



SIGNAL

September 1994 Volume 3 Number 09

The President's Column

Well, summer is over and we'll all be back to the normal routines soon. I hope everyone had a good one. The next few months are shaping up to be very busy Amateur Radio wise. There is the MARS Convention Sept. 17, the NVARC Fox Hunt and MIT Flea Market Sept. 18, The Boxboro Convention Oct. 2, Hosstraders Oct. 8-9, just to mention a few.

In collusion with MARA we have been scheduling at least a Fox Hunt a month. Come to mention it, I saw one of those little critters cross the road this morning on the way to work. Its no wonder I've been having so much trouble finding them...they're pretty fast! Many of us "hunters" only started this summer, but we have learned a lot, and have been very competitive in the most recent hunts. It has been fun an you don't need a lot of equipment to participate. You don't even need a license. A portable scanner will do.

The Hiram Percy Maxim event ended last weekend but I wanted to mention it. It gave some of us a chance to be the "rare DX". Having an appointment as Official Relay Station" I got to sign with the /125 suffix. I was buried more than once under the resulting pileups but it was a lot of fun and I racked up about 150 QSO's in only a few hours. Considering that my style is to fill out a QSL card for each contact as I go, I did pretty well getting it down to less than a minute each. It was a great opportunity to rack up states for WAS and practice for the next contest. One evening I logged 15 contacts from 14 states. They we spread from Maine and Vermont to Arizona and California. I don't know what the coverage was on the other days I operated but I'm sure it was comparable. Hope everyone had a chance to participate.

Hope to see everyone at the upcoming meeting.
Stan KD1LE

At The Last Meeting

Shawn O'Donnell K3HI spoke on current legislation and the proper way to influence your Congressman's or Senators decisions. Stan KD1LE

This Months Speaker & Beyond

Our own Bob Reif, W1XP, will be speaking at the RSGB (Radio Society of Great Britain) HF convention later this year about high frequency antennas. Bob has kindly volunteered to be the guest speaker at our September meeting and give us a sneak preview.



In addition one of the candidates for State Representative may come by. Rich Barry has offered to drop in for a few minutes.

In return we have a chance to talk about matters affecting Amateur Radio before the election.

For October Tom LaCouture, WV1T will be our guest. Tom's presentation is "The Myths and Fallacies of SWR" Study up, he might give a test!

We're planning to have another "Home Brew Night" this winter. If you haven't built anything since the last one you still have time. I've given this some thought and have my decided on my submission. The competition could be keen. Stan

The Treasurer's Report

Many thanks to all the members who have brought their dues up-to-date. We have been extremely lenient with shutting off newsletters to members who are behind in dues; mostly because we realize some people need lots of reminders! But

now we're beginning to drop those (former) members who have been behind the longest. As of September, we have 61 fully paid members.

As of the September Board meeting the fund balances were:

General Fund:	924.16
Education Fund:	240.00

The club's General Liability Insurance premium is payable this month; this is the largest single expense the club has on a regular basis. Therefore, don't be surprised when you see next month's report; no, the Board isn't having extravagant parties HI.

Are you interested in sharing a club table at Hoss Trader's on October 7 & 8? Several people go to the hamfest with items to sell. Most folk also want to roam around and see if there's anything they just *have* to bring back home. It's hard to look around when you haven't yet transferred all your own stuff to new owners. However, if enough club members are willing to sign up to man a table for a couple of hours each we can share the load. Club members who aren't able to attend would also be able to send items along to be sold. Asking and minimum selling prices would be specified by the owner ahead of time (and kept in confidence). The club would retain 10% of the selling price. What do you think? Please bring your comments to the next meeting.

73 de Ralph KD1SM

Fox Hunting

The next Fox Hunt is scheduled for Sept. 17. It will be an on foot event (low tech based on weight). It will take place at the Cowdrey Nature Center land in Lunenburg. The area is large enough to make it interesting and the terrain will help separate the hunters from each others view. We will meet at 1:00



p.m. at the parking area on Rt. 2A to check in and start at 1:15. Since we don't have odometers on our feet and we are all starting at the same time placing will go by the order that people find

the fox. (for those who have not participated in the automobile events, they use a combination of time and mileage driven to determine standings). The automobile events tend to, (but not always), use more elaborate equipment. On foot in the woods the Dopplers and large Yagis are out. All that is required is something that will receive 2 meters. A handheld or scanner will do fine. Some type of small directional antenna might help, but at close range the signals will be very strong. Anything you can do to make your handheld directional would help. Before the start there is time to get a few

pointers from the other participants if you've never tried it before. We will pass out the rules and a map of the area at the start. If you want to plot the bearings you take on the map, a compass, clipboard, pencil, and straight edge might come in handy.

