NANO-NODE - AE

World's Smallest Plug & Play AllStar Personal Hotspot

User's Manual
REVISION 1.03

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1.0   NANO-AE PERSONAL HOTSPOT DESCRIPTION

Nano-AE is a small stand alone personal hotspot that allows connection with over 6500 Allstar nodes and repeaters worldwide.

The built-in LCD touch screen display and menu based application software that makes it very easy for users to operate and configure a node without knowing anything about the Linux operating system.

There is a built-in programmable 430-450mHz simplex radio used for communicating with your HT or Mobile radio. The node responds to DTMF commands entered from your radio for monitoring and controlling the node remotely.

The all-in-one ultra small form factor (3.75" x 3.25" x 1.25") of the Nano-AE makes it ideal for mobile users on the go.

Getting started with Allstar link network

In order to become a member of the AllStar Link Network, you must first register to become a user of the Allstar Link Network. To qualify for membership, you must be a holder of a valid Amateur Radio license. When you first register to become a new user, you enter in the required information, and then a verification e-mail is sent to your specified e-mail address that includes a link to click on that allows us to verify the validity of your e-mail address. Afterwards, a member of our staff will verify the validity of your Amateur Radio license, and will validate your information and enable you to use the system. When validated, you will receive an email accordingly.

After validation, you can go ahead and enjoy the use of the facilities of this Portal and all the Allstar Link Network has to offer. The Allstar system architecture provides for 2 organizational entities: 'Servers' and 'Nodes'.

A 'Server' is a Nano-AE Hotspot at a particular location, on it there is one 'Node'. A 'Node' is a single radio system that may be set up in several different ways. It may be a full-duplex repeater system (Using the Nano-AE external radio connector) or several different varieties of simplex operations (Using the Nano-AE internal simplex radio).

Each entity is created separately. First, a 'Server' is created and configured (by filling in various information in the provided forms). Then, 'Nodes' are requested (created, associated with the previously created 'Server') and, upon approval are configured in a manner similar to 'Servers'. When all 'Nodes' are added and configured, the server then needs to be downloaded.

I know this all sounds overwhelming when you are purchasing the Nano-AE as a plug-n-play device. It is necessary the node number registration is in your name and call sign and can be verified. We will take care of the registration process for you if you complete the below registration form.

There will be an email exchange between the Allstar staff and you in order the validate your information. After this has been completed forward the email containing your newly assigned node number and password and we will program your node before shipment.

Allstar node configuration

The following tasks must be performed before the Nano-AE will operate on the Allstar system.

1) Node registration:
Fill out the registration information below and email it to support@micro-node.com. If you already have a pre-assigned Allstar node number and password you want to use email it to us and we will pre-configure the node before shipment.

2) Configure Network Parameters (See Section 3)
Setup the network interface for either wireless or hardwire connectivity to the internet.

3) Configure Radio Parameters (See Section 5)
Configure the internal radio frequency, PL tone, Channel separation and Squelch level.

4) Configure Node Parameters (See Section 6)
Setup the Allstar network Node Number, Password, Port number, ID call sign and ID'er timing parameters.

5) Configure Telemetry and Courtesy tone parameters (See Section 7)
Setup telemetry messaging and courtesy tone behavior.

6) Configure Audio Parameters (see Section 8)
Setup Transmit and Receive audio levels.

AllStar Link Registration information

First Name:_____   **Last Name**:_____
Address:_____   **City**: **State**:_____
Zip/Postal Code:_____   **Country**:_____

Email:_____   **Phone**:_____.

Call Sign:_____   **Password**:_____.:

2.0   PREPARING THE NANO-AE FOR OPERATION

Nano-AE comes with the following accessories.

- Regulated AC Power Adapter
- UHF Antenna and Right Angle SMA Adapter
- Touch Screen Stylus

Preparing the node for initial power up
Un-box the unit and screw the antenna and SMA right angle adapter on to the female SMA connector on the side of the Nano-AE marked antenna. Then plug the AC power adapter cord into to the connector marked power. Make sure the power switch is in up position and plug the power adaptor into an AC outlet. At this point the node should be powering up, note that it can take up to 30 seconds for the LCD display to activate during the boot process.

DO NOT remove power from the node during the boot process, you must wait for the unit to power up completely before initiating the shutdown procedure.
(See Section 13.0 System Reboot/Shutdown Procedure)

3.0   CONFIGURE NETWORK PARAMETERS

The Nano-AE has two network interfaces, a standard CAT5 network cable connection and optional WiFi wireless connection.

