



THE PROPAGATOR



MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY
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MEETINGS ARE HELD ON THE SECOND TUESDAY OF EACH MONTH
(EXCEPT JANUARY) AT 7:30 PM AT THE STATE EMERGENCY SERVICES
BUILDING, MONTAGUE STREET, NORTH WOLLONGONG.
VISITORS ARE WELCOME TO ATTEND MEETINGS.

THE JULY MEETING -: The next meeting of the Illawarra Amateur Radio Society will be held on Tuesday 9th July at the usual meeting rooms at the S.E.S. Headquarters in Montague Street, North Wollongong.

THIS MONTHS SPEAKER WILL BE BRUCE BERESFORD VK2RT WITH A TALK ON FERGUSON BIG BOARD COMPUTER AND THE EXCHANGE OF DATA ON PACKET RADIO. IF YOU MISSED THE LAST ONE DO NOT MISS THIS ONE VK2DFK MIKE.

THE JUNE MEETING -: Last months meeting was another well attended affair with about 50 members and 1 visitor attending.

The meeting was opened by Keith VK2OB, Society President, who introduced Roger Graham VK2AIV to explain how he made his Siemens M 100 teleprinter into a cheap computer printer for the Apple (or similar) computer. Roger showed us the circuit he used as the interface to drive the 40 mA loop in the M 100 from the standard games port. He also explained how he converted the ASCII from the computer to the Baudot code used by the M 100, and showed the machine language program used to achieve the conversion.

In the general business that followed, Peter VK2XAN reminded all that JOTA is just around the corner and that now is the time to start preparing sites and equipment for the event.

To finish the meeting, Keith, VK2OB gave a talk on transmission lines and antennas, and dispelled many myths and fallacies regarding matching the antenna to the transmission line.

Congratulations to Martin VK2BMH (formerly VK2VMH) on his updated callsign after the last exam.

REPEATER REPORT GRAEME VK2CAG

STORM DAMAGE

The storm that hit Wollongong on Wednesday night 6/6/85 caused considerable damage to the repeater installations at Sublime point and Hill 60. Strangely enough, Mt. Murray came through unscathed. This is unusual, as Mt. Murray usually cops the worst of the wind and the other repeaters are the ones to survive.

At Hill 60 a piece of roofing iron came adrift from the coastguard building and cut through thr transmit antenna of UHF channel 8225. The innards of the co-axial collinear remained intact and the outer fibreglass sheath broke causing the antenna to lay horizontally with its end wedged firmly in the gutter of the building. The broken antenna has been removed for repairs and has been temporarily replaced with a 2-stack five-eighths vertical on loan from Ian VK2EXN.

At Sublime point the mast was bent over by the wind, and is at present leaning at 45 degrees to the north-west. Both 2 metre and 70 cm. repeaters are functioning, but their range is reduced because of the attitude of the aerials. One of the commercial base stations at the same site was damaged by lightning also, so we came out of it fairly well. It may be quite some time before the mast is repaired as a crane will have to be used to lower the tilt-over section and the ground will have to dry out properly to enable safe access for a crane.

We have disposed of the surplus cavity resonators that came out of the old Mt. Murray installation prior to the duplexer being fitted. Most of the cavities went to another club and will be used in their repeater. The proceeds are being used to purchase a quantity of "Debeglass wire" to be used as a permanent replacement for the antenna support guys at Mt. Murray. After surviving the last storm with only nylon rope holding that massive antenna in place, it deserves to have the best to ensure that it stays there forever.

The wind has provided plenty of energy at Mt. Murray. The wind generator seems to be coping well with the adverse weather conditions. It still looks like there is more than enough energy for the repeater's needs, as the ident tone can be heard at its highest pitch on most days, despite a fair amount of repeater useage.

It is normal for the ident tone to fall rapidly from No. 5 (highest pitch) through No. 4 to No. 3 all within a few minutes of using the repeater. The battery voltages represented by these top two tones amount to the surface charge only (above 12.5 volts). Likewise, recovery from No. 3 back to No. 4 and 5 is fairly quick after a period of inactivity. The fact that tone No. 4 or 5 has been heard within the last couple of days indicates that the repeater battery is charged up to 80% or so of its full capacity.

CHEAP REGULATED POWER SUPPLY

HOW WOULD YOU LIKE TO BUILD A 2 AMP VARIABLE REGULATED POWER SUPPLY FOR LESS THAN \$10?

HERE'S HOW ITS DONE.

