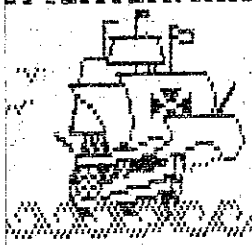
BI-CENTENNIAL.



# THE PROPAGATOR

BI-CENTENNIAL.

## ILLAWARRA AMATEUR RADIO.SOC.INC.

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO. SOC. INC.
VOLUME - 88 , NUMBER : 6 JULY 1988.
REGISTERED BY AUSTRALIA POST PUBLICATION NUMBER : NBH - 1491.

MEETINGS ARE HELD ON THE SECOND TUESDAY OF EACH MONTH , (EXCEPT JANUARY) AT 7.30.PM. AT THE STATE EMERGENCY SERVICES , BUILDING , IN MONTAGUE STREET , NORTH WOLLONGONG . VISITORS ARE MOST WELCOME TO ATTEND THE MEETING'S .

## VI88NSW

CONDITIONS OF USE:-

With 5,000 Amateurs in VK it is desirable that the special call is available to as many as possible. To do this it has been decided to make the call available - one week at a time - to the various Clubs who apply to be placed on the roster.

Most Clubs will now have received a request form for them to request preferred and alternate time slots.

Once your time slot has been confirmed you should draw up a roster of Club members and amateurs from your area who wish to take part. To get maximum use it should be rostered, a few hours at a time, to an operator, taking into account when they use it - e.g. someone home during the day should have it then to allow someone at work to have it in the evening.

Similarly when someone is only going to use it on 80 metres, then someone else could use it on VHF in the same time slot. Use on DX bands has to be programmed to times when they are likely to be open. The main thing to watch is that the call must not appear more than once on the same band at the same time. No changing bands from that applied for if you find it dead, someone else may be on the other band. All timing is done in UTC or Greenwich time, and logs must use this time. During daylight saving the change is at 11 a.m. local or 10 a.m. once we return to Eastern Standard time. To share the call round it is available one week at a time to Club groups - Monday to Sunday inclusive Universal time (11 a.m. Monday change). Advance registration is required via the VK2 Divisional office.

The Club callsign co-ordinator is to supervise the roster, collect the logs, and arrange the widest range of use. Don't forget to include operation for Full, Novice & Limited operators as well as DX stations. Cover the widest practical range of modes. After a while the locals will have worked VI88NSW on most modes and/or bands, and may lose interest. Hopefully the overseas DX will remain to provide contacts. With 8 other VI88--- stations

CONTINUED PAGE 5

# SEMI CONDUCTOR THEORY PART2

This month we will briefly look at IV characteristics.

Semiconductor behaviour when applied to a circuit can be described by a graph of the relation between the voltage across the device and the current through it.

Such a graph is called the IV characteristic. The general shape of the characteristic curve for either a germanium or a silicon pn junction diode is shown in fig 2.

The current and voltage values will only be slightly different for the two semiconductor materials. This slight difference might be exxpected, since more energy is required to break a covalent bond in silicon than in germanium.

But the reverse saturation current for germanium is greater than for silicon. Where as about 0.1v forward bias is necessary to achieve a forward current of 1ma through a germanium junction of certain area, about 0.7v is needed to achieve the same forward current in a silicon junction of the same area.

To better understand the idea of diode action, consider the circuit inn fig 1 (Refer June Propagator). If the battery is adjusted to 0v, we find that there is zero current in the diode. As we increase the battery voltage, current begins to flow in the diode.

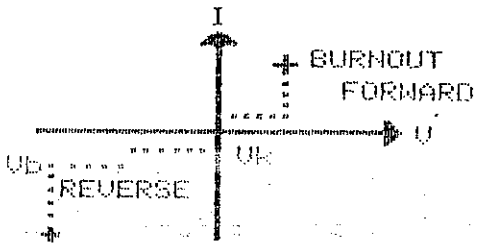
The current will increase slowly at first, but as we increase the battery voltage, the current increases significantly. In other words, when the battery voltage is large enough to overcome the barrier potential, current flows easily.

Fig 2 illustrates the current voltage relation. The voltage Vk is called the KNEE VOLTAGE and simply refers to the approximate voltage above which the diode current increases sharply.

There is of course, a limit to the amount of current that the diode can pass without burning out. When we increase the voltage well beyond the knee voltage, we eventually reach a burnout current.

