CQ

JANUARY, 1949

The Radio Amateurs' Journal

35¢



THIS MONTH

- Applications of the Grid-Dip Oscillator
- Permanent Rotary — Putting One Up to Stay
- Beginners' Converter for 6, 10-11 Meters

Published by RADIO MAGAZINES, INC. Subscription $3.00 a year

PUT YOURSELF ON YOUR CARRIER

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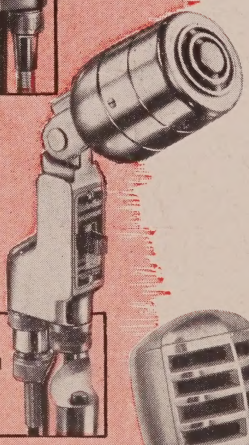
Transmit Your Own Personality

...with an E-V Microphone



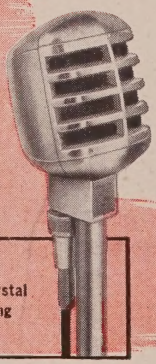
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***The* "630"**

Super dynamic. Long proved in service. Ideal frequency response. High output. Acoustalloy diaphragm.



***The* "910"**

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With an E-V microphone, you assure *accurate reproduction of your own speaking voice.* The shading and warmth of your speech arrive at the other end of the QSO undistorted and undiminished. *Your carrier is modulated with your exact speech* . . . the individuality of your voice is clearly retained . . . *your personality is on your carrier.*

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Q. In efficient rigs, what can you expect to find at the other end of the mike-cord?



A. A KEN-RAD 6SJ7 QUALITY-MADE TUBE!

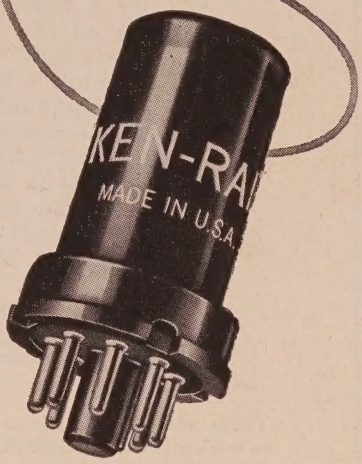
One goes with the other — your microphone and Type 6SJ7. Hams are alike in endorsing this pentode for audio-amplifier work, and experience has shown them how much Ken-Rad quality means to 6SJ7 performance.

Because of further amplification, the audio signal passed on by your 6SJ7 should be free from spurious effects. Here Ken-Rad superior design does a job by providing a filament that cuts "hum" 'way down. Also, Ken-Rad painstaking manufacture plays its part by building a tube with the least microphonic response.

Result for you...improved transmission; a clean signal to cut through the QRM!

The benefits of Ken-Rad better design, better manufacture, go beyond the 6SJ7. Throughout your rig, wherever superior tube performance will aid, it's the smart thing to *assure* this by plugging in Ken-Rad tubes of the types required.

Ask your distributor or dealer to tell you more about the high standards met in building tubes marked "Ken-Rad." Then check this full-measure worth against Ken-Rad moderate prices. These fine tubes — in performance, in value — are real ham bargains!

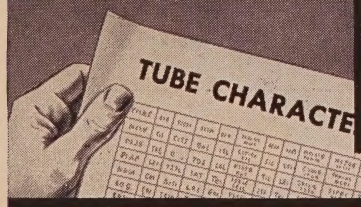


K KEN-RAD

6SJ7
SHARP-CUT-OFF DETECTOR-AMPLIFIER PENTODE

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182-HA25-8850



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PRODUCT OF GENERAL ELECTRIC COMPANY
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W 5 CNK SAYS . . . "Since installing the BUD VFO, 3213 contacts made on ten meters. 37 zones, 48 states. Less than 2% incomplete contacts. NOT ONE SINGLE REPORT OF SIGNAL DRIFT."

W 4 FNQ SAYS . . . "the BUD VFO is way ahead in stability . . . have been able to work consistently into Cuba, Bahamas and around the state . . . reports almost invariably T9X."

W 4 JIH SAYS . . . "I have owned and used a BUD VFO-21 since they came on the market with very good results . . . I would like to take this opportunity to congratulate you on the design of BUD equipment. I use your products throughout my rig and like them for the simplicity of design . . . Tnx for building equipment for the hams."

These unsolicited testimonials make us mighty proud of our VFO-21. Why shouldn't it be just as fine for you as for these hams and the many others who have written to us? This is your chance to buy a fine variable frequency oscillator at a low cost. The BUD VFO-21 is available at $52.50 net including a set of 40 meter coils. Coils for other bands available at $4.00 per set.



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In This Issue

COVER—An improved model of the Dipper compactly built into one small case. The a-c power supply and the grid meter are self-contained. The line cord is connected by means of a plug so it may be removed for substitution of a battery cable if desired. The "probe" coils are each protected by an insulated sleeve and the range of the instrument is 2 to 300 mc. The coil with the alligator clips, shown next to the Dipper, is an inductance "standard" used for measuring capacitors of from 5 μμf to .01 μf as described in "Applications of the Grid-Dip Oscillator." Construction of this model will be described in February *CQ*. —Photo by Sacco-Newman.

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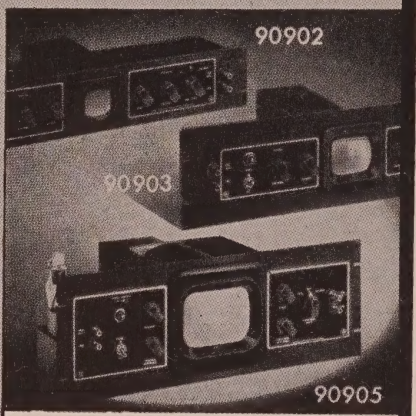
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The No. 90902, No. 90903 and No. 90905 Rack Panel Oscilloscopes, for two, three and five inch tubes, respectively, are inexpensive *basic units* comprising power supply, brilliancy and centering controls, safety features, magnetic shielding, switches, etc. As a transmitter monitor, no additional equipment or accessories are required. The well-known trapezoidal monitoring patterns are secured by feeding modulated carrier voltage from a pickup loop directly to vertical plates of the cathode ray tube and audio modulating voltage to horizontal plates. By the addition of such units as sweeps, pulse generators, amplifiers, servo sweeps, etc., all of which can be conveniently and neatly constructed on companion rack panels, the original basic 'scope unit may be expanded to serve any conceivable industrial or laboratory application.

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★ ★ Letters ★ ★

Amateur Radio for Public Service

Headquarters, 18th Fighter Wing,
Clark Air Force Base, APO 74

Editor, *CQ*:

As your publication is designed *for* amateur radio operators *about* amateur radio operators, I am taking this occasion to inform you of the outstanding service rendered by four amateur stations to the 18th Fighter Wing at Clark Air Force Base, Luzon, Philippine Islands.

Recently when four fighter aircraft were missing during bad weather on a navigational training flight to Formosa, these short-wave stations responded to the emergency by remaining on the job almost constantly for a period of four days to relay vitally needed local weather information to assist an extensive aerial search culminating in a difficult ground rescue operation.

The stations which served so unselfishly were: KA1AI, a 1,000-watt station operated at Clark Air Force Base by M/Sgt Stanley Gier of the Special Services Section for the benefit of military personnel; KA1CD, a private set owned by Major Hugh D. Avary, Chief of Prosthenics in the Dental Clinic at Clark Air Force Base; C3EA, operated near Taikao, Formosa, by Sgt/1st Cl. Al Hattlestad of the Army Advisory Group with Headquarters at Nanking, China; and J2NZI, operated by Captain Melvin R. Jones in Japan.

In view of the fact that there was no other source of weather information available in the vicinity of Formosa, Sgt/1st Cl. Hattlestad observed and reported weather conditions every hour on the hour in addition to reporting the progress of the search mission. Having no relief operator, he worked 18 hour stretches, sleeping three or four hours and returning to the air for another 18 hours throughout the emergency.

M/Sgt. Gier at KA1AI at Clark Air Force Base stayed by his radio board to receive messages from 1800 to 0800 and then Major Avary took over reception during the daytime hours.

Atmospheric conditions precluded direct contact with the Philippines, so that it was necessary to set up a system of relay through station J2NZI in Japan. Again there was no relief operator, and Capt. Jones stood by almost constantly for three days and nights to relay messages from Formosa to the Philippines.

I am sincerely appreciative of the cooperation my organization received from these men, and I wish to commend these amateur radio operators for their unselfish service in time of emergency.

Robert C. Oliver
Brigadier General, USAF,
Commanding

Single Sideband Forever

Rt. 1, Box 231A, San Mateo, Calif.

Editor, *CQ*:

In the November issue of *CQ*, W1BGJ objects to the efforts being made to bring the advantages of single-sideband transmission to the attention of amateurs. Similar objections have accompanied every attempt to improve the art, but always without success. The famous old cry, "Spark forever —THWCW" has its counterpart as each new development comes along. (*QSY to page 6*)



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PRs stand the gaff! Wherever you go you find these fine precision crystals doing their jobs with honor . . . meriting the praise of engineers, operators and technicians. Yes — you can depend on PR for perfect frequency control . . . at low cost . . . for all amateur, commercial and industrial services.

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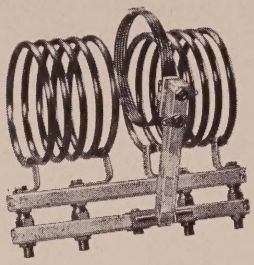
USE "PR" and KNOW where You Are!

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ON NEW

JOHNSON HAM INDUCTORS



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If it's efficiency you want, you'll insist on the new JOHNSON Ham Inductors. Coil windings are a wire size **larger** than on most available inductors — resulting in less heating, lower loss and consequently higher efficiency.

For instance, the 1000 watt twenty meter inductor, pictured above, is wound with .250" diameter copper tubing, not wire. It is intended to match low voltage high current tubes — efficiently! Extra heavy size steatite plug and jack bars insulated by clear polystyrene—not conventional plastic—also result in additional efficiency.

Only with JOHNSON Ham Inductors can you match coil to tube. Another exclusive feature is the matching of link to line with the new JOHNSON "plug-in" swinging link assembly. These outstanding inductors are also available in semi-fixed models.

Remember, too, that the new JOHNSON Inductors and Plug-In Link Assemblies fit all conventional inductor assemblies.

LOADED WITH FACTS



The new JOHNSON "Air Wound Ham Inductor Catalog" contains information and tables which will enable you to select the correct inductor, link or links for your individual application. The booklet is a virtual storehouse of information on Q considerations, tube-inductor matching, link-line impedance matching, antenna coupling, etc. Get it at your dealer or write JOHNSON for a copy of this important reference manual today. It's yours for the asking.

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E. F. JOHNSON CO. WASECA, MINN.

Because W1BGJ's objections are based on emotional grounds rather than on facts, they are fairly easily answered. He asks several questions:

Q: Is our present investment to be thrown in the waste can?

A: No, only the high-power modulator. File it alongside the rotary gap and the chemical rectifier. The portion of the power bill saved by not using the modulator and by not running the final amplifier wide open during every transmission will pay for the SS equipment.

Q: If SS is so potent, why don't the broadcast, short-wave phone, etc., stations use it?

A: Services that are being squeezed for kilocycles or must have maximum performance form their equipment *do* use it. Amateur radio has both these problems.

Q: Don't hams have enough trouble keeping ahead of the F.C.C., general public, etc. already?

A: Judging from the sound of the phone bands, the F.C.C. is well in the lead. We can close the gap by making more effective use of the space we have. SS does not enter into our relationships with the general public, except where it may help to reduce BCI complaints.

The letter in question closes with some sweeping statements to the effect that hams do not have the technical knowledge or money to get, among other things, a *receiver* that will work on SS. If I may be pardoned, I would like to use my own log book to shed some light on that subject.

My station has been operated spasmodically with SS in the 3.9 and 14.2-mc bands for the past six months. The peak power has varied between 200 watts and 1 kilowatt. During this period, 77 contacts have been made while using SS transmission. In all except two or three cases, contact was established "cold" without the aid of AM, FM or c.w. Twenty contacts were on 3.9 mc., the remainder on 14.2 mc. Four of the stations contacted were unable to copy the SS signal. Three more stations were only partially successful in copying the signal. One of the operators who reported "no copy" had removed the b.f.o. tube from his receiver before the war and could not locate it. The remaining 70 stations reported no difficulty in copying the SS signal after the first exchange of tuning instruction, where that was found necessary. There has been, therefore, a 91 per cent return in successful QSOs. *In no case were any of the stations contacted using any special receiving gadgets.*

An attempt has been made to keep a record of the types of receivers on which successful reception has been reported. Although the record is far from complete, it shows that good results have been obtained with the BC-312, BC-342, HRO, HQ-129, HQ-120, RME-69, RME-45, 75A, Super Pro, and NC-101X. It appears that, in the proper hands, almost any receiver will do a creditable job on an SS signal.

From the transmitting end, the results have been most satisfying. The most consistent report received has been on the apparent lack of QRM from AM and NBFM stations once the SS sig-

(*Continued on page 91*)



I Will Show You How to

LEARN RADIO

Servicing or Communications

by Practicing in Spare Time

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YOU PRACTICE RADIO SERVICING

You build this modern Radio as part of my Servicing Course. I send you the speaker, tubes, chassis, transformer, loop antenna, EVERYTHING you need to build this modern Radio Receiver. Use it to make many tests, get practical experience.

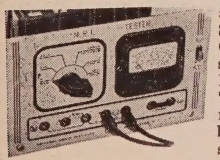


YOU PRACTICE RADIO COMMUNICATIONS

I send you parts to build this Transmitter as part of my new Communications Course. Conduct actual procedure demanded of Broadcast Station Operators, practice interesting experiments, learn how to put a transmitter on the air.

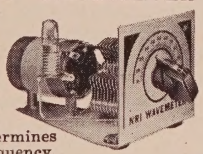
NEW

YOU BUILD THIS TESTER



as part of my Servicing Course. It soon helps you EARN EXTRA MONEY fixing neighbors' Radios in spare time.

BUILD THIS WAVEMETER



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Make Extra Money In Spare Time

As part of my Radio Servicing Course, I send EXTRA MONEY booklets starting the day you enroll. Make extra money fixing Radios in spare time while training. Then start your own Radio sales and service shop or get a good-pay job in Government, Police, Aviation or Marine Radio, Broadcasting, Public Address work, etc. Or think of amazing Television opportunities. Already manufacturers are producing over 100,000 sets a month. New stations going on the air everywhere! Television is America's fastest-growing industry and men who know it will be in demand.

Get Actual Lesson And Book Free

My DOUBLE FREE OFFER entitles you to actual SAMPLE LESSON and my 64-page book, "HOW TO BE A SUCCESS IN RADIO—TELEVISION—ELECTRONICS," both FREE. Mail coupon now. See how quickly, easily you can start. J. E. SMITH, President, Dept. 9AF7, National Radio Institute, Pioneer Home Study Radio School, Washington 9, D. C.

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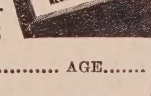
"Am Chief Engineer of Radio Station WORD in charge of 4 men. Owe all I know about Radio to NRI."—CLYDE J. BURDETTE, Spartanburg, South Carolina.

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"Now have two Radio shops servicing about 200 sets a month. Have largest service establishment in Southeastern Missouri."—ARLEY STUDYVIN, DeSoto, Mo.

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National Radio Institute, Washington 9, D.C.

Mail me FREE Lesson and 64-page book. (No salesman will call. Please write plainly.)

NAME..... AGE.....

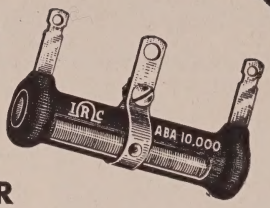
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Feenix, Ariz.
AIR MALE SPESHUL

Deer Hon. Ed:

Golly oh gollies I are hoping that I are in times to catching next editions of your magazines before it are being pressed so Scratchi are ables to getting an ad in your Classifried Ads colyum. So if you are not too busy filling out QSL cards please rushing following ad right down to printer. Here are copy:

> LOST—ONE SIDEBAND of 20 meter single-sideband transmitter. When last seen sideband are in vicinity of 14,220 kc. Sideband badly needed on acct. transmitter now are having no carrier and no sidebands. Anybuddys finding same please contacting post hasty Scratchi, Box 73, CQ Magazines.

Scratchi are not knowing what are happening, but I are now having 1/c transmitter that are not being much good. Inasmuch as SSB transmitter are being without much carrier, and only having one sideband, when one sideband are missing Scratchi are not having much left. I can be talking like sixty into mike and I are getting nothnig but weak tonsils.

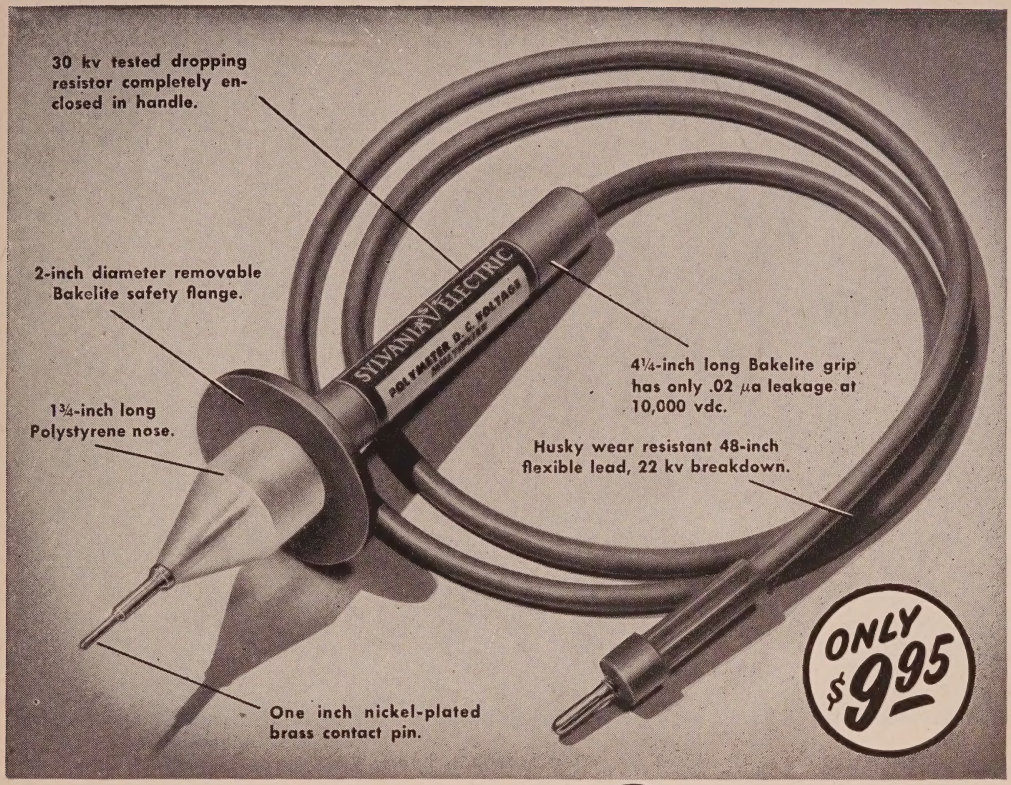
This are all comings about when my XYL-to-be are telling me to get modern rigs and toss out my old stuff. Lil are interested in using rig, and I are figuring Scratchi are being smart if are following her advice. I are reading all articles on single-sideband and are deciding it are for me. However, it not being duck soupy to understand same, Scratchi are in quandry.

One day are moving frequency of old transmitter out of dx end of band and coming up in legal part of band. I are heering some feller back east who are using SSB, so I are getting in contact with him and asking all kinds questions. He are being smart cookies, I guess, as he are not answering my foolish questions, but he are giving me complete talking-to on single-sideband. I are even finding that I can receive his SSB signals on my regular receiver.

Gollies gee, Hon. Ed., he ar able to changing from single-sideband to AM to narrow-band FM in nothing flat, like gal in French bathing suit disrobing. This are really convincing me, so I are asking how I can building same rig, and so this feller are sending me complete circuit diagram.

After a cupple of weeks of feverish activity, and with help of Brother Itchi, I are getting rig all finished and tuned up. My oscillyscope that I had bought on surplus market are proving reel peachy as I can seeing the various waveforms

(*Continued on page 90*)



NOW! USE THIS DC VOLTAGE MULTIPLIER WITH YOUR SYLVANIA POLYMETER AND YOU HAVE A KILOVOLTMETER!

Now you can extend the dc range of your Sylvania Poly (Multi-Purpose) Meter to 10,000 volts! To convert your Polymeter to this high voltage class, merely replace your present low voltage probe with the new Sylvania DC Voltage Multiplier, and Polymeter ranges will be multiplied by 10!

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This accessory extends your Polymeter applications to: Television Circuits, Transmitter Plate Voltages, Experimental Power Supplies, Industrial Electronic Equipment, Electronic Photographic Equipment, and other high dc voltage applications. Economically priced at only $9.95! See your Sylvania dealer today. Sylvania Electric Products Inc., Emporium, Pa.



Poly (Multi-Purpose) Meter

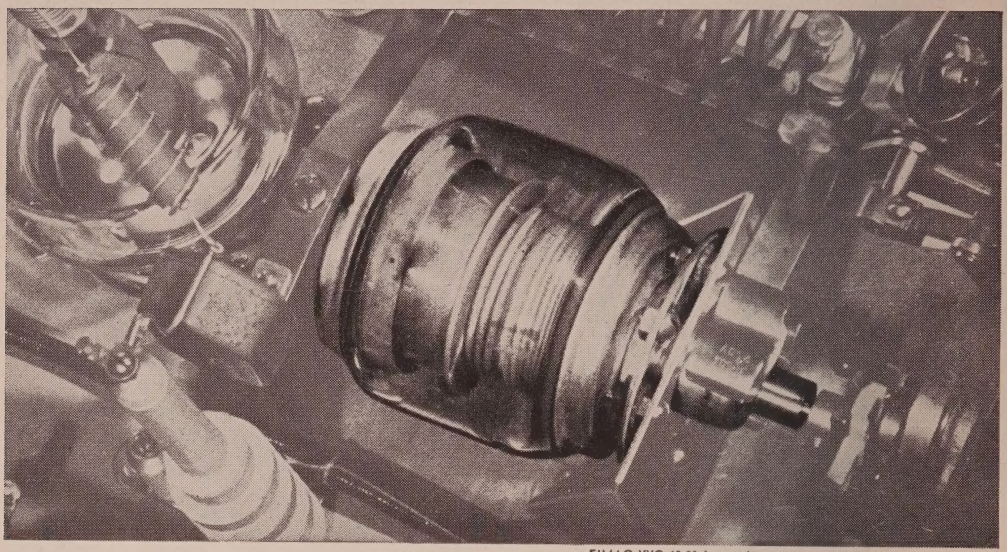
This Sylvania instrument (Model 134Z), provides in one unit the means of making a multitude of electrical measurements and tests. Electrical values measured include audio, ac and rf voltages (up to 300 mc); dc voltages from 0.1 to 1,000; direct current from 0.1 milliampere to 10 amperes; resistance from ½ ohm to 1,000 megohms.

SYLVANIA ELECTRIC

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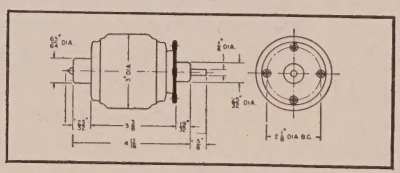
ESSENTIAL IN MODERN CIRCUITRY



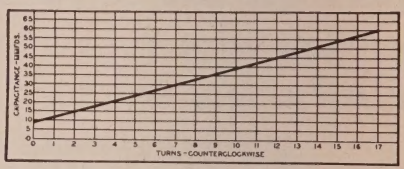
EIMAC VVC 60-20 in an ultra-compact 4-250A 1 KW Amplifier.

Consider the advantages . . . and Eimac Variable Vacuum Capacitors become the essential component in modern circuitry.

- Extremely compact size reduces equipment bulk. Type VVC 60-20 is less than one-sixth the size of air-dielectric capacitors with similar ratings.



- Structural rigidity eliminates electro-mechanical vibration.
- Low-torque tuning mechanism.
- Unaffected by dusty or humid atmospheres. Ideal for industrial application.
- Capacitance variation is linear with shaft rotation.



- Low temperature coefficient. Negligible change in capacitance due to temperature variance. (.004 mmfd. per degree cent.)

Eimac variable vacuum capacitors are immediately available. In addition to the type VVC 60-20 illustrated here, there are types VVC2 60-20 and VVC4 60-20.

GENERAL CHARACTERISTICS

	Capacity	R-F Peak Voltage	Maximum RMS Current
VVC 60-20	10-60 mmf.	20-KV	40 amp.
VVC2-60-20			
Parallel	20-120 mmf.	20-KV	80 amp.
Split-stator	5-30 mmf.	40-KV	40 amp.
VVC4-60-20			
Parallel	40-240 mmf.	20-KV	160 amp.
Split-stator	10-60 mmf.	40-KV	80 amp.

EITEL-McCULLOUGH, INC.

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ZERO BIAS

EDITORIAL

CQ's World-Wide DX Contest

WE DON'T LIKE to blow our own horn any more than most people like to listen to braggarts. But with pardonable pride we'd like to tell you just a little about *CQ*'s first World-Wide DX Contest. The DX fans will get more details in the DX column. But we want the non-DXers to also know about this event.

Six months ago, after deliberation consuming many hours, *CQ*'s DX Committee (W6QD, W6ENV, W6SA and W6DI) decided the time was ripe to hold a truly international DX competition. Meetings were held with prominent DX men throughout the country, and outstanding DXers abroad were consulted. Rules and regulations were hashed over for several months. In order to devise a plan that would be fair to foreign operators it would naturally work a hardship on Ws, for the simple reason that the sole object of other big American-sponsored contests has been to see which DX station could *contact the most Americans*. In a demonstration of cooperation and goodwill (particularly rare in this day where self-interest seems to be the motivating force behind most decisions) rules were agreed upon which favored no one country—and the result of this international fairness placed a definite handicap on Americans. No longer would Ws be the object of all the attention from DX in a DX contest. The strategy was to lure out more and better DX—to give everyone a good time.

From the time of the first announcement in August *CQ*, through the wide foreign circulation of *CQ*, through the cooperation of most of the radio societies of the world, and through the cooperation of amateurs who passed on the rules and regulations to isolated DX stations, the word was spread. Propagation conditions for the phone week-end were only fair, for the c-w week-end they were superb. To say the contest was a success is putting it mildly. It was worthy of all the adjectives Hollywood reserves for its multi-million-dollar spectacles. The logs have been pouring in for several weeks now, logs from Somalia, Tristan da Cunha, Gambia, Macau, Formosa, Siberia—from pole to pole (actually, not just literally, for competing were VP8AM in Antartica and VE8s sitting at the other end of the world).

We're just five years old with this issue of *CQ*, but if entries from over 100 countries in our first contest is any indication, *CQ* gets around.

How Not to Lick TVI

Repeatedly the editorials in *CQ* have discussed TVI in all its phases. Just two months ago, on a very optimistic note, we reported some of the excellent progress that has been made in not only reducing TVI, but in improving public relations. Our own experience had indicated this trend, and we passed it on to our readers. We may be correct in talking for one small New York community—but the violent reaction of readers everywhere else underscores the deterioration of the general situation, not the improvement.

What is happening? We can tell you in a very few words. The hams are quitting, giving up, closing down—and without a fight! We don't mean "fight" neighbors. We never implied that course of action was wise. When we say "fight" we mean make every effort with the tools on hand to lick the problem technically. Fight if necessary any unscrupulous servicemen, any trouble maker in the community who points his finger at the amateur with complete disregard for the truth, even the occasional amateur who says the "h" with everyone except himself. Why the plain unvarnished truth is that most amateurs are going off the air in TV serviced communities without making even a serious attempt to apply the most basic remedies to their transmitters. And many of them have taken this defeatist view because of the discouraging results a few of their fellow hams may have had, or the completely intolerant, uncompromising attitude of most neighbors.

Let's stop and take stock for a moment. At a recent hamfest we attended where there were close to 700 New York and New Jersey amateurs present, an A.R.R.L. official made an appeal to the boys to stay on the air. Deserting the bands in droves, he pointed out, was the worst possible approach to TVI—it places the ham in an even weaker position than he is already. He spoke well and made his point extremely strong. Yet when he finished the MC got up and, with a condescending nod to this official, said it's all very well to talk about not going off the air, but . . .

But what? Here is a typical letter from an amateur in Detroit.

24915 Fairmont, Dearborn, Mich.

Editor, CQ:

A year ago when we read of TVI troubles of the boys on the Eastern Seaboard, our reactions were that it was too bad—but remote. As you know, the expansion of television has been rapid. Predictions within the industry are that by 1952 they will have better than 50 per cent coverage of the country.

Television in this area has resulted in a marked reduction of amateur radio activity. Although the average amateur already has quite a large investment in equipment, he has always been eager to yield to the influence of magazines and advertisers for newer and better equipment. But now he is reluctant to add to his investment until assured of his position with reference to TV.

Mention of your new TVI elimination handbook was news. I hope it provides commercial corrective approaches and does not rely entirely

(*Continued on page* 86)



Left to right: Collins 75A-1 receiver, 310A-3 exciter with speaker above, 30K-1 transmitter

Sitting Pretty

● The owner of a group like this has the best performing half-kilowatt outfit money can buy.

Operating in the 80, 40, 20, 15, 11 or 10 meter bands, he can run 500 watts of stable c-w, or 375 watts of clean, intelligible phone into his PA amplifier. He has bandswitching in all transmitting circuits except the antenna tuning network, where one plug-in coil covers 80 and 40 meters, and another covers 20, 15, 11 and 10. He has very accurate Collins PTO control right on his desk, in the 310A-3 exciter.

It is often said that you can spot a Collins 30K-1 transmitter on phone as soon as you hear it, and that it seems to have more sock than its rated power. One reason is well engineered speech clipping, which permits running the audio gain at high level, with 100% modulation. Another reason is found in good audio design and fine components, providing remarkable clarity of voice transmission.

Add the sensitivity, stability and tuning accuracy of the 75A-1 receiver, and you have the ideal combination, whether for DX or maintaining schedules.

Get in touch with your Collins dealer. If you do not know him, we will be glad to give you his name and address.

FOR SUCCESS IN AMATEUR RADIO, IT'S . . .

COLLINS

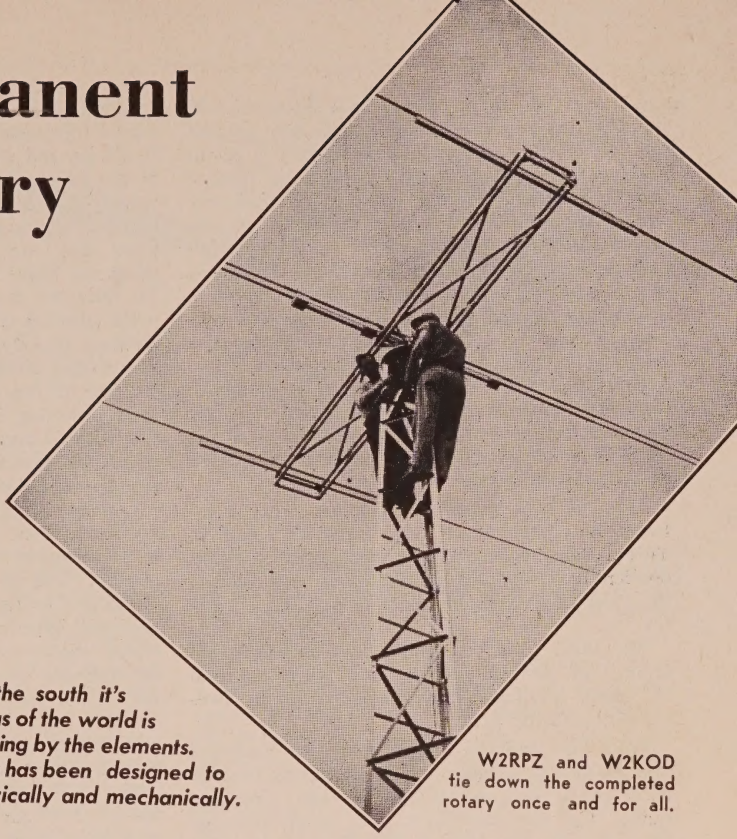
COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, New York 18, New York

458 South Spring Street, Los Angeles 13, California

A Permanent Rotary

LAWRENCE LeKASHMAN
W2IOP*



W2RPZ and W2KOD tie down the completed rotary once and for all.

In the north it's snow and ice, in the south it's frequent high winds. In few areas of the world is any antenna immune from buffeting by the elements. Here is a compact rotary that has been designed to give top-notch efficiency electrically and mechanically.

SOMETHING NEW in rotaries? Not at all—it's a very ordinary three-element close-spaced 14-mc rotary. But this beam is worth a story because it shows how simple the construction and adjustment of a parasitic array can be.

Like many amateurs, because of the tremendous amount of antenna literature available, the author was confused by the myriad ideas presented. Every system had something in its favor. To decide which design should be used we prepared a balance sheet, not unlike one you might use in working on a family budget. The items to be covered were not many—minimum over-all size (both spacing and element length), maximum physical strength, and great physical durability.

Minimum physical size dictated a close-spaced array. Initial reflections ran the gamut from our tiny 144-mc vertical dipole to W2GWE's 4-element 14-mc rotary, and then to some of the commercial arrays we had inspected at Rocky Point. Sober thought, rough measurements of our lot, and a careful inspection determined that the over-all boom length should be held to approximately 14 feet if we were to have an installation that was not out of proportion to its surroundings.

Because some of our friends swear by arrays with all elements driven, and others are sold on parasitic beams, we next turned our attention to the pros and cons of the two arrangements. A careful perusal of the amateur literature disclosed contradictory and inconclusive information although much of it was undeniably excellent. Discussions with the proponents of each type only served to muddle the question even more. We talked to our experts and such phrases as "mutual and self-impedance," "electric intensity at a point in the far field," "induction field," "image antenna a distance *d* under the ground," etc., left us rather numb. But we did manage from this discussion to obtain references to several excellent articles on the subject in the radio engineering literature.[1, 2, 3, 4] We must confess that we skimmed through quite a bit of these references, but were successful in obtaining the information we were seeking from graphs found in the references.

From Brown's classic article[1] we marked down in our ledger that the theoretical gain of a single-section two-element driven array with the elements spaced .125 wavelength excited 180° out of phase is 1.65 in field strength or 2.72 in power (field strength squared = power). In db this represents

*Managing Editor, CQ.

1 G. R. Brown, "Directional Antennas," *Proceedings of the I.R.E.*, Jan. 1937.

2 J.D. Kraus, "Antenna Arrays with Closely Spaced Elements," *Proceedings of the I.R.E.*, Feb. 1940.

3 Ronald King, "The Field of a Dipole with a Tuned Parasite at Constant Power," *Proceedings of the I.R.E.*, July 1948.

4 "Transmission Lines, Antennas and Wave Guides," King, Nimno and Wiley, McGraw Hill.

a gain over the reference half-wave dipole of 4.36 db. We noted that with .05 wavelength spacing and 170° phase shift the calculated gain is 1.9 in field strength (5.6 db) but knew of no method for obtaining the required phasing and equal current relationship. From the same paper we observed that with 90° phasing the field strength gain is 1.41 (power gain of 2 or 3 db). We noted that a quadiature phase relationship and quarter-wavelength spacing provides a unidirectional pattern, whereas the 180° phasing furnishes the conventional bidirectional figure eight pattern.

However, we were more impressed by the figure references showing the performance of a single driven element and one parasitic element; a theoretical gain of 5.6 db with a drive impedance of 14 ohms looked good.

From Kraus's paper[2] we obtained further information on the driven array using 180° phasing. This author has taken into account the practical problem of losses and his figures show a gain of the order of 3.75 db for the famous 8JK type array.

The third paper[3] is quite comprehensive, and from it we obtained data on the effect of the ratio of length to diameter on the behavior of two-element parasitic arrays.

From our study of the literature we concluded that the driven arrangement is inherently broader band, and it will operate over a wider frequency range. On the other hand, the combination of superior gain and high front-to-back ratio is an advantage of the parasitic array. If we could be content to stick to one frequency on 14 mc for both receiving and transmitting we would have decided on a two-element parasitic array carefully tuned for optimum front-to-back ratio on the operating frequency. Because we classify high front-to-back ratio as a "must" we finally determined that ours would be a 3-element parasitic array using one-tenth wave spacing.

Since the bulk of our operating is on c.w., we wanted optimum performance between 14,000 and 14,150 kc, and we estimated from the values given in the references that the feed point impedance would have a resistive term somewhere between 8 and 20 ohms, and a reactive term of reasonably small but, we must confess, unknown value when the beam was excited from 14 to 14.4 mc. To raise the center impedance of the beam to a point where it could be fed directly with plentiful coax, a folded dipole was used as the radiator. The folded dipole gave us an effective center impedance of four times the nominal center impedance, resulting in a substantially flat line when fed with 50-ohm coax. Thus 7-foot spacing between reflector and director and the radiating element was automatically fixed.

Element length could not be compromised. We are firm in our belief that shortening, no matter by what means, should be done only as a last expedient. The extremely low radiation resistance should not be further reduced by center loading of shortened elements. By standard formula[5] the element lengths were determined for 14,050 kc. For the reflector it was 35', for the dipole radiator 33' 4", and for the director 31' 6".

There essentially you have the ingredients of our very effective beam. Simple—and you'd hardly expect another word of explanation as being necessary. But there are bound to be questions in the mind of any ham putting up a beam for the first time. How do I tune it? Suppose it doesn't load? What about the standing wave ratio? How long will it take to WAZ?

Tuning, Loading, SWR

Questions like those are duck soup for the non-expert. He can get his array to work and never worry why. We had the advice of plenty of ex-

5 Reflector=492/fmc
Radiator=492/fmc x 95%
Director=492/fmc x 90%

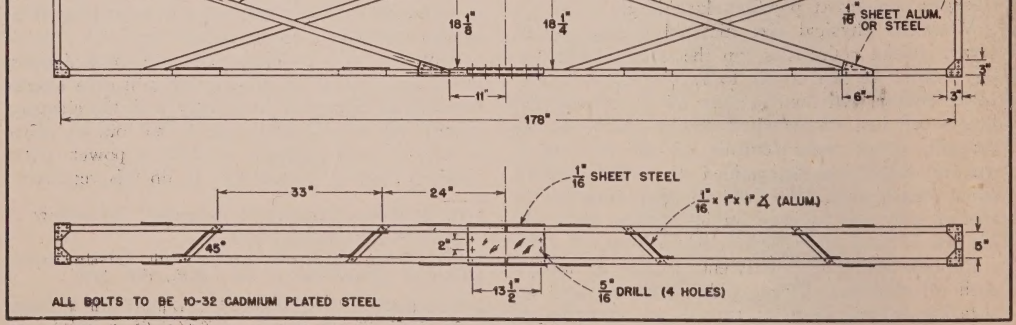


Fig. 1. Mechanical drawing of the boom. The two 7' halves comprising the boom are fastened to the sheet steel center plate by six 10-32 cadimum plated 1¾" steel bolts both top and bottom. The bolts are locked in with lock washers and locking nuts. Variations of the dimensions given may be required for different types of rotators.

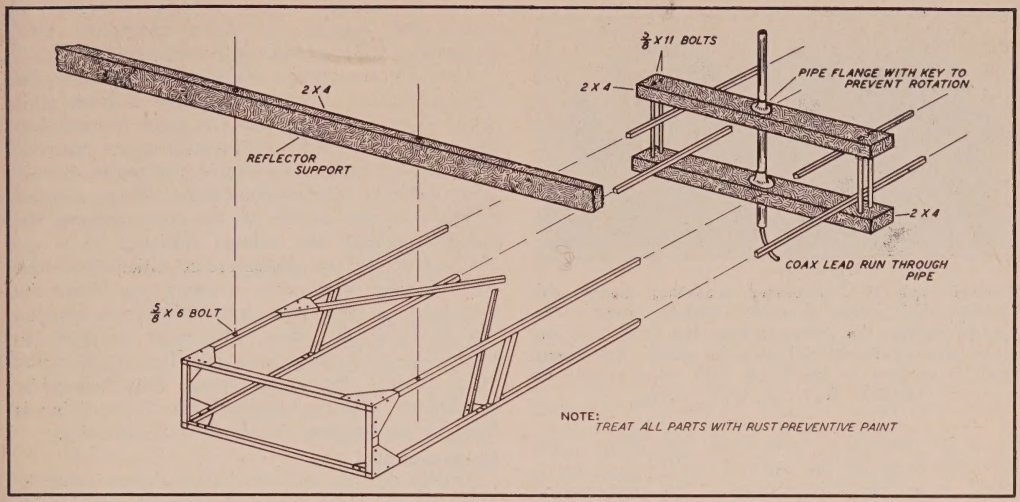


Fig. 2. End detail of the boom is shown in this perspective. Also illustrated is a simple adapter for securing a second beam to the same boom. It is recommended that if a second beam is used it be placed at right angles to the 14-mc unit. The over-all size of the 2 x 4 element support will be dictated by the type element used as explained in the text.

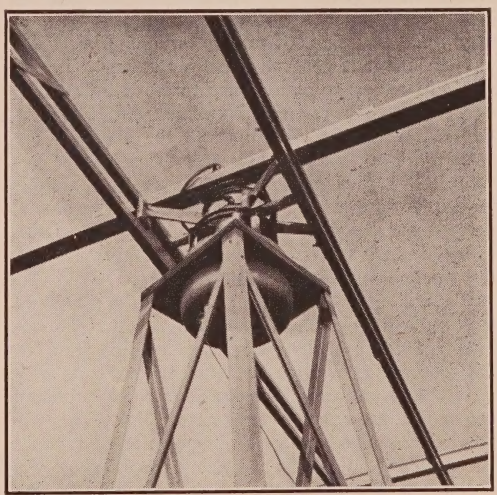
perts and finally had to take our pick as to which answer best suited our purposes. We didn't tune the beam—well, that is, not exactly. The completed beam was put up and checked out. Performance was excellent. It was then deliberately detuned and retuned employing a field strength meter under fairly good conditions. The final beam adjustments agreed so closely with the original "calculations" that our advice is don't readjust the finished beam.

Radical changes as indicated by a field strength meter after a beam has been put up do not necessarily prove anything. They might prove that surrounding objects have various degrees of reflection. They might prove that the level (height) of the measuring instrument was too different from the beam. But unless the beam is completely in the clear and the field strength meter equally so, the measurements may lead more to grief than to glory. We know that this advice will lead to considerable controversy. We can only advise others on the strength of personal experience.

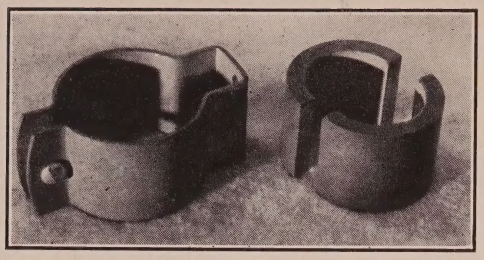
Standing wave ratio and beam loading can be lumped under the same department of misinformation. High amplitude standing waves, if you have them on the feed line, are bad. But frequently not even your best friend can tell you whether you do or don't have them. Measuring SWR on coax is a tough proposition without a slotted line, or similar device. The SWR on this beam is certainly tolerably low. You can accept that figure or question it, but you can't measure it without the elaborate gear.

Now your beam may not load when you first couple the rig to it. You can readily make it load by placing in series a small variable condenser in the shield side of the coax at the pick-up link, tuning until you get the beam loaded, or you can deliberately leave the coax feed line long and trim it until maximum loading occurs at the center frequency you want. Drop those eyebrows, brother—this is definitely not an indication of a high standing wave ratio. On the contrary, it has nothing to do with the SWR. It can be compared to tuning a Zepp feeder. You have tuned out the reactance of the line and pick-up link by either the series condenser or the pruning. And watch yourself on that pruning; a few inches at a time will do the job.

Let us dwell on this standing wave problem.



The spider top of the rotator secures to the steel center plate of the boom with eight 5/16" bolts. This particular installation was a 28-mc beam which omitted the cross braces. A coax matching section is wound around the rotator.



Premax type 10-C insulated mounting clamp with special 1¼" inside diameter Mykroy insert. The insert insulates the elements from the boom and any good dielectric material may be used. The clamp itself is secured to the boom with wood screws, no smaller than No. 10 ¾" long.

It is not generally appreciated that even if the resistive term of the antenna feed impedance is equal to the surge impedance of the transmission line, the SWR will be unity only if the reactive term is zero. For example, if the transmission line is 50-ohm coax, if the antenna impedance at the feed point is 50-ohm resistive and zero ohms reactive (radiator exactly the correct length) the SWR is unity. If, on the other hand, the antenna impedance is complex, comprised of a 50-ohm resistive term and a 50-ohm reactive term, it may be shown that for the particular example the SWR is 2.6.[4]

Consider an antenna being driven by a transmission line which electrically is exactly an integral multiple of a half-wavelength long. The impedance at the transmitter end is exactly the antenna impedance. Because the SWR is almost never—practically speaking is never—unity, as we reduce the length of the transmission line, inch by inch, the impedance at the transmitter varies in magnitude and sign. Thus, by pruning the transmission line it is generally possible to find a length that will either present a pure resistive impedance, or will present a resistive impedance plus a capacitive reactance that will tune out the inductive reactance of the pick-up link and the inductive reactance of the changeover relay if used. In a similar manner the series condenser may be employed to resonate the link (and relay lead) inductance in conjunction with the happenstance reactance of the random length transmission line.

It's not new, but while telling this story we might mention how we treat the antenna changeover problem so that the beam can be used on the receiver as well as the transmitter. It is possible to use any relay for coax switching provided you mount the relay directly at the link. This offers a minimum change in impedance and you'll be surprised how little it affects the loading. As a test try clipping the coax directly to the link and then to the link through the closely mounted relay. The change in loading should be negligible. Keep common on the relay the grounds and the center conductors. You can use a single-pole double-throw relay, switching just the center conductor and leaving the outer conductors (the grounded braid) permanently tied together.

Amateurs are always asking about unbalance in the transmission line when feeding a beam with coax. It is important that the coax transmission line leave the beam at right angles to the plane of the beam for at least one half wavelength. Parallelism between coax line and beam induces antenna currents on the outside of the coax, distorts the radiation pattern and reduces efficiency.

It is true that an unbalanced condition does exist when feeding with coax—however, on 14 mc the magnitude is completely infinitesimal. A bazooka can be made for those who want to prove to themselves that they have put the last fraction of a db into desired radiation. Interchangeably, a trombone balancing section[6] may be used but is likewise unnecessary on the low frequencies.

