
# AllStar Link

Charlie Gale - KARC March 2023

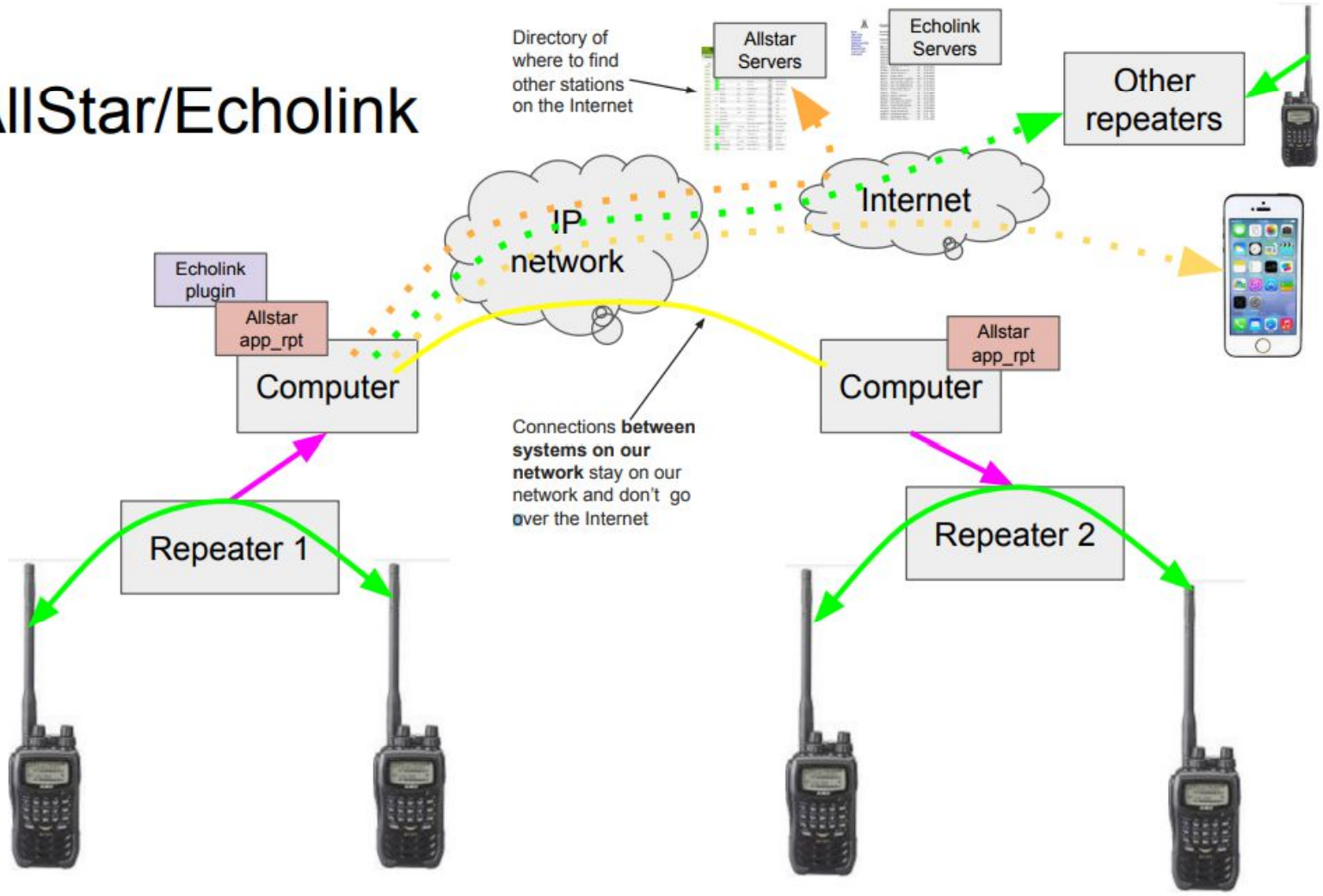
# Types of Ham Radio Linking for Voice

- Analog over analog radio
  - Analog (usually FM) end-to-end
  - Limited distance, can lose quality with each hop
  - Examples: FM radio links, split-site repeaters
- Fully Digital
  - Digitized audio end-to-end - from your microphone to their speaker
  - Requires new radios & repeaters, all require some proprietary, closed components
  - Examples: DMR, DSTAR, System Fusion
- Analog over IP
  - Analog RF to repeater - digital IP between repeaters, supports simplex nodes, computers, cell phones
  - Overlays nicely on top of existing radios and repeaters
  - Some systems can add Internet connections from PCs, smartphones
  - Examples: IRLP, Echolink, **AllStar Link**

# What is AllStar Link?

- AllStar Link is a method of accessing or interconnecting repeaters using internet links
- AllStar Link is very feature rich and open sourced
- AllStar Link has advantages (flexibility and quality) when compared to other linking technologies
- AllStar Link is fully compatible with other existing analogue over IP solutions (won't interfere with Echolink and IRLP, can actually integrate them if desired)
- AllStar Link will run on any Linux computer including Raspberry Pi using a downloaded image or you can build the image yourself.
- AllStar Link has 27,700 users and 26,768 nodes as of this writing

