



Broadband-Hamnet

HSMM-MESH



What is Broadband-Hamnet?

- Formerly HSMM-Mesh
- Utilizes off the shelf hardware with custom firmware
- Self discovering, self configuring, self advertising and fault tolerant network
- Self-sufficient network that does not require any other infrastructure
- Utilizes the 13cm band

What hardware is needed?

- Linksys devices

- WRT54GS version 1.0 -3.0
- WRT54GS version 4.0 *
- WRT54G version 1.0 – 4.0 *
- WRT54GL version 1.0 – 1.1 *

* Limited memory. Will not run latest build of HSMM-Mesh firmware

- Ubiquiti devices

- AirGrid M2 HP
- Bullet M2 HP
- NanoStation Loco M2
- NanoStation M2
- Rocket M2

What hardware is needed?

- High gain antennas
 - Grid
 - Panel antenna
 - Vertical
 - Yagi
- Amplifiers
- Power supply
- Portable Mount





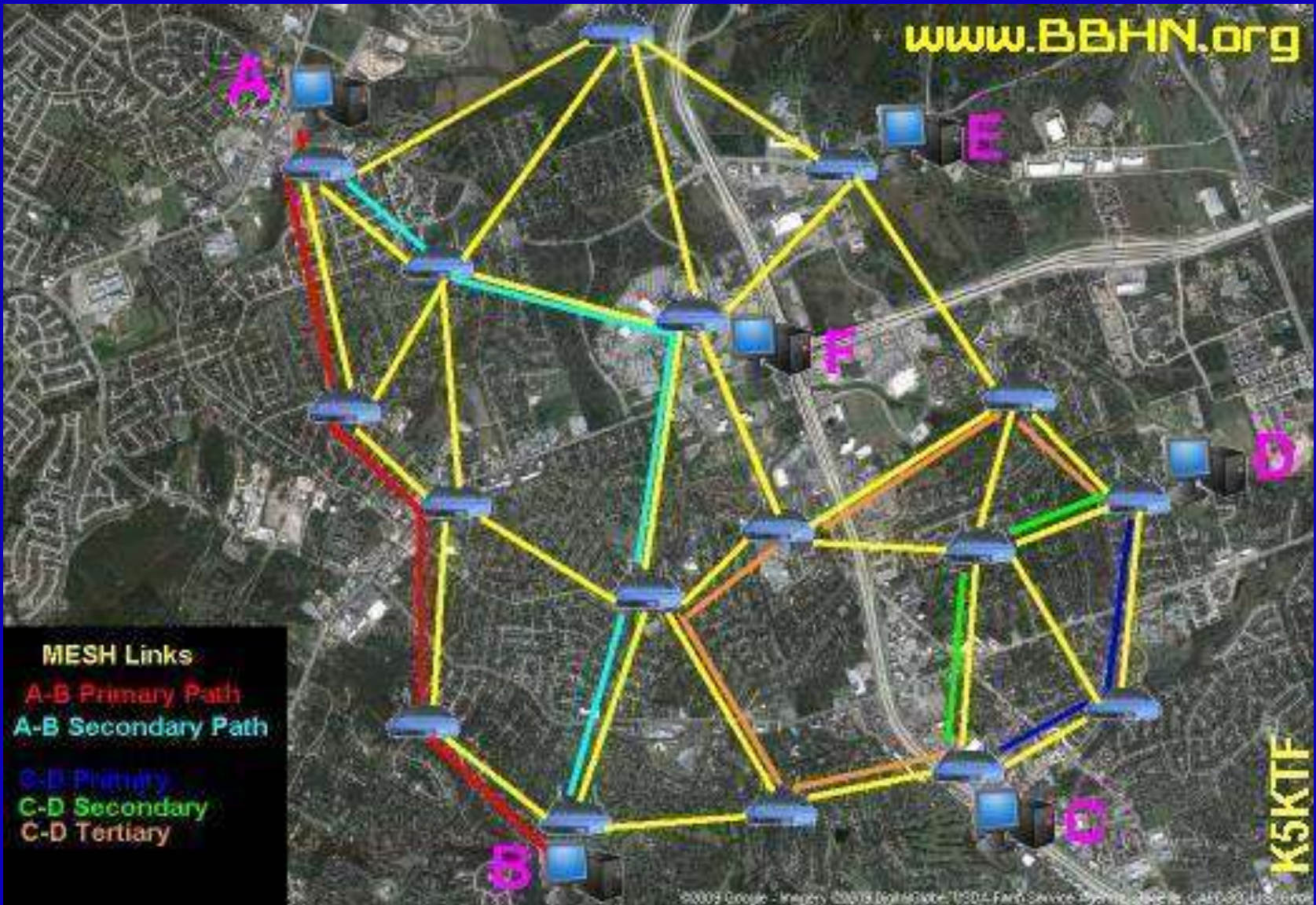


Broadband-
Hamnet

How does it work?

