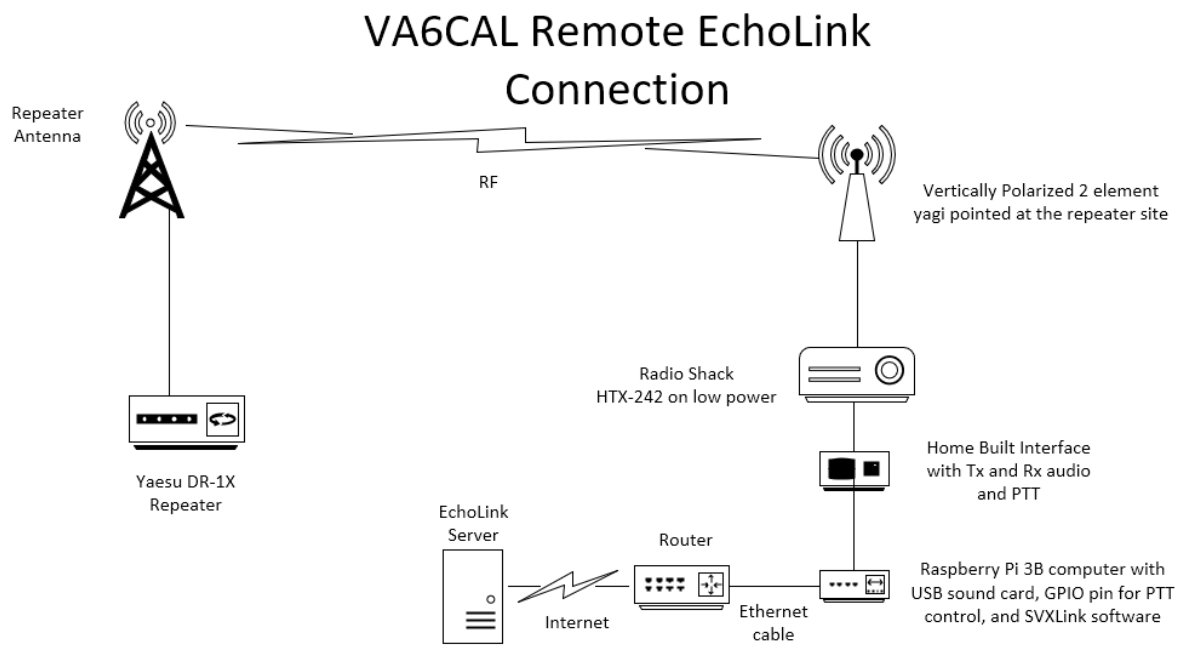
EchoLink Presentation

EchoLink (http://www.echolink.org/) is one of several ways available to the amateur radio community of connecting analog repeaters and users together. Other ways include IRLP (http://www.irlp.net/) and AllStarLink (https://www.allstarlink.org/). Likewise, digital repeaters and users have DMR, D-star, and Fusion networks to choose from. All of these linking systems exist to make it possible for hams to talk to each other without the need for expensive HF radios, high towers, and big antennas. All of them rely on Voice Over Internet Protocol (VoIP) in one way or another.

EchoLink makes it possible to talk to other hams all over the world with just an inexpensive handheld radio, as long as a repeater or a radio that is attached to the EchoLink network is within range. You can also connect to EchoLink from a computer (Windows, Mac, Linux), tablet, or smartphone (Android or Apple), without the need for a radio even.

EchoLink Node Types

User nodes: these are the computer, tablet, and smartphone connections used by individuals without a radio connection.
Link nodes: these are nodes that interface a radio to EchoLink.
Repeater nodes: these are nodes that interface a repeater to EchoLink, either directly (repeater is connected to the internet at the site) or remotely (repeater is connected to the internet through a remote connection to the internet).
Conference Servers (bridges): these servers are designed to support large, continuous conferences with more than 99 other nodes connected to each other.



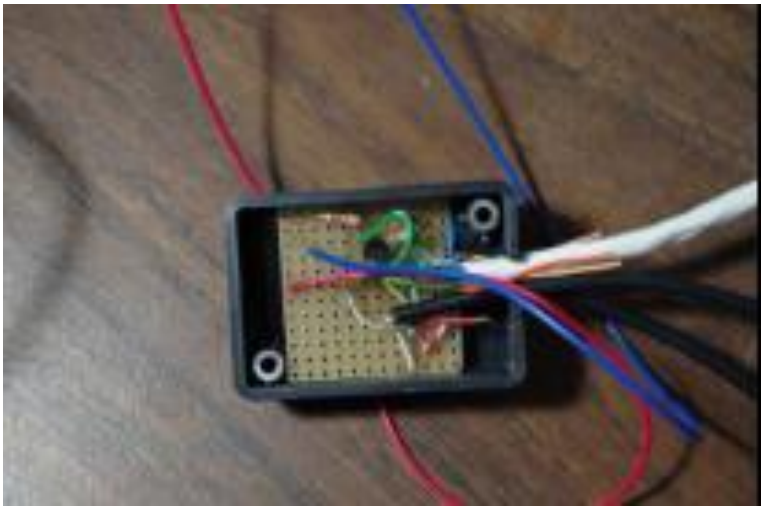
How Are Connections Made?

The EchoLink addressing servers keep track of all the active nodes and their IP addresses. There is also a validation server that checks to ensure that any node that requests access has a valid call sign. When a node, computer, repeater, or link, requests a connection to another node, the address server will indicate whether the requested node is online and what IP address to use to connect to it. At that point, the nodes connect directly to each other and the addressing server is free to answer the next request. If you are familiar with Dynamic Domain Name Servers, then the EchoLink addressing servers perform a similar function.

SVXLink Software on a Raspberry Pi

SVXLink Server is a general purpose voice services system. It started out as an EchoLink application for Linux in 2003 and has evolved from there. See: https://www.svxlink.org/
SVXLink is "command line" based, so it doesn't require a graphical user interface. I ended up installing it on an RPi using the Raspbian OS with GUI so I could use the graphical interface to aid in testing and troubleshooting. The FLDIGI program was helpful in testing the USB audio interface and the PTT control.

Here is the little interface box I built to connect the radio to the RPi:



The blue and red wires connect to the GPIO pins on the RPi that control PTT. The black cables go to the Mic and Speaker jacks on the USB sound card. The white cable connect to the Speaker and Mic jacks of the 2m radio. I didn't include any isolation for the audio lines and haven't had any problems, but the box has room, if I decide to add it later on. There is also room to add a transistor and resistors for a COR line to GPIO pin, if desired. I am using VOX instead.

The complete EchoLink node. The unplugged jack is for the fan in the RPi. It is a little noisy, so I often leave it unplugged.

Because SVXLink is multi-purpose, there are many, many settings to work through, primarily in the svxlink.conf file! It took me a few months of reading and experimenting before I came up with a combination of settings that worked the way I wanted. See https://www.svxlink.org/doc/man/man5/svxlink.conf.5.html for the documentation. If anyone wants to try making their own node, I can email you a copy of my working svxlink.conf file. I also kept a "notes" document with tips and "how-to" steps that I can refer back to.

SVXLink and Older Radios

SVXLink can create its own subaudible tones, which means it will work with older radios that cannot create their own tones. A higher quality sound card might be needed for the lower tones, but the $15 one that I use works for the 110.9 Hz tone required to get into VA6CAL.