

# ANODE

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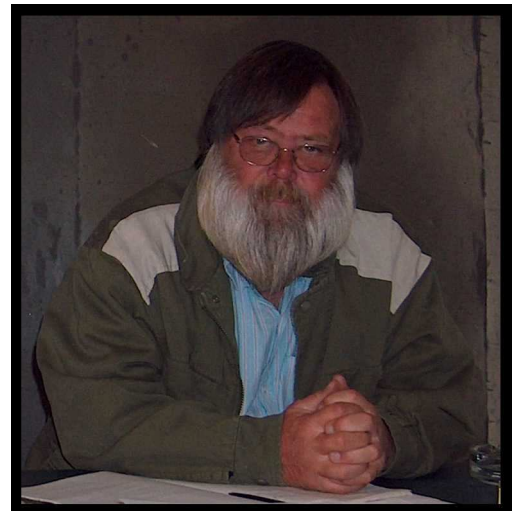
## Editor's Comments

Volume 10, Issue 10  
April 2010

### Silent Key - ZS6FJ - John Friend

**John Friend - ZS6FJ, a long time club member, died Thursday last during the night. He will be sadly missed by the club. As I looked back through all the pictures I took at the club, I saw the enormous contribution he gave to the club. The usual cook on duty at both field days and flea markets. As a club secretary for some years, he assisted in the running and organisation of the club. Rest in Peace my friend.**

As yet I do not have the funeral arrangements to give you. I hope to have them later today. If not I am



sure the meeting tomorrow night will have an announcement.

### SA AMSAT Space Symposium next week

Next Saturday the SA AMSAT Space  
*(continued on page 8)*

## Using the International Beacons

If you are an avid DX'er or a Short Wave Listener, you will appreciate being told of the "openings" in the band you are monitoring. In the past, amateurs would telephone others and let them know. Nowadays it more likely that you will be listening for the beacon on a frequency at the bottom of the band. Over the years, amateurs internationally built up a series of beacons that transmit in a "time slot" from their location.

The **International Beacon Project** is a set of 18 amateur (ham) radio transmitters around the world, each

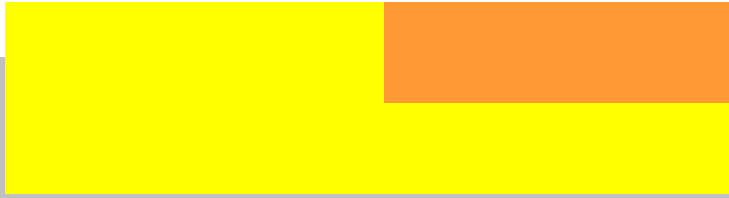
of which transmit every 3 minutes on a set of 5 short-wave frequencies.

Identifying these beacons and where they are can be a bit tricky if you don't know the schedule. Several programs for the PC and for the cell phones of today exist. Most are 'free' and some are not. If your computer is running at the same time as your rig, you can of course use one of these programs to QSY and to "orientate" your antenna system to the beacon transmitter.