Mechanical Gain

Electrically you can see that the beam is simple. Mechanically there can be almost as many possible ways of doing a job as there are individuals who want to put up such a beam. We wanted great strength without an offensive looking structure. While we had no particular objection to using guy wires on the boom, for appearance sake their elimination would be desirable.

Again, having many friends versatile in many fields proved a great advantage. W2VHS, who has a great reputation locally for his handiwork, was consulted and undertook a cooperative building program to turn out a boom. We supplied all of the moral support—Joe did all the work. The result is a handsome and extremely rugged boom. Details of the construction are shown in *Fig. 1.* This boom was designed specifically to go with a Gordon Rotomount. Were a different type rotator employed, some alteration in dimensions might be desirable. For example, the width might be increased or made smaller.

The material used to construct the boom is 1⅛" square aluminum with a ⅛" thick wall. This is standard stock available from any metal supply house. Gusset plates and the center support plates were made from steel sheet ⅛" thick. If we were doing the job over again we would have used aluminum sheet rather than the steel. It is important to avoid contact of dissimilar metal to aluminum on out-of-door installations because of electrolysis. In our installation profuse painting retards electrochemical action.

From the detail of the center support it can be seen where it is necessary to have available a brake to make the right angle bend. If no local shop has this bending tool (and generally an automobile body repair shop, metalsmith, etc., will have one) then the piece may be constructed by clamping the metal between two pieces of ¾ to 1-inch board or ⅜" cold rolled steel to a work bench, allowing sufficient metal for flanges to protrude beyond boards or steel—and gradually bend the flange by striking the metal with a block of wood

6 Bach, "The Trombone T", *CQ*, March-April, 1947.

until a smooth square right angle is obtained. Bolts can be used, but for the added strength, welding is recommended. It is well to keep in mind if using bolts, to insure that they do not weaken stress points under load. Where practicable, place them in a vertical position. Where this cannot be done, don't fail to use reinforcing strips of aluminum, or a large washer under the head and nut of all horizontal bolts. The brace numbers labeled *A* are bent from 1 x 1 aluminum angle. The degree of their pitch is not critical, although we used a 45° slant.

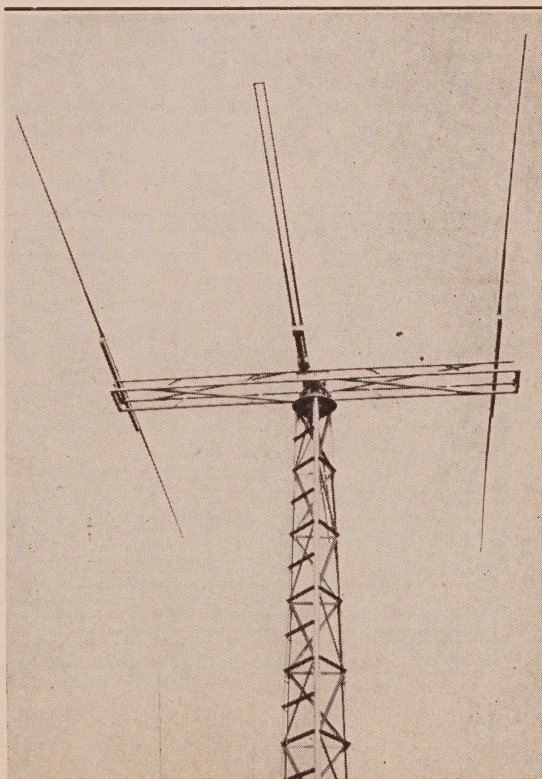
Make liberal use of zinc chromate compound or red or white lead on all bolts before installation. When the beam is completely assembled, metal parts other than the aluminum should likewise be painted with a rust protective paint. Over this should be used a good grade of aluminum paint. The aluminum itself, of course, won't rust, but the steel gusset plates (if used instead of aluminum) and steel center support will, if not adequately protected. For instance, for assembly hardware we used zinc plated steel. But the plating proved very inadequate and they soon started to rust. So paint on all the hardware is a must. For hams located in particularly damp or salty climates even the aluminum should be painted. Special aluminum protective paint is available, as are the other rust preventive paints, at any large hardware or paint store.

The support for the elements is dictated by the elements themselves. On one of the beams patterned after this one, Premax corrugated steel elements are used. They require greater support than aluminum and the cross boom consisted of 8′ lengths of 2 x 4. Each 2 x 4 is mounted on edge, a bolt passing through it and the top member of the aluminum boom. Since it is necessary, or at least desirable to countersink the bolt head, when the final installation is made the hole should be filled with plastic wood. Otherwise water, etc., will collect at this point possibly weakening the wood unnecessarily.

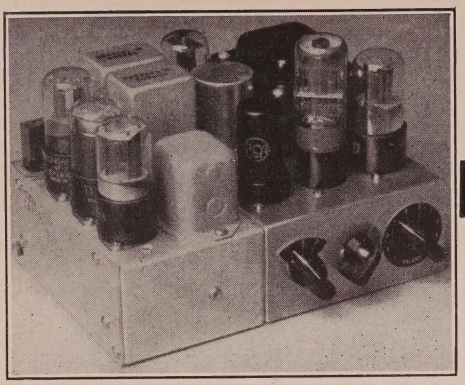
For aluminum elements the wooden cross pieces can be smaller. In the beam illustrated they are Workshop 20-meter tapered elements. The support structure for them measures 6′ over-all. There is no noticable sag in even the longest element. The folded dipole is mounted horizontally; that is, the two elements comprising it are side by side. This reduces the mounting problem, and in no way affects the efficiency of the beam. These elements want to be as close together as practical, in our case 4 inches center-to-center. Blocks bolted to the main support hold the folded dipole. In our experience with beams the Premax hose-type clamp proved extremely effective; it is light, economical, as well as strong. Unfortunately the inserts available from Premax fit only their corrugated steel elements. Therefore, if Premax clamps are used with another manufacturer's elements, Workshop in this instance, a substitute insert must be made. In looking around for a suitable material we hit upon Mykroy, an excellent dielectric material equal to the steatites, but with the property of being easily tooled. Round stock was obtained and drilled carefully using slow speed drills and water for lubrication. The result was a Mykroy insert as shown in the photo. Since all the clamps are secured on the 1¼″ portion of the elements, only one size was required. Other materials could be used, a good grade of bakelite coated with Polystyrene dope, etc. O. D. of the stock is 1½″.

The balance of the job is simple. You put the beam together, get a careful and husky crew of local hams together and drag it up to the top of the tower. A light duty block and fall is very handy. For connections to the folded dipole we soldered lugs on the coax on the ground and then made a mechanical connection to bolts provided on the elements for that purpose. These connections were then coated liberally with Amphenol polystyrene cement.

The finished product is a handsome structure. Even disinterested neighbors have been forced to admire its very utilitarian beauty. More important, DX stations who can't even visualize it have attested to its potency. Rugged and effective—that's what your beam will be if you duplicate this job.



General construction details are shown in this end view. The elements were off-set on the boom because the top of the rotator protruded at exact center. This unbalance was compensated for by placing the shortest element (director) farthest out on the boom. The ends of the folded dipole are strapped together with an aluminum band that is tapped and screwed into the elements.



Controls on the auxiliary chassis are, left to right: power control and function switch, harmonic peaking amplifier, and audio amplifier gain control.

Frequency Standard

A. W. HORST, W9CUX*

THE M.C.W.-C.F.I. unit is a compact little combination audio oscillator and crystal controlled secondary frequency standard that was incorporated in the popular AN/ART-13 transmitter. A number of war surplus stores have offered these sub-assemblies as a separate item both with and without the 200-kc crystal. Crystals seem to be rather scarce but are available in some stores a modest investment.

For a small cash outlay plus a moderate amount of conversion, you may own an excellent secondary frequency standard. Briefly, the converted unit performs the following useful functions:

1. Serves as a precision frequency standard which provides an S9+ signal on your receiver dial at every multiple of 50 kc from 50 kc to about 20 mc and S7 through 30 mc. Maximum error *without warm-up* is in the order of a few cycles at 1000 kc. This signal may also be modulated by the 1000 cycle audio oscillator contained in the C.F.I. unit in order to identify it in the presence of other signals.

2. Provides visual or aural indication of zero beat between any of the 50-kc harmonics and a small input from your v.f.o. or other oscillator.

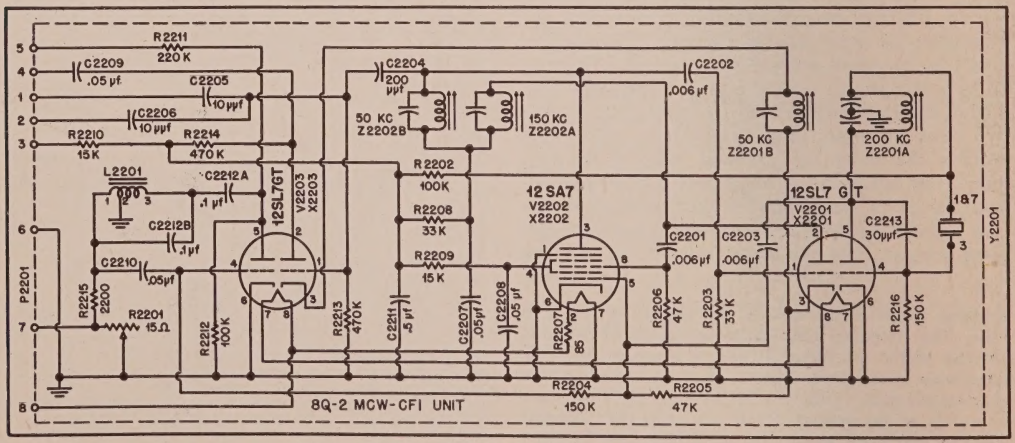
*1031 Pine St., St. Charles, Ill.

3. Supplies a 1000 cycle audio output whose wave-form and stability is far better than the familiar whistle or prolonged "hello-o-o-o-o" commonly used when checking the speech amplifier or modulation envelope on an oscilloscope.

The C.F.I. unit as purchased may be used as a frequency standard merely by supplying it with proper filament and plate voltages. However, it was my own experience that the harmonic strength dropped off rapidly above the broadcast band. In order to remedy this, it was decided to incorporate a harmonic amplifier in the additional chassis which would house the power supply. This chassis eventually took the form shown in the photograph. It has the same height and depth as the C.F.I. unit and is approximately 4½" wide. One of the side plates was removed from the C.F.I. unit and used as a template for drilling the adjoining side of the new chassis. This partition became common to both units and the spare side of the C.F.I. unit was filed in the hardware box for future reference.

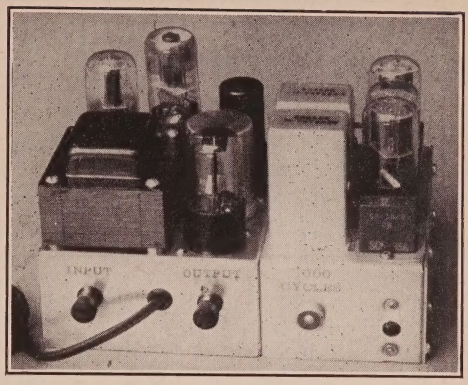
Improving the Output

The first harmonic amplifier tried was of the conventional type using a 6V6 tube with a tapped coil and bandswitch in the plate circuit tuned with



Original C.F.I. unit before start of modification.

Rear chassis decks contain binding posts for comparison signal input and output for aural monitoring. Jack is for 1000-cycle audio output.



from a C. F. I. Unit

With this unit on your operating desk you can take down "off limit" signs on the band edges.

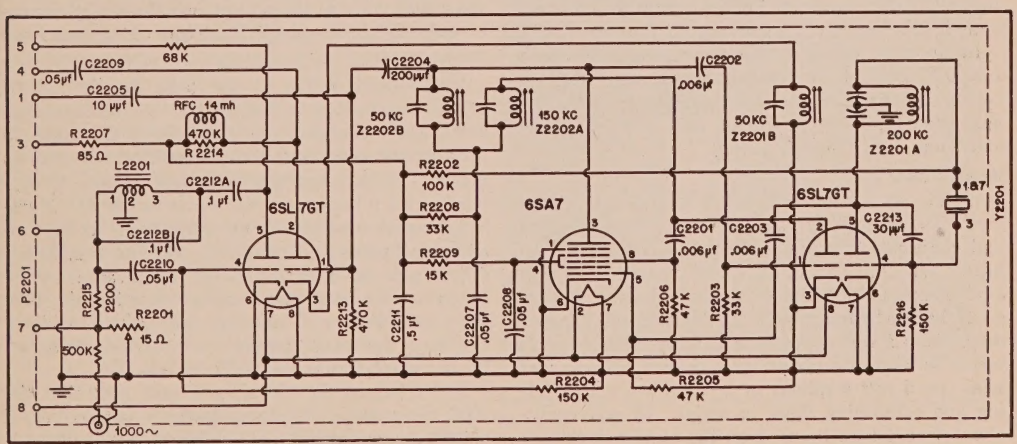
a variable capacity. Output was only mediocre and in addition it was necessary to re-tune the tank circuit to cover the 3.5-4.0 mc band. This led to experiments with a 2.5-mh choke in the plate circuit operating as an untuned amplifier. Results were promising and this finally led to the use of a 2.5-mh choke shunted by a small variable condenser which peaks the harmonic strength for the band desired. Further experiments with the r-f choke led to the conclusion that 2.5-mh is about optimum size and chokes made by National and Centralab performed satisfactorily. The tube was changed to a 6SJ7 with equal output and considerably lower current drain. Although decidedly unconventional, the circuit seems to be stable in operation and not critical as to components. Furthermore, it requires no bandswitch and delivers a wide band of output frequencies for a given tuning adjustment.[1]

At about this stage of the experiments it was decided to investigate the 1000 cycle audio oscillator with the object of imposing a distinctive audio modulation on the r-f marker signals. This audio oscillator originally operated as a warning signal indicating that the crystal calibrator was not operating. As long as an r-f signal of normal magnitude appeared on the No. 1 grid of the 6SA7, the bias voltage developed across the 47K grid resistor, *R2205*, was applied to the grid of the audio oscillator through the 150K resistor, *R2204*, and blocked this tube. By simply removing the lower end of the 150K resistor from the 47K resistor and tying it to ground, the audio oscillator operates in a normal manner. Next, it was determined that several volts of audio were available at either end of the oscillator coil so an audio coupling condenser was connected from the grid end of this coil to the screen of the 6SJ7 harmonic amplifier. This resulted in a pleasing modulation of about 20% on the calibrator signals which makes them easy to identify among the mess of heterodynes in the amateur phone bands.

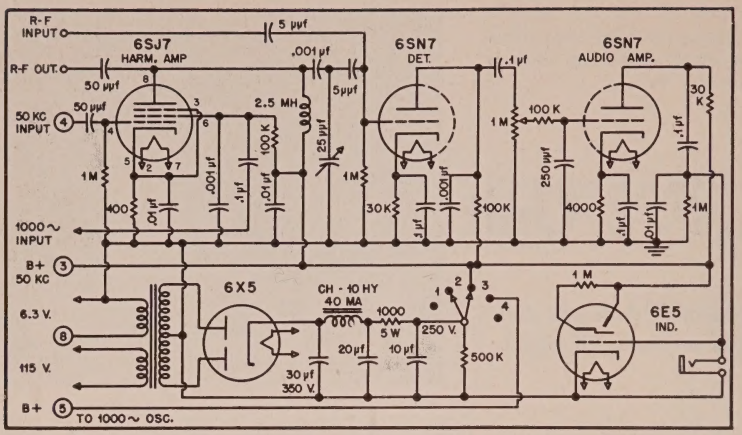
Since it is often desirable to sneak up on a band edge with your v.f.o. while the receiver is tuned to a choice DX signal, further experimenting was done in order to add a detector and a visual resonance indicator. This resulted in the incorporation of a 6SN7 and 6E5. One-half of the 6SN7 operates as a plate detector and the other half as an audio amplifier.

The grid of the first section of the 6SN7 is

1 A 6AC7 pentode amplifier stage employing a 500-1000 ohm plate resister and series peaking, feeding a cathode follower, likewise may be used as a harmonic booster.—Ed.



Modified C.F.I. unit after conversion is completed.



Power supply, harmonic amplifier and visual indicator. Numbered terminals connect to corresponding numbers on C.F.I. connector plug.

coupled to the calibrator harmonic amplifier through a 5-$\mu\mu$f capacitor and to an external binding post through another 5 $\mu\mu$f.

This allows a small signal voltage from a v.f.o. or other source to be mixed with the corresponding harmonic of 50 kc to obtain an audio beat note in the plate circuit. This, in turn, is fed through the 1-megohm gain control to the audio amplifier section of the tube and the audio output appears across the 30K plate resistor. A phone jack coupled to this plate through a .1-μf condenser permits aural monitoring with phones or a small speaker. Visual indication of resonance or near-resonance is accomplished by the 6E5. Circuit constants in the detector and audio amplifier are chosen so that the shadow angle begins to close when the v.f.o. approaches a 50-kc multiple within about 5 kc. This angle continues to close until the difference frequency has been reduced to a few cycles per second. It then opens and closes at the beat frequency until absolute resonance has been reached. In practice, in using this gadget in connection with a BC-696A v.f.o., the point where the shadow breaks open and starts to follow the individual beats is extremely sharp and the accuracy of comparison is many times that of the indication on the 1629 eye tube in the BC-696A where you merely tune for the widest shadow angle.

In order to establish the upper frequency limit for this method of comparison, it was tried in connection with a Meissner Signal Shifter. At near-resonance the eye closed fully through 7 mc and about half through 14 mc.

How To Do It

A few notes on the actual conversion work on the C.F.I. unit may be in order here. The original and converted schematics show the changes in the heater wiring. The tubes were changed to 6 volt equivalents in order that a single heater voltage could be used throughout. In the interest of economy, the 12 volt tubes which came with the unit could be used by choosing a power transformer with two 6 volt windings or a 6 and a 5 volt winding and connecting them in series. 12 volt equivalents would then be used on the auxiliary chassis except for the rectifier which would be connected across only one of the windings.

There is nothing critical about the power supply and components can vary considerably from those shown on the schematic. The filament winding should be able to supply at least 2 amperes and the high voltage should be approximately 250 volts with a drain of 35 or 40 ma.

The 50-kc output available at terminal No. 4 of the output plug was increased somewhat by shunting the 470K ohm resistor, *R2214*, in the plate circuit of the final 6SL7 with a 14 mh r-f choke. This raises the voltage on the plate of the tube considerably while maintaining a relatively high impedance load at radio frequencies. In order to further increase the available plate voltage, it was also found worthwhile to replace the 15K wire wound resistor, *R2210*, with an 85-ohm resistor, *R2207*, which was previously removed from the heater circuit. The 85-ohm resistor is just sufficient to reduce the arc at the switch contacts.

Resistor *R2211* in the B+ lead of the audio oscillator section of the 6SL7 was changed from 220K to 68K with an increase in plate voltage and corresponding increase in audio output. These changes are desirable because the ART-13 supplied about 400 volts to the plug connections while there is only 250 volts available from the conversion power pack.

The tapped switch in the plate supply lead is a little unorthodox in that the rotor feeds two adjacent contacts at each position. With the rotor in the extreme counter-clockwise position, all sections are off. In the next position plate voltage is supplied to all tubes except the audio oscillator. Number 3 position continues to supply plate voltage to all tubes included in number 2 position, and, in addition, puts the audio oscillator in operation so the output of the harmonic amplifier now has the 1000 cycle modulation. Continuing the switch to No. 4 position, the plate supply is removed from all tubes except the audio oscillator.

Referring to the circuit you will note that the 1000 cycle audio output is brought out to No. 7 pin on the connecting plug. This output is control-

able by the small 15-ohm variable resistor, *R2201*. Observation of this output on a scope showed that it possessed a very respectable waveform and therefore might be useful in itself aroud the shack. Accordingly, this was tied to a standard microphone receptacle mounted on the back of the chassis through a half megohm resistor. The series resistor was added in order to raise the output impedance to approximate that of a diaphragm type crystal microphone. The output across a 1-megohm load with the 15-ohm control at maximum is between 10 and 20 millivolts. This is enough to drive the average speech amplifier to full output.

Adjustment and Performance

A little time should be spent in becoming familiar with the adjustment of the permeability tuning slugs in the C.F.I. coils. The tuning screw labeled "200-kc" is adjusted only to bring the 200-kc crystal into zero beat with WWV or a broadcast station on a multiple of 50 kc. The other slugs are peaked for maximum output. It is advisable to do this by observing the S-meter reading on the station receiver set at a high order harmonic, say 14 mc, since this adjustment has some control over the output waveform. Because the waveform determines the harmonic content of the amplifier, it will be found that following this procedure will result in considerably greater output at high frequencies than will result from tuning for maximum 50-kc output as observed on an oscilloscope.

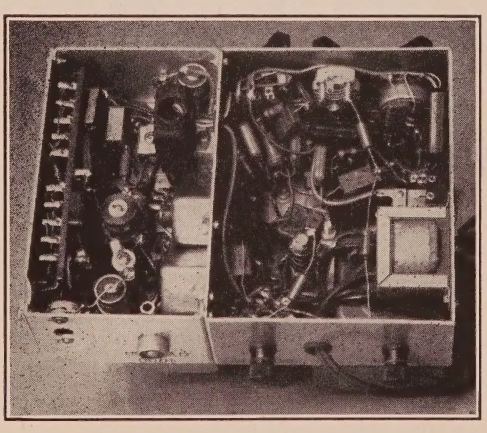
A brief explanation of the regenerative frequency divider circuit employed in the C.F.I. is as follows: The 200-kc crystal controls the grid of the oscillator section of *V2201*. The plate circuit of this tube is also tuned to 200 kc and supplies excitation at this frequency to the No. 1 grid of the 6SA7 mixer. The plate circuit of the 6SA7 is tuned to 50 kc and in turn excites the grid of the tripler section of *V2201*. The 150-kc tank in the plate circuit of this tube feeds back to the No. 3 grid of the 6SA7. This frequency mixed with the 200 kc on the No. 1 grid results in a sustained 50-kc output in the 6SA7 plate circuit. In its original application, this 50-kc output was mixed with an incoming signal from the transmitter on the grid of the first section of *V2203* and an audio output obtained from its plate circuit. This was brought out through an .05-μf capacitor to terminal No. 4 on the connector plug. This triode in the conversion serves as an additional amplifier and 50-kc excitation for the harmonic amplifier is taken from terminal No. 4.

A little experimenting should be done regarding the coupling between the harmonic amplifier and the station receiver. An SX-28 is used here and a single wire run from the output post of the calibrator to the antenna post of the receiver has proved satisfactory. If too much coupling is employed, it will scatter "birdies" throughout the bands.

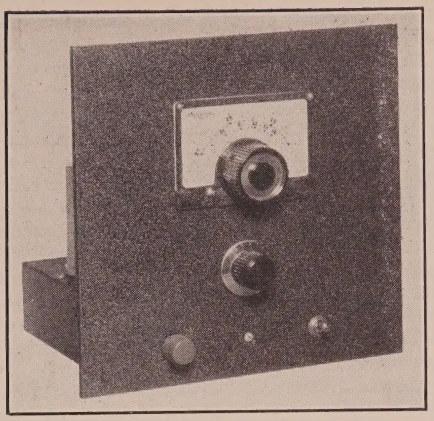
With the receiver tuned to a 50-kc harmonic in any of the amateur bands it will be noticed that there are a number of peaks encountered as the 25-$\mu\mu$f tuning condenser is adjusted. These will vary somewhat in strength and it is only necessary to observe the S-meter to pick the strongest peak. Generally speaking, the less the resonating capacity used, the broader will the band of frequencies covered without readjustment.

Like any other oscillator there is a certain amount of drift during warm-up and operation. However, due to the extremely low temperature coefficient of these low frequency crystals the total drift as observed at 1000 kc will only a few *cycles* from a cold start to normal operating temperature. The unit was run continuously for 8 hours and reset to zero beat after the first 2 hours. The greatest subsequent difference with WCFL on 1000 kc was observed to be about 3 cycles per second. This stability coupled with the ability to establish absolute zero beat between 50-kc harmonics and corresponding points on your v-f-o dial should enable the owner of a stable v.f.o. to utilize the last couple of kilocycles on any band edge without fear of out-of-band operation. Since all of the amateur band edges are, at present, multiples of 50 kc, operation within 5 kc of any of these spots will give a partial closure of the tuning eye which can be observed from time to time during transmissions as reassurance against drifting out of the band.

The converted C.F.I. is a great convenience in retracking the station receiver because of its ability to supply modulated signals every 50 kc without readjustment whereas the average signal generator must be reset for each check point and in addition is not sufficiently accurate on higher frequencies. Another daily use at W9CUX, in connection with the receiver, is to set the main dial so that the bandspread dial calibration comes out on the nose. It is also very interesting to check some of the DX phone boys leaning over the edge at 14,300 kc and then hear them tell the other fellow that their frequency is 14,297 kc.



Bottom view of the converted C.F.I. and associated circuits. Note the Jones connector used to bring the connections from the auxiliary unit to the C.F.I.



Photograph A. Front view of the beginners' 6, 10 and 11-meter converter. Essentially a single-dial converter, the middle knob is used only to peak the incoming signal.

GEORGE H. FLOYD, W2RYT*

Beginners' Converter

For 6, 10 and 11 Meters

For radiophone operation and for c-w DX on 10, the newcomer will want his receiver to tune through 54 mc. Here is a simple unit to give this extended coverage.

IN THE PROCESS OF building and accumulating radio equipment many beginning amateurs find themselves in the position of having a home-built receiver which has been doing an excellent job on 80, 40 and 20 meters, but which will not work on 10 meters, despite parts juggling or any manner of coil rewinding. This is to be expected in many cases because the higher-frequency bands require different construction techniques. The implication is that it is more difficult to build high-frequency receiving gear, but this is not particularly true if a moderate amount of care is used in construction.

The most logical and certainly the simplest way for a beginner to obtain a receiver for the 6 and 10-meter bands is to use a converter which will work into the receiver he already has. Any type of low-frequency receiver, when used in conjunction with a converter, becomes a superheterodyne type of receiver.

General Consideration

The converter about to be described will receive signals in the 27 to 30-mc region or the 50 to 54-mc region and convert them to a frequency of approximately 14 mc. This output may be fed into a 20-meter receiver, which will act on the 14-mc signal in the usual manner, detecting it and amplifying it audio-wise. Fourteen megacycles, which is the intermediate-frequency (i.f.) of the superheterodyne receiver formed by this combination, was chosen so that the converter could be used with practically any low-frequency receiver, especially those which use bandspread plug-in coils covering only a limited frequency range.

A converter to be used in this manner should have moderately good sensitivity and be simple in design, but as a prime consideration it should be easy to build and to get working properly. The beginners' 6, 10 and 11-meter converter was designed with these three points in mind.

*Tube Division, G.E. Co., Schenectady, N. Y.

Electrical Details

With reference to the circuit diagram, *Fig. 1*, the circuit is built around a single miniature tube, the 12AT7. This tube is actually two triodes in one envelope. Despite the fact that a "12" appears in the tube type number a filament voltage of either 6.3 or 12.6 volts may be used.

One triode section of the 12AT7 (pin connections *1*, *2* and *3*) acts as the mixer, and the other section is the local oscillator. When the 10-11 meter coils are used, the oscillator operates over a frequency range from 41 to 44 mc so that incoming signals from 27 to 30 mc produce a frequency difference in the mixer of exactly 14 mc. This latter frequency appears in coils *L1* and *L2* and is sent on to the receiver. When the 6-meter coils are employed, the oscillator operates from 64 to 68 mc, so that incoming 50 to 54 mc signals again produce a difference frequency of 14 mc.

In order to better understand the operation of the converter, assume that the 10-11 meter coils are in place and that a 30-mc signal is coming in the antenna. *Coil A* accepts this signal, and when condenser *C1* is properly tuned, the coil and condenser resonate broadly at 30 mc and place this signal on the first triode section grid (pin *2*). If at the same time condenser *C10* is adjusted so that *Coil B* and *C10* resonate at 44 mc, then the second section of the tube will oscillate at 44 mc. Due to internal and external coupling this 44-mc signal from the oscillator will now also appear on the grid of the first section (pin *2*).

The first section will now act to mix the 30 and the 44-mc signals, and the result will be a 14 and a 74-mc signal. These two resultant signals will appear in the plate circuit of the first section. However, *L1* and *C4* (plus other capacitance) are resonant at approximately 14 mc, so it is this signal that is passed on to the coupling coil *L2* and then to the receiver.

Condenser *C10*, which is connected to the main dial (*Photograph A*) is the main tuning control. *C1*, which is controlled by the knob directly below the main dial, is a broad tuning control which is used only to peak the signal once it has been tuned in.

Coil A is padded with three different condensers—*C1*, *CA2* and the combination of *CA1* and *CA3* in series. The purpose of the two series condensers, *CA1* and *CA3*, is to provide an impedance matching device for the antenna, similar to that popularized by the R-9'er[1]. Adjustment details on this matching will be discussed later.

Coil B employs condenser *CB* for padding and *C10* for tuning. The third plug on this coil allows the oscillator cathode to be connected to a tap on the coil. The mixer cathode is not connected to the mixer coil, but instead connects to ground through *R2*, which acts as a bias resistor.

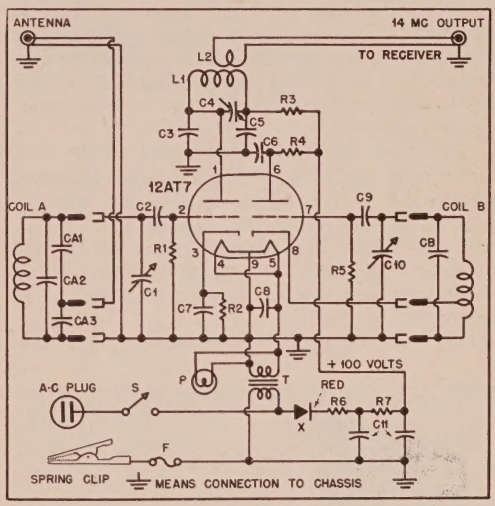
Condensers *C3* and *C5* (even though they are both grounded) are in series, and in conjunction with *C4* act to tune coil *L1* to resonance at 14 mc.

Because of the low voltage and current requirements of the 12AT7 tube, it seemed desirable to include a power supply in the converter design. To do this, it was necessary to add only a selenium rectifier, two resistors and a condenser. *R6* is a current limiting resistor, which protects the rectifier, *X*. *R7* takes the place of a choke, and with condenser *C11* becomes the filter system. *C11* is a double condenser, each section being rated at 40 *μf* at 450 volts.

The connection to the 117-volt a-c line in unusual but is designed so that fuses will not be blown. The spring clip is first fastened to a good ground connection and then the a-c plug in inserted in an a-c socket. Switch *S* is turned on, and if the pilot lamp does not light, it is only necessary to reverse the a-c plug. The power supply is designed to be used on a-c lines only. If d.c. is available, the power supply may be omitted, and the positive d-c voltage fed through a fuse directly to the junction of resistors *R3* and *R4*. The negative lead would connect to the chassis. Transformer *T* should be omitted, and the filament of the 12AT7 energized by four 1.5-volt dry-cell batteries.

Construction

The first step is to procure all of the parts listed under the diagram of *Fig 1*. It is desirable to get parts which are exactly like those listed. One reason for this is that the converter described used those very parts and the builder is therefore assured that his converter should work in a similar manner. Furthermore, if the converter does not work the first time it is tried, the builder knows that this is due to an error in wir-



1 G-E Ham News, Vol. 1 No. 4.

Fig. 1. Circuit diagram of the beginners' 6, 10 and 11-meter converter.

C1, C10—15 *μμf*, variable (Hammarlund HF-15).
C2, C3, C9—50 *μμf*, mica or ceramic.
C4—12-120 *μμf*, mica compression variable (ICA-612).
C5, C6, C7, C8—500 *μμf*, mica.
C11—40-40 *μf*, 450 volts, electrolytic (Sprague EL240).
CA1, CA2, CA3, CB—Cermaic condensers, see Coil Table.
F—1/2-ampere fuse.
L1—11 turns No. 18 enamel wire space wound on 1/2 inch diameter polystyrene rod.
L2—4 turns insulated wire wound over L1.
P—6.3-volt pilot light.
R1—1 megohm, 1/2 watt.
R2—1500 ohms, 1/2 watt.
R3—5000 ohms, 1/2 watt.
R4—50,000 ohms, 1/2 watt.
R5—10,000 ohms, 1/2 watt.
R6—25 ohms, 1/2 watt.
R7—2500 ohms, 2 watts.
S—SPST toggle switch.
T—Filament transformer, 6.3 v. @ 1.2 amp. (Stancor P-6134).
X—100-ma selenium rectifier (G.E. 6RS5GH1).
G.E. 12AT7 tube.
9-pin tube socket.
4 x 4 x 2 inch chassis.
7 x 7 x 2 inch chassis.
8¾ x 9 inch panel.
Main dial (National MCN).
Knob (National HRS-2).
4 x 4 x 1/4 inch piece of polystyrene.
Six-inch length of 1/4-inch rod for shafts.
Twelve-inch piece of 1/2 inch diameter polystyrene rod.
Six-inch length of 300-ohm twin-conductor cable.
2—1/4 inch solid shaft couplings.
2—Female coaxial line chassis connectors (Amphenol 83-1R).
2—Male coaxial line plugs (Amphenol 83-1SP).
1/4-inch panel bushing.
6—Banana jacks.
12—Banana plugs.
Alligator clip for ground connection.
A-C plug.
Fuse holder.
6-32 machine screws and nuts, and soldering lugs.

ing, or some other similar type of trouble, but is not due to substitution of parts which were not specified.

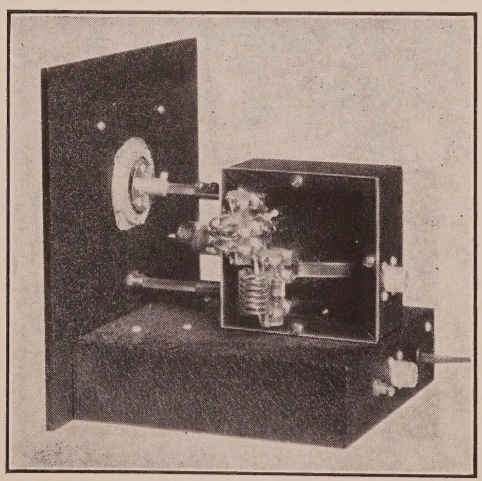
With the exception of *R6* and *R7*, the resistors may be values close to those specified, instead of exact values. For example, *R4* may be 47,000 ohms instead of 50,000 ohms. Also, larger wattage resistors than those specified may be used, although it may be more difficult to get these wired in properly, because of their larger size.

It is important that all condensers be of the value specified. Condenser *C4* may have a range greater than that specified, as long as it covers the range from 12 to 120 $\mu\mu$f. Condensers *C2*, *C3*, and *C8* may be either mica or ceramic condensers, although the latter are preferable from the size standpoint. Similarly, condensers *CA1*, *CA2*, *CA3* and *CB* should preferably be ceramic condensers, although mica condensers will work in most cases.

Note that condenser *CA1* (see *Coil Table*) is actually two condensers, 5 $\mu\mu$f for the 6-meter coil and 5 $\mu\mu$f for the 10-11 meter coil. Similarly, *CA3* is 50 $\mu\mu$f for 6 meters and 50 $\mu\mu$f for 10-11 meters. *CA2* consists of a 5 $\mu\mu$f and a 10 $\mu\mu$f-condenser in parallel for 6 meters, and a 25-$\mu\mu$f condenser for 10-11 meters. For padding *coil B*, the 6-meter condenser *CB* is 25 $\mu\mu$f and 10 $\mu\mu$f in parallel, and for 10-11 meters *CB* is a 50-$\mu\mu$f and a 25-$\mu\mu$f condenser in parallel.

The next step in the construction of the converter is to study the photographs and diagrams. *Photograph B* clearly shows the side and the rear of the converter. *Photograph C* is a detail view of the radio-frequency section of the converter, and must be studied carefully before construction is begun. *Photograph D* is on underside view.

Fig. 2 gives the drilling details for the 4 x 4-inch polystyrene coil mounting board, and *Fig. 3* is the drilling layout for the top of the large chassis (*Fig. 3A*) and the drilling layout for the front panel (*Fig. 3B*). The *Coil Table* shows how to make the coils, and also gives the values for the condensers which are mounted on the plug-in coils.



Photograph B. Right-side view of the converter. Because the coils are mounted on a piece of transparent insulating material, the inside of the r-f chassis is visible. The six-meter coils are in place.

Once the builder has read and understood this article, he is ready to start the actual construction. The first job is the construction of the radio-frequency chassis. The two sides should be removed from the 4 x 4 x 2-inch chassis, and the 4 x 4 x ¼-inch piece of polystyrene should be placed against the side of the chassis and the location of the four mounting holes determined. Following this, the six holes for the banana jacks should be carefully drilled as per *Fig. 2*. The size of these holes will be determined by the type of banana jack, but in most cases will be ¼ inch diameter holes.

Next, refer to *Photograph C* and drill the holes for the miniature 9-pin socket and condensers *C1* and *C10*. All are mounted on the vertical center line of the front of the chassis, the two condenser centers being three-fourths of an inch up from the bottom and down from the top of the chassis, and the socket center being in the exact center of the front of the chassis. The two mounting holes for the socket flange should be in a horizontal plane, so that pins *1* through *4* are below and pins *5* through *9* are above. Mount two soldering lugs under each socket mounting screw, and scrape the paint where the socket fits against the chassis so that a good ground connection is made.

Drill the hole in the rear of the chassis for the coaxial connector, and the holes in the bottom of the chassis for mounting it to the main chassis. These holes are on the center line of the chassis and 1½ inches apart. The rear hole is 1¼ inches from the rear of the chassis. A third hole ¼ inch in diameter is also drilled in the bottom of the small chassis. This hole is ½ inch back from the front of the chassis and ¼ inch in from the left side (as seen from the front of the panel).

The socket and the two variable condensers should next be mounted. The builder is now ready to begin the important part of the construction—that of the r-f section. For best results, follow the directions exactly, remembering that every lead should be as short as possible. It is a wise precaution to draw a pencil mark on the circuit diagram after completing a connection. This mark should be made directly over the line representing the connection just made, and preferably the marking should be done with a colored pencil. This type of record insures that all connections will be made. Refer to *Photograph C*, and proceed as follows:

Connect *R2* and *C7* in parallel, connecting one end to pin *3* and the other end to the lower ground lug on the right (as viewed from the rear). All

directions mentioned will be as viewed from the rear, that is, as in *Photograph C*. The pin numbers shown in the circuit diagram refer to the location of the socket pins as viewed from the bottom of the socket. Looking at the bottom of the socket, the first pin clockwise from the gap between the pins, is pin *1*. The pins are then numbered *2* through *9*, going around clockwise.

Connect the rotor of *C1* to the lower ground lug on the left. Connect a one-foot piece of wire to pin *6*, push it up under *C10* and bring it down along the right side of the chassis and out the ¼-inch hole. Connect *C6* to pin *6* and ground the other end to the upper ground lug on the right. Connect *R5* to pin *7* and ground the other end to the upper ground lug on the right.

Connect pin *4* to pin *5* and connect another one-foot piece of wire to this junction, running the wire in the same place as the other wire. Connect *C3* to pin *1* and ground the other end on the lower ground lug on the right. Connect a one-foot piece of wire to pin *1* and run it down and out the ¼-inch hole. Connect a wire to the center post of the tube socket and run it to pin *9* and then to the upper ground lug on the right. Connect *R1* to pin *2*, and ground the other end to the lower ground lug on the left.

Connect *C2* to pin *2* (by attaching it to the lead of *R1*) and connect the other end to the stator of *C1*. Connect *C9* to pin *7* (by attaching it to the lead on *R5*) and connect the other end to the stator of *C10*. Connect the rotor of *C10* to ground by soldering it to the upper ground lug on the left.

Next, put the six banana jacks on the 4 x 4-inch polystyrene piece, placing a large soldering lug under each jack, with the lug facing toward the rear. The top jack of *coil A* should have two soldering lugs on it, one facing the front and the other facing the rear. Fasten the polystyrene piece to the small chassis, as shown in *Photograph B*.

Connect a wire from the bottom jack of *coil B* to the top jack of *coil A* (the two closest jacks) and bring this wire to the lower ground lug on the left. Use as little heat as possible in soldering to the jack lugs, to prevent the polystyrene from melting. Connect the top jack of *coil B* to the stator of *C10*. Connect the bottom jack of *coil A* to the stator of *C1*. Connect pin *8* to the middle jack of *coil B*. Cut the 300-ohm twin-conductor cable to the proper length, and connect one lead from the middle post of the coaxial connector to the middle jack of *coil A*. The other lead goes from a ground lug on the coaxial connector to the top jack of *coil A*. Connect *C8* to pin *5* and the other end to the upper ground lug on the right. Tighten the banana jacks which may have loosened.

The wiring is now complete on the r-f chassis, and it may be put aside for assembly later. The remainder of the wiring is not critical, and for that reason detailed instructions will not be given. If the circuit diagram has been marked as mentioned before, it is apparent that there are very few connections yet to be made.

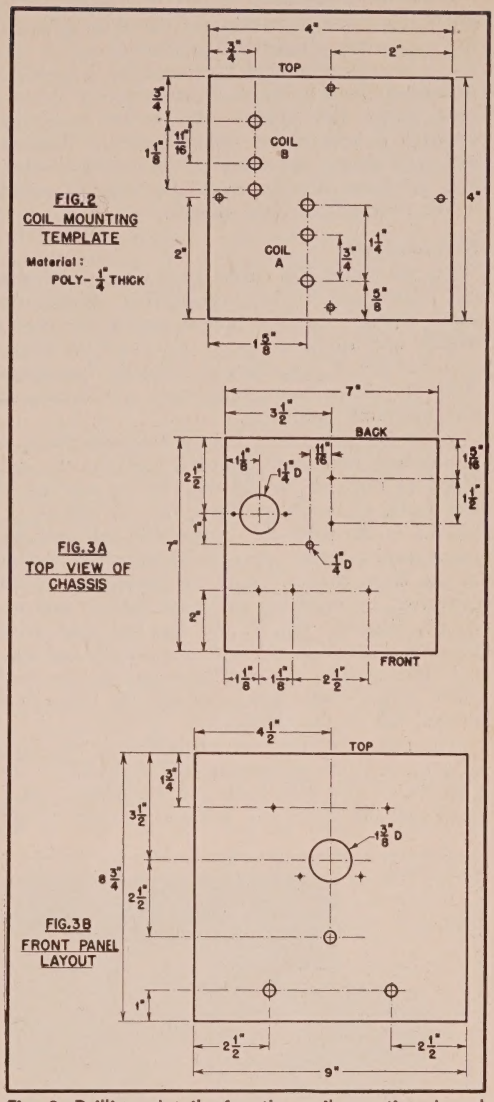


Fig. 2. Drilling details for the coil-mounting board. Fig. 3. Chassis and front-panel drilling layout.

The large 7 x 7 x 2-inch chassis should now be drilled on the top as shown in *Fig. 3A*. The rear should next be drilled as shown in *Photographs B* and *C*. The coaxial connector is in the exact center, condenser *C4* is two inches in from one side and the a-c cord hole is 1⅜ inches in from the other side. Next, place the small chassis temporarily on the large chassis, and check to see if the two shafts for *C1* and *C10* fall as specified in *Fig. 3B*. Drill the front panel as shown in *Fig. 3B*. If the panel is Masonite or similar material, the 1⅜-inch hole will cause no trouble. However, if a metal panel is used, the builder might find it necessary to borrow a socket cutter or punch.

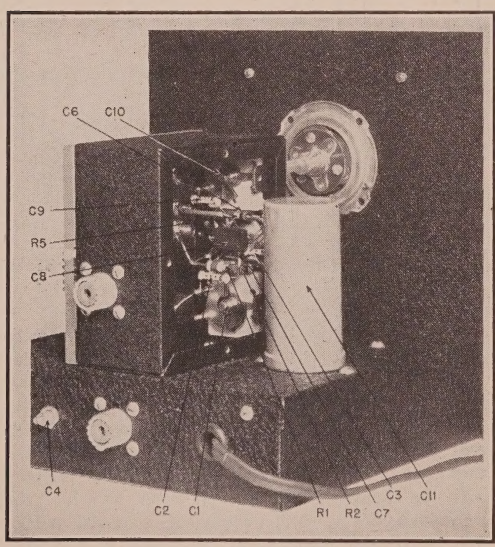
Place the front panel against the large chassis and locate the hole centers for the pilot light and the a-c switch. Referring to *Photograph A*, the screw between the pilot light and the a-c switch is used to hold a clamp which supports the a-c cord under the chassis. It is not necessary, although it adds to the wiring neatness. Remove the small chassis and complete the drilling by cutting the holes for the pilot light and a-c switch in the front of the large chassis.

Final Assembly

Put the tuning dial on the front panel and fasten the front panel to the large chassis. Mount the small chassis. Cut the ¼-inch rod to the proper lengths and use as shafts for *C1* and *C10*. Mount *C11*, rectifier *X*, transformer *T* and the fuse block. Refer to the various photographs for details on this mounting procedure.

Cut a 1¾-inch piece from the half-inch diameter polystyrene rod length and drill and tap one end. Wind 11 turns of No. 18 wire on the top end of this form, as shown in *Photograph D* and as explained in the parts list. Screw this coil onto the rear machine screw which holds the small chassis to the large chassis. Wire the remainder of the converter, by referring to *Photograph D* and the circuit diagram, *Fig. 1*. As the last step, wind four turns of insulated wire around *L1* and connect this wire to the coaxial connector, one lead going to the center conductor and the other to a ground lug on the connector.

The final constructional job is that of the plug-in coils. Cut the polystyrene rod as shown in the *Coil Table*, and drill holes for the banana plugs. Note that *coil A* and *coil B* are of different dimensions and the banana plugs are spaced differently. Wind the coils as shown and solder the proper condensers across the coils as shown in *Photograph B*. After soldering, tighten the banana plugs so that the softened polystyrene can flow around the screw and hold it tightly.



Photograph C. Detail view of the inside of the r-f chassis. Component parts are marked as an aid in identification. The short leads resulting from this type of construction add to the converter efficiency.

Converter Testing

Connect the converter to the a-c line as explained previously, and turn on the a-c switch. The filament of the 12AT7 should be visible. If a voltmeter is available, measure the voltage from chassis to the junction of *R3*, *R4* and *R7*. The voltage should be approximately 100 volts. If it differs materially from this figure, turn the converter off and check the wiring.

The next step is to connect the converter to a receiver. A piece of coaxial cable (as short as possible) is best, although other types of shielded wire will serve. Do not use wire which is not shielded as the unshielded wire will serve as an antenna for the receiver, and cause undesired signals to be heard. If a 6-meter transmitter is available, plug in the 6-meter coils, or if a 10-meter transmitter is available, use the 10-11 meter coils.

