



Key Klix May 2026

The Monthly Q-S-T de the
 MERIDEN AMATEUR RADIO CLUB & WALLINGFORD AMATEUR RADIO GROUP

MARC 2026 MISSION STATEMENT

To create an engaging space for members to explore the science and enjoyment of amateur radio, to support the community's emergency needs (Town OEM) and to provide hands on training for members and prospective radio amateurs.



FIRE IN THE HOLE!

Joe KC1WNJ brought in his homebrew antenna launcher to the OEM for Show & Tell on April 4. Read all about it and all the other happenings in April in Ted's "At the Clubhouse" feature starting on **page 11**.

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"It's the Radio News that's fun to use"

YOUR 2026 OFFICERS

President



DAVE TIPPING
 NZ1J

Vice President



BILL HUGGINS
 NR1B

Treasurer



GEORGE BUCCI
 AC1SK

Secretary



JULES LORUSSO
 KC1STF

Station Manager



ROB CICHON
 K1RCT



MIXING FREQUENCIES

The President's Post, by Dave, NZ1J

The Technician Exam question pool asks us as a multiple-choice question, "Which of the following is used to convert a signal from one frequency to another?"

The correct answer is "Mixer".

Mixers are as important as amplifiers, oscillators, and filters in radio circuits. But, they are probably the most difficult to understand of those four circuits.

As the name implies, a mixer combines, or mixes, two signals. The result of that mixing is two new signals that are entirely new frequencies. The frequencies of the new signals are well defined. One is the sum of the original two frequencies. The other is the difference between the original two frequencies.

As an example, if a 2 MHz signal and a 3 MHz signal are mixed together, they will create the sum frequency (2 + 3 = 5 MHz) and the difference frequency (3 - 2 = 1 MHz).

As another example, if a 7.100 MHz signal is considered to be an RF carrier frequency, and a 1 kHz signal is considered to be a modulating frequency, the new sum and difference signals (7.099 MHz and 7.101 MHz) are upper and lower sidebands. That's an example of a mixer being used as a modulator.

The math behind the unique behavior of the mixer is defined in a Trigonometric Identity that was developed more than 200 years ago:

$$\sin(A) \times \sin(B) = (1/2)\cos(A + B) - (1/2)\cos(A - B)$$

This identity tells us that a sine wave of frequency A, when multiplied by another sine wave of frequency B, produces the sum (A + B) and difference (A - B) frequencies.

And, the above identity also tells us that mixer circuits are analog multipliers. That is, the voltages of the two input signals at every moment are multiplied together to create the output. That one output contains both the sum and the difference frequencies.

Analog multipliers can be purchased. AD633 and AD835 are examples of integrated circuits that do analog multiplication. Unfortunately, parts such as those are expensive. Less expensive circuits that approximate the result of multiplication are often used instead. There was a time when dual-gate FETs were commonly used as mixers. And, the NE602, which is now sadly out of production, was used in many homebrew and kit radios.

Here are a few common applications of mixers:

A Direct Conversion receiver converts a received RF signal into a demodulated audio signal in one step. If you receive a CW (Morse Code) signal on 7.050 MHz and want that signal to appear as a 600 Hz tone, mixing the 7.050 MHz with an oscillator in the receiver that is set to 7.0506 MHz will produce the 600 Hz tone.

AM modulation results in a carrier and an upper and a lower sideband. A mixer will produce the sidebands. A slight modification to the mixer will preserve the carrier as well.

The very common and very useful superheterodyne receiver relies on a filter that is set to

a specific frequency. 455 kHz is a commonly used frequency. Any received signal needs to be converted to 455 kHz before passing through the filter. A "local" oscillator in the receiver and a mixer work together to do the frequency conversion.

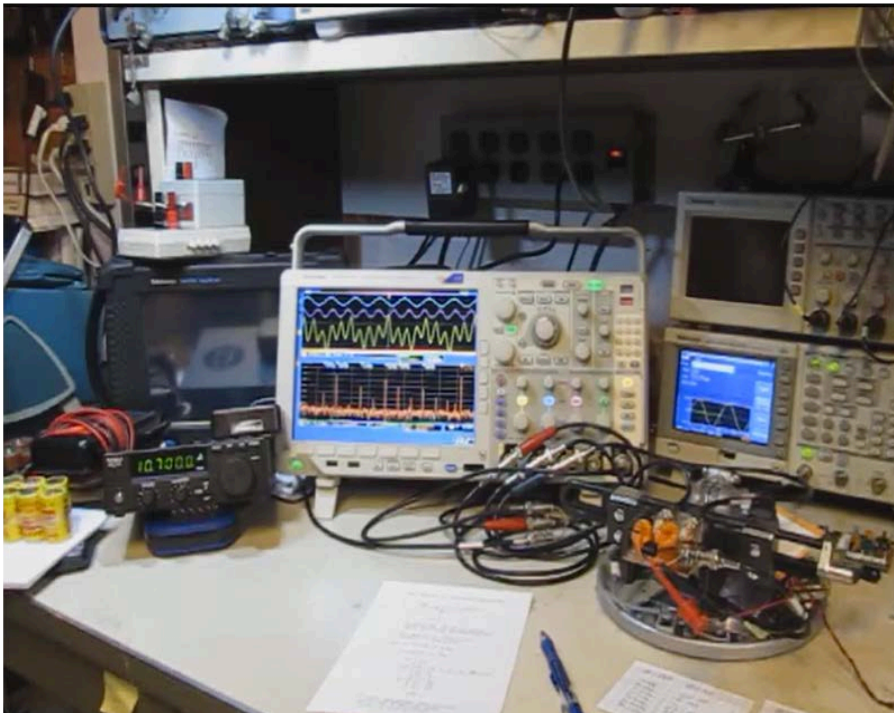
Back in the days of 23-channel CB radios, manufacturers were faced with the prospect of putting 46 crystals in each radio. 23 would set the transmit frequencies, and 23 more would set the receiver frequencies. Instead, the manufacturers relied on mixers and a somewhat smaller set of crystals. A bank of six and a bank of four crystals can be mixed together to create 24 frequencies. ($6 \times 4 = 24$) Of those frequencies, 23 would be used and one would be ignored. To receive, all that was necessary was another bank of four crystals. That new bank of four would be mixed with the original bank of six to create all the receiver frequencies. The result was radios produced with 14 crystals, rather than 46.

If you found this column to be a bit dense, it's because mixers, like many aspects of radio, can't easily be covered in one or two pages. Saturday mornings at the OEM are a great time to dig deeper.

Dave NZ1J

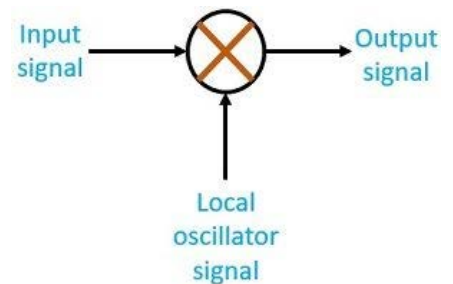


Take a Deeper Dive...



For those interested in taking their understanding of IF stage mixing, we recommend checking out

"#83: Basics of RF Mixers in Radio Receivers / Mixer Tutorial / Frequency Conversion," an excellent YouTube video presentation on the topic by W2AEW, Alan Woulke [here](#).





THE KEY KLIX KUDOS AWARD

The Meriden Amateur Radio Club celebrates the personal achievements and contributions to the world of Amateur Radio of the following members as recognized and nominated by their peers.

May 2026

Jim Savage, N1ZN

for proposing the KeyKlix Kudos Korner
Monthly award program format.

Nominated by Dale Clift, N1AL

Eric Olsson, KB1JL

for organizing MARC's communications
support at the 2026 Cheshire Half Marathon

Nominated by Jules LoRusso, KC1STF

John Yusza, K1LYP

for helping a MARC member make
their first CW Contact at the OEM

Nominated by Al Kaiser, N1API

Mike Ash, K1LHO

for his work on the repeater committee, the
scholarship committee, and the audit committee

Nominated by Dave Tipping, NZ1J

Al Kaiser, N1API

for leading the 10-10 Castle Craig chapter
and alerting the club of DXpeditions and rare DX

Nominated by Dave Tipping, NZ1J

Bob Kaczor, KE1AU

for his largely unrecognized
work as the club QSL manager

Nominated by Dave Tipping, NZ1J

THE KEY KLIX KUDOS KORNER - is NEW and a great way for you to recognize a peer member who has recently done something notable for the good of the hobby or had a noteworthy personal achievement. Send your nominations to keyklix@w1nrg.com and be sure to include a brief sentence explaining why they are worthy of the award!

Minutes of the April Business Meeting

The following minutes of the April 09, 2026, MARC Business Meeting will be moved for approval at the May 14 meeting.

Meriden Amateur Radio Club (MARC)
BUSINESS MEETING MINUTES
April 09, 2026

7:00 - 8:00 PM EST via Zoom

Submitted by KC1STF, Julian LoRusso, MARC Secretary

Quorum: Our club secretary, KC1STF Jules LoRusso confirmed a quorum:
Membership per April 2026 Roster: 171
Minimum required for Quorum: 17 members + 2 officers,
one being the President or Vice President
In attendance: 23 members + 3 officers

In Attendance:

Officers: NZ1J David Tipping (President)
K1RCT Rob Cichon (Station Activities Manager)
KC1STF Jules LoRusso (Secretary)
Absent: Bill Huggins NR1B (Vice President), George Bucci AC1SK (Treasurer)

Members:

AB1DQ	Jimmy Suprenant	KC1NHE	Reed Hansen	N1LES	Joe Murray
AC1TY	Andy Rudczynski	KC1OYN	Rick Becker	N1ZN	Jim Savage
K1LHO	Mike Ash	KC1TSG	Jim Drexler	W1BRY	Don Chepurn
K1LYP	John Yusza	KC1TSX	Mike Barile	W1HLP	Scott Martin
KA1YZC	Paul Patnoad	KC1TSM	Ellen Cosgrove	W1YSM	Ed Snyder
KB1JL	Eric Olsson	KC1YUY	Joe Symcak	WB1GFI	Stan Hiriak
KC1ERO	Jason Pintek	KE1AU	Bob Kaczor	WB1GYZ	Bob Biancur
KC1WFB	Lloyd Saberski	N1API	Al Kaiser	W1EDX	Paul Stasieluk

Reports

- Call to Order:** The meeting was called to order at 7:00 p.m. EDT by NZ1J, President Dave Tipping.
- Secretary's Report:** The secretary's report was delivered by KC1STF, Jules LoRusso
 - March 12, 2026, Meeting Minutes
 - Correction requested by Bob KE1AU regarding QSL cards, and the minutes from March 12, 2026 will be corrected to state as follows:
 - QSL cards from Japan were received from QSOs 4 years ago for the W1N event which were received through the bureau requesting returned QSL cards from MARC from a past contest.
 - Bob KE1AU has entered these contacts into LoTW and QRZ databases.
 - Since QSOs were from Japan and international postage was expensive, it was decided no return cards will be sent for this event.
 - The club does return QSL cards to those sending cards to MARC, or if we feel appropriate, send our own cards to a contact of interest.
 - Bob, KE1AU was appointed the club QSL manager by the MARC president several years ago.
 - Thank you Bob!!!
 - Bob KE1AU will exercise his own judgement for future QSL card interactions. o
 - Motion to accept the March 12, 2026, meeting minutes by Jules LoRusso, as published in recent email by Dave Tipping on 04/07/26 with the above correction was accepted by Membership
 - There were no new members this month.

- Some comments on the drop in membership count from 217 last month to 171 this month after members who did not pay their dues were removed from the roster. See comments in General Discussion.
 - Correspondence: None
 - Questions to the Secretary: None

Treasurer's Report: The April 2026 treasurer's report was created by AC1SK, George Bucci (2026 MARC Treasurer) and distributed to members by Dave Tipping on 4/7/26.

