The Minuteman

The Official Newsletter of the M.M.R.A

The President's Corner

Andy Morrison, N1BHI

The first order of business for this issue is an apology...note the box below -- it contains the names of Life Members who were omitted from the club roster in the last issue. The error was one of those proofs that to err is human, but to really screw up takes a computer. Sorry guys.....

Omitted from Club Roster In Error:

K1BC	Robert C Clements
N1BHA	Dorothy Hilbrunner
KZ1I	David Metz
KA1IYR	Kathleen E. Pate
W1JDO	A Francis Hilbrunner
W1QFD	Anthony J Yuoska
K1TTY	James P. McCaffrey S.J.

The Flea Market came off pretty well. We had a lot of help; Walter (N1HBR) and I would like to thank all who pitched in. Their names are in a special box on page 4....Special mention is deserved by Walter Ching, who did a lot of the planning, and Barry Brozenske, K3BUZ, who did a great job again with concessions -- he actually ran out of hot dogs close to the end of the day. The day was an economic success as well; the club cleared very close to what we had planned for in this year's budget.

Field Day is only two months off! We plan to be at the same location: Slygo Hill in Marlboro. This will be our third year; we've learned a lot about how to make it all work. I'm sure that we'll find new mistakes to make and new challenges to overcome before getting our stations on the air -- but that's the fun of it. So if you are going to be around on June 25th and 26th, join us up on the hill. Get in touch will me, Walter, N1HBR, or Mike, KD1OA if you can come. We play hard, eat well and have a lot of laughs....

The Kit Building class was a great success....nine participants built the "Handi-Finder" kit under the watchful eyes of Eric, KA1EEC, Dave, KT1X, Chris, N1NVL, and Bill, K1IJZ. The kits were ready for testing by mid-afternoon; I did a demonstration of the club's doppler system (It found the fox that Saturday in 31 minutes - 9 transmissions) for the group, and then they began trying out their Handi-Finders....and they **all** worked! I marked the location of Frank, W1JDO, and the Weston Repeater with the doppler,

(Continued on Page 2)

Items of Interest

MMRA Fox Hunt - 1000 Hrs. May 14, Stoneham Repeater
Marlboro VE Session, May 14-1000 hrs
MMRA May Meeting - Tue, May 17, 1930 Hrs - Weston
VHF Contest - June 4 and 5
Marlboro VE Session-June 11, 1000 hrs, Marlboro
Field Day - June 25 and 26

RUN, FOX RUN !

Fox hunts continue to run each Saturday, rotating around the 2 Meter repeaters. For those who have been hunting it has been a lot of fun, as well as a learning experience (Oh darn!). The hunt begins at 10:00 every Saturday morning and runs 'till 12:00 noon. The fox must be publicly accessible (without any fees or tolls) within acceptable range of the target repeater, and transmit for a minimum of 30 seconds every 5 minutes. The only rules for hunters are obey the law, and be responsible for yourself and anyone you bring. Other than that, NO RULES! That's right folks, work alone or together. Get beam headings from your friends at home, use expensive fancy GPS, LORAN/C, APRS, computer terrain following radar, ANYTHING. We have so far seen that the simple methods seem to win just as often as the fancy ones. (if not more) So dig out that old quad, listen to the whine of the handy-finder and fire up those doppler boxes. LET'S HAVE SOME FUN!

Fox Hunt Results:

- **April 16 - Andy N1BHI first in 36 minutes - Club Doppler**. The fox, N1NVK, was hiding in the Shoppers' World Parking Lot.
- **April 23 - Andy N1BHI first in 1 hour 21 minutes-Club Doppler.** The fox, N1NOM, was lurking near the tennis courts at the Westwood High School - practically under W1JDO's antenna.
- **April 30 - Bill, N1KUG first in 57 minutes - Unequipped.** The fox, KT1X, was on Wier Road in Sudbury. Bill and Chris, N1NVL, were vectored by bearings from the club doppler.

Next Hunt will be on May 14 at 1000 Hours. We will also be starting up some evening hunts starting at 1800 Hours Tuesday nights, leading into the Information Net.

Note that the center page in this issue is a copy of the Operator's Guide Supplement - It was formatted so you can fold and insert it into a copy of the full Guide....

President's Corner (Continued)

and everyone had both in about the right direction. They all seemed to have had fun -- our thanks go to the organizers, Eric, Dave and Clark for a job well done! I hope that this can become a regular activity, and perhaps be somehow integrated with an education program designed to get participants prepared for the Tech class license.

Just below, you will find the slate of officers and board members submitted by the nominating committee. Election voting will be at the May membership meeting, so try to attend. The program for that meeting will likely be another N1NVK Slide production, focusing on the Kit-building class. If you were there and anywhere near the camera lens, be prepared to be embarrassed. See you at the meeting.

