

## HAMVOIP Allstar Version 1.5 Update

Announcing the HamVOIP Allstar version 1.5 release for the Raspberry Pi 2/3. A great deal of time has gone into this release over many months. Thanks to Dave, KB4FXC the hamvoip package has become not just a converted Acid to ARM release but a significantly better, feature rich and improved package. This update has significant changes from the 1.02 beta released earlier in the year. While the hamvoip code has basically forked at this point and will have significant feature and performance improvements into the future it will always reflect any important base "ACID" changes should they happen.

The 1.5 release introduces many new features and concepts to the Asterisk/Allstar code. Users will have to make some adaptation to the changes as we move in a new direction. The most significant change is the way updates will be handled in the future. The entire repository including the Archlinux OS will be maintained at hamvoip.org. This has some very important advantages. Since Archlinux is a "bleeding edge" OS in the past a distribution quickly became stale. Users were faced with mismatched and often unusable systems after adding packages and certainly after doing a system wide upgrade. This will no longer happen as a complete packaging system will be maintained at hamvoip.org. Users can install any package from the repository without fear of problems.

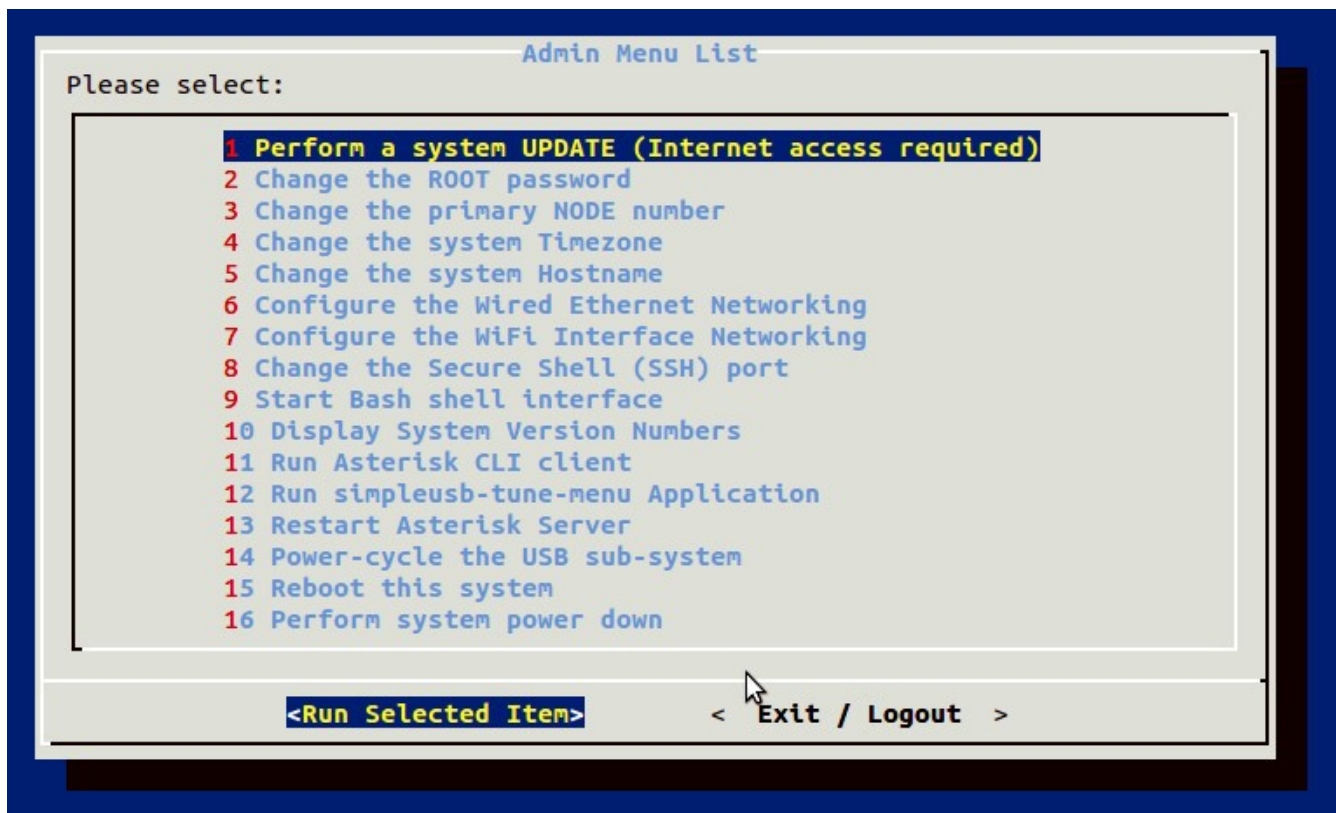
This also offers another very important advantage and that is all the Allstar code, scripts, configuration files, etc. are now packaged. Updates can happen at the press of a key in the ADMIN window. No more rewriting SD cards and losing prior configurations. You will still download the initial image, write it to an SD card, and during the setup process it will be automatically updated on-line to the latest version. Many features will be added in the future with just a simple on-line update the same way you would update software in any Linux system. The updates are NOT forced, the user has the option of not updating but it is almost always desirable to do so.

