

January 2023  
2023 Edition 1



# Mount Vernon Amateur Radio Club



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## MVARC Repeaters

K8EEN VHF Repeater

146.790 MHz

- 600KHz / PL = 71.9 Hz

K8EEN-R Echolink Node:

809800

K8EEN UHF Repeater

444.600 MHz

+5 MHz / PL = 71.9 Hz





## **Club Meeting**

The regular MVARC meeting is the 2nd Monday of each month at 7:00 pm. Attend to complete the group!

The next club meeting is January 9, 2023.

### **Meeting Location:**

**Academy Building**  
**790 Fairgrounds Road**

Visit our Webpage:

<https://MVARC.net>

## President's View

**Frank Counts**

**KC8EVS**

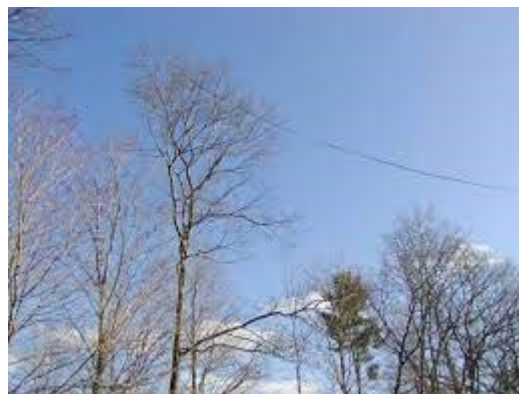


It's January 2023, hope everyone reading this is doing well, Christmas went well and looking forward to the new year. We meet Monday January 9<sup>th</sup> at 7p. Hope to see you all there. Remember at the meeting to check out the radio room before you leave and see all the hard work that has been put into it. The end of the month Jan 28-29 is Winter Field Day we will be working out the details of how the club plans to participate in this event at our January meeting. So, if interested please attend and voice your two cents and join the fun. We will also be discussing other events that will be coming up this spring, so it is always good to attend the meetings for those updates.

Well here in EVS land we have been busy keeping up with grandchildren and projects that need our attention because I fiddled around this summer and took it easy. So now I must catch up, lots to do. One thing that I wasn't expecting was having to put up a new antenna. I have a 160 m OFCF dipole up about 45 feet or did. Monday or Tuesday of last week I found the short leg lying on the ground. To make matters worse it wasn't the support end that was down :( It had broken near the feed point, obviously a branch had been rubbing on the antenna wire. The center is in the top of a pine tree, and I can't see it. I had been noticing that sometimes it was difficult to tune up and that was probably due to the wire rubbing on a branch. I have several other trees to use just the location is not a favorable as this pine. I have another antenna to put up so that has become a priority for me. Now to convince the better half that it is a priority.

I have a couple of kits that I am putting together and will share those with you as I get them completed. I am interested in hearing from you about projects that you are working on, let me know at the meeting or write something to put in the newsletter. Just photos and a little description would be good.

Well, until Monday 9<sup>th</sup> be safe and play radio.



## Meeting Minutes

**Bill Stroud**

**KD8WHQ**



The MVARC December meeting was called to order at 7:03 pm by President Frank Counts. There were 16 members in attendance.

Frank, KC8EVS asked if there were any corrections or additions to the November minutes. The minutes were approved as published in the December newsletter. Terry, KI8N, presented the Treasurer's report. He stated that the mailing address had been changed on most accounts. A motion was made by Don, W8PEN and a second by Michael, KD8HGE to accept the Treasurer's report, the motion carried.

### **Committee Reports**

#### **ARES**

Stan Broadway retired as Ohio Section Emergency Coordinator (SEC). Bret Stemen, KD8SCL, who was the District 7 Emergency Coordinator (DEC) is the new Ohio SEC.

Terry has been participating in the Tuesday night ODEN Net. He suggested that others try joining digital nets for practice.