Connecting a standard CAT5 cable between the ethernet connector on the nano-AE and a unused network port on your router or network switch. The node will automatically request an IP address from your router and configure the network interface. To view the IP address assigned to your node by the router touch the network icon 🖥 and a dialog box will appear indicating the IP address.

If the optional WiFi dongle is plugged into one of the unused USB connectors on the node a WiFi connection can be established between the node and your wireless router or cell phone hotspot. Touching the network icon 📶 located on the task bar will bring up a list of available WiFi networks as shown below. If no wireless networks are found it will show the message "No APs Found - Scanning..." just wait a few seconds without closing the menu, and it should find your network.
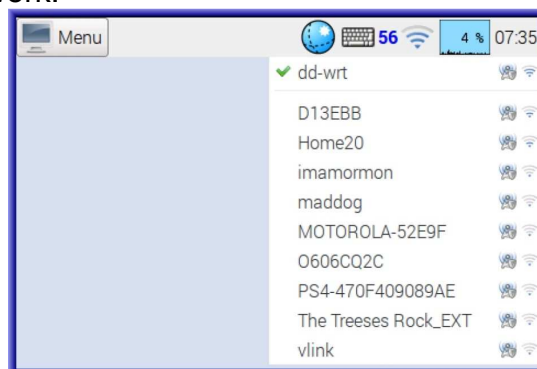
The icons to the right of each router in the list shows whether the network is secure or not, and its signal strength. Touch the network that you want to connect to.

If it is a secured network, a dialogue box will appear prompting you to enter the network key.
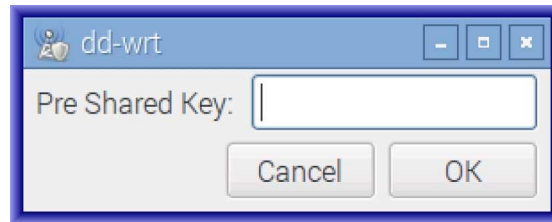

Enter the key and touch OK, after a few seconds the network icon will flash briefly to show that a connection is being established, once it is ready the icon stops flashing and shows the signal strength.

Setting a static IP address

Static IP parameters can be assigned to each network interface manually if needed. Plug a USB mouse into one of the unused USB connectors or use the optional wireless keyboard and right click the network icon 🖥 or 📶, a network settings dialog box will appear. Select the 'WiFi Network Settings' menu and a Network Preferences dialog box will appear.
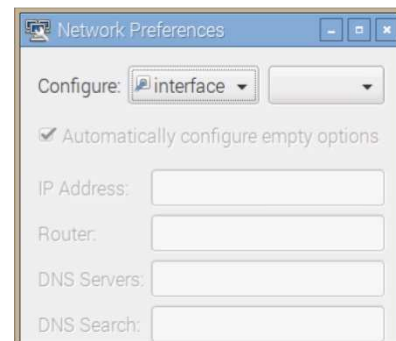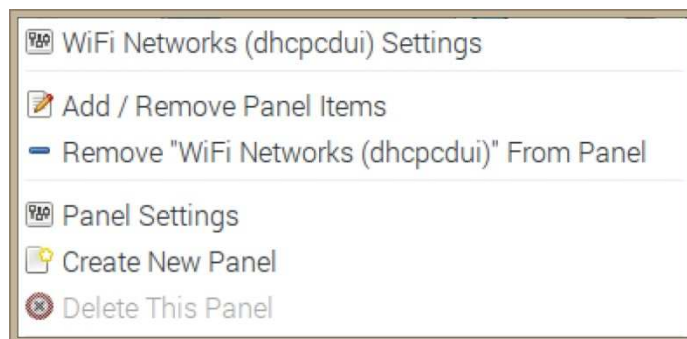
Select the interface you want to assign the static IP address from second drop down box on the configure line. Then uncheck the **Automatically configure empty options** checkbox. Enter the IPA, Router gateway and DNS addresses you want to use and click the X box in the upper right corner.
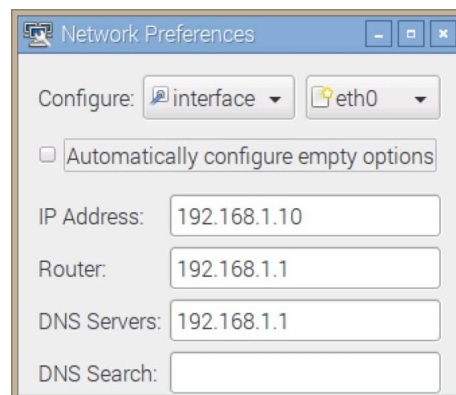
4.0   ALLSTAR OPERATION

The '**AStar'** menu is the default operator page used for connecting, monitoring or disconnecting Allstar nodes or hubs.

