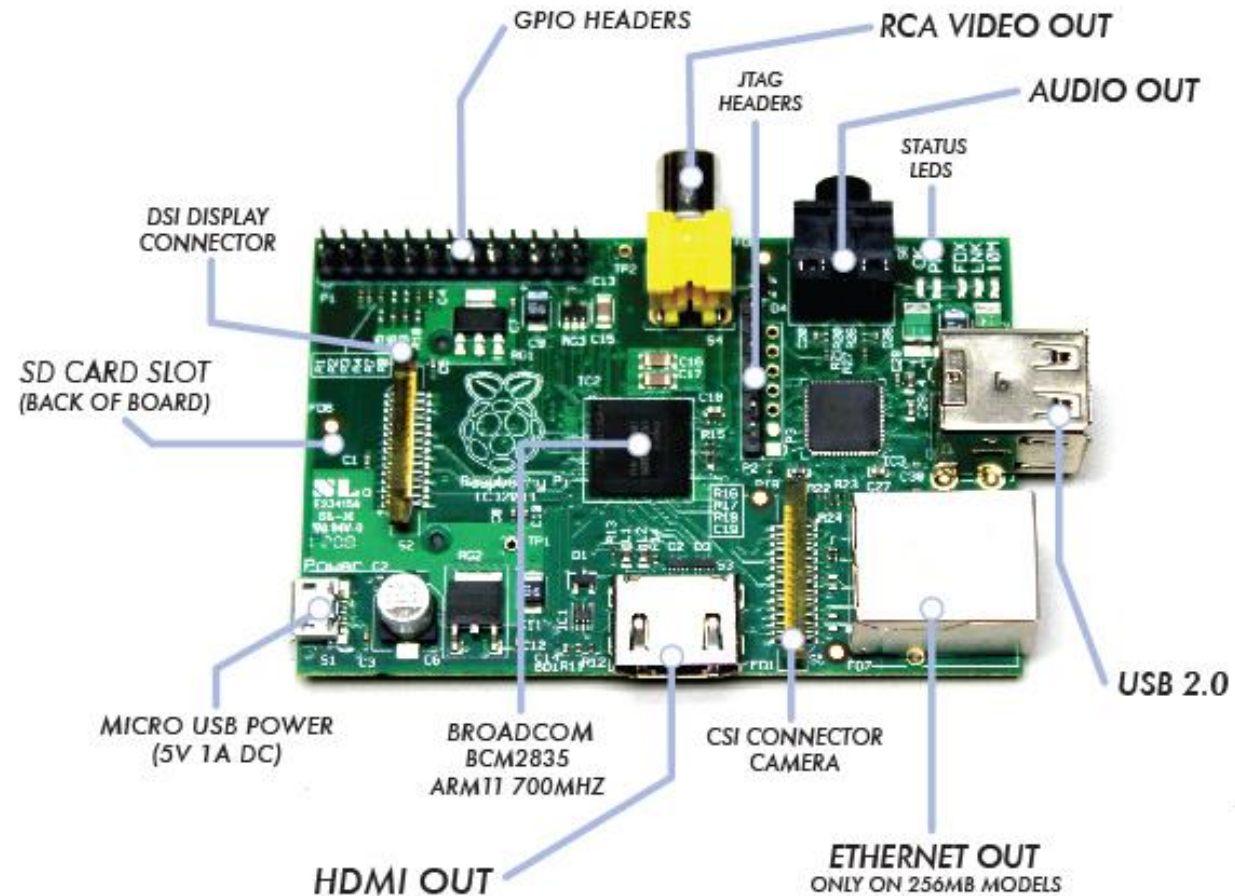


New design for remote radio system using Internet Protocols and PiRLP with Raspberry Pi Linux computer