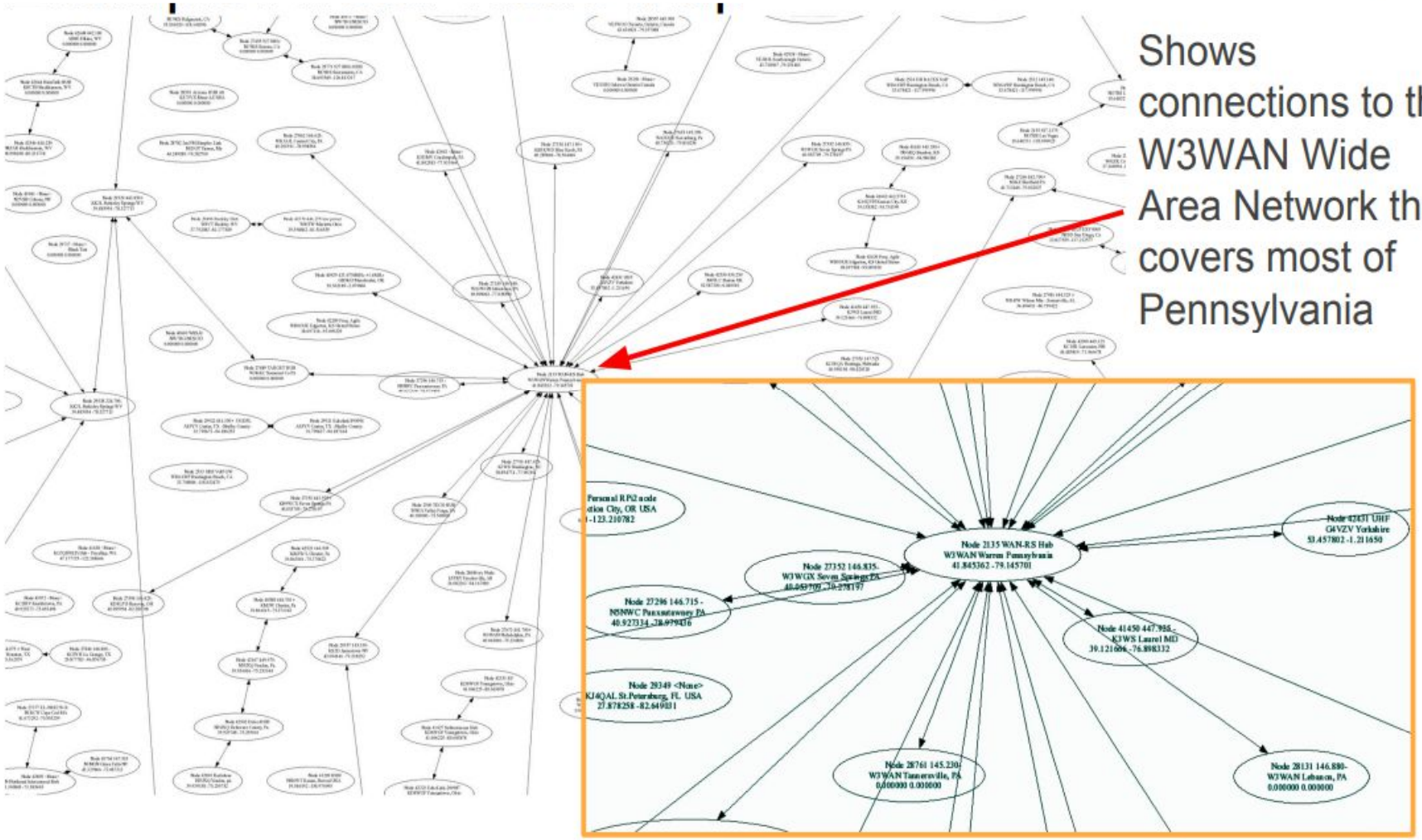
# How AllStar/Echolink works



# Ham Analog Over IP Voice Linking Systems

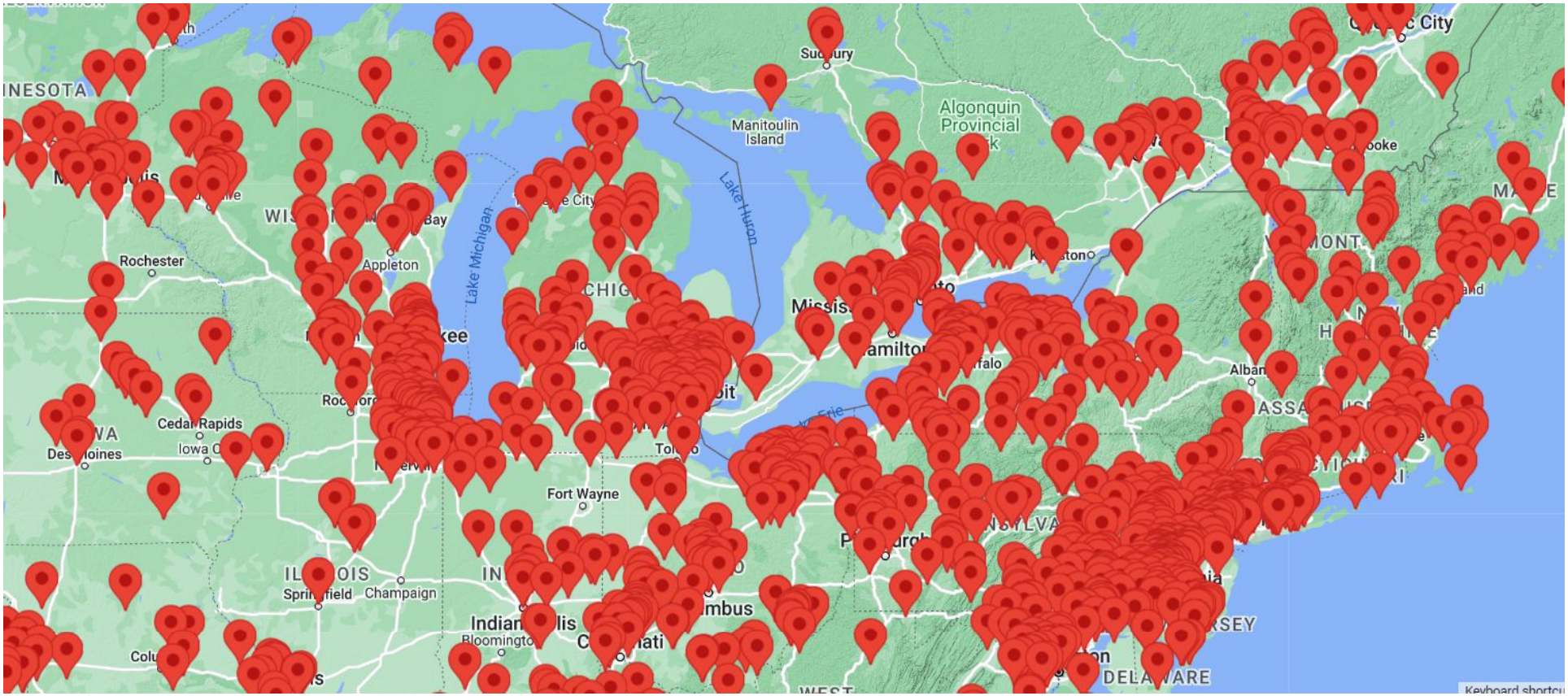
- IRLP
  - Radio to Radio only (by design) - no smartphone/PC connectivity
  - Proprietary software
  - Run by one guy
- Echolink (http://echolink.org)
  - Radio/Smartphone/PC to Radio/Smartphone/PC
  - Good (but not great) voice quality
  - Easiest Smartphone option
  - Has some network limitations
  - Used to require Windows PC at repeater
  - Now can do with Raspberry PI and Linux (with some limitations)
- AllStar (http://allstarlink.org)
  - Radio/Smartphone/PC to Radio/Smartphone/PC
  - Smart Phone and PC support
  - Great, crystal clear voice quality (as good as the radio/repeater is)
  - Best repeater-to-repeater options
  - Very flexible network options
  - Can function without the Internet (using private networks)

