First Time Configuration of the
BeagleBone Black and Raspberry Pi 2

Please read these directions all the way through before proceeding!

Any references to BBB 1.2.1 also apply to RPi2 version 1.0 unless noted.

As of BBB version 1.2.1 there are built-in scripts that automate the configuration process. On all versions to date there is a firsttime script that configures your password, system name, and network preferences.

Starting with version 1.2.1 a new question has been added to the end of the firsttime script that asks if you want to configure your node. You have the option of selecting [Y]es and using the automated script or doing it manually as described below. Either way you will need your node number and node password to continue the configuration process. Node number and server setup can be accomplished at allstarlink.org Note that your node password is a 6 digit number found on the allstarlink.org site under your node information after your node is assigned. The assignment process can take from just a few hours to a day. You will not receive any emails about this. You need to log back in to allstarlink.org to retrieve the information.

On a new image install I recommend starting fresh with the supplied configuration files using either the automated or manual methods. Copying existing files over from a previous system like Acid on a PC might work or it might not. It would be better to get the system up and working and then think about making changes. In any case DO **NOT** wholesale copy the entire /etc/asterisk directory from a previous system or version. **Starting with the 1.2 version all scripts have been moved from the /etc/asterisk/local to the /usr/local/sbin directory. So make sure you don't copy these scripts from an older version to the local directory.** See the scripts how-to for more information on the supplied scripts.

The only thing that is not automated is the setting of your timezone. The stock image is set for the US eastern region. If required use **timedatectl** to check or set your time zone. See "Setting Date and Timezone" on the web page. The BBB uses ntp to set the time and requires an Internet connection.

Starting with BBB version 1.3 and RPi2 version 1.0 timezone is part of the setup.

Automated Node Configuration

If you elect yes in the initial first time setup script the system will reboot and run the node configure script. The first thing the script does is make a backups of the original /etc/asterisk extensions, iax, and rpt configure files. The backup files have _orig appended to the end. The automated node configuration uses a template of the extension, iax, and rpt configuration files to create the final active files which reside in the /etc/asterisk directory. Each time it is run it uses the template files located in /usr/local/etc/asterisk_tpl to create the active files in /etc/asterisk. **The /etc/asterisk extensions, iax, and rpt configuration files are overwritten every time you run this script!!** If you want to continue to use the node-config.sh script to make automated changes you should modify the template files located in /usr/local/etc/asterisk_tpl. Be careful when

modifying the template files as they contain obvious variables that are used by the configuration script that should not be modified. In the event you want to return to the stock template files a backup copy of each file is located in /usr/local/etc/asterisk_tpl/template_backup/

Each time you run the node-config script it remembers your previous entries so you can quickly go through options keeping the prior changes by just hitting enter. Once you get to the item you want to change you would make the change and any others you want to make and then hit enter through to the end where it is saved. Just remember that each time you run node-config it uses the stock template so you need to understand the cautions in the above paragraph.

If you use the automated script to configure your node it would be a good idea to also review the manual configuration (shown below) to get an idea what is changed as this is basically what the automated script does. Starting with version 1.2.1 there are significant changes in the way many things are handled in the configuration and operation of Asterisk Allstar. See the scripts howto and other documents on the web page which describe these changes.

On completion of the node-setup script you will need to configure the /etc/asterisk/simpleusb.conf file and sound settings for your radio. Skip down to the simpleusb.conf configuration at the end of this howto for details.

Note that starting with BBB version 1.3 and RPi2 version 1.0 simpleusb configuration is part of the setup script. Skip down to simpleusb.conf configuration for details.

Manual Method

It is strongly recommended to use the automated script install but experienced users wanting to do a manual install could follow these instructions.

After you setup your Allstar image using the web page instructions you need to setup Asterisk Allstar to work with your nodes. This is not a hard process and you might learn a little about how things work by doing it manually. If you already have a node configured on another computer you can copy over the extensions.conf, iax.conf, rpt.conf, and simpleusb.conf. You might be switching to simpleusb from usbradio so in that case you would just modify the existing simpleusb.conf as outlined below. Do NOT just copy the entire /etc/asterisk directory from a non-BBB system as other files may differ. I have included iaxrpt and iphone example files in the provided files so if you copy your own files over you will have to recreate that code if you need those capabilities.

Here is a quick tutorial on editing the files in /etc/asterisk to your assigned node. I will use the nano editor but this can also be done in vi if you prefer. Suppose you want to edit the rpt.conf file and change the default node assignment 1998 to node 40000. The use of 40000 is just an example use your assigned node number in its place. First you would change to the /etc/asterisk directory:

cd /etc/asterisk

Then you use nano to edit the rpt.conf file:

nano rpt.conf

In the nano screen you enter:

**cntrl **

You will then be asked what you want to replace. You would enter 1998. Then you will be asked what you want to replace that text with and you would enter 40000. Then you will be asked if you just want to replace for one or all occurrences. You want to do this for all occurrences so you type 'A'. At this point node 1998 will be replaced with your assigned node. If you have a second node repeat these steps but use 1999 as the node you to replace.

