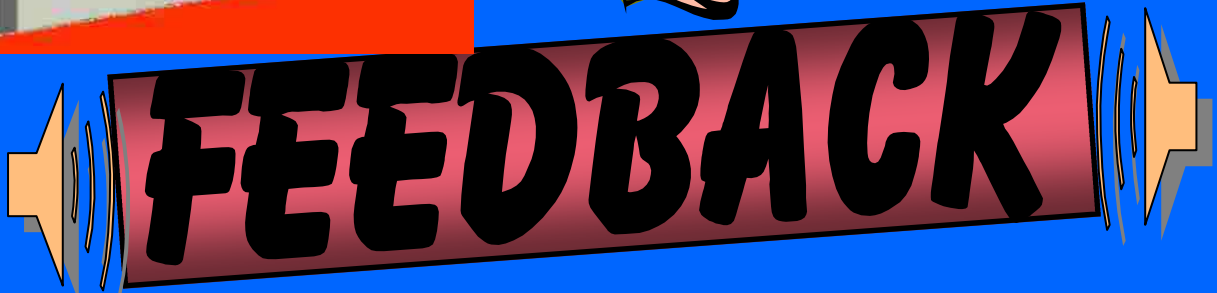
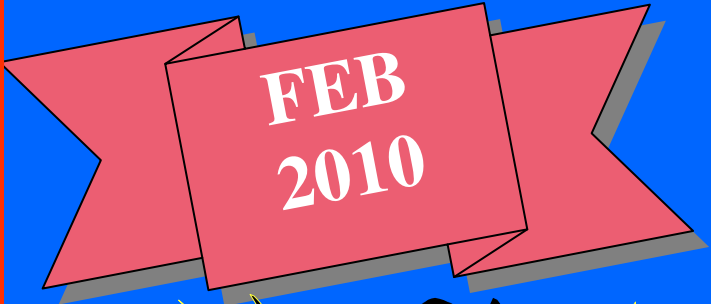


OFFICIAL NEWSLETTER OF THE  
**BORDER RADIO CLUB**  
EAST LONDON



The most coveted Amateur Radio operating awards. An amateur radio operating award is earned by an amateur radio operator for establishing two-way communication (or "working") with other amateur radio stations. Awards are sponsored by national amateur radio societies, radio enthusiast magazines, or amateur radio clubs, and aim to promote activity on the amateur radio bands. Each award has its own set of rules and fees. Some awards require the amateur radio operator to have contacted other stations in a certain number of countries, Maidenhead grid locators, or counties. Because amateur radio operators are forbidden by regulation to accept financial compensation for their on-air activity, award recipients generally only receive a certificate, wooden plaque, or a small trophy as recognition of their award.

Most amateur radio operating awards require that the applicant submit proof, such as QSL cards, of the contacts which satisfy the requirements of the award. There are thousands of operating awards available. The most popular awards are the Worked All States award and the Worked All Continents award, and the more challenging Worked All Zones, DX Century Club (DXCC) and VHF/UHF Century Club (VUCC) awards. DXCC is the most popular awards program, initially requiring amateurs to contact 100 of the (as of 2007) 338 recognized countries and territories in the world. Other popular awards include contacting remote islands, US counties, and lighthouses. Many awards are available for contacting amateurs in a particular country, region or city.

### Special event stations

Many amateurs also enjoy setting up and contacting special event stations. Setup to commemorate special occurrences, they often issue distinctive QSLs or certificates. Some use unusual prefixes, such as the call signs with "96" that amateurs in the US State of Georgia could use during the 1996 Atlanta Olympics, or the OO prefix used by Belgian amateurs in 2005 to commemorate their nation's 175th anniversary. Some events are held annually such as Jamboree on the Air. Many amateurs decorate their radio shack walls with these awards.

I have a special events QSL card and memorial certificate from Darwin Australia commemorating cyclone TRACY in 1974. They ran the award station in 1994 and by submitting 5 IRC's (International reply coupons) which are not available in South Africa, together with your contact details and QSL card, they sent me a nice certificate VI8 TRACY Award. You sometimes get sent IRC's from other operators that wish to pay for the expense of your stamps, to ensure that you send your much sort after QSL card back to him. Remember he may also be waiting for a card from your location to allow him to receive some other award. I have also received QSL cards from Space Station MIR (No longer up there)

That's just an introduction to the interesting side hobby of award and Special QSL card collecting. It gives you the self satisfaction of knowing that you have achieved the necessary contacts to win the awards.

To the newly licensed hams we say, give it a try and see what you can do in this period of Low Sun spot activity.

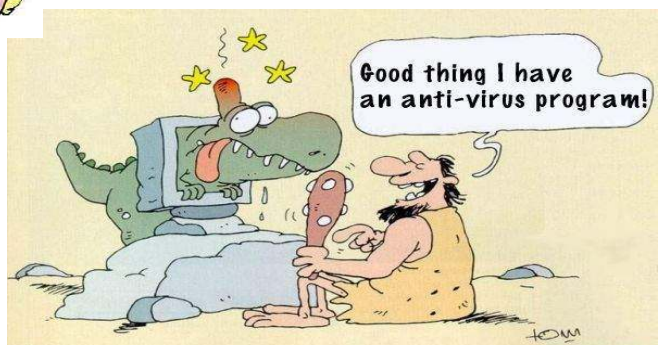
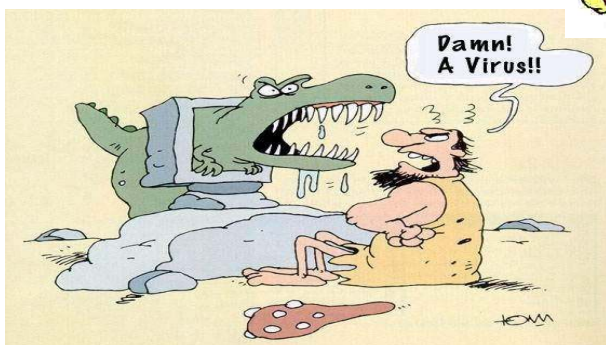
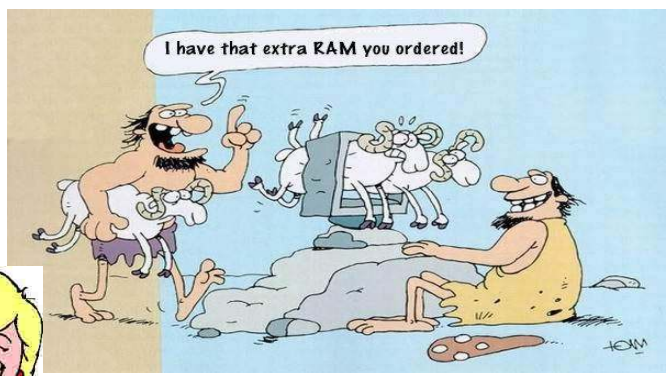
You may be amazed with the results. It's also a good Brag Card for visitors. Let's see **your** awards, Cheers Peter ZS2ABF.

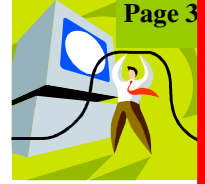
## HAM AWARDS



THESE COULD BE YOURS

# ALL THERE IS TO KNOW ABOUT COMPUTERS





## INTRODUCTION TO PACKET RADIO - Part 13 - by Larry Kenney, WB9LOZ

In this part of the series and the next we'll take a look at some of the TNC commands available to you that we haven't covered previously. You might find that some of the commands are not available in your operate exactly the same. Please refer to your owner's manual for specific details on how to use these commands if they don't function as described here.

