



# HAM HUM

Published by

AK-SAR-BEN RADIO CLUB, INC. - Omaha, Nebr. 68101  
Post Office Box 291 - Downtown Station



Vol. XVI  
No. 7

July 1966

## SPECIAL NOTICE TO ALL MEMBERS OF AK-SAR-BEN RADIO CLUB, INC., OMAHA, NEBRASKA

MEETING NIGHT CHANGED - from the second Friday to the THIRD FRIDAY this month - AUGUST 19, 1966

MEETING PLACE CHANGED - from the 4-H Building, Ak-Sar-Ben Field, Omaha, to HY-GAIN ELECTRONICS PLANT, LINCOLN, NEBRASKA

In traveling from Omaha to Lincoln, leave the Interstate at the Waverly turn-off. Follow old Highway #6 southwest (turn left) until you arrive at Hy-Gain Electronics (about two miles from the turn-off). You will see the plant on your left.

MEETING TIME: 8:00 P.M. at the Hy-Gain Plant

VISIT WILL INCLUDE A TOUR OF THE PLANT, COFFEE AND DOUGHNUTS. HY-GAIN ENGINEERS WILL BE ON HAND TO ANSWER TECHNICAL QUESTIONS REGARDING ANTENNAS.

If you do not have a way to get there, please send a card at once to AK-SAR-BEN RADIO CLUB, INC., P. O. BOX 291, DOWNTOWN STATION, OMAHA, NEBRASKA 68101 and we will attempt to arrange transportation for you.

As we will all be going to Lincoln about the same time we suggest you turn on your mobile rig and use perhaps 3980 kc, 7220 kc or 50.4 mc.

Guests will be most welcome. Bring your CB friends. They are interested in antennas too.

**HAM HUM** is the official organ of the Ak-Sar-Ben Radio Club, Inc., of Omaha, Nebraska, mailed monthly to all members and to others upon request.



Published by  
AK-SAR-BEN RADIO CLUB, INC.  
Post Office Box 291  
Omaha 1, Nebraska  
Editor: Dick Eilers, WØYZV  
Phone HOME: 391-2255  
BUSINESS: 342-1402 - EX. 317  
Associate Editor: John Snyder, WØWI  
Phone HOME: 556-1538  
BUSINESS: 551-0669 - EX. 317

## FIELD DAY - 1966

The Ak-Sar-Ben Radio Club set up for "Field Day" on a site loaned to us by Boys Town. This site was on Chapel Hill Road near the end of Pacific Street. Everything went fairly good this field day and we were sure glad we were in a building and trucks, as there were some fairly strong winds and about one inch of rain.

We operated three transmitters. One on 20 meters that made 318 contacts for 1908 points. One on 75-40 meters that made 231 contacts for 1386 points. One on 6 meters that made 257 contacts for 1542 points. We also qualify for the Spirit of Field Day bonus of 500 points for a point total of 5,336.

We wish to thank the following for equipment loans.

- 1 Truck from Jay McAleer  
WAØLLQ
- 1 Truck from John Bruckner  
WAØMRH
- 1 Truck from General Communications
- 2 Galaxies from World Radio Labs.

1 Thor 6 from Bud Smith,  
WAØICK (ours quit that morning)

1 Tower and 1 Generator from  
Dick Eilers, WØYZV

Smaller pieces of equipment were also borrowed from other people.

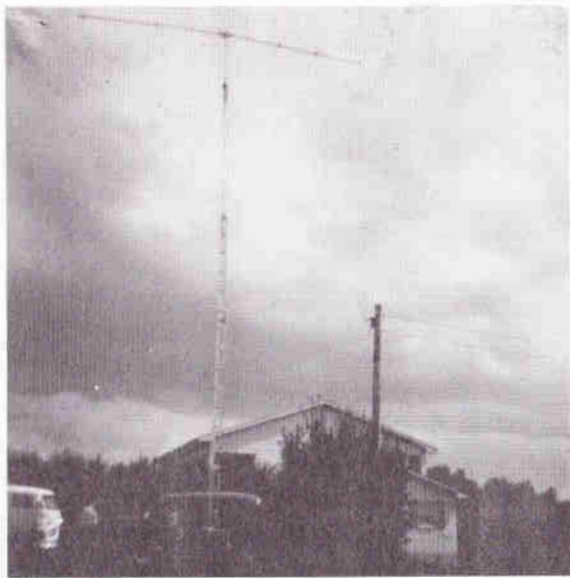
Many thanks to Ed Donze, WØYEV, who took charge of 20 meters, to Fred Fischer, WØEGP who took charge of 75-40 meters, to Bud Smith, WAØICK who took charge of 6 meters.

One of the greatest contributions to the success and enjoyment of field day was the eats and drinks. Harold McClenahan, WAØDGA assisted by his XYL Eva, did an excellent job of feeding the operating crew. There were plenty of eats and drinks at all times.

