The MINUTEMAN
Official Newsletter *of the* Minuteman Repeater Association
Volume 16, Number 1 January 1988

New 440 MHz Repeater on the Air in Marlboro

In the early part of November, a project long in the making was finally finished: the construction and installation of the new 440 machine. The new repeater is based on Hamtronics receiver and exciter boards. The chassis, along with the COR and mixer boards, are all custom built.

After six months and approximately 150 hours of construction, the repeater was put on the air late on a Saturday night. For the first three weeks, it operated with only 15 watts of output, not its normal power output of 100 watts. It was determined that the amplifier had failed due to an improper load caused by an antenna system problem.

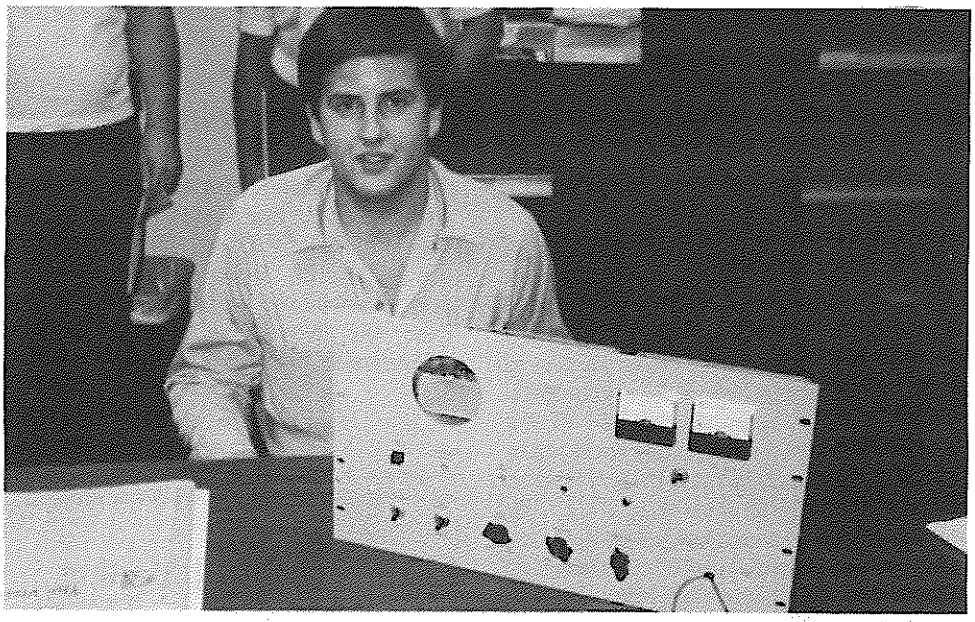
When the repeater was installed, a new antenna and feedline were ordered. Once the material arrived, a work crew was formed and plans for the installation were made with three days notice.

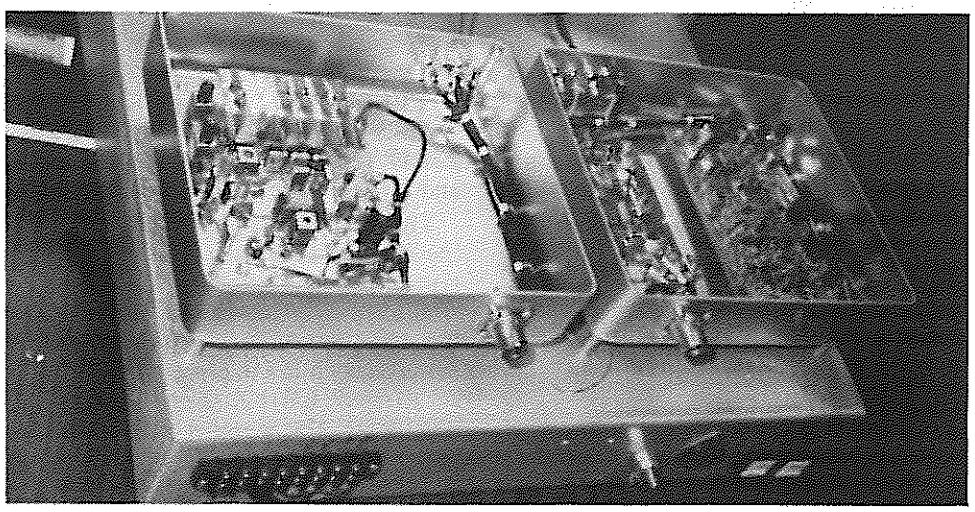
On November 29th, a very cold and windy day, we went ahead with the antenna installation. We met on Sligo Hill at 1:00. While we were waiting for a key member of the climbing team, we began wondering whether or not we were crazy, or just typical hams, chosing a 25-degree day with 40-knot winds to do an antenna job.

