3-3.) Failure to comply may result in a fine of $200.00 for each day violation continues to exist. For the Commissioner of Buildings: John P. Maloney, Zoning Administrator. Corrections of all violations must comply with the provisions of the Chicago zoning ordinance."

Note the above not only directs John to "remove large antenna," but also demands that he *"discontinue the use of premises as a radio ham station"* under threat of fine of $200 for *each day* violation exists!

What city ordinance can prohibit amateur operation duly licensed by the FCC?

K9ARA reports a test case involving K9GRH, Jerome Caraba, already has had two sessions in court and at the third, to be held April 7 at Chicago City Hall, it is hoped that a revision of the city ordinance allowing antennas to a practical height can be passed. But there is still the possibility of high building permit fees, inspections, etc. to discourage amateur operation. John adds that several CB operators have been sent notices to discontinue operations even though they used *indoor antennas* located in attics!

The Chicago Area Radio Council, W9TEM, with advice from ARRL, has provided help to K9GRH in his court battle. The Council has set up a "tower fund" and is accepting contributions from ham and CB operators as well as clubs to help pay the legal expenses in this test case. QTH for the Council is 6000 S. Tripp Ave., Chicago 29, Ill.—*W5RZJ*

HAM CLINIC

CHARLES J. SCHAUERS*, W4VZO

ALTHOUGH most hams do not own precision frequency measuring equipment, they generally manage to keep within a band without too much difficulty.

Modern-day communications receivers can be calibrated very accurately—especially if a crystal calibrator and emissions from WWV are used —so there is little necessity for a ham to own expensive frequency measuring equipment.

But there *are* hams who are interested in frequency measurements and do own worthwhile frequency meters. Some of their gear may be home-made, an expensive commercial unit or a set from military surplus stocks.

The BC-221 Frequency Meter

The BC-221 frequency meter is used by more hams than any other. This fine set first made its appearance about 1937. Since then, there have been many models ("A" to "N") which have seen service with the military and subsequently transferred to the surplus category.

The Navy model of the BC-221 is designated the "LM" followed by a number. In the LM series an odd numbered set indicates that it contains an a.c. power supply.

Covering 125 kc to 20,000 kc, the BC-221 uses a 100 kc crystal calibrator. Some models are a.c. powered, but most are powered by batteries.

The average price of the set runs around $75.00 (with calibration book). However, some dealers are selling them for $50.00, and if the set is in good condition with a calibration book, this is a real bargain!

One of the main objections most hams have to the BC-221 is the requirement for batteries. A number of articles have appeared in various ham magazines on adding an a.c. supply. *CQ* for April 1959 contains an article on how to add a modulator and a.c. supply.

HAM CLINIC has received a number of letters asking us how to use the BC-221 as a v.f.o.— we always refer the writers to an article "A One-Tube VFO Amplifier" contained in *QST* for February 1950. Another article on using the BC-221 as a v.f.o. appeared in *QST* for March 1947.

An article for using the BC-221 to measure ham-band frequencies appeared in the December 1950 issue of *CQ*. Everyone owning a '221 should read this article for it enables them to use a system (with interpolation charts) to measure ham frequencies very quickly.

Many modifications have been made to the BC-221, but most of the modifications on which information has been published have been on the power supply-modulator combination.

An article showing how to make a visual null detector for the BC-221 is contained in *CQ* for October 1948.

One final reference of note to those who own BC-221's is using the meter to check crystals and determine approximate frequency. This information is contained in *CQ* for December 1952.

Here are some important items (gleaned from experience) which should be of interest to those contemplating buying a set or those now owning one.

If you use an a.c. supply with the '221, be sure that the d.c. going into it is perfectly stabilized and well-filtered. The power transformer must be a "quiet" unit. That is, it must not have core chatter or create undue mechanical vibration and should be mounted on shock mounts. Remember, 50 or 60 cycle mechanical vibration can effect the setting accuracy of the meter.

If an a.c. supply is used, provision should be made for leaving the tube filaments on all the time. If you try to use the unit after a short 15 minute warm-up it may drift. At least 30 minutes warm-up time is recommended.

When using the a.c. powered BC-221 (with a built-in modulator of 400 c.p.s. or so), for aligning receivers, the case should be grounded. Do not use a separate ground, but always the one connected to the receiver. The reason for this is to prevent ground loops from forming which could introduce hum.

When changing tubes (especially the 6SJ7 oscillator), recheck calibration settings. Generally, tube replacement will not affect unit accuracy to the extent that its correction becomes a problem.

Some technically capable hams are using the BC-221 to drive a transmitter on s.s.b. Required for this is a special buffer-amplifier stage connected via coax to the BC-221. One caution: be careful of overdrive!

When using the BC-221 around high power transmitters (500 w. to 1 kw), be careful that

*c/o *CQ*, 300 West 43rd St., New York, N.Y. 10036.

a lot of r.f. does not enter the unit. It is easy to "shoot" the coupling capacitor coupled to the 6K8. For checking transmitter frequency, a small 2" piece of wire attached to the BC-221 antenna input is sufficient.

Keying the BC-221 is *not* recommended, although a few enterprising hams have done so.

Troubleshooting the BC-221

Troubleshooting the BC-221 is a relatively simple procedure. After checking tubes, check the voltages which should appear on the various tube elements. Screen and plate resistors in the 6SJ7 stage have been known to change value.

If crystal calibration (correction) is impossible, the probable cause will be the 100 kc crystal in the 6K8 grid. A new crystal will generally solve the problem. Crystal aging can be a problem in the BC-221.

If you have forgotten to remove the batteries when you placed the BC-221 in storage and they have corroded, the residue can be cleaned out of the case with a soap and baking soda solution. When the compartment is dry it can be spray painted.

Calibration

If you do not have a calibration book, blank ones may be obtained from a number of surplus dealers. I can assure you however, that the job of calibrating and making up a new chart for a BC-221 is a long and laborious job.

Providing you have access to another BC-221 which *is* calibrated, you can use a receiver with it to cut your calibration and chart-making time in half.

Here is the way to calibrate a BC-221 using a receiver and a *calibrated* BC-221—or another good frequency meter of the heterodyne type.

Let the receiver and both frequency meters warm up for 24 hours. Set the receiver to the lowest band. Calibrate the receiver with the crystal calibrator and/or with WWV. Disconnect the receiver antenna. Replace the receiver antenna with a piece of wire about 2 feet long. Use a foot long wire on each BC-221 antenna post.

After the receiver dial has been calibrated, set the calibrated '221 on frequency and the receiver on zero b.f.o. setting. Zero beat the signal from the calibrated '221 with the receiver. Check the dial accuracy.

Next, reduce the output of the first BC-221 to zero. Noting its dial reading, set the *uncalibrated* BC-221 dial around the same reading as the first BC-221 for a zero beat. Note the reading. Recheck with crystal, zero again and then note the dial reading. Enter the reading *in pencil* in the new book. Check every kilocycle in the same way. If you do not have the time, then check every 100 kc.

Over a period of two weeks or so you can fill in your own calibration book. If you are only interested in the hambands then the calibration should only take 3 or 4 days.

Be careful when using any heterodyne frequency meter that the harmonic you are working on is the *correct* one.

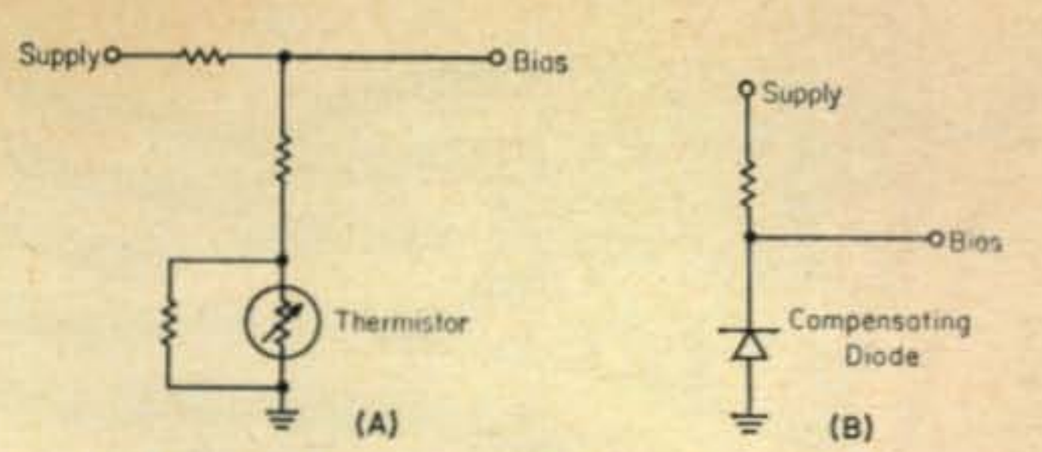


Fig. 1—Two methods of stabilizing bias voltage for transistors. (A) uses a thermistor to maintain bias within reasonable limits with temperature changes. (B) uses a diode to maintain bias with varying supply voltages.

Questions

Transistor Stability—"How about a few choice words on stabilizing transistor biasing circuits?"

Either a thermistor (a device whose resistance decreases as temperature increases) or a voltage-compensating diode (a device whose current determines a bias voltage which establishes transistor collector idling current under no-signal conditions) is generally used for stabilizing transistor bias.

The diode is preferred to the thermistor because the diode bias current varies in direct proportion to changes in supply voltage and because temperature stabilization is better. The diode reduces current variation to about 20% of that possible with the thermistor. See fig. 1 for the elements in the thermistor and compensating diode networks. Compensation is provided in the thermistor network by varying the sizes of the series and shunt resistors; in the diode network by proper diode and series resistance value selection.

Meter Protection—"Can you recommend a solid state device to me that will afford a good measure of meter protection? I use a Triplett 630 v.o.m."

I have tried various schemes recommended by various technicians to protect the delicate meter of an expensive v.o.m., but most of these were too bulky or used relays. I recently obtained from Lectrotech Inc., PO Box 531, Skokie, Ill., a solid state device no larger than a 2 watt resistor (encapsulated) and installed it on my meter. It sells for around $3.00 and really works. Its installation is simple. It is merely placed across the meter ahead of multiplier resistors.

[*Continued on page 88*]

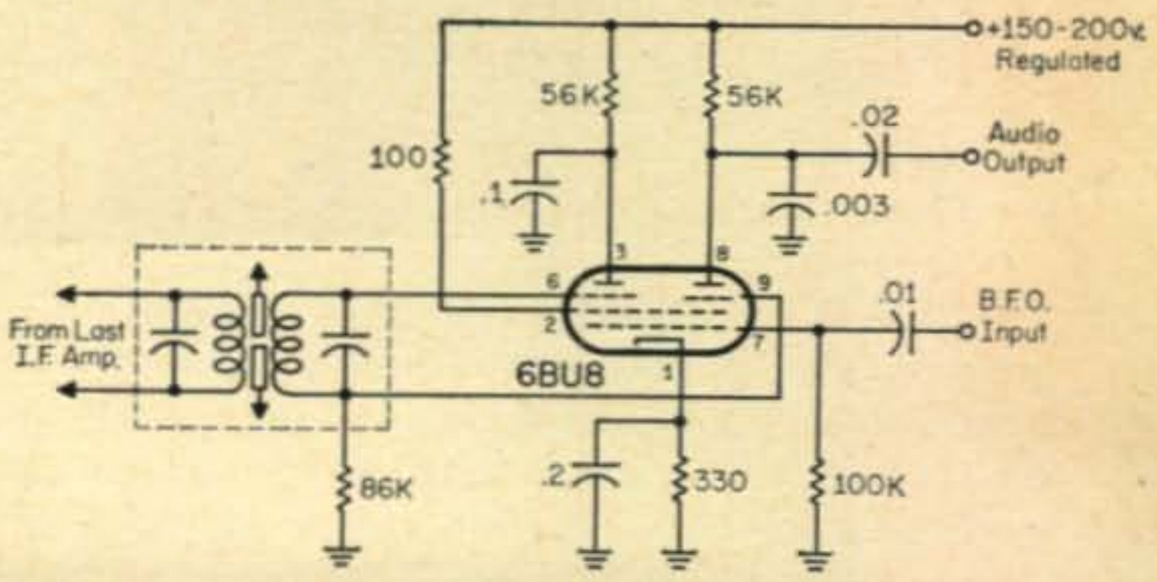
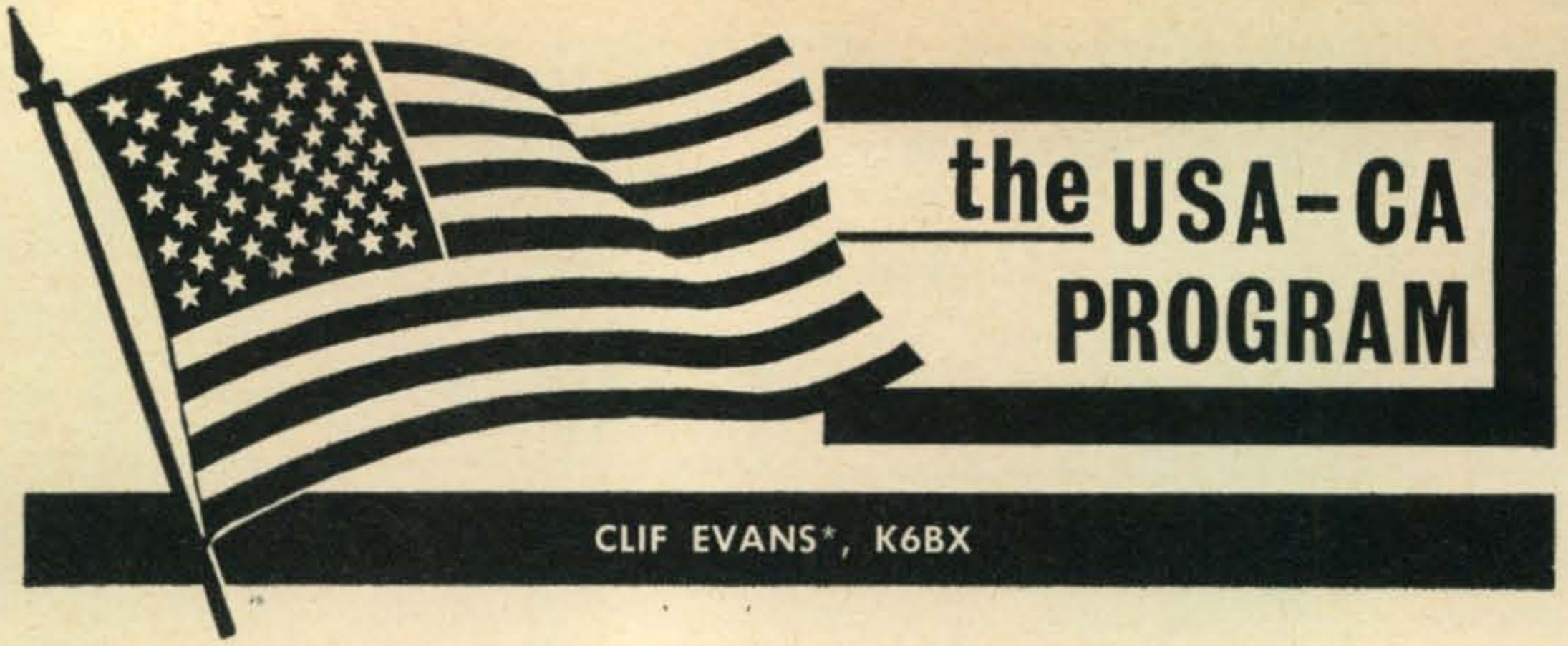


Fig. 2—Product detector using the 6BU8 beam deflection tube. For best operation the applied voltage should be regulated.



the USA-CA PROGRAM

CLIF EVANS*, K6BX

CLIFF Corne, K9EAB, county hunting from an iron lung, again crops a "first", winning USA-CA-2500 number *one*. Cliff, a mainstay in the County Hunter's Net on 7220 kc, credits most of last 500 new counties to Hunter's net activity.

Twenty-four others came in for USA-CA awards during March as shown on the Honor Roll.

USA-CA HONOR ROLL

2500		K8TNE	28	W8JXY	352
K9EAB	1	K3HNP	29	W9HAT	353
2000		W9HUF	30	KØGSV	354
K8CIR	2	W9HGP	31	K7KOI	355
1500		**500**		K3JHG	356
WØMCX	8	K8YGU	347	G4CP	357
1000		WA4MGC	348	WB2MFX	358
WA8EZW	25	WN4LSU	349	K5SGK	359
W8UPH	26	W5CRF	350	WA8EOZ	360
W7KOI	27	K4VOF	351	K9MAU	361

All the USA-CA 1000, 1500, 2000 and 2500 awards were for mixed operations as was nine of the USA-CA-500 awards. Of the remaining USA-CA-500 awards, two were for all c.w.; one for all 2-way s.s.b.; one for all 7 mc and one for all 21 mc phone.

New USA-CA endorsements were: K9EAB for USA-CA-1500 all 2-way s.s.b. and USA-CA-1000 all 7 mc; K9UTI for USA-CA-1000 all 7 mc 2-way s.s.b. W9HGP for USA-CA-500 all 7 mc 2-way s.s.b.

It is pertinent to note that while at the start of the USA-CA Program, most credits were made by past c.w. operations, it appears a majority of new county contacts are being made on s.s.b. and with 7 mc playing a prominent part in such operations.

We Get Letters

Peter, PAØVB, winner of USA-CA-500, age 63 and ham since 1921, says, "Being number one winner USA-CA-500 in my country I can tell you it is a very difficult award for any DXer. After all these years, I was a bit down having somewhat lost interest in contests and new countries; the USA-CA was just the needed incentive to become active again. Now I can enter contests working U.S. stations with high interest. In spite of my age, to work all U.S. counties becomes my goal."

Pictured here is the Chesapeake Bay Bridge-Tunnel Award for contacting Virginia stations. U.S. stations contact 25 Va. stations, 5 of which must be in Virginia Beach, Va., and 3 must be members of the Virginia Beach ARC; DX stations including KL and KH contact 10 Va. stations of which 3 must be in Virginia Beach, and one a club member. Contacts after April 15, 1964. Send log data list certified by two other licensed amateurs to VBARC, P.O. Box 4022, Virginia Beach, Va., 23454. Cost is 25¢ plus 2 IRC or 50¢. QSL cards are required to be in hand. See text for story about the Chesapeake Bay Bridge-Tunnel, sketch of which is shown on the award.

Several letters asking if Club Stations may work for USA-CA. Answer is YES.

Many letters received expressing appreciation that for USA-CA, one does not lose contact credits because of change in call or QTH whatever.

Several letters from DXers lamenting that some U.S. hams do not name county on QSL cards and asking how to identify counties by calls or cities. Counties cannot be identified by call nomenclature. One may identify counties by good Atlas or use of P.O.D. #26, a United States Post Office publication printed annually and available from the U.S. Government Printing Office, Washington, D.C. for $2.50. DXers may also send one IRC to CHC Headquarters, care this writer, who will provide a list of all U.S. and Canadian hams and s.w.l.s. who have made themselves available to help any DXer, upon request, to identify counties from info available on QSL cards. On the bright side this ID situation, evidence now shows a great majority of U.S. hams now do name their county on QSL cards, and that the problem is primarily concerned with cards of old

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

contact dates. Likewise, as U.S. hams have new QSL cards printed up, most now include name of county.

The question seems to persist, if mobiles and portables name county on QSL cards, is it also necessary to name a city. Answer is NO. Prime requisite on any QSL card is that of naming the county and if county is named, that's it. Requirement of naming city or nearest city is *only* to identify county when it is not named. On mobiles, the question has been raised several times, does the mobile have to make out and send several QSLs for the same station contacted when made from different counties during a mobile trip the same day. The answer is NO. In such case the mobile station may make multiple but separate contact entries showing log data for each different county contact, and such recorded on one QSL card. Many mobiles have had special QSL cards printed up which permit this multiple county contact showing.

Nice letter from Chris, WB2CDB/VO1, Argentia, reporting Newfoundland honored hams of the United States with an official presentation by the Attorney General acting for the Premiere

Here is the EDRAN, East Detroit Radio Amateur Net certificate for contacting five members off net after January 1963. Net organized as a Club and operates traffic net each Saturday, 1900 EST, 7260 kc. No charge. Send QSLs to EDRAN, 15164 Deerfield, East Detroit, Mich., 48021. Members are W8PZQ; WA8's CHA, CGZ, EMJ; K8's IEC, IJK, NWR, RGL, SKM, YGU, YLP.

of Newfoundland in giving out the first call sign license plates to hams of the United States. The presentations, made in St. Johns, included Chaplains, school teachers, service personnel, and other U.S. citizens temporarily residing in Newfoundland. This official good will gesture is believed to be the first of its nature in the world. The senior Navy officer at Argentia, Commodore Scarpino, USN, is a dear and close friend of K6BX.

"Rare" Counties

Have started column section covering information leading to possible contacts with "rare" U.S. counties. In too many instances those writing do not give us exact dates/times/frequencies they intend to operate. Also, too many don't seem to realize magazines require a 60-day deadline. Where we don't give exact data upon which to plan "rare" county contacts, suggest those interested send named station an s.a.s.e. seeking exact data or to set up a schedule.

Here is the London Amateur Radio Club, LARC Award with new rules. Requirements; Ontario, Canada stations contact 10 members LARC; rest of North America contact 5; DX including KL contact 3. No charge, but postage appreciated. Send GCR (certified) list to LARC, Box 82, London, Ontario, Canada. Member list for 1 IRC.

K9UIY will provide contacts 14 c.w. and other bands for Carroll County, Illinois.

