



A Member  
of the  
SARL



**Antique  
Wireless Association  
of Southern Africa**

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#### AWA Committee:

- \* President—Don ZS5DR
- \* Technical Advisor—Rad ZS6RAD
- \* Net Controller—Willem ZS6ALL
- \* Secretary/PRO—Andy ZS6ADY

# AWA Newsletter

#56

August 2010

## Reflections:

Thank you so much to all of you who commented on last month's "Reflections". I had a few emails, one or two phone calls and of course a great email from Ian ZL2AIM (ZS5IAN), which you will find in this Newsletter.

It really is wonderful to know this organisation, formed through the insight of a few hams who could see a need for such a group, would grow to such strength and be recognised as an official Club in South Africa.

I know, this is real, because this newsletter is forwarded to various parts of the world and read by many Radio Amateurs, who have the same wants and desires to keep something like this going.

For instance, I know Ian,

mentioned above, forwards this to a few of his friends. I know, Geo, those of you who read the SARL forum, will know the trials and frustrations he has been through after his wife was seriously injured in a most horrific accident gets a regular copy of the newsletter in Canada.

This is just to mention but a few. My point being, we who have this "fetish" for valve radio's know what it is like to have the desire to see them live on.

I know there are many other groups of interested people, not only Radio Amateurs, who collect and maintain these wonderful pieces of radio nostalgia, to perfection. And to each of you, I salute you. It is because of people like you we have these newsletters,

websites, magazines etc, to promote and maintain the interest and so get even more people involved.

I don't know what it is that attracts people to valve radio, but let's face it, there is a definite attraction. Whatever it is, you don't have to be part of the octogenarian club to have it, not that we mind dual membership with other groups.

We do appreciate the interest shown by each and every one of you and the support we get from many. It is this which keeps us going to provide you the readers with as much information as possible. Let's hope it remains so.

Best 73

De Andy ZS6ADY

## Wikipedia—The Resistor

### Tapped resistors

A resistor may have one or more fixed tapping points so that the resistance can be changed by moving the connecting wires to different terminals. Wire-wound power resistors can have a tapping point that can slide the resistance element, allowing any part of the resistance to be used.

Where continuous adjustment of the resistance value during operation of equipment is required, the sliding resistance tap can be connected to a knob accessible to an operator. Such a device is called a "rheostat" and has two terminals.

A frequent element of electronic devices is a three-terminal resistor with a continuously adjustable tapping point controlled by rotation of a shaft or knob. These variable resistors are known as a potentiometer when all three terminals are connected, since they act as a continuously adjustable voltage divider. A common example is a volume control for a radio receiver.

Accurate, high-resolution panel-mounted pots have resistance elements typically wirewound on a helical mandrel, although some include a conductive-plastic resistance coating over the wire to improve resolution. These typically offer ten turns of their shafts to cover their full range. They are usually set with dials that include a simple turns counter and a graduated dial. Electronic analog computers used them in quantity for setting coefficients, and delayed-sweep oscilloscopes of recent decades included one on their panels.

## CW Net:

After the tremendous high last month with the success of the AWA CW activists, this month has been on quite a low.

Despite the fact I have been away on leave and could not get all my things finished in time to go portable, up to the time I went on leave, there was very little activity on CW in the few weeks preceding my going away.

I suppose we could blame band conditions for this as once again, contact to division 5 was extremely difficult, Witbank was just not heard at all and 40m was in it's usual doldrums.

I often read or hear of hams saying they have newly discovered, or re-discovered how great CW is and how much they will be doing to get back on the air and use this wonderful mode. Maybe I'm being a bit

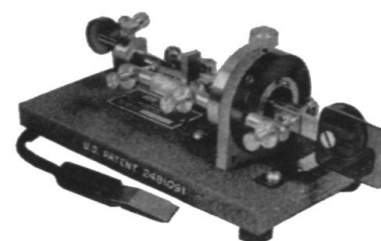
cynical here, but then where are they.

I know not everyone can come up on CW at the time the AWA net is, but surely when you know there is going to be activity on a band, on a mode you prefer, you make time to hear and participate in what is going on.

Maybe I am unjustly standing on toes where I shouldn't be and maybe the time we run the AWA CW net is not convenient to them. If this be the case then let me know what times would suit a larger group of people and we'll give it a try.

Just please do not tell me we should be running it after the SSB net on a Saturday morning, because that has been tried too.

