HAMS Haywire News
September 2009
www.marc.org.za
PO Box 1076, Hilton, 3245

MIDLANDS AMATEUR RADIO CLUB

AFFILIATED TO THE SARL & IN ASSOCIATION WITH THE NATAL CARBINEERS

CLUB COMMITTEE: 2009-2010

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The Chairman's Ruminations

The revised constitution has been agreed by the club committee and is now ready to be circulated. The current constitution had a number of vague statements which have led to some problems of interpretation. These we believe have now been changed and the wording is now clearer. We have made a number of other changes and I would ask members to read it carefully. We are calling a Special General Meeting (SGM) to be held at 11 am on the 17th October. I urge you to please attend and if you cant please send a proxy. The notice is attached to this news letter.

The monthly general meeting will follow straight after the SGM. Once the meetings are over we are planning to move to the Worlds View repeater site, to carry out some repair work on the facility. The building needs painting and some sealing amongst others. So we look forward to having you there with us. The last meeting at Groenekloof was a very pleasant and most interesting few hours. The repaired 6m beacon ZS5SIX, was installed and is working well on 50.321Mhz, look out for it. Thanks to Shaun ZR5S and Mike ZS5ML for their hard work and to Craig ZS5CID for rebuilding the 6m transmitter.

The new Sunday morning net has begun with the news reader running the net from about 7.40 am and the news from about 8 am will include items of interest from the SARL bulletin. Those with items of news are welcome to call in and share their news at the end of the bulletin. I ran the first net in the new format and hope that this format will prove popular with our members. I must once again thank Robin ZS5MRS and Mickey ZS5QB for their devotion to the Sunday net, for Robin, as the "BBC" voice reading the news and Mickey the ever present, competent and calm net controller. My admiration of Mickey's skills have increased greatly after running the net this week. Thank you both for the great job you have done for the club.

The ZU course is going along well and my thanks to Craig ZS5CD and Evert ZS5EFP who have been leading the course. There will be 13 members writing their exams on October 22nd, all are new members of the club and I would like to welcome them and trust that our hobby will bring them great joy.

I would like to welcome the following new members who by this time next month, should all have a ZU licence: Rachael Marx, Jason Marx, Gavin Marx, Lawrence Orsmond, Juan Pieterse, Neville Collins, Shaun Fisher, Krish Ramsaran, Ian Pearson, Farhaadh Rahim, and Curtis Rudling. I wish you all well in the exams.

Enjoy the air waves, in spite of the lack of sun spots.
Mike
ZS5BGV

Diary of Events

24 September	Heritage Day Sprint
24 September	Deadline for October RAE entries
26 September	Joint Swopshop in Monteseal, at John Fielding's place
6 October	Deadline for Heritage day sprint logs - send to riaanzs4pr@gmail.com
17 October	MARC special meeting and general monthly meeting at the clubhouse
21/22 November	Combined club camping weeked at Midmar Dam for the SARL HF field weekend

The M.A.R.C. Infrastructure

Voice Repeaters (FM)

Visit www.marc.org.za/pages/freq.htm for updates of this list

VHF	Tx	Rx	Equipment
Howick - off air	145.6625MHz	145.0625 MHz	SCR200 20W, Diamond X-200 on rx and tx
Estcourt - off air	145.700 MHz	145.100 MHz	Emcom SA256 25W, Diamond X-200 on tx
Franklin - off air	145.725 MHz	145.125 MHz	GE MVP 10W - off air
Worlds View	145.750 MHz CTSS 88.5	145.150 MHz	Emcom SA256 25W, Diamond X-200 on rx and tx
Greytown	145.775 MHz	145.175 MHz	Home Brew @ 20w, Diamond X-200 on rx and tx
Underberg	145.7875MHz CTSS 88.5	145.1875MHz	Q8000 30W
Windy Hill	145.700MHz - Hamnet Repeater - off air		
UHF			
Mt Gilboa	439.225 MHz	431.625 MHz	General Electric MII, Diamond X-200 on rx and tx
Zwartberg	438.775 MHz CTSS 110.9	430.175 MHz	GE MVP 15W - off air

APRS

The national APRS frequency is 144.800 MHZ (Tx & Rx). The I-Gate is at ZR5S (Blackridge). Fixed stations should beacon at approximately 30min intervals with a path of WIDE5-5. Mobile stations should beacon at approximately 1min intervals with a path of WIDE5-5. We have aprs digi's throughout KZN. A PBBS (mailbox) is on ZS0PMB-1 for emergency use. A KA-NODE is on ZS0PMB-7

Packet Radio

Hilton 144.625 MHZ (Tx & Rx) AEA PK-88, Slim-Jim

The PBBS (mailbox) is on ZS0HIL-1. The digi is on ZS0HIL-2. Use Winpack to connect to the PBBS and leave a message for someone.

