THE WEST RAND AMATEUR RADIO CLUB

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March 2006
Volume 6, Issue 8

# ANODE

**Inside this issue:**



## Editor's Comments

**March 2006**
**Volume 6 Issue 8**

**Ham-Comp**

Ron took home his Linux/Ham computer this week. To help him and others in his exploration of Linux, I have written the article below. I shall improve and add to it later to assist other amateurs moving to Linux.

Ron will be reporting back at subsequent Ham-Comp meetings.

**Philip gets down and dirty. Putting an earth on the tower.**

**Work Party at club**

At a recent work-party-day at the club, several items were removed or added to the club. Seen here is OM Philip attaching a vital earth connection to the antenna tower.

The tree which provided shade for many boot-sales and braai's has fallen.

*(continued on page 2)*

## First steps in Linux [Ham-Comp]

**Special points of interest:**

- Contact details on back page (updated)
- New email address for Anode and ZS6WR. See back page

You are in a darkened room. You can just see a blinking cursor. As you get closer, you can see "ron@ZS6BHH:~$". Its a prompt but not one as we know it. Not a 'normal' DOS or Windows prompt. It's a Unix (Linux) prompt. You start to look around...

Once upon a time it was referred to as "the dark place" by children who had only known Windows. It certainly can be an unhelpful and difficult area to get used to. Most users quickly type in 'startx' and press return. This is a retreat as it takes you to the graphical user interface that looks and feels like Windows.

This all assumes you managed to login using your user name and password. Logging in using 'root' is considered a 'no-no'. The 'root' or administrator has the ability to do anything on the system including wiping out files and system. So you should login as a 'plain' user and use the 'su' (super user) command to assume the status of administrator. You will be prompted for a password and this should be a non-simple, difficult to remember string of characters and numbers. Of course you should write it down! But not on the faceplate of the monitor or the keyboard! If this machine is to be connected to the Internet, you should have all this in place before you connect.

If you are logging in as

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**On this occasion the dead branches were sawn up and removed.**

**QUOTE FROM THE ARRL WEBSITE**

[From: "K4YZ" <k4yz@aol.com>
Subject: Federal Government Kudos for MARS and Amateur Radio
Date: 20 February 2006 13:49]

**Amateur Radio's Role Gets Favourable Mention in Post-Katrina Report**

NEWINGTON, CT, Feb 17, 2006--The Amateur Radio Emergency Service (ARES), the Military Affiliate Radio System (MARS) and the HF digital e-mail system Winlink 2000 all got positive mentions in a post-Katrina report from the US House of Representatives. US Rep Tom Davis (R-VA) chaired the panel. References to ARES, MARS and Winlink appear in "A Failure of Initiative"--the final report of the Select Bipartisan Committee to investigate the preparation for and response to Hurricane Katrina.

"Like all levels of government," the 364-page report notes, the National Communication System (NCS), "was not able to address all aspects of the damage to the communications infrastructure of the Gulf States."

"Volunteers at the Montgomery, Alabama, Red Cross volunteer marshalling centre--Dave Hyatt, K1DAV of Torrington, and Dave Wilcox, K1DJW, of New Hartford. Sarratt spent more than a month processing Amateur Radio volunteers for deployment to the Gulf Coast.

"MARS was cited for its role as part of the Shared Resources High Frequency Radio Program (SHARES), an emergency federal communication system put into play when other resources are unavailable. The report says that "within days" of Katrina's landfall, NCS called upon more than 430 SHARES stations across the US to, among other things, assist first responders conducting search-and-rescue missions by relaying information to government

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# Editors Comments & News

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agencies, by relaying logistical and operational information among FEMA EOCs in Georgia, Mississippi and Louisiana, and by handling health-and-welfare messages between volunteer agencies in Georgia and the American Red Cross national headquarters.

"Additionally, the NCS coordinated the frequencies used by the nearly 1000 Amateur Radio Emergency Service (ARES) volunteers across the nation who served in the Katrina stricken area providing communications for government agencies, the Red Cross and The Salvation Army," the report continued. "Emergency communications were conducted not only by voice, but also by high-speed data transmissions using state-of-the art digital communications software known as Winlink."

