

MEETINGS, NETS and SERVICES**Club Station:** VK4WIS**Club Repeaters:**

Bald Knob: VK4RSC on 146.850 MHz & 438.075 MHz.

Luguna Lookout: VK4RMB on 146.825 MHz & 438.175 MHz
91.5 Hz CTCSS

Dulong: VK4RSN on 53.700 MHz

Gympie: Private repeater on 147.975 MHz

General Meeting: Monthly on the first Tuesday at 7:30 pm in the Club House, old Toll Plaza building, 85 Godfreys Road, Bli Bli.

Visitors are welcome to attend.

Weekday Meeting: Weekly at 10:00 am—2:00 pm on Wednesday.**Sunday Meeting:** 3rd Sunday of each month at 10:00—2:00 pm.**Good Morning Net:** Daily at 8.15 am at VK4RSC on 146.850 MHz.
Conducted by various club members.**Tech Net:** Weekly at 8:30 pm Sunday at VK4RSC on 146.850 MHz.
Check in, raise topics and ask your technical questions.**80 m Net:** Weekly at 7:30 pm Thursday on 3660 kHz.**10 m Net:** Weekly at 8:15 pm Wednesday on 28.470 MHz USB.**6 m Net:** Weekly at 7:30 pm Friday at VK4RSN on 53.700 MHz.**2 m Net:** Weekly at 7:30 pm Sunday on 144.300 MHz USB.**2 m Net:** Weekly at 7:30 pm Monday on 147.975 MHz.
Conducted by club station VK4WIS.**QNEWS:** Relayed Sunday at 9:00 am at VK4RSC on 146.850 MHz.
After the broadcast a callback is conducted by VK4WIS.**Internet:** www.vk4wis.org

This website provides previous issues of Pelican Droppings in full colour in pdf format which can be downloaded.

The current issue can be had by subscribing to the email edition in pdf format. Apply to SCARC.

EchoLink: Available on VK4RSC 146.850 MHz.

The Internet station is VK4WIS-R and the node is #316084.

Pelican Droppings

Newsletter of the Sunshine Coast Amateur Radio Club Inc.

Issue No.93

February-March 2008



Angus VK4KMC leaves the Sunshine Coast with a parting gift presented by President Noel VK4NL-more inside

NEXT ISSUE**SCARC Inc. Office Bearers AGM March 2007**

President	Noel Des Jardins VK4NL
Vice-President	Harvey Wickes VK4AHW
Secretary	Gordon Taylor VK4VP
Treasurer	Keith Noll VK4AKA
Committee	Ray Stuart VK4YRS; Frank Winter VK4BLF; Mike Little VK4YFL; Richard Philp VK4YRP

Copy deadline: 3rd Tuesday of the month preceding GM issue.

Email editor: gcombes4@bigpond.com**INSIDE**

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Address: The Secretary, Sunshine Coast Amateur Radio Club Inc.
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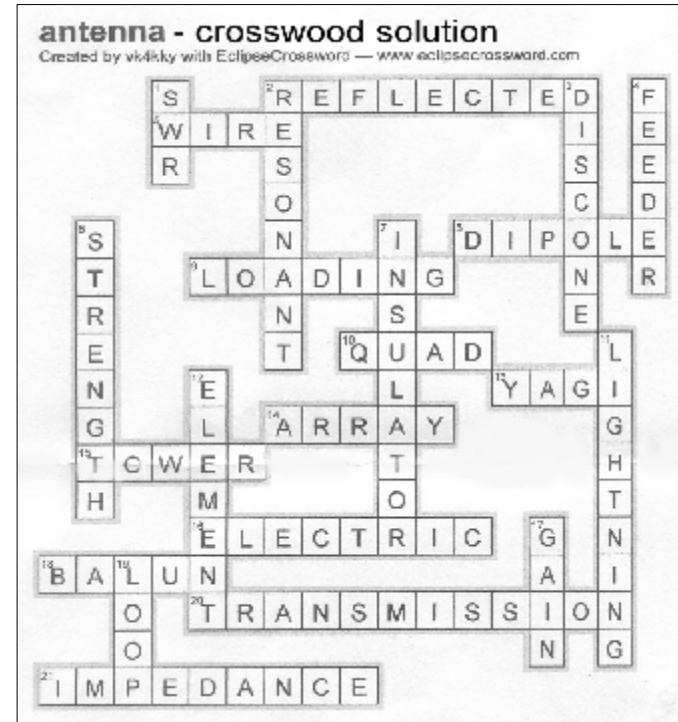
Presidential Preamble