The reason for this is that the diode has a maximum power dissipation. For example, our diode in fig 1 has a maximum power rating of 1 watt. When the product of voltage and current exceeds 1 watt, the diode burns out.

If we reverse the battery in fig 1 and increase the voltage, we find that very little current flows. If enough reverse voltage is applied to the diode, current begins to




BURNOUT

increase sharply. The approximate voltage where this happens is called the BREAKDOWN VOLTAGE Vb of the diode.

If we continue to increase the battery voltage, more current flows until eventually we reach a value of current that burns out the diode. Once again, this burnout is caused by exceeding the diodes maximum power rating. For example, if the diode has a power rating of 0.5 watt and it breaks down at 100v, the maximum current is I=P/V=0.5/100=0.005 or 5ma.

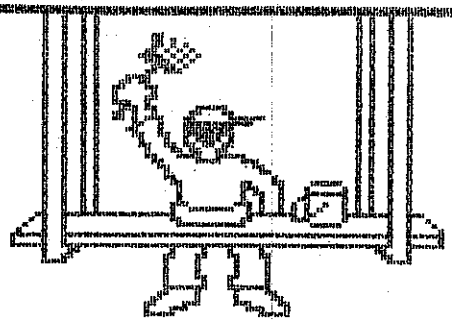
The breakdown phenomenon in a semiconductor diode is caused by either of two effects, Zener or Avalanche.

We will continue with diode circuit analysis next month as time did not permit completion of the article this month..

73's PETER VK2KHE.

# JULY 12th 1988 Annual General Meeting 1988-89.

## << ELECTIONS >>



## ON THE NET

15th May 1988.

VK2KGI-DAVE, CO-ORDINATOR, VK2MT-ROB, VK2EBI-KEVIN, VK2EMV-MORRY.....

29th May 1988.

VK2EBI-KEVIN,Coordinator VK2MT-ROB, VK2BIT-PETER, VK2KGI-DAVE, VK2DMR-DENIS, AX2DFL-DAVE , VK2EMV - MORRY.....

5th June.1988.

VK2MT-ROB, Co-ordinator, VK3AJS-DARREL, VK2EBI-KEVIN, VK2KGI-DAVE, VK2PHD-RAY, AX2DFL-DAVE, VK2EMV-MORRY.....

12th June 1988.

VK2EMV-MORRY,Co-ordinat, VK2MT-ROB, VK2PHD-RAY, VK2EBI-KEVIN .....

19th June 1988.

VK2KGI-DAVE,Co-ordinator VK2EMV-MORRY, AX2DFL-DAVE.....

## FOR SALE

BLACK POLYCORD 3.mm DIA. MOISTURE & U.V.L. RESISTANT. GOOD FOR GUYS & HALYARDS FOR VERTICALS, INVERTED VEES & DIPOLES.NOT AVAILABLE LOCALLY AT HARDWARE SHOPS.... LIMITED QUANTITY AND A BARGAIN AT 10M FOR $1 or 100M for $8 PLS PHONE JOHN, VK2FCW ON : 28-9158.....

## WANTED

A COAX-RELAY 12.Volt D.C WITH DIRECT CONNECTION TO RG-58 COAX-CABLE . (Not with coax sockets) Please contact LYLE VK2ALU on 146.850 or on 438.225 or you Phone on (042) 29-6984. or you contact Lyle at the next Meeting.....

Tnx VK2ALU Lyle....

## TRUCK SHOW

On Fathers Day 4/9/88 there will be a truck show at Shellharbour Workers Club. John VK2XGJ feels that this is an oppertunity to put Ham Radio on display to the large attendance Expected. Members interested in taking part in a display should contact John VK2XGJ on 146.850. or leave a message on his BBS on 147.575. on packet..

F.R.L.4. WINNERS.

Week No: 16 M. Keech.
Week No: 17 J. Simon.
Week No: 18 N. Blayney.
Week No: 19 V. Hee.
Week No: 20 D. Routledge

Also for the ones that missed out in the last lotto . You can put your name down for the next one at the meeting . Be in it to win it.....

