The VHF+ Reverse Beacon Network

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The Question

From Bob, K8TQK:
“Can we come up with a way to automatically monitor VHF/UHF beacons and report on propagation?”

Is there a wheel that’s already been invented???

The Answer

Yes.

The Answer
(From Finish to Start)

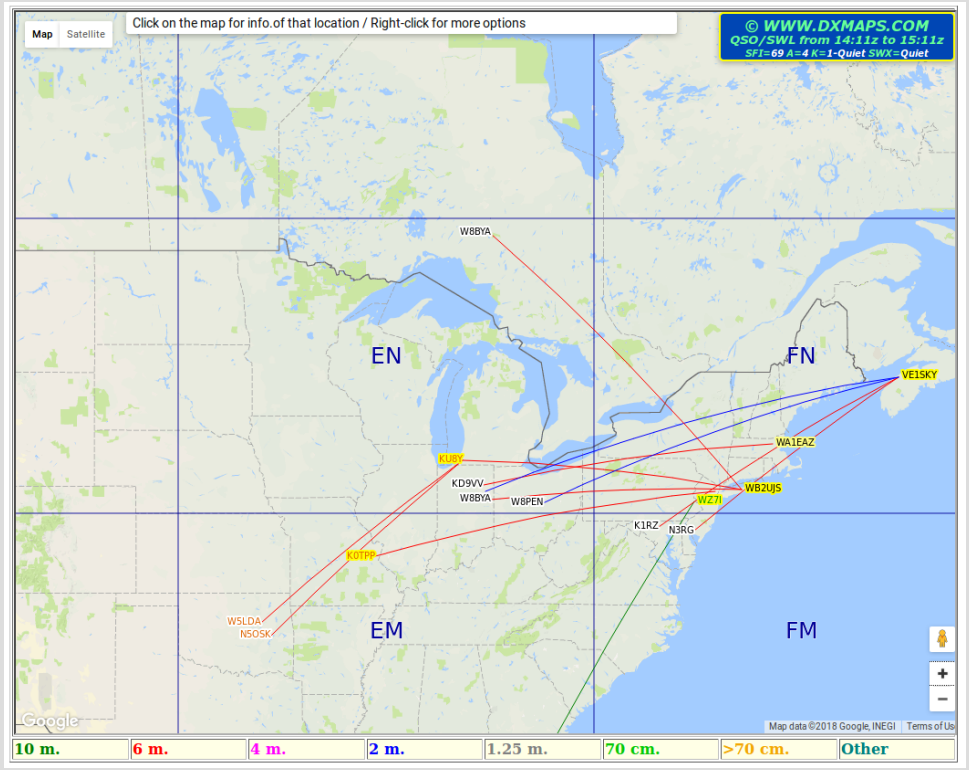
- **DXMaps** is a widely used web site that shows QSOs reported by Clusters and Reverse Beacon Network.
  - http://www.dxmaps.com
- **Reverse Beacon Network** (RBN) is a web site that collects data reported by Software Defined Radios feeding CW Skimmer (and other similar) software.
  - http://reversebeacon.net

The Answer
(From Finish to Start)

- **CW Skimmer** decodes CW signals, looks for CQing stations, and sends reports to the RBN.
  - Windows program by Alex, VE3NEA ($75 license fee)
  - Spots include time, freq, speed, and ***signal-to-noise ratio***.
  - Supports up to 7 x 192 kHz band segments
- Skimmer does CW, and there are also versions that decode RTTY and PSK modes.
- Work is underway to integrate FT8 into RBN network; that will be very interesting for 6M.

That’s Great for the HF Folks, but what about VHF?

dxmaps.com


Map
Satellite
Click on the map for info.of that location / Right-click for more options
© WWW.DXMAPS.COM
QSO/SWL from 14:11z to 15:11z
SFI=69 A=4 K=1-Quiet SWX=Quiet
W8BYA
EN
FN
VE1SKY
WA1EAZ
KUBY
KD9VV
W8BYA
W8PEN
WB2UJS
WZ7I
K1RZ
N3RG
K0TPP
W5LDA
N5OSK
EM
FM
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Map data ©2018 Google, INEGI
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10 m.
6 m.
4 m.
2 m.
1.25 m.
70 cm.
>70 cm.
Other

- DX Maps, Reverse Beacon Network, and CW Skimmer all support 6M and up
- But there are almost **no** VHF+ spots from the US!!!
- Why not?
  - No one thought of it?
  - Lack of Hardware?
    - Lots of relatively inexpensive SDRs that cover multiple HF bands.
    - But for VHF, need one RX per band; that gets expensive.
  - ???
- Let’s solve the problem...

Low Cost VHF/UHF SDR

- USB “dongle” for $20
- Tunes 500 kHz to 1800 MHz
- High sensitivity
- 1 PPM frequency stability
- But, limited dynamic range

- For $20, no sweat to use one per band!
  - Full CW/beacon coverage on some bands requires 2 dongles.

Dongle-to-Skimmer Interface

- Skimmer doesn’t directly support RTL-SDR dongle
- But N1GP “rtl_hpsdr” software on Raspberry Pi gives us a “shim” between dongle and Skimmer.
- Up to 7 dongles on USB
- Emulates HPSDR on Ethernet
- Makes multiple dongles look like one multi-band HPSDR.

