



# 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 in Montague Street North Wollongong.

VISITORS ARE MOST WELCOME

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Volume 94 Number 4

April 1994  
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## EDITORIAL

The next meeting (12/04/94) will have Warren Robinson giving a talk on communications in bushfire control. The John Moyle contest at Saddleback was unfortunately plagued by rain but the good news is Lyle (ALU) made two 10 GHz contacts over a distance of 111km to an area near Frenches Forest on SSB which was Lyle's first 10 GHz SSB contact !

## FOR SALE

JACARANDA TREES about 12 inch high in 6 inch pots.  
\$4 each all proceeds go to club fund.  
Contact Brian VK2UBF on the Monday night net or on 145.650 most of the time after hours.

## LOST !!!!

At Saddleback Mountain.  
One ruined plastic shopping bag.  
The finder can keep the bag, but I'd dearly love to have the tent pegs and hammer that it contained. It's almost a matter of life and death - my wife will kill me if I don't get them back.  
I'll be at the meeting on Tuesday.  
Thanks. Peter VK2FPN.

## THROW-OUT of Bits and Pieces.

In the next six monthly cleanup, about the middle of April, I will be attempting to dispose of various bits and pieces of radio gear - some of that accumulated over many years!  
It will include Siemens Model 100 teleprinters and all sorts of odds and ends. If anyone is interested they are welcome to come and cart away anything that they want. If there is anything special in the way of older type (or maybe not so old, in some cases) of items that you are looking for, let me know and I will see if such is available. Lyle.....VK2ALU.

# THE ULTIMATE PSU /



Continuing from the last article on the ultimate PSU which appeared in the July 93 issue of the Propagator we'll now go onto heatsinks.

## HEAT SINKING CONSIDERATIONS

Firstly some definitions -

Max. temp. of junction =  $T_j \text{ max}$   
Max. ambient temp =  $T_a \text{ max}$   
Max. power to be dissipated =  $P_{\text{tot max}}$

The thermal resistance from junction to air ( $R_{j-a}$ ) in  $^{\circ}\text{C}/\text{watt} = (T_j \text{ max} - T_a \text{ max}) / P_{\text{tot max}}$

A simple analogy to help you recall this is to liken power to current, temperature drop to voltage drop and thermal resistance to electrical resistance.

$R_{j-a}$  is made up of a set of series thermal resistances.

$R_{j-c}$  = junction to case  
 $R_{c-h}$  = case to heatsink  
 $R_{h-a}$  = heatsink to ambient

$R_{j-a} = R_{j-c} + R_{c-h} + R_{h-a}$

Some typical  $R_{j-c}$  values are :-

Transistor case style	$R_{j-c}$
TO 5	35 $^{\circ}\text{C}/\text{W}$
TO 66	5 $^{\circ}\text{C}/\text{W}$
TO 3	1.52 $^{\circ}\text{C}/\text{W}$
TO 36	0.5 to 0.8 $^{\circ}\text{C}/\text{W}$

Diode case style	$R_{j-c}$
DO 4	2.5 to 7 $^{\circ}\text{C}/\text{W}$
DO 5 (Small stud)	0.4 to 1 $^{\circ}\text{C}/\text{W}$
GE 128 (3/4 "Ø stud)	0.18 to 0.3 $^{\circ}\text{C}/\text{W}$
DO 200AA (flange)	0.12 $^{\circ}\text{C}/\text{W}$

$R_{c-h}$  is usually about 0.5 $^{\circ}\text{C}/\text{W}$ , almost independant of what you do. Use a mica or nylon insulator and  $R_{c-h}$  will increase. Cut a neat thread for the stud in the heat sink and  $R_{c-h}$  will reduce. Always use a heat-conducting grease and follow the manufactures advice about torque levels on stud nuts.

Consider the ubiquitous 2N3055 in a TO 3 case.

$$\begin{aligned}R_{j-c} &= 1.5 \text{ }^{\circ}\text{C}/\text{W} \\R_{c-h} &= 0.5 \text{ }^{\circ}\text{C}/\text{W} \\ \therefore R_{j-h} &= 2.0 \text{ }^{\circ}\text{C}/\text{W}\end{aligned}$$

So, for every watt to be dissipated steadily we will get a 2  $^{\circ}\text{C}$  rise above ambient.

