



The
PROPAGATOR
Illawarra Amateur Radio Society Inc.



The monthly newsletter of the Illawarra Amateur Radio Society Inc.

Registered by Australia Post publication number :- NBH - 1491.

Meetings are held on the second Tuesday each month (except January) at 7.30 pm in the State Emergency Services building in Montague St, Nth Wollongong.

Visitors are most welcome.

VOLUME 92, NUMBER 4

APRIL 1992

THIS MONTH'S WORK

At their last meeting and also the next one, the IARS Committee is looking at updating the Rules and Memorandum of Association for the Society, which basically are the rules that the Society is run by.

Most of the changes we have looked at so far are to bring the existing rules (which were put together in a bit of a hurry) into line with how we actually operate the Society. Such things as how the Committee is made up was one thing that we considered.

By the time next month's news letter is written, the Committee's consideration should be complete, and some recommended changes will be presented for you to read. It is intended that these will then be voted on at the June meeting, which will allow the required 21 days notice of the changes before a vote. We will keep you posted with information as we get it.

Also this month, we have some more information about the positions in the Society.

PROGRAMME

Here are the events for the rest of this committee's term of office, and a start on the next year:

APRIL: The Do-It-Ourselves antenna night. This is a bit of an unusual concept for this Society, but is quite common in St George club, and works well. Please join in.

MAY: We haven't had any feedback from anyone about whether to have this auction or not. If there is no interest, then we won't have it, we'll do something else.

JUNE: Another Do-It-Ourselves technical night, but on a different topic. Satellite working was one suggestion I heard, but please suggest anything that you would like to have.

JULY: Annual General Meeting of the IARS Inc. More job descriptions inside for you to interest you.

AUGUST: Col Christiansen to talk about another topic of interest. Col has not decided what to talk about, but this man can talk about almost anything and do well.

Minutes of IARS Committee Meeting -
17 March 1992 at SES HQ, Montague
Street, North Wollongong. Start
19.30

Present: VK2 KLH (Chair), DSH, GID,
GPJ, KVH, KWG, MT, XCC, XGJ.

Apologies: VK2 KCV, SRB, TKE.

The minutes of the last Committee
Meeting of 18/2/92 were read and
received. Moved VK2 XCC, DSH

Copies of the Society's Memorandum
of Association were handed to those
present.

Correspondence in:

- * BARG News - Ballarat & District
ARG Newsletter.
- * Certificate of Currency from
Commercial Union Insurance
- * APC - Morrabin & District ARC
- * Smoke Signals - Central Coast
ARG.
- * DOTC - Repeater Licence Renewals
- * Australia Post - Post Box renewal
- * Brian VK2KLH, has received a
video from the WIA for the next
meeting

Science Centre:

Dale VK2DSH, reported on a visit by
Brian VK2KLH, Rob VK2SRA & Ray VK2XCC
and himself to the Science Centre
on Saturday 14th March. They met
with Glen Moore, Director of the
Centre, who said they were keen to
have a display. They can provide a
location at the rear of the Centre.
A trial run will be conducted for 4
weeks during May on Saturdays and
Sundays between 1 pm and 5 pm.
Modes will include HF voice, VHF
voice and packet with possible
links to science centres in Hong
Kong, Japan, Singapore and
Antarctica as well as Canberra.
Publicity will be sought through
"Electronics Australia", "Amateur
Radio" and the WIA Broadcast.

Digital Communication:

John VK2XGJ, spoke regarding
various modes for the Science
Centre project and developments in
packet radio eg Netrom etc. The
Chairman will give an update on the
Science Centre at the next general
meeting.

New Members:

Moved and seconded that Richard
Pettit be accepted as a member of
the Society.

Society Rules:

The Committee is examining and,
where necessary, updating the Rules
on an on-going basis.

Meeting closed 21.40 local.

DOTC QUESTION

Last month, we asked you a
question from the sheet about meter
multiplier resistances: What
resistor is required to convert a
100 microamp meter movement with
internal resistance of 1k into a 1V
voltmeter?

