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Recommended BASIC Mobile AREDN Hardware

The hardware described in this paper is certainly not the only solution to putting together a mobile AREDN node. However, the hardware listed here is commonly available at very reasonable prices, especially on the used equipment market. Sources for all this hardware include Ebay, Amazon, the manufacturers themselves, and a proliferation of resellers. A quick internet search of the device part number will yield many different sources.

TRANSCEIVER (2.4 or 5 GHz) - Ubiquiti Bullet - price less than \$100 new and can be had on the used market for anywhere from \$25 to \$75. I recommend starting with a 2.4 GHz version and buying it used as cheap as you can. New devices come with a warranty. However, for AREDN we are going to erase the manufacturer's firmware and install our own... so the warranty will be violated, anyway.

Here is a link to a data sheet on these devices:

<https://www.ui.com/download/airmax-ac/bullet-ac/default/bullet-ac-datasheet>

ANTENNA (2.4 or 5 GHz) - Various manufacturers make mobile type antennas for these frequencies. I will only list a couple. For mobile use, a magnetically mounted antenna is probably most practical in typical installations. You will need a 50 ohm coaxial cable to connect the antenna to the TRANSCEIVER. The Bullet TRANSCEIVER has a male type "N" connector at its base, so the cable will need a female type "N" connector on one end and the other end attaches to the antenna with whatever connector is required on the antenna you order. Depending on the antenna, this may be a direct connection not using an intermediate connector. Here are a couple of suggested antennas for 2.4 GHz that have worked quite well in many mobile node applications:

1. WiMag-8 mobile magnetic mount antenna with 8 dbi gain - \$99.95 plus shipping
<http://www.radiolabs.com/products/antennas/2.4gig/wimag-8-wifi-antenna.php>
(May be ordered with a 5 foot or 10 foot coaxial cable with female N connector installed.)

2. L-Com PN# HG2405MGU-NF magnetic mount antenna with 5 dbi gain - \$49.31 plus shipping
<http://www.l-com.com/wireless-antenna-24-ghz-5-dbi-omni-antenna-w-magnetic-mount-n-female-connector#>
(This part number includes a cable with female N connector installed.)

Any 2.4 GHz (or 5 GHz) WiFi antenna will work as long as you can mount it on your vehicle. There is nothing special about the two suggested above. You may find others that work just as well for a much lower price. For detailed specifications, visit the manufacturer's websites at the links provided above.

POWER OVER ETHERNET (POE) ADAPTER - A passive POE adapter is required to power the node from your vehicle's battery. If you have an inverter in your vehicle (some vans come with 120 VAC receptacles installed) then you can use an active POE adapter that plugs directly into a 120 VAC electrical outlet. The passive type POE adapter requires a connection to the vehicle 12 VDC power either directly wired to the battery or using a cigar lighter type plug that will get power from the vehicle cigar lighter receptacle. The Bullet draws only a few hundred millamps of current from the electrical system, so they are easily powered from cigar lighter receptacles. If ordered new, most Bullets come with a 120 VAC POE power supply. These power supplies will have two RJ45 type Ethernet jacks; one is a POE port and the other is a LAN port. The POE port is used to power the Bullet and send data to the device. The LAN port is used to access the node using a laptop computer or other device. A passive POE adapter is exactly the same as the active POE adapter except that it will have a DC receptacle (e.g., 2.1 x 5.5mm) instead of an AC power cord. You will need to make up or buy a DC power cable with a mini DC connector on one end and an automotive type cigar lighter plug on the other end to plug into the vehicle. The mini DC connector plugs into the DC receptacle on the POE adapter and powers the Bullet through the POE Ethernet jack.

Here is a picture of a passive POE adapter:



These can be purchased from Amazon for around \$5. Be sure to use smile.amazon.com and choose the Baldwin County Amateur Radio Club as your preferred charity. See instructions on the Amazon website or go to www.sb-arc.arc and look for the Amazon Smile information to support our club.

LAPTOP COMPUTER - These nodes can be configured on any computer and, once configured, can function without any computer attached. However, you, as the operator, will most likely want to be able to log into your node while operating and check the mesh status page and see what nodes you might be able to link with. To do that, you will need a laptop computer that can operate on its internal battery or use vehicle power with an adapter of some type. Any basic computer will work just fine. No need for very high speed processors or huge amounts of memory. You will normally only be using a common internet browser to look at your node's status. Windows or Linux operating systems of any vintage will work just fine.

ACCESSORIES - At some point you may want to add additional devices to your node such as cameras, voice over internet protocol (VoIP) telephones, file servers, etc. Just about anything you can do over the internet you can do over the mesh network. However, the process of adding these accessories is outside the scope of this paper. Once you get your basic node up and running, we will help you expand your node to use these other devices, if desired.

SETUP and CONFIGURATION - You will most likely need some help in setting up your first AREDN node. Our club has recently taken on AREDN as a club project and as participation grows in this interesting facet of our hobby, any number of our members will be happy to help. At the present time, however, the primary elmers for AREDN are Ron, N4RT; Dennis, K4JIE; and Emery; KC5LIO. Once you get your Bullet, contact one of us to help you flash the AREDN firmware into your device and we can show you how to set up your node with your callsign and other information needed to have it join our local mesh network when it goes on-the-air.

There is also a wealth of information to be had for the reading at the official AREDN website:

www.arednmesh.org

At first glance the site looks very busy and it may be hard to locate specific information that you may be looking for. Don't be intimidated by all the technical info you see on that website. Be sure to register with your call and assign a password and take a look at the forum messages. The forum is where new and experienced AREDN users meet and exchange information. Don't be afraid to post a message there if you need an answer to a question or don't understand something. Everybody using AREDN had to start at the beginning and they will help you get started. There are some very technically savvy hams that read the forums, so someone there is sure to have an answer to any problem you may experience. I'd start with our local AREDN elmers first, but if they can't answer your question, surely someone on the AREDN mesh website can.

Thank you for your interest in AREDN and good luck with your project! The future of this mode is unlimited!

73,

Ron Thomas N4RT