

The Propagator

The monthly newsletter of the Illawarra Amateur Radio Society Inc. (IARS)

Meetings are held on the second Tuesday each month (except January) at 7:30pm in the State Emergency Services building Montague Street North Wollongong

VISITORS ARE MOST WELCOME

Editorial

Late Edition. You have the latest and greatest news in your hot little hands.

Well the Wyong field day has been and gone for another year. The Bus trip back was pretty uneventful (we had Steve under control) except for the 6foot and 5foot woks that were trying to get out of the box in the middle of the isle. The only person of Chinese descent on the bus Vic denied ownership of them. Luckily not too many people bought much junk (*valuable merchandise...Ed*) as the bus was all but booked out. There were many not so tall tails of bargains (\$2 scanners and digital multimeters workable). I bought a couple of floppy drives 1 of which works ok and assorted other stuff. For some reason most people gave the \$5 hard drives a wide berth. I am pretty certain that most people had a good time, I came in under budget so I can go again next year. It was good to catch up with some previously unseen contacts, we may be organising some activities with the Fishers Ghost Club in the near Future.

True to my promise I have started to include some technical articles this issue.

Cheers ...Ken VK2KWG

Coming Events

March
6 meters. Yes there is some one out there! Norm VK2ZXC will be giving us a talk with many visual aids on one of the more challenging bands of our hobby at our March meeting. This promises to be an interesting talk..

The John Moyle Field day is on the 18th/19th March. We will be organising a field day at Saddleback at the march club meeting. (we will probably go up on the Sunday)

Wilkinson Award

Federal WANEWS for March 1995

VK2ALU wins Wilkinson Award

The 1995 winner of the prestigious Wilkinson Award for service to amateur radio, is Lyle Pattison VK2ALU.

The award was determined at the quarterly Federal Convention on the weekend of 4-5 February.

The citation detailed Lyle's 10 GHz world-record moonbounce (Earth-moon-Earth, or EME) contact with WA7CJO last October, which was the first known EME contact on the 3 cm band involving a station in the southern hemisphere.

Lyle is well known for his pioneering work on 70 cm, when he led the Illawarra Amateur Radio Society VK2AMW EME project in the 1970s. For many years VK2AMW was the only Australian station available on 70 cm EME, and held the world 70 cm EME record for a period.....

(well done Lyle. All the members of the club would like to congratulate you on the receipt of this award.....Ed)

Way Back Then

Episode 37.

The VK2AMW Moonbounce Project - 1985

1. Break and enter - twice during year.
2. Good contacts during first half of year.
3. Visits to overseas EME stations by VK2ALU.
4. Major refurbishment of antenna feedhorn.
5. Postponement of return to operations while waiting on installation of effective intruder protection.

Early in January we suffered the first "break and entry" at the escarpment site. Nothing was taken but the nearby University Astronomical Observatory was not so lucky.

1296MHz EME tests on 24/2 resulted in contacts with K2UYH, K4QIF, WB5LUA and VE7BBG. The computer controlled dish pointing error indicator proved to be most useful in maximising signal strength.

SM6FHZ and G3LTF were worked on 2/3. In the case of G3LTF, this was the culmination of several attempts over the previous 14 months -as the very short EME window between VK2AMW and G3LTF, due to the terrestrial path distance approaching half of the earth's circumference, reduced common operating time to little over that needed to establish communication and to exchange the essential reports.

Further tests in March and April resulted in contacts with DK0UKW, OE9XXI SP5CIC/SM, HB9BM and LX1DB.

While there were no EME tests in June, the opportunity was taken to recalibrate the frequency measuring equipment and to check it's sensitivity - using accurate standards.

Work was also carried out on the 28MHz IF channel receiver.