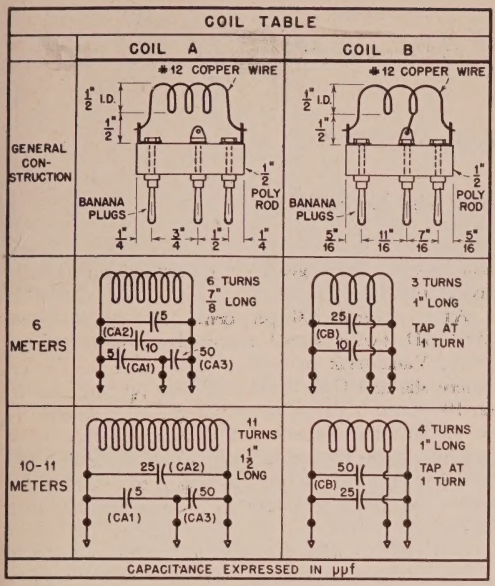
Turn on the receiver and converter and let them warm up for several minutes. Do not put an antenna on the converter. Tune the receiver to 14 mc. Turn on the receiver b.f.o. Set *C1* on the converter to approximately mid-scale. Turn on the transmitter after removing the transmitting antenna, and tune the transmitter final to resonance. The transmitter is now putting out a signal which will be used as a tune-up signal.

Tune the main dial on the converter until a signal is picked up. Reduce the r-f gain on the receiver until the signal is just audible, and peak this received signal by adjusting *C4*. If a signal is not heard when the main tuning dial has completely covered the condenser tuning range the oscillator is not covering the proper frequency range, or is not oscillating. Check the connections and the coil. Once the oscillator is made to oscillate the frequency of oscillation can be varied by pushing the turns together on *coil B*, or pulling them apart. This is not advisable unless the builder is certain that the oscillator is on the wrong frequency.

When the transmitter signal can be received and the i-f tuning (*C4*) has been completed, *C1* can now be adjusted for maximum signal strength. Make a mental note of this position, as the tuning of this control will not change much when using any one set of coils.

The next step is the calibration of the main tuning dial. This is most easily accomplished by borrowing a variable frequency r-f generator, such as a v.f.o. Set the r-f generator on the frequency the transmitter had been on and without connecting it to the converter in any way, see if the converter will pick up the signal. If not, it will be necessary to couple it into the antenna input of the converter.

Set the frequency of the r-f generator at one



end of the band and tune the main dial until this signal is picked up by the converter. The front of the dial can be removed so that a pencil mark can be made on the dial face. Continue this process in half-megacycle steps until calibration is complete. It may be found that the amateur band does not center on the dial. This may be corrected by squeezing the coil turns on *coil B* together, or pulling them farther apart. If, for example, the 27-mc point is too far toward the center, that is, the band is moved too far to the right, the turns on *coil B* should be pulled apart. Conversely, if the band is shifted toward the left, the coil turns should be squeezed together. This handling of the coil turns should be done a very slight amount at a time, so that the frequency is not changed too much.

After calibration, it is desirable to check for "pulling" of the oscillator frequency by the mixer. This should not occur if the schematic was followed faithfully. With a signal tuned in, control *C1* should be changed so that the signal is weaker in the receiver. The main tuning dial should now be retuned for maximum signal strength. If a change in signal strength can be effected by the main tuning dial, then the oscillator frequency is being changed when *C1* is tuned. If this effect is serious, the oscillator voltage should be reduced by increasing *R4*.

Antenna Adjustment

The importance of an antenna cannot be stressed too greatly. All receiving devices depend upon the antenna to pick up a signal, and the best receiver will not function without an antenna. Efficient antennas for 6 and 10 meters are easy to construct. If a transmitting antenna is available, this may be employed for reception by using a double-throw double-pole switch or relay.

The best antenna is at a disadvantage unless it is matched to the receiver. It is for this reason that *coil A* is designed with an antenna matching network. To adjust this network, tune in a steady signal which is being received on the antenna. Do not use a source of r-f in the shack, as most of this energy will not come in the antenna. One of the local hams may be willing to put his transmitter on the air and talk to you (when the band is closed) while you adjust the converter.

When the signal is received, peak up *C1* and tune the receiver for the best signal strength. Turn down the audio gain until the signal is just audible. Next, place a 10-$\mu\mu$f condenser in parallel with *CA3* on the coil in use. If this brings up the audio, repeat with a larger condenser, such as a 25-$\mu\mu$f condenser. Experiment until the audio is as loud as possible. If the addition of capacitance does not increase the audio level, replace *CA3* with a 10-$\mu\mu$f condenser, then again add capacitance in parallel. The range of capacitance should be between 10 and 150 $\mu\mu$f. Some value in that range should cause the converter to best match the antenna and feeder system.

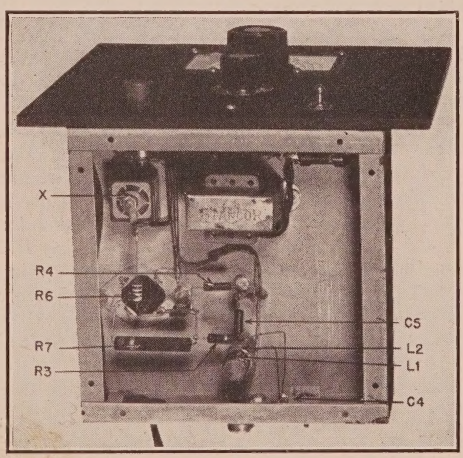
Because the audio level may change appreciably as the above tests are made, and yet not be too noticable to the ear, a more sensitive test would be to measure the audio output of the receiver with an output meter. Of course, a steady modulation would be required on the received signal. If the receiver has an S-meter, this would be even more sensitive as a peaking device.

Final Notes

If a standby switch is desired, which will remove plate voltage from the converter, but leave the filament hot, this may be added between *X* and *R6*.

No IN-OUT switch is provided on this converter, as the design would have become more complicated.

(*Continued on page 87*)



Photograph D. Underside view of the converter. There is very little wiring required because most of it is in the r-f section.

Land of Sunshine--and YLs

LOUISA B. DRESSER, W2OOH*

CQ's YL Editor reports on a visit to the W6s

CALIFORNIA, here we come—land of sunshine, kilowatts—and *really* hospitable YLs! Our five-day visit, during which we attended the Southwestern Division Convention, October 2 and 3, and met many of the YLs in the Los Angeles area, was packed with activity.

How did this W2 happen to be in California? Well, it was essential for the OM, W2IU, to attend the I.R.E. West Coast Convention in Los Angeles the end of September, and a little persuasion convinced him that it would be a golden opportunity for the XYL to go along so we could both take in the amateur convention, too, and get a little vacation, as well.

The latter evolved into several days' stopover at Grand Canyon—a lá the great American tourist! After marveling at this magnificent freak of nature from its rim and depths, we were further impressed with its grandeur by flying directly over the entire length of the Canyon to Lake Mead and Hoover Dam before heading across the Rockies to California. Climbing steadily higher to their crests, suddenly the mountains dropped sheer, and verdant San Bernardino Valley lay before us extending mile on mile to the Pacific, its rich cultivated land and oil fields strewn with cities clustered around the heart that is Los Angeles. Checking in at the Biltmore that evening, September 28, produced a deluge of notes, messages and phone calls—a royal welcome from the YLs!

Visiting Ham Shacks

Thursday morning, bright and early, we hastened to Santa Monica to meet Vada Letcher, W6CEE, who was to be our "official" hostess for the day. Vada first drove us to see Maxine Willis, W6UHA, president of the Los Angeles YL Club. There we enjoyed a long rag-chew, and Maxine served a delicious luncheon (umm, such strawberry shortcake that gal makes; OM W6TS certainly is lucky!) Then we put W6UHA on 10 phone for VK and ZL contacts for the fun of working DX from the West Coast. Running 900 watts, using a rotary beam, and having practically noise-free reception, Maxine is a consistent DXer.

Later Vada took us to visit Helene Leonard, W6QOG ("Helen with an *e* on the end," as she liltingly explained on phone). Helene and OM W6MBD just about live ham radio, as one might guess from their elaborate set-up. Each has a complete station containing a roomful of equipment, in separate rooms connected by intercom, with the overflow (2-meter gear, etc.) accumulating in the living room!

After several 100 per cent QSOs on 10 from W6MBD (with signal reported as 40 db above S9!), Vada took us to her home QTH in Venice where she and OM W6HWM also operate mostly on 10—when TVI, which all of the girls complained of, isn't too serious. Vada, formerly from Nebraska, loves the social side of ham radio, but took her hamming seriously enough to attend night school last year in order to achieve that coveted ticket.

Last call for the day was to Compton to visit Clara Dishong, W6TDL, her QTH being readily located by spotting her looming 10-meter beam. Clara is one amateur who almost welcomed TVI for, after months of time-consuming sessions of handling traffic for GIs overseas, she is glad to take a brief rest from transmitting (she still listens for DX) while she and her OM rebuild the station in a new shack apart from their house.

Naomi Turk, W6YZU, who lives near by, came to join the rag-chew and brought her youngest jr. op, only a few months old. We marvel at Naomi when we think of her making W.A.Z. (the only YL to do so to date), the while taking care of four jr. ops! Between W6YZU and OM W6LEE, there is a real DX household.

On the following day, Friday, Lenore Conn, W6NAZ, met us in Hollywood and showed us famous Hollywood and Vine (and Sunset), and the broadcast studios, including NBC where she is an actress. For some time Lenore has had her own television show Sunday evenings for which she does the researching and writing, and plays the lead, too—aren't we proud of her! Oh, yes, both she and OM W6MSC have TVI at home, but still they both love working at television professionally. And the TVI doesn't prevent them from arranging numerous skeds between GIs out on the Pacific Islands and their families back home.

After lunch at the Brown Derby, Lenore drove us to see Carol Witte, W6WSV, in South Pasadena, whom we hadn't visited except via correspondence since the early war days back at A.R.R.L. Formerly W9WWP in Chicago, Carol had worked for the Navy Department in Washington, D. C., before becoming a member of the staff at *QST*, then leaving West Hartford to join the Waves. Now living in an apartment where no antennas are allowed on the roof, Carol and OM W6WSW

(*Continued on page 88*)

*Assistant Editor, CQ.



Above: YLs participating in Tom Regan's "Community Broadcaster" program over KXLA. L. to r., standing: Lenore, W6NAZ; Rosemary, W6PJF; Clara, W6TDL; Maxine, W6UHA; W2OOH; Helene, W6QOG; Violet, W6CEE; Eleanor, W6AAL, and Mary, W6AVF. Seated: Johnny, W6PAP; John, W6BKY; Tom Regan, and ARRL Vice President McCargar, W6EY.



Above: L. to r.: Evelyn, W6NZP, in charge of convention YL activities; Rosemary, W6PJF, 6th district YLRL chairman; Maxine, W6UHA, president of the Los Angeles YL Club. All YLRL members wore identifying leis during the Southwestern Division Convention.

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Left: Gathering for the YL luncheon. L. to r.: Bertha, W6MA; Clara, W6TDL; Verma, W6JOJ; Ida, W6BIS; Carol, W6WSV; Ruth, W6WQK; Louise, W6VWR.

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Left: Jessie, W7TBR, and Gertrude, W7KOY, from Phoenix, Arizona. Inset: Florence, W6AET.



Above: Visiting YL ham shacks included visiting jr. YLs. Left: Ruth, W6WQK, holding Jerlyn, and right, Carol, W6WSV, with 4-month old Marcia.



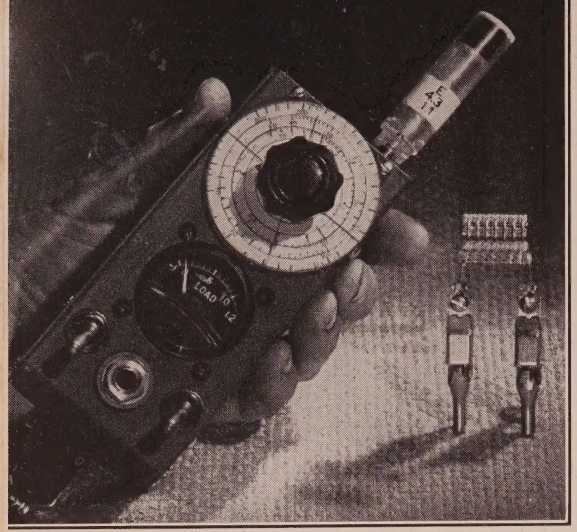
Above: Rag-chewing before the luncheon. L. to r., standing: two XYLs, and Maxine, W6UHA. Seated, Vada, W6CEE; Marie, W6SPX; Violet, W6CEE; Mary, W6AVF; Enid, W6UXF; two XYLs, and Clara, W6TDL.

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Right: "Round-up" following the luncheon. L. to r., standing: Naomi, W6YZU; W2OOH; Ruth, W6WQK; Vada, W6CEE; Wilma, W9POZ/6; Marie, W6SPX; Eleanor, W6AAL; Jessie, W7TBR; Verma, W6JOJ; Enid, W6UXF; Clara, W6TDL; Mary, W6AVF; Maxine, W6UHA; and Louise, W6VWR. Seated: Lenore, W6NAZ; Rosemary, W6PJF; Helene, W6QOG; Ida, W6BIS; Evelyn, W6NZP; Neva, W6YXI, and Carol, W6WSV.

Convention photos courtesy W6NAZ.





Typical grid-dip ocsillator with a continuous tuning range of 2 to 300 mc, this improved self-contained model of W2AEF's Dipper will be described in February.

Applications of

WILFRED M. SCHERER, W2AEF*

RESPONSE TO THE author's description of the "Dipper" and W6WB's grid-dip oscillator story has been tremendous. This instrument is fast becoming more popular as an indispensible and necessary piece of equipment for the radio amateur or engineer. A good many inquiries have been received asking for more detailed information pertaining to its applications. This article describing the uses of the grid-dip oscillator is in response to this widespread interest.

Although the operation of the Dipper, and it may be considered a typical grid-dip oscillator, has previously been described,[1] it might be well to briefly review its employment as four different basic instruments.

1. *Grid-dip oscillator* (g.d.o.) for use as an oscillating frequency meter to determine the resonant frequency of de-energized r-f circuits.

Plate potential is applied to the g.d.o. and it becomes an r-f oscillator. A d-c meter in the grid return indicates relative power. When a circuit, resonant at the oscillator frequency, is coupled to the "probe" inductance, power is absorbed from the oscillator by the resonant circuit and is so indicated by a dip (decrease) in the grid meter reading. The Dipper, employed in this manner, may then be used to check the resonant frequency of a circuit *without the application of power to the circuit in question.* This results in a considerable saving of time, and a definite assurance of correct frequency adjustment of a circuit is obtained. Circuits may be checked or pretuned before completion of the unit in which they are to be used. Only minor trimming is generally required under actual operation. Guesswork or "cut and try" methods are eliminated. Possible damage to components during initial tune up and adjustment is eliminated.

*100 E. Palisade Ave., Englewood, N. J.

1 Scherer, "The Dipper," *CQ*, May 1947.
Bane, "About Grid-Dip Oscillators," *CQ*, March, 1947.

2. *Oscillating detector* for determining the fundamental or harmonic frequencies of energized r-f circuits.

Plate potential is applied and the instrument is again an r-f oscillator. Instead of observing the grid-meter reading, a pair of phones is inserted in the phone jack and an audible beat may be heard when the instrument is tuned to the fundamental or harmonic frequency of a source of r.f. The frequency may be read directly from the calibrated dial.

3. *Tuned r-f diode or non-oscillating detector* for use as an obsorption-type frequency meter. No plate potential is applied and the internal tube is used as a diode. The grid meter is then in the diode load circuit and will read up-scale (current increase) when the instrument is tuned and closely coupled to a source of r-f energy.

4. *Signal generator.* The g.d.o. may be employed for this purpose generally in place of a standard signal generator, except where special shielding or a known r-f output voltage is required.

Methods of Coupling

Correct methods of coupling the Dipper to circuits under test are shown in *Fig. 1.* When used as a g.d.o., harmonics of lumped-constant resonant circuits will not be indicated; however, other resonant frequencies are sometimes indicated. These will be due to other resonant circuits formed by circuit wiring, stray capacitances, etc. In most cases these will occur at a higher frequency. On the other hand, harmonics of antennas, transmission lines, etc., will be indicated as will be explained later in the text under the heading "antennas."

When looking for the grid dip, it will be noted that the grid current reading slowly varies as the Dipper frequency dial is rotated; however, correct resonance is indicated when the meter takes a sharp or pronounced dip.

It is suggested that the user of the Dipper at first set up test L/C combinations, short test antennas, etc., and check them with the instrument in order to become familiar with the coupling methods and with the general behavior and operation of the unit.

Applications

Receiver tuned circuits. Use the Dipper as a g.d.o. Remove power from the receiver and resonate each tuned circuit to the desired frequency as indicated by the meter dip. Gang tuned circuits should be aligned for tracking by checking at each

the Grid-Dip Oscillator

How many amateurs are completely overlooking the countless uses of this easily built piece of test equipment? If you think your shack is complete without one, just read on.

end of the ganged range. A check at one or two points in between will also be helpful. Methods of electrically obtaining the desired bandspread or tracking will not be explained here. Reference may be made to any good radio text book.

Following the above procedure, power may be applied to the receiver and the g.d.o. employed as a signal generator for checking final alignment. A very short antenna should be connected to the receiver input terminals and the Dipper should be placed on the bench removed from nearby conductors, and where body movements are least apt to affect the r-f signal from the instrument. Some sort of indicating device such as an "S" meter or v.t.v.m. at the receiver detector must be used. Where this is not available, tone modulation may be applied to the Dipper and alignment made according to aural indications. If the r-f signal is too strong, the receiver antenna may be shortened, or the Dipper may be removed to a more remote or partially shielded location.

Where a superheterodyne type of receiver is involved and, if the receiver fails to function, it is quite possible that the receiver local oscillator is not working. This may be checked by employing the Dipper as an r-f diode detector or absorption-type wave meter. Couple it to the oscillator coil and, if the meter does not go up-scale when the instrument is tuned to the resonant frequency of the oscillator tank, the oscillator is not functioning. An alternative method having greater sensitivity and capable of more accurate frequency measurement is to use the Dipper as an oscillating detector and listen for the local oscillator beat in the headphones.

Transmitter tuned circuits. Use instrument as g.d.o. with plate power removed from transmitter and proceed to adjust tanks to desired frequency as done with receiver circuits. Tubes should be in place, and where capacitive coupling is used between stages, the grid circuit associated with the following tube should be completed.

After the above procedure, plate power may be applied and final alignment made according to grid and plate meter indications. R-f power at correct frequency in each tank may be checked by employing Dipper as diode absorption frequency meter, or it may be utilized as an oscillating detector. Due to its greater sensitivity in the latter state, care must be exercised not to mistake audible beats from some other energized r-f circuit. This may be checked by moving the instrument closer to the circuit under test and noting whether or not the beat increases in volume. If it does, the beat heard is from the desired circuit. Harmonics also may be heard, so it is wise to check for the beat heard at the lowest frequency.

Neutralization. Use Dipper as diode absorption-type meter and proceed to neutralize in the manner normally employed when using absorption-type wavemeter, or as with similar indicating device, i.e.:

Remove plate power from amplifier stage to be neutralized, and apply power to stage driving the grid. Loosely couple the Dipper to the amplifier tank, tune the instrument to the driving frequency and check for the presence of r.f. in the tank as indicated by a rise in the Dipper meter current. Adjust neutralizing capacitor until no reading is seen on the meter.

Another method may be utilized when employing the instrument as a g.d.o. Remove all plate power from the transmitter. Couple Dipper to grid tank of stage to be neutralized, or, in the case of capacitive coupling, to the preceding plate tank (it is assumed that the tank has already been tuned to correct frequency). Couple fairly close and leave Dipper set in position with its meter deflected at bottom of the resonant dip. Neutralization is then indicated when rotation of amplifier plate tank capacitor has no reaction on the deflected meter reading.

Parasitic oscillations. Apply power to transmitter and use Dipper as oscillating detector while listening on headphones for beat of parasitic oscillation. When parasitic frequency has thus been determined, as read from the Dipper scale, remove power from transmitter and use instrument as g.d.o. to locate circuits or components, such as r-f chokes, circuit wiring, etc., resonant at parasitic frequency .

Parallel resonant traps. Use Dipper as g.d.o. Trap may be tuned or checked either before or after connecting it in desired circuit. If tuned be-

To ensure that the desired circuit is being measured by the g.d.o. the g.d.o. should be suitably coupled and the frequency varied until the dip is obtained. Then moisten one finger with saliva and touch an ungrounded point on the test circuit. The g.d.o. meter should indicate a change in resonance. Lack of g.d.o. meter reaction when the test circuit is touched indicates that the indicated resonance is of another circuit. Be sure power is off before touching test circuit with finger.

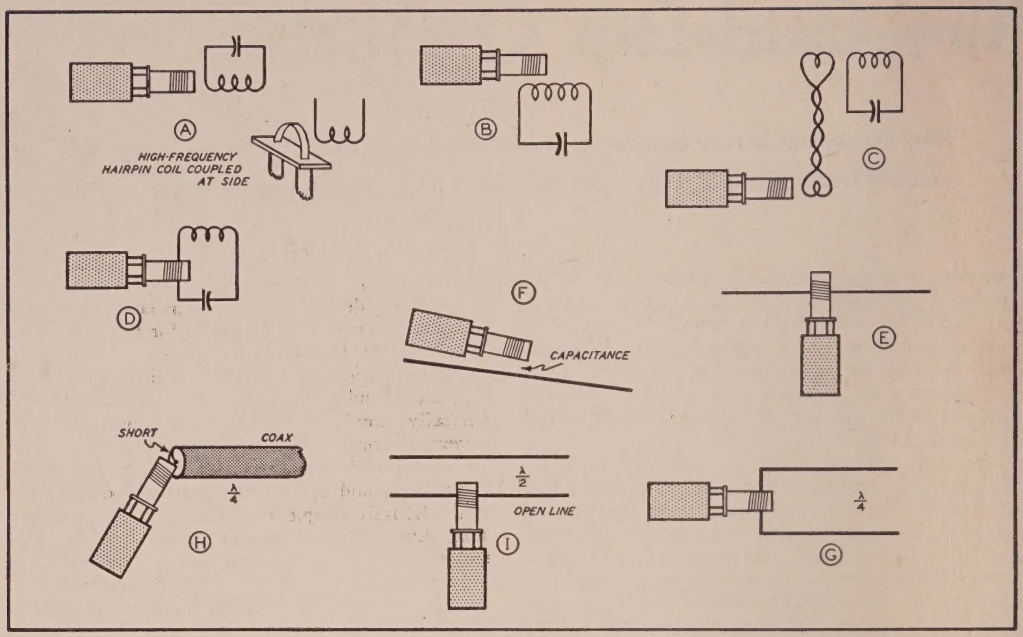


Fig. 1. Proper methods of coupling the Dipper to circuits under test. Wherever possible use method shown at A Method at B should be used as an alternate. If the coil is so located (such as in a shielded can) that normal coupling methods cannot be used, link coupling as at C may be used, or sufficient coupling may often be made to an ungrounded lead from the inductance as at D and E. If several coils are located at close proximity and prevent accurate readings, short out the undesired inductances. As an additional precaution to check measurement of desired circuit, detune it to confirm readings. Inductive coupling shown at E should be used for antennas or any other straight wire. Capacitive coupling for this purpose is shown at F. Use G for shorted quarter-wave open lines (or odd multiple thereof). For quarter-wave shorted coax lines use H. For open or shorted half-wave lines use I. For half-wave coax lines see text. In all cases, greatest accuracy is realized when coupling is as loose as possible, consistent with obtaining sufficient indication of dip.

fore installation, adjustment will remain correct upon installation if its inductance is physically removed from other conductive components which may alter the inductance value. This is not usually the case, so further minor adjustment will probably be required after installation. When in the circuit, it is possible that its resonant frequency may be quite a bit off as indicated by the Dipper. Actually the trap itself will still be tuned to approximately correct frequency but the g.d.o. reading may not be obtainable due to stray capacitance across the trap having a circuit Q higher than that of the trap itself. This tends to swamp out any reading obtainable with the meter; however, an effective trap should have good Q and high C, in which case, correct reading will be observed.[2]

Final precise adjustment may be made by applying power to circuit and by tuning trap under actual operation for desired effect. In many cases this will not be necssary as pretuning is quite accurate.

Series resonant traps. Follow same general procedure as with parallel resonant traps. To check or tune prior to installation, trap may be first connected as a parallel trap. At high frequencies or where the trap inductance is low, the lead completing the parallel circuit should be of large wire or wide copper ribbon to keep its inductance low, and care should be taken not to permit this lead to be positioned so as to add stray capacitance. Leads to be used upon final installation must also be included when external measurements are being made.

Measure circuit Q. Use the Dipper as signal generator. Connect a v.t.v.m. across the circuit to be measured. Couple instrument to circuit (*Fig. 1A*) and resonate for maximum or peak reading on v.t.v.m. Note frequency at which this occurs. Then shift the Dipper each side of resonance to the frequency where the voltmeter reading drops to approximately 70.7% of that at resonance. Note the frequency of these two points and calculate the circuit Q from $Q = \frac{f_r}{\Delta f}$, where f_r is the resonant frequency and Δf is the difference between the "off resonance" frequencies just found. The original coupling of the Dipper should be adjusted for a convenient maximum reading on the v.t.v.m. and then should be left fixed at this position for the remainder of the procedure.

When the circuit Q is quite high, it may be

2 Scherer "TVI Corrective Measures," *CQ*, August, 1948.

necessary to check the Dipper frequencies with a calibrated receiver, because the "off resonance" points will occur too closely together for accurate reading on the instrument scale.

Relative circuit Q at a given frequency. Use Dipper as g.d.o. and observe character of the dip —whether broad or sharp. The sharper the dip, the higher the *Q*.

Measurement of capacitance. Several methods may be employed. All involve the use of the Dipper as a g.d.o.

The most generally useful method requires preliminary calibration using each of the Dipper coils. A small jig must be made (*Fig. 2*) into which may be plugged any one of the coils. Capacitors of known value are connected across the coil by means of the alligator clips. Then the resonant frequency resulting from the combination of each known capacitor and each coil is recorded.

An alternative method of calibration is to connect the jig and coil across an accurately known small mica capacitor of 1000 $\mu\mu$f. Find resonant frequency and mark a point at this frequency coinciding with 1000 $\mu\mu$f on a chart — double logarithmic paper should be used. Then mark a point corresponding to 250 $\mu\mu$f at twice the resonant frequency just found. Place another mark at a point corresponding to 62.5 $\mu\mu$f at four times the original frequency. Place a fourth mark at a point corresponding to 4000 $\mu\mu$f at one half the original frequency. Draw a line between the four points and calibration will be complete. A typical chart, showing calibrating points, is shown in *Fig. 3*. Due to the distributed capacitance of the coils, a slight error will be encountered at very low capacitance measurements. Likewise, due to self inductance of large capacitors, a small error will be found when measuring these. Errors will be negligible for most practical purposes.

Measurements below 50 $\mu\mu$f are generally not obtainable because resonance at these values usually falls out of range of the coils left available for frequency checking. If lower capacitance range is desired, then make a separate coil with alligator clips so any one of all the Dipper coils will be available for finding resonance. The one shown in the photograph consists of 7 turns of a B & W 3002 Miniductor. This will permit continuous frequency coverage together with complete capacitance coverage of from 5 $\mu\mu$f to .01 μf.

To check an unknown capacitor, it is then only necessary to clip the jig, with a coil inserted, across the unknown value component. Find the resonant frequency and refer to the calibration chart for value of capacitor with the coil employed. For over-all accuracy, it is best to employ one of the coils from the medium frequency range. When using the jig or "standard inductance," the alligator clips should be connected as near as possible to the unknown capacitor itself. Even a short lead from the capacitor will add inductance and cause a slight error.

For these measurements, in a great number of cases, the capacitor need not be removed from the circuit in which it is wired unless the capacitor is heavily loaded.

Another method, similar to that above, is to employ a known inductance and find the resonant frequency with the unknown connected across it. Then $C_x = \frac{1}{4\pi^2 f^2 L}$ where f is the resonant frequency in cycles and L is the inductance in henries. C_x will be in a farads.

A third method, for capacitors up to about 1000 $\mu\mu$f, requires an inductance which is shunted by a calibrated variable capacitor. The capacitor is set at maximum and the resonant frequency of the circuit is found. The unknown capacitor is then connected across the variable and the capacitance of the latter is decreased to a point where the circuit resonates at the original frequency. The difference between the first and last settings of the calibrated variable capacitor is the value of the unknown.

Measurement of inductance of r-f coils. Connect a capacitor of known value across the coil and use the Dipper as a g.d.o. to find the resonant frequency of the resulting L/C combination. The inductance of the coil may be calculated from $L_x = \frac{1}{4\pi^2 f^2 C}$ where L_x is in henries, C is known capacitor in Farads; or reference may be made to an L/C-resonance chart.

Due to the distributed capacitance of the coil, some error will result; however, if the value of the known capacitor is fairly high, the error will be negligible.[3]

Relative Q of capacitors or inductances at a given frequency may be noted by observing the character of the dip, as previously described.

Antennas. Use Dipper as g.d.o. Coupling should be made at a low impedance or high current point as shown at *Fig. 1E*. This point, for a half-wave

3 In measuring small values of inductance, be sure to employ a low inductance standard condenser, connected to the unknown coil by wide ribbon, in order to obtain accurate results. —*Ed.*

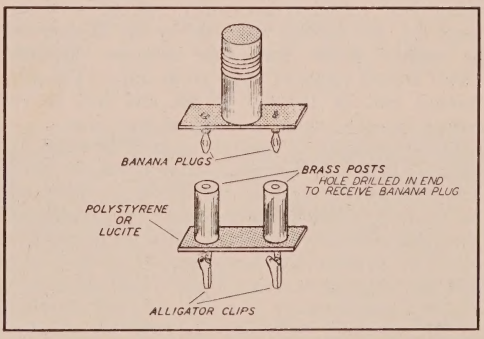


Fig. 2. Jig for coils used in capacitance measurements. Where measurements are generally to be made of capacitors not wired in circuits, the jig may be mounted on a small stand placed on the bench.

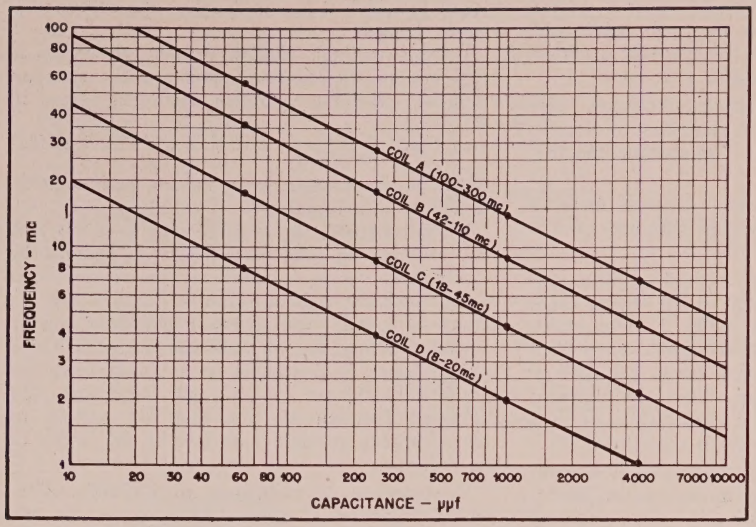


Fig. 3. Typical calibration chart for capacitance measurements, subject to limitations set forth in text. Calibrating points as described in the text are so indicated.

antenna, is at the center, and for longer wires is at points odd quarter wavelengths measured from either end. It will be observed that a full-wave antenna will not be a half-wave at exactly half its resonant frequency. This is because the end effects are found only at the antenna ends and will be absent at other points when the antenna is a full wave or more long. It is therefore always necessary to measure an antenna under the conditions desired (relating to physical and electrical length). Measurement should be made with the antenna placed as near as possible to its ultimate operating position. Checks with the Dipper on a given antenna at different heights or positions will show an amazing difference in antenna resonance.

If it is physically impossible to reach a low impedance point, a check may be made at a high-impedance or high-voltage point. Capacitive coupling should be used as shown at *Fig. 1F.* If the high-impedance point involved is one of the ends, the end effect will be altered due to the presence of the instrument and the resonant frequency of the antenna will slightly decrease. This must be taken into consideration when making measurement, i.e., the reading indicated by the Dipper will be slightly lower than true antenna resonance (with Dipper removed away from end). This difference will be about 1 to 3% and will be encountered only when checking at the ends.

In all cases it is helpful to keep in mind the physical length in feet vs. electrical length (half-wave, full-wave, etc.) as calculated approximately by formula. Unlike lumped resonant circuits, antenna harmonics are detected when using the Dipper. As previously mentioned, these harmonics will not occur at exact multiples of a half-wave.

When measurement is made, the feeders should be disconnected from the antenna. Unless the feeders happen to be perfectly matched or terminated, true antenna resonance will not be indicated because unmatched feeders or incorrectly terminated feeders will present either a positive or negative reactance and will, therefore, alter the electrical length of the antenna.

When the antenna element is of very large diameter, such as is often found in rotating beams, sufficient coupling to the Dipper may not be obtained and some difficulty will be encountered in finding a reading. This condition may sometimes be relieved by jumping a foot or so of the antenna at the center with a small diameter wire and coupling to this wire.

If the antenna is to be normally used with its center open, close it with the shortest possible wire during measurement. This must be done also with the folded dipole. The short may later be removed, if required, when feeders are connected.

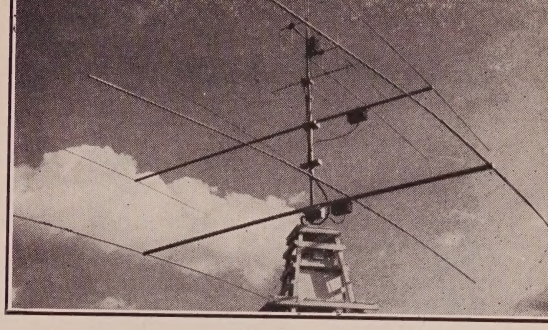
Tuned or resonant feeders, such as used in the Zepp antenna. Use Dipper as g.d.o. and check for desired resonance at the series or parallel tuned circuit on the transmitter end of the feeder. If resonance at the desired frequency is not obtainable, alterations may be made in the tuned circuit or the feeder length according to the actual resonant frequency found. Care must be exercised not to become confused by other resonance indications. It must be remembered that a Zepp is actually a long wire antenna partially doubled back on itself and resonance can therefore be noted at frequencies both higher and lower than the desired one.

Untuned or non-resonant feeders. After the antenna has been adjusted to the correct length, an untuned feed line may be connected employing some system of matching. Correct match may be obtained by making adjustments while employing a transmission impedance bridge[4] or a standing-wave-ratio meter[5] and using the Dipper (set at antenna resonant frequency) as the signal generator.

(*Continued on page 91*)

4 Jones, "Balanced R-F Impedance Measuring Set," *CQ*, October 1945.
Tiffany, "A Universal Transmission Bridge," *QST*, December 1947.
5 Pattison, Jr., Morris, Smith, "A Standing Wave Meter for Coaxial Lines," *QST*, July 1947.

The Other Fellow's Station-W1BB



TRYING to describe W1BB in even one entire issue of *CQ* is about as simple a task as putting a kilowatt in a suitcase. Stewart S. Perry first became active in 1912 using the call "SS." Officially licensed in 1917 he has been active pretty much since then with spark rigs, audions, etc.

The station now being operated under the call W1BB is in reality many stations under one roof. On his roof are no less than 11 different antennas for all bands from 80 to 1¼ meters. The rotary illustrated covers 2, 6, 10 and 20. To top it off is a vertical quarter-wave whip for 15 meters. Each individual beam is mounted so that it can be taken down separately to work on if necessary. Each beam is individually fed with coax brought to a control panel in the shack. Automatically the antennas are switched through a coax relay to whichever transmitter is in use. W1BB is mighty proud of this antenna installation which is a remarkable demonstration of how much gear can be hung on one rotator. Some of the other features of his antenna installation include remote controls on the roof for testing from that position, automatic stops, and a brake for high-wind conditions.

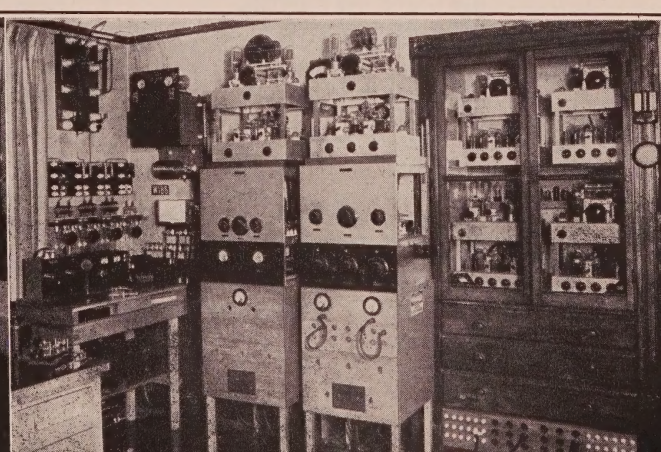
W1BB features a separate complete r-f section on each band. QSY is almost instantaneous and requires merely the insertion of the proper plugs in the control panel. Each transmitter is rated at 250 watts phone and 500 watts c.w. E.C.O. or crystal is available on all bands. On the small table which comprises a separate operating position is an emergency setup using a Harvey UHX-10, NC-200 and SW3 operated from a vibrapack. In the basement, connected to the radio room wiring through a control box is a 600-watt gasoline generator. This will handle one of the large transmitters for emergency communications.

The operating position was in reality designed for maximum convenience and utility—not to make visiting hams drool. On it is the beam control box, HRO, variac enabling instant QRP, a pushbutton safety switch which will kill all power upon contact, crystal/e.c.o. master unit with 25 crystal positions, Hallicrafters 5-10 for 6-meter work, National 1-10 and an emergency receiver for 144 mc. In the stand on casters is the NC-200 emergency receiver and monitor, Meissner Signal Shifter as a spare v.f.o. or as a low powered battery operated transmitter, battery operated SW-3, and Panadaptor. To the extreme left is a broadcast receiver and record player. Among the miscellaneous gear is a charging panel, emergency low power transmitter with single wire Marconi antenna and tuning unit on the wall. This piece of gear is ready to go at all times. Everything in the station is controlled remotely from a 6-volt storage battery and relay circuits.

In this ham's paradise you'd expect to find W1BB all the time. But when not earning his living as a sales engineer for Worthing Pump and Machinery Corp., you might find him out on his boat with his fine family. The XYL Alice, and Jim and Skip are pretty well used to ham radio by now. But even when vacationing around the country W1BB works all bands. His automobile is completely equipped for portable and mobile operation—2 through 80. Rig is 20 watts with a 6L6 final. An NC-173 serves as a receiver; for 2 a TR-4. This past summer on a 6-week trip to California W1BB operated portable in all U.S. Districts and kept nightly schedules with W1BDU on 7 or 14 mc. And they never missed a sked! At that time operation was portable only, with F.C.C. notification been given at each stop-over, but next year W1BB says he'll do it mobile.

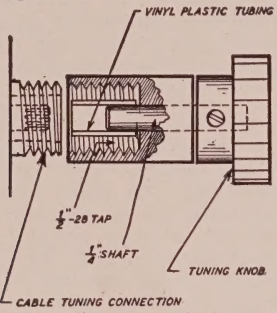
We didn't tell you about the 600-meter receiver or the 200-watt phone-c.w. rig for ordinary portable work like Maine vacation trips. But this thumbnail sketch should prove that W1BB is an old-timer who has lost none of his enthusiasm and still takes his hobby seriously.





274N Receiver Tuning Knob

This is a homemade tuning adaptor for the 274 N series receivers. The shaft and tuning knob are standard items. The only special parts are a piece of vinyl plastic tubing, the inside of which should be slightly smaller than ¼ inch, and the adaptor fitting itself which is machined out of ordinary brass, or even aluminum. This adaptor is ¾ inch in diameter and ¾-inch long. One end is tapped to a depth of ⅜ inch with a ½ inch, No. 28 tap. A ¼-inch diameter hole is reamed on through to the other end. The length of the ¼-inch shaft should be such that the end of the shaft butts against the end of the splined shaft in the receiver tuning fitting and the plastic tubing fits evenly over both shafts when the adaptor is screwed onto the receiver fitting.

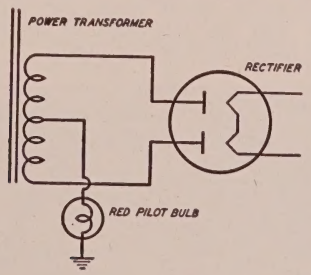


The plastic tubing retains its elasticity indefinitely and there is no noticeable backlash in tuning the receiver. For convenience a crank may be added to the tuning knob if desired.

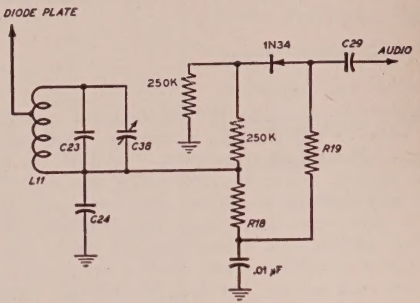
T. C. Freedom, W8HVE

High Voltage Pilot Bulb

A simple panel light indicator for high voltage power supplies can be made by inserting a dial light in series with the secondary center-tap of the high voltage transformer. The pilot bulb should have a current rating suitable for the drain on the supply. When current is being drawn the pilot will light, and in addition will act as a fuse.



F. C. Johnston, VK3EL



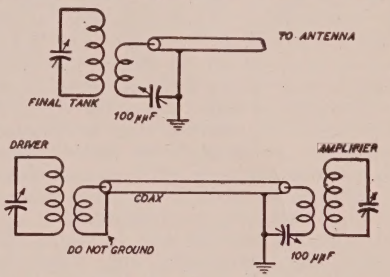
Noise Limiter for the SCR-274N Receivers

This is the simplest and most effective noise limiter I have used with 274N command receivers. The circuit calls for the addition of two resistors, a 1N34 crystal diode and a paper condenser. The noise limiter is of the self-adjusting series type and does not require a removal switch from the circuit since the quality and signal loss are negligible. The noise limiter may be wired into the receiver in about five to ten minutes.

Don Jeppesen, WØQFZ

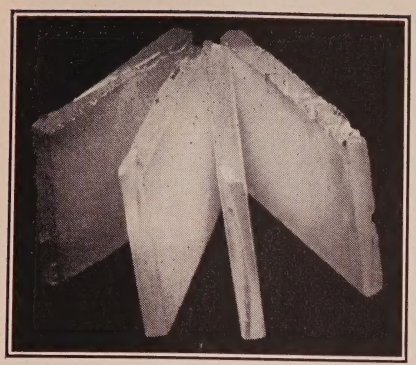
Tuning Out Coax Cable Reactance

This little trick does not seem to be sufficiently well appreciated by the average amateur, although it has been used to good advantage in commercial and military radio equipment. Better coax cable matching and transfer characteristics can be obtained by inserting a variable tuning condenser between the return of the link and ground. This condenser is tuned for maximum loading, which in this case means minimum reactance in the link. Maximum power transfer may be obtained with minimum coupling by using this method.

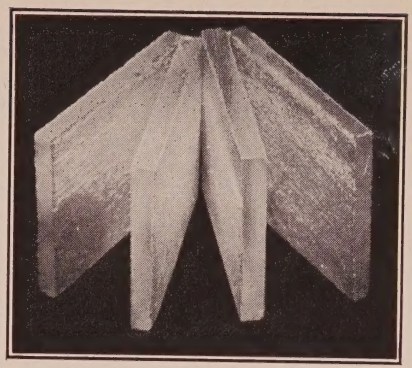


A particular instance of its effectiveness was in trying to drive a pair of 4-125A's to 700 watts input with an 807 doubler. Without the tuning condenser in the link return between these two stages I could only obtain 10-ma grid current. Tuning out the reactance brought the 4-125A grid current up to over 20 ma. It is equally effective when trying to load a beam feed with coax line.

Ken Chase, W2MA



Good and poor rough blanks. The jagged uneven edges of the poor blanks readily distinguish them from the uniform even edges of the good blanks.



Crystal Grinding Simplified

E. W. JOHNSON, W2UXA, ex-W9RAB*

Taking the mystery out of a job most amateurs have been reluctant to tackle.

MANY ARTICLES ON CRYSTAL GRINDING have appeared in amateur magazines since Herb Hollister set forth his arguments for and against the X and Y cut plates in a 1930 *QST*. There were some even before that time, and plenty since then. The sad part of the story is that the current information contained in articles, the handbooks and manufacturers' instructions, is undeniably confusing. They vary widely—and drastically—in their recommendations as to what to do and how to do it. It seems that the correct approach is indicated, so let's look at this problem of amateur crystal finishing from a logical standpoint, and take up the questions of what we want to do, how to do it, some of why we do it and what we do it with. The techniques described are based on sound war-born experience with large scale crystal production that have also proven to be equally adaptable to the small scale operations of an amateur grinder.

In order to simplify things, we will confine our discussion to the almost universally used AT and BT cuts in the region of 3 to 10 mc. As far as the average amateur is concerned, the chief difference between these two cuts is in the fact that frequency for frequency, the BT cut is somewhat thicker (about 30%) than the AT. In other words, a 1000-kc AT cut is about .066" thick, while a BT cut at the same frequency is about .100" thick. Also from a practical standpoint, the BT is probably easier to handle for a beginner as it is less prone to frequency jumps and spurious responses; on the other hand, the AT cut is somewhat more active and has a better temperature-frequency coefficient.

*Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

Sometimes one will encounter an alleged AT or BT cut that is a real "drifter." The chances are pretty good that it will turn out to be a "miscut"—an AT blank for instance cut at the correct AT angle but from the BT side of the Z or optical axis of the raw quartz crystal. They can usually be identified by their frequency-thickness coefficients.

The Blank

Blanks should have their major surfaces virtually plane parallel, with a convex contour not exceeding a few ten-thousandths of an inch at 3.5 mc and correspondingly less at 7 mc. Under no circumstances should the major surfaces be allowed to become even slightly concave, nor should it be

FREQUENCY-THICKNESS CONSTANTS (K)

$$F \text{ (in kc)} = \frac{(K)}{\text{THICKNESS IN THOUSANDTHS OF AN INCH}}$$

CUT	K
AT CUT	65.5
BT CUT	98.4
AT MISCUT	94.5
BT MISCUT	74.0
X CUT	112.6
Y CUT	77.3

Fig. 1. For the various type crystal cuts the frequency is directly proportional to the thickness.

permitted to become wedge shaped. (Why? Try and get any decent level of activity out of such a blank! Or if you do get any activity, see how many frequencies you may have!)

