



The Minuteman



Volume 30 Issue 2

November 2000

Repeater Report Bryan Cerqua, W1BRI

Weston 146.820:

Back in September the failed power amplifier was removed and found to have blown output transistors.

New transistors were ordered from RF parts. Back some time ago Andy N1BHI had given me an older GE power amp with the correct filter board containing the antenna matching board. The antenna matching board mounts piggy backed to the low pass filter board. The GE documentation specifies that the antenna matching board is required when the power amplifier is transmitting into a duplexer (repeater operation). Most likely these transistor failures are caused by not running amplifier with the antenna matching board.

The antenna matching board has now been installed on the PA along with new output transistors and new balancing networks. The antenna matching board has two trimmer capacitors, coil and three other fixed capacitors with a diode detector for sampling the reflected power. When the amplifier was re-installed the trimmer capacitors were adjusted for the lowest DC reading on detected reflected power. The power amplifier is has now been running for over one month.

One of the signs of failures on this type amplifier is the overheating of the balancing network placed between the two output transistors. The network consists of a 24 ohm 2 watt resistor in parallel with 27pf capacitor. When there is a large dif-



Left: The Culprit – an MRF 648 transistor... when one of these loses interest in further toil, the PA dies.
W1BRI Photo

ference between the power delivered by each output transistor the 24 ohm resistor gets fried. Usually this means that one of the output transistors has failed causing a large voltage to appear across the 24 ohm resistors. Once one transistor fails the other will soon follow.

The amplifier will be inspected a few months from now to observe the condition of the balancing resistor. It is hoped that the amplifier will last for a very long time now that the antenna matching board is used. Just as a reminder, the same failure occurred on the Marlboro 146.61 repeater amplifiers. In this case the antenna matching boards were present but not adjusted since this was the first GE base station that I put on the air and was unaware of them. After replacing all the power transistors (We got 4 transistors for free this time from GE, long story) I

adjusted the antenna matching boards properly - the repeater has been running flawlessly for over 4 years now. Lets hope it stays that way.

Quincy 146.670

The PA on Quincy had also failed, blown output transistor and fried balancing resistor (same old story). This amplifier was the original 146.82 PA and has been through many repairs. At first I thought maybe the club should find another PA but I wanted to give it another shot to save the club money. This PA also did not have an antenna matching board.

We purchased one from New London Technology for one third the cost that GE quoted. The used board arrived within a few days and was in excellent shape. It was measured using a Network Analyzer and it checked out just fine. The 10W board's
(Continued on page 3)

If you have not yet renewed your membership for the 2000-2001 period please renew...we still need your support!

November MEMBERSHIP MEETING

**Wednesday, Nov 15, 2000 - 1930 Hrs
Campion Center, Weston MA**

Program:

To Be Announced

**Raffle
Other Stuff**

Build a Simple Mobile Mount

Jon Titus, KZ1G

If you need a place to mount a mobile rig and your vehicle has a split front seat, you can take advantage of a simple type of mobile mount that requires no holes through the chassis, nor does it require any special hardware. My design lets you remove the rig quickly, too. All you need is standard hardware-store parts, some ¼-in. Plexiglas, and a piece of wood. I'll give you a quick description so you can see how I built my mount. Then you can adapt my idea to your needs.

In short, the wood slips between my front seats and Plexiglas discs attached to it provide a rotating base that lets me position my rig so I can use it from the driver's or the passenger's seat (Figure 1).



As the base for my mount, I used a piece of ¾-in.-thick pine that slid snugly between my front seats. If I had needed more width, I would have built up the pine using ¼-in. plywood pieces glued to the side of the ¾-in. lumber. I don't recommend using plywood alone for the base because you'll need to screw into the grain for a pivot screw, and plywood doesn't hold well any screws driven into an edge. If necessary, a lumberyard that does mill work can plane a piece of pine to almost any thickness.

