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RADIO AMATEURS' JOURNAL





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For further information, check number 1 on page 126.

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AMATEUR



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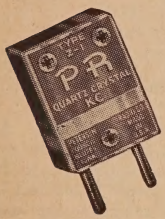
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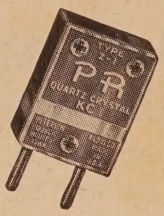
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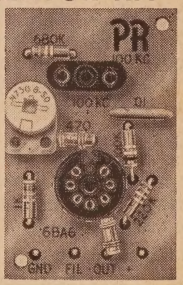
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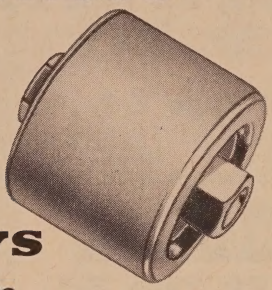
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For further information, check number 4 on page 126.

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For further information, check number 5 on page 126.

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

CQ Certificates:

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

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Technical Information:

CQ has no one available to answer technical questions. Please check the 11-year cumulative index which was published in the January 1956 CQ for information about articles in past issues of CQ. The December 1956 CQ yearly index will bring you up to 1957. Most back issues are available at 50c each from us, check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free.

Disclaimer:

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

CQ, The Radio Amateurs' Journal

October 1957
Vol. 13, No. 10

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HEATHKIT
DX-100
TRANSMITTER KIT

PHONE AND CW

- *Phone or CW—160 through 10 meters.*
- *100 watts RF on phone—120 watts CW —parallel 6146 final.*
- *Built-in VFO—pi network output circuit.*
- *Easy to build—TVI suppressed*



MODEL DX-100

$189.50

$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

Shipped motor freight unless otherwise specified. $50.00 deposit required on c.o.d. orders.

The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

For further information, check number 6 on page 126.

HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulater and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulater. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.



MODEL DX-35

$56.95

Shpg. Wt. 24 Lbs.

$5.70 dwn., $4.78 mo.

- *Phone or CW—80 through 10 meters.*
- *65 watts CW—50 watts peak on phone—6146 final amplifier.*
- *Pi network output to match various antenna impedances.*
- *Tremendous dollar value—easy to build.*

BRAND NEW

HEATHKIT DX-20
CW TRANSMITTER KIT



- *Designed exclusively for CW work.*
- *50 watts plate power input—80 through 10 meters.*
- *Pi network output circuit to match various antenna impedances.*
- *Attractive and functional styling—easy to build.*

MODEL DX-20

$35.95

$3.60 dwn., $3.02 mo.
Shpg. Wt. 18 Lbs.

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including "potted" transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

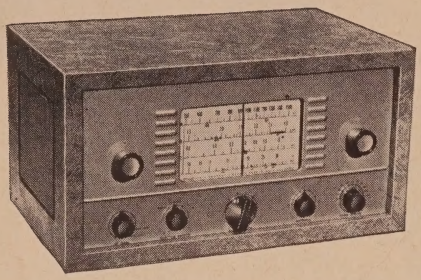
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HEATHKIT

COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT



This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception. Shpg. Wt. 12 Lbs.

MODEL AR-3

$29.95

incl. excise tax (less cabinet)

$3.00 dwn., $2.52 mo.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A. Shipping Wt. 5 Lbs. $.50 dwn., $.42 mo. $4.95

Ⓐ HEATHKIT VFO KIT MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. $1.95 dwn., $1.64 mo. **$19.50**

Ⓑ HEATHKIT GRID DIP METER KIT MODEL GD-1B

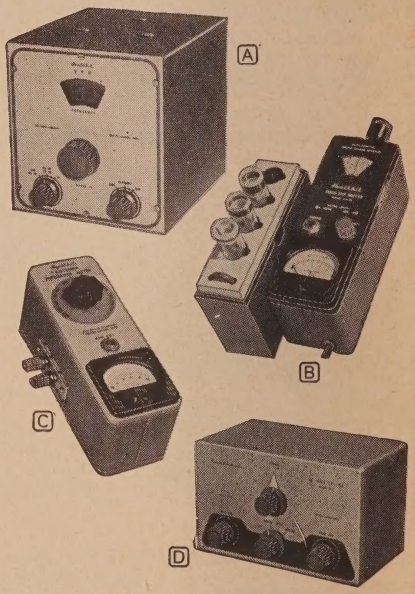
Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. $2.00 dwn., $1.68 mo. **$19.95**

Ⓒ HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. $1.45 dwn., $1.22 mo. **$14.50**

Ⓓ HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. $1.00 dwn., $.84 mo. **$9.95**



HOW TO ORDER...

It's simple—just identify the kit you desire by its model number and send your order to the address listed below. Or, if you would rather budget your purchase, send for details of the Heath Time Payment Plan for orders totaling $90.00 or more.

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

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For further information, check number 8 on page 126.

EDITORIAL . . .
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

Reciprocation

The Communications Act of 1934 prohibits the licensing of aliens to operate radio transmitters within the U.S. So, with the exception of a treaty (International treaties hold precedence over national law) with Canada, no foreign amateurs can be licensed over here, no matter who they are or how important the reason might be. Since we are one of the few countries that have taken such an attitude it is not popular and most foreign countries in turn refuse to license U.S. hams when they are in a foreign country. A few hams, devoted to the cause of international good will, have been trying to change our laws.

Recently I learned that the Aircraft Owners and Pilots Association (AOPA) has been faced with the same problem with regard to alien private pilots flying in the U.S. These pilots have been unable to use their radio equipment. Now that the use of radio in many areas is obligatory the result is that these foreign pilots, whose pilots licenses are recognized by the CAA for use in the U.S., are unable to fly because the FCC can't issue them a radio operating license.

Two AOPA members in the House of Representatives have introduced bills to correct this problem. Rep. Clair Engle of California introduced H.R. 6886 and Rep. Peter Mack, Jr., of Illinois bill H.R. 8543. Letters from these gentlemen indicate that they are not willing to expand their bills to cover alien amateur operators since this might possibly complicate things.

Amateur radio and private flying are hobbies of about the same magnitude. How come we don't have a couple of bills going for us? The AOPA bills will help us in that they are entering wedges and do introduce the first change in the non-alien clause of the 1934 Act. Since by the time you read this Congrses will have adjourned till next year there isn't much we can do. The same bills will come up next time however, and if you have any influence in such matters it would be a good idea to use it.

The size of the amateur bands after the next international frequency allocation conference will depend upon the attitude of foreign governments. The absolute refusal of the U.S. to extend amateur licensing privileges to visiting aliens has created vast ill will and is bitterly deplored the world over. We should do everything in our power to correct this situation.

The Twin Three

How many of you old timers remember the Twin Three beam? Pop, KA1CM, told me a lot of sea stories about it while I was still a peon (1/c) in the Navy and got me all enthused. He told me how he used to run rings around all of the other ops over in the Philippines using one of those beams. So, when I finally got a good location and the spur of W8LO's (W2ZW) article in the January 1947 CQ on the Twin Three or Twin Triplex, I rushed out into about five feet of snow and swung a couple of them into the air, positioned 90° apart.

They worked great. I got "loudest signal on the band" reports from everywhere. But there was something strange about them too. The boys in England would report that I was the only U.S. signal on the band . . . then a little later I would fade for them and work Germany for a similar report while the G's were busy working U. S. stations. I would work Italy while everyone else was working Germany, etc. Lower angle of radiation!

One morning I heard a very weak station calling CQ way up in the high end of the band. I couldn't get his call so I called "W7 question, portable question." I felt so silly doing this that I only called a couple of times. Sure enough, he came back. As he grew stronger I found that I was in contact with W7IMW/C7 in Tientsin, China. He said that I was the only station coming through. After a half hour he said that I was fading out and that quite a few other stations were now coming in from the U.S. I signed and worked PK1AW and VK6DD as the skip lengthened. An hour later W7IMW/C7 was calling again . . . everyone else had faded out again.

In talking with other Twin three owners I found that they had had similar experiences. They all seemed to agree that it was a terrific antenna for working DX. I won the DX contest that year for my section with it too. Then came the sun spot decline and before long the low angle of radiation of the Twin Three was no longer skipping out. I'm sure that few of those beams have survided the ten years since the bands were at their last peak since only antennas with a much higher angle of radiation could give any performance during the slack years. Now that we have good

Designed for



Application



The No. 90901
One Inch
Instrumentation Oscilloscope

Miniaturized, packaged panel mounting cathode ray oscilloscope designed for use in instrumentation in place of the conventional "pointer type" moving coil meters uses the 1" 1CP1 tube. Panel bezel matches in size and type the standard 2" square meters. Magnitude, phase displacement, wave shape, etc. are constantly visible on scope screen.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS

propagation conditions almost everyone has forgotten about the old Twin Three. Maybe I should reprint that January 1947 CQ article.

The beam is real easy to make, consisting of two folded (three wire) dipoles spaced 1/6th wave apart and fed out of phase. It is bi-directional, so if you make two you don't really have to rotate your beam, just put in a relay to switch between them. They have a very narrow (and low) angle of vertical radiation and a broad horizontal angle. I worked the Pacific and Europe on one and Asia and South America on the other. When I put one up on ten meters I worked 14 stations in 14 countries, one right after the other . . . the 15th was a U.S. station!

The beam was originally designed by John Kraus W8JK, I believe, and is similar to the "ZL-Special" that is presently growing in popularity. Anybody going to write an article, bringing us up to date on this beam?

Chassis Maker Wanted

Someone recently suggested that it would be nice if some company would make punched chassis available for our various construction articles. I agree. If anyone is interested in such a venture they might drop me a line and we'll see if we can work out the details.

There are possibilities for profound changes in ham radio just with this one little change. I'm sure that the availability of a ready punched chassis would go a long way towards getting me to heat up the soldering iron. I like to build things, but the inertia of having to go downtown and shop around for the right chassis, take it home, lay it out, drill and punch the holes, mount parts, and then discover that I've forgotten some of the important holes . . . etc., cuts my construction way down. Now if I could just send a check for one all ready to go, that would be something different.

One of the big features of the Heath and other kits has been the punched chassis. On several occasions I have purchased a Heathkit and assembled it even when I had all the parts on hand for the thing (except the chassis).

Well, who's interested?

Texas in July . . . Brrrrr

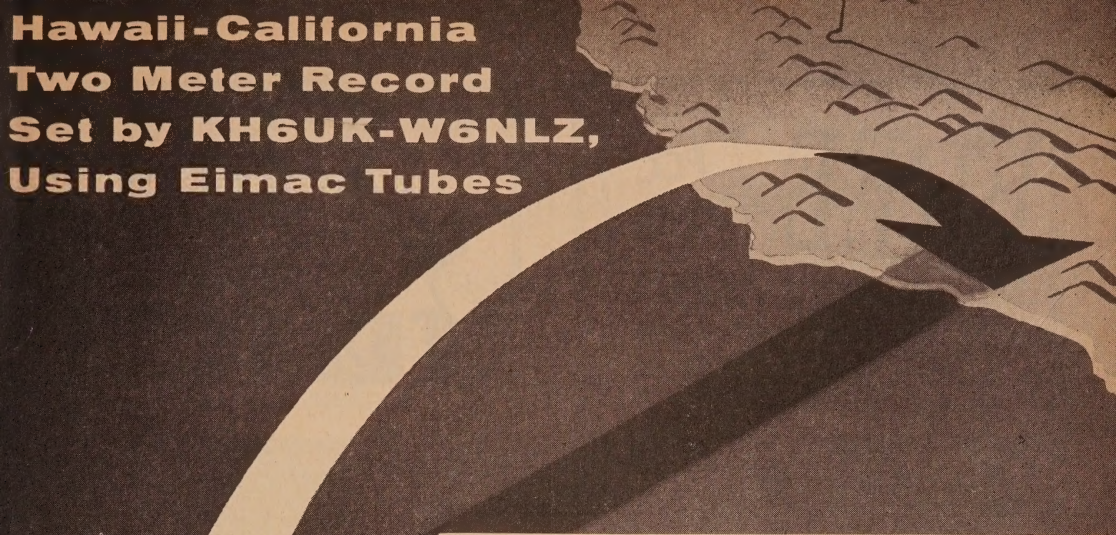
They don't have air conditioning down there, it is refrigeration. Bernie, W5YVJ, of Houston, who put me up (and up with me) for a couple days has an 8-ton unit for his ranch house and a mere 3-ton unit in his Caddy. When those things get going good they spit ice cubes out and frost up the windows!

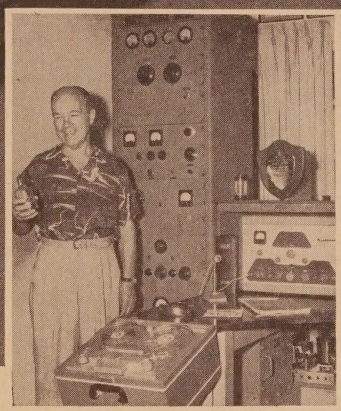
Speaking of frost, Bernie has been chatting with the South Pole gang at KC4USN quite a bit and had a couple of their stories to pass along. They got to talking about the temperatures down there one night (they have one

[*Continued on page 98*]

← For further information, check number 9 on page 126.

Hawaii-California Two Meter Record Set by KH6UK-W6NLZ, Using Eimac Tubes





Ralph Thomas KH6UK



John Chambers W6NLZ

On July 8, 1957, Ralph Thomas KH6UK and John Chambers W6NLZ spanned the Pacific from Southern California to Oahu, T.H. on two meters. At 9:33 PM PDST, the first signals came through. Two-way CW contact was established at 10:11 PM PDST, and the last signal faded out at approximately 10:50 PM PDST.* To W6NLZ and KH6UK goes the distinction of being the first amateurs to cover such a vast distance on two meters . . . a matter of some 2558 air miles. Of significance is the fact that both KH6UK and W6NLZ used Eimac tubes in their two meter final amplifiers . . . KH6UK running a pair of 4-125A's and W6NLZ employing a pair of 4X250B's, with inputs in both cases approximately one KW. The 120 amateur radio operators at Eimac salute KH6UK and W6NLZ on their achievement and are proud that Eimac tubes were again used in a communications first.

*On August 18, KH6UK and W6NLZ repeated their record-breaking contact.

EITEL-McCULLOUGH, INC.
SAN BRUNO · CALIFORNIA

Eimac First for quality, dependability and performance

For further information, check number 10 on page 126.

4-125A CW
Typical Operation

Plate volts	3000 Volts DC
Screen volts	350 Volts DC
Plate current	.167 Amps DC
Plate power input	500 Watts
Plate power output	375 Watts

4X250B CW
Typical Operation

Plate volts	2000 Volts DC
Screen volts	250 Volts DC
Plate current	.250 Amps DC
Plate power input	500 Watts
Plate power output	410 Watts

FREE

MONEY MAKING FCC Commercial LICENSE INFORMATION

An FCC License can be Your Guarantee of Success in Electronics.

WE GUARANTEE

to train you until you receive

YOUR FCC LICENSE

If you fail to pass your Commercial License exam after completing our course, we guarantee to continue your training, without additional cost of any kind, until you successfully obtain your Commercial license.

HERE'S PROOF:

Name and Address	License	Time
Walter Eggers, Pacific Grove	1st	12 weeks
Paul Reichert, West Salem, Ohio	2nd	10 weeks
Harold Phipps, LaPorte, Indiana	1st	28 weeks

WE CAN PROVIDE NAMES IN YOUR AREA ON REQUEST

EMPLOYERS MAKE OFFERS LIKE THIS:

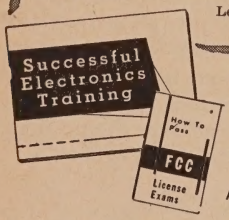
Letter from nationally-known Airlines: "Radio Operators and Radio Mechanics are needed for our company. Periodic wage increase with opportunity for advancement. Many company benefits."

OUR TRAINEES GET JOBS LIKE THIS:

Chief Engineer

"Since enrolling with Cleveland Institute I have received my 1st class license, and am now Chief Engineer of Station WAIN. Thanks to the Institute for making this possible."

Lewis M. Owens, Columbia, Ky.



MAIL COUPON TODAY AND RECEIVE ALL 2 BOOKLETS

FREE

Accredited by National Home Study Council

Cleveland Institute of Radio Electronics
Carl E. Smith, Consulting Engineer, President
Desk CQ-33, 4900 Euclid Ave., Cleveland 3, Ohio

Please send Free Booklets prepared to help me get ahead in Electronics. I have had training or experience in Electronics as indicated below:

☐ Military ☐ Broadcasting
☐ Radio-TV Servicing ☐ Home experimenting
☐ Manufacturing ☐ Telephone Company
☐ Amateur Radio ☐ Others

In what kind of work are you now engaged?.....

In what branch of Electronics are you interested.....

Name .....Age.....
Address .....
City .....Zone.....State.....

Special Tuition Rates to Members of Armed Forces



Feenix, Ariz.

Deer Hon. Ed:

I not knowing when I ever being so perplexed. Are it being Greek, Sanscrit or even Marshun—yes indeedy, we are considering ladder possibility. Of coursely, it coming so slowly grate geenyus Scratchi should have figyouring it out, but you are knowing how it being, Hon. Ed., when you thinking you on track of sumthing tremendyus, you just not yewsing Hon. Brane.

An then, natchyourally, it not happening at all if amchoor frend of mine not going away on vaycayshun. You see, he having just finished bilding 1/c sooper-dooper hi-sensitivity rock-stable reseever. Man oh man, what a reseever.

It reeding freakwency practikally to cycles. It having more controls than atomic powder plant, and what voltage regulayshun. Hon. Ed., it having more VR toobs in it than you can counting. You could pulling a-c plug from wall and reseever having so much voltage regulayshun it staying on for cupple minutes.

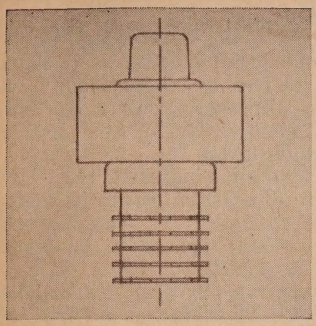
Feller what bilding it are anxious to testing it, but his XYL insisting he taking her on vaycayshun, so he deciding to lending it to me, so I could testing it and reporting back to him when he returning from vaycayshun. If you thinking I turning him down on offer you are ded wrong.

First nite I getting it I just sitting there and are so thrilled just to be tooning it. First hour doing nothing but listening to signals coming in. Are even forgetting to going on air having so much fun listening to reseever.

Next nite, howsumever, things are diffrunt. Yes indeedy, that when it happening. I having rig all warmed up (this not hard thing to doing in Feenix) and are tooning cross band to seeing what are wanting to work. Are having rotery beem pointed to VK-land and are hoping for reel dee-x.

Are heering lotsa fast fists when suddenly heering this reel slow see-w note, going abouts one-half wpm. This are speed Scratchi can reeding reel solid, so desiding to copy same. First cupple words not making any sense, so

[*turn page*]



New ceramic tubes assure longer life—greater dependability

Ultra-compact new HT-33 kilowatt amplifier first to employ extra-safe, extra-long-life ceramic power tube



Performance and dependability were key words in the Hallicrafters laboratories when the HT-33 was on the drawing boards. That's why our engineers insisted on new, costlier ceramic power tubes. Result: another Hallicrafters first that means consistently higher performance over a longer life.

Here's what ceramic tubes mean to you: 100 watts greater plate dissipation. Greater overload safety. Unbelievable ruggedness (they'll withstand repeated 11 milli-second shocks of 50g) and reliability. *Advanced design, too.* Notice the clean lines, the *compactness* of the HT-33—just 12⅜ inches high, for trim table-top application. See it, and compare these and other features, at your supplier's today.

MORE FACTS ABOUT THE HT-33

- Six amateur bands: 80, 40, 20, 15, 11-10 meters
- Simplified tuning: greater power transfer and higher harmonic attenuation.
- Low drive requirement: 8 watts P.E.P. will drive to full KW
- New type Neon Indicator light for fuse overload.
- Quieter operation: higher performance allows low speed blower.

NEW
FROM
hallicrafters
CHICAGO 24, ILLINOIS

WHERE THE BEST IDEAS IN COMMUNICATIONS ARE BORN

Available with convenient terms from your Radio Parts Distributor.

Export Sales: International Operations Raytheon Mfg. Co., Waltham, Mass.

For further information, check number 11 on page 126.

New! New!

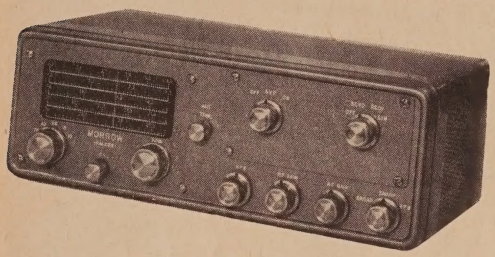
MORROW
PRESENTS
THE

FALCON RECEIVER

FIXED, PORTABLE, MOBILE

Exactly matches our MB-560-A transmitter in size; interchangeable with MBR-5's cables and power supply.

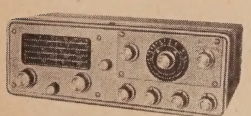
YOU CAN HEAR THEM WITH THE FALCON!



Amateur net $169.00

Less power supply, speaker and BCT*

SELECTIVE BANDPASS: Narrow 2.8 KC, Broad 9.2 KC at 6DB down.
SENSITIVITY: 1 microvolt with 14DB signal to noise ratio on 10 meters.
DUAL CONVERSION superhetrodyne receiver eliminates images.
Tunes amateur bands 75, 40, 20, 15, 10 meters.
Provision for Broadcast accessory tuner.
Size: 4" high, 11¾" long, 7⅛" deep.
Weight: 6½ lbs.



*Conelrad Monitor and Broadcast tuner accessory (BCT) has its own dial — no retuning required when switching from an amateur frequency to broadcast and back again. BCT amateur net, $19 95. FALCON with BCT installed, $189 00 amateur net (less power supply and speaker)

SEE YOUR JOBBER

Prices Subject to Change Without Notice

QUALITY AND PERFORMANCE

MORROW
radio manufacturing co.
2794 Market St. Salem, Ore.

For further information, check number 12 on page 126.

desiding having good dee-x on acct. feller are sending in foren languige.

Matter of factly, I not even being surely of some of the letters, but keeping on copying wateing for guy to ending transmishun. Ten minutes later he still sending, so I desiding to turning rotery beem to finding what direckshun signals coming from.

Hackensake!! You knowing what, Hon. Ed? No matters what direckshun beem pointing, signals still same strength!! This are turning into 1/c mistery. Slow sigs, foren languige, signal from noplace at all!!

I trying to keep on copying, but cupple hours later signals still coming, so Scratchi going to bed. Not without ideas, though. Yes indeedy by gollies, nobuddys fooling around with Scratchi.

Next day taking message I copying down to the yewniversity and asking Hon. Professors to telling me what languige are in. Having no luck, on acct. message not seeming to being in any languige.

Nothing dawnted, taking it to friend of mine who working in secrut code secshun of Are Force. He sighfering and resighfering and doing everything but unsighfering message. Finally he getting mad at it and feeding it to secrut machine they having what supposed to unsighfering anything putting into it.

Machine are grunting and groaning and clicking and clacking and finely little lite on machine turning on which saying "tilt." Frend saying message meening nothing, and I saying howcomes he knowing it meening nothing if he not knowing what it meening, and maybe his machine not working on signals and messages from outer space.

At this frend are saying he not reely buleeving story about how I getting message, so I telling him if he wanting to he can coming out to shack and heering for himself. He saying that stayshun prolly not on, but he coming out just to showing me.

He showing up rite after dinner, and when we first trying, not finding signal. He wanting to tooning around, but I saying no dice, so we just wateing. Finely, just as getting dark, signal starting. At first it kinda rough, like guy are sending with his nose, but pretty soon can making out dots and dashes and letters and words.

Are Force frend are copying awhile, then suddenly he stopping, putting pencil down, and lifting up lid on reseever. He looking, then listening, then looking. Finely he pointing inside reseever. I looking inside. Sacremento!! Hon. Ed.!! Unbuleevable!! Are four or five lightning bugs inside, and as they lighting, signals are coming. Off, on, dot, dash.

When frend seeing all this, he muttering sumthing about fireflies changing ionizayshun potenshul of VR toob which are in r-f circuit which putting negative resistance in circuit

[*Continued on page 107*]

Ode (owed?) to the GPR

Oh! GPR, Oh! GPR
How really, really great you are.
All the hams from A to Z
Are really crazy over thee.
Your built in ease of operation
Has swept like fire across the nation.
Your lovely, lovely sensitivity
Gives life a lot more liveability.
Your low, low noise and other factors
Make other sets real bad actors.
With SSB you are akin
It goes with you like Vermouth with Gin.
Your range, your band spread sure are great
All other brands you make me hate.
Your circuits and your AVC
Are sure to me a joy to see.
Oh! GPR, Oh! GPR
How really, really great you are.



One of the boys in our sales department (Charles Dean to be specific) got all het-up about the GPR-90 and wrote the above in a moment of passion, we assume.

For further information, check number 13 on page 126.

hallicrafters

SINGLE SIDEBAND MONTH IS HERE!

WIN a complete SSB station consisting of SX-101 receiver



Hear Single Sideband in action at your own distributor's . . . and enter the easiest, most exciting contest in ham history!

To give licensed hams a real opportunity to know the advantages of SSB, Hallicrafters has designated October as *Single Sideband Month.*

During October, leading distributors from coast to coast will be demonstrating Single Sideband on a specially installed, *complete SSB station* on their premises. (Participating distributors listed below.)

Each distributor will conduct a *local contest,* selecting a winner from among his own customers.

Each local winner will receive an award of a famous, *Hallicrafters SX-101 receiver worth $395.00!*

But that's not all—from among the more than *90* local winners, a grand prize winner will be selected to receive, in addition to his SX-101, a *Hallicrafters HT-32 Transmitter* and *HT-33 Kilowatt Amplifier!*

HERE'S HOW YOU ENTER—

1 Go to the distributor nearest you who is listed below—any time during the month of October. Hear his informative and interesting *special SSB demonstration.*

2 Fill out the entry card which your distributor will supply you, *including call letters and completion of, in twenty-five words or less, the statement:*

"Hallicrafters SSB equipment is superior because . . ."

3 Turn in card to distributor—*do not mail to Hallicrafters.* Distributors will judge entries and select winners *locally.* Awards will be made to entrants submitting the best, most sincere and original statements in the opinion of the distributor or other individual(s) he may designate.

4 Each local winner will receive a *Hallicrafters SX-101 Receiver* from his distributor. Decision of the distributors' judges shall be final.

5 Local winners' names and entry statements then will be forwarded to the Hallicrafters Company, where a panel of judges will select one as *Grand Winner.* This lucky ham will receive, in addition to the SX-101 awarded to him locally, a companion *Hallicrafters HT-32 Transmitter* and *HT-33 Amplifier.* Judges' decision shall be final.

6 Entries become the property of the Hallicrafters Company, and will not be returned. Winning statements may be published by the Hallicrafters Company and winners identified.



HT-32 transmitter HT-33 kilowatt amplifier or one of more than 90 SX-101's



VISIT ONE OF THESE DISTRIBUTORS IN OCTOBER!

CALIFORNIA
Berkeley: Electronics Suppliers
Burbank: Valley Electronic Supply Co.
Culver City: White Enterprises
Inglewood: Universal Distributors, Inc.
Long Beach: Larry Lynde Electronics
Los Angeles:
Henry Radio
Radio Products Sales Co., Inc.
Oakland: Elmar Electronics
Palo Alto: Zack Radio Supply Co.
Sacramento: Market Radio Stores
San Diego:
Western Radio & Television Supply
San Francisco:
Northern Cal. Amateur Supply
San Francisco Radio & Supply Co.
Television Radio Supply Co.
Zack Radio Supply Co.
San Jose: Frank Quement

COLORADO
Denver: Radio Products Sales Co.

CONNECTICUT
Hartford: Hatry of Hartford, Inc.
New Haven: Radio Shack Corporation

DELAWARE
Wilmington: Almo Radio Co.

DISTRICT OF COLUMBIA
Washington, D. C.:
Electronic Wholesalers, Inc.

FLORIDA
Miami: Electronic Supply Co.
Tampa: Kinkade Radio Supply

GEORGIA
Atlanta: Specialty Distributing Co.

IDAHO
Idaho Falls: Schwendiman's

ILLINOIS
Chicago:
Allied Radio Corp.
Green Mill Radio Supply Co.
Newark Electric Co.
Premier's Ham Shack
Peoria: Selectronics Supplies, Inc.

INDIANA
Fort Wayne: Warren Radio Co.
Frankfort: M. H. Dossett Co.
Indianapolis:
Graham Electronics Supply, Inc.
South Bend: Radio Distributing Co., Inc.

IOWA
Council Bluffs:
World Radio Laboratories, Inc.
Des Moines:
Bob & Jack's Store for Hams
Fort Dodge: Ken-Els Radio Supply

LOUISIANA
Shreveport: Kolemay Sales Co., Inc.

MARYLAND
Silver Springs: Emco Wholesalers

MASSACHUSETTS
Boston: DeMambro Radio Supply Co.
Worcester: Radio Electronic Sales Co.

MICHIGAN
Detroit:
M. N. Duffy & Co.
Reno Radio
Grand Rapids: Radio Parts Co.

MINNESOTA
Minneapolis:
Lew Bonn Co.
Electronic Center, Inc.
Northwest Radio & Electronic Supply Co.

MISSOURI
Kansas City:
Associated Electronic Supply Co.
Radiolab
St. Louis: Walter Ashe Radio Co.

MONTANA
Great Falls: Modern Equipment Co.

NEW HAMPSHIRE
Concord: Evans Radio

NEW JERSEY
Bloomfield: Variety Electronics Corp.
Newark: Hudson Radio & Television Corp.
Passaic: Nidisco-Passaic, Inc.
Trenton: Almo Radio Co.

NEW YORK
Albany:
Fort Orange Radio Distributing Co., Inc.
Amsterdam: Adirondack Radio Supply
Bluepoint, L. I.: Standard Parts Corp.
Buffalo: Genesee Radio Parts Co.
Hempstead: Standard Parts Corp.
Jamaica: Harrison Radio Corp.
Mineola: Arrow Electronics, Inc.
New York:
Harrison Radio Corp.
Harvey Radio Co.
Hudson Radio & Television Corp.
Terminal Radio Corp.
White Plains: Melville Radio Corp.

OHIO
Cincinnati: Steinbergs, Inc.
Cleveland:
Pioneer Electronic Supply Corp.
Columbus: Universal Service
Toledo: Selectronic Supplies, Inc.

OREGON
Portland:
Portland Radio Supply Co.
United Radio Supply, Inc.

PENNSYLVANIA
Allentown: A. A. Peters, Inc.
Philadelphia:
Almo Radio Co.
Radio Electric Service Co., Inc.
Pittsburgh: Tydings Co.
Reading: George D. Barbey Co.

SOUTH DAKOTA
Watertown: Burghardt Radio Supply

TENNESSEE
Chattanooga:
Curle Radio Supply & Sound Service
Knoxville: Bondurant Brothers Co.
Memphis: W & W Distributing Co.

TEXAS
Amarillo: R. & R. Electronic Co.
Austin: Hargis-Austin, Inc.
Houston:
Busacker Electronics Systems
R. C. & L. F. Hall, Inc.
Lubbock: R. & R. Parts & Supply Co.
San Antonio: Modern Electronics Co.
Waco: Hargis Co., Inc.
Wichita Falls: Mooney Radio Supply Co.

VIRGINIA
Arlington: Key Electronics
Norfolk: Radio Equipment Co.

WASHINGTON
Seattle:
Amateur Radio Supply Co.
Seattle Radio Supply
Tacoma: C & G Radio Supply

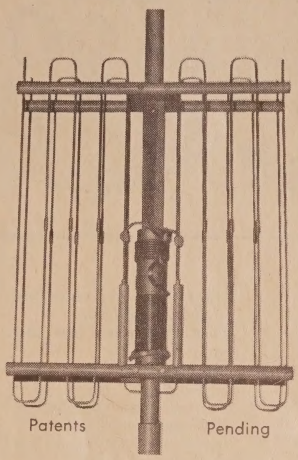
WISCONSIN
Fond du Lac: Harris Radio Corp.
Manitowoc: Harris Radio Corp.
Milwaukee: Amateur Electronic Supply

For further information, check number 14 on page 126.

A NEW ANTENNA PRINCIPLE

Only 27″ x 22″

PROVEN IN EXACTING TESTS AND TWO YEARS ON THE AIR AT WØMBH — KØAST



Patents Pending

THE Little GIANT BEAM ANTENNA $66.66

- Only 27 inches high by 22 inches wide.
- Fully resonant at a HALF WAVE in the 7 MC and 14 MC bands.
- Handles up to 1 KW.
- Uni-Directional characteristics.
- Minimizes harmonics.
- 52 ohm feed line, any length, substantially flat at resonant frequency. *Use standard co-ax fittings and cable for stacking $\frac{1}{1}$ or $\frac{2}{2}$
- Antenna has standard 52 ohm stocket in base for easy feed line connection.
- So compact only a TV rotator is required even if stacked.

SELSYN MODELS coming soon for full band resonance from your operating table.



THE Freeman COMPANY

YANKTON SOUTH DAKOTA

Telephone 2829

For further information, check number 15 on page 126.

Letters . . . to the editor

Dear sir,

In the February 57 CQ, I think you blew your top. As you said that only High School boys listen to Int SW. Well for your information & VERY NARROW *MIND*, there are many people in the Social Security age, who are Monitoring Int SW Stations on the side line to make a little more money. Also please note your NARROW MINE as saying we Int SW Listeners were out to get QSL cards ONLY. But please note *ARN't the HAMS doing the same? Or you to tight to send out QSL cards to HAMS???*

Now as your coment on the person who sent in his card saying he was a Int SW listener & was proud of it. Why didn't you finish what was on the card? The Name & Address of this Int SW Listener? Also why he was proud of being a SWL??? That was because we SWL's did more then you did, douring the 2 wars, most of the SWL's listened for Prisoners of War during WW#2. But douring the Korean war, you were still yak the yack to someone on Ham Radio. When we SWL's were doing the work, that is listing to Int SW bands & getting the PoW's then writing the loved ones. . . . There is no dought that some hams did this also, sent messages to boys in Japan, Germany, Italy, Etc. but it was FREE Japan, FREE Germany not Comme Germany, Free Italy.

Now wanting to take the 25 & 19 Mtrs band away from Int SW Radio. This would be wrong. But if you would studdy your own HAM Freqrencies, you will find that the SSB transmitters are JAMMING all the Freqrencies up. . . . How long would it be before the 19 & 25 Mtrs band would be the same. That being Jammed by SSB stations. . . . What the ham should do is OUTLAW the SSB Stns, like they did the atomic bomb.

This is one reason WHY I am not interested in Ham Radio. As the SSB Jam Ham bands have become like the Int SW Bands with Russia all over it. But there is still a great many who do Int SW Listing. Just because 7000 of your listners wrote in saying they were not Int SW Listners, well some time or other they were, if they wern't why would there be so many HAMS now days. In your very VERY SHORT MEMORY, you did the same thing. Either listened for Brd/cast stns KDKA Pit, Pa. & other stations on a Crystal set. The 7000 cards arn't all the SWL in the world who live in the USA, CANADA, C. & S. AMER; FAR EAST, MIDDLE EAST, EUROPE. There are just as many SWL's in the USA or more then there are HAMS.

The remark you made does anyone sit down & tune the Int SW Bands? the Answer is YES. Just like you would sit down & try to catch that countary you need to get the WAS etc.

When you mention opening the 25 & 19 Mtrs to Hams, you sound like we are headed tword the COMME thoughts. *SHAME ON US is CORRECT? At present I am working for 3 countaries, I send them repts in monthly on the reception which I get on them in Ky.* NHK Tokyo Japan, Radio Australia, New Zealand, I send repts to each month. Then I help all other *FOREIGN STATIONS* who ask for *HELP.* To get a clear Freq to the USA that is not JAMMED by Moscow, or C or S Amer, VOA, etc. So My job is a 24hr one. Do you know any HAM that has a JOB like this, except talking to another HAM??? You said you never hrd of anyone who Monitored Freq's on Int SW Band? Well all I can say is that you get your head out of the sand, & start listing & looking around you.

I have learned a lot about the culture of the countary which I am listing to, also, know them a little better. I have also made many friends in other countaries, which would have not come about if it wern't for Int SW Radio.

I have received news reports from the Pacific douring WW#2, at 0700EST the same news which I hrd at 0700

[*continued on page 104*]

JAMMED PACKED WITH ACTION!



Ask the man that has one.
More features than all other converters combined!
Write for complete information . . . **PRICE only $149.00**

The HAMMARLUND HC-10
SSB/CW AM/MCW CONVERTER

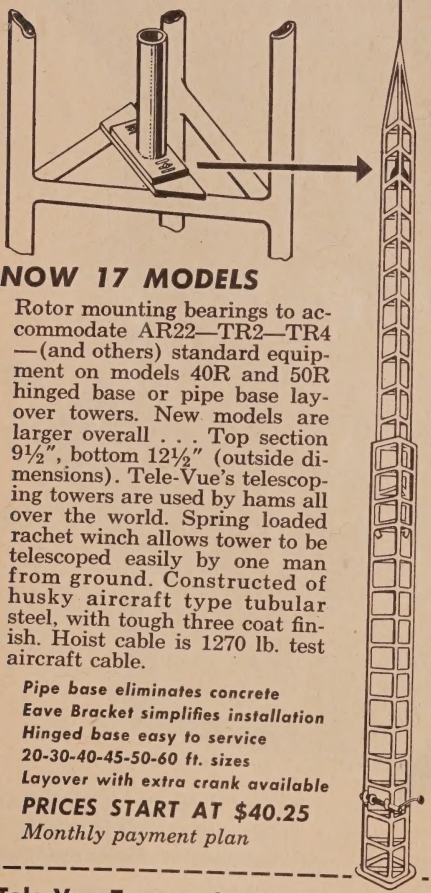
HAMMARLUND MANUFACTURING COMPANY, INC., 460 W. 34th ST., N. Y. 1, N. Y. • Export: Rocke International, 13 E. 40th St., N. Y. 16, N. Y. Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

For further information, check number 16 on page 126.

New TOWERS

. . . added to the Tele-Vue line

Rotor mounts inside top section on Adjustable Rotor Post



NOW 17 MODELS

Rotor mounting bearings to accommodate AR22—TR2—TR4—(and others) standard equipment on models 40R and 50R hinged base or pipe base layover towers. New models are larger overall . . . Top section 9½", bottom 12½" (outside dimensions). Tele-Vue's telescoping towers are used by hams all over the world. Spring loaded rachet winch allows tower to be telescoped easily by one man from ground. Constructed of husky aircraft type tubular steel, with tough three coat finish. Hoist cable is 1270 lb. test aircraft cable.

Pipe base eliminates concrete
Eave Bracket simplifies installation
Hinged base easy to service
20-30-40-45-50-60 ft. sizes
Layover with extra crank available

PRICES START AT $40.25
Monthly payment plan

Tele-Vue Towers, Inc.
701-707 49th St., So. ST. PETERSBURG, FLORIDA

FREE BROCHURE CQ-10
MAIL THIS COUPON FOR FULL INFORMATION

Name_____

Address_____

City_____ State_____

Prices subject to change without notice.

For further information, check number 17 on page 126.

Contest Calendar

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

October	5-6	VK/ZL Phone
October	12-13	VK/ZL CW
October	26-28	CQ W.W. DX Phone
Nov.	30-Dec. 2	CQ W.W. DX CW
November	9-10	ARRL SS
November	16-17	ARRL SS
November	23-24	RSGB 21/28 Phone
Oct. 1 - Dec. 31		OV Munich

VK/ZL
See July issue for dates, times and new rules and scoring system.

CQ W.W. DX
See August issue for complete details. See page 54 this issue for pertinent details. See page 62 for George Jacobs' special DX Contest propagation report. Condx sure look good.

ARRL SS
A good opportunity to limber up your fist for the "Big Contest" at the end of the month. See *that other magazine* for details.

R.S.G.B.
United Kingdom vs The World on 21 and 28 mc Phone.

Time
0700 GMT November 23rd to
1900 GMT November 34th 1957.

RULES
1. Phone only. AM, SSB, NBFM and etc.
2. Only one contact per band with each station. Crossband contacts are not allowed.
3. Stations outside the British Isles can only claim points for contacts with G, GC, GD, GI and GW.
4. Make sure you sign the usual declaration regards rules, power and that you will abide by the decision of the R.S.G.B. Council.

Serial Numbers
Progressive five figures consisting of RC report plus 3 figures which may start with any number between 001 and 100 for the first contact.

Scoring
Overseas stations score 5 points for each completed contact. An additional bonus of 50 points is given for the first contact with each British Isle country/numerical prefix. eg. G2, G3, G5, GW2, GM3, GI5, and etc. (This

new completely... brilliantly new!



GONSET COMMUNICATOR III



Now . . . a new series of VHF station "packages", linear amplifiers and accessories for amateur 2 and 6 meter bands and other VHF ranges.

The modern Communicator III model combines, in a single unit, all features found previously only in several different models. Many important, wholly new features add to even better performance and operating convenience.

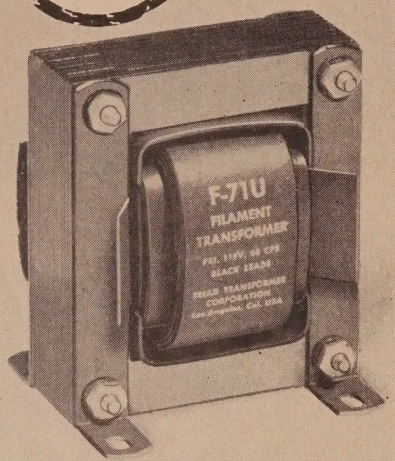
- Modern inside and out. Finished in attractive Alpine White enamel with knobs in Gun Metal Blue. Cabinet size is approximately the same.
- 6V DC and 12V DC and 115V AC. All three. One vibrator. Simple interior strapping changes DC voltages.
- Full press-to-talk operation. (Actuated by button on microphone) Transmit-receive switch on panel can be used if desired.
- Receiver: New low-noise X155 RF tube in sensitive "Cascode" with AVC to avoid blocking tendency from very strong locals. Special gang-tuned circuits provide new high order of image rejection. Improved I-F selectivity. Gonset noise limiter. Adjustable squelch. Earphone provisions.
- Full-vision slide-rule-type tuning dial.
- Squelch for quiet standby. Control on panel.
- Transmitter: All tunable circuits now have panel knobs. New gang-tuned circuits reduce spurious emissions to negligible values. New 6L6GB modulator tube gives heavier modulation.
- Panel meter replaces "Green eye." Meter switches to exciter or RF output or to receiver for indication of relative signal level.
- Provision for 6 crystals with panel selector switch. (Also operation with external VFO.)
- Silicon diodes eliminate power supply rectifier tubes.
- New line includes Linear Amplifiers in all frequency ranges and entirely new VFO which has ranges for both 2 and 6 meters.
- 269.50 less microphone and crystals.

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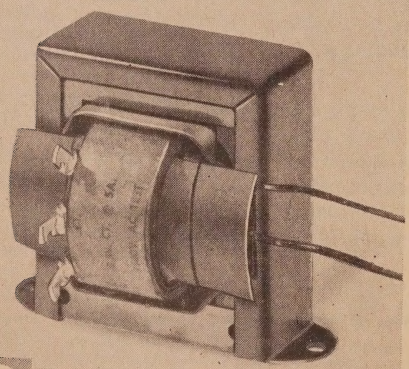
For further information, check number 18 on page 126.

TRANSFORMER NEWS FROM TRIAD



SPECIAL FILAMENT TRANSFORMERS

Included in their quality construction is Triad's exclusive "Climatite" treatment for moisture protection and elimination of lamination noise. Write for Catalog TR-57.



Type	Secondary Volts	Secondary Amperes	Test Volts
F-10U	5.0 CT.	14	10000
F-71U	2.5 CT.	10	10000
F-72Z	2.5 CT.	5	7500

TRIAD TRANSFORMER CORP.

4055 REDWOOD AVENUE, VENICE, CALIFORNIA
812 E. STATE STREET, HUNTINGTON, INDIANA

A SUBSIDIARY OF LITTON INDUSTRIES

For further information, check number 19 on page 126.

could really build up to a sizable figure.)

There is no multiplier. It's contact points plus bonus points.

Awards

For overseas stations a certificate will be awarded to the top station in each country and each call area in VE, VK, W, ZL and ZS.

SAMPLE LOG

Date	*GMT*	*Band*	*Stn*	*Sent*	*Recd*	*Pts*	*Bonus*
24	0706	21	G2MI	57001	57003	5	50
"	0714	21	G3AWZ	59002	58006	5	-
"	0720	21	GW3ZV	59003	59009	5	50
"	0100	28	G2DC	5504	55029	5	50
						20	150

Total (Points plus Bonus) 20 150 170

Check logs from non-competing stations are requested.

1956 Results

Leading scorers for each continent were; VQ4RF 1895, VS6CY 935, ZB1AJX 2470, VP6WR 2155, VK2AKV 725 and PY4AKT 445. The top man for the British Isles was G3DO with 3345 points. The only US winners were W1FZ 1330 and W8NWO 1180. So some of you fellows missed a good opportunity to add to your wall paper.

OV Munich

The OV Munich of the DARC is running a contest from the 1st of October to the 31st of December 1957, to celebrate the Munich 800 Year Anniversary.

This is not one of those knock down and drag out "brawls" but a nice leisurely affair open to all amateurs on both phone and CW. All bands 3.5 thru 28 mc can be used. The idea of the contest is to work as many Munich stations as possible. They can be identified by the suffix "C12" following their call, Example, DJ2FB/C12.

Scoring

Each contact with a Munich station counts one point per band. The multiplier is established by the number of bands used during the contest; ie, the highest possible multiplier therefore would be 5. For stations outside of Europe, 80 meter contacts will count 2 points.

Awards

Awards will be made in two sections. Under Part 1 the highest scoring amateur from each continent will not only win a medal and a certificate but will also be awarded expenses for a 3 day stay in Munich on the occasion of the 800 year Anniversary Festival during July 1958. (Ed. Note—How he gets from Timbuctoo to Munich to collect is not explained.) Second and third place winners from each continent and the top scorer from each country will also receive certificates. (Ed. Note—The USA covers a lot of territory for only one certificate.)

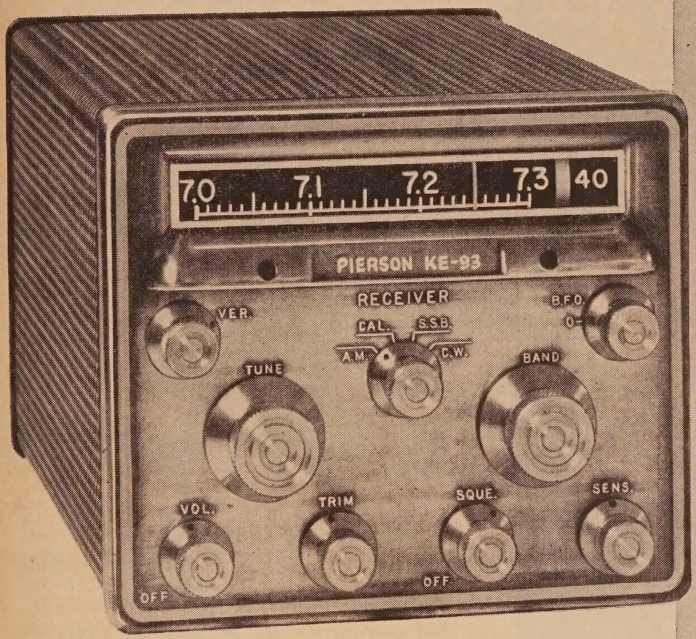
Under part 2, any station can obtain a

[*continued on page 100*]

new, improved

PIERSON KE-93

communications receiver



A Full-Fledged 12-Tube All-Band Communications Receiver In A Small, Mobile Package!

Built to outperform existing mobile receivers, the Pierson KE-93 equals and surpasses many receivers of the large console variety. Extremely small and compact, the KE-93 Receiver is designed for either mobile or fixed station operation. It delivers high over-all performance on seven bands; 10, 15, 20, 40, 80, 160 meters, and broadcast band. In addition, it features a new functional design and simplified control operation. Best of all, it bears the name of Pierson, whose more than 25 years of radio-engineering know-how have produced many outstanding receivers familiar to veteran hams the world over.

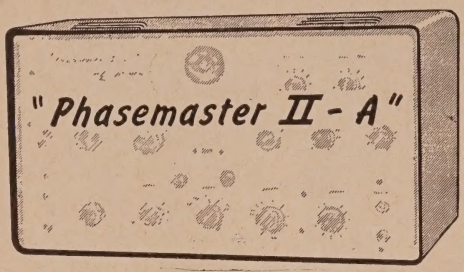
- Dual conversion, crystal second mixer, virtually eliminates image responses
- Dial displays only the band in use. Indirect lighting provides non-glare readability of large legible lettering.
- Plated satin finished panel styled to match the most luxurious car interior.
- Each ham band spread over entire length of dial.
- Extreme selectivity and sensitivity.
- Size: 6″ wide, 5″ high, 9″ deep.
- Rigid construction, die cast panel and turret housing.
- Highly effective noise silencer and squelch circuits of new design.
- Provisions for external S meter.
- Controls in most practical and convenient operating panel position for mobile operation.
- Function switch provides ideal settings for A.M., C.W. and S. S. B. operation. Excellent S. S. B. reception even in "mobile in motion" operation.
- Versatile, 7 position turret band switching.
- 6 or 12 V.D.C. or 110 V.A.C. power packs permit mobile, fixed, or portable operation.
- Competitively priced.

AUTOMATION ELECTRONICS, INC.
1500 West Verdugo Avenue, Burbank, California

WRITE TODAY FOR COMPLETE DETAILED INFORMATION

For further information, check number 20 on page 126.

LAKESHORE announces the new and improved



CONDENSED SPECS

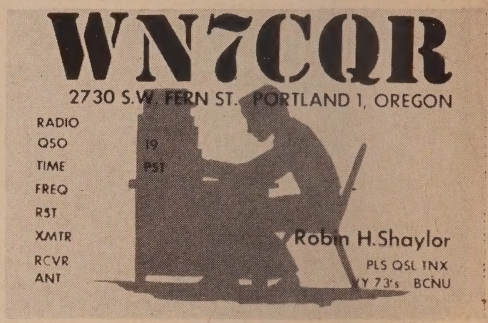
- SWITCHABLE EYE FOR TUNE UP OR DISTORTION CHECKING
- IMPROVED 9 MC STABILITY
- NEW STEEL CHASSIS
- TALK ON FREQUENCY OR ZERO BEAT
- VOLTAGE REGULATION
- MANY OTHER FEATURES

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MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

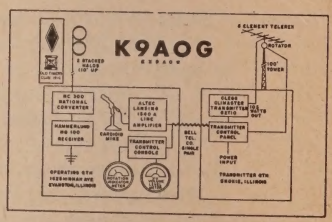
For further information, check number 21 on page 126.

QSL Contest

WINNER

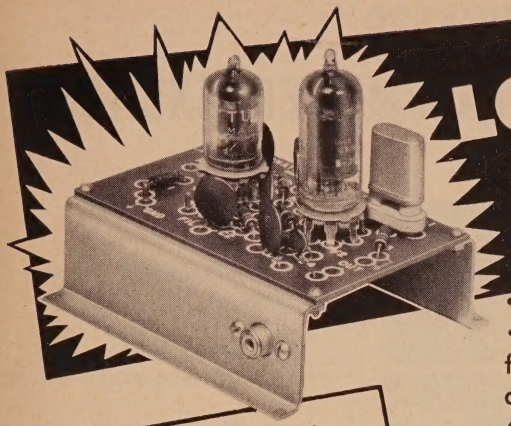


Winner is WN7CQR; Prize is a two year subscription to CQ. Another contest next month, and the month after, and the month after. Honorable mention, but no prizes, go to OH3OW for his beautiful three color silk screened card and K9AOG for his descriptive, if not artistic, card.



LOSERS



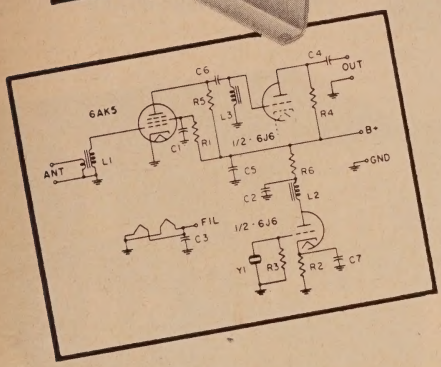


LOW COST...

FCV-1 CRYSTAL CONTROLLED CONVERTER

For 6 Meter or 2 Meter

• Compact • Simple to operate • Simple to assemble • Output IF frequency can be changed by merely changing the crystal (crystal range of 40 MC to 50 MC).



KIT (with crystal less tubes) $10.95

COMPLETE, wired and tested, with tubes and crystals $15.95

Frequency Range:
6 Meters: 50-54 MC
2 Meters: 144-148 MC
Sensitivity 1 microvolt or better
*Output IF** (1) 600 KC to 1500 KC
(2) 7 MC to 11 MC
(3) Special—Write for Information.
*Specify IF when ordering.

Plate Power 150 volts to 250 volts DC @ 15 ma to 20 ma
Heater Power 6.3 volts @ 625 ma
Tubes 6AK5 RF Amplifier
6J6 Mixer Oscillator
Size (Overall) 4"x3½"x3½"
Weight 3 ounces.

QUICK SELECTION of the 12 most used Frequencies

MODEL C-12 CRYSTAL CONTROLLED

ALIGNMENT OSCILLATOR

The Model C-12 Test Oscillator has 11 internal crystal positions and 1 external . . . provides a number of different crystals in one unit for quick selection.

Unit accommodates FX-1 Crystals from 200 KC to 15,000 KC. Built-in Attenuator. Maximum output is .6 volt.

External Crystal Socket. Write for complete information on FX-1 Crystals.

OSCILLATOR (Less Crystals) 200 KC-15,000 KC Range $49.50

The C-12 Unit is compact, self-contained complete with power supply for operation on 115 volts AC, 60 cycle.



ONE DAY! PROCESSING *CRYSTALS*

Commercial Type F-6 and Amateur Type FA-9. Write for free catalog.



HOW TO ORDER:
International Crystals and Printed Circuit Units are sold direct, for fastest service! Shipments prepaid when cash accompanies order; otherwise C. O. D.

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For further information, check number 24 on page 126.

NEW! THE VIKING "NAVIGATOR" ...an outstanding CW TRANSMITTER/EXCITER!



- Bandswitching 160 through 10 meters
- Flexible, highly stable VFO
- Electronic time sequence keying



This splendid new 40 watt CW transmitter/exciter is designed for the discriminating CW operator who desires a compact, flexible CW transmitter with enough RF power to excite most high powered final amplifiers on CW or AM. Highly stable, built-in VFO is temperature compensated and voltage regulated—unit may also be operated by crystal control. Electronic time sequence keying applies wave shaping to the keyed amplifier stages for perfect "make" and "break" on your keyed signal. Signal clicks and chirps are eliminated, yet the "break-in" advantages of a keyed VFO are retained. The system operates so fast that a breaking station may be heard between transmitted dots! Fully TVI suppressed and filtered—wide range pi-network output will match transmission line impedances from 40 to 600 ohms. Completely self-contained with built-in power supply.

Cat. No. 240-126-1 Viking "Navigator" Kit with tubes, less crystals and key **$149.50** Amateur Net

Cat. No. 240-126-2 Viking "Navigator" wired and tested with tubes, less crystals and key.....**$199.50** Amateur Net

See your authorized Johnson distributor for easy payment terms!