As a side note users still need to be aware that SD cards do have a certain life and while that is probably a very long time with on-line updates the tendency to not replace cards is there. Users should keep track of their SD card time in use and maybe replace them every year or two if reliability is important. At \$6 for a 16G San Disk Ultra on Amazon it is cheap insurance. Also use a new card when first writing this update not one that has been in a system for two years. Throw out the old one or mark it as used so you won't later recycle it back into use.

### **ADMIN menu**

At first boot the setup files run as in prior versions but they are now graphical in the sense that they include color highlighting. Once setup is complete an administrative menu appears at login. This allows quick access to many useful programs and scripts that the user would need to run to administer Allstar. You also have the option of leaving the administrative menu and running commands at the Linux (bash) prompt and typing 'exit' will return you to the ADMIN menu.

Here is a screen view of the **ADMIN** menu:



A description of the **ADMIN** menu commands.

### 1. Perform a system update

This allows the user to update their system from the hamvoip repository. Any updates including kernel updates will be included. It is the option of the user to update their systems periodically when updates are announced. This is optional but since updates can also include system improvement, bug and security fixes it is usually a good idea to keep up to date. A system update is done before the initial setup.

### 2, 3, 4, 5. Change settings of password, node number, timezone, hostname

This items are configured at initial setup but can be changed here if desired. Password is your Linux login password on this server. If you change it be sure to remember what it is!

### 6, 7. Setup or change wired or wireless connections

Wired Ethernet setting are configured at setup. Wired settings can be later changed to DHCP (default and preferred) or static depending on your needs

A wireless connection can be initially setup and controlled here. See wireless info below.

## **8. Change the SSH port**

The default SSH port for Allstar is 222 and this can be changed at setup or with this option. If you change it be sure to remember what it is so you can get back into your system via SSH.

## **9. Start Bash shell interface**

This option opens a window so you can enter any Linux command. To return to the ADMIN window type 'exit' at the Linux prompt.

## **10. Display system version numbers**

Gives a display of the current system version numbers including the hamvoip, Asterisk, and Linux kernel.

## **11. Run Asterisk CLI client**

This option puts you into the Asterisk client and you will see the CLI prompt. The Asterisk client allow a user to view and troubleshoot Asterisk and Allstar parameters. You can use the client to manually connect or disconnect to/from other nodes.

Example connect command to connect node 1998 (substitute with YOUR node) to node 40000

```
Pi3-1*CLI> rpt fun 1998 *340000
```

The client is also useful for troubleshooting. It displays various log messages in the opening screen. It will display “hungup” when you release PTT when unkeying your radio while talking into your node or when a connected node unkeys. It also displays the DTMF digits you press on your radio so it is handy to check that they are decoding correctly.