I am all for keeping a CW net running, even if it is just 2 people on frequency, but I would also like to promote more activity



on the band in CW and attract more people to the net.

Can I expect any response to this request, surprise me !

De ZS0AWA ... --

## SSB activity:

Band conditions have once again taken their toll on the SSB nets during the month. Numbers are down, people complain about not being heard able to hear and division 5 stations have had to revert back to using 80m to get through to div 6.

Although this is sometimes frustrating, it does work. Once again we want to appeal to the div6 stations. If you can't hear Willem as the control station on 40m, try 80m. 3615 is the frequency and it does tend to hold out well for the time our SSB net is on. Especially on short distances.

Now we know you can hear Dudley in Zimbabwe and you can hear the division 2 sta-

tions, but if you can't hear the Net controller and he can't hear you, then you not going to be able to join the net.

Yes, someone will say "ZS6XYZ is calling you Willem", and so Willem will call in the station. Chances are he did not call you in the first time because he could not hear you and the second time round he's still not going to hear you so he's simply going to continue without calling you in again.

80m is not there because we don't want you to call in, it's there because we want to hear you, and want to make sure the rest of the net hear you. This was the whole reason for starting the 80m relay and those who use it

will tell you it works just fine.

So next time, instead of giving up, try 80m.



HRO 500

## AM:

The AM net on Saturday mornings has been really well attended with up to 10 stations having called in one morning. This is really good, the only problem being in winter, the 80m band tends to open late, so time is really limited.

Wednesday evenings are mostly disastrous as the band tends to go out shortly after we start and then opens again about an hour later. By this time everyone has got fed up and switched off. There has been the odd evening the band has stayed open and given us a good chance to play around on AM for about 2 hours, which really makes it quite exciting. MF's fly back and forth and when the band stays open, conditions are normally excellent. Good strong signals in all direc-

tions.

Please let me reiterate, this does not happen too often. However, when it does, we are there to take full advantage of it.

The list of listeners sending in and giving reports from the AM net has grown to almost 30 and each name and call sign has been put on the list for the draw at the end of the year for the FR50B receiver. This too is quite encouraging, because it means there are quite a few who listen to the AM net.

Remember, to get your name on the draw for this lovely little receiver, all you have to do is listen to the AM net at any of the advertised times and give us a report of the stations you heard.

You can do this either by calling in on the AM net, if you have AM Tx, reporting in on SSB at the end of the net or on the SSB net at 08:30.

We look forward to hearing from you.



Yaesu FR50B Rx

### Ramblings of Remembrances of Radio – by ZS5IAN

I have just finished having a QSO with ZS5TUB (aka ZS5CQD for those fortunate enough to read CW), and in that QSO he mentioned having asked the club members to write down how they got into amateur radio. Now I don't remember Tubby's request, but have decided to put pen to paper right away and write down my travels into the world of ham radio.

I was brought up in Blackrock, an area south of Dublin in Ireland. I was born in 1946 and was brought up in a house with many commercial radio sets. My father obviously liked to listen to the radio and he had bought many radios over the years. Pride of place was given to a large radiogram which was about the size of an average size desk. On opening the lid, which was a lovely knurled French walnut lined with brown felt, ones eyes were struck by the 78 rpm record player on the left hand side. This was automatic and one could load up to 10 records onto the player to be loaded automatically when the previous one was finished. Of course, you had to remember to change the needle after 10 records had been played. I can still see the two tins of His Masters Voice needles on the side of the player. One was for gold needles which lasted 10 records and the other was for silver needles which only lasted for one record. The automatic loading system was in theory all fine and dandy until you played a record that did not have a serrated ridge running on the outside of the label. That was when you got slippage..... well you can imagine the "music" that came out of the speaker. (ZS5RON will be feeling quite sick by now)

