March 2009
Volume 9, Issue 9

ANODE

Inside this issue:

Editor's Comments

March 2009
Volume 9, Issue 9

When I was young…
You could talk around the world..... on CB!

Lots of short articles this month. Hopefully at least one will be of interest to you the reader.

Frequency Counter etc.

For those of you who were interested in getting a PIC based frequency counter…

ZS6RZ Contact details

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Special points of interest:

- Contact details on back page (corrected & updated)
- Ham-Comp Latest on web site.

Editor's Comments

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From "our" Geoff, ZS6GRL

Dear Geoffrey,

Recently a PSK31 CQ transmission of yours was automatically captured by a member of the PropNET project. You can see how it was plotted at http://propnet.org/catch3.php?date=2009-02-26&call=ZS6GRL&center=ZS6GRL

PropNET is a system for analyzing and recording HF and VHF circuit quality. It uses a distributed network of PSK31 stations automatically transmitting and receiving messages and reporting them to a central database, where real-time displays and statistical analyses are generated. We're interested in real-time propagation detection and long-term analysis of circuit usability, and other interesting uses that the combination of radio and computers can facilitate.

Current activity can be seen here:
http://propnet.org/catch3.php

and of course the introduction to the whole site is at http://propnet.org

You're obviously interested in digital modes and computers ... please give the site a look, and if you'd like to join us, contact me or w2ev@arrl.net for a non-automated welcome.

Note: PSK31 reception can be imperfect, and the analysis, recording, and sending of this invitation were all accomplished by computer without human review. It's possible the callsign was miscopied, and if you received this message in error, we apologize. In any case, this is the only message you'll receive from us.

73 de Dave KF6XA (data-whacker and webmaster) kf6xa@arrl.net

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RADIO MISTAKE: THAT'S NOT A BOMB – IT'S AN ANTENNA

In Nebraska, a sad yet funny story out of Omaha. That's where Police and a Bomb Squad have blown up a trap from a ham radio antenna because nobody could figure out what it was.

It all happened on Thursday, February 26th. That's when both agencies were called out following the discovery by a cleaning crew of a device that they thought looked like a PVC pipe bomb.

The house in question belonged to Bob Rennolet, W0AEX. There had been an electrical fire in the house 2 weeks ago and he had hired the clean-up crew but it had no idea as to what it had found. So, rather than take chances, the Bomb Squad decided to blow it up. That's when they realized it was not a bomb but a piece of W0AEX's ham radio gear.

Ironically, W0AEX lives next door to a fire station, so they didn't have far to go to put out the fire or blow up the trap. (K0NEB, W0HXL)

Just what has she got to do with Amateur Radio News?

Find out at :-
http://www.southgatearc.org/

JB 2009

The Sync Detector Kit

Why Serious AM Listeners Need One!
[IMPORTANT NOTICE
Effective March 21, 2004, the Sync Detector kit has been discontinued. It has become very difficult to get the Sony ICs in a timely fashion so it just isn't practical any longer.
73 Steve]

AM DETECTORS

AM can be a very pleasant form of modulation, useful for Amateur, Aircraft, Shortwave Broadcast, and Standard Broadcast stations. Reception of amplitude modulated signals can be difficult at times, though. Selective fading, adjacent interfering signals, and phase distortion at the receiver can all reduce the quality and readability of AM signals.

The usual means of AM demodulation is the envelope detector. In its simplest and most common form, it is a crystal or tube diode. The preceding stages in the radio receiver are entirely devoted to bringing the AM signal to this diode detector. The $1000 radio is still a crystal set at heart!

There are better ways to demodulate AM signals and one of the best is Synchronous Detection. In this method, a local oscillator is phase-locked to the original AM carrier signal, and is used in a product detector to produce audio. Additional means can be used to select which of the AM sidebands are used to produce audio, if desired.

The synchronous detector has been around since the early days of AM -- but has rarely been used in radio designs. The low cost and "adequate" performance of the crystal diode almost always won out over the complexity and higher cost of the sync detector. For the serious listener of AM, however, the envelope detector is not adequate. Synchronous Detection is the way to go...