Here is a 'goodie'. As you know, independent cities and parks not officially within counties, may be counted one time only for any adjacent county of one's choice. K7PWY of Montana made arrangements with the Yellowstone Park Company to set up station K7PWY/7 in the lobby of the Old Faithful Inn during the CHC/HTH/FHC QSO Party, so those who contacted Don may take credit for any one of the following counties; Teton, Wyoming; Park or Galletin in Montana, and Fremont, Idaho, a very rare one. Don worked primarily 14 mc s.s.b. using 900 watts p.e.p. As Don stated, he got all "lathered" up at the prospects of being on the receiving end of pileups. Don's portable operations also show how field trips can be made much more productive and fun by seeking out locations of high interest to hunters.

W1SZJ, Rt. 2, Box 159, Ridge Rd., Hanover, Maryland, will provide Washington County, Maine contacts during July. S.a.s.e. to him for details.

W8CSK will operate from "rare" Switzerland County, Indiana, 1300Z-2100Z, 21 June on 7 and 14 mc CHC/QRP frequencies. He requests s.a.s.e. with QSLs.

Here is one of three awards sponsored by the Clermont County Amateur Radio Club, Ohio. This one is for working counties in Southwestern Ohio. Another is for working stations in Clermont County, and a third for working five members of the Club. See details in text. Members are: W8JRP, ZRL, HQK, OWP, HOQ, QLG; K8CKO, ADM, SOE, BJA, OPB, ZFJ, JTZ, BON; WA8BOZ, EKV, FLZ, EMA; WN8HST, HOD.

Pictured above is the Worked All Aardvarks certificate for working members of the Peninsula Amateur Radio Klub, P.O. Box 531, Bayone, N.J. 07002. Locals work 7 members plus Club Station WA2VLR; DX stations work 3 members and the Club station. Contacts after January 1, 1962. No charge. Send complete log data. Locals are defined as within the 2-call area; DX stations outside same. Members: WB2' DLM, FUJ, HVO, IYI, DOW, HVP, KIY, HUX, HVQ; WA's LCK, QOA, RZG, UOX, UZJ, WAS, GWB, MGA, QYX, SZY, UPT, VKW, WZF KRI, NQE, RIR, TAY, UZI, YZY, K2DWL, K3VPV.

WA4EPH operating from very "rare" Bath County, Virginia, June 17-August 15, 75 meter s.s.b. QSLs to Camp Nimrod for Boys, Nimrod Hall, Bath County, Va., 24470.

K7GVM/VO1, Argentia, Newfoundland, Canada, would like to set up skeds with any and all counties in Alaska and Hawaii. Write him. Jim reports he hopes to add VO1 to CHC prefix before he leaves VO1 land.

New York All Counties Award

The New York City-Long Island v.h.f. CHC Chapter #19, announces sponsorship of five classes of awards for working stations in New York Counties; Class E basic for confirmed contacts with 22 different counties and with gold embossed seals for each additional 10 counties to total of 62. No date or time limits. Award is in design with plans for 11 × 14 with orange border and at least two other colors. Will bring you a picture in later issue. Sponsors state that a prime purpose of the award is to provide incentive for more v.h.f.ers to become interested in

Pictured here is the "One Hundred" Award sponsored by the New York City-Long Island v.h.f. CHC Chapter #19 for making confirmed contacts with 25 stations in each of the four states of Pennsylvania, Connecticut, New Jersey and New York (total 100). Band or mode endorsement on original award when processed only. No date or time limit. Send GCR (certified) list and $1 or 10 IRC to WA2SAZ, Harry Smith, 108-24 71st Avenue, Forest Hills 75, New York. See text for three other awards sponsored by the Chapter.

the USA-CA Program. (Incidently, the Chapter's Awards Custodian is Harry Smith, WA2SAZ, holder of CHC-150, for having achieved over 150 amateur radio awards on 50 mc or above only. See full-page picture of Harry's station, page 71, June 1963 *CQ*.) For basic award, send GCR (certified) list and $1 or 10 IRC to WA2-SAZ, Harry Smith, 108-24 71st Ave., Forest Hills 75, New York.

World's Fair Award

The NYC-LI CHC Chapter #19 announces sponsorship of a World's Fair Award for working 25 Long Island stations with at least two CHCers or two Chapter #19 members included. Date limits are on or after January 1, 1964 through May 1, 1965. No endorsements except band or mode on original awards when processed. Apply as stated in New York Counties award.

The NYC-LI v.h.f. CHC Chapter #19 issues two other awards. See photo for the "One Hundred" award for working 25 stations in each of four states of Pennsylvania, Connecticut, New Jersey and New York. The fourth Chapter award is for working Chapter members. Stations within 50 mile radius New York City work 10; over 50 miles work 5. Contacts any bands. AOMB/M, band/mode endorsements. For basic award send GCR (certified) list and $1 or 10 IRC. Seal endorsements for each additional 5 members; send GCR and s.a.s.e. for seals. Custodian, WA2SAZ as above. Members are: K1BHY, WA1BEP, AKE, K2AGJ, EWG, FP, EFN, RPW, UKQ, WA2EIY, GSO, MGV, BNF, PMW, PPR, PWI, QCQ, QPC, WQC, SAZ, SNT, WB2BEV, CCF, EKV, FFH, FEQ, FTQ, JKJ, K3EGP, MPZ, UIG, K4RHL, TBG, WA4BMC, FVD, WA5ECF, K6BX, UTO, WA6MIE, MWG, OET, K7PNC, TET, UGA, K8QLT, W8FKU, K9CIF, W9BJH, KØMAS, RGU, KH6BIH.

Pictured here is an unusual award in form of trophy rather than certificate, sponsored by the Cleveland 50 mc DX Club for working 6 members outside a radius of 75 air miles. QSLs must have been exchanged. For details and member list, send s.a.s.e. to Sect'y, WA8EHI. Club call is WA8BCA. Club is willing to operate portable from some nearby "rare" county if enough folks write with suggestions.

Ohio Tops Bid For State PR

As shown in summary table in April '64 col-

[*Continued on page 96*]

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

On March 23rd, during the week of the annual IEEE Show, the now-regular New York RTTY Dinner and meeting was held. Elston Swanson, W2PEE, was Chairman of this not-too-formal gathering of the clan, and an interesting and happy time was had by all. Honored guests included Herbert Hoover, Jr., W6ZH, President, and Ed Handy, W1BDI, Communications Manager, of the ARRL, and, Phil Catona, W2JAV, whose technical contributions to amateur RTTY are known throughout the world.

*431 Woodbury Road, Huntington, N. Y. 11743

Finn Rambech operating LA6VC at Trondheim, Norway. A 32S3 is frequency-shifted by a Lorenz tape printer with keyboard. Antennas are a 3-element tri-bander up 50 feet, a 10/80 meter vertical, a sloping dipole for 80 and a 10/40 meter ground plane. Finn also works 144 mc with a 10-element yagi.

Featured speaker of the evening was Stu Meyer, W2GHK, President of the Hammarlund Manufacturing Company. Stu described briefly the simple means of obtaining f.s.k. in the HX-50; and, at some length, the problems of adjacent signal overload in communications receivers and their solution. Also described was an i.f. amplifier type of noise limiter, unusually effective in the presence of impulse noise, such as Loran.

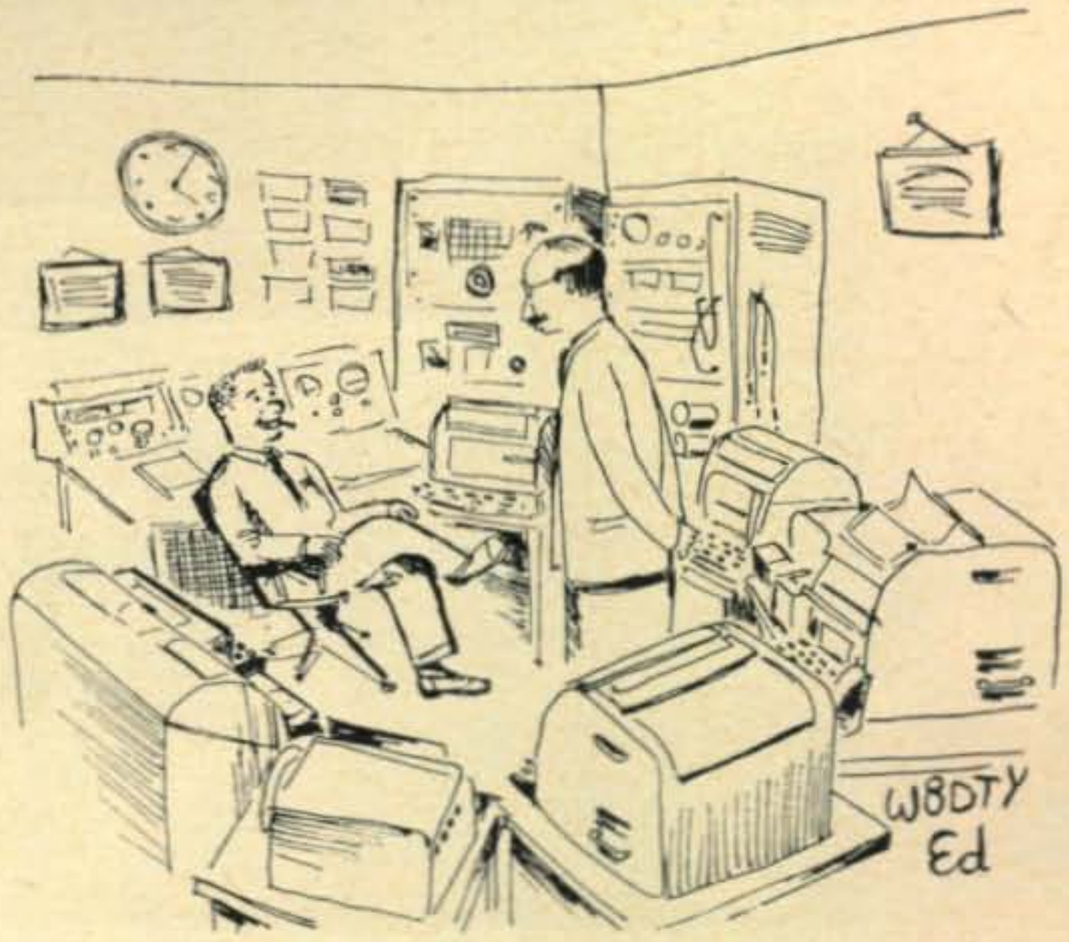
Other speakers included Vic, K3NIO, who spoke on filters and TU's, mentioning the new character recognition system of autostart on h.f. used by K8DKC; Jack, WA4END, who spoke on very narrow shift f.s.k. on a.m. broadcast transmitters; and Al, W1FGL, who described simple TU modifications for the "two-tone" limiterless method, and the a.f. heterodyne system for copying various values of narrow shift.

Much thanks were voted to W2PEE for his efforts in organizing this dinner meeting, and in appreciation much thanks also went to those who donated door prizes, such as Hammarlund and Hallicrafters, and to W2JAV for several of his famous printed circuit TU boards.

Transistorized TU for Narrow Shift

In the September 1963 issue of *CQ* we described the W2JAV transistorized narrow shift converter. We have since reported on the exten-

RTTY The Hard Way...No. 31



"When I was on sideband I had room for six chairs in here!"

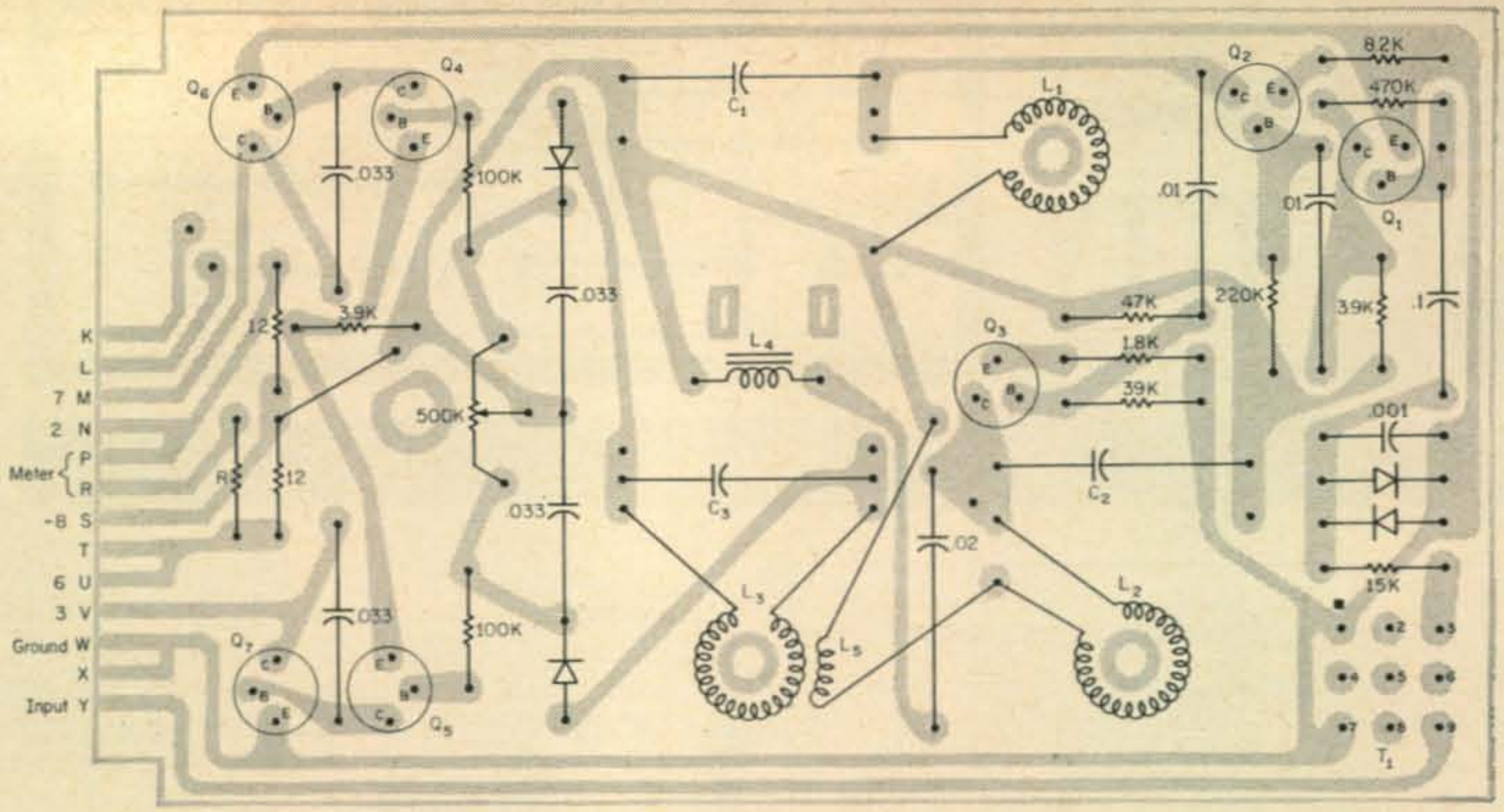


Fig. 1—Narrow shift TU, component parts placement.

sive narrow shift (usually 170 cycles) activity around 7140 kc. Many of those stations on with narrow shift are using this TU. We have had many requests for a detailed component layout on the board pictured in that RTTY Column. Figure 1 shows the layout requested, looking at the underside, or foil side, of the board. Several notations are in order: First of all, while C_1, C_2, and C_3 are shown as single capacitors, holes are provided to connect several capacitors of various values in parallel to achieve resonance of the associated inductance. Secondly, a jumper is required, on the component side of the board, from the junction of the two 12 ohm resistors to the 3.9K ohm resistor. Letter designations of the connector are shown, and the corresponding polar relay (255-A) terminal numbers are also indicated. (Connector information was contained in the April 1964 RTTY Column.)

Printed Circuit Board now Available

As promised in the tail-end "Comments" part of the March 1964 RTTY Column, we have made a supreme effort to obtain printed circuit boards for this *narrow shift* TU. Maybe we *are* a sucker for punishment, but our experience with Project Despair taught us a few things. So, here we go again: By the time this appears in print we expect to have a supply of boards *and connectors* on hand. These will be available for $2.50 per board, undrilled, but with connector included, postpaid. Send money order or check, made out to me, to the Huntington QTH at the head of the Column. *Do not send cash.* (By the way, we cannot export.)

On the Bauds

W2HWH of Maplewood, N. J., has a new console and recently obtained Model 14 tape gear from W2ZKV of Elmhurst, Long Island. WA2JWK of Albany, N. Y., is looking for a 440 cycle tuning fork, for the transistorized standard in the *New RTTY Handbook. (Try any music store, Ben!)* W2GUR of Garden City, Long Island, has a 75A-1 for sale, cheap.

K3OHI of Kennedyville, Maryland, has for sale some "UA-14" machines (without covers) that look like the FRXD-9. W4NZY of Louisville, Ky., has for sale that scarce #103628 tuning fork (87.6 v.p.s.) for setting series governed motors to the right speed. WA6TBC of Campbell, Calif., reports that the Bay area proper is on 146.42 and the South Bay area is on 146.475 mc.

K8DKC of Ann Arbor, Mich., reports digital character recognition autostart active on 3766.7 kc. Other future frequencies are 7133.3 and 14,066.7 kc. The standard operating procedure

[*Continued on page 90*]

The New York RTTY Dinner on March 23 drew quite a crowd of well-known RTTYers including W2PEE, W2JAV, K3NIO, W1FGL and yours truly W2JTP.

UHF ROUNDUP

BY ALLEN KATZ*, K2UYH

Not too long ago we had the opportunity to visit the IEEE (Institute of Electrical and Electronic Engineers) show at the New York Coliseum. If you have never visited one of these shows, we would suggest that you put it on your list of musts. Even if you are not directly connected with the electronics industry, you will marvel at the spectacle created when the world's electronics producers gather to exhibit their wares.

This year, despite the disappearance of the huge parabolic antennas which use to adorn the second floor (they were enough to drive a fellow mad trying to figure a way to sneak one into his back yard), there was still plenty of material to interest the most avid u.h.f.'er. Of particular attraction to us were the advances announced in the field of semiconductors. Our attitude toward transistors has been rather old fashion in the past. However, if we were not convinced of the potential of semiconductors use in u.h.f. gear before the show, we are now. If you are presently using 2C39's to triple to 432 mc as we are, all you have to do is look at the efficiency of the new power varactor triplers and get a little sick. Can you blame a fellow for feeling a little animosity toward these devices, especially when a six inch box can replace the three feet of rack panels he has just spent several months building?

Many companies now produce Varactors which can handle power inputs up to 50 watts, and claimed efficiencies as high as 73% (for a tripler) are not uncommon! Prices seem to be coming down too. Some Varactor diodes can compete favorably with the 5894's price wise.

One word of warning—do not expect to modulate the driving source of a Varactor multiplier and get a modulated output (at least not an understandably modulated one). If you want to work phone with a Varactor tripler, you will have to follow it with a modulated amplifier. This only goes to prove that the vacuum tube is not dead yet—at least not for a while.

Howard, W8JLQ has sent in a few pertinent remarks on his favorite subject—"big" colinear arrays: "Hooray for Cal, K2ODL. Glad to see there are a few who won't give up on the colinear systems." Maybe that is the situation out in the midwest, but here in the east it seems that the colinear is becoming more popular every year. "Nothing wrong with yagis, even long ones, except that they don't seem to out-perform colinears twice their size, or at least some people appear to believe this way! It's difficult for me to see how someone can believe that 13 elements (yagi) can equal 32 or 48 elements (colinear). In my opinion a 13 element yagi equals a 13 element colinear! Nothing more. Why should any antenna system be any better than any other size for size? What difference whether an array X wavelengths square be composed of a single dish, corner reflectors, dipoles, horns, etc? Therefore why quibble endlessly over the system. Let's just get enough antenna.

"One thing for sure, 24 elements is 6 db below 96 according to free space theory, which I believe, but somehow on mother earth the difference averages out more. This I can only attribute to vertical-stacking. The 96 element colinear we use is 12 stacks high and 4 wide; a reasonable size for performance, yet not unduly large or complex to attain on 432 mc. 432 sure seems dead since losing my 96 in a bad storm. We now have only 24 elements up until I can restore the regular antenna. I have used 96 so long now that I didn't know that I didn't realize how much any budding 432 men were cramping themselves with tiny 16 element collinears and puny 13 elements yagis."

Amen! You do run into factor like antenna efficiency, feedline loss, and others, but in the long run it always seems that what Howard just stated comes true. It's the amount of aluminum you have pointing skyward that counts.

Tough luck on losing your array, although judging by your comments I am sure you will have all 96 elements shortly. Say if you get a chance, how about sending in the dimensions of your particular array. This might get a few more 96's on the 432 mc.

Raphael Soifer, K2QBW/K1WXC, director of OSSC (Office for Satellite Scatter Coordination) has come through with some up dated information on ECHO II orbit which looks very encouraging. "ECHO II, by virtue of its larger size, reflects 2.7 db more signal than does ECHO I (when ECHO I was considered perfectly spherical)." [Roughly 2 db below the moon over a transcontinental path.—*Ed.*] "However, the latest orbital data on ECHO II, received this morn-

W8DX as received by W8JLQ over a 65 mile path. Those big antennas do work!

*48 Cumberland Avenue, Verona, New Jersey, 07462.

ing from NASA, gives the perigee at 982.47 and apogee at 1354.79, both these figures in kilometers. Converting, this yields a current altitude range from 611 to 840 statute miles, both considerably below ECHO I's nominal 1035 miles. Therefore, for any given path, the slant range to ECHO II from each station will be considerably less than to ECHO I, and thus the path loss will be less.

"A quantitative presentation of these variations is given on page 33 of *QST*, April, 1962. With the satellite at its current perigee, the path loss curves presented there show that ECHO II (simple passive reflection) will yield stronger signals than moonbounce so long as the sum of the distances from each station measured to the projection of the satellite along the ground is less than 3,000 miles.

