Getting Started with AREDN RF

3/24/2022

KG7KMV for SW Idaho ARC

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Introduction

For about a $125 startup cost you can join in the Treasure Valley wide area AREDN mesh network. You'll need a temporary small unmanaged switch to aid in loading initial firmware as well as a couple short ethernet patch cables. For final installation you'll want to locate the hAP near your existing home internet router and the SXTsq/LHG outside with line of sight toward Shafer Butte with an ethernet cable running between the two.

Hardware Requirements

Equipment to purchase (Amazon links)
- Cat5e or Cat6 Ethernet cable (shielded optional) depending on installation
- MikroTik hAP (**RB952Ui-5ac2nD**) $49
- MikroTik SXTsq 5 (**SXTsq/LHG-5HPnD**) $69 (<15 miles from Shafer Butte) Or
- MikroTik LHG 5 (**RBLHG-5nD**) $75 (>15 miles from Shafer Butte)

Borrowed/temporary equipment:
- Small unmanaged switch
- Ethernet patch (1-2') cables

References

- https://www.arednmesh.org/content/installation-instructions-mikrotik-devices
- https://www.youtube.com/watch?v=loCU6AkGDMg

Revisions

Date	Who	Change
3/20/2022	KG7KMV	Original document
3/24/2022	KG7KMV	Update to include SXTsq or LHG, formatting

MikroTik Hap Firmware Procedure

1. Download the latest Firmware images for MikroTik hAP Factory and sysupgrade. Also get the sysupgrade for the SXTsq/LHG from:

    http://downloads.arednmesh.org/firmware/html/stable.html

2. Download the TinyPXE server here: http://reboot.pro/files/file/303-tiny-pxe-server/

3. With a network switch and two short cables, attach your PC to the switch and the hAP (port 1) to the switch (powered off).
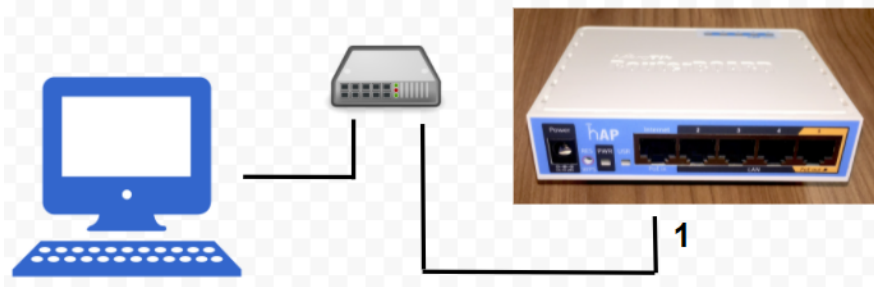
4. Change your PC to the static IP 192.168.1.50 / 255.255.255.0
5. Run the TinyPXE server.
6. Select the downloaded factory .elf file as the Boot File.
7. Click the Online button.
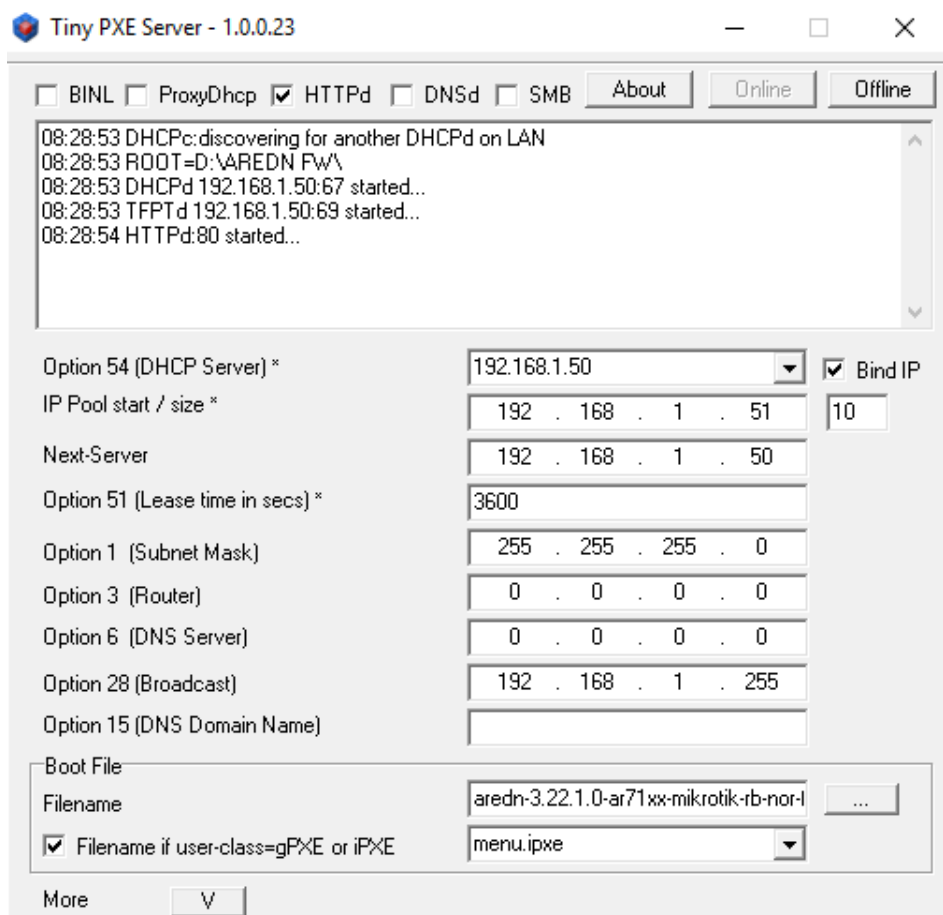
8. Press and hold the hAP reset button while applying power to the device. You will see a line in the PXE server log window with "TFTPd:DoReadFile…"
9. When the log moves beyond the DoReadFile line, release the reset button.
10. Click the Offline button on TinyPXE.
11. Change your PC to DHCP.
12. Move the Ethernet cable from port 1 to port 2, 3, or 4 on the MikroTik hAP.
13. Use a web browser to access http://192.168.1.1
14. Click the Setup button.
15. Login with **Root / hsmm.**
16. Click Administration.
17. Click Upload Firmware Choose File button.
18. Select the sysupgrade.bin file.
19. Click the Upload button.
20. **WAIT** ~ 2 minutes. The device will reboot itself a couple times.
21. User a web browser to access http://localnode.local.mesh

> *If you're having trouble reaching this point: Start over, View the referenced video, or find help.*

MikroTik Hap Configuration Procedure

This will configure the Hap to act as a WiFi access point for your PC or mobile device to connect to, allowing access into the AREDN mesh. The Hap includes a 2.4GHz Mesh node which can be used for local mesh links. Port 5 will be configured for passive 24v PoE to operate the SXTsq/LHG as a link into the wide area mesh.

1. Use a web browser to access http://localnode.local.mesh
2. Click the Setup button.
3. Login with **Root / hsmm.**
4. Change the Node Name to <callsign>-router.
5. Enter a new password (twice). This is the password to change the node configuration.
6. Click the Save Changes button. It will reboot itself.
7. When it comes back up, Login to Setup again (with your new password).
8. Set the Mesh RF Channel to -2
9. Set the Channel Width to 10MHz.
10. Check Enable LAN Access Point (WiFi access into the mesh)
11. Set the SSID to <callsign>-AREDN
12. Set a WiFi Password.

13. Click Save Changes and then Reboot.
14. Use a web browser to access http://localnode.local.mesh
15. Click the Setup button.
16. Login with **Root / your password.**
17. Enter your Latitude, Longitude, and grid square. Click Apply Location Settings.
18. Set your timezone (UTC suggested).
19. Click Advanced Configuration.
20. Find "aredn.@poe[0].passthrough", enable it, and click Save Setting and Reboot.

