



NVARC

Signal



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Next Meeting

February's meeting will be held 7:30 PM on 20 February 2025 at the Pepperell Community Center at 4 Hollis Street in Pepperell Massachusetts.

Our guest speaker will be Gerry Hull W1VE on the subject of remote radio station operation.

Weekly 2-meter Net

The NVARC Information Net is held Monday nights at 7:30PM local time on the 2m N1MNX repeater – 147.345MHz+100pL.

An informal net on 28.410 SSB often follows the 2-meter net.

President's Corner

Bruce K1BG

The February meeting is right around the corner, and spring soon follows. It's a good time to highlight upcoming NVARC activities that will take our minds off the current cycle of snowy and cold weather.

First, NVARC elections take place at the April meeting. "Why is he talking about April?" you ask. Well, as club president, I must appoint a "nominations committee" that will go out and find a slate of willing (and able!) volunteers to run for office. Besides coming up with a slate of candidates, it would be great to have several candidates for each position. If you are interested in volunteering for the committee, or interested in serving as either president, VP, secretary, treasurer, or a board member at large, please let me know.

NVARC participates in the ARRL Field Day event that takes place in June ("The last full weekend in June"). This year, we will have many new club members who have not participated before. We traditionally set stations up in the Heald Street Orchard in Pepperell. I will be looking for a person to chair the "Field Day Committee" who will coordinate and plan the event. Whoever volunteers gets to organize activities and make critical decisions that will affect our effort – things like where we operate, how many transmitters we have on the air, that kind of thing. Please consider taking the lead role. You will get plenty of help!

I have a list of volunteers to judge at the upcoming Bromfield Science fair. It takes place on the afternoon of March 7th. If you want to judge and haven't contacted me, don't wait - please let me know.

As all of you are aware, NVARC had a very successful Technician License Class last autumn. Based on its success, we are planning another technician class starting on March 10th. I'll get emails and notices out later this week. If you know of anyone who would like to become an amateur radio operator, please let me know and I'll put them on the list. Les, N1SV, and Bob, N1DVC, helped last time and they have already said that they would love to participate again. If YOU would like to help, please let one of us know. We can use all the help we can get!

Are any of you Volunteer Examiners? NVARC needs to put a VE team together. One of the hallmarks of successful clubs is to not only hold license classes but to offer test sessions on a regular basis. Our recent class graduates fended for themselves when it came to getting tested. I'd like to offer testing when our next classes are finished. Please let me know if you are a VE or want to become one and are interested in helping with an exam session.

(cont'd next page)



This past weekend I travelled south to Orlando Florida to attend HamCation (hamcation.com). For those of you who do not know, HamCation is the second largest amateur radio gathering in the country (the Dayton Hamvention is larger). HamCation claims over 25 thousand attendees with around 60 vendors exhibiting. The weather was beautiful (sunny in the low 80s). Besides seeing old friends, looking at all the latest in gear, and attending a talk or two, I saw several current and former NVARC members. Jean - K1AVM, Dennis - K1LGQ, Bill - AB1XB, and Bob – W1XP, were all in attendance. It was a pretty busy time, so I hope I didn't miss anyone! The next big gathering is the before mentioned Dayton Hamvention which takes place in May. I hope to see you there!

Last but certainly not least, NVARC has an awesome speaker for February. Gerry Hull, W1VE, is an expert on remote amateur radio station operation. Gerry has personally set up stations such as ZF9CW, 7Q6M, VY1AAA, VE4YH, VE9XX, and others for remote operation. Attend and discover how easy it is to either operate someone else's station remotely or set up your station for remote operation. If you think February's speaker is good, we have a real treat for you in March. But I'll save that for the next Signal. See you at the February meeting.



