NEXT MEETING: March 21st, 2015

Meeting Program

Getting Ready for the Eastern VHF-UHF-MW Conference In April
Trends in Modern Power Amplifier Design – Steve W1SMS

BOARD MEETING - 11:15 AM at Lulu’s, 151 Hazard Ave. Enfield, CT
phone: (860) 763-2377
I-91 exit 47 Rt.190E. 1 mile on left.

GENERAL MEETING - STORRS LIBRARY - from 1 PM to approximately 3:45 PM.
693 Longmeadow St, Longmeadow, MA 01 http://www.luluspizzeria.com/106
http://longmeadowlibrary.wordpress.com/

DON’T FORGET
The North East Weak Signal Group
2 Meter VHF and Above Net
Every Thursday at 8:30 PM local 144.250 MHz.
W1COT, WZ1V or K1PXE Net Control

MEMBERSHIP in the N.E.W.S Group is $15 per year. Apply to Tom Williams, WA1MBA. Email
tomw(at)wa1mba.org You may download an application from our web page:
http://www.newsvhf.com/

The N.E.W.S. LETTER is the publication of the North East Weak Signal Group. Articles may be
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Filecco W1WSO, via email to w1wso.fn31@gmail.com.
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ACTIVE ON: 6, 2, 432, 1296
President's Report

March Meeting Topics:
Getting Ready for the Eastern VHF-UHF-MW Conference In April
Presentation Topic – Trends in Modern Power Amplifier Design
By Steve Simons – W1SMS of Lunar Link International

Last year at about this time I wrote, “With all the snow we’ve been getting during this ‘old fashioned winter’ the middle of April seems like a long ways off, but it will be here before we know it!” Who would have thought it would be even worse in 2015 especially in eastern New England! Wow, I hope the members in eastern Massachusetts are doing alright. Hopefully we will have better weather by the time the meeting rolls around on March 21. Not soon enough for us who would like to get outside to work on some antenna projects, but we live in the northeast and the weather will be what it will be. I hope the several really HEAVY snow storms of 2015 didn’t bring down your antennas or collapse any of your roofs!

The conference committee has been hard at work getting ready for the April conference. We should recognize and thank the committee members: K1MAP, N1JFU, W1GHZ and WZ1V for their hard work on the conference. If you can help out, you can contact Mark Casey, one of the 2013 VHF Conference Co-Chairs at 413-566-8118 or 413-566-2445. I’m sure he can suggest something for you to do to help out. Paul, W1GHZ is always looking for papers and presentation topics. Please call Paul if you can think of something interesting to talk about.

Like the last 3 years, in early February, I attended the Orlando “Hamcation” hamfest in Florida. This is usually a nice break from the cold winter weather in the northeast. Last year I had to leave early to avoid a serious ice storm in southern Pennsylvania but this year I had to return a day early to avoid an ice storm in North Carolina. Sometimes we get hit coming and/or going! Fortunately the beautiful sunny weather we all think of as normal in Florida in February was on hand, with highs in the mid 60s and lows in the 40s. A wonderful respite from the northeast WX.

At least 3 of us from NEWS made it to Hamcation this year. I bumped into Mark – K1MAP, and Paul – W1GHz, and a number of the VHF ops from the Florida Weak Signal Society including Steve and Sandra from DownEast. They say: Hi! The new ARRL VHF contest rules were discussed at the FLWSS meeting with most people liking the changes. We will see how the work out during the “Big” contest in June. FLWSS appears to be quite active and growing with goals similar to those of NEWS. You can check out their web site at http://flwss.net/.

I did manage to pick up some very nice “fleas” in the flea market including some dual contact high-isolation high-power type N relays good to 1.5 GHz and some more very inexpensive 6-way SMA coax switches that turn out to perform very well up through 6 GHz. The high isolation relays were grubby on the outside but looked great inside in the contact “channel” where it counts. At $15 each, what’s not to like! Only downside was the dual coils draw more than the typical operating current. A thorough outside cleaning will make them look great all around!

Of course our primary topic during the March meeting will be discussing our conference coming up in April. In addition, I have asked Steve Simons – W1SMS now part of Lunar Link International to discuss the evolution of high power amplifiers. We have all seen more and more very high power VHF amplifiers used in recent years. Steve will help us understand the advantages and disadvantages of the new technology and what we can expect in the future.