#### **ARRL**

Scott informed us that there will be a yearlong ARRL QST contest. Information about the contest will be in the January QST magazine or on the ARRL website. He stated that there will be new forms for ARES, more on that at a later date.

Scott also reported that he applied for MVARC to be an ARRL Special Service Club. That application was approved and we are now recognized as a Special Service Club.

#### **Repeaters**

Steve, N8RLW reported on the work that is on-going with the rebuild of the 146.79 repeater and associated equipment at the repeater site. He also gave a short overview of the new System Fusion repeater and the progress being made to get it on the air soon.

Michael, KE8HGE reported on progress to the repeater access at the hospital. Nothing new to report.

#### **MESH Network**

Don, W8PEN reported that the Mesh Network was working fine. He would like to put a node in the radio room as time and weather permit.

#### **Club Station Water Tower Lease**

Nothing new to report.

#### **Technician License Class**

Michael, KE8HGE, reported class is going great and they are halfway done. Looking at middle of January for testing.

#### **Health & Welfare**

Roger and Don went to Tony's, KC8UR residence and installed an HF antenna. They originally had an issue with QRN (noise) but fixed that and Tony is on the air.

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**"I am interested in hearing from you about projects that you are working on, let me know at the meeting or write something to put in the newsletter." Frank, KC8EVS**





### Old Business

MVARC Directors looked at the Bylaws and did not see any need for changes at this time.

A new MVARC logo was presented in the November Newsletter. There was a discussion as to accepting it. A motion was made by Roger, KE8ICI and seconded by Steve, N8RLW to accept the new logo, the motion passed.

The Academy Building radio room is operational. There is an 80-6 meter OCF dipole and a dual band antenna in the attic of the building.

### New Business

Frank, KC8EVS, presented a list of events that we will be involved in next year. The chairperson is noted after each event.

Gravel Grinder – Steve, N8RLW chair

Parks on the AIR – Terry NI8N Chair

NVIS – Needs a chairperson

Field Day – Don, W8PEN Chair

Winter Field Day – Roger KE8ICI chair

There was a discussion regarding food for field day and ordering pizza for those attending was the best solution.

The meeting was adjourned at 8 pm. Motion made by Steve N8RLW and seconded by Roger, KE8ICI.

Members present at the December Meeting:

Frank Counts KC8EVS

Scott Yonally N8SY

Terry Windsor KI8N

Steven Harvey N8RLW  
 Tom Evans KD8HSA  
 Wayne Bower WB8WB  
 Michael Jacobs KC8HGE  
 Don Russell W8PEN  
 Barry Butz N8PPF  
 Ralph Bower KC8REB  
 Emery Bennett W8TW  
 Roger Gorrell KE8ICI  
 Bill Stroud KD8WHQ  
 Jim Bostic KD8IZT  
 Don Bunner KB8QPD  
 Ralph Dunmire

### What is an ARRL Special Service Club?



A club that exists to go above and beyond for their communities and for Amateur Radio is what defines a Special Service Club (SSC). They are the

leaders in their Amateur Radio communities who provide active training classes, publicity programs and actively pursue technical projects and operating activities.

We all owe Scott, N8SY a big thanks for taking the time and effort for applying to the ARRL for MVARC to be recognized as a SSC!

Also note the new SSC badge on page 1 of this newsletter.

### What is an Affiliated ARRL Club?



An ARRL Affiliated Club must have at least 51% of the club's voting members active ARRL members.

For 2022 MVARC ARRL membership was at 55% which allowed us to maintain an active Affiliated ARRL Club membership.

## NOTICES

### MVARC has a new a new mailing address

Mount Vernon Amateur Radio Club  
812 Coshocton Avenue  
PMB #145  
Mount Vernon, OH 43050

NOTE: When sending mail to this address the PMB and # must be used.