## **12. Run simpleusb-tune-menu Application**

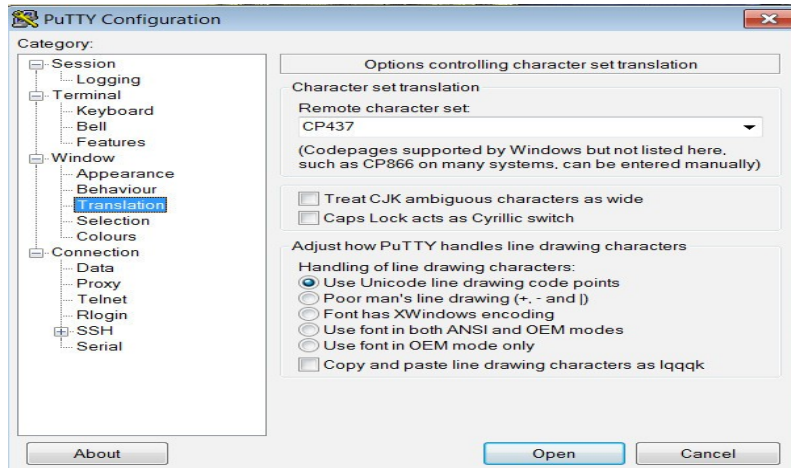
This is the classic but enhanced simpleusb-tune-menu. More information on this below.

## **13, 14, 15, 16. Perform various system operations**

These options include restarting Asterisk, Power cycling the USB bus in software, Rebooting your system, or powering down (halting) your system.

To logout of Linux select Exit/Logout at the bottom of the ADMIN screen.

## ADMIN Screen Notes



Some users especially those using putty or winscp may experience strange characters in the graphical screens. These graphic screens are not truly graphics but representation of sent ASCII characters. There are many character sets available. The one that generally works best is **CP437** available in the dropdown menu under the translation tab in putty. Select this and save your session (IP address and PORT) so you can quickly come up the next time in the right mode.

If you are using a windowed session make sure the window is made large enough to display the entire text in both width and length. Have a too small window can cause text to wrap or flow off of the bottom of the screen.

## Simpleusb-tune-menu

There are many changes in the simpleusb channel driver as noted in the revision list. While the simpleusb.conf file remains, there is a new simpleusb-tune-menu program which allows changing simpleusb settings in a **real-time** fashion. No more need to change a setting and restart Asterisk just to find out if it works the way you want. You could be key down into your node and change deemphasis or pre-emphasis and it will immediately change so you can compare your audio on the fly. Also COS settings will be greatly simplified. You will be able to transmit to your node radio and set the correct carrierfrom (now called **cosfrom** in simpleusb-tune-menu) phase immediately. Settings are saved in simpleusb.conf when written from simpleusb-tune-menu and simpleusb-tune-menu reads changes in simpleusb.conf upon startup. Parameters are also saved in the simpleusb\_tune\_XXX.conf per interface files. It is recommended that changes to simpleusb be made in the simpleusb-tune-menu application and not in the simpleusb.conf file. Also because of changes in the structure of the simpleusb.conf file users are cautioned to **not** copy existing config files forward to this new version.

The changes made to simpleusb in this version are just the first step towards a completely new channel driver (IOPIPE) that will be in a future update. IOPIPE will use ALSA and allow a multitude of external sound processing options. See future updates below. Here is an example of the new simpleusb-tune-menu screen.

### Simpleusb-tune-menu menu options

Active simpleusb device stanza: [usb] -----

- S) Select active USB device stanza
- V) View COS, CTCSS and PTT Telemetry using real-time display
- P) Print Current Parameter Values
- 2) Set Rx Voice Level (using display)
- 3) Set Transmit A Level
- 4) Set Transmit B Level
- B) Toggle RX Boost Mode (currently Enabled)
- C) Toggle Echo Mode (currently Disabled)
- D) Flash (Toggle PTT and Tone output several times)
- E) Toggle Transmit Test Tone/Keying (currently Disabled)
- K) Manually key COS (currently Unkeyed)
- F) Toggle PRE-emphasis Mode (currently Disabled)
- G) Toggle DE-emphasis Mode (currently Disabled)
- H) Toggle PLfilter Mode (currently Enabled)
- I) Toggle PTT Mode (currently active LOW)
- J) Change COSFROM Mode (currently "usbinvert")
- L) Change CTCSSFROM Mode (currently "no")
- M) Change RXONDELAY value (currently "0")
- N) Change RXAUDIODELAY value (currently "0")
- W) Write (Save) Current Parameter Values
- O) Exit Menu