While on an overseas holiday during late June/July, VK2ALU visited the 1296MHz EME stations of G3WDG in England and VE7BBG in Canada. G3LTF and PA0SSB were also contacted by phone while in their vicinity. Much interesting information was obtained. G3WDG

has now had several EME contacts on the 2300MHz band, while VE7BBG indicated that it should be possible to obtain echoes from the surface of the moon on 10GHz if 35 watts and a 10 foot Dia. dish was used (a prediction that has since been borne out!).

Following these overseas discussions, VK2ALU decided to remove the circularly polarised W2IMU feedhorn from our dish, make up specialised test equipment and to put the feedhorn through a series of extensive tests and adjustments, aimed at producing peak effectiveness. It would then be used as a basis of comparison with a new and rather novel type of dish feed which had been developed by VK2ALU and tested with the co-operation of the CSIRO.

As this was expected to take some time, the portable items of equipment in the operating building were also removed, for checking out and "tweaking up" by VK2ALU.

This turned out to be a most fortunate move, as another "break and entry" occurred in late August - but nothing worthwhile was stolen.

Efforts were then made to obtain and install an effective security system for the building and dish equipment - a task which, unfortunately, never achieved success.

The project was then put "on hold" for the rest of the year, in the hope that those involved could "come up with the answers" - not an easy task, as the intruders were armed with

bolt cutters (and finally with oxy cutting gear!) and could be well away before operation of the security system could bring people in from Wollongong.

In the meantime work continued on the portion of the feed testing equipment which would measure the clockwise and anticlockwise components of feed radiation pattern and the degree of isolation between them.

Lyle VK2ALU.



Swineherd

Swill from the PIG Sty

David Henderson, VK2YKQ
 AMPRnet: david@snoopy.vk2ykq.ampr.org
 Internet: wehend@itwol.bhp.com.au

The Wollongong Packet Internet Gateway is an experimental facility run jointly by the University of Wollongong and the Illawarra Amateur Radio Society Inc.

Specs: JNOS 1.10H ; 1200 bps on 144.625 MHz.

We are undertaking a tightening of security on the PIG following the incidents mentioned at the last club meeting. Eventually we believe we will be able to allow telnet connections from aliases defined on the PIG's mbox command while still restricting access to the telnet command itself. Also, Richard has solved the earlier problems encountered with JNOS version 1.10H and the PIG is now happily running that version. This latest version has some very nice enhancements over previous versions, particularly in the areas of tracing and security, as well as several bug-fixes. Also, the version we have compiled for Wollongong is just a smidgen smaller than our earlier 1.10G as a result of the C equivalent of "spring cleaning"!

The PIG is now running TCP TIME server. This allows you to synchronise your PC's clock (+/- a few seconds due to propagation delays) with the PIG. The PIG intern synchronises its clock with the University's computer system. I suggest that you first ping the PIG so that the ARP tables in both machines are updated (this will minimise delay), and then enter:

```
rdate offset -6
rdate server 44.136.24.9
```

Check the time on your machine, adjust the number of hours in the offset command and try again if you find the time zone definitions on your machine are different. The syntax above works in JNOS 1.10h - you may need to check the syntax if you run a different flavour of NOS.

One of major problems in using NOS on an Intel-based platform is the 640k system memory limit. Here is a way of freeing up some of the memory used unnecessarily by NOS. The file nos.cfg in the NOS root directory defines the names of files used by NOS - if they differ from the default. However, in doing so, each of these names consumes valuable system memory. NOS by default, assumes that it is at the drive root directory (e.g. C:\) - but most people put NOS at a layer or so lower (e.g. C:\NOS). In order to minimise the memory used, you can use the DOS SUBST command to build an alias, i.e. put:

```
SUBST F: C:\NOS
```

(or its equivalent on your system) in your AUTOEXEC.BAT file and change directory to F: in NOS.BAT. This will allow you to comment out most, if not all, of the definitions in NOS.CFG and save yourself between 15-20k bytes of system memory. Unfortunately, the SUBST command is only in DOS version 5 and later (I don't remember whether it was in version 4).

