Implementing IRLP and Echolink using a Raspberry Pi

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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

A Typical IRLP Node

Cable or DSL connection
Need at least 36 Kb sustained bandwidth for ADPCM or 15 Kb for GSM

Low power Link Radio on mobile frequencies

from Sound Card Line Out to radio Mic

from Speaker to Sound Card Line In

PPM to radio

COS from radio

Your local repeater

Sound Card

Network Card

IRLP Board

IRLP Logic and DTMF Decoder Board

Three normally open MOSFET switches are available for external control

Parallel port connection used to connect PTT to radio, COS from receiver and sending DTMF digits to the IRLP software

www.irlp.net
for more info
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
Connections
Software

• Linux

```
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:~$ ```
NODE IDLE

Last IN: 
Last OUT: 
Last CW: 
Interval: 
Codec: 
Port: 
TimeOut: Disabled 
EchoLink: Enabled 

*** COMMAND LINK ESTABLISHED 

---End vCon Reply OK---

UTC 05/23 02:52:35  LOCAL 05/22 19:52:35
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
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