

# THE PROPAGATOR.

VOLUME 99/00 ISSUE TWO NOVEMBER 99 Printed Bi monthly PRICLESSS  
Meetings 2<sup>nd</sup> Tuesday every month (except January) S.E.S Building montague street Nth Wollongong  
Starting 7:30pm. Official newsletter of the Illawarra Amateur Radio Society Inc. PO Box 1838 Wollongong.

This months meeting will be the ANNUAL auction. The club room will be open from 7pm and all goods for auction MUST be booked in before 7:30pm. If you would like to pre book your goods, give me a ring on 4267 2296 and i will give you a lot number.

ALL GOODS BOOKED IN AFTER 7:30PM EXTRA 20% COMMISSION WILL GO TO THE CLUB!!!!!!!!!!!!!!  
**No junk No junk No junk!!!**

Everything will be sold for over \$10!!!!!!

As you will see from this issue we have TWO new advertisers. Kindly support these advertisers as they support us.

The December meeting will be one NOT to miss. What with the start of the SNOWBALL another great meat tray, we also have a GREAT speaker. The Federal President has agreed to give us a talk and answer questions. So come along the meeting will start as usual at 7:30pm.

There was not going to be a Propagator for the December meeting. But i have received a Profile from a long time member and at the moment it's about 4 pages long and VERY interesting to read. So i will break it down into 2 issue's. As this member has done so much it will be published as received. I wish i knew 5% of what this member has forgotten. I'm still looking for members profile to fill future editions from February 2000 and onwards

so why not give it ago, you never know what you can do!!!!!!!!!!!!!!

I have also asked a member to give us a demo of the log that he use's and this person is a VERY keen dx'er so it must work well. This demo will be at the February meeting. I am also looking for some member that has win radio or something like it that could give use a demo and a talk on this. So if you can help out contact me. As you know we are COMMUNICATORS so lets communicate to one another.

If you would like to have guest speakers at some meeting give your list to me and i will see what can be arranged.

The first Saturday get together was held on the 23<sup>rd</sup>. This was in response to members questionnaires. Well what a day. There where four hardy soles at Sublime Point for 11am but the weather was not good so after awhile we all came home to warm up. I think we will try again maybe January 8<sup>th</sup> or 15<sup>th</sup>. Will let you know later. Inside this issues.

Page 2 and 3 Minutes of meetings.

Page 4 and 5 Constructors corner.

Page 6 news

Page 7 and 8 Members Profile.

Page 9 more news.

Page Ten and Eleven Repeater report.

Page Twelve Remember These

Page Thirteen Club Information

Page fourteen mailer



## Minutes of club meeting held September 14<sup>Th</sup>

Opened at 7:40pm

apologies from vk2's zdm, axj, gce, kbi, agb, tph, zlj, xbc,  
visitors glen miles and Luke Neeson vk2zln

attended. 26

Correspondence in: Newsletters from B.A.R.G, St George, Central coast,  
Moorabbin@district arc, David brown labor for ward 3 , Thank you card from VK2AIJ  
, Subs from vk2kej , vk2wrj, vk2hcl , vk2zdm , vk2srb , vk2pg , vk2mrj, vk2agv,  
vk2fkq, vk2bes, vk2asn, vk2vzq, vk2zwg, vk2kcv, vk2kbi, vk2crm, vk2ko, vk2bub,  
vk2xic,

Returned newsletter from vk2uar , \$10 cheque from vk2xic for 828 E band radio, e-  
mail from Barry white vk2aab re Internet gateways, vk2wi minutes of last council  
meeting 09/07/99 E Mail from Richard vk2zvx re Gateway at Connectivity

Correspondence Out : E-mail to vk2aab re Internet gateways are they legal? Vk2eo  
re the special call vk2000. Both are attached. E Mail to Richard vk2zvx re the  
gateway at connectivity

Minutes of August meeting read and accepted by VK2ubf 2<sup>nd</sup> VK2tnk  
Matters arising from: nil

Treasures report.

Repeater report. Rob VK2MT spoke briefly and said they are working!!

General business.