Now for a couple of hints on using NOS. Be aware that I run JNOS, so these notes may require 'translation' into your favourite NOS version. First, a description of some of the less-well known and sometimes undocumented JNOS commands:

- The following commands are available from the mbox command line on JNOS (i.e. on the PIG):

```
ML show list of past users
RM read my mail
RH read may and show headers
KM delete my mail (all msgs)
MS show mailbox stats
SR send a reply to the current msg.
```

- A file whose name is defined by Pdbase in NOS.CFG (default is names.dat) will add a users name after the userid in the 'From:' field of mail. Just create the file and enter one line.per userid:
 userid RealName

- A file called convmotd.txt in the spool directory will be displayed to users joining convers on your machine. A file whose name is defined by Cinfo in NOS.CFG will automatically add personal details (/p) for convers users on your machine - this info will be visible to all users if your machine has an automatic convers link to the PIG.

- A file called mreg.txt in the spool directory will be displayed when a user in your mbox types register. Registration info is written into the users.dat file in the spool directory. If you register and supply an e-mail address, messages sent from your machine will include a 'Reply-To:' field with that e-mail address. By the way, don't confuse NOS' registration with the same terminology on a PBBS - unlike a PBBS, 'registering' on a NOS box gets you absolutely NO extra privileges - it merely adds extra information about you in the users.dat file - mind you, the sysop may decide to manually place a specific entry in the ftpusers file for those who register, and grant them extra privileges that way. This is largely because ANYONE monitoring on air can watch you login to the host - and see your password - and then anytime after that, they can login as you.

- ftp auto connect. Place a file called net.rc in your NOS's root directory and enter the following for each remote host:

```
<host> <loginid on that host> <passwd>
```

NOS will automatically log you in to that host when you ftp to it. e.g. my file has: "uow-gw.vk2amw.ampr.org anonymous

vk2ykq@snoopy.vk2ykq.ampr.org" which means that if I ftp to uow-gw.vk2amw.ampr.org, then I will be automatically logged in (as anonymous). The use of anonymous and the full e-mail address of the user as password are standard ftp practices on the Internet and I strongly recommend you use the same for amateur hosts. These login details are logged and allow the sysop to contact you in the event of problems.

- who's on convers. To find out who is on the convers bridge, most people would connect to the PIG and join CONV (or telnet to socket 3600) and then type /w - well there's an easier way if you run NOS:

```
finger conf@uow-gw.vk2amw.ampr.org
```

will give you the same information - so set-up a PF-Key with that command and it can all be achieved with the press of two keys! Also to find out what convers inter-host links are active, finger links@uow-gw.vk2amw.ampr.org (note that these will only work for hosts running JNOS).

- to find out what the SMTP server will translate e-mail addresses into on your machine, you can type the following from the command prompt:

```
rewrite <address>
```

- split screen. You may find it easier to do "split ax0 44.136.24.9" instead of using connect - the split command is identical except it invokes a split screen - which solves the problem of incoming messages messing up your screen as you type a reply in convers. If you have ttylink compiled in to your executable (and started!) then the same applies to telnet sessions to convers - do "ttylink 44.136.24.9 3600" instead of telnet and you should be greeted with a split screen.

Last month I waxed lyrical about a method for receiving messages from a PBBS without having to have outbound traffic queued. Well I've been reading a bit more of the doco and I've found a much simpler method (Oh well I had fun playing anyway). All that you need to do is put a 'P' after the PBBS callsign in the FORWAD.BBS file - i.e. my file now reads:

```
vk2xgj P
ax25 ax0 vk2xgj
pbbsmail
```

No longer is there a need for the postman.txt file and the NOTHIN user on the PBBS. Anyway that's enough for another issue. 73

The Lighter Side

Q Why did the chicken cross the road?
A. To get to the other side

Q Why did the chicken cross the park?
A To get to the other slide.

Q Why did the chewing gum cross the road?
A It was stuck to the chicken's foot

Q Why did the computer cross the road?
A It was programmed by a chicken.

