The Minuteman

Volume 8 Number 3 | The OFFICIAL NEWSLETTER of the MINUTEMAN REPEATER ASSOCIATION | November 1979

PRESIDENT'S CORNER

Well, budgets are past and it looks as if the MMRA will keep its head above water for another year without inflating its dues structure. Of several items facing the Board of Directors this year, several need comment. Our by-laws require a rather lengthy procedure for presenting and approving (or disapproving) a new repeater; we are asking the membership to bear with us during this time, and to file written comments with us concerning your feelings. We are fortunate in having Al, KA1AL as Clerk of this organization, to guide us through the legal tangle.

As a result of complaints addressed to me and the Board concerning the activities of a very few members on the repeaters, this Board of Directors will follow a policy of reviewing membership applications and renewals, as provided for in our by-laws. We do not (immediately) intend to publicly embarrass such members by requesting an "ouster" vote at any membership meeting.

Hopefully, by the time you read this, regular emissions will be available from the 450 repeater at Quincy Hospital. Some of our technical crews either do or will soon need additional help as the complexity of our desires grows; if you feel a need to donate your expertise, please let us know.

MMRA is headed for one of its best years with repeater proposals, auction/flea market, public service, weather watch, and similar activities heading the list. We need more inputs from the membership, and more help on the Newsletter, repeater technical crews, and various committees. Please offer your support in the areas you feel need the most help.

Curtis, K2TJZ

61 REPEATER UPDATE

Everything has been proceeding very smoothly in Marlboro. A new heater has been installed to keep equipment and repair crews warm this winter.

The standby repeater is still being upgraded and will probably be fully operational early next year. Shortly a new crystal oven will be installed in the present machine to cure once and for all the frequency drift problems.

For those who are interested in helping the local weather men with their forecasts, there is now a daily weather net on 61 at 6 PM local time. Check in and tell them how the weather is in your area.

In conclusion I would very much like to thank K1VCO for his generous contribution of the new heating system and WA1DDD for wiring it in. That's it, see you on 61.

de K1ST

The Radio Amateurs Interstateweather Net (RAIN) now meets nightly at 23:00 hours local on the Marlborough 01/61 machine.

If you can supply any information, we would appreciate it.

de N1AMF

Principal Profile

Too often we take sterling service as a "given"; perhaps too often we don't know much about guys like W1UIQ, who often, and very quietly, grace our midst and help our days or nites on MMRA repeaters.

WARREN EAST, W1UIQ, of Dorchester, is precisely that type of member. No new-comer, Warren was first licensed in 1951. He shares your scrivener's dislike for C. W. with an equivalent passion, and got his "hots" for VHF on 6 meters during the cycle peak of '55-56, with some side forays to the 2 meter activity of those formative years.

"Worrisome Warren" hit 220 for a series of lonesome sojourns about 1960. The thrills of the latter resuscitated a latent interest in woodworking and antique clocks about then, and he took leave from hamdom for nearly ten years, except to retain his ticket and old gear.

That ingrained curiosity of the true ham bit again in '72 while messing around on "two" one fateful night. Strange and intriguing signals at 146 Mhz from an HRO-7 and W2AZL converter combo soon seduced our hero; bitten by this most contagious of bugs, W1UIQ changed to a "Gladding" TXCR and membership in the then embryonic, feisty MMRA.

In a moment of enthusiastic, if innocent, commitment Warren was suddenly the (wanted, vaunted, daunted?) trustee of 07-67 at WR1AAI, Quincy. His employment at the "Microsonics" division of Sangamo-Weston in Weymouth has kept the wolves from Warren's door since 1963. Moving up to Manager of the outfit's Calibration Laboratory in '69, he is dedicated to his job and reputedly revels in his hard work!

As is often true of some of MMRA's more mature types, W1UIQ is not over-endowed with lusty, robust, good health in a measure often needed for clambering up and down roofs and towers. But, in his areas of solid competence, Warren and his tech cohorts continue to serve us well. Our days and nights are more fun because of Warren East's help, service, easy manner, and pithy humor. Those who depend on 07-67 can join in "Cheers" indeed for W1UIQ, day-in — day-out.

de W1IIM

NEW REPEATER

Plans for the new repeater, included in Marlboro's budget request this year, are still being formulated by the Board for presentation to the membership, probably at the January meeting. With considerations of equipment, usage, WARC, surplus commercial equipment, it looks like 450 MHz will be the frequency band. We have some options as to siting, operating modes, coverage, and "bells and whistles." We will try to keep you up-to-date as much as possible so that you will have a good idea what we will be proposing in January, and those with strong feelings one way or the other will have ample time to prepare presentations. Some of the access methods we will propose will involve little or no additional expense to 2-meter operators to operate 450 -- food for thought. The end result of the presentation will be a mail ballot with, hopefully, one question: "Shall we, or shall we not?"

Curtis, K2TJZ

MINUTEMAN REPEATER ASSOCIATION, INC.

THE MINUTEMAN REPEATER ASSOCIATION

The Minuteman Repeater Association is an organization dedicated to the promotion of amateur radio activities through the use of UHF and VHF Frequency Modulation techniques; to encourage participation in the Radio Amateur Civil Emergency Service (RACES) of the Commonwealth, or any county or town therein, and the U.S. Government; to develop, utilize and coordinate amateur radio repeater systems as licensed by the Federal Communications Commission; to assist Civil Defense and other units of Government in the field of communications as the need may arise; to sponsor any endeavor or engage in any other non-profit purposes for and in behalf of the membership of the Association, which is consistent with the provisions of Internal Revenue Code, section 501 (C) (7).

