N.E.W.S. LETTER

The Publication of the North East Weak Signal Group

JAN 2005 VOLUME THIRTEEN ISSUE ONE

NEXT MEETING

SATURDAY THE 8TH OF JANUARY
AT THE RADISSON HOTEL IN ENFIELD, CT
W1GHZ AND N1JEZ WILL PRESENT
A POTPOURRI OF SMALL PROJECTS
THERE WILL BE A DUCT TAPE AUCTION

IN THIS ISSUE

DON'T FORGET

THE NORTH EAST WEAK SIGNAL GROUP
2 METER VHF AND ABOVE NET
EVERY THURSDAY NIGHT AT 8:30 p.m. LOCAL
144.250
W1COT, WZ1V, OR K1PXE NET CONTROL

MEMBERSHIP in the N.E.W.S. Group is $15 per year. Apply to Bill Conner K5GMX, K5GMX@arrl.net. You may download an application from our web page http://www.newsvhf.com

PREZ SEZ
DE WA1MBA

Hope everyone had a fun and safe holiday time with family and, of course loads of great ham radio presents! I got my new laptop a couple of months ago in advance of the holidays as my Christmas present - and although it isn't specifically a ham thing, it sure is being used for the hobby.

What's cookin' for the Winter? I trust everyone has planned out their Winter shack work - getting the hill-top equipment back into good working order, starting new projects, and testing the home equipment for the January contest. My new year's resolution is to get the darn 78 GHz radio working in time for the June contest!

As you will read elsewhere, Paul W1GHZ and Mike N1JEZ have put together a set of small projects to talk about at the January 8th meeting. We will have a "duct-tape auction", so bring along that boat anchor and something else of value to auction off together. See you in Enfield in Saturday afternoon the 8th!

73 Tom WA1MBA

SECRETARY'S REPORT OF THE NEWS NOV 13TH MEETING DE W1GHZ

Issues for NEWS meeting:
- K5GMX - suggested that it would be more convenient to have dues for everyone expire at a fixed time
- WZ1V - 1296 beacon - in process
  - 2m beacon - gone, lightning
  - beacons need dedicated team to keep them running
- should members phone numbers be on website?
- incorporation

NEWS Meeting called to order at 1PM by President - Tom Williams, WA1MBA
Old business:
- WZ1V reported on 2m and 1296 beacons - need a dedicated team if they are to be successful
- incorporation of NEWS as a non-profit corporation - no action yet (this might be good for donations, but IRS paperwork is required every year if assets >$25K, less frequent reporting otherwise) - TABLED
- meeting dates chosen for 2005 - 1/8, 3/12, 7/9, 8/27, 11/19

New business:
- 2005 Eastern VHF/UHF Conference: April 8-10 at the Radisson Enfield
- 900MHz bandplan shifted down - K1MAP reported that digital modes are encroaching on 903 MHz, so weak signal may need to move down to 902 MHz. The club could organize an xtal buy to facilitate moving.
- A committee was formed (K1UHF, K1MAP and WA1MBA) to comm talk to ARRL and to other east coast VHF groupas bout moving the calling frequency, and to DEMI about a group crystal purchase.
- A MOTION was made by K1UHF - To support move to 902 MHz. APPROVED unanimously.
- K5GMX is looking to update member database. Expiration dates for dues areconfused, all should start on same date each year.
- A MOTION was made by KB1VC - To make the renewal date for all members the July meeting date (dues $20), with new members joining after January reduced to $10, and all current members extended until July 2005. APPROVED.
- A MOTION was made by KB1VC - to accept logo on NEWSletter as official club logo. APPROVED.
- Report: the WA2UMX beacon is repaired, will be back on the air in December.

Meeting Adjourned 1:57 PM

A Duct tape auction followed.

The speaker was KJ1K on rover evolution
- he has reduced setup time from >1hr to <15min
- started out building rig on-the-spot; now has rover van
- important to field test before contest
- a good logging program for rovers is Roverlog, by Tom Mayo N1MU

JANUARY PROGRAM

The January NEWS meeting has traditionally coincided with the first blizzard of the year. Just in case tradition is broken this year, we have planned a program for the meeting.

We will show and demonstrate a potpourri* of small projects that N1JEZ and I have been working on. These may include:
- ·The voltage standard for the shack, described in this issue.
- ·A low-cost, accurate frequency marker locked to GPS.
- ·Some battery widgets good for portable operation.
- ·A really simple 24 GHz transverter.
- ·An optical spectrometer.

The list may grow or shrink, depending on what works well enough to show in public.

The voltage standard will be operational, so bring your DVM and check its accuracy.