Once I had a piece of wood that fit between the seats, I marked on it the front and top edges of the seat. I cut my wood

so the top followed the seat height and I adjusted the front slope to match the angular position for my 2M rig. The seat line can curve if need be, but the front slope should be straight.

Next I measured the *diagonal* across my 2M rig's mounting bracket and cut two equal discs of ¼-in. Plexiglas with a slightly larger diameter than the bracket measurement. I have an Icom IC-228H transceiver, so my discs were about 6 ½ inches in diameter. One of the Plexiglas discs will mount to the wood to provide a base and the other will mount to the transceiver bracket to provide a rotating "table" for the rig.

In my rig, the heatsink doesn't take up much space, so the "footprint" of the transceiver is pretty much square. Thus I could keep the "table" small, and a diameter equal to the diagonal of the mounting bracket worked well. If you have a rig that has considerable depth, you may need to adjust the diameter of your disc--or other mounting arrangement--so the rig can swing around a central pivot point. Or you can increase the height of the wooden base to give you more "swing space" for a larger rig.

The next step involved drilling the Plexiglas to make mounting holes. Drilling Plexiglas or other plastic materials requires careful control of the drill. At high drill speeds, the drill will "catch" the plastic and yank it up the drill, often causing cracks that ruin the hole. You must control the drill's speed and hold the plastic securely. I recommend using a C clamp to fasten the plastic to a wood scrap and to a work surface. Drill small pilot holes first and increase drill sizes as needed, in increments. Practice drilling some holes in scrap plastic until you can properly control the drill speed and drilling rate.

I drilled a small pilot hole through the center of each disc. Then I centered one of the Plexiglas discs on the width of the wood base and attached it using 1 ½-in. angle brackets. The center pilot hole lined up with the center of the wood. (If you used a combination of plywood and ¾-in. pine, center the disc on the solid wood.) My design offsets the brackets from the center of the Plexiglas discs (one left, one right of center) to give the Plexiglas added rigidity. I used wood screws to mount the brackets to the wood, and standard 10-24 flat-head machine screws, lock washers, and nuts to secure the Plexiglas disc to the brackets. I countersunk the holes for the machine screws so the heads would not protrude above the flat surface.

Next I removed the IC-228H mounting bracket and centered it on the second Plexiglas disc. Additional drilling and countersinking provided mounting holes for four flat-head 10-24 machine screws.

I used a 2 ½-in. roundhead wood screw (with a washer) in the center of the transceiver's disc to attach it to the wood base. The screw provides a pivot point that lets the transceiver "rotate" as needed. I attached the transceiver's disc and mount to the base using the screw and tightened the screw so the mount would rotate easily, but not loosely. Then I attached the

(Continued on page 3)



MMRA VE Sessions

2nd Saturday of Each Month
Marlboro Public Library, 9AM

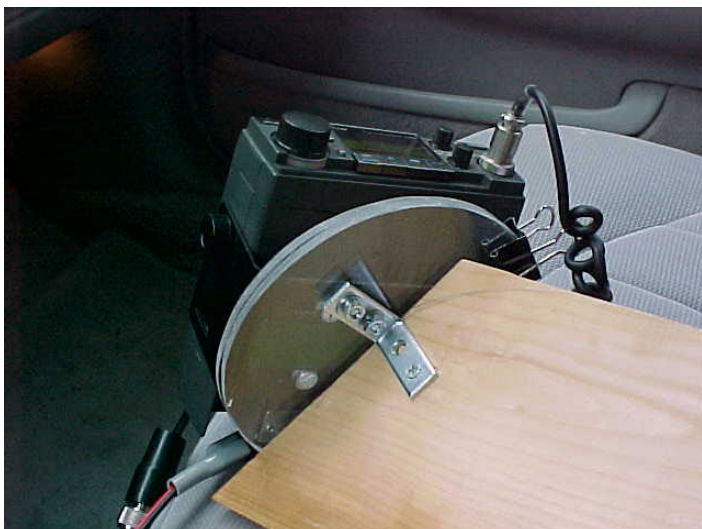
Contact: Bill Wade, K1IJ

617-891-9079 Evenings 6 to 10 PM,
Weekends 8 AM to 10 PM.