*(continued on page 2)*

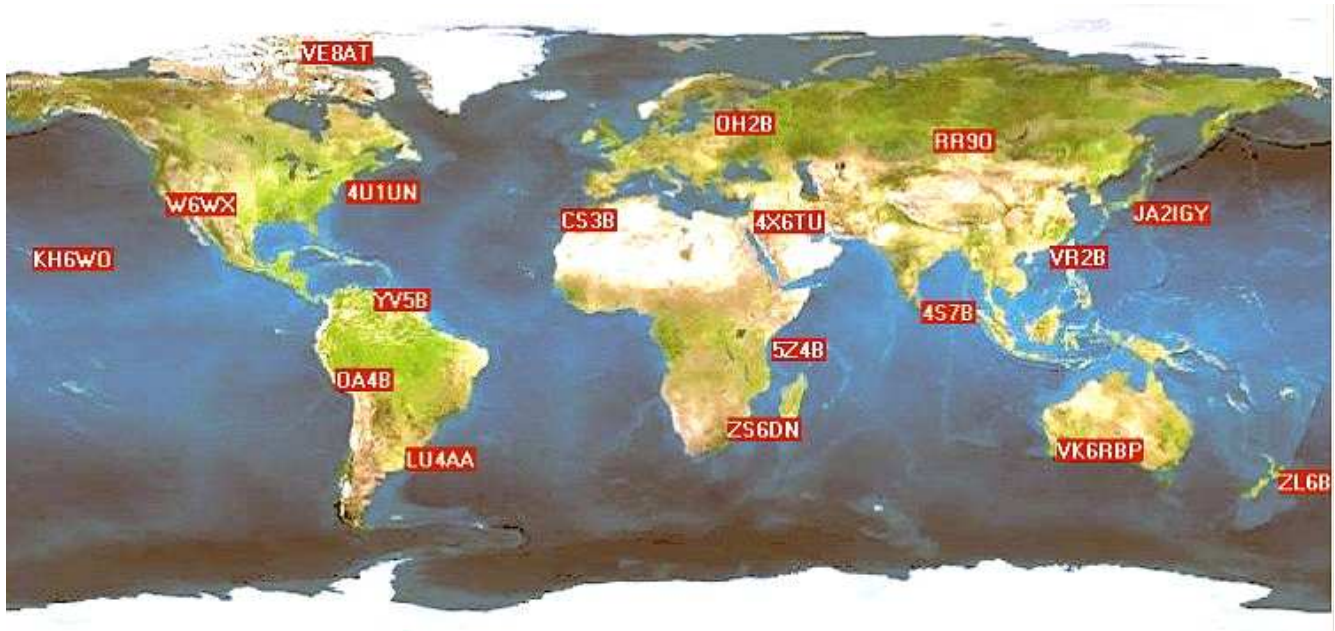
**Special points of interest:**

- Contact details on back page (corrected & updated Jan 2010)
- Ham-Comp Latest on web site.



# Using the International Beacons

(continued from page 1)



## Local Beacon Monitors

The Faros program from VE3NEA automates the monitoring of the beacons and saves the daily results as gif files which can be uploaded to a web site.

<http://www.ncdxf.org/beacons.html>

There is of course a lot of software to assist you with this task. Even an Excel spreadsheet program. One such program is 'ibp'.

- Antarctica - GC07tw - King George Island, Antarctica 20m Spectrometer
  - ZS1HMO - JF95po - Hermanus Magnetic Observatory, South Africa
  - ZS6/KW1O - KG44df - Menlo Park, Pretoria, South Africa
- For a larger list of the beacons' information :-

## ibp

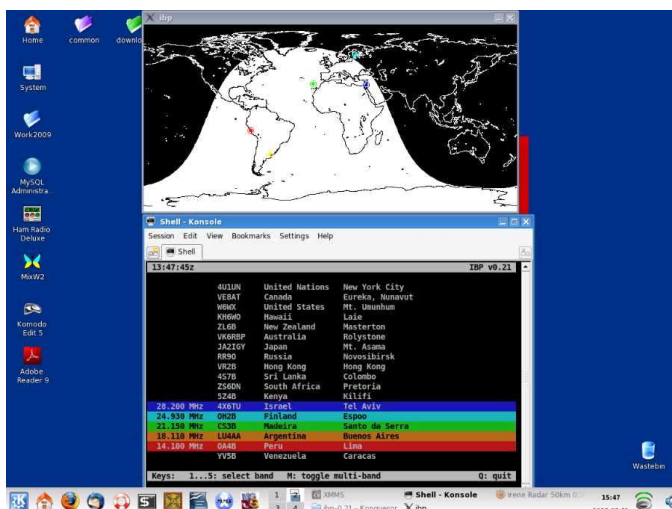
A tool to show which IBP beacons are transmitting. This allows short-wave radio users to quickly assess the current worldwide propagation conditions.

A screenshot of ibp is shown here to the left. The coloured bands and the coloured beacons are moved according to the time clock in the PC. So indicating the "active" beacons.

## Other tools

A great many other tools exist to help with these beacons. Even a PIC project from Practical Wireless. If you need the program or the article please let me know.