- 1) Elect a treasurer. One nomination vk2cav elected
  - 2) How long should the club use the special call sign vk2000?  
After some discussion the members said for 2 weeks a letter will be sent to vk2eo  
shortly.
  - 3) Guest speaker for December meeting? Suggest Peter Naish vk2bpn. David  
vk2ezd moved this be accepted. Letter to be sent a.s.a.p.
  - 4) October get-together 23<sup>rd</sup>. Suggest arrival at Sublime point at around 11 am,  
Bob vk2zrf asked about wheel chair access this is OK.
  - 5) Ted vk2tth asked for his radios to go as his wife said they come back you go. So  
the radios went!!!!
  - 6) snow ball. Members badge draw. This had much discussion the went to a show  
of hands and they snowball will be running suggested date maybe December.  
Details later.
  - 7) Richard vk2vzx spoke of the gateway coming on line SOON at connectivity, more  
details as they come to hand.
  - 8) Leather tongue went to Phil vk2fhn ask him why. Raffle won by Wayne vk2tbf
- meeting closed at 8:25pm nice cakes where had by all thanks Simon.

Opened at 1945

Attend 30

apologies from Vk2's utg, zdm, xjo, kej.

visitors: nil

Correspondence in: Letter from Peter vk2phn re old Propagator's do we require. Also he's giving up his membership. Subs from vk2zro, vk2uar, vk2xgj, vk2thd  
Advert renewal from cavions, Account from vimcom, licence renewal for vk2rmp, Select insurance brokers

News letters from: Brag central coast E Mail from vk2bpn he will attend the December meeting. New cheque book I.M.B. Minutes of council meeting W.I.A plus Registration form conference of clubs 13/11/99

Correspondence Out : Peter Naish re the December meeting. E mail to Peter Naish thanking him for his letter.

Minutes of meeting Read and approved vk2ubf second vk2zwg

Matters arising from: nil

Treasures report. Attached Moved vk2cav 2<sup>nd</sup> vk2ubf

Repeater report. Not given as Rob was not there. It will be in the November propagator.

General business. Conference of clubs Les vk2kld and Bob vk2zrf interested in going. Vimcom has taken up the advert for this year. No other business was forthcoming.

Meeting close at 2000. Auction was started and many good bargains were had by those in attendance.

Simon again had a good selection for supper. Bob vk2zrf walked away with the meat tray. Good one Bob I hope you liked the meat.

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# CONSTRUCTORS CORNER

## SOME NOTES ON PROGRAMMING COMMERCIAL RADIOS

If you are of a technical bent or, like me, want to save a few shekels on radio gear, there is no better way than to re-use commercial gear. There is heaps of ex-commercial gear available for both VHF and UHF at rock bottom prices. Quite a bit of this stuff is in great condition but needs replacement because it is 25kHz channelled (6kHz deviation) and band-plans now require 12.5 kHz channelling (2.4 kHz deviation).

**Rule 1** Unless you specifically want a single channel unit (for packet etc.) steer clear of radios needing crystals for each Tx and Rx channel. That being said, Phillips FM828s are the bees-knees as single channel units (I have 5 of them in my shack).

Most modern transceivers use a PLL and some sort of frequency synthesis to derive the required channels. The devices to do that may be either replaceable/reprogrammable ICs or they may be programmable directly.

The Phillips FM9000 and Motorola Syntrx are examples of the former. The Syntrx uses a bipolar PROM and cannot be reprogrammed - you will need to either burn a new PROM (which are now hard to get) or replace the PROM with an EPROM on a small board. The FM9000 series use an EPROM which can be erased and reused. The Phillips FPP software is used to prepare the binary file containing the EPROM information. This software is available from a number of sources including a hack for the E-band units for 6 meters. There are a number of excellent Australian websites detailing how to modify program etc. both the Syntrx and FM9000. These include site detailing special ham replacement PROMs and CPUs to make your radio all-singing and all dancing.

