



# SIGNAL



de NINC

December 2007 Volume 16 Number 12

## This Month's Meeting

This month's meeting program is Homebrew. Bring along those homebrew projects and show us what you are doing.

Next month's meeting program is Members Short Subjects. We are still looking for a few more presentations for February.

## Last Month's Meeting

Last month's meeting presentation was the 100 Pound Dxpediton by Scott Andersen NE1RD. Scott described his quest to do these DXpeditions with a minimum of equipment and maximum fun.



The focus of the presentation was a DXpedition to Montserrat he made with six other hams. Each operator had individual goals for the trip. It wasn't sim-

ply a single effort to set up a station and work as many stations as possible. They instead worked CW, SSB and Digital modes from the base location and worked portable operations from several locations including the Volcano Observatory, the beach walking portable, and bicycle mobile.

Scott covered other items such as the equipment they used, how they coordinated the preparations since they didn't meet until they arrived on the island, and some of the problems they ran into.

For more information see Scotts Website at <http://100pounddxpedition.blogspot.com/>

## NVARC Emergency Coordinator

Den KD2S asked to be replaced as the NVARC Emergency Coordinator. Den has held the position for several years. The coordinator keeps NVARC in contact with local emergency managers and organizations like RACES and ARES.

Larry KB1ESR volunteered to fill the position and was approved at the November Board meeting.

## Book Review

Thunderstruck  
A book by Erik Larson  
A review by Bob Reif W1XP

*Thunderstruck* a book by Erik Larson, is a true story of two lives and how they interact. One life is that of the developer of radio, Guglielmo, Marconi. The other life is that of Hawley Harvey Crippen, a Michigan born medical doctor. The book weaves together these two tails. One is the development of a new means of world wide communication, and the other one, that of the most infamous murder in London. These two stories develop at the end of the 19<sup>th</sup> century and the early part of the 20<sup>th</sup>. Most of

the story takes place in Edwardian London in the roughly twenty years before the First World War.

The story of Marconi is that of a young man that is driven to develop a system of wireless communication that will change the world forever. But it isn't easy for Marconi. In some respects he turns out to be his worst enemy. He develops relationships that are beneficial but he later manages to offend the very people that have helped him and could help him further. He is also driven with the desire to span the Atlantic with his wireless almost to the ruin of his company. What turn of events will finally establish his dominance in the world of wireless is not revealed until the end of the book.

On the other hand, Dr Hawley Crippen is an American trained doctor and seller of patent medicines. He moves to London with his wife who has aspirations for the stage, but no real talent. After failing on the New York stage she has insisted on moving to London where she feels her talent will be appreciated. Crippen falls in love with his younger secretary and then murders his wife most brutally. How he almost gets away with it and is finally identified and tracked down by an inspector of Scotland Yard is also a fascinating story. The interesting thing is how these two stories, seemingly so unrelated, are so interconnected in the end.

I enjoyed the book and found it a good diversion in these days of zero sun spots and poor band conditions. The non technical description of Marconi's development of radio should be of interest to all users of radio today. All in all it is a well researched book and one I think anyone with an interest in radio will enjoy.

73 Bob W1XP

## 42 Volt Automotive Electrical Systems

The automobile industry has been planning for a change in the operating voltage for automobiles for some time. The change is to a 36 volt automobile electrical system from what we think of as the 12 volt system. When I became aware of the change I started wondering how this will affect the things we do in radio. A more basic question is why? What is driving the industry to this change. When will it happen? So I thought I would do a little research on the subject.

### Background

The problem is the same one that 40 years ago drove the change from six volt to twelve volt automotive systems. Electrical demand in modern automo-

biles keeps increasing. The automobile industry has been working on this problem for more than ten years. In the 1920's automobile peak electrical power was around 100 watts. By 1940 it was near 500 watts. By the year 2000 the average was three kilowatts. Automotive experts estimate that future non-propulsion automotive electrical systems will require eight to ten kilowatts by the year 2010. These are huge numbers and 12 volt systems cannot reasonably handle the current and power requirements. Already some high end automobiles use dual or water cooled alternators. The BMW 750i has a maximum electrical load of over 400 amps at twelve volts.

### The Transition

As to the effect at least from a voltage perspective it looks like there will be a transition from 12 volts to 36 volts between 2010 and 2020. Some explanation is required here. We refer to the current electrical systems as a twelve volt system and we know charging voltage is higher at 13.8 volts or so. That is the battery is 12 volts and the charging is 13.8 volts. Literature and standards refer to it as a 12/14 volt system or sometimes a 14 volt system. The new systems are often called 42 volt systems but what they are referring to is a 36 volt battery and 42 volt charging system.