Please enter your selection now:

As you can see many options have been added. Here is a description of the individual items -

### S) Select active USB device stanza

This selects the active USB interface. It only needs to be selected if you have more than one interface attached to your Allstar server.

### V) View COS, CTCSS and PTT Telemetry using real-time display

This is a new option that allows real-time viewing of the status of COS, CTCSS, and PTT.

Here are screen views of the real-time option with various system states -

```
REALTIME RX TELEMETRY DISPLAY:
  COS   | COS   | COS   | CTCSS | CTCSS | PTT
(composite) | (input) | (test) | (input) | (override) |
  CLEAR | CLEAR | CLEAR | IGNORE | CLEAR | CLEAR
```

This example shows a quiescent state, no COS or PTT.

```
REALTIME RX TELEMETRY DISPLAY:
  COS   | COS   | COS   | CTCSS | CTCSS | PTT
(composite) | (input) | (test) | (input) | (override) |
  KEYED | KEYED | CLEAR | IGNORE | CLEAR | CLEAR
```

This example shows COS active. COS input shows the actual input COS composite shows when COS is actually applied such as when RXONDELAY delays it.

```
REALTIME RX TELEMETRY DISPLAY:
  COS   | COS   | COS   | CTCSS | CTCSS | PTT
(composite) | (input) | (test) | (input) | (override) |
  CLEAR | CLEAR | CLEAR | IGNORE | CLEAR | KEYED
```

This example shows that the TX (PTT) is keyed.

The real-time display is very handy for checking and setting up your nodes COS (or CTCSS) phase. COS input should show keyed when you key a radio on your node radio frequency. If it shows keyed when in a quiescent state the phase is wrong and you should select item J- COSFROM (or K- CTCSEFROM if used) to change to the opposite state. No restarting of Allstar is required. The PTT mode can also be changed in the same way. In most cases PTT it is the default value of active low. Be sure to save any changes before exiting.

Most users will only use the COS input so as can be seen in the screens above CTCSS is ignored. The COS composite input shows the state of the COS input plus any RXONDELAY. By default RXONDELAY is set to 0, no delay but it can be used to delay the actual triggering of COS to avoid loop back triggering. This is set with option M in the menu. Both RXONDELAY and RXAUDIO DELAY are set in 20ms increments. RXONDELAY has a maximum of 100 (2 seconds) and RXAUDIODELAY has a maximum of 26 (520 ms).

**(P) Print the current settings to the screen.**

```
Active simpleusb stanza: [usb]
USB device String: 1-1.3.1:1.0

Card is: 0
Name is: usb
Rx Level: 500
Rx no-delay: 0
Rx audio-delay: 0
Tx A Level: 500
Tx B Level: 500
preemphasis: no
deemphasis: no
pfilter: yes
rxboost: yes

PTT: Active LOW
PTT status: Un-Keyed

CTCSS (input): Ignored
COS (input): CM108/CM119 Active LOW
COS (test): Un-Keyed
COS (composite): Un-Keyed

Press <enter> to continue.
```

### **(2, 3, 4) Audio settings**

These items are unchanged from the original simpleusb-tune-menu and set the input and output audio levels.

### **B) Toggle RX Boost Mode**

Turn on (default) or off the RX (local RF input to your node radio) boost. If menu item (2) RX level is to high (number too low) you can turn OFF RX boost. Likewise if the setting is to low RX boost can be turned ON.