The answer was (B) 9000 ohms. To
read full scale, the meter must
have 100uA flowing in it, and we
want this to be at 1V. This means a
total resistance of 1 divided by
100u, or 10 kohms. The meter is
already 1k, so we need another 9k
in series.

This month we ask you one about
reactance of capacitors: What is
the reactance of a 180pF capacitor
at 9 MHz (approximately)?

- (A) 0.1 ohms
- (B) 1 ohms
- (C) 10 ohms
- (D) 100 ohms

FOR SALE

Roger VK2AIV has the following
equipment for sale: Kenwood TS-520S
HF rig, in good condition and
working order. Includes the manual
and a microphone. Cost is \$460.
Contact Roger on (042) 341431.

Roger also told me that in his
30 years of operating, he has
logged 1200 contacts, which works
out to be 40 a year over that long
period. Can anybody else claim
something like that??

Minutes of IARS General Meeting -
10 March 1992 at SES HQ, Montague
Street, North Wollongong. Start
19.45

Visitors: Geoff Stratton VK2FEJ,
John Faulkner VK2DVW

New Calls: Norm Collett VK2UMC,
Theo Jepson VK2GTJ

A report on the Gosford Field Day
trip was given to the meeting.

Conference of Clubs: Brian VK2KLH,
has written to all clubs in the
region but has not received any
replies. Also there has not been
any action at metropolitan level.

Science Centre: Dale VK2DSH, spoke
regarding possible involvement with
the University of Wollongong's
Science Centre. This requires
manpower and commitment over 3-4
hours per week on Saturdays and
Sundays - with modern comms
including satellites.

Future Meeting Program:
April - Antennas
May - Auction
June - Technical Night
July - Annual General Meeting
August - Col Christiansen

Simon VK2XQX, spoke of TAFE
difficulties - the "Principles of
Radio" class is now full. Pat
VK2KCV to write to TAFE re
possibility of future classes.

Lyle VK2ALU gave a brief talk on
the series of articles regarding
the Society's history that he has
been writing for the Propagator.
Lyle also spoke regarding a video
"Antenna Circus". Brian VK2KLH, has
written to the author, G8CJ, for
further info.

Rob, VK2MT, gave a brief repeater
report and mentioned the possible
link between 8525, 8225 and 8325.
(See separate report...Ed).

John Faulkner VK2DVN was introduced
and gave a talk on spread spectrum
and frequency agile systems.

Meeting closed at 21.30 local.

MORE JOBS FOR THE SOCIETY

We continue with our description
of office bearers in the IARS, for
those who might be swayed to take a
position. This month we have some
of the people who do not vote at
Exec Committee meetings.

ASSISTANT SECRETARY: Stands in for
the Secretary in his absence, and
also shares some of the large
amount of paperwork.

ASSISTANT TREASURER: For the last
two years, this has been an easy
job as Ken VK2TKE has mostly been
there. Helps out with the money
work.

ASSOCIATE COMMITTEE MEMBERS: There
can be any number of these people,
who generally are advisers to the
Exec Committee, extra workers or
interested parties.

REPEATER PRESIDENT AND COMMITTEE:
Here we have probably the hardest
working people in the whole Club.
These fellas work in all weather,
at any time, to keep our growing
repeater systems on air. The Rep
Pres also gets to write a report
for the Propagator every issue, to
let everyone know what is going on.
Not a job for the lazy, but an
excellent way to learn a lot about
repeater systems and radios.

QSL CARDS IN/OUT: Get QSL cards
from the Secretary as they come in
and try (and try and try) to get
them to their owners. Also get QSL
cards from members and send them to
the Bureau (along with all the ones
we were sent by mistake). Easy!

PUBLICITY: This is one position
that is not a huge amount of work,
but well executed it can be a bonus
to the Society. This person sends
info about the Society's activities
to the WIA for broadcasts, and also
can do various other things of an
advertising nature.

That about wraps it up for this
week, as the column is just about
full. Next week I will finish off
the descriptions for the remaining
positions.

WAY BACK THEN... Episode 6.

Jan. 1968 to Dec. 1969 - the end
the first 20 years and the start
of a new era.

