



N.E.W.S. LETTER

The Publication of the North East Weak Signal Group



March 2009

Volume Eighteen

Issue 2

President: N1JEZ, Mike Seguin
Vice President: KA1OJ, Mark Foster

Current Officers
NEWSLetter Editor: W1FKF, Don Twombly

Secretary: W1GHZ, Paul Wade
Treasurer: WA1MBA, Tom Williams

Next Meeting March 7, 2009

K1WHS at N3NGE for the January VHF test
WZ1V hacking the Mio GPS units
N1JEZ on 122 GHz - W1RIL 122 GHz source

“Bring your Show and Tell”

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Don’t Forget

**The North East Weak Signal Group
2 Meter VHF and Above Net
Every Thursday at 8:30 PM Local 144.250**

MEMBERSHIP in the N.E.W.S Group is \$15 per year. Apply to Tom Williams, WA1MBA.

Email mw@wa1mba.org You may download an application from our web page <http://www.newsvhf.com/>

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The President's Corner

The January VHF Contest has come and gone. I was joined again this year at my camp in FN44ar by a couple of friends, KT1VT and N1DMP. Conditions seemed fair. Activity seemed a bit light with several stations noticeably absent possibly due to the Ice Storm? We had a short opening on 6M into the Great Lakes, but otherwise 6M was pretty quiet in our neck of the woods. My camp is 12 miles north of Burk Mtn. Fortunately it's at 2000' with a decent shot to the E-S-W. We did work Stan, KA1ZE and Phil K3TUF for some distance.

I still haven't found the time to put up the towers, so we again ran low power with antennas only 25' off the ground. This was the first year I've experienced any line noise. I'm off the grid with the nearest power about a mile away. But this year there was noise at about 215 degrees. The noise blander did take care of it. Time to go looking for a bad power pole.

Our April Conference is approaching fast. I'm sure Bruce will fill us in on the progress at our meeting. I hope we have a decent turn out, but the economy is a big factor. At least gas prices aren't through the roof.

At our annual picnic in July we'll be looking to elect a new President, Vice President, Secretary and Treasurer. Paul, W1GHZ and Tom, WA1MBA have said they'd be willing to stay on as Secretary and Treasurer, but would definitely step aside if someone wanted to take over those positions. As I stated before, I won't be running for President again. Mark, KA1OJ has also said he doesn't intend to seek reelection. If you have any interest, please let me know. I think it's vitally important for the health of a club to get fresh blood in the elected positions. Personally I'd like to see some of our younger members take over the reins.

Also at our July meeting, we'll be looking for 3 new board members. The terms of Bob, W1COT – Art, W1TDS and Ron, WZ1V expire. Mark, K1MAP has one year left. If you're interested in serving on the Board, please let me know. I'll be throwing my hat in the ring for BOD in July at the conclusion of my term.

Our meeting this time is "Show and Tell". We have some neat stuff lined up:

K1WHS on his January adventure at N3NGE.

WZ1V – Unlocking the Mio GPS for use as a PDA.

N1JEZ on 122 GHz - W1RIL's 122 GHz signal source

And more.....

Finally, thanks to Tom, WA1MBA for his presentation last time on his 78 GHz amplifier. Good Stuff!

73,

Mike, N1JEZ

From our Secretary

NEWS Meeting 10 January 2009, Storrs Library, Longmeadow, MA

Next meeting 7 March 2009 at the Storrs Library, Longmeadow, MA

Board of Directors meeting convened 1217 at Royal Buffet, Enfield, CT

Agenda :

- 5760 contest initiative
- new President and VP needed in July
- software for NEWSletter
- VHF Conference
- Mt. Equinox beacons

Board meeting adjourned 1240

NEWS Meeting , Storrs Library, Longmeadow, MA

Called to order by President, N1JEZ, at 1312

ANNOUNCEMENTS

- Letter of thanks received from NOBARC for donation
- Eastern VHF/UHF Conference 4/17-19
- SEVHFS Conference 4/24-25