# vertical extended double zepp for 2 metres

**Derived from the old long wire Zepp antenna, the VEDZ cut for two metres becomes an antenna of manageable proportions with a number of useful features.**

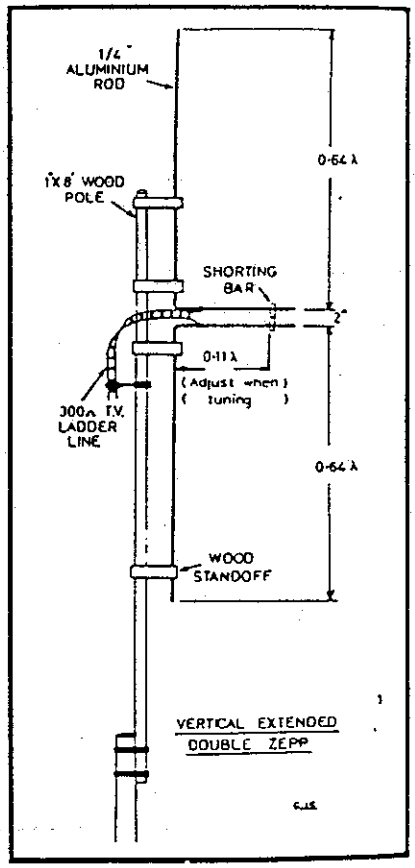
The VEDZ gives a very low angle of radiation, requires no ground plane, is not critical to adjust and needs only an SWR meter to set up on frequency. The antenna can be fed with 300 ohm TV ladder line giving a cost saving over expensive co-ax.

The Zepp antenna is basically an end fed ½ wave wire. Adding another ½ wavelength and feeding at the centre gives the Double Zepp. Extending the arms of the antenna to 0.64 wavelength causes all the radiation to take place at 90 degrees to the axis of the antenna. Used as a vertical the radiation is omnidirectional and at a very low angle. Extending the antenna further is not recommended, as the radiation pattern breaks up into four lobes as the dimensions tend towards 1½ wavelengths.

The VEDZ, being 1.28 wavelengths over all, is not resonant and presents a high capacitive reactance at the feed point. To bring the antenna to resonance, inductance must be added to tune out the capacitance at the feed point.

This is done by using a shorted stub less than ¼ wavelength long. This stub will provide the required inductance as well as acting as a matching transformer for the feedline. The stub length works out at 0.11 wavelength. If you add it all up, the stub brings the total length of the antenna to a resonant 1.5 wavelengths (0.64 + 0.64 + 0.11 + 0.11).

The radiation pattern remains the same as for 1.28 wavelengths (which we want) as the stub does not radiate.




**CONSTRUCTION**

The antenna is constructed from ¼ inch aluminium rod and is mounted on a well painted (to keep out moisture) wooden pole. Wood or preferably ceramic stand off insulators are used. The aluminium rod is cut and bent to the dimensions as shown in the diagram. Cut the rod forming the stub longer than required and trim after tune up. The shorting bar for the stub is made from a strip of aluminium bent to form a clamp and is finally secured with two small bolts.

The stub allows a balanced feed of almost any impedance. Sliding the feedpoint to the shorted end of the stub will give a low impedance match and sliding towards the antenna end gives a high impedance match. The most economical way to feed the antenna is to use 300 ohm ladder line with a balun or tuning unit at the Tx end.

**ADJUSTMENT**

To adjust the antenna all that is needed is an SWR meter and a transmitter on the required frequency.

The first step is to connect the feeder to the stub at about the centre. Apply power from the transmitter and adjust the shorting bar on the stub until a dip is seen on the SWR meter. This should bring the antenna to resonance. Now slide the feeder up and down the stub for the lowest SWR. Some interaction between the positions of the feed and the shorting bar will be noticed. Juggle both for the best result. An SWR of 1:1 should be possible without too much trouble.

**RESULTS**

Simple comparison tests showed a considerable improvement in performance over a ¼ wave ground plane and a noticeable improvement over a ⅝ wave ground plane used at this QTH.

## VI8BNSW

Periods are still available for the Club participation in use of the special Bicentennial Call. If you can take part and wish to, contact Tony VK2ENX. Phone at work 27-0032 or at home at 28-5296. Period of operation for I.A.R.S. is 0000.UTC. 18/7/88 To 2359 UTC. 24/7/1988.....

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## JUNE COMMITTEE MEETING..

