

Implementing IRLP and Echolink using a Raspberry Pi

Clay Jackson

N7QNM



Introductions

- Clay Jackson – N7QNM
 - Licensed 1991
 - Amateur Extra
 - Computer/Data Background
 - Ham radio interests
 - Digital
 - EmComm
 - Search and Rescue



- What the heck is a Raspberry Pi?
- What are IRLP and EchoLink?
- Connecting the dots
- Building STN3230
- Q & A



What the heck is a Raspberry Pi?

- “Good Eats”
- A small, low power single board computer
 - Quad Core ARM CPU
 - 1 Gb RAM
 - Powered by 5V USB supply
 - Built-in HDMI Video
 - General Purpose I/O
 - Linux



Pi Now Does Windows!





IRLP and EchoLink

- Radio over IP
- Two different approaches
- Talk 'round the world on your HT
- Integration - EchoIRLP



Radio Over IP

- VOIP
- PC/Soundcard
- “Nodes”
- Connect one node or many
- Conferences



IRLP

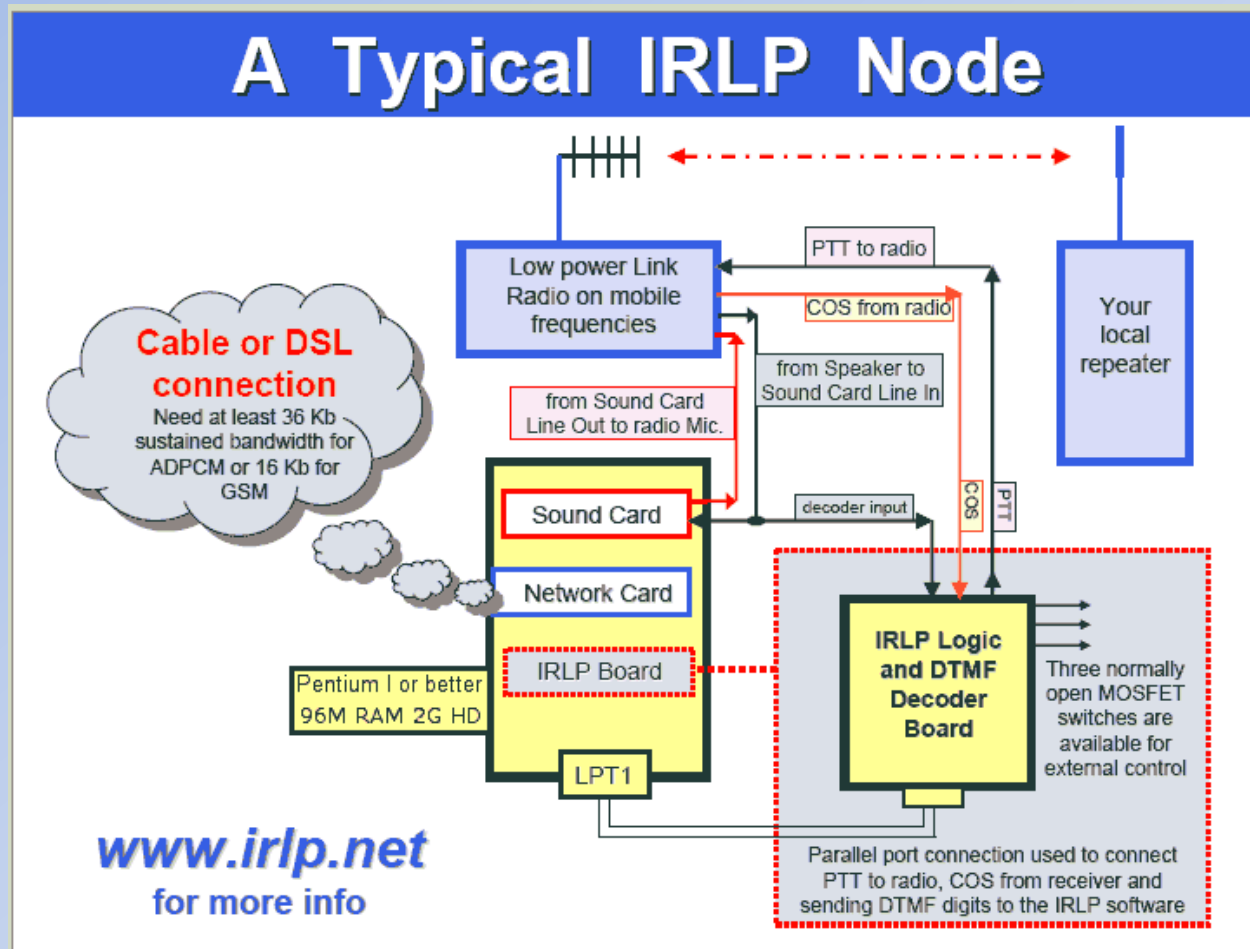


How IRLP Works

- Linux Based
- Hardware for VOX/Radio Control
- Full DTMF
- Soundcard for A/D



Typical IRLP Node



What's it Cost?