Remember, please E-mail me about specific topics or speakers you would like to hear give a presentation at some upcoming NEWS meeting… Even better, if you have a topic YOU would like to speak about, please let me know. More ideas are always better than not enough. Please keep them coming. My E-mail is: rlfbauer@gmail.com Thanks in advance for your help.
Secretary's Report
NEWS Meeting 3 January 2015
at Storrs Library, Longmeadow, MA

Called to Order by President, WA2AAU, at 1312

TREASURERS REPORT
104 paid members plus 13 permanent
Highest membership in 10 years
Balance $5306
Predicted excess for 2015 $2100

OLD BUSINESS
W1GHZ - VHF Contest rules comments
from last meeting forwarded to Committee

NEW BUSINESS
K1FO.com is up for renewal -
Does club have a use?
~$15/year

ANNOUNCEMENTS
- Conference needs someone to ship prizes to.
- Conference Workshop suggested on Antenna modeling
WA2AAU can help

SHORT PRESENTATIONS by:
W1GHZ
W1FKF
KI2L
WA2AAU
Adjourned 1433

Treasurer's Report
The treasury and membership are at healthy levels for
this time of year. Lyn Glagowski, WB1CCL is in
process of taking over the management of the NEWS
website, and I have been communicating with her to
share the membership database. We are trying to fig-
ure out if there is a way to get the website to be more
up-to-date with minimum effort. Whether or not we
succeed doing that, I intend to reduce work and delays
in getting information from the database to those who
need it. I still intend to retire as the treasurer at the an-
nual club meeting in July.

I will be watching the Red Sox in Spring Training at
Ft. Myers Florida during the March NEWS meeting. I
wish you great weather. Heaven knows, by then it sure
would be nice to put these dreadfully cold days and
deep snow behind us!

Tom WA1MBA

FOR SALE:
TS-790A: 144/432/1296 module, 45/25/10W,
CW/SSB/FM. Meant for satellite work, but great for
contesting: listen on one band and transmit on another
at the same time. Original box and all accessories.
Must sell. $800

FT-817A: With 500 Hz CW filter; original box and all
accessories. Rarely used. $600

Six-meter 600W amplifier: Converted Henry 1KD.
Probably has power supply problem. Have extra 3-
500z. Will to sell all just for the two tubes. $250

Make offers. Can deliver to the April conference.

Emil W3EP  860-642-7271   W3EP@ARRL.net
**2015 Calendar**

March 21, 1PM - 4PM - N.E.W.S. Group Meeting
April 13, 1900-2300 Local - 144 MHz Spring Sprint
April 17-19 - Eastern VHF-UHF Conference
April 21, 1900-2300 Local - 222 MHz Spring Sprint
April 22 - Lyrids meteor shower
April 25-26 - Southeastern VHF Society Conference
April 29, 1900-2300 Local - 432 MHz Spring Sprint
May 1-2 - New England Amateur Radio Festival - Deerfield, NH
May 2, 0800-1300 Local - Microwave Spring Sprint
May 9-10, 2300-0300Z - 50 MHz Spring Sprint
May 15-17 - Dayton Hamfest
June 13-15, 1800Z-0300Z - ARRL June VHF QSO Party
July 11, 11AM - 4PM - N.E.W.S. Group Picnic
July 18-19, 1800Z - 2100Z - CQ Worldwide VHF Contest
August 1-2, 1800Z - 1800Z - ARRL UHF Contest
August 12-13 - Perseids meteor shower
August 15-16, 6AM - 11:59:59PM - ARRL 10-GHz & up Cumulative Contest
September 5 (tentative), 1PM - 4PM - N.E.W.S. Group Meeting
September 12-14, 1800Z-0300Z - ARRL September VHF QSO Party
September 19-20, 6AM - 11:59:59PM - ARRL 10-GHz & up Cumulative Contest
September 21, 1900-2300 Local - 144 MHz Fall Sprint
September 29, 1900-2300 Local - 222 MHz Fall Sprint
October 2-4 - Mid-Atlantic States VHF Conference
October 7, 1900-2300 Local - 432 MHz Fall Sprint
October 9-10 - New England Amateur Radio Festival - Deerfield, NH
October 11, 8AM-2PM - Nutmeg Hamfest & ARRL CT State Convention
October 17, 0600-1300 Local - Microwave Fall Sprint
November 17 - Leonids meteor shower
November 21, 1PM - 4PM - N.E.W.S. Group Meeting
December 14 - Geminids meteor shower