But I digress..... the other side of this desk-sized radiogram had a series of buttons. The aforesaid radiogram, ON/OFF, Long wave, Medium wave, and three buttons for short wave. Well Long wave was boring – all you heard was the BBC Light program on 1,500 meters. Medium wave had the local Radio Eireann – that was mostly very Irish – not for a young chap like me, and also had the BBC Home Service – well if you have never listened to the Goon Show, Beyond our Ken, Around the Horn, then you have not listened to Commercial Radio! Of course there was the very famous Radio Luxembourg that was received after about 8 pm on a dark evening. They broadcast pop music until the wee hours of the morning. Their top twenty broadcast from 10pm until 12 pm on a Saturday night was THE definitive OFFICIAL top twenty hits of the past week. That was great! I would be letting the Irish side down if I did not mention Radio Caroline – started by a young chap from Tallaght outside of Dublin. That was a "Pirate" radio station broadcasting pop music 24 hours a day from a ship in the Irish Sea. It was more than 3 miles off the Irish coast and the British Coast, so no authority could close them down. Later the ship was joined by Radio Caroline 2. But the other three buttons? When one of them was pressed, the dial would light up with such names as Halverson, Moscow, China, and lots of countries that brought alive a young lads imagination. Turning the dial slowly you could hear different languages accompanied by hisses and squeaks etc. Listening to that must have been the seed in my mind for the Short-wave Listener that I was to become many years later.

Unfortunately, those 6 buttons were to spell the end of that radiogram. One day it would not switch on. I just kept hitting those buttons at random waiting for something to happen. And it did! Smoke started billowing out of the cabinet. I shouted for my dad, and between the two of us we dragged it out into the front garden. It never saw the light of day again. Now, as I think back on that radio gram, the aerial was just a long piece of wire curled up lying at the bottom of the cabinet – and yet we could tune into all those foreign stations. It was a blessing in disguise for it though – my family had got tired of me playing my two 45 rpm records at the 78 speed whilst holding my hand against the turntable to reduce the speed to around 45 rpm. To this day, if I hear *el Paso* by Marty Robbins or *Poor me* by Adam Faith I cringe when I think how I murdered their hit singles! Next day my dad came home with a new record player that played all the new fangled speeds as well as 78.

Round about 1956, I found a small radio in the garage called a Lafayette. It was about the size of a modern transistor radio. It was made in the USA so it had to be powered by 110 volts. No problem for me. My dad had lots of resistance wire which I wound alongside ordinary insulated wire and bound it to the insulated wire by means of many rolls of black sticky (very sticky!) insulating tape. I can't remember how I ended up with 110 volts, but my dad must have had a meter of sorts. The antenna was a length of "aerial" wire hung out my bedroom window and laid along the garage roof below. My insulating job must have been below par, as I had many an electric shock whilst using that radio. (There was no standard as to say which of the 15 amp pins was live and which was neutral. – Each socket varied as to what the Irish electrician felt like on the day! However the earth was always the earth!) To have my own radio in my bedroom was a great boon to me. I listened to the radio whenever I had a spare minute. – Don't forget there was no TV then – Unfortunately that radio had only Long wave and Medium Wave – no short wave.

The day came when my dad came home with a large wooden box with a glass "window" in it. It had a name on it proclaiming it to be a PYE Continental. There was a place in the front that looked like it had a speaker behind it. On inquiring what it was, I was given the stock answer from my dad – "a box for white mice" This contraption did not have the fancy coloured windows with Halverson and Moscow on it – but I knew it was something electrical. It was days before I was told that it was a television set. This would have been about 1957 and no one in Ireland had heard of a TV set! Now the fun began..... my dad would sit with his slide rule and his "Job Pad" and make copious notes and write down lots of figures. Finally he had his design for a TV Aerial. He bought the aluminium and made up a dipole and reflector etc etc. This was mounted on top of the yet to be finished garden swing. The grand day came and the TV was switched on. Snow, snow and lots more snow. My dad swore that he saw a test pattern and who were we to argue with him? The only test pattern that I saw was SNOW! Well what would you expect with the nearest station being in London and us in Ireland! Valves were swapped and changed and changed again until my dad finally

decided that one needed the antenna mounted high up. Well we had it put up on the chimney on top of the two story house. Yes! I could see the test pattern! The whole family sat around the TV (black and white of course), and watched the BBC test pattern for hours and hours..... So many people stopped and asked us what the strange thing was on our chimney! Then a TV station opened in Wales and soon after another one in Belfast. Now we had a choice of stations – but that also meant an antenna farm on top of the chimney. Some of the new stations (including the new ITV) had to have a different type of antenna. Reception was not so great from these stations. But not to worry, my dad already knew the answer to that. Raise the antennas even higher! Now we had a very high antenna that had to be supported by galvanised guy wires to many points of the house and garden. But he was right – now we could get a great signal from England, Wales or Northern Ireland. (Irish TV was still to come).