The MMRA owns and operates four two meter repeaters:

Marlboro	146.01/.61
Quincy	146.07/.67
Weston	146.22/.82
Stoneham	146.115/.715

All general correspondence and inquiries regarding membership should be addressed to The Minuteman Repeater Association, Box 2282, Lexington, Mass. 02173.

PAST PRESIDENTS

Steve Rudin	W1WSN	1971–1972
Robert Waters	W1PRI	1972–1973
Steve Rudin	W1WSN	1973–1974
Robert Lynch	W1EFH	1974–1975
Louis Savoie	K1RAK	1975–1976
Merrill Callum	W1IAE	1976–1977
Gerald Horne	K1GOI	1977–1978
Dan Heather	N1DH	1978–1979

COMMITTEE CHAIRMEN

Meetings	Vacant	
Raffle	Frank Malloy, Jr.	KA1AF
Fund Raising	Frank Malloy, Jr.	KA1AF
Public Service	Doug Chisholm	WA1BLG
Technical Advisor	John Graham	WA1YTL
Public Relations	Vacant	
Nominating	Vacant	

OFFICERS

President	Jack Curtis	K2TJZ
Vice President	Peter Munroe	WB1DQC
Secretary	Ham Hayes	WB1GUZ
Treasurer	Marty Kullen	K1GRB
Clerk	Al Kunian	KA1AL
Directors	Bill Wade	K1IJZ
	Mort Grant	W1JSH
	George Downs	W1CT
	Arthur Davis	W1HIT
	Dan Heather	N1DH
Trustee-82	Bob Wilmarth	W1CMR
Trustee-67	Warren East	W1UIQ
Trustee-61	Steve Tolf	K1ST
Trustee-715	Bill Sencabaugh	K1UAQ

MMRA BULLETINS

Monday & Friday — Commuting Hours

Mornings—0730	Ruthie Ferguson	W1SCS
Evening—1730	Pat Heather	WA1YTQ

PUBLIC SERVICE NET

Tuesdays —2000 on 22/82; Traffic or comments

MMRA CONTROL OPERATORS DISTRIBUTION

MARLBORO—01-61

Richard G. Hurd	WA1YCV
Richard R. Hurd**	WA1SEN
Shawn Kelley	WB1AEL
Walter Kimball	W1SQY
John Lovell	K1LRK
Glen Rantana	WA1UJU
Steven Tolf*	K1ST

STONEHAM—115-715

Earle Benson	W1HXF
Albert Bolduc	KA1AS
Robert Craven**	W1WXA
Joseph Fermano	W1RRN
Morton Grant	W1JSH
William Sencabaugh*	K1UAQ
Geoffrey Talbot	WA1EGL

QUINCY—07-67

Warren East*	W1UIQ
Mike Goldberg	K1LJN
Bruce Marshall	WA1EOT
Francis Molloy	W1DWI
William Morgan	WA1GHL
John Morrison	WA1UVR
William Pitts	W1LZW
Joseph Sapienza	W1KSA
Lou Savoie**	K1RAK
Delsanio Schiavo	K1QAZ
Howard Sherrick	K1QAX

WESTON—22-82

Jim Bricker	WA1QKK
Robert Clements	K1BC
John Ferguson	W1IIM
John Graham	WA1YTL
Edward Hannon	KA1AA
Stan Kaplan	K1WTF
Rev. Dan Linehan	W1HWK
Dan Rodakis	KA1BMJ
William Wade**	K1IJZ
Robert Wilmarth*	W1CMR
Ken Harman	K1IEQ

*Trustee **Tech. Supvr.

THE MINUTEMAN

The Minuteman, the official Newsletter of The Minuteman Repeater Association, is published ten times a year. The purpose of the Newsletter is to keep its members informed on meetings, special events and actions of the officers and membership. It is also to serve as a source of technical information written by its members and to list equipment offered for sale. Letters to the Editor are strongly encouraged, and they must be signed. Names will be withheld upon request. Material for the *Minuteman* should be sent to the Editor, Don Sherman, WA1OEJ, 1 Wallis Court, Lexington, Mass. 02173 by the 7th of the month preceding publication.

MINUTEMAN STAFF

Editor	Donald Sherman	WA1OEJ
Associate Editor	Dan Heather	N1DH
Associate Editor	Ruthie Ferguson	W1SCS
Layout/Pasteup	Charlie Hanson	WA1YRQ
Address Labels	Bob Clements	K1BC
Humor	Murry Finer	K1GGP
Contributing Editors	Jack Ferguson	W1IIM
	Robert W. Chin	WB1FHT
	Sigrid Marble	N1AKD
	Rein Beeuwkes	W1BFM
Advertising	Warren Magee	W1KAN
	Dan Heather	N1DH
Typist	Betty Griffin	
Printer	The Lexington Press, Inc.	

MINUTEMAN DEADLINE

1st of Month Deadline for material which requires con-derable editing or re-writing.

7th of Month Deadline for submission of regular material.