Jean K1AVM, Bruce K1GB, Dennis K1LGQ

Ten Things to do with a Software Defined Radio

Les N1SV



(10) Listen to your favorite AM, FM, or shortwave broadcast stations - Before I got my amateur radio license, I used to be a shortwave listener and listened to both shortwave stations and amateur radio stations. It's probably one of the motivations I had for getting my license. Here is useful website that lists worldwide broadcast stations by frequency <https://shortwave.live/> . And here's a chart of the US amateur radio frequency allocations: https://www.arrl.org/files/file/Regulatory/Band%20Chart/Hambands4_Color_11x8_5.pdf

(9) Interface WSJT-X to your SDR and decode your favorite digital signals – Use the SDR# software and the Calico Cat plug in to make WSJT-X think its communicating with a Kenwood TS2000 transceiver when it's really controlling the SDR through SDR#. The audio output from SDR# is routed to the WSJT-X software through use of virtual audio cable software. I've done this with both the RTL-SDR & AirSpy HF+ Discovery SDR. So, if anyone needs assistance on how to do this, I'd be happy to help.

(8) Use your SDR as a cheap Panadapter – A Panadapter is a device that can display the RF spectrum of your receivers IF output. Many transceivers have an IF output port on them intended for use with a Panadapter. Both the RTL-SDR & AirSpy SDRs make an inexpensive Panadapter. This is relatively simple to do if you have access to your transceivers IF output and know what the IF frequency is. Here is additional information on how to do this: <https://www.rtl-sdr.com/rtl-sdr-as-a-cheap-panadapter/>

(7) Receive NOAA weather satellite images – NOAA operates weather satellites which transmit at around 137 MHz and orbit the earth up around 800 Km. The imagery is SSTV transmitted as an FM modulated signal. Here is a really good tutorial on how to do this with lots of pictures: <https://www.a-centauri.com/articoli/noaa-poes-satellites-reception>

(6) Track aircraft using ADS-B air radar – Modern planes are equipped with ADS-B transponders that transmit at 1090 MHz. These transponders transmit periodic location and altitude information to air traffic controllers. The RTL-SDR can be used as an inexpensive ADS-B receiver. Here is information on how to do this:

<https://www.rtl-sdr.com/adsb-aircraft-radar-with-rtl-sdr/> The link in the article for the RadarBox AirNav software isn't useful but here is a better link: <https://www.airnavradar.com/legacy-software-downloads> . You can't use the AirSpy HF+ Discovery SDR for this, as its maximum frequency is only 260 MHz but the RTL-SDR will work fine.

(5) Use an SDR as a cheap spectrum analyzer – An RTL SDR can be used as a spectrum analyzer using a program called Spektrum that can be run on a Windows or Linux OS. For more information on how to do this see this article

<https://www.rtl-sdr.com/spektrum-new-rtl-sdr-spectrum-analyzer-software/>

(4) Listen to the ISS or satellites – N2YO has a great website site that tracks and lists the popular commercial and amateur radio satellites including the ISS: <https://www.n2yo.com/> . I've used this site for making a list of satellite passes available for Field Day. Another good web site is:

<https://www.amsat.org/#> Armed with this information and a simple directional antenna you can listen in on the fun. On some amateur radio satellites, you may just hear their periodic ID beacon in CW or phone conversations including from the ISS. Know that all of these satellites are not geosynchronous meaning you will have to track them (move your antenna) as they race across the sky.

(3) Receive amateur radio SSTV signals – Slow scan tv is a method of transmitting still images popular on some amateur radio frequencies like 14.230 MHz. Here us a list of popular frequencies:

<https://www.amateur-radio-wiki.net/sstv-frequencies/> In addition to SDR# you will need a program called MMSSTV that you can find here

<https://hamsoft.ca/pages/mmsstv.php> . Here is a YouTube video on how to put everything together <https://www.youtube.com/watch?v=ok6CFVmNSOY>

(2) Explore the world of VHF/UHF communications – If you have the RTL-SDR you can explore the following VHF / UHF bands; 50-54 MHz, 144-148 MHz, 222-225 MHz, 420-450 MHz, 902-928 MHz, and 1240-1300 MHz. If you have the Airspy HF+ Discovery you can explore the 144-148 MHz & 222-225 MHz bands. Either way you can explore FM repeaters and find a directory of them here:

https://www.repeaterbook.com/repeaters/index.php?state_id=none . Simplex FM activity can be found on the following national calling frequencies 52.525 MHz, 146.52 MHz, & 446.0 MHz. And the simplex SSB / CW calling frequencies are 50.125 MHz, 144.200 MHz, 222.100 MHz, 432.100, 903.100, & 1296.100 MHz.