This new fangled TV now meant that dad no longer listened to the radio (actually referred to as a *WIRELESS*) in the now renamed “TV room” That radio was now dumped into the garage where I rescued it and put it in my bedroom. **AND** it had **SHORTWAVE**! Now things were happening! Once again I could listen to the different languages from around the world in the privacy of my own bedroom.

Eventually that wireless ended up in our summer house on the East Coast of Wexford, but it also came to a smoky end due to the transformer wax being coveted by the local mice for their meals.

One day I took the steps up to the attic and did a bit of exploring. Two wooden boxes were found with earphones attached to them. What were these boxes? Beautifully made wooden boxes with electrical apparatus could not be left in the attic so were taken down to my bedroom where they were examined minutely. I asked Dad when he came home from work and he said that they were crystal sets. “What’s a crystal set?” I asked. “It’s an old fashioned radio” he replied. “Show me how it works” I asked. Five minutes later I was listening to Radio Eireann through the earphones. Wow! No batteries or Mains electricity! Well Radio Eireann was not my cup of tea – but this was something else! Within a week I had gone to Dublin to seek out a place called CQ Radio. I bought a crystal (2 shillings) and armed with that and a booklet that the man in the shop had loaned me, off I went home to build my own crystal set. First of all I got hold of a toilet roll insert. Next, 80 turns of copper wire evenly wound on to the insert. A quick lesson on using a soldering iron and I had a crystal set that did not need a cats whisker to fire it up!

As I write this I remember that soldering iron. It had a **huge** tip which was heated up on a paraffin primus stove. A large bar of solder and a tin of flux were it’s accoutrements. When I built my first Heathkit transistor set many years later and overheated the transistors, my dad thought that I was ham fisted. (He had just finished a Heathkit 6 transistor radio – long wave and medium wave-with the same soldering iron.) My radio never did work.... But the seed was there.

At the age of 19 I decided to emigrate to hotter climes. I travelled on the Pendennis Castle to South Africa. Stopping at Las Palmas on the way, I bought a radio for next to nothing. The reason that it was sold for next to nothing was that inside it – it had next to nothing.... Long wave was not in use in South Africa and that is what it was – a Long wave receiver. That put me off radios for a while.

One car that I bought in the early 70’s had a radio in it that had short wave. During the day it was dead, but at night time it came to life with lots of interesting stations that brought back memories of sitting in my bedroom in Dublin listening to the same stations. Well then along came TV some years later and the radio died a natural death – well for the time being anyway. During that time I bought a Sony SW30 world receiver. I still have it to this day. But now my appetite was tempted by this receiver. During this time the news broadcasts in South Africa were very slanted and it was great to hear the same news but given a different slant to it.

One Sunday morning a friend phoned me and gave me a phone number of a person selling a “FRG7”. It turned out to be Gary ZS5NK. I bought it and listened to the BBC and other stations for some months, before purchasing a Icom R75. I then joined the Short-wave Listening Group in Durban. One day Steve ZS5HP came around to my house and asked what ham stations I had listened to. “Ham stations?” I replied – “I don’t listen to ham stations – I listen to broadcast stations”. He thought I was mad and showed me how to tune in to the amateur bands. I was hooked! Within 5 months I had written my RAE and was a regular person on the 2m repeaters. It was not long after that that I fell in love with CW. Well maybe I should call it a love hate relationship. After failing the CW exam twice (nerves!) I got down to some serious study of CW with Mel ZS5MF and Roger ZS5FX. Roger was a real brick and gave up at least one hour of each evening on a simplex channel on 2 meters to teach both myself and Colin ZS5CF the intricacies of the Morse Code. Roger, take a bow!

An old friend of mine who had been a “Ham” for many years and lived in UK, Raymond G4NJW had been in touch with me via email and encouraged – nay shoved – me into passing the CW exam. To this end he came out here and gave me a present of a TenTec 1340 which I will always treasure. This is a QRP rig for 40 meters and when I use it (which is a lot), I think of Raymond



and I in the quiet of the bush in Botswana and me listening for 2 hours a day to my MFJ Morse Tutor. I am sure there were times that he would gladly have thrown it into the fast moving waters of the Okovango River just for a bit of peace and quiet.