STEP 1. GO TO CAVION'S AND BUY ONE OF THOSE 48 VOLT EX-TELECOM SUPPLIES. THERE ARE PLENTY OF THEM IN STOCK. THEY HANG AROUND THE LEFT HAND SIDE OF THE ROLLER DOOR NEAR WHERE THE BATTERY CABLES ARE. THEY LOOK LIKE AN OPEN CHASSIS ABOUT 150mm SQUARE WITH A LARGE DOUBLE INSULATED POWER TRANSFORMER, ONE SMALL PRINTED CIRCUIT BOARD, A 4 WAY CONNECTOR BLOCK AND A 240 VOLT POWER CORD ATTACHED. THEY HAVE POSSIBLY HAD WATER IN THEM BUT ARE UNLIKELY TO BE DAMAGED AS THE TRANSFORMER IS SEALED. THESE GO FOR AROUND \$5 TO \$6 EACH.

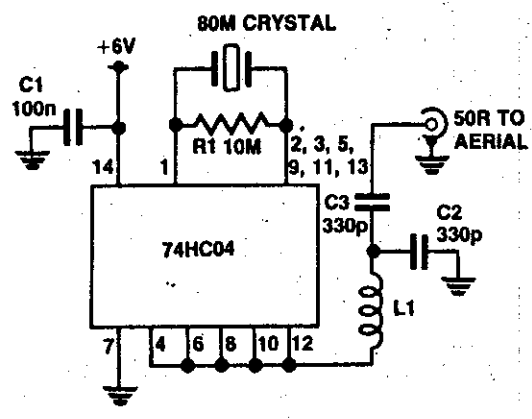
STEP 2. ON THE BOARD CHANGE R4 TO 1K, REMOVE THE 500R TRIMPOT AND REPLACE IT WITH A 5K POT WITH A SHAFT, AND RUN WIRES BETWEEN THE HOLES IN THE BOARD AND THE NEW POT. MAKE THE WIRES LONG ENOUGH TO ALLOW THE POT TO BE MOUNTED ON THE FRONT PANEL IF YOU DECIDE TO FIT THE UNIT INSIDE A BOX.

THIS SUPPLY WILL HAPPILY GIVE OUT 1 AMP CONTINUOUS ALL DAY AS IS (FROM THE TERMINALS MARKED + -). THE POT WILL VARY THE OUTPUT VOLTAGE FROM ABOUT 6 TO 20 VOLTS.

TO INCREASE THE CURRENT RATING, ONE OF TWO WAYS CAN BE USED. ONE WAY IS TO CONNECT A VARIAC TRANSFORMER IN THE MAINS SUPPLY TO THE UNIT AND DECREASE THE INPUT AC VOLTAGE TO ABOUT HALF. THIS REDUCES THE DC INPUT TO THE REGULATOR AND THEREBY REDUCES THE HEAT DISSIPATION OF THE POWER TRANSISTOR. CAVIONS USUALLY HAVE VARIACS AROUND. THE OTHER WAY IS TO REMOVE THE POWER TRANSISTOR FROM ITS HEATSINK AND MOUNT IT ON A LARGER HEATSINK, OR ON THE BACK OF THE CASE IF USED.

MOUNTED IN A CASE WITH A COUPLE OF METERS AND TERMINALS ADDED IT MAKES A VERY USEFUL GENERAL PURPOSE SUPPLY FOR THE BENCH.

GRAEME VK2CAG. IDEA BY JACK VK2ZU



L1 = 10 turns wound on 50 mm of 10 mm ferrite rod. The rod should be loose enough to allow for initial adjustment.

CMOS 80M transmitter

John Rickard of Heathmont, Vic, has designed this simple circuit for use as a transmitter broadcasting on 80M. It consists of a CMOS inverter wired as a crystal oscillator. The output is fed to the 50 ohm load by the LC matching circuit which functions to reduce harmonics. The output power is 150 mW or so with a 6 V supply rising to over 200 mW with 7 V in. Over 500 mW has been obtained from the circuit, but this was achieved with a 12 V supply,

and considerably exceeds manufacturers specifications. The output circuit is brought to resonance by adjusting the position of the ferrite rod in the coil while observing the supply current. A peak in the current coincides with maximum RF output. Keying the transmitter is easily achieved by interrupting the supply. The circuit could easily be adapted to other frequencies by suitable scaling of the LC output circuit, and substituting a suitable crystal.