(1) Explore the world of MF/LF communications – If you have an AirSpy HF+ Discovery SDR you can explore the 630m (472-479 KHz) & 2200m amateur radio bands (135.7-137.8 KHz). There used to be a comprehensive 630m web site: <https://472khz.org/> but it doesn't seem to be operational anymore. There are also still some commercial LF / MF frequency beacons around though they seem to be steadily decommissioned. Here is a listing of long wave radio beacons <https://dxinfocentre.com/ndb.htm> The RTL-SDR with its lower frequency limit of 500 KHz unfortunately cannot be used for this.

Antenna Corner John KK1X

I don't have anything to report this month. I've collected the components to build the multi-band beam outlined in the February issue of QST. I really only needed to purchase the aluminum angle and a bag of 2.5" hose clamps. I hope to expound on the construction details for a later article.

Have you seen the [DX Commander](#)? It's a multi-band quarter-wave vertical designed and sold by Callum M0XXT. There are several models, and Callum is nice enough to publish *everything* regarding his antennas, knowingly allowing others to replicate his products. No secrets. Anyway, I was inspired by my friend Mark VK4MFX having built one. I already had the 40' mast and a bunch of wire. I used a bit of aluminum angle as a common feed point, some large PVC plumbing bits, and a few plastic cutting boards from Walmart to serve as spreaders. All the parts are roughed out and ready for tuning.

The clone and the beam are waiting for warmer weather.



DXer's Notebook

Propagation

Les N1SV

This is the first of a series of articles related to DXing that I hope might be useful to both those club members who haven't been bitten by the bug, as well as those veteran DXers. DX refers to long-distance communications and for the HF bands typically this refers to making contacts with international stations.

For those new to DXing you may be wondering about what HF band to choose or what time of the day would be best to attempt to make international contacts. It really depends on the propagation characteristics of the particular band, the time of day and or season of the year, and where we are in the solar cycle. While 20m may be the most well-known band for DX its also the most competitive. Right now, I think 10m or 15m might be a better choice for newcomers.

Propagation characteristics vary somewhat by band and are heavily influenced by sunspot activity. Propagation on the 20m through 10m bands is dictated by the F layer of the ionosphere and the footprint the sun makes on the earth. Shortly after our sunrise these bands come alive with signals from Europe & Africa, as the F-layer ionizes. The first band to open is 20m and then successive higher bands, 17m, 15m, and so on. Around midday here on the East Coast, signals from Europe will get weaker as the sun sets over there and the bands begin to close in that direction. As the sun shifts here to being over the Americas, South American stations will come into focus and European stations will begin to disappear. The only exception here will be 20m, as it will stay open well past the European sunset and it could be open all night for them. In mid-afternoon we will start to hear signals from the Pacific. As we get closer to our sunset, these signals will get stronger and those from Asia may appear. Some period of time after we're past our sunset, these bands will begin to close with signals disappearing from the higher frequency bands first then the lower frequency bands. Again, the only exception may be 20m, which could stay open for an extended period of time.

The 30m band is unique in that it shares characteristics with both the 20m and 40m bands. The band seems to always be open somewhere internationally. From midday well past midnight European & African stations and even those from Asia will be heard. And from early morning until past midday, Pacific and Asian stations will be heard.

The 40m band is for the most part a night-time band, however signals from Europe & Africa will start to be heard here from our late afternoon and continue until past European sunrise (very early morning for us). For several hours just past our sunrise, signals from the Pacific and Asia will peak.

The 80m & 160m bands are strictly night-time bands. They open to the East at sunset and close to the East after the European sunrise. To the West the bands open after sunset in the Pacific and will stay open until our sunrise. South American stations can be heard anytime it's dark but will be strongest during mid-evening hours.