On passing the exam, I decided not to let go of CW. Through Tubby ZS5TUB, and like stalwarts I was coaxed into getting on the air on a regular basis. Mossie ZS4XJ was a great Elmer and always listened out for me when I was in Botswana or Swaziland or even just Johannesburg or Cape Town. That was the beginning of my love for QRP as a small transceiver was just the job for use whilst travelling around. Transmitting from hotels in Southern Africa needed some serious thinking when it came to antennas. To this day, I have found that two “slinky” springs pulled apart, supported in the middle and fed with some 75 Ohm cable takes a lot of beating when it comes to portable indoor antennas. Of course an antenna tuner helps a lot and that is when I got into building kits.

I could write a lot more on QRP and QRPp as well as building kits, but I will leave that for another time. For now, I have at least fulfilled my part of the deal by telling you how I got into Amateur Radio

Ian MacQuillan

ZL2AIM ( exZS5IAN)



Drake 2A Receiver



Drake 2C Receiver



## Using Ferrite Beads to Keep RF Out Of TV Sets, Telephones, VCR's, Burglar Alarms and Other Electronic Equipment

**RFI and TVI** have been with us for a long time. Now we have microwave ovens, VCR's and many other devices that do wrong things when they pick up RF.

There are several ways to tackle the problem but most of them involve opening the affected equipment and adding suppressor capacitors, filters, and other circuit modifications. Unfortunately there is a serious disadvantage associated with this approach. Any modifications made to domestic entertainment equipment can - and often are - blamed for later problems that arise in it. Modifying your own equipment is not so bad, but taking a soldering iron to your neighbour's stereo is risky. An alternative approach is to use ferrite beads to reduce the amount of RF entering the equipment. If the equipment is in a metal box, or even if it's in a plastic box, if RF is prevented from entering the box on the antenna lead, the power cable, the speaker leads, the phono pickup leads, and on any other wires entering the box, it is possible to solve the problem without any modification to the equipment. Ferrite beads just slip over the wires and stop RF from going in.

**Ferrite beads are made** of the same materials as the toroid cores used in broadband transformers but are used at much higher frequencies. For example, ferrite Mix 43 is used for tuned circuits in the frequency range .01 to 1 MHz. It is efficient and losses are low. But, if it is used in the 1-1000 MHz range it is lossy. So when you slip a bead of Mix 43 over a wire and there is RF in the 1 -1000 MHz range going down the wire, it is just as though you put a resistor in the wire. But you did not have to cut the wire to insert the resistor; you just slip a bead over the wire. If the resistance of one bead is not enough you can add more beads or add longer beads to get more resistance. The beads, unlike a resistor, do not affect the wire at low frequencies so the audio, DC, and other low frequency components go through the wire just as though the bead were not there.

There are three bead materials in general use: Mix 77, Mix 43, and Mix 64. Mix 43 is the best for all-round use. It works from 1 to 1000 MHz. Mix 77 is a little better at the lower frequencies, so if your major problems are on 80 and 160 meters use it. Mix 64 is a little better on the higher frequencies so if your problems are mostly on two meters and up use it.

It is important to remember that the frequencies mentioned are those of the interfering signals to be eliminated, not the operating frequencies of the equipment being protected. For example: To protect a telephone operating at voice frequencies of .002 MHz we use type 43 or 77 beads to keep 14 MHz RF out.

So when you buy beads you must specify both the physical size (FB-3, FB-8, etc.) and the material (Mix 77, Mix 43, etc.) depending on the frequency of the RF interference. FB-1, FB-3, and FB-7 have .05" holes that will slip over bare #18 gauge wire. FB-8 has a .09" hole and will slip over the insulation of #22 wire. FB-24 and FB-63 have .2" holes to go over larger wire or cable. FB-56 has a 1/4" hole to clear RG58/RG-59/RG-58X. FB-102 and FB-124 have 1/2" holes to clear RG-8/RG-11.

**Cables.** So far we have talked about slipping beads over individual wires. But, in many cases, we are going to find two wire speaker cables, two wire or three wire power cables, twinlead antenna cable, and multi-wire control cables. Cable wires are close together and act just like a single wire as far as RF pickup is concerned. So the whole cable can go through the bead and this will suppress RF transmission through all the cable-wires. This is a lot easier than putting beads on each wire.

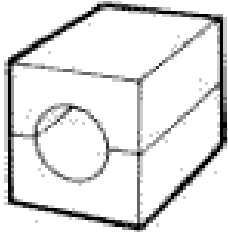
Twinlead is a special case. If you put a bead on each wire you'll kill the TV signal. But if the whole twinlead goes through a single bead, the TV signal goes on through but the RF interference is suppressed by the bead. This is because the twinlead is a transmission line to the TV signal but looks like a single wire to the RF interference.