A table showing frequencies and times is over the page. JB 2010



## Using the International Beacons

Call	Location	14.100	18.110	21.150	24.930	28.200	Operator	Status
4U1UN	United Nations	00:00	00:10	00:20	00:30	00:40	UNRC	OFF3
VE8AT	Canada	00:10	00:20	00:30	00:40	00:50	RAC/NARC	OK1
W6WX	United States	00:20	00:30	00:40	00:50	01:00	NCDXF	OK
KH6WO	Hawaii	00:30	00:40	00:50	01:00	01:10	KH6BYU	ON
ZL6B	New Zealand	00:40	00:50	01:00	01:10	01:20	NZART	OK
VK6RBP	Australia	00:50	01:00	01:10	01:20	01:30	WIA	OK
JA2IGY	Japan	01:00	01:10	01:20	01:30	01:40	JARL	OK
RR9O	Russia	01:10	01:20	01:30	01:40	01:50	SRR	OK
VR2B	Hong Kong	01:20	01:30	01:40	01:50	02:00	HARTS	OK
4S7B	Sri Lanka	01:30	01:40	01:50	02:00	02:10	RSSL	OK
ZS6DN	South Africa	01:40	01:50	02:00	02:10	02:20	ZS6DN	OK
5Z4B	Kenya	01:50	02:00	02:10	02:20	02:30	ARSK	OK
4X6TU	Israel	02:00	02:10	02:20	02:30	02:40	IARC	OK
OH2B	Finland	02:10	02:20	02:30	02:40	02:50	SRAL	OK
CS3B	Madeira	02:20	02:30	02:40	02:50	00:00	ARRM	OFF2
LU4AA	Argentina	02:30	02:40	02:50	00:00	00:10	RCA	OK
OA4B	Peru	02:40	02:50	00:00	00:10	00:20	RCP	OK
YV5B	Venezuela	02:50	00:00	00:10	00:20	00:30	RCV	OK

1 - Operation may be intermittent due to local conditions.

2 - Off for unknown reasons. The local operators are looking into the problem.

3 - Off during renovation work on the United Nations building roof.

5 - Off due to hardware problems. Repairs are underway.

# Rectifier diodes as varicaps (varactors)

Written by Hans Summers  
 Sunday, 23 August 2009 00:17

These measurements followed on from my 1994 experiments on Common Diodes as Varicap Diodes. In this case I concentrated on rectifiers as the varicap (varactor) diode, in order to check and extend the previous measurements. I used one of each type of rectifier diode currently available in my junk box and a few other types for comparison as detailed below.

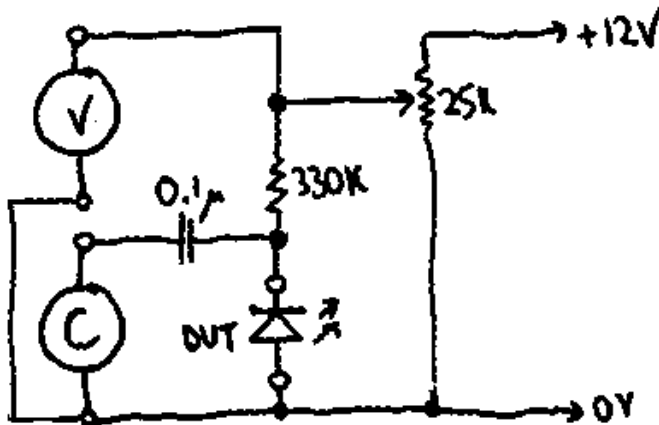
For this experiment I used the AADE L/C Meter kit pictured above right. The simple test circuit diagram of the set-up is shown below. DUT (Device Under Test) is the LED being evaluated.



n't show any worthwhile capacitance, which is expected and good, since it's supposed to be a high speed switching diode.

The graphs below shows all of the measurements made. I've shown two different scales, so that the much larger capacitance of the large rectifiers doesn't swamp the smaller ones.

*(continued on page 5)*



The measurements were performed for comparative purposes on the following types of diodes:

- 8 Rectifier diodes,
- 2 Small signal switching diodes,
- 1 Actual real and proper varicap (varactor) diode,
- 1 5 mm Red LED for comparison with the LED measurements.