In outline they can be either square or rectangular, but the adjacent edges in any case should be reasonably close to right angles—as much so as you can make them using a common steel square for checking. (Why? Better activity as a result

of less interference with the motion of the blank.) Or you can make them round and naturally forget about the squareness.

Thickness and contour can be checked with a micrometer—a very, very handy tool for the amateur crystal grinder. One reading to .001" will do, as you can interpolate .0001" points, but one reading directly to .0001" is much better. Irregularly

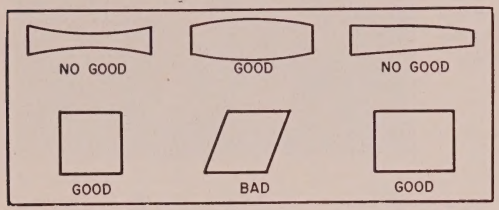


Fig. 2. Proper operation of a crystal is vitally effected by its shape. (Defects exaggerated.)

shaped plates can and will often oscillate satisfactorily, but for uniformly best results watch the contour (keep it slightly convex) and keep them reasonably square-cornered. The finished plate should be small enough to easily fit the intended holder without binding at the edges, and large enough so that at least about half the area of the "lands" in each of the corners of the electrodes is covered. For freedom from frequency shift due to vibration or shock, the plate and electrodes should be a good fit in the holder cavity—maximum clearance of the order of .01. In no case should the quartz plate be larger than the electrodes. When finished, the edges should be free from cracks, large chips and incipient fractures. Small chips appear to be of little consequence at the lower frequencies (about 3.5 mc, for instance) but apparently become increasingly important as the frequency goes up. Moreover, cracks, chips and fractures are potential sources of trouble such as complete failure, poor activity, erratic behaviour or frequency jumping. If the chips are small, and the material has broken away cleanly, they are not of too great concern; however, if in doubt, the best thing to do is get rid of them. You can round off the corners and edges slightly if you want to.

Grinding

The ordinary flat of plate glass is fine for hand grinding, as is the often-described figure of eight motion. So, too, are the little glass gadgets known as "dops" sometimes supplied with kits and to which the blanks are "sweated" for grinding. Personally, I prefer to use my fingers—not one finger, pressing in the center of the blank (it is very, very easy to make a 7-mc BT blank concave by putting pressure only in the center of the blank), but two—actually the thumb and forefinger exerting equal pressure on areas near diagonally opposite corners. Make a few figure eights, rotate the blank 90° so you can put pressure on the corners "unused" in the previous operation, make an equal number of figure eights, turn it another 90° and continue until your thumb has been on all four corners. Slight irregularities in contour can be smoothed out by the application of greater pressure on the high spots, and if the center gets too high, then place one finger in the center and make the necessary number of figure eights to bring the contour back to where it belongs. And, if your plate has a reasonably good contour to begin with, confine subsequent grinding to but one side and your chances of ruining it are vastly decreased. How much pressure? Take it easy. Use a moderate amount, for haste makes waste in the form of cracked and wedge-shaped blanks.

Finishing to Frequency

Blanks can be finished to frequency by grinding, as described above, or by etching. If you grind, use the finest abrasive that will do the job; 303 to 304 optical flour is suitable and should be available from a local optometrist. A few ounces will finish a lot of crystals! Coarser abrasive can be used if you have to move the frequency a relatively long way—say 50 kc at 7 mc or 20 kc at 3.5 mc. Etching, however, offers many advantages over grinding and is strongly recommended. A well etched crystal will be for all practical purposes free of aging effects—you won't have to take it out and clean it frequently in order to make it percolate satisfactorily. You can use hydrofluoric acid if you want to, but it is *DANGEROUS* stuff to work with and have around, even when you are well equipped to handle it. Ammonium bi-fluoride, or one of the similar patented compounds (such as Safe-T-Etch) are just as effective and much safer and easier to use. If you should spill any of a fluoride solution on yourself, wash it off with copious quantities of warm water. There is really not much of an excuse for using hydrofluoric acid, as the bi-fluoride is usually available from local drug stores or chemical houses. Containers for etching solution should preferably be of lead or copper, but glass or crockery will do in a pinch except for hydrofluoric acid. Don't leave it in glass or crockery any longer than is necessary, as prolonged exposure will result in the bottom dropping out or holes being eaten through the side or bottom or some such phenonmena. Use a saturated solution; start out with half a cup of

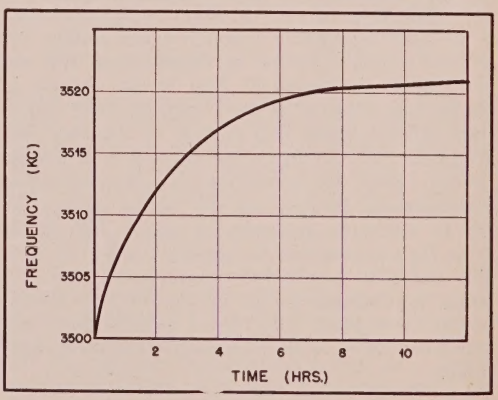
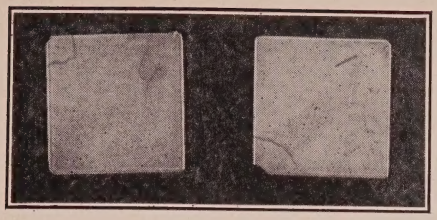


Fig. 3. The curve shows a typical change in frequency over a given time for a crystal being etched.



Typical examples of poor blanks. Note the chipped and cracked corners. By proper grinding they can be restored to useful activity.

etching compound and add just enough water (preferably warm to hot) to completely dissolve it. Surprisingly little water is required. Use it at room temperature, but if you are in a hurry, you can speed up the etching rate considerably by keeping it at about 120° F. If kept in a copper or lead container, it will keep its strength almost indefinitely and a cupful will etch plenty of crystals. Use a little basket made of copper wire to hold the crystal in the etch pot. Rinse the plate thoroughly in warm or hot water as soon as you take it out of the etch, then scrub it vigorously with a toothbrush and a detergent soap, such as Dreft or Swerl. Air drying is greatly preferred over drying with any sort of a cloth. Incidentally, use the toothbrush technique before etching, and before testing or mounting whether you finish to frequency by grinding or by etching. If possible, handle the plate with tweezers—preferably plastic—but if you use your fingers, touch only the edges. Cleanliness cannot be overemphasized!

The rapidity with which crystals will change frequency when etched depends upon several factors:

a. The original finish of the blank (surface condition).
b. The frequency of the blank.
c. The temperature of the etch.
d. The concentration of the etch.
e. The type of cut.

In general, they etch very, very rapidly at first, gradually slowing up as the kilocycles come off. The first 5 kc at 3.5 mc and the first 15 at 7 mc go fast, even at room temperature—a matter of minutes, in fact. If you want a crystal that is really free from aging, it is best to figure on taking at least 15 kc off a 3.5-mc blank, and about 30 kc off a 7-mc blank. You can easily etch a 3.5-mc AT blank about 75 or 100 kc and a 7-mc BT blank about 150 to 200 kc. The rate of etching curve will look something like that shown in *Fig. 3.*

Grinding the crystal again after etching will void the results of etching in so far as the prevention of aging is concerned; if you want a good stable crystal, make sure that you have etched the previously noted minimum amounts after the last grinding.

Contrary to popular belief, an AT or BT cut plate is capable of oscillating at more than one frequency. They are normally operated in what is called the thickness shear mode, but can be made to oscillate in flexure or face shear along the length and width dimensions, and at frequencies that are quite low (around 100—300 kc) in the average high frequency plate. From a practical standpoint, this means that when our edge dimensions are such that harmonics of these low frequency modes coincide with the thickness-shear frequency, we get either a dip in activity or a completely dead crystal. Furthermore, these different modes will all have different temperature-frequency coefficients; this in turn means that it is entirely possible to have a crystal that has perfectly good activity at one temperature, alter this activity greatly if the temperature is changed by even a few degrees. Do not dismiss the effects of these low frequency harmonics lightly; their effect is very pronounced at 3.5 mc, but somewhat less at 7 mc. In fact, at 7 mc, the chances of getting, with random dimensions, a crystal with good activity, are pretty good —perhaps 5 out of 10 won't need any further work on them after the edge chips and cracks are removed. The chances on 1 mc are about 1 in 10, and at 3.5 mc, about 3 in 10. This coupling effect between the low and high frequency modes can be pretty well explained as follows:

If you keep the thickness (frequency) constant, change an edge dimension and plot the data, you get something like this. (Remember, it's just an example.)

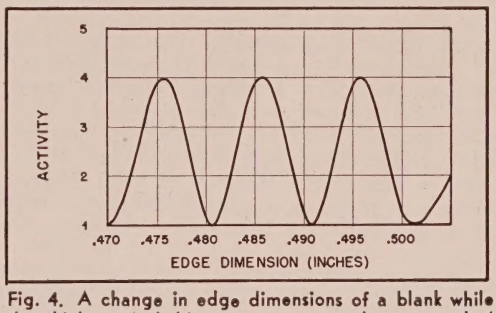


Fig. 4. A change in edge dimensions of a blank while the thickness is held constant can result in a marked change in crystal activity.

If you keep the edge dimensions constant and change the thickness (frequency) you get something like this: (Again, this is only an example.)

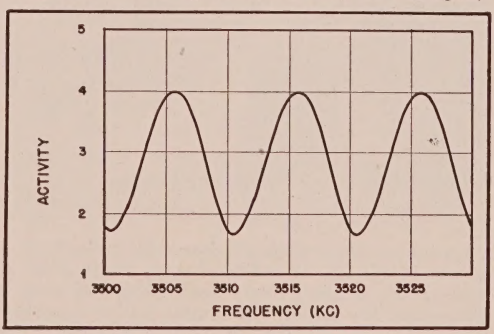


Fig. 5. Holding the edge dimensions constant and altering the thickness can effect the frequency and activity as shown on the graph.

In actual, practice, you would find that the curves you get are not quite as smooth and regular as those shown. This is due to the fact that we have two linear dimensions and several flexure or shear modes to deal with, plus other effects; the result is that a real graph would show a lot of lesser dips and peaks superimposed on the main trace.

What does all this mean to the chap grinding his own crystals? Simply this: the principal factors affecting the activity of a crystal at a given frequency, assuming that it is otherwise in good shape, are the edge form and dimensions. In other words, the *first* thing you do to bring activity up under those circumstances is to start working on the edges. Work on but one edge at a time, and a little bit at a time; check results frequently. Once you get what appears to be the maximum activity from working on one edge, start working on the other and keep at it until you get either a maximum or satisfactory activity. This work on the edges can be straight edge grinding, keeping all surfaces as close to right angles as is possible, or you can bevel the edges. Beveling of all edges is highly recommended. Slope of the bevel is relatively unimportant—somewhere around 45° to 60° is satisfactory—but stay away from excessive "knife edges" or "saw tooth edges" which are potential sources of trouble from chips and cracks. (See *Fig. 6*).

The tools for edge grinding? Preferably a bonded abrasive, such as a fine grit diamond hone or the fine emery paper sometimes known as "crocus cloth," but you can use a glass plate and a fairly coarse abrasive. Do most of your beveling and edge grinding before you make your final adjustment to frequency as removal of much material in the process will cause a substantial upward shift of frequency. There is one exception—you will find that one edge of an AT cut plate is much more frequency-sensitive than the other; in fact, if you keep working on this edge, you will probably find that you can sometimes make the frequency *decrease* by several to a score or two kilocycles, all in one jump. This is an often useful trick, but it takes experience to make it work right!



Abrasive may be removed from the surface of a crystal by the use of a dish of warm water, a jar of soap, and a brush. A very small amount of soap is placed on the brush. The crystal is then scrubbed vigorously until all the abrasive is loosened. The loosening of the abrasive may be accomplished more quickly by dipping the crystal into warm water several times during the scrubbing process.

Electrodes

Electrodes for AT and BT cut plates are made so that they come in contact with the oscillator plate only at the four corners. This is done deliberately, since contact at the center of the crystal will keep it from oscillating if enough pressure is applied to keep it firmly clamped so that it will not shift between the electrodes. The air gap between the crystal and the electrodes is usually of the order of a few ten-thousandths of an inch with about .0003" a practical minimum. The spring

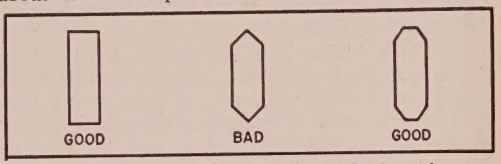


Fig. 6. The shape of the edge of the blank is important to obtain maximum activity.

should exert a presure of from 2 to 6 pounds on the crystal-electrode "sandwich," and there should be no marked change in activity when this pressure is applied. If there is, it means that either the dimensions, the contour or the electrodes are probably not what they should be. Most commercially manufactured electrodes are pretty good, so if you have low activity don't blame them unless you are pretty sure that they may be defective. Try different combinations; rotate the crystal 90° at a time between the electrodes and see if you get any change in activity; do the same for the electrodes. In other words, find the position of the crystal and the electrodes where you get the best activity. This procedure will tend to compensate for any slight irregularities that may exist in either electrodes or crystal. Cases where electrodes that are not otherwise defective can kill activity are:

a. Where the air gap between the center of the electrodes and the crystal is so small—or non-existant—that they touch and consequently dampen the vibrations of the crystal. Too much contour on the crystal can do this.

b. Too much air gap. This is a pretty rare case at the frequencies we are dealing with and with commercial electrodes.

c. Resonance. This can happen, and does. If the air gap is such as to make the air column between the crystal and the electrode resonate at the crystal frequency, the oscillations of the crystal are very effectively damped. There are two practicable remedies for this trouble—either change the frequency of the crystal or change the air gap. The latter can be done

(*Continued on page 93*)

Monthly DX Predictions - January

OLIVER PERRY FERRELL*

THE METHODS DESCRIBED in National Bureau of Standards Circular 462 ("Ionospheric Radio Propagation")[1] making use of the C.R.P.L.—D series ("Basic Radio Propagation Predictions")[1] permits a fairly accurate estimate of radio transmitting conditions to be predicted in advance. Also of special interest to the radio amateur are the modifications outlined in an article in the November, 1948, issue of *CQ*.[2] Using the methods described in this latter text the following analysis was prepared based on these parameters:

A. 1000 watts effective radiated power.
B. Antenna gain factor 1.
C. Noise discrimination factor 1.
D. Service gain factor c.w. to phone 14 db.
E. Receiving location free from man-made noise.

West Coast to South Africa

40 meters: The very high atmospheric noise level persists during the South African summer months. Their signals may be heard in the United States, but only the strongest Americans will get through between 1745 and 1900 PST. *20 meters*: Fair to good phone opening from 1645 to 1845 PST. C-W signals from 1345 to 1915 PST. *10 meters*: This is still not a good time of year for working this path. Very high absorption levels leave only a few weak signals between 0645 and 0830 PST. Conditions improve slightly towards the end of the month.

West Coast to Southeastern Asia

40 meters: High atmospheric noise levels at far end of the path plus considerable auroral belt absorption keep signals down in the mud. Maybe a few weak signals getting through just before sunrise, but not to be depended upon. *20 meters*: Short opening from 0845 to about 0945 PST. Phone signals just readable. *10 meters*: Fairly consistent opening starting at about 1545 PST. Band probably will not close until after 1815 PST. Good signal strengths, though somewhat stronger during the first hour of the opening.

West Coast to Middle East

40 meters: When ionospheric conditions are quiet there may be signals from 1730 to 1945 PST. This is a decidedly poor opening in any case. *20 meters*: Slow buildup opening starting between 0645 and 0730 PST with band closing just before 1000 PST. Phone signals during the first hour *10 meters*: No predicted opening. MUF should not exceed 22 mc. Possibly a few scattered signals during the last week around 0800 PST.

West Coast to Central South America

40 meters: Fairly high noise level at far end of path, but fair opening from before 1800 to 0030 PST the following day. Some signals until 0230 PST. Best conditions after 2230 PST. *20 meters*: Consistent good opening 1700 to 0130 PST the following day. Also a few scattered signals around 0500 PST, though mostly c-w quality. *10 meters*: Band opens around 0645 PST with strong signals. Conditions dip around 1000 PST, but build to strong peak between 1445 and 1630 PST.

West Coast to Europe

40 meters: Considerable auroral absorption with weak signals principally around 2200 to 2345 PST. Possibility of some of the stronger signals also being heard around 1700 PST. Not a particularly good band for this path on a prediction basis. *20 meters*: Fairly good opening around 0645 PST. Decreasing signal strengths until band closes at about 1215 PST. There may be some difficulty with atmospheric noise at far end of the path. *10 meters*: On ionospherically quiet days a good opening with strong signals starting at obout 0745 PST. Band will generally close around 0930, but may remain open frequently until after 1015 PST.

Midwest to Western Australia

40 meters: Noise level and predicted field strengths are about equal, but expect to hear signals from 0400 until 0915 CST. Peak time 0445 to 0730 CST. *20 meters*: Fairly good opening starting around 0845 CST as local MUF increases. Signals probably heard until about 1130 CST, though peak time is 0915 to 1015 CST. *10 meters*: MUF is low at far end of the path. Weak to fair signals possible on less than 15% of the month between 1845 and 1930 CST. Conditions improve during the last of the month.

Midwest to Western India

40 meters: Much the same conditions as predicted during December with a few weak signals 1900 to 2015 CST. *20 meters*: Band opens sharply around 0745 with good signals. Phone until 0900 CST, c.w. until 1015 CST. *10 meters*: No openings directly predictable, possibly one or two around 0715 CST, but very far from dependable. MUF generally less than 24 mc.

Midwest to Mediterranean Areas

40 meters: No openings predictable. Auroral absorption is too high. *20 meters*: A few weak c-w signals 0700 to 0830 CST. Better c-w conditions starting 1030 CST to 1415 CST. Peak with possibly readable phones 1245 until 1400 CST. *10 meters*: A very good opening on ionospherically quiet days from 0745 until 1015 CST.

East Coast to Australasia

40 meters: Good opening 0330 until 0830 EST. Peak expected 0445 to 0730 EST. *20 meters*: The MUF at the near end of path is low, but opening starts gradually on the direct path around 0830 EST. Good phones until 0945 EST, c.w. possibly to 1015 EST. *10 meters*: Regular absorption levels are very high during this season, but a few weak to fair strength signals may get through between 1615 and 1915 EST. Peak is during the latter two hours.

(*Continued on page 86*)

*Assistant Editor, CQ.

1 Available from the Superintendent of Documents, Government Printing Office, Washingon 25, D.C.
2 "A New Method of Predicting Band Conditions" O. P. Ferrell, *CQ*, November, 1948, page 26.



Conducted by HERB BECKER, W6QD*

THE FOLLOWING is a last minute recap of approximate scores and other news about our first World-Wide DX Contest. Since W2IOP is the boss, and since he scored more points that I did, and since he has most of the Contest information anyway, this is given to you with that well-known LeKashman touch.

Where to start, that is the question. Biggest thrill I got was reading over *C8KY's* log. He was active only in the phone contest, and as you all know Perry Ferrell let conditions misbehave that week-end. He more than made up for it the following week, though. Among the lucky Ws to work Zone 23 were W2SAI, W3BES, W8KML, WØAN, and W8HUD. Although we were promised greater activity from stations in Zone 23, so far C8KY's log is the only one from that zone on hand.

While the phone week-end may have been disappointing to many, there seemed to be plenty of stuff on—if you could raise it. Some of the juicer prefixes competing on phone include C, VS6, ZD1, 3, 4, KX6, VP2 (Grenada), CT1, 2, 3, YS, YN, 4X4, KP6, C3, J2, 9, HR, HP, HA, TG, VQ2, 4,5,CP, HL, CR9, CX, VR2, ST, IS, ZB1, 2, LX, MI13, MD1, ZS3, AR8, ZE2, ZC1, OQ5, VU, VP8, etc. That "etc." stands for just about every prefix in Europe, South America, North America, and Central America, with a fat sprinkling of the rest of the world. We didn't hear a lot of the stuff in the States, but my, oh my, take a gander at the DX stations' logs. It is early to speculate on the winners, but some of the top claimed scores are: ZS6CT, 31,284; PY2AC, 124,068; W6SA (W6SA and W6SZY ops), 47,790; W6GRL, 38,752; VQ4ERR, 28,224; G2PU, 90,628; ZS2CI, 54,982; W7ESK, 32,712; KH6IJ, 23,200; C1CH, 47,320; W8HUD, 52,682; W8DAW, 38,755; W8KML, 55,875; W6AM, 22,659.

The c-w week-end defies description—a terrible admission on the part of an editor who is supposed to have as many adjectives handy as the average W6 has watts. On the last tally the logs on hand indicate participation by over 100 countries. Why even this broken-down old DX man (please compare my score with W6QD's) has spotted better than a half-dozen countries that would have been new ones for me. Before I say another word let me tell you about our good friend Bert Brown, W4FU. Right after the contest Bert was asked by *ZD9AA* to do him a little favor and pass a message on to *CQ*. Unsuspecting Bert told him to go right ahead—and that's how come we have the complete log of ZD9AA on hand—calls, reports, time, et all.

A lot of the gang objected to including 3.5 mc in the contest, but on the East Coast anyway, from 80 right through 10, there was DX aplenty to work. Of all the bands in general use, 14 mc seemed to show the poorest performance. 10 and 40 in the United States anyway, ran neck and neck for honors, if a quick analysis of logs on hand is any indication. While it is true that the most DX was worked on 20, 10 and 40 showed activity that was a joy to listen to. In our best hour we worked over 30 Europeans on 40, and most of them were S7/9! At no time during the contest was there a dead band—that is, if you had the endurance, there was always an open band. But since OM Becker has a long column this month anyway, and since we're going to write up the contest completely in a couple of months, for the moment let's just look at some of the claimed high c-w scores reported.

W2IQG,	289,680*	W4KXN,	96,446	W5GEL,	48,650
W4KFC,	277,736	G5CW,	95,438	HK3CK,	46,057
KH6IJ,	259,483	VE3QD,	93,600	W1JYH,	42,959
W6SZY,	231,105*	WØNUC,	92,105	W8AZD,	42,768
HB9CX,	227,458	W8ZY,	85,620	W3GHD,	42,552
PY2AC,	205,140	W1RY,	84,785	W2IMU,	42,456
KG6DI,	210,000	VE4RO,	83,622	LB8R,	42,330
W8WZ,	202,500	VE4RC,	83,622	VE4XO,	41,184
W2FBA,	192,072	EI9J,	83,121	J2AHI,	40,272
W8JIN,	187,354	W9NII,	78,923	W3BEN,	39,312
W2BXA,	177,840	W6AM,	73,580	KH6QH,	39,274
CE3AG,	176,252	W6EPZ,	71,898	W2HMJ,	38,940
W6GRL,	169,680	W4KVX,	69,680	W9CIA,	37,248
W9IU,	137,175	WØAIW,	68,328	VE7ZM,	37,180
W6RM	132,854	W1BIH,	64,416	OK1RW,	37,164
WØDAE,	130,262	W6IBD,	61,548	TI2KP,	37,064
W9LM,	123,900	W6OMC,	61,084	W6BPD,	36,816
GW3ZV,	121,626	W1CJH,	59,220	W2EMW,	36,240
ZC1CL,	118,000	TF3EA,	58,000	VE6MZ,	35,482
KH6MI,	117,264	W5KC,	57,794	W2UFT,	33,553
VE7HC,	111,338	W7GUI,	54,720	W6QD,	32,996
LU5BM,	108,342	W2QCF	53,680	VE1EA,	32,012
W2IOP,	108,120	W9LVR	49,875	KL7PJ,	31,920
W6LDJ,	105,544	W3JTC,	49,770	W3ARK,	30,400
W9PSR,	101,780	W3JKO,	49,248	W6SRF,	30,305

* Multiple-Operator Station

Last month, W6ENV came to the rescue and churned out the column when I had to hit the road again to cover the Northern part of this state of ours. Sometimes it gets rather rugged trying to do the column without having it conflict with the necessary business trips yours truly must make at regular intervals. With such a masterful job as Andy has done on the last couple of occasions, I am sure Larry wouldn't mind if, sometime, I just kept going on a continual trip.

Congratulations to the following for making W.A.Z.

83	G6ZO	Chris Amundsen	40	157
82	LA7Y	Jim M. Kirk	40	180
84	W3LOE	Robert Cheek	40	194
85	W6SN	William A. Lippman	40	196
86	W6AYZ	Roy D. Mayes	40	147
87	W6DZZ	Edward J. Hoetzel	40	161
88	W6UCX	John R. Linden	40	137

**Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.*

None of the above really need much of an introduction, as their calls have been heard time and again on the air working the stuff. LA7Y had a little delay, since no country list was received, however, a quick exchange of airmail brought the necessary list of countries. You might be interested to know that Chris has never exceeded 40 watts input to his 807 which he uses in the final . . . the receiver is an AR-88. G6ZO received his 40th card and rushed them to us. They probably arrived just in time, because Jim is now a newly married man, which situation, they tell me, is not particularly conducive to DX. He may have a different formula, however . . . W3LOE and W6SN with 194 and 196 countries respectively, jumped quite a ways up in the Honor Roll in this issue. I think, too, you fellows should know that W6AYZ, who lives in a little town near Sacramento, is a brother of old W6BYB, and more recently D4AVW. Both of the boys are DXers from away back. W6DZZ, another old-timer, will no longer be heckled by the boys at the joint where he works. W6UCX really applied himself during the past year or so, and, obviously, it has paid off. Yes sir, 88 certificates thus far, and more coming without a doubt.

No Marathon 1949

After weighing all factors, we have decided against running the DX Marathon again in 1949, though this will disappoint many. I appreciate you fellows being interested enough to send in your comments, both for and against. Everyone seemed to think the Marathon was a swell idea for the past year, but they seem to think that it would probably be just as well to take a year's rest.

Those of you who have been participating in the 1948 DX Marathon should get your final revisions in without waiting too long. As a matter of fact, any additions or revisions postmarked later than 60 days from December 31, will not be allowed.

First, let me say that Guy Dennis, W6DI ,is coming along very well, although at this writing he is still in the hospital. For those who didn't read last month's DX column we reported the unpleasant news of the accident which befell Guy. The home made bomb that was discovered in his yard, and which he had in his left hand when it exploded, could have killed him. By the time you read this, he will probably be back on the air knocking off a couple of new ones. I should mention again that when the accident happened, Guy was in the process of cooking up the December totals of the Marathon; therefore, no changes have been made until this issue.

To get a little assistance on bringing the Marathon up to date, I thought I had better lower the boom on another committeeman, W6SA. Upon phoning his office it was learned that, "He is off for a week to have an operation or something." This was all news to me, but after a little sleuthing on the part of operative 1492, he was found to have gone to the hospital to have something called an appendix removed. By the time we found the right hospital, he had been discharged. We finally caught up with him, though, and dumped the whole Marathon file in his lap. Since he was going to be home for a few days recuperating, we figured he might as well be doing something for the good of the cause.

Today, I gave W6ENV a blast on the phone, and since he is custodian of the Honor Roll, I wanted to know how this was coming along. Well, he had been in bed for three days with Virus X (that's a sickness!), so everything was just dandy. Anyway, he is on the mend, and unless W2IOP or the printer falls flat on his face, we will have the Honor Roll, Marathon, and DX column this month.

A group of the boys in New York have formed a club called the "39'ers." According to the advance notice of their first meeting, it is supposed to be significant of the usual zone score on the East Coast. The first meeting was run by W2BJ, and they have it understood that anyone in the club who makes W.A.Z. has to buy a round of beers for everyone, in order to remain in good standing.

WØPNQ, who used to operate *KL7MH* on a small island 1500 miles west of the mainland, has just finished his new kw rig, using an 833 in the final. In fact, it was completed the day before the DX contest, during which he grabbed himself four new ones: *MP4BAB, VP8AM, I1BCB,* and *KM6AJ*. PNQ is having a little private DX contest with WØRBA . . . No doubt, that's the reason for the new rig.

W1NMP's activities have hit a new all-time low; however, he says the sigs emanating from his new jr. op, around 2 a.m., are hitting a new all-time high . . . but, Stan can't seem to hook up with Zone 26. I wish somebody in Zone 26 would work W1NMP and get him out of the dumps, or whatever he is in.

Patience is a Virtue

HC1AW and *ZP3AW* . . . What about him? Those of you who think ZP3AW was a phoney and will never QSL had better quit worrying. He was definitely in Paraguay and will eventually get a QSL card to everyone hae has worked. The same thing goes for his present station, HC1AW. He is a DX man at heart and well knows the scarcity of ZP QSL cards. It is not a question of getting around to sending cards, but it is simply a matter of not being able to do so until he returns to the States. Just be patient, gang . . . you'll get a card.



Four well-known Belgian DXers. Left to right: ON4AU, ON4US, ON4UT, ON4JW.

W. A. Z. HONOR ROLL

C. W.-PHONE			C. W.-PHONE			C. W.-PHONE			C. W.-PHONE			PHONE ONLY		
W6VFR	40	214	W6MLY	40	129	W2GUR	39	120	G3AAE	37	99	W6VFR	39	144
W2BXA	40	208	G5BJ	40	126	G5WM	39	120	W2SGK	37	95			
W6ENV	40	205	W6NRQ	40	123	G8RL	39	120	W7BTH	37	95	W6DI	38	163
W6PFD	40	203	W6BIL	40	89	WØOUH	39	119				W4CYU	38	162
W8HGW	40	206				G6BS	39	117	W3OCU	36	140	W8BKP	38	145
W6ITA	40	201	W3BES	39	206	W6NRZ	39	117	W2RGV	36	137	W7HTB	38	132
W6EBG	40	201	W2GWE	39	200	W7ETK	39	116	WØDU	36	134			
W6SAI	40	199	W2PEO	39	198	G3QD	39	116	W3LVJ	36	131	W2BXA	37	148
G2PL	40	199	W2HHF	39	193	G3TK	39	114	OA4AK	36	128	W1HKK	37	136
W3GHD	40	197	W9IU	40	192	W6LGD	39	111	W4DIA	36	120	G3DO	37	131
W6ADP	40	197	W3DPA	39	191	W6RLQ	39	110	SV1RX	36	119	G6LX	37	124
W4BPD	40	193	W8BKP	39	190	W6LN	39	107	MD5AK	36	118	G2AJ	37	121
W6SN	40	196	WØNUC	39	189	W7GXA	39	106	G2CNN	36	114	C1CH	37	75
W3LOE	40	194	W3JNN	39	189	W6MI	39	106	G2AKQ	36	112			
W4CYU	40	194	W8RDZ	39	188	KG6AL	39	104	W3AYS	36	109	W1JCX	36	155
W6SA	40	186	W2NSZ	39	186	W6LEV	39	103	W2BF	36	108	W1NWO	36	140
W6MØB	40	186	W3KT	39	186	W6ID	39	102	VE1PQ	36	105	W8REU	36	139
W2CZO	40	185	W9ANT	39	185	W7ENW	39	101	W4BK	36	101	W1MCW	36	136
W3EVW	40	185	F8BS	39	183	W6WJX	39	101	G2AO	36	100	W2DYR	36	135
W6MEK	40	185	W5ASG	39	180	W6AX	39	93	G6WX	36	95	W6PXH	36	129
ZL1HY	40	184	G6ZO	39	180	G6PJ	39	76	WØRBA	36	91	W1FJN	36	128
W6DI	40	181	W2HZY	39	180				W7EYS	36	90	G2PL	36	128
W6NNV	40	180	W3JTC	39	180	W3JNN	38	191	GM2AAT	36	75	G6BW	36	127
W2IOP	40	180	W6ZCY	39	180	VE3QD	38	172				W3JNN	36	126
W7AMX	40	179	W8NBK	39	174	W1JYH	38	170	CM2SW	35	143	W6WNH	36	123
W6KRI	40	178	W6KRI	39	173	W3EPV	38	167	W4DHZ	35	133	W4INL	36	113
VE7ZM	40	177	W3DRD	39	174	W3IYE	38	161	W4LVV	35	125	F8VC	36	111
VK2DI	40	177	W1ENE	39	173	KP4KD	38	155	W3WU	35	121	VE7ZM	36	109
WØYXO	40	176	W2CWE	39	173	W8FJN	38	153	VE3AAZ	35	118	G5YV	36	106
W6PCS	40	175	PY1DH	39	172	W3DKT	38	151	W8ZMC	35	118	G6WX	36	105
ZS2X	40	175	W6MX	39	171	W1ZL	38	150	W2GVC	35	118	W3DHM	36	96
W6TT	40	174	W2CYS	39	170	W4OM	38	149	W9WCE	35	117	W6SA	36	92
W6AM	40	173	W9RBI	39	170	W2PUD	38	149	W9CKP	35	116	F8DC	36	87
W6FSJ	40	172	W1NMP	39	169	W9LNM	38	144	W8AVB	35	113			
W6OMC	40	171	W8LEC	39	169	W8CVU	38	142	VE3ACS	35	111	XE1AC	35	142
W9KOK	40	171	W1BIH	39	167	W3KDP	38	141	W9CKP	35	109	W9RBI	35	131
W6WKU	40	170	W6RBQ	39	166	SM5WI	38	137	W6ZZ	35	104	W8BF	35	120
W5AFX	40	169	W6GDJ	39	164	W1KFV	38	134	G8VR	35	100	G3FU	35	115
W9VW	40	169	W6MVQ	39	164	W4FPK	38	132	W2WC	35	99	W6CHV	35	111
W6RM	40	168	VK2ACX	39	164	W4VE	38	132	W2HAZ	35	91	W4ESP	35	111
W7GUI	40	168	CE3AG	39	162	G8IL	38	131	G2AVP	35	89	W6PCK	35	109
W7FZA	40	166	W4BRB	39	162	W3ZN	38	130	W8JM	35	86	GM2UU	35	107
W6DUC	40	166	W4DKA	39	162	G5CI	38	130	D4ANM	35	80	W4OM	35	106
W6AMA	40	165	G5DQ	39	160	W2PQJ	38	130	G8RC	35	78	W9CKP	35	106
W6PB	40	165	W4INL	39	159	TF3EA	38	128	G3BDQ	35	74	G8QX	35	100
W6PKO	40	164	WØGKS	39	159	W9FKH	38	127	W7FNK	35	72	W9HB	35	89
W7DL	40	162	W6RM	39	159	G6LX	38	126						
VE7HC	40	162	W9LM	39	158	W9MZP	38	126	W4HA	34	124	W2RGV	34	111
W6DZZ	40	161	G8KP	39	156	W9TB	38	124	W9FNR	34	103	W8BIQ	34	103
WØNTA	40	161	VE7HC	39	156	GW3AX	38	123	G8QX	34	99	W8QBF	34	89
W7BD	40	160	W2RDK	39	154	WØSQO	38	123	G8KU	34	96			
VE4RO	40	160	W4GG	39	152	W6IFW	38	122	VK4RC	34	91	W5ASG	33	118
LA7Y	40	157	W9LNM	39	152	WØEYR	38	120	W9LI	34	90	W2ZW	33	115
G3AAM	40	156	G6QB	39	152	GW4CX	38	120	W8JM	34	89	W4HA	33	114
W6BAM	40	156	W8SDR	39	152	W8WWU	38	119	G6XX	34	89	W9BZB	33	108
W7BE	40	156	W6PQT	39	151	W8KPL	38	117	W3FYS	34	89	W8ZMC	33	102
W6KUT	40	155	G5YV	39	151	W9YNB	38	117	WØFWW	34	89	W5LWV	33	100
G3DO	40	154	G2AJ	39	151	W5CPI	38	113	W7PK	34	87	W2PQJ	33	100
W6BPD	40	154	W2COK	39	150	OK1CX	38	110	W2JA	34	84	WØHX	33	89
W6SRU	40	153	W6EPZ	39	149	G3ZI	38	107	W5CD	34	81	VE3ZM	33	81
W6FHE	40	152	G2WW	39	147	G8IP	38	105	W8PCS	34	80	VE3BNQ	33	79
W1AB	40	151	D2KW	39	147	W6MUF	38	105	W6WUD	34	68	W2DRH	33	60
W6SC	40	150	W2MEL	39	145	W9FKC	38	104	J4AAK	34	66	[illegible]		
KH6IJ	40	150	W6RW	39	145	KH6PY	38	94						
OK1FF	40	150	W6EAK	39	143	C1CH	38	76	W4LVV	33	111	W9RNX	32	108
W6LEE	40	150	W6OEG	39	143	G3BI	38	75	W4QN	33	104	W9WCE	32	94
ON4TA	40	148	W6JZP	39	142	W3JKO	37	154	WØGBJ	33	79	W2HY	32	85
W6ANN	40	148	W9DUY	39	141	W2TJF	37	144	G2LC	33	85	W2SVK	32	84
W6AYZ	40	147	G6BQ	39	140	W3LVJ	37	138	W8QUS	33	85	W9GZK	32	72
W6TI	40	146	G3FJ	39	139	W4ML	37	131	WØFET	33	81			
W7DXZ	40	146	W6UZX	39	137	W2CNT	37	126	G8VG	33	78	W6UZX	31	85
W9NRB	40	146	W9VND	39	136	G4CP	37	117	G3BFC	33	77	W6AM	31	81
W6LER	40	145	G5RV	39	132	W2EMW	37	117	W2NXZ	33	61	W4LZM	31	80
W6OD	40	144	G2VD	39	132	VE1EA	37	116	VE3AGC	32	108			
W6PZ	40	143	G2FSR	39	130	WØAZT	37	112	W2OEC	32	96	OA4AK	30	84
W6AOA	40	139	W6LRU	39	130	W2BJ	37	111	W1BFB	32	94	W9MIR	30	82
W6UCX	40	137	W6DLY	39	129	W6CTL	37	111	HA1KK	32	78	W2SVK	30	74
ON4JW	40	136	VR5PL	39	124	W2GUR	37	109	WØFET	32	71	W7JUO	30	70
W6RDR	40	134	G5VU	39	124	G4AR	37	108	W2AYJ	31	103			
G3AZ	40	134	W8VLK	39	123	W8HSW	37	104	G6QX	31	90	W8SXU	28	59
W7GBW	40	129	G3AAK	39	122	G5MR	37	100	VE5JV	31	83			
W6YZU	40	129	OK1AW	39	122	W2BLS	37	100	KL7CZ	30	56	W2BF	27	52

Horace Greer, W6TI, has just wired that he has received 51 cards from *AC4YN*, which were sent to him via *VU2GB*. Gerry Balantine, VU2GB, says that the India Radio Amateur League will handle all cards for VU2, VU7, AC3, and AC4. After what W1NMP thinks, I know I shouldn't say this, but what the heck, here goes . . . VU2GB goes on to say, "Have the W1s any xmtrs to put out their calls? Send a W6 xmtr to Rhode Island . . . it would enlighten that state." Hmmm! You figure it out. . .

I can't figure out what happened to W2OEC, operated by W6C©D. Just get a load of this chatter he puts in a letter. "I am beginning to believe that the Sardinians are very restless about the canning factories of New Jersey. I can't think of any other reasons why the IS1s won't return my calls. Will 'CQ IS1' work? My smile has increased, with *SP8XA* being the cause. That 'X' in the call scares me a little. They don't have any FM experimental stations, do they? If so, Major Armstrong should hear of this. Turkey must be waiting for Thanksgiving, cuz *TA3FAS* is still in there kicking." All of that is from W6COD, op at W2OEC . . . and, for the love of mike, don't blame me.

Anotner old-timer back on the air, and making his way up the Honor Roll, is W9LI. As Jim says, 20 years is a long time to stay in moth balls.

All of you want to know what we are doing with the Palestine situation. Do we count ZC6 and ZC8 separately? Or . . . are Israel and Arab-held Palestine different countries. The answer . . . is "no." Now don't blow a fuse. When you think of the situation there as it stands now you will have to admit it is rather touchy. We have nothing definite as to the the eventual boundaries . . . nor do we have any assurance that everyone will recognize the division of Palestine. In short, it is not a matter of life and death that we decide immediately if they should be two different countries. Let's take it easy and when we do decide we'll be certain that it will stick. Israeli is listed on our new country list in error.

We hear that after January 25, there will be no more American stations in the Philippine Islands. Someone said they won't license Americans after that date, because we won't license Philippines in this country. If this goes through, it may be a little tough to work a KA.

WØRBA says there is no contest anymore with WØPNQ, since he got the 833 final. He says *CR6AW* opened shop on November 6, and can be found on the low end of 20, T7. This will take some of the burden off of *CR6AF*, *CR6AI*, and *CR6AQ*.

W6ODD has been sending his cards for operation as *FI8* and *CR8*. If you haven't received yours yet, better get after him. W9LM says that he got a card from *W8OZG/C6*, who admits he is a bottlegger, as well as apologizing for crossing up W9LM as to what zone he was in. He tops it off by wanting to play chess by letter with W9LM. I can't think of a better way to spend the next 45 years.

W7HXG says he has just put up a new 3-element wide-spaced 20-meter plumber's nightmare, and until he gets a motor for rotating the antenna, it will stay fixed on South America.

(*Continued on page 72*)

DX MARATHON

C.W. PHONE

Zone 1

KL7KV	32— 65
KL7KI	19— 31
VE8AS	14— 18
KL7CZ	12— 12
KL7DE	8— 11

Zone 2

VO6EP	38—134
VO6J	15— 38

Zone 3

W6PFD	40—189
W6SN	40—185
W6ENV	40—184
W6ITA	40—179
W6NNV	50—161
W6KRI	40—155
W6AM	40—153
W6RM	40—148
W6OMC	40—147
W6PQT	40—131
W6WKU	40—121
W6UCX	40—127
W6SRU	40—117
W6HZT	40—115
W6UZX	40—114
W6LRU	40—113
W6FSJ	40— 92
VE7ZM	39—119
W6ANN	39—109
W6QD	39— 97
W6GAL	38—140
W6WWQ	38— 81
W6LN	38— 72
W6MI	36— 83
W6MUF	36— 77
W6OEG	35— 80
W6CTL	35— 96
W6KYV	34— 82
W6QWL	32— 83
W6ZZ	32— 79
W6BIL	32— 65
W6LER	32— 53
W6MXN	30— 72
W6CID	27— 39
W6EYC	25— 47
W6OKL	24— 55
W6AGT	24—144
W6VAT	24— 37
W6MGZ	23— 29
W7PK	21— 49
W6MIO	19— 22
W6UXF	17— 18

Zone 4

W9VW	40—153
W8EWS	40—150
WØYXO	40—146
W9IU	39—175
W9NDA	39—167
W9LM	39—157
W5ASG	39—152
W8SDR	39—130
WØGKS	39—123
W9GA	39—106
W9LNM	39—133
WØEYR	38—120
VE3QD	36—132
W9CIA	36—121
W9TB	36— 89
WØDU	35—118
W8GLK	34—103
W4HA	34—116
WØSBE	33— 95
W9WCE	32— 96
WØCFB	32— 90
W8KPL	32— 85
WØCMH	30— 18
W5CPI	29— 75
WØAZT	29— 60
W5EWZ	29— 51
W8MQR	28— 57
W9MZP	28— 49
W5ZD	27— 75
WØUOX	27— 57
W8BF	25— 68
W9EHS	24— 56
W8LFE	23— 38
W5JPC	22— 45
W8NKU	21— 46
W9KMN	15— 13

Zone 5

WIENE	39—163
WINMP	39—159
W3DPA	39—145
W1BIH	39—133
W1AB	39—121
W3DRD	38—138
W1JYH	38—132
W3IYE	37—120
W3EPV	37—110
W3OCU	36—140
W4JFE	36—137
W1AWX	36—104
W2TJF	35—125
W1BFT	35—111
W2EMW	35—110
W2RGV	34—101
W3WU	34— 98
W2AW	34— 95
W4LVV	33—119
W2WW	33— 87
W2MEL	33— 87
W3NOH	32—108
KH6PY	38— 94
W2PQJ	32— 91
W8JM	29— 68
W2OM	29— 65
W1MRP	28— 81
W3AQT	28— 59
W4TO	27— 95
W2BF	27— 72
W4JUJ	27— 60
W1CJH	26— 66
W4ALJ	26— 52
W3RJS	25— 52
W2IOP	23— 47
W2PUD	23— 40
W4IK	21— 46
W1HJ	21— 44
W4CY	21— 43
W1QCJ	21— 38
W3NPZ	18— 41
W4BRB	16— 36
W4HKJ	13— 21

Zone 7

TG9JK	33— 80

Zone 8

KP4HU	39—146
KU4AD	28— 65
KP4KD	21— 48

Zone 10

OA4AK	36—116

Zone 11

PY1DH	30—134

Zone 12

CE3AG	39—133
CE7AA	35— 33

Zone 14

F8BS	39—149
G3DO	39—121
ON4MS	35— 76
EA5BE	29— 73

Zone 20

SV1RX	31— 93

Zone 25

J2AHI	18— 35

Zone 27

KG6AI	28— 51

Zone 30

VK2DI	40—147

Zone 31

KH6IJ	39—102
KH6LF	36— 96
KH6NB	36— 72

Zone 32

ZL1HY	33— 82
ZL2GX	32— 96
ZL1QW	20— 39

Zone 36

FE8AB	32— 78

Zone 37

VQ3HGE	39—122

Zone 38

ZS2X	39—126

PHONE

Zone 3

W7HTB	38—117
W6DI	37—141
W6CHV	32— 97
W6ITA	31— 90
W6PXH	30—100
W6AM	27— 52

Zone 4

W9NDA	36—111
W9RBI	35—117
W9HUD	34—109
W5ASG	32— 99
W8NK	31— 70
W5LWV	29— 71
W9WCE	27— 69
W5ERY	26— 73
WØSBE	26— 61
VE3BBZ	24— 52
W8LFE	16— 23

Zone 5

W1JCX	35—127
W1NWO	35—124
W4ESP	35—110
W1ATE	35— 97
W1FJN	33— 97
W4HA	32—104
W2RGV	31— 76
W2IUV	30— 72
W2DYR	29— 78
W2PQJ	25— 54
W1CJH	23— 52
W1EQ	22— 52
W2BF	20— 44

Zone 6

XE1AC	34— 33

Zone 7

TG9AD	22— 35

Zone 8

KV4AD	27— 55

Zone 10

OA4AK	30— 68

Zone 13

CE3AB	31— 99

Zone 14

G3DO	35—106

Zone 14

F8DC	28— 47

Zone 25

J2AHI	19— 81

Zone 31

KH6NB	26— 48



Conducted by VINCE DAWSON, JR., WØZJB*

EVEN THOUGH THE MUF in November did not reach the peak it did a year ago, several openings into DX land has rewarded the die-hards, who remained active on 6 meters, during the winter lull in activity.