This brings us to coaxial cable. The signal going through the coax is confined to the inside of the coax shield. But the outside of the shield acts just like any wire; it can pick up RF and that RF can be carried to the TV or monitor. Shield beads placed over the cable will suppress this interference.

**Toroids.** When we start talking about slipping beads over coaxial cable and multi-wire cable we see that we may need beads with pretty big holes. Also, if the cable has a moulded plug on the end (like some power cords, for example) the plug has to go through the hole and we may need a very big hole indeed. Fortunately a variety of ferrite toroid cores are available with holes as big as 1.4" diameter. They are not available in all the same materials as beads but in similar ones. As a guide when specifying toroids for RF suppression: Mix 43 is the best for all-round use. It works from 1 to 1000 MHz. Mix 77 is a little better at the lower frequencies, so if your major problems are 80 and 160

meters use it. Mix 61 is a little better on the higher frequencies so if your problems are mostly on two meters and up, use it.

After you put that big plug through the toroid hole you'll find that the toroid fits the cable very loosely. Don't worry. It will still work fine. If there is room to do it, loop the cable around and run it through the toroid again. Do this as many times as you can. Each turn is just like adding another toroid. And, using the big Mix 61 cores, you add an inductive choke where two turns is four times as good as one turn, three turns is nine times as good, etc.



**Split Beads.** This is a new development to solve the problem of putting beads or toroids over cables that have big plugs on the end. They are beads that have been cut in half. You put the two halves over the cable and wrap them with tape to hold them together. The mating edges are polished smooth so the two halves mate very closely.

They are available with centre holes of 1/4" and 1/2" diameter. Also for flat computer cable 2 or 2-1/2" wide. It is important that the two halves of the split beads fit exactly together. So the 1/2" hole beads cannot be used for cables larger than 1/4". It does not matter if the cable is smaller than the hole. All split beads now available are of 43 material which is the best overall material for 1-1000 MHz interference suppression.

**Telephone Interference.** The standard telephone is highly susceptible to RFI. The telephone wiring in the house and outside on poles make a large receiving antenna. And in the telephone instrument are voltage-variable resistors that act like detector diodes so nearby radio stations are clearly heard. The solution is to keep RF out of the telephone by putting ferrite beads on the telephone cable as it enters the instrument. The plug of modular telephones will go through F82 toroids. Unplug the wire from the telephone, put it through the hole of the toroid (three or four times if there is room) and plug it back into the telephone. Or use a split bead.

**Burglar Alarms.** These are much like telephones in that they have extensive wiring throughout the building that acts like an antenna to pick up RF. The solution is the same: Use beads or toroids on the wire entering the electronics box to keep RF out. It also may be necessary to put beads on the 115-v AC power cord.

**TV Sets.** Put a bead or toroid on the power cord as it enters the set. Toroids or split beads on the antenna cable also may be needed.

**VCR's.** The VCR is a real RFI problem. Ferrite beads on all wires entering the VCR can eliminate RFI from most amateur bands. But on 80 meters even this doesn't always work. It may be necessary to shield the VCR housing to completely eliminate RFI.

**Stereo.** Long speaker wires can act like an antenna to pick up RF and feed it into the output of the amplifier. The amplifier's feedback circuit allows the RF to reach the input where it is rectified, amplified and then heard in the speaker. The solution is to use beads on the speaker wires just as they leave the amplifier. RF can enter the stereo system through the power cord. Use a split bead or a toroid on the cord just as it enters the stereo.

We have been talking about keeping RF out of equipment. You can also use beads and toroids to keep RF in. That fish tank heater that makes all that racket on 80 meters is using its power cord and the house power wiring to radiate interference. A bead or toroid on the power cord right at the heater can keep the noise from entering the wiring. Computer power cords and connecting cables can be treated in the same manner. Sometimes RF comes out of a transceiver's power cable. A toroid can stop it. Or RF flows on the outside of the antenna cable, going right around your lowpass filter. Again, toroids to the rescue.

**Computers.** Computers are a part of many modern amateur radio stations. Often they are directly connected to the transceiver for RTTY, packet and other digital modes. They also are used for contest scorekeeping and other uses. Computers generate RFI because they use digital waveforms in the high frequency band that have high harmonic content. They can cause interference throughout the shortwave band and even into VHF.