"Although several amateurs have been attempting to use ECHO II at 144 mc, no success has yet been reported. We are expecting, however, that contact will be made when the satellite's altitude decays to a point where path loss becomes tolerable. Then, too, the possibility of QSO by ionization phenomena should not be ruled out.

"Your column could be of great help to stimulate work on 432 mc, where antenna gains are easier to come by, noise is lower, and tracking not as prohibitive as at 1215 mc. We are told, by someone who should know but wants to remain anonymous, that KH6UK might be willing to sked West Coasters with enough oomph to be heard via 432 mc ECHO II. Thus far, however, those willing to build 432 mc kilowatts with big circular polarized tiltable arrays have not been evident." We know, Ray. Does anyone have any ideas on how to efficiently polarize a colinear antenna? Thanks very much for the information, please keep us informed of ECHO II progress and the possibilities for communication by passive reflection.

To show that the West Coast is no further behind in the field of amateur television than any other part of the country comes the following choice words from Chris, WA6HTJ of Los Angeles, California: "I agree with the remarks of K3ADS in the March column. However, I feel a higher percentage of carrier than recommended would be advantageous. May I cite the following modulation percentages as those required by the FCC for commercial TV stations: Sync tips—100%, Blanking level—75% ±2.5% (the black level should be held as close to the blanking level as the state of the art permits), Peak white—15% +0% −15%. For ATV, the black level should be held to not more than 75% or erronous sync may occur. The use of 75% carrier level rather than the 60% suggested in the column is quite desirable in cases where signal levels are low. Also the 15% white level is merely to insure a carrier at all times for intercarrier audio, and therefore peak white can be run at 0% in ATV.

"Here in Los Angeles (and most of southern California), accepted frequency of operation is video carrier 435.2 mc, audio carrier 147.6 mc—antennas are vertically polarized. Stations active are W6LYS, WA6LYL (WA6IRB/6), W6IWA, W6VCF, W6DEO, W6MMU, and several others occasionally. I am working on a pair of 4CX250B's, to run a kilowatt, grid modulated on ATV. Antenna is a 64-element colinear, and receiver is a Centimeg TV converter using two 8058 Nuvistors (special product) and two 6DL4's in grounded-grid to a standard TV receiver. Informal TV net time is 2100-2200 (local time) Wednesdays. The two meter frequency is usually monitored." FB on your TV activities, sure hope we will be hearing from your group in the future. I would like to hear more about that Centimeg and I am sure the readers would too.

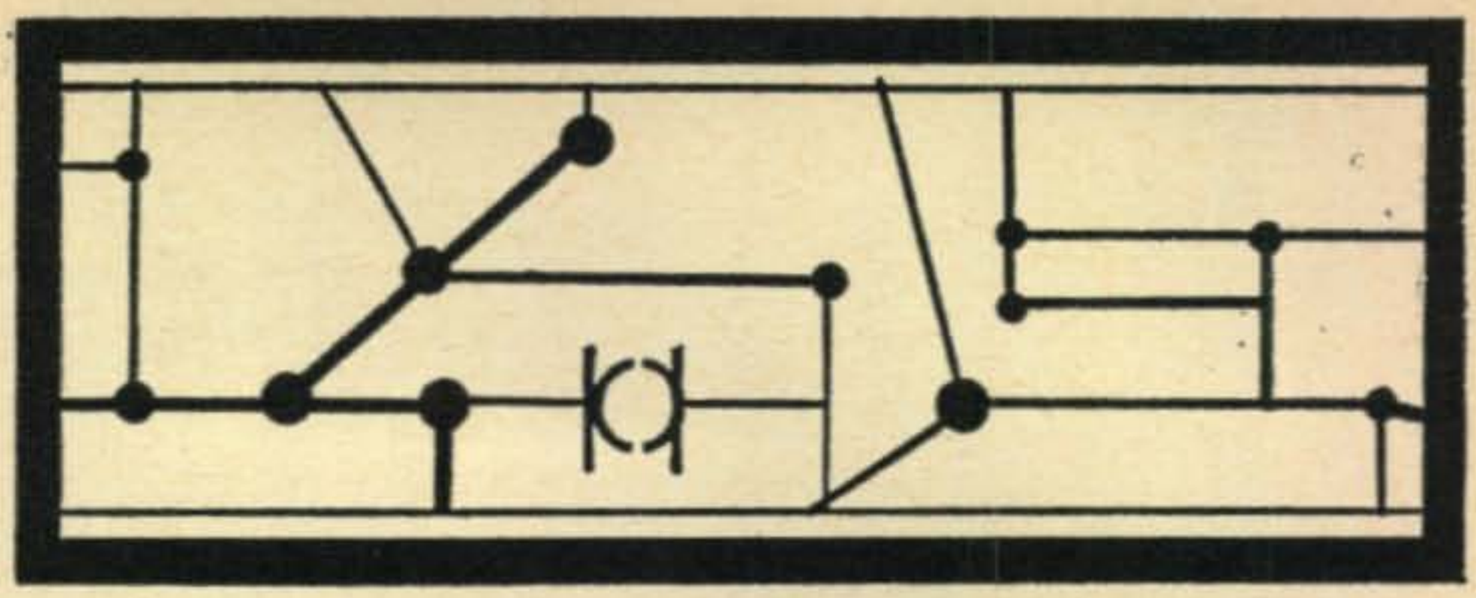
Texas is no TV slouch according to Vic, W5HPT: "Considerable happenings down this way since last note. We have ATV going and have been received by W5AJG at 28 miles. This was call letters only, with considerable snow. Transmitter at this end was 5894 tripler followed by 5894 amp on 440 mc, grid modulated. Power output at transmitter approximately 6 watts as measured on a Bird watt meter. Leroy was picking up the video from a RDO receiver into a Conrac monitor. Ahead of the RDO he was using two stage of 8058 r.f. amplifiers. We reversed the procedure, however I couldn't get good horizontal sync at this end. Situation looks promising, interest has been expressed by a couple of other hams. One other chap is on, however I don't have his call nor have I received a picture. I was using an old ATJ 'IKE' camera. However, since the original tests I have acquired a Vidicon camera, so better things should be coming." We will have to get busy to keep up with you here in New Jersey. Plans now call for a 24 hour TV beacon transmitter aimed at New York City. I wonder how many other areas are taking this approach to drum up TV activity. If you have a TV beacon going (if not, why not give one a try) send us time, frequency, etc., so we can make up a nationwide listing. That about wraps it up from here. Everyone keep up the good work.

73, Allen, K2UYH

Please Note...

After June 15, please address all correspondence to the new *CQ* offices at 14 Van Derventer Ave., Port Washington, L. I., N.Y.

NOVICE



WALTER G. BURDINE*, W8ZCV

As I write this I am listening to the radio announcing the terrible earthquake disaster in Alaska. Once more the amateur is called upon to furnish the only communications from a disaster area, and, as the radio has just announced, one ham sent the news and said he would have to sign off to go hunt his sister who was among the missing. I have just received a call from a local resident to try and contact someone in Kenai and Yakataga to see if they were among the missing. You can see that any disaster in the world affects those nearby as well, our locals were school teachers in Alaska. Our actions during these times can form a better opinion of the ham by the people if we use it to our advantage.

Our equipment should be ready to use at any time and not need to have two or three wires soldered before it can be used. To be really useful the equipment must be capable of being operated for extended periods of time without local power sources and should be supplemented with a low power portable rig for short range communications to a more powerful station. Battery power or equipment powered by portable a.c. power plants is useful in times of emergency. If the power supply is too large it can use too much fuel and render it useless. Some kind of portable antenna or one that can be erected in a short time should be in the emergency kit, as well as a battery powered broadcast receiver for local news if the station is on the air. In case of emergency, be *really* ready.

80 and 40 Meter C.W. Rig

I personally prefer low power rigs for my operation on both c.w. and phone. I also think that the so-called all band rig is never as efficient as single band rigs designed and adjusted for maximum power output. I do spend a lot of time on my antennas and the adjustment of my station. After all, no one wants to talk to a station that isn't operating correctly, there are just too many good stations on the air for that.

I use a lamp for a dummy load with a light meter to measure the maximum power output of the lamp. I know that the lamp is not the best dummy load but I *do* have the lamp and the light meter, so I use them. I adjust the voltage on each element in the tube for maximum output and proper frequency control.

I have a complete r.f. section for each band from 160 meters to 220 mc and I can use either of two modulators or power supplies with them so that I can operate duplex or cross band if I so desire. This makes for versatility and dependability as I can always have one of them working. I can try different r.f. circuits without building the power supply or modulator, I can always get on the air for a ragchew. No method of learning radio is as good as that of building and testing on the air of new circuits, you rarely forget what goes into a rig that you have built. I will publish pictures and diagrams of these in time in the column.

The diagram and constructional data for a 40 and 80 meter transmitter will be discussed first as this will allow the new Novice to get on the air with the least amount of equipment. He usually has a receiver that can be used.

Each r.f. section is built on an aluminum chassis measuring 7 × 9½ × 2". Use aluminum to permit you to work the chassis with a minimum outlay for tools (see the November 1963 issue of *CQ* for some very good articles on tools and construction of radio equipment). If you are a little short of money you can build the oscillator section first and put it on the air before

Shown above is T/Sgt. Lowell Mashburn, W7BSW at the controls of the base MARS station at McChord Air Force Base, Washington, during the disastrous Alaskan earthquake on March 27. The McChord AFB MARS station handled over 2,000 messages to and from Alaska in less than four days! Amateur emergency preparedness once again has proved its worth.

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

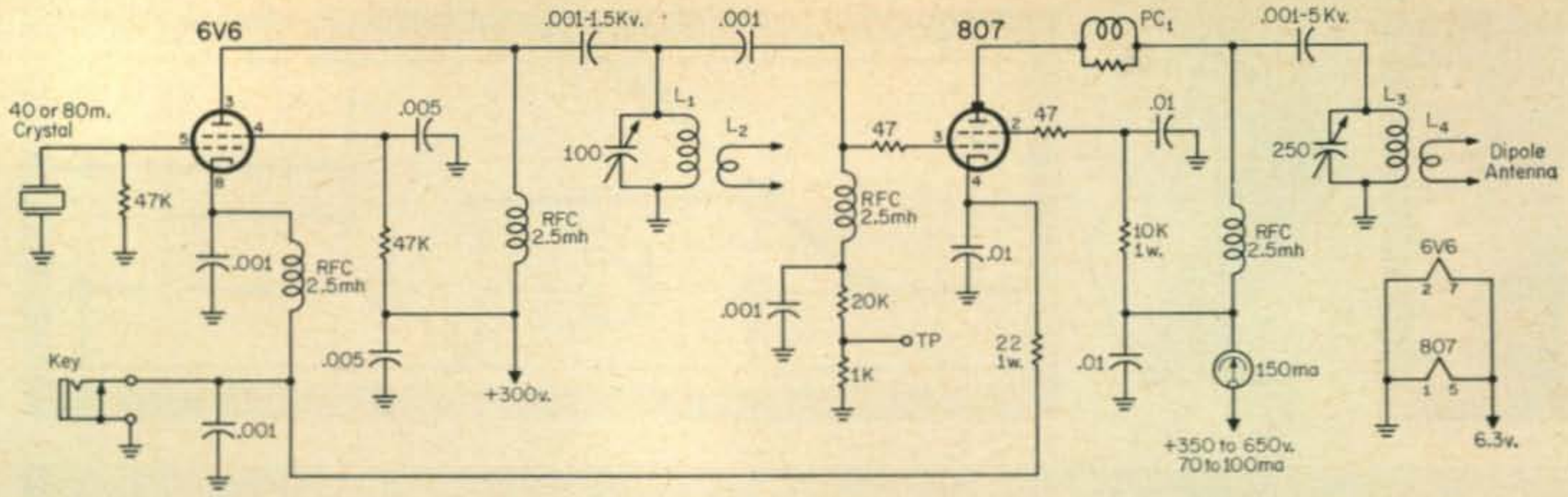


Fig. 1—Schematic diagram of a simple 80 or 40 m. Novice transmitter. Plug-in coils are used. Link L_2 is needed only when the 6V6 oscillator is to be used alone, without the 807 amplifier. In this case the antenna would connect directly to L_2. All capacitors greater than one are in mmf; all others are in mf. Resistors are ½ watt unless otherwise indicated.

PC_1—6t. #20e. on 47 ohm 1 watt resistor.
L_1—#24e. on 1¼" plug-in coil form. 80m.—35t.; 40m.—19t.
L_2—#24e. on same form as L_1. 80m.—8t.; 40m.—6t.
L_3—#20e. on 1¼" plug-in coil form. 80m.—28t.; 40m.—16t.
L_4—3t. #20e. on same form as L_3. (Same for 80 and 40 meters).

the amplifier parts are bought and installed. This way you are using your Novice license to gain that needed code speed. You can use any available power you happen to have around the shack for a power supply. It is not necessary to use the tubes shown if you have any old television set around that is not being used for any other purpose. The 6V6 socket can be filled by a 6G6, 6K6, 6L6, 6F6, 6Y6, 12A6 or any similar tube if the socket connections are checked in the handbook or tube manual and the correct filament and high voltages are applied. The circuit need not be changed except to supply the correct operating voltages to the tube elements. The 1625 is about the cheapest power amplifier available but it can be replaced by any of the above mentioned tubes with corresponding decrease in power output. You can also use an 807, 6146 or similar beam power tube.

I use five prong tube sockets and the corresponding male plug to connect the units together. Be sure that the wires carrying the filament voltages are at least #16 so that the correct voltage is available at the tube socket.

A nice cabinet to use on the chassis can be constructed from a piece of Reynolds "Do-It-Yourself" aluminum available from any hardware.

Power Supply

Almost any voltage can be used, depending upon the tube used in the rig. 425 volts at 90 ma on the final tube (the 1625) will give a signal that can be heard in just about any part of the world if used with a good antenna. The 1625 can be run at 750 volts to give the full 75 watts input allowed the Novice operator. However, the oscillator and the screen of the 1625 must be run with a supply of about 300 volts.

Data for changing the transmitter to an all-band unit will be shown in a future column. The change of parts will be very small and the same size chassis can be used.

Study the pertinent chapters on transmitters in the *Handbook* for antenna design and construction and tune-up procedure.

A carefully constructed transmitter operated intelligently can do wonders for the new operator. I will be watching for you with one of these rigs on most any band or mode of operation that you decide to use. Good luck.

Letters

Many of the letters received have as much information written between the lines as in the letters themselves. Read this and think about it for a few minutes. This letter makes 35 countries that I know reads the column.

"Dear Walt: I'm about as new to amateur radio as most of the Novices are, I've had my license since Feb. 1963 and have never operated from the home QTH.

"I always listen across 15 meters for anyone

[*Continued on page 98*]

Building international good will and possibly creating a new DX YL ham is one and the same thing for L. W. Hardy, KØZSE of Redwood Falls, Minnesota. Norma Montealegre (seated) and her American Field Service "sister" are shown talking to Norma's family in Costa Rica. KØZSE has contacted TI2ZZ, TI2IO and TI2SS many times, he now would like to contact someone to do the same for Norma's twin sister in California.

VHF REPORT

BY BOB BROWN*, K2ZSQ

It has been over a year and a half since K2ZSQ took on the job of continuing *The VHF Amateur* as a section in this magazine. It hasn't always been easy batting out material every thirty days and still trying to keep up with the correspondence. But we enjoy every minute of it.

After due examination, however, we have realized that including this v.h.f. material in any other form than a column has lead to some confusion. Many readers have said that they didn't know where the "v.h.f. section" began and where it ended. And still others didn't know to whom to send their news reports. And worse yet, many readers new to ham radio and to *CQ* were totally unaware of the reasons for carrying the title, *The VHF Amateur*, to start with!

It is also felt that *CQ* itself will be a great deal more balanced in scope if important v.h.f. topics (such as the controversy over the current K3IOP case) are discussed in ZERO BIAS or in our ANNOUNCEMENTS column, with feature articles pertaining to v.h.f. being included "up front."

And so, starting with this issue the VHF REPORT and UHF ROUNDUP will be treated as would any other of *CQ*'s regular monthly columns. They will be within themselves as comprehensive and all-inclusive as can be made. Additional contributions from K2ZSQ and K2UYH will appear from time to time, but these will supplement or expand the already existent coverage in the monthly columns.

Let me add that all the present v.h.f. programs (Reader Reports, VHF Century Club, VHF Contests, etc.) will continue as before with no cut-down anticipated. For some time now I have felt that I haven't been able to devote as much time to this work as I'd like, what with the full-time job as editor of *Communications Equipment Marketing*, the pressure of other interests and the desire to remain active on the air. This slight lightening of this writer's load will actually facilitate a better concentration on the VHF REPORT column than has been possible before while still enabling me to do a fair job in my other endeavors.

A Bug-Free Rig for 2

Interested in about 35 watts on 144 mc? This may well be the rig for you. The circuit shown in fig. 1 has been built by W8HHS and dozens of others with great success. Most beginners in the v.h.f. "homebrew" field encounter difficulties when attempting to "straight-run" the final tube at the output frequency (such as found in most circuits using 2E26's and 6146's). Unfortunately, these tubes with their high sensitivity are prone to instability and require neutralization—plus special care in circuit layout.

The rig in fig. 1, however, produced no evidence of instability (all units performed well). And our audio circuit incorporates high-level negative clipping, resulting in a fine "DX punch." A 72 mc trap is included in the output circuit to prevent possible sub-harmonic energy from being radiated.

Tune-up is simple and straight-forward. (Tune all circuits for maximum output as noted on an SWR bridge adjusted to read "forward power.") The doubler-final amplifier requires high grid drive and all that is available is used. A number 47 pilot lamp will light to approximately ⅔ normal brilliancy under actual output monitoring conditions.

Power input will be about 35 watts. Measured output into a 50 ohm load was 18.58 watts. This is about par for a double-final amplifier on 144 mc.

The power supply components can be "burgled" from a junk TV chassis. Most TV shops sell TV junkers for $5.00 or less. And most of the resistors and capacitors needed can be gleaned from the same source.

Surplus 8 mc crystals are used for frequency control and inexpensive APC type variable capacitors can be used in the tuned circuits, if desired. Variable capacitor shafts should be brought out to the front panel.

An accurate grid dip meter can be used to adjust the 72 mc subharmonic trap.

A 2E26 tube can be substituted for the 6146, but it will result in reduced power output.

The modulation transformer can be a 25 watt unit of the multi-match variety. It must match a 3800 ohm plate-to-plate, modulator impedance, to a 3500 ohm secondary load, presented by the 6146. A UTC S-19 is recommended. Some sur-

WA9FPC and WA9IMR repairing the 30 foot monster at W9JFP, Milwaukee. This six meter baby now weighs 90 lbs. (with "repairs") but it is still performing from atop Vic's 105 foot tower like always. Look for W9JFP/7 in Nevada on the 13th and 14th of June.

*c/o *CQ*, 300 W. 43rd St., New York, N.Y. 10036

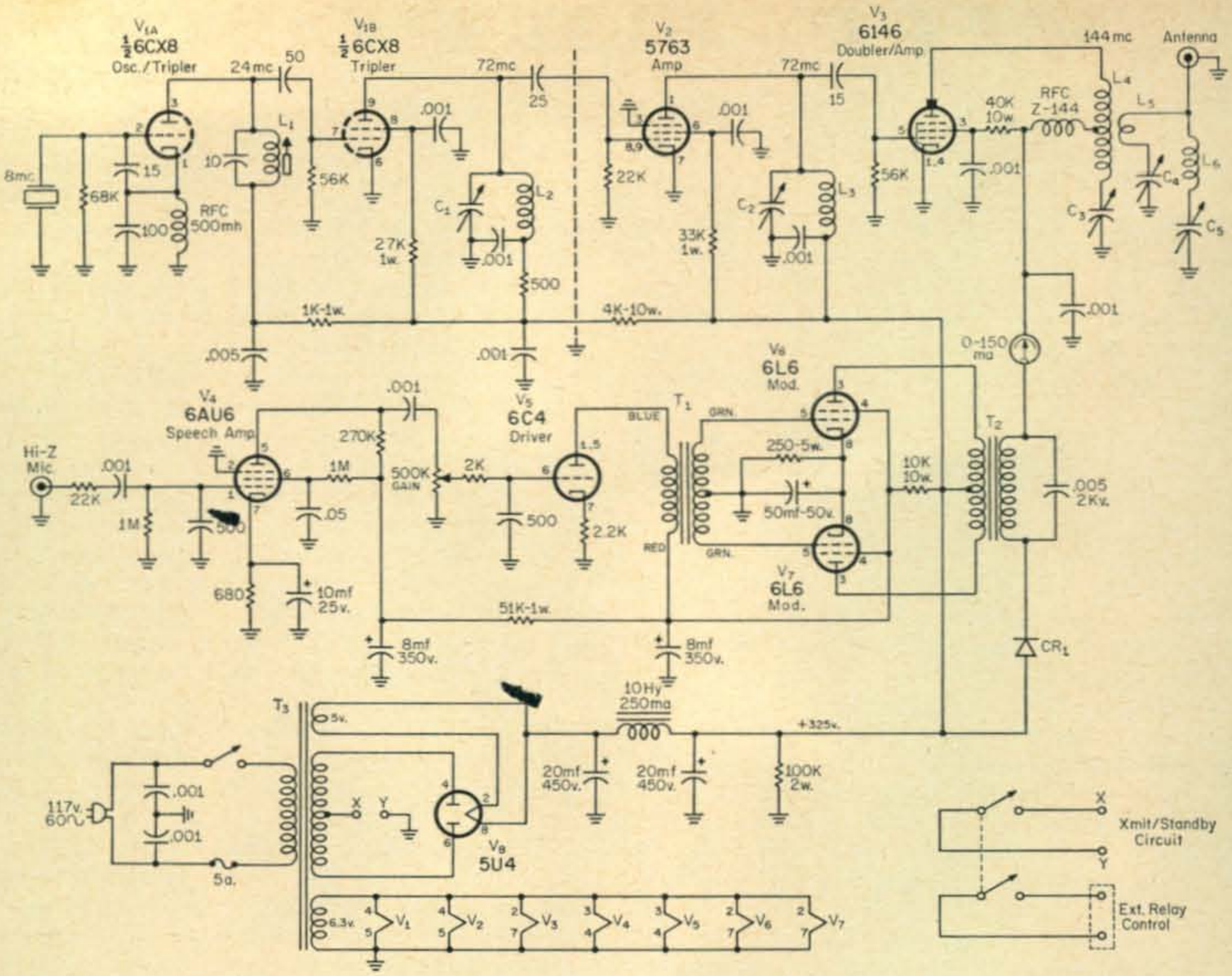


Fig. 1—Bug-free transmitter for 2 meters as described in the text. It runs 35 watts, doubling in the final. Negative-clipped modulation is employed for that added DX punch. Most parts can be scrounged from a TV junker.