During the transition automakers and suppliers want flexibility so it is likely the systems will be dual voltage for this period. The primary system will be the 36/42 volt system and 12/14 volts will be generated to charge an auxiliary 12 volt battery. This way auxiliary equipment like lights, radios, and other accessories do not have to be designed to immediately run from 36 volts. The possible ways the 14 volt charge voltage is generated are as varied as the manufacturers and some options are dual voltages from the alternator charging dual batteries or a combined 12/36 volt battery, a single 42 volt alternator using a dc-dc inverter to charge the 12 volt battery, or any other combination you can think of.

### What is driving this change?

The simple answer is the increasing power requirements mentioned above. The specific issues relate to designs for comfort, features and future designs to meet emissions and fuel economy standards. The emission and fuel economy standards are more stringent in Europe because of EU regulations so the manufacturers there will likely lead the way. A basic design change to improve fuel economy is to reduce weight. Increasing the system voltage reduces the current required for a given task. This results in cost and weight savings for the electrical system wiring in

general. It will allow smaller more efficient electric motors and actuators and will allow them to be used to do things current motors and solenoids can not handle.

Some of the specific items from the literature.

There seems to be significant interest in eliminating belt driven devices that are typical in today's engine compartment. This is referred to as a "clean engine design" which is a stated goal of several manufacturers. Belt driven systems are noisy, inefficient and they cannot be controlled as they are slaves to engine speed. The clean engine alone is expected to yield up to a 10% mileage improvement. An electrically driven water pump could be optimized for cooling. An electrically driven AC compressor could be moved in or near the passenger compartment. For fuel efficiency making the typical automobile into a low end hybrid seems a goal. One way to do this is to combine the starter motor, alternator and flywheel into a single system in the drive train. This eliminates some belt driven items and combines them into one unit. Once this is done it opens the door to things like regenerative braking and quick starting for "off when stopped" type operation. The industry term is Integrated Starter Alternator Damper (ISAD). For emission requirements preheating and temperature control of the catalytic converter is mentioned. Another area of interest is converting things like engine valves to solenoid actuation. This would allow more computerized engine optimization for both emission control and fuel efficiency. Electric power steering and braking is mentioned and would help in designs for vehicle avoidance systems or automated roadways.

#### First examples

Toyota has at least one production automobile using 42 volts for domestic sales. Other manufacturers seem to be phasing it in with their offering of hybrid vehicles which by their nature are more electric centric and efficiency sensitive.

#### Issues

Batteries for 42 volt systems have arcing, leakage, and longevity problems. Since batteries dislike heat and cold moving the batteries out of the engine compartment could help. This may lead to the use of sealed AGM type batteries in the passenger compartment like in the old days.

The 42 volt value was chosen in part due to human safety concerns and regulations. It is generally accepted that 50 volts can stop a human heart. Beside the risk to the user there are concerns for emer-

gency personnel that may have to put out a fire or cut open a damaged vehicle after an accident.

#### For Us

At the current time it looks like we will have 12 volts available in new cars for the next 10 years or more so a power source for our existing equipment won't be a problem. The unknown is how all of the much more powerful electrical and electronic systems will affect us in terms of noise and there is always the backwards issue of system susceptibility to RF much like we experienced as all cars went to computer systems. There will be safety requirements like protected battery terminal and the dangers of jump starting between 12 volt and 42 volt systems. Since they will be relatively easy to design and in demand devices to run twelve volt devices from the available 36/42 volts should be available.

#### When will it happen?

The slow automotive market and the lack of action by both the US Congress and the Canadian Parliament on CAFÉ mileage standards have caused the conversion to slip. The conversion will cost money and the automotive industry will hold off until they need to make the change. Since the standards have already been agreed upon and vendors have developed some of the hardware it sits in the wings. Additional work still needs to be done to address things like corrosion and leakage problems.

#### Did You Know?

Johnson Controls is one of the largest producers of automobile batteries. They manufacture batteries for Toyota, Nissan, Ford, Daimler-Chrysler and Honda and under brand names for AutoZone, Sears, Wal-Mart, Costco and Interstate.

Stan KD1LE

### You Thought Gas Was Expensive

So with oil nearing \$100 a barrel (42 gallons) how does it compare to other products. Most of the listed items do not come in gallon sizes so the calculation is made based on a commonly available size.