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For further information, check number 23 on page 126.

12 cm... RSI

(Radar Speedmeter Interference)

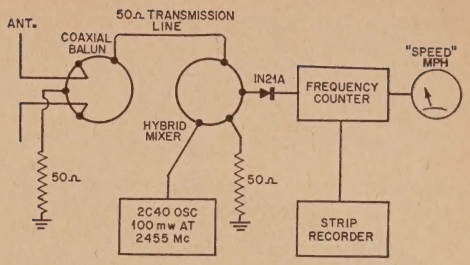
Thomas F. Snyder, K6PGB
1542 Harvard St.
Santa Monica, California

Time, with its attendant progress, brings all things. And progress, especially when it involves electronics, can bring some mighty peculiar things to the radio amateur. The smoke has pretty well settled around the impact of television, and the new components and techniques that hams have been able to use are pretty well agreed to have been worth the minor crisis that TVI once was. But as progress continues, to TVI, and its less-often experienced relatives, Model Airplane Interference, Garage Door Interference, and Electronic Organ Interference ("The I's Have It" W4WBC, *CQ*, Sept. '55), has now been added Radar Speedmeter Interference. Unlike some of the others, however, which make good topics for tales told by the Old Timer to Novices gathered around the operating chair, RSI can result in some mighty uncomfortable situations. It invariably results in action by public officials which, for immediacy and forcefulness, far surpasses anything ever done by the FCC.

The first indication of RSI to the amateur, invariably one operating mobile at the time, comes in the form of a wailing siren and flashing red lights attached to a police car rapidly overtaking the inoffensive amateur. It is often followed by a ridiculous charge of going something like eighty miles per hour in a 25-mile zone! And don't laugh; it can happen to you!

In their creditable attempt to stop some of the highway tragedies caused by excess speed, the police of many communities have begun the use of Doppler speed-measuring equipment in place of the older techniques of measuring the time required by a car to traverse a known distance which for various technical and legal reasons have not been entirely satisfactory. These devices, or Radar Speedmeters, are easy to use, accurate, and make the legal distinction of measuring the vehicle's speed directly, rather than determining it by some indirect method.

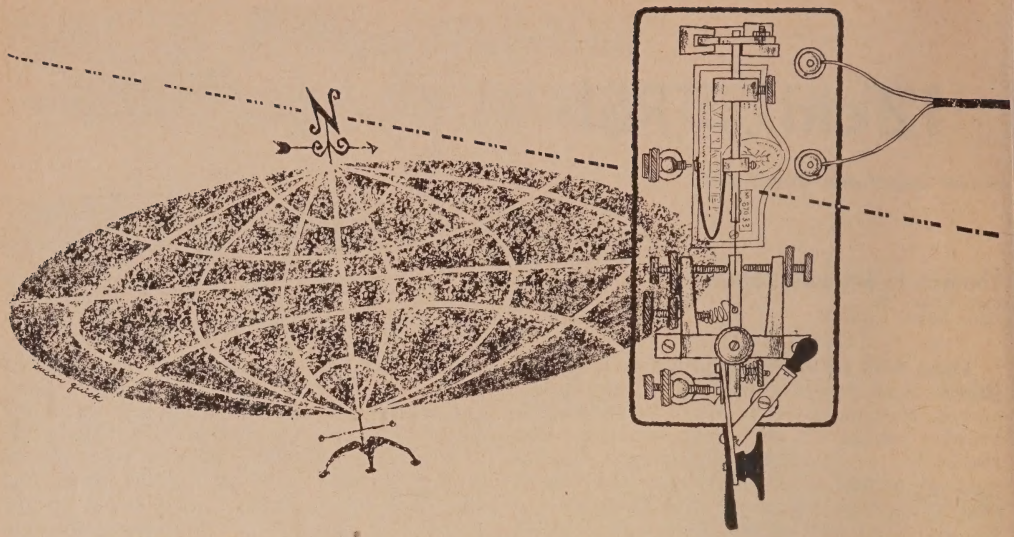
Basically, they make use of the Doppler principle that relative motion between a source of a wave and a reflecting surface will cause a frequency shift in waves reflected. The effect is similar in the common case of an automobile, with its horn sounding, going by a pedestrian. The pitch of the horn seems higher when the auto is approaching than when it is going away. In the case of the speedmeter, continuous radiation, at a frequency of 2455 megacycles, is transmitted toward oncoming traffic and some is reflected back toward the source. This reflected radiation is compared with a sample of the transmitted wave, and the shift in frequency, proportional to the speed of W6—'s car, is measured and converted into miles per hour according to the formula, $F_d = \frac{89.4\ V}{\lambda}$ cycles/MPH. V is the speed of the car, F_d is the Doppler shift, and λ is the wavelength of the signal, in centimeters. At the carrier frequency involved, a speed of 100 MPH results in a Doppler shift of 732 cycles.



The speedmeters are typically employed by mounting them behind or in the open trunk of a police car which is in radio communication with another patrol car parked farther up the road. The speed indicator is placed in view of an officer sitting at the radio, who takes the licence number of violators and advises the other officers of the offense. An inked chart is also made, which may be used as evidence. When properly calibrated, which is easily and frequently done, they are accurate to within one percent, and their only weakness, other than to deliberate rf jamming, is in the case of crowded traffic, where their limited resolution causes confused readings. A recent improvement in operating technique, caused by motorists coming to know the characteristic appearance of the speedmeter, is to house the unit in the *closed* trunk of an unmarked police car. The lid of the trunk is made of moulded fiberglass, which is transparent to the radio waves, and the installation is impossible for the motorist to spot, unless he happens to carry a receiver tuned to 2455 mc. This is not so unlikely as it may seem, a ham band extends to 2450 mc., and maybe mobile on 12 centimeters will become more popular!

The block diagram of a typical unit appears above. The transmitter is a 2C40 lighthouse tube oscillating in a coaxial resonator which couples about 100 milliwatts into a hybrid

[*Continued on page 108*]



How to work DX with low power

D. E. Priest, W4SHW
P. O. Box 1110
Sarasota, Fla.

As soon as the general ticket has arrived and the ex-novice is set to descend on the general ham frequencies with vim and vigor, it's a sure cinch that the word "DX" will have been added to the ham vocabulary. It's all part of this wonderful hobby of ours to contact a fellow ham in another country; and very lucrative to the person who hasn't done so before. We hope to divulge no secrets of any of the top ranking D-Xers, but forthcoming are a few tips that should be adhered to before launching into the pursuit of the elusive foreign station.

1. What is DX?

Answers vary to this question. Naturally, if you've been pounding brass with a kw since World War I, working a G isn't going to be DX in your book. But with the novice, or ex novice with a re-converted BC459, a G will be as treasured as working Venus on two meter teletype. Let's consider DX as any station outside the United States and popular Canadian provinces. Distance need not be the criterion, either. FP8AW is a more widely sought catch from his perch on St. Pierre Island off Newfoundland than most ZL's in New Zealand.

2. Which is easier to work, Phone or cw DX?

Assuming that the new general class ticket has arrived, it's a cinch that the prospective DX hound has some backing in cw; none, if little, in phone work. Also the relationship with foreign bands on phone, differing with the straight through c-w operation makes cw the likely bet for DX operation. We don't even include the relative power, and antenna merits of experienced DX operators.

3. How much power should I have to consistently work DX?

Power is the least consideration in looking for DX. The best commercial transmitter in the world is useless in the hands of an inept operator. Training will come by experience (we hope!!). Stationwise, the DX'er should have maximum convenience set for operating along with comfort for long stretches. He should have a receiver that will pick up the DX signal with rejection features for QRM that should be mastered for utmost efficiency by the operator. Home brew or commercial-bought needn't make any difference. Antennas operating efficiently for band and/or direction should be installed. A good antenna is worth a power increase ten fold. A VFO is a necessity! Having gotten these figures straight, we might look to the bands and their properties. First the bands.

160 meters.—believe it or not. DX is being logged by many an operator, and even a WAC has been made by postwar operators. Loran, the power reduction and the utmost necessity of having a really functioning antenna doesn't make this the band for the newcomer, but it can be done. P. S.—The DX comes in the late hours, so better get the coffee pot out for 160.

80 meters—Here is one fine band for getting out provided you listen long enough and hard enough. The high static level makes it rough for the summer time listeners, but come the winter and it's there, sho-nuff. Most foreign countries don't have the big frequency allotment that the North American amateurs have; therefore look for the DX on the low end. You can expect European and North Africans to come through after midnight along the East Coast, and the Asians to pop through mighty weak before sunrise. The South Americans will come through earlier as a rule. One thing about 80; when the band is open, it's open and you'll hear 'em, no doubt about it. Lots of old timers down here running hefty signals with good antennae. You'll have competition.

40 meters. Lots of folk don't realize what a fine DX band 40 is. Probably the best from several standpoints; namely, you'll hear more foreign countries more consistently with less equipment perfection, the receiver being the only exception. Daytime DX is a reality in the wintertime to some. Also in the winter, the Europeans and North Africa along with some Caribbean stations pop in with fervor for the Easterners, and work west till about nine o'clock, EST. South America and middle Europe makes itself known, while the West Coast gets its chance for Europe at midnight EST. A little later the Pacific and ultimately the VK-ZL contingent will roll toward the East Coast. The really rare Asia contact can be made close to sunrise when the band resumes its normalcy for short haul inter-USA work. At peaks, however, W stations may find themselves working a goody with the sun shining. Yes, there is excellent summer time DX work on 40 meters. Just a little harder, perhaps, with the QRN level added. Come spring and fall you'll find surprises too. One thing about our most popular amateur band. 40 meters requires just a little more than a passing listen. The tightly packed lower frequencies will not produce DX on the top two layers by far. Try listening down about three . . . it takes a little time to adapt, but considering the 40 meter novice band, you've had practice . . . you'll hear it.

20 meters—The best reputation possessed by any amateur band is twenty meters. Here, higher power and high gain directive antennae come into play. The really rare ones are found on 20, and when the band opens up, lookout for the little fellows. At its height of the sunspot cycle, the band is open twenty four hours a day to every nook and cranny of the globe. Right now the twenty meter band is folding later in the night, with less frequent blastings in the daytime. We would prefer a beginner to get some experience on another band before taking the leap to 20.

15 meters—Next to 40, we'd recommend fifteen as the ideal beginner's band for DX. Perhaps the novice operator had some luck up here if he had the AT-1 perkin' with a good 7 mc crystal. Mebbe not, but you'll find fifteen has good possibilities for low power. Good antenna problems here. You can build a good effective one with a minimum of loot in a small area.

Daytime openings to Europe, particularly to Europe and Africa, and the easiest band to get to Asia, in the late afternoons, seems to be fifteen. And it's going to get better.

10-11 meters. Both these frequencies offer the same luck as 15, although both are more erratic at this writing. Both will get better, and once again a good antenna, a necessity at the high frequencies, can be built at a small cost. When you hear 'em, it will be easy to contact 'em.

These are the DX bands today. Let's take into consideration a few operating practices now.

Receiving: Learn how to use your receiver. Before ever turning on your transmitter to go DXing, sit down and listen . . . listen, and listen some more. Learn your receiver's capability to pull out the little peanut whistle under the locals. Listen to the DX station and learn his routine. Does he sign and listen for another signal on the same frequency? Or does he finish with one station and then call QRZ? or CQ-DX? Does he answer the station that calls him back on the same frequency, or does he tend to come back to the station that slips off to one side. Or does he signify that a station calling him call either five or ten kc's higher. Usually this latter process is seldom used by a DX station, but if they did, they'd spend more time in QSO. Perhaps this DX station is working as many W's as possible, or is he a ragchewer? Remember, getting a QSL card isn't the only thing in working DX. Does the DX station drift? if so, is he bringing the receiver along with him? How fast does he send? Mebbe we better get the code oscillator out and practice a little while we're at it ourselves. Learn when your own particular area of the world is getting the DX. Why call a European station early in the evening on seven megacycles when all he can hear are the East Coast boys? This will save a lot of strain on the 6L6, the nerves and the light bill.

Let's turn to the operating now, with a sample of a DX session for the newcomer. It's about seven PM on the East coast so after shooing the XYL and kiddies into the front room to watch Sid Caesar, you've absconded to the cellar where the AT-1 with VFO that you built just ten months ago is nicely nestled against a BC348Q with a FL8 filter. Outside is the 'bomb.' A nicely functioning 40 meter vertical that you managed to get in before the frost hardened up the ground for the laying of the radials. Works nice on 15, too, but the neighbors next door have an old TV mon-

ster with 21 mc if's in it. The high pass hasn't shown up from the TV manufacturer but the band is dead anyhow. So here we go. But wait a minute. You say you've never worked any DX with the rig? So what, we gotta start somewhere! Lessee here, 40 meters. Let's get the transmitter tuned on the dummy antenna then we can take a look around on the receiver. 40 is crowded tonight . . . as usual. It being a weekend, we'll find a lot of competition, but then again maybe more stations on the DX end, too. Starting right down at the low end all we can hear are W8s out in the midwest and to the south . . . doesn't seem to be much to look for in the line of DX. Wait a minute, here's an open spot around 7025. Better make sure the VFO on the transmitter is along too just in case. What? To call CQ-DX? Naw! You'll be wasting your time on this band with that power calling CQ-DX. Better to listen and then pick and choose as you see fit. Hear that? No, not the W8 ragchewing with the W2 . . . the weak, raw signal tuning up there. Let's wait around a minute and see what it is. Here it comes . . . CQ . . . nope, just a W4 with rather poor regulation. Better put on the coffee; this might be a long wait.

Whoops! No use tuning much above 7100 kcs. Most of the DX, save for some Latin stations stay on the lower third of forty. Here's one . . . hear him in there? It's YU1-DEF, and he's a good solid S-6 here in the second layer. Not bad for tonight. A rather long CQ . . . bet the whole band is laying for him. There, he's signing. Shall we call . . . no, not this time . . . let's hang around and see what happens. There . . . at least three stations hear him on this side. All of them are calling on his frequency. All are giving him long calls, using their own call sparingly. Let's see who he comes back to. There's the YU . . . he came back to a W2 we didn't hear, so we assume the whole band was after him. His transmission is to the point and short. Most YU's don't ragchew. He signs with the W2, and immediately two stations we can hear are calling him. We don't hear him return to anyone . . . now there are several more stations calling him. We can't assume it for fact, but some of them probably never heard the YU in the first place, and are in there just for laughs.

Tuning down toward the low end we hear a W8 in QSO with a DJ2. We stop and listen for the DJ2, but there just a few hundred cycles above is a CT2 calling CQ. Good DX. He gives a short call and then stands by. Shall we call? Yes, but hold it a sec . . . let's see what sort of a stir he caused. Don't hear anybody calling him. Let's give it a try. No, not right on his frequency. Move a little up the band from the W8/DJ2 QSO and give a call. Make it short. Use the DX call about four times . . . sign your own about the same with one repeat. Now stand by . . . there he is, and he's coming back to us! While many stations will stand by to a station, they miss another which is just as desirable to work. Which is the better method is debatable, but in this case it paid off. There's his report . . . 569 with QRM . . . name is Juan . . . weather is warm . . . make your own transmissions in tune with the DX. If he's in a hurry, he'll show it, but if he's in the mood to rag chew, he'll really show it. Often a QSO? at the end of your first transmission will produce the rag chew type of QSO and a long friendship in future QSO's. This QSO is of the moderate type, about twenty minutes long . . . the well known exchange of QSL's . . . the 73 and DX OM! We sign and stand by with a traditional di-di-dah-di-dah . . . that was a mistake . . . the whole band takes it for granted that the QSO is over and starts calling the CT2 and his final transmission is wiped out. Make sure that the other station has signed and all is complete before making the complete sign of transmission. Many a station lurking in silence to work the DX will take this to mean that the QSO is completely terminated when actually it isn't. The DX station is often guilty of the same misdemeanor. But we did get the CT2 and the road to DX has been opened.

Here are some added tips to assist the fledgling DX man in his cw exploits.

Listen before you send. If the whole band cuts loose on a station and you think you have a chance, listen, then move to either the high or low side in making a call. If many stations are calling, make a long call, as several are sure to stop . . . then re-call on the DX frequency. The DX station will take his time in selecting (or perhaps completely rejecting) his potential QSO.

If the DX station is making as many QSO's (and QSL's!!!) as possible, and you're unsuccessful in a pile-up, stop . . . listen to what the DX station is working. Perhaps you can gain a pattern that the DX station is using in selecting. (If you're using low power and the DX station is working the strongest station right on *his* 2 frequency, it might be better to give up and try looking around for something else, as everybody tries working the rare one. Come back at intervals, and see what's happening. You can never tell: you might get a break).

Use your VFO judiciously. Never slide into a frequency with the VFO and final on, thus giving away the fact you're in there for business. No matter the amount of power you're using, you're still stronger than the DX station, and besides causing momentary QRM, you've tipped off another hunter. Earlier, we said that a VFO was a necessity in hunting rare ones. This needn't be true, but with a crystal, or small amount of rocks, it certainly takes per-

[*Continued on page 113*]

the Forty Meter Folded Dipole and Other Bands

Herbert Greenberg, W2EEJ
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It is general knowledge that a forty meter halfwave folded dipole can be used on its third harmonic (15 meters) as a one and one-half wave length antenna, but it is not nearly as well known that it also can be used on eighty meters. This is easily done without switches, relays, stubs, baluns, tuners, traps, or other devices.

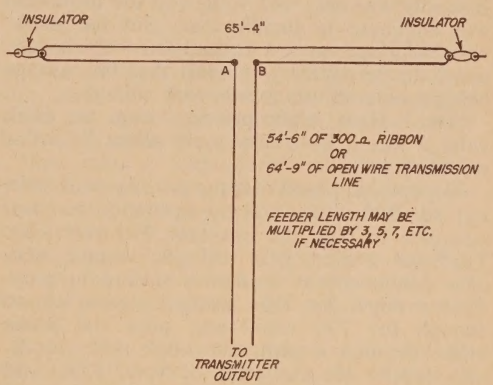
The small price you have to pay, in most cases no great inconvenience, is to make the transmission line a quarter wavelength long at eighty meters. If a quarter wavelength will not reach from the antenna to the transmitter you can use an odd multiple of a quarter wavelength.

If the antenna is well matched with 300 ohm line at both forty and fifteen meters then any length which calculates to a quarter wave (or odd multiple) on eighty meters will not adversely affect the operation of the system, since the line will still remain "flat" at the two higher frequencies. On eighty meters, however, the antenna becomes a high impedance double zepp fed half-wave. This can best be observed by tracing the antenna wire from point A to point B on the diagram. This path is twice the length of the flat top portion, and will perform as a bent antenna with the ends folded back. There is some loss due to cancellation of the fields, but the current intensity, and the radiation, is far greater in the center of the antenna than in the ends, and the total efficiency is fairly good.

The high impedance of the points A and B would be a poor match to the 300 ohm feedline were it not for the property of a quarter wave section of transmission line to act as a transformer and change the impedance to the opposite of the termination. An open or unterminated quarter-wave will reflect a short at the other end, and a shorted length would have no effect! Therefore, if the proper length of transmission line is chosen the very high impedance of the antenna is transformed to a relatively low one at the transmitter.

Although the folded dipole is usually fed with 300 ohm balanced transmission line, it is possible to load from a pi-net into a balanced line with the unbalance tending to cancel. A few turns (5 to 8, depending on diameter) of good quality plastic coated hookup wire wound on the "cold" end of the final tank coil can be used to feed the antenna's transmission line, if preferred. An antenna coupler or balun could be used if available, with the tuner having the always desirable effect of attenuating harmonics.

The dimensions in the diagram are optimum for the Novice portions of the bands. The formula for calculating the half-wave is $\frac{468}{f}$ where f is the frequency in megacycles. This is for the antenna portion and includes a factor allowing for end capacity. The formula for the length of the feeder is $\frac{246}{f}$.V, where f is in megacycles also. V is the velocity factor of the transmission line, and for commonly used TV type ribbon line is .82, but for open wire line with ceramic or good grade plastic separators it is .975. This material is in most handbooks. Remember, in the above, that the answer is in feet, and .75 of a foot is nine inches, for example. This is easily overlooked.



The actual antenna physically can be entirely made from available TV ribbon type 300 ohm line, or the open wire type, which is less affected by weather, and preferably, though more expensive, used. Sturdy supports, and good quality end insulators, should be obtained. If preferred, a forty meter dipole kit can be purchased. A little extra effort and planning, beforehand, and in erecting the antenna, will pay off in continued operating pleasure, despite weather and time. ■

John W. Campbell, Jr., W2ZGU

"But . . . . . I Measured It!"

Hamilton Q. Jones, known to his neighbors as "that Ham Jones", stared in bewildered dismay at the cooling and gently smoking remains of some $60 worth of electronic gear. The 829's plates were rapidly cooling down through dull red to black, but the globs of metal in the base of the tube testified to the total defunctness of the grids and screens. The fuse had blown—but only after it had blown had Ham remembered that he'd used one of the "slo-blow" type, and the "slo-" feature had been plenty slow enough to allow various components to go off in scintillating sparks.

"But," groaned Ham in bewildered protest, "I *measured* it!"

No, Hamilton, you didn't measure *it;* you measured the position of a needle on a curved scale, which, according to the theory you had in mind, was correlated with a voltage. You didn't measure the voltage; you measured a theory—and the theory, as testified by the remains of your gear, happened to be not applicable in this case. True, the Root Mean Square value of the a.c. voltage you measured was 45, as indicated by your nicely calibrated vacuum tube voltmeter. And 45 volts plus the 400 volt B-supply was only 445 volts, and the insulation was adequate to handle that. But the meter was calibrated on the assumption (which happened to be contrary to fact) that the voltage being measured was a *sine-wave* voltage.

"But," Ham might protest, "even the peak voltage would have been only about 70 volts, wouldn't it?"

Nope; it happened that the *positive* peak voltage was 390 volts. And the insulation was *not* adequate to take the resultant 790 volt jolts. That was a nice, neat coil you wound, with nice double-cotton insulation soaked in polystyrene dope. But that insulation wasn't good enough for 790 volts—and once the peaks broke through a path, the whole 400 volt B-plus supply hit the grids of your 829. And while your power supply transformer is rated at only 300 ma, a.c. machinery can *handle* remarkable overloads for a short time.

Sure Ham "measured it"—but he didn't find out what "it" was, and whether his "measure" was appropriate. How many feet in a quart, huh? The measure "feet" is utterly inappropriate to "quarts", because quarts measure volume, and feet measure linear dimension; *cubic* feet can measure quarts, but not *feet.*

I can, with perfectly good, accurately calibrated instruments, demonstrate to you that the higher the voltage applied to a resistor, the *lower* the power in the resistor! I can *show* you that the maximum power is present when the voltage is a minimum!

I can also take an accurately calibrated voltmeter, and demonstrate conclusively that 1.0 volt will jump a half-inch gap through air.

I can, also, demonstrate with good, accurate instruments that 10 milliamperes of d.c. will make the tungsten filament of a 100 watt lamp bulb explode in a blue-white flash.

Of course, I can, also, show you with accurate meters that I can light a 100 watt lamp bulb indefinitely at zero amperes and zero volts, so that I'm getting 100 watts of power from no volts and no current. That's the easiest trick of all; just use standard DC meters and run the lamp on AC. Since the standard d'Arsonval meter movement uses a permanent magnet, and a moving coil having relatively high inertia, alternating current running through the coil produces a torque first one way, and then the other—and the inertia of the coil integrates the alternating torques. The integral of any sine wave is always zero; it pushes just as hard one way as another. The result makes a monkey's uncle out of ordinary arithmetic; arithmetic says $1-1=0$, and that $1000-1000=0$, and since things equal to the same thing are equal to each other, then $1-1=1000-1000$–so a good 1000 volt sine-wave is equal to a 1 volt sine-wave, and both are really nothing at all.

So . . .

You should try taking hold of these two nothings-at-all-really some time.

So you measured it, huh? *What* did you measure? A theory, friend—a theory. And that theory may or may not be applicable. You just stick to one theory, and I'll set up a simple little arrangement that'll make your meters tell you the damndest lies you ever heard of.

Every one of the cockeyed results mentioned above can be demonstrated with simple equipment.

Ham Jones isn't alone in his bewildered amaze; every scientist makes mistakes in metering, or in using his theories. Einstein, in his famous Relativity theory, as originally published, made a slip in simple algebra, and had the wrong algebraic sign on one quantity—with the result that his equations yielded

a remarkable new entity, the Cosmical Constant. Took the math sharks a couple of years to spot the minus where a plus should have been, too!

One of the all-time highs in "But . . . . I *measured* it!" mistakes involved an AEC test of a "nuclear device". The bomb was all set, the complex electronic data-gathering instruments were all set and carefully adjusted, the count-down began, the button was triggered. . . . and nothing happened.

Now when the boys test one of the "nuclear devices," they are very genuinely testing; it's *not* just a bomb; it's a test of fundamental nuclear theory that bears as much on peacetime uses of atomic energy, as it does on military applications. The atomic material used is, actually, less costly than the immense and complex system of electronic data-gathering equipment—which latter, like the bomb itself, has a "service life" of something like 0.0001 seconds. Any ham would go hysterical with joy to get his hands on one tenth of the electronic gear that gets vaporized in the first few micro-seconds after the bomb goes off.

The research crew, understandably, doesn't want the bomb to go off, then, unless *all* the electronic equipment is functioning perfectly. The major purpose of the test would be lost. Consequently, the test metering equipment has test and metering equipment built into it, connected to cut-out relays, so that if any of the gear has failed, the test will be cut off.

When the firing signal was given, and the bomb didn't go · . . it was easy to guess that *something* had failed. The question, naturally, was *what?* After all, it could be that one of the several thousand relays involved was a bit sticky, and hadn't dropped as it should have. That a solenoid release had triggered, but the plunger had not fallen properly, even when it was freed. That . . .

Tests showed that all the accessory equipment in the safety domes was functioning properly. Somebody was going to have to go out to the bomb cab, sitting all by its lonely self some 300 feet above the desert sand, and climb up the ladder.The vibration might, of course, be just what was needed to free a sticky relay and make the bomb-shoot a success. Of course, no one was going to watch him climb, because if the bomb did go off, any watcher would have his eyes burned out, at the same instant the climber was volatilized. It would be much harder on the watcher; he'd live long enough to know he was blind.

Evenutally, someone did climb the vibrating ladder, and did get into the bomb cab, and succeeded in throwing the safety lock on the bomb. Then they investigated what had gone wrong.

It seems the test crew, checking all the equipment just before the test-shot was due, had gone over every piece of equipment, accurately aligning and adjusting most carefully using high precision special test-instruments. The voltages had been adjusted; the frequencies had been nailed down—everything had been tested most carefully.

Then the test-crew unplugged their elaborate test instruments, took them down out of the cab, and drove off to safety in their truck. Meanwhile, the over-voltage relays in several sensitive pieces of equipment had popped open; the elaborate test equipment the test-crew used had drawn quite a bit of current itself. With that load taken off the several-miles-long power line feeding the bomb-cab, the line-voltage rose enough to kick out the relays.

The electronic gear was readjusted very carefully, using the same test equipment . . . but powered from a mobile generator on a truck right below the bomb cab, this time. The next count-down produced a quite successful test.

I don't know who climbed that vibrating ladder up to the bomb cab, but I can't help wondering how he looked at the test-crew man who protested, feebly, "But . . . I *measured* it!"

Measured *what?* He measured the behavior of the equipment under condition T, *on the theory that* condition T was equivalent in all important respects to condition F . . . which wasn't true, because the presence of the test instruments themselves made a signficant difference.

Reasoning

How, though, could I "prove" that there's *more* power in a resistor when it has *less* voltage?

Easy!

Take one of the surplus rotary switches, or even an ordinary buzzer or relay· Take a battery, and use the buzzer, relay or rotary switch to make-and-break the current from the battery, into the resistor.

Now take a high-quality, accurately calibrated vacuum tube voltmeter. It's been calibrated on sine-wave basis, but is, actually, a peak-reading device.

Let's say we apply 10 volts from the battery to the switch and resistor system, and that the switch is closed 50% of the time, and open 50%.

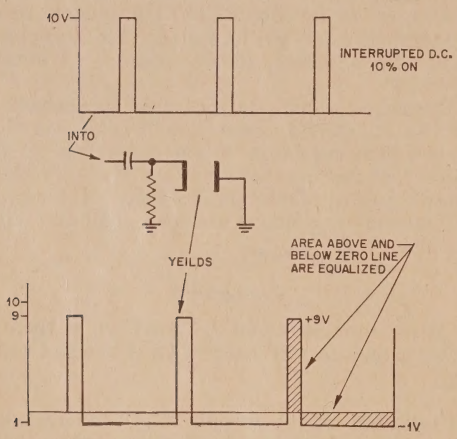
Now a d.c. voltmeter applied to the battery will read 10 volts. Applied to the resistor, it will read 5 vols. (It's integrating and determining the *average* current flowing through its coil; since current flows at a 10-volt-into-its-resistor-system rate 50% of the time, it reads juts ½ the battery voltage.) Apply the VTVM, and it reads 3.5 volts. That's all right, though; we know that it's calibrated on a Root Mean Square basis, but actually reads peak, so is callibrated to read .707 times the peak voltage.

But whoa back, here! The peak voltage is *10* volts, not 5! The VTVM should read 7 volts!

Oh no! This is, as is usual, a half-wave diode rectifier type instrument, fed from a blocking condenser in the input. The condenser-and-resistor system charges up to such a point that there is an equal flow of electrons into and out of the condenser on each cycle. It adjusts itself to an arbitrary Zero Line, and the diode rectifier then reads the peaks—and usually that means the *negative* peaks—with respect to that zero line.

But our voltmeter, it happens, measures *positive* peaks. So it has adjusted itself so that the zero line of a.c. measurement is half way up the 10-volt interrupted d.c. voltage; the result is that there are only 5 volt peaks above that, and the instrument reads 3.5 volts.

Now let's adjust the rotary switch, or the buzzer, so that it is closed only 10% of the time, and is open 90% of the time.



voltage waves . . .

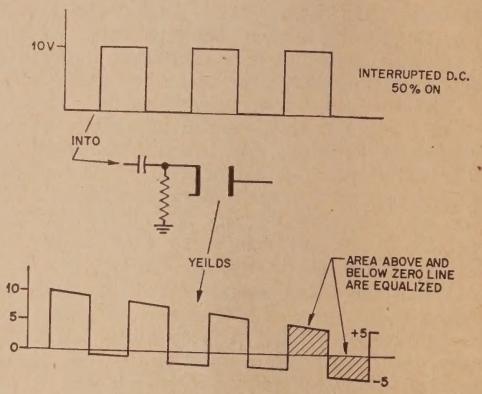
Again the VTVM condenser-resistor system adjusts itself to an arbitrary AC zero such that the flow of electrons into and out of the condenser is equal. Of course, since the current is on only 10% of the time, the zero line will adjust downward so that the short time of "on" can allow as many electrons to flow into the condenser as can flow out of it during the 90%-"off" time.

The VTVM now reads 6.3 volts.

If we measure the heat-energy dissipated in the resistor, we will find that much more energy was released when 3.5 volts was applied to it, than when we apply the measured 6.3 volts. Naturally; the 3.5 volt reading was obtained when the current was flowing 50% of the time; the 6.3 volt reading came when the current was flowing only 1/10th of the time!

So we have, by the use of accurately calibrated instruments, "proven" that there is more power in a resistor when less voltage is applied. And this "proves" the E^2/R is all wrong, doesn't it? Why . . . we *measured* it!

How can we "prove" that 1.0 volt will jump half an inch air-gap? For this we need a rather specially constructed voltmeter. It has to be insulated to withstand the application of 25,000 volts or so, and yet have a low-voltage scale. We use a DC meter, and simply apply it to the pulsating DC output of a radar transmitter power supply. The power supply yields 1 microsecond pulses of 20,000 volts at 1,000 amperes to a 20 megawatt magnetron—but of course, the pulses are separated by thousands of microseconds. The voltmeter, faithfully integrating and averaging the torque pulses produced, reads "1.0 Volt." The Voltmeter has to be well insulated, of course, because those 20,000 volt pulses will jump quite an air-gap.



. . . and what happens

Incidentally, applying that radar power supply output into a 100 watt tungsten filament bulb will, understandably, cause the filament to vanish in a blue-white explosion. 100-watt bulb filaments aren't designed to withstand 1000 amperes at 20,000 volts, even for a microsecond. It wouldn't be hard to show that the *average* power through the power-supply was only a quite reasonable number of milliamperes, of course.

You can really have fun with voltmeters of different kinds, applied to the same voltage source. Take something simple like a 10 volt, 60-cycle a.c. power-line filament transformer as a source, and see what we get with different instruments.

Of course, a d.c. meter reads zero. It's integrating the voltage on an algebraic-addition basis, and naturally gets a net result of nothing-at-all.

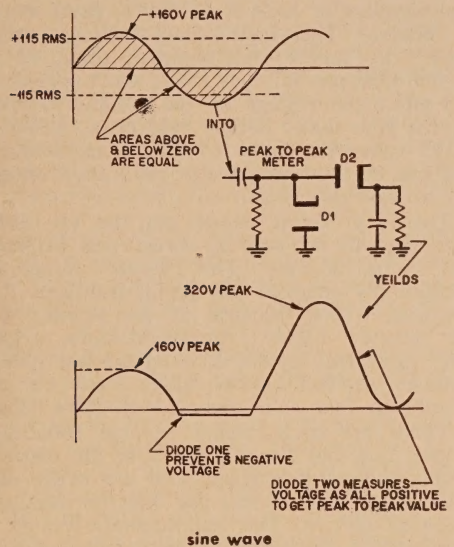
The standard iron-vane type of a.c. line-voltage meter will read 10 volts. It's an integrating type, too—but it integrates on an

arithmetical-addition basis. It gets pulses of torque from the voltage waves, but because it uses a field coil, instead of a permanent magnet, it doesn't pay any attention to the *sign* of the voltage—plus and minus are all the same to it. On d.c., the iron-vane meter will read just as accurately as the regular d.c. meter; it doesn't give a darn.

Meanwhile, a vacuum tube voltmeter of the standard diode-rectifier type reads "10 volts" only because it's been calibrated to read RMS voltage on the scale, although it measures peak voltages.

But if we use a peak-to-peak reading voltmeter, such as the RCA Voltohmyst Senior, we'll read 28.3 volts.

Now let's try a pulsating a.c. voltage. This might be produced in a number of ways, but it amounts to discontinuous current flow, like



sine wave

the interrupted d.c., but the succeeding pulses are in opposite directions.

Man, that's *really* crazy! The peak-to-peak meter would still read 28.3 volts; a peak-reading instrument doesn't care whether the current is continuous or not, it measures only the extreme values present at any instant during the time it's connected.

The simple diode voltmeter will read 10 volts as before. It's actually a peak reading meter, miscalibrated to read in RMS terms.

The iron-vane meter will read somewhere between zero and 10 volts, depending on how discontinuous the voltage is; it's an averaging type of instrument.

We can try switching the d.c. voltmeter (which of course still reads zero) to the a.c. scale; it is now a copper-oxide rectifier type instrument.

What it reads is now anybody's guess; the only thing we can say for sure is that it won't agree with any of the other instruments. The iron-vane instrument is an averaging type, as is the d.c. d'Arsonval movement of the d.c. meter—but the copper-oxide rectifier is something else again. It's a full-wave job, but since it isn't linear in the first place, it *always* produces a discontinuous as well as pulsating d.c. output when attached to any sine wave a.c. input. Unlike the VTVM's, it has no condenser to store the peak-voltage energy, so it won't read peaks. Finally, the meter's a.c. scale has been callibrated to read RMS voltage on continuous sine wave a.c., despite the fact that the rectifier stack has a zero-voltage discontinuity itself.

You guess what the resultant reading will be! Whatever it is, it's strictly a fantasy cooked up in a mechanical imagination that hasn't the foggiest notion of what's really going on.

O. K., friend . . . whaddaya mean when you say "voltage?" Peak? Peak-to-peak? Root Mean Square average? Geometrical-area above and below zero average? Arithmetical average? Algebraic additive average?

In a resonant circuit of infinite Q, there would, theoretically, be extremely high voltage which would not be readable on *any* of the voltmeters here considered — because that voltage exists only when there is absolutely zero current. And all the voltmeters discussed here draw some current.

The only type of metering device that will give you intelligible information about voltage in a circuit is a cathode ray oscilloscope; it presents the instantaneous voltage at every instant. You can, on an oscilloscope, read the peak instantaneous voltage, or get a picture of the area of time-voltage. It will be just as honest with an interrupted d.c. voltage as with sine wave a.c. or microsecond pulses—provided you don't have any amplifiers in the circuit, but take the input direct to the cathode ray tube D plates. A scope will, then, read both d.c., a.c., and the combination of a d.c. biased a.c.

Most of the standard VTVM's around use negative-peak rectification — the input signal goes to the plate of a diode. Because of the effect of pulses in a condenser-resistor circuit causing the arbitrary "a.c. zero" point to shift to such a value that the area above and below the arbitrary a.c. zero is equal, such VTVM's can indicate about 3 volts of r.f. present, when there is, actually, a fine, healthy drive to the next stage grid. Reason: if the signal has good, strong positive peak pulses, the next stage grid will be driven strongly positive, giving good, healthy slugs of plate-current. But the *negative* peaks read by the VTVM may be quite puny —though longer lasting in time. If the positive pulse rises to 100 volts for 1/10th of the cycle, while the grid of the stage you're interested in will be driven nicely, the VTVM will read only 10 volts . . . because it reads the *negative* pulses.

VTVM's are not very reliable instruments for measuring the balance of voltage drive to push-pull hi-fi audio output tubes, because of their sensitivity to wave-form distortion. Unless the input to the audio amplifier under test is *pure* sine-wave, a perfectly balanced push-pull stage will show different voltage on the two final-stage grids. A small amount of harmonic present can put an additional slight peak on one wave, and depress the peak of the other slightly, so you'll read a difference.

A peak-to-peak VTVM would ignore that problem—but darned few VTVM's are peak-to-peak instruments. The ordinary 115 volt a.c. line, on a peak-to-peak instrument will read 325 volts; that already represents about all the voltage a 6AL5 diode can be trusted with. A standard 400 volt B-supply transformer will read nearly 1000 volts peak-to-peak.

Other Problems

In addition to the problems encountered when a perfectly good, accurately calibrated meter is used to measure voltage . . . how do you know yours is accurate? When was it last calibrated? So you have a beautiful $60 multimeter, and it reads 12.5 volts, while this cheap little $3 meter reads 14 volts, so of course you know it's *really* 12.5 volts. Oh · . . yeah? The beautiful $60 job was calibrated back in 1951, shipped cross-country to your dealer, shipped or carried to your home, then you dropped it back in 1953, but fortunately didn't break it, and on field day two years ago Bill forgot to change scale when he went from measuring the should-have-been 115 volts a.c. the generator was putting out to measuring the 350 d.c. volts the B-supply was giving out.

But that cheap little $3 meter happens to be a simple, rugged device that isn't quite as linear as its scale suggests, but on its 15-volt scale is less than 1% off at the 14-volt mark.

Still wanna bet that $60 multimeter's more accurate than the cheap $3 job—as of right now?

If it isn't, how can you tell? Send it back to be calibrated, so you'll know? Remember the AEC test-crew that measured all the voltages on the bomb-test, though; but by the time they moved their instruments out the voltages weren't the same. By the time your meter goes cross country and back . . . it might be worse off than it was when you sent it!

You could, of course, get some literature from the Bureau of Standards on how they calibrate Standard Voltmeters. Very interesting reading, by the way . . . but you need it about as badly as you need a Primary Frequency Standard. It wouldn't cost you much more to get the Primary Frequency Standard than to get the type of equipment used in primary standard voltage measurements. But there's a right simple and cheap way of doing a calibration job on your meters.

In the Bureau of Standards standardization techniques, a Standard Cell is used as the primary reference voltage. This Standard Cell is a remote cousin of an ordinary dry cell—very remote. You can get one, if you insist, from Weston Instrument Co., for about $100; it delivers 1.0183 volts at 20°C., provided you don't draw any current whatever from it—and that means not more than 1/100th of a microampere. If you hitch an ordinary 1000-ohms-per-volt voltmeter across it, you might as well throw it away and buy a new one.

For ham work, that's nonsense, of course. But you can, in any of your local dealers now, get a Mallory mercury battery—and the mercury battery is not so remote a cousin of the standard cell. Any of the one-cell units delivers 1.345 volts with excellent accuracy, on no-load test, or when the load is held down to a microampere or so. For VTVM's, that's easy, of course. The infinitesimal voltage drop caused by the 50 microampere drain of a 20,000-ohm-per-volt type meter won't appreciably affect the voltage of the A-battery type. And if your meter doesn't read pretty close to 1.345 volts—the meter's wrong. The mercury cell can be used as a meter calibration check for at least two years.

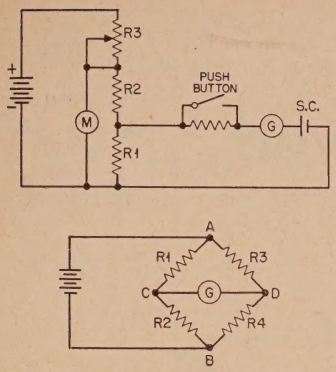
There's a "9-volt" model out, the TR-146R that contains six cells in series, and delivers 8.07 volts, actually. The "9-volt" rating is because it's intended for use in transistor radio sets, where, because of the stability of the mercury battery voltage, it does a job fully equivalent to that done by the less stable ordinary dry-cell battery which starts out at 9 volts in fact—but doesn't stay there long.

There are some higher voltage B-battery models out, but these are still in the experimental-and-research stage, and are being developed for radio-service use. Not for voltage-metering service. The requirements for optimum service in running a radio receiver are not the same as for voltage-metering; better stick to the simpler, low-voltage units for calibration work.

But that doesn't mean you can calibrate your meter *only* at 1.345 and 8.07 volt levels, by any means. The original meaning of our old familiar "potentiometer" term was "potential metering device," and it was used for exactly that—voltage, or potential metering.

There are some real fancy gadgets that Bu. Standards uses for precision calibration; we don't need that degree of precision. The circuit of the original potentiometer system is beautifully accurate, magnificently flexible, and calls for a galvanometer sensitive to a micro-microampere or so. For work with those hyper-accurate, but hyper-sensitive Standard Cells, you need it.

The circuit shown below works just fine for our purposes:



R3 is a variable resistor, by which the current from the large battery can be controlled; the voltage drop appearing across the two resistors R1 and R2 will, of course, be I x (R1 + R2); the meter to be calibrated is attached in parallel with them, and reads the voltage developed across them. The current flowing through the meter can be anything it likes; it has no influence on the voltage appearing across R1, which will be strictly IxR1.

Now there will be some value of I such that IR1 is exactly equal to the voltage produced by the standard cell (SC) we are using. If that SC is a 1.345 volt mercury cell, the product of I times R1 must be 1.345 exactly if the galvanometer, G, is to read zero. If it is either greater or less, current will flow through G.

Let's use the most sensitive current-indicator handy as our galvanometer. That may *not* be your lovely 50 microampere meter, either; it may turn out to be a 500 microamp. meter that was originally part of an r.f. ammeter—because of the very low internal resistance of the meter movement. Make a few checks on that point; it may take 1/10th of a volt to move that 50 uamp. meter, because of high internal resistance, while 1/200th of a volt will jiggle the 500 uamp. job.

R4 is put in series so that the galvanometer won't be overloaded when the system is way out of balance; the push-button switch shorts out the resistance when you've got the thing about balanced.

Start with the resistor R4 in circuit, and change the variable R3 till the galvanometer reads zero; then cut out R4, and rebalance accurately. You then know that the voltage across R1 equals the no-load voltage of the standard cell—1.345 volts if you're using a single mercury cell.

You do *not* need to have the slightest idea what the actual value of R1 is, nor do you need to know what current is flowing in the circuit; you need know only that whatever the resistance of R1 is, the value of I is, when the galvanometer reads zero, such that the product of IR equals 1.345.

You do not need to know the actual value of R2, either; but you do need to know the *ratio* of R1 to R2. You can, of course, use precision wire-wound resistors for R1 and R2, and get the ratio of values from the precision labels. But you can, on the other hand, use an automobile storage battery for your heavy-duty battery, and make R1 and R2 a couple of lengths of nichrome resistance wire. If you use 3 feet of wire for R1, and 27 feet of wire for R2, then R1 will be 10% of the sum of R1 plus R2, and when the galvanometer reads zero, the meter calibration should read 13.45 volts.

You can't measure resistances with the extreme accuracy you want—but a yardstick will give pretty darned good ratio of lengths. If the wire is reasonably uniform in cross-section, the resistance will be quite accurately directly proportional to length. It's fairly easy to run a couple of amperes through a piece of nichrome wire, and get the voltage you want on R1; on the other hand, you can run a couple of milliamperes through standard precision resistors and get equally good results.

The best technique for making precision measurements is the technique that remains precise, even when your equipment is sloppy. Then by making your equipment neat, clean, and tight, your assurance of precision is that much greater.

Simple, Neat

This potentiometer set-up has the simple elegance of all the basic scientific techniques; the standard cell operates at zero load. The galvanometer need only say "yes" or "no" as to whether there is current flowing—it doesn't have to measure. The resistors don't have to have any particular value; they need only have an accurately known *ratio*.

If you can establish a resistance ratio between R1 and R2 of 100 to 1 with the 1% or better accuracy you want, the voltage check can be carried up to the 150-volt range, using an ordinary B-supply instead of the larger battery to balance against the standard cell. If you use the 8.070 volt mercury battery, a ratio of 10 to 1 takes you to 80 volts; a ratio of 20 to 1 takes you to the 160 volt level.

Incidentally, if you don't have, and can't get the 1% precision resistors, since only the resistance *ratio* is critical, the Wheatstone Bridge system can allow you to go from something you can measure with a yardstick, to something in the order of hundreds of ohms, where you can measure higher voltages.

The essential Wheatstone Bridge system is this:—

[*Continued on page 116*]

an Improved Filimiter

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The C-W filter-limiter described by Ferres in the July '56 *CQ* does an excellent job of noise reduction, but it does have two limitations which are overcome by the circuit described here.

In the first place, the author has found that having to copy all signals at 800 cycles becomes annoying after several hours of operation and at times it seemed that QRM could be reduced if the beat note could have been shifted slightly. The Improved Filimiter, therefore, provides a choice of both 800 and 1000 cycles which overcomes this drawback of the original model.

Second, it was discovered that in suburban areas and on frequencies where the QRN was low enough to approach the inherent noise level of the receiver, more gain was required in order to obtain better limiting action. A different type of limiter was included in the new unit and this proved more satisfactory when the noise level was low, and it also worked just as well when the QRN was heavy.

The Improved Circuit

The improved circuit is shown in *Fig. 1*. The first stage consists of the triode section of a 6AN8, wired as in the original model. The second stage uses the pentode section of the 6AN8, the output of which feeds a 6AL5 connected as a full-wave shunt limiter. This circuit has been used before and found to be very effective (reference 1). Negative noise peaks cause one diode to conduct and positive peaks, the other diode. When either diode conducts, the plate load of the pentode drops from 240,000 ohms to about 5000 ohms, providing a very flat limiting characteristic. The cathode of the positive-conducting diode is biased positive by the voltage divider made up of *R10* and *R11* and this bias determines the maximum output level of the stage. The limiter characteristics are shown in *Fig. 2*. The pot, *R5*, in the grid circuit of the pentode, is a "set and forget" control mounted on the back drop of the chassis and is used to adjust the overall gain of the unit. *R12* is mounted on the front panel and serves as the regular gain control, adjusting the signal level in the phones. A 6C4 is used as the output tube of the filter-limiter. The parts can be easily mounted on a 3″ x 4″ x 5″ aluminum "Fleximount" case.

The theory of the series-resonant tuned circuits was covered completely in the previous article so it will not be gone into again here. The choice between the two peak frequencies is selected by the DPST toggle switch, *SW1*. When *SW1* is open, *C2* tunes *CH1* to resonance at 1000 cycles and *C12* tunes *CH2* to 1000 cycles also. Closing *SW1* connects *C3* across *C2* and *C13* across *C12*, lowering the resonant frequency of both circuits to 800 cycles. The output at 1000 cycles is about 3 db lower than at 800 cycles, but this was not found to be of any importance. The frequency response of the filter is shown in *Fig. 3*. A slope of 34 db/octave is obtained at both 800 and 1000 cycles.

The Filimeter requires 150 volts at about 3 ma and 6.3 volts at .9 amps. This can often be obtained from an auxiliary power socket on the receiver. If a separate power supply is more convenient, the one shown in *Fig. 4* can be used. The parts can be mounted on a 2¼″ x 2¼″ x 5″ case.

Tuning

Mica condensers were not found necessary in the tuned circuits so the less expensive paper condsensers were used instead. As the chokes *CH1* and *CH2* vary somewhat in inductance, the condensers used to tune them

1. Emerick Toth, "Noise and Output Limiters," Part 2, Electronics, December, 1946.

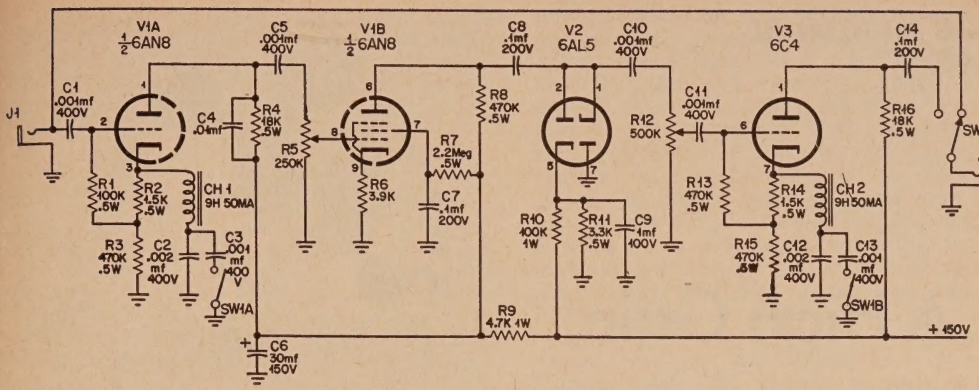


Fig 1. CH1 & CH2 are Stancor C1215.

should be selected by experiment. If maximum selectivity is not required, satisfactory results may be obtained by using any .002 mfd condensers for *C2* and *C12* and .001 mfd for *C3* and *C13*. For the sharpest selectivity, however, the following procedure should be followed.

The best way to tune the circuits accurately is to feed a 1000-cycle tone into the input jack at a level of about one-half a volt. Remove the 6AL5 from its socket, set the gain control *R12* to maximum, connect an output meter to the output jack and set *R5* so that the output meter just barely shows a reading. Switch *SW1* should be open. Now temporarily connect a .002 mfd condenser into the circuit in the position shown for *C2*, reducing the setting of *R5* if the output meter goes off scale. Try other .002 mfd condensers, as they may differ as much as 40% in capacity, or other condensers near this value until the maximum output reading is obtained at 1000 cycles. Solder in the condenser selected. The next step is to close *SW1*, feed an 800-cycle tone into the input jack and select a condenser of about .001 mfd for use as *C3*. After *C2* and *C3* have been wired in, repeat the above procedure for *C12* and *C13*. When making these adjustments, the voltage at the output jack should not exceed about one volt. When it goes above this, reduce it by adjustment of *R5*.

After the condensers have been installed, replace the 6AL5, connect the input jack to the phone jack of the receiver and plug a pair of phones into the output jack. Set *R5* to about half-way on, and the Filimiter is ready for use. Some experimenting with the receiver r-f and a-f gain controls as well as with *R5* and *R12* will be necessary until the best operation with the existing noise conditions will be obtained. The setting of *R5* is not critical and once it is set, may be left alone.

As highly selective r-f circuits, such as a crystal filter, tend to integrate the peaks of impulse noise, the best signal-to-noise ratio is usually obtained when the receiver i-f is set to as broad a response as possible, being governed, of course, by the QRM encountered. ■

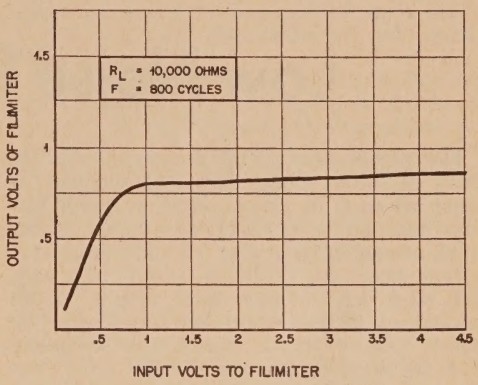


Fig 2.

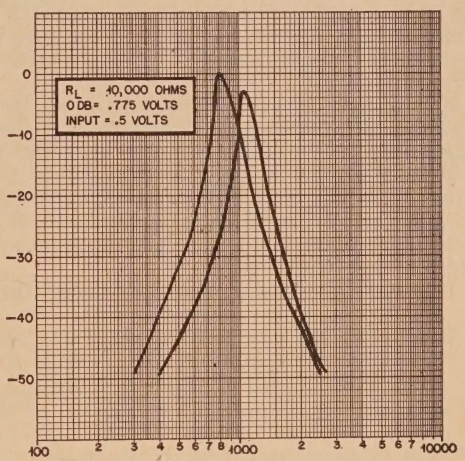


Fig 3.

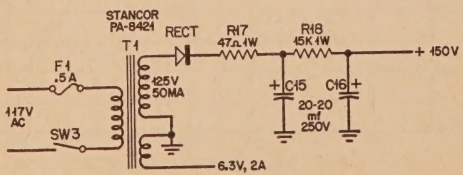
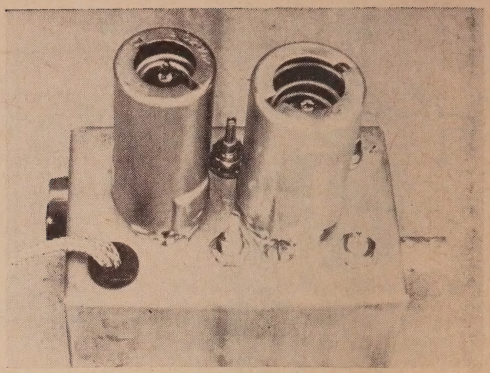


Fig 4.

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A High Gain, Low Noise Preamp For Ten

The preamplifier to be described, was the result of seeing many articles in the past, in which all sorts of claims were made for preamps and preselectors, and yet were not backed up by actual figures arising from measurements. A few, gave their results in gain figures only, and most writers gave their results in the amount of increases seen on the receiver S-meter. Lack of noise, which was sometimes given as an advantage, still did not satisfy me. The lack of proper matching at input and output, and the necessity of retuning each time the receiver frequency was changed, were additional reasons for my attempts at a good preamp, with results obtained by actual measurements.

Having had considerable experience in the development of high-gain i-f amplifiers in the neighborhood of 60 mc, I was well acquainted with the problems involved, and the results to expect from this particular circuit. If it could work so well at the higher frequencies, I decided to try adapting it to the lower frequencies and see what would result.

The unit to be described, has overcome the above mentioned problems, and at the same time provides better than 22 db of voltage gain, with a very low noise figure. More will be said later about the noise figure.

The first unit was built without regard to the output circuits in respect to matching and tuning, using the circuit in *Fig. 1*. A bench test, into a 10k ohm load, indicated a voltage gain of 12.5, which is equal to 22 db. The output circuit tuned sharply, and had to be retuned each time the input frequency was changed. When it was connected to an NC-125 the weaker signals were increased by 4 S-units, with a noticeable decrease in background noise. Stronger signals, increased from S-7 to 20 db over S-9.

Because of the encouraging results, it was decided to build another unit, adding two desirable features, eliminating tuning by broadbanding, and properly matching the output impedance. This was accomplished by use of a broad-band overcoupled circuit in the output of the cascode circuit, and adding a cathode follower.