TREASURERS REPORT

- account moved to Citizens Bank - no fee
- 86 paid members, 15 in data not paid
- current balance \$3101
- projected expenses for year \$718

OLD BUSINESS

none

NEW BUSINESS

- MOTION - K1MAP - to support 5760 contest concurrent with 10 GHz contest, with separate scoring - N1DPM second APPROVED: 10 for 6 opposed
 - MOTION - K1MAP - donate up to \$100 to support WA1ZMS beacons on Mt. Equinox
- APPROVED unanimously
- Discussion - update software for NEWSletter
 - W1RIL - update on interference on 144.190 - caused by intermod from pager. Send reports with grid & signal strength to W1RIL(at)juno.com

Meeting Adjourned.

PRESENTATION

WA1MBA gave us an update on the 78 GHz amplifier

Help make the Conference a success

Contribute a door prize

Contribute a door prize

Contact:

Art W1RZF

w1rzf@comcast.net

Thanks

From our Treasurer

The treasury remains solid as we approach Spring. We have had only a few old memberships expire, approximately equaling the number of new members this year. It came to my attention that when I performed the last "duct tape auction" that I was remiss. The proceeds of some of the materials were being donated to the club, but not everyone's, and in my zeal as treasurer I had missed this. My apologies to anyone who did not receive their payment for their goods. Please see me privately and I will reimburse. In the future I will do my best to get it right. As Yogi Berra said "I have chagrin on my face". Hope to see everyone at the next meeting.

73's
Tom WA1MBA



[MW] Invitation to Ham Wedding

Together with their families
Michele Ann Bergh, W1MKY
and Dale Paul Clement, AF1T
request the honor of your presence
at their marriage Saturday the twenty fifth of April
two thousand and nine at ten O'clock in the
morning St. Theresa Church 18 Old West
Hopkinton Road Henniker, New Hampshire

ICE STORM DAMAGE W1ZC

My VHF tower (Rohn 25) has been up for 25 years with no major problems. Appears two sets of guys were hit by large falling Pine limbs and pulled out one of the anchors! Hard to believe. One saving grace is that it appears none of my large hardline cables were damaged or kinked!

Dick, W1ZC



35th EASTERN VHF/UHF CONFERENCE:
APRIL 17-19, 2009
CROWNE PLAZA HOTEL (860)-741-2211
1 BRIGHT MEADOW BLVD. (OFF RT.5)
ENFIELD, CT 06082

The aim of the Conference is to share with our fellow VHFer's and above technical achievements in the field of communication and experimentation. You are all invited to participate by presenting a technical paper or submitting one for publication in the Conference Proceedings CD. Just your attendance is also welcome and we have a full program scheduled once again this year. If you are interested in presenting a paper at the conference or submitting one for the Proceedings please contact: Bruce Wood, N2LIV at N2LIV@ARRL.NET For the technical presentations, PowerPoint presentations are preferred, but not required. The conference will provide an LCD projector, screen and wireless microphone for use by its participants. If your presentation requires a different format such as a slide projector, please contact me prior to the conference and I will arrange for it. A Conference Proceedings will be published on CD. You do not need to be a speaker to have your material included in the proceedings, just interested in sharing with your fellow radio enthusiasts, so please send it along by MARCH 15, 2009. In addition to our technical presentations and world famous Bandsessions we'll have a new LAB Session with Noise Figure, Gain and Power Measurements and a Manufacturers Demo area which will be open aturday afternoon. We encourage you to bring equipment to test. We'll also have Greg Bonaguide, WA1VUG of Rohde & Schwarz America to manage the preamp noise figure and gain measurement Lab Session (0MHz-50GHz), and Mark Casey, K1MAP and Art Needham W1TDS to head up the Sunday morning flea market. Art Holmes W1RZF and Michele Bergh W1MKY will head the Prize Donations. This years' VHF-SHF Trivia Quiz will be hosted by Dale Clement, AF1T. The Proceedings CD with the event schedule and many interesting articles is included with your conference registration fee and will be presented to you when you arrive. Hope to see you soon!

