



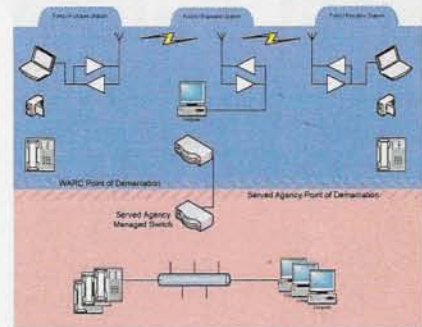
W I S C O N S I N  
**AMATEUR RADIO**  
C L U B

## Digital Backbone Project

The Wisconsin Amateur Radio Club is deploying a 5.6 GHz – 5.825 GHz high speed digital network in southeast Wisconsin. This high reliability, mesh network is designed to support the served agencies of the club as well as act as a backbone for remote receive sites for repeaters and point to point links for communications for members.

Many forms of communications are supported on the digital backbone. Some examples include:

- Voice
- Pictures
- High resolution video
- Telemetry
- Large file transfers
- E-mail
- Telephone communications (Voice over IP / VoIP)
- Network bridging



Due to the 6 to 54 megabit bandwidth, multiple simultaneous communications can take place on a single channel. Any site can act as an intelligent digital repeater into the network and thereby expand the mesh, provided it has proper credentials.

The cost of the station is particularly attractive. Due to advancements in the commercial field for this type of equipment, a fully capable transceiver and antenna can be purchased for less than \$250, putting this technology into the price range of the average amateur radio operator. The station requires a non-dedicated but powered-on computer to complete the installation.

## Transceiver

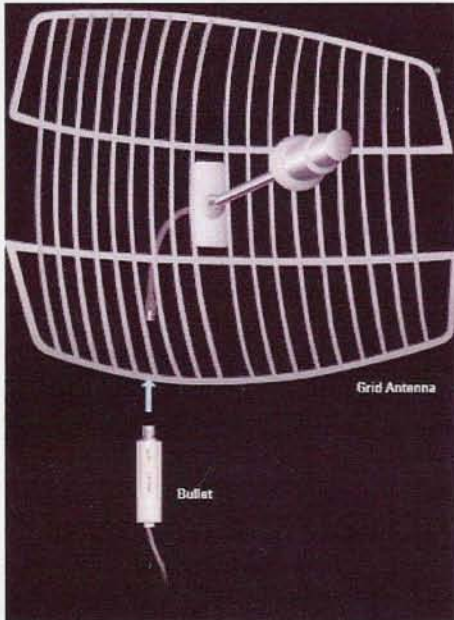


Several manufacturers are now making transceivers capable of operating in the 5 GHz spectrum that is compatible with the network. The Wisconsin Amateur Radio club has selected the Bullet 5HP by Ubiquiti Networks. This 1 watt transceiver will be available for less than \$100 and is enclosed in a waterproof tube that mounts directly to the antenna eliminating the need for coax or hardline of any type. A waterproof cat-5 cable is run into the shack. This inexpensive cable carries the digital data and feeds power to the transceiver.

## Antenna

Antennas are available in a wide range of gains and configurations. Omni directional antennas with 11-14 dBi gain are common. Directional, grid parabolic antennas as shown below sport up to 30 dBi gain with a few degrees of forward beamwidth. A 20 mile, line of site link is possible.

At our key geographic sites, we will also be deploying so called "sector antennas" that each have high gain over a 90 degree beamwidth and are arranged in a cluster of four to provide high gain, 360 degree coverage. Each antenna has its own transceiver and retransmission of signals can be dynamically configured to be transmitted in a single direction or in an omni-directional fashion.



## Field Deployment

Due to the 12 volt operation and the small, high gain antennas, a portable station can be quickly assembled in the field and added to the digital backbone network. The only requirement is line of site to another digital backbone station and the proper credentials.

Field locations provide:

- VoIP telephone for command posts
- Real time high resolution video of conditions
- E-mail and file transfers
- Extension of the digital network
- Standard voice type QSO's

## Join Us!

All amateur radio license classes can deploy and operate this technology. If you would like to participate, lend your expertise, or put up your own station please come to a meeting or contact our technical committee chairman, Glenn Schulz at [W9IQ@arrl.net](mailto:W9IQ@arrl.net) for more information.

The Wisconsin Amateur Radio Club meets the last Wednesday of each month at the Germantown Police Department EOC. Social time begins at 7 PM and the meeting kicks off at 7:30 PM. The cookies are plentiful, the coffee is hot, and guests are warmly welcomed. Visit us on the web at [www.wiarc.org](http://www.wiarc.org) for the more information.



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