While you are editing the rpt.conf file you should also change the CW-ID to your call. The parameters are:

idrecording and **idtalkover**

idrecording is used to set your ID which can be in CW or the playback of a sound file. See the web documentation on how to create a sound file.
The example rpt.conf has the idrecording set like this:

idrecording=/etc/asterisk/local/node-id
;idrecording=|iDE WA3XYZ/L

In this configuration the node-id.gsm file in the /etc/asterisk/local directory is played at each ID. This file plays sample text and would need to be changed to say your call. Edit:

/etc/asterisk/local/combine.sh

using the instructions found in the file to play your call. You may also comment this line with a ';' and uncomment the second line replacing WA3XYZ with your call.

idtalkover sends CWID interrupting any voice ID when a signal is present. WA3XYZ should again be changed to your call.

idtalkover=|iDE WA3XYZ/L

If you wish to publish your node so it shows up on the public node list at allstarlink.org you need to uncomment two lines as follows:

; *** Status Reporting ***
;
; Uncomment the following two statpost lines to report the status of your node to stats.allstarlink.org

;statpost_program=/usr/bin/wget,-q,--timeout=15,--tries=1,--output-document=/dev/null
;statpost_url=http://stats.allstarlink.org/uhandler.php ; Status updates

Simply remove the semicolon from each statpost line. Note that it is not necessary to do this for others to connect to you. The registration process in iax.conf establishes the connection capability to your node. But without advertising you will get less connects because others will not know you are there unless you tell them or they randomly connect to your node.

If there are no more changes you can save the file:

cntrl X and then select 'Y' to save.

You should then do the same thing for the extensions.conf file. Replace 1998 and if you have a second node 1999 with your assigned nodes using the same process as above.

Then edit the iax.conf file to install your registration information:

nano iax.conf

scroll down to the registration line. It should look like this:

; Uncomment one or both of the following lines and add
; your node number in place of xxxxx
; and your node password in place of yyyyyy

;register => xxxxx:yyyyyy@register.allstarlink.org
;register => xxxxx:yyyyyy@register.allstarlink.org

Note that it is commented with a preceding ';' Remove the ';' and edit xxxxx to reflect your assigned node and the yyyyyy to reflect that nodes password. Passwords are assigned with your node and can be looked up by logging into your account at allstarlink.org and checking the nodes password. If you have a second node you would like to register on this server uncomment the second line and edit the node and password.

Optionally you can also add passwords (secret=) in both the iaxrpt and myiphone sections.

Also in the iax.conf file towards the top is a line that reads:

bindport=4569

Port 4569 is the default iax protocol port. If you are using just one server on your public IP address then you can skip to the simpleusb.conf section below.

If this is a second or higher number server being used on a single public IP (the ip between you and your provider) then you need to select another port. You can put up as many servers as your bandwidth will allow but each must be on a separate port. The setup is easy. Go to **allstarlink.org**

and after you setup the server select **Server** then **Server Configuration**, then select the server name that you defined. You will then be in the **Allstar Server Configuration** window for that server. Select Network Configuration and under the **Network Configuration** tab observe the UDP port. If you haven't previously changed it it should read 4569. If this is a second port change it to 4568. With additional ports you could work down in number as long as there is not a local port conflict with the number you select. Save the change by select the Submit button. Now back in **iax.conf** change the bindport setting:

bindport=4568

No matter what port or ports you are using if you want others to be able to connect to you then you must "port forward" the appropriate port in your router pointing back to your BBB's IP address. This is not necessary to connect outbound.

Setting your Node in the Environment File

If you do a manual configure you will need to set you node number in the allstar.env file located in /usr/local/etc

Edit this file using nano:

nano /usr/local/etc/allstar.env

Find the line that defines the node number:

\# defines the primary node (node1) number
export NODE1=1998

Change the number (default 1998) to your node number

Save the file and exit.

Simpleusb.conf configuration

Automated configuration via the node-config.sh script

Starting with BBB version 1.3 and RPi2 version 1.0 simpleusb configuration is part of the setup script process. If you are using earlier versions skip down to the manual simpleusb.conf setup.

Before the initial setup of your node you should have a USB audio interface and radio properly connected. Depending on your radio the simpleusb.conf file may need to be customized. The automated setup has several radio's already configured in a database and an option to do your own configuration. If you have a radio that is already defined in the database then select it from the menu. The script will then show each item as selected for that radio. Unless you want to change something just hit enter through all the items which accepts them as displayed.

If you do not have a radio that has been previously defined then select 'other' and change the settings to satisfy the requirements of the radio you are using.