The June committee meeting took place at the home of Rob VK2MT after we found that nobody had a key to fit the SES headquarters. ----- THANKS ROB --------

Eleven members turned up and discussion covered a wide range of topics including antennas for 2 MX at S.E.S and entertainment for future meetings.

A financial report from Dave VK2YKQ/VAV showed a balance similar to last year and that the F.R.L.4. was fully subscribed giving a good return.

Keith VK2OB suggested a survey to check on support for a motion to Conference of Clubs for the use of SIX metres by Novices.....

Keith said there is pressure on bands in the 6 MX region by commercial interests and that the old adage of "use them or lose them" is still VALID. 6 MX provides interesting propagation and it is fairly easy to convert disposals equipment to this band. A Round follows.

Members keen to use this band should discuss the motion with Keith VK2OB ....

After the meeting the members were shown around Robs station and antenna system which are not only technically very impressive but also very professionally finished.

# VI88NSW CONTINUED

in Australia to work some confusion may arise with the DX stations. Please explain it carefully to them.

Logs:- Full logs must be kept with a copy retained by the Club, and another sent to the Divisional Office as soon as practical after the end of the Club's allocation. Logs may be submitted as original, photocopy, or computer printout - just as long as we can determine who worked who, when.

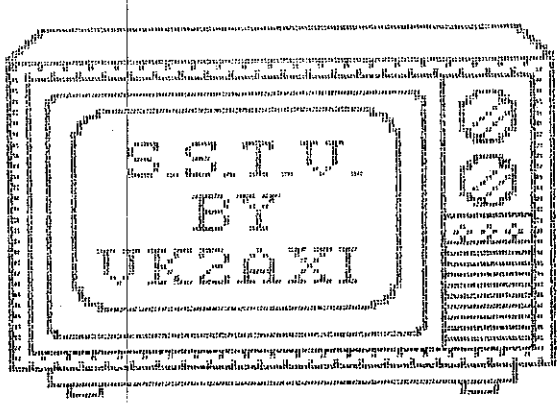
QSL Cards:-
Advise your contact that his/her cards are to be sent via the VK2 QSL Bureau ( PO Box 73, Teralba, N.S.W. 2284, Australia). The Bureau is sending all cards received to the Divisional Office. The Division has available a three colour card to respond to all ( confirmed ) cards received. We do not intend to send out cards for contacts made, only when a card is received from the other station . A Club may either use the Division's card or design their own. ( We need to see a draft before they are printed.)

Re printing your own cards for the Club or individual use - any printing which uses words concerning the Bicentenary must conform to the guidelines of the Bicentenary Authority and be approved by them.

Bicentenary Authority Approval:- As a service to Amateurs throughout Australia the Bicentenary Authority has ap-pointed the NSW Division of the WIA to check and approve QSL Cards design using Bicentenary logo's and wording, under the following condition. The Amateur has to be a member of the Institude or the Club affiliated with the Institute in any Division.

Inwards cards will be sorted by date to the Club concerned, and

CONTINUED PAGE 9




# GUEST SPEAKER WILL BE BRIAN WADE SUBJECT S.S.T.V

Slow-scan television (SSTV) is a technique by which pictures can be transmitted within the 2.8 kHz audio bandwidth normally used in amateur radio voice equipment.

Because the bandwidth is so much narrower than the 6 MHz bandwidth of ordinary fast-scan television (FSTV) it is not possible to transmit 625 lines in 1/25 second - 25 complete pictures a second - to achieve the illusion of moving pictures.

Instead, the number of lines in the picture is reduced to 120, and about 8 seconds are needed to transmit a complete picture. Sending a sequence of slow-scan pictures is a bit like putting on a slide show, whereas fast-scan television is more like a movie show.

The slow-scan picture resolution is obviously not as good as ordinary fast-scan TV - but neither is a replayed videocassette, which seldom gives better than 300 line resolution. Provided the slow-scan picture is displayed on a small screen - or if you step back a bit from a large screen - the picture quality is surprisingly good. Since the total bandwidth for the slow-scan signal lies well within the audio spectrum, it becomes possible to transmit and receive pictures with a normal amateur voice transceiver (SSB or FM) and an ordinary audio tape recorder can be used to record signals for playback at a later time.