The only disappointment in the field day operation was that more of the club members did not actively participate in the activities as I know they would have enjoyed it too.

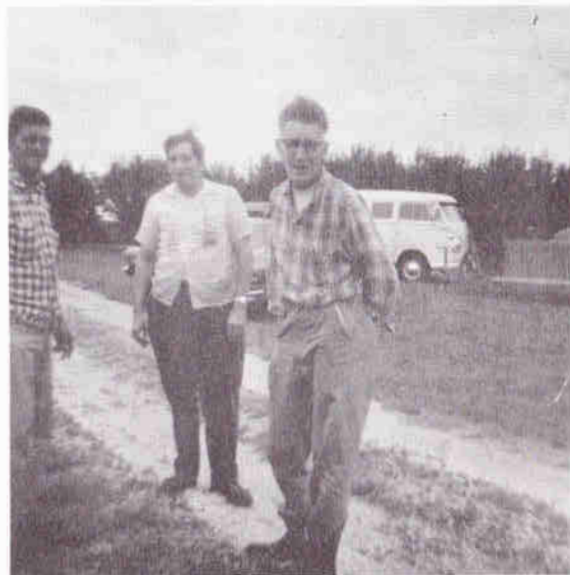
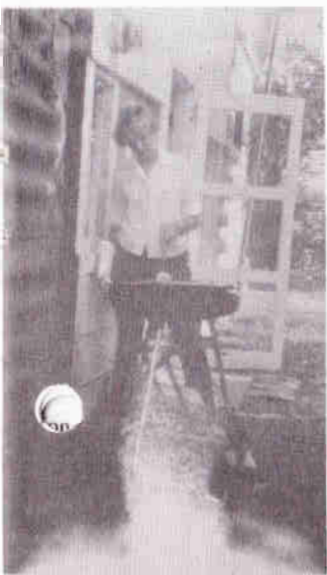
Royce E. Johnson, WAØKIL  
Field Day Chairman

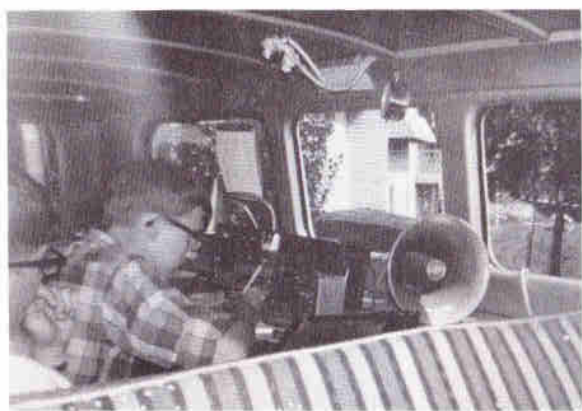
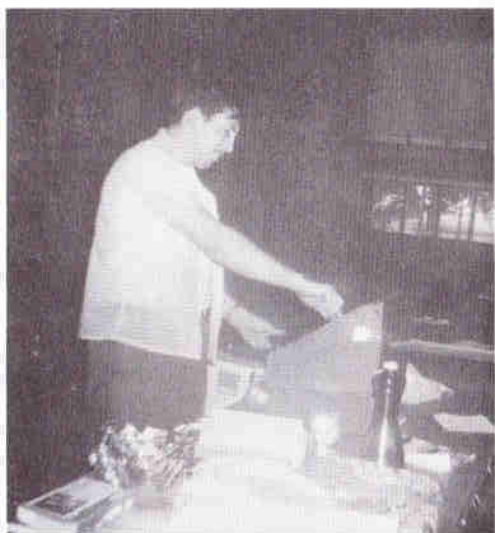
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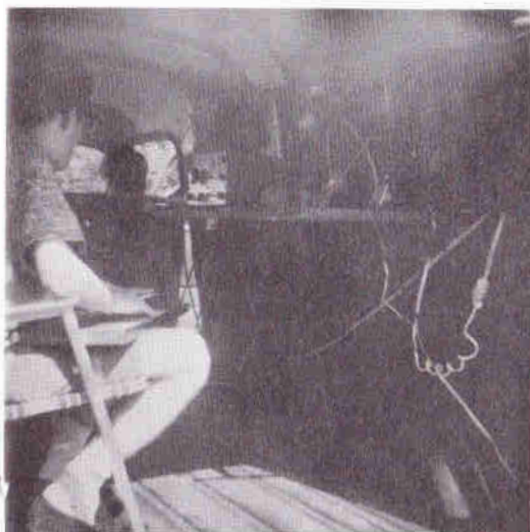