### **(C, D, E, K) Various test modes**

These options allow you to:

- (C)** turn on echo mode. What you say on TX will be echo'ed back on RX.
- (D)** Toggle key PTT with tone several times.
- (E)** Toggle TX test tone.
- (K)** Manually key COS. This does the same thing as transmitting to your node radio. If you connected a microphone and headset to your USB FOB you could use this option to key COS and thus your transmission to your RF or connected nodes.

### **(F, G, H) Set equalization and filters**

Options **(F)** and **(G)** set pre and deemphasis on or off. Like the other options this is a real-time setting. You or the person you are talking to can actually hear the difference as you change these settings. Pre and deemphasis is determined by the type of radio and the connections to the radio you are using. If emphasis is set improperly voices will lack either low or high frequency response. Also if deemphasis is set wrong your radio's DTMF tones may function erratically or not at all. Pre-emphasis is to the RF transmitted (TX) audio of your node. It is what you receive and hear. Deemphasis is applied to the (RX) discriminator audio and is how others hear you when you are RF transmitting to your node. You will not hear the effect of deemphasis (others will) unless you listen by another means to your node or output of your repeater.

Option **(H)** turns the PL filter on (default) or off. This sets a highpass filter above the PL frequency range to help eliminate the tone in the voice audio.

### **(N) RXAUDIODELAY**

RXAUDIODELAY is used to eliminate squelch tail. Valid values are from 0-24 in 20ms increments. Typical values for most radios are 5-10. If you set this too long you will hear an echo of your voice when you drop TX.

### **(W) Write (Save) Current Parameter Values**

After making any of the above changes you must select **(W)** to write them before exiting. Without saving changes will not be in effect the next time you boot or restart Asterisk.

### **(0) Exit Menu**

Exits back to the ADMIN menu or Linux



## Wireless Setup

Wireless setup is available from the ADMIN menu. It is fully integrated into the system and works a little differently than the prior version. Here is a screen view of the wireless menu.