## The SSTV Signal.

A composite slow-scan video signal (i.e., video plus synchronising pulses) is used to frequency modulate an audio oscillator. Frequencies used are:

1200 Hz - synchronising pulses
1500 Hz - black
2300 Hz - white

Shades of grey are represented by frequencies between 1500 Hz and 2300 Hz. The modulated audio sounds a little like a radioteletype signal (which switches between 2125 and 2295 Hz).

**SSTV standards**

| Parameter | 50Hz Mains | 60Hz Mains |
|---|---|---|
| Line speed | 50Hz ÷ 3=16·6Hz (60ms) | 60Hz ÷4=15Hz (66ms) |
| Line performance | 120 | 120 |
| Frame speed | 7·2s | 8s |
| Picture aspect ratio | 1 to 1 | 1 to 1 |
| Scanning direction | | |
| Horizontal | left to right | left to right |
| Vertical | top to bottom | top to bottom |
| Sync pulse duration | | |
| Horizontal | 5ms | 5ms |
| Vertical | 30ms | 30ms |
| Subcarrier frequency | | |
| Sync | 1,200Hz | 1,200Hz |
| Black | 1,500Hz | 1,500Hz |
| White | 2,300Hz | 2,300Hz |
| Required transmission bandwidth | 1·0 to 2·5kHz | 1·0 to 2·5kHz |

Two slightly different signal standards have developed, based on the power-line frequency of the country concerned. Amateurs in the U.S.A divided their power-line frequency of 60 Hz by 4 to get a line frequency of 15 Hz and hence a frame transmission time of 8 seconds. Those with 50 Hz mains divided by 3 to get a line rate of 16.6 Hz and frame time of 7.2 sec.

SSTV monitors - and computer programs - will often accept either standard - but not always without adjustment!

No modification whatsoever is necessary to the existing transmitting and receiving equipment because the SSTV signal is always at audio frequencies - like the audio signals of RTTY, you put them in to the microphone socket, and take them out from the loudspeaker output.

## The SSTV Monitor.

In 1958, when Copthorne Macdonald WA2BCW, a young engineering student at the University of Kentucky first developed an amateur SSTV system, he built a monitor in which the picture was traced out on the face of a surplus radar tube with a P7 (orange) phosphor. The "afterglow" of the phosphor lasted just long enough to display the 8-second picture, although a viewing hood and darkened room helped the presentation.

Since that time, the development of cheap memories for computers has made possible a slow-scan to fast-scan receive converter. The converter accepts a slow-scan picture, converts it to digital form, stores the complete frame in a memory bank, and then scans the memory at 625-line rate. The resultant picture is then viewed directly on a normal domestic TV set. The results on the screen are quite remarkable, and far superior to the radar tube pictures.

For amateurs unwilling to invest in a special-purpose converter, programs exist for various computers which display the slow-scan picture on the computer monitor. Some such programs have the limitation of displaying only "black" or "white" picture elements, instead of the full range of greys available from the slow-scan signal.

## The SSTV Camera.

In the early days, a flying-spot scanner was the way to go. The slow-scan raster was traced out on the face of a small cathode ray tube. A photographic transparency (slide) was placed between the cathode ray tube and a photomultiplier tube. The varying output of the photomultiplier was the slow-scan video signal.

The really intrepid slow-scanners built their own live cameras although, as the "73 Slow Scan TV Handbook" says - "...be prepared to spend some time setting up the camera...the adjustment procedure between optical focus, electrical focus, contrast and video level may go on for days..."

Again, fast computer memory chips make possible a fast-scan to slow-scan converter. The converter accepts a fast-scan picture from a normal TV camera (or video recorder, or TV set), converts it to digital form, and stores it in a memory bank which is then scanned at the slow 120-line rate to generate a SSTV signal.

## The Slow-Scan Converter.

Many of the functions of the fast-to-slow and slow-to-fast converters can be combined to produce a single "converter", which is connected between a TV camera, a TV receiver, and the amateur transceiver - thus making a complete slow-scan station. Commercial converters such as the "Robot" brand have a very good reputation, but also a not insignificant price. (I gather they will also handle 256-line pictures in full colour!)

CONTINUED PAGE 8

# RECEIVING LOOP ANTENNA

RECEIVING LOOP:

LOW Q Receiving loop for 160 meters. The loop will drop the signal about 10 to 15 db. With 30 db front to side may be expected. In order to obtain a sharp bidirectional pattern, the overal length must not exceed .08 wavelength.

