

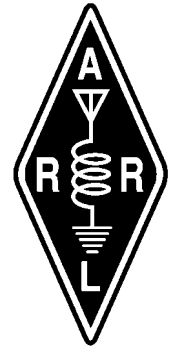


The Minuteman Repeater Association

# The Minuteman

Volume 32, Number 2

November 2002



## President's Corner by Kevin Paetzold, K1KWP

**Last Meeting:** Our September meeting featured a presentation by Bill Ricker, N1VUX, about troposphere effects on propagation and the research that he has been doing in that area. This was a fascinating talk because of his ability to forecast these effects and some of the science behind that. It was a very good technical tutorial on the different kinds of "tropo" enhancement that we encounter, especially in the spring/summer and particularly on the VHF/UHF frequencies. Bill's talk explained most of the propagation effects that I have been observing myself for the last couple years from the Cape, even the alternating one way propagation/path effect that WAINLR and I once encountered during a 6M QSO when I was on the lower Cape. If you ever see N1VUX offering to talk on this subject again I strongly encourage you to try to attend! On behalf of the entire MMRA I very much want to thank N1VUX for taking the time to prepare and make this presentation to us.

**MMRA Meetings in General:** Bill's presentation was the latest in a long series of very interesting subject matter, presentations, and venues that have been available at MMRA meetings. In the last couple years we have had presentations covering Digital TV, repeater construction, commercial tower construction, APRS, early microprocessor computers, the ham radio response to NYC on 9/11, the FEMA DMAT teams, and a multimedia DX-pedition presentation. Almost all of these have been at least as interesting as things I have seen at conferences and events like the ARRL Boxborough Convention. We are working on arrangements for the remaining meetings of the year and they should be just as interesting.

The low membership turnout, perhaps 10%, that we usually have at our meetings continues to surprise and concern me. I am surprised because I believe that we almost always have arranged for very interesting content. I am concerned because I know of the great deal of work that went into these presentations, including actual behind the scenes research/work, and the image of the MMRA that the speaker must get from our low meeting attendance. I am also concerned because the cost of meetings is one of the largest single expenditures that the club makes every year. Any ideas about how to increase meeting attendance would be most welcome.

**The Next Meeting:** Our November 20 meeting is once again at the offices of American Medical Response (AMR) in

Natick, MA. Just as last year this invite was arranged by Bill Thorpe, WA1NLR. Thank you Bill! Touring the AMR facility, dispatch center, radio rooms, etc. was fascinating last year and I expect will be just as interesting this year. Details with directions are available on page six in this newsletter and on the [www.mmra.org](http://www.mmra.org) web site. I hope to see you there.

**Work Parties in Marlboro on Saturday Morning, November 23:** There is a need to do some work on both of the repeater shelters which we operate in Marlboro. We have selected Saturday, November 23 as a date to work on the list below. Depending on how many volunteers we get we may be able to add some significant items to this list. If you can, bring tools and supplies appropriate to these tasks:

- Cut the vent holes in the 146.610 shelter and install the vents that we already have. Fix up this shelter for the winter, caulk/seal any bug/pest holes, other random tasks like inspect fans, sweep and clean out dust, etc.
- Fix up the 449.925 shelter for the winter, seal bug holes, fix door, remove a pile of pipes behind the repeater racks, and other random tasks.

Several people have in the recent past contacted me offering to help on various projects and work parties. Thank you for doing so and do not be surprised if we contact you for help. I have not yet had a chance to go back through my email and pull those names out and ask people individually if they are available. However if you are willing to help with these activities please do not wait for me to contact you and let me know if you are available, even if you have offered in the recent past.

We are also looking for a volunteer to work on adding PL to the Weston 220 repeater; this is NOT scheduled for Nov 23. Please send email to [mmra@mmra.org](mailto:mmra@mmra.org) to volunteer to help with any of the above.

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# About the Minuteman Repeater Association

The Minuteman Repeater Association (MMRA) is dedicated to Amateur Radio and public service. The MMRA has built a large system of repeaters in Eastern Massachusetts.

The MMRA meets on the 3rd Wednesday of September, November, January, March, and May. Meetings start at 7:30 PM in the Campion Center in Weston MA. Meetings are open to all interested parties. Talk-in is available on the Weston 2-meter repeater (146.82).

The Minuteman newsletter is mailed one week before each meeting. Members are encouraged to submit articles. Articles may be sent to the editor via email to [n1be@arrl.net](mailto:n1be@arrl.net). The deadline for articles is the last Friday of the month preceding the meeting.

Each Tuesday evening at 8PM the MMRA links all the repeaters for an open net. The topic is "Technical Information and Other Stuff". Feel free to join us.

Membership in the MMRA is open to all radio amateurs. Annual dues are \$25 per individual or \$35 per family. The membership year starts on Sept 1st. Dues for new members are prorated for the remainder of the year. See our web-site for details.

