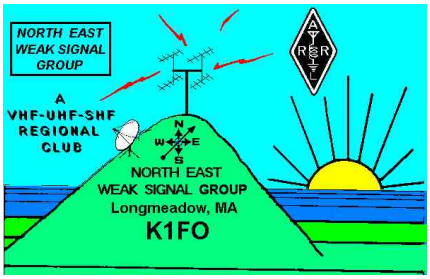

N.E.W.S. LETTER

The Official Publication of the North East Weak Signal Group – N.E.W.S. - Home (newsvhf.com)

July 2023	Volume 31	Issue 3

Next Meeting: July 22, 2023.

In This Issue

Knights of Columbus, Picnic area and Pavilion,

371 Washington Rd., (aka George Washington Road) Enfield, CT 06082

(20 mi N of Hartford, 8 miles S of Springfield)

DON'T FORGET

The North East Weak Signal Group 2 Meter Net
Every Thursday at 8:30 PM local 144.250 MHz
K1BXC Net Control

MEMBERSHIP in the N.E.W.S Group is $10 per 2 years.
Apply to George Collins, KC1V. E-mail: news.kc1v@gmail.com.
You may download an application from our web page: http://www.newsvhf.com

Send articles by e-mail to Don Twombly at donw1fkf-news@yahoo.com.

Treasurer's Report

Treasurer's Report June 28, 2023

Balance, Last Report 3-25-2023: $2824.70

Income:

Dues:	$30.00
Donations:	$15.00

Balance as of 6-28-2023 $2869.70

Current Paid Members:

We have 2 new members 3 renewals

Totals are: 80 Regular
3 Life
12 Permanent

Submitted June 28, 2023 George Collins, KC1V

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Secretary's Report North East Weak Signal Group
at Storrs Library, Longmeadow, MA
and by ZOOM

Called to Order by President, WA2AAU, at 1326

TREASURERS REPORT
Balane $3294
Members:
79 Regular
3 Life
123 Permanent
1 New Members

OLD BUSINESS
-Club insurance W1JHR working with MA
on liability for permits
-W1FKF 10G beacon in Maine will have sectoral horn antenna. Still snowed in.
-K1MAP conference - 100+ registered. Deadline April 3
NEW BUSINESS
ANNOUNCEMENTS
K1MAP beacons in FM14 now pointed to
New England K1MAP 144.282 K1FWS 222.054
ADJOURN 1345
PRESENTATIONS:
WA1ZMS on his sub-mm wave gear
used for 1st Worked All Bands March 2003
134 GHz uses an SHF dish
Band is 132 to 141 GHz actual freq ~140 GHz
for distance of 1.12 km
134 & 241 last bands for N1JEZ & KT1J Worked All BandsContest
Permits for Mt. Greylock and Mt. Sugarloaf (Sunderland) as well as Mt. Wachusett
- W2AAU - NEWS permit application should be kept separate from MGEF
- MOTION W1GHZ - Club to pay application fee ($45) for up to 3 sites UNANIMOUS

The 35th Microwave Update (since 1985) and the 46th Eastern VHF/UHF Conference

Was held at the Hilton Garden Inn on a high hill in Windsor, CT, from Thursday April 20 to Sunday April 23, 2023. It was a great time to get together for the first time in 4 years. 139 registered and 15 spouses and family members also attending the Banquet on Saturday evening for a total of 154 in attendance for most or some of the activities. Attendees came from all over the USA including Alaska and Canada, and from Belgium, England and Sweden.

New England spring weather provided us with an unexpected warm spell, mostly in the 80's, during the entire conference. Social activities started on Wednesday evening at the Hilton. Thursday morning the ARRL provided headquarter tours in Newington, CT, with 2 nearly sold out tours of the New England Air Museum in nearby Windsor Locks in the afternoon followed by the usual Social and informal sell+swap+vendors+displays at the Hilton that evening. Friday was a full day of Presentations and an Auction, then a Social and Swap in the evening.

Greg Bonaguide of Rhode & Schwartz again brought several tables of state of the art test equipment and tested gear and home brewed creations.

The Hilton Garden Inn proved to be a good choice, just of I-91 between Hartford, CT and Springfield, MA, and with a shuttle the short distance to Bradley Int'l Airport. The on site restaurant was open for Breakfast, Dinner and drinks. On Friday and Saturday a lunch was pre-arranged at Jim's Family Restaurant & Pizza, about 2 miles away. About 90 pre-registered for lunch each day.