Election Slate - May, 1994

President:	**Andy Morrison, N1BHI** Incumbent
Vice-President:	**Walter Ching, N1HBR** Incumbent
Secretary:	**Frank Morrison, KB1FZ** Incumbent
Treasurer:	**Ian MacLennon, AF1R** Incumbent
Clerk:	**Clark Conti, N1NVK** First Term
Board Member:	**Al Kunian, KA1AL** Incumbent
Board Member:	**Tom Qualtieri, WB1GMA** Incumbent

Newsletter Editor Resigns

It is with regret that we have accepted the second and final resignation of Bob KD1GG as Editor of the *Minuteman*. Bob had first announced his resignation in the December, 1993, issue, explaining that time would be very tight after the arrival of his second harmonic. Mark, AA1IA, stepped in and volunteered his time to address, stamp and mail the last two newsletters, relieving Bob of some of the burden. However, because he found recent changes to the editorial review process unacceptable, Bob resubmitted his resignation. Bob brought a new, clean and visually appealing style to the *Minuteman* and his influence will be felt for some time to come. Thank you, Bob, from all of us at the MMRA.

We are actively searching for a new editor and would like to have one in place for the next issue, September/October, 1994. Due to the late timing of this change, Andy N1BHI will edit and publish this last issue before the summer hiatus. If you are interested in volunteering for the job, or know of someone who might be interested, please contact either Andy,

Radio Trivia.....What was the nature of the first trans-Oceanic radio message, and who was it for?

N1BHI or Walter N1HBR via the MMRA hotline (508/489-2282) or at the next meeting (May 17).

The Repeater Report

Chris Conti, N1NVL - Technical Director, MMRA, as told to Andy, N1BHI. Clark has been out straight for the last couple of months, but things are returning to a more normal state for him.

146.610 N1BHI/R Marlborough, MA

Nothing of significance to report here....

146.820 KA1AL/R Weston, MA

The Power Amp has gone flaky we have it off-line for now; hopefully we'll get it working soon. It developed an intermittent power drop from about 100 watts to zilch.

146.715 N1NVL/R Stoneham, MA

The repeater is running well; we are still looking at early to mid summer to complete the linking scheme. By the way, remember that if you don't want to listen to a lot of intermod when tuned to 715 - and you have CTCSS capability - set your receive tone to 146.2, and you'll hear only the Stoneham repeater.

224.400 N1BHI/R Quincy, MA

Bill, N1KUG, has the machine running pretty well; we added PL to its input to get rid of the noise problem that kept popping the repeater and the network when it was linked. The tone is 103.5.

146.670 KA1HKP/R Quincy, MA

Everyone has been pretty busy, so we still have not been able to schedule dates for work on the antenna system. Mike, KA1HKP, has been working on improving the grounding at the site. We plan the upgrade of the controller to a 7K this summer.

224.700 N1HBR/R Weston, MA

Weston 220 is playing well; nothing new to report.

223.940 N1BHI/R Hopkinton, MA

The repeater is still off the air; it should be back in its new shelter during the next month.

446.725 N1NVK/R Stoneham, MA

Both transmitters are being worked on - one has an intermittent, the other some kind of feedback. Clark, N1NVK, is working on them....Bryan, KA1YQB, is helping out. Another note about PL - this repeater now requires a tone of 88.5 to access it.

449.925 N1HBR/R Marlborough, MA

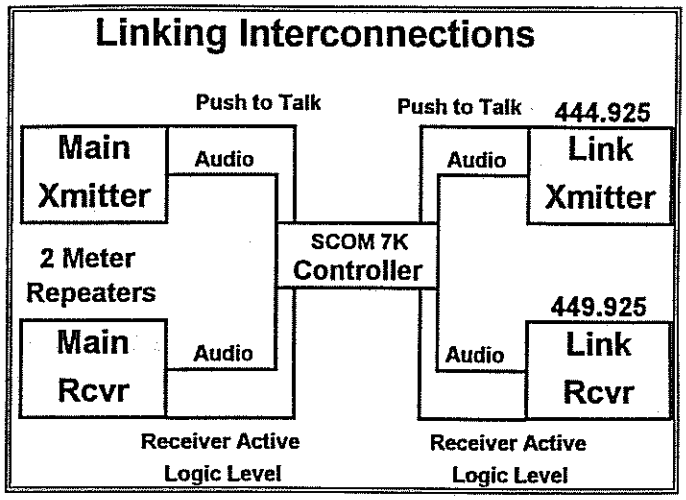
The transmitter frequency is unstable...we plan an upgrade to a Quintron transmitter - this is a commercial device, capable of 100 watts continuous duty, with extremely good frequency stability. This is critical to its role as the hub of our network.

145.030 KA1OUI-3 Node

The netrom continues to provide reliable backbone service to New England.

How the Links Work - A Technical Description

We've gotten a lot of questions about how the linking systems work since installing the SCOM controllers. So here's a description of how each of the linked repeaters and its linking equipment hang together.....