REDUCING DISTORTION

The AM signal can arrive at the receiver in a variety of states. It can have phase-cancellation of the carrier or sidebands (selective fading) caused by multi-path propagation in the ionosphere. It can have adjacent signals causing interference or heterodyne whistles. The envelope detector cannot help with these problems -- in fact, the nature of the envelope detector exaggerates the distortion and noise caused by such problems, making AM very unpleasant to monitor.

The synchronous detector will greatly reduce these problems allowing excellent AM listening in what would otherwise be poor conditions.

The nasty tearing distortion caused by selective carrier fading is eliminated by use of the phase-locked local oscillator. This oscillator substitutes for the original AM carrier, even when the carrier goes into one of these fades.

The envelope detector will hear high distortion, while the sync detector produces clean audio.

Selective fades on the sidebands can be reduced by use of a synchronous detector capable of choosing which sideband to use for demodulation.

REDUCING INTERFERENCE

A synchronous detector that includes the selectable sideband feature will help reduce adjacent signal interference, as well as heterodyne whistles.

The choice of the upper sideband will cut out interference from a signal below the desired one. Similarly, use of the lower sideband will reduce interference from a signal above the desired frequency.

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The Sync Detector Kit

(Continued from page 3)

THE SYNC DETECTOR KIT

I have been a ham for 21 years (WD8DAS), and a professional Broadcast Engineer for 15 years. In the course of this activity I often found myself frustrated by the poor AM performance of my various receivers -- mostly due to their envelope detectors. For years I researched the synchronous detector, gathering information and building a number of prototypes for my own use. I even bought one of the very few commercial radios that include a synchronous AM detector.

I've become a firm believer in the benefits of the sync detector and have tried to spread the word among my friends and fellow radio hobbyists -- shortwave listeners, hams, and AM broadcast monitors. When I began being asked to build sync detectors for some of these folks, I decided to put together a kit to save folks the trouble of "reinventing the wheel" when they wanted to gain the benefits of selectable sideband synchronous detection.

The kit I now offer was developed to provide a design based on modern integrated circuits that has the best features of the sync detectors I've discovered...at a reasonable cost to build! The design is to be used with a tube or solid-state receivers having a 400 - 500 kHz IF -- the most common IF is 455 kHz.

The kit of parts, with circuit board and instructions, is $159.00.

If you would like a fully assembly and tested detector board, the cost is $229.00.

CONSTRUCTION AND HOOKUP

The sync detector kit is not complex -- but it does require good soldering skills and knowledge of electronic components. Instructions and drawings are included to make the kit as easy as possible, but order the assembled version of the detector if you are not comfortable with electronic circuit construction.

The sync detector is connected to the output of the last IF stage of your receiver. You must be comfortable with disassembly of your receiver, and capable of identifying the correct connection point. It is not difficult, but requires a basic knowledge of electronics, as well as a schematic diagram of your receiver.

Do not order either version of the detector if you are not comfortable with this sort of electronic work!

Due to the fact that I cannot control the construction and/or installation of the detector, I can only accept sealed detectors or detector kits for refund (less $15.00 shipping and handling). If the sealed bag has been opened, a refund is not available.

If you enjoy kit-building and know your way around your receiver, you will have success with this sync detector. Your investment will pay off in many enjoyable hours of clear listening!

Synchronous Detector Specifications

Sync detector: Sony AM Stereo IC

IF Centre Freq: 455 kHz typical, adjustable for I.F. of 400-500 kHz

Sideband Selection: Encapsulated Precision Phase-Shift Network Combiner

Input Impedance: 1 megohm (FET source-follower).

Input Level: 500 mV typical, 100 mV min, 1 v max.

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The Sync Detector Kit

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Output Impedance: 10 k ohms.

Audio Output Level: 100 mv typical (to be fed to audio stages of receiver or an external amp)

Power Requirements: 12 volts DC at 20 ma typical, but voltage of 4 - 14 vdc acceptable

Physical Dimensions: 1.0" H x 3.0" W x 4.0" D

For an independent evaluation of my Sync Detector kit, see Walt Novinger's review in Electric Radio Magazine, October 1994.