The report further noted, "In Mississippi, FEMA dispatched Amateur Radio operators to hospitals, evacuation centres, and county EOCs to send emergency messaging 24 hours per day. It further cited comments from Bay St Louis Mayor Edward A. "Eddie" Favre that Amateur Radio operators "were especially helpful in maintaining situational awareness and relaying Red Cross messages to and from the Hancock County (Mississippi) EOC."

According to the report, radio amateurs at airports in Texas and Louisiana "tracked evacuees and notified families of their whereabouts," while the Red Cross "deployed Amateur Radio volunteers at its 250 shelters and feeding stations, principally in Mississippi, Alabama and Florida."

The Salvation Army, the report pointed out, operates its own system of Amateur Radio volunteers known as SATERN (Salvation Army Team Emergency Radio Network). "During the Hurricane Katrina response and recovery effort, SATERN joined forces with the SHARES program and received over 48,000 requests for emergency communications assistance utilizing federal frequencies made available via the SHARES program," the report noted.

"The extent of destruction and damage to the communications infrastructure and services caused by Katrina exceeded that of any other natural disaster experienced by the Gulf Coast states," the report concluded. "Simply put, Katrina's devastation overwhelmed government resources at all levels."

"A Failure of Initiative" asserted that the loss of power and the failure at various levels of government "to adequately prepare for the ensuing and inevitable loss of communications" hindered the hurricane response "by compromising situational awareness and command and control operations."

"Despite the devastation left by Katrina, this needn't have been the case," the report stressed. "Catastrophic disasters may have some unpredictable consequences, but losing power and the dependent communications systems after a hurricane should not be one of them."
END QUOTE

{—}

**DBM or dual gate mosfet**
[from the rec.radio.amateur.homebrew newsgroup]

From: <aadu.adok@gmail.com>
Subject: mixer: DBM or dual gate mosfet?
Date: 01 March 2006 11:03

hello,
I'm building my first receiver. I can't choose what kind of mixers should I use. I have read that diode ring mixers are far superior compared to dual gate mosfet mixers.

Is this true for both - first (RF / VFO) and second (IF / BFO) stages? Or is there any real difference at all?

thanks

"Paul Keinanen" <keinanen@sci.fi
wrote in message news: e21e025mgmlknlh3e0uc-s38bapmvrsrsaa@4ax.com...

In Europe, there are several high power broadcasters start-

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# Editors Comments & News

(Continued from page 3)

ing at 7100 kHz, which would easily overload the 40 m receiver. Assuming loaded Q

OH2BT's comments about how much better things have gotten in Europe really made me say hmmmm.... I only recently heard actual measurements, rather than whining, and things are pretty horrible today - they must have been intolerable decades ago.

Tight front ends and careful control of levels obviously are important with any mixer, but especially something with the gain of a 602. Nevertheless, I doubt there are many cases where a 602 would be even useable in Europe, let alone "good"...

<Allison-nospam@nouce.bellatlantic.net
wrote in message news: jr5b029tn5nkkdlpplatj3glp3sphbgbem@4ax.com...

If you building a radio that runs on batteries then using more power may be bad.

Also keep in mind that more power=more heat

If you are building a simple analogue VFO, temperature compensating the VFO can be the most tedious part of designing a receiver. Depending on how tight your box is, the difference in heat could be an issue. Keeping the oscillator stable while delivering more power also means more buffer stages between the VFO and the mixer.

If you are designing with a DDS, of course, all this is pretty much moot. With a typical DDS chip and a packaged clock oscillator at some high frequency, the oscillator will draw so much current and generate so much heat that what the mixer requires is invisible.

..