Saturday offered a full day of Presentations, 2 Auctions, and the usual evening Banquet, Awards and Prize Drawings. Chip Cohen, W1YW was our Banquet speaker. He spoke on "invisibility Cloak". Worked All Bands awards were presented to Henry Ingwersen, KT1J, (#2), and Mike Seguin, N1JEZ (#3). The Don Hilliard Technical Achievement Award was presented to Mike N1JEZ and the Will Jensby mmw Award was presented to Brian WA1ZMS.

The Tom Kirby Memorial Award was presented to Dave Olean, K1WHS. . On Sunday morning a tailgate swap was held in the parking lot at The Vintage Radio & Communications Museum, about 3 miles away. The museum is well worth a stop and is open regularly throughout the year.

Thanks to all that attended, and to those who helped out. The next Microwave Update will be held in or near Vancouver, BC, Canada October 3-5 2024. It's likely that we will hold the 47th Eastern VHF/UHF Conference at the Hilton Garden Inn in Windsor, CT. Tentative dates are April 18-21, 2024.

Paul Wade, W1GHZ – Program, Proceedings, A/V, Registration & Co-Chair
Steve Kostro, N2CEI – Proceedings
Sandra Estevez, K4SME – Proceedings & Shirts
Maty Weinberg, KB1EIB -- Proceedings
Mark Casey, K1MAP – Hotel, Finance, Hospitality, Registration & Co-Chair
George Collins, KC1V -- Registration
Dan Burbank, K1BXC -- Registration
George Altemus, KA3WXV -- Registration
Greg Bonaguide, WA1VUG, of Rhode & Schwartz – Test Room
Kent Britain, WA5VJB – Auctioneer
Mickey Clement, W1MKY -- Prizes
Don Twombly, W1FKF -- Prizes & A/V
Lanette Twombly, KA1NKD -- Prizes & A/V
Mike Seguin, N1JEZ -- A/V
Ray Roberge, WA1CYB – A/V & Zoom
Bob Bownes, KI2L – A/V & Zoom
NEWS Volunteers
Packrats Volunteers

Mark K1MAP

Club Commission Program

One of the benefits of being an ARRL Affiliated Club is having access to the Club Commission Program. Affiliated clubs can use this program to receive a commission for promoting membership in ARRL. When you sign a new member, the club gets $15, and when a member renews through the club, you get $5.

Members can renew anytime without losing any of their membership time. Details and forms are available on the ARRL website, at www.arrl.org/affiliated-club-benefits. FAQs are also available to help explain the program. It does take some effort and a bit of paperwork, but the club reaps the reward in cash. If your affiliated club is not participating in this program, ask them to investigate it (ARRL)

Weekly Calendar

Mon. Packrats Nets start at 7:30pm on 6 meters, 8pm on 144.150, etc. Philadelphia area.
Tues. Mud Toads Net FM17, Virginia 8pm 144.250
Activity Night 7:30pm 222.100 K1WHS+
Weds Activity Night 432 N1DPM+
Thurs. NEWS net, W1COT (K1BXC alternate) 8:30pm 144.250
Sat. Chesapeake Net 144.205 W3BFC FM28 9pm
144.205 Mornings 8:30-9:30 AM -- 144.205 , 144.190, ME, Canada to NC and out to OH, WV

Officers:

President Dick Frey, WA2AAU, Delanson, NY
Vice Pres. Eric Mazur, KA1SUN, Savoy,

Treasurer George Collins, KC1V, Somers, CT
Secretary Paul Wade, W1GHZ, Cabot, VT

Board Of Directors:

Tom Cefalo W1EX N Reading MA

Tom Williams WA1MBA Orleans, MA
Bob Bownes KI2L, Troy, NY
Mark Casey K1MAP, Hampden, MA

For Sale:

Several TE Systems VHF and UHF amps.
Some transverters, Kuhne and DEMI.
Kenwood TS-2000X with the 1296 module.
Misc test equipment including a LeCroy 1GHZ Digital Storage Scope
I have a bunch of my excess radio stuff, lot of it is VHF/UHF,
listed on my personal website: Chuck ko1i.com

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Papers from Microwave Update 2023 and 46th Eastern VHF/UHF Conference, including papers not in printed book and updated papers are available at http://www.microwaveupdate.org/conf2023/2023papers.html if you prefer a printed Proceedings book, they are available at lulu.com search "Microwave Update 2023" 15% discount code LKAB317CD may apply

Mt. Wachusett Permit

222 and up Contest and 10 GHz above Contest

if someone wants to be on the permit list, specify which contest. It is not for overnight for the 222 MHz and up. It will run from 1400 local to 1900 local on the Aug. 5th and and then from 0800 local to 1400 Local the next day on the 6th. It might be useful for rovers.

contact me by email George W1JHR specrisk@aol.com

Picnic MDS and

ERP Testing 2023

The July Picnic/ Annual Meeting will again feature relative (human and radio as a system) Minimum Discernable Signal and (relative) ERP testing on 10 GHz, 24 GHz, 47 and 78 GHz. Some call it the “Shoot Out”.