Gary Crum, KK7DV and David Jenkins, W7JFH

Raspberry Pi computer running Linux

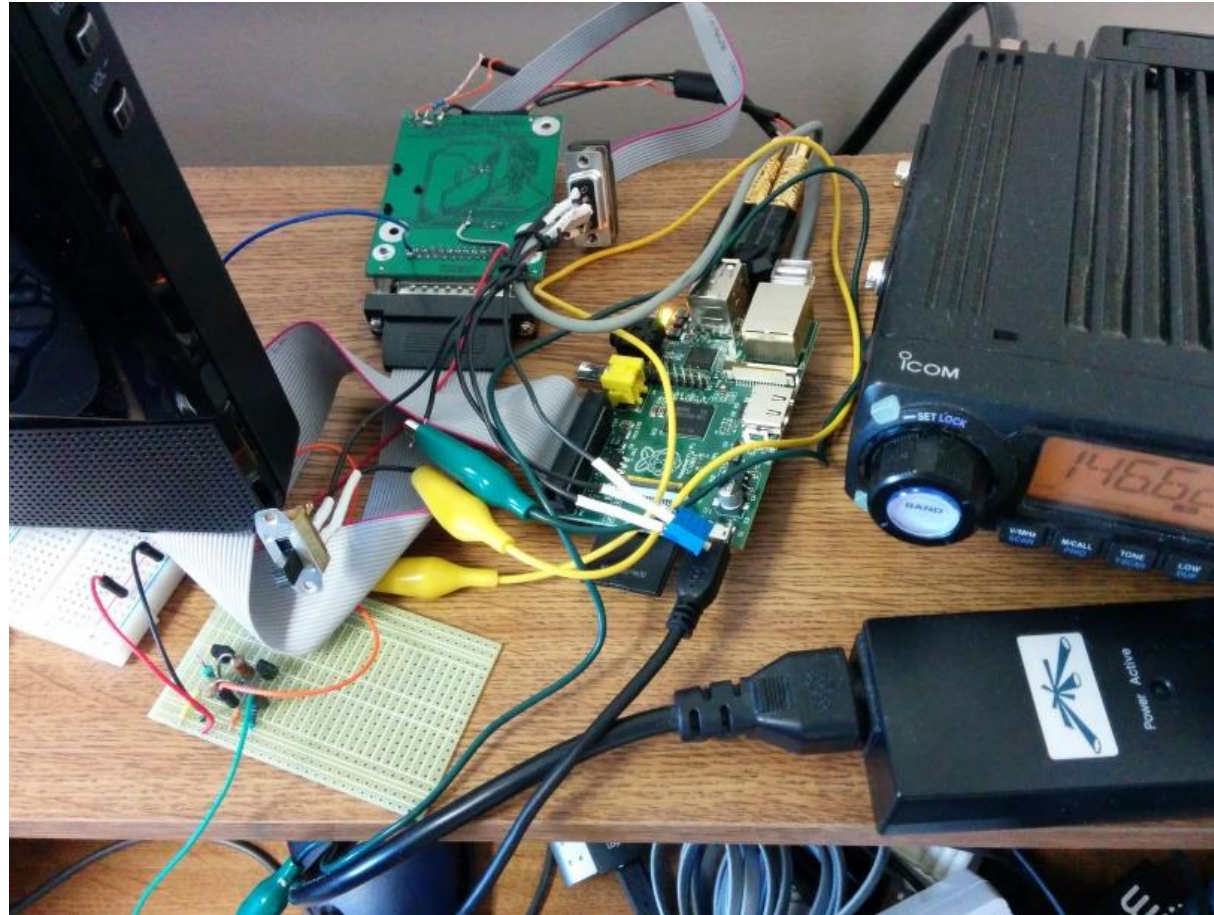


Web site: <http://www.raspberrypi.org/>

Remote control application



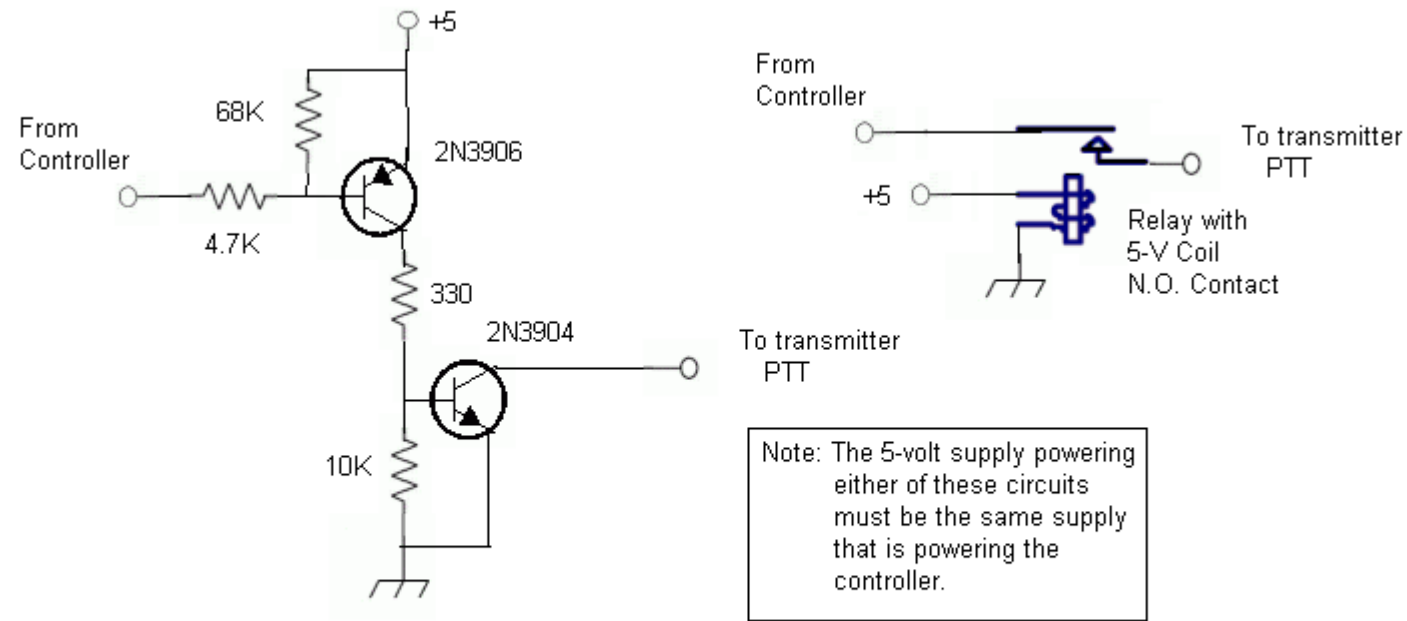
Operational remote radio control system



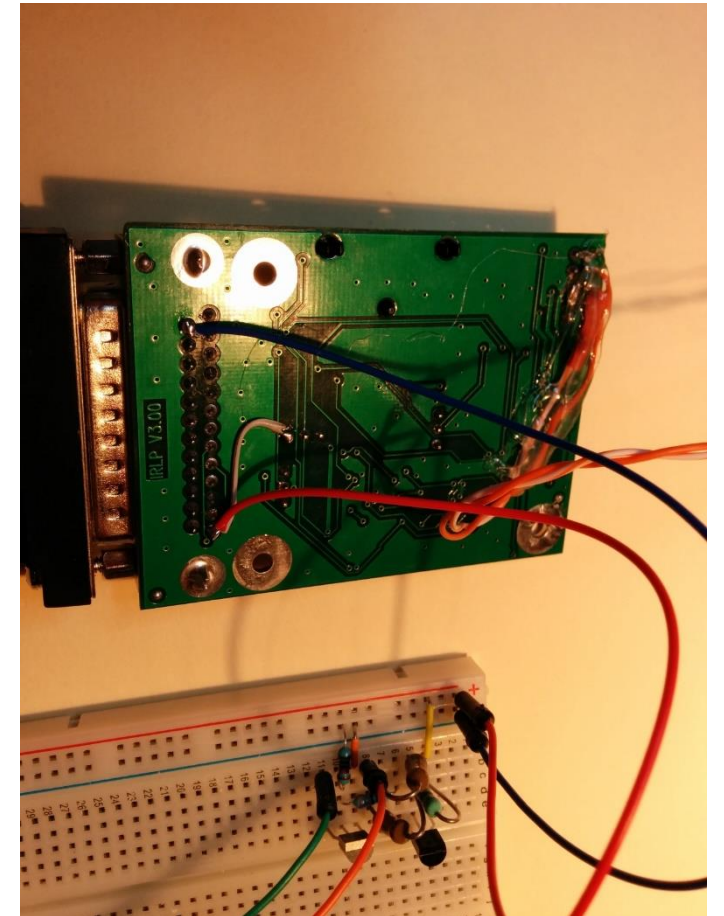
PiRLP web site: <http://www.irlp.net/pi/>