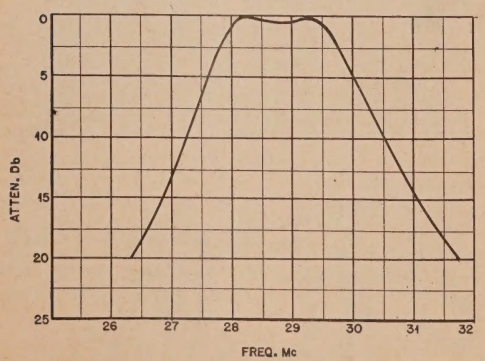


Fig. 3. Overall response of preamp.

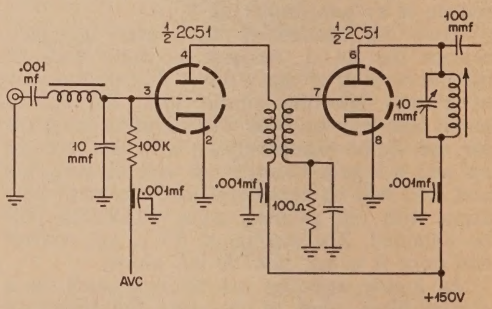


Fig. 1. Original circuit with unmatched output. Pin seven (7) should be connected to ground, and the coil should be connected instead, to pin eight (8).

A few (but not simple) calculations resulted in the circuit shown in *Fig. 2*. The measured response is shown in *Fig. 3*. For the range of 28.0 to 29.6 mc, the maximum attenuation is 1.0 db, and essentially flat from 28.1 to 28.9 mc.

Circuit Description

The first two triodes are halves of a 2C51, and are used in the familiar cascode circuit with two deviations from the generally used arrangement: the use of a series tuned input, and the cathode coupled circuit. The 2C51 lends itself well to this type of a circuit, since the two halves of the tube are laid out symmetrically and have an internal shield terminating centrally at the socket.

The input coil, *L1*, forms a series resonant circuit with the capacity of *C1* in parallel with the tube and wiring capacities. The impedance of this combination is approximately 250 ohms for the value given, and provides a voltage step-up of 5:1 at the grid. With the antenna connected, the series circuit provides a low impedance input at resonance. Should the antenna become shorted, the input end of *L1* becomes grounded, and the grid becomes a high impedance point with the tuned circuit in parallel resonance. Should the antenna become open or disconnected, which is more likely, the input becomes the impedance of the capacities alone, since *L1* is no longer in the circuit. Under these conditions the grid is practically bypassed by the capacity of *C1* to ground. This prevents any possibility of oscillation. While not of great importance as used here, the same circuit can become a headache when followed by amplifiers with a total of 100 db gain, as it is normally used at the higher frequencies.

The use of a bifilar coil (two windings with the turns of one winding adjacent to the turns of the other winding) to couple the plate of the first section to the cathode of the second section eliminates the loss of gain normally encountered in a cascode amplifier when the two elements are directly tied together. Under these conditions the plate voltage is divided across the two sections in series, and full gain of the sections are not realized. With full plate voltage on each half of the tube, the plate is still directly coupled for r.f. to the following cathode by the 1:1 turns ratio and unity coupling of the bifilar winding. The 100 ohm resistor in series with the secondary of this coil provides bias for the grounded grid section. This winding is loaded by the approximately 350 ohm impedance of the cathode, and results in a low Q, broadly tuned circuit. Because of this the slug has been omitted, as it does not require tuning. The primary is tuned by the plate capacity of the first section, and is loaded by the reflected impedance of the heavily loaded secondary.

The output load of the second section is a double-tuned overcoupled bandpass circuit, and is loaded by the 5600 ohm resistors across each coil to give a flat response over the required frequency range. Coupling is provided by the 1.5 $\mu\mu$fd condenser, *C13*.

The cathode follower was designed to pro-

Parts List

(All resistors are ½ watt.)

C1—12 $\mu\mu$fd, NPO, tubular ceramic.

C2, C3, C4, C5, C6, C7, C8, C9, C10, C11 — 1000 $\mu\mu$fd, disc ceramic.

C13—1.5 $\mu\mu$fd ± .25 $\mu\mu$fd, tubular ceramic.

C14, C15—22 $\mu\mu$fd, NPO, (*RMC Type C* disc ceramic or equiv.)

C12—1000 $\mu\mu$fd, Feedthrough bypass. (*Centralab MFT-1000.*)

R1—100,000 ohms.

R2—68 ohms.

R3, R5—10 ohms, composition.

R4—100 ohms.

R6, R7—5600 ohms.

R8—680 ohms.

RFC1—15.0 μh. r-f choke. (*Jeffers 10102-36 or Ohmite Z-28*)

RFC2—0.22 μh. r-f choke. (*Jeffers 10100-22 or Ohmite Z-460*)

L1—17 turns #24 Formex wire, closewound.

L2—22 turns #32, each winding, Formex wire, closewound. (See text.)

L3, L4—15 turns #24 Formex wire, closewound.

Forms used, ¼" ceramic slug-tuned, iron core. (*CTC-LS6, 2C3L* for all but L2. For L2, a *CTC-LS6, 2C4L*, was used, since this has four terminals.)

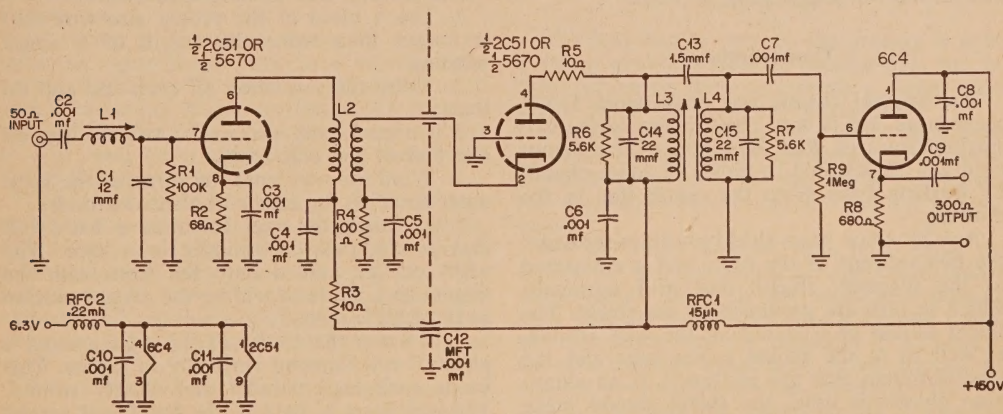


Fig. 2. Final circuit using cathode follower output. Although not shown, pin 5 of the 2C51/5670 should be soldered to the shield.

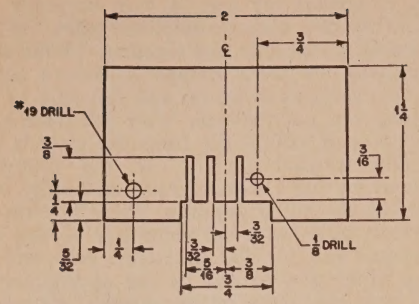


Fig. 4. Layout of interstage shield.

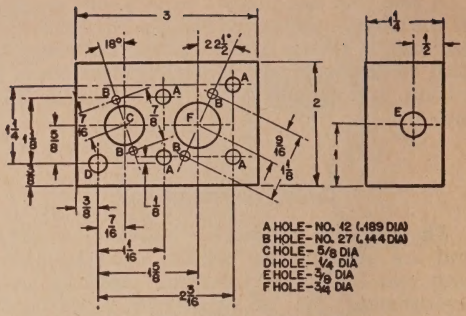


Fig. 5. Chassis layout; top view.

vide a proper match to the receiver input, which is nominally 300 ohms. From the calculated values a 3900 ohm bias resistor was arrived at, in order to drop the 330 ohm cathode impedance of the 6C4 to 300 ohms. In actual tests, the output voltage was almost doubled when the 680 ohms shown in the circuit of *Fig. 2* was used, and the output was loaded by a 300 ohm resistor.

It might be noted at this point, that better control of strong signals might be obtained by returning the 100K grid leak of the first triode, to the a-v-c line of the receiver after bypassing with a 1000 $\mu\mu$fd condenser, instead of returning it to ground.

The 10 ohm resistor in the plate lead of the second section was put in to prevent a possibility of oscillation around 450 mc, the internal resonant frequency of the tube. Experience has shown that it successfully damps out any tendency toward this oscillation, but does not affect the normal operation of the tube, so it was included as a matter of course.

It may appear to those unfamiliar with high frequency wiring that there is an excessive use of bypasses and chokes. However, I have learned by bitter experience that it is better to put them in at the start, rather than find out they are necessary after wiring is completed and all the components are in place.

Construction

The original chassis was made from 1/32" sheet brass, but is very close in size to the two smallest sizes of *Bud Mini-boxes*. The layout used can be adapted to either of these chassis by working away from the center line in the drawing.

A .020" thick brass shield partition separates the two sections of the tube, and is connected to the filament, shield, and grid terminals, which in turn are grounded by the shield. The shield should be soldered all the way around, as well as to the socket center post and the tube terminals that are grounded. If an aluminum chassis is used, the shield should make good contact with the chassis in several places, and grounded by solder lugs mounted on the socket mounting screws. The shield dimension used is shown in *Fig. 4*.

The chassis layout is shown in *Fig. 5*, and should be followed as closely as possible since the position of the components allows for easiest wiring and best results. This layout is similar to that used at the higher frequencies and has proven to be quite trouble-free.

The center hole for the input connector is shown, but the type used is left up to the builder. For 50 or 75 ohm input, it should be of coaxial type. The output connector may be of any type; banana jacks being used in the original unit to facilitate testing and measuring.

The #19 hole shown in *Fig. 4* is for mounting the feed-through bypass condenser *C12*. The 1/8" hole is for the lead connecting the second cathode to the secondary of the bifilar coil. The shield, if made of thin material, can be easily cut with a pair of small sharp scissors or a coping saw with a fine blade.

Winding The Bifilar Coil

For those not familiar with winding a bifilar coil, the task may seem quite difficult. After having sworn at quite a few myself, I found that it can be done quite easily if it is done systematically. The method is as follows:

1. Use a piece of the proper size wire that is longer than twice the length of a single winding.
2. Clean the insulation off each end and tin them.
3. Connect each end to the two tie lugs on one end of the coil form.
4. Wind the wire onto the form, or the form onto the wire, by either of these methods:

a. Chuck the coil form in a hand-drill that is clamped horizontally in a vice. The wires can be guided onto the form with the fingers as a guide providing the proper tension as the drill is turned.

b. Loop the center of the wire around a piece of rod clamped vertically in a vice. This keeps each lead parallel and closely wound. The coil form is held in the hand and turned so that the form rolls up the wires. Be sure to keep proper tension while winding.

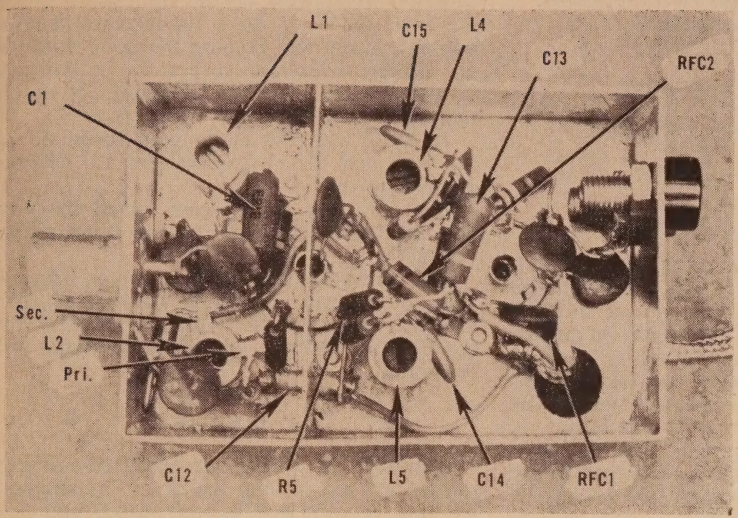


Fig. 6. Bottom view of wired chassis. Main components and their locations are identified.

5. When the proper number of turns have been wound on the form, wrap the wires lightly around the terminating lugs to keep the turns from unwinding, and cut them off leaving an extra inch or so. Coat the coil with coil dope, and when dry, the leads can be unwound from the lugs, skinned, and soldered.

Wiring

The layout of the chassis and components can be seen from the photographs, the major components are identified in *Fig. 6,* with the windings of *L2* identified. *Fig. 2* shows the ends of the coils that are connected to the tube terminals and ground, the tops and bottoms being indicated by a *T* or *B* respectively. An additional resistor may be noticed in the bottom view of the chassis, connecting the primary of *L2* to the plate of the first section. This was used to kill an oscillation that showed up with a high impedance antenna connected, but can be left out.

In wiring it is best to leave the coils out until the components have been wired to the socket terminals. A ground lug under each socket mounting screw facilitates the connection of grounds. These should be in addition to lugs used to ground the shield mentioned under *Construction.*

The lead from the bottom of the secondary of *L2* to the cathode is seen in the photograph, *Fig. 6,* and is a piece of #22 bus wire covered with a piece of small diameter spaghetti. The wiring on all other components except the cathode lead and the choke leads should be kept as short as possible, and wired as directly as can be done.

Where chokes are used the importance of using the shortest lead length does not apply. Since chokes are resonant circuits by themselves it is more important to place them away from the coils, and as near to ground as possible. Here again, experience has been the best teacher.

The filament and plate supply leads consist of a double shielded wire, and is brought out through a small rubber grommet. Separate unshielded leads may be used, but a good ground connection must be made with the power supply or receiver.

Power Requirements

The power requirements are 6.3 v. at .45 amp. for the filaments, and a maximum of 150 v. for the plate. The total plate current at this voltage is 25 ma., with the 2C51 drawing 20 ma. A lower plate voltage may be used with a slight sacrifice in gain, but should the maximum indicated be exceeded, the plate dissipation of the tube would be excessive.

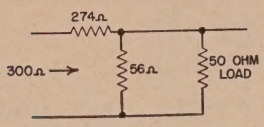
Tuning Up

The best way to tune up the preamp is with a sweep generator and an oscilloscope, but in the absence of such equipment a signal generator or on-the-air signal will suffice.

For sweep alignment, *L3* and *L4* should be adjusted for maximum amplitude and flattest response centered at 29 mc. *L1* is then tuned for maximum, readjusting *L3* and *L4* if necessary.

For the other method, tune in a signal on or near 29 mc and detune *L3* and *L4* for minimum signal. Peak *L1* for maximum output, then tune *L3* for maximum. *L4* is then tuned for maximum, and *L1* repeaked if necessary. Be sure that the signal used is low enough to prevent overloading of the preamp or the receiver. The response shown in *Fig. 3* was the result of tuning with a signal, and using the latter method.

Fig. 7. Matching pad used for measurements. 274Ω should read 240Ω



Gain And Noise Measurements

Since the gain measurement can be made in several different ways, it was decided to use as many methods as possible and see how the results compared. From experience in an experimental lab, I have learned not to trust one type of measurement unless it can be proven by one or more additional measurements. The problem here was to arrive at figures for 50 ohm input and 50 ohm output, and the equivalent in a 300 ohm input when comparing the gain of the receiver without the preamp. A matching pad, shown in *Fig. 7*, was used to transform 50 ohms to 300 ohms, and vice versa. Its attenuation was calculated to be a voltage ratio of 22 to 1, or the equivalent of 13.4 db. When used in the output of the preamp an additional gain of 4 db was measured, and the pad output being loaded by a 50 ohm termination dropped the output voltage in half, giving an added 6 db, a total voltage gain of 23.5 db.

Two other methods for measuring the voltage gain were used. The first was to compare the output voltage across a 300 ohm resistor, and the second was to measure the stage-by-stage voltage gain in the preamp, both in relation to the open-circuit voltage of the signal generator. For both measurements, a *Milivac* was used. This instrument is a vacuum-tube milivolt meter with a very high input impedance and reading as low as 10 milivolts. Under these conditions the measured gains were 22.5 db, and 21.5 db, both fairly close to each other.

Using an HQ-129X with the preamp connected to it, signals were increased by 5 S-units. According to the manufacturer, one S-unit is equal to an increase of 6 db, but is probably less. This also gives a figure of 25 db average.

For noise measurements, using the receiver, the generator output required to give the same output from the receiver without the preamp was 16.4 times the voltage required with the preamp connected. This is equal to slightly more than 24 db. For equal signals with and without the preamp, the noise was down 20 times when modulation was removed. Although not conclusive, they aid in coordinating the results.

The final method of measuring the noise was with a noise generator of commercial make, with the preamp connected to a *Super-Pro* receiver. Although "noise-figure measurement" may sound like a complicated deal, it is only a matter of hooking up the equipment, setting the noise generator for a 1.4 increase in noise output voltage, and reading the noise figure in db directly from the generator. In the case of the preamp two sets of figures were obtained:

1. 3 db, with the audio gain tuned up all the way, and the r-f gain set for 1.0 volt out of the receiver.

2. 4 db, with the r-f gain up all the way, and the audio gain set for the same output voltage.

This indicates that the best noise figure is with the r-f gain set below maximum, otherwise the receiver noise will begin to enter into the picture, and the overall noise figure will deteriorate.

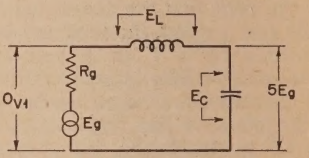
Conclusion

Although this preamp was designed and built mainly for ten meters, the same circuit could be used equally well on any band, and possibly in a band-switching unit. However, the idea of switching was discarded for the time being, due to the complexity of switching so many points and maintaining the same stability.

It is hoped that in the near future information for coils for other bands will be completed so that those desiring may apply this preamp to their favorite band.

Appendix

For those interested in the theory of the input circuit of the cascode, the following is offered:



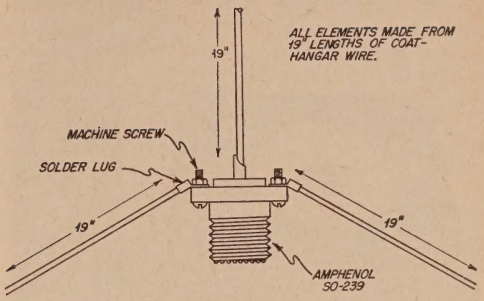
O_{v_1} should read E_{g_1}

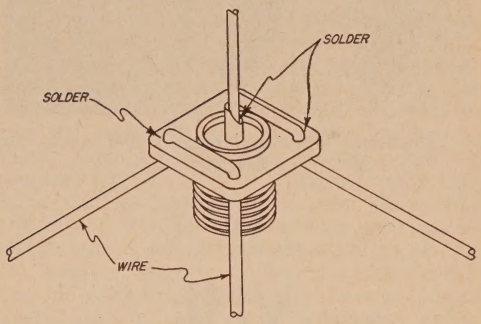
The input may be regarded as a series-tuned resonant circuit fed by a generator with its internal impedance R_g. At resonance $X_L = X_c$, and the voltage across the resonant circuit is zero due to the phase relationship of E_L and E_c. Since all elements are in series the phase and amplitude of the current I_a is the same in each component. The applied voltage E_g appears across the source impedance R_g due to the current, and $E_g = I_a \times R_g$, or I x 50, in the case, of a 50 ohm generator. The voltage appearing across the coil and condenser are:

$E_L = I \times X_L$ and $E_c = I \times X_c$

Since the grid impedance is $X_c = 250$ ohms, $E_c = I \times 250$, or five times the input voltage. Therefore:

$E_{grid} = 5E_g = 5 : 1$ step-up in voltage at the grid. ■





Poor Man's Ground Plane

Robert C. Lieberman, KN2RIC . .
519 E 32 St.
Paterson 4, N. J.

For Six-bits you can become the owner of a real, honest-to-goodness, shiny, brand new, everlasting, all metal, sturdy, reliable, cheap, beautiful, too good to be true, sweetperforming, compact two meter ground plane antenna. (etc.)

This little peach of a ground plane is as easy to construct as five solder connections and tightening four nut and bolt combinations. As a matter of fact that's all it takes to build it. The Secret?

The whole design is centered around an Amphenol SO-239 female chassis mounted r-f socket. If you don't have one in the junk box or the local surplus house doesn't have one the cost new is less than 75¢. A wire nineteen inches long is soldered to the center connection of the SO-239. This forms the vertical radiator. From the four corners wires 19 inches long connected to solder lugs are bolted and chinched up fast. If 72 ohm cable is used bend the ground plane wires down about 45 degrees or more. Only a slight droop, if any, is necessary if the ground plane is fed with 50 ohm coax. Due to the differences in measuring length of ground plane and vertical elements for any one antenna the exact droop can only be found by experimentation.

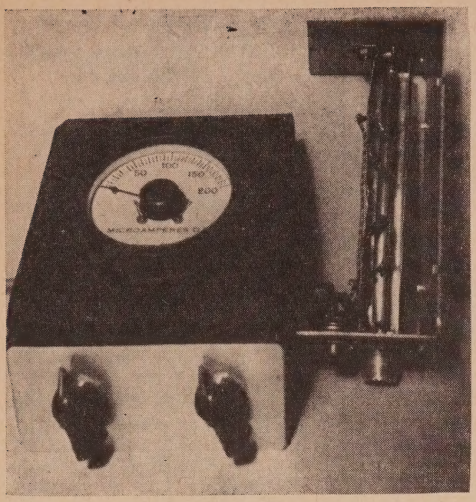
Experience has shown that coat hangers can be used but are very difficult to solder and any successful solder joint is liable to be "cold." It is recommended that copperweld or any type of heavy wire be used for the radiating elements.

A much more desirable antenna and one that can be used for mobile applications also is to cut two lengths of wire 40 inches long and solder it directly to the SO-239, the wire passing through two corners on the same side.

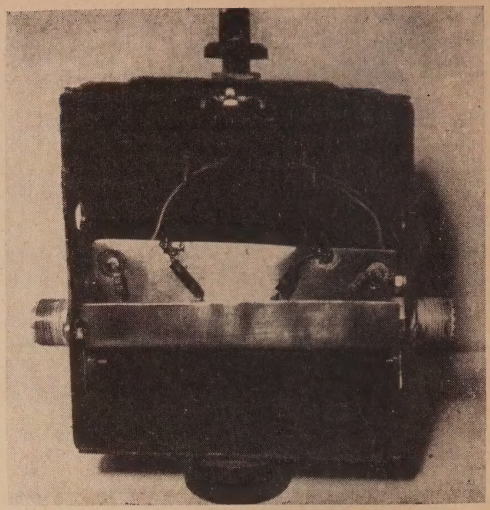
This antenna can then be connected to a length of coax cable and taped to any vertical support. Spray the socket with plastic spray when finished.

Another type of mounting is to pass the cable through a length of pipe (conduit) which will support the antenna. No connection is necessary to the pipe. It serves as a clean mount and makes the antenna look professional. For mobile use lash the antenna to any convenient point on the car and pass the cable in through the window to the rig. The Author has used a suction cup mounted on a coax 90° elbow connection to mount the antenna on top of the car.

Results have been far superior to other types of antennas used for two meter mobile. Results with two of the ground plane elements broken off seemed just as good as with four. With only one element left signals were down only slightly (couldn't tell by ear, only meter). But with all elements off . . . nothing. ■



Indicator for several couplers and inside view of 432 mc coupler.



Couplers for general VHF use.

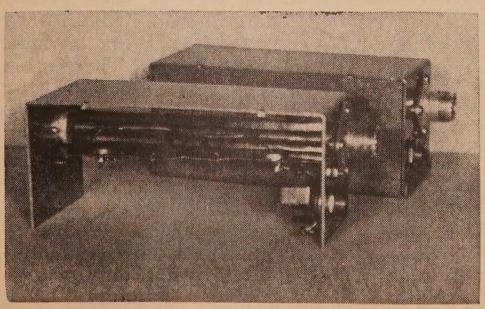
VHF Directional Couplers

Frank C. Jones
850 Donner Ave.,
Sonoma, Calif.

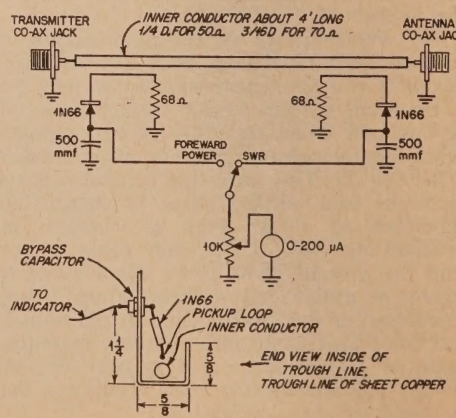
A device for measuring relative power output or standing wave ratios in the coaxial line out of a transmitter is very useful in working on a beam antenna, or as a check on the tuning and output of any VHF transmitter during normal operation. The resistor type power devices are difficult to construct properly for other than HF use, while the inductive pick-up loop type are very simple to build and easily adjusted. The only disadvantage of the inductive type is that the calibration is only good for one particular band. This can be overcome by several calibrations on the indicator, or by using a separate coupler for each transmitter and a plug-in indicator with one calibration.

The indicator consists of any sized microammeter available, a meter case, a SPDT reversing switch, and a potentiometer across the meter for calibration purposes. If an ac-

220 and 144 mc couplers for insertion in coax lines.



VHF Directional Coupler.



curate calibration is not desired, a O-1 milliammeter may be used for any transmitter having an output of over 10 watts. For accurate standing wave measurements, a O-100 or O-200 microampere meter is desirable. For low power measurements, a sensitive microammeter is needed.

The directional coupler itself consists of a short section of coaxial or trough line of 50 or 75 ohm impedance in series with the coax line between the transmitter and the antenna or antenna coupler. This type of RF indicator is designed for coax lines only and cannot be used directly in open wire or twin lead antenna feeders. The trough lines used in these couplers shown here were about 4½ inches long and were mounted in small aluminum boxes with the coaxial line fitting at each end. The actual trough line length is not important provided it is a small fraction of a wavelength long. In each trough line are two short pick-up loops inductively coupled to the inner conductor. These loops connect each to its terminating or balancing ½ watt 68 ± ohm resistor and each to a 1N34 or 1N66 diode and by-pass condenser. The two loops are in effect back to back so one indicates forward and the other the back waves along the transmission line. The exact value of resistance is practically independent of frequency and seems to depend on the length of RF pick-up loop. Pairs of ½ or ¼ watt resistors (not wire wound) were picked out with an ohmmeter. Any matched pairs lying between 60 and 70 ohms seem to give a good balance for either 50 or 70 ohm bridges on all the VHF bands. A pair of old carbon resistors with line leads wound and soldered around each end of a carbon rod were tried, but no SWR balance could be obtained. The small "carbon" insulated types worked fine and the axial lead with a insulating sleeve acts as the pick-up loop with its free end soldered to the 1N66 diode lead about ⅛ to ¼ inch from the diode unit.

The two diodes should each have the same side connected to the pick-up loop so the meter indicator can be switched to either loop and diode for RF indication. Any miniature type diodes may be used. The RF bypass condensers were of the mica button type having capacities ranging between 400 and 1000 mmfd. This type of bypass condenser is better than most other types in the VHF range. They were mounted in the flashing copper trough lines in or on ⅜ inch holes and soldered in place. The center tabs act as the bypass feed thru terminals for connection of each diode to the DC meter jack or cable to the metering device. A three way jack and plug permits connecting the indicator into any transmitter directional coupler.

The trough lines were made of thin sheet copper sold by sheet metal or hardware stores as "flashing copper." Pieces about 5 inches long and 2½ inches wide were formed into trough lines in a small vise. Small tabs at right angles to the 4 to 4½ inch long troughs, permitted mounting the lines to the mounting bolts on the bases of the coax line fittings at each end of the aluminum boxes (which were approximately 5x2x2 inches in size.) The 50 ohm units were made with ¼ inch diameter copper or brass tubes, and the 70 ohm units with 3/16 inch diameter tubes soldered to the inner conductor terminals of the coax fittings. In both cases the trough line was made ⅝ inch square with one side extended out an extra ½ inch for mounting the bypass condensers and balancing resistors.

The normal procedure here was to connect the directional couplers into the 50 mc transmitter line with a 50 or 70 ohm carbon resistor termination (2 or 3, 150 ohm 2 watt resistors in parallel directly across the output coaxial jack). With about 5 watts or so of r-f power output, the coupling units were adjusted to give the same full scale deflection reading at some given potentiometer setting—with the coupler turned over or reversed back and forth during these adjustments. Once this adjustment has been made with a 6 or 10 meter transmitter, it isn't necessary to reverse the coupler itself and the reversing switch can be used to indicate either power output toward the antenna or SWR reverse power back towards the transmitter. With a resistor termination, the SWR reading should be zero, and full scale when the antenna jack is open circuited if the forward wave reading in both cases is full scale. With an antenna termination the SWR reading will be some fraction of the forward reading and if these are less than a 10/1 ratio it behooves the operator to readjust the beam antenna stub or tuning adjustments at the antenna.

Once the forward and reverse loop coupling adjustments have been made, the aluminum box covers can be put on, and the directional couplers connected permanently into the coaxial lines on each transmitter for monitoring, the actual RF power output and checking the SWR power in each system. This arrangement is in use by W6AJF on 432, 220, 144 (one vertical and one horizontal beam on this band) and 50 mc. The same type of coupler can be used on lower frequencies by using longer RF pick-up loops in order to obtain reasonably good sensitivity at the lower frequencies where the inductive and capacitive reactances are less. The total cost of each directional coupler (less indicator) can be kept below $4 and the construction and adjustment of 2 or 3 couplers can be completed in one or two evenings of work. Here the couplers were compared to a Jones micriowatch unit (43rd cousin once removed?) for actual power and SWR calibrations once the balance conditions were made on each coupler. ■

Project Handicap

Jack J. Meniktos, W6TFO . . .
P.O. Box 4274
Calistoga, Calif.

An article on such a non-technical subject as this might appear out of place in a magazine devoted to the intricacies of radio except that it presents another facet of our hobby which could be one of the most interesting you have yet explored.

To begin with, this is in no way a bid for sympathy for myself or any other handicapped person. The general run of sympathy has no substance to anyone except to the giver. Yet sympathy coupled with the will to do something practical is like connecting a final amplier to the antenna. Without an antenna, the final is useless, and without the final—well, you can receive signals but you are unable to transmit them. We need a few more final amplifiers for our sympathy antennas.

There are many thousands of handicapped persons in our country for whom time is a burden. Their families are not always able to alleviate this burden because much of their time is required by the everyday problems of living. A handicapped person then must try, as far as is possible, to be his own morale booster. As steadfast as he may be, this is often not good enough and the gaps must be filled by his friends. Can friends fill the void? Certainly, but how many real friends does a shut-in have? Take a moment to think about what would happen to your circle of friends should you drop out of circulation for six months or so and be confined to the house or bed for this time. Where you might have counted your friends in the hundreds before, the number drops to a handful. Wonder why? The answer is simple. Friendships are built on something called "common ground", but when you become a shut-in most of this ground disappears. Only those whose roots were deep in your common interest remain. Those whose roots were superficial are flung away to take root elsewhere. When you step away from an active life, you pass into another world and only those few fast friends make the journey with you with their assurances of help in any way. These friends give the handicapped a spiritual reason for existence, the key to a healthy mind, and I might add, the first key that opens the first door to physical health. What about the physical side? This is where you amateurs come in, providing a means for the handicapped to accomplish something—a desperate need for these persons.

Why You?

Although many training organizations for handicapped exist, limitations of distance and cost render them inadequate to assist many. Rehabilitation organizations sometimes assist only those who are considered good financial risks or who can be reached by available transportation, leaving many without hope for the future and these are the people needing our help. Perhaps now the light is beginning to shine on just what you can do to bring hope and happiness to some of those who cannot be reached by rehabilitation services. You are really, in many respects, a trained therapist with the ability to teach and guide others in the field of amateur radio. While helping someone else, you will invariably help yourself. Maybe you are a little tired of "yakking" on the air, or general interest in the hobby, may be lagging a little. Why not try reviving your interest by helping someone else. You can even relive the excitement of getting an answer to your first "CQ" by watching the progress of your handicapped protege.

Needless to say every handicapped person will not be interested in being a radio amateur. It is for you to make a tactful approach to determine whether his interest in the hobby might be stimulated. Remember what I said about sympathy at the beginning of this article? Your handicapped friend will know your intentions concerning sympathy as soon as you open your mouth, and don't be surprised at what you may see. There are no surprises where the handicapped are concerned. An important consideration lies in understanding that the person is not helpless in his own mind and if you give your time, you will probably be amazed at what he can accomplish.

Sound Him Out

On your first visits after you have rung out the signal reports and weather to your satisfaction and you have established his interest in radio as a hobby, it is important to find out just what he may have in his final and how much power he can run. In other words, what is his physical capacity? Find out what tube-type he resembles, maybe an 813 or a rugged 304TL. You'll have to run your own curves. There are no charts for the handicapped. Next, compute his amplification factor by exciting his grid with a little of your drive in the form of ideas, keeping his anode voltage low for these tests. His mu will probably appear high in the beginning so apply the drive gently.



W6TFO in 1951 working on a twenty meter final amplifier. The jar hanging from his antenna pole contains ACTH and illustrates excellently the problems described in this article.

[*Continued on page 102*]

Jack J. Meniktos, W6TFO was first licensed in 1940 and worked for Eitel-McCullough and the Piezo Electric Lab at Mare Island Navy Yard, Vallejo, California.

In 1950 he was stricken with rheumatoid arthritis which rendered him all but helpless and pursuit of his hobby was difficult. In 1952 Aaron W. Miller, W6YHS lent a helping hand in Jack's amateur activities and this article is written in tribute to him. At the present time W6TFO's condition is much improved and he gives much of the credit for this improvement to his activity in amateur radio.

He is 34, has an XYL and two children at home in Calistoga, California.

SSB Ten Meter Converter for the BC-458 VFO

John W. Govier, W8QNW
18670 Gilchrist
Detroit 35, Michigan

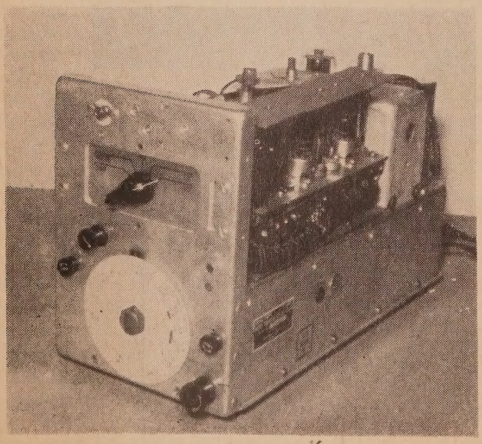
With the increase of sun spot numbers and a noticeable increase in SSB stations, the ten meter band will offer many hours of good DX for those who are able to operate in the 28 mc band. Transmitters of the commercial variety with built in VFO have no problem, but those of us with exciter minus the VFO, usually have a converted BC-458; which makes a very stable unit.

The conversion for all bands except ten meters is not too difficult and can be completed in several hours. For ten meter operation of the VFO, some sort of crystal conversion is necessary to arrive at the frequency of 37.5 mc which most phasing exciters require to operate in the 28 mc band. Such a converter is shown in the photo, being simple in circuitry and using a minimum of components.

The Circuit

The crystal used in the oscillator stage is an overtone type and marked 24.000 mc, however, a 48 mc crystal will work just as well. The injection frequency to the SSB exciter has to be 37.5 mc for 28.5 mc output, due to the 9 mc mixer employed in most SSB exciters. The departure from the crystal frequency of 24 mc is controlled by the BC-458 VFO frequency, which must be mixed with the crystal frequency to produce the necessary 37.5 mc injection voltage to the SSB exciter.

Complete Unit



Confused? Suppose for example, a 24.102 mc crystal is available instead of the 24.000 mc unit, and the BC-458 VFO frequency is set to 5.5 mc. This 5.5 mc frequency is then doubled in the output stage of the BC-458, the 1625, and fed to the converter as an 11 mc injection voltage. Mixing the 11 mc signal with the 48 mc signal, which is the 24 mc crystal frequency doubled, and taking the difference frequency: the resultant output frequency is 37.204. After beating this 37.204 mc signal in the SSB exciter, the output frequency would be 28.204 mc. Therefore it would be necessary to reset the VFO to 5.352 mc instead of 5.5 mc to obtain 28.5 mc output with the 24.102 mc crystal. By using a 24.000 mc crystal and a VFO range of 5.5 to 5.0 mc, the SSB exciter will operate between 28 and 29 mc. The range of 28.5 mc to 29.5 mc can be obtained by using a crystal frequency of 24.250 mc or 48.500 mc, using the same VFO frequencies.

Once the converter has been placed in operation, recalibration of the BC-458 should be made due to added components and wiring. One half of a 6J6 is used as the24 mc crystal oscillator, and is capacitively coupled to the second section, which doubles the frequency to 48 mc. A 6AH6 operates as a mixer with crystal injection applied to the control grid and VFO injection into the cathode. If the BC-458 has been converted to all band operation with the exception of ten meters, all that is necessary is to strap bandswitch using 160 meter output for the injection voltage to the converter. The 37.5 mc output from the 6AH6 is capacitively coupled to the bandswitch, before being connected to the SSB exciter. Filament voltage is taken from the twelve volt source feeding the 1625 output stage in the BC-458 and applied to the 6J6 and 6AH6 in a series connection. Plate voltage is supplied by the SSB exciter power supply and enters the BC-458 at the rear socket, center pin. This plate voltage connection is made at the power supply end of the 20 watt 6K plate dropping resistor for the BC-458. The bandswitch furnished with the *Central Electronics* 458-K conversion kit, for the 160, 80/20, 40, and 15 meter bands, has two insulated contacts that short together in the ten meter position of the switch. The plate voltage coaxial lead passes through these contacts to the converter so plate voltage is applied only in the ten meter position.

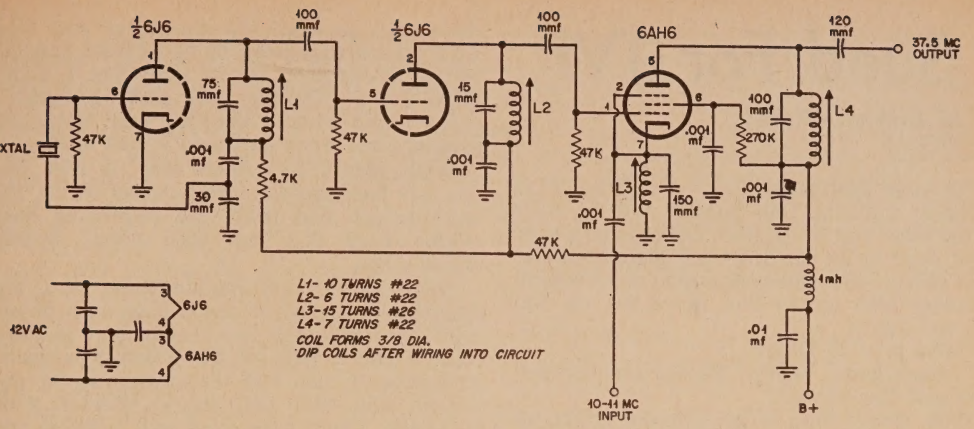


Fig 2

Construction

The complete unit is constructed on a L shaped chassis 6¼ x 1⅜ x 1⅜ inches and secured to a U shaped chassis which serves as a shield. This chassis is also constructed from aluminum and is 6½ x 3⅝ x 1⅝ inches. Fig 1 illustrates the layout of parts. The coil forms are of surplus variety, being ⅜ inches in diameter and having a winding length of ⅝ of an inch. Each coil should be checked with a grid dip oscillator after it has been wired into the circuit to determine whether or not it has the proper tuning range. At the top of the larger chassis that forms the shield for the unit, four small holes should be drilled for slug adjustment on each of the coils. Three of the four holes will not be adjustable once the BC-458 cover is put into place, but the fourth hole, the output slug of the 6AH6, can be adjusted by removing the small plate, which is the access door for the 1625s. The filament leads pass through a ⅜ inch hole drilled in the bottom of the shield chassis, and down into the unused 1625 tube socket, and are soldered to pins 1 and 7 of the active 1625.

The small chassis is attached to the large shield chassis with three metal screws, with about ⅜" clearance between the bottom of the coil forms and the bottom of the shield chassis. The entire unit is then put into place on the right side of the BC-458, and secured with two metal screws. A third screw is used but this one takes advantage of the tapped spacer near the front of the 458 chassis. Two small metal spacers, with the same thickness as the tapped spacer, are placed under the two metal screws, to make the unit level. All wiring except the filament leads, is made from RG-59A/U, with the shields grounded.

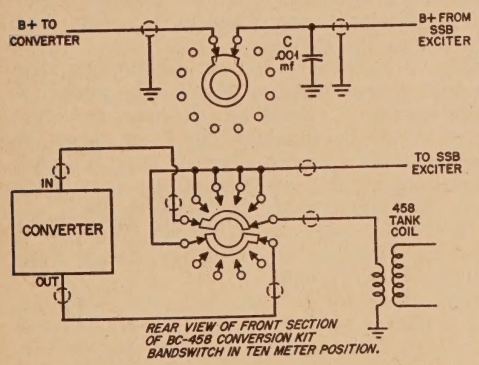


Fig 3

Tuning Procedure

The exciter should be set for ten meter operation and a receiver or other detection device tuned to the crystal frequency. Apply filament and plate power to the BC-458 and set the bandswitch to ten meters. A short piece of wire clipped to the receiver antenna terminal and held near the crystal oscillator, will provide sufficient coupling for determining whether or not the crystal is oscillating. Adjust the slug in L1 to obtain the most stable operating condition by rotating the bandswitch between ten and fifteen meters, with the receiver tuned to zero beat at the crystal frequency. Any departure from zero beat requires a slight readjustment of the oscillator slug. The second coil L2 is adjusted for maximum output at twice the crystal frequency (when using a 24 mc crystal) with the aid of a receiver or vtvm connected to grid and ground of the 6AH6.

Tune the receiver to 28.5 mc and the BC-458 to approximately 5.250 mc. Carefully adjust the SSB exciter, mixer and output controls, until a deflection is indicated by the tuning indicator or receiver S-meter. If no indi-

[*Continued on page 115*]

Sued For TVI

G. M. Carrier, W9PQZ
811 18th Street
Bedford, Indiana

"If your Dad doesn't get off the air we're going to dynamite your house!" said the voice at the other end of the line. Then the telephone went dead in the hands of a frightened twelve year old girl who came rushing to the basement pleading with me to shut down the rig and run for safety!

"Who was it, Dear?"

"I don't know, Daddy, but she sounded real mad and I'm scared."

Well, it was time to go to bed anyway, so the rig was shut down and promised that it would be looked into on the morrow to see what had slipped.

A couple of years ago when the Novice tickets first arrived, the son and I put on an intensive neighborhood search for TVI and we had detected a slight amount of it across the street. Due to our inexperience we had not tuned carefully enough and after a little dial twisting the TVI disappeared. Our very fine neighbor was shown, thereby, what to look for and asked to advise us if TVI showed up again. She was convinced that we meant it and would consider it a favor to hear from her instead of the FCC. We did not receive a single call during our entire year on the air as Novices.

We repeated the procedure when our higher class tickets arrived and could not detect any TVI; a little BCI on an AC-DC radio next door, but nothing serious nor objectionable to the neighbor. Once we tried the 21 mc band, but the up-roar from the youngsters in front of our own TV upstairs stopped that one, and also the lady across the street called and said she was hearing us testing. We had rather expected this and instead of fighting it, we just avoided that band.

So imagine my consternation at receiving a threatening phone call when we thought our carefully laid ground work of neighbor relations would rate a friendly call before hostile forces would be set in motion! But there it was—after 2½ years—our first complaint and we didn't even know who was making it!

The transmitter was checked out the next evening, but not a trace of TVI could be found on our own TV nor on that of the lady across the street, so we signed in on the Indiana Phone Net which meant a matter of about one minute on the air, giving call letters and stating that we had no traffic.

About 20 minutes after making this brief transmission the telephone rang. It was for me, and on the other end was the Police Department. Had I been on the air about twenty minutes ago?

Confusion reigned in my mind. But at least there was someone on the other end who would listen to a word or two before hanging up, so I explained to the cops that I didn't think I was TVI-ing, but gosh, I couldn't check it out without knowing who was complaining, and were they sure it was me?

Well, they didn't know who it was, but the lady had held the telephone up to the TV and the cop had heard the interfering ham talking, and that had been about twenty minutes ago.

Naturally this information came as a big relief to me because it would have been physically impossible for the complainant to have made a phone call, got the police department advised, and then had them listen in on me while I said, "W9QYQ this is W9PQZ with no traffic. Good evening, Frank." But if not me, why all the phone calls?

The answer to that one was simpler than I had thought it was going to be. The lady had obtained a list of all the hams in town and the cops were just going down the list to find out who was on the air at that time to see if they could get the interference located and stopped.

The old brain starting revolving and of course the first thing that popped into mind was, "The old bat must have called every ham in town last night and threatened to blow them up!" (This was later confirmed at Club meeting). But all I said to Mr. Policeman was, "Sure would like to help the poor people out, but can't do it without the name and address." I expected a refusal, but the cop was a reasonable guy and was probably glad to get rid of the complaint anyway, so he gave me the name and address. Woe is me! If only he had refused!

So, big hearted soul, I climbed into the car and drove to the troubled home which was more than a mile away from my home and several miles away from the home of another of the recipients of the threatening phone calls. Knees knocked harder than knuckles as I rapped for attention at the door, but I bravely identified myself as a member of the Hoosier Hills Ham Club interested in anyway possible to eliminate the problem the lady had reported to the Police.

Such a welcome—and no fooling—at that moment I was King of the Earth, and if I really could do anything to help she certainly would be thankful. So I sat down in their big easy chair in front of their TV and enjoyed about five minutes of the show with them: and then suddenly, there it was!

"W9WHL, this is K9BEH, William 9 Whoopin' Hollerin' and Laughin', this is King 9 Baker Easy Howdy."

Both were local boys, but only W9WHL had a phone, so I gave him a land line call and asked him to advise K9BEH that he was pouring in on channel 3 in the North end of town.

This is a little unbelievable even to me, and I heard it personally, but K9BEH is clear out at the municipal airport, 5 or 6 miles South of these people, but his 6 meter transmissions were plenty Q5.

We had a strange hook-up; I was on the telephone talking to Bill, who was on 6 meters talking to Kenny, and Kenny was on Channel 3 talking to me! Experimentation showed that the TVI existed only when the transmitting antenna was pointed North, and so for the evening in question, that solved the problem.

Of course while I was there I tried to be very nice, but I did mention that I for one was very glad to get the thing squared off because I had received a very unusual telephone call that had scared my daughter half to death. I described the call, and naturally the lady of the house was quick to claim that she had not made any such calls as that. Not having said that she had, I let her off the hook without an accusation, but I certainly had my own thoughts.

Bidding the people a friendly goodbye, I told them to call me, or better still call Bill, if they heard K9BEH again and we would, as a club, try to help Kenny with his problem.

This was mistake number three. Number one was asking who it was, number two was going out to try to help, and number three was offering to help further if possible.

"That fellow's on again" was my lot whenever I was luckless enough to receive a phone call in between my 'teen age daughters' seemingly endless confabs. But the fact was, he was *not* on again! Another of the hams, Bob, W9ZSX, received a "He's on again" call when the presumed culprit was sitting in a chair right beside Bob in his own shack and they weren't either of them on!

Every time there was a storm, the lightning streaks were presumed to be ham radio! A passing taxi was a ham! Long skip came into Bedford and no TV was working right. Normal people were hearing interference from everywhere, but not the lady in the North end; she was hearing hams.

The technician, K9BEH, sold all his equipment and is at present planning to move to Florida, but the lady in the North end is still hearing him.

Last Monday night I guess my patience was worn out. *SHE* called. "It isn't my TV this time. It's a lady down in your end of town, only six blocks from you, and not only has the interference ruined several programs for her, but now her TV is on the blink and she has had to have a service man twice. It's a shame that a law-abiding citizen has to sit at home and be molested this way. You fellows coming uninvited into our living rooms!"

That was all I could take. Says I, "Look, lady, *I'm* not in your living room. *I* have never bothered your television reception at all, and yet you are in *my* living room right now, completely uninvited. I am not in your living room; you are in mine."

You could tell that she couldn't believe her ears because this time she didn't say "What did you say?" and then keep right on talking; she actually stopped and listened!

I was irritated enough, so by golly, I repeated for her. And in the repeat I added, "And I have better things to do than listen to your complaints. I'm on the air."

She grabbed that one; "You are on the air *now?*"

"Yes."

"Then it is *you* who has ruined the TV in the South end of town! I shall tell her!"

"Look, lady," I said, "have your friend take down the call letters and then let us know *who* it is. Only then can we help."

"Well the voices are too indistinct for that. She can't tell who is talking, but she can hear the voices, and I shall tell her it is you!" and she hung up.

"Wait, lady," I fairly yelled, "I didn't tell you that I --- ". But she was gone.

After I had gone to bed the phone rang and my son answered. I heard him say, "Well Dad's in bed". Then I was almost asleep again when I heard his next words, "Well, I'll tell him." There was such a long pause between his first words and his last that I thought he had hung up at the beginning!

And so it was that I was duly notified that the lady in the South had called and was going to sue. She was seeing an attorney the next day! It didn't take me as long to tell it as it did her, but that was the message as I received it.

That was last Monday evening. Tuesday, while I was at work, the wife got a call from the lady in the South telling her that Mrs. "South" is a law-abiding citizen, a gold star mother, a community worker, and not a trouble maker, so she thought it only fair to tell us whom she had hired as attorney and that suit was being filed for damages to her TV because of my "high-powered" (150 watts) station ruining her TV and causing her service bills. And it was a shame that I should be allowed to talk right into other people's living rooms, uninvited.

Of course my wife could have said that as President of the City PTA, and as a member of the Red Cross Blood Mobile crew, and as a member of the Department Club, etc., "and besides, my husband wasn't talking on your TV because --- ", but she never had a chance to get a solid word in.

Well, here it is Thursday and I have not heard from the plaintiff's attorney yet, but I think that if I do I shall tell him that Mrs. "South" had better get a patent on her TV set. It is the first device to my knowledge that translates code transmissions into voice reception. I was on the air, yes! But I was on cw! ■

Wayne Winters, Major, CAP
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Albuquerque, N.M.

CAP Radio

"I'm out of control and ejecting" was the message that crackled through the jet pilot's headset. Twisting in the cockpit of his speedy Naval fighter the aviator caught a glimpse of his wing man as the latter disappeared into the heavy layer of clouds in a steep dive.

Darkness was rapidly approaching as the pilot put his jet into a 180 degree turn and called Williams Air Force Base at Phoenix, Arizona for a "fix." Making an "X" on his chart when the position report came in from "Willie" (AFB) moments later, the jet jockey noted that he was approximately 50 miles east

The Gonset is fixed up for push to talk . . .

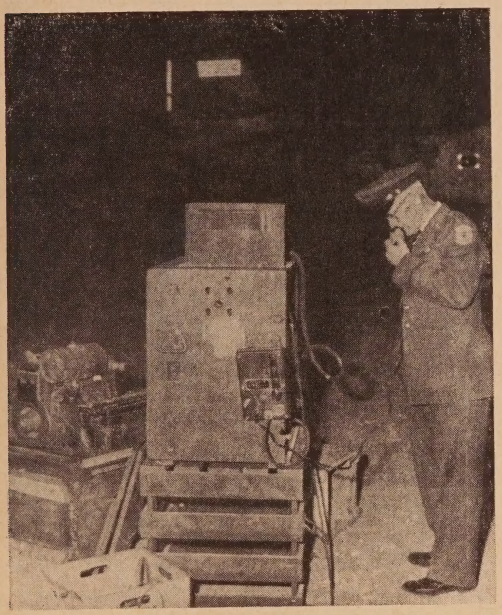


of Prescott, Arizona and over the rugged Mogollon mountain range.

A second 180 put the ship back on its original course just as a flash came up through the clouds under the right wing tip. . . . A plane was down. . . . A pilot might have died in the crash or perhaps he had successfully parachuted into the mountains. . . . At any rate another Air/Ground rescue mission had been set up for the Civil Air Patrol, official civilian auxiliary of the United States Air Force.

Object: Locate pilot and wreckage. If possible bring him back alive.

Upon notification from the Air Force, Prescott CAP squadron's communications officer fired up a *Johnson* Viking in the headquarters radio room and working under the call of



At night only the ground parties report in to the portable flight line control radio.

Thunderbird Three put out the word that a "Redcap" was in progress, asked all local fixed and mobile stations to report in, then went about contacting other Arizona CAP units to give out what details were available.

By dawn of the following day two radio-equipped Jeeps were in the Mogollon rim country. A number of CAP and military aircraft were searching the area and a helicopter had arrived from Air Rescue Service, March Air Force Base, Riverside, California. Communications had been established between the Jeeps of the ground party, the aircraft, and search base headquarters at Prescott.

At about 0900 hours a message was radioed in from one of the aircraft that the wreckage and the parachuted pilot had been spotted.



Mobile control tower can bring 'em in on a highway if necessary.

The Jeeps immediately started for the location of the downed airman while the whirly-bird took off carrying a doctor. The ship that had located the crash circled overhead while radioing directions to the ground party.

A few minutes later the search base headquarters received the information that the helicopter had landed beside the victim, that he was seriously injured and that an ambulance would be needed when the craft returned with its load.

It would be pleasant to write that CAP had added another life to its imposing list of those saved, but such was not the case. So seriously was this airman injured when he struck the mountainside that he died seven days later in Fort Whipple hospital. This is, however, an excellent example of the work that has been performed by Civil Air Patrol most every day during the fifteen years of its existence. Not all missions consist of plane crashes, for most every major emergency sees CAP activity, but CAP does fly something like 92 percent of the search and rescue missions in the United States today.

Radio communications play a big part in Civil Air Patrol. . . . So big in fact, that the organization maintains and uses the largest network of two-way radio stations in the world, consisting of over 11,000 fixed, mobile and aircraft units operating on seven frequencies "loaned" by the Air Force.

The majority of these stations are installed in ground vehicles such as Jeeps, cars and trucks and operate with less than 50 watts of r.f. to the antenna. Fixed stations, while fewer in number are allowed more power, ranging from 400 watts for a Wing station to 75 watts on Squadron level.



One of the gal cadets going on an observer flight.

Roughly, CAP operates in the 48 states, Hawaii, Alaska and the District of Columbia. Each state is known as a "Wing", with the state broken into "Groups" and the Groups into Squadrons. With the squadrons responsible for conducting most of the actual search and rescue work. It is at this level that the greatest portion of the communications activity takes place.

At this point it might be well to explain that radio in CAP in no way conflicts with amateur radio. However there are numerous hams who are active in Civil Air Patrol radio work, and because of CAP radio many CAP members become interested in amateur radio. The CAP network is basically a by-product of the need for communications in search and rescue work. Hamming on the frequencies is frowned upon and but one station in each Wing is authorized to work across state lines.

Equipment-wise Civil Air Patrol has almost the same variations as are to be found in amateur radio: Some comes from the Air Force as surplus; some is purchased by CAP funds; the balance is owned by the individual member, paid for out of his own pocket. . . . There is no way that a CAP member may legally be given equipment by the Air Force or CAP to become his own property, but in many instances CAP does issue out accountable equipment which the individual may use, to be returned at any time that the organization may request it.

A few examples of gear most common in Civil Air Patrol are: Fixed station transmitters; BC-610, BC-699, Command transmitters (converted), the *Johnson* Viking and various models of the Globe, *Collins* and *RCA* equipment. Receivers often are the BC-348, BC-342, *Hallicrafter, National* or again, Command gear.