Just as in previous years, to test for MDS, we set up a distant signal source with a keyer. After everyone has a chance to peak up on the signal, the signal level is reduced until you can no longer hear it, then you have found the MDS for your system (compared to others). The difference is recorded in dB. It’s all relative because the equipment and range are not calibrated. You decide how well your reception works, noting that some might be better because of larger dishes or better noise figures and stronger PAs. Our unofficial reference standard is Dale, AF1T. You can use your waterfall display or whatever tools for whatever purposes, but to be fair you must copy the CW signal by ear. Once you can no longer copy it (or basically tell that it is there through your ears) you have reached your minimum.

Finally, we also check relative ERP, transmitting one at a time and recording the relative power received at the distant point. We complete one band (MDS and ERP) and then move on to another.

This isn't a competition. It’s a chance to check out the gear with friends around to help. Most folks have 10 GHz stations that work pretty well, while a few will find problems and fix before the 10 GHz & Up contest in August. Not only do we all know whether our equipment functions, and about how well, but also that there will be some other good stations to work.

I am preparing and using the equipment I built for this purpose, and have found the problem encountered last year when I couldn’t do the ERP part of the testing. It was operator error. I designed this thing and couldn’t figure out how to use it. Now the system has new reminders that tell me how to do the ERP testing. We will see how it goes. As Paul W1GHZ says, “There is no such thing as *fool proof*, the best we can do is *fool resistant*.” This experience and others have taught me that I need to join Fools Anonymous, but I haven’t found a local chapter yet.

Last year we did the high bands first, and that worked well. If you are brining 47 GHz or 78 GHz radios, please arrive early. We hope to start testing those bands by 11 AM. Some bands are done before the club meeting and some after.

We always need some help for setup and to run tests – thanks for the help!

Tom WA1MBA
tomw@wa1mba.org

Beacon Status: W1LE

I am still getting some hours in on the Kuhne-Electronics PLL2-Synthesizers to be sure of the reliability.
Have evaluated a few GPS/DO units and I just got in a Leo Bodnar Mini Reference GPS/DO for a single 10 MHz output.
It is a very compact unit and USB powered. From a cold start to GPS frequency lock is typically less than 30 seconds.
Currently looking at the holdover RF frequency accuracy when GPS signals are lost.

I performed a site survey at the WGBH transmitter site on top of Big Blue Hill in Milton, MA, the highest point east of Mount Wachusett, in Massachusetts. With Many hams in the technical side of the organization, interest was high. Logistics have yet to be resolved. Also visited the Blue Hill Observatory, famous as a weather observatory and from their tower I could see clean horizons for 360 degrees. Mount Wachusett was clearly visible, Mount Monadnock can be seen on a clear day. Both sites are potential VHF/UHF/microwave beacon sites.

Are You Ready to Use a Remote Base as a Paid Ham Radio Service ?

As time marches on and we loose interest and capability to maintain a multiband station with antenna loaded towers,
We can appreciate the opportunity to buy into someone else's ham radio enterprise using internet access.

One such service is Remote Ham Radio (RHR) found at: **https://www.remotehamradio.com/**

For a monthly or a yearly membership fee, along with a radio site use fee (pay for what you use), you can operate over the internet from your home with your laptop or PC.

Other remote base ham radio sites, available as a paid service, can be found with a Google search.

Is there Room In your Ham Shack for a Voice Over Internet Protocol (VOIP) phone ?

While you have internet piped into your ham shack for monitoring the DX clusters and the VHF/UHF chat pages, How about a direct dial, private, phone system to connect with like minded hams ?

Look to: **https://hamshackhotline.com/**
https://amateurwire.org/
Find others with a Google search

HamShack Hot line is just such a system. The only expense is the phone instrument, but they are available at the auction sites for short money.

Requirements: Only for licensed ham radio operators.
You provide the phone instrument, (my CISCO instrument cost me about $40 on Ebay)
It is a private telephone system with connectivity only to registered ham users.

Radio In A Box (RIB) **https://www.youtube.com/watch?v=1XqBhp7M2Uk**
Here is an interesting link to the NCDXFoundation, Radio in a Box (RIB) concept currently utilized on DXpeditions. Tesla Starlink for internet connectivity, Raspberry Pi 4 computer, Node Red software, Water cooled PA, 900 MHz WiFi local radio link to local Flex operating positions, other operators anywhere else with internet access…..