Allison-nospam@nouce.bellatlantic.net
wrote: On Wed, 1 Mar 2006 09:04:13 -0500, "xpyttl" <xpyttl_NOSPAM@earthling.net wrote:
<Allison-nospam@nouce.bellatlantic.net
wrote in message news: jr5b029tn5nkkdlpplatj3glp3sphbgbem@4ax.com...

If you building a radio that runs on batteries then using more power may be bad. Also keep in mind that more power=more heat If you are building a simple analogue VFO, temperature compensating the VFO can be the most tedious part of designing a receiver. Depending on how tight your box is, the difference in heat could be an issue. Keeping the oscillator stable while delivering more power also means more buffer stages between the VFO and the mixer. Actually even without the heat issue you still have to compensate it or ambient variation will drive you nuts. Granted a few transistors delivering 5-10mW of power is not a great heat generator when you add all the surrounding possible sources. If you are designing with a DDS, of course, all this is pretty much moot. With a typical DDS chip and a packaged clock oscillator at some high frequency, the oscillator will draw so much current and generate so much heat that what the mixer requires is invisible. Since buffering the VFO is a good idea anyway the buffer and later stages can supply the 5 or more milliwatts needed for level 7 rings. Since those stages can be "remote" the small heat generated is not a big issue. However between a VFO, buffer and a buffer to deliver power you can be hitting 30-50mA and on batteries that's a bigger issue. If you using DDS, likely power is not an issue and the combined DDS and control plus display could be surprisingly high or at least has to be managed. However you approach the problem a little though to the overall effects are important. After all what usually separates a great receiver from a passable one is attention to the little details. Allison

Some of the modern DDS chips require little power. Analog Devices has some DDS chips that draw less than 50ma at 5v, I think there is one that takes but 15ma. True a vfo will draw even less, but we are not talking about gobs of power in any case.

DDS vfo's have very low phase noise, and the ones that can be

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clocked at 100MHz or higher can deliver quite low spurs. The AD9954 series have a 14 bit DAC and can make a very good HFO for a single conversion receiver with no PLL loop filter needed to clean up the output. Chris Jones wrote:

aadu.adok@gmail.com wrote: hello, I'm building my first receiver. I can't choose what kind of mixers should I use. I have read that diode ring mixers are far superior compared to dual gate mosfet mixers. Is this true for both - first (RF / VFO) and second (IF / BFO) stages? Or is there any real difference at all? thanks I have recently bought the books from the RSGB which contain all of the Technical Topics columns from RadCom for the last couple of decades or so. It seems like they really like making mixers from FST3125 Bus Switch ICs, and up to perhaps 50MHz these are supposed to be much better than the average diode ring mixer. They call the configuration "H-mode" and the guy who I believe is supposed to have come up with the idea is called Colin Horrabin. Here is an article randomly selected from a Google search: http://xoomer.virgilio.it/sergiocartoceti/pdf%20files/IK4AUY_%20qex_07-2004.pdf I don't like the way they generate the LO signals with XOR gates but apart from that it is interesting. Chris

One thing I forgot: I7SWX I believe is responsible for many of the H-mode mixer circuits in the the Technical Topics column. http://www.qsl.net/i7swx/index.htm

Chris

Hi
If you think the situation in short waves today: Russian and their previous satellite country jammers are quiet. Local broadcast is nearly completely in FM. Propaganda is no more effective to transmit in short waves Commercial data is practically in Internet and in satellites Marine communication is in satellites.

All this means less cross modulation products in first mixer than some sixteen years ago Atmospheric noise in sw is much higher than the noise of modern front and mixer stage Advantage of diode mixer is marginal IGFET mixer is simple and advanced solution for DIY project. IGFET mixer doesn't need any front amplifier stage. A selective band filter in front of mixer is superior to broadband transformers I am using loosely coupled 3 stage band filter tuned by variable triplet air capacitor 3 coils for low end of sw and 3 coils for upper end of sw. Coils are DC selected by small reed relays KISS