- No expenses were presented for approval by club membership for reimbursement.
 - Jim N1ZN suggested the report be expanded to include summaries of income and expenses for the month in addition to what George presented in his report.
 - Rick KC10YN, our former MARC treasure mentioned he created 3 reports each month with varying levels of detail, one being a 3 page summary report which could have some details that George could consider for a more expanded report to membership.
 - Mike K1LHO reminded us that too much detail would lead everyone to not read the report.
 - Treasurers report was accepted by membership via vote.
3. **Station Manager's Report** - The April 2026 station manager's report was delivered by K1RCT Rob Cichon (Station Activities Manager)
- Please refer to the report submitted by Rob and published in email by Dave Tipping on 4/7/26
 - A noise issue on the repeater was resolved. Someone was experimenting with APRS and didn't realize they were causing a problem.
 - No update on equipment loan program.
 - Refer to report for remaining details.
4. **Scholarship Committee** - Jim N1ZN our scholarship committee chairperson provided comments below:
- Applications for the 2026 scholarship program are expected in the next couple weeks.
 - Once applications received, Jim will present a plan to the committee members for review.

Old Business: None

New Business:

5. Recognition

- The topic of a more expanded recognition system was discussed. Presently there are two awards annually and it seemed more could be done to recognize club members who work hard to create valuable programs for the club, or simply reach out to club members needing help with equipment or on-air skills to become better amateur radio operators.
- Jim NZ1N suggested we create a recognition section in Key Klix so club members can write nice notes about other club members who deserve to be recognized.
 - For example, Jimmy AB1DQ, has been doing an outstanding job not only serving as our editor for KeyKlix, but also his stellar work in organizing the Technician license training class for our new potential amateur radio operators and MARC members.
- Al N1API suggested the president include some recognition of club members in his monthly Key Klix column.
 - Dave NZ1J says he's always looking for topics to include in his column. If someone wants Dave to mention something special in the president's letter, just send the information to him.
- Everyone seemed to like the Key Klix Kudos Korner for expanding our recognition of MARC members.

- Send your Kudos comments to Jimmy AB1DQ for next month's Key Klix
- Note, Key Klix articles are due the Friday before the publication date which is either the 1st or 2nd Tuesday of the month.
 - Jimmy will send out reminders in groups.io

6. Discussion on Why Membership roster reduced from 217 to 171

- Membership dropped from 217 to 171 because members who did not pay dues were removed from the roster.
- Al N1API mentioned that members who drop from the roles do come back, particularly around June Field Day
- Back during COVID, Ed W1YSM contributed \$500 to create a "Good and Welfare Fund" that could be used to pay members' dues who are in financial hardship.
 - Thank you Ed for your generosity in that contribution!
- There was a need for clarification of the purpose of the fund. Rick KC10YN suggested the following wording
 - "The Good and Welfare Fund is used to help any member, or prospective member, to receive financial assistance for dues. The member in need of assistance could approach any officer to request help and the process to consider financial support will be kept in confidence between the officers of MARC."
 - The membership voted and approved this wording for future reference.

7. Field day plans for 2026

- Per Dave NZ1J, next month we need to get more serious on planning for Field Day 2026
- Bill NR1B was still interested in setting up an operation in a farmer's field like last year; Jules KC1STF will assist
 - Please check out Bill's article in the March Key Klix on his field day experience in 1969, quite an impressive article with pictures of Bill when he was a young chap.

8. 5 Headsets for Saturday CW

- Dave NZ1J proposed 5 inexpensive headsets be purchased for Saturday AM CW use. Cost ~\$50
- Membership approved the purchase.

9. Welcome Guide

- George AC1SK, Joe KC1YUY, and Jules KC1STF worked on a new 2-page version of the MARC Welcome Guide using former 13 page version as a starting point. Input was also received from Dave NZ1J.
- The exercise was a great success in the spirit of making our MARC operations more streamlined and easier to manage for future club leadership.
- The only suggestion for improvement was from Jim N1ZN suggesting we add a short introductory section prior to what was included possibly from the club president. We agreed this was a good idea and our welcome guide team will create a revision for future use. Tentatively the present version will be used for the upcoming VE session.

10. Motion to work on individual changes to the bylaws then defer update to later date

- Dave NZ1J proposed we work on individual changes to the bylaws that make sense to streamline MARC operations, then once a collection of changes have been approved, we would then update the bylaws with the updates members have already agreed to.
- In the discussion there was concern about how many changes were we talking about, and how long would this take (Jim KC1TSG comment)
 - Dave NZ1J responded, between 5-10 topics, no more than 3-4 months

11. Standardization of Dues Regardless of Payment Methods

- Dave NZ1J proposed that dues for all members will be \$25 regardless of payment method
- Cost for PayPal will be \$1.03 (per Rick KC10YN)

- Motion passed to standardize dues to \$25, regardless of payment method (22 in favor, 1 opposed)

12. Repeater Committee Membership Requirement

- Dave NZ1J proposed the membership requirement for the repeater committee be the same as the scholarship committee. Presently membership requirement was 5 members.
- Motion to make membership requirement “No Fewer than 4 members” passed by membership.

13. Nutmeg Hamfest Town Hall

- Ed Snyder W1YSM reminded everyone the Town Hall to discuss the status and plans for the October Nutmeg Hamfest will be on Zoom, April 23, 2026 at 7-8 PM.
- Members are encouraged to attend to provide input on the logistics for the Hamfest, the guest speaker program or any other suggestions.
- Ed, thank you for being the leader of the Hamfest activity, and I’m sure many club members will be willing to assist to make this year’s event a success.

14. Technician License Class

- Jimmy Surprenant has completed Week 6 of his Amateur Radio Technician Class for the Meriden Amateur Radio club.
- I had the honor to co-lead the instruction session on Radio Signal Fundamentals with Ron Wakefield W1TK. I hear the lab transmitter project that Jimmy and Dave organized was a great success and provided a pleasant break to the instruction sessions focused on test questions and associated fundamentals.
- We all in MARC need to be extremely grateful for all the effort Jimmy invested in organizing this class. Hopefully we will receive a few more club members with great passion for various amateur radio activities.
- We also want to thank the club members who have offered their time to assist Jimmy as instructors. The schedule and list of topics are in the chart below. Please feel free to stop by at the OEM during the class sessions. The classes start at 6:30 PM on the dates noted and run till about 8:00-8:30 PM

Meriden Amateur Radio Club Technician License Class - Working Syllabus - Spring 2026					
Week	Class Date	Topic	Chapter	Instructors	
1	2026-03-03	Welcome & Communicateing with Other Hams	1, 6	AB1DQ Jimmy Surprenant	NZ1J Dave Tipping
2	2026-03-10	Licensing Regulations & Operating Regulations	7, 8	KC1QWH Stephen Rygiel	KC1STM Ellen Cosgrove
3	2026-03-17	Electricity	3	WA1K, Jack Chapman	KC1TSL Charles Vosbrinck
4	2026-03-24	Components and Circuits	3	NZ1J Dave Tipping	AB1DQ Jimmy Surprenant
5	2026-03-31	Radio Signal Fundamentals	2	KC1STF, Jules LoRusso	W1TK Ron Wakefield
6	2026-04-07	LAB: TRANSMITTER PROJECT	X	AB1DQ Jimmy Surprenant	NZ1J Dave Tipping
7	2026-04-14	Amateur Radio Equipment	5	K1LYP John Yusza	KC1QWH Stephen Rygiel
8	2026-04-21	Propagation, Antennas, & Feed Lines	4	W1TK Ron Wakefield	KC1STF, Jules LoRusso
9	2026-04-28	REPEATER COURTESY & NETS - ON AIR DEMO	X	KC1QWH Stephen Rygiel	K1LYP John Yusza
10	2026-05-05	Safety	9	KC1TSL Charles Vosbrinck	WA1K, Jack Chapman
11	2026-05-12	REVIEW	all	AB1DQ Jimmy Surprenant	W1TK Ron Wakefield
12	2026-05-19	VE SESSION	all	N1ZN Jim Savage	K1LYP John Yusza

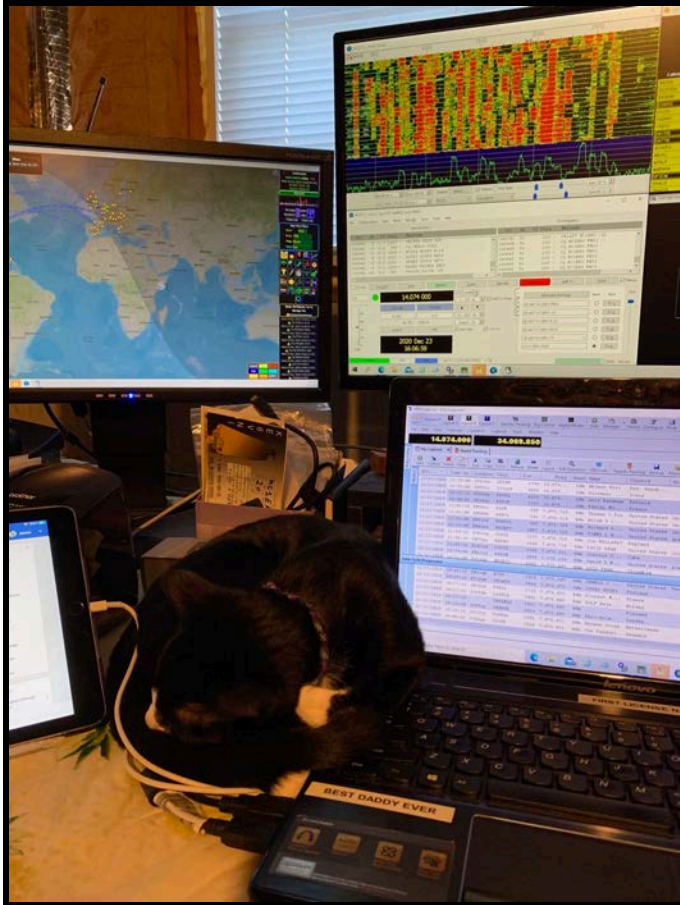
Meeting Adjourned: Meeting was adjourned at 8:05 PM. See you next month everyone!

Respectfully submitted
 Jules LoRusso
 KC1STF



From the Department of Radio Cats More MARC CAT Control!

Club members have responded to the call for photos of their feline shack companions. This month we have _____ RADIO CATS for your consideration...



LEFT: Initially, you may wonder where the kitty is hiding. Look closely, and you will see *Willow* has found a comfortable place to nap, discreetly nestled into the keyboard in the shack of **Jason Pintek's, KC1ERO**.

ABOVE: Meet *Podge*, assisting **Steve Ford, WB8IMY**, with a kit project in his shack.

**CQ CQ CQ
CALLING ALL RADIO CATS!**

*Do you share your
radio space with a
feline friend?*

Send your photos to keyklix@w1nrg.com, and we'll publish them in our next issue!





THE W1NRG NEWSLINE

*“Providing Continuous Waves
of Useful Club Information.”*

Cheshire 1/2 Marathon & More CERT News!

*by Eric Olsson, KB1JL, with additional content by Shawn Warren, KC1NQE,
as published in the Wallingford CERT newsletter*



On Sunday, April 12, members of the Meriden Amateur Radio Club and the Wallingford CERT team assisted with the ION Bank Cheshire ½ Marathon. Volunteers provided communications and key personnel at intersections to help local police and medical teams as runners took to the streets. 942 runners started the race and 935 finished. No incidents were reported.

The charity fundraising event is held annually to raise money for Abilities without Boundaries and other charities, and is sponsored by Ion Bank. **Lloyd KC1WFB** is one of the race organizers.

It was the club's second year of participating and providing communications. It was a great radio team effort, with ideal weather conditions. The club repeater W1NRG provided solid communications to all the course participants with their handheld radios.

Thanks to the following participants in support of our effort:

AC1TY, W1BRY, KA1YZC, KC1TSL, KC1RBY, KC1ERO, KC1VVC, WA1SFH, N1AKN, KC1ISI, K1RCT, WA1NQE, K1PET, N1LES, KC1VQY, KC1TSX, KC1VRG, K1LHO, K1DMS, KC1WFB, K1LYP, KB1JL, and Eric Granoth.

MARC congratulates Mario Vazquez of Farmington, who finished first with a gun time of 1:08:19, and Andrea Condie of New Haven, who finished first among female runners with a time of 1:17:20, and we salute all who ran in the races that day. Full results can be found online [here](#).