## FIELD DAY PHOTOS

by Eva MacClenahan, XYL of WA0DGA



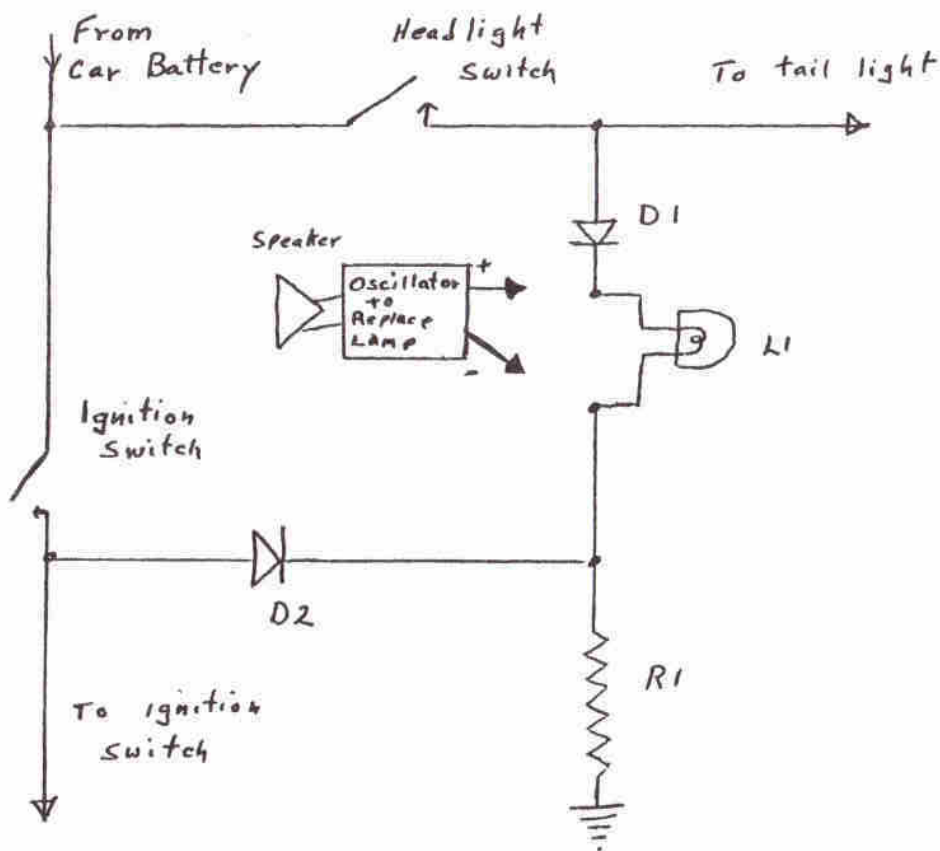




## A TWO-EVENING PROJECT

Did you ever leave your car lights on in the parking lot? There is no need to have it happen with an alarm system. Several types of alarm systems can be put together. The figure shows the most simple arrangement.

It works like this. With the head lights or parking lights on, the tail light lead will have positive 12 volts on it. This will flow through diode D1 to light lamp L1 and on through resistance R1 to ground. The lamp is a 6 volt lamp. The remainder of



D1 Any common diode large enough to pass the current of L1 or the oscillator used in its place.

D2 Able to pass about twice the current of D1.

R1 The same resistance of the lamp or oscillator.  
If L1 is a #47 pilot lamp use a resistance of 47 ohms.  
Adjust for other circuits arrangements.

the 12 volts is dropped across resistance R1. The point to keep in mind is that the junction between the lamp and resistance is 6 volts above ground. When the ignition switch is turned on, positive 12 volts flows through diode D2 and on through resistance R1 to ground. This will place positive 12 volts at the junction of the lamp and resistance and since there is now positive 12 volts on both sides of the lamp it will not light.

With the ignition on, the lamp does not light regardless of the tail light circuit condition. The lamp only lights when the ignition switch is off and the light switch is on.

The diodes keep the tail light circuit from affecting the ignition circuit and vice versa.

A 6 volt buzzer may be used in place of the lamp. Use ohms law to determine the value of resistance R1. Of course the diodes must be able to pass the necessary current. Diode D2 passes about twice the current of diode D1.

A novel project is in store for those of you who are sold on solid state. Just replace the lamp with an oscillator circuit and a miniature speaker. Adjust the resistance R1 for optimum results and choose diodes to handle the current, which will be very small.

I used the code practice oscillator circuit in the ARRL handbook. Add an output transformer and 2-inch speaker. The ready-made 98 cent oscillator from W.R.L. should work quite well and only a speaker is needed. It is part number "Cordover CPO-4". My circuit is mounted in a small 2 by 2 by 1 3/4 inch open-type

box which mounts under the dash with one screw. The single screw supplies the necessary ground lead. Two wires emerge from the box and are connected to the ignition switch and head light switch. A common pin and a voltmeter can be used to probe for the proper wire under the dash. A lead to the taillights was used in preference to the headlights since the taillights are on whenever the headlights are on. This also gives protection against leaving just the taillights on.