Complete PiRLP kit, including:

- Pi 2 Model B, with AC power supply
 - IRLP Board Modified for Pi
 - 25 Pin GPIO cable wired for Pi
 - USB sound card, modified/wired to IRLP board
 - 16GB Micro SD Card loaded and configured
- \$280

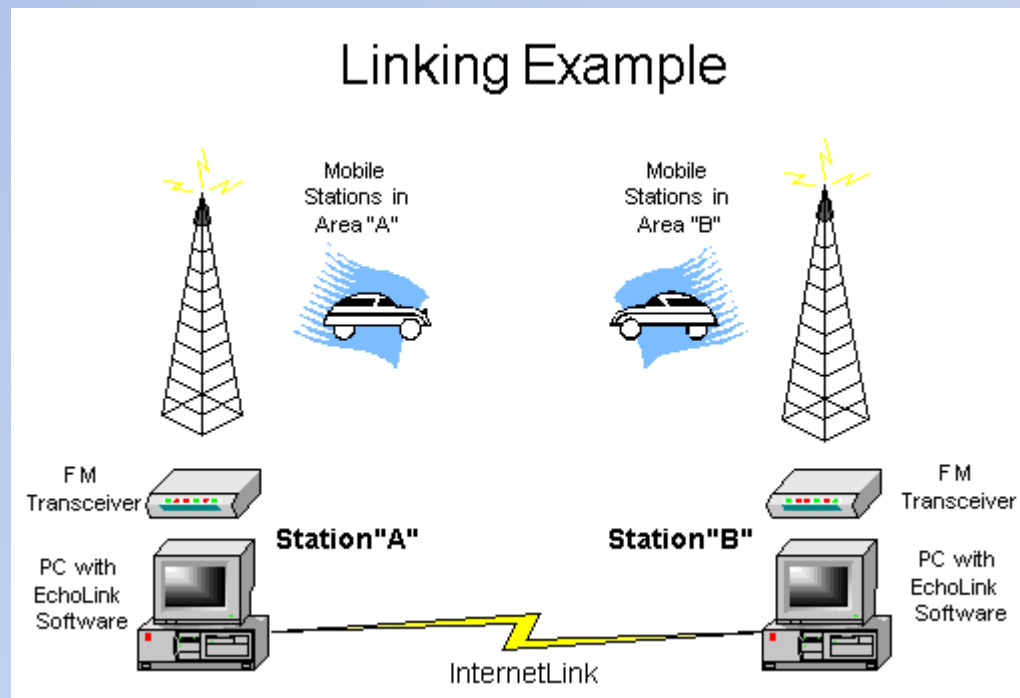


But Wait, There's More!

- EchoLink Integration
 - EchoIRLP
- Repeater Controller
- Open Source Software



EchoLink



How EchoLink Works

- Windows-based
 - Mac and Smartphones also
- Requires only a sound card
- Radio over IP only
 - No repeater control or DTMF functions
- \$0 cost (above device)