73,

Conference Chairman and Proceedings Editor:

Bruce Wood, N2LIV

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Nesconset, N.Y. 11767-1711

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516-928-0698 Ext 210 Work

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35th EASTERN VHF/UHF CONFERENCE:
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CROWNE PLAZA HOTEL (860)-741-2211
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ENFIELD, CT 06082



4/17/09 FRIDAY LODGING

6:00pm 'til HOSPITALITY ROOM Socializing, Photo displays

Snacks, Refreshments and More.

4/18/09 SATURDAY REGISTRATION, FORMAL TALKS, BANDESSIONS, LABORATORY TEST SESSION, EQUIPMENT VENDORS & MUCH, MUCH MORE.

7:30am REGISTRATION BEGINS

8:30am TALKS BEGIN We have the following set up:

8:45 am ANNOUNCEMENT more to come soon

9:00am *Dale Clement, AF1T - Basic Antenna Theory*

9:15am Someone Goode W1 6,2 & 222 BANDESSION,

10:00am *Paul Wade, W1GHZ, author of QST MicroWavelengths column - WaveGuide Filters*

10:00am Ron Klimas WZ1V 432, 903 & 1296 BANDESSION,

10:45am AUCTION/BREAK,

11:00am *Brian Skutt, ND3F - Backpack Rover - Updated*

11:00am Someone Goode W1 2304 & up BANDESSION,

12:00pm LUNCH (on your own)

1:00pm AUCTION,

1:15pm *Paul Drexler W2PED - 24 GHz Updates*

2:00pm *Phil Theis, K3TUF - Digital Station Enhancements*

2:00 - 5pm *Test Lab to 50 GHz - Greg Bonaguide, WA1VUG Rohde & Schwarz America*

3:00pm *Ken Schofield, W1RIL - 60 Years of Building*

4:00pm BREAK

4:30pm *NEWS MEETING - N1JEZ*

7:00pm BANQUET (7 PM - 8:30 PM)

8:20pm Tom Kirby Award Presentation

8:30pm VHF - MICROWAVE TRIVIA QUIZ, Dale Clement AF1T

9:00pm DOOR PRIZE EXTRAVAGANZA, Art Holmes W1RZF and Michele Bergh W1MKY

4/19/09 SUNDAY

8:00am-11am VHF-SHF SWAPnSELL - Mark Casey - K1MAP

(bring your VHF-SHF goodies and lots of money)

DIRECTIONS & RESEVATIONS

FROM SPRINGFIELD, I-91 TO EXIT 49, LEFT OFF RAMP, TAKE 2ND RIGHT.

FROM HARTFORD, I-91 TO EXIT 49. RIGHT OFF RAMP, TAKE FIRST RIGHT

EACH REGULAR REGISTRANT RECEIVES A COPY OF THE PROCEEDINGS ON CD AND IS ELIGIBLE FOR PRIZE DRAWINGS.

OVERNIGHT RATES \$99, MENTION NEWS GROUP BY MARCH 17, 2009

CALL (860) 741-2211 for CROWNE PLAZA HOTEL IN-HOUSE RESERVATIONS

A x4 Subharmonic Mixer for 24 GHz

Part III

Paul Drexler, W2PED

In this final installment, additional design details are given and some prototype results are presented.

A WAVEGUIDE TO MICROSTRIP TRANSITION

Since the mixer is designed in microstrip, the easiest way to couple RF energy into the mixer would use a high frequency SMA connector. Since most amateur systems however, utilize waveguide, some thought was given to providing a waveguide interface at the mixer RF input. This is normally accomplished using a waveguide to coax transition by soldering a small diameter pin to the microstrip, which in turn acts as a waveguide probe placed into guide with a waveguide backshort roughly $1/4$ guide wavelength away from the probe. Paul Wade W1GHz recently presented the design of this type of coax to waveguide transition in a QEX article¹.