The four annunciators indicate the state of the internal or external radio. Each annunciator will illuminate whenever that specific radio function is active.

To connect, monitor or disconnect a specific Allstar node number, Enter a node number and touch either '**Con**', '**Mon'** or '**Dis**' button. If there connected nodes listed as shown above you can simply touch a particular node number from the list and touch the '**Dis**' button to disconnect that node.

Disconnect all connected node numbers.

The connection list window will show the status of up to ten connections to the hotspot. Four connections are listed at any one time if additional nodes are connected use the scroll bar on the right to bring them into view.

Connection from node 2455 in transceive mode
Connection to node 2444 in transceive mode
Connection to node 2560 in receive only mode

5.0   CONFIGURE RADIO PARAMETERS

The **'Radio**' menu is used for configuring the internal radio transmit and receive frequencies, PL tone, channel separation and squelch level. Nano-AE is also capable interfacing an external high power mobile radio or repeater using the external DB9 radio connector if wide area coverage is required.

Internal Radio Settings

Selects whether the node will use the internal radio or externally interfaced radio or repeater

Sets the internal radio transmit frequency, Enter a frequency between 430.000-449.999mhz and touch **'Save XMT'** button to save.

Sets the internal radio receive frequency, Enter a frequency between 430.000-449.999mhz and touch **'Save REC'** button to save.

Selects the internal radio channel separation

Selects 1 of 38 different Continuous Tone Coded Squelch (CTCSS) values or OFF

Selects 1 of 8 different squelch levels

External Radio/Repeater Settings

CTCSS, Check for active low signaling.

PTT, Check for active high signaling.

20db Audio Attenuators, Check for additional Receiver or Transmitter gain.

De-Emphasis (input from discriminator), Check to enable

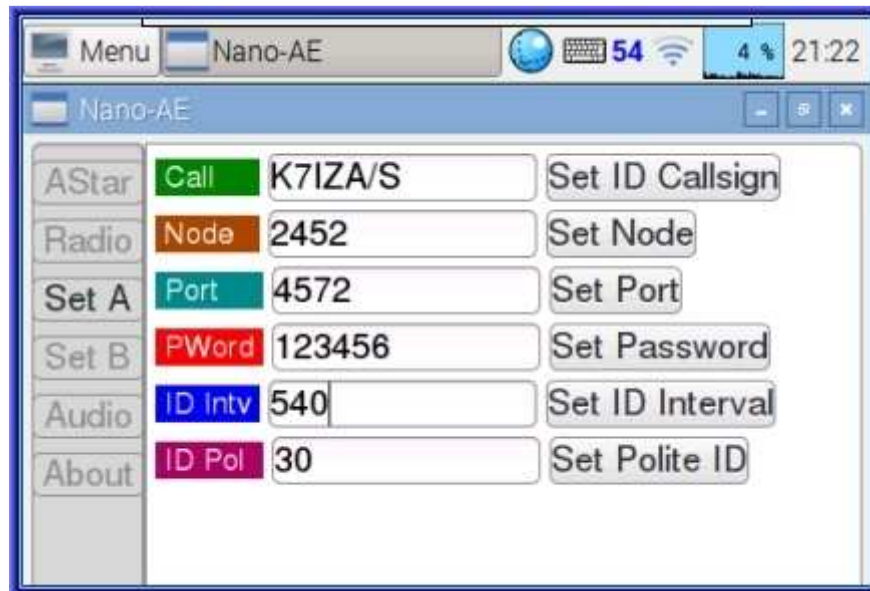Pre-Emphasis (Flat Audio to Transmitter), Check to enable.

PL Filter, Check to enable.

6.0   CONFIGURE NODE PARAMETERS

The **'SET A**' menu is used to configure the primary node information necessary for the node to register with the Allstar system servers. As well as the local identifier call sign and timing parameters needed for identifying the station locally.

Enter the call sign to be used when the node identifies itself over the air locally and touch the **'Set ID Callsign**' button to save.

Enter the timing interval in seconds (300-1000) to be used between ID cycles and touch **'Set ID Interval**' button to save.

Enter the timing interval in second (3-120) before ID timer expires to try and ID in the tail and touch **'Set ID Interval**' button to save.

Enter your pre-registered Allstar node number and touch the **'Set Node**' button to save.

Enter your pre-registered node number password and touch the **'Set Password**' button to save.

Enter the internet port number (4569) to be used for receiving calls from the network and touch the **'Set Port**' button to save.