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Ham and Wine go well together

By Joe Barr on March 07, 2005 (8:00:00 AM)

Wine -- the open source implementation of the Windows API on X and Unix -- is a tool that you may never need. Its development seems to have been driven primarily by games and office suites available on the Windows platform, but not on Linux. Since I'm happy with the games available natively to Linux, and I don't have much need for office suites, that means I haven't been watching Wine mature over the years. But now I've got an itch that I can only scratch with a shareware app for Windows, so I thought it was time I installed Wine to see if it could bring some relief.

I've just gotten my ham radio license, and have become interested in Linux software for amateur radio. There is quite a bit, from applications for generating Morse code to others for sending and receiving fax, RTTY, PSK31, slow scan TV, and more. But my itch has to with continuous wave (CW), the original emissions type for radio and for hams. I searched in vain for a CW decoder for Linux.

I did find a shareware application for Windows, though, called CwGet, which does some fairly sophisticated work with the sound card in order to decode the Morse code you feed it. Think Audacity and you'll know what I mean. The app consists of three sizable windows: the top window is a spectrum display, the second contains the decoded text of signals you've tuned, and the third is a time-domain display of the sounds received.

Everything I read said "this is what you want." But of course it isn't, because I don't run Windows. It was just about this time that the news about Microsoft blocking users running Wine from downloading updates and tools from their site began to spread. All the sudden I wondered -- if Wine is good enough to have Microsoft blocking it, could it run CwGet?

I found Wine in Synaptic and installed the latest version from the Debian repositories. Things didn't go well. I checked on the #winehq IRC channel on the Freenode network and learned that the Debian version is broken. I was told to follow the directions for Debian on the WineHQ download page instead.

The instructions given were to add the WineHQ repository to Synaptic, do a reload, and install Wine. So I removed the version of Wine that was broken, and installed the official WineHQ version in its place. Would the official version of Wine go where the Debian version would not?

I downloaded and unzipped CwGet. Then I used Wine to install it, by entering wine setup.exe in the same directory I unzipped it in. The install ran without a hitch, right up until the very end. The last pop-up window in the installation process asks if you want to view the Change History

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Ham and Wine go well together

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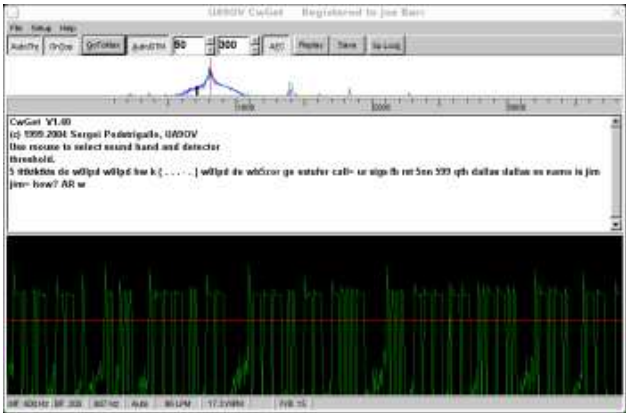
and the Help file. The Change History displayed just fine, but there was a problem trying to execute the Help file and I got an error message instead of Help. As described further down, glitches with Help turned out to be my only problem.



I used an audio cable with a mini-jack at each end to connect my Yaesu FRG-7700 receiver to the Line In port on my SoundBlaster Live! card. Then I found a ham band with some CW activity and started CwGet. I was amazed when I saw the CW being decoded real time, as I heard it, but there it was. Yes, CwGet would work on Linux, thanks to Wine.

There were a couple of glitches, both of them having to do with the Help function. First of all, Help doesn't show anything if I don't start Wine in the program directory that contains CwGet and its help file. And even when I do start it from there, the images don't display properly and text that you have to scroll to in order to display it is smudged and illegible. If there are tweaks for Wine or the Wine configuration you can make to resolve those issues, I haven't found them.

I'm pleasantly surprised with the progress Wine has made since the last time I looked at it. I think I'll be using it more often, now that I've registered CwGet.

Yep, that was my starting point. But as I said in the piece, I never found anything for decoding CW. But that was last week. I've since been informed that "The pre release version of gmfsk gmfsk-0.7pre1.tar.gz now has cw decode and encode. You can download it at :-

`http://gmfsk.connect.fi`

So it looks like I no longer need Wine to scratch that particular itch.