Accredited - ARRL VE Program

transceiver and slipped the assembly between the car seats. A ½-in. ACCO spring paper clamp holds the transceiver's disc against the one attached to the wood base.

I've been using this arrangement for about a year and find it idea for a small transceiver. It's easy to remove from my car in case I need the space, and I can quickly position the rig for either driver or passenger use.



Above: A view of transceiver mount showing attachment of Plexiglas disc to the wood base.

Repeater Report...Continued

(Continued from page 1)

DC control circuitry was rebuilt this time much neater than before. The control hybrid that regulates the RF output power was removed and tested OK on the bench. It was re-installed but this time with socket pins for easy removal in the future. After the two power transistors were replaced and the antenna matching board installed, I powered up the PA up driving it using my HT on low power. Well the darn thing didn't work. After poking around on the 10W board I discovered that a resistor was missing in the RF detector circuit.

The RF detector circuit is used to bias up the control hybrid that drives the collector voltage for the 10W board. This resistor must have been removed the first time the amplifier was rebuilt at the time the GE repeater was built for Quincy. Without this resistor the sampled RF from the input was going negative instead of a few volts positive. This is why I thought that the control hybrid was bad. After installing the resistor, I fired up the PA and it started to make power. The output power was not what it should have been.

I disconnected the path between the 10W board and the main PA board and attached a power meter to the 10W board output – the power checked out fine. I reconnected The 10W board to the main PA board. After working on it for the whole day, I was getting a little frustrated. I tried walking the fre-

quency of the HT up and down, then quickly found that the RF output was OK at 165Mhz. There was 2 turn coil at the point where the RF output splits into two paths to drive each power transistor on the main board. Spreading the turns on this coil decreased the RF output power at 146Mhz. So the next thing was to remove this coil and replace it with a 3-turn coil. Now the power was what it should be. This was good since it was 15 minutes to midnight and I was getting very tired. Later the next week the power connector was replaced with quick disconnect type plug just in case the PA needs to be pulled out in the future. Hopefully by the time you read the newsletter the repaired PA will be re-installed and Quincy will be back to normal. Thanks for all the member's patience while these amplifiers were being repaired. It is not often that two amplifiers fail at the same time. The cost to fix these two commercial amplifiers was only \$198 for parts, labor was free as usual. Try getting GE or any repair shop to fix them for that price and I will buy you a case of your favorite beer or Pepsi for those that don't like beer, you know who you are.

Also the Quincy antenna mount should be repaired before the newsletter comes out. As you might have known last year N1XXI (Wayne) and I discovered that the two top lag bolts had pulled out from the concrete water tower. A pipe was used to wedge the mast back into the mounting holes, we were very lucky that last year's winter was very mild.

Editor's Note: It's done! Here's an excerpt from an email Bryan sent to me: I should of brought my camera to Quincy, we had quite a crowd. You may want to mention that the following members showed up to help out: N1XXI (Wayne), W1BRI (Bryan), K1KWP (Kevin our VP), N1QPR (Bill) & N1VJE (Shelly). Also N1NO (Dave) showed up from Hull to get a glimpse of the repeater site. I think it is important to mention the above in the news letter to inspire team work and all. N1NO (Dave) is a regular on the repeater and he is doing a great job keeping the other Quincy users informed about what has been going on about the PA repair and Phone line changes. It would be nice to mention him.....

PS...If I had forgotten to mention that fact that Wayne did all the work on fixing the antenna mount for Quincy you may want to mention that in the news letter. Wayne also adjusted the antenna matching unit and the output power. I had to keep my hands off the stuff since I wanted others to feel like that they did some stuff. Also Bill (N1QPR) and Kevin (K1KWP) installed the PA back into the repeater rack. All I did is fix the PA.