Hi gang! Here goes for another edition of the President's column. I recently headed off to Perth for a break for a couple of weeks and, while there, a telephone call told me that our grant applications had been approved. Wonderful news. So it's thanks to our grants team. Those involved firstly were the WIA and Keith VK4AKA for finalizing the paper work for the \$1,000 up-grade of our main repeater VK4RSC on 146.850 MHz. Next was the State Government's Gambling Community Benefit Fund grant of \$25,950 for the WICEN caravan radios. Finally the Jupiters Casino Community Benefit Fund granted \$37,847 to up-grade our entire repeater system. Our thanks for the approval of the latter totaling \$63,797 go to Vin VK4FVCW and Richard VK4YRP for their tireless work in processing the grant applications. Their involvement and close attention to the related WICEN and State and Sunshine Coast emergency services organisations has reaped this handsome reward. Credit too to those in the club who helped them.

Wet weather has has interfered with repeater construction work. Our erstwhile riggers have been visiting our repeater sites to sort out a plan of attack for putting new equipment into operation. Thanks too to Keith VK4MBH and Bart Derlagen for organizing a \$200 sponsorship from Noosa Outlook IGA in support of the Noosa hill repeater after recent help in the flooding of the area. Thanks to a donation by Bill Ervine the club is now the proud owner of a Kenwood TS430S power supply & tuner. Drop in any time, Bill.

The \$1000 WIA grant was presented by Ewan McLeod VK4ERM; WIA vice-president, at the February GM, who kindly gave of his time to attend. Ken Fuller and XYL Pat also attended; Ken was the instigator of the grant application. Ken has worked hard for amateur radio and the WIA and we wish him health and happiness in his retirement.

Two of our long and hard-working members are off overseas (so-to-speak); Angus VK4KMC and XYL Liz are pulling up stakes in Maroochydore to live in the peace and tranquillity at Russell Island near Brisbane. Angus has been a past member of the club administration and Liz has been the mainstay of the club's general meeting raffles and tea breaks. We will miss them both. (see photo on page 9)



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PELICAN DROPPINGS BOOK REVIEW