Mobile rigs usually see converters on car radios or Command receivers. Many of the converters are home made, as are a lot of the transmitters. Such transmitters as the *Elmac, Babcock, Harvey-Wells* and that wonderful little *RCA* AVT-112a are popular with the mobile boys. All manner of whip antennas are to be found, with center-loaded whips predominating.

Aircraft work is conducted for the most part of VHF with the Sarcom, *Gonset* Communicator and Aerotron making up most of the



Practice in air drops is part of the CAP training.

installations. The Communicator is extremely popular for it offers the triple threat of usefulness as either a fixed, mobile or aircraft station. The old SCR-522 still finds considerable favor as a base station, with the ARC-3 and ARC-4 and ARC-5 being used to some extent.

There remains a considerable need for a good personal portable unit in CAP. The old BC-745 "pogo stick" is still in evidence but it is cumbersome and not too effective. The few BC-611 walkie-talkies that have appeared are difficult to obtain and expensive. A light VHF pack-set that is capable of ground-to-air communications over a two or three mile range would pretty much solve the requirements of ground parties who must often trudge over miles of rough country to the scene of a crash.

Regular daily nets are scheduled by all Wings, with routine traffic being passed. Following is a

table of frequencies, power, etc.:

Channel	Freq. (mc)	Power (Watts) Wing	Group	Sqdn.	For use by—
1	2.3740	400	150	75	All Stations
2	2.3940	400	150	75	Freehold & Fort Monmouth New Jersey area only.
3	4.3250	400	150	75	East of Mississippi
4	4.5075	400	150	75	General use
5	4.5850	400	150	75	General use
6	5.5000	1	1	1	Ground rescue, practice
7	148.14	50	50	50	Anywhere, anytime

It has only been in recent years that Civil Air Patrol has come to make much use of its VHF frequency, but today a good deal of emphasis is being placed on it due mainly to the shorter range cutting down on interference between states and the relatively static-free qualities of VHF reception. As this is written a second VHF channel is being considered for CAP utilization.

Although Civil Air Patrol radio stations are assigned by authority of the IRAC as granted to the Air Force, FCC regulations are used as a guide (such as crystal control and requiring every operator to obtain a restricted radiotelephone operator's permit or higher). This procedure is to assure that only qualified personnel will operate or make adjustments on



Radio gear like this can be found in many of the CAP'ers homes.

transmitters. Frequency and modulation checks are continually conducted by competent technicians.

Most CAP units have a radio shop in which gear can be constructed, repaired or maintained. An excellent example is the one located at New Mexico Wing headquarters, Kirtland Air Force Base, Albuquerque, N. M. Here a large stock of parts and materials are maintained, along with an imposing array of test instruments. This particular shop is under the supervision of Capt. Einar Morterud, (W5FPB) Wing director of communications. It was here that Lt. Col. T. A. Allen (W5CFJ) and Lt. Col. Paul Vandenberg (KN5HMN) developed an unusually compact and potent transmitter for CAP mobile use that operates on both HF and VHF employing a single modulator.

The Cadet program is rapidly coming to the forefront in CAP activities, supplementing but not replacing search and rescue missions. Cadet membership is open to boys and girls 14 years of age and older. Cadets gain valuable knowledge in many phases of aviation, not the least of which is communications. Both Cadets and Seniors have opportunities to learn a great deal about radio communications by operating under competent supervision in classes, practice missions and actual emergencies.

There is a place in CAP for every ham who desires to partake in such activity. Nothing in the program can be considered in any way compulsory and there is no provision for the organization to be taken into the armed forces in case of war. In other words it is entirely voluntary and a member can quit at any time.

By the same token there is no pay in Civil Air Patrol other than the satisfaction one receives from aiding his fellow man and doing a job for his country. Rich rewards are to be found in working with young people, imparting one's knowledge of radio to those who have less, and perhaps starting some man or woman off down the road to hamdom.

An inquiry at your airport, Civil Aeronautics Administration office or an Air Force recruiting office will bring details on when and where the local CAP squadrons meet. . . . You'll find no formalities, no marching, no chest thumping, no barked commands, no free radio gear and no pay in CAP. But you may discover an interesting supplement to the hobby of amateur radio. ■

The Communicator makes a fine control tower rig at this unused airport.



Arthur E. Hutchins, W5AX1/MM
c/o Bernuth Lembcke Co. Inc.
420 Lexington Ave.
New York 17, N.Y.

* Radio Officer SS Fullerton Hills

Pet Peeves

Having been in this ham game some 30 years and a commercial telegraph and radio operator for longer than I care to mention, I feel impelled to sound off about some of the sloppy operating practices now prevalent on the ham phone bands. In commercial work these Sloppy Joes would be classed simply as "lids", but this would seem too harsh a term to use on my fellow amateurs. Be that as it may, I am listing below a few of the things that curl my hair—the few remaining strands, that is. And, lest I be classified as a "holier than thou" lecturer, I must blushingly admit that I have been guilty of most of these deviations from good operating procedure at one time or another. However, long and painful experience has made me "see the light".

Long-Winded CQ's: This has always puzzled me. Why waste time calling CQ interminably? My operating time is limited and I certainly am not going to stand by and wait for the long-winded CQ'er to sign his call. So I move on to some fellow who calls CQ a moderate number of times, interspersed with his own call. The longer one calls CQ, the less chance there is of receiving a reply. Endless CQs do not make your signal any stronger, nor does it improve the hearing of a possible contact. So why waste time and electricity on long calls when a short CQ will do the job better and with less strain all around?

Microphone Technique: Try to put some "tone" in your voice instead of calling CQ rapidly and jerkily, which sounds like a hen who has just laid an egg. If you must cough, cover the mike. It is rude to cough in anyone's face, even though he is a thousand miles distant. Avoid "mouth noises", such as smacking your lips, heavy inhaling or exhaling too close to the mike. This reminds me of a pig in a trough of slops. Avoid saying ". . . er", ". . . ah", ". . . and-ah" or other faltering speech. If you can't think of anything to say, turn it over to the other fellow.

Conversational Subjects: Avoid describing your equipment down to the minutest detail. After all, who cares what tube you are using in your oscillator? Or the exact wattage of your final? Or the detailed physical lay-out of your antenna system? All these have been described over and over again at great length in handbooks and other publications. Everyone knows that a Ranger runs about 65 watts, a Viking or a 32V-1 120 watts, etc. Make the rig descriptions brief unless the other fellow asks for details. You only bore him with long, drawn-out details with which he is doubtless already fully cognizant.

Breaking Into Round-Tables: Avoid breaking in with such remarks as "What do you say, Ernie, you old buzzard?" Simply say "Break, W5XYZ". Save your remarks until you have been "invited in". Never break phone-patch or message traffic, or at other times when it is quite obvious you would not be welcome. Never start calling a station until he has received the other fellow's final. If you saw two or three fellows conversing on the street, you wouldn't think of elbowing your way in between them and start talking. That would be discourteous. What price courtesy on the air?

Zero-Beating: After a station has called CQ and invited replies "around the frequency", it would seem silly to zero his frequency and assume that you are his only reply. Chances are that you and several others are calling him zero-beat, resulting in unintelligible cat-calls. It would be much better to call him a couple of kcs to one side, where he would have a reasonable chance of hearing you. *Caution:* Never tune up on the calling station's frequency. Do your tuning a few kcs to one side, then slide the VFO in on the frequency. Avoid long call-ups when the calling station has indicated he is tuning near his own frequency first. If he is going to hear you at all, he will do so in two or three calls. If you call too long, he is going to become disgusted and start searching

up or down the band. If you want contacts, avoid long-winded calls. They are for the birds.

Use of Phonetics: Phonetics are fine tools of communication, provided you don't overdo it. Omit phonetics after establishing contact and you know each has the other's call correct. Don't use phonetics on common names when handling traffic. "Brown" should be spelled B-r-o-w-n, rather than Baker-Roger-Oboe-William-Nan. Its silly to say Queen-Roger-Mary, when you mean QRM. Use your head when using phonetics.

Give Your QTH: When Calling CQ, avoid saying "near Boston", or "eastern Tennessee". If you live in Podunk, say "Podunk". You have to establish your QTH for the other fellow's log anyway, so why not do it at the beginning and get it over with? And, if you are a maritime-mobile, for Heaven's sake don't say "Latitude 27 degrees, 10 minutes North, Longitude 48 degrees, 17 minutes West". Everyone should know that Latitude is either North or South and Longitude is East or West. The Rules and Regulations say "approximate geographical location". Therefore, in the above case "27 North, 48 West" would be sufficient.

Designations: Avoid cooking up your own designations. In the amateur service there are only five designations, i.e., fixed, portable, mobile, maritime-mobile and aeronautical-mobile. There is no such thing as "portable-mobile" or "marine-mobile". A rig in a car is "mobile" regardless of whether the vehicle is in motion, parked, or upside-down in a cornfield. A rig on a ship is "mobile" when the vessel is inside the 3-mile Continental U. S. limit, in inland waters, harbors, or tied up to a dock. It is "maritime-mobile" only when the vessel is on the high seas, outside the 3-mile limit. A rig on a picnic bench, in a tent, etc., is "portable" even though it was brought to the location in an automobile. I am particularly burned up when a contact comes back with "portable-marine-mobile", etc. Incidentally "mobile" is pronounced "mo'bil" (as in noble) and not "mo bile' ". "Bile" is a liquid secreted by the liver.

Testing: There is only one place to test and that is on a dummy antenna. A light bulb of suitable wattage across the R.F. output of your transmitter will furnish a load for testing modulation and you can whistle into the mike to your heart's content, without discombobulating your fellow amateurs on the already crowded bands. *Think* before you test, then do it on a dummy antenna. But if you must whistle, then hire a hall and sell tickets.

Don't Be a Bore: Be considerate of the other fellow. Don't make antenna tests, change mikes, transmitter adjustments, or other time-consuming interruptions without first checking to see if it is okay with your contact. Don't carry on telephone conversations and leave your contact "dangling" interminably. Ask your telephone caller to call back or sign with your on-the-air contact. Don't put your children on the mike to "show off". They may be jewels to you, but usually they are of little interest to your contact. Everyone knows a child of three or four can talk—you don't have to prove it by putting them on the air. Even parakeets can talk at one year.

Calling "CQ DX": I have always been a firm believer that you will raise more DX if you *listen* for it instead of *calling* for it. I have worked all States, all Continents and more than a hundred countries without ever having called "CQ DX". Also I have never used more than 200 watts, but have spent many hours patiently tuning the DX band for that elusive country. Imagine 100,000 W's calling CQ DX with only about 20,000 DX stations to answer them! You can readily see that the odds are about 5-1 against getting an answer. It's like betting on the Dodgers prior to 1955.

All this is probably like tilting at windmills, but if a few amateurs mend their sloppy operating habits and graduate out of the "lid" class, I shall feel amply rewarded. The National Safety Council is continually exhorting motorists to be careful, but every week-end hundreds of them go out on the highways and commit suicide. A lot of hams get on the air with a "me first" attitude and wonder why they don't get out. The answer is, of course, they are being *heard* but, at the same time, are *ignored* because of their on-the-air churlishness. If we are gentlemen in our homes and our friends' homes, then let us be gentlemen behind the wheels of our cars and at the mike in our radio shacks.

Note: No reference is made to cw operation as I do that for a living and after eight hours of fighting the QRM/QRN, etc., on the marine commercial bands, I don't feel like taking a "postman's holiday" by foraging in the ham cw bands. However, most of the above can be applied to cw as well as phone operating. ■

Editor's note: While I am pretty cynical about any dreams of glory Hutch may have with regard to his article cleaning up the meatballism on our bands, I feel that as a chronic offender on almost all counts that I should categorically denounce this attempt at stifling the individualism of the American Ham. Meatballism will better be cured by the few starry-eyed idealists in our ranks who are willing to suffer the social ostracism and vituperation by pouncing on offenders on the air. The anger and lasting bitterness of an exposed lid is a terrifying thing to behold. My motto: once a meatball always a meatball . . . now let's get that automatic CQ'er going.

CQ Tests

the Crosby Sideband Converter

Don Stoner, W6TNS
P.O. Box 137
Ontario, Calif.

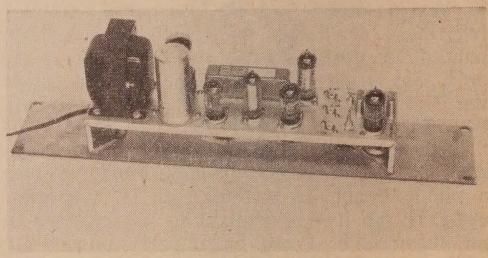
It would be unjust to use any lesser words than fabulous, amazing, and remarkable when describing the Model 67A Sideband Converter. The Crosby Labs have constructed, in a neat and compact package, what most manufacturers would like to put in their receivers if they could raise the price several hundred dollars. When connected to a typical communications receiver, the 67A will produce a selectivity curve that is essentially the same as the Collins 75A4. Sideband stations roll in loud and clear and each cw operator seems to have the whole band all to himself. The sure fire combination of the Collins Mechanical Filter and the product detector make even old fashioned a-m signals perk up. As a matter of fact, when tuned properly, every a-m station is automatically converted into a SSB signal before detection.

Have you ever cursed your receiver when a station gets close to your operating frequency and causes the inevitable heterodyne? Possibly you have even let loose with a mental blast directed toward the offending operator. Well, don't feel that you are being discriminated against, chum! QRM unites every ham in the world in a common "QRM bond". Quite often the solution to the QRM problem lies in the receiving equipment rather than the other fellow's operating practice. More than likely your receiver just isn't selective enough.

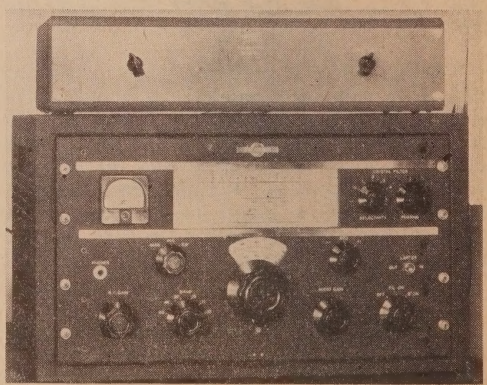
Modern communications techniques have proved that an audio response of 300-3000 cycles will provide adequate voice quality. This type of response characteristic produces audio sidebands about 3 kc wide, on each side of the carrier. Since we know that both SB's contain the same information it would seem natural that a receiver 3 kc wide would produce readable audio, and this is exactly the case. Why do we desire a receiver that is as narrow as possible? Simply because the narrower the receiver bandwidth, the closer stations must be to produce an interfering heterodyne. Conversely, you can operate closer to the adjacent station without hearing his heterodyne.

Q Multiplier circuits have been used to increase receiver selectivity and this they do admirably. However, the response curve is pointed rather than smooth and flat, as shown in fig 1. The lower audio frequencies are grouped near the carrier frequency. The higher audio frequencies will be "rolled off" rather badly and as a result, the received audio sounds very bassy. Although it is an improvement over the original receiver response (dashed line), it is by no means optimum. Extremely strong signals five or six kc's off resonance will still produce audible heterodynes.

The Crosby 67A Sideband Converter avoids



Exposed and operational view (with 75A-1) of Adaptor.



this condition by using a Collins Mechanical Filter. The solid line in fig 1 illustrates the typical response of a 3 kc mechanical filter and the response of the 67A. Notice that the top of the response is relatively flat which results in flat audio output (± 3 db between 300 and 3000 cycles). At the filter cut-off frequency this response drops abruptly to a very low value. Stations that are more than 3 kc off resonance are virtually inaudible. When receiving with the 67A, the communications receiver dial is adjusted so that the carrier is positioned at either edge of the flat portion of the response. Under these conditions the modulation of one sideband is placed on top of the filter response and the other SB "falls off" the passband and is rejected. In this manner, we convert the incoming station, be it a-m, ssb, or dsb, to a pure single sideband signal.

By way of explanation, the Collins Mechanical Filter is an electromechanical bandpass filter which may be used to limit receiver bandwidth. As shown in the Mechanical Filter functional diagram, fig 2, it consists of an input transducer, a resonant mechanical section comprised of a number of metal disks and an output transducer. The input and output transducers serve only as electrical-to-mechanical and mechanical-to-electrical coupling devices and do not affect the selectivity characteristics. This is determined by the mechanical resonance of the metal disks. An electrical signal applied to the input terminals is converted into a mechanical vibration at the input transducer by means of magnetostriction. This mechanical vibration travels through the resonant mechanical section to the output transducer, where it is converted by magnetostriction to an electrical signal which appears at the output terminals. Small permanent magnets are used at each end of the filter to provide something for the transducer coils to "work against".

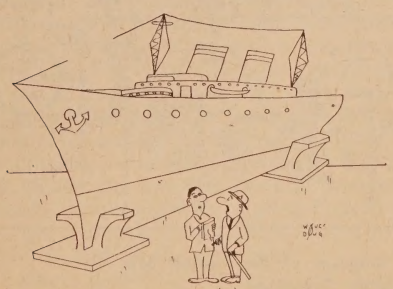
The circuit of the 67A is shown in fig 2. An i-f signal (between 440-510 kc or 800-1000 kc) up to .25 volts is injected into J101 and mixed with the conversion oscillator in V101 (6BA7). With a 455 kc i-f the oscillator generates 705 and 708.4 depending on which sideband is being received. The difference signal, which is an exact duplicate of the input signal except that the frequency is changed to 250 kc, now passes through the mechanical filter and one sideband is rejected as described earlier. When receiving SSB signals there is no sideband to reject, naturally, and the operation remains the same. The output of the filter is applied to V102A (½ 12AU7), which is the input to the product detector. V104 & B (12AU7) is a cathode coupled, crystal controlled local oscillator and is coupled to the product detector by V103B (12AU7), a buffer and impedance matching tube. The local oscillator provides a stable carrier for reinsertion and exalted carrier detection. The other section of V103 (A) provides a stage of audio amplification ahead of the receiver audio.

A feature worth noting in the 67A is the stability of sideband selection. It is superior to the circuit that switches the converter oscillator to either side of the i-f. When using the Crosby 67A with a 455 kc i-f, sidebands are changed by switching the converter oscillator between 705 and 708.4 kc. With the other type of circuit, the oscillator would be switched from 205 to 705 kc. The latter two frequencies are so widely different that it is difficult to maintain the same stability on each frequency. Proper temperature compensation on one frequency would not be the same as the other and as a result they would drift differently. This impairs the lineup such that when the sideband switch is thrown from upper to lower sideband, the lower sideband may be out of tune or vice versa. The conversion oscillator in the 67A avoids this nicely.

It should also be stressed that the 67A was designed so that it could be used with war surplus receivers that utilize an i-f between 800 and 1000 kc. Believe it or not, but your BC-348 can have the selectivity of a 75A4! Since the conversion oscillator is used on the low side of the i-f, it is necessary to reverse the position of the local oscillator crystals so that the markings on the switch positions will read correctly.

The 67A can be easily connected to any suitable receiver by mounting three connectors on the rear apron. The connectors and cables are supplied, incidentally. The first connector is wired to the output of the receiver i-f amplifier through a voltage divider (also supplied). Next, the audio path between the detector and volume control is broken and one connector is wired to the detector and the other is wired to the volume control. These connectors are then cabled to the 67A jacks, J101, J102, and J103 respectively. More complete instructions are provided in the instruction manual.

Tuning the communications receiver when using the 67A is simplicity itself. The 67A is aligned by receiving a moderately strong station with the switch in the REC position. Adjust the receiver for maximum signal strength, then place the selector switch in the LSB position. Adjust T101 for a zero beat and/or a



"is it 6 or 12 volts??"

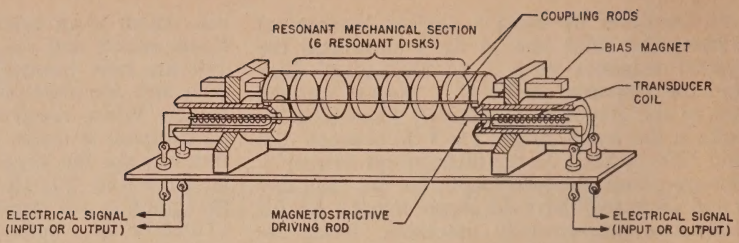


Fig 2. Details of Mechanical Filter.

normal sounding audio. Next, place the selector switch in the USB position and repeat the procedure by adjusting C104. Simple as that! When receiving a-m stations the receiver dial is adjusted for zero beat and the SB selector switch is placed in the position that has the least interference. When receiving SB signals, the receiver is tuned for normal sounding audio.

You will be amazed at the a-m, c-w, and SB signals when receiving with the 67A. It is unnecessary to constantly readjust the r-f gain with SB stations of different signal strengths. The same holds true with cw signals. It is invaluable for cw net operation. If a heterodyne comes on when receiving an a-m station you simply switch to the other sideband and the racket miraculously disappears!

It is quite possible that an 800 cycle model may be introduced, tailor made for the cw operator, in the near future. More information on the 67A may be obtained by writing directly to Crosby Laboratories, Inc., Box 233, Hicksville, N. Y. ■

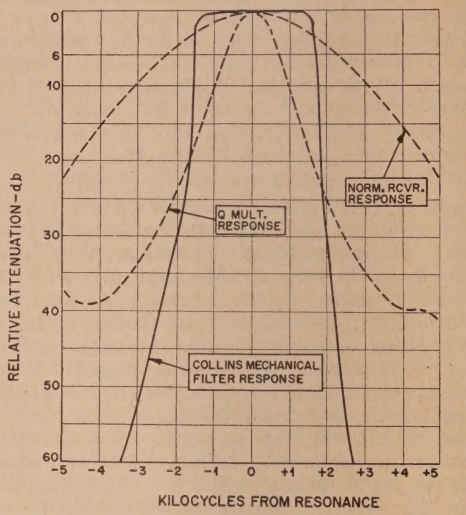


Fig 1. Response of the Crosby 67A compared to the original receiver selectivity and that of a Q Multiplier attachment.

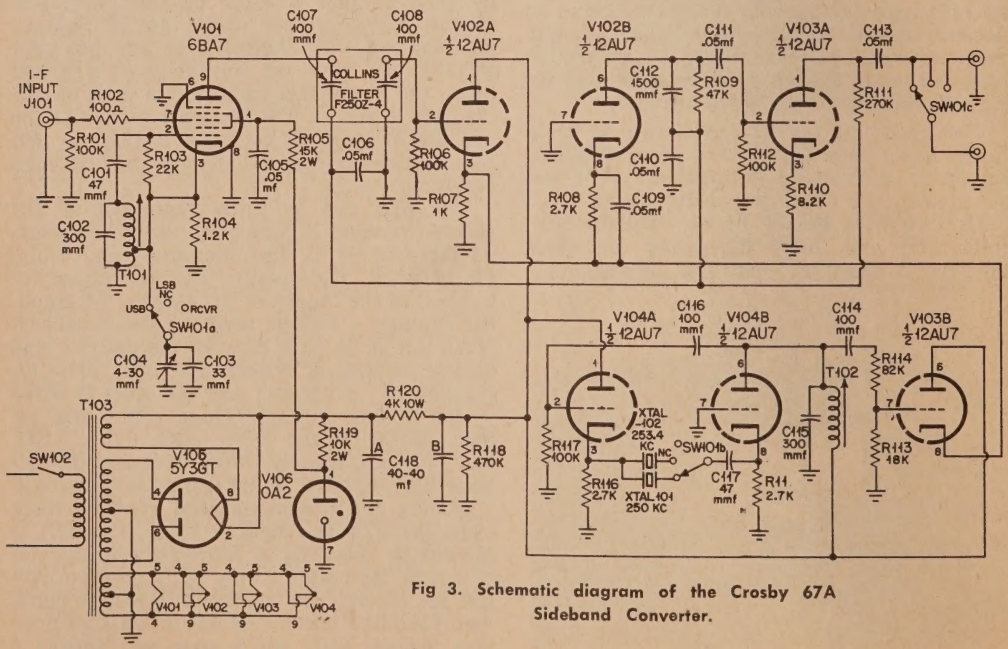


Fig 3. Schematic diagram of the Crosby 67A Sideband Converter.

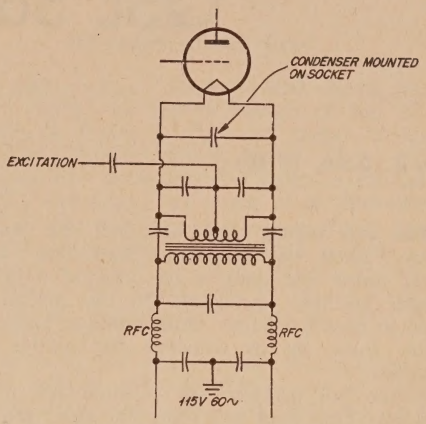
Simplified Filament Transformer for the Grounded Grid Linear Amplifier

Robert Collina, W2JRV
33 McKinley Ave.
Westwood, N. J.

After listening to single sideband for some time and finding out how some of the fellows have "rebuilt" filament transformers for their grounded grid final amplifiers, I would like to pass this information along to those interested.

I have successfully used the following system on industrial oscillators running up to 12 KW plate input during the past ten years. This is now being used at W2BGY with 1 KW input on 20 meters.

Any transformer with the proper ratings may be used either cased or uncased. It is necessary to mount the transformer on stand-off insulators and in such a position that the stray capacity between said transformer and chassis, shielding, etc., be kept at a minimum. (At least 2"). Keep in mind that this entire unit is now above ground as far as R.F. is concerned, how much is dependent on the excitation voltage. The schematic is as follows:



A total of eight mica by-pass condensers is required. The capacity is not critical, .002, 600 W.V. is sufficient. Care should be taken that the leads on all condensers be kept short. Also, the final tube socket and filament wiring should be kept away from chassis to decrease stray capacity to ground. The rf chokes may be homemade by using two 4" x ½" dia. stand-off insulators and winding #18 wire almost the full length. (Solid wire with plastic insulation is recommended.) Plastic tape may be used on both ends to hold the wire securely. The transformer end of these R.F. chokes should be kept in the clear. The 115V end may be mounted on chassis, shielding, etc., with by-pass condensers to ground.

This system eliminates the necessity of winding special transformers. ■

Surplus... Letters...

Both Henry F. Pierce, W4YQW, Box 118, Meeadowview, Va., and Lewis Lear Jr., 403 South Illinois St., Delphi, Indiana, wrote requesting conversion information on the APN-1 altimeter to a 420 mc transceiver. Unfortunately, these units are not too well suited for such a conversion. The transmitter section will make a fair modulated oscillator, as it uses two 955 operating in push-pull. The receiver, however, is hopeless! This section of the APN-1 uses two acorn *diodes* as balanced frequency modulation detectors on the fundamental frequency. As a result, it takes several thousand microvolts to produce a useable output. Signals that strong are hard to find on the 420 band.

J. Lasker, K2PWL, 171 Linwood Avenue, Buffalo 9, N. Y., writes to inquire about the test patterns available from the RETMA. *OM, the full address is The Radio and Electronic and Television Manufacturers Association, 777 14th St., N. W., Washington 5, D. C. I am not sure of the cost, but I believe that it is around five dollars.*

The writer forgot to sign this one, but he provides us with the following information:

Re your June, '57, column, page 66, letters to the editor, mention was made of an exact replacement transformer for the APA-10 panadapter available from Ferranti Transformer Co., of N. Y. Your information was in error as the company quotes $48.00 net for such a transformer. Is it possible that you may have had some other concern in mind. *Oh, that is ridiculous. No, that's the company, although it was a few years ago that I purchased the APA-10 transformer. I guess as the stock goes down, the price goes up. A suitable replacement transformer for the APA-10 can be obtained by writing Mr. George Lichterman at Arrow Sales, P. O. 3007, North Hollywood, Calif. I won't quote a price this time, because it might be wrong, too. . . . Hi.*

Also, on the subject of the APA-10 Robert B. Hupper, 47 Willits Road, Glen Cove, N. Y., writes:

Regarding the APA-10 mentioned in the June, 57. First, I find no Ferranti Transformer Co. in the New York telephone book. Second, I was not able to find a company among the advertisers in CQ from whom I obtained a

[*Continued on page 110*]

QSL Samples PSE

Roy L. Gale, W1BD
Box 154
Waterford, Conn.

The old saying that "one-half the world doesn't know how the other half lives" was never more true than in the case of a QSL-printer and his customers. In this article, I hope to create a better understanding between them. First, let us consider the matter of samples:

Nearly all printers ask a dime for their samples. This does not represent their selling price; nor does it represent a handling charge, as many hams appear to believe. The dime is merely a deposit, for printers are not interested in selling samples. At the time this is written, it costs ten cents for the material alone, made up of a 3-cent stamp, envelope, price-list, and five cards before being printed.

Why the magic word "five," you ask? Because that is the maximum number that can be sent without adding extra postage.

What becomes of the dime, I hear someone say. It is deposited in a little piggy-bank, there to remain until such time as the ham sends back the cards, accompanied by an order. Then it is returned to him, even though the samples he sends back are crumpled, begrimed, and so badly damaged that they cannot be used again.

Wouldn't it result in increased business if we sent out free samples to everybody that sent a postal request for them? A simple answer: Because, on the average, a ham sends similar requests to as many as *thirty other printers at the same time.

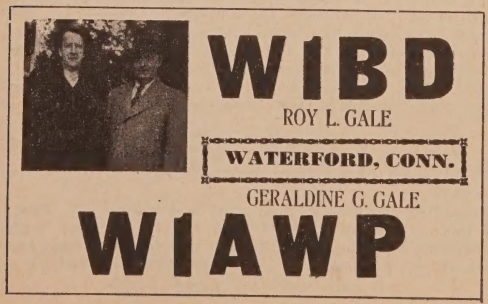
Let us assume that 30 printers send out free samples, and one of the printers eventually receives an order. The other twenty-nine would have to stand a loss of a dime each. Figure it out, using your slide rule, if necessary! The fortunate printer must subtract $2.90 from the amount received for the order before he can determine he has received anything for the cards. And all that he asked for the hundred one-color QSLs was three dollars, anyhow! At that rate, he will soon be as rich as Croesus. There is a story of a millionaire who amused himself by throwing dimes at the feet of children, but it neglected to state that he gathered up his millions in the steel industry, not by running off QSL cards on a hand printing-press. Possibly this was because ham radio hadn't been born yet. To be serious again. Shall we add $2.90 to the price of your order, or let each person send a deposit for his samples?

On reading a recent article on **QSL cards, one might conclude that every ham owns either a cattle ranch or an oil-well, and is just aching to unload a hundred or more dollars on a few QSLs. Truly, one western ham was overheard saying that his cards cost him sixteen and a half cents apiece. And he wasn't from Taiksus either!

In spite of all this seeming opulence, the devious ways our little hams think up to sidestep that dime deposit are many and amusing. I have them all classified so that I can sort them as the requests come in; ie, before tossing them into my cavernous fireplace. I had to discontinue throwing them into the waste basket, for my huge Samoyed loves to eat the things. He has a rare sense of dog humor, and they tickled his stomach so much that he heaved them up in the middle of the night. That disturbed my rest!

The three most popular schemes are as follows: First, we have the fellow who "wants to order 1000 cards." Surely, that ought to bring the free samples! Nope, I don't like large orders. Second, there is the chap who says: "I want to see some of your cards, which have been highly recommended to me." Sorry, OM, you forgot to say who my benefactor was. Third, we have the ham who is: "fresh out of QSLs; rush samples!" Sorry again; I'm forgetful, too, and you'll have to try a different kind of bait.

At the beginning of my printing career, I



*PSE QSL TNX. CQ May 1957.
**Putting Snap into QSL Cards, CQ June 1957.

sent out reminders that a deposit was required. It was a printed form, couched in most polite terms. But, one ham—a Novice, incidentally—sent me an extremely unkind letter, saying: "If you r_quire a deposit, why doesn't your advertisement say so?" Since my advertisements in two well-known ham magazines have always called for a dime, all I could think of was: Why did they have to shoot Lincoln? And how did a little boy who couldn't read simple English get past the Radio Inspector to grab up a Novice license?

Continuing his tirade, the Novice asked: "What would *I* do with a lot of samples not my own?" Really, I dunno. The more important thing is that I couldn't do much with them either, if I didn't have them. All of which goes to show that there are a lot of ways to look at a subject, some of them really startling.

The author of one of the before-mentioned *articles lamented the fact that one printer never got around to send him the samples he requested. (Sorry, OM, it wasn't I, as I still have your letter with the dime extracted from it). But let's see why it often requires many years to get them into the mail:

Rush

In March, 1953, I received a postal on which was written: "Pse send QSL samples." Six months later, I received another postal, identical in every way except that it said "rush." He was a patient chap, you see, but his name wasn't Job, as his initial was "I." Well, maybe sometime, in ten years . . . .

And now for the cards themselves. Yes, the report form can be printed on the address side of the card; but at an average of seventy-five cents a hundred, it is not a paying proposition for the printer, especially if he is asked to change his stock form in any way. Every printer knows that, to get every letter to print, without having an impression show through on the glossy side, requires much patience and skill. The least troublesome way is to have the whole form made up into a zinc etching. Then, of course, it cannot be changed.

But make it individual

So, along comes the ham who wants frequency shown as **Meters** instead of **mc.** Or perhaps he wants to have the name of his Super YL-Chaser receiver shown. (This will be changed to something else when he catches the YL, and before his stock of cards is exhausted). The only way in which a printer can get even a fair return for his labor is to do at least one-thousand of these reports at one run. Hence, he cannot set up just for one small order, and to use a type-set form is unthinkable.

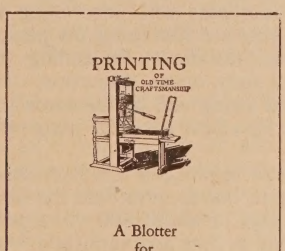
What is all this uproar about individualistic and distinctive designs? There are so very many thousands of hams, each with his own pet ideas, that it would be impossible to send out samples incorporating many of them. For instance; I once visited a hamshack where the walls were plastered with personalized cards, and nary a one of them intrigued me.

If you desire an original card, tell your printer exactly what you want in the way of a design, and prepare to swoon when you receive his quotation, assuming, of course, that you are not from Taiksus. Even the simplest of designs done by a commercial artist will cost $3.50, and the etching for the same will cost half as much additional. If the design is complex, the cost can be pretty staggering. A photo of yourself and station seems to be as personal as one can get. If you have a sharp print, a half-tone engraving can be had for about $1.75, plus two weeks delay. The addition of this engraving to the set-up can increase the printer's troubles manyfold. A speck of lint or a tiny shaving from the edge of the card gets on the ink roller and a defect appears in the print. It cannot be corrected and all such defective prints must be discarded. That means that each print has to be scrutinized as it is taken from the press, a time-consuming job.

Salary?

Your QSL printer cannot charge you "so much an hour" for his work, and thus make a respectable day's pay, but because of severe competition, has to name a fixed sum for the completed job. In support of this statement, I will quote from a letter just received: "I can get QSL's printed locally, but the price for them is higher than I believe necessary." To which I will add that I have sometimes made as high as a dollar an hour—more often

[*continued on page 114*]



DSB Considerations and Data

Dale S. Harris, K2KID
Heavy Military Electronic Equipment Dept.
General Electric Co.
Syracuse, New York

The trend by more and more amateurs to suppressed carrier phone communications is one of the greatest things that has ever happened to amateur radio. It is really a pleasure to operate in the segments of the bands which the sidebanders have pretty well taken over.

DSB offers a very easy way for anyone to try out suppressed carrier operation and it is hoped that this discussion will encourage more of you to try it. Let us not get off into any AM versus SSB versus DSB arguments—those arguments are for the professionals and the average amateur should steer clear.

Several DSB articles have appeared in recent issues of CQ showing the basic tetrode balanced modulator circuits used to suppress the carrier. These circuits may have either of two configurations:

1. Push-pull grids with parallel plates, or
2. Parallel grids with push-pull plates.

In either case, the screens are modulated with push-pull audio. Generally, the first configuration will be the best one to use since the push-pull components will be small and a pi-tank can be used in the output, the advantages of which are well known.

Hi-Level vs Linear

There are two approaches to medium or high power DSB. One is to make your final a high power balanced modulator. The other would be a low-power balanced modulator driving a linear amplifier. Unless you already have a *linear* amplifier (and know how to keep it linear) the high level approach is definitely recommended. If you do use a linear, don't forget that a single audio tone to the DSB exciter is a two-tone signal into the linear amplifier!

Most CW exciters have plenty of output to drive even the big tetrodes in a DSB final. Anyone with a two tube final (either push-pull or parallel) will only have to modify one RF circuit and split the screen grids to put the final on DSB.

Most any tetrodes may be used in the balanced modulator circuit and a tabulation of the recommended variables for the more common tubes is presented later. The general considerations of how to operate different tubes are best discussed one circuit at a time.

Grid Circuit

Each tube should definitely have its own grid bias resistor. Attempts at using a common bias resistor have resulted in aggravating any off-balance tendencies the tubes may have. The grid circuits should be operated as for normal class C Plate Modulated operation. The normal bias resistors for class C are used. The grid current is run up to normal values. It has considerable effect upon the resting plate current.

Bias may be partially from a battery, but should not be all battery bias. Partial battery bias will be found very handy if you want to include voice control operation.

Screen Circuit

The dc bias applied to the screens through the modulation transformer secondary has two effects. Most important is its effect upon the bow tie pattern crossover point. Just enough negative bias should be used to give a clean crossover and limit the resting plate current. Any further negative voltage will cause the two halves of the pattern to separate apart indicating distortion. The screen bias is necessary on some tubes to hold down the resting plate dissipation requirements. The bias battery or supply should have good regulation and should be by-passed heavily with several microfarads of capacitance. The smaller tubes (807's, 6146, etc.) work nicely with zero screen bias.

The screens must be by-passed for rf but not for audio, so the by-pass condensers should not be larger than .001 mfd and should be mica. The audio swing of the screens determines the amount of plate current the tubes can draw. As a conservative estimate of how much audio voltage you will need, take the normal plate modulated screen voltage and double it. Your audio *peaks* should hit this value (from center tap of mod. xfmr to screen) If you really want to run to full tube capability, you can check by heavily loading the final and running up the audio voltage till the RF no longer increases with increasing audio. At this point you are flattening on peaks because of emission limitation. Exceeding that audio voltage will only cause distortion. This maximum screen swing will be the same for a given tube type regradless of what plate voltage you run.

The screen modulator needs relatively small power output, but to modulate the larger tubes, voltage swings of about 800 volts peak are required. This is best accomplished with a step-up transformer. A pair of 6L6's in Class AB1 will modulate most any tubes, but step-up transformers with push-pull primary and secondary are a scarce commodity. The best solution available now seems to be to use a 10 or 20 watt class B driver transformer of 5:1 (pri to ½ sec) step down ratio. Using it backward will give you 1:1.25 primary to one-half secondary.

Before long perhaps the transformer manufacturers will make available more suitable transformers.

Another possibility is to use a single 6L6 into the 117 volt winding of a small power transformer. This will give you roughly a 1:3 step up to half of the HV winding and works quite well.

Clipper-filter

While talking about modulators, it should be pointed out that speech clipping can be used to good advantage in DSB and is a very worthwhile feature to put in the speech amplifier. Clipping will give you a big boost in average talk power. Just remember to reduce low frequency response before the clipper-filter, and preserve both lows and highs after the clipper-filter.

Plate Circuit

As previously mentioned, the plate current of the DSB stage is pretty well determined by the audio swing on the screens. The way to more power then is obviously higher plate voltage. Bearing in mind that on normal AM the plate voltage swings up to twice the dc plate voltage, you can use up to twice the AM plate voltage on your DSB stage, and up to that value, the higher the better. Any given tube will work satisfactorily at its normal plate voltage, but it's a similar situation to linear amplifiers, if you really want to sock them, you must run up the plate and screen voltages.

This means that you have the following choices based on voltages available:

400-600 volts	6L6's, 2E26's, 6V6's, 6Y6's
600-1200 volts	807's, 1625's, 6146's
1200-1600 volts	?
1600-3000 volts	813's
2000-4000 volts	4-125A's, 4-250A's

Paralleling tubes on each side of the balanced modulator offers a powerful little package (four 807's give 300 watts p.e.p. *output*), but the paralleled output capacitances may make it difficult to get above 20 meters with four tubes.

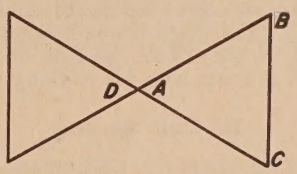
Since the plate current swing depends largely on the screen voltage swing, the best way to tune the DSB stage is not by plate current dip but by tuning for maximum output. With the tank circuit resonated, increase your loading to the maximum output point and stop. That's all there is to it. Some tank circuit conditions will cause greater plate current readings but reduced output.

The plate current meter, of course, does not read peak plate current, so if you want to figure your peak envelope power you must apply a factor. For sine wave modulation, the meter reading should be multiplied by 1.58 (1/.636). This figure and your plate voltage will give you peak envelope power input; you multiply by about 75% efficiency to get your peak envelope power output. If you are running relatively high plate voltage on your tubes you can estimate your peak output as four times the carrier output rating for AM phone service. This is conservative estimating, however, since with the low duty cycle of speech you can get a little better than this before distortion sets in from emission limiting or instantaneous downward plate voltage hits the screen voltage level.

Half of your peak power appears in each sideband which means a 3db disadvantage compared to SSB. The ability to select the best sideband at the receiving end buys some of this back, and clipping buys even more.

Checking Patterns

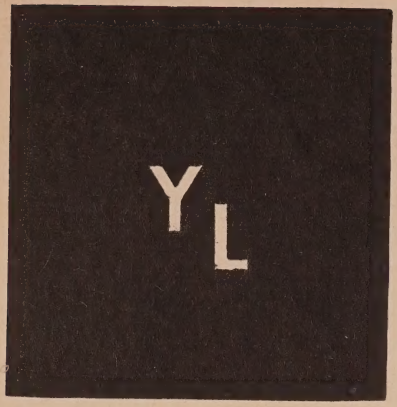
Just as in AM and SSB, it's always best to check your signal with an oscilloscope. The handiest pattern for checking DSB is the familiar bow tie. Apply audio on your horizontal amplifiers and rf direct on the vertical plates. This procedure is described in the handbooks. It is recommended that the audio be taken off the secondary of the modulation transformer for minimum phase shift. The audio voltage here will be way too much for your scope input though, so rig yourself a voltage divider of 1 megohm in series with a 10K resistor and pick audio off across the smaller resistor. Your bow tie should look like *fig. 1*.



Line AB and AC should be nice and straight. The A end of these lines has a tendency to bulge slightly with too much grid drive and may become concave with too little drive, so experiment here. If you have negative bias on the screens, there will probably be a little kink near A where the screen goes through zero, but this does not cause bad distortion. Peaks at B and C should be nice and sharp. If they are rounded you are flattening and probably due to overdriving the screens. If points A and D are separated so the points don't meet, you have too much negative bias on the screens. With high plate voltage you will find it easier to get a good bow-tie pattern. If your tubes are not balanced, one half of the pattern will rise higher on peaks than the other side. One half of the pattern represents each tube, but has no relationship to the upper and lower sideband. The side-bands will be identical in any case.

The bow-tie pattern won't show up audio distortion so you will find it interesting to

[*Continued on page 118*]



Louisa B. Sando, W5RZJ
212 Sombria Drive
Sante Fe, New Mexico

YLRL Awards

The Young Ladies' Radio Lague offers these awards to any amateur anywhere in the world who can qualify for them: WAS/YL, YLCC, and WAC/YL. The rules governing these awards are published in this column about once a year, together with a list of the awards which have been made. The rules are listed somewhere near here.

All YLs are requested to be conscientious in sending QSLs. Even if one is not personally interested in the YLRL awards, it means a great deal to those who are working for them.

YL Club Awards

The Rhode Island YL Club offers an RIYL certificate to any licensed OM or YL, anywhere, who makes contact with ten Rhode Island YL operators. Send list of stations worked, together with QSLs, to: Ruth Parker, W1WED, 75 Ridgeway Ave., Hoxsie, R. I. The YLs worked do not have to be members of the RIYL Club.

The Young Ladies' Radio Club of Los Angeles offers the "Lad 'n Lassies" certificate to any amateur with confirmations of contacts with ten members of the club. The 10 QSLs must be dated Jan. 1952 or later and a self-addressed stamped envelope should be enclosed for return of the cards. Send your application and QSLs to Gilda Shoblo, W6KER, 3715 Liberty Blvd., South Gate, Calif. These are the current members of the Los Angeles YL club: W6's AKE, AVF, BIS, CBA, CEE, DPB. DXI, EHA, FEA, JCA, JMC, JMS, JZA, KER, KYZ, LBO, MFP, MWU, NAZ, NZP, PJU, QGX, QOG, QOO, QWC, REF, SGL, SHR, TDL, UHA, WRT, WSV, QYL; K6's ACF, ANG, BUS, BXX, CYZ, DRS, DWQ, EIA, EJE, ELO, EXQ, EXV, GMX, GQW,

CQ DX Contest

Don't forget the CQ World Wide DX Contest. Dates are Oct. 26-28 for phone and Nov. 30-Dec. 2 for cw. For complete rules check CQ for Aug., page 54. A goodly number of YLs from all over the world have participated in previous contests, both phone and cw. Come on, gals, join the fun!

YLRL 18th Anniversary Party Rules

Phone: Start—November 6, 1957 at 12 noon EST. End—November 7, 1957 at 12 midnight EST.

CW: Start—November 13, 1957 at 12 noon EST. End—November 14, 1957 at 12 midnight EST.

Eligibility: All licensed YL and XYL operators throughout the world are invited to participate. Non-members of YLRL are not eligible for cup awards but are eligible for certificates. Only YLRL affiliated clubs will be eligible for the club award. Contacts with OMs do not count. The YL-OM Contest will be held in the early part of 1958.

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

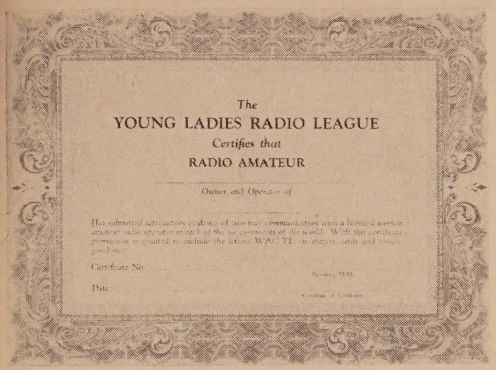
Procedure: Call "CQ YLRL" or "CQ YL."

Exchange: QSO number; RS or RST report; name of State, U. S. possession, VE district or country. California stations will include the name of their section in the QSO. California is divided into eight (8) sections as follows: Santa Clara Valley, East Bay, San Francisco, Sacramento Valley, San Joaquin Valley, Los Angeles, San Diego and Santa Barbara.

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

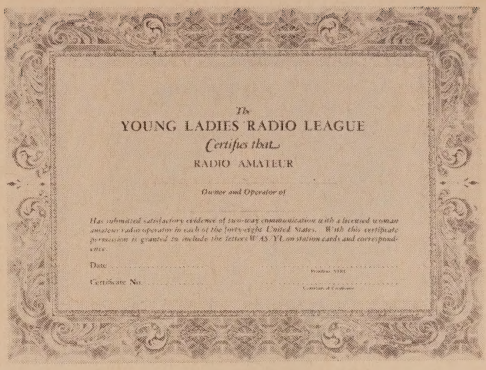
Logs: Copies of all phone and cw logs, showing claimed score, must be postmarked not later than November 30, 1957 or they will be disqualified. Please file separate logs for each mode of operation. Send logs directly to YLRL Vice President Mildred Wright, K5LIU, P.O. Box 1088, Pasadena, Texas.

Awards: Highest individual phone score—cup
Highest individual cw score—cup
Highest (average) club score—gavel
Certificates will be awarded to high place cw and phone winners. Highest score in each district, U. S. possession, VE district and country, where at least three (3) entries are received, will be awarded a certificate. If a member wins both contests she will be awarded the two cups.
The aggregate scores of phone and cw reported by club secretaries and confirmed by the receipt of contest logs by the vice president shall constitute a club entry. Segregate club entries into phone and cw totals, add the two for aggregate club score and divide the result by the number of members participating.



WAC/YL AWARD

1. The Young Ladies Radio League issues a Worked All Continent-YL certificate to any licensed amateur in the world.
2. Two-way communication must be established on the amateur radio bands with the six continents: North America, South America, Europe, Africa, Asia, and Oceania. Any and all authorized amateur radio bands may be used. Cross-band contacts are permitted; contacts may have been made over any period of years.
3. Contacts with all six continents must be made with duly licensed woman operators.
4. Contacts with all six continents must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.
5. Six QSL cards or other written confirmations, showing proof of contacts, must be submitted with application. IRC's, or the equivalent thereof, must be sent with the confirmations to finance their return by first-class mail. The YLRL will not be responsible for any loss or damage to same.
6. Decisions of the WAC/YL custodian regarding interpretations of these rules as here stated, or later amended, shall be final.
7. Send applications and confirmations for this award to: Barbara Houston, W3OQF/Ø General Delivery, Cedar Rapids, Iowa.



WAS/YL

YLRL offers a WORKED ALL STATES-YL award. Here are rules for earning the certificate.

1. The WAS/YL award, Worked All States-YL, is available to all amateurs.
2. Two-way communications must be established on the amateur bands with all 48 of the United States. Any and all amateur bands may be used. A QSL from the District of Columbia may be submitted in lieu of one from Maryland.
3. Contacts with all 48 states must be made with stations operated by licensed women operators.
4. Contacts with all 48 states must be made from the same location. Within a given community one location may be defined as from places no two of which are more than 25 miles apart.
5. Contacts may be made over any period of years provided only that all contacts are from the same location as defined in #4.
6. 48 QSL cards, or other written communications, from stations worked confirming the necessary two-way contacts, should be submitted by the applicant to: Grace Ryden, W9GME, 2054 N. Lincoln Ave., Chicago 14, Ill. A list of the contacts must accompany the cards and sufficient postage must be sent to finance their return. The YLRL will not be responsible for any loss or damage to same.

HVC, IHD, IKF, INK, JCL, JRL, JSN, KCI, KUP, LIH, OAI, OAO, OQD, OWQ, PRA, QFY, RFX, RHZ, RLU; KN6's KEK, OSL, PLB, PPM, PRZ, SCS, SPR.

The Ladies Amateur Radio Klub (LARK) of Chicago offers a LARK certificate to any licensed OM or YL, anywhere, who makes contact with ten LARK members (the contacts can be with non-resident or honorary members as well as resident members). Send a list of the contacts, dates made and frequencies to Gladys Jones, W9MYC, 4232 Hampton Ave., Western Springs, Ill. Present membership of LARK includes: W9's BCA, IFT, LOY, SPI, LAS, TDC, BCB, MYC, UON, QXI, IWP, YBC, IKS, SJR, YWH, AYX, TMZ, YXK, LDK, SYX, KFC; K9's EMS, BWJ, EMP; KN9's CZQ, BUS; Non-resident members: W9's MAS, AQB, ZXZ, LKD, RUJ, LRT; W8's UAP, SNB, MBI, ATB; K9CCO, W5VWW, K4EQB; Honorary members: KN9-ALU, W4DEV, W9WOI, W4ZMV, W5ZUD.

Texas YL Round-up Net Awards

The Texas YL Round-up Net offers the YL-OM certificate to any YL or OM for 25 confirmed contacts with stations operated by licensed women amateur radio operators who are full members of the Texas YL Round-up Net. These are the rules:

1) Two-way communication must be established on one of the amateur bands with 25 licensed women amateur radio operators who are full members of the Texas YL Round-up Net.

2) All contacts must be made by the contestant from the same location and under the same call over any period of years providing that the YL was a full member of the net at the time of the contact.

3) Each member of the net has been certificated with a Texas YL Round-up Net Certificate on which there is a number and a date of issuance. The 25 QSLs for the necessary two-way contacts must have the member's membership certificate number and date of issuance on the QSL card to count.

4) Contacts made with members of the Texas YL Round-up Net during any regular net meeting will *not* count.

5) QSLs must be sent to the custodian by first class mail. The QSLs must be accompanied by the list of claimed contacts, including the call, full name of the operator, certificate number and date of issuance, date of contact, time of contact, and band of operation arranged alphabetically by call. Sufficient postage must be sent to finance their return by first class mail, plus 10¢ to cover mailing cost of certificate. The Texas YL-



Custodian of YLRL's WAC/YL award is W3-OQF/Ø, Barbara Houston. Barbie, the XYL of W3MAX/Ø, started hamming in 1948. Holds A-1 op, YLCC, and many YLRL contest certificates. Former editor and D/C for YLRL, she is active in YL nets especially on 75 and 40. Two jr. ops.

WAC/YL

Since publicity on WAC/YL (Worked All Continents, YL) was published in this column in June '55, interest in this award has grown tremendously. At that time W2QHH was the sole possessor of a WAC/YL certificate. Since then WAC/YL awards have been issued to:

ZL1BY	K5BEU	G3DOG
G4ZU	PJ2AA	JA1CJ
CE5AW	G8PL	W8SDD
VK3CX	W6QOG	K6EXQ
JA1AA	OH5PE	G3GIQ
G3DO	W4VCB/3	CR6AI
PY2OE	W6GPB	PAØVB
W8JIN	JA6AK	W6BSY
W6DLY	VK5AB	YO3RF
VK3YL	W8CQ	W6FKH
W6UHA	W9KA	K6QAI
W7RT	W8AJW	W3BIW
LU1CA	W1FTJ	WØAZT
EA4CR	W4HLF	W6QGI
JA6HK	W5UBW	W6USG
JA8AA	K4CYF	W3OP
W3BVL	KL7ALZ	JA1CR
LA5YE	W5JCY	PAØULA
W6YY	W8HWX	LU4DMG
KV4BB	W7SFK	K3ACY
W2SAW	KH6BGE	SM5AHK
VU2JP	VK3ACN	LU8EN
W8PQQ	W6WRT	W4SGD
W6MBD	W2HTI	W1RLQ
DLIKB	W8HUX	LA3DB
KL7ZG	W3JZY	F9MS
W7PHO	W8MXS	CE3DY
JA9AA	W5HWK	

Round-up Net will not be responsible for any loss or damage to the contestant's QSL cards.

6) Decisions of the Texas YL Round-up Net Custodian regarding interpretations of these rules as here stated, or later amended, shall be final.

7) Send applications and confirmations for this award to Custodian: Miss Helen M. Douglas, W5LGY, 1501 Monroe St., Commerce, Texas.

8) A gold star sticker is given for the working of an additional 25 members of this net.

Present members in good standing of the Texas YL Round-up Net include:
W5's BDB, CHR, CTE, DIV, DJC, EAO, EGD, ERH, ETH, EYE, FFH, FWS, GXG, HCE, ILO, IOZ, JCY, KEC, KRJ, LGY, PDC, RYX, SON, SPV, SYL, TSD, TYX, ULX, UXW, WXT, WXY, YAJ, YKE, YRT, YTM, ZJT, ZLU, ZPD; K5's ADQ, ALF, BNH, BNQ, BWM, CRH, DVE, EGB, ELD, ESB, GMI, GYZ, HNM; WØ's LQX, SZH, TYB; KØ's ACC, BCQ, BFH.

The Texas YL Round-up Net also offers the YL-OM 10CC certificate for YLs only. Here are the rules:

1) Two-way communications must be established by a licensed YL on authorized amateur bands with stations mobile or fixed, operated by 1,000 *different* licensed *male* amateurs. Any and all amateur bands may be used.

2) All contacts may be made from any location as long as it is under the same call, whether fixed, portable, mobile or novice.

3) Contacts may be made over any period of years—past, present and future.

4) A list of the 1,000 OM contacts should be sent to the custodian. This list should contain the following information: station worked, band or frequency, report, date and time. Contacts should be listed by country, call area, and by call letters in alphabetical order. Note: No cards are to be sent—just the verified list.