Next up for MARC & CERT is the Gaylord Gauntlet. The 2026 Gaylord Gauntlet is a 5K obstacle trail run held on Saturday, June 13, 2026, at Gaylord Specialty Healthcare in Wallingford, CT.

The event features 24+ natural/man-made obstacles over woods and fields, benefiting the Gaylord Sports Association. Registration is open, with prices increasing after April 30, 2026.

Wallingford CERT members can sign up to volunteer online [here](#).

At the Clubhouse *with Ted, KC1DOY*



Saturday, 4 April 2026, was gadget day at the club. **Paul WA1MAC** brought in his [SKTOME Portable Voice Changer](#) for a show-and-tell. It came complete with a built-in sound card and cables. Apple iOS requires a separate conversion cable, and devices with a Type-C interface will need an adapter.

It works with almost any device, such as phones, gaming devices, and computers. It's plug and play, so it needs no driver downloads. It has a long list of modes such as Robot, Cartoon, Baby, Male, and Female. It includes sound effects like Applause and Cheer.

Paul said that he might try using the male-to-female voice change to increase his QSOs since so many hams will jump on a CQ from a YL.

We'll see how well that works. Paul, you may want to change your profile picture on QRZ, too!!!

~Ted KC1DOY

Saturday 11 April 2026, in addition to the usual VE session and code practice, there were some other interesting activities. **Ken KC1TYO** brought in an electronics kit that he was using to build an audio amplifier.

Dave NZ1J gave him some pointers on how to assemble it on a project board. He demonstrated how to correctly align the components in the correct holes in order to avoid an easy mistake to make. (I know because I had the same problem when we did the AM radio build.) Dave went on to explain how to add a few more parts in order to drive a speaker as well as connect an input device to the amp.



Spring Has Sprung...





John KC1KQH brought in his homebrew 70cm antenna that he built in order to receive the ARISS Slow Scan TV (SSTV) transmission from the International Space Station (ISS) starting on April 11, 2025. The event is themed "Humans in Space" to celebrate the International Day of Human

Spaceflight.

Unfortunately, the signal was not strong enough to be completely decoded. Yet, it proved that everything was working, and the next time, with a better pass, he should be able to get the complete picture.

Good luck, John!

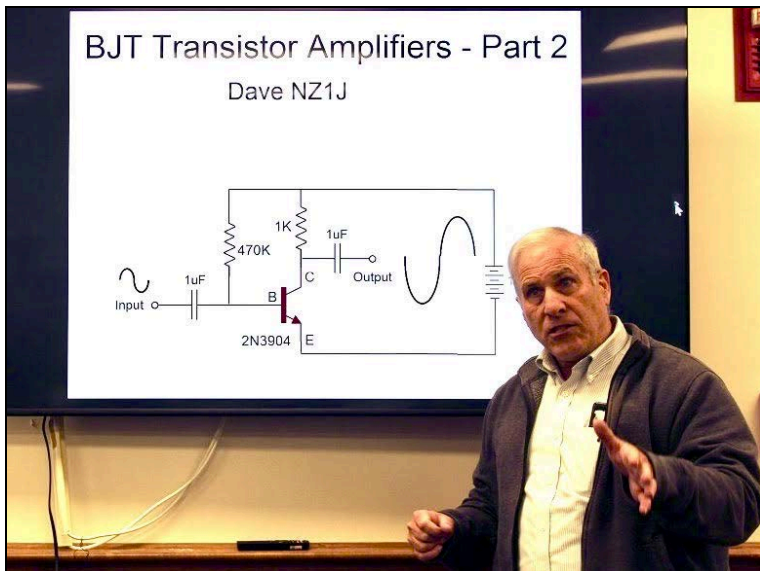
Joe KC1WNJ brought in his homebrew antenna launcher. It is made from 1 1/2" PVC pipe. The black part is a modified irrigation valve with a compressor trigger attached. The compressed air can be provided by an electric compressor or by a standard bicycle foot pump. A Schrader valve is there to attach the pump. You can also see the pressure meter that is used to determine the correct amount of air in the launcher. Joe uses bean bags as ammo for the launcher.

He originally used a capped section of smaller diameter PVC pipe but the bean bags work better.

Kudos to Joe's wife, who stitched up the bean bags for him. Behind every successful ham, there is a good XYL!

~Ted KC1DOY





At our MARC activity meeting on the last Saturday of the month, 25 April 2026, **Dave, NZ1J**, presented the second session on Class A bipolar junction transistor (BJT) as amplifiers. Like the first session last month, the April session was well attended.

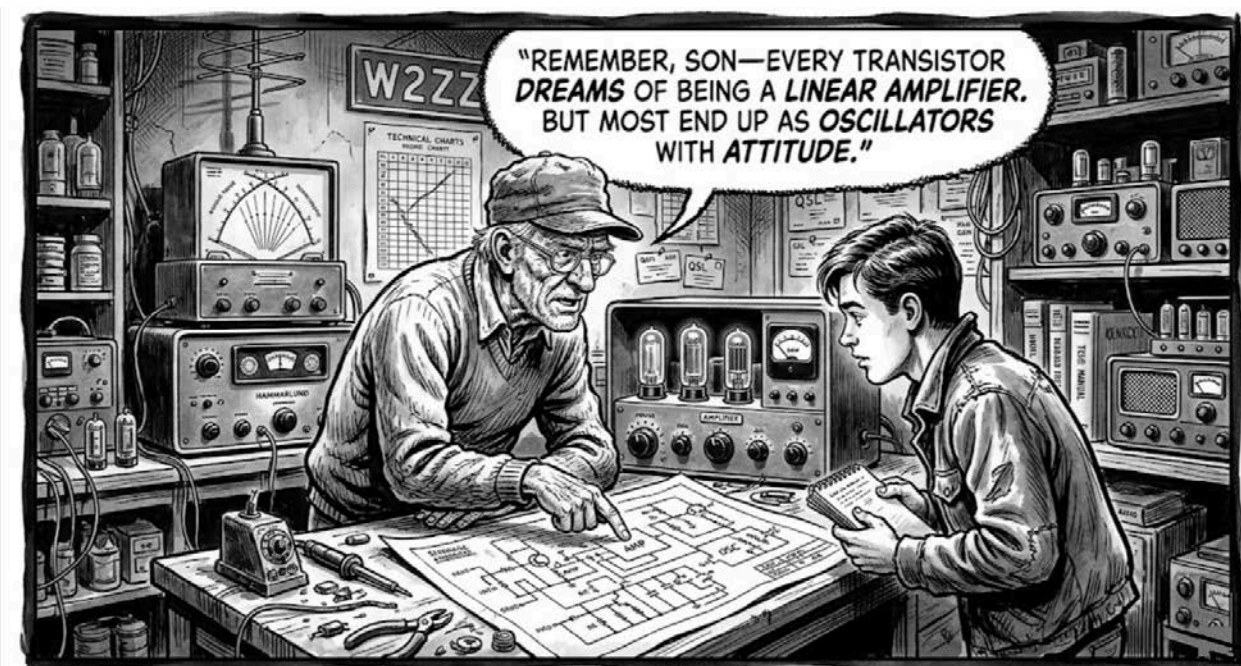
Dave explained positive and negative feedback, how positive feedback reinforces the signal being amplified, and the fact that this leads to oscillation if not carefully controlled; negative feedback reduces gain and stabilizes the amplifier.

Dave also explained how two BJT amplifier stages can be connected in cascade, producing a total gain that is the product of the two stages' individual gains.

Dave concluded this month's session by covering amplifier input and output impedance. Output impedance is determined by the value of the resistor connected to the transistor collector, and how matching the source and load impedances is essential to maximize the circuit's gain. We hams understand the importance of impedance matching when we adjust (tune) our transmitting antennas for an impedance match as close to 1:1 as possible to achieve maximum signal output.

There is yet more to come so look for the next activity meeting announcement. In the meantime, check out this month's slide deck following this article, starting on page 14.

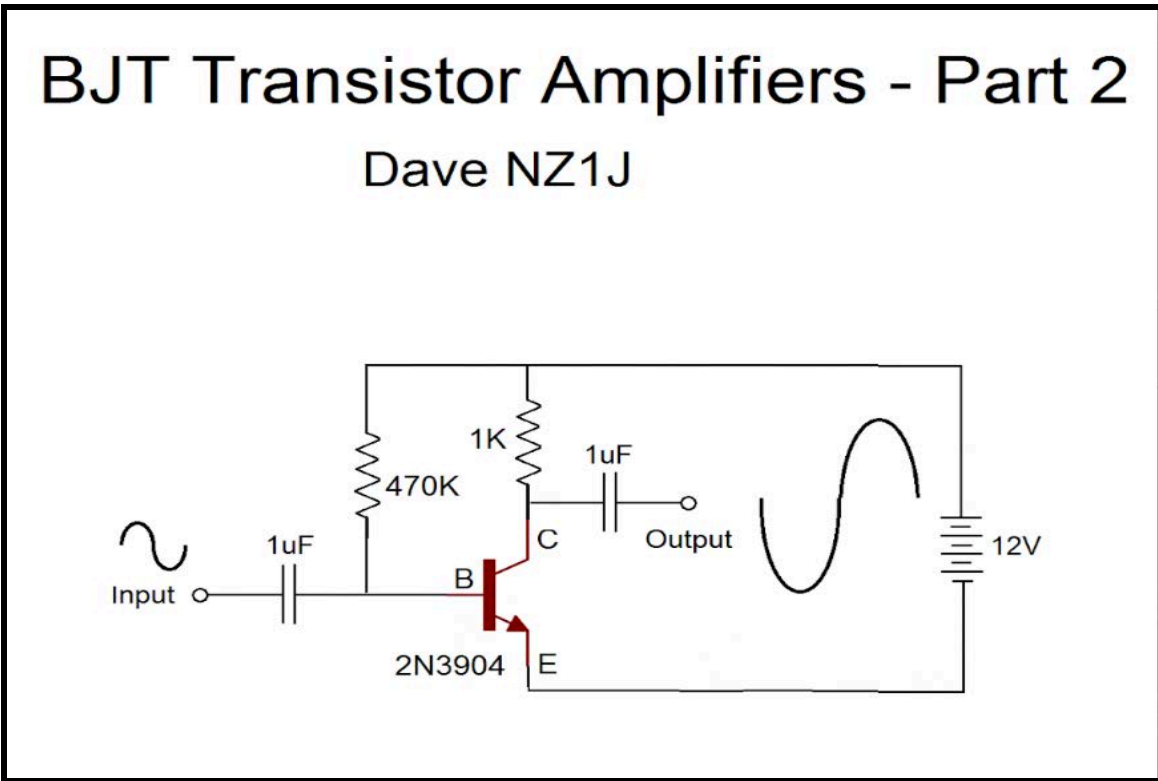
~ Ted KC1D0Y



The more you know...

BJT Transistor Amplifiers Slide Deck

by NZ1J, Dave Tipping, as presented at the April Activity meeting.

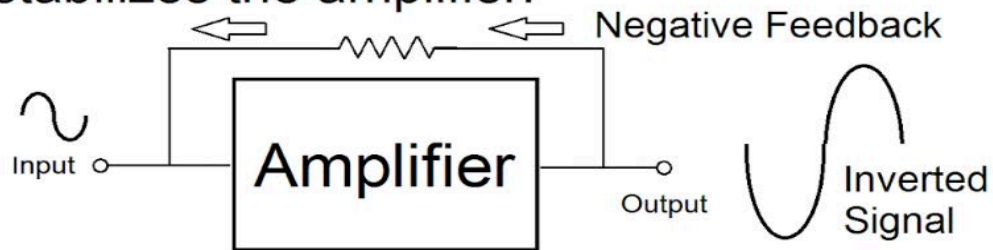


Positive and Negative Feedback

Feedback is just that. Part of the output of an amplifier is fed back to the input of the amplifier.

Positive feedback reinforces the signal and often leads to oscillation.