**8BITCONV:** This command enables the transmission of 8-bit data in converse mode. Used with AWLEN - see below. For normal packet operation, such as keyboard to keyboard transmissions, use of bulletin board systems, and the transmission of ASCII files, 8BITCONV should be OFF. If you need to transmit 8-bit data, set 8BITCONV ON and set AWLEN to 8. Make sure that the TNC at the receiving end is also set up this way. This procedure is normally used for transmission of executable files or a special non-ASCII data set.

**AWLEN:** This parameter defines the word length used by the serial input/output port of your TNC. For normal packet operation, as described above, AWLEN should be set to 7. Set to 8 only if you're going to send 8-bit data.

**AX25L2V2:** This command determines which level of AX.25 protocol you're going to use. If OFF, the TNC will use AX.25 Level 2, Version 1.0. If ON, the TNC will use AX.25 Level 2, Version 2.0. Note: Some early TNCs will not digipeat Version 2.0 packets. With AX25L2V2 OFF, if your TNC sends a packet and the packet doesn't get acknowledged the first time it was sent, it will send it again and again, until an "ack" is received or the TNC retries out. With AX25L2V2 ON, if your TNC sends a packet and doesn't receive an "ack" the first time, it will send a poll frame to see if the other TNC received the packet. If yes, then it would continue, if not then it would send the last packet again. The advantage here is that short poll frames are sent, rather than long packets containing data. This can greatly reduce channel congestion. For VHF/UHF operation, it is almost essential that every TNC have AX25L2V2 ON. Many operators have suggested that Version 2.0 NOT be used on the HF bands as it tends to clutter the frequency with poll frames. See the CHECK command below for related information.

**BEACON:** Used with EVERY or AFTER to enable beacon transmissions. BEACON EVERY n - send a beacon at regular intervals specified by n. BEACON AFTER n - send a beacon once after a time interval specified by n having no packet activity on the frequency. n = 0 to 250 - specifies beacon timing in ten second intervals.

1 = 10 seconds, 2 = 20 seconds, 30 = 300 seconds or 5 minutes, 180 = 1800 seconds or 30 minutes, etc.

For example, if you set BEACON EVERY 180 (B E 180), the TNC will transmit a beacon every 30 minutes. If you set BEACON AFTER 180 (B A 180), the TNC will transmit a beacon after it hears no activity on the frequency for 30 minutes. B E 0 will turn the beacon off. The text of the beacon is specified by BTEXT and can contain up to 120 characters. The path used for the beacon transmission is specified by the UNPROTO command. YOU SHOULD USE BEACONS INTELLIGENTLY! Beacons are often a point of controversy in the packet community because they tend to clutter the frequency if used too frequently. You should keep your beacons short and infrequent, and they should only be used for meaningful data. Bulletin boards use the beacon for advising the community of who has mail waiting for them, clubs use beacons for meeting announcements, and beacons are used for severe weather warnings. In areas with heavy packet activity, beacons should not be used just to let everyone know that you're monitoring the frequency, that your mailbox is ready, or that you'd like someone to connect to you. You should monitor the frequency for activity and make some connections yourself.

**CHECK n:** Sets a timeout value for a packet connection. When a connection between your station and another seems to "disappear" due to changing propagation, channel congestion or loss of the path, your TNC could remain in the connected state indefinitely. If the CHECK command is set to a value other than 0, the TNC will attempt to recover the connection or disconnect. The action taken depends on the setting of AX25L2V2. The value of CHECK (n) may be set from 0 to 250 and the timing is based on the formula of n \* 10 seconds. (n = 1 is 10 seconds, n = 5 is 50 seconds, n = 30 is 300 seconds or 5 minutes, etc. A value of 30 is a recommended value to use.) If CHECK is set to 0, it disables the command. If AX25L2V2 is ON, the TNC will send a "check packet" to verify the presence of the other station if no packets have been heard after (n \* 10) seconds. If a response to the "check packet" is received, the connection will remain. If no response is received, the TNC will begin the disconnect sequence, just as if the DISCONNECT command had been sent. If AX25L2V2 is OFF, after no packets are heard for n \* 10 seconds, the TNC will not send a check packet, but will begin the disconnect sequence.

**CMSG:** Enables the automatic sending of a connect message whenever a station connects to your TNC. If CMSG is ON, the TNC will send the message contained in CTEXT as the first packet of the connection. CTEXT can contain up to 120 characters. Of course, you must have a message in CTEXT for CMSG to function. This feature is often used when the station is on but the operator is not present. The connect message is used to advise the other station of that fact, and often says to leave a message in the TNC buffer or mailbox. If CMSG is OFF, the CTEXT message is not transmitted.

**KISS:** KISS enables the TNC to act as a modem for a host computer, allowing programs such as TCP/IP, the G8BPQ Packet Switch, various BBS programs, and other programs using the Serial Link Interface Protocol (SLIP) to be run. Before turning KISS on, set the radio baud rate and terminal baud rate to the desired values. Set KISS to ON and then issue a RESTART command.

(To be continued in part 14)

# Contributions made by South Africa to the development of telecommunications

**DATED 1972** PART 1 (apologies for the poor reproduction)

**A F Bennett**

## 1 Introduction

It is customary for the incoming President to review the particular branch of electrical engineering in which he is involved and forecast future developments. This was done very comprehensively three years ago by Dr Boyce and if I were to follow the tradition I could only repeat much of what was said then. I feel free, therefore, to please myself and should like to take the opportunity of highlighting the contribution made by South Africa to the art of telecommunications.

Not many of the names of those mentioned in this review will appear in the books on the history of telecommunications in the year 2000, but they will be acknowledged in the Institute's record of proceedings in 1972.

The term 'telecommunications' is really broader than is generally realised and in fact covers the transmission and reception of sounds, signals and images by electrical means. In other words, telegraphy, telephony, facsimile, broadcasting, television and radar are all branches of telecommunications.

Not only has South Africa contributed by research, development and invention to the art, but its engineers have always been ready to consider new ideas, quick to assess their worth and bold enough to adopt those they accept and have not waited while other people tried them out. Thus South Africa has always been up-to-date and sometimes ahead in techniques and equipment.

South Africa has played a part in many branches of telecommunications from the much abused public telephone to space research. To support my claims I shall elaborate a little on the achievements in the following areas:

- Automatic public telephones
- Open wire carrier telephone systems
- Lightning and the protection of open wire telephone lines
- Automatic party-line telephones
- Automatic telephones
- An automatic long distance telephone switching system
- VHF Broadcasting
- Radio frequency predictions and the study of the ionosphere
- Radio frequency generation

## 2 Automatic public telephones

When the Post Office embarked on the automation of the Witwatersrand and Cape Peninsula telephone systems in the early 1930's, no satisfactory automatic public telephone system was available and hence it was planned to provide this type of service with manual

switching and control. In the meantime, an Assistant Engineer of the Post Office, P G T de Villiers, designed an automatic coin box telephone which met some of the requirements for such a system and negotiations were going on to have the telephone manufactured in Sweden. (Incidentally, the record states that these would have had to be paid for in gold.) At this point another South African, W D Corlett, then a Telegraph and Telephone Electrician, patented a system which not only met all requirements, but enabled existing coin boxes to be used. This system was accepted by the Post Office in January, 1933, and the record reports that it had been incorporated in the four first automatic exchanges opened in the Peninsula a year later and that it proved entirely successful in operation.