The author has made his own WG to coax transitions and learned quite quickly that the length of the probe can be *very* tricky to get just right! The concern was that if a small wire is used as a probe, the preparation and placement of the wire probe might result in less than optimal performance if building more than one or two mixers. For this reason the author chose a different approach to this aspect of the problem. Instead, a direct microstrip to waveguide transition was designed where the microstrip itself becomes the probe for the transition. The design is illustrated in the figure below. The left side represents the 50ohm microstrip line while the rectangular block to the right represents a WR42 waveguide. The microstrip probe is widened in order to improve the impedance match over a relatively broad frequency range centered around 24 GHz. Note that the board itself is inserted into the guide. What's not shown directly is that the groundplane of the PC board is removed to allow the fields to pass through the board's dielectric.

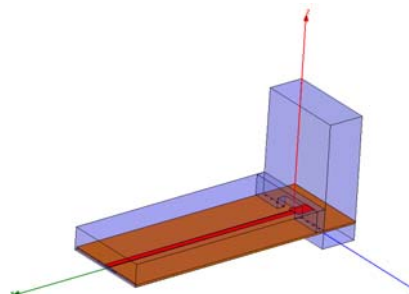


Figure 13 – A Microstrip to Waveguide Transition using Microstrip Probe

The above design was modeled using Ansoft HFSS, a full-wave EM simulator useful for analyzing 3D high frequency structures. The model predicts less than a 0.3 dB insertion loss and a very good return loss for this design.

ASSEMBLING THE MIXER

A machined aluminum housing was designed to house the mixer assembly including the waveguide to microstrip transition; a WR-42 waveguide interface for the RF port is built directly into the mixer housing. The diodes are not shown in this conceptual drawing but are placed near the center portion of the microstrip transmission line. The LO input is the SMA connector at the lower edge and the connector at the right side is for the IF. The overall mixer measures approximately 1.5 x 2 inches. The board is attached to the housing using a conductive epoxy.

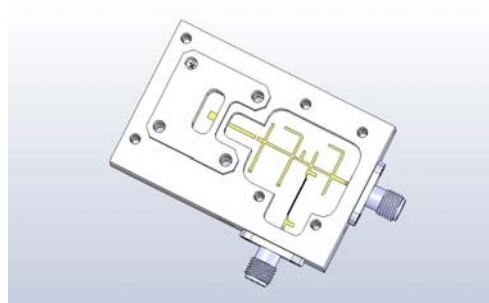


Figure 14 – Mixer Assembly

MEASURED RESULTS of PROTOTYPE SUBHARMONIC MIXER

The mixer was first measured as a downconverter with a 24.192 GHz input of -20 dBm and a $+10$ dBm LO. The resulting 144 MHz IF signal is measured at -29.5 dBm. This translates to a measured conversion loss of 9.5 dB. When varying the RF input signal, the mixer response is essentially flat to within 1 dB over an RF bandwidth of ~ 500 MHz. The design works equally well at the 24.048 GHz amateur band used in Europe and elsewhere.

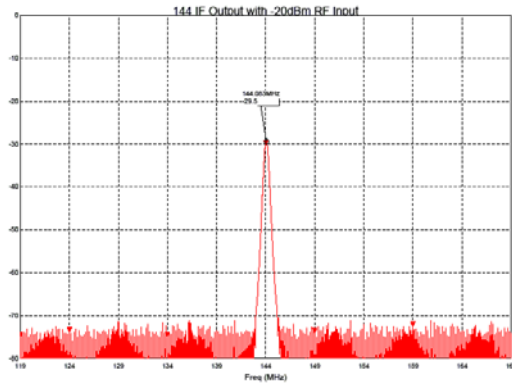


Figure 15 – Prototype Mixer Measured Results as a Receiver Mixer

Next, the prototype was measured as a transmit mixer with an output at 24.192 GHz. The LO level is $+10$ dBm and the IF drive level was set at -10 dBm. While slightly greater output could be attained by driving the mixer harder, an input of -10 dBm represents the highest drive level without driving the mixer into compression. Note that as a transmit mixer, the conversion loss is again 9.5 dB. The measurement was made over a 100 MHz output bandwidth, and no close-in spurious signals were detected.