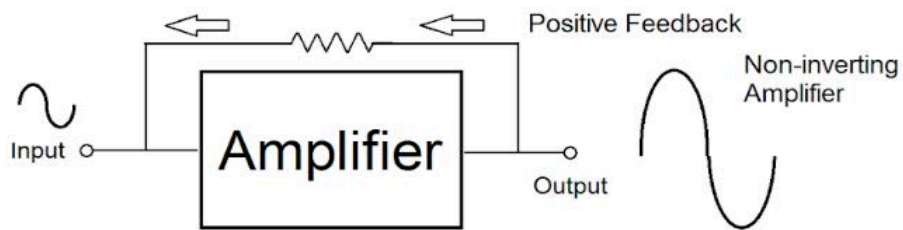
Negative feedback reduces the amplifier gain and stabilizes the amplifier.



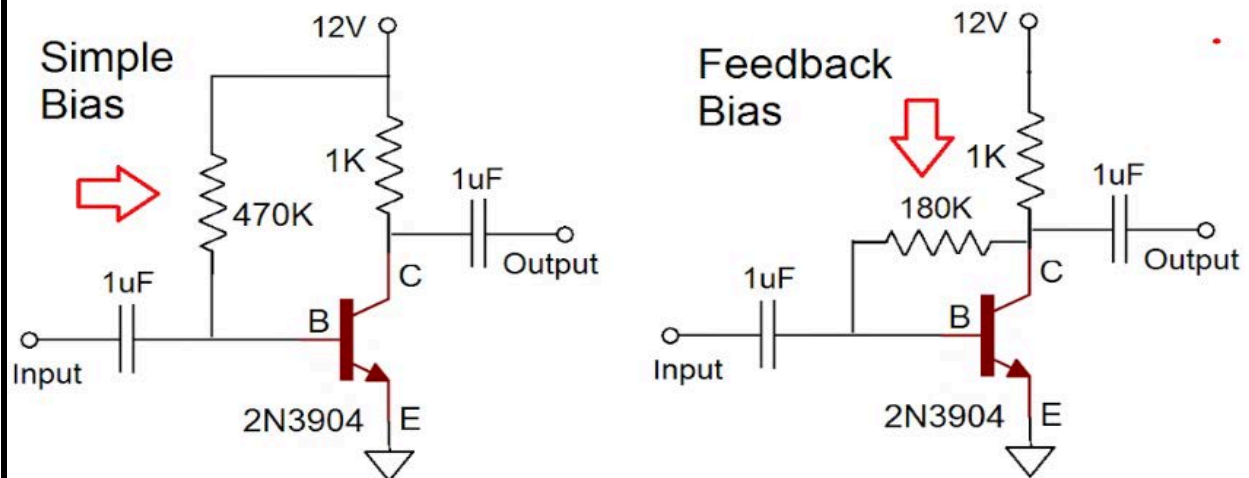
Positive Feedback

Positive feedback often results in oscillation. It's used to make oscillators from amplifiers.

Sometimes, unintentional positive feedback causes an amplifier to oscillate. Public address systems are prone to that sort of oscillation.



Using negative feedback in the bias circuit, the gain is lower, but the circuit is more tolerant of variations in transistor gain.

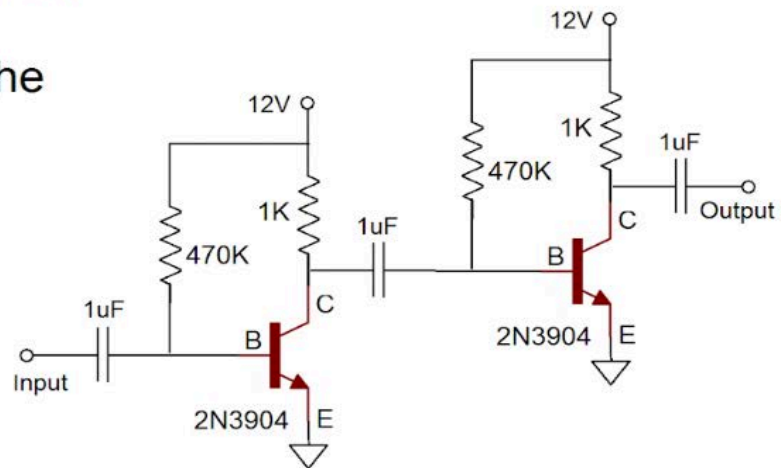


Cascade Connection

Amplifier stages can be connected in cascade. The overall gain is the product of the two stages' gain. If each stage has a gain of 50, the total is $50 \times 50 = 2500$

Note that the loaded gain of a stage is less than the unloaded gain. The second stage loads the first stage.

Also note that each stage inverts the signal. The two stages result in no inversion.



Impedance and Loading

Like any source or load, amplifiers have an input impedance and an output impedance.

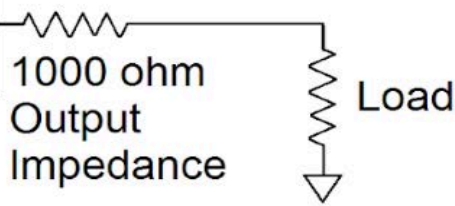
The amplifier we've been considering has an input impedance of about 1000 ohms. The output impedance is just determined by the value of the resistor connected to the transistor's collector. In our example, that is also 1000 ohms.

If a low impedance, such as an 8 ohm speaker, is connected to the output of the amplifier, the voltage gain will be decreased a lot.

'Impedance Matching' maximizes the circuit's gain.

An Example of Loading

Amplifier with
10V Output

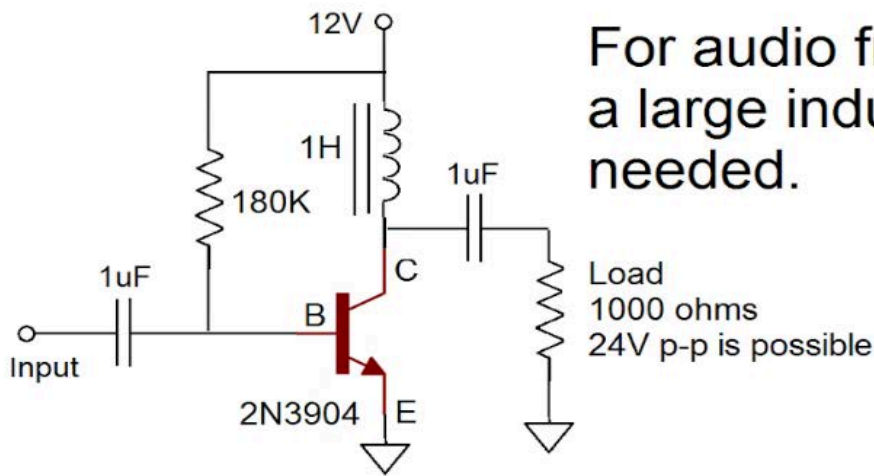


Load Res.	Load Volt.	Load Curr.	Load Power
9000	9V	1mA	9mW
3000	7.5V	2.5mA	19mW
1000	5V	5mA	25mW
500	3.3V	6.7mA	22mW
200	1.7V	8.3mA	14mW

Matching the source and load impedances results in the maximum power in the load.

An Inductor in place of the Resistor

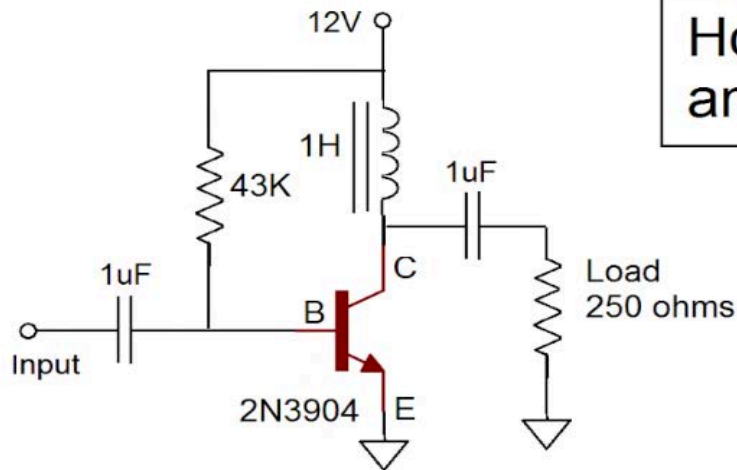
The resistor connected to the collector terminal takes a lot of the output power. An inductor is more efficient. However, there is a risk of excessive voltage damaging the transistor.



For audio frequencies, a large inductor is needed.

How much power can it make?

The 2N3904 is limited to 40V, 200mA, and 625mW. Setting current to 50mA meets these requirements.



How might we drive an 8 ohm speaker?



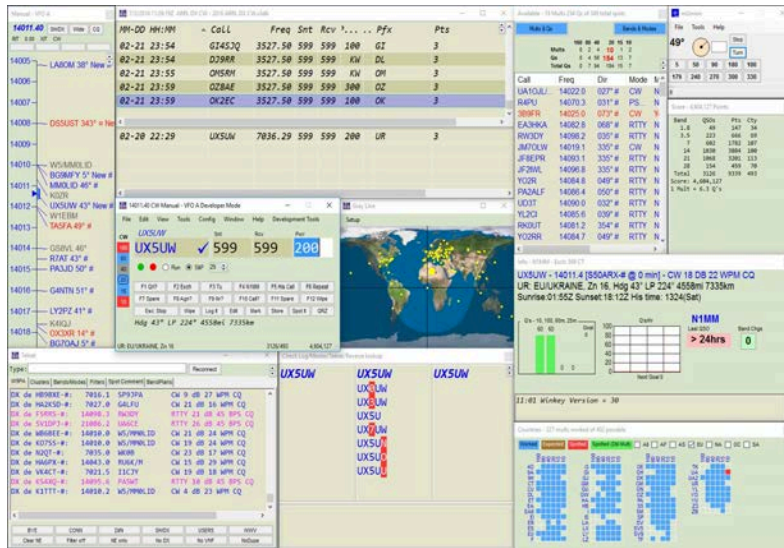
The more you know...

N1MM Logging Software Review

by KC1SA, Steve Allen, KeyKlix Contest Editor



Spring is here, although 25-degree morning temperatures of this past week had me scratching my head a bit and asking, "What month is it?" The fall and winter contests are behind us, and most are probably gearing up for Field Day, which is just two months away. Logging software preference is somewhat of a personal choice, but once you use one and get used to its nuances, you stick with it. For me, when I got my 'ticket' in 2013, Ham Radio Deluxe was what I used as a daily logging program. At that time, HRD was transitioning from a freeware program to a yearly licensed program, and so I grabbed the last freeware version and stuck with it until 2023. I finally bit the bullet and purchased HRD in '23, but honestly, all the bugs that lived in the freeware version exist today in the paid version.



HRD is the Swiss army knife of ham tools, but is horrible as a contesting logging platform. In 2014, I realized HRD's shortcomings and switched to N1MM+ software for logging QSOs during contests. After each contest, I export the contacts to my HRD logbook. N1MM+ can be a steep learning curve, but there are numerous help resources on the web to help a user out.

This month I was planning to write a beginner's guide to N1MM+, but with so many resources available, why reinvent the wheel? Google is your friend, and the N1MM forums on groups.io are very helpful.

This YouTube video is a basic entry-level introduction to N1MM+. Give it a look.

<https://www.youtube.com/watch?v=gq01KGNuQfE>

I will be taking a short hiatus from articles over the next few months. Nice weather is upon us, radio will take a back seat while Ruth and I see the country. Maybe I'll hear you on the air for Field Day?

73,
Steve

KC1SA

The more you know...

The Loop on Ground (LoG) Receiving Antenna: Introducing the Shielded LoG (SLoG)

An exclusive **KeyKlix** technical guest feature by KZ1S, Steven K. Lamoreaux

ABSTRACT

The Loop on Ground (LoG) antenna is a simple but effective design despite its low efficiency. This is a low-gain antenna that takes advantage of less-than-perfect ground conductivity. The SLoG is less efficient than a half-wave dipole or quarter-wave vertical antenna, resulting in a signal loss of two to three S units at 1.9 MHz in comparison; however, noise levels at two test locations drop from typically S9+ to around S1 to S2, significantly improving the signal-to-noise ratio. This receive-only antenna also provides excellent reception across the U.S. broadcast band (530 to 1700 kHz). This paper describes a variant: the Shielded Loop on Ground (SLoG). A full analysis is presented in an Appendix and addresses the magnetic component of the electromagnetic wave, as usual for a loop antenna. This analysis suggests that it should be possible to construct a shielded Beverage antenna.

a

Note: This antenna design was rejected by both QST and QEX, with a statement that the analysis "is wrong" and that there are "errors"; a request for a copy of a review stating what is wrong and the nature of the errors was not honored. One issue might be the use of the magnetic field component of the electromagnetic wave for the analysis, which can also be applied to the Beverage antenna. ARRL publications do not acknowledge the magnetic component of the wave, which appears to add a complication, while, in fact, detailed analysis is made easier from this approach. Certainly, there might be factors of two missing here and there in the analysis, or grammatical lapses and typographical errors; however, the fundamental physics is straightforward, and the performance is validated using the FCC records of ground wave field strengths from local AM stations, and by on-the-air tests. In any case, the antenna costs practically nothing to assemble; no ladder climbing, no towers, etc. This antenna performs so superbly on 160 m and the AM broadcast band that it is a shame to suppress the idea, hence its inclusion in KK, thanks to AB1DQ.