Fortunately, our climber arrived in time to put a stop to our mental meanderings. Tom Hughson, a co-worker of mine, deserves special thanks for his help during that day. He spent nearly three hours clinging to that tower, 90 feet up in a bitterly cold wind.

Thanks to the intrepid climbing team, we had the old antenna down, and the new custom-cut 8.5 Db gain Super Station-Master and 150 feet of 7/8 inch heliax installed in less than three and one half hours.

Several days later, when the last connector arrived, the machine was put back on the air. Also installed at that time was a new amplifier board. Preliminary tests show that the system is operating flawlessly. Ian, AF1R, operating with 1.5 watts from a handheld in Needham, was almost DFQ.





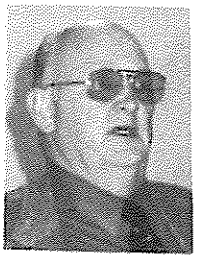
Subsequently, the grounding system was improved and the duplexers were tuned to yield even better performance. If you have a 440 radio, stop in on 449.925 and say hello. Let us know how the system performs!

Special thanks go to Masscom Systems for lending materials for the tower job, and to Tom Hughson for climbing the "Rocket." Also, hats off to other members of the crew:

Andy, N1BHI	Bob, N1BRM
Dave, KA1REK	Frank, KB1FZ
Ian, AF1R	Matt, KA1PHA
Barrie, K3BUZ	Peter, KA1QEK

If I have inadvertently missed anyone, please forgive me; the confusion of the day is the cause. All in all, it was a totally successful day.

—Scott Bullock, KA1CLX



President's Report

Marlboro 440 Repeater

The Marlboro 440 repeater has been rebuilt, due to a tremendous effort by Scott Bullock (KA1CLX). Scott not only rebuilt the transmitter-receiver, but replaced the antenna with a new Phillips Dodge on a cold day fit only for the most dedicated of hams. Thanks to him, the repeater is working better than ever according to user reports.

Silent Key

We were all saddened by the passing of Joe Devin, W1MWF, last November. Joe was involved in the field of radio and electronics for most of his life and with the MMRA for a number of years. He served as vice president in 1980-1981 and in 1981-1982 and had been the trustee of the 146.07/67 repeater in Quincy for 6 years. Joe will be missed in the MMRA both as a friend and as the trustee of 07/67. He had many contacts in the Quincy area that helped in the location of 07/67 there and established good working relations with city officials. This was important because the repeater is located on city property.

Schedule of Future Meetings

The next meeting will be held Wednesday, Jan. 20, 1988 at the Campion Center, Weston, MA.

The **March** meeting will be held on Monday, March 21, 1988 at the 1st Congregational Church, 25 Woburn Street, Reading, MA.

The **May** meeting will be held on Wednesday, May 18, 1988 at the Campion Center, Weston, MA.

Quincy 146.07/67 Repeater

We are looking for a Trustee for the 07/67 repeater. With the passing of Joe Devin, the trusteeship has been taken on by the president, K1IAO. This is a temporary situation because he will not be in this area on a permanent basis after the middle of 1988. Any volunteers out there? (With the change in the call sign the autopatch codes for the 07/67 repeater were also changed. All members who paid their 1987-88 dues have been notified of the new codes.)

Newsletter Distribution

This copy of The Minuteman will be sent to past and currently paid up members of the MMRA. However, this will be the last mailing to those who have not paid their 1987-1988 membership dues. Sorry, but the cost of distribution just will not allow sending the newsletter to members whose dues are not current.