7.0   CONFIGURE TELEMETRY, COURTESY TONES AND LCD BRIGHTNESS

The **'SET B'** menu is used to setup how telemetry services and courtesy tones function.

Courtesy Tone Setting

There are six courtesy tone types available on the Nano-AE. Each courtesy tone can be turned on or off with a simple check box.

Unlinked - Enable node idle courtesy tone
Remote - Enable courtesy tone when a remote base is connected
LinkUnkey - Enable courtesy tone when a linked node unkeys
NoLocalLink - Not used
NoUnkey - completely disables the courtesy tone.
HoldOffTele - Enable all telemetry to be held off until a local user on the
            receiver or a remote user over a link unkeys.

Telemetry Messages

Allstar nodes send telemetry information to all other connected systems through out-of-band messages over the VOIP channel. It is up to local user to decide what to do with this information. It can announce it, or ignore it. The Telemetry Default setting configures the mode operation allowing all telemetry (both local and obtained from other nodes**)** to be either always announced (On), never announced (Off), or announced only when a function is executed and a short time thereafter (Timed).

Duplex Mode

0 = Half duplex with no telemetry tones or hang time.

1 = Half duplex with telemetry tones and hang time. Does not repeat audio.
This mode is preferred when interfacing a simplex node.

2 = Full Duplex with telemetry tones and hang time.
This mode is preferred when interfacing a repeater.

3 = Full Duplex with telemetry tones and hang time, but no repeated audio.

4 = Full Duplex with telemetry tones and hang time. Repeated audio only when the autopatch is down.

Duplex Mode 1 ▾

Repeater Hang Time
Repeater tail hang time (in ms)

Hang Time 1 Set Time

LCD Backlight Brightness
Adjust LCD backlight to 25%, 50%, 75% or 100% brightness level.

LCD 100% ▾

8.0   CONFIGURE AUDIO PARAMETERS

Selecting the '**AUDIO'** menu allows you set the transmit (XMT) and receive (REC) audio levels for the node. This menu also provide a means of generating a 1khz tone with 3khz of deviation for setting the transmit audio level. As well as a parrot mode that will record your audio locally and retransmit it allowing you to hear how you sound.

Sets the nodes radio transmitter audio level heard by your radio. Enter a value between 1-999 and touch the **'Set XMT Level**' button to save the new value.

Sets the radio receiver audio level heard by users on the Allstar network. Enter a value between 1-999 then touch the **'Set REC Level**' button to save the new value

Toggle on/off a 1khz tone at 3khz of deviation that is transmitted by the node to set the transmitter audio level. Warning! This signal will be heard by all connected nodes or hubs so make sure to disconnect all before activating this function.


Single Parrot Mode allows you to record and automatically play back a single audio transmission. Touch the 'Set Single Parrot' button then key up your radio and record a short audio transmission and unkey. The node will play back the recorded audio allowing you to hear what you sound like to other users on Allstar.