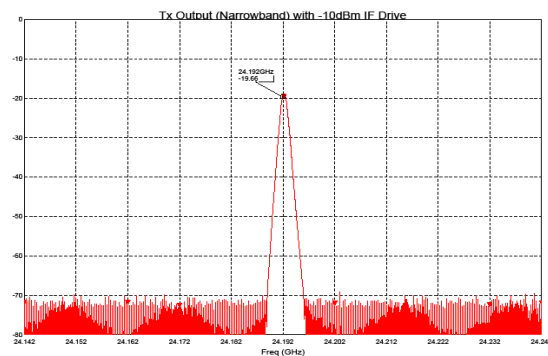


Figure 16 – Transmit Mode Results for Prototype Mixer (narrowband)

Finally, the transmit bandwidth was widened in order to measure the rejection of the close-in $4 \times$ LO signal. Results are shown in Figure 17 below.

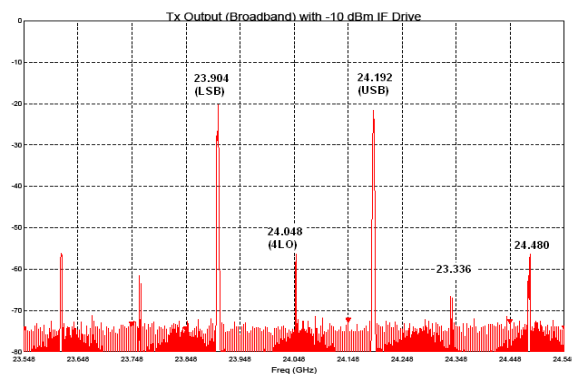


Figure 17 – Transmit Mode Results for Prototype Mixer (broadband)

The above broadband spectrum analyzer measurement was made over a 1 GHz bandwidth, and there are a number of undesired mixer signals, as expected. The desired RF signal at 24192 MHz is the USB mixing product and is seen at one and a half divisions to the right of center. The undesired LSB signal at 23.904 GHz is equal in amplitude to the desired RF signal. There are several additional mixing products every 144 MHz above our desired RF signal; however they are more than 35 dB below the desired. A surprising result can be viewed in this data. **Note that the 4LO signal (at the center) is more than 35 dB below the desired 24.192 GHz signal.** In most fundamental mode mixers that the author has measured, the LO signal is *at the same level* as the desired USB RF signal. While RF filtering is still obviously required, the x4 subharmonic mixer appears to require less filtering than a standard type mixer.

Lastly, one comment on the mixer's conversion loss is in order. Recall that the computer simulation of Figure 12 shows a predicted conversion loss of ~8 dB. The conversion loss figures on the prototype measure ~9.5 dB so there is a difference noted. Some of this can be attributed to etching tolerances, etc but there are two factors that were unaccounted for in the model prediction: the loss of the WG transition and the loss of the additional length of input microstrip between the WG transition and the actual mixer input. With these factors in mind, the predicted conversion loss is just shy of 9 dB. A measured conversion loss of 9.5 dB agrees very well with the predicted value.



Figure 18 – Prototype Subharmonic Mixer

A photo of the prototype mixer assembly is shown above. The WR42 waveguide RF port can be seen on the left, the IF connector at the right side, and the LO input connector at the lower portion.

FUTURE EFFORTS

The prototype subharmonic mixer was designed using the 'primo' Teflon-based Rogers 5880 board material. The fabrication costs using this material are somewhat cost prohibitive for amateur radio applications. In an effort to get the costs down to more attractive levels, the author has redesigned the mixer to be fabricated on a lower cost Rogers 4350 type material. While the lower cost 4350 material has a disadvantage of higher dielectric losses, the performance tradeoff is felt to be minimal. The author is also starting to take a look at this mixer topology for use on 47 GHz.

CONCLUSION

A x4 subharmonic mixer for 24 GHz has been designed and demonstrated with favorable results. It is my hope that this hardware will make it somewhat easier for amateurs to enjoy the 24 GHz band.