Stan, W1LE

Medium Power VHF & UHF Amplifiers using small Misubishi MOSFET Modules

Paul Wade, W1GHZ ©2023
w1ghz@arrl.net

For my transverters for 144, 222, and 432 MHz, I usually use a small Mitsubishi MOSFET module as a power amplifier. These modules can provide at least 7 or 8 watts output, adequate to drive modern LD-MOS amplifiers, with a few milliwatts input from a basic transverter board. For simplicity and flexibility, I use a separate PC board for the amplifier module, usable at all three bands, similar to the one that G4DDK[1] used with his Anglian two-meter transverter. A major advantage of the separate PC board is that the module can be tested and adjusted standalone.

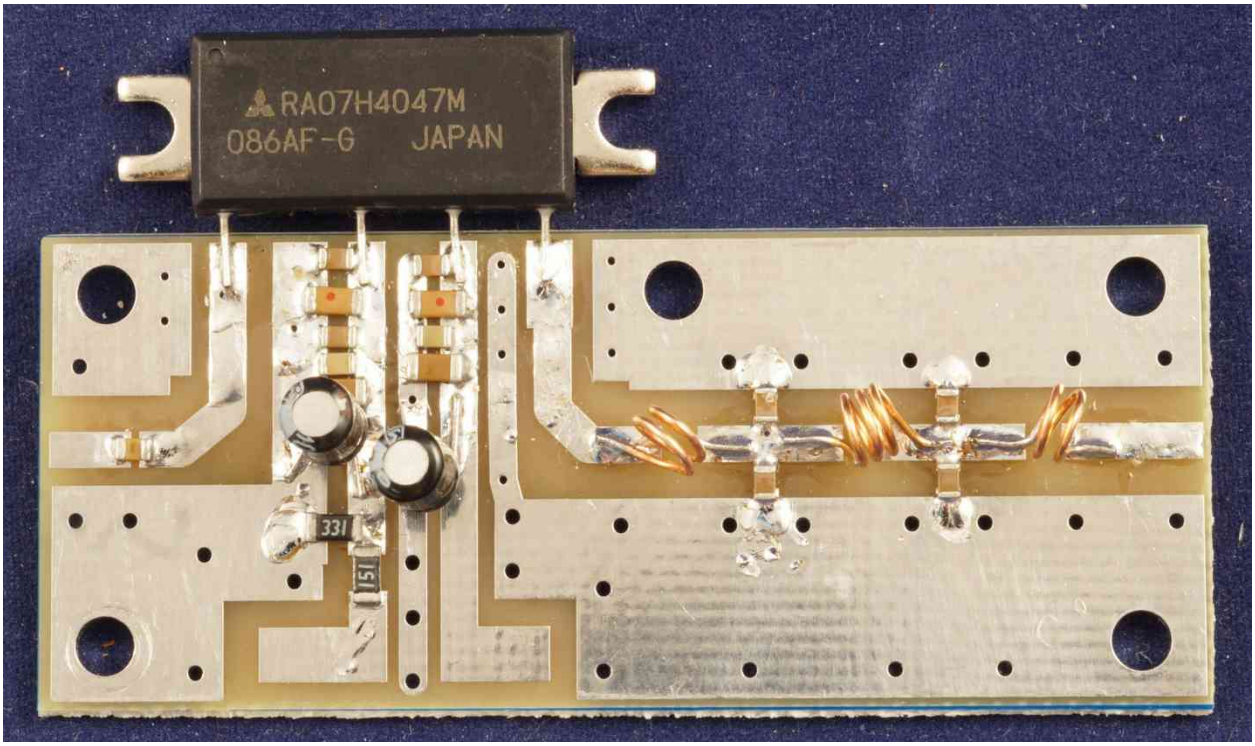

Figure 1 – 432 MHz MOSFET Module and PC board with Low-Pass Filter

An amplifier board for 432 MHz is shown in Figure 1, including a low-pass filter on the output and adequate bypassing of the DC supply and bias leads. What is not shown in the picture is the metal plate underneath. The module has no ground return lead, so it relies on the flange for both ground connection and for heat sinking. The PC board has a ground plane on the bottom and many plated-thru holes to provide short connections to the metal plate or heat sink to which the module is bolted. At these power levels, bolting them to a die-cast aluminum box with a light smear of thermal grease is often adequate. If the amplifier feels too warm after running overnight, a small heat sink on the outside of the box might be needed.

The DC lines are bypassed by an assortment capacitors, as recommended by the manufacturer, covering a wide frequency range to ensure stable operation, as shown it the schematic, Figure 2. I start with a value suitable for the operating frequency placed closest to the module, then space the others further away, with small electrolytic capacitors for low frequencies furthest from the module.

