

Official Bulletin



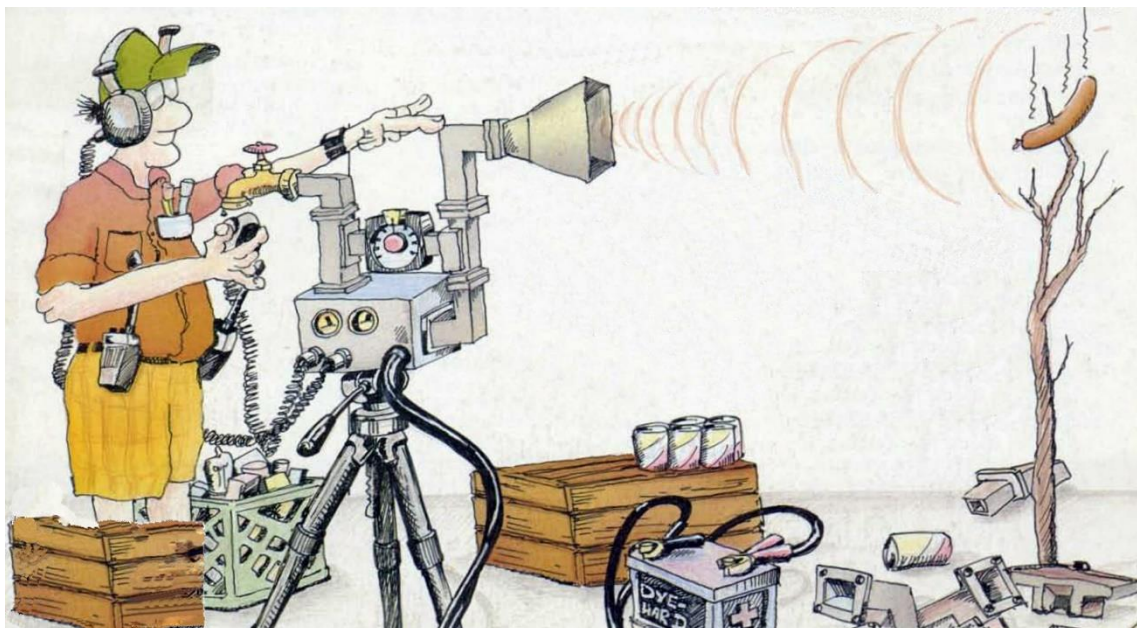
MHZ to GHZ

The West Australian VHF Group Bulletin

APRIL 2016

THE WEST AUSTRALIAN VHF GROUP (INC)

PO BOX 189 APPLECROSS 6953



Contents

- 1. Editors comment**
- 2. From the President's desk**
- 3. 10GHz SDR monitoring receiver.**
- 4. Home Brew**
- 5. G4BAO 23 cm driver amplifier and 45 watt amplifier**
- 6. Contact index**

1. Editor's Comments

2016 magazine starts the year off with a selection of different perspectives that hopefully will expand during the course of the year. The submission by Ty VK6HTY is a welcome 10GHz addition which is simple and effective way of detecting microwave transmission. Well done Ty. An interesting addition in home brew is the website of ON6MU is a VHF magnetic loop seeing the long wave boys have been busy of late building their own mag loop antennas. Similar problems are encountered at all frequencies with capacitors etc.. More submissions from members would be appreciated. There is only 4 months to go before next edition of the magazine.

2. From the President's Desk Terry VK6ZLT

Well, 2016 has certainly started out with a flurry of activity since the advent of the 1st Saturday in the month as an afternoon of shack and project work at Wireless Hill Operators Cottage. Well done all. A special WELL DONE goes to Denis VK6FADF who organised the John Moyle Field day session at Wireless Hill. A special thanks must go to the club stalwart Bob VK6KW in his efforts to replace the broken packet radio whip antenna which resided on the very top of the clubs tower system, as well as the help in sorting the massive amount assortment of radio material that has accumulated gear from various sources

3. 10GHz SDR receiver detector

LNB+BiasT+SDR=10GHz Rx Experiment

Ty, VK6HTY

Introduction

This is a fun little experiment that can be done on the cheap. The idea came from researching a technical talk on Raspberry pi's and SDR's. The small RTL2832 DVB-T USB dongles are cheap to experiment with, but there are limitations. So the more expensive Fun cube's may give better stability and pass-band filtering.