Naturally, during the winter months, the v-h-f bands suffer from loss of activity, but with all the 2-meter lads active during the past summer, little did anyone imagine these stations would pile back on the lower frequencies in search of DX. In order to help restore 144-mc activity around Erie, Pa., W3AU, W3GV, W3NOJ, W3QKI, and W3WBM have mailed out a circular letter to approximately 50 stations in Western N. Y. Pa., Ohio, Michigan and Ontario. Two evenings each week, namely Mondays and Thursdays, are the nights designated for getting together, the time is between 2100-2300 EST. DX is not the main reason for these get togethers, which stimulate lots of contacts and rag-chews. All 2-meter stations in this area are urged to set aside these evenings and make a few contacts.

F-2 Openings

As mentioned previously, a few of the 50-mc gang were sufficiently active to take advantage of several F-2 openings that occurred in November.

Indications, in late October, were that the MUF might swing over the 50-mc boundary any day. The first opening reported to us was a contact between G5BY and ZS1P, Nov. 1, between 0918-1004 EST. Signals had a slow rolling fade from S7 to the noise level. ZS1P was last heard at G5BY around 1009 EST, when the signal settled into the noise and disappeared. G5BY mentions that the peak MUF days for the North Atlantic path in October, were the 22, 25 and 27, when harmonics up to 47 mc were heard. On Nov. 13, the MUF was up to 48 mc at 1300 EST, and on Nov. 17, WKI7 came through on 48.5 mc. Within 30 minutes the MUF had dropped back 9 mc and the Ws went out on 28 mc at the same time; WWV was sending Ns during this period.

Nov. 9, between 1110-1140 EST, the California and Washington paths to the east coast appeared to be open for Ferrell in Philadelphia. Numerous diathermy and other harmonics were found in the 50-51 mc spectrum, as well as, the rebound scatter from the Zenith FM station in Chicago on 45.1 mc. The latter is usually a good indication that the MUF is exceding 50 mc. During this same date W7QLZ heard signals up to 48.7 mc, W5ML heard harmonics from the northeast up to 47.4 mc around 0900 CST; while W7HEA heard FM stations around 46 mc. Later in the evening the 50-mc band was open via Es from Wyoming to the middlewest.

The trans-continental path across the U.S. was open on Nov. 13, when W7DYD near Seattle worked, from 1135-1145 PST, W2BYM with S5 signals. Nov. 14 was better for W7DYD, when he worked W2BYM, VE1QY, and heard W1CLS, between 0940-1158 PST. The signals from VE1 were S9, while the W1s were much weaker. During this opening W2BYM was heard calling VE7CN. Nov. 15 W7DYD had contacts with W1CLS, W1ATP, and W1FMH, between 0955-1028 PST with fair conditions.

On Nov. 21 HC2OT, ex-W5DNN, worked into W5-W8. Although reports are not complete at this writing, W5AJG worked him at 0900 CST with S9 signals for Leroy's eighth country. At W5AJG the 85′ 4-element beam was 12 db better than the same type of antenna at 35′. W5AJG also mentions that HC2OT was coming into W5 on Nov. 20, although Leroy was unable to be active on that date. In Metamora, Ill., W9ALU had his beam on G land at 0900 CST, Nov. 21, when HC2OT was heard off the ends. HC2OT peaked S9 for about 4 minutes, then faded out. W8CMS, W8MVG and W8NQD also worked HC2OT on Nov. 21, with S9 signals.

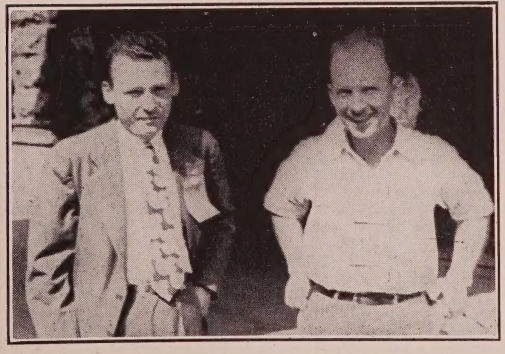
See Report Section for further information on the openings, as reported by dates.

50-mc Notes

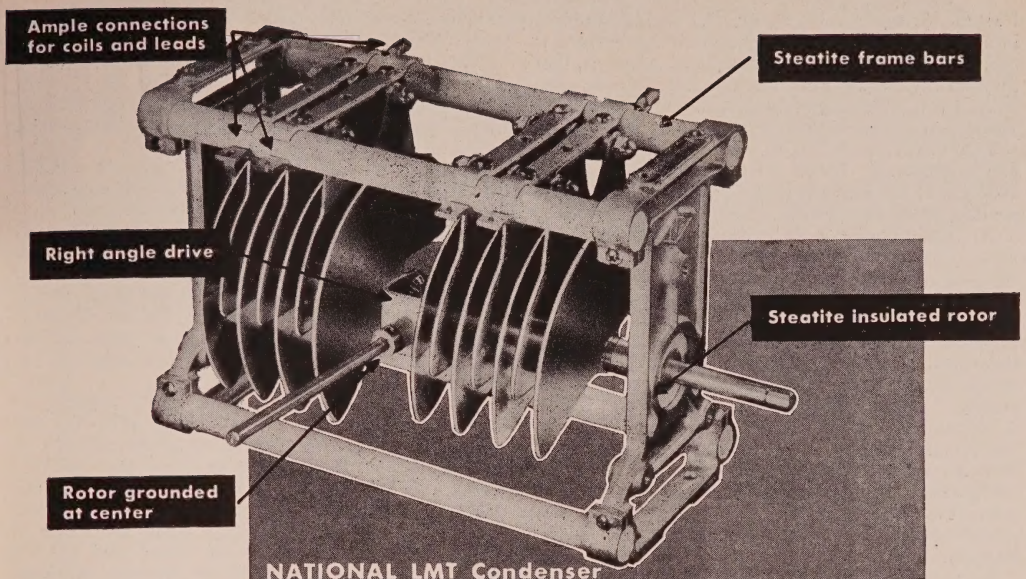
Charles Rice, W8MVG, has been hearing very weak signals up to 50.2 mc almost daily. These carriers peak on Africa, but bad QSB prevents identification. Tone modulated signals are sometimes heard right up to 50 mc.

In California Ray Bloemer, W6QG, has been missing some of the 50-mc DX because of WGBA-

Send all contributions to Vince Dawson, Box 827, Gashland, Mo.



OA4AE and W9ALU. Two top-notch 6-meter DX men talk it over at Milwaukee.



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FM in Springfield, Mass., on 48.1 mc, although it is a good marker and indication that 6 meters is open. The thing that Ray complains about is that they always drag out the national anthem, and while he is standing at attention, the 50-mc band opens and closes before he can sit down.

Tom Stence, W8NQD, says that his heart stopped beating for 5 minutes on Nov. 21 at 1003 EST, for he called CQ on six with his beam pointed south and HC2OT answered him, on what Tom thought was a very dead and lonely band. Tom requests no flowers, just more nice surprises like that, for the v-h-f heart is plenty strong at his QTH.

VE7CN says that on the recent transcon openings on Nov. 13-14-15 a very interesting thing happened. VE7ABO, who is 100 miles farther away and the same distance from any active 6-meter station, heard W1CLS, HPC, FMH, ATP, as well as W7ERA, DYD, LMF, VE7CN, AEZ and VE7NM. The receiver was an SX-43 with a long wire antenna. No doubt the W7s and VE7s were being received via scatter rebound, while the W1s were F-2 hop, yet VE7CN was unable to hear any of the rebound scatter, nor as many of the W1s.

In Sheridan, Wyo., W7JRG says that the lack of aurora openings for him is something to comment on. Ken has watched the band whenever it appeared probable that aurora reflections might occur, but to date his only contacts are via Es, for there just isn't any F-2 or locals to work. After listening to the horrible QRM on the lower frequencies, Ken is convinced that 6 meters is the band for him and is now trying to promote some local activity, for he well remembers the FB QSOs he had with such members of the 50-mc fraternity as W9ZHL, W4FWH, W6IWS and W6BPT.

Ed Gessert, W5ELL, in Albuquerque, is now off the air due to moving to a new QTH. Getting back on the air will be quite a bit of work for Ed, as it involves building a shack in the garage, putting up two towers and installing a heater in the shack.

W5AJG says the QSL business is too good, for it bites into his operating time on the v-h-f bands. Both W5AJG and W5ML in Oil City, La., are having a feud these days, both trying to outdo the other.

Things have been quiet around W6-land according to W6AMD. Roy did hear an FM station on 49 mc on Nov. 14 from 1102-1126 PST, but nothing came through in the 50-mc region.

W8LBH is trying to work up a 6-meter net in Ohio, anyone interested contact Bud for further information. W8LBH has a 522 converted to 50 mc, feeding into a 3-element workshop beam, with which he has worked 21 states.

Basil, at VE5NC, has a new converter using a 6J6 and 6C4 that covers between 28-47 mc, which feeds into a 522 i-f strip. The ratio detector isn't doing so well, but for AM works well above 40 mc. A regular communications receiver with sharper i.f.'s is used on 28-30 mc, but the broad response of the 522 i.f. above 30 mc is an advantage, in that additional selectivity is not of much use and the tuning of the converter becomes less critical. The highest MUF Basil has heard so far this year is 44.5 mc.

In Tulsa the 6-meter gang meets nightly at 2000 CST, then looks for W5HTZ, W5GNQ and W5HLD, all around 100 miles away. Activity is up on 50 mc in Tulsa with these on: W5WI, HFY, FFW, OPI, MEY, OOJ and W5LEI. W5LEI found out how to open the 6-meter band by just calling plenty of CQs when short-skip is in on 28 mc. Of course the other end of the deal is to have the W7s in Arizona working on their receivers and happen to tune you in. This happened with both W7OWX and W7QLZ when W5LEI was heard on Oct. 29.

W9NJT is operating on 6 meters exclusively and does the same as everyone else, complains that activity is too low. Don has as locals to depend on, W9OFL and W9VZP, the rest of the gang having gone to W6QDs land of DX. But that's not as exciting as v.h.f. says W9NJT, for anyone with 15 watts tied to their bed springs can work DX. Well at least that's a new way of putting it; W6QD please copy.

Propogation Log

Oct. 26—Ionospheric conditions unsettled, but MUF across Atlantic reached 42.1 mc while trans-continental MUF reached 42.7 mc. Some sporadic-E during late evening in the southwest. W6IWS worked VE7AEZ. W7QLZ worked W5GNQ, W5HTZ, W5EHR, W5LEI and heard several W4s. W6AMD worked W5ZZF. W5LEI also worked W7OWX and W7FFG.

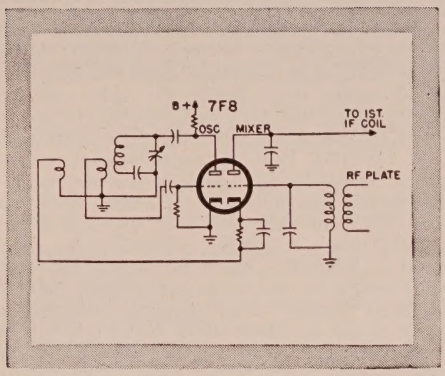
Oct. 27—Mild ionospheric disturbance, various path MUFs did not exceed 39.0 mc.

Oct. 28—W5ML worked W9ALU at 0920 CST on a quick sporadic-E opening. Peak Atlantic

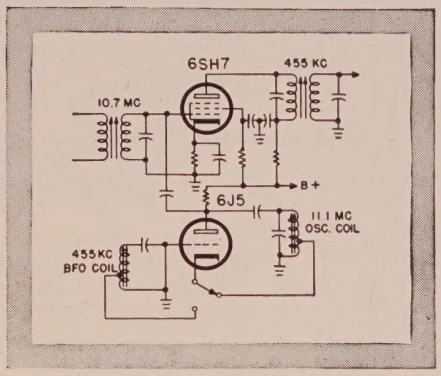


Left to right: W4JBE, W2-TP, unidentified, W8QYD, W4SBF, WØWGZ, WØ-VIK, W9JIL, and W5HLD. Photographed after the v-h-f meeting conducted by WØZJB at the National A.R.R.L. convention.

Two Reasons Why the SX-43 Is Extra-Hot on 6 Meters --



TRIODE MIXING . . . in the first detector. This quieter method of conversion greatly boosts the signal-to-noise ratio because there's almost no first detector "hiss." Inductive coupling (rather than electronic) of the oscillator signal avoids multi-grid noise in the sensitive 50-Mc range.



DOUBLE SUPERHET . . . After two stages of IF at 10.7 Mc, this 6SH7 makes a second conversion down to 455 kc for ample selectivity, plus complete absence of images. The 6J5, which is used as BFO on other bands and otherwise idle on this band, acts as local oscillator. No extra tubes, yet plenty of extra performance!



SX-43 $189.50

Before you buy, see and try the SX-43. Compare its features . . . learn the thrill of its superior performance. At its price, it's the hottest thing available—by far.

Range 540 kc to 55 Mc plus FM Band 88 —108 Mc; other features include calibrated bandspread, one stage tuned RF, temperature compensated oscillator, crystal filter, two stages IF, tuning meter, two stages audio; 10 tubes plus rectifier.

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Manufacturers of precision radio and television equipment.

MUF just under 46.0 mc, trans-continental MUF about 41.0 mc.

Oct. 29—Conditions ionospherically quiet, but MUF did not appear to go above 44.0 mc on any path.

Oct 30—Same as above, but probably did not exceed 44.5 mc.

Oct. 31—Same as above, but probably did not exceed 43.5 mc.

Nov. 1—G5BY worked ZS1P at 0918 EST. Northwest MUF lower than 40.0 mc. W6QG heard Hawaiians on 46.2 mc at 1330 PST. W6AMD worked W5JLY at 2222 EST during the onset of a moderate ionosphere storm.

Nov. 2, 3, 4, 5 and 6—Conditions poor to fair, some ionospheric disturbance during first three days. Peak MUF reported only 42.4 mc on any path.

Nov. 7—Conditions improved greatly over day before, but peak was only 44.5 mc.

Nov. 8—Northeast MUF up to about 46.0 during morning. W8CMS worked W5HTZ at 2258 EST via some thin sporadic-E.

Nov. 9—Ferrell thinks 6 meters was open around 1115 EST for trans-continental F2 work. Carriers were heard up to 51.0 mc. W6QG reports MUF exceeding 46.5 mc at same time. Very good sporadic-E opening during the evening between W7 and W9, WØ. W7ILL and W7JRG worked over 20 different stations from 1907 to 2153 MST.

Nov. 10—North Atlantic MUF shot up to over 47.0 mc during the early morning. Ferrell heard Stockholm, Paris, and London TV and FM until 1115 EST. W6QG and W7QLZ heard FM stations up to 46.0 mc from the east coast. W5ML heard up to 46.5 mc from the southeast. W9ALU worked W5JLY at 2311 EST.

Nov. 11—Trans-Atlantic conditions slightly down, but trans-continental MUF was over 46.5 mc. Conditions were ionospherically quiet.

Nov. 12—Trans-Atlantic MUF exceeded 45.5 mc from 1005 until after 1130 EST. Trans-continental MUF was about 45.5 mc. Lower W7 and W6 to W5 was open from 1845 to after 1930 PST.

Nov. 13—Trans-Atlantic MUF was above 47.0 mc. At 1355 EST W7DYD heard W2BYM, finally making contact at 1435 EST. VE7CN heard signals up to 50.3 mc. W2BYM heard him, but no contact was made. W7QLZ and Ferrell both were inside the skip and heard signals only up to 45.0 mc.

Nov. 14—Trans-Atlantic MUF again exceeded 47.0 mc, but no one seems to get through on 50.0 mc. VE7CN worked W2BYM on c.w. at 1445 EST. W6AMD heard an FM station on 49.2 mc at 1402 EST. W7DYD worked W2BYM, VE1OY and W1CLS until 1458 EST. Ferrell, W7QLZ and W6QG again were inside the skip and heard nothing above 46.5 mc. Band opened for sporadic-E W1 to W4 and eastern W5 from 2100 to 2200 EST. W5JTI, W4LNG and W4GMP were on.

Nov. 15—W7DYD and W6QG both heard the FM station on 48.1 mc from 1240 EST. Later from 1255 to 1328 W7DYD worked W1CLS. W1ATP and W1FMH. VE7CN also worked W1CLS. VE7ABO heard numerous W1 signals and considerable rebound scatter back from W7 and VE7 signals. This opening preceded ionosphere storm by about eight hours. W7QLZ reports sporadic-E to W5 around 2140 EST. W1CLS worked VE7CN on phone and c.w., plus W7ERA, VE7AEZ and VE7NM. W6IWS also heard W1CLS.

Nov. 16—Trans-continental MUF exceeded 49.0 mc around 1245 EST, but no 6-meter signals were reported as getting across. Conditions unstable.

Nov. 17—Conditions again unsettled, but MUF reached to 43.0 mc during the mid-day. A W8 to W5 sporadic-E opening from 1900 until 1945 EST.

Nov. 18—W6QG had a short opening (it was about time) working W1CLS at 1255 EST and hearing W1HMS. W7QLZ heard signals up to

(*Continued on page 80*)

50 MC HONOR ROLL

CALL	S.	C.	CALL	S.	C.	CALL	S.	C.	CALL	S.	C.	CALL	S.	C.
W9ZHB	48	6	WØINI	42	3	W2RLV	37	6	W6AMD	34	3	W1AF	27	5
WØZJB	48	4	W7HEA	42	3	W5FSC	37	6	W7JPA	34	2	W7ACD	27	2
WØNFM	47	5	WØKPQ	42	2	W5JTI	37	5	W7JRG	27	2	W7JRG	27	2
W9QUV	47	4	W8QYD	41	4	W4EQR	37	4	W1HDQ	33	6	W5LBG	26	3
W6UXN	47	3	W3CIR/1	41	3	W5VV	37	4	W6PUZ	33	4	WØDNW	26	2
WØUSI	47	3	W5ML	41	3	W6IWS	37	3	W4WMI/4	33	3	WØYKX	26	2
W6WNN	47	3	W8ZVY	40	7	W6OVK	37	3	W4DRZ	33	3	W7BOC	26	2
W4GJO	46	4	W4QN	40	4	W9NJT	37	3	W7KAD	33	3	WØUEL	26	2
W9DWU	46	3	W1LLL	40	4	W7DYD	37	2	W3MKL	33	2	W6NAW	26	2
WØDZM	46	3	W4FBH	40	3	W9UNS	37	2	W1CLH	32	3	W7QLZ	25	3
W9ZHL	45	6	WØSV	40	2	W7FDJ	36	3	W5WX	32	3	VE1QZ	24	6
W1CLS	45	5	W4GIY	40	2	W3OR	35	6	W6FPV	31	3	W5LIU	24	3
W7BQX	45	4	W5JLY	39	10	W1GJZ	35	5	W4HVV	30	2	G5BY	24	19
W9PK	45	3	W1CGY	39	6	W6BPT	35	4	WØDER	30	2	XE1KE	23	6
W8NSS	45	3	W6ANN	39	3	W1JLK	35	4	W4FNR	29	3	W9AB	23	4
W7ERA	44	4	WØDKS	39	3	W9VZP	35	4	W8MVG	29	6	W8YLS	22	3
W7FFE	44	4	WØYSJ	39	2	W9UIA	35	3	W5ELL	29	2	W7CTY	22	2
WØQIN	44	4	W4GMP	39	2	W5HF	35	3	VE1QY	28	4	W8LBH	21	2
W5VY	43	11	W2AMJ	38	6	W5HTZ	35	3	W9FKI	28	4	W5HVP	20	3
W5AJG	43	8	W5FRD	38	6	W5HLD	35	3	W4FQL	28	3	VE7NM	17	2
W4EQM	43	3	W2IDZ	38	5	W2BYM	34	4	W1ATP	28	3	VE7CN	15	2
W9ALU	42	5	W3OJU	38	5	W3RUE	34	3	W5ESZ	28	2	W8EP	14	2
WØBJV	42	3	W4FID	38	4	WØJHS	34	3	W9MBL	28	2	KH6PP	5	7



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RME-45 — with speaker	125.00
RME VHF-152	64.00
RME DB-20	54.00
NATIONAL NC-173 — with speaker	145.00
NATIONAL NC-183 — with speaker	215.00
NATIONAL HRO-7T COMPLETE	240.00
HAMMARLUND HQ-129X — with speaker	135.00
SONAR CFC	39.00
SONAR XE-10	32.50

The ones listed above are the "pick of the crop"—come in and look over our "as is" SUPER BARGAINS!

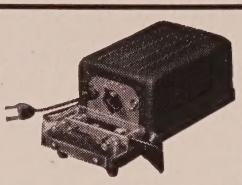
At any time within a month, you can return your used receiver and I will allow you full credit toward the purchase of a new receiver.

NEED ANY MOBILE GEAR

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T-17B—Made by Shure, this model that we offer has superior quality and pickup characteristics..... $1.98



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HALLICRAFTERS BC610E—Late model, factory modified for 10-meter operation. Reconditioned and guaranteed! Complete with speech amplifier and coils for 10-20-40-80. **$895.00**
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Conducted by LOUISA DRESSER, W2OOH*

BACK IN THE April, 1946, issue of *CQ*, when this column was first initiated, one of the objectives set forth by Amelia, W2OLB, was "getting more of a voice for the YL in ham affairs." Whether or not this column has had any influence in this direction, one can only surmise, but it is becoming increasingly apparent that the YLs are receiving more recognition from brother hams.

For instance, the occasion of a hamfest and dinner held recently by the Chester Radio Club at Walbers on the Delaware, Essington, Pa., was, according to club secretary Anabel Gifford, W3NNS, "the first time in the area that the YLs participated in an affair of this sort."

To get in on their good fortune, we joined forces with W3 YLs for the evening, where we met Anabel, W3NNS; Jean Hauff, W3INL, and Adele Burnham, W3OCH, and renewed acquaintance with Mae Burke, W3CUL.

Mae, we learned, was the Chester Club's first YL member, having joined the club back in 1931. She came up with her ticket in 1932, but after a number of years let her license lapse. When the bands opened up after the war she again became interested, and OM W3VR suggested, "Why don't you see if you can get your old call back?" Sure enough, she did, and for the past two years has been active on 80, 40, 20 and 10 c.w., and 10 phone. On 20 and 10 c.w. she runs 250 watts, and 50 watts on 40 and 80. To date Mae has worked 60 countries, has WAS and WAC. She also is active in two traffic nets, one of them the Eastern Shuttle Net at 10:30 a.m. every day, of which, by the way, Tillie, W3NHI, is net control.

Adele, W3OCH, and her OM, W3NYN, are on the air with a converted police transmitter, an S40 receiver and a 3-element Workshop beam, and find they are really getting out with their signals. As Anabel described it: "They have a new QTH, a new beam, and live in Delaware—with all the world before them!" Working a YL in Delaware must be like snagging rare DX!

Jean, W3INL, was our featured YL of the Month in this column in October *CQ*. Since that writing she and OM W3GHS have put up their 70-ft. high 6-element 10-meter rotatable beam, with the stacked 6-element 144-mc beam above it, and Jean is keeping W3INL on the air on 2 meters. Pix of the new beam left us drooling!

Following the hamfest, Anabel and OM Giff took us home with them for the night, and early the next morning we had W3NNS on the air for DX and W contacts, including an FB QSO with Annette, W4LKM, on 10 (so sorry we couldn't stay long enough for the YLRL net!). Between QSOs we gleaned from Anabel how she started in ham radio.

OM W3AAW has been on the air since 1923, but it wasn't until he started operating 5-meter portable-mobile before the war that Anabel became interested. At that time, also, they were using a 2-meter station in a plane, the equipment for which was so big that Anabel was the only one small enough (she's all of 4 ft. 9 in. tall!) to fit in beside it. From the plane she experienced the fun of calling "CQ airborne" and hearing every ground station within range come back to her. After 10 was opened at the close of the war and she heard "all those nice people" she knew she just had to get her license. When the prized ticket finally arrived, Anabel rushed gleefully to the phone to tell the OM, who was at work, that her call was W3NNS. "Ah," came the reply, "Now No Socks"—which, she confesses, is *practically* the case! Though we must add, Giff is perfectly happy with the state of affairs.

For the past year and a half Anabel has been very active on 10, spending every minute of the day she can at the rig. With a 4-element wide-spaced rotary, 125 watts, e.c.o., and an HQ-129X, she keeps her log well filled. Anabel has many regular skeds, among them one with Ruth, W5IZL, and all last year she kept a daily one with Mary, D4ATR (now F7AH). Anabel handles a good deal of traffic, and loves all operating, as is attested by her A-1 Operator and Rag-Chewers' Club certificates.

(*Continued on page 70*)

*Assistant Editor, *CQ*. Send all contributions c/o *CQ*, 342 Madison Ave., New York 17, N. Y.*



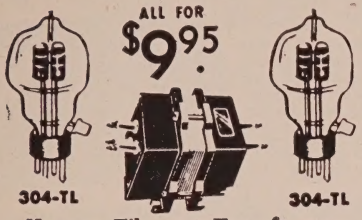
YLs attending the Chester (Pa.) Radio Club hamfest. Standing: W3OCH, Adele, and W3INL, Jean. Seated: W3CUL, Mae, and W3NNS, Anabel.
—Photo by W3ADV

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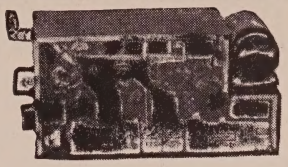
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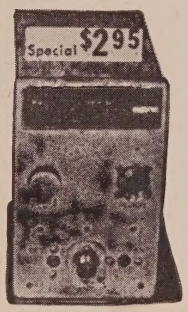


Freq. 108-110 Mc. Tube complement 10 tubes—1—12SQ7, 2—12SR7, 1—12A6, 1—12AH7GT, 2—12SG7, 3—717A. NEAR NEW CONDITION. Companion to the glide path receiver. Also contains 90 and 150 cycle band-pass filters. Has the best AVC system yet developed can use parts or use as a model for construction. 10 tubes, crystals, relays, etc. Schematic included. Don't pass this up. With dynamotor. Only **$3.95**—2 for.....**$6.50**

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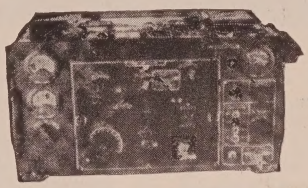
NAVY TRANSMITTER GP-7

125 watt xmtr., self-contained AC, 400 cycle power supply; uses suppressor grid modulation for phone, VFO controlled, 803 in final; built of std. parts. Bargain priced.....**$9.95.** Add **$1.** for packing.



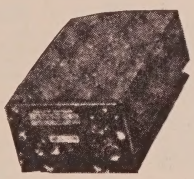
Can be adapted to radio controlled devices. Was used by pilots to flash a signal lamp on aircraft instrument panel when in range of a beacon transmitter. Responds to modulated signals over a variable range of 62 to 80 Mc. Tube plates and filaments operate directly from 24 V. DC. Can be adapted for radio control of experimental apparatus opening garage doors, etc. Circuit diagram and parts list included on either model shown below. BC-357—contains **12C8** and **12SQ7** tubes and **sensitive relay** (size 5⅝" x 5¼" x 3¼").

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PARTS AND PRODUCTS REVIEW

Exciter-Transmitter

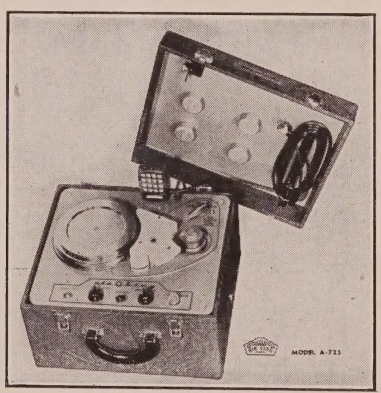
The Hunter Manufacturing Co., Inc., Iowa City, Iowa, is now making a bandswitching v-f-o controlled permeability tuned exciter with an output of 20 watts from 3.5 to 29.7 mc. Featuring



direct frequency reading, individually calibrated scales for all bands, integral crystal calibrator, low impedance link coupled output, excitation control, standby monitoring position, and control circuits for a final amplifier, the unit is housed in an attractive gray cabinet.

Portable Wire Recorder

Air King Products Co., Inc., Brooklyn, N. Y., are now manufacturing a new portable wire recorder. Model A-725 wire recorder is a complete unit including amplifier and speaker; has immediate playback; records from microphone, radio, phonograph or telephone; incorporates automatic shut off at end of play or rewind; makes perman-

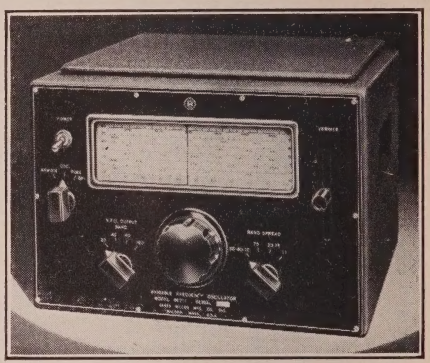


ent recordings or erases automatically when recording over used wire; has plug for cable to record from radio or phonograph; safety lock to prevent accidental erasures. The carrying case is blue gray leatherette, trimmed with nickel hardware. Compact and lightweight, the recorder weighs only 21½ pounds and measures 13¾" x 12" x 9".

V. F. O.

The new Millen 90711 consists of a 6SK7 compensated electron coupled oscillator of exceptional stability and low drift, a 6SK7 broad-band buffer or frequency doubler, and a 6AG7 tuned amplifier which tracks with the oscillator tuning. The 90711 contains a regulated power supply.

Output sufficient to drive an 807 is available on 160, 80 and 40 meters and reduced output is available on 20 meters. Low impedance output terminals are on the rear of the chassis. A cable and adaptor provide output at high impedance on 160, 80, 40, or 20 meters. A switch on the front panel selects the frequency range to be covered. Good bandspread with a separate scale on the dial is provided on the 80, 75, 40, 20, 12, 11, and 10-meter bands. The full vision calibrated illuminated vernier dial has a separate scale for each of the seven bands plus a 0 to 100 scale.



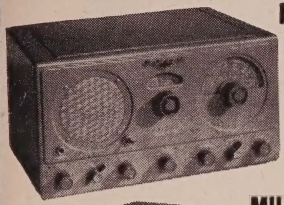
A switch, separate from the tuning range switch, selects the output band. This enables any tuning range to be used with any output band. A function switch on the front panel can turn on the oscillator alone, the entire v.f.o., or can select remote control so that the v.f.o. can be controlled by the station master transmit-receive switch. Since the output is isolated from the oscillator by two stages, zero frequency shift occurs when the output load is varied from open circuit to short circuit.

New Literature

A 4-page condensed bulletin of Electro-Voice microphones, stands and accessories is now made available by Electro-Voice, Inc. In this bulletin, the majority of popular E-V models are illustrated and described for quick reference. It includes cardioid dynamic and crystal microphones, broadcast and general-purpose dynamic and crystal Mobil-Mikes, differential microphones, velocity microphones, contact mike, and low-cost multi-purpose Century Microphones. Also includes E-V button-control floor stands, desk stands and mounts, and accessories. A copy of this Bulletin No. 103 may be obtained by writing to Electro-Voice, Inc., Buchanan, Mich.

Happy New Year from all the gang at HARVEY

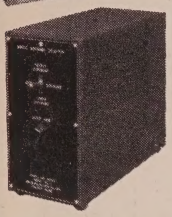
1940 1949



NATIONAL NC-57

540 kc to 55 mc with separate 6SG7 RF amplifier. Bandspread tuning and simple 5-position band switch. Built-in speaker. *Shipping Wt. 31 lbs.*

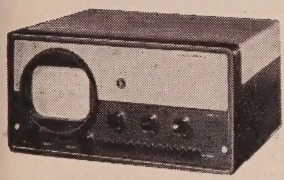
$89.50



MILLEN 92105 SSSR

Selectable single sideband reception will remove 95% of your QRM difficulties. Use with any rcvr having 455/456 IF. Other IF by changing crystals to your IF. *Shpg. Wt. 10 lbs.* **$75.00**

HALLICRAFTERS TV

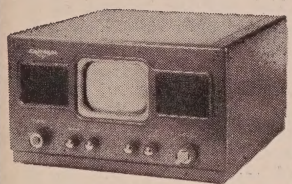


Push-button tuning covers all 13 channels. Model T-54 in steel cabinet with 7" kine tube. *Shpg. Wt. 50 lbs.*..... **$189.50**

Model 61. With 10" kine tube. *Shpg. Wt. 65 lbs.*..... **$289.95**

Model T-60, projects 12" x 16" picture. *Shpg. Wt. 125 lbs.*..... **$595.00**

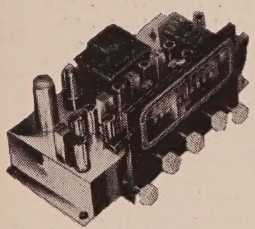
NATIONAL TV



All channels, 2 speakers, automatic gain control. Vernier fine tuning. **Model 7-M,** steel cabinet. *Shpg. Wt. 50 lbs.*..... **$189.50**

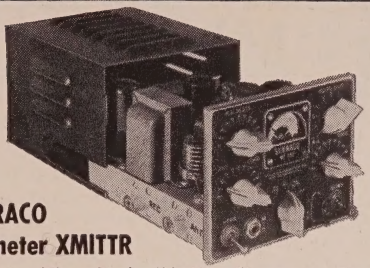
Model 7-W, same in fine mahogany cabinet. *Shpg. Wt. 50 lbs.*..... **$199.50**

RADIO CRAFTSMEN TUNER



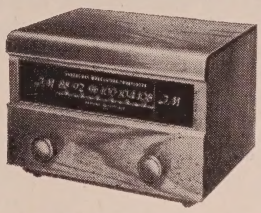
FM and AM with automatic frequency control. T. R. F. Stage on both AM and FM. **Model RC-8.** *Shpg. Wt. 20 lbs.*..... **$110.00**

Model RC-2 Hi-Fi audio amplifier. *Shpg. Wt. 30 lbs.* **$39.00**



SUBRACO 10 meter XMITTR

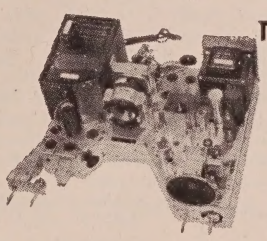
Compact mobile xmittr for "dashboard" mounting. Measures only 5½" x 4½" x 6½", weighs only 6 lbs. Designed to operate at 30 wts. input. Uses 6V6 Tritet xtal osc. quadrupling from 7 to 28 mc driving 2E26 Class C mod. amp. High level Class B modulator capable 17 watts audio. Built-in Coax antenna relay; p.t.t. switch. All controls front panel including illuminated meter, xtal jack, etc. Plate requirements: 300-400 volts at 140-180 ma. *Shpg. wt. 8 lbs.* Less tubes **$79.95:** including complete set tubes..... **$87.50**



GE FM TUNER

Only a few left of this unusual buy. Covers 88-108 mc range, uses guillotine tuning. Designed for export and tropicalized, has power inputs for 110 to 250 volts 60 cyc. *Shpg. Wt. 30 lbs.* **HARVEY SPECIAL PRICE**

$49.50



TECHMASTER TV KIT

Exactly the same as the RCA 630TS chassis, complete kit of parts, including pre-wired and aligned RCA front end, condensers, resistors, punched chassis, new and improved, sockets mounted, etc., all tubes including kine, complete manual with service notes, all RCA. (Free circuit and parts list on request). *Shpg. Wt. 85 lbs.*

$198.50



COLLINS 32V-1

Desk xmittr, VFO controlled, band switching, gang tuned. Rated 150 watts input on CW, 120 on phone. *Shpg. Wt. 133 lbs.* **Complete $475.00**

All in stock for immediate delivery.

Telephone: LUxemburg 2-1500

hrc

HARVEY RADIO COMPANY INC.

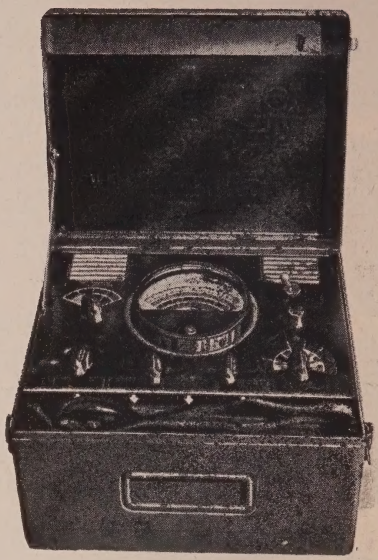
103 West 43rd St., New York 18, N. Y.

NOTE: All prices are Net, F.O.B. N.Y.C. and are subject to change without notice.

PRECISION TEST EQUIPMENT

(Government Surplus Release)

Low Voltage CIRCUIT TESTER Model 1-42



Here is an instrument that any mechanic that works on automobiles, boats, or airplanes would be proud to own and we offer it at a fraction of its original cost. The low voltage circuit tester is a self-contained trouble-shooting device for making a complete and rapid check of the generator—battery circuit, including any current and voltage regulators which may be used. Battery voltage, regualtor and cut-out settings, and generator performance can all be easily determined.

This tester is enclosed in a gray heavy-gauge metal box with a strong hinged top that, when opened, is supported by a slide rod and when closed, is latched by clamps. There is a carrying strap attached to the box.

This instrument was manufactured for the Quartermaster's Corps, United States Government Ordnance Department under the most rigid specifications. It is comparable in beauty and dependability to instruments made today that sell for many many more dollars than our price. Electric Heat Control Company, Cleveland, Ohio, or the Heyer Products Company, Inc., Belleville, New Jersey manufactured these for the Army. Although the unit you receive may be made by either of these companies, it will be practically identical to the unit made by the other company and all are made under Heyer Products Company's design and according to Government specifications.

This low voltage circuit tester is 11 3/16" wide x 9 9/16" deep x 7½" high and can be used on either a 6 volt or 12 volt system. There is a metal chart attached to the lid of each unit which is easily readable while using the instrument. This chart shows settings of all controls and gives operation instructions to be used in conjunction with the operating manual which is included with the tester. One can quickly determine and correct trouble with this instrument. There are two battery leads with drive-in connectors (with spikes—lead coated) 8' long; ammeter lead (3-wire) complete with calibrated shunt, 6' long; voltmeter leads with alligator clip connectors and rubber insulators 8' long, and field rheostat leads with alligator type connectors and rubber insulators 5' long. The direct reading meter scale 4" in diameter with color-coded scales, along with the push-button switch, voltage selector (3-circuit toggle switch), meter polarity switch, utility switch, voltage-ammeter scale selector switch, field rheostat, regulator test selector switch, multisection load resistor, is used to control all operations and functions of this instrument. The master meter reads 0-60 volts and 0-60 amperes. One switch box indicator has following ranges; 0-9 volts and ampers, scale deviation—0-9 range in 1/10th of a volt, 0-18 in 2/10th's of a volt, 0-60 in 1 volt and ampere division, 0-9 in .05th of a volt and ampere.

Price $29.50

Terms: Cash With Order

They are brand new. Each weighs approximately 14 pounds. The price that we quote is only made possible because of the fact that they are Government surplus and this company bought them at a "steal". Remember, this is truly the finest of instruments and we cannot over-emphasize that we believe it is the best bargain ever offered.

ESSE Radio Co

130 W. New York St.
Indianapolis 4, Ind.

Unless Otherwise Stated, All of This Equipment Is Sold As Used
CASH REQUIRED WITH ALL ORDERS
Orders Shipped F.O.B. Collect

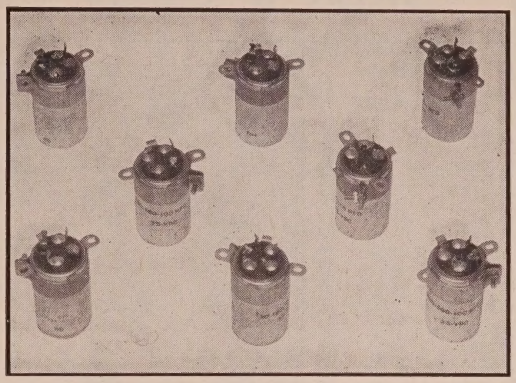
ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA

ELECTROLYTIC CONDENSERS ALUMINUM CANS

30 Mfd.	450 volts	**60c.**
20 Mfd.	450 volts	**50c.**
40 Mfd.	450 volts	**75c.**
50 Mfd.	350 volts	**50c.**
2500 Mfd.	3 volts	**25c.**
100 Mfd.	25 volts	**50c.**
50 Mfd.	10 volts	**45c.**
1000 Mfd.	15 volts	**45c.**
30 Mfd.	150 volts	**35c.**
.14 Mfd.	50 volts	**15c.**
100 Mfd.	300 volts	**75c.**
100-100-100 Mfd.	35 volts	**65c.**
20-20-20 Mfd.	25 volts	**35c.**



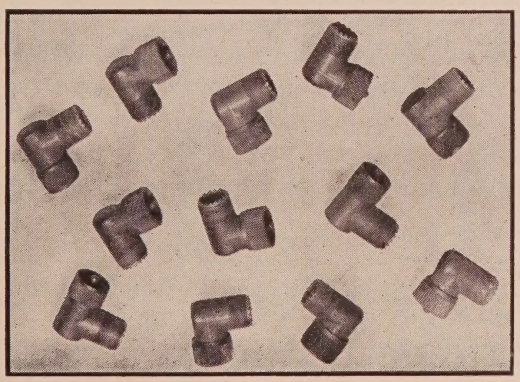
HIGH VOLTAGE CONDENSERS

1 Mfd.	10,000 volts Aerovox	**$15.00**
.25 Mfd.	20,000 volts Aerovox	**$ 4.95**

METERS (NEW)

General Electric	0-15 Ma. DC 3½" Round	**$2.95**
Westinghouse	0-500 Ma. DC 3½" Round	**3.50**
General Electric	0-10/250 Ma. DC 2½" Round	**2.50**
Westinghouse	—10/+6 DB 3½" Round	**7.50**
Westinghouse	0-5 Amp. TC 3½" Round	**4.50**
Triplett	0-500 V. AC 3½" Square	**6.00**
Simpson	0-150 V. AC 2½" Round	**3.50**
Triplett	0-75 AC Amps 3½" Round	**7.50**
Westinghouse	0-3 Amp. RF (less TC) 2½" Round	**3.50**

AMPHENOL LOW-LOSS UHF CONNECTOR for . . .



AMPHENOL LOW-LOSS UHF CONNECTOR for RG type cable. Rugged construction, heavily silver plated, provides easy asembly and positive connection. Type 83-1AP Angle Plug Adapter polystyrene insert, pin and socket—very special.....**20c each**

Type 83-1R Receptacle, chassis type, low-loss Mica filled insert, very special, ...**30c. each.**

ESSE RADIO CO.

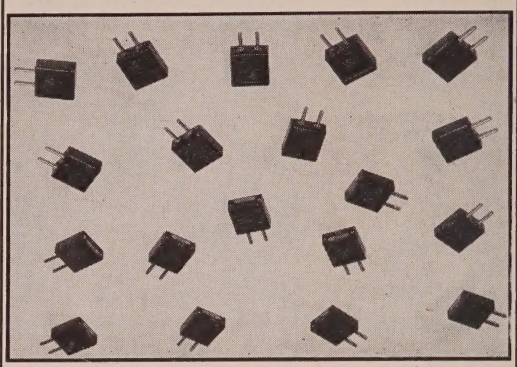
Esse's Special Offer

INDIANAPOLIS, INDIANA

CRYSTALS IN STANDARD 5-PRONG SOCKET HOLDERS

10 Meter Ham Band

7120	$ .55
7130	.55
7140	.55
7160	.55
7180	.50
7210	.50
7220	.50
7240	.50
7250	.50
7260	.50
7270	.50
7290	.50
7280	.50
7300	.50
7310	.45
7320	.45
7330	.45
7340	.45



Odd Frequencies

5450	$ .50
5560	.50
5810	.50
7660	.50
7670	.50
7680	.50
7690	.50
7700	.50
7710	.50
7920	.50
7940	.50
7950	.50
7970	.50
7990	.50
8245	.50
8248	.50
8250	.50
8261	.50
8252	.50

2 Meter Ham Band

8351	$ .75	8476	$ .75
9356	.75	8477	.75
8357	.75	8480	.75
8360	.75	8486	.75
8361	.75	8488	.75
8362	.75	8520	.75
8367	.75	8530	.75
8400	.75	8540	.75
8450	.75	8541	.75
8451	.75	8542	.75
8452	.75	8547	.75

20 Meter Ham Band

7120	$ .55
7130	.55
7140	.55
7160	.55

40 Meter Ham Band

7120	$ .55
7130	.55
7140	.55
7160	.55
7180	.50
7210	.50
7220	.50
7240	.50
7250	.50
7260	.50
7270	.50
7280	.50
7290	.50
7300	.50

2 Meter Ham Band

8065	$ .75
8092	.75
8100	.75
8103	.75
8104	.75
8105	.75
8110	.75
8114	.75
8115	.75
8120	.75
8124	.75
8126	.75
8130	.75
8194	.75

A TREMENDOUS BARGAIN — QUARTZ CRYSTALS WITHOUT HOLDERS

Get an assortment of these and grind to your own frequencies or use them as they are. .5X.6" B-cut lapped on faces and squared on edges (Ready to use). We will give you an assortment of these from approximately 13 thousandths of an inch to 24 thousandths of an inch whereby you can grind to frequencies desired.

These crystals are now ground to the approximate following frequencies:

3500	5300	6800
3700	5600	6900
3900	5800	7300
4100	6000	7400
4300	6200	7500
4600	6300	7800
4900	6700	7900

Formula for converting thicknesses of B-cut crystals to frequency is as follows: F=98.4/T where F is frequency in kilocycles and T is thickness in inches.

AN ASSORTMENT OF 20 DIFFERENT THICKNESSES — $2.50

ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA

CONCERT MASTER RADIO TUBES — NEWLY MANUFACTURED

Brand New Radio Tubes (not surplus)

Each tube is individually beautifully boxed. Standard radio tube guarantee, backed by the manufacturer and also by Esse Radio Company.

55c - ea.