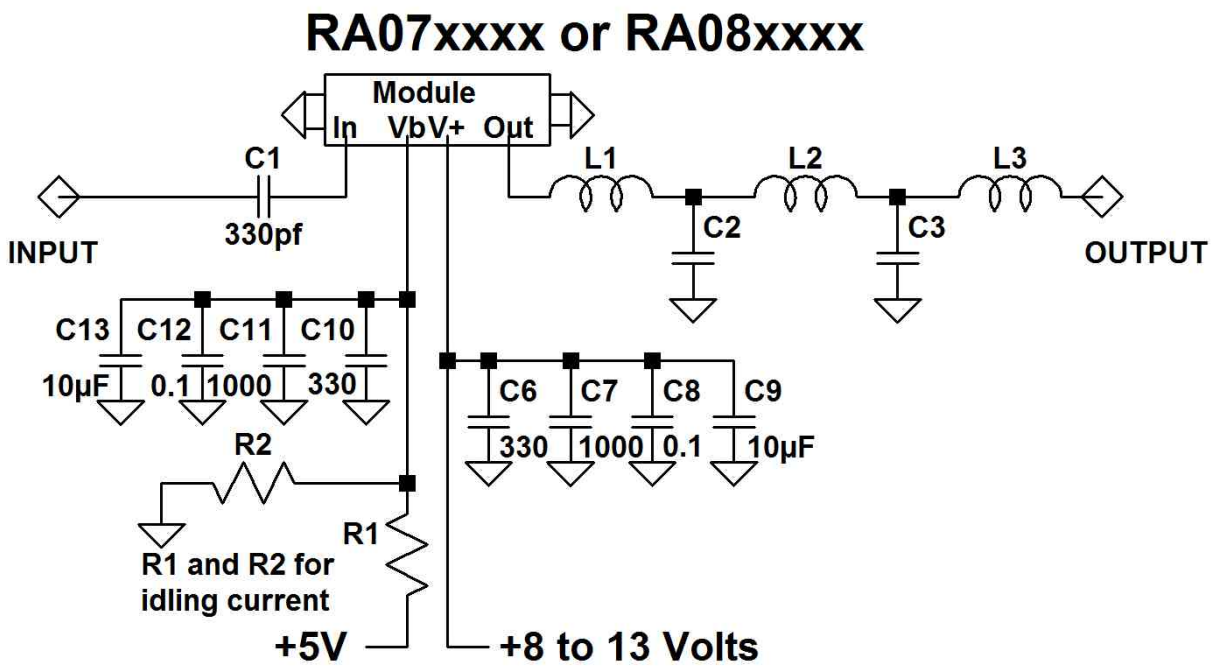

Figure 2 – Schematic diagram of MOSFET module amplifier

The maximum power output of a module is limited by the supply voltage – some versions are specified for 7.2 volt operation while others are for 12.5 volts typical. All can provide at least 8 watts maximum output at specified voltage. I sometimes reduce the supply voltage to limit the maximum output power from the module to avoid the possibility of blowing up an expensive LDMOS transistor if something goes wrong.

The bias voltage enables an idling current for reasonable linearity, and also controls the gain, typically 26 to 34 dB, depending on current and frequency. Typical bias voltage is around 3 volts, but the current changes fairly quickly with bias voltage, so a regulated voltage source is recommended – I take it from a 5-volt regulator with the voltage divider shown in the schematic with R1 chosen for the desired idling current. In various transverters, I have set idling current anywhere from 0.35 to 0.8 amps. In normal operation, the **V+** voltage is on all the time and the **Vb**, the bias voltage is switched on during transmit. With no bias voltage, the module draws no current.

The output power curve seems to be fairly independent of the bias voltage and idling current, and seems pretty linear up to about half of saturated output power. If the module is driving a high power SSPA, bias might be adjusted in a two-tone test for best IMD. Rover stations running barefoot might prefer a lower current.

At high gain, the module may be sensitive to input impedance of the preceding stage – I saw one instance where changing the input cable length changed the output power. If enough drive is available, a small attenuator at the input might be a good idea – a chip resistor on the PC board in place of C1 with shunt resistors on each side to form a π-attenuator will work fine (the input capacitor isn't necessary).

All broadband amplifiers will generate harmonics when driven near maximum output power, so a low-pass filter on the output is recommended and included on the PC board. It is much easier to filter at these low power levels. Table 1 shows the nominal low-pass filter values. The capacitors, C2 and C3, may be made up of two capacitors, one on each side of the transmission line, like Figure 1, to reduce loss and to make non-standard values. For instance, 28 pf = 18 pf + 10pf.

