

ANODE

Inside this issue:

Editor's Comments	1
Project "Ham-Comp" Layout of project	1
What is APRS ?	3

Editor's Comments

June 2005

Winter Static

43% Humidity early morning reducing to less than 30% later in the day. Means that the leakage of static from my body reduces as the winters day passes. Increasing the potential for static electricity shocks. My 'man-made' fibre pullover generates a large charge in my car against the cloth seats that are so nice in summer. Usually mean-

ing that as I get out of the car, I get a belt off the car metal bodywork.

If you can feel it, it's a voltage greater than 3.5kV! A few hundred volts can damage electronic items that you touch such as keyboards, mice (not the squeaky kind) and things like memory modules and amateur radio rigs. Please take care of your valuable electronic devices.....

Weather Report

Colder by 1 degree or so in the UK, according to the weather forecast on SABC TV. It reaches 23C in the "shack". Warm enough for cats to brush past me. (Perhaps I should buy a Mini.)

Hmm, new software application

A Ring tone generator for cell phones. It records wave (.WAV) files

(Continued on page 2)

Project "Ham-Comp" - Layout of project

2005-05-14

and screening

for DOS etc.

☐ Identifying your pc components / modules. Pictures and connectors.

☐ Assembling and testing. Troubleshooting.

☐ Research & Development using the veteran pc

☐ Assessing your hardware

☐ Ham applications (long). Multiple uses/apps from Morse Tx/Rx to Ham logging.

If you have any suggestions or comments, please email me (John Brock) at the email address on the back page.

☐ The origins of the hardware. History of the PC.

☐ The manual for ham's

☐ Installing an operating system

☐ xxx

☐ Pc radio frequency interference RFI

☐ Windows emulation. Replacements

I propose to ask the club for an additional Saturday afternoon. We can get a lot done with the available

(Continued on page 10)

Special points of interest:

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

Editors Comments & News

(Continued from page 1)
 at a much lower quality / bandwidth than can be achieved by the sound card's software/driver. I wonder how they do that?

Checking for last minute emails. There were none. Shouldn't have bothered. I don't have a problem with spam any more as the Firebird email client I use, automatically removes them. No more email woes.

[Not an advert] Elektor July/August issue coming soon. Remember to buy it for the 100+ circuits.

Reading some other newsletters - Particularly WATTS. I found out the other day that the latest Acrobat reader for Windows 98 was 5.05. So don't try loading Version 6 or 7 onto your old pc. Personally I find version 4 quite adequate for the newsletters. It also loads a lot quicker on my 80486 than Version 6.x on my Pentium 4! It also doesn't keep trying to get access to the Internet like Version 6.

{—}

Email from OM Tony - ZS6BKO

Sorry that I missed the "bring and fix" meeting where you discussed getting "old" computers to do something useful...

I have an old "286" that I think can only be used as a typewriter. Is there anything more that I might do with

it? Other than using it as a door-stop?

73 de Tony (ZS6BKO)

Reply to Tony (OM ZS6BKO) who has an old 80286/AT machine.

cannot find one of those, try an ARCnet adapter coupled to another Windows 3.x/Win9x type pc. As an APRSDos monitoring pc using APRS. See the main article

What can it be used for?

- ☐ A terminal for use with Packet radio/RTTY
- ☐ Telnet terminal into a Linux/Unix computer for use with APRS. This can use either the serial port or a network adapter.
- ☐ A (graphics terminal) X Workstation coupled to a Linux/Unix computer. If it has a VGA display adapter.
- ☐ A morse trainer/receiver/transmitter.
- ☐ Quite a lot of software exists for a Dos type machine. Also there are now quite a few free disk operating systems on the Internet for download.
- ☐ For example a DX bearing calculator. Given the location (Latitude/Longitude) of the other station, and knowing yours, it will calculate the bearing for your H.F. antenna beam.
- ☐ A DOS workstation on a network connected to a Linux or Windows 9x computer. Whilst it can't act as a server, it can act as a workstation coupled to another computer. It can use an Ethernet adapter (ISA) card to connect to the network. If you

What can't it be used for?