All he did was fix the PA...well, I guess that was enough.

Phone Patch Procedure:

As some of you might have heard, the club is dropping all the phone lines at the two meter repeater sites.

The phone line at 146.61 may remain but at this time the decision is has not been finalized. The decision to drop the phone lines was a financial one. It is costing the club over \$1000 each year to keep the phone lines active. Under the current membership status this is not acceptable. Dropping the phone lines does not prevent the members from making an autopatch since the

MMRA Information - Repeaters, Officers and Board Members

Marlboro	146.61	N1BHI/R	FTL	P	PL - 146.2 in/out
Marlboro	449.925	N1HBR/R	FTL	P	PL - 88.5 in/out
Quincy	146.67	W1BRI/R	PTL	P	PL - 146.2 in/out
Quincy	224.40	N1KUG/R	FTL	L	PL - 103.5 in/out
Weston	146.82	KA1AL/R	PTL	P	PL - 146.2 in/out
Weston	224.70	N1HBR/R	FTL	L	
Hopkinton	223.94	N1BHI/R	FTL	L	PL - 103.5 in, out
Stoneham	146.715	N1NVL/R	PTL	P	PL - 146.2 in/out
Stoneham	446.725	N1NVK/R	PTL	L	PL - 88.5 in, none out
Marlboro	449.575	N1NVL/R	FTL	L	PL - 88.5 in/out
Marlboro	53.81	W1BRI/R	PTL	L	PL - 71.9 / 173.8 in, 71.9 out

MMRA Officers:

President:	Clark Conti, N1NVK
Vice President:	Kevin Paetzold, K1KWP
Secretary:	Bill Thorpe, WA1NLR
Treasurer:	Ian MacLennan, AF1R
Clerk:	Ed Mulhern, N1NOM
Director:	Bryan Cerqua, W1BRI
Director:	Al Kunian, KA1AL
Director:	Chris Conti, N1NVL
Director:	Wayne Foley, N1XXI
Director:	Andy Morrison, N1BHI
Newsletter Editor:	Andy Morrison, N1BHI
Technical Directors	Chris Conti, N1NVL
	Bryan Cerqua, W1BRI

750* Disables PL on 2m rpters

•Email: mmra@mmra.org

•Web Page:

www.ultranet.com/~mmra

Minuteman Articles — Solicitation

If you have ever built anything, fixed something, or have an experience that you want to share, then you should submit an article to the MMRA Minuteman. Contact Andy Morrison, N1BHI, if you want to talk about it. We can scan artwork and schematics to make an article more interesting and useful. Give it a try!

Important MMRA Club Information:

Membership Meetings: 3rd Wed of Sept, Nov, Jan, Mar, May at Campion Center, Weston at 7:30 PM

Board Meetings: 3rd Wed of Oct, Dec, Feb, Apr. Meetings are open and members are welcome. If a visiting member wants to be on the agenda, please contact Clark Conti beforehand.

Newsletters are mailed one week before each meeting; article submissions are due one month before each meeting.

The MMRA is dedicated to Amateur Radio and the public service. The MMRA is a registered non-profit Massachusetts corporation. Membership is open to all amateurs. Annual dues are \$25.00 individual, \$35.00 family.

Board Meeting Notes....Kevin Paetzold, K1KWP

This board meeting and its agenda were announced for several weeks on the mmra@mmra.org mail list and also on the Tuesday night 8PM nets. Items that were discussed during the board meeting:

- We had some issues getting membership renewals etc... from Boxboro processed. All renewals go through a single funnel/process. In the future at events such as Boxboro where renewals are accepted they will be mailed daily to the secretary in envelopes which will be provided.
- At previous board meetings it was decided that the club would consolidate all the autopatch phones lines in order to save cost (> \$1000/year). The autopatch phone lines get very little use. However having autopatch capability is very useful when needed.
The decision has been made to disconnect all the autopatch phone lines except for the 449.925 repeater effective Dec 1. Autopatch access from any repeater will still be possible from most repeaters (the same list that have autopatch today) by first linking any given repeater to 449.925 (several are already full time linked). The detailed procedure is in the Repeater Report.
The technical committee will be more inconvenienced by this decision than autopatch users. However for the financial health of the organization this is an overdue and prudent move.
- In the first half of 2000 a project was undertaken by W1BRI and N1QPR to make changes in the programming for the system's SCOM 7K repeater controllers. The board received an update on this completed activity.
Updated control code sheets were also produced as a result of this effort, and are included with this newsletter.
- The board received an update from N1QPR on the plans to move the 449.575 repeater to a facility in Concord MA. This is being done in co-operation with town government in Concord. This effort is currently held up by budget issues in Concord town government. It is hoped/expected that this will be resolved soon. Stay tuned.

- SET planning: As detailed elsewhere in this newsletter the MMRA participated in the Massachusetts Statewide Emergency Test on Nov 4. MMRA plans were discussed and approved during this meeting.
- ARES leadership have discussed with the MMRA on multiple occasions the desire to link other repeaters (and other repeater systems) into the MMRA system in order to obtain full coverage of Eastern Mass Section for the monthly ARES net and for emergency situations. The board confirmed their support for trying to move forward on this kind of activity in conjunction with parties such as ARES leadership, recognizing the responsibilities associated with providing such core infrastructure..
- At a recent general membership meeting it was suggested that the MMRA try to pursue a financial grant. Such a grant should be in the area of improving the infrastructure that enables emergency communications support. Any member who has experience in writing grant justifications should contact the board via the mmra@mmra.org mail list.
- In the hope that we can involve more members in MMRA activities by communicating them more in advance and more publicly it was suggested that the MMRA start maintaining a calendar of events which would list the various meetings and other activities that are or can be scheduled in advance.

Editorial from the VP: In addition to making events more well known in order to increase participation there is another aspect to this calendar of events. As with most organizations a minority of people end up doing the majority of the work. It is hoped that by making work parties more planned and announced we can not only get help for those who have been bearing much of the burdens but we can leverage more effectively off those who have the skills and knowledge required to keep this system and this organization functioning

phone line at 449.925 will remain active. Since all the two meter repeaters can be linked to 449.925 all that is needed to make a patch is to first link the repeater you are on to the 449.925 repeater. The user link command that is included on your membership letter is all you need to link up the repeater. This is not much of an inconvenience to put up with considering we are saving over \$1000 per year. Without the phone lines those of us who maintain the controller software will have to put up with the inconvenience of having to drive to each repeater site with a laptop computer to update the SCOM controllers.

The phone patch procedure is outlined below.

If a user is on any of the two meter repeaters and needs to make an autopatch, do the following:

1. Announce on the two meter repeater that you are on that you intend to bring up the 449.925 link to make an autopatch.
2. Use the "User Link" command (See membership letter) and bring up the 449.925 link
3. Listen for repeater activity, if active break in and ask the users to standby while you make the patch. If not active just announce using your callsign that you are making an autopatch. If you are making an **EMERGENCY** type autopatch state so when you request the users to standby. This is really not any different than the normal type of procedure you would use on any autopatch.
4. Use the 449.925 autopatch command (See membership letter) to access the phone patch. Remember that the 449.925 repeater is in the 508 area code and you may need to dial 1 + area code + number for the location your calling.
5. Proceed with your phone patch, remember the 6 minute warning limit on autopatch calls.
6. Terminate the phone patch by entering the 449.925 patch down command.
7. After the repeater announces that the patch is down state that you are bringing down the link and notify users that might be standing by to continue their QSO after the link is taken down.
8. Enter the "Link Down" command for the two meter repeater that you are on.
9. After the repeater announces that the link is down announce using your callsign that you are clear.

Note! If you are making an autopatch from one of the 220 repeaters there is no need to bring up the 449.925 link since all the 220 repeaters are full time linked. Just make the autopatch just as if you were on the 449.925 repeater to begin with.