There is a 10368.460 MHz beacon at Wireless Hill transmitting FSK at ~1W. So lets use it.

I found many radio amateurs around the world got this build going in a variety of ways, but here's the very brief description from the youtube video I used:-

"Published on Apr 19, 2013

Just a quick clip showing the reception of the AF6HP Santiago Peak X-band beacon at 10.368330 Ghz. Receiving equipment: Directv-style ~18" dish, cheapy ~\$5 "Universal FTA satellite LNB" with a local oscillator frequency @ 9.750 Ghz. The LNB downconverts it to around 618 Mhz, signal then goes to a (cheapy) RTL2832 DVB-T dongle, (~\$11 to \$20) connected to a notebook PC, running SDR#. (free software, thats pronounced sdrsharp) Of course, I'm powering the LNB with a 12v battery, and using a \$3" satellite splitter" as a bias tee. One side of the splitter passes DC, the other doesn't. Connect your IF receiver to the side that doesn't, or else there may be smoke. ;)"

<https://www.youtube.com/watch?v=yFhT59ZfqaQ>, the video isn't much, but I could see the potential for a bit of experimenting and if nothing else I could get a bit of a win for not much. Got to thank Jason W6IEE for inspiration on this build.

Construction

It's built like the formulae in the title. Basically a satellite single output LNB connected via f-type cable to a satellite diplexer or 2-way splitter(this is setup at the bias-T), the splitter has power pass-through on one side, but not the other. 12Vdc power(I used the battery from an old APC400 UPS) is injected inside the splitter at the LNB centre pin output and the SDR usb dongle is connected via cable at the other non-power pass-through output on the splitter **(The SDR cable has to be connected at the non-power pass-through output or there will be another experiment about what bits get fried and what bits don't :)**) Depending on the type of connector on the antenna input of the SDR dongle, there needs to be a

converter from f-type to pal or mcx connectors. The SDR dongle can then be plugged into a laptop, PC, or I have it working on an android tablet, Motorola Xoom with a on-the-go cable, and it will work with an android phone with the same cable (obviously powering the SDR will drain the battery in the tablet or phone quicker)

Requirements

- LNB – Universal, single 0.3Db loss, LO 9.750GHz - ~\$15-20 or ~free with old SatTV dishes, lower the loss, lower the noise.
- Satellite 2-way splitter – 5 to 1000 MHz - Power and Non-power pass-through - ~\$7
- Wire - junkbox
- 12v battery - junkbox
- 2 lengths of f-type connector cable - ~\$5 each
- F-type to PAL or MCX - ~\$2
- SDR – RTL2832 DVB-T USB dongle - ~\$15
- Software:
 - Win32 SDR#(pronounced SDR Sharp) - <http://airspy.com/download/>
 - Android – RTL drivers and RTL Touch (This is a paid version. There is a limited demo time, but it can be used without the waterfall features, audio still works.)
- Optionals:
 - Mounting
 - Satellite dish offset LNB mount– I haven't used one yet
 - USB extensions