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**41st ANNUAL EASTERN VHF/UHF/MICROWAVE CONFERENCE**

Fri./Sat./Sun. April 17-18-19 2015
BAYMONT INN & SUITES,
20 Taylor St., Manchester, CT 06042
(just a few miles northeast of Hartford, CT off I-84, at Exit 63)

Registration $30 (includes Super Hospitality Room, & Saturday Lunch)
Registration $25 before April 1 makes the Saturday Lunch Free.

Banquet $28. Must order banquet before April 10.

Our Registration web page at
http://www.newsvhf.com/vhfconf.html
is on-line NOW!

The Discounted Room Rate is in effect again this year!
$69 for 2 double beds or 1 king, $109 for a suite,
You CAN Reserve Now
Call the Baymont Inn: 860-643-5645
Tell them "VHF Conference" to get the discounted rate
Discount is available Thurs, Fri, Sat, & Sun nights
There are a limited amount of rooms available for the discounted rate which
expires March 17.

******************************************************************************

Speakers and Papers needed
details at http://www.newsvhf.com/vhfconf.html

Talks and papers, both long and short, are needed.
Please tell us about what you have been working on.
Operating, contesting, construction, homebrewing, mi-
crowaves, whatever.
Please let Paul Wade know if you are considering something, with a deadline of 18 March.
Please contact Paul Wade, W1GHZ, Conference Co-Chairman
w1ghz@arrl.net
*******************************************
Check out this link to see who is coming!
http://www.newsvhf.com/whoscoming.html
Check: www.newsvhf.com for updates

SCHEDULE:

FRIDAY----7am--FREE Continental BREAKFAST for those staying at the Baymont Hotel
Noon – Lunch-- on your own
2:30pm-5pm – WORKSHOP Session
Antenna Modeling - WA2AAU
Making the VHF and up Contest changes work to our activity advantage - K3TUF
6pm to 10pm-- SUPER HOSPITALITY ROOM & INDOOR SWAP & VENDORS

SATURDAY----7am--FREE Continental BREAKFAST for those staying at the Baymont Hotel
8am to 5pm -- Presentations 8am to 5pm -- Indoor Vendors
Speaker List to Date--MORE to come!:
N6NB Working Hawaii on VHF, 1957-2014
N6NB VHF Adventures Coast to Coast, a 58-year odyssey
N1ZN Parabolic Dish Manufacture
K3TUF A Radio Server for VHF+ Contesting and Weak Signal Work
N1JEZ 241 GHz

W1GHZ 6-Meter stuff
K3TUF VHF+ Contesting; it's a whole new ballgame
KI2L Experiences building the W6PQL 220 and 1.2GHz SSPAs
VE2DFO 500 Watts on 1296 Solid-State
W3SZ OpenHPSDR Applied to VHF/UHF/Microwave Operations
and The Great 2015 Crash of the Internet Aircraft Servers
Noon*****NEW*****
**PIZZA & SUBS LUNCH INCLUDED with registration!
6pm -- Pre-Banquet Hospitality
7pm -- BANQUET BUFFET, Tom Kirby Award Presentation,
Banquet Speaker, Trivia Quiz, Door Prizes

SUNDAY--7am--FREE Continental BREAKFAST for those staying at the Baymont Hotel
8-11am -- SWAP/TAILGATE in Parking Lot

Sponsored by: North East Weak Signal Group (NEWS)

QUESTIONS?
Please Contact one of the 3 Conference Co-Chairmen:
Paul, W1GHZ, (presentations, proceedings)
w1ghz@arrl.net
Ron, WZ1V, (registration, website, test session)
wz1v@arrl.net
Mark K1MAP, (hospitality, hotel, swaps/vendors)
map1@mapinternet.com
413-222-9292
Simple Frequency Doublers with High Performance
Paul Wade W1GHZ ©2014
w1ghz@arrl.net

Doubler: 5 MHz to 10 MHz
The recent availability of Lucent/Symmetricom GPS units with good 5 MHz oscillators has sparked a need for a frequency multiplier to provide a 10 MHz frequency standard. Mike, N1JEZ, located an article by K6IQL describing a frequency multiplier for this application. However, I thought the circuit seemed a bit complex for a simple function.