ECHO-LINK "voip"

Our node number is 244279 Call Sign ZS5PMB. This Echo-link facility is available on the Midlands linked Repeater network.

E-QSO "voip"

We are in the " 101ENGLISH" virtual room, on the "repeater.dns2go.com" server. This is linked to RF at Blackridge on 433.400 MHz simplex.

BEACONS

Hilton, Groenekloof 50.321 MHz (Tx) ZS5SIX FSK

WEB SITES

MARC'S very own website	www.marc.org.za
SARL's website	www.sarl.org.za
HAMNET website	www.hamnetkzn.org.za

Regular Events

The KwaZulu Natal Net:
Starts at 06h00 on 7.055 MHz. in winter and 3.650Mhz in summer and continues until 07h40. Colin ZS5CF hosts the net from 06h00 & Gary Potgieter (ZS5NK)-takes over later on.

MARC Sunday Morning Net:
Times: 07h45. Club bulletin is presented at 08h00.
Frequencies: HF: 3.620MHz
VHF: 145.750, 145.675, 145.775MHz
UHF: 439.225MHz

Hamnet Bulletins: Sundays at 07h00 on 145.625MHz and 3.670MHz
Wednesdays at 19h30 on 145.625MHz and 3.670MHz

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Editor's Waffle

I forgot to mention two important things in last month's HHN, and both involve Robin, ZS5MRS. Robin kindly donated his old weather station, which experienced the wrong end of a lightning storm. Luckily it was not too damaged for repairs. Shaun managed to get it going, and Craig is busy convincing the repaired weather station to talk to a radio by building a tnc for it - hopefully we will see the data on the internet soon. It is not clear yet from where it will broadcast its weather reports - the options are Sani Pass, Hilton (Groenekloof) or Gilboa. Thank you, Robin, I'm sure that the data will be well received and appreciated by all in our club.

Staying with Robin, thank you for the national news bulletins every Sunday. They complimented Mickey's excellent net controlling. We will truly start to realise Mickey's net-controlling skills in the months to come when we run the morning nets. Mike, ZS5BGV, you did a marvellous job in running it with the new format for the first time last Sunday. Thanks for paving the way. If any of you listeners have constructive advise for improvements, please let us have them. Also, if anyone would like to run the morning net, please contact the committee, who will be more than happy to accept.

Groenekloof certainly has received a new make-over. Shaun and I spent 3 visits there in the last month, transferring EQSO, Echolink, the ship and aircraft plotters and Shaun's MARC PC. Our well attended club meeting there last Saturday was a success and saw more changes: Shaun climbed the tower, removed a further 3 heavy antennas and the 6m loop antenna. The loop antenna had developed an open circuit, and was repaired on the ground before being hoisted up the tower again . A new cable was attached, and the repaired 6m beacon was switched back on. Thanks for the repair, Craig!

We also met up with Jan Coetzee, ZS5JC, from the Hibiscus Coast. His company has agreed to fit alarm systems at Groenekloof, and possibly at World's View, and these would also give us early warning systems about power cuts, like the power loss at Gilboa which we are experiencing at the moment.

I drove up to Eshowe on the 12th and fetched the two Polyscops from Willie, ZS5WI, who kindly looked after them until we could fetch them. They are now in our club house, together with the thick manuals, waiting for someone to have a look at them. They could become useful assets wrt our repeater maintenance. Maurice, ZS5MR, we will probably have to twist your arm to have a look at them, and then to hold a demonstration one day for us at a meeting. Willie, thanks for the old HHN magazines as well!