Although this system was first used successfully in South Africa in 1934 and many changes have been made subsequently to improve efficiency and foil thieves, vandals and the 'bright boys' who delight in devising ways of getting free calls, there have been many other inventions in this field since then and as a result many very sophisticated automatic coin box telephones have been placed in service throughout the world.

The Corlett invention was one of method and technique which provided a fully automatic public telephone and the only difference between the use of it and an ordinary instrument is that a coin must be deposited in the coin box before a conversation can be commenced. This equipment produces an electrical signal as each coin is deposited as well as an audible signal for use when the call office is being manually controlled such as on trunk calls.



**Fig 1 Automatic public telephone**

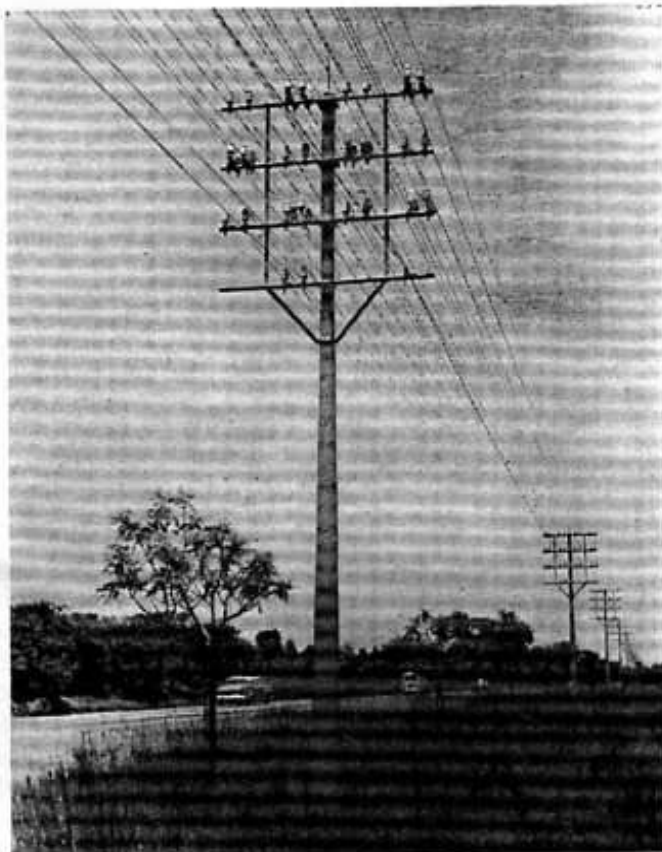


Fig 2 Open wire carrier route

### 3 Open wire carrier telephone systems

As the telegraph poles flash past when one drives along a modern highway at high speed, one gives little thought to the telephone conversations taking place over those wires, as well as the hundreds of telex messages and telegrams passing along at the same time. Most people would be amazed to know that on that quiet unimposing collection of fittings and wires channels can be provided for 300 or more simultaneous telephone conversations and that any one of these could be subdivided to provide 24 telegraph channels. For instance, the route shown in Figure 2 could well be carrying 317 simultaneous telephone conversations or perhaps 307 telephone conversations and 240 telegraph messages.

In the early days the only way of providing long distance telephone communications was by means of open wire lines. The distance was limited by the efficiency of the telephone and the attenuation of the line. With the advent of the thermionic valve, audio frequency amplifiers were introduced at intervals along the line as this made it possible to increase the distance greatly over which satisfactory conversations could be carried on, but it was still possible to carry only one conversation on one pair of wires.

A system known as carrier telephony which involves the application of radio techniques, but using relatively low frequencies, enabled the line capacity to be increased considerably. In South Africa where the distances to be spanned are great the carrier system proved to be a very economical means of not only improving the capacity of the line but of the standard of transmission. South African engineers were quick to realise the possi-

bilities of open wire carrier systems and some of the earliest systems in the world were installed here.

The main carrier routes in South Africa are built to very high mechanical standards, consequently the electrical characteristics can be predicted and maintained with considerable accuracy. The electrical stability of these routes is such that Dr C F Boyce was stimulated to propose that they could, with systems employing the then newly developed compandors, be exploited at frequencies up to 300 kHz. This contention was investigated and confirmed in America. As a result of design work done in South Africa by W Brading, equipment is now being manufactured in this country to provide 12 telephone channels in the spectrum above the conventional 12 channel systems and by so doing South Africa achieves the highest open wire exploitation in the world.

This carrier system is not the only one to have been developed in South Africa. Prompted by this country's vast distances and sparse population in the rural areas, the PO engineers developed a rural carrier system which was specifically designed for relatively short distances on low-grade overhead routes and is used to provide trunk lines or the backbone to a multi-party subscriber line arrangement. It is an assembly of channels (up to 10 circuits per pair) rather than a system. The channel spacing is 8 kHz in comparison with the usual 4 kHz and the use of double sideband transmission uses up a lot of frequency spectrum but in the normal application of these systems this characteristic is unimportant.

A highly sophisticated three channel system intended for use over relatively short distances between points which do not require more than six or seven circuits and operating in the 6 to 32 kHz spectrum has also been designed, developed and manufactured in South Africa and is used locally and in other countries.

**TO BE CONTINUED**

### BEWARE OF CROCS



CROC FOUND IN LAKE WHILST  
MEMBERS OF THE BRC WERE SWIMMING



RN6BN's ANTENNA SYSTEM. IT'S 32 ANTENNAS WITH 15 ELEMENTS EACH.  
I WONDER IF HE IS A PLUMBER BY TRADE !  
IT IS NOT FOR THE FAINT HEARTED OR A CLUSTER HOME DWELLER Hi.

1. When his 38 caliber revolver failed to fire at his intended victim during a hold-up in Long Beach , California would-be robber James Elliot did something that can only inspire wonder. He peered down the barrel and tried the trigger again. This time it worked.
2. The chef at a hotel in Switzerland lost a finger in a meat cutting machine and after a little shopping around, submitted a claim to his insurance company. The company expecting negligence sent out one of its men to have a look for himself. He tried the machine and he also lost a finger. The chef's claim was approved.
3. A man who shoveled snow for an hour to clear a space for his car during a blizzard in Chicago returned with his vehicle to find a woman had taken the space. Understandably, he shot her.
4. After stopping for drinks at an illegal bar, a Zimbabwean bus driver found that the 20 mental patients he was supposed to be transporting from Harare to Bulawayo had escaped. Not wanting to admit his incompetence, the driver went to a nearby bus stop and offered everyone waiting there a free ride. He then delivered the passengers to the mental hospital, telling the staff that the patients were very excitable and prone to bizarre fantasies. The deception wasn't discovered for 3 days.
5. An American teenager was in the hospital recovering from serious head wounds received from an oncoming train. When asked how he received the injuries, the lad told police that he was simply trying to see how close he could get his head to a moving train before he was hit.
6. A man walked into a Louisiana Circle-K, put a \$20 bill on the counter, and asked for change. When the clerk opened the cash drawer, the man pulled a gun and asked for all the cash in the register, which the clerk promptly provided. The man took the cash from the clerk and fled, leaving the \$20 bill on the counter. The total amount of cash he got from the drawer... \$15. [If someone points a gun at you and gives you money, is a crime committed?]