I. INTRODUCTION

Noise levels from natural and anthropogenic sources in the 160 m band at my location are very high when using slightly elevated long horizontal or short vertical antennas. KM1R, Mike Castellano, whom I see most mornings and afternoons on the commuter train to New Haven, told me that he received AM radio stations from Los Angeles, 8000 miles across the Pacific, while stationed in Southeast Asia around 1970, a region with intense atmospheric noise. The antenna was a simple long loop of wire on the ground. The signal, estimated at the S-5 level, was well above the noise.

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The prospect of a loop placed on the ground was intriguing; however, I was extremely skeptical that this could work. I lack space for a Beverage antenna, KM1R's preferred 160 m antenna. Desperate to solve my noise problem, I explored the loop-on-ground option.

A wire antenna-on-ground or "Rogers Antenna" was described as early as 1919, and it was noted that as a long-wave receiving antenna, its performance is unparalleled. In this article, the antenna is partially buried, and its inefficiency as a transmitting antenna is noted.[1] Who among us have noted that a wire antenna that has fallen often works better (for receiving)? This phenomenon has a sound theoretical basis.

A quick Internet search yields extensive information about the LoG (Loop on Ground) and limited discussion of the BoG (Beverage on Ground). There is general agreement that both the LoG and the BoG work well; however, I am unaware of any source that provides a technical analysis of such antennas. A detailed analysis is presented in an Appendix to this note, available from the author on request. [2]

Among the most detailed presentations of the LoG is by Matt Roberts, KK5JY. [3] Modeling indicates that the loop's total length should be a small fraction of a wavelength and shows directivity. I reproduced these results using EZNEC Pro 6.0. However, a small horizontal loop antenna with a balanced current feed should not demonstrate azimuthal directivity. Furthermore, there seems to be no physical reason for such a loop to optimally be a tiny fraction of a wavelength.

II. DEVELOPMENT OF THE SLOG

Due to the modeling results for a LoG antenna appearing unreasonable, I conducted experiments at home in Guilford, CT. Laying a wire loop is straightforward; no ladders or climbing is required. I concluded that adding an electric field shield to the LoG is feasible, transforming it into a SLOG or Shielded Loop on Ground, similar to the shields used with ordinary loop antennas.

In the 18th Edition of the Antenna Handbook [4], Chapter 5 discusses loop antennas. Equation (1) of Chapter 5 (p. 5-3, also labeled here as Eq. (1) for convenience) gives the voltage, or electromotive "force" (EMF), which represents a voltage induced by energy conversion, across the terminals of a vertical loop antenna:

$$V = \frac{2\pi A N E \cos \theta}{\lambda} \quad (1)$$

where (1) : V = voltage (EMF) between the loop terminals :

A = area of loop in square meters :

N = number of turns in the loop :

E = electric field strength of the EM wave :

θ = angle between the loop's plane and the signal source direction :

λ = wavelength of the EM wave,

in the case of a vertical wave electric field (vertical polarization). Additionally, $V = 0$ for perfect horizontal electric field polarization, in the case of a loop with a vertical plane.

With a shielded loop, $E = 0$, and this equation does not predict any voltage at all; however, shielded loops work effectively when an electrical break in the shield prevents the formation of a competing loop. This conundrum is addressed by realizing that Eq. (1) is a restatement of Faraday's Law of Induction, one of Maxwell's equations, describing the generation of EMF by oscillating magnetic flux. This can be seen as follows: For a freely propagating wave (far from sources), the amplitude of the magnetic field B in an EM wave relates to E as $B = E/c$, where c is the speed of light (with E and B 90° out of phase in space and time, with orthogonal field vectors). Noting that frequency and wavelength are related by $f/c = 1/\lambda$, V is then related to E as

$$V = 2\pi f N A B \cos \theta = N \omega A B \cos \theta = N \frac{d\Phi_B}{dt} \quad (2)$$

where $\Phi_B = AB$ denotes the amplitude of the magnetic flux through the loop, and d/dt represents its time derivative, which, for a harmonic field, is equivalent to multiplying by $\omega = 2\pi f$. Thus, a loop acts as a magnetic dipole antenna, generating voltage between its terminals through the oscillating magnetic flux of the EM wave. The same principle applies to dynamos, alternators, and transformers. EM waves are fundamentally no different; there would be no EM waves without Faraday's Law of Induction.

It should be noted that mention of the magnetic component of the electromagnetic wave fields is shielded away from ARRL technical publications, a trend that began in earnest around 1960. This is likely because it is hard to understand how magnetic fields at the center of a loop can affect the developed loop voltage. This is part of the mystery of Maxwell's equations, which can be understood by employing the magnetic vector potential.

If the total length of wire in a loop antenna approaches λ , it ceases to function as a magnetic dipole antenna and becomes a Quad antenna element, exhibiting maximum sensitivity for signals from directions perpendicular to the loop plane and to the electric field component of the wave, dominating the antenna response. However, adding a shield to the loop forces $E = 0$ along the wire, maintaining the response of a magnetic dipole, as determined by Eq. (1).

Such a shield, often called an "electrostatic" shield in the literature (and in [4]), suppresses direct electric field effects on the loop, even time-varying ones, from local sources—whether static, atmospheric, quasistatic, or the oscillating electric fields in EM waves—making the system primarily sensitive to the magnetic component of EM waves. A technique to locate and isolate sources of magnetic noise in the midst of electrical noise involves using a small shielded loop made of coaxial cable (coax) [5]. DeMaw describes a small multi-turn shielded loop antenna made with coax.[6] Shielded loops are commonly used; the SLoG employs RG-58 with its shield grounded at one end as the "electrostatic" shield.

The remaining question is: how large should a shielded loop be for maximum sensitivity? As a guess, the sides of a square loop should be less than approximately 1/4 wavelength; otherwise, the phase of the oscillating magnetic field will not remain constant across the loop area. One might also assume that the total length should be less than 1/2 wavelength to avoid a detrimental phase delay when extracting the signal current; these factors determined the parameters of my test antenna. Fortunately, I had two 250'

rolls of RG-58 on hand, each with BNC connectors on both ends. In about half an hour, I set up the antenna shown in Fig. 1. The main criterion was to keep the total length at about 1/2 wavelength, with side lengths of 1/8 wavelength.

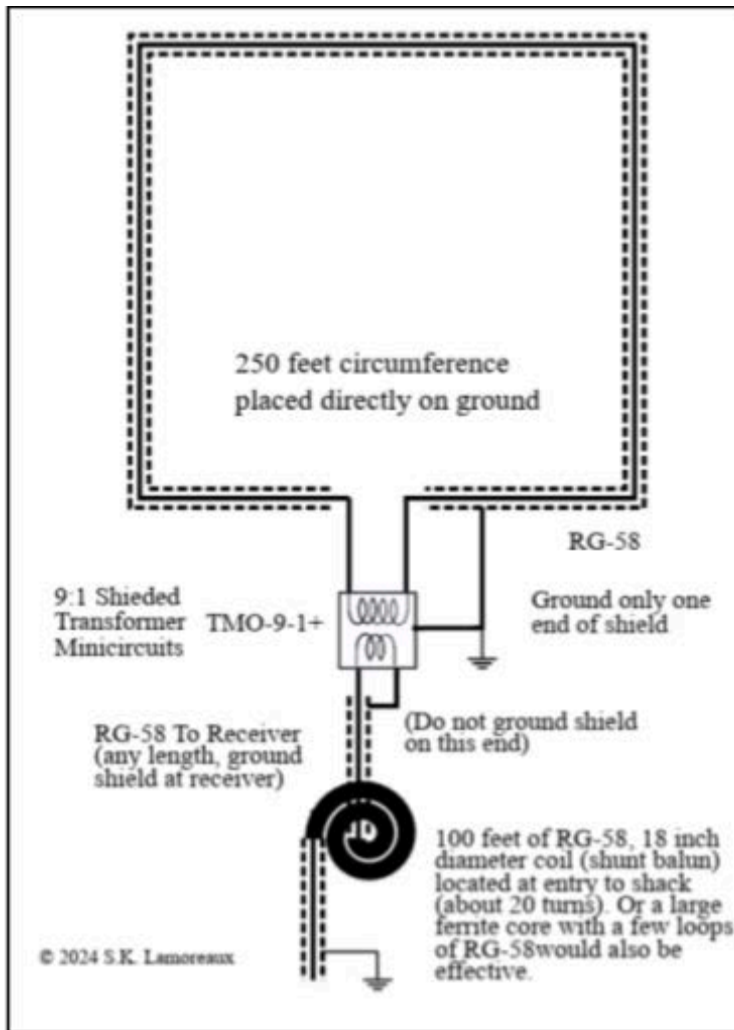


FIG. 1. Experimental shielded loop on ground (SLoG). I used the excess RG-58 feedline as an inline balun at the entrance to the house. At my location, this appears to be helpful in reducing common-mode noise. A high-inductance ferrite balun should also be effective. The MiniCircuits transformer is obsolete, however it is available on the surplus market, and in lieu of that, any balun-type hand-wound transformer suitable for 1.8 MHz should work. The lead-in secured to the ground with landscaping staples, and eventually disappears into the lawn thatch.

Photographs of the set-up at the end of the article show the overall scheme I employed. I ensured careful RF connections, but found that banana connectors work well at low frequencies (below 2 MHz). Almost any coaxial cable can be used; RG-6 is available for about \$50/1000 feet (Amazon.com). The MiniCircuits 9:1 transformer I used is no longer available, so I tried a three-turn trifilar-wound 9:1 balun on a #43 ferrite two-hole core, Fair-Rite 2843009902 (DigiKey 19341075-ND). I also tested a shielded transformer wound with two turns of RG-174, grounding only one end of the shield for the secondary and using seven turns on the primary (which provided better impedance matching than six turns) with the same core type. All performed similarly. A mishap with the lawnmower was resolved with wire nuts, with no detectable degradation in the performance of either the lawnmower or the antenna.

As this antenna meets my needs, I did not conduct further experiments with its dimensions. Experimentation is straightforward for the inclined. I studied grounding, simplified by the use of banana plugs. Some grounding configurations do not work; however, it can be difficult to distinguish the differences between those that do. The scheme in the drawing was implemented and works well at my location. In general, the specific configuration depends on the properties of the ground, the noise sources and locations, and the available area.

III. PERFORMANCE TESTS

1. It works; however, there is widespread agreement on that point for LoG. At my location, receiving noise with electric-field sensitive antennas was vexing, with rare minima around S5 and an average of S9 + 10 dB or more. With the SLoG, the noise is typically below S2, according to my AR6000 receiver and HF-380 transceiver.
2. Its larger area than previously recommended functions well; no preamp is needed; however, the gain reduction with this antenna type might lead to a low audio level for some receivers, in which case a good quality preamp will be beneficial.
3. 3. AM radio stations WBBM Chicago and WLW Cincinnati are received at S9 to S9 +20 dB in Guilford, CT, during early winter evenings (around 10 PM). Estimates of signal strength based on the effective radiated powers of stations and distances (750 and 600 miles, respectively) suggest a 10- to 20 dB loss for SLoG compared to a dipole antenna, while the signal-to-noise ratio improves by 30+ dB relative to a long wire antenna. This is the best AM broadcast band antenna that I have ever used, with audible stations at every 10 kHz channel across the AMband and sometimes more than one station in a channel.
4. WWVB at 60 KHz is received at S9 in the early evening (winter, 70 kW effective radiated power, vertical polarization, 1700 miles); at this frequency, there is 60 Hz modulated noise at S6, likely from underground wires about 20 yards from one side of the loop.
5. I can hear DX on 160 m for the first time at my location.
6. The losses are high; it is not useful for transmitting.
7. There are no apparent resonances, and additional gain loss becomes apparent above 4 MHz, establishing a rough upper frequency limit for the large loop presented here, although 14 MHz signals, including some DX, are often heard.
8. There is no obvious reason for this system to exhibit directivity and there is no evidence of such. The antenna is sensitive to low-angle and horizontally (E-field) polarized EM waves.
9. The SLoG easily picks up magnetic noise and should be located as far away from power lines, both overhead and underground, as possible. A loop around a house would likely have a high noise level, but it would be fun to try.