E.M.E. REPORT BY LYLE VK2ALU

By the time that this article is being read I should be back in VK after a 7 week holiday during which I am hoping to have met up with some of the EME operators in England and Canada with whom we have carried out 1296MHz EME tests and have seen some of their EME gear.

In next month's Report I may be able to comment on what I have gleaned.

Satellite Notes.

As some of the overseas EME operators which I hope to meet also have satellite communication systems I should have gained a few ideas in this field also.

Satellite Pass Information.

See May issue of the Propagator for background information.

<u>Day</u>	<u>Date</u>	<u>AOS</u> <u>Time(EAST)</u>	<u>Day</u>	<u>Date</u>	<u>LOS</u> <u>Time(EAST)</u>
July			July		
Fri	12	2001	Sat	13	0342
Sat	13	1600	Sat	13	1623
Sat	13	2015	Sun	14	0252
Sun	14	1458	Sun	14	1541
Sun	14	2035	Mon	15	0159
Sat	20	0052	Sat	20	1123
Sun	21	0004	Sun	21	1040
Fri	26	1933	Sat	27	0615
Sat	27	1850	Sun	28	0529
Sun	28	1809	Mon	29	0444
Aug			Aug		
Fri	2	1925	Sat	3	0036
Sat	3	0513	Sat	3	0641
Sat	3	1226	Sat	3	1339
Sat	3	1957	Sat	3	2339
Sun	4	0316	Sun	4	0858
Sun	4	1034	Sun	4	1257
Sun	4	2042	Sun	4	2210

Lyle VK2ALU.

Date to remember -: 24.7.85 7:30pm at Bradbury Primary School
Jacaranda Ave. Campbelltown.
Fisher's Ghost Amateur Radio Club Meeting. VK2SG will
demonstrate Packet Radio.

TWO SIMPLE BUT HANDY MODS FOR THE FT-480R

These 2 modifications should well of been included on the 480R in the first place. The first mod involves the "scan" function (whether scanning the whole 2mx Band or just the memories). Normally the rig stops on receiving a signal & needs to be manually restarted by the Operator, (quite a nuisance). This mod restarts the "scan" after 6 secs.

Remove the top of the set & locate the "PLL Control Unit" Board. (It's the 6" x 2" Board closest to the front of the set). Right in the middle of the Board is a large 42 pin IC (main PLL IC). Next to Pins 18 & 19 of the IC there is a small loop of wire (possibly bright green in colour), that is about $\frac{1}{2}$ " in length & comes out of the board & straight back in. By cutting this "jumper" wire, the scan function will restart 6 seconds after stopping on a "busy" or "clear" frequency. If you would like to have the option of either "restart" or "stop" while scanning you could do what I did & use the "Tone Burst" switch underneath the front right of the set. It is a DPDT slide switch. (Tone Burst as you are well aware is unnecessary here). Remove the 2 wires from the switch, solder them together & cover them to prevent shorting to the case. Run 2 wires to the "jumper wire" & to the switch & you can now select either "stop" or "restart".

The second mod is very handy as it allows you to check the input of a Repeater using existing switches on the set & microphone. Normally, to check the input, VFO:B has to be selected, then the input frequency manually dialled in. Rather tedious & dangerous while driving.

This modification is right next to the previous one, on the same board (PLL Control Unit). Locate Jumper Plug "J-4003" which is in the middle at the back of the board. (There are 2 Jumper Plugs either side & it should have 9 wires coming from it.) Locate the wire that comes out of the plug, directly opposite Pin 18 on the large PLL IC, it should be Dark Purple in colour & is in the 3rd plug hole from the left, the 2nd hole has no wire. (It is marked "PTT" on the Circuit Diagram). Cut this wire at a suitable point & solder a silicon signal switching diode in series with the wire, with the arrow pointing away from the Jumper Plug. (Very technical). I used a 1N914 diode, 13¢ from Trickies. Cover with heatshrink or tape & put the set back together. That's it.

To use this mod, set the rig normally to use a Repeater. To check the input, press the "Tone Call" button on the microphone or on the front of the set. The RX frequency will magically change (hopefully) to the input frequency of the Repeater. The "Tone Call" facility still works, (if you can think of a use for it), by pressing either "Tone Call" Button & the PTT Button simultaneously. Having the button on the mike makes it easier & safer to check the input while driving. (Keeps the XYL happy). Also the "Lock" switch on the back of the mike still works with this mod.

I would also assume these 2 mods will work with the FT-680 (6mx) & FT-780 (70cm) rigs as they all use the same "basic" circuits.