# Example AllStar Link Node Map

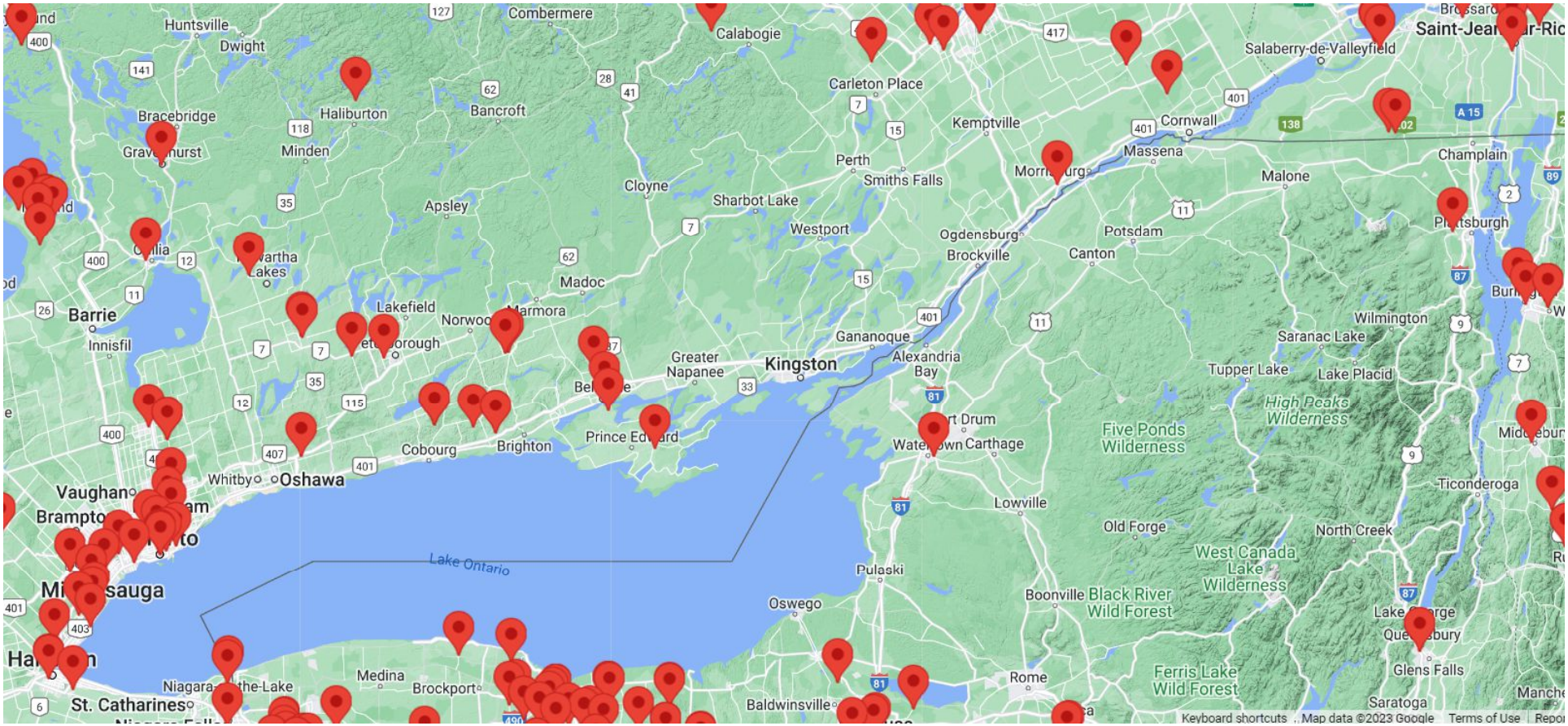



From Http://AllStarLink.org

# Map of Nodes around us



# Nodes Closer to Home



# Allstar Software - some details

- Based on Asterisk
  - a free, open source Linux based PBX phone system
  - Asterisk used in business to handle many phone extensions, voicemail, auto-attendant, etc
  - Adapted a little to connect radio systems
  - Carries voice, and PTT, COS, other radio-specific information
  - App runs on Linux called “app_rpt” that handles Allstar connections between repeaters, simplex nodes, computers
  - Can run on any Linux computer (PC, laptop, Raspberry PI, etc)
  - Ready made Linux installations can be downloaded
  - Install, configure, tweak, and go
  - Since it’s a completely open standard - hams are experimenting
    - Bridges to DMR digital talkgroups, DSTAR reflectors, Echolink
    - Lots of small simplex nodes at people’s houses -You can make one yourself
    - Some huge province/state wide countrywide and worldwide networks
    - Some small scale networks with 2-3 repeaters linked
    - Some systems are interconnected full time, some on demand

# Allstar Software - DTMF commands

- *1 Disconnect from link.
- *2 Connect to node in Rx only mode.
- *3 Connect to node in Transceive Mode
- *4 Command Mode for controlling node
- *5 User-defined macros
- *6 User defined functions, such as autopatch
- *7 Connection Status / Other Functions
- *8 User defined functions
- *9 User defined functions
- *0 User defined functions
- *A User defined functions
- *B User defined functions
- *C User defined functions
- *D User defined functions

Example: *112345 = disconnect from node 12345

# Common DTMF commands

- *80 Force System ID
- *81 Say System Time
- *980 Say app_rpt software version
- *75 Link Connect (Local Monitor Only)
- *72 Last active node (system-wide)
- *73 System-wide connection status
- *71 Disconnect all links (macro)
- *74 Reconnect all links (macro)

# Example Management Screen


Nodes Display Groups HAMVOIP

27225 => WA3DSP Philadelphia Hub Richboro, PA 18954 Permanent

Connect | Disconnect | Monitor | Local Monitor | DTMF | Look Up | Rpt Stats | Bubble Chart | Control | Favorites