On the way back from Eshowe, I popped past New Germany and attended a HamNet meeting, were we displayed our readiness for emergency comms. We had 10 fully kitted, self sufficient stations on display, including a few 4x4 vehicles. A lot was learnt from the displays - it's always fascinating to see how plans are made with limited resources to make something work properly. It was enlightening to see what expertise is at hand amongst us and that quite a few can assist with emergencies at short notice, without having to rely on local infrastructures, like electricity, food, repeaters etc. A few members were also in possession of their own repeater radios, ensuring that if formal club repeaters were unavailable, an independant repeater could be quickly set up if required in times of need for effective communication. We have made use of these on various Hamnet events throughout the year in the past.

It is also enlightening to see so many students attending the course offered at the moment. Thanks to Mike, ZS5BGV, for organising the logistics. Mike has been pushing for this for a long time now. With Craig's push (ZS5CD), and Evert's help (ZS5EFP), this course came earlier than originally anticipated - thanks to you guys! What is great is that we will hopefully have more new voices on our airways soon. Hopefully some of you will visit the swop shop this Saturday at John Fielding's place, in Monte Seal, this coming Saturday (26 Sep). There are normally some good bargains to be had, and hopefully you will be able to pick up some good radios and antennas to get you on air. Directions are on our website.

On a more sombre note, OM Hill, ZS5HL, is in the intensive care unit in St Annes. He had a fall, and a subsequent heart attack, and things are not looking good. Please keep him and his wife in your prayers. Thank you Bert for keeping us up to date on his condition.

That's it from me. Please visit our website www.marc.org.za for current events. I try and keep it updated, when time allows.

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Last month, we covered Repeater basics - thanks to Brad, ZS5Z, from HARC for the heads up. Last month, Brad also outlined some new repeater ideas which they want to implement, and here is a summary of this. Have you heard of **Repeater Voting Systems**? I had not. It turns out that this technology has been around for quite a while. To describe it, here is an extract from an article I was pointed to on the internet, by Mark Kolber, WB2WHC (http://www.repeater-builder.com/rbtip/wb2whc.html):

"How often have you found it difficult (or impossible) to access a repeater even though you can hear the repeater at full quieting? This can happen even if the repeater is equipped with a high sensitivity, state-of-the-art receiver. Here's where diversity reception and voting circuits can play an important and helpful part. Diversity reception improves a repeater's receiving capability by making use of a second receiver tuned to the repeater's input frequency. This receiver is sometimes located at the main repeater site and connected to a separate antenna. More often, however, the second receiver is at another site in an area not well covered by the main site receiver. So positioned, this second receiver is sometimes called a satellite receiver. The signal received by the satellite receiver is relayed to the main repeater site via a radio (or wire) link. In either case, the satellite receiver provides enhanced receiving capability for the repeater. At the main repeater site, a voting circuit selects the better of the two received signals and sends the chosen signal to the repeater's transmitter. If only one of the two receivers is able to hear the signal, the job of selecting the better signal is easy! Often, however, both receivers can hear the signal. Then, only the receiver with the better signal must be selected. Why? Because simply adding the two audio signals from both receivers results in a signal that is nearly as noisy as the noisier of the two signals. We want only the quieter signal. That's the function of a voting circuit: It votes for the receiver with the better signal. Some voting circuits work by comparing the S-meter or AGC voltage level of the two receivers and selecting the audio from the receiver with the greater amplitude. Although this method can work well, it has two problems. Because the satellite receiver often is remotely located, a telemetry system is required to relay the satellite receiver's S-meter reading (as well as its audio output) to the main site so that the satellite and main receiver S-meter readings can be compared. Also, selecting the receiver with the higher S-meter reading doesn't always yield the quieter audio. For example, a receiver that's in a high noise area, or is affected by desense, may have a higher S-meter reading, yet it delivers noisier audio than the other receiver, which may be in a quiet area. Another voting circuit compares the noise levels within the two audio signals and selects the signal with the lower audio noise level and better quieting. Because this method uses only the audio signals, no telemetry information from the satellite, or local receiver, is needed. Only the carrier operated relay (COR) and audio signals from the two receivers are used."

With increased RF at high sites, we are being plagued by increased interference from various sources. This can be combatted using various methods, like adding cavity filters (band pass and notch filters), which are expensive, utilising CTCSS tones to guard the frequency etc. It is a way of life - RF is going to get worse as wired technology is moving towards wireless technology. So we have to move with the times, irrespective of individual procrastination.

