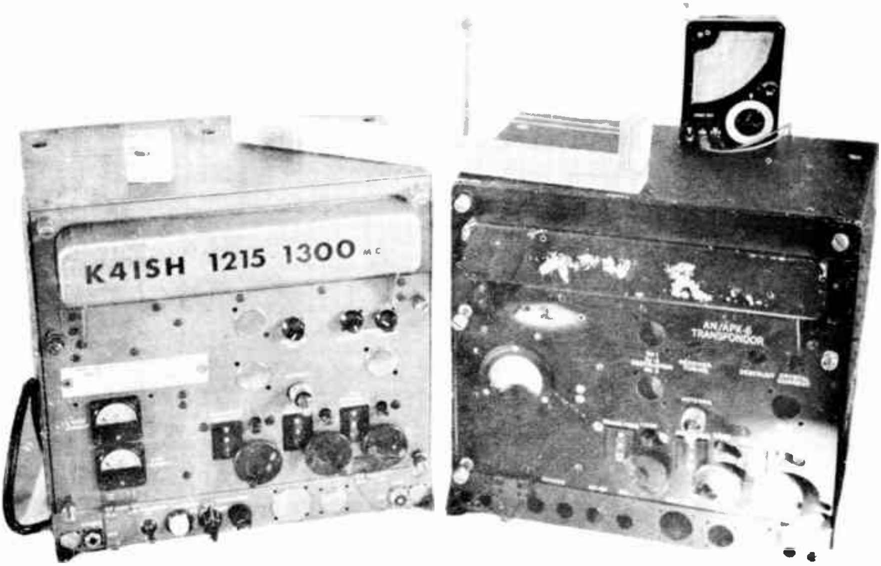
February 1962

35¢

The VHF Amateur



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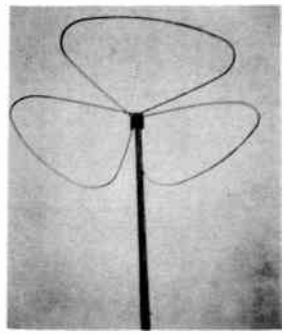

PERFORMANCE SPECIFICATIONS

Pattern: 360 horizontal, variations of ± 2DB or less

Band Width: SWR 1 : 1.2 or less over 4 Mc

Gain:

Single bay — approx. 5 DB over Halo

Two bay — approx. 5.5 DB over single bay

Four bay — approx. 7.5 DB over single bay

MECHANICAL SPECIFICATIONS

Elements ¼" — 17T6 aluminum rod

Brackets — aluminum alloy

Insulation — polystyrene

Fasteners — Stainless Steel and plated steel

Mount — from ¾" to 1½" pipe

Packaged for shipment by parcel post.

For Further Information & Illustrations Refer to:

Page 42 September QST
and
Page 60 October QST

PRICES

¾ meter	ABW	420	$ 8.95
1¼ meter	ABW	220	$10.95
2 meter	ABW	144	$12.95
2 BAY			
¾ meter	ABW2	430	$20.75
1¼ meter	ABW2	220	$26.95
2 meter	ABW2	144	$29.65
4 BAY			
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The VHF Amateur

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COVER PHOTO

This is the equipment used by K4ISH during his recent 1215 mc contact with K4OCK in Miami - a good 15 miles - for a Florida first !

EDITORIAL

BOB BROWN, K2ZSQ

Progress Report

In our November 1961 edition we did a short story entitled "How Are We Doing?" which briefly described goings-on here at Rahway. Since that time, however, much has happened well worth mentioning. Before we get too deep into recent affairs, though, it is only fair to tell you that we are now employing a new printer to do *The VHF Amateur* every month. As you know only too well, your January issue was way overdue and even this issue is a bit late. The reason: our part-time printer decided to take a holiday vacation without notifying us. Copy was ready for the January issue on December 15. We didn't receive our January magazine until January 15. So, you can see our predicament! In any case, we now have a full-time printer who costs a little more but promises the job quite a bit earlier.

During a part of 1960 and all of 1961 I did a monthly VHF Column for *CQ Magazine*. I only regret that at least for now continuation of that work is impossible. I hope, though, that our new DX Report column will more or less fill that gap. We have long needed a DX column in this magazine to balance out our construction and technical articles and to provide the added service of reader participation in "making the news." Our Reader Report is now four months old and already a huge success. We can guarantee that consideration will be given to each and every "Report" received. Big plans are ahead at Dan's DX workshop. For years we have been fooling with the idea of a mapping system of Sporadic-E openings on 50 mc and tropo and aurora conditions on 144 mc. Each major event (such as a 144 mc aurora) would be plotted on a map (printed by us and distributed to interested readers) by you and sent to us for country-wide correlation. The result would be map printed in this magazine of the United States and surrounding areas showing the actual intensity and coverage of (in this case) the 144 mc aurora. This would show you what possibilities you missed, pattern of coverage, and those most likely to be in a fringe area next time. The possibilities of this mapping system are vast. Within a few month's time we could plot patterns of openings, auroras, etc., and actually be able to *predict* these phenomena. Let us know your feelings on the matter, your suggestions, and if you would be in a position to help by filling out the map. Write to WA2DMQ at his Newark, N. J., QTH.

Bucks for Writers!

With our March 1962 edition we will be in a position to pay for articles (at long last). Since we are not on a competitive scale with the larger general ham publications, don't expect too much. But the fact remains that from now on we'll be able to provide fame *and* fortune (within limits, of course) to writers who get their articles in print. A check will be mailed *upon publication* to those writers who succeed. Why not try your hand at writing for us? You've got nothing to lose and stand a darned good chance of having your idea expounded before 15,000 eyes. What do we need? Here goes: construction articles (top on our list). Give us the most complete write-up possible with pictures (snapshots are OK), schematic and a parts list. In this "construction" category fall transmitters, receivers, accessory units (such as linear amplifiers), and antennas. If it hasn't been in print before, we want it! Next on the list comes technical articles—discussions of propagation—and the like. By the way, before I forget—we're also paying for pictures (such as the snapshots found in our columns)—$1.00 for each printed. 'Nuff said.

Prices Going Up

Due to the increased publication costs we are forced to up our subscription rates 50¢ a year. EFFECTIVE MARCH 3, 1962: SUBSCRIPTIONS $2.50 a year, $4.00 for two years, $5.50 for three years. As you can see, you save considerably by subscribing for two or three years (life subscription still only $30.00—plug plug). You might care to renew now, before March 3 and save the increase—OK. But all those after get the higher rates.

In closing, I might mention that we are slowly going over to linotype printing (like this page). I think you'll agree that it's a lot nicer (also more expensive). By June or July we hope to have *The VHF Amateur* completely linotyped with a more professional touch.

73,

Bob, K2ZSQ

I Like ....

2 meters!

Robert C. Higgins, W2IXU
308 Edgar Avenue
Cranford, New Jersey

What other band can boast an "OSCAR?" I had planned a construction article describing how to build an inexpensive transmitter for two meters, but with the whole country turning their receivers to our band, I think we had better say something about the big event. The first report we received was a news release on...

DECEMBER 12, 1961: The report mentioned how and when the missile was shot off and how the satellite was operating. The signals were being heard in Antartica by an amateur station, presumably on the first pass. Looking to the local gang here in the northeast, I found that the signals were copied Friday night, December 15, 1961, by several, including W3VWX, K2BNK and W2LFO. The next day, Saturday, the boys were all set for the 11:34 EST pass. The big topic the first week was the count each received. K2BNK copied a low of 56 Friday night; W2LFO copied 86 on Saturday. The count I refer to is the number of DITS counted in any one minute starting with the "H" and ending with the "I" in HI. The device that keys the transmitter is temperature sensitive so as the altitude and temperature vary, so does the speed of the keying. The big surprise came at the speed of the keying; most expected a slow speed signal - so the fast keying was a shock even to the old CW men. Activity has been very high on the band because of the long waiting period between passes, thus leaving time for rag chewing and comparing notes on OSCAR, even in the early morning hours.

Thanks to Herman, K2BNK, we were filled in on some important aspects of the operation and so I'll pass them along to you. The orbit is a polar one passing over each pole at a tilt of about 10 degrees. This means that as the earth rotates the satellite will pass over every part of the earth at one time or another. It takes about 91.66 minutes on each orbit so each pass is moved by about 23 degrees; depending on your latitude, the distance of each pass will be about the same distance apart. The official reports were given out stating the crossing at the equator and all in degrees West of Greenwich, to cut down the confusion. Herman simplified it for me by bringing out the point that since we are on one side of the earth for the first pass which is going north to south, onethe daylight pass we have rotated around to the other side by night time and the satellite now will come out of the south and head toward the north. This is important for beam-settings.

The signals have been copied for two consecutive passes on some days. This was done during the day by setting the beam in the northeast for the first pass and then 91 minutes later looking to the northwest. The length of time the signals were copied varied with the maximum being about 8 to 9 minutes and minimum being about 3 minutes. The time heard is calculated on how far away it is and the altitude.(Figuring horizon to horizon). The signal strengths varied from station to station and from each pass they ran about an S5 average. The receivers used varied from the most elaborate low-noise converters to Gonset Communicators! Antennas, from 64 elements to Halo's. When it passed overhead almost any antenna or any setting seemed to be OK, while as the distance grew, the better equipment paid off.

In conclusion, it looks as if "OSCAR" has brought a lot of new interest to the two meter band. Why not give a listen?

73,

Bob, W2IXU

Miami Microwaves!

K4OCK - K4ISH on 1215 mc

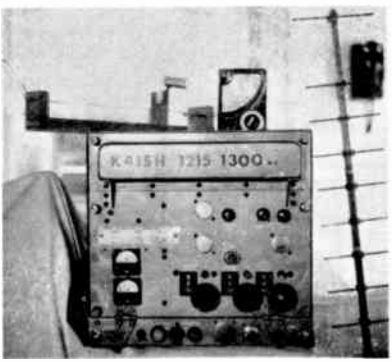
John W. Gregory, K4OCK
3000 S.W. 103rd Court
Miami, Florida

Lloyd A. Proebsting, K4ISH
310 S.W. 59th Avenue
Miami 44, Florida

A First!

Early in November, 1961 a telephone call to K4ISH from K4OCK set in motion the machinery and burning of "midnight oil" that was to result in what is believed to be the first 1215 mc contact in Florida and known to be the first in Southeast Florida. This contact was made on AM over a 15 mile path using surplus equipment to be described later. The contact was initiated on November 30, 1961, at 2015 EST and lasted until 2130 EST. Subsequent contacts occured on preceeding evenings with phone patch verifications from W4NVF and W4VBQ. W4UPS was present in K4ISH's shack during a 40 minute QSO on November 7, 1961.

Transmitter and Receiver



APX/6 transponders were procured locally at under $10.00 each. These are no longer available at the original source, but the author's have made contact with Jacwin Electronics, 620 N.E. 125th Street, North Miami, Florida, who promises to have the units shortly complete with tubes at under $10.00 per unit.

The AN/APX-6 is an IFF unit that was used during the Korean War and have since been declared "surplus" and obsolete. Everything is in the unit to make the conversion as purchased except for a modulator and power supply. A 15 watt modulator is required and power supply capable of 300 volts at 150 ma. The original conversion information regarding this unit appeared in September 1960 QST. This information is only basic and leaves a great many questions unexplained and unanswered. There are several major omissions and errors in the article. (Editor's note: Preceding statement is the opinion of the writers, not this publication necessarily. See "Power & Audio - APX-6" by W5IUR in the June 1961 issue of THE VHF AMATEUR.)

If interests warrants, a future issue of this magazine will carry complete step by step conversion information regarding the AN/APX-6 and further information about the test equipment made up by the authors to spot-check the frequency and the output strength of the completed units. Since the authors had no frequency checking equipment that would go into the microwave spectrum, a simple lecher wire and field strength indicator was constructed and it was most gratifying to make the frequency check. By carefully measuring the distance between the two nulls with a centimeter scale and computing mathematically, we were able to fix our frequency to plus or minus 1 mc.

Geographical location prohibited a telephone call to solve the many problems necessary to get the APX-6's on the air. Therefore, it was mandatory that the authors "lived" with these units and burnt much of that so-called "midnight oil" for a period of 10 to 15 days and probably can now modestly state that they know what it does and does not require to result in a successful operation on 1215 mc.

Antenna

Antennas used for the initial contacts were cylindrical horns - and, for the want of a horn, (of approximately 1 gallon size) we chose the closest thing at hand - which just happened to be "Ameco" 5 qt. oil cans. The driven element was constructed from #12 wire exactly 6.15 cm long or 1/4 wave length on 1220 mc. This element is placed in the horn (5 qt. Ameco oil can) in the vertical plane 6.15 cm from the rear of the horn. Gain of this antenna is about 6 db. Since this type of antenna produced gain through compression of the "E" plane, it would be of little use for DXing. The authors intended to use these antennas for initial contacts and point-to-point local work only. Multi-band arrays are now under construction for DXing. These arrays will be yagis or rhombics. With the present horn, K4ISH, who is a Flight Engineer with National Airlines, Miami, has heard Tampa DME signal across the state. Initial receiver operation was set up on the Miami DME signal, which is about 1000 mc.

Times wire (T4-50) cable was used at both the author's QTH's. This cable by rough calculations exhibited about 5 db attenuation per 100 feet. All other transmission lines tried, even the so-called low-loss polyform stranded center conductor cable, was almost a perfect attenuator at 1215 mc. Radiation losses from open wire line were excessive even though the theoretical loss would be less than coaxial cable.

With the increased capture area of larger antenna arrays, the authors hope to create DX interest in Florida.

Since the authors will most probably not have Micro-Wave Associates "paramps" made available to them, the moonbounce circuit is going to take a little time. However, it will be in mind for future experiments.

The authors plan to move the APX-6's to 1296 mc shortly and then begin the crystal controlled converters, etc.

Questions regarding the APX-6's will gladly be answered by the author's. Please enclose a self-addressed-stamped-envelope if request is submitted by mail. See you on 1296!

Stolen (with permission) from
FLORIDA SKIP, Jan. 1962

AUTHOR'S CONTEST!

At long last, here are the results of our first 6-month AUTHOR's CONTEST! Here's how the voting went...

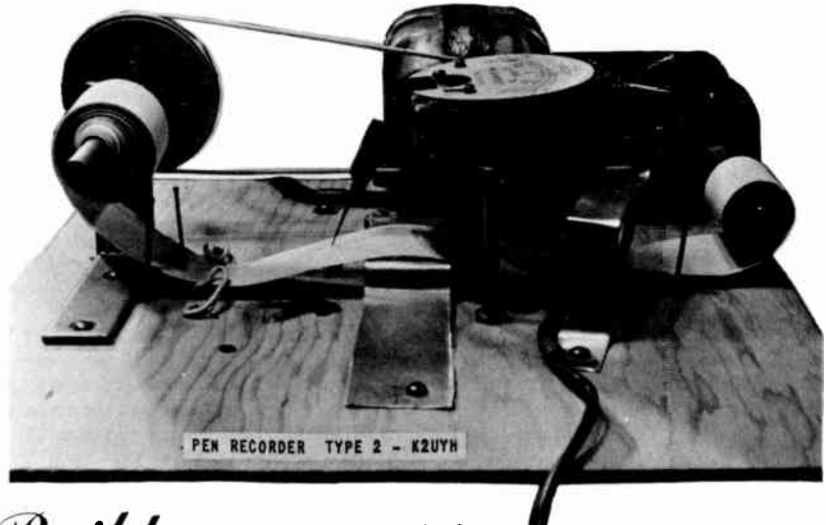
FIRST PRIZE (Clegg 99'er 6 meter transceiver): Dave Heller, K3HNP, for his article "'HNP' 6n2 VFO" in the September 1961 issue.

SECOND PRIZE (Gem Electronics units for 50 & 144 mc): Michael A. Czysch, LU3DCA, for his article "Modulation Monitor", October, 1961.

VOTING PERCENTAGES

June 1961 issue: "TVI on 6 meters," K3HNP - 57.12%. July: "De UCH", W4UCH - 36.36%. August: "100 Watts - SSB", K4RLX - 50%. September: "HNP" 6n2 VFO, K3HNP - 89.476%. October: "Modulation Monitor," LU3DCA - 87.5%. November: "Who's Got the Button?", K2OPI, 22.14 %.

Our deepest gratitude to those who took the time to vote and to the companies furnishing prizes to our winners.



Build your own
Pen Recorder

Allen Katz, K2UYH
MOONBOUNCE EDITOR
48 Cumberland Avenue
Verona, New Jersey

In providing a permanent record of moonbounce experiments and many other amateur endeavors, a pen recorder has a marked advantage over a tape recorder. In moonbounce, extremely narrow bandwidths are used to obtain gain. These narrow bandwidths change the tone of the received signals, making them hard to discern with the human ear. The pen recorder is not affected by this change.

The two pen recorders to be described were built individually, although the basic idea is the same. An armature pivoted and spring loaded in a magnetic field will change position as the field is varied and can move a pen which writes on a continuously moving paper.

Construction

The first recorder's armature--magnetic field arrangement is completely homebrew. The magnetic field is produced by two 5,000 turn coils of #33 enameled wire wound about ¾" diameter x 2¼" long (1¾" shaft & ½" head) stove bolts placed as shown in Figure #1. The armature (a ½" length of ¼" diameter stove bolt) is supported in a 1¾" x 2¼" x 3/8" plastic frame between the two coils. Conical bearing surfaces are drilled into the plastic frame for pivots made from brass machine screws whose ends are tapered to a point. Tension is applied to the frame by a spring made from approximateky 20" of piano wire. The pen is attached to the plastic frame by a thin aluminum clamps (see Figure #2).

The second recorder's armature-magnetic field arrangement is made from an old 3" meter (1 ma full scale). The case is removed and the needle is cut off about 1/8" from the pivoted coil. The needle's counterbalance is bent slightly up and a 1½" length of #18 copper wire is soldered to it (see Figure #3). The pen is taped to this wire. Two ground

FIGURE #1

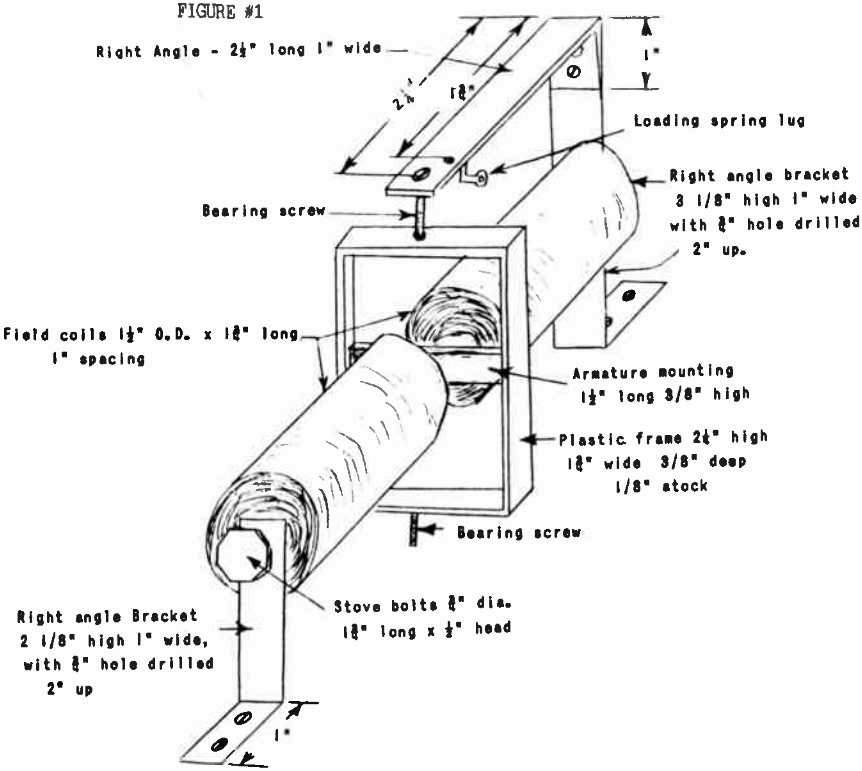


FIGURE #2

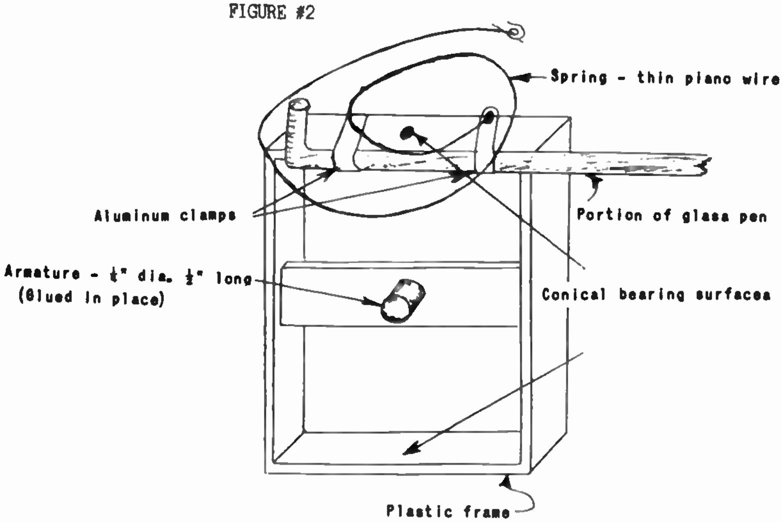
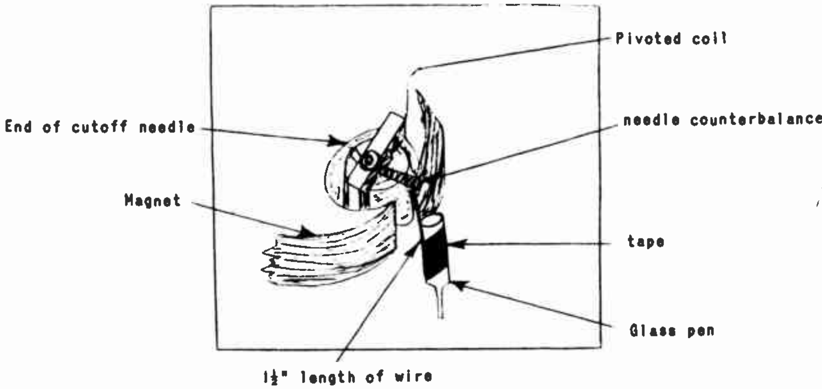


FIGURE #3 - Portion of old 3" Meter



lugs - connected between thė holes previously used for the case - and two metal standoffs (1¾" high and 3¼" apart) support the meter above the moving paper strip. The meter is tilted enough to let the pen just touch the paper.

The layout for the two recorders is shown in Figures 4A and 4B respectively. Both recorders are mounted on a 10" square x ¼" thick plywood board and use adding machine paper. The pickup roller (in both types) is made by drilling a 3/8" hole in a right angle bracket and placing an extension shaft and panel bushing through. The paper can be attached directly to the shaft with a piece of tape. The feed roller is made by attaching a fixed shaft to a bracket (see layout). Over this shaft is placed a 2" piece of 3/8" tubing which fits snuggly into the center of the paper rolls. Drive is produced in the first recorder by a clock motor directly attached to the pickup roller, while power is obtained in the other by an old Erector Set motor and dial cord pulley arrangement.

The pen used in both recorders is made by slowly rotating a length of ¼" glass tubing over an open flame until it becomes soft, and then quickly withdrawing it from the flame and drawing it apart to produce a thin section of tubing about 1/32" in diameter. Scratch the center of the section with a file and break apart with hands (either side may be used for the pen.) All other cuts of the glass tube may be made in this manner. For the pen of the first type recorder, the tube will have to be reheated and bent 90 degrees at a point 3" and again at a point 7½" up from the small end. The tube is finally cut 3/8" up from the last bend. For the second type, the tube is cut 1½" up from the small end (see pen details - Figure 5). The pen end may also have to be ground with emery paper before a suitable line can be traced.

Operation

The connection of the second type recorder into the receiver system is rather simple. All that is needed is a diode of the 1N34A variety in the lines between the receiver's audio output and the meter. The first type, however, will usually need a booster amplifier. Details of one suited are shown in Figure 6.

Ordinary ink may be used as long as the pen is washed out after each use. The pen can be filled by an eye-dropper. Although the speed is not constant, because of the change in diameter of the pickup roller, both recorders have and should perform satisfactorily for most purposes.

Editor's Note: Both the author and this editor are very curious to see what uses you will put your pen recorder to. Possibilities are countless. Send us a picture of your completed pen recorder. The first picture received will win the entrant a FREE THREE YEAR SUBSCRIPTION or extension to your present subscription. Send your picture today!

FIGURE #4A *LAYOUT - PEN RECORDER* *TYPE 1 (VE3BZS)*

Scale: 1" equals 1 1/5"

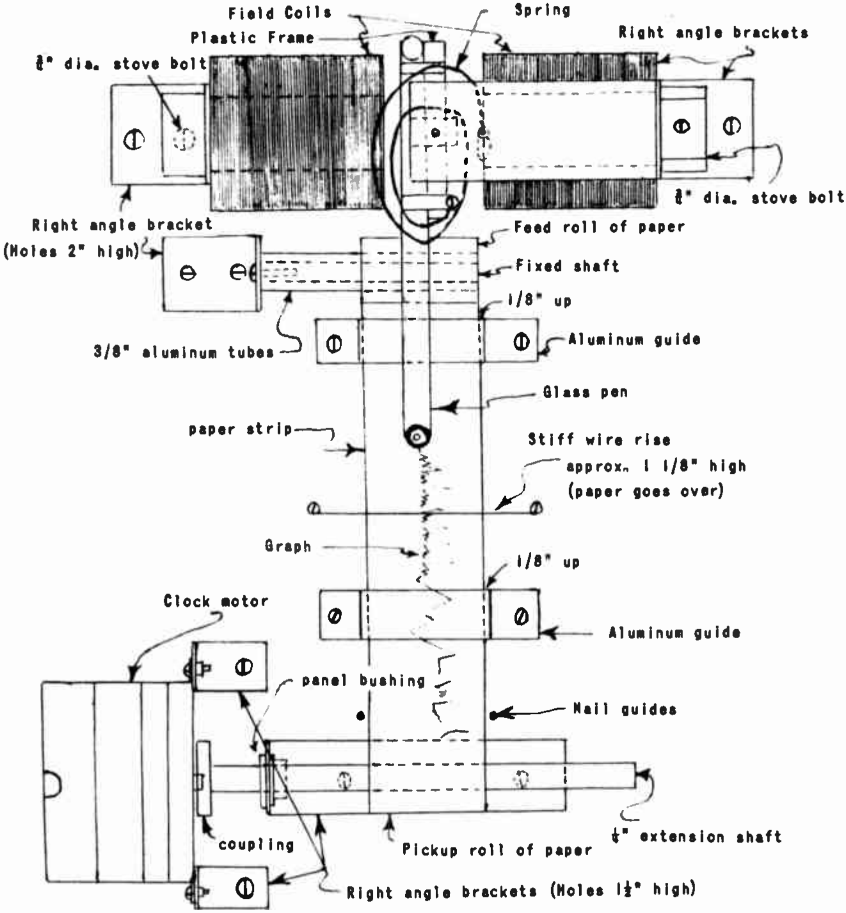


FIGURE #6 - PEN RECORDER AMPLIFIER - TYPE 1 - Block Diagram

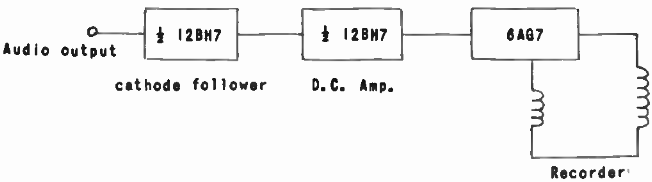
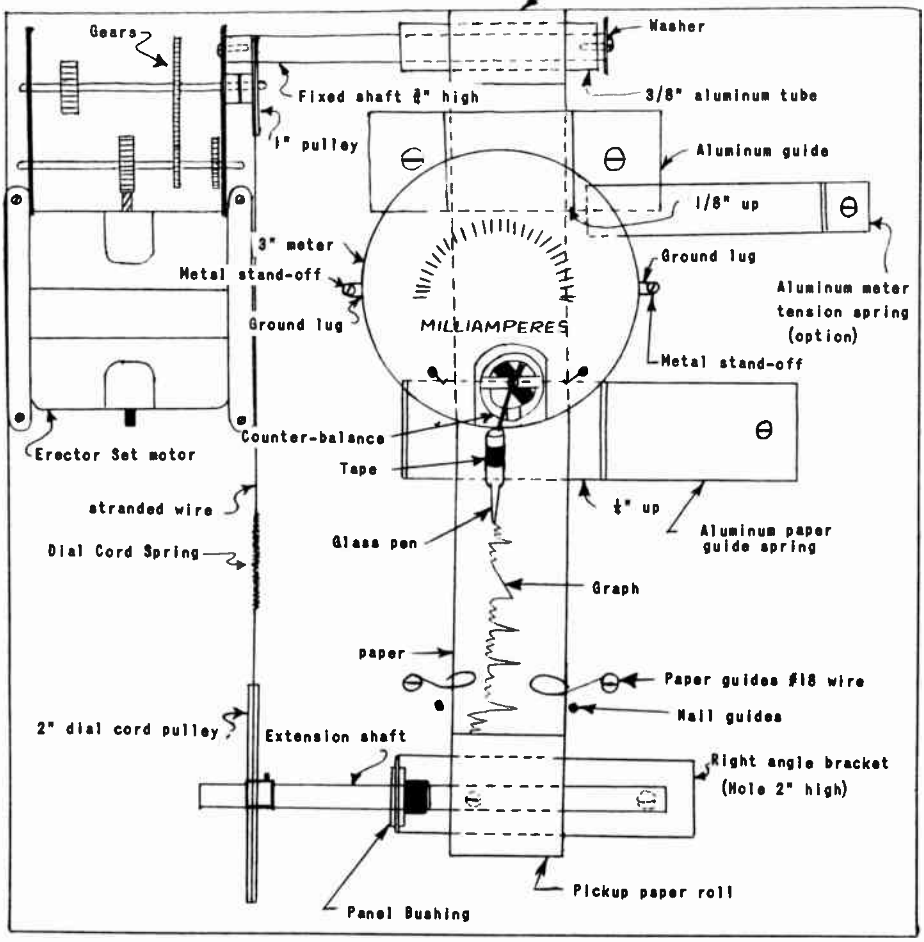
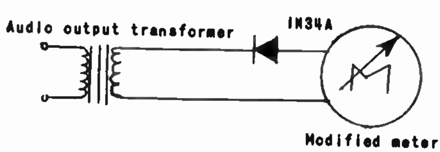


FIGURE #4B LAYOUT - PEN RECORDER TYPE 2 (K2UYH)

Scale: 1" equals 1 1/5"



PEN RECORDER - TYPE 2



CIRCUIT

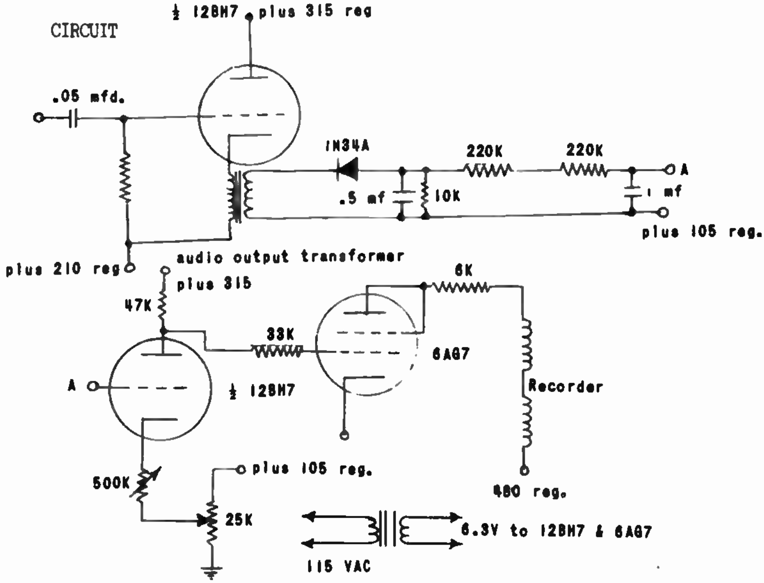
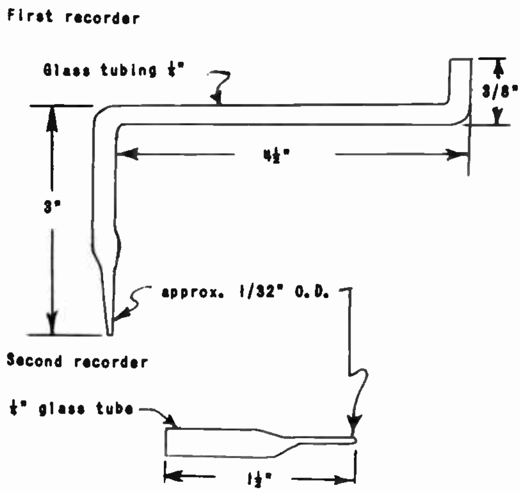


FIGURE #5 - PEN DETAILS



Mobile Transceiver

for 50 mc

Irv Math, WA2NDM
36 Wilcox Avenue
Yonkers, New York

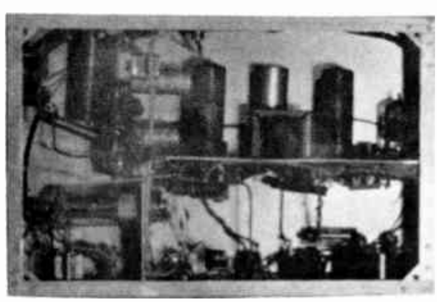
Front panel view of WA2NDM mobile transmitter. Controls are (l to r) meter switch and power switch, pilot light, crystal socket and mike jack, oscillator tuning and BC/SW switch, ant load and final tank tune.

When the mobile bug finally bit about 4 months ago, it was decided to construct a six meter transceiver rather than purchase one of the many costly commercial units on the market today. Thumbing through the Handbook (1957 edition) we came across a small 10 watt rig that seemed to fit the bill perfectly. Unfortunately none of the components were on hand, but we did go for the construction style very much. The unit we built used a similar type of construction therefore.

The circuit as it finally resolved itself is shown. A 6AG7 is used as an oscillator-tripler (from 8 mc crystals) to 25 mc, and a 2E26 in the final doubles to 6 meters. While some efficiency is lost in doubling, no neutralization is required and thus tune-up is quite simple. Final grid current is measured as is output by the meter. By employing this type of indication, the procedure is simply "tune for max".

The modulator is conventional. Half of a 12AX7 is used a a grounded-grid amplifier (to match a carbon mike) driving the other half as a straight amplifier which in turn drives a 12A6. This supplies approximately 7½ watts of audio. Modulation is of the Heising type and quality is very good with an absolute minimum of distortion even though a carbon mike is used.

To simplify receiver construction, an International Crystal FCV-2 converter was purchased and is used in conjunction with the BC receiver in the car. A front panel switch enables the changeover between BC and 6 meters.



Interior view of transceiver. The 2E26 is to the left of the chassis. In the center top is the FCV-2 converter. Next is the 6AG7, electrolytic cap., audio transx, 12A6, and 12AX7. Ant/pwr relay, upper l/hand corner.

The entire transceiver is housed in a 7 x 12 x 3 aluminum chassis. The interior chassis is made of a 2 7/8 x 12 sheet of aluminum. Exact layout can be seen (rather fuzzily) in the picture at the right. The converter is held in

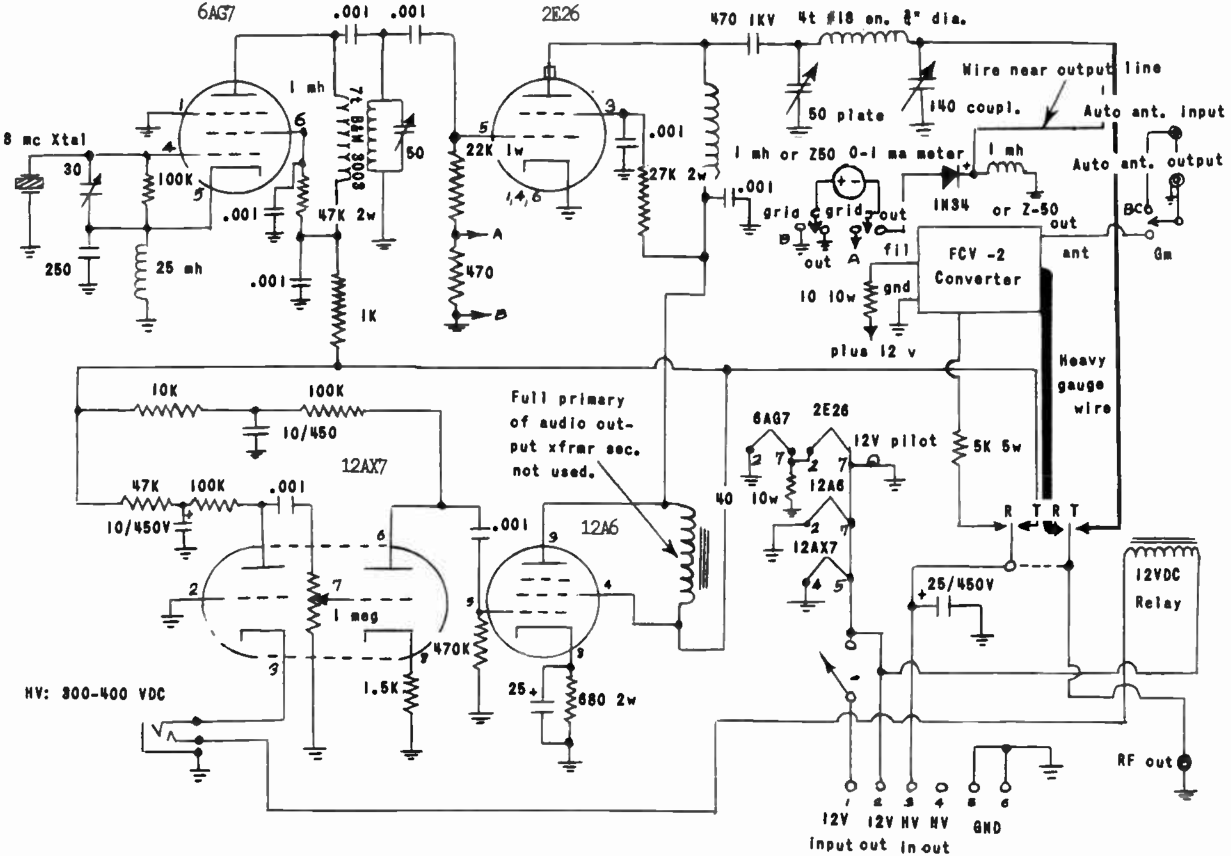


FIGURE 1 – WA2NDM's Six Meter Mobile Unit – SCHEMATIC DIAGRAM

make it a NEW CLEGG ZEUS

Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position

6 AND 2 METER TRANSMITTER

185 Watts of Solid "Talk Power"

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

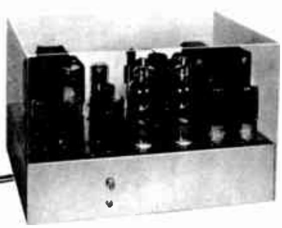
Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! — You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

PERFORMANCE DATA

AUDIO: Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum talk power without splatter. A panel mounted indicator provides visual monitoring of modulation. Frequency response is flat within 2 db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps. Hum and noise levels are down at least 40 db below 70% modulation. Up to 18 db of speech clipping, adjusted with a calibrated panel control gives ZEUS the "talk power" to outperform many KW rigs.

RF: The VFO will maintain frequency stability of 1 part in 10^6 per degree F. per hour after a 15-minute warmup. Frequency reset accuracy is within 5 KC. A precise, zero backlash, flywheel loaded dial makes accurate tuning easy on both 6 and 2 meters.

Maximum TVI suppression is inherent in all ZEUS circuitry. 6 meter output power is fed to the line thru a pi network circuit. Output on 2 is link coupled to a high efficiency tank.



Amateur Net Price: $675.00 Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

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Missouri
Butler—Henry Radio
St. Louis—Walter Ashe
New Hampshire
Concord—Evans Radio
New Jersey
Mountainside—Federated Purchaser
Newark—Terminal-Hudson Electronics
Shrewsbury—Federated Purchaser
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Amsterdam—Adirondack Radio Supply
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Harvey Radio
Terminal-Hudson Electronics
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Ohio
Cincinnati—Steinberg's
Cleveland—Pioneer Electronic Supply Co.
Columbus—Universal Service
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Nashville—Electra Distributing Co.
Texas
Dallas—Crabtrees
Houston—Busacker
Virginia
Arlington—Key Electronics
Wisconsin
Milwaukee—Amateur Electronics Supply

in place by small angle brackets.
In

After construction, the unit should be hooked to a power supply furnishing 12 volts for the heaters (AC can be used) and 300 volts DC. A dummy load (I used a 7½ watt lamp with a 50 mmf trimmer in series) should be connected to the transmitter output jack. Depressing the mike button, the oscillator plate should be tuned for maximum in the Grid position of the meter, Switching to Output, the plate and loading controls should be adjusted for maximum reading. The bulb should glow brightly at this point. Speaking into the microphone should cause a noticeable flickering of the bulb.

With these adjustments complete, the transceiver can be installed in the car, all cables connected, retuned, and your mobiling career started.

Sound Off!

It's not very often that we "sound off" about anything through these pages. Most of the time we just restrain our frustrations saving the reader from countless pages of strictly editorial trivia. Today, however, the Editor got a letter from New York City which is a "must" for comment...

The letter was from a fellow amateur in behalf of his local amateur radio club requesting a plug for their ingenius certificate, the "Worked All Manhatten" award. Well, they're going to get a "plug" alright. Requirements are just to work 10 Manhatten hams. Send a list - AND ONE DOLLAR (to cover expenses, most likely). Oh brother...

We've all been aware of the trend being set by well intentioned amateurs toward this certificate-award business. OK by me - we're even willing to photograph and print the certificate in this magazine if it is in the true spirit of ham radio. But this $1.00 "per" racket is going too far.

It is only fair that we have our editorial policies (most of which can be altered by a twist of the arm and a shot of ---) but in this particular case we're going to hold our ground. Needless to say, the request was REFUSED and the certificate returned with a letter stating our feelings on the matter.

Anyone who thinks they can bilk $1.00 out of a fellow amateur for a two-colored piece of typewriter paper is pushing things too far. What sort of people are we admitting to the hobby? How commercial can we get? I only hope this will stop now - before more people get in on the scheme. The time will come when they'll be asking $5.00 for an RCC certificate if we don't watch out........Heaven help us.

Q R Mary

Walter Shivers, K3KZT

"Sorry, OM, I missed most of your transmission." Do you say this - does it sound familiar? It should. This statement can be heard on all bands, but primarily during 6 meter openings. It seems that we forget how wide the band is when we hear a rare one coming in. Some say, "I can't operate on the high end." Not true. I've followed the DX hounds up the band as high as 51 mc. Everyone seems to be trying to work the same fellow, forgetting that there are fish in the ocean. And how about the "little fellow?" Have you stopped to consider that he might want a new state also? Did you start out with a gallon - or even 100 watts? Remember when you finished calling "CQ DX" and turned it over, only to find 300 watts on frequency calling "CQ DX" (only much louder)? It was pretty bad then, huh? Well, the same conditions exist today, but it doesn't sound the same because the shoe is on the other foot now.

And how about the boys that figure it takes too much time to hook up that dummy load? They tune up right on frequency to keep anyone else from snagging that rare one 'till they're good and ready. Does this apply to you? ------I hope not.

VHF SSB!

Phil Gural, K2PCG
204 East Northfield Road
Livingston, New Jersey

A few SSB'ers have written to me telling me what they have been working. One letter I received is from Bob Heil, K9EID, of Marissa, Illinois. Bob mentioned that he's been working the following stations on ground wave, 6 meters, with "Good" S-meter signals. The approximate distance of each station is indicated in parenthesis. K9HAE, Princeville, Illinois, (300 miles); W9HGE, Beloit, Wisconsin (450 miles); K9ZTK, Evansville, Indiana, (175 miles); W4CSN, Henderson, Kentucky, (190 miles); K4GEQ, Reed, Kentucky, (190 miles); and recently K4ZCE at Hartford, Kentucky.

Bob went on to mention that he has daily rag chews with K9ETS, W9WXR, K9KZB, and WØDJG on 50.11 at 0100 to 0130 (CST).

Bob also mentioned that on December 2nd he worked K8NIE, K9DTB, K9ZOO, KØSVT, and WØWKE on aurora. (I also heard this aurora and only heard locals calling frantically. There seems to be a lack of SSB'ers in the New England states. Where is everybody? Please, someone in New England write and let me know where everybody went!)

Also got a nice letter from Sam Berlin, WA2CVF, Brooklyn, New York. Sam passed along a list of SSB'ers who sign into the East Coast SSB Net. This net meets every Sunday at 1300 (EST) on a frequency of 50.110. The stations are : K2ZBX, K2UTN, W2AXU, K2PBO, K2PXP, K2OHF, K2YGL, K2DQT, K2SGY, W2NCF, WA2GJT, K3CZI, W2RJD, W3HFY, WA2ONB, K2PCG, W2IMB, K2VIX, WA2SFD, WA2DWK, WA2LRO, and WA2CVF.

Bill Rhode, WA2EMA, Roseland, New Jersey, has informed me that SSB activity on 2 meters has been slow in his area. The SSB'ers in the New York area have adopted 144.10 as the SSB calling frequency. Also, there are a few SSB stations operating just above 145 mc.

Once again the cry goes out for more information. What is always appreciated is news, of nets, and its members, any construction hints and articles. Since I only operate 6 meters, SSB news of 2 meter-variety is always appreciated. I have yet to receive mail from the West Coast. Come on fellows out there in W6 and 7 land - let me know what you have been doing out there!

My last comment is not of a happy note. During the band opening on 6 meters on December 16th, SSB activity was pretty good. What my complaint is that there were two to four QSO's going on within 500 cycles of each other. Being that we have more than 500 cycles, fellows, let's not bunch on the same frequency but spread out for one or two kc - if and when possible. During this particular opening I didn't hear any other SSB signals except on that one spot. Let's all get together in one big QSO or spread apart so as not to fight each other. Thanks

73, Phil, K2PCG

A BUCK A PIX! **Starting next month, the publisher will pay the fantastic sum of $1.00000000 for each picture printed in THE VHF AMATEUR. We want photo's of your station, you (egad!), or your antenna. Give us some to choose from please. Put your name & QTH on the back so we'll know where to send that bagful of money (pennies anyway). Also write a good caption. Thank you.**

MOONBOUNCE

Allen Katz, K2UYH
48 Cumberland Ave.
Verona, New Jersey

Calculus and Dish Construction

Amateur interest in parabolic antenna construction has grown enormously since the first 1296 mc moonbounce contact back in July of 1960. Along with this increase in interest, there has been an equal increase of information on dish construction available to the VHF man. Yet, many problems still hinder the prospective parabolic antenna constructer.

One question frequently asked is how to compute the length along a parabolic curve. This problem is important no matter what method of parabola construction a builder intends to use. For example, using the "stress method" (in which stress is applied to the ends of long rods to produce an approximate parabolic curve) of construction, say an amateur wishes to build a dish with an eight foot focal length and a 24 foot diameter. He would first substitute in the general parabola the equation Y equals $\frac{X^2}{4P}$. From this equation, the height up (Y) is obtained for any given distance (X) over from the vertex of a parabola of focal distance P - See Figure 1. Our amateur friend substitutes in this equation as follows: X equals radius equals 24/2 equals 12', P equals focal length equals 8'

$$Y = \frac{X^2}{4P} = \frac{(12)^2}{4(8)} = \frac{144}{32} = 4.5'$$

He finds that the height of the dish's edge above its vertex should be 4½ feet, but he is still faced with a difficulty.

FIGURE 1 - Parabolic Curve

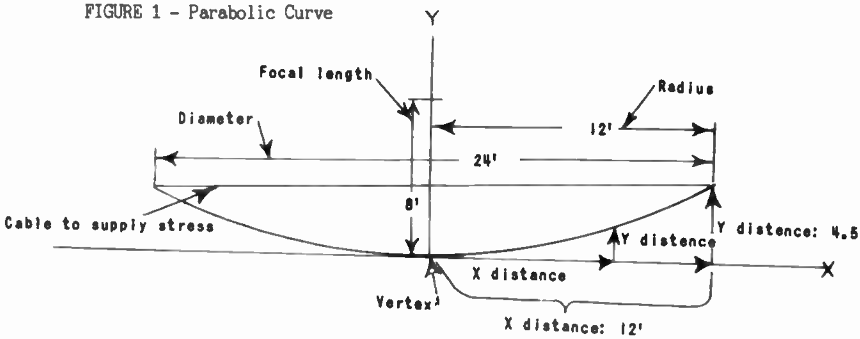


FIGURE 2

When number of chords approaches infinity and their length approaches zero, their sum will equal the length of the curve.

How long should he cut the rods to produce the proper size curve? He can solve this problem in several ways: (1) He can work backwards, by using rods a little longer than 24 feet. After bending the ends of these rods up 4½ feet, he measures the diameter obtained and substitutes this value back into the equation to get the exact focal distance. (2) He can draw a scaled down diagram of the curve, and lay a length of wire along the curve. Measuring the length of the wire (straight) and knowing the scale of the diagram, he can determine the length of the curve. (3) He can caluculate the length of the curve by calculus.

The length of a curve can be considered to be made up of an infinite number of straight lines whose length approaches zero - See Figure 2 above. Calculus is nothing more than a way of adding up the sum of these lines. The general expression for the length of a curve in caluculus is:

$$S = \int_a^b \sqrt{1+\left(\frac{dy^2}{dx}\right)}\,dx$$

This equation will mean nothing to our amateur if he has not studied calculus. However if the general parabola equation is substituted in the caluculus equation, and the equation obtained integrated, a new equation is derived for the length of a parabolic curve requiring *no calculus*. The equation is:

$$S = \frac{R\sqrt{R^2+4P^2} + 9.2P^2 \log_{10} (R+\sqrt{4P^2+R^2}) - 9.2P^2 \log_{10}\sqrt{4P^2}}{2P}$$

"Yipes!" ...Our amateur friend would probably say at seeing the size of this equation. Fortunately the equation is not as bad as it looks, and will be a valuable tool when designing parabolic antennas. The ease with which the equation can be worked is shown in our example which follows:

R = radius = 12 feet P = focal distance = 8 feet

$$S = \frac{12\sqrt{12^2+4(8)^2} + 9.2(8)^2 \log(12+\sqrt{12^2+4(8)^2}) - 9.2(8)^2 \log\sqrt{4(8)^2}}{2(8)}$$

$$S = \frac{12\sqrt{144+256} + 9.2(64)\log(12+\sqrt{144+256}) - 9.2(64)\log\sqrt{4(64)}}{16}$$

$$S = \frac{12\sqrt{400} + 589\log(12+\sqrt{400}) - 589\log\sqrt{256}}{16}$$

$$S = \frac{12(20) + 589\log(12+20) - 589\log 16}{16}$$

$$S = \frac{240 + 589\log 32 - 589\log 16}{16}$$

$$S = \frac{240 + 885 - 710}{16}$$

$$S = 26.6 \text{ feet}$$

K2CSM 1296 mc Amplifier

Ot, K2CSM, broke the cavity transmitter barrier when he designed the 1296 mc amplifier shown in Figure 3 (below) and Figure 4 (next page). Not only is his amplifier small and highly efficient, but it is also easy to build.

The amplifier consists of a cavity made from a ¾ inch length of 3 inch diameter copper pipe. Two disks 3 inches in diameter are cut from copper flashing. A 1 3/16 inch hole is drilled into the center of one disk, and a 13/16 inch hole in the center of the other. The two disks are then soldered to the sides of the copper pipe. The side with the larger hole will be the plate side and the smaller, the grid side.

Two other disks of copper flashing are cut 2¾ inches in diameter. Into the center of one of these disks a hole approximately 1 1/16 inches in diameter is cut (just large enough to fit the plate ring of a 2C39 snuggly), and into the other, a hole approximately 11/16 inches

FIGURE 3

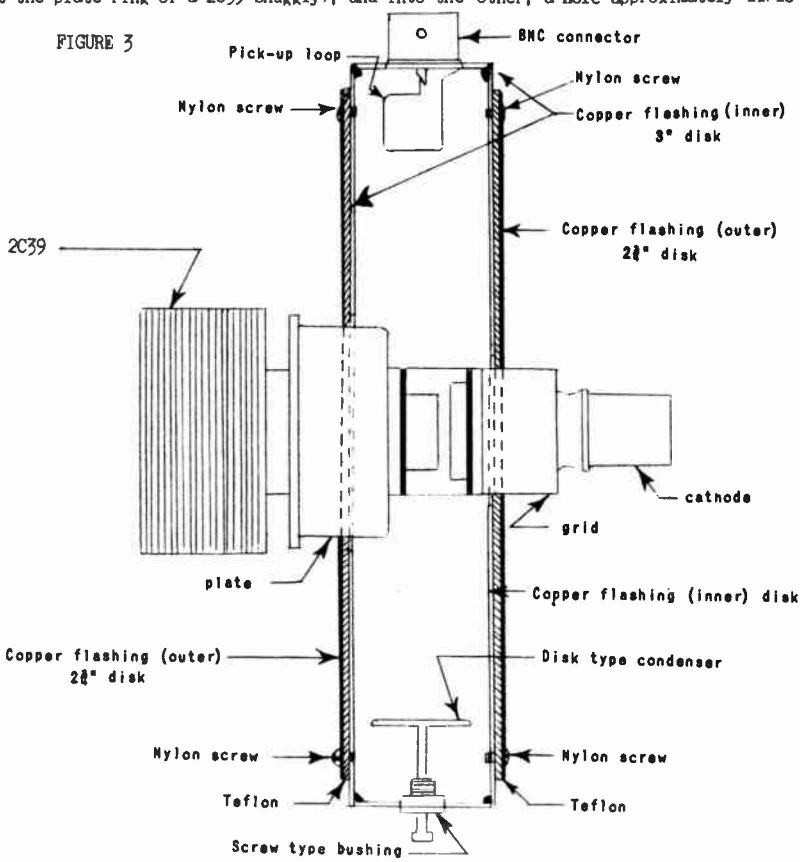
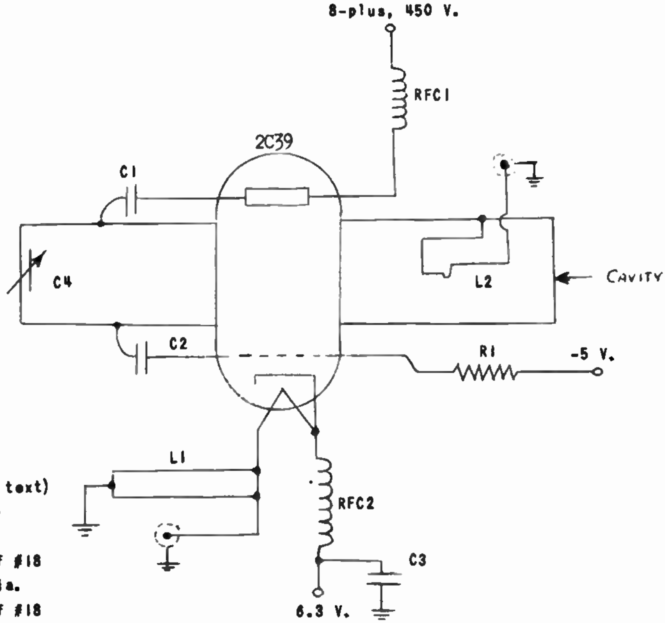


FIGURE 4



C1: See text
C2: See text
C3: 100 mfd
C4: See text
R1: 500 ohms
L1: 1 inch (see text) copper strip
L2: 1 inch loop
RFC1: 3 turns of #18 wire ¼" dia.
RFC2: 6 turns of #18 1/8" dia.

in diameter is cut (just large enough for the grid ring).

A 3/8 inch hole is drilled into the top center of the copper pipe, for a BNC connector on to which is soldered a 1 inch length of wire for the output pick-up loop. On the opposite side of the pipe a ¼ inch hole is drilled for a screw type bushing, through which a disk type condenser (made from a ½ inch circle of copper flashing) can be controlled.

The 2¾ inch copper disk with the larger hole is centered over the plate side with a thin sheet of Teflon (containing a hole of equal size) sandwiched between it and the cavity. The same procedure is followed for the disk with the smaller hole on the grid side. Both disks are held in place by means of Nylon screws.

The 2C39 is fitted through the cavity as shown in Figure 3 and fed at the cathode. The feed system's dimentions will depend on the driver and the size of the chassis the amplifier is mounted on. A little experimentation with a copper strap (about 1 inch) should yield good results. The amplifier can also be used as a tripler from 432 with a larger copper strap and RFC at the cathode.

DX Report

Daniel L. Parnes, WA2OMQ
184 Huntington Terr.
Newark 12, New Jersey

SCHEDULE BOX: 50 - 432 mc

Present Skeds: 50 MC

K1BHY-W3OR-W3HHW at 0630 EST
K1JRW-K2QWO Fri. at 2130 EST
W1ZGO-K2QWD Wed. at 2130 EST
WA2UAK-W2WEA No details
K2JNG-K3IGX No details
WA2PMW-K2EWG No details
W4LZP-W5EHX-K5YTA No details
K5HKG (Metairie, La.) CQ Net at 2000 EST, Tuesdays
K6QXY-K7JTG-W6FZA-K6UMM-W6NLZ-W6QMN-K6HCP-WA6AVV...... SCATTER SKEDS (Calif.)
K6UMM-W6FZA - No details
K7AAO - W6FZA, W6NLZ 50.02 mc
K7EZP-K7GGJ No details
K8NIE - W8BAN No information
KØDQG-WØUES No details
KØMSS-KØYSX-KØPSZ-KØLHZ-WØVZJ

Present Skeds: 144 MC

WA2EWV - Local MARS 143.95 mc Tuesdays at 1900 EST.
W3WOO-K3HEC SSB No details
K4MHS (N.C.) Local Net Frid. at 2130 EST on 145.2 mc.
W7JU -W6WSQ Sundays No details
W9OII-W9BPV
XE1OE - XE1GE
G2DHV - G6BY

Present Skeds: 220 MC

W3UJG-W3ARW-W3HFY No details

Present Skeds: 432 mc

W9OII-W9EDP-W9BTI-W8PT

Schedules Wanted

K4EOS, VE7IR, WA2VCM & K9EID want 50 mc skeds.
W5UKQ & K9EID open for 144 mc.
K1BHY, W3UJG, W3BJG, K8AHY, & K8NIE desire 220 mc skeds.
XE1OE, WØVOM, W9OII, K8AHX, & W3UJG would like 432 mc skeds.

"Ground Wave"

It seems that many readers are confused about the term "ground wave." For the purpose of the Reader's Report questionaire, "ground wave" may be used interchangeably with tropospheric bending and a weather (or temperature) inversion. Another connotation of "ground wave" could be any contact beyond the line-of-sight normal range. Of course, this range does vary with the quality of the receiver, transmitter and antenna. At this time, however, I would like to say that for 50 mc the normal range for a station using a 5 element beam, a 50 watt transmitter, and a moderately priced receiver is about 75 miles. At a later date I do hope to have a more accurate figure from tabulations of the Reader's Reports. The normal range for 144 mc seems to be about the same as that for 50 mc, but the effects of inversions and tropospheric bending are much more pronounced.

50 MC

During December 6 meters had its ups and downs as far as openings are concerned. The 2nd of December proved to be a FB day for all who had their beams up north towards the Northern Lights. This seemed to be the only aurora for that month. If anyone did hear other aurora disturbances, drop me a line and tell me about it. Sporadic E clouds, however, were floating around on the 16th and the 28th. Both E openings were to the Mid-West from the New York City metropolitan area. I would like to know if the clouds had effect in any other areas.

144 MC

Two meters in December seemed quite normal with fairly good ground wave conditions reported. From Abilene, Texas, W5IWB says that the Dyess Air Force Base MARS net has been working into the Dallas-Fort Worth area (about 160 miles east) with good signals both ways. George, G2DHV, of Sidcup, England, hears G6NB in Bucks about 50 miles away very often with a 5x9 signal. Incidently, last summer while George was fixed mobile running 15 watts he heard and worked DL6SS (Oldenbury) for 365 miles and GW3JPB/P (Dangollen) for a distance of 181 miles.

Also on 144 mc K1CKR (Nantucket, Mass.) worked K1DBC

Obituary - OSCAR

On New Years Day, 1962, "OSCAR" sent us its last signals. The gang here in the East copied good signals New Year's Eve, but the rate had slowed down to counts of 40-30 and finally 26. Herman, K2BNK, supplied the count and on the last pass he merely heard a weak signal with some Doppler shift indicating it was OSCAR. His total count of passes copied was 46. This was out of a total of 311 orbits as counted at the equator. We will all be looking and listening for the next phase (perhaps published reports) of PROJECT OSCAR. -W2IXU.

and K1IED both in Connecticut. VE1CL was worked by K1CKR in the middle of Sept. K2LQU (Maspeth, N.Y.) with only 12 watts worked into Conn. W3SUJ in Laurel Gardens, Pa., worked last month into Cleveland and Canton, Ohio. He says that most evenings northern N.Y., northwestern Pa., eastern Ohio, and West Virginia are heard and K9UIF and K2KGN are heard every evening. K4MHS (N.C.) worked W2ESX (N.J.) in Oct. W5UKQ on SSB contacted Demopholis, Alabama. John hears Dallas, Texas, stations anytime and occasionally W5FYZ in Menden. W8ZGW (Bay City, Mich.) reports that during August he heard the states of Iowa, Nebraska, Wisconsin, Ill., and N.Y. Ed recently worked W9AAG and W8KAY in Arkron. K8NIE worked W8MAT in Gaylord, Mich. During Nov., K8AEM in Marshall, Mich., heard Ontario, Ohio, Ind., Mich., & Ill., with only a Heath 2'er. *How about that?* W9OII (Sharon, Wisc.) worked W9BPU, 160 miles away.

MORE 6 METERS

I heard from Bob, K9EID, (Marissa, Ill.) regarding the Sporadic-E opening on Dec 17th. He listened to the opening for some back scatter and worked K9MOM in Ind. on two-way SSB. Also worked were Phil, K2PCG, and (more backscatter) W9HGE in Beloit, Wisc. Here's an item of interest, I'm sure: On Dec. 16, 1961, K2SUQ (N.J.) and K2QLW (N.J.) heard *K4PGL/VK9 calling "CQ" at 1703 EST on 50.4 mc. K2QLW called the VK9 and heard him say "QRZ the NNJ"*... and afterward, to be heard no more.

K3HNP (Pa.) heard on Dec.28 all of 9-land, all of Ø-land except the Dakotas, Colorado and Minnesota, and all of 8-land except West Virginia. The only "5" heard was in Oklahoma. By the way, Dave worked all he heard. I might ad that on this day there were reports of double-hop.(to the states of Washington and Idaho). I just wonder who else heard double-hop. Getting back to the 17th again, WA2PMW heard Alabama, Tenn., Ill., and Missouri. He also heard KZ5KQ. Too bad he didn't nab him! KL7AUV finally made contact with VE8BY. Both signals averaged at S9! Jack, KL7AUV, even taped Pete's transmission. When - December 3rd at 0350 GMT. WA2FRW and WA2FUL, father and son from Brooklyn, N.Y., were at it again on the aurora of the 2nd of December. WA2FUL racked up W1LZL (Mass.), W1EXZ (Vt.), W1AQE (Mass.), K1GRT (N.H.) and the last choice piece of DX: VE2AIO. WA2FRW got in his two cents worth with K1GRT and VE3RM.

XE1OE in Mexico, who runs a KW on 50 mc and who was heard by many last summer, will be looking for contacts this spring around the low end of the phone portion. KØDQG (Boone, Iowa) worked into Salt Lake City, Utah. WØCCD in Omaha, Nebraska, talked to K9ETS/9 in Moline, Illinois, via aurora and worked into Missouri and Iowa on ground wave. From St. Louis, Mo., WAØAOJ contacted K3MWV in Newportville, Pa., last month. WØGXJ, Cedar Rapids, Iowa, worked into Galesburg, Ill., and Monona, Iowa. WØRVA (St. Louis, Mo.) tells me that he plans to be on SSB real soon. All you sidebanders look for Harmon when the band is open! Another SSB station is W9VPP (Wisc.) who is also looking for a band opening - because he is the only ham within a radius of 150 miles!

From Shreveport, La., K5VMC, who is a SSB enthusiast, worked into western Texas, about 600 miles from his QTH. W7GUH (Oreg.) worked 500 miles north into Canada. Ken, K8PAO, from South Lyon, Mich., made a recent contact into Lansing. He usually works into NE Ind. Ken frequently hears K2ZYX and K8MMM. Due to college studies, Ken doesn't get on the air as much has he would like to. We hope to hear you on this summer, Ken! W7LHK (Montana) using a 385' long wire worked out quite well during the big Oct. aurora. K7GAG in Phoenix tells of K7MBI (Phoenix) working regularly K7OTH (Prescott), about 100 miles - over, around, or through an 8,000 foot mountain range!??? WA6LGT (mobile) worked four states from Texas. From a Colorado fixed mobile QTH he worked 9 states. I'd say that's really working out from the mobile! Using 2000 watts P.E.P., K6QXY worked K7JTG (Ariz.) 550 miles, and W6FZA (280 miles) on scatter last month. K6QXY says that there are fair ground wave conditions most of the time and lots of tropo scatter. K5HKG usually works into Mobile, Ala. during the evenings. A W7 running ½ watt on 'phone was heard by W5JFB/5 in Baton Rouge. Also heard was an HK5 in Cali, Columbia, "CQ'ing" last month. K7OFJ, W4BCL, K4IJY, W4ERX/4, W4NQX and W4ALM were all worked by W5FRK (Fort Worth, Texas). Fred contacts stations in Houston, San Antonio, and Oklahoma City, Okla., regularly. The most frequently heard foreign stations are LU3DCA, XE1OE, KP4AAN, CO3NR and CO2DL. On Dec. 29, W4LZP (Tenn.) contacted K1PUS in R.I. In addition W4LZP worked K5GRU, W5EHX & K5YTA. Groundwave around the Nashville area has averaged around 200 miles over the last few weeks. Big contact last month for W4AYV (Fla.) was to New Orleans on backscatter. W4AYV often hears W4ACT in Naples, Fla.

Chattanooga, Tenn., was worked by K4KUF (Whistler, Ala.) for a distance of 359 miles. K4YBL (Fla) hears mostlyvOhio on openings. K4RTG (Va.) reports hearing K3BOB, K8MMM, and K5RER regularly during skip, etc. K4EDS worked WA4AJC (Nashville), K4DBP, and W4LYT in Nov. Often heard in Birmingham by K4EDS are: W4ZOD (Tenn.), K4QOE (Ga.) and W4NYT (Mobile, Ala.). W4OAB hears consistently: W4CPH, K4HZS & W4VTW.

K2QWD (Syracuse, N.Y.) worked W3ASD (Del.) last month.

73, Dan, WA2DNQ

Reader's Report

Fill out and return to us today!

Rip out this form and return to us today. Fill in as completely as possible. Sent your form to: Dan Parnes, WA2DNQ, DX Editor, 184 Huntington Terrace, Newark 12, New Jersey

Your Name ______________________ *Call* ______________

Address ______________ *City* __________ *State* __________

This report covers my 2 6 220 432 (circle one) for the month of JANUARY 1962

Transmitter power input ______ *Antenna* __________ *AM CW SSB DSB NBFM (circle)*

JANUARY - FEBRUARY REPORT

What has been your furthest contact since Jan. 1? (Give call, QTH, date & time) ________

____

Any unusual band conditions since Jan 1? (Give date, type, time, what heard) ________

____

Do you presently hold (or desire to have) schedules with any DX stations? (Give call, regular sked time, date).

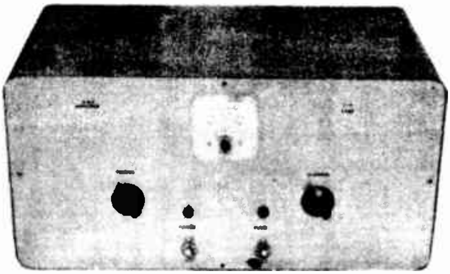
____

Are you operating (or interested in) the bands above 432 mc?

____

Three New Compact

6 Meter Linear Amplifiers



Model 600

600 watts P.E.P. SSB, 300 watts AM linear, 600 watts CW, with a 4-125A in the final. Fan cooled. Requires approximately 5 watts drive. Recommended power supply: Heath KS-1 or B&W. Price **$139.00** less power supply.

Model 1000

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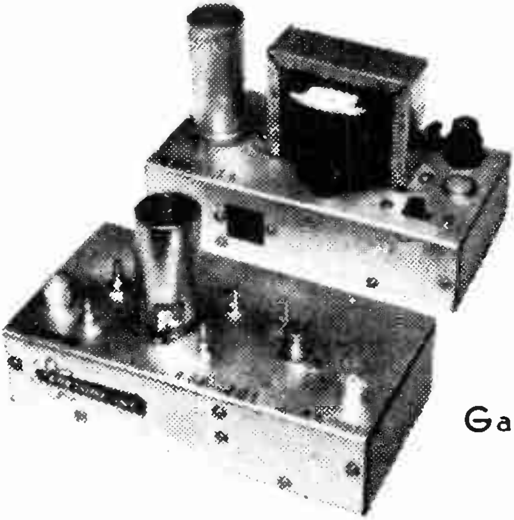

Gain: 25 db

Noise Figure: less than 3.0 db
I.F.: 14-18 mc,
Input-Output: 50 ohms, BNC
Power Required: 6.3v and 150 vdc
Tubes: 6CW4 and 6U8
Shielded Case: 6" x 3" x 1½"

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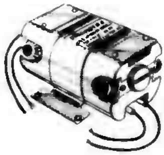

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January 1968

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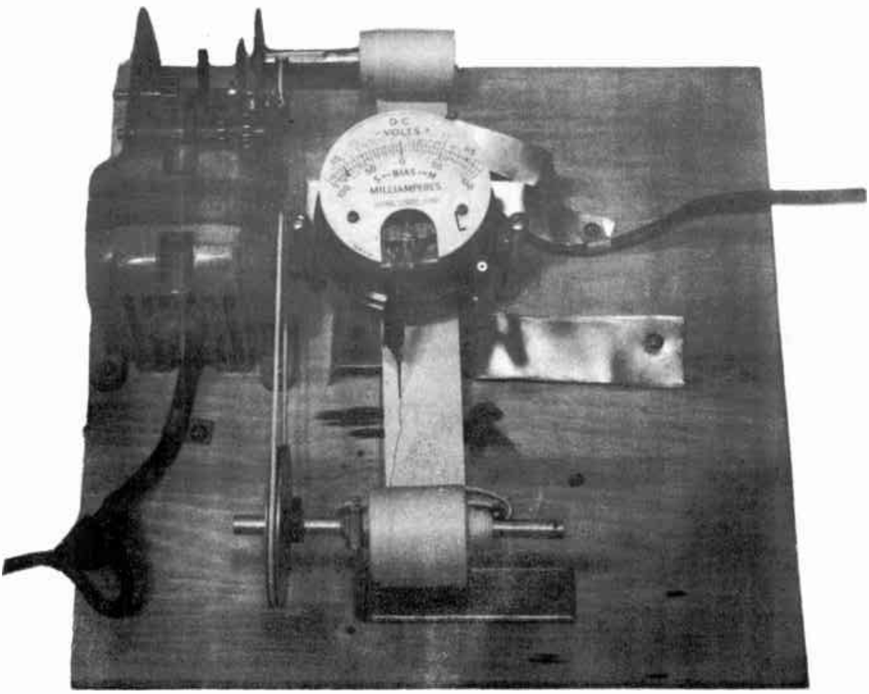

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COVER PHOTO

By reading this paragraph you will learn absolutely nothing. There will be a big article next month on how to build one of these gems. If you've been clever enough to figure out what it is, drop ye Editor a card with your guess. ....Meantime, we'll enjoy your confusion.

I Like ....

2 meters!

Robert C. Higgins, W2IXU
308 Edgar Avenue
Cranford, New Jersey

With this new year we are going on seventeen years old. The two meter band, I mean. The present 144 to 148 mc band was created by the FCC after World War II to replace the old 112 mc band. We are one of the newest bands and we boast more growth than any other amateur band. The reasons are obvious - we have room and welcome to our frequencies all ages and all classes of amateurs. All newcomers to the band get a welcome greeting and a friendly fraternal companionship that no other band offers. The number of stations operating regularly (once you move to "two" you never leave) increases daily. The band is not crowded, yet it is never dead. How is this possible? We are unique because of our frequency and our population distribution in the U.S. and Canada. Depending on location, the average station on two meters has an operating radius of about 20 miles. In or on the outskirts of a large city, he has no trouble making cintacts because of the large numbers of urban hams that operate on two meters.

The QRM problem is solved by the 4 megacycles that the FCC gave us. The fellow living in the country has equal opportunity to work out or into the cities. Our country cousins need only add a few elements to their beams (this can be as simple as putting another coat hanger on the boom) or raise the mast (add 10 feet of TV type 1¼" masting). Regular 'phone contacts over 100 miles are common. After the contacts are made, conversations never drag because you'll always find someone you have a lot in common with. So you see *I Like Two Meters* and so will you.

Starting in this issue of THE VHF AMATEUR you will find in this column construction projects for a complete two meter station. It will feature low cost as a means of getting started. Later, refinements will be added that will put you in the DX class. (Yes, we have a DX gang on two meters too.) This month we'll start at the top with the antenna:

A 5 Element Beam for 144 mc - $1.17

I constructed a very strong high gain 5 element beam for use during the summer months two years ago. It is still in excellent condition in spite of being exposed to the elements (pun not intended) for two years. The beam can be built by almost anyone at a cost of under two dollars. In fact, because of a mistake on my part, two of these beams were made for a total cost of $1.40. I forgot to bring the aluminum elements along to the summer QTH and substituted wire coat hangers - and, to my surprise, they worked out fine. Here is how the beam is constructed:

Refer to the diagram Figure 1: Secure a 10 foot length of EMT electrical conduit ½" size at your local electrical supply house (cost 90¢). Cut it in half and make two beams for a stacked array or sell the other half to a friend. Drill four 1/8" holes as marked on the diagram. Keep the drill level and drill completely through from one side to the other. These holes will hold the three directors and reflector. At right angles to these holes (using a #30 drill) drill four more holes. These are for sheet metal screws and will keep the elements from slipping- Do not drill all the way through the boom - just the bottom. Drill two 1/8" holes completely through the top and bottom of the boom as shown ½" apart; this will hold the barrier strip which supports the driven element.

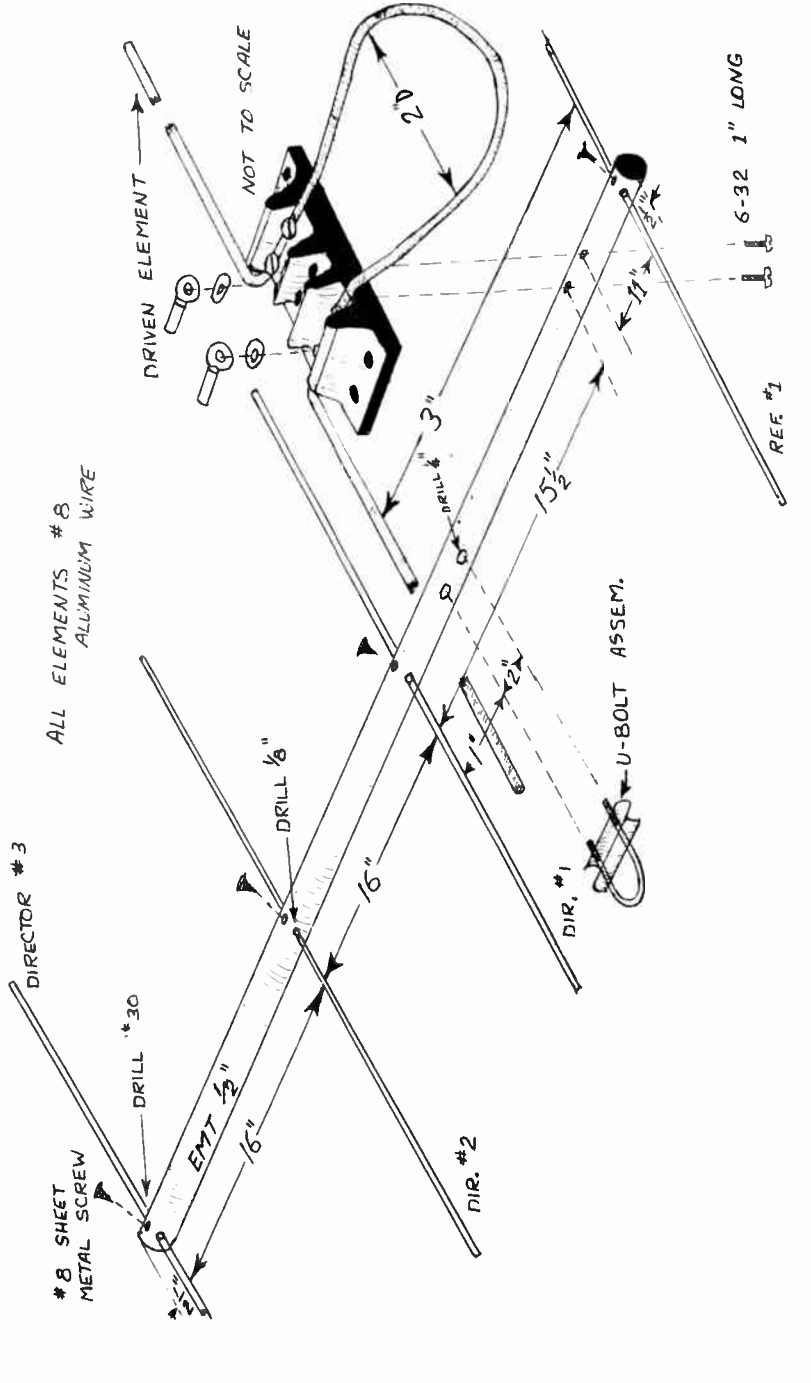
Drill two ¼" holes 2" apart as shown to hold the "U" bolt clamp. This completes the drilling. A hint on drilling the holes: Center-punch all holes first and secure the conduit in a vise or between two pieces of wood before you drill. The conduit is thin walled and is easy to drill, even with a hand drill. In fact, using a Parker Kalon steel nail I have punched the holes through with a hammer! This is mentioned as a last resort only, however.

The elements for the directors and reflectors are cut to size according to the diagram. The aluminum used is #8 TV ground wire; while not the best, it's cheap and does the job. I bought it from a local TV service man for 2½¢ a foot.

The driven element will be made from a piece of #8 wire 43" long. Find the center and bend it into a "U" shape around a 2" diameter object - this can be a piece of pipe, jar or can. I now use a Jones barrier strip #354-11-03-001 as a mounting. The strip has three double mounting screws. The "U" shaped wire will be placed under the double screws on the two outside barriers. This is done by removing all six screws from the strip. Place the "U" shaped wire in the two end barriers (you will have to form the wire and squeeze it down to an inch so it will fit). Replace the four screws by first placing washers under all four and then spade lugs under the two screws away from the loop. Tighten up the screws. It should now be a simple matter to bend each end at right angles so they form the element as shown in the diagram. A hint on using the aluminum wire: It comes in a reel and will have bends in it. To straighten it, place one end in a vise or have someone hold it tight. Then use the handle of a hammer and press down on the wire and draw it to you at the same time. This will press out all the wrinkles.

To assemble the elements, start with the driven element. Use two 6/32 by 1" screws and fasten the barrier strip to the boom as shown by running the screw through the bottom of the the boom and up the bottom of the strip into the threaded hole in the center barrier. The other elements are slipped through the holes and centered, then locked in with four #8 self-tappers that have had the sharp ends filed or ground off. Do not pull them up too tight or they'll bend the aluminum. Slip the TV type "U" bolt clamp assembly in place, straighten out the elements, and your beam is ready for the feedline. If you have used coat hangers instead of aluminum, just clean off the paint where they have to make contact on the barrier strip. The black paint will keep them from rusting.

I fed the single bay as follows: Connect a length of 300 ohm TV twinlead on the two outside terminals where you have placed the spade lugs; this method is a steal from a commercial beam and matches up very well. Run the lead down and away from the beam at right angles using standoff insulators where needed down and into the rig. At this point I constructed a coax balun as shown to match the low impedance unbalanced output of the converter and rig. However, you might want to use the 300 ohm balanced feed. Other methods of feeding are to put a balun up at the loop on the driven element and run coax down into the shack - either method is OK - I used twinlead because it was available (cheap) and worked just as well. If you have built two of the beams described and wish to stack them, use a coaxial balun at each driven element as described above. Space the beams 6' 9" apart on the mast and connect a piece of 75 ohm coax 5' 7" long to each balun. Run the ends of these to the mid-point of the mast, connect together with a piece of 52 ohm coax, solder all connections, and run the 52 ohm coax to the shack. This system is also "borrowed" from a commercial beam and works very well. This will give you about 12 db of forward gain. The single bay is rated at about 9 db...



PARTS LIST	*COST*
BOOM - 5' EMT conduit	$.45
DIR. #1 - 36"	
DIR. #2 - 35¾"	
DIR. #3 - 35"	
DRIVEN ELEMENT - 35"	
REF. #1 - 40"	.40
BARRIER STRIP - Cinch-Jones 3-142 or eqiv.	.40
4 - #8 x ¾" sheet metal screws	
2 - 6/32 x 1 machine screws	
2 - Soldering lugs and washers	.20
U-Bolt assembly. Parker #UBC-2	.26
TOTAL COST.......$1.71	

eliminating. . .

generator noise

Howard Butterfield, WA2NDL
1502 Elaine Terr.
Union, N.J.

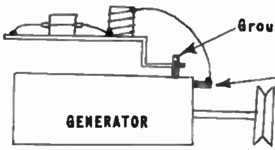
The first thing to do is find out if the noise is coming through the wiring or the air. If it is coming through the car wiring, you will hear it on the BC radio. Get rid of this first. Check to make sure the antenna cable is still grounded at both ends. If your car radio works fine, you can forget about the condenser and suppressor. They won't help.

FORD products make the best noise generators, as anyone who drives another make knows. They can hear the Fords go by.-Getting back to the noise problem, my car radio worked OK. Next problem - the converter. Also generator noise. After reading books that told all about buying (dirty word) a coaxial condenser, I found out that they just won't help on 50 mc. Real problem is that the generator is transmitting on 6 meters! So turn on the converter and radio. Start the engine. Disconnect 6 meter antenna. No noise? If so, noise is definetely not coming through hook--up or car wiring. It's being transmitted. The usual cure for this is a parallel circuit. Means very heavy wire for the coil. The generator puts out 50 amps (in my '55 Merc). Try a by-pass to ground, or a series circuit. This is not a cure-all, but it certainly makes a difference in my nice Ford product.

To make this without any test equipment take a coil and condenser and hook it between the antenna and ground of the set you're using. Tune in any signal. Tune condenser or coil to minimize that signal. (Effect: 50 mc is by—passed to ground). The next step is to mount this contraption in one small package. Here'es how I did it.

COIL: ½" dia. ¾"L 4T #18 wire
CONDENSER: 3-30 mmfd ceramic trimmer

1/8" alum. bracket bent and notched to fit ground lug of generator.



Next time you go to the supermarket, buy something that comes in a plastic bag. Keeps the grease off.

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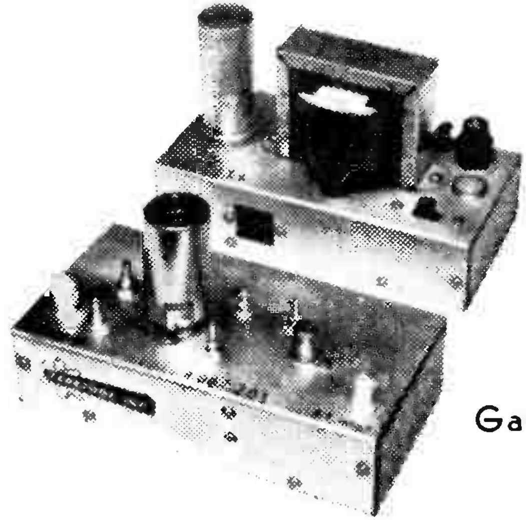

Gain: 25 db

Noise Figure: less than 3.0 db
I.F.: 14-18 mc,
Input-Output: 50 ohms, BNC
Power Required: 6.3v and 150 vdc
Tubes: 6CW4 and 6U8
Shielded Case: 6" x 3" x 1½"

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A Tripler for 432

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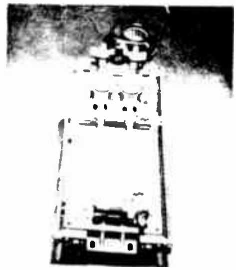
Don Goshay, W6MMU
8352 Westlawn
Los Angeles 45, Calif.



Top view with cover removed, showing the 2C39's and the plate lines. The lines are tuned with the chain drive assembly

Although activity on the 432 mc band has risen to a new high lately, there are probably many fellows who have thought about getting started, but have either not known where to begin, or were wary of investing a chunk of cash in tubes and parts and not being sure of getting results. About the simplest way to get a good 432 mc signal on the air is to construct a tripler that can be driven by a Gonset Communicator or any low powered 144 mc rig. As far as the transmitter is concerned, the investment is then confined to the parts necessary for the required tripler stage. If constructional know-how or time is limited, you might consider modernizing a piece of surplus gear now available at Selectronics in Philadelphia. (Editor's note: Going price is $15.00 from Selectronics, 1206 S. Napa Street, Philadelphia 46, Pennsylvania.) Although the unit is rather large (6 x 6 x 15), sufficient space can probably be found in most ham shacks.

The unit consists of a pair of 2C39's connected in grounded grid configuration (see picture above). There are a pair of tuned lines in the cathode (input) circuit which are tuned to 144 mc by a split stator variable capacitor. A similar pair of lines are in the plate (output) circuit, but these are tuned by a slider mechanism. The capacitor and slider are driven by a chain arrangement which most experimentors will prefer to eliminate. The 2C39's are each rated at 100 watts plate dissipation, so they will undoubtedly last a lifetime when operated at the low power level required here. Convection currents in the cooling of the plates would be satisfactory if it weren't for the silver plated enclosure employed to reduce stary radiation and consequent power loss. Cooling is adequately handled by a 110 volt, 60 cps, 2 phase blower which is supplied with the tripler. The second phase is derived from a 1 mfd paper capacitor.

