

N.E.W.S. LETTER

The Official Publication of the North East Weak Signal Group – <http://www.newsvhf.com/>

November, 2014

Volume 23

Issue 6

NEXT MEETING: November 22nd, 2014

November 22 Meeting Program

Research Balloon Communication

Jason Mativi, Williams College
Mea S. Cook, Williams College
Sigurd Kimple, KJ1K, NoBARC

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.

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President's Report

It seems every year is busier this time of year. There are several major hamfests and meetings and many other great VHF, UHF and above activities. In the last month and a half, we have had the ARRL September VHF QSO Party, the second part of the 10 GHz and Up contest.... YEA... Go Tom (and the other 78 GHz guys). The moonbounce contest is also in this time frame. Then we had the Pack Rats VHF conference, and Microwave Update (this year in Rochester, NY). It was good to see quite a few NEWS members at each of these conferences. Next year, Microwave Update will be out west in southern California. Plan ahead now and maybe make the trip. I've gone a few times and the guys always put on a great conference. Meet some folks from the other coast!

This meeting we will have a presentation on the research balloon work that has started at Williams College, in Williamstown, MA under the direction of Mea S. Cook, Assistant Professor of Geosciences in her GEOS 215 class – "Climate Changes". Professor Cook has her Ph.D. from MIT in 2006 and her BA from Princeton in 1999. One of her students, Jason Mativi will give the presentation at our meeting on November 22. The Northern Berkshire Amateur Radio Club (NoBARC) has been assisting with the balloon launches by providing radio equipment and operators to receive the radio signals from the balloon.

Professor Cook is not available on our meeting day so Jason Mativi will discuss the balloon during his presentation including just how the balloon is used, what measurements it makes, what kind of data is necessary to transmit to the ground, what data must be transmitted to the balloon, how much data is involved. Also the physical limitations are important. For example, how heavy the overall package can be, how much of that weight can be radio transmitter or receiver equipment. How long can the antenna be. What limitations might there be on the shape of the antenna. How long are the flights in time and distance? How high will the balloon go? Flight package recovery? What are the temperature and pressure ranges over which the radio equipment must work? And so on..

I have asked Mea and Jason to think about a wish list of things they might like to do. How might they like to expand what they have planned now? Maybe someone in the group would be interested in helping them "push the envelope" on their plans. The NEWS group has a lot of very competent people in the group with wide experience in practical radio communications techniques in the VHF and higher frequency bands where communications to and from the balloon would be most effective. This should be a fun, mind-expanding topic.

I have also asked KJ1K, Sigurd Kimpel – KJ1K to talk about the technical details of the communications that have been used on previous launches and the means for receiving balloon data. The Northern Berkshire Amateur Radio Club has been instrumental in assisting with receiv-

ing balloon data.

Finally, I would appreciate any ideas for future program speakers. Who would you like to hear?

- R. L. Frey – WA2AAU

Secretary's Report

NEWS meeting Sept. 6, 2014

Meeting run by WA1MBA & K1MAP, (Pres, VP & Sec on vacation).

- WA1MBA: \$5209 in treasury , do we want to combine the club and conference accounts?
- K1MAP: \$9919.53 in Vhf Conference account, up from \$7685.48 before the conference. We have too much \$. Suggest we vote on reducing dues to \$10 at next meeting
- WZ1V: explanation of Conference Paypal account and it was difficult to set up, so may be hard to change if we combine accounts
- K1AE: Motion to keep these accounts separate--passed unanimously
- K1MAP: Motion to pay Packrats for our share of ARRL 100th Convention booth out of Conference account up to \$500 instead of regular club account--passed unanimously

Break

- WA1MBA: 78 GHz record presentation
- W1FKF: new devices
- N1JEZ: Many new projects, video of Mt. Washington beacon repair.
- K1MAP, substitute recording secretary

Treasurer's Report

The treasury is doing well. As usual for this time of year, there are some stragglers who have not renewed membership. I will be sending out final notices in the next month. Our membership numbers are up as we continue to get new members, a bit ahead of normal for this time of year. On a personal note, over the course of the last two weekends I stripped the home tower of antennas and then of cables. We expect to put the house up for sale next Spring. Maybe the new owners will want to take advantage of the location and use the tower.. who knows? I won't be at the November meeting because my niece is getting married the same day. Enjoy your time together, and I will see you again in January.