The time of the year dictates the level of natural noise level (QRN) on the low bands (40m and down). During our summer, thunderstorms locally as well as more distant ones can make DX communications impossible on 80 & 160m. Where we're at in the solar cycle also dictates what bands are apt to have the best propagation. Right now, we're at the peak of the solar cycle, so the higher bands (20m and above) have the greatest possibility of working DX. And not just working any DX but some really long-haul paths and therefore hard to reach places. Now is a great time to be a DXer! While the bottom of the solar cycle may be the worst time for the higher bands due to the lack of sunspots, it's the best time for the low bands. Noise is at a minimum and propagation is optimum (especially during the winter months).

Upcoming DX Events:

ARRL International DX Contest CW 2/15-2/16

VK9XU (Christmas Island) 2/18-3/4 <https://vk9-2025.topdx.de/#welcome>

VU2DSI (India) 2/20-2/24 [AU6LON - Callsign Lookup by QRZ Ham Radio](#)

VP9/N1SV (Bermuda) 2/28 Active on FT8 F/H WARC bands

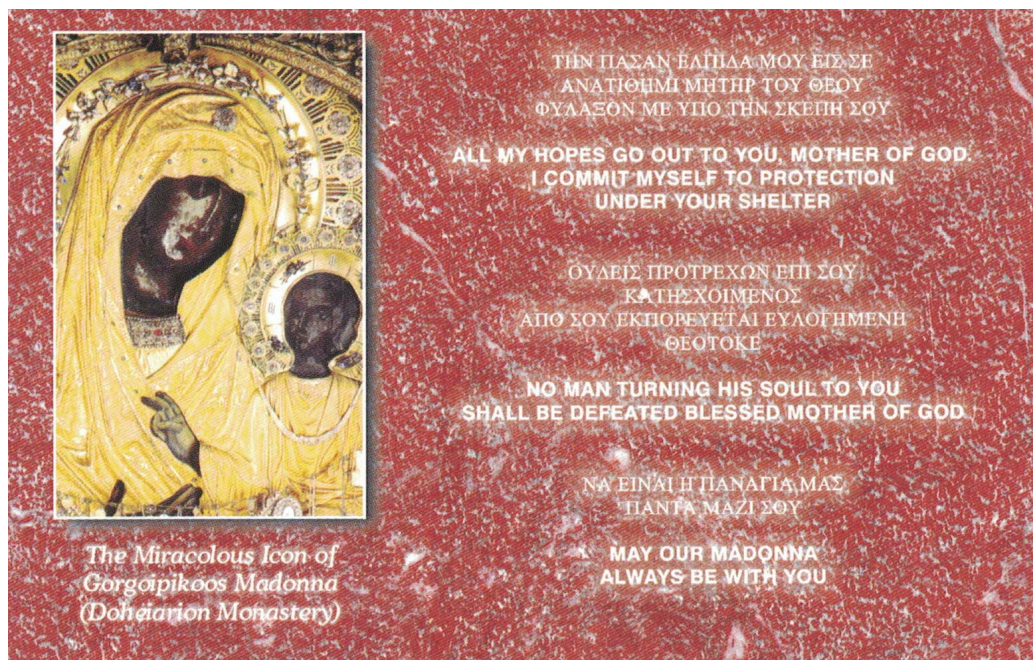
(VP9I in ARRL DX SSB)

ARRL International DX SSB Contest 3/1-3/2 <https://www.arrl.org/arrl-dx>



Mount Athos is a mountain in Northeastern Greece governed autonomously and therefore considered by the ARRL as a separate DXCC entity. It is home to a monastic community that dates back to 800 AD. The location had been active periodically by the famous Monk Apollo who died in 2019
<https://www.arrl.org/news/dx-voice-from-mount-athos-monk-apollo-sv2asp-sk>

This QSL card was my first contact with this very rare DXCC entity in 2000. In late January 2025 a group of hams was invited to active this rare entity using the call SV1GA/A. They operated for several days but were then told to cease operations and went home. Little else is known right now including if they will be able to return or what the validity of those contacts will be for DXCC credit.



Hooked on Phonetics

An introduction for the new licensee

Skip K1NKR

<https://en.wikipedia.org/wiki/Soundex> Do you remember the old TV show (or maybe it was just a network segment) Hooked on Phonics? My kids grew up on it. They learned the alphabet. They learned sounds. And being raised all over the country, they grew up without a New England accent. Their alphabet includes a letter seldom used around here. You know, the one we call “ah,” positioned between “cue” and “ess.”