Nominating Committee

The Executive Board, acting as the nominating committee this year, is seeking persons to fill the positions of president and vice president. Any member who is interested in these positions should contact a Board member.

220 Handheld Raffle

Remember, we are raffling off an ICOM-3AT at the March 21st meeting. The 3AT is a 220 MHz handheld transceiver that was donated by Dave, K1JHT. Tickets are $5.00 each. Bring in a new member and you will receive a free raffle ticket. (See the November edition of *The Minuteman.*)

Minutes of Board Meeting

December 15, 1987

K1IAO called the meeting to order at 7:38 p.m. Present were: K1IAO, KA1CLX, K1PBL, KA1AL, KB1FZ, K3BUZ and Tom WA1ZID, Trustee of the Quincy 224.40 repeater. KA9CRG, WB2DCL, and N1BHI were absent.

The Board voted unanimously to make the January 1988 issue the final distribution of the newsletter to those members who have not renewed their membership for 1987-88. A special notice will be included with the mailing label for those so affected. KB1FZ announced that we now have 328 members paid through August 1988.

WA1ZID mentioned that his control operators were in need of current membership lists. KA1AL made an up-to-the-minute computer runoff of the membership roster with copies for distribution to all repeater trustees.

KA1CLX requested that the Handi-Talkie raffle article be rerun in the January newsletter as a reminder that tickets are still available.

KA1AL reminded the Board that July 16, 1988 is the changeover to two area codes for telephones in our area. All our repeaters with Bay State coverage will have problems as our controllers are not set up to handle area code dialing. We will have to restrict autopatch service, come up with ways to finance new modern controllers, or get clever in ways to reprogram what we have (no easy task considering the documentation available).

There being no further business, the meeting was adjourned. A nominating comittee meeting was held after the board meeting.

Raffle Committee Report

The November 17 meeting raffle centered around an ARRL publications theme. The raffle was held at the Islington Community Church meeting site in Westwood, MA. The following is a list of raffle prizes and their winners:

New 1988 ARRL Handbook . . . . . Andy, N1BHI
ARRL Operating Manual . . . . . Dottie, N1BHA
Radio Interference Manual . . . . . Bill, KA1LZJ
200 Meters and Down . . . . . Gerry, KA1OUI
Repeater Directory . . . . . Dottie, N1BHA
Extra Class License Manual . . . Ralph, WB2DCL
Repeater Directory . . . . . Bill, W1KPZ
Repeater Directory . . . . . Richard, KA1INO
Advanced Class License Manual Tom, WA1ZID

The committee welcomes donations of prizes of both a radio and non-radio nature. They may be brought to the meeting or given to Scotty or Frank.

A Bill Rogers travel bag, donated by Road Runner-Active Child, and a 2 meter 1/2 wave magnetic mount antenna, donated by Dave Metz, KZ1I, are among the prizes to be raffled off at the January 20th meeting.

—Scott, KA1CLX and Frank, W1JDO

MMRA Officers and Staff

General Membership Meeting

November 17, 1987

President K1IAO called the meeting to order at 7:50 p.m. with 41 people in attendance. Salty announced the passing of Joe Devin, W1MWF, the trustee of the Quincy 146.67 repeater. K1IAO volunteered to contact the FCC to find out how long the repeater could be allowed to operate with Joe's call. We expect the time to be short and urgently need a trustee for Quincy 67. In addition, a trustee is also needed for Quincy 224.40.

KA1AL reported that 146.82 in Weston is about 10 dB better on receive since the all new repeater went in. Measurements showed a 0.1 microvolt squelch threshold with 0.35 microvolts for 20 dB quieting. A spur complaint about an audible output on 147.45 was received. The spur was measured at -65 to -70 dBc (dB below the carrier level) which is well below the legal requirement.

N1BHI reported that the tube amplifier removed from Quincy 67 is now in service on Marlboro 61, producing 160 watts out of the diplexers into the antenna.

KA1CLX reported that the Marlboro 440 repeater is now up with the exciter only. The antenna opens up in the wind and has destroyed the repeater power amplifier. A used working power amplifier was purchased for $100.00. A new antenna with 7/8 inch heliax is coming. Full repairs are expected to take about a month.