Joe Barr

12 VOLT GEL CELL CHARGER

BY N1HFX

Recently, a fellow amateur was looking for a gel cell charger which would first charge at a fixed rate and then later switch to a trickle charge when the cell was fully charged. After reviewing several catalogues and web sites, the MAX712 IC was discovered. This IC meets all the requirements for almost any type of battery charging system. The circuit in Figure 1 was designed specifically for 12 volt gel cells.

When a discharged gel cell is connected, the charger goes into a fast charge mode at a fixed rate of 400 ma. After the chip detects the voltage levelling off or when 4 1/2 hours has elapsed. (which ever happens first.) the fast charge will stop. After the fast charge has ended, the IC goes into a trickle charge rate of about 50 ma. This trickle charge continues until 13.8 volts is reached which will stop all charging current since the cell is now fully charged. If the cell voltage should drop for any reason, either a fast charge or trickle charge (IC will detect what is needed) will start again.

When constructing this circuit, be sure to attach a small heat sink to Q1. Apply a DC (partially filtered) voltage of at least 15.3 volts. The voltage must never go below this level even under

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12 VOLT GEL CELL CHARGER

(Continued from page 6)

load conditions. Many of the DC wall transformers available will work just fine as long as they meet the minimum voltage requirement. The input voltage can be as high as 24 volts. If the input voltage must be in the 30 volt range, increase R1 to about 820 ohms.

Because this circuit will not overcharge a gel cell, the battery can be connected indefinitely.

This circuit is designed primarily as a 12 backup system and can be connected to the load provided the device to be powered only draws current during power line interruptions. Use a diode from the battery to load if needed. This circuit makes an excellent battery backup to an amateur transceiver.