John W. Orr, WØPHW

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WANTED: RTTY receiving converter.  
WØYZV 391-2255

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### JULY MEETING

Three films were shown at the meeting on July 8th. The first was entitled "The Oscilloscope, How It Works." It was a good basic technical film from the library of the Northwestern Bell Telephone Company. From the same library was a film entitled "The Breath Of Life." It was a color film describing the fundamentals of mouth to mouth rescue breathing. The film was timely as this is the swimming season.

The third film called "The Square Wave" was an excellent technical film, courtesy of Textronic, Inc. It described the composition of the square wave and its application in circuit testing.

Our thanks to John Orr, WØPHW, for arranging for the films.

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Royce Johnson, WAØKIL, won the attendance drawing at the July meeting. It was \$8.00.

\*\*\*\*\*

July 4, 1966

Dear Dick:

I have managed to work 208 countries on SSB with 190 confirmed during last 14 months. Also WAZ on SSB so doing o.k. considering lack of time and a lousy radio QTH. I am actually down in a valley surrounded by hills, but seem to punch out fairly well... Running Collins S Line with 30S-1 and also have Galaxy V with Galaxy Linear..nice little K.W. Using Xmas tree Telrex arrays just as I had in Omaha except they are on a 71-foot Tri-ex motorized tower. A real F.B. system if it was up on one of the Penn. Mountains!

Business-wise---since becoming President of our company I spend most of my time in jets flying all over the USA...so little time for much else...

Ham-Hum still FB. Keep it coming...here is check to cover your efforts...please excuse long time in complying but just don't get around with my personal ham duties as well as I should...Regards and best to all...see you on the air soon...

73 es etc.  
Frank, K3MVP  
EX WØIOS  
8258 Brittany Place  
Pittsburgh, Pa. 15237  
\*\*\*\*\*

**FOR SALE**

- Heath HR-10 - - - - - \$40.00
- Heath DX-60A - - - - - 40.00
- Code Course Record - - - 4.00
- Suprex Headphones - - - - 3.00

Call 393-0564  
Bill Fries, WNØMNO  
\*\*\*\*\*

June 27, 1966

Field Day at Swanson Lake, southwest of Trenton, Nebr.

Hi:

A fine group of enthusiastic Hams, young and old, took [ ] and no records were broken, <sup>up</sup> but next time---

Of interest to all Hams is the rehash of experience and the conclusions to be drawn for guidance in preparation for next time. First off about the gear. Take time now to package a tested portable antenna system, including poles; put it up and take it down, after a test run, several times, just to make certain you do have an antenna system that is good enough to take with you. As a suggestion, in this country it will be adequate to have the antenna about ten feet off the ground, out of the way of people stumbling into it, yet not too difficult to provide poles for installation. The choice of antennae is up to you, but for emergency consider the long wire, then the dipole, then the vertical.

Second, and really most important, the transmitter and receiver should be a matched set; a unit that is complete with relays, cabling, etc. that you can and have set up at home, tested, took apart, boxed, then reset up and tested a few times. The idea of someone bringing an antenna, another a transmitter, another a receiver, another an antenna coupler, etc., then trying to assemble them at the FD site, just adds to the confusion. Have a complete station.



Third: Operating stations should be spaced as far apart as possible, and antennae also, headphones for both the operator and the logger, or relief operator at each station.

CW ok on all bands, AM fone, ok on higher bands, mobiles, ok, especially if you have a 115 v. converter so you can operate portable. Above all, take time this summer to pretend it is FD and make a few practice runs.

WAØFDW, Skee, pounding away at CW late at nite, looked up to find an interested visitor; a skunk came in and helped out by picking up the bugs that had been attracted to the lite, then very politely went away. WAØCBJ, Ed, seemed to have an inexhaustible source of "Just what you need articles," when something was needed to add on, splice, or test.

We did not make so many contacts, but we sure had a good turnout, a good time, and shared a lot of experiences that will, we hope, help us provide public service during a real emergency, with greater efficiency.

73,

Dayton L. Phifer

WØVEA

\*\*\*\*\*

**OFFICIAL BULLETIN NR 67 FROM  
ARRL HEADQUARTERS NEWING-  
TON CONN JUNE 30 1966 TO ALL  
RADIO AMATEURS BT**

A reciprocal operating agreement is now effective between India and the United States. Amateurs of one

country visiting or residing in the other may obtain permission to operate their own amateur stations there. The United States has previously reached reciprocal agreements with Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, the Dominican Republic, Ecuador, France, Israel, Luxembourg, Paraguay, Peru, Portugal, Sierra Leone and the United Kingdom. Many others are being negotiated and successes will be announced as they occur AR

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July 12, 1966

Hello Gang:

Got Ham Hum OK and a very good issue. Just wanted to let the Omaha and Council Bluffs bunch know I got a new call now. It is W6EHJ. Will be looking for the home gang around 14260-14289.