Email to the club leadership should be sent to [mmra@mmra.org](mailto:mmra@mmra.org). The MMRA web site is: <http://www.mmra.org/>

An email distribution list for club members has been established on: <http://www.yahoogle.com/> — the name of the group is "MMRA".

## Repeater and Frequency Information

Location	MHz	PL	Call	Note
Marlboro	53.810	71.9	W1BRI	PTL
Marlboro	146.610	146.2	N1BHI	FTL
Quincy	146.670	146.2	W1BRI	PTL
Stoneham	146.715	146.2	N1NVL	PTL
Weston	146.820	146.2	WZ0C	PTL
Hopkinton	223.940	103.5	N1BHI	FTL
Quincy	224.400	103.5	N1KUG	FTL
Weston	224.700	none	N1HBR	FTL
Stoneham	446.725	88.5	N1NVK	NA
Brookline	447.875	88.5	K1IW	Affiliated, PTL
Shrewsbury	449.575	88.5	W1BRI	FTL
Marlboro	449.925	88.5	W1MRA	Network Hub

Marlboro	144.390	none	N1QPR-2	APRS Digipeater
Marlboro	145.030	none	W1MRA-3	KA-node Digipeater
?	145.630	146.2	W1MRA	Fox Box

**Notes:** FTL = Full Time Linked to the Hub.  
PTL = Part Time Linked (on demand).  
NA = linking is Not Available.

**PL:** PL is now required on 2 meters to prevent interference.  
The code **750** will temporarily disable the PL requirement.

**Using the Autopatch:** Only the hub has a telephone line.  
(1) Link to the hub if necessary.  
(2) Then bring up the patch using the 449.925 autopatch codes.

**Control codes are sent to members upon receipt of dues.**

## MMRA Leaders

President	Kevin Paetzold	K1KWP
Vice President	Bob Evans	N1BE
Secretary	Bob DeMattia	K1IW
Treasurer	Bill Northup	N1QPR
Clerk	Jon Titus	KZ1G
Technical Officer	Bryan Cerqua	W1BRI
Director	Larry Banks	W1DYJ

Director	Shelley Northup	N1VJE
Director	Steve Schwarm	W3EVE
Director	Bill Thorpe	WA1NLR
Emergency Coordinator	Bill Northup	N1QPR
Public Service Coordinator	Kevin Paetzold	K1KWP
Newsletter Editor	Bob Evans	N1BE
VEC Liaison	Bill Wade	K1IJ
Webmaster	Michael Ford	WZ0C

## President's Corner (cont.)

(Continued from page 1)

**Please renew if you have not already done so:** To all those who renewed at Boxborough or who have renewed so far this year thank you for doing so. For all those who have not renewed we would appreciate your renewal. As I indicated in a previous newsletter the overall MMRA membership numbers are steadily decreasing year over year. If this trend is not reversed the MMRA will sink into oblivion along with its repeater resources.

**Board meetings and MMRA office holders:** Usually in months that do not have a general membership meeting we hold so-called "Board meetings". These meetings would be more appropriately be called "business meetings". At these meetings the real business of the MMRA is conducted. This includes the management and spending of the club's financial resources as well as other decisions on planning, club direction, policies, etc. All members are welcome at board meetings and directions are available on [www.mmra.org](http://www.mmra.org) web site. These meetings usually occur on the 3rd Wednesdays of August, October, December, February, and April. They are generally announced during the Tuesday night nets and announced on the [mmra@yahoo.com](mailto:mmra@yahoo.com) email list.

As I indicated in the previous newsletter I was very happy to see some "new blood" in the people holding offices in the MMRA. However there are various other officer positions, or jobs, that have been held by the same person for multiple years. I expect we will need new candidates for several of these positions during our elections in the April/May timeframe. I believe that term limits are a pretty good idea and that a healthy organization needs turnover in various offices in order to bring new ideas to the table and to prevent mass burnout of the existing officers.

Attending the board meetings is an excellent way to see first hand what these positions entail and is the way to "become more involved" with the MMRA. If you are a regular user of the MMRA repeaters have you considered taking your turn helping with the behind the scenes work that is required to keep the organization and its repeaters functional? Just a few years ago I was originally licensed as KB1CZM so I consider myself new. Are you a relatively new ham who would like do your part to help improve and maintain what a lot of previous hams have made available to you through their efforts? Please seriously consider attending the board meetings.

## Announcing the CEMARC Youth Net

The Council of Eastern Massachusetts Amateur Radio Clubs (CEMARC) has concluded arrangements for the start of a "Youth Net." The weekly Youth Net will go on the air starting Sunday, November 10th at 7:00PM. This will be a directed net and will have a teenaged net control operator. This net is strictly intended for youths up to Grade 12. Subject matter will be at the discretion of the net participants. All young operators are welcome. **No adults will be allowed** as participants to this net except as noted below.

