QRPi
Whispering Raspberries
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WALT LUNA
“the quieter you become, the more you are able to hear”

PENETRATION TESTING,
REDEFINED.

A Project By Offensive Security
<table>
<thead>
<tr>
<th>WiFi</th>
<th>GSM</th>
<th>2m FM</th>
<th>WSPR</th>
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</thead>
<tbody>
<tr>
<td>Watt</td>
<td>0.1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Miles</td>
<td>0.06</td>
<td>22</td>
<td>62</td>
</tr>
<tr>
<td>Miles/W</td>
<td>0.6</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>
• Message components:
  28 bits for callsign
  15 for locator
  7 for power level
  = 50 bits total.

• Forward error correction (FEC)
• 1.4648 baud
- Modulation: continuous phase 4-FSK, tone separation 1.4648 Hz.
- Occupied bandwidth: about 6Hz
- Duration of transmission: 110.6 s

BW = 5.9 Hz
Mkr 1: 14.099995 MHz, 20.875 dBm
Mkr 2: 28.192299 MHz, -25.003 dBm
Initial cross version compatibility issues 😊
RaspberryPi V1 B
RaspberryPi V1 B+
RaspberryPi V2 B
WsprryPi terminal screen

```
pi@raspberrypi ~:/WsprryPi_V2_no_printf $ sudo ./wspr -r -s ha7dcd jn97ml 20 20m
WSPR packet contents:
  Callsign: ha7dcd
  Locator: jn97ml
  Power: 20 dBm
Requested TX frequencies:
  14.097100 MHz
Extra options:
  ntp_adjtime() will be used to periodically calibrate the transmission frequency
  Transmissions will continue forever until stopped with CTRL-C

Using mbox device /dev/vcio.
Ready to transmit (setup complete)...
Desired center frequency for WSPR transmission: 14.097100 MHz
  Waiting for next WSPR transmission window...
^[[B^[[B Obtained new ppm value: 6.15073
  TX started at: UTC 09-25-2015 21:06:01.002
  TX ended at: UTC 09-25-2015 21:07:51.617 (110.615 s)
Desired center frequency for WSPR transmission: 14.097100 MHz
  Waiting for next WSPR transmission window...
  Obtained new ppm value: 9.07901
  TX started at: UTC 09-25-2015 21:08:01.002
```
20m band
20m band
10m band
The BCM2835 SoC (right) and its accompanying memory

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One of the creators of WsperryPi
Ultimate 3 QRSS,
Assembled by HA7DCD
STRATUM 0

GPS SATELLITE

STRATUM 1

NTP TIME SERVER

STRATUM 2

SERVER/WORKSTATIONS

SWITCH/RоUTER

ETHERNET CLOCK

http://www.galsys.co.uk/news/what-time-server-do-i-need-for-my-business/
Ideal Waveform

Transition too early

Transition too late

Jitter

Oliver Mattos and Oskar Weigl (PiFM)
Dan, MD1CLV
F8CHK
Guido PE1NNZ
Michael Tatarinov
James Peroulas
WsperryPi mod – HA7ILM
Andrew Holme:
http://j.mp/GPU_FFT
http://j.mp/PI-FMRDS

http://j.mp/PI-FMRDS
QRPi manual:

[j.mp/tapr-qrpi]
HDSDR + Signal Hound SA!
Thank you for your attention!

j.mp/taprqrpi