Connecting the lead-in coax to the high-impedance input of a 30 MHz oscilloscope reveals a 17 mV (rms) voltage, with a broad spectrum of signals from local AM radio stations. Isolating the dominant signals together with their known field intensities can be used to evaluate antenna performance. Shunting the input with a 50 Ω resistor halves the signal amplitude, indicating that the antenna, transformer, and lead-in act as a source with roughly 50 Ω impedance.

The dominant signals are ground waves from WFAN, 660 kHz, and WHSQ (formerly WCBS), 880 kHz. Both are 50 kW AM stations that share the same vertical antenna. The transmitters and antenna are located on High Island, east of the Bronx, about 100 km away, with a propagation path mostly over the salt water of Long Island Sound. Therefore, the distance

is within the range of ground waves, and the electric field strength should vary inversely with distance. An analysis of the received signal amplitude is in Appendix B, and there is good agreement between theory and experiment.

Other performance tests are from on-the-air use. In late July 2024, using a SLoG, KM1R was able to work Hawaii from Connecticut, as the SLoG provided a enough increase in signal-to-noise ratio over his usual double L antenna to ensure comfortable copying. In early August 2025, he heard the Jarvis Island DXpedition on 160 m, about 6000 miles away, just before local sunset, and worked it twice around August 10 at 4:30 AM local time. During periods of low atmospheric noise, KM1R reports that the SLoG and double-L antennas produce similar signal-to-noise ratios.

The optimal length for 160 m is still to be determined and might depend on local environments (ground properties, noise sources). The goal is to optimize the signal-to-noise ratio, not gain, and the system is non-resonant. Testing performance is therefore not simple or precisely defined. The loop need not be square; it can be circular (maximizing the area for a given length) or a non-regular polygon. KM1R found that a 100' perimeter loop performed worse than a 250' loop, particularly for receiving the AM broadcast band, though the differences were slight. The optimum for 160 m is likely between 150' and 250'.

The effect of the number of turns N in the loop is also of interest, in reference to Eq. (1). Assuming a maximum wire length L of about $\lambda/2$, the voltage across the loop terminals should scale as

$$V \propto NA = N \left(\frac{L}{N} \right)^2 = \frac{L^2}{N}. \quad (3)$$

The power received (voltage squared divided by the source impedance) varies as L^4/N^2 . This implies that optimal sensitivity is reached at $N=1$, and maximum A for a given length of the wire, all else being equal. The source impedance is likely to increase with N for a given L ; however, this remains a question for the experimenter. Although $N > 1$ seems undesirable, if the available area is too small for a full loop, increasing N while keeping $L \approx \lambda/2$ will result in a higher gain.

The system is elementary in both theory and construction, offering a unique opportunity for analysis and experimentation. The design presented here meets my needs, so I was not inclined to experiment further. The detailed analysis is available from the author on request..

IV. ACKNOWLEDGEMENT

I thank Mike KM1R for telling me about the LoG concept and his earlier experiences, for building his own SLoG, and for reporting his SLoG results.

V. REFERENCES

- [1] "Design of 'Rogers' Ground Antenna," J. Stanley Brown, Radio Amateur News, July 1919, p.10. "Experiments on Ground Antenna with Their Relation to Atmospherics," Chas. D. Herrold, loc. cit., p. 11. <https://www.worldradiohistory.com/Archive-Radio-News/20s/Radio-News-1919-07.pdf>
- [2] Beverage, Harold H., Rice, Chester W., Kellogg, Edward W., "The Wave Antenna- A New Type of Highly Directive Antenna", Trans. AIEE. 42, 215-266 (1923). doi:10.1109/T-AIEE.1923.5060870
- [3] <https://www.kk5jy.net/LoG/>
- [4] The ARRL Antenna Handbook, 18th ed., R. Dean Straw, ed. (American Radio Relay League, Newington, CT, 1997).
- [5] Richardson, Robert C. and Smith, Eric N. "Techniques in Condensed Matter Physics at Low Temperatures" (Addison-Wesley Advanced Book Classics, Reading, MA 1996). See §4.8, Fig. 4.78.
- [6] Doug DeMaw, Beat the Noise with a Scoop Loop, QST July 1977, pp 30-34.
- [7] <https://transition.fcc.gov/fccbin/amq?list=0&facid=9636>
- [8] Edward Conrad Jordan, Electromagnetic Waves and Radiating Systems (Prentice Hall, 1968). ISBN 978-0-13249995-8
- [9] <https://www.qsl.net/n9zia/conduct.html>
- [10] L.D. Landau and E.M. Lifshitz, Electrodynamics of Continuous Media (Addison-Wesley, Reading, MA, 1960), §67.

VI. BIOGRAPHICAL INFORMATION



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Steven K. Lamoreaux is a Professor of Physics and holds a Eugene Higgins Chair at Yale University; B.S. Physics 1982 Univ. of Washington, Seattle; M.S., 1983, University of Oregon, Eugene, OR; Ph.D., 1986, University of Washington. His current research aims to detect dark matter bound to the galaxy using quantum measurement enabled ultrasensitive microwave detection at the yoctowatt level (-210 dBm). He was first licensed at age 14 in 1972 with the callsign WA7VYG.

EDITOR'S NOTE

KeyKlix thanks Steve, KZ1S, for allowing us to publish this excellent paper on the SLoG. One of my main focuses as your editor this past year has been to provide more useful technical content written at varied levels of expertise that our membership, with their diverse radio interests, will find interesting.

Members interested in obtaining an original PDF copy of Steve's article, complete with the supporting Appendices, which are omitted here for space concerns, should drop Steve a line at steve.lamoreaux@yale.edu. I am certain he would love to know what you think of his work.

~ JMS/AB1DQ

PHOTOGRAPHS

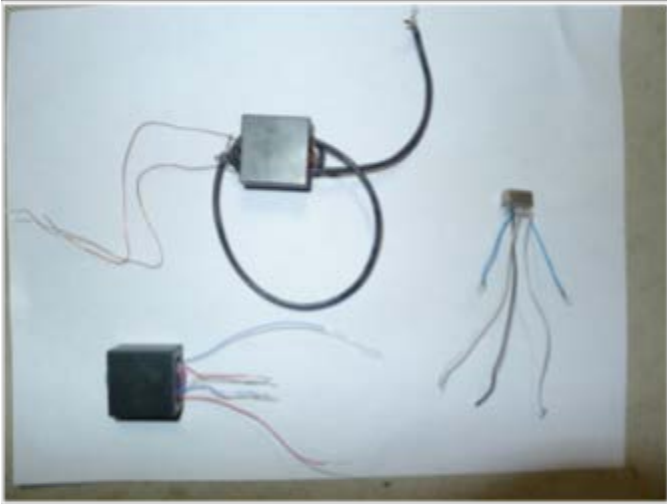


FIG. 2. Examples of the home-made transformer and trifilar balun, both wound on a Fair-Rite #43 two-hole core, 2843009902 (DigiKey 1934-1075-ND).



FIG. 4. The excess lead-in coax is wound onto an old empty spool, and this serves as a simple balun.



FIG. 3. The connector box is screwed to a tree, with the loop leads and signal leads hanging down. A junked die-cast EconoBox was used and minimal weatherproofing was employed. The banana-BNC connectors were temporarily used to experiment with grounding configurations.



FIG. 5. Repairs are straightforward and can be made weatherproof and permanent if desired.

The more you know...

Morse Walker — CW Training that Fits Your Schedule

by Steve Ford, WB8IMY

One of the most challenging aspects of CW contesting – or CW operating as a Parks On The Air (POTA) activator – is deciphering what you’re receiving from the other station. If the signal is loud and clear, and the operator has a decent “fist,” chances are you’ll copy his or her call sign and all the other necessary information in short order.

But we all know that those instances are often few and far between. Maybe the ionosphere isn’t being cooperative, and the received signal is fading in and out. Or perhaps the other operator has decided to fire back at a speed that strains your ability to copy. And worst of all, you may have several stations responding to you at the same time, at different speeds and with different signal strengths – the CW equivalent of drinking from a fire hose!

None of these factors are within your control, of course, but you can train yourself to cope. Thanks to modern software technology, it is now possible to simulate these challenging situations, allowing you to sharpen your CW receiving skills under highly realistic conditions.

There are applications such as MorseRunner by Alex Shovkoplyas, VE3NEA, that attempt to simulate CW contest environments. MorseRunner is a free Windows application you can download at www.dxatlas.com/MorseRunner/.

However, to use MorseRunner, you obviously need to install the program. Once installed, it can only be used on the computer on which you’ve installed it. So, you are essentially anchored to a particular computer, or collection of computers, not to mention the Windows operating system.

CW Training on The Go

Henry Prince, W6NYC, has created a different approach that he calls Morse Walker. Morse Walker is a cleverly written CW contest simulator that you can easily configure to provide the type of “workout” you desire. Do you want to train for difficult band conditions? Morse Walker is happy to accommodate you. Would you also like to prepare for the possibility of someone responding at lightning speed? Morse Walker can randomly throw that challenge into the mix when you least expect it.

Best of all, and this is one of my favorite features, Morse Walker can simulate several stations responding to you at once! It’s up to you to pick the station you want to work and enter the call sign accordingly, just like in real life.

But what makes Morse Walker different from any other CW simulator I’ve encountered is that it is entirely web-based. To use Morse Walker, you simply open a web browser on any computer or mobile device and go to www.morsewalker.com. Once you’re there, you plug in a few bits of information, including your call sign and name, and then choose your simulation parameters (such as allowing multiple replies).

When you’re ready, click the green CQ button, and Morse Walker sends CQ with your call sign. After a slight delay, you’ll hear a reply (or more than one reply). Enter the calling station’s call sign in the adjacent field. If you get it slightly wrong, the “caller” will send it again. If your entry is wildly wrong, you’ll hear nothing, and you will have to call CQ again.

When you copy a call sign correctly, it is added to your results table at the bottom of the screen. At the same time, Morse Walker completes the contact and then calls CQ again.

When I first tried a POTA simulation, I had to chuckle when Morse Walker added the traditional "dit dit" exchange to complete the contact. Thanks to Morse Walker, you can train whenever and wherever you desire. I recently ran a simulated POTA activation on my phone while waiting for plane flight! According to a note on the website, Henry considers the current version of Morse Walker to be a "beta," so look for even more features to appear soon.

Morse Runner
File Run Send Help

UTC	Call	Recv	Sent	Pref	Chk
00:00:30	JA1APK	599 001	599 001	JA1	
00:00:46	TM7XX	599 001	599 002	TM7	
00:00:59	KD1J	599 001	599 003	KD1	
00:01:12	KD9ST	599 001	599 004	KD9	
00:01:36	KHOAA	599 003	599 005	KHO	
00:01:55	W9UAL	599 002	599 006	W9	
00:02:11	YEOANA	599 001	599 007	YEO	
00:02:30	KB5GA	599 001	599 008	KB5	
00:02:53	WA8VTD	599 003	599 009	WA8	
00:03:07	VE7RF	599 004	599 010	VE7	
00:03:30	KU6W	599 004	599 011	KU6	
00:03:49	KB6MMS	599 005	599 012	KB6	
00:04:06	SM4CTT	599 002	599 013	SM4	
00:04:29	DL6AST	599 002	599 014	DL6	
00:04:50	ON6UC	599 003	599 015	ON6	

Station
Call: VE3NEA QSK
CW Speed: 30 WPM
CW Pitch: 600 Hz
RX Bandwidth: 500 Hz

Band Conditions
 QRN Flutter Activity: 3
 QRM LID's
 QSB

Run for 5 minutes

Call: _____ RST: _____ Nr: _____

F1 CQ F2 <#> F3 TU F4 <my>
F5 <his> F6 B4 F7 ? F8 AGN

00:05:00

	Raw	Verified
Pts	15	15
Mult	15	15
Score	225	225



*Hey Old Man...
The weekend is coming!*

*Do you know which
contests will be on the air?*

*See page 34 for our list
of Upcoming Contests
& Special Event Stations!*

MARC VE Sessions

MARC holds a VE Session on the second Saturday of the month at 9AM at 143 Hope Hill Road, in Wallingford.