$T_j \text{ max}$  for a 2N3055 is 200 $^{\circ}\text{C}$ . If operated at this temperature this will lead to premature failure. So design for  $T_j \text{ max}$  of 125  $^{\circ}\text{C}$  say. Expect  $T_a \text{ max}$  of 40  $^{\circ}\text{C}$ . If the heat sink were infinite :-

$$P_{\text{tot max}} = (125^{\circ} - 40^{\circ}) / 2 \text{ }^{\circ}\text{C}/\text{W} = 42.5 \text{ Watts}$$

Hence, with a pass transistor voltage drop of 3 V, max pass current =  $42.5 / 3 = 14.2 \text{ A}$

However an infinite heat sink is unlikely and 14.2 A is very close to the limit of the 2N3055 (15A).

A typically available heat sink, using a natural convection, mounted vertically, with a rough black surace can have  $R_{h-a}$  of 0.9 to 4  $^{\circ}\text{C}/\text{W}$  depending on its area.

$$\begin{aligned}
 R_{j-a} &= R_{j-c} + R_{c-h} + R_{h-a} \\
 &= 1.5 + 0.5 + 1.5 \\
 &= 3.5 \text{ } ^\circ\text{C/W}
 \end{aligned}$$

Allowing a max temp drop from junction to ambient of  $125^\circ - 40^\circ = 85^\circ\text{C}$ , the maximum power that can be dissipated,

$$P_{\text{tot max}} = 85 / 3.5 = 24 \text{ W} \quad (8\text{A @ } 3\text{V drop}).$$

What happens when we talk 60 A ?

$$P_{\text{tot}} = 60 \times 3 = 180 \text{ W}$$

$$\Delta T = 85^\circ \text{C}$$

$$R_{j-a} = 95/180 < 0.5 \text{ } ^\circ\text{C/W} \quad \text{Which can't be done !!}$$

Now we can see the benefit of large C, So that  $\Delta V$  across the pass resistor can be kept small at max. load.

Let's try 10 x 2N3055's. If the load is equalised, each tries to dissipate  $6\text{A} \times 3\text{V} = 18 \text{ W}$  and gets temperature rise to heat sink of  $18 \times 2 = 36^\circ\text{C}$ . ( $R_{j-c} = 1.5 \text{ } ^\circ\text{C/W}$  and  $R_{c-h} = 0.5 \text{ } ^\circ\text{C/W}$ ) This leaves the heat sink temperature rise to be a max of  $85 - 36 = 49^\circ\text{C}$ .

So the heat sink must dissipate 180 W over  $49^\circ\text{C} = 0.25 \text{ } ^\circ\text{C/W}$ .

This may be achievable with forced air draft cooling. For natural convection such a heat sink would have a volume of about 400 cubic inches. ( $4'' \times 10'' \times 10''$ ). That's quite a bit of chassis real estate and bank balance !

Also we can see what happens if we use GE pass transistors with their max  $T_j$  of  $110^\circ \text{C}$  which we would need to derate to say  $80^\circ\text{C}$  so we don't experience rapid degradation.

Allow 2V drop and try 6A per device.

$$\text{Case TO36} \quad R_{j-c} = 0.5 \text{ } ^\circ\text{C/W}, \quad R_{c-h} = 0.5 \text{ } ^\circ\text{C/W}, \quad R_{j-h} = 1.0 \text{ } ^\circ\text{C/W}.$$

Put 10 transistors in parallel for say 50 A.

$$\therefore I \text{ each} = 5\text{A}. \quad \text{Max } P_{\text{tot}} = 10 \text{ W each}. \quad \text{Temp rise} = 10^\circ\text{C} \quad (10 \text{ W} \times 1 \text{ } ^\circ\text{C/W})$$

With an ambient of  $40^\circ\text{C/W}$ . This leaves  $30^\circ\text{C}$  for the heat sink to dissipate  $50\text{A} \times 2\text{V} = 100\text{W}$

$$= 0.3 \text{ } ^\circ\text{C/W}$$

$$= 250 \text{ cubic inches of heat sink or forced air cooling.}$$

So don't overlook use of GE pass transistors particularly if you can find either a transformer close to the required voltage (See previous tables) or a CV transformer, so that transformer voltage change from no load to full load is small (Good load regulation).