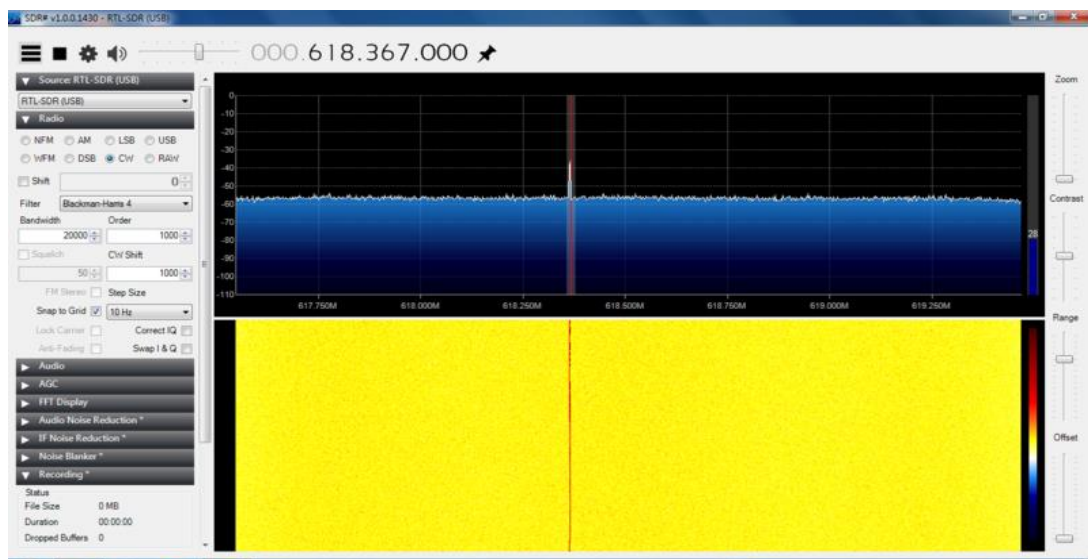
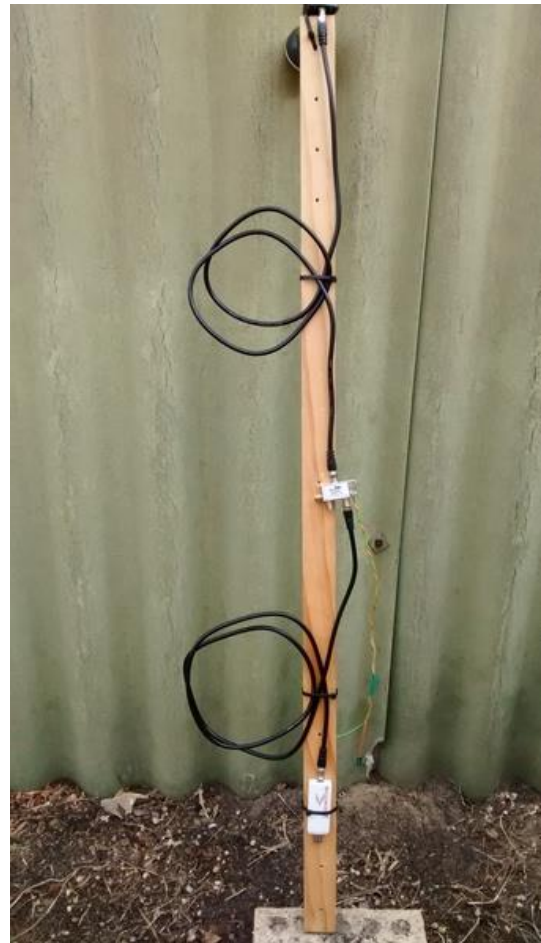