MikroTik SXTsq/LHG Firmware Procedure

1. Download the two latest Firmware images for SXTsq/LHG Factory and sysupgrade.
   https://downloads.arednmesh.org/afs/www/
2. Download the TinyPXE server here: http://reboot.pro/files/file/303-tiny-pxe-server/
3. With a network switch and two short cables, attach your PC to the switch and the
   SXTsq/LHG to the switch via the PoE adapter (keep powered off).

4. Change your PC to the static IP 192.168.1.50 / 255.255.255.0
5. Run the TinyPXE server.
6. Select the downloaded factory .elf file as the Boot File.
7. Click the Online button.
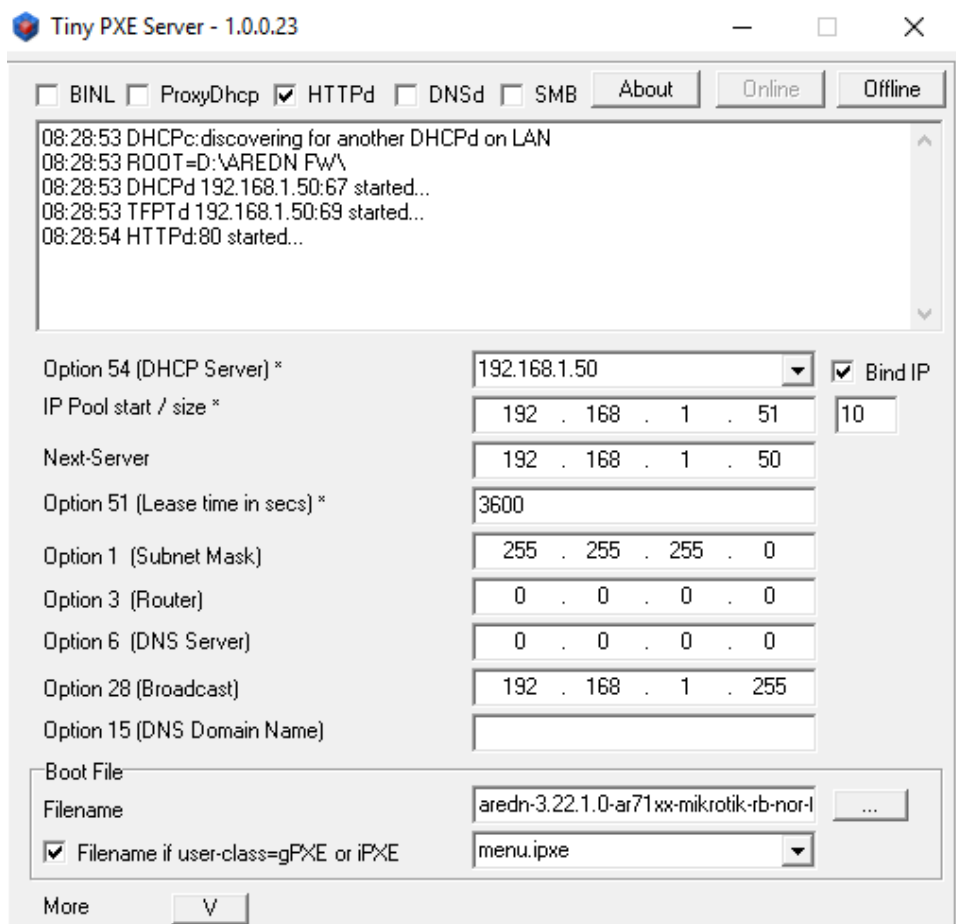
8. Press and hold the SXTsq/LHG reset button while applying power to the device. You will see a line in the PXE server log window with "TFTPd:DoReadFile…"
9. When the log moves beyond the DoReadFile line, release the reset button.
10. Click the Offline button on TinyPXE.
11. Change your PC to DHCP.
12. Use a web browser to access http://192.168.1.1
13. Click the Setup button.
14. Login with **Root / hsmm.**
15. Click Administration.
16. Click Upload Firmware Choose File button.
17. Select the sysupgrade.bin file.
18. Click the Upload button.
19. **WAIT** ~ 2 minutes. The device will reboot itself a couple times.
20. Use a web browser to access http://localnode.local.mesh

> *If you're having trouble reaching this point: Start over, View the referenced video, or find help.*

MikroTik SXTsq/LHG Configuration Procedure

This will configure the SXTsq/LHG to be a link into the Treasure Valley wide AREDN mesh. It is intended to be connected to port 5 on the mikroTik hAP, which automatically configures a DTD link between the two nodes over the ethernet cable.