If you are constructing premixer then I recommend DBM to keep birdies in low level For IF/BFO my recommendation is also DBM or "semi DBM" For both of those DBM solutions I recommend you to Google a nice advanced component MC1496. In some Motorola handbooks and ARRL handbooks are examples for MC1496 as DBM, product detector and balanced modulator. It is mostly used in single ended circuits in RF meaning and balanced for DC

73, Risto OH2BT On Thu, 02 Mar 2006 19:33:23 -0000, dplatt@radagast.org (Dave Platt) wrote:

In article <4406fe2e$0$25339$39db0f71@news.song.fi , Risto Tiilikainen <risto.NON.tiilikainen@luukku.comMUNIST.invalid wrote:
If you think the situation in short waves today: Russian and their previous satellite country jammers are quiet Local broadcast is nearly completely in FM Propaganda is no more effective to transmit in short waves Commercial data is practically in Internet. and in satellites Marine communication is in satellites. All this means less cross modulation products in first mixer than some sixteen years ago Atmospheric noise in sw is much higher than the noise of modern front and mixer stage Advantage of diode mixer is marginal There's a good discussion about the advantages and disadvantages of various mixer types, for different applications, in "Experimental Methods in Radio Frequency

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Design", a book I strongly recommend. As others have pointed out, there's no one right solution. Even for use in what seems like a simple, constant application (e.g. a CW receiver for the 40-meter band), the choice of which is more appropriate can swing one way or the other based on how you intend to use the receiver. As one example given in EMiRFD, if you're looking for a simple receiver which is intended for QRP operation on backpacking trips, then the low power consumption, and the mixer gain of an active mixer such as a Gilbert cell (e.g. SA602 and similar) can make this the ideal. Out in the woods, the RF levels will be low, and the relatively low IP3 of these sorts of mixers isn't likely to be a problem.

The lowly SA/NE602 isn't so bad considering the power it uses and the 15-17db of gain it offers. Like any power mixer care in use is important.

On the other hand, if you're planning to build a receiver which may have to operate in a strong-adjacent-signal environment (e.g. for Field Day or other contesting), then you may want to favour a diode-ring double-balanced mixer operating at a high LO-injection level, and the devil take the power consumption :-)

Even then with care in generating the power it's not that bad.

The FET-switch mixers seem to be a really nice alternative, and although they've gotten relatively little visibility in amateur-radio applications they've become very popular in commercial use (e.g. cell-phone handsets). I haven't yet had a chance to play with these myself but they look like fun!

I have, really nice devices but a challenge to build circuits with good symmetry at higher frequencies like 6M and up. Some of the layouts can be a bear to drive properly and have the same port impedance matching considerations as DBMs. They also still have losses in the 6-8db range so gain distribution requires care.

However singly balanced FET mixers have been around for a while and can offer good IP3 with simpler design. Over the years several designs using both active mixers (single and dual gate [mos and junction] FETS) as well as MOSfets, and transistors in passive modes. The handbooks and QST and Ham Radio featured these designs for bands such as 40M where broadcasters are a problem.

Allison

There's a good discussion about the advantages and disadvantages of various mixer types, for different applications in "Experimental Methods in Radio Frequency Design", a book I strongly recommend.

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fun!

-- Dave Platt <dplatt@radagast. org AE6EO Hosting the Jade Warrior home page: http:// www.radagast.org/jade-warrior I do _not_ wish to receive unsolicited commercial email, and I will boycott any company, which has the gall to send me such ads!

...a long explanation, but a needed one. One of the most important characteristics of a mixer is its ability to handle large input signals without overloading. if overloaded by an unwanted signal, chances are that it will not be able to handle the weak signal you're interested in. the physical mechanism involved is not important, except for the fact that increasing current through an active mixer (re FET or transistor, or the injection power in a DBM tend to alleviate the problem in some measure. the noise figure of both is more or less equal and adequate in the HF range. the main advantage of the dual gate MOSFET is that it needs much less power from the local oscillator and can save you an amplifying stage. Not really crushing, but sometimes needful. If you're talking about a simple first receive I'd go with the MOSFET mixer. there are very good examples in the hand book. iI used them for years with success and still using them in one form or another. the problem is much less severe at the second mixer, because the IF filters tend to defend it from large unwanted signals and the amplitude variations are also smaller due to AGC action. Soooo , KISS (keep it simple, stupid!!!), a very good adage. good luck with your first. Sandy 4Z5KS