Firstly, I must correct two
items in Episode 5, caused by a
typing error in a date. The Club
meetings were moved to the
Committee Room at the Wollongong
Town Hall as from November 1967
(not 1976) and regular issues of
our Club Newsletter commenced in
April 1967 (not April 1976). I
suggest that you correct this date
in the Episode 5 article if you may
need to refer to it in the future.

1968.

The election of Officers in
May resulted in - Pres. Roger
Evans, VK2BRE. Vice Pres. Eric
Fisher, VK2DY. Sec. Alan Ward,
VK2VH. WIA Zone Officer Lyle
Patison, VK2ALU. Committee VK2's
ALU, BJB and ZQH.

Talks etc. given at Club
meetings during the year included
Feb - Talk by VK2ALU on his Class B
grounded grid HF amplifier, use of
two tone oscillator for SSB
linearity checks, interpretation of
CRO patterns etc. July - Tape on
application of transistors as RF
amplifiers. Sept - Talk on theory
and operation of Cathode Ray
Oscilloscopes by VK2BRE. Nov -
Talk on use of Translators
(Repeaters) at VHF by VK2ZDD from
Sydney.

About this time the
Department gave approval for
Amateur use of Repeaters on the 2
metre band and our club decided
that we should look into the
provision of a 2 metre Repeater in
the Wollongong area. Firstly, we
would try to obtain used commercial
FM mobile sets which were suited to
conversion for use on the 2 metre
amateur band.

In August the Club
participated in the Hobbies
Exhibition at the Wollongong Police
Boys Club. Due to the enthusiasm of

our members and assistance from
WICEN of Sydney, who provided a
demonstration of mobile
communication, we were awarded
second prize for "a Society
Exhibit". It was a very successful
exhibition, with more than 4000
people attending over the two days.

The Wollongong Net frequency
of 53.982MHZ was discussed at the
Nov. meeting. It was suggested that
a different frequency be used to
this, as it coincided with that of
the Sydney Net. To be looked into.

1969.

Eric Fisher, VK2DY, commenced
a course of lectures, on behalf of
the Club, for aspiring candidates
to the AOCF. He was assisted by
other members of the Club on
specific topics.

The course was held on one
night each week for 3 hours, at a
room made available to us by AIS in
their Engineering Building.

Those attending were asked to
join the WIA, resulting in 34
applications for Associate
Membership being forwarded on by
the Club in February.

The Course lasted until near
the end of the year and assisted a
number of people to obtain their
Amateur Licences.

At the AGM in April, the
following Officers were elected -
Pres. Don Reynolds, VK2ZRK. Vice
Pres. Eric Fisher, VK2DY. Sec. Hank
Laauw, VK2BHL. Treas. Alan Ward,
VK2VH. Area Officer Lyle Patison,
VK2ALU. Committee VK2's AGV, BHO,
BJF and BRE.

Talks etc. given at meetings
during the year included - May -
Equipment exhibition by Club
members and film on Soldering
Techniques etc. June - Talk by
VK2AGV on his 6metre transmitter
with transistorised VFO. July -
Auction Night and slides on Apollo
Space Flights by VK2BRE. Aug -
John Milton, local District Radio
Inspector, spoke on Radio

CONT' P 11

A Homebrew FM receiver by Dale VK2DSH

This article describes a basic superhet FM receiver that is suitable for use on any band up to 2 meters. The design is based on the CA3089 (RCA) or LM3089 (National) chip. This is quite an old chip now, but is still readily available from a number of sources. It costs about \$5. The main advantage of this chip compared to more recent types of FM demodulators is that it will work over a wide frequency range and that it is suitable for both narrow and wide band operation.

The design is conventional, a single stage of RF amplification followed by a dual gate mixer which also has some conversion gain. The local oscillator is crystal locked. If more or less channels are required the circuit is easily modified. For HF bands, the crystal oscillator could probably be replaced by a VFO, however I have not tried this. The crystals must be series mode, third overtone types. If operation on 2 meters is contemplated, fifth overtone mode would be required. Almost any npn transistor with a Ft of 300 - 500MHz would be suitable in the oscillator circuit.