- Mesh nodes communicate with other nodes over Wi-Fi frequencies and only talk to other mesh nodes on the wireless port
- Mesh nodes use peer to peer connections
- WiFi interface operates in Ad-Hoc mode
- OLSR is used for auto linking of mesh node radios
- Access to the mesh is available only from a mesh node, not directly to client devices
- Mesh nodes on channels 1-6 use FCC part 97 rules instead of part 15
- Mesh nodes will create a network just by turning several of them on

Mesh topology



What can it do?

- The mesh is a network, not an application
- Resources on your mesh node can be shared with others on the mesh
- See and use advertised services on other nodes by clicking them in a web browser

| KC0IQW-1 mesh status | | | | |
|----------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|------|----------|
| <input type="button" value="Refresh"/> <input type="button" value="Auto"/> <input type="button" value="Quit"/> | | | | |
| Local Hosts | Services | Current Neighbors | LQ | Services |
| KC0IQW-1 | | KC0IQW-2 | 100% | |
| • kc0iqw-Server | Chat | KC0IQW-3 | 100% | |
| | FTP | KC0IQW-4 | 100% | |
| | HTTP | | | |
| • kc0iqw-pbx | | Previous Neighbors | When | |
| • kc0iqw-printer | | | | |
| • conference.kc0iqw-server.local.mesh | | none | | |

How can ARES leverage the Mesh?

- Email
- Internet access
- Intranet
- Keyboard to keyboard chat using IM
- Printing
- Radar
- Video
- VoIP

How do I get started?

- Download firmware from <http://www.broadband-hamnet.org>

Software Download

| Broadband Hamnet Firmware for Ubiquiti (UBNT) | | |
|---------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FACTORY - flashing from inside AirOS or by TFTP SYSUPGRADE - upgrade a unit already flashed as a mesh node | | |
| bbhn-1.1.2-ar71xx-generic-ubnt-bullet-m-squashfs-factory.bin | 3.7MB | Factory Bullet M2 & M5 HP, Bullet M2 & M5 Titanium, NanoStation Loco M2 & M5, Nanobridge M2 & M5, AirGrid M2 & M5, Picostation M2 md5sum:d3a632e6b55ac66ee64ae6091c646f44 |
| bbhn-1.1.2-ar71xx-generic-ubnt-bullet-m-squashfs-sysupgrade.bin | 3.7MB | SysUpgrade Bullet M2 & M5 HP, Bullet M2 & M5 Titanium, NanoStation Loco M2 & M5, Nanobridge M2 & M5, AirGrid M2 & M5, Picostation M2 md5sum:f5c4fcb0ad47536af1bf8e09e0b15f80 |
| bbhn-1.1.2-ar71xx-generic-ubnt-nano-m-squashfs-factory.bin | 3.7MB | Factory NanoStation M2 & M5 (Not Loco - Use the bullet-m image for Loco) md5sum:e787c3ec0d43a56f6fc5567f6644a934 |
| bbhn-1.1.2-ar71xx-generic-ubnt-nano-m-squashfs-sysupgrade.bin | 3.7MB | SysUpgrade NanoStation M2 & M5 (Not Loco - Use the bullet-m image for Loco) md5sum:0b88c89ba12a454b3845e104dd45d1d1 |

How do I get started?

- Flash router with Mesh firmware

The screenshot displays the web management interface for a NanoStation loco M2. At the top, the title "NanoStation loco M2" is on the left and the "airOS" logo is on the right. A navigation bar contains tabs for "MAIN", "WIRELESS", "NETWORK", "ADVANCED", "SERVICES", and "SYSTEM", with "SYSTEM" currently selected. To the right of the tabs are "Tools:" and "Logout" buttons. A blue banner at the top of the main content area displays "Uploaded Firmware Version: XM.v6.0" and a "WARNING: Uploaded firmware is third-party, make sure you're familiar with recovery procedure!" with "Update" and "Discard" buttons. Below this is the "Firmware Update" section, which shows the current "Firmware Version: XM.v5.5.8" and "Build Number: 20991". It includes an "Upload Firmware:" section with a "Browse..." button and the text "No file selected.". There is also a "Check for Updates:" section with a checked "Enable" checkbox and a "Check Now" button. The "Device" section shows "Device Name: WAN2" and "Interface Language: English". The "Date Settings" section shows "Time Zone: (GMT-06:00) Central Stan" and "Startup Date: [] Enable".

NanoStation loco M2 airOS

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: Logout

Uploaded Firmware Version: XM.v6.0
WARNING: Uploaded firmware is third-party, make sure you're familiar with recovery procedure! Update Discard

Firmware Update

Firmware Version: XM.v5.5.8 Upload Firmware: Browse... No file selected.
Build Number: 20991

Check for Updates: Enable Check Now

Device Date Settings

Device Name: WAN2 Time Zone: (GMT-06:00) Central Stan
Interface Language: English Startup Date: Enable
Startup Date:

How do I get started?

- Configure node
- Browse to <http://localnode:8080>

NOCALL-236-68-179

[Help](#) Night Mode

This node is not yet configured.

Go to the setup page and set your node name and password.