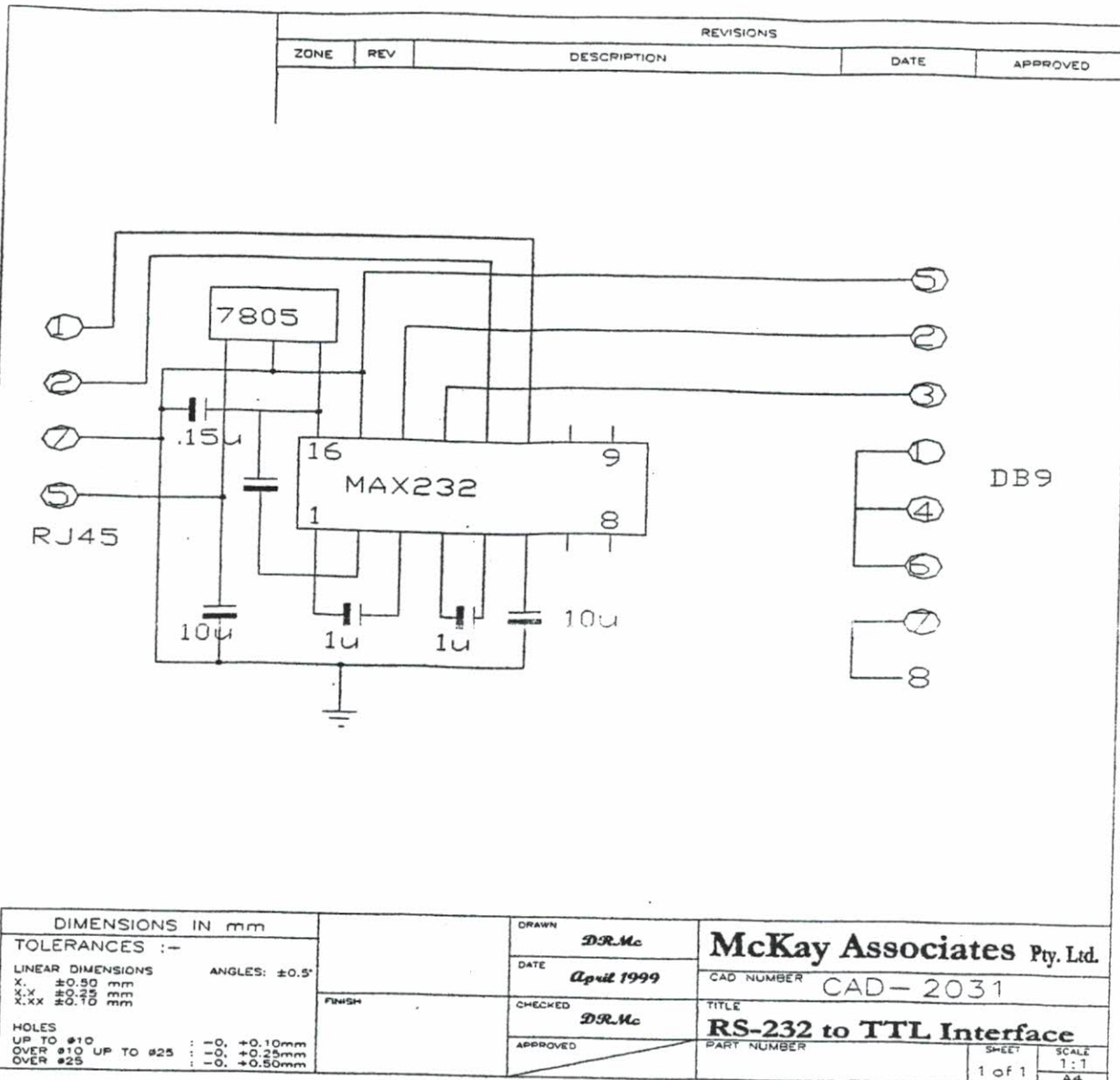
Try Glen Percy's site [www.users.bigpond.com/glen\\_percy/synmod.htm](http://www.users.bigpond.com/glen_percy/synmod.htm) as a good place to start for Syntrxs

[www.fortunecity.com/skyscraper/pentium/335](http://www.fortunecity.com/skyscraper/pentium/335) is a good place to start for FM9000 (including the Service Manual) and follow the links.

Many radios require the use of some sort of interface plus software for programming the radios. A good place to start for Motorola radios is the Batlabs site [www.batlabs.com](http://www.batlabs.com). This site has a huge amount of information about specific radios, building a RIB box, diagrams of interface cables and how to build a RICK box (go take a look to find out!!!).

Many commercial radios only need an interface that converts RS232 signals from your computer to the TTL levels required by the radio. The simple circuit below (based on a MAXAR MAX232 - about \$6 from Jack at Newtech) works very well. The one I built includes provision for both internal and external 12V. On the next page is my drawing of the RS232 to TTL converter I use - this unit is built in a small jiffy box with DB9 connectors. I then use a number of different interface cables for each type of radio.

One final comment. Quite often the radio manufacturer provides software which is only licenced to you. Trade in such software is considered verboten - Motorola especially have a real thing about this and actively pursue illegal users of their RSS (Radio Service Software).