### General License Examinations

The National Conference of Volunteer Examiner Coordinators ([NCVEC](#)) Question Pool Committee ([QPC](#)) has released the [2023 – 2027 General Class FCC Element 3 Question Pool & Syllabus](#) .

The new pool incorporates some significant changes compared to the 2019 – 2023 pool. Its 432 questions were modified slightly to improve wording or to replace distractors; 51 new questions were generated, and 73 questions were eliminated. The difficulty level of the questions is now more balanced, and the techniques and practices addressed were updated.

The new 2023 – 2027 question pool is effective July 1, 2023 – June 30, 2027, and *must* be used for General-class license exams administered on or after July 1, 2023.

### 2023 Upcoming Events

The following are possible 2023 club participation events.

- Winter Field Day
- OH ARES VHF Contest
- ARES Readiness repeater check for Red Cross shelter locations.
- ARES tabletop disaster simulation
- FLDIGI exercises and message sending
- Annual ARES SET
- Ohio State Parks On The Air at Mohican State Park
- Black Fork Gravel Grinder 2023 - May 6th, 2023
- 24-hour foot race at Mohican State Park.
- Skywarn™ Training by the National Weather Service
- Field Day
- Various ham radio contests from club station.
- Christmas Party 2023

**Do you have any events/activities YOUR club could participate in?**

## Radio Activity

**Don Russell**

**W8PEN**



Happy New Year everyone! The club had a great 2022. I am looking forward to 2023 to be even better.

### **Club Station**

With the club room refurbishing finally completed, HF antenna installed in the attic, and the Icom 7300 operational, the club is ready to continue with on the air activities from the club room. We have had several club members participate in the ARRL November Sweepstakes and the ARRL 10 meter contest. Looking at January, the North American QSO party (January 21<sup>st</sup>) and the Winter Field Day contest (January 28<sup>th</sup>) seems like good possibilities. Since both contests are after the January club meeting, I will see who is interested in working these contests.

We could use a little more participation from club members for these events. Hopefully when members see how much fun we are having, the participation will grow.

There are plenty of other operating events that the club could participate from the club station. Not just contests. For example: Terry, KI8N, suggested setting the station up for digital and a few digital traffic nets. Just to get our feet wet and be more prepared.

With the IC-7300 being “digital ready”, setting up for digital would not be hard to do. Even the dated computers we are using would work well on digital.

If we ever get internet hooked up for the club, I might even try setting the station up as a remote base. That way, club members could operate the station from their own homes via the internet. Wouldn't that be neat?

### **EchoLink**

A few months ago, I installed the 2 meter repeater's EchoLink on a different computer. Everything was running perfect with no computer crashes. However, the laptop battery died the other day. It turns out the Laptop I am using will not turn on without a battery installed. This battery is bad enough that it is not detected by the computer.

I ordered a new battery, which came in dead on arrival. Would not work and would not charge. Another battery is on the way and EchoLink should be up and running before meeting night. If there are any other issues with the EchoLink computer, I am thinking of using one of the clubs' older computers. They work and should be fast enough to handle EchoLink.

Since Steven, N8RLW, and Roger, KE8ICI, have taken over the club repeaters, I will not be giving repeater reports from here on out.

I am still in charge of the EchoLink system and the Mesh Network.

### **Local Mesh Network**

Lately, I have been putting a lot of effort into the Mesh Network.

Initially, the main agenda with the mesh network was to set up a node at the club room and run the Bulletin Board System (BBS) and the Phone system (PBX) from there. Both these systems have been running from my house for a few years.

After setting things up, I realized that our mesh network was not as fast as I thought it was. While the BBS worked, it was slow. I have a few videos on the BBS and they required a lot of buffering from a computer to play correctly. The PBX was useless. The mesh network would not even provide VOIP speeds. The mesh network is supposed to be HSMM (High Speed Multi Media). This was TSMM (Turtle Speed Multi Media)!