Available in our junk yard.....

1. Electronics bits and pieces (millions!)
2. Meters, gauges, instruments, cables, wires etc.
3. Metal sections:- copper, brass, aluminium, s/steel
4. Motors, gearboxes, pumps, assorted machinery
5. Steel sections, sheet, planks, ladders, shelving
6. Scales, safes, compressors
7. We buy all metals including platinum and gold

Two acres jammed full of practical and valuable government disposals.

Our regulars swear it is
the best place for value

CAVIONS

11 Moloy St,
Bulli
Ph (042) 846838

Winding a H.F. Helical Whip Antenna. (part 1)

Can you wind up home-brew HF whip antenna that really works? Yes indeed. And it's easier than you think.

First there are some decisions to make. How long do you want the whip to be? Common sense says that a long whip will probably perform better than a short one (and it's true). But a 3-metre-long antenna is a complete nuisance on the vehicle, and you'll be surprised how well you can get out with a much shorter one. Be prepared to get excellent reports from a whip about 1.5 metres long.

Now you'll need some kind of fibreglass rod to wind the whip on. A discarded CB antenna can be just the thing, since it already has the metal 5/16 inch 26-TPI screw fitting on the bottom. The papered rod makes the calculations a bit slower, but the finished whip looks (and works) like a bought one. A good alternative is one of those bright yellow fibreglass rods sold for supporting electric fence wires. They're 10mm in diameter and 1500mm long. Cost about \$2 each when I bought some from "All Tractors" in Bomaderry. You'll have to make your brass screw fitting for the bottom end. And while you're at it, make up a little screw fitting for the top end for a fine tuning adjustment, and glue the fittings with epoxy cement.

How much wire will you need? The basic formula is $256/f$ metres of wire, where f is the operating frequency in MHz, provided that the is wound on the rod as described below. And how thick should the wire be? Thicker the better. We'll get to that in a minute.

Now pay attention and get this right. Measure the available length of fibreglass rod and divide it into 9 equal parts. Mark the 9 portions clearly on the rod with a texta pen. Let's agree to call the sections A, B, C, D, E, F, G, H, and I, starting from the bottom. The bottom section (That's A) will end up with only 1% of the total wire on it. The next section (That's B) will have 2%. Section C gets 4%, then D gets 6%. Section E has 7%, and section F gets 9%. Add these up and the total is only 29% of the wire. That leaves 71% of the wire which will be close wound to fill the top three sections G, H, and I.

With that understood, you can now calculate the thickest possible wire to use. It's easiest to explain with actual figures. Suppose you chose to make your 20m whip resonant in the middle of the band, about 14.18MHz. The basic formula gives the required length as $(256/14.18)$ metres, which is very near 18 metres of wire. And 71% of this will be $(18 * 0.71)$ which is 12.8 metres. Suppose further that your fibreglass rod was one of the electric fence kind, 1500 mm long, and you decided that the available length was say 1450mm.

When you mark off the rod into 9 equal parts, each one will be $(1450/9)=161$ mm long, so the top three sections G, H, and I will total $(3*161)=483$ mm. And since the rod is 10mm in diameter, its circumference will be $(10*3.14)=31.4$ mm. For now take this figure as the length of 1 turn of wire.

See it coming? You have to wind 12800 millimetres of wire, close wound onto sections G, H, and I. And if each turn is 31.4mm long, that means $(12800/31.4)=408$ turns to be fitted into a length of 483mm. That means each turn can occupy $(483/408)=1.18$ mm, and that is the thickest wire you can use.

If you're a maths whiz, you'll realise that the length of one turn using wire of this thickness will not be the figure we calculated (31.4mm) since the diameter of each turn, measured at the centre of the wire, will be $(10+1.18)=11.18$ mm, so the close wound section will end up with fewer turns than you expected, and less inductance too, so the finished whip will resonate a bit higher than you planned. (Sure enough, it does too. Mine came out 14.9MHz). So be prepared for a bit of cut and try at the end of the job. I'll explain later.