But we are faced with more and more other challenges, and the repeater voting system could help HARC: their repeater site has undergone upgrades, and as such their transmit and receive antennas have lost their original separation, and it is unclear whether the original antenna positions will be offered back to the club. As a result of the desencing of the two antennas in close proximity, protective measures employed result in having to use higher power to access the repeater, resulting in a reduced area in which the repeater can be accessed.

Now you have an idea why a repeater voting system can be of benefit here, and in fact with other repeaters as well. How?

One option would be to house the repeater transmitter on their present tower, which has a very good coverage. Now add an amplifier so that the repeater will reach far and wide, including some of the dead spots experienced at present. Now, find local high sites in strategic areas, each of which is in range of the central transmitter. These receiver sites can be over 100km away. You could of course also have more than one transmit site, each guarded with different CTCSS tone guards and linked to the other transmit sites. In this way, you could travel throughout our country, and speak on one vhf channel.

But I'm getting ahead of myself - how would it work in the short term in Durban?

They would have a high powered transmitter in Kloof, with decent coverage. With a multi station voting receiver, they can set up multiple receivers within their coverage area, each one communicating with the repeater voting unit, which will determine which signal is the best to be transmitted via the central transmitter.

There are commercial systems which can accommodate up to 64 voting stations at the moment, like one from LDG Electronics.

It just shows you that when we stagnate, technologically we can be left far behind.

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HOW I BECAME A RADIO HAM Robin Seal, ZS5MRS

I grew up In Northern Rhodesia, now Zambia, but spent most of my formative ham radio years in Rhodesia, aka Zimbabwe. My elder brother, John, was (and is!) a lot cleverer than I was/am, especially in the finer subjects of maths and science. Way back it was all I could do was to switch on and tune my father's old battery-operated receiver – whereas when this electronic wonder broke down (frequently), it was brother John who opened it up and fixed it.

In 1955, shortly after I started work, I went down to Lusaka to spend Christmas with my parents. As the 25th dawned, John said to me "come and join me wishing my friends Happy Xmas". I did just that, going to his house which was close by. I was quite bemused by the array of wires and switches and lights which greeted me as I entered the small "kia" which served as his shack. He was true to his word. Before long he was having one QSO after another – conditions were good, his radio was good, and his external antennas were simply magic. I was entranced and vowed there and then to get myself a similar set up. Little did I know what stresses this vow held in store for me.

Under John's guidance I acquired some Heathkit kits : and in comparatively short order, I had built a Code Oscillator, a receiver, and then, somewhat later, a transmitter.

I subsequently moved to Rhodesia – one of my really useful initial purchases was an ex-post office morse key, which I still have!

However, it was CB radio which got me going, and "Mr Glub" was born . Janet, my then Secretary, made a model of this splendid fellow (which I also have in my present shack). Mr Glub, and three friends (who would travel to work at the same time and who also lived In Mount Pleasant) and I had great fun chatting to each other In the "good buddy" spirit which is CB. Later they joined me in learning morse and swotting for the RAE.

Dan Windell was an ex-Shift Boss who was employed as the main telephone switchboard operator at Rio Tinto's mine at Eiffel Flats. He was BLIND – totally blind, having been injured in an underground blasting accident. But what was special about this guy, was that he was a licensed ham radio operator – I went to his house one evening and saw him sending and receiving with the greatest of ease. If I ever needed a bit of motivation, this experience was it.

On 19th March 1981, I passed the RAE – my certificate holds pride of place in my shack.

I should like to mention some of the high-lights with which I have been blessed during the 28 years which have elapsed since that memorable day. The first was to pass my Morse test. This I did on my second attempt – by the time this happened I had managed to get my speed up to 20 wpm, send and receive.

The second high-light was the opportunity which I had to establish a Radio Club at the Company school in Big Bend in Swaziland – this rewarding experience lasted 4 years, from 1993 onwards. During this period I had a personal "high", the memories of which are still fresh in my mind. The USA was in the midst of its space exploration, and was sending up a number of manned vehicles. NASA and the ARRL had determined to involve as many schools as possible in these adventures. SARL was keen to participate and, knowing that the Sisekelo Amateur Radio Club was active, I was asked to arrange for the club to meet up with the current space bird "Columbia". To this I readily agreed, and on the evening of Saturday 1st May 1993, the Club and I met at our shack (which was a sort of annexe attached to one of the classrooms) and set about trying to establish a QSO with "Columbia". A large number of teachers, parents, and pupils had gathered to watch. Sylvia, my XYL was also there, and she still remembers seeing the bright "star" racing across the sky at the same time hearing me, and other club members, conversing with the crew of "Columbia". It was truly a moment of history and drama.