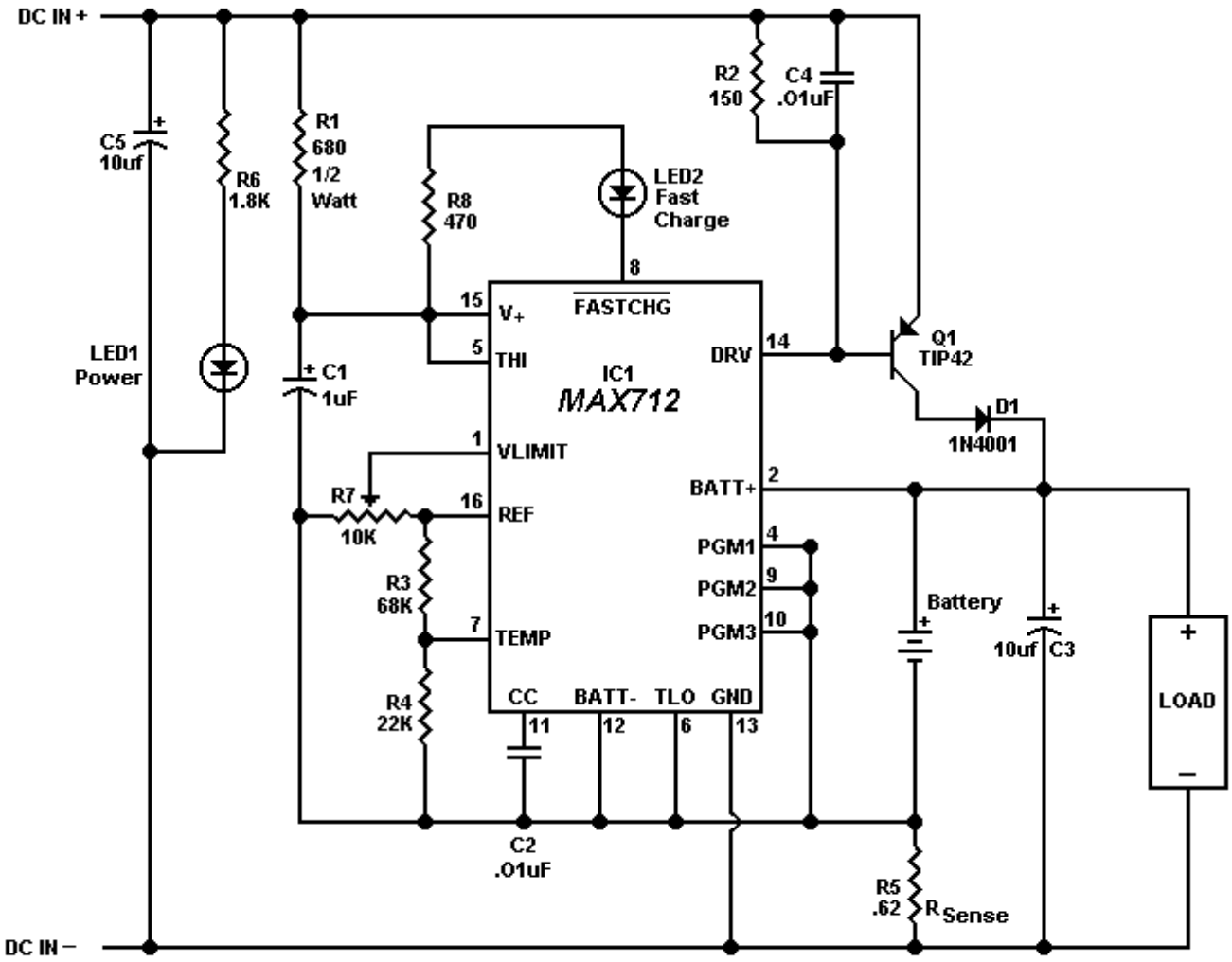

Figure 1

The output voltage must be aligned prior to use. Disconnect the battery from the circuit and apply power. Connect a digital volt meter or other accurate volt meter to pin 2 (positive lead) and to pin 12 (negative lead). Adjust R7 until exactly 13.8 volts is read.

The MAX712 IC and the .62 ohm resistor are available from Digi-Key, 701 Brooks Ave, Thief

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12 VOLT GEL CELL CHARGER

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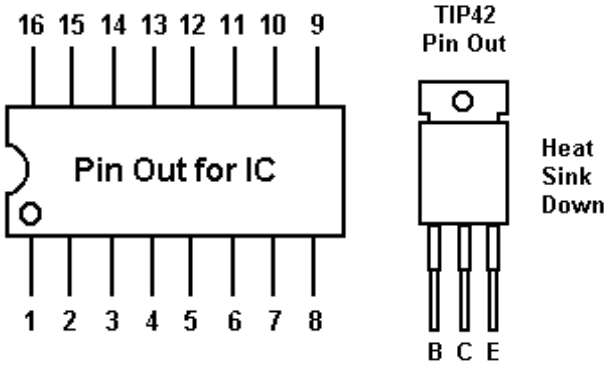
River Falls, MN 56701 (1-800-344-4539). Order part numbers MAX712CPE-ND and 0.62W-1-ND respectively. All other parts are available at Radio Shack.

DE N1HFX



PARTS LIST

C1 MAX712 Battery Fast-Charge Controller IC (Cost is $6.27 from Digi-Key)
R1 680 ohm 1/2 watt resistor (Blue Gray Brown)
R2 150 ohm resistor (Brown Green Brown)
R3 68K resistor (Blue Gray Orange)
R4 22K resistor (Red Red Orange)
R5 .62 ohm 1 watt resistor (Blue Red Silver) (Cost is 27 cents from Digi-Key)
R6 1.8K resistor (Brown Gray Red)
R7 10K PCB trimmer resistor (103)
R8 470 ohm resistor (Yellow Violet Brown)
C1 1 microfarad tantalum capacitor (observe polarity)
C2,C4 .01 microfarad capacitor (103)
C3,C5 10 microfarad electrolytic capacitor (observe polarity)
Q1 TIP42 PNP transistor or similar (attach heat sink)
D1 1N4001 Diode (observe polarity)
LED1,LED2 2 volt standard LED (observe polarity)

CW - Modern International Morse Code

The Modern International Morse Code was invented by Friedrich Clemens Gerke in 1848 and used for the telegraphy between Hamburg and Cuxhaven in Germany. After some minor changes in 1865 it has been standardised at the International Telegraphy congress in Paris (1865), and later normed by the ITU as International Morse Code.