Note that some radios like the Motorola's can be configured at the radio in different ways. It is a good idea to have knowledge of how your radio is configured before attempting to install it on Allstar.

Some notes about settings

Here is a quick list of the settings that would most likely change in simpleusb.conf. Do not change anything not listed here unless you are familiar with what you are doing.

The beginning of the simpleusb.conf has the following stanzas -

[general]

[usb]

followed by settings definitions. The [usb] designation is a label which is referenced by the rxchannel=radio/usb in rpt.conf. The usb at the end matches the [usb] in simpleusb.conf This attaches the radio to the node stanza where the rxchannel is defined in rpt.conf.
[usb] is the default and automatically set in the initial setup.

rxboost=0 or 1 - (default 1)

  This turns on extra audio gain on the receiver side.
  This is the audio coming FROM your node radio. The
  audio you transmit from the radio talking to your
  node. This would be item 2 in the simpleusb-tune-menu
  audio setting program.

carrierfrom=usb or usbinvert (default usbinvert)

  This sets the COS input state on received signal.
  This signal is on pin 8 of the DMK-URI and comes
  from your node transceiver. It is typically a
  5V high, 0V low signal but can be any high voltage
  up to 24V but must go to near 0 volts low.
  Setting to usb means the signal is high on
  received signal. Setting to usbinvert means the
  signal is low (0V) on received signal. The
  Preferred way is usbinvert where available.
  For best results the receive signal indication
  should be qualified by PL not just noise squelch.

invertptt=0 or 1 (default 0)

This is almost always set to 0 meaning the a ground
on the PTT line keys the transmitter. If you have a
rig that requires a high to key you would change the
setting to 1

plfilter=yes or no (default yes)

This turn on a filter to help eliminate the PL tones

deemphasis=yes or no (default no)

If you have rx audio (audio from the node radio)
coming from a point where no deemphasis has been
done set this to 'yes'. If your audio is coming
from a point where the deemphasis has already been
done (speaker audio) then set this to 'no'
A 9600 baud data port would not have deemphasis
so set this to 'yes' in that case.

preemphasis=yes or no (default no)

This is the audio from the USB FOB to your node
transmitter. If you are feeding audio to a mic input
connection you would set this to 'no' If you are
going in past a preemphasis point in the radio then
this would be set to 'yes' Many radios have data ports.
Typically a 1200 baud port has premphasis so the
setting would be 'no' If connecting to a 9600 baud
port you would set this to 'yes'

More on Pre and deemphasis

Depending on the radio and connections to that radio that
you use these settings could be on or off. As an example
the Alinco DRx35 series radios have a DB9 data connector
on the rear panel. It has outputs for 1200 and 9600 baud.
If you use the 1200 output (preferred) you would use no
deemphasis but if you use the 9600 baud output you would
use deemphasis. The input seems to work fine without
preemphasis. The Yaesu 7800 has a similar output on the
rear using a mini DIN connector. The outputs work similarly
to the Alinco but the input requires preemphasis. Other
radios like the Motorola's can be programmed in many
different ways. Experimentation is in order here. There is no

clear cut way to solve this as it requires operator intervention.
If you have the node radio RX output set incorrectly you will
often have no or poor DTMF response. Go into the Asterisk client:

asterisk -rvvv

and hit each DTMF key. The display should show each key press
and display the proper number or character. If this is not
working change the deemphasis setting and try again. Note however
that some handhelds, like the Chinese knockoffs are notorious
for poor DTMF so try another source if available.

For node radio TX (what you hear) you will have to use your
judgment on audio quality. If it sounds pinched with no highs
try setting preemphasis on.

When changing pre or deemphasis values recheck your levels.

rxaudiodelay=0 to 24

This setting is used to eliminate squelch tails on
the node radio. 0 is no delay and a value is the number
of 20ms delays. So a setting of 5 would be a 100ms delay.
Set this to the minimum value necessary to eliminate the
tail. Setting this value too high can cause excessive
delays and result in hearing yourself when you unkey
on a repeater node. Typical settings are 3-6. Experiment!

Manual simpleusb.conf configuration

To manually configure simpleusb.conf go to the /etc/asterisk directory.

cd /etc/asterisk

Edit the simpleusb.conf file.

nano simpleusb.conf

Reference the settings note above to configure the file.

Save the file and exit nano.

Restart asterisk at the Linux prompt:

astres.sh

Then proceed to setting the transmit and receive audio levels using 'simpleusb-tune-menu' below.