- ☐ A server of any type on a network. WFW/Win9x/Linux. It cannot run Linux or any Windows 3.x or Windows 9x. Sorry but the 80286 processor cannot virtualise an 8086 which an 80386 can.
- ☐ It will be very unlikely for you to find the 80386SX converter that was available in the later days of the 80286. But have you a known working 80386 or 80486 motherboard? This could be substituted for the 80286 motherboard which could then be framed and hung on the wall. The 80386/486 motherboard will fit the case and run from the power supply with no modification required. Unlike the late model Pentium IV motherboards will not fit in older ATX cases as they don't have a separate power cable for the cpu. Nor for that matter will older Pentium III motherboards work in newer cases as the power plug from the power supply will not engage the motherboard socket as it has too few connections!
- ☐ By the way Tony, I don't think you should call these computers "old" as they are not even 20 years old. JB

What is APRS?

THE STATE OF APRS as of July 2004: This APRS Specification version 1.1 represents additions, corrections, and deletions since the original APRS1.0 spec of 21 June 2000. This edition represents the state of the APRS protocol and its usage through July 2004. As of this date, the state of the APRS users showed almost 27,000 stations worldwide of which:

- # 33% are fixed or home stations (includes WX stations)
- # 36% are infrastructure (30% digis and 6% IGates)
- # 31% are mobiles

APRS Mobiles: Of these mobiles, it is interesting to note that almost 60% are transmitting APRS using the Kenwood D7 or D700 APRS radios but more significantly nearly 85% of all mobile APRS users, who view APRS data in their vehicles, use these radios as their only source of APRS data while mobile. Thus, to the extent that APRS is intended for tactical-real-time local display of data to end users, compatibility with these mobile users is a significant driver in the consideration of changes to the APRS Specification. Another interesting observation is that about 55% of all APRS stations are firmware devices (digis, TNC's and trackers and WX stations) that are not easily upgraded. This is a testament to the stability of the APRS protocol and our desire to maintain compatibility with existing users where possible.

APRS is NOT Ham Radio's MOBILE COMPUTING: The 1200 baud national APRS user channel cannot and was never intended to be Ham Radio's solution to Mobile Computing. The thousand-fold greater bandwidths required for typical Mobile Computing applications are enormous and there is no attempt to clutter the APRS channel with all possible data that might be of use to a user with a laptop in his car. APRS is for brief, short data types of immediate Ham Radio interest to all tactical users on the local RF channel.

From APRS.TXT AUTOMATIC PACKET/ POSITION REPORTING SYSTEM (APRS)

Document version: 8.5.3 (10 year anniversary update)

Document dated: 18 Sept 2002 (Previous version was 1 Mar 2000)

Author(s):

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Home page: www.aprs.org or
www.ew.usna.edu/~bruninga/aprs.html

APRS is a real-time tactical digital communications protocol for exchanging information between a large number of stations covering a large (local) area. As a multi-user data network, it is quite different from conventional packet radio.

APRS is different from regular

packet in four ways. First by the integration of maps and other data displays to organize and display data, second, by using a one-to-many protocol to update everyone in real time, third, by using generic digipeating so that prior knowledge of the network is not required, AND FORTH, since 1997, a worldwide transparent internet backbone, linking everyone worldwide. APRS turns packet radio into a real-time tactical communications and display system for emergencies and public service applications (and global communications). Normal packet radio has only shown usefulness in passing bulk message traffic (Email) from point to point. It has been difficult to apply conventional packet to real time events where information has a very short life time and needs to get to everyone.

Although the recent interfaces to the Internet make APRS a global communications system for live real-time traffic, this is not the primary objective. But like all of our other radios, how we use APRS in an emergency of special event is what drives the design of the APRS protocol. Although APRS is used 99% of the time over great distances, and benign conditions, the protocol is designed to be optimized for short distance real-time crisis operations.

APRS provides universal connectivity to all stations by avoiding the complexity and

(Continued on page 4)

What is APRS?

(Continued from page 3)

limitations of a connected network. It permits any number of stations to exchange data just like voice users would on a voice net. Any station that has information to contribute simply sends it, and all stations receive it and log it. Secondly, APRS recognizes that one of the greatest real-time needs at any special event or emergency is the tracking of key assets. Where is the Event Leader? Where are the emergency vehicles? What's the Weather at various points in the County? To answer these questions, APRS is a full featured automatic vehicle location and status reporting system too. It can be used over any 2-way radio system including HAM, CB, Marine Band, and Cellular Phone. See CB.txt and CELLULAR.tt. Now there is even a nationwide LIVE APRS tracking network on the Internet! See APRSnet.txt or you can connect by Phone line and modem. See APRStel.txt

APRS is on 144.39 throughout the North American Continent. Other countries often use other frequencies. Check locally.