Heelllooo... We would not have to do this stuff if we had more members – if some more significant number of members continued to support the MMRA, these cost cutting measures would not be necessary. But as it stands, we are dwindling. On the day we can no longer afford insurance, we are SOL. C'mon.... Re-up!!

Give the MMRA World Wide Web Home Page a try..... let us know what you think.... any ideas are welcome. We are looking into things like an MMRA list server. We now have our own domain name - mmra.org. The Web Page keeps getting better.....

WWW Address:

<http://www.mmra.org/~mmra>

MMRA Participates in Simulated Emergency Test Drill

What follows is a report from W1DYJ, net control:

MMRA SET Drill -- 4 November 2000

Downed Aircraft -- 121.775 Mhz. AM

At 9AM an earthquake of magnitude 6.2 occurred in Hopedale, Massachusetts. This created a problem at the Minute Man Airport in Stow, causing a downed aircraft at an unknown location. At 1500 UTC the crack foxhunters of the Minute-man Repeater Association were called into action.

Log (UTC)

 1500 W1DYJ: MMRA called into action based upon "rumors" of a downed aircraft
 1512 K1KWP: Reported a downed aircraft within 10 miles of the Marboro C.C.
 1526 K1ANN: First reports of signal, from Rt.177 at N42 26 19.9 W 71 33 18.4, breaking squelch
 1528 KT1X: Reported signal from Rt.62
 1548 N1NOM: Reported multiple confirmations from Minute Man Airport in Stow
 1606 K1ANN: Reported strong signals, bearing about north, from N42 26.47 W71 31.59
 1630 WZ0C: Reported aircraft found
 N42 28.299 W71 30.793

Participants in the Foxhunt

 K1ANN K1KWP KA1NLD KD1LE KD1SM KT1X
 N1BE N1BHI N1NOM N1XXI W1DYJ WA1NLR
 WR1O WZ0C N1VUX (ARES rep and photo ops)

SET Drill...continued

President's Corner Clark Conti, N1NVK

Participants in the supporting MMRA net

Net Control: N1XKB

RACES Checkin: NS1P

Checkins: KB1EZL N1KUG W1HFR

Late checkins with monitoring reports: N1NO W1MPN

The map below shows the search area. The team localized within a half-hour; and about an hour later the signal origin was found in the parking lot of the hockey field in a conservation area. It was a good exercise...and shows the real value of the "fox-hunt" aspect of amateur radio.



Disaster drills like the recent one on Nov 4th are helpful in that tell us what we don't know. By creating a scenario like the imagined earthquake we look at what we would do without commercial power. How long our battery powered radios and cell phones would run without a re-charge. Would the repeaters run? Would the tower fall in the first minute? They allow us to imagine what we would do after that. It reminded me of watching a group of kids role playing Dungeons & Dragons...

What if you encountered an angry dragon with big claws...?

"I'd cut his arms off with a sword."

What if he had six arms? As you attacked one he'd hit you with another

"I'd use my MAGIC sword"

What if he had 3 heads and saw your every motion, and knew how you fought? "First I'd use my faceted jeweled talisman to shine sunlight in all his eyes, to distract him... Dragons hate sunlight."

Each question lets us think about what we COULD do if we had anything we wanted. It also lets us think about what the next problem would be, and then the solution to that.

Later we can try to figure out how to make a magic sword, or in our scenario, a better back up power supply.

Some of the problems we encountered in looking at the "Earthquake" game is how to make the equipment and antennae survive, or at least be easily replaced.

I have no doubt that Kevin wished for a dozen or so magic swords during the

drill. I like to think of myself as the creative - inventive type. I think we need to define the parameters of what items would be helpful and start exchanging ideas. I am sure some of you have ways of solving some of the problems once they are clearly defined, and everyone would benefit from the results.