RULES

Everyone must check in at the parking lot and we will all start together. This is an individual event so there should be no "team efforts". The frequency of the Fox will be 146.56 MHz. and it will ID at approximately 60 second intervals. The Fox is automated, so don't expect to find a person standing out there with a handheld. If your lucky you may get a peek at it as it dashes off into the woods. It will be in plain view (not buried) and at eye level or lower. When you find the Fox you must remove the next numbered card and bring it back to the starting place. The cards will be numbered from 1 to NN. When you find it please don't disclose its location or dash off such that others might not have the pleasure of finding it themselves. Just discreetly return to the start. The "Fox Masters" will have the option of interjecting some clues as time goes on.

Stan KD1LE

The Mara Fox Hunt

The Montachusett Amateur Radio Association held its third fox hunt of the year on August 28. Representing NVARC were the team of Stan KD1LE and Clint KD1OL. Also participating were Paul N1IPG with Sean N1REK representing the Mohawk ARA, Gordon N1MGO, Charlie WN1E, Barry W1HFN, Dave KA1YHW, and Tom K1JHC. With divided loyalties (again!), the team of Jeanine N1QIT and Ralph KD1SM declared as a MARA team. The nimble fox this time was Phil WA1DWS who hid himself in luxury in the lobby of the Royal Plaza Hotel at Routes 31 and 2 in Fitchburg. With clues like "I'm near a stream of water" and "People are leaving here with umbrellas", the fox baited the hunters. The stream of water proved to be the lobby fountain and the umbrellas were from a tool truckload sale being conducted in a function room. First place was very nearly a tie as the N1QIT/KD1SM team located the transmitter just moments before KD1OL/KD1LE. Most of the rest of the hunters eventually followed along, with only 2 dropping out due to inability to hear any signal from the fox. MARA thanks everyone who participated. The next MARA fox hunt had not been scheduled at the time of publication. Check in to 145.45 (-, Fitchburg) for updates.

Ralph KD1SM

(As seems to be the custom, copious amounts of ice cream were consumed at a local establishment after the event. Everyone's blood sugar must get low during these ordeals.--ed.)

Board Meeting Notes

The September meeting covered preparations for Septemberfest. We again discussed the purchase of folding tables for the Club. The books the Club purchased for the Pepperell Library are now available. Clint discussed the way the Rochester tables would be run (more elsewhere). We also discussed the plans for the next Fox Hunt. The Board voted to pay the insurance bill that Ralph referred to in his report.

Stan KD1LE

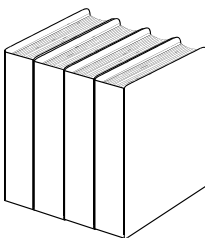


Classes

We will be hosting another Novice/Tech license class this fall. Septemberfest has been where we get most of our students, but if you know of anyone looking for a class let them know. The location for the class is not yet known. But it will most likely be at one of the two previous locations in Groton. There's no charge for the class, but students will have to get the text (on their own or purchased through the club). Older versions of the text have out-dated question pools since they were changed the end of last year. We did have some people sign up at Septemberfest last weekend.

Because of the large number of Novice/Techs in the club we were wondering if there was interest in a General License class or a study group? Let us know what would be helpful to you.

Stan



ARRL NOTES

Excerpts From:

ARRL NEW ENGLAND DIV DIRECTOR'S BULLETIN 94-16

VERMONT AMATEUR RADIO COUNCIL TO SUPPORT STATEWIDE SCHOOL PROJECT-

John Gladding N1HLG, reports that the Vermont Amateur Radio Council (VARC) recently voted to support a program to place weather alert radios in Nelson W1LTW. The "Lets Talk Weather" project, developed in conjunction with the National Weather Service will prioritize Vermont's 500+ schools from a weather severity and incidence standpoint and provide NOAA Weather Radios for schools as funds are raised.

