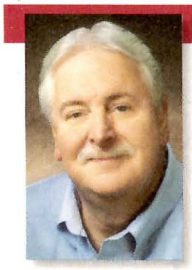


Steve Ford, WB8IMY, wb8imy@arrl.org

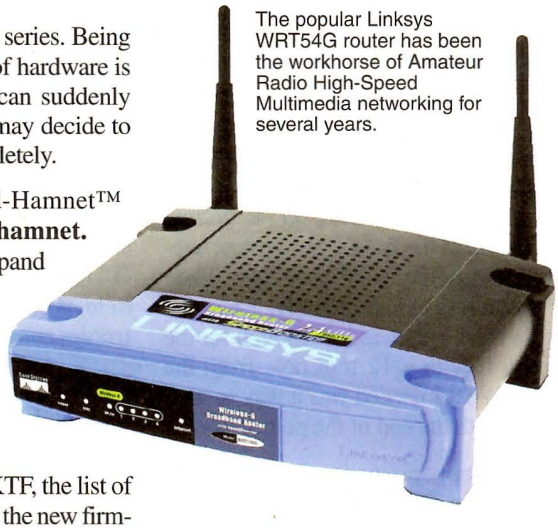
High-Speed Multimedia Goes Beyond the Linksys WRT54G

In the finest tradition of Amateur Radio, hams have been "hacking" the Linksys WRT54G series of inexpensive consumer Wi-Fi routers and turning them into 2.4 GHz high-speed data transceivers. These routers operate on a number of channel frequencies that are well within our 2.4 GHz ham allocation, meaning that we can legally do fun things such as attaching them to high-gain antennas and RF power amplifiers. The result has been the development of Amateur Radio High-Speed Multimedia (HSMM) networks in several locations around the country.

The development of mesh technology has made it ridiculously easy to set up highly redundant HSMM networks. Mesh-enabled router/transceivers communicate with each other and route data automatically to wherever it needs to go. If one router in the mesh network goes offline, the network instantly adapts and establishes new routes.

All this has been going on for a number of years, aided and abetted by the fact the Linksys routers are widely available and extremely simple to modify by installing new firmware. The only issue has been overreliance on the WRT54G series. Being dependent on a single brand of hardware is never a good idea. Designs can suddenly change, or the manufacturer may decide to discontinue the product completely.

That's why the Broadband-Hamnet™ project (**www.broadband-hamnet.org**) has been working to expand the HSMM hardware universe. In February they announced that they had released new firmware that enables Ubiquiti 2.4GHz devices to join the mesh.



The popular Linksys WRT54G router has been the workhorse of Amateur Radio High-Speed Multimedia networking for several years.

According to Jim Kinter, K5KTF, the list of Ubiquiti devices supported by the new firmware includes:

- Rocket M2
- Bullet M2 HP
- AirGrid M2 HP
- NanoStation Loco M2 (NSL-M2)
- NanoStation M2 (NS-M2)

These devices have higher quality radios with more output power than the WRT54Gs, while still providing the same interface that current HSMM mesh enthusiasts have come to know. Best of all, they are widely available from Amazon and other retailers for $50 to $80, depending on the model. You'll find more information and the firmware at **www.broadband-hamnet.org**.

The next step in their project is to modify the newly released firmware to work on the Ubiquiti 5.8 GHz gear, and then the 3.4 GHz units after that. Stay tuned.

Front and rear views of the Ubiquiti Nanostation Loco router. Available for about $50, all you have to do is load new firmware to turn it into a 2.4 GHz HSMM mesh transceiver.

21st Century Signal Sleuthing

Martin Ewing, AA6E, shared a fascinating story that begins with a ham in Finland. Oona Raisanen, OH2EIQ, happened to see a video clip on the Internet of a news helicopter filming a police chase in Kansas City, Missouri. While watching the video she noticed an unusual bit of interference in the audio track. As she listened closely, Oona realized that she was hearing a data transmission. Her curiosity was piqued, and the chase was on!

Oona captured the audio signal and went to work extracting the information. She uncovered a bit stream consisting of packets of 47 bytes each, synchronized by start and stop bits and separated by repetitions of the byte 0x80. If the first four bits of each byte are ignored, the data forms a smooth gradient of three-digit numbers in base 10. It didn't take long before Oona realized that it was GPS data: latitude and longitude coordinates!

Nucomm, the manufacturer of the helicopter video transmitter, confirmed her discovery and said that the system allows the helicopter to be viewed "on a moving map system." It can also enable the receiving antenna to lock onto the helicopter's position, allowing an uninterrupted video downlink. You can read the story online at **www.windytan.com/2014/02/mystery-signal-from-helicopter.html**.

Congratulations to Oona! The ham spirit is still very much alive in the 21st century.