KB1FZ announced that of the 448 members on the roster, 265 have paid to date.

W1JDO displayed the 3AT Handi-Talkie being raffled off in March, and offered tickets to all interested at $5.00 each.

KA1PHA announced a new 220 repeater in be put up by the MACOM Amateur Radio Club on their plant in Chelmsford.

K1IAO then introduced the speaker, Dan Odem, who announced his revised talk on "Unusual HF Topics of Interest to Hams". Specifically, the three topics were a rocket propagation measurement in which hams participated, a low power "impossible" propagation measurement, and a computer simulation "ionosphere in a box" study.

The rocket propagation measurement involved beacon transmitters in Puerto Rico on the 7, 14 and 21 MHz bands with about 150 volunteer hams monitoring the transmissions around the country. The rocket was launched from Cape Canaveral, Florida on an eastward course during daylight hours when the 300 kilometer high F2 layer in the ionosphere provided the propagation path. The rocket's plume was predicted to punch a hole in the F2 reflecting layer, which would be observed as signal strength changes or drop outs when the propagation path reflected from that portion of the ionosphere which was punched through. The maximum effect was noticed on 21 MHz, with some effect on 14 MHz and no effect on 7 MHz. Hams beyond 2200 kilometers were unable to copy any signal on 21 MHz. The results confirmed predictions made by the computer, thus adding to our scientific understanding of the various mechanisms of propagation.

The "impossible" propagation measurement was planned to determine the path loss on a 500 kilometer path near the peak of the last sunspot cycle with a transmitter site in Alabama and receive site in South Carolina. However, the South Carolina site turned out to be noisy and the quiet Alabama site didn't want any transmitters, so the site functions were reversed. The test swept the frequency of the 100 watt transmitter and receiver across 20 MHz of the HF band once per minute, using WWV time to synchronize the sweeps. FCC permission to conduct this test was given subject to revocation if three reports of interference were received, with announcements to be disseminated to the public in advance. Of the seven complaints received, none occurred when the transmitter was on the air. Antennas were deliberately kept simple in design to ease calibration which was essential to the experiment (gains had to be accurately known). A horizontal dipole, a vertical monopole, and a beverage antenna were used. QRP operators will be interested to learn that power had to be reduced to 0.0005 watts into a 7 dBi gain horizontal dipole to produce a 10 dB signal to noise ratio at the 15 MHz maximum usable frequency.

The "ionosphere in a box" computer simulation study was designed to develop and verify a model to predict the ionospheric conditions. Ionospheric conditions are measured by soundings whereby time delay of the returning echo can be plotted against frequency. Lower frequencies reflect from the less ionized lower layers and the echos return sooner. As the frequency is raised, the transmissions penetrate the low layers, taking longer to return. A graph of the time delay versus frequency is called an ionogram. When the computer model is run using median values for the ionosphere, results are not good enough to be useful. However, when a single measured data point is used to update the model, the resulting calculated ionogram closely resembles the measured one. Median values are not very useful for the ionosphere because of rapid changes and wide variations which are averaged into the median ionospheric values. Median values for noise prediction models have been found to be quite good, however. Most HF noise is caused by lightning discharges propagated for long distances through the ionosphere.

Dan answered a number of questions from the audience. We learned that the upper frequency limits of ionospheric propagation is around 100 MHz. Tropospheric propagation starts at 100 MHz but works best at 400 MHz. With high antennas, 500 kilometer paths can be covered regularly. Terrain scattering works best on low frequencies, making it easier to get over hills on low frequencies (i.e., 50 MHz) than high ones (440 MHz). The questions finally were forced to end by the late hour. The raffle was held and the meeting adjourned.

Respectfully Submitted,
B. L. Brozenske, K3BUZ, *Clerk*

Handi-Talkie Donated

Dave, K1JHT, has made a generous donation of a mint condition ICOM-3AT, 200 MHz handheld transceiver, which he won at a previous MMRA drawing, for the Club to use as a raffle prize. Special raffle tickets were available at the MMRA meetings in November and will be available at the January and March meetings for $5.00 each. A free raffle ticket will be given to members who bring in a new member (a person who was not a member from 1 September 1986 to date). The drawing will be held at the Reading meeting on 21 March 1988.