Exams are paperless and require a PIN from www.hamstudy.org/ prior to the exam date.

For more info, contact Jim at N1ZN@arrl.net, or Bill at zz71818@hotmail.com.





HamX - The Northeast HamXposition

August 13-16, 2026

Call for Speakers

HamX (<https://hamxposition.org/>) is the largest amateur radio convention in the Northeast! With close to 1,800 attendees each year, HamX draws radio amateurs from all over and is an ideal venue to present your ideas and experiences. It has the largest array of forums of any ham event in the country.

This is a call for speakers on topics of general interest to the amateur radio community. Some examples include: Operating practices, contesting, DXing, mobile stations, emergency communications, emerging activities, STEM outreach, club improvement, radio history, restoring antique gear, test equipment, kit building, antenna design, AI in amateur radio, VHF/UHF/Microwave/Mesh, EME, and more. If you have a story to share, we would like to hear about it.

To submit a talk proposal, please go to the following website and enter the requested information: <https://registration.hamx.org/speaker/> If you are a first-time visitor to the site, please pick a username and enter it in the Username field to create an account.

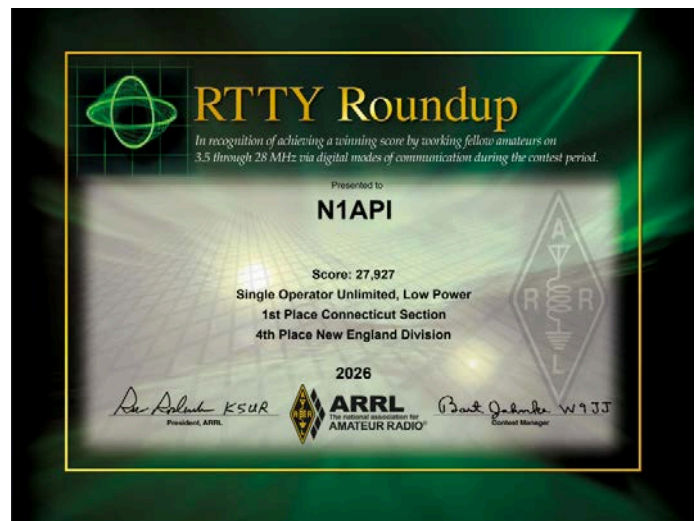
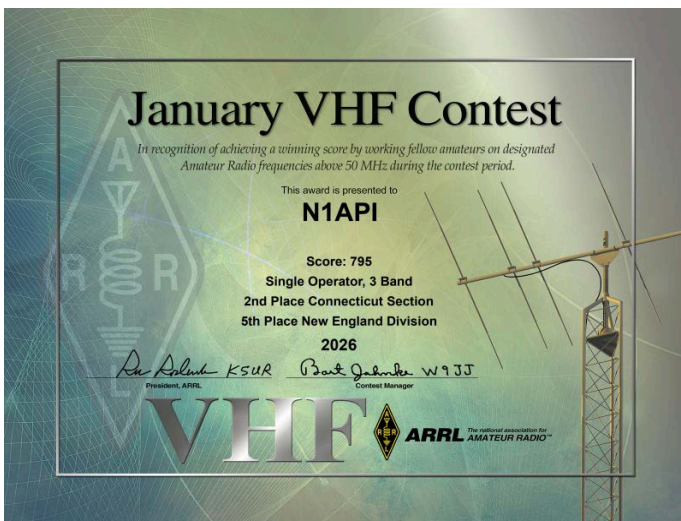
If you have any further questions, please reach out to the program chair at the e-mail address listed below.

We look forward to your contribution at HamX 2026!

Mark Noe KE1IU - ke1iu@hamx.org
HamX Program Committee Chairperson

Strays: Even More Kudos!

CONGRATULATIONS to N1API Al, Kaiser, for two recent contest achievements! Al placed second in the Connecticut Section / fifth in the New England Division in the January 2026 VHF Contest and took **FIRST PLACE** in the Connecticut Section / Fourth Place in the New England Division for the January 2026 RTTY ROUND UP. NICE WORK AL!!!!



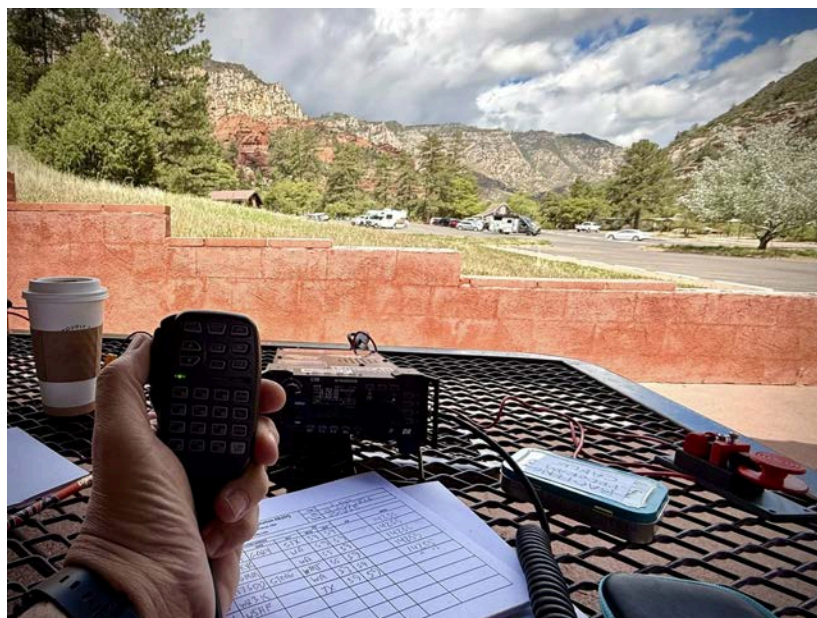
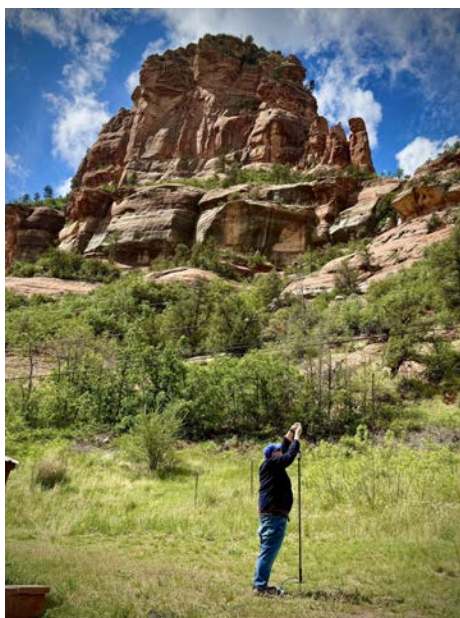


MARC in the Parks

Highlighting member POTA activations in April

Jimmy AB1DQ & Ellen KC1TSM spent a week's spring vacation in Arizona last month and brought along their portable HF POTA "git-kit" to activate a few parks and add Arizona to their eclectic list of states activated (to date: AZ, CA, CT, MA, ME, NH, RI, VT & WI).

On April 13, while staying in Sedona, they traveled north of the town to Slide Rock State Park and activated US-1068, making the required minimum 10 QSOs, including on P2P, all on phone.





Jim Drexler, KC1TSG, experienced his all-time best POTA activation on April 15 at Sleeping Giant, making 91 QSOs in two hours with 15 min break across 40 and 20 M SSB. This activation brings Jim over the 900 mark towards the Kilo and only 2 activations away from Repeat Offender.

Among his contacts, Jim made a park-to-park contact with fellow club member **AC1TY Andy**, who was presently in Florida.

Jim later completed his KILO at Sleeping Giant on April 23, reporting it was almost too windy for his 17' vertical, but it withstood without issue.

With the two local KILOs under his belt, Jim now looks forward to getting back to doing what he likes best about POTA, getting out to previously non-activated parks for the season.



Scott, W1HLP's familiar tailgate POTA station during his April 15 activation.

Scott Martin, W1HLP, also made a P2P with Andy during his POTA activation of US-1705 Osborndale State Park on the 15th. A bit flustered by the dead band conditions on 40M & 20M CW that day, Scott, a true CW aficionado, broke out the microphone to avoid a skunking on the activation - well played, Scott.

Congratulations to **Dave Tipping, NZ1J**, on earning the POTA 'Kilo' award at Millers Pond State Park on April 21.

A Kilo is 1,000 QSOs made in one particular park - accumulated over all of one's visits to the park. All that's required for many of the POTA awards is to just keep making QSOs.

Dave reported poor propagation on the 21st, but **Scott, W1HLP**, and **Jim, N1ZN**, both called Dave on CW and helped him get him over the finish line.

Nice work, Dave!

Kilo		POTA	
Park	Contacts ↓		
Wharton Brook State Park (US-1728)	12396		
Sleeping Giant State Park (US-1717)	2786		
Cockaponset State Forest (US-7531)	2599		
Wadsworth Falls State Park (US-1726)	1472		
New England Trail National Scenic Trail (US-4561)	1338		
Hammonasset Beach State Beach (US-1676)	1087		
Millers Pond State Park (US-1697)	1009		
Chatfield Hollow State Park (US-1656)	253		

Congratulations to **Dave, NZ1J** for earning his seventh Kilo in April!



Andy N1XXU and Debbie Berk K1PET Purchia decided to head out and activate Black Rock SP, US-1649, on April 26. They tried hunting but couldn't hear activators. So they hunted stations doing the Florida QSO Party and some DX. We set up on 20m and 40m and even checked the upper bands with no luck.

The antenna that they started with was the POTA Challenger. 34' Whip measured down to 25' and the 8' raised counterpoise. It did well on 20m, but when they tuned it up on 40m, it wasn't great (it's designed as an off-center fed vertical for 20m). So Andy changed out the 4:1 unun for a 9:1 and extended the whip to 29', which gave them a random vertical, and that worked great on 40 and 20m. All in all, they had a fine day.



Scott Martin, W1HLP, rounded out his busy POTA month on April 29 at US-1716, Silver Sands State Park, a popular park of **WA1MAC**, **Paul Clark's**, to activate.

Scott made 26 CW QSOs in 50 minutes with very little effort - including one with our club president, **Dave, N21J**.

Impressed at how quickly and easily the contacts came, Scott remarked, "No wonder Paul loves it here."

Fine work, everyone!

Were you aware... that the Connecticut Parks on the Air Activators Group has registered the callsign **WB1CT** for their activations? If you happened to work WB1CT on the first morning of the new year, you are part of the inaugural POTA log of the group. The club has been around - and growing - since its first informal activities in early 2021. Until recently, most of their hunters were more familiar with their previous callsign, K2D, the special event one-by-one callsign it shared with the Connecticut operators in the 13 Colonies Event each July. Group director Conrad Trautmann, N2YCH, told Newsline that as the group grew larger and added even more activities, it made sense to become an official nonprofit club, which is did in late 2025. The FCC granted the club callsign shortly afterward.

With a special park-to-park net that helps activators get more Connecticut parks in their logs, the club continues to evolve, both in activities and membership. The group has more than 100 POTA activators throughout the state. When they're not on the air, they keep in touch regularly via a groups.io list.

Be listening for WB1CT calling "CQ POTA" or why not join the action. You can find details on the [club's page on QRZ.com](#).