I was elected as Secretary of the Radio Club of Swaziland, remaining as such until I retired and moved down to South Africa. The rest is not history. My final experience was as Chairman of MARC.

That's all Folks!

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SWR, Return Loss, and Reflection Coefficient - an interesting explanation - author unknown

This paper is intended to give the newcomer to RF terminology a brief overview of SWR, return loss and reflection coefficient. Instead of concentrating on mathematical derivations or formulas which can make simple ideas seem complicated, this paper will endeavor to explain the fundamental principals and physical relevance of the terms.

SWR, which stands for standing wave ratio, may be illustrated by considering the voltage at various points along a cable driving a poorly matched antenna. A mismatched antenna reflects some of the incident power back toward the transmitter and since this reflected wave is traveling in the opposite direction as the incident wave, there will be some points along the cable where the two waves are in phase and other points where the waves are out of phase (assuming a sufficiently long cable). If one could attach an RF voltmeter at these two points, the two voltages could be measured and their ratio would be the SWR. Identical results would be obtained by measuring currents. By convention, this ratio is calculated with the higher voltage or current in the numerator so that the SWR is one or greater.

Here are two examples to illustrate how the numbers work. Consider a 1 volt source driving a cable with either a short or open on the end such that all of the power is reflected. Since the reflected wave is as big as the incident wave there will be points where the two voltages cancel completely and other places where the voltage will be 2 volts. The ratio of 2/0 is infinity which is as "bad" as the SWR can be. If, instead, the load were equal to the characteristic impedance of the feed line, say 50 ohms, no power would be reflected and only a constant incident wave would appear at all points along the cable. The ratio of any two voltages would therefore be 1 which is as "good" as the SWR can be. The SWR for terminations between these two extremes may be calculated by considering the interaction of the reflected wave with the incident wave to determine the minimum and maximum voltages. But, as it turns out, the SWR is simply the ratio of the resistance of the termination and the characteristic impedance of the line. For example, a 75 ohm load will give an SWR of 1.5 when used to terminate a 50 ohm cable since 75/50 = 1.5. A 25 ohm resistor will give an SWR of 2 since 50/25 = 2. Note that the larger resistance is always used in the numerator by convention.

Consider that the concept of a reflected wave also works at "DC". Suppose that a long pair of superconducting jumper cables are connected to a 12 volt car battery and the far end of the cables are touched together. The battery will be "shorted out" as long as the cables are touching: that is, the battery voltage will fall to zero and the current will be limited only by the internal resistance of the battery. Another way to describe what is happening is to say that 6 volts travels down the cables where is encounters the short and is reflected back inverted in "phase". This -6 volt reflected wave cancels the +6 volts at all points on the cables. In this example, the characteristic impedance of this system is the battery's internal resistance: if a resistor of the same value is connected to the ends of the cable then the voltage will drop to 6 volts and maximum power will be delivered to the resistor. When the short is removed the 6 volts reflects off of the open circuit without inversion and it adds constructively bringing the voltage on the cable up to 12 volts. A 12 volt battery could be said to be a 6 volt source driving a poorly matched load. The battery is a 6 volt source when it is loaded by its characteristic impedance which rarely happens - most batteries couldn't withstand a "good" match for very long! The point is that SWR, return loss, etc. are valid concepts for long cables, short cables, no cables, or even ideal non-dimensional parts. And perhaps more importantly, simple Ohm's Law computations at DC will give the same results as the more mysterious RF equations involving magically reflecting signals and characteristic impedance.