Following the mixer is an amplifier at the IF frequency, this stage provides some gain as well as impedance matching to the bandpass filter. I have tried a number of different filters in the circuit, both crystal and ceramic types. Old 2-way radios from the club auction are a good source of suitable filters. Depending on the filter type, the collector resistor of the IF amplifier may need changing to obtain optimum bandpass response.

Crystal filters that I have tried have had bandwidths from 10 to 60KHz, ceramic types up to 300KHz. If no filters are available, an LC combination may be used. If filters for other frequencies are available they may be used without difficulty.

The 3089 chip contains a limiter, demodulator, signal strength and squelch circuit. Most of the components around the chip are to provide bypassing and bias to the internal circuitry of the chip. The demodulator requires a resonant circuit at the frequency of the IF stage, either a single or double tuned circuit may be used. The single tuned circuit is easy to setup and seems to work well.

An internal squelch circuit is provided, but it is more suitable for wide band FM use. For narrow band applications, an external noise squelch is more suitable.

Audio output is passed to the audio amplifier based on an LM380, giving about 1 watt of audio output. De-emphasis is provided between the demodulator and the volume control.

All the inductors shown on the circuit were wound on toroids, the type of core and the number of turns depend upon the band on which the receiver is going to operate. Toroids are very easy to use and have the advantage of small size and very little radiation.

For those who are interested, artwork for a suitable PCB is available, see me for details. Also available is an RCA application note which details the features and use of the 3089 chip.

REPEATER REPORT
AS AT 25th MARCH 1992

(Editor's note: Last month we didn't have a repeater report due to a mix up with the deadline, so this month Rob VK2MT has quite a bit to say. All pretty interesting stuff...)

VK2RAW/VHF (146.850 MHz): Since the February report, VK2RAW/VHF has performed well. Some good long distance stations have been calling in, in particular VK1's. All was OK until the morning WIA broadcast on Sun 8th March. During the broadcast the output of the repeater faded away. It returned about five minutes later for around 15 minutes, then faded away again. In all, it faded four times during the broadcast.

During shorter QSOs, the repeater was fine, but lengthy QSOs sometimes produced the fading. It appeared to be a temperature related fault, but the fading didn't happen on the evening broadcasts. This may have been because the solar panels would not have been producing much power (being after sunset) and so the battery voltage would have been lower, possibly generating less heat in the transmitter.

This continued for two weeks, until sometime on Wed 18th March, the repeater failed totally. On Sat 21st March, John VK2XGJ went to Mt Murray to remove the Packet digi equipment (see later), and also checked 146.850, as we thought that the transmitting section had failed, probably the exciter. He brought the exciter, power amp and Packet system back to Wollongong (thanks very much to John).

After collecting the gear it was checked on the workbench. The PA was still OK, but there was no measurable power from the exciter. As I write this report, I have spent two nights working on it, with no success. We might have to contact Graeme VK2CAG, who built

the unit, for some ideas. (The exciter is over twenty years old, and as far as I know has only failed once before, which is a credit to Graeme.) The repeater will be returned to service as soon as possible.

Meanwhile, if ever VK2RAW is unable to relay WIA broadcasts for whatever reason, the repeater / broadcast team (Ken VK2TKE and friends) will make every effort to relay through VK2RIL. This was done last weekend with no problems.

VK2RAW/PKT (147.575 MHz): This has been removed from service to be modified by John VK2XGJ as a possible high data rate (9600 baud instead of the present 1200 baud) link into Sydney. (See separate article...Ed).

VK2RIL/VHF (147.275 Mhz): Once again, all working well until... On the afternoon of 12th Feb, a spectacular lightning storm passed up the coast. VK2RIL went off air around 1600. Next morning before work, I went up to Sublime Pt to investigate. Found no 240V power on site, and the fuse to the repeater had blown, 15V protection zener diode short circuit. Unable to repair on site. Just before I left, a Motorola tech arrived to check why their equipment (including their wonderful pagers) was off the air. Turned out that a 80A fuse in the main fuse box had blown. I was told that Sublime Pt had taken two strikes of lightning the previous afternoon, one near the Kiosk and one to the tower.