$C_{1,2}$—3.0-25 mmf APC variable.
C_3—0-15 mmf variable.
C_4—50 mmf miniature variable.
C_5—3.0-30 mmf trimmer.
CR_1—500 ma silicon rectifier.
L_1—18t. #28 e. wire on ⅜" dia. slug-tuned form.
$L_{2,3}$—5t. #16 tinned wire, ½" dia., ¾" long. (Air-wound, self-supporting.)
L_4—4t. #12 tinned or copper buss wire, 1" dia., 2" long. (Air-wound, center-tapped.)
L_5—2t. #18 insulated wire, ¾" dia., inserted in center of L_4.
L_6—8t. #20 e. wire, ½" dia., close-wound, self-supporting.
T_1—1:3 interstage transformer, single plate-to-grids.
T_2—25 watt multi-match modulation transformer (see text).
T_3—Power transformer. 325-0-325 v.a.c. at 250 ma, 6.3 v. at 5 amps and 5 v. at 2 amps. (From TV.)

plus outlets have fixed impedance modulation transformers available which offer a close match.

This two meter rig will serve well as a driver unit for a 2C39, 6360 or similar tripler stage for 432 mc use.

Layout should follow the usual v.h.f. practices. Locate the speech and modulator components away from the p.a. stage and exciter circuitry. The use of a baffle plate to divide the modulator and r.f. portions of the chassis is also recommended. Tube shields should be placed on the 6AU6 and 6C4 stages to prevent stray r.f. from reaching the audio section.

Use short, direct connections for all wiring of coils, capacitors and resistors. Place the 6CX8, 5763 and 6146 stages in a straight line and as close to one another as possible. Place a small baffle shield between the 6CX8 and the 5763 to prevent mutual coupling between the two 72 mc circuits.

Use disc ceramic capacitors throughout the r.f. and speech sections of the transmitter. All resistors are ½ watt unless otherwise specified. A 17 × 10 × 3" aluminum chassis will allow ample room for all circuits. The more skilled home constructor can manage with a much reduced chassis area.

By the way, this neat 'lil rig originally appeared in a popular publication called the *VHFER*. This magazine is now well into its second year of publication under the skilled directorship of W8HHS, well known in v.h.f. circles for his many constructional developments over the years. Try it. She costs but $2.00 a year. Order through: Comaire Electronics, Ellsworth, Michigan.

New York VHF Picnic

The Annual Field Day and Picnic of the Southwestern New York VHF Association will

be held on July 18 and 19 at the Great Valley Fire Tower near Great Valley, New York. N.Y. Highways 16, 17, 219 and 353 all lead to the general area of the site. And "VHF" signs will be posted on roads leading to the picnic.

WB2GXE, the club station, will be on the air on six and two meters (frequencies not known at this writing) to talk in any mobiles needing further directions. From what we hear, this should be a gala affair for the entire family. But don't forget to pack those picnic lunches! Contact WA2VOI for more details.

Report from XEØCS

Mike Gauthier, K6ICS, tells that in March he took a Gonset Sidewinder 2 meter s.s.b. rig with him to Ensenada, Mexico, hoping to work back into the states under his XEØCS call. The antenna was a Telrex 11 element beam. But things didn't work out too well. "I heard several very weak unidentifiable signals. They sounded like NBFM. I was unable to get a fix on their location because of their sporadic appearance. Because of their action, though, I feel these were commercial of governmental spurious emissions."

Mike goes on, however, to mention that on April 28-29 there will be another mobilecade from Los Angeles to Ensenada. And many of these mobiles (calls not available at this writing) will be bringing along v.h.f. gear. "Maybe then we'll be able to work back into the states," adds Mike.

With the Century Club'ers

Since our last dissertation on the state of the *CQ* VHF Century Club, we have been literally deluged with applications for membership. And they continue to pour in. If you presently have an application pending, rest assured that your certificate will be shipped shortly. The normal waiting period is about two weeks. Next month we will again present a more detailed progress report on the club along with a box showing new member's certificate numbers and calls.

Space doesn't permit our running the rules as often as we'd like, but if you are interested in joining, grab a copy of *CQ* for March, 1964, and check the VHF REPORT column. Or if you'd prefer, drop me a self-addressed stamped-envelope and we'll send you a rulesheet and official application.

Letters from Readers

It has been quite some time since we have published letters, so we thought for a change we would run a few this month and forgo our usual "DX Doings" section. This first one comes from Sid Emmons, K8ZES, of Galion, Ohio, who writes in part:

"Plan to push all four v.h.f. bands in this year's contest to try to run up a decent score. My 220 mc gear is okay but I haven't yet got the antenna completed for 432 mc yet. Transmitter and converter are working fine (8058's and 416B on converter, 3CX100A on transmitter—about 35 watts in).

"Activity locally has been so-so. Several warm evenings ago the band felt like spring but this was short lived as snow is now on the ground again and the temperature is about 20 degrees.

"The Marion VHF Hi-Banders (our club) is doing fine also. The Sunday evening 2 meter net at 2000 EST is active with about 18-25 members and guests checking in.

"Paul, K8UOZ, is having success with an additional 1000 EST Sunday morning club "roundtable" on six meters. Membership is running in excess of 40 with about 55 at the meetings. The amazing part of it is that nearly all of them are reasonably active on v.h.f. John, WA8GKK, at Port Clinton, Ohio, drives 100 miles or better roundtrip to make the meetings!" *Keep us posted, Sid!*

Santa Rosa, California: Noland Lewis, WB6CKI. writes to tell us all about his station.

"Thought you might be interested in my v.h.f. activities. I am now on sideband on two meters. The rig is a Swan 120 driving a h.b. mixer (12AT7, 12BY7, 6360), about 3 watts out. This in turn drives a pair of 2E24's in AB_2, 50 watts input. The antenna is a h.b. 20 foot 16 el. spiral array with about 15 db gain. The receiver is a Collins 75A-4 with an Ameco CB-2 converter, a PV-144 preamplifier and a BC-1031B pan-adapter.

"I plan to work the *CQ* VHF Contest from Mt. St. Helena. My frequency for normal sideband work is 145.025. Best DX, 250 miles using 6 watts on a.m." *Tell us more about s.s.b. activity out there, Noland!*

Westfield, New Jersey: John Abbruscato, WA2PBN/WB2EPF, tells of his doings lately.

"It has been such a long time since I've heard or worked you on the air that I had to drop a line. The last time I worked you I had a Clegg Thor. Now I'm using a Clegg Venus 6 meter sideband transceiver. Have been running it for two months and in my estimation 6 meter sideband is the greatest!

"I have no new DX since the summer. Still stuck with 40 states, VO1, KP4, VP7 and VE1. I hope this summer to pick up a few new states and maybe catch XE1OE on s.s.b. Right now the Venus is running barefoot into the six element Telrex 45 feet up. I hope by the summer to back it up with a kilowatt linear.

"My most recent efforts are towards a two meter mixer to put the Venus on 2 sideband. I am quite anxious to return to the band after leaving about a year and a half ago. I have intentions of trying a mixer similar to the one described by Bob Heil, K9EID, in the November '62 *CQ*." *Good luck, John. See you soon on two!*

Wrap Up

We'll be bringing back the "DX Doings" and "Club Notes & Quotes" next month per usual. Meantime, let us hear from you! After all with such aids as sporadic-*E* and the summer inversions, you should have something worth writing about. See you next issue.

73, Bob, K2ZSQ

YL

LOUISA B. SANDO*, W5RZJ

LAST call for YLRL's 4th International Convention! Celebrating the 25th anniversary of the Young Ladies Radio League, it will be held at the Nationwide Inn, Columbus, Ohio, June 19-21, 1964.

Briefly, the program is this: Fri. all day—registration and eyelash QSOs. *All YLs please bring one of your QSLs.* As part of registration these will be posted on a large map so all can easily spot who is there. Sat., 9:30 A.M.—YLRL business meeting conducted by YLRL President K1IZT, Blanche. 1:00 P.M.—YL luncheon with recognition of YLs plus prizes. 7:00 P.M.—banquet for YLs and OMs. Speaker will be W6UXF, Enid, 25-year continuous member.

An OM program is planned for Sat. beginning at 9:00 A.M. with a trip to the Center of Science and Industry. This is a new building housing the Columbus Radio Club, one of the most complete radio stations in the area, a planetarium with shows, and many interesting projects.

All who remain on Sunday are invited to be guests of the Buckeye Belles, hostess club for the convention, at Brunch in the hospitality room. In addition, the Lancaster Hamfest is but 35 miles away.

The Belles have received so many embroidered emblems not only a bed cover but a luncheon cloth as well will be made of them. Truly, these will be wonderful prizes! Absentee tickets may be had for $1 for YLs who cannot attend but who want a chance on these prizes, as well as a gift from the Belles.

Complete registration ticket is $10 — $2.50 registration (for Sat. coffee, "loot bags," luncheon & banquet favors), $2.50 luncheon, $5 banquet; OM's banquet $5. Note from convention chairman, K8MZT, Shirley: *If you want to receive the personalized favors, get your registration in by June 12.* (However, any YL will be welcomed up to the last minute.) Send your registration to Libby Isham, K8UKM, 474 Darbyhurst Rd., Columbus 14, Ohio. Be seeing you!

*4417 Eleventh St., N.W., Albuquerque, New Mexico 87107.

Mary Schultz, K6OWQ

Mary Schultz, K6OWQ

We regretfully record the death on March 18 of Mary Schultz, K6OWQ, of Temple City. It happened as one of those tragic events wherein an innocent bystander becomes the victim. Following a drugstore robbery, police from three communities pursued the suspect onto the San Bernardino Freeway and in a high-speed chase fired seven shots at his car. Mary, driving a new Comet, was seen to swerve into the freeway's inner lane just after the bandit's car entered it and crashed into her car, killing Mary instantly. An autopsy later revealed a bullet lodged in the top of Mary's head, causing a wound not serious enough to have killed her but undoubtedly the reason she lost control of her car moments before the collision.

The *Los Angeles Times* editorialized thus: "With radio relays at police command, the robber in plain sight, and considering the nature of freeways themselves, [the necessity of] this chase-and-duel action seems wide open to serious doubt as [a] drastic procedure that overly endangers the public."

Our sincere condolences to Mary's OM, Carl ("Bud"), W6CG. Bud is an engineer with KHJ-TV, and writes for RTTY Society of So. Calif. They had no children.

Mary has been written up in these pages earlier

Hard working gals of YLRL's Convention Committee at the Buckeye Belles annual meeting Mar. 8: L. to r., seated: K8WZF and K8GWF, co-chmn. prizes; K8YFB, chg. trading stamps; WA8AHU, off. photographer; W8LGY, conv. co-chmn. Standing: K8OMC, off. photographer; K8UKM, registration; W8OTK, bus. mgr.; K8PXX, co-chmn. prizes; K8ITF, decorations, favors, and designer of embroidered bed cover & luncheon cloth; K8MZT, general chmn.

—as top c.w. scorer in YLRL's A.P. in '58 (*CQ* Feb. '59), and when she became the first YL to receive the WAC-RTTY award (*CQ* June '61), as well as in our book *CQ YL* for her DX work. K6OWQ was one of the comparatively few YLs to hold WAZ, in addition to DXCC (171) and many DX awards.

Mary earned WAS in her first 6 months as a Novice, and DXCC a year after getting General (July '56). She received BPL for handling over 1300 messages from the Anchorage Fur Rendezvous in Feb. '59 via RTTY contact with KL7ALZ. She had many "firsts" on RTTY, and was most proud of the fact that she was the only contact on RTTY accomplished by the XE4B DXpedition to Socorro Is. At least ten YLRL certificates were neatly framed on the hamshack wall for Mary's c.w. contest activities.

Another hobby of Mary's was growing roses. We shall be forever grateful to her for introducing us to some of the delightful "roses of yesteryear" we found blooming in her garden (during a visit following the Disneyland convention two years ago)—and, thanks to her, have since added to ours.

Mary will ever be remembered by her many friends in the Los Angeles YLRC, in YLRL, and through her years of world-wide QSOs.

Weber Lawsuit

At copy deadline (Apr. 1) this is the status of the lawsuit by the City of Santa Barbara against the Webers—K6GHU, K6KCI, WA6IBR—to stop their operation on the basis of being a "public nuisance" (see April *CQ*).

It is hoped the final pre-trial hearing will be held May 22, at which itme the city attorney, Stanley Tomlinson (whose own son is a ham!) will take deposition's of the FCC inspectors, under cross-examination and a statement of agreed facts by both sides will be included in the record. The judge will then make a decision as to the jurisdiction upon the agreed facts and the law involved. If the judge rules in the Webers favor, that will end the case, unless there is an appeal by the City. If he rules against the Webers, there will be a regular trial to determine the facts with witnesses, expert testimony, etc.

ARRL legal counsel Bob Booth, W3PS, attended the March 13 pre-trial hearing. He is authorized to be at the trial if needed. ARRL President Herbert Hoover, Jr., W6ZH, also has been in close touch with developments and took part in an informal meeting with the city attorney and the Webers' attorney, Howard Shepherd, W6QJW. Their attorney sums it up thus: "Basically the issue is whether the California Superior Court can enjoin operation of an amateur station to stop TVI or BCI when the FCC investigations show no violations of the rules and regulations."

In the meantime the Webers continue to operate, at this writing Irma and Lou spending all their waking hours at the rig and phone handling urgent traffic into and out of Anchorage, Spenard and other Alaskan communities in the wake of the devastating earthquake and tidal waves.

WØJRQ Lawsuit

Latest developments in the Mace Warner, WØJRQ, lawsuit (see April *CQ*, p. 41) are that insufficient time was allowed by the court for the trial on March 31, and the attorneys are sparring for the earliest date thereafter. Mace has had to dig up another $500 personally—this makes nearly $2,000 out of his own pocket for the protection of amateur radio. As Mace comments, "Any screwball can start a lawsuit for a very few dollars, but to defend oneself costs a fortune!" The Denver Radio Club is collecting a defense fund to help fight this case. Please send any contributions c/o Walter M. Reed, WØWRO, 1355 East Amherst Circle, Denver, Colo., 80210.

Here and There

Correction: Mailing address for YLRL's treasurer, Barbie Houston, K5YIB, is Box 88, Richardson, Texas, 75081.

At their annual meeting the Buckeye Belles elected these officers: Pres., K8PXX, Toni; V.P., K8QBU, Helen; secy., K8CEN, Louise; treas., WA8CJP, Ruth. W8HWX, Lillian Richardson, 3907 Starr Ave., Oregon, Ohio, is the new certificate custodian. All applications for certificate should be certified with log information and 25¢ enclosed to cover handling.

The Floridoras are proud recipients of their own club call, WA4RXP, trustee for which is W4UF, Dot. They plan to have WA4RXP in operation during Field Day. Working the club call at any time will count as two points toward the Floridora certificates. 33, W5RZJ

Phone Results [*from page 45*]

DJ2IB	"	2769	40	14	25
DL7BA	**3.8**	**9360**	**156**	**9**	**39**
DJ2YA	"	8910	188	8	37
DL1IN	"	4343	86	8	35
DJ5RH	"	1553	53	6	23
DL5CF	**A**	**182,578**	**409**	**61**	**132**
DL5AO	**14**	**114,935**	**347**	**37**	**90**
DL4BW	"	15,478	123	26	45
DL5SE	"	8448	137	13	35
Hungary					
HA9OZ	**A**	**34,998**	**204**	**37**	**77**
HA1KSA	"	3154	51	13	25
HA6NI	"	30	6	2	3
Ireland					
EI8P	**A**	**17,484**	**154**	**21**	**41**
Italy					
I1BAF	**A**	**310,128**	**615**	**66**	**147**
I1LCF	"	24,140	180	26	59
I1PHN	"	10,295	112	19	52
I1EVK	"	5640	54	17	30
I1SF	**21**	**35,322**	**183**	**25**	**62**
I1TDJ	"	32,319	148	26	55
I1WSG	"	1675	27	9	16
I1ZFT	**14**	**97,112**	**402**	**36**	**86**
I1NAL	"	7520	126	10	37
I1AMU	**7**	**2485**	**60**	**7**	**28**
Luxembourg					
LX3BW	**A**	**23,114**	**129**	**25**	**66**
LX3DQ	"	12,528	134	20	52
LX1CO	14	1740	50	7	22
Malta					
ZB1BX	**A**	**53,460**	**272**	**32**	**103**
Netherlands					
PAØHBO	**A**	**269,640**	**602**	**59**	**151**
PAØWQ	"	145,340	398	51	121
PAØLV	"	10,488	133	18	58
PAØLOU	"	9472	71	23	41
PAØDJ	"	4212	51	18	36
PAØHSJ	"	3315	79	10	29
PAØUC	**21**	**6560**	**60**	**16**	**25**
PAØGMU	"	3800	51	13	25
PAØEEM	**14**	**18,642**	**131**	**23**	**55**
PAØJWA	"	8673	75	20	39
PAØPRK	"	2310	47	9	24
PAØGKO	**7**	**1560**	**60**	**4**	**22**
Northern Ireland					
GI6TK	**A**	**12,320**	**90**	**24**	**46**
GI3CDF	**3.8**	**16,092**	**265**	**13**	**41**
Norway					
LA5HE	**A**	**140,616**	**295**	**55**	**134**
LA8NH	"	6850	136	14	36
LA1NG	"	208	18	4	10
LA6U	21	1536	45	4	8
LA3UF	**14**	**22,849**	**172**	**22**	**51**
LA4KF	14	18,648	166	19	44
LJ2S	"	3811	83	12	25
Poland					
SP5XM	**A**	**90,013**	**338**	**48**	**119**
SP5YC	**21**	**5720**	**57**	**12**	**18**
SP5ZA	"	2686	40	13	21
SP9ADU	"	63	7	2	5
SP5AR	**14**	**37,540**	**227**	**22**	**60**
SP6AAT	"	3774	91	7	27
SP9AHA	"	630	44	4	10
SP8AJK	7	63	7	4	5
Portugal					
CT1KF	**A**	**74,655**	**323**	**37**	**98**
CT1LN	"	5712	99	14	42
CT1PK	**21**	**26,634**	**165**	**17**	**52**
CT1UO	"	3840	83	7	17
Roumania					
YO7KAJ	**A**	**7809**	**98**	**15**	**42**
YO2BB	**21**	**13,248**	**130**	**16**	**32**
YO3ZA	**14**	**17,199**	**212**	**19**	**47**
YO6KAF	"	3172	116	5	21
YO2CJ	"	748	44	3	14
YO9CN	**7**	**4532**	**80**	**10**	**34**
YO7VS	"	1081	33	7	16
YO5LU	"	441	21	5	16
YO5TR	"	289	17	5	12
YO3JU	"	120	14	4	8
Scotland					
GM3BCL	**A**	**59,983**	**265**	**41**	**92**
GM3JDR	**14**	**40,050**	**270**	**26**	**64**
Sicily					
IT1ZDA	**21**	**23,541**	**197**	**15**	**44**
IT1TAI	**14**	**97,875**	**360**	**34**	**91**
Spain					
EA7ID	**A**	**80,855**	**248**	**54**	**103**
EA4GR	"	70,794	323	35	79
EA3OF	"	23,229	206	21	68
EA3KT	"	22,601	159	23	74
EA4GZ	**14**	**104,854**	**449**	**29**	**74**
EA4EP	"	22,011	212	20	49
Sweden					
SM3BIZ	**A**	**207,702**	**518**	**50**	**148**
SL6BH	"	131,408	391	55	117
SM5BAU	"	20,088	100	29	43
SM5BPJ	"	9855	72	29	47
SM6BDS	"	660	26	7	15
SM5CEU	**21**	**3996**	**56**	**12**	**24**
SM5AM	**14**	**74,529**	**341**	**29**	**62**
SM5ANH	"	72,009	300	33	94
SM5KV	"	28,747	190	25	64
SM3AF	"	8370	136	10	21
SM5CMG	"	608	32	4	12
SM6ARH	"	396	21	5	13
SM5CAK	**7**	**1296**	**57**	**5**	**19**
SM3AZI	"	360	19	4	14
SM5GZ	**3.8**	**8415**	**174**	**7**	**38**
Switzerland					
HB9ZY	**A**	**258,420**	**491**	**65**	**154**
HB9MO	"	104,160	287	51	117
HB9J	"	37,062	190	26	45
HB9QO	"	20,116	106	33	61
HB9UD	"	20,055	127	32	73
HB9UL	"	3498	40	10	23
HB9DX	21	448	12	5	9
HB9KU	**14**	**4365**	**37**	**19**	**26**
Wales					
GW3FSC	**14**	**2050**	**75**	**5**	**20**
GW3NWV	"	1998	41	9	18
GW3ITZ	"	1364	63	4	18
Yugoslavia					
YU3OV	**A**	**37,418**	**214**	**30**	**76**
YU1AG	"	4272	79	14	34
YU1SF	14	165	15	2	9
YU4JOP	**7**	**2414**	**66**	**6**	**28**
Union of Soviet Socialistic Rep.					
European					
UA1TT	A	754	27	6	20
UA3APW	28	180	8	5	5
UA4PA	**21**	**16,287**	**167**	**16**	**45**
UW3BV	"	9588	170	10	24
UA6FD	"	2550	64	6	24
UA1MU	**14**	**82,740**	**371**	**30**	**75**
UA4PW	"	28,210	187	24	67
UA3KQB	"	21,384	171	25	56
UA3YA	"	3075	75	12	29
UA1ZF	"	1025	29	10	14
UA1NA	"	600	24	7	13
UA1KMF	"	375	21	4	11
Estonia					
UR2BU	**A**	**19,598**	**126**	**28**	**54**
Latvia					
UQ2FS	21	464	23	4	12
UQ2CS	**14**	**2622**	**114**	**4**	**19**
Moldavia					
UO5WS	**14**	**2520**	**101**	**7**	**23**
UO5RO	"	950	36	5	14
Ukraine					
UB5UN	**A**	**209,304**	**518**	**59**	**145**
UB5CI	"	3910	63	15	31
UB5FG	28	378	12	7	11
UB5KCA	**7**	**5289**	**123**	**8**	**33**