“Fixing boat Electrics” by Tony Thorrold VK4KKY

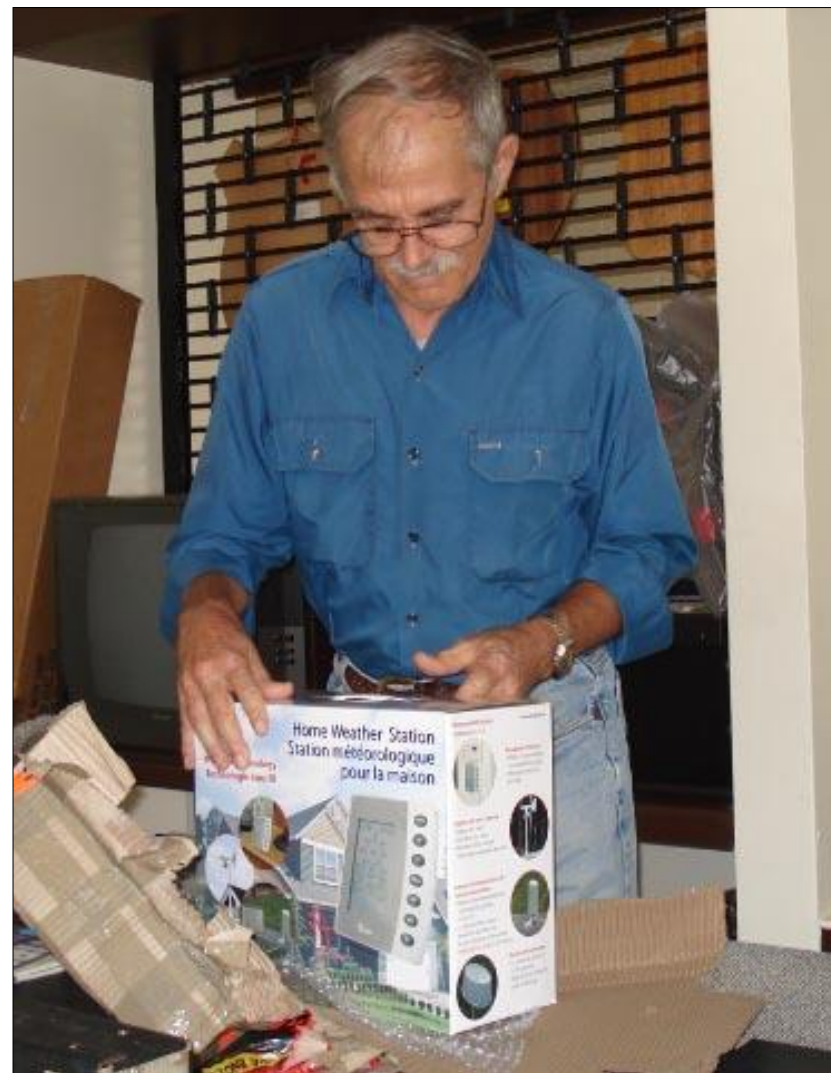
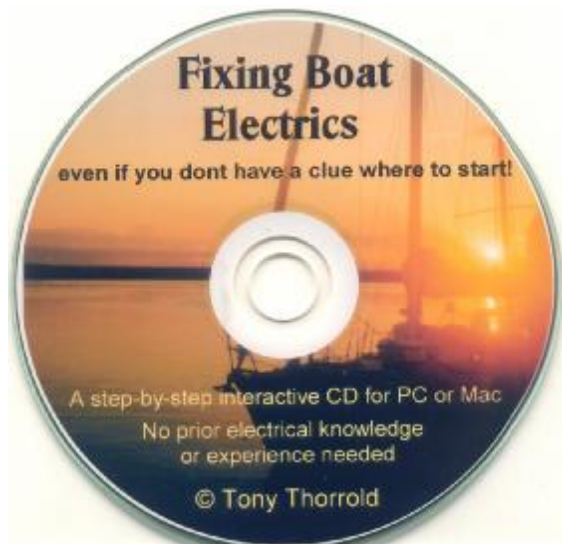
Tony Thorrold has authored teaching books for radio amateurs; now he has tackled something different—a CD book on fixing electrics in yachts, powerboats, caravans and remote dwellings for users who have little or no formal technical training about things electrical.

There are 13 chapters: Looking for the Problem, Power Sources, Batteries, Wiring Up, Switchboards, Radios, Motors, Pumps & Refrigeration, Engine and Navigation Instruments, Lights & Power Outlets, The Multimeter, Wiring Diagrams, Basic Electricity and finally Tools.

The writing and presentation is remarkable for its ease of reading and illustration. There are photos for all equipment mentioned in the text and the coloured diagrams are simple and to the point. All this is covered in 209 pages.

The format is 2-column landscape, and this, combined with interactive subject headings (click on the blue highlighted text to go straight to the subject) virtually eliminates the need to scroll pages.