Editorial

Andy Morrison, N1BHI

The drill on Saturday drew out quite a few people. There were about 14 participants from the MMRA in the hunt for the simulated downed aircraft. We wish that we could have more events that would tempt this kind of participation. That the people who came out did so indicates that there are still those who take the hobby seriously...that, yes, it is a hobby, but it has some more important aspects.

If the events simulated during the drill had really happened, you can bet that a lot more people would have come out to help. That's the nature of ham radio.

But we have to remember one thing...that if people whose business it is to plan for emergency situations are to continue to take us seriously, we have to maintain a high level of participation in planning, drilling and learning.

Doing this will also help keep the hobby alive...to maintain

the willingness of the government to allocate significant spectrum to our use. So, let's try to get into more of this kind of stuff.

By the way...I was out monitoring the activities, to get info for the newsletter...when it appeared that the transmitter was somewhere near the Minuteman Airport, I remembered the runway numbers - 3 and 21 - which means that the runway headings are 30 and 210 degrees. So, I decided to go a little north of the airfield...the area over which an airplane would fly approaching runway 3. I heard the transmitter pretty well sitting in a little parking lot just off rt 111, on Stow Road. I should have hunted...

Minuteman Repeater Association, Inc.
P. O. Box 1127
Berlin, MA 01503

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

-Application for Membership-

- ☐ *New* or ☐ *Renewal*
☐ *Individual Membership (Dues \$25 per year)* ☐ *Family Membership (Dues: \$35 per year)*
☐ *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 by-laws, and understand that acceptance of this application entitles me to all rights and privileges of membership as provided under the by-laws.

Signature: _____ Date: _____

Name: _____ Callsign: _____ Class of License: _____

Home Address: _____

E-Mail Address: _____

Occupation: _____ Employer: _____

Work Phone #: _____ Home Phone #: _____

Member of: ARRL? _____ Other Clubs? _____

I can and am willing to assist/serve the Association and/or help maintain the Repeaters in the following ways (check all appropriate boxes)

- | | | |
|--|---|--|
| <input type="checkbox"/> Antennas | <input type="checkbox"/> Shelters | <input type="checkbox"/> Repeater Tech Committee |
| <input type="checkbox"/> Flea Market | <input type="checkbox"/> Medical Aid | <input type="checkbox"/> Special Projects |
| <input type="checkbox"/> Receiver | <input type="checkbox"/> Equipment Construction | <input type="checkbox"/> Repeater Control Operator |
| <input type="checkbox"/> Publicity | <input type="checkbox"/> Meeting Set-up | <input type="checkbox"/> Association Officer |
| <input type="checkbox"/> Transmitters | <input type="checkbox"/> Equipment Transportation | <input type="checkbox"/> Board of Directors |
| <input type="checkbox"/> Newsletter | <input type="checkbox"/> Social Events | <input type="checkbox"/> Field Day |
| <input type="checkbox"/> Logic | <input type="checkbox"/> Technical Documentation | <input type="checkbox"/> Emergency Communications |
| <input type="checkbox"/> Public Service | <input type="checkbox"/> Refreshment | <input type="checkbox"/> CW Operation |
| <input type="checkbox"/> Telephone | <input type="checkbox"/> Schematic Drawing | Other-Specify: _____ |
| <input type="checkbox"/> Legal Aid | <input type="checkbox"/> Technical Library | |
| <input type="checkbox"/> Education: | <input type="checkbox"/> Teach Code | |
| <input type="checkbox"/> Technical Documentation | <input type="checkbox"/> Teach Theory | |

Send this form with your Dues to:
MMRA, P.O. Box 1127, Berlin, MA 01503



The Minuteman

Volume 30 Issue 2

November 2000



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***Meeting Program:
To Be
Announced***

Renew Your Membership!

If you have not renewed yet, you will not see the insert in this issue that has all the user and patch codes. In addition, this is the last newsletter you will get if you have not renewed. We don't want you to disappear from our roles...we still need your support. Take a look at all the stuff in this issue – isn't that worth your continued support?

Return Address:

MMRA
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