"You're fired, Jack. The lab results just came back, and you tested positive for Coke."



### **On Grid / Off Grid / Grid Tied System / Power cut, sorry "Load Shedding":**

On Grid System: That is where your house gets feed electricity from the power station via the municipality.

Off Grid System: Is where you make your own electricity via a generator or solar power or wind turbine or a hamster running on a wheel (good for an IPod).

**Grid Tied System:** This is normally where you have a Solar or wind power system and you sell your electricity that you make to the grid and you use electricity from the grid when you need electricity. Simply put, your power generation turns back the meter when you supply the grid and the meter runs forward when you use. This is not available in South Africa as our government and municipalities are still stuck in the ERA of Screwing Us. There is no nice way of putting it.

**Power Cuts / Load Shedding / Cable Theft:** This is when demand exceeds supply for electricity and you get switched off for a while, me and my customers stay on. In some peoples cases it could be a long while. Maybe a few days if the sub station supplying you has blown up, or they stole the cables for the copper.

### **Batteries:**

Batteries, keep in mind that they will have to be maintained, and then replaced after a certain number of years. The PV modules should last 20 years or more, but batteries just don't have that kind of useful life. Batteries in PV systems can also be very dangerous because of the energy they store and the acidic electrolytes they contain, so you'll need a well-ventilated, non-metallic enclosure for them. Although several different kinds of batteries are commonly used, the one characteristic they should all have in common is that they are deep-cycle batteries. Unlike your car battery, which is a shallow-cycle battery, deep-cycle batteries can discharge more of their stored energy while still maintaining long life. Car batteries discharge a large current for a very short time -- to start your car -- and are then immediately recharged as you drive. PV batteries generally have to discharge a smaller current for a longer period (such as all night), while being charged during the day.

The most commonly used deep-cycle batteries are lead-acid batteries (both sealed and vented) and nickel-cadmium batteries. Nickel-cadmium batteries are more expensive, but last longer and can be discharged more completely without harm. Even deep-cycle lead-acid batteries can't be discharged 100 percent without seriously shortening battery life, and generally, PV systems are designed to discharge lead-acid batteries no more than 40 percent or 50 percent, but ideally if you can then, no more than 20% per day. Thus giving you up to 5 days of autonomy will provide you with the best life span of your batteries.

### **Charge controllers:**

Also, the use of batteries requires the installation of another component called a charge controller. Batteries last a lot longer if care is taken so that they aren't overcharged or drained too much. That's what a charge controller does. Once the batteries are fully charged, the charge controller doesn't let current from the PV modules continue to flow into them. Similarly, once the batteries have been drained to a certain predetermined level, controlled by measuring battery voltage, many charge controllers will not allow more current to be drained from the batteries until they have been recharged. The use of a charge controllers is essential for long battery life. The charge controller regulates the voltage to 14.2 Volts DC. Perfect for charging batteries. You can get the charge controllers in 2 different sizes from us 10Amps and 30Amps and in both 12Vdc and 24Vdc.

### **Solar Panels:**

Solar panels come in different Watt sizes. From 5Watts up to 200Watts. They can also be made up of different kinds of cells. Mono Crystalline Solar Cells "Black" or Multi Crystalline Solar Cells "Shiny Blue". Please make sure that the panels you buy are rated on the back. Unrated panels are just not worth buying as you don't know what you buying and don't just believe the salesman. Half the time they don't even know what kind of panel they selling you never mind the rating.

### **Inverters:**

You will need an Inverter to change the 12 Volts DC "the current stored in the battery" into useful 220 Volts AC "The type of current that comes out of your wall plugs." We have them in 600Watts, 800, 1000, 1200, 2000, 3000, 4000 and 5000 Watt sizes. We can supply inverters with and without built-in chargers. The inverters with built-in chargers are very useful for people looking for UPS system "Backup power." These inverters can be used to power lights or whole houses depending on the size of the inverter. The length of time they can power lights or the house for depends on the size of your battery bank. They are very good at charging and keeping your batteries fully charged through mains power supply.

Inverters without built-in battery chargers are best used for off grid systems or where people are using the generator's 12volt battery charger.

### **Solar Heating ,Solar Geysers:**

You get 2 main kinds of solar geysers. Low pressure and High pressure. The low pressure geyser works with 1 bar or less pressure and the high pressure geyser works with the same pressure your current geyser works with. Solar geyser can have an electrical element which can be used if there is no sunshine or if you have used all the hot water up at night time. A solar geyser can not be used to generate electricity it only makes water hot.

Our Solar geysers have up to 50mm thick insulation and have vacuum tubes. The vacuum tubes are the best way of heating water and do not get affected by cold whether as the cold can not be transferred through a vacuum.

### **Geyser Blankets and Controller Units:**

If you can't convert to a solar geyser because of budget constraints or because building limitations etc. Then the next best thing you can do is fit a geyser blanket and insulate your hot water pipes laying in your roof. This will help reduce temperature loss in your geyser tank. Fitting a geyser controller unit will help you automatically switch on and switch off your geyser when required. This will drop your electricity bill significantly on your geyser's electricity consumption. Another way to switch your geyser off automatically during the day and on at night is to fit a Day and Night switch. This will save you the hassle of having to fit a timer switch which could reset itself every time there's a power cut.



## Exploring Rechargeable Batteries by Peter Parker VK3YE

Rechargeable batteries: they're used everywhere, and there's many different brands and types. Almost every amateur has their own opinions on the merits of different types and the best ways to look after them. We examine the main types available and their suitability for various equipment amateurs' use.

### How rechargeable batteries work

Batteries convert stored chemical energy into electrical energy. This is achieved by causing electrons to flow whenever there is a conductive path between the cell's electrodes.

Electrons flow as a result of a chemical reaction between the cell's two electrodes that are separated by an electrolyte. The cell becomes exhausted when the active materials inside the cell are depleted and the chemical reactions slow. The voltage provided by a cell depends on the electrode material, their surface area and material between the electrodes (electrolyte). Current flow stops when the connection between the electrodes is removed.

Rechargeable cells operate on the same principle, except that the chemical reaction that occurs is reversed while charging. When connected to an appropriate charger, cells convert electrical energy back into potential chemical energy. The process is repeated every time the cell is discharged and recharged.

Different cells use different electrode materials and have different voltage outputs (1.2, 1.5, 2 and 3.6 volts for the types discussed here). Higher voltages are possible by connecting cells in series. A set of several cells connected together is called a battery. However, because lay people do not distinguish between a 1.5 volt cell and a 9 volt battery (which comprises several cells), the term battery is widely used for both batteries and cells.

The capacity of cells is expressed in amp-hours (Ah) or milliamp-hours (mAh). The approximate time that a battery will last per charge can be found by dividing the battery pack capacity (normally written on the battery pack itself) by the average current consumption of the device. Thus a 600 mAh battery pack can be expected to power a receiver that takes 60mA for 10 hours.

Cells can be visualized as consisting of a cell with a resistor in series. You won't find an actual resistor should you split open a battery pack, but the effect is the same. Some battery types have higher values of internal resistance than others. High internal resistance doesn't matter if powering items that draw fairly low currents (eg a clock or small receiver). However, if running something like a 5-watt handheld transceiver, a battery with a high internal resistance will not deliver the current asked of it.

Having explained some of the characteristics important to all batteries, we will now look at each cell type in turn.