Take a look at the diagram above....in the center is the SCOM controller - the heart of the system. It's fully programmable to assume whatever personality we want; in another article we'll give you a description of how the programming works. But the main component in the controller that allows us to run linked systems is the "multipoint switch" - under program control it can direct any audio source to any audio destination. The controller is designed to control two receivers and two transmitters, and through the multipoint switch can interconnect them so that receive audio on either receiver can be repeated by **both** transmitters.

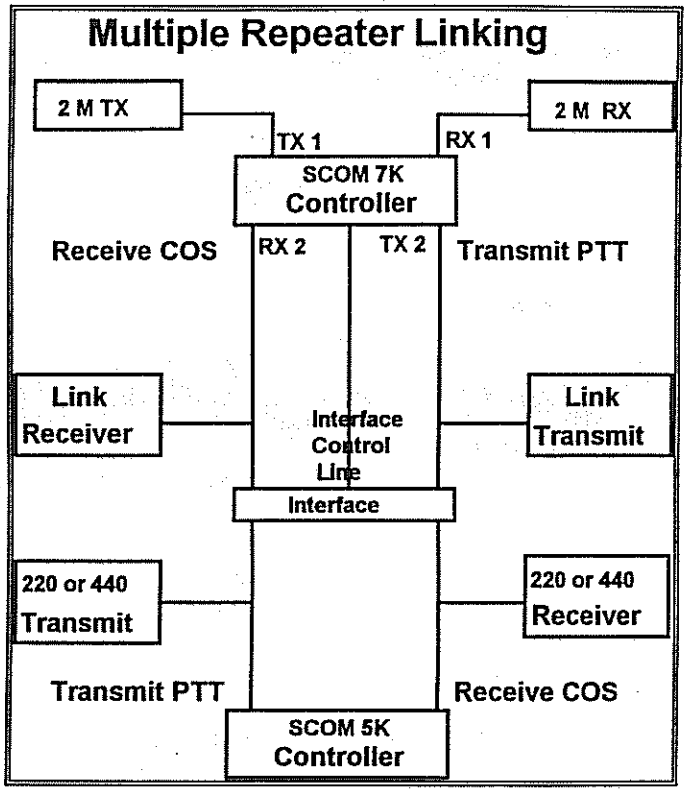
All we need to do is to hook up each transmitter's Push To Talk (PTT) and audio inputs to the controller at the contact points designated for Transmitter One and Two. Receiver One and Two audio outputs and Receiver Active Logic Lines (often referred to as COS or COR) are connected to the appropriate contact points.

In programming the controller we instruct it to connect the Receiver One **and** Two sources to the Transmitters so that when Receiver One is active, both will transmit and repeat the audio from Receiver One. When Receiver Two is active, Transmitter One is repeating and Transmitter Two is down. To control the links we establish commands that enable or disable the paths between the receivers and transmitters. It is even possible to make Receiver One go to Transmitter Two only, and Receiver Two to Transmitter One only.

As described in an earlier article, the link between repeaters is established through the Marlboro 440 machine - as you can see above, Transmitter Two transmits on the Input frequency - 444.925 and Receiver Two listens to 449.925, the output of the Marlboro 440 repeater. So, when in a linked state, if Receiver One goes active, both the 2 meter transmitter and the 440 transmitter are on - and Marlboro 440 hears that, repeating whatever is being received by Receiver One.

At another 2 meter site, Receiver Two is listening to the output of Marlboro 440....if it is in a linked state, Receiver Two going active is sensed by the controller, which turns on Transmitter One.

The next diagram shows how we link two repeaters at one site into the system. This is the case at Weston, Stoneham and Quincy.



As you can see, this diagram is somewhat more complex...in effect is happening is that the second repeater's controller is cross connected with main controller. The secondary repeater controller TX-PTT is connected to the 7K RX2 (link receiver) COR input. For the sake of simplicity, the diagram uses one line to represent both audio and control lines - so secondary repeater controller transmit audio is summed with the link receiver audio. The summing happens in the interface box shown between the secondary repeater controller lines and the link transmitter and receiver.

The interface box has relays that make or break the control and audio connections between the secondary repeater and the TX2/RX2 contacts on the 7K. When the controller has been given the command that activates the secondary repeater link relays in the interface, this is how it all works.....

If you transmit on the input to the main repeater, both TX1 and TX2 (main and link) are turned on. Since the PTT line for TX2 is hooked up to secondary receive COS, the secondary repeater thinks its receiver is active....and since the audio from link TX2 is coupled in, the secondary controller activates its transmitter, which also repeats what is coming in on the main receiver.*[Continued on Page 4]*

Linking....Continued from page 3....

If you transmit on the input of a linked repeater, or on the input of 449.925, link receiver COR goes active. The 7K sees that go high and turns on the main transmitter. Since link receive COR is tied to secondary transmitter PTT, that transmitter turns on and repeats what is coming in on the link receiver. The 5K controller is not involved - the PTT signal is actually the COR signal from the link receiver.