The power supply requirement is rather flexible. It has been found that output power varies little when the plate supply voltage is varied from 400 to 900 volts. In any case, the total current drain is practically constant at 60 - 70 mills for all voltages. Grid current is infintessimal when drive is supplied by a Communicator.

Power output varies from 4 to 7 watts depending upon many things, including tube condition, plate voltage, tuning adjustments, etc. The biggest variable is the drive power available. If your Gonset is not up to snuff, the tripler will not talk as loud. If a bigger rig than a Gonset is used, the output will be much greater.

The filament supply voltage is 6.0 volts at 2.0 amps. A standard 6.3 volt transformer with a small guage wire to the filaments usually drops the voltage close enough to 6.0 volts. The filament transformer must not be grounded. A pictorial of the hookup is shown on the next page.

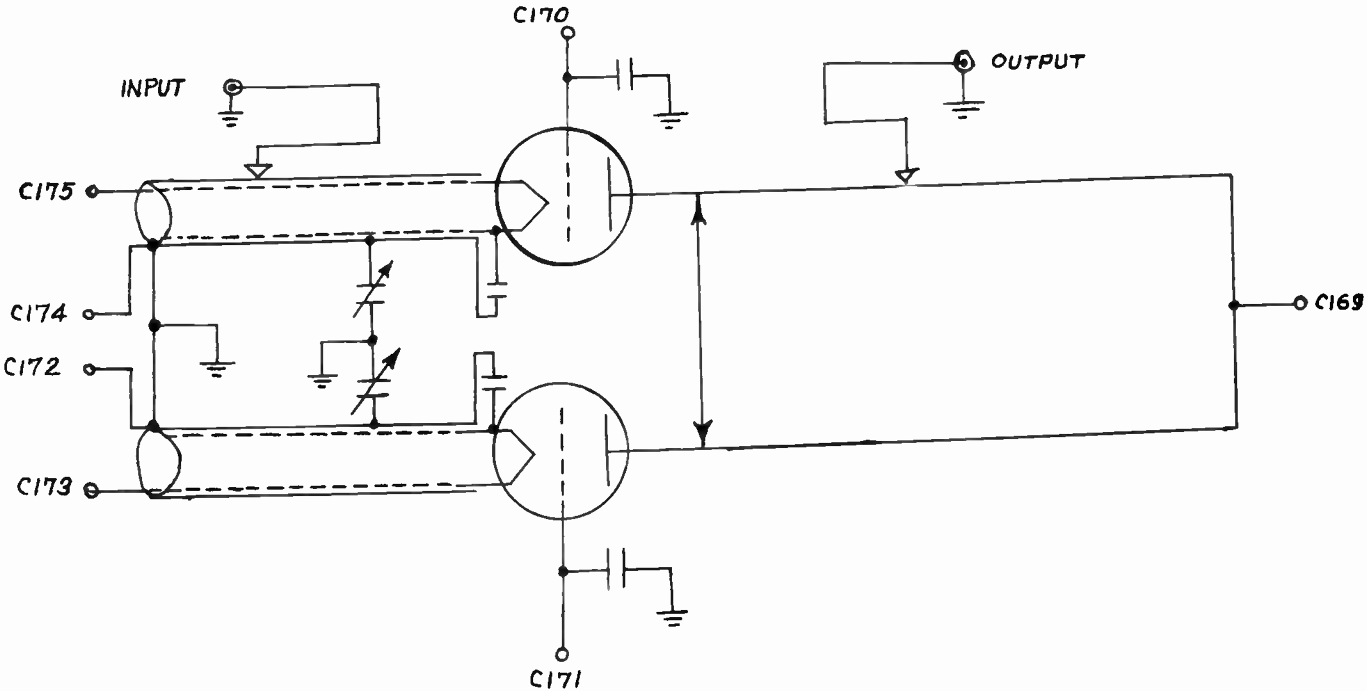


Fig. 1

Side view of the Simple Tripler with the tube access door open.

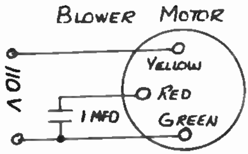
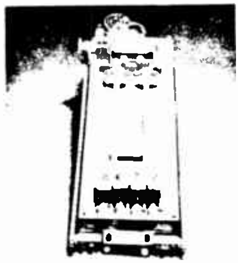


FIG. 2



Bottom view with cover removed showing the cathode lines, split stator tuning capacitor and the filament connections C-175, 174, 173 and 172.

Tuneup of the tripler is accomplished as follows:

1) Tune up the Communicator to 144.0 - 144.2 mc using a dummy load, or, if none is available, to whatever antenna is handy.

2) Connect the Communicator to J-113 on the tripler through a length of RG-8/U cable.

3) Set R1 at maximum resistance and R2 at minimum resistance.

4) Turn the 2C39 filaments on and allow 1 minute for warmup.

5) Turn the 2C39 plate voltage on.

6) Adjust R1 for about 50 mills plate current.

7) Turn the Communicator to TRANSMIT position and tune the input variable capacitor fot maximum plate current. As an additional aid, a milliameter may be inserted in series with R2, if necessary. Turn R1 if plate current rises above 70 or 80 mills.

8) Connect an output indicator to J-112. This may be a UHF wattmeter, a 50 ohm resistive load and some sort of diode or VTVM RF probe, or an antenna - field strength meter combination.

9) Tune the output circuit slider until output is indicated. Output will be present when the slider is about 2¼ inches from the center line of the 2C39's.

10) Repeat the adjustments outlined and adjust R1 and R2 and the TUNE and LOAD knobs on the Communicator until no further increase in output can be obtained. Pay no further attention to the plate milliameter for the final adjustments.

It will be found that with plate voltages in the order of 400 volts, R2 wikl be zero ohms, its optimum value increasing as plate voltage is increased toward 900 volts. Output power will actually decrease with plate voltages above 900 volts. When using higher plate

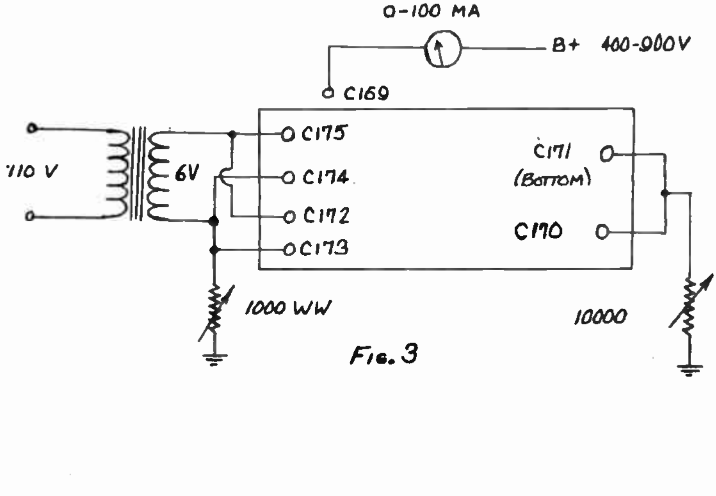


FIG. 3

voltages, enough R1 must be left active to limit the static current to 100 ma or so when drive is removed. Static current values much lower than this are preffered. In this way, the tubes are protected and there is no necessity for cutting off the plate voltage during receive periods.

If the tripler acts unusual, a spurious oscillation around 1500 kc may be present. This is due to the seven power lead filters built into the unit. Its presence can be detected by placing a standard broadcast set near the rig and tuning around for the oscillation. The oscillation should be checked both during transmit and standby periods. It may be eliminated by connecting an 8 mfd capacitor directly from C-119 terminal to ground.

Modulation of this unit is indeed unique as no modulator is required other than that in the Communicator....The system has been employed by the author in a 2C39 tripler for 1296 mc service for several years. Since output is primarily dependent on the drive power, the output will faithfully follow the modulation envelope of the Communicator. This is not a compromise system, as good quality modulation is produced. Actual modulation percentage is much higher than can be obtained with conventional plate modulation of this unit. The modulation fidelity is aided by the audio inverse feedback provided by the unbypassed R1.

A slight increase in output power can be obtained by exprrimenting with the output coupling link. The silver plated steel unit is stiff and difficult to bend. Further, it is tied down by a ceramic standoff insulator. The link may be replaced by a piece of No. 12 copper wire and the standoff insulator removed and discarded. Series tuning of the link may help, but the total length of wire in the link must be quite short before resonance can be achieved. The output figure quoted aabove was achieved without series tuning.

For the boys who crave high power, a companion unit is available at Selectronics. This unit is identical to the tripler except that the input tunes to 432 mc. The same power supply as used with the tripler can also supply the final.

The 2C39's can give 50 watts output and this output level could no doubt be reached with the drive power available from the tripler. The final would require an external plate modulator, but who needs a modulator for CW?

"4-over-4" for-6

Vincent J. Varnas, K8REG
4329 Renwood Drive
Dayton 29, Ohio

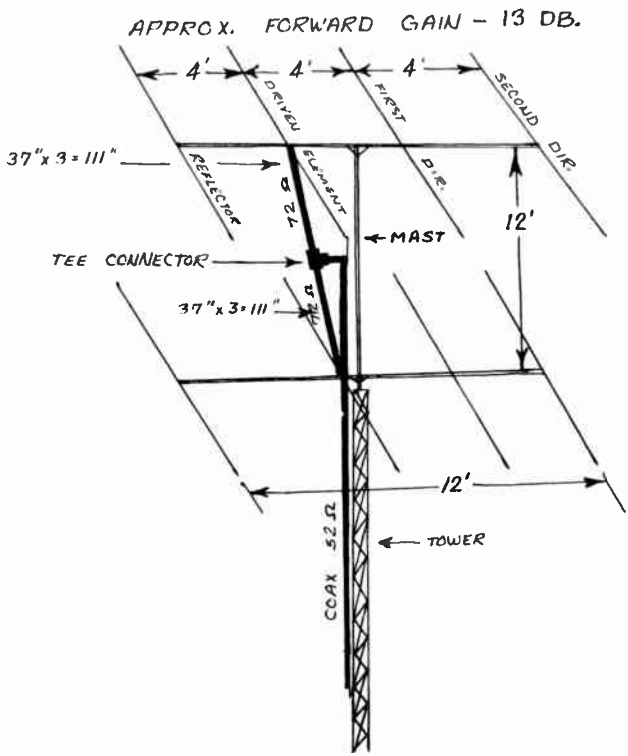
During my two years on six meters, I have used no less than four different antennas. The majority of these have been "Long John" beams. Although it is impossible to determine whether one type of antenna will work better than another under all conditions, I am now of the opinion that a stacked array of four or five elements on each bay will out-perform most "Long John" antennas.

In the past couple of years, commercial manufacturers have made the beam antenna more popular than stacked arrays. The reason for this is that many amateurs are losing their spirit of experimentation and are readily accepting whatever the commercial antenna manufacturing have to offer.

The reason I say that a stacked array will outperform a "Long John" beam is because a stacked array gives you a lower angle of radiation. This is most important on 59 mc when you are trying to work groundwave or Sporadic-E skip. Other advantages are that you can rotate a stacked array more easily than a "Long John" and that 3 db! (Forward gain achieved by vertically stacking two beam antennas.)

Unfortunately I have found that not too many stations realize the correct method of stacking and are, therefore, missing the full benefits which might be gained if the stacking procedure were done correctly.

The following is a plan for stacking two four element, optimum spaced beams. First you either buy or build the two four element beams. The length of the boom is twelve feet. To use an antenna any longer than this would mean a risk that your structure might be blown down by the first heavy breeze. Next comes what seems to be the difficult part - correctly spacing the beams. To achieve the best possible performance, it is necessary to space the two beams approximately the length of the boom of one of them. This would be twelve feet in the case of a four element beam. The last step is to construct the phasing lines and then connect the transmission line to them by using a coax "tee" connector. The phasing lines are made from 72 ohm coax. such as RG 11/U. The transmission line is 52 ohm coax such as RG 8/U. Each half of the phasing lines must be an odd number of ¼ wave lengths long. Figuring the velocity factor for coax cable, this makes a ¼ wave length at 50.5 mc 37" long and, of course, you would use an odd number such as 1,3 or 5. Remember this is ½ of the phasing line and the other half is identical to the first. The entire array should be mounted on a tower; high enough to clear all surrounding objects.



VHF SSB!

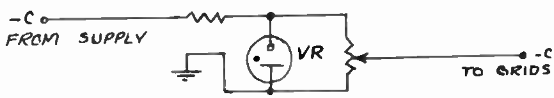
Phil Gural, K2PCG
204 East Northfield Road
Livingston, New Jersey

Now that the new year has begun, we all hope that SSB on the VHF bands will increase. In the past few weeks, I have received a few letters with some construction hints and a few asking for information.

The following were selected because of the possiblity that others might be having a similar problem.

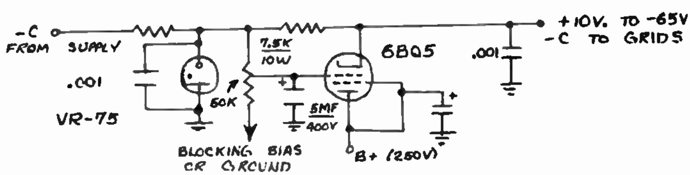
One construction hint that was received is from Jim Rosenthal, WA2GJT. Jim has designed a grid biasing circuit for such tubes as 100TH's. Jim says...

"When operating Class 'B' it is important to maintain constant grid biasing voltage. The conventional method of biasing is to use a VR tube with a potentiometer across it as shown:



"With a circuit like this the bias voltage varied from a standing value of -30 v, to -150 v as drive was applied. The varying grid bias made the final hard to drive and resulted in non-linearity. It was apparent that a low impedance (battery, for instance) or an electronic regulating circuit was needed.

"The circuit shown here is the result of several sessions at the drawing board.



"It is a form of electronic regulation but uses only 2 tubes. This circuit holds the grid voltage from -30 v to -38 v as full grid drive is applied."

Jim goes on to mention that if higher bias voltage is needed to use several VR in series. It must be kept in mind, though, that the B-plus voltage will have to be reduced as the negative voltage is increased . This is done to keep within maximum plate dissipation rating of the control tubes (s). The layout is critical and will also work for AB1,2 finals.

The other is a letter asking for information and is from Ernest LaBonte, K8GVM. Ernie asks: "I would like to know if you know of a low level mixer converter for mixing a low power 14 mc SSB signal to 144 mc."

I suggest you look in the ARRL SSB Handbook. In it is a heterodyne circuit designed by W2EWL. Also the mixer circuit of the W1CLS heterodyne circuit might be used. Or, instead of a 5763, try a 6AK5 with inductance coupling for the 130 mc signal and no grid resistor. After the mixer, however, you are going to need a few stages of amplification in order to drive a 5894.

73,

Phil, K2PCG

Trading Post

RATE: Commercial ads - 5¢ per word. Free to readers - any reasonable length. Ad from readers MUST BE SUBMITTED ON A POST CARD or QSL card. TRADING POST, 67 Russell. Rahway, N.J.

FOR SALE: Custom made ceramic ash tray (green, brown, or white). Your handle and call letters in gold. Only $5. Choctaw Ceramics, K5ZTH Jim, RR 1 Box 14K, Choctaw, Oklahoma.

WANTED: Skeds on the higher bands above 50 mc. Write Jerry Elmore, KØTRU, P.O. Box 261, Hiawatha, Iowa.

I HAVE four 3X2500F3 tubes made by Eimac. Used but still good. Jim Overheul, K8YZP, 323 Pine, Paw Paw, Michigan.

WANTED: Any info on surplus RT-22/APX-1 and/or TN-8/APX-1 unit. Art Lebermann, K8SCD, 116 Cortland, Apt. 407, Highland Park 3, Michigan.

FOR SALE: Gonset Comm. III, 6 meters; Knight VFO: crystal mike; AC & DC power cords and mobile rack for Gonset; schematics and manuals included with all above equipment. $175.00 for everything. Mort Cohen, WA2ARS, 11 Brighton 10 Terrace, Brooklyn 35, N.Y. Or call TW 1-3125 after 6:30 PM.

SALE OR TRADE: Two new RCA 833A transmitting tubes. Gerard A. Baldauf, 175 Wernersville Blvd., Wernersville, Penn.

CHANGE XTAL FREQUENCY, etch, safe method everything needed. Ammonium Bi-floride, containers, holder, instructions, guaranteed. $1 postpaid. Ham Kits, Box 175V, Cranford, N.J.

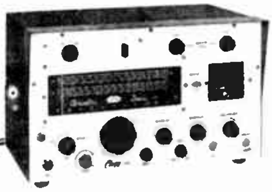
FOR SALE: APR-4 tuning units: TN-16, TN-17, TN-18 and TN-19, 38 to 2200 mc. In good condition - all for $100.00. Lavoie 105-S 375-725 mc frequency meter, $10.00. Heath VF-1 $14. Want Electronic switch and square wave generator for use with Tektronix 511A scope. Ken Schieker, Rt. 1, Box 242, Opelika, Alabama.

FOR SALE: Lettine 6 meter transmitter. 45 watts with operating instructions, 6 crystals, microphone, coaxial antenna relay. Will ship C.O.D. or deliver within 75 miles. All items like new - $60.00. Dwayne E. Foltz, K8TOQ, 1721 Grand Avenue, Dayton 7, Ohio.

FOR SALE: 1 KW final for 2 meters, 2 meter heterodyne mixer for 2 meters with regulated power supply. KW power supply components. 20 amp variac, brand new BC-221. 220 mc RF amplifier, blower & 4CX250M. Write Joe Szabat, 228 Plummer Street, Oil City, Penn. W3LST.

FOR SALE: Globe Scout 680A, and Trio 9R-4 receiver with six meter converter - 160-6 meters. All in excellent condx. No reasonable offer refused. KØTRU, P.O. Box 261, Hiawatha, Iowa.

make it a ▶ **NEW CLEGG ZEUS**



Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position

6 AND 2 METER TRANSMITTER

185 Watts of Solid "Talk Power"

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

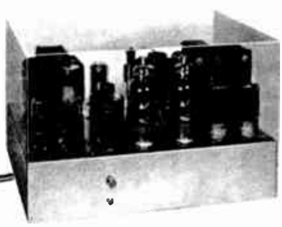
Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! — You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

PERFORMANCE DATA

AUDIO: Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum talk power without splatter. A panel mounted indicator provides visual monitoring of modulation. Frequency response is flat within 2 db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps. Hum and noise levels are down at least 40 db below 70% modulation. Up to 18 db of speech clipping, adjusted with a calibrated panel control gives ZEUS the "talk power" to outperform many KW rigs.

RF: The VFO will maintain frequency stability of 1 part in 10^6 per degree F. per hour after a 15-minute warmup. Frequency reset accuracy is within 5 KC. A precise, zero backlash, flywheel loaded dial makes accurate tuning easy on both 6 and 2 meters.

Maximum TVI suppression is inherent in all ZEUS circuitry. 6 meter output power is fed to the line thru a pi network circuit. Output on 2 is link coupled to a high efficiency tank.



Amateur Net Price: $675.00 Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

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***Coming Soon*- Matching VHF RECEIVER!**

***Clegg* LABORATORIES**

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

You must have worked a

NEW Clegg 99'er

6 METER TRANSCEIVER

A Compact, Top Quality Station for just $139.95!

CHECK THESE EXCLUSIVE 99'er FEATURES:

- Dual Conversion SUPERHET with Noise Limiter, S Meter, AVC.
- Low Noise RF Preamplifier.
- Stable — Selective — Vernier Tuning — Built-In Speaker.
- 8 Watt Crystal-Controlled Transmitter.
- 9 Tubes and Rectifier — 14 Tube Performance.
- Completely Wired and Tested with AC Power Supply.

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

Ask your Clegg Distributor (listed below) for full information. He'll be glad to serve you.

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California
Hemet—Gil Severns
Los Angeles—Henry Radio
Radio Products Sales
Oakland—Elmar Electronics
Riverside—Mission Ham Supply
San Francisco—Amrad Supply
Connecticut
Bridgeport—Kaufman Electronics
Hartford—Radio Shack
Harry of Hartford
Delaware
Wilmington—Delaware Electronic Supply
Dist. Columbia
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Miami—Amateur Radio Center
Illinois
Chicago—Allied Radio
Amateur Electronic Supply
Peoria—Klaus Radio & Electric Co.
Indiana
Fort Wayne—Brown Electronics
Indianapolis—Van Sickle Radio Supply
Iowa
Council Bluffs—World Radio
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Hutchinson—Acme Radio & T.V.

Maryland
Wheaton—Key Electronics
Massachusetts
Boston—DeMambro Radio
Radio Shack
Harvard—Electronics Inc.
Reading—Graham Radio Co.
Michigan
Ann Arbor—Purchase Radio Supply
Detroit—M. N. Duffy Co.
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Grand Rapids—Radio Parts, Inc.
Minnesota
Minneapolis—Electronic Center
Missouri
Butler—Henry Radio
St. Louis—Walter Ashe
New Hampshire
Concord—Evans Radio
New Jersey
Mountainside—Federated Purchaser
Newark—Terminal-Hudson Electronics
Shrewsbury—Federated Purchaser
New York
Amsterdam—Adirondack Radio Supply
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Harrison Radio Corp.
Harvey Radio
Terminal-Hudson Electronics
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Pittsburgh—Tydings Co.
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South Carolina
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Tennessee
Nashville—Electra Distributing Co.
Texas
Dallas—Crabtrees
Houston—Busacker
Virginia
Arlington—Key Electronics
Wisconsin
Milwaukee—Amateur Electronics Supply

WILL TRADE: Scatter signals from Oregon on 50.02 mc for scatter signals from the Midwest. K7AAD, Route 2, Box 35, Beaverton, Oregon.

K3HNP: Wants your old call letter license plates. Don't forget him! 14 Darkleaf Lane, Levittown, Penn.

FOR SALE: Two Eimac 4-125A's new condition, ten dollars each. KØTRU, P.O. Box 261, Hiawatha, Iowa.

FOR SALE: Heath Pawnee 2 meter transceiver with built-in nuvistor preamp. Will guarantee operation - $225. HQ-145C receiver with calibratpr - $200. Contact Bob, W2QPP, 246-30 137th Road, Rosedale 22, L.I., N.Y. LA 5-0722.

FOR SALE: Gonset - $175.00. WA2ARS.

TOROIDS: 88 mhy with MOUNTING HARDWARE. Uncased; like new. Information sheet included. $1 ea., 5/$4.00 Postpaid. KCM, Box 88, Milwaukee 13, Wis.

TECHNICIANS: Now - a publication for and by Technicians. Send 25¢ for February issue. "The Technician", Box 465, Billings, Montana.

FOR SALE: NC-173, excellent condition $110.00; Johnson 6N2 converter, 26-30 mc IF, $55; HRO-M, modified, 6SG7 1st and 2nd RF, coax input, power supply, speaker, 9 coil sets - $70.00. Set of 3 converters with power supply. Tecraft CC 5 50, Malory Inductuner, not modified - $45.00. 6 meter transmitter, pair 807's, AM CW with VFO, 50 watts with built in power supply, 100 with 600 volts plate modulator, ant. changeover -$50.00. 2 meter transmitter LW 50, 20 watts, AM CW, separate speech amp., power supply, all on 10 x 17 chassis, with grid meter. $50.00. 750-1000 volt 300 ma power supply with 866's - $25.00. A. Kenneth Akin, Jr., K3DNO, 7413 Oak Lane, Chevy Chase 15, Md.

FOR SALE: Hallicrafters S-106 6 meter receiver, $30; Tecraft 25 watt 6 meter transmitter, $25; Telrad 18A frequency standard with outputs every 10, 100 or 1000 kc - $20. Ronald J. Krupsa, 3437 Washington Blvd., Cleveland Heights 18, Ohio.

FOR SALE: Hallicrafters S-85 excellent - $90. Tecraft transmitter and converter (2 meter) never used with power supply for one (homebrew) Deluxe "Lightning Bug" worth $35.00 like new - antenna transmit-receive switch worth $12.00. 177VAC. Best offers. Will deliver in Chicago area. Ray, K9ZGU, 1319 E. Mayfair Road, Arlington Heights, Illinois. Tel: CL 5-4518.

LOW NOISE CONVERTERS: For sale. One has a regulated power supply and is rack mounted and the other is the conventional 7x9x2 chassis job without power. $65.00 for combo, $50.00 for solo. Jack, K2IUK.

MOONBOUNCE

Allen Katz, K2UYH
48 Cumberland Ave.
Verona, New Jersey

Ask the average amateur which is stronger - CW or phone. He will probably answer "CW." Then ask: If a station transmitting on phone switches to CW, will the CW signal be stronger than the phone (same power output). The answer is no. True, the CW will be more copyable due to a factor called threshold of hearing, which simply means you cannot copy a signal whose strength is equal to the noise. You need a little extra, that extra is less for CW, than for phone.

But this is not the real advantage of CW. Noise is everywhere, while (most) amateur signals only occupy a small space. It is only sensible to make your receiver sharp enough to receive just the signal without a lot of excess noise. CW has a narrower bandwidth than phone and therefore when received properly has less noise along with it. If you don't think this makes a difference, look at the April '61 Moonbounce column and get a 15 db surprise. A broad receiver (not even too good on AM) will, when tuned for CW, not beitaking full advantage of this mode.(As compared to a a sharp receiver tuned in for CW).

The Truth About Crossed Yagis From a Letter by K1BKU

"The type of antenna being used here is crossed yagis fed in phase quadrate; i.e. two sets of yagis elements mounted on the same boom, one set vertical and the other horizontal, so that each element forms a cross. If the feedline runs directly to the horizontal element , and a quarter wave loop of transmission line connects the horizontal driver element with vertical driven element so that, viewed from the rear, the elements at 9 o'clock and 12 o'clock are connected together, clockwise transmitted polarization will result. The great advantage of this antenna is that during reception the polarization of the antenna is reversed, permitting reception of a counterclockwise polarized signal. This not only permits reception of one's own echoes, but means that all participants need only build one type of antenna." By the way, Ned's antenna consists of eight 11 element 18 foot yagis stacked 15 feet vertically and 20 feet horizontally. Many thanks Ned.

Oops Department

Boy was I red when Ott, K2CSM (not W2CSM) told me we had his call wrong in the write-up on his excellent 1296 mc converter in the October edition of THE VHF AMATEUR. However, just to show he isn't too mad, he promised something special in the way of 1296 mc gear for next month's column.

Activities

Not much word this month in the way of activities - Fellows, you will just have to write more. We have heard that 432 is booming with a group of old two meter operators like W3IBH, and W3CLQ. CT3AE is on a trip, but he'll be back soon. WA6NCD wants to see more on helix antennas. We plan to oblige him in the near future.

'Till next month,
Allen, K2UYH

DX Report

Daniel L. Parnes, WA2DMQ
184 Huntington Terr.
Newark 12, New Jersey

Antenna at W1QKA (President of Nashua Mike & Key Club). On the pedestal at left is Roland's 1296 mc 4' dish. On the tower is 144 mc 32 collinear (facing), 432 mc 32 element collinear (behind), & 1296 mc corner reflector (behind).

SKED BOX

Present Schedules 50 & 144 mc

W1ZGO-K2QWD 2130 EST Wed.'s 50 mc
W3HFX-W3UJG-W3ARW 220 mc
WA2UAK-W2WEA 50 mc
KØDQG-WØUES 50 mc
WØCCD works into Iowa & Missouri
K7AAD (Oregon) - W6FZA, W6NLZ 50.02
K7EZP (Oreg.) - K7GGJ (Wash.) 50 mc
W7JU (Nev.) - W6WSQ Sunday's 144 mc
KØMSS-KØYSX-KØPSZ-KØLHZ-WØVZJ 50 mc
K2JNG - K3IGX 50 mc
WA2PMW - K2EWG 50 mc
W3WOD - K3HEC 144 mc SSB
K6UMM - W6FZA 50 mc

Schedules WANTED!

W5UKQ wants 144 mc skeds.
K4EDS (Ala.) wants 50 mc CW skeds into Kentucky and Arkansas.
VE7IR desires 50 mc CW skeds
WA2VCM (Auburn, N.Y.) wants 50 mc CW
K9EID always open for 50 or 144 mc schedules!

This time we have received some 'Reader's Reports' from November's issue...finally. For those who didn't as yet send in a report, please do. We need a report from you every month. Don't forget to send us your's today! For how else am I to know what is going on in your area? Response has been fairly good, but it could have been much better. So... let's hear from you!

VE7IR (North Vancouver, British Columbia) is on every evening from 0300 to 0500 GMT on 50.088 mc phone-CW and is looking for skeds. VE7GR is experimenting with TV on 420 mc. A newcomer to Vancouver is VE6PQ who will be on 144 mc with a 500 watt rig, AM, CW & RTTY. During the skip season (50 mc), look for VE7NM, VE7ND, VE7AOD, VE7XW, VE7OE, VE7KD and VE7IR. They are all around the Vancouver area. *One of those would make a FB contact, wouldn't it!* K6VXI (San Francisco) reports that K6RNQ & W6AJF are quite active and open for new skeds. K7AAD (Beaverton, Oregon) runs 300 watts into an 11 element Spiralray on 50.02 and consistantly works into California (W6FZA, W6NLZ, W6YX). Good ground wave to Seattle also reported by Loren (180 miles). W7JU (Boulder City, Nevada) keeps weekly skeds with W6WSP, 144.006 mc at 8 AM PST on Sundays. W7JU is 2600 feet above sea level. *Want*

Reader's Report

Fill out and return to us today!

As an aid to both the Editor and to our new "DX Report" column, your assistance is greatly needed. This page can be removed from the magazine without damage to the contents.

If you like, make a facsimile. Of course, if you complain enough, ye Editor might be tempted to send you a new magazine if pages 3 & 4 also fall out. Enough trivia...

RETURN TO: Reader Report, c/o DX COLUMN
Daniel L. Parnes, WA2DMQ
184 Huntington Terr.
Newark 12, N.J.

Your Name...*Call*...........

Address...*City*...............*State*.........

- *What bands (VHF) do you operate?*____________ ▪ *How much power?*____________
- *What kind of antenna do you use?*____________ ▪ *How high above sea level?*____
- *Do you operate MOSTLY ( ) AM, ( ) CW, ( ) SSB*
- *What was the furthest contact made in the last month?*____________
- *When, if at all, have there been good GROUND WAVE conditions in your area. Also, to what extent (how far)?*
- *Work any new states recently (or during the Summer)?*____________
- *What are the most frequently heard DISTANT stations?*____________
- *Do you presently hold schedules with anyone?*____________
- *Who do you know that seems to work out exceptionally well in your area?*____________

to trade QTH's Mack? K6UMM (Canoga Park) worked K6HCP (San Jose) about 400 miles away on 50 mc. K6UMM also hears quite regularly W6FZA (175 miles), K6RNQ (435 miles), K6QXX (475 miles). K6HMS (Costa Mesa) works and hears sigs 400 miles away nightly on 144 mc. Jim Michels, K7GSR, of Salem, Oregon, works 50, 220, 432, 3500 and 5,600 mc! Jim reports that W7BVV, W7JIP and W7SO are all active on 144.18 mc. 7BVV & 7SO have 42' Long Johns. A lot of FM activity there, also. K7EZP (Forest Grove, Oregon) reports working WØKPJ (Norton, Kansas) during November on 50 mc. Warren also mentions that he frequently hears KØTSD and K7ALE on skip. He's picked up 16 new states using his new Clegg 99'er.

KØMSS (Omaha, Nebraska) works 210 miles consistantly. Last month he worked into Kansas City on 50 mc. *Oh... he's 1400 feet above sea level! Like to trade QTH's with you also!* If you live in Hawaii or North Dakota, look for him because you can help him get his W.A.S. certificate. W5HPT (Bedford, Texas) hears frequently W5HTZ (Wewoka, Oklahoma) on 144 mc. W4HHY (Nashville, Tennessee) contacted W4NYT (Roanoke, Alabama) for a distance of 230 miles on 50 mc. Also, Ohio, Indiana, and Illinois stations were heard by W4HHY last month. W9BF (Angola, Indiana) contacted last month WA4AAJ (Independence, Ky.) and K8MMM (Novelty, Ohio) on 50 mc. From Marissa, Illinois, K9EID, Bob works and has skeds with W9HGE (Wisc.), K4GEQ (Ky.), K9ZTK (Ind.), WØKMV (Kansas City, Mo.) and WØDJG (Iowa)... *WOW!*

W3RUE (Belle Vernon, Pa.) worked on Oct. 1 W4WDH (N.C.). Also heard by Ted are W8TYY (Columbus, Ohio) on 432 mc. K3KEO is on 144 mc. With a Halo, K3OBU (Wilmington, Delaware) worked K4EUS (Chester, Va.). Also heard very frequently are Long Island, N.Y., stations. K3IPM (Philadelphia) hears W1BU (Mass.) and W4UCH (Va.) very regularly on 50 mc. Stan worked Cuba, Newfoundland, Mexico, Costa Rica, Puerto Rico, and Nova Scotia this past summer. From Md., K3DNO heard stations on October 1 at a distance of from 300-500 miles on 50 mc. K3LOV (Solebury, Pa.) with only 7 watts worked into W. Orange, N.J. last month. Mark hears K1BHY (Conn.) quite often on 6 meters. The most frequently heard distant stations at W3WOD (Baltimore, Md.) are W8KAY, W1MEH, W1RJA, W1AJR, K2BNK and W4MKT - 144 mc. W1HDQ is heard most often by W3WJC (Reading, Pa.) during aurora sessions. W3WJC worked K4DIG (Alexandria, Va.) on November 24 at 11:06 EST. (2 meters). WA2PMW (College Point, N.Y.) worked on November 12 Bellport, Long Island . Lou hears K3HNP, WA2FMC, and K1TGI often on 50 mc.

Here's a nice contact from the N.Y.C. area: K2SWI (Huntington, L.I.) worked on November 5. K1NAY in Maine! K3LZI, K3HNP, K1PBE, W1ALE, and K3KEO are heard regularly by K2SWI. Incidentally, George has only been on 6 meters for four months. Nice going, eh! WA2DMC (West Orange, N.J.) worked W3ATY (Baltimore) on November 23 and K4VNF (Fla.) on Oct. 27... once again, 6 meters. WA2DAC (Peru, N.Y.) runs a KW on 50 mc, 30 watts on 144 mc. and also works 1¼ meters. He worked KP4AAN with only 9 watts AM this past summer! WA2GSO (Lawnside, N.J.) worked K1IIM/1 in New Hamshire on 50 mc. Richard frequently hears K1BHY and K3EHS.

WA2PWI (Middlesex, N.J.) reports that he has worked N.C., Va., Md., Franklin Co., Pa., Mass.. and Conn., recently on 6 meters. Tom is doing real well with only 40 watts. K2JNG (Union City, N.J.) can be found on 50.016 mc CW, and presently has skeds with K3IGX. Walt is looking for CW contacts - So, how about taking the dust off the key and looking for him? K2PBP (Millburn, N.J.) hears K3KEO, K3MWV, and K3HNP with real good sigs on 6. W2ALR (Lockport, N.Y.) worked W9CUX (Geneva, Illinois) during the aurora in October. He also works W8KAY every night on 144.3 mc. From Auburn, N.Y., WA2VCM worked K1JWK (Conn) and K3OWC/3 (Bald Eagle Mt., Pa.) John says that the longest ground wave contact recently was K3JFL (Thomasville, Pa.)...about 250 miles. WA2UNQ (Garfield, N.J.) worked K8MMX (Marion, Ohio) on November 15 at 2150 EST. K2RRM (near Binghamton, N.Y.) regularly works K2ZSQ (Rahway, N.J.) on 50 mc.

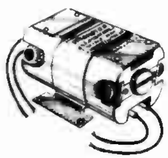
Aurora Session - December 2, 1961

Jim Bellows, K8NIE, of Midland, Michigan, reports that Dec. 2 aurora between 1600-1900 EST as "quite a session." Jim worked K9DTB, K9EID, K9ZOO, K9YIA, W9HGE, WØPFP and adds, "Nothing really remarkable about this except it was a roundtable on 50 mc SSB via aurora - shades on 75 meters and of things to come?"

Well, fellows, that's it for this month. If your Reader Report wasn't in print this month, you can be assured it'll be in next time. Columns are written at least a month in advance - hence a delay. Keep those Reader Reports and letters coming. We love 'em!

'Till next month, Dan, WA2DMG

MORE BARRY GOODIES!



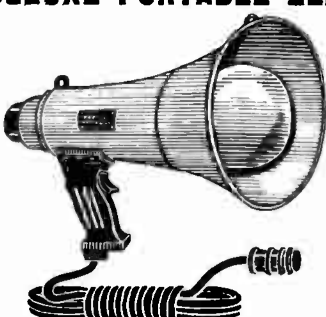
700 VOLT DYNAMOTOR

Input: 12.6 (21 amps) *Output*: 700VDC at 260 amps. Made by Sangamo. Frame and construction similar to Carter dynamotors. With mounting bracket frame mounted to dynamotor. Units are brand new in mint condition. Weight: 8½ lbs.. Our price: **$13.95**.

PLATE TRANSFORMER

Pri: 115VAC 60 cycles.
Sec: 3.000-2,500-0-2,500-3,-000 at 350 ma insulated for 10 KV.
Size: 4"Hx7"Wx6¼"D.
Stock: X-6000/350.
Our price: **$34.95**

DELUXE PORTABLE ELECTRONIC MEGAPHONE TYPE PAE-2



$99.00

Consists of 6 tube amplifier, operating from modern built-in 6 volt (non-spillable) plastic wet-cells. Unit comes complete with power supply and built-in charging supply to recharge batteries from 115VAC. Complete with books and spare parts. Unit is strictly "Rolls Royce" throughout.

Output stage: 4 tubes in push-pull parallel. Voice capable of operation up to one mile! Limited quantity of these units available.

Furnished with dynamic mike in horn assembly with trigger switch, cord, and plug. All brand new in original cartons. Order Remler Type PAE-2.

Ask for your FREE BARRY GREENSHEET!

BARRY ELECTRONICS CORP.

512 BROADWAY • NEW YORK 12, N. Y.

WAlker 5-7000

VHF SPECIALS!

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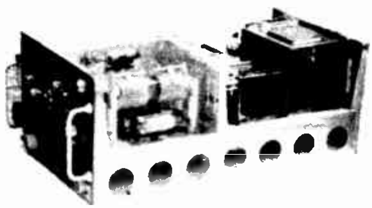

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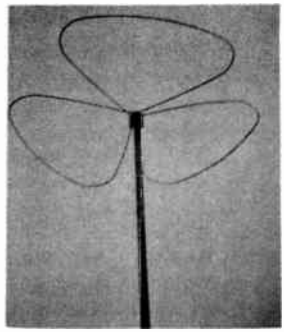

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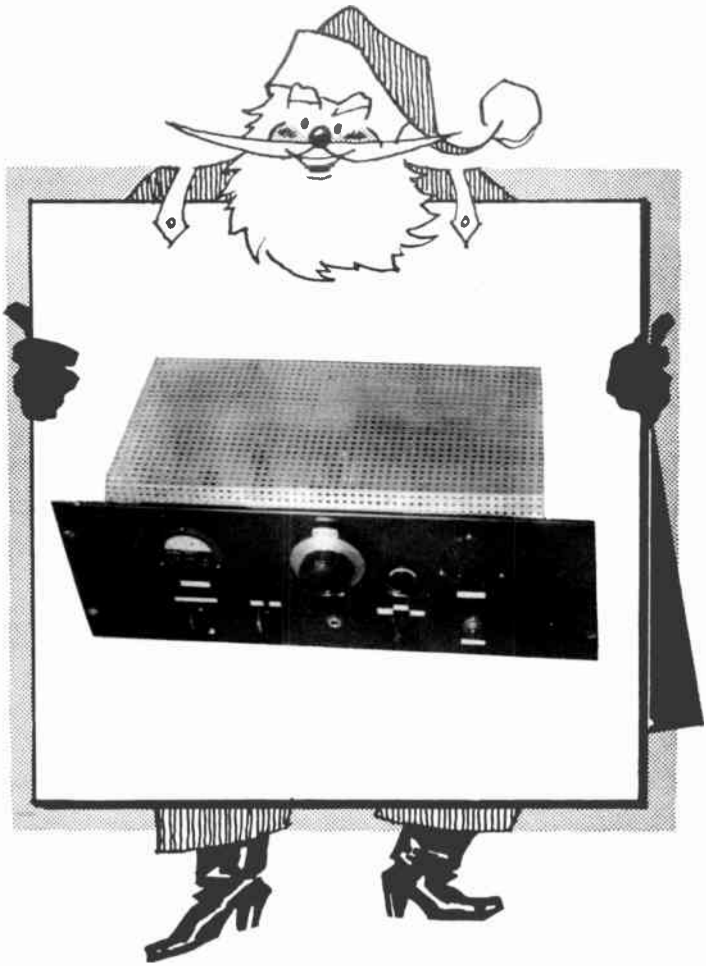

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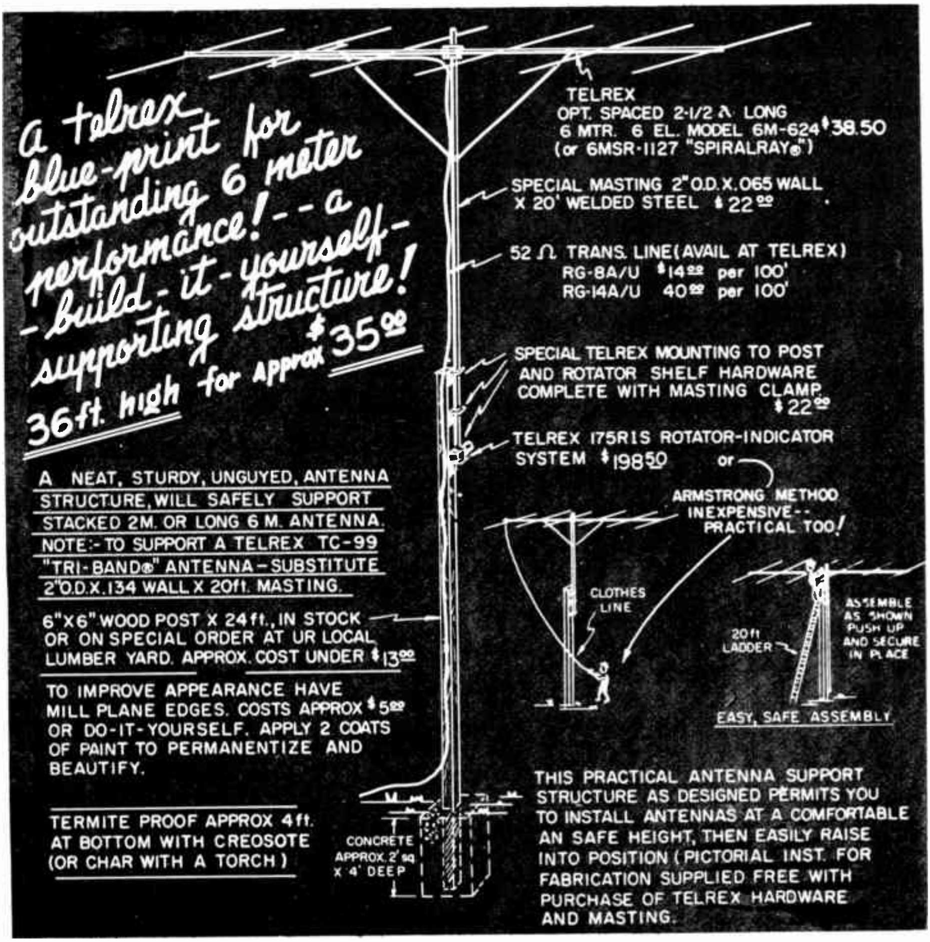

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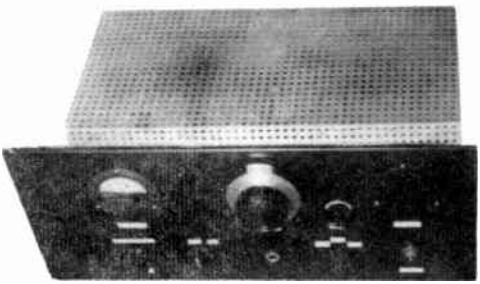
Our Front Cover

Sleighbells are ringing, wreaths are sparkling, and Santa brings us a new high power six meter rig. Who could ask for more? For those chilly winter night projects, see page 4!

120 Watts on 6 Meters

...the hard way - Homebrew!

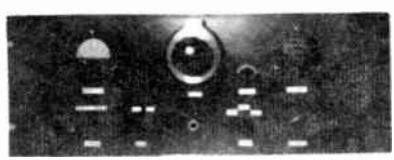
Ken Foster, W2IBD
472 Bayview Avenue
Cedarhurst, N.Y.



This is a view of W2IBD's 120 watt six meter rig from the top.

The transmitter to be described came into being as the result of several attempts to pack a lot of power into a small space. After having had many problems with construction and operation, the RF section was put on a normal sized chassis, and with the modulator, plate, and exciter supplies, was mounted in a 30" desk top rack.

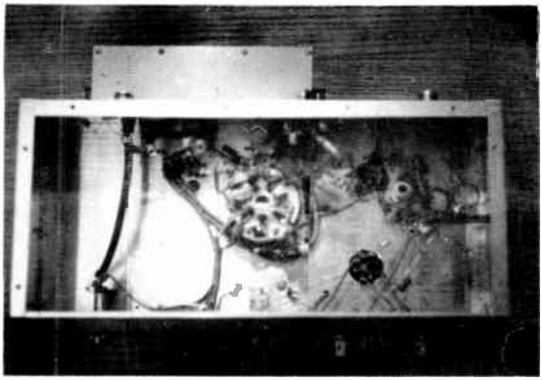
Let's go no further until we get a good understanding of what to expect from deviating from the accepted axiom that the shortest distance between two points is a straight line.. heavily by-passed. Anyone considering this transmitter or any piece of VHF gear must bear in mind that lead length, by-passing, etc., is very important to avoid parasitics, and instability. If you have sockets which have a center ground post built in, do not use it. *Make all ground connections to chassis.* The matter of by-passing is very important and in my shack receives very careful attention. The usual disc ceramic used for by-passing here (.001) has a series resonant frequency in the neighborhood of 35 mc, with normal lead length. By shorting the leads together with a copper strap, this frequency can be easily determined with a GDO, and can just as easily be raised to 50 mc by trimming the lead length. With the series resonant frequency at 50 mc, an extremely low impedance path to ground is provided for 6 meter RF. Bakelite sockets are *not* recommended due to RF leakage. Some low value resistors are wire-wound even though they look like composition. Be certain that the ones you use are actually low inductance composition type or you may have to solve the mystery of the exploding resistors as I did!



Left to right (Top)...DC meter, final tuning, loading, and RF meter.

Left to right (Bottom)...xtal select, mode select, key jack, meter select, and filament lamp.

The circuit consists of a 6CL6 working as a modified Pierce Oscillator, tripling in the plate circuit and driving a 5763 doubler. The doubler is capacity coupled to the grids of an 829B or 3E29, which is cross-neutralized and is rock solid. A 5894 may be substituted for either of the above, and probably would not have to be neutralized. If a 5894 is used, R7 should be changed to 20K, 5 watts. The grid current would be 5 ma and the screen current would be 16 ma. To insure that a loss of drive to the final would not result in a molten--pool of glass and metal in the 829B socket, a 6AQ5 is triode connected as a screen clamp. With no drive the input to the final is held to a very low value. Returning to the 6CL6, a tuned circuit can be switched into the grid and any 8 mc VFO can be used to drive the rig. All power wiring is shielded, and all leads out of the chassis are Pi filtered. The cable which connects the RF section to the modulator and power supply sections, uses sheilded wire and is enclosed in shield braid. The entire rig is enclosed in *Reynolds* perforated stock and fastened with a generous number of screws. The meters are shielded, the DC meter with a metal can fastened to the back of the panel, and the meter leads shielded and by-passing The RF meter is covered by a piece of perforated stock.



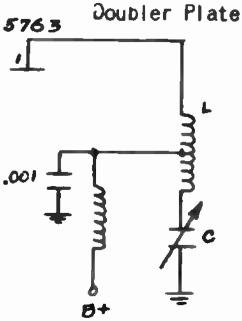
Here's a view of the unit looking at the bottom wiring.

The transmitter is constructed on a 7 x 15 x 3 chassis, although it could easily be put on a 7 x 10 x 3 with room to spare. I used the larger size so as to have room for 2 meter plate lines. The front panel is a standard 7 x 19 rack panel, secured to the chassis by the various switches and the filament pilot light. The layout of parts is left to the individual, although it is necessary that the layout be such that lead length is kept at a minimum. The plate tuning condenser for the final is mounted on a 1/8 x 2 x 2 5/8 poly sheet secured to the chassis by an aluminum angle bracket. Connections to the 829B plates are made with thin copper sheet stock about ½ inch wide. Heat dissapating plate connectors should be used to keep the temperature of the plate seals within bounds. I have had great sucess using *Fahnestock* clips although you may wish to use a commercial product, such as Bud TC-487. WARNING...*The rotor of the final plate tank capacitor is not grounded so it is necessary to use an insulated coupling to bring the control out to the front panel.*

The circuitry is straight forward with two possible exceptions. The oscillator screen may need an additional capacitor to ground, Cs (220 uuf) for fast starting. The doubler plate circuit must be balanced to feed the final grids. If the grid drive is not balanced, the tube (final) will generate harmonics overheat, and generally be unstable. It may be necessary to place a small trimmer from the lower end of the doubler plate tank to ground, to balance the output capacity of the 5763. This is indicated as Cpp (3-30 uuf) on the diagram. In the rig here it was not necessary due to wiring capacity. WARNING...*the doubler plate capacitor is at the plate supply potential and must be adjusted with an insulated tool.* An alternate circuit is shown to remove that hazard. In the alternate circuit, the coil resonates with the output capacity of the tube and the trimmer to form a balanced plate tank circuit.

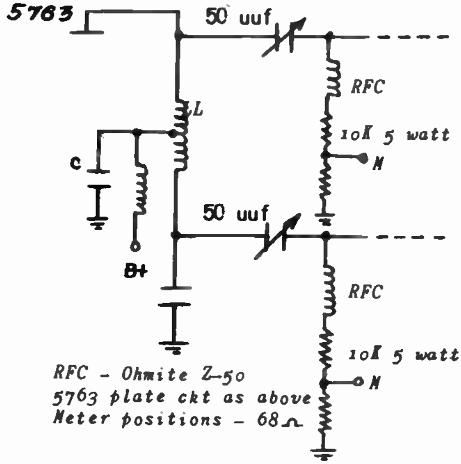
The final neutralizing condensers are made from #12 insulated wire crossed from each grid terminal, through the tube socket and up the outside of the

Alternate Circuit for Doubler Plate



L - 12T #22 ¾" dia.
C - 3 - 30 uuf trimmer
RFC - Ohmite Z-50

Alternate Coupling to final



RFC - Ohmite Z-50
5763 plate ckt as above
Meter positions - 68Ω

tube envelope. The wires should protrude at least ¾" above the chassis at the start. With full drive and plate and screen voltage applied, the wires should be trimmed *EQUALLY*, no more than 1/8" at a time until there is no *"kick"* in the grid meter as the plate condenser is tuned through resonance. An alternate method can be used if there is a very sensitive RF detector available. The detector should be loosely coupled to the plate tank, full drive applied, the plate circuit tuned very carefully to resonance and *NO* plate or screen applied (voltage that is). The wires would then be trimmed until there is no indication on the detector. In either case, if the neutralizing adjustments are made around 50.25 mc, they will hold for any frequency normally used for 6 meter operation. I have operated up to 53.0 mc and have had perfectly stable operation in all respects.

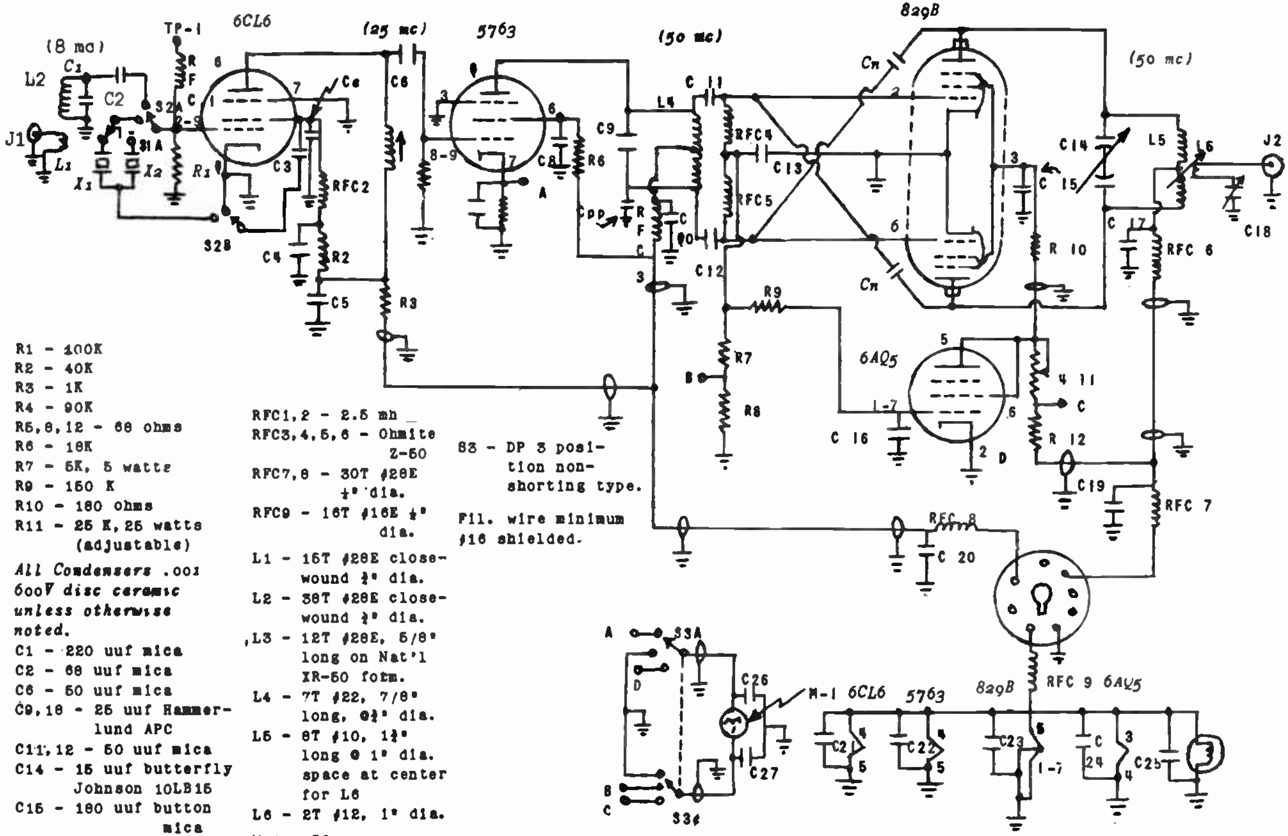
The circuitry of the 829B is very critical in regard to lead length and little hidden inductances. The cathode should be grounded with a copper strap, a piece of wire does have inductance at 50 mc. A button mica by-pass condenser is highly recommended for C15 the screen by-pass condenser, and should be mounted as close to the screen terminal as possible. R10 is used to isolate the screen from any stray RF in the power leads. Please save the *Bufferin* and be sure R10 in non-inductive.

The output link is variable and is used to obtain proper loading of the final, along with C18. C18 serves to tune out transmission line reactance and does have a decided effect on loading.

If a single supply is used for the entire transmitter, a tune-up switch is suggested for the 829B screen circuit. It is not absolutely necessary since the clamp tube will hold the final input to a safe value, but it is desirable.

Power requirements are 400 to 600 volts at 325 ma and 6.3 volts at 4.25 amps. The modulator should be capable of supplying 60 watts without distortion, if you want to run full input. I am modulating with zero bias class B 807's, and have a bit of reserve audio.

Operation is as follows: With all tubes in place, and the circuits dipped to the operating frequency with a GDO, apply voltage to all but the final screen (if you've put in a tune-up switch, otherwise trust the clamp). The oscillator should start at once and develop 25 to 40 volts negative at TP-1 depending on crystal activity. L3 should be dipped to the proper frequency



R1 - 100K
R2 - 40K
R3 - 1K
R4 - 90K
R5,8,12 - 68 ohms
R6 - 18K
R7 - 5K, 5 watts
R9 - 150 K
R10 - 180 ohms
R11 - 25 K, 25 watts (adjustable)

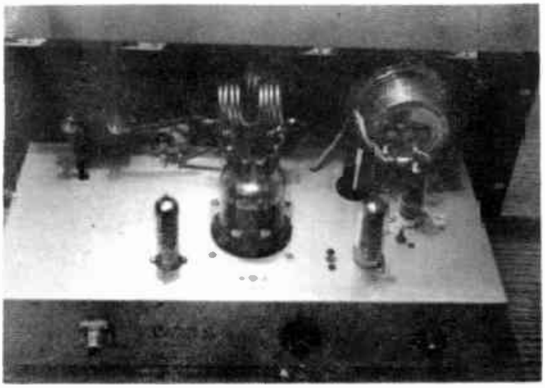
All Condensers .001 600V disc ceramic unless otherwise noted.

C1 - 220 uuf mica
C2 - 68 uuf mica
C6 - 50 uuf mica
C9,18 - 25 uuf Hammerlund APC
C11,12 - 50 uuf mica
C14 - 15 uuf butterfly Johnson 10LB15
C15 - 180 uuf button mica
C17, C19-.001, 3KV
Cs, Cpp, Cn - See text

RFC1,2 - 2.5 mh
RFC3,4,5,6 - Ohmite Z-50
RFC7,8 - 30T #28E ½" dia.
RFC9 - 16T #16E ½" dia.
L1 - 15T #28E closewound ⅜" dia.
L2 - 38T #28E closewound ⅜" dia.
L3 - 12T #28E, 5/8" long on Nat'l XR-50 form.
L4 - 7T #22, 7/8" long, @½" dia.
L5 - 8T #10, 1½" long @ 1" dia. space at center for L6
L6 - 2T #12, 1" dia.
M-1 - 50 ma.
S1 - SPDT
S2 - DP 2 position shorting type

S3 - DP 3 position non-shorting type.

Fil. wire minimum #16 shielded.



Rear Apron left to right...Ant., Power, VFO in. Tubes left to right...6AQ5, 829B, 5763, 6CL6. Right of 6CL6 - TP-1. Between 6CL6 and 5763 is L3...left of 5763 is Cg...Above 5763 is xtal socket w/xtals. Across panel left to right is RF meter, C18, final tank & link, DC meter w/ shield. The 4 bright spots at top are grounds...

(approximately 25 mc) and you should get about 1 ma drive to the 5763. This corresponds to 80 to 90 volts negative at pin 8. Measure this with a 2.5 mh RF choke in series with the voltmeter probe. The doubler tank should dip at 50 mc with a cathode current of 40 to 45 ma. With the meter in the final grid there should be no difficulty obtaining 15 ma of drive. Under load, 10 to 12 ma is enough. If you have trusted the clamp tube up to this point and have had plate voltage on the final, you should also have had a load connected to the antenna terminal because the final will start to draw plate current as soon as there is enough grid leak bias developed to cut off the clamp tube...With the final loaded so as to draw 200 ma, the screen voltage should be 200 volts and screen be 20 ma. *DO NOT run the final with a light load or no loading, there is no protection for the screen in the event loading is lost or greatly reduced, and these tubes make very poor triodes.*

A note here on the final tank circuit. The circuit without the tube connected will dip to about 80 mc, and will only hit 6 meters with the tube in the circuit. This fact has confused a couple of people when they checked the tank.

This rig doesn't have to be given up when the GRO bug bites since there is adaquate output for even the triode kits that have hit the market lately, so it's fine for driving any KW.

Control over drive to the final can be had by changing R6 to a 25K pot. As long as we're on the subject of things to do, R7 could be removed and a 10K 5 watt resistor placed in series with each final grid RF choke, and each grid could then be metered. Further, C11 and C12 could be replaced by 50 uuf trimmers and grid current could then be very accurately balanced. You would find that C9, C11, and C12 would inter-act and any change in one of them would necessitate changing the settings of the other two. With this change in circuitry, grid drive to the final would vary from 5 to 7 ma for each grid.

After the initial tune-up, assuming the antenna is reasonably matched and not too reactive, the only control that need be touched for reasonable frequency changes is the final plate tank. The oscillator plate coil and the doubler are both are both rather low Q and so cover a rather broad frequency range.

Correction

Ye Editor got a "land-line" call the other day from Ken Foster, W2IBD, on some corrections on his article *120 watts on 6 Meters - the hard way...homebrew!* They are as follows...

The coil form for L3 listed as XR-50 should be XR-90. Also 5763 grid resistor R4 should be 5763 cathode resistor R5.

Plate coil L5 --- The plate condenser should tune with about 2/3 meshed. Juggle or squeeze plates until you hit resonance with C14.

By the way, the filament light should be a #47.

If you have any more problems, drop Ken a line. He'll be only to happy to help you out.

A Simple NBFM for the VFO

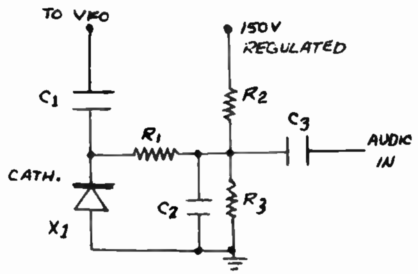
Richard Huntress, K1CXX
27 Linden St.
Auburn, Maine

If you are receiving threatening phone calls at all hours of the day and if your neighbors are circulating a petition to have you removed from the air because your AM 50 mc transmitter comes in on their TV, radio, intercom, hi-fi, tape recorder, kitchen sink, etc., this article may be of interest to you. Before you give in to your neighbors and operate only after 2 AM, after the Late-Late Show, - why not try NBFM (narrow band frequency modulation)? If your rig uses a VFO, then this system of NBFM can be added to it quite easily. The junk box should provide most of the necessary parts and even if every part for it is purchased new, it wouldn't run over a couple of bucks, which is a small price to pay for keeping the neighbors out of your hair.

This system of NBFM was added to two different transmitters at this QTH with excellent results. Even though the tube line-up varies from one transmitter to another, it should be possible to add NBFM to most any transmitter without much difficulty.

The heart of this system is composed of a germanium diode, which is used as a voltage controlled capacitor. This diode is one of the common types that is sold three for a buck on the surplus market. A VFO has to be used as the frequency control of the transmitter because a device like this added to a rig using crystal control would result in a small amount of phase - not frequency - modulation. A germanium diode, when it is back biased, will act as a variable capacitor, its capacity depending on the amount of bias across the diode. This variable capacity effect is quite small in the standard run of the mill diode, but it is adequate to deviate a 6 or 8 mc VFO enough so that by the time it is multiplied to 50 mc, better than 10 kc of deviation can be obtained. In the actual circuit the diode is back biased to one-half its rated peak inverse voltage (P.I.V.). The P.I.V. rating for diodes can be obtained from the diode section in the back of the ARRL Handbook - under the column headed "Max inverse volts." Allied Radio also gives the P.I.V. rating of diodes and other data in their regular catalogues in the transistor and diode section. A 1N48 diode was used in this job (P.I.V. of 85 volts) and has a bias of 42 volts across it in the actual circuit. This bias voltage is obtained from a voltage divider consisting of R2 R3 (Figure 1). The voltage supplied to R2 R3 should be regulated, otherwise any changes in supply voltage will shift the operating frequency of the VFO. Most VFO's use a 150 volt regulator tube to supply the voltage to the oscillator tube so R2 R3 should be supplied from this voltage source.

The VFO's that were modified for NBFM used the popular series tuned Clapp oscillator circuit. C1 is used to couple to the VFO and acts as part of a capacitive divider in series with the variable capacity of the diode. R1C2 is a filter used to keep the RF from the VFO from being shorted to ground and also keeps it out of the audio system. Audio is fed to the diode through R1, and C3 from the plate of the audio driver tube in the modulator section. In my rig the audio tube line-up is 6SJ7-6C5-6V6 driving a pair of 1625's class AB2. The modulator and power supplies are mounted on one chassis with different RF units used for each band. A 6 foot power cable is used to connect these units to the power supply. A patch cord, with PL55's at both ends, is used to get the audio from the modulator to the



PARTS LIST

C1 - 5 uuf ceramic
C2 - 100 uuf mica or ceramic
C3 - .01 mfd 600 volt
R1 - 10K .5 watt
R2 - 50K 1 watt
R3 - 20K 1 watt
X1 - 1N48 diode

FIGURE 1 - The basic NBFM unit.

VFO section. Obviously many transmitters have the RF, audio and power supplies on a single chassis so the audio patch cord would not have to be used (Figure 2). Even though the patch cord was not made with shielded wire, no hum or feedback problems were encountered.

About 85 volts (or less) peak to peak of audio should be applied to the NBFM section. If more audio than this is applied, the diode will conduct on negative peaks and possibly wreck it on positive audio peaks.

If a patch cable is used, jack J1 should be of the type that shorts to ground when the jack is pulled out. This is done to prevent any hum on the carrier when the rig is used on either AM or CW. The switch in section A of Figure 2 does the same thing.

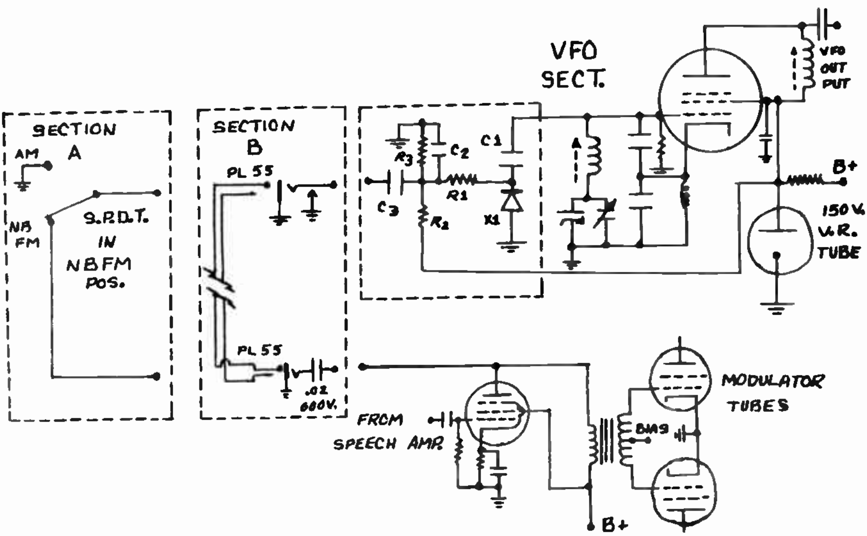
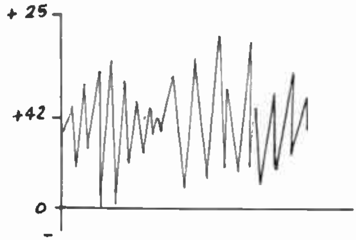


FIGURE 2 - Shows how the NBFM unit is connected into the transmitter. All parts necessary for the NBFM are shown inside the dashed lines. In section A is the method used to couple audio from the modulator section into the NBFM unit if everything is constructed on the same chassis. In section B a patch cord is used if the RF section of the transmitter is on a separate chassis away from the modulator section.

FIGURE 3 - Scope view of voltage across diode with about 85 volts maximum peak to peak of audio being applied to the NBFM unit.



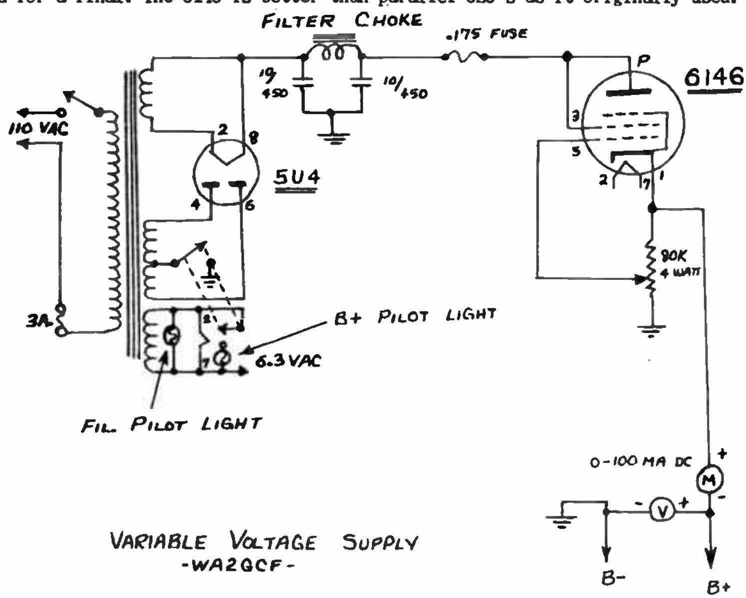
There has to be some way of disabling the modulator tubes when using the NBFM. Possibly the rig could be switched to CW position but just make sure the audio driver stages are not being disabled at the same time. The final method used to kill the modulator tubes is left up to the individual reading this. The 1625's in my rig are disabled by killing the high voltage to them with a switch marked AM-CW FM. The VFO will have to be retuned a bit as the frequency will be lowered by about 20 kc after the addition of the NBFM parts.

The amount of deviation is controlled by the audio gain control in the transmitter. The final NBFM signal that is put on the air should not be any wider than a conventional AM signal. To obtain the right amount of frequency deviation, run an on-the-air check with another station and adjust the audio gain control until it sounds best on his receiver. The amount of deviation necessary for the best quality signal may vary a bit from one receiver to another. On a regular receiver NBFM is slope detected by tuning off to the side of the carrier to receive it. This tuning off to the side makes NBFM poor for weak signal work (DX). This last remark is not true if a receiver is used that is especially made for NBFM detection in which case the NBFM is equal or superior to the AM due to the noise imunity feature of FM. NBFM is used here mainly for local work (50 miles or less) with AM or CW used for DX work. All the hours that I have spent operating on NBFM, not one complaint of TVI, BCI, etc has been received, so it was well worth the time spent on adding it to the rig.

Variable Voltage Power Supply

Jerry Vogt, WA2GCF, 180 Grafton St., Rochester 21, N.Y.

This is my version of a power supply that can be made with a soft 6146 since a soft tube is NG for a final. The 6146 is better than parallel 6L6's as it originally used.



Heath Modifications

Joe Lupo, WA2GGW
792 Avenue A
Bayonne, New Jersey

This time we tear apart the TWO'er!

Hope you all liked my last article in the May issue and I hope you had good results with the conversions. This article includes some TWO'er modifications, since I now own one of these, also. Upon completion of the TWO'er, we immediately installed UHF coax connectors in place of the phono plugs. We then begin to transfer ideas from the SIXER to TWOER. First came the power supply chokes. A pair of 3 hy, 50 ma chokes replace R14 and R15 for better power supply regulation. The chokes can be mounted in any convenient place in the more than spacious sub-chassis of the TWOER.

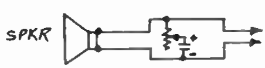
Next came receiver changes. The regenerative circuit in the TWOER is not the same as in the SIXER, so a direct substitution could not be made. With the help of WA2KRI, we found the correct capacitor to shunt. A 2 meg resistor across C26 will increase receiver performance, selectivity, and sensitivity. It will also change the tuning of the rig so that retuning of the detector coil is also in order.

Transmitter modifications. The only transmitter deficiency is low power. Mine ran exactly 5 watts input (200V at 25 ma). A 4 hy RF choke was placed across the final grid resistor, R6. The TWOER now runs about 9 watts input, with an appropriate increase in output, also. Some other changes which can be copied from the SIXER are the Squelch circuit, the headphone installations, and the MCW circuit (see May issue for SIXER adaptions).

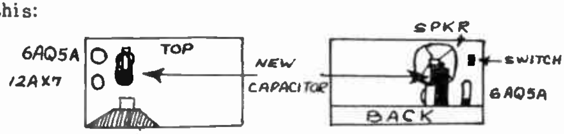
Work at the shack here never ceases,- for example, the SIXER is now running at 15 watts input. The receiver section was further improved, and a variable noise limiter was added.

At the receiving end, this was the turn of events: I knew that 2.7 meg resistor across C111 increased performance of the SIXER a little, so a smaller resistance should do more. I shunted that resistor with a 6.8 meg resistor, bringing the total resistance across C111 to about 1.8 meg. Retuning of the detector coil is again necessary after this change.

As for the variable noise limiter:

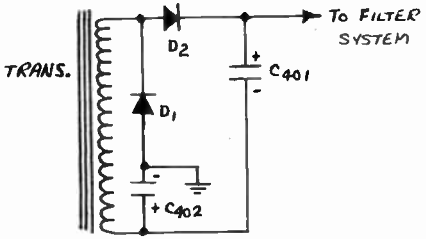


This is the circuit. The capacitor is a 2000 mfd, 10V electrolytic, and the pot is a 25 ohm wire-wound affair. The 'lytic can be placed, inverted, in front of the audio transformer like this:

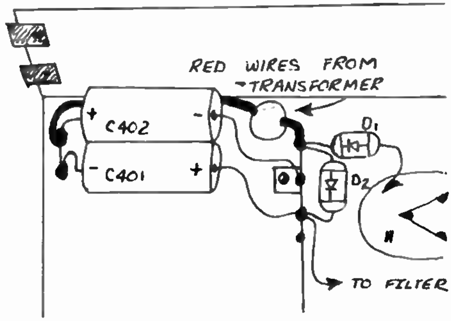


POWER SUPPLY CHANGES

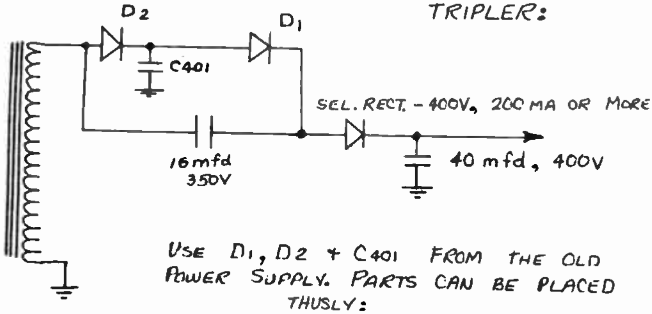
PRESENT POWER SUPPLY



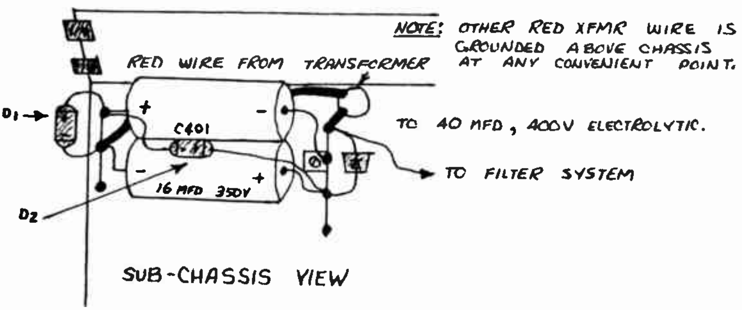
D1, D2 - 200 MA SEL. RECT.
C401, C402 - 100 μfd 200V.



THIS MUST BE CHANGED TO THE VOLTAGE TRIPLER:



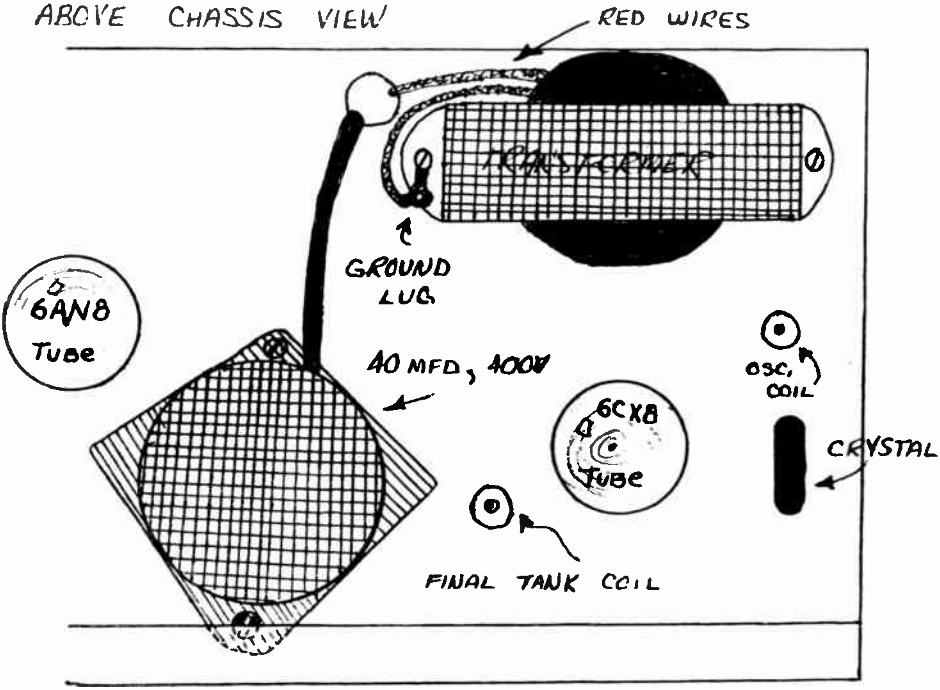
USE D1, D2 + C401 FROM THE OLD POWER SUPPLY. PARTS CAN BE PLACED THUSLY:

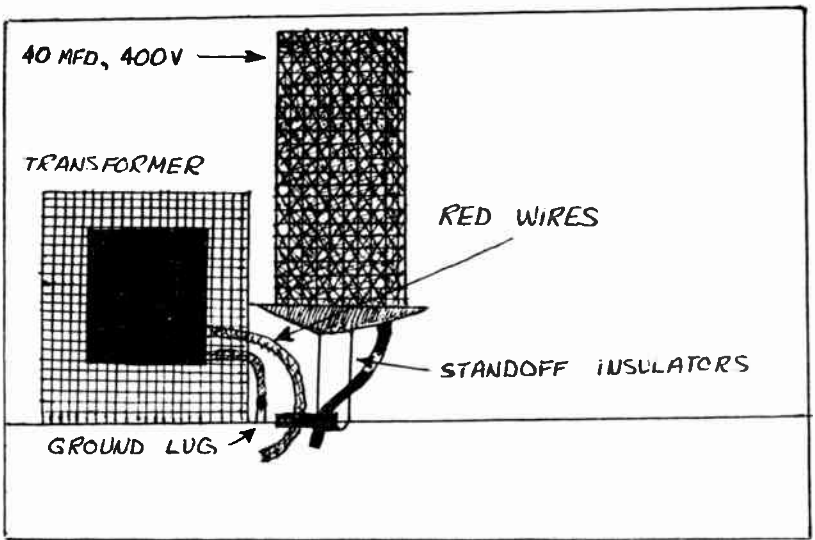


SUB-CHASSIS VIEW

PLACEMENT OF LARGE ELECTROLYTIC - ETC.

ABOVE CHASSIS VIEW





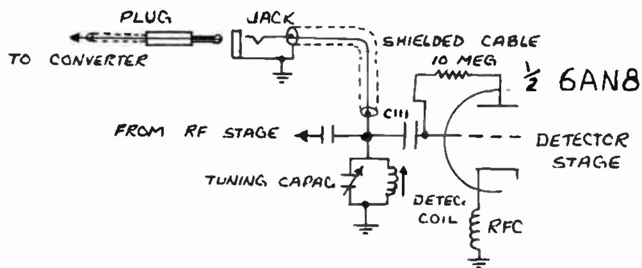
VIEW FROM BACK OF CHASSIS

As for the transmitter, the change that resulted in the increase was the changing of the SIXER's power supply from a voltage doubler to a voltage tripler. One rectifier and two other capacitors are needed. They are:

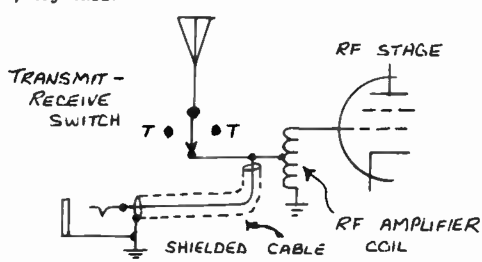
Selenium rectifier: 400V, 200 ma or more
Capacitors: (1) 40 mfd, 400V electrolytic
(1) 16 mfd, 350V tubular

(See other page 13 for details on power supply construction. Details of placement of electrolytic capacitor on opposite page, 14).

Another major change in my shack was a new receiver setup. I am using a Tecraft converter into an HRO receiver. In front of the converter I'm using the RF stage from the SIXER's receiver section as a preamplifier. With this setup, there is no transmit-receive switch necessary. The RF to the converter is taken from the tuning capacitor. Be sure to use shielded wire all the way from the tuning capacitor to the jack, if you want to install one, to the converter if you install this setup (see print).



NOTE: This loads down the RF stage to the point where the detector will not regenerate. If you intended to use the SIXER barefoot as well as with a converter, this change cannot be made. However, try this:



This alteration does not affect the operation of the SIXER alone in any way whatever, so it may be used mobile and also used with a converter at home.

That's it on the modifications. I'd like to hear from anyone who has any ideas on bettering either the SIXER or the TWOER. Best luck to all!

Knobs?

Is there any interest in an ARC-5 knob such as was described in the September issue for precise calibration of the 'HNP VFO?' It may be possible to obtain a durable plastic knob just right for the application in the range about $1.50 if a sufficient quantity can be assured. Perhaps a run of 500 would amortize the tooling cost. Divisions would be 1 or 2 kc for 6 meters and 3 or 6 kc for 2 meters. Drop a note to THE VHF AMATEUR if you'd be interested. If it looks practical a preferential price will be arranged for advance orders.

You must have worked a

NEW Clegg 99'er

6 METER TRANSCEIVER

A Compact, Top Quality Station for just $139.95!

CHECK THESE EXCLUSIVE 99'er FEATURES:

- Dual Conversion SUPERHET with Noise Limiter, S Meter, AVC.
- Low Noise RF Preamplifier.
- Stable — Selective — Vernier Tuning — Built-In Speaker.
- 8 Watt Crystal-Controlled Transmitter.
- 9 Tubes and Rectifier — 14 Tube Performance.
- Completely Wired and Tested with AC Power Supply.

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

Ask your Clegg Distributor (listed below) for full information. He'll be glad to serve you.

Alabama
Mobile—Aco Electronics
California
Hemet—Gil Severns
Los Angeles—Henry Radio
Radio Products Sales
Oakland—Elmar Electronics
Riverside—Mission Ham Supply
San Francisco—Amrad Supply
Connecticut
Bridgeport—Kaufman Electronics
Hartford—Radio Shack
Hatry of Hartford
Delaware
Wilmington—Delaware Electronic Supply
Dist. Columbia
Wash.—Electronic Wholesalers
Florida
Miami—Amateur Radio Center
Illinois
Chicago—Allied Radio
Amateur Electronic Supply
Peoria—Klaus Radio & Electric Co.
Indiana
Fort Wayne—Brown Electronics
Indianapolis—Van Sickle Radio Supply
Iowa
Council Bluffs—World Radio
Kansas
Hutchinson—Acme Radio & T.V.
Maryland
Wheaton—Key Electronics
Massachusetts
Boston—DeMambro Radio
Radio Shack
Harvard—Electronics Inc.
Reading—Graham Radio Co.
Michigan
Ann Arbor—Purchase Radio Supply
Detroit—M. N. Duffy Co.
Radio Supply & Engr. Co.
Grand Rapids—Radio Parts, Inc.
Minnesota
Minneapolis—Electronic Center
Missouri
Butler—Henry Radio
St. Louis—Walter Ashe
New Hampshire
Concord—Evans Radio
New Jersey
Mountainside—Federated Purchaser
Newark—Terminal-Hudson Electronics
Shrewsbury—Federated Purchaser
New York
Amsterdam—Adirondack Radio Supply
Jamaica—Harrison Radio Corp
N. Y. City—Arrow Electronics
Harrison Radio Corp.
Harvey Radio
Terminal-Hudson Electronics
Staten Island—Two-Way Radio
Buffalo—Genesee Radio Parts Co.
Rochester—Rochester Radio Supply Co.
North Carolina
Winston-Salem—Dalton-Hege, Inc.
Ohio
Cincinnati—Steinberg's
Cleveland—Pioneer Electronic Supply Co.
Columbus—Universal Service
Dayton—Custom Electronics Inc.
Youngstown—Armies Electronics
Toledo—Selectronic Supply Co.
Oklahoma
Okla. City—Central Electronics
Tulsa—Radio, Inc.
Pennsylvania
Allentown—Federated Purchaser
Pittsburgh—Tydings Co.
Wyncote—Ham Buerger
Rhode Island
Providence—W. H. Edwards Co.
South Carolina
Sumter—Dixie Radio Supply Co.
Tennessee
Nashville—Electra Distributing Co.
Texas
Dallas—Crabtrees
Houston—Busacker
Virginia
Arlington—Key Electronics
Wisconsin
Milwaukee—Amateur Electronics Supply

VHF SSB!

Phil Gural, K2PCG
204 East Northfield Road
Livingston, New Jersey

I have received some comments from hams who have a desire to build or buy a SSB rig for 6 or 2 meters. Most of them would like to know the answers to such questions as:

"Has SSB activity increased?"
"Basic advantages?"
"What equipment is available commercially?"
"What present equipment can be used?"
"How much would a good SSB station cost?"

To begin, SSB activity has picked up considerably over the past five years. I have heard from a few SSB'ers who claim they have worked 15 or more states SSB to SSB on 6 meters. Not only has 6 meter activity increased, but 2 and 220 mc as well. 220 mc was included because there are now three states represented by SSB. If there is enough interest, I will start a SSB - W.A.S. listing - for details, see the SSB column in the September issue of THE VHF AMATEUR.

The advantages have to be divided into groups: equipment, and propagation and interference. Under equipment, there is no large modulator needed even for that kilowatt rig. This also means one less power supply is needed. All the audio that is needed can be taken from two dual triodes or less. Only one exciter is needed. Operation on different bands is accomplished by heterodyning the signal to the desired band and amplifying the signal through one or more linear amplifiers. What is meant by heterodyning is simply mixing of two frequencies to obtain a third frequency. As an example, to operate on 6, using an exciter having an output on 14 mc, a 36 mc signal would be mixed with the 14 mc SSB signal. (14 mc plus 36 mc equals 50 mc).