Low-Pass Filter Components

Frequency	L1	C2	L2	C3	L3
144 MHz	60 nh	28 pf	100 nh	28 pf	60 nh
222 MHz	25 nh	20 pf	50 nh	20 pf	25 nh
432 MHz	15 nh	10 pf	27 nh	10 pf	15 nh

Table 1

Figure 3

The inductance of a coil is measured by putting the coil in parallel with a chip capacitor and measuring the resonant frequency with an antenna analyzer[1], impedance analyzer, or VNA, as shown in Figure 3 – maximum impedance of a parallel-resonant circuit occurs at resonance.

The resonant frequency calculation is $f = \frac{1}{2\pi\sqrt{LC}}$

Turning this around, inductance is $L = \frac{1}{C(2\pi f)^2}$

C is the value of the chip capacitor, plus 1 or 2 pf for the PC board capacitance.

Squeeze and stretch the coils until the desired resonant frequency is reached. Adding turns to the coil or increasing the diameter increases inductance, if the first try misses.

The filter is tuned on the PC board with a 50-ohm load at the output, shown in Figure 4, before installing the amplifier module, using the same instrument or a VNA . SMA edge mount connectors are slipped on PC traces at the ends of the filter – most connectors fit tightly enough so that solder is not needed for the temporary connection. Squeeze and stretch the coils to tweak for best response at the operating frequency, with good VSWR below the operating frequency and high VSWR above the operating frequency. If you are using a VNA, you can also measure the transmission response, like Figure 5.