### Nickel-cadmium (NiCad)

Nickel-cadmium cells are the most commonly used rechargeable batteries in consumer applications. They come in similar sizes to non-rechargeable cells, so they can directly replace non-rechargeable alkaline or carbon-zinc cells. NiCads have a lower voltage output than non-rechargeable cells (1.2 vs 1.5 volts). This difference is not important in most cases.

NiCad battery packs have voltages of 2.4, 3.6, 4.8, 6, 7.2, 9, 10.8 volts, etc. This corresponds to 2, 3, 4, 5, 6, 7, 8 and 9 cells respectively.

NiCads perform best between 16 and 26 degrees Celsius. Their capacity is reduced at higher temperatures. Hydrogen gas is created and there is a risk of explosion when cells are used below 0 degrees.

NiCad batteries have a low internal resistance. This makes them good for equipment that draws large amounts of current (eg portable transmitting gear). However low internal resistance means that extremely high currents (as much as 30 amps for a C-sized cell!) will flow if cells are short-circuited. Short-circuiting should be avoided as it can cause heat build-up and cell damage.

Most portable transceivers come with NiCad battery packs where the cells are welded to metal connecting straps. There is good reason for this. In high-current applications, the unknown (and varying) resistance between cells and battery holder contacts can result in erratic operation. This is especially so when the transceiver is used in a salt-laden environment. An encased battery pack overcomes these difficulties and provides more reliable operation.

The normal charging rate is 10 per cent of a battery's capacity for 14 hours. For example, if a battery pack has a 600 mAh rating, its correct charging current is 60 mA. Because the charging process is not 100% efficient, the charger needs to be left running for about 14 hours instead of 10 hours. Higher charging currents are possible, but the charging time needs to be proportionally reduced. NiCads can be left on a trickle charger indefinitely if the charging current is reduced to 2% of the battery's amp-hour rating. Avoid the build up of heat during charging for long battery life.

NiCad batteries require a constant current charger; ie one where the current provided to the battery is fixed over the entire charging period. Such a charger can be something as simple as an unregulated DC power supply with a series resistor to limit the charging current into the cells. If the charger's voltage and the battery's desired charging current is known, Ohm's Law can be used to calculate the correct series resistor value. Because NiCads have a low internal resistance, proper charging can occur with several cells in series.

For best life, do not discharge NiCads to less than 1.0 volt per cell. When charging, NiCads should read 1.45 volts per cell. If the cell voltage is higher during charging (eg 1.6 or 1.7 volts), the cell is faulty and should be discarded.

You'll often hear discussions about the so-called 'memory effect' exhibited by NiCad cells. This refers to the claimed tendency of cells not to deliver their rated voltage when placed in a charger before being fully discharged. Belief in the existence of the 'memory effect' is widespread amongst users of NiCad batteries. However, textbooks and data from battery manufacturers make little or no mention of it. Believers say that to prevent it batteries must be discharged to 1 volt per cell before charging. Non-believers say that this discharging merely reduces cell life.

Evidence suggests that true 'memory effect' is rare. It was first noticed in communications satellites where cells were discharged to precisely the same discharge point every time. In casual amateur use batteries are most unlikely to be discharged to the same point after every use. Much of what is mistaken for the 'memory effect' is voltage depression, which is caused by long, continuous overcharging, which causes crystals to grow inside the cell. Fortunately both

the 'memory effect' and voltage depression can be overcome by subjecting the battery to one or more deep charge/discharge cycles.

Another term you will hear is 'cell reversal'. This can occur when a battery of cells is discharged below its safe 1.0 volt per cell. During this discharge, differences between individual cells can lead to one cell becoming depleted before the rest. When this happens, the current generated from the remaining active cells will 'charge' the weakest cell, but in reverse polarity. This can lead to the release of gas and permanent damage to the battery pack.

NiCads can short circuit due to the build up of crystals inside the battery. The use of a fully-charged electrolytic capacitor placed across the cell can effect a temporary cure. Over-discharging of batteries invites short circuiting. Batteries should be stored charged. A lifespan of 200 to 800 charges is typical for NiCad batteries.

#### **Nickel metal hydride (NiMH)**

Like NiCads, nickel-metal hydride cells provide 1.2 volts per cell. Battery makers claim that NiMH cells do not suffer from the 'memory effect' and can be recharged up to 1000 times.

NiMH cells are not as suitable as NiCads for extreme current loads, but do offer a greater capacity in the same cell size. A typical AA NiCad may have a 750 mAh, but a NiMH may provide 1100 mAh - 45 percent more. This makes NiMH cells a good choice for applications where long life is desired but current demands are not high - eg portable receiving equipment. NiCad chargers can be used to charge NiMH batteries, but the charging time needs to be lengthened to take NiMH's typically larger capacity into account. The main enemy of rechargeable cells is heat. If cells get hot during charging, reduce the charging current to no more than that recommended.

#### **Rechargeable alkaline manganese**

Unlike the preceding two battery types, rechargeable alkaline manganese (RAM) cells give a full 1.5 volts each. They are therefore suitable for applications where the substitution of 1.2 volt NiCads for 1.5 volt dry cells results in degraded equipment performance.

RAM cells are cheaper to buy than NiCads. They can be recharged between 50 and 750 times. They also have a greater capacity than do NiCads - 1500 mAh is typical for size AA cells. RAM cells are good for use with outdoor and solar equipment as they will work efficiently at temperatures up to and exceeding 60 degrees Celsius.

RAM cells have a much higher internal resistance than NiCads (0.2 ohms vs 0.02 ohms). This means that they cannot supply high peak values of current. For this reason they are unsuitable for use with standard amateur HTs. However, their high capacity and long shelf life (5 years) makes them suitable for low powered or emergency-use applications, such as clocks and emergency torches.

Chargers intended for NiCad and NiMH cells will not charge rechargeable alkalines. This is because rechargeable alkaline cells require a constant voltage source of between 1.62 and 1.68 volts to charge. RAM cells should be connected in parallel rather than in series when charging several cells at a time. Unlike other rechargeable batteries, RAM cells are pre-charged and do not require charging before first use.

#### **Lithium ion**

Lithium ion cells are the most recent of the battery types discussed here to come onto the market. They offer higher cell voltage (3.6 volts) and greater capacity for a given volume. This makes them especially suitable for handheld equipment where long operating times are important, such as mobile phones.

As an example of what Lithium ion battery packs can do, a typical lithium ion battery pack is 55x45x20mm but provides 7.2 volts with a 1100 mAh capacity. Lithium ion batteries are still quite expensive, but are coming into amateur use through their inclusion in handheld transceivers such as Yaesu's VX-1R and VX-5R models.

#### **Sealed lead acid**

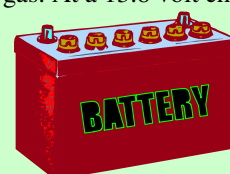
Sealed lead acid batteries (or 'gel cells') are less popular than NiCads in handheld equipment, but find widespread use as back up batteries in security systems and for amateur portable operation. Per-cell voltage is 2.3 volts when charged, and 1.8 volts when discharged. This equates to 13.8 and 10.8 volts respectively for a battery of six cells. For best use of the full battery charge, equipment intended to operate with '12 volt' sealed lead acid batteries should operate well (if not at full power) at voltages of 10.8 volts or less.