Using SSB, ground wave contacts will be made further than with AM. Quoting from the *Radio Handbook:*

> A statistical study of the distribution of signals on the air versus the signal strength shows that the probability of successful communication will be the same if the SSB power is equal to one-half the power of one of the two AM sidebands. Thus SSB can give from 0 to 9 db improvement under various conditions when the TOTAL sideband power is equal in SSB and AM. In general, it may be assumed that 3 db of the possible 9 db advantage will be realized on the average contact.[1]

Being that the signal is much narrower, there will be less possibility of interference from an AM station. Along with this, the person who is receiving the signal can use a narrower bandwidth which means the receiver will have a higher gain. Another point to bring out is that all of the signal is "talk power." In other words, the person receiving

[1] Orr, W. I., W6SAI, RADIO HANDBOOK, 15th edition, page 329.

the signal must supply the carrier with the SSB signal supplying the modulation. TVI will also be less.

As of this writing, I am not too sure of what SSB gear is available commercially. There are quite a number of exciters and final amplifiers available for the low bands, but, VHF has not been given enough attention. More on this subject in the future.

The only piece of present equipment that might be able to be used is the station receiver and converter. It should be noted here that the receiver should be selective and quite stable. Listening to a SSB signal will tell you if your receiver is stable. Intelligibility can further be improved with the aid of a signal slicer or product detector.

The cost depends on what equipment and parts are available. The biggest single priced item is the exciter. Next comes the final amplifier and its power supplies, and last, the heterodyne unit. I hope to have in the future a complete SSB rig for 6 meters having an output of about three watts. The cost of this rig (I hope) will be under $60.

One final word to all SSB'ers. If you have a good idea and/or piece of gear that will be of interest to all, send it to me for publication. I am out to help SSB and your help is needed.

73,

Phil, K2PCG

Letters Page

Reader's Notes & Comments

Send your letters to: "Letters Page," THE VHF AMATEUR, 67 Russell Ave., Rahway, N.J.

Chicago, Illinois: A letter from W9DJ...

"Had only four states last May (50 mc) but when the band opened and stayed open I took it serious - after fifteen or sixteen weeks off and on, I wound up with 41 states, 40 confirmed. Now have eighteen states on 144 mc, 4 states on 220 mc, and this weekend I'll be on 432 mc for the first time - full power, 50 watts, with 11 elements (soon 44).

"Transmitter used on six, an SR-34, with only about 14 watts out; a pair of NC-300 receivers and an SX-101A with plenty of Tapetone and National converters, Centimeg converter on 432 mc. Have three SR-34's (I work for Hallicrafters -hi!).

"Six long yagis (Telrex), five AR-22's, and five masts make up my antenna farm along with 135' wire for the low frequencies and a coaxial vertical (10 meters) on a four story building overlooking lake Michigan, just a few blocks south of the "loop" business district. My roof 60' x 110' - hi! " *Some set-up! Get us some pictures of your shack and some news of activity in your area! Send spare SR-34's to me - hi. EDITOR.*

Allen Katz, K2UYH
48 Cumberland Ave.
Verona, New Jersey

MOONBOUNCE

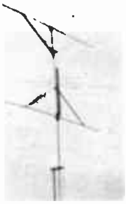
144 mc Moonbounce – K1HMU & W6DNG

They made it across!!! On September 14 K1HMU, Farmington, Conn., worked W6DNG, California, for the first TRANSCONTINENTAL 2 METER CONTACT IN HISTORY – via the moon. No information yet available on the W6DNG station, but on the East: 1KW, paramp, and 176 element clockwise circularly polarized cross-yagi beam. Signals were S3 on CW on 144.0 mc.

Schedules were set up and tried for several days with no results. Then on the 6th day the sound that will make any VHF man's heart trill: The sound of a CW signal hardly distinguishable due to weak signal strength and the change in tone from a station 3,000 miles away (mean distance 238,000 miles) – the dream had come true. A dream which was fired in the minds of VHF men back in 1946 when Army Signal Corps. engineers bounced a radar signal off the moon on a frequency not far below two meters. In as early as 1952 W2GKP and W4AO were conducting moonbounce tests on two, but results were too sporadic for a QSO. In 1956 the VHF columns could have been ringed in black with the news of the destruction of the antenna on the western end or project moonbounce between W2NLY and W6QKI. In 1959 the Rhododendron Swamp VHF Society was at it again on two meters – with same results – some echoes, but too sporadic. These fellows went up to 1296 mc where they made the first moonbounce contact with Eimac Radio Club in California. Finally the trick has been turned with circularly polarized antennas (to overcome the Faraday shift) and the door to world-wide communications on a band within every amateur's reach.

With every VHF breakthrough we are faced with a paradox. There is the joy of accomplishment, the new prospects for the future, the advancement of the art; there is also the knowledge of one less challenge. It is this challenge – the opportunity for discovery – that makes VHF different. If these same challenges existed at 10 kc, 10 kc would be our goal to conquer. There was a time when 50 mc was UHF; there will be a time when 10^{15} mc (gamma rays) are our practical limit of VHF. The door has not closed and even when it does I feel the VHF spirit will still be around. For now, let's aim at 144 mc W.A.S. and spanning the great pond on 144 mc all the way to infinity.

REQUIREMENTS FOR 2 METER MOONBOUNCE



144 mc array, 10 over 10, at CT3AE.

The following is the two meter portion of a table printed in the April 1961 issue of THE VHF AMATEUR showing the different gains necessary to have a positive path loss on various VHF bands. The only really variable condition shown on the table is the receiver power. The receiver power is primarily dependent on cosmic noise, which can vary on two meters anywhere from about 250 degrees kelvin to above 3,000 degrees. The table is calculated for minimum cosmic noise. This cosmic noise is one factor which explains why a moon bounce contact is possible one night and not the next. There is another factor, Faraday shift, which can be overcome by using circular polarization. The early mentioned contact proved the necessity of using oppositely-wound circular polarization at each end. Stations in the East should use clockwise polarization in order to work stations in the West using counterclockwise circular polarization and vice versa.

144 MC - Requirements

Antenna Gain
(64 element beam) plus 22 db at the transmitter
(64 element beam) plus 22 db at the receiver

Transmitter Gain
(750 watts out) plus 29 db

Receiver Power
(100 cycle bandwidth with 417A converter) plus 184 db

Transmission Line Loss
(Transmitter and receiver very near antenna) less than -1 db

Path Loss -252 db

TOTAL...............plus 4 db

ACTIVITIES

Bill, WA2EMA, wrote in to tell about schedules he's been running for several months with Jose, CT3AE. Jose believes that a QSO is possible between him, on the Island of Madeira near Portugal, and Bill in the U.S.A. on 144 mc, because of the many times he has received TV signals on the high channels from South America. He theorized that the strange propagation was caused by an atmospheric disturbance over the Azores and hopes it will produce usable results within the limits of amateur power levels; however, after months of no success coupled with the growing knowledge in the field of moonbounce, they decided to switch forms of propagation. Helix antenna construction has started at both ends (see September "Moonbounce" column for details on 144 mc helix antenna) and schedules should be resumed soon with the possibility of the first transatlantic 144 mc contact via the moon.

Until next month,

Allen, K2UYH

DX Report

Daniel L. Parnes, WA2DMQ
P.O. Box 4132
Newark 12, N.J.

At this writing (November 5) we haven't as yet received any Reader's Reports since the November issue just hit the mails. So, at least for this month, we'll have to go it alone. ~~If you~~ haven't already done so, by all means rip out page 29 and mail it today! Your support is sorely needed in this new endeavor.

Columnist Dan Parnes, WA2DMQ, at his Newark listening post. Receiver is an HQ-170, transmitter, Lettine. Judging by that expression, he must have just missed W3ASD...

The month of October seems to have been a good one for the 144 mc gang. Many good ground wave sessions were reported, at least in this area. One fellow snagged five new states. No specifics this month, however.

50 mc activity was most unusual with exceptional ground wave conditions, Sporadic-E openings, and a never-to-be-forgotten aurora. One thing at a time, though...

October seems to be the month of real short Sporadic-E openings. For example, K2IEZ (N.J.) reported a quick opening at 1205 GMT October 6. Bob worked K5AJF (Arkansas) 59, K9AAU (Ind.) 59, W9BJP (Wisc.) 59, and K8TGE (Mich.) 58, but 45 minutes later the band closed.

Meet Mark Welland, WA2TEM, also of Newark, New Jersey. Mark is 14 and runs a Lettine 262 (45 watts) into a 6M2 meter Finco antenna. Both converters are Tecraft feeding into a Lafayette HE-10.

WA2QPC worked W9PIU (Wisc) at 1700 GMT October 22. This time the band was only open for 12 minutes.

WØAJX (Kansas) and KØLFI (Mo.) were heard by your columnist with heavy QSB at 0400 GMT Oct. 26. Five minutes later they were gone.

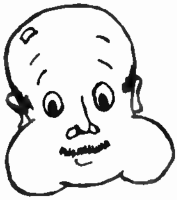
K4RNG and an unidentifiable W4 from Florida were 59 at 0345 GMT Oct. 27. This one lasted four minutes.

AURORA: October 28 (1630 -1900 GMT). WA2FUL worked K4DIG, K3GLU, K4QNF, K8UGA, K3ISH, K8UKA and WA2CEC. K1BEN worked WA2FRW. K3KEO (Delaware) was heard on AM phone. K4LHB, K3IHT, W4ULE, and K8MMM were heard quite strongly all along the East Coast.

'Till next month,

Dan, WA2DMQ

FREE Hi-Pass Filters!



Staff

The present day television receiver is a wonderful example of American igenuity, design and construction developed over a long period of years to its present state of perfection. However, as is true with much mass produced apparatus it still leaves something to be desired. One inherent shortcoming of most present television receivers, including the relatively expensive color receivers, is their inability to reject a strong local radio signal. These unwanted signals which the receiver permits to slip through may cause lines or streaks either light or dark to appear on the picture screen or, in varying degrees, remove the picture - or replace, in part or completely, the sound of the television program with that of the amateur signal. Why? Because the TV is not designed or constructed to reject these emmissions.

In over seventy per cent of these cases the interception can be eliminated by the proper installation of the correct High Pass Filter on the TV. In another 15% audio rectification can be solved quite inexpensively. One word of caution: There are many High Pass Filters on the market, but not all filters will eliminate interception on frequencies between 44 and 52 mc.

If you are really interested in clearing local TV's of the problem (with a FREE filter) send the following information to the address given below:

1. Call of intercepted ham (you).
2. Make (manufacturer) of TV.
3. Request R.L. Drake TV-300-HP filter.
4. Year TV set was purchased.
5. Serial number of TV.
6. Model number of TV.
7. Type of antenna (roof-top, rabbit ears, attic, built-in).
8. Name, address, phone number and SIGNATURE of neighbor.

It is imperative that the neighbor, not you, send a letter to the manufacturer with ALL the above information. Especially important is the serial number and model number.

ADDRESSES OF TV MANUFACTURERS SUPPLYING FREE FILTERS

GENERAL ELECTRIC
116 Washington Street
Bloomfield, New Jersey

MONTGOMERY WARD
19 Watchung Avenue
Plainfield, New Jersey
c/o Mr. Plue

ADMIRAL
Admiral Distributors
497 N.J. Railroad Avenue
Newark, New Jersey
c/o Mr. Durante

ZENITH Radio Corp.
6001 Dickens Avenue
Chicago, Illinois

R.C.A.
RCA Service Co.
Parkside Avenue
Trenton, N.J.

or

RCA Service Co.
1573 Irving Street
Rahway, New Jersey

HOT POINT
TV Service Department
254 Elizabeth Avenue
Newark, New Jersey

MAGNOVOX
Magnovox Corp.
Fort Wayne, Ind.
c/o Mr. Chapman

PHILCO
J.M. Otter Co.
2030 Upland Way
Philadelphia 31, Pa.

or

Fineberg's
c/o Mr. Mauro
750 Dowd Avenue
Elizabeth, N.J.

EMERSON
Emerson TV
14th and Cole Sts.
Jersey City, N.J.

CAPEHART
Capehart Parts Service Div.
454 William Street
East Orange, New Jersey

WESTINGHOUSE
Westinghouse Appliance Serv.
528 Ferry Street
Newark, New Jersey
Mr. Ballatine

ZENITH
Zenith Radio Corp.
6001 Dickens Avenue
Chicago, Illinois

CBS - TV
CBS Columbia
46 East 52nd Street
New York, N.Y.
c/o Mr. Reitano

or

Hygrade Electronics
9216 Church Avenue
Brooklyn 36, N.Y.

CROSLEY BENDIX
Philco Distributors
c/o Warranty Department
47-51 33rd Street
Long Island City, N.Y.
c/o Mr. J. Rigores

SPARTON Div. of Magnovox Corp.
c/o Mr. D.R. Barnett
Fort Wayne 4, Ind.

DUMONT
Igoe Brothers
524 W. 23rd Street
New York, N.Y.

or

Igoe Brothers
35 Halsey Street
Newark, New Jersey

SYLVANIA
Sylvania Electric Products, Inc.
Radio & TV Division
700 Elliott Street
Batavia, New York (c/o Mr. E. Mooser)

or

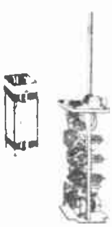
Sales Service Department
1000 Huyler Avenue
Teterboro, New Jersey

Although in nearly all the addresses given above the distributors are in the New York City area, we KNOW that they are reliable. They were compiled with the lists of the Levittown TVI Committee, K2HFL, and K2ZSQ's TVI package. If you do have difficulty, however, give the information on the opposite page to your LOCAL agent. But first, by all means, try our list. We've given these adresses to over 4,000 hams across the country who by mail have secured free Drakes and a little sleep. Only 7 have reported difficulty. If you get a new address or further information, please write so we can revise our list. In the meantime, good luck!

BARRY ELECTRONICS

VHF TRANSMITTER

BRAND NEW!

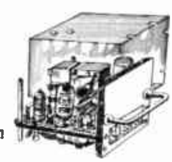


Perfect for 2 meter and/or 1¼ meter conversion. Late, modern design. Uses two 6201 tubes into one Amperex 6360 twin tetrode. Xmtr only 4" x 4" x 11." Only 3⅝ lbs. Complete with 10 ½" antenna. A & B batteries, cables and conversion data. plus schematic and case. Battery weight: 23 lbs.

Price: ***$15.00*** with all tubes.

(We can ship w/o battery-same price)

MOBILE TRANSMITTER



Uses 5618 crystal oscillator into CBS 5516 amplifier. Modern design. Only 7 lbs net weight including built-in 6 v. vibrator power supply. Completely enclosed in aluminum cabinet (5½"H x 7"W x 8"D). Furnished with crystal that doubles near 10 meter band. Will require slight and easy modification for 10 meter operation. A real beauty! Easily adaptable as an excellent low-cost Citizen Band rig!

Price: ***$11.95*** with tubes.

Fill out the coupon for your FREE Barry Green Sheet!

BARRY ELECTRONICS CORPORATION, 512 BROADWAY, NEW YORK 12, NEW YORK

Yes! Send me the (check one) Mobile Transmitter............( )

VHF Transmitter...............( )

Barry *Green Sheet* ....( )

Find $_______ enclosed.

NAME ______________________ CALL __________

ADDRESS ______________________________

CITY ______________ ZONE __________ STATE __________

Further Information?
Write

BARRY ELECTRONICS CORP • 512 BROADWAY • NEW YORK 12, N. Y. • WAlker 5-7000

Reader's Report

Fill out and return to us today!

As an aid to both the Editor and to our new "DX Report" column, your assistance is greatly needed. This page can be removed from the magazine without damage to the contents.

If you like, make a facsimile. Of course, if you complain enough, ye Editor might be tempted to send you a new magazine if pages 3 & 4 also fall out. Enough trivia...

RETURN TO: Reader Report, c/o THE VHF AMATEUR
67 Russell Avenue, Rahway, N.J.

Your Name...Call...........

Address...City...............State..........

■ What bands (VHF) do you operate?________________ ■ How much power?________________

■ What kind of antenna do you use?____________________ ■ How high above sea level?____

■ Do you operate MOSTLY ( ) AM, ( ) CW, ( ) SSB

■ What was the furthest contact made in the last month?________________________

____

■ When, if at all, have there been good GROUND WAVE conditions in your area. Also, to what extent (how far)?

____

■ Work any new states recently (or during the Summer)?________________________

____

■ What are the most frequently heard DISTANT stations?________________________

____

■ Do you presently hold schedules with anyone?____________________________

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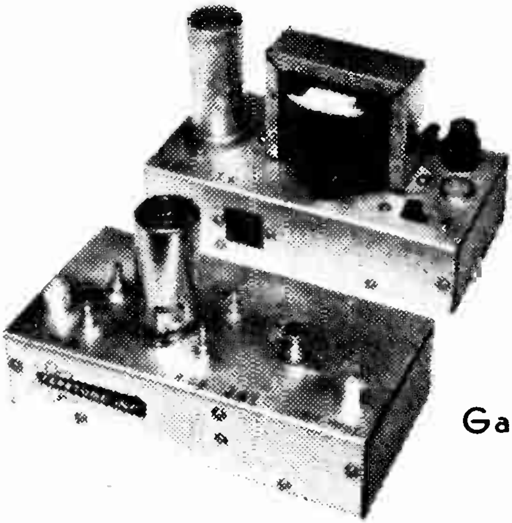

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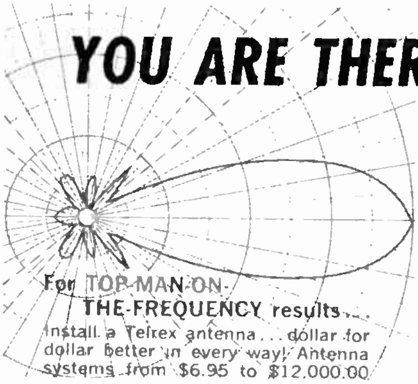

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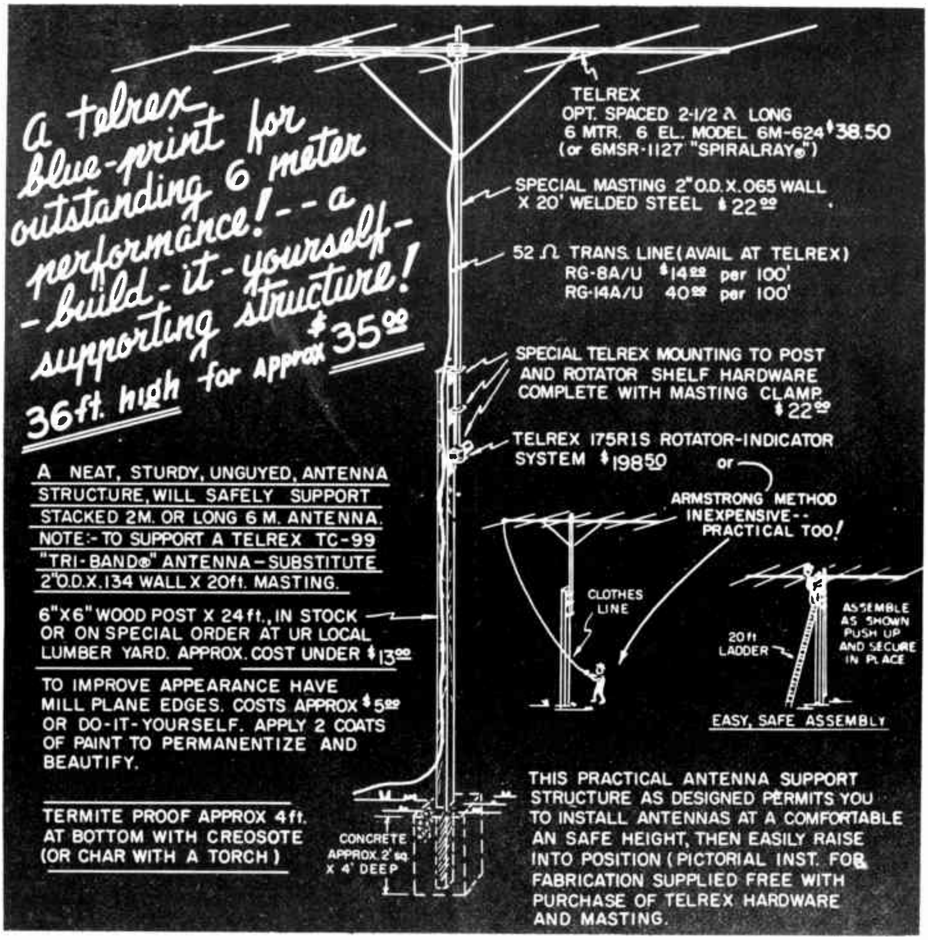

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Our Moonbounce, South American, and S.S.B. columns did not arrive in time for this month's issue. Look for their return next month

LETTERS PAGE

Address all correspondence to "Letters Page," VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

"Crystal Controlled" ...AND right on frequency!

An article by W8BPY appeared in the September '61 issue of this magazine which got my dander up. Titling his article, "Crystal Controlled...BUT right on frequency?" he boldly stated that the accuracy of a crystal is based on its marked frequency. From this he concluded (from heretofore unknown mathematics) that the "percentage of error in a rock is multiplied by the multiplier that you use in your transmitter." This statement is absurd.

For example, let us take a crystal for two meters. Our mutual friend who is still operating in a special class of service buys a rock at 8.000 mc with a percentage error of .005%. This means that the rock can be anywhere between 7.9996 mc and 8.0004 mc (neglecting temperature drift, input capacitance, etc.). If the rock is exactly at 8.000 mc it will multiply to 144.000 mc (factor of 18). If we assume the rock if off by .005%, we will have a frequency range of 143.9928 mc to 144.0072 mc after multiplication. This is a deviation of 7.2 mc from the desired frequency, or 18 times the .4 kc deviation which we had at 8 mc. BUT IT IS STILL A PERCENTAGE ERROR OF ONLY .005%.

$$\frac{7.2 \text{ kc}}{144{,}000.0 \text{ kc}} = .00005 = .005\%$$ You may check the math if you wish.

Thus, while the deviation has been increased 18 times, the percentage error has remained the same. This is because you are multiplying not only the cryatal deviation, but also the center frequency. Thus when you compute your percentage error, you will always come up with the original percentage error of the rock, regardless of WHAT your multiplier is.

In conclusion, we would like to say that we are not condemning W8BPY's article (in its entirety). He brought out some very important points that many hams forget, such as the input capacitance of their rigs. We just wanted to calm down the jangled nerves of the people who, by now have multiplied .005% by 18 and come up with the erronious deviation percentage of .08.

So you see, Mr. Bayha, we DO know our frequency.

- Joe Fabula, WA2NGA, Bayonne, New Jersey

Everything's Coming Up Roses

-I just received my first issue of the VHF AMATEUR and have scanned through it.

I do want to compliment you on the magazine. I find it much more interesting than QST because your magazine is devoted entirely to VHF while the other covers everything from soup to nuts, and at this stage of the game I am more interested in VHF than anything else.

Wishing you all the luck in the world in your venture and with best regards to all the gang there in Rahway, I am

- Sidney S. Jaffe, WA2DMC, West Orange, New Jersey

FLASH! Two-Way moonbounce QSO on 2 meters between K1HMU and W6DNG on September 14. Details later.

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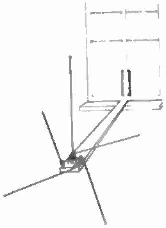

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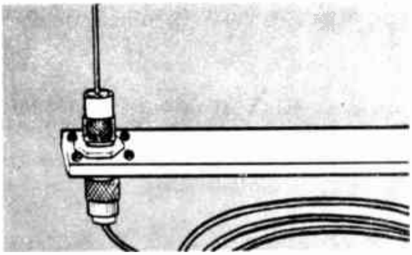

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(All bracket models complete with Antenna, 10' of cable, all necessary connectors and hardware.)

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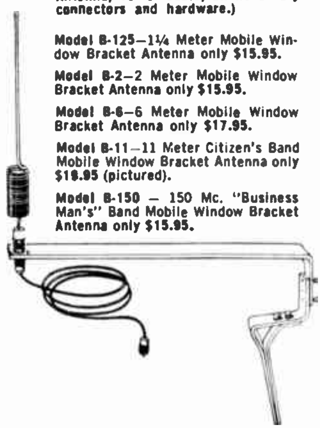
Model B-6—6 Meter Mobile Window Bracket Antenna only $17.95.

Model B-11—11 Meter Citizen's Band Mobile Window Bracket Antenna only $18.95 (pictured).

Model B-150 — 150 Mc. "Business Man's" Band Mobile Window Bracket Antenna only $15.95.



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The CORRUPTED Ground Plane

A. Kenneth Akin, Jr., K3DNO
7413 Oak Lane
Chevy Chase 15, Maryland

Most of us are familiar with the ground plane and it's virtues; stacked ground planes have been used by commercials for years to provide gain without directivity. The mechanical problem of stacking four, eight, or more of these antennas has stopped hams from using them. Cross-polarization is not the problem that some people say it is on 6 or 2; it may become one on UHF, but that isn't our concern at this time. Any gain lost on VHF frequencies is made up for by ease of assembly, economy, and trouble-free operation.

Let me state right now that the secret of the corrupted ground plane is wire, the most common commodity in radio. No tubing, rods, or peeled back coax - just wire. The only thing you might not have is a tall object to hang it from. If a 120 foot pine has been soaking up your power, make the tree work for you! Hang a set of stacked ground planes from it.

The basic antenna is shown in Figure 1. On the ground plane, if the radials are placed parallel to the coax the antenna has an impedance of 72 ohms - no matching troubles with 72 ohm coax. Use at least four radials, equally spaced around the coax and all the same length. Tape down the radials at several points, suspend the vertical element from a handy spot, and you're in business.

You can use any kind of wire that will hold the weight of the coax, but plastic covered wire is needed for the stacked models. Because you're using wire and not ½ inch tubing, a ¼ wave length is longer than the charts would lead you to think. To find the length of a ¼ wave length of wire use the formula:

$$\frac{5905}{\text{freq. in mc}} \times \frac{1}{2}.$$

..This adds up to about 2 inches on 6 meters, hence it is worthwhile.

The stacked model is best explained by Figure 2. The tops of the radials are soldered to the central wire and are completely insulated from it for the rest of their length. Tape down the radials about every foot to keep them in place.

The single section model is best suited for portable work because it can be rolled up and tucked into a corner when not in use. When needed it can be easily be hung from any single point.

The by far most intriguing use for the stacked ground plane is Field Day. All you need is a large weather balloon and a tank of gas. One bay at 50.5 mc is just under 10 feet; go to 20 feet and get 3 db gain, 40 feet and 6 db gain, 80 feet and 9 db, etc. A stacked ground plane of 64 bays would be 640 feet tall and have 18 db gain. *I'll stick to my 'Long-John' yagi! -ED.*

Words of caution: The higher the power, the better the insulation will have to be. Anything higher than immediate surroundings is susceptible to lightning problems. Even on a clear day a tremendous static can build up - Install a VHF RF choke between the center conductor and the ground. Also, take the usual precautions (try a Blitz Bug) for equipment protection.

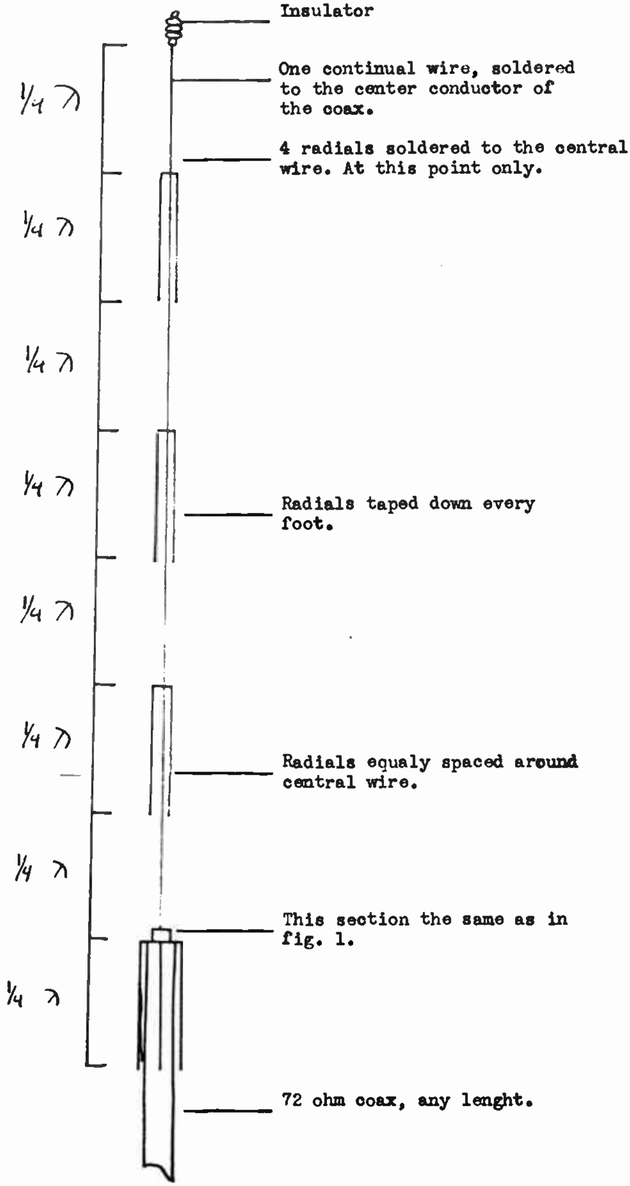

Insulator
One continual wire, soldered to the center conductor of the coax.
4 radials soldered to the central wire. At this point only.
Radials taped down every foot.
Radials equaly spaced around central wire.
This section the same as in fig. 1.
72 ohm coax, any lenght.
1/4 λ
1/4 λ
1/4 λ
1/4 λ
1/4 λ
1/4 λ
1/4 λ
1/4 λ

FIGURE # 2

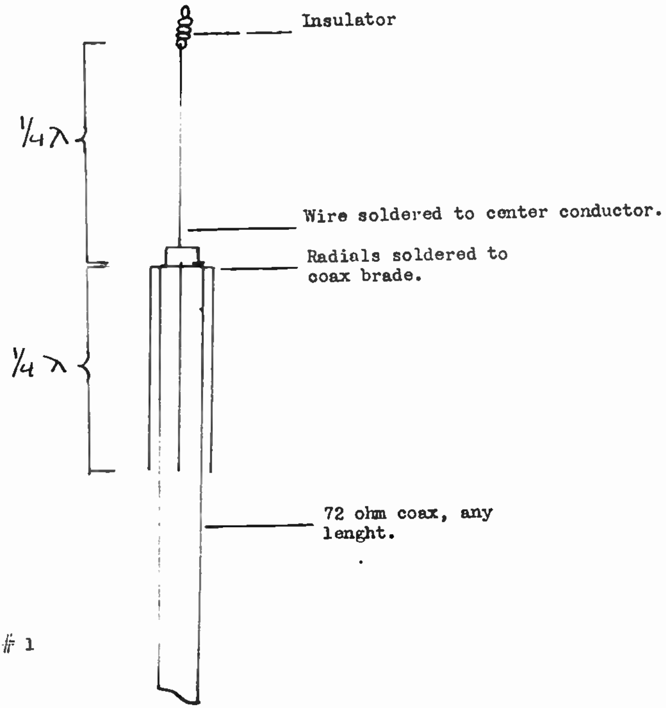


FIGURE # 1

SENECA Audio & CW

Jerry Vogt, WA2GCF
160 Grafton Street
Rochester 21, N.Y.

Many times when a Seneca user gets on the air someone will remark that the rig is getting out but it isn't quite like having plate modulation. This is quite true: It isn't quite like plate modulation.

First of all, we must understand that by plate modulation we don't mean basic Heising modulation. We mean regular, run-of-the-mill transformer coupled plate modulation. We now want to know whether plate modulating the Seneca will be an advantage or disadvantage. Let's consider good and bad points of both plate nodulating the Seneca or leaving the rig as the factory recommends - with controlled-carrier screen modulating.

True, with plate modulation you can run a little higher plate current, but still not as much as you would for CW operation. Since you are doubling your plate voltage with

100% modulation you cannot run the Seneca at as high a level of plate current as on CW because you would exceed normal plate dissipation by doing so. In practice, you can run the 6146's at 140 watts,plate modulated, however, many tricks have been employed such as changing your final plate feed-through capacitor and using forced-air cooling. Heath, however, frowns on this since it still exceeds published ratings on 6146's in push-pull.

When running the Seneca with plate modulation, you can always watch the average plate current on the meter which now would remain steady. You would also have an advantage inasmuch as your signal would always be "covering the noise level" more than with screen modulation as Heath uses. These are a few of the reasons for using external plate modulation. Before running out to buy an Eico modulator, though, look at the advantages of playing with the screen modulation Heath says is more practical...

The major reason for leaving the screen modulation alone in the Seneca is probably the best-money. The second reason is almost as good-time and temper, maybe even a new rig.

When using the Seneca as is, I have found that it has a certain punch to it that no amount of clipping or speech compression in a plate modulator can deliver. This is due to the fact that you will nearly fully modulate the carrier you have at any instant during the talk cycle. That is to say that since the carrier power varies with speech, your voice will cause enough modulation of carrier available at that instant to give "solid modulation" of what power there is instantaneously. Since no form of clipping is employed to get this punch, no distortion occurs as it does when a high level of speech clipping is used. This seems to me to be a definite advantage over plate modulation. This punch is especially useful on aurora openings where the "mush" of the reflection seems to swallow the signal. The punching effect on controlled-carrier modulation will get through when no others can. This can be seen in SSB also where the carrier is not important but where the modulation pulls through because of its punch. A Seneca can be tuned in during an aurora opening as a sideband station would be and the effect is much the same. When a plate modulated station is tuned in the same way, however, the carrier is much more steady and therefore the "mush"eeffect has a greater action on the modulation.

These aren't *all* the pros and cons on the subject, but are to be considered seriously before making a decision about it. I have been plate modulating my Seneca for about five months with an Eico model 730 modulating and have gotten the expected good results with the mess of cables, relays and the like that accompany the conversion. I might add, though, that I've gone back to screen modulation recently and find good results with the same conditions including DX. For those interested in plate modulating the Seneca, you will be surprised how easily it may be done. In fact, if the Editor speaks up quick, I just might write up the conversion, since I am still not entirely against it.

CW FOR THE SENECA - 50 MC

For the CW man on 6, here is good news for you! A simple modification on the Seneca will give you keying which may even work...It consists of changing the key from the usual method to keying of the triode section of the 6AN8 which acts as a multiplier. It will reduce receiver blocking and reduce the possibility of clamp tube oscillation.

The step-by-step instructions:

Refering to pictorial #15, page 42, of the manual, install a .001 uf capacitor between lugs #1 and #4 on socket V-9. Next install a small #6 solder lug under the mounting nut adjacent to lug #4 of the same socket. Place it close to lug # 4 and solder. This will prevent the clamp tube oscillation which may have occurred.

Remove the lead between pin 7 of V-10 and ground lug on V-11. Install insulated lead from V-10, pin 7 to terminal strip GG-4.

Refering to pictorial 18, page 52, install .005 uf disc capacitor between lugs #1 and 3 on terminal strip DD. Disconnect the negative lead of the 40 uf capacitor from the ground lug GL and reconnect to lug #2 of relay at location K.

These changes will connect the OA2-VR tube and 40 uf capacitor to the center tap of the low voltage transformer and should reduce receiver blocking.

Refering to pictorial #8, page 20, and pictorial #29, page 74, install a .001 uf feedthrough capacitor in a convenient location near FT-4 so it will not affect the operation of the multiplier bandswitch. Disconnect the ground end of the 1K ohm resistor coming from pin #3 of the 6AN8 socket and reconnect to the feedthrough capacitor. Connect a lead from the other end of the feedthrough capacitor to FT-7 on driver housing.

This modification should be of definite advantage to the CW man, and if your an AM man like myself, you may wish to perform this operation on your rig in case some good aurora comes along this winter.

filtered audio

Dave Heller, K3HNP
14 Darkleaf Lane
Levittown, Penn.

There are numerous advantages to having a well-filtered modulator. These need not be enumerated; everyone knows what a sharp signal sounds like, especially on a sharp receiver. In addition to providing a cleaner-sounding signal the filter causes less band spectrum to be occupied, thus permitting legal operation closer to the band edges and causing less annoyance to those operating on frequencies close to your own.

Filtering is the restriction of the audio range through the modulator. The usual limit is about 3000 cycles; often the range is narrowed about to 2600 cycles. If the filtering is any sharper the modulation will be excessively bassy and hard to copy.

Figure 1 shows a typical modulated AM signal. The sidebands extend beyond 5 kc and taper off to about 10 kc. This signal occupies 20 kc; i.e., it will QRM anything within 10 kc of its carrier.

Compare now Figure 2. Here a 3 kc filter has narrowed the audio pass so that the signal disappears less than 3500 cycles either side of the carrier. This signal occupies less than 7 kc. Three such signals can fit in the bandspace occupied by the signal of Figure 1 without interfering with one another.

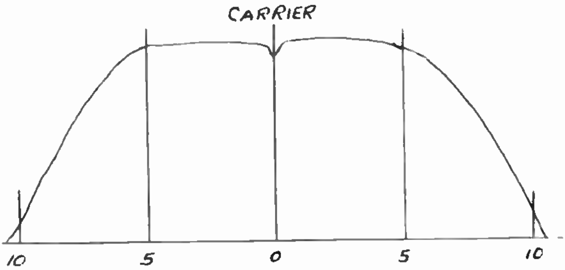


FIG. 1

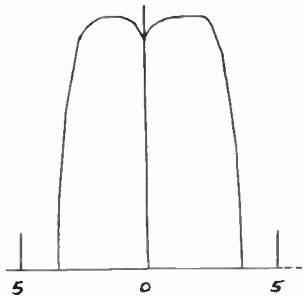


FIG. 2

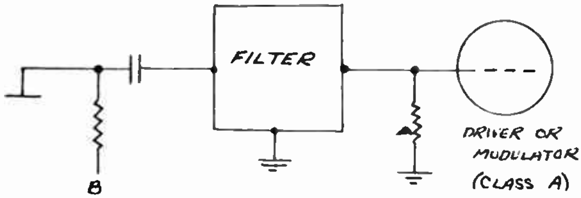


FIGURE 3

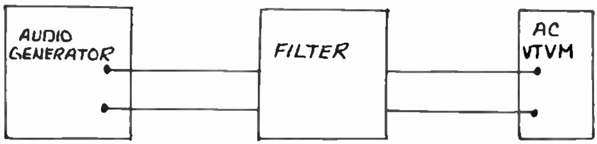


FIGURE 4

But what has happened to the output power? Aren't the sidebands chopped down in Figure 2,output that could have been radiated? Certainly not! Figures 1 and 2 are not power curves, but spectrum occupancy curves. The modulated stage can absorb only so much audio power without regard to the audio frequencies present. So the peak usable power in Figure 2 is the same as in Figure 1. However, since sharp receivers can utilize only the narrow band of Figure 2, rejecting the excessive sidebands of Figure 1, these excess sidebands become wasted power; though transmitted, it is only messy QRM.

Where does the attenuation loss occur? In the voltage speech amplifier (or modulator) where no harm is caused by these losses. At worst slight additional audio gain may be required.

HOW TO BUILD A FILTER

The ARRL Handbook has sufficient data for mathematical design of an audio filter (P. 50, 51, ARRL Handbook, 1961). There is other audio filter data in the Handbook section on modulation and in other publications. The description in this article is of an empirical approach which permits the use of junkbox parts of unknown vintage and electrical value.

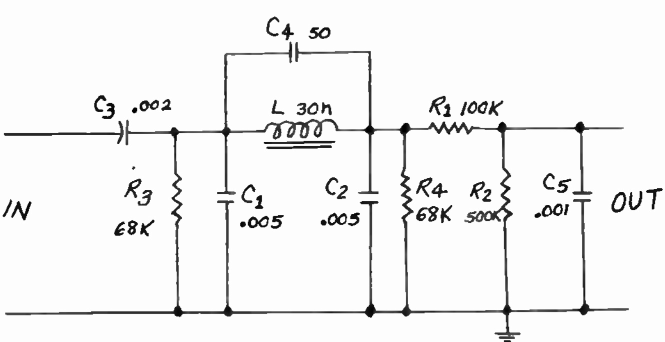


FIGURE 5

First decide where the filter will fit into the circuit. A logical spot is before the grid of the last A stage in the modulator. (Figure 3). RL & RG will determine the maximum terminating impedances of the filter.

Equipment needed:

1. An audio generator (sinewave) with output from 100 cycles to 10 kc.
2. A VTVM with AC scales.

First calibrate the audio generator to the VTVM. Plot the curve of volts output vs. frequency over the 100 cycles to 10 kc range without disturbing the output of the generator. This characteristic probably will be quite flat over the range; if not, the curve may be used to correct the curve run of the final filter. The plot may look like Figure 4.

A generalized filter is shown in Figure 5. Far more parts are shown than will be necessary in any single filter. The essential components are L, C1 and C2. The remaining parts may or may not be necessary to give the desired characteristic. The parts values shown are only starting points.

Find an iron core inductance which you suspect has an inductance between 10 and 100 henry. One winding of a small audio transformer may be good. Hook up the first attempt filter using the inductance and the starting values of C1 and C2 and run a characteristic. Try different values of the condensers; try adding the other parts and running curves. No amount of writing here will substitute for a little experience and experimenting. The effect on the characteristic of varying the component values will rapidly be observed, after which the desired final characteristic may quite rapidly be obtained. The shunt condenser CC will have the effect of reducing the peak in the curve at a frequency just before cutoff. This condenser, if used, should be quite small.

When the filter is constructed measure its overall attenuation - the ratio of generator output to filter output. A ratio of 2:1 equals 6 db; 4:1, 12 db; 8:1, 18 db, etc.

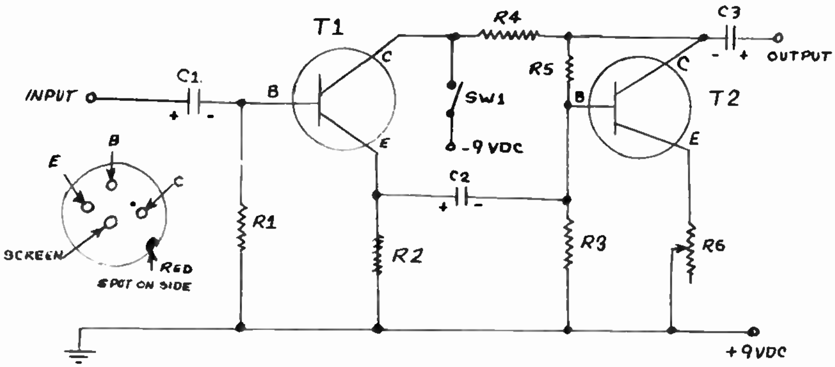
Mike Pre-Amp

VHF

ED's ELECTRONICS
935 Main Avenue
Passaic, N.J.

R1 - 51K ½ w.
R2 - 15K ½ w.
R3 - 51K ½ w.
R4 - 10K ½ w.
R5 - 820K ½ w.
R6 - 3K ww pot.
C1 - C2 - C3: 20 to 30 mfd
SW1 - S.P.S.T.
T1,T2 - 2N321 transistors.
1 - 9VDC batty.
1 - Minibox 2¼ x 2¼ x 4"
2 - Mic. connectors.

This is the only data available at the present. - ED.



TRANSISTOR MIKE PREAMP

BIG SURPRISE - SEE PAGE 30. DO YOUR PART NOW!

Here we are at the East Coast VHF Society's HAMFEST back in August. Seated, left to right, are Allen Katz, MOONBOUNCE editor, Pete Markavage, WA2CWA, Circulation Manager; Bob Brown, K2ZSQ, Editor-Publisher; and "Red" Brown, K2ZSP, (Photo by K3HNP.)

How Are We Doing?

Bob Brown, K2ZSQ
E D I T O R

The question, "How've you been doing?" has popped up so much since our July issue announcement of my working full time on our magazine that we decided to give you an article on the order of "Inside THE VHF AMATEUR" or what-have-you to quell qualms and provide info from the "Inside" out.

As you may already know, up to this last summer THE VHF AMATEUR was a one-man part time effort with limited circulation (approximately 1,500 readers). At this writing, (October 15) the magazine *has* grown into a full-time endeavor with a new hard-working staff and we can boast 6,700 readers. All of this work has been kept more or less behind the scenes and can't be noticed too much in the magazine itself, except possibly through advertising and new calls and staff members on page 3. Perhaps, though, before we get into our present entanglements we ought to give you a "capsule report" on how THE VHF AMATEUR was begun...

Four years ago (October 21, 1957) your Editor was engaged in a 50 mc net called Channel A. The organization grew fast and needed a club paper. So we started a little

Here's our youngest staff member, Doug Clanton, Production Manager. After the printer delivers the magazine pages, nothing stops Doug 'till it's out in the mail!

Here's Pete (WA2CWA) working over the days' subscriptions, renewals, back issue requests, etc. That machine on his right is the 'Addresserette" which prints your name and QTH on your copy each month from stencils. Some job!

weekly bulletin and called it "QSO" - Official Organ on Channel A. Once word got around that we had a 'poop sheet' for 6 meters, everyone wanted it. So we expanded it to a 5 page mimeo and retitled it "QSO" - The VHF Amateur's Journal. Then in 1960 (January) W3NL offered to print it for us by the method we now use, offset printing. After a few months we again (and finally) arrived at a new title, "THE VHF AMATEUR." The only reason for the change was to convey more meaning. At that time, our circulation had grown to about 300 readers. In May, 1960, Andy (W3NL) notified us that he could no longer print the magazine because of time problems. So, we went to a local printer who did our May issue and did such a good job of it that we've stuck with him ever since.

To get back to "How are we doing," let us discuss some of our more recent efforts. Last month (and Sept.) we started 'hitting' distributors, that is selling our magazine over-the-counter. It's worked well, but involves a lot of time packaging and mailing the magazines Parcel Post to our distributors. By selling THE VHF AMATEUR in this way,

These pictures are rather fuzzy, but in any case this is the way the pages are put together to form your finished magazine. They are hand collated, stapled, and boxed. This job constitutes working 18 hours a day every day 'till they're all done. Then the mailing...

Here's our booth at the Syracuse VHF Roundup on October 7. On the left (seated) K2ZSP, right K3HMP, along with a beloved new subscriber. Those arent big QSL's hanging behind us, but some of Dave (K3HMP)'s license plate collection!

we increase circulation, enjoy more readership, get more articles, and snag new advertisers. The distributor mailing job takes about a week and a half at present, and, combined with the one week regular mailing, means that after the printer gives us pages for an issue, it takes us THREE WEEKS to get them all in the mail. And somewhere in those three weeks we have to get another issue prepared (which, in itself, is no easy matter) and off to the printer. He takes about two and a half weeks to print it. So, perhaps you can see why occasionally we get behind or a September issue arrives in October - hi! Problems, problems! Someday, if we ever manage to make a buck,we'll have the whole thing done proffessionally and spend all our time getting after delinquent SSB and MOONBOUNCE editors who forget about deadlines.

For the present, at least,we're all penny-pinchers.We have to be. The expenses of running even a small magazine like this are sometimes insurmountable. Since we're working with no capital, we must depend on a regular, healthy flow of subscriptions and advertising to tide us over. To give you an idea of the relationship and the importance of carrying advertising, if we printed this November issue without any advertising, it would only be 5 pages total. So, you see, advertising pays for the magazine. For every new full page ad, we can add three pages of text. So if ads drop, pages drop. Endless vicious circle. But so far we've made it without mishap.

So far no mention has been made of our writers or staff members...here goes. The small group of Rahwayans who work closely together on a day-by-day are K2ZSQ-ZSP, Pete Markavage, WA2CWA, our Circulation Manager, and our youngest member, Doug Clanton. Doug is not presently licensed, but he's working at it. This is the closely knit group that forms the nucleous (Boy do I murder the King's English!) of our staff. But, in spite of the constant activity and hustle, the whole thing still depends on you, the reader. We must give you a VHF magazine you like - or we're out of business. All our articles are written by readers (usually who we've never met) who take the time to sit down and write about what they've been doing, what they've built, etc. Most articles are written by fellow VHF'ers who've never written an article before in their life, but still want to do their part. So we have to add a coma here, delete a sentence there - So what! Isn't that what an Editor's for? We can always use more info - and this means YOU!

Let us conclude by adding that we love VHF, and we like putting out a magazine to serve the fraternity. Drop by sometime when you're in the NYC meteropolitan area - we'd love to meet you in person, get your suggestions, and show you 'what we've been doing'!

This Christmas... *make it a* NEW CLEGG ZEUS

Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position

6 AND 2 METER TRANSMITTER
185 Watts of Solid "Talk Power"

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

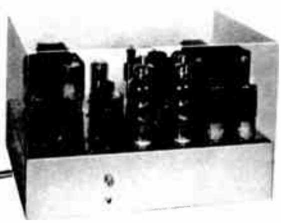
Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! — You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

PERFORMANCE DATA

AUDIO: Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum talk power without splatter. A panel mounted indicator provides visual monitoring of modulation. Frequency response is flat within 2 db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps. Hum and noise levels are down at least 40 db below 70% modulation. Up to 18 db of speech clipping, adjusted with a calibrated panel control gives ZEUS the "talk power" to outperform many KW rigs.

RF: The VFO will maintain frequency stability of 1 part in 10^6 per degree F. per hour after a 15-minute warmup. Frequency reset accuracy is within 5 KC. A precise, zero backlash, flywheel loaded dial makes accurate tuning easy on both 6 and 2 meters.

Maximum TVI suppression is inherent in all ZEUS circuitry. 6 meter output power is fed to the line thru a pi network circuit. Output on 2 is link coupled to a high efficiency tank.



Amateur Net Price: $675.00 Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

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Coming Soon-**Matching VHF RECEIVER!**

Clegg LABORATORIES

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Button, Button,

WHO's GOT THE BUTTON?

Samuel W. Daskam, K2OPI/K1POK
R. D. #1
Lebanon, New Jersey

After having to build several VHF converters, preamps and just plain amplifiers, I realized that I had been forced into using a component which I knew practically nothing about. This expensive (except surplus, of course) but necessary item is the button capacitor, and its relatives, the feed-thru and stand-off capacitor. A little investigation was made and the following facts uncovered.

First let's cover the button feed-thru types. These are of the silver-mica variety. They are usually made by stacking silvered mica plates in a brass housing which has been silver plated. The circular design allows the RF current to be passed to ground from all points, providing the shortest possible path between the center conductor and the chassis. This puts very little of the lead inductance in series with the RF as happens with an ordinary disc capacitor. The dielectric strength is usually tested at 1250 volts DC, but the maximum working voltage is 350 volts AC pr 500 volts DC. The button types are generally available in capacitances values from 15 to 4700 pf. Usually these units are soldered to the chassis, so it is very difficult to use these with an aluminum chassis.

The threaded-bushing and eyelet feed-thrus have about the same electrical characteristics as the button. The main difference is the fact that no chassis soldering is needed since a mechanical grip is made by a hex nut. The peak test voltage on these types is 1250 volts and the DC working voltage is 500 volts. The ranges available for the threaded bushing type is 4 to 8500 pf and for the eyelet type 2 to 1550 pf. Care must be taken with these two types as too much lateral strain on the leads may break the ceramic insulation. When soldering to the leads, use as little heat as possible to prevent damage.

The stand-off capacitors come in three varieties; the button, threaded, and push-on. These are excellent for by-passing filaments to ground and also serve as tie-points for other components. The DC working voltage of these types is also 500 volts. The button style has values from 15 to 4700 pf, the threaded from 1 to 2500 pf, and the push-on is obtainable in capacitances from 10 through 1500 pf.

Figure 1 shows the frequency characteristics of three types of capacitors previously described. The dips occuring at the higher frequencies are due to resonances from the lead inductance, etc. Although these curves were made using Erie Resistor Corporation capacitors, it is assumed that other makes would be equally as good.

A partial listing of the advantages of these types of capacitors is as follows:

1. The lead inductance is mostly in series with the DC path to ground.
2. Rigid mounting gives greater mechanical stability and avoids variations in the capacitance to ground.

3. The feed-thru types make the use of partitions for shielding much more effective and simpler.
4. They may be used in the VHF-UHF range very succesfully.
5. Most of the types are available from amateur parts suppliers.

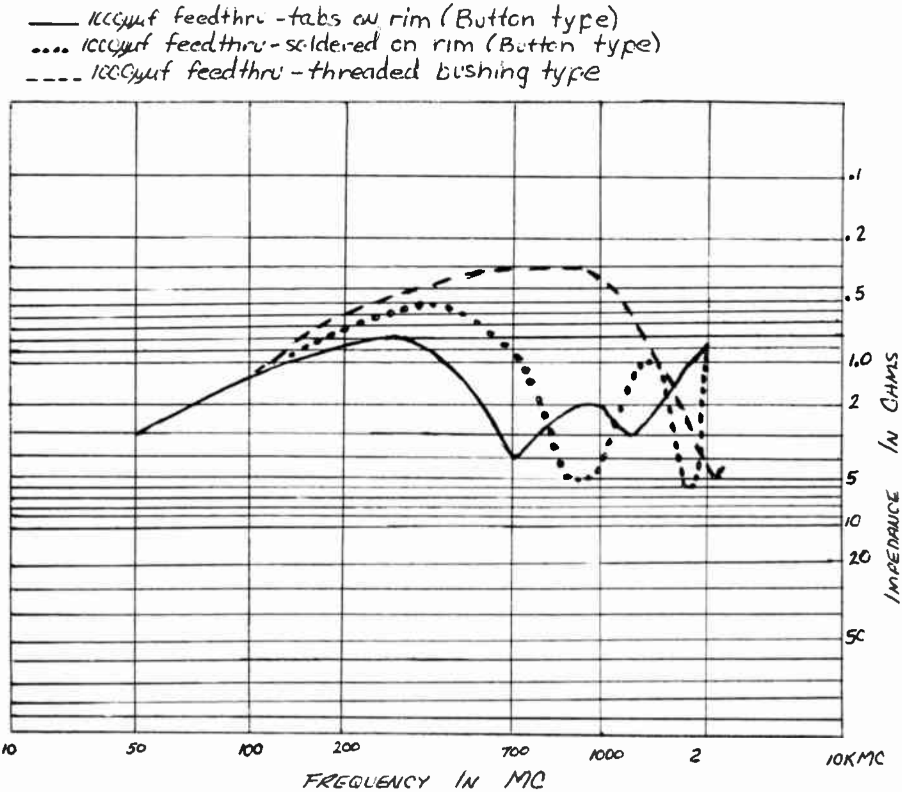


FIGURE 1

Operating Projects

VHF

It seems that Worked All States is the ultimate ambition of every VHF'er. Now, thanks to CQ MAGAZINE, counties worked are significant (as it was for a few months thanks to Ed Clegg). Try your own private project. Mine right now is to work and confirm every town in Bergen and Hudson counties of New Jersey. Hudson has only a dozen munincipalities, all quite populous, but in poor terrain and with sparse amateur population. Bergen has plenty of VHF but about 70 towns. The distance from me is 65 to 85 miles. The project isn't easy, but the list is growing. The real question is whether I can work Edgewater. First, no hams. Second, at the bottom (and away from me) of a steep cliff.

Devise a project like this. It will provide a challenge and good contacts when everyone else considers the band dead and useless.

-Contributed by Dave Heller, K3HNP
14 Darleaf Lane
Levittown, Pennsylvania

VHF

TRADING POST

RATES: Commercial ads - 5¢ per word. FREE to readers - any reasonable length. Ads from readers MUST BE SUBMITTED ON A POSTCARD or QSL card. TRADING POST, 67 Russell, Rahway, N.J.

WILL TRADE: Scatter signals from Oregon on 50.02 mc for scatter signals from the Midwest. K7AAD, Route 2, Box 35, Beaverton, Oregon.

K3HNP: Wants your old license plates. Don't forget him! 14 Darkleaf Lane, Levittown, Penn.

QSL's, SWL's, PHOTO's: NICHOLAS & SON PRINTERY, P.O. BOX 11184, PHOENIX 17, ARIZ. 2/62

BUY-SELL-TRADE: Cameras, lenses, telescopes, amateur radio equipment. Denson Electronics, Box 85, Rockville, Conn.

FOR SALE: 850 Z-50 RF chokes. New and clean. 10 for $1.50. Entire lot $85. HE-10 receiver and 6 meter converter - $75. A. Fagans, W2SHU, 158 Jefferson Avenue, Rahway, New Jersey

FOR SALE: Zeus for sale. Write or call (after 5 PM) Manny Forte, K2UQC, 425 Parkinson Terrace, Orange, New Jersey.

FOR SALE: DX-40, built in CW monitor - $35.00 works FB. Also JT 30 mike - $3.00. 110 VAC coax relay - $7.00. Curt Damm, K2ZJW, 302 S. Union Avenue, Cranford, N.J. BRidge 6-8623.

MAKE AN OFFER: I have four 3X2500F3 tubes, made by Eimac. Jim Overheul, K8YZP, 323 Pine, Paw Paw, Michigan.

WANTED: Manual for APX-6. Also information on the tubes it takes. Fred Coleman, W5UW, 703 Bull Lane, Missouri City, Texas.

SALE OR TRADE: Two RCA 833A transmitting tubes. New. Gerard A. Baldauf, W3JKH, 175 Wernersville Blvd; Wernersville, Pa.

PROJECTS & KITS WIRED! Cash only. Kit 25% of cost (above that of unit) - wired and checked out. Projects (custom built) materials, and prints or schematics must accompany all orders. George Kupp, K2DQT, 61 Cortlandt Street, Belleville 9, New Jersey.

WANTED: Write-ups on equipment you're building. Running short of technical articles. And, they'll be more author's contests with more BIG prizes next month. Write NOW to: THE VHF AMATEUR, 67 Russell Avenue, Rahway, New Jersey.

A 'Universal' Contest

Samuel W. Daskam, K2OPI/K1POK
R.D. #1, Lebanon, N.J.

One of the problems with attempting to create activity in the average club is that any one project is usually limited in interest. This is mostly due to the great spread in the frequencies worked by individual members.

Described here is a contest which was designed not only to create activity, but also to be equally fair to every member regardless of license, power or location. In the end, it will usually turn out that the hardest working operator wins.

The contest is described by the rules as used by the West Jersey Radio Club:

1. Members not present at the initial drawing may draw their slips at any subsequent meeting. 5 different counties will be picked from the slips in the box by each participating member. If a member draws the county in which he resides, the slip will be returned to the box and another slip drawn. The drawing will be such that the names of the counties cannot be seen by the drawing member. After recording his "counties", the slips will be returned to the box prior to the next member drawing.

2. Contest starts immediately after the drawing of slips.

3. Only members with 2/3 or more of their current dues paid up are eligible.

4 Any or all amateur bands and modes of transmission may be used if valid under the member's license privileges.

5. All contacts must be made from the member's QTH, as stated on his license. No contacts from or to mobile or portable stations may be counted. Exception: stations operating from a new QTH awaiting change of address from FCC.

6. The winner will be the first member who submits QSL cards to the Activities Chairman at a club meeting confirming 2-way contact with his 5 counties during the contest.

7. The member with the earliest postmarked cards will be the winner in case of a tie.

8. The contest will end at 2400 hours at the end of 90 days. In the event no member has received all 5 cards, the winner will be the firstest with the mostest.

9. Prizes -

10. Any possible situation not covered by these rules will be ruled upon by a committee of three chosen by the Activities Chairman.

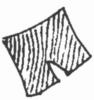
Most of the loopholes have been plugged especially by rule 10. There are ruthless and devious means of working your counties, but scheduling is generally frowned upon. The counties were selected by drawing a circle of 100 miles radius on a map and including all counties which have their county seat within the circle.

It was found that up through two meters the contest will be fair to all members. The hardest part for the low band operators is getting the contact to QSL. Another rule should be added to avoid operation during weekends when a nation-wide contest is scheduled on any band.

If you think this is a snap contest, get your club to run it and try to win. You'll soon find that calling "CQ Wayne County, Pa." is not the right bait to offer and sneakier means must be employed. The winners in the first WJRC contest were as follows:

(First)	Brand A	6 & 2 meters
(Second)	Brand B	80 meters
(Third)	Brand X	6 meters

The 80 meter operator would have been the winner if he could have gotten all of his QSL cards from his contacts. Credit for help in working out the rules and plugging loopholes goes to the club Activities Chairman - Bob Johnsen, W2SLZ.



S H O R T   S H O R T S

This item came in to late for "Trading Post" but we still wanted to get it in...

FOR SALE: Custom made ceramic ash tray (green, brown, or white). Your handle and call letters in gold. Only $5. Choctaw Ceramics, Jim, K5ZTH, R.R. 1, Box 14K, Choctaw, Okla.

50 mc W.A.S.

Send in your listing for THE VHF AMATEUR's Worked All States department! Let's see how you rate! Minimum states confirmed needed for listing: 28. Cards must be on hand for inspection if requested. All entries must be submitted on a postcard or QSL card and addressed to: W.A.S. Listing - 50 mc, THE VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

CALL	AREA	POWER IN.	STATES WORKED
K9EID	Ill.	1500 PEP	49
K6UMM	Calif.	175	46
W3RUE	Pa.	200	48
W2EIF	N.J.	200	48
K2LTW	N.Y.	90	47
W7MKW	Wash.	150	47
K4BPY	Ky.	-	47
K9DTB	Ill.	60	47
K2DZM	N.J.	100	46
K2QVC	N.Y.	200	46
K2QWD	N.Y.	45	46
K5IQL	N.M.	600	46
K2ZBX	N.J.	-	46
K4RTG	Va.	700	46
K8REG	Ohio	-	46
W8UZ	Ohio	-	45
K6UJL	Calif.	7	45
K1BIL	Mass.	50	45
KL7AUV	Alaska	200	45
K9KZB	Ill.	100	45
K9KGI	Ind.	200	45
W5UQR	La.	85	44
K2MUB	N.Y.	150	44
K4PPX	Fla.	-	44
K4QHN	Fla.	600	44
KØHOS	Iowa	15	43
W2ORA	N.J.	15	42
K4PEV	Tenn.	50	42
K1BHY	Conn.	-	42
K8DKO	Ohio	45	42
W3JWY	Md.	75	42
K2MXT	N.Y.	180	42
K3BOB	Md.	40	41
K4QQE	Fla.	-	41
K2VDR	N.Y.	90	41
W2HVW	N.J.	100	41
K7EMO	Wyoming	120	40
W2EAQ	N.J.	190	40
K2ZSQ	N.J.	100	40
K2CVG	N.Y.	65	39
K4PXJ	Tenn.	8	39
K1GBI	N.H.	50	38
KØPSF	Minn.	90	37
K2HAK	N.J.	100	37
K9IUM	Ill.	90	36
K2UGH	N.J.	125	36
WA2BBU	N.J.	160	36
K6VXI	Calif.	120	36
W8UML	Mich.	40	33
K4EBT	Fla.	19	33
K4RLX	N.C.	100	33*
W3BRU	Pa.	35	32
K1IZM	Mass.	100	32
K1AUD	Conn.	195	32
KØPWS	Mo.	12	32
K2CMG	N.J.	6	31
LU3DCA	Argentine	-	30
K1PSR	N.H.	200	29
W5BJB	Texas	-	29
WA2BDP	N.J.	50	29
K2ZSP	N.J.	100	28
W3DJM	Pa.	-	28

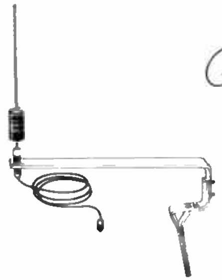
*signifies 2-way SSB confirmations.

This list will be revised periodically as we receive notice from you of changes of status.

See Page 30

...And do your part...

New Products



You don't often see a review in our magazine plugging new manufactured gear for one simple reason: It has been overdone to the extent of "rubber stamp" type "nice" acclaims. Well, perhaps we are breaking our own precedent, but we simply must tell you about TII's new antenna bracket for the mobileer. Although it is true that Technical Industries, Inc. is a newcomer to the ham marketplace (and one of our advertisers), the fact remains that they're making a darned good bracket.

I bought one of these brackets with the 144 mc whip back in August and installed it on my Chevy (a one minute job). Still have it and much satisfied. But I'll have to admit that it's like nothing I've ever seen before. The fascinating aspect of this product is not the antenna (standard 2 meter whip) but the mechanical mounting bracket. This is made of the absolute finest materials available and designed so it can be snapped over your rear window (as a clamp). When you close the window the whip arrives (and STAYS) right in the center of the roof. This has been proved to be the best location for a whip since the car roof thereby acts as a ground, forming a "ground-plane" type effect on your radiation, increasing your working radius. The window itself and the window rim are both protected by a rubber lining, while the metal mounting bracket is completely coated by a non-conductor. (I used an ohmeter to check - just like trying to measure conductance of wood). The window clamp needs no tools (not even a screwdriver) for installation. It utilizes gold-plated thumb screws which can fastened or unfastened in seconds.

For your $15.95 you get the bracket with screws, dual standard coax receptacle, a whip of your choice (even base loaded for six meters) already installed on a male coax connector, and a 10 foot length of RG/58U with connectors on both ends. All in all, we can't sing anything but praises for this one and recommend it highly for the VHF mobile man. *-K2ZSQ*

DX Report

Daniel L. Parnes, WA2DMQ
P.O. Box 4132
Newark 12, N.J.

Many readers have long suggested a DX Report column in THE VHF AMATEUR. After careful consideration, WA2DMQ was selected for the job. Although relatively new to VHF, Dan has commanded respect if for nothing else his fantastic ability to work DX others aren't hearing and his admirable knowledge and use of good operating tactics. Welcome to the staff, Dan!

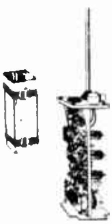
I have been noticing ever since I started listening to the VHF bands just how little CW is used. If one were to tune the lower edges of our VHF bands during peak operating hours, he would surely hear nothing but noise level. But, on the other hand, a few kcs higher (in the 'phone section of course) the activity is so great that it's sometimes difficult to find a clear frequency. To listen to these QSO's a non--ham type would think the distance capable is just to the next town.

Continued on page 27

BARRY ELECTRONICS

VHF TRANSMITTER

BRAND NEW!

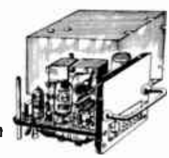


Perfect for 2 meter and/or 1¼ meter conversion. Late,modern design. Uses two 6201 tubes into one Amperex 6360 twin tetrode.Xmtr only 4" x 4" x 11." Only 3⅜ lbs. Complete with 10 ½" antenna. A & B batteries, cables and conversion data. plus schematic and case. Battery weight:23 lbs.

Price: ***$15.00*** with all tubes.
(We can ship w/o battery-same price)

MOBILE TRANSMITTER

Uses 5618 crystal oscillator into CBS 5516 amplifier. Modern design. Only 7 lbs net weight including built-in 6 v. vibrator power supply. Completely enclosed in aluminum cabinet (5½"H x 7"W x 8"D). Furnished with crystal that doubles near 10 meter band. Will require slight and easy modification for 10 meter operation. A real beauty! Easily adaptable as an excellent low-cost Citizen Band rig!



Price: **$11.95** with tubes.

Fill out the coupon for your FREE Barry Green Sheet!

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Yes! Send me the (check one) Mobile Transmitter............( )
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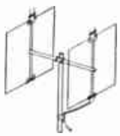
Tubes

All CBS, Westinghouse, Tun-Sol. We have in stock 5763's, 6146's, 6360's 5763's, etc.

Towers

Rohn
Tri-Ex



Plus these:

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Radio Publications
Alto Call Plates
Numechron 24 - Hour clocks
Burgess Batteries
Gramer - Halldorson Transformers
Sonar

SPECIAL TO THOSE BRINGING THIS AD OR MAGAZINE WITH THEM!

RG8U - SPECIAL - 10¢ a foot. Atlantic Cable.
6146's - SPECIAL - $4.00 with ad.
36 foot tower - SPECIAL - Tri-Ex crank-up, swivel base, drops to 10' 9". Reg. $106 plus freight. Our price - $95.00 complete. (Four section tower)
National 62 VFO - SPECIAL - w/power supply. Good for Gonset Communicators. Our price - $42.00 with ad.
55% discount on all tubes - SPECIAL - with ad.
Coax Relay - SPECIAL - DK 24 VDC coaxial- $4.00

OLD ANTIQUES

BACK ISSUES FOR SALE

25¢ Each

Yes, we do have some old issues of THE VHF AMATEUR available in limited quantities. We've been literally swamped with back issues requests lately, but we still have some left.

1958 - SOLD OUT

1959 - SOLD OUT

1960 - August, September, October, and November.

1961 - January, February, March, April, September, October, and November.

ye olde antique shoppe

c/o THE VHF AMATEUR

67 Russell Ave., Rahway, N.J.

DX REPORT - Continued from p-23

Just why isn't CW used more often? That's hard to answer. On our bands above 50 mc CW is by far the most practical for DX while at the same time less expensive. A1 emission is used to work DX because it can cut through QRM and be heard more easily even in high noise level areas. The very few who do use CW are usually working DX stations that just simply cannot be worked on phone (try AM double-hop to Arizona from New Jersey and you'll see what I mean). Our latest moonbounce record, K1HMU-W6DNG on 144 mc, couldn't possibly have been accomplished at S3 levels on AM. Yet this and almost all our famous VHF history-making events (e.g. KH6UK-W6NLZ's 144, 220 and 432 mc efforts) were established on CW.

A Sporadic E 6 meter opening isn't for an instant the only time to put your key to work. During ordinary band conditions a regular "CQ" on CW might bring back some really rare ground wave contacts. Use that first 100 kc more often, and watch your W.A.S. climb!

Leaving this subject fairly well worn, we ought well discuss another item: this column. This is the first of a series that *will* appear in THE VHF AMATEUR every month. Aside from editorial comments, this space will contain reports of what is going on DX-wise across the country, what's being heard at your QTH, and any news you think might interest your fellow VHF men. To acquire all this information single-handedly would be darned near impossible. The only way we can do a comprehensive job is to get reports and letters from you. As per a suggestion by Earl Witt, K2QWD, of Syracuse, we talked Editor Bob into relinquishing a page every month for you to rip out and send to him. He'll get 'em up to me after jotting down separately any remarks that might concern the magazine as a whole. SEE PAGE 30!

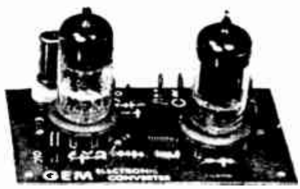
73 for now,

Dan.

VHF

AUTHOR'S CONTEST!

just look at these prizes...



This month marks the last in our monthly AUTHOR's CONTEST which will end with the November 1961 issue. All articles and columns in this issue are to be evaluated by you below and returned to us immediately. We'll announce which articles, on a percentage basis, were the most popular in this issue. At the end of November, all percentage winners will be competing against each other for top prizes. Best winners over-all get the prizes pictured above. YOUR article can win! Meanwhile, help our writers this month by doing your part...

Return immediately to: *THE VHF AMATEUR*, 67 Russell Avenue, Rahway, New Jersey.

Directions: Pick out the best articles (only four) and rate those four in the order of their appeal to you (#1, #2, #3, #4 - first being best, and fourth being 4th best)...

Currupted Ground Plane	( )	Operating Projects	( )
Seneca Audio & Keying	( )	Universal Contest	( )
Filtered Audio, K3HMP	( )	DX Report, WA2DMQ	( )
Mike Preamp	( )		
Who's Got the Button?	( )		

Reader's Report

Fill out and return to us today!

As an aid to both the Editor and to our new "DX Report" column, your assistance is greatly needed. This page can be removed from the magazine without damage to the contents. While you're at it, you just might fill in the last Author's Contest coupon on the other side. If you like, make a facsimile. Of course, if you complain enough, ye Editor might be tempted to send you a new magazine if pages 3 & 4 also fall out. Enough trivia...

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Address...City...............State.........

- What bands (VHF) do you operate?________________ ■ How much power?________________
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- What was the furthest contact made in the last month?________________

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- Work any new states recently (or during the Summer)?________________

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- Do you presently hold schedules with anyone?________________
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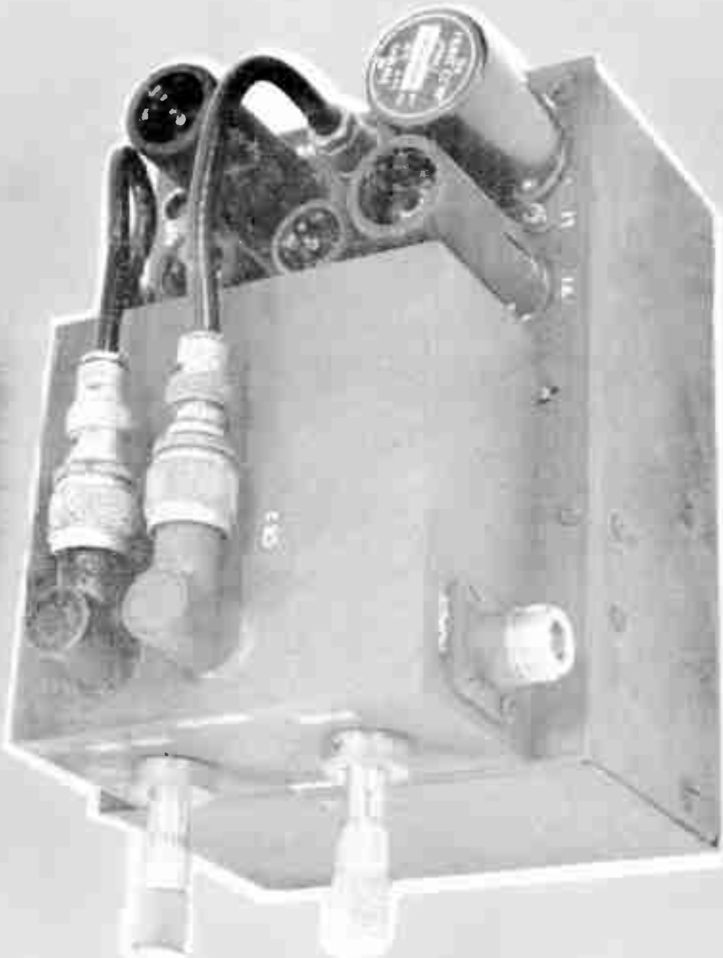


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The VHF Amateur

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FRONT COVER

Our moonbounce editor, Allen, K2UYH, snagged a great circuit from Ot, W2CSM, on his 1296 mc converter. See schematic and parts list on pages 10 and 11. This little converter is really "hot" and simple to build, using only three tubes (common ones at that), 6U8, 6AN4, and a 6DJ8. Converter output (1296 mc) feeds into your regular receiver at 26 to 30 mc. Nice, eh?

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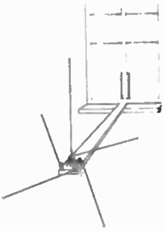

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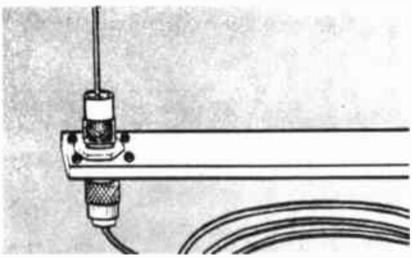

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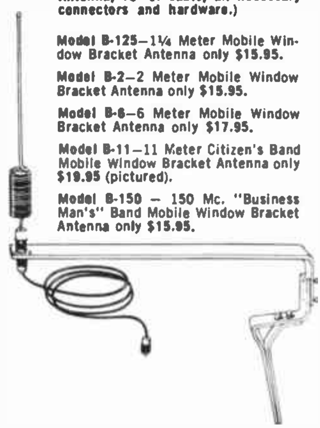

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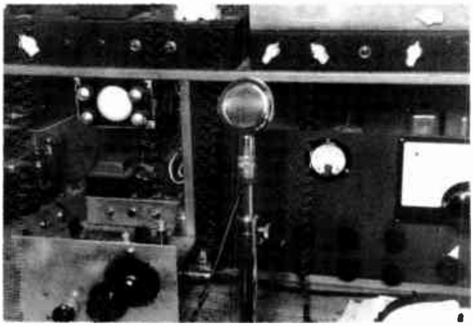


MODULATION MONITOR

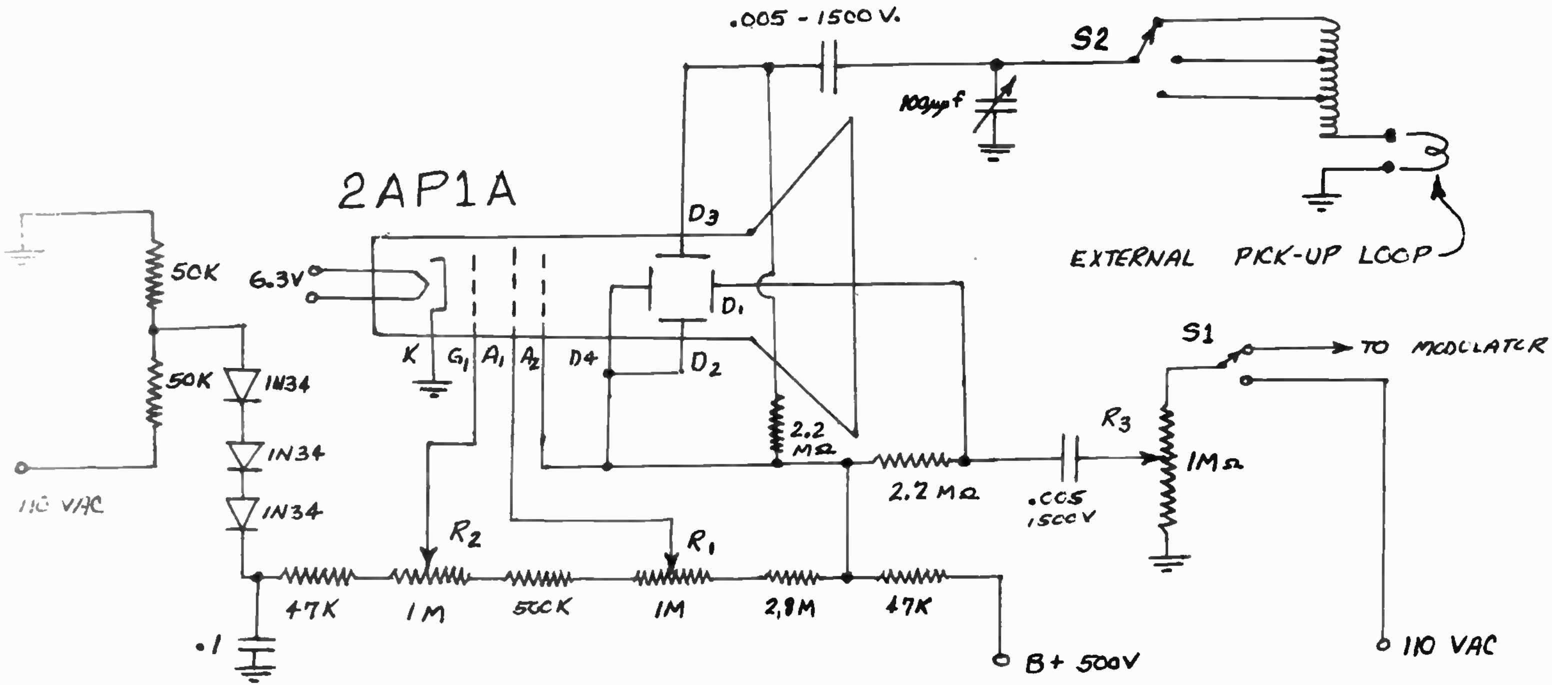
Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, ARGENTINA
South American Editor

Judging by the articles appearing in the magazines, more and more members of the amateur fraternity are perceiving the importance of a good quality in modulation in their 'phone transmitters. And with good reason. It is not enough if you spend all your efforts in generating a beautiful strong and clean carrier, modulated only up to a mere 30% or so and unreadable under adverse conditions. What you want to get through is information, contained in the sidebands generated by the process of modulation, and not only notice that you are on the air by the presence of your carrier.

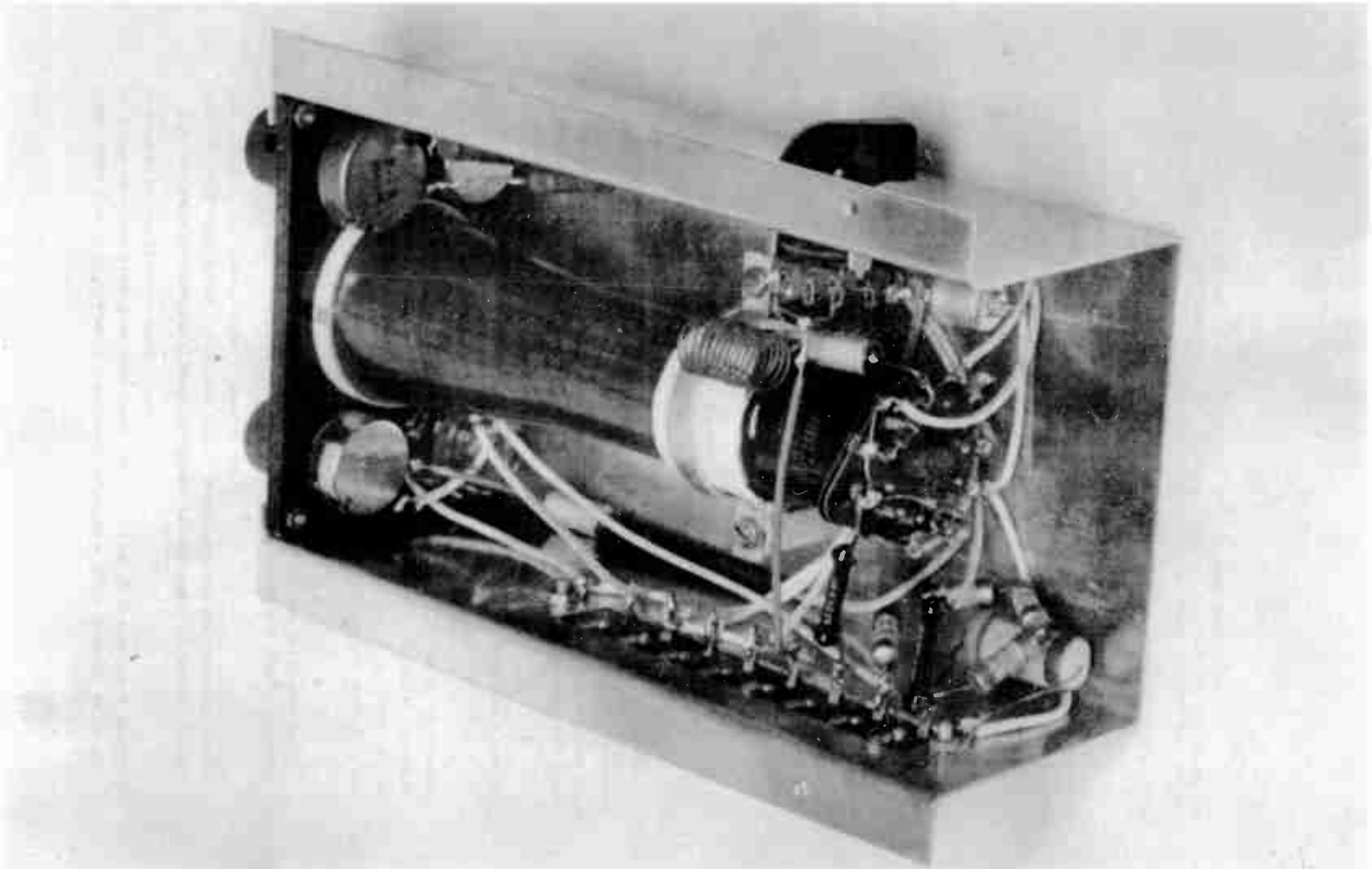
The simplest way to actually see what's coming out of your transmitter is by the use of a monitor equipped with a cathode ray tube. Because of this tube, which can be a small one (the 2" tubes are just of the right size), only a few potentiometers and resistors are needed, and the circuit is really self-explanatory.

The voltage applied to the B-plus terminal comes from the transmitter power supply, and is turned on and off at the same time, so there is no danger of burning a hole in the screen of the CRT when no signal is applied to the deflection plates. The value of the B-plus may be anything from 400 to 700 volts.

The switch S1 selects the horizontal sweep voltage, which may be audio signal taken from the secondary of the modulation transformer through a resistive voltage divider made from several 1 meg resistors (see the ARRL Handbook for full details) and provides the presentation of the trapezoidal pattern, which is especially useful to monitor the linearity of the modulated power stage. The second switch position applies sinusoidal sweep to the horizontal



.005 - 1500 V.
S2
100μμf
2AP1A
D3
EXTERNAL PICK-UP LOOP
50K
6.3V
D1
S1
TO MODULATOR
K
G1
A1
A2
D4
D2
50K
IN34
2.2 MΩ
R3
IN34
2.2 MΩ
1MΩ
110 VAC
IN34
.005 1500V
R2
R1
47K
1M
500K
1M
2.8M
47K
.1
B+ 500V
110 VAC



plates taken from a small filament transformer, connected with its secondary to the 6.3 volts winding of some other power transformer, and in this way it is possible to visualize an envelope pattern of the outgoing signal.

From this backwards-connected filament transformer was also taken the voltage for the negative supply which allows a brightness control without bringing the cathode to a positive potential with respect to the filament of the CRT.

An RF signal of the proper value is connected to the vertical plates through the tuned circuit formed by the tapped coil, the 100 uuf variable capacitor and the pick-up loop. Switch S2 selects the taps for 10, 6 or 2 meter operation.

The accompanying photographs give a good idea about the construction and mounting of the complete unit. The chassis was bent from a flat piece of aluminum and is 8¼" long. The front panel was made from a piece of pertinax (any insulating material will do) and is just large enough for the picture tube, the three potentiometers and the rotary switch S1. S2 is mounted on one side of the chassis and a terminal strip on the other one.

The picture at the head of the article shows the monitor mounted in the author's station just in front of the operating position.

This little instrument has been invaluable to control the modulation level of the different transmitters in use at LU3DCA, and I know no other way to find the correct settings of the controls of a modulator furnished with a speech clipper, a real necessity if you want to have an effective 'phone transmitter.

VHF

'MAVERICK' RIDES AGAIN —

Samuel W. Daskam, K2OPI/K1POK

Several questions have been asked about the filter in the June issue of THE VHF AMATEUR. I will try to answer them as they come, but please be patient.