5) Have the 1,000 confirmations (QSL cards) verified by three (3) licensed amateurs with their signatures and calls at the bottom of the list. In places where there is only one licensed amateur, the following statement should be attached: I, ——(*YL's name*)——, do hereby swear that this is a valid list of the 1,000 QSL cards signed and received by me. Signed: ————————, date: ————————. Sworn to and subscribed in my presence this —(*no.*)— day of ——*month & year*——. Signed: ——(*Notary Public*)——.

6) Please include 15¢ in stamps with your list to cover postage and handling.

7) All decisions, present and future, will be made by the custodian in case of discrepancies. The present custodian is Lyn Ohlson, W5RYX, Dallas 17, Texas.

8) A copy of these rules will be sent any Ham sending a stamped, self-addressed envelope to the custodian.

South African Woman's Radio Club Awards

The South African Woman's Radio Club offers the W.A.Y.L. (Worked All YL) certificate. If you hold QSL cards from different YLs worked in ZS, ZE, CR, VQ and OQ lands, since 1/7/52, you may be entitled to one of the certificates. Amateurs outside the above countries need have only 10 QSLs for confirmation. SAWRC also issues stickers for the W.A.-Y.L. for 20 and for 50 confirmations. Send your application and cards to SAWRC Secretary Miss Ruth Woodland, ZSL1RW, SAWRC, P.O. Box 3488, Cape Town, South Africa.

The SAWRC offers a new certificate called



Custodian of the WAS/YL award is W9GME, Grace Ryden. Grace came into Ham radio in 1948 and received Class A a year later. She holds YLCC, WAS/YL, WAS, WAC, RCC. Asst. director of the Central Division 1954-56, she is now asst. SCM. 9th YLRL D/C in '52, she organized the Hair Pin net in '54, was NCS until '56, and helped organize the Chicago YLRL. She enjoys the YL nets and operates all bands.

WAS/YL

First of the awards to be established—and still the most difficult to achieve—was WAS/YL—Worked All States, YL. To date (Aug. '57) WAS/YL—has been awarded to these amateurs:

W2QHH	W9GME	W9KA
W1FTJ	W4HLF	W4VCB/3
W4ARR	W8HUX	W6WRT
W8HWX	W7TGG	W7SFK
W3OP	W6QYL/4	W5RYX
W4SGD	W9YBC	W5EDG
W9CMC	W1BFT	
W3MAX	WØUMO	

the "Triple K—Key Keen Klub" certificate. It is for *cw* operation and only YLs (from anywhere in the world) can apply for it. Proof is required of 100 contacts using International Morse code, and a certificate with one sticker bearing the letter "K" will be sent if the log submitted is in order. After 500 cw contacts, the second "K" sticker can be applied for. When 1000 QSOs are made by key, the third "K" will be issued. Apply to SAWRC, as above.

YLCC

The YL Century Certificates, for confirmed contacts with 100 or more YL operators, has proved most popular. Since it was established in 1953, YLCC has been awarded to 188 amateurs. The number in parentheses following

[*Continued on page 127*]

YL Century Certificate

The YL Century Certificate for confirmed contacts with stations operated by 100 or more different licensed women amateur radio operators is issued by YLRL upon compliance with the following rules.

1. Two-way communication must be established on authorized amateur bands with stations, mobile or fixed, operated by 100 *different* licensed women amateurs. Any and all amateur bands may be used.
2. All contacts must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.
3. Contacts may be made over any period of years, provided only that all contacts are from the same location as defined in 2.
4. Contacts with YLs anywhere in the world are recognized, provided only that confirmations clearly indicate the stations contacted were operated by duly licensed women amateur radio operators.
5. 100 QSL cards, or other written communications from the stations worked confirming the necessary two-way contacts, accompanied by a list of claimed contacts, including the full name of the operator, alphabetically arranged, and the date and time of contact, must be submitted by the applicant directly to the YL-CC custodian. Sufficient postage must be sent with the confirmations to finance their return by first class mail. The YLRL will not be responsible for any loss or damage to same.
6. Endorsements: Confirmations of contacts, accompanied by alphabetical list, as described above, from stations operated by additional YLs may be submitted for credit each time 50 additional confirmations are available. Endorsements will be made to the original certificate as application is approved. *Gold* stickers will be awarded to applicants who have worked 50 additional contacts from the same location (or within a 25-miles radius). *Silver* stickers will be awarded to those who have moved from the location in which they earned their original certificate.
7. Decisions of the YL-CC custodian regarding interpretations of these rules as here stated or later amended, shall be final. All inquiries regarding cards, applications, or the certificate should be addressed to her. Address: Katherine M. Johnson, W4SGD, Box 666, Fuquay Springs, N. C.



Custodian of the YLCC award is W4SGD, Katherine Johnson. On the air since 1950, Katherine holds YLCC with 9 endorsements (total 550 YL confirmed contacts), WAC/YL, WAS/YL, also WAS for 75 phone. Active in nets and CD work, she prefers 80, 40, 20 and 15. OM W4PZE, son W4UJI, and she has two jr. YLs.

SB

Bob Adams, W3SW
919 McCeney Road,
Silver Spring, Md.

COUNTRIES WORKED
(Two-Way SB)

W2KR	87	W2EWL	70
DL4SV	85	HR2WC	70
K2AAA	81	W5HHT	70
W2CFT	81	W3HN	70
W4INL	80	F7AF	70
ZS6KD	80	W8JXM	65
G6LX	80	K2GMO	65
W2JXH	77	W6IAL	65
W3BZ	76	OH2OJ	64
ZL3IA	76	W1EQ	64
W3ZP	75	W3SW	64
G3MY	75	PY2JU	63
ZL3PJ	75	W6OZO	63
VK3AEE	75	W6UPP	63
VE4NI	75	CN8MM	63
K6GMA	73	W9GPI	62
VE2GQ	71	W6HIL	60
W6UOU	70	F7AC	60
	YU1AD	60	

Jim, DL4SV returned to Munich after a three month's vacation Stateside, and by working UA1DZ, OA4CX, SVØWE, HS1A and CR9AH jumped into the number two spot, right behind W2KR. A1, W2CFT and Bob, W4INL are also making a serious challenge.

Empty, ZS6KD returned from a four week's vacation and reached the 80 mark. Three new West Coast stations reached 60 countries this month, W6OZO, W6UPP and W6HIL.

Several new SB stations made their debut and started a big pile-up on twenty with every one trying to contact them namely, HS1A, UA1DZ, CR9AH, EI4E and VP2AZ. Welcome fellows!

Sam, OH2OJ and his XYL operated OH2-OJ/OHØ and gave many stations a new country. We have just received word from ON4CC, Arthur that his DX-pedition to LX-land has been called off due to licensing problems. He had prepared for this trip for many months and the tiny SB transmitter constructed for the trip was doing a remarkable job during tests.

VQ4EO, Paul advises that he is contemplating a Dx-pedition across Africa in a special Land-cruiser station-wagon and will work the SB rig enroute. Paul hopes to start late in November, and not later than January. The ten thousand mile trip will include the following countries: VQ4, VQ5, VQ3, VQ2, ZD6, OQ5, FQ8, FE8, ZD2, (Nigeria), ZD2, (Togoland), FD8, ZD1, ZD3, FF8, and PX1. Permission is now being requested from the various countries. This one will be worth watching for. We will have the complete schedule in next month's column. Paul proposes to operate in a novel way, by calling CQ, requesting answers on any frequency but his own, and then to acknowledge all the stations logged during the listening period at one time. This is to conserve his battery in the mobile station, particularly while crossing the Sahara Desert.

W6UOU, Ted operated as W6UOU/KS6 and was very popular on 15 and 20. W4INL, Bob reports that his QSL to YI2RP, Box 6905 Basra, Iraq was returned, marked "No such box." Who has the correct QTH?

OA4CX, Mark, believes there would be considerable more SB activity in South America if there were more QSOs in Spanish. Most QSOs and round-tables are in English and the Latin operators hesitates to call in. Mark advised that OA4BK, OA4CK, OA4EX and OA4CX are active on twenty and OA4AS a new SB station is on 15. OA4FA is building an exciter and will soon be on the air. OA5H in San Juan Bay, Southern Peru is on 15 and 20 SB.

According to John, PY2JU there are now four active SB stations in Brazil, PY2CK, PY2BSI, PY4APE and himself. John sent QSL cards to 137 W-K stations and received 70 replys. This seems like a very low percentage especially when PY2JU was the only PY on SB for a long time. An excellent photo of PY2JU is shown below.



TF2WBU, Marv in Iceland has a new rhombic antenna 75 feet high and sounds like a local BC station. TF2WBZ, Steve is also active on twenty.

I1II, Tino, is active on 20 SB and joins I1BAO, Peter, I1LOV, Augusto and I1BGA, August to make four active SB stations in Italy.

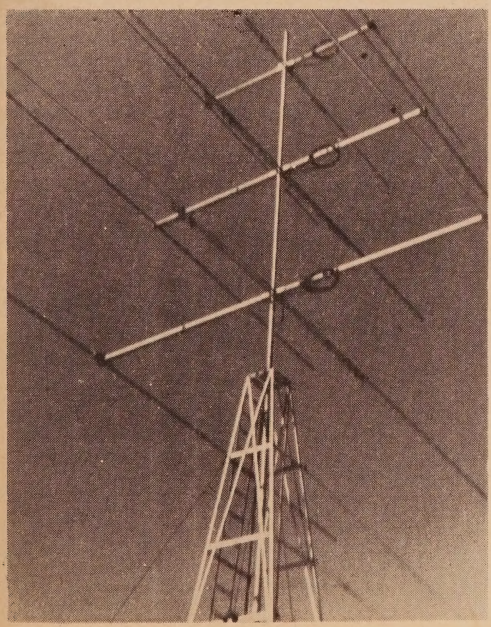
Peter, OZ3EA is building a new rig for OZ5KG, who will join OZ7BO, OZ7T and Peter in Denmark.

Barney, SVØWK is leaving Solonika for a two month's vacation in the States. His double SB, suppressed carrier transmitter did an excellent job for him.

Eva and Alex of CN8MM, have returned from a vacation trip thru Europe, and are active again on 15 and 20. CN8MM won our first DX Contest and are already preparing to win the next one. The W3SW cup which was the first prize was sent to them. A photo of CN8MM with Eva and Alex is shown and also the antenna which is three stacked Telrex beams on 10, 15 and 20.

CN8MM





General Curt LeMay, was assigned the call K4RFA, and is active from his new QTH at Fort Meyer, Va. We were very happy to see "Butch," KØDWC nominated for his third star. Congratulaitons, Lt. Gen. Griswold!

Norb, F7BN is on leave in the States and we are expecting him to drop in the shack.

While working HS1A last evening, Ken told me that he had gone up to the shack to pass the time while his XYL was having their fifth harmonic. Congrats! Ken. Incidentally HS1A has a very strong signal on the East Coast from 1500 to 1800 EST with the beam pointed North. So does CR9AH. KA2MA with Abe operating is heard every morning from 0600 to 0900 with excellent strength. His new W3DZZ beam is working very well. Harry, JA1ANG has returned from a vacation and has fired up a new linear.

We are happy to welcome a new XYL on SB, Gil of K6IKF. We are pleased to show a photo of Gil and her station. She was Editor for the Tri County Amateur Radio Association, and is now its vice-president.

K6IKF



From Wilf, VE6BB, we learn that the following Canadian stations are active on SB: VE7-ALW, AKN, YY, QJ, DH, FX, MT, DV, BG, BK, EL, MI, PO, and AKI. VE6-CN, FI, HB, OT, SV, BB, VE4NI and VE4-QI. There are some VE1, 2 and 3 also active.

During a contact with W4VEI/KL7, I was advised that the station was on the U.S.S. Burton Island (AGB-1) an ice-breaker operating near Point Barrow, Alaska. It seems that the Navy will approve certain Amateur operation aboard Navy ships which are engaged in "unusual or isolated duty provided they are operated by members of the crew holding valid operators' licenses." The equipment which was furnished by Hallicrafters, consists of an SX-101 receiver and a HT-32 and HT-33 exciter and KW linear. In the short time the "Burton Island" has been in the North, over 1000 contacts have been made in all States and 22 countries. Ninety-seven phone patches were handled for members of the crew, and a photo shows one of a bearded sailor talking home. Bob Dennis W4VEI is the operator, and he wrote to say that they

[*Continued on page 101*]

DX

R. C. "Dick" Spenceley, KV4AA
Box 403, St. Thomas, Virgin Islands

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

No. 357 CN8MM ALEX AND EVA PERENYL 40-257 (PHONE).

This is the first WAZ to be issued to a CN8 station and is Phone WAZ No. 9.

We welcome the following stations as newcomers to the HONOR ROLL:

W2ZGB	Gabe	39-211	ZE3JO	Mal	35-146
LU3EX	Alfredo	39-201	W3BQA	Chas	35-126
W1FFO	Ted	39-188			
SP8CK	Ed	39-151	**PHONE ONLY**		
W9BPW	Bill	38-135	DL1AU	Helmut	37-180
K5DGI	Wes	37-137	W9YSQ	Harry	37-177
W8IUA	Roger	35-147	W7ADS	Glenn	36-180

DX Notes

As we write (Smith-Corona and I) two noteworthy D'peditions are on the air, Ted Henry, W6UOU/KS6, from American Samoa and Danny Weil, VP2VB, from the British Virgin Islands. The former after a days stop in Fiji (VR2BC) arrived in Samoa on August 8th and immediately put W6UOU/KS6 into operation (KS6 and other U.S. Possession calls are not given out unless you are a resident there). Ted's cw signals were consistently loud and clear, 14055, in the wee hours and his slow but sure keying gave hundreds a long awaited KS6 contact. Sideband was also used much to the satisfaction of devotees of this mode of operation who are working their way up to the eventual SB DXCC. Ted's efforts to put ZM7 (Toke lau) on the air were stymied by lack of license and transportation. Operation from British Samoa, ZM6, may be a possibility.

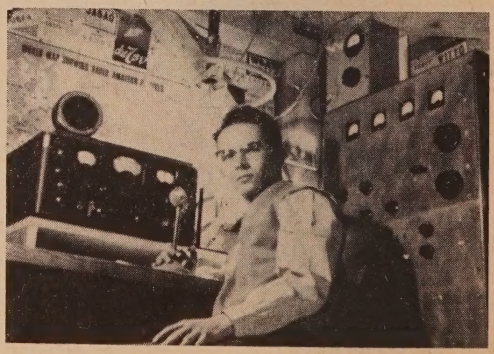
Regarding VP2VB: Danny sailed from St. Thomas on August 6th on the French ketch "EVE" (The "EVE" came from Mauritius and Capt. Maurice Sauzier is a friend of Leny, VQ8AB/VQ8CB) and arrived at Roadtown, Tortola, late that day. After a visit to the Commissioner Danny proceeded to Buck Island, about five miles up the coast and the scene of VP2VG's recent DX'pedition, the next morning. Setting up the Hallicrafter HT-32, SX-101 plus long wire antenna, VP2VB got on the air that afternoon with ONE gallon of gas. Many contacts were made before the ONAN sputtered and quit with a dry tank. Next morning a full drum arrived and VP2VB was in business for keeps. First contacts on cw were: W2CHK, W4FIJ, W9IRS, W8PNK, W4ENK, W2TVR, W3XVE, W9KQD, DL7BA and DL7AA. First Sideband contacts were: W4NQN, W2BXA, W5RHW, W8JPE, W3HLX, W2YOG, KV4AA, W9RUK, W6BE, and W7GBJ. First AM contacts were: W4ADY,

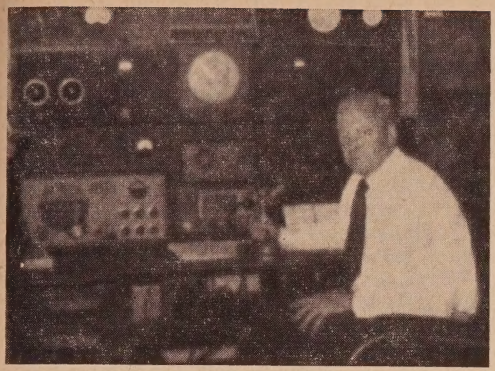
LAST MINUTE ITEMS

FLASH!

DL4AAP (W6GHM) will be signing SVØWJ on Crete from October 5th to October 9th. He will then go to Rhodes where the call SVØWQ will be used between October 10th and 13th. 500 watts will be used on all bands. Stew requests that a dollar accompany each QSL to defray partial costs of trip. Such contributions will result in an immediate return QSL via airmail. Those not contributing should send their cards to W6GHM's home QTH and all will be answered when he returns home next year. Foreign stations should include IRC with card. SSB operation is possible if a rig can be obtained. QTH: PFC Stewart Fason, HQ and Service Co., 2nd Battle group. 7th Regt. APO 36, PM, N.Y. (No calls will be answered ON SVØWJ/SVØWQ's frequency. Call 20 kc up, or down, as instructed).

HB9PL, Pete Langenegger, of Zurich, Switzerland, runs a 4-250 in the final to a 2 element ZL beam. Receiver is a modified SX-28. In three years Pete has amassed 203 countries and is active on 14, 21 and 28 Mcs. phone and CW.





ZS6NT, Chris Neill, of Johannesburg, is presently active on 28 Mcs. He runs 90 watts to a three element beam. Receiver is a SX42.
(Photo courtesy W9MWD)

W8JIN, WØGRP, WØUUE, W8DSZ, W8KIA, K4CEF, W3PGB and W8VOW. Over 2000 contacts were made from 14 hour per day operation at VP2VB and Danny had to go right out and dig up most of the last 800. Danny was the lone resident on Buck Island during this venture and our thanks again go to Bill Bailey, VP2VG, who placed his house at Danny's disposal. VP2VB pulled the big switch on August 18th and should now be in England outfitting his new boat towards bigger and better DX'ploits. (With a definite change of administration, which took place on July 1st 1956, the British Virgin Islands, a distinctive geographical group by itself, having their own postage stamps etc., were placed on the CQ lists as a separate country for WAZ).

Of great interest in VS1HJ's visit to the Maldive Islands. He was due to leave Singapore on August 17th and arrive at this rare spot on August 19th for a ten day stay. Considerable efforts were made to obtain a ticket and, at this time, we can only express the hope that he was able to get on the air and run off a thousand or so QSO's!

HE1-land was due to be on the air again thanks to the efforts of HB1MQ/FL, HB1KB/FL and HB1OQ/FL who planned a three day stay starting August 24th. Activity mostly on 14mc.

Rumors continue regarding activity from Tannu Tuva. UAØOM advises that UAØPG is there with a QRP rig. UP2AS was unable to make the trip this year due to suspension but will try next year.

SVØWP (Larry, W3JTC) has worked 157 countries from Athens since March and hopes to have a three band quad by the end of August. He reports that a new station is on from Crete with the call of SVØWN. QTH is T/Sgt. Clyde S. Geist, 6938th RSM, APO 291, NYC. He is active on 14 mc, cw and phone. Other SVØ stations remain the same with SVØWB, SVØWE and SVØWO being on Rhodes, Dodecanese Islands.

DL7BA hears from DM2XLO, who recently returned from China, that Chinese hams will be given licenses around mid-1958 (Zone 23 possibilities).

Via W8PQQ we hear that VU2RM advises that VU2AX will be going to AC4-land sometime in August. Length of stay unknown.

Cesar, EA9DF, will now return to Spain on new assignment which precludes any appearance at IFNI. He made no mention of receiving the rig which was "supposedly" sent him for this purpose.

VO1BD and VO1BF were due to visit FF8-land for two weeks starting August 29th. SB operation was planned.

Yvon, FF8AC, is the ony ham operating from French Guinea. He is good for the DUF award. See QTH's.

VS9AD is on frequently at 1500 GMT 14035/40 kc.

VP3VN was heard at 0140 GMT 14081 while XW8AB is quite active, 14025, 1000 GMT. G3AAE operated as GC3AAE in June and made several hundred contacts in 40 countries on WAC.

VP2LU, St. Lucia, Windwards, say that he will stay at his present QTH anywhere from a few months to two years longer. Fred states that W4HE is on Antigua but the authorities there refused him a license. Requests for tickets on Ascension, ZD8, by VP5RR, VP7BN and K2AAA were turned down flat. VP2LU also advises that U.S. base at Fernando da Naroha should be opening soon which may give rise to PYØ activity.

ZD4BZ is now on as FE8AK, 14140, A3, 0600 GMT. See QTH's. Also on 21 mc A3, 100 watts. Gary, W6NJU, plans trip to Miami in late August and will try to get over to Navassa Island.

Willie, W1JMI, recently operated from Vermont and worked 121 hams in 21 countries. Mac, W4DNU, now KH6CMM, and Bill, K2GNY, plan a DX'pedition to Palmyra, KP6, sometime between September 1st and December 1st. A 100 watt rig plus a transmitter of the 32V series will be taken along. W4LVV may handle the QSL's and all calls are re-

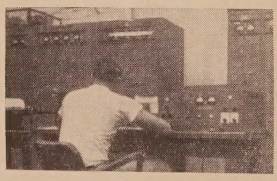
K4DAS, Al Wessel, of Miami, Fla. has been on since 1955 and has worked 110 countries and 32 zones.



quested OFF frequency. Inquiries may be addressed to P. G. Roemer, KH6CMM, Staff Allowance, FAW-2, Base Radio, USNAS Navy 14, c/o FPO, San Francisco. ZD4CM, Mike, in Hohoe, Ghana, is quite active on 14 cw around 1900/2000 GMT. . . The South Calif. Bulletin, via FB8BC, states that Louis, FB8XX, will leave Kerguelen Island in November. We understand that Pierre, FB8CC (an old operator of FB8XX) will be his relief. . .

DX'ploits

Jim, W8JIN, leads off this month with ZD4AF (Ghana) giving him a 268 total. . . Gene, W6EBG, adds FL8AB to hit 265 while Lindy, W8BHW, comes up to date with VS4JT, FB8XX, ZD4CM, OH1RTØ, FW8AA and VK9AJ to reach 265. . . Dewey, W6VE, goes to 264 with ZD4CM as Horace, W6TI, rises to 261 with UM8KAA, VP2VG and ZD4CM. . . . John, W7GUV, adds UM8KAA and OH2HG/Ø for 259 while Ray, W6BUD, nabbed FB8XX, FB8CD (Comoro) and ZD4CM to reach 257. . . Norm, W6NNV, upped to 257 with such as FB8CD, ZD4CM, FB8XX, IT1AGA, UM8KAA, TI9CR, TP2VG and OH2HG/Ø as Jack, W6NTR, made it 254 thanks to FB8XX, ZD4CM and HC8GI. . . Fred, W8KML, moved to 249 (227 phone) with OH2OJ/Ø and W6UOU/KS6 while John, W6EFM, went to 248 with such as XW8AG, UH8KAA, UJ8KAA, CR5SP and UM8KAA. . . Clint, W8SYC, deleted LA8FZ/P and added VP2VB, ZC5AL, W2HQL/KC4 for a 246 total as Erwin, OE1ER, added 5 to reach 245. . . Vlad, OK1FF, hit 243 with ZC5AL, YA1AM, FR7ZC, OQØCZ and FL8AB while Roy, W6LW, rested on 240 with UM8KAA. . . Wally, W7ENW, added 7 for a 218 total as Bill, W6WWQ, jumped from 192 to 212 with such as VR6TC, OH3QC/Ø, FB8XX and UR2KAA. . . Dick, G3DOG, made it an even 200 with HS1A, LU2ZS, UM8KAA and VP2VG while Stan, W1CLX, moved to 263 with W6UOU/KS6. . . Carl, W9ABA, went to 247 with HS1A, OH1ST/Ø and FB8XX as George, W2HZY, rises to 241 after keying with FB8ZZ, ZC5AL, ZD4CM, YJ1DL, UM8KAA and LA2JE/P (Svalbard). . . Ed, W2GT, ups to 241 with such as SM8KV/LA/P, UI8KAA, VP8BK, SVØWN and ZC5AL while Rip, W4EPA, hits 240 with FL8AB, VR6TC, ZS2MI, FB8CD, FB8XX and ZA2ACB. . . Bob, WØQVZ, nabbed FB8XX, PX1FC and W2HQL/KC4 for 233 as Glenn, W7ADS, submits new list with a 229 label. . . Otto, K6ENX, goes to 224 with such as VP2VG, 4X5RE, UD6BM, UL7KBK, FL8AB and I5RAM (Scratch ZM7AC Otto!) while Frank, W9UXO, rises to 225 with UO5AA, ZD4BQ, UM8KAA, OQØVN and VS9AD. . . Cal, K6CJQ, submits new list jumping him from 123 to 221! as Len, W6WO, goes to 219 with such as SM8KV/LA/P, PX1FC, 3V8BY, OH2AA/Ø, YA1AM. . . Skip, W9YSX, slid to 199 with VK9DB, 9S4CH, UL7KAD, W2IWC/KC4, UR2AK, MP4BCG, OH3AA/Ø, UO5PK and PX1FC while Edgar, DL6MK, rises to 39-160 with XE1PJ. . . Bob, W6YMH, makes it 178 thanks to VP2VG, PJ2ME, VS9AI, GC2FZC, UJ8KAA, FE8AH, FG7XE, EA9AF and BV1US as Miles, W6ZZ, hits 170 with VR6TC, 3V8AO and W6UOU/KS6. . . Norm, DL4RI, adds HS1B, FE8AH, UH8KAA, ZD6JL, FO8AC, ET3UCA, VS2CL and VS6BF to reach 150 while Bill, W8ESR, ups to 145 with such as FK8AS, VS1GL, FY7YF, VP8AI, UJ8AF, VQ2AS, KR6AE, HI8BE, VP2VG, ZD2DCP and VP5BH. . . Nelson, W8UEP, adds 15 for a 141 total as Russ, W9QNO, goes to 116 with 3V8AO, VK9NT, VK9NM, ZK1AU, KM6AX and KAØSC (Iwo). . . Ed, W7HKT, adds 27 to reach 171 while Norm, W8DLZ, ups to 169 thanks to UN1AB, UJ8AF, VP2VB and KP6AL. . . Bill, W4HKJ, added zone 17 with UI8KAE plus VK9VM, SVØWB, UG6AB, UP2AT and UL7KAA for a 164 total as Dave, KL7BUZ, added two zones with KZ5BG and XW8AG plus KC6KU, VR3G, FO8AC and W7FNK/KP6 for a 119 total. . . Al, W8PQQ, nabbed W6UOU/KS6 for 247 on phone ony while Ernie, W6KQY, rose to 217 on A3 with FK8AS, M1B, VS9AI, UR2KAA, ZD4CB, I5FL, OQØDZ and VS1CG. . . Cy, W6PXH, submitted new list raising his phone total to 176 as Ralph, W6CHV, added 18 on phone to hit 182. . . Harry, WØANF, raises himself a zone with VK6WG, A3, while Gan, W6CHY, upped to 139 on phone with XW8AG. . . Al, F7ER, has worked 145 and returns to K2CJS in Sept. . . Mike, K6ICS/6, quickly added 10 countries from new QTH for a 52 total. . . Ron, W2SUC, reaches 164 with ZD1NWW, UQ2AB, FK8AT, and VS1HC. . . Latest for Lloyd at W6KG were: VKØAB, GD4VH, VP9DM, EL2P, FK8AT, KG1JA, UPOL7 and UA3MIR (Festival stn.). . . A card from ZD4CB gave Dough, VK5BY, 200 confirmed. . .



VP2LU, St. Lucia, B.W.I. has been dispensing Windward Island contacts for the past few months and has been able to work 136 countries during his stay. Recently on SSB 300 stations and WAC were worked. Fred expects a re-assignment to Antigua, in the Leeward group, and may be there as this is read. He is trying hard to catch up on the arduous chore of QSL'ing.
(Photo courtesy Bill Stewart)

HONOR ROLL ENDORSEMENTS

(To August 15th, 1957)

Last complete HONOR ROLL appeared in the Sept. issue.

W8JIN	40-268
W6EBG	40-265
W8BHW	40-265
W6VE	40-264
W6TI	40-261
W7GUV	40-259
W6BUD	40-257
W6NNV	40-257
W6NTR	40-254
W8KML	40-249
W6EFM	40-248
W8SYC	40-246
CE1ER	40-245
OK1FF	40-243
W6LW	40-240
W7ENW	40-218
W6WWQ	40-212
G3DOG	40-200
W1CLX	39-263
W9ABA	39-247
W2HZY	39-241
W2GT	39-241
W4EPA	39-240
WØQVZ	39-233
W7ADS	39-229
W9UXO	39-225
K6ENX	39-224
K6CJQ	39-221
W6WO	39-219
W2ZGB	39-211
LU8EX	39-201
W9YSX	39-199
W1FFO	39-188
W6MUF	39-176
DL6MK	39-160
SP8CK	39-151
W6YMH	38-178
W6ZZ	38-170
W6TKX	38-162
WØGUV	33-155
DL4RI	38-150
W8ESR	38-145
W8UEP	39-141
W9BPW	38-135
W9QNO	38-116
W7HKT	37-171
W8DLZ	37-169
W4HKJ	37-164
W3RPG	37-152
K5DGI	37-137
ZL3CP	37-136
KL7BUZ	37-119
ZE3JO	35-146
W8IUA	35-147
W3BQA	35-126

PHONE ONLY

CN8MM	40-257
W8PQQ	40-247
W6AM	40-223
W8KML	39-227
W6KQY	39-217
DL1AU	37-180
W9YSQ	37-177
W6PXH	37-176
W6CHV	36-182
W7ADS	36-180
WØANF	36-148
W6CHY	35-193

WAX TOP FIFTY

W1FH	276
W6AM	275
W8PQQ	271
ZL2GX	271
W6AQA	270
W6MX	270
KV4AA	270
W2AGW	270
W6SYG	268
W8JIN	268
W3KT	267
W9VND	267
W3JNN	267
W8KIA	266
W6DZZ	265
W3GHD	265
W6SAI	265
W7VY	265
W8BHW	265
W6EBG	265
W6GFE	264
W6VE	264
W6SN	263
W6CUQ	263
PY2CK	262
W6VFR	261
W9NDA	261
W3EVW	261
W6TI	261
W6ADP	260
W6MEK	259
W9HUZ	259
W7GUV	259
W2BXA	258
W6TS	258
W1GKK	257
W6BUD	257
W6NNV	257
G6ZO	256
W5KUC	256
W8DAW	256
W7AMX	255
CE3AG	255
W6NTR	254
WØYXO	252
W8HGW	251
W8BRA	251
VK2DI	250
GM3DHD	250
W8NBK	249

OTHER 250 PLUS

W5ASG	269
W1CLX	263
W9RBI	262
W2WZ	262
W3EPV	256
W5JUF	256
W8UAS	255
W5ADZ	254
W1BIH	254
W9LNM	252
W2QHH	252
W8JBI	250
W6YY	250

PHONE WAZ AND 200 PLUS

CN8MM	40-257
W8PQQ	40-247
PY2CK	40-244
VQ4ERR	40-241
ZL2GX	40-226
W6AM	40-223
G8IG	40-199
ZL1HY	40-163
W6ITH	40-161
W9RBI	39-248
W6DI	39-236
W8KML	39-227
CX2CO	39-222
W6YY	39-222
W6KQY	39-217
W9NDA	38-225
W8QJR	38-218
CE3AB	38-214
W2BXA	38-211
W3GHD	38-209
W3JNN	37-236
G3DO	37-209
W1NWO	36-225
W1MCW	36-223
W4HA	36-216
W5JUF	36-206
W5ASG	36-205
W9RNX	36-205
CO2BL	35-210

Next complete HONOR ROLL will appear in the Jan. issue.

The following stations have been dropped from the HONOR ROLL as no change in total has been reported in over two years. Reinstatement will be made on receipt of new report.

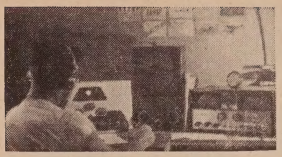
CW/PHONE: W8DMD, W9MXX, W2HHF, W8HFE, W2IMU, GM3CSM, W2GRV, W8VLK, W4DKA, G6QX, W6CUL, TF3SF, PY4IE, WØTKX, W3LVJ, W6KYG, W2OST, VE3LJ, OH3OE, WØAIH, KV4BB, KG4AF, EA4BH.

PHONE ONLY: XEIAC, W3LTU, PK4DA, W7HTS, W8HUD, F9BO, SM5KP, W4CYU, W1HHK, ZS6Q, W3BES, W1JCX, W8BF, W8REU, VK3BX, W6TT, TI2TG, W1BEQ, GM2DBX, W9BVX, W2DYR, HC2JR, W6PCK, W2RGV, PY2JU.

WASM

(Worked all SM districts)

SM5AHK advises that mounting costs of this Certificate are not covered by the 10 IRC's originally requested to accompany applications for this Award. Future applicants should forward, by check, money order or currency, the equivalent of 10 Swedish crowns which have the approximate value of $1.90 U.S. currency. WASM is issued in the form of a very attractive table "clothlet."



"Shanti" Perea, 457WP, of Koloonawa, Ceylon, tho running 15 watts has worked over 1050 W stations. He seeks Utah, N. Mex., Mont., Wyo., Nev., and No. Dak. for WAS.

(Photo courtesy W3VKD)

EYMA

"800 years" Munich Award

(As applied to W/K/VE hams)

On the occasion of the Munich 800 year Anniversary Festival, which takes place in July 1958, the Munich section of the D.A.R.C. has arranged this contest from October 1st to December 31st 1957.

1. Outside station should contact as many Munich stations, phone or cw, on the 3.5—7—14—21—28 mc bands.

2. Minimum reports: cw 338, phone 33.

3. Each contact as one point per band with two points being given for 3.5 mc contacts.

4. Total score is sum of all contacts multiplied by bands used. ie: maximum multiplier is 5.

5. Munich stations may be identified by the suffix "C12" ie: DJ2FB/C12.

6. Top scorers in each continent will be awarded expenses for a three day stay in Munich during the Festival. Second and third place winners in each continent and first place winners in each country will receive a Certificate.

7. In addition, all W/K/VE stations will receive a Certificate upon submitting QSL showing contacts with 20 different Munich stations during this period.

8. Applications must be postmarked not later than January 31st 1958 and sent to: OV Munchen, P. O. Box 4, Munich 40, Germany.

W. A. M. Certificate

(Worked all Manawatu, ZL2, stations)

The N.Z.A.R.T., Manawatu Branch, will award this Certificate to any Amateur station submitting a list, giving QSO data, with 12 Manawatu Branch area stations on any combination of bands.

[*Continued on page 81*]

NOVICE

Donald L. Stoner, W6TNS . .
P. O. Box 137
Ontario, California

Seventy three, Al, it's time to get to work on the Novice Column for CQ Magazine. Click. Off goes the transmitter filament switch. Click. On goes the IBM typewriter switch and here we are together again this month. I think it's about time we examined impedances and boned up on some sugar coated theory. We often hear or read about impedance and impedance matching but it often remains a deep mystery for many amateurs.

"What's all this jazz about impedance matching, anyway?" Although not always phrased in this manner, the question almost always comes up sometime during the career of a budding Novice. Whether you know it or not, a good working knowledge of the "basic facts of life" of impedances and matching can make the difference between having your rf carrier dribble off the end of your antenna or putting a "rock crushing" signal into the other fellow's receiver.

Let's start with a simplified definition. The amount of resistance that a device presents to a source of alternating current (ac) is known as *impedance.* As an example, that new hi-fi speaker that you just bought says that it is 16 ohms on the label. Measure it with an ohmmeter and the meter says that is only 2 ohms. Did you get gypped? No, you're measuring the resistance, not the impedance. You used a dc device (the ohmmeter) and the definition specifies *a source of ac.* To prove the point, connect a 16 ohm resistor in series with the speaker and connect this combination across an audio oscillator. Now, if you measure the ac voltage across the resistor and the ac voltage across the speaker you should find that they are exactly the same. Amazing! The speaker presents a 16 ohm load to ac and a 2 ohm load to dc. Antennas and transmission lines are quite similar in that 300 ohm line won't read 300 ohms with an ohmmeter. The measuring techniques call for rf measuring devices, not ohmmeters. More about that later.

Another basic fact about impedances is this: the greatest amount of power transfer will occur between two devices *when the impedances are matched.* In your hi-fi amplifier the best match is obtained when the 16 ohm (impedance) speaker is connected to the 16 ohm output (impedance) of the amplifier. Right here is one of the big bug-a-boos in the Novice station. Poor signal reports and lack of dx often results when the transmitter is not matched to the transmission line or the transmission line is not matched to the antenna. When there is a *mis-match,* you no longer have the best power transfer. Some of the juice stays in the transmitter and never reaches the antenna where it belongs!

To gain a little clearer insight into this matching business, let's look at a typical case. Novice WN2NSD wants to put up a simple antenna so that he can operate on the 40 meter band. Probably the simplest antenna is the dipole (or doublet as it is often called). The dipole is two pieces of wire mounted at the end and at right angles to the transmission line. The length of the wires is a function of frequency and they are usually one quarter wavelength long on each side of the transmission line, for a total of one half wave length. The Handbook says the length can be found by dividing the frequency (in mc) into 468. For the center of the 40 meter Novice band (7.175 mc) it comes out roughly 65 feet. Therefore the wires would be 32 feet, 6 inches each side of the transmission line. By experimentation, it has been found that the impedance at the *resonant frequency* (the frequency that it was designed for) will be approximately 72 ohms. At frequencies other than 7.175 mc the antenna will have an impedance other than 72 ohms, that's why it works best at this frequency.

So now we have our antenna of the correct length up in the air, but how shall we connect it to the receiver. You might think of it as a "radio hose" for it carries the rf from the transmitter in much the same manner as a hose carries water. To be more accurate, we call it a transmission line. Remembering what you read a few paragraphs back, we know that for best power transfer the impedances should be matched. Looking at the transmission line catalogue we find both RG-11/U and RG-59/U coaxial cable with a 72 ohm impedance. RG-11 is bigger and has a little less losses. In addition it will handle more power than the RG-59 but for most Novice applications (except VHF) the RG-59/U is quite adequate. So WN2NSD buys enough coax to reach from the antenna to the transmitter. What about the match here? Most amateur transmitters use a *pi-network tank circuit* and can match any transmission line impedance between 50 and 600 ohms. There is no mis-match here, either. All the the impedances are correctly matched and the

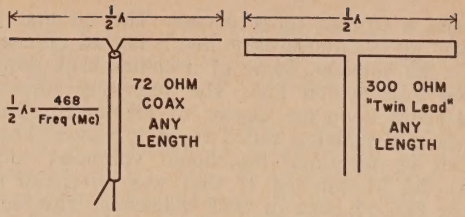
best power transfer between the transmitter and antenna can take place. Coax transmission lines are convenient for another reason. The low pass TVI filter can be inserted in the line without causing any appreciable mismatch.

The antenna and transmission line system that I have just described is very efficient simply because all the impedances are matched. It really gets out! Many hams used separate dipoles for each band. Why? Remember that I said the impedance is 72 ohms *only* at the frequency of resonance. If you try to use the 40 meter dipole on 80 meters, the impedance goes up to several thousand ohms and a horrible mis-match results. Even if you force your 75 watts up the transmission line, about 74 watts will turn right around and come back down the transmission line. Only about one watt will be radiated by the antenna. The rest of the juice will be absorbed by the transmission line and the transmitter tank circuit. This is the reason why coax gets hot and tank circuits often burn up.

Let's look at another "case history." Joe Novice has an Uncle who can buy 300 ohm television "twin lead" wholesale. Coax is more expensive, so what the heck, let's make the antenna out of twin lead. He calculates the length, cuts it, shorts out each end, and cuts one of the wires at the exact center. To this he attaches enough twin lead to reach to the shack and presto, he has constructed a *folded dipole*. By experimentation it is known that a folded dipole has four times the impedance of the simple dipole or approximately 300 ohms. Very convenient, for we can use the 300 ohm "twin lead" as the transmission line also. No mis-match results between the antenna and the transmission line.

However, a problem rears its ugly head at the transmitter. The transmitter output and coax cable consists of a cold grounded conductor surrounding a hot central conductor. This is called an unbalanced system but is satisfactory if the unbalanced transmitter is fed to the unbalanced coax cable. The 300 ohm line consists of two conductors held apart by insulation and is called a *balanced feedline*. Connecting the balanced feedline to the unbalanced transmitter output creates another mis-match! There are several ways "to beat the rap." One is to use a *balun*. This can either be a length of transmission line properly connected or a set of coils. Its purpose is to transform from balanced to unbalanced or vice versa. Another method is to use an *antenna coupler*. When transforming from balanced to unbalanced, the balun also provides a 4 to 1 stepdown in impedance. The antenna coupler will provide a continuously variable impedance step down allowing you to match to a wide range of impedances.

Both of the preceding antennas were basically one band devices. What about multiband

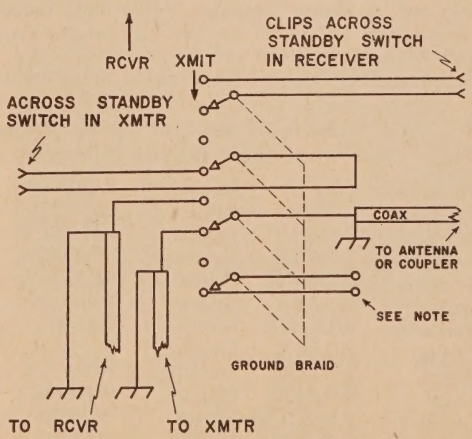


Two typical antennas designed to work on a single amateur band. These antennas are the ones discussed in the text.

operation with antennas such as the off center fed Hertz, the Windom, long wire, random wire, etc? Let's use our folded dipole as an example. This antenna has an impedance of 300 ohms at resonance. Now if we move the transmitter to some other band, the impedance is going to be different. Insert an antenna coupler between the transmitter and the line we can match to this new impedance. As another example let's say that you string up 100 feet of wire from your shack to a tree. This length does not resonate on any ham band, therefore, the impedance never comes down to 72 ohms on any of the ham bands. It might dip down below 600 ohms on some of the bands and if it does, most transmitters will load it up with rf. But for operation on all bands we must have a device that will match to a wide range of impedances. Enter the antenna coupler again. With a suitable coupler the wire will load up on all bands. Incidentally, this type of antenna is called a random wire because it is not resonant on any of the ham bands.

Whenever a mis-match occurs in the sys-

A very simple method of adding a transmit-receive switch for one knob control of your station. The information and schematic was sent to us by Richard J. Patak, K6JSC.



tem, a strange thing occurs. The r-f that is sent up the transmission line is not all radiated by the antenna. Some of it comes back down the transmission line. The returning amount depends upon the degree of mis-match. This returned signal is called *standing waves*. They can be measured directional voltmeter such as the Monimatch II that was described in the Feb 57 issue of QST Magazine. This unit measures the amount of juice going in each direction on the transmission line. Obviously the more that you have going up and the less coming down means more is being radiated by the antenna and that's what you want. It has to go someplace! I use one permanently connected in the transmission line to monitor the forward and reverse voltages. Whenever I QSY, I always touch up the antenna tuner for minimum standing waves. I find that I am getting 6 to 10 db higher signal reports since I started using the Monimatch. Look up this device for use in your station, it's recommended!

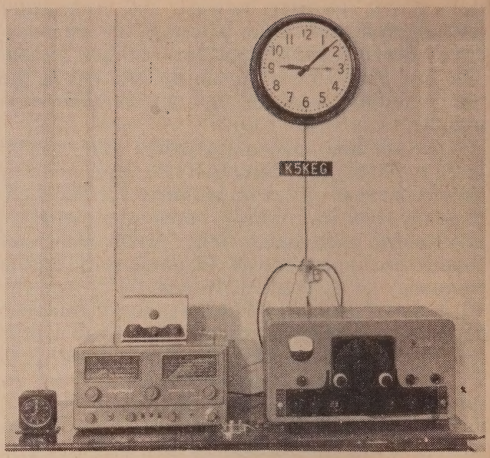
As you may have guessed, I have only scratched the surface of this business of impedance and matching. However, now that you have the basic theory I suggest that you sit down with the Handbook and dig a little deeper. I find the subject very fascinating and I think that you will too. There are many aspects to the subject and I could not do it justice even if I had all the pages of this issue at my disposal.

Net News

KN2VAB writes to say that a new net is being formed. The NCS will be KN2VAB and alternate NCS is KN3AIC. Anyone wishing to get into this net should contact R. W. Javins, KN3AIC, 722-D, MEMQ, NATC Patuxent River, Md. or Tex Birnholz, KN2VAB, BOX 217, Budd Lake, N. J.

For the benefit of the General Class hams that may be reading this, Bob Patterson, K5DZE, 316 South 11th St., Columbus, Miss. would like to invite all teenage hams to call into the Alabama Teenage Net which meets everyday at 1630 CST on 3905 kd. Miss., Ga., and Alabama stations call in so far.

Bob, KN5JTN, 509 Dakota, Norman, Oklahoma and Milton, KN5KRM are starting a Novice Net, called the Sooner Novice Net. For more information write either Bob or Milton.



Bob Parrish, K5KEG, P. O. Box 2251, Corpus Christi, Texas operates 40 and 15 meters with his NC-88 and Valiant (loaded down to 75 watts of course). Bob will be glad to sked anyone needing Texas for WAS or for a ragchew.

Who's DX?

Pete Roussel, K5JCC, 6515 Brompton, Houston 5, Texas has a Swedish pen-pal that sent him a report of Novice Stations that he heard on the 15 meter Band. Rolf Stromberg reports the following stations were received between April 1 and April 20. They are: KN1ADB, AOK, AQI, WN1NYK, KN2SEM VDW, VIM, VPR, WN3HQQ, IRQ, KN4, HVA, KIC, LNM, LXJ, MAI, MAV, OUR, KN5HLU, HSV, KN6UJW, WN7DOO, KN8BSE, CLE, CQU, DHG, DJK, DMS, DNW, DSO, DYX, GNW, KN9DNV, DTO, EAY, KNØGJX, HAN, HBS, HWK. If these boys would like to know what their sig. rpts. were they can drop Rolf a note and he will oblige. His address is Rolf Stromberg, Box 514, Vindeln, Sweden. Many thanks Pete for forwarding this list.

We wonder if any of these hams are what their names indicate?

Sheriff	W9FLI	Rector	WØLKF
Judge	W2GIC	Sexton	W7VCR
Warden	WØYYF	Pastor	KN8ACR
Sailor	K4HXP	Parson	W9DEI
Seaman	WØRDZ	Priest	WØDGR
Stoker	W5AFS	Bishop	KØDEK
Yeoman	WØQWY	Monk	WØJJL
Ensign	K2ABX	Shepherd	W7TXH
Baker	W5YCC	Shoemaker	W9WAR
Cook	W5DDU	Dancer	WN8BKT
Butcher	KN4GCD	Singer	W2RQJ
Butler	K5DHK	Miller	K4ABO
Mason	K2AFO	Weaver	W1AKL
Carpenter	W8AA	Knitter	W9ABR
Porter	WØAGG	Pilot	K2EDQ
Painter	WØOVL	Barber	W8ALY
Hunter	W2TH	Brewer	WØAG
Steward	W4AFI	Farmer	WØYCT
Merchant	W2LGF	Foreman	W8WZK
Miner	W9DDA	Messenger	W3AGF
Major	W9NEO	Nurse	W9YNK
Sergeant	WØWAJ		

KNØCEG is a Sportsman
K5DTV is a Prince
W7AAP is a Duke
W9FGF is a Baron

George Haylock, G2DHV, 63 Lewisham Hill, London, S. E. 13 England sent along a list of Novice stations that he has copied on the 15 meter band. They go as follows: KN1-ADB, WN1NYX, KN2IJN, WN2OSO, KN2-UOB, UWY, VAC, YYH, ZPT, WN3JWH, KN4JYQ, KGO, KRJ, MAV, QFO, KN8-DHM, DJZ, DYX, EEW, GHG, ETO, and KN9GZF. My thanks to you also for sending along the reports.

Stig Asklund, SM5A90, Ragelsangen 2B, Sundbyberg, Sweden sent along a very nice letter about his activities in Sweden but neglected to list any Novices that he may have heard.

Frank Anzalone, W1WY is the guiding genius of the CQ Contest Calendar department. Frank dropped me a card about the forthcoming W. W. DX Contest. He writes:

Dear Don: Last year we added the Novice section



Ah, a pretty face graces the Novice Shack for a change! Frances Continello, KN4PPX, 2401½ 4th Avenue South, St. Petersburg, Fla. has worked 28 states, VE5, XE1, KZ5, CM2, WP4 and G3, but only one YL out of 110 QSO's. What say gals?

to our W.W. DX Contest. Only 6 logs were received from the WN/KN boys, and two won certificates. A very poor showing indeed! The CW portion does not come up until the last week in November.

Looks like you gents have plenty of time to check the tubes in the ole exhaler and inhaler, and make general preparations for doing some serious DX digging during the contest. Plan now to get one of those certificates! For more information, see Frank's column in the front section of the magazine.

Help Wanted

Michael V. James, 232 East Burleigh Street, Milwaukee 12, Wisconsin would like to meet a local ham who would want to give him the Novice examination.

Larry Murdock, 408 West Lee Avenue, Enterprise, Alabama hopes to be a ham and could use help with the code and theory.

Pete Kramer, Class 3-A, Fleet Sonar School, Key West, Florida would like information on becoming an amateur and needs help on the code and theory.

Carl Lanzberg, 329 Main Street, Paterson, N. J. is interested in becoming an amateur and needs help with the code and theory.

Matthew Blanding Jr., Route 1, Box 43C, Dalzell, South Carolina would like to meet a local ham and see a ham station. He needs help with the code and theory.

Letters to the Editor

Richard J. Patak, K6JSC, 1850 Juanita Avenue, San Dimas, California sent along a diagram, similar to the octopus, only manually controlled. Richard used a three pole, two position switch for the transmit receive functions. Since internal connections are made in the receiver, he suggests using alligator clips if your are adverse to changing commercial equipment. Many thanks Dick, your circuit is around here abouts.

Bob Parrish, K5KEG, P. O. Box 2251, Corpus Christi, Texas sent in a nice picture of his station and two very good suggestions for the readers of the Novice Column. Bob says:

Don't take the Novice test until you get up to 7½ words per minute. If your finances permit, get your General rig right off and reduce the loading to 75 watts. That way you won't lose $35-70 when you do get your "big ticket" and trade the rig for more power. I believe that if a newcomer will realize at the beginning that the real goal in ham radio is the General ticket and that the Novice license is just a convenient means of getting live code practice on the air, he will find his progress tremendously accelerated. *I must agree with Bob on all points except one. I think that the real goal is to continually improve yourself and to advance your amateur class as high as your ability permits.*

Dear Don: I am unable to find the Miller #4407 coils to modify my Q multiplier for use with my Command Receivers. Could you please tell me where they can be obtained? Yours Truly, David W. Hyde, KNØHTU, 1129 32nd St. N.E., Cedar Rapids, Iowa. *You can obtain the*



Joe Lewey, KN1BVT, 35 Elm St., Revere, Mass., Runs an S-41W and an HT-17 into a 40 meter dipole. Out of 137 contacts, Joe has only worked 11 states for his WAS and plans on going up to 15 meters.

coils directly from the manufacturer, J. W. Miller Coil Co., 5917 South Main St., Los Angeles, Calif.

Donald E. Simonsen, KN7AEJ, 3213 "R" Street, Vancouver, Washington believes that he is the first KN7 to be licensed in Washington. He expounds with:

Dear Don: I am planning a trip to Swift Creek Dam, Cougor, Washington and should be on the air by the time that this is printed. My rig is a DX-35 and a new National NC-109 with a long wire outside the barracks. I will work 40 and 15 meters day time since I work nights. I plan on printing special QSL cards. 73's Don.

KN5LLA, Jerry Johnson, Box 506, Celina, Texas is very pleased with his DX-35 transmitter. He puts it this way:

Dear Don, The DX-35 must be a swell transmitter for I have had my ticket 3 days and worked 5 states. My receiver is an S-40B with a doublet antenna. I am on 40 meters and would like a sked with anyone that could help on my WAS, 73's Jerry.

David Beam, KN9IQM, 2516 Noyes Street, Evanston, Illinois and Bill Asoegren, KN9IQK, sound like they have been tangling with some high speed operators. They write:

Dear Don, We are interested in keeping slow speed (five to ten wpm) with other amateurs. Anyone who is interested please write to me at the above QTH. All letters will be answered. 73 and hope to work you sometime. Dave and Bill. *I think you got the wrong slant fellows. The idea is to get up to 13-15 wpm!*

Bill, KN6YEK, 666 Burchett, Glendale, Calif. is practically a local. He says:

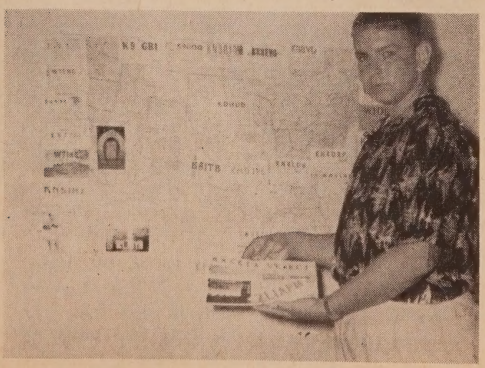
Dear Don, I am 15 years old and have had my ticket since 1-31-57. I use an S-20R and a Globe Chief. The antenna is a 40 meter doublet. I have worked 4 states and no countries. I would like information on converting my rig to 6 meters. I would like to sked with other states. 73 and best of luck, Bill.

Dear Don, I would just like to tell in your Novice Shack about Mr. James P. Brown, W4ZD, 25 First Ave. Atlanta, Georgia and his helpfulness to prospective Novices in the Kirkwood, East Atlanta area. 73's Thomas Nichols, 98 Warren St. N.E. Atlanta 17 Georgia.

Bill Ellington, KN4MWB, 2015 Arnold Drive, Charlotte 5, N. C. sounds like another "DX Gun." He writes:

Dear Don, My call is KN4MWB and I have been on since Feb. and am 14 years old. The rig is an AT-1 and NC-88 with a Q Multiplier. I work 40 and 15 meters. So far I have 40 states and 11 countries, my best DX being KA8 and 4X4. My only antenna is a 40 meter doublet. I would like to sked Wyo., Nev., Idaho, N and S Dakota, Nebr, Iowa, and Vt. I QSL 100% and will sked anyone needing N.C. for WAS. 73 and DX Bill.

I was heard in Viet Nam. Stan Brokl, KN6YYQ, 2592 Sierra Way, LaVerne, Calif. was copied when he ran a Heath AT-1 feeding *a 40 meter dipole* via a homebrew antenna coupler. Other DX includes ZL1, FO8, ZL4, VK3 and misc. WH6's and WL7's.



Richard L. Rimmel Jr., 1108 Hillsboro St., Pittsburgh 4, Pa. is both a Novice and a "Surpluser." He is having trouble with his receiver and would like to find a schematic for Aircraft Receiver RCA Model AVR-20A1. can you help him?

Wanna Work some DX? Kent Carlson, Box 713 Wailuju, Maui, Territory of Hawaii wrote to say:

Dear Don, I got my ticket about 2 months ago. The rig consists of a DX-35 and an S-38D. I have a two band dipole for an antenna. I haven't reached the states yet but am trying hard. I will be happy to sked anyone needing WH6. I will QSL 100%. I only work 40 meters. The best time would be from about 10 o'clock PST to about 1 o'clock. I will answer all letters. 73's and keep up the gud work, Kent.

From the land of eternal dampness Ron Hines 14300 N.W. 16 Court, Miami 47, Florida writes:

Dear Don, My rig is a 6W6 running 13 watts with a Scott 215 export receiver. With this set-up, I've worked 24 states WP4, WH6, CO2, 5, 8, and CM2. I work only 40 meters. I'll sked anybody, anywhere, anytime for any reason. I QSL 100%. I am trying to work all Florida counties.