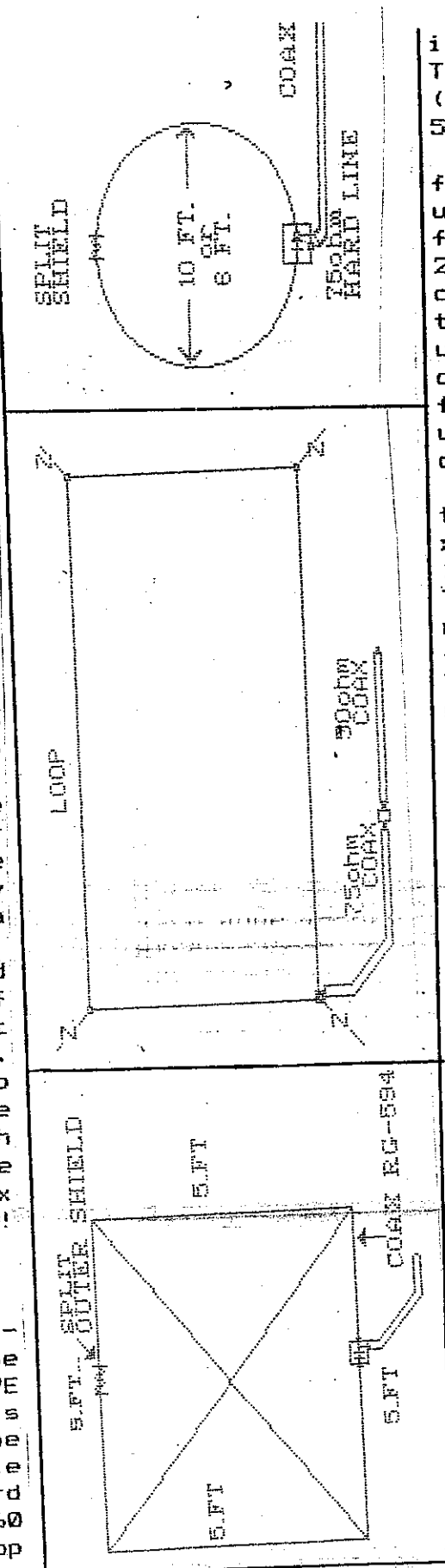
Use 75 OHM COAX or 75 OHM hard line. 5 feet x5x5x5. Use a MiniBox With 2 so239 connectors attache to minibox. install a cap TRIMMER about 600 pf. inline connect it to both centre connectors of the so239.

Run the feed line and attache the shield to the minibox and the centre conductor to one side of the trimmer capacitor. Adjust the cap for NULL and your ready to go. It cut the noise very well you may even want to instal a preamp.

You can also build a receiving loop out of hard line. About 10 feet or 5 feet in diamater. Be sure to slit the loop in the middle and remove the SHIELD about 1 inch in length. Instal the trimmer in the mini-box and adjust. GOOD LUCK!!!

FULL WAVE LOOP:

With all the Antennas running around the 160 Band the FULL WAVE LOOP has made it's place. With all of the inovations available you can take the Word from Experienced 160 Operators, Try the loop




if you have the Room Hi The Formula is 1005/f (mhz). Thus 1005/1.850= 543.24324 feet.

A matching transformer is needed, you use 75 OHM coax, thus for 1.850 you nead 246/1.850=132.97297. If coax with solid polythylene insulation is used a velocity factor of 0.66 must be used. If foam polyethlene coax is used a velocity factor of 0.80 is used.

Thus you can use the following 132.97297 x 0.66=87.76216 OR 132.97297x0.80=106.37837 Try to get up the antenna as high as possible for greater efficiency . You can mount the antenna either vertical or horizontal.

When you feed the antenna you can feed it from top, bottom, or side. Keep in mind that feeding from the side in vertical hang, you will get vertical polarization. Remember that you get as much radiation out if you can get it up up up up.

So get that antenna up as HIGH as possible. Even if you can get it 10 feet higher it makes a difference. If you find that you have trouble getting SWR down (that is due to lack of enough wire) you can try a N4CQC tunning stub just cut a piece of wire and hang it in one of the corners.

Believe it or not it works !!! My thanks to all who gave their vast knowledge in hel-

# LOOP CONTINUED

ping with the info on loops. Watch for future articles on various loops which will appear in this publication. Best of LUCK and GOOD DX. SEE you on 1.850 this WINTER!!!!!!