15th of Month Deadline for camera-ready advertisements or exceptional material after approval by Editor. Material must be in correct size format and typeface. Please contact Editor at home, evenings—443-9450—for details.

20th of Month Editor submits material to printer.

30th of Month Mailing of the Newsletter.

Please note that The Newsletter now has available an editing and re-writing staff. If you have material which must be rewritten or summarized, please send to The Minuteman, c/o Dr. D.S. Sherman, 1 Wallis Court, Lexington, Mass. 02173. Material submitted after the 7th of the month is very difficult to handle. Your cooperation will be greatly appreciated.

ROAMING

Rover found out that Sears (and mebbe others) Smoke Alarm is indeed designed around the internal resistance of the Duracel battery. Other replacements wouldn't work.

Murry, K1GGP off to Hallandale, Florida again. His condo antenna may be invisible, - not so his 15 meter signal.

N1DH, WA1YTL, N1HR, KA1CGO and WB1FDB are seasoned sources (no pun) re coal and wood burner BTU efficiencies, and have good dope on solar water heaters et al.

If DX seems absorbing now, you should remember the Archduke Otto of Hapsburg racking 'em up while the Nazis invaded Vienna, decades ago.

The response to Radio Amateur Weather Interstate Net (RAIN) (on 01-61 at 6 PM every day) is very good. Try it - takes about 3 minutes, and helps the cause. The MMRA Public Service Net is worth a pitch, too, if you're available Tuesdays at 8 PM on 22-82.

The Women Radio Operators of N. E. (WRONE) had 72 at their Danversport 25th Anniversary Lunch on November 3rd. Several MMRA gals were there, including KA1BBN, Evelyn, WA1WQM, Kit, and W1SCS, your AM Bulletin station, who was a cofounder.

The Board's O. K. for a 450 MHz installation at Marlboro (as of 11/1/79), if endorsed by the membership, could open the way for many activities, i. e., ASCII (when okayed), ATV, 10 Meter FM DX link-ups, cross link to say Mt. Greylock, etc. limited only by the Tech crew's and Trustee's energies.

North country skiers and travelers should note: K1MOQ, Frank, now ties his 37-97 machine at Tunbridge, Vermont, into 25-85 at Derry via a 220 link.

The latest MMRA control-ops' list shows 26 or more ladies in our ranks, and a fine crew they are, too, including flyers, doctoral educators, lovers, sociologists, pharmacists, writers, editors, homemakers, programmers, executives, artists, engineers, and not necessarily separately, sterling helpmates and parents.

Rumor has it that some manufacturing sources like Atlas, Alda, and unnamed others are about to go down the drain. If you thought Chrysler was alone - - - -

Speaking of the above, ye scribe wanted to do a sort of "Masters and Johnson" personal profile on one of our best, but my chief mentor laughed, hooted at my obvious incompetence, and hid my teeth behind the ketchup, just to be mean; then she had my arm re-set!

de K1UEW

KZ5's WILL CEASE

CANAL ZONE will cease to be a separate country at the end of September, under the recent U. S./Panama treaty. After that, all KZ5's will have to qualify for an HP1 license to stay on the air. (HR REPORT 7; 6/79)

submitted by K1GGP

Zeal without Knowledge is a runaway horse.
Proverb

Let us all be happy and live within our means, even if we have to borrow the money to do it.
– Artemus Ward

It is prosperity that gives us friends, adversity that proves them.
Proverb

FCC DENIES RECONSIDERATION ON MARINE 220 USE

The FCC has denied eight petitions for reconsideration of its decision to include a proposal to make maritime mobile the primary service on 220, with amateur secondary. The June issue of Ham Radio quoted the FCC as pointing out that four years had been devoted to the U. S. WARC position, and there had been ample opportunity for comment. The fact is that the 220 proposal was not included in any public notice, but appeared for the first time in the final order. Thus, it would appear that the FCC has violated the administrative Procedures Act, and can be sued to force reconsideration.

I would suggest that all League members contact the New England Director, John Sullivan, W1HHR, and urge that the ARRL bring legal action against the FCC. I would point out that any question of antagonizing the FCC is hardly relevant when they have already acted to, in effect, give away what is rapidly becoming an important band to us. The time to head off this threat is short, and firm action should be taken immediately.

A number of writers have suggested that all Hams should write to their representatives and senators about this high-handed and apparently illegal action. This could be very effective, at a time when the FCC is under attack by powerful commercial interests, and badly needs congressional support.

Anybody with 04/64 can send a message to W1HHR through the 10:30 PM net.

Whatever you do about this, please do it quickly!

AB1Z

REVIEW: Presentation on the Harvard University SynchroCyclotron by Kris Johnson, K1WQ on September 24, 1979, in Weston

On September 24th at the MMRA Meeting in Weston, we were treated to one of the most interesting facets of physics through a well prepared presentation on the Synchro-Cyclotron at Harvard University by Kris Johnson, K1WQ. With first hand experience as a member of the Harvard Cyclotron staff, Kris conducted us on an audio-visual tour of the facility with a bit of history and some detailed explanations of some of the more complex and interesting equipment.