Oceania

Australia					
VK2APK	**21**	**3402**	**68**	**8**	**10**
VK2AHT	**14**	**77,168**	**264**	**28**	**76**
VK2JZ	"	20,526	122	22	44
VK2KM	"	17,292	93	23	43
VK2AUS	"	2320	38	11	18
VK2RA	"	99	5	4	5
VK3ATN	**A**	**204,800**	**468**	**62**	**98**
VK3TL	**14**	**85,202**	**286**	**33**	**80**
VK3HL	"	15,228	95	19	35
VK4TY	**A**	**34,310**	**155**	**31**	**63**
VK5GG	**14**	**18,720**	**134**	**20**	**32**
VK6RU	**A**	**87,444**	**251**	**41**	**85**
Caroline Is. (East)					
KC6BK	**14**	**49,000**	**212**	**29**	**69**
Cook Islands					
ZK1AR	**A**	**39,338**	**182**	**38**	**51**
Fiji Islands					
VR2DS	**14**	**90,016**	**387**	**30**	**67**
Guam Island					
KG6AJB	**14**	**35,073**	**166**	**24**	**57**
Hawaii					
W5FAS/KH6	**A**	**152,985**	**423**	**54**	**87**
KH6FAH	"	146,574	509	40	62
W7UXP/KH6	**21**	**23,218**	**168**	**18**	**29**
KH6EKO	**14**	**120,530**	**511**	**28**	**57**
Marcus Island					
W4VGL/KG6	**14**	**95,448**	**368**	**30**	**67**
Marshall Islands					
KX6BD	**14**	**29,116**	**207**	**20**	**38**
Midway Island					
KM6CX	**14**	**18,096**	**139**	**18**	**34**
New Caledonia					
FK8AC	**14**	**9240**	**97**	**16**	**24**
New Zealand					
ZL1AGO	**A**	**26,230**	**138**	**35**	**50**
ZL1AAS	**14**	**159,507**	**507**	**32**	**79**
ZL4LB	14	19,272	119	20	46
ZL4BO	**7**	**1512**	**38**	**10**	**8**
Philippines					
DU7SV	**A**	**9120**	**160**	**7**	**13**

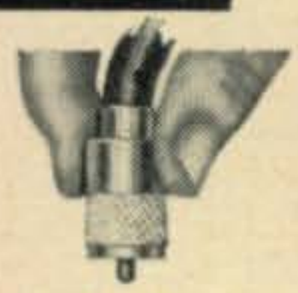
South America

Argentina					
LU7DGM	**A**	**21,835**	**149**	**21**	**34**
LU1DAB	**28**	**95,353**	**415**	**22**	**57**
LU4DMG	14	969	19	8	11
Brazil					
PY7GV	**A**	**38,315**	**143**	**30**	**67**
PY1NBF	"	30,783	168	34	59
PY2CAN	"	1100	20	12	13
PY2CPQ	"	736	16	9	14
PY5EG	**21**	**20,398**	**124**	**23**	**39**
PY1ATR	"	19,266	127	19	38
PY7EC	"	8697	77	11	28
PY5IO	"	2888	33	15	23
PY4ABH	21	156	6	6	6
PY2CBP	**14**	**21,948**	**140**	**23**	**36**
PY2BGO	"	720	15	9	9
British Guiana					
VP3HAG	**A**	**90,750**	**422**	**28**	**47**
Colombia					
HK4EB	**A**	**220,981**	**573**	**50**	**87**
HK3AFB	**14**	**12,544**	**87**	**18**	**38**
HK3RQ	"	12,098	105	17	29
Ecuador					
HC5EJ	**A**	**169,728**	**585**	**35**	**61**
HC5NW	"	5250	53	19	23
Juan Fernandez					
CEØZI	**A**	**11,448**	**90**	**25**	**29**
Netherlands, W. I.					
PJ2AA	**14**	**163,817**	**538**	**26**	**81**
Paraguay					
ZP5OG	A	2520	39	12	12
ZP5CG	**21**	**7530**	**91**	**12**	**18**
Peru					
OA1W	**A**	**12,395**	**81**	**27**	**40**
OA4BI	**14**	**34,965**	**206**	**24**	**39**
OA4PD	"	21,840	139	19	41
Surinam					
PZ1AX	**21**	**41,410**	**340**	**17**	**24**
PZ1BK	"	17,543	115	17	36
PZ1BJ	**14**	**39,831**	**200**	**19**	**52**
Uruguay					
CX3BH	**A**	**446,558**	**829**	**66**	**125**
CX1OP	"	1058	25	10	13
Venezuela					
YV5BIG	**A**	**240,352**	**572**	**51**	**87**

[*Continued on page 86*]

by hams...
for hams...
Harvey is reliability

Harvey
VALUES OF THE MONTH



CARBORUNDUM'S NEW LOW-COST, NON-INDUCTIVE "HAM LOAD" GLOBAR

• Reduces QRM • Increases Efficiency • Dissipates 250 watts output

regular price $23.75 ham net

NOW, WHILE THEY LAST
HARVEY SPECIAL ***$12.75***

A new 50-ohm resistive dummy load that's ideal for all types of amateur service — fixed, portable or mobile. By switching the "Ham Load" into your antenna circuit, you eliminate on-the-air tuning and needless QRM. The unit also provides a dependable, non-inductive termination for testing equipment, measuring power and antenna matching.

The Carborundum "Ham Load" is supplied as a single unit with standard coax connector for easy mounting on rack or cabinet, or for designing into home-brew equipment. Although small in size, the high-temperature ceramic resistance element dissipates up to 250 watts **output** for 5 minutes! Unlike bulbs or wire-wound resistors, SWR remains essentially flat at less than 1.5:1 up to 54 Mc (with the load mounted at least 5" from metal reflecting surfaces).

SPECIFICATIONS

Resistance: 50 ohms, non-inductive. **SWR:** Less than 1.5 at 54 Mc. **Dissipation:** 250 watts (up to 5 minutes); 150 watts continuous. **Connector:** Standard coax (SO-239 type). **Size:** Approximately 13½" long by 1" diameter. **Mounting:** Any convenient location. **Caution:** Due to heating when loaded at high power, the unit should be mounted in freely circulating air.

ROTRON WHISPER FAN

The fan that moves 60 cu. ft. of air per minute . . . while running so silently you have to look to see if it's running! Removes heat to save your rig, yet uses only 7 watts. Measures 4½" square by 1½" deep. Has run for years in computers and other commercial equipment without attention — lifetime lubricated.

Operates on 110-120V. A.C.

Amateur Net **$14.85**

EXTRA-SENSITIVE HEADPHONES BY SUPEREX

600 ohm impedance; extra-high sensitivity for weak signals and hard-to-read stations . . . reproduction is crisp, free of distortion . . . unequalled wearing comfort over long use.

Amateur Headphone Model AP-S.

Amateur Net **$24.95**

Don't forget to include postage and shipping charges! We refund excess.

WE SPEAK YOUR LANGUAGE — and have for 37 years. It means orders from every corner of the world are handled personally and your instructions, in any language, are followed. It means we speak the universal language of all radio amateurs. And that gives you such ham-to-ham extras as consultation on your problems, meeting specific requirements, and — at your request, with no charge — opening sealed cartons for complete equipment check-out.

Send check or money order including shipping charges. We return any excess.

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RADIO CO., INC.

OUR 37th YEAR

103 West 43 St., New York 36, N. Y. (212) JUdson 2-1500

Uni-card

For further information, check number 43, on page 110

YV5BPG ..	"	19,647	119	33	26
YV5AHG ..	"	672	12	9	12
YV1DP	**14**	**106,152**	**664**	**13**	**40**
YV7GB	"	81,440	349	26	54
YV5BPJ	"	57,460	245	28	57
YV5AMW ..	"	19,564	103	22	51
YV1LA	"	13,156	98	13	33
YV3BS	"	12,144	102	15	31
YV5AKU ..	"	532	10	9	10
YV5BUK ..	"	288	13	6	6
YV5AKP ..	"	266	7	7	7
YV5AMP ..	"	150	5	5	5

MULTI-OPERATOR
Single Transmitter
North America

United States

WB2CCO	**66,402**	**201**	**39**	**87**	(K1BVI & WA2UJI)
W3TMZ	**194,580**	**343**	**60**	**147**	(W3TMZ, W9SZR/3, HC1KA)
W3ADO	64,400	182	43	97	(K61LB, K9MBQ, KØDQI, KHP)
K3VTO	11,388	115	17	35	(K3VTO, WFX)
K4FEF	**10,106**	**83**	**26**	**36**	(K3IMZ/4, K4JXO, W4NSV, PDU)
K6ASL	**155,408**	**336**	**57**	**119**	(K6ASL, MQG; WA6DUG, EPQ, IPY, JLL; WB6BSJ, ENX)

Alaska

KL7EKB	**126,113**	**580**	**28**	**61**	(KL7EKB, EOJ, EMV)
KL7BCW	117,414	496	31	68	(KL7BCW, BJW, BZO, AQU)

Anguilla

VP2KI	**132,066**	**716**	**33**	**54**	VP9L, AX, BN, W2YTH)

Canada

VE3BOG	**29,754**	**142**	**35**	**52**	(VE3BOG, BWM)

Costa Rica

TIØRC	**595,358**	**1238**	**78**	**140**	(TI2SS, HGA, PI)

Guadeloupe

FG7XL	**80,892**	**306**	**40**	**67**	(Jean & Monique)

Africa

Republic of Congo

9Q5UC	**364,826**	**844**	**42**	**112**	(9Q5AB, CC, EP, HU, LQ, OB, TH)

Asia

Union of Soviet Socialistic Rep.
Club Stations
Asiatic

UA9KCE	**433,780**	**687**	**53**	**177**	
UA9KTE	6230	64	9	26	

Azerbaijan

UD6KAR	**34,125**	**169**	**24**	**51**	
UD6KGF	1414	37	4	10	

Kirghiz

UM8KAB	**28,917**	**185**	**20**	**43**	

Europe

Austria

OE1PHW	**9333**	**114**	**19**	**42**	(OE1PHW, WO)

Bulgaria

LZ1UF	**16,906**	**171**	**22**	**57**	(LZ1UF, SP5AHO/LZ)
LZ2KKZ	7502	101	15	47	(Club Station)
LZ2KRS	1586	57	5	21	(Club Station)

Czechoslovakia

OK1KPR	**50,193**	**251**	**31**	**112**	(Club Station)
OK3KGI	4224	107	8	25	(Club Station)

England

G3SCU	**101,964**	**354**	**32**	**84**	(G3SCU, HTA, IYG, RUV, RUX)

Germany

DL1KB	**623,948**	**856**	**83**	**201**	(DL1KB, DL1JW)
DLØDX	35,298	333	28	78	(DJ5OW, DJ6MQ, DJ6RZ, DJ7VY, DJ8SW)
DL4OV	**206,910**	**690**	**36**	**78**	(DL4DT, XR; DJØFP, KK)

Netherlands

PI1PT	**14,508**	**139**	**20**	**58**	(School Station)

Northern Ireland

GI8PA/A	**273,966**	**730**	**46**	**108**	(GI3AXI, GAL, HXV, JXS, KYP, GI5UR, GI8AP)

Norway

LA8D	**27,450**	**168**	**27**	**48**	(LA2LI, LA3FG, LA6VH LA7OI,)
LA1H	8437	122	15	44	(Club Station)

Portugal

CT1EY	**234,080**	**598**	**51**	**139**	(CT1EY, CT1YE)
CT1LR	3154	83	10	28	(CT1LR, CT1KH)

San Marino

9A1AIJ	**446,145**	**883**	**71**	**174**	(I1AIJ, BER, LCK, ZSQ)

Sweden

SM5AZU	**47,343**	**229**	**36**	**93**	(SM5AZU, ATN, BGM)

Union of Soviet Socialistic Rep.
Club Stations
European

UA3KND	**23,220**	**187**	**28**	**60**
UA3KYA	19,680	138	21	59
UA4KWB	13,530	150	17	49
UA6KTB	4452	82	12	30
UA1K1A	3150	71	7	28
UA3KFB	2278	57	8	26
UA1KFA	1069	22	10	18
UA3KOB	594	27	4	14

Estonia

UR2KAT	**8112**	**134**	**12**	**40**
UR2KAE	3570	93	8	27

Kaliningrad

UA2KAW	**2040**	**80**	**9**	**21**
UA2KAK	1674	49	6	21

Latvia

UQ2KAA	**59,774**	**308**	**39**	**82**
UQ2KCC	17,136	178	23	49

Ukraine

UB5KSP	**14,972**	**197**	**21**	**55**
UB5ARTEK ..	9720	109	18	42
UB5KYA	1904	50	11	23

White Russia

UC2KSA	1372	47	6	22

Oceania

Guam

KG6AAY	**179,070**	**527**	**49**	**92**	(K6SDR, WA6EHL)

Hawaii

KH6EPW	**423,468**	**887**	**69**	**93**	(KH6EPW, KH6EVT)

Western Caroline Is.

KC6BO	**181,251**	**467**	**51**	**96**	

Wake Island

KW6DS	**64,220**	**329**	**29**	**47**	(KH6COY, KH6EUR)

South America

Argentina

LU8FAO	**56,602**	**225**	**29**	**62**	(LU2FAO, LU8FAO)

Chile

CE1FX	**102,300**	**397**	**35**	**58**	(CE1FX, CE1DD)

Ecuador

HC2JT	**499,722**	**805**	**75**	**147**	(HC2JT, HC2LF)

Netherlands Antilles

PJ2CR	**51,958**	**222**	**34**	**49**	(PJ2CR, PJ2CO, PJ2CY)

MULTI-OPERATOR
Multi-Transmitter
North America

K2GL	**956,868**	**930**	**99**	**264**	(K2GL, W2SKE, W21WC, W2GLM, K2TXC, K1ZVU/W6KFV)
W6VSS	**743,040**	**864**	**102**	**218**	(W6VSS, W6NJU, W6UED, K6EVR, K6YRA, W8BKP, W5KFT)
W3MSK	**407,043**	**539**	**83**	**190**	(W3MSK, W3ZKH)
WØNFA	**389,902**	**563**	**86**	**188**	(WØNFA, KØLFY, KØUTX, KØRAL, KØDUB)
W8NGO	**157,874**	**295**	**58**	**135**	(W8NGO, W8CLB, W8ONA, K8LSG)

Africa

ET3USA	**389,844**	**671**	**56**	**148**	(Club Station)

Europe

DJ3VM	**605,710**	**946**	**72**	**166**	(DJ3VM, DL1BI, DJ1BP, DL1CR, DL1CX, DL3AO, DJ3JZ, DJ7PF, DL9CI)
DLØWW	590,750	868	74	204	(DJ3OU, DJ3YV, DJ4OT, DJ4XN, DL6NK, DJ6WI, DL9GU)
OH5SM	**412,848**	**961**	**74**	**208**	(OH5SM, OH5NQ, OH5NW)
I1DFD	**289,674**	**672**	**57**	**141**	(W3GSA, W4FSB, W9LIG, K9OYT)
OH2AA	**179,270**	**569**	**46**	**136**	(OH2ER, OH2LP, OH2MK, OH2SB)
4U1ITU	**59,170**	**345**	**29**	**68**	(G2MI, HB9UD, HB9YK, K8CFU, VE3DA, WØMPW, YV5BJP)
UB5KED	**11,088**	**140**	**16**	**50**	(Club Station)

South America

CX2CO	**1,026,086**	**1237**	**90**	**203**	(CX2CO, CX7CO)
HC2FB	**173,824**	**767**	**39**	**58**	(HC2FB, HC2BJ, HC2CW, HC2FC, HC2HP, HC2MO, HC2RT)

Our thanks to the following stations who took time out to send us a report of their limited operation for checking purposes: DJ7BM, GI4RY, KP4BCP, LA6VH, LU9DAH, LX1DE/m, OH3-TA, OX3JV, OZ2IF, OZ5FT, OZ7KV, PAØDF, PAØTV, PY3AHJ, SM3CJD, SM5BZ, SM5CAK, SM5MC, SM7-ACB, VE3AO, VE3BGV/SU, VE8JJ, VK7A1, VP7NB, K1YRO, W2DEW, W2GRA, W2GT, W2PEO, K3UDX, WA6FBN, WB6FBN, YV1DP, YV5-BTC, 4X4MJ, 9Q5JW, 9Q5UC, SYL-A-3699, VP9BY.

Shure 444 Microphone

A RECENT addition to the Shure Bros. line is the Model 444 Communications Microphone. It is a high-impedance controlled-magnetic unit designed to provide a special response at speech frequencies for producing maximum speech intelligibility together with a good audio punch under adverse conditions such as may be due to noise, interference or low r.f. signal level.[1] This response characteristic cuts off sharply at the low-frequency end of the voice range with 100 and 200 c.p.s. —25 and —10 db, respectively, below 300 cycles. From 300 to 1000 cycles the response is relatively flat. Above 1000 cycles the characteristic rises to a peak at 3000 c.p.s. which is +13 db above the 1000 c.p.s. point. It then drops off sharply to —10 db at 6000 c.p.s. Output level at 1000 c.p.s. is —55 db into a 100,000 ohm load. The polar pattern is semi-directional.

The Model 444 thus is ideally suited for s.s.b. transmissions as well as for a.m. and f.m. work. Other feaures include:

1. A finger-tip control bar, located at the front of the base, for actuating the microphone and an external relay or control circuit. The control bar can be used in a non-locking manner for push-to-talk operation, or it may be locked in for other types of control.

2. A separate switch, located in the base, for instantaneous selection of push-to-talk or vox operation.

3. Microphone height adjustable from 9¼" to 11¾".

4. Sturdy high-impact "Armo-Dur" base and microphone case.

The Shure Model 444 Communications Microphone is priced at $25.50, complete with adjustable-height stand and 7 foot two-conductor cable. It is manufactured by Shure Bros., 222 Hartrey Ave., Evanston, Ill.—*W2AEF*

[1] Scherer, W. M., "Factors in Choosing A Microphone," *CQ*, January 1963, page 42.

Under conditions of overload, the excessive or damaging current is by-passed around the meter thus preventing damage to the movement. I recommend it.

6BU8 Product Detector—"I understand that the 6BU8 makes a good balanced product detector. If so can you give me a diagram of one which will work with any good communications receiver?"

Yes. See fig. 2. This very fine product detector can be used with nearly any communications receiver. The original detector is of course removed, unless you want to arrange switching for this circuit, which would not be difficult.

The 6BU8 is similar to the 7360 and 6AR8. Handling the largest signals is a task that the product detector shown can do very well.

The circuit was tried on a GPR-90 (TMC) receiver and it worked beautifully. It is recommended that the voltage coming to the 6BU8 be regulated. If the b.f.o. is stable, this circuit works better than any I have tried.

RCA Dipper—We have so many requests to supply a circuit for a good transistorized grid dipper that we finally decided to construct the one described in the current *RCA Transistor Manual* (SC-10). After building it we found that it worked very well indeed. Hand capacity effects were minimum and the unit was very easy to calibrate.