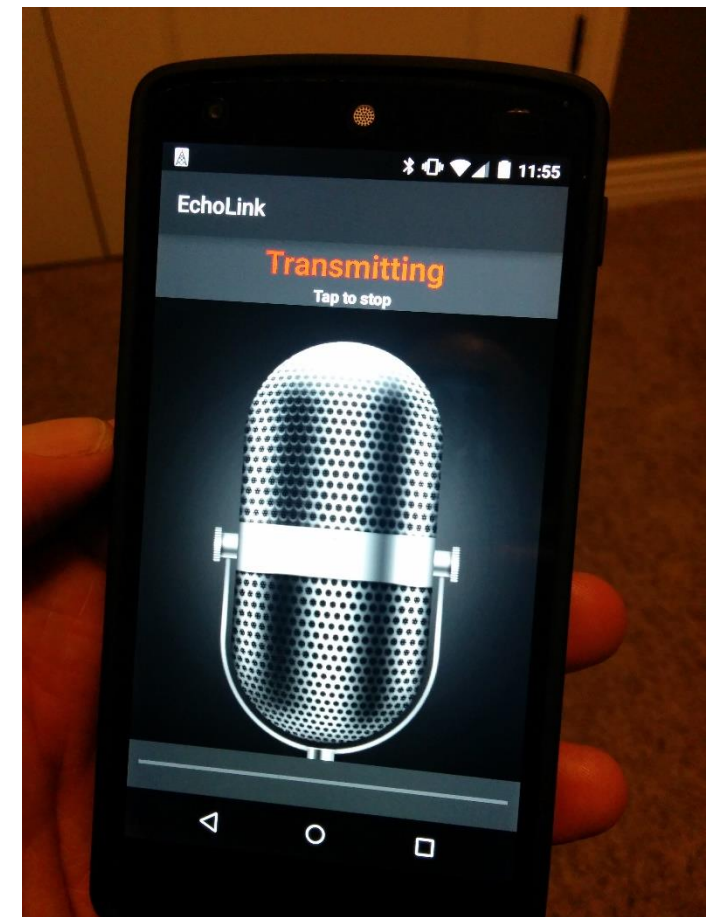
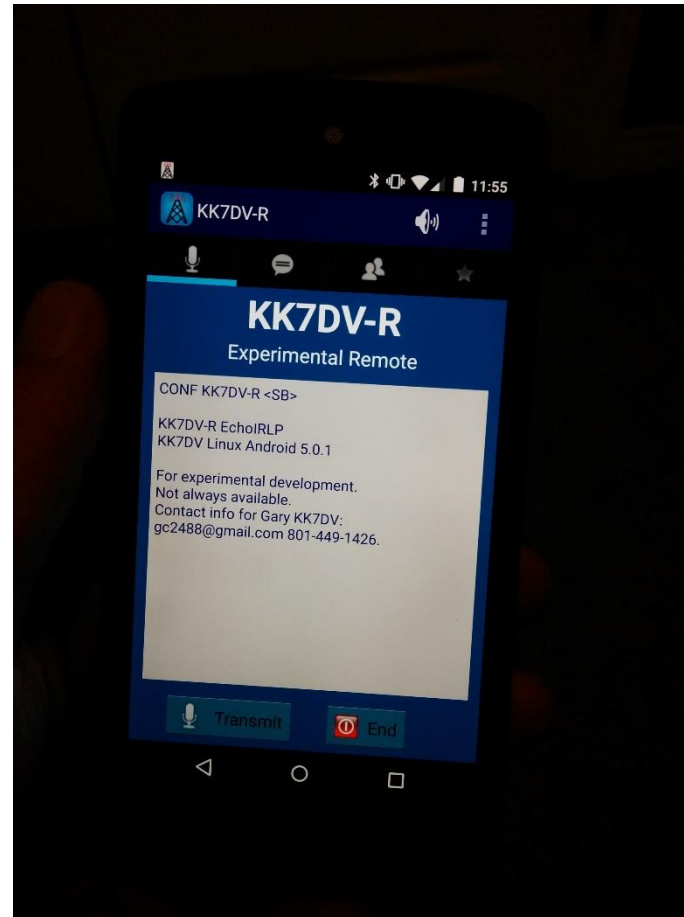
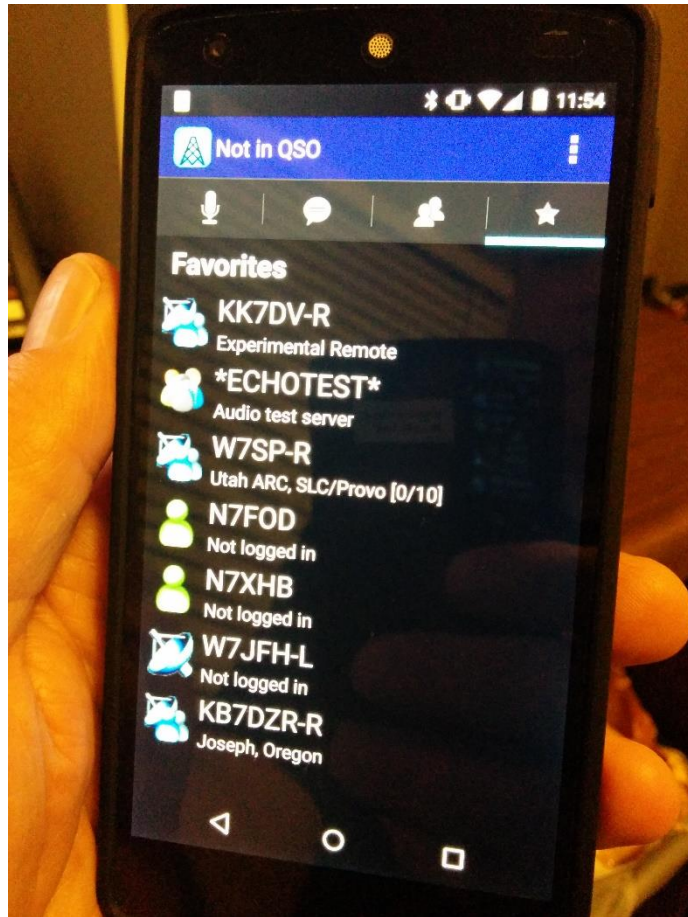