73,

Orin Miller, W6EHJ

(Ex-WØSEE)

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**OFFICIAL BULLETIN NR 68 FROM  
ARRL HEADQUARTERS NEWING-  
TON CONN JULY 7 1966 TO ALL  
RADIO AMATEURS BT**

The ARRL QSL Bureau aids delivery of QSL cards to amateurs in the United States, its possessions, Puerto Rico and Canada from other parts of the world. Amateurs expecting QSL cards from DX stations should be sure to have stamped, self-addressed envelopes, of standard large letter size, on file with the appropriate call area QSL bureau. See page 156, July QST, for bureau addresses and further information AR

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## PART II

### ABOUT ANTENNAE

written for CROSSTALK by Jim Peck, W2LVW

Now that we have gotten over the hurdle of DB and power gain/loss without losing too many of you, I hope, let's continue with this talk about antenna gain, which is what we all are so much interested in. How do we get antenna gain? Well, there are only two approaches to antenna gain:

1. Increase or multiply the power or intensity in the antenna so that the antenna radiates the same pattern shape with greater intensity. (Remember my thoughts about the economics of amateur radio? This is the hard and expensive way.)

2. Change the shape or pattern. Since we don't need radiation in all directions at all times, we can increase the intensity by changing the shape of the pattern to put the radiation in the direction we want when we want it.

Basically this is done by using an antenna which utilizes the same amount of power; but now the pattern will be shaped to give us the desired directivity, the same as a water sprinkler we use on our lawns. (How come we can do it on a lawn, but can't do it with antennas?) There is so much water coming out of a given hose. If we apply the hose to a rotating sprinkler, we distribute water in a given circle. If we change the head of the sprinkler, we cover a different

amount of area with the same amount of water still coming out of the hose. So, how do we get more gain out of an antenna? Well, remember that fat donut we were talking about? Well, now comes the time for us to start flattening it out a bit. Just look back at the drawing and try to imagine what would happen if you put the palm of your hand on the donut and squash down on it? Well, if this was your radiation pattern, you would increase your range. Well, we can't go up the tower and squash down on our antenna, so we have to have a solution other than that one.

To get antenna gain for amateur use, we will skip over the vertical type of antennas and use horizontal antennas, as this is the type mostly used by amateurs. We first have to use a couple of new words here... "in phase and out of phase." Well, about all we have to know about this is that if you stuck two half-wave dipoles out of your window and fed the same amount of power to each one of them using the same amount of line to each antenna, then the signals leaving the antennas would leave at the same point in time and arrive at a friend's house at the same point in time and this would be in phase. These two in phase signals would, in effect, give him a stronger signal at his

receiver and give you an apparent gain. Now anything else not being equal, meaning if one of the cables was longer or shorter, or anything else effecting the timing of the signal, would be considered as being out of phase and at the other fellow's hamshack he would get the difference between the two signals, and this would be less than optimum. Keeping this in mind, and also keeping in mind the fact that in order to change from the vertical to the horizontal radiation pattern all you have to do is mount the antenna in the desired position, an explanation will be attempted as to how gain is derived from antennas. Remember that antenna gain cannot be generated by the use of additional power or anything like this; we have to squash down on the donut.

We should remember that a vertical half-wave dipole has a circular pattern in the horizontal direction. If we place it in front of a screen, wire mesh, or something similar, then we could no longer radiate in the direction to the rear. This also means that the pattern is no longer circular. We know from theory and experiment that when the half-wave dipole is spaced one-quarter-wave length ahead of this screen or mesh, the radiation which was going to the rear will now be in phase with the radiation going out to the front, and as it is in phase it is actually reinforcing this radiation and at the same time forming a lobe at the front, which is called a directional lobe...hence a directional

antenna. Remember also, if this half-wave dipole is placed in a horizontal direction, the same rules apply. Now we will replace the screen or mesh with an element similar to the one we are using for the dipole, and we now have a two-element beam. We can now say that we have decreased the beamwidth of the antenna or increased the gain of the dipole antenna.

The Yagi Antenna: Perhaps the most widely-used directional gain antenna used by amateurs is the Yagi. It has many forms and variations, but generally consists of at least two and usually three to five elements. Each additional element puts a little more of a squeeze on the donut and flattens the pattern out a bit more giving a little bit more gain, directivity, etc. Instead of adding elements at the rear, when we go the three-element Yagi, we start putting one in front of the dipole. This is like adding a lens to a flashlight. It focuses the beam pattern and conversely the gain of the antenna. Elements at the front of the dipole are called directors, while the elements at the rear of the dipole are called reflectors, and, at this time, the dipole itself acquires the name of the driven element.