The unit was housed in a small 2" × 3" × 4" aluminum utility box. We mounted the small parts on a small circuit board along with the transistor. Wiring is not critical, although we did find that short leads are a must at the highest frequency (97 mc). We added a small ceramic

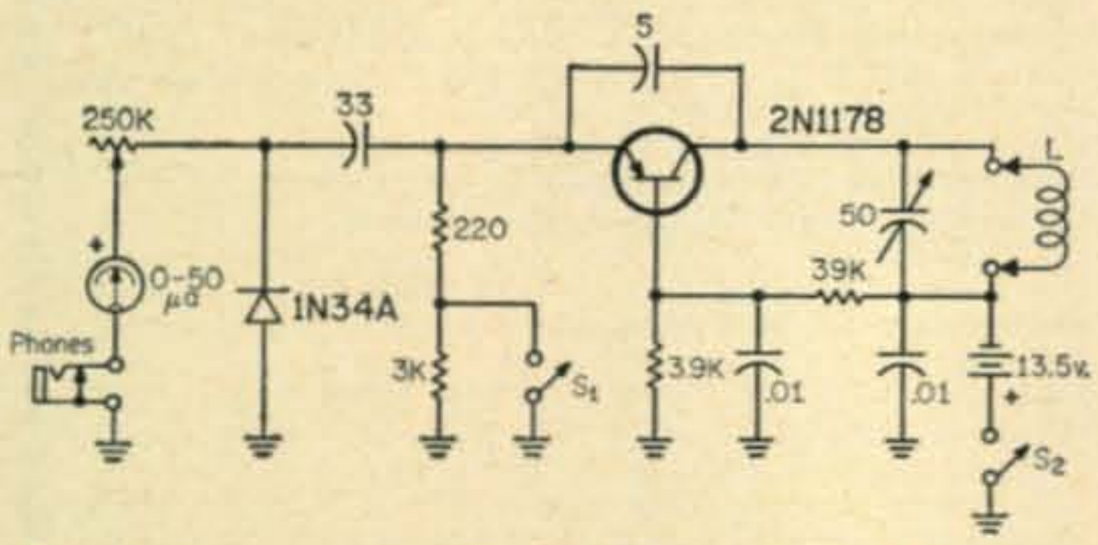

Fig. 3—Circuit of the "Dipper" shown in the *RCA Transistor Manual*. Switch S_1 is closed for operation below 45 mc. Frequency range of the unit is 3.4 to 97 mc. Coil data is shown below.

Coil Table—RCA Dipper

Coil	*Range (mc)*	*No. Turns*	*Wire Size*
A	3.4-6.9	48¼	28
B	6.7-13.5	22	24
C	13-27	9⅛	24
D	25-47	4⅛	24
E	46-78	1½	24
F	74-97	Hairpin loop 1⅞" l. × ¼" w. #16 tinned.	

NOTE: All coils wound on ¾" dia. × 1-9/16" long. Polystyrene coil forms (Amphenol 24-5H). Coil "F" is mounted within the coil form.

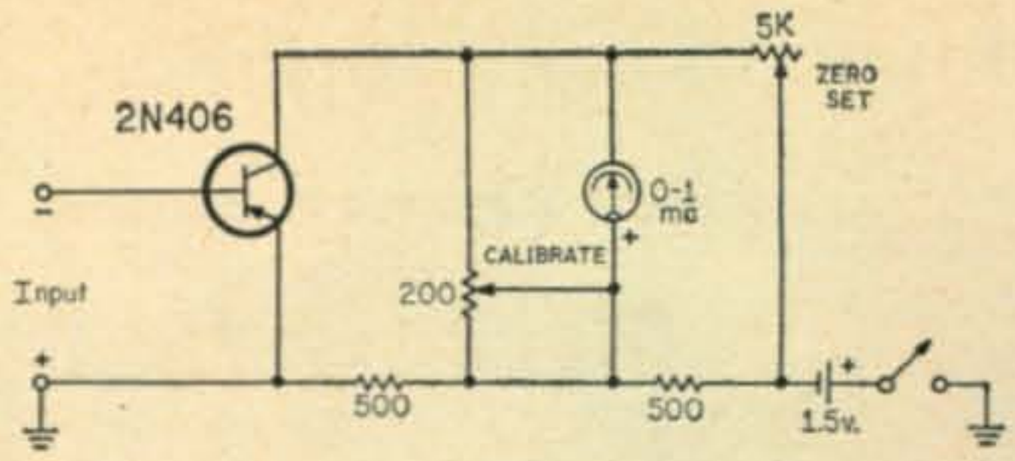

Fig. 4—Amplifier to increase the sensitivity of a 0-1 ma meter to 0-50 μa may be used in the RCA "Dipper" shown in fig. 3 or for any other application where high sensitivity is required.

switch (S_1) for operation of the dipper below 45 mc instead of using the jumper suggested by RCA. The circuit of the dipper is shown in fig. 3. One wise thing to do when constructing the unit is to make all ground connections to a central point, otherwise you may run into hand capacity effects. If you do not have a 50 microamp meter you can increase the sensitivity of a 1 ma meter by using the scheme in fig. 4. Dope the coils after winding with a good grade of plastic cement, otherwise you may run into calibration problems as we did at first.

Compactrons—"To conserve space, sockets, *etc.*, I am interested in using a few of General Electric's Compactrons in a rig I am building. Where can I obtain general information relative to Compactrons? What I need immediately is a Compactron which contains three triodes similar to the 12AU7. Any help?"

Yes. The Compactron you are looking for is the 6AV11. If you want complete condensed specifications on GE's Compactrons ask for these by writing K4URX, Electronic Components Division, Tube Department, General Electric Co., 316 East 9th St., Owensboro, Ky. The sheets are free and should be in your tube information file. We'll have more info for you later on using some of the Compactrons in a few ham circuits.

AR-88 Information—This is a request for assistance. I have received a number of calls from foreign hams for information on the AR-88, especially manuals. If any of HAM CLINIC's readers have a manual to pass on send it to me please. Mine was loaned out and never came back. (Incidentally, those who are looking for modification info on the AR-88 receiver can find it in the February 1957 *CQ*)

Collins 32V on 6 Meters—"Any information on putting the Collins 32V transmitter on 6 meters?"

Yes. See the April 1958 issue of *CQ*.

Adding S.S.B. to Viking—"In what issue of *CQ* did information appear on adding s.s.b. to the Viking transmitter?"

The October 1954 issue.

Tips for Techs—You can use the Polaroid print coating plastic for coating coil windings. You should apply at least four coats, waiting for each coat to dry thoroughly before applying another.

Another tip: bothered with a.f. feedthrough from your transistorized power supply? Use a heavy diode in series with the positive input lead and bypass it to ground with a 500 mf 50 volt electrolytic. Always use the diode in series

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W9DIA

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For further information, check number 28, on page 110

with the ungrounded lead and make sure the diode can handle the current. Sometimes two diodes must be used in *both* input leads and

Still another: if you own an inexpensive transistor recorder, better dynamic stability is obtained from the battery supply by paralleling the battery with a good husky electrolytic of a 1000 mf or so.

Thirty

HAM CLINIC always welcomes tips from its readers. If you have information of general interest to brother hams shoot it in to us and we will be glad to give you full published credit. Please tell us that you have *not* sent the idea to another magazine or that it has never been published before.

For this month then, thanks for reading HAM CLINIC. 73 75 and 72 to hams everywhere, Chuck.

RTTY [*from page 74*]

is to switch to 3620 after contact is established. K8DDC asks us to pass on to K4IBX (March '64) the information that "BP-114/210" appears on the side of his military TG-7B version of the Model 15. K8PVC of Ludington, Michigan, is building the W2JAV transistor TU.

WAØGUN of Denver, Colorado, has acquired a TG-7B. KØUBY of St. Louis, Mo., now has a Model 14 typing reperf and a Model 14 T.D. WØJRQ, being sued to remove antenna (*CQ*, April, 1964, page 41) is a very active RTTYer, in case you didn't know.

KC4USV is on 14,090 kc and is really interested in moving traffic via RTTY. GM3GUJ is trying for 20 with the help of W6SEW. LA6VC reports only 3 or 4 active RTTY stations on from Norway. SM6CSC, allowed only 14,100 to 14,-110 kc, uses a Model 15, an NC-303 with an 80 kc discriminator TU, and a pair of 4-250A's in the final.

Comments

Since space for columns is at a premium these days, we have cut the "On the Bauds" activities section down to a minimum this month in order to get the narrow shift printed circuit board component layout to appear as large as possible. Tune in next month and find out who is on RTTY in *your* area.

73, Byron, W2JTP

Announcements [*from page 20*]

Florida

The Broward A.R.C., Inc., meets the second Wednesday of each month at the National Bank Building, 4th floor auditorium at 8 P.M. Ed Wheeler, K4LJS, editor of the *Broward Ham News* would like to exchange monthly bulletins with other clubs. His address is 619 S.W. 20th Terrace, Ft. Lauderdale, Florida.

Rocky Mountain ARRL Convention

The Rocky Mountain Division ARRL Convention will be held in Estes Park, Colorado on July 11 & 12 under

the sponsorship of the Colorado Convention Committee. The program will include a balanced presentation of technical and special interest features as well as MARS and ARPSC meetings, QSL contest, c.w. contest, transmitter hunts, and a Saturday night dance. Featured speakers will include Herbert Hoover, Jr., W6ZH, and Prose Walker, W5KZA. A special program is planned for wives and children to make it "fun for the entire family." The convention will be held in the Stanley Hotel. Information about reservations and rates available from the Estes Park Chamber of Commerce. Early registration is $3.00 until July 1st; $4.00 at the door. Meal prices and further information available from Chester Lewis, KØKZJ, 1861 South Shoshone St., Denver, Colorado.

Maryland

The Confederate States A.R.C., Inc. will sponsor their "Rebel Hamfest" on Sunday, June 21, 1964. Marshall Hall Amusement Park, Bryans Rd. (Routes 210 & 227) is the place. There will also be a pre-hamfest dinner/dance and selection of the "Rebel Queen" on June 19th at the American Legion Hall, Temple Hills, Maryland. K3LMM can fill you in on the details.

Punched Tape

Russ Stedinger, K6ZBL saw the *CQ* review of the Atko Mini-Keyer (April) and is stretching his neck out by telling us he's willing to punch plain-text tapes for anybody as long as they supply clear, double-spaced typewritten copy. He also says the offer is good only as long as his perforator is operative and time available. We hope our readers will be good enough to include postage. Russ' QTH is 2816 Delaware St., Oakland 2, California.

License Plates

Dave Heller, K3HNP famous (?) license plate collector is still looking for automobile license plates with amateur calls. Regular and foreign plates will do too; he's not choosey! His QTH is 14 Darkleaf Lane, Levittown, Penn.

New Mexico

The Totah Amateur Radio Club will hold its Summer picnic, June 20, 21, 1964 at Vallecito, Colorado, Saturday night dinner and Sunday pancake breakfast, $2.50 a person over 15 years old. For reservations, write Box 24 Farmington, New Mexico.

Georgia

The Atlanta Radio Club, Inc. will hold their 36th Annual Hamfest on June 6-7 at the Lenox Square Shopping Center auditorium. Many prizes will be given away and dinner dance will take place Saturday night June 6th. For tickets and additional information write K4MDC, 3039 Francine Drive, Decatur, Georgia 30033.

A Request

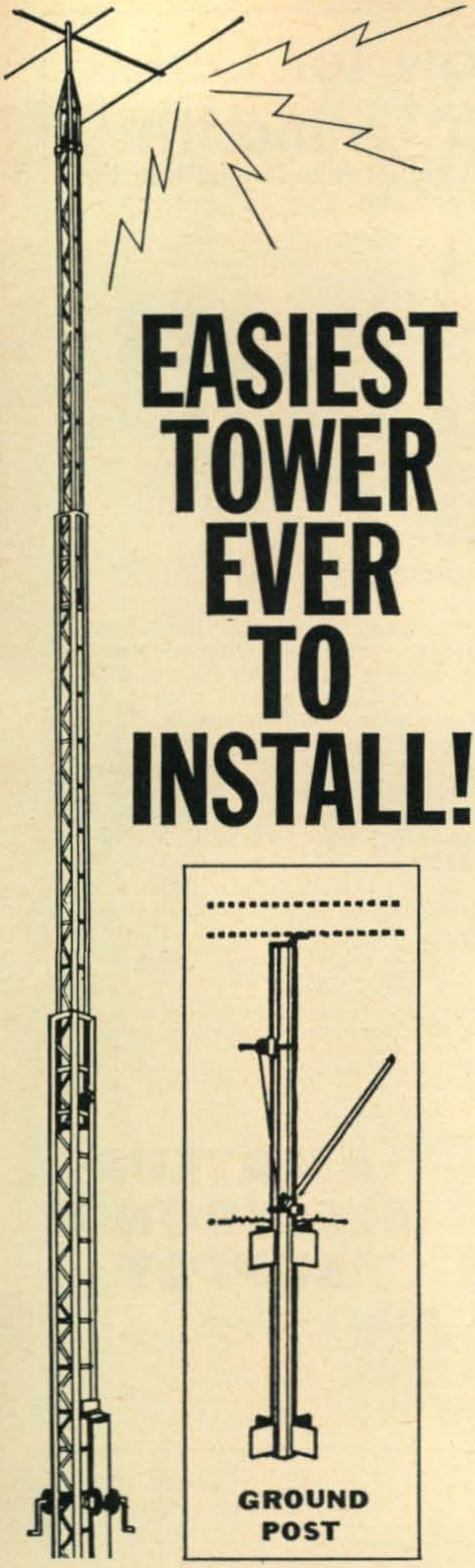
Dave Geiser, WA2ANU, author of the "Radio Classics" series appearing in *CQ* is anxious to find any and all leads to licensed radio amateurs, living or dead, who now hold or previously held a valid patent or invention. If you know of *anyone* (it can be a friend, boss, brother, father, yourself, etc.) fitting that description please give Dave all the information you can gather. His address is Snowden Hill Road, New Hartford, New York 13413.

Letters [*from page 16*]

remaining before us of accurately monitoring the illegal portions of this lid's transmissions (including cross-town kilowatting) noting time, frequency in kilocycles, and nature of the violation, and submitting them to the FCC, Buffalo, N.Y. where a large file of this guy's transmissions has been growing for a decade. In the end this sub-subband shall have a new birth of freedom, and operations of the ham, by the ham, and for the ham shall not perish from the earthy, low, low end of seventy-five where so-called Class-A transmissions are better dead than read.

Francis K. Williams, WA2UFI
Box 3360, 362 Memorial Drive
Cambridge, Massachusetts 02139

[*Continued on page 94*]



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Have You Seen This Man?

CQ has been requested by the FBI to lend a hand in the apprehension of one of its ten most wanted fugitives. The man in question is Alfred Oponowicz, a safecracker who is known to have used radio equipment in his operation. It is suspected that he may approach dealers in amateur or CB equipment with the intent of purchasing two-way radio gear. If you see this man, notify your nearest FBI office. *Do nothing else! This man is dangerous!*

The following is the text of the official FBI release:

UNITED STATES DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION

ALFRED OPONOWICZ, also known as: Albert Consolo, Al Jordon, James Mallory, Albert Opanowicz, Alfred Opanowicz, Alfred Openowicz and Albert Oponowicz

FUGITIVE

BANK BURGLARY; UNLAWFUL INTERSTATE FLIGHT TO AVOID PROSECUTION –BURGLARY

Alfred Oponowicz, who is known as a skilled safe cracker and allegedly fled from an Ohio courtroom while being tried for bank burglary, has been added to the FBI's list of "Ten Most Wanted Fugitives."

This veteran criminal was arrested while allegedly fleeing from the attempted burglary of the Broadway and East 57th Street Branch of the Cleveland Trust Company, Cleveland, Ohio, on the early morning of September 2, 1962. Numerous burglary tools, two-way radios, a police radio monitor and a fully loaded .38 caliber revolver were recovered near the crime scene. When arrested on a nearby roof top, Oponowicz was found to have six .38 caliber cartridges in his pocket. One accomplice is presently serving a prison sentence for this crime and another has pleaded guilty.

Oponowicz appeared for trial in Cuyahoga County Court, Cleveland, Ohio, on February 4, 1963, but remained only about one hour. He departed during a recess, leaving his wife in the courtroom holding his hat and coat.

A Federal warrant was subsequently issued at Cleveland, Ohio, on March 12, 1963, charging him with unlawful interstate flight to avoid prosecution for burglary. On April 4, 1963, another Federal warrant, charging bank burglary, was issued against Oponowicz at Cleveland, Ohio.

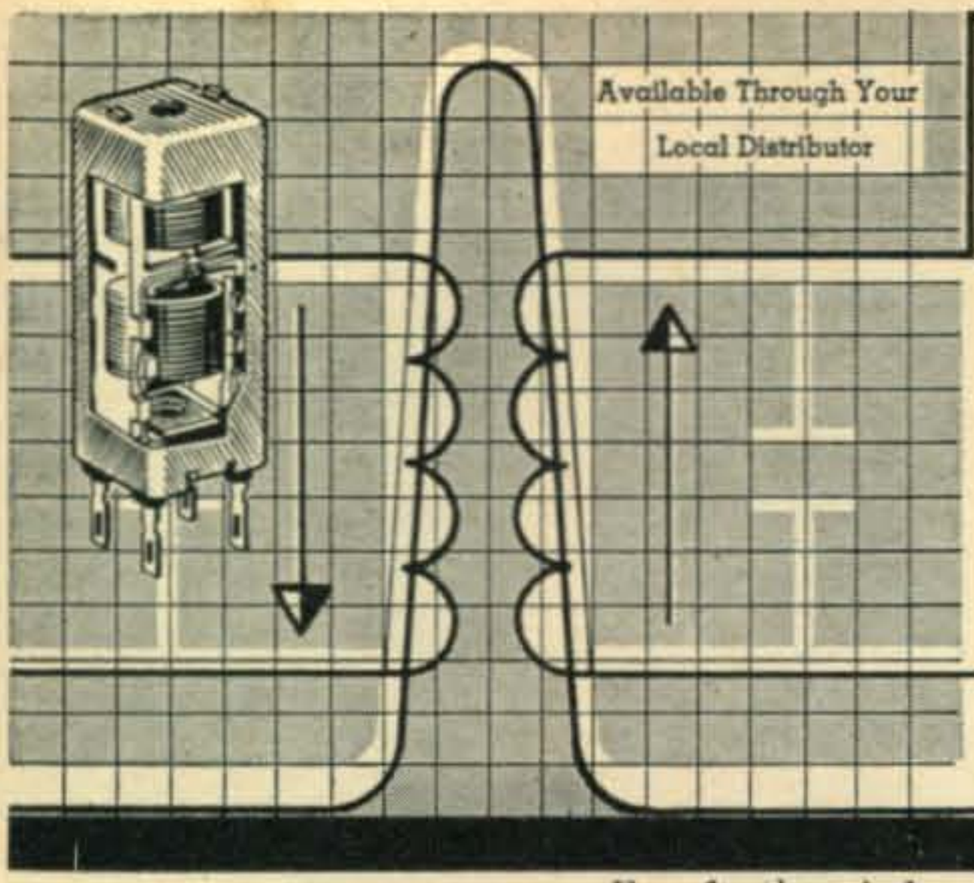
He is a white American who was born at Carnegie, Pennsylvania, on January 4, 1926. He is 5'9" to 5'10" tall, weighs between 170 & 185 pounds, has a medium build, a fair complexion, dark brown hair and hazel eyes. He bears a 4" scar on the inside of his left forearm, a scar on the left side of his chin, a ½" cut scar on the right side of his forehead, a 1" scar on the calf of his right leg, a 2" scar on his left lower jawbone, a small scar on his right cheek, a scar on the right and middle ring fingers, a scar on the back of his left hand, a scar on the point of his chin, a scar over his left eye and a scar above his right knee from a gunshot wound. The bulb of his right ring finger is large and scarred.

Oponowicz is considered extremely skilled in the use of tools, but has had little legitimate employment since the majority of his time since 1942 has been spent in confinement. He has occasionally worked as a steel worker, salesman, barber, baker, clerk-typist and laborer.

He reportedly attempted suicide in December, 1955, by slashing his wrists while confined at the Ohio State Penitentiary. He is not known to smoke or drink and has been described as moody and morose. He is said to be a neat, conservative dresser who never wears a hat and likes late model cars in good condition.

This fugitive is believed to be heavily armed with various weapons, including a machine gun, has a history of escapes from custody and has reportedly stated he will shoot it out with law enforcement officers rather than being taken alive. He should be considered extremely dangerous.

If you have any information concerning the whereabouts of Alfred Oponowicz, you are requested to immediately notify the nearest office of the FBI, the telephone number of which may be found on the first page of local telephone directories.



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12-C31	455 kc.	Output I.F.	13.6 kc.	32.6 kc.
13-W1	1500 kc.	Input/Interstage I.F.	130.0 kc.	264.3 kc.
13-W2	1500 kc.	Output I.F.	121.4 kc.	240.5 kc.
913-C1	455 kc.	Input/Interstage I.F.	8.5 kc.	24.3 kc.
913-C4	455 kc.	Output I.F.	10.9 kc.	28.6 kc.
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913-W4	1500 kc.	Output I.F.	25.6 kc.	73.4 kc.

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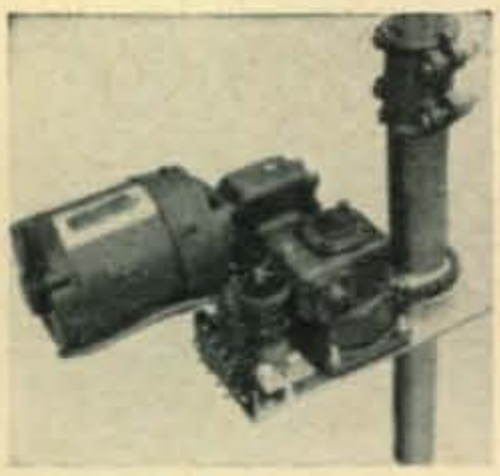
For further information, check number 51, on page 110



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Tuning Aid [*from page 57*]

nier case and the four screws replaced. The height of the shaft is determined by the height of one's receiver control and can be adjusted by base height and/or the placement of the vernier on the upright support.

To date, the tuning aid has performed well and makes "zero-beating" s.s.b. and tuning c.w. a simple task. For example it requires about 50 turns to tune the Novice band on 80 meters whereas it previously required about two turns.