The author wishes to thank Al Ward W5LUA, Barry Malowanchuk VE4MA, and Brian Justin WA1ZMS for their thoughtful suggestions and inputs to this paper.

¹ P. Wade W1GHZ, "Rectangular Waveguide to Coax Transition Design," QEX Nov/Dec 2006

S. Mass, Microwave Mixers, Artech House Publishers 1993



MIO GPS

At lunch before our last club meeting, Don W1FKF showed me his Mio GPS which he unlocked it's underlying Windows CE 5.0 Operating System. How cool is that, now it doubles as a PDA. With a 400 MHz ARM processor and 60 MB of RAM, it's actually a decent shirt pocket Windows computer! So on his suggestion I bought a Mio C320 4.3 inch widescreen GPS on Amazon.com for \$95. I chose to use the "MioPocket"unlock, which you'll find published in the forums at http://www.gpspassion.com/FORUMSEN/forum.asp?FORUM_ID=37 There's also a "MioPocket Lite" unlock with less "stuff". If you install it on a SD memory card, it will leave the GPS completely unmodified, meaning you'll have both PDA and GPS nav capability while the SD card's plugged in - unplug the card and it's the stock GPS. Figure 1 shows one of several desktops within MioPocket. Some of the "stuff" included are Microsoft Office viewers, appointment calendars, Opera and IE web browsers, and nPOPuk email software. So I ordered a Ambeon WL54C-SD 802.11g SDIO wifi card for \$45. Another that works is a Spectec SDW-821. I had to move many of the maps onto an SD memory card to make room for MioPocket to run on the GPS's internal 1 GB flash. So when I'm web surfing, only the eastern US maps are there. When I'm on the road I pop in my SD card with all the maps. I was even able to add Canada, and Jerry's skin for MioMap which adds more features, like displaying altitude in feet. It turned out some registry entries for the Ambeon wifi card I bought were missing so some reverse engineering was needed. But I can connect to both WEP and WPA-PSK as well as unsecured wireless routers now. I've successfully added some Windows CE software applications. There's already a decent video player, but I wanted a better MP3 player than the included Windows Media Player CE. So I added Naviplayer from <http://www.freewebs.com/xytler91> As Don mentioned at lunch, Ham programs are sparse for Windows CE. But I did find and add Pocket Locator, a small and free tool for calculating the grid locator from geographic coordinates and vice versa. Use the Win CE cab file to install it.

Tried PeekPocket and it works. It's a small utility that scans for wireless AP's and shows signal strength, encryption type, SSid, MAC address. etc. <http://dzolee.blogspot.com/search/label/PeekPocket> Another interesting software can be found at <http://www.pocketdos.com/> which is a DOS environment to access many DOS applications on your pocket computer. In conclusion, this is a lot of fun for a small price. Highly recommended for aspiring geeks and Dilbert wanna-be's! If there's enough interest I add a page for this on <http://www.newsvhf.com/miogps.html>.

-73, Ron WZ1V

For Sale

Name: Robin Midgett
Phone Number: 615-301-1642
Callsign: K4IDC
Category: AMPVHF
Heading: FS: AM-6154/AM-6455 Amplifiers
Ad Message:

I have for sale several clean AM6154/55 amplifiers. The chassis are tested for voltages, blower, and function. Cavities are silver cleaned, ready for installation of your input circuit. {original input circuits, power sensor and LP filter removed}. They are in very nice shape with good sockets and brackets, no corrosion or overheating. The cavities are without tubes. 4CX400A or the Russian GS-36B tubes will fit nicely in these amplifiers, and provide reliable power. The 4CX250 will also work with anode adaptors; I have a few and can make more. I have a lot of spare parts (cavities, time delay relays, various mech. parts, and a number of extra chassis w/o modules) & spare modules. I'm asking \$225.00 each for the amplifiers, and I will crate & ship at the buyers expense. UPS & FedEx (probably DHL also) will take the package with surcharges; figure on the package being 20" x 10" x 24", and ~100 lbs. from 37122.