First, some fellows are interested in the maximum power which can be handled by the filter. If a flat line (low SWR) is used, the filter as described should handle about 450 watts. This is power input to the filter and not d.c. power input to the final amplifier as is the case with most commercial specs. An increase in SWR will increase the peak voltage across the capacitors. For use at the kilowatt level, wider spaced variables such as made by E.F. Johnson or Hammarlund should be used.

Unfortunately, the tuning procedure seems to have been confusing. The reason for retuning C2 at 50 mc after adjusting for minimum feedthru at 58 mc is that the suck-out "well" is rather broad and its position has some effect on the attenuation at 50 mc. To insure the lowest possible insertion loss at 50 mc, the trap must be adjusted for both frequencies.

An error has been found in the schematic as it was originally published - but it will still work OK. L3 should be in series with C2 and not C4. There is no coil on the L4 leg. But regardless, input and output ends can be switched.

When properly adjusted, C1 and C2 are about at minimum capacitances. This may make tuning the high end of the band rather difficult. Suggested capacitors to solve this problem are the Hammarlund HF-15 or any similar type having about 2.5 pf minimum capacitance.

VHF

MOONBOUNCE

Allen Katz, K2UYH
48 Cumberland Ave.
Verona, New Jersey

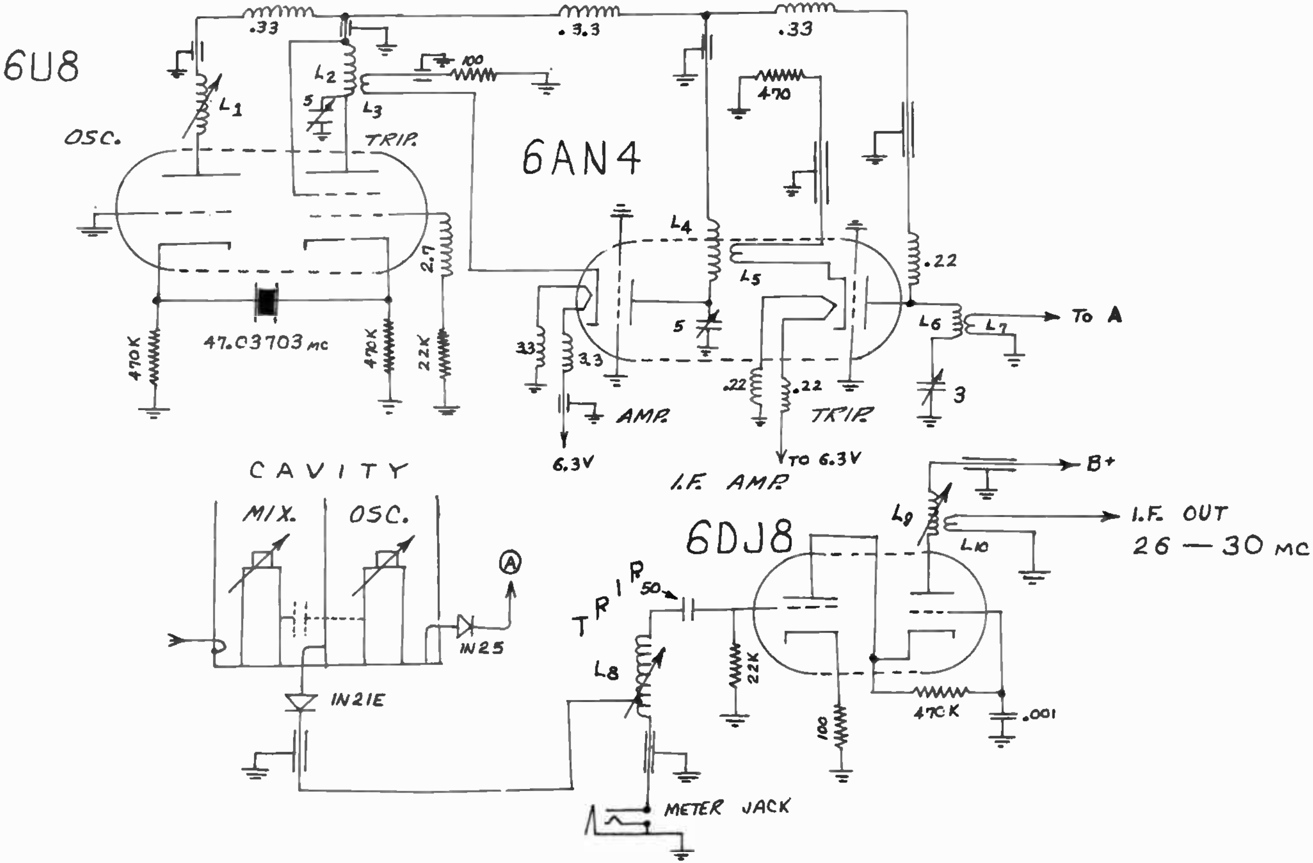
A horrified expression and a high pitched cry, "MATH?" This typifies the attitude too many hams have toward mathematics. Most of these hams have had a good background in math, far in excess of any necessary to master the simple equations presented in this column. Then why all the fuss?

If one operated the low frequencies where commercially built equipment and dress pattern construction articles prevail, possibly one could dispense with math, but here on the VHF frontier, where commercial equipment is nonexistent and construction articles scarce, math is a necessity.

One has great pleasure in building his own equipment, but how much more pleasure is gained by building *and designing* your own gear? This is what mathematical applications can do for you. It has been the policy of the column to give general construction information along with mathematical formulas in order that its readers could build and design equipment tailored to their own needs.

New Book - - - "VHF For The Radio Amateur"

After hearing my friend's praise W6AJF's book, *VHF For The Radio Amateur*, I could not help but to rush out and buy a copy. I then proceeded to read it cover to cover. Although we were very impressed by the practical content, we would have liked to see a little more theory. We concur with Frank's comments on collinear arrays,using a collinear here at K2UYH. We would have been even happier if he mentioned a parabolic antenna - alas. His transmitter section made us really light up. Never before had we seen a 1296 mc transmitter in print, and here we had two to choose from! The flat line unit really looks simple to build. His converter section is also excellent. The idea of running 416B's with out-forced air cooling is sure to prove invaluable with these tubes becoming available to the general ham public. Frank has a whole section on paramps for the fellows who's interest lies in that direction. This is the first VHF book that deals so thoroughly with the UHF end and truly warrants the attention of all VHF operators. *A fine job, Frank!*



6U8
OSC.
TRIP.
.33
.3.3
.33
L1
L2
L3
5
100
470
6AN4
L4
L5
L6
L7
.22
To A
47.03703 MC
470K
470K
22K
2.7
33
3.3
5
.22
.22
3
AMP.
TRIP.
6.3V
TO 6.3V
I.F. AMP.
B+
CAVITY
MIX.
OSC.
A
IN25
IN21E
TRIP
50
L8
6DJ8
L9
L10
I.F. OUT
26 — 30 MC
22K
100
470K
.001
METER JACK

1296 Converter

Ot, W2CSM, has sent in the following information (see schematic on left) on a 1296 mc converter that he has designed and built. It's a real beauty and works likewise...

P A R T S   L I S T

Cavity: 2" x 2" x 4" 3/8" diameter center conductor length adj. with micrometers

L1: 17T #28 3/16" slug form	L6: 2T #16 3/8" diameter
L2: 4T #16 3/8" dia.	L7: 1T #16 3/8" dia.
L3: 3T #16 3/8" dia.	L8: 14T #28 ¼" slug form. Tap at 4 turns.
L4: 4T #16 3/8" dia.	L9: 26T #28 ¼" form.
L5½ 2T #16 3/8" dia.	L10: 3T #26 ¼" form.

ACTIVITIES

W2CSM also sent along the following list of stations active on 1296 mc in the North Eastern area. Ot is using a 7 turn helix beam with his converter. However he has purchased a 6 foot spun aluminum surplus dish with which he plans to work moonbounce in the future.

1296 MC STATIONS

W3ZFW W3GGR W3FEY W2PEZ W6NTW/2 - 1296.645 mc W2TTM W2CXY
K2UUR - 1296.010 mc W1BU K2GGI W2CSM W2NTY

W2NTY dropped by THE VHF AMATEUR booth at the East Coast VHF Society's Hamfest to tell us that he has been on 1296 for more than a year and wants to know why he wasn't in the "UHF Directory" in the April issue. I don't know, Larry, but I'm sure it won't happen again.

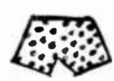
W1GKA wrote to tell us that New Hampshire may soon be an active "Moonbounce State." He and W1DUB are assembling a cylindrical parabola like the one in the February edition of THE VHF AMATEUR. Good luck, Roland, - hope to hear of you soon!

Alan, VE3BZS, sent us a long letter containing a write-up on his homebrew pen recorder! We are going to devote the column to the pen recorder in one of the up-and-coming editions - watch for it - Alan has done a great job on his. Alan says he is headed north again, so his moonbounce activities will be halted for a few months.

Until next month,
73, Alan, K2UYH

VHF

S H O R T   S H O R T S

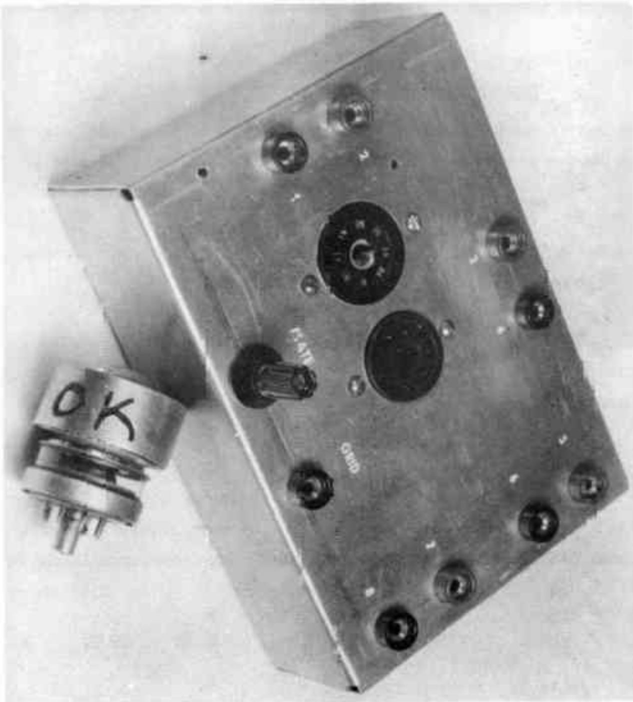


Several recent articles in this and other magazines indicate that certain operators with comparatively scarce calls or states are most unhappy about the confirmation requests their scarcity promotes. Their solutions are, apparently, to demand postage, or even completely refuse QSL's. Quite an attitude...

Nothing wrong with insisting on receipt of cards before sending one - or ignoring cards with wrong time, dates, etc. But simple courtesy demands responce when these conditions are met. Of course the one who announces "No QSL" is a couple of steps above he who promises and then ignores...

- Anonymous

VHF



SAM's BOTTLE BAKER

Samuel W. Daskam, K2OPI/K1POK
R.D. #1
Lebanon, New Jersey

Recently there has become available, by means of surplus, a great number of different types of vacuum tubes which are of interest to the VHF man. These include both high power audio and high power beam tetrodes such as the 4X150.

The average amateur taking a fling by buying one or more of these gems is usually faced with the problem of testing his new tubes. Unfortunately, the corner drug store's tube tester stops slightly short of testing the 6146, 4X150, 4X250 and other assorted heat generators.

Therefore, the buyer is presented with these alternatives: (1) Build a kilowatt (or whatever) and test his tubes in the actual circuit; (2) Try it in his buddy's circuit, (3) modify his tube tester to accept the transmitter types, or (4) build a "Bottle Baker."

This simple circuit is shown in figure 1. It consists of various transmitter type sockets connected in parallel. In my case I needed only the loctal (4X250 family) and 8 pin octal (most other types). Other types of sockets may be added as needed. The pins are brought out to banana jacks, but could terminate in wire leads. The loctal needs an extra connector for the grid contact which is on the key at the center of the base of the 4X150.

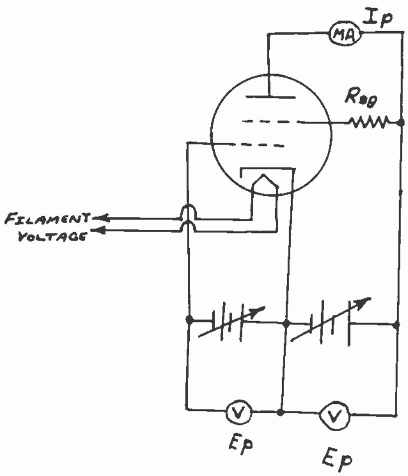


FIGURE 2

(METER SET-UP)

Also needed is a plate cap for tubes with the plate pin on the top or side. The cap for the 4X150 was made from a strip of copper ½" x 4" with a right angle bend at the erds to form a clamp. It was formed around the plate radiator of a 4X150.

Now that the chassis is ready, use it! For an example, let's try a 4X150. Pick up your transmitter manual or spec sheet for the 4X150. Be careful at this stage - 4X150's come in two breeds: 6 and 26 volt filaments. This threw me on the first unmarked 4X150 I tested. I tried it on 6 volts and almost discarded it when I got practically no emmisions. Next, a power supply must be selected capable of providing AC filament, DC plate voltage, and negative DC grid bias for the tube in question. Fortunately, a test at the lower voltage end of the Ip - Ep curves is valid. For the 4X150 is use 400 volts which is well above the "knee" of the curves. Of course, the nearer the voltage is to the planned operating voltage, the better. It may be advisable to put a fan on the plate of sone tubes, but if plate and screen dissipation is held down, it may not be necessary. First, apply the correct filament voltage. Next, put on the negative grid bias which, for ease in checking with the curves, should be a voltage plotted on the Ip - Ep current. In this case, a bias of -30 volts is used. A battery (or several in series) will serve as a good grid bias supply as the drain is very small. Next, a screen dropping resistor should be inserted between the plate supply and the screen lead. To find the correct value, refer to the typical operating conditions in the tube manual. For 400 volts the 4X150 will have a screen current of 40 ma. Employing a little $R=\frac{E}{I}$ tells us that the screen dropping resistor should be 2.5K if we want to drop the 400 volts down to 300 volts for use on the screen grid. Remember to calculate the power dissipated in the dropping resistor and select the wattage accordingly. This one would dissipate 4 watts. A handy addition to the circuit would be a high wattage rheostat with the dial calibrated in ohms so that you could quickly select the needed resistance. The next step is to connect the plate voltage and record the plate voltage and plate current. The meter set-up is shown in figure 2. Since exposed plate leads are employed, USE CAUTION. After recording Ep and Ip, change the grid bias to -40 volts (in this case). Again read the plate current. It should have decreased. If it did, record the new value. (If it increased, patent it). The plate currents for one of the 4X150's which I tested were:

At $E_g = -30v$	$I_p = 195$ ma
At $E_g = -40v$	$I_p = 95$ ma

which values fall almost on the published curves. The fact that 195 ma was flowing in the first case would indicate that the tube was probably good.

Now to calculate gm (transconductance - the measure of the ability of the grid voltage to control the plate current while the plate voltage is held constant.) The gm may be calculated from:

$$gm = \frac{\Delta I_p}{\Delta E_g} \quad (E_p \text{ Constant})$$

$$\doteq \frac{195 \text{ ma} - 95 \text{ ma}}{40V - 30 V} \doteq \frac{100 \text{ ma}}{10V} \doteq 10{,}000 \text{ umhos}$$

Although the above calculation was not essential to a basic test of the tube, it was done to bring out the significance of the test.

If you have succeeded in keeping your fingers out of the high voltage (a suggested procedure), the plate voltage should always be removed from the tube first. Assuming that the gm is found to be within 25% or so of the published value, the tube should be good. Remember, the acid test is in a dynamic test such as the actual circuit.

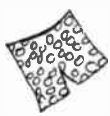
If a problem occurs in finding spec sheets for some of the larger or older tubes, write the manufacturer and he will usually send the specs complete with curves.

Is it worth it? For two years I passed up some 4X150D's sitting in a box marked "Untested - As Is - $1" in a surplus store in New York. Finally I decided to throw caution to the winds and bought a pair. Upon testing them by this method, I found they were good and later trials in a 6 and 2 meter rig showed average results. Evidently, everybody else passed them up assuming they were no good. A quick inspection should be made of the glass for cracks and/or a light bluish haze to see if it is gassy. If a white powder is noticed inside the tube - BEWARE - as it may be flakes from the cathode due to overvoltage.

Naturally, I picked up more 4X150's at a buck each the next trip to the big-town and only one was bad. Upon further inspection, the tell-tale white powder was present inside the glass. But even at that, it is still a good bargain. These eyeball tests do not guarantee against some bad apples in the barrel, though.

VHF

SHORT SHORTS

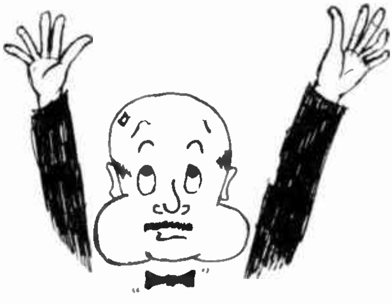


A pair of stations were heard discussing an OO card for out of band operation one had received. Zeroed on each other, they were over the edge...

-Anonymous

VHF

Signal Reports...



Dave Heller, K3HNP
14 Darkleaf Lane
Levittown, Penn.

These VHF operators who are either afraid to give an honest signal report or are incapable of doing so would learn a lot from an evening's listening on a particular frequency: 3999, to be exact. This crop of sidebanders is an elite society - because they want it to be. First of all, you don't deliberately set 1 kc from a band edge unless you *know* you're good - *no* drift - *no* residual carrier, *no* upper sideband. But a written description of this group tearing one of their fellows apart for a couple of cycles drift or the least flattop or nonlinear operation doesn't tell the story - you must hear it. Please do - It's an education.

Contrast this with the VHF "talking" bands. A station that doesn't move a kc every few minutes must be crystal controlled. Modulation 100% or less is reported "insufficient." Broad signals are radiated with pride. Technically this is all a step backward, contrary to the government's purpose in licensing radio amateurs.

Many VHF'ers don't seem to care. They reject any less-than-perfect signal report; they tell the friendly OO to soak his head. These characters don't read the better magazines, so let's dismiss them from this discussion - they won't see it anyhow.

The majority don't know what to think. They receive conflicting reports - the distant station says the signals' fine, with possibly slight drift. Most of the local's report the same, but "broad due to overload" (whatever that means). But a couple of critical locals keep saying that they're overmodulating. Whom to believe?

So perhaps a discussion on how to give a signal report is in order. The receiver used must be stable and reasonably sharp. A "sideband" receiver with steep IF skirts helps, but it isn't mandatory. A scope on the receiver also helps. A means of attenuating signals before the receiver (or converter, if one is used) is necessary.

Drift measurement is either simple or impossible. Use either your VFO or receiver - whichever has better stability and calibration. My VFO reads less than one kc frequency difference on six meters whereas the receiver can only be read to about 3 kc - so I use the VFO. Simply measure the frequency received at intervals - and report what you read. But if your equipment isn't stable, the readings, obviously, are meaningless.

Continued on page 18

NEW

A Compact Top Quality
6 METER TRANSCEIVER

When Clegg Laboratories first decided to run an entry in the low-priced six-meter transceiver sweepstakes, it was with the full reolization thot the competition would be keen. To run a succesful race, our entry would not only have to live up to the reputation of its illustrious Climaster forebears but would also have to outperform the products of competent engineering by other manufacturers.

With these goals for incentive Clegg engineers attacked the project in earnest. Suiting new circuitry to outstanding new components, the resulting "99'er", created by and for active hams, includes all those design and operating features so necessary for both outstanding fixed station and mobile performance on the crowded 6 meter band.

Clegg 99'er

AMATEUR NET $139.95

PERFORMANCE DATA

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Superior transmitter performance results from the use of a fundamental 8 MC crystal which doubles in the oscillator and triples to 50 MC in the following stage. This in turn drives a 7558 power amplifier to maximum efficiency. The oscillator stage is broad-banded so that crystals of 8, 12, 16 or 24 MC can be used. High level modulation of the plate and screen assures a fully modulated carrier which is transferred to the antenna through a flexible pi network tank circuit.

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You can't miss hearing this!

CLEGG ZEUS

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AMATEUR NET: $675.00

...185 Watts of Solid "Talk Power" Tops the Band!

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

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Bridgeport - Kaufman Elec.
Hartford - Radio Shack
Hatry of Hartford

DELAWARE
Wilmington - Delaware Elec.

FLORIDA
Miami - Amateur Radio Centr.

ILLINOIS
Chicago - Allied Radio
Amateur Electronic Supply
Peoria - Klaus Radio & Elec.

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Indianapolis - Van Sickle

IOWA
Council Bluffs - World Radio

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MARYLAND
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Boston - DeMambro Radio
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Harvard - Electronics Inc.
Reading - Graham Radio Co.

MICHIGAN
Ann Arbor - Purchase Radio
Detroit - M.N. Duffy Co.
Radio Supply & Engr. Co.
Grand Rapids - Radio Parts

MINNESOTA
Minneapolis - Electronic Cntr

MISSOURI
Butler - Henry Radio
St. Louis - Walter Ashe

NEW HAMPSHIRE
Concord - Evans Radio

NEW JERSEY
Mountainside - Federated Pur.
Newark - Terminal-Hudson Elec.
Shrewsbury - Federated Pur.

NEW YORK
Amsterdam - Adirondack Radio
Jamaica - Harrison Radio Corp.
N.Y.C. - Arrow Electric Co.
N.Y.C. - Harrison Radio Corp.
N.Y.C. - Terminal-Hudson Elec.
Staten Island - Two-Way Radio
Buffalo - Genesee Radio Parts
Rochester - Rochester Radio

NORTH CAROLINA
Winston-Salem - Dalton-Hege

OHIO
Cleveland - Pioneer Electronic
Columbus - Universal Service
Dayton - Custom Electronics
Toledo - Selectronic Supply Co.

OKLAHOMA
Okla. City - General Elec.
Tulsa - Radio, Inc.

PENNSYLVANIA
Allentown - Federated Pur.
Pittsburgh - Tydings Co.
Wyncote - Ham Buerger

RHODE ISLAND
Providence - W.H. Edwards

SOUTH CAROLINA
Sumter - Dixie Radio Supply

TENNESSEE
Nashville - Electra Distrib.

TEXAS
Dallas - Amateur Electronics
Crabtrees
Houston - Busacker

VIRGINIA
Arlington - Key Electronica

WASHINGTON, D.C.
Electronic Wholesalers, Inc.

WASHINGTON
Seattle - Seattle Radio Sply.

WISCONSIN
Milwaukee - Amateur Electron.

Broadness may be caused bt overmodulation or excessive modulation spectrum, especially in the case of linear amplifiers, nonlinear operation. Differentiation of the type of broadness is not always easy without an oscilloscope, but the existance of excessibe width is simple to determine. As mentioned above, a means of attenuating the incoming signal is necessary. I have a coax switch to select several antennas; a spare and cliplead antenna permits adjusting a strong signal to give almost any S-meter reading.

Pick any convenient reading as reference - say, 10 db over S9 for locals and tune in a local with a known clean signal (who preferably has a 'scope monitor). Adjust your antenna for the reference signal strength and tune across the 100 percent modulated signal, recording its apparent width. Have this same station give you a short transmission devoid of modulation and again tune through it - the apparent width of the unmodulated carrier is the receiver passband (for an unmodulated carrier has zero width). The difference is the bandwidth of the station. It should be about 7 or 8 kc if the station is really sharp and clean.

Now you know what a good signal sounds like under your test conditions. Write it all down before you forget. Any signal that takes any more room on your receiver dial, when the strength is adjusted to your "standard," is broad; with experience you can learn to measure approximately how broad.

Don't be afraid to tell what you read or hear - even though the reply will often be (charitably speaking) misinformed.

VHF

SOUTH AMERICAN NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, ARGENTINA

Here I am again with a short notice to let you know what is happening on VHF down this way.

After a complete absence of any openings on the six meter band during the last few months, yesterday in the late evening, or more exactly at 0200 GMT of September 4, I heard again for the first time a steady carrier on 49.9 mc coming in with the characteristic flutter fading of TE propagation. You can imagine my feelings when I detected this first sign of life on a completely deserted band, but I nearly fell off my chair when a fellow in the lab told me he heard three W2 stations on 6 meters around 2030 GMT on Saturday, September 2. It is really worthwhile to monitor the band closely again!

I hope this good news will also bring back some of the local activity we enjoyed in other days, because right now nearly all 6 meter stations have migrated to other bands, to the point that it is now easier to find someone on 144 than 50 mc, a situation not found ever before down here!

Next month I hope to be back with some DX contacts with our many friends in W—land!

'Till then, *73, Michael, LU3DCA*

VHF

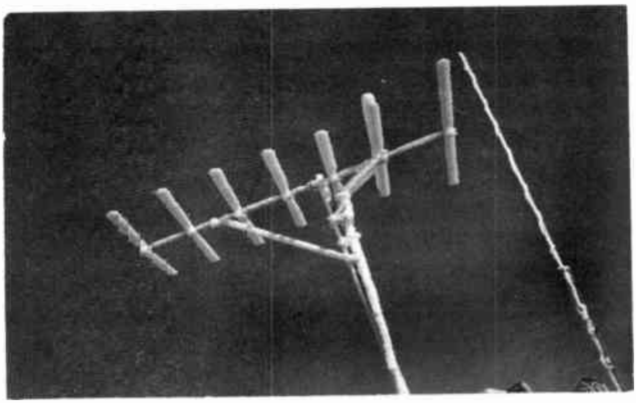
between EAST and WEST

The author, OE6AP, at the mill with a friend trying to "say it right" in this, his first, English article.

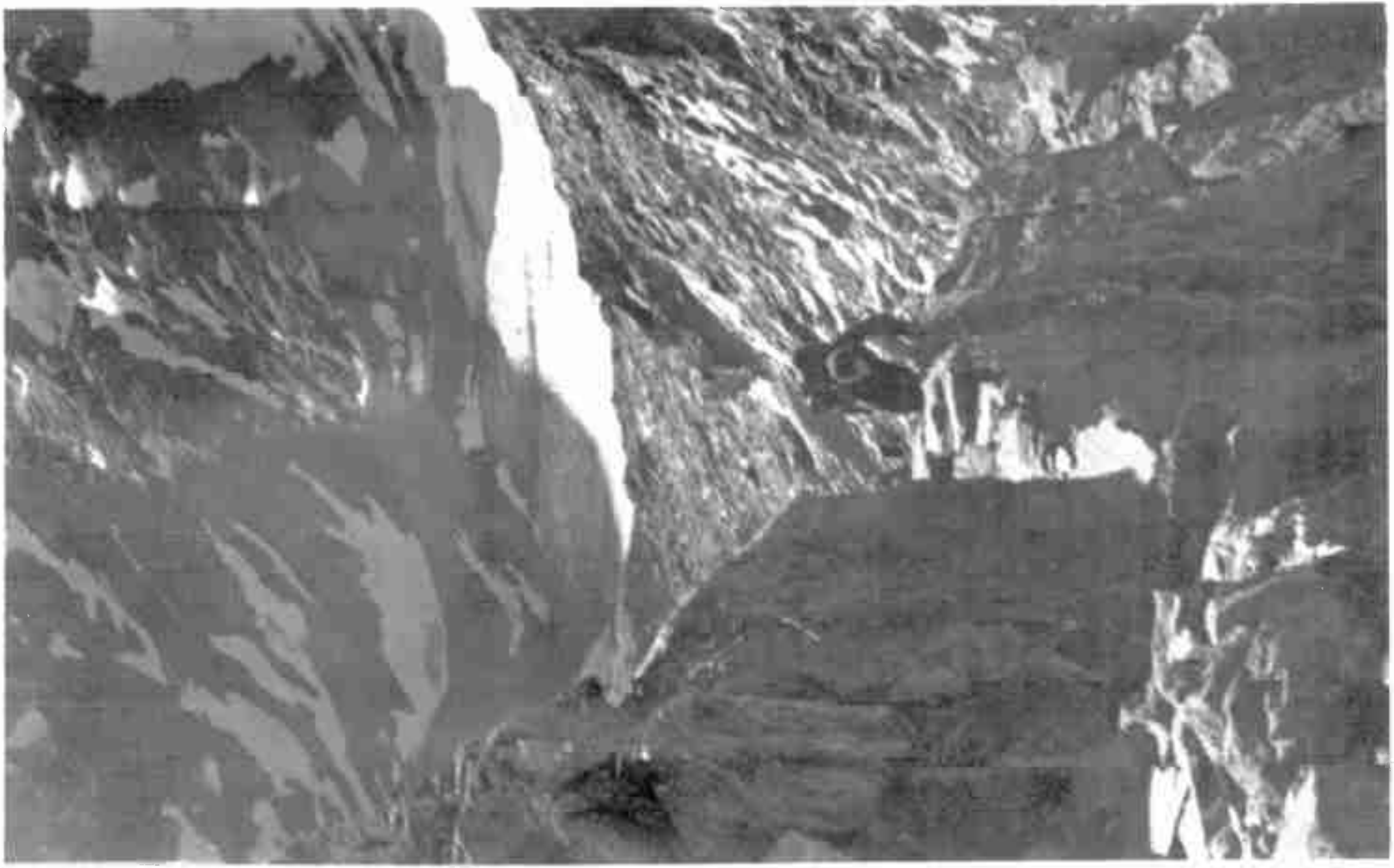
Alois Pendl, OE6AP
GRAZ IX
Plüddemanngasse 49
AUSTRIA

The author of this report is a well-known VHF man in Central Europe, being at this very time Austria's VHF manager and editor -

Austria is situated in the center of Europe, bordering Switzerland and Lichtenstein in the west. Czechoslovakia and Hungary in the east, Germany in the north, and Yugoslavia



Two meter yagi and vertical in normal 16 degree sunshine.



ABOVE: The long trek to OE6AP's portable QTH (at top). Elevation 9,318 feet up!
LEFT: Picturesque but rugged climb to the top to do some after work (?) operating!

and Italy in the south. My native town is Graz, in the south-east section of Austria, bordered by the Yugoslav and Hungarian frontiers.

I started on 144 mc with very uncomplicated sets; nearly 15 years ago, however, a 144 mc twin-Super was created, having 11 tubes, as well as a portable transmitter with the 823A in the final. The antenna then was a 4 over 4.

With my faithful friends, OE6MS and OE6TH, I planned all first skeds that were necessary to establish the vhf spectrum in this area. OE6RH took care of the 432 mc "firsts." Austria, like Switzerland being a very mountanous country, a good deal of climbing was necessary for this purpose. We still preserve and cherish many colored films taken then.

Here's a quick look down the way we came. Rough, eh? Typical view from OE6AP/p in the Austrian Alps.

Nearly all mountain peaks suited for VHF in the surroundings - near or far away - were tested. Mountain roads, cable railways, jeep courses on impassable roads, expeditions with pack animals...but in most cases we did our own conveying of the required materials up to the mountain peaks.

Thirteen European countries were reached: Austria, Germany, Yugoslavia, Czechoslavakia, Switzerland, France, Lichtenstein, Italy, San Marino, Hungary, Poland and England. Our signals were heard in Sweden, Finland, Netherlands, and we heard Finland, Sweden, and Denmark. DX tests and skeds were made with Kharkow University, Ukraine, Roumania, Egypt, Bulgaria, Belgium, Svalbard, Malta, Monaco, Lebanon, etc. And if my XYL had not prohibited it, still much more would have been done - hi!

The set had been completed, antennas were adapted to the latest fashion (and I guess there is hardly one single type of radiator that was not made use of), and ready to go. The converter inlet substituted the 417A for our E88CC - the 417A in turn later substituted by a nuvistor.

Not unlike this was the situation with 70 mc, 432 mc and 1296 mc. Some years ago I reached the highest goal of my efforts by sending the first European meteor-scatter signals to SM, Sweden. This was the starting point for the European ms avalanche. I had the best experiences of all with VHF'ers on both sides of the Iron Curtain. One might even state that it is easier for a western OM to be a "good" OM, since he has more economic possibilities. In the eastern countries the bottleneck is bridged by the creation of club stations. It is true, though, that this also fosters pre-military drill...

A further problem is the density of "in-groups." In this respect England prevails, followed closely by Czechoslavakia, Germany, Italy, etc. Of course the variety of languages is a major stumbling block with 'phone QSO's. But what is this drawback when you are working on top of the Sonnblick (9,317 feet) with an OM on an island in the midst of the Adriatic who tells you that he is only 9 feet above sea level? Or if you have caught San Marino or Lichtenstein? In

Over a mile high and still having antenna troubles! Here's the author making some last-minute repairs on frozen guy wires.

The author and his HB 432 mc collinear   OE6AP back home working on power supply.

the spring of this year I chose for variety's sake testing conditions in the plain - electing a site but a few yards from the barbed wire fence-clad border of Austria and Hungary, the "Iron Curtain" hermetically tightening the borderline. Yes, but it does not succeed in separating VHF'ers! The Hungarian club station HG5KBF of Budapest, for instance, is an indefatigable working group, dealing with VHF most enthusiastically.

In our country, the 50 mc band has not yet been released; during the IGY, however, I obtained a special license for 70 mc - this having since, alas, also expired. In 1960 the 144 mc Sporadic E reflections from Italy to Germany and in 1961 from Yugoslavia to Germany were the outstanding European events of the year.

Let me terminate by pointing out that VHF has still the charm or originality - each signal arising, for example, in the southeast Europe area representing something new and challenging. Beyond this, moonbounce puts more interesting and untried tasks before us.

There are still many more interesting things to be discussed, but we'll have to save them for another writing.

73, Alois, OE6AP

VHF

PROPAGATION FORECAST

Good chances this month of some trans-equatorial (TE) north-south openings on 6 meters. Check the band a few minutes after sunrise.

The 2 meter boys should keep ears pinned to the receiver on 145 mc for HI's from Oscar I. Check the October CQ's "Space Communications" column for full details...

- K2ZSQ

VHF

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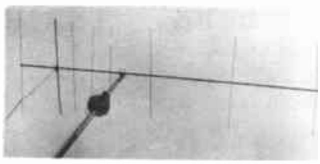
Silver Falcon introduces high gain at a very low price. Elements are cut from hi-Q aluminum rod except 6 meters which uses ½" tubing. The 6 meter Yagi features Gamma-Match and beams for 2 meters and above use a folded dipole matching 300 ohm line. All antennas are coated with lacquer to reduce oxidation of the aluminum. Aluminum is used throughout with the exception of brass screws and cadmium plated steel screws. All hardware is furnished. All antennas F.O.B. Saginaw, Michigan.



8 Element for 2 Meters, 12 db gain - $7.50

50 Mc - 9.0 db gain. 5 elements on a 9 foot boom. Boom is 1" Thickwall.....$11.95

144 Mc - 12.0 db gain. 8 elements on a 10 foot boom. Boom is 5/8" Dia........7.50

144 Mc - 15 db gain. 11 elements on a 18 foot boom. Boom is 1" Dia...........15.95

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432 Mc - 16.8 db gain. 15 elements on a 10 foot boom. Boom is 5/8" Dia........6.50

50 Mc - 10.4 db gain. 6 elements on a 18 foot boom. Boom is 3" Dia........24.95

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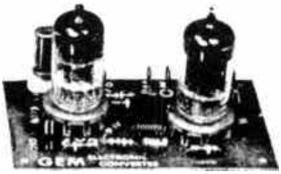
AUTHOR'S CONTEST!

just look at these prizes...



This month marks the fifth in our monthly AUTHOR's CONTEST which will end with the November 1961 issue. All articles and columns in this issue are to be evaluated by you below and returned to us immediately. We'll announce which articles, on a percentage basis, were the most popular in this issue. At the end of November, all percentage winners will be competing against each other for top prizes. Best winners over-all get the prizes pictured above. YOUR article can win! Meanwhile, help our writers this month by doing your part...

Return immediately to: *THE VHF AMATEUR*, 67 Russell Avenue, Rahway, New Jersey.

Directions: Pick out the best articles (only four) and rate those four in the order of their appeal to you (#1, #2, #3, #4 - first being best, and fourth being 4th best)...

Modulation Monitor, LU3DCA	( )	Signal Reports, K3HNP	( )
Moonbounce! K2UYH	( )	S.A. News, LU3DCA	( )
Sam's Bottle Baker, K2OPI	( )	East & WEST, OE6AP	( )

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Burgess Batteries
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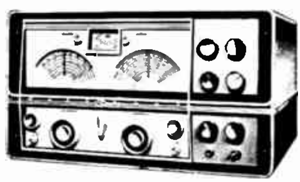

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CQ

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VHF for the radio amateur. A new dynamic handbook that covers all phases of VHF activities.

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2 Meter single nuvistor pre-amp. This unit will give up to 30 db gain & will reduce or eliminate cross-modulation. Tuned input and output. The very small size (only 2½" x 2") allows unit to be used in restricted space. Ideal for Gonsets, etc. Wired and tested less tube ONLY $4.50. Requires 0-50V at 4ma.

6 meter cascode (2 6CW4's) pre-amp. 20 db gain. Size (only 2½" x 2") will allow unit to fit in smallest space like the HQ-110 or converters. Requires 0-100V at 8 ma. Wired and tested less tubes ONLY $5.50.

The 6 meter printed circuit converter uses a 6BQ/BZ7 as a cascode R.F. amplifier and a 6X8 High Gain pentode mixer and oscillator. This converter will give a good signal-to-noise ratio and maximum sensitivity and I.F. output. The circuit uses very Hi-Q air wound coils and the broadband oscillator will accept crystals from 40 to 50 mc for any I.F. output. Wired and tested for only **$6.50**

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The

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Amateur

October 1961

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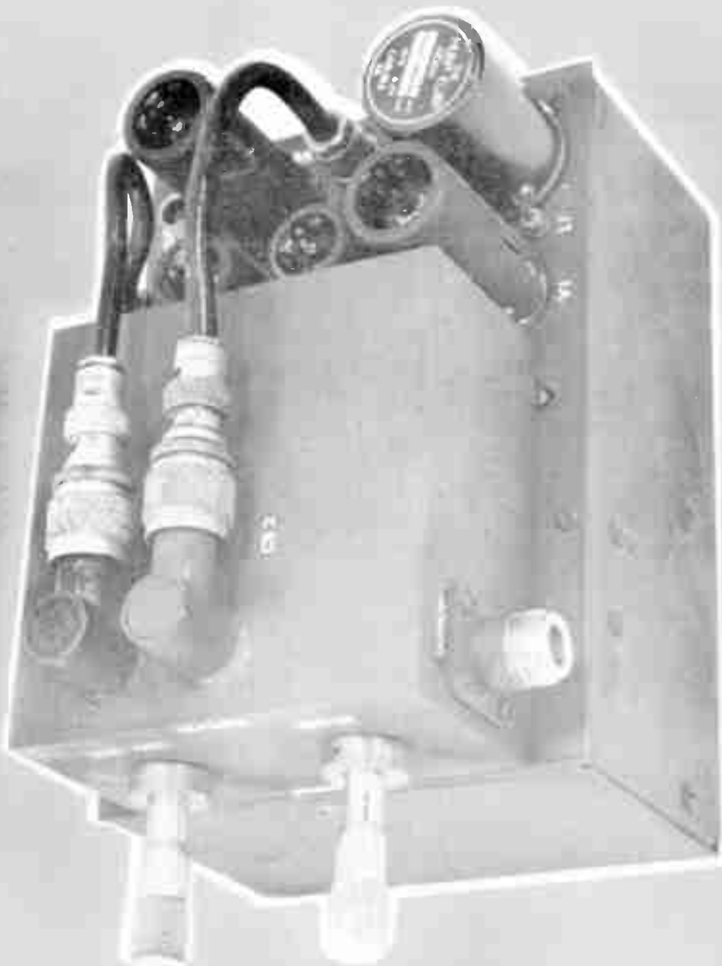

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FRONT COVER

Our moonbounce editor, Allen, K2UYH, snagged a great circuit from Ot, W2CSM, on his 1296 mc converter. See schematic and parts list on pages 10 and 11. This little converter is really "hot" and simple to build, using only three tubes (common ones at that), 6U8, 6AN4, and a 6DJ8. Converter output (1296 mc) feeds into your regular receiver at 26 to 30 mc. Nice, eh?

tii
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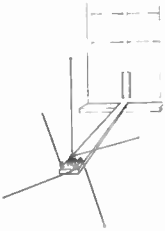

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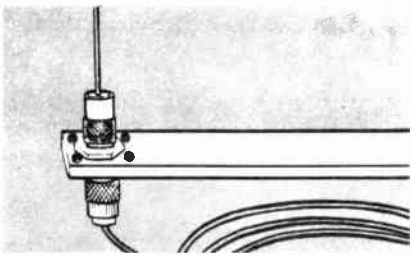

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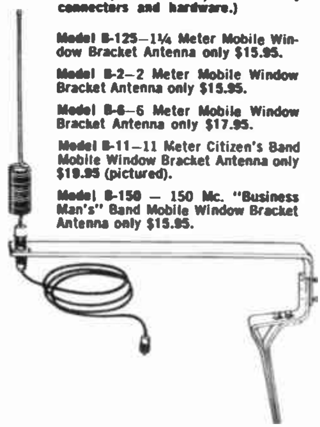

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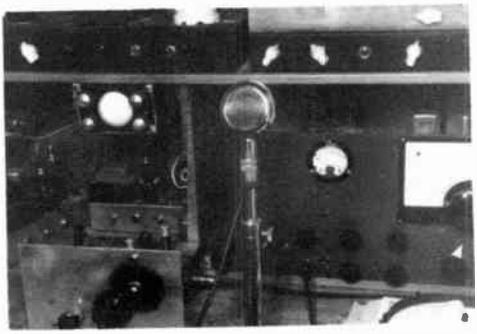


MODULATION MONITOR

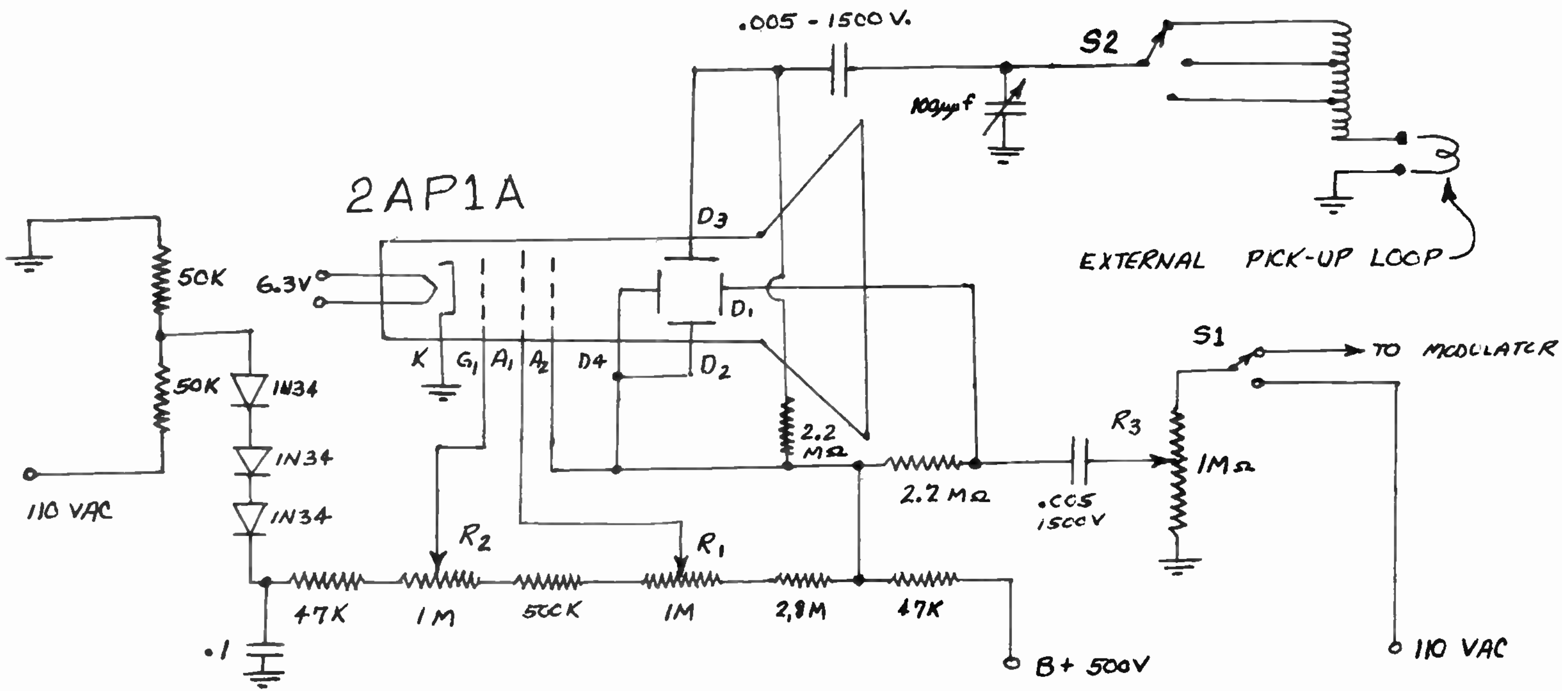
Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, ARGENTINA
South American Editor

Judging by the articles appearing in the magazines, more and more members of the amateur fraternity are perceiving the importance of a good quality in modulation in their 'phone transmitters. And with good reason. It is not enough if you spend all your efforts in generating a beautiful strong and clean carrier, modulated only up to a mere 30% or so and unreadable under adverse conditions. What you want to get through is information, contained in the sidebands generated by the process of modulation, and not only notice that you are on the air by the presence of your carrier.

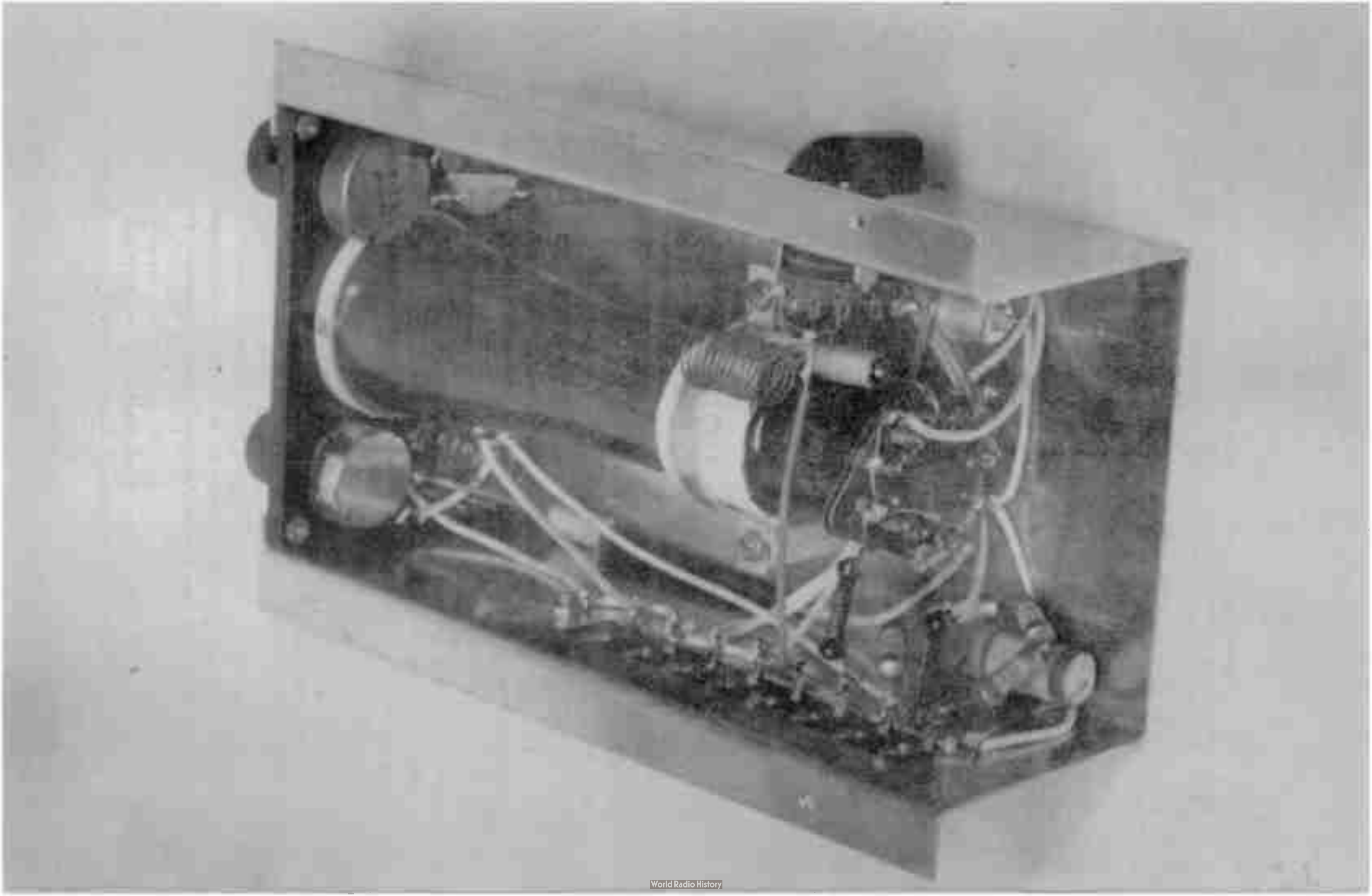
The simplest way to actually see what's coming out of your transmitter is by the use of a monitor equipped with a cathode ray tube. Because of this tube, which can be a small one (the 2" tubes are just of the right size), only a few potentiometers and resistors are needed, and the circuit is really self-explanatory.

The voltage applied to the B-plus terminal comes from the transmitter power supply, and is turned on and off at the same time, so there is no danger of burning a hole in the screen of the CRT when no signal is applied to the deflection plates. The value of the B-plus may be anything from 400 to 700 volts.

The switch S1 selects the horizontal sweep voltage, which may be audio signal taken from the secondary of the modulation transformer through a resistive voltage divider made from several 1 meg resistors (see the ARRL Handbook for full details) and provides the presentation of the trapezoidal pattern, which is especially useful to monitor the linearity of the modulated power stage. The second switch position applies sinusoidal sweep to the horizontal



.005 - 1500 V.
S2
100μμf
2AP1A
D3
EXTERNAL PICK-UP LOOP
50K
6.3V
D1
S1
TO MODULATOR
50K
1N34
K
G1
A1
A2
D4
D2
2.2 MΩ
R3
1MΩ
1N34
1N34
2.2 MΩ
.005 1500V
110 VAC
R2
R1
47K
1M
500K
1M
2.8M
47K
.1
B+ 500V
110 VAC



plates taken from a small filament transformer, connected with its secondary to the 6.3 volts winding of some other power transformer, and in this way it is possible to visualize an envelope pattern of the outgoing signal.

From this backwards-connected filament transformer was also taken the voltage for the negative supply which allows a brightness control without bringing the cathode to a positive potential with respect to the filament of the CRT.

An RF signal of the proper value is connected to the vertical plates through the tuned circuit formed by the tapped coil, the 100 uuf variable capacitor and the pick-up loop. Switch S2 selects the taps for 10, 6 or 2 meter operation.

The accompanying photographs give a good idea about the construction and mounting of the complete unit. The chassis was bent from a flat piece of aluminum and is 8¼" long. The front panel was made from a piece of pertinax (any insulating material will do) and is just large enough for the picture tube, the three potentiometers and the rotary switch S1. S2 is mounted on one side of the chassis and a terminal strip on the other one.

The picture at the head of the article shows the monitor mounted in the author's station just in front of the operating position.

This little instrument has been invaluable to control the modulation level of the different transmitters in use at LU3DCA, and I know no other way to find the correct settings of the controls of a modulator furnished with a speech clipper, a real necessity if you want to have an effective 'phone transmitter.

VHF

'MAVERICK' RIDES AGAIN —

Samuel W. Daskam, K2OPI/K1POK

Several questions have been asked about the filter in the June issue of THE VHF AMATEUR. I will try to answer them as they come, but please be patient.

First, some fellows are interested in the maximum power which can be handled by the filter. If a flat line (low SWR) is used, the filter as described should handle about 450 watts. This is power input to the filter and not d.c. power input to the final amplifier as is the case with most commercial specs. An increase in SWR will increase the peak voltage across the capacitors. For use at the kilowatt level, wider spaced variables such as made by E.F. Johnson or Hammarlund should be used.

Unfortunately, the tuning procedure seems to have been confusing. The reason for retuning C2 at 50 mc after adjusting for minimum feedthru at 58 mc is that the suck-out "well" is rather broad and its position has some effect on the attenuation at 50 mc. To insure the lowest possible insertion loss at 50 mc, the trap must be adjusted for both frequencies.

An error has been found in the schematic as it was originally published - but it will still work OK. L3 should be in series with C2 and not C4. There is no coil on the L4 leg.But regardless, input and output ends can be switched.

When properly adjusted, C1 and C2 are about at minimum capacitances. This may make tuning the high end of the band rather difficult. Suggested capacitors to solve this problem are the Hammarlund HF-15 or any similar type having about 2.5 pf minimum capacitance.

VHF

MOONBOUNCE

Allen Katz, K2UYH
48 Cumberland Ave.
Verona, New Jersey

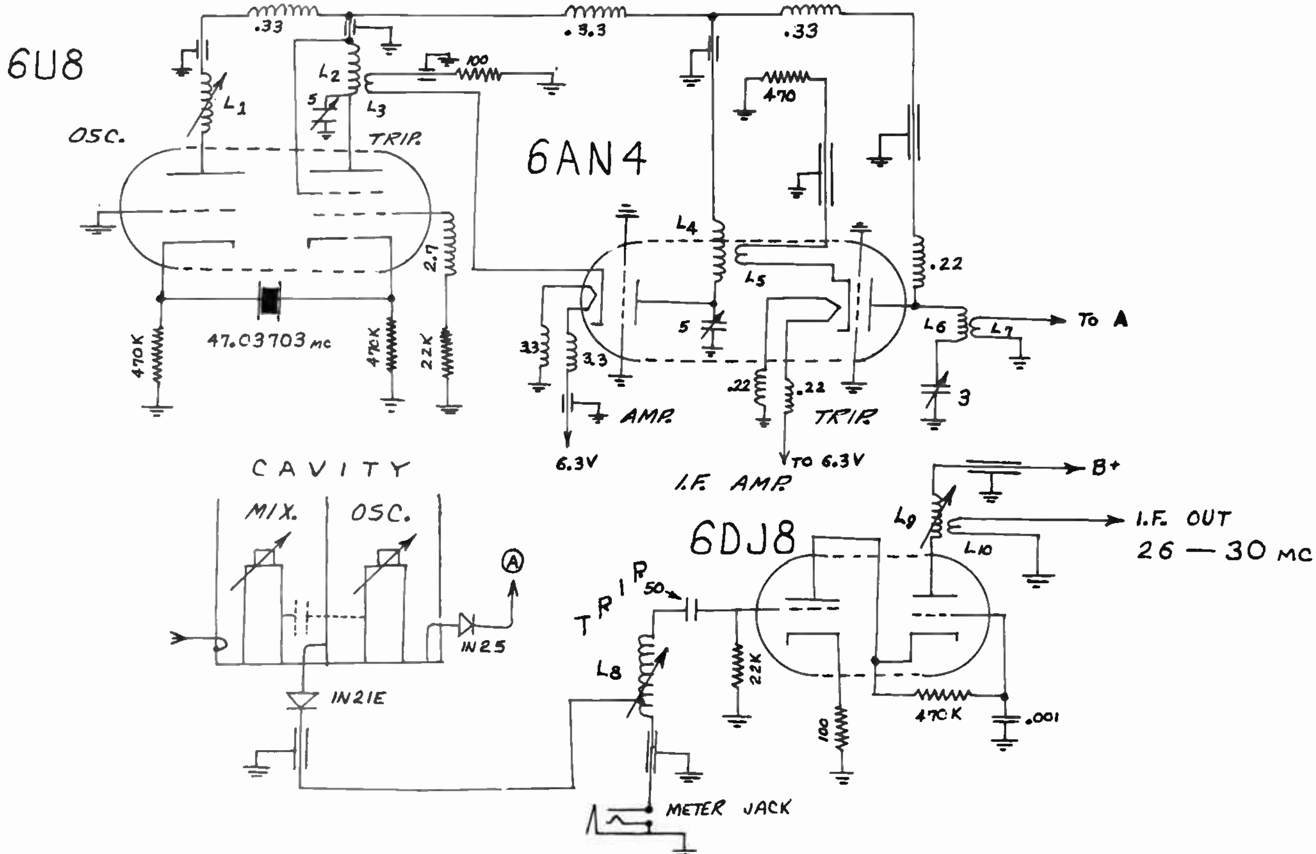
A horrified expression and a high pitched cry, "MATH?" This typifies the attitude too many hams have toward mathematics. Most of these hams have had a good background in math, far in excess of any necessary to master the simple equations presented in this column. Then why all the fuss?

If one operated the low frequencies where commercially built equipment and dress pattern construction articles prevail, possibly one could dispense with math, but here on the VHF frontier, where commercial equipment is nonexistent and construction articles scarce, math is a necessity.

One has great pleasure in building his own equipment, but how much more pleasure is gained by building *and designing* your own gear? This is what mathematical applications can do for you. It has been the policy of the column to give general construction information along with mathematical formulas in order that its readers could build and <u>design</u> equipment tailored to their own needs.

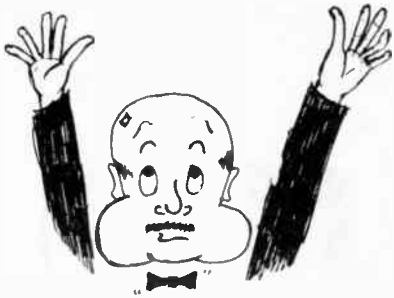
New Book - - - "VHF For The Radio Amateur"

After hearing my friend's praise W6AJF's book, *VHF For The Radio Amateur,* I could not help but to rush out and buy a copy. I then proceeded to read it cover to cover. Although we were very impressed by the practical content, we would have liked to see a little more theory. We concur with Frank's comments on collinear arrays, using a collinear here at K2UYH. We would have been even happier if he mentioned a parabolic antenna - alas. His transmitter section made us really light up. Never before had we seen a 1296 mc transmitter in print, and here we had two to choose from! The flat line unit really looks simple to build. His converter section is also excellent. The idea of running 416B's with out-forced air cooling is sure to prove invaluable with these tubes becoming available to the general ham public. Frank has a whole section on paramps for the fellows who's interest lies in that direction. This is the first VHF book that deals so thoroughly with the UHF end and truly warrants the attention of all VHF operators. *A fine job, Frank!*



6U8
OSC.
L1
L2
L3
5
TRIP.
.33
.3.3
.33
100
470
6AN4
L4
L5
.22
L6
L7
To A
5
3
2.7
470K
47.03703 mc
47OK
22K
33
3.3
AMP.
6.3V
.22
.22
TRIP.
TO 6.3V
I.F. AMP.
CAVITY
MIX.
OSC.
A
IN25
IN21E
TRIP
50
L8
22K
100
470K
.001
6DJ8
L9
L10
B+
I.F. OUT
26 — 30 MC
METER JACK

Signal Reports...



Dave Heller, K3HNP
14 Darkleaf Lane
Levittown, Penn.

These VHF operators who are either afraid to give an honest signal report or are incapable of doing so would learn a lot from an evening's listening on a particular frequency: 3999, to be exact. This crop of sidebanders is an elite society - because they want it to be. First of all, you don't deliberately set 1 kc from a band edge unless you *know* you're good - *no* drift - *no* residual carrier, *no* upper sideband. But a written description of this group tearing one of their fellows apart for a couple of cycles drift or the least flattop or nonlinear operation doesn't tell the story - you must hear it. Please do - It's an education.

Contrast this with the VHF "talking" bands. A station that doesn't move a kc every few minutes must be crystal controlled. Modulation 100% or less is reported "insufficient." Broad signals are radiated with pride. Technically this is all a step backward, contrary to the government's purpose in licensing radio amateurs.

Many VHF'ers don't seem to care. They reject any less-than-perfect signal report; they tell the friendly OO to soak his head. These characters don't read the better magazines, so let's dismiss them from this discussion - they won't see it anyhow.

The majority don't know what to think. They receive conflicting reports - the distant station says the signals' fine, with possibly slight drift. Most of the local's report the same, but "broad due to overload" (whatever that means). But a couple of critical locals keep saying that they're overmodulating. Whom to believe?

So perhaps a discussion on how to give a signal report is in order. The receiver used must be stable and reasonably sharp. A "sideband" receiver with steep IF skirts helps, but it isn't mandatory. A scope on the receiver also helps. A means of attenuating signals before the receiver (or converter, if one is used) is necessary.

Drift measurement is either simple or impossible. Use either your VFO or receiver - whichever has better stability and calibration. My VFO reads less than one kc frequency difference on six meters whereas the receiver can only be read to about 3 kc - so I use the VFO. Simply measure the frequency received at intervals - and report what you read. But if your equipment isn't stable, the readings, obviously, are meaningless.

Continued on page 18

You can't miss hearing this!

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AMATEUR NET: $675.00

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Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

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NEW JERSEY
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Shrewsbury - Federated Pur.

NEW YORK
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N.Y.C. - Arrow Electric Co.
N.Y.C. - Harrison Radio Corp.
N.Y.C. - Terminal-Hudson Elec.
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Broadness may be caused bt overmodulation or excessive modulation spectrum, especially in the case of linear amplifiers, nonlinear operation. Differentiation of the type of broadness is not always easy without an oscilloscope, but the existance of excessibe width is simple to determine. As mentioned above, a means of attenuating the incoming signal is necessary. I have a coax switch to select several antennas; a spare and cliplead antenna permits adjusting a strong signal to give almost any S-meter reading.

Pick any convenient reading as reference - say, 10 db over S9 for locals and tune in a local with a known clean signal (who preferably has a 'scope monitor). Adjust your antenna for the reference signal strength and tune across the 100 percent modulated signal, recording its apparent width. Have this same station give you a short transmission devoid of modulation and again tune through it - the apparent width of the unmodulated carrier is the receiver passband (for an unmodulated carrier has zero width). The difference is the bandwidth of the station. It should be about 7 or 8 kc if the station is really sharp and clean.

Now you know what a good signal sounds like under your test conditions. Write it all down before you forget. Any signal that takes any more room on your receiver dial, when the strength is adjusted to your "standard," is broad; with experience you can learn to measure approximately how broad.

Don't be afraid to tell what you read or hear - even though the reply will often be (charitably speaking) misinformed.

VHF

SOUTH AMERICAN NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, ARGENTINA

Here I am again with a short notice to let you know what is happening on VHF down this way.

After a complete absence of any openings on the six meter band during the last few months, yesterday in the late evening, or more exactly at 0200 GMT of September 4, I heard again for the first time a steady carrier on 49.9 mc coming in with the characteristic flutter fading of TE propagation. You can imagine my feelings when I detected this first sign of life on a completely deserted band, but I nearly fell off my chair when a fellow in the lab told me he heard three W2 stations on 6 meters around 2030 GMT on Saturday, September 2. It is really worthwhile to monitor the band closely again!

I hope this good news will also bring back some of the local activity we enjoyed in other days, because right now nearly all 6 meter stations have migrated to other bands, to the point that it is now easier to find someone on 144 than 50 mc, a situation not found ever before down here!

Next month I hope to be back with some DX contacts with our many friends in W—land!

'Till then, *73, Michael, LU3DCA*

VHF

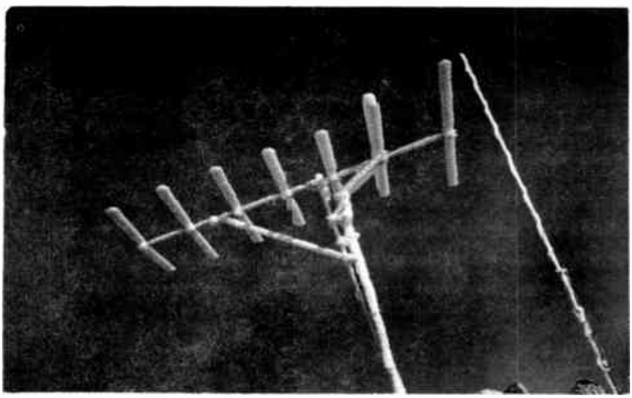
between EAST and WEST

The author, OE6AP, at the mill with a friend trying to "say it right" in this, his first, English article.

Alois Pendl, OE6AP
GRAZ IX
Plüddemanngasse 49
AUSTRIA

The author of this report is a well-known VHF man in Central Europe, being at this very time Austria's VHF manager and editor -

Austria is situated in the center of Europe, bordering Switzerland and Lichtenstein in the west. Czechoslovakia and Hungary in the east, Germany in the north, and Yugoslavia



Two meter yagi and vertical in normal 16 degree sunshine.

ABOVE: The long trek to OE6AP's portable QTH (at top). Elevation 9,318 feet up!
LEFT: Picturesque but rugged climb to the top to do some after work (?) operating!

and Italy in the south. My native town is Graz, in the south-east section of Austria, bordered by the Yugoslav and Hungarian frontiers.

I started on 144 mc with very uncomplicated sets; nearly 15 years ago, however, a 144 mc twin-Super was created, having 11 tubes, as well as a portable transmitter with the 823A in the final. The antenna then was a 4 over 4.

With my faithful friends, OE6MS and OE6TH, I planned all first skeds that were necessary to establish the vhf spectrum in this area. OE6RH took care of the 432 mc "firsts." Austria, like Switzerland being a very mountanous country, a good deal of climbing was necessary for this purpose. We still preserve and cherish many colored films taken then.

Here's a quick look down the way we came. Rough, eh? Typical view from OE6AP/p in the Austrian Alps.

Nearly all mountain peaks suited for VHF in the surroundings - near or far away - were tested. Mountain roads, cable railways, jeep courses on impassable roads, expeditions with pack animals...but in most cases we did our own conveying of the required materials up to the mountain peaks.

Thirteen European countries were reached: Austria, Germany, Yugoslavia, Czechoslavakia, Switzerland, France, Lichtenstein, Italy, San Marino,Hungary, Poland and England. Our signals were heard in Sweden, Finland, Netherlands, and we heard Finland, Sweden, and Denmark. DX tests and skeds were made with Kharkow University, Ukraine, Roumania, Egypt, Bulgaria, Belgium, Svalbard, Malta, Monaco, Lebanon, etc. And if my XYL had not prohibited it, still much more would have been done - hi!

The set had been completed, antennas were adapted to the latest fashion (and I guess there is hardly one single type of radiator that was not made use of), and ready to go. The converter inlet substituted the 417A for our E88CC - the 417A in turn later substituted by a nuvistor.

Not unlike this was the situation with 70 mc, 432 mc and 1296 mc. Some years ago I reached the highest goal of my efforts by sending the first European meteor-scatter signals to SM, Sweden. This was the starting point for the European ms avalanche. I had the best experiences of all with VHF'ers on both sides of the Iron Curtain. One might even state that it is easier for a western OM to be a "good" OM, since he has more economic possibilities. In the eastern countries the bottleneck is bridged by the creation of club stations. It is true, though, that this also fosters pre-military drill...

A further problem is the density of "in-groups." In this respect England prevails, followed closely by Czechoslavakia, Germany, Italy, etc. Of course the variety of languages is a major stumbling block with 'phone QSO's. But what is this drawback when you are working on top of the Sonnblick (9,317 feet) with an OM on an island in the midst of the Adriatic who tells you that he is only 9 feet above sea level? Or if you have caught San Marino or Lichtenstein? In

Over a mile high and still having antenna troubles! Here's the author making some last-minute repairs on frozen guy wires.

The author and his HB 432 mc collinear   OE6AP back home working on power supply.

the spring of this year I chose for variety's sake testing conditions in the plain - electing a site but a few yards from the barbed wire fence-clad border of Austria and Hungary, the "Iron Curtain" hermetically tightening the borderline. Yes, but it does not succeed in separating VHF'ers! The Hungarian club station HG5KBF of Budapest, for instance, is an indefatigable working group, dealing with VHF most enthusiastically.

In our country, the 50 mc band has not yet been released; during the IGY, however, I obtained a special license for 70 mc - this having since, alas, also expired. In 1960 the 144 mc Sporadic E reflections from Italy to Germany and in 1961 from Yugoslavia to Germany were the outstanding European events of the year.

Let me terminate by pointing out that VHF has still the charm or originality - each signal arising, for example, in the southeast Europe area representing something new and challenging. Beyond this, moonbounce puts more interesting and untried tasks before us.

There are still many more interesting things to be discussed, but we'll have to save them for another writing.

73, Alois, OE6AP

VHF

PROPAGATION FORECAST

Good chances this month of some trans-equatorial (TE) north-south openings on 6 meters. Check the band a few minutes after sunrise.

The 2 meter boys should keep ears pinned to the receiver on 145 mc for Hi's from Oscar I. Check the October CQ's "Space Communications" column for full details...

- *K2ZSQ*

VHF

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ARC-3	Rcvr 100-156 mc 17 tubes; 1/new	*17.50*
ARQ-1	Transceiver 14-50 mc; 807 PA; excellent	*29.50*
BC-1158	6 mtr xmtr; pair 815s mod by pair 815s	*34.50*
R-1132A	100-125 mc tunable w/115 vac 60 cy pwr supply	*55.00*
SCR-522	100-156 mc transceiver w/tubes; excellent	*22.50*
TS-3/AP	Freq. mtr; 2400-3400 mcs; w/cal chart; new	*9.50*

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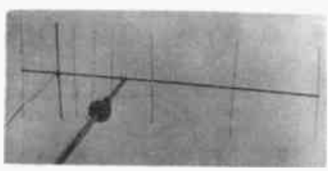

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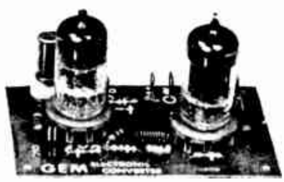

This month marks the fifth in our monthly AUTHOR's CONTEST which will end with the November 1961 issue. All articles and columns in this issue are to be evaluated by you below and returned to us immediately. We'll announce which articles, on a percentage basis, were the most popular in this issue. At the end of November, all percentage winners will be competing against each other for top prizes. Best winners over-all get the prizes pictured above. YOUR article can win! Meanwhile, help our writers this month by doing your part...

Return immediately to: *THE VHF AMATEUR*, 67 Russell Avenue, Rahway, New Jersey.

Directions: Pick out the best articles (only four) and rate those four in the order of their appeal to you (#1, #2, #3, #4 - first being best, and fourth being 4th best)...

Modulation Monitor, LU3DCA	( )	Signal Reports, K3HNP	( )
Moonbounce! K2UYH	( )	S.A. News, LU3DCA	( )
Sam's Bottle Baker, K2OPI	( )	East & WEST, OE6AP	( )

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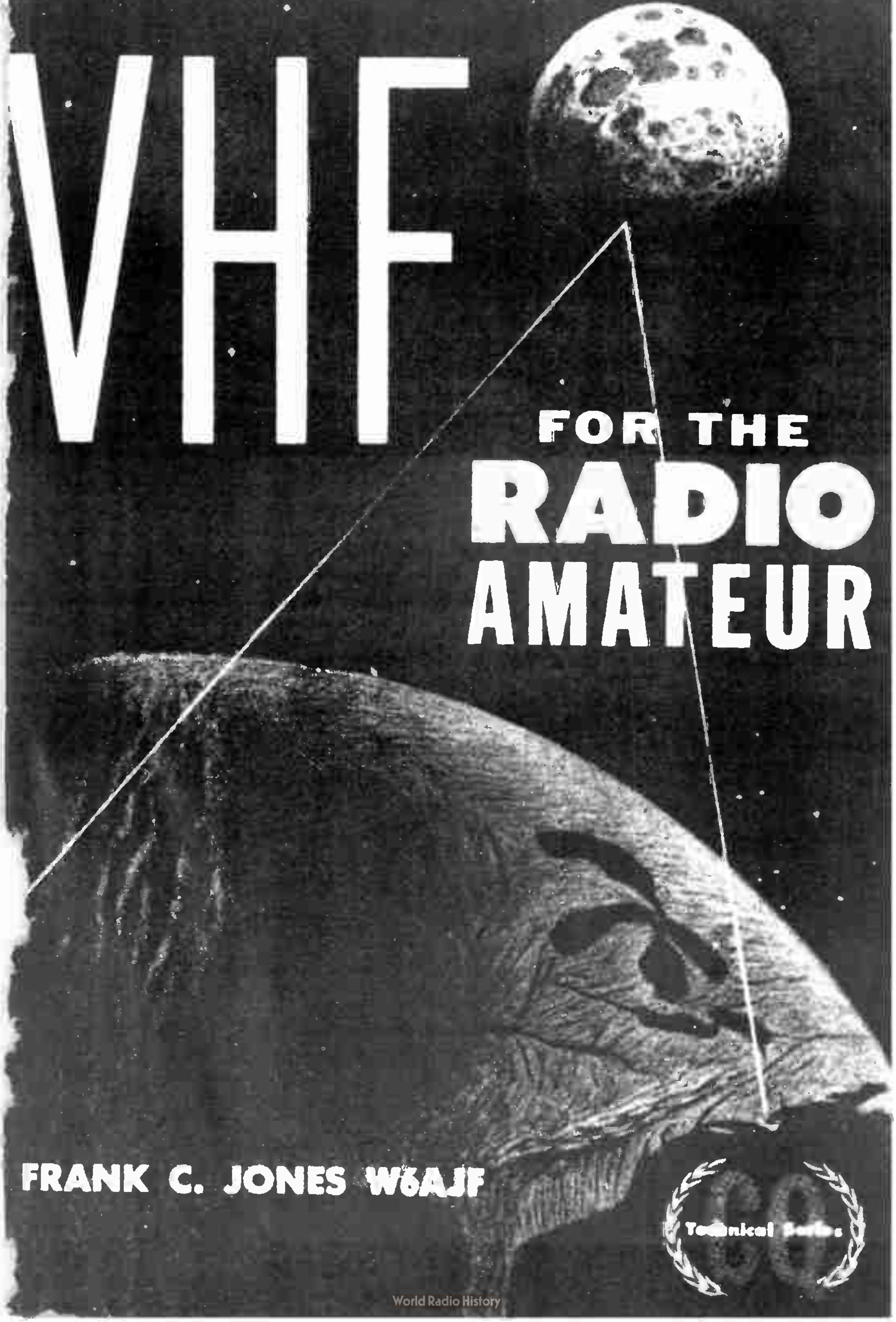

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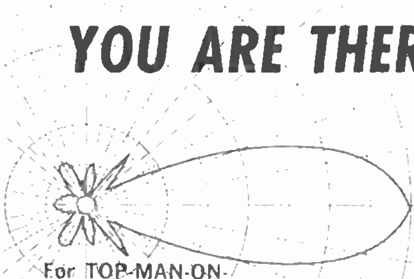

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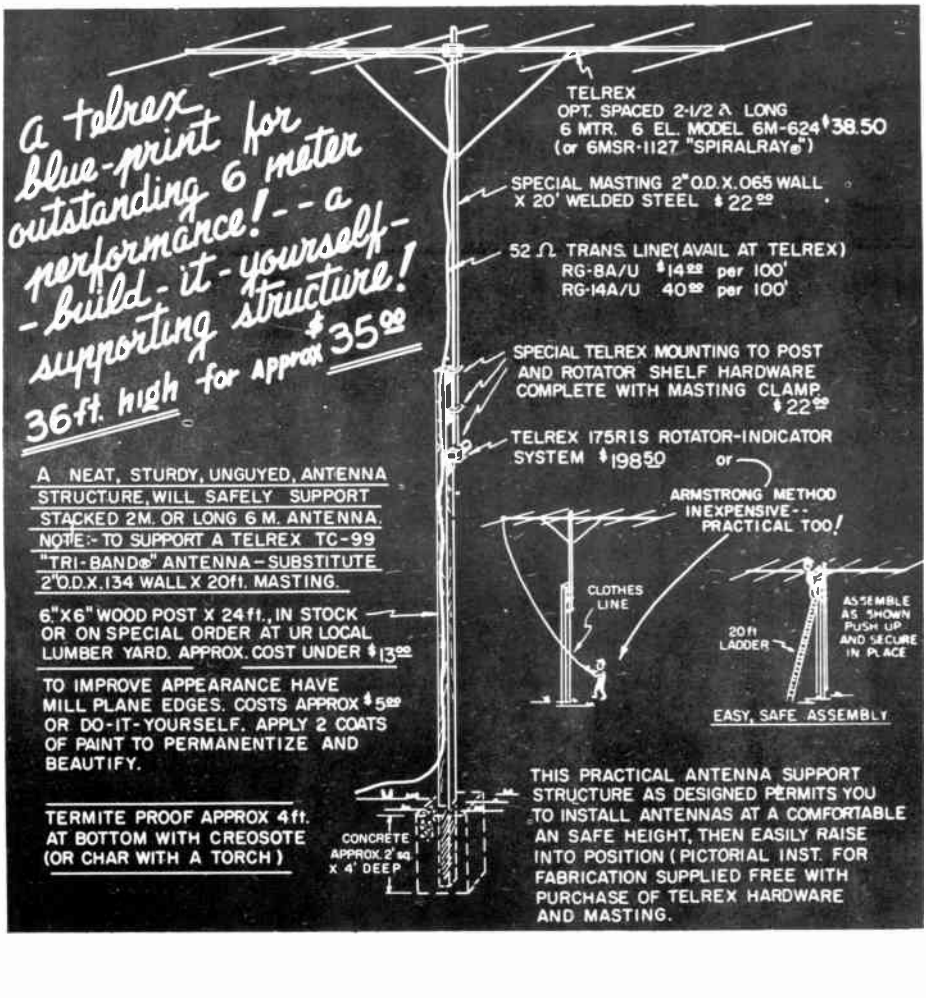

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Cover Photo

On our cover this month we have a new Clegg 99'er. See page 15.

EDITORIAL

As you may already know, our editorial policy has been only to comment on current topics of far-reaching importance. We believe that an Editorial should NOT be a monthly monologue or just a means of fulfilling an editor's urge to fill up space. But, in spite of these beliefs, we would like to expound just a wee bit about THE VHF AMATEUR and what we intend to do.

First off, though, an explanation is due re last month's lateness. As you know, the June issue was received in July. We are doing all we can to get back on schedule now. The reason: Your editor faced graduation ceremonies at ye ole schoole plus a two week tour of 13 states for business purposes. We wish to express our appreciation to all readers who sent letters of inquiry and concern regarding their magazine. Although we didn't have time to answer every letter, we trust all have their copies by now.

Now as to the future of THE VHF AMATEUR: Your editor has decided to work full-time on the magazine. In the past we had only a few hours a week to devote. Obviously, a great deal of thought went behind this decision. From the financial viewpoint, our magazine never has been what some would call a "money-maker" but we believe that in due time it may be. Over the last six or seven months we have been astounded at the number of renewals and new subscriptions received. In January of this year we had just about 1,000 subscribers. Now we have over 3,000. To make money, though, we have to shoot for 10,000. This kind of success (financial) is not our chief concern, though. We'll get by.

Our purpose now is what it has always been: To provide the VHF man with a magazine he can call his own. The VHF population is growing by leaps and bounds. It won't be long before VHF will become the center of amateur interest. - And we want to be there to serve you. Well, we're running out of space. Maybe more next month...

Bob Brown, K2ZSQ

Ted Fabian — W3RUE

Possible Modes Of VHF Propagation Workable In Tri-State Area

No doubt the average VHF operator has read many articles on VHF propagation, but most of these articles contained info on propagation for the world in general.

The purpose of this article is to give the local tri-state ham an idea what can be expected on the VHF bands in the local area, and help a fellow figure on what mode of propagation he is contacting a station.

Here are some observations that I have made starting on the 56-50 and up to the 432 Mc. band during my 25 years of VHF activity, the first 2 years on the illegal side of the fence. These observations were not taken from the text books, but from actual experience by the author.

50 Mc. PROPAGATION

There are 13 types of propagation on the 50 Mc. band that I know of, 12 of which I have experienced. The approximate distances that can be covered with the different modes are as follows.

1. Ground Wave 0 to ı5 miles. Under normal conditions, locations other than mountain tops and airplanes.
2. Atmospheric Bending 75 to 200 miles. (W3BWU working South East)
3. Tropospheric Bending 250 to 550 miles on 50 Mc. 300 to 1200 miles on ' l4 Mc. (Note difference between 50 Mc. and 144 Mc.)
4. Aurora 70 to 900 miles.
5. Ionospheric Scatter 400 to 1250 miles. (Contacts with W4RMU and W4IKK)
6. Meteor Scatter 350 to 1400 miles.
7. Back Scatter from F2 200 to 1100 miles.
8. Sporadic "E" 250 to 1600 miles.
9. Double Hop Sporadic "E" 1800 to 2400 miles.
10. F "2" 1950 to 6500 miles. (My 50 Mc. contacts KH6 — ZE — VQ2)
11. Transequatorial Scatter 3500 to 7500 miles. (Contacts with LU9)
12. Forward Scatter from Aurora 800 to 2100 miles. (Contacts with VE8, VE4 and VE7)
13. White Mary — Happens in the Arctic region. (I have no experience with this one, haven't been up to the North ~'e lately.)

Most F "2" contacts are made from ' st to East. Transequatorial contacts are m v North-South paths.

144 Mc. PROPAGATION

On 144 Mc., you can look for 7 typ ,f propagation.

1. Groundwave 0 to 75 miles.
2. Atmospheric Bending 75 to 200 mil .
3. Aurora 70 to 1000 miles.
4. Tropospheric Bending 300 to 1200 m. :s. (Note difference b tween 6 and 2 mete :s)
5. Meteor Scatter 500 to 1250 miles.
6. Ionospheric Scatter Mostly around distances of 300 to 500 miles. This type of scatter can be worked year around. It's being done nightly by W8KAY and W2CXY, Ohio to New Jersey. (Also my nightly contacts with North Carolina and New Jersey a couple of years back during the winter months.)
7. Sporadic "E" 1350 to ? miles. Very rare occurence on 144 Mc. up to this time. (Note difference between 6 and 2 meters)

220 Mc. PROPAGATION

1. Groundwave 0 to 75 miles.
2. Atmospheric Bending 75 to 200 miles.
3. Tropospheric Bending 300 to 1200 miles. (Worked W1HDQ, W8PT both at 450 miles. Heard W5AJG. Dallas, Tex. 1100 miles.)
4. Aurora 100 to 500 miles. (Worked K3CBA at 325 miles.)

432 Mc. PROPAGATION

1. Groundwave 0 to 65 miles.
2. Atmospheric Bending 75 to 175 miles. (Worked W8BFQ, 96 miles.)
3. Tropospheric Bending 200 to 750 miles. (Worked W3FEY, Lancaster across band from 432 Mc. to 220 Mc., 200 miles.)

No Aurora has been heard at this time.

For the information of those contemplating getting on 432 Mc., the following stations have equipment for the 432 Mc. band and will be very glad to put on a test signal for aligning convertors, and will be glad to listen for you on transmitter tests. These stations are using crystal controlled transmitters. Crystal controlled convertors used by W3QIZ and W3RUE.

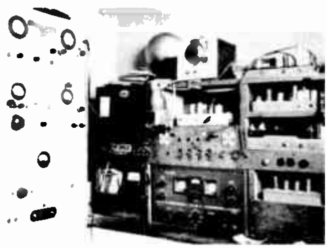
K3LUW Baldwin Boro — 20 Watts
432.345 Kc. 16 el Collinear

W3QIZ Johnstown, Pa. — 40 Watts
432.480 Kc. 15 el Yagi

W3YNM Elizabeth, Pa. — 15 Watts
432.500 Kc. Square corner ref.

W3RUE Donora, Pa. — 40 Watts
432.012 Kc. 16 el Collinear

K3LUW is putting a signal into Donora on 432 Mc., a path of 14 miles airline, absolutely not in the line of sight, stronger than any signal we have heard on 220 Mc.



All equipment is home built including antennas, transmitters and five converters, except HQ129X. Transmitters — 50 mc. 160 watts and 144 mc. 125 watts, both using 829-B in the final. 220 mc. 90 watts and 432 mc. 50 watts, both using 5894 in the final. —W3RUE

TVI ... and what to do about it!

J. D. "Red" Brown, K2ZSP and Robert M. Brown, K2ZSQ of 67 Russell Avenue, Rahway, New Jersey.

(Reprint from Western Radio Amateur)

Let us uppose that you've been advised by a neighbor that you are causing television interference. What are you going to do? Will you ignore it and continue on the air as before? Will you decide to stay off the air except during late evening hours, Saturdays and Sundays? Will you face the problem and solve it to your satisfaction and the satisfaction of the TV owners?

All three of these approaches have been used by members of the ham fraternity. Suppose, we'll say, you decide to ignore the interference. What can you expect? Well, most likely, you will get trouble which may come in any number of guises. I recall hearing a ham describe how he had his guy lines cut several times with the result that his antenna isn't much good now. Another young amateur described in rather bitter words how "lousy" his neighbors have been. I haven't heard either of these fellows around for quite a while.

How about the second choice? Suppose you operate only after 11:00 p.m. and at odd hours during the weekend . . .what then? It's certainly an improvement over ignoring the TVI complaints and you can operate with a reasonable assurance that the trouble will be minimized. However, you are still a potential source of annoyance to the viewer who has set his heart on seeing a particular movie on the "late show". HOW ABOUT THE DX? Do you want to miss a large part of the fun of ham radio operation by voluntarily limiting your on-the-air time to certain hours? This approach doesn't guarantee success, it only reduces the magnitude of the problem. It also reduces the enjoyment you can expect from your rig.

TVI KIT

Suppose you decide you'd like to operate at will (and who doesn't), by licking the problem. How do you do it? There is no pat solution. Each one is just as individual as your neighbors. However I can offer some advice that I hope will be helpful.

Get yourself a TVI kit! Yes, I said a TVI kit What's in a kit? Sure, I'll tell you. I'll even list the items numerically in the order of their importance.

LISTEN

1.) First, you need the ability to listen ATTENTATIVELY and without interrupting for a considerable length of time. The neighbor who has heard you talking about ham radio for several weeks or months until he finally found out who you are has had plenty of time to build up quite a head of steam. He's had his programs interrupted numerous times and he's angry. He's been a captive audience on numerous occasions and doesn't like it. Nothing will lower that head of steam as much as attentive and understanding listening on your part.

AMATEUR PSYCHOLOGY

2.) You will need for your TVI kit a ready smile. "Friendliness begets friendliness", and no one will stay angry for very long with someone as understanding and as friendly as you are going to be.