The Minute Man Repeater Association ([www.mmra.org](http://www.mmra.org)) has made available their linked system to air this net, and will have control operators monitoring. In addition, Ann Weldon, KA1PON, a mother, grandmother, Club President, and school-teacher, has agreed to act as a mentor and to help coordinate this net.

What can you and I do? First, talk up the net startup. Advise potential participants to attempt to use one or more of the MMRA repeaters before the net begins in order to determine

which repeaters will work best for them. Check MMRA web site for the list of repeaters at:

<http://www.mmra.org/club/repeaters/>

Help potential net members to decide which repeater to use if you can.

The future of amateur radio, and our clubs depend on these young operators. Their future, in continuing in the hobby depends on us. Let's not fail them, or ourselves.

**Note:** While no adults will be recognized during the Net, parents who desire to sign on their child under their control, using their call, may do so. However, once the Net starts, no adults will be recognized, only the child who was checked in.

Please direct any questions to:

- Frank Murphy, N1DHW n1dhw@arrl.net
- Ann Weldon, KA1PON aweldon@aol.com
- Kevin Paetzold, K1KWP k1kwp@arrl.net

## Jon Titus, KZ1G, Receives Stibitz Award

Jon Titus, KZ1G, an MMRA board member has won a 2002 George R. Stibitz Computer & Communication Pioneer Award—a major accomplishment in the computer industry. The Stibitz Award, hosted by the American Computer Museum of Bozeman, MT in conjunction with the Computer Science Department of Montana State University, pays tribute to living pioneers of the computer and information age.

Jon is recognized for the invention of the Mark-8, the first hobbyist microcomputer, which appeared as a construction project in the July 1974 issue of Radio-Electronics magazine. The original Mark-8 computer now resides in the permanent Information Age exhibit at the Smithsonian Institution's National Museum of American History in Washington, DC. Jon received his award at the American Computer Museum on October 18th.



## Repeater Report by Bryan Cerqua, W1BRI



New cover on the 449.575 repeater.

**449.575:** The repeater was removed from the Shrewsbury site the weekend of October 19th to rework some of the coax cables and connectors on the power amp for improved shielding. I also made a metal cover to increase the shielding of the repeater electronics. The power amp had an SMA type connector on the input and a soldered on coax of low quality for the output. Type N chassis mount connectors were added to the power amp and double shielded cables were used to connect the amp to the duplexer. The link radio was also re-aligned for improved sensitivity and the crystal oscillators adjusted on frequency. Since the 900 MHz paging transmitter is no longer present at the site, the notch filter was removed from the link radio to reduce insertion loss and improve the shielding for the link radio. Also, the TU 255 bandpass filter that was vertical, is now re-mounted horizontally to prevent the repeater rack door from hitting the tuning knob.



TU 255 bandpass filter with black tuning knob

Chuck, KA1MWP, helped with the repeater re-install on the following Tuesday morning. Initial testing shows much better link performance into the Marlboro and Milford repeaters.

There is still some desense when connected to the Milford repeater and a user is very weak. I suspect some mixing is taking place in the transmitter output between the link radio TX signal; it may require an isolator on the repeater amplifier

output. Since the repeater is full time linked to Marlboro and there is no desense problem in this mode, the occasional problems when linked to Milford can be tolerated for now.



New cables between the duplexer and PA.

The next Sunday W1BRI visited the Shrewsbury site and installed a single notch cavity filter on the output of the power amplifier. The notch frequency is set to 441.825 which is the input to the Milford UHF repeater. This helps prevent a mix in the power amplifier output between 449.575 and 441.825. Since the duplexers on this repeater are notch type there is nothing blocking 441.825 link radio transmitter output from entering the 449.575 PA.

The link radio does not cause desensing when it transmits on 444.925 because the duplexers are tuned to notch out 444.575 and 449.575 which is very close to 444.925. The results are much better with the new notch filter but there still is some desense of very weak signals on 444.575, the Shrewsbury input, when linked to Milford. An isolator is the next thing to try, more on that in the next newsletter.



New N connectors on the 449.575 PA

*(Continued on page 5)*

## Repeater Report (cont.)

(Continued from page 4)

**449.925:** The charging resistor that connects between the Quintron power supply and the backup battery was changed from  $2\Omega$  to  $22\Omega$ . This will reduce the charging current and prevent the electrolyte from boiling away. The output voltage for the Quintron power supply is near 15V and with  $2\Omega$  the constant current for a charged battery could be one amp or more. With  $22\Omega$  it should keep the standby current near 50mA. A checkup will be done to see if the water level in the battery is down.