### 9.0 NODE ABOUT INFORMATION AND SOFTWARE UPDATE

Selecting the '**ABOUT'** menu will display the nodes serial number and software revision level and also provides a means of updating the system software.
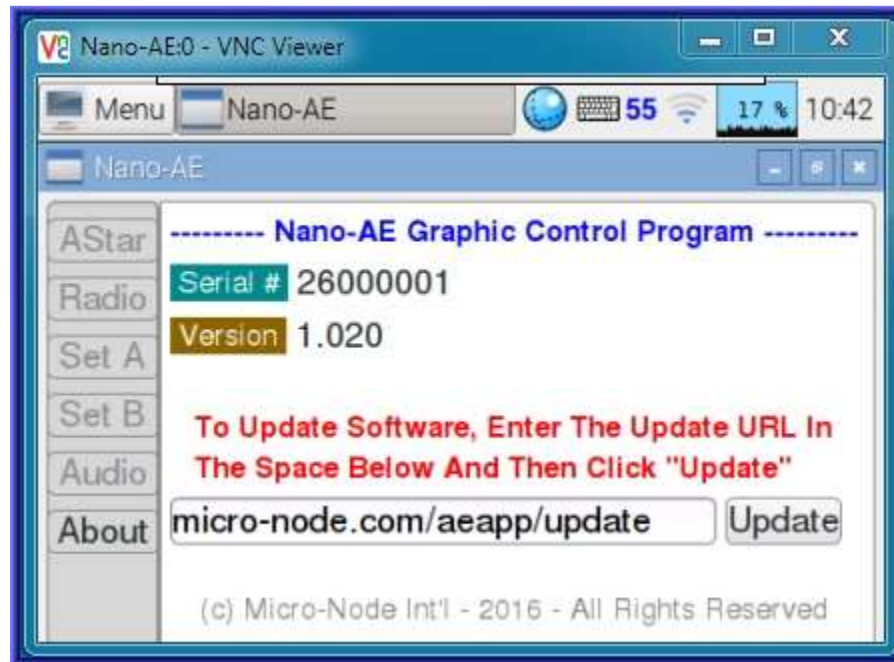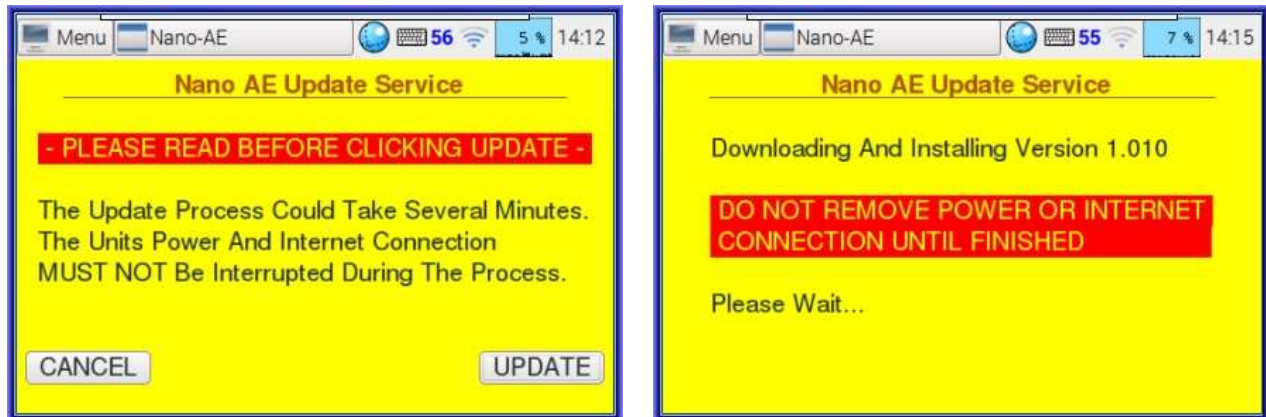

Software Updates

Micro-Node over time will be adding new features and functions to the node, as these new features and functions are added a notification will be posted on our webpage.

To Update the Nano-AE system software press the **Update** button and If the nodes current software revision is older than what is available you will have the option of continuing with the software update or canceling the process.
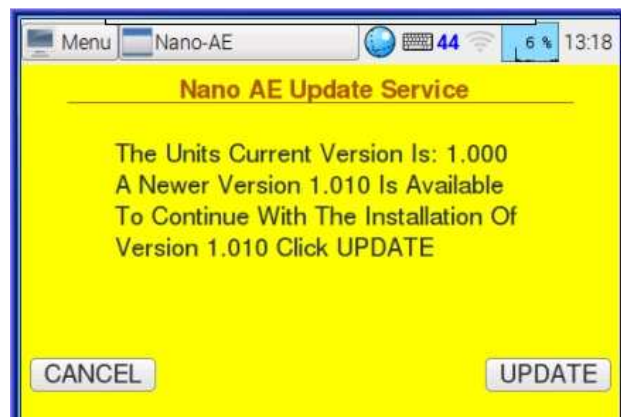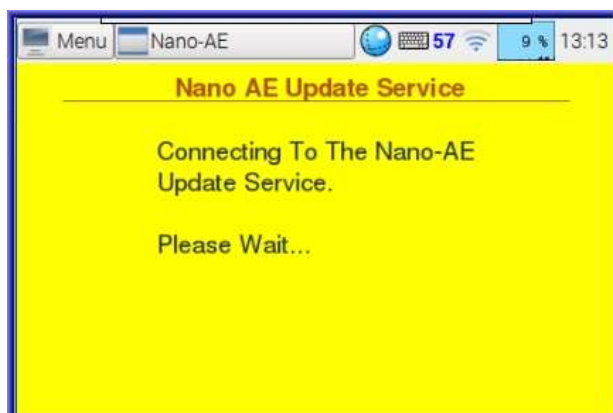
Pressing the **UPDATE** button will initiate the software update process and display a warning dialog box indicating that power and the internet connection must not be interrupted during the update. Acknowledge the warning by pressing the **UPDATE** button to start the process.

When the update process has completed a dialog box will be displayed indicating that it has completed successfully. After a successful update a reboot will be necessary to initiate the new software.