1L4, 1R5, 1T4, 5Y3GT, 7AF7, 35W4, 39/44, 501, 1S5, 1U5, 3A4, 12SR7, 26, 35Z5GT, 80, 5W4GT, 5Y4G, 6F6GT, 6J5GT, 6J7G, 6K6, 6Q7GT, 6SA7GT, 6SK7GT, 6SQ7GT, 6X5GT, 12A8GT, 12AT6, 12BE6, 12J5GT, 12SA7GT, 12SK7GT, 12SQ7GT, 14X7, 35B5, 41, 50A5, 50L6GT, 50Y6, 84/6Z4, 1A5GT, 1C5, 1H5GT, 1N5GT, 1P5GT, 1V, 2A5, 3Q4, 3Q5GT, 5U4G, 5X4, 6AC5GT, 6AQ5, 6A8GT, 12SF7, 6AT6, 6AU6, 6A7, 6A8GT, 6BA6, 6BE6, 6C5, 6C6, 6C8G, 6D6, 6F5GT, 6H6GT, 6K7GT, 6K8GT, 6P5GT, 6SC7GT, 6SP5GT, 6SJ7, 6U6GT, 6U5G, 6U7G, 6U6G, 6V6GT, 6X4, 6Z4, 12BA6, 12F5GT, 12J7GT, 12K7GT, 12Q7GT, 12K8GT, 12SF5, 12SG7, 12SJ7GT, 24A, 25L6GT, 25Z5GT, 25Z6GT, 35/51, 35L6GT, 35Z3, 36, 42, 43, 45, 47, 51, 57, 58, 71A, 76, 75, 77, 78, 85

89c - ea.

0Z4, 0Z4G, 6B8, 6F8, 6T7GT, 6Q6GT, 6S7G, 6J8G, 7C7/1232, 1LA4, 1LA6, 1LC6, 1LD5, 1LE3, 1LN5, 7X7/XXFM, 70L7, 117L7GT, 117P7GT, XXFM, 6L6G, 6L6GA, 7E5, 7K7, 2050, 1Q5, 1T5, 2A3, 2A7, 5Z4, 6AC7, 6B4G, 6C8G, 6D8G, 6S8GT, 7A4/XXL, 7A7, 7B6, 7B7, 7C5, 7C6, 7C7, 7H7, 7Q7, 7Y4, 14A7, 14B6, 14Q7, 25AC5GT, 25A7GT, 35L7GT, 117Z3, 35Y4, 117Z6, XXL, 35B8, 12SN7, 12SJ7, 12SH7, 12SG7, 12AU6, 6SR7, 6BH6, 6C4, 6C5, 6F6, 6H6GT, 6K8GT, 6SC7, 6SG7, 6SH7, 6SJ7, 1L4, 5Y3GT, 27, 6SA7, 12SA7, 6SK7GT, 6SQ7, 6J5GT, 12J5, 1G4, 1U4, 3V4, 5Z3, 6AC4, 6AL5, 6AL6, 6BA6, 2051, 6AG5, 30, 31, 37, 38, 39, 56, 57, 76, 89, 1S4, 2B7, 5V4, 6A3, 6R7, 6SL7, 6SN7, 6Y6, 7A4, 40, 83, 182B, 183, 482B, 483, 1C6, 1R4, 1J6, 6AG5, 6T8, 6B7, 6T7, 12AG7, 6Z7, 19T8

SURPLUS TUBES that are not sold as new or in containers but will be checked by us before we ship them to you and will be found in excellent condition or we will not ship them.

Tremendous bargains if you can use quantities.

7F7	$25.00 per hundred	6SL7	25.00 per hundred
7C5	25.00 per hundred	30	35.00 per hundred
7Y4	25.00 per hundred	12A6	25.00 per hundred
6L6	50.00 per hundred	1625	25.00 per hundred
5T4	25.00 per hundred	1629	25.00 per hundred
5R4	25.00 per hundred	6C5	25.00 per hundred
6SA7	25.00 per hundred		

ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA

NEW VOLUME CONTROLS

1 megohm, carbon 1" shaft	$ .35
1000 ohms, carbon, screw-driver shaft	.35
20 ohms, wire-wound, 1" shaft	.35
500,000 ohms, carbon, 2" shaft	.35
1000 ohms, wire-wound, 2" shaft	.35
6000 ohms, with switch, carbon, 1" shaft	.40
Dual 25000 ea., wire-wound, 1" shaft	.35
Triple 25,000-50,000-20,000, carbon, 1" shaft	.70

NEW RESISTORS — WIREWOUND

3 ohms, 20 watt	$ .10
2500 ohms, 20 watt	.10
½ ohm, 20 watt	.10
11269 ohms, 100 watt (has 5 taps)	.35

NEW RESISTORS — CARBON

	per hundred
100 ohms, ½ watt	$3.00
120 ohms, ½ watt	3.00
220 ohms, ¼ watt	3.00
270 ohms, 1 watt	3.00
470 ohms, ¼ watt	3.00
480 ohms, ½ watt	3.00
1200 ohms, ½ watt	3.00
6800 ohms, 2 watt	3.00
12,000 ohms, 2 watt	3.00
21,000 ohms, ¼ watt	3.00
56,000 ohms, ¼ watt	3.00
85,000 ohms, ¼ watt	3.00
150,000 ohms, 1 watt	3.00
270,000 ohms, ½ watt	3.00
830,000 ohms, ¼ watt	3.00
1,200,000 ohms, ½ watt	3.00
5,600,000 ohms, ¼ watt	3.00

NEW CONDENSERS

.5 mfd. 600 V., Oil, ¾"x1¼"x2"	$ .20
.5 mfd. 400 V., paper 1" dia. x 2¼"	.25
5.2 mfd. 50 V., Chicago Ind. Cond. Corp., Oil, 1 x 2½ x 3"	.25
4 mfd. 600 V. GE Pyranol, 1"x2½"x3"	.50
2 mfd. 600 V., Aerovox Oil, 1"x1"x3½"	1.25
8 mfd. 600 V., Chgo. Ind. Cond. Corp., Oil, 1" x 4" x 5"	1.50
1 mfd. 4000 V., C-D, Oil, 2"x4"x7"	4.00
.20 mfd. 600 V., mica	.50
4 mfd. 1000 V., Oil, C-D or Aerovox, 1" x 2" x 7"	2.50
30 mfd. 330 V. AC, GE pyranol	3.00
2 mfd. 1000 V., C-D, Oil, Single hole mounting, 1½" dia. x 4½"	1.75
4 mfd. 600 V., C-D, 1½" x 4½", single hole mounting	1.25
140 mmfd., variable, padder screwdriver adjustment	.25
7-17 mmfd., variable tuning, 5 plate, 2" shaft, ¼" dia.	.25
.1 mfd. 400 V., paper Aerovox	.15
.14 mfd. 50 V., paper	.15
.1 mfd. 1500 V. paper	.20
.05 mfd. 400 V. paper	.15

LIP MICROPHONE

Lip microphone, made by Western Electric, Navy type CW-51071, with instruction sheet, brand new $1.50

TYPE 813 TUBES

Type 813 tubes (New) ..... $5.95 ea.
Type 813 tube sockets (New) ..... .50 ea.

TELRAD 18-A FREQUENCY STANDARD



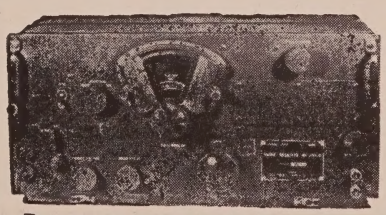
Checks signals in the range of 100 Kc. to 45 Mc. with a high degree of accuracy. Self-contained power supply is 110, 130, 150, 220, and 250 V. 25-60 cycle AC. Complete with tubes, dual crystal, and instruction book. Brand new. Price $39.50

MOLDED MICA CONDENSER

600 WV DC .02 mfd. mounting tabs for bolting down. Large sized rigid tinned lug connections. Rating plainly stamped on brown mica case. Overall size 1¾"x1¼" x¾". Made by Aerovox or El-Menco. Brand new. Price ..... $4.50 per hundred.

MAGNESYN INDICATOR

To be used for beam antenna. Practically same as I-81-A Selsyn indicator. 15-25 V. 60 cycle AC. 3" size. Excellent condition ..... $1.85 ea.
Plug for connection ..... .50 ea.



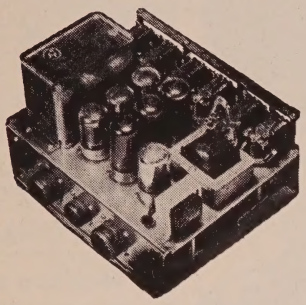
BC-348 COMMUNICATIONS RECEIVER

6 bands, 200-500 Kc. and 1.5-18 Mc. 2 stages RF, 3 stages IF, BFO, crystal filter, manual or AVC. Complete with tubes and 24 V. dynamotor. These receivers have been thoroughly checked in our work-shop and found in excellent condition.

$149.50

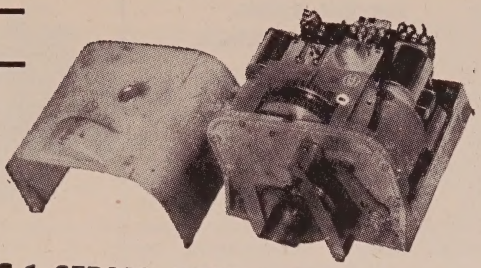
ESSE RADIO CO. **Esse's Special Offer** INDIANAPOLIS, INDIANA

C-1 AUTO PILOT COMPONENTS



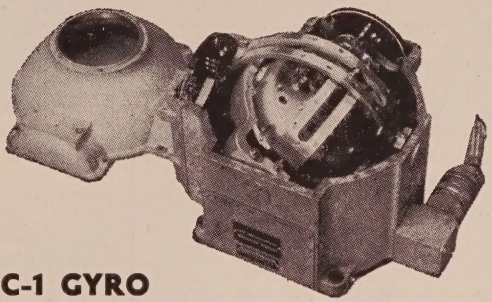
C-1 AUTO PILOT AMPLIFIER

Used to control operation of servo unit in response to signals received from gyro unit and control unit. The complete amplifier includes one rect. 7Y4, 3—7F7's for amplification and control, 3—7N7's for signal discrimination, 1 power transformer, 6 relays, 4 control pots, chokes, condensers, etc. Convert for use on radio controlled models, doors, etc. Operates from 24 V. DC. Size, 9¼" x 6¼" x 7⅝". Complete.....**$6.95**



C-1 SERVO UNIT

Use to rotate beam antenna, actuate boat rudder control, etc. Contains 24 V. motor, clutch, relays, etc. Reversible. Size overall approx. 10½" x 8½" x 6½".
Price **$12.50**



C-1 GYRO

Part of the C-1 Auto Pilot which is sold separate and may be used to conduct many interesting and amusing experiments. Operates from 24 V. DC or may be operated for short periods on 110 V. AC. Gyro will run for approx. 15 minutes after actuating. Size—approx. 8"x8½"x8½". Price.....**$8.95**

---

813 tube sockets.....**$ .75** each

866 tube sockets..... **.50** each

Acorn tube socket..... **.25** each

Octal tube sockets..... **.15** each

Microswitches type WZ-23LT1 normally closed. Packed 10 to carton. (New) .....Carton **$2.50**

Type R-RS normally closed. Packed 10 to carton. (New).....Carton **2.50**

Headphones HS-16-A, high impedance. Made by Trimm with 5' cord and phone tips. Brand new..... **3.50** each

---

OIL CONDENSERS

	EACH
7.5 Mfd. 300 V. AC, G.E. Pyranol.....	$1.50
30 Mfd. 330 V. AC, G.E. Pyranol.....	3.00
2.5 Mfd. 300 V. DC, Chicago-Industrial	.50
1 Mfd. 5000 V. DC, G.E. Pyranol.....	4.50
1 Mfd. 5000 V. DC, G.E. Pyranol.....	3.75
1 Mfd. 3000 V. DC, Chicago Industrial	2.00
1 Mfd. 250 V. DC, RCA.....	.25
.5 Mfd. 600 V. DC, RCA.....	.25
4 Mfd. 600 V. DC, RCA.....	1.35
2 Mfd. 1000 V. DC, RCA.....	1.35
4 Mfd. 300 V. DC, RCA.....	.35
8 Mfd. 600 V. DC, G.E. Pyranol.....	1.50
8 Mfd. 600 V. DC, Chicago Industrial	1.50
2 Mfd. 600 V. DC, Aerovox.....	.35
5.2 Mfd. 50 V. DC, Chicago Industrial	.35
4 Mfd. 1000 V. DC, C-D and Aerovox	1.35
4 Mfd. 60 V. DC, G.E. Pyranol.....	.50

PAPER CONDENSERS

.0475 Mfd. 200 V. Aerovox.....$	.10 ea.
.0035 Mfd. 1000 V. Aerovox.....	.15 ea.
.1 Mfd. 400 V. Aerovox.....	.15 ea.
.05 Mfd. 400 V. Aerovox.....	.15 ea.
.5 Mfd. 400 V. Aerovox.....	.15 ea.
.001 Mfd. 1000 V. Solar.....	.15 ea.

CO-AXIAL CABLE

For high frequency low-loss, trouble-free, weather proof, durable service. Fully shielded, cut to length. Brand New.
RG8/U-52 ohm (marked RG8/U)
Price—100 ft. for.....**$4.95**
RG8/U-52 ohm (unmarked)
Price—100 ft. for..... **3.95**
RG29/U-ohm (marked)
Price—100 ft. for..... **3.95**

ESSE RADIO CO.

Esse's Special Offer

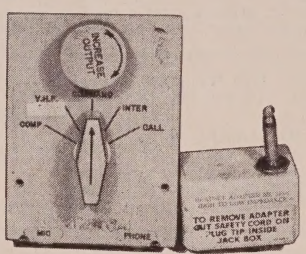
INDIANAPOLIS, INDIANA

SURPLUS RADIO CONVERSION MANUAL

Edited and printed by Techno-Graphic Publications. It contains 115 pages, size is 7" x 10½", printed on good paper stock, covers well bound. A partial list of contents includes complete information on the conversion of the following popular war surplus items: BC-221 Frequency meter, BC342, BC312, BC348, BC946B, SCR274N, SCR522, BC1068A receivers, BC412 cathode ray oscilloscope, BC645 transceiver for citizen's band, SCR274N transmitters, SCR522 transmitter, TBY transceiver, various dynamotors, and a cross-index on tube numbers, frequency allocation chart, electronic surplus index with listing of over 135 items and descriptions or functions or frequencies or tube line-ups etc. of same. Circuit diagrams of original items, and of converted jobs, together with values of various component parts abound in the manual. The text is clear, concise and easy to read and follow. The price per copy is.....**$1.25**

ULTRA-VIOLET FLUORESCENT COCKPIT LIGHT ASSEMBLY

Air Corps type C-5, 28 V. DC operated. Black plastic case about 1½" dia. x 3" long. Has adjustable mounting flange, 3 foot two conductor shielded cord and plug. Includes bulb. Brand new.....**$1.00**

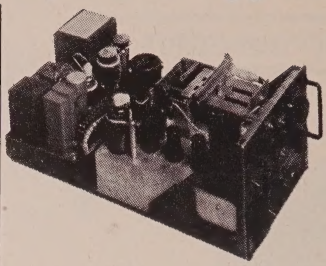


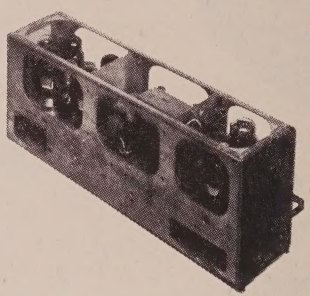
JACK BOX BC-1366

Contains 2-pole 5-position switch, rheostat, two phone jacks, etc. In aluminum case 3½" x 4⅜" x 2¼". Complete with headphone set adapter to match high to low impedance. Price **$1.25**

CAPACITOR: 2000 Mfd.

10% + infinity. Working voltage 50 V. DC. Test voltage 50 V. DC. Electrolytic. Bakelite case, hermetically sealed. Max. dimnsions 2-1/16" dia. x 4⅜". Soldering lug type terminals. Price.....**$1.25**



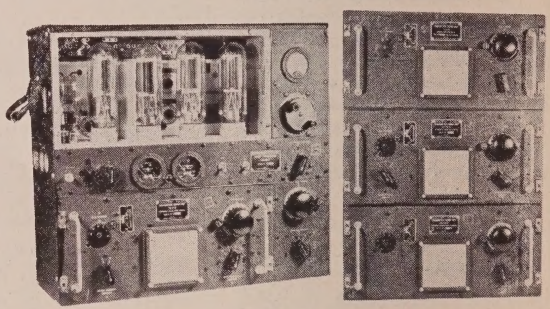


T-26 APT-2 RADAR TRANSMITTER

Contains tunable VHF circuit using 2—JAN CTL 703A's or 368AS tubes. Other tubes are: 2—5R4GY's, 1—2X2, 1—807, 1—6AG7, 2—6AC7's and 1—931A. Other parts such as 24 V. DC motor and blower, HV. condensers and transformers, terminal strips and Amphenol connectors, knobs, fuse holders, etc. make this unit invaluable for parts alone. Weight approx. 45 lbs. Size 21" L x 10½" W x 7¾" H, in metal case. **$9.75**

PP-2/APQ-5 POWER UNIT

400 cycle, 115 V. Contains 10 tubes as follows: 2—5U4G's, 1—6A5GT, 4—6Y6G's, 1—6SL7GT, 2—VR150-30 and numerous condensers, transformers and resistors. Weight 17 lbs. Size 21" L x 5¼" W x 7¾" H. Price....**$5.75**



BC-375 GE MOPA TRANSMITTER

The most famous of all surplus transmitters. Was used by the Army bombers and ground stations during the War. Frequency range is covered by means of plug-in tuning units as shown below. Each tuning unit has its own oscillator and power amplifier coils and condensers, and antenna tuning circuits all designed to operate at top efficiency within its particular frequency range. Transmitter and accessories are finished in black crackle, and the milliammeter, voltmeter, and RF ammeter are mounted on the front panel. **Frequency Range:** 200-500 Kc. and 1500-12,500 Kc. (Will operate on 10 and 20 meter band with slight modification). **Oscillator:** self-excited, thermo-compensated, and hand calibrated. **Power Amplifier:** neutralized class "C" stage, using 211 tube, and equipped with antenna coupling circuit which matches practically any length antenna. **Modulator:** Class "B"—uses two 211 tubes. **Power Supply:** Dynamotor which furnishes 1000 V. at 350 Ma. **Conversion** instructions and diagram for 110 V. AC furnished upon request for.....**$1.00.**

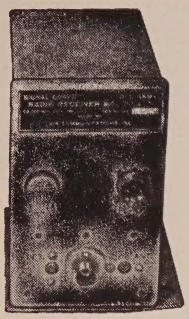
PRICES: As follows—

Transmitter only	**$19.50**
Tuning units TU-6B, TU-7B, TU-8B, TU-9B, TU-10B, TU-26B, choice	**2.50**
Dynamotor PE-73C	**4.95**
Antenna tuning unit (BC-306A)	**4.95**

ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA



MARKER-BEACON RECEIVER

Can be adapted to radio controlled devices. Was used by pilots to flash a signal lamp on aircraft instrument panel when in range of a beacon transmitter. Responds to modulated signals over a variable range of 62 to 80 Mc. Tube plates and filaments operate directly from 24 V. DC. Can be adapted for radio control of experimental apparatus opening garage doors, etc. Circuit diagram and parts list included on either model shown below:
BC-357 — contains 12C8 and 12SQ7 tubes and sensitive relay (size 5⅜" x 5¼" x 3¼").

Price **2.95**

BC-1033—contains 6SH7, 6SL7 and 12SN7 tubes, sensitive relay (size 5⅜" x 5¼" x 3¼").

Price **$3.50**

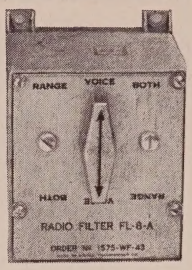
AIRCRAFT RADIO RANGE FILTER

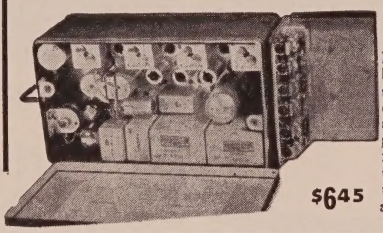
For helpful reduction of QRM on crowded CW bands. When attached to output of any communications receiver:

1—Will pass signal of 1020 CPS, eliminating others.

2—Will pass voice frequencies and eliminate 1020 CPS code signal.

Compact, light weight, with switch. Size 2¾" x 2⅝"x3¾". Price **$2.25**



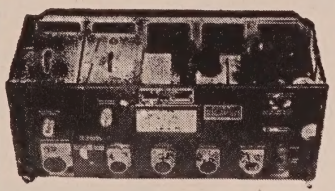


$6.45

R-89/ARN 5A GLIDE PATH RECEIVER

Formerly used for blind landing but adaptable to many other uses such as receiver for new police or citizen's band. Band of operation 326-335 mc. on any of three pre-determined crystal controlled frequencies. Contains eleven tubes, 6 relays, and other valuable parts. For 24 V. DC operation. Size 13¾" x 5¼" x 6⅜". Price, complete as shown.

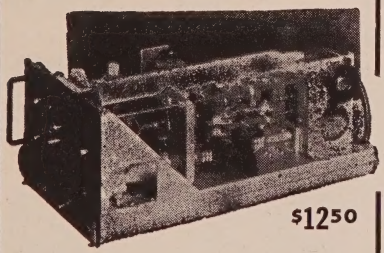
APN-1 RADIO ALTIMETER



A complete 460 mc. radio receiver and transmitter which can be converted for ham or commercial use. Tubes used and included: 4-12SH7, 3-12SJ7, 2-6H6, 1-VR150, 2-955, 2-9004. Other components such as relays, 24 volt dynamotor, transformers, pots, condensers, etc., make this a buy on which you cannot go wrong. Complete in aluminum case 18" x 7" x 7¼".

Price **$8.95**

T-39/APQ-9 RADAR TRANSMITTER



$12.50

Contains many excellent parts for the VHF experimenter such as a cavity oscillator using 2-RCA 8012 tubes rated at full output to 500 Mc. Tubes are forced air cooled by 24 V. DC motor, which is easily converted for 110 V. AC operation. Other valuable parts such as a pair of 807's, 2-6AC7, 1-931 and 1-6AG7 tubes; ceramic switch, potentiometers, gears, revolution counter, etc.

Lapp 800 lb. safe working load insulators

.95

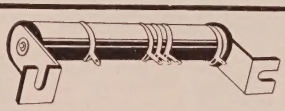
Lapp heavy duty insulator with strap mounts.

165



LS-3 Loudspeaker

6" PM type, in rugged metal case for indoor or outdoor use. Weather proof. Has 4000 ohms to voice coil transformer. Case is felt lined.
Price **$6.50**



WIRE WOUND VOLTAGE DIVIDER RESISTER

100 watt tapped at 3,000, 10,500, 10,523, 10,546, 11,296 ohms. With mounting clips.

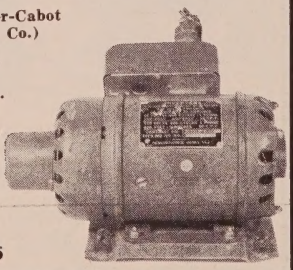
Price, New.....ea. **65c**

MG-149F INVERTER

(Holtzer-Cabot Elect. Co.)

Input 24 V. DC 36 amps. Output 115 V. 400 cy. AC, 500 V. A. Output at 90% P.F.

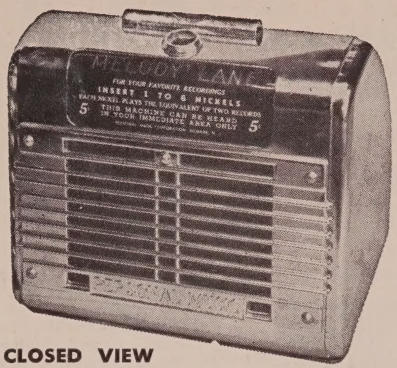
$12.95



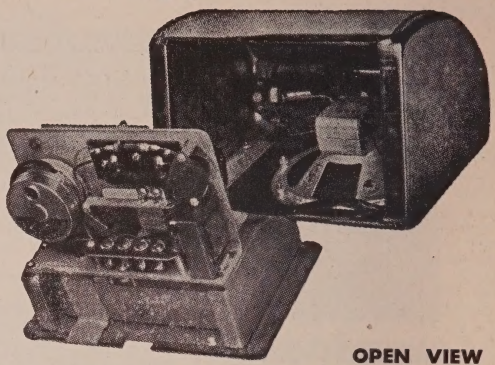
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CLOSED VIEW

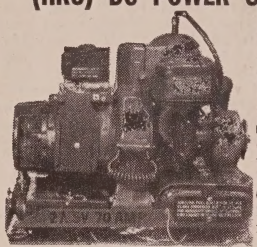


OPEN VIEW

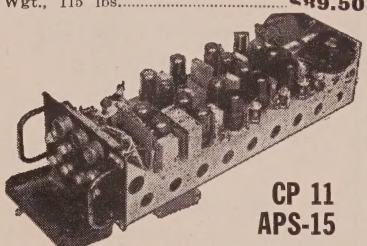
REMOTE CONTROLLED COIN INSERT AND SPEAKER BOX

- Made by Personal Music Corp. Newark, N. J.
- Model F
- 24 Volt operated, fused
- Weight 6½ lbs.
- Size 4¾ x 7½ x 5½" high
- Sloping front
- PM Speaker 5" size
- Has 2 Pilot Lights for illumination
- Finished in chrome metal and grill with red plastic
- Accepts 1 to 6 nickels
- Each 5c coin gives about two phono records of music
- Should be mounted on a flat base
- Has Haydon Mfg. Co. timer
- Has provision for locks (lock furnished)
- Easily removable coin box, size 6" x 3½" x 1½"
- Requires 4 wires from power unit
- A beautiful piece of equipment that could be build to house coin operated radio.
- Worth several times our asking price.
- Price brand new.....**$6.95**

(HRU) DC POWER SUPPLY



24-28 V. at 70 amp. 2000 watts gasoline engine generator with electric starter. Power supply which can be used to operate 24-28 V. equipment, start airplane engines, charge batteries, as a welding machine, lighting system, or for amateur radio station. 21½", 17½"x24⅝". Wgt., 115 lbs.....**$89.50**

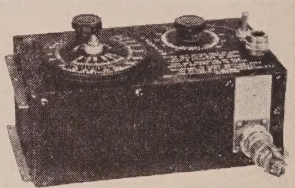


CP 11 APS-15

Contains 13—6SN7-GT's, 3 6SA7-GT's 1—5Y3-GT; 24 V. motor and blower (will operate on 110 V. 60 cy.); 4—one megohm precision wire-bound resistors; 80—86 Kc. crystal. Wgt. approx. 25 lbs.
Price **$9.75**

CARBON THROAT MICROPHONE

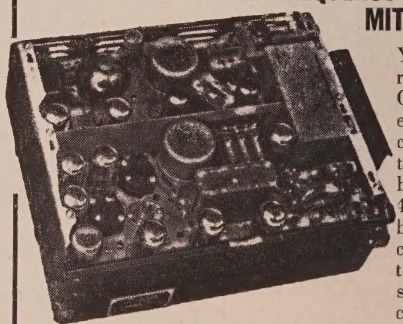
Ideal for plane, portable, or mobile operation, also for construction of lie detectors, toys, etc. You can't afford to be without a few at the price. Adjustable elastic strap fits any neck. Works into 200 ohm impedance input circuit. Used, but in good condition. Price **40c**



INTERVALOMETER

Electronic timing device. Was used for releasing bombs at intervals. Ideal for dark-room timer, model train controller. (Contains relays, switches pilot lights resistors knobs, etc.)
Price **$2.25**

BC-645 ULTRA HI-FREQUENCY TRANSMITTER-RECEIVER



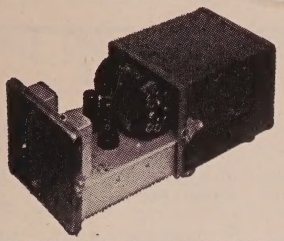
You read about it recently in QST! Originally operated in the frequency band from 450 to 500 Mc. Can be converted to 420 Mc. amateur band. Consists of complete transmitter and modulator system, and receiver.

See QST magazine Feb. 1947 p. 15 for conversion to work in fixed location or as mobile station for new citizen's band or amateur frequencies in 450 to 500 MC range. Complete, Brand New with 15 tubes....**$15.00**

ESSE RADIO CO.

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INTERPHONE AMPLIFIER

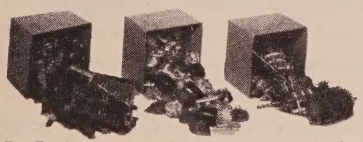
Beautifully constructed in gray finish sturdy metal cabinet. Operates on 24 V. input. Complete with dynamotor. Has 1—6V6 and 1—6SJ7 tube, volume control, carbon or magnetic microphone input. Fastened to sturdy resilient mounting on rubber. Size 6" x 7" x 9". Shipping weight 14 lbs. **$3.45**



A—Insulated Resistors. Kits of assorted resistors of various wattages and values. Some gold band resistors. 100 for **$1.25**
500 for **$5.49**

B—Condenser Kit. Contains assortment of 25 various condensers including 2-2Mfd. 600 V. filters, 1-1000 Mfd. 15 V. filter 4-1 Mfd. 400 V. paper by-pass, 3-3 gang midget trimmers. etc. **$2.65**

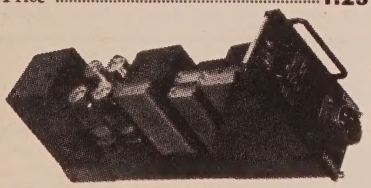
C—Hardware Kit containing about 5 lbs. of radio hardware including nuts, bolts, washers, shafts, gears, grommets, lugs, screws, spacers. It is a gold-mine of invaluable parts **$1.95**



D—Resistor mounting lugs and terminal strip kit. Assorted sizes and shapes. Many, Many, Many. **$1.00**

E—Tube Socket Kit. 25 or more assorted sockets having various usable sizes. **1.50**

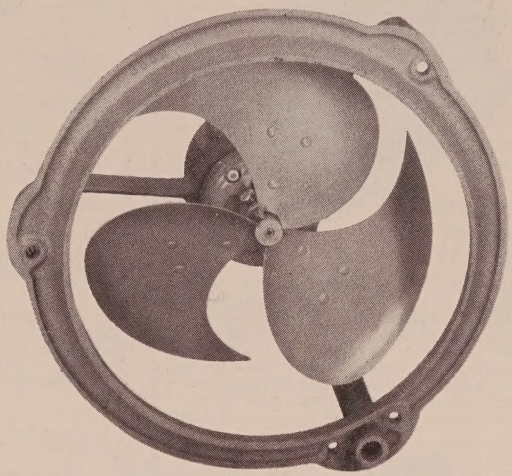
F—Switch Kit consisting of assortment of 10 rotary and toggle switches.
Price **1.25**



PP-51/APQ-9 RECTIFER POWER UNIT

400 cycle 115 V. Contains 4—5R4GY, 2—4Mfd. 1000 V. DC condensers, 2—1 Mfd. 1500 V. DC condensers, 400-2600 cycle power transformer, resistors, etc. Weight 38 lbs. Size 21" L x 5⅝" W x 7¾" H. Price **$7.95**

BLOWER MOTOR ASSEMBLY



Maximum dimensions 12¼" dia. x 7¾". Input voltage 80-110 V. AC. .Frequency 50-60 cycle single phase. Rpm. 1550 at 110 V. AC. Finish, 1 coat Navy grayGlyptal over 1 coat of zinc chromate primer. (New). Price..... **$15.00**

ARGON BULBS

2 watt, 110 Volt, Edison base. Ideal for R.F. indication, night light. Brand new, Box of ten..... **$2.00**



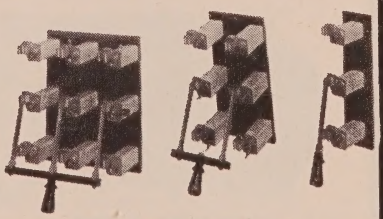
CONDENSER, 2 Mfd. at 600 V. DC, oil-filled, made by Aerovox. Size 1 ⅜" x 1⅝" x 4¾" high overall. Has mounting screws and porcelain standoff insulators. Brand new. Price ..... **$ .70 each**

CONDENSER, 4 Mfd. at 300 V. DC oil-filled, made by RCA. Size 2 x 2¼ x 3¾" high, with mounting flanges attached. Brand new. Price **$ .70 each**



BC-314 RECEIVER

Frequency coverage 150-1500 Kc. — 4 ranges, two RF stages, 1st detector, two IF stages, 2nd detector, RF oscillator, CW oscillator and audio. Total 9 tubes. 14 V. DC at 5.3 amps. input to dynamotor. Easily converted for 110 V. AC. Use headphones or speaker or both. New, with manual **$99.50**
Used **79.50**



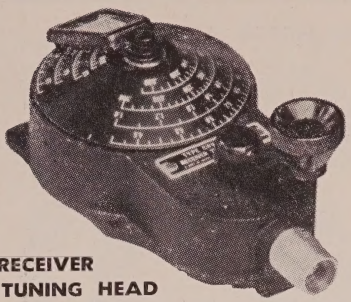
ANTENNA KNIFE SWITCH

Single Pole Double Throw..... **$1.00**
Double Pole Double Throw..... **1.25**
Triple Pole Double Throw..... **1.50**

ESSE RADIO CO.

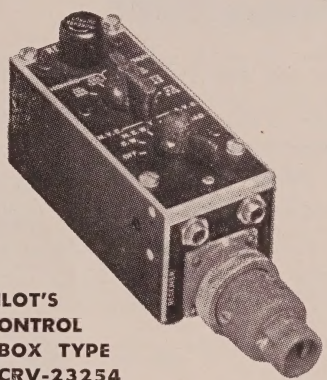
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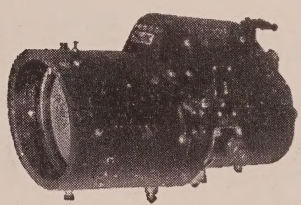
RECEIVER TUNING HEAD CRV-23253

Used with CRV-46151 Receiver for vernier tuning. Has beveled dial with hairline cursor. Bands are 200-560, 560-1600, 1600--4450, 4450-9050 Kcs. Each band spread over about 280 degrees of dial edge. Has provision for flexible tuning shaft or can be adapted for direct drive on any tuning shaft. Black crackle finish. Size 5" x 3" x 2" overall. Brand new.....**$1.50**



PILOT'S CONTROL BOX TYPE CRV-23254

Used with CRV-46151 Receiver for remote control of volume, selection of any one of six frequency bands, as off/on switch or selection of C.W. and M.C.W. and M.V.C. or A.V.C. Black crackle finish. Size 2" x 2½" x 5" high. Brand new.....**$1.50**



INDICATOR SCOPE ID-41/APQ-13

About 6" diameter by 15" deep. Contains 1—5FP7, 1—6AK5 tube, 5 Grain of Wheat 3 V. pilot lights, magnetic deflection yoke, condensers, resistors, potentiometers, sockets **$7.50**

WIRE AND CABLE

(A) 3 stranded conductor side of a shield. Each about 30" long. .....**20c** each

(B) 2 conductors of stranded wire. Each strand about No. 8 gauge. Rubber covered twisted and cloth braid outer cover. .....**$7.00** per 100 ft.

(C) Heavy duty rubber covered 2-stranded conductor flexible. Ideal for 110 V. AC power leads for heavy electrical machinery. .....**$10.00** per 100 ft.

(D) 3 conductors of number 20 enameled cotton covered wire. Color coded, completely shielded. Moisture and fungus proofed. Ideal for intercom work.....**$2.00** for 50 ft. **$8.00** for 250 ft.

(E) 4 strands of braided wire each rubber covered and color coded, one strand being shielded cotton and cambric outer wrappng. .....**$5.00** for 100 ft.

(F) 4 conductor wire No. 18 wires stranded rubber covered. **$6.00** for 100 ft.

(G) 4 conductor wire No. 18 wires stranded shielded rubber covered. .....**$7.00** for 100 ft.

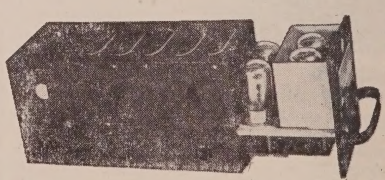
(H) 2 conductor wire solid rubber conductor twisted No. 18. **$1.50** for 100 ft.

(I) 3 conductor field telephone wire twisted. **$5.75** for 525 'roll

COMMAND SET COMPONENTS

Transmitter, 4-5.3 Mc., with tubes and crystal	Price	**$9.00**
Transmitter, 5.3-7 Mc., with tubes and crystal	Price	**9.00**
Receiver, 3-6 Mc. with tubes and dynamotor	Price	**10.00**
4-tube modulator with tubes and dynamotor	Price	**5.75**
3-tube modulator with tubes and dynamotor	Price	**4.00**
Antenna meter and condenser control box	Price	**2.50**
Single receiver control box with dial and crank	Price	**1.75**
Triple receiver control box with dials and cranks	Price	**2.50**
Single receiver rack	Price	**1.00**
Double receiver control box with dials and cranks	Price	**2.00**
Double receiver rack	Price	**1.50**
Double transmitter rack	Price	**1.50**
Transmitter control box with switch and key	Price	**2.00**

TURBO AMPLIFIER



Used for parts—shipped complete with the following tubes: 2—7C5's, 1—7Y4, 1—7F7.

Price .....**$1.75** ea.

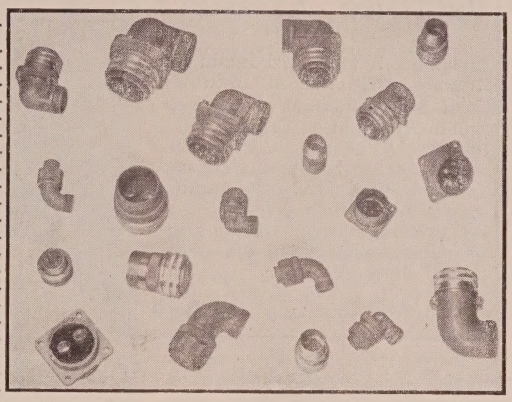
ESSE RADIO CO.

Esse's Special Offer

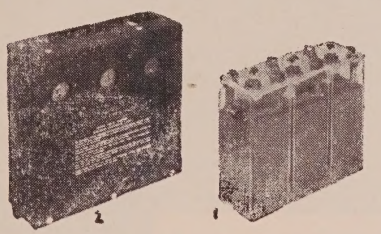
INDIANAPOLIS, INDIANA

CABLE CONNECTORS AND PLUGS

Manufactu	Type	Price
Amphenol	AN3101-16-10P	.50 ea.
Amphenol	AN3101-18-18S	.70 ea.
Amphenol	AN3101-22-5S	.60 ea.
Amphenol	AN3102-22-15P	.60 ea.
Amphenol	AN3102-28-10P	.60 ea.
Amphenol	AN3102-32-5P	.60 ea.
Amphenol	AN3106-18-11S	.65 ea.
Amphenol	AN3106-18-18P	.65 ea.
Amphenol	AN3106-24-6S	.80 ea.
Amphenol	AN3106-24-7P	.90 ea.
Amphenol	AN3106-32-5S	.90 ea.
Harwood	AN3108-14S-*	.65 ea.
Aero	AN3108-14S-2S	.65 ea.
Cannon	AN3108-14S-2S	.65 ea.
Amphenol	AN3108-14S-2S	.65 ea.
Amphenol	AN3108-18-12P	.80 ea.
Amphenol	AN3108-22-5S	.80 ea.
Cannon	AN3108-22-5S	.80 ea.
Amphenol	AN3198-24-6P	.90 ea.
Amphenol	AN3108-24-16S	.80 ea.
Cannon	AN3108-24-16S	.80 ea.
Amphenol	AN3108-32-5P	.90 ea.
Amphenol	AN3108-28-10P	.90 ea.



WILLARD LEAD ACID CELLS



6 V. (New) (Dry-charged).....**$3.00**

6 V. (In metal carrying case) (Add electrolyte specific gravity 1.625) (Drugstore). **$4.00**



Fine quality, high-grade knife, fishhook, tool and hand-axe sharpener and polisher. U.S. Government surplus. Light weight (weight less than 1 ounce). Size, ½ inch wide x 4 inches long. One-half of instrument is finest possible whetstone and other half is cork rust remover and polisher. Any trapper, hunter, fisherman, hobbyist or machinist cannot afford to pass up this bargain.

15c EACH

24V—L-350 AMP LEECE NEVILLE AIRCRAFT GENERATOR for HEAVY DUTY WORK

24 V L-3—50 Amp—Leece Neville aircraft generator for heavy duty work. Can be used on automobiles, etc. for that 24V rig. Weight 24 lbs. — 5" diameter—11" long — (¾" diameter; 1" length shaft). Brand new.....**$17.50**

TRANSFORMER

Transformer, 110 volts 60 cycle input; output being two secondaries—each giving 14 volts at 11 amperes, which can be used alone, in parallel, or in series for various voltage and current combinations. Size about 3½" x 3½" x 4" high. Ideal for operation of propeller pitch motors used for beam antenna rotation. Shipping weight 7 lbs. Manufactured for our company. Brand new **$5.95**

BC-733D LOCALIZER RECEIVER



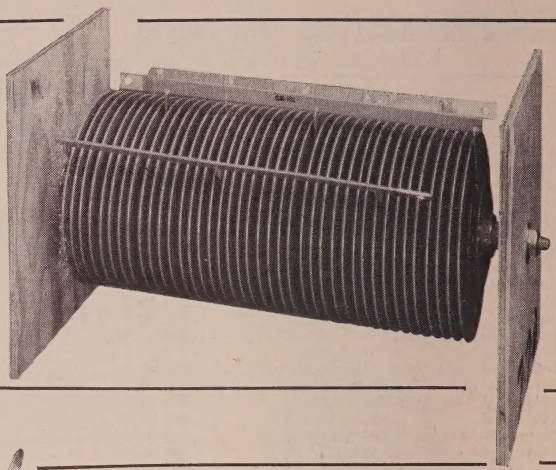
A part of aircraft blind landing equipment. Operates on any six of its predetermined crystal controlled frequencies in the range of 108120 mc. Contains 10 tubes, three of which are WE-717-A's —and crystals. Ideal receiver for conversion to 144 mc. ham band or mobile telephone bands. For 24 V. DC operation. Size 14½" x 7" x 4¾". Price with dynamotor.....**$5.95**

ESSE RADIO CO.

Esse's Special Offer

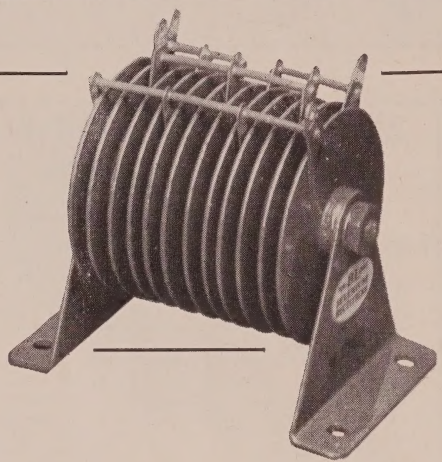
INDIANAPOLIS, INDIANA

RECTIFIER ASSEMBLY



Selenium 15 amps. maximum continuous DC current inductive load for continuous duty. Maximum AC input 46 V. RMS single phase. DC output maximum 34.9 Volts. These rectifiers were used in Navy type CLG-20341 rectifier power unit which delivered 6-12-24 Volts DC current at 15 amps. Maximum dimensions 4⅜" dia. x 12 ¾" long.

Price New.....**$12.50**



RECTIFIER SELENIUM

Maximum AC 60 cycle sine-wave. Input 13 Volts; output 9 Volts. Continuous current rating 2 amps. with inductive or resistive load. Maximum dimensions 3⅛" x 1 1/16" x 1 1/16". 12 square plates bridge circuit. (New).

Price.....**$4.00 ea.**

BL - SELENIUM RECTIFIER

Type 23751, half-wave. Use 2 of these for full-wave circuit converting 110 V. AC to 135 V. DC at .75 amps. or parallel for higher current ratings. Voltage output controlled by condenser across output.

Brand new. Price.....**$1.75 ea.**

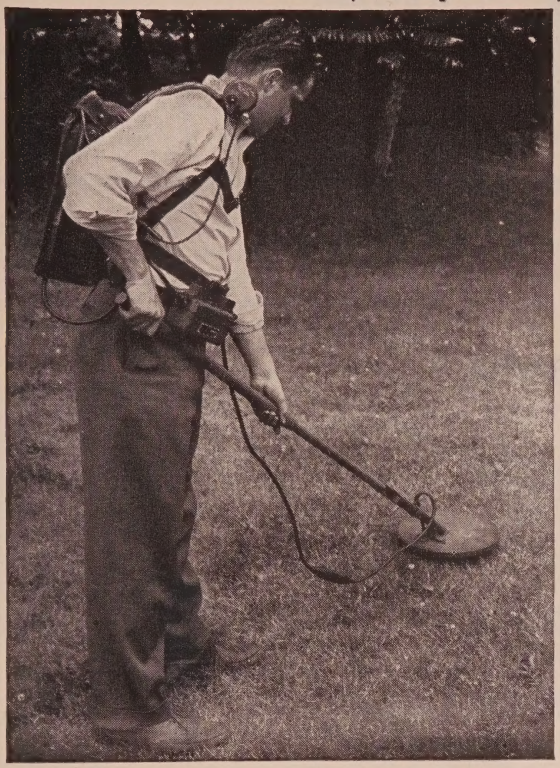


WESTINGHOUSE RECTIGON BATTERY CHARGER BULB

Style 289416, 6 ampere rating. For replacement in most chargers or for building power supply to use on D.C. operated equipment. Brand new.....**$2.50 ea.**

MINE DETECTOR SCR-625 *BRAND NEW*

Attention: Lumbermen, Prospectors, Miners, Plumbers, etc.



Below is a description of one of the finest metal detecting Mine Detectors ever built.

Operates in the manner of aural and visual method.

If you are looking for metal buried in logs, pipes in the ground, ore bearing rocks, underground cables, metallic fragments in scrap materials, metallic money buried or hidden in undetermined places this Mine Detector will probably surpass anything that was ever built. The United States Forestry Service has recommended procedure for using this detector to find concealed metal in tree logs and other timber products. Our government is reported to have paid several times the amount of our prices. They originally were sold by War Assets to jobbers for $166.00.

Unit consists of a balance-inductance bridge, a two tube amplifier and a 1000 cycle oscilator. The presence of metal disturbs the bridge balance resulting in a volume change of the 1000 cycle tone. Tubes used are low battery drain types such as 1G6 and 1M5. The circuit may be modified for control of warning signals, stopping of machinery etc., when metal is detected.

Operates from two flashlight batteries and 103 v (B). However a power supply operating for 100 v may be used.

This unit is brand new and comes complete with spare tubes, spare resonator and instruction manual—in wooden chest 8-1/4 inches x 28-1/4 inches x 6 inches. Weight in operation is 15 pounds. Packed in original overseas container.

We do not know exactly what the deepest possible penetration would amount to when this detector is used but we have had customers who have bought the detectors with the expectations that the detector would locate metallic objects buried several feet under the ground or under water and we have had absolutely no complaints whatsoever regarding the detector not living up to the customers expectations.