The CD-book is housed in a robust plastic cover (much better than a fragile jewel case). It has a retail price of \$34.95 posted for single copies, but Tony offers it to SCARC members for \$15.00 posted. I have one copy at this price for anyone who asks me. Otherwise send your order to PO Box 2064, Woorim, Queensland 4507 or phone 0411 891 813. (This review by PD Editor, Geoff VK4GWC).



With much sadness I record a silent key in Quentin Greene VK4BQG, who passed away suddenly on the 1st February 2008. He was a Gympie Club member for many years and when the club disbanded he continued his membership with the Sunshine Coast Amateur Radio Club. took over he maintained his membership. Quentin was a willing worker, always ready to assist with maintained needed in the Gympie area with a joke or two. Farewell mate. That's your lot this time. Noel VK4NL

EME Operation by Trevor Benton VK4AFL in Brisbane Reported by PD Editor Geoff Combes VK4GWC

I first met Trevor on 144 MHz SSB in 1996 when we were both operating 2 metre DX along the coast and east to New Zealand and New Caledonia. He was better equipped than I, having assembled a high power transmitter using modified commercial units. I had just completed building a sequencer for controlling preamp, RF amp and transceiver driver for general use and particularly for satellite operation. He needed one and so I built another in a finished manner complete with a service and operating manual. He uses this sequencer to protect the preamps at the antenna feed point when switching from receive to transmit.

Since then Trevor has moved on to the more challenging EME operation. He began in 1998 on 432 MHz using a 4 x 28 element linear array. By the end of that year he had made 42 contacts. That antenna was replaced by a 16 x 15 element linear array which, in



Fig.1 The VK4AFL antenna for 432 MHz EME operation It comprises 16 x 15 element linear Yagis mounted on an AZ-EI rotator which also rotates about its bore axis for polarity control.

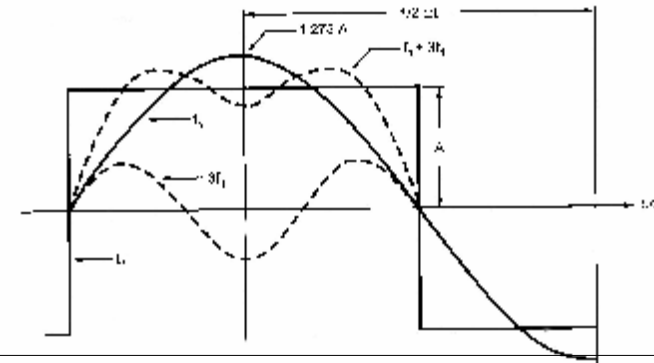


Fig.2 Square waveform produced by the Class D amplifier showing the fundamental frequency and 3rd & 5th harmonics.

When switch S1 is closed switch S2 is open current flows into the load from the DC supply. This creates the positive half cycle. One half cycle later the switches open and close together and the current reverses making the negative half cycle to complete the whole square wave.

Now the square wave is represented by its fundamental and harmonics by the Fourier equation:

$$E = (4A/P)[\cos \omega t - 1/3 \cos 3\omega t + 1/5 \cos 5\omega t - \dots]$$

Fig.2 shows the square waveform with first two of its odd harmonics. The LC filter removes all odd harmonics leaving the sine wave component of the original RF square wave. Amplitude A is half Edc. The sine wave has an amplitude equal to 1.273 A.

The Class D is most useful in amateur radio as a CW amplifier. Next issue will describe a 100 W Class D amplifier built for amateur radio bands 160 to 80 metres.

Reference: J.Vermasvuori OH2GF, "Introduction to Class D Tuned RF Amplification", QEX Jul/Aug 2007

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The Class D RF amplifier - Part 1 An Introduction

by Geoff Combes VK4GWC

We are all familiar with the linear AM and SSB and the CW modes of transmitting RF. The applicable classes for these are A, B, and C. Class A is linear but is not used for RF because of its inefficiency (less than 50%). Class B, also linear, was used initially for RF vacuum tube amplifiers, but latterly was replaced by the versions AB1(zero grid current) and AB2(some grid current) that provided better linearity for SSB service. These have efficiencies of 50 to 60%. The non-linear Class C amplifiers is ideal for CW service as it has a theoretical maximum efficiency of 80%. In all these classes the output power device is excited - whether modulated or unmodulated - at the operating frequency and may be tuned for a single frequency or for an amateur band.