VERTICAL or HORIZONTIAL

This is a major question to be answered. With a little experience at each type of poloriZation it depend's on how much space you have.. So let's take a little look at the ideal setup or near it.

With the large space required for the large antenna to work like a dipole, you must get it up up up up. So how can I compete with the BIG GUN'S. Try a vertical. It work's getting that low angle of radiation on top band is needed, so try to get that ground system in this spring and summer, it pay's off..

So keep working and try any type of vertical. Get that low angle of radiation.

DXCC WHO ??

What it the craziness of this goal is it all worth it ? Well the other day while trying to achieve this award on TOP BAND, it seem's to drive you crazy trying to work em and then to get the QSL is another task.

The common task you are not in the log for time and date. But I have worked him two times, may be I should have worked him three times? Well who know's. But this thing has been going on for a long time and will continue to do so.

How can one keep from going to the crazy farm ? I hate to tell you but as far as I know there is no remedy for the problem. With all the DX hound's on the band 160 that is the only band hee hee, it seem's to be a lot harder to work em than before due to the QRM and some ungentlemen like operating.

So continue on and try try try try. But if all would co-operate you may not encounter this problem again (not in log). But you know you worked em at least I think so.

Well try again my friend and keep on trying and maybe some day you will get that 160 DXCC.

Then on the other hand, you may sit back and say what in the hell am I doing this for ?

Only you can answer that or maybe you can't. So keep on working on that antenna system, get those receiving antennas out and try try try try. See you in the pile up's

73's the Editor

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AGM 12TH JULY 1988.

The July meeting is the ANNUAL GENERAL MEETING. It is now necessary for nominations for Club Committee Members to be in writing , signed by two members and initialled by the person nominated. Nominations will be accepted at the A.G.M. 12th July 1988.

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# JUNE MONTHLY MEETING

The June meeting was held on 14/6/88 and 38 members and visitors were present. No organised speaker was present but an interesting evening was enjoyed by those attending. President Bill VK2DYU explained the need for the subs increase and commented that a check on other similar clubs showed their subs averaged about double ours.

Lyle VK2ALU announced to the meeting that he had fired up a 10 GIGA HERTZ Beacon which would soon be on air for propagation tests.

ZL Operators have arranged to listen for the beacon and LYLE says little is known about 10 GIG propagation so results could be interesting.

Members interested in this project or other activity on 10 GIG should contact Lyle.

Lyle also mentioned that at a Northern NSW centre the local Radio Society had use of the fine facilities of the high school metal workshop with mutual benefit to the school and the Radio Club.

New faces welcomed at the meeting were Sydney I.A.R.S. Members Jeff VK2BTU , Jim VK2KFQ and Ron VK2PYQ.

CONGRATULATIONS to Peter (VK2XIN) who has now upgraded to VK2FPN.

# THE ILLAWARRA AMATEUR RADIO SOCIETY. INC.

## P.O.BOX.1838.WOLLONGONG.2500.N.S.W.

**MEETINGS:** Are held every 2nd Tuesday of the Month except January,at 7.30.pm. in the S.E.S. Headquarters, Montague street, North Wollongong.

**REPEATERS:**

| | | |
|---|---|---|
| VK2RAW - 146.850. - (VOICE) | VHF | Mt Murray. |
| VK2RAW - 147.575. - (PACKET) | VHF | Mt Murray. |
| VK2RIL - 147.275. - (VOICE & R.T.T.Y) | VHF | Sublime Point. |
| VK2RUW - 438.225. - (VOICE) | UHF | Hill 60.Port Kembla. |
| VK2RIL - 438.725. - (VOICE & R.T.T.Y) | UHF | Sublime Point. |

**BROADCAST:** On Sunday evening prior to the club meeting, at 7.00.pm. R.T.T.Y. Mode Transmitted on 147.275.VHF, and relay on 3.562.Mhz. +/- QRM. Callbacks taken immeddiately afterwards. The voice broadcast will be held straight after the WIA Broadcast on 146.850.Mhz < VK2RAW > and 3.562.Mhz +/- QRM.