Included on the distribution disk are several README text files on applications of APRS such as for weather nets, direction finding, plotting satellite contacts, and monitoring DX clusters. You must read at least the README.lst, DEMOS.txt, NewNotes.txt and HELP.txt files. APRS uses UI frame broadcasts and map dis-

plays. There are three major display subsystems and a number of other minor displays as follows:

LIST-STATUS - This display maintains a list of the latest UI frame received from each station. In effect, this is a multi-station one-line broadcast status system. On a DX cluster freq, this display accumulates a list of all users and what was their latest command to the cluster.

POSITIONS - This display maintains a separate list of the positions of each station often including a brief comment. They can also contain DF and or WX info.

MAPS - Maps from 300 yards up to 4000 miles can be displayed. All other APRS stations will be plotted. Stations reporting a course and speed are dead-reckoned to their present position. Overlay databases of the locations of all APRS DIGipeaters, National WX Service sites and even HAM stores are built in. You can zoom in to any point on the globe!

MESSAGES - In addition to the one-line STATUS packets, two-way messages with acknowledgment are supported. All incoming messages alert the user on arrival and are held on the MESSAGE screen until Killed.

BULLETINS - This screen maintains a list of active BULLETINS. These are important multi-line BULLETINS addressed to everyone.

TRAFFIC - Shows the last 42 messages monitored between other stations on the net. The MAPS-PLOTS-TRAFFIC command will connect these stations with lines on the map.

LIST-LOG - This display is a time sequenced log of every new status or message received. This is in contrast to the LATEST display which only shows the most recent status packet per station.

HEARD LOG - Displays the total number of packets per station per hour. These statistics show the connectivity of the network over varying paths, such as HF, or to see when stations enter and leave the net.

DIGIPEATER LIST - This display displays the raw packet header so that APRS users can see what digipeater paths are being used by other stations. The proper use of digipeaters is important in an APRS network. An asterisk in the first column means that you hear the other station direct without a digipeater! Change your UNPROTO path to NONE to chat with those stations.

STATION TRACKING. Although APRS automatically tracks mobile GPS/LORAN equipped stations, it also tracks perfectly well with manual reports or Grid Squares. APRS will use a Grid Square in brackets at the beginning of any packet. Addi-

(Continued on page 5)

What is APRS?

(Continued from page 4)

tionally, any station can place an object on his map including himself and within seconds that object appears on all other station displays. In the example of a parade, as each checkpoint with packet comes on line, its position is instantly displayed to all in the net. Whenever a station moves, he just updates his position on his map and that movement is transmitted to all other stations. To track other event assets, only one packet operator needs to monitor voice traffic to hear where things are. As he maintains the positions and movements of all assets on his screen, all other displays running APRS software display the same displays. There is also a Tracking command on the P display that will cause APRS to keep the map display always cantered on a selected object.

GRID SQUARES: Because of the ambiguity of a grid-square position report, APRS will not display a 4 or 6 digit grid square report on map ranges less than 128 and 8 miles respectively. Stations reported in the same grid square are randomly offset to avoid cluttering of call signs on top of each other. Grid Squares are brief; six characters vice seventeen. APRS uses this to advantage in GRID-SQUARE mode, for Meteor Scatter, SAREX, or the PACSATS.

ACARS: If your TNC has an ACARS modem for receiving Airline digital packets on

131.55 MHz, then the optional APRSair.EXE will plot the positions of all aircraft in range (usually up to about 200 miles out).. See ACARS.txt

USING APRS ON ALL DIGITAL CHANNELS: Use APRS posit packets on all frequencies as a general purpose network topology display on ANY packet frequency! See the PROTOCOL.txt for details on APRS formats and see FRQCOORD.txt for suggestions for using APRS as a freq-coordinate display tool.

SATELLITES: Use the special version APRStk.exe to enjoy APRS and also see all the satellites when they come in view. At least 5 satellites permit APRS digipeating and 7 can be received by your Kenwood Radios and auto-tuned by APRStk for each pass! APRS is ideal for the short but congested satellite pass. APRS only requires one successful packet for everyone to see each successful station compared to the typical *CONNECTED* SAREX mode which requires 5 successful packets. Thus APRS reduces channel loading, while capitalizing on the most fascinating aspect of the amateur radio hobby, and that is the display on a map of the location of those stations. See SPACE.txt.