So, I went to work on speeding things up. With the help of a few network tools called Iperf and IperfSpeed, I found that the average speed of our mesh network was only about 200 Kilobits/second or slower. Lol. That is talking just a little faster than the old phone modems!

Just to make a long story short, I found that mostly the issue was with the bandwidth settings I was using. There are three bandwidths to choose from in the AREDN firmware packages: 5 MHz, 10 MHz, and 20 MHz. The higher the bandwidth, the faster the network. At least to a point. Signal strength has a lot to do with speed. If the signal strength is not there for a 20 MHz bandwidth, you end up with much slower speeds because of many repeats between the nodes.

Our mesh network uses 5 GHz frequencies and 2.4 GHz frequencies. We were using 5 MHz bandwidth on the 2.4 GHz nodes and 10 MHz bandwidth on the 5 GHz nodes. This should actually be sufficient for speeds of at least 1 Megabits/sec but was not.

First, I upped the 5 GHz nodes up to 20 MHz bandwidth and was rewarded with an increase of speed for the mesh network to 1.5 Megabits/second. Much better.

I took the additional step of increasing the bandwidth of the 2.4 GHz nodes to 10 MHz and we now have a network supporting speeds up to about 3 Megabits/second and at times up to 8 Megabits/second. I am very pleased with these results.

Now, the PBX phone system is working well and videos from the BBS work without buffering. Just like YouTube!

I may eventually put the 2.4 GHz nodes back to 5 MHz bandwidth. 1 Megabits/second is good enough for our purposes. But for the time being, I am going to leave things as they are.

Sorry for all the Megabits, Ghz's, and Mhz's. Hope everyone got the drift of what I was saying.

### Future Projects for the Mesh Network

I am once again excited about our Mesh Network. I really feel that this system will eventually be something that the ARES can use during disaster events.

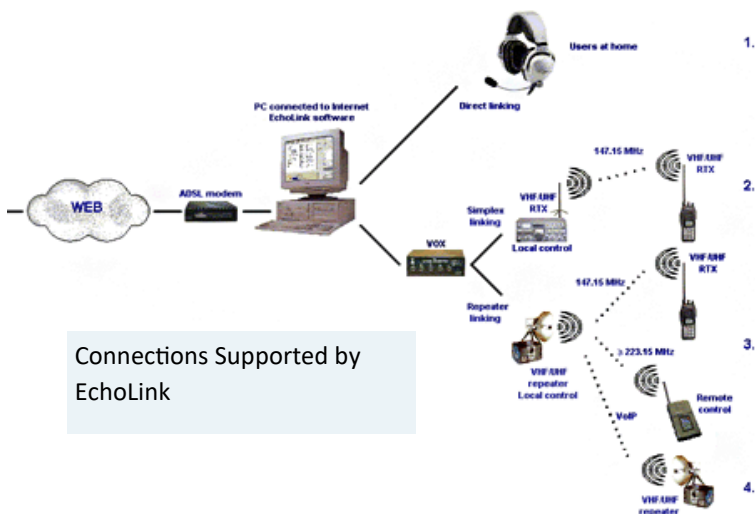
Early this Spring, I am hoping to replace a defective 5 GHz node at KCH. I am rethinking the strategy for the 5 GHz nodes to make them more useful.

We also have the Centerburg project still up in the air. We hope to place a 2.4 GHz node and a 5 GHz node on the Centerburg water tower. Same with the Fredericktown water tower.

My offer still stands. I will help anyone set up a mesh node that lives in the Mt. Vernon area. If you live outside the area, there is still a possibility of setting up a node if you are on high ground or/and have a tower of 30 – 40 feet.

### See Ya

That's it for this month. Hope to see everyone at the January meeting. 73.