For example, consider a 2 volt battery with a 50 ohm internal resistance driving a 50 ohm load through 50 ohm coax cable. (Follow along on a piece of scratch paper!) The match is optimum and the maximum power of 20 mW is delivered to the load. (1 volt squared / 50 ohms.) Now consider a 100 ohm load. The current is 2/150 = 13.3ma and the resulting voltage across the 100 ohms is 1.33 volts. The power dissipated in the resistor is 1.33 x 13.3 ma = 17.8mw. Since incident and reflected power concepts are valid at DC it could be said that 20 mW arrives at the 100 ohm resistor which absorbs 17.8 mW and reflects the remaining 2.2 mW. The reflected 2.2 mW has a voltage of 0.33 volts in the 50 ohm cable. This reflected voltage adds to the 1 volt incident wave to give 1.33 volts. For a very low frequency there would also be a point along a sufficiently long cable where the voltages would subtract giving 0.67 volts. (As the frequency approaches DC, the required cable length approaches infinity!) The SWR is therefore: 1.33/.67 = 2. It is indeed easier to calculate the ratio of the resistors as mentioned earlier! Obviously, at DC the wavelength is infinite and only the voltage addition is observed. Note that the reflected wave is not inverted when the resistance is greater than the characteristic impedance of the cable! (Here is a memory aid: remember the DC example where a short reflected a canceling negative voltage. Obviously, a lower resistance reflects an inverted wave.) Also, notice that the voltage across the 100 ohm resistor (1.33 volts) is equal to the voltage that would appear across a 50 ohm resistor (1 volt) added to the reflected voltage (0.33 volts). Although this description may seem like an artificial construction, consider what happens when the battery is first connected. With a fast oscilloscope connected at a midpoint on the cable, the 1 volt could be observed as it passes as a step increase. When the 1 volt arrives at the load, 0.33 volts is reflected and is observed a short time later bumping the 1 volt up to 1.33 volts where the scope is connected. The voltage does not simply go up to 1.33 volts in one step!

In cases involving RF signals, some time will pass during the 'round trip of the reflected energy and the phase of the reflection will also depend upon this length of time. Imagine that a resistor in a black box is at the end of a length of

cable. From the outside world this length of cable will give the reflection from the resistor a phase shift since the signal must make a round trip through the length. If a 100 ohm resistor has an SWR of 2, a cable long enough to invert the signal after the round trip will make it look like a 25 ohm resistor, also with an SWR of 2 but with inversion (a cable with a multiple of 1/4 wavelength would do the trick). Since the impedance looking into this black box is a function of the SWR and the cable length, it can be seen that intentionally mismatched lines can be used to transform one impedance into another. Notice that the 1/4 wave cable inverts the impedance and preserves the SWR. This impedance inversion may be used to match two impedances at a particular frequency by connecting them with a 1/4 wave cable with an impedance equal to the geometric mean of the two impedances. (The geometric mean is the square-root of their product.) A 50 ohm, 1/4 wave cable will match a 25 ohm source to a 100 ohm load : sqrt(25 x 100) = 50. Of course, it is not always easy to find the desired impedance cable!

Multiples of 1/2 wavelength will give enough delay that the reflection is not inverted and the impedance will be the same as the load. Such cables may be used to transfer the load impedance to a remote location without changing its value (at one frequency).

Other cable lengths will transform an impedance which differs from the cable's impedance with a reactive component. If the load is a lower impedance than the cable, a length below 1/4 wave will have an inductive component and above 1/4 (but below 1/2) wave a capacitive component. If the load is a higher impedance than the cable, the reverse is true. Above 1/2 wavelength, the reactance will alternately look capacitive and inductive in 1/4 wave multiples. This reactance will combine with the load's reactance and offers the possibility of resonating the reactive component of the load. Therefore, a cable with the "right" length and impedance can match a source and load with different resistance and reactance values. Obviously, these calculations can become quite involved and most engineers resort to a Smith chart, a computer program or perhaps the most common method, trial and error with a SWR meter or return loss bridge! In most cases, it is most desirable to match every component of a system to the chosen system impedance so that device matching is not frequency sensitive and critically dependent upon the cable lengths.

SWR is a useful number for evaluating the actual voltages and currents present along transmission lines and SWR can be directly measured in many cases but it is often more convenient to work with other, equivalent measures. For example, the voltage reflection coefficient is the fraction of the incident voltage that is reflected. If 0.2 volts reflects from a load with a 1 volt incident wave then the reflection coefficient is 0.2. This number conveys the same information as the SWR but is often more easily calculated and observed. And the terms 'power transmitted', 'transmission loss' and 'power reflected' need no explanation beyond explaining that they are usually percentages. The return loss is simply the amount of power that is "lost" to the load and does not return as a reflection. Clearly, high return loss is usually desired even though "loss" has negative connotations. Return loss is commonly expressed in decibels. If one-half of the power does not reflect from the load, the return loss is 3 dB.