Item	Price per Gallon
Poland Springs Water	\$1.39
Crude Oil	\$2.38
Gasoline	\$2.99
Milk	\$4.20
Orange Juice	\$7.98

Diesel Fuel (UK)	\$8.00
Diet Snapple	\$10.32
Dunkin Doughnuts	
coffee in Box o Joe	\$15.36
Evian Water	\$21.19
Scope Mouthwash	\$84.48
Vicks NyQuil	\$178.48

**2007 Field Day Results**



The 2007 ARRL Field Day results have been published.

Among all 2A entries NVARC ranked 100<sup>th</sup> of 477 with 4370 points.

For all New England 2A entries NVARC finished 12<sup>th</sup> of 33 entries.

In Eastern Mass NVARC finished 5<sup>th</sup> of 10 2A entries.

CALL/CLUB	Points	Contacts	Part
K1RK Falmouth ARA	7588	1956	79
W1MX MIT	6600	1799	25
W1ON MITRE/BARS	5706	1558	54
W1HP Philips ARC	5196	1408	19
N1NC	4370	895	31

**NVARC Historical Field Day Results**

YEAR	OVERALL	NE	EMASS
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2007 2A	100 of 477	12 of 33	5 of 10
2006 2A	74 of 455	7 of 26	3 of 7
2005 3A	42 of 262	6 of 14	3 of 6
2004 2A	31 of 455	5 of 22	2 of 7
2003 2A	84 of 429	9 of 26	3 of 7
2002 2A bat 15 of 35		1 of 3	1 of 2



Year	Class	CW	Phone	Total Pts
		Contacts		
2007	2A	512	200	4370
2006	2A	801	532	5202
2005	3A	685	427	4744
2004	2A	1079	871	7458
2003	2A	474	950	4396
2002	2B	303	126	4160

Notes: In 2005 and 2006 we shut down early due to weather. 2002 was run in the 5 watt battery class.

**Board Meeting**

This month's board meeting was canceled due to the snow storm. Arrangements for necessary actions were coordinated over the radio.

We received email from MARA Board. They have made the arrangements with the QSL Bureau for QSL cards for a May sort. They are requesting we supply the sorting boxes.

Ralph submitted the Treasurers report for the newsletter.

We are collecting materials for the two additional sorting boxes we want to build. Richard W1LTN donated \$20 for the project. Stan collected some plywood pieces.

We received the two tri-band radios purchased by NMAEPC. Powerpole connectors have been installed. The radios need to be programmed.

**Adopt A Highway**

Our November cleanup was Sunday the 18<sup>th</sup> and was the last of 2007.

Thanks to John KK1X, Bob W1XP, Larry KB1ESR, Stan KD1LE, Ralph KD1SM, and Leo K1LK for participating in the November cleanup.

Thanks to everyone who helped out this year. Sixteen members participated one or more times this year. For those who missed out on the fun you will have to wait until April next year. Why not give us a hand? We only spend one hour each month so it is not a lot of time. If we have eight or more people we can pick up our entire 2 mile road segment in less than an hour. Each group of two people covers a one-half mile section.

The following members helped out during 2007.

John KK1X, Peter N1ZRG, Jim AA1PO, Earl WR1Y, Callie K1ZAK, Leo K1LK, Bob W1XP, Stan KD1LE, Ralph KD1SM, Gary K1YTS, Nancy KB1KEF, Dave N1MNX, Bob AB1CV, Les N1SV, Larry KB1ESR, Cindy.

Our participation in the program gets us two signs on Route 119 and local publicity and good will recognized by local Boards of Selectmen.

**How Fast Is It?**

We often get into discussions about computer equipment and numbers come out as to how fast some something is. One problem is equipment uses different ways of describing speed. Most devices describing data transfer speeds use either millions of bits per second (Mbps) or millions of bytes per second (MBps) a byte being eight bits. So how do some typical items stack up?