This is an innovative program that highlights another way that Amateur Radio can provide real community service.

MINUTEMAN RA RATED EXCELLENT BY ARNS-

Bob Levine KD1GG, sent me a note recently to let me know that the Minuteman RA scored 186 out of the possible 200 in the ARNS newsletter contest and received an "Excellent" rating. Recognition like this gives both the club and Bob, as newsletter editor, a feeling of pride and accomplishment for all the work that goes into creating a good newsletter each month.

FCC DATA SHOWS SLIGHT INCREASE IN HAM POPULATION-

The latest FCC license data clearly shows the impact of two factors on the US Ham population.

	Percent change		
	Dec., 93 Feb. to July	July, 94	
Ext	65,277	65,113	0.5%
Adv	112,637	108,751	-2.8%
Gen	126,898	121,799	3.2%
Tek	227,681	245,481	+6.4%
(Tek + = 139,818)		(Tech = 105,663)	
Nov	99,105	91,693	-5.7%
-----	-----	-----	
Tot	631,598	632,837	+0.3%

First, the increase in Techs more than offsets the losses in all other license classes! In addition we are now getting a breakdown so we can look at both No-code Tech numbers and Tech+ numbers. It's clear that some sizable percentage of those entering at the Tech level are passing their CW tests to move to Tech+. Now, it will be interesting to see when that process starts to impact Gen/Adv/Extra numbers.

Second, the license renewal situation is apparently already being felt in the Novice license numbers. This is a dramatic drop and probably is a mix of Novices upgrading to Tech+ and people who got the license and then never got active or lost interest and probably will never renew. We can likely learn more about that split from VE data in the future.

We will keep watching the trends to see what more we can learn. Right now, almost 4 out of every 10 Hams hold the Tech/Tech+ license. It will be important to watch the mix of Tech/Tech+ to see what these trends really mean.

W1TMO HOSPITALIZED-

Dave Crocker W1TMO, East Mass Section Manager is currently in hospital in Boston. I spoke with his wife this morning and Dave has his H/T in his hospital room and is apparently active on local repeaters. It sounds like he is making good progress and our thoughts and prayers are with Dave

and his family as he continues on the road to recovery.

73, Bill Burden WB1BRE
New England Division

Director
American Radio Relay League

NVARC QSL Bureau

The "Buro" sent out a half pound of cards again in Sept. But I'm wondering where all you Dxr's are? The past few shipments would have you believe that KD1OL & KD1LE represent NVARC in the world of HF communications. You don't need a "KD" prefix to participate. Stan

Hosstraders

Well, it's September and that means to some of us, ROCHESTER !!! . I'm one of those who enjoys hamfests for all the important reasons: the bargains, the food, the folks you don't get to see any other time, the food, the crisp fall air and of course the food, (or did I already mention that ?). Well, this fall is no different than most in that I'm going to the Hoss Traders Hamfest at the Rochester NH fairgrounds October 7 & 8. Your beloved President Stan and I will be heading out the morning of the 7th and we will be setting up and spending the night. Now the part you all been waiting for

"What's this got to do with ME ??"

Well, as we have done in the past, we will take all the items that have been cluttering your shack and display them for sale at the hamfest. Here's the deal, You get the item to me with the following information, your name, how much you would like for it, and how much you will take for it and Stan and I will try to sell it and bring you 90% or what we got for it. The other 10% goes to the club. Stan and I won't even take expenses since we would go anyway for the food and such. So, bring the stuff to the meeting or get it to me at home and we will take it with us when we go. In the unlikely event we do not sell the item, it will be returned, no charge. We will also take outright donations of stuff to sell with the complete price going to the club.

Finally, Stan and I would like to see some of you at the hamfest so we can enlist you for a short time so we can see all the rest of the hamfest. So see Stan or I and make plans to be with us at the Hoss Trader's Rochester Hamfest.. Clint KD1OL

What's the Frequency?