I have recently bought the books from the RSGB which contain all of the Technical Topics columns from RadCom for the last couple of decades or so. It seems like they really like making mixers from FST3125 Bus Switch ICs, and up to perhaps 50MHz these are supposed to be much better than the average diode ring mixer. They call the configuration "H-mode" and the guy who I believe is supposed to have come up with the idea is called Colin Horrabin. Here is an article randomly selected from a Google search: http:// xoomer. virgilio.it/sergiocartoceti/pdf% 20files/IK4AUY_%20qex_07-2004.pdf I don't like the way they generate the LO signals with XOR gates but apart from that it is interesting.

Chris

On Wed, 1 Mar 2006 09:04:13 -0500, "xpyttl" <xpyttl_NOSPAM@earthling. net wrote:
Actually even without the heat issue you still have to compensate it or ambient variation will drive you nuts. Granted a few transistors delivering 5-10mW of power is not a great heat generator when you add all the surrounding possible sources.

If you are designing with a DDS, of course, all this is pretty much moot. With a typical DDS chip and a packaged clock oscillator at some high frequency, the oscillator will draw so much current and generate so much heat that what the mixer requires is invisible.

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However you approach the problem a little though to the overall effects are important. After all what usually separates a great receiver from a passable one is attention to the little details.

Allison
On 1 Mar 2006 01:03:21 -0800, aadu.adok@gmail.com> wrote:

hello, I'm building my first receiver. I can't choose what

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kind of mixers should I use. I have read that diode ring mixers are far superior compared to dual gate mosfet mixers.

DBMs are very good if properly applied but if improperly used they will disappoint the user. Their advantages is they are rugged, hard to overload and easy to build. Disadvantage, no gain rfamp may be needed, must have at least 5mw of LO power (some need more), are designed for around 50 ohm impedances at all ports.

Dual gate MOSFET, popular many years ago, and generally easy to apply with moderate overload resistance. The common reason for not being used as much is simply availability. Common Jfets (u310, MPF102) in pairs can be used in a cascode compound connection with nearly equal performance as the MOSFETs without cost and ESD considerations. Advantage is good gain, low noise and low power.

Is this true for both - first (RF / VFO) and second (IF / BFO) stages? Or is there any real difference at all?

Depends on receiver design. I've seen Mosfets (or two Jfets) used for first mixer and DBM used for product detector. The idea there is a DBM and the end of an IF will see large signals and the overload resistance is valuable there.

Like others have said superior varies depending on goals. One parameter in this case of DBMs is the oscillator power needs and often the need for more gain stages. If you building a radio that runs on batteries then using more power may be bad.

Alllison

On Wed, 1 Mar 2006 07:03:01 -0500, "xpyttl" <xpyttl_NOSPAM@earthling.net> wrote:

Probably the most popular mixer for simple HF receivers is the NE/SA 602/612. This is an active mixer. It has amazing amounts of gain, such that an RF stage is almost never needed. It is extremely simple to deploy, and it requires almost no power. Thus, in portable/ battery powered circuits it is almost always the mixer of choice. It has an absolutely horrid TOIP. There are other, mostly older, even poorer, active mixers, but the 602 is a very versatile part, so it seems to show up everywhere.

If you really intend to use mixers with such horrible IP3 figures, I would suggest using a very selective front end ahead of it. For a single band CW receiver some fixed tuned stages might suffice, but otherwise some tuneable input filters should be used.

In Europe, there are several high power broadcasters starting at 7100 kHz, which would easily overload the 40 m receiver. Assuming loaded Q of 100 and the front end tuned to 7000 kHz, the -3 dB bandwidth would be +/-35 kHz from the centre frequency with some usable attenuation at 7100 kHz.