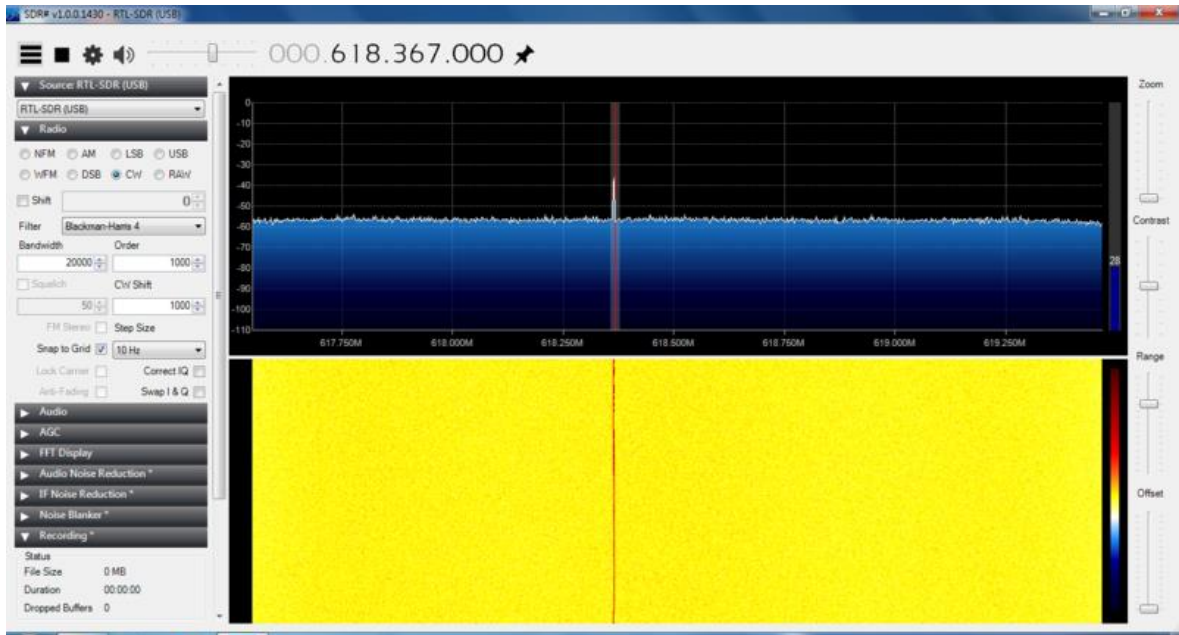
Results

The LNB down-converts the received 10 GHz signal down to a usable ~618.4MHz that the SDR dongle can receive, and then pass to the computer software.

At the car-park on the south side of Kings Park overlooking Stirling highway and the swan river just to the right of the Narrows, there is a direct line of sight to Wireless Hill, Ardross. The CW signal can be clearly picked up, but it has the tendency to drift. One test it drifted from 618.435 to 618.367 that's ~70KHz. Heat and vibration or movement seem to affect stability.

Now this is receive only, so it can make a cheap monitoring or 'target' receiver for 10GHz. A whole lot more experimenting can be added, as in adding an satellite dish would get better range, solid or shorter cables, Funcube or something similar as the SDR for better filtering and stability, and I wondering about the possibility of transmission through the splitter and LNB considering the set-top box at boot up is 'hand-shaking' and passing codes to the satellite.