Click **Save Changes**, even if you didn't make any changes, then the node will reboot.

| | | | |
|-------------------------|-------------------------------------------|-------------------------|---------------------------------------------------------|
| WiFi/LAN address | 172.27.0.1 / 24 fe80:200:f:fe00:0 Link | firmware version | 0.4.1 |
| WAN address | none fe80:213:10f:fee:c4b1 Link | configuration | not set |
| default gateway | none | system time | Sat Jan 1 2000 00:06:10 UTC |
| your address | 172.27.0.6 | uptime | 6 min |
| | | load average | 0.10, 0.24, 0.14 |
| | | free space | flash = 4348 KB /tmp = 15200 KB memory = 17744 KB |

How do I get started?

- Click the “Setup” button
- Log in with the username root with the password hsmm

NOCALL-236-68-179

[Help](#) Night Mode

This node is not yet configured.

Go to the setup page and set your node name and password.

Click Save Changes, even if you didn't make any changes, then the node will reboot.

| | | | |
|------------------|-------------------------------------------|------------------|--------------------------------|
| WiFi/LAN address | 172.27.0.1 / 24 fe80:200:f7fe00:0 Link | firmware version | 0.4.1 |
| | | configuration | not set |
| WAN address | none fe80:213:10ff:fecc:44b1 Link | system time | Sat Jan 1 2000 00:06:10 UTC |

def

:

Authentication Required

A username and password are being requested by http://localhost:8080. The site says: "OpenWeb"

User Name:

Password:

How do I get started?

- Configure node name with your callsign in the form of KC0IQW-1
- Set a new password of your choice
- Click “Save Changes” to save and reboot

| | | | | | |
|-----------------------------|---------------------------------------------|---------------------------------------------------------|-----------------------------------------------|---------------------------------------|--------------------------------------|
| Node Status | Basic Setup | Port Forwarding, DHCP, and Services | Administration | | |
| Help | <input type="button" value="Save Changes"/> | <input type="button" value="Reset Values"/> | <input type="button" value="Default Values"/> | <input type="button" value="Reboot"/> | |
| Node Name | <input type="text" value="KC0IQW-1"/> | Password | <input type="text"/> | | |
| Node Type | <input type="text" value="Mesh Node"/> | Verify Password | <input type="text"/> | | |
| WiFi | | LAN | | WAN | |
| Protocol | <input type="text" value="Static"/> | LAN Mode | <input type="text" value="13 host Direct"/> | Protocol | <input type="text" value="DHCP"/> |
| IP Address | <input type="text" value="10.8.207.221"/> | IP Address | <input type="text" value="10.140.253.209"/> | DNS 1 | <input type="text" value="8.8.8.8"/> |
| Netmask | <input type="text" value="255.0.0.0"/> | Netmask | <input type="text" value="255.255.255.240"/> | DNS 2 | <input type="text" value="8.8.4.4"/> |
| SSID | <input type="text" value="BroadbandHamn"/> | DHCP Server | <input checked="" type="checkbox"/> | <hr/> | |
| Mode | <input type="text" value="Ad-Hoc"/> | DHCP Start | <input type="text" value="210"/> | Mesh Gateway | <input checked="" type="checkbox"/> |
| Channel | <input type="text" value="1"/> | DHCP End | <input type="text" value="222"/> | | |

How do I get started?

- Click on “Mesh Status” to display connected nodes and services

KC0IQW-1

[Help](#) Night Mode

| | | | | |
|------------------------|-------------------------------------------------------|---------------------------|---------------------------------|-------------------------------------|
| WiFi address | 10.8.207.221 / 8 fe80::de9f:dbff:fe08:cfdd Link | Signal/Noise/Ratio | -43 / -94 / 51 dB | <input type="button" value="Auto"/> |
| LAN address | 10.140.253.129 / 25 fe80::de9f:dbff:fe09:cfdd Link | firmware version | 1.0.1 | |
| WAN address | 172.17.100.101 / 24 fe80::de9f:dbff:fe09:cfdd Link | configuration | mesh | |
| default gateway | 172.17.100.1 | system time | Sun Jul 20 2014 03:06:44 UTC | |
| | | uptime | 23:26 | |
| | | load average | 0.00, 0.00, 0.00 | |
| | | | flash = 3316 KB | |
| | | free space | /tmp = 14628 KB | |
| | | | memory = 9176 KB | |

How do I get started?

- Click on a link to access an advertised service
- Click on a node name to view information of a neighbor

KC0IQW-1 mesh status

| Local Hosts | Services | Current Neighbors | LQ | Services |
|---------------------------------------|----------------------|---------------------------|------|-------------|
| KC0IQW-1 | | KC0IQW-2 | 100% | |
| ● kc0iqw-Server | Chat | KC0IQW-3 | 100% | |
| | FTP | KC0IQW-4 | 100% | |
| | HTTP | | | |
| ● kc0iqw-pbx | | Previous Neighbors | | When |
| ● kc0iqw-printer | | | | |
| ● conference.kc0iqw-server.local.mesh | | none | | |
| ● unifi | | | | |
| Remote Nodes | ETX | Services | | |
| none | | | | |

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Questions?