**Interface**                      **Speed bits/second**

HF 300 baud	0.3kbps
Modem V.90	0.23 Mbps
RS-232 max	0.01 Mbps
Parallel	1 Mbps
Enhanced Parallel	2 Mbps
USB 1.0	1.5 Mbps
USB 1.1	12 Mbps
USB 2.0	480 Mbps
Firewire 1394	400 Mbps
Firewire 1394b	800 Mbps

**Device**                      **Speed bytes/second**

CDROM 1X	0.15 MBps
CDROM 52X	7.8 MBps
DVDROM 1X	1.3 MBps
DVDROM 16X	21.1 MBps
ATA100 Disk Drive	100 MBps
Disk SATA 1	150 MBps
Disk SATA2	300 MBps

**Networking Wireless Technologies**

<b>Device</b>	<b>Max</b>	<b>Typical</b>
Bluetooth 1.1	1 Mbps	
Bluetooth 2.0	3 Mbps	
802.11	2 Mb/s	0.25 Mb/s
802.11a	54 Mb/s	6.75 Mb/s
802.11b	11 Mb/s	1.375 Mb/s
802.11g	54 Mb/s	6.75 Mb/s
802.22n	540 Mb/s	67.5 Mb/s

**Networking Wired Technologies**

LocalTalk	0.230 Mbps
10base Ethernet	10 Mbps
100base Ethernet	100 Mbps
Gigabit Ethernet	1000 Mbps
100 Gigabit Ethernet	100,000 Mbps

**Computer Buses**

PCI 33 MHz	1067 Mbps
PCI Express x1	2000 Mbps
PCI 66 MHz	2133 Mbps
AGP 1x	2133 Mbps
AGP 16x	17,066 Mbps
HyperTransport	179,200 Mbps

**PC Memory Buses**

FPM DRAM	0.176 GBps
PC100 SDRAM	0.8 GBps
PC1600	1.6 GBps
PC3200 SDRAM	3.2 GBps
PC2-10000 SDRAM	20 GBps

## ARRL Letter

### WRC-07 WRAPS UP IN GENEVA; WILL LIKELY MEET AGAIN IN 2011

The final working session of the 2007 World Radiocommunication Conference (WRC-07) in Geneva drew to a close Thursday afternoon, November 15. The signing ceremony for the Final Acts will take place Friday. According to International Amateur Radio Union (IARU) Secretary David Sumner, K1ZZ, the principal achievements and disappointments, as they relate to the Amateur Services, of the conference are:

#### Achievements

\* Maintenance all existing amateur allocations, including the 7.200-7.300 MHz allocation in ITU Region 2 (the Americas) that had been somewhat at risk in connection with consideration of additional allocations for HF broadcasting (see below).

\* A new worldwide secondary allocation at 135.7-137.8 kHz with a maximum radiated power limit of 1 W e.i.r.p. (given the low efficiency of practical antennas for this frequency range, this limit is not as severe as it may sound).

\* Inclusion of an item, "to consider an allocation of about 15 kHz in parts of the band 415-526.5 kHz to the Amateur Service on a secondary basis, taking into account the need to protect existing services" on the provisional agenda for WRC-11 (set for 2011).

\* Avoidance of future agenda items that pose serious threats to key amateur allocations.

\* Some improvement in the so-called "country footnotes" that provide for different allocations by country in all or part of the 1.8, 3.5, 50 and 430 MHz amateur bands.

**Disappointments** \* No new allocation for the Amateur Service in the vicinity of 5 MHz, and no agenda item to consider such an allocation at a future conference.

\* No future agenda item to consider an amateur allocation at 50 MHz in ITU Region 1 (Europe, the former Soviet Union, Mongolia, Africa and parts of the Middle East).

The amateur issues were of course a minor part of the WRC-07 agenda, but the Amateur Service was involved in one of the most contentious agenda items dealing with allocations between 4 and 10 MHz. A series of European Common Proposals had proposed changes to allow for an increase of 350

kHz in HF broadcasting allocations, with a footnote for administrations to allow the Amateur Service to use 5.260-5.410 MHz on a secondary basis and with a radiated power limit of 250 W; however, HF broadcasting had no support from the other regional organizations and no compromise acceptable to all parties could be found. Ultimately the European administrations had to accept "no change" for broadcasting, effectively scuttling our chances for a 5 MHz allocation.

The IARU had hoped that if an allocation could not be achieved at WRC-07, an appropriate agenda item could be included for WRC-11. The 2007 conference, however, had little interest in taking up HF issues at the next conference, tentatively set for 2011, having little to show for a great deal of effort expended on HF in preparing for WRC-07. The only HF issues on the provisional WRC-11 agenda have to do with oceanographic radar applications and the implementation of new digital technologies for the maritime mobile service.

The International Telecommunication Union's planning for the next World Radiocommunication Conference begins on Monday in Geneva, with the convening of a two-day Conference Preparatory Meeting for WRC-11. Paul Rinaldo, W4RI, will attend on behalf of the IARU.