The question now may be raised, how many elements? To increase the gain of a three-element Yagi, we can add additional directors in front of the first one, but there is a limit from the practical standpoint. In order to increase the gain of an antenna by 3 db (remember this means to double

the apparent power output), we have to add directors of the proper size and overall length and spacing which effectively double the length of the antenna. This obviously imposes quite a problem at certain frequencies (recall the chart) and restricts the amount of gain we can practically achieve. Adding additional elements also makes the band width and beam pattern so sharp that other deficiencies become apparent. So, an overall judgement must finally be made by the amateur as to just what he wants to accomplish with his antenna. Another method used to increase the directivity and gain of an antenna is to stack arrays. We will not go into this except to mention it here. You must keep in mind that for every 3 db gain you want, you will practically double the set-up which you now have.

Deviating slightly, but still

remaining on antennas, Figure 1 is a chart of circuit analysis equivalents which has been in my possession for a number of years and is not readily available at one time and in any one place. This applies primarily to transmission line<sup>11</sup> but can also be applied to antennas. The explanation is for one cycle, but you must keep in mind that what applies to one cycle applies to all other cycles. The conditions shown will explain the presence of currents or voltages at any given point on an antenna or a transmission line at any given point at any time and also whether the circuit is capacitive, inductive, or resistive at any given point at any given time. This applies to any frequency, but becomes more apparent the higher you go in frequency.

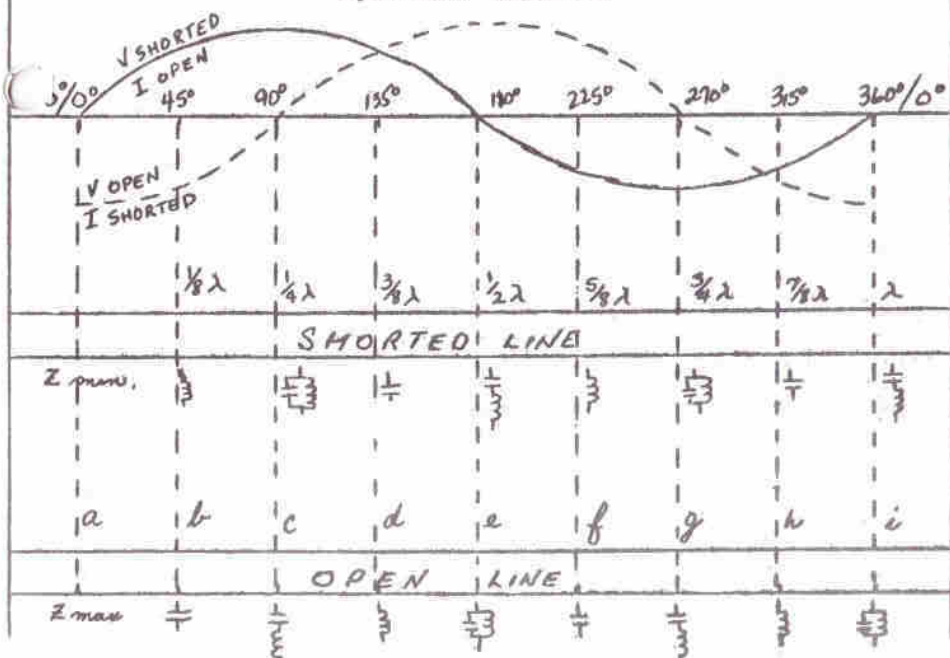
Here are a few examples on how to make use of it...

Assume we have:

	THEN ON THE SHORTED LINE WE WOULD HAVE	ON OPEN LINE
Condition "A"		
Zero degrees	1. Minimum impedance 2. Minimum voltage	1. Maximum impedance 2. Maximum voltage
Zero wavelength	3. Maximum Current	3. Minimum Current
Condition "B"		
45 degrees	1. Voltage and current are nearly equal 2. Impedance is of intermediate value.	1&2. Same as for shorted line but of opposite phase
1/8 wavelength	3. Circuit behaves like a pure inductance.	3. Circuit behaves like a pure capacitance.
Condition "C"		
90 degrees	1. Maximum impedance 2. Maximum voltage 3. Minimum current	1. Minimum impedance 2. Minimum voltage 3. Maximum current
1/4 wavelength	4. Circuit behaves like a parallel resonant circuit of capacitance shunted by inductance.	4. The circuit behaves like a series resonant circuit comprising a capacitance in series with an inductance.