10.0 CONNECTING TO A ALLSTAR NODE OR HUB

Connecting or disconnecting an Allstar node or hub can be accomplished using the on-screen keyboard or DTMF commands sent from your radios keypad. To use the on-screen keyboard first select the 'AStar' menu then touch the 'Node' entry field. Then touch the on-screen keyboard icon ⌨ from the task bar at the top of LCD screen. A keyboard will appear on screen, using the numeric keypad enter the node number you want then touch the Connect or Disconn button.

To execute DTMF commands entered from your radio, key the radio enter the command and unkey. The following commands are available for connecting and disconnecting the node from the Allstar network.

| Command Code	Description
*1node	Disconnect Link
*2node	Connect link in monitor only mode
*3node	Connect link in transceive mode
*70	Local connection status

Notes:
1. 'node' is an Allstar Link node number
2. Node number zero (0) is shorthand for the last node operated on by a previous command
3. Monitor mode means listen to a node, but do not send any audio to it
4. To use the *70 command telemetry needs to be in 'ON' or 'TIMED' mode.

11.0   CONFIGURE LOCALE AND TIMEZONE SETTINGS

To set your time zone and locale preferences:

Touch the **MENU** button in the upper left corner of the task bar and select **Preferences** then select **Raspberry Pi Configuration** then **Localization.**
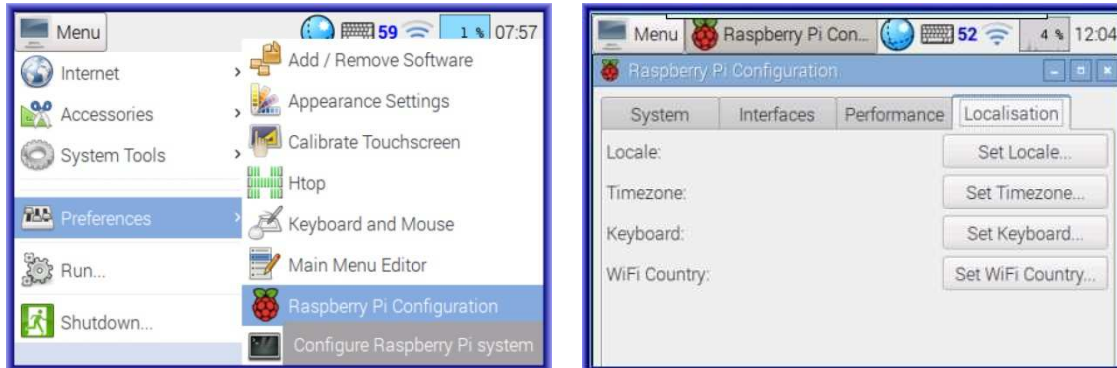
Select **Set Locale,** then using the drop down menus select the Language, Country and Character Set to be used by the node. Click **OK** save settings.

Select **Set Timezone,** then using the drop down menus select the area and Location to be used by the node. Click **OK** save settings.
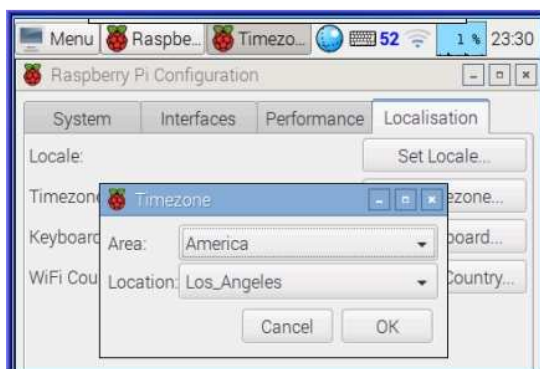
12.0   SYSTEM BACKUP

Backing up Operating System Software in case of a system crash is very important and easy to do using the built in SD Card Copier utility. To accomplish this you will need a USB to Micro SDCH card adapter and a minimum 8gb Micro SDHC memory card.

Preload the 8gb micro SDHC memory card into the USB to Micro SDCH card adapter then plug the adapter into one of the unused USB ports located on the right side of the Nano-AE. The **Removable Medium is Inserted** dialog box will appear indicating the system has recognizes the memory card. Press the **Cancel** button to close this dialog box.