HI-PASS FILTER

3.) Third, you will need a GOOD high pass filter complete with a short length of TV twin lead installed on one end. When I say good high pass filter, that's just what is meant. High pass filters can be very good, "so-so", and practically worthless. Ask your friends who operate on the same bands exactly which has been most effective for them. The most effective for our own 6 meter TVI has been the RL DRAKE No. TV-300HP.

After you've had a chance to discuss the problem rationally with the set owner and have explained that to the best of your ability to determine it, you are operating on the assigned amateur frequency. Explain how the filter can be simply installed at the back of the set and that a material if not complete reduction in TVI will be evident as long as you are transmitting on your assigned amateur frequency. The set owner will probably agree to temporary installation of the filter for a TEST. LET HIM INSTALL IT. If for some reason at a later date something happens to his receiver, he may feel that you caused it by tinkering with it. (Besides the FCC now has a regulation prohibiting it.)

Now you are ready for a test. If possible, have someone, preferably a nearby ham, operate your rig. The modulation should be left at the usual setting and the antenna rotated to give the set owner the "full blast". Let's assume that your rig is clean and the filter cleared the TVI (and in 99% of the cases it will).

FREE FORMS AND LISTS

4.) The last item in your TVI kit are these . . . a prepared form for submission to either the set manufacturer or the local distributor of that make TV. Another sheet should contain information showing where to send the form for the high pass filter. In case the TV set in question is no longer made, as for instance FADA or OLYMPIA, the responsibility for obtaining the filter rests with the set owner. You, being a nice guy, could offer to obtain it for him at dealer's cost to further cement good relations.

GETTING FREE HIGH PASS FILTERS

This begins a new phase of modern TVI problems. The TV manufacturer has in recent years recognized the fact that TVI in itself in most cases is nothing more than "front-end overload". Rather than to install a $5.00 high pass filter in every TV, the manufacturers supplies them free on request. In all actualities only out of every thousand TV's (at most) sold have trouble with amateur interference.

Here in New Jersey, many TVI Committees have been set up to mediate between the set owner and the interfering station, as well as to determine the addresses of those TV companies giving away free high pass filters. We have found that all the company requires is a signed statement by the set owner listing the call letters of the interfering amateur station, the serial number of the set, and the model number of the latter. We have about forty addresses of distributors in this area who comply.

We wholeheartedly suggest that you visit your local dealers to see if they will honor these statements. We've found, in more than 1,000 out-of-state cases, that 87% do. The following is a list of companies THAT WILL COMPLY AND SUPPLY FILTERS on request . . . just see the local distributors.

Emerson, General Electric, Montgomery Ward, Admiral, Hot Point, Sylvania, Philco,

W3RTV, Jule W. Fantaski

Al Cardillo, K3DMT
President, G.P.V.H.F.S.

Sid Lippman, K3CJY

Capehart, Westinghouse, Dumont, Motorola, and Crosley Bendix.

For your convenience we have obtained the addresses of a few major brands with whom you may deal direct (with the signed statement) through the mail —

Magnavox, c/o Mr. Chapman, Fort Wayne, Indiana.

Spartan, c/o Dr. Barnett, Fort Wayne-4, Indiana.

Sylvania, Radio and TV Division, 700 Elliot Street, Batavia, N.Y., c/o Mr. E. Mooser.

RCA Service Co., Inc., 1573 Irving St., Rahway, New Jersey.

Zenith Radio, 6001 Dickens Ave., Chicago, Illinois.

CBS TV, c/o Mr. Roberts, Hygrade Electronics, 9216 Church Ave., Brooklyn 36, N.Y.

This is by no means a complete listing, but should facilitate you in your problem.

We have printed up copies of our lists and statement forms for some of the local 6 meter gang, and would be only too happy to send some copies out to you if you could use them. Just drop us a line, enclose 25c to cover costs, and we'll send out the list along with as many forms as you deem necessary.

Another Case For VHF

Let us consider for a moment antennas for VHF. As they are physically smaller than a low frequency antenna, it should be obvious that for the same power gains they will be less costly. The converse is also true that more dollars invested in a VHF antenna will provide greater gain than on lower frequencies.

If the VHF antenna provides 10db of power gain, which incidently is possible to accomplish with yagis of practicable size, the effective power is then ten times greater than that radiated by a dipole. A good rule of thumb for comparing the effectiveness of SSB vs AM signal, each under optimum conditions of receiver bandwidth, is 2 to 1 gain in favor of SSB. In other words, 50 watts PEP is equal to 100 watts 100% modulated AM carrier; Hence, if we put 50 watts PEP into the 10db gain antenna, the radiated talk power would be the equivalent of 1000 watts AM in a dipole.

I'm sure you will all agree that 1000 watts radiated is a substantial signal on any frequency, but let's stick to HF. With this amount of signal on 2 or 6 meters, amateurs should be should be able to get some scatter transmissions effects and consistantly increase their contact area from purely local ground wave of some 30 to 50 miles out to 150 to 300 mile range.

With these thoughts in mind, we at HALLICRAFTERS have come up with two new transverters. The HA-2 is for 2 meters and the HA-6 for 6 meters. These units both function in the same fashion but provide different output frequencies. Here's the way you use them: Connect either one to any 10 meter receiver and transmitter and the transmitter signal will be converted to VHF. The incoming VHF signal is converted to 10 meters to feed the receiver. On the transmitter side the transverter will take any input from 10 to 100 watts.

The transverter is a linear frequency converter so that no matter what mode you feed into it, it will convert the input signal to a new frequency. Therefore, if you feed it AM, out comes AM; feed it SSB; out comes SSB. Obviously it will also convert FM, CW and RTTY on 10 meters to signals on VHF frequencies.

RW "Bud" Drobish, W9QVA

From The Ham Shack Of K3GQA

PHILIP, BELLEVUE, PA.

Here is an oddity that could really shake you if it happened to you. I know, because I was "Shook"—It actually happened.

Let me brief you first then I'll get into what I want to convey to you. It was a Monday evening and having left the GPVHF 6 meter net at 50.4 Mc. at nine o'clock in order to check into the Breeze Shooters Net on 29,000 Kc., I found that when a certain station checked in with his comments, a major portion of the disertation was with regards to hearing K3GQA on Single Sideband on the 15 meter band. Well, being on the 15 meter band isn't anything unusual in itself but just where on the 15 meter band, in this particular case is the point of interest for this article. Well, one of the points, anyway, because another good point is to display just once again how a fellow Ham can help another.

Here's what happened — W3NKM, Stan, was the certain station that I mentioned in the earlier paragraph, and he informed me in a very nice way that he had heard me on SSB at 21,052 Kc. the previous evening calling K4QHN in Sarasota, Florida. Well, as you can see, 21,052 Kc. isn't exactly in the phone section of the 15 meter band, and furthermore, K4QHN wasn't to be heard on 15 either. And still further, my good friend Stan, W3NKM, was working a DX contest (CW no less) at the time and this "Loud and Clear SSB" signal couldn't possibly have added to his Key Clickin' Pleasure, because it had no business there. So after the Breeze Shooters Net was closed down, I asked Stan to meet me down the band and we could talk about the condition that prevailed the previous evening.

At this point, you might ask, "Just what does this have to do with VHF since this is a VHF publication?" Well, let me tell you—it does have something to do with VHF because it was on a VHF band (6 meters) that I was calling K4QHN. Just how Stan had heard me on 15 meters was the thing that shook me, so this is what Stan and I talked about "down the band". Well, it turns out that in order for me to get a SSB signal on the 50 mc. band, I mix a 29.1 mc. signal (fixed) with a 21 mc. SSB signal obtained from my HT-32. This mixing takes place in a power mixer that I made, and then I feed the additive frequency (50 mc.) into my VHF Linear Amplifier and thence to the antenna. On that Sunday evening, I was transmitting on approximately 50.152 mc. when I was calling K4QHN who incidently was also operating Single Sideband. Now for me to be on 50.152 mc. I would have to tune my VHF in my HT-32 to 21.052 mc. since this would be the required SSB signal when mixed with a fixed 29.1 mc. signal. It must be remembered, however, that when two frequencies are mixed in a Mixer, there are four frequencies that appear in the output, namely, each of the two original frequencies plus the difference frequency, plus the additive frequency. Now Stan and I continued with the discussion along the the lines that even though the output of the mixer was tuned to the additive frequency, it could be quite possible that either one of the two originals could be getting through. Well, how were we to find out? Very simple, indeed, for all we had to do was to set up the original set of conditions, just as they were the evening before and make a few tests. Well, now, keep in mind that Stan and I were talking to each

PHILIP J. POLITO, K3GQA

other on the 10 meter band when this discussion was going on and if I were to set up the "original" condition as I had it the night before, I would necessarily have to utilize my HT-32 as a SSB generator on 21.052 mc. so that I would be able to put out a test signal on 50.152 mc. when mixed with the 29.1 mc. fixed signal in the mixer, and to further complicate the situation, Stan had no means of receiving me on the 6 meter band to be able to communicate with me (we would have worked crossband). So, what were we to do? (It's a good thing that there are telephones around.) Yes, we signed off on the 10 meter band and then I called Stan on the telephone. There was no other way. Oh, yes, we could have quit and gone to bed, but that wouldn't have solved my technical problem. So Stan stuck it out with me to the not-so-bitter end, because, believe it or not, we did correct the trouble — Hi — Hi. What we did, as I said before, was to set up the orginal condition, everything the same, even the operating frequency of 50.152 mc. Now then, when I came on the air with my test signal on 6 meters, Stan was tuning for me on 15 meters. Sure enough, he found me, exactly the same place as the night before. Well, one phase of our test was concluded. Now, the next thing we did was to find out whether he was getting me through the 6 meter set-up or from the HT-32 itself. So, whilst he is listening on 15 with one ear and to me on the other (telephone), I proceeded to turn off my Linear Amplifier—he still heard me on 15, so this phase of the test proved that it was not on the 6 meter set-up that was causing the trouble. He was actually hearing me at about S7. So Stan asked me to rotate my Mosley Triband Beam. Sure enough, the strength of the signal as heard on 15 dropped considerably and then built right up again. So now we were sure that it was coming from the HT-32. But, just how it was getting up to the antenna posed a question because the HT-32 was not connected to the Mosley at all because its output was being fed into the 50 mc. mixer. So what we did then was to disconnect the Mosley transmission line from where it was connected to the Low Frequency Antenna Change Over Relay. The signal dropped as reported by Stan and then Stan said, "Now, short the transmission line". I did, and sure enough he heard no more . . . how about that?

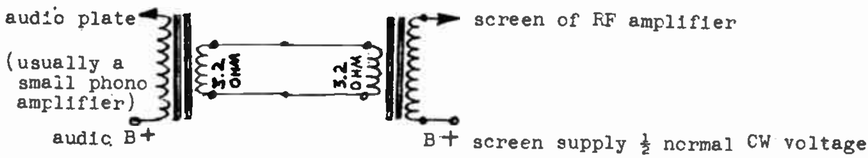
Preceding four pages were stolen from the G.P.V.H.F.S. Hamorama publication -ED.

de: Uncle Charlie How
re: High Level Plate Moduation
or
100 – 500 Watts < $20.00

While we all realize that SSB is not coming to our VHF bands, but is already here, there are still a great many stations equipped only for AM operation and it is to those that this article is directed.

If one searches back through *QST's* to the early twenties they will find more amplitude modulation schemes including grid, screen, plate, super, ultra, etc., than a stick can be shaken at. Sorting them out scientifically one will eventually realize that Class B high level plate modulation will yield the greatest overall output power for a given input. The purpose of this article is to illustrate how a 100 to 500 watt modulator may be built for less than $20.00 and to explain how and why the components recommended are used.

Most hams at one time or another have used small audio output transformers back to back as the modulation transformer when screen modulating a tetrode or pentode final amplifier, as illustrated in Figure 1.

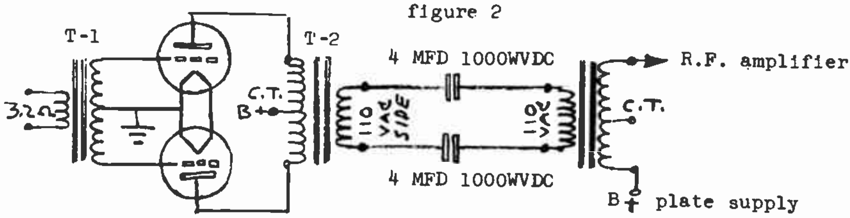


The reason the above system works so well is that the screens of most tetrodes seldom draw over 2 to 5 watts of power thus allowing a small phono type audio amplifier to easily handle the power requirement, along with the fact that the impedance of the screen or screens being modulated is usually between 3000 to 6000 ohms. Most small audio amplifier's final output tubes plate impedance also runs between 3000 and 6000 ohms. With the foregoing transformer hookup we have essentially a one to one turns ratio between the first primary and the second secondary so since the impedances of the audio output stage and its screen load are basically equal we have the load well matched to the power source allowing efficient transfer of this audio power with a minimum of distortion and audio power loss.

The above system is extremely simple and inexpensive if one is satisfied with the poor overall efficiency that screen modulation yields, but applying the same idea to high level plate modulation by using surplus plate transformers and substituting zero bias surplus triode modulator tubes will allow us to generate up to 500 watts of audio power which should certainly modulate most rigs 100 percent.

Figure 2 illustrates a Class B modulator using a pair of surplus 838 zero bias triodes and a pair of surplus plate transformers hooked up again, back to back.

figure 2



(T-3 and T-2 surplus
plate power transformers

(T-1, 5 to 10 watt audio
output transformer)

It is necessary to use two plate transformers of the same exact type in the above circuit so that an overall turns ratio of 1:1 still exist between the first and second transformers. Again we are fortunate in that the plate impedance of most moderate and high power Class C final amplifiers is usually between 2000 and 8000 ohms and the above modulator tubes work best into an impedance of approximately 8000 ohms when using about 1250 volts on the plates of the 838's. At 1000 volts on the 838's, their best plate to plate load is approximately 5000 ohms, so it may be seen that by changing their plate voltage their optimum plate to plate load can be varied. In actual practice this is gilding lily since the above modulator has been used to modulate final amplifiers with plate impedances varying from 1800 ohms up to and including 9200 ohms without varying the modulator plates from about 1200 volts with no ill effect and no measureable loss in audio power.

Speech frequencies that contribute to the intelligibility of voice transmission lie between 300 and 3000 cycles, therefore it is apparent that any transformer that will transfer power at a frequency of 60 cycles with a given amount of iron in it, will transfer considerably more power at the higher frequencies where normal speech occurs with the same amount of iron in it since power transfer per unit weight of iron laminate in a transformer increases with frequency. We have all seen how much lighter a 400 cycle 100 watt power transformer is when compared to a 100 watt 60 cycle transformer. All this then leads us to the conclusion that a given 60 cycle plate transformer will handle considerably more power (audio) than 60 cycle power. There is also another factor in our favor power wise. A transformer's ability to transfer power is limited partially by the amount of DC current flowing through both its primary and secondary windings. In figure 2 we have divided the DC current between both transformers, hence we may further increase the power handling capability of our modulator for a given size transformer.

Since most inexpensive plate transformers lie in the 800 to 1200 volt region, Figure 2 shows two DC blocking capacitors where the two 110 volt windings are connected. These capacitors serve as an extra safety precaution if the transformers you use have a low voltage rating and are unnecessary if their voltage rating is adequate. A close look at voltages developed within the transformers will tell us just what margin of safety we have. Assuming the modulator plate supply to be 1000 volts and the RF amplifier plate supply to be 2000 volts, T-1 would have a maximum of 2000 volts to ground and T-2 a maximum of 4000 volts to ground, all this while under modulation. By raising the transformers above ground; that is, mounted on ceramic pillars or insulators of some kind, the voltages across both transformers are reduced by one half. Any surplus plate transformer designed for the military especially, will have a voltage rating safety factor of at least 4 to 5 times its rated working voltage. Normal commercial transformers of even modest quality have safety factors of 2 or 3. All this means that with an 800 volt military plate transformer rated at 200 ma we may expect a pair of them used in Figure 2 to easily handle 200 to 300 watts of audio, or if of the 300 ma variety to handle a good 500 watts to modulate a full kilowatt.

If over 300 watts of audio is required, another pair of 838's may be paralled to the ones shown. Four 838's with approximately 1300 volts on the plates will deliver 600 watts of audio and fully modulate a 1200 watt amplifier. T-1 shown in Figure 2 is a small 5 or 10 watt audio output transformer hooked up in reverse, and serves remarkably well as the driver transformer, giving the audio amplifier ahead of it the usual 1:1 turns ratio which adequately matches the 838 grids. When a speech amplifier and modulator like this are being built from scratch it is best to use a low impedance driver source for this modulator such as a pair of 6N7 triodes running zero bias. A 12AX7 and 6C4 will more than drive the 6N7's which will more than drive the 838's (four) to well over 600 watts output.

The ideal supply for this modulator, two 838's, would supply about 1200 to 1300 volts at 300 ma load. This supply need not be quite as strong as 300 ma if a large amount of capacity is available in the power supply filter and three flashlight batteries series connected together to form a four and one half volt bias supply for the 838's. This bias will reduce the 838 plate current to about 80 ma idling which will allow the power supply to "punch" the 838's with somewhat more power during voice peaks. The combination of transformers, power supplies, and modulator tubes that may be used with this basic circuit are limited only by the ingenuity and lack of funds of the user. It is also suggested that the Barry Corp., 512 Broadway, New York, N.Y., be written and a copy of their "Green Sheet" be obtained as it lists most every surplus transformer type ever made and available. Barry's transformer type #80G115 should handle 200 watts of audio adequately. It is priced at $1.50 each, and fairly representative. The 838 triodes may also be obtained from Barry at $.95 each.

One note of caution: when raising the transformers above DC ground, on insulators, remember that they may have internally shorted to the transformer case, and touching them would be the same as touching the plate tank coil in the final when transmitting. Enough said.

A later article may possibly cover the use of low voltage plate transformers to generate high voltage plate supplies if there is any interest in same.

73, UCH

VHF

A Night With W8PT

Jack Woodruff, W8PT
RFD 3, Box 157
Benton Harbor, Mich.

Home from work at 5:45 PM. and on goes the big switch. Andold HRO-5 is kept tuned to 5 mc WWV and we flip it on in time, we hope, for the 5:49 propagation forecast broadcast. More important is the flutter content of their signal because the propagation broadcasts aren't always too accurate. Many is the time when I've been working aurora stations like mad while they are still sending N7 or N6 (did you ever hear an N8 or N9?). Their signal is check intermittently throughout the evening. A second check is made on the signal of WWI on 49.880 or thereabouts. If there is any aurora present, it will make their signal audible. If tropo conditions are good, their direct signal is heard weakly. W8PT does not operate six meters in this Channel 2 fringe area, so the six meter beam is fixed permanently north. Setting to the WWI signal is easy with the 75A2 even though they are not audible at the time. A few minutes listening will generally produce enough meteor bursts of their signal to tell they are tuned in.

After supper, conditions are rechecked on the TV set or the FM tuner. If conditions are poor, as usual, we go to work on one of our many, many projects until 2030 EST at which time the Southwestern Michigan 220 mc Net goes on the air starting with the latest ARRL Official Bulletin. (Copied on W1AW at 1900 EST). The net functions Monday, Wednesday, and Friday. Active stations include W8GOV, W8KSV, W8CVQ, K8JZR, W8EYD, and W8PYQ. At 2130 the 220 mc beam goes SW and a sked is kept with W9REM from our old home town, Downers Grove, Illinois (W9PK). Also worked in that area are W9JEC, W9SKN, W9RPF, K9JIJ, K9QDS, K9LTC, W9OVL, W9VVH and others. At 2215 I move up to 432 mc and with the beam again SW I call CQ for 3 minutes. Population is a little scarce on 432, but contacts with W9AAG (225 miles) and W9OII (120 miles) are made nightly and W9ZIH, W9OJI and WØDEN are worked frequently. Also worked occassionally are W8GOV, W8JLQ, W8RQI and W8HCC. W8PT was on 220 mc two years before working Michigan and 432 one year before working the home state. In both cases it was Slim, of W8GOV, that came to the rescue and had a lot of fun doing it. After all this, if the bands are still "dead", we do a little local rag chewing with the "Twoer," or go to bed. If the bands are open, its a different story right from the word "GO". Sometimes 432 will be open with the signals running 40 to 59 db over S9 with just normal conditions on the other bands.

The array of equipment at W8PT might be of some interest. On 432, the receiver is a 416B preamp into a 6BC4 GG RF stage into a 1N22 mixer using the cavity in an R-89/ARN5A
into a 6AJ5 IF stage in- to a 75A2. The 75A2 is connected
to a B&W coaxial switch for converters on all the VHF
bands and an antenna for LF listening. The 432 trans-
mitter consists of a BC 625 (522) driving a 5894 tripler
driving a 5894 amplifier. The antenna is two 13 element
Yagis two wavelengths apart and is fed through Q bars
and Celluline. Next to W8JLQ's 192 element collinear
my antenna is nothing, but it does a surprisingly good
job for me. W9AAG at the other end of our nightly 225
mile 432 hop only uses a single 13 element Yagi, but the
experts say a collinear is the thing for 432. On 220 mc,
another homebrew conver- ter is used. It consists of a

W8PT

417A GG into a 6BS8 cascode into a 6AM4 mixer into the 75A2. The transmitter uses 5763-5763-6360-6360-5894 at 90 Watts with a PP 7034 final in the making. The antenna is a single 13 element Yagi on a Rohn #6G tower up 47 feet.

On 144 mc there are three rigs and a separate 75A2 receiver with a mechanical filter and product detector installed. The usual converter is an FCV-2 with 6CW4 preamp coming out at 26-28 mc on the A2 but other converters are also on hand. Making converters is one of my favorite pastimes and there are always a few coming of going. Transmitter #1 is a pair of 7034's in push-pull with about one KW input, CW only. Transmitter #2 is a pair of 826's modulated by 811's and runs about 275 watts input on 'phone only. Transmitter #3 is a Heath "Twoer" usually good for about 100 miles.

The 144 mc antennas include a 20 element Telrex Long Yagi on a #30 Rohn tower and up about 60 feet, and a 10 element homemade Yagi used with the "Twoer" and mounted on the house under the 432 beam. The towers are only a few feet in from the bluff overlooking Lake Michigan and the bluff is 175 feet high at this point. The 144 mc and 220 mc beams are about 230 feet above the lake and the other beams are lower but in the clear. I have already worked Montana and Wyoming on 144 mc so now am looking for skeds with Idaho, Arizona, and New Mexico. Have a 32V3 on the lower frequencies and work the 7095 and 14095 VHF CW laison frequencies quite often. Would like skeds with anyone west of the Rockies and also need Maine and South Carolina. The latter two have already worked Michigan, so I guess no one there is interested in skeds.

Licensed 32 years ago and active on VHF for years as W9PK (all but Nevada ten years ago on six), I am employed as an Inspection Foreman for the VM Corporation in Benton Harbor and am 47 years old. *MY PET PEEVE: Why all those guys beat their brains out on 75 and 40 when there are plenty of QRM free kilocycles (even megacycles) on the VHF bands!* Also, why the low frequency DX'ers don't try VHF DX, which takes just as much skill and patience and is much more fun. To me there is nothing that can compare with a successful meteor scatter contact for thrills and excitement.

I am and always have been a staunch supporter of the ARRL and hold appointments of OBS, OES, and PAM (Phone Activities Manager) - but prefer CW - hi!

73 - *Jack, W8PT*

VHF

California Kilowatt

(SMALL VERSION)

Jerry Vogt, WA2GCF
160 Grafton
Rochester 21, N.Y.

It has been quite some time since someone has built a five watt rig with a built-in modulator. With this in mind, we decided to make up one to see how it would work out.

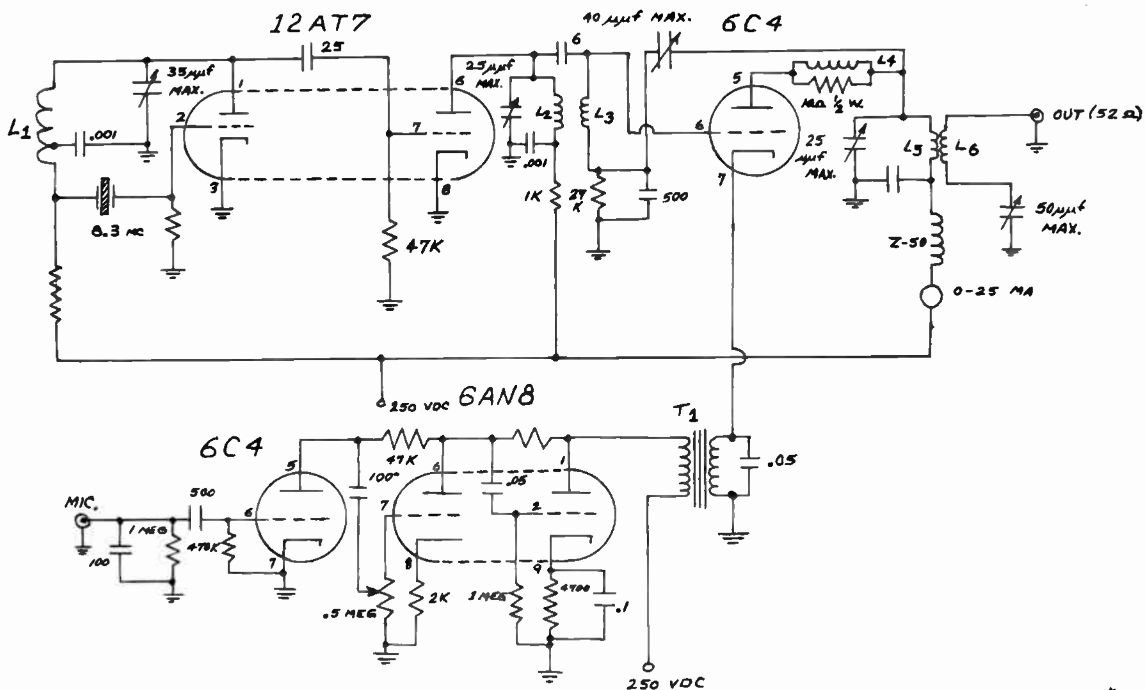
This rig has many features different from the run-of-the-mill job. It can be noticed that cathode modulation is used for ease of wiring. Common tubes, typical of receiver use, are used and a small power supply are all that is needed. Most of us have a 6 meter converter or receiver working so this is just the boat for a General who doesn't want to sink a California buck into a project. The whole thing can be built for around fifteen dollars using the traditional junk box. It has been designed so that no fancy parts are needed and just about any external connections are easy to make. Since everyone has his own metering and T-R switching ideas, we won't bother discussing it.

Sorry, we didn't finish it in time for pictures, but perhaps in a future issue (front cover maybe, Bob?) . There may be a few details unattended to such as B-plus power and neutralizing, but it should work well. At any rate, any improvements you fellows make would be welcome to our ears. Let's hear from you! Write me at the address above if you want to criticize it, since the author needs lots of mail. Besides we ran out of coal and paper works just as well. Just one final word - Good luck and *don't disbelieve the who says you sound better than the 5 KW rig next door.*

P A R T S   L I S T

L1 - 14 turns of B&W 3003 tapped 4½ turns from the cold end.
L2 - 6½ turns as L1.
L3 - 7½ turns as L1.
L4 - 2½ turns #18 wire on 10 ohm ½ watt resistor.
L5 - 3½ turns of #14 wire - ½" diameter, 5/8" long.
L6 - 2 turns of #14 - Insulate from cold end of L5.

T1 - Interstage with a 2 to 1 (2:1) ratio.


12AT7
25
35μμf MAX.
L1
.001
8.3 MC
47K
25μμf MAX.
L2
.001
1K
27 K
L3
500
40 μμf MAX.
6C4
L4
MΩ ½ W
25 μμf MAX.
L5
L6
OUT (52 Ω)
50μμf MAX.
Z-50
0-25 MA
250 VDC
6AN8
T1
.05
6C4
47K
MIC.
500
1 MEG
470K
100
100
.05
.5 MEG
2K
1 MEG
4700
.1
250 VDC

6 METER TRANSCEIVER

by Ken Phillips, K8CHE
351 Hillman Rd.,
Akron 12, Ohio

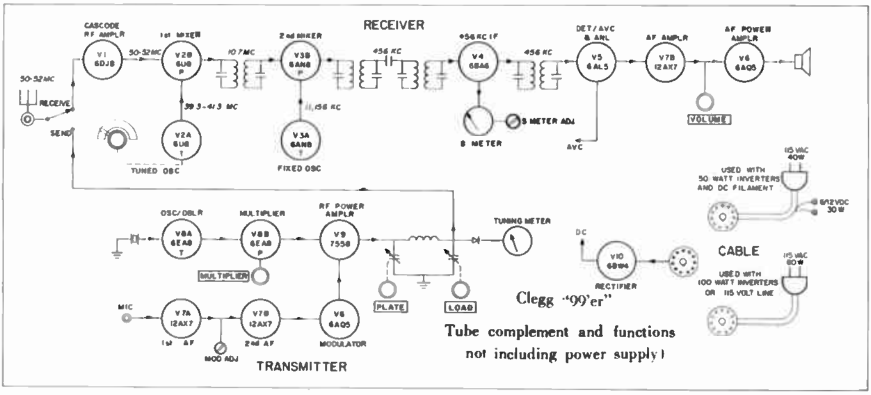
A Clegg 99'er six meter transceiver was made available by Clegg Labs as the main prize for the 6th Annual Northeastern Ohio VHF Picnic.

This was a pre-production model so that we feel we have been one of the first hams to have a 99'er on the air. We were so impressed with the operation of the transceiver that we want to offer this unsolicited testimony of the 99'er.

Let me tell you what she looks like. (I feel that I must call her "she" because she really performed like a lady and looks good too.) The case is very modern with the over-hanging top to give the awning effect. About 50% of the perforated metal which makes it run cool (50% of the case, that is) even after those long ragchews common on six meters. The front panel is white with black lettering and is easily readable without panel lights. The S meter is at least 2 inches square and doubles as a transmitter tune-up meter, and without any switching other than the Send-Receive switch. Plug in a crystal, any old 8 mc surplus rock, flip the lever switch to Send, adjust the buffer, the final, and load the antenna all from the front panel. Adjust all controls for peak reading on the meter and it's ready to go! Flip the switch back to receive and the meter is an S meter. We tried 5.6, 6.3, 8.4 and 25.2 megacycle crystals in the 99'er and they all furnished sufficient output to operate the rig - even though it is basically designed for the 8.334 to 9.000 mc crystals. The crystal socket and the mike socket are right on the front panel.

And now the receiver. Most of the quality transceivers in the high priced range have double conversion but have used the range of 1.7 to 2.5 megacycles as their lowest I.F. Perhaps this is because they are meeting governmental specifications of a certain bandwidth. The 99'er is built to *ham specifications* and not for the politicians. The double conversion receiver uses a 10.7 mc first I.F. and a second of 456 kc. And to improve on this improvement, they have used double tuned I.F. transformers in the 456 kc range. For those not up on their receivers, this is using two I.F. cans between stages, coupled by a small condensor. This puts very sharp edges on the bandpass and makes it easy to chop off the interferring stations. We operated the 99'er at the Picnic using just a vertical about 20 feet in the air, and were able to separate the mobiles operating in the area from the base stations more than 15 miles away! Not too sharp...just right for VHF.

And the noise limiter...You wouldn't know it had one because you won't find an on-off switch for the ANL. But it's there, and it works so well that you 'wonder where the noise went.' Operating at the Picnic with a couple of hundred automobiles (including Fords) we wern't bothered by QRN - in fact, it was conspicious by its absence!



Clegg "99'er"
Tube complement and functions
not including power supply)

The model we had tuned from 50 to 52 megacycles with the first 500 kc being spread over half the dial. This gave approximately ½ inch of the dial for each of the first 100 kc. We see from their literature that models that tune the entire four megacycles are available at no extra cost for those optimists that believe that the hams will somedays operate above 50.5! *I wish I had one of those models covering to 54 mc during yesterday's band opening,* optimism or *no optimism! - K2ZSQ.*

The 99'er has a spotting switch on the front panel that allows you to find the exact location of an old crystal...and with crystals that are on a known frequency should offer accurate calibration marks.

The factory literature says that the receiver has an overall noise figure of less than 4.5 db; the transmitter has 8 watts input to a 7558 final with 5 to 6 watts output. Both of the above statements were confirmed during our field tests.

We didn't get a chance to operate the 99'er mobile, but the method they suggest is rather clever and bears repeating. "For mobile operation with the 99'er a 50 or 100 watt inverter may be used. If a 50 watt inverter is used it is necessary to draw filament current directly from the car battery. When a 100 watt unit is used, the regular cable provided with the unit should be used." A 50 watt inverter costs about $15.00.

73 - Ken, K8CHE

VHF

PROPAGATION FORECAST

JULY - AUGUST 1961

The big news this month is, of course, the meteor showers. The AQUARIDS shower is scheduled for a period between July 26 and 31. The PERSEIDS meteor shower is the years' biggest, lasting from the last week in July to its peak in mid-August. We'll be looking for 2 meter reports on this event.

Sporadic E openings, such as 6 meter operators have been experiencing for the past two or three months, are due to continue into late August. Many short-skip openings should provide new states for sharp 6 meter operators. - *K2ZSQ*

6 Meters - Mobile

Dick DeMalignon, KØPSF
4334-44th Avenue South
Minneapolis 6, Minnesota

Here is a fine little mobile rig that will give you many fine QSO's, and will not take up too much room in the car.

The circuit is as simple as any that can be found. (See diagram). The oscillator uses rugged, inexpensive 8 mc crystals, and triples in the plate circuit. The use of a wide band tank eliminates the need for tuning this section after initial set-up has been made.

The oscillator is the first half of a 12AU7. The doubler-driver uses the other half of the 12AU7 and feeds the 2E26 or 6893 which is the 12 volt version of the 2E26. Final tuning is a Pi-Net. A 7½ watt light bulb was lit a little over full brilliance, and I figure this was about 8 watts output, and, judging from some of the signal reports I have gotten, this is comparable to other 2E26 rigs.

The modulator is a straight audio amplifier with carbon mike input. I used an Argonne AR-107 output transformer for mike transformer because of the small size and it works very well using the primary in the grid circuit. The 12AU7 is two stages of resistance-coupled amplifier, driving a 2E26 or 6893 modulator. A form of Heising modulation is used by feeding the B plus to the center-tap of a Stancor A-3852 Universal Output Transformer and feeding the RF plate from one side and the audio plate from the other. The secondary is not used. This is an 18 watt transformer and is running close to maximum. There is some heating

(Continued on page 28)

You can't miss hearing this!

CLEGG ZEUS

TRANSMITTER for 6 & 2

...185 Watts of Solid "Talk Power" Tops the Band!

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! — You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

CHECK THESE FEATURES AND SEE WHY A NEW ZEUS WILL PUT YOUR CALL ON THE "MOST WANTED LIST"

- High Level Plate and Screen Modulation
- Highly Efficient Type 7034 Final Amplifier
- Self-Contained Stable VFO
- Built-In Automatic Modulation Control
- Simple Band Switching and Tune-Up
- Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position

Amateur Net Price: Only $675. Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

Ask your Clegg Distributor (listed below) for full information. He'll be glad to serve you.

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Henry Radio, Los Angeles, Severns, Hemet

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Delaware
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Florida
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Indiana
Brown Distributors, Fort Wayne
Van Sickle Radio Supply, Indianapolis

Iowa
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Kansas
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Harrison Radio Corp., New York

Ohio
Universal Service, Columbus
Sternbergs, Inc., Cincinnati

Oklahoma
Radio, Inc., Tulsa

Pennsylvania
Tydings Company, Pittsburgh
Eugene G. Wile, Philadelphia

South Carolina
Dixie Radio Supply Company, Sumter

South Dakota
Dakota Supply, Yankton

Virginia
Key Electronics, Arlington

Washington
Radio Supply Company, Seattle

NEW CLEGG ZEUS

TECHNICAL INFORMATION

In designing ZEUS, major emphasis was placed on producing a highly efficient, high power, completely self-contained VHF transmitter for full coverage of the 6 and 2 meter amateur bands.

The equipment is housed in two separate enclosures, one containing all power supplies, audio driver stages and the Class B modulator system. The other is a compact, attractive tabletop unit which contains all RF stages, audio preamplifier and VFO. Functional switches, audio gain controls and normal metering are conveniently located on the operating panel which features an accurately calibrated slide rule tuning control. Designed with a trememdous reserve of driving power, ZEUS RF stages are non-critical in tuning and more than 500 KC of QSY is available without retuning. Tank circuits are silver plated for maximum efficiency.

Outstanding innovations in both VFO and modulator system design provide performance factors unequalled by any other commercially available equipment.

PERFORMANCE DATA

AUDIO: Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum talk power without splatter. A panel mounted indicator provides visual monitoring of modulation. Frequency response is flat within 2 db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps. Hum and noise levels are down at least 40 db below 70% modulation. Up to 18 db of speech clipping, adjusted with a calibrated panel control gives ZEUS the "talk power" to outperform many KW rigs.

RF: The VFO will maintain frequency stability of 1 part in 10^6 per degree F. per hour after a 15-minute warmup. Frequency reset accuracy is within 5 KC. A precise, zero backlash, flywheel loaded dial makes accurate tuning easy on both 6 and 2 meters.

Maximum TVI suppression is inherent in all ZEUS circuitry, 6 meter output power is fed to the line thru a pi network circuit. Output on 2 is link coupled to a high efficiency tank.

SPECIFICATIONS

1. A full 185 Watts input on both CW and AM phone.
2. Frequency Range:

   CRYSTAL - 49.5 to 55.0 MC and 142.0 to 148.5 MC
   VFO - 50.0 to 54.0 MC and 144.0 to 148.0 MC
3. Power Cable permits separating units by 10 feet, providing remote control of Modulator/Power Supply unit. Cables up to 50 feet can be furnished on special order.

NEW

Clegg 99'er

6 METER TRANSCEIVER

A Compact, Top Quality Station for just *$139.95!*

CHECK THESE EXCLUSIVE 99'er FEATURES:

- Dual Conversion SUPERHET Noise Limiter, S Meter, AVC.
- Low Noise RF Preamplifier.
- Stable — Selective — Vernier Tuning — Built-In Speaker.
- 8 Watt Crystal-Controlled Transmitter.
- 9 Tubes and Rectifier — 14 Tube Performance.
- Completely Wired and Tested with AC Power Supply.
- 12 Volt Mobile Adapters Available.

Amateur Net Price: $139.95

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

THE 99'er

is a combinatiom transmitter-receiver intended for both fixed station and portable operation. Small in size, low in cost, big in performance, and high in quality were our design goals -- and we achieved them all!

The 99'er has a stable fundamental mode crystal oscillator using 8.3 to 9.0 Mc or 12.5 to 13.5 Mc crystals. Unlike units employing overloaded high overtone crystal oscillators, the 99'er is "rock" stable. It is also easily driven by most VHF VFO's. A spotting position on the SEND-RECEIVE switch permits easy spotting of the transmitted frequency on the receiver.

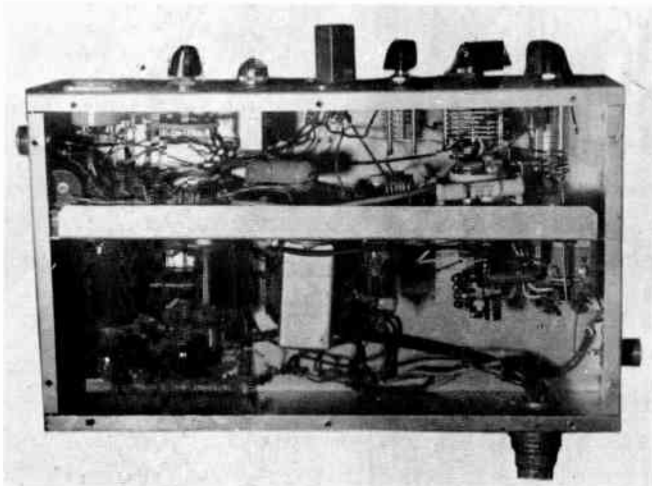
Compare the specifications and features of this unit with those of other transceivers currently available--compare the receiver features alone -- and we're sure that you'll not be happy with any other unit!

A REAL HAM STATION, DESIGNED BY AND FOR ACTIVE HAMS

The 99'er is NOT a converted Citizen Band unit. The 99'er IS A TRUE HAM STATION, which includes those design and operating features required for crowed ham band operation necessarily omitted from C-B equipment.

The 99'er is attractively packaged in the manner befitting any ham fixed portable or mobile station. It will fit at home in a living room or in a Cadillac -- in a VW or a Sprite.

Over-all size of the 99'er is only 10" x 6" x 8" deep. Construction is sturdy, yet over-all weight is less than 10 lbs. A 12 volt power supply is available for mobile operation.



but not excessive, although I would not suggest anything lighter. When using 2E26's, the filaments, of course, will have to be series connected.

The crystal socket on the front panel is an octal socket wired so that a crystal can be plugged in any way; it can, however, be wired so as to accept two crystals with a switch to select frequency. There are two tally lights, green, which goes on with filaments, and red, which goes on when transmitting. The two meters (See photo) are miniature meters, Japanese made for Aristo-Craft. If these are not available from your local hobby dealer, they can be obtained from Aristo-Craft Miniatures, at 134 Pennsylvania Avenue, Newark 2, New Jersey. However, if a field strength meter is one of your possessions, the meters may be omitted. I have a 1 ma meter in the cathode circuit of the final, and a 5 ma meter in the grid. This way I have a contant monitor of the final.

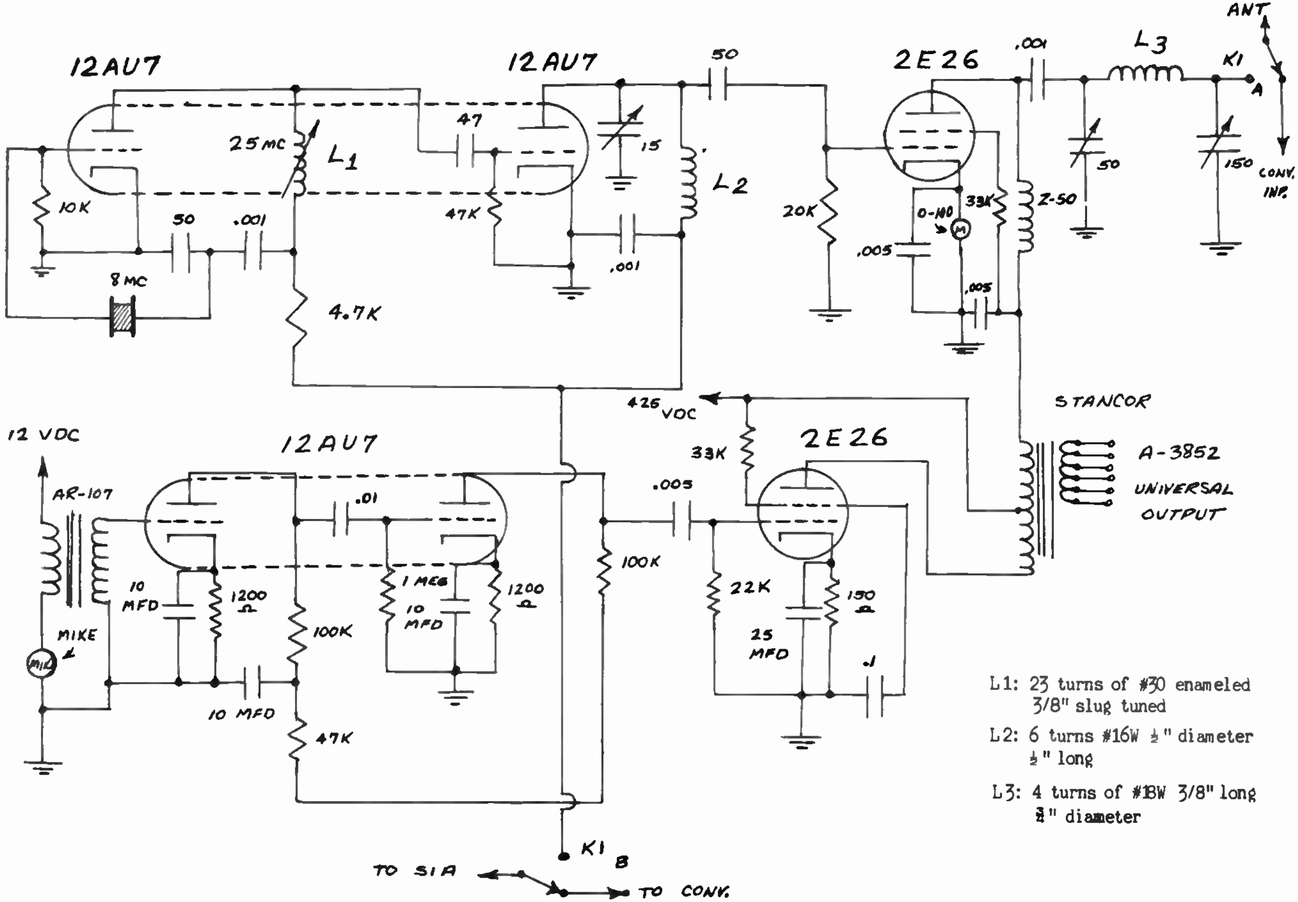
Drive (doubler tuning), plate tune, and plate load are brought out to the front panel for obvious reasons. The power switch is a 3PDT rotary and preforms three functions. It applies power to the filaments, applies B-plus to the converter which is installed in the rig by the modulator section, and switches the broadcast receiver input from the broadcast whip to the converter output. There is a 4PDT 12 volt relay near the final that also preforms three functions. It switches the 6 meter whip from the receiver to transmitter, switches B-plus from the converter to the RF and audio stages, and applies 12 volts to the relay controlling the HV dynamotor for the modulator and final. This also applies 12 volts to the red Transmit light on the front panel.

The power supply is a TCS-14 dynamotor set mounted in the trunk. This unit has two dynamotors, one supplying 225 volts at 100 ma, and the other supplying 425 volts at 180 ma. By changing two connections I have the small dynamotor starting with the power switch and supplying converter B-plus and the HV dynamotor starting with the push-to-talk switch on the mike. B-plus cannot be applied to the final when the power switch is in the 'off' position.

The only real problem in construction was the dropping resistor for the converter, as it was a 6 volt unit.

The whole unit is built into a 12 x 7 x 3" chassis pan with a 12 x 3 sub chassis mounted 3 inches back from the front panel.

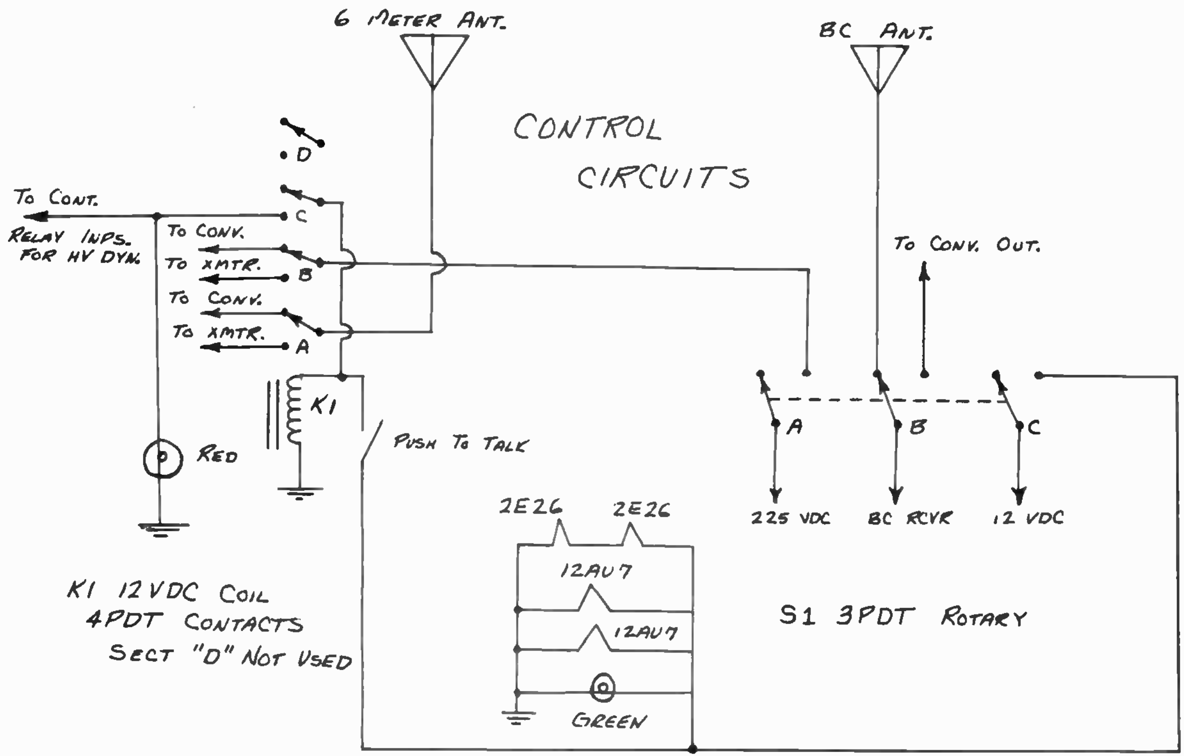
If the author can be of any assistance, in, perhaps, the form of answering questions, suggestions, etc., I'll do my best. Address all mail to the QTH at the head of this article.



L1: 23 turns of #30 enameled 3/8" slug tuned

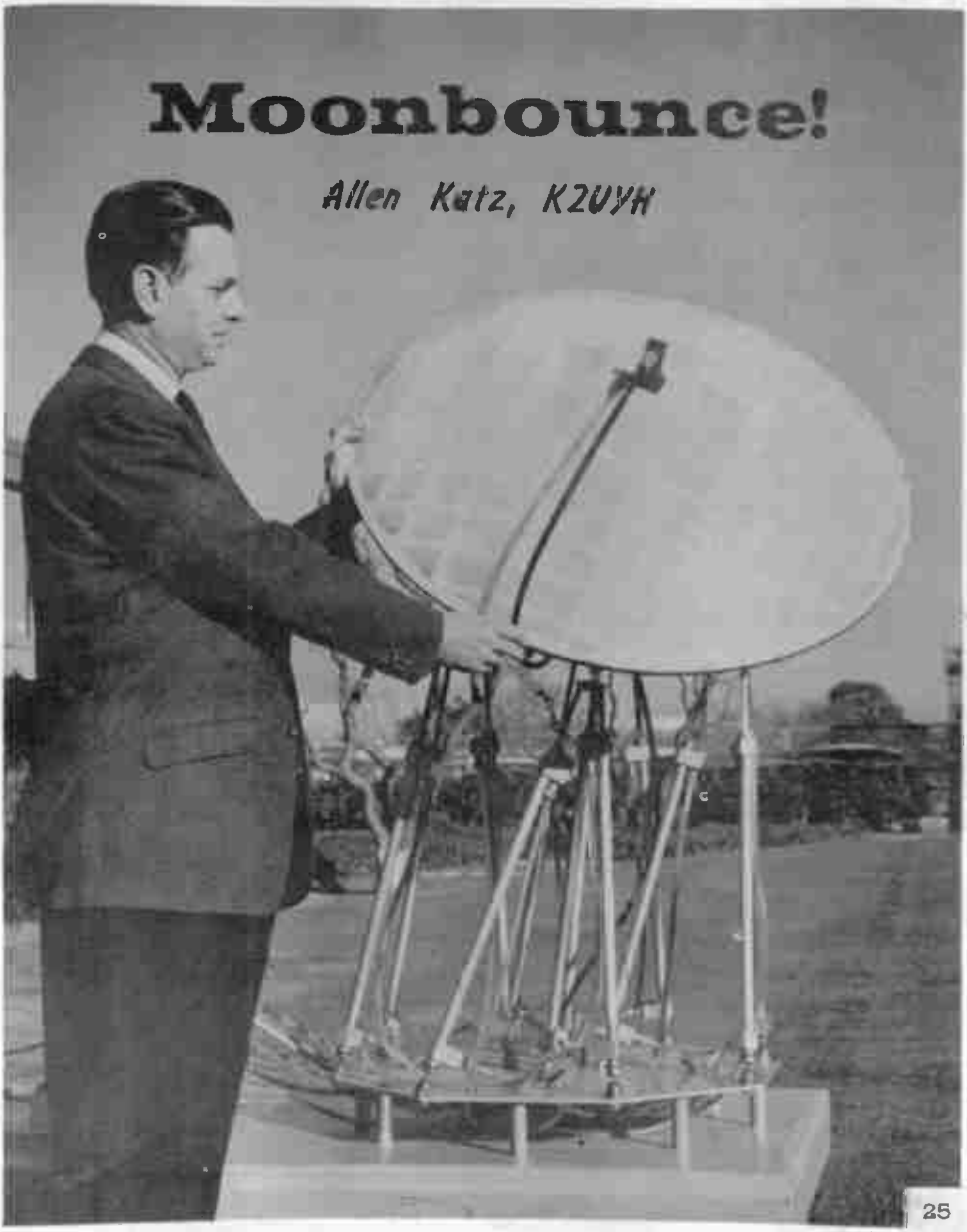
L2: 6 turns #16W ½" diameter ½" long

L3: 4 turns of #18W 3/8" long ¾" diameter


6 METER ANT.
BC ANT.
CONTROL CIRCUITS
TO CONT.
RELAY INPS. FOR HV DYN.
D
C
TO CONV.
TO XMTR.
B
TO CONV.
TO XMTR.
A
K1
RED
PUSH TO TALK
TO CONV. OUT.
A
B
C
225 VDC
BC RCVR
12 VDC
2E26
2E26
12AU7
12AU7
GREEN
K1 12VDC COIL
4PDT CONTACTS
SECT "D" NOT USED
S1 3PDT ROTARY

Moonbounce!

Allen Katz, K2UYH



MOONBOUNCE Editor

Allen Katz, K2UYH
48 Cumberland Avenue
Verona, New Jersey

This month our Editor really went wild! Bob, K2ZSQ, gave us quite a masthead (see previous page), but for good reason. The following is the caption: **MOUNTAIN VIEW, CALIF. --- A new type of antenna, composed of a lightweight rigid foam reflector and an antenna positioning device which can move the reflector through any angle of azimuth and elevation has been developed by the Electronic Defense Laboratories (EDL) of Sylvania Electric Products, Inc. Jesse R. Lien, General Manager of Sylvania's Mountain View Operations, said that the equipment is less expensive, stronger, lighter and easier to fabricate than conventional antennas now in existence. Potential uses of the antenna include satellite communication and radio and radar astronomy.** Boy, that thing would really go great guns on 1296!

Skeds Listing Proposed

Any increase in activity on the UHF and microwave portion of the amateur bands will benefit moonbounce activities. In conjunction with this idea, our Editor, Bob Brown, K2ZSQ, suggested that we include in the column a listing of schedules on the higher VHF bands. We agree with Bob, and are offering to print all information on schedules sent in. With the summer months and the chance they offer to get that new antenna up, we hope to be hearing from many of you.

On the subject of letters, this column's biggest supporter and friend, Alan, VE7AIZ, writes...

"Many thanks for your recent letter. I just returned a couple of weeks ago from N. Quebec where we lived in tents and the temperatures hit -40 degrees F! However we had small heaters which naturally saved the day. The trip was quite interesting. We were in the Auroral zone and I saw aurora every night. I shall probably try to get in touch with VE8BY at Yellow Knife to arrange 50 mc skeds if he so desires.

"I may possibly incorporate limited means for receiving 1296 mc but to be honest, I am not capable enough to attempt all I would like to. I shall be extremely interested to hear from you personally and through your column of your progress on 1296. Possibly you will be able to pick up Sam Harris's transmissions right off the bat. I will get some info together on my pen recorder. Am afraid I can't make too much of a step-by-step letter, but will try to give the general picture. The recorder had non-linear response and needs quite a bit of power (20 watts, 8 suppose) with the amplifier.

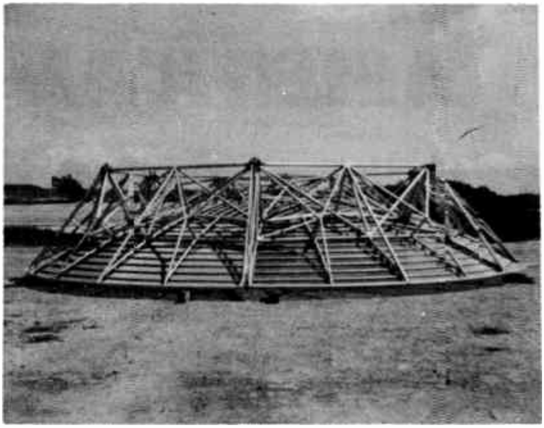
"The February issue of *The VHF Amateur* has brought forth two replies. One concerned the pen recorder, so, as you say, the construction details are of more interest.

"Am leaving Ottawa again on a short trip so will be a couple of weeks or so before I can complete the write-up on the pen recorder - hope it won't be too brief.

73, Alan, VE7AIZ"

Technical Discussion - Moonbounce

Due to the adoption of extremely low noise receiving techniques by amateur radio, antenna noise and how it affects receiver power has come to the attention of many amateurs. In the April column we mentioned the formula for the gain of a perfect receiver (a receiver with a zero db noise level) $PR = -10 \log KT\Delta f$: where K is Boltz mann's constant; T is antenna temperature in degrees Kelvin; and Δf is receiver bandwidth. As can be seen from the formula, the two limiting factors of a perfect receiver are bandwidth and antenna



30 foot Kennedy dish at KH6UK.

temperature. Bandwidth is a problem of design depending on the amount of information you wish to transmit, the stability of your equipment and the selectivity of your receiver.

Antenna temperature, however, is a problem of nature. By antenna temperature, we do not mean the actual temperature of your antenna, but rather the amount of noise generated in the portion of the sky your antenna is orientated. The noise is refferred to as a temperature temperature and measured in degrees because it is produced by the random motion of particles. The faster a particle is in motion, the higher its kinetic energy, and the higher the noise generated. Kinetic energy is dependent on temperature. When you heat a substance, you are adding energy to it; this increase the velocity of the particles (molecules in this case) and the temperature of the object rises. For these reasons, temperature in degrees was adopted as a measurement of noise.

A problem develops in calculating the temperature of the part of the sky your antenna is facing. Antenna tempetature, or Cosmic noise, varies with frequency, time, and area of sky. Along with the formula for perfect receiver gain another formula for minimum temperature as a function of frequency was given. This formula is fine for the operator who can point his beam in any direction and keep schedules waiting for the time when cosmic noise will be at minimum. The situation of the moonbounce operator is different - he can only point his antenna at one particular point in the sky, namely the moon. It is not logical to expect the moon to have the same temperature as any arbitrary point in the sky. The temperature of the moon at microwave frequencies is around 200 degrees Kelvin[1] This value is considerably higher than one calculated for an arbitrary spot in the sky. The increase is probably due to the fact that the moon acts as a reflecter of the sun's (a very hot object and therefore a potent source of noise) energy. This leads one to question the possibility of having a lower noise temperature and a better chance for a contact with a new moon, which occurs when the moon is reflecting minimum amount of energy to the earth. This is only one of the many questions to be answered by the moonbounce operator in the future which make moonbounce a fascinating and challenging part of amateur radio.

Jame C. McLaughlin and Robert W. Hobbs, "Noise Factors Affecting V.H.F. Communication," QST (June 1960), p. 17.

That's the column for this month. We hope more of you will follow Alan s example and write.

73, Allen, K2UYH

SOUTH AMERICAN VHF NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, Argentine

Here is LU6DBE in his shack. Fernando is active on 50 and 144 mc with homebrew transmitters, most of them visible in picture.

During the last three weeks not too much DX was worked on the VHF bands. Conditions on 6 meters deteriorated continuously, and only very few openings were recorded.

So the band was open over the path to Cuba in the evening of April 28. From 2200 to 2240 GMT I heard the commercial station *Radio Progreso* coming in very nicely, but I received no answers to my many CQ calls. This station, or better, the harmonic heard, is a good beacon for that Carribean region and was heard quite often somewhat below 50 mc.

Another DX opportunity was enjoyed on May 1, when I had a pleasant QSO for a half hour with XE1GE, the only station coming through. Signals faded out at 2230 GMT, and this was the last time Ihheard any DX signal on the band.

The first DX season of 1961 is now probably over, and looking back over the openings we had the chance to log this time we are a bit surprised to note such a big difference to the propagational conditions at the same time last year. We did not expect a decrease in the activity level caused by the diminishing sunspot curve, but now we note that 196C brought us DX possibilities far in excess of what could be explained by the current theories.

On 2 meters we only had some isolated contacts with LU2FAO and LU2FCD, but in the future I shall pay more attention to this band and concentrate my efforts to really explore all the DX possibilities offered on this frequency. If I can manage to go to some high power, I plan to run some schedules for meteor scatter tests to initiate, at last, this phase of VHF work here in South America.

SSB is another point which was discussed in detail with LU3EX recently. The advantages of this communication system were noted on several occassions when marginal DX signals could still be copied on SSB when all others already had become unreadable. While Alfred decided to use the filter system (he already has a set of I.F. filter crystals), I still don't know exactly what to do, and the final decision will be subject to the difference in price, ease of construction, and operating convenience. (Any suggestions from the SSB fraternity?)

Finally, we shall not forget the interesting prospects offered by Project OSCAR, the amateur satellite program. This will be really the beggining of a new era of VHF DX communications, and it is certainly not too early to begin to ready our rigs for some possible participation in this exciting program.

As you can see, we didn't have too much news to report this month, but a lot of rebuilding projects. In the future, I will try to keep you informed about any DX activities in these southern latitudes and at the same time show you what is done technically around here on the Very High Frequencies.

73, Michael, LU3DCA

Trading Post

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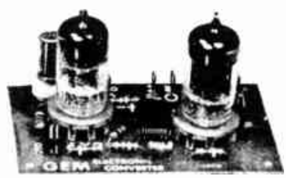
AUTHOR'S CONTEST!

just look at these prizes...



This month marks the second in our monthly AUTHOR's CONTEST which will end with the November 1961 issue. All articles and columns in this issue are to be evaluated by you below and returned to us immediately. We'll announce which articles, on a percentage basis, were the most popular in this issue. At the end of November, all percentage winners will be competing against each other for top prizes. Best winners over-all get the prizes pictured above. YOUR article can win! Meanwhile, help our writers this month by doing your part...

Return immediately to: *THE VHF AMATEUR,* 67 Russell Avenue, Rahway, New Jersey.

Directions: Pick out the best articles (only four) and rate those four in the order of their appeal to you (#1, #2, #3, #4 - first being best, and fourth being 4th best)...

MODES OF PROPAGATION, W3RUE	( )	EVENING WITH W8PT, W8PT	( )
TVI - WHAT TO DO, K2ZSQ-ZSP	( )	CALIFORNIA KILOWATT, WA2GCF	( )
CASE FOR VHF, W9QVA	( )	SNEAK PREVIEW - 99'er, K8CHE	( )
FROM THE HAM SHACK, K3GQA	( )	6 Meter Mobile, KØPSF	( )
DE Uncle Charlie How	( )	MoonBounce! K2UYH	( )

SOUTH AMERICAN NEWS, LU3DCA ( )

"Terrific! ... Unbelievable ... Best rig – ever"!

Here are a few unsolicited comments from owners of Clegg VHF equipment

Clegg Zeus VHF Transmitter FOR 6 AND 2 METERS

A highly efficient, 185 watt AM, high power VHF transmitter for full coverage of the amateur 6 and 2 meter bands and associated Mars frequencies.

Automatic modulation control with up to 18 db of speech clipping provides magnificent audio with "talk power" greater than many kilowatt rigs.

This beautiful unit with its ultra-stable VFO is the ultimate in VHF equipment for amateur and Mars operation.

99'er Transceiver FOR 6 METERS

This completely new transmitter-receiver is ideal for both fixed station and mobile operation. Small in size, low in cost, and tops in performance, the 99'er offers operating features unequalled in far more costly equipments. The double conversion superhet receiver provides extreme selectivity, sensitivity and freedom from images and cross modulation. The transmitter section employs an ultra-stable crystal oscillator which may also be controlled by external VFO. An efficient, fully modulated 8 watt final works into a flexible Pi network tank circuit. A large S meter also serves for transmitter tune-up procedure.

From Ohio:

". . . I am a quality control supervisor with a leading electrical manufacturer and this Zeus transmitter is to me the finest piece of workmanship that I have ever purchased or inspected . . ."

Richard E. Hayes, K8UXU

From New Hampshire:

". . . We feel that our new Zeus is the best thing that ever happened to us since we have been in ham radio (5 years) . . ."

Hazen & Beatrice Bean, K1JFQ

From Florida:

". . . We are well satisfied with the results of this unit as we have worked forty DX contacts in little more than three hours on May 23, 1961, including six new states which we were unable to work in the past two years with a 120 watt, 6 & 2 transmitter of a different mfg. . . ."

Jack Edlow, K4YIW

From California:

". . . Never before have I been more pleased with a piece of gear than I am with my Zeus. In two days I have worked 24 states with several contacts in each, (phone) on six meters. And the signal reports — yow! For the most part unbelievable . . ."

Jeanne & John Walker, WA6GEE

From Pennsylvania:

"Words cannot express the pleasure and performance of ZEUS. I have worked 5 states 5-9, plus I have given you $1,000,000 advertisement . . ."

Dr. A. Schlecter, K3OEC

From Puerto Rico:

". . . I want to inform you of the excellent results obtained with the Zeus Transmitter I bought one month ago. Taking advantage of the band opening, I have been able to work up to the present thirty-eight states, including California . . ."

Pedro Fullana, KP4AAN

From New Jersey:

". . . I would like to tell you I am more than delighted with the operation of the Zeus. Have had nothing but good reports from other Ham's . . ."

Donald E. Gillmore, WA2QCQ

From Georgia:

". . . This set is terrific. I've had terrific results with it. It's the best rig — ever."

George E. Missback, K4QOE

K8CHE in Ohio tells about 99'er

". . . with the 99'er haywired in from a four element beam, through 100 feet of coax, through a matching network, through a length of 72 ohm twinlead, and then through a length of 300 ohm twinlead to reach the 99'er, we could read the Michigan stations Q5! and back through the above haywire we were able to put 4.4 watts into the antenna as measured by a RF ammeter! . . ."

Ken Phillips, K8CHE

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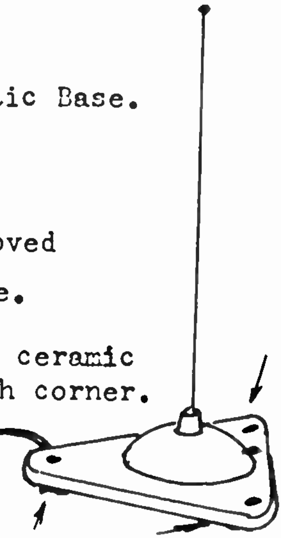

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ARC-3.....Xmtr 100-156 mc 832PA; 8 channel, 1/new..................19.50
ARC-3.....Rcvr 100-156 mc 17 tubes; 1/new..........................17.50
ARQ-1.....Transceiver 14-50 mc; 807 PA; excellent..................29.50
BC-1158...6 mtr xmtr; pair 815s mod by pair 815s...................34.50
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SCR-522...100-156 mc transceiver w/tubes; excellent................22.50
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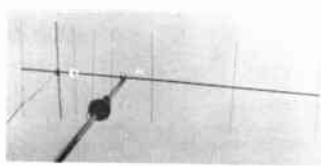
L-O-N-G YAGIS

For 6 Meters, 2 Meters, 220 & 432 mc

Silver Falcon introduces high gain at a very low price. Elements are cut from hi-Q aluminum rod except 6 meters which uses ½" tubing. The 6 meter Yagi features Gamma-Match and beams for 2 meters and above use a folded dipole matching 300 ohm line. All antennas are coated with lacquer to reduce oxidation of the aluminum. Aluminum is used throughout with the exception of brass screws and cadmium plated steel screws. All hardware is furnished. All antennas F.O.B. Saginaw, Michigan.



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144 Mc - 12.0 db gain. 8 elements on a 10 foot boom. Boom is 5/8" Dia........7.50

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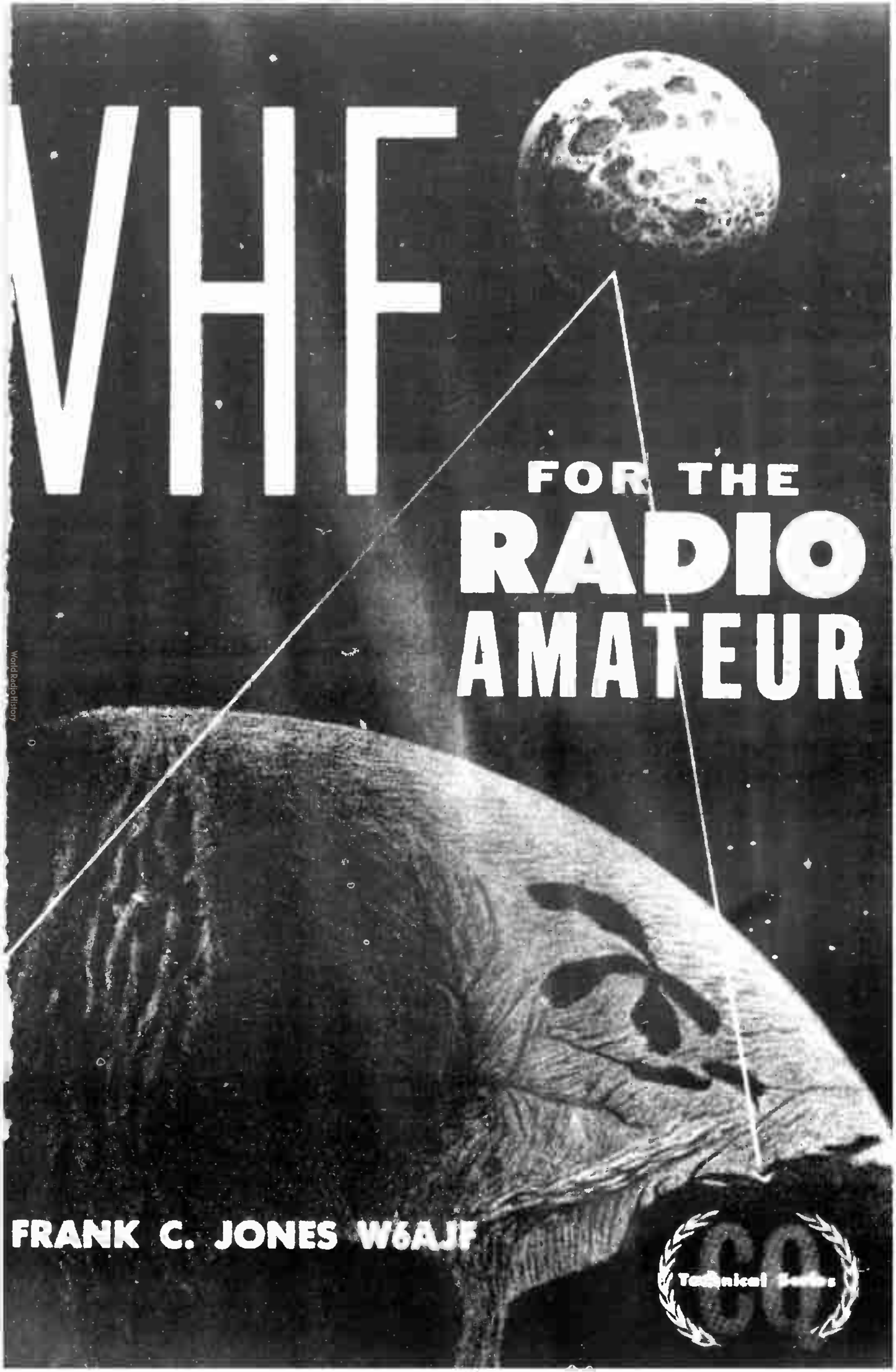
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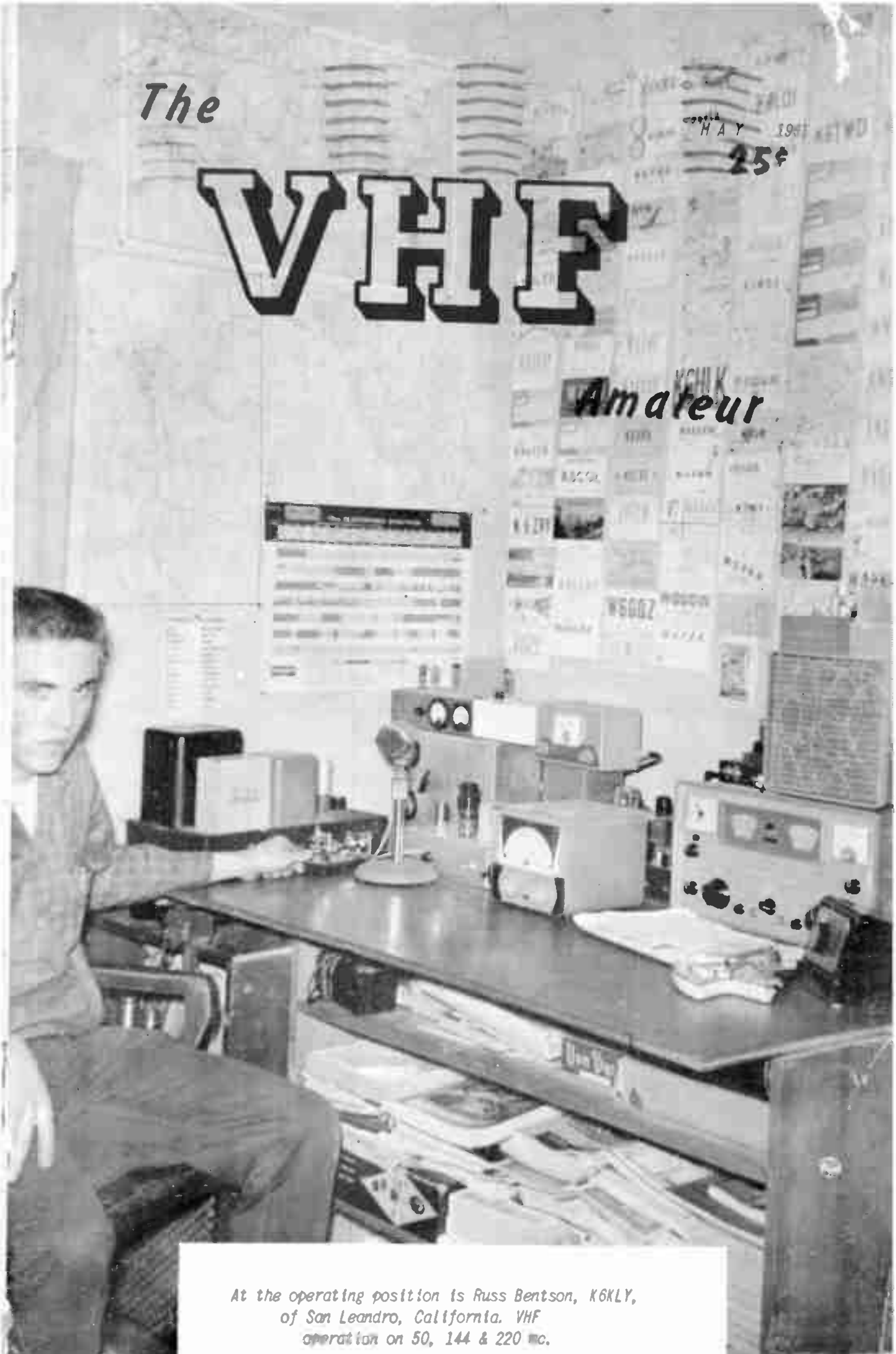

At the operating position is Russ Bentson, K6KLY, of San Leandro, California. VHF operation on 50, 144 & 220 mc.

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10 Watt - 6 Meter Transmitter

The Amateur Radio Society of Harrison, N.J.
K 2 I A P

In this article the A.R.S.H. presents its first project designed by club members. This project, a 10 watt 50 mc transmitter was completed under the direction of Archie, K2ANB. Although 50 mc transmitter designs can be found in almost any ham publication, the purpose of this job was to present a design utilizing *parts and tubes which are common and easily obtained.* This, we hope, will encourage more amateurs to get on the air.

CIRCUIT DETAILS

The transmitter circuit diagram shown uses half of a 12AT7 as a frequency tripler and the other half as a doubler to obtain 50 mc from an 8 mc crystal. If a 25 mc crystal is used, only doubling action is obtained from the circuit and TVI possibilities are materially reduced. A horizontal deflection beam power tube, a 6BQ6, is used as a final. Input power to the final circuit depending on the final plate voltage, is between 10 to 15 watts. The estimated output is 7 to 10 watts. The plate power supply requirements are 100 ma @ 300 - 500 v for the 6BQ6 and 60 ma @ 300 v for the 12AT7. A filament supply of 2 amps @ 6.3 v is required for supplying both tubes. A closed circuit jack, J-2, is provided for CW operation.

CONSTRUCTION AND TUNING

The transmitter is assembled in a 6 x 6 x 6" shielded box mounted on a 3 x 6 x 9" chassis. The assembly and positioning of components is shown on the diagrams at the end of this article. The shielded box portion contains the final (6BQ6), parasitic suppressor (P.C.). output pi-network components (C-3, C-4, and L-4), neutralization arrangement (nc), M-1 (0 - 100 milliameter) and J-1 the antenna output jack. M-1 is used primarily for tuning up the transmitter and may be eliminated as a permanent feature. M-2 (0-5 ma), C-2, L-1, X-3 are mounted on the side of the chassis as shown.

Neutralization of the 6BQ6 is required. This is accomplished through nc (see schematic) which consists of a length of #16 rubber covered solid wire attached to the lower portion of L-3. This is brought through a 1/8" hole about 2½" into the shielded box and cut to length for proper neutralization. C-6 is a .001 mfd feed-thru capacitor. Mount L-3 and C-1 as close to pin 5 as possible. When tuning, C-1 and C-2 are used for adjusting the grid current of the 6BQ6 for a maximum reading. This reading of approximately 2 ma is obtained on M-2. M-1 is used along with C-3 and C-4 for tuning the plate circuit of the 6BQ6 to resonance. This will be indicated by a minimum plate current reading.

When wiring up the transmitter, make connections as short as possible. A review of VHF wiring procedure may be advisable before attempting construction.

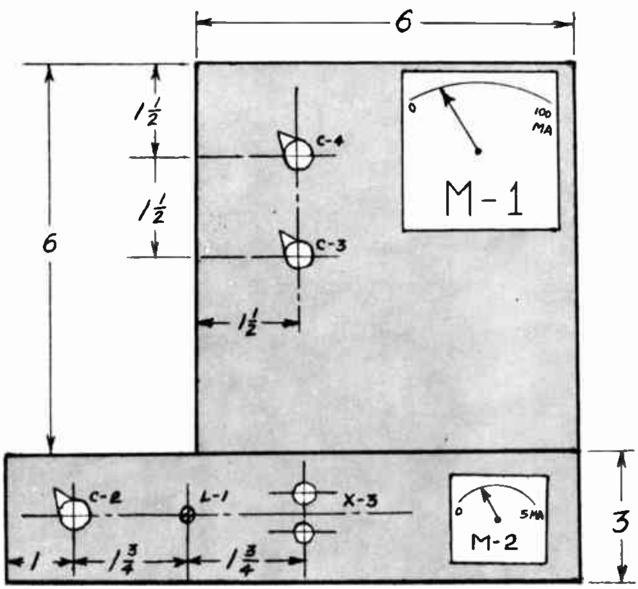
A few possible modulators and mike inputs which may be used with this transmitter are:

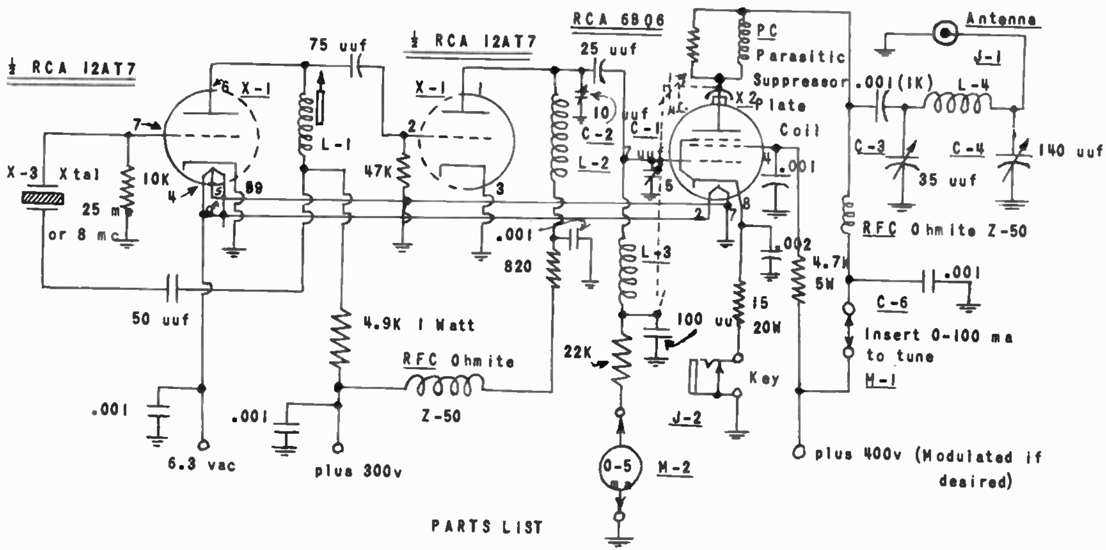
1. Crystal mike input
   "Low Power Modulator"
   ARRL Handbook - 1960 - page 271
   Tubes used (1) 12AX7, (1) 6C4, (2) 6AQ5's
   Power supply 90 ma @ 500 vdc

2. Single button carbon mike input
   "Simple Modulator for Portable Work"
   ARRL Hints & Kinks - Vol. #3 - Page 48
   Tubes used (2) 6V6GT's
   Power supply 75-100 ma @ 200 - 300 vdc

TVI suppression is incorporated in the circuit through the use of the pi-output network, parasitic suppressor pc and neutralization. However, proper by-passing and shielding are necessary for additional reduction.

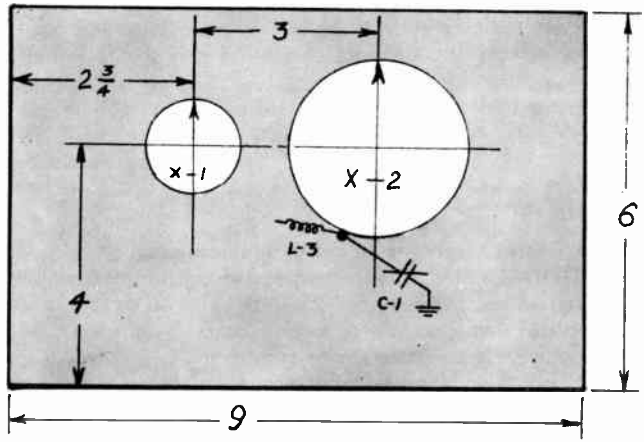
Many thanks to Hal, W2VHU, for the constructive advice on the design of the 6BQ6 final and to John, WA2ERI , for the excellent construction work on the transmitter.--Thanks to the Society for this article, which was also published in their *R.A.S.R. VHF Activities*.





PARTS LIST

L-1: 23t #30 EN. on 3/8" Slug-tuned form
L-2: Air-Dux #516t 3/8" long 5/8" dia. (use 6 t)
L-3: Air-Dux #516t use 6½ t
L-4 Air-Dux #608t - 4t #18 3/4"
PC: 2½ t #18 Spaced 1½ times wire dia. on 10 ohm ½ watt resistor.
NC: See note in text
C-1: Erie Ceramic Trimmer 1.5 - 7 uuf



VHF

Satellite Scatter

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77 Massachusetts Avenue
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The VHF Amateur, *through this initial article by K2QBW, is cooperating with the new Office of Satellite Scatter Coordination at M.I.T. which was opened on March 1, 1961. We urge ALL readers to carefully read the following and to cooperate by writing at once to the Director, address above, with the information requested in the article and for further details on the subject. This is a MUST for the scatter enthusiast!*

You will undoubtedly recall my QST *article of July, 1960,* in which I made the offer to supply all needed information to those sincerely interested in satellite scatter work. This office has been created with the help of the Department of Electrical Engineering as a means of supplying you with this information.

As the name implies, we exist to coordinate research, not to conduct it ourselves. That we leave to you, the participating radio amateurs. This is as it should be, for the most important findings in amateur history have always resulted from the personal initiative of the individual experimenter, rarely if ever from centralized planning. OSSC, (Office for Satellite Scatter Coordination) therefore, does not have a "program" of experimentation, nor does anyone expect to have one. We are here simply to make your life easier, by establishing frequency channels for standardization, by providing a means of disseminating findings among your fellow experimentors, by acting as a information bureau through which any news which might develop out of your work can reach the outside world, by publishing bulletins from time to time with information of interest to those in the field (namely you), by maintaining lists of amateurs involved in satellite scatter together with pertinent information as to their activities, and, of course, by attempting to supply advice to possibly help you over an obstacle. We cannot guarantee to know all the answers, but we can, by asking various sources in the Department, as well as some places such as Lincoln Laboratory, etc., attempt to fill in where our own knowledge falls short.

As is generally known, there are in excess of three dozen objects in orbit at the present time, with the likelihood of this number increasing as time goes on. One can calculate that, out of any given hour, one or more satellites will be capable of providing satellite scatter communication over a given path for perhaps twenty mintutes, on the average. This is simply a consequence of the large number of satellites. This would tend, of course, to make statistical correlation between signal bursts and satellite passes quite difficult. This is complicated by theories which have been proposed saying that a satellite need not actually be in proximity to the two stations to produce a signal strength increase. For example, some say that a satellite in polar regions may produce bursts in many parts of the earth. Others feel that the ionized trail, if indeed one exists, may become separated from the satellite in flight, and therefore cannot be assumed to follow the tracking information for the satellite itself. In other words, assuming proper conditions, satellite proximity is a sufficient, but not necessarily a necessary , condition for burst incidence. This brings to mind a possible new method of reasearch. Previously, one would first predict a satellite pass, then schedule the tests to coincide with it. Today, however, it might be worth the effort to reverse the procedure, i.e., to schedule the test for a period of, let us say, an hour, which can be arbitrarily chosen so long as the ionospheric MUF for the path in question is below the operating frequency. The satellites could then be correlated with the finished test results, if possible, rather than vice versa. This, of course, raises the point that there are two other principal modes of propagation which will enter into the results, viz. meteor scatter and ionospheric. But why not? It might be a good idea to see if a so-called "multiple scatter" communications system can indeed provide useful communication. The strong likelihood is that any future use of the frequencies in question during periods of sunspot lull for other than local work will indeed be via some combination of the three modes, rather than via one alone. Therefore, why not use the multiple scatter system in our tests?