The Harvard Cyclotron, more accurately named the SynchroCyclotron, was built over thirty (30) years ago and was used for high-energy physics research and experimentation. As more and more modern facilities became available to the scientific research community, the Harvard Cyclotron was used in pioneering medical treatment by irradiation under the joint efforts of the Cyclotron staff and the Neurosurgery Service at the Massachusetts General Hospital. To date, well over 1, 300 patients have been treated at the Harvard Cyclotron Laboratory, many of them referred from doctors in Europe, South America and the Near East.

The Cyclotron is remarkably reliable at providing us with the necessary amount of and quality of proton beam. In order to produce these protons, we start out with hydrogen gas. We strip off the electrons in a low-voltage arc discharge, providing an abundant supply of protons. The protons are then subjected to both an oscillating electric field which accelerates them up to about one-half the speed of light (about 300, 000, 000 miles/hour) as well as to a strong magnetic field which keeps them contained in an ever-widening spiral configuration. At the end of each cycle (which takes 0. 003 seconds) the protons are channelled off into a beam pipe which then leads into the treatment area. By using several magnets placed at various points along this beam pipe, the final proton beam attains a diameter about the size of a pencil and an intensity of some 1, 000, 000, 000 protons/cm^2/second.

Once the beam enters the treatment room, it is scattered and shaped to form a larger diameter and special contour, the size and shape dictated by the doctors in order to irradiate only a specific area of skin and underlying tissue. Beam characteristics are being constantly monitored by various electronic instruments and displayed at the control panel outside of the treatment area. All electronic and mechanical adjustment controls are performed there and beam status is always monitored by a control operator while the beam is running. Many types of interlocks and safety features are designed into the system which will shut off the beam automatically should any problem arise. The average irradiation time for a patient is about three (3) minutes..

CO-AX CABLE FACTS IN A NUTSHELL

Item 1 The outer jacket on co-ax cable is very important in determining what the life span of the cable is. Cable with vinyl jackets come in two types: Class 1 - contaminating type originally used on cables such as RG-8/U, RG-58/U and RG-58/U. This jacket material when manufactured is kept flexible by incorporating a plastisizer or extender. Unfortunately, as soon as the cable is jacketed, the extender starts to move from the jacket thru the shield braid into the polyethylene insulation around the center conductor. This causes the polyethylene to change its insulation characteristics with increasing electrical losses. These losses can be readily measured after a year or two. Thus the older cable, particularly surplus cable that is old, is no great bargain at any price.

Item 2 Later cables have used what is called a Class 2A jacket. This material is long lived, abrasion resistant, not damaged by sunlight, it can be buried for underground use, and best of all is non-contaminating to the polyethylene center conductor insulation. All of these advantages add up to a useful life for the cable of 10 to 20 years (how does that sound?) and the Class 2A jacketed cable has not, I repeat, has not increased the cost of the cable to us, the amateur using co-ax cable. Examples of these cables are RG-213 replacing RG-8, RG-58C/U replacing RG-58/U, RG-58B/U replacing RG-58/U, etc.

Item 3 With RG-8/U no longer being a MIL-SPEC cable, the shielding no longer has to be made so well. The result is cheapened shielding and less density of the braid. This has been cheapened to such an extent that if you bend the cable the braid spreads to leave holes in it so you can see the inner insulation. Therefore, it behooves us to refuse to purchase NON-MIL-SPEC cables. As frequencies get higher, there would be more and more RF leakage thru these poorly made cables. The manufacturers did not cut the price on the NON-MIL-SPEC cables, but merely cheapened them.

Item 4 Theoretically foamed insulation on cables should increase their efficiency. However, there are none of them made to MIL-SPEC so far as shielding, do not have Class 2A jackets, and unless the foam is gas filled to keep moisture from oozing thru the jacket into the foam, are not desirable. Losses go up very rapidly if moisture gets into the foamed insulation.

To conclude - stick with late types of co-ax using Class 2A jackets and leave the foamed co-ax to TV. Jacket type for co-ax can be checked in the cable makers catalog. Cable jacketed with 2A jacket is normally no more expensive than the older NON-MIL-SPEC cables.

(Compiled from "Amphenol" and "Times Wire & Eng. ")

Submitted by Murry - K1GGP

One of every four Americans is mentally ill. If three of your friends are o. k., you' re in trouble.

Beauty may be only skin deep, but it' s a valuable asset if you are poor and not overly bright.

Board of Directors Report

The Board of Directors of the Minuteman Repeater Association met on November 1, 1979. Guests present were Earl W1HFX, Bob WB1FHT, Steve K1ST, and Jack AB1Z.

After the reading of the Minutes of the previous meeting the guests were presented. Bob Chin WB1SHT requested to address the Board on the subject of a telephone directory prepared exclusively of emergency and police numbers for some 273 towns. This would be a joint effort of REACT and ham radio and Bob was seeking the approval of the Directors for this undertaking. This would be at no cost to the MMRA except for some possible costs for paper for extra copies. The data base would be maintained by Bob and what he actually sought was some people, perhaps from the Public Service Committee, or others to furnish information on the update of numbers so that the data base is always correct. He explained that neither the Telephone Company nor any other agency had any such book. Bob further went on to explain the upgrading taking place within react and produced some educational material and training pamphlets which REACT is now using directed toward those efforts. This would not be in alliance directly with REACT, but rather a contribution from members to update the data base. The board provided support for this project.