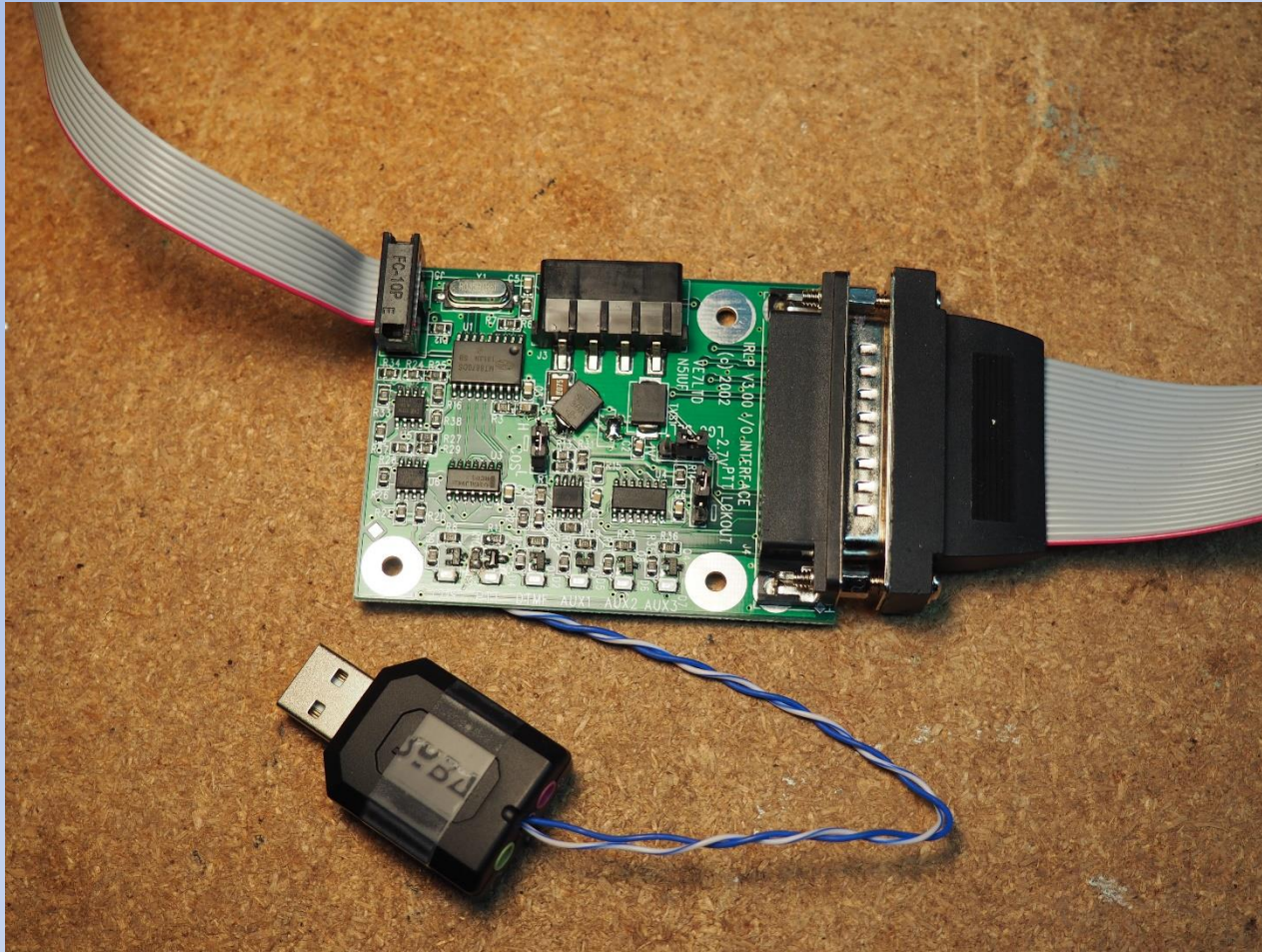


Putting it all in a Pi

- Modified IRLP board
- Use GPIO (General Purpose I/O) header
- USB Sound Card
- Software
 - Base
 - EchoIRLP
 - Register EchoLink separately