**Denis McKay - VK2DMR - vk2dmr@mpx.com.au**

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## CONGRATULATIONS

Go to the following members:-

Peter Reid vk2hpr , Ken Dobell vk2zoo (What a call sign) and John Peary vk2hpj. All of the above attend the course with Vaughan vk2kbi at the TAFE in Wollongong and as you can see all got their HAM radio licenses. Lets hope they get much pleasure from HAM radio and have a long membership in the club. Some only have to upgrade to full call theory so good luck when you do. We also would like to wish a VERY warm welcome to Luke Neeson I take it Luke's studying at the Wollongong uni. He signed up to be a member of our club also Luke hope you have a happy and long stay with us. Hope to catch you on the repeaters one of these days.

## Pig to fly again soon

As you have read in the minutes of the September meeting. It looks like the Paket Internet Gateway ( THE PIG ) hopefully will be up and running very soon. Connectivity is an ISP here locally and the rate we get is TERRIFFIC. If any members are looking to get the INTERNET why not ask connectivity. More details about the gateway when they come to hand.

## VOLUNTEERS NEEDED.

Many members have returned there questionnaire. The club needs some volunteers to start an 80 meter and 2 meter net. If somebody has a nice speaking voice and is NOT mike shy! Could he or she approach the local community radio station 2vox fm and see if we can get a segment on there. I would suggest that we go

for about half hour maybe every two weeks but that will be up to the volunteer. Some members asked about having 6 meter to 2 meter gateways also a 6 meter paket radio frequency. Also there is a NEED for some member to teach MORSE. Can somebody contact the committee. I may EVEN be in that (ED)

We also had an offer of a FREE web page. I think we may ask Our isp for one but more on this later.

## CLUB SNOWBALL

At the club meeting in September it was agreed that the club will run a members snowball. The following are some rules of the snowball.

All financial members as at November meeting, can enter the draw. Each member will be given a number, this number will be as in the membership book. The snowball will start at the December meeting and will run to the June 2000 meeting. The starting prize will be \$20 and if NOT won will SNOWBALL by \$5 at the next meeting and keep snowballing until won. If won at any meeting the prize will go back to \$20 and start to snowball again until won. To win this snowball the member MUST be present at the meeting when his / her number is drawn. If the snowball is NOT won at any meeting it will be drawn at the AGM and the same rules apply. The committee will have the right to decide whom is eligible to win and NO correspondence will be entered into

# MEMBERS

## PROFILE

Rob Skelcher VK2TNK our President

Our hard working and enthusiastic Secretary/Editor has announced his intentions to get a self-written "profile" from various members of the I.A.R.S., I'm one of the first victims, so here goes.

I was born in Birmingham UK, as half of non-identical twins, in 1934. I don't remember this event (thank heaven!) but I can, just, remember my father's first solo in a tiger moth and the outbreak of war, both of which occurred in 1939. My parents evidently very soon tired of my company and I was dispatched to boarding school in 1943 and released in 1951. At sometime during this period my uncle Bill "G4Ocean India" attempted to interest me in Amateur radio. He managed to make it so boring that it was to be another 45 years before I tried again. By 1957 I had qualified as an Architect and after a trip around America and Canada, joined my Dad's business. I was actually quite keen on work but, when not in my office, filled the time by building and driving various racing cars, getting married, having kids and so on. We lived in Stratford Upon Avon and life was fun, but it was very regular routine.

During the mid 70's the U.K economy got out of control to the extent that even Architects made quite substantial profits. The

politicians reacted quickly ( for them) but not quickly enough. I had made sufficient to settle a rather depressing divorce, and have enough left to buy a yacht, sell up almost everything and start planning a major voyage. I was then 47 years old and felt that the time had come for a change of life. I had met several Australians ( actually my twin sister had married one) and knew a bit about OZ and it sounded as if this was the place to head for.

In August 1980 we departed from Falmouth, heading west. The aforementioned twin lived in a place called Wollongong and this was to be our destination. We told various Aussies, whom we met along the way, about this and they instantly fell about laughing!!

It took us 14 months to reach the 'gong', via the Caribbean, Panama canal and the Pacific ocean, and it was during this voyage that I became interested in Ham Radio. Lots of American boats are equipped with HF, some licensed and others 'pirate'. The one group, of course, will not speak to the other for fairly obvious reasons!