Info-Hams Digest Mon, 11 Jul. 94 Vol. 94 : Issue 773

FREQUENCIES OF INTEREST DURING HURRICANE SEASON REPRINTED FROM THE SALVATION ARMY TEAM EMERGENCY RADIO NETWORK NEWSLETTER (JANUARY 1993) WITH ADDITIONS (7/94)



3815 ANTIGUA/ANTILLES NET
3815 INTER-ISLAND 75 METER NET (CONTINUOUS WATCH)
3818 ANTILLES NET
3915 SOUTH CAROLINA EMERGENCY NET
4270 FAX PICTURES FROM CFH HALIFAX
4426 USCG BROADCASTS FROM NMN PORTSMOUTH VA
0400,0530,1000Z
6330 FAX PICTURES FROM CFH HALIFAX
6501 USCG BROADCASTS FROM NMN PORTSMOUTH VA
0400,0530,1000,1130,1600Z
6673 HURRICANE HUNTER AIRCRAFT
7165 ANTIGUA/ANTILLES NET
7232 SOUTH CAROLINA EMERGENCY NET
7243 SOUTH CAROLINA EMERGENCY NET
8080 FAX PICTURES FROM NMN
8764 USCG BROADCASTS FROM NMN PORTSMOUTH VA
0400,0530,1000,1130,1600,1730,2200,2330
8765 HEALTH AND WELFARE TRAFFIC
8993 AIR FORCE AND COAST GUARD USB
10536 FAX PICTURES FROM CFH HALIFAX
11246 HURRICANE HUNTER AIRCRAFT
11249.5 HURRICANE HUNTER AIRCRAFT
11398 HURRICANE HUNTER AIRCRAFT
11425 HURRICANE HUNTER AIRCRAFT
13089 USCG BROADCASTS FROM NMN PORTSMOUTH VA



1130,1600,1730,2200,2330
 13245
 ANTIGUA/ANTILLES NET
 USB
 13354 HURRICANE
 HUNTER AIRCRAFT
 13510 FAX PICTURES
 FROM CFH HALIFAX

14150 AMATEUR NET
 14275 INTERNATIONAL AMATEUR RADIO NET
 / RED CROSS

14283 CARIBUS NET
 14283 HEALTH AND WELFARE TRAFFIC
 14303 HEALTH AND WELFARE TRAFFIC
 17314 USCG BROADCASTS FROM NMN
 PORTSMOUTH VA, 1730Z
 14316 MARITIME MOBILE NET
 14325 HURRICANE WATCH NET (AMATEUR-
 TO-NATIONAL HURRICANE
 CENTER)
 14375 AMATEUR NET
 18019 HURRICANE HUNTER AIRCRAFT
 21310 HEALTH AND WELFARE IN SPANISH

AMATEUR EMERGENCY NETS IN HURRICANE
 AREAS: REPRINTED FROM THE SALVATION
 ARMY TEAM EMERGENCY RADIO NETWORK
 NEWSLETTER (JANUARY 1993) WITH
 ADDITIONS (7/94)

ALABAMA 3695
 ANTILLES 7165
 SOUTHERN LA 7245
 BAJA 7235
 BELIZE 3935
 BERMUDA 14275
 CARIBBEAN EMERGENCY 14185
 CARIBBEAN MARITIME MOBILE 7115; 1200Z
 CARIBBEAN WX 3808; 1030Z
 CALIFORNIA WX 3948; 1400Z
 GEORGIA 3975
 GULF COAST CENTRAL HURRICANE 3935; 7245
 GULF COAST WESTERN HURRICANE 3845;
 7260
 GULF COAST OUTGOING ONLY 3967; 7283
 GULF COAST HEALTH & WELFARE 3993; 7264
 INTERAMERICAS H & W 21390
 LAKE CHARLES LA 3993.5; 7264
 LOUISIANA 14340; 1900Z
 MANANA 7070
 MEXICAN NATIONAL 3987.5
 MISSISSIPPI ARES 3923; 3910
 NORTH CAROLINA 3915
 SOUTH CAROLINA 3915
 SOUTH TEXAS EMERGENCY 3955; 7250
 TEXAS TRAFFIC H & W 3691; 7290 DAY;
 3910 NIGHT
 TRANSATLANTIC MARITIME MOBILE 21400

WATERWAY 7268

WHENEVER A HURRICANE IS WITHIN 300 MILES
 OF LAND IN THE NORTHERN WESTERN
 HEMISPHERE, THE HURRICANE WATCH NET IS
 OPERATIONAL ON 14.325 MHz USB. THE
 HURRICANE WATCH NET PROVIDES
 COMMUNICATION BETWEEN THE NATIONAL
 HURRICANE CENTER AND THE AFFECTED
 AREAS.