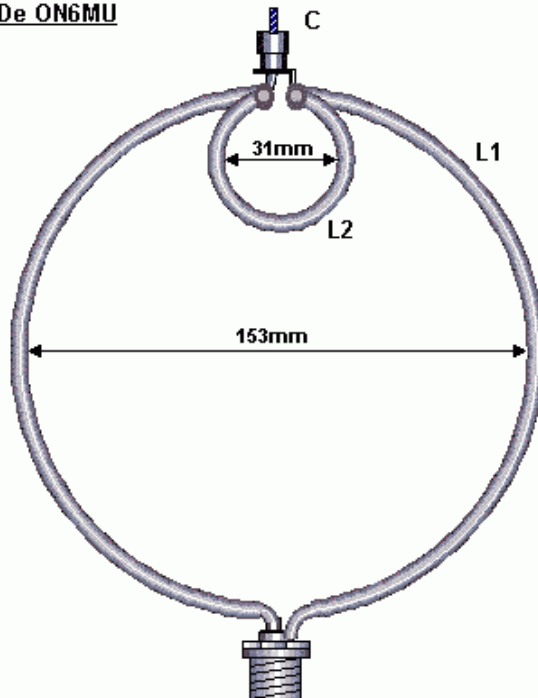


Setup at Kings Park
Screenshot of SDR#

4. Home Brew <http://users.belgacom.net/hamradio/homebrew.htm>

VHF Magnetic Loop RE-A144L14P

De ON6MU



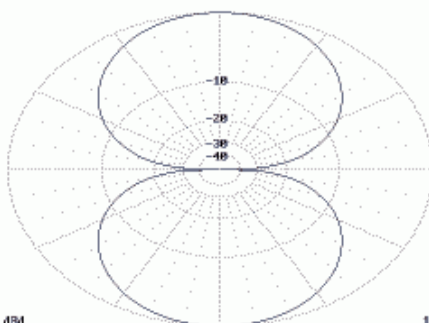
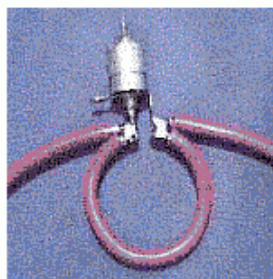
A magnetic loop has a very small bandwidth but insensitive to man made noise. It is much smaller than a conventional antenna for the same frequency and has a gain that can be compared to a quarter wave antenna even if the loop is mounted a meter from the ground. All in theory ofcourse. It has a bi-directional radiation pattern like a dipole and is very selective. This means that you need to tune the antenna using 'C' about every 0.5Mc on VHF for maximum reception and 1:1 SWR. Ideal for portable use or as a repeater antenna.

'C' has to be an air- or vacume capacitor because of the high voltages that can occur on the capacitor when transmitting! I tested the antenna using my VHF portable in my garden and the loop had about the same results as my quarter wave mounted 6 meters higher. The 'Q' of the loop depends on the quality of the material, size and 'C'.

C = air- or vacume capacitor of 0...20pF

L1 = 1/4 wave: for 145MHz use a copper or brass wire with a length of 49cm and at least 3mm in diameter.

L2 = is 1/5 of the length of L1: for 145MHz use the same material as L1 and has a length of 9.5cm



0 dB = -07 dBd

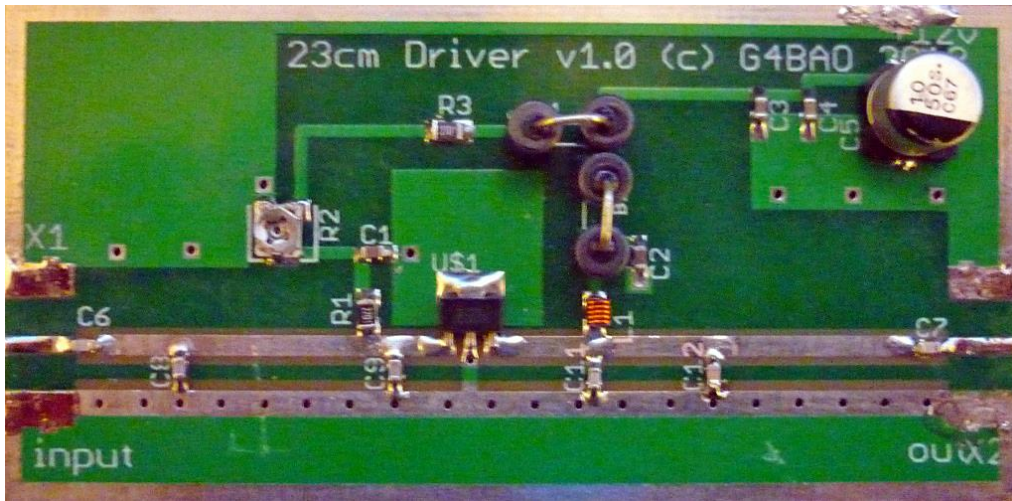
145.000 MHz

Note: maximum power depends on the capacitor used. In this example the maximum power is around 10watt
Tune 'C' very carefully until SWR is 1:1. A few pF over or under and you'll get a high SWR. Don't tune the capacitor while transmitting!