Return loss is a convenient way to characterize the input and output of signal sources. For example, it is desireable to drive a power splitter with its characteristic impedance for maximum port-to-port isolation and , therefore, it may be desireable to check the output return loss of an oscillator or other source. The output return loss is measured by applying a test signal to the oscillator through a directional coupler or circulator:

Any reflected energy appears at the test port and will be x dB below the input. This dB drop is the return loss (after correcting for the coupler's loss). The test signal frequency is swept through or adjusted to be near the oscillator's output frequency. A spectrum analyzer connected to the test port of the coupler will display the output of the oscillator and the reflected test signal. The dB drop in the reflected test signal below the applied level is the output return loss. The baseline is easily determined by disconnecting the oscillator so that nothing is connected to the coupler's test port. Since there is no load all of the energy will reflect and a 0 dB return loss reference may be established. In situations where an open is unacceptable due to high power levels an intentional mismatch will provide a known return loss. For example, a 75 ohm resistor will exhibit a 14 dB return loss in a 50 ohm system while reflecting only 4% of the test power.

An isolator is a seemingly magical device which allows energy to flow in only one direction so reflected energy from a load at the test port does not return to the signal generator but is passed on to the output port regardless of the impedance at any of the ports! This "magic" defies linear "common sense" for passive networks but isolators are highly non-linear devices employing special ferrite in powerful magnetic fields. Engineers who design circuits and systems operating above 500 MHz enjoy the utility of the ferrite isolator but these marvelous devices become impractical below about 200 MHz. Circuits are available in the technical library which simulates the ferrite isolator for frequencies below 300 MHz. The RF op-amps can handle signals approaching 12 dBm so this isolator is only suitable for bench testing low-power RF devices. The attenuation through a directional coupler or return loss bridge can make measurements difficult when the return loss is high and the test signal is small but the isolator has no "loss" and will work well with very small signals. It is also desirable to use small signals when testing antennas for obvious reasons. The isolator exhibits a good output return loss at its test impedance and its good input return loss provides an excellent termination for a long cable from a generator with a questionable SWR.

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If you have any useful articles for this newsletter, please email them to zs5ml@marc.org.za for publication. Any articles of interest to Amateur Radio, both technical and non technical, will be well received

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Membership Fee Summary for 2009/2010

Full and Country Membership: R190-00 (R140-00)
Joint Membership: R300-00 (R250-00)
Student: R 95-00 (R40-00)

All who opt to receive their HHN by email qualify for a discount of R50-00. These discounted fees are shown in brackets. The committee is also aware that some might not be in the position to pay these increases, and that they should be catered for. If you are in this position, or know of someone who would need assistance, please approach a committee member. Payment schedules will also be catered for, and confidentiality will be maintained. Please note that our financial year is from 1 July to 30 June in the following year, and that the new membership fees became due on 1 July.

MARC's banking details are:

Account Name:	Midlands Amateur Radio Club	Account Number:	62057756507
Bank	First National Bank	Account Type:	Current Account
Branch:	Bank Street		
Branch code:	220825	Use your Call Sign or Invoice Number as reference	

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Ham Bulletin Readers

27 September - ZS5CID
04 October - ZS5PJ
11 October - ZS5ML
18 October - ZS5BGV
25 October - ZS5CID

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Tailpiece:

An elderly gent was invited to an old friend's home for dinner one evening. He was impressed by the way his buddy preceded every request to his wife with endearing terms such as: Honey, My Love, Darling, Sweetheart, Pumpkin, etc. The couple had been married almost 70 years and, clearly, they were still very much in love.

While the wife was in the kitchen, the man leaned over to his host, 'I think it's wonderful that, after all these years, you still call your wife those loving pet names'.

The old man hung his head. 'I have to tell you the truth,' he said, 'Her name slipped my mind about 10 years ago, and I'm scared to death to ask the cranky old woman what her name is.'

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