If you transmit on the input of the secondary repeater, its receive COR goes high. The 5K sees receiver activity and turns on the secondary transmitter. Since secondary transmitter PTT is tied in parallel with the link receiver to the 7K RX2 COR input, it turns on both the primary transmitter (TX1) and the link transmitter (TX2).

The main controller, the 7K, can establish the following link states:

- Primary Linked, secondary unlinked
- Secondary linked, primary unlinked
- Both primary and secondary linked
- Nothing linked.

The commands to do all this will be given to users in September with their 1994-1995 renewal code lists. We are still debugging the program logic involved; there are still a couple of minor bugs. These will be fixed by the end of the summer, and if all goes well, the Stoneham 2 meter and 440 repeaters along with the Quincy 2 meter and 220 repeaters will all be linkable.

So that's how it all works....we'll be giving you some insight into how the SCOM controllers are programmed in a future newsletter. If you have any questions about all this, just check in to the Tuesday night Information Net, or grab one of us at a meeting.

Examination and Upgrading News

Bob Levine KD1GG

The Marlboro VE Team continues to schedule examination sessions monthly at the Marlboro Public Library. The Marlboro Public Library is located at the west end of Main Street in Marlboro.

Marlboro VE Team Session Schedule:
Sat May 14 -9:00 am, Sat June 11 - 9:00 am
Exam Sessions will resume in September
Contact KD1GG at 485-7006 for reservations.

Flea Market – Those who were there.....

Bob, WA1ZJE, Bryan, KA1YQB
Tom, WB1GMA Brian, N1OBC
Bob, KD1GG
Mike, KD1OA
Stu, WD8LOC
Jerry, N1FFX
Jed, KA1OUI
Frank, KB1FZ Clark, N1NVK Chris, N1NVL
Frank, W1JDO Dotty, N1BHA

IF we forgot anyone, sincere apologies. Remind us at the next meeting.....

each group of digits. The 224.70 Weston repeater also uses the same test sequence but only responds with "OK" in CW.

On the 449.925 Marlboro repeater, an alternate test sequence of "321*", "654*", "987*", and "2085*" is used. This sequence is also available to any of the repeaters that are currently linked into the network, and if used will supplement the other test sequence by testing your tones through the network link path.

3. If you do not get the expected response ("Level Okay" in words or "OK" in CW), try once or twice more but please don't beat a dead horse. Have your tones levels looked at by someone with the test equipment to determine if there really is a problem.

GETTING THE NEWS

In addition to the 5 bimonthly meetings (September, November, January, March, and May) and the corresponding issues of the club newsletter, *The Minuteman*, there is also a weekly Net held on the repeater network. The Net currently meets each Tuesday at 8:00 PM ET unless it is also the night of a membership meeting.

AUTOPATCH OPERATION

Each of our 2-meter repeaters has its own autopatch and a second autopatch via the 449.925 repeater is available to all network-linked machines. The 449.925 repeater provides the other 220 and 440 machines with autopatch capabilities as long as they are linked. Since there are potentially two different autopatches available, the 2-meter autopatch codes are different than the 220/440 codes.

All autopatch operations are essentially the same regardless of which repeater or autopatch is used, with only a few caveats. The Stoneham, Quincy, and Weston autopatches are within the 617 area code, but both Marlboro autopatches are in 508. You must keep the area code and local calling regions in mind so that you know when to precede numbers with "1-", "1-617-", or "1-508-" as necessary.

At the time of this writing, Quincy's controller and autopatch are scheduled for replacement in the Summer of 1994. Until that time, its operations are slightly different and will remain as discussed in the Operator's Guide. The following description assumes, however, that Quincy has been upgraded.

1. Choose the repeater and autopatch you wish to use. In general, if you are on a 2-meter repeater, you should use the local autopatch. If the 2-meter repeater is linked, you have the option of using the 449.925 autopatch. If you are on a 220 or 440 repeater that is linked, or on 449.925 itself, the 449.925 autopatch is the only choice. If a 220 or 440 machine is not linked, there is no autopatch capability.

2. Check to be certain that the frequency is clear. Autopatches, except for emergency traffic, do not take precedence over normal traffic.

3. Announce your intention to use the autopatch by transmitting something similar to "This is N1XYZ on the patch" and then unkeying.

4. Using the appropriate code listed on your membership card for the autopatch you are going to use, key the digits as shown. The system should then respond with a voice message "Autopatch On, Please Enter Phone Number". You will *not* hear a dial tone.

5. Key the digits for the desired phone number just as if you were dialing from your home phone. The autopatch will go through faster if you append a "*" to the number. For example, to dial 508/555-1234, key "5551234*", "15551234*", or "15085551234*" depending on which autopatch was used. Consult the Operating Guide for the local calling areas associated with each autopatch.