**53.81:** The repeater still has a power output problem when the temperature is cool. I believe the solid state pre-driver amp is temperature sensitive and it is not providing adequate power to the tube amp. This problem has been ongoing. Hopefully I will soon get back up to the site with some test equipment to fix it.

**224.700:** A PL board for the Weston 220 repeater is on order and hopefully will be installed in a few weeks.

## Try an Internet Linked Repeater

The Internet Repeater Linking Project (IRLP) uses the internet to link repeaters that are widely separated. Like operating HF, with an internet link you might be talking to someone a long distance away. It's fun technology and is becoming very popular.

Rob Bellville, N1NTE, invites all amateurs to try his Internet linked repeater, node #818, in Worcester. There are no prefix or access codes. But please read the IRLP operating information on the "Information Pages" of the IRLP web site at <http://www.irlp.net/> for more information on how to use this mode. Specifically, a good usage guide can be found at: <http://www.irlp.net/03-background/guide.html>

Rob's N1NTE repeater operates in simplex, transmitting and receiving on 146.430 MHz with a PL of 114.8 Hz. This simplex node or "gateway" is very similar to a remote base.

You can link via DTMF commands to over 600 other nodes (some simplex, some repeaters) all over the globe including Antarctica, India, Australia, Canada, Europe, and of course, the US.

There are also "reflectors" that allow multiple nodes to connect together and form a sort of round table. To access one of the largest reflectors located in Indiana, you simply need to activate it by pressing 9200 on your DTMF pad. 9201 turns it off. (Node + 0 turns it on, Node + 1 turns it off.) A list of active nodes can be viewed at: <http://www.irlp.net/15-status/frame.html>

Rob's node automatically IDs every 30 minutes with the callsign and PL tone so if you hear it you can work it. It will be moving to another location in a few weeks and from there it will have a greater range. The <http://www.n1nte.net/> web site has some more information about N1NTE's IRLP node.

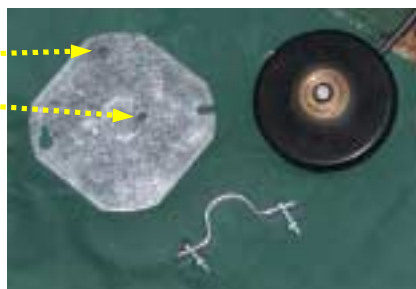
## Those \*&^!\*&!@%^! Plastic Roofs by Kevin Paetzold, K1KWP

Assigned to a mobile during a public service event, you arrive all prepared with a magmount 2M/440 antenna. Upon examination you find the vehicle has a non-magnetic roof. There is an effective and cheap solution to this problem via a metal cover from an electrical junction box. You could perhaps duct tape the cover to the roof and then use the magmount. Another solution is to add an electrical conduit bracket so that the cover can be mounted to a tubular bracket as are often used for the driver's exterior mirrors. Since a picture is worth a thousand words see picture one:

Hole #1

Hole #2

I drilled "hole #1" so that it could be used with the original keyhole shaped hole to mount the bracket on one side of the cover. This may be important for your magmount. Some magmounts have enough clearance in their center to be able to instead use "hole #2".



Picture two shows an upside down view of the cover mounted to a piece of PVC.



In picture three you can see that my usual foxhunting assistant is not as impressed by this as I was.

Of course this is not the ideal sized ground plane for this antenna but almost everything is a compromise anyway and this does work pretty well. I want to thank KA1OTQ for this idea and for the cover and bracket that you see in this article. My addition to his idea was to drill the extra holes for the bracket. I was surprised how well this works with only one screw holding the bracket.



# Getting to the November 20th MMRA Meeting

This meeting will NOT be at the Campion Center as usual but will be at the offices of American Medical Response in Natick where, thanks to WA1NLR (and the AMR staff), we will tour the AMR radio dispatch facilities.

As usual the meeting will start at 7:30PM. It is important that members be on time for the meeting so that we can conduct whatever club business is needed and so that AMR staff can conduct the tour in a coordinated and timely way.

The address of AMR and directions are below. Talk-in will, as usual, be on the Weston 146.820 PL 146.2 repeater.