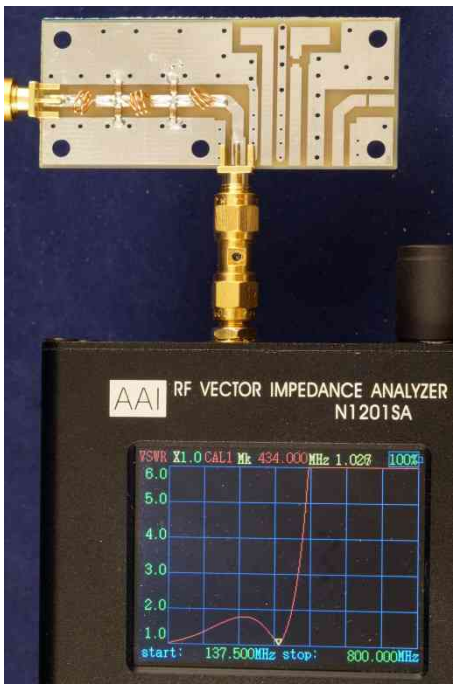

Figure 4

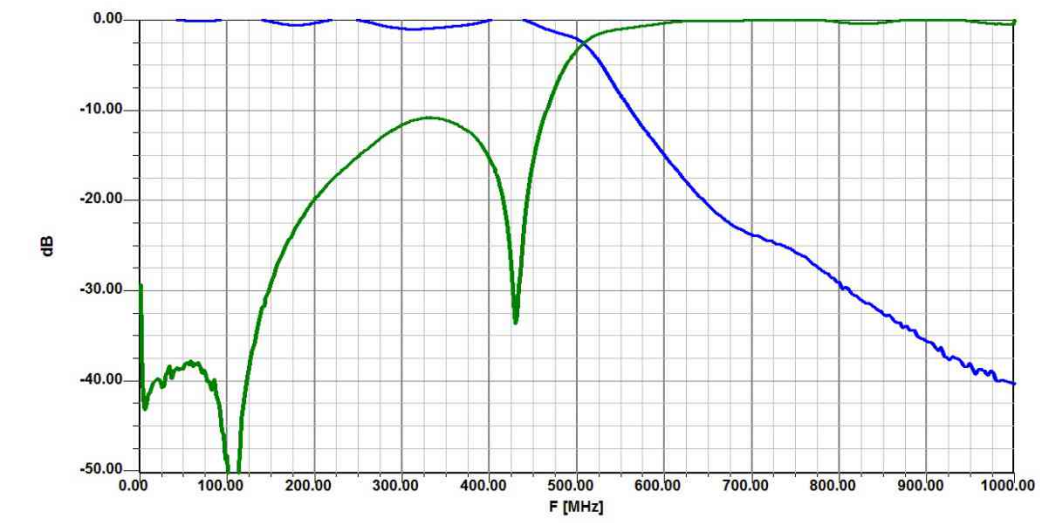

Figure 5 – 432 MHz Low-Pass Filter response after tweaking

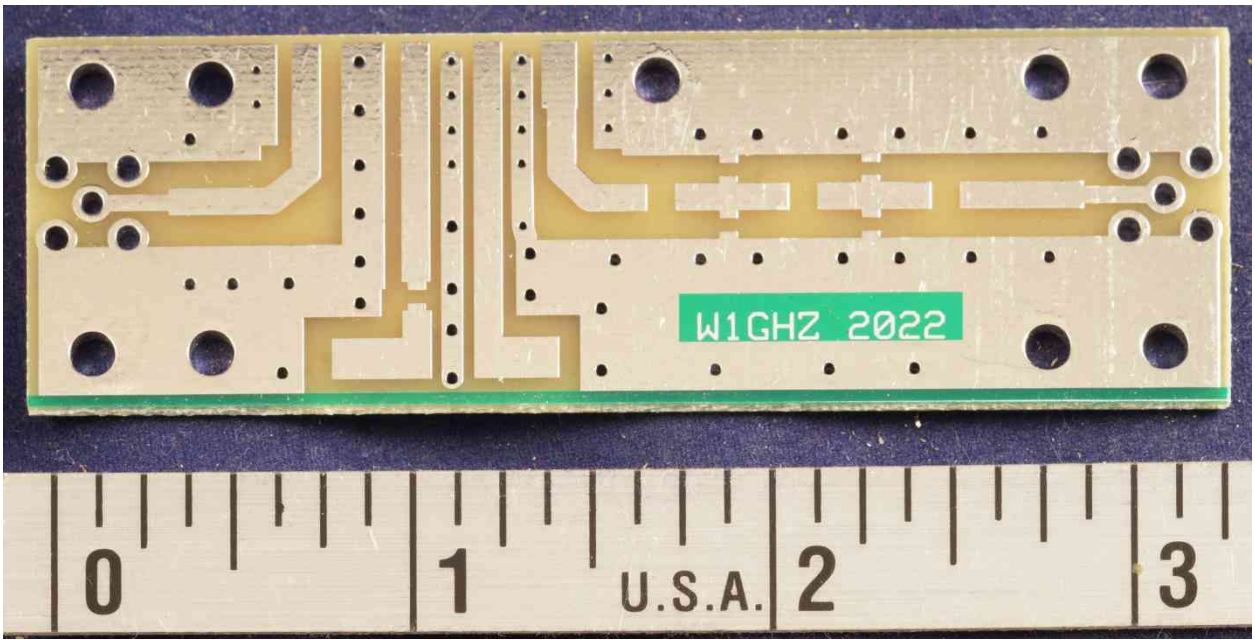

Figure 6 – PC board for module amplifier with provision for SMA connectors

My latest revision of the PC board, shown in Figure 6, includes board-mounted SMA connector footprints, making a standalone amplifier easier. These can be cut off to allow for a pigtail coax connection, shown at the input of the module in Figure 7, or attached at a right-angle to make an SMA connection like the one on the output. This amplifier is part of a 2-meter transverter driven by an SDR as an alternative to an FT-817 as a microwave IF. The transverter is identical to my 222 MHz transverter[4] with different filter components for 144 MHz.