From the **MENU** drop down select **Accessories** then select **SD Card Copier** and a SD Card dialog box will appear.
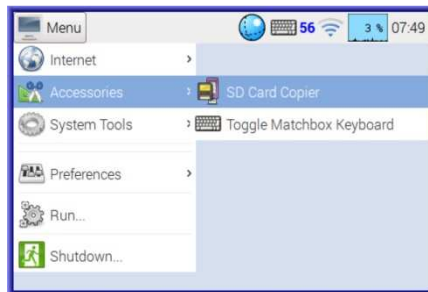
From the **Copy To Device** dropdown select the mass storage device to use for the backup. (/dev/sda) and click **Start.**
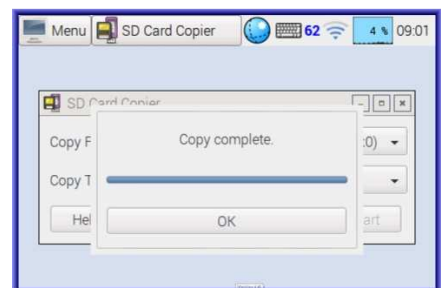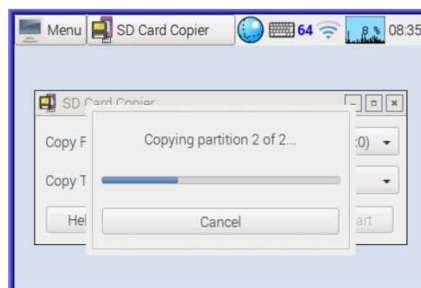

The storage media is prepared and the operating system image is copied to the micro-SDHC memory card. When the copy process has completed click **OK** and remove the backup media.

13.0 SYSTEM REBOOT/SHUTDOWN PROCEDURE

As with any Linux or Windows based computer system a proper shutdown is required before removing power to avoid possibly corrupting the file system.