Smogville (Southern Calif.) is well represented this month. Steve Love, KN6UHN, 9632 E. Naomi Avenue, Arcadia, Calif. He emotes with:

Dear Don, The rig here is a homebrew 807 transmitter which I have W6SYG to thank for, an NC-101X receiver and a half wave 40 meter dipole. All seem to work ok as I have worked 42 states and 17 countries and 4 continents, all on 21 mc. I am very active on 15 meters and will sked anybody needing Calif., for WAS. 73's Steve.

Bob Ogren, KN1CVH, 931 Pleasant St., New Bedford, Mass. sends us the following:

Dean Don, The rig here is a WRL Globe Chief in use with a borrowed HQ-129X from W1NSP's shack. KN1BOC, my first contact, is the teacher of the Ham Radio Club at school. I have made eight contacts in five states with two confirmed, in one week of operation. In a couple of weeks I will have a new SX-99 receiver. 73's Bob.

Don Lambert, KNØKUZ, Rockford, Minn. has some kind words to say. I quote:

Dear Don, I read ur Novice column all the time. I think it is great. Pse keep up the gud work. I have had my ticket about a month. My xmitter is a Viking Adventurer with a long wire off center feed. I would like to hear from anyone at the Great Lakes Naval Center for I would like to contact a buddy of mine there. I will sked anyone and I QSL 100%. Well, BCNU Don.

Also from the land of orange juice and tract homes Gene Qwens, WN6ORZ, 1327 Park Avenue, Long Beach, Calif. registers this complaint:

Dear Don, I would like to let the 40 meter phone men know that their harmonics are coming up in the 80 meter band. I don't say all the 40 meter phone men are guilty, but there are quite a few in Southern California. 73's Gene. *Somehow, this does not sound plausible, Gene. Harmonics are multiples of the fundamental. Therefore, 40 meter stations could interfere on 20, 15,*

[*Continued on page 82*]

DX [*from page 75*]

Minimum reports are 339/33 and shall have been made AFTER September 1st 1956. QSO data should contain: Date, GMT, Report and *christian names* of operators contacted.

The Manawatu Branch covers the area within an approximate radius of 15 miles from Palmerston North.

Applications go to: ZL2HT, Mr. A.G.S. Bradfield, 70 Te Awe Awe St., Palmerston North, New Zealand.

Here and There

OA4AU (W6WVC) was due to return home in August . . . Bob Ford, ex-AC4RF, spent three weeks in N.Y. during August making a documentary film for TV/CBS . . . Bob, GM3HXT, now signs VK2NF . . . G3JFF now turns up as VS1HU for a two year stay in Singapore. He has been on since July and has worked 70 countries . . . Bob, W4CKD/4 (ex-W8PQK) is back home after a three year stay at DL4LU . . . VE2AKF reports that the station signing FB8AX on 28 mc in Feb. is NG . . . W2TVR tells of a spot in Jamaica, BWI, known as the "Maroons" which was apparently a sanctuary for runaway slaves and has a separate treaty still in effect with England. Fred suggests VPØ—hmmm—! (Walvis Say in Southwest Africa is a naval base somewhat similar to KG4 and might qualify as "separate" should these lengths be pursued —!) . . . Ed Foley, ex-TA3US, TUSLOG DIST. 13, Box 9, APO 224, N.Y. writes that TA3US was shut down from March 21st 1957 and repeated attempts to reopen received the following answer: "Turkey does not allow Amateur Operation" . . . FG7XD is now in Detroit (letters forwarded from Callbook QTH) and Pierre, FG7XC, builds funds to acquire a DX-100 . . . KV4AA was happy to log visits from WØNXX, W4GFV, W3WBJ, KN4OZS and W4YB . . . New officers of the West Gulf DX Club are: President W5ADZ, V.P. W5CEW, Sec'y Treas. W5VHR, Editors (DX Bulletin) W5GNG/W5KBU. We salute the efforts of the retiring editor K5ABW for an arduous job well done! . . . Dixie, W2ZVS, goes to DL4-land with the USAF and will be DX'pedition-minded during the next three years. . . .

On September 6th to 8th Messers: OH1RT, OH1ST, OH1NK and WØAIW were scheduled to appear from Aaland Islands, OHØ . . . W4GXB reports that CN8JX and a bunch of CN8 boys plan a trip to IFNI in the near future and advise that all details have been worked out except transportation . . . We ponder on HV1CUR who was heard working CN8JX and W2RA . . . Another one was 4W2RP, on 21035, who gave his name as Abdulle and said QSL to King Ahmed, c/o Royal Palace, Taiz, Yemen . . . OK1MB

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This is the best known radio theory book available. It is written without the usual broadside of calculus too so that you won't have any trouble applying the theory. This book is a must for anyone who really wants to learn about radio. 1078 pages.

Circle 'em, or write on separate paper . . . send checks, money, etc.

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reports that his Albanian trip could be possible on December 12th during the European DX test . . . KP4AIO will try to get to Navassa Island in December. His other trip was cancelled due to unrest in Cuba . . . ZA2ACB's activity from June 12th to 15th netted him 171 contacts 105 in Europe and 66 DX. Among the DX worked were ZC4IP, 4X4DK, OD5LX, JA1VX, JA6AD and VS1GZ. QSL's were due to go out in early September . . . All QSL's have been answered for Danny's VP2VB operation . . . Ted, W6UCU/KS6, American Samoa, went QRT on August 22nd with approximately 1850 QSO's . . . VS1HJ's trip to the Maldives, mentioned earlier, was cancelled as the runway was unsuitable for landings (as yet?) . . . XW8AG has been noted on 14042, 1100 GMT. FX7XC, 14040, 1100 GMT. UM8KAA, 14083, 2350 GMT . . . VQ4ERR skeds VQ9HAY each Sunday at 0400 GMT. VQ4ERR calls on A3, 14310 and VQ9HAY answers on 14337 QRS cw. Contacts with VQ9HAY unlikely unless helped by VQ4ERR or VQ4AQ . . . W7VY visited Europe and called in at EI9Y, G8KS, G3HLS, FB8BR/Paris, ON4AU, ON4QF, DL7AA, DL7BA and DL7CW . . . Evert Kaleveld (PAØXE) is now quite active as OA7I, 12550 feet up at Juliaca, Peru. QSL to Box 538, Lima. He is the only OA7 in existence and thus, a good one for WPX . . . W6YY overheard HL2AM say that he was officially licensed on July 9th and is now "legal". He was on 14130, A3, 1400 GMT, with a BC-610. QTH: Box 35, APO 970, San Francisco, Calif. (FCC ban!) . . . FL8AC has been heard on 14035 . . . Ray, VR3A, advises that he will be QRV again from Fanning Island in early October on all bands. Best times 0200/0400 and 0500/0700 GMT . . . In an unfortunate aftermath to the W2HQL/W2IWC trip to Navassa W2PRN's car was broken into (He was bringing the spare parts back to W2HQL from Miami) and two cases containing mikes, bugs, spare parts and tools were stolen. Total loss around $400 smackers! . . . K2GFQ reports that a U.S.S.R. Award "W-150-C" (Worked 150 Countries) has been proposed and will soon come into being. All QSL's MUST go via official QSL Bureaus. Paul also reports that UA3BJ, L.S. Shishkin, P.O. Box 898, Moscow, handles cards for UM8KAA . . . ZD4CM is ex-G5BH. QSL to M. H. Coleman, P.O. Box 100, Hohoe, Ghana . . . We regret to report the passing of Hal, ZL3JA, on July 22nd . . . Hal, KL7MF, worked C3CG on August 22nd, 1735 GMT, 14 cw. C3CG gave his name as Lee and said he had received his license just two days before and was the first "C" station to be relicensed . . . Via West Gulf Bulletin and W4IQG we hear that VU2AX will be AC4AX by September 1st. Also, by the same date, FW8AA will have had his generator repaired and will be on with more power and activity . . .

ADDRESSES

AP2U—M. Noor Mohamed, 6, Roberts Market, Quetta, West Pakistan.

DL2YU—Don Willoughby, 22C Rothenbach, Post Effeld, 3 Kelenstr., Germany.

FF8AC—P. O. Box 129, Kankan, French Guinea. FWA.

ex-FG7XB—Antoine Noel, BCT North, Orly Airport, Paris, France.

FP8AA—Via K2CPR.

HC1WP—Ernest, P. O. Box 461, Quito, Ecuador.

KA4AS—Fushimi Radio Club (W9VCH-W7WTU) 10th US ASA FLD STA, Box 162, APO 9, San Francisco, Cal.

KZ5BX—Box 26, Fort Gulich, Canal Zone.

OA5M—Nel, P. O. Box 1229, Lima, Peru.

PY1KZ—W. F. Boucas, P. O. Box 125, Rio de Janeiro, Brazil.

PY2BKV—Box 540, Campinas City, Sao Paulo, Brazil.

PY3PA—Boss, P. O. Box 256, Porto Alegre, Brazil.

PY5AL—Rolf, P. O. Box 260, Caritiba, Parana, Brazil.

SP6XA—Tadeusz Matusiak, Szenwalda 7/3, Wroclaw 9, Poland.

SVØWN—T/Sgt. Clyde S. Geist, 6938th RSM, APO 291, PM., N. Y.

TP2VB—Via KV4AA

VP5WS—Bill c/o Cables and Wireless, Kingston, Jamaica, BWI.

VP8BS—Via G4NT. Cards go out in 1958.

West Gulf DX Bulletin—W5GNG/W5KBU, P. O. Box 99, Odessa, Tex.

W6BIL—Geo. Maxey, 945 Lincoln St., Redding, Calif.

W6UOU/KS6—Via W6UOU.

ZL1APM—Clayton Rowe, 8 Morrow Ave., Buckland Beach, Auckland, New Zealand.

ZL2AVQ—Ex-ZK1AB, Dough, 8 Ormond Road, Napier, New Zealand.

Thanks to K6ICS, W6KG, W4LVV, SVØWP and West Gulf Bulletin.

73, Dick, KV4AA

Novice [*from page 80*]

10 meters and so on, but not below *the fundamental frequency. Possibly you have something acting up in your receiver.*

That about does it for this month men. Next month, we have some interesting items scheduled. The theory section will show *actual photographs* of the signals that travel through a typical communications receiver, not just theoretical drawings. You can see the mixer conversion, amplification, detection and audio amplification with the aid of the marvelous Textronixs oscilloscope. See you then.

73's Don, W6TNS

RTTY

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

Patch panels, dear to the heart of all telephone system men, are not found in the usual amateur radio station. They are appearing, however, in more and more amateur RTTY installations. Why? Because it is the ideal way to set up local circuits (within the shack) to permit the use of various pieces of equipment, as desired.

Now, what do we mean by a "patch" panel? Well, in its most simple form, it consists of a row of jacks connected to different pieces of equipment. A patch cord can be a two-foot length of "zip-cord" with a surplus PL-55 (or *WE* 347) 'phone plug on each end. Audio circuits, usually of 500 or 600 ohm impedance, are conveniently handled in this manner. Broadcast stations, at transmitter and master control, have patch boards to permit the rapid transfer of stand-by lines and equipment.

Teletype (sometimes called telegraph) circuits are d.c. and are usually of the "constant-current" type. In other words, a neutral Teletype circuit is a series loop with 60-ma of *marking* current in it. (Some RTTYers use a 20-ma loop.) Additional machines are patched into a loop without appreciably changing the line current by connecting them in *series*. Of course, the jacks must be of the closed-circuit type.

Fig 1 shows the fairly simple wiring of one circuit of the 4-circuit *WE* 63C1 or 63C2 Telegraph Loop Switchboard. One machine, or set, is connected to a line through the three jacks of each circuit. The LPG (looping) jacks permit the required series patching, while inserting a plug into a SET jack disconnects the associated machine from its line and connects to that machine. Patch cords should be inserted into the SET jack before inserting in an LPG jack to avoid opening the line circuit. In disconnecting, the plug should be removed from the LPG jack before removing it from the SET jack for the same reason.

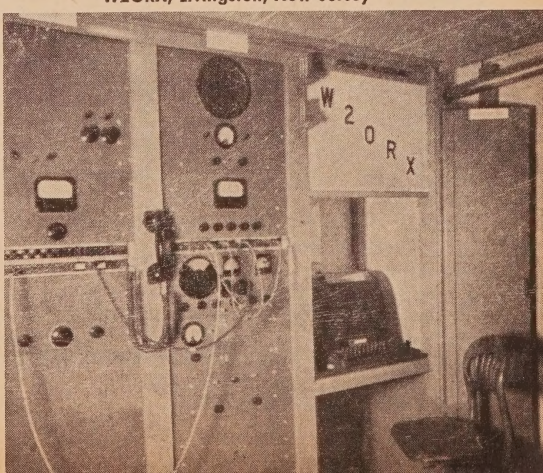
The RTTY column in the February 1957 issue of *CQ* described an uncomplicated patching system in use at W1BGW. This is also described on page 91 of the *RTTY Handbook*.

RTTY at W2ORX

Last month, as a teaser, we printed a picture of part of the RTTY set-up at W2ORX. This month we show a little more. (One rack, or "bay," is *still* out of the picture, on the left.) Note the extensive patching system, and the large quantity of patch cords. The bay just to the left of the Model 26 machine contains, from top to bottom: monitor speaker, afsk terminal unit, fsk terminal unit (*CQ*, June '56), patch board, SX-24 receiver for test signals, local 60-ma d-c supply plus autostart circuits, and a two-tone (2125 and 2975 cycles) test oscillator. The two bottom panels contain the 80-kc and 76-kc carrier supply oscillators for the SSB exciter.

Fig 2 shows the more complicated keying and patch circuit used by W2ORX and the Livingston RTTY Group. The patch connections shown in the photo are for setting up a test fsk loop. This is where the machine keyboard keys the two-tone oscillator, the output of which is patched to the SSB exciter modulator. The modulator is fed with a 76-kc carrier

W2ORX, Livingston, New Jersey



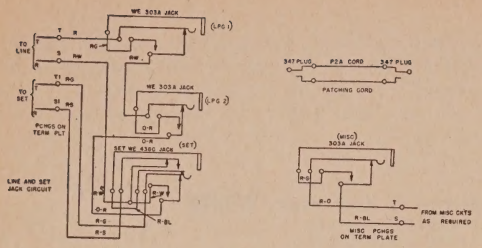


Fig 1—WE 63C1 or 63C2 Telegraph Loop Switchboard

and the upper sidebands fall in the center of the SSB filters. The signals are picked off at an amplifier following the filters and are patched to the fsk terminal unit, the neutral output of which is patched to the receiving selector magnet of the machine. The test afsk loop patch is similar, except that the two-tone oscillator is patched directly to the afsk terminal unit.

The SSB exciter delivers about three-watts of power to the third bay (not shown) which contains the frequency-changing equipment to get down to 2-meters.

Dick, W2ORX, has prepared a very comprehensive description of the patching procedure and the terminal arrangement as used by the Livingston Group, but unfortunately we don't have the room to print it. If you are interested in the fine details of this RTTY terminal, a polite note to Dick might get you a copy.

Autostart

Last month we described the autostart system as used by the Livingston Group. Here are a few more details on the relays: For *RY2*, Dick suggests a relay of the *Potter & Brumfield* LS series. The object is to use a fast-acting relay which can operate on about one milliampere so as not to load down the neutral output of the terminal unit. The relays being used have a nominal d-c resistance of 2000-ohms.

RY1 need not be a fast relay. W2ORX says that they use a *WE* B-24 alarm relay. This operates on less than 1-ma and the armature can be adjusted to mechanically cause the relay to be slow-operating. An adjustment

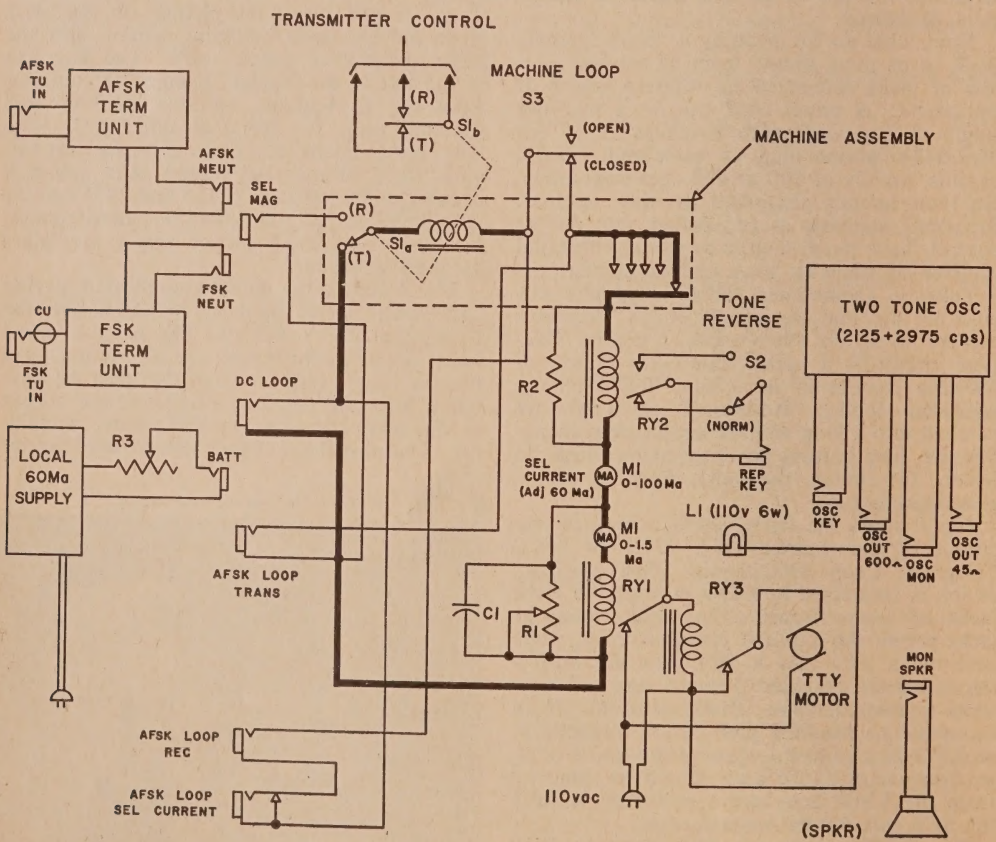


Fig 2—Livingston RTTY Group Keying and Patch Circuit

was made to cause about a two-second delay so that speech would not trip the autostart. Once *RY1* is operated it will not release at 60-wpm because the shunt capacitor *C1* is large enough to keep sufficient average current through the relay winding. For those who can't obtain the B-24, the *P & B* LS series can be substituted.

RTTY Handbook

The announcement of the availability of the *RTTY Handbook* by W2NSD and W2JTP in the August RTTY column turned out to be just a little premature. That issue got out a bit early that month and then the printer took a little longer than expected, so we are sorry if the delay inconvenienced anyone.

The response, by the way, has been terrific, but we are trying hard to keep up with the orders. Did you send for yours yet? It will be mailed to you post-paid for $3. Make checks or money orders payable to *RTTY Handbook,* and send your order *today* to:

RTTY Handbook c/o W2JTP
16 Ridge Drive, High Hills,
Huntington Station, N. Y.

East Coast RTTY Net

Random RTTY operating can be fun, but it is more useful as well as fun to check in on a regular net. Such a net is the East Coast RTTY Net on 3620 kc. This is an old net, with W3PYW originally NCS. Now, Jack Berman, W1BGW, is NCS. Stations check in all up and down the east coast—from Maine to Florida. On dark cold winter nights, WØBP and W9TCJ, and occasionally VE3ATC, check in for traffic headed in their direction. And, of course, Ed Handy, W1BDI, Communications Manager of the ARRL, sends his carefully taped official ARRL bulletins at 60-wpm. Ed, too, picks up traffic for re-transmission on the Trans-continental RTTY Net.

If some of you east coast fellows are just beginning with RTTY, give a listen on 3620 kc Wednesday nights at 7 pm. It's well worth while.

CHI-RTTY Meeting

Magazine deadlines being what they are, we do not as yet have the report on the First National (and 3rd Chicagoland) RTTY Meeting that was held in conjunction with the ARRL convention August 29th through September 1st. The hard-working RTTY Committee this year consisted of George W9SPT, Ray W9GRW, BeeP WØBP, Bob W9JBT, Burt W9OCV, Bob W9TCJ, and Bert WN9CNY.

Details I will supply next month, in the Mammoth, Beamoth, November issue; providing I can con Wayne and Art into letting me have a little space.

Amateur Radioteletype Channels

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.
National, AFSK 27.2, 147.96, 144.138 mc.

Area Nets:

California	147.85 Mc.	AFSK on AM
Chicago, Ill.	147.70 Mc.	AFSK on FM
Detroit, Mich.	147.30 Mc.	AFSK on FM
Washington, D.C.	147.96 Mc.	AFSK on AM
	147.495 Mc.	AFSK on AM
New York City	147.96 Mc.	AFSK on AM
Livingston, N.J.	146.30 Mc.	AFSK on AM
Buffalo/Niagara	147.50 Mc.	AFK on AM
Boston, Mass.	147.96 Mc.	AFSK on AM
Seattle, Wash.	147.00 Mc.	AFSK on AM
Spokane, Wash.	147.15 Mc.	AFSK on AM

Anyone interested in amateur TV gear? Cecil Watts, K2VOP, 124 Ringdahl Court, Rome, New York, has a surplus TV camera and a 420 Mc transmitter with antenna that he would like to sell or swap for RTTY gear, a printer in particular. Bill, K2TQI, of Trenton, New Jersey, reports that he is editor of the Delaware Valley Radio Association News and that W2TAM writes a monthly RTTY column in that bulletin. Other active RTTYers in the Trenton area are W2UAE and K2CLD. Ray Disbrow, K2DFP, Box 161, Hazlet, New Jersey, writes that he has a Model 26 for sale, as does Myron Gottesman, W2FCJ/2, at the Hotel Greystone in New York City. John, W2IGX of Montclair, and Randy, W2IHD of Roseland, are joining the Livingston (New Jersey) RTTY Group. Dick, W2ORX, will soon have up an 85-foot tower for horizontally polarized afsk on 146.3 Mc. Walt Morrison, W2CXY of Chatham, New Jersey, is looking for a Wheatstone Tape Boehme keying head for Morse code. (How did *that* item get in *here?* Ed.)

Don, W4EHU of Gainesville, Florida, reports that he has been working mostly 40-meter RTTY this past summer. He has under construction (RTTYers *build*) a grounded-grid final and a heterodyne exciter. W4FPC is looking for an easy way to fsk a KWS-1. (Next month, *CQ* will have a feature article on this, Wayne willin'.) Charles, K4BND of Arlington, Virginia, has built a copy of the *Northern Radio* Type 152 converter.

George, W8PAX of Canton, Ohio, and Charles, W8IMH of Painesville, Ohio, are machine men by vocation and RTTYers by avocation. Bill, W8TCT of Cleveland, Ohio, finally got his old Model 12 going and is using it on the MARS RTTY net. Art, W8BNL of Dunbar, West Virginia, is also on MARS frequencies with a Model 14 and a W2PAT converter. Being the only station in West Virginia, Art says, he is holding off the ham bands.

Bob, W9TCJ, is working on an electronic AFC system. Jack, W6CQK/2, is finishing up a narrow-shift converter. He also found in surplus (*G & G Electronics*—see ad in *CQ*) an I-97A Bias Meter. Don, W7KWB, of Phoe-

[*Continued on page 107*]



George Jacobs, W3ASK
607 Beacon Road,
Silver Spring, Md.

CQ DX Contest Special

Propagation conditions during the upcoming CQ DX Contest are expected to surpass those of last year's record-breaking Contest period!

The smoothed sunspot number of 154 observed last October was the highest ever recorded during any DX Contest held previously. Although a sudden radio storm marred a part of the 1956 Contest, propagation conditions in general were very favorable. Observers in many parts of the world actually reported propagation conditions during the 1956 Contest as the best ever experienced during a DX Contest—and the record-breaking scores seem to bear this out. Unprecedented solar activity continues, with a smoothed sunspot number of 157 forecast for October, 1957 and 153 for November. Because of the correlation that exists between solar and ionospheric behavior; propagation conditions during this year's Contest period should be as good as, or better than, last year. *Outstanding* DX conditions are expected from the United States to all Zones of the world on the 10, 11, 15 and 20 meter bands during the 1957 Contest, provided that no sudden radio storms develop.

Since this year's Contest looks like another record breaker, we've polished up the crystal ball, and dug out the special ouija board, to turn out one of the most comprehensive propagation forecasts ever to appear in *CQ*, or for that matter, in any technical publication.

Contest Dates

The *Phone Section* of the CQ World-wide DX Contest will be held from 0200 GMT October 26th until 0200 GMT October 28th. The *CW Section* from 0200 GMT November 30th until 0200 GMT December 2nd. See page 54 of *August CQ* for complete Contest rules.

Forecast

Those of you who may from time to time calculate your own propagation data may be interested in knowing the over *three-hundred* circuits were analyzed in preparing this month's *CQ DX Propagation Charts*. This month's *Charts* are centered on *eight* major geographical areas of the United States, and there's one almost custom made for your QTH. The following key indicates the best *Chart* to use depending upon the State you plan to operate from.

Qth (State)	Use Chart Centered On
Maine, Vermont, N.H. Mass., Conn., Rhode Is., N.Y.,Pa.,N.J.,Del.,Md., D.C., Va., West Va.	Northeast USA
North Car., South Car., Ga., Alabama, Fla., Miss., Tenn.	Southeast USA
Calif., Nev., Ariz.	Southwest USA
Oregon, Wash., Idaho	Northwest USA
Missouri, Ill., Ind., Ohio, Mich., Wis., Ky., Iowa	Central USA
Texas, New Mex., La., Okla., Arkansas	South-Central USA
North Dak., South Dak., Minn., Montana	North-Central USA
Colo., Wyoming, Utah, Kansas, Nebraska	West-Central USA

This month's Contest *Charts* are based upon a double-side band AM signal with an *effective radiated power* (ERP) of 500 watts at low radiation angles (less than 15 degrees). ERP is equivalent to the *power output* of the transmitter *multiplied* by the *power gain* of the antenna over that of a free space dipole. For example, a transmitter rated at a power output of 125 watts being used with an antenna having a 6 DB (power gain of 4) gain at low radiation angles has an ERP of 500 watts. In this example, the ERP is the same as that for which the *Charts* have been calculated. To use the *Charts* for other values of ERP, for each 6 DB difference in power, add or subtract (add if greater than 500 watts, subtract if less) 1 from the symbols shown in the *Charts* indicating the number of days the circuit is forecast to open.

The *Charts* can be helpful in preparing an efficient operating schedule during the Contest period. For example, if you intend to operate in the *Single Band* category, say *fifteen meters*, the following is a typical operating schedule that can be devised from the data appearing

Text continued on page 89

CQ Propagation Charts

ALL TIMES IN EST

Northeast USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	5A-7A (3) 7A-1P (4) 1P-4P (2)	5A-8A (3) 8A-2P (4) 2P-6P (3) 6P-8P (2)	4A-7A (4) 7A-2P (3) 2P-6P (4) 6P-4A (3)	5P-7P (2) 7P-3A (4) 7P-2A (2)*
Central & Eastern Europe	6A-8A (2) 8A-1P (3) 1P-3P (2)	5A-8A (2) 8A-2P (3) 2P-5P (2)	3A-6A (3) 6A-12N (1) 12N-3P (2) 3P-7P (4) 7P-3A (2)	5P-8P (2) 8P-1A (3) 8P-12M (1)*
Southern Europe & North Africa	5A-7A (3) 7A-2P (4) 2P-5P (3)	5A-8A (3) 8A-1P (2) 1P-7P (4) 7P-9P (2)	8A-1P (1) 1P-10P (4) 10P-6A (2) 6A-8A (3)	5P-7P (2) 7P-3A (4) 7P-2A (2)*
Eastern Mediterranean	5A-7A (2) 7A-10A (3) 10A-4P (2)	5A-7A (2) 7A-11A (1) 11A-7P (3) 7P-9P (2)	3P-5P (1) 5P-7P (4) 7P-11P (3) 11P-4A (2)	7P-1A (2) 8P-12M (1)*
Central & South Africa	6A-11A (2) 11A-4P (4) 4P-7P (3) 7P-9P (1)	5A-8A (2) 8A-11A (1) 11A-1P (2) 1P-6P (4) 6P-9P (3)	1P-3P (2) 3P-10P (4) 10P-5A (3) 7A-9A (2)	6P-12M (2) 8P-11P (1)*
Central America	6A-8A (2) 8A-4P (4) 4P-7P (3) 7P-10P (2)	4A-8A (2) 8A-3P (4) 3P-6P (5) 6P-4A (3)	7A-9A (4) 9A-4P (2) 4P-11P (5) 11P-3A (4) 3A-7A (3)	5P-6A (4) 6A-8A (2) 8P-4A (3)*
South America	5A-2P (3) 2P-5P (4) 5P-10P (2)	6A-10A (3) 10A-3P (2) 2P-7P (4) 7P-3A (2)	3P-6P (2) 6P-1A (5) 1A-3A (3) 3A-8A (2)	6P-5A (3) 8P-2A (2)*
Malaya & South East Asia	7A-10A (1) 3P-7P (2)	7A-10A (2) 4P-9P (3)	6A-9A (2) 4P-9P (1) 9P-2A (3)	NIL
Australasia	8A-12N (2) 12N-3P (1) 3P-7P (4) 7P-10P (2)	7A-9A (3) 9A-4P (2) 4P-11P (3) 11P-1A (2)	9P-12M (2) 12M-4A (3) 3A-7A (2) 7A-9A (4)	2A-8A (3) 4A-8A (2)*
Japan & Far East	4P-8P (3)	3P-5P (2) 5P-9P (3) 9P-11P (2)	4P-9P (2) 9P-2A (3) 2A-8A (2)	12M-5A (1)
Guam & Pacific	8A-11A (1) 2P-4P (2) 4P-6P (3) 6P-8P (2)	8A-11A (2) 3P-5P (2) 5P-11P (3)	7P-10P (2) 10P-3A (3) 3A-6A (2)	11P-3A (1)

ALL TIMES IN EST

Southeast USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	6A-8A (3) 8A-1P (4) 1P-5P (2)	6A-8A (3) 8A-12N (2) 12N-4P (4) 4P-8P (2)	1A-7A (3) 12N-3P (3) 3P-9P (4) 9P-1A (2)	5P-7P (3) 7P-10P (4) 10P-12M (3) 7P-11P (3)*
Central & South Africa	7A-12N (1) 12N-2P (3) 2P-5P (4) 5P-7P (2)	12N-3P (2) 3P-6P (4) 6P-8P (3) 8P-11P (2)	1P-5P (2) 5P-10P (4) 10P-2A (2) 7A-9A (1)	5P-7P (1) 7P-12M (2) 8P-11P (1)*
Australasia	7A-9A (1) 3P-5P (3) 5P-7P (4) 7P-10P (2)	7A-10A (3) 4P-7P (3) 7P-9P (4) 9P-2A (2)	7P-11P (3) 11P-3A (4) 3A-7A (3) 7A-9A (4)	2A-7A (3) 3A-7A (2)*
Malaya & South East Asia	7A-11A (2) 11A-2P (3) 6P-8P (3)	2P-6P (1) 6P-11P (2)	5P-8P (1) 6A-8A (1)	NIL
Far East	4P-6P (3) 6P-8P (2)	3P-6P (2) 6P-9P (3) 9P-2A (2) 6A-9A (2)	9P-6A (2) 6A-8A (3)	NIL
South America	7A-3P (3) 3P-6P (4) 6P-10P (3)	6A-9A (3) 9A-3P (2) 3P-9P (4) 9P-3A (3)	6A-8A (3) 8A-3P (2) 3P-5P (3) 5P-4A (4) 4A-6A (2)	6P-5A (4) 5A-8A (2) 7P-4A (3)*
Antarctica	2P-4P (2) 4P-6P (3) 6P-9P (2)	5P-7P (2) 7P-12M (3) 12M-3A (2)	7P-10P (2) 10P-6A (3) 6A-8A (2)	2A-6A (2)

ALL TIMES IN CST

Central USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe	6A-10A (3) 10A-12N (4) 12N-2P (3)	5A-11A (2) 11A-2P (4) 2P-4P (3) 4P-6P (2)	11A-2P (2) 2P-7P (4) 7P-2A (3) 2A-6A (2)	5P-12M (2) 6P-11P (1)*
Southern Europe & North Africa	6A-8A (3) 8A-1P (4) 1P-4P (3)	5A-8A (3) 8A-12N (2) 12N-3P (4) 3P-9P (2)	12M-3A (2) 3A-6A (3) 6A-4P (1) 4P-8P (4) 8P-12M (3)	5P-2A (3) 6P-1A (2)*
Central & South Africa	5A-10A (1) 10A-12N (3) 12N-3P (4) 3P-7P (2)	5A-12N (1) 12N-2P (3) 2P-5P (4) 5P-10P (2)	1P-3P (2) 3P-6P (3) 6P-10P (4) 10P-4A (2) 7A-9A (1)	6P-1A (2) 7P-11P (1)*
Greenland	9A-12N (2) 12N-5P (3)	8A-2P (2) 2P-5P (3) 5P-8P (2)	6A-4P (2) 4P-8P (3) 8P-12M (2) 12M-6A (1)	6P-5A (2) 7P-4A (1)*
Antarctica	9A-2P (2) 2P-8P (3)	8A-11A (2) 11A-3P (1) 3P-7P (2) 7P-11P (3) 11P-3A (2)	3A-9A (2) 2P-6P (1) 6P-9P (2) 9P-3A (3)	12M-5A (1)
Central America & Northern South America	6A-8A (3) 8A-4P (4) 4P-8P (3) 8P-10P (2)	5A-8A (3) 8A-5P (4) 5P-10P (3) 10P-5A (2)	1A-6A (3) 6A-9A (4) 9A-6P (3) 6P-10P (5) 10P-1A (4)	7P-5A (4) 5A-7A (2) 8P-4A (3)*
South America	6A-8A (2) 8A-4P (4) 4P-8P (3)	5A-9A (3) 9A-2P (2) 2P-6P (4) 6P-2A (3)	12M-5A (3) 5A-8A (4) 8A-5P (1) 5P-12M (4)	8P-4A (3) 9P-3A (2)*
Hawaii	10A-12N (3) 12N-8P (4) 8P-10P (2)	9A-4P (2) 4P-8P (4) 8P-11P (3) 11P-2A (2)	2A-5A (3) 5A-9A (2) 9A-5P (1) 5P-7P (2) 7P-2A (4)	11P-7A (4) 12M-6A (3)*
Australasia	8A-11A (2) 11A-2P (1) 2P-7P (4) 7P-10P (3)	7A-10A (3) 10A-4P (2) 4P-10P (3) 10P-2A (2)	8P-11P (2) 11P-3A (4) 3A-9A (3)	2A-7A (3) 3A-6A (2)*
Japan & Far East	2P-4P (2) 4P-7P (3) 7P-9P (2)	6A-9A (1) 2P-5P (3) 5P-8P (4) 8P-11P (2)	2A-8A (2) 8A-2P (1) 2P-8P (2) 8P-2A (3)	12M-7A (1)
Malaya & South East Asia	1P-3P (2) 3P-8P (3)	7A-11A (2) 2P-4P (2) 4P-10P (3)	6A-9A (1) 8P-11P (2)	NIL

ALL TIMES IN CST

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

LAST MINUTE FORECAST

Short wave propagation conditions are expected to be normal on Oct. 26th, and most of the 27th. A three day radio storm, presently forecast to begin on Oct. 28th, may adversely affect conditions to some areas of the world towards the end of the phone-DX contest period. Radio storms are also likely to occur Oct. 1-2, and 6-8. Better than normal shortwave propagation conditions are expected Oct. 16-18.

ALL TIMES IN CST

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

ALL TIMES IN MST

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

Symbols Indicating Number Of Days Circuit Is Forecast To Open During Month:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) Over 26 days.

*Indicates time of possible eighty-meter openings.

Six-meter openings are likely to occur on approximately 10% of the days on those circuits for which ten-meter openings are shown with a symbol of (4).

The 160-meter band is likely to open approximately 10% of the nights on those circuits for which eighty-meter openings are shown with a symbol of (3).

The CQ DX Contest Special Propagation Charts are based upon a double-side band A.M. radiated power of 500 watts at radiation angles less than 15 degrees. For each 6 DB difference in power, adjust the symbol shown by (1). These forecasts are calculated from basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards and are valid through November 15, 1957.

ALL TIMES IN PST

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

ALL TIMES IN PST

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

in the *Charts*. The schedule shows the areas of the world for which 15 meters is optimum throughout the day for a southwestern USA QTH. The data in the *Charts* can be rearranged in similar ways to form operating schedules for other bands.

Single Band Schedule
15 Meters, Southwest USA QTH

Time (PST)	Optimum Area	Zones
6PM—10PM	Far East, Australia, Siberia.	1,117-19, 24,25,29-32.
10PM—2AM	Guam & Pacific, Australia, South East Asia.	22-24,26-32.
2AM—8AM	Catch Some Sleep.	
8AM—10AM	Asia.	22-24,26,28,-30.
10AM—2PM	Europe, Pacific, Far East, Central America.	6-9, 14-17, 20-22, 24-34.
2PM—6PM	Africa, Central and South America.	6-13, 33-39.

General Conditions

All is not necessarily beer and skittles when peak sunspot activity occurs. True, the ionosphere is more intense than ever before, but on the other hand there is a great increase in the occurrence of *sudden ionospheric disturbances* which can mar propagation during this period. SID's, as they are usually called, occur almost without warning, and can cause total blackouts of the high frequency spectrum lasting from a few minutes to several hours. They occur about once or twice a year during the minimum of a sunspot cycle, but as often as a dozen times a month during the peak of the cycle. SID's are unpredictable, and at the time of writing this part of the column (mid-August) not enough other type data is available for determining whether any radio storms will occur during the 1957 Contest. A "last minute forecast" for the Phone Section, made at press-time, appears elsewhere in this column.

Up to the minute forecasts during the Contest period can be obtained from several other sources. The most up to date forecasts are those broadcast by WWV on 2.5, 5, 10, 15, 20 and 25 mcs, at 19½ and 49½ minutes past each hour. WWV forecasts are intended primarily for north-Atlantic circuits, with a similar forecast for north-Pacific circuits broadcast from WWVH, Hawaii, on 5, 10 and 15 mcs. at 9 and 39 minutes past each hour. These forecasts consist of a letter-number combination transmitted in slow Morse Code. The letter "N" indicates conditions at the time of issue are normal; the letter "U" that conditions are unsettled or erratic, and the letter "W" that conditions are disturbed. The number indicates the average quality of propagation conditions for the next few hours as follows:

1—useless	5—fair
2—very poor	6—fair to good
3—poor	7—good
4—poor to fair	8—very good
	9—excellent

The *Voice of America* broadcasts a shortwave propagation report and forecasts every weekday during its *Panorama USA* program beamed to Europe at 1800 GMT (1 PM EST). During major DX Contests special forecasts are carried. Several shortwave frequencies are used for these transmissions, and latest schedules can be obtained from the *Voice of America*, Washington 25, D.C., Attention IBS/EC.

Assuming that propagation conditions during the 1957 Contest will be normal, (and the *Charts* are based on this assumption), then excellent DX conditions can be expected during the morning and afternoon hours on and *ten and eleven meter* bands. Propagation conditions to all areas of the world should also be excellent on *fifteen meters* from early morning through the early evening hours. On *twenty meters*, DX to one part of the world or another should be possible around the clock, with the band peaking during the late afternoon and throughout the evening and early morning hours. During the Phone Section, *twenty meters* should be the best band for night-time DX. Night-time propagation conditions on *forty meters* is not expected to be better than fair, and because of increased absorption associated with the rapid rise in the sunspot cycle, DX conditions on the *eighty* and *one-hundred-sixty meter* bands are forecast to be generally poor.

In the event that a radio storm should develop during the Contest, all is not lost. Not all areas of the world are adversely affected by an ionospheric disturbance. Those paths passing through or near the auroral zones become weak, fade considerably, and may "blackout" entirely. On the other hand, North-South paths from the USA to South America, Africa, Australasia, etc. generally remain unaffected, and during certain types of storms radio conditions have been observed to *improve* on these circuits. If, as happened last year, a radio storm should develop during the Contest, concentrate on working East-West paths during the daylight hours and North-South paths during the

[*Continued on page 113*]

V H F

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

The mail bag has been filled with comments on contest rules. It seems that everyone wants rules but nobody wants the same kind.

I can't remember far enough back in ham radio to recall the time when anyone I knew was satisfied with a set of contest rules. I know what I want and you know what you want but we just don't agree. It is true that it is easier to win a V.H.F. contest from the east coast than anywhere else in the country. The reason for this is not the unequitable distribution of section multipliers alone but a combination of this and the fact that there are more V.H.F. participants on the east coast. The "CQ" V.H.F. contests make an effort to even out the section multipliers but *it is up to you to do something about the uneven V.H.F. population.*

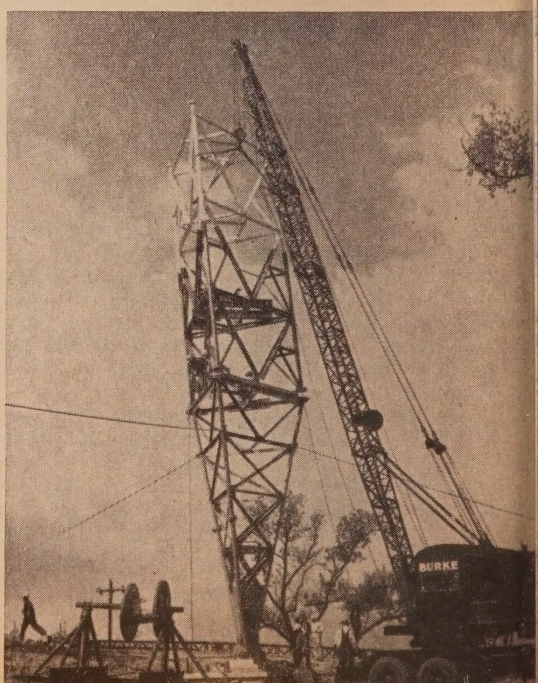
On the other hand we are not trying to establish a tradition. The "CQ" V.H.F. contests are run for the sole purpose of providing you with an opportunity to enjoy some mild competition with your fellow hams. If you don't enjoy them the way they are, all you have to do is suggest something better. If your plan is accepted by the majority and doesn't make the scoring too hard for Helen, you have got yourself a contest. Or maybe you would like to handle the contest logs. (V.H.F. clubs pse note.) I am open to propositions from all and sundry.

Two Meters

The two meter band has enjoyed a small upsurge in activity in the past few months. The number of new states worked by the faithful is astounding. Helped by the Perseids and excellent tropo conditions the average two meter dx'er has at least twenty-four states racked up and you need better than thirty to qualify as expert. Even in New England, long the home of low power, small antennas, and poor receivers, the trend toward something better is noticeable. (The last I heard W1REZ was looking for number twenty-eight and he didn't do with a Gonset and a vertical whip.)

Despite the slight pickup in two meter activity however, the average population of the band has steadily declined to the point where it becomes questionable whether it pays to operate it. (It is nice to have a private band to talk to your friends but there is a limit to how much effort it is worth.) Obviously this loss of population is a direct result of the short sighted thinking involved in allowing technician on six meters and restricting it on two. A much more even distribution of V.H.F. population would have resulted if this monumental display of ignorance had not been perpetrated on the poor defenceless V.H.F.'er. (Have *YOU* been writing to your ARRL director and your congressman?)

For the edification of those who don't know the standard dx frequencies, the following list was kindly sent in by high man, W8KAY. (If you work these send him a box top and he'll send you some more.)
W5DFU-144,003.5 to 006, W5IOW-144,175, W5RCI-144,2-6/ K5AEH-144,156, W5HXK-144,012, W5JWL-144,069, W5JQU-144,090,



W1MHL/1 sets up for the August contest. (Actually it is the new Blaw Knox TV tower being installed for use by WSM-TV in Nashville, Tenn.)

W5AQS-144,149, W4LNG-144,290 approx., W4DBV-144,112, W4GIS-144,408 approx., KØEMQ-144,118 WØLFE-144,391fi WØBKV-144,195, KØDOK-144,068, WØRUF-144,-074, W4RFR-144,085, W4HJQ-144,058, W4-LTU-144,058-59, W4ZXI-144,015, W2BHS/-4-144,155 approx., W4CPZ-144,357, W2CXY-144,010-298, W4CVQ-144,130, W3FPH-144,-154, VE3DIR-144,201, W2ALR-144,105, WØ-QDH-144,023, 273, 450, W5AJG-144,352-354.

Six Meter News

DX is the big news on six these days. Once again XE's from Mexico, CO's from Cuba, TG9's from Guatemala, LU's from Argentina, PJ's from Aruba, etc., are beginning to come through. And don't forget, things will look even brighter when the MUF starts to rise in a very short time.

Even at this writing, we've had several double-hop openings to the west, hearing California, Kansas, Colorado, Utah, Wyoming with good S8 signals.

This is the time to start pointing those beams and power toward Europe, Africa, etc. Remember that by this time Portugal, the Azores Islands, the Madeira Islands will be in operation on 50 mc and that Africa has been on 50 mc and made some W contacts last spring.



Ron (W8BKT) 10,800 points to win Michigan section on 50 mc.

Things are looking very good for 50 mc DX this fall and don't YOU be the one caught with the rig torn apart or the antenna down.

According to the automatic band-checker (and her log from last year and this year), the skip openings this year have not been as long nor as loud as the openings last summer.

The first opening in the spring was some time later than the first opening last year. It was quite short in duration and the signals did not compare with signals from the first opening last year. So far the openings have compared in this same manner for this season, at least here in New England.

Six meters is growing by leaps and bounds in this and other areas. In Massachusetts alone there have been close to fifty new signals on six meters in the last month, some new calls, some old timers who have finally seen the light. AND a number of the new calls belong to XYL's whose husbands will soon regret that they ever encouraged ham radio as a family project. (Not so of course.) The women are in there working the band when the O.M.'s aren't home and it's turned out to be a very fine way of doing things on six meters.



Walt Read (W6ASH) and Bill Holmes (K6DUY) at the door of their mobile hamshack. The outfit was operated from Mt. Diablo for the contest weekend. (April) Antennae used were a conventional "J" and eight element stacked vertical colinear with extended elements.

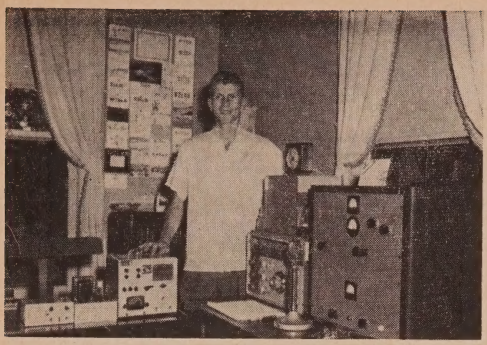
Six Meter Scatter

Despite the nice skip openings and generally good tropo conditions, the dx minded among the six meter boys are still making a strong effort to promote interest in scatter skeds.

W4HHK has his twenty-four element beam going and is carrying on skeds with all and sundry. Paul expects to outline his plans at the national convention and so I can't tell you about it now.

W4RMU and W4AYV are good bets for skeds to the south eastern part of the country. W9APY in Indiana is a nightly contact from the east coast. Lew gets home at 2345 EST, and if you can stay up that late you'll find a real operator on the other end. In addition to sending cw he can switch to SSB at the drop of a hat and you'll be amazed at the way he comes in.

If you are interested in a scatter sked, don't hesitate to try. Drop us a line and we'll get you in touch with the right party.



Oregon's 50 mc winner, Ed Bear, Jr. (W7FVN).

Dayton, Ohio Net news comes to us from Bob Grenell (W8RHR):

"As acting secretary of Dayton's newly formed 'Brown Sugar' Net (50.54 mc.), I've been assigned to give you some dope on our budding enterprise. Every night at 2200 sharp, our members (at present 16, but constantly expanding) or at least four or five of them, call in and we keep it going 'til all hours.

"Plans for the future include code practice nets, and a *certificate*. Soon we will be able to make anyone working one half of our membership an honorary member. (Actually this is a very subtle way of trying to get QSL's from DX stations who want certificates!)

"Activity around Dayton is really hot. Lots of fellows on plus good ground-wave and recent skip openings to all call areas keep interest up pretty high.

"Recently worked or heard: XE1AC (heard by me); CO2CT, worked by K8EXJ; TG9JW, worked by W8HXT; and a station which came through the noise for fifteen or twenty seconds around June 20th, just long enough for me to detect a strong British accent. Sounds like more Africans coming through!

"One tip: when LU's are working into your call area on ten, watch for Mexico, Guatemala, and Cuba on six. They may be working LU's themsleves, but sometimes you can hear them or even work them." *Thanks for all the dope from your area, Bob. Ve-r-r-ry interesting.*

Greenville, South Carolina From Gene Garrison (K4KSU) concerning news and views from his QTH:

"Active on six in the Greenville area are: K4KSU, W4TLC, K4KMW, W4ASD, W4NWB, K4AWB and K4HEA. K4LOC has finished his tour of duty with USAF here and has returned to New Jersey.

"I'm seventeen years old, and a high school senior. I've had a tech ticket since January, but I didn't get on until March. I'm using a 6146 driven by a 5763 and modulating with a pair of 6BQ6's, about forty-five watts input. My receiver is a homebrew superhet for six and ten meters. My skyhook is a WRL five element beam, thirty feet up. Since March I've worked sixteen states, have fifteen confirmed and have worked VE3.

"On June 30, I worked portable from the top of Mt. Mitchell, North Carolina, elevation 6600 feet, using a ½ wave dipole antenna about six feet above ground. Transmitter and receiver were set up in a little laundry shack. (Thanks to N.C. state park service.) I called 'CQ' once, then answered stations solid for one hour. I worked K4LZQ, K4KFW, K4ELF, W4ZXD, W4VWT in Tennessee; K4AWB in South Carolina, and W4YIU in North Carolina.

"Greenville rag-chewing and calling frequency is 50.250." *Nice to get this information Gene, and to know there is good activity in South Carolina. We don't hear your territory very often on six.*

Calumet City, Illinois From the Convention State via Lorraine Seymour (K9AZE) we get the following:

"We have recently organized a new radio club, which will be known as the 'Six Meter Club of Chicago.' The first official meeting was held on July 6th on the south side of Chicago.

"Club officers were elected as follows: President—Bob Hodge, K9GIS; Vice President—Al Seymour, W9NYO; Secretary—Lorraine Seymour, K9AZE; Treasurer—Ben Hall, W9OVL. One additional officer will be elected at the time that the club receives a station call.

"The main purpose of the club will be to foster better and more activity on the VHF and UHF bands, and, above all, to promote amateur radio to the fullest extent.

"At present we have two club projects being put into action: 1. A practice CW Net, to be headed by W9ZKQ, Swede. Practice will be each night from 2000 to 2200 CST on the low end of the six meter band. *The LOW end?* 2. TVI prevention and the handling of TVI complaints. *Fine projects, Lorraine.*

"Present membership totals twenty-six. Dues have been set at $2.00 a year per member. Any amateurs interested in further details can check in our weekly air meeting at 2230 CST at 50.4 mc. If you can't get close to 50.4, we will be tuning for calls." *Sounds like a very fine club, Lorraine, good luck and keep up such fine projects.*

Albany, Georgia A contributor from Georgia, Ben Brooks (K4BLA) sez:

"I haven't seen any letters from Georgia about Six Meters so I'm trying my hand at it. I've been on the air since May, 1957, worked 18 states, with twelve confirmed. I use a homebrew transmitter running 22 watts input and a channel 2 antenna with an Internaational Crystal Converter working into a TCS-12 Receiver.

"Here in South Georgia the old timers don't seem to want to get on Six, and they sure don't know what they're missing.

"I have some information for the six meter gang; if they are using 6SK7 tubes, as R.F. amplifiers, change them to the 6AC7 type, and note the difference. Also, use 717A in the I.F., these tubes are UHF 6SK7 and there is no rewiring of socket connections.

"Also, I can get information on most all pieces of Surplus Gear, so if anyone needs information, just drop me a line and I'll see what I can do." *Ben, you don't know what you're saying. Don't write and ask me boys! Ben's address—Rte #1, Box 476, Albany, Georgia.*

Roselle Park, New Jersey Bob Papsch (WN2MRV) would like some information:

"I would like to get up to two meters as soon as possible after I find out if I passed my General. I've been working on 15 and 40 meters plugging my code until I have the General.

"I'm wondering if you confirmed two meter men have something for me. It's got to be simple (simple brain) and inexpensive (tight pocket) for just rag-chewing, no DX yet. I would like some information about 220, 420 and 1215 mc. (best freq., best times, results, propagation information, etc.)." *How about it boys, give Bob his information. QTH 236 Bender Ave., Roselle Park, New Jersey.*

North Hollywood, California From K. J. Farnsworth (W7WLV/6):

"No longer a Utah six meter ham. Now joined the six meter QRM area." *Oh No! Another good six meter Utah contact gone bad.*

"By all means let's print the run-down on the BC1162A for six meters. Of the two greatest things keeping fellows off six meters is ITV and TVI." *Agreed!*

[*turn page*]

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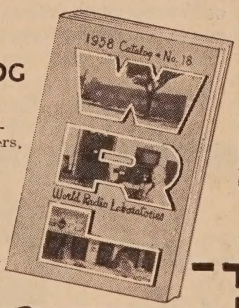
Globe Chief 90—$ 67.50; $ 5.47 per mo.; Kit: $54.95
Globe Scout 680—$109.95; $ 8.91 per mo.; Scout 66: $99.95
Globe Champ 300—$449.00; $25.14 per mo.; Kit: $375.00
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For further information, check number 26 on page 126.

VHF [*continued*]

"The person that can come up with a really good TVI'd six meter transmitter will have the world by the tail. Not to mention a pile of money. I have tried almost every idea ever written for TVI on six, but have not found one yet that really works 100%.

"Six meters in Utah about dead when I left there, but here in Southern California it sounds like seventy-five meters on a Saturday night. This is for me." *Good luck to you at the new QTH, K.J., but we'll sure miss you from Utah.*

Marissa, Illinois Bob Heil (K9EID) speaks from Illinois:

"After cutting the telephone wire, turning off the one-eyed monster (*I threw mine out, Bob*) and getting the rig fired up, I began on May 22nd and started the season. During the first ten weeks, I have worked forty-one states, four VE3's, one VE2 and two CO2's. I worked most of these with my sixty watt 6146-6-8 rig. But I now have a Communicator and ready for a Linear. My Communicator is on NBFM with a Sonor VFX 680 VFO exciter." *Must be the location, that's what they always say.*

"I am still looking for schedules South of St. Louis in Missouri, Illinois, Indiana or anywhere else. At present I know of only one station south of us, and that is W9UWL at Murphysboro.

"The St. Louis area is nearing the 250 mark on six meters. There are quite a few new ones coming on now. *So that's why all I hear is St. Louis, when the band opens up!—Helen.* Channel two has cut down the activity a little, but I notice lately that activity is picking up." *Thanks, Bob, glad to hear from your area in Illinois.*

ARUBA, NORTH. ANTILLES This deserves to be in Caps and also POP (PJ2AX) for sending us the following information:

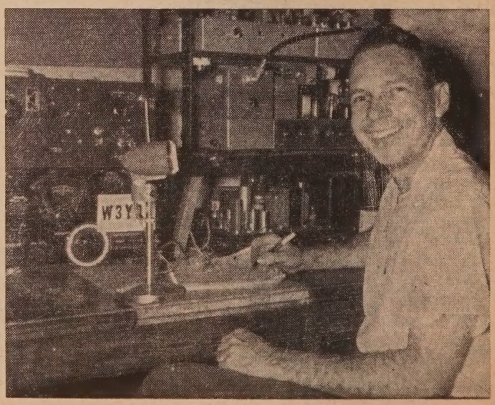
"Thought some of the six meter boys might be interested in where their signals are being heard.