## Results

The following table lists the minimum, maximum, and ratio of max to min capacitance of all 11 diodes in this test. Note that the 1N4148 does-



## Rectifier diodes as varicaps (varactors)

*(Continued from page 4)*

### Conclusions

I still like the gentler and slightly more linear curve of the proper MV2115 varicap and the 5mm red LED. For cheapness, general availability, etc etc etc., 5mm red LED's STILL get my vote!

### Spreadsheet

A spreadsheet containing ALL measurements and graphs is available on request via email.

<http://www.hanssummers.com/contact.html>

Last Updated on Tuesday, 01 September 2009 04:46

## 30m QRSS Receiver

Written by Hans Summers  
Thursday, 18 June 2009 18:07

The inspiration for this project was Paolo IZ1KXQ, who used a simple SA602-based homebrew direct conversion receiver to produce some very nice QRSS reception reports, of my Junkbox QRSS beacon and others. Paolo's receiver was based on a 1997 QST article by Daniel Wissell, N1YBT: "The 40m SLR - a Shielded-Loop Receiver". Paolo didn't use a shielded loop, he used a toroid as matching and input filter connected directly to a 30m dipole.

I was surprised by the excellent results Paolo achieved and decided to have a go myself. As an additional twist I decided to try to power the receiver from the USB port of a laptop computer, which supplies 5V at up to a few hundred mA.

My circuit (see above) uses Paolo's input matching filter, followed by a simple SA602 as mixer and crystal oscillator. I grounded one side of the bandpass filter tuning capacitor, the side connected to the tuning capacitor shaft: this is so that when adjusted with a screwdriver the tuning is not affected by the connection to the screwdriver. The balanced output from the mixer is fed into a low noise NE5534 op-amp. The gain of the op-amp is set at 45 dB. The output is fed directly to the line input of the laptop computer. Despite the

NE5534 datasheet specifying a minimum supply voltage of +/- 3V, it seems to work fine at just 5V single rail. 10.140 MHz crystals are available from Peter DL6NL, see his contact details at the bottom of my Junkbox QRSS beacon page.

The incoming +5V from the laptop is filtered by an arrangement of two L-C filter sections, each consisting of a 10 uH inductor and 220 uF / 0.22 uF capacitor combination. In operation I tried swapping the USB power source for a 9V (PP9) battery but could not detect any difference in noise level. So I concluded that USB-supplied power is clean enough to power a receiver! I did notice a substantial increase in noise level when running the mains power supply to charge the laptop batteries. So: operate QRSS reception on battery power alone!

As for construction: I purchased a tin of Ozon mints. You'll notice from the photographs, that it's a very small tin. The mints are also tiny and tasty (70 of them). You can eat them very fast but your mouth will sting for a while afterwards. I built the receiver "ugly" style on a small off cut of PCB, which I soldered into the tin when done. After application of the soldering iron for a few seconds, solder adheres very well to the tin. I drilled two small holes in the sides of the tin, and fed through 7-stranded wire as the two arms of the 30m dipole. Each is 7.1m long. The receiver therefore sits directly at the centre point of the dipole, i.e. there is no feeder between antenna and receiver. Power from the laptop, and audio

## 30m QRSS Receiver

(Continued from page 5)

back to the laptop, come and go via about 7m of twin screened cable (separately screened). I found that of the four wires in a USB cable, the 0 and +5V are conveniently and sensibly colour-coded black and red.

**Picture (right—for the rest visit his web site.)**

1. The tiny Ozon mint box, with the lid closed.
2. Open the lid, to see the tiny receiver!
3. The antenna wires (blue and green) and power/audio cable wind up into a compact and portable package.
4. Operating mobile in my garden. The receiver can be seen hanging in the middle of the dipole, against the blue sky background.

The last of these pictures, shows the receiver enclosed in an additional box made from white polystyrene packaging material intercepted on its way to the rubbish bin. This was hastily cut up and formed into a polystyrene box to provide some degree of thermal insulation. Without this, the crystal drifted up and down by a few 10's of Hz quite rapidly, as the sun came and went behind clouds. With the polystyrene box this problem was greatly reduced, resulting in a slower drift over several minutes. With indoor operation this would be less of a problem.