Good Luck with these complicated mods!
Rob VK2JRC.

TOUR OF WIN-TV

A tour of Television Station WIN-TV is planned for Saturday 20th July at 12:00pm. The tour will be conducted by the Engineering and Operations Manager of the station and will be limited to a maximum of 12 people. Unfortunately, due to various reasons, it would be preferable to also limit this tour to Amateur Operators only. (If there is enough interest a second tour could be organised for other interested parties - eg XYL's, kids, etc).

So, if you're an "Interested Ham," keen to see the intricate inside workings of a TV Station, Contact me on the air, or by Phone on 84-7889.

ROB VK2JRC

A U S S A T

A paper presented by Mr. Mike Stevens (Telecom). Reprinted with permission.

The Australian national satellite communications system will consist of two Hughes HS376 satellites to be launched about July and October 1985 by shuttle or by Arian, and is expected to be operational September/November 1985. A third spare satellite will be available and will probably be launched at a later date.

The HS376 is an established satellite design - spin stabilised with 2 telescopic cylindrical solar panels and special arrangements to radiate excess heat from the power amplifiers into space. It will have a diameter of approximately 2.2m, its height in orbit with antenna and solar panels deployed will be 6.6m and its initial on station weight will be about 650 kg.

The first two craft will occupy geostationary orbital equatorial slots at 156°E and 164°E. The third satellite when launched will occupy the 160°E slot. Aussat will maintain the satellites so that the sub-satellite point is within $\pm 0.05^\circ$ north/south and east west of nominal. The satellites have a nominal operational life of 7 years with internal redundancy provided to reduce out of service transponders at end of life. The solar cells provide over 1000w of D.C. power. Nickel Cadmium batteries provide power when the craft passes through the earth's shadow.

The receiving up-link band is 14 GHz, that is 14.0-14.5 GHz. There are three receive beams, two covering Australia, one vertically polarised, one horizontally polarised, and one of unknown polarisation covering P.N.G.

The down-link transmit band is 12GHz, ie 12.25 - 12.75 GHz. There are five spot beams, one each covering Western Australia, Central Australia, North East Australia, South East Australia and P.N.G. Two additional national beams provide continental coverage.

From a communications point of view the satellite consists of a series of frequency shifting band-pass amplifiers or transponders. As previously mentioned, the up-link band is 14GHz and the down-link 12GHz. In order to achieve the necessary frequency conversion from 14 to 12 a fixed 1748 MHz frequency shift is used.

The satellite will carry 15 transponders each with a bandwidth of 45MHz. Four transponders will use high power 30W TWT (travelling wave tube) amplifiers for radio and TV services to remote areas and the other eleven will use 12W TWT amplifiers. These will carry the other services.

The 15 transponders are divided between two polarisations with 32MHz channel spacing. Band overlay protection is provided by cross polarisation rejection. Allowance has been made for a certain degree of optional flexible connection between the transponders and the various transmit bearers. For example, transponder 13 is permanently assigned to the National beam while transponder 1 can be switched to either National or South Eastern Australia beam.

The company owning the satellite, (Aussat Pty. Ltd.), will build and own eight major earth stations, one in each of the capital cities. These will be equipped with 13M (18M Brisbane and Darwin - for rain attenuation) ESA and high power amplifiers of 600W or 2kW, the former with TWT and the latter with klystrons. The space craft will be monitored from the Sydney (Belrose) and Perth stations. Aussat will offer access to the satellite through these stations for various services such as TV and data.

With regard to satellite users, the two biggest are likely to be the A.B.C. and D.O.A. D.O.A. will provide their own earth stations for their satellite system and will be virtually independent of Aussat or anybody else. It is not yet clear whether the A.B.C. will provide their own earth station or use Aussat facilities. The four transponders switched to the four spot beams will provide the Homestead and Community Broadcasting Satellite Service or HACBSS. This service is intended for reception in relatively small domestic earth stations. The corresponding 30W transponders on the 2nd satellite will probably be used to provide a similar commercial service.

A U S S A T - continued.

Before concluding it is worth briefly examining one of the problems that has been encountered with the high powered HCBSS transponders. It was originally planned to transmit one TV programme and several SCPC carriers for radio services. Unfortunately it was found that non-linearity in the transponder amplifier precluded this and it was necessary to resort to the use of a Multiplexed Analogue Component System (MAC) instead of the originally proposed PAL system.