American Medical Response Inc.  
4 Tech Circle  
Natick, MA 01760-1029  
Phone: (508)653-1140

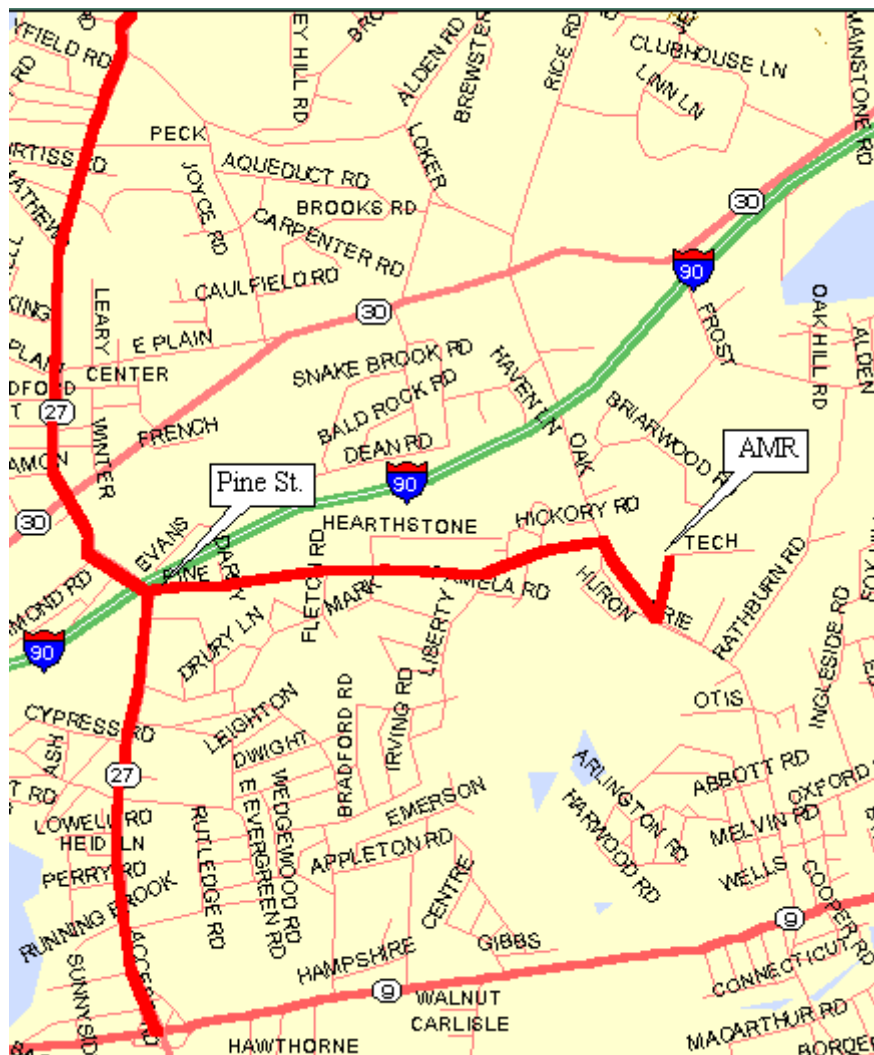
## Directions:

### From Route 20,

- Take route 27 South.
- Travel 3.6 miles.
- Turn left at the blinking yellow light, which is immediately after the Mass Pike Bridge, onto Pine St.
- Take Pine St. to the end.
- Turn right onto Oak St.
- Take next left onto Tech Circle.
- AMR is 2nd building on left. (White building with AMR sign in front.)

### From Route 9,

- Take Route 27 North for 1 Mile.
- Watch for Dairy Queen and blinking light.
- Turn right at the blinking light onto Pine St.
- Take Pine St. to the end.
- Turn right onto Oak St.
- Take next left onto Tech Circle.
- AMR is 2nd building on left. (White building with AMR sign in front.)



Map showing routes to AMR in Natick.

## Stoneham site changes?

W1DYJ sent us a newspaper clipping about planned construction at the Stoneham site. The developer is proposing to build an office park at the site of the former Boston Regional Medical Center. We do not know the timeframe for this construction or what the impact will be on our use of space there for the 146.715 & 446.725 MHz repeaters.

## Fox-a-thon Results

Although the October 19th fox-a-thon was lightly attended, it brought out a new team of W1DYJ and N1XKB. N1BE hid on a low-lying residential dead end street in Wilmington. The Shawsheen River and lack of knowledge of the local streets were impediments to the hunters. W1JDO was the only home station to supply a line, and without Larry's usual mapping of the lines it took a while for the hunters to determine which town the fox was in.

Breaking with recent tradition, the 146.715 Stoneham repeater was used for the hunt. WZ0C found the fox during the 11:35 AM transmission. W1DYJ and N1XKB arrived eight minutes later, a very good showing for an inexperienced team! I hope they continue to hunt.



## How I Solder PL-259s—Without Melting Them by Jon Titus, KZ1G

Many hams have a difficult time soldering the braid in co-axial cable to the outer shell of a PL-259 connector. By using a propane torch with a soldering tip, you can make a solid connection, but without melting the plastic insulation on the cable or within the connector. Here's how I do it.

First, unscrew the barrel from the connector and push it up the cable. Also push the adapter up the cable.