THE NATIONAL BUREAU OF STANDARDS
 BROADCASTS STORM WARNINGS ON 2.5, 5.0,
 10.0, 15.0, AND 20.0 MHz A.M. AT 8 MINUTES
 PAST THE HOUR AND HALF-HOUR.

F.E.M.A OPERATING FREQUENCIES
 FEMA VHF/HF FREQUENCIES

VHF
 138.225, 141.725, 165.6625, 138.575, 141.875,
 166.225, 139.10, 141.95, 167.975, 139.825,
 142.025, 168.35, 139.45, 142.35, 169.25, 139.225,
 143.60, 169.60, 139.95, 143.625, 169.875, 140.025,
 163.10, 170.20, 140.90, 164.8625, 173.1875

UHF, 409.125

HF:

CH.	FREQ.	CH	FREQ.	CH	FREQ.	CH	FREQ.
01	2320	19	6151	37	13633	55	18744
02	2360	20	6176	38	13744	56	19757
03	2377	21	6608	39	13780	57	19969
04	2445	22	7348	40	13783	58	20027
05	2458	23	7428	41	14450	59	20063
06	3341	24	8462	42	14776	60	21866
07	3379	25	10184	43	14836	61	21919
08	3388	26	10483	44	14885	62	22983
09	4603	27	10184	45	14899	63	23028
10	4780	28	11721	46	14908	64	23390
11	5211	29	11801	47	15464	65	23451
12	5378	30	11957	48	15509	66	23550
13	5402	31	11994	49	15532	67	23814
14	5821	32	12009	50	15708	68	24008
15	5961	33	12129	51	16201	69	24282
16	6049	34	12216	52	16430	70	24526
17	6106	35	12219	53	17519	71	24819
18	6108	36	13446	54	17649		

All HF frequencies in Khz., most USB.

Mark Your Calendar

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- The Eastern States Exposition Sept. 16 - Oct. 2
- Framingham Flea Market Sept. 25
- Boxboro Convention -- Oct. 1,2
- Hosstraders Oct. 9,10
- MIT Flea Markets Sept. , Oct.

Public Service Log

JOTA is coming up for the Scouts and Den KD2S and Stan KD1LE have been preparing to provide them with a location and equipment. Its probably going to be a two troop camp out..

Stan KD1LE attended the Region 1 MARS Conference in Portsmouth NH. on Sept. 11. The Chief of Navy Marine Corps MARS spoke to the many operators who attended.

Tech Talk

Gain? Directivity? What's the difference? Let's start with **Directivity**. A simple definition of directivity would be the focusing of energy in one direction at the expense of other directions. Let's take a sphere and consider its surface area.

The sphere will represent an antenna that radiates equally in all directions. We know this antenna as an Isotropic source. You can't build one, but it does give us a starting place.

An angle of one degree at the center of the sphere will project a line on the surface. An angle of one degree at right angles to the first angle will project another line on the sphere. Now we have a little square on the surface that represents one degree of angle in both directions at the center or origin of our sphere. So what! Well it just so happens that if we do this exercise for each and every square degree (a degree wide and a degree high) we find that there are 41,253 little square degrees on the surface of our sphere and it doesn't make a bit of difference what the diameter is. Our Isotropic radiator from the previous paragraph would radiate an identical level of energy through each of these little square degrees.

OK, so what about **Directivity**? If we could get the energy to be distributed across less of the surface, some of our little square degrees would radiate more than others. Lets say that energy is focused such that one half of the surface radiates and the other half does not. The total amount of energy hasn't changed;-- just its direction. Since twice as much energy is going in one direction we have a power increase of 2 which we all know is 3 dB. The **Directivity** of our fictitious antenna is 3 DB. We got to this figure by dividing the total surface area of the sphere in square degrees by the area that was actually radiating the energy. Using one half of the sphere makes the math pretty simple so lets try another example.