Verification of credit to persons bringing in new members will be allowed if the new member indicates his sponsor. This may be done via the application, or by written affirmation of the new member prior to the drawing.

Phone Patch Note

Bob Ling, W1IBF, points out an error in the phone patch code information that was mailed out with the last newsletter. He says you have 4 (four) seconds to enter the code after the beep, not the 2 (two) seconds previously indicated.

Royce Sawyer, N1BPU Describes State's Emergency Communications Facilities

Our guest speaker at the September meeting, Royce Sawyer, N1BPU, was introduced by K1IAO. Royce described the Framingham Civil Defense Center which is designed to shelter CD workers from a 20-megaton blast three miles away. The National Warning System (NAWARS) is triggered from NORAD in Colorado or Olney, MD to warn the nation of an impending attack. The Massachussetts State Police take this call and are responsible for activating the Massachussetts warning system. Every two months a full test of the warning system is conducted when each community is asked to report

time and source of their test message. These links were fully federally funded and are maintained with federal funds.

A dedicated telephone system allows Massachussetts CD Framingham to talk directly to nuclear power plants in Rowe, MA; Vernon, MA; Seabrook, NH; and to Emergency Operations Centers in New Hampshire, Vermont, and Massachussetts to facilitate emergency evacuation around the power plants. State Police Framingham can turn on sirens around the Seabrook plant via a remote control link.

The Emergency Broadcast System provides rapid alerting of broadcast stations through a ripple down system whereby each station listens to other broadcast stations with a dedicated tone receiver. WROR is the Massachussetts originating station, getting its alert from an out-of-state station. Originating stations are preferred to be 24-hour, 50-kilowatt FM stations near the state capitol with emergency power. The remaining Massachussetts stations get their alert through WROR.

Microwave dedicated links cover Belchertown, Westboro, and Tewksbury CD facilities. A relay site on Mount Wachusett can cover 95 percent of the state, with a repeater on Mount Graylock covering the remainder around Rowe and Vernon. A total of 28 CD vehicles can be reached anywhere in the state throgh tone operated squelch. Teletype is used on the microwave links, and facsimile is used some places. No funds are now available for packet although it would be excellent for gathering data from lots of communities quickly. This is a priority item when funds become available.

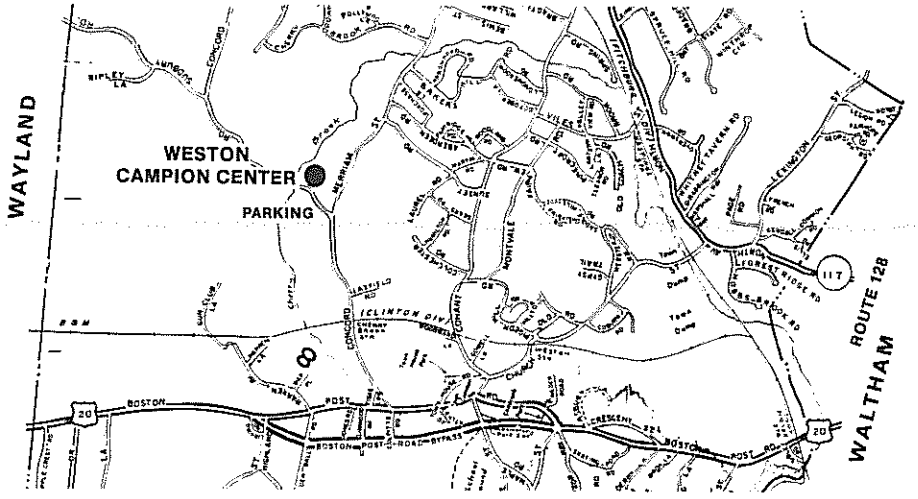
ARES and RACES organizations are available locally in most towns and interested hams can contact their local Emergengy Coordinator or Barry Porter, KB1PA, 47 Erin Road, Stoughton, MA 02072 for details.

January Meeting to be held at the Campion Center in Weston

— Wednesday, January 20, 1988 —

"An Introduction to Packet Radio"

a presentation by Dave Crocker, W1TMO



MMRA

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