I went and saw Graeme VK2CAG about the damage. The zener diode was replaced but then we found a fault on the ident board - the repeater was identifying diddididah dahdidah dididahhhhhhh (one for all you limited calls out there...Ed) non stop. One by one, I replaced all the CMOS ICs on the board until I found the crook one.

The repeater was then functioning OK. Graeme returned it to the site but found that the battery charger for the backup batteries has short circuit pass transistors, and so was charging excessively. He brought the charger back down and repaired it. I took the family for a nice Sunday drive (16th Feb) and while we happened to be passing, I stopped in at Sublime Pt and reinstalled the gear.

Assessing the damage to the equipment and knowing of the two strikes, a Guesstimate as to what happened would be - the strike near the Kiosk got into the mains, damaging the charger. This in turn overcharged the batteries, which caused the voltage to rise to about 15 volts. This blew the CMOS IC (they don't like that sort of voltage level), then the voltage went even higher until the zener committed suicide in a last effort to save the fuse. Of course, the fuse blew next. (Theoretically, the fuse should have blown first). Then the second strike hit the tower (fortunately I suppose the repeater was off the air by now) and somehow took out the 60A main fuse. No other problems with the repeater since.

VK2RUW/UHF (438.825 MHz): Lots of work done at Knight's Hill in the past two months. I won't go into details, but work like replacing guy wires at the 200ft level, installing extra tower clamps on the LDF 4-50 Heliac, changing the Goulburn link transceiver's PA stage to a higher power version (to increase signal level at the other end) and then changing it back to the original 2.5W after problems, tested an old Mocom filter to help stop the occasional interference we are getting (courtesy of Steve VK2XNH, thanks Steve), and a whole lot more.

The link to Goulburn is still being used on a regular basis. Some exciting news is that discussion and work has commenced on the linking of adding 8525 Mt Ginini to

the Knight's Hill - Mt Gray linked repeaters. This extra link would provide fantastic coverage. Most of you would be aware of 146.950s coverage from Mt Ginini - you can drive for hours and still have full scale reception. The UHF repeater has similar coverage, but it is very much under-used in comparison (that's the story of 70cm...Ed).

The linking will allow us extra coverage into VK1, Snowy mountains, Wagga, Cooma and into VK3. The repeater people in VK1 we have spoken to are very enthusiastic and keen for the linking to go ahead. It's just a matter of time.

VK2RUW/PKT (144.750 MHz): This ROSE digipeater was commissioned on Sun 27th January. It was first tested on 147.575 before being shifted to its designated frequency of 144.775 (I think). The antenna for both the VHF and UHF ports is a Diamond Dual Bander (X-200). The money for this was very kindly donated to the IARS by Vic VK2KVH (many thanks Vic). The antenna is mounted on the eastern side of the Knight's Hill tower at the 100ft level and is fed with LDF 4-50 Heliac.

Excellent coverage was obtained on both bands. The UHF port could access lots of distant digis direct, thus saving on through time. Unfortunately the DR-200 dual port TNC failed at the end of February. Phil VK2TPH and myself tried to fix it on site but were unable. We removed the unit to the test bench but were still unable to fix it. The unit has been returned to its owners, AAPRA (Aust Amateur Packet Radio Assoc, I think...Ed) for them to fix. System off air until whenever.

VK2RIL/UHF (438.725 MHz): A lot of work has been done on getting this system back on the air. When the IARS purchased this repeater, we understood from the previous owner that it was a functioning repeater. This was far from the truth. It had been reconfigured for base station operation. Most of the repeater wiring had been removed, the

transmitter harmonic filter was gone, there was an incorrect substitute transistor in the receiver mixer (which caused us a lot of wasted time trying to tune the receiver), the mode selecting switch was gone plus a lot of other bits were missing. Many, many hours were spent getting the unit back to being a basic repeater again.