Price $79.50
Shipping Weight 125 Pounds

We can not over emphasize our belief that if an Army surplus mine detector could solve your problems in detecting metal this detector should fill the bill.

NOTE: Batteries are not furnished, we can supply for $4.50 extra.

ESSE Radio Co
130 W. New York St.
Indianapolis 4, Ind.

Unless Otherwise Stated, All of This Equipment Is Sold As Used
CASH REQUIRED WITH ALL ORDERS
Orders Shipped F.O.B. Collect

MERIT news

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MERIT LEADS AGAIN!

Now! Merit Plate Transformers, open and sealed types, for small transmitters, amateur, or experimental use, provide you with transformer equipment unequalled . . . for dependability—for economy. Shown below are four more leaders in the Merit quality line—your best buy, by all odds!

BUY THEM FROM YOUR
MERIT DISTRIBUTOR TODAY!

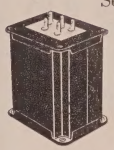
Open Type Mounting "D"



Type No.	Net Price	Sec. Rms. Volts	Sec. DC Volts	Sec. DC MA
P-3157	$6.90	660-660† 550-550	500 400	250
P-3159	8.10	900-900 800-800	750 600	225

†Has 40-volt bias tap

Sealed-in Type Mounting "H"



Type No.	Net Price	Sec. Rms. Volts	Sec. DC Volts	Sec. DC MA
P-4057	$9.60	660-660 550-550	**500 400	250
P-4059	10.80	900-900 800-800	750 600	225

**Has 40-volt bias tap

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Since 1924
FINE RADIO PARTS
ANNIVERSARY 25
MERIT
COIL & TRANSFORMER CORP.
4429 NORTH CLARK ST., CHICAGO 40, ILL.

YL's FREQUENCY

(*from page 52*)

YL of the Month

In keeping with the increased recognition afforded YLs these days, we were greatly interested to read this note in W6QD's DX column some time ago: "The Radio Club of Peru recently celebrated its 17th anniversary, and for the first time it admitted YLs to the affair. Possibly responsible for this was the ham spirit shown by OA4D who is the first Peruvian YL operator."

OA4D is Clemencia Palma of Lima, Peru, who tells a most interesting story of how she came to be a radio amateur.

"My brother, Ricardo (now OA4M)," writes Clemencia, "is in broadcasting, and has always been interested in everything concerned with radio. He acquired his station equipment—which afterward he transferred to me—during the last months of 1940, the year in which he became a radio amateur, with the call OA4D. Near his house there lived a German fellow who spent the entire day listening to German news broadcasts, and at times my brother caused QRM to his reception. Taking revenge for the interference my brother caused him, every time Ricardo went on the air the German fellow would turn on his electric razor, or some other motor, in order to interfere with my brother's reception. You can well understand how angry that QRN made Ricardo, so he decided to bring his equipment to my house and operate here.



Clemencia Palma, OA4D, YL of the month.

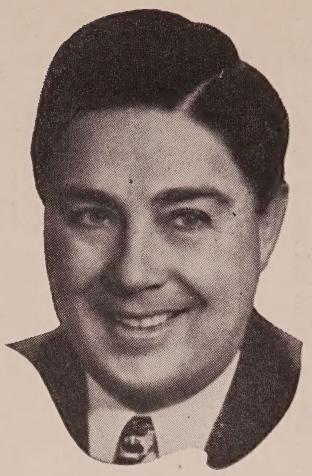
"Since that time I have become the third operator of OA4D, my brothers being the first two operators. Then came the QRT for all the North and South American stations, with the exception of Paraguay and one amateur in Uruguay, CX3-CN. As I like radio so much, I asked and obtained permission from my government to operate my station during the QRT, and from time to time I contacted the ZP amateurs and my very good friend, CX3CN."

A member of a well-known family in Peru, Clemencia is the granddaughter of Ricardo Palma, one of the most famous of Peruvian writers. Her father, Clemente Palma, was also a writer and a journalist.

Clemencia, herself, is secretary to the general manager of a mining company which buys all kinds of minerals and exports them to the U.S.A. and Europe. "My work," she adds, "is very interesting, but it takes so much of my time that I cannot spend much on the air, though I usually operate my station from 9 p.m. (OA) onward, usually at about 14,400 kc."

Right now OA4D consists of an HT-9 transmitter, a 3-element rotary beam, and an HQ-120 receiver with an RME preselector.

BOB HENRY HAS IT IN STOCK AND OFFERS YOU A BETTER DEAL!



Henry Radio stores in Butler, Missouri and 11240 West Olympic Blvd., Los Angeles, California have complete stocks of amateur, FM, Television, Short Wave, Communications, Recording, and other radio equipment. I promise you lowest prices, complete stocks, quick delivery, easy terms, generous trade-ins. I promise that you will be satisfied on every detail. Write, wire, phone or visit either store today.

Bob Henry
W6ARA

A FEW OF THE ITEMS I STOCK ARE:

Collins 75A	$ 375.00
Collins 32V	475.00
Collins 310B-1	190.00
Collins 310B-3	215.00
Collins 30K-1	1450.00
National NC-57	89.50
National NC-173	189.50
National NC-183	268.00
National HRO-7T	292.50
National HRO-7C	372.45
National HFS	142.00
National NC240D	236.25
Hallicrafters S38	49.95
Hallicrafters S53	89.50
Hallicrafters S40A	110.00
Hallicrafters SX43	189.50
Hallicrafters SX42	295.00
Hallicrafters SX62	289.50
Hallicrafters S47	229.50
Hallicrafters S51	149.50
Hallicrafters S58	59.50
Hallicrafters S55	129.50
Hallicrafters S56	110.00
Hallicrafters T54	189.50
Hallicrafters HT18	110.00
Hallicrafters HT19	359.50
RME HF-10-20	77.00
RME VHF-152A	86.60
RME DB22A	71.00
Hammarlund HQ129X	177.30
Gon-Set 10-11 converter	39.95
Stancor ST-203-A	44.70
Hunter Cyclemaster	169.50

Millen, Sonar, Bud, Gonset, Silver, Premax, WorkShop, Amphenol-Mims; Jensen, Meissner, Browning; I have everything.

Some prices slightly higher on the west coast.

LOW PRICES

I guarantee to sell to you as cheap as you can buy anywhere.

COMPLETE STOCKS

Hallicrafters, National, Hammarlund, Collins, Millen, RME, Meissner, Meck, Gordon, Amphenol-Mims, RCA, Vibroplexs, Sonar, all other amateur receivers, transmitters, beams, parts, etc. If it is amateur or communications equipment—I can supply it.

QUICK DELIVERY

Mail, phone, or wire your order. *Shipment at once.*

EASY TERMS

I have the world's best time sale plan because I finance the terms myself. I save you time and money. I cooperate with you. Write for details.

LIBERAL TRADE-IN ALLOWANCE

Other jobbers say I allow too much. Tell me what you have to trade and what you want.

TEN DAY FREE TRIAL

Try any receiver ten days, return it for full refund if not satisfied.

FREE NINETY DAY SERVICE

I service everything I sell free for 90 days. At a reasonable price after 90 days.

FREE TECHNICAL ADVICE

and personal attention and help on your inquiries and problems.

Butler, 3, Missouri

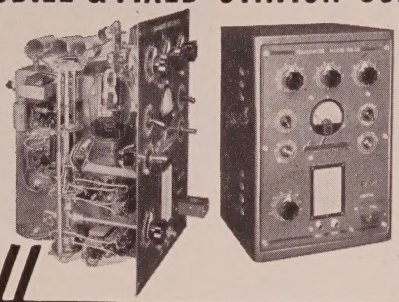
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"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"

For BOTH

MOBILE & FIXED STATION USE



Harvey-WELLS

TBS - 50
TBS - 50A

Now that mobile phone can be used on all amateur bands (except 40 meters) the TBS-50 & TBS-50A become more adaptable than ever before because it is ideal for use in automobiles, trucks, boats, camps, etc.

50 WATTS **8 BANDS**
PHONE OR CW
(Class B. Modulation)
NO PLUG-IN COILS

80, 40, 20, 15, 11, 10, 6 and 2 METERS
(*Completely wired and tested — not a kit*)

Crystal controlled on all bands, yet requires no oscillator or multiplier tuning. Operates from AC pack or Dynamotor Supply for mobile work. New, beautiful black crackle finish.

TBS-50..Complete with tubes, only **$99.50**

THE NEW TBS-50A

Incorporates a small three tube preamplifier with sufficient gain so that any high impedance microphone having an output level of approximately -50 db can be used.

TBS-50A, complete with tubes only

$121.25



Send for catalogue describing Harvey-Wells Transmitters, Power Supplies, Preamplifiers and Rack Panels

Harvey-WELLS
ELECTRONICS, INC.
SOUTHBRIDGE,
MASSACHUSETTS

DX

(*from page 45*)

This will, of course, allow him to clean up that continent, and then he might as well swing it over to Africa.

W3FYS heard, via *CE3HQ*, that there are no CE6 stations active on c.w. So, it looks like if any of you fellows want to get the "W.A.C.E." certificate, yau are going to have to get into the 6th district with phone.

VK9NR on Norfolk Island is working over the 20-meter band and puts in a good signal. Usually around 14050 and T8. As yet Norfolk isn't on the official list of countries but looks as though you better work him . . . "just in case." He is ex-VK3NR and will be there for a couple of years so don't feel badly if you miss him on your first 2X2 call. Norfolk is located midway between New Caledonia and New Zealand.

Out of the Northern California DX club's "DX'er," I swipe the following: *W9GMD/KJ6* is now *KP4DX*, but will be glad to QSL any of his KJ6 contacts who didn't receive a card . . . *VP4TAF* is now *KV4AG*, and he will be glad to do likewise for any of his VP4 contacts. I also see where W6WB has hopes of squeezing something out of *ZD7AA*, who, while active, claimed he was on St. Helena Island. I have seen Bane perform some remarkable things, but many of you will remember when "ZD7AA" made a mistake in signing off from a QSO, thus: "de W . ." etc. he hasn't been heard on the air since. The Northern California DX Club now has around 47 members, and most of them are really bonafide and ultra-rabid DX men. This old fossil W6PB edits their "DX'er," and I guess he ought to do a good job since he is one of the real old-timers out here. I can remember, in 1921, when he was signing 6VK on spark. When he was up too late on school nights, his mother would pull the main switch, and then it was, "To bed, Daniel!" I'll bet this strikes a familiar sound with many of you . . . same here.

KL7KV says that DX really comes hard in Anchorage. The town has a population of 20,000, and Bill says there are 120 licensed amateurs there . . . of course, not all of them are active.

Credit Due

In the November column, we ran an operating code to be used by foreign DX men. We lifted this out of the "F.E.A.R.L. News," and complimented them for running it, as it was essentially the same as we have preached off and on for a couple of years. However, it develops that I didn't read far enough in the "F.E.A.R.L. News," otherwise I would have discovered it was the A.R.R.L. who set up these seven operating rules. Far be it from me to dish out credit to the wrong party: therefore, I am taking this opportunity to state that the boys at A.R.R.L. spent some time pinning down the operating code in seven clear-cut paragraphs that, if used by the DX man overseas, will go a long way toward eliminating some of the pitiful operating practices that have existed during the postwar period.

W3JKO says he is going to handle the QSLs for *SP8XA*, who, incidentally, is now operating

±1db
20-20,000 CPS

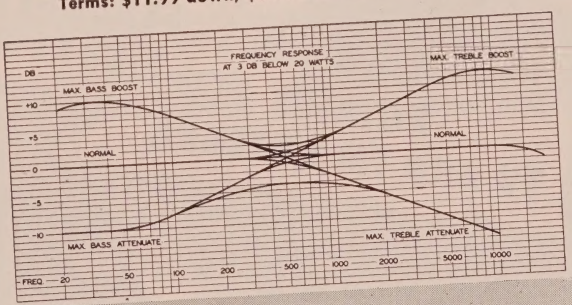


The ALLIED 20 Watt Phono Amplifier An Engineer's Dream–Sensibly Priced

Here's the audio amplifier experts appreciate. It's the *big* buy in high fidelity. *Check the curves:* Note the range of the two tone controls, offering flexible compensation. *Look at the facts:* Less than 2% harmonic distortion at full 20 watts, virtually none at room levels. Up to 10 db adjustable volume expansion independent of volume control setting. 8 db of inverse feedback. Hum is 'way down—80 db below 20 watts. Dual phono input with 78 db gain. Matches anything—output impedances 4, 8, 16, 250 and 500 ohms. For record reproduction or for operation with a radio tuner, there's nothing finer at anywhere near this low price!

93-103. 20 Watt Amplifier complete with tubes. NET, f.o.b. Chicago **$59.95**

Terms: $11.99 down, $5.09 monthly for 10 months





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You'll find *everything* you want in receivers, transmitters, instruments, parts and station equipment in our up-to-the-minute 180-page Catalog. Get it today. And get *every* buying advantage at ALLIED—fast shipment, money-saving values, top-quality equipment, ideal easy-payment terms, square trade-in deals and down-to-earth help from ALLIED's old-time Hams. For full satisfaction, get and use the ALLIED Catalog!

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☐ Enter order for 20 Watt High-Fidelity Amplifier
Enclosed $..... ☐ Full Payment
☐ Part Payment (Bal. C.O.D.)
☐ Send Time Payment details and order blank.

Name.....

Address.....

City.....*Zone*.....*State*.....

on c.w. approximately 28,150 kc. Bob says he is sixteen years of age, and his father is a prewar ham. In any event, do not try to send any cards directly to SP8XA.

VE7HC told me that near the end of the contest, he kept pouring down the coffee trying to keep his eyes open. I guess he kept them open alright, after glancing at his score. Gord said one of the biggest surprises of the contest was after hearing *CT2AB* being called by a W6, he spent fifteen minutes trying to locate the CT2, with no success. He then decided that he was wasting time, so tossed out a quick CQ. Sure . . . you guessed it! Back came CT2AB.

Some fellows have been askig about *MD1A*, *TR1P*, and *MD2*. They are all the same country and come under the listing of "Libya" in the country list. A common question involves Cyrenaica, Libya, and Tripolitania. These are not separate countries.

If any of you boys want to work another CE7, that is, another one besides *CE7AP* who is on the Island of Tierra del Fuego, Chile. He is William "Bill" Shorethose, W6DOK, of Los Angeles. Bill is no newcomer, having operated the first part of this year on 20 c.w. as *KP4FX*, and prewar, he was on 20 phone as KA6FB. CE7AP is very QRP as the transmitter consists of a 6L6GA with 3.5-watts input . . . His source is a 12-volt storage battery. He operates on 7006 and 14,010.

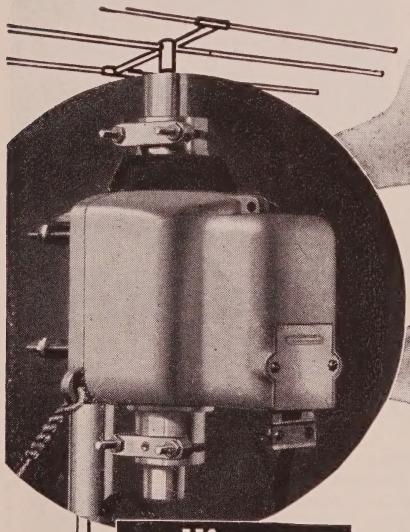
ZL2GX is still waiting for a card from Zone 17 to give him W.A.Z. Jock uses a pair of 75Ts and the antennas used are two 8JK Twin 3s. He was lucky enough recently to grab *C8KY* for Zone 23. ZL1HY, although having worked C8KY sometime back, worked him again during the phone section of our recent DX contest. He also grabbed *VO6EP* in Zone 2 in the c.w. section. Ah . . . Zone 2 . . . Where have I heard that before???

WØNUC got a letter from *OY3IGO* which gives with a little info. Says he . . . "my power is now 35 watts . . . was 15. We pay about 20 cents per kwk. It is hard to get the right chassis made up here and so it is made in Copenhagen. Takes about a month to get it. You (NUC) were my contact NO. 996 and the second WØ. I am still the only active OY although *OY5WS* has just been licensed but at present is wireless operator on a trawler. *OY8LA* has returned to Denmark and is using OZ8LA now.

If you work *LU9AL* . . . wait 'till you see his QSL. You're in for a treat. It's about 8½ x 11 but I won't tell you more. Go and work him. W2IOP got one . . . so any of you should be able to.

I previously mentioned about G8VB but here's something else. Harold is an artist on 3.5. mc. Recently he established the first G-KP4 QSO when he worked KP4ES. If any of you stay up late enough you might listen for G8VB who is always between 3740 and 3760 kc.

In VE3QD's column in "Xtal" he writes; "Heard *ZC1CL* and *VS4AC* (Laccadive Islands) in QSO the other evening. You should have heard the QRM when they finished . . . everyone in the band was calling one or the other." I imagine so . . . but what about this VS4AC guy . . .



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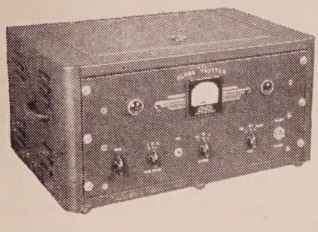
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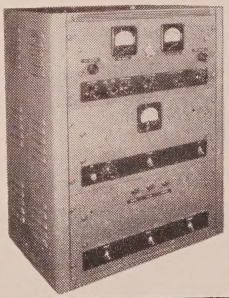
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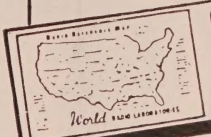
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If any of you fellows work W3AYS ask him about his antenna problems. He's using some sort of a long wire with a tuning system, which of course, changes from a band to band. He likes the long wire stuff over some of the others. W6EPZ says that as bald as he is he is still losing hair over trying to get QSL cards out of Zones 18 and 19. Better get a bottle of Vitalis and hang on a while longer.

Those of you who worked *VO2CJ* may like to know he is now back in the States. While in VO2 he was running 120 watts into a pair of 807s and worked 30 zones and 67 countries . . . which to him was a heap of fun.

W9BZB goes after the 10 phone type of DX but sadly admits that these were heard but not worked . . . *EA4FC*, 28,350, *SVØWB* 28,350, and *VQ8AE* 28,300. KL7PJ worked about 430 stations during the Contest and is going to QSL via the bureaus. This will save time and a little dough . . . and as Chuck says, "I'm going to QSL 100 per cent whether they want 'em or not."

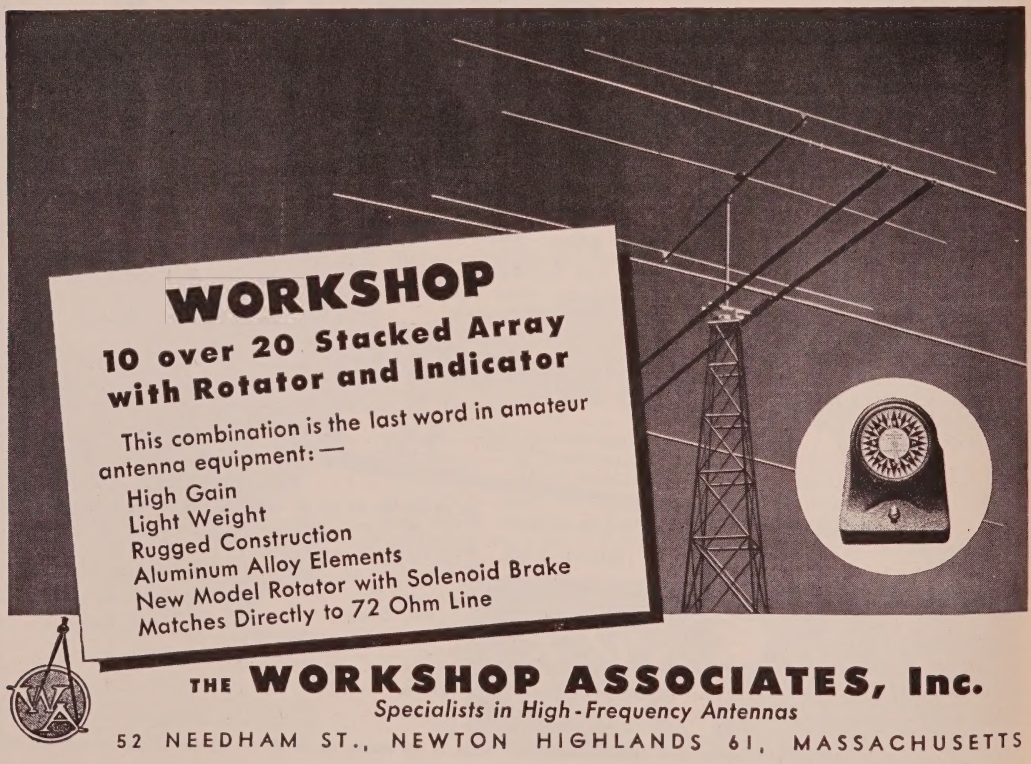
W2EMW has the Contest and the good conditions which we arranged, to thank for two new ones . . . *ST2FU* and *VP8AM*. G6QX has his rotating dipole working now picked off *KL7KV* for his first Zone 1 QSO. Bob says he hopes this will get him out of the booby spot in the Honor Roll.

ET3AB is back in England and the QTH will be found . . . oh, you know where. Well, anyway apparently he was supposed to be the QSL manager for the ET3 gang and relates that *ET1IR* and *ET1JJ* do not hold valid licenses. Says he received over 200 QSL cards for these stations, but doesn't say whether or not he got them to these boys. According to W4HA . . . *4X4AA* is Joe of *ZC6LA* and who says there are three other 4X stations on looking for contacts.

WØNUC tells me that one of the Zero quartet, WØGKS, has sold out. Yep, sold out the works. Doesn't have anything around the joint pertaining to ham radio. Something about this just doesn't sound like Doc. Let's get him back. . . whatdya need Doc, a toob? Another Zero, WØUOX, is climbing up the ladder of DX and it won't be long before he'll be giving all these guys a run for top spot. Leo . . . that's NUC . . . goes on to say that he's sleeping better since he took out insurance for wind, fire and lighting damage.

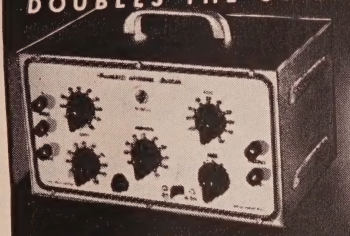
Everybody seems to be working *AC3GG* but no one knows where the heck he is and until we know . . . we ain't acountin' it. Just hold off sending that one in for credit 'till you hear more from us. Remember *ZD7AA* . . . well! W6TMP passes on the dope that *HL1BA* is being called "bootlegger" but insists he will QSL when he gets back to the States. W8ZY barged in to see W4FU a while back and guess who else barged in . . . W6GRL. Bet it was pretty deep around there for a while.

KH6LF tells us that Johnston Island may be void of ham radio for a while. Seems as though the two boys that have been there, *W4DGW* and *KJ6AB*, have been transferred. He said efforts are being made to secure a ham for there, and one of the boys now stationed on Johnston is taking his ham exam, but, of course, at this time, we



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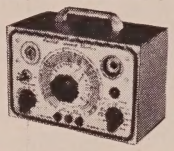
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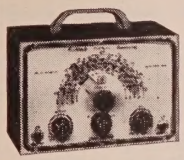
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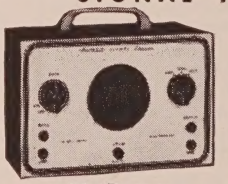
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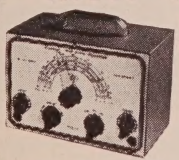
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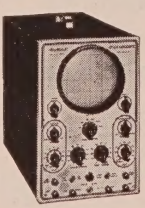
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have no way of knowing whether he passed or not. I can think of a good many thousand DX men hoping he passes the exam.

The other day, *TI2BF* dropped in to see the boss, W2IOP, that is, and kicked a few words around with him for awhile. No, he hasn't left Costa Rica, in fact, he is in charge of communications there for T.A.C.A. Airlines.

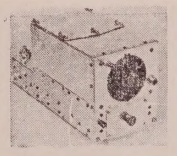
W7BE has packed up his foot locker and headed for KH6. Bill, while stationed in Washington for 18 months, did a good piece of DX and made W.A.Z., DXCC, and worked 160C with maximum input of 400 watts. He will probably be in the islands for three years, and it will be interesting to see what kind of a DX record he can pile up there.

I hope all of you, on this continent, as well as those overseas, will pardon me if I seem to get a little enthusiastic about the first World-Wide DX Contest just concluded. We of *CQ* do not want to take any particular credit, because, after all, we are just hams, but it does indicate that we did our best to follow any comments or suggestions which you fellows have made to us during the past year. Generally speaking, it adheres pretty much to the thinking of the majority of you. Since I took great pains to select a DX committee with very broad shoulders, we can stand any criticism you might choose to make.

Activity at W6QD during the c-w weekend was somewhat spotty. Night time conditions, putting it mildly, were lousy, as it was impossible to do any 40 meter work, due to this terrific power leak that reminded me very much of one of the old Ford spark coils used in 1920. The XYL, however, seemed highly pleased when, out of a clear sky, I decided to hit the hay at a reasonably early hour. She thought at least a power leak has some merit. Anyway, I'll have you know that I really cracked down on Zone 2 again, making it doubly certain they will stay in the log. The day after the contest, a group of my neighbors were in a huddle on the sidewalk, and as I drove past, all I could hear was, "And did you have trouble on channel 2 over the week-end?" Oh, well, maybe I should have settled for a couple of 9s. I sincerely hope you fellows had a Merry Xmas and that this New Year will be a happy one . . . if DX is good I'm sure it will be. 73.

QTHs

CE7AP	**Wm. R. Shorethose, Casilla 26-D, Punta Arenas, Chile**
CWTO1	**Bill Spencer, c/o B.W.T., Shanghai, China**
EA3MA	**Box 1312, Barcelona**
EA7AU	**94 Palmas, Seville**
ET3AB	**D. Golding Esq., No. 7, Pretoria Rd., Southsea, Hampshire, England**
HC7KD	**Box 340, Quito, Ecuador**
HK3CT	**Box 3831, Botota, Columbia**
HS1LA	**Via W6RRG**
MD4BPC	**Hargesia, British Somaliland, c/o Post Office**
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SP8XA	**c/o C. R. Shaffer, W3JKO, Riva, Md.**
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VO2CJ	**Lt. R. Phelps, Jr., USN, Squadron VP-62, N.A.S. Patuxent River, Md.**
VP2GJ	**Via W1FTX**
VQ4ALF	**Box 3024, Mombasa, Kenya Colony**
W6DLX/KW6	**291 Jefferson, Vallejo, California**
YN1RO	**153 AACS, APO 3024, c/o P.M. New Orleans**
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DM 21CX	28	1.6	235	.090	BC 312	$ 3.45N
DM 25	12	2.3	250	.050	BC 367	$ 2.49LN
DM 28R	28	1.25	275	.070	BC 348	$ 8.75N
DM 33	28	7	540	.250	BC 456	$ 5.50
DM 42	14	46	515	.110	SCR 506	$ 6.50LN
			1030	.050		
			2/8			
PE 55	12	25	500	.400	SCR 245	$ 5.25LN
PE 86	28	1.25	250	.060	RC 36	$ 3.95
PE 101 C	13/26	12.6/	400	.135	SCR 515	$ 5.25N
		6.3	800	.020		
			9 AC	1.12		
BD AR 93	28	3.25	375	.150		$ 4.95N
23350	27	1.75	285	.075	APN-1	$ 3.50N
35X045B	28	1.2	250	.060		$ 3.50N
ZA .0515	12/24	4/2	500	.050		$ 3.95N
B-19 pack	12	9.4	275	.110	Mark 11	
			500	.050		$ 9.95N
D-104	12		225	.100		$ 14.95N
			400	.200		
DA-3A*	28	10	300	.260	SCR 522	$ 8.95N
			150	.010		
			14.5	5		
#5053	28	1.4	250	.060	APN-1	$ 3.95N
DA-7A	26.5		1100	.400	TA-2J	$25.00N
CWD-21AAX	13	12.6	400	.135		$17.50N
	26	6.3	800	.020		
			9	1.12		

*For PE 98 Less Filter Box
N—New LN—Like New

CONVERSION COILS FOR ARC-5 TRANSMITTERS

M.O. Coils	P.A. Coils	Antenna Loading Coils	Freq. Range
$1.00 ea.	$1.00 ea.	$ .85 ea.	
6029	7247	6033	3-4 Mc.
6030	9293	6034	4-5.3 Mc.

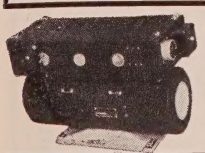
CONVERSION KIT, consisting of 1-MO coil, 1-PA coil, 1-ANTENNA COIL, in any one particular frequency range $2.00

ARC No. 4990, variable xmtg capacitor, 22-.4—145 mmf. .05" spacing, 11 rotors. Eeach..... $1.00

ARC 5632 Var. Xmtg. capacitor, 29.2—117 mmf. .06" spacing, 16 rotors, worm drive: 9:1.... $1.00

80 METER VFO KIT

ARC-5, Xmtr M. O. parts and circuit for that new VFO-exciter. Kit consists of the following: 1-6029 M.O. coil; 1-5632 tuning condenser; 1-4990 padding cap. 1-ARC-5 Xmtr. schematic. Complete kit $2.75



PE 218 INVERTERS
Input: 25128 VDC at 92 amps. Output: 115 volts at 1500 volt-amps. 380-500 cycles. New $49.95
Used, ex cond. $25.00

OIL CONDENSER

1. mfd. 10 KDVC 14F191	$15.00
.6 mfd. 15 KVDC, 25F585-G2	8.70
1.5 mfd. 6000 vdc	12.50
.25 mfd. 20,000 vdc	17.50
10 mfd. 1000 VDC	1.79
3x10 mfd. delta connected synchro-capacitor, 90v60 cycles	4.95
.1 mfd. 6000 vdc, 25F509-G2	6.50

SCR-610 11-10 METER PORTABLE/MOBILE RIG

SCR 610 portable transmitter-receiver, 27 to 38.9 mc, crystal controlled, using FM for efficient operation. Unit consists of Xmtr-rcvr BC 659 and power supply PE 97 . . . operating from 6 or 12 vdc. Slightly used, excellent condition. Less Xtals, Antenna or handset $25.00

XMTR TUNING UNITS

For BC 610: TU 47 (2-2.5mc); TU 48 (2.53 mc); TU 53 (8-12 mc). Each..... $1.75

For BC 223AX: TU 17 (2-3 mc); TU 18 (3-4.5 mc). Each $1.95

6-Section Ceramic Stack: 10-460 mmf, for Collins Art-13 ..... $ .69

ROTARY BEAM COMMUTATOR

6 Slip rings 3" dia. ½" wide each mounted in low loss form. Each ring brought out to pin. Inside dia. 1½". New $5.45

INSTRUCTION MANUALS

BC 312, BC 342	$1.25		
SCR 281	$1.25	Mark II	1.00
SX-32	1.00	SCR 508	1.00

VIBRATORS

TR 1210, 12 vdc, 5 pin	$1.00
OAK V-6675, 24-32 vdc, 7 pin	1.00
Mal. Type G534C, 12 vdc, 5 pin	1.00
Mal. Type G629-C, 12 vdc, 4 pin	1.00
Radiart VR2, 6 v. DC. 6-pin special	1.00

Mfrs. quantities available.

HEADSETS

Dynamic mike and headset combination. A high quality, efficient unit, used in B-19 tank Xmtrs. Mike and phones complete, new..... $2.75

R-15 headsets: 8000 ohms impedance, rubber cushions. Comes with 8' cord and plug PL 55. New..... $2.95

Headbands: HB-1, HB-4, HB-30. New..... 25c each

30' US ARMY SIGNAL CORPS RADIO MASTS

Complete set for the erection of a full flat top antenna. Of rugged plymold construction telescoping into 3 ten-foot sections for easy sowage and transportation. A perfect set-up for getting out. Supplied complete: 2 complte masts hardware, shipping crate. Shipping wt. approx. 300 lbs. Sig. Corps 2A289-223-A. New ..... $39.50 per set

GREAT TUBE VALUES!

01-A	$ .45	5FP7	3.50	562	90.00	9004	.47
1B24	4.85	5JP2	8.00	615	.89	9006	.47
1H5	.55	5J30	39.50	703-A	7.00	CEQ 72	1.95
1N5	.69	6AC7	1.00	704-A	.75	EF 50	.79
1T4	.69	6C4	.58	705-A	2.85	F-127	20.00
2C21	.69	6G	2.00	†707-B		FC 258A	
2C22	.69	6K7	.55		20.00		165.00
21J21-A		6L6GA	1.00	714AY	25.00	GL 562	75.0
	25.00	6SC7	.70	715-B	12.00	FC 271	40.00
2J22	25.00	6SL7	1.00	720BY	50.00	GL 562	
2J26	25.00	6V6	.79	720CY	50.00		75.00
2J27	25.00	7C4	1.00	721-A	3.60	GL 623	
2J31	25.00	7E5	1.00	723-A/B			75.00
2J32	25.00	7E6	.72		12.50	GL 697	
2J38	25.00	10Y	.60	724B	1.75		75.00
2J39	25.00	12A6	.35	725-A	25.00	ML 100	
2J55	25.00	12GP7	14.95	726-A	15.00		60.00
3J31	55.00	12K8Y	.65	800	2.25	QK 59	65.00
2X2/879	.69	12SF7	.49	801-A	1.10	QK 60	65.00
3A4	.65	12SR7	.72	804	9.95	QK 61	65.00
3BP1	2.25	15R	1.40	815	2.50	QK 62	65.00
3C24	.60	28D7	.75	836	1.15	*RCA 932	
3C30	.70	30 (Spec.)	.70	837	1.95		.65
3D6	.79	45 (Spec.)	.59	843	.59	VR 91	1.00
3CP1/S1		39/44	.49	860	15.00	VR 130	1.25
	3.50	35/51	.72	861	40.00	VR 135	1.25
3D21-A	1.50	227A	3.85	874	1.95	VR 137	1.25
3DP1	2.25	225	8.80	876	4.95	VU 120	1.00
3EP1	2.95	268-A	20.00	1005	.35	VU 134	1.00
3FP7	1.20	355-A	19.50	1619	.21	WL 532	4.75
3GP1	3.50	417A	25.00	1624	.85	WN 150	3.00
3Q5	.79	530	90.00	1629	.35	WT 260	5.00
5BP1	1.20	531	45.00	1961	5.00	†with cavity:	
5BP4	4.95	532	3.95	8012	3.95	Cavity only	5.00
5CP1	3.75	559	4.00	9002	.65	*Photocell	

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KEY CLICKS

In the article "Near Grazing Incidence Reflection at 144 Mc," December, 1948, page 36, the third paragraph should read: "Isopleths have been drawn to show the *vertical* variation in the refractive index." It is obvious from *Fig. 2* that the ordinate scale is in altitude and thus, the isopleths show a cross-section of the lower atmosphere in terms of refractive index.

In response to many inquiries it should be pointed out that the pilot lights used as band indicators on the Gold-Plated Special described in October *CQ* are a stock Drake Manufacturing item, model number 5, $1\frac{1}{32}$" jewel pilots with amber coloring. In the parts list the audio-frequency oscillator transformer used with the 12AU7 audio oscillator was unmarked. It should be a midget interstage a-f transformer.

V.H.F. — U.H.F.

(*from page 50*)

49.6 mc, but still seemed to be inside the 6-meter skip.

Nov. 19 and Nov. 20—Conditions appeared unsettled, though trans-continental reached 46.5 mc for over several hours. HC2OT reportedly worked into W5.

Nov. 21—Honors belong to HC2OT for working W5AJG, W8CMS, W8MVG and W8NQD. He was also heard by W9ALU. Signals were in from 0950 until 1055 EST. Trans-continental MUF did not exceed 45.0 mc.

Nov. 22—Tremendous signals were heard from Europe between 40.0 and 46.0 from 0915 until 1130 EST, but no 6-meter signals are reported to date of writing.

What has the Moon to do with it?

Recently an idea has been circulating around that long-range 2-meter DX openings could be predicted according to the phases of the moon. The original suggestion was made by responsible amateurs after establishing a prima facie correlation. Since this is quite an intriguing subject, our propagation expert, Perry Ferrell, has reviewed the scientific literature and written the following analysis.

"In the first place, the moon does not produce a sizable tide in our atmosphere at sea level. Nor can the so-called F-region ionospheric tide be correlated with 2-meter DX.

"Getting at the root of the problem was quite simple. As you may well imagine, our Weather Bureau people are quite interested in the lunar effects, since if it affected 2-meter DX, it must also affect the weather. While we may not have many concrete 2-meter observations, we certainly have plenty of weather records. An exhaustive examination of the barometric readings at Batavia was made by J. Bartels in the late twenties. To all appearances no correlation existed. Bartels was, of course, searching for some change in the pressure between the time of the new moon and the first quarter, or between the full moon and the last quarter. Theory indicated that the gravitational field of the moon would slightly pull out

NEW YEAR SPECIALS

CD-501A CABLE for PE 103A—BC 654A.....NEW $1.95

HS-30 HEADSET complete with matching transformer, 6 ft. cord, and PL-55.....BRAND NEW $1.95
HS-30 HEADSET .....NEW .95

HAND SWITCH—SW 141T with extension cord CD-318B, PL 68, Throat Mike plug.....NEW $0.29
ANTENNA KNIFE SWITCH SPDT—Cutler Hammer.NEW .49
SURPLUS RADIO CONVERSION MANUAL, 115 pages of circuits, etc. .....POSTPAID 2.50
ANTENNA AN-160—2000-6000 kc, 9 insulators and jumpers, 100 ft. long .....NEW 1.00

ARB RECEIVER 195-9050 KC. 28VDC,—COMPLETE with Manual .....NEW $44.95

HS-23 HEADSET .....NEW $3.25.....USED $0.69
HS-33 HEADSET .....USED .89
HEADSET ADAPTER MC385D High to Low Impedance.. .35
EXTENSION CORD—CD 307A with PL 55 and JK 26 NEW .49
MOTOROLA Control Head .....NEW 2.50

IDEAL MOBILE POWER SUPPLY
PE 237—Heavy duty vibrator power supply, 6, 12 or 24v input. 525v, 95 ma; 105v, 42 ma; 6.5v, 2 amp; 6v, 500 ma; 1.3v, 450 ma; small supply 100v, 17 ma; 1.35-450 ma with tubes, shock mounted.....BRAND NEW $29.50

K-7 GUN MOUNT ASSEMBLY, ideal mount for beam antenna, cable control.....NEW $5.95
50 Ft. RG34U with connector.....NEW 2.95
250 Ft. PHOSPHOR BRONZE stranded transmitting antenna wire .....NEW 3.95

BC-1306 SMALL COMPACT TRANSMITTER, 3800-6500 KC, 3A4, 2E22, less cover. Can be used with PE 237, GN58.....NEW $9.95

T-17 MIKE .....NEW $1.50.....USED $0.75
SCR-274 REMOTE TUNING HEAD, 3 crank..... 1.00
DYNAMIC HEADSET and MIKE, P.O. Mark 11....NEW 1.95
MN 26 RADIO COMPASS RECEIVER, tubes 15—1500 KC .....USED 18.95

BC-348 MOUNTING BASE .....POSTPAID $2.50
BC-348 OUTLET PLUG .....POSTPAID .80
BC-348 MNTG. BASE & OUTLET PLUG.POSTPAID 3.00

BC-224 RECEIVER, 12 V.D.C. Input, Excellent condition.$79.50

TUBE SPECIALS

5BP1	$1.15	250TH	$17.50
5BP4	2.50	304TL	.90
5CP1	2.50	316A	.79
872A	1.00	807	1.25
2X2	.75	1616	1.00
75TL	2.50	VT-127A	2.95

THROAT MIKE.....$0.50.....**HAND KEY**, NEW $0.50
JOHNSON Variable Capacitor 250 F20 .....NEW 1.95
CRANK for 274N RECEIVERS ..... .60
I-82 SELSYN INDICATOR—5"—360° scale, Good condition 2.95

1st, 2nd, 3rd I.F. from SCR 522, 12,000 kc $0.35; 3 for $1.00
2nd & 4th I.F. from BC 348, 930 kc..... .35; 3 for 1.00
I.F. Transformer from SCR 300..... .35; 3 for 1.00

12 In. CERAMIC INSULATORS, 1 in. Diam.....NEW $0.25
12 In. CERAMIC SPACER.....NEW .20
T-32 DESK MIKE.....NEW $3.50.....USED 1.95
OVERLOAD RELAY—Potter Brumfield, 10 ma. 5,000 ohm D.C. trip; 115v A.C. 60 cy. reset.....NEW 3.95

TRANSFORMERS
5v at 190 amperes 115 v, 60 cycle, Input.....USED $12.95
200-0-200 at 60 ma; 6.3v 3 amps, output, 115 volt, 60 cycle input .....NEW 2.50
100 watt Class B modulation transformer P.O. BC 375 .....NEW 2.95

SOUND POWERED CHEST SET .....NEW $5.95
CRY TUNING UNIT 2.3 to 4.2 M.C., ideal M.O., P.A. and antenna tuning unit for mobile 70-80 meters.NEW 7.50
5" P.M. COMPARTMENT SPEAKER, 25 watts 50-6000 ohms, Waterproof, Used, Excellent..... 8.95

ROTATING ANTENNA RC-224 for 10 cm. parabola. Complete with 2—28 V.D.C. motors. Easily converted to 115 V.A.C. for any beam. Approx. 1 RPM.—Conversion instructions included. Shipping weight 200 lbs. Good Condition.....$24.50

TERMS: F.O.B. Pasadena, unless postpaid. 25% deposit on all C.O.D. orders.

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EVEREADY Hevi-Duty Minimax BA43 p/o SCR284 90/45 & 1½V for Recvr & Xmtr use w/octal socket & handle 2⅝ x 4¾ x 6¼", 7.3 lbs. metal case triple sld pkg Late '47 date ..... Ea $1.39
2 for $2.49; 10 for $10.00
BR18/BB52/5oz/36V S'Bat $1.49; 8 for $10
BURGESS 3V F2BP/late '47 date 5 for $1
BB54/2V 27 amp WILLARD S'Bat..1.98
WILLARD 4V/40AH/TBY S'Bat....5.95
BB206U/2V 11AH WILLARD S'Bat..1.89
WILLARD 6V/25AH/7½L 2½W. 6½H. 3.49
BAT'Y ACID (R.Exp only) 1 pt.... .59; 2 pts..... .98

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BC457 Xmtr AS IS Less Tubes $3.49
BC456 Modulator AS IS Less Tubes 1.49
BC456 Modul w/Tubes&Dyn Good Used 4.98
BC375 or BC191Xmtr, AS IS less Tubes & TU 7.95
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BC1066 UHF Batty Rcvr NEW.... 9.95
BCI-196 SigGen UHF Bat NEW.. 5.95
BC906 p/oIE46 Fq Mtr & Monitor NEW 29.95
BC1073 Wave Mtr. 150-210Mc Used. 10.95
APS13 Rcvr Xmtr, less tubes LN* 6.95
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PARALLEL TUNABLE COAX CAVITY w/adj hat 300-400Mc LN*..... 4.95
Audio Band Pass Filters 60, 90 or 150 cyc 20DB cutoff HiQ CSD $2.25 ea. 3/4.95
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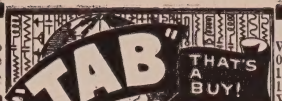
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in 115VAC/50-60cy. Output 2.5VCT/10 Amps 10KV insul w/JOHNSON sockets & TUBES. SPECIAL.....$5.95
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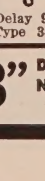
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Antenna AN-30 Telescopic Whip COLLAPSES 12" to 9 ft New O'Seas pkgd ea.....$1.49; 2 for 2.49.
Antenna AT5/ARR1, AT1/APN2 30cm/12" lg w/COAX conctn w/ watrprf gasket & flange for mobile mtg ea. 98c; w/PL259 $1.24
Antenna AN130B Spring Swiveled Whip END LOADED 33" lg ea. 1.25; 2 for..... 1.98
Antenna P108/LU3 12cm lg w/ Coax fitting, each..... 1.98
Antenna AS23/APWcoax ftg. 2.98
Antenna MS49-54, 18 ft whip 3.98

HIPOWER VAR ANT NETWK 100IA—1 KW RF New 1.5 to 7 mcs convertible to HiFreqs. PiNetwk adjustable IN & OUTpt Csd 15x15x23" rackMtg Ribbon coil & 250 mmf/7000V cndsr RFmtr, insltrs Tech Manual. Will match most ants. Brand new, ready to use....$12.95
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Same NEW USN cost $369. Only $162.
BLOWERS — 100CFM/28VACDC $4.95; 100-CFM/12VACDC $4.95; 250CFM/28V ACDC & Xfmr115VAC $10.95; 40CFM/28VACDC4500r/min veloc $3.25; Blower Xfmr 12 or 28V—115V AC.....$1.69



XTAL DIODES and THERMISTORS—VARISTOR—1N34 $1.08; 2/$2.10; 10/$9.85; 1N21, 21A, 22, 23, 23A ea. $1; 12/$10; 1N21B, 1N26 $2 @ 10 for $17.50; 1N35 Dual-Diode $2.29; D168391 Therm Compensator $2; 3/$5; D170396 HF pwr meas 90c; 3/$2.50; 1C Bulb Time Delay 90c; 3/$2.50; VARISTOR CW20259 Type 38C $2.98

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Write Qty Prices. We ship types in stock. 0.116 to 95000 ohms, ea. 30c; 10 for $2.50; 100000 to 950000 ohms, ea. 40c; 10 for $3.50; 1 Meg. to 20 Megs, ea. 75c; 10 for....$6.50
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IRC ATTENUATORS — 100000 ohms 20 pos $2.98; 250000 ohms 20 pos.....$4.98

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200 microamp DC GE 4" sq. 5 scales AC&DCV & ohms Red & Black K.E. pointer NEW $7.95

Range	Description	Each
5 Ma	Tuning GE 2½" B'Csd	$1.49
1 Ma	DeJur 2½" Bklt Csd	3.95
25&2.5 Ma	GE Galvnmtr zero ctr	3.95
1 Amp	RF 2½" GE Bklt Csd	3.95
5or9Amps	RF 2½" GE/Wstg. B'Csd	3.49
750 Ma	RF 2½" Csd extCpl Wstn	3.49
15 Amp	DC 2½" Csd Hoyt	2.95
240 Amp	DC 50 MV mvt 2½" B'csd	2.49
30 Volt	DC AN 2½" B'Csd Wstg	2.49
10,000 V	DC 1000 ohms/V 3½" B'C	12.95
150 Volt	AC 25-125cyc2½"Wstg&GE	3.95
7.5 Volt	AC 3½"BkltSq.RA35 Wstg	4.49
15 Volt	AC 3½"BkltSq. Wstn476	4.95
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TestLeads&Clips 8ftinsltd 30A 49c; 3/		1.20
TestLeads&RedBlack Insul Prods HiQual		49c

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the earth's atmosphere and this would be reflected as a change in the over-all atmospheric pressure at sea level. Actually, the pressure fluctuation was so small that it was completely swamped in the everyday hourly air mass movements across the station. However, to make a long story short, this pressure fluctuation was finally detected and under these circumstances it should be classed as a triumph for statistical methods.