Custom PTT protection



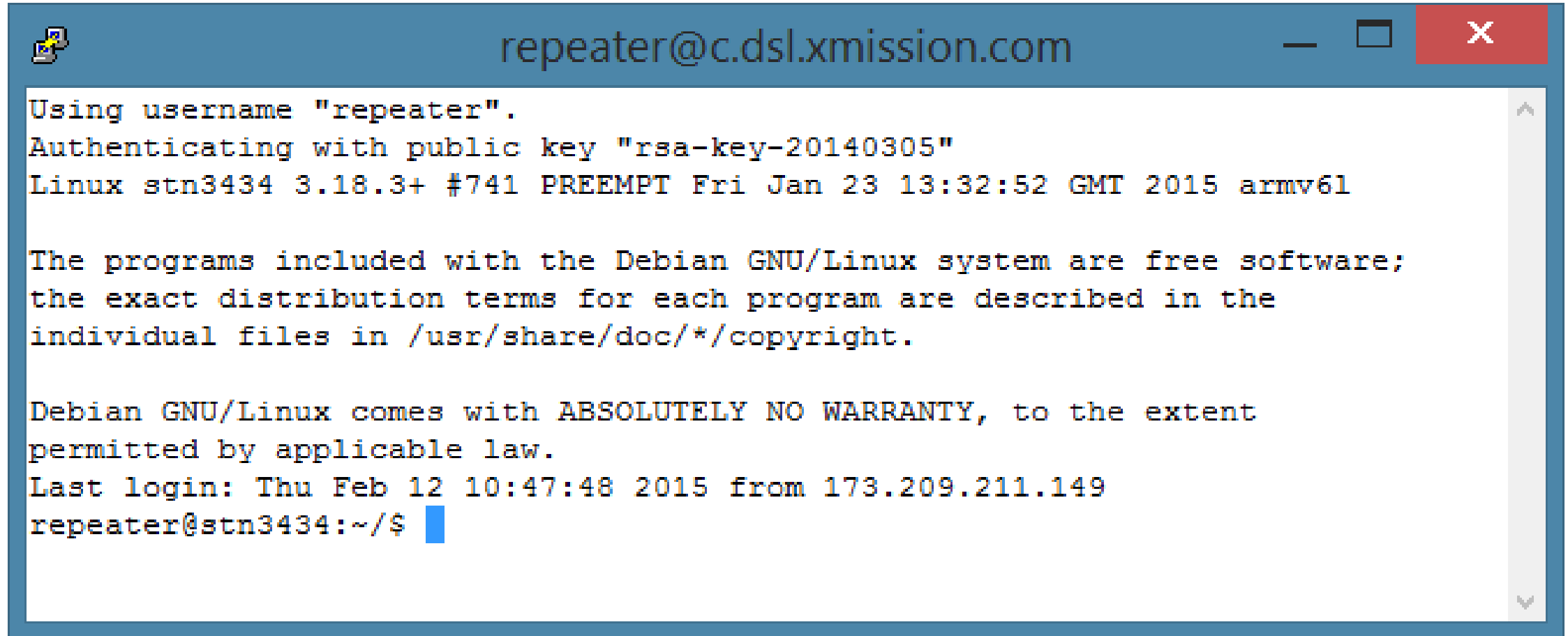
Controller Power-failure Protection Circuits