6. The controller now determines if the number is acceptable and will place the call if it is. Only calls to 508, 617, and 800 area codes can be dialed. Calls to certain exchanges (e.g. 976) or via the operator are also excluded. If the number is accepted, the voice message "Please Hold" will be issued and the call will be placed. If not accepted, there is no response at all and you may retry the number without having to use the clear and activate codes again. You must clear the patch when you are done trying, however, regardless of whether the call went through.

7. If the call went through, carry on your conversation, remembering to announce to the called party that he is on the air and that you cannot hear him or her while you are talking (i.e. the conversation is half-duplex) so he/she must wait until you are done.

8. Upon completion of the autopatch, or if the call was dialed but did not complete (e.g. a wrong number, no answer, or an answering machine), key the Clear code as shown on your membership card for the autopatch you are using. A voice announcement will indicate "Autopatch Off".

9. You should then announce that you have completed your autopatch call by transmitting something similar to: "This is N1XYZ clear of the patch".

CALLING AREAS

Bay State East exclusions are no longer enforced on any autopatch. The 9:00 AM to 12:00 PM weekday restriction on long-distance calls no longer exists. The club pays for each and every call made (including local calls) so use the autopatch wisely.

ADDITIONAL INFORMATION

There is no longer a 25 second "safety timer" on the autopatches. A 3 minute patch length timer is still active, however, and will terminate the autopatch with 30 seconds of warning.

LINKS

The network linking strategy has been recently revamped with a test setup already in place at the Weston 146.82/224.70 site. The link software for user-controllable temporary link commands is not yet "user friendly" but should be ready in the Summer of 1994. The link codes shown in the Operator's Guide are, in general, no longer valid. Further details on linking as it develops will be distributed in *The Minuteman* and subsequent updates to the Operator's Guide.

REPEATER NOTES

Weston is no longer VOX operated; it is carrier operated just as all the other MMRA repeaters are.

EMERGENCY AUTODIAL NUMBERS

We are currently reviewing and standardizing the use of autodial commands for local and state police. Note that you do not use the autopatch codes with these autodial codes - just key them in directly and they bring up the patch with the predetermined phone number. Emergency Autodialed autopatches also provide an extended 10 minute timeout timer. At the moment, but subject to change, we support the following:

State Police (800/525-5555):

146.61	6177*	(6178* to clear)	
146.67	Not Supported		
146.715	911*	(78* to clear)	
146.82	911*	(78* to clear)	
449.925	77*	(78* to clear)	

Local Police:

146.61	911*	(9110* to clear)	Marlboro PD
146.67	Not Supported		
146.715	Not Supported		
146.82	WPD* (973*)	(9110* to clear)	Weston PD
449.925	MPD* (673*)	(674* to clear)	Marlboro PD

For more information, please contact:

MINUTEMAN REPEATER ASSOCIATION
P. O. Box 2282
Lexington, MA 02173

508/489-2282

MINUTEMAN REPEATER ASSOCIATION
OPERATING GUIDE SUPPLEMENT

(Updates to the May 1991 Edition, this revision dated May 6, 1994)

BRIEF SYNOPSIS OF THE MMRA

We have added a tenth repeater system (our ninth FM voice repeater) in Stoneham.

OUTPUT	INPUT	CALLSIGN	CITY/TOWN	LINK	PL-IN	PL-OUT
146.61	-600 kHz	N1BHI/R	Marlboro, MA	Y/F		
146.67	-600 kHz	KA1HKP/R	Quincy, MA	P/C		
146.715	-600 kHz	N1NVL/R	Stoneham, MA	P/C		146.2
146.82	-600 kHz	KA1AL/R	Weston, MA	Y/C		
223.94	-1.6 MHz	N1BHI/R	Hopkinton, MA	Y/F		
224.40	-1.6 MHz	N1KUG/R	Quincy, MA	Y/F	103.5	103.5
224.70	-1.6 MHz	N1HBR/R	Weston, MA	Y/F		
446.725	-5 MHz	N1NVK/R	Stoneham, MA	P/Y	88.5	
449.925	-5 MHz	N1HBR/R	Marlboro, MA	(HUB)		
145.03	145.03	KA1OUI-3	Marlboro, MA	(NetROM)		

The Link availability/default codes, as listed above, are as follows:

- Y ... Yes (link exists as of this writing)
- P .... Planned (not yet available, but expected during 1994)
- F .... Full-time link (on by default, but can be dropped on command)
- C ... Callable link (off by default, but can be raised on command)

OPERATING PROCEDURES

Timers: The standard timeout timer value is 120 seconds (2 minutes).

CONTROL STATIONS

Your control options: Pressing the "*" key will no longer reset the timeout timer on any of the repeaters. Timeout overrides are now a control-operator-only function.