Antenna patterns are measured at the point where the power drops to one half or where the voltage has dropped to .707 of the maximum voltage in the pat-

tern. Remember power is voltage squared? Lets say we've built an antenna that has a pattern like a doughnut. It's circular in one plane, but has a beam width of 70 degrees in the other plane. What is its **Directivity**? If we multiply 360 Deg. by 70 Deg., its beam width in both planes, and divide this number into 41,253 we should get a number that represents this antenna's **Directivity**. The hand calculator yields a power gain of 1.76, or 2.14 DB. This is our standard half wave dipole. This is not the **Gain** of the antenna it is the **Directivity**. To find the **Gain** we would have to know all the various losses associated with our antenna. I fudged the 70 degree number to make the dipole come out right because my neat formula works best for narrow beam widths. Using the 41,253 method for a broad beam width like a dipole gives an error of about a half DB.

As I make my dipole shorter and shorter, the pattern remains almost the same. A dipole on the verge of disappearing (known as an infinitesimal dipole) has a **Directivity** of 1.76 DB while the half wave dipole has a **Directivity** of 2.14. We've only lost .38 DB shortening our dipole to an overall length of let's say 1/64 of an inch on 160 Meters. Well, gosh if that's all we lose in **Directivity** we can put iddy-biddy dipoles all over the place. Now we come to the real difference between **Gain** and **Directivity**. Remember those losses mentioned in the previous paragraph? Well here's where they bite.

We all know that a half wave resonant dipole has an impedance of about 72 Ohms. This impedance represents the radiation resistance of the antenna. We match this to the transmitter and most of our energy is delivered to the radiation resistance which is the part that sends our message to the world. Let's shorten our dipole to one tenth wavelength. The radiation resistance of this dipole is 7.9 Ohms. By the time we get finished matching this antenna to the rig most of our energy will be dissipated in the matching network. Our directivity hasn't changed, but our **Gain** sure has. Here comes the whole story in a nutshell. **Gain is equal to Directivity times Efficiency**. As we dump more and more of our power into resistance other than the radiation resistance our efficiency goes down and with it our **Gain**. Let our dipole shrink to .01 Wavelengths:---- the radiation resistance is .08 Ohms. Trying to match to this impedance is guaranteed to keep the shack warm. All we've talked about so far is the radiation resistance change that has dropped our efficiency. There's more.

As the antenna is lengthened or shortened as we have seen its radiation resistance changes. We've shown that for a shortened dipole, the result is a low value, but it could just as easily be a higher value as we leave the length at which the antenna is reso-

nant. The antenna input impedance is not a pure resistance, it is composed of a resistance in combination with a reactance. Only at resonance does the reactance disappear, and not always even then. The reactance value for antennas that are not resonant can be very high appearing as a large capacitance or inductance. We know we can't dissipate energy in a reactance, so now our efficiency is further lowered by a requirement to match out both the resistive and reactive components of the input impedance.

There are a number of ways to measure **Gain**. One is to measure the field strength of the antenna at a known distance far enough removed to stabilize the pattern (far field for you nit-pickers) and with known power and path loss. This is **Gain**. The pattern might indicate a **Directivity** much higher than what you measure, but this is **Gain**. Another method for measuring **Gain** is to compare the signal either sent or received by our antenna to a standard antenna of known gain. Finally, the path loss between two of our unknown antennas will give a value of **Gain**. To get **Directivity** we simply measure the beam width of the antenna in the vertical and horizontal plane and plug the numbers into a formula.

When someone approaches you with this new six inch whiz bang antenna guaranteed to have at least 12 DB of **Gain** over a dipole, requires no matching, and works on all frequencies without radials, ask him whether he's talking about **Gain** or **Directivity**. If he says **Gain** ask him how he measured it and could you see the test results. He'll most likely go looking for another customer.

73, Russ

From the Video Library

The Video Library now has six titles available to loan.

The Last Voice From Kuwait

The all China DF Competition

Your League at Work

Signal to Noise Story

Gonzaga Prep HS Radio Club Satellite communications

The New World of Amateur Radio

You can get them anytime you can catch me at home, and I will bring the available tapes to each meeting. Stan

Resource List

Construction Earl Russell 448-5822

DX Bruce Blain	448-9438
NTS, MARS Stan Pozerski	433-5090
Races Ben Akins	433-9227



Nashoba Valley Amateur Radio Club

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PIO: Earl Russell WR1Y

Meetings are held on the 3rd Thursday of the month
- 7:30 p.m. - Pepperell VFW hall. Talk-in 146.490
simplex

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

Packet address: PEPMBX (145.09 MHz)