Class D is a step away from the A, B and C classes in a series (extending to at least class S) that are called switch-mode RF amplifiers. They are non-linear but have a theoretical maximum efficiency of 100%. Low losses make these classes ideal for semiconductor power devices. In fact the advent of the MOSFET device gave impetus to the development of the switch-mode classes for commercial uses. In this story I will refer only to the Class D RF amplifier, as in a following article we will look at a Class D amplifier that has been built for amateur use.

How they work:

A Class D amplifier comprises a DC source that is switched on and off to a load at the operating radio frequency. The load is the radiating antenna preceded by a filter. The input to the filter is the square wave created by switching the DC supply and the output of the filter feeding the antenna is the residual sinusoidal fundamental frequency of the square wave. Fig.1 is a simple way of doing it.

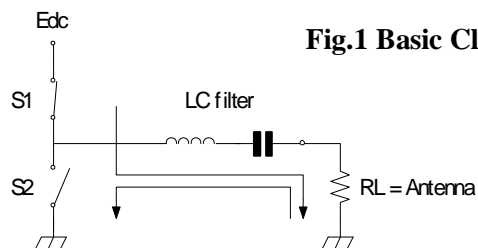


Fig.1 Basic Class D Amplifier



**Fig.2 3.7 metre diameter parabolic dish for 1296 and 2301 MHz EME operation
SCARC member Wayne VK4WS set up the feed horn for VK4AFL.**

addition to the necessary AZ-EL rotator, has axial rotation to accommodate the effect of Faraday rotation (of RF radiation polarity) that occurs between transmitting and receiving antennas over the EME path (see Fig.1).

Next Trevor set up for 1296 MHz EME operation using a 3.7 metre diameter parabolic dish (see Fig.2), and followed with operation on 2301 MHz (13 cm). He can switch between these bands in about 45 minutes. With 100w at the feed of a 3.7m dish he receives S3 CW echoes and very weak, but Q5, SSB returns. The half-power beam width of a 3.7m dish is 4 degrees at 1296 MHz and 2.5 degrees at 2301 MHz. Compare these widths with that of the moon as seen from earth at 0.5 degrees, and the sun by coincidence the same. The rotators are controlled (set) manually from AZ-EL data supplied by PC software (the moon's Keplerian elements are essentially constant).

The 2301 MHz power amplifier is an Ericsson cell phone for



**Fig.3 Ericson cell phone transmitter for 2301 MHz.
Chassis and cooling system by Trevor VK4AFL**



**Fig.4 Wiring for the transmitter shown in Fig.3 ,
built by Trevor VK4AFL**

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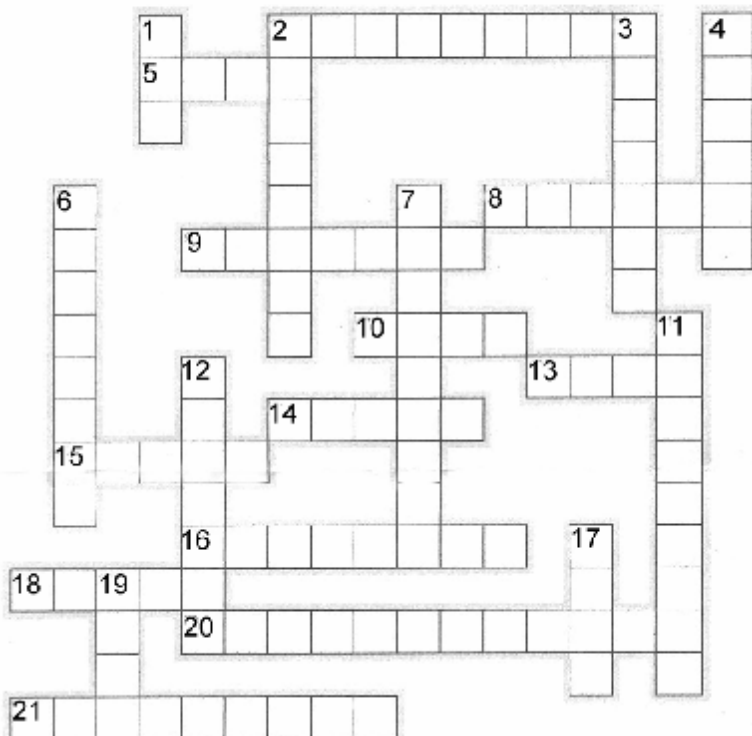
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Across