The next guest, Jack Carroll AB1Z, stated that he was revising the MMRA Blue Book, which of course, is a compilation of police and emergency numbers that would be used for our organization and, of course, is not as comprehensive as the documents supported by the previous guest. Jack sought Board approval so that he might officially approach police and public authorities for correct numbers. The Board unanimously supported him.

Steve Tolf, K1ST was the next guest and he was there to discuss the implementation of a new repeater which had been the subject matter of previous discussions and for which an appropriation could be made. It was explained that the procedure would be that his presentation would have to be made at a membership meeting called for that purpose or for any other business that would come before the meeting, and that he would have to present his views there; that opponents would be given their opportunity to present their view and a formal mail vote taken eventually of the membership to make the final determination.

In any event, the Board of Directors, after much consideration, approved a vote of confidence for a 450 MHZ repeater as opposed to a 220. This being their endorsement, the final vote being that of the membership, a Motion was made to send a separate notice stating the purpose of this meeting to the membership and it was carried by majority vote; one opposed. The reason for this was that it was felt that the notice was too important to be put into a regular newsletter, and there is also a time element involved.

AB1Z then presented a proposal for a printed auto patch procedure which was discussed and the format temporarily tabled, pending further studies.

The Board then took up matters of budgets, correspondence and renewal lists and various matters of routine business.

The beginnings of the formation of a Nominating Committee for next year's candidates then ensued.

The By-Laws were then discussed and it was felt by the Board that because the organization was now a large corporation consisting of about 530 members, that it was very difficult, in accordance with the By-Laws, to facilitate certain changes. KA1AL, the Clerk, pointed out that about 3 administrations previous to this one, an Internal Revenue Tax exempt status as a charitable corporation was sought by MMRA; that this was still pending, and that KA1AL was corresponding regularly with the attorneys hired to do this job. Certain changes suggested by these attorneys would almost be impossible to implement under the present By-Laws.

Following this discussion, the Board and the President supported a revision of the By-Laws at some future date.

Peter WB1DQC, the Meetings Chairman, then presented the meeting's agenda. He said that Rick Machon, Assistant Station Manager of Boston Edison, Pilgrim I, would give a talk at the membership meeting on November 27, 1979, the subject being Nuclear Power Generation and Distribution.

The next membership meeting was to be scheduled for Weston on January 16, 1980. The proposed speaker is K1MM who would talk on the Spraytling DX' Pedition.

A possible March 17, 1980 meeting at Lynnfield will be held and one on May 20, 1980 back at Weston.

There being no further business to come before the meeting, it was declared:

Adjourned.

A True Record. ATTEST: Alan E. Kunian
KA1AL, Clerk

KUNIAN, GREENBAUM & NORRIS

Counsellors at Law
326 Union Avenue, Framingham, Mass. 01701

October 3, 1979

TO: Jack Curtis, K2TJZ, President
Minuteman Repeater Association

FROM: Alan E. Kunian, KA1AL, Clerk
Minuteman Repeater Association

RE: Advisory Opinion:
Requirements of Meeting and Balloting
for a New Repeater

The requirements of the above subject matter are set forth in Article 8 of Section IV, and Section V. Article 1. b. of the By-Laws of the Minuteman Repeater Association.

My opinion is that you must call the meeting clearly specifying that this subject matter shall be a main purpose of the meeting (this shall not preclude the conducting of other business at the meeting). The precise proposal shall then be discussed at the meeting.

The By-Laws clearly state that voting shall be by mail as set forth in Article 8 of Section IV. This means that a summary of the background of the vote and the issues must be included with the ballot. I would assume that the issues would be developed at the meeting and summarized in the material accompanying the ballot.

The second paragraph of Section 8 refers to the inclusion of materials by proponents of both sides of any issues equally. The only way that I can see that this can be literally complied with is perhaps an announcement at the meeting that: (1) the By-Laws require a mail vote, and (2) proponents of either side send in their written position on the matter by a stated deadline. You would then have to edit same, summarize and present both sides equally in the mailing.

The quorum required is forty (40%) percent vote of the membership. Once the quorum is achieved, there must be two-thirds (2/3) in favor to carry the vote.

Validity questions of the vote and ballots are conclusively determined by the Board of Directors, and the results of the vote mailed to the membership.

Assuming that we have 500 paid members, we will need votes of 200, and of the 200, two-thirds (2/3) must vote in favor.

Also, the ballots must be postage pre-paid.

Cordially,

Alan E. Kunian, KA1AL
Clerk
Minuteman Repeater Assoc.

Technical Corner

DF EQUIPMENT

The winter months offer you an excellent opportunity to gather the necessary parts and build the equipment you will need to join us in transmitter hunting. The basic equipment includes: a ZL special direction-finding antenna, a receiver with a 146.31 MHz crystal installed, a field strength meter and an attenuator.

Construction details of the ZL special are shown in Fig. 1. This antenna is ideal since it has a cardioid pattern with about 3 1/2 db forward gain and a sharp null off the back. It has two 300 ohm twin lead, half-wave elements, about .1 wavelength apart, strung out on dowel supports. Spacing is about 8 1/2 inches and the elements are driven 135 degrees out of phase, resulting in a near perfect cardioid pattern. The feed point impedance (in spite of the elements being folded dipoles, which ought to result in about 300 ohms) is about 72 ohms, balanced. The impedance is changed from balanced to unbalanced with a balun coil mounted directly at the feed point. You may wish to try the bazooka balun which several of our hunters have used. RG-59/U is used for the feedline and length is unimportant. Slip a length of shield braid over the vinyl covering of the cable and connect it to the cable shield 1/4 wavelength from the feedpoint. The opposite end, near the feed point, is not terminated; but, the shield must cover the feedline up to this point. Additional details will be found in the ARRL Antenna Book and the FM and Repeater Handbook.