The MAC System employs time compression to separately transmit the luminance and Chrominance components together with a time multiplexed multichannel digital sound system, consisting of high quality 15kHz sound channels in the horizontal blanking period.

FUTURE: When Aussat is launched and operational in late 1985 the ABC's ability to relay, interchange and broadcast its programmes will be virtually unlimited. The restrictions imposed by the reliance in terrestrial radio link for programme relay will be ended.

In the long term Aussat will provide the means to supply any community with a number of national or regional AM, FM or TV programmes. All that would be required is a relatively low cost earth station and a selection of low power transmitters suitably located.

There is no doubt that there will be a demand for these services in rural and country areas. Once the Aussat system settles down and money supply increases there will probably be an explosion in provision of satellite services. Those organisations with the infrastructure, knowhow and efficiency should find themselves with a bright and secure future.

Contributed by Ken, VK2DOI

DX NOTES -: Just to prove that DX can be worked if it is really wanted, here is a list of DX worked during the last month on 20 metres by Jim VK2EJM between 2pm and 5pm. CT1CXH, I2SM, I5KGF, I8SFY, KB6JK, KC7WO, KE6OA, KE7EGB, KG6HD, KG6TI, K5DZV, K5YNC, K6CD, K6NA, K6MYC, LZ1KSN, N6JKG, N7UA, OE3CTH, OE5UHM, RT4UA, UA3ABN, UT4UWV, UT5DK, VE3DFD, VE5AFU, VE6EO, VE6EP, VE6JV, VE6OA, VE6VK, VE6WB, VE6AVP, VE6BBI, VE6BMB, VE6CCB, VE6CDU, VE6CNW, VE6CPE, VE7GZ, VE7SG, VE7VA, VE7XM, VE7YF, VE7APX, VE7AQA, VE7BCU, VE7BGW, VE7BKA, VE7BPC, VE7CBK, VE7CBV, VE7CLH, VE7CUZ, VE7DCD, VE7DGI, VE7DON, VE7DTS, VE7ENP, VE7ERX, VE7ESK, VE7EXI, VE7XYL (presumably an XYL who refused to take amateur radio lying down), VE7ZZZ, WA7CGR, WA7FIG, WBOLYI, WB6IBQ, WB6URE, WB7EBG, WOGYH, W1ATE, W4UPH, W5KMZ, W6AQ, W6BMH, W6HFL, W6NGZ, W9BM, W9JLH, YU1SZ, YU1US, YU1PSF, ZS1AU.

A DIFFERENT DIPOLE

Ray Wells VK2BVO

The coaxial dipole presented here is a variation of an HF design which has been described in a number of publications.

Claims for the antenna include improved bandwidth, Balun not required, less affected by proximity to trees etc, electrically quieter because the entire antenna is at ground potential and a direct match to 50 ohm coaxial feedline.

It is not the writer's intention to prove or disprove any of the above claims but merely to present his ideas on how to construct VHF/UHF versions. As can be seen, from the accompanying diagrams, two construction methods have been employed. One is a variation on the other. In method A, see fig 1, the entire antenna is made from a length of coaxial cable which, after construction, is suitably enclosed and weatherproofed. PVC conduit makes a very suitable enclosure.

Take note that the velocity factor of the coax used will affect the length of section "B". If there is any doubt as to the velocity factor of your piece of coax then DO NOT USE IT. Length "B" is an important dimension. For method B, see fig 2, the braid of the coaxial cable is removed and replaced with a suitably sized metal tube. 10mm OD

tube is a neat fit for RG8, UR67 style coax. The tube is cut for the total dipole length "A" with small brass plugs being used to provide the short between inner and outer conductors. The method used to achieve the short will depend on the material used but be guided by the following. Tin the brass slugs. If the tubing is copper or brass the plugs may be soldered in place through a small solder hole in the outer tube. If aluminium tube is used the plugs may be secured by some small screws into the brass slug. If the screws and tube are dissimilar metals then protection from the atmosphere will be necessary to avoid corrosion. In any case the brass plugs are first soldered to the inner conductor. Again dimension "B" is critical and remains dependant on the velocity factor of the cable used. With method B it is not necessary to enclose the entire antenna. Just seal up the ends of the tube and also the termination with the main feedline.

The author has constructed one of each type to date including 2m version using LDF4 hardline coax according to method A

and enclosed in PVC conduit for weather-proofing. This antenna was designed for 146.5 MHz and pruning of element lengths was not necessary to achieve the following VSWR characteristics; 144 MHz less than 1.2:1 146.5 less than 1.2:1 and 148 MHz 1.5:1.