The tuning aid can be employed after the approximate part of the band one wishes to monitor is determined. Simply slide the unit towards the receiver so that the rubber tip is placed lightly against the receiver's tuning control. Tuning and drift control are no longer tedious chores when the assistant is slid into position and put to work. ■

Propagation [*from page 64*]

Time Zone: PST (24-hour Time)
WESTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	*NIL*	06-14 (1) 14-16 (2) 16-20 (1)	19-00 (1)	*NIL*
Northern Europe & European USSR	*NIL*	06-09 (1) 14-16 (1) 19-22 (1)	*NIL*	*NIL*
Southern Europe & North, West & Central Africa	*NIL*	05-13 (1) 13-16 (2) 16-20 (1)	19-22 (1)	*NIL*
Eastern Mediterranean & East Africa	*NIL*	06-08 (1) 11-14 (1) 18-20 (1)	*NIL*	*NIL*
South Africa	*NIL*	05-07 (1) 10-13 (1) 21-23 (1)	19-20 (1) 20-21 (2) 21-22 (1)	19-21 (1)
Central Asia	*NIL*	07-15 (1) 19-22 (1)	*NIL*	*NIL*
Southeast Asia	20-22 (1)	07-08 (1) 08-09 (2) 09-14 (1) 22-00 (1)	02-06 (1)	*NIL*
Far East	12-14 (1) 20-22 (1)	06-08 (1) 08-10 (2) 10-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-02 (1)	01-02 (1) 02-05 (3) 05-06 (2) 06-07 (1)	03-05 (1) 03-05 (1)*
Pacific Islands & New Zealand	12-17 (1) 17-20 (2) 20-22 (1)	02-07 (1) 07-09 (2) 09-16 (1) 16-18 (2) 18-22 (4) 22-00 (3) 00-02 (2)	22-00 (1) 00-04 (3) 04-06 (2) 06-07 (1)	23-01 (1) 01-04 (2) 04-06 (1) 01-04 (1)*
Australasia	14-17 (1) 17-20 (2) 20-22 (1)	18-20 (1) 20-21 (2) 21-23 (3) 23-01 (2) 01-07 (1) 07-09 (2) 09-14 (1)	23-00 (1) 00-04 (2) 04-07 (1)	00-01 (1) 01-03 (2) 03-06 (1) 01-03 (1)*

North & Central South America	15-17 (1)† 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	13-15 (1) 15-17 (2) 17-20 (4) 20-22 (3) 22-23 (2) 23-04 (1) 04-06 (2) 06-13 (1)	18-20 (1) 20-00 (3) 00-02 (2) 02-04 (1)	19-20 (1) 20-23 (2) 23-03 (1) 20-23 (1)*
Southern Brazil, Argentina, Chile & Uruguay	12-14 (1)† 08-11 (1) 11-12 (2) 12-14 (3) 14-16 (2) 16-18 (1)	05-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-22 (1)	20-22 (1) 22-01 (2) 01-04 (1)	22-08 (1) 00-02 (1)*
McMurdo Sound, Antarctica	12-16 (1)	11-16 (1) 16-17 (2) 17-19 (1)	19-21 (1) 02-07 (1)	*NIL*

Contest Calendar [*from page 65*]

horse of the party. Walt, K6GMA the chairman for this year's party reported this one as the best yet, with entries from members all over the world.

Editors Note

Due to limited space because of the Phone results in this issue and limited time because of the tremendous job preparing the C.W. results for next month, I haven't a thing to say, for which all concerned should be thankful.

All organizations that have activities coming up this Fall should get this information to me at once. Three months before the date of the activity is not to soon to get this information out if you want to get the best coverage.

73 for now, Frank, W1WY

USA-CA [*from page 72*]

umn, Ohio has 44 Amateur Awards programs which in a constructive manner enhances that state's public relations before the world. The Clermont County Amateur Radio Club has just announced three additional awards to focus publicity attention toward Ohio's southwestern counties and cities. The three awards are: "Work Clermont County" award for working seven stations in Clermont County; "Southwestern Ohio Counties" award for working one station in Clermont, Warren, Clinton, Hamilton and Brown Counties in Ohio; "CCARC" award for making contacts with five members of the Clermont County Amateur Radio Club. The three awards will be issued for all one mode or band or mixed operations. Send GCR (certified) list and $1 or 10 IRC to Custodian, CCARC, Comanche Noble, WA8BOZ, 3602 Lewis Road, Amelia, Ohio 45102.

Historical Event Documented

Back in 1960 construction started on the 17.5 mile long Bridge-Tunnel between Virginia Beach, Va., and Wise Point, Va., at a cost exceeding $200,000,000. It was completed and opened on April 15, 1964 at which time the Virginia Beach Amateur Radio Club documented the historical event with an award which shows schematic sketch of Chesapeake Bay Bridge-Tunnel. It is rated as one of the engineering marvels of the world.

Here, again, as we repeatedly present, amateur radio awards programs can be used as public relations vehicles to promote recognition of significant accomplishments of our society, which in itself is a public service which enhances amateur radio's stature before the public and governing political body.

Washington State Joins USA-CA Program

Washington State now has a "Worked All Washington State" Award for working that state's counties after January 1, 1964. The new award, sponsored by the Washington CHC Chapter #15 and endorsed by Governor Albert D. Rosellini, Washington, commemorates the 75th Anniversary of Washington's Statehood. (See picture of Governor Rosellini in act of kicking off the Program)

The award, WWC, Worked Washington Counties, has following requirements: Continental U.S. stations including Alaska, and Canada work twenty counties for basic award and with endorsement seals for thirty and thirty-nine counties. All others work twelve Washington counties for basic award and with seals for twenty and thirty-nine. No charge. Available to s.w.l.s. Send GCR (certified) list to Washington CHC Chapter #15 Custodian, W7NNF, Fred J. McKinnon, 18150 60th., Place NE, Seattle, Washington 98155.

Governor Rosellini is a strong friend of Amateur Radio. He personally pushed through legislation for Washington amateur call letter automobile license plates. In endorsing CHC Chapter #15's WWC program, the Governor extended his best wishes that all amateurs of the world enjoy their associations in meeting the amateurs of the state of Washington and with hopes many will some day enjoy the hospitalities afforded by the state and its citizens.

The award certificate format has a large gold "75" showing the dates 1889-1964. CHC Chapter #15 members, assisted by members of the Richland Radio Club, largest and most active RC in the state, has plans this summer to operate from many 'rare' Washington counties.

What's Cooking Department

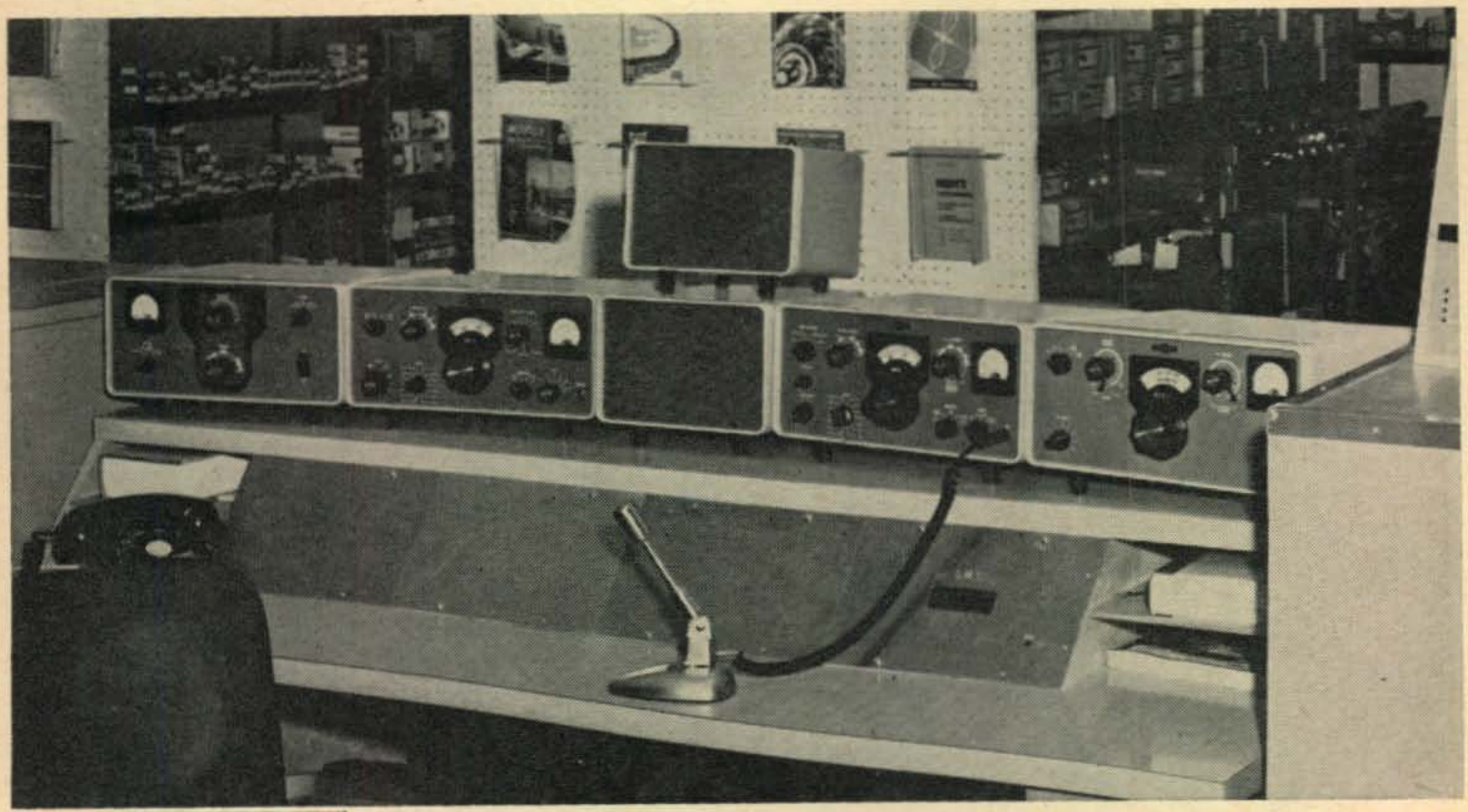
Liberalization of Hawaii Counties Award Program using classes is coming up next issue. An Illinois club sponsoring an award for working mother/daughter teams, so take that hint. Award coming up for working San Diego County, California stations including CHCers. Already told you of award pending for working groups of counties named after Presidents. Put on list to start looking for Orange County, California stations. These and more next issue. While you are having fun county hunting take time out to also engage in some significant aspect of public service which by the way includes improving your own operating proficiency. Happy hunting.

Old Man, K6BX

Novice [*from page 78*]

on the bands. Sometimes using the KWM-1, KWM-2 and the SR-160. I hear a lot of activity, but when I try to call one of the Novices on frequency, they very seldom come back.

FLORIDA HAMS
Make A.E.S. Your
COLLINS Headquarters



FLORIDA HAMS! Stop in or write me today for a TOP TRADE-IN QUOTE on any new COLLINS equipment. Pay just $5.00 down and take up to 3 years to pay. The OPERATING COLLINS display shown above is waiting to give you a FREE Demonstration. Hams not living in Florida should write our Main store at:

3832 West Lisbon Avenue, Milwaukee, Wisconsin, 53208

73's Phil K4ZKK (Mgr. Fla. Store)

19 AZALEA PARK SHOPPING CENTER

ORLANDO, FLORIDA

STORE HOURS

Mon., Wed., Thurs.: Noon to 9 p.m.
Tues. and Fri.: Noon to 5:30 p.m.
Saturdays: 10 a.m. to 4 p.m.

AMATEUR ELECTRONIC SUPPLY

For further information, check number 66, on page 110

"I seldom use high-power because of the QRM it might cause there, but with 100 watts, I've worked 30 states and about 35 countries on 15, so don't give up 15 yet as a lost cause. It's like 20 and 40, it has its days.

"Also, I can't set skeds but I would like to make a few contacts from Iceland (TF2WIL) on 15 meters. All they have to do is look in the low end (21.100 to 21.120) and I just might be there. I have worked two WN6s from Newfoundland. 73, Dennis."

Thanks for the letter, Dennis, I still need a phone card from Iceland. I believe that many Novices would benefit greatly if they would spend more time listening and calling specific stations than by calling CQ so much. Of course, if no one called CQ there would be no contacts. Still, it would be better to do more listening. Dennis may be reached at D. M. Talbert, WA4-MFS/VO1, TF2WIL, Box 12, Navy 103, c/o FPO, New York, New York.

Can You Spare Some Help

Miss Marianne Eppley, 2040 South York #3, Denver, Colorado, 80210 could use some help and she would like to meet a local YL operator who could help her when she gets tied up on theory problems. Any help would be appreciated. Her ambition is to become an efficient and proficient radio operator. Thank you.

That just about winds up the ball of yarn for this month. Did you send a picture of your Novice or Technician station or yourself? Did you write? Good luck to you in your Field Day operations and I hope you do well with your emergency power. Be looking for me on Field Day.

73, Walt

The M1M Story [*from page 51*]

The information which I included in the letter of application to the PTT was the dates of the proposed operation, station location and transmitter power output. Also, a photocopy of the home station license must be included. As mentioned before, this letter should be written in Italian, and should be mailed at *least* four months in advance of the proposed operation dates.

For a reservation of the ham radio chamber in the Hotel Bellavista, one must write to:

Albergo Bellavista
Via Borghesi
Republic of San Marino

There is one aspect to the Aldo family which is very amusing. Mrs. Aldo knows nothing about ham radio, but she has a pretty good sized QSL collection just from the hams who have operated from her hotel. And Paulo, also with no technical background, knows just exactly where to put antennas on and around the hotel! He has helped many visiting hams erect their antennas and knows quite a bit about the practical aspects of the work. I have the feeling that it wouldn't take much to get Paulo interested enough to get his own license.

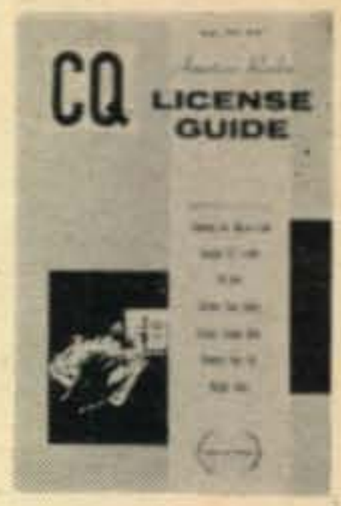
CQ TECHNICAL BOOKS

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!

COMMAND SETS

This is a collection of reprints, containing all available information on the conversion of the popular "Command" surplus gear into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra Class operators. 136 FABULOUS! AMAZING! TERRIFIC! pages.

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.

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.

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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CQ ANTHOLOGY I	$2.00	☐
CQ ANTHOLOGY II	3.00	☐
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SIDEBAND HANDBOOK	3.00	☐
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CQ LICENSE GUIDE	2.50	☐
"NEW RTTY HANDBOOK"	3.95	☐
COMMAND SETS	1.50	☐
MOBILE HANDBOOK	2.95	☐

SIRS: My check (money order) for $_____ is enclosed. Please send the following items to:

Name_____

Address_____

City_____ Zone_____ State_____

New York City Residents add 4% Sales Tax

Although the M1M trip was planned about four months in advance, very little advance notice was sent out. The reason for this is that I didn't want to announce it until I had the necessary permission from Rome. I had been disappointed with other applications too many times to stick my neck out. But thanks to the quick-reflex publicity of the DARC's DX-MB, the W4KVX DX Magazine, and W1RAN's splendid grapevine, the word was spread pretty well, complete with QSL address. This, incidentally, resulted in several QSL cards (including a couple from the States) beating me back home.

QSL's

All QSL cards received with SASE's or IRC's were answered by direct air mail. All others went via the bureau. There was about a two-month delay in getting the outgoing QSL's on their way for two reasons. One was that immediately after coming back home, I was very busy with getting my family packed off to return to the States. Then a delay in getting the QSL's printed after they were ordered made it early February before I even had the QSL's in my hands. They were made out and distributed as soon as possible, and I apologize for the delay. QSL's were sent 100% for all contacts, and if none has been received by this time, please write K3KMO to ask for a second one. I will appreciate QSL's from all stations worked, since I qualified for several awards, and would like to have the cards to apply for them.

Incidentally, the hams who sent dollar bills with their QSL's had them returned. I don't agree with the QSL-for-a-buck routine. Anyone wanting to make a trip such as this should either finance it himself or by private subscription (personal opinion).

Personal Data

For those who asked, "Who is the operator at M1M?", I wish to provide the following sketch. I first got my license as W4UWA, then ended up in Germany with the Army, operating as DL4WA. After getting out of the Army, and finding a job in Pennsylvania, the next call sign was K3KMO. The job assignment to Germany again resulted in the call sign DJØHZ (DL4/DL5 calls are now reserved for military personnel only). Then in the 1962 *CQ* WW DX Test (c.w. weekend), I joined DL1TA as second operator for LX3TA.

Although some people may say that I am a newcomer to the DX contests, I wish to point out that I won the all-band, single-operator DL4 certificate for the 1958 *CQ* WW DX Test (I was the only DL4 in the contest), and helped DL1TA win the multi-operator LX certificate in the 1962 c.w. contest (we were the only LX station entered). And a quick check of the results of the 1963 ARRL CW DX Test results will show you how well DJØHZ did in a single-band effort on 3.5 mc.

In closing, may I ask anyone going to San Marino for a DXpedition to please write me and set up a schedule. *I never have heard a station* from San Marino in twelve years' hamming. ■

Waters Channelator [*from page 47*]

KWM-2/2A front-end crystals limit operation to certain specific band segments. For these cases, newly desired ranges, such as 14,100-14.300 kc, 3700-3900 kc, 3900-4100 kc, *etc.*, can be had by the installation of special front-end crystals which are available from Waters.

The Channelator has a clean-cut appearance, befitting its installation alongside of the KWM-2/2A. It is a high-quality item, well built to withstand the rigors of mobile service.

The Waters Model 349 Channelator is priced at $79.95, less crystals. The crystals, No. EL-A4601, available only from Waters, are $6.00 each. Special front-end crystals No. EL-A4602-1 are $7.00 each. Accessory socket and cable assembly No. MA-337-56 for Model 337-M2 *Q*-Multiplier cost is $3.00 (not needed with Model 340-A or 340-PT *Q*-Multiplier/Notch Filter). An adapter will soon be available to permit use of the Channelator with the Collins S-line. The producer is Waters Manufacturing, Inc., Boston Post Road, Wayland, Mass.—*W2AEF*.

Monitor Scope [*from page 39*]

when the clamper was employed. This was easily corrected with a simple modification suggested by the Heath Company as follows: "One point not covered in the manual is the fact that 50 watts peak power in the feedline is required for proper clamp action. However, the clamping action can be further improved by placing a 7.5 mmf capacitor across R_{13} if no operation on v.h.f. is contemplated. If operation with v.h.f. gear is intended, then the value of the capacitor should be reduced to 2.2 mmf."

To do this, it was necessary to drill a ¼-inch hole in the chassis next to R_{13}. No deterioration was found at the higher frequencies when a 7.5 mmf capacitor was installed. Excellent overall performance was obtained on all bands through 50 mc in all the applications checked. As pointed out in the manual, some distortion of pattern can exist when the unit is used at 144 mc. It was found that this can be minimized by setting the attenuator for the smallest vertical amplitude consistent with a useable display. At 144 mc appreciable power is absorbed when the least attenuation is used, so it will be best to employ the highest attentuation wherever possible. No significant power loss was indicated on the other bands.

The Monitor Scope is attractively styled and is a compact unit measuring only 5¼" h. × 7⅜" w. × 11" d. (including knobs). Its performance, usefulness and conveniences are such that make it an indispensable piece of gear, just as our burglar must have realized.

The Heathkit Model HO-10 Monitor Scope kit is priced at $59.95. It is available from the Heath Company, Benton Harbor, Mich. A matching companion kit, the Heathkit Model HO-13 Ham Scan low-cost spectrum monitor, will soon be available.—*W2AEF*

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COLLINS Headquarters

"DOC", W9HJS and this **OPERATING COLLINS DISPLAY** are waiting for you at our **CHICAGO STORE.** Stop in for **FREE** Demonstration.

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AMATEUR ELECTRONIC SUPPLY

6450 MILWAUKEE AVE., CHICAGO, ILL.

"Chicago's New HAM HEADQUARTERS"

For further information, check number 68, on page 110

Ham Shop

Rates for the Ham Shop of 5¢ per word for advertising which in our opinion, is non-commercial in nature. A charge of 25¢ per word is made to all commercial advertisers or organizations. Since we do not bill for Ham Shop advertising, full remittance **must** accompany all orders.

Closing date is the 10th of the 2nd month preceding date of publication. Your copy should be typewritten, double spaced on one side of the page only.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchandise listed therein. We reserve the right to reject advertising which we feel is not of an amateur radio nature.

QSL's? WPE's? CB's? Finest samples 25¢. DeLuxe 35¢. (refunded). Sackers, W8DED, Holland, Michigan.

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.

Q-STAMPS Now $1.50! Postage stamp size photographs for QSL's! 50 large or 100 small, $1.50 per gummed-backed, perforated sheet. Free Samples. Q-Stamps, Box 149, Dept. 4A, Gary, Indiana. 46401.

QSL's Samples 25¢. Rubber Stamps; Name, Call, Address, $1.55. Harry Sims, 3227 Missouri Avenue, St. Louis, Mo. 63118.

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.

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

NEW QSL PRINTER with new designs. "2-color" $2.25 per 100. 10¢ for samples. Corneilson, 321 Warren, N. Babylon, N.Y.

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.

HAM EQUIPMENT Buy, sell, trade. Lupi, 1225 Hillside Place, North Bergen, N.J.

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.

RTTY gear for sale. Write for list. 88 or 44 Mh Toroids. Five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

ATTENTION HAMS! We buy, sell ham gear. Repair and alignment facilities available. Hold Advanced and First phone. Used gear always reconditioned. Money back guarantee. KitKraft Company, P.O. Box 406—Canal St. Station, New York N.Y. 10013.

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.