The same calculations as used for pass transistors apply to heat sinking of diodes.

In both cases avoid mica (or similar) insulators between the case and the heatsink; it is better to insulate the chassis by using nylon bushes and bolts. In such large PSU's copper strap between the rectifier stack and the heat sink, between the heat sink and the output terminals will improve load regulation but allow for expansion of the copper and heat sinks under load.

When putting the rectifier stack together, putting 10 nF disc ceramic capacitors across the diodes will almost always lift you from Class A to Class B suppression. The following formula is an approximation :-

$$R_{\text{thermal}} = \text{Temperature difference} / \text{Power dissipated}$$

The assumptions made are :-

1. Heat transmission from the die junction is uniform (no local hot spots).
2. Heat transmission from the diode body to the heat sink is by conduction and from the heat sink to air is by radiation and convection.

Problems are :-

1. We know the diode body radiates;
2. Conduction and convection can be predicted by linear temperature difference relations, like the formula above but
3. Radiation is proportional to  $[(T_{\text{diode}})^4 - (T_{\text{ambient}})^4]$  and moderated by the colour and texture of the radiating surface. The texture alone can alter the heat emission by a factor of 20 (rough black surface  $E = 0.96$ , smooth clean aluminium  $E = 0.04$  to  $0.05$ ). If the max die temperature is designed for  $40^\circ\text{C}$  above an ambient of  $40^\circ\text{C}$  about a quarter the heat will be dissipated compared with designing for  $120^\circ\text{C}$  above  $40^\circ\text{C}$  ambient.

The lesson here is, even when you have used the formulae, they are only approximations. You should build a prototype PSU and test it under part and full load conditions to measure the realised steady state temperature rise of the heat sink above ambient, at several ambient temperatures up to  $40^\circ\text{C}$ . The reason for trying part load is that max power dissipation may occur at less than full load because of transformer and diode volt drop. Also remember to CALCULATE your diode junction temperature to ensure it doesn't exceed your design level; heat sink temperature is less than junction temp. Exit temperature from forced air draft cooling is not a reliable design criterion but if you were using liquid cooling, then temperature rise from inlet to outlet would be very useful.

## REFERENCES

- Rogers GF & Mayhew YR "Engineering Thermodynamics"
- RCA "Transistor, Thyristor & Diode Manual"
- International Rectifier "Semiconductor Selection Catalogue"
- Powerbox "DC Power Supply Catalogue"
- 73 Amateur Radio Today, March 1993, Pages 10-12
- General Electric Semiconductor Catalogue
- ARRL Handbook

### 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, scales, safes, compressors
6. We buy all metals including platinum and gold
7. Two acres jammed full of practical and valuable government disposals

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the best**

**place for value**

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## WAY BACK THEN

## Episode 28 ..... 1982.

(i) Period of intensive work on repeaters.

(ii) Graeme Dowse, VK2CAG, made Life Member.

(iii) Club members put their RTTY gear to work. (iv) Sunday evening RTTY broadcast on VK2RAW.

A great deal of work was carried out on repeaters by the Repeater Committee, assisted by a large group of club members, during 1982 - including the following:-

Feb - The security cubicle was completed and installed underground at Mt Murray for VK2RAW and a new antenna mast erected.

Mar - Equipment was installed in the cubicle.

Apr - The antenna and mast at VK2RAW was blown down in a severe storm. The original mast was replaced and a dipole antenna was installed on it, as a temporary measure, until the new mast could be repaired and replaced.

Jun - UHF repeater VK2RUW was moved to the Coastguard site at Hill 60, Pt Kembla. New mast at Mt Murray repaired.

Jul - A 25W solid state P.A. was made up to replace the valve unit of VK2RAW at Mt Murray.