The K6IQL circuit does frequency multiplication by mixing two copies of the 5 MHz signal in a mixer. Driving the mixer with two signals in quadrature eliminates a DC term and significantly reduces the fundamental frequency output and the undesired harmonics. K6IQL used a power splitter to with one leg driving a 5 MHz phase shift network to generate the quadrature signals.

I recalled seeing hybrid transformers which provide quadrature signals over a wider bandwidth. A quick search of the Minicircuits website found several candidates, but they cost more than a mixer or a power splitter, which is basically a small RF transformer just like the ones in a mixer. Then it occurred to me that it should be possible to replace the transformer in a mixer with a hybrid transformer and make a frequency doubler. Has Minicircuits already done this? Another search found frequency doublers with low conversion loss and good suppression of fundamental frequency and undesired harmonics. Even better, these were priced in the same ballpark as a mixer.

I ordered some AMK-2-13+ frequency multipliers, specified for 10 to 1000 MHz input, because I was thinking 10 MHz rather than 5 MHz. Then I did a simple PC board layout for the multiplier with an MMIC amplifier. A photo of the assembled prototype is shown in Figure 1 and the schematic diagram is shown in Figure 2.

![Figure 1 – Simple Frequency Doubler 5 MHz to 10 MHz](image)

I first tested the prototype unit with the frequency multiplier alone, then added an MAV-11 MMIC for the amplifier connected directly to the mixer through a blocking capacitor, without the optional attenuator or filter. It works just fine at 5 MHz – test results are shown in Figure 3. Conversion loss is about 12 dB, and both the 5 MHz fundamental and the 15 MHz third harmonic are down more than 40 dB. The 20 MHz fourth harmonic is only about 20 dB down, but is far enough away to be easily filtered out if necessary.

![Figure 2 – Simple Frequency Doubler Schematic](image)

<table>
<thead>
<tr>
<th>Frequency Doubler -- 5 to 10 MHz</th>
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</thead>
<tbody>
<tr>
<td><strong>5 MHz</strong></td>
</tr>
<tr>
<td><strong>Power in -&gt;</strong></td>
</tr>
<tr>
<td><strong>Output</strong></td>
</tr>
<tr>
<td>5 MHz</td>
</tr>
<tr>
<td>10 MHz</td>
</tr>
<tr>
<td>15 MHz</td>
</tr>
<tr>
<td>20 MHz</td>
</tr>
<tr>
<td>25 MHz</td>
</tr>
</tbody>
</table>

![Figure 3 – Frequency Doubler 5 to 10 MHz Test Data without Low-Pass Filter](image)

I then added the simple low-pass filter shown in Figure 2, with the results shown in Figure 4. The 20 MHz fourth harmonic is significantly reduced, so that all undesired frequencies are now at least 40 dB down. The low-pass filter is also shown in the Figure 1 photo.
Figure 4 - Frequency Doubler 5 to 10 MHz Test Data with Low-Pass Filter

Since these are wideband parts, I tried the prototype at a higher frequency, with an 80 MHz input frequency. Performance was similar, but with about 10 dB less suppression of fundamental and third harmonic. This is still an excellent multiplier and I can see some other uses.

Higher Frequency Doubler
Since these Minicircuits multipliers are wideband parts, rated up to 1000 MHz, I tried the prototype at a higher frequency, with an 80 MHz input frequency. Performance was similar, but with about 10 dB less suppression of fundamental and third harmonic, as shown in Figure 4. This is still an excellent multiplier and I can see some other uses.

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Power AMK-2-13+ Alone</th>
<th>Power with MAV-11 Amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>-42</td>
<td>-33</td>
</tr>
<tr>
<td>10</td>
<td>-35</td>
<td>-27</td>
</tr>
<tr>
<td>15</td>
<td>-32</td>
<td>-23</td>
</tr>
</tbody>
</table>

Figure 5 - Frequency Doubler 80 to 160 MHz Test Data without Low-Pass Filter

One immediate application is to multiply the output of my 200 MHz locked VCXO to 400 MHz for the LO of a 432 MHz transverter – with an SDR, the IF doesn’t have to be in a ham band. I assembled another PC board, this time with a GVA-84 MMIC amplifier to get a bit more power to drive a high-level mixer. The board is shown in Figure 6, with a jumper wire in place of the low-pass filter. The RF choke, L1, is 150 nH, good for 400 MHz but not 10 MHz. My initial test was with 80 MHz input so I could see the output on a spectrum analyzer with a 350 MHz maximum frequency. Performance in Figure 7 shows higher power output than the unit in Figure 5, but with similar suppression of unwanted frequencies.