1. Use a web browser to access http://localnode.local.mesh
2. Click the Setup button.
3. Login with **Root / hsmm.**
4. Change the Node Name to <callsign>-SXTsq or <callsign>-LHG.
5. Enter a new password (twice). This is the password to change the node configuration.
6. Click the Save Changes button. It will reboot itself.
7. When it comes back up, Login to Setup again (with your new password).
8. Set the Mesh RF Channel to 172.
9. Set the Channel Width to 10MHz.
10. Disable the WAN.

11. Click Save Changes and then Reboot.

Final Setup

1. Install the SXTsq/LHG outdoors with a direct line of sight to Shafer Butte.
2. Install an Ethernet cable between the SXTsq/LHG and port 5 of the hAP.
3. There are several configuration options:
   a. You may choose to have your AREDN connected to your home internet or independent via port 1. This port has a WAN router on it to block traffic coming into the AREDN mesh while allowing traffic out.
   b. You may connect your PC to the hAP for both Internet (if connected) and full AREDN access via wired or WiFi. Keeping your PC on your home network will allow access to the hAP configuration page but not deeper into the AREDN mesh.
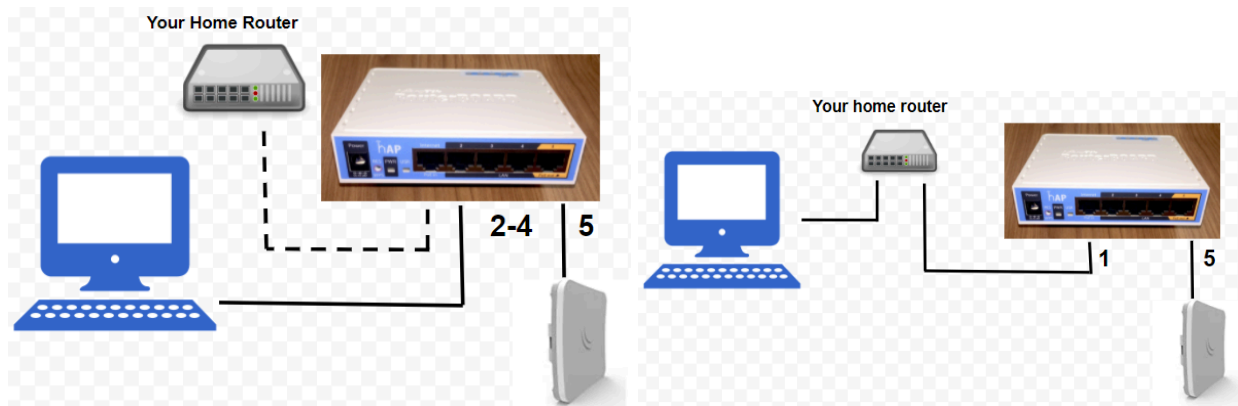
4. Ideally with a mobile device connected to your hAP WiFi so you can take it with you to the installed SXTsq/LHG, use a web browser to access http://localnode.local.mesh
5. Click the Mesh Status button. You should see a Current neighbor of your SXTsq/LHG (dtd) and hopefully more if it has meshed to another node.

6. Click on the SXTsq/LHG link to be taken to the SXTsq/LHG status page.
7. Click the "Signal/Noise/Ratio" Charts button
8. Either turn the sound on, or observe the Realtime SNR to fine tune the aiming of your SXTsq/LHG for the best possible signal.
9. That's it, you're on the Treasure Valley AREDN mesh!