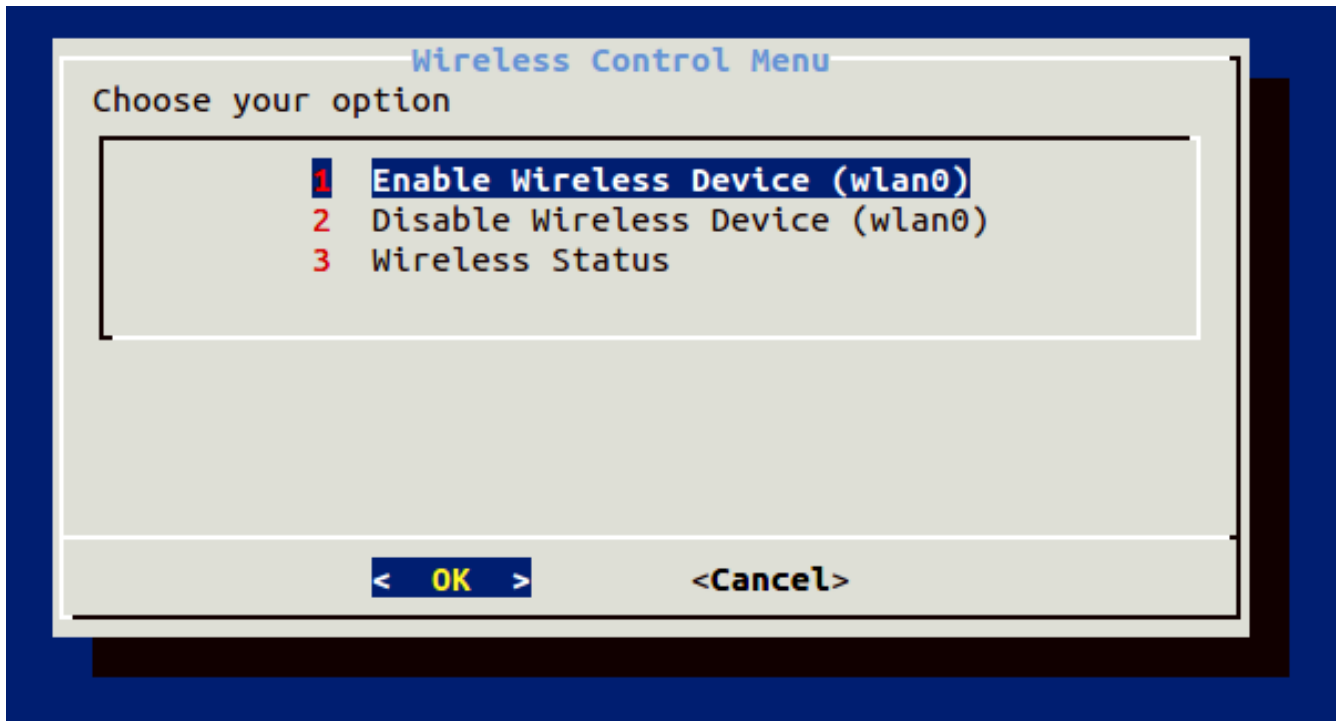
### **Main Wireless Menu**

#### **(1) Setup Wireless SSID and Passphrase**

Select this option to setup wireless access on your Allstar server. This selection also has an initial option to clear the wpa\_supplicant file should you want to delete all prior entries you made and start with a clean slate. A scan is done for all available access points. Scroll up or down and select the access point you want to use. You are then asked for the passphrase or leave blank for an open access point.

#### **(2) Control/Status of the Wireless Interface**

This option will allow you to enable or disable the wireless device or check its status. Setting up the wireless device, option 1, automatically enables the it. You can use the enable/disable option after setup to turn off or on wireless. **Caution - If you are using wireless and you turn it off you will lose contact with the server and must access via a wired connection or HDMI monitor.**



### Wireless Control Menu

#### (3) Display the wpa\_supplicant File

This option will display your wpa\_supplicant file. The wpa\_supplicant file is a text file that stores the info used to establish your wireless connections. This option will allow you to check that the access points and passphrases were correctly entered.

## Transition Notes

Please **DO NOT** copy old config files from prior versions and other releases to the new system. The `rpt.conf` file has changed significantly. It has been better organized and documented and new commands have been added. Take the time to configure the files in place. Things like additional functions, etc. can be cut and pasted from old files. Because this is now an in place update-able image once configured the files will carry forward through future updates so you should not have to do manual updating again unless the file architecture is changed or additional commands are added. We will not be responsible for broken systems from using old config files!

Users should always document additions they make to the configuration files. Comments are preceded by a semicolon ';' This will make it easier to identify what you have changed. If you also save and document the changes you make in a separate file it will be easier to understand when you forget what you did in the future. Custom scripts and other user files should go in the `/etc/asterisk/local` directory.

The ADMIN menu is designed to aid the majority of Allstar users who are uncomfortable in a Linux command mode environment. While there is a shell to Linux option in the menu some more experienced users may find that they want to immediately enter Linux command mode upon logging on. Commenting the last line of `.bash_profile` will eliminate the starting of the ADMIN menu at logon. Please note that updating of the system should **always** be done in the ADMIN menu not manually in Linux. Users who have disabled the ADMIN menu can enter it by typing `admin.sh`. We discourage disabling the ADMIN menu unless you are an experienced user as it has important links to often used utilities.

Kernel updates will happen when a significant change is made that effects functionality, either bug fixes or system improvements.

Updates will be announced on the hamvoip arm-allstar forum and more major changes on the hamvoip.org web page.

Source code is not a part of the image download but will be available as a package download. The source is significant in size and unless you have a need for it there is no reason to download.

The base image download at hamvoip.org will be updated occasionally. This is only to eliminate the amount of online updates needed for new adopters when they initially startup. Existing users should only have to download base images for new installations or if you are using Allstar in a completely offline installation and need to update. Existing installations can always be updated online if you have access to the Internet.