We stayed in Wollongong for 6 months during which I made contacts which eventually , 3 years later, enabled me to set up in business. We set off in April '82 again westward, homeward bound. I had obtained a marine-band HF, most of it's channels obsolete, but we used it for basic communications,  
continued next page

then I borrowed a receiver with which I could follow the Amateur traffic. It was great to hear weather reports from a yacht 200 miles ahead of you and know what to expect.

In Durban we met my old mate, jumbo g3lzn, and hit upon a plan. He had money in S.A. Which couldn't be taken out so he might as well spend it. We brought an Icom 720a all mode transceiver, and installed it in my boat with a hustler antenna with little whiskers thing sticking out of it, so that it worked over a wide range of frequencies. While in Durban we participated in an annual Ham event. The local operators, under the direction of Alistair ZS5MU, drive down to Durban and 'adopt' a yacht each, many of whom they have got to know over the air. In convoy of cars they are taken to Alistair's farm for a party and listen to Alistair's net 14.330MHz at 0530 Zulu.

From South Africa onwards I was able, carefully, to use the Icom to talk to friends on other yachts and sometimes to Rudi (whose call sign I can't remember and I wouldn't tell you if I could) who ran a net in the UK. I was using genuine call-sign, Hong Kong, whose owner had agreed not to operate till we got home. In return for the loan of the Icom. I had agreed to get it into the UK without paying import duty. It didn't seem a good idea to smuggle it, so I decided to resort to the principle that "Bullshit Baffles Brains". I succeeded in confusing the poor Customs Officer by getting the numbers wrong, saying it was

second hand, borrowed, it didn't work and even if it did I didn't know what it was supposed to do, That he eventually gave up in despair and signed the Clearance Certificate!! It took 14 months for Australia House London to give up trying to find a reason for refusing to allow us in, so off we set again in September 1984. We got bashed about a bit crossing the dreaded bay of Biscay but there after followed much the routine as the previous voyage, getting back to the Gong on 4th November 1985, being the only Wollongong yacht to circumnavigate from that city. I finally got around to doing something about Ham radio, after I met David vk2kwy in Mudgee. I joined the Society in about 94/95, I got my license in 1997. I still haven't got around to getting my full call. I am a retiree and pensioner so, in theory, should have plenty of time for it, but it doesn't seem to be happening, but my intentions are there. My views of Amateur Radio in general and CW in particular have already been made clear. I find the hobby interesting and rewarding, it's given me a lot and I hope to be able to put something back, but don't expect anything technical. If anyone has enough patience to help me into PAKET I think I'd like it. You can tell I've got a high-tech brain from the fact that my favorite means of land transport is a PUSH-BIKE and a sailing boat on water. Well Mr. editor that's my lot for this issue, hope it's of use.

Many thanks Rob for this article  
propagator November 99 Page Eight.

## NEWS EXTRA!!!!!!

In the article by Denis McKay the url for the syntrix radios is not to clear so here it is again.

[www.users.bigpond.com/glen\\_percy/synmod.htm](http://www.users.bigpond.com/glen_percy/synmod.htm)

I have just had some E mail from the Federal President of the W.I.A and he will be coming to our December 14<sup>th</sup> meeting. So if you had not planed on coming to this meeting it may be worth your while as Peter will talk on ANY subject you want and he will also answer any questions you may have about the W.I.A. The only thing he will NOT speak on CW for more than 15 minutes. So don't ask to many questions on this subject.

I have been asked to inform you AGAIN that if you would like to come to the field day at Gosford, which I think is February 26<sup>th</sup> 2000. So if you would like to go, yes I know that's a long way into the future, but Ken vk2tke would like to know so he can get a bus. So if you want to come to this great event start thinking about it now and save your pennies for the trip. A great day out is assured and you will be with like mined people and you never know may get your self a bargain as well. Only thing the bus is small so NO large Sat dishes!!!!!!!!!!!!!!!!!!!!

The club has received a letter from Peter Read vk2fpn. Peter was a former Editor of this news letter and a great job he did. He has offered the club some very old news letters and I have gone an collected them from him. This will make my job a

LOT easier as all i have to do now is RECYCLE some items. It's with regrets that he has also given up his membership in the I.A.R.S. I hope Peter you find time to get back into Ham Radio soon.

### CALLING ALL NET SURFERS.

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that the I.A.R.S users.

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As you have seen we now have two new advertisers. PLEASE support these companies. They support us.