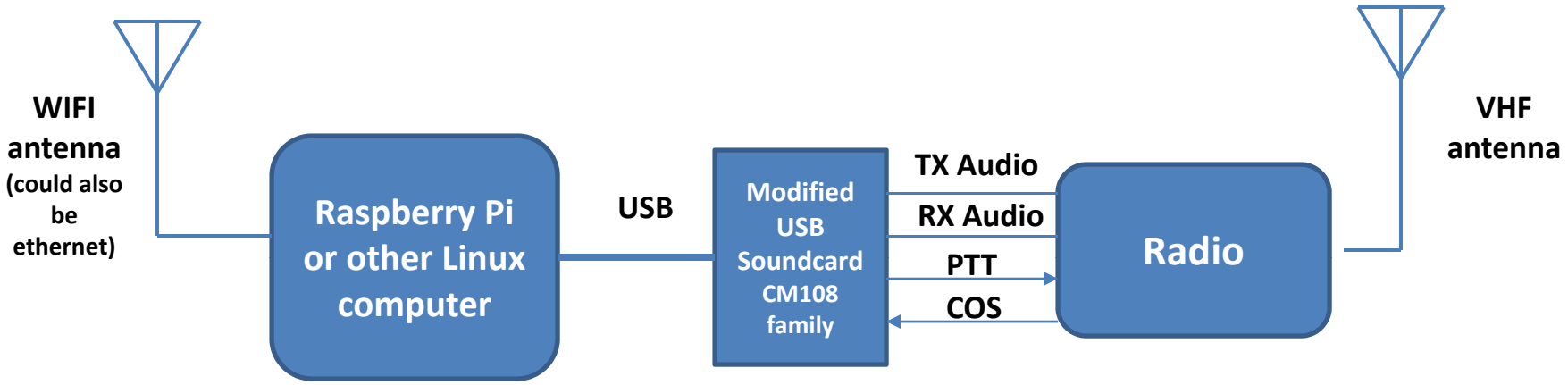
Configuration Editor | AST Module/Rpt Reload | AST START | AST STOP | AST FAST-RESTART | SERVER REBOOT
Docs | How To's | AllStar Wiki | CPU Status | AllStar Status | Node Info | Active Nodes | All Nodes
Pi GPIO | Linux Msgs Log | AST Log | Connection Log | IRLP Log | Web Access Log | Web Error Log | Allow/Restrict

[ 27225-HUB ] [ WAN IP: 67.165.29.63 ] [ LAN IP: 192.168.0.151 ] [ AstP: 4569 ] [ MgrP: 5038 ] [ SShP: 15400 ]
[ Friday, March 2, 2018 EST 21:42:33 up 122 days, 19:35, 1 user, load average: 0.63, 0.64, 0.64 ]

Display Configuration

| *Node 27225 => WA3DSP Philadelphia Hub Richboro, PA 18954* Bubble Chart IsNodes | | | | | | |
|---|---|---|---|---|---|---|
| **Node** | **Node Information** | **Received** | **Link** | **Direction** | **Connected** | **Mode** |
| 47337 | NK8O lightweight hub Louisburg KS | 001:12:32 | ESTABLISHED | IN | 01:44:34 | Transceive |
| 41833 | KH2FI 145.650 Simplex Imperial Beach, CA | 001:13:48 | ESTABLISHED | IN | 04:15:25 | Transceive |
| 44006 | W2BTF Ruskin, FL | 001:44:58 | ESTABLISHED | IN | 01:47:24 | Transceive |
| 29014 | WA3DSP PHL LOCAL HUB Richboro | 001:47:42 | ESTABLISHED | IN | 04:15:37 | Transceive |
| 43542 | KD3WT 446.875 - Overbrook Pa. | 002:54:58 | ESTABLISHED | IN | 04:15:32 | Transceive |
| 46543 | WA3ADI UV-82 - AllStar Node Havertown, PA | 004:12:05 | ESTABLISHED | IN | 04:15:36 | Transceive |
| 40561 | WA3DSP ECHOLINK 147090 Richboro, PA 18954 | 004:15:21 | ESTABLISHED | OUT | 04:15:38 | Transceive |
| 7 of 20 | | | | | | |

# What do we need to get going?




## Also need:

Hosting location
Internet access
Account
Node number
Call sign

**TX Audio – sound from the internet connection**

**RX Audio – sound to the internet connection**

**PTT – transmit enable signal (Push to talk)**

**COS – Carrier on signal (could be from squelch)**