FOX HUNTING OR DIRECTION FINDING: APRS is an excellent tool for plotting the location of a hidden transmitter, balloon, or interfering sig-

nal. APRS has several powerful DF tools:

- 1) Plots the positions and Bearing lines of all participating stations whether mobile or fixed
- 2) Plots the overlapping signal strength contours for OMNI-DF reports. This technique even plots big BLACK circles for NULL reports so that you see all the areas where the FOX is NOT! This OMNI technique is very powerful and locate a jammed to a neighbourhood with NO beams or special equipment.
- 3) Fade-Circle Search and Rescue technique for single station signal strength location using only a OMNI antenna
- 4) Optional automatic DF interface to Doppler DF units for automatic plotting of DF bearings.

For more DF info, see the DF.txt file.

WEATHER STATION REPORTING: APRS position reports can also include the wind speed and direction, as well as other important weather conditions. APRS supports a serial interface option to the ULTIMETER and DAVIS home weather stations to do this automatically. All weather stations show up as a blue circle, with a line indicating wind speed and direction. The APRS NEXT command will successively highlight each WX station in turn, for WX at a glance. APRS also has a database of the locations

(Continued on page 6)

What is APRS?

(Continued from page 6)

ing. This allows the rate to be every 10 minutes for a local event or every 30 minutes for the typical home station running WIDE3-3. All transmissions can be toggled off using the CONTROLS-XMT command, or forced at any time with the X key. See PROTOCOL.txt

COMMANDS: The keyboard is always active. Almost every key does something or brings up additional menus. (APRS processing of packets on the air is continuous EXCEPT while waiting for the user response to a prompt. These prompts are surrounded with a yellow). Commands fall into 3 categories:

SCREENS:

Space Key - Display map and all station locations
 L - LIST - Menu for DX, LOG, TELEMETRY, RESOURCES screens
 P - Positions - Displays a list of all stations reporting positions
 B - BULLETINS - Keeps a list of all BULLETINS heard
 R - Read Messages - Displays all of your in and out messages
 T - Traffic - Displays the last 23 lines of messages between stns
 D - Digis Used - Displays the digipeater paths being used by others
 H - Heard Log - Displays packets per hour per station for 24 hours
 V - VIEW - Displays all packets on a scrolling screen

SUB-MENUS:

F1- Help - Select from a MENU of HELP commands
 C - Controls - Display a one line control panel
 F - FILES Menu - For Loading/ Saving files, or Replaying tracks
 I - Input commands - Used to input posits, DF info or add Objects to map
 O - OPERATIONS - Several commands for normal operations
 M - MAP Functions - Functions dealing with maps
 W - Weather Menu - Displays the number of beacons per hour per station

MESSAGES:

R - READ - Displays your incoming and outgoing messages
 S - Send - Sends traffic to a station
 E - Erase - Erases outgoing traffic lines
 K - Kill - Kills incoming traffic lines
 T - Traffic - Displays message traffic between other stations

DEMONSTRATION FILE: To see how APRS looks in our area, FILES-LOAD the file named WASHDC.BK. To see the tracking of the GPS equipped Army/ Navy game football run, FILES-LOAD FBALL.BK and do a FILES-REPLAY of the file named FBALL93.HST. To see the Marine Corps marathon, load MARTHON.BK and replay the MARTHON.HST file. See Details in README.lst.

SELECTING STATIONS: The cursor can be moved to select

any station on the map using the arrow keys. When near any station symbol, the ENTER key will "select" the station. Detail information on that station will be displayed on the bottom of the screen. Alternatively, use the + and - keys to step through each station one by one. or the <> to step through objects on the current map scale only. You may also use the cursor on the P or L-list to select a station or object. Once selected, several functions may be performed:

ALL - Displays a list of all beacons from that station.
 EDIT - Change the position packet text
 MOVE - Move the station by moving the cursor
 DELETE - Delete the station.
 FOLLOW - Force this object to FOLLOW a course (APRSdr only)
 UPLINK - Toggle on/off transmitting the object to others
 ALARM - Sets an alarm if that station ever moves.
 TRACK - Always centre display on selected station as it moves
 SPECIAL- Mark stations for selective display with the JUST command

The select function also works on the LATEST and POSITION display lists by using the up/down arrow keys.

REPLAY: Replay past track histories either from memory or from a file. Tracks are kept in on-line memory until 150 have been saved, and then are saved to a HISTORY file. During

(Continued on page 8)

What is APRS?

(Continued from page 7)

REPLAY, use the following commands:

C - CALLsigns on/off

HOME - Homes map to presently displayed station

SPACE- Redraws the present map to remove track clutter

F - Faster. Speeds up playback

G - Overlays the Civil Air Patrol Search and Rescue grids

M - Medium replay speed

P - Pause

S - Slow. Slows down playback

Q - Quit playback.