As the system will be using separate antennas for receive and transmit, a set of cavity filters have been tuned to decrease any desense problems. An external power supply charger is being built. Ken VK2TKE has obtained two 6 element yagis to focus the signal down the coast from Sublime Pt, and these will be fed with two runs of LDF 4-50. The repeater should provide a saturation type coverage all over Wollongong down to Kiama. The poorest reception will be experienced around Dapto and southwest to Macquarie Pass, this being the shadow from Mt Keira.

VK2RUW/HF (28.620 MHz): The 10m repeater was removed from service on Sun 27th January (when the ROSE system hit the air). A slight fault had appeared at the receiver end (Mt Murray) and the feedline and antenna mount for the transmitter were used for the ROSE system to get it on the air. The repeater is under evaluation.

I apologise for the length of this article to those who are not interested in repeater info, but I feel that I should put some detail into the report. Ken and I are continually asked, on and off air, what is happening with a repeater. With the shortening of the meetings, there is not time to give reports there and so we spend lots of time answering people's questions after the meetings. These reports are the way we tell people what is happening, our intentions and calls for assistance.

(I stand behind this view. I think that Rob's stories are a great way to learn a lot about radio equipment from your armchair, and they do let you know what is happening in what many people consider to be one of the main arms of the Society's work. I for one thought my radio was crook when I couldn't trigger VK2RAW/VHF, but now I know. Rob, feel free to write all you like. Graham VK2GID, the fella that types all this up every month.)

Till next time (if they allow me back)...Rob VK2MT.

HOW ABOUT PACKET VIDEO?

By now, most of you will have heard of the concept of sending sound information by digital means. But why stop there?

Research is currently being conducted by the University of Wollongong (and no doubt other places) into the idea of sending video signals by digital means. This is of course not new - slow scan television is one example of this. However the present research is into ways of compressing the digital video signals, so that one picture takes up less memory in a computer, or can be sent quicker down a given channel.

Of course, the existing 1200 baud Packet radio system is not really fast enough to send proper moving pictures down, but the slow scan of the past is making way for what you might call "Medium Scan", and still over a narrow bandwidth (as opposed to fully fledged ATV). The technology for this exists right now, it's just a matter of putting it all together.

Another research project at the Uni involves developing a system where a mobile salesman can have his computer linked to the main office computer, all without leaving his car. The Amateur world already has such gizmos in the form of Packet radio terminals, so once again we lead the hot-shots in technological developments.

Regulations and Amateur Licence requirements etc. Sept - Noel Boyd, of a well known Wollongong Service organisation, gave a talk on Commercial Mobile VHF Equipment and Mobile operation. Oct - Social Night - with films on travel subjects plus one on Glenn's round-the-world space flight. Nov - Talk on Civil Defence, by Mrs. Helen Coote, Illawarra Zone Civil Defence Controller.

December 1969 started a new era in Club activity, with a talk by Lyle Patison, VK2ALU, on Proposals for a 432MHz "Moonbounce" Project, to be undertaken, under his direction, by interested members of the Club.

The Project would be carried out under the auspices of the Wollongong University College (as it was then), using the parabolic dish antenna, building, etc owned by the University College and located on a site at West Dapto which was formerly a Solar Radio Observatory built and operated by the CSIRO Division of Radiophysics, who had moved their activities to the Parkes Radio Telescope etc. a few years earlier. Our Moonbounce Project would proceed in conjunction with a Radio Telescope Project conducted by the Wollongong Amateur Astronomers.

We would design and construct the receiving and transmitting equipment required for Earth-Moon-Earth communication on the 432MHz band, using the CW mode of operation. We would have to make a technical submission to the Department which would justify the need to be granted a High Power Permit. We would also have to arrange for the 30 foot dia. parabolic reflector to be refurbished and to design and install a suitable feed system, along with all the RF cables and power, control, protection, interlocking system and equipment operating cables. We would then have to ensure that the whole system operated to the standard required for Earth-Moon-Earth operation, within the constraints

of the "state of the art" which existed at that time and because of which, only a bare handful of Amateur stations around the world had achieved success.

Quite a challenge!

In future Episodes I will briefly mention our progress, failures and "triumphs".

Other Club activities during the year included -

A barbeque at Mt. Keira Summit Park in July.