Our club has won the Medium Category in club competition for the September 2008 VHF QSO Party with over 2 Million points! In addition to having the highest score, we also had the most entrants. Many thanks to all our contributing members. Our largest score contributors were from K1WHS multi, and Jeff K1TEO who also authored the results article in QST.

-73, Ron WZ1V

13th Annual SVHFS Conference

April 24 & 25, 2009

http://www.svhfs.org/conf_2009.htm

Charlotte NC!!

Doubletree Hotel Charlotte Airport
2600 Yorkmont Road
Charlotte NC 28208

Direct numbers to hotel 704-357-9100 voice
link to their website --> [Doubletree Hotel Charlotte Airport Website](#)

Microwave Update

Will be returning to the Dallas area for 2009 and will be sponsored by the North Texas Microwave Society. Conference dates are October 23rd through October 25th and the conference will be held at the recently remodeled:

The Westin, Dallas Fort Worth Airport
4545 West John Carpenter Freeway
Irving, Tx 75063

This is the same hotel where the 2004 Microwave Update was held. Thanks to Al Ward, W5LUA, and Bob Gormley, WA5YWC, who negotiated an excellent conference rate of \$89 per night (plus applicable taxes). Reservation details will be forthcoming and a special website will be setup to handle reservations (and an 800 number for those that do not have access to the web). As in previous years, the conference will start with a surplus tour on Thursday to several local surplus and radio spots including Fry's Electronics, Tanners (family run electronics and surplus business), Harbor Freight, CDC (surplus tools), Texas Towers and perhaps others. The technical presentations will be held throughout the day on both Friday and Saturday. Along with the traditional noise figure measurements we are planning antenna gain measurements in the parking lot and a "rover row" for microwave rovers to park and show off their rigs. Measurements on equipment will be made through 47GHz (or higher with advance notice). As is always the case at Microwave Update, a gold mine of prizes will be handed out at the banquet on Saturday night --- if you would like to donate prizes, please contact our prize chair, Eric Silverthorn, NM5M. Papers will be accepted in any area of microwave operating, equipment construction, measurement, roving, theory, etc. Kent, WA5VJB, will be compiling the proceedings. Please contact Kent if you have a paper for the proceedings. If you have a topic you would like to present at MUD, please contact Al Ward, W5LUA, who will be organizing the talks.

We have several other activities in the planning stages including a ladies program so there will be more information on this as our plans firm up. Microwave Update is the only conference in the U.S. devoted to the amateur microwave bands that start at 900MHz. Attendees include the "who's who" of microwave operating in the U.S. as well as representatives from around the world including Europe, Japan and Australia. I'm looking forward to seeing everyone again in Dallas for some great technical discussions and friendship. Please forward this message to others you feel are interested!

73,
Steve, N5AC
MUD 2009 Conference Chair

Bob Gormley, WA5YWC, MUD 2009 Director
Al Ward, W5LUA, MUD 2009 Director and NTMS Vice
President Craig Young, KA5BOU, MUD 2009 Director and
NTMS President

Mid Atlantic States VHF Conference

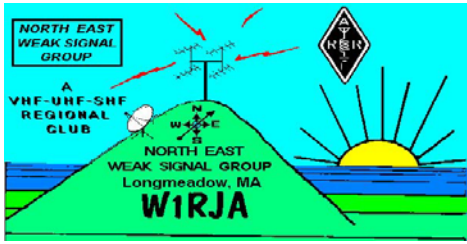
Saturday, September 26, 2009
East Norriton, PA

An informative and fun filled day of presentations, eyeball
QSOs with VHF gurus and beginners,
auctions of good "stuff" and a great door-prize table.