For those of us who still use the voice modes, getting the point across—especially getting callsigns correct—can be a challenge. “Thanks, KA1ABC, ...or was that AA1JDZ. Five-nine-plus. One hundred percent copy.”

Many of the letters in the English language sound alike. Consider the groups a, j, k; b, c, d, e, g, p, t, v, and z; f, s, and x; i and y; and m and n. This is why we use phonetics to get through.

While the study of language’s sounds goes back to the sixth century BC, the use of a phonetic alphabet really caught on with the development of the telephone. Multi-national standard phonetic alphabets didn’t catch on until World War II. In the late 1940s, the ICAO (International Civil Aviation Organization) insisted that a phonetic alphabet word set be developed that:

- 1) used a live word in each of the three international working languages
- 2) was easily pronounced and recognized by airmen of all languages
- 3) had good radio transmission and readability characteristics
- 4) had a similar spelling in at least English, French, and Spanish, and the initial letter was the letter the word identifies
- 5) was free from any association with objectionable meanings.

Several options were proposed and tried. A revised alphabet was adopted on 1 November 1951, to become effective on 1 April 1952 for civil aviation. Following some corrections, a final version was implemented by the ICAO on 1 March 1956, and the ITU (International Telecommunication Union) adopted it by 1959. The extended story of this process can be found at https://en.wikipedia.org/wiki/NATO_phonetic_alphabet. Also see QST for February 1954 (p. 56) and May 1989 (p. 60).

Incidentally, in 1918, a phonetic algorithm called Soundex (<https://en.wikipedia.org/wiki/Soundex>) was invented and it was later used in the 1930s to analyze Census information. Soundex is based on the fact that letters that can be linguistically interchanged (but, admittedly, not necessarily aurally confused) tend to fall into groups: b, f, p, and v; c, g, j, k, q, s, x, and z; d and t; and m and n. “Devil” in English is “teufel” in German. Playing with Soundex can be a lot of fun and a way of exploring inter- and intra-language similarities.

There is one phonetic alphabet but it has a couple of names. The NATO (North Atlantic Treaty Organization) Phonetic Alphabet is currently officially denoted as the International Radiotelephony Spelling Alphabet (IRSA) or the ICAO phonetic alphabet or ITU phonetic alphabet

The phonetic alphabet we all should use is Alfa, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliett, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, and Zulu.

These words are pronounced: AL fah, BRAH voh, CHAR lee (or SHAR lee), DELL tah, ECK oh, FOKS trot, golf, ho TELL, IN dee ah, JEW lee ETT, KEY loh, LEE mah, mike, no VEM ber, OSS cah, pah PAH, keh BECK, ROW me oh, see AIR rah, TANG go, YOU nee form (or OO nee form), VIK tah, WISS key, ECKS ray, YANG key, and ZOO loo. Note the syllable emphasis. It helps avoid mistakes.

Don't, don't, don't fall into the oft-abused habit of making up your own phonetics. On the air you'll often find hams using place names like Argentina, Belgium, China, or cutesy phrases like "with one empty beer mug." First of all, national languages differ—Germany is really Deutschland and you'll be back to the "was that a G or a D" conundrum. And while cutesies may help recall an old QSO friend, they really don't get the message across on a noisy band. (The worst phonetic alphabet I've found is one in which none of the word pronunciations match the intended word, e.g., are, bdellium, cell, ...gnat, ...sell, etc.)

Of course, CW aficionados have no need for phonetics. And we here in Massachusetts are fortunate because the Morse apostrophe is four dashes—the same as TO. So saying that your QTH is New'n can be sent as N-E-W-'-N or N-E-W-T-O-N with no delay in transmission.