Using fixed tuned octave wide front-end filters with the 602 is just asking for trouble.

Paul OH3LWR <aadu.adok@gmail.com> wrote in message news:1141203801.248815.322050@e56g2000cwe.googlegroups.com...

hello, I'm building my first receiver. I can't choose what kind of mixers should I use. I have read that diode ring mixers are far superior compared to dual gate mosfet mixers.

"Superior" is something of a loaded word. Whether a particular parts is superior or not depends on your design intent.

Probably the most popular mixer for simple HF receivers is the NE/SA 602/612. This is an active mixer. It has amazing amounts of gain, such that an RF stage is almost never needed. It is extremely simple to deploy, and it requires almost no power. Thus, in portable/ battery powered circuits it is almost always the mixer of choice. It has an absolutely horrid TOIP. There are other, mostly older, even poorer, active mixers, but the 602 is a very versatile part, so it seems to show up everywhere.

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At the other extreme are diode ring mixers. These can have stellar TOIPs, but take a lot of oscillator power. Further, they need lots of RF as well, so some sort of RF stage is needed. All this adds up to a need for plenty of power. The best diode ring mixers will use matched, Schottky diodes, but good old 1N4148's do work, and quite well. Many designs use packaged diode ring mixers such as those from Mini Circuits.

The dual gate MOSFET falls kind of in the middle. It doesn't have the horrible TOIP problems of an active mixer, but it's not as power hungry as a diode ring. The MOSFET seems to have fallen out of favour lately, in spite of being a "balanced" sort of solution. I suspect most designers are either going for power consumption or performance, and really, quite good performance can be had with the active mixers with careful design.

Is this true for both - first (RF / VFO) and second (IF / BFO) stages? Or is there any real difference at all?

Careful design can manage what the second mixer sees more easily than the first. This can make the dynamic range problems of an active mixer less of an issue. For that reason, balanced designs that tend toward management of power consumption will sometimes use a diode ring for the first IF and an active mixer for the second. But a superhet bent all out on power conservation will almost always use a pair of 602's. Designers who want to avoid ICs for whatever reason will use a pair of diode rings.

I shouldn't sound so down on the 602. A WELL-DESIGNED 602 receiver can easily match the performance of the $1000 class rice box rigs. It cannot, however, come close to the performance of an equally well-designed diode ring rig. But the diode ring rig will probably consume three times the power, meaning three times the heat to deal with and the associated oscillator compensation issues.

So you picks your poison...

On Wed, 01 Mar 2006 01:03:21 -0800, aadu.adok wrote:

hello, I'm building my first receiver. I can't choose what kind of mixers should I use. I have read that diode ring mixers are far superior compared to dual gate mosfet mixers.

It depends on what you mean by superior. The mosfet mixer has gain and usually has a lower noise figure. The diode mixer will have superior strong signal handling (higher IP3), but will have about 7dB loss. The diode mixer needs more local oscillator power. They both make excellent mixers if they are applied properly.

To get the most bang for your buck, it is hard to beat a ring of 1N914 or 1N4148 diodes at a few cent each. The ferrite 'cups' from scrap Toko IF transformers can be used as cores for the trifilar wound transformers.

There are a few other options you should consider. High level IC mixers like the AD831 are worth considering. Switching mixers using MOSFETs are capable of very high performance. Search for info about the N6NWP front-end from QST Feb 93 or the H-mode mixer used in several recent homebrew designs.

http://uk.groups.yahoo.com/group/picastar/
http://xoomer.virgilio.it/sergiocartoceti/article_7.htm
http://www.warc.org.uk/cdg2000/introduction.htm

If you build the receive mixer as a separate module, you can try them all and pick the one that works best for you.

73, Ed. EI9GQ.
-- Linux 2.6.15 Remove 'X' to reply by e-mail. Yes, my username really is: nospam.

JB - March 2006

# First steps in Linux [Ham-Comp]

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'root' now is the time to add a user. Type 'adduser' and press enter. Alternatively type '**adduser** your-name' and press enter. Careful reading of the screen and trying the help will ultimately lead you to success.