### 500 kHz EXPERIMENT ENTERS SECOND SEASON

Fall has brought lower static and good propagation, making excellent conditions for the 500 kHz experimenters. The ARRL 500 kHz experimental license, WD2XSH, was issued in September 2006 and has 19 active stations.

Project Coordinator for the ARRL-sponsored 500 kHz experiment Fritz Raab, W1FR, said, "We have been joined by a second US experimental license, WE2XGR, with five participants, as well experimenters in the UK, Germany, Sweden and the Czech Republic; operating modes include CW, QRSS, PSK-31, and others. Contacts have been achieved at distances up to 1234 miles. Signals have been received all over North America, Alaska, and Hawaii, and trans-Atlantic reports are not uncommon."

The best time to listen is between sunset and sunrise, Raab said. "The operating frequencies are: WD2XSH -- 505.2-510 kHz; WE2XGR -- 505-515 kHz; UK -- 501-504 kHz, and SM, DL, OK -- 505.0-505.2 kHz. Reception reports should be filed at the [www.500kc.com](http://www.500kc.com) Web site so that they become part of our data base." Additional information can be found at the experiment's Web site and also in the

### OPERATIONS APPROVED FOR DXCC CREDIT

ARRL DXCC Manager Bill Moore, NC1L, announced earlier this week that all operations from Vlad Bykov's, UA4WHX, last trip have been approved for DXCC credit.

These operations include, but may not be limited to, the following: 5X1VB -- Uganda; 9U0VB -- Burundi; 9X0VB -- Rwanda; D20VB -- Angola; D60VB -- Comoros, and J20VB -- Djibouti. Other operations include: 3DA0VB -- Swaziland; 5R8VB -- Madagascar; A25VB -- Botswana; C91VB -- Mozambique; ST2VB -- Sudan; Z2/UA4WHX -- Zimbabwe; V51VV -- Namibia, and OD5/UA4WHX -- Lebanon.

If you have any questions concerning these operations, or any questions about the ARRL DXCC program, please e-mail the DXCC Desk <[DXCC@arrl.org](mailto:DXCC@arrl.org)>.

### AARP Endorses Amateur Radio

Amateur Radio and the ARRL received a significant public relations boost from the AARP this week. Promoting life-long learning for their members, Susan Ayers Walker wrote "Finding Your Hobby Online" for the AARP Web site. What's the first and most prominent activity listed to keep the mind active and functional? Amateur Radio! Here's what the article had to say: "Long before the internet was created, the Amateur Radio network was the way people from all over the world could connect. Amateur, or ham, Radio operators created vast social networks by talking long distances to other radio enthusiasts, making distant friends and exchanging calling cards. It is this linkage of radio enthusiasts that is ready to help communication flow in case of a disaster or weather emergency. The ARRL, the National Association for Amateur Radio, has an informative website with lots of news and information, plus info on getting started or finding a chapter in your area." You can read more at <[http://www.aarp.org/learntech/computers/life\\_online/finding\\_your\\_hobby\\_online.html](http://www.aarp.org/learntech/computers/life_online/finding_your_hobby_online.html)>.

### Treasurers Report

Income for November was \$80 in membership dues, \$21.14 from bank interest, \$30 from PowerPole connector sales, and \$15 from the book raffle, and \$0.05 found during the road cleanup on the 18th. Expenses were \$16.40 for newsletter postage, and \$9.32 in

miscellaneous postage leaving a net income of \$120.47 for the month.

Current balances:

General fund	\$4,290.42
Community fund	\$2,386.83

As of 13 December we have 60 members who are current with their dues and 6 renewals outstanding. Please check the member roster that is circulated at the monthly meeting if you do not remember your renewal date. Your membership date also appears on your newsletter mailing label.

If you are not yet an ARRL member please consider joining and showing your support for the programs developed by our national organization. If you let me send in your membership then the Club pays for the stamp and receives a portion of your ARRL dues.

Ralph KD1SM

### NVARC Club Net

The club net meets on the 442.900 repeater. Subjects discussed recently; emergency communications preparedness, repeater maintenance, current activity on Pave Paws interference problem.

Recent participants include Dave N1MNX, Bob W1XP, Bob AB1CV, Joel W1JMM, Larry KB1ESR, Skip K1NKR, Gary K1YTS, Stan KD1LE, Les N1SV, Richard W1LTN, Ken K1JKR, Den KD2S.