Spread the woven shield at a point right above the outside insulation. I use a small awl with a sharp point to spread the braid and push it to either side. You want to see the center insulation. Take care to not break any of the fine braided wires:



Next I push the awl through and behind the center insulation and bend back the exposed section so I can slip out the center insulation. This keeps the woven braid intact, so I don't have individual wires going haywire—often into my thumb:



The next view shows the insulated center wire pulled up and out of the braid.

I use my soldering iron to tin just the first 1/4-inch of the braid (left side of the image). After the soldered section cools, I bend the end into a 90-degree "L" with just a short piece at right angle to the



main braid. This gives me a short piece of rigid braid at the end that will "spring" into the holes in the PL-259 shell. Then I can grab the point and pull through the entire braid. And the soldered end holds the individual wires in place. The rest of the braid remains flexible. Eventually, I'll cut off the tinned end of the braid:



Above you can see I also strip off insulation from the center conductor and tin its entire length.

Now you can see I've worked the center tinned conductor into the center connector on the PL-259, and I have worked the shield up through one of the holes. Note the small right-angle bend on the end of the shield. That's the tinned part that held the end in place so I could grasp it with needle-nose pliers and pull through the entire shield. I have also screwed the adapter into the barrel of the connector:



Now I cut off all but about 3/8th-inch of the remaining unsoldered braid and push the loose braid around the barrel of the PL-259. The braid then conforms to the cylindrical shape but rests below the upper edge of the threads and the edge of the knurled section:



Next, I use the blowtorch with its soldering head. The blowtorch provides a lot of quick heat that lets the solder flow onto the body of the PL-259. But because the PL-259 heats quickly the center insulation of the coax and the PL-259 don't melt. Note—I don't use the flame! The Bernz-O-Matic torch kit came with a copper soldering "head" that gets heated by a flame that shoots out several inches on the side:



Now you can see the nice bright solder joint. Just slide up the barrel of the PL-259, solder the center conductor, cut off the excess wire, and you're ready to use the connector:



# Next Meeting — Wednesday November 20, 2002

## WA1NLR: Field Trip to American Medical Response

The November 20th MMRA meeting, will be at AMR, 4 Tech Circle, Natick. AMR is the nation's largest private provider of medical transportation.

At the meeting there will be a brief presentation about AMR. Then we will tour the extensive radio system at the site. We also plan to show the presentation about the MMRA that was displayed in our Boxborough convention suite.

A map and directions to AMR are on page 6. As usual, talk-in is on the 146.82 Weston repeater.

Please be aware that there is no elevator at AMR. It will be necessary climb one flight of stairs.

## Calendar of Ham Radio Events

**Nov 3:** Framingham FARA Flea  
**Nov 9:** MA Simulated Emergency Test  
**Nov 10:** First weekly Youth Net  
**Nov 16:** Newtonville WARA & 1200RC Ham Radio Auction  
**Nov 20:** **MMRA meeting**  
**Dec 18:** **MMRA board meeting**  
**Dec 27:** **MMRA Newsletter Deadline**  
**Dec 31:** ARRL/AMSAT Straight Key Night  
**Jan 15:** **MMRA meeting**

(Flea market info from W1GSL list. <http://mit.edu/w1gsl/Public/ne-fleas>)



### MMRA VE Sessions

3rd Saturday of each Month

9 AM at the Marlboro Public Library

**Contact: Bill Wade, K1IJ**

781-891-9079 Evenings 6 to 10 PM,

Weekends 8 AM to 10 PM.

**Accredited by the ARRL VEC**

### THE MINUTEMAN REPEATER ASSOCIATION

MMRA  
P.O. Box 669  
Stow, MA. 01775-0669

Email: [mmra@mmra.org](mailto:mmra@mmra.org)



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WE'RE ON THE WEB!  
[HTTP://WWW.MMRA.ORG/](http://www.mmra.org/)

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# Minuteman Repeater Association Quick Membership Renewal

(Please use reverse side for new memberships)

Name: \_\_\_\_\_

Callsign: \_\_\_\_\_

Email: \_\_\_\_\_

Dues paid (please check one):

☐ Individual Membership (Dues: \$25 per year)

☐ Family Membership (Dues: \$35 per year)

Do you want to receive the newsletter via email? If so, you'll receive more content earlier.

☐ Check box for Electronic Newsletter: You must supply an email address.

Any other info changed since your last application was filed?

☐ If yes, please check here and please fill in new info on the reverse side.

Please submit completed application forms with your dues  
at the MMRA Boxboro suite  
or mail to:

MMRA  
P.O. Box 669  
Stow MA 01775-0669

# Minuteman Repeater Association, Inc.

P.O. Box 669

Stow MA 01775-0669

A Non-Profit Communications Organization Serving the Public in Time of Emergency.