The receiver seems to work well. The audio can be monitored simply by plugging earphones into the computer's sound output socket. The design is fully differential and whilst some broadcast breakthrough is occasionally audible, it is very infrequent and barely noticeable.

My first test of the receiver was to listen for my own 30m QRSS beacon signal (image above left). Reception of the 360 mW signal from just a few metres away was of course no great feat of DX - but useful as it allowed me to easily tune the front-end bandpass filter for maximum signal strength, and test out the various settings of the ARGO spectrum analysis software. ARGO is the most popular of the available free software packages for decoding QRSS signals and can be



downloaded here. Image second left above shows my first decoding of my own beacon signal. Notice the rapid frequency drift in the receiver causing the trace to look very wobbly. That was before I put the receiver board in its tin. The following day I installed the receiver in its tin and the rapid drift disappeared, see the trace in image (above second right). I switched off the transmitter and connected the receiver to the attic dipole - I was able to receive my first remote beacon station (above far right, that's the weak trace of Andrea IK4IDP in Bologna, Italy - locator JN54QL.

### GOUPL Garden reception

On 3<sup>rd</sup> May 2006 I switched off my beacon transmitter again for a few hours (since it is impossible to receive any remote signals whilst a local signal is booming in at point blank range). I hung the dipole antenna between a tree in the front garden and an upstairs window, at about 4 - 5m height from the ground. I was able to copy three stations as shown below. Note that the drift is all in the receiver, rather than the transmit stations.

### GOUPL/IW0HK QRSS mini-DXpedition in London!

(continued on page 7)



## 'Editor's Comments

*(Continued from page 1)*

Symposium will be held at the University of KwaZulu-Natal, another event not to be missed.

The Northern Cape Amateur Radio Club is operating the World Cup Soccer special event station, **ZS10WCS**, for the month of April

### **Propagation Report from Hannes Coetzee, ZS6BZP**

From <http://www.southgatearc.org/>

Hannes Coetzee, ZS6BZP, reports that the solar activity is still at low levels. The face of the sun is nearly blank as only Sunspot 1 061 remains. The effective sunspot number is expected to decline to levels less than 10 for the coming week

<http://www.spaceweather.com/>

### **Greenland on the amateur radio satellites**

Reid, OX/N0RC, is operating on the Amateur Radio Satellites from Thule, Greenland, grid square FQ56, until May 30

### **Cross Country Wireless End Fed Antenna**

A high-performance HF mono-band antenna for portable or fixed operation using an efficient antenna matching unit

### **Historic Satellite Newsreels**

The archives of British Pathe contain many historic video clips of early space activities

### **April SatMagazine**

The April edition of SatMagazine is now available for download and covers satellite Radio and TV broadcasting using L-band and S-band

### **AO-51 CTCSS experiment**

From Sunday April 11 the Amateur Radio satellite AO-51 will be using a new experimental 67Hz CTCSS (PL) routine

### **Tony's 10-metre band report**

Thursday through to Sunday were very good last week. **ZS10WCS** was very popular but TN5SN just shaded it on Sunday.



**The West Rand Amateur Radio Club**

Established in 1938

KG33XU 26.14122 South - 27.91870 East

P.O. Box 5344  
Weltevreden Park  
1715

**Phone: 082 342 3280** (Chairman)**Email: [zs6wr.club@gmail.com](mailto:zs6wr.club@gmail.com)****Web page: [www.jbcs.co.za/ham\\_radio](http://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!

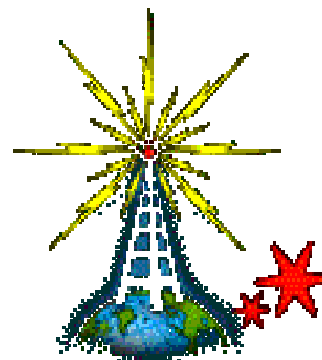
Chairman	Joop Hesp	ZS6C	082 342 3280	<a href="mailto:zs6wr.club@gmail.com">zs6wr.club@gmail.com</a> <b>OR</b> <a href="mailto:joophesp@telkomsa.net">joophesp@telkomsa.net</a>
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## West Rand members - we need your input!

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.**  
[zs6wr.club@gmail.com](mailto:zs6wr.club@gmail.com)