This, of course, only a suggestion, but it is one which has definite potential for amateur participation.

To facilitate experiments of the foregoing type, as well as more conventional varieties, OSSC hereby declares the frequencies 21.010 mc, 28.010 mc, *and 50.010 mc,* to be standard frequencies for experimentation. All amateurs are requested to use one of these three channels for work, so that casual observers and others who happen to be free in order to listen will know where to look. Note that this request does not affect normal amateur operations,because these are conducted on these frequencies at times unsuitable for satellite scatter work. Observers hearing experimental work are requested to get in touch with the particular station involved. If you cannot determine who the station you hear is, submit your monitor log to OSSC. By the same token, it would be greatly appreciated if all stations involved in satellite scatter work would inform OSSC as to which channel they are using and when, so that we might forward any monitor reports which may come in.

Re satellite predictions: In the interest of preserving the individual initiative and derived personal satisfaction therefrom which is necessary for truly meaningful participation, it has been decided that satellite predictions and orbital correlation must remain the responsibility of the individual operator. In line with this policy, the following sources will supply satellite orbit prediction charts, generally good for about a week in advance, free of charge to all qualified observers. Complicated as they may seem at first blush, they are really quite self-explanatory and it is well worth the afternoon it will take to get acquainted with their format. Any specific questions which you may have will be answered by either the issuing source or OSSC. One word of advice: It is our intention that OSSC remain a non-classified project. The savings in terms of time and red tape gained in this way are enormous. However, the price we pay for these savings is that, legally, we posses no "need to know" for obtaining classified orbital information. This is a consequence of the necessity for our remaining unclassified and free from governmental restriction. Therefore, orbits for Samos, some Midas, and even some Discoverer satellites, among others, will not be given us. Please do not expect these.

Sources:

Smithsonian Astrophysical Observatory, 60 Garden Street, Cambridge 38, Massachusetts. (attn. Carlton W. Tillinghast)

Headquarters, Air Force Command and Control Development Division, Laurence G. Hanscom Field, Bedford, Massachusetts. (attn. CCSTN)

Additionally, it would be beneficial for all those interested in satellite scatter work to register with the Volunteer Satellite Tracking Program, 826 Connecticut Avenue N.W., Washington 6, D.C. (attn. Norton Goodwin). This organization, an outgrowth of the IGY, supplies various kinds of useful information including data on expected launch times and probable orbits for certain new satellites, and orbital data in the form of modified orbital elements. These, to be translated into orbit predictions, must be processed by the observer as described in *Satellite Report No. 7*, which is available from them at a cost of one dollar. All other information besides the processing manual is, of course, free.

Remember, OSSC was formed for your benefit. Make use of it. We cannot disseminate information if you who discover it do not write and let us know what you find out, nor can we know who will best profit by this information if amateurs engaged in satellite scatter work do not write and let us know who they are and what their work involves. Similarly, we cannot coordinate unless we know what we are coordinating. Let us know times, frequencies (be sure they are the ones mentioned above for best results), and schedule partners so we can do our best to help you.

For your information and convenience in lining up schedules, there follows a list of amateurs who have expressed interest and ability to be active schedule partners: K2GKM, K3HKK (write to K3IQU), K3JTE, K5JEH, W9MAK, K9GDF, K9IJK, KØQFK, KØTMB. The following feel they can best serve as monitors: K2BMI, WA2FFC. K2JWD has expressed interest but his equipment is unknown. W3EQD has high power equipment, but the time factor is unknown in Don's case.

Data on ionospheric and/or magnetic activity may be obtained weekly from Natl. Bureau of Standards, Boulder, Colo. Ask for their CPRL-Jb' warning service.

The following back issues of periodicals contain very useful information: *Proceedings of the IRE:* 3/58, 6/58, 8/58, 10/58, 1/59, 6/59, 7/59, 4/60, 11/60, 12/60, 1/61. *QST:* 6/59, 7/60. Also *Scientific American* 8/59, *Nature* 2/60, *Bulletin of the American Physical Society* 1/60, 4/60.

VHF

PROPAGATION FORECAST

The VHF Amateur will endeavor to present propagational forcasts every month for our reader's benefit.

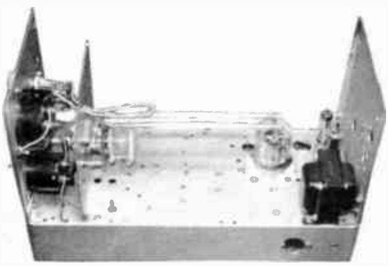
MAY, 1961

Sporadic E: Tremendous increase in activity should result in countless short-skip openings over a range of not more than 1350 miles on 6 meters. Meteor Shower: Aquarids, expected first week in May. Watch 2 meters. North-South (F2): 2PM - 4PM CST & MST from Central U.S. to S.A. 5-7 PM PST West Coast U.S. to Islands and New Zealand. These are the best expected times for 10 meters, so look for openings on six along same schedule. *-K2ZSQ*

VHF

2 Meters . . . 829B!

Richard Huntress, K1CXX
27 Linden Street
Auburn, Maine



Here's a top view of K1CXX's 829B final amplifier for 2 meters with the side support off. Note the filament transformer, 6BQ6 clamp tube, and VR tube on back of chassis.

I have built different final amplifiers in the last year or so, using the 829B, with hairpin loops, ¼ and ½ wave length lines for the tuned circuits. Using a plate tank, composed of a coil and capacitor, results were very poor; not much RF output but lots of heat.Next half wave capacity loaded lines, folded back on themselves to conserve space, were tried. These were a great improvement, but you can't crowd tuned lines into a small chassis and keep the lines balanced. It was then decided to build the final amplifier on a more roomy chassis, so the lines could be all by themselves. The junk box provided about all of the necessary parts. The chassis that the unit is built on had been used for other projects and had holes like a sieve.

Plate Lines

The plate lines are made from 5/16" diameter copper tubing, spaced 7/8 of an inch between their centers. The plate caps for the 829B were my biggest problem. Every time I thought of buying commercial heat dissapating caps, I could hear cash registers ringing up a lot of money. Again the junk box was consulted. I found some old metal binding posts that were very popular in the early days of radio. These were used on battery radios to provide the connections to the wires going to the batteries. Two types of these are shown in figure 5 (see next page). I believe these are still quite popular in the junk boxes of many ham shacks. The first type is screwed into a ¼" diameter piece of rod which is threaded. I found in my junk box a couple of metal spacers which were threaded and worked out nicely. The second type, a ¼" diameter, hollow metal spacer is connected to the binding post, as shown in figure 5. The copper tubing used has an inside diameter just large enough so that the metal spacer, connected to the metal binding post, can be driven tightly into the end of the copper rod. I heated the end of the copper rod and put solder down into it, to make a real solid connection between the binding post and the copper rod.

The lines are spaced the same distance between centers as the distance between the two plate pins on the 829B. At the other end of the lines, the tubing is bent at a right angle, flattened, drilled, bolted together, then soldered. When the lines are finished,

(continued after next page)

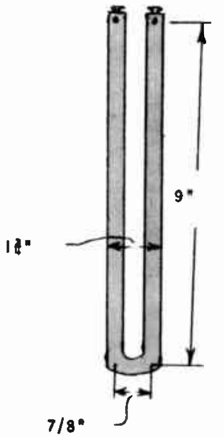


FIG. 1

Plate lines, top view. Lines are 3/8" diameter copper tubing.

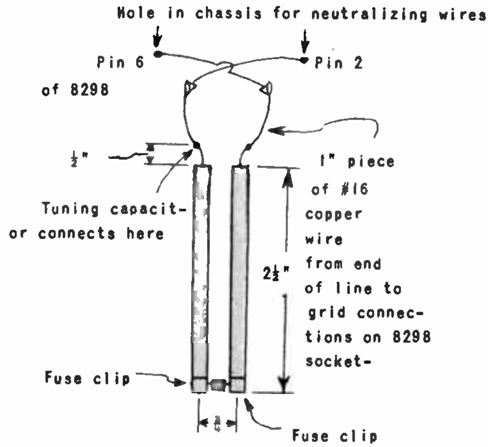


FIG. 2

Grid lines top view. Lines are ¼" diameter copper tubing.

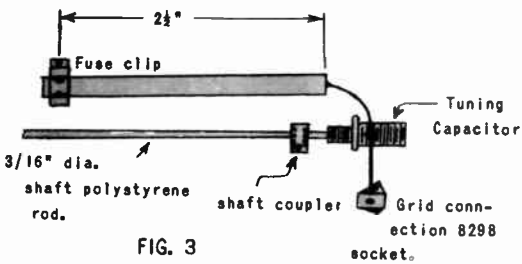


FIG. 3

Grid lines, side view.

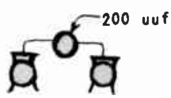


FIG. 4

Grid lines end view showing fuse clips with 200 uuf capacitor soldered between them.

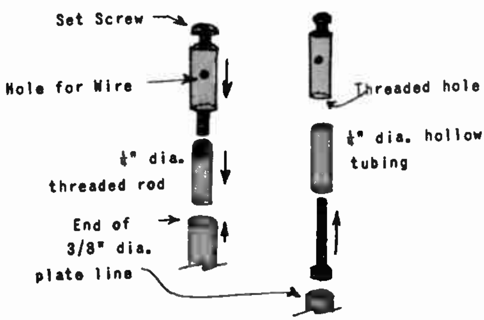


FIG. 5

Two different types of binding posts which are used to connect plate lines to the 8298

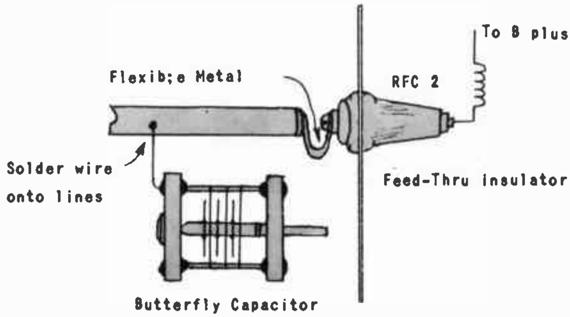


FIG. 6

Shorted end of plate lines,
side view.

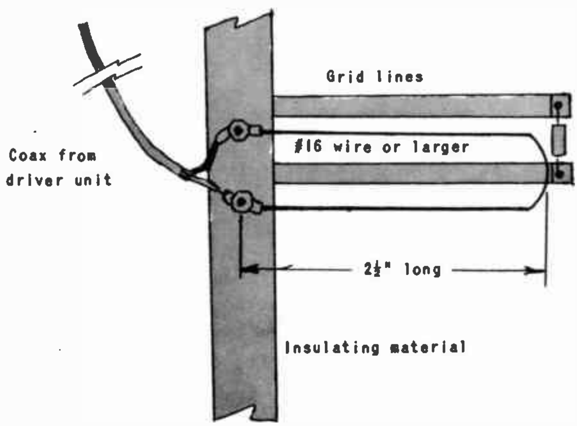


FIG. 7

View of input coupling loop as seen looking down toward the chassis. Hairpin loop is mounted about ¼" above the grid lines.

they look like a tuning fork and if the two holes are positioned just right they will slip right over the plate pins on the 829B. These holes have to be in the right position because, when the screws in the binding post are tightened, you can crack the seal very easily on the 829B. These lines conduct heat off from the plate pins of the 829B very nicely. Of course the tuned lines could be made of solid tubing, by drilling and threading the ends to fit a screw. Two holes would have to be drilled for the plate pins to fit through. The tuning condensor is connected 1¾" from the shorted end of the lines. By connecting it way down on the line, instead of up close to the tube, longer lines can be used and, secondly, it makes the plate tuning much less touchy when it comes to dipping the final. The butterfly condensor used was the final tuning capacitor from a defunct 522 transmitter. This was marked Part # 117 in schematics and is rated 2.8 to 11.0 uuf. It has three rotor and three stator plates per section. I believe some surplus companies are selling units similar to this at a reasonable price. A larger value could be used, by connecting it nearer the shorted section. The lines are for the most part supported at the shorted end by a short flexible piece of metal. *See figure 6.*

The butterfly capacitor was mounted below the lines on a support made of insulating material. Two short wires, about one inch long, go from the stator sections at the back at the back of the capacitor up to the lines, where they are soldered on. These two wires add still a bit more support for the lines. The rest of the support comes from the 829B itself. The shaft of the tuning capacitor is turned with a shaft , made of a polystyrene rod, the same diameter as that of the tuning capacitor. With a butterfly capacitor, from minimum to maximum capacity is only ¼ of a turn of the shaft, so a 3 to 1 vernier drive was used on this capacitor. Those cute little Japanese vernier dials on the market would really fill the bill here.

The shaft of the butterfly can be coupled to the plastic rod by fitting a piece of spagetti tubing over the shafts where they couple together and adding a drop of cement. As the shaft of the butterfly turns easily, this method works well with no slippage. At the other end, to get it (3/16" rod) to fit into a ¼" knob, either wrap plastic tape around the rod to increase its diameter, or drive the rod into a ¼" diameter metal shaft, with a hold through metal shaft coupler as the rotor section should not be grounded.

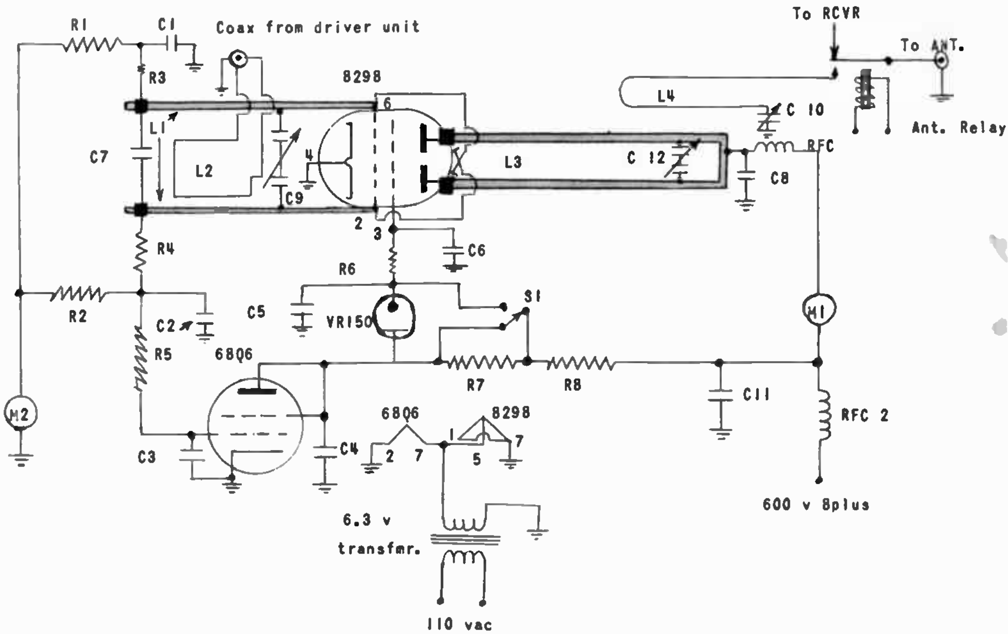
GRID LINES

These lines are made with ¼" diameter copper tubing, spaced ¾" between centers. A moveable short was made by taking two fuse clips and soldering between them a 200 uuf small mica or ceramic capacitor. This capacitor was used between the two clips instead of a shorting bar made of metal for two reasons: First, using the capacitor made the lines physically longer. Due to the high input capacity of the 829B a ¼ wave length line is very short so this method was used to lengthen them. Secondly, the amount of grid current for both sections of the tube can be measured separately at the junction of R1-R3 and R2-R4 by measuring the negative voltage at these points. This way it shows that if one half the tube is receiving more drive than the other half. With a shorting bar, you can't check to see if the input to the tube is balanced or not.

The tuning capacitor is a midget butterfly job mounted between the tuned lines by the two connections from its stators. This is the only support for this capacitor, but as it is very small and light, no trouble was had with it. A plastic rod was used with this shaft, also, as the rotor section should not be grounded. A J38 mike jack was used for a bushing where the rod comes through the front of the chassis. This 3/16" rod is about the size of the inner shaft on concentric TV volume controls so by filing one side of the rod flat, TV knobs will fit nicely. With a grid dipper, tune the lines to the two meter band with the movable shorting condenser. The tuning afterwards is all done with the midget variable. The hairpin loop used to couple from the exciter into the lines is a single turn of the wire, 2½" long by ¾" wide, mounted about ¼" above the grid lines, positioned as shown in *figure 7.*

NEUTRALIZING

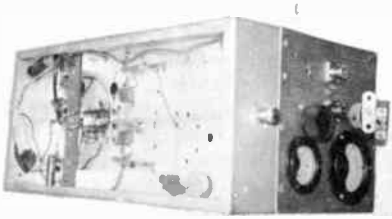
The tube is neutralized by crossing two wires from the grids of the tube and passing them up through small holes drilled in the chassis. These wires extend about 1 inch above the chassis along the sides of the tube and are made of a stiff insulated wire (#18 or so), The tube was neutralized the regular way...By applying grid drive and running the plate tuning capacitor through resonance and adjusting the neutralizing wires so that the grid drive doesn't vary. Netralization can be checked when the rig s completed by first applying drive to the final (with no plate voltage) and adjusting the input capacitor to resonance. Next apply the high voltage (with no load) and dip the final. Maximum grid drive should occur at the same spot that the final dips. With plate current at minimum (plate dip) tuning the plate capacitor either direction off resonance the grid drive should drop as the plate current rises. This 829B did not neutralize exactly like the method outlined, but was very close.



Schematic diagram for K1CXX's 2 meter 829B final amplifier

PARTS LIST

- S1 - SPDT switch
- M1 - 250 ma meter
- M2 - 20 ma meter
- RFC1, RFC2 - Ohmite Z-144
- R1, R2 - 10K, 2 watt
- R3, P4, R5 - 1K, ½ watt
- R6 - 100 ohm 1 watt carbon
- R7 - 3K, 5 watt wire-wound
- R8 - 15K, 20 watt wire-wound
- C1, C2, C3, C4 - .001 mfd 600 volt ceramic
- C5, C6 - 500 uuf disc ceramic 600 volt
- C7 - 200 uuf mica or ceramic
- C8 - 500 uuf 2500 volt transmitting mica
- C9 - 1.8 - 8.7 uuf miniature butterfly E. F. Johnson type 5MB11
- C10 - 10 uuf variable
- C11 - .001 mfd 2500 volt mica
- C12 - 2.8 to 11.0 uuf butterfly. See text.



A bottom view of K1CXX's 2 meter final amplifier

The 829B socket was mounted on the top of the chassis above a 2½" diameter hole. This makes for a short cathode ground lead which is desirable. The socket was mounted so that the cathode lead (the big pin) was toward the front of the chassis.

This final is being driven from an exciter which uses a 2E26 as a doubler from 72 mc as its final. With this low power driver, 12 to 14 ma of grid drive can be obtained at a plate power input of *125 watts* to the 829B.

A one-turn hairpin loop is used to couple from the plate line and C10 is used as a loading condenser. The capacitor

The author, Richard Huntress, K1CXX, at his basement VHF headquarters. Note that all equipment is either built from a kit or home-brew.

used for this purpose should have a very low minimum capacity. The antenna change-over relay was built right into the rig at the end of the pick-up loop.

A screen grid clamp tube is used so that the rig can be used on CW., and also serves as protection for the final, should drive to this unit fail. For use on CW, the switch on the final amplifier is put into CW position, which cuts out the 3000 ohm screen grid resistor and at the same time places the VR150 in series with the screen lead. The driver unit is keyed when used on CW. With the key up, the plate current on the 829B is about 15 ma. If the rig is keyed when the phone/CW switch is in phone position, the plate current, with the key up, would be around 75 ma which would soon overheat the tube.

A single turn loop of wire was soldered to the base of a 60 watt bulb and held close to the plate lines, with about 110 watts input to the final, full brilliance was obtained from the bulb.

This final was built after the fall tropo season, so I haven't had a chance to try it on that mode of propagation, as yet. It has been used on numerous auroras lately, though. I have worked VE2's, W1's, W2's, W3's and down into W4-land using it.-Antenna is an 11 element Cushcraft beam.

VHF

Customizing Your SIXER

Joe Lupo, WA2GBW
792 Avenue A
Bayonne, New Jersey

After working on and with my Sixer *from the day of its completion, I* am prone to say that this little lunchpail is the finest piece of gear a beginning six meter man can obtain. I say this not because of its operation, which leaves much to be desired, but because of the opportunities it gives for a green ham to experiment on his rig and learn the strings of practical electronics. I have done all the work on my rig myself, with the aid of a neighbor's electric drill, and the ideas for conversions came from various sources other than my own necessity for them. I have included in my rig all the changes described in K3HNP's excellent article, which appeared in *The VHF Amateur*, and I would personally like to thank him for it.

Enough talk. Now let's get down to some work...

1 - The first change I incorporated into my rig was in the power supply filtering system. I substituted 3 henry, 50 ma filter chokes for the two resistors R401 and R402. They can be mounted sub-chassis, one between the two audio tube sockets, 6AQ5 and 12AX7, the other is mounted to the rear of the audio volume control. These chokes can be bought for under 50¢ apiece in one of the small stores on Cortlandt Street, NYC, seen advertised in any of the current ham magazines. These chokes, by the way, raise the plate voltage on the receiver and speecn amplifier resulting in higher gain.

2- Another alteration which is more than necessary in many *Sixers* is the elimination of transmitter instability. The reason for the drifting is the oscillator. The oscillator tank circuit uses, as a capacitor, the inter-electrode capacitance of the triode section. As the tube warms up, the frequency drifts around the center frequency and finally settles down when the tubes settle down. cured the ill by putting a 2 uuf capacitor across the oscillator coil (L-201) and shorting out enough coil turns to have the tank tune six meters again.

3- In order to facilitate tuning of your rig, two changes are in order. First, cut a hole in the case directly over the oscillator coil. Thus it can be tuned from outside the case with a tuning rod. The final can be tuned the same way, or if you wish not to fish around in a dark box for a little screw it can be altered for front tuning; remove the final tank capacitor (C-208) and the final coil slug, which screws right out. Secure a small variable and place it between the T-R switch and the end of the chassis. Mount this capacitor with the tuning screw coming through the chassis face. Connect the stator plates to the plate of the tube (pin 9). The other plates - the rotors - are connected to ground. With this arrangement, the transmitter can be tuned while the case is on, and when the neon bulb can be more clearly observed.

4 - While we're on the transmitter section, I'd like to include a change I made for work at my summer QTH. I have no six meter antenna there, so I am forced to use the TV antenna system. The present loading capacitor, however, does not accomodate the 300 ohm impedance setup with full output, so I replaced it with a 140 uuf air dielectric variable (screw type, also). This is neither an important nor necessary change, but if work with a variety of antennas is anticipated, it might come in handy.

5 - I have found, incidentally, that a tube shield left ungrounded on the transmitter tube allows for a slight increase in input power. The heavier the shield, the larger the increase. I started out with a small tube shield and soldered over 20 pieces of #10 wire on it to dissipate heat, and wound up with a wierd, porcupine-looking monstrosity. However, since my rig draws in excess of 45 ma cathode current, unmodulated, I need it.

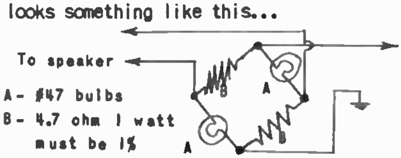
6 - In case anyone missed K3HNP's article, I will briefly restate the transmitter conversion which enabled me to raise my input from *4½ watts to 10 watts!* Just put a 10 micro henry 50 ma RF choke across the transmitter grid resistor, (R203) and retune. That's about all the changes I made on the transmitter other than the next (#7).

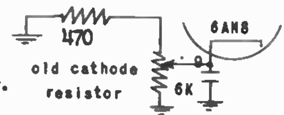
7 - I'd like to pass along some tube changes also. The 6AU8 ransmitter tube can be directly replaced by a higher current 6CX8, while the 12AX7 can be just as easily replaced by a 5751 Hi-Fi tube. I have found by experimentation that the 6CX8 draws more current than either the 6AU8 or 6AU8A, and would reccomend it above the others.

8- About every *Sixer* owner I have had a QSO with has a complaint about the lack of receiver selectivity. This can be remedied as easily as placing a 2.7 meg ½ watt resistor across the capacitor (C111) and retuning the detector coil. The increase in selectivity is usually noticed on the stronger signals, but a slight overall decrease in bandwidth will be noticed.

9 - A little tinkering on my part brought me to desire an RF gain control for the receiver. I tried a few ways but none seemed to work as well as I wanted it to. The best way I have come across so far is to remove the 470 ohm cathode resistor (R102) and I put it across a 6K potentiometer. Connect one end of the pot to ground and the slider of the pot is connected to the cathode of the receiver, RF amplifier tube. This, and a very critical setting of the regeneration control can be mounted between the volume control and mike connector with a small knob to fit the space. *See schematic below.*

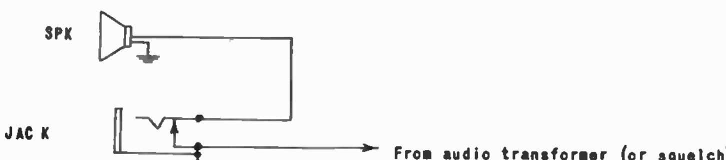
10 - Next in order comes some audio stage refinements. First comes the addition of a squelch circuit sold commercially for $5.98 and which cost about 75¢ to build. Schematically, it looks something like this...





Schematic for RF gain control...#9

11 - Headphones always come in handy on any rig, including the *Sixer*. For the headphone operation, put a jack in as illustrated...



12 - Here's a sneaky way to get MCW out of the Heathkit job. Put a headphone jack on the rear chassis apron in the space between the two screw legs next to the power plug...Some case cutting is also in order here. Connect the ungrounded end of the jack to the audio transformer secondary lead that goes below the chassis. With the transmitter on, place your mike near the speaker, and key. The audio feedback produces a strong piercing note. If you have a squelch circuit in the rig, you may have to short it out to obtain sufficient feedback, or, better yet, put a switch in for the squelch circuit.

13 - Finally, we come to the last change, and a minor one at that. I replaced the antenna connector with a u.h.f. coax connector which fits right in place. I used a u.h.f. coax socket because I could not install a regular coax connector in view of its size.

In conclusion, I would like to wish all you *Sixer* owners best of luck on the modifications I will also answer any letters accompanied by a stamped, self-addressed envelope. Right now I am working on a variable-selectivity control which will not change the tuning of the rig. Look for my next article!!

VHF

We Need Your Help!

That's right - We at *The VHF Amateur* need more assistance from readers toward a better magazine...in the form of technical articles and construction articles. Why not try your hand at writing articles. Not only will you get an extension on your subscription, but also the satisfaction of helping others by publicizing your work. What say?

You can't miss hearing this!

CLEGG ZEUS

TRANSMITTER for 6 & 2

...185 Watts of Solid "Talk Power" Tops the Band!

Again . . .

Clegg Laboratories brings VHF'ers a new power packed performer . . . A new beauty that's guaranteed to produce more carrier output and a higher level of modulation power than any other commercially built VHF amateur transmitter now available.

Put a *Zeus* on 6 and 2 and watch the QSO's roll in. If you like DX, listen to this! — You'll have 185 solid watts on *both* AM and CW . . . and you'll have *automatic* modulation control that will actually let you "out-talk" many kilowatt rigs!

CHECK THESE FEATURES AND SEE WHY A NEW ZEUS WILL PUT YOUR CALL ON THE "MOST WANTED LIST"

- High Level Plate and Screen Modulation
- Highly Efficient Type 7034 Final Amplifier
- Self-Contained Stable VFO
- Built-In Automatic Modulation Control
- Simple Band Switching and Tune-Up
- Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position

Amateur Net Price: Only $595. Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

Ask your Clegg Distributor (listed below) for full information. He'll be glad to serve you.

California
Henry Radio, Los Angeles, Severns, Hemet
Connecticut
Kaufman Electronics, Bridgeport
Delaware
Delaware Electronics Sup., Wilmington
Florida
Amateur Radio Center, Inc., Miami
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Indiana
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Iowa
World Radio, Council Bluffs
Kansas
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Key Electronics, Wheaton
Massachusetts
De Mambro Radio Supply, Boston
Michigan
Purchase Radio Supply, Ann Arbor
Radio Parts, Inc., Grand Rapids
Missouri
Henry Radio, Butler
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Car Parts Depot, Roswell
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South Carolina
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Washington
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NEW CLEGG ZEUS

TECHNICAL INFORMATION

In designing ZEUS, major emphasis was placed on producing a highly efficient, high power, completely self-contained VHF transmitter for full coverage of the 6 and 2 meter amateur bands.

The equipment is housed in two separate enclosures, one containing all power supplies, audio driver stages and the Class B modulator system. The other is a compact, attractive tabletop unit which contains all RF stages, audio preamplifier and VFO. Functional switches, audio gain controls and normal metering are conveniently located on the operating panel which features an accurately calibrated slide rule tuning control. Designed with a trememdous reserve of driving power, ZEUS RF stages are non-critical in tuning and more than 500 KC of QSY is available without retuning. Tank circuits are silver plated for maximum efficiency.

Outstanding innovations in both VFO and modulator system design provide performance factors unequalled by any other commercially available equipment.

PERFORMANCE DATA

AUDIO: Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum talk power without splatter. A panel mounted indicator provides visual monitoring of modulation. Frequency response is flat within 2 db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps. Hum and noise levels are down at least 40 db below 70% modulation. Up to 18 db of speech clipping, adjusted with a calibrated panel control gives ZEUS the "talk power" to outperform many KW rigs.

RF: The VFO will maintain frequency stability of 1 part in 10^6 per degree F. per hour after a 15-minute warmup. Frequency reset accuracy is within 5 KC. A precise, zero backlash, flywheel loaded dial makes accurate tuning easy on both 6 and 2 meters.

Maximum TVI suppression is inherent in all ZEUS circuitry, 6 meter output power is fed to the line thru a pi network circuit. Output on 2 is link coupled to a high efficiency tank.

SPECIFICATIONS

1. A full 185 Watts input on both CW and AM phone.
2. Frequency Range:

   CRYSTAL - 49.5 to 55.0 MC and 142.0 to 148.5 MC
   VFO - 50.0 to 54.0 MC and 144.0 to 148.0 MC
3. Power Cable permits separating units by 10 feet, providing remote control of Modulator/Power Supply unit. Cables up to 50 feet can be furnished on special order.

NEW
Clegg
99'er
6 METER TRANSCEIVER

A Compact, Top Quality Station for just $119.99!

CHECK THESE EXCLUSIVE 99'er FEATURES:

- Dual Conversion SUPERHET with Squelch, Noise Limiter, S Meter, AVC.
- Low Noise RF Preamplifier.
- Stable — Selective — Vernier Tuning — Built-In Speaker.
- 8 Watt Crystal-Controlled Transmitter.
- 9 Tubes and Rectifier — 14 Tube Performance.
- Completely Wired and Tested with AC Power Supply.
- 12 Volt Mobile Adapters Available.

Amateur Net Price: $119.99

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

THE 99'er

is a combination transmitter-receiver intended for both fixed station and portable operation. Small in size, low in cost, big in performance, and high in quality were our design goals -- and we achieved them all!

The 99'er has a stable fundamental mode crystal oscillator using 8.3 to 9.0 Mc or 12.5 to 13.5 Mc crystals. Unlike units employing overloaded high overtone crystal oscillators, the 99'er is "rock" stable. It is also easily driven by most VHF VFO's. A spotting position on the SEND-RECEIVE switch permits easy spotting of the transmitted frequency on the receiver.

Compare the specifications and features of this unit with those of other transceivers currently available--compare the receiver features alone -- and we're sure that you'll not be happy with any other unit!

A REAL HAM STATION, DESIGNED BY AND FOR ACTIVE HAMS

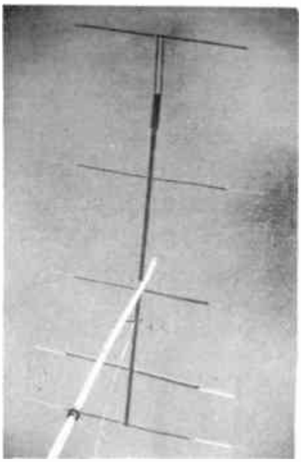
The 99'er is <u>NOT a converted Citizen Band unit.</u> The 99'er IS A TRUE HAM STATION, which includes those design and operating features required for crowed ham band operation necessarily omitted from C-B equipment.

The 99'er is attractively packaged in the manner befitting any ham fixed portable or mobile station. It will fit at home in a living room or in a Cadillac -- in a VW or a Sprite.

Over-all size of the 99'er is only 10" x 6" x 8" deep. Construction is sturdy, yet over-all weight is less than 10 lbs. A 12 volt power supply is available for mobile operation.

SOUTH AMERICAN
VHF NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, Argentina



LU1MBJ's 6 meter long Yagi, already used for several U.S. contacts.

By the time I am writing these lines the better part of March is over and only very little of the DX expected for this month became true. Conditions have been far below those of last year, and we hope that April may still bring us some decent openings for compensation.

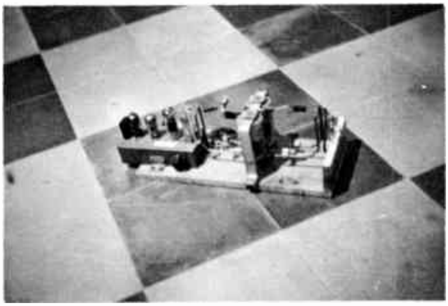
On February 24th we had the opportunity to chat with two fellows from Sao Paul; PY2BQG and PY2CQQ (this one a new station) were in for two hours, working a lot of LU's and some CE.

And then came the VHF Contest weekend scheduled by *CQ* magazine. The most active stations were informed about the event, and everybody was hoping for cooperation of the ionosphere. One big problem was that no one had the January issue of *CQ* magazine to get the full contest details, and I just got mine three days *after* the contest. Anyway, in the late evening of February 25 we began hearing some Brasilian stations and I had a QSO with PY5NZ, PY5GK, and PY7AFP. Then I had to go out for a while, and when I came back I had the chance to work KP4AAN, our good friend Peter who was very busy accumulating contest points. A little after midnight, the path to Brasil was still open, so PY7AEE and PY2CQQ were also added to my list.

The following Sunday afternoon surprised us with a Sporadic E opening to the South, and a contact was established for the first time with Arthur, LU4DOZ (see his picture in the past October *VHF Amateur.)* Then an ionized cloud apparently drifted West, taking LU4DOZ out of the picture and bringing in the signal of LU1MBJ, in Mendoza. (See pictures in this column). This was the last QSO for me during the contest period.

But that night also brought some TE propagation to Puerto Rico, Brasil, and Columbia, where HK1GF and HK1LG were greeting their friends in Argentina.

During the following two weeks I noticed DX signals coming in via TE propagation every night, mostly commercials from Venezuela and other Central American countries. Amateurs were not always there, but on some of these days we talked with KP4CK, PY7AEE, HC1FS, YV3BD, and XE1GE, but we heard them also in contact with LU2FCD, CE3XK, CE3NT, LU7KC, PY5GK & CX8BE.



2 meter transmitter at LU1MBJ described in text below

On March 17 conditions were good to Puerto Rico at 2345 GMT, and I had the pleasure of meeting KP4ALY, KP4AOD and KP4AYT. As the last one was new to me, my "worked list" of different KP4's increased to 40, but the fellows told us that there are now more than 100 different KP4 stations active on the VHF bands.

On the next day, a Saturday, I missed a nice opening which lasted for 2 hours. Relatively short skip (800 miles) and long range DX was present at the same time, so the local boys had a Field Day working KP4AXC, KP4ASU, KP4CK, XE1OE, LU2KE, CE3NT and others. I switched the receiver on when the signals were fading out already, but I still managed to snag OM Tad, XE1OE, (ex-W8NRM), and congratulated him for his big progress with the Spanish language.

The pictures this month show you LU1MBJ's 6 meter long Yagi, home-made from aluminum tubes and a wooden support. The other shot displays a typical example of what a ham can do without the adequate elements but with a lot of ingenuity; the only "special" item is the 24 mc crystal, included in the oscillator circuit of a 6J6, while the second half of this tube doubles to 48 mc. Another 6J6 push-pull tripler follows, driving a 12BH7 push-pull amplifier at 144 mc (in the plate circuit of this tube is the only variable control of the exciter). In the final, two LD5 German war surplus VHF triodes are used, with Lecher circuits at the grids and plates. The plate tuning capacitor is home-built, and a 50 ma dial lamp is included in the grid circuit to show grid current. This rig is loaded to 60 watts on 'phone and 80 watts on CW.

Good luck on the "very highs" -

73, Michael, LU3DCA

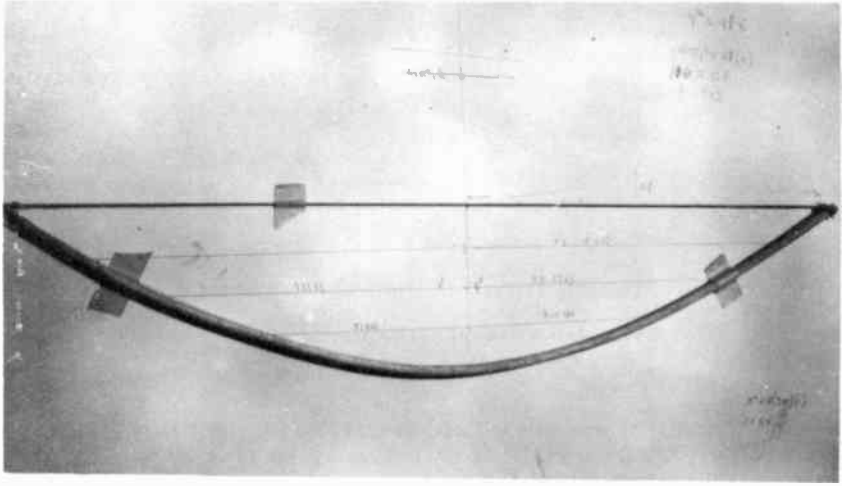
VHF

APX-6's For Sale

APX-6's are obtainable in the Boston area at:

Electro Craft Co.
1124 Dorchester Avenue
Dorchester, Massachusetts

At present there are 30 on hand with more available. Price is $8.00 each without tubes, 2C42's, 2C46's - $2.50 each (tested). Only other tubes used in the conversion are 8 6AK5's easily obtained. —*Thanks to reader Bill McCormick, W1AHE, for this info!*



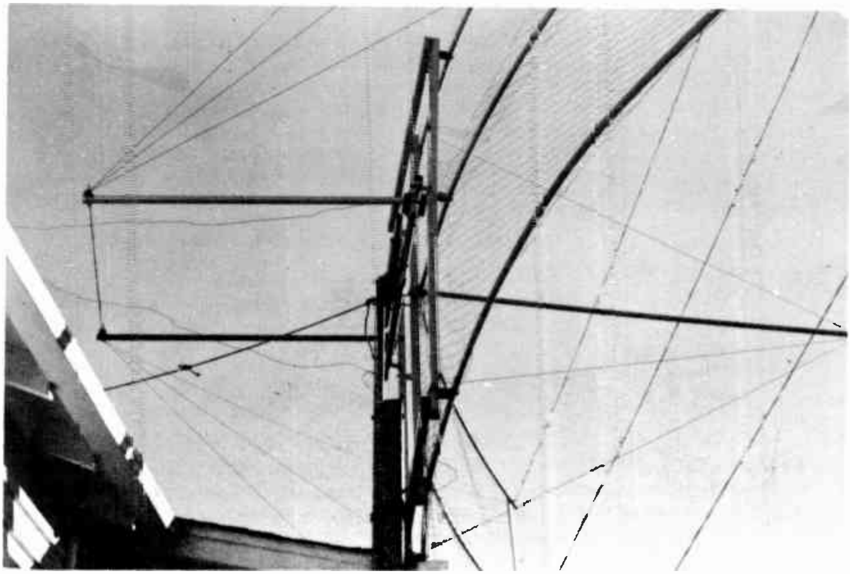
Moonbounce Activities

Allen Katz, K2UYH
48 Cumberland Avenue
Verona, New Jersey

There are several methods now in use for construction of parabolic reflectors. The parabolic antenna described in the February edition of the *VHF Amateur* used a method by which stress is placed on a frame to produce an approximate parabolic curve. The picture above shows an experiment performed to determine the accuracy of a parabolic curve thus produced. The experiment showed that for a parabolic curve of 28 feet diameter and a 4 feet depth, the maximum deviation should be less than one inch. Furthermore, if a correction is made at the point of maximum deviation by the use of spacers cut to the proper distance as in the photograph on the next page, the maximum deviation should be less than 3/4 of an inch. This value is for a reflector with a small ratio of diameter to depth. The larger this ratio the greater the accuracy, but the smaller the gain. The accuracy will not be affected by cutting and measuring of parabola sections and should be sufficient to 1296.

The gain of a parabolic antenna with the dimensions mentioned above using the formula $G = \frac{4\pi A g}{\lambda^2}$ (G is gain in db over isotropic radiator), (A is projected area in square feet, g is an efficiency factor and λ is the wavelength in meters) was calculated for 1296 mc to 33 db if it had the average efficiency factor of 55%. However, even if the antenna only had an efficiency factor of 20% it still would have a gain of 30 db!

The effect of weather conditions on this type of construction can not fully be answered at this time. Thus far no warping has been noticed on our antenna. I must be noted that



Example of use of spacers to correct parabolic curve.

that there is some deviation with a strong wind, but the reflector always goes back to its original shape because of the stresses. We hope in the future to have information on other methods of parabola construction.

LETTERS

Ruddy, W4LNG, of Atlanta, Georgia, writes...

"I enjoy your column on "Moonbounce Activities" in The VHF Amateur. I am interested in moonbounce on 144, 220 and 1296 mc. I have been interested since the first W4AO experiments, but have never reached the point of actually trying it. I am best equipped for 144 mc work at present, but am gradually collecting parts for all three bands.

"I think it would be wise to ask you to write up some technical info on parabolic antennas and feeds. Judging by some of the homemade jobs that have been pictured, I would say that some of the boys are going to be disappointed in the performance of same. A good rule of thumb on accuracy seems to be that the reflector should not deviate from a true paraboloid by more than 1/16 wavelength, and that it should hold this tolerance in any position, on a windy day, when wet, and after the materials have warped. None of the homemade jobs look like they would meet any of these requirements. You should also warn everyone about the importance of a good feed system. Consider some simple formulas...

$$\text{Gain} = \frac{4\pi}{\lambda^2} \text{ times Ae (effective area)}$$

$$\text{Ae} = \pi\,\text{Dia}^2 \text{ times efficiency}$$

"A figure for efficiency frequenly used for commercial antennas is 55%, so you can imagine how low a hastily constructed job might run. This efficiency is dependent on the feed. The feed and trasmission line should not obstruct any of the aperature, yet it has to in order toachieve the feed. The feed must illuminate the reflector in the optimum fashion in order to compromise between not utilizing the entire reflector and too large a feed beam which will waste energy to the rear by going outside the reflector. Also direct pickup on the feed should be avoided."

Dickie Harris, K4LZO, of Nashville, Tennessee...

"In your article you mentioned the availability of parabolic dishes on the surplus market. Any information as to where, how much, and the size of the dishes would certainly be appreciated.

"As for activity in the Nashville area, right now it is all in the APX-6 stage, but we are working for something bigger and better." ——The surplus parabolic reflecters mentioned were being sold by the pound as industrial scrap metal by Leon Bickoff and Co., 189 Oraton Street, Newark, New Jersey. One was pictured last month.

In closing I would like to thank all those who wrote - Keep it coming! Hope to hear more of you in the future.

73 -
Allen, K2UYH

50 mc W.A.S.

Send in your listing for THE VHF AMATEUR's Worked All States department! Let's see how you rate! Minimum states confirmed needed for listing: 21. Cards must be on hand for inspection if requested. All entries must be submitted on a postcard or QSL card and addressed to: W.A.S. Listing - 50 mc, THE VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

CALL	AREA	POWER IN.	STATES WORKED
W7MKW	Wash.	150	47
K4BPY	Ky.	-	47
K9DTB	Ill.	80	47
K2DZM	N.J.	100	46
K5IQL	N.M.	600	46
K2ZBX	N.J.	-	46
K6UJL	Calif.	7	45
K1BIL	Mass.	50	45
KL7AUV	Alaska	200	45
K9KZB	Ill.	100	45
W2EIF	N.J.	25	45
K4QHN	Florida	600	44
K2QWD	N.Y.	50	43
KØHOS	Iowa	75	43
K4PEV	Tenn.	50	42
K8DKO	Ohio	45	42
W3JWY	Md.	75	42
K3BOB	Md.	40	41
K2VDR	N.Y.	90	41
K2MUB	N.Y.	150	41
W2HVW	N.J.	100	41
K2MXT	N.Y.	180	42
K1BHY	Conn.	120	40
W2EAQ	N.J.	100	40
K8REG	Ohio	100	40
K2CVG	N.Y.	65	39
K4PXJ	Tenn.	8	39
K2ZSQ	N.J.	100	39

CALL	AREA	POWER IN.	STATES WORKED
K1GBI	N.H.	50	38
K2HAK	N.J.	100	37
K4RTG	Va.	18	36
K2UGH	N.J.	125	36
WA2SBU	N.J.	160	36
K6VXI	Calif.	120	36
W8UML	Mich.	40	33
W3BRU	Pa.	35	32
K4EBT	Florida	19	33
K1IZM	Mass.	100	32
K1AUD	Conn.	195	32
KØPWS	Mo.	12	32
K2CMG	N.J.	8	31
LU3DCA	Argentina	-	30
W5BJS	Texas	-	29
K2ZSP	N.J.	100	28
HC1FS	Ecuador	70	26
W3MNE	Md.	100	26
KØCWR	Mo.	45	26
K2VSE	N.J.	30	24
K2VNK	N.J.	70	24
K3KEL	Pa.	50	24
WA2ACI	N.Y.	45	23
K8EUX	Ohio	-	23
K2DQT	N.J.	-	23
K3ATX	Penn.	30	22
K2VNL	N.J.	70	22
K2EFN	N.J.	14	21

This list will be revised periodically as we receive notice from you of changes of status. Also send us your 2 meter and 220 mc listings - We are starting a new W.A.S.

VHF "Combine"

Pete Markavage, WA2CWA
670 Maple Avenue
Rahway, N.J.

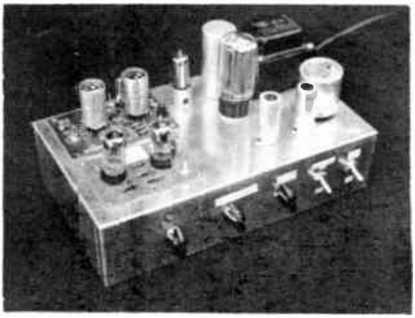


Photo courtesy of Dr. J. Noldering

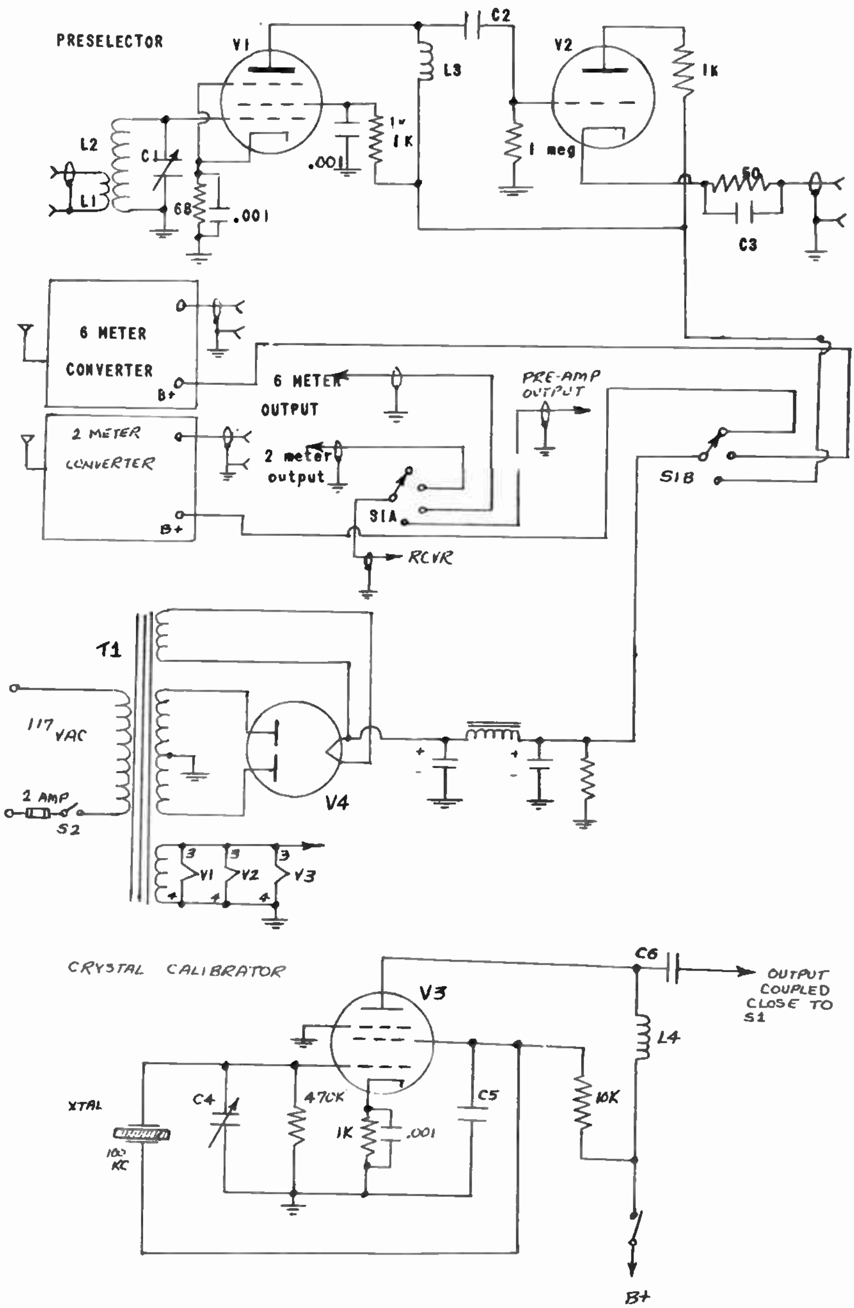
This is WA2CWA's double-converter, crystal calibrator, preselector and power supply combine! And all on one chassis yet!

The gadget described below is for the ham who likes to switch from the low frequencies to VHF with a minimum of effort. This particular unit consists of two converters, for 6 and 2 meters, a 14 to 30 mc preselector, crystal calibrator, and a complete power supply. The preselector can also be used as an I.F. amplifier with any of the converters. The layout is simple and straightforward and no difficulty should be encountered in building this unit. The original preselector consisted of two tubes, but due to the fact that a crystal calibrator was needed, one was removed. The schematic shows both tubes while the pictures show only one. The wiring is not critical and most of the parts to this unit can be found in your junkbox. The combine was built on a 7 x 12 x 3" aluminum chassis, but any chassis is sufficient as long as it holds whatever you want on it securely. The converters that I used were printed circuit types, so the holes in the chassis had to be large enough to accomodate each converter. No special tools were used to cut the chassis holes, except an electric drill and a file. A lot of elbow grease was used this way, but it was well worth it!

The coils L1 and L2 are made from a ten turn length of B&W 3015 Miniductor. L1 consists of three turns and L2 of seven turns. Unwind ¼ of a turn from each end of the coils. When cutting the wire, be sure not to cut the insulation. In this manner the insulation will hold the coils together.

V1 is a 6DE6, which has a slightly lower noise level than the conventional 6CB6. V2 is a 6C4 which is used as a cathode follower. When using the 6DE6 alone, the gain is much sharper and you have to peak C1 each time you tune to another frequency. With the 6C4 you tend to draw out the gain over the whole band and C1 can be left in one place.

To use the preselector as an I.F. amplifier will depend on what I.F. your converters are feeding into. If it is between 14 to 30 mc, there is no prblem. If the I.F. frequency is lower, you will have to increase the number of turns on L1 and L2. Only experimentation will determine the correct coils for your particular I.F. To connect your converter to the preselector, merely run a short piece of coax from the output terminals of your converter to the input terminals of the preselector. You may have to readjust your converter's output slug or trimmer after connecting them together.


PRESELECTOR
V1
C2
L3
V2
IK
L2
C1
1K
.001
1 meg
L1
68
.001
50
C3
6 METER
CONVERTER
B+
6 METER
OUTPUT
PRE-AMP
OUTPUT
2 METER
CONVERTER
2 meter
output
S1B
S1A
B+
RCVR
T1
117 VAC
V4
2 AMP
S2
V1
V2
V3
CRYSTAL CALIBRATOR
C6
OUTPUT
COUPLED
CLOSE TO
S1
V3
L4
XTAL
C4
470K
C5
1K
.001
10K
100 KC
B+

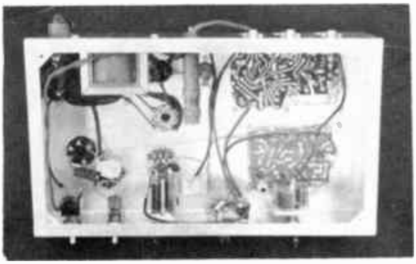


Photo courtesy of Dr. J. Woldering

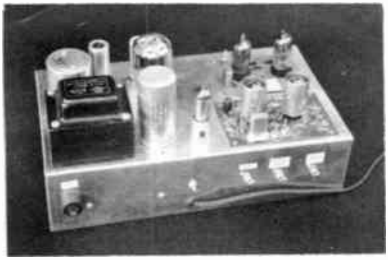


Photo courtesy of Dr. J. Woldering

The crystal calibrator is simple in design and the only difficulty that will arise is getting the 100 kc crystal cheap. A 6AU6 is used as the oscillator but other similar tubes could be used without altering the circuit too much.

I have also included here a switching circuit, which enables me to switch from converter to converter without any difficulty. This switching arrangement suits me but you may have your own ideas on how you want it to work. Put your ideas on paper and send them to the Editor. Your ideas are greatly needed and they may be of some help to a ham who is having trouble in this field.

PARTS LIST

L1 - 3 turns of #20 wire 1" diameter. 1/8" from bottom of L2
part of B&W 3015 Miniductor.
L2 - 7 turns of #20 wire 1" diameter part of B&W 3015 Miniductor
L3,4 - 1.1 mh RF choke
C1 - 130 mmf midget variable capacitor
C2 - .001 mf
C3 - .01
C4 - 7 to 45 mmf trimmer
C5 - 140 mmf
C6 - 20 mmf
S1 - 1 section, 2 pole, 4 positions
S2, 3 - SPST toggle switch
T1 - Stancor PM-8407 or an equivalent
V1 - 6DE6
V2 - 6C4
V3 - 6AU6
V4 - 5U4
7 x 12 x 3" aluminum box or any available chassis.
RCA phono plugs and jacks, knobs, hardware, etc.

VHF

Get there first! Let's see your article in next month's issue! Don't miss the details on our Author Contest - May we hear from you today?

Dinner-Hamfest of East Coast VHF Society, Inc. held at River Edge, New Jersey, on February [illegible].

Marie, K2YEA & [illegible]

[illegible], WA2[illegible] & Carl, WA2[illegible], with [illegible], K2YEA

[illegible] from Bayonne, New Jersey

Ed Tilton, W1HDQ, VHF Editor of QST

Right to left: K2KDJ, [illegible], XYL, [illegible], XYL, WA2[illegible]'s XYL, WA2JCY.

At the bar - [illegible]

Chairman [illegible], [illegible]

At the head table [illegible], of the VHF AMATEUR staff, [illegible] of [illegible], Bob, [illegible], Editor of THE VHF AMATEUR and VHF Editor of CQ, [illegible] of the ECVHFS, Inc., and Ed Tilton, W1HDQ.

All photos courtesy of [illegible].

Trading Post

RATE: Commercial ads - 5¢ per word. Free to readers - any reasonable length. Ad from readers MUST BE SUBMITTED ON A POST CARD or QSL card. TRADING POST, 67 Russell, Rahway, N.J.

FOR SALE: Millen HF RF Amplifier, 90811, with instruction manual, two 829B tubes, and coils for 6 meters. In very good operating and physical condition - $23.00. Ron Krupsa, K9KVO/9, 4542 W. Barry Avenue, Chicago 41, Illinois.

FOR SALE: Gonset Communicator III, 6 meters, 14 crystals, crystal mike, AC & DC power cords and mobile rack for Gonset. Also 5 element Telrex 6 meters - new; Eico 5" scope. Manuals included with all the above equipment. $275.00 takes everything. (Will also sell separately). Contact Mort Cohen, WA2ARS, 11 Brighton 10 Terrace, Brooklyn 35, New York, or call TW 1/3125 after 6:30 PM.

FOR SALE: Viking Challenger - good condition - $90.00. Meissner Signal Shifter - all band VFO-exciter-ECO - $25.00. Will ship C.O.D. or deliver locally...Heiko Ganzer, K2REH, 814 Nicholas Place, Rahway, New Jersey.

FOR SALE! SX-99 receiver w/matching speaker, Tecraft 6 meter converter CC-50, Tecraft converter power supply. All excellent condition - Complete for $180.00. Gordon A. Watts, K9PQQ, 521 So. 13th Street #5, Decatur, Indiana.

PROJECTS & KITS WIRED! Cash only. Kits 25% of cost (above that of unit) - wired and checked out. Projects (custom built), materials and prints or schematics must accompany your order. George Kupp, K2DQT, 61 Cortlandt Street, Belleville 9, New Jersey.

MORE APX-6's! About 15 of them here in Dayton at: Northridge Surplus, 2344 Needmore Road, Dayton, Ohio. PRICE - $4.00 EACH! (Thanks to K8REG for your tip!)

TRADE: Keystone Twenty, 8mm movie camera and/or Stevens 58-AC, repeating bolt action 12 gauge shotgun. Both excellent condition. Write to Richard S. Smith, 13571 Rayen St., Pocoima. California,

For Sale: Globe Scout Deluxe 8 months old, BC-342 receiver, homebrew 6 meter converter, VF-1 VFO, Antenna tuner Globe AT-3, Western Radio all-band trap antenna, 14 novice crystal for 40-80 meters. Entire deal - $150.00. Ted Woodbury, WA2BZV, 141 W. Hazelwood Avenue, Rahway, New Jersey.

WANTED: Old call letter license plates. Please write me and let me know what plates you have and how we can make arrangements to get them. Dave Heller, K3HNP, 14 Darkleaf Lane, Levittown, Pennsylvania.

FOR SALE: Lists and forms for obtaining free high pass filters for your neighbors complaining of TVI. 25¢ from THE VHF AMATEUR, 67 Russell Avenue, Rahway, New Jersey.

QSL's: SWL's, CITIZEN BAND, SAMPLES 5¢, NICHOLAS & SON PRINTERY, BOX 11184, PHOENIX, ARIZONA.

WANTED: Construction articles for THE VHF AMATEUR! See the announcement on our AUTHOR's CONTEST on page 37. We need your help for the success of our magazine. We are expanding now due to your support, but please don't let us down - An extension on your subscription plus a good chance at the top prize ... A Clegg Climaster "99"'er!!!

"Rabbit Ears" for SIX!

Ted Woodbury, WA2BZV
141 W. Hazelwood Ave.
Rahway, New Jersey

This experimental antenna was adopted from a 15 meter experiment conducted by W6EHY and illustrated in *73 Magazine*, November 1960 issue.

All though this antenna may not be the answer to all, it should be appealing to the budget-minded amateur and the apartment dweller with his TVI and grouchy landlord to contend with. It is basically a center-fed dipole with the elements 45 degrees off the horizon and 90 degrees from each other. The interaction between elements in this arrangement bring the center feed impedance down to 54 ohms which accepts RG58U coax barefoot very nicely without baluns, matching arrays, etc.

Elements were made of 3/8" brass extension curtain rods easily purchased at the local 5 and 10¢ store for 39¢ each. The feedline is RG58U which we all have a few feet of around the junk box. The entire array if constructed as we did requires 80" of turning space and being bi-directional the rotation is only 180 degrees.

The Q of the antenna shows to be right for good band width over 300 kc with maximum efficiency and no retuning necessary.

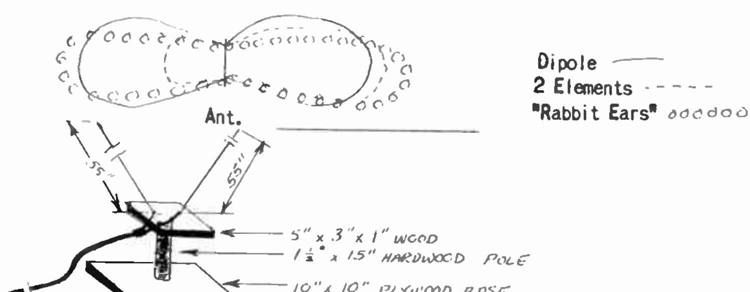
Brass was chosen for its high conductance as compared to aluminum, to help make up for the fact that this array was chosen for indoor operation. With the assistance of Editor Bob Brown, K2ZSQ, and his Heath reflected power meter, the SWR checked out at 1.3 to 1 at 50.25 mc and the reflected power was only 2½%! Not bad!

The peak the antenna on a signal we first null them out off the end of the antenna and then put the array broadside to this point which by hand rotation only takes a second.

And last but not least, the antenna is as effective with vertical wavefronts as with horizontal.

Imagine! No cross polarization, gain over dipoles, and a total cost of $1.62 (including 12 feet of cox). We are waiting for a band opening to see what we can do with our "Rabbit "Ears". Untl! then 73...

The radiation pattern, checked with a Field Strength Meter, checked out as follows:



The elements are held on by 2 screws, one acting as a soldering lug for coax.

Coming Next Month!

That's Right! Starting next month we will inaugurate an Author's Contest for The VHF Amateur. *As you all know, our magazine is published at a break-even level, and we're not able to pay for articles. But starting next month we will offer an item well worth all literary efforts by readers.*

<u>Prize:</u> Clegg Climaster "99"'er
(see ad in centerfold)

Each month we will print rating blanks to be filled out and mailed in by you to us. The results of these ratings will be printed in the next possible issue of The VHF Amateur. *If you feel, for example, that W4XXX's article on 220 mc converter was the best in that issue, cast your vote by filling out the blank and voting his article best. The* <u>*Author's Contest*</u> *will end with the November 1961 issue, at which time all readers blanks will be cross-checked on a percentage basis - and the article receiving the largest* percentage of votes *will be declared the winner.*

The contest, as outlined above, will run for a six-month period and will reward some lucky winner with a "99"'er! Your cooperation in the form of good construction and technical articles will be greatly appreciated. Who knows? Try your hand at writing!

VHF

CQ

Introduces

VHF for the radio amateur. A new dynamic handbook that covers all phases of VHF activities.

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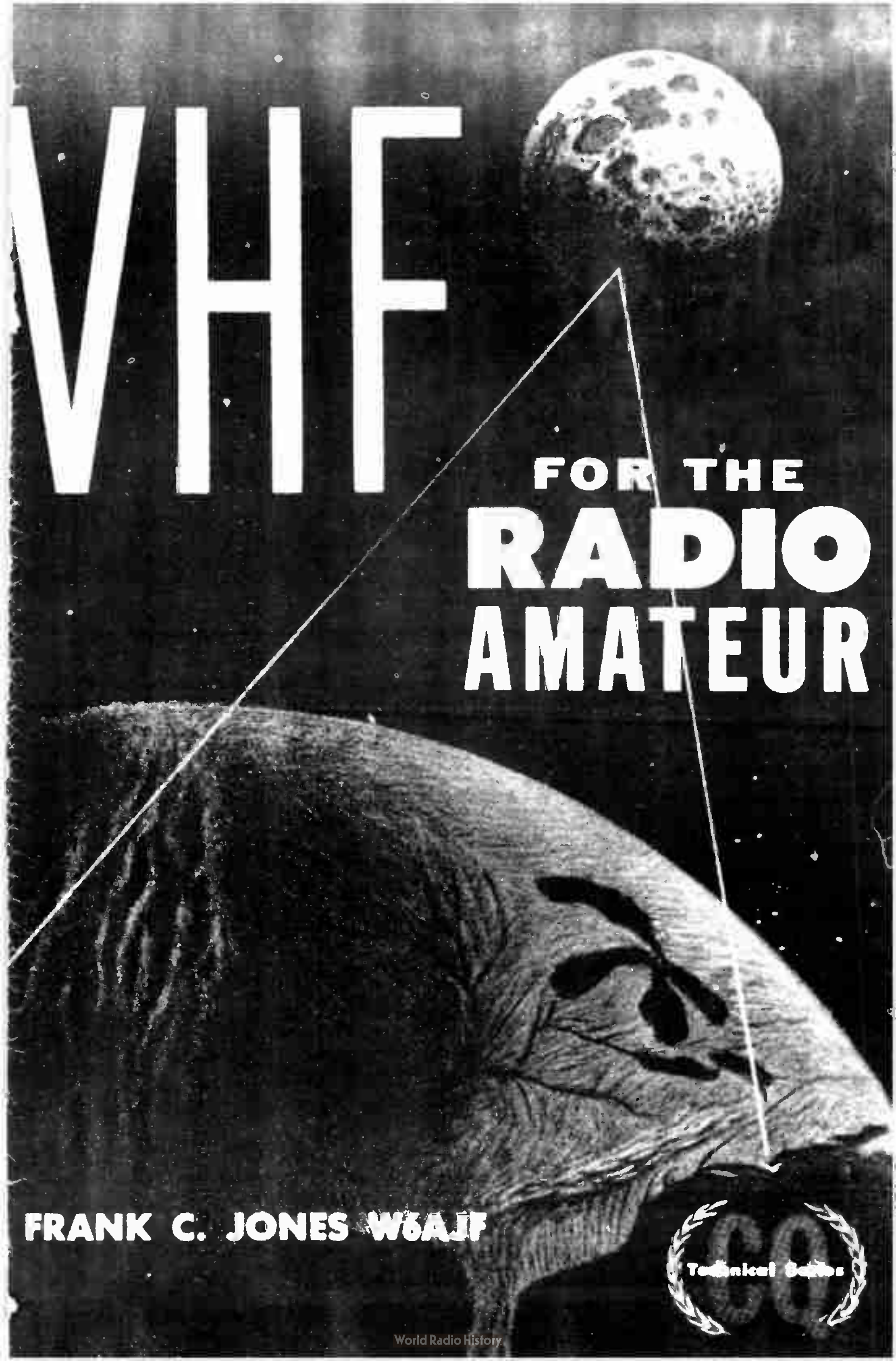

VHF
FOR THE
RADIO
AMATEUR
FRANK C. JONES W6AJF

RAHWAY, N. J.

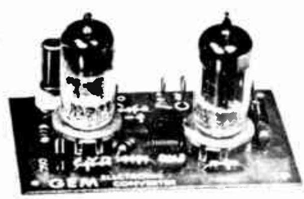
The VHF Amateur
67 RUSSELL
RAHWAY, NEW JERSEY

To:

Wm R Mandale
305 Hamilton Rd.
N Syracuse 12, N.Y.
7/61a

Postmaster: Form 3547 Requested PRINTED IN U.S.A. THIRD Class Mail

The New GEM 144mc NUVISTOR Converter



The GEM 2 meter converter uses a 6CW4 NUVISTOR triode R.F. amplifier and a 6X8 oscillator, tripler - mixer. This small unit will give maximum gain and sensitivity with a low noise level. Universal input and output for any antenna or receiver. Wired and tested on 2½" x 4" circuit board for only $6.00.

2 Meter Nuvistor Pre-Amp wired and tested only $3.50.

GEM Standard 6 Meter Converter

The 6 meter printed circuit converter uses a 6BQ/BZ7 as a cascode R.F. amplifier and a 6X8 High Gain pentode mixer and oscillator. This converter will give a good signal-to-noise ratio and maximum sensitivity and I.F. output. The circuit uses very Hi-Q air wound coils and the broadband oscillator will accept crystals from 40 to 50 mc for any I.F. output. Wired and tested for only $5.00.

All items sent Post-Paid in advance.

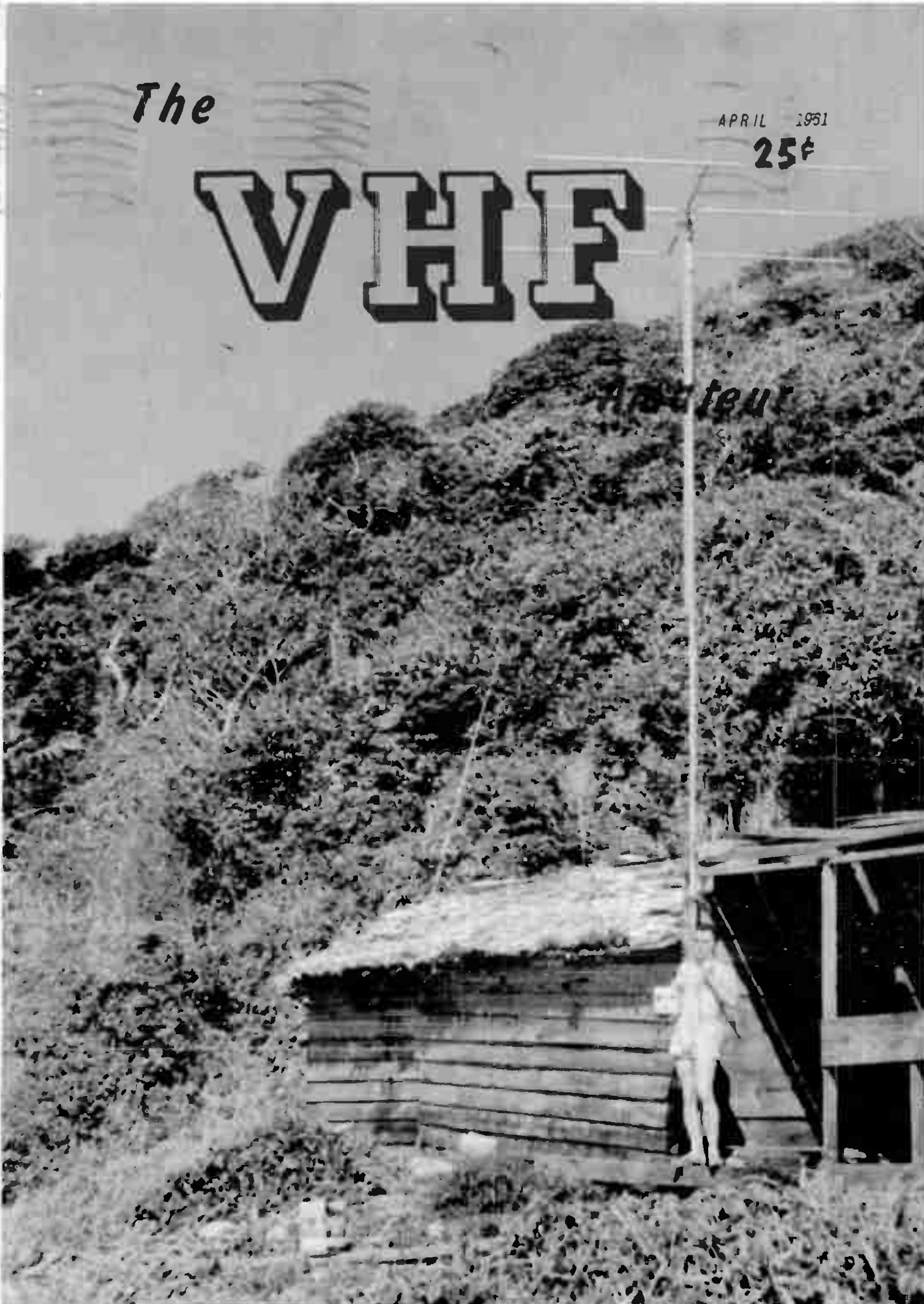
GEM ELECTRONICS
R. R. 3, Springfield, Ohio

Telephone Terre Haute 282 - Urbana Ohio Exchange

The VHF Amateur

APRIL 1951

25¢



Island DX Paradise: *Here on the tiny isle "Ilha dos Corais" in the South Atlantic, Conrad, PY5GK, of Brasil, sets out to break all VHF DX records with a DXpedition to end all DXpeditions!*

for VHF

New Climaster ZEUS TRANSMITTER

2 Meters & 6 Meters

175 WATTS

AM—CW

50 MC-54 MC 144 MC-148 MC

. . . with Automatic Modulation Control
to outperform even many kilowatt rigs

(3.5 MC-30 MC and 220 MC adapters available soon)

GUARANTEED

to outperform any other commercially available amateur VHF Transmitter

Note some of the many features found only in this outstanding new VHF Transmitter:

- High Level Plate and Screen Modulation
- Highly Efficient Type 7034 Final Amplifier
- Self-Contained Stable VFO
- Built-In Automatic Modulation Control
- Simple Band Switching and Tune-Up
- Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position
- Attractive Styling

Amateur Net Price: Only $559. Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

Coming Soon- Matching VHF RECEIVER!

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

L. Berkley Davis (left), vice-president of General Electric, presents trophies to John T. Chambers, W6NLZ, (center), and Ralph E. Thomas, KH6UK, joint winners of the ninth annual Edison Radio Amateur Award-1960.

KH6UK - W6NLZ

Bob Brown, K2ZSQ
EDITOR

A record-breaking commendation was awarded recently to two well-deserving fellow v.h.f. enthusiasts, KH6UK and W6NLZ, both of whom are most highly regarded in v.h.f.-u.h.f. circles as well as the ham fraternity at large as perhaps the most outstanding representatives of our ideals and constant determination to explore the unknown, setting no limitations. Here's what G.E. had to say...

"'Pioneers in the wilderness of radio wave propagation' is the way Chairman Frederick W. Ford, of the FCC, described this year's joint winners of the Edison Radio Amateur Award.

"Speaking at a banquet in the Carlton Hotel, February 23, Chairman Ford declared that long-distance ultra-high-frequency communication experiments by Ralph E. Thomas, KH6UK, and John Chambers, W6NLZ, had made a significant addition to knowledge of radio wave propagation.

"Thomas, 57, of Kahuku, Oahu, Hawaii, and Chambers, 40, of Palos Verdes Estates, near Los Angles, California, received the ninth annual Edison Award, sponsored by General Electric. Each got trophies and they split a $500.00 cash prize.

"Using low-power home-made and Army surplus equipment, the Chambers-Thomas team set

continued on page 27

A Base Loaded Whip for 6 Meters

Herbert F. Noltje, W2TQS
151 Sunset Lane
Tenafly, N.J.

The very popular Heath Sixer *has been modified* by many until only the name-plate remains to clearly identify it. The designers of this transceiver included one feature that seems to have been completely overlooked by most hams - the handle!

When I built my *Sixer* I had one thought in mind - an ideal portable rig for traveling light. However, my traveling plans didn't included enough wire to string a dipole and a roll of coax to feed it. Even when it is possible to cart a case of cable around most portable locations leave much to be desired when it comes to hanging the antenna.

The answer was an antenna that was light, and small enough to pack inconspicuously - specifically, a base loaded whip that could be installed and removed conveniently. Here's the way it works:

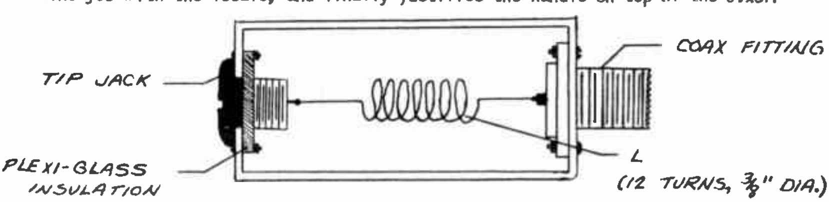
> THE BASE LOADING COIL CONSISTS OF 12 TURNS OF UNINSULATED HOOK-UP WIRE WOUND ON A 3/8 INCH FORM. THE TURNS ARE SPACED A WIRE'S DIAMETER APART. THE WHIP MEASURES 36 INCHES, AND IN MY CASE WAS MADE FROM A STRAIGHTENED COAT HANGER SOLDERED TO TIP-JACK PLUG. FOR OTHER MECHANICAL DETAILS SEE THE SKETCH.

The mechanical modifications are limited only by the the builder's imagination and specific needs. For my purpose, I constructed the loading coil unit in a piece of "U" shaped aluminum with a coax fitting on one end and an insulated tip jack at the other end. The coil was soldered between the two.

For the utmost portability, I assembled the finished unit in a small box taken from the surplus junk pile (mini-boxes will do here), and mounted it directly to the back of the *Sixer* case. A short length of coax with plugs on both ends allows the connection of the loading unit in seconds. When another antenna is to be used, it is only necessary to unplug the connecting coax and couple the other line to the regular fitting.

As with any antenna, a good ground is important, and the loading coil mounting box should be well grounded to the case.

Reports have ranged from as good as the dipole I had been using to an increase of from 3 to 4 "S" units over the dipole. This little antenna is no DX'er, but it sure does a fine job with the locals, and finally justifies the handle on top of the *Sixer!*



VHF

U.H.F. Directory

George Gadbois, W3FEY
858 Eden Road
Lancaster, Penn.

The following is a list of stations believed to be active on the amateur bands above 220 mc. Because of the devious methods used to gather this information, no guarantee of accuracy can be made. An attempt has been made to exclude stations that may have been active at one time but who now have become inactive; however, many stations included on this list may not really classify as being active at this time. I suggest that you contact any of these stations that you may be interested in scheduling for frequencies and times of activity.

220 mc

K1AII	Plymouth, Mass.
W1AJR	Middletown, R. I.
K1API	Manchester, N. H.
W1AZK	Chichester, N. H.
K1CXX	Auburn, Me.
K1CIG	Manchester, N. H.
W1CTW	Arlington, Mass.
W1EXZ	Danville, Vt.
W1FOM	Southington, Conn.
W1FZ	Farmington, N. H.
W1HDF	Elmwood, Conn.
W1HDQ	Canton, Conn.
W1HMT	Goffstown, N. H.
W1IQD	Goshen, N. H.
K1IZM	Marlboro, Mass.
K1JIX	Harvard, Mass.
W1JZA	Waterbury, Conn.
W1MFT	Greens Farms, Conn.
W1OOP	Needham, Mass.
W1OSQ	Milford, Conn.
W1PZU	Manchester, N. H.
W1QVF	Collinsville, Conn.
W1QXX	Arlington, Mass.
W1RFU	Wilbraham, Mass.
W1UHE	Tiverton, R. I.
W1USF	Fairfield, Conn.
W1VNH	Feeding Hills, Mass.
W1WAS	So. Portland, Me.
W1WYZ	Manchester, N. H.
W1YDS	W. Hartford, Conn.
W2AGK	So. Plainfield, N. J.
W2AOC	Brooklyn, N. Y.
K2AXQ	Rivervale, N. J.
K2BVC	New Rochelle, N. Y.
W2BVJ	Roseland, N. J.
K2CBA	Troy, N. Y.
WA2DEC	Union, N. J.
K2DIG	Tenafly, N. J.
W2DWJ	Elizabeth, N. J.
W2DZA	Teaneck, N. J.
K2DZM	Rahway, N. J.
W2EJO	Ellicottville, N. Y.
K2GGA	N. Syracuse, N. Y.
K2GUG	Buffalo, N. Y.
K2HAZ	Wayne, N. J.
W2HBC	Mt. Vernon, N. Y.
K2HIL	Orangeburg, N.Y.
W2HVL	Little Neck, N. Y.
K2ISA	Troy, N. Y.
W2JDU	Warrenville, N. J.
K2JLN	Edison, N. J.
W2KFC	Haddonfield, N. J.
K2KIB	Newark, N. J.
W2LBK	Port Washington, N. Y.
W2LKP	Rhinebeck, N. Y.
W2LRJ	Bellport, N. Y.
W2LWI	Wappingers Falls, N. Y.
K2LYR	Packanack Lake, N. J.
K2MEB	Plattsburgh, N. Y.
W2MGF	Edison, N. J.
W2NTY	Saddle Rivver, N. J.
K2PCG	Livingston, N. J.
W2PEZ	Bloomingdale, N. J.
K2PPZ	Elizabeth, N. J.
K2QJQ	Patchogue, N. Y.
K2QWE	Passaic, N. J.
K2RIA	Somerville, N. J.
K2RMD	Plainfield, N. J.
W2SEU	Freeport, N. Y.
W2SHU	Rahway, N. J.
W2SLZ	Somerville, N. J.
W2SMJ	So. Plainfield, N. J.
K2SMZ	Oaklyn, N. J.
K2VDK	Manville, N. J.
W2WOF	Glen Head, N. Y.
K2AAX	York, Pa.
W3AHQ	Silver Springs, Md.
W3AJD	E. Berlin, Pa.
W3ANX	Carnegie, Pa.
W3ARW	Scranton, Pa.
W3ATL	Palmyra, Pa.
K3BBO	Bradford, Pa.
W3BJG	York, Pa.
K3BPP	Doylestown, Pa.

W3BPZ	Allentown, Pa.
W3BYF	Allentown, Pa.
W3CAJ	Lewisberry, Pa.
K3CEZ	Greenbelt, Md.
W3CGV	Wilmington, Del.
W3FEY	Lancaster, Pa.
W3HFY	Havertown, Pa.
W3HIX	Quakertown, Pa.
K3HQC	Bareville, Pa.
W3HZU	York, Pa.
K3IUV	Philadelphia, Pa.
W3JYL	E. Petersburg, Pa.
W3JZI	College Park, Md.
W3KKN	Willowgrove, Pa.
W3LCC	Kensington, Md.
W3LZD	Scranton, Pa.
W3MUM	Hanover, Pa.
W3QFM	York, Pa.
W3RUE	Belle Vernon, Pa.
W3SNM	Fleetwood, Pa.
W3TIF	Johnstown, Pa.
W3UJG	Rockville, Md.
W3VIR	Willowgrove, Pa.
W3ZFA	Bradford, Pa.
W3ZRF	Catonsville, Md.
W3ZRR	Philadelphia, Pa.
W4FWH	Doraville, Ga.
K4KLD	Hoschton, Ga.
K4QAB	Auburn, Ga.
K4RAY	Alexandria, Va.
W4RFR	Nashville, Tenn.
W4RMU	Jacksonville, Fla.
W4SEQ	Fairfax, Va.
K4TFU	Falls Church, Va.
K4TFY	Decatur, Ga.
W4TLC	Greenville, S.C.
W4UBY	Annandale, Va.
K4UKQ	Woodbridge, Va.
W4UMF	Falls Church, Va.
W4UML	Athens, Ga.
W4VIW	Greenville, S.C.
W4VSN	Oak Ridge, Tenn.
W4ZXI	Greensboro, N.C.
W5AJG	Dallas, Tex.
K5BDD	Arlington, Tex.
W5BFH	Albuquerque, N. Mex.
W6AJF	Marks, Miss.
K5UNK	Socorro, N. Mex.
K5WGF	Albuquerque, N. Mex.
W6AJF	Sonoma, Calif.
W6ASH	Los Altos
W6BJI	Fresno
W6FZA	Porterville
K6GKX	Long Beach
K6GTG	Arlington
K6IBY	Costa Mesa
W6IEY	La Mesa
K6JTC	Sunnyvale
W6MMU	Los Angeles
W6NLZ	Palos Verdes Estates
W6NZV	Mill Valley
W6OKR	Larkspur
K6RNQ	Oakland
K6UZC	Oxnard
W7AMH	Tucson, Ariz.
W7FGG	Tucson, Ariz.
W7HBH	Portland, Oreg.
K7HID	Tucson, Ariz.
K7HJD	Tucson, Ariz.
K7ICW	Las Vegas, Nev.
W7LEE	Parker, Nev.
W7RT	Seattle, Wash.
W7RUX	Phoenix, Ariz.
K8AOM	Wheeling, W. Va.
K8AXU	Elkins, W. Va.
W8BAX	Columbus, Ohio
W8BMO	Dayton, Ohio
W8CSW	Powell, Ohio
W8CVQ	Kalamazoo, Mich.
W8DX	Detroit, Mich.
W8GHX	Tipp City, Ohio
W8GOV	Kalamazoo, Mich.
W8IJG	W. Richfield, Ohio
K8JZR	Ostimo, Mich.
W8KSZ	Kalamazoo, Mich.
W8LGI	Summit Station, Ohio
W8LPD	Cincinnati, Ohio
W8NEE	Dayton, Ohio
W8NOH	Grand Rapids, Mich.
W8NRM	Lakewood, Ohio
W8PT	Benton Harbor, Mich.
K8PUT	Cincinnati, Ohio
W8PYQ	Battle Creek, Mich.
W8SFG	Hubbard, Ohio
W8SVI	Fairboin, Ohio
W8SZN	Youngstown, Ohio
W8VIX	Detroit, Mich.
W8VIY	Youngstown, Ohio
W8WRN	Columbus, Ohio
W8ZCV	Waynesville, Ohio
W9AAG	Woodhull, Ill.
K9AMG	Skokie, Ill.
K9AQP	Valpariso, Ind.
K9BDJ	Skokie, Ill.
W9BOD	Skokie, Ill.
W9BQC	Rockford, Ill.
K9CXV	Huntertown, Ind.
W9DJ	Chicago, Ill.
K9DOE	Lake Zurich, Ill.
K9DWR	Glen Ellyn, Ill.
W9EQC	Aurora, Ill.
K9HWC	Wheaton, Ill.
K9ILH	Wheaton, Ill.
W9JCS	Chicago, Ill.
W9JEC	So. Holland, Ill.
W9JFP	Milwaukee, Wis.
W9JGN	Berwyn, Ill.
K9JLJ	Chicago, Ill.
W9JIY	Indianapolis, Ind.
K9KIP	Norwood Park, Ill.
K9MXR	Aurors, Ill.
K9ONW	Aurora, Ill.
K9OTE	Chicago, Ill.
W9OVL	Hammond, Ill.
W9REM	Downers Grove, Ill.
W9ROS	Roselle, Ill.
W9RPF	Napeville, Ill.
W9RWQ	Lincolnwood, Ill.
W9RYM	Paxton, Ill.
W9SKN	Oswego, Ill.
W9ULH	Portland, Ind.
W9VVH	Griffith, Ind.
W9WOY	E. Chicago, Ind.
W9ZIH	Chicago, Ill.
WØDDX	Roscoe, Mo.
KØDGU	Raytown, Mo.