Figure 6 – Frequency Doubler for higher frequencies

Higher Frequency Doubler
Since these Minicircuits multipliers are wideband parts, rated up to 1000 MHz, I tried the prototype at a higher frequency, with an 80 MHz input frequency. Performance was similar, but with about 10 dB less suppression of fundamental and third harmonic, as shown in Figure 4. This is still an excellent multiplier and I can see some other uses.

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Power AMK-2-13+ Alone</th>
<th>Power with MAV-11 Amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>-27</td>
<td>-19</td>
</tr>
<tr>
<td>160</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>240</td>
<td>-30</td>
<td>-19</td>
</tr>
<tr>
<td>320</td>
<td>-7</td>
<td>-5</td>
</tr>
</tbody>
</table>

Figure 7 – Performance of Frequency Doubler for higher frequencies, 80 to 160 MHz

At higher frequencies, I was only able to measure total power output, shown in Figure 8, but the power at undesired frequencies should be small. The output power at 400 MHz is excellent. I tried it at higher frequencies as well and found only a small rolloff at 1000 MHz. I pushed it up to 1296 MHz, where the output is a few dB down, but still very usable. To be certain that the output is at 1296 MHz and not just fundamental feedthrough, I put a good interdigital filter on the output – the output power was only a hair lower, so the multiplier is still working fine.

Figure 8 - Performance of Frequency Doubler at higher frequencies
Summary

The performance of this simple frequency doubler is quite impressive, and adequate for many applications with no additional filtering. It is a simpler and much less expensive solution than other frequency multipliers I have used, which usually must be followed by a helical or printed filter to clean up the output. Mini-circuits also offers higher-order multipliers, with some well into the microwave region – further investigation is in order.

References

2. www.minicircuits.com

Central States VHF Conference

The Central States VHF Society is calling for the submission of papers, presentations and posters for the upcoming 49th Annual Central States VHF Society Conference to be held in Denver, Colorado on July 23-26th, 2015. Registration is online now at http://www.csvhfs.org.

Papers, presentations and posters are solicited on both the technical and operational aspects of VHF, UHF and Microwave weak signal amateur radio.

Suggestions are listed below, but are not limited to:

- Propagation (Sporadic E, Meteor Scatter, Troposphere Ducting, etc.)
- Amateur Satellites
- Regulatory Topics
- Antennas including Modeling/Design, Arrays, and Control
- Test Equipment including Homebrew, Using, and making measurements
- Construction of stations equipment, such as Transmitters, Receivers, and Transverters
- Operating including Contesting, Roving, and DXpeditions
- RF power amps including Single and Multi-band Vacuum Tube and solid-state
- Pre-amplifiers (low noise)
- Digital Modes WSJT, JT65, etc.
- Regulatory topics
- EME
- Software-defined Radio (SDR)
- Digital Signal Processing (DSP)

Non-weak signal topics, such as FM, Repeaters, packet radio, etc., are generally not considered acceptable. However, there are always exceptions.

Please contact our Proceedings Chair below if you have any questions about the suitability of a topic.

Strong editorial preference will be given to those papers that are written and formatted specifically for publication, rather than as visual presentation aids.

For more specific information, please see the "Guidance Documents" section on the Conference website at http://www.csvhfs.org.

Our conference Proceedings and Speakers chair is John Maxwell, W0VG and he can be contacted at w0vg@arrl.net or from the convention website!
The North East Weak Signal (N.E.W.S.) Group is being established to form a camaraderie 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: Tom Filecco, W1WSO via email – w1wso@comcast.net. Dues are $15/year. Remember, this group is formed by VHF'ers for VHF'ers.

Mail to:
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c/o WA1MBA Tom Williams PO Box 28
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http://www.lunarlink.com

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EME - Digital - Contesting

W1QJ - W1SMS info@lunarlink.com
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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!