PgUp/PgDn - Zoom in and out

FILES: All APRS files are retained in five different sub-directories of BAKS, LOGS, HSTS, SYSTEM, MAPLISTS and README. There are several other files used by the system:

MAPLIST.USA - The file that lists all map files to be used by APRS.

These MAPLISTS are all in the MAPLISTS directory. Change to different MAPLISTS using the MAPS-CHANGE command. BACKUP .BK - Automatic backup of system every time program is quit. It can be loaded quickly using the FILES-LOAD-B command.

Or Automatically by invoking APRSXX/B at the DOS prompt.

MAPFIX40.EXE - A powerful program for fixing, drawing, and modifying maps!

SYSTEM (DIR) - Contains the following required files lint-

TAPR.TNC - Setup parameters for your TNC (InitAEA.TNC for AEA) RESTORE.TNC - TNC commands used to restore your TNC after quitting APRS.

CAPGRIDS.DAT - A file of the CAP Sectional Aeronautical charts

DXCALLS.DAT - Call sign prefix-to-LAT/LONG database for DX spots

XXXX.SYS - Numerous brief files for APRS internal screens

OTHER FILES: METAR.TXT - A sample file used to load National Weather Service data

NWSPOSNS.POS - A file of the locations of all NWS sites

CHESSBOARD: To demonstrate the flexibility of APRS in reporting the movement of objects in a net, there is a 2 mile chessboard in the centre of the Gulf of Mexico. Two APRS stations can place pieces on the board with the INPUT-ADD command or can move existing pieces using the Cursor, SELECT and INSERT commands! An easy way to begin a game, is to load the CHESS.BK file which already has all 32 pieces saved. By selecting the alt-SETUP-OTHER-GAME command APRS not only keeps track of the move numbers but also changes the packet address from APRS to GAME, so that others on frequency will not see their PLists cluttered with the pieces as they are moved. Also, GAME mode only UP-

LINKS the LATEST move, to minimize QRM. You may consider going to an unused frequency so as not to clutter an active APRS net, however.

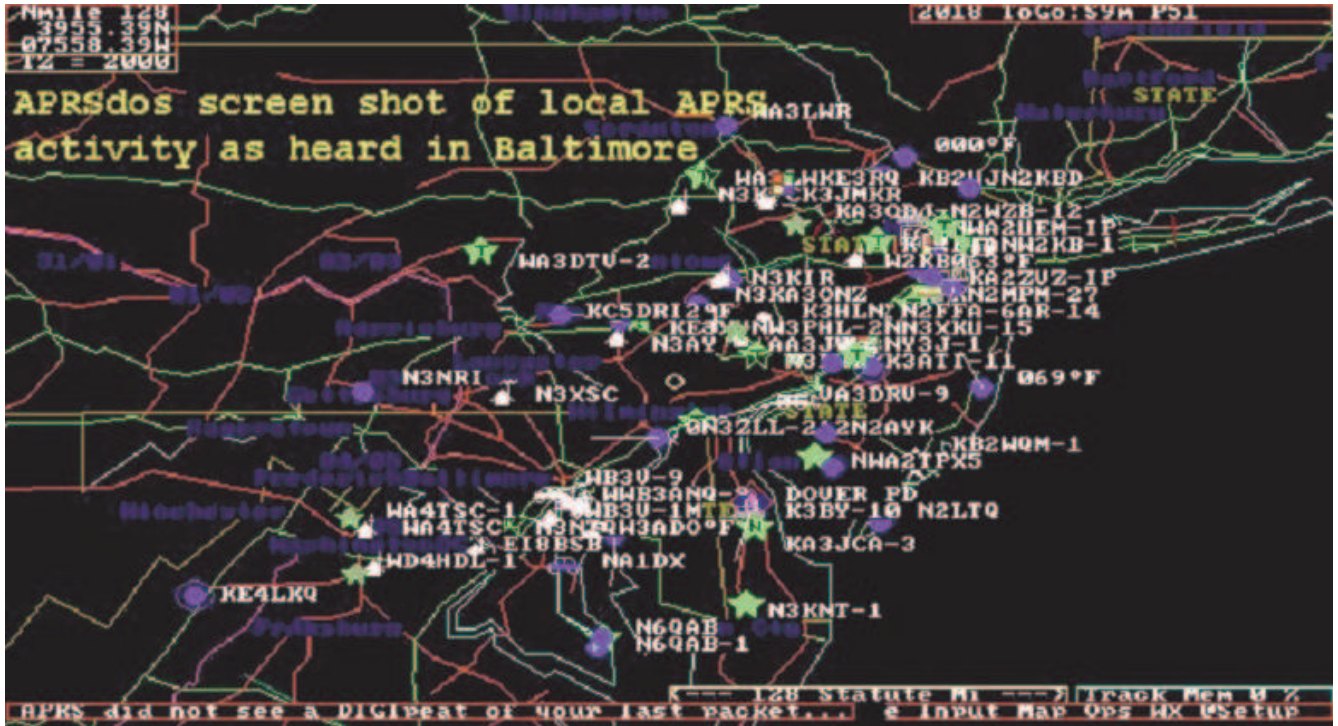
If you want to Kibitz a game in progress, also load the CHESS.BK file and use the CONTROLS-FILTERS-OTHER command so that your APRS will monitor OTHER packets on the channel so you will see the GAME packets. If you missed the beginning of the game, ask one of the players to use his P list to SELECT and UPLINK any piece locations you missed.