EchoLink connection method



SSH Linux access

A terminal window with a blue title bar. The title bar contains a small icon on the left, the text "repeater@c.dsl.xmission.com" in the center, and standard window control buttons (minimize, maximize, close) on the right. The main area of the window is white and contains text in a monospaced font. The text shows the process of logging in via SSH, including the username used, the public key for authentication, the system's boot information, a notice about Debian GNU/Linux software, and the login time and IP address. The prompt "repeater@stn3434:~/ \$" is visible at the bottom.

```
repeater@c.dsl.xmission.com
Using username "repeater".
Authenticating with public key "rsa-key-20140305"
Linux stn3434 3.18.3+ #741 PREEMPT Fri Jan 23 13:32:52 GMT 2015 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.
Last login: Thu Feb 12 10:47:48 2015 from 173.209.211.149
repeater@stn3434:~/ $
```


Software structure: directories


- `repeater@stn3434:~/ $ find . -type d -print`
- `./scripts`
- `./scripts/admin_php_scripts`
- `./bin`
- `./features`
- `./features/controller`
- `./features/irlp_vpn`
- `./features/speakdate`
- `./features/IRLPvCON`
- `./features/morse_id`
- `./features/EchoIRLP`
- `./features/EchoIRLP/scripts`
- `./features/EchoIRLP/bin`
- `./features/EchoIRLP/audio`
- `./features/EchoIRLP/custom`
- `./features/EchoIRLP/noupdate`
- `./features/EchoIRLP/source`
- `./features/EchoIRLP/docs`
- `./features/star69`

Software structure: shell scripts

```
repeater@stn3434:~/ $ ls scripts
```

admin_php_scripts	control~	enable	flash_upgrade	nobackup.list	on,v	statupdate
audio_level_test	control_20140317	enable~	idmorse	off	pi_send_info	statupdate_cron
audiotest	control_orig_20140128	end	idmorse~	off~	play_my_ids	troubleshoot-irlp
backup_for_reinstall	control,v	end~	idmorse,v	off_20140317	process_check	update
call	custom_wavplay	experimental_call	incrementcount	off_orig_20140201	pulsecheck	update_files_cron
call,v	decode	exp-x-reference	interval_id	off,v	record_my_ids	vu_audio_test
check_pgp_status	disable	failure	interval_id,v	on	ref-x-reference	vu_dtmf_test
clean_old_audio	disable~	failure~	ipupdate	on~	remote_admin	wavplay
common-functions.sh	dropcall	fifoecho	ipupdate_cron	on_20140317	rotatelog	
connect_to_reflector	dtmfdial	find_best_server	irlp.crons	on_orig_20140201	send_wave_files	
control	dtmfregen	fix-udev	irlp_reset	on_to_remote	sfswrapper	