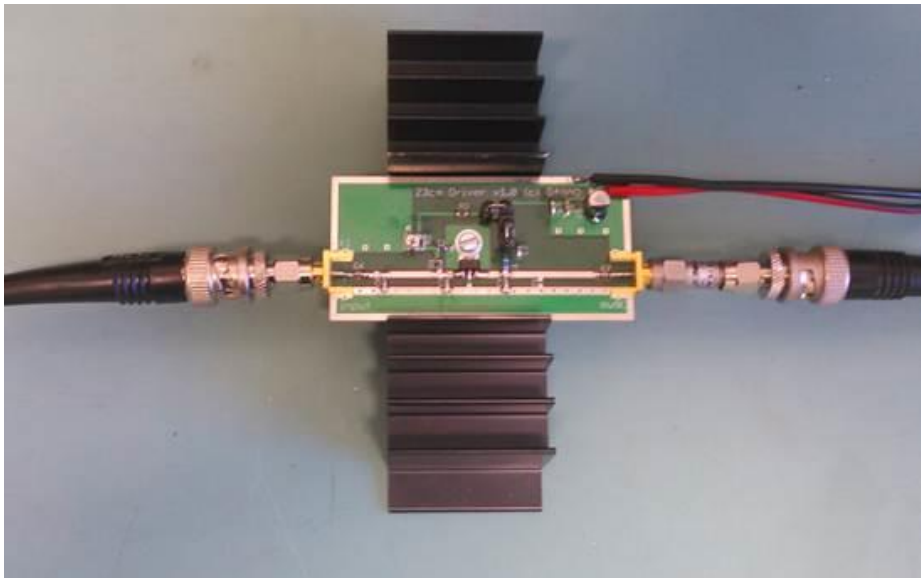
Can be tuned in any part of the entire VHF band.

<http://www.qsl.net/on6mu>

5. G4BAO 23 cm driver amplifier and 45 watt amplifier



2 watt 23cm driver amplifier

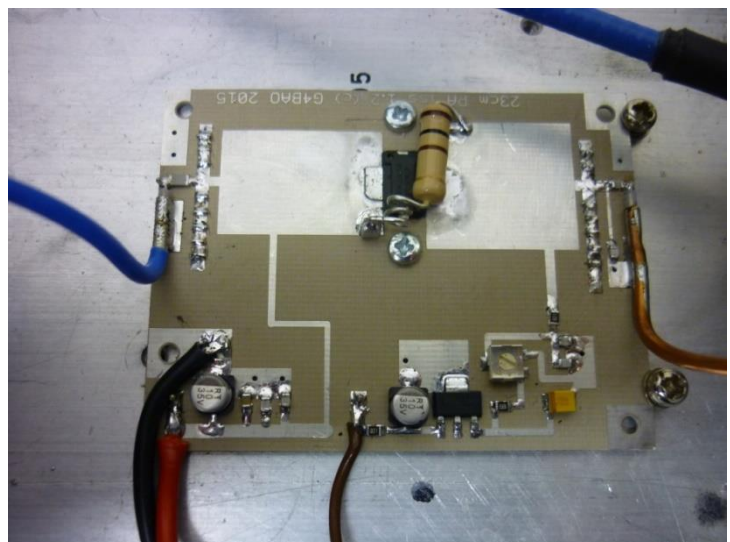


2 watt 23cm driver amplifier on test

45 Watt Power Amplifier

These amplifiers can be obtained in kit form from G4BAO at

<http://www.g4bao.com/>



6. Contact index

President Terry VK6ZLT president@wavhfgroup.org.au

Vice- President Denis VK6FADF committee@wavhfgroup.org.au

Secretary Graeme VK6LV secretary@wavhfgroup.org.au

Treasurer Graeme VK6LV treasurer@wavhfgroup.org.au

Publicity TY VK6HTY committee@wavhfgroup.org.au

Activities Terry VK6ZLT president@wavhfgroup.org.au

Museum Rep Bob VK6KW committee@wavhfgroup.org.au

Bulletin Editor Terry VK6ZLT president@wavhfgroup.org.au

Councillor Tom VK6ZAF committee@wavhfgroup.org.au

Councillor Ty VK6HTY committee@wavhfgroup.org.au

Councillor Phil VK6ZKO committee@wavhfgroup.org.au

Councillor Graham VK6FGMC committee@wavhfgroup.org.au

Trustee # 1 Wally K6KZ committee@wavhfgroup.org.au

Trustee # 2 Bob VK6PO committee@wavhfgroup.org.au

New or Intending members

Why not checkout the following

<http://www.wavhfgroup.org.au/history>

<http://www.wavhfgroup.org.au/subscriptions>