* Potpourri (pronounced poopery) - stuff that smells good to some people, while other think it stinks.

W1GHZ

A HIGH POWER FILTER FOR 432 AMPLIFIERS
DE DAVE OLEAN, K1WHS

If you have ever tried to operate on 432 while a 144 MHz transmitter is operating in the same location, you know what happens. The 432 receiver falls apart as front end overload causes de-sensing along with splatter from non-linearities in the front end stages on 432. A great filter for 144 MHz was written up by AF9Y. It consisted of a 5 pole filter designed for low insertion loss and moderate stop band attenuation. It was enough to cure the third harmonic problems of the high power 8877 triode amplifier in use on 144 MHz.

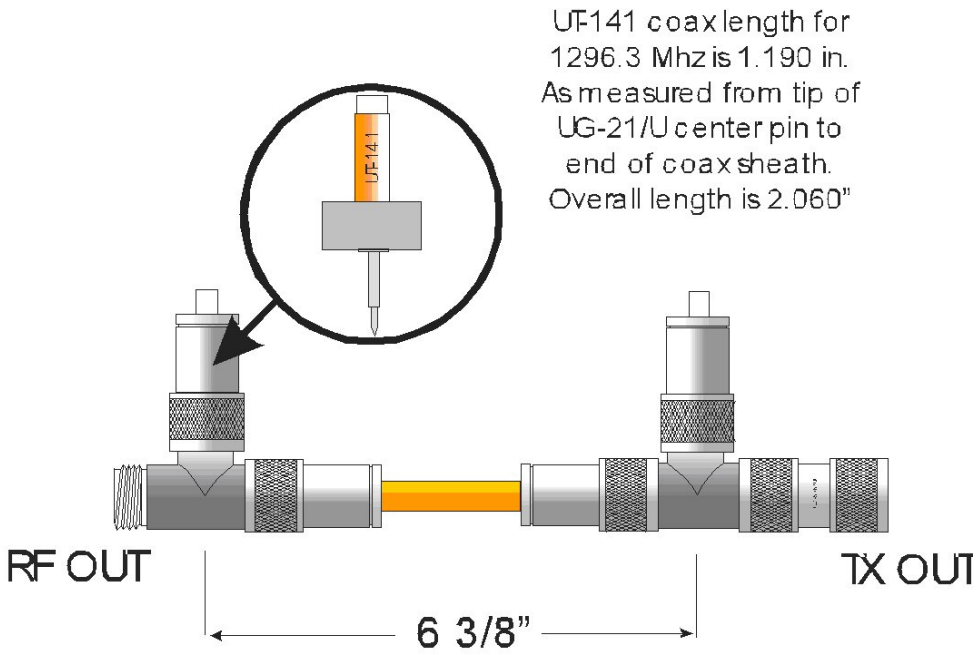
The same situation exists when 432 and 1296 stations are co-located. A high power 432 amplifier will develop enough third harmonic energy to send your sensitive 1296 front end into orbit. There can be enough energy flying around to actually damage the 1296 front end if the antennas are located on the same mast. A -40 dB third harmonic still means that 150 milliwatts is being radiated from the 432 yagi. Any coupling between 432 and 1296 antennas should exceed 20 dB and avoid damage, but don't bet your life on it.

In my station, I had to rig up a good 432 filter to hang on the back of my homebrew 8938 kilowatt. That amplifier was ruining reception on 1296 when I operated both bands at once in a multi- operator environment. My antennas were located on different towers about 50 ft apart. A few attempts (just before a contest!) at a simple filter with Teflon capacitors produced too much heat for my comfort level. Time was running out and I needed a solution, so I came up with a third harmonic filter. It is basically a double open ¼ wave stub separated by about 360 electrical degrees. Each open stub, tuned to 1296.3 MHz produces a short circuit at 1296 in the signal path, but allows the 432 energy to pass thru with minimum loss. I tuned up my filter by carefully trimming each stub. I was careful to leave a slight amount of Teflon dielectric exposed so as to improve high voltage breakdown characteristics. Any energy at 1296 will produce a voltage spike at the end of the stub. The lengths needed for resonance will vary depending on the exact connectors used, but I found that 1.190" is required as measured from the center pin tip to the lip of the UT-141 outer jacket. I added about .070" extra exposed dielectric with the center conductor. In fact, my first pass at the filter used all commercial coaxial adaptors. I used a combination of two males and one female barrel between the two N tees. In addition, I used some male barrels as the stubs! I found that about ¾ turn of the barrel needed to be unscrewed to on each stub to make the UG-578/U resonant as a quarter wave at 1296.3 MHz.