Software customization



```
repeater@c.dsl.xmission.com
File Edit Options Buffers Tools Sh-Script Help
function id_morse {

# KK7DV addition - log ID
log "id_morse: starting function id_morse in interval_id"

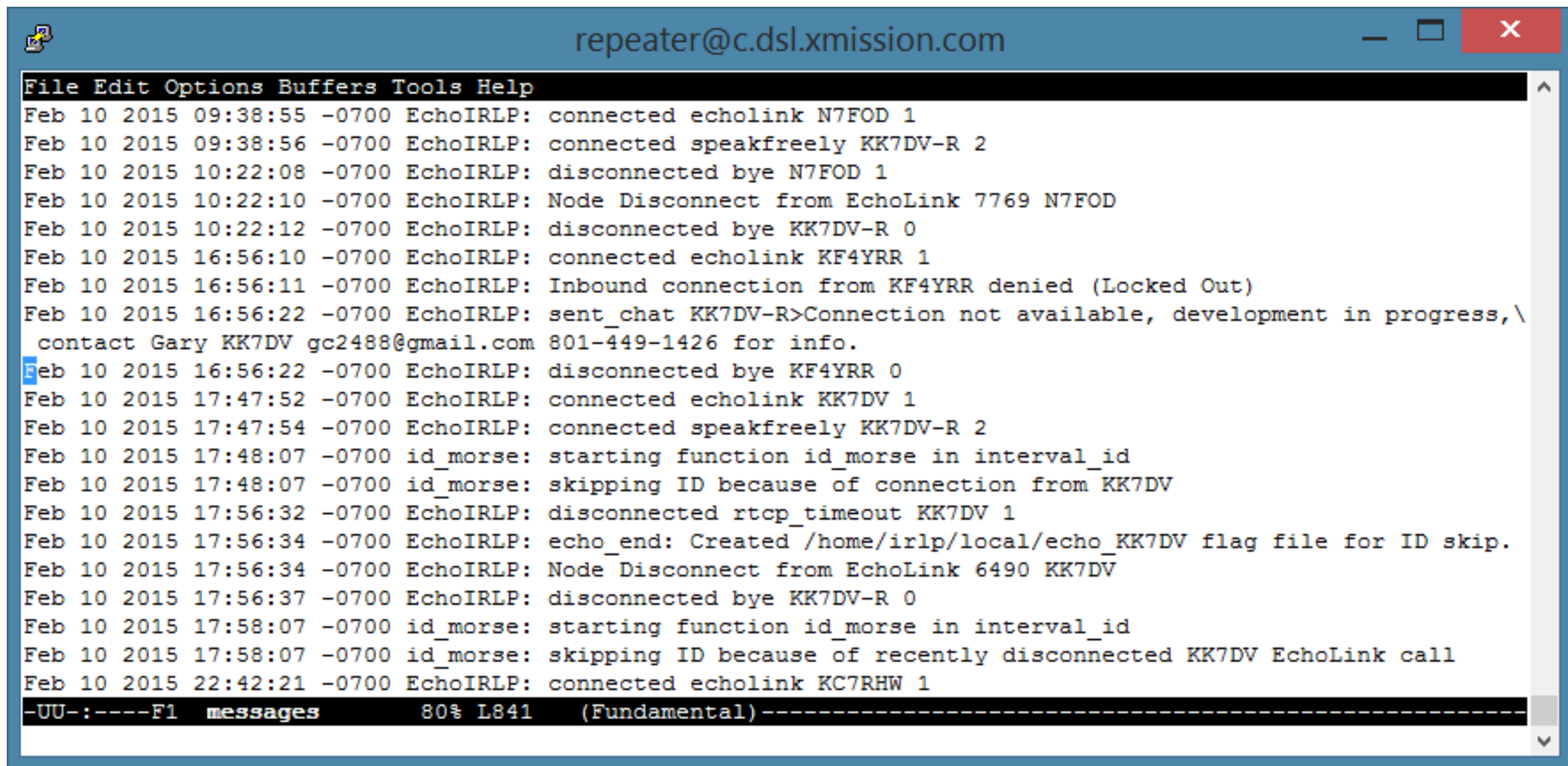
# KK7DV addition to omit ID for case where connection is from self
if [ "`cat $LOCAL/echo_call`" = KK7DV ] ; then
    log "id_morse: skipping ID because of connection from KK7DV"
    return 0
fi

# KK7DV addition to omit ID for case where KK7DV just disconnected
if [ -f $LOCAL/echo_KK7DV ] ; then
    log "id_morse: skipping ID because of recently disconnected KK7DV EchoLink call"
    rm $LOCAL/echo_KK7DV
    return 0
fi

# If the MORSE_TEXT variable is not set, we use the CALLSIGN variable
if [ -z "$MORSE_TEXT" ] ; then MORSE_TEXT="$CALLSIGN"; fi

--UU-:----F1 interval_id 11% L62 RCS:1.4 (Shell-script[bash])-----
```

Log files



```
repeater@c.dsl.xmission.com
File Edit Options Buffers Tools Help
Feb 10 2015 09:38:55 -0700 EchoIRLP: connected echolink N7FOD 1
Feb 10 2015 09:38:56 -0700 EchoIRLP: connected speakfreely KK7DV-R 2
Feb 10 2015 10:22:08 -0700 EchoIRLP: disconnected bye N7FOD 1
Feb 10 2015 10:22:10 -0700 EchoIRLP: Node Disconnect from EchoLink 7769 N7FOD
Feb 10 2015 10:22:12 -0700 EchoIRLP: disconnected bye KK7DV-R 0
Feb 10 2015 16:56:10 -0700 EchoIRLP: connected echolink KF4YRR 1
Feb 10 2015 16:56:11 -0700 EchoIRLP: Inbound connection from KF4YRR denied (Locked Out)
Feb 10 2015 16:56:22 -0700 EchoIRLP: sent_chat KK7DV-R>Connection not available, development in progress,\
  contact Gary KK7DV gc2488@gmail.com 801-449-1426 for info.
Feb 10 2015 16:56:22 -0700 EchoIRLP: disconnected bye KF4YRR 0
Feb 10 2015 17:47:52 -0700 EchoIRLP: connected echolink KK7DV 1
Feb 10 2015 17:47:54 -0700 EchoIRLP: connected speakfreely KK7DV-R 2
Feb 10 2015 17:48:07 -0700 id_morse: starting function id_morse in interval_id
Feb 10 2015 17:48:07 -0700 id_morse: skipping ID because of connection from KK7DV
Feb 10 2015 17:56:32 -0700 EchoIRLP: disconnected rtcp_timeout KK7DV 1
Feb 10 2015 17:56:34 -0700 EchoIRLP: echo_end: Created /home/irlp/local/echo_KK7DV flag file for ID skip.
Feb 10 2015 17:56:34 -0700 EchoIRLP: Node Disconnect from EchoLink 6490 KK7DV
Feb 10 2015 17:56:37 -0700 EchoIRLP: disconnected bye KK7DV-R 0
Feb 10 2015 17:58:07 -0700 id_morse: starting function id_morse in interval_id
Feb 10 2015 17:58:07 -0700 id_morse: skipping ID because of recently disconnected KK7DV EchoLink call
Feb 10 2015 22:42:21 -0700 EchoIRLP: connected echolink KC7RHW 1
-UU-:----F1 messages 80% L841 (Fundamental)-----
```