Touch-Tone (DTMF Keypad) Tests: The 5-step procedure described is no longer valid on any of the repeaters. Please use the following procedure instead:

1. Pick a time with no repeater traffic. There are no specific times during which this test is unavailable, so please use your best judgement. Announce your intention to test by transmitting: "This is N1XYZ testing touchtones."

2. On any of the 2-meter repeaters (Quincy not available until Summer 1994) key the following sequence: "123*". and unkey. You should hear a voice announcement saying "Level OK, Enter 4 5 6", at which time you should key "456*". The sequence continues with "789*" and finally "2580*". Note that a "*" should terminate

EASY AS "PI" ATTENUATOR

By Clark Conti, N1NVK

Brain Teaser.....Name the one river in the world that flows in every possible direction....

Attenuators help fox hunters to determine the distance to the target by comparing relative signal strength, or the correct beam heading when the signal is too strong to easily determine the peak. An adjustable attenuator can be worth its weight in gold, unfortunately laboratory types usually are. This article describes one I built with cheap parts (available at Radio Shack) that still does the job.

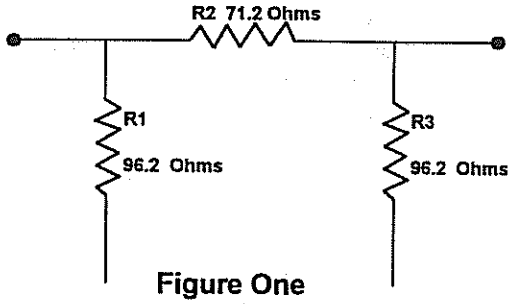


Figure One

The PI attenuator is so named because it physically resembles the Greek letter "PI", two vertical bars connected at the top by a third bar. Although both input and output show equal impedance (for our case 50 ohms), part of the signal is reduced as it passes through the device. Figure 1 shows a 10 dB step. Looking at the circuit from either end it appears as a 96.2 ohm resistor in parallel with a 167.4 ohm, or an impedance of 61 ohms... close enough for us. The signal is reduced by R2 /(R2+R3) = 96.2/167.2 ... OK so that's not exactly 10 dB either, so sue me. The purpose of this project is to build something simple to use for fox hunting, not for a calibration lab.

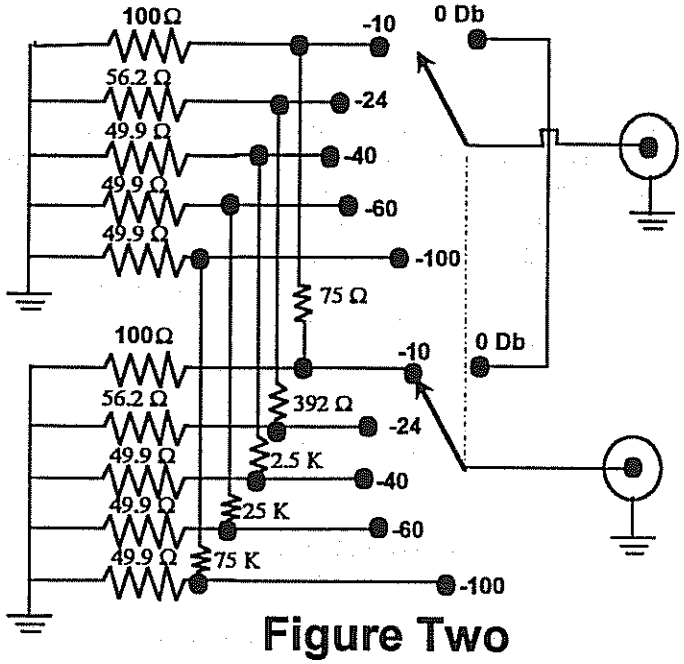


Figure Two

I combined 5 attenuators on a 2 pole - 6 position rotary switch in a shielded enclosure with 2 BNC connectors so that I could quickly change the signal level coming into my rig. Each successive step knocks a full scale S-Meter reading to about half scale. The last step (or is it the first?) is a straight feed through with no resistors for a direct reading.

The schematic is shown in figure 2 with a parts layout in figure 3. I used 1/4 watt 1% carbon film resistors because I had them, but if I were doing it again I would have chosen 1/2 watt 5% jobs. They're cheaper and might even survive if you accidentally transmit on low power... I live & learn. Accuracy of the steps stinks, and impedance isn't a perfect match either. Signal on the 100 dB step is only marginally above what leaks into the radio through the speaker grill BUT I made the whole thing for about 10 bucks and it works, so I call it a huge success. Who needs lab standards anyway? After all, we're not professionals... we're amateurs!