Once you have added a user with your name and assigned a password. You should make sure there is a strong password for the 'root'. Make sure you write it down somewhere. Now logout and login as yourself. Try the 'su' command and remember the 'root' password. This should get you going sufficiently to install new software as 'su' and to operate normally as yourself.

**F1, F1!** [Help]

Most commands have an option parameter '- -help'. So type the command, such as 'ls - -help' and press enter.

Or you can try 'man command', 'help command' or even 'info command'. Where 'command' is the text of the command such as 'ls', 'df', 'mount' or 'su'.

**Navigation**

First we need to be able to navigate around the files and directories. So lets start with 'pwd'. Pwd shows the working directory and prints it to the console.

If you use 'CD' and type it on its own and press enter, you will be returned to your 'home' directory. Very handy when you want to return home! But not so useful when you actually wanted to type 'CD /etc'. Still the up arrow key works just like the F3 key in DOS, so you can save retyping and add to the previously typed 'CD'. Such as 'CD /etc'. You are probably squinting at the '/' and saying under your breath "Its the wrong way round". No it isn't. Unix/Linux uses the '/' for directory paths. So get used to it as Unix will ignore attempts to use the other '\' (backslash) in your navigation.

**So how do I copy from a floppy disk?**

First you have to 'mount' it. Then you have to 'cp' (copy) the file or files to somewhere. Lastly you should umount (unmount) the floppy so you can remove it. The same procedure applies for CD's and DVD's. Also its possible to mount other hard disks into the tree structure of the main hard disk, to increase storage capacity or backup.

So to mount the floppy:-

```
mount /mnt/floppy
```

then if you type...

```
ls -l /mnt/floppy
```

you should see the files on the floppy disk. You can then copy them to a directory on the hard disk using the 'cp' command.

```
cp /mnt/floppy/*
```

[NOTE the '.', this will copy all of the files to the current directory.]

**What about a CD?**

A cd is almost the same. Use '`mount /mnt/cdrom`' to mount the CD. Then '`ls -l /mnt/cdrom`' will produce a listing of the files and directories on the CD. Decide where you want the files put and cd there with '`cd /path/directory`'. So that when you type '`cp /mnt/cdrom/folder/* .`' It will copy them there. Don't forget the dot '.' Or you will find nothing happens.

**Next time**

Next time, I think we should try installing some software. There are hundreds of packages available for the Radio Amateur most of which are 'free'. Maybe a morse or RTTY package.

Later…

JB March 2006

**The West Rand Amateur Radio Club**
26.14122 South - 27.91870 East

P.O. Box 562
Roodepoort
1725

Phone: +27 11 475 0566
Email: **zs6wrmail@mweb.co.za**
**[NEW EMAIL ADDRESS]**

**Bulletins** (Sundays at …)
11h15 Start call in of stations
11h30 Main bulletin start

**Frequencies**
439.000MHz 7.6MHz split
(West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

# Radio Amateurs do it with more frequency!

| | | | | |
|---|---|---|---|---|
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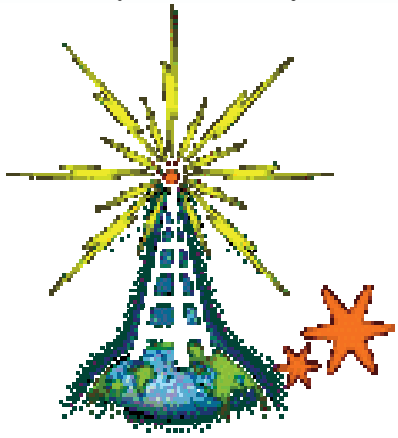
# West Rand members - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

In July 2003, we re-published an Anode Compendium on CD. It has the issues from July 2000 until June 2005. This included the new Adobe reader. It has been updated, check with the chairman for details.



**We need your input! Email us articles, comments and suggestions please.**
**John_brock@telkomsa.net**