The under \$10 auction went of VERY well. Some members spent up big. About \$5 and went home with truck loads of goodies. Lets hope the OVER \$10 goes as well, don't forget to bring your cash. Also don't forget the meat tray, you may go home with \$20 worth of meat, just for \$2.

Just another reminder that If you want to book your items in BEFORE the auction give me a call and i will give you and item number and list them on the sheet. The meeting place will be open from 7PM and any NO goods will be booked in AFTER 7:30PM !!!!!!!!!!!!!!!!!!!!!!!!!!!!!

## REPEATER REPORT – October 1999

On the 11/6/99, I met with two representatives from ACA at our Maddens Plains site to investigate the continuing intermodulation interference to our 6850 Rptr. (There was a very good article in last month's "Radio & Communications" about intermodulation - I highly recommend it so that you can fully appreciate the difficulty in resolving this problem we have on 6850). At this meeting our Rptr system was fully checked-out. Our RXer was OK, our TXer was clean, we had ample isolation between our RX & TX antennas plus between our RX antenna & CSR's TX antenna (more than 30dB better than is suggested), basically our system checked out fine.

Eventually (after many hours), they confirmed exactly what we had already determined was the problem. – that our Rptr was suffering from an intermodulation problem. We had previously determined this was the problem over many months of investigation, while ACA used a 14 page computer print-out of ALL intermodulation possibilities from ALL TXers in a 4klm radius, that could create an intermod on our 146.250MHz RX frequency. I've shown a few people this print-out & they are all amazed at the number of "hits" (as ACA calls them) that end up on 146.250MHz. Fortunately, most cause no problem as the TXers concerned are far enough away, but two of CSR's TXers "hit" our RXer square on.

The problem is due to a third order intermod, with the formula of  $A + B - C = 146.250\text{MHz}$ . Where A is our TXer – 146.850MHz, B is CSR's Control channel – 166.700MHz & C which is CSR's most recently installed trunk channel - 167.300MHz. Thus you can see, all 3 TXers have to be TXing to create the intermod.

So, after ACA confirmed what we already knew, the first question I asked was – how do we fix it? I was informed that the problem is due to some sort of rectification that appears to be up on the tower somewhere & "ACA doesn't climb towers". That was it. That was the end of ACA's help in the matter. Don't get me wrong, the gentlemen concerned were very pleasant, but even though they had confirmed the cause (a third-order intermod), our RXer was not protected from this, it wasn't their responsibility & that was the end to the matter. Some questions that come to mind are - why bother paying license fees? – what protection does it afford US? – what DO we get for our money?

Anyway, the interference continues. In the meantime, I contacted the site-owners. They initially appeared keen to assist us in the matter, but it's now been over 3 months since first contact about this matter & several phone calls later have been fruitless. We won't be giving up, but it looks like it maybe a "Millennium Project" the way we're going. By the way, if you would like to "tune-in" to CSR's frequencies they are: 166.700, 166.850, 167.00, 167.150 & 167.300MHz. (Don't let the kids listen – their users generate a lot of 4 letter words.)

JOTA has come & gone. Before the weekend, I had put together several "temporary" links to give the local kids access to more stations. 8225 (& UHF links) to 6975 & also 6850, plus linking the 10m Rptr into the systems. All worked well, except for the humungous amount of pirate Asian stations "chat-chat-chattering" away to themselves. The 10m Rptr only stayed connected for half an hour before I shut it down in disgust.

### MADDENS PLAINS

The new 6850 Rptr (based on the FM 814) is awaiting installation. The new RXer board is installed & PERHAPS it may handle the intermod better. (It could also be worse, but we won't know till we install the Rptr.) Also, the new 8725 is almost ready but our biggest obstacle in installing these new Rptrs, is the lack of space that we have available for our gear. We only now just manage to fit the current 6850 (& diplexer), 8725, Packet AMW-6 (& TNC), WIA Broadcast RXer, DTMF controller & link TXer to 8225 for the WIA Broadcast. Anyway, with a bit of modification (& a shoe-horn), we'll get the gear in there somehow.

### KNIGHTS HILL

The 2 new packet systems (VK2AMW-3 on 144.825 & VK2AMW-4 on 144.925) are working very well. They are connected "back-to-back" allowing access to different systems & services. Phil (TPH) & myself have had lengthy discussions re this site for packet & our plan is to both improve -3 & -4's coverage (beams & heliax) & to also add one or two more systems on different frequencies, all interconnected, to allow even greater freedom & access. In on one frequency, out on a choice of three others. (Hopefully soon, the "PIG" will be back on the air.)