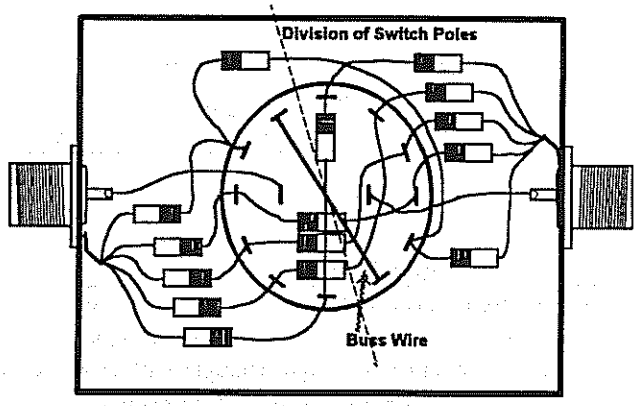
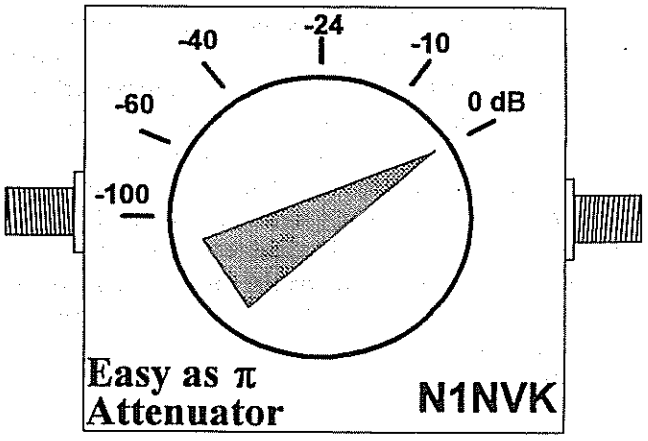


Figure Three - Inside View



Editors Note:

One minor error - Clark had used BNC connectors in his drawing - I made 'em SO239's - Oh well...we're only amateurs. Thanks, Clark!

THE PUZZLE CORNER

F. P. Morrison, KB1FZ

Can you think of a synonym for the work "Thesaurus..."

Many thanks for your response to the first Puzzle Corner! Answers were received from Jon KZ1G, Peter WB1DWK, Rudy KD1T, and Carter W1TCD.

Everyone had the correct answer to Problem #1. It violates the 11th Commandment, which states "Thou shalt not divide by zero".

None of the answers to Problem #2 were correct, unfortunately, in that the distances given were not the minimum.

The solution to the problem is found by opening the room up as shown in Figure 1, and drawing a straight line (the shortest distance between two points in Euclidean geometry) from the spider to the fly. Note that the room can be opened

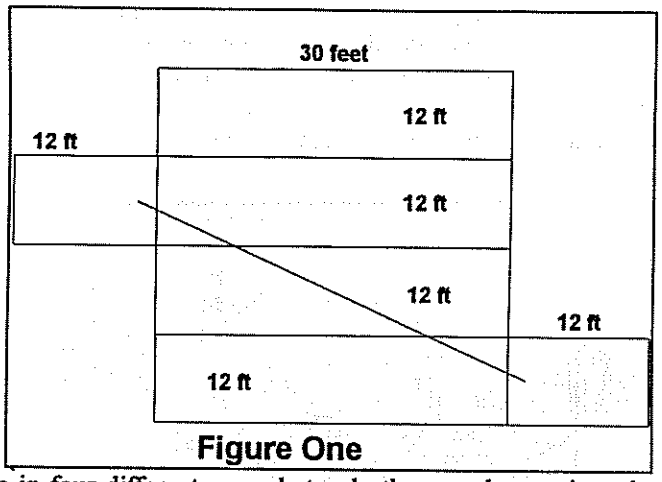


Figure One

up in four different ways, but only the one shown gives the shortest distance. This is a geodesic in "room space". The distance is the hypotenuse of a right triangle with sides of 24 feet and 32 feet; this yields 40 feet as the shortest distance.

Some of the proposed solutions to Problem #3 neglected to account for the statement that the answers had to be yes/no. Jon, KZ1G, came up with an ingenious solution to this one. He used the analogy of the designer who wished to logically invert a signal; he had two devices, one a "non-inverter" and the other an "inverter", but he did not know which was which. So he put them in series, so that regardless of which was which, when he put A in, he would always get not-A out. Thus, Jon reasons that if either man were asked "If I asked the other man if I should take the right fork, would he tell me yes?". If the answer is yes, take the left fork; if the answer is no, take the right fork. N1BHI, Andy, also came up with an answer which I think is the same as Jon's.

My answer to the problem goes as follows:

Question #1, to the first man: Are you from the same house as he is?

Question #2, to the second man: Is that the road to East Oilcan?

Calling the two families A (truth tellers) and B (liars), there are four possibilities:

First Man	his answer	Second Man
Family A	Yes	Family A
Family A	No	Family B
Family B	Yes	Family A
Family B	No	Family B

Thus, if the first man's answer is yes, it is clear that the second man is from family A, the truth-tellers, and vice-versa. Thus when he asks the second man the second question, he will know how to interpret the answer and will take the correct road. Reader comments on these answers are solicited.