HAMARAMA

Sunday, September 27, 2009

<http://www.packratvhf.com/latest.htm>



N.E.W.S. Group Membership Application

Name: _____ Callsign: _____ Grid: _____

Street: _____

City: _____ State: _____ Zip: _____

Phone (home) _____ - _____ - _____ Optional (work) _____ - _____ - _____

Email _____

ARRL member? Y N Electronic Newsletter Delivery? Y N

Operational Bands (circle) 50 MHz 144 MHz 222 MHz 432 MHz 903 MHz

1.2 GHz 2.3 GHz 3.4 GHz 5.6 GHz 10 GHz 24 GHz 47 GHz

76 GHz Light Other (list)

The North East Weak Signal [N.E.W.S.]Group is being established to form a comradely among fellow VHF-UHF-SHF enthusiasts, and support a convenient means to exchange technical information. We currently have 6 meetings per year, held at a centrally located facility, and provide a "NEWSLETTER" that is distributed 2 weeks prior to each meeting. Any contributions to this publication are appreciated and can be sent to: Don Twombly, W 1FKF 23 Maura Dr. Woburn, MA 01801 Email: donw1fkf-news (at) yahoo (dot) com. Dues are \$15/year. Remember, this group is formed by VHF'ers for VHF'ers.

Mail to:

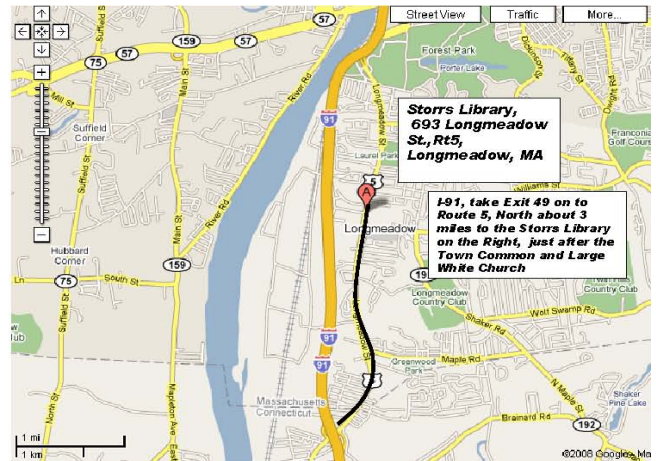
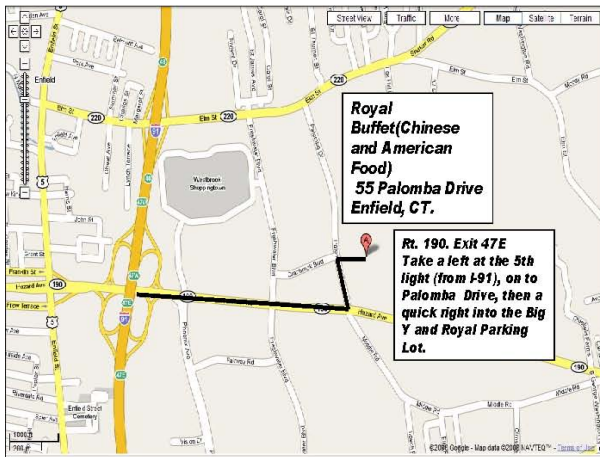
North East Weak Signal Group

c/o WA1MBA Tom Williams PO Box 28

Shutesbury, MA 01072

Email: tomw (at) wa1mba (dot) org

ARRL Affiliated Club



Board Meeting and Lunch Meeting Location



SSB Electronic USA manufactures and distributes HF, VHF, UHF and SHF equipment covering 10 MHz to 47 GHz

124 Cherrywood Drive, Mountaintop, PA 18707 USA
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Next Meeting March 7, 2009

K1WHS at N3NGE for the January VHF test
WZ1V hacking the Mio GPS units
N1JEZ on 122 GHz - W1RIL 122 GHz source

“Bring your Show and Tell”

**1 PM at the Storrs Library
693 Longmeadow Street, RT 5
Longmeadow, MA**

**N.E.W.S Hats will be available at the next meeting!
\$12 each - cash (bring some singles please) or check.
See Mark, KA1OJ**

Don't Forget
**The North East Weak Signal Group
2 Meter VHF and Above Net
Every Thursday at 8:30 PM Local 144.250
W1COT, WZ1V or K1PXE Net Control**

North East Weak Signal Group

c/o WA1MBA Tom Williams PO Box 28 Shutesbury, MA 01072



Check your membership
expiration date on your mailing label!