A Club library was launched in August, with Graeme Dowse, VK2AGV, as Librarian. It contained technical books, magazines etc., some donated by Club members. It proved quite popular with our members.

Some Club members took part in JOTA in October.

Tom Barnes, VK2ABI, accepted the position of Area WICEN Coordinator in October.

In June the publication of the monthly Club Newsletter was formalised, with the allocation of a set down portion of members subscriptions to be devoted to cost of publication, postage, etc.

As at August 1969, Club membership was 83 and average attendance at meetings was 35.

Lyle VK2ALU.

FOR SALE

More quality goods from VK2DSH!

Airmec 4 channel large screen CRO - \$30. IBM letter quality printer with centronics interface - \$300 or offer. Contact Dale VK2DSH 042-286056 AM.

POST BOX - All mail can be sent to "THE ILLAWARRA AMATEUR RADIO SOCIETY" at PO Box 1838, Wollongong, 2500.

REPEATERS - VK2RUW - 29.620 Voice Mt Murray/Knights Hill
- VK2RAW - 146.850 Voice Mt Murray
- VK2RIL - 147.275 Voice/RTTY Sublime Pt
- VK2RAW - 147.575 Packet (NetRom) Mt Murray
- VK2RUW - 147.575 Packet (ROSE) Knights Hill
- VK2RUW - 438.225 Voice Knights Hill
(Off air) - VK2RIL - 438.725 Voice/RTTY Sublime Pt

BROADCASTS - The Wireless Institute of Australia, N.S.W Division broadcast is relayed to 29.620 MHz and 146.850 MHz at 10.45am and 7.15pm each Sunday. Callbacks after the broadcast. RTTY broadcast in the week before the Club meeting, Sunday evening, 6:45pm on 147.275 MHz, relayed onto 3.618 MHz +/- GRM and 29.620 MHz, with callbacks immediately after.

NEWS LETTER - The "PROPAGATOR" is published each month to reach all financial members in the week preceding the Club meeting. Articles and letters are always welcome. Commercial advertising \$40 per quarter page per year, member's classifieds free for one issue. See Graham VK2GID for details.

MEMBERSHIP - \$15.00 P.A, concessions \$12.00 P.A, expiring immediately after the Annual General Meeting in July.

STORE - The Club store is open at each meeting, and sells all sorts of hard to get knick-knacks that you might need.

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

***** COMMITTEE *****

PRESIDENT	-VK2KLH - Brian Clarke	
VICE PRESIDENT	-VK2GID - Graham Denney (042) 294170	
SECRETARY	-VK2KCV - Pat Kennedy (042) 673198	
ASSIST SEC	-VK2GPJ - Pat Jordan	
TREASURER	-VK2TKE - Ken Goodhew	
ASSIST TREAS	-VK2SRB - Robert Bonella	
COMMITTEE	-VK2DSH - Dale Hughes	-VK2GPJ - Pat Jordan
	-VK2XCC - Ray Ball	
ASSOCIATES	-VK2JRG - Ron Hanks	-VK2KWG - Ken Grimm
	-VK2MT - Rob McKnight	-VK2SRB - Robert Bonella
	-VK2XLA - Graeme East	
	-VK2XGJ - John Simons (042) 614628	
REPEATER PRES	-VK2MT - Rob McKnight	
REPEATER COMM	-VK2TKE - Ken Goodhew and others	
QSL CARDS	-VK2JBS - Bill Stone	-VK2GID - Graham Denney
PUBLICITY	-VK2KWG - Ken Grimm	
BROADCAST	-VK2TKE - Ken Goodhew and his merry men	
EDITORS/PRINTERS	-VK2DSH, VK2GID, VK2XCC	
SOCIAL DIRECTOR	-VK2XCC - Ray Ball	
CANTEEN	-VK2JRG - Ron Hanks	
STORE & TOWER	-VK2KVH - Vic Hee	
DOTC LIASON	-VK2OB - Keith Curle	
LIFE MEMBERS	-VK2ALU - Lyle Patison	-VK2CAG - Graeme Dowse
	-VK2OB - Keith Curle	

XCE work in 2055E
6850 off rebuild