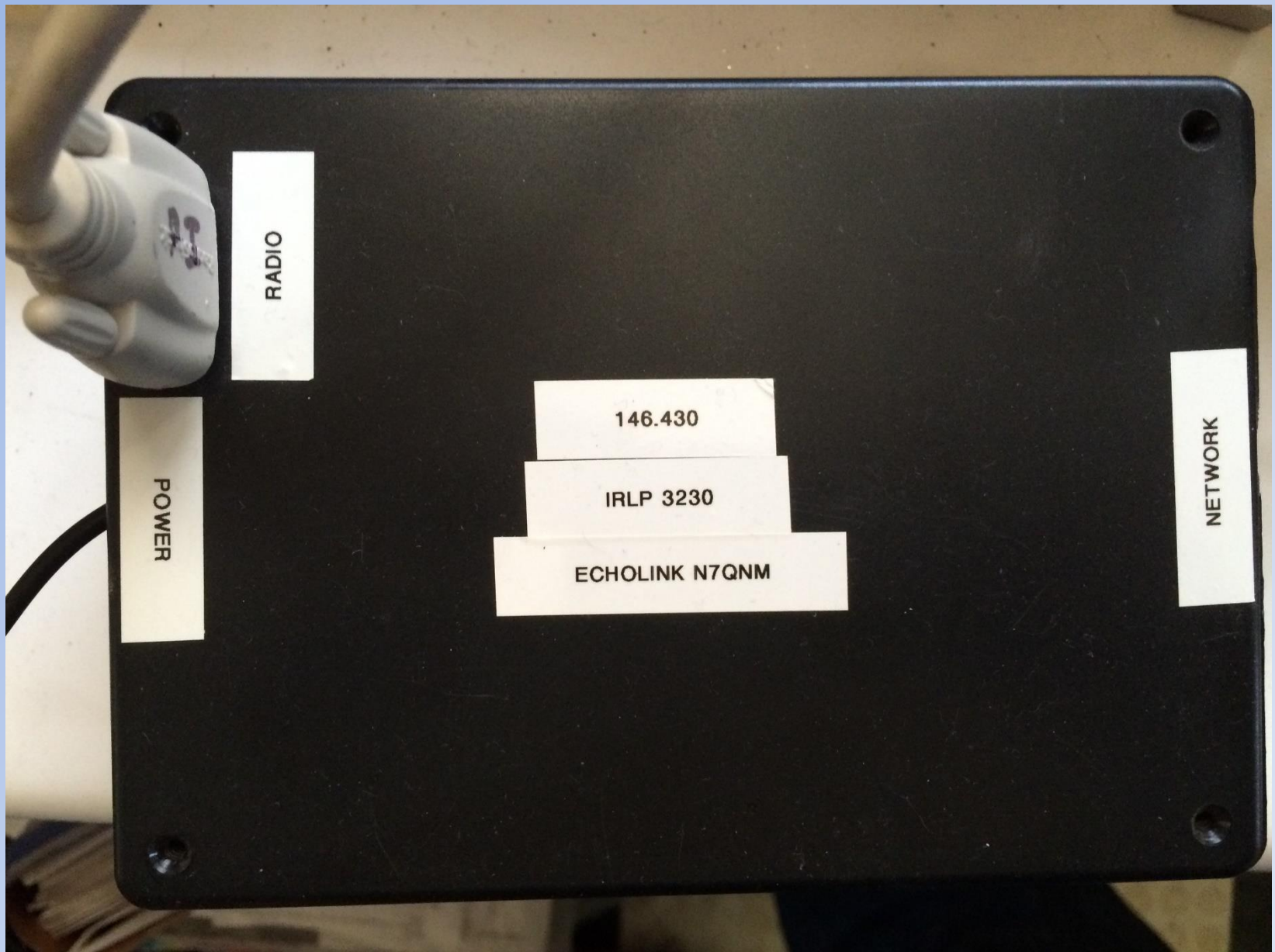


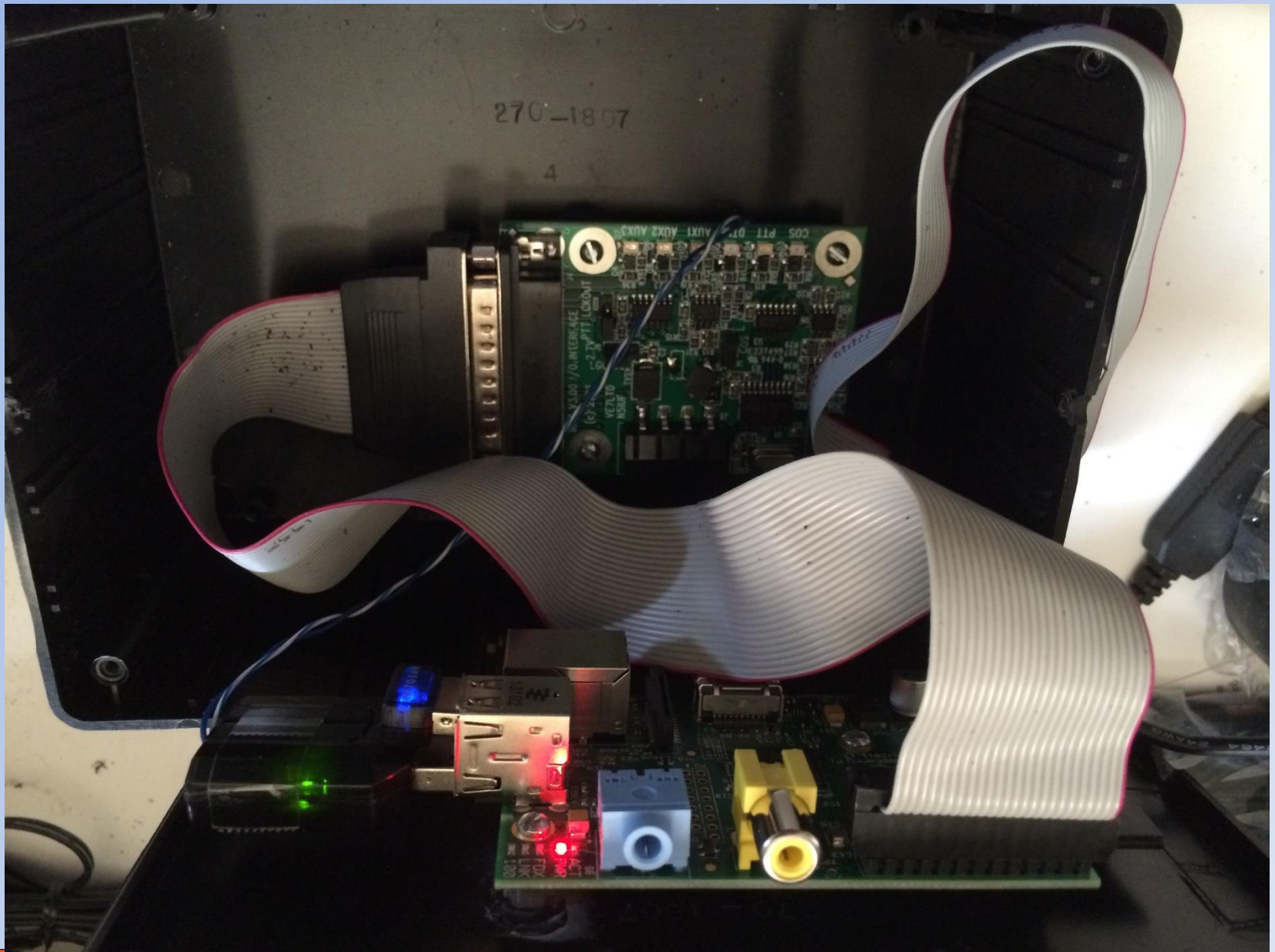
Pi-IRLP



Connections

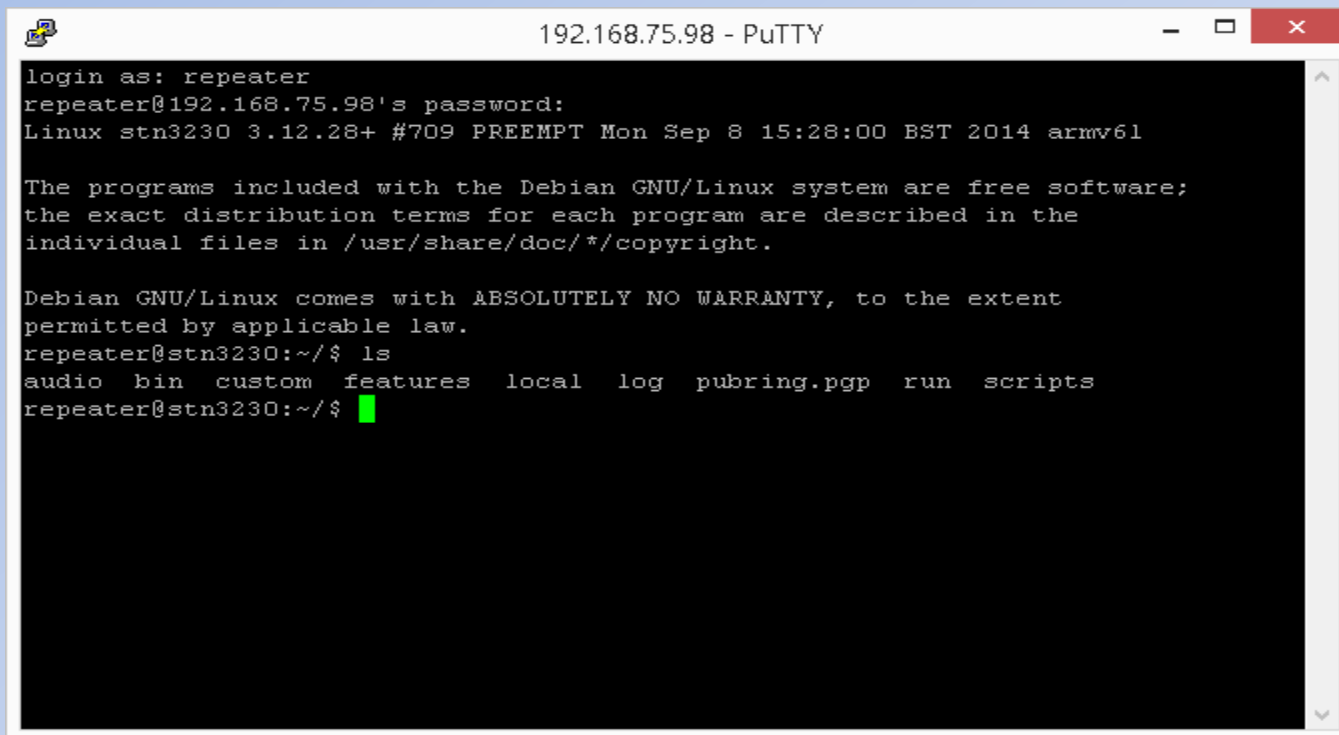






Software

- Linux



A screenshot of a PuTTY terminal window titled "192.168.75.98 - PuTTY". The terminal shows a login session for a user named "repeater". The prompt is "repeater@192.168.75.98's password:". After the password is entered, the system displays the Linux version: "Linux stn3230 3.12.28+ #709 PREEMPT Mon Sep 8 15:28:00 BST 2014 armv6l". It then shows the Debian GNU/Linux system's free software disclaimer: "The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright. Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law." The user then runs the command "ls" in the directory "~/", which lists the following files: "audio bin custom features local log pubring.pgp run scripts". The prompt returns to "repeater@stn3230:~/ \$" with a green cursor.

```
login as: repeater
repeater@192.168.75.98's password:
Linux stn3230 3.12.28+ #709 PREEMPT Mon Sep 8 15:28:00 BST 2014 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
repeater@stn3230:~/ $ ls
audio bin custom features local log pubring.pgp run scripts
repeater@stn3230:~/ $
```