FIGURE #1

I EQUIVALENT CIRCUITS



It must be mentioned that this entire treatise was initiated in order to clarify a lot of points we have heard discussed on the air, from the one where a fellow in the club felt that the higher his SWR, the better his operation was, and we just couldn't convince him of anything else. There is no magic incantation or chant which

can be used to improve your transmission and/or reception. There are no signal intensifiers or wave concentrators, etc. on the market at the moment...so, this article was attempted in order to try to show the only proven way to better reports both ways on the amateur bands.

de Crosstalk

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OFFICIAL BULLETIN NR 69 FROM ARRL HEADQUARTERS  
NEWINGTON CONN JULY 14 1966 TO ALL RADIO AMATEURS BT

The Federal Communications Commission has adopted without change its proposal in Docket 16420 which makes the RACES service

permanent. The text of the rules as now worded appears on page 41 of QST for March 1966 AR

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## BOYS TOWN FIELD DAY

On the weekend of June 25 and 26, the Boys Town Radio Club held its first field day. All of the members went up to the shack after school Friday afternoon and we loaded up all the equipment onto a panel truck and hauled it all up to the Boys Town Tree Nursery, where the field day was to be held. We had a 3,000 watt generator on loan from the boiler room and it gave us smooth and trouble-free operation during the whole time. We set up the Novice Station, but they did not compete in the field day. We just set up their set so they could get some practice on their code and operating procedure.

Then we set up the General station with the help of Fred Fischer, Royce Johnson and John Snyder. We used our Galaxy V transceiver and TH-3 beam from HY-GAIN. We had the beam mounted on a 20 foot pipe and put on a rotor that was given to us by John Snyder for field day use. It was the first time we had used the beam and it got out pretty good. We were running about 300 watts of power.

We cooked our own food over an open fire and we had cots and tents set up. We had a pretty good menu - Hamburger at breakfast, Hamburger at lunch and Hamburger at dinner. Pat made some Irish Stew and it tasted pretty good.

We had everything set up by Friday night, so everyone went about their own business. Some of the guys did a little broadcasting,

some explored the tree nursery, and the others slept or sat around the fire talking. The night went slow, but the sun finally came up and we were ready for the field day to start. Then at 3:00 Paul Lambrie took over the rig for two hours and then came Bernard Meyer and last was Bernard Stacy. All the generals competed between themselves for the most contacts. All together we got a total of 247 contacts. Bernard Meyer got the most contacts and he also got a free steak dinner. Bernard got 109 contacts. Paul Lambrie was second with 91 contacts and last was Bernard Stacy with 47 contacts.

We had a great time and some of the Junior and Sophomore members are already planning for the next year's field day.

We would like to thank the members of the Ak-Sar-Ben Radio Club who came out and helped us with the equipment and those who helped to organize the field day.

de Shack Yak

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### OFFICIAL BULLETIN NR 70 FROM ARRL HEADQUARTERS NEWINGTON CONN JULY 21 1966 TO ALL RADIO AMATEURS BT

A reciprocal operating agreement is now effective between Germany and the United States. Amateurs of one country visiting or residing in the other may obtain permission to operate their own amateur stations there. The United States has previously reached reciprocal agreements with Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, the Dominican Republic, Ecuador, France, India, Israel, Luxembourg, Paraguay, Peru, Portugal, Sierra Leone and the United Kingdom. Many others are being negotiated and successes will be announced as they occur AR

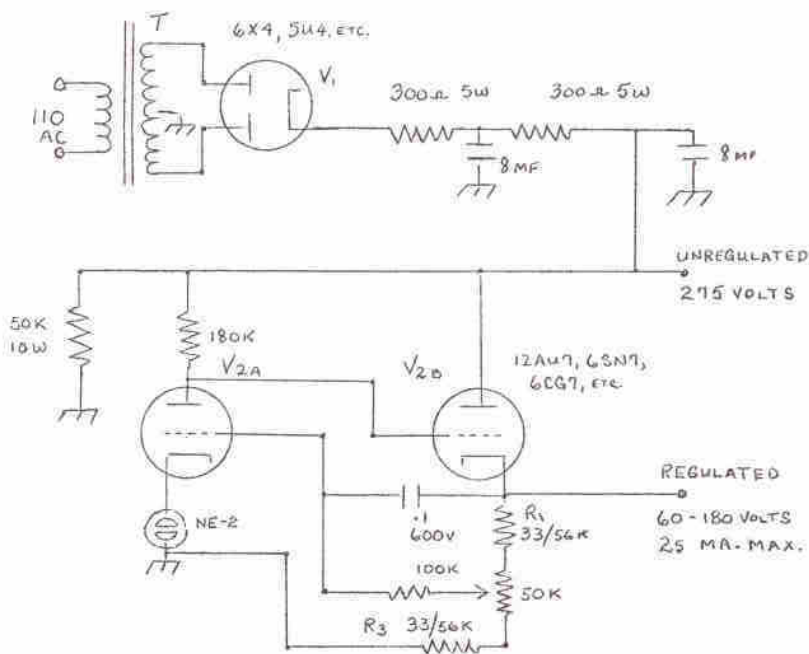
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## A REGULATED POWER SUPPLY

NOTES: Unregulated B plus to V2 should be a minimum of 100 volts higher than the maximum regulated voltage required. Output voltage can be changed with 50 k pot in cathode of V2b; R1 and R3 should be selected to give desired range of adjustment on this pot. Additional V2's can be used for greater current. NE-2 firing voltage limits the obtainable variation in

output voltage. V1 can be a 6X4, 5U4, 5R4 or silicon diodes can be used. T should be capable of delivering between 250 and 350 volts each side of center tap. The power supply is suitable for powering transmitter oscillators, VHF converters or as a screen supply for some of the popular tubes used in small transmitters. (6146's, 6L6's etc.)