A 70cm antenna was constructed in accordance with method B using aluminium tube and UR67 coax. It was designed for 435 MHz (Band Centre) and its VSWR was under 1.5:1 across the band (420-450 MHz). Again, these figures were obtained without the need to prune the element lengths.

These dipoles do work and offer a matching system and a construction method which is highly recommended to anyone looking for a simple yet rugged antenna. The elimination of external matching devices (gamma etc) make it an ideal portable antenna. Its on air performance is equal to any conventional unity gain antenna.

Reproduced by arrangement from 'Smoke signals' October 82 AR

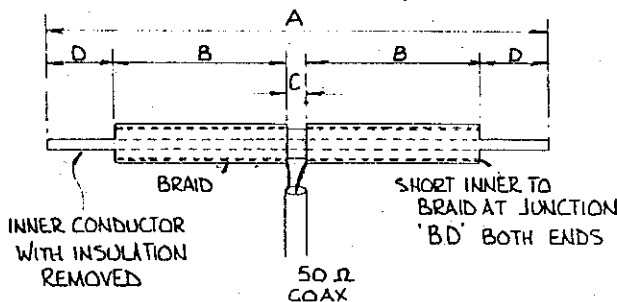


Fig 1: Method A. For construction — see table for dimensions

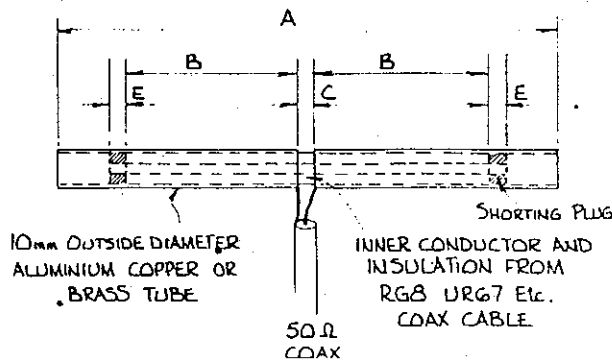


Fig 2: Method B. For construction — see table for dimensions

TABLE

Dimension	Remarks
A	Normal dipole length. $L(\text{mm}) = 299780 \times k$ $k = (\text{approx}) .9$ for 10mm tube @ 450 MHz $k = (\text{approx}) .93$ for 10mm tube @ 146 MHz
B (IMPORTANT DIMENSION)	Electrical $\frac{1}{4}$ wavelength. $L(\text{mm}) = 299780 \times v$ $v = \text{velocity factor of coax used.}$ allow .66 for RG8, UR67 etc. allow .88 for FHJ4, LDF4 etc.
C	The braid or outer jacket is removed for this dimension. Use 10mm for 2m band and 70cm band. A larger gap could be allowed for lower frequency bands.
D	Inner conductor without insulation. This length may be trimmed during final adjustment of antenna.
E	Shorting plug used to short inner conductor to outer tube. See comments in main text.

FOR SALE -: Rank Xerox 660 plain paper copier

\$130.00 ONO

Contact Jim VK2EJH on (042) 84 9317

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(Just up from the Harp Hotel)

Phil VK2KPL has advised that the VK1 amateur radio group has for sale lengths of 2.5 mm (14 gauge) hard drawn copper wire (of which they have up to 2 or 3 kilometres in length) for the low price of \$25.00 per hundred metres plus the cost of freight from Canberra.

Now is a good opportunity to build that 3 wavelength per leg rhombic for 80 metres that you always planned.

Those interested can contact Phil on repeater 6850 or on the following phone number - (048) 91 2920.

Ray VK2PHD/XCC club storeman advises that he still has several club Tee-shirts for sale in sizes 18 and 20. There are about half a dozen of each size and they are priced at \$8.50 each. See Ray at the next club meeting.

FOR SALE - 1 TH5-DX Hy-Gain beam antenna
5 element tri-bander with balun
good condition. \$250.00
Phone David VK2NH (02) 727 3169 (after 7pm
or before 11am)

TOROIDAL BALUNS

K. Curie VK2OB
24 Beach Drive, Woonona 2517

Practical information about making ferrite-cored toroidal baluns. The details should apply to almost any antenna that can be fed with a balun. Experiments at this QTH were all with quads but of many shapes and sizes.

It is essential when winding a toroidal balun to know the impedance you are trying to match and I would recommend that you beg, borrow, buy (or build) an antenna impedance bridge.