http://192.168.75.98/control/ x +

192.168.75.98/control/ Search

Admin and Control Page

stn3230 - (n7qnm) Refresh

Node Status - **ENABLED**
Current Connection - **IDLE**

Disable Enable End Call

Desktop Call:
192.168.75.119

☐ GSM ☒ ADPCM Submit

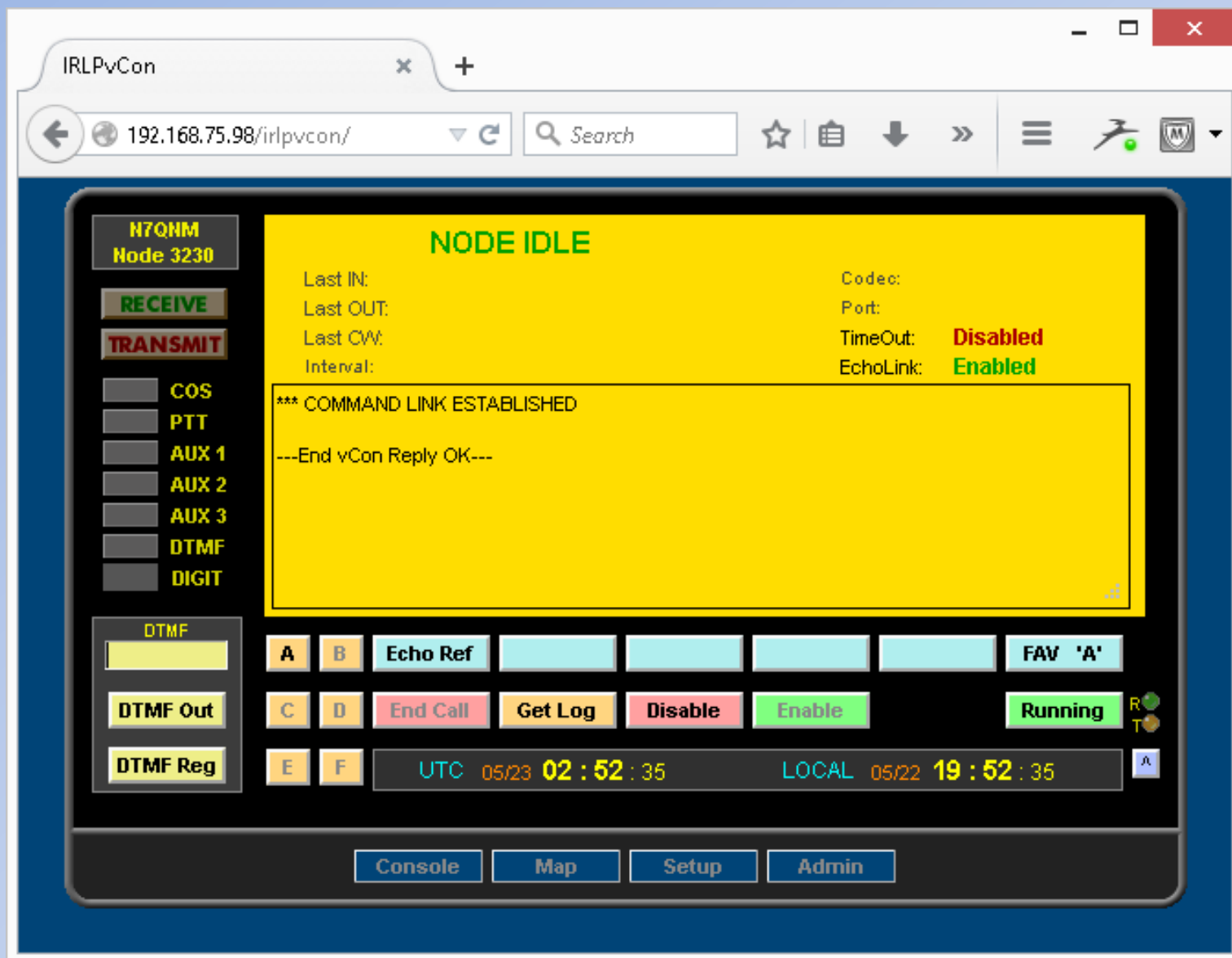
DTMF Script:
Submit