Aug - A 6dB gain antenna was purchased and installed at Mt Murray. All remaining equipment, including the transmitter and new P.A. were installed in the new cubicle. Cavity filters were installed to eliminate receiver de-sense problems.

Sep - VK2RAW repeater was completely re-aligned and tested, using the D.O.C spectrum analyser.

Oct - New batteries and charging system installed at Mt Murray. Construction commenced on new 2m repeater for Sublime Pt.

Nov - Transmit antenna at Mt Murray damaged by storm. Temporary antenna installed.

Dec - Construction completed of main section of new 2 metre repeater. Checks made, using spectrum analyser, and on-air tests carried out, on an attended basis.

At the September monthly meeting, the IARS conferred well deserved Life Membership on Graeme Dowse, VK2CAG, in recognition of his outstanding work, over a long period, on the club's repeaters. In fact, Graeme still gives valuable assistance from time to time to help sort out repeater problems which require his expertise.

At the AGM, held in March, the following were elected Pres. Keith VK2OB, VP. Dennis VK2DMR, Sec. Dave VK2PBP, Treas. Geoff VK2ZHU. Committee VK2's EMV, JT, DXJ and PHD.

Although the club's "resident cartoonist", Brian, VK2AXI, left Wollongong in March, he continued to provide us with cartoons for the Propagator for some years. By popular demand ("royal decree") an 8 page insert was included in the December issue. It contained a selection of some 26 of the earlier cartoons.

The first report of Pager interference to amateur 2 metre repeaters was noted in April. VK2RWI at Dural and the High Range repeater were directly affected. VK2RAW also suffered from interference problems, which were reported to D.O.C.

Approx. 150 Siemens Model 100 teleprinters became available at Cavions in September. A group from our club were allowed to select the better units, which were purchased by various members for \$20 each. This resulted in a spate of local RTTY activity, some on HF but mainly on 2 metres.

Much information appeared in subsequent issues of the Propagator, on how to construct the necessary RTTY terminals and get the systems working, as well as tutorial material on RTTY theory.

The October Propagator contained an announcement that monthly Sunday evening RTTY broadcasts on VK2RAW would cover matters of interest to IARS members.

Club members set up amateur stations at Mt Keira Girl Guides Camp, Kiama Scout Clubhouse, Robertson Scout Hall and Grey's Point Scout Hall over the October JOTA weekend.

Talks etc. given at monthly meetings included -

Feb - Talk "The Amateur Experimenter is Dead" - Roger Harrison VK2ZTB Apr - Talk "Police Communications" - Ray O'Grady.

May - Display of Amateur Equipment - Barry Hartley of Macelec. Demonstration of RTTY/Morse/ASCII decoder - Don, VK2WB.

Demonstration of Keyboard, Paddle and Accukeyer - Ned, VK2AGV.

Jun - Talk "Amateur Television" - John, VK2ZUH and Bob, VK2YOD.

Jul - Talk "Moonbounce at Dapto" - Lyle, VK2ALU.

Aug - Demonstration of CMOS Keyer - Ken, VK2DOI.

Sep - Mini Auction. Talk on WIA - Sue Brown, VK2BSB, President N.S.W. Division. Slides on Dural - Jeff Pages, VK2BYY.

Oct - Talk on ANARTS - Sid Molen, VK2SG.

Nov - Talk and Demo. on IC1000 RTTY Terminal and Robo 800 Terminal/Keyboard - Ian, VK2DGA.

A Christmas Barbeque was held at Macquarie Park Nursery. Albion Park on December 19. Attendance was rated as disappointing- "only half-a-dozen members and their families turned up".

Lyle VK2ALU.

# **NEWTEC ELECTRONICS**

**Reseller for :-**

**Altronic, Arista, Jaycar, Rod Irving**

**Stockist of :-**

**Alarm accessories, UHF antennae, tools, computer accessories, test equipment, cable, R.F. sprays and electrical components for the Professional, Amateur and Hobbyist.**

**Call in and see Jack at :-**

**102 Kembla St. Wollongong**

**Phone & Fax 27 1620**

**If we haven't got it**

**we'll be happy to get it in**

# CRYSTAL SOURCE FOR 828'S

Hopefully elsewhere in this issue, I will have had time to type up some info regarding the Philips FM 828. Apart from that stuff, I also wanted to pass onto other Club members a good place to obtain Crystals for these (& any other X-tal locked radios).