A field strength meter is desirable once you get near the hidden transmitter. Usually, the S-meter on your receiver will be pegged and become useless close to the transmitter. The field strength meter is less sensitive and includes a means of attenuating the signal from your DF antenna. The schematic for a simple meter is shown in Fig. 2. If you want to build a more sophisticated version, check the FM and Repeater Handbook. In it you will also find construction details for a VHF attenuator. An attenuator is handy for getting in a little closer to the hidden transmitter while still using your highly selective receiver.

Get your equipment together and join us next season. If you have questions, ask some of the hunters mentioned in Will Gregson's article. We'll be looking forward to having you with us!

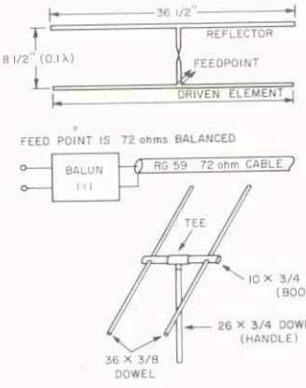
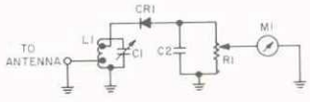


Fig. 1



L1 – 4T NO. 14 SOLID
C1 – 50 pf APC
C2 – 0.001 mfd disc
R1 – 50 K pot
M1 – 50/200 mua meter
CR1 – IN270 or equiv.

Fig. 2

RF RADIATION

Is the Amateur Operator at Risk?

Back in June of this year the FCC issued a Notice of Inquiry about the potential hazards of radio frequency radiation (General Docket 79-144). This followed publicity about microwaves at the Moscow embassy. Some U.S. towns have already tried to enact their own exposure limits (e.g. New York City have proposed a 50 μW. cm^{-2} limit for frequencies above 10 MHz). If these laws were passed they would severely hamper day-to-day and emergency communications via amateur radio. However, public concern is mounting and amateur radio must rise to the challenge. The ARRL is forming a committee to examine the problem. The committee will reply to the FCC Notice and will collect information on the political, social and technical aspects. They have a difficult task ahead. Scientific studies are too few and even the experts do not always agree. In this country the occupational standard for exposure to RF radiation is 10 μW. cm^{-2}. This power density level can cause a 1° rise in the temperature of living tissues. On the other hand, in the U.S.S.R., the limit has been set at 0.01 μW. cm^{-2}. In practice, 99% of Americans are exposed to less than 0.001 μW. cm^{-2}, most of this coming from broadcast stations. The amateur operator, however, may be exposed to higher RF fields. In the June 1978 QST, N3NL shows how to calculate the field strengths near your antennas. Operations in the bands 1.8 - 30MHz are generally considered to be safe. However, using more than minimal power on amateur bands from 2M and up requires a little more care.

If a person is exposed to very high doses of radiation, what effects could occur? For people who have lived close to power company transformers for a long time the 60 Hz radiation may increase the incidence of childhood leukemia (Am. J. Epid. 109:273; 1979). At VHF and UHF frequencies the bad effects seem to be related to heating of living tissues. As in a microwave oven, the radiation causes heating by agitating the molecules. A 10° temperature rise in the eye can cause permanent cataract damage. Heating of the testes causes temporary sterility. Other information links cancer, heart disease and birth defects to microwave radiation. When rats are exposed to high levels of microwaves, they behave very oddly. Until more detailed studies have been completed, the issues will continue to be confused. In the meanwhile, WA2UMY suggests the following common-sense approach (Ham Radio, September 1979). If you are pregnant, you should avoid strong RF fields. No one should look into a microwave antenna. Keep high frequency high power antennas more than 10 feet away from any people. These recommendations may change when future studies have been completed. So if in doubt, mount your VHF/UHF antennas as far as possible from the shack and any living areas of your home.

Blue Book Revision Under Way

WA1BLG has handed me the job of updating the long-out-of-print and semi-mythical MMRA Blue Book. For the benefit of newer members, that's a writeup of the emergency and public service practices of the club. It turns out to be a bigger job than I thought, and a lot of the practical side of this kind of operating that's been learned since repeaters were new never got into the original edition. I'll try to have a tentative table of contents ready for the next issue of the Minuteman, but a rough draft of the book itself is likely to take six months to a year. Meanwhile, I'd like to ask for suggestions as to what should go in. Written, if possible. If anyone feels like writing up some particular subject, to become a chapter of the book, that would be real nice. Lists of topics, outlines, rough notes on accumulated wisdom, and whatever can be sent to me at 25 Evergreen Ave., Bedford, Mass. 01730. I'm available for verbal discussions at meetings and on the Tuesday night Public Service Committee net on 82. I'd really rather have your ideas in writing, though; I'm much more likely to get them right that way.

de AB1Z

Board of Directors Report

NOVEMBER 14, 1979

Present at the meeting were: K1IJZ Bill Wade, W1CT George Downs, N1DH Dan Heather, KA1AL Al Kunian, W1JSH Mort Grant, K2TJZ Jack Curtis, WB1GUZ Ham Hayes, WB1DQC Peter Munroe, and W1HIT Art Davis.