In real life, you'll probably be using enamelled wire salvaged from your junk box, and making do with the nearest practical size available. Before you go out to buy expensive wire, try dismantling various old brush type motors (a vacuum cleaner is a good place to start). The field coils yield lots of top quality undamaged wire, and you may be lucky.

Now for the actual winding. Rule up a little table like the one on the next page, and work out the number of turns you'll need in each section of the rod. The figures given in the table are worked out for the same example that we began with. Knowing the number of turns to go in each section, you can work out the pitch of the winding and mark little dots on the fibreglass rod to guide you as you wind on the wire. It's fiddly, but much better than trying to guess the spacing the spread the turns out later (if you wind the wire on tightly

as you should, it's hard to push the turns about afterwards).

All ready? Measure out the length of wire. Solder one end onto the metal base of the whip. Tie the other end to some suitable object 18 metres away. Have a few lengths of sticky tape on hand, and some spring clothes pegs to anchor the winding when the phone rings. Now hold the rod horizontally from left to right in front of your body, and rotate it slowly with fingers and thumbs as you advance along the wire while you wind the turns firmly and neatly into place. Add a bit of sticky tape every so often in case things come unstuck.

If you're trying to measure the resonant frequency of the whip using only your transmitter and an SWR bridge... well, good luck. But if the resonant frequency is somewhere well outside an amateur band, it isn't easy. Much simpler with a dip oscillator and a little RF bridge (details about this are in the "Propagator" for July 1992... or see Roger Graham for a photocopy).

Roger Graham VK2AIV
(Part 2 next monthEd)

NEWTEK ELECTRONICS

*** **New Location** ***

JUST UP THE ROAD FROM THE BOTTOM ROUND ABOUT IN KEIRA ST.
(SWAN ST END)

Reseller for:- Altronics, Arista, Jacar, Rod Irving

Stockist of:- Alarm accessories, UHF antennae, tools, computer accessories, test equipment, cables, R.F. sprays, and electrical components for the professional, Amateur and Hobbyist.

Call in and see jack at:-
348 Keira St. Wollongong
Phone and Fax 271620
If we haven't got it
we'll be happy to get it in.

All the whips I've made (maybe five or six) have come out near to, but not exactly on, the design frequency. So how do you adjust it?

(1) A little brass screw added at the top of the whip can lower the frequency. A 10mm upstand at the top lowers the frequency by about 150kHz for a 20-metre whip. If you've provided a little threaded socket at the top of the rod, you can screw in various lengths of extra metal for fine tuning.

(2) What if the initial frequency is too low? Removing turns is surprisingly ineffective. You have to take off lots and lots to raise the frequency just a little. But it does work. So you can remove (or add) turns at the top.

(3) Much more effective, if the frequency is too low, is to slacken off the tension a little and slide the close -wound portion towards the top, if there's room.

FREQUENCY COUNTER SUGGESTIONS

All ABC television stations in N.S.W. are frequency locked to a rubidium standard with a probable accuracy of 1 parts in 500 million. The colour burst xtal. oscillator in your colour t.v. set is locked to this standard when the set is tuned to an A.B.C. station. By connecting one end of a coax. cable to one side of the xtal. via a parallel combination of a 10 megohm resistor and a 2.7 pF ceramic capacitor right at the xtal. and the other end of the coax. to a socket at the back of the set you have access to an accurate 4.43361875 MHz standard. I have modified two sets without any problems.

WARNING. Don't use with a set having a hot chassis, make sure it has a conventional power transformer /rectifier or external dc power supply.

As an alternative to the above, Electronics Australia (October and November 1993) described a "TV-DERIVED FREQUENCY REFERENCE" which inputs a signal from the video output of a VTR and has output frequencies of 200 and 500 kHz, 1,2,5 and 10 MHz locked to the rubidium standard. Using this 10MHz signal could give marginally higher accuracy than the above method depending on the resolution of your counter.