Chris (XBC) & myself went to the site on the 6/10/99 to try installing two links from the UHF Linked system into 6975 & 8725. Unfortunately, the day didn't go well. As well as it pouring while we were there, the HIGH levels of RF made for some extremely weird happenings. We were hearing FM radio station audio coming through earth straps & our fingers touching the eqpmnt made either the volume level change or to change stations! We eventually left the site in darkness, with fog & rain & got home at 7.30pm. Unfortunately, further adjustments need to be made, including replacing 8225's TX crystal as it has gone

temperature sensitive. (Warm - lower freq./Cool - higher freq.)

### SADDLEBACK MTN

6975 is working very well. This is the new FM-814 Rptr & is doing a good job.

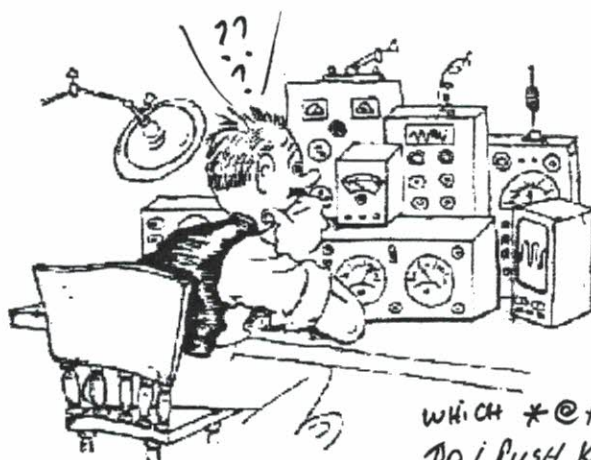
### MT BOYNE

Visited the site during the school hols & apart from some minor freq. & level adjustments everything fine. It is also an FM-814 Rptr with the digipeater on-site as well (VK2AMW-5 on 147.575MHz).

### MT MURRAY

VK2AMW-7 on 147.575 just keeps chugging away. No probs.

Better go, run out of space, till next time - Rob VK2MT.



### WANTED

Peter Reid, a new member, is looking for a 5 or 6 element beam for 2m. If you have something like this and NOT using it give him a call on 146.850 or 438.225.

Also a 2 met radio for his car any offers? His call vk2hpr or even catch him on a RUTTYS bus!!!!!!!!!!!!

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**REPEATERS**

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VK2RMP	146.850	VOICE	MADDENS PLAINS	
VK2RMP	438.725	VOICE	MADDENS PLAINS	
VK2RIS	146.975	VOICE	SADDLEBACK MT	
VK2RUW	29.620	VOICE	KNIGHTS HILL	(OFF AIR)
VK2RUW	438.225	VOICE	KNIGHTS HILL	VK2RGN,VK1RGI
<b><u>DIGI'S @ BBS'S.</u></b>				
VK2AMW-1	144.625	GATEWAY	WOLL UNI	(OFF AIR)
VK2AMW-3	144.825	PAKET	KNIGHTS HILL	VK2AMW-4
VK2AMW-4	144.925	PAKET	KNIGHTS HILL	VK2AMW-3
VK2AMW-5	147.575	PAKET	MT BOYNE	
VK2AMW-6	144.700	PAKET	MADDENS PLAINS	
VK2AMW-7	147.575	PAKET	MT MURRAY	
VK2XGJ	144.700	BBS	DAPTO	

CLUB MEETINGS HELD 2<sup>ND</sup> TUESDAY OF EVERY MONTH EXCEPT JANUARY @ 7:30PM IN THE S.E.S. HQ MONTAGUE ST NORTH W'GONG.  
 COMMITTEE MEETINGS HELD 3<sup>RD</sup> WEDNESDAY OF EVEN MONTHS.  
**MEMBERSHIP \$20 PA OR \$15 CONCESSIONS EXPIRING AFTER AGM.**

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**Disclaimer:** All comments are those of the EDITOR and not of any committee or club member. All projects are presented as given and if any damage is done to your equipment the club is NOT responsible!

HANDLE WITH ENTHUSIASM

LYLE PATISON VK2ALU  
98 HEASLIP STREET  
MANGERTON 2500



# THE PROPAGATOR

VK2AMW SINCE 1948

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