OTHER SPECIALIZED VERSIONS OF APRSDOS:

APRSmax.exe This program removes some rare features from the full up APRSDOS to make more room for more stations. This version will capture and display over 250 stations compared to the original 100. When either system is full, the oldest station is deleted to make room for each new station heard.

APRSdr.EXE: For tracking known OBJECTS that move at known speeds over a known course, such as the runners in a Marathon, use APRSdr. This program will Dead Reckon objects along the course, so that you can reasonably track the progress of the event, without having to

(Continued on page 9)



(Continued from page 8)

strap a GPS/TNC and RADIO to the head of the lead runner. All GPS mobiles will also be tracked. This is a tremendous visual aid for NET CONTROL.

tracking and Kenwood radio tuning

APRSdata.exe: A local tiny-web-page server for all mobile Kenwoods

APRSwx.exe: This version minimizes serial port overflow if you are running an interface to an Ultimeer 2000 WX station.

Also on this APRS site is a downloadable PowerPoint presentation. JB

APRSmin.exe: This version runs in less space, about 450K instead of 550.

APRSair.exe: For tracking commercial aircraft using the ACARS system.

APRSnet.exe: For tracking all packets on the INTERNET www.aprs.net:10151

APRSstk.exe: Includes Satellite

Project "Ham-Comp" - Layout of project

(Continued from page 1)

machines at that time. Also some members don't like driving home late at night. With it being winter, it is much warmer on a Saturday afternoon.

Just to refresh your memory regarding what we are about...

Project "Ham-Comp"

Objective

To assemble as many complete working computer systems with amateur radio software for distribution amongst members and interested parties. To raise the club members ability and resources level.

Method

Collect all computer hardware at the club. Use 'bring & fix' meetings to teach/train members in hardware assembly of pc's. Use volunteer members to test and report on pc based software. Schedule assembly then software installation and then test and demonstration.

Requirements

Lowest level of hardware:

80386SX with 4MB+, 80MB hard disk drive, 2 x Serial ports, 1 x parallel port, monochrome display & monitor. Sound card.

Software operating systems:

- ☐ Linux with DOS compatibility: to run console applications.
- ☐ Linux with WINE (Windows Emulator): to run Win 9x apps.
- ☐ Windows 98 second edition - if desperate.

Applications

- ☐ Morse Tx/Rx, RTTY, packet modes. Call book/Log database.
- ☐ We shall explore the use of Windows apps running under the Linux emulator. This cuts the cost and problems with legal versions of Windows.
- ☐ Use of pc for test equipment. Measurement of Voltage & Current. The Oscilloscope. Signal generation.
- ☐ We should also explore the software development tools available to provide innovation and amateur generation of usable software and systems.

Cost implications

Virtually nil for both hardware or software. We will 'scrounge' most of the hardware. The software we can install from the

clubs Linux box. CD's can easily be created for use by mem-

bers.

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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!

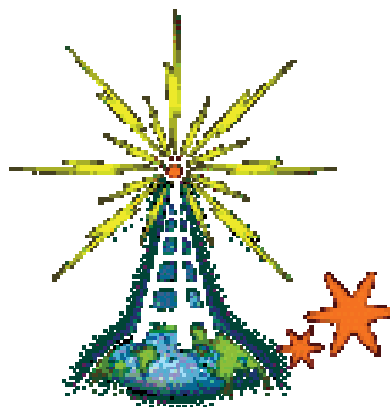
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West Rand members - we need your input!

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 this year. 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.
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