Gel cells are cheap, rugged and reliable and should last several years at least. If you want a battery to run a QRP HF station or a VHF/UHF handheld for several hours, they are the ideal choice. They are also widely used with small solar systems.

Sealed lead acid batteries can either be used on a cyclic charge regime (battery connected to charger for a specific time) or continuous float use, where the battery is across the charger any time it's not in use. Cyclic chargers should charge at 2.4 or 2.5 volts per cell and be current limited to prevent overcharge. In contrast continuous float charging (or trickle charging) requires a charging voltage of only 2.3 volts per cell (13.8 volts for a '12 volt' battery). With both types of use the charger voltage is held constant. Connect batteries in parallel if charging two or more from the one charger.

Chargers for sealed lead acid batteries are available commercially or can be made at home. Special gel cell charger ICs exist to provide the necessary voltage and current regulation. Alternatively chargers can be made from the more common regulator chips such as the 723 or LM317. These chargers can be used to directly trickle charge the smaller '12 volt' gel batteries. No damage is done if the charger remains on, even when the battery is fully charged. This is because as the battery voltage approaches 13.8, the charging current will fall to negligible levels.

Sealed lead acid batteries should not be charged at voltages higher than those indicated as safe above. This is because high charging voltages (eg 2.6 volts per cell) will endanger the battery due to the production of excess gas. At a 13.8 volt charging voltage the production of gas is low, and the battery should give years of service. Charging current should not exceed 20 per cent of the rated amp hour capacity of cells. If using a high current 13.8 volt power supply as a charger, some form of current limiting is desirable to stay within the battery's limits.





## 10 days in Paradise

ZS2BS visit in East London October 2009.

From 16<sup>th</sup> to 26<sup>th</sup> of October I had the possibility to visit my friends in East London. Henry ZS2AHL gave me a wonderful accommodation at his home in Beacon Bay. Henry and Pat gave me such a lovely welcome and let me be a part of their family.

Thank you so much for all the things you have done to me.

Sunspots are not much to find in our days. We are quite out of the minimum but far away from the propagation we had around 2002. I thought it would be very challenging to operate from South Africa this time but sometimes you find a small part of paradise like Henry's shack. He has a nice QTH right on top of a small hill in beacon bay. He runs a 6 element 3 band yagi antenna on a 10m mast rotatable 360°.



He has a DXer's dream shack of with 3 transceiver to choose and 400W output on all HF Bands. Don't forget the wire Antennas for 160m up to 40m. To say it short, it is a real DXer's paradise. Round about 300 QSO were made with all continents all around the world. At the last weekend I operated in the CQ-WW-DX-contest with the aim not to work as much stations like usual. My aim was to work as much DX zones as possible of the 40 DX zones of the world.

After 24h of contest with some brakes of sleep and a nice braai with ZS2ILN and his daughter 34 zones were in the log. Hawaii, Alaska, North, Middle and South America, Japan, Australia, China, India, Mongolia, Europe and Africa of cause were possible to work in 24h. Not only the DXing was on in the 10 days.

First Saturday the IOTA activity was a great success with lots of fun and a well organized program. On Tuesday it was a great pleasure to visit our Border Radio Club meeting at ESCOM's place in the evening. To see all the friends back again was a magnificent event for me. Due the week I visited some of you and we had a lot of interesting talks about Amateur Radio and more. Sorry to those I had not the time to visit, but 2010 is coming soon.

Thanks again to all from the Border Radio Club, have a nice and healthy 2010 and seeing you in 2010, plans are on my table.

Best 73s good DX, Marcel ZS2BS



**BACK TO REALITY**

**GREETINGS FROM A WHITE  
GERMANY**

**TO THE BORDER RADIO CLUB**

**MARCEL ZS2BS/DJ5MS**



FEBRUARY

4	ZS2ILN	Ivan	Newman
5	ZS2CY	Cedric	Hart
12	XYL	Ann	Prior
25	XYL	Dawn	Kumm



WHO SAY'S DX IS DEAD

COPY OF ONE OF MARGELS MANY LOG PAGES

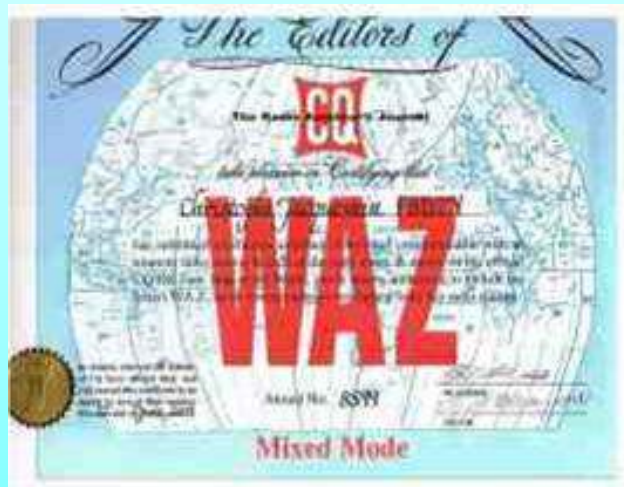
RUFZEICHEN/STATION	2009 DATUM/DATE	UNIVERSAL TIME COORDINATED/UTC VON/FROM	BIS/TO	BETRIEBERS NAME/ANWIS FUNKURS RUFZEICHEN/STATION	SIGNAL/RAPOORT GEGEBEN SENT	ERHALTEN RECEIVED	OPERATORS NAME/QTH/BEMERKUNGEN/REMARKS	QSL AB SENT/RE
Z7Q7CE	11.10	7:04		S20	59	59	new band Malawi gr2	✓
E48MM	11.10	10:35		S17	59	59	" "	✓
K6YRA	12.10	15:14		S17	57	55		✓
K4WV	12.10	22:45		S40	59	59	Jack Virginia WX313	✓
T41MS	14.10	16:15		S25	57	59	gr2 new band Blum	✓
T07BR	14.10	17:35		S20	58	59		✓
SV8/HV9	14.10	17:53		S40	58	59	Rene G4-067	✓
<hr/>								
DL3TD	17.10	18:53		S20	55	59	001	✓
WA2OAX	17.10	18:59		S20	57	56	IRA Kambath	✓
ZS10WCS	18.10	4:40		S40	58	59	Dirk ZS1VD13	✓
DF6FR	18.10	10:46		S15	59	57	FAT 002	✓
OE4YEW	18.10	10:47		S15	59	59	Samuel Madrid	✓
P14CC	18.10	10:54		S15	55	57	Jack Rotterdam	✓
DL8CS	18.10	10:56		S15	56	59	003 M15 Ulef	✓
R120A	18.10	11:55		S15	59	59	Parul	✓
ZS2NB	18.10	11:57		S15	59	59	Nick	✓
HE8S	18.10	12:05		S15	55	55	4825	✓
IW8ELR	18.10	12:07		S15	42	55	Nopodi	✓
DN8DAN	18.10	12:08		S15	55	55	Rim	✓
JA2JG	"	12:09		S15	53	55	KoKi	✓
DF2CK	"	12:10		S15	55	55	Dink Rico	✓
DC8XM	"	12:12		S15	53	51	Pom Band	✓
DL7BU	"	12:13		S15	53	57	Peter	✓
RW6AUB	"	12:15		S15	44	57	Ande	✓

## ***CQ announces 75th anniversary Worked All Zones award***

The November, 1934, issue of R/9 magazine announced a new operating award for radio amateurs, designed to encourage the growing popularity of contacting stations across the globe, what we know today as DXing. The award was called Worked All Zones and was to be granted for making confirmed contacts with hams in each of the 40 zones into which the world had been divided by R/9's editors.