"It was shown that the average lunar pressure wave at the equator was only plus or minus 0.01 mm (normal pressure 760.0 mm at 0° C.). This corresponds to a so-called adiabatic heating of 0.015° C. between the first quarter and full moon. If we extrapolate this to the latitude of Washington, D. C. it means that the air temperature increases 0.02° F when the moon is full and right overheard.

"Naturally, this in itself is far too small to have any effect on 2-meter DX by a factor of several hundred. Any other lunar effects at sea level are unknown, and since 2-meter DX depends strictly upon weather conditions it would indeed be strange if the Weather Bureau had not already discovered them."

That seems to solve that.

144-mc Notes

We have received several requests that we double check the distance record for the 144-mc band. Some operators have wondered if the span between W2TDW/4 (Clingman's Dome, Tenn.) and W2RH (Port Chester, N. Y.) was not more than equal to the record between WØWGZ (Grinnell, Iowa) and W3GV (Erie, Pa.).

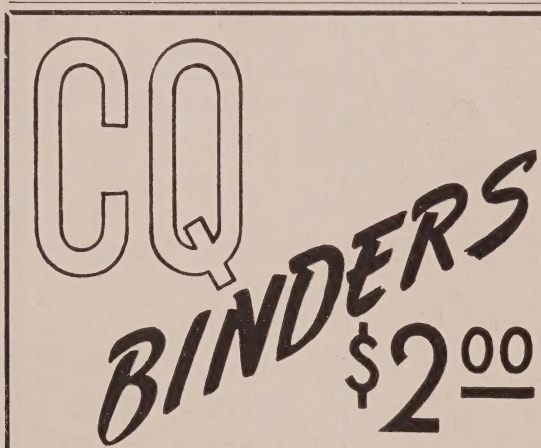
144-Mc Honor Roll

	States	Dist.		States	Dist.
W8UKS	15	6	W9LWE	8	5
W8WJC	14	6	W1CTW	7S	2D
W8WXV	13	5	W9IPO	8	5
WØNFM	12	4	W3GV	8	5
W1JFF	12	4	W4FBJ	7	5
W1IZY	12	4	W8PYY	7	4
W1PIV	12	4	W9PK	7	4
W3KUX	12	5	WØBZE	6	3
W3RUE	11	5	WØGOK	6	3
W9BBU	11	5	W8DRZ	5	4
W3GKP	10	5	WØWG	5	4
WØIFB	9	6	WØRNC	4	2
W9AB	9	5	WØKPQ	3	2
W9ZHB	9	4	WØDDX	3	2
W2JPA	9	4	WØMZH	3	2
W1CTW	9	3	WØZJB	1	2

Based upon geographic coordinates the record is 649.4 miles between WØWGZ and W3GV, while the distance from Clingman's Dome, Tenn., falls slightly short of this, equalling only 614.9 miles.

WØBZE has moved near WØRSI and has a complete rebuilding job to do before he will be back on the air. Smitty adds that Arnold, WØWGZ, is now working for Collins Radio, having just graduated from Iowa State College with a B. S. in electrical engineering.

Here's a little inside information on a recent 2-meter expedition which took place from Wayah Bald Mt. near Franklin, N. C., on Oct. 16-17. Using a 4-element horizontal beam and 15 watts of power to a 522, W4KHL worked W4KMK, Greenville, S. C.; W4FQI, Oak Ridge, Tenn.; W4LNB and W4ENL in Chattanooga, Tenn.; and heard W4NVW of the same city. In Atlanta, Ga., the stations worked were: W4LMF, LSX,



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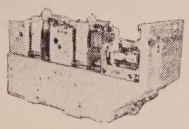
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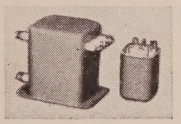
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10 mf 450 wv 35c	30-30mf 150 wv 100-100mf 25 wv 45c
2500 mf 3 wv 35c	2400 mf 50 wv 1.10
30 mf 450 wv 75c	15 mf 150 wv 25c

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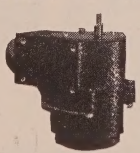
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KIP, LNG, and W4GMP; W4NWA in Dahlonega, Ga., was worked also. The receiver was a VHF-152A ahead of a BC-312. W4KHL also moved to Clingman's Dome, Tenn., but it was raining cats and dogs hence no signals were heard, and no one has reported hearing W4KHL/4. Roy, W4KHL, adds the Atlanta gang is begging for skeds and will make them with anyone interested enough to write the Atlanta Radio Club, or members just mentioned.

Bob Cook, W2JPA, has worked 9 states and 4 districts, and adds that he would like to run skeds with fellows that are west of him. W2JPA runs 100 watts with two 5-element beams, one vertical to passify the east coast and the other horizontal.

As luck would have it, the Midwest V-H-F Club of Chicago held its first annual 2-meter QSO party, on October 23-24, and conditions were perfect. Stations in four states were able to contact each other, the band sounding more alive than it had for weeks. Numerous stations outside the Chicago area had many nice contacts, so all the gang in the area are looking forward to many more of the same contests. That's one way of getting activity, for all had a good time.

Conditions in England on 145 mc were wonderful on Nov. 11-12-14, according to G5BY, due to a warm air stream from the south, which sent the temperature to 14 degrees above normal. All signals up to 190 miles were S9 and G5BY worked PAØZQ and PAØPN around 2140 GMT. Both distances being well over 400 miles, which no doubt will add to G5BYs laurels, as it is a new G-DX record on 145 mc. On Nov. 12, G5BY, heard both ON4FT and F8BY but no contact was made.

W9JMS contacted W7JRG on 50 mc and convinced W7JRG to try horizontal on 144 mc. Ken adds this isn't to let the east coast fellows down, but the seventh district is closer to the middlewest.

W9ALU, advises that his current project is the W2PAU 2-meter preamplifier described in May-August *RCA Ham Tips*, using a push-pull neutralized 6J6. Hod adds that it works wonders on any converter.

From Tulsa, Okla., W5LEI says that 2 meters is going again and that W5DFU has a new 48-element beam that not only rotates but moves up and down several wavelengths. W5DFU runs 200 watts and wants skeds with interested 2-meter parties, of course vertical polarized!.

220-mc Notes

Cal Hadlock, W1CTW, has 7 states and 2 districts on this band. Cal is having bad luck as all the actvity in W2, on 220 mc, has moved to 420 mc. Cal, W1CTW, still believes that the fellows are overlooking a good bet as he has been able to work into W2 on 220 mc, when not a thing was coming in on 2 meters. How can we put over the idea that v-h-f operation means three bands instead of two or one, this is the cry of W1CTW. Well, Cal, if the jokers that invented the SCR-522 had only included the 220-mc spectrum on the gismo, no doubt the QRM would be the same as on 144 mc-or would it? Let's hope that more of the fellows can visualize the possibilities and help to create activity for you, soon that is!!

W7QLZ says that there is no activity on 144

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mc, but lot's of the gang have converted the APT-5 and APS-13 units for 420-mc operation. The Phoenix gang meet nitely at 2000 MST, with a personal gathering at the Acme Electric Store each Wednesday, led by W7KJT. The net operates on 435 mc, with simple dipoles being used at the present, but several of the gang have parabolics up, using a screen reflector. The gang in Phoenix, now active on 420 mc includes: W7KWO, W7MIV, W7KTJ, W7MIW, and W7QLZ.

DX PREDICTIONS

(*from page 41*)

East Coast to Eastern Asia

40 meters: Erratic opening centered around 0530 EST. Possible peak about 0630 EST, but still not to be depended upon daily. *20 meters*: Band opens suddenly around 1645 EST with readable phones. Signal strengths decrease slowly with band going out about 2130 EST. Peak conditions 1715 to 1830 EST. *10 meters*: Short opening with fairly strong signals from 1745 to 1845 EST. Active only on ionospherically quiet days.

East Coast to East Indies

40 meters: Conditions depend on the extent of auroral zone absorption. Possible openings between 0545 and 0745 EST. Some improvement towards the last of the month. *20 meters*: Very weak signals at both ends of this path on the direct route. Band appears likely to open around 0830 EST depending on near end MUF. Scattered and erratic signals may actually be heard and worked up until 1400 EST, but not to be depended upon. Possible secondary opening centered around 1800 EST. *10 meters*: During less 40% of the entire month the band may open between 1745 and 1830 EST with fairly strong signals. The MUF is just outside the low edge of this band. Erratic conditions, at best.

East Coast to Central South America

40 meters: Band opens slowly as absorption level drops down after 1815 EST. Peak conditions centered about midnight. *20 meters*: First opening 0545 EST with fair signal strengths, though these will drop into the noise level before 0830 EST. Band reopens after 1530 EST with signals building up to the peak 1930 to 2130 EST. Possibly a few scattered c-w signals from 2200 to 0315 EST the following day. *10 meters*: Band opens sharply around 0730 EST. Signals lose from 6 to 8 db during the mid-day, but build to a good peak between 1445 and 1630 EST.

ZERO BIAS

(*from page 11*)

on amateur methods. I'm looking for a little "down to earth" practicality that will keep my hobby from becoming a nuisance to myself and to my neighbors.

James B. Strang, W8NFR

The above letter was written within one month after the first TV station went on the air in that metropolis. It describes a typical reaction, one

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that pretty well mirrors the thinking of the average amateur. And in general we are forced to agree completely with this attitude.

But what? There is much that can be done if only the gang can be made to realize it. The many published articles contain material that *does* work. Read W2GVZ's letter:

337 Hamilton Ave., Glen Rock, N.J.

Editor, CQ:

I just wrote to W2GIVE to thank him for his article in June CQ re TVI, because it helped me to cure my TVI completely, and I am very grateful.

By following his instructions concerning the various stubs, plus using a 56-mc and a 70-mc wavetrap in series with the plate of the final, I eliminated TVI from a set only 100 feet from my antenna, much to our mutual delight. Radiation from the transmitter itself did not enter into the picture as my Collins 30K is very well shielded. It cost me thirty hours of effort, but it surely was worth it, and I now feel very smug.

Thanks for publishing a very helpful article on a difficult problem.

Pat Jessup, W2GVZ

Yes, this editorial is an appeal, it is a plea—try to clean up your rig; try to explain the amateurs' rights to your neighbors; help track down TV dealers, servicemen, or just plain viewers who are misrepresenting the facts—above all, don't think the cause is hopeless.

BEGINNERS CONVERTER

(from page 27)

When the receiver is to be used in the regular manner, the converter must be disconnected from the antenna posts of the receiver and the regular receiving antenna placed on the receiver.

When the receiver dial is tuned, the main tuning dial on the converter will have to be retuned in order to receive on the same frequency. This means that the calibration on the converter will hold good for only one setting of the receiver dial. Therefore, make certain that the receiver is always tuned to the same frequency when the converter is being used.

The converter need not be turned off when changing coils, as there is no d-c voltage present on the coils.

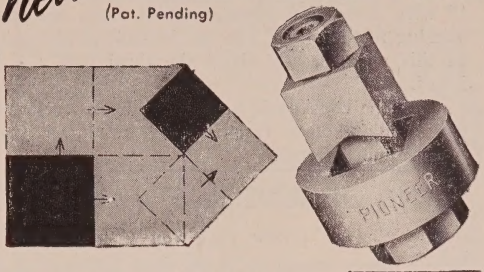
The beginners' 6, 10 and 11-meter converter may be used on 2 meters. Operation on this band is not especially recommended, however, because the coil construction is rather critical and much experimentation may be necessary. Further, it was found that oscillator pulling could not be completely eliminated. This means that the calibration would not hold, as the frequency of the oscillator would change whenever *C1* was tuned.

For those that are willing to experiment, and have the necessary equipment for experimentation, the information on coils for the 2-meter band is as follows:

Coil A: The coil is one turn of No. 12 wire, made the same size as the 6 and 10-11 meter coils. *CA1* is 5 $\mu\mu$f. *CA2* is zero (none used). *CA3* is 50 $\mu\mu$f. *(QSY to page 88)*

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(Pat. Pending)

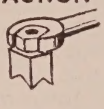


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Coil B: The coil is a 1¾-inch long piece of No. 12 wire, connected directly across from one outside lug to the other. The tap is made at the point on this wire directly above the third lug. *CB* is 5 $\mu\mu$f.

With the coils made as described, the oscillator will oscillate on a frequency 14 mc lower than the incoming signal.

LAND OF SUNSHINE — AND YL's

(*from page 28*)

have a dipole strung up in the attic and get out as best they can on 40 with an ARC-5 and a BC-348.

Louise Willomitzer, W6VWR, of Arcadia, was at Carol's, too, and we all had a gratifying ragchew. Lou, we were intrigued to learn, was formerly a New Yorker, as was Lenore (W2NAZ)—Lou being in Lenore's first radio class in AWVS. Lou is a whiz at c.w., and during the war was a Signal Corps radio operator at Governor's Island, N.Y.

Later, on Friday, we visited Ruth Mask, W6WQK, at Glendale. Ruth and OM W6VRC have already licked their TVI and are active on 10 phone. Ruth is a registered nurse, but during the war she put her radio knowledge to good use by working for the Army as a junior engineer at the Presidio in San Francisco.

We were having such a superb time visiting the YLs we could hardly tear ourself away to take in any of the I.R.E. activities with the OM, but after missing the get-together party the evening before, on Friday we did take in the "nite of fun" at Slapsie Maxie's famous night spot on the "Strip."

YL's Attend Convention

Saturday's dawn brought the first day of the Southwestern Division Convention. Registration at the historic Alexandria Hotel started early, and among the first of the YLs we met was Evelyn Scott, W6NZP, of Long Beach, who was in charge of the YL activities, assisted by members of the L.A. club under the direction of President Maxine Willis, W6UHA. Evelyn and OM W6KTS run the Scott Radio Supply in Long Beach. Many of the hams attending the Convention have been Scott customers for years, and Evelyn even remembers some who were shooed out of the store when they were youngsters with fingers itchy for a spare part or two!

Bertha Wallace, W6MA, XYL of widely known W6AM, was there early, too, for she was in charge of the YL luncheon that day.

Next among the YLs we met was Rosemary Robin, W6PJF, 6th district chairman for YLRL, who traveled all the way from Stockton with OM W6INP to attend the Convention. Rosemary is the "Lone Ranger" in Stockton, the only YL thereabouts, and has been ever since she received her ticket some time before the war. The mother of two jr. ops, she operates on 80 meters most of the time, but she likes 2 also, and is now getting set up to be on 10 phone and 40 c.w., explaining, "At heart I am really a c-w 'man'—but gosh, phone is lots of fun, too!"

Shortly after we registered, publicity chairman W6PAP gathered a group of OMs and YLs and conducted us to station KXLA to participate in Tom Regan's "Community Broadcaster" program, in an attempt to explain to the BCLs some of the mysteries of ham radio, and particularly the YLs' interest in it.

By this time all the licensed YLs were togged out with gay crepe paper leis—in blue, rose, green, or yellow—with silver diamonds bearing the letters YLRL, the work of art of Clara, W6TDL, and her OM. The leis provided a colorful touch when we all gathered at Bullock's Department Store for the luncheon and fashion show, both of which were tops.

There we met many more of the YLs—including Verma Cobb, W6JOJ, of Baxter, formerly W1KTY; Wilma Pappila, W9POZ/6, hailing from Illinois; Mary Klein, W6AVF, an x-ray technician of Monterey Park, now on 10 and studying for class A; Dorothy Williams, W6QLM, a 10-meter gal from Los Angeles, and Marie Mandroian, W6SPX, also of Los Angeles. Marie and OM W6RLX, are on all bands with a kw rig, using a four-element beam on 10 and 20, and sixteen-element array on 2 meters. They also operate 2 and 10 mobile.

Most of the members of the Los Angeles YL

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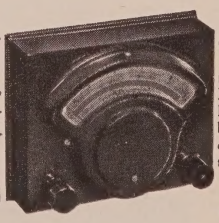
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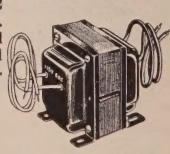
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Club were present. In addition to those mentioned earlier there was Enid Aldwell, W6UXF, of L.A., 6th district YLRL chairman last year, and a crack c-w operator. Another hobby of Enid's is raising flowers, and the waxy white gardenia she wore to the luncheon was the first of the season from her garden.

Another club member is Nina Henry, W6AAL, a telephone operator of Baldwin Park, who for her hobby prefers the key. Nina first became interested in radio twenty years ago when her brother was learning code in the Boy Scouts, but it was only recently that she renewed her interest, got her license, and came up with an "A" call.

A number of the Los Angeles YL Club members attending have already been written up in these pages at one time or another, but among the newer members we met Ida Carney, W6BIS, of San Pedro, treasurer of the L.A. Club. Ida's favorite bands are 10 phone and 80 c.w., on which she runs about 400 watts, and she also does a little 6-meter mobile operating when possible.

Not all of the girls were able to be present and among those we missed were Sandy Sarver, W6YRL, of Van Nuys, and Helen Cook, W6MWO. Helen, former president of YLRL, was just out of the hospital, but she sounded chipper indeed when we talked with her via landline.

Up from San Diego especially for the occasion was Neva Fredenburgh, W6YXI, vice president of the San Diego YL Club, while Gertrude Pond, W7KOY, and Jessie Olson, W7TBR, came all the way from Phoenix, Arizona.

But we discovered that not all of the YLs taking in the Convention went to the luncheon. One, a "brand new" YL, was Genevieve Malette. W6EHA, of Santa Monica, who received her ticket just a few days before the Convention. And Florence Jones, W6AET, of Altadena, admitted that "instead of attending the luncheon like I should have, and for which I sold tickets, there I was down at Kierulff Radio with all the gang of 'buzzards' from 3956 kc, then over to open house at Radio Products Sales, Radio Tel, and Radio Specialties. And if you ask me if I enjoyed the raffles, my answer is that I won a Hallicrafters receiver! So maybe I'm not disappointed at being absent from the luncheon after all."

Florence, who works for the Navy Department, has been on the air for fifteen years, having learned code at the age of nine. She is strictly a c-w operator—80, 40, 20 and 10, with most of her time spent on 20 and 10, for she is a DXer at heart, adding: "My most choice bit of DX is DA7RF, a Polish boy I used to qso before the war, and a contact that has turned into a lasting friendship. Present equipment at W6AET consists of a GO-9 with v.f.o., running 400 watts input, and a BC-348Q receiver, the rig sitting on a 67" long table she built herself. Her OM, W6DOB, is a television engineer, so as with many another W6 ham couple we met, they live radio practically 24 hours a day.

(*QSY to page 90*)

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Saturday evening brought more activity, with many of the YLs serving as hostesses at the dance. Here, also, we met Downs Wright, W6WMA, a recently licensed YL from Trona.

On Sunday, activities were climaxed with a banquet and entertainment, at which the YLs were star performers. Violet Sasse, W6CEE, a recent high school graduate, secretary and youngest member of the L.A. YL club, played several accordian solos, while Lenore, W6NAZ, acted with W6LIP in lively skits, including one depicting "ma and pa" with their first television receiver experiencing ham-caused TVI.

During the entertainment we sat next to W3GV and his XYL, who turned out to be W3KPE—"Kitchen Police Everyday," as Isabelle Bliley expresses it. Though not very active on the air because of caring for her jr. ops, Isabelle, if she wishes, can operate her OM's station from 80 to 2 meters, on the latter W3GV being an outstanding experimenter. Isabelle and her OM were on a real vacation trip, an automobile tour through the West, but were keeping in touch with their five jr. ops back home in Erie, Pa., by talking with them over the air from friends' stations along the way—good old ham radio!

Altogether thirty YLs attended the Convention—a record turnout! And now it's back to the subway circuit again for us, but our visit to the W6 YLs shall always remain a high-light.

SCRATCHI

(*from page* 8)

when I are going from AM to FM to SSB. Lil are being there for big ceremony when Scratchi are putting rig on air, and when Lil are seeing how new rig are working it are all I can do to keeping her from christening it with bottle of tequilla.

Then, Hon. Ed., comes the big tragedy. I are turning rig on after a couple of weeks of it working like sixty only this time it are working only on one cylinder. Of course, you are understanding, Hon. Ed., that it are no easy stuff to telling when SSB rig are working or not. In first place, are having practically no carrier, and unless speaking into mike, are having no outputs. So, when Scratchi not speaking into mike, are having practically no outputs which should be having, but when speaking into mike are still having practically no outputs, which should not be having, if you are following me. Louder I am speaking into mike, less of what I should be having is coming out.

Oscillyscope are showing that having nearly no carrier but are showing at same time that are having no sideband, so somewhere Scratchi are losing his sideband. This is why are riting hastily so you can advertising same so maybe Scratchi are getting sideband back and getting on air again.

Respectively yours,
Hashafisti Scratchi

P.S. Please disregarding ad for your Hon. Mag. as Lil are just coming in shack and finding trouble. It seems mike cord are not plugged in audio input hl jack. H. S.

LETTERS

(*from page 6*)

nal is properly tuned in. The report is received so frequently that it must be given some weight.

The most revealing contact to date was a solid one-hour coast-to-coast QSO with W3MBY on a Saturday afternoon, with SS being used on both ends. To those who operate 14-mc phone the mere mention of the day of week and time is sufficient, but to those who are not familiar with the joys of 14-mc phone it might be mentioned that the band is a veritable bedlam at this time. The way W3MBY's beautiful SS signal stood out above the grinding and gnashing left not the slightest doubt that SS is here to stay. The receiver on this end? About 35 dollars' worth of surplus and junk-box parts with an ordinary detector and b.f.o.

Let's give SS a try on its merits. The objectors need have no fears—if it won't do what is claimed, it won't last.

R. Leigh Norton, W6CEM

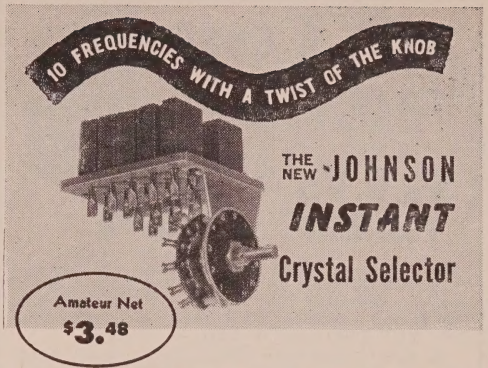
GRID-DIP OSCILLATOR

(*from page 34*)

The transmission bridge or the s-w-r meter should employ a meter of full scale sensitivity of 200 μa, or less, for most accurate readings. Coupling to the Dipper should be as loose as possible consistent with obtaining sufficient reading. If the coupling is too tight, the Dipper frequency calibration may be slightly shifted and it will have to be brought back to the correct point while listening to its beat on a receiver.

After the feed line has been adjusted for correct s-w-r or match, the antenna frequency should be again checked. With the feeder correctly matched, antenna resonance should remain the same with and without feeder connected. When checking with feeder connected, the antenna resonant dip will not be very pronounced due to loading by the feeder. Other more pronounced dips may be found. These will be feeder resonance at or near the operating frequency and may be correctly ascertained by lengthening or shortening feeder and observing frequency change of these other dips. Antenna frequency should remain constant.

Tuning the parasitic beam. Use the Dipper as g.d.o. and adjust driven element for resonance. The feeder should be disconnected and the parasitic elements should be set at their calculated correct length. If the driven element is open at the center, close it. After this element has been properly set, connect and match feeder as described above (open antenna center if matching system so requires.). The parasitic elements may then be adjusted using the Dipper as the signal generator coupled to the feed line and observe readings on a receiver (with an "S" meter) connected to a short antenna some distance away. Relative field readings in actual "S" units then may be obtained after each adjustment. As when matching feeder, coupling to the Dipper should be as loose as pos-



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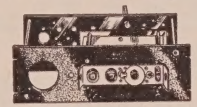
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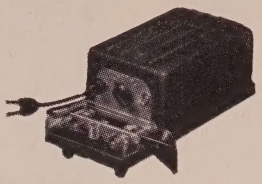
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sible. It is a good idea to occasionally check the actual frequency of the instrument on the reciver.

After the parasitic elements have thus been tuned, disconnect the feeder and go through the entire tuning up operation again and make the necessary readjustments where required. If the beam is located so that surrounding objects are likely to cause detuning as the beam is rotated (this may be checked during antenna and parasitic element tuning), it may be advisable to do the final retuning with the beam positioned either towards the direction in which it will be mostly used, or where the greatest degree of rotation has the least effect.

Needless to say, the transmitter may be used as the signal generator in place of the Dipper during the above adjustments; however, the employment of the Dipper for this purpose is more convenient, because the entire operation may be handled right on the roof by one person, or wherever the beam is located. The use of the Dipper also keeps the band free from unnecessary *QRM*.

Quarter-wave shorted lines. Use Dipper as g.d.o. and couple for open wire lines as at *Fig. 1G*, and for coaxial lines as at *Fig. 1H*. When trimming lines for correct length, fittings to be eventually used for connections should be installed on the end of the line. The approximate frequency of the line may be determined by rough calculation. Other resonant points can be found, however. These will be at three times the fundamental quarter-wave, where the line is then three quarter-waves long, or five times the fundamental quarter-wave, etc.

Quarter-wave open lines. For open-wire lines, connect a short at one end and measure as for quarter-wave shorted line. Due to the length of the short, the actual electrical length of the line (used as an open line) will be slightly in error depending on the line spacing. The closer the spacing, the smaller the error.

For coax lines, place short on line and measure as quarter-wave shorted line. The short should be as direct and short as possible from inner conductor to shield in order to avoid errors. Fittings should also be included. Remove the short after measurements are completed.

Half-wave shorted lines. For open-wire lines, couple at center as shown at *Fig. 1I*. For coax line, measure for quarter-wave shorted line at half the calculated or desired frequency. Resonant frequency thus found must be then multiplied by 2 for a resulting half-wave shorted line.

Half-wave open lines. For open-wire lines, couple at center as shown at *Fig. 1I*. For coax line, short one end and measure for quarter-wave shorted line at half the calculated frequency. Resonant frequency thus found must be multiplied by 2 for the correct length of the line after short is removed; provided the short is made direct as mentioned above.

Check standing waves. Aside from employing the Dipper as the signal generator in conjunction with a s-w-r meter, open-wire feed lines may be checked for the existence of standing waves by

using the instrument as a diode detector. A flat line is indicated when the meter reading remains constant as the Dipper "probe" coil is moved along the line. Care must be used to maintain uniform distance or coupling between coil and line. Where the Dipper coil is protected by an insulated sleeve, the coil form may be held against the line for maintaining uniform coupling.

This method is the same as that using a neon bulb, crystal detector or other similar device.

Relative field-strength meter. Use Dipper as diode detector. Connect a short antenna to one of the coil posts through a 5-30 $\mu\mu$f capacitor. The instrument's frequency calibration will shift some, so the dial will have to be rotated for maximum reading of the received signal. Actual frequency calibration is unimportant for this purpose. Sensitivity of the Dipper as a field meter is not as great as that of some other devices, but it will, nevertheless, be helpful in most cases.

The Dipper may be employed for a number of other measurements, principally when utilized as a signal generator. Its use as a g.d.o. will be quite obvious and self suggestive for measurement of many other types of equipment and circuits. The applications herein described are those which will be generally most useful.

CRYSTAL GRINDING

(*from page 40*)

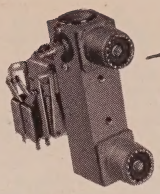
either by changing electrodes or by carefully lapping down the electrode lands, taking care to maintain equal plane surfaces on the lands.

You can also make substantial frequency changes by changing the air gap. The greater the air gap, the higher the frequency. Changes of a few hundred cycles at 3.5 mc and a kilocycle or so at 7 mc are perfectly feasible and the technique affords an often used and practical means of accurately adjusting a crystal to frequency. This is the principle usually utilized in many of the commercial "variable frequency crystals."

General

A crystal is a frequency controlling device—*not* a source of r-f power. Let the crystal take it easy and you'll get a steady carrier and freedom from chirps, yoops, excessive drift and other annoying phenomena.

As for stability under varying temperature conditions (remember that the harder you drive a crystal, the more it heats internally!), the common practice of specifying drift in terms of cycles per megacycle per degree centigrade doesn't mean a thing unless the temperature range is specified, and you know the shape of the temperature-frequency curve. So called "low-drift" crystals may actually have a practically zero coefficient over a very limited temperature range on certain parts of the curve. The reason for this is that the temperature-frequency curve af AT and BT cuts is anything but linear over an extended temperature range, although it approaches linearity over a very restricted part of the temperature-frequency curve.



ADVANCE
COAXIAL
RELAYS

for minimum line loss...

Extra high efficiency in antenna switching makes ADVANCE small Coaxial Relays ideal for mobile and other low power transmitters. Designed for 50 ohm RG cable, these ADVANCE Relays maintain a VSWR ranging from 1.04 : 1.00 at 80 mc, to 1.40 : 1.00 at 300 mc, with max. rating of 250 watts. A variety of terminal positions are available.

Write for descriptive folder on all ADVANCE Radio Relays

ADVANCE RELAYS

ADVANCE ELECTRIC & RELAY CO.
1260 WEST SECOND STREET ★ LOS ANGELES 26, CALIFORNIA

R & M's GOT IT!
NO MORE SEARCHING
FOR HARD-TO-GET
SURPLUS RADIO
EQUIPMENT

Three large warehouses stocked with thousands of govt. radio surplus equipment and parts, priced at a fraction of original cost.

Write for complete price list. Individual data supplied on specific equipment.

R and M
RADIO COMPANY

1426 N. Quincy St., Dept. C, Arlington Va.

Classified Ads

Advertising in this section must pertain to amateur radio activities. Rates: 25c per word per insertion for commercial advertisements. 5c per word for non-commercial advertisements by bona fide amateurs. Remittance in full must accompany copy. No agency or term or cash discounts allowed. No display or special typographical ad setups allowed. "CQ" does not guarantee any product or service advertised in the Classified Section. Closing date for ads is the 25th of the 2nd month preceding publication date.

PERSONALIZED book matches . . . call letters or name and address . . . samples with prices. Miss Amanda Martin, Box 1123, Rochester 3, N. Y.

QSL CARDS: New, original, exciting. New modern designs exclusive with us from one to multiple color cards. Your own design reproduced at small additional charge. Our prices are the most reasonable, consistent with quality work. Fast service. Send for free samples of price list. The W2PEO Press, 24 Villa Road, Larchmont, N. Y.

CALL LETTER PLATES, aluminum. 6½" x 2⅜". 1¼" raised letters on black background. $1.00. Hawkins Radio Company, 621 E. 31st St., Kansas City 3, Mo.

FREE SAMPLES of QSLs-SWLs. W1HJI, Box 32, Manchester, N. H.

SALE: Amertran plate transf 6200 v. 750 ma. ct. Two 450TH. Three 2 mfd 5000 v. filter condenser, one rectifier, fil. transf 5 v, at 25 A 25000 v. ins. Two 872 and sockets. All new for $100.00. Write 131 S. Benita Ave., Redondo Beach, Calif.

10 & 6 METER BC222 mobile rigs. Two complete sets. Ready to operate. Tune 28-52 mc. $60. R. Hayos, 219 W. 81st., New York City.

BIG STOCKS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Sonar, Meck, other receivers, transmitters, etc. Reconditioned S38 $35.00, S40 $59.00, S53 $59.00, NC46 $59.00, NC240D $149.00, DB20 $29.00, VHF152 $59.00, RME84 $69.00, RME45 $99.00, HQ120X $99.00, HQ129X $139.00, Meck T60 $89.00, DB22A, HF-10-20, SX43, SX42, SX28A, S36, HT18, HT9, BC610, NC173, NC183, HRO, other receivers, transmitters, VFOs. Easy terms, Shipped on trial. List free. Henry Radio, Butler, Missouri.

FOR SALE: Hallicrafters SX28 communications receiver. Jack for FM and phono. Perfect condition. Best offer. Dr. Henry W. Radom, 113 West 42 Street, New York 18, N. Y

WANTED: ART/13. Preferably unconverted. State condition and price. WØDNW, 210 W. Second, North Platte, Neb.

BC 348-Q, BUILT-IN Q-5er, 1852 RF stage, noise limiter, external power supply, etc. Make offer. W4MVM, Chickasaw, Ala.

BC-348-M RECEIVER, BC-459 transmitter, 110 volt power supply for both. $50. W. Kirchhoff, 485 Pelham Road, New Rochelle, N. Y.

QSLs? SWLs? Made-to-order! Samples 10¢. Sackers. W8DED, Holland, Michigan.

CRYSTALS: Precision, low drift mounted units, 3500 to 9000 kilocycles, ±5 kilocycles $1.00. Exact frequency $1.50. Specify mounting. Write for quotations all other frequencies. Breon Laboratories, Williamsport, Penna.

FOR SALE: 2 PE-103 generators. 1 new in original crate—$12.00; 1 used—$9.50. 2 Westinghouse radiation meters, 0-3, $2.50 each. 1 Weston milliammeter, 0-250, less shunt—$2.50. W2ADC.

QSL's, SWL's. MADE the way you want them. Samples? W9BHV QSL Factory, 857 Burlington, Frankfort, Indiana.

ALUMINUM TUBING for antennas, 11 ft. lengths x ⅝" OD, 24ST (rigid), $1.50 per length. Metalcraft Toy Co., Paul Brown Bldg., St. Louis.

FOR SALE: CREI introductory and advanced course. New condition—$55.00. Sonar XE-10—$25.00. Sonar CFC exciter—$35.00. Robert J. Barrone, 1618 Bay Court, Brooklyn, N. Y.

SELL: 500 watt 115 volt remote start Fairbanks Morse light plant. Used very little. $200. ARC-ARN 7 radio compass—$20. Welte, W7HJM, Hingham, Mont.

GF11/RU-16, brand new and complete, xmtr covers 2000-9050 kc, receiver 195-13575 kc. Receiver partially converted to a.c. for external power supply. Complete outfit with dynamotor, spare tubes, etc. as shipped by manufacturer $50.00, xmtr and dynamotor only $30.00, receiver and coils to cover 195-13575 kc with power supply $35.00 Receiver only $25.00. Hollis Button, Valley City, No. Dak.

BC348J, BRAND NEW in original crate, including shock mount base, manual, not used or tampered with—$75.00. f.o.b. W9CCF, 328 Center, Waupaca, Wisc.

BINDERS FOR YOUR CQ ISSUES available! Rich red Dupont Fabricord, stainproof and washable. Backbone gold stamped with CQ and year —1945, 1946, 1947, 1948, 1949 specified in order. Center channel to keep magazines fastened in position. $2.00 each postpaid. Foreign orders—add 25c per binder. Plain binders on special order at no extra cost.

QSLs QUALITY CARDS priced right. Samples. W9UTL, 1768 Fruitdale, Indianapolis, Ind.

OUR BUSINESS . . . Buying, totally and completely refinishing and selling . . . amateur radio transmitters. Transmitter Exchange, Wakefield, Rhode Island.

10-METER 3-ELEMENT BEAMS—$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

AMATEUR RADIO LICENSES. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

QSLs. Samples for stamp. Henry L. Carter, Jr., W2RSW, 747 S. Plymouth, Rochester 8, N. Y.

WANTED: Aircraft Radios; BC-348, AN ART-13, RTA-1B, AN/APN-9, R5A/ARN-7, AN/ARC-1, AN/ARC-3, SCR-718, BC-788-C, I-152, MN-26-C, Tests set with TS or I prefix. State quanity, condition and best price first letter. HI-MU Electronics, Box 105, New Haven, Conn.

QSLs, SWLs. Quality cards. W5FAY Press, 6118 Goliad, Dallas, Texas.

WHY WAIT? Join N.A.R.C. today. The best $2.00 investment ever made for the good of the amateur. Send your application with handle, QTH and class of license to: National Amateur Radio Council, Inc., 23 Main Street, Champaign, Illinois.

FOR SALE: One new HQ129X complete with speaker and manual $134.50. One new NC-240D complete with speaker and manual $199.50. One NC-46 complete with speaker and manual, slightly used, $69.50. Ward Lantis, W4LEB, 2207 Millye St., Westwood Hills Add., Kingsport, Tenn.

AF-100 SUPREME transmitter for sale, like new, used 3 months, $375. R. Cabanillas Jr., Room 803, 9 Maiden Lane, N. Y.

FOR SALE OR TRADE: Mobile rig including Stancor ST203A, Gonset converter with noise clipper, also 19B22A. Want scope, prop pitch motor, BC-221 frequency meter or what have you? Bernard R. Bailey, W7MEG, 514 Third St. West, Billings, Mont.

FOR SALE: HT-9 transmitter in excellent condition, coils for 80-20-10 m, spare tubes, instruction book crystals, $300. Local buyer preferred. L. F. Brown W2JJD, 37-30 81st Street, Apt. D-5, Jackson Heights, L. I., N. Y.

COLORTONE QSLs! Snappy! Bright! Different! Beautiful samples free! Colortone Press, Tupelo, Miss.

BARGAINS—NEW AND USED TRANSMITTERS —Receivers—Parts. New 150 watt phone $199.00; 60 watt phone $99.00; Globe Trotter $57.50; Abbott TR-4 $29.50; HT-9 $295.00; MB-611 $59.00; Silver 701, 800, 801, 802, $29.50 ea.; NC-173, SX-28 $149.00 ea; HQ-129X, HRO $139.00 ea.; RME-45, SX-25 $99.50 ea.; RME-9D $39.50; SX-24 $75.00; BC-348, S-40 $65.00 ea.; S-20R $49.00; NC-44, S-38 $35.00 ea.; many others. Large stocks—trade-ins. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Labs, Council Bluffs, Iowa.

SELL MACKAY 167-BY kilowatt. Finest power and audio components. $500 or best offer. Local purchaser only. W. C. Thomas, 40 North Road, White Plains, N. Y.

WANTED: Teletype 1/40th HP synchronous motor. W6ITH, Moraga, Calif.

WANTED: BC-224-A instruction manual or schematic. Lewis Denson, W4LYE, Route 1, Box 395, Anniston, Alabama.

WANTED: QST—all issues prior to December 1924. Write giving details, condition and price. Ed Newman, 214 Munro Blvd., Valley Stream, L. I., N. Y.,

WANTED: HRO bandspread coils. Write airmail giving price. Bill Scarboro, 2K2AA, Nuie Island, Pacific.

COMPLETE PORTABLE RECORDING UNIT—Presto K8 recorder with built-in 3 channel mixer, Webster 78 wire recorder, microphones, auxiliary equipment, all A-1 condition. Sell units separately, or as complete unit. Also ARC/5 receiver power supply. W3KJL, 720 N. Webster Ave., Scranton, Pa.

ALUMINUM TUBING, angles, channels and pipe. Write for list. Willard Radcliff, Fostoria, Ohio.

SACRIFICE—Cash wanted. Receiver NC240D and speaker used 2 months, $180; frequency meter BC221, $33; transmitter, phone-cw, 150 w. 80-10 complete audio and power supply all enclosed in 28" Par-Metal gray crackle cabinet, $120; wire recorder, Webster portable, new, $118; new spare plate transformer, Thordarson 1500 v. @ 500 ma., $29. G. L. Schultz, W2EJB, Essex Falls, N. J. Caldwell 6-4394.

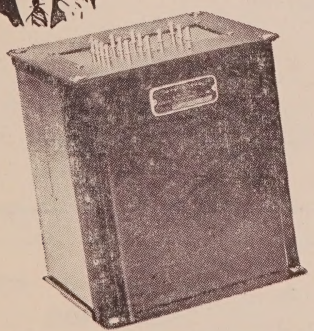
DB22A, VHF-152A, HF-10-20, (all slightly used) bargains! W8QJC, P. O. Box 218, Holland, Mich.

COMMAND SETS: ARC-5/274N transmitters, 3-4 mc. new $14.95, used $9.95; 7-9.1 mc. new $12.95, used $8.95; 2-3 mc., 4-5.3 mc. or 5.3-7 mc. new $9.95, used $6.95. Receivers, 190-550 kc., 520-1500 kc. or 1.5-3 mc. new $15.95, used $12.95; 3-6 or 6-9.1 mc. new $9.95, used $7.95. Splines 25c, crank knobs 75c. Used sets in excellent condition—satisfaction guaranteed. W5EAL, 1110 Winbern, Houston 4, Texas.

Note: In W5EAL's November classified ad a line of copy was inadvertently omitted so that the ad incorrectly read "Receivers, 190-550 kc, new $9.95, used $7.95." The correct advertisemnt appears immediately above this notice.



"It's KENYON Transformers For My Rig Because They Always Put Out!"

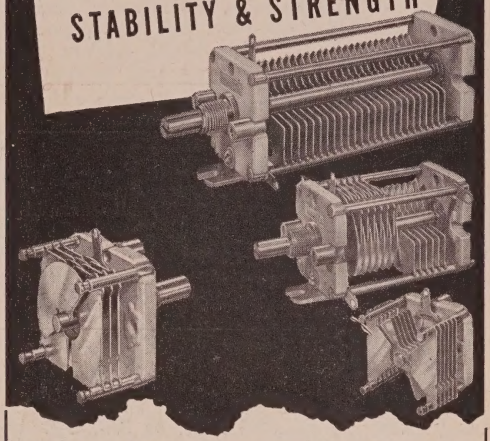


- Hams everywhere specify KENYON "T" Line Transformers! Manufactured under rigid standards, all KENYON transformers are constructed of the finest grades of material plus the skill and long experience of a highly trained competent operating staff.
- All KENYON transformers are checked progressively in the course of manufacture and are laboratory-tested upon completion to insure satisfaction. Yes, KENYON "T" Line Transformers meet the most exacting requirements of critical purchasers. For skillful engineering, progressive design and sound construction — *Specify* KENYON for top performance in your rig!

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Available in .030" and .080" spacings for all types of communications equipment having tuned circuits operating as high as 500 mc.

Single Type — Available in six models: 2.8 to 11 mmf, 3.5 to 27 mmf, 4.6 to 51 mmf, 5.7 to 75 mmf, 6.8 to 99 mmf, 11.6 to 202 mmf.

Dual Type — Available in three models: 3.5 to 27 mmf, 4.6 to 51 mmf, 6.8 to 99 mmf.

Differential Type — Available in three models: 2.8 to 11 mmf, 3.5 to 27 mmf, 4.6 to 51 mmf.

Butterfly Type — Available in three models: 2.8 to 10.5 mmf, 4.3 to 26 mmf, 6.5 to 51 mmf.

Other Capacities and spacings available on special order. Write for new JOHNSON 167 Variable Catalog.

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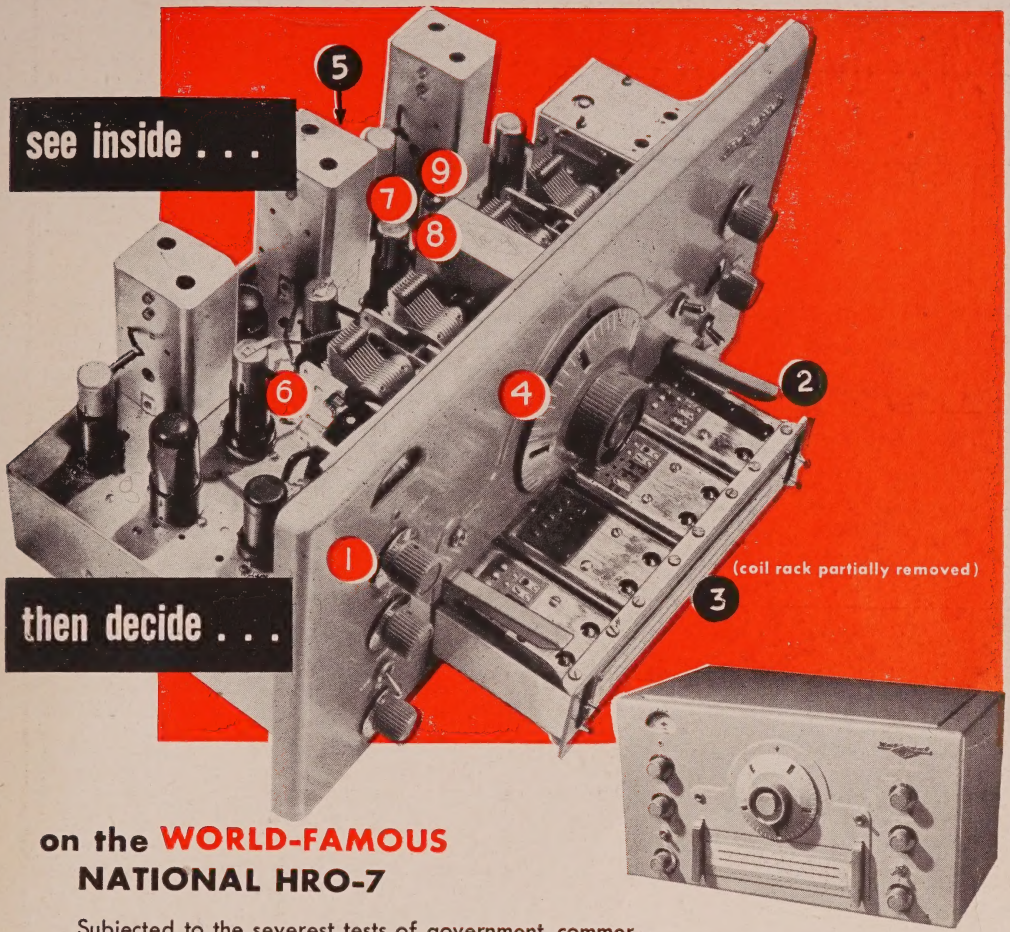
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RANGE: 1.7 to 30 mcs. (Additional coils available for 50 to 430 kcs, 480 to 2,050 kcs, 30 to 35 mcs.)

SENSITIVITY: 1 microvolt or better.

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1. **Automatic adjustable-threshold noise limiter.**
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4. **500-degree micrometer dial (effective scale length 12 feet). 400 degrees of bandspread on 80, 40, 20 11-10 meters.**
5. **Accessory socket and switch for NFM adaptor or phonograph.**
6. **Two tuned RF stages.**
7. **Two IF stages.**
8. **Precision gear drive eliminates backlash.**
9. **Voltage-regulated high frequency oscillator for exceptional stability.**

$312.86 (Complete with coils and power supply, less speaker)

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