

WsprryPi A Raspberry Pi WSPR beacon







What is WSPR? weak signal propagation reporter







WSPR

- WSPR-2 (2 Minute timeframes)
- developed by K1JT Joe Taylor
- Decode Signal with a S/N of -28 dB in a 2500 Hz bandwidth
- (WSPR-15: 9dB more sensitive)
- WSPRnet.org for reporting and viewing
- The RaspberryPi will be transmitting with between 8 and 10 mW (-> 10dBm)







A Chebyshev Filter



| Band | C1 | C2 | C3 | C4 | L1/L3 | L2 | Toroid |
|-------|------------|-----------|-----------|------------|-------------|-------------|----------------|
| 2200m | 2.2n//10n | 4.7n//22n | 4.7n//22n | 2.2n//10n | 105 (54uH) | 105 (54uH) | T50-2 (red) |
| 600m | 2.2n//2.2n | 10n | 10n | 2.2n//2.2n | 64 (20uH) | 70 (24uH) | T50-2 (red) |
| 160m | 820 | 2200 | 2200 | 820 | 30 (4.44uH) | 34 (5.61uH) | T50-2 (red) |
| 80m | 470 | 1200 | 1200 | 470 | 25 (2.42uH) | 27 (3.01uH) | T37-2 (red) |
| 60m | 680 | 1200 | 1200 | 680 | 23 (2.12uH) | 24 (2.30uH) | T37-2 (red) |
| 40m | 270 | 680 | 680 | 270 | 21 (1.38uH) | 24 (1.70uH) | T37-6 (yellow) |
| 30m | 270 | 560 | 560 | 270 | 19 (1.09uH) | 20 (1.26uH) | T37-6 (yellow) |
| 20m | 180 | 390 | 390 | 180 | 16 (773nH) | 17 (904nH) | T37-6 (yellow) |
| 17m | 100 | 270 | 270 | 100 | 13 (548nH) | 15 (668nH) | T37-6 (yellow) |
| 15m | 82 | 220 | 220 | 82 | 12 (444nH) | 14 (561nH) | T37-6 (yellow) |
| 12m | 100 | 220 | 220 | 100 | 12 (438nH) | 13 (515nH) | T37-6 (yellow) |
| 10m | 56 | 150 | 150 | 56 | 10 (303nH) | 11 (382nH) | T37-6 (yellow) |
| 6m | 22 | 82 | 82 | 22 | 7 (165nH) | 9 (265nH) | T37-6 (yellow) |



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A Tschebyscheff Filter

100nF decoupling capacitor C1



| Band | - 61 - | — C2 — | - 63 - | — C 4 — | L1/L3 | L2 | Toroid |
|------|--------|-------------------|--------|--------------------|------------|------------|----------------|
| 20m | 180 | 390 | 390 | 180 | 16 (773nH) | 17 (904nH) | T37-6 (yellow) |







Raspberry Pi Basics

First Login

use putty or ssh command

ssh pi@44.143.189.X #ip is on the back of your rapsi

to change user pi's default password

passwd pi







Raspberry Pi Basics

Some basic linux commands







Installing WsprryPi

cd /home/pi

Clone WsprryPi using git

git clone https://github.com/JamesP6000/WsprryPi

Build WsprryPi

cd WsprryPi/











Installing WsprryPi

make the executable a command by copying it to /usr/bin

sudo cp wspr /usr/bin/wspr









The wspr command

this is the bare minimum for wsprrypi to run (type wspr without arguments to see more)







Using screen

Since wspr would stop if we would terminate the ssh session we better execute it in a virtual shell

screen -S wspr

Basic screen commands







Making it plug&play

To make this thing plug&play we use a service script

cd /etc/systemd/system

get the service description from my computer
sudo wget https://raw.githubusercontent.com/oe3cts/WSPR-HAT/
master/wsprrypi.service

nano is a simple command line text editor use it to view the new file

nano wsprrypi.service





WsprryPi

A systemd service file

| [Unit] |
|---------------------------------------|
| Description=Wsprrypi |
| After=multi-user.target |
| |
| [Service] |
| Type=forking |
| User=root |
| #specify a user that runs the process |

ExecStart=/usr/bin/screen -d -m -S wspr wspr -r OE1LBS JN78 10 20m #execute the wspr command with your callsign and locator for start

ExecStop=/usr/bin/killall -w -s 2 wspr #kill this screen for stop

WorkingDirectory=/root

[Install] WantedBy=multi-user.target



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A systemd service

press ctrl+X to end nano press Y and two times enter to save the file

sudo systemctl start wsprrypistart the servicesudo systemctl stop wsprrypistop the servicesudo systemctl status wsprrypicheck service statussudo systemctl enable wsprrypienable start on bootsudo systemctl disable wsprrypidisable start on boot

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Thanks!

Any Questions? Google them ;-) (then write me an email lukas@lbsfilm.at)







Some more Links

https://github.com/JamesP6000/WsprryPi http://physics.princeton.edu/pulsar/k1jt/ wspr.html http://wsprnet.org

http://www.linuxveda.com/2014/04/28/ autostart-process-gnu-screen-systemd/

https://github.com/oe3cts/WSPR-HAT

https://en.wikipedia.org/wiki/ Chebyshev_filter