Today, 75 years later, R/9 has been succeeded by CQ magazine and WAZ Worked All Zones sponsored by CQ since 1945, continues to be one of amateur radio's most prestigious operating awards. In celebration of the WAZ's 75th anniversary, CQ magazine is announcing a limited term "Diamond Jubilee WAZ" award. A special certificate will be issued to amateurs who make contacts in all 40 CQ Zones of the World between **November 1, 2009 and December 31, 2010**. Certificates will be numbered but there will be no endorsements. Confirmations will not be required.

However, it is expected that applicants will continue to uphold amateur radio's longstanding tradition of honesty and self regulation. Standard WAZ application fees will apply. Complete details on the Diamond Jubilee WAZ Award is in the October 2009 issue of CQ, and is on the CQ website, [www.cqamateurradio.com](http://www.cqamateurradio.com), with a link from the October issue highlights page. WAZ is the second oldest amateur radio operating award still offered today. The only current award that is older is the International Amateur Radio Union's Worked All Continents award. The ARRL's DX Century Club (DXCC) award was introduced in 1936. To date, more than 8,600 basic WAZ awards have been issued.



## **NEWS**

In August of 2009 Peter (ZS2ABF) came to Sheffield as part of his tour of the UK and visited us at the SARC giving us a power point on ham radio in Africa. Peter is the editor of the local magazine for the local radio Club "ZS2BRC" In East London South Africa.

He produces the magazine every month and he does a superb job of it, he did ask if we would like to share Ideas and remarks both ways on the magazine, feel free to have a read.

Here is the link for the border radio Club site home page.

<http://www.zs2brc.co.za/>

The second link will take you to the magazine that Peter produces

[http://www.zs2brc.co.za/fb\\_newsletters.htm](http://www.zs2brc.co.za/fb_newsletters.htm)

Enjoy it, there is loads of good technical Information as well, and do feel free to email the editor.

**Trevor M0TWS Club Secretary SARC**



Your **FEEDBACK** magazine is now Shown on the Sheffield Amateur Radio Club's Web page in the UK. Trevor M0TWS (Tea without Sugar) has made a link on their "Ning" social networking site back to our ZS2BRC web site. The hams visiting their site can now link to our magazine. Here is a brief shot of Trevor's listing on their Home site. To get to the SARC go to: <http://sheffieldarc.ning.com>

# HomeBrew QSL Cards

By KA6KBC, Bill



I remember as a young amateur the excitement of going to the mailbox and finding a QSL card from an earlier QSO. This is what it's all about. It reinforces the personal aspect of the hobby. I encourage you to experiment with your photography and desktop publishing techniques to produce QSL cards you are proud of. A QSL card is a specially designed postcard that hams exchange in the mail whenever they make contact with one another for the first time. Hams exchange cards in friendship and to prove that they actually made radio contact.

Each ham's QSL card has a unique design that may include words and pictures about his or her family, friends, and places that are special to them. The cards also include information about the ham's call sign, radio contact equipment, date, time and type of contact, and geographic location of the ham.

One of the best things about being a ham radio operator is the chance to talk to people on the other side of town, the other side of the state or even the other side of the planet that you wouldn't have otherwise met. Ham radio operators traditionally exchange QSL cards through the mail to confirm that mutual contact has occurred. A custom QSL card is truly a collector's item for the people you contact.

Fortunately, with a little help from your computer and printer, they're easy and fun to make.

### How to Make a Custom QSL Card:

#### From your PC:

There is nice software that can be down loaded – **QSL Maker**, developed by WB8RCR let's you design and print your own QSL cards, allowing to personalize background, by importing pictures or just filling with a plain color, and let's you personalize headings and address as well as your own call sign. It can import ADIF log file for fields auto filling during the print process, or allow you to insert directly QSO Data into a table. It runs on Windows, I've tested it on Windows XP, and is completely Free ! Works great. You can make a very custom QSL Cards.

<http://qslmaker.mints.org/>

#### Sample Cards:

Confirming QSO with	Date (Z)	UTC	Freq / DX Mode	Pwr Out	Report

**CROATIA - EUROPE**  
 WAZ:15 ITU:28 LOC:JN76WA  
**9A2TK** 73, Tom  
 To: F651 D This confirms our 2 way PAC QSO  
 Date: September 12, 2000 Time: 18:28 UTC  
 Band: 2m UR Sigs: 599

# QSL CARDS

Sample 73's – Bill – KA6KBC  
<http://billbrwn.tripod.com/id23.html>

UNITED STATES  
**KA6KBC**  
 Bill Brown  
 4355 Via De Los Robles,  
 Yorba Linda, CA 92886

CONFIRMING QSO WITH

RADIO	DATE	UTC	MHZ	MODE	RST

Pwr. QSL. TXR: 73.



# Attention - Read this



## SARL AGM - Port Elizabeth (23 - 25 April 2010)

As was discussed at the General Meeting on Tuesday 19 January 2010, please come to the February General Meeting with your final decision regarding attendance of the SARL AGM. The main concern is the booking of accommodation for the two nights in Port Elizabeth plus payment of any deposits for this. We will further discuss the costs as well at this meeting - Anthony ZS2BQ.



### Chairman's Chirp

## BORDER RADIO CLUB



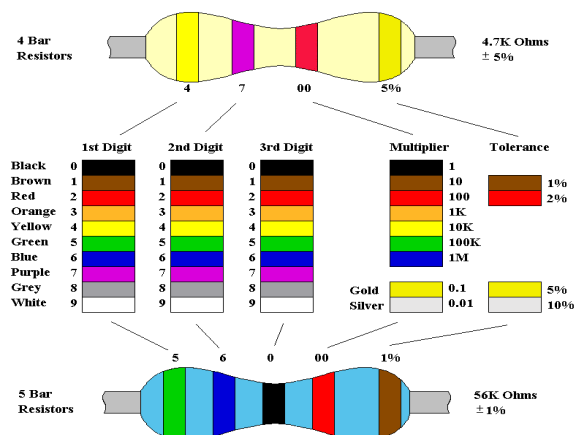
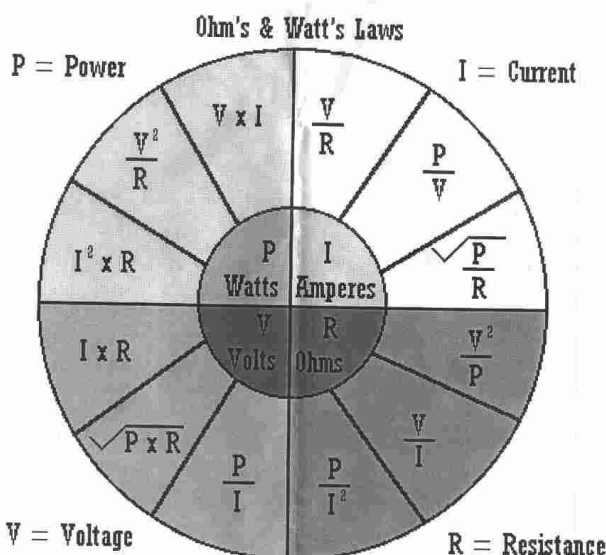
Well, the first meeting of 2010 was held on Tuesday 19 January and we had a surprise speaker in the form of Brian Sullivan, a real fundi on battery manufacture, care, applications etc. Just when you thought you knew quite a bit about batteries, along comes Brian to dispel your "myths"! I think even Clarrie, who I respect for his in-depth knowledge about almost anything, learnt from the presentation. We definitely need more of these types of talks. Members, I appeal once again to you to come up with suggestions for interesting talks at our General Meetings.