International Morse code is still in use today, although it has become almost exclusively the province of amateur radio operators. Until 2003 the International Telecommunications Union (ITU) mandated Morse code proficiency as part of the amateur radio licensing procedure throughout the world. In some countries, certain parts of the amateur radio bands are still reserved for transmission of Morse code signals only.

Since Morse relies on only an (on-off keyed) radio signal, it requires less complex equipment than other forms of radio communication, and it can be used in very high noise / low signal environments. It also requires less bandwidth than voice communications, typically 100-150 Hz. The extensive use of pro-signs, Q codes, and restricted format of typical messages facilitates communication between amateur radio operators who do not share a common mother tongue and would have great difficulty in communicating using voice modes.

Morse code is also very popular among QRP operators for enabling very long distance, low-power communication. Readability can be sustained by trained operators even though the signal is only faintly readable. This level of "penetration" is due to the fact that all transmitted energy is concentrated in a very small bandwidth making the use of a narrow receiver bandwidth practical. A narrow bandwidth receiver uses filters to exclude interference on

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CW - Modern International Morse Code

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frequencies close to the desired frequency. Concentrating the transmitted energy in a small bandwidth gives the signal a "spectral brightness" that is much higher than the average natural noise (but see also spread spectrum).

In the United States until 1991, a demonstration of the ability to send and receive Morse code at 5 words per minute (WPM) was required to receive an FCC amateur radio license. Demonstration of this ability is still required for the privilege to use the HF bands. Until 1999, proficiency at the 20 WPM level was required to receive the highest level of amateur license (Extra Class); effective April 15, 2000, the FCC reduced the Extra Class requirement to 5 WPM.

The World Radio communication Conference of 2003 (WRC-03) made optional the international Morse code requirement for amateur radio licensing. Although the requirement remains on the books in the US, Canada, and elsewhere, some countries are working to eliminate the requirement entirely.

Amateur and military radio operators skilled in Morse code can often understand ("copy") code in their heads at rates in excess of 40 WPM. Although the traditional telegraph key (straight key) is still used by many amateurs, the use of semi- and fully-automatic electronic keyers (known as "bugs") is prevalent today. Computer software is also frequently employed to produce and decode Morse code RF signals.

A commercially manufactured paddle used in conjunction with an electronic keyer to generate high-speed Morse code.

As of 2004 commercial radiotelegraph licenses are still being issued in the United States by the Federal Communications Commission. Designed for shipboard and coast station operators, they are awarded to applicants who pass written examinations on advanced radio theory and show 20 WPM code proficiency (this requirement is waived for "old" Extra Class licensees). However, since 1999 the use of satellite and very high frequency maritime communications systems (GMDSS) have essentially made them obsolete.

On May 24, 2004, the 160th anniversary of the first telegraphic transmission, the ITU added the "@" (the "commercial at" or "commat") character to the Morse character set and is the digraph "AC" (probably to represent the letter "a" inside the swirl appearing to be a "C"). The new character facilitates sending electronic mail addresses by Morse code and is notable since it is the first official addition to the Morse set of characters since World War I.

For the Morse code links, go to this site:-

From: http://g3vre.org.uk/cw.asp

The West Rand Amateur Radio Club
Established in 1948
KG33XU 26.14122 South - 27.91870 East

P.O. Box 562
Roodepoort
1725

Phone: 082 342 3280 (Chairman)
Email: zs6wr.club@gmail.com
Web page: www.jbcs.co.za/ham_radio

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

Frequencies
439.000MHz 7.6MHz split
Input: 431.4MHz (West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

Chairman	Joop Hesp	ZS6C	082 342 3280	**zs6wr.club@gmail.com OR joophesp@telkomsa.net**
Vice Chairman	Geoff	ZS6GRL	082 546 5446	glevey@gmail.com
Secretary (Anode)	John Brock	'PieRat'	011 768 1626	brockjk@gmail.com
Treasurer	Craig Woods	ZS6CRW	082 700 0163	craig.woods@absamail.co.za
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SARL Liaison	Willem	ZS6WWJ	082 890 6775	marie.w@absamail.co.za

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.
zs6wr.club@gmail.com