The 10 MHz signal could replace the 10 MHz oscillator in counters using this frequency, allowing very accurate measurements not dependent on the stability of your counter. Some commercial counters have provision for doing this. My counter was built from a Silicon Chip magazine design and uses an ICM7216A counter chip with a pin marked "EXT OSC". I assume that this pin could be used.

I have read that in U.S.A., government certification as a frequency measurements laboratory can be obtained by using this method. A xtal. and oven would of course be unnecessary if this system was used on a permanent basis.

A good xtal. oven circuit appeared in an article by Bob Parker in Electronics Australia (September 1991 page 67). I am using this circuit with small changes. In the article a 5 Watt wirewound resistor is used as the heating element and a BC177 transistor is used as the temperature sensor. In my oven the resistor has been replaced

by a TIP32 transistor connected as a programmable constant current source and the BC177 temperature sensor has been replaced by another TIP32. As described by Bob Parker, the xtal. is clamped between the resistor and the BC177 transistor. I found that the TO-220 cases make it a bit better mechanically and the maximum quantity of heat can easily be preset with a 1/2 Watt resistor external to the insulated xtal. box. I also replaced the 7.5 volt zenner and dropping resistor with a 78L05 i.c. The 2.7M and 1.2M resistors connected to the 741 output were changed to 2.2M and 1M respectively. The oven is well insulated.

The crystal used is a cheap one. After a warm-up of one hour the frequency checked recently was within .3 (point 3) Hz of the previous calibration done six months earlier. This is undoubtedly a fluke but the system works well.

The commercial t.v. transmitters appear to be within about 1 part per million of the ABC and are all different. They use xtal. oven control.

Apart from my mods. to the oven all of the above info. has come from Electronics Australia.

Peter. VK2PG @ VK2XGJ.



December Committee meeting Minutes

Start: 1950

Present: VK2's UBF, MT, UR, KWG

Apologies: Les Holmes

Minutes of previous meeting read and confirmed. moved UBF, sec MT

Matters arising from minutes:

- Review of issue of propagator to various clubs by Ken KWG
- Wyong field day deposit reqd to be paid by feb meeting.
- Club raffle a success.

Correspondence out:

- Letters to R.Skeltcher & M.Burton re club membership.
- Steve Martin MHR re proposed increase in license fees.

Correspondence in:

- Application for membership R.Skeltcher & M.Burton.
- Wollongong city mall manager.

Treasurers Report: received from Brain UBF.

Repeater Report: received from Rob MT.

- All Repeaters OK.
- Pacific Power to reply about antenna site
-

General Business:

- UR to send letter to Steven Martin MHR re Fees
- UBF to send letter to Michael Lee MHR re fees
- UBF spoke on club running radio course.
- UR to check with SGARC on fee structures for radio courses. MT suggested up front fee \$50.

Meeting Closed: 2125

January Committee meeting Minutes

Start: 1945

Present: VK2's UBF, MT, UR.

Apologies: VK2KWG

A welcome was given to Jim Button VK2NPA the education officer for St George Amateur Radio Club. The meeting took the form of a discussion on running a theory course for amateur radio leading to the examination.

Radio theory handbook for amateur operators by Fred Swainson to be obtained by candidates, lectures are in reference to this book.

Discussion with lecturers re structure of course then publicity.

Fees to club funds - \$40 to cover copies of lectures etc.

Many thanks to Jim for giving us an idea how to run a course in Amateur Radio.

Meeting Closed: 2045

WICEN News

Thanks to Rob VK2MT WICEN members here at the Wollongong end of the Sth coast region can join in the WICEN Net each Thursday night at 2030 hrs.

The Link with 146.700 VK2RMU (Little Forest-Milton) from 438.225 VK2RUW (Knights Hill) is nothing short of amazing.