Quite a bit of time was also spent on discussing the SARL AGM, which is being hosted by PEARS this year. No decisions were made as to attendance, but we will hopefully sort that out at the February meeting. More about this in my next Chirp.

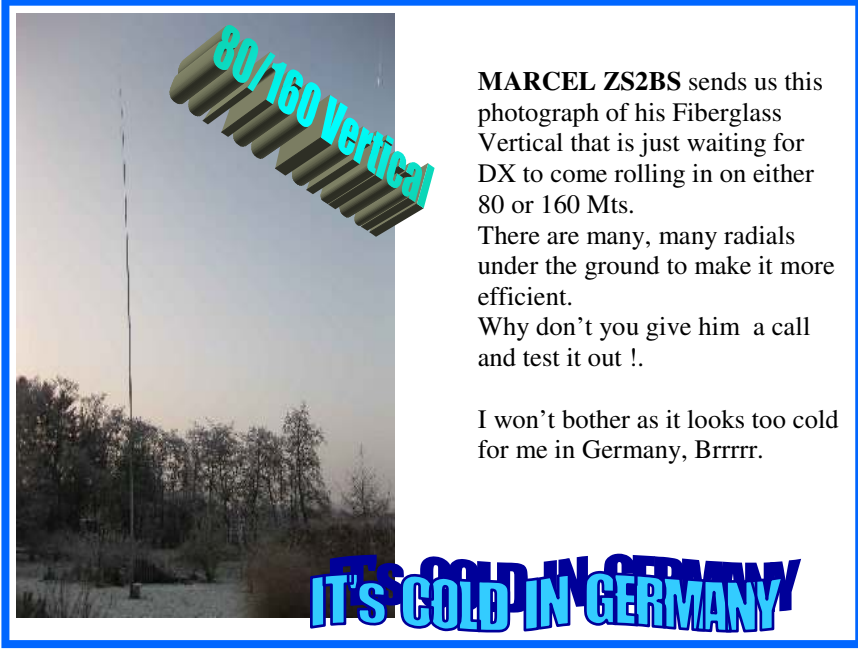
I will be taking delivery of my new ICOM HF rig won in the PEARS raffle during the course of next week (25<sup>th</sup> January), so hopefully you'll hear me blowing the dust out of it's innards at some time (that should surprise many of you....).

At the time of writing, your ICASA invoices have yet to be posted, but that doesn't prevent you from taking last year's receipt along to your local Post Office and renewing your licence that way. At this stage you have until 28 February 2010 to have paid your dues - please do so to avoid ending up having your licence cancelled. Yes, it does happen and it will mean doing the whole RAE thing all over again!

Until next time.  
**Anthony ZS2BQ**



**TO LOG YOUR BRAIN**



MARCEL ZS2BS sends us this photograph of his Fiberglass Vertical that is just waiting for DX to come rolling in on either 80 or 160 Mts.

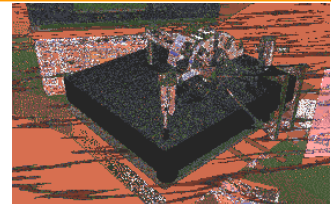
There are many, many radials under the ground to make it more efficient.

Why don't you give him a call and test it out !.

I won't bother as it looks too cold for me in Germany, Brrrrr.



**What a single spelling mistake can do on an SMS... Husband went to Pretoria . And sent an SMS to wife: "Having a wonderful time, wish you were HER .....!!"**



**KNOW THE Q CODE**

**Q Codes By G8MNY**

Here is a list of Q codes, I am sure there are loads more. Originally the shorthand was developed to speed Morse code contacts up, using the fact that most words starting with a Q have U as the 2nd letter, so anything else can be this 3 letter code system. Other codes are used e.g. CB's 10 & Mill Z code etc.

The Q code is very popular even in phone communication & in commercial circles. It has the great ability to permit clear exchanges between different languages too. The use in phone mode greatly helps under poor signal or language conditions, so it not being lazy.

However I do try not to use it when on a demo station with public present,

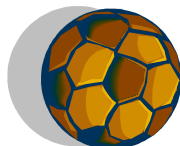
Q Code	Simplified Meaning, To/From
QAV	Are You calling me
QCM	Your Tx is defective
QFE	Aircraft Pressure (mB)
QNH	Ground Air Pressure (mB)
QOH	Interference From

QRA	Locator code/Station Name	QSD	Keying Defective
QRB	Distance apart	QSI	Can't Break in
QRD	Where are you bound	QSK	Break in?
QRG	Frequency Readout	QSL	Acknowledge Contact
QRH	Frequency Varies	QSM	Radio Jamming?
QRI	Tone Report	QSN	Heard Time Freq MHz
QRJ	Weak Signals	QSO	Radio Contact
QRK	Readability/Intelligibility	QSP	Relay message to
QRL	Busy (freq in use)	QSR	Repeat call on calling freq
QRM	Man made interference	QSS	Working freq
QRN	Natural static interference	QST	Tone is?
QRO	Power Increase	QSU	Reply here/freq
QRP	Power Decrease	QSV	Send series of Vs
QRQ	Send Faster	QSW	Send here/freq
QRR	Ready for Automatic	QSX	Listen to freq MHz
QRS	Send slower	QSY	Change freq MHz
QRT	Stop Sending/Closedown	QSZ	Send more than once?
QRU	Anything for me	QTC	Message
QRV	Ready	QTH	Location
QRW	Inform Call, Freq MHz	QTQ	Q Codes used
QRX	Standby (time)	QTR	Time is
QRY	What is my turn?	QTS	Send Call for Tuning
QRZ	Who is calling?	QTU	Operating Hours
QSA	Signal Strength	QTV	Stand Guard on Freq
QSB	Fading Signals	QTX	Keep QSO open till
		QUA	News of call xxx?

**WORLD CUP - SOUTH AFRICA**



We have been reading a lot about the security in our country and the preparations for the World Cup. The press seem to have **blown it out of all proportion**. So, I am going to make sure that if, I do buy some form of Protection device it will be a dual purpose gadget that I can use after the soccer. May be I will buy one of these, it looks useful.



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The Border Radio Club holds monthly General Meetings every third Tuesday of the month at The Gatehouse, Eskom's Sunilaws Office Park, Quenera Drive, Beacon Bay 19:30 for 19:45.

Anyone and everyone is welcome to attend. The Club can be contacted via e-mail at:

[info@zs2brc.co.za](mailto:info@zs2brc.co.za) or [news@zs2brc.co.za](mailto:news@zs2brc.co.za) or [feedbacknews@zs2brc.co.za](mailto:feedbacknews@zs2brc.co.za)

Visit our Border Radio Club Website at address, <http://www.zs2brc.co.za/> (do not use a search engine)

Listen to our Sunday bulletin at 07:45 on 145. 650 Mhz. FM Local, and relays on 145. 675 Mhz. FM, 3.575 Mhz. FM, 7. 074 Mhz LSB, and 3.615 Mhz LSB.

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