"On July 14th, 1957, between 6:00 P.M. to 7:30 P.M., E.S.T., the following stations were heard on the Island of Aruba with good signal strength: K4EAC, W4LNB, W4CSV, K4EYE, W4BLW, K9CIB, W4KNB, W4KNY, W4NWB, K4MYI, W8AVY, K4AJJ, K4AIA.

"The above were recorded by Max, 2nd operator on Station PJ2AX." *Congratulations, you boys who were getting to Aruba; and to you Pop our sincerest thanks for the information.*

[*turn page*]

W3YQD, 220 mc winner for Maryland. (Wot hoppen to all those guys who wanted a 220 mc contest?)



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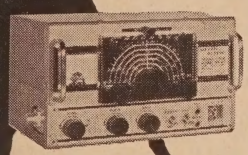
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Phone: ORegon 8-5000

For further information, check number 59 on page 126.



W1UIZ (portable in the Vermont section) after thirty-six hours of operating.

Gurdon, Arkansas Jay Harwell, Jr. (W5JWL) sends us some two Meter information:

"Thought I would write you and give some dope on what has been going on with us on two meters. We finally got going right and have really been having a time. We finally got a crystal controlled converter going and an 815 running 50 watts input, and just recently have put on a pair of 4-125's and have a 417A in our converter. Thanks to W5RCI, W5ML, and the gang in Louisiana; we have had lots of help from them and the gang in Mississippi. We have worked most all active stations in this local area.

"We caught the July 3, 4 opening and worked the following: W9KPS, W4HJQ, W8TPL, W8GZW, W8EHW, W8RUH, W4MKJ, W8SVI, W8LUZ, W4LVA, W8SDJ, W9LLG and KØDOK. On 5th worked W4KCQ. 6th worked W4EQM, W4GTG, KØDOK, WØTGC. 8th worked W9PMN, WØRUF, WØLFE, WØYRX, W4MKJ, W9KLR. 25th worked W9LF, W9AAG, W9REM. On 28-29th worked via metor scatter W2NLY. (*I knew he was bound to get in there.*) From 25th on contacts made with new rig. Going back to June 30th, at 1727 worked WØQDH via aurora.

"We have worked fourteen states, six call areas, and longest contact was with W2NLY which was about 1150 miles. I have QSL's for every state with the exception of Oklahoma where I have worked several stations. *All right now, Oklahoma, come on with those QSL's.* States worked are, Arkansas, Oklahoma, Texas, Louisiana, Tennessee, Mississippi, Ohio, Kansas, Illinois, Missouri, Indiana, Kentucky, Alabama, and New Jersey." *Quite an imposing list I calls it.*

"We are looking for Meteor Scatter schedules for new states and would be pleased to hear from anyone. Boy, this two meters is really something!" *I agree with you Jay, keep at it and it gets to be even more that way.*

Talcottville, Connecticut Connecticut finally comes through via Leland Howard (W1YKK).

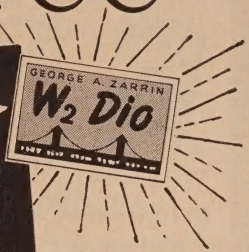
"We're on the air here in 'Yankeeland' from time to time and hope to have a QSO with you sometime."

"At the moment of writing, the equipment here consists of a Heathkit DX-100 transmitter and National NC-183 receiver, using various antennae for different bands. How does that compare with your set-up?"

"We are affiliated with HCJB in Quito, Ecuador (best known as "The Voice of the Andes") I'd like to give a plug for that station and also inform you of a monthly program slanted especially to hams. The first Tuesday of each month, at 9:30 P.M., EST this program,

[*turn the page*]

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with every RCA transmitting tube you buy during October and November

Here's an unusual opportunity to have your QSL card made into a lapel pin. You'll be proud to show your call letters to other hams in such an eye-catching way. Best of all, it's FREE, when you purchase an RCA transmitting tube for your gear . . . whether you drop in at HARVEY'S, just off Times Square, or send in your order by mail. All you have to do is bring or send in your QSL card when ordering. HARVEY'S will do the rest . . . and soon you'll be sprouting your new identification pin . . . *an exact color reproduction of your QSL card.*

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generally known as 'Call of the Andes,' can be found at 9.75, 11.9 or 15.1 mc. Mark this on your calendar and tune in each month, if possible. Other English programs are on daily (except Monday) at 4:00-5:30 P.M., 9:00-midnight and 1:30-5:00 A.M., all EST. Daytime 17.9 mc is used instead of 9.75."

"So what say? Give the receiver a break from the ham bands sometimes." *Will do that, Lee. Glad to know that other countries are pushing the hams too.*

Phoenix, Arizona Clyde Criswell (W7QLZ) sez from his great state:

"Six meters seemed to be way below 48-49 with fewer and shorter openings and very erratic, so far this summer."

"I want 1950-1951 complete, 1952 January, February, mountains very well into the valley, so I listen to the Phoenix VHF Club net on Wednesday night to find out what is going on." *Unusual to hear from Arizona, O.M., so we're always glad of any news at all.*

Trading Stock from Vadnalia, Illinois Albert Hourigan, Jr., (K9CNG) will trade:

"I notice in July 'CQ' that some of the boys want 416B and 417A tubes. I have a good stock of each that is trading stock."

"I want 1950-1951 complete, 1952 January, February, March, April, June, July, November, December—1953 January, February, March, May, June—1955 July, August, September, October, December—1956 January, February, March, April, May, June of 'QST.' And 1950-1951-1952-1953 complete—1954 January, February, April —1955, May, June—1956 March, September, October, November and December—1957, January, February, June of 'CQ.'" (*Thought we'd never get to this point, Al.*)

"Will trade one of the 416B's or 417A's for any twelve issues of the above mentioned that I need." *How have you ever managed to get along Al, with such a stortage of reading materials in your area?*

73, Sam, W1FZJ

Editorial [*from page 8*]

night a year) and mentioned that it was about 75° at head level, 0° at foot level, and in the head was 35° at seat level.

The newspapers might be interested to know about the last piece of equipment that was dropped to the Pole group before the long winter night set in. I'll bet there is a long interesting story on how it was managed, but the last thing they dropped in was a life sized manikin, guess which sex, with a note written across the chest, "Don't Forget."

Whoops

In the "Save 11" results last month we left out a whole set of calls of fellows who were active in the contest. Guess it happened in the typing . . . sorry fellows. Those affected were:

50 points or more	*Under 50 points*
K2IVG	K2JLR
K2KJI	K2KMG
K2KME	K2LMC
K2LST	W2IPJ
W5BVX	
W9KIK	

No log submitted

K2IQX	K2JOM	K2KCE	K2KM	W3ECR
K2IUG	K2JST	K2KCK	K2KNV	W9EJ
K2IWV	K2JXB	K2KEY	K2KVY	W1IJI
K2JLQ	K2KAQ	K2KFR	K2LSY	
K2JNG	K2KAU	K2KFV	K2LTN	

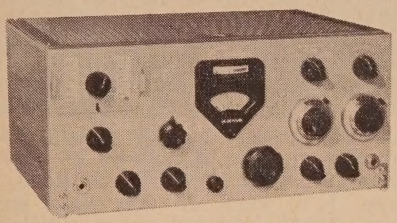
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73, Bil Harrison, W2AVA

From South and West: Thru New Jersey, leave Holland Tunnel in "Downtown" exit lane, continue straight down for 12 blocks.

From North: Thruway exit 7, Saw Mill River Parkway, (or George Washington Bridge), down Henry Hudson Parkway and West Side Highway. Exit at Chambers St., left on Chambers 3 blocks to West Broadway, right 4 blocks.

From New England: Merritt Parkway, to West Side New York via Henry Hudson and West Side Highways. (See "From North")

From Long Island: Via Brooklyn-Battery Tunnel, right on West St. 9 blocks to Vesey St., right 2 blocks to Greenwich St., left ½ block.

Via Tri-Boro, Queensboro, or Midtown Tunnel: East River (F.D.R.) Drive downtown, and around thru underpass tunnel to Brooklyn Tunnel entrance, but continue straight up West St. 9 blocks to Vesey St., right 2 blocks to Greenwich St., left ½ block.

All New York SUBWAYS can bring you to Ham Headquarters, U.S.A.! —

IRT, Lexington Ave. Express to Fulton Street station, up Broadway to Barclay St., left 2 blocks.

IRT, 7th Ave. Express to Chambers Street station, down West Broadway 4 blocks.

IND: Take A, AA, CC, or D train to Hudson Terminal (Chambers St.), one block west on Barclay St.

BMT 4th Ave. line to City Hall Station, walk two blocks west on Barclay St.

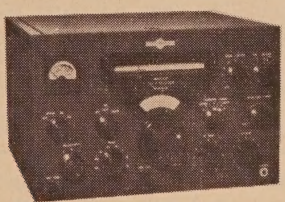
It's even easy by TRAIN!—

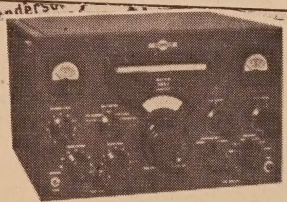
Penn Station: Take IRT Subway Express downtown 2 stops to Chambers St.

Grand Central Station: Take IRT Express downtown 3 stops to Fulton St.

Hudson Terminal: Fulton St. exit, left 1 block to Greenwich St., right 1½ blocks.

Barclay St. Ferry: 2 blocks east to Greenwich St.





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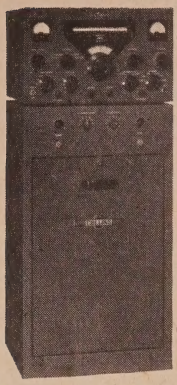
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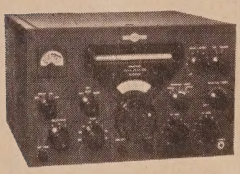
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Electronic Center Inc.



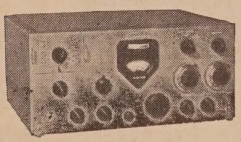
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KWM-1 Transceiver, Net Price $770.00

For complete information, accessories, terms, trade-ins, write:

Electronic Center Inc.
107 3rd Avenue North, Minneapolis 1, Minn.
For further information, check number 30 on page 126.

Editorial *continued . . .*

November Whopper

Just in case you've missed it elsewhere, we've been working for months to get our special behemoth November issue ready. Gad, but it has a lot of articles! Naturally you have your subscription in so you won't be faced with that $1 newsstand price next month.

Best best regards Wayne

Syracuse VHF

The annual Syracuse VHF Roundup will be held October 12 in Liverpool, New York (3 miles west of Syracuse) at 2 p.m. at Martin's Restaurant. Interesting talks are scheduled by Sam Harris and Ed Tilton plus the usual unusually humorous after dinner speaker. This is a yearly meeting ground for all VHF'ers from the east coast to the midwest. Obviously it is a CQ approved hamfest and the editor will make every effort to be there. Pre-registration is $4.50 from W2IYR, 8 Holly Road, No. Syracuse, N.Y. Gad, do they have prizes! They even had more prizes than people last year.

Contest *[from page 20]*

certificate by working a given number of Munich stations.

1. European stations outside of Germany, and including zones 20, 33 and 34, must contact 30 different stations.

2. Amateurs in zones 28, 29, 30, 31, 32 and zones 13 and 39 if located in the Antarctic, only need 10 different stations.

3. All other locations must show a minimum of 20 stations to obtain a certificate.

(Note: The same station only counts once regardless on how many bands it was worked.)

QSL cards are requested for all contacts. They should be sent not later than January 31, 1958 to: **OV Munchen**
Post Box 4,
Munich 40, Germany

See you in Munich next July.

73, Frank, W1WY

FLASH! K2AAA, (Don Mertens) of Eldico and K2GL, (Buzz Reeves) of Soundcraft are donating two additional cups. These trophies are for the top scorers in the multi-operator division. This will give you boys something to shoot for.

A Few Final Reminders

1. Keep all times in GMT.

2. Make sure you sign the requested declaration and print your mailing address.

3. Don't expect us to tabulate your score. Better do a little figuring yourself or you might end up in the Check Log column.

4. Observe log instructions. Fill Zone num-

[continued on page 127]

SB [*from page 71*]



Bob Dennis, W4VEI/KL7 and bearded sailor during phone patch to U.S.A.

will leave Alaska soon for Seattle, and they begin a cruise to the Antarctic on November 1, stopping enroute at Hawaii, Australia and New Zealand. Schedules for patches are desired and we can all help to show the Chief of Naval Operations that a Ham station on certain ships would help the morale of the crew members considerably by providing phone-patches to their homes.

Your Editor is catching up with the leaders in the Countries worked list again, since removing K2DW's total. By working DU7SV, VQ4EO, TF2WBU, KX6BQ, HS1A, KM6-AX, SVØWK, YUIAD, FS7RT, PJ2MA, PY-2CK, ON4CC, KG6NAA, OA4CX, KC4USK, W9IVO/KH6, UA1DZ and EA2CA within a twenty-four hour period the total is now 64.

We were surprised to learn that Bruno, HB-9FU was married recently. Good luck to you and the bride. G6LX, Ronnie returned from a holiday in Europe and is busy catching up on the latest news to report in his SB column in Short Wave Magazine.

W2DR, George has completed his yearly trip to the Far East, and is glad to be home after six months of travel. We talked to George from several Asiatic stations.

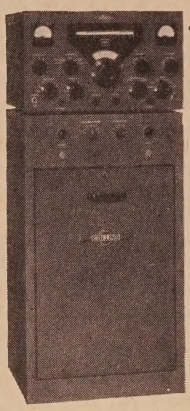
SVØWE, Bradford has a big signal from the Isle of Rhodes. Bill Slater, SVØWA is back in Salonika with his usual fine signal after a short leave in the USA.

Forty is getting more popular every day, and excellent contacts are reported over long distances. This band should be the answer to the terrific congestion on 20, for those who prefer to rag-chew without QRM.

73, Bob, W3SW

Subscribe now. The November issue will be $1.00 on the newsstands.

BUY IT FROM "THACH" WØQV



for the top performing Amateur kilowatt... *Collins* KWS-1

Unmatched performance, accuracy and stability characterize the Collins KWS-1 in SSB, AM or CW operation. Extremely accurate 70E VFO. Pi-L output network. Collins Mechanical Filter. See us about generous trade-in allowance and time payment terms.
KWS-1 kilowatt Transmitter,
Net Price $2,095.00

75A-4 SSB Receiver



Designed expressly for operation on the 7 HF Amateur bands. Features AVC on SSB and CW, separate detectors for AM and SSB, passband tuning, rejection tuning, Gear Reduction Tuning Knob, superior selectivity and many other time-proven Collins features.
75A-4 Receiver, Net Price $695.00

KWM-1 SSB Mobile Transceiver



First mobile transceiver in the Amateur field — 175 watts PEP input, 14-30 mc. Use for mobile or fixed station without modification.
KWM-1 Transceiver, Net Price $770.00

For complete information, accessories, terms, trade-ins, write:

THE OVERTON ELECTRIC CO., INC.
522 Jackson St., Topeka, Kansas
Phone CE 3-3261

For further information, check number 57 on page 126.

Project [*from page 47*]
He will need time to orient himself to new ideas so keep your hand on the control that supplies the excitation. It would be wise to inform yourself as to your friend's physical condition and this must be handled as if you were making your own transistors. This is best done through becoming well acquainted with the family. Let your friend set his own pace and be watchful he doesn't let his enthusiasm drive him to exceed his physical endurance. Be guided by his family and his doctor, but remember too much inquiry has already been directed at his family and after a time becomes irksome unless they realize you are sincere in your efforts to help. Its not at all inconceivable that you will become one of the family (W6YHS is at my home) and later on will be able to discuss the problem freely with the handicapped keeper himself.

Light the Fire

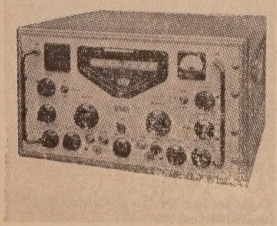
If your friend has no radio experience, your job is to kindle his imagination. Start with simple projects well within his physical capacity, supplying your help as asked for. You, as the therapist, must build his confidence so make haste slowly. Bear in mind these people tire easily, Maybe a spare receiver will help pass lonely hours when he cannot be active with his hands. Supply some old copies of radio magazines, everything in them is new to a beginner. Your investment and interest in time might result in his wonderful comeback to a useful life or at the very least improve his mental health, and your dividends will be in rehabilitating a fellow man, a truly worthwhile accomplishment.

Some handicapped persons are already licensed hams and in many respects it is easier to help them than those without a license. It is going to be up to you find them. This may take a little effort, but would it take more than going up a tower to work on your beam or working all night over a hot soldering gun on a new rig? Here is a guy who really needs you and your energy, so give. There are many shut-in hams in hospitals or at home hoping against hope to be able to get on the air but without help how can they do it? Friends or family may not have the know-how. My wife is probably like most family members, and I wouldn't expect her to put up an antenna or work on a high voltage power supply so it's clear we need a trained amateur operator around a handicapped's station.

Be a Shadow

While you are working with the handicapped, you will have to accustom yourself to the submergence of your personal identity. This may sound strange to you, but I assure you that you must learn to lose your identity in order to be of real help to them. Just for example, suppose your handicapped friend has laid out a new panel for his rig. He has everything marked and lined up ready to go. You have consented to finish the panel for him, realizing he can't do it himself. Now, are you going to use his ideas and instructions in accomplishing the job, or do you believe since you're doing the job that you'll use your own ideas instead? To answer those questions, just consider this: If he could complete the task himself, he would without your help. It behooves him, as it is, to ask for help and the job he's working on is usually a "pet baby" which makes it doubly hard to turn it over to someone else. He also feels that the end result of his project will prove to him that he still has useable capabilities and that just being is not in vain. You may find that the handicapped person has an annoying attention to minor details and it is helpful to understand why. Just remember that merely wiggling a finger may be a tremendous accomplishment for him and you would have to trade places with him to measure its value to him.

The time you spend helping the handicapped could be more important than putting another station on the air or bringing one more person into the hobby. You could be the instrument that helps him create confidence in himself. Unfortunately, time to spare is hard to find these days, but it's there if we look for it. Contribute some of it today to a handicapped person for who knows, you may be training yourself for tomorrow. It could happen to you! ■



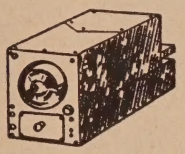
New Receiver

Racal Engineering Ltd. has announced a new type of communications receiver, their RA-17. It tunes from .5 to 30 mc with electronic band switching, thereby eliminating switch contacts and complex gear trains. There are 30 bands, each 1 mc wide, and a 60" tuning scale for each band so that resetting is simplified. The chassis is cast for rigidity. There are so many features to this new type of receiver that you will just have to send for more data to find out about it. Like for instance the first i.f. at 40 mc. Circle A on page 126 and marvel. It costs plenty, by the way.

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

NEW LOW PRICES! — EFFECTIVE OCTOBER 1st

COMMAND TRANSMITTERS & RECEIVERS



ARC-5 and SCR274 as available

BC 455

XLNT... $5.95

Depot Repacks... $7.95

Receivers, w/o dynamotors

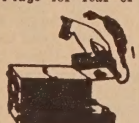
R-25 Marine, 1.5-3 MC, new $10.95
R-26 or BC-454, 3-6 MC, used $6.95. Depot Repacks 7.95
R-27 or BC-455, 6-9.1 Mc, used $5.95. Depot Repacks 7.95
R-28, 100-156 MC, Exlt 13.95
R-4/ARR-2, 234-258 MC, as is w/o tubes, $2.95, w/tubes, used 4.95
Receiver Spinner Knobs ..... ea. .69

Transmitters, w/o modulator or dynamotor

T-18 Marine, 2.1-3 Mc, as is, w/tubes, 3.95, used 4.95, boxed 7.95
T-19, 3-4 Mc, as is w/tubes, 6.95, used 7.95, new 8.95
T-20 or BC-457, 4-5.3 Mc, as is w/tubes, 2.95, used 3.95 boxed 5.95
T-21 or BC458, 5.3-7 Mc, as is, w/tubes, 2.95, used 3.95, boxed by depot 4.95
T-22 or BC-459, 7-9.1 Mc, as is, w/tubes 3.95, used 5.95, boxed 8.95
T-23, 100-156 Mc. xmitter used, 13.95, xlnt 14.95
Special—1 R-28 Rec. & 1 T-23 xmitter both 25.95

Misc. Command Equipment as available

Receiver dynamotors 28V, used ..... $ 1.00
BC-456 SC Mod. w/tubes, new 4.95, used 3.95
MD-7 ARC-5 Pl Mod w/tubes less dyn. Xlnt 8.95
28 v dynamotors for above unit 3.00
3-Rec. Rack, new 2.49
C38 ARC-5 Control Box ..... Xlnt 1.49
C30 ARC-5 Control Box ..... New 4.50
Radio Compass Ind. I82A With Selsyn ..... New 8.95
12V Relay DPST ..... New 2.49
New 24V Trans. 1A 3.50
Plugs for rear of receiver 1.00



110 VAC power supply for ARC-5 & 274N Recvrs kit 8.95, Wired & tested 12.95

Receiver Conversion kit: cont. schematic, BFO Sw, 25 K Pot. phone jack and knob, with instructions 1.95

1625 Tubes, for trans # mod, 50¢ 3/1.00

POWER DRIVEN ANTENNA REEL

½ HP G.E. Motor—12-24 V. Removable 6" Reel. Cam worm gears, bevel gear. Solenoid clutch. In gear only when current on. Operates clockwise or counter clockwise. Ideal for power fish line, opening or closing doors, auxiliary power take-off. Can be used as buffing machine or for dozen of other uses. **$4.95**
Weight 6 Lbs. ..... New

Popular Dynamotor Specials

DM-34 Recvr. Dyna. 12 V in 220 @ 80 ma out. new 4.95
DM-42, 12 V in. out 1000 and 500, ea at 215 Ma. used 12.95
DM-35, 12V in. 600 at 200 Ma out. Xlnt 12.95
Wincharger Dyna. 12 v in 440 @ 220 MA Out, new 12.95
BD-69 Rec. Dyna. 14 v in, 220 at 80 MA out, new 9.95
PE-73, 24 v in 1000 at 350 Ma. out. New 8.95, used 6.95

BC-357 Radio Beacon Receiver

62-80 Mc. radio controlled receiver. Contains 10,000 ohm plate relay. Power requirements are 24 V. AC. @ .5 Amps. and 220 V. DC. @ 20 Ma. Swell for Garage Door Opener, Receiver, and other remote control installations. **$4.95**
Brand New ..... $ 1.49
12 V Heavy Duty Solenoid. New ..... $1.25 ea. 3 for $3.50
5763 Tube. New ..... $1.49 ea. 2 for $2.75
815 Tubes. New ..... 89¢ ea. 3 for $2.00
826 Tubes. New ..... Used: $34.95
BC-654 Transceiver: 3800 to 5800 KC .....

Cathode Ray Tubes

5HP4 or 5CP1 ..... New 1.98
7BP7 ..... New 2.98

WESTON—SANGAMO

METERS.	ALL NEW	2" SQUARE
0-2 Ma	0-300 Ma	
0-5 Ma	0-500 Ma	**$3.29 ea.**
0-15 Ma	0-20 VDC	**SPECIAL**
0-50 Ma	0-40 VDC	
0-100 Ma	0-300 VDC	**3 for $9.00**
0-200 Ma		



Heavy Duty Collins choke 4 Hy-300 Ma can take 500 Ma peaks. new 3.95
Bantam 1-watter, BC-746 plug-in transmitter tuning unit from WALKIE TALKIE. 140 mmfd APC type variable cond. plus assorted parts including chassis. Builds into low power transmitter (See CQ March '54) ..... New, $1.29

OIL CONDENSERS

2 mfd 5000 vdc new ..... $5.95 8 mfd 600 vdc new 1.49
2 mfd 1000 vdc new ..... 1.95 4 mfd 600 vdc new 3 for 1.00
10 mfd 600 vdc new ..... 1.49 2 mfd 600 vdc new 3 for 59¢
Mobile Microphones, newly assembled, W.E. D173015 similar to the TC-128, push-to-talk switch, 3 cond. 5' curl. cord, new **$3.95**
Chest Mike T-26 w/Fl Button. New $1.49
F-1 Carbon Mike Element ..... 59¢
RT-48A/TPX-4 IFF Trans-receiver 157-167MC. Complete with Tubes, used, xlnt. Makes nice 2 Meter Rig $12.95
BC 655 Signal Generator Range 17.5 to 160 Mc. good for T.V. set alignment, use as transmitter fre. checker, built in 0-200 Ua. Triplett 2" round Meter. New $19.95
Brand New Headphones, HS-23, 2000 ohms, $3.95. HS-33, 600 ohms, complete with brand new rubber cushions **$4.95**



New small cushions, pr. ..... .49
Used chamois cushions, pr. ..... .49
New lg rubber cushions, pr. ..... .29



Brand new impedance matching transformer, plug in, 2000 ohms to 600 ohms, takes std plug, boxed 69¢ each, 3 for **$1.95**

CD-307A cords, has JK-26 on one end for phones, std plug other end ..... **$ .97**

Stewart Warner Ammeter, 60-0-60 Amps, brand new, 95¢, 6 for 5.00
Phone-CW Filters, 1020 cycles, new, FL-5, 69¢ FL-8 with switch 1.89
GP-7 transmitter with all tubes less 803 tubes with 80 meter coil unit only 13.95
less tubes and coil unit 7.95
TU-7, 4.5-6.2 MC; TU-8, 6.2-7.7 Mc; TU-9, 7.7-10 MC; TU-10, 10-12.5 MC; TU-26, 200-500 Kc, choice, used, for BC-375 transmitter, each 2.29
T-30 Throat Mikes, used, 5 for 1.00
3' Mast Sections, MS-49 thru 52, 50¢ each. 53 and above, 75¢ each. Special 1 each MS-49 thru 54, makes 18' vertical 2.95
MN-26C direction finding Equipment
MN-26C Receiver w. dyna 14.95
MN-20E Loop 4.95
MN-52H Az Cont Box 2.95
All above new, special, 1 each for 21.95



Antenna Insulators, Bendix MT-48C, plated end caps, new 15¢ ea., 10 for 1.25
Control Box w/5 Ma S meter, special 1.98
SCR-522, exc. condition. Contains Receiver, Transmitter, Modulator, tubes, tunes 100-156 MC, covers 2 m w/o modification 29.50
522 Control Box—BC602 ..... New 4.50
New transmitters, GF-11 for 12 volts, or GF 12 for 24 volts, with tubes and built in modulator—less tuning unit, GF-11 $8.95 ..... GF-12 8.95
BC-223 Xmitter New With all Tuning Units 29.50
Used W/One Tuning Unit 18.95
Right Angle Coax Connectors. Type M-359 and M-359A (83-1AP) ..... .29

TG34 or TG10, 1 Hour Code Tapes

No. 10, No. 13 ..... New, ea. 1.25

2.00 Minimum Order. All prices Subject to Change without Notice. Canada & Mexico minimum 10.00. Cash with Order. Sorry, no COD. California Orders include 4% tax. Prices FOB Los Angeles.

SAM'S SURPLUS, 1306 Bond St., Los Angeles 15, California

For further information, check number 31 on page 126.

QUARTZ CRYSTALS

FAST SERVICE
UNCONDITIONAL GUARANTEE!



Crystals ground and etched crystals to your specified frequency at the lowest cost in the industry—supplied in popular FT-243 holders, ½" pin spacing, .093" pin diameter — also in DC-34 holders, ¾" pin spacing, pin diameter .156 or FT-171 holders, pin spacing ¾" with banana plug pins (fits 5-prong tube socket).

In FT-243 holders from 1001KC to 2500KC:

.01% Tolerance $1.75
.005% Tolerance $2.50

2501KC to 9000KC:

.01% Tolerance $1.50
.005% Tolerance $2.50

Available in MC-7 or FT-171 holders at above prices. Specify holder wanted.

HERMETICALLY SEALED OVERTONE CRYSTALS

Supplied in HC6/U metal holders, pin spacing .486", pin dia. .050"—pin diameter .093" also available. Specify diameter wanted, otherwise .050" supplied.

10 to 30 MC .005 tolerance ..... $3.85 ea.
30 to 54 MC .005 tolerance ..... $4.10 ea.
55 to 75 MC .005 tolerance ..... $4.25 ea.
75 to 90 MC .005 tolerance ..... $5.50 ea.

(Write for quantity prices)

NOVICE CRYSTALS

80 meter band within 1KC of specified frequency from 3701KC to 3749KC in 40 meter band from 7152KC to 7198KC within 1KC of specified frequencies in FT-243 holders ..... 99¢

ANY AMATEUR BAND CRYSTAL from 3500KC to 8650KC, .05% tolerance ..... 99¢

(Add 5¢ per crystal for postage and handling.)

RADIO CONTROL CRYSTALS

SPECIAL!

27.255 MC sealed crystals ..... $2.50 ea.

MARINE FREQUENCY CRYSTALS

.005 Tolerance—available in FT-243 holders, or MC-7 (pin spacing ¾", diameter .125") holders.

2009	2182	2670	2977	$2.50 ea.
2110	2406	2738	3021	
2126	2637	2953	3093	
2174	2638	2961	3193	

(Other marine frequencies available at $2.50 ea.)

Stock crystals in FT-243 holders from 5675KC to 8650KC in 25KC steps ..... 50¢.

FT-241 lattice crystals in all frequencies from 370KC to 540KC ..... 50¢

200KC Crystals 2.00
455KC Crystals 1.00
500KC Crystals 1.00
1000KC Frequency Standard Crystals 3.50
Dual socket for FT-243 crystals ..... .15

Low frequency FT-241 crystals from 880.20KC to 1040.62KC in steps of 1040 cycles—75¢

(Write for complete listing.)

MANY ELECTRONIC PARTS DISTRIBUTORS NOW HAVE TEXAS CRYSTALS IN STOCK.

Texas Crystals

The Biggest Buy in the U.S.

8538 W. GRAND AVENUE • RIVER GROVE, ILL.
ALL PHONES—GLADSTONE 3-3555

Terms: All items subject to prior sale and change of price without notice. All crystal orders MUST be accompanied by check, cash or M.O. WITH PAYMENT IN FULL. No C.O.D.s. Postpaid shipments made in U.S. and possessions only. Add 5¢ per crystal for postage and handling charge.

For further information, check number 32 on page 126.

Letters [*from page 16*]

EST, was coming across on the standard/Brd/cast freq of 0550-1500Kc at 1200EST. So all douring the Pacific War, & now, I still receive the news about 5hrs ahead of it when on Brd/cast ban. Douring the war, I hrd the fall of Manila, before it was on Stn Brd/cast band. Then I hrd FIRST HAND the retaking of the Philippines by Mc Arthur. Sence then, I have hrd the news from Korean war before it was on the Std Brd/cast sets in the USA.

These are ONLY a FEW of the things which I do here. Many stations write me to ask me to Monitor there TEST Xmts to the USA. . . . Will you please note, I know Int SW Listners from the young age of 95, to the teens, around the WORLD. Some of them are HAMS & still do Int SW Listing. WHAT DO YOU THINK OF *THIS?*

I may be a Int SW Listner but I am Proud of the WORK which I have done. Many Int SW Listner has better RXes then the adverage HAM, as they have to try to get through, or get the message, where as the HAM would say sorry better close for now, as I can't read U. . . . I know 5 Int SW Listners who have either HRO-50 or HRO-60. & there are more that have NC-183*D* National

Many of the HAMS only have one stage RF sets, like Hallicrafters then trade then in 2yrs or so.

But as a Int Sw Listner, I have a HRO-50 & have on order a NC-183*D* National. I will use both receivers on Int SW RADIO. Also I have a BC221 Freq Mtr, 3 speed Tape recorder 1⅞, 3¾, 7½" per second. Ant's are Cut to Freq. They are long wire type. One inverted L, they run N&S, E&S, NE&SW, NW&SE. All Ant's are 25' to 50' in the air.

I have 150 QSL cards, Hrd 53 Countries on INTERNATIONAL SW BAND. I have no QSL's from HAMS, as very few of them will send you a QSL even if you send return postage.

I also have a 24 hr clock, BC453, Auto set clock, can be set any 15 min up to 10 hrs. or seting.

For your information, I was the one who said I was proud of listing on Int SW Bands. If we SW listners don't stand up for our selves, who will defend us? SURLY not the HAMS, as they try to discredit, everything we try to do.

If you don't believe me when I said I was a PoW listner, I will be very glad to send you the letters, as proof. I am 32 Yrs old. I started DXing on a S19R Hallicrafters in 1939. The S19R is in good use today, only thing it has needed sence owing it was Filter Condencers, & one dial cord, & a Out put transformer for speaker.

You may have started this to stur up Broad Cast listners, to see how many replies you will receive. Or this may be a gimmic to get new QTH's so U can send to see if they would be interested in CQ Mag?

The dozen or so countries that are spending money to get these Brd/casts behind the Iron Curtain, or Bamboo Curtain. They are telling the trouth. But as you said there were political speaches we weren't even hearing, well that is because of the Jam Moscow puts on all FREE stations in Europe. These political brd/casts mean a lot now days sence we are in the middle of everything that happens in the world. As we want to know wether the countries are still our friends, or have gone Comme. Or dosen't somthing interest you? If not you are thing like the middle of the road nations feel, don't know wether to stay with the West or go with the Commies. Example INDIA is one of the many Nations in question today.

I will admit that the USSR is sending a lot of bunk to us, to make us believe it. But I don't listen to them. . . . But douring the Korean War, that is where I got all the PoW's from.

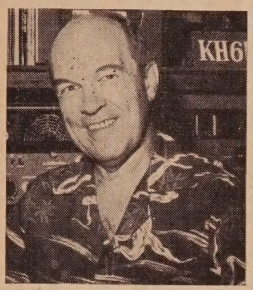
I told you I was 32yrs old. I am not in the class in getting QSL Cd's from a station which I already have one from.

If that is the way CQ Editor feels about the Int SW Band, I think it is time for someone else take over his post, as Editor. As he has gotten to Narrow Minded, Or can think of himself, before he thinks of others.

I don't guess you remember Ken R. Boord that was with Radio & TV Mag for 10 Yrs, he had a real set up, you sent him your Int SW Reports, then he would publish them in R&TV Mag. . . . By any chance this post is

CONGRATULATIONS

W6NLZ and **KH6UK**
on the first W6/KH6
two-way QSO on
2 meters!



KH6UK,
"Tommy"
Thomas

W6NZL,
John Chambers



"Big-Bertha"

Both W6NLZ and KH6UK long felt that this record setting contact was a distinct possibility. Both operators were highly skilled, each had many VHF "firsts" to his credit. Schedules were diligently maintained. Equipment was continually improved. Finally on July 8, 1957 . . . two-way contact!

Gonset's antenna group is indeed proud that both of these well known amateurs were using Gonset-designed Big-Bertha-type antennas.

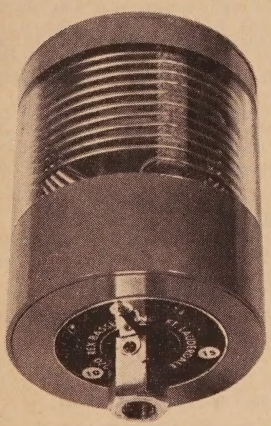
GONSET GONSET
DIVISION OF L. A. YOUNG SPRING & WIRE CORP. Burbank, Calif.

For further information, check number 53 on page 126.

NEW!

BASSETT 3 BAND VACUUM COIL

For Use With The New KWM-1 Mobile



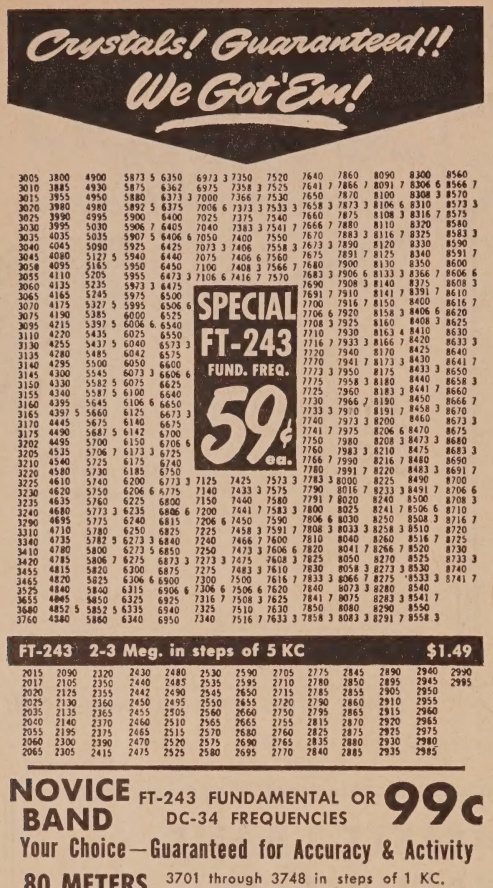
- Model VC-1020 covers 10, 15, and 20 meter bands.
- Efficiency comparable with individual coils.
- Hermetically sealed and filled with pure helium.
- Band selection by rotating coil—120°.
- Impervious to rain, dirt, and effects of weather.
- Extremely high "Q" and handles 1 KW SSB easily.
- No switches, sliders, in coil to destroy "Q".
- Fits standard ⅜-24 rods, 36" base rod, 60" top rod.
- Factory engineered for resonance. No adjusting necessary.
- The only weather sealed high efficiency coil.
- Unconditionally guaranteed.

Model VC-1020—$26.50 Amateur Net

See your Distributor or write for brochure and pricing information on the BASSETT All Band Model VC-1075 Vacuum Coil, and other mobile accessories.

REX BASSETT, INC.
BASSETT BUILDING FORT LAUDERDALE, FLORIDA

For further information, check number 33 on page 126.



For further information, check number 34 on page 126.

now held by W2PNA Int SW Editor of the Newark News Radio Club 215 Market St, Newark 1, N. J.

Ken Boords address is 948 Stewartstown Rd, Morgantown, W. Va. USA. Ken now has a HOT SHOT SHEET. Where the Int SW Monitors still send him the news that is printed 2 times a month. Douring his 10yrs he had picked up over 1000 Int SW Listners in the USA. Not counting the ones from Australia, Canada, New Zealand, Europe, Middle East.

Every Int SW listner no matter how young or old should have a number, Example in you live in the 4th distric your number should be like this W4-123456 or W40-123456 something like this to show how many Int SW Listners there were in the USA also the world. Then have a book with the SWL's QTH etc in it, something like the Ham Call book.

I will say again, you would pick up more subcribers to CQ, if you would add Ken R Boord, as Int SW Monitor, & the listings of stn's he has hrd. Then U will see how large an AUDENCE of SWL's are that listen to the 19 & 25 Mtr bands try it, & you will find there will not be many teenagers in the bunch. This is a Challange to you, to see who is right or WRONG. This QTH is KEN R. BOORD, 948 STEWARTSTOWN RD, MORGANTOWN, W. VA. Ask him to send you an sample of his work. Also write Newark News Radio, 215 Market St, Newark, N. J. for a sample of the SWL's work, then write the Japanese SW Radio Club P.O. Box 29, Sendai, Japan. Then write the Universal Radio DX Club for a sample of there club work.

21446 Burch St.
Hayward, Calif.

Then write the ISWC in London, England, 100 Adams Gardens Estate S.E. 16, London England.

Well I have either messed you up fether, or you see the Int SW Radio a little clearer. At least I hope so.

I have subscribed to CQ for 10 yrs, but if you still want to take this action tword the Int SW Bands 19 & 25 Mtrs I will write everyone I can think & have them swamp you with mail, from all parts of the world. Even Moscow, & the Iron Curtain Countries, as well as Red China. So do what you want, & see what I can do to you. So it is up to you.

William N. Roemer
RFD #3 Box 44
Bowling Green, Ky.

No Komment—Ed.

Technical Talks

The USAF MARS net convenes at 2 p.m. eastern time on Sundays on 7540 kc and 3295 kc for a technical discussion. The following are the scheduled speakers for October.

Oct. 6. Mr. E. H. Shively of Dielectric Products Engineering Co., Inc.
Subject: "Antennas for the VHF and UHF."

Oct. 13. Mr. George W. Bailey, Exec. Secy. of I.R.E.
Subject: "Services of the I.R.E."

Oct. 20. Mr. Leonard Kahn, Pres. of Kahn Research Laboratory.
Subject: "Compatible Side Band."

Oct. 27. Mr. Edward Tilton of ARRL.
Subject: "The World above 50 Megacycles."

The first two Sundays in November will feature a panel discussion on "Atomic Energy" with Doctors J. B. H. Kuper, Clarke Williams, and Kenneth Green. The last two Sundays will be devoted to "Transistors" with a panel from RCA Laboratories.

First Michigan QSO Party

The weekend of October 12th and 13th has been set aside for the first Michigan QSO party ever held. Amateurs throughout the world who are working for the Michigan Wolverine Award will find Michigan stations alerted on all bands between 3:00 o'clock, Saturday, October 12th, throughout the remainder of the weekend for stations calling "CQ Michigan". Michigan stations calling "CQ" will identify themselves by signing, "/Mich" after their calls. The purpose of this QSO party is to give you new counties for the Wolverine Award. It will be an annual event.

RTTY [*from page 85*]

nix, Arizona, is about to QRM Scratchi with a new 4-400 kilowatt final (*That will teach him!*) Don just got an FRA converter, too, which he is modifying to go with his 75A-3.

Joe, K5JRR, of Baton Rouge, Louisiana, has a W4OLL TU and a Model 12 which needs vacuum tube keyer tubes a-la-W9TCJ to operate on 6-meter afsk.

Steve, W7AZF of Reno, Nevada, should be on 40 and 80 with a Model 26 and a Gates/W6AEE converter by the time you read this. The rig will be 450 watts to a pair of 811A's. Charlie, W6ASJ, was of great help to Steve in getting him started. (Is W7AZF the only RTTY station on from Nevada?)

Jim, VE7AIK, has rebuilt and is back on 7140 kc swapping insults with BeeP, WØBP. Don, VE7AOG, while primarily a vhf-addict, borrowed an ARC-5 from Jim and is helping Jim out on 40-meters with BeeP.

Comments

An *RTTY Handbook* was recently ordered by EI6W of Galway, Ireland. We hope this is a forecast of European RTTY activity. As reported here not too long ago, there is RTTY activity from CN8 on 20-meters, but nothing at all has been heard from Europe. We realize that would-be RTTYers in Europe *really* have problems. European teleprinters are not 368 opm, but are 400 opm. Even if they *do* obtain an American machine they are likely to have another problem: 50-cycle power systems. Now, let us suppose that a European ham gets on with his 400 opm machine. Could we work him? Well, *if* we had a TG-7 ( ), the military "field" version of the Model 15 with an a-c governed motor, we *could* increase our speed to 404 opm to correct for the differences in length of the signaling codes. Just how this *was* done in England during WWII is no secret. The only thing wrong with this procedure is that it would be illegal for us to change the speed of our machines to work a machine with a different speed. The FCC specifies that we use only "60-wpm" speed. See what I mean, about problems?

73, Byron, W2JTP

Scratchi [*from page 12*]

or sumthing like that. He are also menshuning something about this being one for the books as he leeving.

So, Hon. E., not from Mars or noplace. Howsumever, if any reseever manufactyouers riting you asking for your eggspert opinion on what things they putting in there new reseevers, be surely to telling them to including window screens over ventilayshun holes—they mite even calling them lightning arrestors.

Yours respectively,
Hashafisti Scratchi



ARC-5/R28 RECEIVER 2-meter Superhet, 100 to 156 MC in 4 crystal channels. Complete with 10 tubes. **$20.45**
BRAND NEW

110 V AC power supply kit $9.75

ARC-5/T23 TRANSMITTER companion for above; includes 2-832A and 2-1625 tubes. BRAND NEW, complete with tubes **$19.95**

ARC-5/T23 TRANSMITTER **$5.95**
Excellent used, less tubes
BRAND NEW, less tubes $7.95
ARC5 MODULATOR, type MD7 BRAND NEW $8.95

SCR-522 FINEST 2-METER RIG!
Terrific buy! VHF Transmitter-Receiver, complete with all components. 100-156 Mc. 4 channels, Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition. SCR-522 Transmitter-Receiver, complete with all 18 tubes. COMBINATION ..... **Special** **$33.33**

BC-929 3" SCOPE INDICATOR COMPLETE
For IFF and Radar Navigation. Complete with all tubes. Used with SCR-729 and AN/APN-2 Equipment. Excel. Used. **$12.95**
As Above, BRAND NEW $14.95

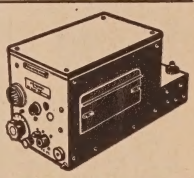
SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES Type	Description	Used	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	$10.95	$11.95	$14.95
BC-454	Receiver 3-6 Mc	7.19	8.29	11.95
BC-455	Receiver 6-9 MC	5.25	7.95	9.95
BC-456	Modulator	2.24	2.75	4.24

BC-457 TRANSMITTER—4-5.3 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-458 TRANSMITTER—5.3 to 7 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-459 TRANSMITTER—7-9.1 Mc, complete with all tubes and crystal. BRAND NEW **$11.95**
ARC-5/T-19 TRANSMITTER—3 to 4 Mc. BRAND NEW, complete with all tubes & crystal **$8.88**

110-VOLT AC POWER SUPPLY KIT
FOR ALL 274-N and ARC-5 RECEIVERS
Can be assembled quickly and easily, on predrilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. No wiring changes needed. This is a substantial kit of QUALITY Parts—custom fitted—no cutting or trimming. Don't be fooled by flimsy unsatisfactory imitations! Complete kit of parts with metal case, Instructions **$7.95**
Wired, Tested, Ready to Operate $11.50
SPLINED TUNING KNOB for 274-N RECEIVERS. Fits BC-453 BC-454 and others. Only **49c**

234-258 MC RECEIVER
BRAND NEW 11-tube UHF Tunable Receiver with schematic. Only a few at this low price! Complete with tubes.
$9.99
With 28V 1.6A Dynamotor, complete $12.98
110 VOLT AC POWER SUPPLY KIT for above $9.75



ARC-5 MARINE RECEIVER-TRANSMITTER
Navy Type Comm. Receiver 1.5 to 3 Mc. BRAND NEW with 6 tubes **$16.95**
Navy Type Comm. Transmitter 2.1-3 Mc BRAND NEW with 4 tubes and Xtal **$12.45**
DYNAMOTOR for Above $4.95

DYNAMOTOR VALUES! Excellent BRAND
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As above, BRAND NEW $3.95
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DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—**BRAND NEW** only **$2.95**

FAMOUS BRAND HI-FI DYNAMIC HEADSET WITH LARGE RUBBER EARCUSHIONS
Frek. Range: 40-14,000 CPS. No distortion. **BRAND NEW. Value $45.00** **$6.95**
CD-307A Cords, with PL55 plug and JK26 Jack ..... .99
DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug. **BRAND NEW,** Special$ **$3.95**
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53 Vesey St., New York 7, N. Y.

For further information, check number 35 on page 126.

FOR SALE

TRANSMITTERS & RECEIVERS

Collins TCS-5 Xmitter 1.5 to 12 mc..... $29.00
A.T.D. Xmitter, 200 KC—15.8 mc., output power 50 W. CW. 40 W. ph. nominal..... 65.00
B.C. 375 with 5 tuning units, new..... 60.00
B.C. 191 with 2 tuning units..... 28.00
AVT-112-A Xmitter, 80 mtr..... 24.00
T.B.W. Transmitter, 803 in final..... 45.00
Arc. 5—2 mtr. Transmitter..... 24.00
Arc. 5 Xmitter 2.1—3 mc. new..... 19.00
Arc. 5 Xmitter 5.3—7 mc. new..... 9.00
GF-11 mobile Xmitter. See CQ mag. 1/57.. 14.50
B.C. 423 radio modulator..... 19.00
ARC.-5 modulator. MD-7 new..... 12.00
Collins MBF Transceiver 60-80 mc..... 45.00
National RBL-5 receiver 15-600 kc. with 115 V.A.C. supply. New..... 65.00
Teletype receiver with power supply and 11 tubes, less tuning unit..... 18.00
AVR-20-A1 receiver. 80 mtr..... 22.00
ARC-5 2 mtr. receiver..... 14.50

TEST EQUIPMENT

Dumont 5 inch scope, model 208..... 85.00
USN 3 inch scope with book..... 33.00
RCA Chanalyst—makes many tests..... 59.00
GR & Federal 804 signal generator 7.5—330 mc. Needs parts & repairs..... 25.00
Signal Generator, Measurements Corp. Model 78. Needs parts and repairs..... 12.00
Frequency meter, Navy LM type. Original calib. book. Power supply..... 85.00
Freq. meter model OAP. A VHF test set 150-230 mc..... 35.00
TS-127/U Freq. meter, 375-725 mc..... 45.00
OAN Test. Osc. 200 kc.—2 mc..... 32.00
Freq. Meter—LM type, unfinished. New needs cover, var. cond., xtal, tubes..... 9.50

TRANSFORMERS & CHOKES

1250 V. C.T.—425 ma. 6.3 V. C.T. 7 Amp. 5 V. C.T. 4 Amp..... $ 8.75
1180 V. C.T.—425 ma. plate Transf..... 7.50
1500 V. C.T. or 1300 V. C.T. 250 ma..... 4.50
4800 V. C.T. or 3500 V. C.T. 300 ma. UTC CG-305..... 42.00

24 V.—3 Amp....	2.75	10 Hy. 400 ma....	3.95
12 V.—4 Amp....	2.50	10 Hy. 250 ma....	2.75
6.3 V.—5 Amp....	1.75	8 Hy. 200 ma....	2.50
6.3 V.—3 Amp....	1.50	8 Hy. 150 ma....	2.00
6-7 or 8V. 10A....	3.50	25 Hy. 100 ma....	2.00

Tapped Sec. 8-9-10-11-12 V. 5 Amp..... 3.75
Mod. Transf. rated 20 W. good for 35 W, 1:1 ratio, 6000:6000 P.P. AB or single. Class A to single or P.P. to 100 W. RF.. 1.75
Univ. Driver Transf. 15 W. Audio. Pri. to ½ Sec.—4:1-4.5:1-5:1-5.5:1 6:1..... 2.25
Carbon Mic Transf. 75-125000 ohm..... 1.25
SSB (see Q.S.T. Mar. '56) set of 3 trans.... 4.00

POWER SUPPLIES & DYNAMOTORS

0-1500 V.-300 ma. with variac, 2 meters..... 39.00
Dual supply—600 V. & 400 V. 200 ma..... 15.00
Power Supply 900 V. at 300 ma..... 25.00
Super Pro power supply..... 20.00
Selenium supply for 6 & 12 V. output..... 22.00
6 V. Dynamotor 425 V.—375 ma..... 16.00
12 V. Dynamotor 625 V.—225 ma..... 16.00
12 V. Dyna. 515/1030 V. 215/260 ma..... 12.50
P.E. 101 new—$9.50... PE-103 new..... 24.00
Leece-Neville 6 V.—$42.00; 12 V..... 78.00
Selenium Rectifier 18 V. full wave Bridge—3 A. $2.50; 5A. $4.50; 7A. $6.00; 10 A..... 7.50

MISCELLANEOUS

500 mmf. Var. Cond. 7" lg. 1.95; 400 mmf. 3" $1.75
20 mh. 500 ma. R.F. choke..... 1.25
Ant. relay—12 V. isolantite..... 2.50
Vac. Cond. 10 KV. 25 mmf. $4.95; 500 mmf... 4.95
Vac. Cond. 32 KV. 50 mmf. $8.00; 100 mmf... 9.00

WANTED

Commercial receivers, Transmitters, Test. Equip.

REPAIR SERVICE

We repair receivers, transmitters, test equipment, meters, etc.
All above prices are based on relative values some items are new some used.
Min. order $5.00 fob Hempstead. 25% with COD orders. Write for bargain bulletin.

ALGERADIO ELECTRONICS CO
236 N. Franklin St. Hempstead, N. Y.

RSI [*from page 25*]

mixer. This last is an ingenious gadget which simultaneously delivers power from the transmitter to the antenna, keeping it out of the detector, and delivers the echo from the antenna to the detector, keeping it out of the transmitter. (This scheme is impractical for ham use, for half of the power in each case is lost in a terminating resistor.) 50 milliwatts, therefore, is radiated by a printed-circuit antenna, consisting of 16 dipoles in a 4 x 4 array, which are connected to the transmission line through a coaxial balun. The antenna has a half-power beamwidth of some 20 degrees in the horizontal plane and gives an effective range of about 200 feet for vehicles the size of an automobile. Reflected energy, entering the crystal detector, is mixed with a sample of the outgoing radiation which leaks through the hybrid ring, and the difference frequency is amplified and sent to a frequency-measuring circuit, to be read out in miles per hour.

Radar Speedmeter Interference enters as a result of the extreme lack of selectivity of the rf assembly. This selectivity consists solely of that afforded by the antenna, the balun, and the hybrid mixer. A sufficiently strong radio signal, of any frequency, can get through to the crystal mixer, which detects any modulation and delivers the audio frequency to the frequency counter. Thus, if you happened to be producing a dominant thousand-cycle note in your speech, as you went mobiling past a speedmeter installation, as far as the officer knows, you were doing 120 miles per hour! It is proposed to install a resonant cavity filter between the antenna and hybrid ring to eliminate such spurious responses, but few, if any, units now feature this improvement.

Some drivers have resented the advantage that law-enforcement officials have taken of the fruits of science and have attempted countermeasures against the speedmeters. Typical of these have been bearing-balls carried in the hubcaps, lengths of chain trailed under the car, and bundles of tin foil tied to the grille. None of these have any chance of success, and the tin foil will probably throw back a stronger echo than the unadorned automobile itself! The only way that the reflection can be eliminated is to carry on the front of the car a non-reflecting material, such as that used to simulate free-space conditions while testing radar equipment, and that would be pretty obvious. RF jamming with a *modulated* carrier would be quite effective but easy to detect, and is quite illegal. The only safe solution is to hear them in time to be able to slow down, if required, before they hear *you,* but the complexity of the equipment required would make the effort hardly worthwhile. ■

MM·1 + Receiver Monitoring = MM·2



All the transmit features of the MM-1 *plus* RECEIVER MONITORING are presented in the new MULTIPHASE RF ANALYZER MM-2.
For use on SSB, DSB, AM, PM and CW.
RECEIVER MONITORING — use with any receiver. Look at received signals. Give reports of Overmodulation, Flat-topping, Parasitics Key waveshape, etc. Simple connections, no holes to drill, plug-in IF unit. New features asked for in your letters.

New variable sweep control with improved speech locking for transmit and receive.
TRANSMITTER MONITORING — NO TUNING, BROADBAND response flat from 1 MC to 55 MC at power levels of 5 watts to 5 KW. Useful indications to 200 MC. For use in "series" with 52—72 ohm coaxial lines. A short pickup antenna is recommended for other systems. RF attenuator controls height of pattern in 3 db steps. Function selector for envelope, trapezoid or bow tie patterns. Built-in 1 KC oscillator.
Silent, Automatic, Electronic switching between RECV and XMIT triggered by transmit RF.
Model MM—2 wired, less IF Adapter . . . . . $129.50 Kit . . . $99.50
Plug-in IF Adaptors — Model RM—50 for 50 KC IF, Model RM—80 for 80 KC IF, Model RM—455 for 450 to 500 KC IF $9.95
Watch for early announcement of our new Model 100V Broadband Exciter-Transmitter with built-in Linear VFO. It will be advertised when it is in stock at your distributor.