Some of the interference is radiated from the circuit boards but the most common source is interference conducted out of the computer on the many cables that connect it to its monitor, its keyboard, its printer, and the radio or its data controller interface.

To get rid of the interference, it is helpful to try to find which cable it's coming out of. Start by tuning in the interference and writing down the "S" meter reading. Then disconnect, one at a time the devices connected to the computer and as you do so note any change in "S" meter level. Disconnect the printer, the modem, the keyboard, the mouse, the monitor, the data controller, and anything else connected to the computer. Hopefully this procedure will give a good clue as to where the problem lies.

If you isolate the major problem to one external device, place toroid cores or split beads over the lead from the computer. Do this right at the exit point from the computer. Also, if the affected device is itself an active generator, a monitor for example put beads right where the leads come out of it. Watch the "S" meter for any change - this tells you if you are getting somewhere. Also, if the device has a power cord or a telephone cord put beads on them. Always remember that telephone and power wires can conduct interference outside your residence and near your an-



tenna.

Split beads usually are the best for computer RFI. The cables have big connectors that won't go through a reasonable size toroid. Removing the connectors to slip on a toroid and then rewiring the connector is a lot of work and you might make a rewiring mistake and get into real trouble. Split beads are great! And they are effective from 1-1000 MHz. Just be sure that the two halves of the bead fit tightly together.

If a bead reduces but does not eliminate an interference signal, try more beads. If one is good, two are better. In stubborn cases add capacitors. A capacitor from a lead to a ground converts the bead into a low pass filter. Use ceramic disc capacitors of .001 to .01  $\mu\text{F}$ . In a multi-wire cable one bead serves all but you will need a capacitor to ground from each wire.

Each interference problem is different. You have to try this and then try that until you find a solution. Using the principles outlined here, ferrite beads and toroids can be extremely helpful.

**Editor's Note:** Here's an interesting & important question and answer that popped up:

**Q.** What is the best place to insert such devices? Is it at the antenna, as the article recommends? What would be wrong with putting it at the transmitter? Isn't a series resistor still a series resistor, as long as it's anywhere between the source and the load?

**A.** The balun must be right at the antenna. It is not in series between the source and load. Coaxial cable acts like a 3 wire cable: 1) The inner conductor, 2) The inside of the shield, and, 3) The outside of the shield. The power flows through 1 & 2. Due to skin effect the current on wire 2 (inside of the shield) does not penetrate the shield and flows only on the inside. This leaves the outside of the shield free to carry a different RF current. The current coming up the inside of the shield is supposed to go to one side of the antenna but there is nothing to stop it from flowing down the outside of the shield. Without a balun some part of the current will flow down the outside. The balun prevents that by presenting a resistance (or an inductance) to this path. If the balun is down at the transmitter this current can flow that far and thus will radiate. The balun does not affect the path between transmitter and antenna; just this unwanted current path on the outside. Ferrite bead baluns are only practical as 1:1 ratio. Ferrite transformer baluns can be made also in 4:1, 9:1 etc.

*(This Article was first presented in 2008, but with all the complaints we hear these days about noise from and to various sources, I thought it may be a gentle reminder to us all to what we have available to prevent interference in both directions—Ed)*



Geloso G212 Transmitter



**CONTACT US:**

P.O. Box 12320  
Benoryn  
1504

Fax: 27 86 620 3291  
Mobile: 082 448 4368  
Email: andy.cairns@xsinet.co.za

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**Antique Wireless Association  
of Southern Africa**

**Mission Statement**

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yester-days radio transmitters and receivers. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association.

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**Notices:****SARL 80m Club Championships SSB leg Wednesday 28 July 19:00 to 20:00.**

It's here again, so get out there and make a few points. If you are not doing it for a Club, then send in your log marked for the AWA. We are doing really well so far, so keep it going. If we can get a good few points, it could put the AWA in the lead.

**NET TIMES AND FREQUENCIES:**

The following are times and frequencies for the AWA nets:

**AM Net**—Wednesday evenings from around 18:30: Saturday mornings from around 06:00 or when band conditions allow. Frequency—3615.

**SSB Net**—Saturday mornings from 08:30. Frequencies—7070 with a relay on 3615.

**CW Net**—Saturday afternoon from 14:00. Frequency—7020.  
(Times given are CAT or SAST)

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