The net is a good place to bring information for the club and questions or discussions. The net meets at 8:00 PM Monday evenings on the 442.900 N1MNX repeater.

## Flea Markets

2008

February

16 Marlboro MA Algonquin ARC

17 Westford MA Antique Radio

23 Milton VT

March

30 Southington CT

April

6 Framingham FARA

19 Manchester NH NE Antique Radio

August

22-24 NE Division Convention Boxboro

## Advertisements



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Tell them you saw it in the Signal. Advertisers should contact the NVARC Treasurer for information.

## Contest, DXpeditions and Special Events

The information for a DXpedition can be quite detailed and may include bands, dates, number of stations, and times of day they plan to work certain continents so I can not list it all here. But if a country or prefix is of interest you can get more information at [www.425dxn.org](http://www.425dxn.org).

### Contests 2007

December

30-Jan 2 ARRL 160 Meter Contest

January

5-6 ARRL RTTY Roundup

12-13 North American QSO Party CW

13 DARC 10 Meter Contest

19-20 North American QSO Party SSB

26-27 CQ 160 Meter Contest CW

February

2-3 Vermont QSO Party

2-4 Delaware QSO Party

23-24 CQ 160 Meter Contest SSB

23-24 North American QSO Party RTTY

### DXpeditions

Call	Location	Until
9V1CW	Singapore	2008
9A60K		12/31/07
9A07P		12/31/07
SG60RK	Gotlamb Is	12/31
FO5RU	French Polynesia	1/15/08
FO0	Clipperton Atoll	3/08

See [www.425dxn.org](http://www.425dxn.org) for more listings



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Vice President: Peter Nordberg N1ZRG  
Secretary: John Griswold KK1X  
Treasurer: Ralph Swick KD1SM

**Board Members:**

Les Peters: N1SV 2005-2008  
Joel Magid W1JMM 2006-2009  
Bob Reif: W1XP 2007-2010

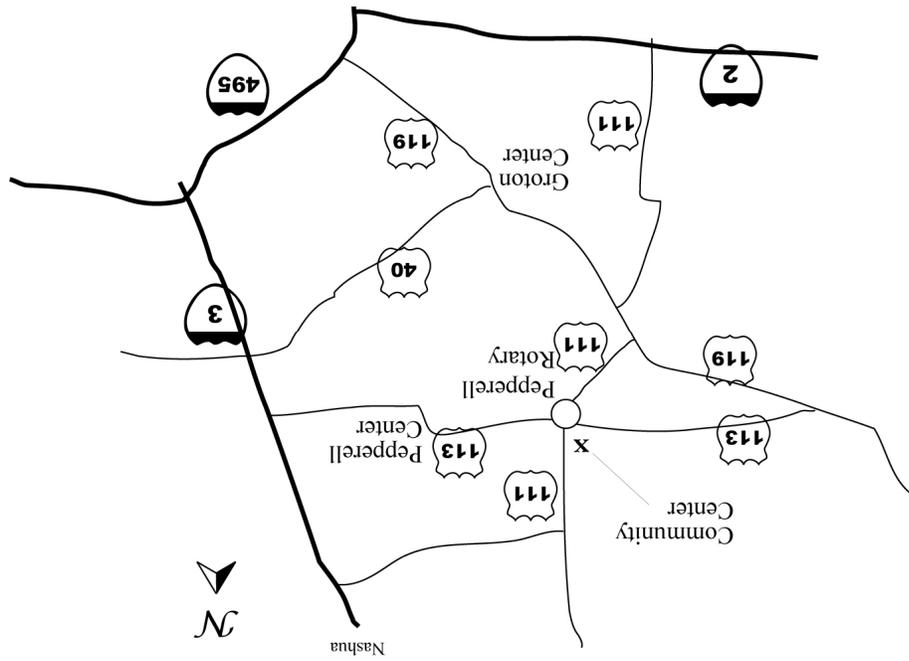
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Property Master: John Griswold KK1X  
N1NC Trustee: Bruce Blain K1BG

Meetings are held on the 3rd Thursday of the month  
7:30 p.m. - Pepperell Community Ctr.

Talk-in 146.490 simplex  
442.900 + 100Hz Repeater  
147.345 + 100 Hz Repeater  
53.890 – 100Hz Repeater

This newsletter is published monthly. Submissions,  
corrections and inquiries should be directed to the  
newsletter editor. Articles and graphics in most IBM-  
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