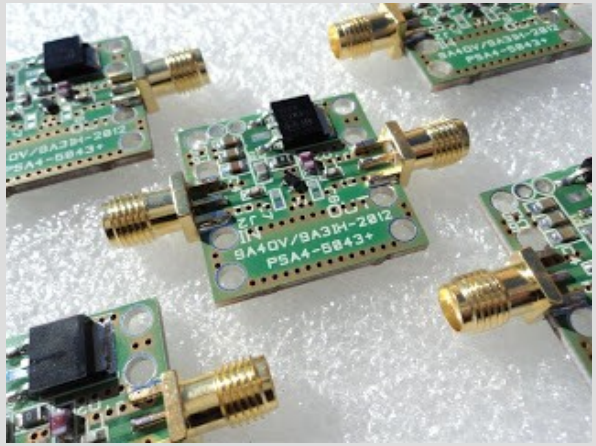
The Complete Receiver

Antennas

- The goal is to copy stations that other locals can hear, so you don’t need (or want) to be on a mountain top.
- Guidelines:
  - Horizontal polarization and omnidirectional
  - ~50 feet above ground from a decent location
  - Stacked halos a good choice for lower bands
- Best if node is located away from transmitters

Preamps and Feedline

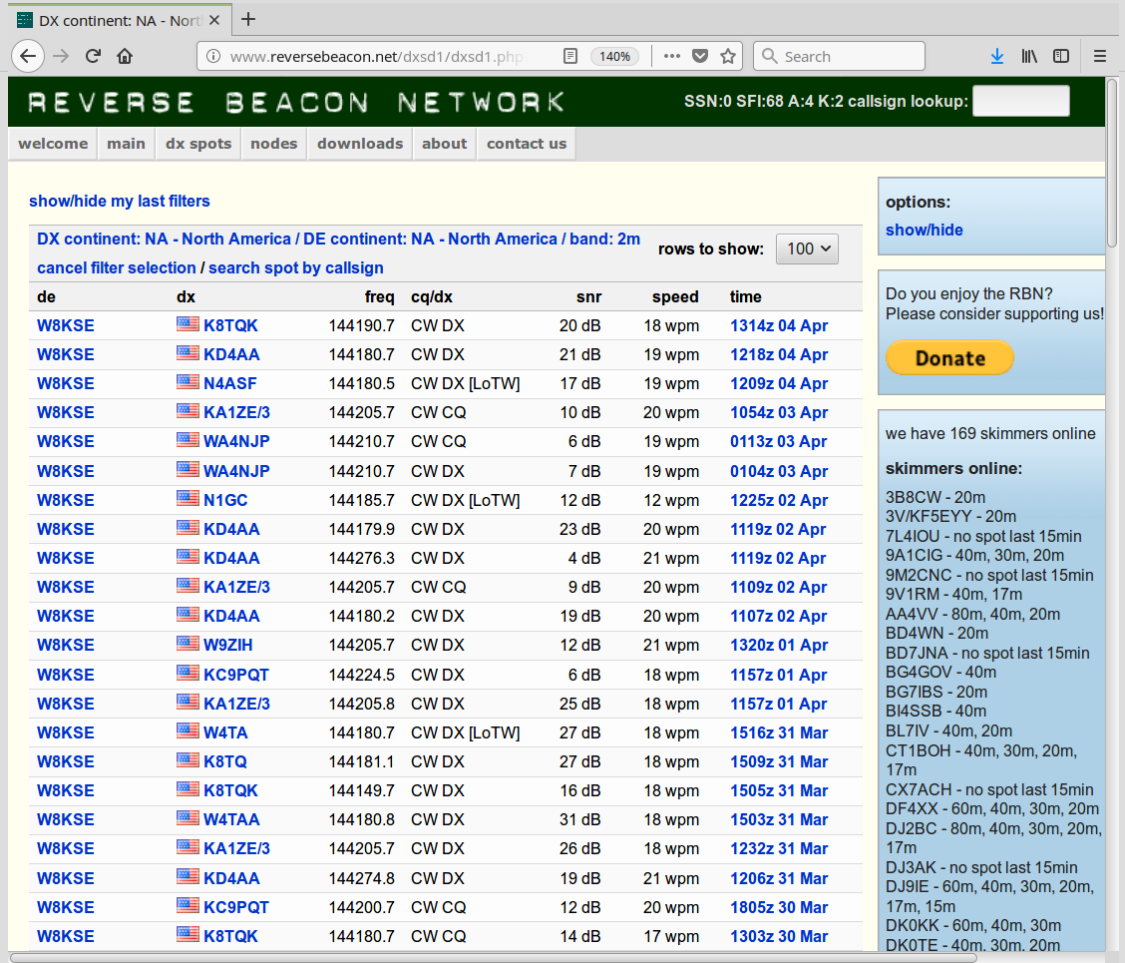
- Low-cost preamps like “LNA4ALL” provide <1 dB NF and >20 dB gain for <$30
- Can be powered from coax.
- RTL-SDR.com dongle provides power on coax.
- Put preamp at antenna and use cheap CATV coax (RG-6) for feedline.



Putting It All Together

- i5 class PC with Windows 7 or 10 (~$150)
- CW Skimmer Server software ($75 registration)
- Raspberry Pi 3 and power supply(~$45)
- Linux OS and rtl_hpsdr software (open source)
  - Available as plug-and-play SD card image from N8UR
- 1 dongle per 192 kHz band segment ($20 each)
- USB hub, USB cables, ethernet cable (~$50)
- Antennas, pre-amps, feedline (???)
- Internet connection (needs very little bandwidth)

RBN Spot Page



Building a Network

- W8KSE (EN80ee) is up, but one site doesn't tell us much
- What if we had V+RBN nodes every 50-150 miles?
  - We'd see propagation across a wide area
  - We'd have a better idea of activity
  - We'd have local station testing tools (send CQ, observe SNR)

So, why don't ***you*** build a node, too?

Thanks!

For more information:
http://www.febo.com/pages/V+RBN