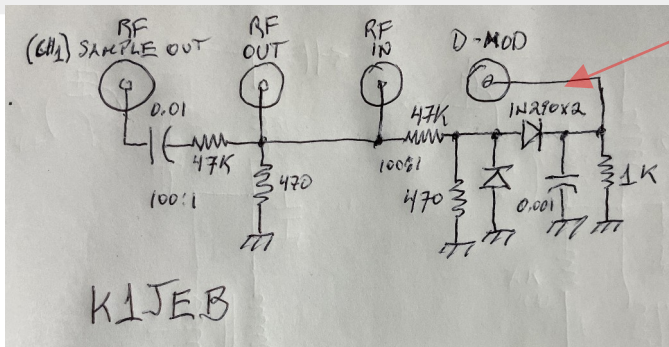
Working POTA John KK1X

I've not retired from POTA, but I'm progressing at a much slower pace than last year, when I committed to 500 POTA contacts a month. I did manage that goal. So far in 2025, I have made, I think, 14 contacts, all during Winter Field Day. I was operating phone, but had a sore throat so didn't manage a lot of contacts.

AM Transmitter Modulation Station Monitoring

John K1JEB

I restored a Heathkit DX-100 AM transmitter. In doing so I also modified the circuitry to the 6146B final amplifier to improve the linearity during AM modulation. To test the results I needed to be able to monitor the modulated signal output. The usual testing is to watch a Trapezoid on an oscilloscope. The Vertical input or CH1 on a dual-trace scope is used to watch the amplitude of the AM carrier. The Horizontal input or CH2 on the scope monitors the demodulated audio from the modulated carrier. To accomplish this I needed to make a test jig, adapted from a design by Clark Burgard KB1NFS.



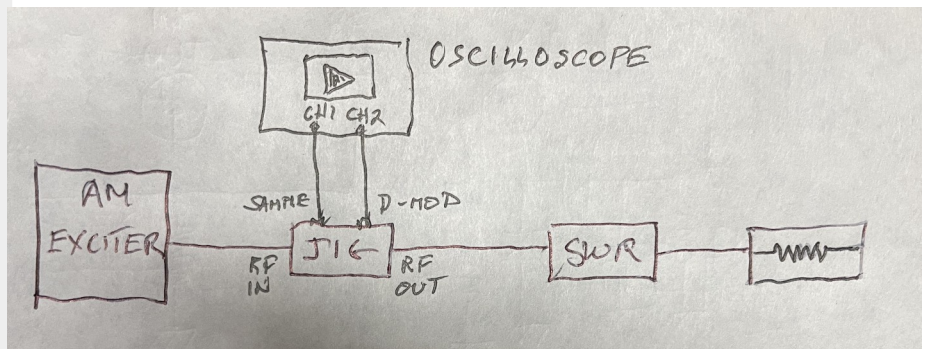
Schematic of the test jig



Completed test jig

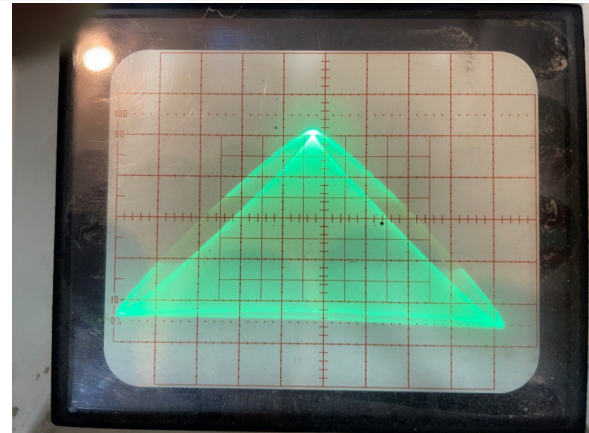
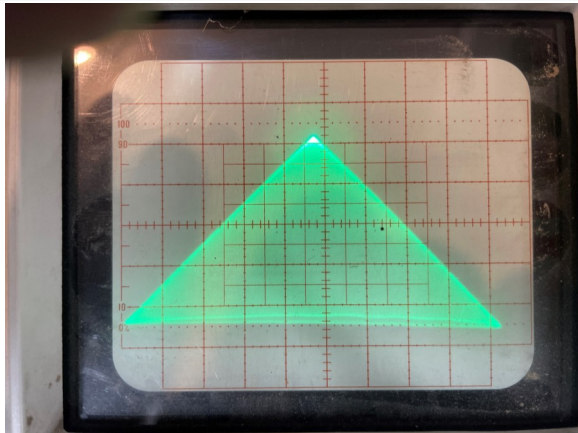
Errata: The diodes are not 1N290 but 1N270 germanium 100 PIV diodes. The 1N34 can also be used but they are rated for 30v PIV. If you use silicon diodes such as the 1N614 your trapezoid peaks will be come rounded at low transmitter power do to the 0.6V forward voltage drop. vs the 0.3V for germanium diodes.