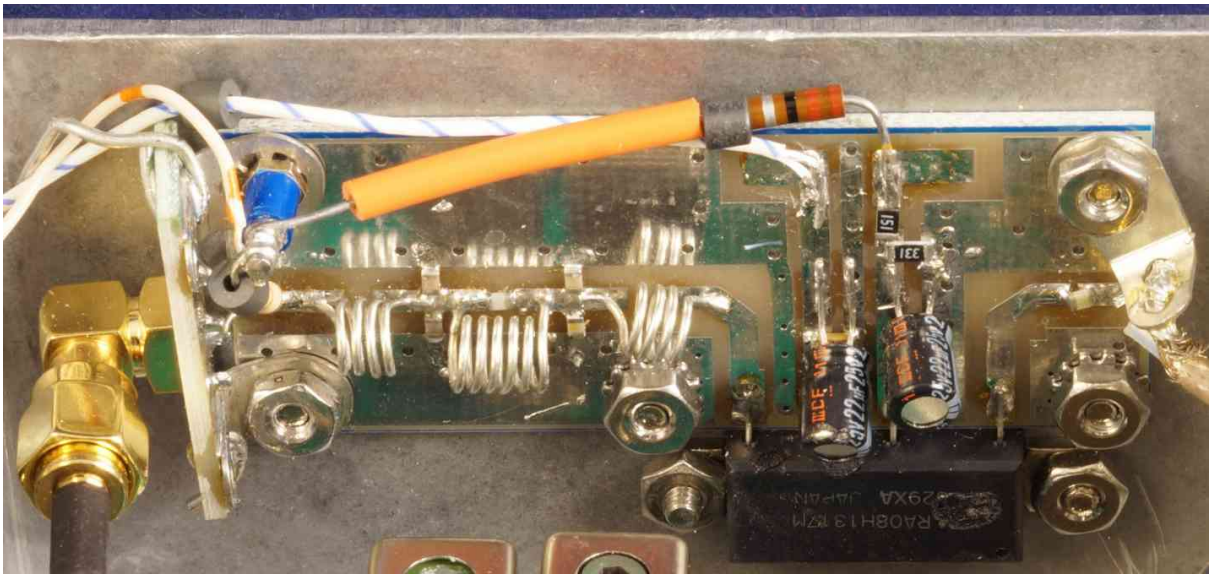

Figure 7 – Amplifier for 144 MHz showing alternative coax connections

Some of the 144 and 432 MHz version of the modules are available from RFParts.com, while the 222 MHz modules and some other versions seem only to be available from ebay sellers. The usual cautions apply, but some prices are attractive. I test them in a standalone amplifier – the module leads are easily soldered and unsoldered – and all so far have been functional.

Notes

1. Sam Jewell, G4DDK, "144MHz 8W low power linear amplifier," http://www.g4ddk.com/144MHz8WPA.pdf
2. Paul Wade, W1GHZ, "Antenna Analyzer Pet Tricks," ***QEX***, January/February 2019, pp. 22-26. Also http://www.w1ghz.org/QEX/Antenna_Analyzer_Pet_Tricks.pdf
3. www.nanovna.com
4. Paul Wade, W1GHZ, "222 MHz Transverter, Mark 3," *Proceedings of the 54th Conference of the Central States VHF* Society, ARRL, 2022, pp 146-165. Also http://www.w1ghz.org/xvtr/222_MHz_Transverter_Mark3.pdf

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N.E.W.S. Group PICNIC-Rain or Shine: July 22, 2023-- 10am to 4pm

Knights of Columbus, Picnic area and Pavilion,
371 Washington Rd., (aka George Washington Road) Enfield, CT 06082
(20 mi N of Hartford, 8 miles S of Springfield)
Social Gathering!
Free Lunch!
Swap-Sell-Tailgate!
Microwave Bands MDS Testing (WA1MBA) 10 GHz to 78 GHz
Meeting
Please bring any items of VHF+ interest that you would like to sell, swap, or just show off. There is plenty of room to tailgate in the parking lot or pick a table and bring your items under the pavilion.
Your stories and experiences--True or Not-- are all welcome.
Show-Off Items with No VHF+ interest, but with Entertainment Value
may also be appreciated or ridiculed--take your chances, just keep it clean.


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Arrow Antenna


Directive Systems


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MICROWAVE
LIVE OAK, FLORIDA
AMATEUR RADIO EQUIPMENT
FOR 50MHZ AND ABOVE


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ENGINEERING LLC

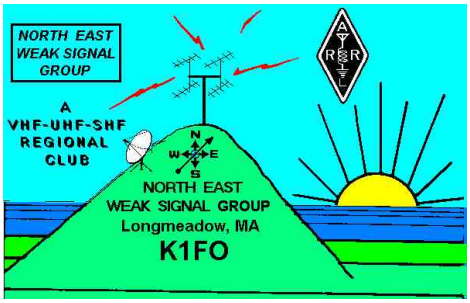

DAVIS RF
DIVISION OF ORION WIRE CO., INC.


HAMMOND
MANUFACTURING


TIMES MICROWAVE SYSTEMS
An Amphenol Company


DAIWA


MOUSER
ELECTRONICS



North East Weak Signal group

MEMBERSHIP APPLICATION

Date: _____

Name: _____

Call sign: _____ 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 3.3 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 was established in 1993 to form a camaraderie among fellow VHF-UHF-Microwave enthusiasts and support a convenient means to exchange technical information. We currently have six meetings per year, 4 are held on at the Storrs Library on Rt. 5 in Longmeadow, Mass., 1 at our annual Conference in April, and 1 at our Annual Picnic in July. We provide a "NEWSLETTER" that is distributed via email two weeks prior to each meeting. Any contributions to this publication are appreciated and can be sent to: Don Twombly, W1FKF by e-mail to donw1fkf-news@yahoo.com
Dues are $10 for 2 years. Please contact or mail application to: NEWS Treasurer, George Collins, KC1V, 105 Ninth District Rd., Somers, CT 06071 or E-mail: news.kc1v@gmail.com

Mail to

Treasurer

North East Weak Signal Group
c/o George Collins
105 Ninth District Road
Somers, CT 0607

NEWSLetter

North East Weak Signal Group
c/o Don Twombly, W1FKF
32 Bumfagon Road
Loudon, NH 03307