To properly shutdown the Nano-AE touch the **MENU** button in the to upper left corner of the LCD screen and select **SHUTDOWN** from the drop down menu.
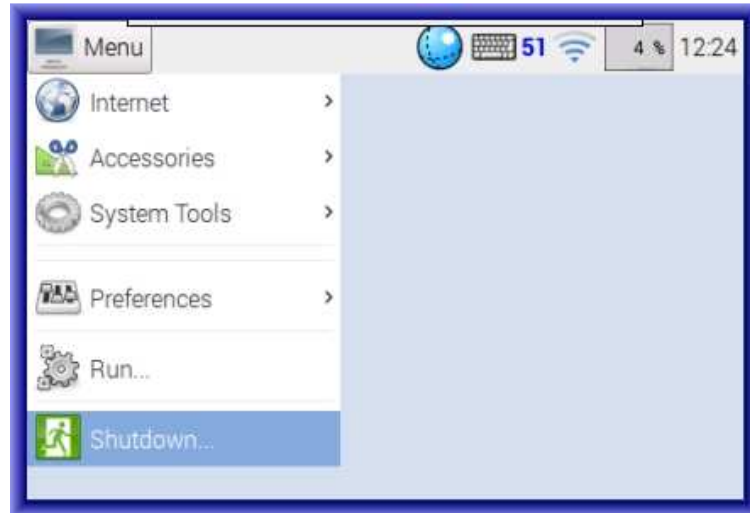
The **SHUTDOWN OPTIONS** dialog box will appear giving you the option to shutdown or reboot the Nano-AE. Touching the Shutdown button will properly close all files and shut the system down. The shutdown process is complete when the LCD backlight turns off.
<u>Wait an additional 15 Seconds before removing power from the node.</u>
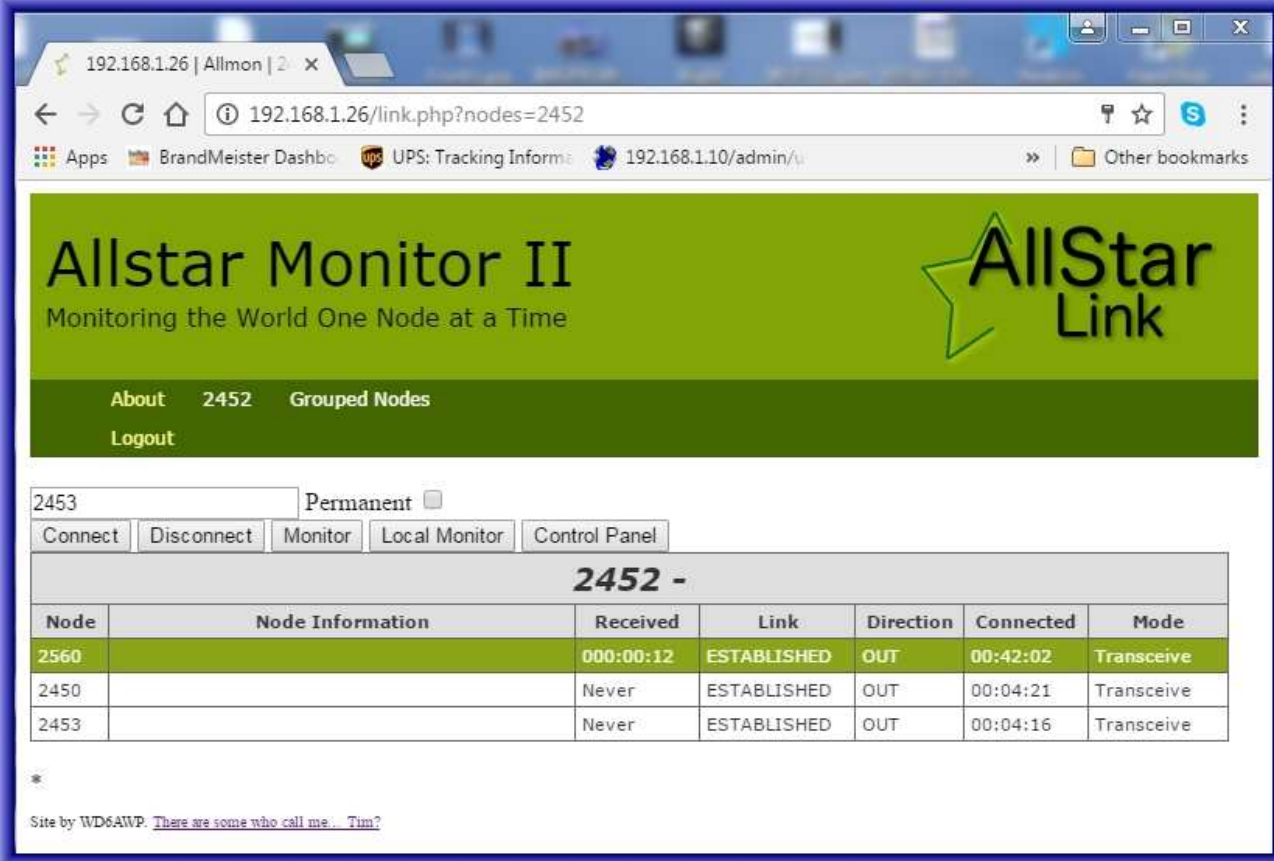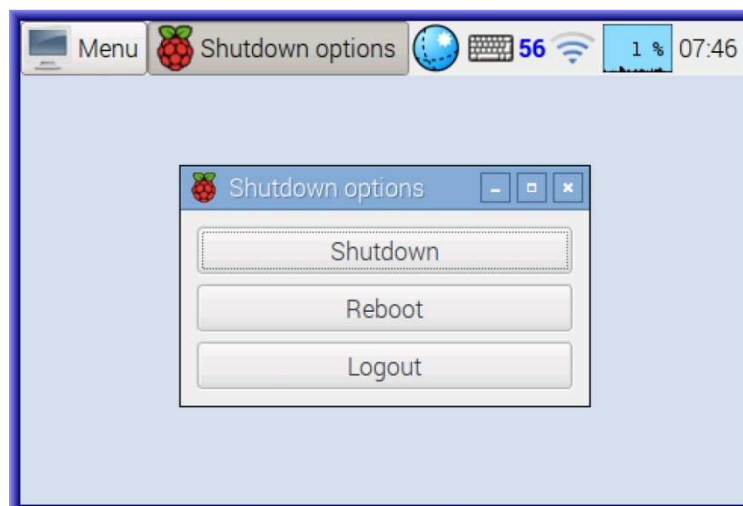
14.0   NETWORK MONITORING AND CONTROL (ALLMON)

Allmon is a webpage utility hosted by the Nano-AE for managing your Allstar node remotely from any computer or smart phone on your LAN (local area network) using a web browser. It provides a real time view of all connected and transmitting nodes. Transmitting nodes are highlight green, The list is sorted in reverse order of the most recently received node. The last node to talk is always at the top of the list. Any node that is currently being received will be highlighted by a green background as well as moving to the top of the list. The node list is updated once a second giving near-real-time node status.

To access the Allmon web utility you need to know the IP address assigned to the Nano-AE. By touching the network icon 🖥️ or 📶 located on the task bar a small information window will appear that will display the IP address assigned to the node by the router.

Enter the IP address into your web browser to start the Allstar Monitor II web page.

If you want to control the Nano-AE from Allmon you need to login using:

Username: 'admin'
Password: 'nano-ae'

Once logged in the node control menus will appear allowing you to control the node from Allmon.

E-mail: support@micro-node.com   Phone Support: 702-528-4700
Website: www.micro-node.com