The Membership was announced at 535 dues-paid persons.

Correspondence and normal Board business was handled at the beginning of the meeting.

K1BC Bob Clements, known to most of us as the person who has generously made available the data base and print-out of the Membership lists and the like, asked the Board if he may locate his 220 MHZ repeater at our Weston location.

The Board voted to grant a license terminable by either party with thirty (30) days notice to allow K1BC to use MMRA Weston facility for a 220 MHZ repeater. KA1AL was designated to prepare the License Agreement.

With regret it was announced that WA1OEJ Don Sherman could no longer maintain the responsibility of Newsletter Editor. Don did not have enough support and contributions. He will still perform some functions for the MMRA.

The Board considered replacement names, and the President and certain Board members were designated to act at once.

The following is the latest report on the proposed new repeater for either 220 MHZ or 450 MHZ:

1. The Board had entertained K1ST Steve Tolf of the 01/61 technical group on November 1, 1979.

2. That group had proposed a 220 MHZ machine and the Board favored a 450 MHZ.

3. Steve went back to his group and has reported to the Board that his group has no interest in 450 MHZ, but supports 220 MHZ.

4. The Board reports that the Marlborough proponents may proceed with their proposal and be prepared:

   (a) to notify the Clerk of their formal written proposal for a Membership meeting notification to all members;

   (b) prepare proposal for meeting presentation;

   (c) prepare argument for required mail ballot.

IMPORTANT POLICY CHANGE

An amendment to the policies and guidelines was made on November 14, 1979. Please note in your policy section (see recent Newsletter for policies and guidelines).

The policies were amended by adding to and inserting a new paragraph after Section 3.16, entitled "3.17: Policy on Membership, Technical Supervisors, Technical Crews, Committee Chairpersons, and Control Operators must be paid-up members of Minuteman Repeater Association."

Formerly only Trustees were required to be members.

The Board requested a progress report on the Quincy 450 MHZ machine and appropriate inquiry will be made.

AUTOPATCH ACTION

The Board has been aware of the problems with interpretation of the FCC Regulations and the incidental problems as they filter through control operators and user members. It has become apparent that members have become rusty in the use of autopatch procedures when making emergency or public service calls to Police Departments.

The Board VOTED as follows:

To encourage the use of the autopatch for purposes of training to facilitate emergency calls; to permit the use of autopatch for convenience calls within the realm of good taste, the policies and guidelines of the Association on autopatching and FCC Regulations.

The present procedure on 22/82 is to ask if a control operator is present to make convenience calls; and emergency calls may be made without this inquiry. It was brought to the attention of the Board that perhaps control operators have misinterpreted this requirement. The station making the inquiry for convenience calls need only determine that the control operator is on duty. Permission of the control operator to make the call is not necessary.

The Tech Supervisor and the Board are attempting to change this procedure for the convenience of the members and appropriate inquiry of the Technical Committee and Trustee will be made.

The By-Laws were discussed and it was the consensus that the requirements of a forty (40%) percent return of mail ballot votes with two-thirds (2/3) majority resulted in restrictions of organizational activity detrimental to the good of the Association in areas where such a vote is required. As an example, it is almost impossible to achieve routine amendments required by Internal Revenue Service for our tax exempt application requested by the law firm which initiated this action back some time in 1977. The Clerk was therefore instructed to prepare a proposed By-Law change to be presented by Board members for a future Membership meeting.

The meeting commenced at 7:30 P.M. and adjourned at 10:35 P.M.

ATTEST: Alan E. Kunian, KA1AL
Clerk
Minuteman Repeater Association

Buy and Sell

FOR SALE -

1.	2 Telephone poles - 60 foot You remove them.	$ 25.00
2.	KIRAK Frequency Counter	$ 50.00
3.	1 Poly Comm 6 with mike and unused vertical	$ 30.00

Dave Stapleton, W1GJV - 6 Buttercup Lane, Dover, Mass. 02030 785-0534

FOR SALE:

1. Shure 444 desk mic. Good condition. $26. (Hi imped)
2. D-104 Silver Eagle Desk Mic. Good condition. Amplified = 9V Bat. All Chrom. Push to talk base lever and chicken choker side lever. $50.
3. Icom 211 All mode Transceiver. Never used mobile. Excellent condition. 6 months old. Selling because need money. No scratches. $670 firm.

Call Dick, WB1CTO 146.430 Mz direct or 528-0279 evenings.

FOR SALE - HAMMARLUND HQ-129-X receiver and JOHNSON CHALLENGER 80-6 Meter transmitter. Package Deal - $90.00
Contact Glenn Gustavson (K1MCH) evenings and weekends at 259-0666.

FOR SALE: Mint FT901DM; Autek QF-1 Audio Filter. Call Bill, N1GL after 8 P.M.
203-348-1331

WANTED: Heavy Duty 70 ft. or higher Crank-up. Call Bill, N1GL after 8 P.M.
203-348-1331

MEASUREMENT OF VELOCITY FACTOR ON COAXIAL CABLES AND OTHER LINES

(A simple direct method devised by Chet Smith, K1CCL and described by George Downs, W1CT.)