A quad driven element that is over 1/2 a wavelength from the ground will vary in impedance from about 55 ohms with a .1 λ

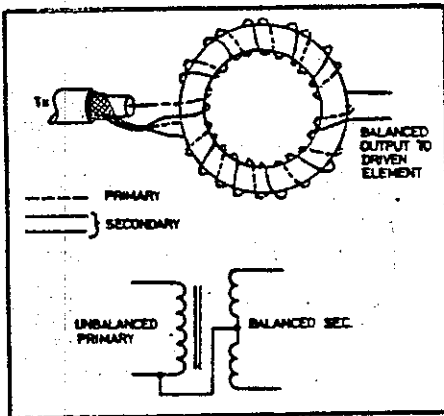
spacing to the reflector to about 115 ohms with a .2 λ spacing. The director makes negligible difference. The main problem is that proximity to trees, rooftops, etc., as well as other closed loop elements in multi-band quads, all vary the impedance.

It is best, I have found, to have a minimum of 10 turns on the primary winding and most ratios can be made close enough without exceeding 15 turns on the primary. For ease of adjustment the two secondary windings should be wound on first—they must have the same number of turns and I always make them one continuous winding with a large loop halfway that can be snipped later. This keeps the windings intact and also saves the sharp ends from

piercing your hands when winding the primary over the top.

To calculate your turns proceed as follows—

If your impedance is, say, 98 ohms and you want to feed the antenna with 50 ohm coax the ratio of these impedances is 1.96 to 1. As with any close-coupled transformer the turns ratio is the square root of the impedance ratio, thus in this case 1.4 to 1. Then as it is essential to use about 10 turns on the primary the secondary turns would be 14. This means that we would wind 10 turns on the primary and 14 on the secondary in the form of two 7 turn windings.



SOME EXAMPLES (Turns are practical figures)

Coax	Impedance	Impedance Ratio	Turns Ratio	Turns Primary	Half Secondary
50	50	1:1	1:1	10	5 each
50	75	1:1.5	1:1.2	10	6 each
50	84	1:1.68	1:1.3	14	9 each
50	100	1:2	1:1.414	14	10 each
75	200	1:2.67	1:1.63	11	8 each
50	200	1:4	1:2	10	10 each

LEFT: FIGURE 1.

If you have to guess your impedance it is best to leave a couple of extra turns on the primary and check your SWR as you remove them half a turn at a time. If you are working off a ladder or the roof it is wise not to try for a 1:1 SWR as it will change when the antenna is at full height.

There are probably many good ferrites available. The one I use is the Mullard FX1586, which is excellent at HF. It does seem to be "running out of steam" at the

top end of 10 metres, but results are still good on this band. Wire is not very critical, 14 SWG is what I have used and found that it wraps around the toroid without springing off and slipping. If you use wire from an old transformer heater winding the enamel may not provide adequate insulation, and I would suggest that you layer plastic tape over the secondary before winding the primary.

Once you are happy with the matching, the balun can be coated with silicone rubber or in my case (I have a beach frontage) encapsulated in epoxy resin.

I have run 350 to 400 watts PEP through these baluns without melting candle grease poured on them as temporary moisture shields. I don't know what power they will take, but they will handle any legal amateur power.

AUCTION SALE OF NEW ITEMS AT JULY MEETING.

A local distributor is disposing of most of his stock of ham gear. The following items will be sold in July - some have a small reserve.

- Kenwood AT130 Antenna tuner
- Kenwood MB100 mounting bracket for TS120 or 130,
- Kenwood DK5 digital adapter unit for TS520,
- Kenwood B55 Monitor scope module.
- Kenwood YG33950 250Hz CW Filter to suit TS520 or 520S.
- Daiwa. CNA1001 Auto Antenna Tuning Unit.
- Ferris Bumper mount aerial base
- Palomar HF Transformer for Mobile impedance match

Lawrence Hargrave Award

With the renewed interest in the Lawrence Hargrave Award it is perhaps an ideal time to remind members of our own club's award, which was inaugurated during the 1981 commemoration of Lawrence Hargrave on the weekend of March 28/29.

For those who know very little about the man himself, here is a short profile -:

Lawrence Hargrave (1850 - 1915) was born in England and came to Australia in 1866 to join his father, Judge John Hargrave, a former N.S.W. Attorney General.