When using this jig connect the the jig between the transmitter and the dummy load through the pass through RF connectors. Then add a cable from the RF Sample connector to CH1 or Horizontal connector on the Oscilloscope. Next connect the a cable between the D-MOD connector to t CH2 or Horizontal connector on the Oscilloscope.



Next step is to setup your oscilloscope and place it in the X-Y mode. On my 566 Tektronix scope I would be turning the Time Base knob fully clock wise. Immediately adjust the screen brightness down to decrease the spot on the screen or you will burn a hole in the CRT screen phosphor.

Put an audio signal into the phone jack on the transmitter and adjust the audio frequency generator to 1Khz audio signal with the signal output set to zero. Next turn on your AM transmitter and after a 2 min warm up period key the transmitter to send AM signal (after you tune it up for maximum output). You should see a vertical line on the screen of the oscilloscope. This represents the CW carrier amplitude from the transmitter. You may need to adjust the the CH1 gain switch on the oscilloscope for a display vertical height. Next, increase the output signal from the Audio Signal Generator until you see the Horizontal trapezoid pattern being displayed on the screen of the oscilloscope:



With a 100% modulation you should see a perfect trapezoid with straight lines along the edges from the bright point on top to the wide base. (left) If you want to flip the image by 90- degrees just swap the cables between CH1 and CH2. If there is any deviation from this image then you have a problem with your transmitter. On the right is an example of a phase linearity between the or drop in frequency response in the audio.

For under modulation the tip will be flattened. For over modulation the tip will form a vertical line.

For further interpretation of the possible trapezoid patterns see the older Amateur Radio Hand books printed in the 40's, 50's and 60's in the AM mode chapters. You can also purchase a ready made commercial jig at CleanRF.com as seen here:



They do come at a cost, but if you don't want to build one you at least buy one for \$159.95. I had the parts. This commercial unit you can connect a set of cans and listen to your demodulated signal. This is something I will do as well to my DIY unit.

73

John Bielefeld K1JEB



Recent (unusually large) Saturday AM breakfast gathering at Tiny's in Ayer. We normally occupy one large and one small table. This time I count two large and three small to accommodate this crowd of at least 12.

George
Kavanaugh
KB1HFT Photo

The crowd (l-r): Les N1SV, Skip K1NKR, Jim N8VIM, John KK1X, Jim AB1WQ, Matt KC1TUV, Max (hiding behind) John K1JEB, Peggy KC1EIV, Angela, Rob K1RTD, and George KB1HFT behind the camera. Oh, and I think I'm missing someone...

Treasurer's Report
Ralph KD1SM

A treasurer's report was unavailable at press time.

Business Meeting Report
John K1JEB

A secretary's report was unavailable at press time.

Nashoba Valley Amateur Radio Club
PO Box 900
Pepperell MA 01463-0900
<https://n1nc.org>

President: Bruce Blain K1BG
Vice President: Les Peters N1SV
Secretary: John Bielefeld K1JEB
Treasurer: Ralph Swick KD1SM

Board Members:
Fred Darling KB1RGT(2024-2025)
John Griswold KK1X (2024-2026)
Jim Hein N8VIM (2024-2027)

N1NC Trustee: Bruce Blain K1BG

Join NVARC! Annual dues are
\$15 individual, \$20 family

Contact us on the N1MNX repeater:
442.900(+) PL100
147.345(+) PL100
53.890(-) PL100

This newsletter is published monthly. Submission,
corrections, and inquiries should be sent to

editor@n1nc.org

to reach the newsletter editor.

Editor: John Griswold KK1X
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