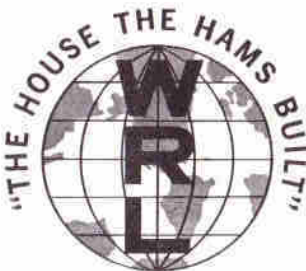
from SPREADBAND, W0JKQ ed



### OFFICIAL BULLETIN NR 71 FROM ARRL HEADQUARTERS NEWINGTON CONN JULY 28 1966 TO ALL RADIO AMATEURS BT

The Federal Communications Commission has modernized its Novice examination and consequently has released eight additional questions for study by prospective Novices. ARRL has prepared question and answer sheets on this supplemental information, available upon request from ARRL, 225 Main Street, Newington, Connecticut 06111. Please enclose a stamped, self-addressed envelope with your request. The material will also appear in the September issue of QST AR

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**WORLD RADIO LABORATORIES**

DEPT. QST

3415 WEST BROADWAY, COUNCIL BLUFFS, IOWA / 51504

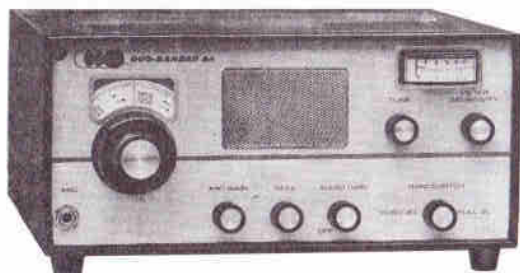
- Ship Special Package ZZM088 — \$199.95
- Ship Duo-Bander 84 — \$159.95
- Send Information on other Duo-Bander Packages
- Quote attached Trade
- Send Free 1966 Catalog
- Check or money order enclosed F.O.B. Council Bluffs, Iowa

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City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**INTRODUCING WRL'S SENSATIONAL COMPACT 300 WATT DUO-BANDER 84 FOR IDEAL SSB TRANSCEIVING ON 80 AND 40 METERS**



**INTRODUCTORY OFFER UNTIL MAY 10TH**

**\$159<sup>95</sup>**  
\$8.00 MONTHLY

**WIRED**

**NOT A KIT! THE PERFECT FIRST OR SECOND — MOBILE OR FIXED STATION — TWO BAND TRANSCEIVER**

**COMPACT — 80-40 METER SSB TRANSCEIVER. A LOW COST RIG — WITHOUT SACRIFICE OF POWER AND PERFORMANCE. INCLUDES BUILT-IN SPEAKER AND GIMBAL MOUNT! E-Z TUNING WITH BANDPASS EXCITER DESIGN — JUST PEAK OUTPUT FOR SMALL QSY. Illuminated VFO dial with 2 kc calibration. High impedance mic. input with push-to-talk operation. Combination S-Meter/Output indicator. Smooth vernier (12:1 slow and 2:1 fast) VFO tuning.**

300 Watts PEP-SSB input, covering 3.8-4.0 and 7.1-7.3 mcs. (LSB-80 and 40 meters). A pair of proven 6HF5 final tubes. Separate, relay switched, tuned RF receiving stage, 1/2 uv. sensitivity at 10DB S/N. Rugged printed circuit boards, combination tube-transistor circuitry for best performance. Stable solid state VFO and balanced modulator, zener regulated. Selectivity 2.5 kc @ - 6DB receiving and transmitting with a 4 crystal filter. Carrier and unwanted sideband suppression - 40DB. 1 watt of audio with built-in speaker. Fixed 50 ohm input/output impedance. Excellent AVC. COMPACT SIZE: 5" high, 11 1/4" wide, 10" deep, less power supply. Net weight 10 3/4 lbs. Shipping weight 15 lbs.

DUO-BANDER 84 .....	\$8.00 monthly .....	\$159.95
AC48 .....	250 Watt (115 VAC) Economy Supply .....	\$ 49.95
AC384 .....	300 Watt (115 VAC) Deluxe Supply .....	\$ 79.95
DC384 .....	300 Watt (12 VDC) Deluxe Supply .....	\$ 89.95

**SPECIAL**

**FIXED STATION PACKAGE**  
(INCLUDES DUO-BANDER 84 AND AC 48 SUPPLY)

**\$199.95**  
**\$10.00 Monthly**  
Order Package  
**ZZM088**

**WRITE FOR OTHER PACKAGE INFORMATION**