In 1875 Hargrave joined the New Guinea expedition of William MacLeay, and later spent three months exploring the hinterland beyond Port Moresby with O. C. Stone. In 1876, as an engineer on the Neva, he steamed more than 80 kilometres up the Fly River, the furthest any white men were to penetrate the interior of New Guinea until 1890.

His most famous work, however, was the design and construction of model flying machines and motors to propel them. In 1893 he began constructing box kites, and in the following year he was lifted 5 metres off the ground at Stanwell Park, just North of Wollongong. The first powered aircraft flight in Europe was made in a box kite based on Hargrave's work.

Lawrence Hargrave is commemorated by his portrait on one side of the twenty dollar bank-note.

So it is fitting that the Illawarra Amateur Radio Society have as it's award a commemoration of this great Australian and his feats.

The club net on 80 metres of a Sunday evening on 3.562 MHz will now be run in two parts, firstly as the standard net, and after this is finished there will run a session for stations wishing to work the award to call in and pass signal reports with club stations. Any club members with perhaps half an hour to spare may like to join the net in addition to the 10 or so regulars to enable stations to work the award.

The details of the award are -: VK stations must work 10 club members and overseas stations must work 5 club members. Alternatively one contact with VK2AMW (club station) will suffice. The cost of the award is \$2 or 4 I.R.C.'s.

THE ILLAWARRA AMATEUR RADIO SOCIETY

P.O. Box 1838, Wollongong, 2500

Meetings: Second Tuesday of every month except January at 7:30pm in the S.E.S. Headquarters, Montague Street, North Wollongong.

Repeaters: VK2RAW-6850 VHF Mt Murray
VK2RUW-8225 UHF Hill 60 Port Kembla
VK2RIL-7275 VHF Sublime Point
VK2RIL-8725 UHF Sublime Point

Broadcasts: On Sunday evening prior to the club meeting - 7:00pm RTTY, 7:15pm-Voice : Transmitted on 7275 VHF and by relay to 3.562 MHz. Callbacks after the voice broadcast.

W.I.A. Relay: On 6850 at 11:00am and 7:30pm each Sunday.

Club Nets: 3.562 MHz SSB on Sunday at 8:00pm and slow morse net on 28.440 MHz on Tuesday at 8:00pm.

Newsletter: "The Propagator", published monthly to reach financial members in the week preceding the meeting. All articles, ads, etc to the editor by 3rd Tuesday each month.

Membership: The Secretary, I.A.R.S., P.O. Box 1838, Wollongong, 2500. Full membership \$10.00 per annum; students and concessions \$5.00 per annum.

Awards: The award of the Illawarra Amateur Radio Society is the Lawrence Hargrave Award. VK stations require 10 contacts with I.A.R.S. members; overseas stations require 5 contacts with I.A.R.S. members. Alternatively contact with VK2AMW is sufficient for the award. Band, details of time, day, frequency, stations worked + \$2 or 4 I.R.C.'s to Award Manager, I.A.R.S., P.O. Box 1838, Wollongong, 2500.

Committee: President - Keith Curle VK2OB, 24 Beach Dve, Woonona.
Vice President - Bill Chadburn VK2DYU, 45 Belatine Ave Dapto.
Secretary - Jim Hayes VK2EJH, 1 Kathleen Cres, Woonona.
Treasurer - Andrew McEwan VK2XGC, 7 Nioka Ave, Keiraville.
Auditor - Geoff Cuthbert VK2ZHU, 1 Nioka Ave, Keiraville.

General Committee: Ian Callcott VK2EXN, Wojciech Tomczyk VK2OE, Martin Hutchings VK2BMH, Jim Mead VK2EJM, Gerhard Mueller VK2XGA, Dave Routledge VK2NGS, Paul Suters VK2KPS.

Repeater Chairman: Graeme Dowse VK2CAG

Repeater Committee: Bill Jut VK2KWJ, Rob McKnight VK2JRC, Morry Van De Vorstenbosch VK2EMV, Peter Woods VK2VCK, Ian Callcott VK2EXN, Mike Keech VK2DFK, Dave Colless VK2EZY.

EME Co-ordinator: Lyle Patison VK2ALU

Store: Ray Ball VK2XCC

Publicity Officer: Dave Myers VK2DFL

Broadcast Officer: Paul Suters VK2KPS

Propagator Editors: Paul Suters VK2KPS, Jim Hayes VK2EJH, Gerhard Mueller VK2XGA.

Life Members: Graeme Dowse VK2CAG, Keith Curle VK2OB, Lyle Patison VK2ALU.