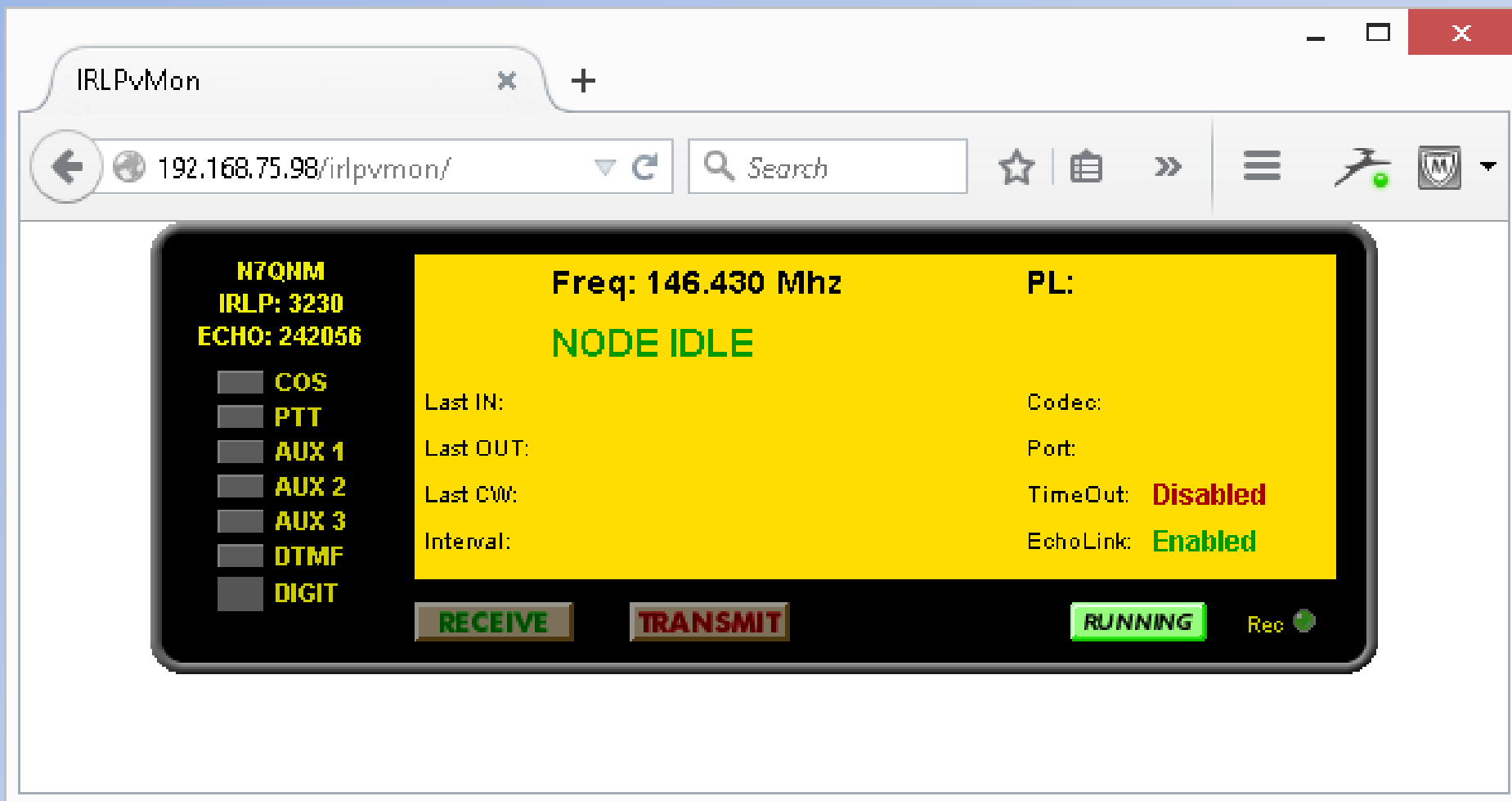
DTMF Regen:
Submit

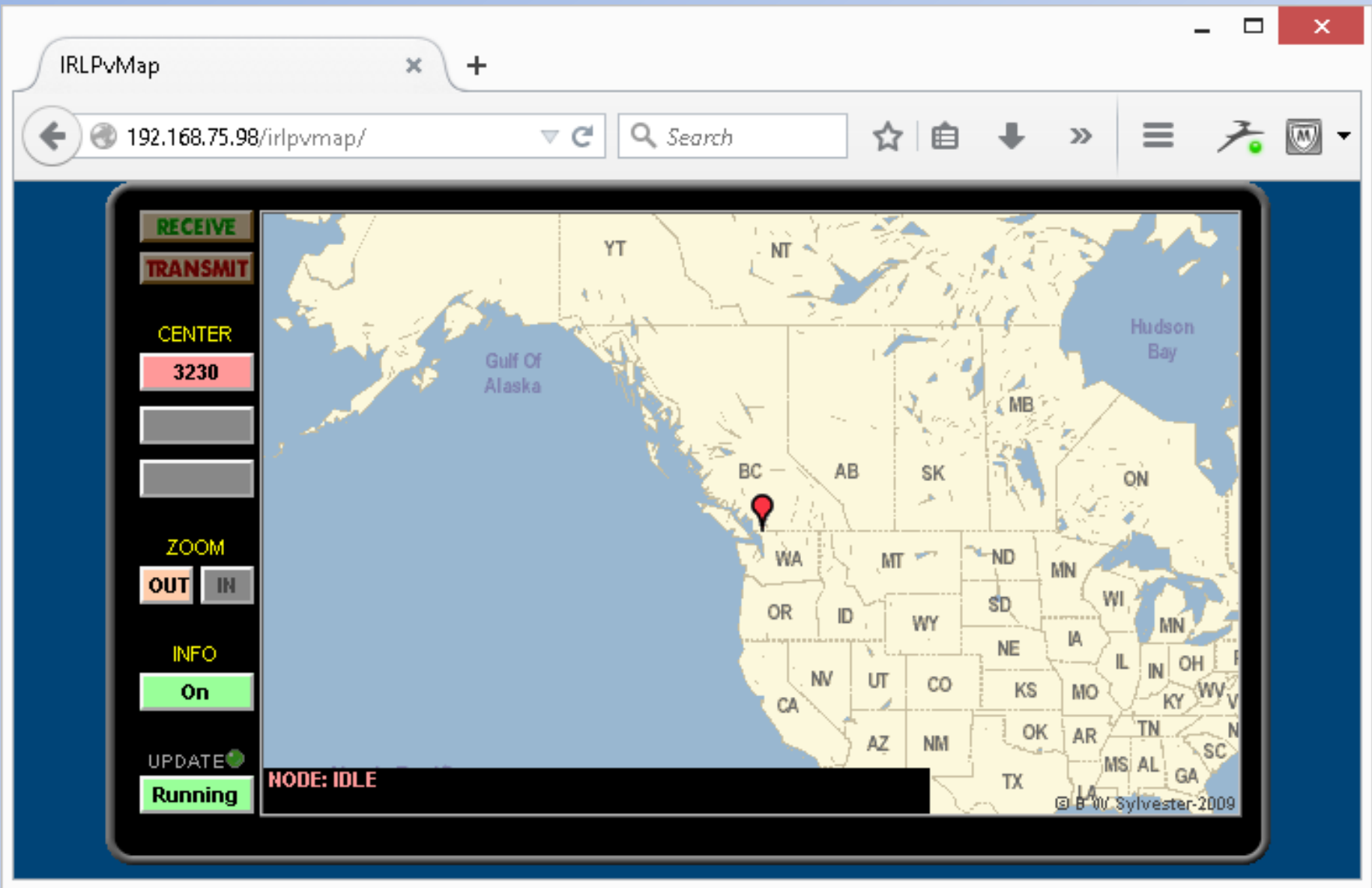
Display messages file:
20 lines Submit

Environment File Edit File









Gotchas

- 60 cycle hum in Pi power supply
 - Used 12VDC to USB Converter from Amazon
- Backup your SD Card
 - Make 2 copies!
- Wireless Networking
 - Configuration is arcane
 - Small dongle antenna



Demo

- K7IRP Repeater in SeaSide
- Connect to N7QNM Node (3230)



Next Steps

- Connect to N7QNM-R 442.300 Repeater
- Use IRLP Board as repeater controller
 - Cross-Band



Resources

- www.raspberrypi.org
- www.irlp.net
- www.irlp.net/pi
- www.echolink.org



Q & A



Thx
de
N7QNM