When cutting a piece of coax or twin lead to a specific fraction of a wavelength for impedance matching or phase shifting, the physical length of the cable is shorter than the free space dimension calculated from the formula. This is because the wave travels slower in the cable than it does in free space. The ratio of the speed of the wave in the cable to the speed in free space is called the velocity factor (V_f). E.g., the V_f for RG58/U is given in the ARRL Handbook as 66%. This means that instead of being 40.174 inches long, a half wave of RG58/U at 147 MHz would be 40.174 x .66 = 26.515 inches.

The problem is that, particularly with regard to the foam dielectric types, the rating in the tables is only an approximation. The actual cables vary as much as 10% from batch to batch, and sometimes (but much less so) from one part of a reel to another part. In doing precise work it becomes desirable to measure the V_f of the actual cable being used.

The K1CCL method is simple and straightforward:

- Take a piece of the cable to be used. Preferably it should be more than 5' long.
- Short one end of the cable.
- Peel back just enough of the other end to solder to.
- Prepare three coils by winding #20 bare wire around the shank of a 1/4" drill. Make the coils 1 turn, 2 turns, and 3 turns. Space the turns 1/16". Leave 1/2" pigtails.
- Solder each of the three coils in turn between the shield and center conductor of the unshorted end of the coax, and determine the resonant frequency with a grid (or tunnel) dipper. (See Figure 1) Use minimum coupling that will give a positive reading. The calibrated receiver (or a wavemeter) is an option to give greater accuracy. Grid dippers are not usually calibrated all that well.

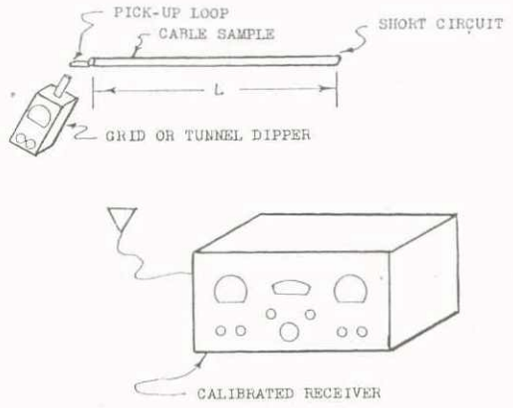


FIGURE 1 - TEST SET-UP FOR MEASURING THE VELOCITY FACTOR FOR COAXIAL CABLE OR TRANSMISSION LINE

- Plot your results (turns vs. frequency) for 3 turns, 2 turns and 1 turn on a piece of graph paper. (See Figure 2) Using your calibrated eyeball, plus straightedge, French curve or whatever, extrapolate to find the resonant frequency at zero turns. Call this frequency "F" (in MHz).

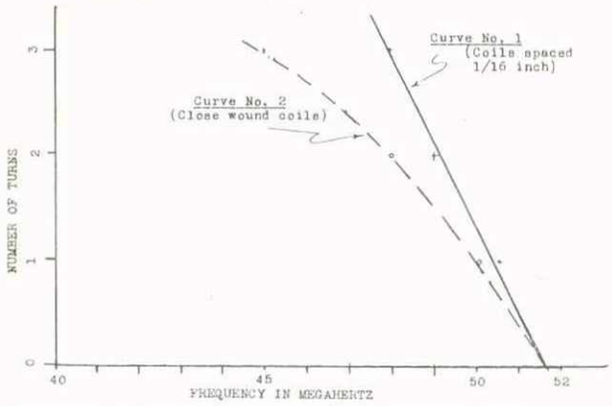


FIGURE 2 - MEASUREMENTS OF RG58/U CABLE BY METHODS OUTLINED IN THE TEXT

- Measure the overall length of the cable you have been using. Convert this length to meters. (One meter = 39.37") Call this length "L" (in meters).
- Substitute these values in the formula

$$V_f = \frac{2FL}{3} \%$$

Where - V_f is the velocity factor expressed in %.

F is the resonant frequency at zero turns in MHz.

L is the length of the cable in meters.

For those who want an elegant solution, make the cable length (L) 1.5 meters (59.06"). The 2/3 then cancels and the formula becomes $V_f = F$.

An actual example:

Cable: RG58/U, Length: 76 1/4" = 1.937 meters

Data: F_{3t} = 48 MHz, F_{2t} = 49 MHz, F_{1t} = 50.5 MHz.
F (extrapolated) = 51.7 MHz (See Figure 2)

$$V_f \text{ (measured)} = \frac{2FL}{3} = \frac{2 \times 51.7 \times 1.937}{3} = 66.76\%$$

which is pretty close to the value given in the Handbook.

Those without a calibrated receiver in the 100 MHz range could use a cable sample of 4 meters or more to get the readings down into the H.F. range.

It is important that the spacing between turns be the same for each of the three coils. 1/16" spacing seems to give fairly linear results as shown on Curve No. 1 of Figure 2. Curve No. 2 was made with another set of coils. These were wound on a 1/4" drill shank of #22 enameled wire and were close spaced. The curve was not linear, but the answer came out the same.

FIRST CLASS MAIL

Expired W1BFM,0636,Oct 79

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