2. a wave
5. long and thin
8. simple antenna
9. type of coil
10. square in the sky
13. he was Japanese
14. more than one
15. holds up an antenna
16. one of the fields
18. matches coax to yagi
20. a kind of line
21. property of coil

Down

1. it's a ratio
2. cut to length
3. used on a scanner
4. gets signal up there
6. field xxxx meter
7. stops the signal
11. antenna enemy
12. part of an antenna
17. make stronger
19. polo?

Solution on page 15

which Trevor built the metalwork, cooling and wiring (see Figs. 3 and 4). This amplifier produces 120W at 30% efficiency to the antenna. This power level is not arbitrary. The mode for communicating on these bands is CW code for which the licensed power limit is 120 W. All terrestrial and EME operation on VHF and UHF bands from 50 MHz and upwards by station VK4AFL conform with the amateur license limit and conditions.

You may wonder why Trevor did not begin EME operation with the 144 MHz that he was familiar with as many others have done. The answer is that he lives on a 1/2 acre suburban house block and thought that 2 m EME would be too prone to cause interference (e.g TVI). Also the size of a 2 metre Yagi array was too daunting to contemplate.

Finally I mention that recently I posted to him another sequencer which he will keep as a spare for the original one that he continues to use.

End



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Absorbed Glass Mat Batteries

A PD Tech Review by Tony Thorrold VK4KKY

We all know that using a normal car battery for powering a radio or other device for a long time without recharging will soon destroy the battery. Conventional wisdom tells us that a deep cycle lead acid battery is designed for this type of application. If you are able to fully charge this type of battery the correct way and not discharge it more than 50% it will give outstanding service. The “correct way” means charging at a high current using a smart 3-stage charger, not a standard car type regulator.

A standard car type alternator / regulator is designed to quickly top up the energy taken by the starter motor (rarely more than 0.5 amp-hour) and then supply the energy needed by the lights, etc. Using your vehicle’s alternator to recharge a deep cycle battery will take at least 12 hours of continuous engine running to reach about 75% of its full charge. If you then discharge it to the recommended minimum of 50% you will have only 25% of the rated capacity available to use. Your 100 amp-hour battery will actually only give you 25 amp-hours of useful energy.

In these circumstances an Absorbed Glass Mat (AGM) battery will give you great advantages over a conventional lead-acid deep cycle battery:

1. An AGM battery will charge up to about 90% of rated capacity in 3 hours when used with a normal car alternator / regulator.
 2. They can be regularly discharged down to 20% of their rated capacity without damage.
 3. They are totally sealed and spill-proof.
 4. They never need topping up with water.
 5. They can be mounted on their sides or ends if necessary.
 6. They have a very low self-discharge rate and if initially fully charged, they can be left for up to a year without damage.
 7. They are very robust and can take a lot of physical shaking and pounding without damage (good for use in a boat or caravan)
 8. The price per usable amp-hour is less than with lead-acid deep cycle batteries.
- End



Angus McBain VK4KMC opens his gift from the club—
A Home Weather Station.

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