On behalf of John, Dave, Lyle & myself, I contacted the company RAKON in Melbourne, to order some X-tals for our 828's. I spoke to a lady named Robyn, who is the Sales Office Manager. She was very pleasant & helpful, & as I found over the next few days very patient, (we changed our order three times).

RAKON take Mastercard/Bankcard/Visa Phone Orders & have a 10 day delivery service (less if you want to pay a little bit more). You can also have Wards Overnight Express for only a dollar or so more than Australia Post.

I mentioned to her that if we 4 were successful in our conversion of these 828's to our Amateur Band, that other Club members may avail themselves of RAKON's services. She said if that were the case, they would be able to offer over a \$5 discount on each X-tal. As it turned out, as a token of goodwill I suppose, they also (without my knowledge), discounted the cost of the 10 X-tals we had just ordered.

Now I guess this is a blatant advertisement to RAKON (notice I type their name in caps), but when a business goes out of their way to help the individual or a small group of people like ourselves, I for one am very keen to support them. So, if you need to buy X-tals in the future, for 828's or whatever, consider purchasing them from RAKON. Their details follow...

RAKON Australia Pty Ltd  
Tel: (03) 720 5277                      Fax: (03) 720 4436  
6A The Mall  
Wantirna Vic. 3152

Normal X-tal Prices:  
1 only/\$24.68 each  
2-4 (same freq)/\$23.23 each  
5-9 (same freq)/\$22.32 each

IARS "Special" Price:    \$19.36 each X-tal    Pack & Post    Wards Overnight    \$8.75

It would be advantageous to us (& them) if we pooled our orders to get the discount & share the P & P costs. Don't forget to mention the IARS (& my name if you like).

## REPEATER REPORT    2/3 - 3/4/1994

VK2RAW (6850) - On Wednesday (23/3) I took a day off from the Salt Mine to do a bit of work at Mt Murray. Planned to do 3 things...

- 1) - Install a new board on the existing rptr control bd to give the rptr some new functions.
- 2) - Install a new antenna to provide a stronger signal to 8225 rptr for the Sunday WIA Broadcasts.
- 3) - Check/fix the Solar Panel Regulator feeding the batteries.

The new board contains 4 new rptr functions. It's main purpose was to bring 6850 "into line" with the Society's other three rptrs. Those functions being a 5 second tail with a "beep" to indicate time-out reset, courtesy ident (the rptr ident waits till the end of your over before triggering) & a "tail remover". This last function is for JOTA Satellite linking of rptrs. (As discussed in previous Reports, the way Optus connects two rptrs together, one of them has to have no tail, otherwise the whole system locks-up.) The "tail-remover" is controllable remotely via DTMF.

The installation of this new board went well, although rather slow due to being very careful not to let any of that expensive smoke escape from any of the components. Connected the board to a spare switchable input to the TXer controller, so that if the new board were to fail (heaven forbid), just switching to the old position will return the rptr to it's "old" mode of operation.

The longer tail & beep, have become quite popular & common overseas & have some quite good advantages to the short tail. The idea of the beep (besides indicating when the timeout timer has reset), is to try & increase the time between operator's overs & "force" them to give a pause, thus allowing breakers & emergency traffic into a QSO. The longer tail also has a few advantages. It allows users with handhelds up to 5 secs at a time to find the best RXed signal strength from the rptr, thus stopping the annoying multiple "kerchunking" of

the rptr with a short tail. It also allows users/listeners, who are on the "fringe" of reception, to turn off their radio's mute, thus stopping the cutting in & out of signal when getting weak, (they won't have white noise between overs like with a short tail). It could also be considered that having the TXer keyed on continuously, instead of on/off/on/off/etc, may be "kinder" to the rptr's components. Also, it is more pleasant to listen to the continuous tail, then hearing your radio's mute closing after every over (as well as the rptr's). Anyway, some will like it, some will not, to each is own. At least all our Club's rptr systems have a degree of "conformity".