Here are some new questions to tickle your logical and mathematical palates:

1. Devise a circuit that permits the control of a light with three switches in different locations (on-off from any one of the three).
Courtesy of KZ1G.

2. Three runners, A, B, and C are on a straight track. B is midway between A and C. A catches up to C in 4 minutes, and B catches up to C in 6 minutes. How long does it take for A to catch up to B?

3. Two men A and B work on a job. A working alone can do the job in 12 hours, and B working alone can do the job in 8 hours.

a. How long will it take to do the job if they work together?

b. If A works alone for 2 hours, and then is joined by B, how long will the job take?

4. Assuming a spherical rotating earth, no winds, and no atmospheric drag, an object at rest with respect to the earth's surface is dropped from some height above the surface. Where will it strike the surface with respect to the point directly under the object when released? With the same assumptions, an object is thrown vertically upward. Where will it strike the earth relative to the launch point? Answer in qualitative terms, not quantitative, i.e. N, E, S, W, etc.

MMRA Membership Meeting
Tuesday, May 17, 7:30 PM
Campion Center, Weston
Elections, Field Day Planning
Kit Building Class Slide Show

Minuteman Repeater Association, Inc.
P. O. Box 2282
Lexington, MA 02173
Voice Mailbox:(508) 489-2282.

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 Lic:_____

Home Address: _____
_____
_____

Work Address: _____
Work Phone#: _____ Home Phone: _____

Member of: ARRL?_Other Clubs?_____

Equipment Available for Your Use:

Type	No.	Mobile	Port.	Fixed	DTMF	FM	SSB	Packet	CW	Patch	Rtty
HF	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
VHF	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
UHF	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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

☐ Antennas ☐ Flea Market ☐ Public Service p Equipment Transportation
☐ Receiver ☐ Legal Aid ☐ Education: ☐ Technical Documentation
☐ Xmitter ☐ Refreshment ☐ CW ☐ Theory ☐ Schematic Drawing
☐ Logic ☐ Newsletter ☐ Medical Aid ☐ Tech Committee-Rptr:_
☐ Telephone ☐ Special Projects ☐ Meeting Set-up ☐ Control Op.-Rptr:_____
☐ Publicity ☐ Assoc. Officer p Bldg Construction ☐ Bd of Directors
☐ Equipment Construction ☐ Field Day ☐ Emergency Comm.
Other-Specify:_____

Please return this form with your Dues to: **MMRA**
PO Box 2282
Lexington, MA 02173

The Minuteman

Newsletter of the Minuteman Repeater Association - May 1994
Volume 23 Number 5

MMRA Repeaters:

Weston	146.82	KA1AL/R	PTL	P	
Marlboro	146.61	N1BHI/R	FTL	P	
Marlboro	449.925	N1HBR/R	FTL	P	
Stoneham	146.715	N1NVL/R	PTL	P	PL - 146.2 out, none in.
Quincy	146.67	KA1HKP/R	PTL	P	
Quincy	224.40	N1BHI/R	FTL	L	PL - 103.5 in, none out
Weston	224.70	N1HBR/R	FTL	L	
Hopkinton	223.94	N1BHI/R	FTL	L	
Stoneham	446.725	N1NVK/R	PTL	L	PL - 88.5 in, none out

[FTL = Full Time Linked PTL = Part Time Linked]
[L = Patch available via link] P = Local Autopatch]

MMRA Officers:

President:	Andy Morrison, N1BHI	To Contact Officers
Vice President:	Walter Ching, N1HBR	or Board Members
Secretary:	Frank Morrison, KB1FZ	Call MMRA Voice
Treasurer:	Ian MacLennon, AF1R	Mail Line:
Clerk:	Al Williams, KA6BUV	
Directors:	Tom Qualtieri, WB1GMA	508 - 489 - 2282
	Al Kunian, KA1AL	Toll Free from
	Chris Conti, N1NVL	508 and 617 Areas
	Mike Ryan, KD1OA	
Newsletter Editor:	*Open*	

May Meeting Agenda

Tuesday, May 17, 1994

Campion Center, Weston-1930 Hrs

Kitbuilding Class Report - Eric, KA1EEC - with slides
Field Day Planning - Tom, WB1GMA
Elections
Schedule of Upcoming Events

Important MMRA Club Information:

Membership Meetings: 3rd Tue of Sept, Nov, Jan, Mar, May at Campion Center, Weston at 7:30 PM
Meeting Dates for 1993-94 Season: September 21, November 16, January 18, March 15, & May 17.

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

MMRA Voice Mailbox (508) 489-2282.

Newsletter Information	September issue	November issue	January Issue	March Issue	May issue
Mailing Date	Done!	Done!	Done!	Done!	Done!
Submission Deadline done!	Done!	Done!	Done!	Done!	**Done!**

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.

Mail Return Address:

MMRA
P.O. Box 2282
Lexington, MA 02173

TO:

First Class Mail