It was great to talk to other WICEN members, you only see at exercises in which we were involved. The regional co-ordinator, Steve VK2XNH was net controller, those participating were from a wide area of the south coast.

VK2GFO	Roly	Broulee
VK2DRK	Derek	Tuross Heads
VK2UR		Ron Fairy Meadow
VK2EMI	Reg	Vincentia
VK2XNH	Steve	Sanctuary Point
VK2XJQ	John	Vincentia
VK2MT	Rob	Fairy Meadow

So you can see it was a good coverage from my QTH, using a dual band Alinco Transceiver, transmitting on 2 watts. Many thanks again Rob for all the work you've done in getting this link up and running.

WICEN exercises coming up over the next few months are as follows.:

- Batemans bay Triathlon, Sunday 29th January
- Dunmore Horse Trial in march
- and a big event for WICEN/VRA/Crest, on the 4th to 11th of march, RTA Big Bike Ride starting from bundanoon finishing at Ulladulla a week later.
 - Day 1 Bundanoon to Moss Vale
 - Day 2 Moss Vale to Robertson
 - Day 3 Robertson to Kiama
 - Rest day at Kiama
 - Day 5 Kiama to Kangaroo Valley Showground
 - Day 6 Kangaroo Valley to Huskison
 - Day 7 Huskison to Sussex Inlet
 - Day 8, Sussex inlet to Milton
 - Day 9 Milton-Mollymook to Ulladulla.

So as you can see it's going to be a big job providing communications for this event.

Our call sign for the south coast region is VK2WIJ, so if you hear the call over the air you'll know it's WICEN participating in an exercise, helping to keep the lines of communication open.

will tell you more next month.

Ron Hanks VK2UR

South Coast Region WICEN

POST BOX - "THE ILLAWARRA AMATEUR RADIO SOCIETY Inc."
PO Box 1838, Wollongong, 2500.

REPEATERS	VK2RIL	147.275	Voice/RTTY	Sublime Point
	VK2RIL	438.725	Voice/RTTY	Sublime Point
	VK2RAW	146.850	Voice	Mt. Murray
	VK2RUW	438.225	Voice	Knights Hill
	VK2RUW	029.620	Voice (off air)	Knights Hill
	VK2RUW	144.775	Packet(ROSE)	Knights Hill
	VK2AMW-1	144.625	Packet	Wollongong Uni
				(Packet Internet Gateway)

BROADCASTS - The Wireless Institute of Australia, N.S.W. Division broadcast is relayed to 146.850 and 438.225 at 10.00am and 7.30pm each Sunday. Local call-backs after the broadcast.

NEWS LETTER - The "PROPAGATOR" is published each month to reach all financial members in the week preceding the club meeting (*at the discretion of the editor*). Articles and letters are always welcome. Commercial advertising \$60 per ad per year, members classifieds free for one issue. See Ken VK2KWG for details.

MEMBERSHIP - \$20.00 P.A., concessions \$15 P.A., expiring immediately after the Annual General Meeting in July.

LAWRENCE HARGRAVE AWARD - VK stations require 10 contacts with IARS members. Overseas stations require 5 contacts. One contact with the Club station VK2AMW is suitable. Details of contacts are to be sent to the Club secretary.

*****COMMITTEE*****

PRESIDENT	VK2KWG	Ken Grimm		
VICE PRESIDENT	VK2UBF	Brian Farrar		
SECRETARY	VK2UR	Ron Hanks	(042) 84 2691	
ASSIST SEC		Les Holmes		
TREASURER	VK2UBF	Brian Farrar		
ASSIST TREAS		TBA		
COMMITTEE	VK2GCE	Brian Clarke	VK2KVH	Vic Hee
		TBA		
REPEATER	VK2MT	Rob McKnight	VK2TKE	Ken Goodhew
	VK2CAG	Graeme Dowse	VK2BIT	Peter Woods
	VK2XCE	Michael Sediakin	VK2UBF	Brian Farrar
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