Future possibilities

- FC-301 radio interfacing and frequency-agile RS-232 serial control
- Information lookup using Raspberry Pi internet connection
- More complete logging and recording
- Voice recognition in style of Siri and Google

Similar computer systems

- System-on-a-Chip (SoC)
inexpensive, systems running Linux

- BeagleBone (TI SoC)

<http://beagleboard.org/bone>

- Edison (Intel SoC)

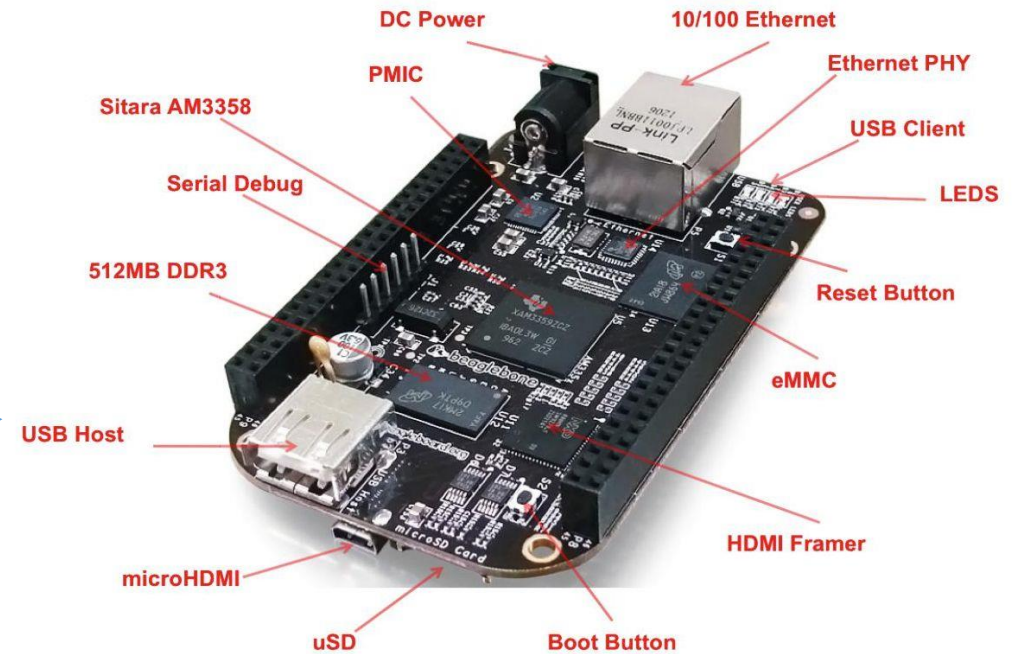
<http://www.intel.com/content/www/us/en/do-it-yourself/edison.html>

- Raspberry Pi 2 (Broadcom SoC)

<http://www.raspberrypi.org/>

- ODROID (Amlogic SoC)