It is always a good idea to backup your SD cards but since this is going to be a rather constant update process, in the event of a failure where you had to use an older backup card you would need to do a system update in the ADMIN menu after installing the card to bring the code up to date.

## Update Notes

Here are some other features and improvements that have been rolled into the 1.5 release -

- A very exciting addition is the new dahdi timing module – dahdi\_hrtimer – to take advantage of the on-board high resolution timer of the Raspberry Pi. This brings timing precision equal to the best PC's with typical dahdi test results of 99.97% or better. This fixes many issues in the system depending on precise timing including courtesy tones, CWID, codecs, etc. There is now no reason or advantage to use a PC for Allstar! For those of you who like numbers here is the comparison. While these numbers don't look significantly different a tenth of a percent is a big deal when dealing with the timer results.

With default dahdi timer -

--- Results after 30 passes ---

Best: 99.636% -- Worst: 99.413% -- Average: 99.543363%

With onboard high resolution timer -

--- Results after 30 passes ---

Best: 99.995% -- Worst: 99.984% -- Average: 99.990906%

- The Asterisk system is now patched to Asterisk 1.4.44 which brings several improvements and NO known security issues.

- Wireless scripts for the Pi 3 are installed. Bluetooth for keyboard support will be available as a package for the RPi3. The wireless scripts have been integrated into a wireless menu which makes it easy to manage wireless connections from one place. Wireless setup is an option on the ADMIN menu. Once the new ALSA channel drivers are installed we will investigate Bluetooth audio for Allstar.

- Major OS upgrade. The kernel and all packages have been updated to 4.4.44-1-ARCH. This brings many improvements as the Raspberry Pi Archlinux ARM port matures.

- PHP update to 7.0.2 – with changed apache config to accommodate it. Allmon2 works.

- Packaged all Asterisk/Allstar specific code. This is important as it allows for easy Internet upgrades.

- Stopped rsync from running by default, changed the default for network setup to “N”O in firsttime.sh. The default DHCP with router permanent (reserved) DHCP address assignment based on the Raspberry Pi MAC address is recommended.

- Reorganized the rpt.conf file and added meaningful comments. New commands have been added. Please review the file. Do **NOT** wholesale copy any configuration files from old copies of Allstar instead if you have custom setting integrate them into the new files **AFTER** you do the initial setup.

- Isnodes updated to use dropdown menus for commands and allow custom commands to be added.

See [https://hamvoip.org/RPi2-3\\_Allstar\\_version.pdf](https://hamvoip.org/RPi2-3_Allstar_version.pdf) for the complete list of changes.

## **Future Enhancements**

Because of the repository update capability of hamvoip V1.5 you can expect many updates in the future. One of the first updates to appear will be the SW support for the NANO interface followed by the IOpipe channel driver. This will be a total update of the current sound and I/O control system and include the (improved) functionality of both simpleusb and usbradio into one package. Old channel driver will be retained for compatibility purposes.

The released hamvoip V1.5 will have IRLP capability with a package download. This package is expected to work as good or better than the original IRLP package taken out of Allstar many years ago. However it is important to note that while this capability will exist it is not something that everyone will need or want to do. To do so you will need an IRLP node number and keep in mind that at least on the IRLP side it has been frowned on to bridge to other services. That being said there are many existing bridges out there running on aging PC's that could benefit from a hardware face-lift using the Pi.

LinuxRMS (winlink), Additional APRS tools, direwolf, ax25 utils, etc. will be included as packages that will supply some additional capability for users that need it outside of Allstar itself.

Standard packages that would normally be included with a complete Linux release will be available in the repository. They will always be synced to the current kernel that is being used so no worries about getting out of sync in the future.

**Our goal is to make Allstar better and we think this release is a significant step in that direction. Look for many further advances in the future. Your constructive input is always welcome.**

**Good luck with your installation. We are always here to help. Additional information is available at the [hamvoip.org](http://hamvoip.org) web site. Be sure to join the email forum, link on the web page, for information on updates and your questions or problems regarding this software or Allstar in general.**