WØIFC	Jennings, Mo.
KØITF	Prairie Village, Kan.
WØITO	Kansas City, Kan.
KØJZL	Kansas City, Kan.
WØLRC	Belton, Mo.
WØOFY	Toddville, Ia.
KØTZN	Belton, Mo.
WØYZV	Omaha, Neb.
WØYZZ	Overland, Kan.
KH6UK	Kanuku, Oahu
VE3AIB	Toronto, Ont.
VE3BQN	Toronto, Ont.

432 MC

W1AJR	Middletown, R. I.
W1FZ	Farmington, N. H.
W1HDF	Elmwood, Conn.
W1IO	Danvers, Mass.
K1JIX	Harvard, Mass.
W1MFT	Greens Farms, Conn.
K1NXI	Farmington, N. H.
W1OOP	Needham, Mass.
W1UHE	Tiverton, R. I.
W1VNH	Feeding Hills, Mass.
W1WAS	So. Portland, Me.
W1ZPV	Niantic, Conn.
W2AOD	Flushing, N. Y.
K2ASI	Hicksville, N. Y.
K2AZT	Baldwin, N. Y.
W2BLV	Haddon Hgts., N. J.
W2BQK	Bergenfield, N. J.
K2CBA	Troy, N.Y.
K2DIG	Tenafly, N.J.
W2DWJ	Eliazbeth, N.J.
W2DZA	Teaneck, N.J.
K2DZM	Rahway, N.J.
W2FQK	Woodstown, N.J.
K2GRI	Porter Corners, N.Y.
K2HAC	Somerville, N.J.
W2HBC	Mt. Vernon, N.Y.
W2HEK	Woodstown, N.J.
K2ISA	Troy, N.Y.
W2KDZ	Bernardsville, N.J.
K2KIB	Newark, N.J.
W2LRJ	Bellport, N.Y.
W2NTY	Rochelle Park, N.J.
W2OTA	Wantagh, N.Y.
W2PPT	Richmond Hill, N. Y.
W2SCG	Babylon, N. Y.
K2UUR	Parlin, N. J.
W2VCG	Pennington, N. J.
W2VSA	Elmhurst, N. Y.
W2VYF	Bloomfield, N. J.
W2WOF	Glen Head, N. Y.
K3AAX	York, Pa.
W3AJD	E. Berlin, Pa.
W3ARW	Scranton, Pa.
W3BSV	Salisbury, Md.
W3CGV	Wilmington, Del.
W3CRL	Dallastown, Pa.
K3EH	Levittown, Pa.
K3EOF	Penndel, Pa.
W3FEY	Lancaster, Pa.
W3FLX	Philadelphia, Pa.
W3GGR	Pleasant Hill, Md.
W3IMW	Perkasie, Pa.
W3IVL	Perkasie, Pa.
W3JNC	Bethlehem, Pa.
W3LCC	Kensington, Md.
W3MAG	Sellersville, Pa.
W3MMW	York, Pa.
W3RE	Silver Springs, Md.
W3RQT	Newark, Del.
W3RUE	Belle Vernon, Pa.
W3SAP	Bethlehem, Pa.
W3SST	York, Pa.
W3UJG	Rockville, Md.
W3VIR	Willow Greve, Pa.
W3WHZ	Newark, Del.
K4ALH	Hampton, Va.
W4BSJ	Chamblee, Ga.
W4HHK	Collierville, Tenn.
W4HJQ	Glendale, Ky.
W4NRB	Newport News, Va.
W4RFR	Nashville, Tenn.
W4SCJ	Hampton, Va.
W4TLV	Demopolis, Ala.
W4VVE	Phoebus, Va.
W4ZVX	Norfolk, Va.
W5AJG	Dallas, Tex.
W5HTZ	Wewoka, Okla.
W5JWL	Gurdon, Ark.
W5KTD	Shreveport, La.
W5RCI	Marks, Miss.
W6AJF	Sonoma, Calif.
WA6BFC	Arcadia
W6BUT	Taft
W6GTG	Highlands
K6GWE	Berkeley
K6HCP	San Jose
W6HPH	Camarillo
K6IBY	Costa Mesa
W6NLZ	Palos Verdes Estates
W6NTV	Turlock
W6OHQ	Oakland
W6OKR	Larkspur
W6PIV	Sacramento
W6SDM	Oxnard
K7GGJ	Yakima, Wash.
W7HBH	Portland, Ore.
K7JSJ	Corvallis, Ore.
W7IHL	Kirkland, Wash.
W7RUX	Phoenix, Ariz.
K8AGO	Columbus, Ohio
K8AIY	Detroit, Mich.
W8ARR	Detroit, Mich
W8BAX	Columbus, Ohio
W8DMR	Columbus, Ohio
W8DX	Detroit, Mich
W8GVG	Dayton, Ohio
W8HBB	Detroit, Mich.
W8HCC	Sandusky, Ohio
W8HRC	Detroit, Mich.
W8HTD	Dayton, Ohio
W8IPR	Berkley, Mich.
W8JLQ	Toledo, Ohio
W8NRM	Lakewood, Ohio
W8PQO	Saginaw, Mich.
W8PT	Benton Harbor, Mich.
W8RLT	Livonia, Mich.
W8RQI	Toledo, Ohio
W8TTY	Toledo, Ohio
W8TWT	Plymouth, Mich.
W8TYY	Columbus, Ohio

W8UB	Port Clinton, Ohio
W8UCT	Inkster, Mich.
W8UST	Toledo, Ohio
W8VCO	Toledo, Ohio
W8VOZ	Van Buren, Ohio
W9AAG	Woodhull, Ill.
W9AGM	Chicago, Ill.
W9ALE	Chicago, Ill.
W9AYM	Chicago, Ill.
W9DRN	Des Plaines, Ill.
W9FHS	Chicago, Ill.
W9GAB	Beloit, Wisc.
W9ITL	Chicago, Ill.
W9KKU	Chicago, Ill.
W9LX	Chicago, Ill.
W9OJI	Wheaton, Ill.
W9OKB	Chicago, Ill.
W9PBP	Chicago, Ill.
W9PVO	Chicago, Ill.
W9PWH	Chicago, Ill.
W9QVO	Chicago, Ill.
W9SQE	Chicago, Ill.
W9ZIH	Chicago, Ill.
WØDEN	Iowa City, Ia.
KØITF	Prairie Village, Kan.
KH6UK	Kanuku, Oahu

1215 MC

K1CJX	Granby, Conn.
W1CUT	W. Hartford, Conn.
W1HDQ	Canton, Conn.
W1QWJ	Springfield, Mass.
W1RVW	Springfield, Mass.
W1STR	Springfield, Mass.
W1VNH	Feeding Hills, Mass.
W1WFL	Wilbraham, Mass.
W1YDS	Wilbraham, Mass.

1296 MC

W1BU	Medfield, Mass.
W1OOP	Needham, Mass.
K2CBA	Troy, N. Y.
K2GRI	Porter Corners, N. Y.
K2ISA	Troy, N. Y.
K2TKN	Pluckemin, N. J.
W3ARW	Scranton, Pa.
W3CGV	Wilmington, Del.
W3FEY	Lancaster, Pa.
W3GGR	Pleasant Hill, Md.
K6AXN	Richmond, Calif.
W6BLK	San Diego
W6DQJ	Rivera
W6HB	Menlo Park
W6HIT	Panorama City
W6HPH	Camarillo
W6JRK	La Cresenta
W6MMU	Los Angeles
W6NLZ	Palos Verdes Estates
W6PCQ	Santa Monica
W6SSB	Long Beach
W8LIO	Dorset, Ohio

VHF

"Transistorized" - 6 Meters!

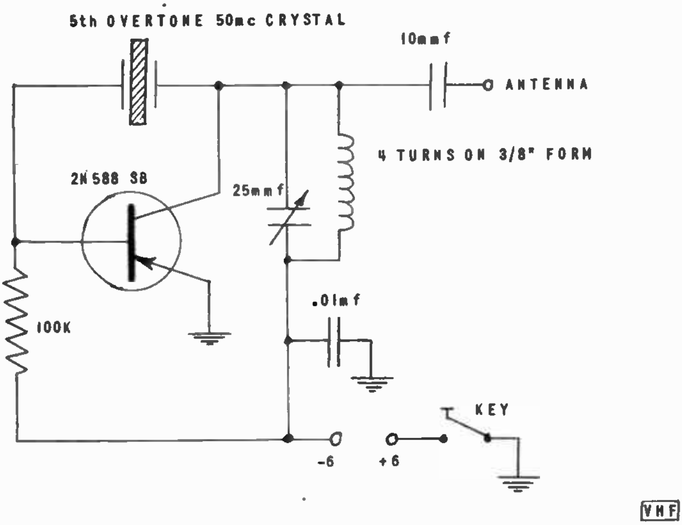
David Thornburg, K9SRW
443 W. Webster Avenue
Chicago, Illinois

I have found this transistorized transmitter to operate on more of a novelty basis, but its value in basic theory cannot be overlooked. No modulator has yet been designed but I am considering a Hiesing circuit now. The transmitter demonstrates the use of semi-conductors at the v.h.f. frequencies, something which is too often overlooked.

Construction should be straight forward, and care should be taken to use the correct battery polarity. As you can see, the power supply is keyed since no warm up time is required. Care should be taken to use only batteries and not battery eliminators because *any* ripple present will show up on the signal.

DX? Not quite, but one mile operation has been accomplished using a receiver with I mv sensitivity.

(Editor's Comment: Many thanks for this circuit, Dave! K9SRW is a very active O.E.S. for ARRL and this month is competing in the Chicago Science Fairs. Good luck!)



COAX for VHF

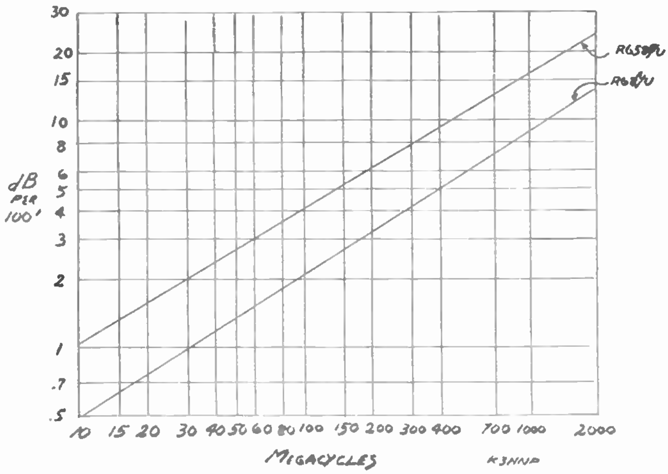
David L. Heller, K3HNP
14 Darkleaf Lane
Levittown, Penn.

The antenna feed line is the weak link in the amateur station. It contributes nothing but losses; perhaps that is why its effect is so frequently overlooked. The general rule seems to be to hang a piece of coax of the correct nominal impedance and forget it. On the lower bands this doesn't do much harm, but above 50 mc line losses can easily consume 75% of the transmitter output or the signal into the receiver.

This article is intended to assist the amateur select the coax line best suited to his individual need. There is no one "best" cable for any particular installation. The amount of losses that can be tolerated must be weighed against the cost and availability of the various cables. However, it is interesting to note that some of the most common coax types should not be used in any serious installation.

The losses in the antenna feedline of course are equal on transmit and receive; usually it is the latter that requires most consideration, for the limits on receiver sensitivity inhibit v.h.f. activity more than transmitter power (how many KW v.h.f. are there as compared to low-noise converters?).

Open feeders will not be discussed. They can provide transmission efficiently better than any coax, but have their own problems.



The table at the end of this article lists most of the available coax types. Most are for reference, being seldom available to the amateur. The data is reduced to that of importance in hamming: impedance, diameter, jacket material, attenuation at 100 and 1000 mc, and price. Prices are approximate, taken from a bulk, net list, and generally are lower than the short-length over-the-counter cost.

It is important when buying coax to be sure you are getting cable meeting the Military specifications for the particular type. There are many cables available advertised as having characteristics similar to an RG/U type. These may or may not be worth using; the major manufacturers sell only cables inspected for conformity to specification in all regards.

A very important characteristic usually overlooked is the jacket material. The vinyl jacket contains a platicizer to obtain flexibility; many common plasticizers will migrate from the jacket into the inner dielectric. This is a continuing process from the day of manufacture. The effect is to alter the impedance and greatly increases losses. A type I jacket contains such a migrating plasticizer; cable with type I jacket material has a useful life possibly as short as one year and very seldom as much as three years. This, of course, is to say that the WW II surplus RG/8U (which is type I) is essentially worthless.

Type II and other jacket materials contain non-contaminating plasticizers and should be useful for ten, fifteen years or even longer. Obviously, then, if the antenna is to stay up a few years, type I coax should not be considered even though it is a bit cheaper.

What coax should be chosen for a particular installation? Many cables on the list are special and not commonly available. For 50 ohm line it is best to choose among RG58B/U, RG58C/U, RG8A/U (or RG213/U), RG17/U, RG17A/U (or RG218/U), or Times T4-50. For 75 ohm line use RG59A/U, RG59B/U, RG11A/U, Times JT204, or Belden 8213.

The common cables with type I jacket material are RG5/U, RG8/U, RG54/U, RG58/U, RG58A/U, RG11/U, and RG59/U. The group (which includes virtually all transmission lines in use) is not recommended. The useful life is too short.

The graph above permits determining the loss of any cox at any frequency. Simply plot the two attenuation figures given in the table at the end of this article and draw a straight line through these two points. RG58B/U and RG8A/U are already plotted.

The table below does not list all avaiaIlable coax types for lack of space, but most of those omitted are specials which are not suitable for amateur use and are seldom available. The impedances listed are 50 and 75 ohms; many other impedances, of course, are standard.

50 Ohm Types

RG/U	Cost	Dia.	Jacket	100mc	1000mc
5	$11	.332	1	2.6	9.5
5B	24	.328	–	2.4	8.8
8	9.50	.405	1	2.1	9.0
8A	12.50	.405	2	2.1	9.0
9	23	.420	2	2.0	6.5
9A	30	.420	2	2.3	8.6
913	30	.420	2	2.3	8.6
10	19.50	.475	2A	2.3	9.0
10A	20.50	.475	2	2.1	9.0
14	23	.545	2	1.4	6.2
14A	27	.545	2	1.4	6.2
17	48	.870	2	.85	4.2
17A	52.50	.870	2	.85	4.2
18	65	.948	2A	.85	4.2
18A	68	.945	2A	.85	4.2
19.19A	83	1.120	2	.68	3.5
54	–	.275	1	3.1	12
54A	7.50	.250	3	3.1	12
55	8	.206	3	4.2	16.0
58	4	.195	1	4.2	16.0
58A	–	.195	1	5.3	22.0
58B	–	.195	2	4.2	16.0
58C	5	.195	2	5.3	22.0
74.74A	40	.615	2A	1.4	6.2
141A	–	Hi-Temperature RG58C/U			–
142A	–	Hi-Temperature RG55A/U			–
147	–	Same as 19 w/armor			3.5
148	–	Same as 8 w/armor			–
159	–	Hi-Temperature 55			–
212	–	Same as RG58/U			–
213	–	Same as RG8A/U			–
214	–	Same as RG9B/U			–
215	–	Same as RG10A/U			–
218	–	Same as RG17A/U			–
223	–	Same as RG55A/U			–
224	–	Same as RG74A/U			–

75 Ohm Types

RG/U	Cost	Dia.	Jacket	100 mc	1000 mc
6, 6A	$15.00	.332	2	2.8	11.0
11	9.00	.405	1	2.1	7.8
11A	12.00	.405	2	2.1	7.8
12	19.00	.475	2A	2.1	7.8
13	17.00	.420	1	2.1	7.8
13A	18.00	.420	2	2.1	7.8
59	4.00	.242	1	3.8	14.0
59A,B	5.00	.242	2	9 @ 400	9 @ 400
140	—	HI-TEMPERATURE 59A/U			—
144	—	HI-TEMPERATURE 11/U			—
216	—	SAME AS 13A/U		—	—

VHF

Plate Modulating The Heath

SENECA

Vince Varnas, K8REG
4329 Renwood Drive
Dayton 29, Ohio

I am one of the many amateurs who owns a Heathkit "Seneca." When I purchased it, factory built, the 1960 Sporadic E season was just beginning. After numerous successes and after working 40 states on six, the DX subsided. To take its place, I realized a form of propagation called "extended ground wave." This is a condition which allows one to make contacts over a 150 mile or more distance under "dead band" conditions.

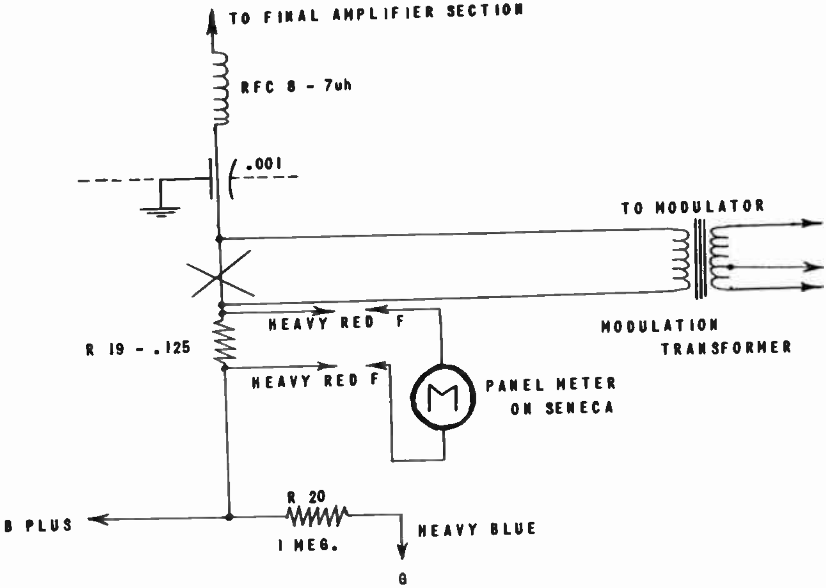
The Seneca's controlled carrier, screen grid modulation was ideal for Es, good auroras, and average "groundwave." However, when "extended ground wave" signals became weak and my own signal diminished in strength to only one "S" unit out of the noise, the audio proved to be almost undreadable. Under similar conditions, the audio proved to be 100% on fully plate modulation and signals were Q4 and Q5. For this reason I feel that owners of Senecas can be greatly aided in making "ground wave" and aurora contacts by converting to plate modulation.

I use an Eico 730 modulator-driver to achieve plate modulation using the circuit shown on the next page. Upon testing, I found that stations I had worked previously now gave me reports of my modulation being "100% better" than before the conversion.

Any modulator delivering 50 watts of audio may be used. Once installed, merely place the Seneca's function switch in the c.w. position, apply the B plus to the modulator, and you're in business.

Since no change has been made in the Seneca's original modulation system, the resale value remains high.

Editor's Note: We'd like to hear from others with similar hints of interest. Whatsay?



Remove wire at "X" and connect modulation transformer of outboard modulator in series with lead carrying the B plus. —*K8REG*

VHF

UNDERSTANDING V.H.F.

PROPAGATION

Communications on 144 Mc by Auroral Reflection — *W2AZL*

Carl E. Scheideler, W2AZL
727 Coolidge Street
Plainfield, New Jersey

PART II

There are a number of means by which 144 mc signals may be propagated over fairly long distances, namely: tropospheric scatter, ionospheric scatter, meteor scatter, temperature inversion, Sporadic E and auroral reflection. This article will deal with the utilization of auroral reflections since it is my feeling that many do not understand how to make the best use of this medium.

The largest number of auroras occur in the spring and fall of the year although one may occur at any time. There are manyways of determining when an aurora is in progress or about to commence. Listen on the lower frequencies 3.5 through 14 mc for hollow sounding signals and the lack of DX. Some of the gang who live in a TV or FM fringe area have an extra antenna pointed north and look for the appearance of stations from long distances. Another help is to take advantage of the CRPL Radio Warning Service, Boulder, Colorado. This can be obtained by writing the National Bureau of Standards CRPL Radio Warning Service, Boulder, Colorado, and requesting the CRPL-JB forecasts. They are mailed from Boulder each Wednesday with predictions for the following week. Listen to WWV on 2.5, 5.0, or 10.0 mc at 19 after and 11 before the hour will give an idea of the present possibilities of an aurora. If WWV is sending W5, U5 or less, look for aurora on 144 mc. This is not foolproof, however, since the broadcast is only changed every six hours and conditions may change rapidly during that time. If the lower frequency bands drop out due to a "SID" (sudden ionospheric disturbance), look for an aurora approximately 27 hours later. If an aurora is observed, mark the date in your log and look for a reoccurance 27 days later plus or minus a few days.

Possibly one of the least understood parts of communication by auroral reflection is which way to point the beam. The usual practice is to point it in a northerly direction. This may work for short haul contacts up to distances of 500 miles or less with a fairly broad beam. The antenna at my station has a 15 degree beamwidth to the half power points and the best direction for the W1, W2, VE1, VE2 is slightly east of north. The W8's peak at about 30 degrees west of north and the W9's 30 degrees west of north. The W4's in Virginia and Kentucky peak at 30 degrees west of north and the more southerly W4's peak progressively further toward the west until the beam is almost directly west for Florida. The W5's and southern WØ's peak almost due west. In the case of some of the southern stations it was found possible to improve the signal strength by tilting the beam. It would appear from these observations that if a station in Nebraska wanted to work a station in New Jersey, he would point his beam in a northeasterly direction and the station in New Jersey would point to the northeast. All of the above is pointed out merely to illustrate the fact that one may get auroral reflections from other than a northerly direction and advantage should be taken of this fact to work stations at longer distances.

Some observations made at this station in the past 12 years may be of help. The best or longest haul contacts are made during a *red aurora.* This is because the red aurora occurs at a higher elevation than the green or white. The best auroras seem to coincide with a high pressure area centered over or below the Great Lakes region so that most of the country is in a high pressure area. This would suggest that some help is needed from tropospheric bending and scattering. Usually a good aurora will last for as many as five or six hours without fading. When the aurora fades, don't shut down; it may be back in a few minutes. If not, check the band in half-hour intervals - you may be pleasantly surprised. Usually if an aurora fades at 8 to 9 PM it will be back around midnight. Auroras have been observed as far south as Florida, so don't think your location is too far south. While some contacts have been made using 'phone, these are few and far between. Blow the dust off that old brass key and I'll be seeing you on 144 mc during the next auroral - *W2AZL*

VHF

FLASH!

News has just broke on another 1296 mc first- A RTTY two-way contact on February 11, 1961! W6TPJ, of Rosemead, California worked first W6CG (of Temple City) and then K6OWO (also of Temple City) for the first 1215 RTTY contacts!

For further details, check the April 1961 CQ VHF Column. News break via Byron Kretzman, KØWMR, CQ's RTTY Editor...

VHF

SOUTH AMERICAN VHF NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, Argentina

Not too much DX was worked during the last week of January and the first half of February down here in South America. Bet we cannot blame propagational conditions for this unhappy situation, as lack of activity in the Central American countries was the most important reason. Trans-equatorial propagation showed up again with fair regularity, and some sort of commercial signal was heard in Buenos Aires in the early evening hours of January 23,25,26,27,30 and 31, and nearly every day since the second week of February. These commercial signals are radiotelephones operating with low power, simple antennas and over relatively short distances, but we often hear them with "arm-chair copy" and listen to them for a while when no amateur signal shows up on the higher side of the 50 mc calibration mark.

On January 30 HC1FS in Ecuador worked his **first DX this year** by contacting PY5GK. Then he had to wait again for a long while, and only on **February 19** did he have a chance to consume some electricity with his 6 meter rig when the band opened up to Mexico in

Conrad, PY5GK, operating his portable equipment at Ilha dos Corais, a small island in the South-Atlantic.

Looks like the boys are fixing grub at their stay with PY7GK at this most exotic island DXpedition.

the afternoon and he got to greet the operators of XE1GE and XE1DDD. In the late evening of that same day he also contacted LU3DCA and passed along to me the foregoing information.

. In a letter received a few days ago, Arthur, LU4DOZ, reports the first contacts over the path of KP4-LU accomplished this year. At 1900 GMT on February 8 he worked KP4AVB, KP4AXC and KP4AWL, all of them with S9 plus signals, although the latter two were using Heathkit "Sixers," those little rigs with 5 watts input. Arthur's antenna was lying on the ground during these contacts, because of the storms which are hitting his home town once every week lately, but he is now building a rugged 30 foot crank-up tower which should support his 6 and 2 meter beams in the near future.

On February 10 the local gang got at last another opportunity to work a little DX, and we had some fine rag-chews with PY1XW and PY7AEE. February 16 was good for some north-south propagation in PY-land only,with PY5GK and PY7AEE talking to each other. The following evening produced a more widespread opening, with PY1BSL, PY7AEE and PY5GK coming in nicely here, and before going QRT I also heard the latter talking with CE3XK in Santiago de Chile.

The following Saturday, February 18, brought the happy surprise of XE1GE's familiar voice coming down from Cuernavaca for the first time this year. It was around 2100 GMT when he first worked LU4DOZ, and after another QSO with LU2DEK he placed the 281st call-sign on his "LU's-worked-on-6-meters" list!

6 METER CONDITIONS IN 1960 AS SEEN FROM PHOENIX, ARIZONA

Although these are not exactly South American items, I think the following statistics supplied by Morgan Monroe, K7ALE, comparing propagational conditions on 50 mc in 1959 and 1960 are just too interesting to pass up. He writes...

"IN 1960 WE LOGGED 169 BAND OPENINGS ON 126 DAYS. THE PERCENTAGE OF OPEN DAYS TO TOTAL DAYS DURING THE YEAR WAS 34.43, AND THE AVERAGE DURATION OF OPENINGS WAS 96.6 MINUTES. SEVEN COUNTRIES AND 31 UNITED STATES WERE HEARD OR WORKED DURING THE YEAR, INCLUDING

AUSTRALIA (HEARD ONLY), ARGENTINA, MEXICO, ECUADOR, URUGUAY, CHILE (HEARD ONLY), AND CANADA (VE6 AND VE7).

"AN INTERESTING CONDITION IS APPARENT BY COMPARISON OF THE FINDINGS ABOVE WITH THOSE FOR 1959. IN THAT YEAR WE LOGGED 121 OPENINGS ON 99 DAYS, — THE PERCENTAGE OF OPEN DAYS TO TOTAL DAYS WAS 29.55, AND THE AVERAGE DURATION OF OPENINGS WAS 122.3 MINUTES. SIX COUNTRIES AND 42 STATES WERE HEARD OR WORKED.

"THUS IT APPEARS THAT 1960 WAS BETTER THAN 1959 IN NUMBER OF 50 MC OPENINGS AND IN DAYS OPEN, BUT 1960 OPENINGS WERE SHORTER AND NOT AS WIDESPREAD (AT LEAST WITHIN THE UNITED STATES) AS IN 1959. ALSO, THE GENERAL QUALITY OF SPORADIC E PROPAGATION LAST YEAR WAS BELOW THAT OF 1959 —MORE QSB, LESS SIGNAL STRENGTH, ETC. — ALTHOUGH SOME OF THE F2 OPENINGS OF LAST FALL WERE 'IONG THE BEST WE HAVE EVER WORKED."

Such accurate observations as those which permitted the foregoing analysis will certainly be a valuable aid in explaining some day what actually are the mysteries of propagation on 50 mc. Congratulations, Morgan!

The pictures displayed this month were taken during a DXpedition to the "Ilha dos Corais," a small island in the South-Atlantic, accomplished by PY5GK with the help of two friends. This was a "VHF-only" effort worthy of imitation, especially in the Carribbean area.

By the time this appears in print you may be contacting Conrad, PY5GK, from his home shack pictured two months ago in these pages...

73 - *Michael, LU3DCA* VHF

Moonbounce Activities

Allen Katz, K2UYH
48 Cumberland Avenue
Verona, New Jersey

The true moonbounce operator differs from other v.h.f. men because he is looking for a bond on which a particular propagation can be best used, not for a propagation which can be used best on a certain band. He must make this decision for himself and from incomplete information. Theoretically he can accomplish moonbounce on any band, if he can muster enough gain to overcome the path loss.

The path loss for a moonbounce system can be obtained from the formula loss db is equal to 10 log $1.62 \times 10^{-26} \times \lambda^2$.[1] The transmitter used will have a gain according to theffformula gtxx equals 10log P (gtx equals gain in db, while P is the power out in watts). The gain of most receiving and transmitting antennas can be obtained from various handbooks. The gain of a parabolic antenna, however, is not too frequently seen in amateur publications and given by the formula Ga equals 10 log $\frac{4\pi Ag}{\lambda}$ *(Ga* is the gain in db over isotropic radiator, A is projected area of the reflector in square feet, g is efficiency factor which is approximately 55% for most antennas and λ is the wavelength in meters).[3] The gain of the receiving system can be obtained by first calculating the power ...a perfect receiver can achieve from the the formula PR_0 equals $-10 \log K t \Delta f$ (PR_0 is perfect receiver power in db, K is Boltzmann's constant which equals 1.37×10^{-23}, T is antenna temperature in degrees Kelvin - Temperature (approx.) equals 300 degrees K $(.22\lambda^{2.4})$ and Δf equals the receiver bandwidth in cycles.[2] From the perfect receiver power, the receiver's noise figure in db must be subtracted to obtain the actual receiver power. It should also be remembered that the transmission line losses must be subtracted from overall gain.

The following chart shows theoretical gains-pathloss calculated for typical moonbounce systems on 144 mc, 432 mc, and 1296 mc.

CHART I

Gains - Pathloss

144 mc	Antenna Gain	
	(64 element beam)	plus 22 db at the transmitter
	(64 element beam)	plus 22 db at the receiver
	Transmitter Gain	
	(750 watts out)	plus 29 db
	Receiver Power	
	(100 cycle bandwidth with 417A converter)	plus 184 db
	Transmission Line Loss	
	(transmitter and receiver very near ant.)	less than -1 db
	Path Loss	-252 db
	Total	*Plus 4 db*
432 mc	Antenna Gain	
	(30 ft. dish)	plus 27 db at the transmitter
	(30 ft. dish)	plus 27 db at the receiver
	Transmitter Gain	
	(500 watts out*)	plus 17 db
	Receiver Power	
	(100 cycle bandwidth with Paramp.)	plus 194 db
	Transmission Line Loss	
	(transmitter and receever mounted very near or on ant.)	less than -1 db
	Path Loss	-252 db
	Total	*Plus 19 db*

*(With 50 watts the legal power on 432 mc you can still make a positive total. (500 watts - wishfu' thinking!))

1296 mc	Antenna Gain	
	(18 ft. dish)	plus 35 db at transmitter
	(18 ft. dish)	plus 35 db at the receiver

Transmitter Gain (500 watts out)	plus 27 db
Receiver Power (100 cycle bandwidth with paramp.)	plus 105 db
Transmission Line Loss (Transmitter and receiver mounted on or near antenna)	-1 db
Path Loss	-271 db
Total	*Plus 30 db*

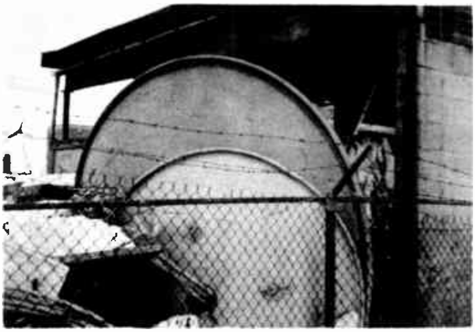
The above chart should not be taken at face value. There are other factors to consider, however the chart's values do give a starting point from which to work.

The big limiting factor not shown on the chart is the Fariday shift. As radio waves travel through the atmosphere their polarization is shifted thus causing a large db loss due to cross polarization. Although the exact extent of this shift is not known, it is known that the effect is lessened with frequency. The Fariday shift is probably one important reason why practical moonbounce communications have not been accomplished on the lower v.h.f. bands but has succeeded on 1296 mc.

Two other factors to be considered in the choosing of a band to try for moonbounce are population and expence. The trend in population seems to be toward 1296, especially since the recent success on this band. Remembering that one needs a second station for a two-way contact, 1296 seems to be the band to find that second station. The other bands should not be neglected. On 432 the extent of Fariday shift is not known, and it is an easier band to set up a moonbounce system. The 50 watt power limit is not so great a deterrent as many believe. With only 50 watts a system with a favorable gain-loss relationship can be built. The bands above 1296 have great potential with the extreemly high antenna gains which can be achieved on them.

What band will you be on? Please write and let us know your plans for future inclusion in this *your* column.

73 - *Allen, K2UYH*



As mentioned in last month's column (See page 8, March issue) parabolas are available from surplus dealers. A typical example is Bickoff's in Newark, N.J., pictured above. These 12 footers go for about $100.00.

VHF

ALLIED's

LINCOLN 6-METER TRANSCEIVER

Bob Brown, K2ZSQ
EDITOR

THE VHF AMATEUR *reviews another new product currently available to amateurs interested in 50 mc transceivers fixed & mobile*

Anyone who follows the ads in QST *and* CQ *magazines surely* was as startled as I was to see Allied's announcement of a new 6 meter transceiver recently. The advertising claims were just a little bit too good to believe for $57.50, and unable to control myself any longer, I sent away for the unit.

More surprises were in store when the package arrived and the *LINCOLN* was actually on the air in five minutes! - The unit comes complete, already wired and tested, with mike (an Astatic, by the way) and a 50.2 mc third overtone crystal. Running directly into our 11 element Long John Yagi, amazing results were obtained.

Before we continue I'd like to mention a matter which most all readers will agree with - exaggerated product reviews. Most magazine reviews we read today are mere rubber stamped reiterationsof manufacturers claims and sometimes highly exaggerated reports. Perhaps this reports may appear in the same light to many, but this is intended as an objective review under actual on-the-air tests. Everything we state is true and as accurate as our experience permits, in spite of surprising results with the unit. Now on with the results...

Tests run the first night of operation proved most successful, with the *LINCOLN* providing good reliable contacts over a surprising range.Some contacts were made with stations in Southern New Jersey, New York, Connecticut, and Upper New York State, (and later Pennsylvania) with the longest distance from Rahway (NNJ) being about 270 miles into upstate New York. Admittedly, ground wave conditions were good, and the antenna optimum, but still the 7 watts input held up with an "S8-9" report over that distance.

Reception is aided by a tunable Superhet receiver covering the entire band with a slow tuning Vernier dial. Sensitivity is excellent, selectivity better than expected but still not enough to compare with the home "hearing aid." Tube line-up is 6U8A, mixer, 6AL5, ANL, 6CX8, RF output, 12AX5, mike amp, and 6V6GT, modulator/AF output.

__ADVANTAGES__

1. Superhet Receiver - 50.0-54.0 mc
2. Easy mounting for mobile
3. 100% modulation with indicator
4. Full 7 watts input (6CX8)
5. Built-in TVI filter

__DISADVANTAGES__

1. Half-inch tuning of usable portion
2. Requires outboard power pack for mobile use ($10.95 6v or 12v).
3. Uses 3rd overtone 50 mc crystals

The Allied *LINCOLN* is available exclusively from: ALLIED RADIO, Dept. 212-B1, 100 N. Western Avenue, Chicago 80, Illinois.

VHF

50 mc W.A.S.

Send in your listing for THE VHF AMATEUR's Worked All States department! Let's see how you rate!! Minimum states confirmed needed for listing: 21. Cards must be on hand for inspection if requested. All entries must be submitted on a postcard or QSL card and addressed to: W.A.S. Listing – 50 mc, THE VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

CALL	AREA	POWER IN.	STATES WORKED	CALL	AREA	POWER IN.	STATES WORKED
W7MKW	Wash.	150	47	K1GBI	N.H.	50	38
K4BPY	Ky.	–	47	K2HAK	N.J.	100	37
K9DTB	Ill.	80	47	K4RTG	Va.	18	36
K2DZM	N.J.	100	46	K2UGB	N.J.	125	36
K5IQL	N.M.	600	46	WA2BBU	N.J.	160	36
K2ZBX	N.J.	–	46	K6VXI	Calif.	120	36
K6UJL	Calif.	7	45	W8UML	Mich.	40	33
K1BIL	Mass.	50	45	W3BRU	Pa.	35	32
KL7AUV	Alaska	200	45	K4EBT	Florida	19	33
K9KZB	Ill.	100	45	K1IZN	Mass.	100	32
W2EIF	N.J.	25	45	K1AUD	Conn.	195	32
K4QBB	Florida	600	44	KØPWS	Mo.	12	32
K2QWD	N.Y.	50	43	K2CMG	N.J.	8	31
KØHOS	Iowa	75	43	LU3DCA	Argentina	–	30
K4PEV	Tenn.	50	42	W5BJB	Texas	–	29
K8DKO	Ohio	45	42	K27SP	N.J.	100	28
W3JNV	Md.	75	42	HC1FS	Ecuador	70	26
K3BOB	Md.	40	41	W3MBE	Md.	100	26
K2VDR	N.Y.	90	41	KØCWR	Mo.	45	26
K2MUB	N.Y.	150	41	K2VSE	N.J.	30	24
W2BVW	N.J.	100	41	K2VNK	N.J.	70	24
K2MXT	N.Y.	180	42	K3KEL	Pa.	50	24
K1BBV	Conn.	120	40	WA2ACI	N.Y.	45	23
W2EAQ	N.J.	100	40	K8EUX	Ohio	–	23
K8REG	Ohio	100	40	K2DQT	N.J.	–	23
K2CVG	N.Y.	65	39	K3ATX	Penn.	30	22
K4PXJ	Tenn.	8	39	K2VHL	N.J.	70	22
K2ZSQ	N.J.	100	39	K2EFN	N.J.	14	21

This list will be revised periodically as we receive notice from you of changes of status. Also send us your 2 meter and 220 mc listings – We are starting a new W.A.S.

VHF

Trading Post

RATE: Commercial ads - 5¢ per word. Free to readers - any reasonable length. Ad from readers MUST BE SUBMITTED ON A POST CARD or QSL card. TRADING POST, 67 Russell, Rahway, N.J.

FOR SALE: Globe LA-1 linear, excellent condition, $85 (factory wired). See Dave Heller, K3HNP, 14 Darkleaf Lane, Levittown, Pennsylvania.

Leaving 6 Meters: complete station up for grabs. 120 W, written up in the June 1960 *VHF Amateur*. Send for list. Ken Foster, W2IBD, 467 Oceanpoint Avenue, Cedarhurst, N.Y.

WANTED: Tower and/or rotator. Local deal only.... New England and New York. I will take down and move tower. Nick Skeer, K1PSR, P.O. Box #132, Amherst, New Hampshire.

FOR SALE: Gonset Communicator II, 6 meters, 14 crystals, crystal mike, AC & DC power cords and mobile rack for Gonset. Also 5 element Telrex 6 meters - new; Eico 5" scope. Manuals included with all above equipment. $275.00 takes everything. (Will also sell separately). Contact Mort Cohen, WA2ARS, 11 Brighton 10 Terrace, Brooklyn 35, New York, or call TW 1-3125 after 6:30 PM.

FOR SALE: Johnson Viking 6N2 converter, 28-30 mc. New, never used - Bargain. Call YU 4-2437- now!

QSL's: SWL's,CITIZEN BAND, SAMPLES 5¢. NICHOLAS & SON PRINTERY, BOX 11184, PHOENIX, ARIZONA. (6/61)

FOR SALE: Viking Challenger - good condition - $90.00. Meissner Signal Shifter - all-band v.f.o.-exciter-e.c.o. - $25.00. Will ship C.O.D. or deliver locally....Heiko Ganzer, K2REH, 814 Nicholas Place, Rahway, New Jersey.

FREE HIGH PASS FILTERS: Every major TV manufacturer will supply TVI filters (usually Drake 300-HP's) to TVI recipients upon request!!! Send for the lists of these companies and proper forms to be filled out by complainees. 25¢ to cover printing, paper, envelops, and postage to TVI Dept., *The VHF Amateur*, 67 Russell Avenue, Rahway, N.J.

WANTED-WANTED-WANTED! Construction articles on v.h.f. - u.h.f. gear for this magazine. Also need pictures of your station, you (horrors!), or your antenna. Write us now! *The VHF Amateur*, 67 Russell Avenue, Rahway, N.J.

READ *FLORIDA SKIP!* Everyone in the country is jumping on the Florida bandwagon for this real dandy publication edited and published by Andy Clark, W4IYT, S.E.C. Florida. It's loaded with news, general *and* v.h.f! Some of the staff: W4RMU, VP7BH, K4EUJ, K4RNS, K4PPX (CQ contest 2 million pointer - 1959), K4LLG, and many, many more. Whether or not you live in the heart of Sunny W4-land, you'll like *FLORIDA SKIP*. And it only cost $2.00 a year for a full supply of the best the Sunshine State has to offer. Don't pass this one up! Send your 16 bits to *FLORIDA SKIP*, P.O. Box 501, Miami Springs, Florida.

K3HNP, the license plate collector, is still looking. Please - your used ham plates. Can the LU-land friends help? 14 Darkleaf, Levittown, Pa.

TRADE: Any surplus 811's for swap? K3HNP. VHF

Single Sideband

J.S. "Rusty" Bravman, K2UTN
170 Schenck Avenue
Great Neck, N.Y.

This month we were delighted to attend the East Coast VHF Society dinner, on February 25, and even more so to meet many of those with whom we have exchanged RST's

Left to Right: K2ZBX, WA2CVF, K2PXP

The SSB gang at the East Coast VHF Society dinner and members of East Coast SSB net, Steve, K2PBO, Rusty, K2DTN, Gene, W2RJD and Don, W2MFG

and QSL's (even QRM). Shown above are those representing the sideband faction and members of the East Coast Single Sideband Net. Many thanks to John, K2ZBX, for these fine shots. Many prizes were distributed after the meal, and a good time was had by all.

The following is a construction article designed for those with a high power urge.

Left to Right: Vito, K2PXP, KYL (of PXP), and Frank, father of K2UTN.

500 WATTS - 500 SQUARE INCHES

Single sideband has been termed a miracle for the v.h.f. pioneer. This in many ways is true, but in order to take utmost advantage, high power levels must be used. Since most available heterodyne units produce low power outputs, an additional unit, an amplifier, is required. The following is a description of a single unit that transforms a low frequency signal to a high power six meter job.

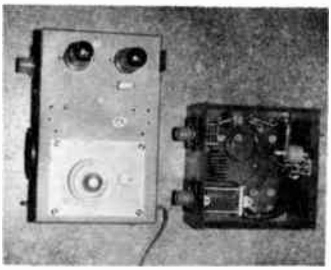
A second desirable feature of this unit lies in its small size, allowing easy station assembly and transportation. The simplicity of circuits makes it easy to duplicate.

Circuit Description

The unit utilizes single oscillator, mixer and amplifier stages. The oscillator uses a 6AG7 tube in a crystal controlled circuit. The 29 mc overtone crystal was chosen, but may be replaced if a different mixing scheme is desired, providing that L2, L3, and L4 are properly adjusted. The 29 mc signal produced is then fed via a 100 uuf capacitor to the grid of the mixer. The plate and screen supply of the oscillator must be well regulated for necessary stability.

The cathode of the mixer, another 6AG7, is fed with 21 mc sideband through L3, L4. This signal should never be allowed to exceed five watts. If a one hundred watt exciter is used, the driving power must be appreciably attenuated. The mixer develops sufficient drive to amply excite the 4X150A final amplifier. Bias for the final is supplied through

Complete unit and low voltage power supply.



and varied with a 15,000 ohm potentiometer. It was found that ordinary carbon varieties were not capable of carrying the currents present across it, and should therefore be avoided. The 4X150A was chosen as a final amplifier in the interests of small size and efficiency.

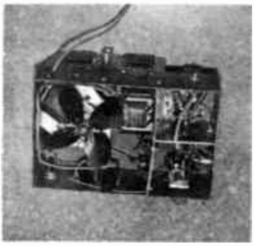
A standard Pi-Network output circuit is used. The low voltage power supply follows standard circuits, deviating only in the use of a dividing resistor to produce both low B plus and bias voltage from a common resistor.

CONSTRUCTION

The unit is housed in a steel minibox which measures 4" x 6" x 9½". A second minibox, with one side removed, and measuring 4" x 6 3/4" x 6 1/8", serves as housing for the plate circuits. Aluminum could also have been used, and probably have been machined more easily. The completed unit measures 8" x 9½" x 6", and is pictured at the top of this page.

The construction was begun with the partitioningof the interior of the larger minibox into three compartments, using aluminum sheet. The oscillator compartment measured 3" x 2"3/4", that of the mixer 3" x 3", and the remainder for the final stage (see photo at the lower right). Next, the hole for the 4X150A air system was cut. Such holes being so large may best be machined by either a hole saw or a nibbler. It is strongly recommended that the air system socket be used for effieient cooling. Next, cut the meter hole and those for screws, other components,and sockets.

To cool the final tube, a phonograph motor fitted with a four inch blade was used in the interests of miniaturization rather than a large blower. The individual blades of the fan were twisted to reverse the flow of air. When fitted in place, this fan draws air through an opening in the bottom plate and thus forces it to escape through the air system socket, cooling the tube within. To increase the operating efficiency of this system all holes or spaces remaining in the bottom cavity after the completion of parts mounting should be stopped up. The opening for the blade in the bottom plate should be only slightly larger than the blade itself, and perfectly centered.



It will be found that it is easier to first wire the oscillator and mixer sockets and subassemblies, and then insert them into their respective cavities. Final connections may then be made rather than attempt to complete the entire wiring in such a cramped space.

When wiring the 4X150A socket be sure to make all ground and bypass connections extremely short.

PLATE COMPARTMENT

Contact to the anode cooler of the 4X150A is accomplished by means of a strip of copper 3/8" wide, that is bent into a circle and fastened together with a screw. Tightening this screw causes the copper band to grip the anode more firmly. The plate blocking and bypass capacitors are of the TV doorknob variety. Several vent holes should be drilled into the plate compartment to allow adequate escape of the forced air.

ADJUSTMENTS

Upon completing the construction and carefully checking the wiring, it is recommended that a grid dip meter be used to approximate the coil settings and make any adjustments that prove necessary.

Begin by applying filament voltage. The fan should begin to force air through the tubes's anode cooler, and out the top. After a few minutes the 6AG7's should begin to feel warm. Now B plus voltage and bias may be applied. It is highly advisable to start with about six hundred volts on the plate of the final. Adjust the bias so that the static plate current is about 50 milliamperes. This setting must be readjusted at a higher plate voltage. Provision has been made for the antenna relay to apply full bias during receive periods to cut off the tube.

After completing the above tests, apply drive, and peak the oscillator and mixer controls for maximum output. Then dip the plate tuning control and load to the desired power level. If all goes well, apply the full 2,000 volts to the plate and readjust.

T V I

TVI, almost synonomous with five hundred watts, is minimized with proper shielding, and the use of a low-pass filter. In a few cases this may not be sufficient, since some have TVI difficulties at the 50 watt level even under the above precautions.

This unit has been in operation here for several months, bringing many more pleasures to u.h.f. operating. Happy DX hunting!

SSB SSB SSB SSB SSB SSB SSB SSB SSB SSB SSB

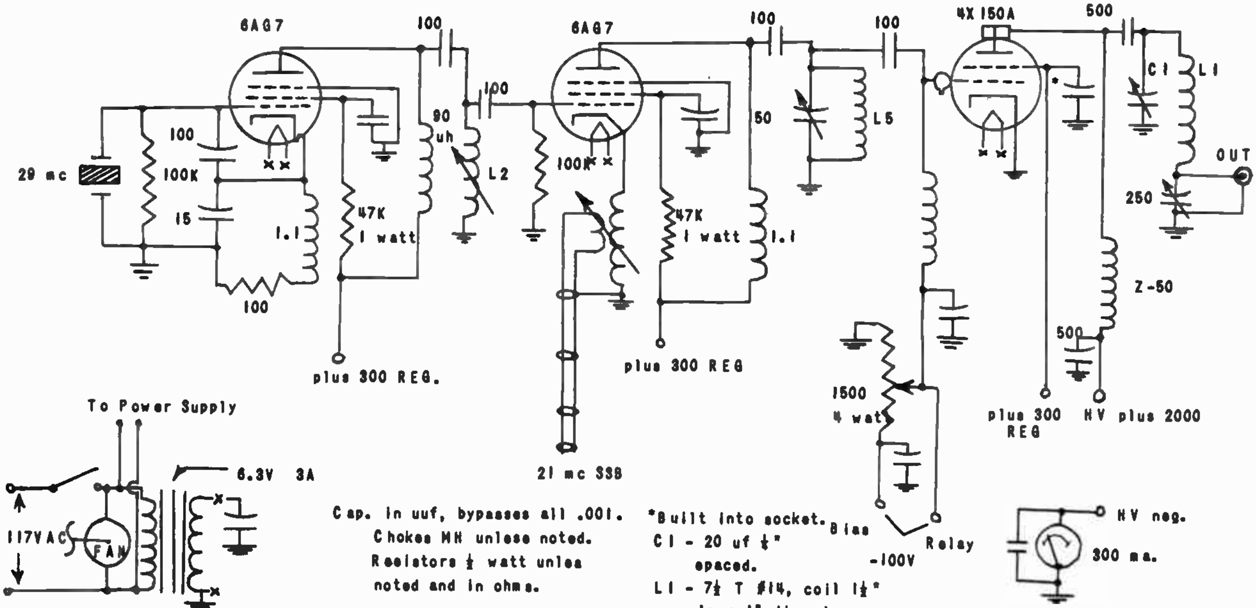
LETTERS

From John Webb, W7MAH, 1330 Buena Vista Avenue, Reno, Nevada, a note letting us know about his work on six and two SSB. He's trying for the K2UTN WAS-SSB cup. We'll wish you best of luck, John, - It's getting dusty already.

The next comes from Henry Savage, W4RFR...

"I HAVE JUST RECEIVED MY FIRST COPY OF THE VHF AMATEUR AND WAS VERY HAPPY TO FIND A SSB VHF SECTION. I HAVE OPERATED 6 & 2 METERS ON SSB FOR OVER A YEAR. THERE ARE SEVERAL 6 METER SSB BOYS HERE BUT NOT A SINGLE AM, CW, OR SSB STATION ON 2 METERS.

"THE RIG HERE IS A 4X150 FINAL WITH A 6Y6 CLAMPER TUBE RUNNING ABOUT 200 WATTS PEP. THE TRANSMITTING CONVERTER IS AS FOLLOWS: 32.5 MC XTAL IN AN OVEN INTO A 5U8 OSCILLATOR AND DOUBLER, 5763 DOUBLER TO 130 MC INTO GRIDS OF A 6524. THE SSB AT 14 MC IS FED INTO THE SCREEN OF THE 6524. THE 6524 PLATE ARE IN PUSH-PULL. ANTENNA HERE IS 32 "L", 75' HIGH.



Cap. in uuf, bypasses all .001.
Chokes MH unless noted.
Resistors ½ watt unless noted and in ohms.

*Built into socket.
C1 - 20 uf ½" spaced.
L1 - 7½ T #14, coil 1½" long 1" diameter.
L2 - 9T #32 wire on 3/8" slugtuned form
L3 - 3T #22 wire on ¼" slugtuned coil closewound.
L4 - 10T #22 same as L3 (form), closewound.
L5 - 4T 3010 Miniductor.

K1LSY and I had the first known SSB contact last October working 30 sec. calling periods. Both of us were using VOX listening for approx 3-4 sec. between calls. We had several good bursts last August during the Perseids. I find SSB much superior to CW in making contacts (meteor). There was very little doppler shift on Joe's signal. Our best burst seemed to come around midnight. I have also made contacts via the Aurora on SSB.

"I am interested in any skeds with SSB stations on 6 or 2 via aurora, scatter, meteor, etc. My normal operating frequency on 2 is 144.052 and 50.105 on 6 meters. Also have a good 416 B cavity pre-amp for 2 if you would be interested. It has a gain of 25 db and noise of approx 2 db. Keep up the good work on VHF!" *Nice hearing from you, "Red," and hope to hear from you soon about your interesting work. We'll especially be looking for the dope on that preamp!*

Well, that about wraps it up this time. Let's hear from you next! Until next month...

73 - *Rusty, K2UTN*

VHF

EDISON AWARD - From page 3 - continued

distance records on 432 mc, 220 mc, and 144 mc over the 2,540 miles course between Hawaii and California."

And the boys are still at it! Here's a note to your Editor from "Tommy" KH6UK....

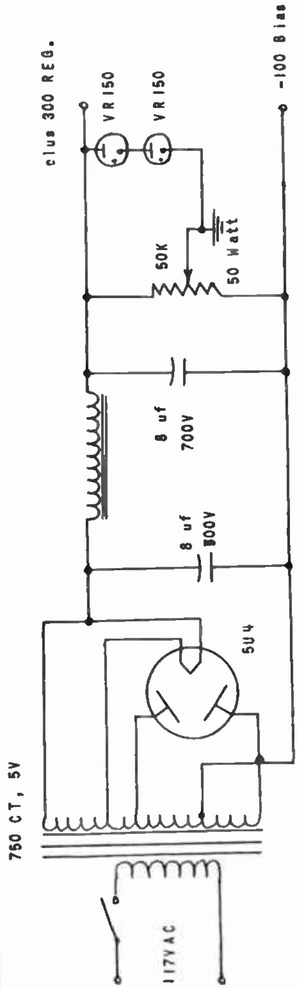
"I still run 432 mc tests with W6NLZ whenever conditions look favorable. During December we had several such days and even January has produced days when conditions looked fairly good on both ends of the path, with very little or no wind present. If we only had this kind of weather last Summer!

"I have tried to keep watch on 50 mc, but have caught no openings yet this season. I am kept very busy at work, though, and have had little time for ham radio. Have a 28' Kennedy dish which I hope to get up some soon. Am now building the low power stages for 1296 mc and will have an Eimac Klystron for the final. Should be all set for some serious moonbounce operation one of these days."

-Our most sincere congratulations to you and John, Tommy, and stick with it! We're with you all the way! Just keep us informed on further work and developments out your way!

Tommy's latest 1296 work provided us with a real nice shot of his 28' dish. No room this month, but we'll get it in for sure next issue. - K2ZSO

VHF



HAMFEST!

Some of the gang at last year's DAYTON HAMVENTION: From far left corner to front, Sam Harris, WIFZJ, Helen Harris, WINOY, Ed Gillespie, K8MDX, Jack Probst, K8GDV, R.C. Clark. Right side, back to front, Kay Brandeburg, K8IYW, Gene Pierce, K8SMO, George Hansley, W8SVW (This year's VHF Chairman), and Mrs. Edward Gillespie.

DAYTON HAMVENTION - APRIL 29: Pictured above is some of the group at last year's affair. Note presence of honorable Sam Harris, WIFZJ, V.H.F. Columnist for *QST*. Sam will be there again this year as well as *CQ's* V.H.F. Editor and the Editor of *The VHF Amateur* (one and the same), Bob Brown, K2ZSQ. The VHF Dinner will be at the Dayton Biltmore Hotel, 1900 hours, Friday, April 28th. W8SVW mentioned both the dates, 28th and 29th, (Friday and Saturday), and we don't know which - so get there early and find out! Program is as follows (and accurate):

The VHF Forum on Saturday, April 29th, at 900-1200 hours. Moderator will be Larry Brandenburg, W8TEK. Speakers will be Sam Harris and Bob Gooding (W3OII).

Hidden Transmitter Hunt on 432 mc at 1300-1330 hours on Saturday.

A Talk on Semi-Conductors by Don Stoner, W6TNS, 1540 -1630 hours on Saturday.

The Main Banquet on Saturday Night at 1900 hours will feature Dana Atchley, WIHKK, President of Micro Waves Associates.

This will be the biggest Dayton affair ever - Don't miss it! Attendance this year will far surpass 2,000!

SWAMPSCOTT, MASSACHUSETTS: April 8-9. The collosal convention that last year alone had an attendance of over 3,500!!! Don't miss it. K2ZSQ and K2ZSP will be there too, natch. Write Radio Convention, 15 MacArthur Blvd, Danvers, Massachusetts for details and registration. This outstanding gathering has drawn more hams to one place at one time than *any other anywhere!* Make it a point to be there this year! ! !

VHF

The VHF Amateur is published monthly by Robert M. Brown, K2ZSQ, at 67 Russell Avenue, Rahway, New Jersey. Telephone: FUlton 1-1284. EDITOR: Robert M. Brown, K2ZSQ, 67 Russell Avenue, Rahway, New Jersey. OWNER: James Donald Brown, K2ZSP, 67 Russell Avenue, Rahway, New Jersey. Rates are: $2.00 a year, $3.50 two years, and $5.00 three years. Add $1.00 outside North America...Add $1.00 U.S. Air Mail...Add $2.00 overseas Air Mail. Opinions expressed herein are NOT necessarily those of the EDITOR, PUBLISHER, or OWNER. We do our best to present facts, but we assume no legal responsibility arising out of debts, royalties, etc. We reserve the right to discontinue publication at any time. If an error is made, we hasten to point out that all is experimental and we guarantee nothing. Write us if you wish to reprint anything contained herein, - permission will probably be granted. All published articles are rewarded with a one year subscription. *Display advertising rates are: $15.00 full page, ½ page $8.00, ¼ page $5.00. All art work is charged at cost, determined by extent of composition required.* DEADLINE IS THE 20th OF THE MONTH.

CLIMASTER ZEUS

The *ZEUS* is a high performance, completely self-contained VHF transmitter equipment designed primarily to cover the 6 meter and 2 meter amateur bands. The unit is housed in two separate enclosures, the larger of which houses all power supplies, audio driver stages and the Class B modulator system. All RF stages, VFO and audio gain controls as well as normal metering and operational switches are located on the attractive, compact, table top unit.

The unit features several circuit innovations in the VFO and modulator system design. Performance factors are unparalleled by any other available VHF equipment.

CHARACTERISTICS & SPECIFICATIONS

I. POWER RATINGS

a) AM 175 watts carrier input, 115 watts output.

b) CW 200 watts input, 130 watts output.

II. MODULATION

a) 95% negative with automatic feed back control of low level clipper. 120% positive peak with proper audio polarization.

III. FREQUENCY RANGE

a) Crystal control - 48.5 to 55 MC and 142 to 149 MC.

b) VFO control - 50.0 to 54.0 MC and 144 to 148 MC.

IV. VFO STABILITY (after 15 minute warmup)

a) 1 part in 10^6/°F/ hour.

b) 1 part in 10^7 per volt line change.

c) Less than 50 cycle keying chirp and FM component on 2 meters with normal line voltage regulation.

d) Reset accuracy better than 3000 cps at 144 MC.

V. TUBE AND SEMI-CONDUCTOR COMPLEMENT

a) RF: 6BK7-B, VFO/crystal oscillator...6AH6, Class A Buffer....6CL6, frequency multiplier...7558, frequency multiplier...7558, driver (straight through)... 7034/4X150, final power amplifier...6BX7-GT, clamp tube...8-4) and 6-3), VFO filament regulator.

b) MODULATOR: 12AX7, speech amplifier...12AU7, speech amplifier/cathode follower... 2-1N34A's, speech clipper...12AT7, phase inverter...6BX7-GT, direct coupled cathode follower driver...2-811A's, Class B modulators...6W4-GT, negative peak detector...6C4, modulation control tube.

c) POWER SUPPLY: 2-5R4-GY, high voltage power supply rectifiers...5U4-GB, low voltage power supply rectifier...16Y1, bias rectifier...0A2, regulator.

VI. PHYSICAL DETAILS

a) Table top RF/low level audio unit, 15" wide by 9" high by 9" deep. Weight 20 lbs.

b) Dust cover enclosed modulator/power supply, 17" wide by 13" deep by 11" high overall. Weight approximately 80 lbs.

c) Normally supplied power cable permits separating units by 10 feet permitting remotely controlled operation of modulator/power supply. Extra lengths up to 50 feet can be furnished on special order.

CLIMASTER ZEUS: Amateur net price - completely wired and tested $559.00.

See your distributor or write for detailed brochure.

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The VHF Amateur

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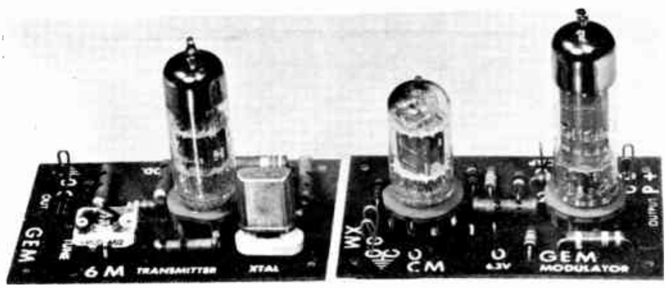


The "Little Gem" 6 Meter Transmitter and Modulator Units!

These two small units will make up a complete 6 meter station of only 1" x 5"! The transmitter uses a 6AU8 as a triode oscillator using 50 mc overtone crystals and a pentode R.F. amplifier. Features automatic antenna matching either hi or low impedance output. Will give a good solid signal on a beam antenna at 3 *watts input!* Requires 200V @ 15 ma - 6.3V.

Wired and Tested (less tubes and crystal) only $4.50 *post-paid.*

GEM MODULATOR UNIT:

The modulator unit consists of a standard 12AX7 pre-amplifier featuring either crystal/dynamic or carbon mike input and a 6BQ5 power pentode. Will give up to 7 watts of audio. Will modulate a 15 watt transmitter. Two of these units can be used as the basis of a high gain intercom system. Can also be used as phono amplifier or small P.A. set. Gain can be regulated by varying the voltage input. Requires one 8-8 mmf filter capicitor and output transformer. 100/250V - 6.3V. *Wired and Tested only* $3.50 *post-paid.*

GEM ELECTRONICS, R.R. #3, Springfield, Ohio

February 1961
25¢

The VHF Amateur

[illegible] Elements On 50 Mc And [illegible] Elements On 144 Mc At
PY5[illegible], Curitiba, Parana, Brazil

"You Will Never Be Lonesome"

Randolph Blodgett, WA2DEW
372 Essex Avenue
Bloomfield, New Jersey

One often hears the expression that there are radio amateurs wherever one travels, and that friendships are quickly made.

Such was the case as we took time out from the pleasure - business trip through the Caribbean to look up a few of the fellows and being pleasantly surprised to encounter others along the route. To be sure, we were limited in our travel this time but nevertheless the few places we visited were well populated with hams.

In St. Thomas, Virgin Islands (U.S.A.) we again visited our friend Dick Spencerley and his charming XYL. KV4AA probably has his QSL card in nearly every ham shack in the world, or so it would seem after reading the log for even one day's operation. The greater portion of the pictures of the amateur radio magazines have ham shack pictures where invariably his QSL is on display. Dick is a hard worker, the latch string is always out, and he deserves a lot of credit for his contributions (both money and time) in furthering DX'peditions and amateur radio as a whole.

Saw John Newman, KV4BN, on the street with the back of his sporty convertible filled with gear. It seems as everything needed fixing - he sure had a tough day.. Look for him, too, on the air soon.

By the way, the very best martini south of New York will be found at *The Galleon House* bar operated by the Yates; his rig for the moment was dismantled and from his comments I think he will be back on the air soon. It just seems that everyone is awfully busy down there in the land of love, rum, and sunshine in spite of the delightfully moderate pace of everyday living. Mananna? To be sure!

To relax, we took the Harman Safari over to St. John, a neighboring isle. Although we have been there before, we never tire of the marvelous mountain views. The vari-hued blue waters dotted with what seems like hundreds of islands and cays - truly a sight worth seeing again and again. On this island of 12,000 acres or thereabouts, Lawrence Rockefeller has established a National Park covering about 9,000 of these acres. Its development are progressing and eventually it will be the mecca for the deluxe tourist as well as to provide facilities for the happy families who will inhabit the camp sites or rent a tent and gear for their own safari into the hills.

I must mention here that our guide was Nora Ellington, a near authority on the flowers and trees of the island and who, when she heard that I wanted to meet a ham, conducted me to KV4BO, John Dunham, currently attached to the staff of the Caneel Bay Plantation. John was busy doctoring a motor but we had time for a nice chat. His XYL and harmonic met us on the beach later and we learned more about his ham activities.

Did I say the beach? There are many, many, beautiful beaches on these islands; white

(Continued on page 22)

Moonbounce Activities

Allen Katz, K2UYH
48 Cumberland Avenue
Verona, New Jersey

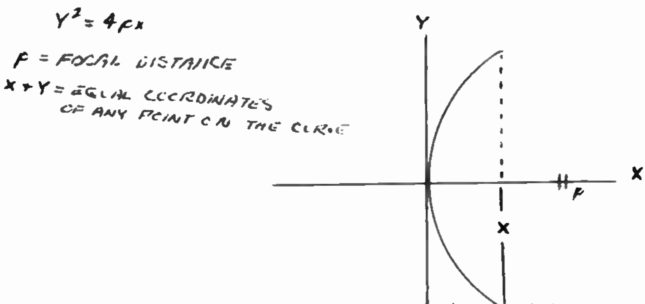
This past year the greatest amateur communications break-through occurred since radio amateurs first spanned the continent. The idea was not new, but awaiting for two groups of devoted amateurs with enough initiative and ambition to carry the project through. The challenge now is for other amateurs to follow the path proved possible by W1BU and W6BH and develop this form of propagation to its fullest extent.

The purpose of this column will be to inform interested amateurs of the activities and technical advancements being accomplished in this field, amateur moonbounce communications.

Construction of a Cylindrical Parabolic Antenna

A cylindrical parabolic antenna as compared with a parabola of revolution has the disadvantage of having less gain and an inability to change polarization readily. However, its gain is sufficient for moonbounce communications, and its construction is easier, faster, and less expensive.

The cylindrical parabolic reflector shown in the photographs was constructed of wood and chicken wire. The shape of the curve was derived from the formula $Y^2 = 4px$.



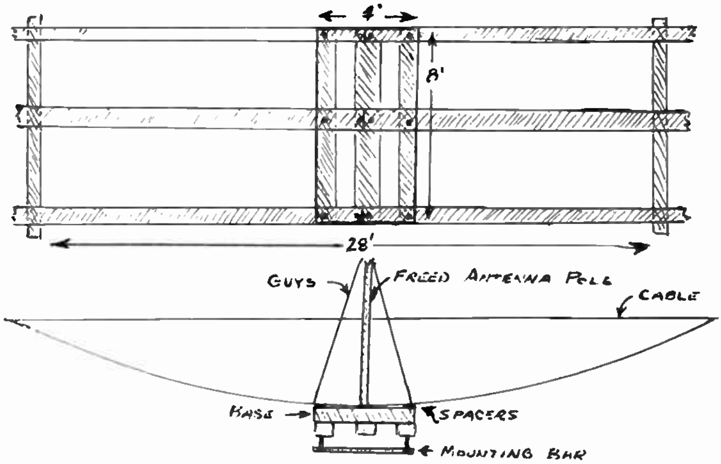
$Y^2 = 4px$

In the formula $Y^2=4px$, $(\pm X, \delta Y)$ represents the coordinates of any point on a parabolic curve. The value of X is the distance in front of the base of the parabola and the value of Y is the distance offset from the center. For example: If you decide to construct a parabolic reflector with a distance across the mouth of 28 feet and a depth of 4 feet, 4 feet would be the X distance and 14 feet would be the offset from the center of the point at the end of this parabola. (Center can be reffered to as the Y distance). By substituting X and Y in the forula, the focal distance, p, can be derived.

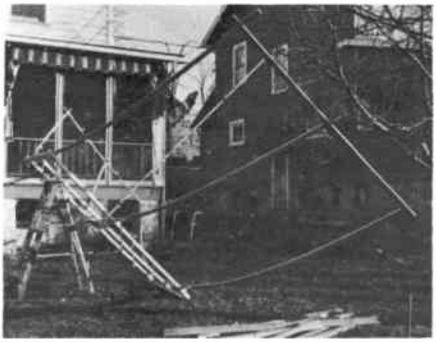
$$Y2 = 4px$$
$$(14)\,2 = 4p(4)$$
$$196 = 16p$$
$$p = 12.25 \text{ feet}$$

Once the focal distance is determined, you can determine the Y distance for a given X distance and vice versa.

The first step in the parabola's physical construction was the assembly of the base.



To the base was attached six lengths of Redwood, 1" x 2" x 16'. Across the ends of the six lengths of Redwood were place two eight foot pieces of Redwood, 1" x 2". Chicken wire, four feet wide and one inch mesh, was then stapled between the outside and centerpieces (see pictures). The next step was to place spacers between the edge of the base and the six Redwood pieces, which make up the frame. Three cables were cut to a length of 27 feet, the distance across the opening of the parabola shown in the picture, and fastened between the ends of the frame. The parabola then had an approximate parabolic curve. The wood took the shape of a parabola because when pressure is applied to the end of a length of wood and is equally transmitted through the wood, the wood takes the shape of a parabola. This fact may be proven by taking measurements at different points on the curve. A pole was bolted to the center of the reflector and guyed to the base to support the primary antenna. A metal pole was bolted across the back of the base for the purpose of mounting; finally, after the parabola is mounted, the ends of the frame should be guyed to a point on the back of the parabola for rigidity. Next month I hope to have details on a feed antenna being built by Gene, K2KJI.



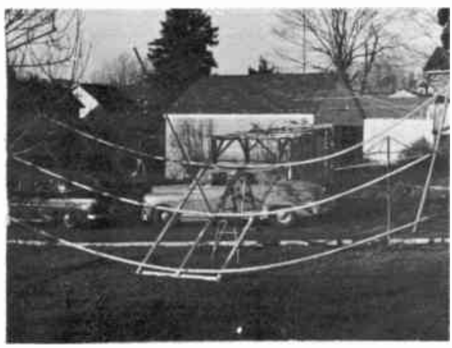
Moonbounce has a great future ahead of it. I would like to thank our Editor for seeing this future potential, and making this column possible. I would also like to thank those who have helped me with this first column, Roger, K2SMN, and Irv, WA2IKA.

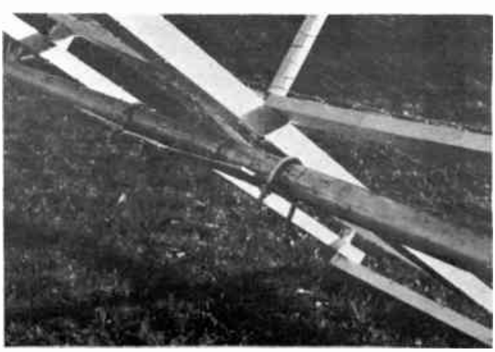
This is *your* column, and it needs your support to succeed. Please send in information regarding your projects, accomplishments, and plans in the field of moonbounce communications.

Until next month, good luck and DX on the higher bands...

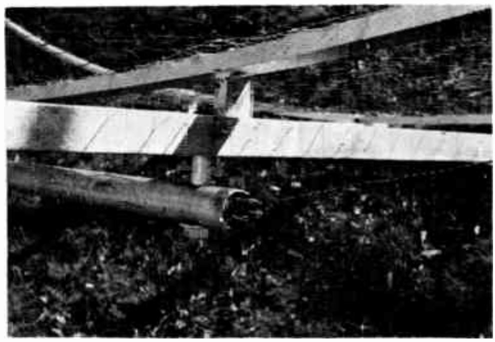
73, Allen, K2UYH

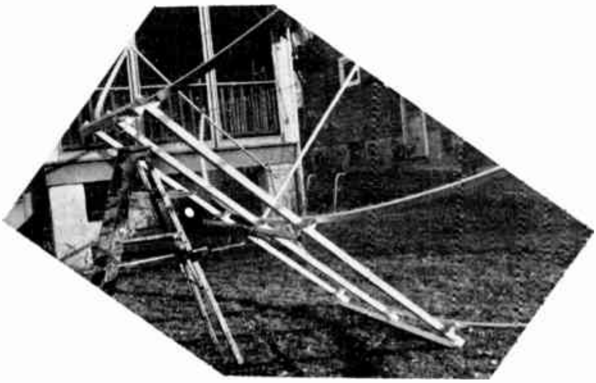
EDITOR'S COMMENT: Many thanks for a job well done, Allen! I'm sure our readers will do their utmost to make your job more enjoyable (-I know what it's like to try to put something together every month, pounding away at the mill 'till all hours of the night). We first met Allen at the East Coast V.H.F. Society Picnic and Hamfest last summer and were stunned to learn that he had constructed a 30' parabolic reflector (see last month's front cover photo). We were also amazed at the fantastic intellectual capabilities of this young man, a student at Newark College of Engineering, Newark, New Jersey. So, naturally enough, we kept after him for a regular column. We might add here that his 30' parabola was ruined in a big storm not too long ago, thus facilitating the construction of another - this one along different lines. Allen sent along these pictures to help you in future construction of his new item described over the last few pages.





This Moonbounce Activities *column is intended as both a technical* and *a NEWS column. This means that your contributions are vitally needed. Please try to give K2UYH the cooperation he deserves - Drop Al a line, if only to contribute words of encouragement. UHF and Moonbounce are the coming thing - Don't be one to miss out on it!*





2 Meters—

Propagation

Walt Bain, W4LTU
RFD 1, Box 27-M
Springfield, Va.

The Geminids meteor shower put in its annual show on December 10 through 14 and the usual number of 144 mc fanatics were in there banging away for new states. Final results are not available at present but several QSO's are known to have resulted.

WØBFB in Iowa worked W4AIB in South Carolina, while K2IMG in Ithaca, New York, put it across with WØYSJ in North Dakota, a 1000 mile path. WØYSJ also worked VE3DIR in Toronto. In addition, VE3DIR made it with W4FWH in Georgia for what Tony described as his easiest meteor contact ever; it took only 15 minutes. Your correspondent was in there trying, but in vain. We came very close to making it with WØYSJ, a real near miss over a 1120 mile path. Some signals were heard from WØRSP in South Dakota but nil from WØMOX in Colorado, a tantilizing 1450 mile path. WØMOX indicated by postcard, however, that he had heard on December 11 an extremely weak but continuous sequence of signals! This could be something other than meteor and certainly bears looking into.

Aurora has been flirting in and out during the last month with the most spectacular, and disappointing, event being the big disturbance of November 12 through 14. Although a record-breaker as far as its disruption of things ionospheric, it apparently failed to produce any v.h.f. auroral DX of similar sort or proportion. It has been shown that excessive absorbtion can cause auroral reflections to be much weaker on 50 mc than on 144 mc. Perhaps it was so bad this time it effectively took out all bands. Did anyone try 220 mc? Lesser auroras appeared on November 30, December 7, and December 15. On the latter W4LTU worked W9EGH briefly with Mac reporting no activity to the west of him so its full extent is not known. Tropo ducting got in one more lick before winter set in with W4HHK near Memphis coming in S9 at W8KAY, Akron, on November 26.

The column this month is even shorter than usual and there are two reasons for this. One is that your correspondent has been tied up with business for a considerable portion of the time and the other is that, as usual, no one has had any contributions to make to the column. It appears likely that both of these situations will persist, but we will do the best we can. ——Stolen, as usual, from the *AUTO-CALL*. You have undoubtedly noticed our ad for this dandy publication and this W4LTU item should give you an idea of the caliber and appeal of its text to the avid v.h.f. man. Although this is not a v.h.f. magazine, it does have Walt's monthly column plus additional features concerning the v.h.f. world...A worthwhile investment -Editor.

Meteor Shower

Geminids Meteor Shower - December 9-14th, 1960

Ernie Brown, W5FYZ
Minden, Louisiana
144.15 Mc

WØIC, Denver, Colorado: On December 11th I received my call and many short bursts. Signal level high, - Thanks for the fine QSO on the 12th; signals peaking S8 with several long bursts. Glad we could make it, Claude. Your signals were copied by other stations in this area during our skeds.

K5TQP, Albuquerque, New Mexico: Thanks for my first New Mexico contact and state #26, Fred. I was rather pessimistic about our chances, but your signals were very good and were copied by other stations in this area, including one in Texas - hi! On the 10th I heard a few pings and letters; same on the 11th. On the 12th identification was made early on a ten second burst, and the QSO wrapped up just as sked time ended. In fact, we had to borrow a few minutes from the next sked, hi!

WA6MIX, Burbank, California: Can't say I heard a thing, Don. Sure want to keep trying, so let's get together before the next shower. Apparently this shower was too low. Thanks for the effort.

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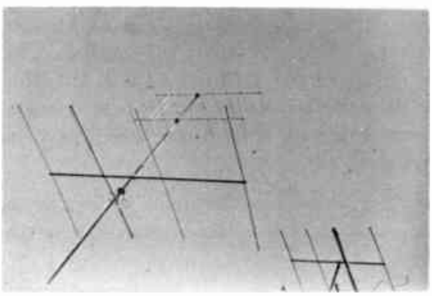
W1JDF, Methuen, Massachusetts: Thanks for trying on the two peak days, Sumner. Nil from your direction at all. Will be glad to try again.

In conclusion---Shower peaked from 10pm to 12M CST, night of 12th. All QSO's were about 800 miles from here in a WNW to NW direction. NE condx very poor -----Ernie, W5FYZ.

SOUTH AMERICAN VHF NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, Argentina



LU9AT's antenna mast, supporting an 8 over 8 Yagi system for 2 meters and a 4 element Yagi for 6.

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During the following two weeks, from November 21 to December 4, there was not too much activity on the 6 meter band down here. Only the PY1's and PY7's were heard with fair regularity, so we put a little more attention on 144 mc, and some nice contacts were made. On December 1, LU2FCD and LU2FAO at 220 miles north of Buenos Aires came in with S9 signals, at the next evening they were copied at an average of S7, but the real surprise was the S9 signal from LU2DBK in Mar del Plata, 250 miles south from here, on December 3. Apparently a stable inversion had built up over this part of the Atlantic coast, and at

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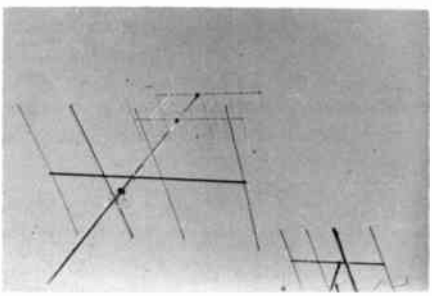

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Here's an exceptionally good shot of Conrad PY5GK, of Parana', Brasil.

the next morning we still were able to continue our ragchews with Roberto in splendid conditions. LU2DBK was also heard by LU2FAO over the 470 miles of separation, but no two-way contact was completed.

In the Carribean area, the evening hours of December 3 brought a fantastic 6 meter opening between Puerto Rico and Cuba. Signals were amazing both ways, and many mobile KP4's equipped with the famous Heathkit *SIXER*, worked into CO-land in spite of the flea power output of those rigs.

The rest of the first two weeks of December were pretty quiet on 6 meters. Some kind of TE signal was heard nearly every day, but amateur activity was very low and sometimes only a commercial signal outside of the lower band edge gave us the indication that the band was open. One of the better days was December 13. After hearing PY1BSL and PY7AFP for some time,another signal came up and I could identify KP4CK talking to CE3XK. A few minutes later the signal reached a comfortable strength and a half-hour QSO was made with Felix. Before going QRT I still heard KP4AFA, KP4AXC and PY5GK, Conrad Holdorf, who's station and antenna system can be seen in the photographs above and on the front cover, respectively.

Conrad - PY5GK

Some additional info may be interesting: PY5GK starting his amateur work on v.h.f. in 1952 In 1954 he had his first QSO on 144 mc over 70 miles with a portable rig *running only 1/3 of a watt into a ¼ wave antenna!* Since then he has worked the following countries on 50 mc: KH6 - XE - W4 - TI - HC - OA - CE - LU - CX - ZP - YV - FM7 - PJ - KP4 - CO - CT3 - FF8 - and PY7, PY6, PY1, PY4 and PY3!

Up to 1959 he used the following equipment: A 25 watt transmitter with a 6146 in the final, a 6AQ5 as doubler-driver and a 6AU6 as crystal oscillator. The receiver was a H1-140-XA with a 4 tube crystal controlled converter.

Now the transmitter has been changed to a new one running 150 watts to a 4-65A driven by a 2E26 and two 6CL6 tubes in the oscillator and multiplier stages...The receiver is a homebrew double conversion job with 18 tubes.

On 144 mc the TX runs 15 watts and the RX is also of the double conversion type, with 21 tubes. All the transmitters, receivers, converters, antennas and even the 35 foot tower are HOMEMADE --- An impressive job really well done!!

Next month I will tell you about some DX-peditionary work done also by PG5GK, the most active v.h.f. man in Brasil's fifth call area.

73,
Michael, LU3DCA

Message From The Publisher

You have, undoubtedly, noticed subtle changes in the format of THE VHF AMATEUR over the past year - improvements, we hope, that were to your satisfaction.

No doubt you also remember a SURVEY that we ran in a two-month period early last summer. The returns on that survey were most encouraging and informative. Hundreds of readers returned the survey page filled out with such information as changes that you would like to see in THE VHF AMATEUR, type of articles that interest you most (DX, news, activities reports, construction articles, technical data, propagation explanation, etc). In general, the correlation of this information resulted in the following: (listed according to their interest and importance to you)

1. *Construction articles*
2. *Propagation Explanation*
3. *Technical data of new concepts and ideas*
4. *DX news and Activities reports*
   (This includes "Letters to the "Editor", etc.
5. *Announcements of Hamfests, etc.*
6. *Full page pictures (collection of stations, operators, antennas, etc.)*
7. *TRADING POST and Worked All States listings*

This may or may not fully represent your views, as readers now, but it does give us something with which to work. BUT WE NEED YOUR HELP! Our little magazine serves as a medium or get-together point where v.h.f. - u.h.f. enthuiasts can present their ideas to benefit each other. This means that to further improve, we need your support. We would appreciate your comments on what YOU would like to see...But most of all, your contributions in the form of articles, columns, and pictures. The listing above can give you an idea what we're looking for - but remember one thing - No one on our staff is any more than an average v.h.f. man getting the satisfaction of helping fellow hams through our publication. In addition, even though we can't pay, as such, for contributions, a small reward of a one, two, or three year extension to your subscription will be given.

6 Meter Moonbounce!

Alan Goodaire, VE3BZS (ex-VE7AIZ)
2211 Greenlands Road
Victoria, British Columbia
CANADA

The following article was condensed somewhat from a recent letter to the Editor. In it Alan explains an amazing series of experiments with 50 mc moonbounce and its results. A MUST for anyone interested in the latest v.h.f. developments!

Lately, in particular, I was interested and pleased to see various letters and references to moonbounce...

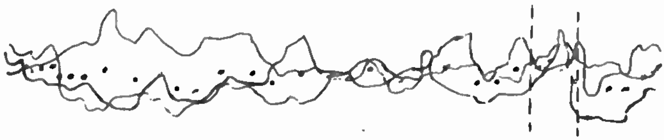
I have been interested in the idea of amateur communication via moon reflection since I first saw the report of Ross Bateman's and other's attempts and successes with 144 mc in 1953.

In 1959 - 1960 Gail Allwine, W7RDY, and I, VE7AIZ, tried some 50 mc moonbounce tests. Out of about a dozen tries, a half dozen were unsuccessful, mostly due to tube failures or excessive interference, while one of these was done at moonset and was just plain unsuccessful. About a half dozen showed some degree of success and I am enclosing some of the tracings made from original records. By the way, all tries were done at moonrise except the one mentioned.

Gail ran 800 watts (600 watts approximately into the antenna) into a 4-250A transmitter modified by operating the crystal oscillator and buffer stage on batteries to obtain greater frequency stability. The rig was keyed automatically to produce 1 second pulses every 15 seconds. The antenna was a 6 over 6 Yagi array.

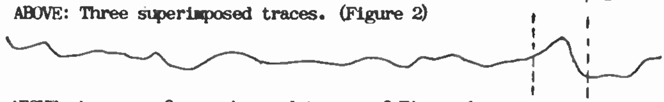
At VE7AIZ the antenna was a 10 element Yagi. The receiver was at VE7AIZ and consisted of a 6AK5 - 6AK5 - 6J6 converter with the 6AK5's triode connected and neutralized and had a measured noise figure of just under 3 db at 50 mc. The station receiver was modified by running the H.F. oscillator and BFO on batteries to obtain good frequency stability. Also the converter crystal oscillator and buffer stage were run on batteries for the same reason.

The receiver output was passed through an audio filter of about 40 cps band width then detected by a germanium diode and the output passed through an R-C filter of a time constant of 1/5 second and displayed on a home made pen recorder. Receiver tuning was done with a vernier attached to the BFO control after the main tuning control had been roughly set. The BFO was calibrated so the receiver tuning would be corrected for Doppler shift.



ABOVE: Three superimposed traces. (Figure 1)

ABOVE: Three superimposed traces. (Figure 2)



ABOVE: Average of superimposed traces of Figure 1.

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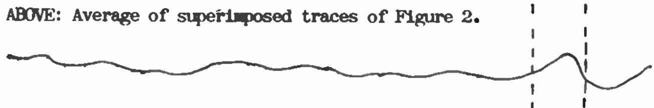

ABOVE: Average of the two averages.

The formula arrived at for S/N ratio calculations is:

$$\frac{S}{N} \text{ (a voltage ratio)} = \frac{Pt\ Gt\ Gr\,\lambda^2 \times 1.6 \times 10^{-26}}{kT\ (.22\,\lambda^{2.4} + (F_{\lambda=1}-1)/\lambda)} = \frac{1}{(\frac{1}{2} B_{3db} \frac{1}{4RC})^{\frac{1}{2}}}$$

B_{3db} is bandwidth of tuned circuit (audio filter) and RC is time constant of R-C network

Pt is the transmitter power in watts

Gt is the transmitter gain over isotropic radiator

Gr is the receiver gain over isotropic radiator

k is 1.38×10^{-23} joules/degree (Boltzmann's constant)

T is 300° (degree) Kelvin

$F_{\lambda=1}$ is noise figure of tube at λ = 1 meter

There are several assumptions made in using the formula but it gives an idea of what, or rather, why parameters are necessary. This formula assumes, for one thing, that the receiver has a square law detector and that B_{3db} is quite a bit larger than $\frac{1}{4RC}$.

The more voltage fluctuates in a random manner so the detection of a signal in the presence of noise is a statistical problem. One can say very roughly, for example, that this formula should give the S/N ratio within a factor of 2 about 50%

of the time whereas a detection by a factor of 10 is quite unlikely.