REMOTE CONTROL unit, 9 tubes, AN/ARW-26, brand new, complete, $5.00 postpaid (cost Navy $125.00) MDC, 923 W. Schiller, Phila., 40, Pa.

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.

FOR SALE New and used CB and 2-way F.M. radio equipment. Send for list. Dealer inquiry invited. Becom Co., Seminary Heights, Weatherford, Texas. 76086. 817 LY 4-5172.

FOR SALE: Heavy duty 80 foot tower, 20 foot sections, 30 inch sides, galvanized, $200. Larry Pensel, WØUST, Guttenberg, Iowa.

STOP! Don't buy, sell or swap until you see the latest interesting offers in "Equipment Exchange"! 12 big issues $1 sample copy free. Write: Brand, Sycamore, Ill.

TECHNICAL MANUALS for surplus electronics. Free list. W3IHD, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Commercial, military, all types, ARC, ARN, ARM, GRC, PRC, URR, URM, TS, 618S-T, 51R, 51X, APN, others . . . Ritco, P.O. Box 156, Annandale, Va.

FREE! Blue Book listings mailed on request. Our used equipment discounts lead the field. Two week trial, 90-day guarantee, nothing down, up to 24 months to pay. Full trade-in value toward new equipment during guarantee period. You cannot beat our deal. World Radio Lab., Box 919, Council Bluffs, Iowa.

HAMFESTER RADIO CLUB Hamfest August 9, 1964. Write for details Hamfester Radio Club, K9LOK, 5434 South Bishop Street, Chicago, Illinois 60609.

LET'S SWAP CLUB. Used items, Stamp. Cabon, 1510 Dunsmuir, Los Angeles 19, Calif.

SCIOTO VALLEY Amateur Radio Club Hamvention, Chillicothe, Ohio, July 26th, Ross County Fairgrounds. Admission $1.00. Prizes, Entertainment. Bring the family.

CERTIFICATE will be issued by Henry Ford Museum to any station that works Motor City Radio Club station W8MRM during the 24 hours prior to the Old Timers' Night banquet and program. Work W8MRM on May 30 (GMT) on 1.815, 3.660, 3.877, 7.040, 7.172, 14.060, 14.230, 29.610, 50.178, 146.94 or 147.3 mc. QSL for certificate.

SELL Drake TR-3 transceiver with AC3 supply. Only a few hours service. Must sell. Wonderful buy—$525. Cartons and booklet. Phone HE 3-0830. Webb K2GKH, 125 Ocean Ave., Jersey City, N.J.

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—Shawnee HW-10 6 m transceiver. Professional wiring. Used very little $175. You pay shipping charges. Sheldon Brown, K1MYA, 335 Winchester St., Keene, N.H.

416B's: $3.00 each while they last. R. McCloud, W1DVT, Old Harvard Rd., Harvard, Mass.

MOBILE: AF-67, Super 12, PE-103, 505C Mic. Complete with cables, relay and instructions. $150.99. K4QVK, Box 169, Kings Mountain, N.C.

MUST SELL: G-76 with ac & dc supplies. Turner 256 Mike, Saturn 6 Halo, Webster Band spanner, B&W 423 Filter, Ameco CN 144 conv., Dow-Key DKC-TRM-1 (1.8-30 mc). WB2MRK, NY, WA4AIG, Fla.

AUDIO AMPLIFIERS AM-447 A/G 6 watts, New, 12.95. New "% Of Normal" meters FS=25ua, $2.95. Include Postage. David Criss, 7567 Imlay City Rd., Imlay City, Michigan.

FOR SALE SX-115 Receiver $350.00. Cash. Call 609-494-2518. W2FWY.

SELL: GR-91 rcvr; HD-11 Q-Mult. Good cond. Best offer takes. Henry Golczynski, US #1 Motel, Alma, Georgia.

FOR SALE: New Collins 189-A2. Phone patch $45. R. Arrowsmith, 4605 No. 17th St., Arlington 7, Va.

For further information, check number 47, on page 110

For further information, check number 48, on page 110

WANTED: Navy surplus Link model 886 remote control. Ralph Villers, Box One, Steubenville, Ohio.

SPECTRUM ANALYZERS: Fit your receiver. Brochure. Halco, Box 283, Saxonville, Mass.

SACRIFICE: Almost new, mint condx 220 mc Communicator IV and same condx Gonset 6/2/220 vfo. Must raise cash. Best offer over $200 takes this station worth over $550. Box SN, CQ Magazine, 300 West 43rd St., New York, N.Y. 10036.

SACRIFICE beautiful KW p.p. 810 amplifier, modulated by p.p. 813's. Highest quality parts, easily worth three times asking price of $150. Also hundreds of high quality components to be sold. Write for your needs. R. McIntyre, W8WOM, 3137 Mayfield Rd., Cuyahoga Falls, Ohio.

SELL Heathkit IT-21, scope and other test equipment. Rustrack Model A Recorders, QST 5-64, Simpson 303-260. Phone Crestview 56802 or Box 1975, Beverly Hills, Cal.

FOR SALE Drake 2-A, 583 Q-XER. Drake xtal calibrator and speaker, perfect condition. $250. Stu Nattboy, K2MSO, 966 E. 55 Street, Brooklyn 34, N.Y. HI 4-8072.

6M BEAM Eleven element Telrex, AR-22 $50 WA2FSD, 516-482-7857.

COLLINS KWS-1 transmitter s/n 969 New final tubes 7580, updated at factory 2 years ago $750.00. Collins 75A-4 receiver s/n 3673, 3.1 filter, reduction knob $450.00. Drake 2-B receiver with 2-AQ and one low frequency band added 2900 to 3500 kc. Like new, used less than 200 hours, $220.00. HT-37 transmitter s/n 337000-130060 like new condition $275.00. W9FAA, phone 725-5407, Cassville, Wisconsin, 53806.

WANTED: cosmophone. Any model. Bell, 1088 Rubio, Altadena, Calif., 91001.

FOR SALE: HX-500 (new) $375.00; Harvey Wells Z-Match $45. Settling Estate, Write W1PAZ.

6N2 THUNDERBOLT factory wired, less than 30 hours use. Absolutely guaranteed in perfect electrical and mechanical condition. Will sell for $400 or swap for h.f. transceiver in perfect condition. Donn Drury, W4WTO, 5800 Seton Dr., Margate, Fla.

MOBILE TWINS: G-77 and G-66 excellent condition, power supplies, speaker, cables, aluminum mounting frame, remote control switch, mike receptacle, foot-switch, manuals. F.O.B. Cleveland, $300. W8GAS, 2231 Taylor Road, Cleveland, Ohio, 44112.

ASTATIC G-Stand, $5.00. WØOZS, RFD 5, Box 8, Iowa City, Iowa.

FOR SALE Johnson Valiant Xmtr. Guaranteed as good as new. $350. WØTTX 629 Mo. Lawrence, Kansas.

NATIONAL NC-183D with speaker. Excellent condition $140. K9ACG/4, 1316 Overlook Terrace, Titusville, Fla.

TA-33 SR, AR22—Excel. cond. both $75. Richard Samuels, 17 Country Village Ln. New Hyde Park, L.I., N.Y. Tel. HU 8-2128.

SALE OR TRADE Hallicrafter SX-42 am/fm, Best offer. Want old HRO. L. J. Kistler, 1505 E. Ford., Tampa, Fla., 33610.

SELL OUT! Drugstore console tube checker with 125 popular tubes, $99; Superior TD-55 tube checker $10; PACO E-400 Sweep Generator, $88; Sprague KT-1 capacitor checker, $20; Lafayette 30A vom $10; (Equipment is used but in excellent condition and guaranteed to work.) Much, much more—4-65A, etc. send for mimeo sheet. Charles Ball, Jr., 436 Hatcher, Rocky Mount, Va., 24151.

SALE Heathkit Shawnee and Pawnee (6 & 2 m) excellent condition with manuals and mobile parts. Sacrifice for $150 each or $275 for both. WA4AEB.

SWAP Have S Line barefoot. Mint. Want KWM-2. Paul Hess, W2NGQ, 800 Old Kensico Road., Thornwood, N.Y. RO 9-0511.

TELREX TRI-BAND Beam, Model TC99C. Five elements, 16 foot boom with balun. Used in six months, factory condition. Catalogue price $199.95 will sell for $100. W1MZB.

FOR SALE Marauder 6 months old professionally wired, like new, $300. Going to Collins. FOB Edward Kuligowski, 63 Conn. Ave., Massapequa, N.Y.

SELL Mohawk receiver. Used less than 20 hours. $175 FOB Sanford, Florida. E. Pedersen, W4YXL, 421 W. Lincoln Rd., Kokomo, Indiana.

SELL. One slightly used 4CX1000A, highest offer takes it. T. A. Krueger, 1325 LaSalle Ave. S, Apt 214, Mpls, Minnesota.

FOR SALE: Complete model 19 with table $72.50. Complete model 15 with table $52.50. Model 15 less table and keyboard $39.50. All 60 wpm 60 cps sync motors and weather type. Pair 833A's $5.50 each. H. Brown, 1718 Toklat, Anchorage, Alaska.

HEALTH MOBILE ham station for sale—Comanche receiver, Cheyenne transmitter, HP-10 Power Supply 12 volt, mike, etc. $150. Dick Johnston, 3 Oak Road, Southington, Conn.

KWS-1 without power supply, looks and operates excellent and 75A-4 with vernier knob, speaker and all modifications, like new, manuals. $950.00. DB-23, $25.00. Bruce W7JMS, 2844A Quay Loop, Holloman AFB, N.M.

COLLECTOR's ITEM: Sell, as package or individually, sixteen miscellaneous issues "R/9" and "Radio" magazines April 1935 to June 1940. Make reasonable offer. W3BS, 1012 Wilde Avenue, Drexel Hill, Pa.

FOR SALE or trade, hardtop for Stingray Corvette, as new $300; Motorola FMTRU-80D 2m complete $75; 2 FMTRU-5V $15 each. Pilot stereo amp—Model SM244 $50. Want Ranger II, APR-4, SX-73, SX-88, SX-42, Tri band beam, Hi power 6 m transmitter. FOB Route 3 Box 500J, Tallahassee, Fla.

GOING TO COLLEGE Sell Knight T-150 with Astatic JT-30 mike $100. DCS-500 rcvr (Details in 1963 and 1964 Handbooks) $120. Both in FB cond. Gary Andrews, WA9DCJ, 210 South Jackson, Oblong, Illinois.

SELL: DX-100 with SB-10 adapter $165, HE-45B 6m transceiver $65, HE-35 6m transceiver, $20. WA2PDT, 736 Fairmount Ave., Chatham, N.J., ME 5-2449.

DX-100B Good condition. Best offer over $120 takes it. Will ship. Write Ken, K8ZZV, 1709 22nd Ave., Menominee, Michigan, 49858.

ALL NEW 417A/5842 $3.50 ea., JAN 5692 $3 ea., .02/600 v—5¢ ea., .044/600 v—5¢ ea., .0005/600 v—5¢ ea., .01/6000 v—25¢ ea., .05/10 kv 25¢ ea., 140 mf/300 vdc tubular 75¢ ea., 10 for $7, 10, 80, 40, 40,/450, 350, 350, 300 vdc universal tubular filter $1 ea., 10 for $9.50. No COD Orders Under $5, additional 50¢ for Handling. Don's Electronic Bargains, 3882 East 131 Street, Cleveland 20, Ohio.

WANTED: Tower. Must be 40′ or greater. State condition and type. Will pick up within a 100 mile radius of QTH. Also a Heath Seneca, in any condition. Stan Nazimek, WB2GKF, 506 Mt. Prospect Ave., Clifton, N.J.

MUST SELL Complete years QST 1925 to 1929 incl. 1931 to 1963 incl. Want six dollars per year. Write for list of entire collection. W9LZ, 4423 North LaPorte, Chicago, Illinois, 60630.

FOR SALE: Collins KWS-1 mint $725; Clegg 62T10 vhf xmtr—150 watts 2, 6, 10 meters $225. WANT: Mint 75A-3, 75A-4. Local deals preferred—will deliver 100 miles. Larry Kohlman, 9 Hidden Green Lane, Larchmont, N.Y. 914-TE4-6018 after six.

FOR SALE: Vibroplex deluxe cw key—$10; IRC-QJ4 to QJ822, assorted controls Boxed, new, approx 800 pieces, lot $75; Ameco—CSB, box, kit new $6.00; G.E. rectifiers 150 assorted, 1N1013, 1N108, 1N1007, 1N105, 1N152, 1N581, 573 boxed, new, lot $50; automatic noise limiter. Noisestop $8.00; Sprague Ski-Mobile Suppressor kit, new $8.00; Sencore-RC-121 substituter $25; RCA-WF10A geiger counter $25; Heath CO-1 code oscillator $5; Multi-Elmac 20′ factory made cable harness for AF-68, PMR-8 & 1070 supply $10 Eico 6 & 12 volt battery eliminator & charger 6 to 20 amps $20; Johnson CB Tone Alert 12v dc & 110 v ac $30; Gonset fm radio mobile tuner $30; Hy-Gain new BDY mobile antenna base mounts $1.50; Polaroid #240 Print Copier, new $10.00; Gonset G-76 transistorized 12 volt dc power supply #3350 $45; Lafayette HE-74, 6 to 80 m vfo new $35; Multi Elmac PMR-8 receiver AF-68 transmitter M1070 ac/dc power supply (for all three pieces) $250; TV camera with built in 7 inch monitor with transmitter Will demonstrate $150; Central Electronics 100V 6 band transmitter 10, 11, 15, 20, 40, 80 meter ssb, am, pm, dsb, fsk, 5 to 100 watts variable r.f. control built in scope, vox, etc., used less than 20 hours—$495; Central Electronics same specs as above but rated at 200 watts model 200 V—$595. Sal Francione, W2IDC, 146-07 Jamaica Ave., Jamaica, New York, 212 JA 3-5973.

SEND FOR LIST of best buys in good reconditioned amateur equipment. Sample: Factory reject (repaired) Globe V-10 vfo, $89.95 ham net, yours for only $39.95. Many others. H & H Electronic Supply, 506-510 Kishwaukee St., Rockford, Illinois.

PE-101C DYNAMOTERS input 12v output 600v 200ma. 13 lbs. $12.95. Bedford Electric Supply, Box 16, Bedford, Mass., 01730.

ACCESSORY EQUIPMENT. Many specialties. Free Details. Halco., Box 283, Saxonville, Mass.

PRINTED CIRCUIT BOARDS Hams, Experimenters. Many different projects. Catalog 10¢. P/M Electronics, Box 6288 Seattle, Washington 98188.

COLLINS KWM-1, 615E1, 351D1, mike, cable, whip, $500. Howard Rowan, WA2JDG, Van Duyne Ave., Riverdale, N.J.

FOR SALE Johnson 6N2 converter model 250-43-32, output range 14-18 mc. Factory wired, new, never used. $50. Will ship. K5OEZ, Darce Sugart, Box 12, Kemp, Texas.

SIXTH Annual Penn-York Hamfest. Penna. Ave. Methodist Fellowship Hall, Elmira, N.Y. June 20. Reservations to "Tickets," Penn-York Hamfest, POB 81, Elmira, N.Y. $4.50 advance, $6.00 at door.

CRYSTAL CLEAR bargains in xtals. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

ELECTRONIC TUBES Top brands sold at substantial savings! (minimum order $15). Authorized GE distributor. Send for free buyers' guide for all your tube requirements. Top cash paid for your excess inventory (newly only-commercial quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016, 212-MU-6-2834.

DISCOUNTS! Reconditioned gear. Trial privileges. CE100V $399.35; Zeus $399.35; KWM-2 $716.15; KWM-1 $296.55; Pocketphone CB $29.98; HT-37 $333.50; DX-100 $117.15; Invader $372.10; NC-109 $99.45; NC-125 $84.35; Swan 40 $138.70; and hundreds more. Write for free Blue Book listings. World Radio Lab., Box 919, Council Bluffs, Iowa.

HAMFESTER Radio Club Picnic and Hamfest: August 9, 1964. For details write: Hamfester Radio Club, John Chass, 5434 South Bishop Street, Chicago, Illinois 60609.

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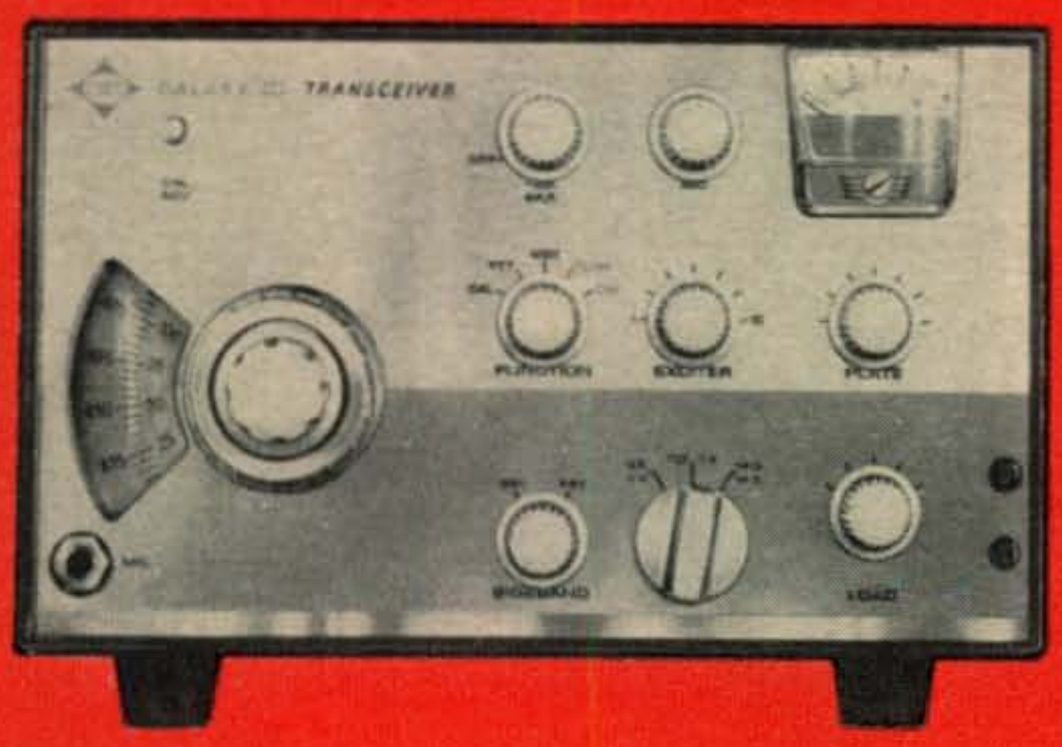

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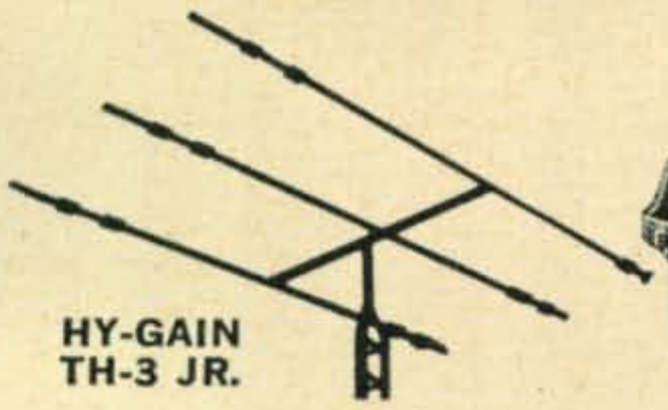

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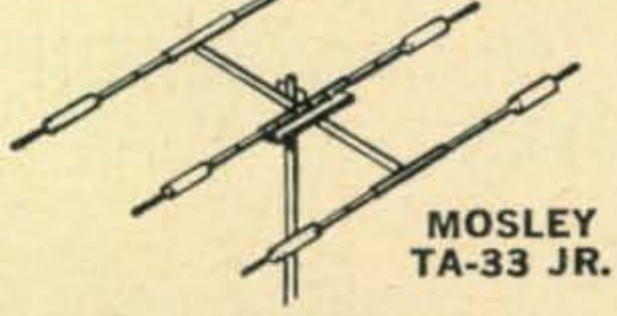
CDR TR-44 Rotator System



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3-element beam covers 10/15/20 meters with gain to 8 db and FB/ratio of 25 db. Handles 600 w. PEP input. Maximum 3-band performance in limited space. Durable, taper-swaged aluminum-tubing elements, Slim Line traps. Turning radius, 14′ 9″. Shpg. wt. 46 lbs.

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90 CZ 472-AF. TH-3 JR. Beam, *Only*..... **69.95**

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Trap-Master 3-element beam works 10/15/20 meters with up to 8 db gain and 25 db F/B ratio. Takes up to 600 watts, PEP input. SWR is usually less than 1.5:1 at resonance. 1¼″ O.D. boom is 12′ long. Wind load, 86 lbs. Turning radius, 14′ 9″. Shpg. wt. 49 lbs.

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90 SX 475-AF. 12 VDC Supply. Shpg. wt., 10 lbs. **129.95**
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86 SX 574-AF	40M capsule	1½	9.50
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Up to now you've had to pay at least $1585 for a commercial grade 2 KW amplifier. No longer. The brand-new National NCL-2000 maximum kilowatt is only $585, including its built-in power supply. Up to now most amplifiers in the price range of the NCL-2000 have been 500 watt jobs, usually using a whole string of low power tubes straining to deliver a peak kilowatt. Not now. The new NCL-2000 is a real brute of a desk-top amplifier for the 80 through 10 meter bands that was designed from power supply to output tubes to loaf along at a "D.C." kilowatt . . . 2000 watts PEP input and 1300 watts of peak output into your antenna on any band. Operate CW? AM? RTTY? The National NCL-2000 is rated for full kilowatt operation in these services.

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