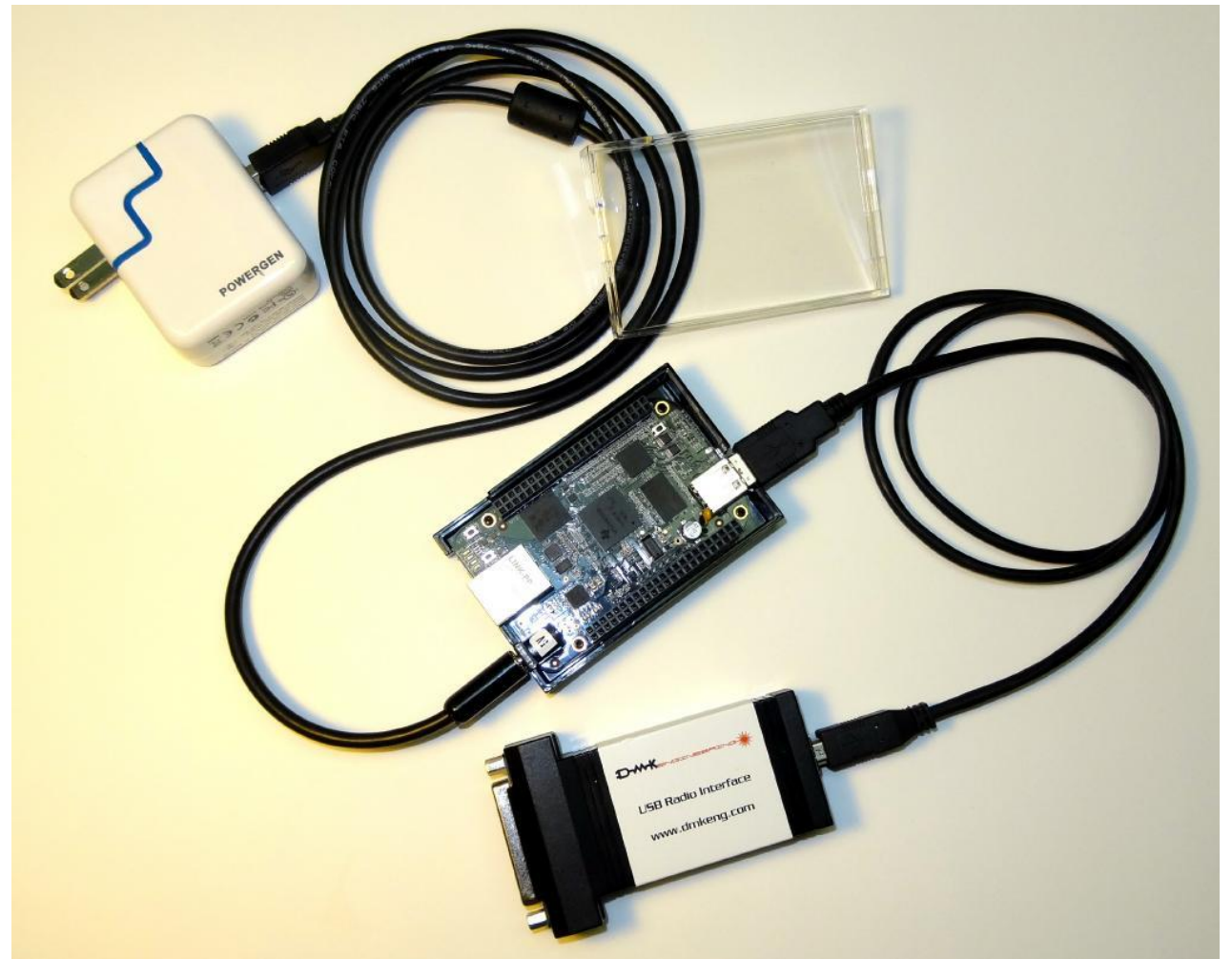
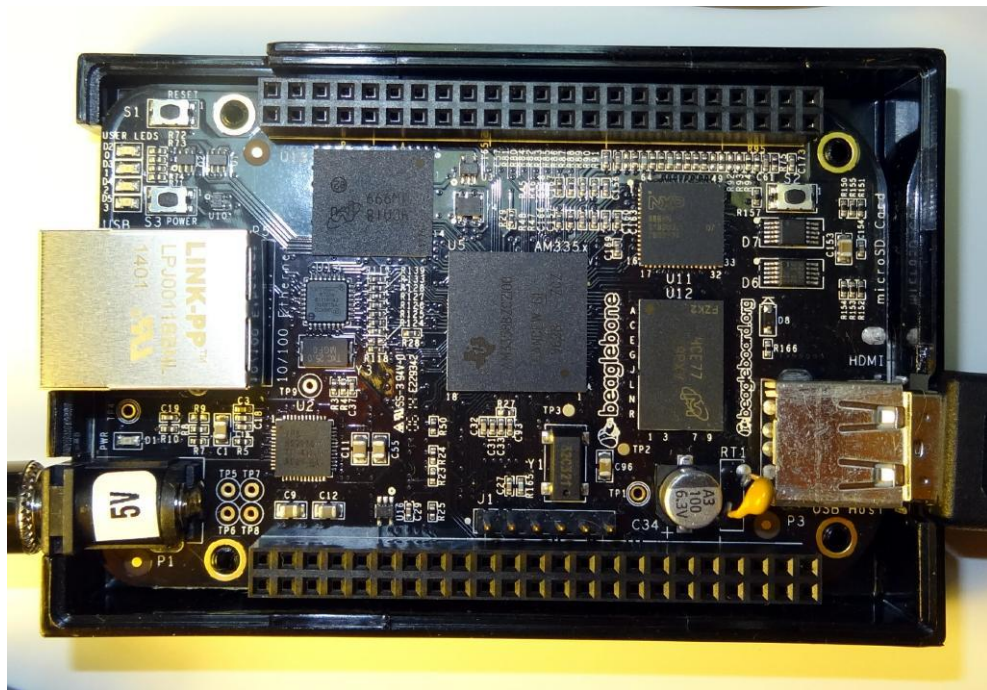
<http://www.hardkernel.com/>



BeagleBoneBlack with Asterisk and AllStar

<http://hamvoip.org>

<https://allstarlink.org>



Any similar experience and interests?

Questions?

Contact info

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 - Sometimes on 146.62- when commuting weekdays at 8:30am

- Dave Jenkins, W7JFH
 - dpjenkinsjr@gmail.com