[This article republished from [Amateur Radio Newsline 01/30/26](#)]

SELECTED ON AIR EVENTS - May 2026

CONTESTS: *Click on hyperlink for more info...*

VOLTA WW RTTY Contest	1200Z, May 9 to 1200Z, May 10
CQ-M International DX Contest	1200Z, May 9 to 1159Z, May 10
SKCC Weekend Sprintathon	1200Z, May 9 to 2359Z, May 10
4 States QRP Group Second Sunday Sprint	0000Z-0200Z, May 11
NZART Sangster Shield Contest	0800Z-1100Z, May 16
His Maj. King of Spain Contest, CW	1200Z, May 16 to 1200Z, May 17
EU PSK DX Contest	1200Z, May 16 to 1200Z, May 17
Baltic Contest	2100Z, May 16 to 0200Z, May 17
Run for the Bacon QRP Contest	2300Z, May 17 to 0100Z, May 18
NTC QSO Party	1900Z-2000Z, May 21
QRP ARCI Hootowl Sprint	0000Z-0100Z, May 25
SKCC Sprint	0000Z-0200Z, May 27
CQ WW WPX Contest, CW	0000Z, May 30 to 2359Z, May 31
ARS Spartan Sprint	0100Z-0300Z, Jun 2

STATE QSO PARTIES:

Arkansas QSO Party	1400Z, May 16 to 0200Z, May 17
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SPECIAL EVENT STATIONS:



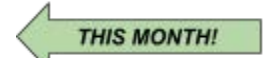
Focus on...

W9IMS The Indianapolis Motor Speedway ARC 2026 Special Events

RACE 1: The INDYCAR Grand Prix
May 3-May 9, 0000Z-2359Z



RACE 2: The Indianapolis
May 18-May 24, 0000Z-2359Z



RACE 3: The Brickyard 400
Jul 20-Jul 26, 0000Z-2359Z



WORK INDIVIDUAL EVENTS FOR QSL CARD / WORK ALL THREE FOR A CERTIFICATE!

3.840 7.245 14.245 18.140.
Certificate & QSL
www.w9ims.org

Indianapolis Motor Speedway ARC.
P.O. BOX 30954
Indianapolis, IN 46230.



Weekly W1NRG Nets... On the Air all week long!

Sunday:

ELMER NET

SUN 7:30 pm VIA ZOOM

See the MEMBERS AREA of our Website for the Zoom access information.

Monday:

NEW HAVEN/MIDDLESEX SKYWARN NET

MON 7:00 pm W1NRG/R 147.360PL 162.2Hz

6 METER SSB NET

MON 8:00 pm 50.175 MHZ USB

Tuesday:

2 M FM NET

TUE 7:00 pm W1NRG/R 147.360PL 162.2Hz

10 M 10-10 CASTLE CRAIG NET

TUE 8:00 pm 28.375 MHZ USB

Wednesday:

JUST PUSH THE BUTTON NET

WED 7:00 pm W1NRG/R 147.360PL 162.2Hz

Saturday:

COFFEE CUP NET

SAT 9:00 W1NRG/R 147.360PL 162.2Hz

Saturday mornings at the OEM is the only place to be!

Join us starting at 9:00 am at 143 Hope Hill Road for our Saturday Open House.

Hang with fellow club members in a non-structured social setting and participate in various radio activities such as:

- Code practice
- Operate W1NRG, our club station and work some DX
- Radio repair clinic
- Bring in your projects for a Maker's show & tell

Come, relax, & socialize with a wicked cool group of the friendliest hams anywhere!

Don't forget ...

SOMETIMES WE HAVE DONUTS!



Key Klix *Klassified* - Buy, Swap & Sell...

ITEM FOR SALE

**Heathkit SB-221
2KW Amplifier**

\$750

Clean expertly wired, nonsmoker, working fine. Modified to include 10 meters.



(actual item depicted)

Contact: Bob KR1U

Email: oldradiodoc@gmail.com

Tel: 860-928-2628

ITEM FOR SALE

**Yaesu FT-726R
Triband UHF/VHF
FM/SSB/CW transceiver**

\$350

Works fine. Includes 2, 430, 440 and satellite modules, CW filter and manual.



(actual item depicted)

Contact: Bob KR1U

Email: oldradiodoc@gmail.com

Tel: 860-928-2628

ITEM FOR SALE

Kenwood TS 450S (AT)

\$400

Very nice, very little use, includes microphone and power cables.

Contact: Frank D.

Email: kc1cab@snet.net



(actual item depicted)

ITEM FOR SALE

**Yaesu G450 ADC Rotor
and Controller.**

\$200

Includes connectors to rotor and controller.



(actual item depicted)

Contact: Frank D.
Email: kc1cab@snet.net

ITEM FOR SALE

**MFJ 998 Automatic
Antenna Tuner**

\$525

Works well, Includes iCom interconnect cable. Some minor wear on the case.



(actual item depicted)

Contact: Frank D.
Email: kc1cab@snet.net

ITEMS FOR SALE

**N9SAB Portable 40-6 meter
OCF dipole**

\$65

Only used once.



(Stock Photo - not actual item)

Contact: .Rich marzo7088@yahoo.com

ITEMS FOR SALE

**Maxcon 80-10m
OCF dipole**

\$50

(No photo available)

Contact: .Rich marzo7088@yahoo.com

***Sell your ham related items in
KeyKlix for FREE!***

Email keyklix@w1nrg.com with your details, price, and contact info.

Key Klix Klassified (Kontinued...)

Telegraph Keys for Sale...



I'm thinning out my telegraph key collection, and I have several straight keys that I would like to sell. These include Speed-X Keys, military keys like J-37 and J-38, toy keys, and a few others. If you are interested, feel free to email me at WJ1B@arrl.net, and I am sure we can work something out.

You can also view some of these keys on my website: <http://www.wj1b.com/telegraph-keys.html>

Harold WJ1B

Key Klix May 2026
Has been brought to you by

EDITOR IN CHIEF..... JIMMY SURPRENANT, AB1DQ
CONTEST EDITOR..... STEVE ALLEN, KC1SA
BIOGRAPHER..... BOB BIANCUR, WB1GYZ
PHOTOGRAPHERS..... TED RENZONI, KC1DOY
AL KAISER, N1API

Thank you to all of this month's contributors, including...

**AB1DQ - KB1JL - KC1DOY - KC1ERO - KC1SA - KC1NQE - KC1STF
KC1TSG - KZ1S - N1API - N1XXU - NA1L - NZ1J - W1HLP - WB8IMY**

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idea you'd like to share
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Key Klix is *your* newsletter, and we rely on you to share your latest radio news so we can provide engaging content for all. Contributing is a great way to connect with other members who may share or want to learn more about your particular areas of radio interest. Drop us a line at keyklix@w1nrg.com with articles, logs, news of what is happening in your shack, and photos, which are most appreciated.

Keep **Key Klix** Kool!

MEMBERSHIP ROSTER

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AB1DQ	James Surprenant	26	KC1OCS	Richard Dewick	26	KO4EEL	Tom Williams	26
AB1HB	Charlie Dudac	26	KC1OGL	Paul Randazzo	26	KR1U	Bob Eslinger	29
AB2T	Jordan Zarembo	26	KC1OWD	Kevin Van Keuron	26	KX1USA	Rob Messercola	26
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AC1SK	George Bucci	26	KC1OYR	Brent Moyer	27	N1API	Al Kaiser	30
AC1ST	Louis Brenner	26	KC1OYS	Jim McAuliffe	26	N1BRI	Brian Beegan	26
AC1TY	Andrew Rudczynski	26	KC1PEN	David Henry	26	N1ERR	Paul Benedetto	26
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K1DMS	Dave Sack	26	KC1PYT	Jeff Gazso	26	N1GY	Geoff Haines	27
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K1MAL	Chris Altieri	27	KC1RBY	Sergio Frutuosa	26	N1JEO	Joel Curneal	26
K1MMK	Michael MacKennedy	27	KC1RLQ	Eric Barbour	26	N1JMX	Jeff Martin	28
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K1RCT	Rob Cichon	26	KC1SEN	Nicholas Worroll	26	N1OKF	Bob Parisi	26
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K1SCI	Stuart Isaac	26	KC1SYU	Jim Cosgrove	26	N1OQC	Mike Johnson	27
K1SMD	Silas Moeckel	26	KC1TAD	Tom Dipinto	27	N1PHI	Trish Nitsheke	26
K1STM	Anne West	26	KC1THU	Mike Zelladonis	26	N1PQQ	Greg Cartier	26
K1TDO	Todd Olsen	26	KC1TKY	Bob Hourigan	26	N1QYB	Bill Witecki Jr	26
K1TGX	Jerry Molaver	30	KC1TPN	Rick Foster	26	N1XXU	Andy Purchia	26
K1VDF	John Blevins	26	KC1TSG	Jim Drexler	26	N1ZN	Jim Savage	26
K1WJL	Dave Swedock	27	KC1TSK	Rich Pagano	26	N2CKD	Lovji Hakim	26
K2RPM	Bruce Torello	26	KC1TSL	Charlie Vossbrinck	27	N2TAG	Dave Taglianetti	26
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KB1APO	Jim Sintay	27	KC1TSX	Mike Barile	26	NZ1J	Dave Tipping	26
KB1CXK	Joe Clarizio	26	KC1TSY	Dan Gessner	26	UT3UY	Anatoly Kirilenko	26
KB1FGC	Richard Guerrero	26	KC1TSZ	Deb Caron	26	W1AJK	Andrew Kazimer	26
KB1HAX	Bill Reyor III	26	KC1TWA	William Caron	26	W1BRY	Donald Chepurna	27
KB1JL	Eric Olsson	26	KC1TYO	Ken Williams	26	W1EDX	Paul Stasieluk	26
KB1LWS	Jeanne Gherardi	26	KC1UJQ	Mark Kirschner	26	W1HLP	Scott Martin	26
KB1MFU	John Ramadei	27	KC1VCU	John Mandeville	26	W1IHS	Jason Polaski	26
KB1RLF	Steven Chapman	26	KC1VQY	Michael Granoth	26	W1IKW	Iain K White	29
KB1TBL	Dave Laliberte	26	KC1VRG	Robert Shemo	26	W1LV	Steve Morley	26
KB1TGS	David Robinson	26	KC1VUM	Matthew Erff	26	W1NDT	Robert Lombardo	26
KB1TTV	Jonathan Martin	26	KC1VVC	Joel Helfer	26	W1PRK	James Procaccini	27
KB1YFJ	Glenn Couture	26	KC1VZI	Joe DePaolo	26	W1RCI	Ron Isaac Jr.	26

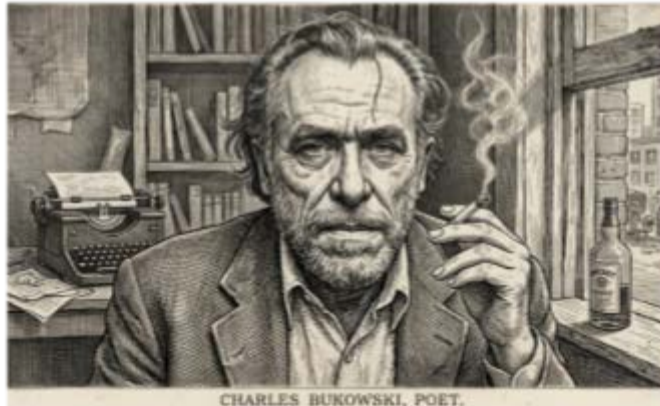
W1RWW Bob Woodtke Jr.	26	WA1SFH Douglas Sharafanowich	26
W1TK Ron Wakefield	26	WA1TRY Rich Aubin	L
W1UFO Mike Cei	26	WA1ZVY Jim Martin	28
W1UKX Greg Gherardi	26	WB1DQT Bill Bacon	26
W1YSM Ed Snyder	26	WB1GFI Stan Hiriak	26
W3APC James Cook	27	WB1GYZ Bob Biancur	27
W4FMM Bob Munro	26	WB8IMY Steve Ford	26
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WA1FFT Ray Irwin	26	WV2LKM Steve Waldmann	26
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WA1MAC Paul Clark	27	Spencer Rygiel	Y

KEY

L: Lifetime Member
Y: Youth Member

“Find what you love and let it kill you.”

~ Charles Bukowski



CHARLES BUKOWSKI, POET.