## — Membership Form —

☐ New or ☐ Renewal

☐ Individual Membership (Dues: \$25 per year) or ☐ Family Membership (Dues: \$35 per year)  
or ☐ Novice Membership (1st year Dues: \$10)

I hereby apply for membership in the MINUTEMAN REPEATER ASSOCIATION, INC. I agree to abide by the rules and regulations of the Association as stated in the bylaws., and understand that acceptance of this application entitles me to all rights and privileges of membership as provided under the bylaws.

☐ Check box for Electronic Newsletter: Receive more content earlier. Must supply email address.

Name: \_\_\_\_\_ Callsign: \_\_\_\_\_ Class of License: \_\_\_\_\_

Address: \_\_\_\_\_ Home Phone: \_\_\_\_\_

Town, State, Zip: \_\_\_\_\_ Work Phone: \_\_\_\_\_

Email Address: \_\_\_\_\_

Occupation: \_\_\_\_\_ Employer: \_\_\_\_\_

Member of the ARRL? \_\_\_\_\_ Other Clubs? \_\_\_\_\_

Bands and Modes you operate. Please check all that apply:

	Fixed	Mobile	Portable	FM	DTMF	CW	RTTY	PSK31	APRS	Packet	SSB
HF											
VHF											
UHF											
Satellite											

I can and am willing to assist/serve the Association and/or help maintain the Repeaters in the following ways:

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Antennas                 | <input type="checkbox"/> Meeting Setup                | <input type="checkbox"/> Speaking at a meeting |
| <input type="checkbox"/> Association Officer      | <input type="checkbox"/> Net Control                  | <input type="checkbox"/> Special Projects      |
| <input type="checkbox"/> Board of Directors       | <input type="checkbox"/> Newsletter                   | <input type="checkbox"/> Technical Library     |
| <input type="checkbox"/> Education                | <input type="checkbox"/> Public Service               | <input type="checkbox"/> Web Site              |
| <input type="checkbox"/> Emergency Communications | <input type="checkbox"/> Publicity                    | Other—Please specify:                          |
| <input type="checkbox"/> Equipment Construction   | <input type="checkbox"/> Radio Shelters               | _____  |
| <input type="checkbox"/> Equipment Transportation | <input type="checkbox"/> Refreshments                 | _____  |
| <input type="checkbox"/> Grant Writing            | <input type="checkbox"/> Repeater Control Operator    | _____  |
| <input type="checkbox"/> Legal Aid                | <input type="checkbox"/> Repeater Technical Committee | _____  |
| <input type="checkbox"/> Medical Aid              | <input type="checkbox"/> Social Events                | _____  |

Other family members:

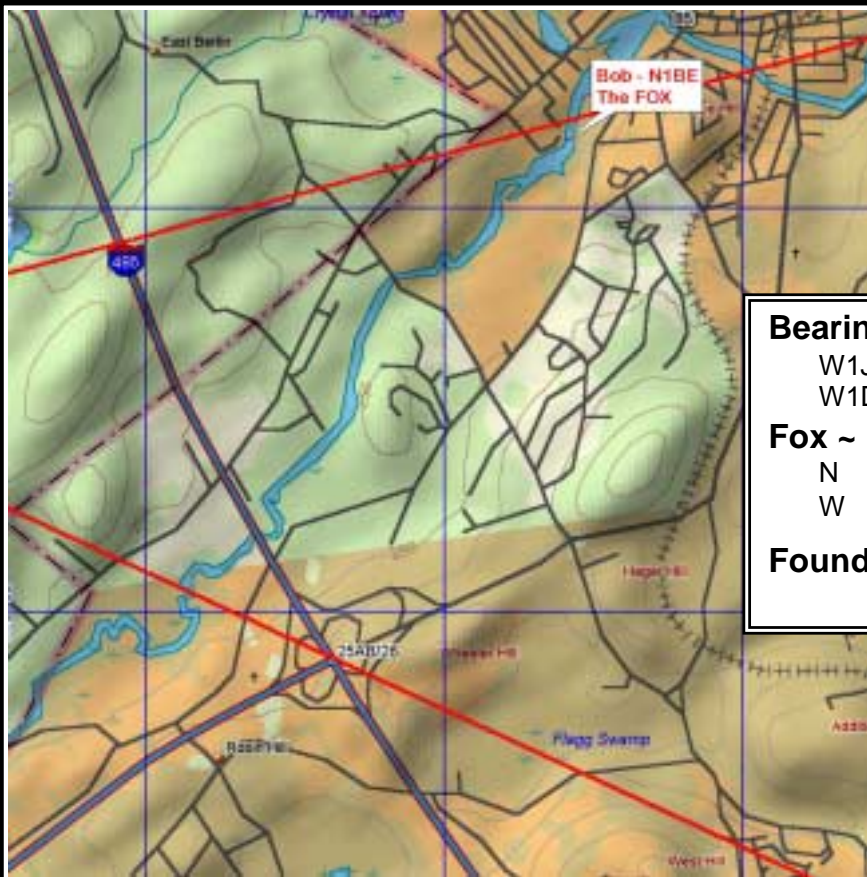
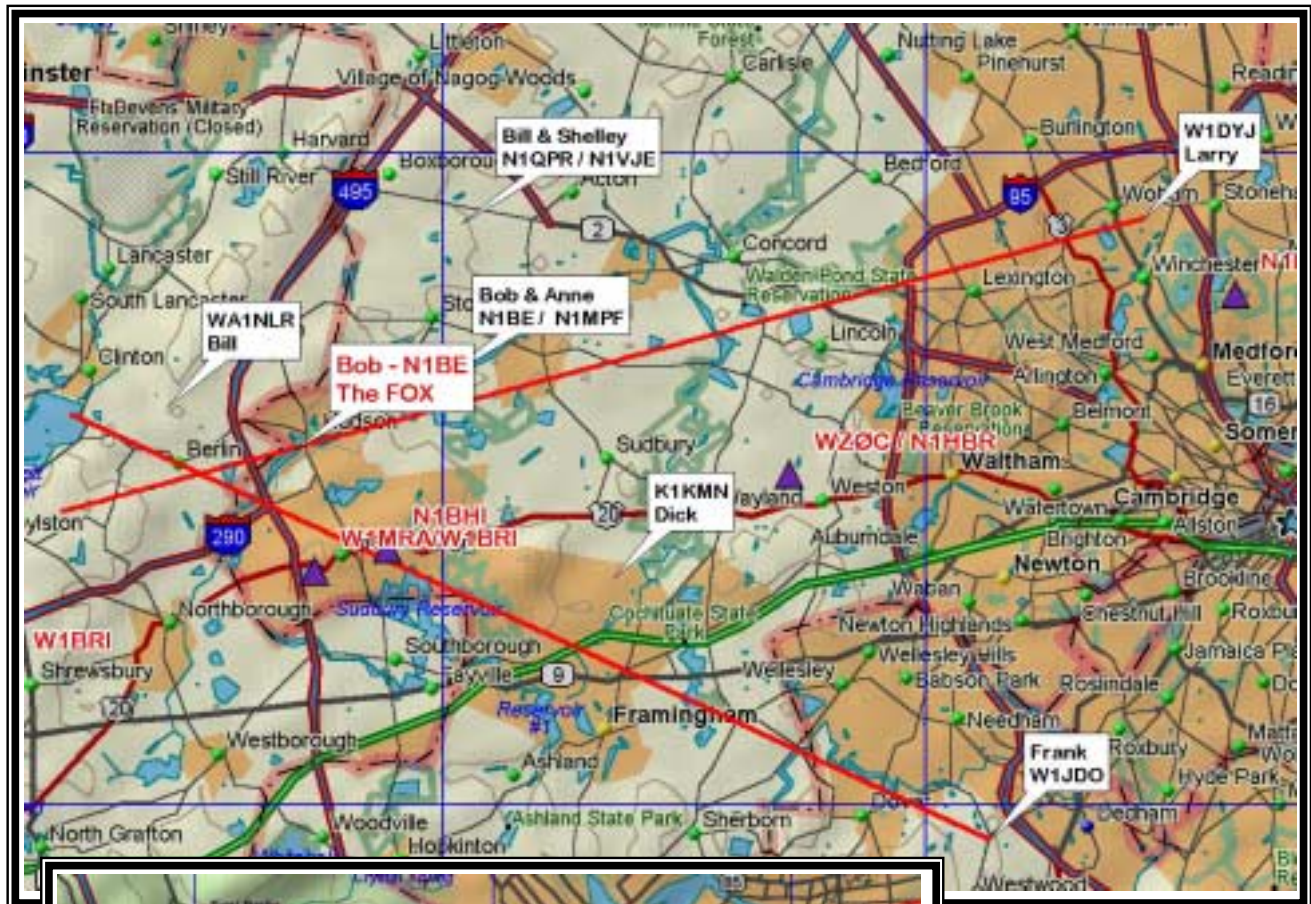
Name: \_\_\_\_\_ Callsign: \_\_\_\_\_ Class of License: \_\_\_\_\_

Name: \_\_\_\_\_ Callsign: \_\_\_\_\_ Class of License: \_\_\_\_\_

Name: \_\_\_\_\_ Callsign: \_\_\_\_\_ Class of License: \_\_\_\_\_

Name: \_\_\_\_\_ Callsign: \_\_\_\_\_ Class of License: \_\_\_\_\_

# MMRA Foxhunt ~ 21 September 2002



## Bearings: Initial / Actual

W1JDO 295° / 299°

W1DYJ 255° / 255°

## Fox ~ N1BE ~ Bob

N 42° 23.164

W 071° 34.600

## Found by: W1CDA

K1KWP