One point to be noticed is that for Yagis and similar arrays $g\,\eta$ is proportional to the boom length and the optimum wavelength is given by

$$\lambda^{3.4} = 1.9\ (F-1)_{\eta \cdot 1}$$

for a 416B λ optimum $\simeq \frac{1}{2}$ meter...However if a parabolic dish is used, since: $g = \frac{4\lambda A}{\lambda^2}$ and A = area of dish in $(\text{meters})^2$

$$\frac{S}{N} = \frac{P_t\ (4\lambda)^2\ A^2/\lambda^2 \times 1.6 \times 10^{-26}}{kT\ \left(.22\ \lambda^{2.4} + (F-1)_{\eta=1}/\eta\right)\ \left(\frac{\lambda}{2}\ B_{3db}\ \frac{1}{4RC}\right)^{\frac{1}{2}}}$$

then the smallest wavelength possible should be used.

I am not positive, but believe also that an extremely narrow beamwidth can be obtained a tremendous increase in returned signal should be experimental because the problem changes from one in scattering and distance to the fourth power effect to a distance to the second power effect.

The echos obtained by the 50 mc experiments show a retardation by the ionosphere. This is by an amount of say a 100 times that to be expected by using a simplified formula to calculate this. However 50 mc is a bit low for the frequencies the formula is intended to be used at. The delay is about a 10th of a second or so and indicates a terrific amount of Faraday rotation took place. The MUF was quite close to 50 mc during most of the experiments so the ionosphere no doubt had a profound effect on the signal.

Because of low S/N ratio, definete conclusions are hard to reach.

S/N of individual echos averaged 1:1, I would say.

The formula neglects ground reflection gain and calculated S/N without ground reflection gain was about $\frac{1}{2}$ so probably some of this gain was being realized (if formula correctly describes the situation).

Non-Technical Aspects

VE7AIZ looked out to the east on several miles of salt water and elevation was about 200 feet. W7HDY had woods to the east but otherwise had a clear shot.

Horizon at each location was provided by the Coast Range of mountains in Washington about 9000' high and 70-100 miles away.

I am now at VE3BZS and will be building some new moonbounce equipment for 220 mc or possibly 144 mc.

I feel personally that 1296 mc is impractical from a financial point of view and believe that 220 mc moonbounce will be successful with a much lower cost.

Ross, W4AO, has corresponded with me a lot and has been interested and very helpful in moonbounce problems.

Bob, K6RNQ, also has shown much interest and we may do some 220 mc work. We had one unsuccessful 50 mc try but did some meteor scatter work.

Jud, K2CBA, wants to do some 220 mc moonbounce and I hope we can try this spring or summer if I can get over being lazy and get the gear built.

Unfortunately I've never received a reply from Sam, W1FZJ, but imagine he is busy just about all the time. Haven't been able to get any information regarding Sam's results he claims on 50 mc or 144 mc. 1296 is too high probably to show this effect with amateur power levels.

I should think the main reason for lack of echos most of the time on 50 mc tests occurs from a combination of ionospheric effects as well as antenna pattern and ground reflection effects.

EDITOR's COMMENT: Many thanks, Alan, for your interesting report. Alan would like correspondence with anyone interested in these efforts. He also mentioned to us that he read John Booker's (K2SKB) letter and would like to correspond with him also. If you know John's address at Stanford, please drop Alan a line and let him know.

Just got in some pictures from Herm, K2AVA, of the recent SYRACUSE VHF ROUNDUP. Here's a shot of some of the fellows just hamming it up. Please note the Halo on the yacht, and also Al, W1CRV, and Herbie, W1UVB's homing pigeon's truck!

HAM TIP: WA2MMW suggests the use of an .005 disc ceramic capacitor from filament to ground be installed in the modulator input stage. Since the capacitor serves as a short to ground for any RF coming from the AC line, this capacitor will often cure a stubborn case of feedback!

Trading Post

Rates-Commercial ads-5¢ per word.Free to readers-any reasonable length.Ad from readers must be submitted on a postal or QSL card.Send to TRADING POST,67 Russell Ave.Rahway,N.J.

HQ-110 with spkr & clock$189,LA-1 $80,McMurdo-Silver exc 80-6 $18,several good G.E. FM two-way units easily modified to two meters-30 watts-less acc.$29.F.O.B. Roger McGrath,KØDNW,Box 913 Boulder,Colorado.

Wanted-One or more approx. 3 ft. parabolic dishes-Walter Baker, W8BAX,2920 Bremen St.Columbus 24,Ohio.

For Sale-Six meter Hy-gain halo with telescoping mast-$10. Six meter FCV-2 converter mounted in STP-M1 case(IF freq .6-4.6 mc.) $12. STP-50 six meter transmitter-$25. STP-10 matching modulator $25. SR-34 Hallicrafters transceiver-six&two meters-6,12,&110 volt with original carton and manual-$380. Viking six& two Thunderbolt with original carton and manual-factory wired-$500 David Sutherland,K4RTG,Pen Hook,Virginia.

For Sale-Tapetone converter-6 meter XC-51-10-14 mc. output-Brand new never used-$49. Walter Taylor,K2MLT,RD 2,Hammondsport,N.Y.

For Sale-Famous BC-779B Super Pro Receiver-18 Tubes complete with matching power supply,matching 6&10 meter Tecraft deluxe converters,xtal callibrator,integrated master control box and manuals.All in excellent condition.$125.Will deliver a reasonable distance. Call Oxbow 6-1342 or write Lew Stadtmauer,W2HNE, 12 Lincoln Place, Wayne,N.J.

Wanted-Used UHF TV converter for amateur band or commercial full range UHF converter. Francis X Biehl,K2PoP,343 Maple St. Brooklyn 25,N.Y.

For Sale-Two meter Gonset 111 in like new condition with xtals cables,and antenna. Works on 6,12 or 110. $190. Andy Clark,W4IYT, 41 Lenape Drive,Miami Springs 66, Florida.

Wanted-Six meter CW equipment-Mary Wilson,WA2JBB,308 W 22nd St. New York 11,N.Y.

Wanted-Address of an East Coast supplier of preformed finger stock for 2C39B tubes. R G Lachance,W1QKA,48 Learned St,Nashua,N.H.

QSL's: "Brownie",W3CJI,3110 Lehigh,Allentown,Pennsylvania.Samples 10¢,with catalog,25¢. (3/61)

QSL's: SWL's, Citizen Band, Samples 5¢. Nicholas & Son Printery, Box 11184, Phoenix, Arizona. (3/61)

For Sale-DX-40 & D104 mike, no stand,$60. K2UQC,425 Parkinson Terrace, Orange,N.J. OR2-3142 after 6 PM.

For Sale-Hallicrafter SR-34, cost $495,like new at $325. Ronald Stier, Major Seminary, St. Meinrad, Indiana.

Wanted-Auto license plates for a collection-especially wanted are ham license plates and those from outside the U.S.(See Nov. 1960 VHF Amateur for picture of this collection) Dave Heller, K3HNP,14 Darkleaf Lane, Levittown, Pa.

For Sale-DX-40 4 months old, rocks, key-$60. Converted DX-35 for 6,15,40 meters- 6146 final-$40. Springfield walkie talkie for 6-$25. Phil Barsky,WA2FUL, 11 Brighton Terrace,Brooklyn 35, N.Y. After 7:30 P.M.-TW1-3125

Wanted-Construction and technical articles on VHF-UHF gear and propagation.for publication in the VHF Amateur. Your reward For this skull pounding will be the satisfaction of helping other hams plus a 1,2,or 3 Year extension to your subscription. Bob Brown,K2ZSQ, 67 Russell Ave, Rahway,N.J.

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50 mc W.A.S.

Send in your listing for THE VHF AMATEUR's Worked All States department! Let's see how you rate!! Minimum states confirmed needed for listing: 21. Cards must be on hand for inspection if requested. All entries must be submitted on a postcard or QSL card and addressed to: W.A.S. Listing - 50 mc, THE VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

W7MKW	Wash.	150	47	K4PXJ	Tenn.	8	39
K4BPY	Ky.	-	47	K2ZSQ	N.J.	100	39
K9DTB	Ill.	80	47	K2HAK	N.J.	100	37
K2DZM	N.J.	100	46	K4RTG	Va.	18	36
K5IQL	N.M.	600	46	K2UGH	N.J.	125	36
K2ZBX	N.J.	-	46	WA2BBU	N.J.	160	36
K6UJL	Calif.	7	45	W8UML	Mich.	40	33
K1BIL	Mass.	50	45	W3BRU	Pa.	35	32
KL7AUV	Alaska	200	45	K4EBT	Florida	19	33
W2EIF	N.J.	25	45	K1IZM	Mass.	100	32
K2QWD	N.Y.	50	43	K1AUD	Conn.	195	32
KØHOS	Iowa	75	43	KØPWS	Mo.	12	32
K4PEV	Tenn.	50	42	K2CMG	N.J.	8	31
K8DKO	Ohio	45	42	LU3DCA	Argentina	-	30
W3JWY	Md.	75	42	K2ZSP	N.J.	100	28
K9KZB	Ill.	100	41	HC1FS	Ecuador	70	26
K3BOB	Md.	40	41	W3MNE	Md.	100	26
K2VDR	N.Y.	90	41	KØCWR	Mo.	45	26
K2MJB	N.Y.	150	41	K2VSE	N.J.	30	24
W2HVW	N.J.	100	41	K2VNK	N.J.	70	24
K2MXT	N.Y.	180	42	WA2AC1	N.Y.	45	23
K1BHY	Conn.	120	40	K8EUX	Ohio	-	23
W2EAQ	N.J.	100	40	K3ATX	Penn.	30	22
K2CVG	N.Y.	65	39	K2VNL	N.J.	70	22
				K2EFN	N.J.	14	21

This list will be revised periodically as we receive notice from you of changes of status. Also send us your 2 meter and 220 mc listings - We are starting a new W.A.S.

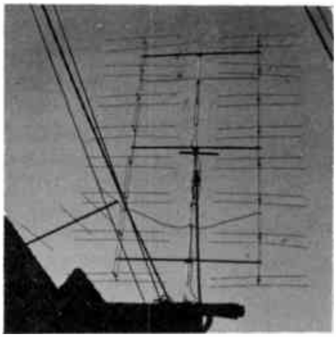
Letters

Send your letter to us: THE VHF AMATEUR, 67 Russell Avenue, Rahway, New Jersey.

Benton Harbor, Michigan: Jack, W8PT, comes through with...

"I sure had a lucky year! During the Perseids we had a "duck soup" contact with W7JRG for Montana on 144 mc. Made it within a few minutes of first schedule. Then the big aurora of November 13th gave me Wyoming, K7HKD and several contacts with Colorado, Oklahoma and Kansas which had already been worked. K7HKD was only using a Seneca and a 10 element beam. Then December 12th brought the Geminids meteor shower and a long sought contact with Georgia, W4ING. Ruddy's signal was really pounding in here and its definetely the best Geminids I've heard.

"Now I need Maine and South Carolina real bad! I now have 37 states, all confirmed. So, you see, I've been quite lucky!"



Here's a view of K2UYH's collinear array. Looks like 2 meters, eh?

Polo, Illinois: Jim Nayton, K9HQW, of 503 South Division, writes...

"I'm using a Gonset III - 6N2 VFO to a homebrew four element 40 feet up. I also converted an ARC-5 to 6 meters and am using it for c.w. running 35 watts.

"On December 5 we had a real good E opening. W1's, 2's, 3's, 4's, 7's, Ø's, and VE's were in for over four hours!

"December 6 we had an opening intc W5 land.

This is KL7AUV (middle) with friends helping with Jack getting shingle on his new QTH in Spenard, Alaska.

"December 7 had an aurora opening.

"December 8 saw a 10 minute opening at 1830 CST into W1 land.

"So we have had our share lately - we're not complaining!"

Norwood, Pennsylvania: Bob Sanborn, W3AMO, of 565 Winona Avenue, has a very interesting report on "Aurora Intensity Study." Bob has a good break-down on a minute-by-minute basis of an aurora (Sept. 4, '60) which might prove true on any aurora...

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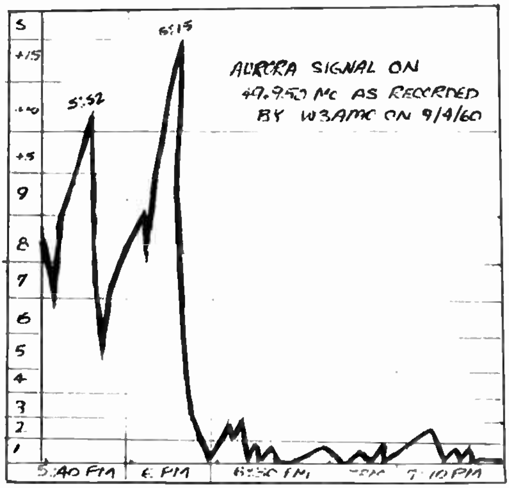
Jay Gross, WA2JCQ, operator at Westfield, New Jersey. 6 meters.



Hanover, New Hampshire: George Bunting, KØITF, transplanted to 107 Hitchcock Hall, writes...

"I'll be here (at Dartmouth) for the next six months, anyway. I'm using W1ET now and have brought all my v.h.f - u.h.f. gear with me so you should be hearing from us (at least for the next four years!).

"Great aurora Saturday night (This was dated 11/15/60) - I worked ten states with 14 QSO's - 6 call areas and two VE's - including Illinois, Virginia, Michigan, VE2, VE3. - in the first operation on 144 mc here. I put up beam and fixed my KW when I saw the aurora - Sure was shot by it.

"We are also on 50 and 220 mc with my equipment and excellent antennas, so point yours up this way. Just have to put up the beam to get on 432 mc."

Hank Wilkie, K3AZH: Of Wilmington, Delaware, emits with...

"Enclosed is my check for another year's subscription to your fine magazine. I have thoroughly enjoyed the articles and you certainly have made rapid progress from the first issue 14 or 15 months ago! Keep up the good work!

This gives you an idea of the activity of Jay, WA2JCQ. This is his QSL collection.

"Might also advise that the Delaware 6 meter net has just issued a VHF-UHF certificate for Delaware contacts. The requirements are: Within a 75 mile radius of Dover, Delaware, a station must work and QSL at least 10 member stations on any band 6 meters or higher. Over the 75 mile radius only 5 contacts are required. Logs to be submitted to K3AXW, John Cordray, 1416 Oakhill Drive, Wilmington, Delaware. Net meets on Tuesday nights at 2100 hours on 50.400 mc. 22 stations on the net at the present."

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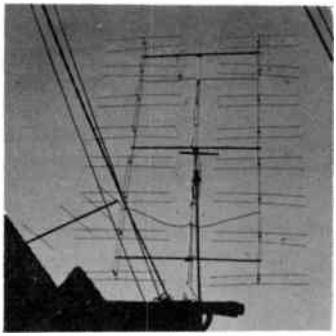

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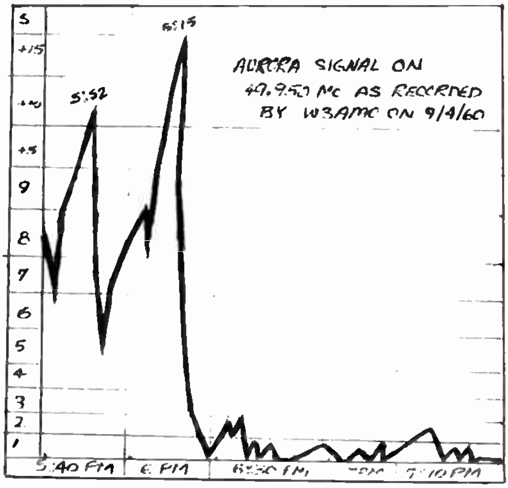

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Single Sideband

Joseph S. "Rusty" Bravman, K2UTN
170 Schenck Avenue
Great Neck, N.Y.

The hope that 1961 would bring a new summit in v.h.f. SSB seems to be coming true already. Through the seasonal band openings, as well as local work, an ever-increasing number of sidebanders have been heard congregating on six and two meters. There is also much talk of 220 mc and higher.

It has been noticed that a large number of sidebanders are utilizing high power (1KW), making record setting QSO's more probable over extended distances. Many stations have begun along these lines. We are hopeful that these efforts will help to link the v.h.f. sidebanders of the nation, and later of the world together, and shall devote a portion of this column to serve as a score board for such endeavors.

One step toward this goal deals with the linking of sidebanders in areas of their concentration by a net. I am happy to announce the formation of a sideband net on six meters in the New York metropolitan area. Meetings are held at eleven AM on Sundays. Sidebanders are invited to sign into this net. In other areas, another net may have to be organized; if not, there's a good resolution for 1961!

All in all, 1961 looks like a great year.

Letters:

"Kal", K4RLX, P.O. Box 102, Shaw Air Force Base, South Carolina, reports:

"I am on six and two meter SSB, running a 5894 final, and enjoy it immensely. On the last band opening (January 5), I chatted with about fifteen stations in W1, W2, VE2, VE3 districts, ——all on two way SSB! I am presently engaged in some "dead band" testing with K9EID, Bob Heil, of Marissa, Illinois, and am hoping for some interesting results." *We'll be interested in hearing how you make out, Kal. By the way, Bob, K9EID, is running similar tests with other parts of the country and is scheduling some interesting work.*

S/SGT Don Jorstad, W4HIL/9, Box 825, Fisher, Illinois, reports increase in six meter sideband in his area.

"I plan to be on SSB, as soon as I can pick up a 10A or 10B with a v.f.o. Have Seneca, will trade.

"At present I'm running a Seneca, with a Sky Sweep receiver and five elements air born fifty feet.

"KØIAX/9 and K9HAE are both on SSB in this area. K9HAE lives in Pleasantville, Illinois, about 70 miles from here. Nightly skeds are kept with good results. KØIAX/9 is running a 20A, with a 4-65A linear." *Nice hearing from you, Don, and be interested in future news.*

Bob Bosewell, W6NKI, 10054 Woodale Avenue, Pacoima, California, sends along some fine west coast news.

"For about 2½ years, Hal, W6NMW, has been active on two meter SSB. Since that time there has been a large number added to that list. Fred, K6ZGJ, is now active with low power, that he intends to increase very soon.

"I am now running 2KW PEP, as is W6NMW. The rest of the SSB boys in and around the Los Angeles area include Bob, W6QMN, who is on two meters for the first time with his new heterodyner. He expects to have a 'big rig' going soon. Vern, K6PER, and Jim, W6MJC, will be on the air with good SSB very soon. Other high power stations on two meters are: Sam, K6VLM, Bob, K6ZVH, and Allen, W6FZA. It appears that more and more amateurs are becoming interested in two meter single sideband in this area. If I, or any other of the above can help anyone getting on SSB, we'll be glad to do it.

"In the near future I'll have some very interesting, and simple methods for getting SSB on in a quick fashion." *Good hearing from you, Bob. We'll be interesting in learning some of your SSB tricks. Like to hear some of these fine California signals up this way!*

In closing, I hope to see many of the v.h.f. sidebanders at the approaching hamfests. until next month...

73 — Rusty, K2UTN

(Continued from page 3) YOU WILL NEVER BE LONESOME — R. BLODGETT, WA2DEW

sand, blue clear water and oh, so comfortable, with air temperatures of 70 - 85 degrees, very little surf and tide - also no sea animals to bother one. (Note: It is safer and better swimming here than along the Jersey Coast and *never* anything like the crowd - in fact, a dozen people would constitute a "crowd" down here).

Another day we found it necessary to go to the British Virgin Island of Tortola, where Road Town is the largest settlement and houses the governmental buildings.

Since air traffic to a nearby island was now about non-existant as well as the ferry service, we took the boat *Youth of Tortola* from Kings wharf at Charlotte Amalie for the 28 mile (one way) trip.

The February 20, 1960 issue of the *Saturday Evening Post* printed a very descriptive story of these British Virgins and it made the trip have more meaning than it would from the usual tourist point of view.

We travelled along the Sir Francis Drake Channel which leads like a long straight path between the chain of large and small tropical islands and made several stops at boat landings where a few houses nestled at the base of the steep hills and mountains to form communities.

After a most enjoyable and scenic trip we arrived at the Municipal dock of Road Town, where white helmeted and white jacketed representatives of the Crown made certain we were well qualified to enter.

It required but a short time to consumate our business and so had a couple of hours to sight-see and visit. The main street is probably a half mile long and has stores, P.O., homes and official buildings; there are many homes among the hills where farming is the chief occupation.

We drove to "Millies" and found both Mr. and Mrs, Chris Hammersley to be charming hosts. They have a small inn or the equivalent and cottages for rent perched on a small historic sight overlooking the entire settlement and harbor.

It was here - over refreshments - that Mrs. Roy said her OM was at work on his rig and some fellows had dropped in to give him a hand. I introduced myself as WA2DEW and a chap across the room came back with the information that he was WA2KQN of Haddonfield, New Jersey. About 1800 miles from our homes by air and water. The next stop was at Treasure Isle, The Roy's place, where we had a delicious luncheon and their "specially prepared house drink." (If you go there don't miss it - WOW!). Here VP2VA, Mr. Roy introduced VP1JH of WØNWX and Bob Dennison of Newton, Iowa, - WØVDA, Dan O'Leary also of Newton, and W3ZFF, and Earl Quay of Mechanicsburg, Pennsylvania.

Just beginning to get acquainted when the announcement came that it was departure time. If we missed the boat, it would not be back for three days. So we reluctantly said "73" to the gang, hopped into the waiting Impala and got to the wharf, where, you guessed it, WA2DEW and XYL just made it as the lines were cast off.

So back to St. Thomas, silouetted against the setting sun with the deep blues of the Caribbean reflecting the changing lights of approaching night, and stored within us a wealth of memories of a beautiful mountainous island with happy people. I say it again, as ham to ham, wherever you go, "You will never be Lonesome."

HAM TIP: A grid dip meter can be used as a signal generator when peaking of the converter and receiver for maximum weak signal reception. Used on the fundamental, 144 or 50 mc, the grid dipper may produce too much signal, even when placed some distance away from the receiver. This may be due to R.F. fed back through the power lines. When this was tried recently on the 50 mc converter, it was found that even the second harmonic of 25 mc provided too much signal. The sixth harmonic of 8.3 mc was sufficiently weak that alignment was soon accomplished. ---*Credit for this item goes to THE VHF AMATEUR'S "GET-THAT-RIG-ON-THE-AIR!" Department head, "Red," K2ZSP.*

HAM TIP: For those who like their radio theory "sugar-coated", the *ELEMENTS OF RADIO* by Marcus and Marcus is highly recommended. This book is published by Prentice-Hall, Inc., Englewood Cliffs, New Jersey at $7.00. This excellent text requires no previous knowledge or training as a prerequisite. It is so well written that it is recommended for the beginner and as a refresher for the advanced radio amateur. ---*Credit is due to Department head K2ZSP, this time, too,- but from our "EXPLAIN-IT-TO-THE-EDITOR" division.*

INTERESTING NOTES FROM EXCHANGE PAPERS

Every once in a while we run across some general, but genuinely interesting items from our many exchange publications. Here's one from the S.J.R.A. *HARMONICS*..."Here's A Xmas Treat for Your Kiddies - Santa will be on 20 SSB starting on 12 Dec. thru 23 Dec. on 14.280 at 1800 EST to Approx. 1830 EST. Call VE8-located W7QMU/VE8." Now doesn't that beat all!

Ran across this item in the "WANT ADS" section of *AUTO-CALL*..."FOR SALE: 813's, 10¢, with grid, 25¢; with plate, 50¢, with both, 50¢; with base, $2.00; with air pumped in, $10.00; with filaments and glass - complete, $25.00---I.M. Noughty, 12345 Crazy Place, St. Elizabeths."

Re *FLORIDA SKIP:* "FROM HERE TO DX" ....LUBECK, Germany (UPI). A 24-year-old newsman, Jost Lehmann, was killed when he put a bottle atop his head at a party and asked another man to shoot it off.

CAPE TOWN (AP). It soon will be easier to go to Hell. A paving is being made - with good intentions - to Hell, an almost inaccessible mountain village near Prince Albert, Cape Province - People now get to Hell mainly on donkeys.

The VHF Amateur is published monthly by Robert M. Brown, K2ZSQ, at 67 Russell Avenue, Rahway, New Jersey. Telephone: FUlton 1-1284. EDITOR: Robert M. Brown, K2ZSQ, 67 Russell Avenue, Rahway, New Jersey. OWNER: James Donald Brown, K2ZSP, 67 Russell Avenue, Rahway, New Jersey. Rates are: $2.00 a year, $3.50 two years, and $5.00 three years. Add $1.00 outside North America...Add $1.00 U.S. Air Mail...Add $2.00 overseas Air Mail. Opinions expressed herein are NOT necessarily those of the EDITOR, PUBLISHER, or OWNER. We do our best to present facts, but we assume no legal responsibility arising out of debts, royalties, etc. We reserve the right to discontinue publication at any time. If an error is made, we hasten to point out that all is experimental and we guarantee nothing. Write us if you wish to reprint anything contained herein, - permission will probably be granted. All published articles are rewarded with a one year subscription. *Display advertising rates are: $15.00 full page, ½ page $8.00, ¼ page $5.00. All art work is charged at cost, determined by extent of composition required.* DEADLINE IS THE 20th OF THE MONTH.

3RD ANNUAL DINNER AND HAMFEST

Neptune's Inn, located on Route 4 near River Edge, New Jersey

Saturday, February 25th starting at 7:00PM.

The program includes installation of new officers; presentation of awards to members of our society and to other distinguished radio amateurs; speakers of note; novel entertainment; door prizes, etc; all topped off with plenty of unusually good food.

Tickets at $5.00 per person are available from any member or write to:

Roy King, K2BNQ
55 Woodland Avenue,
Montvale, New Jersey

Tickets will also be available from many of the radio parts distributors in the East Coast area.

Ticket deadline is Sunday, February 12th. No tickets will be sold at the door.

Requests from other radio clubs for specific groupings will receive special attention, if such orders are received early by K2BNQ. Requests of this nature can be honored only for blocks of five (5) or more tickets.

Motel accommodations are available nearby and there are ample parking facilities at the Inn.

THE EAST COAST VHF SOCIETY INC.

(a non-profit amateur radio group)

for VHF

New Climaster ZEUS TRANSMITTER

2 Meters & 6 Meters

175 WATTS

AM—CW

50 MC-54 MC 144 MC-148 MC

. . . with Automatic Modulation Control to outperform even many kilowatt rigs

(3.5 MC-30 MC and 220 MC adapters available soon)

GUARANTEED

to outperform any other commercially available amateur VHF Transmitter

Note some of the many features found only in this outstanding new VHF Transmitter:

- High Level Plate and Screen Modulation
- Highly Efficient Type 7034 Final Amplifier
- Self-Contained Stable VFO
- Built-In Automatic Modulation Control
- Simple Band Switching and Tune-Up
- Two Unit Construction with Remote Modulator and Power Supply Conserves Space at Operating Position
- Attractive Styling

Amateur Net Price: Only $559. Completely wired and tested with all tubes, Modulator. Power Supply. VFO. cables. etc.

Coming Soon - Matching VHF RECEIVER!

Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

The VHF Amateur
67 RUSSELL
RAHWAY, NEW JERSEY

To: Wm R Mandale
305 Hamilton Rd.
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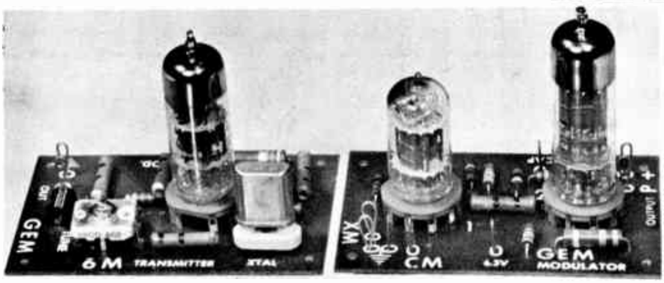
7/61a

Postmaster: Form 3547 Requested PRINTED IN U.S.A. **THIRD Class Mail**



The "Little Gem" 6 Meter Transmitter and Modulator Units!

These two small units will make up a complete 6 meter station of only 4" x 5"! The transmitter uses a 6AU8 as a triode oscillator using 50 mc over-tone crystals and a pentode R.F. amplifier. Features automatic antenna matching either hi or low impedance output. Will give a good solid signal on a beam antenna at 3 *watts input!* Requires 200V @ 15 ma - 6.3V.
Wired and Tested (less tubes and crystal) only $4.50 *post-paid.*

GEM MODULATOR UNIT:

The modulator unit consists of a standard 12AX7 pre-amplifier featuring either crystal/dynamic or carbon mike input and a 6BQ5 power pentode. Will give up to 7 watts of audio. Will modulate a 15 watt transmitter. Two of these units can be used as the basis of a high gain intercom system. Can also be used as phono amplifier or small P.A. set. Gain can be regulated by varying the voltage input. Requires one 8-8 mmf filter capicitor and output transformer. 100/250V - 6.3V. *Wired and Tested only* $3.50 *post-paid.*

GEM ELECTRONICS, R.R. #3, Springfield, Ohio

The VHF Amateur

MARCH 1961
25¢

K2MLT's new station on a 1900 ft. mountain showing stacked 8 over 8-6 meter array at Hammondsport, New York.

for VHF

New Climaster

ZEUS

TRANSMITTER

2 Meters & 6 Meters

175 WATTS

AM—CW

50 MC-54 MC   144 MC-148 MC

. . . with Automatic Modulation Control to outperform even many kilowatt rigs

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Coming Soon **- Matching VHF RECEIVER!**

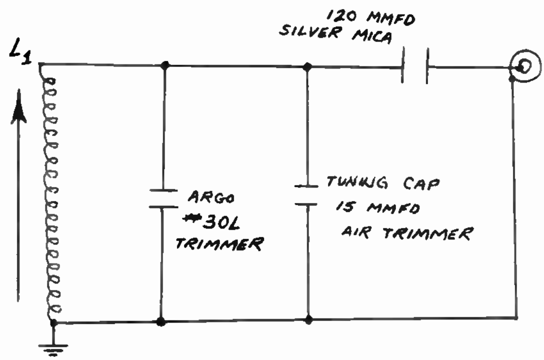
Clegg LABORATORIES

RT. 53, MT. TABOR, N. J. • OAkwood 7-6800

A Tubeless V.F.O.

George Kupp, K2DQT
61 Cortland Street
Belleville 9, N.J.

Here's a handy item for any rig. This circuit of a tubeless v.f.o. presented below was originated by KIELA...



Use short piece of RG 58/U cable to connect to crystal input.

LI : 17 turns #22 wire on a 3/8" slug tuned ceramic coil form. Green or red slug is OK.

VHF

HAMFEST!

Subject: 7th annual family picnic of the Royal Order of Hootowls (Six meter radio group).
Where: Gaffneys Lake Wilderness Resort near Seattle, Washington.
When: June 18, 1961 (father's day) rain or shine.
Registration: $.50 per R.O.H.O. member and $2.00 per non-member. Prize registration and family included.
Food: All food will be "potluck."
Contests: Annual XYL Crazy Hat Contest and Annual OM Crazy Beard Contest.
Program schedule: Sunday June 18, 1961. Registration will open at 9:00 AM sharp and will close at 12:45. Potluck dinner will be served by the food commitee at 1:00 PM.
Motel accomodations can be made for you if you will write now! Write direct to

Swimming Pool Motel "240"
24001 Highway 99
Edmonds, Washington

or the resort

Gaffneys Resort
Lake Wilderness
Maple Valley, Washington

VHF

Review of:

The Gonset IV

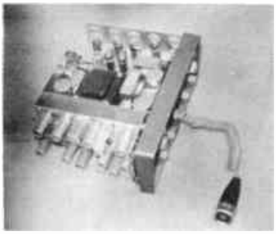
Ben Friedland _K2PBP
25 Farview Road
Millburn, New Jersey

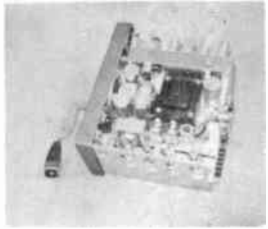
The Gonset Communicator IV is the latest addition to the already popular series of v.h.f. transmitters. Basically it is still a low power, self-contained v.h.f. station, but many new ideas, complete rengineering and new physical design put it out of the class of the previous Communicators.

The receiver portion features triple conversion. A frame grid 6ER5 is used as the RF amplifier. A 6J6 acts as the first oscillator using an overtone crystal at 64.5 megacycles. It multiplies to 129 megacycles for injection into the first mixer, another 6ER5. The crystal controlled first conversion provides excellent stability. A 6C4, the second oscillator, is tunable over the frequency range of 12.7 to 16.7 megacycles. It combines in the second mixer with the first I.F. frequency of 15 to 19 megacycles to produce a fixed frequency output of 2.3 megacycles. The 2.3 mc second I.F. is coupled through a double-tuned bandpass transformer to the third mixer, a 6BE6, where it is heterodyned against a 2755 kc oscillator to produce the 455 kc third I.F. signal. Two stages of amplification at 455 kc are used, both 6BA6's. Six tuned circuits provide the desired selectivity. One-third of a 6AV6 is used as the detector. This same tube is used as a delayed AVC rectifier furnishing delayed AVC to the RF amplifier. A controlable noise limiter and a squelch function are provided by a 6AL5. The triode portion of the 6AV6 is the first audio amplifier.

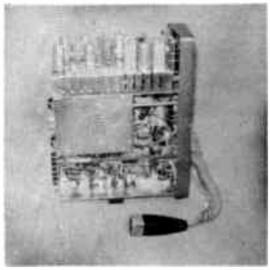
The audio section serves a dual purpose as it is used both on transmit and receive. A 7059 serves as a speech amplifier and phase inverter. Two 6BQ5's act as push-pull audio amplifiers. A dual secondary transformer provides both speaker and modulation outputs.

The transmitter uses either 6 or 8 mc crystals or an external v.f.o. as the frequency source. The plate circuit of the first 12BY7 is broadbanded in the 24 to 24.66 mc range. A second 12BY7 triples to 72 to 74 mc and a third 12BY7 doubles to the operating frequency of 144 to 148 mc. A 6360 is used as a push-pull amplifier running 20 watts input. Only two tuning adjustments are necessary, plate tuning and plate loading, adding to the simplicity of operation.





The universal power utilizes two 2N1554 transistors for 12 VDC operation. 177 VAC operation is possible by changing power cords. The two-way power transformer operates into a silicon diode bridge rectifier, the output of which is filtered by a capacitor input filter.



A permanently attached ceramic microphone with coil cord and push to talk switch and a switchable meter, either power output of transmitter or as an "S" meter, round out the unit.

The transmitter when tested with a watt meter showed 10 watts output into a 50 ohm load.

A new physical size, 5 x 12½ x 11", as well as a new panel layout make the unit very attractive.

VHF

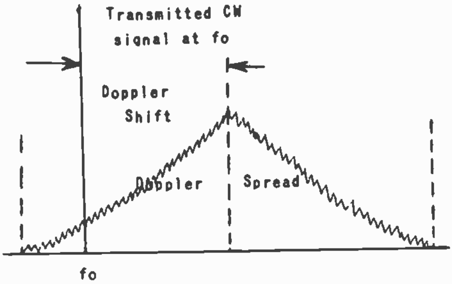
AURORA

Harold P. Grace - W3HFY
108 N. Concord Street
Havertown, Pennsylvania

The following is presented for those who have observed or worked VHF aurora, and who may be interested in recent IGY findings concerning this mode of propagation. The following material has been abstracted from three recent papers appearing in *The Journal of Geophysical Research...*

Among the most interesting features of aurora reflected signals are their spectral characteristic which results in the garbling of AM phone and characteristic note of CW signals. It has been shown that CW signals reflected from the aurora have their spectra shifted and spread by as much as 300 - 900 c.p.s. at frequencies of 50 - 150 mc., and as much as 2.5 kc at operating frequencies of 400 mc. The following shows a typical transmitted and received (aurora reflected) signals for CW emmission, illustrating both the Doppler shift and the Doppler spread in frequency spectra occuring.

The frequency components of the reflected signal fluctuate in amplitude in a noise-like fashion at a rate faster than the response of any spectrum analyser used to date. The frequency shift may be either up or down, and may pass from one side through zero to a shift in the opposite direction over periods of time as short as one hour.



Recent studies by Stanford Research Institute at both Palo Alto, California, and at College, Alaska, on frequencies of 50 - 400 mc using antennas of 3 degree beamwidth with both CW and pulse signals, have shown:

1) That Doppler shift data indicate a predominately east -west motion of the auroral forms. The velocity of motion is 500 meters/sec., and is independent of time of day.

2) That the magnitude of the Doppler spread on the reflected signal is proportional to frequency over the VHF-UHF range, i.e., the spread at 144 mc is roughly three times that at 50 mc and that at 432 mc is about eight times that at 50 mc. Thus received signal distortion becomes progressively worse as frequency is raised. It appears that this Doppler spread is due to a spectrum of different velocities of individual auroral reflectors reflectors in each small volume as would result from small scale turbulence.

3) That the Doppler shift appears to be unrelated to the position in space of the aurora.

4) That the magnitude of Doppler shifts and spreads for both discrete and difuse echo returns is similar at a given frequency and is independent of local time.

Using antennas of 3 degree beamwidth and frequencies from 50 to 800 mc, auroral signak returns (echoes) have been characterized as discrete (appearing over only a very narrow range of beam headings).

Discrete echoes generally correspond to visual forms of aurora. For these discrete echoes, increasing signal frequency results in decreasing echo amplitude and decreasing average duration. These discrete echoes or reflections drift in position and are generally unstable in that they appear and disappear in a few minutes. Their occurance shows a broad peak centered around local midnight, and they are most frequent during the winter months.

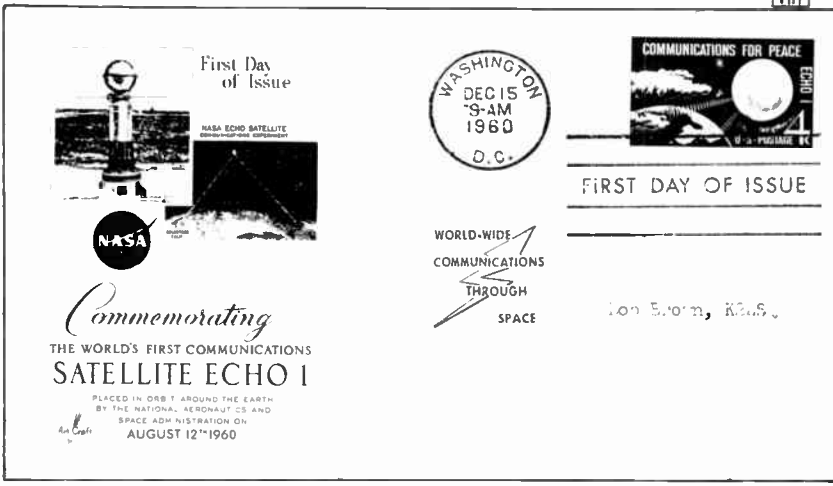
Diffuse echo returns, on the other hand, do not correspond to anything seen visually. At all operating frequencies both large layers of reflection and isolated echoes are seen. All diffuse echoes are generally stable in that the echo remains unchanged once it is established, and, excluding a rapid fade rste, the duration of the echo return is long, i.e., of the order of hours. The occurance of these diffuse echoes shows two broad peaks, one centered at 0800 and the other at 1600 local time, while they appear to occur over the entire year in a randomly distributed manner seemingly related to solar activity.

The variations of auroral echo power with operating frequency are poorly understood. For discrete echoes, echo power decreases in direct proportion to increase in frequency up to about 400 mc, and then abruptly decrease over a thousandfold for a further doubling of frequency. For diffuse echo returns, echo power decreases as the inverse square of increase in operating frequencyupp to at least 800 mc, i.e., the strength of the echo return at 200 mc is 1/8 that at 50 mc and that at 400 mc is 1/16 that at 50 mc.

Although many characteristics of auroral signal returns have been defined, important questions remain concerning the effect of frequency of the probability of occurance, the maximum frequency at which auroral propagation can occur (above 800 mc), and the latitude dependence of auroral propagation.

...So much for the scientific status of aurora propagation. However, in closing I would like to add a few pertinent observations drawn from amateur operating experience. The severe distortion of AM phone signal appears to result largely from the Doppler spread of the carrier rather than the Doppler spread of the sidebands. Thus reception of AM signals can often be improved from RØ to R2 or R3 by insertion of a stable carrier with your BFO using the maximum of received selectivity (i.e., using SSB receiving techniques). Experience by the writer and many others with SSB has shown this mode capable of getting through R4 to R5 signals on most 50 mc auroras when AM signals are unreadable.
---Reprinted from *QSO* (*The VHF Amateur's* predecessor) November 18, 1969.

VHF



TOP: First day cover commemorating Echo I (many thanks to W3ASK for this contribution!)
BOTTOM: Even the Swiss are excited about Echo II Here's HB9RG by his 1296 mc receiver. (Thanks to DL3FM and the DL-QTC magazine)

VHF

Moonbounce Activities

Allen Katz, K2UYH
48 Cumberland Avenue
Verona, New Jersey

One of the many obstacles to the construction of a practical moonbounce communications system is the achievement of transmitter stability. Extreme stability is necessary because of the narrow receiver bandwidths used.

Placing the oscillator crystal in an oven especially designed to keep the crystal at a relatively uniform temperature has been used successfully for many years in the v.h.f. spectrum. Crystal ovens, however, leave much to be desired on frequencies as high as 1296 mc. Their inadequacies come from a slight variation in temperature caused by the kicking in and out of a thermostat which controls the oven's heating element. These variations, while insignificant on lower bands, can mean the difference between "copy" and "no copy" on 1296 mc where a shift of one cycle at the oscillator frequency can be a change of a kilocycle on the operating frequency.

Sam Harris, W1FZJ, V.H.F. columnist for *QST*, devised a very ingenius and inexpensive way to get around this problem. Sam sunk a hole ten feet into the ground where the temperature is constant. Into the hole he placed a transistorized oscillator sealed in a thermos bottle. Transistors were used because they add no heat to the system. This method has an added advantage in being uneffected by mechanical shocks on the surface.

It should be remembered that these same principles should be applied to the receiver. You are fooling yourself if your receiver and transmitter are not both stable. An easy way to accomplish receiver and transmitter stability is to use one oscillator similar to Sam's for both transmitter and receiver. With judicious choice of crystal frequency this system will not work badly. For example: if one uses a one megacycle crystal in the transmitter, it can be multiplied by 1296 mc. In the receiver the one mc crystal can be multiplied by 1152 to get a frequency of 1152 mc for a 144 mc I.F. output.

Parabolic Antennas

It has come to my attention that parabolic antennas of various sizes are available from many surplus dealers. In the New Jersey area parabolic reflectors as large as twelve feet in diameter have been seen for sale - a 12 foot spun aluminum was priced for about one hundred dollars. This price is fairly reasonable considering that a new ten foot dish would cost about $1,200.00. Similar buys should be possible in other parts of the country.

Before closing, I would like to remind you that this column needs *your* support to succeed. Please send information and pictures concerning your moonbounce activities.

73, Allen, K2UYH

DOUBLE CONVERSION for the COMMUNICATOR II

Ben Sandberg W8RJJ and
Mike LaVere WA8CHJ

With activity on the two meter band increasing daily, it becomes more imperative for the receiver in use to display a resonable amount of selectivity. Crowded band conditions, harmonic interference from aircraft, a tendency towards increased power and other similar disturbances have made reception of weaker stations practically impossible. It was for these reasons that the authors, both owners of Gonset II receivers decided to add double conversion to this receiver.

The use of double conversion improves the image ratio and affords good selectivity in the I.F. amplifier. It is obtained in superheterodyne receivers by first converting the incoming signal to a rather high intermediate frequency, amplifying it, and then converting again, this time to a much lower frequency. The first intermediate frequency produces the necessary wide separation between the image and the desired signal, while the second one supplies the desired selectivity.

The modification is simplicity in itself and well worth the time (about 1 hour) and the slight expense (about $5) involved. As indicated in the block diagram, Fig. 1, the 6 MC signal which is the output frequency of the first oscillator-mixer tube) appears at the grid of the 6BH6 (VII), the existing second I.F. amplifier. It is at this point that we inject the output of our added second local oscillator. Since this tube is now intended to operate as a mixer it was found necessary to increase its bias. This was easily accomplished by changing the existing 120 ohm cathode resistor to a 5000 ohm. The output of this stage is our new second intermediate frequency, and as such, necessitates replacing the two remaining 6 MC I.F. transformers with ones resonant to the new intermediate frequency. It was decided to use 455 KC as the new intermediate frequency since transformers of this frequency are relatively easy to obtain. A word of caution at this point in that since one of the replaced I.F. transformers is used for detector service, two identical transformers should not be used. An "input" type similar to Miller Coil Co. 12-C1 can be used for the I.F. stage and an "output" type similar to Miller 12-C2 used for the detector stage.

The circuit chosen to generate the required local oscillation frequency was a modified Pierce, utilizing a 6455 KC crystal for excitation. The crystal frequency is not too critical and can be as much as 5 KC either side of that frequency. Since the mixer stage employs cathode bias, the amount of injection voltage is non-critical, but rather that an adequate amount be available. To insure this it was necessary to tune the oscillator plate circuit with a peaking coil and a capacitor as indicated in the partial schematic diagram, Fig. 2. If desired the capacitor used could be a trimmer. The tube chosen for the oscillator was a 12AT6 since these particular receivers are wired for 12 volt operation. A 6AT6 can be used in place of the 12AT6 for 6 volt receivers. B plus

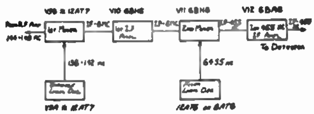


FIG. 1 Partial block diagram Gonset II receiver

voltage is obtained from the receiver B supply buss which feeds the plates and screens of the existing tubes.

The area adjacent to the R.F. amplifier, V8, located at the rear of the receiver chassis was utilized for the oscillator circuit. The crystal socket and crystal was located outboard directly behind the oscillator tube. Tie points were inserted where required to support the parts of the oscillator circuit. After wiring the oscillator per the schematic, Fig. 2, oscillation can be determined by measuring the voltage at the grid pin (pin 1). If the circuit is oscillating the voltage at this point will be approximately 3 to 4 volts negative.

The wiring of the oscillator should present no problems since lead dress is not critical, but as in all good wiring practice, lead length should be kept to a minimum. All grounds should be returned to a single point preferably at the oscillator socket.

If the oscillator is working then the next step is to procede to changing the I.F. transformers. When lifting the existing components remember that they will be returning to the same pin of the new transformer, therefore their dress should not be disturbed. After the new transformers have been installed the job is completed by injecting the local oscillator energy to the "new" mixer grid (pin 1 of VII) by means of a "gimmick," in this case a 2.2 mmf ceramic capacitor was used. The capacitor was soldered directly to pin 1 of VII and a short length of wire was soldered to the other end of the capacitor. The remaining wire end was then connected directly to pin 1 of the oscillator tube. It is important to keep this lead as short as possible to prevent coupling stray oscillator energy to the existing circuits.

To align the two new transformers it is only necessary to peak them for maximum output using either a station or existing background noise. No trouble was encountered during the conversion so the job can be tackled with complete confidence towards a successful conclusion. The resulting sharpness and somewhat greater gain then before the conversion will certainly make worthwhile the money and effort expended.

---The above article was extracted from *Western Radio Amateur*, one of the most outstanding ham magazines now on the market. This article should give you an idea of the high technical quality constantly maintained throughout the publication. See ad in back.

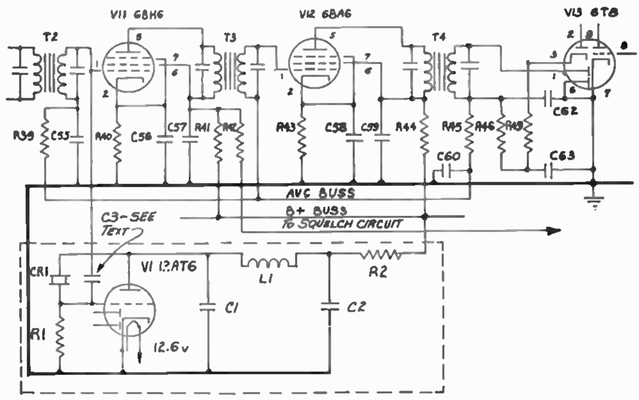


FIG. 2 Partial schematic gonset II receiver

NOTES: 1. New oscillator circuit shown within dashed lines.
2. Reference designations except those within dashed box conform to Gonset schematic.

Parts List

R39 270K ½W
R40 5000 ½W
R41 10K 1W
R42 220K ½W
R43 120 ½W
R44 10K 1W
R45 1.2M ½W
R46 1M ½W
R49 1M ½W
C55 .001MF. CER.
C56 .01MF. CER.
C57 .01MF. CER.
C58 .01MF. CER.
C59 .01MF. CER.
C60 .01MF. CER.

T3* 455KC I.F. (input)
T4* 455KC I.F. (output)
C62 50MMF CER.
C63 .01MF CER.
T2 6MC I.F.

OSC. CKT. Parts List

CR1 6455 KC XTAL (FT 243 Type)
R1 33K ½W Carbon
R2 100K 1W Carbon
C1 50MMF Ceramic
C2 .01MF Ceramic
L1 Peak. Coil, 500UHY. (Miller 617 or Equiv.)

* originally 6MC.

VHF

UNDERSTANDING V.H.F.

PROPAGATION

J.D. "Red" Brown, K2ZSP
67 Russell Ave.
Rahway, N.J.

This article will be the first in a series concerning the various basic elements of propagation as it is applied to the v.h.f. man. Edited this month by the other member of the family, K2ZSP, it might well develop into a family project - hi! This installment covers tropospheric and Sporadic E conditions — K2ZSQ

PART 1

Any discussion of v.h.f. propagation should properly start with tropospheric conditions. Tropospheric propagation is our most common form of v.h.f. phenomena and should be understood before moving to the study of other types. Tropospheric propagation takes place in that part of the earth's atmosphere nearest to us - from earth to a distance of about six miles. All of our storms, weather and atmospheric changes as we see them affect propagation. Thus it is sometimes called the "weather layer."

Tropospheric propagation could be truthfully called tropospheric bending. The change in direction of a radio wave could be illustrated by a comparison with light waves. Let's look back to the time as youngsters when we tried to hit fish in a brook and didn't succeed. We failed not only because of poor aim but also because the fish wasn't where we saw it. The light rays reflected from the fish were bent at the boundary between the water and air, consequently we saw the fish other than at his true location. Lenses and prisms are also examples of the bending of light waves; consequently, just as light waves may be reflected or bent so also may radio waves.

"Ground Waves"

The term "ground wave" is of course a misnomer and probably is a carry-over from low frequency work; however the term has come into general use on v.h.f. to denote an extension of the normal range of transmission and reception to several hundred miles, depending, of course, on frequency." Ground wave" is a form of tropospheric bending. It is most prevalent in coastal areas, or areas adjacent to large lakes. Again, our weather element.

"Ground wave" or tropospheric bending is caused by temperature inversion, a sharp difference in moisture content of the upper air masses, or a combination of the two. Remember the example of the bending of light waves at the surface of the water. Here the light waves passed from one substance to a completely different one. At that point a bending of the light waves took place. Something similar happens during tropospheric bending. The two dissimilar substances are of course part of our atmosphere. They are different because of temperature differences, moisture differences or both. The sharper the line of demarcation, the more pronounced the effect. Radio waves transmitted at an angle from the surface of the earth are bent back and thus are received at a greater than the normal distance.

"Ground wave" occurs most frequently during the warmer months but does happen during the winter. Here is a typical example - - In the early morning hours the sun's rays strike the upper atmosphere first. Its temperature rises before the air near the ground warms. These unlike masses cause bending of the v.h.f. wave. A similar condition is true near sunset and sometime continuing for several hours. As the sun sets, the lower atmosphere cools while at higher levels the sun is still shining. Here again we have two unlike masses. A dissimilarity in the moisture contained in each mass further increases the tropospheric bending. It is possible for this bending to be caused by either the temperature or moisture differences individually.

Personal observation has shown "ground wave" conditions to be more prevalent during times of clear weather during the warm months. "Ground wave" v.h.f. communications in excess of 500 miles as been recorded. More commonly our range is extended over a distance of one hundred to two hundred miles depending on the station equipment and frequency.

You as an active v.h.f. man can enjoy "ground wave" further by arranging your time on the air to conform to times when tropo work should be best.

Sporadic E Layer Skip

In the region of the E layer of our atmosphere, at approximately 30 to 70 miles in altitude, frequently clouds of very high ionization are formed. These clouds (not visible, of course) are capable of reflecting v.h.f. signals. It is thought that there is some correlation between aurora and E layer propagation, but this is not definetely known. This cloud layer may be spotty, reflecting signals from a small area or an occasion reaching continental proportions. Propagation by Sporadic E propagation is thought to be limited to (at the highest) 144 mc and lower, however 144 mc transmissions in excess of 1000 miles lead to some question regarding the upper limit. Only in the last few years have any kind of Sporadic E 144 mc work been possible at all. Minimum distance for Sporadic E skip is about 600 miles and maximum for single hop is about 1400 miles.

Somewhat related to Sporadic E type skip is that of F2, which will be covered extensively in a later part of this series. Meanwhile little enough is known about this popular Sporadic layer. It seems to be at is best during the months of May, June and July, but may occur in any month. It appears both during daylight and at night but tends to peak at about four hours after sunrise and again just after sunset..

"JB," KØRTF, goes about his Sporadic E DX hunting methodically. He keeps a map of the U.S. available at his operating table. When an opening occurs, he may hear a W5 working a W3. Quick check in the callbook locates the W5 in Ark. and the W3 in Pa. He draws a line between the location in Ark. to the point in Pa. Midway between the two locations on his line he places an "X". This is assumed to be the "point of reflection." Soon he has an area giving an idea of the extent of the reflective layer. By locating the "area of reflection" he has been able to work states that he hadn't previously heard by working *across* this point. The idea is simple and workable. Perhaps you'd like to try it. Check the V.H.F. Column in the February 1981 *CQ* magazine.

VHF

SOUTH AMERICAN VHF NEWS

Michael A. Czysch, LU3DCA
Monasterio 345, V. Lopez FNGBM
Buenos Aires, Argentina

During the weeks between December 18 and January 21 the propagation conditions here in South America reached again the expected minimum on 6 meters, reducing our DX possibilities to a very small margin, although it is not such a complete zero as during the months of June, July and August.

In fact, during December last year we enjoyed many very fine Sporadic E openings, but this year they were observed few and far between, now I'm not sure if the season was really not so good or if it was only the lack of activity which caused this impression. Anyway, here in Argentina we worked this kind of DX on January 7, 17, and 19. On these three dates mentioned several stations from the province of Mendoza were contacted by the local gang, and at the date last mentioned (19th) also some CE's were coming in.

DXotic QTH of the month: Olinda, PY7AEE hometown in Peruambuco, Brasil. Nice, eh?

At PY7AEE the OM himself in his shack. Note all the homebrew equipment!

As Mendoza is another little center of 2 meter activity; we took the chance to arrange some skeds for 144 mc work with LU8MAH and LU1MBJ. During the present hot summer months luck may be with us and permit a QSO for a new South American record on that band.

TE propagation has been very irregular recently, but at least it was not comepletely. In the late evening hours of December 20 and 29 I observed several commercial signals from the north below the band-edge, but no amateurs were on. This year's DX show began with a QSO between PY1XW and LU2KE in the province of Tucuman, but this was not before January 10 that we could manage a contact to a foreign country from Buenos Aires. On this date I heard and worked PY7AFP, OM Jose in Pernambuco with his 6-watt-transmitter. The following evening brought in the signals from PY2BQG, PY2CCO, PY5GK, and PY1XW, who also worked stations in Mendoza and Chile.

January 12 was not so good, and only PY7AFP was contacted again, but several of the Brasilian call areas were working each other and the CE's, which were not yet heard this year here in LU-land.

On January 17 and 19 there were two different kinds of propagation present at the same time: Transequatorial and Sporadic E. The first one brought in the fluttering signals from PY1XW and some commercial carriers, while the E's were reponsible for the slow varying S9 signals of the Mendoza fellows. For more than 4 hours we were busy answering the calls of all these long-time friends, and I hope some of them will respond to my requests for a picture for this column.

Next month conditions will probably come up again reaching the usual peak in March, and on this side we are fixing already everything on the rigs to be prepared for the new season. Are you?

73 -

Michael

50 mc W.A.S.

Send in your listing for THE VHF AMATEUR's Worked All States department! Let's see how you rate!! Minimum states confirmed needed for listing: 21. Cards must be on hand for inspection if requested. All entries must be submitted on a postcard or QSL card and addressed to: W.A.S. Listing - 50 mc, THE VHF AMATEUR, 67 Russell Avenue, Rahway, N.J.

W7MKW	Wash.	150	47
K4BPY	Ky.	-	47
K9DTB	Ill.	80	47
K2DZM	N.J.	100	46
K5IQL	N.M.	600	46
K2ZBX	N.J.	-	46
K6UJL	Calif.	7	45
K1BIL	Mass.	50	45
KL7AUV	Alaska	200	45
W2EIF	N.J.	25	45
K2QWD	N.Y.	50	43
KØHOS	Iowa	75	43
K4PEV	Tenn.	50	42
K8DKO	Ohio	45	42
W3JWY	Md.	75	42
K9KZB	Ill.	100	41
K3BOB	Md.	40	41
K2VDR	N.Y.	90	41
K2MJB	N.Y.	150	41
W2HVW	N.J.	100	41
K2MXT	N.Y.	180	42
K1BHY	Conn.	120	40
W2EAQ	N.J.	100	40
K2CVG	N.Y.	65	39
K4PXJ	Tenn.	8	39
K2ZSQ	N.J.	100	39
K2HAK	N.J.	100	37
K4RTG	Va.	18	36
K2UGH	N.J.	125	36
WA2BBU	N.J.	160	36
W8UML	Mich.	40	33
W3BRU	Pa.	35	32
K4EBT	Florida	19	33
K1IZM	Mass.	100	32
K1AUD	Conn.	195	32
KØPWS	Mo.	12	32
K2OMG	N.J.	8	31
LU3DCA	Argentina	-	30
K2ZSP	N.J.	100	28
HC1FS	Ecuador	70	28
W3MNE	Md.	100	26
KØCWR	Mo.	45	26
K2VSE	N.J.	30	24
K2VNK	N.J.	70	24
WA2ACI	N.Y.	45	23
K8EUX	Ohio	-	23
K3ATX	Penn.	30	22
K2VNL	N.J.	70	22
K2EFN	N.J.	14	21

This list will be revised periodically as we receive notice from you of changes of status. Also send us your 2 meter and 220 mc listings - We are starting a new W.A.S.

VHF

Trading Post

RATE: Commercial ads - 5¢ per word. Free to readers - any reasonable length. Ad from readers MUST BE SUBMITTED ON A POST CARD or QSL card. TRADING POST, 67 Russell, Rahway, N.J.

<u>QSL's:</u> "Brownie," W3CJI, 3110 Lehigh, Allentown, Pennsylvania. Samples 10¢, with catalog 25¢. (3/61)

<u>FOR SALE:</u> SX-99 and speaker, $95.00. 2 meter ground plane and 100 feet of RG-59/U coax - $10.00. Tunable TV receiver from 55 mc - 215 mc - $20.00. Heathkit MM-1 test meter $23.00. Can deliver locally. Chuck Sizer, WA2FHC, 33 Tulip Street, Cranford, New Jersey. BR-6-2466 (telephone).

FOR SALE: Viking Challenger - good condition - $90.00. Meisnner Signal Shifter - all band v.f.o.-exciter-e.c.o. - $25.00. Will ship C.O.D....Heiko Ganzer, K2REH, 814 Nicholas Place, Rahway, New Jersey.

WANTED: K3HNP, the license plate collector, would like any additions to the growing collections. Much desired: ham call plates and any from outside U.S. Ordinary plates from most states are wanted, but write first, as postage runs high. 14 Darkleaf Lane, Levittown, Pennsylvania.

NEW TV Camera tubes: 6198 or 5527 - $50.00....W1BYX, Box #122, Rockville, Connecticut. (6/61)

WANTED: Construction articles on VHF-UHF gear for this magazine. Write us now! *THE VHF AMATEUR*, 67 Russell Avenue, Rahway, New Jersey.

QSL's: SWL's, Citizen Band, Samples 5¢. Nicholas & Son Printery, Box 11184, Phoenix, Arizona. (3/61)

WANTED: Address of East Coast supplier of preformed finger stock for 2C39B tubes. R. G. Lachance, W1QKA, 48 Learned Street, Nashua, New Hampshire.

FREE HIGH PASS FILTERS: Every major TV manufacturer will supply TVI filters (usually Drake 300-HP's) to TVI recipients upon request!!! Send for the lists of these companies and proper forms to be filled out by complainees. 25¢ to cover printing, paper, envelops, and postage to Bob Brown, K2ZSQ, 67 Russell Avenue, Rahway, New Jersey.

VHF

News from

West Europe

George V. Haylock, G2DHV
28, Longlands Road
Sidcup, Kent
ENGLAND

Firstly, my congratulations on THE VHF AMATEUR! There have been some good openings on two meters recently (our bands are 144 to 146 mc Region 1) especially during last October and December. Many continental stations heard and worked...otherwise it has been rather low on activity due to winter season here.

G3HBW made QSO with OH1NL...0300/0630 GMT. A very fine QSO, even R9 on bursts! OH1NL also worked HB9RG by meteor scatter of distance of 1080 miles...last December. Both contacts beat the old record set up in 1959 by G5NF and I1KDB for Sporadic E.

G8NB is using a transistor transmitter on 144.610 mc.

G5YV has heard signals from UA1KAW. UR2BU has also been heard. G3HBW has just made contact with HB9RG as well. LA4YG heard GM3BDA and OH1NL.

GI3KYP/A will be active soon on 145.598 mc. GI3GXP worked HB9RG during last October, first time! GI5AJ works G2NY regularly every night.

G3BDO made QSO last August with F9QE via the Echo I balloon.

A number of UK stations are equiped for the 4 meter band, from 70.2 to 70.4 mc with some active on both bands making for crossband QSO's.

DL1HM has designed a new antenna for mobile operation (DARC). Activity here includes DL1CK, DL6TU, DL1EI, DM2AUI, DL6QS, DJ6BB, DJ4PY, DL1FF, DL6SS, DL9ARA, DJ5HG, DL1EK, DL9PL, DJ1ZU, DJ4YJ, DL6MH, DL1RX, DL1PS, DJ5HG. Austrian stations are: OE1WJ, OE9IM, ON4CP, OZ2AF, OZ7WA, OH1NL, and LA4VC, LA9T, HB9KH, SP6LB, SP3GZ, LA4YG, LA3AA, LA4RD. Others on v.h.f. are: DMØUHF and DLØUH, DLØSG.

Here are some more G'S: G3EGK, G3LRP, G3EGK, G3MHD,G5ML, G5YV, G2WO, G6NB, G5TZ, G2KI, G2XV, G2CIW, GW8MQ, GM3GIU, GW2HIY, GI3KYP, GC2FZC, GI5AK, GM3BDA, GM3FHH, GW3GU, GW3MFY.

Swedish stations to be active are: SM6PU, SM4COK, SM5AAS, SM4AMM, SM5BDQ, SM5TC, SM5OT, SM5BWC, SM4PG, SM7BAE. Skeds have been made with OE3SE and OK2VCG.

Quite a number of UK hams and DL/DJ are on 2 meters with mobile gear including G2DHV/M on 144.70 and 145.250 mc.

Beacon stations in regular operation are GB3VHF on 144.50 and DLØVH on 145.98 mc. (And ON4UB on 145.000 mc also a SM4 station).

Dresden station (TV) on 145.250.

This should give you VE/W stations the gen for cross-the-water QSO's!

73, George, G2DHV

VHF

Alaska Reporting

Jack Reich, KL7AUV
Box 1048, Star Route A
Spenard, Alaska

Things are looking up around here - - especially on two meters...I have been heckling the Alaskan hams for at least three years to get tooled up on six or two and set up some knife-edge communication with Fairbanks or points north of the Range. Have never had any luck in getting anyone on six up that way, but they have been slowly increasing their two meter work for the past year, and now have at least seven stations operating at Minchumina, Tanana, Nenana, Shaw Creek, and Fairbanks, with fair results. They are mostly using beams pointed at McKinley. About a week ago, Wilbur Butler, KL7ALA, made the first Anchorage - Minchumina contact, using only a Communicator and Ground Plane here in Anchorage. KL7IS, at Minchumina, is using a Seneca, Heath Converter and Mohawk with a 22 element Telrex. Maury Wright, KL7CNN, then got his gear cranked up and has set up a real pipeline into Minchumina using a Seneca and BC-639 in or Communicator. He has an 8 element Telrex. KL7DJI in Nenana has a Seneca and Heath converter with a Telrex beam, and KL7CLH in Tanana has a homebrew 50 watt rig with a 36 element beam. Shaw Creek is using a Communicator, and in Fairbanks, KL7AEQ, and KL7CWO are on. I don't know what their gear is. Same goes for KL7CFN at North Pole.

Interesting development so far, is that KL7CNN, Anchorage, and KL7IS, Minchumina get best results from vertical polarization, apparently knife edge over Mt.Foraker. KL7DJI, in Nenana, can gear KL7CNN in Anchorage *only* if they use cross polarization. Apparently this is a bounce of the side of McKinley. KL7CNN has tried a Telrex Spiral array, which does *not* improve his signal to Minchumina, and Nenana cannot hear him at all using the Spiral array!

Needless to say, interest is looking up in the two meter region around here...KL7ALA and I worked the V.H.F. Sweepstakes last weekend, and came up with totals of 20 and 28 contacts respectively. I got a few of my 28 on six meters, which ALA does not have. Our CD net here consists of about 35 fairly active stations on 145.3, and roll call is given on Tuesday, Wednesday, and Thursday at 7 PM. Average check-ins per night during 1960 was 17.

I am fully back in business on six meters, with my 6 element optimum spaced Telrex up, and am watching the bottom of the band and the two Illinois 149.8 and 49.86 mc stations. Have heard them several times, although weakly. Haven't got the keyer tied in yet, but hope to have it ready for use when conditions look favorable. Still 250 watts CW on 50.080. Am going to arrange schedule with VE8BY as soon as I get time to write to him.

73, Jack

VHF

Letters

Send us your letter today! We'll try to print all letters as received. Let's know what you've been doing! Write us now! Address? THE VHF AMATEUR, *67 Russell Avenue, Rahway, New Jersey.*

Auburn, Maine: From the famous pen of Richard Huntress, K1CXX, comes a real comprehensive report...

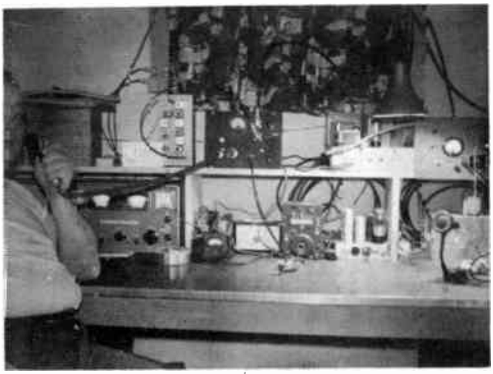
"The V.H.F. bands. as usual are very dead here in the state of Maine. I keep regular schedules with K1HAV in West Gardiner and W1CRJ/1 over in Bridgeton. W1CRJ (Bill) is using a homebrew 4 element beam and a 40 watt v.f.o. controlled 6146 -6L6's modulator rig that I loaned him. He has a TBS-50-D but is presently working on a v.f.o., voice to talk, and TR antenna switching. He installed a new rotor on his antenna system recently and added a homebrew 5 element two meter beam above the 6 meter antenna at the same time. This is a 25 mile haul as the crow flies but he has a very nice signal on two meters, using only a Gonset Communicator.

"Walter, K1HAV has finished building a 6 meter mobile rig, using 6AQ5's plate modulating an 815 tube final at about 40 watts input. He has been receiving such a good reporting claims with it that I sort of suspect he has lost interest for the time being in putting it in the car.

"I worked Mike, K1NAT, down in Berwick recently and he informed me that he was the only active station in that locality at present. Mike has a Gonset Communicator III and, Berwick being in the very southern part of the state, he can work into Massachusetts easily, so he isn't too lonely.

"K1GPI, down on Cape Elizabeth, is also on six meters. I heard that his beam came down in one of our recent storms, which explains why I haven't heard him on for some time.

"Activity on the 2 meter band has dropped off sharply since last fall. When the cold weather set in and the good coastal inversions disappeared, so did most of our 2 meter stations. The Massachusetts boys told me that on a good inversion they could work up to 25 different Maine stations in one evening. There are still a few "die-hards" though. These are fellows who are tired of fighting the QRM of the lower bands and like a band that they can have a good rag-chew on. Most stations run low power rigs such as 522's and Gonset Communicators. If you run 70 or 80 watts, like myself, you are kidded about being a high power station. Using this low power most of the boys can work 40 to 60 miles any time of the day throughout the year. There are very few v.f.o.'s on the band and most activity is between 144.4 to 144.9 mc. The majority of the stations are using crystal controlled converters into a regular communications receiver with a good horizontal beam and rotor.

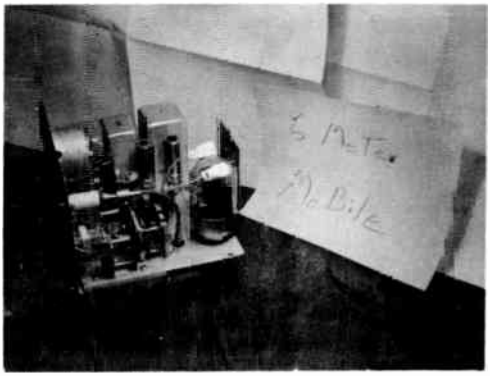


Walter, K1HAV, and shack. On the top shelf LtoR is 6 meter Tecraft converter, his six meter mobile rig, power supply for something or other, and the SCR-522 two meter transmitter with front panel that he added. Below in the middle of pix what looks like an ARC-5 transmitter is actually a V.F.P. for 6 meters. This, by the way, was built from a diagram in THE VHF AMATEUR that he swiped from me. The mike on the bench to the right goes the 522 ommiter and behind that is the 522 receiver. The picture IS A PHONEY as I was working him at the time (duplex) when it was taken and the only rig working is the 2 meter SCR-522. The mobile rig was just set there for the picture. The live mike is the one on the bench to the right of picture.

"As for myself, I have made few changes here in the equipment recently. The 6 meter transmitter now uses a heterodyne v.f.o. instead of the old 6 mc x 8 equal 50 mc job. It sure made an improvement in stability and the amount of band spread on the v.f.o. dial is terrific! It uses a 9 mc v.f.o. beat against a 41 mc crystal to produce 50 mc.

"I have also built a more efficient final amplifier for the 2 meter transmitter. It is an 829B with ¼ wave length lines in the plate and grid circuits with an output of about 60 watts at 110 watts input.

"I would appreciate it if you would sometime mention that I am on trying to work aurora on 2 meters, whenever there is any. Presently I have able to hear more than I can work even though the converter is only a HB 6BQ7 - 6AK5 as RF's, 6AK5 mixer into an RAX-2 receiver. I have two crystals, both in the second 100 kc of the band so as not to fight the KW's on the first 100 kc, but now it seems that many of the receivers can't tune above 144.1 mc for some reason or other. When I do snag a station, they give me a good RST so the rig must be working OK. The antenna is an 11 element Cushcraft beam, 5 ft. above my



K1HAV's mobile rig with the 815 final.

6 meter beam, fed with 300 ohm oval twin line. On CW the rig runs about 130 watts input.

"I also have installed NBFM into the 6 meter V.F.O. as I am heard by every radio, hi-fi, intercom, and TV set in the neighborhood, when using AM. I spend much of my time on the air, working K1HAV duplex 6 to 2 meters and also with W1CRJ/1, now that he has gear running on both bands. We have had other hams in our shacks when we are using duplex, and it takes them a while to get used to it. In my book it has an all over voice to talk. It is surprising how quickly 10 minutes will pass, using duplex as compared to listening to ten minutes of monologue from the other station, using the simplex method. The only trouble is we have yet to figure how to get three stations in on this at the same time. *Get a rig set up on 220! - ED.* It is also a good test to see if the equipment can stand up under a few hours of continuous operation.

"Bob, sorry I can't find more to write on local news but there just isn't any. Everybody and his brother operate 75 meters here in the state. You couldn't interest those guys in VHF if you gave them the equipment. As they put it, "I don't want to work across the street." At 1700 hours on 75 meters they all join in on the Seagull net on 3940 kc. At that time of night you boys down in W2 land are QRM'ing the devil out of the band and they have a rough job to work stations 25 miles away! *Get 'em on 2 meters! - ED.* It takes them 10 minutes to handle short pieces of traffic by relaying from one station to another to work this distance. We can work 50 miles any direction anytime on 6 and 2 to other stations with decent gear but you can't convince them of that. One big trouble is that the boys have belonged to CD at one time or another and have used the Gonset Communicator with either the spike or a crumbly ground plane and a 147.999 mc crystal. For a few evenings they call "CQ" on that high frequency and hearing nothing, they go to radio clubs and get on 75 and rap the h--l(*CENSORED - Ed!*) out of VHF. Most of those Gonset Communicators couldn't pick up a KW if it were nextdoor with those ¼ wave antennas!

"Here in Auburn the CD has a setup at the county building with at least a 50 ft. tower and ground plane. At our local Airport is another 2 meter setup. These two stations are about 6 miles apart and they can't work each other without relaying to a station in the middle. In that direction I can work a station down in South Portland (35 miles) who is also using a Gonset Communicator about an S7. He, of course, uses a horizontal beam. A fellow over in Bridgton who runs a CD told me that they could barely copy Auburn on two. The Auburn station is located in the highest spot in town above me on a hill that I have to go over to work south. It is a line of sight for 50 miles in most directions from there. He said that he didn't think W1CRJ/1 could work me on 2 at all! He, W1CRJ, put up a 5 element beam used a CD communicator and a 144.9 mc rock and comes in here about

S7 to S8.

"I first got started working VHF in 1958. A station is Lewiston our twin city was on 2 meters with a ground plane. He was all excited as they had been getting inversions and he had worked into Portland which was real DX for him. This is a 35 miles haul. Those nights K1HAV who was running 522 units to a stacked 5 element beam tells about working into New Jersey, New Yotk, and Rhode Island area. To most people mention two meters and right off the bat the think of only being able to work across town. If you knew how many stations had 2 meter gear it would surprise you to know and if they all got on at once with horizontal beams, the first mc of the band would sound like 75 meters. About 2 years ago Walter, K1HAV, started on two meters and he said that there were a couple of dozen stations on at that time but right now you would be lucky to work half a dozen different stations a week. Many of the boys have left and gone to MARS to get something for nothing.

"Project for V.H.F. Clubs"

"Another thing I want to mention is this QSL business. On skip openings to a rate state like Vermont, New Hampshire, etc., everybody wants of course to work it for W.A.S. Now this QSL biz costs about 5.5 cents per card. Now when we have short skip to Chicago forinstance, there must be hundreds of stations all on crying for Maine. They get on and QRM the fellow I am working and are sore when I don't come back to them. I could easily work 20 or 30 stations in an opening but I don't as I would shortly go broke on QSL cards. These large cities have big V.H.F. clubs and spend money like drunken sailors for hamfests, etc. Now my pitch is *why don't these big clubs kick in a few buck and print up QSL's WITH STAMPS and ship them to some of the VHF hams in the rarer states?* I am not kidding about the fact that a state will stay rare partly because of the QSL'ing. I have talked to W1EXZ in Vermont about this and he doesn't plan to work many stations in a skip opening because of experience in the past costs of QSL'ing. I believe that if QSL's cost nothing the stations in the rarer states would work more stations. Lately on skip I have been inclined to work stations I've worked before instead of looking for new ones. I have gone broke on stamps alone. I would not have brought the point up about clubs printing up and donating cards except for the fact that I was working a station down in Massachusetts last fall that's a big wheel and all he did was to brag about their V.H.F. club and how rich it was and how they liked to spend money on themselves. I still burn when I think of it. They seem to have the opinion down in Massachusetts that Maine is really up in the sticks. In the big cities they can lay their hands on surplus gear for a fraction of the price we can but I don't care to have the point rubbed in. I brought this point up about QSL'ing as you might be in more of a position to feel out some of the clubs and see just how an idea like that would go over. They probably would be willing to chip in for tar and feathers and send somebody to use them on me. As one of our Maine boys has since sold his gear put it, "Why should I work them? All they want is my QSL!"

"We had some very good skip on January 4 and 5. This was as good as any that we get in the summer months. I worked into Delaware, Pennsylvania, and Maryland which is quite rare and only happens once or twice a year at most. Walter, K1HAV, managed to get a New Jersey on phone which is real short skip. Walter gets a big kick out of skip. He gets on and calls "CQ" and says "Maine" a few times and has to beat them off with a stick. He is a great ragchewer so doesn't work too many different stations per opening.

"I see you have a section on SSB now! I would like to say one thing about SSB and that is that it really cuts through on aurora. I have worked different stations in New Jersey and New York who were using sideband on aurora and so help me they were still coming through as the band was going out and even the CW signals were getting too weak to copy!"

San Fernando, California: Here's a real short note from Bob Adams, W6QMN, SSB enthusiast extrodinairl...

"Have KW of SSB and CW on 50.103. Operate weekends. Rather disgusted at lack of activity here.

"Rig is modified KWS-1. Receiver is Grounded Grid 6AJ4's - 75A4. Antenna 9 element horizontally polarized.

"Hope to have 2 meter KW on soon. Will be on 144.010 mc as per W6TIB's suggestion."

Lynn, Massachusetts: Terry Weddleton, W1NQQ, emits with...

"Handle here is Terry. I thought I'd write to fill you in on the activity at this station.

"I'm running a Globe Hi-Bander to an 8 element Telrex yagi. The reciver is an SX-99 with a 417A converter. The Hi-Bander is a great rig! The aurora back in November netted my 50 watter 58A and 57A reports throughout New York, Pennsylvania, and Ohio. A slight inversion on the 6th of December netted 5X9 reports within a 250 mile radius.

"I hope you will tell the hi-power boys to look on 144.108 or 144.13 mc for my signal on aurora or tropo openings.

"Hope to have an 829B final running on 2 meters by mid-winter, so my signal may come up a little more."

Lethbridge, Alberta, CANADA: Regular reporter Bob Henry, VE6DB, comes through with...

"In the way of news etc., - - - We here only heard one opening on 6 meters during the last V.H.F. A.R.R.L. Contest. We heard K7ALE and K7RUX and managed to work K7RUX for a short one. This on phone which is really something for VE6 land in winter!

"Also Dave, VE6FF, and I have finally gotten on 1230 mc and are working up further tests once we get a more portable rig. Pete, VE8BY, is also in on our tests and we have hopes of a bit of fun "way up thar." Pete is always looking for a QSO via aurora with anyone on 6 meters." *Nice hearing from you, Bob. How about a write-up on your 1230 mc work and some pictures? Sure would appreciate any contributions, and I'm sure our readers would too! How about it? - ED.*

Minoa, New York: The secretary of the world-famous Syracuse V.H.F. Club takes time off from his important role of conducting essentials of a new administration to write...

"At the last meeting we held election of officiers for 1961 and the results were asffollows...

"Charles (Charlie) Sellwood, W2RHQ, - PRESIDENT. Howard (Larry) Lawrence, K2TXG, VICE PRESIDENT. Richard (Dick) Benjamin, K2YFY, TREASURER. Albert (Al) Scaia, K2ZRX, ACTIVITIES MANAGER. Chuck Chester, K2TXX (that's me), SECRETARY.

"I'll try to keep you informed on any pertinent happenings here at Syracuse V.H.F. Club, Inc., and we sure will appreciate any help you can give us at the publicity end.

"All of us here at the Syracuse V.H.F. Club Inc., are really looking forward to a bigger and better year coming up under the leadership of a very enthusiastic and active president like Charlie Sellwood."

VHF

Message From The Publisher

In the publishing of even a small magazine such as THE VHF AMATEUR, *many problems continually crop up that must be resolved. Most of these are small ones with which your help is greatly desired - but this we will cover later.*

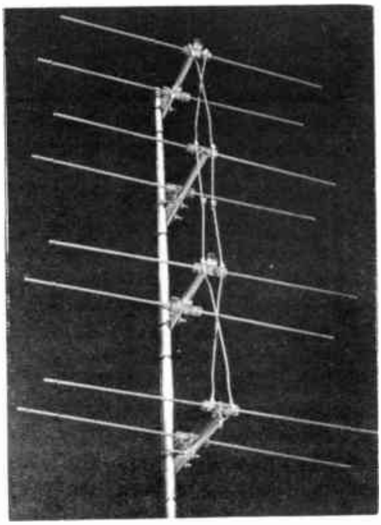
We are now mailing well over 2,000 copies out every month to readers through Third Class Mail. We pay 3¢ per copy by affixing a stamp to each. This is a very slow delivery-type mailing - we've found some readers reporting over three weeks between the time we mail the magazine and them actually getting it. So, we've applied for a Second Class Mailing Permit. This will mean you'll receive your copies within days of its mailing. We'll probably get it before the next issue. In the meantime, please bear with us. Thank you.

Now some of the things you can help us with: First there is the matter of change of address. If you have moved, or are planning to change QTH, please notify us immediately with your "old" and "new" address. We can process the change of address stencils the same day we hear from you. But, under the arrangements with the Post Office, your copies will not be forwarded to you. If you move without letting us know, you'll miss future issues.

Articles - Construction

This is another item wherein we depend solely on you, the reader. We need good construction articles on v.h.f. or u.h.f. gear, antennas, etc. This is something only you can provide. Everyone at one time or another has built a piece of original gear, or modified a known circuit - you hear 'em all the time on the air talking about it. Why not write it up for THE VHF AMATEUR? *For any magazine to suceed, it needs reader support. We are no exception to the rule. Your help would be most appreciated.*

— Bob Brown, K2ZSQ



NEW RELEASE

The trend toward new u.h.f. antennas has really taken a big step forward lately. More and more antenna manufacturers are dwelling on the production of new and better v.h.f. hardware. A typical example is Cush Craft.

They are now producing v.h.f. collinear arrays for 2, 220 and 432. These are light weight 16 element jobs that can be stacked for maximum gain. They feature a large capture area, high forward gain, high front to back ratio and other advantages such as mechanical balance, etc.

For 432 mc, the 16 element price is $9.85. 220 mc, $12.95. And 2 meters is only $16.00.

We suggest that if you are interested in these arrays you write immediately to

Cush Craft, 621 Hayward Street, Manchester, New Hampshire

VHF

The VHF Amateur is published monthly by Robert M. Brown, K2ZSQ, at 67 Russell Avenue, Rahway, New Jersey. Telephone: FUlton 1-1284. EDITOR: Robert M. Brown, K2ZSQ, 67 Russell Avenue, Rahway, New Jersey. OWNER: James Donald Brown, K2ZSP, 67 Russell Avenue, Rahway, New Jersey. Rates are: $2.00 a year. $3.50 two years, and $5.00 three years. Add $1.00 outside North America...Add $1.00 U.S. Air Mail...Add $2.00 overseas Air Mail. Opinions expressed herein are NOT necessarily those of the EDITOR, PUBLISHER, or OWNER. We do our best to present facts, but we assume no legal responsibility arising out of debts, royalties, etc. We reserve the right to discontinue publication at any time. If an error is made, we hasten to point out that all is experimental and we guarantee nothing. Write us if you wish to reprint anything contained herein, - permission will probably be granted. All published articles are rewarded with a one year subscription. *Display advertising rates are: $15.00 full page, ½ page $8.00, ¼ page $5.00. All art work is charged at cost, determined by extent of composition required.* DEADLINE IS THE 20th OF THE MONTH.

CLIMASTER ZEUS

The *ZEUS* is a high performance, completely self-contained VHF transmitter equipment designed primarily to cover the 6 meter and 2 meter amateur bands. The unit is housed in two separate enclosures, the larger of which houses all power supplies, audio driver stages and the Class B modulator system. All RF stages, VFO and audio gain controls as well as normal metering and operational switches are located on the attractive, compact, table top unit.

The unit features several circuit innovations in the VFO and modulator system design. Performance factors are unparalleled by any other available VHF equipment.

CHARACTERISTICS & SPECIFICATIONS

I. POWER RATINGS

a) AM 175 watts carrier input, 115 watts output.

b) CW 200 watts input, 130 watts output.

II. MODULATION

a) 95% negative with automatic feed back control of low level clipper, 120% positive peak with proper audio polarization.

III. FREQUENCY RANGE

a) Crystal control - 48.5 to 55 MC and 142 to 149 MC.

b) VFO control - 50.0 to 54.0 MC and 144 to 148 MC.

IV. VFO STABILITY (after 15 minute warmup)

a) 1 part in 10^6/°F/ hour.

b) 1 part in 10^7 per volt line change.

c) Less than 50 cycle keying chirp and FM component on 2 meters with normal line voltage regulation.

d) Reset accuracy better than 3000 cps at 144 MC.

V. TUBE AND SEMI-CONDUCTOR COMPLEMENT

a) RF: 6BK7-B, VFO/crystal oscillator...6AH6, Class A Buffer....6CL6, frequency multiplier...7558, frequency multiplier...7558, driver (straight through)... 7034/4X150, final power amplifier...6BX7-GT, clamp tube...8-4) and 6-3), VFO filament regulator.

b) MODULATOR: 12AX7, speech amplifier...12AU7, speech amplifier/cathode follower... 2-1N34A's, speech clipper...12AT7, phase inverter...6BX7-GT, direct coupled cathode follower driver...2-811A's, Class B modulators...6W4-GT, negative peak detector...6C4, modulation control tube.

c) POWER SUPPLY: 2-5R4-GY, high voltage power supply rectifiers...5U4-GB, low voltage power supply rectifier...16Y1, bias rectifier...OA2, regulator.

VI. PHYSICAL DETAILS

a) Table top RF/low level audio unit, 15" wide by 9" high by 9" deep. Weight 20 lbs

b) Dust cover enclosed modulator/power supply, 17" wide by 13" deep by 11" high overall. Weight approximately 80 lbs.

c) Normally supplied power cable permits separating units by 10 feet permitting remotely controlled operation of modulator/power supply. Extra lengths up to 50 feet can be furnished on special order.

CLIMASTER ZEUS: Amateur net price - completely wired and tested $559.00.

See your distributor or write for detailed brochure.

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