A UHF Yagi was installed to increase the signal strength sent over to Knights Hill, for the relaying of the WIA Broadcasts. This new antenna was installed about 10 metres up the tower, with a new feedline being run into the cubicle as well. Installation went "relatively" well, except for trying to get the RG-213 in via the conduit. It was extremely unco-operative to put it mildly... Anyway, it lost the battle, & the signal to 8225 has been greatly improved.

At this point, it was 1600 & I had been there for 6 hours (oh, how time flies...), so decided to call it quits. The Regulator check-up can wait for another day.

VK2RIL (5650) - Nothing much to report. Everything working wonderfully well without the intervention of those lovely Pagers. This new frequency is so peaceful & quiet (both on the input & output). It definitely soothes the nerves of a "pager-jangled" rptr officer! The list of different callsigns using/returning to the rptr since the frequency change is very encouraging. By the way, we are still "testing" this new frequency & look forward to any user's comments on the frequency. The quest for a better site is still progressing & there are a few leads we are following, with one being rather optimistic.

VK2RUW (8225) - In last month's Report, we mentioned that we were looking at changing the 10m Gateway frequency again. We started off on 29.290MHz, which attracted a lot of JA users (being 10kHz below their domestic Call Channel), but caused problems to our "sister" Gateway (VK4RLB) in Brisbane. Moved to 29.040 upon their suggestion, but then we started suffering from occasional interference. So on the 7/3, Peter (BIT) was set to head over & change to another frequency, when the Gateway itself promptly failed. Upon arrival at the site, Peter found the 20A P/S had ceased to perform it's duties due to a 35A rectifier bridge biting the proverbial dust. As he

didn't have a bridge on him at the time, (doesn't everybody have a 35A bridge in their pocket for just such an occasion???) removed the P/S & brought it down to the next night's Club meeting for repair. Connected the Gateway to the cubicle's batteries till the P/S was returned. (The 10m Gateway is normally run from the P/S not the batteries, so that if there is an emergency of soughts & mains power is lost to the site, the UHF rptr can run for the longest time possible without the rather severe current drain from the Gateway, around 15A continuous when in TXmit).

The Bridge Rectifier was replaced at the next night's meeting & the P/S was returned by Peter on Thursday. Since shifting to 29.020MHz, the interference we occasionally suffer, is less than 29.040, but not by much. Since the change, it's taken a while for our DX regulars to find us again, but most have "found" us.

The 8225 rptr itself is basically working well, but there is some unexplainable interference that occasionally pops up. It manifests itself as severe static or noise over the top of signals. Sometimes it sounds like rectification from metal components on the support tower, but other times nothing like it. It is presently very intermittent & of course doesn't do it when someone is on site.

The latest report from VK1 is that the link eqpmt to connect us (& Goulburn) to 8525 Mt Ginini is progressing well. Apparently, the word is that the present (new?) VK1 Council is very supportive to the idea & are "pushing" for it's installation. Time will tell...

VK2RIL (8725) - Nothing to report. Rptr is performing fine, but with a better site for it & 5650, the useage would probably be increased.

We have also been supplied with 10 brand new, good quality "keyed-alike" padlocks for all our sites. The padlock situation had become rather critical with the damage incurred from attempted break-ins. This new supply came at a very convenient time, otherwise the Club would have had to start buying new padlocks (around \$30 a piece). We would like to say a BIG Thankyou to the person who supplied them, but we can't due to "security" reasons, but he (or she), knows who they are. Thanks. Till next time - Rob (VK2MT)

PS: After my rather undeserved presentation of the "Leather Tongue Award", I must warn all rptr users, that I am quite keen to pass on this prestigious trophy to someone of a more deserving nature. As such, watch out, you "Time-out", double over someone, forget the rptr offset & operate simplex on the rptr's frequency, etc & I'll be listening. I don't bear grudges, I get even...