- Tom WA1MBA

Coax Relay Driver

For 28 Volt Coax Relays

Paul Wade W1GHZ ©2014- w1ghz@arrl.net

Most of the good coaxial relays we find operate on 28 Volts, while most of our equipment runs on 12 volts. With the increasing popularity of LDMOS solid-state amplifiers, 28 volts or 48 volts may already be available, but many transverters will not switch a 28 volt relay – the higher voltage sneaks back in and upsets or even damages the transverter. Other transverters and transceivers will not handle enough current to driver a relay, and a lot of folks struggle with this problem.

A popular solution for 28 Volt relays is the voltage booster circuit from Down East Microwave. These are fine for small SMA relays, but questionable for the larger relays needed for QRO operation.

Another solution is to rewind a 28 volt relay to operate on 12 Volts. I've done this for several relays with Type N connectors, and used one for years on 1296 MHz. In preparation for EME operation with W1AIM, I measured the isolation of this relay – only 40 dB or so. So I've been hitting my preamp pretty hard for a long time! Time for a new relay.



Figure 1 – Coax relays with marginal isolation at 1296 MHz

I quickly dug through my coax relay collection and started measuring isolation. All the relays like Figure 1 were in the 40 dB range, but several like Figure 2 had 60+ dB isolation. They don't look easy to rewind for 12 Volts, but my amplifier runs on 28 Volts anyway. They also take a fair amount of current to switch, 250 to 300 mA at 28 Volts, so the booster is not an option. The one on the right is a latching relay; that's a separate problem.



Figure 2 – Coax relays with good isolation at 1296 MHz

Chip has a DB6NT transverter which is specified to only switch 12 Volt relays, and the schematic confirms that the 28 Volts would feed back into the circuit. My transverter is homebrew, and I don't know where the schematic is, but I'm pretty sure the relay driver is a hefty power FET. I hooked up the relay with 28 Volts to see if the transverter would drive it – sure enough, the transverter was upset and wouldn't switch properly.

Time for a proper relay driver that isolates the relay from the driver. I sketched up the circuit in Figure 3, and built it in an Altoids tin, shown in Figure 4. Construction is quick dead-bug style. I didn't bother with a PC board, but I could make some if there is any interest. The transverter or transceiver grounds the PTT line to transmit, and the power FET, Q2, pulls one end of the relay to ground – the other end is connected to 28 Volts. Don't forget the diode across the relay to catch switching spikes. If the driver is very far from the rig, a zener diode, D4, across the PTT line might prevent damage from stray voltage surges.

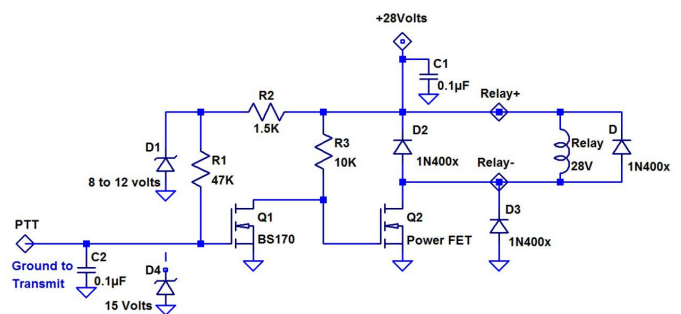
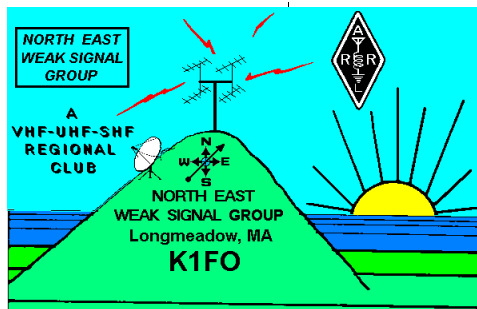


Figure 3 – Schematic Diagram of 28 Volt Coax Relay Driver

Other Relay Voltages

The driver circuit should also work fine for 12 Volt relays, if your rig won't drive a relay directly. If you happen to have 48 Volt relays, the driver circuit should work fine with a larger value for R2. Just make sure the power FET is rated for at least 100 Volts. And finally, relays for 110 Volts AC will often work fine on 28 Volts DC – give it a try.



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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 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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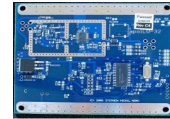
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