My homebrew stubs were made with UT-141 soldered to a small circular brass piece trimmed to fit inside the UG21/U connector and be held down by the screw on back clamping nut. The overall length from connector center pin tip to the end of the open stub is 2.060" in my case. Different connectors may change this dimension slightly. After all, I trimmed it for both stubs to be centered on 1296.3 MHz for maximum attenuation. If you do not get the stubs accurately trimmed, you will not get -100+ dB of attenuation, but it will still be darn good! Even 70 dB will be great for our purposes.

Measured loss is about 0.05 dB at 432 MHz and maximum attenuation of over 100 dB, will occur at 1296.3 MHz. I have used this filter for two years with no ill effects. No explosions and no arcs. The filter has handled 1300 watts or better and runs pretty cool. In actual use, I can tune in the third harmonic on 1296.3 and see only an S-7 signal. Before the filter was in line, that same signal was pegging the S-meter and de sensing the receiver.

Best way to tune the filter is with a swept response to see the notch clearly. If you do not have such capabilities, the notch may not be correct, but attenuation will still be good enough to solve your problems. Scalar analyzers have about 50 dB of range, so you will need some attenuators to see all the way to -100 dB! If you can see that the null is centered on 1296, that is good enough. Your filter will work just fine!



A VOLTAGE STANDARD FOR THE HAMSHACK

PAUL WADE W1GHZ ©2004
W1GHZ@ARRL.NET

Recently, while tuning up a new project, it seemed like the knob on the power supply turned awfully far just to reach 12 volts — then I noticed the "low battery" indicator on the digital multimeter. The voltage was already above 16 volts. Fortunately, that project has an internal regulator so no damage was done. However, it was annoying — this digital multimeter replaced one whose flaky range switch caused similar problems. At times, I've pulled out the old Simpson VOM - the red needle is reliable but not as precise.

A few nights later, I found a bag of parts buried on the workbench — probably purchases from a hamfest last summer. Among the gems was an IC marked AD581L. A quick search at www.analog.com showed it to be a precision voltage reference, laser-trimmed to exactly 10 volts. Just the ticket for

untrustworthy digital meters.

The AD581 has only three terminals: an input of 12 volts or higher, an output of 10 volts, and ground. No external components required. I dug up a small ABS plastic box, a couple of pin jacks, and a cord with an Anderson Powerpole connector. Two holes and three solder joints completed the assembly. The photo shows the complex assembly — I added a bypass capacitor, just because. A schematic is hardly necessary.

Time to spark it up — the output was 10.01 volts on the digital multimeter. Pretty good, but the L suffix is specified to be within 5 millivolts, so I tried a lab-grade meter, and read 10.003 volts — really good. The data sheet talks about aging for 200 hours to stabilize, so I ran it for a week and measured again: 10.0031 volts.

Is this accuracy necessary? Probably not, most of the time. I tried several digital multimeters of various age and quality, and obtained the following readings: 10.10, 10.03, 9.96, and 9.98 Volts, a range of 70 millivolts. None is off by more than 0.4%, not bad considering that these were cheap meters rated for 1% accuracy when new, and never calibrated since. 1% accuracy is fine for most measurements, but some things, like battery testinq and charging, require finer resolution. We've learned the hard way that good, fully-charged batteries are essential for successful portable operation. Comparison to an accurate standard is a good way to get more accurate results.

This is a handy little gadget that you can build, even if your homebrewing skills aren't quite up to tiny surface-mount microwave components. The AD581 is readily available from www.analog.com, or an equivalent part, the LT1031 from www.linear.com (see application notes AN82 and AN42); both are available from Digikey. In either case, you can pay for as much accuracy as you need. Other voltages are also available. Many are lower noise than normal voltage regulators, so they might be good voltage references for low-noise oscillators.

Some of these parts may be available as surplus — mine apparently was — so let us know if you find a good source.

FOR SALE OR SWAP:

I have a DEMI 144-28, 2 meter transverter with 28 MHz IF for sale. Output power is up to 25 watts and the receive noise figure is less than 1 dB. Unit is in good condition. $250 shipped in the lower 48.
73
Fred
N1DPM

THE SOUTH MOUNTAIN GROUP (K3EAR) IS LOOKING FOR OPERATORS

The South Mountain Group (K3EAR) is looking for operators and or Rovers for its annual January operation .

Several NEWS members have traveled down in the past and carpooling can be arranged from the Ma. , Ct. area . Possibly more as we drive thru several states to get down there . The operation is always fun as well as rewarding .

Contact either Russ , N3EMF (n3emf@earthlink.net) or Walt , WA1HHN (wa1hhn@aol.com) or the station itself at k3ear@yahoo.com .

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c/o K5GMX
Bill Conner
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