\* \* \*

Minutes of Committee Meeting of IARS held at SES HQ. Montague St.  
Nth. Wollongong on 15.3.94

Start: 19.45

Present: VK2-UBF, UR, KWG, MT, SRB, ZWG

Apologies: KLH

Minutes of Previous Meeting were read and Confirmed Moved Brian UBF Sec. Jim ZWG

Matters arising from the Minutes:

Brian UBF as "Important Notice to all Members" re Annual Fees was not reported to Gen. Meeting discussion in Gen. Business

Correspondence In:

Newsletter "Dragnet" SGARC

Aparatus Licence Accounts received from SMA

Cheque Book from IMB for Club Treasurer

1994 Calender WIA

Phone call V. Varley Wollongong Mall re "Easter Show comes to Town" IARS participation.

Acc. re Mailing of March issue of "Propagator" P.G & S.A READ.

Correspondence Out:

Cheque P.G & S.A READ

Cheque SMA re Apparatus Licences

"Application for Membership" V. Williamson acceptance

Treasurers Report:

Balance: \$456.43

Income: \$20 Membership Fees

\$105 from VK2YKQ for 3 FM 828 Radios

\$70 " VK2XGJ for 2 FM 828 Radios

\$105 From VK2EZD & VK2ALU for purchase of FM 828 Radios

Total Income for the Month \$300

Total Acc. Payable for Month \$401.80

Balance: \$344.63

Presented by Brian UBF

Repeater Report:

Favourable reports on Repeater change of Freq. at Sublime Point 145.650

Work to be done on Mt. Murray Repeater on Sunday 20.3.94

Presented by Rob. MT.

Gen. Business:

V. Williamson accepted as new member call sign (VK2KBI)

New intending Member Martin Way invited to next Club Meeting

Future of TAFE Course in Amateur Radio discussed - Letter to be drafted to Phil. Williams TAFE re information on commencement of Course

Discussion on involvement of WEA in setting up Course

Brian UBF suggested "Notice to Members" re Annual Fees be brought to next Gen. Meeting in April without fail

Membership Fees are due at Annual General Meeting - Members not financial by August General Meeting will not receive copies of the "propagator"

Brian UBF discussed "Recruit a Member" campaign - Members bringing in new Members will receive a \$5 discount on Membership Fees

Brian to frame letter on this proposal for "Propagator"

Meeting Closed: 20.45



MICEL

ENCLOSED ITEMS ARE FOR PROPAGATOR TO RUN UNTIL

JULY ISSUE.

\*\*\*FROM THE TREASURER\*\*\*

KINDLY READ IMPORTANT MESSAGE ELSEWHERE IN THIS ISSUE.

AS MEMBERSHIP RENEWALS ARE DUE SHORTLY FOR A LIMITED TIME  
WE ARE OFFERING A DISCOUNT. YES YOU READ ME CORRECTLY!

HOW DO I APPLY:- WELL. SIGN UP A NEW MEMBER AND RECEIVE  
A \$5 DISCOUNT ON YOUR MEMBERSHIP WITH EVERY NEW MEMBER  
YOU SIGN UP. IF YOU SIGN UP ENOUGH NEW MEMBERS YOU WILL  
GET YOUR MEMBERSHIP FREE. THINK ABOUT IT.

YOURS BRIAN JK2UBF.

I WOULD HAVE SENT THIS TO YOU VIA XCS BUT HAVEN'T WORKED  
OUT THAT SIDE OF MY PACKET SYSTEM YET.

BRIAN.

**\*\*\*\*IMPORTANT NOTICE TO ALL MEMBERS\*\*\*\***

MEMBERSHIP FEES ARE DUE TO BE PAID BY AUGUST MEETING.  
KINDLY FILL OUT BELOW AND BRING TO NEXT MEETING OR  
MAIL TO:

THE TREASURER  
I.A.R.S.  
PO BOX 1838  
WOLLONGONG NSW 2500

NAME:.....

ADDRESS.....

SUBURB.....

POST CODE.....

CALL:VK .....

FULL MEMBERSHIP   \$20 PA.  
CONCESSIONS       \$15 PA.

UNPAID MEMBERS WILL CEASE TO RECEIVE THE PROPAGATOR .

!

TREASURER

# MURPHY'S LAW

The principle that whatever can possibly go wrong will  
(Funk and Wagnalls, Standard College Dictionary)

## MURPHY'S LAW

If anything can go wrong, it will.