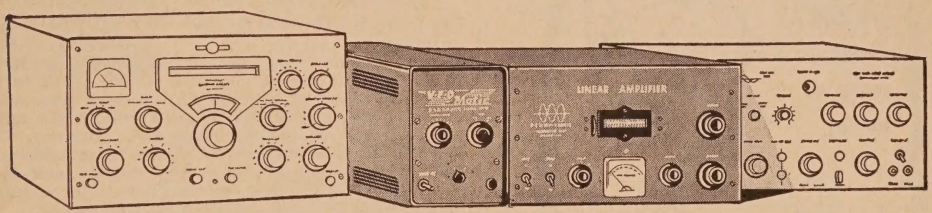
WRITE FOR INFORMATION

MULTIPHASE EQUIPMENT

Central Electronics, Inc.
1247 W. Belmont Ave. • Chicago 13, Illinois

For further information, check number 37 on page 126.

Now . . . transmitter tracks automatically with receiver



Plug new V-F-O-Matic into Collins receiver . . . automatically keeps Xmtr zeroed to receiver frequency

NEW V-F-O-MATIC . . . plugs into 75A-2, -3, -4 Collins receivers; requires no rewiring or changes; does not affect calibration, sensitivity or adjustments. Collins precision VFO furnishes freq. control for both send and receive. For all SSB phasing type exciters (10A, 10B, 20A, Phasemaster, Hallicrafter HT-32, etc.) using 9mc mixer frequencies. Automatically zeros in Xmtr to exact freq. received. Operates both upper and lower SB on 75 and 20 meters. Complete with power supply. (Model 80-10 all-band unit for KWS-1 also available.) Immediate delivery.

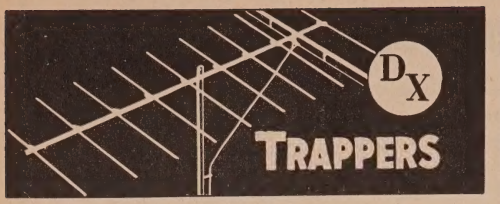
PRICE $124.50
($14.50 down; $10.50 per month)
SATISFACTION GUARANTEED

LA-400-B LINEAR AMPLIFIER . . . simplified multiband operation on 75 thru 10 meters. Improved TVI suppression. New metering circuit reads RF voltage input, plate current and RF amps output. Low Z, untuned, 400-watt P.E.P. input with more stability, better linearity, only 20 watts drive. Pi-net output. Designed around four Modified 1625 Tetrodes. Especially effective for SSB; also delivers high quality signal on AM, PM, CW. Ideal for portable use. Complete with power supply and tubes. Teams well with V-F-O-Matic.

PRICE $199.95
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ALSO AVAILABLE
Modified 1625 Tetrodes $3.75 each
SATISFACTION GUARANTEED

P & H ELECTRONICS • 424 Columbia, Lafayette, Ind.

For further information, check number 38 on page 126.



Taco, world's largest organization devoted solely to the design, development and manufacture of antennas offers top-performing, high quality amateur band antennas. Taco, and only Taco, can offer such values . . .

5 ELEMENT, 6 METER BEAM
Provides 8 db gain, or multiplies transmitter output 6.3 times. Net price **$12.95**

10 ELEMENT, 6 METER BEAM
Provides 11 db gain, or multiplies transmitter output 12.6 times. Net price **$24.50**

10 ELEMENT, 2 METER BEAM
Provides 11 db gain with extra-sharp directivity pattern. Net price **$11.50**

10 ELEMENT, 1¼ METER BEAM
Provides 11 db gain, or multiplies transmitter output 12.6 times. Net price **$ 9.95**

WRITE FOR CIRCULAR GIVING COMPLETE TECHNICAL INFORMATION ON THESE BRAND-NEW HAM-BAND ANTENNAS...

TACO Technical Appliance Corp. Sherburne, N.Y. Dept. 00

In Canada: Hackbusch Electronics, Ltd., Toronto 4, Ont.

For further information, check number 39 on page 126.



Our New Flyer Is The Talk Of All ARRL'ers!

Get your free copy today!

COLUMBIA ELECTRONICS
2251 W. Washington Blvd.
Los Angeles 18, Calif.

WANTED BC-939
Antenna Loading Unit $75.00

Radalab INC.
87-17 124th Street • Richmond Hill 18, N. Y.

Surplus Ltrs [*from page 61*]

schematic for the APA-10. Just what "companies advertise APA-10 manuals"? I checked through nearly two years of CQ's and could not find even one. *Well, first, Robert, maybe they don't have a telephone! The writer of the letter above apparently was able to contact them. Second, the ad that I remembered was in QST, not CQ. I quote from page 162, Jan. '57 QST, "Panoramic Adapter ID60/APA-10 Tech. Manuals $2.75 postpaid in USA. Electronicraft, 27 Milburn St., Bronxville 8, N. Y." So sue me. Third, I don't think you are interested in the transformer for $48.00. See the above letter.*

Bob Parrish, P. O. Box 2251, Corpus Christi, Texas, writes:
Dear Don, I'm a new Technician-Novice and I want an inexpensive way to get on 6 meters phone. This sounds like a conversion of the war surplus MBF 110 volt ac/dc transceiver. How about it? *Bob, there will be a conversion printed shortly in CQ (naturally). It's real delux and well worth the effort. (No, I didn't write it.)*

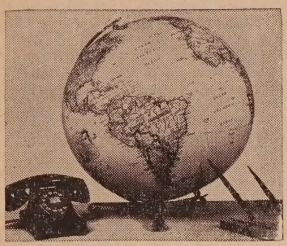
H. L. Dempsey, K4DPH, 300 E. 30th St., Anniston, Alabama, writes:
Hi, Don, I have a Navy surplus receiver, model RDZ, with a frequency range of 200-400 mc. It is 110 vac operated, uses 23 tubes and weighs about 200 lbs. Is it good for something? Besides a boat anchor, that is. *Thanks, K4DPH. That it is, that it is! This is one of the better deals on the current surplus market and is classified as "late surplus." This unit has a Collins autotune unit and is crystal controlled on ten channels between 200 and 400 megs. It will cover the 220 band as is and should cover the 420 band with a little fussing. Another terrific bargain in the 200 to 400 mc gear is the Navy MAN. This job was made by RCA and is "late, late surplus." It includes a ten channel receiver, ditto transmitter and a combination power supply that will operate from 12, 24 volts dc or 110 volts ac! They sell for between 40 and 50 dollars. I have seen several and they appear to be brand new!*

I'll bet Bill Stover, K6YNT, picks up CQ on the news stands and missed the April issue. He inquires:
Dear Mr. Stoner, I was just leafing through the March issue of CQ and became interested in your article on the conversion of the BC-454, 455, for a 6 meter transceiver. It would simplify matters a great deal if you might have a photo of the completed unit. Sincerely, Bill. *Bill, the April was a jammed packed issue with more than the usual number of terrific articles, and as a result, there was no room for the photos. They appeared in the following issue (May). Hope you got it.*

Possibly I fouled up Gary M. Seibert, W7QMZ, 1304 S.E. 16 Ave., Portland, Oregon.
Dear OM: In a recent issue of CQ, you mentioned that you were planning a conversion of the Navy TBX-8. I haven't seen it yet. If you are not going to print it, do you know where I could get a manual on this unit? *Sorry, Gary, but there are so few of these units available that I decided against a conversion. There are always a lot of unhappy people when a conversion is printed on a unit that is unavailable. Maybe the readers can furnish you with a manual.*

Hubert F. Cobb, 13009 Broadway, Cleveland 25, Ohio, sounds like a real "dyed in the wool" surpluser.
Dear Don: I would like to obtain some data on the AN/ARR-2 receiver for a conversion to 220 mc. I also have a TV transmitter that I would like to convert to 220 mc and already have one on 420. Thanks, Hubert. *I believe there will be a conversion on the ARR-2 in the third issue of the Surplus Conversion Manual that is to be released shortly.*

FOR YOUR HAM SHACK



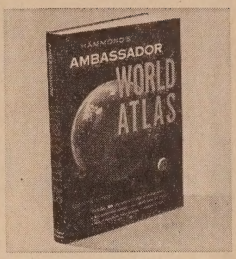
GLOBE

Here it's Friday already . . . what better time to give the XYL this globe for your shack . . . and *you're getting a FREE year of CQ to boot.* Costs $25.00 in the stores . . . only $19.95 on this CQ deal.

ATLAS

Come on, get with it. Don't pull a blank when some one asks you for the capital of Honduras. For only $12.50 you can own 7 lbs. of full-color maps and a complete gazeteer. Send for this Hammond Atlas. PLUS a one year subscription to CQ.

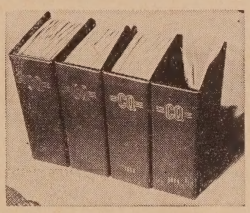
only $12.50

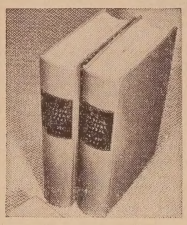


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MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from all of the experienced mobile operators. There is all sorts of information in here that cannot be found anywhere else. This is NOT a collection of reprints. $2.95 postpaid.

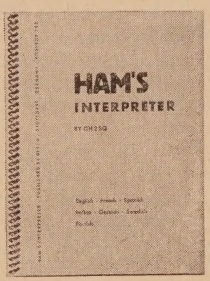
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This IS a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous amazing terrific pages for only $1.50 PPD.



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Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has twelve lessons on it and should be all you need to learn the code for both the Novice and General license.

C10

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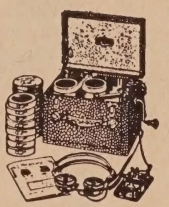
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1 kilowatt Transmitter
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15 hy/ mils; 400 ohms; 2500 v test . . 4 lbs . . **$1.19** . . 2/$1.95
10 hy/50 mils; 127 ohms; 2000 v test . . 5 lbs . . .95 . . 2/$1.69
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7 to 13 vct/ 20 amps; potted; 2.5 KV test . . 25 lbs . . **$ 2.95**

AUDIO INDUCTORS . . . dual section reactors; 235 mph/1.5 mils; 285 mh/0 mils; 28 KC; 0.67 mw . . each section completely shielded and hermetically sealed; solder lugs on base . . for dynamic noise suppression use . . 4 oz . . **39¢** . . 3/95¢

Write for Free Government Surplus Bargain Bulletin!

JOE PALMER
P.O. Box 6188ccc, Sacramento, California

Major George Haviland, USAF, 413 Newton Rd., Hatboro, Pa., has a simple request, he writes:

Dear Don, I would like some conversion information on the SCR-522. I wrote to another ham magazine and got an unsatisfactory answer. I was told how to go SSB, but not how to get it working on AM-Hi. I have information on the Bendix TA-12F if you are interested. *The conversion on the 522 appears in the 1st volume of the Surplus Radio Conversion Manual (Editors and Engineers, Santa Barbara) and should prove helpful. The Bendix TA-12 is a popular and plentiful unit. Why don't one of you guys drum up a conversion on it and submit it to CQ Magazine?*

Byron Burke, 6900 South La Grange Road, La Grange, Illinois would like information on converting the APS-13 to 420 mc. *This information can be found in the Surplus Radio Conversion Manual, Volume 2.*

Frank Cronin, W4WOB, 226 S. Purdue Ave., Oak Ridge, Tenn. is in the market for a new receiver.

Dear Don: I have been struggling along with a Howard 450 (Q Multiplier and product detector courtesy of CQ) but am looking for something a little better. How is the RAX-3? I would like to obtain information on this unit. *I am not qualified to answer, Frank, for I have never used one of these units as a communications receiver. Possibly some of the readers have.*

To the "save our surplus" department, Willie Sams, K2MTN, 187 9th St., Jersey City, N. J. writes:

Dear Mr. Stoner, I am trying to locate an inductor from the BC-375-E. I wonder if you know where I can get one. *Sorry, Willie, those are little goodies and they have disappeared out here. I'll bet someone reading this has one that you can dicker for.*

By golly, here's one customer we can help out. Stephen R. Teed, 81 Horizon Drive, Boise, Idaho writes:

Dear Sir, I recently purchased a TBY transciever and would like to see a conversion article. Yours very truly, Stephen. *See the beginning of the article Stephen. What other magazine can give service that is that fast?*

James A. Smith, Box 320, Hope, Arkansas would like the name of the dealer that has a BC 2 meter frond end. *Try Arrow Sales, Box 3007, North Hollywood, James.* Also, he would like to obtain information on the BC-1267A or write to someone that has done a conversion on this unit.

Elmer R. Strunk, W9ERE, Morton, Ill., would like to obtain a manual on the TG-34A keyer.

Loal Broulette, 2017 West 14th Street, Sioux City, Iowa would like information on connecting up the ARC-5 three receiver control box.

Malcolm L. Lerris, Gallager, Ridge, N. B. would like information on converting the Bendix TA-12 transmitter. *I believe there is a conversion on the TA-12 in the 2nd Volume of the Surplus Radio Conversion Manual.*

Walt Clevenstine, W3CUO, 711 Arch Street, Spring City, Penna. suggests a conversion on the ASB-5 scope indicator to a device to check your own phone or SSB transmitter or to check the incomming signals. These units are very plentiful all over the country.

73, Don, W6TNS

How to work DX [*from page 28*]

severance of the greatest type; somewhat like a hungry tiger near an almost dry water-hole. But it can and is being done.

Never strike out blind for DX because you hear other stations calling. Make sure you know who and where the DX is.

If at first you don't succeed, don't get discouraged. Remember that even on a percentage average, there's one DX station for every four to five W-VE stations, and on the air the average is even less in the DX's favor. This means there's bound to be a crew of hunters, along with yourself, on the prowl.

No matter how bad the situation might be, always use your station in the best amateur tradition. Senseless calling and tuning on the air for protracted periods serves only to rile up other operators and DX stations, causes needless QRM . . . and its against rules and regulations set forth by the FCC for amateur operation.

Heed the DX station's desire. A reply by a station in New York to the DX 'CQ WYOMING' is certainly not going to snag you a contact now or in the future.

And above all, don't get power conscious. The amateur operator in the 20-75 watt class is just as capable of knocking off some rare ones with his home brew equipment as the kw with years of experience; provided, mastery of operating, convenience of operating, antenna problems have been worked over carefully by the fledgling operator.

Sorry, have to leave now. The ZL's are coming through on the low end of 40!! ■

Propagation [*from page 89*]

morning and evening hours. The East-West paths appearing in the *Charts* with a rating of (3) or better should hold up during all but the most severe type storms.

Six Meters

Although the *six meter* band is not included in the Contest, several DX openings on this band are expected during October, becoming more numerous later during the winter months. Openings are most likely to occur on several days during time periods when *ten meter* openings are shown in the *Charts* with a rating symbol of (4). DX conditions to South America, Europe and Africa should peak around noontime, with the band opening towards the west later during the afternoon and early evening hours.

Post Mortem

The upcoming Contest will occur during a

[*Continued on page 116*]

Another Sencore Time-Saver

SENCORE Model TDC22
TRANSISTOR CHECKER

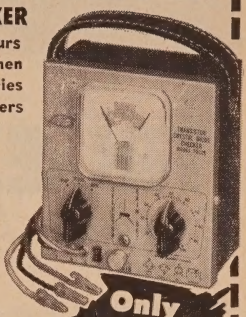
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Quickly and accurately checks all transistors and crystal diodes.

Provides these 4 important checks on transistors: OPEN • SHORT • CURRENT GAIN • LEAKAGE
Checks forward to backward resistance of diodes.

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For further information, check number 41 on page 126.

the *Collins* 75A-4



Designed expressly for Operation on the 7 HF Amateur bands

This outstanding SSB receiver features AVC on SSB and CW, separate detectors for AM and SSB, passband tuning, rejection tuning, Gear Reduction Tuning Knob, superior selectivity and many other time-proven Collins features. Net Price $695.00

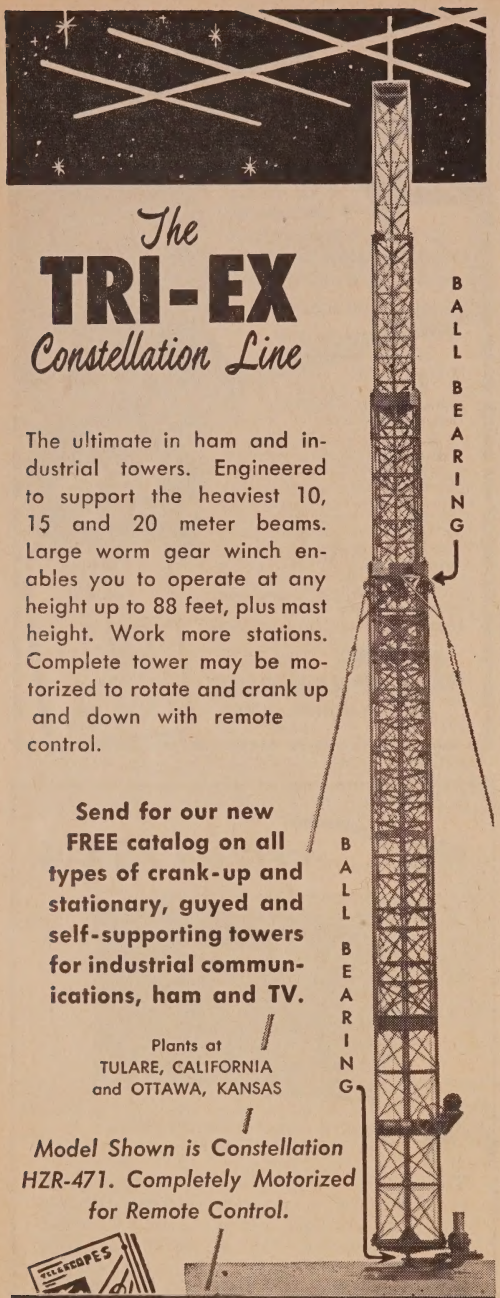
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The ultimate in ham and industrial towers. Engineered to support the heaviest 10, 15 and 20 meter beams. Large worm gear winch enables you to operate at any height up to 88 feet, plus mast height. Work more stations. Complete tower may be motorized to rotate and crank up and down with remote control.

Send for our new FREE catalog on all types of crank-up and stationary, guyed and self-supporting towers for industrial communications, ham and TV.

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Model Shown is Constellation HZR-471. Completely Motorized for Remote Control.

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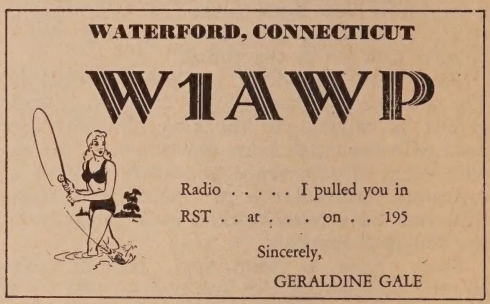
For further information, check number 22 on page 126.

QSL [*from page 63*]

fifty cents! This for skilled work in inflationary times.

The layman has a hazy idea that a printer just throws a few pieces of type into a press and turns a crank or something, and out roll the finished cards. One morning a customer personally handed me an order for a two-color job, and then added very innocently: "If you aren't too busy, will you run off a few right now, so I can see how they are going to look?" He was informed that none would be forthcoming until late in the day. This incident shows that each person knows his own trade best. QSL printers are not usually overrun with work, and two days should suffice for any simple order. If he requires several weeks, you may conclude that his main business is other work of a better-paying nature. He will use your QSL order for fill-in work only.

Over a period of years, it has been found here that simple designs sell best. One of the most pleasing (to me) designs I ever saw was that of a "pretty YL" background done in silver ink, with the call letters in royal blue super-imposed. In all fairness, I must hasten to add that it was done by a colleague in Baltimore.



There is a popular fallacy that, the larger the order, the lower the price for each 100 cards should be. Far from the truth! After the first 100 cards, the labor and material costs remain constant.

So, OM's and YL's, when you think up a headache for your printer, stop and consider that he receives a very small return for the skilled work that he does for you. Keep your designs simple. The card you will receive, if any, in return for the elaborate one you send to the other ham, will more than likely be one of the penny-and-a-half variety, or even one of the free ones given out by manufacturing concerns.

Commenting on the subject of QSL designs, a fellow-printer wrote: "No matter how pretty a design you think up, they'll order the darndest things!" ■

Converter *[from page 49]*

cation of injection signal is prevalent, adjust L4 and continue to tune the exciter. The output signal from the exciter may be weak when only slightly off resonance, however there will be sufficient amplitude to be detected at the receiver. The operating Q of L4 is such that little or no trouble should be experienced in locating the maximum output point of the converter.

As a check on the stability of the completed converter, two simple tests should be made. Remove the crystal from the oscillator stage and decrease the coupling from the tank coil in the output section of the BC-458. In the latter case, there may be enough 10 to 11 mc energy at the cathode of the 6AH6 to operate the mixer, but at a very low level and insufficient for proper injection. Either of these tests should render the converter inoperative. Due to the additional wiring added to the

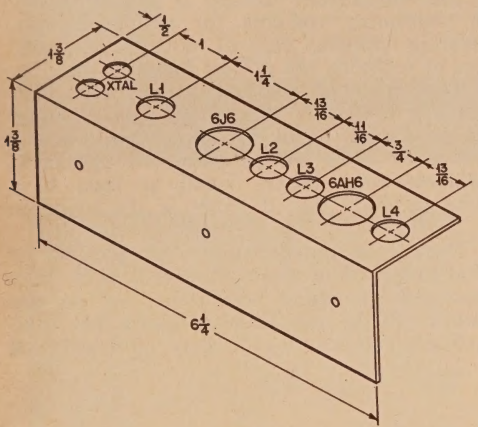


Fig 1

front section of the bandswitch, it will be necessary to check the calibration of the VFO on both 21 and 4 mc. Upon completion of the calibration process, the 28 mc portion of the dial can be marked by comparing the output of the transmitter against a 100 kc crystal standard or accurate receiver. Additional checks may be recorded against the 24 mc crystal and the VFO frequency before calibrating the dial. Two or more trimmers connected into the VFO circuit will aid in correcting dial calibration on the various bands. These may be front panel or internally mounted in the BC-458, and wired to the band-switch similar to the trimmer furnished with the conversion kit. The unit described has been functioning satisfactorily for several years and has resulted in many fine SSB contacts on 28 mc with VK's, ZL's, LU's, G's, and ZS's. And among the ZS's is ZS6KD, South Africa's first SSB station, who usually calls you! ■

Really SILENT A-C Relays

By DOW

Model DKC



1000 WATTS
Length 4½", width 3"

←*Silent* A-C magnet prevents hum modulation of carrier — A-C types guaranteed as quiet as D-C.

Special connector protects your receiver ←from R.F. during transmission (Optional).

Transmit contact-pressure over 75 grams, making the 1000 w. rating very conservative. Causes negligible change in SWR up to 100 Mc.

DKF rigid adapter for external chassis mounting, $1.85



AC types (All Volt.) Amateur net..... $10.50
DC types (All Volt.) Amateur net..... 9.50

See your distributor. If he has not yet stocked Dow Co-axial relays, order from factory. Send check or money order or will ship COD. Prices net FOB Warren, Minn. Shipping Weight 9 oz. Dealers' inquiries invited. Literature on request.

Add $1 for external switch (Optional)
Add $1 for special receiver protecting connector (Optional)

THE DOW-KEY CO., INC.

WARREN, MINNESOTA

For further information, check number 43 on page 126.

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APR-9 . . . ARC-1 . . . ARN-7 . . . ART-13 PARTS . . . BC-788-C . . . I-152-C . . . LP-21-AM, -LM, or MO-18A or MO-507 from these loops . . . R-65/APN-9 . . . TEST SETS I-100, TS-117, -125, -147, -148, -486. What else have you? ? ?

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You'll be glad you did!!

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For further information, check number 44 on page 126.

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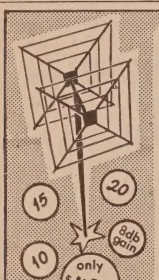
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Collins KWS-1 SSB Transmitter, Net Price $2,095.00
Collins 75A-4 SSB Receiver, Net Price 695.00
Collins KWM-1 SSB Mobile Transceiver, Net Price 770.00

EVANS RADIO
P. O. Box 312, Concord, New Hampshire

For further information, check number 45 on page 126.



announcing the
Cubex TRI-BAND CUBICAL QUAD

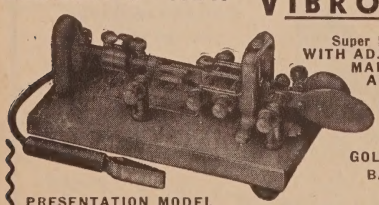
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- ONLY 16.8'wide - NO STUBS

Dual-band 15-20 $44.95
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AMAZING NEW VIBROPLEX



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24-K GOLD-PLATED BASE TOP

PRESENTATION MODEL $29.95

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THE VIBROPLEX CO., INC. 833 Broadway, N. Y. 3, N. Y.

But I Measured It . . . [*from page 35*]

In this set-up, the absolute values of the resistors can't be determined, but the ratios can. The battery current flows through two branches in going from A to B. There will be a current I1 flowing through R1-R2, and a current I2 flowing through R3-R4. In each case, the total voltage developed will be the same, of course. But the galvanometer will read zero *only* when the voltage developed across R2 is exactly equal to that developed across R4. And then, of course, the voltage across R1 must be equal to that across R3, also.

This requires that the ratio of R1 to R2 be exactly the same as the ratio of R3 to R4—although R1 doesn't have to equal R3 in value, naturally.

If R3-R4 is a length of nichrome wire, carefully measured off, with the point D precisely 1/10th of the way from A to B, then the bridge circuit will balance when, and only when, R1 is 1/10th of R2.

The Wheatstone Bridge is mighty useful for measuring resistors for voltage-dividers, metering circuits, etc. of course; in many uses of resistors, the critical factor is the ratio of two or more resistors, rather than their absolute values. A Wheatstone Bridge set-up can be darned handy for such work.

And by using the potentiometer system to calibrate your meter, you'll at least have some certainty that it reads as it's supposed to.

There then remains only the question of what that reading means. You will, then, have measured something accurately; just so you don't make the mistake of believing that automatically measures *it* accurately, all is well! ■

Propagation [*from page 113*]

period of sunspot activity more intense than any recorded during previous years. The Contest, because of the large amount of world-wide activity on the various amateur bands, offers an excellent opportunity for checking propagation conditions during this period of unprecedented intense solar activity. Any comments readers of this column may have concerning observations during the Contest period would be appreciated.

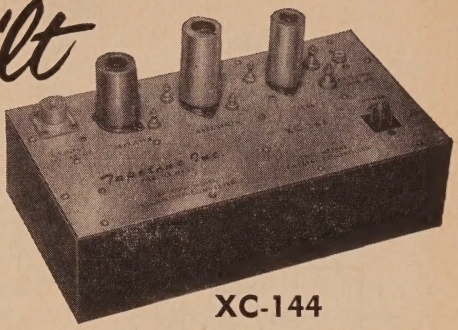
Stand by for what may turn out to be the most exciting weekends in the history of amateur radio—*the CQ Worldwide DX Contest.* It has taken more than 200 years for the sunspots to reach their present intense level, if you miss this year's Contest you might have to wait another 200 years before the sun acts this way again! Good Luck.

73, George, W3ASK



Quality Built

2 AND 6 METER CONVERTERS



XC-144

Two Meter grounded grid 417A Crystal Controlled Converter. 2.8 db Noise figure, 33 db Power gain, 60 db Image rejection, 80 db I. F. rejection and 80 db down on all other spurious responses. XC-144 output 14 to 18 mc. Price **$79.95**

XC-50

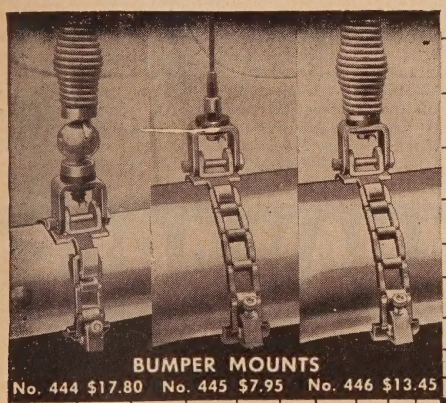
Six Meter Double Cascode Crystal Controlled Converter. 4 db Noise figure, 33 db Power gain, 90 db Image rejection, 80 db I. F. rejection and 80 db down on all other spurious responses. XC-50 output 14 to 18 mc: XC-51 output 10 to 14 mc. Price **$59.95**

Other Models:

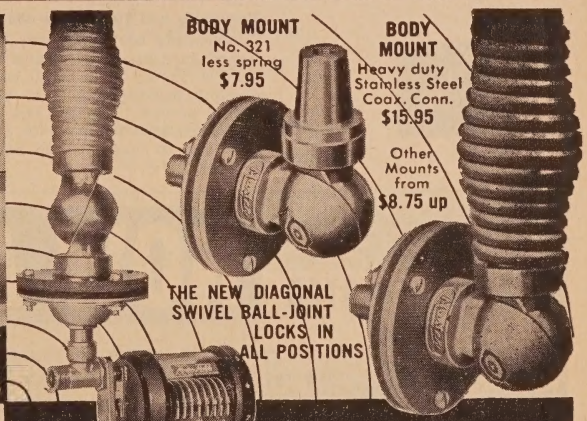
XC-144-C output . .	26 to 30 mc.
XC-144-N output . .	30 to 34 mc.
XC-50-C output . .	26 to 30 mc.
XC-50-N output . .	30 to 34 mc.

Ask your dealer or write to **TAPETONE, INC.**
10 ARDLOCK PLACE, WEBSTER, MASS.

For further information, check number 46 on page 126.



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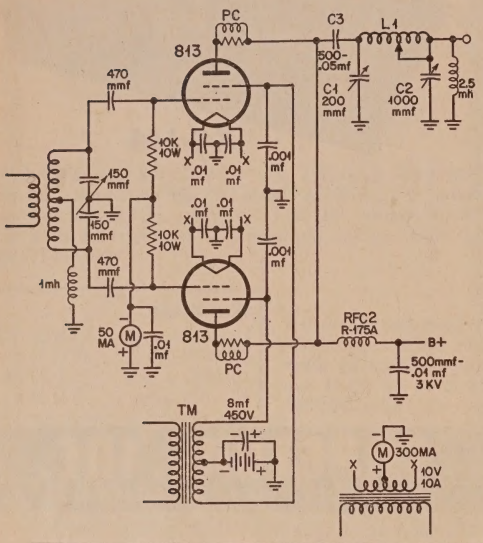
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For further information, check number 47 on page 126.

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Screen Volts	0	0	0	0	–22.5	–67.5	–90	–65
Plate Current Resting	10	25	30	25	100	55	60	80
Plate Current Full Whistle	50	150	100	125	205	245	265	300
PEP Output	30	100	150	150	380	600	840	1500



DSB DATA *[from page 65]*

shift to an rf envelope pattern by switching to internal sweep on your horizontal axis. By using a steady audio note you can synchronize and see how well your audio is doing.

If you have established the proper conditions you will have a good bow-tie shape and you will be pleased to note that the tuning controls don't affect the shape much. If you detune anything, about all that happens is you get less than maximum output.

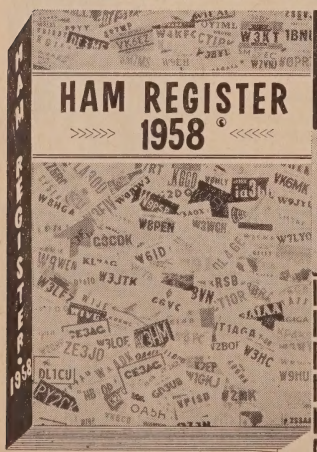
Fig. 2 is a complete circuit diagram for 813's. Exactly the same circuit is applicable for all tetrodes—you can use lower voltage components for smaller tubes of course.

Table 1 shows DSB operating conditions for some of the more common tubes. Don't worry if you don't have the exact voltages called for, these are the ones tried by W2CRR, W2HNH, W2SBI, and K2KID. Pick out the tubes you want and have a go at DSB. You'll like it! ■

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Interesting book, profusely illustrated. After reading this book you will have a darned good basic understanding of electronics and electricity . . . how it works, etc. The junior op or XYL will have a pretty good background for really understanding radio if they start with this introduction. They will see how electricity is used around the house and the car. Since all of the theory is related to things that everyone isfamiliar with this book certainly makes for a painless and interesting source of fundamentals. 245 pages, $4.50. Published by the American Technical Society.



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W O W

The November issue of CQ will be the first Annual Behemoth Gigantic Colossal Tremendous Oversized Bulky Multipaged issue. We are going all out on this one. We have over 50 feature articles scheduled, and providing the book doesn't fill up completely with advertising we will get all 50 into print.

Articles are being carefully selected to provide a complete picture of the whole of ham radio . . . features will be included of every aspect of our varied hobby. These are not unimportant articles . . . many of the articles are by our top writers . . . W6SAI, W6AJF, W6GEG, W2AAA, W6TNS, W2NSD (?), W6BLZ, W2AEF, etc. and W2ZGU.

This issue will practically be a handbook. It will be the largest issue of CQ ever printed. As a matter of fact, it will contain more articles than any ham magazine has ever printed before, and more pages too.

Here are some of the articles that will be featured:

Phone Patches, switchless circuits, hybrid
QSL designing
Grinding Crystals
Selenium rectifier and glow tube tester
Transmitter tuning meter
Repairing HV plate transformers
Filter-Limiter for CW
Novel transmitter tuning system
Special SSB Power Supply
Selective audio filter
PL-172 kilowatt rig (Penta Labs)
Model 26 RTTY and how it works
NC-240 D Modifications by W6SAI
Sideband Filter Choke
220 mc harmonic disposal
Complete KW rig, 4-400A's
Radar Speed Meter info
New Type S-Meter
DSB data, 813 rig described
Real WOW YL article
125 watt modulator
Mobile compressor
Multi-band vertical
Gamma for tri-band beams
DSB amplifiers by W6AJF
How to raise chipmunks in a wet climate

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BARGAINS: Reconditioned with new guarantee. Shipped on approval. Hallicrafters S38, $29.00; S40A $69.00; SX99 $119.00; SX71 $149.00; SX-100 $229.00; Viking Adventurer $39.00; Viking II $199.00; Ranger $179.00; Valiant, $379; S40B; S85; SW54; NC98; NC183D; NC300; HQ129X; HQ140X; GPR90; A54; AF67; PMR6; PMR7; Collins KWS-1; 75A1; 75A3; 75A4; 32V3; many other items. Easy terms. Write for list. HENRY RADIO, Butler, Mo.

MICHIGAN HAMS! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover, Ann Arbor, Michigan. Telephone NOrmandy 8-8696, NOrmandy 8-8262.

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INSTRUCTION

INSTRUCTION: General license theory class begins October—Jamaica, L. I., evening. Community Center. Data and application from Schachet, W2HNG, 135-30 232nd St., Springfield Gardens 13, L. I., N. Y.

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WANTED: ARC-3, ART-13, ARC-1, BC-348, BC-221, BC-610E and other military surplus and commercial aeronautical equipment. You ship COD, we pay freight. Write, wire, phone. JAMES S. SPIVEY INC., 4908 Hampden Lane, Washington, D.C. Phone OLiver 6-8608.

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HF 10-20 sell VHF 152A used with book $45 or trade. Russ Smith, W6ONK, 605 W. Andrews, Fresno 5, Calif.

WANTED: Used NC-300-75A-3 or HRO receiver, quote lowest price. J. Kane, 312 Penn St., Camden, N.J.

WANTED: Communications receiver such as BC-312, BC-342, BC-348, National, Hallicrafters, etc. Also test equipment; freq. meters, signal generators, etc. Price? Condition? Cash or 220mc gear. Gerry, K6EZB, 9800 W. National, Apt. 10 Los Angeles 34, Calif.

WANTED immediately by student, two xmtrs DX-100 or Viking II w/VFO. Also DB-23 or similar preselector. Must be in good condition and reasonably priced. Urgent since leaving for Europe by October 15th. Offers from New York metropolitan area only. Larry Greenman, c/o Soloff, 909 East 29th St., Brooklyn, N. Y.

WANTED: Palco Bantam 65 with or without modulator. Give condition and lowest price. Charles Woodson, 4935 Rock Creek Lane, Mission, Kansas.

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RADIO MAGAZINES. Buy, sell, trade. Bob Farmer, Plainview, Texas.

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FOR SALE OR TRADE: Globe King 500B original crate used very little, best offer. Collins 75A2 with R-42 speaker, best offer. Heavy duty 20pk beam 3el. with 20 ft. double boom 52ohm Omega match and 100 ft. coax all for $60. 3el. 10 meter Hy-lite beam $15. Metal cased 6 tube ac-dc radios with Hayden timing motors and 25c coin mechanism, $8. FOB. Copeland, W5RMK, Box 56, Whitis City, New Mexico.

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QSL's-SWL's samples 10c. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSL's Samples, dime. Print Shop, Corwith, Iowa.

QSL SAMPLES. Dime. refundable. Roy Gale, Waterford, Conn.

QUALITY QSL's. Samples, 10c Lee, W5CZA, Box 7171, Oklahoma City, Oklahoma.

QSL's, samples 10c. Gay Krenz, Fall Creek, Wis.

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56	57	58	59							

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[*from page 100*]

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EST	Fri. Oct. 25, 9:00 pm	Sun. Oct. 27, 9:00 pm
PST	Fri. Oct. 25, 6:00 pm	Sun. Oct. 27, 6:00 pm

CW

GMT	Sat. Nov. 30, 0200	Mon. Dec. 2, 0200
EST	Fri. Nov. 29, 9:00 pm	Sun. Dec. 1, 9:00 pm
PST	Fri. Nov. 29, 6:00 pm	Sun. Dec. 1, 6:00 pm

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calls indicates total number of YLs worked, gold or silver stickers having been issued for each additional 50 YL confirmations.

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W9NN (150)
W2OWL (200)
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W6EHA
W8VQD
W6KER
W6QGX
W4LAS
W7ULK (150)
W8SPU (150)
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W7VIU
W7MWR
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W6NAZ
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W8ZCV
W9KA
W2EEO
W7GLK
W6DXI (150)
W7TGG (200)
W7SFK
W1YNI (200)
W9RQF
W5UBW
W1VYH
K2DSW (150)
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WØOMM
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W1WPX
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W5VYW
W4AJV
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W3PVH
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W3URU/150
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W3DDV
WØUMO
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W1CEW
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W1VXC
W4CHK
W6YZU
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W8VRH
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W7WLX
K9CQF (150)
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K4CZP
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W4BWR (150)
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W4EJQ
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W1RLQ (150)
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W4IA
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33, Louisa, W5RZJ

TUBES

"TAB" TESTED — *Guaranteed* — OUR 12th YEAR IN BUSINESS

0A2	.80	5R4	1.00	6Y6	.89	810	10.00
0A3	.90	5U4	.59	6X4	3/$1	811	3.00
0B2	.72	5V4	.89	7C4	.69	812	3.00
0C3	.84	5Y3	.59	10Y	1.00	813	8.00
0D3	.80	6A7	1.00	12A6	.59	814	3.00
0Z4	.50	6A8	1.00	12AT7	.89	815	2.00
1B3	.78	6AB4	.59	12AU7	.69	826	2/$1
1L4	.82	6AC7	.79	12AX7	.79	828	8.00
1R4	.88	6AG5	.69	12SK7	.75	829B	8.00
1R5	.78	6AG7	.89	12SL7	.79	832A	5.00
1S4	.78	6AU6	.59	12SN7	.69	837	1.49
1S5	.68	6AJ5	1.00	12SQ7	.69	866A	1.20
SC22	20/$1	6AK5	.69	24G	2.00	954	10/$1
2C39A	11.00	6AK6	.69	25L6	.72	955	3/$1
2C40	7.00	6AL5	.59	25T	4.00	956	3/$1
2C43	8.00	6AQ5	.66	25Z5	.72	957	4/$1
2C46	5.00	6AS7	3.00	28D7	.80	958A	2/$1
2C51	3.00	6AT6	2/$1	35T	4.00	959	1.00
2D21	.68	6BA6	.59	50L6	.69	991	5/$1
2E22	2.00	6BA7	1.00	HK54	4.00	1619	4/$1
2E24	3.00	6BE6	.59	T55	9.00	1625	3/$1
2E25	7.00	6BG6	1.50	RK20	5.00	1626	3/$1
2E26	3.00	6BK7	1.00	RK38	4.00	1629	7/$1
2E30	2.00	6BQ7	1.00	RK47	3.00	1851	2.00
2V3	2/$1	6BZ7	1.25	H69	4.00	5654	1.00
2X2	2/$1	6C4	2/$1	75TL	15.00	5670	1.00
3A5	.68	6C5	.69	100T	6.00	6146	4.00
3C24	2.00	6CB6	.80	203A	2.00	6550	4.00
3E29	9.00	6CL6	1.10	211	.49	7193	20/$1
3Q4	.68	6H6	.59	233A	1.00	3APIA	6.50
3Q5	.86	6J4	1.72	250T	20.00	3BPI	1.90
3D23	5.00	6J5	.59	254	3/$1	3DPIA	6.80
4-65A	15.00	6J6	.59	388A	1.00	3EPI	1.00
4-125	32.00	6K8	1.00	434A	2.00	3KPI	7.00
4-250	35.00	6L6	1.00	450T	43.00	5API	2.95
4E27	7.00	6SA7	.69	717A	4/$1	5BP7A	25.00
4PR60	35.00	6SJ7	.69	801	4/$1	5CP1A	6.50
4X150	19.00	6SK7	.72	802	2.00	5FP4A	3.00
4X250	35.00	6SL7	.89	805	6.00	5JP1A	14.95
4X500	43.00	6SN7	2/$1	807	1.19	5JP1	8.95
5BP1	1.98	6U8	1.00	808	1.00	5JP7A	18.00
5BP4	1.98	6V6T	1.00	809	3.00	5LP7A	23.00

We Buy! Sell & Swap As Well!!!
Tubes! Tubes Wanted! Top $$$ Paid!

TRANSFORMERS: *PRIMARIES 115V, 60 cycles, 1Ø*

TYPE TPF51 RCA H'Sealed Pwr&Fil Transf 1200VCT @ 200 ma, 6.4V@8A. 5V@3A & 125V@200ma, 5H7L6*W H1Lo Pri. $6.95 ea., 2 for $12, 5 for $25
TP501 Pwr 24V @ 8A Tap @ 6.3V wgt 5 lbs. $5, 2 for $9
TPF52 Pwr & Fil 778VCT @ 200 ma. 5V @ 3A, 6.3 VCT @ 5A Uprt dbl shell $3.75 ea., 3 for $9
TPF53 Pwr & Fil. 270VCT @ 50 ma. 6.3V @ 2A ea. $2, 4/$7
TPF54 P & F 150V @ 30 ma. 6.3V @ 1A. $1.49, 3/$4
TP513 Mfd. for G/E. H'SEALED PWR UP TO 1250VCT@ 100ma has taps PRI & SECD. 8H7W5¼D/$81 acq. $12@
TP508 G.E./PRI/230V; SECD1550VCT&TAPS@167ma, CAN USE ON 115VINPT. SECD 1800VCT@200ma. $6@
TP509 GE/PRI/2200V; SECD 1088@320ma $5@
TP510 GE/PRI2220V; SECD 860VCT@525 ma $3@
CH1029 CHOKE 8HY@750ma/G.E. $12@
CH1030 CHOKE 6EY@1.25A/G.E. $18@
CH1031 CHOKE 0.6Hy@3.2A/G.E. $10@
CH1032 CHOKE 10Hy@350Ma/G.E. $5@
CH1033 CHOKE 2.5Hy@800MA/G.E. $7@
CH1034 CHOKE 5Ey@500Ma/G.E. $7@
CHOKE 8Hy@150ma/USN H'SLD $2@, 3 for $5.
CHOKE 20HY@75ma/$1.@; 1000Hys/5Ma/12KV $3.
RF INTERFERENCE FILTERS 10Amp/130VAC $1.49@
RF INTERFERENCE FILTERS 200Amp/130VAC $12@

FILAMENT TRANSFORMER 866A/2.5VCT/10A/7.5KV $2.98
866A Combination tubes Sockets & Fil Transf $5.89

SPECIAL CHOKE CH1001 desgnd W.E. 4 Hy. @ 450 ma @ 27 ohms H'Sealed E.V. Insul. Size: 4-9/32x3-7/16x4-13/16 10 lbs. SPECIAL $4 each, 3 for $10, 9 for $27

60mcs/85DB Gain IF STRIP W.E. Dsgn mfrd by MOTOROLA contains 8/6AK5 & 1/6AL5 Tubes $13@, Less Tubes $6@

USED ARC/5 274N EQUIPMENT SPECIALS!

BC457 As Is	$1.39	BC457/4 to 5.3 Tested	$3.95
BC458 As Is	$1.98	BC458/5.3 to 7 Tested	$4.95
AN-ARR2/RCVR As Is	$1.89	ARC5/T19/3 to 4 Tested	$6.89

Each "TAB" Kit Contains The Finest Selection

Kit 25 Precision Resistors
Kit 10 Switches
Kit 25 Knobs
Kit 75 Carbon Resistors*
Kit 36 Panel Lamps
Kit 10 Electrolytic Cond's
Kit 15 Volume Controls
Kit 25 Tube Sockets
Kit 50 Tubular Condensers
Kit 500 Lugs & Eyelets*
Kit 10 Bathtub Oil Cond's
Kit 5 lbs. Surprise Package
Kit 10 Transmit Mica Cond's
Kit Encapsulation Fluid

Kit 40 Ceramic Insulators
Kit 25 Power Resistors
Kit 65 Mica Condensers
Kit 5 Crystal Diodes
Kit 250 Ft. Hook Up Wire, Ass'td
Kit 100 Fuses Assorted
Kit 35 Ceramic Condensers
Kit 10 Rotary Switches
Kit 6 Piezo Xtals & Holders
Kit 60 Inductors & Coils
Kit 5 Microswitches
Kit 10 Wheat Lamps
Kit Glyptal cement & varnish

Order Ten Kits — *EACH*
We Ship Eleven!!! — *KIT ONLY . . .* **99c**

Every Kit Sold On "TAB" Money Back Guarantee!

WRITE FOR CATALOG

"TAB"

TERMS: Money Back Gtd. (cost of Mdse. only), $2 min. order F.O.B. N.Y.C. Add Shpg. charges or for C.O.D. 25% Dep. Tubes Gtd. via R-Exp. only. Prices shown are subject to change.

111CV Liberty St., N.Y. 6, N.Y., Rector 2-6245

For further information, check number 55 on page 126.

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LARGEST STOCKS: Get *everything* from our complete stocks of Ham gear and industrial electronic supplies—*all* the dependable lines.

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Send for the 1958 ALLIED Catalog. You'll want it handy always—to fill all your station needs—to bring you *everything* in Electronics at lowest, money-saving prices. The 404-page ALLIED Catalog features the largest and latest selection of receivers, transmitters, electron tubes, transistors, test instruments, money-saving KNIGHT-KITS, Hi-Fi systems and components, P.A. equipment, recorders, electronic parts, tools, books and specialized industrial electronic equipment. Save time, money and effort—fill *all* your electronic supply needs from your 1958 ALLIED Catalog.

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Send for our lists of top buys in reconditioned Ham gear. We trade BIG, so we always have on hand outstanding buys in fine reconditioned equipment. Ask for our lists.

Serving the Amateur for 37 years



ALLIED RADIO

100 N. Western Ave., Chicago 80, Illinois

For further information, check number 56 on page 126.

FINEST AMATEUR RECEIVER IN ITS PRICE CLASS



NC-109

BURTON BROWNE/New York

The accent is on value . . . with features found only in more expensive receivers.

The lowest-priced general coverage receiver available today with exclusive "Microtome" crystal filter, separate product detector for CW and SSB reception. Has big "S" meter. Covers 540 kc to 40 mc in four bands including broadcast band. Voice, CW or SSB. Features smart, new styling.

FEATURES:

- ★ Calibrated bandspread for 10, 11, 15, 20, 40 and 80 meter amateur bands. Separate tuning capacitors, knobs, and scales for general coverage and bandspread.
- ★ Large 12 inch indirectly-lighted lucite slide rule dial.
- ★ Adequate over-all selectivity with eleven miniature tubes including rectifier and voltage regulator.
- ★ Has exclusive "microtome" crystal filter providing five degrees of sharp selectivity in addition to normal bandwidth for voice, has sharp phasing notch over 60 db deep for interference rejection.
- ★ Separate product detector for excellent reception of CW and SSB Signals.
- ★ Has "S" meter on front panel for signal strength indication and more accurate tuning.
- ★ Accessory socket for external adaptors, and other accessory devices including phono input or crystal calibrator.
- ★ Has gang-tuned RF amplifier stage, two IF and two AF stages.
- ★ Has separate antenna trimmer and tone control on front panel.
- ★ Separate high frequency oscillator tube increases stability. Has ceramic oscillator coil forms and is temperature compensated for exceptional stability.
- ★ Separate RF and AF gain controls.
- ★ Series type automatic noise limiter.
- ★ Conelrad (CD) frequencies clearly marked on dial.
- ★ Mode selector switch for ANL, AM, CW, SSB and accessories.
- ★ Smartly designed two-tone cabinet.

COVERAGE:

BAND	GENERAL COVERAGE	BANDSPREAD
A	.54-1.6 mc	— —
B	1.6-4.7 mc	3.5-4.0 mc (80 meters)
C	4.7-15.0 mc	6.9-7.3 mc (40 meters)
D	14.0-40 mc	14-14.35 mc (20 meters)
		20.4-21.5 mc (15 meters)
		27-30 mc (10/11 meters)

TUNING SYSTEM: Separate general coverage and bandspread tuning capacitors connected in parallel on all bands. Bandspread, used primarily for tuning the amateur bands, can be used as a vernier for general coverage use. Antenna trimmer is on the front panel.

AUDIO SYSTEM: Two-stage audio amplifier with single 6AQ5 output tube provides 1.5 watts at less than 10% distortion. A handsomely styled accessory speaker is available. Output impedance 3.2 ohms. Has phone jack.

DRIFT: .01% or less.

SENSITIVITY: Under 1-2 microvolts (10 db signal/noise ratio).

SELECTIVITY: 6 Positions. Constant Gain.

	NORMAL	SHARP
6 db	5.2 kc	200 cycles
60 db	29.5 kc	10 kc

plus four additional intermediate degrees of sharpness.

CONTROLS: Main tuning; bandspread tuning; antenna trimmer; band selector switch; RF gain control; AC ON/OFF and AF gain control; stand-by switch; mode selector switch for ANL, AM, CW, SSB and ACC; tone control switch; BFO pitch control; selectivity control; phasing control.

TUBE COMPLEMENT:

RF Amp.	6BA6	AF Output	6AQ5
Freq. Conv.	6BE6	Rectifier	5Y3GT
HF Osc.	6C4	Voltage Regulator	0B2
1st IF Amp.	6BA6	Product detector	6BE6
2nd IF Amp.	6BA6	Det, AVC and ANL	6AL5

1st AF and BFO/S meter amp. 12AT7

OTHER SPECIFICATIONS:

Antenna Input: 50-300 ohms, balanced or unbalanced.
Size: 16 13/16" Wide x 10" High x 10⅞" Deep.
Finish: Handsome Two-tone gray wrinkle finish.
Shipping Weight: Approx. 35 lbs.
Optional Accessories: Matching Speaker, XTAL calibrator.

Only $19.95* down
Up to 20 months to pay at most Receiver Distributors.
*Suggested Price: $199.95**
**Prices slightly higher west of Rockies and outside U.S.A.

For further information, check number 2 on page 126.

Eight out of 10 U.S. Navy ships use National receivers

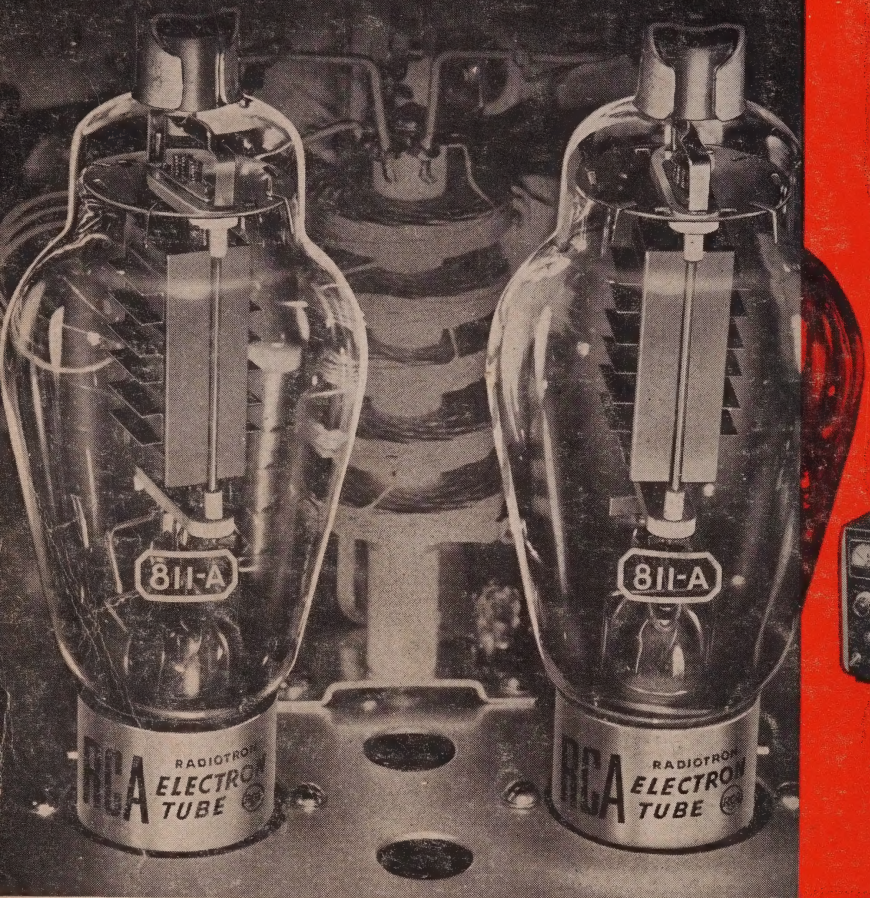
NC-109

tuned to tomorrow

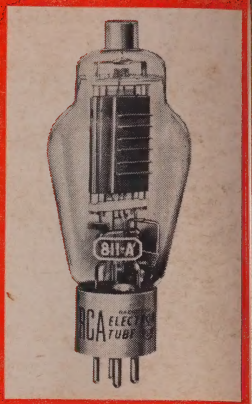
Since 1914 **National** NC® COMPANY, INC.,
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NEW VIKING "COURIER"

USES RCA-811-A's



Inside the Viking Courier—showing the RCA-811-A's "ready to go"



RCA-811-A—A high-perveance power triode. 260 watts input, CW; 260 watts, SSB; 175 watts, AM phone. For more data, write RCA Commercial Engineering, Sect. A Harrison, N. J.



The Viking Courier—Johnson's new bandswitching 500-watt linear amplifier

Designed "ahead" for the progressive amateur who wants a signal that carries authority, this Johnson high-power linear has what it takes. Two RCA-811-A power triodes deliver the rf punch.

Here are important reasons why designers specify the RCA-811-A: (1) The tube is a high-perveance type—delivers a whale of a lot of power at moderate plate voltages; (2) Its extremely high mu permits operation in class B SSB service with zero bias; (3) It delivers more watts of power for your "transmitter dollar."

Whether you buy or build, for best performance make sure the tube line-up in that rig is RCA. RCA high-perveance power triodes and beam power tubes are available at your RCA Tube Distributor —for every amateur power requirement. See him for the types you need.

For further information, check number 3 on page 126.

RCA

TUBES FOR AMATEURS

RADIO CORPORATION OF AMERICA

Electron Tube Division Harrison, N.J.