**W.I.A. RELAY:** On 146.850. at 10.45.am. and at 7.15.pm. each Sunday.

**CLUB - NETS:** On 3.562.Mhz. SSB +/- QRM on Sunday at 8.30.pm.

**NEWSLETTER:** "THE PROPAGATOR",published Monthly to reach FINANCIAL-MEMBERS in the week preceeding the club meeting. All articles, adds etc , to the editor must be in, or try , by the 3rd Tuesday each month.

**MEMBERSHIP:** The Secretary,I.A.R.S.Inc, P.O.Box.1838. Wollongong, 2500. Full membership is $10 per annum; students & pensioners concessional members $5 per annum.

**AWARDS:** The Award of the Illawarra Amateur Radio Society.Inc. is the LAWRENCE-HARGRAVE-AWARD. VK stations require 10 contacts with I.A.R.S. members. Overseas stations require 5 contacts with I.A.R.S. members. A contact with VK2AMW is sufficient for the award.Band-details, date. frequency, station worked and $2 or 4 I.R.C.'s .to THE AWARD-MANAGER, I.A.R.S.Inc,P.O.Box. 1838. WOLLONGONG.2500. No QSL-CARD is required.

**STORE:** The club store operates at each club meeting. by COMMITEE-MEMBERS.

**COMMITTEE:**

| | |
|---|---|
| PRESIDENT: | VK2DYU- BILL CHADBURN. 45 Beltana Ave, Dapto. |
| VICE-PRESIDENT: | VK2OB - KEITH CURLE. 24. Beach Drv, Woonona. |
| SECRETARY: | VK2JTB- TOM BROWN. 10. O'Keefe Cr. ALBION - PARK. |
| TREASURER: | VK2VAV-YKQ-DAVE HENDERSON.8.Gladstone st.Bellambi. |

**GENERAL-COMMITTEE:** VK2MT - ROB McKNIGHT, VK2BIT - Peter Woods, VK2XCC/PHD - RAY BALL.

**REPEATER - CHAIRMAN:** VK2XGJ - JOHN SIMON.

**REPEATER -COMMITTEE:** VK2CAG - GRAEME DOWSE , VK2EXN - IAN CALLCOTT, VK2EMV - MORRY .v .d. VORSTENBOSCH. VK2DFK-MIKE KEECH, VK2MT-ROB McKNIGHT, VK2BIT-PETER WOODS, VK2TPH-PHIL HOWCHIN, VK2XGJ-JOHN SIMON, VK2FCP-FRED BROWN.

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| QSL-CARD'S OUT : | VK2EXN - IAN CALLCOTT. |
| QSL-CARD'S IN : | VK2BIT - PETER WOODS. |
| PUBLICITY - OFFICER: | VK2VAV/YKQ - DAVE HENDERSON |
| BROADCAST - OFFICER: | VK2ENX - TONY MOWBRAY. VK2ALU LYLE PATISON. |
| CARTOONIST : | VK2AXI - BRIAN WADE. |
| PROPAGATOR-EDITORS : | VK2JT - JOCK TAYLOR, VK2EMV - MORRY.v.d.VORSTENBOSCH, VK2KGI - DAVE CAPON. |
| PRINTERS : | VK2DFK - MIKE KEECH. AND POSTED BY VK2BIT - PETER WOODS. |
| SOCIAL-DIRECTOR : | VK2XCC/PHD - RAY BALL. D.O.C.LIASION VK2OB - KEITH CURLE. |
| CANTEEN-MANAGER : | VK2DYU - BILL CHADBURN. |
| LIFE - MEMBERS : | VK2CAG-GRAEME DOWSE. VK2OB-KEITH CURLE.VK2ALU-LYLE PATISON |

**SUNDAY - EVENING - CLUB-NET - ROSTER:** STARTING AT 8.30.pm.

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| 8.30.pm. | FIRST SUNDAY OF THE MONTH : | VK2MT - ROB McKNIGHT. |
| | 2 nd SUNDAY OF THE MONTH : | VK2ENX - TONY MOWBRAY. |
| | 3 rd SUNDAY OF THE MONTH : | VK2KGI - DAVE CAPON. |
| | 4 th SUNDAY OF THE MONTH : | VK2PHD - RAY BALL. |
| | 5 th SUNDAY OF THE MONTH : | VK2EBI - KEVIN MURPHY. |
| | And on stand-by : | VK2DUP - GRAEME PARSONS. |