### Corollaries:

1. Nothing is as easy as it looks.
2. Everything takes longer than you think.
3. If there is a possibility of several things going wrong, the one that will cost the most damage will be the one to go wrong.
4. If you perceive that there are four possible ways in which a procedure can go wrong, and circumvent these, then a fifth way will promptly develop.
5. Left to themselves, things tend to go from bad to worse.
6. Whenever you set out to do something, something else must be done first.
7. Every solution breeds new problems.
8. It is impossible to make anything foolproof because fools are so ingenious.
9. Nature always sides with the hidden flaw.
10. Mother Nature is a bitch.

## THE MURPHY PHILOSOPHY

Smile...tomorrow will be worse.

## MURPHY'S CONSTANT

Matter will be damaged in direct proportion to its value.

## QUANTIZATION REVISION OF MURPHY'S LAW

Everything goes wrong all at once.

## HILL'S COMMENTARIES ON MURPHY'S LAW

1. If we lose too much by having things go wrong, take all possible care.
2. If we have nothing to lose by change, relax.
3. If we have everything to gain by change, relax.
4. If it doesn't matter, it doesn't matter.

## O'TOOLE'S COMMENTARY ON MURPHY'S LAW

Murphy was an optimist.

## ZYMURGY'S SEVENTH EXCEPTION TO MURPHY'S LAW

When it rains, it pours.

## BOILINGS POSTULATE

If you're feeling good, don't worry.  
You'll get over it.

## ILES' LAW

There are always an easier way to do it.

### Corollaries :

1. When looking directly at the easier way, especially for long periods, you will not see it.
2. Neither will Iles.

## CHISHOLM'S SECOND LAW

When things are going well, something will go wrong.

### Corollaries :

1. When things just can't get any worse, they will.
2. Anytime things appear to be going better, you have overlooked something.

## CHISHOLM'S THIRD LAW

Proposals, as understood by the proposer, will be judged otherwise by others.

### Corollaries :

1. If you explain so clearly that nobody can misunderstand, somebody will.
2. If you do something which you are sure will meet with everybody's approval, somebody won't like it.
3. Procedures devised to implement the purpose won't quite work.

## SCOTT'S FIRST LAW

No matter what goes wrong, it will probably look right.

## SCOTT'S SECOND LAW

When an error has been detected and corrected, it will be found to have been correct in the first place.

### Corollary :

After the correction has been found in error, it will be impossible to fit the original quantity back into the equation.

## FINAGLE'S FIRST LAW

If an experiment works, something has gone wrong.

## FINAGLE'S SECOND LAW

No matter what the anticipated result, there will always be someone eager to

- (a) misinterpret it,
- (b) fake it, or

(c) believe it happened to his own pet theory.

## FINAGLE'S THIRD LAW

In any collection of data, the figure most obviously correct, beyond all need of checking, is the mistake.

### Corollaries :

1. No one whom you ask for help will see it.
2. Everyone who stops by with unsought advice will see it immediately.

## FINAGLE'S FOURTH LAW

Once a job is fouled up, anything done to improve it only makes it worse.

## FINAGLE'S RULES

1. To study a subject best, understand it thoroughly before you start.
2. Always keep a record of data, it indicates you've been working.
3. Always draw your curves, then plot your reading.
4. In case of doubt, make it sound convincing.
5. Experiments should be reproducible, they all should fail in the same way.
6. Do not believe in miracles, rely on them.

## WINGO'S AXIOM

All Finagle's laws may be bypassed by learning the simple art of doing without thinking.

## GINSBERG'S THEOREM

1. You can't win.
2. You can't break even.
3. You can't even quit the game.

## FREEMAN'S COMMENTARY ON THE GINSBERG'S THEOREM

Every major philosophy that attempts to make life seem meaningful is based on the negation of one part of Ginsberg's Theorem.

1. Capitalism is based on the assumption that you can win.
2. Socialism is based on the assumption that you can break even.
3. Mysticism is based on the assumption that you can quit the game.

735. JIM. UK2ZUG.

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