Setting your Audio Levels

Type the following line at the Linux prompt:

simpleusb-tune-menu

The following will display:

The program will display the following options:

```
 active (command) USB Radio device is [usb]
1) Select USB device
2) Set Rx Voice Level (using display)
3) Set Transmit A Level
4) Set Transmit B Level
E) Toggle Echo Mode (currently Disabled)
F) Flash (Toggle PTT and Tone output several times)
P) Print Current Parameter Values
S) Swap Current USB device with another USB device
T) Toggle Transmit Test Tone/Keying (currently Disabled)
W) Write (Save) Current Parameter Values
0) Exit Menu
```

Please enter your selection now:

If you have more than one USB device connected you will have to select the correct device with option 1. This will show the name you assigned in rpt.conf and simpleusb.conf [usb] or [usb2] for a second radio node. Note that a typical one radio node system would just use [usb] Then using option 2 you can transmit into your node radio using a hand held or other transceiver and set the level using the graphic display. You will get an opportunity to change the level. Values range from 1 to 999 (500 is default) If the required values for the proper setting are too high or low you can turn rxboost on or off (0 or 1) in simpleusb.conf.

When you are satisfied with the level you can select option 3 to set the transmit level, again 500 is default. This is the level you hear from other nodes and local messages on your radio. This level setting has no meter display. You either have to use a service monitor or set it by ear. You want the level to be equal to other stations you have observed on your transceiver say from local repeaters.

If you have more than one radio node repeat the settings for that node by selecting it with option 1 and repeating the other settings. Once you are happy with the level settings you can select option W to save the settings then option 0 to exit. This stores the settings and they will be used

each time you start Allstar. You can run the simpleusb-tune-menu program again at any time to change the settings.

You should now be set to use your node. Be sure to backup your work - see the backup howto.

Setting up a second radio node (RPi2 only)

A second simpleusb radio node should work fine on the RPi2 but is not recommended on the BBB.

Both the BBB and RPi2 come configured with default nodes 1998 and 1999. Node 1998 is configured in the initial setup to your assigned node number. To establish a second radio node that is not private you will need to request another node number at allstarlink.org under the same server as the first node. The 1999 node would then be replaced with this new node number. See the manual method above for directions on how to change the 1999 node to the new node number. The example shows 1998 but you will be using 1999 as the node to replace. This involves editing three files, extensions.conf, rpt.conf, and iax.conf and replacing or inserting the new node information.

First setup or have setup the first node and save the settings as described above in simpleusb-tune-menu. **DO NOT** plug in the second USB FOB at this time! To make sure these settings are saved do the following:

asterisk -rvvv
CLI>**susb active usb**
CLI>**susb tune save**

You should see the message:

"Saved radio tuning settings to simpleusb_tune_usb.conf"

Make sure this node is working with the radio before continuing. Again **DO NOT** plug in the second USB FOB until instructed to do so below.

Then edit /etc/asterisk/simpleusb.conf and add a second stanza. You can call it [usb2] You can just copy and paste the first stanza but change {usb] to [usb2] It would then look like this:

[general]

[usb]
; Alinco DR135, DR235, DR435 Transceivers
eeprom=0
hdwtype=0
rxboost=1
carrierfrom=usbinvert
ctcssfrom=no
txmixa=voice

```
txmixb=no
invertptt=0
duplex=1
plfilter=yes
;deemphasis=no
;preemphasis=no
;rxaudiodelay=0

[usb2]
; Alinco DR135, DR235, DR435 Transceivers
eeprom=0
hdwtype=0
rxboost=1
carrierfrom=usbinvert
ctcssfrom=no
txmixa=voice
txmixb=no
invertptt=0
duplex=1
plfilter=yes
;deemphasis=no
;preemphasis=no
;rxaudiodelay=0
```

The comment line with the radio type may be different or not there. Now edit the [usb2] stanza to the proper values for your second radio.

Save the file. Now edit /etc/asterisk/rpt.conf and skip down to the second node stanza. It will now be your second node number as edited above.

```
[xxxxx] ; Change this to your assigned node number
rxchannel=dahdi/pseudo
```

Your second node number should already be in place of the xxxxx above. Comment out the second rxchannel=dadhi/pseudo line and add a line pointing to usb2 as show below.

```
[xxxxx] ; Change this to your assigned node number
rxchannel = SimpleUSB/usb2
;rxchannel=dahdi/pseudo
```

Save rpt.conf and exit.

Now stop Asterisk:

astdn.sh

Now connect the second USB FOB and radio. Then start asterisk:

astup.sh

Go into the Asterisk client and type the following:

asterisk -rvvv

CLI>susb active usb2
CLI>susb tune save

Again you should see this message but now with usb2:

"Saved radio tuning settings to simpleusb_tune_usb2.conf"

You now should have two radio nodes operational. <u>**Do not**</u> switch physical USB ports on the RPi2 as they are assigned and saved. If you must disconnect things mark the ports and reconnect in the same way.

We have strived to make the BBB and RPi2 setups as easy as possible. If you have a problem with setting up your node or a comment on the setup procedure we are here to help. Use the arm-allstar forum to ask your question. Have fun!!

Doug, WA3DSP