## ARES

**Terry Windsor**

**KI8N**

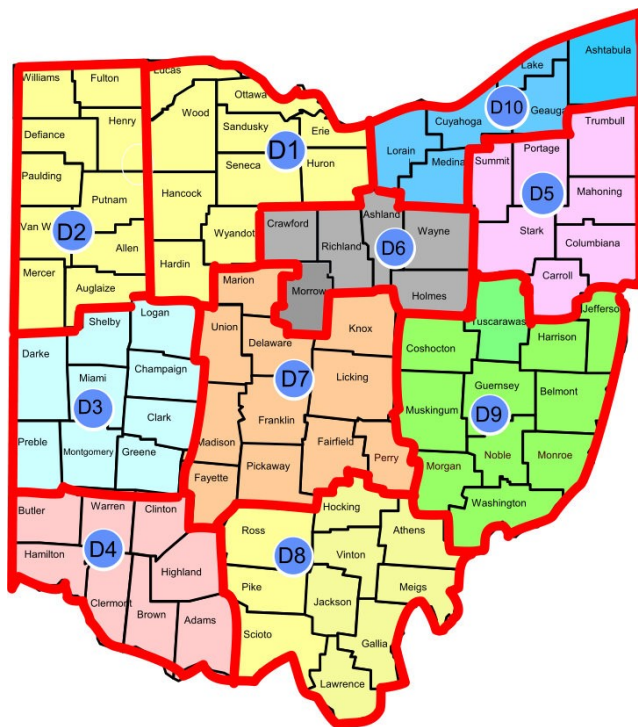


No active ARES events this month.

As noted in the December minutes Stan Broadway retired as the Ohio Section Emergency Coordinator after many years.

Bret Stemen, KD8SCL was appointed the new SEC. Taking Bret's place as District 7 Emergency Coordinator (DEC) is Scott Hixson, KC8ITN. Looking forward to hearing from and working with Scott.

Knox County is located in Ohio District 7.



Another retirement at the end of December was Mark Maxwell, Knox County Emergency Management Agency Director. Taking his

place is James DeChant who was the deputy director. Wishing Mark a great retirement and looking forward to working with James.

This is a great time for all club members interested in ARES to review the [Ohio Section ARES](#) web pages and complete or update any NIMS ICS training courses.

In the interest of ARES training this month I completed ARRL's EC-016—Public Service and Emergency Communications Management for Radio Amateurs. Thanks to Tom Sly, WB8LCD (Ohio Section Manager) for approving my application to take this course.

I emailed all members information about the upcoming January 14 Ohio ARES VHF Contest. We will discuss at the January meeting to see if anyone is interested in operating in this contest.

Thanks everyone and stay safe and be prepared!





# January 2023



Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 	2	3	4 4:45 pm Dinner - Southside Diner	5	6 10:00 am Breakfast - McDonalds, Newark Rd.	7
8 9:00 pm ARES Sunday Night Net—G. M. Jacobs (KE8HGE) (W8PEN)	9 7 pm MVARC Monthly Meeting 	10 OHDEN Net 7:45 pm	11 4:45 pm Dinner - Southside Diner	12	13 10:00 am Breakfast - McDonalds, Newark Rd.	14 OH ARES VHF Contest NA QSO Party—CW
15 9:00 pm ARES Sunday Night Net—Roger Gorrell (KE8ICI)	16 Martin Luther King Day	17 OHDEN Net 7:45 pm	18 4:45 pm Dinner - Southside Diner	19	20 10:00 am Breakfast - McDonalds, Newark Rd.	21 NA QSO Party—SSB
22 9:00 pm ARES Sunday Night Net—Terry Windsor (KI8N)	23	24 OHDEN Net 7:45 pm	25 4:45 pm Dinner - Southside Diner 	26	27 10:00 am Breakfast - McDonalds, Newark Rd.	28 Winter Field Day
29 9:00 pm ARES Sunday Night Net	30	31 OHDEN Net 7:45 pm				

## Miscellaneous Rambling

**Terry Windsor**  
**K18N**



Thought this would be a good time to change this column and discuss the ARRL's Year of the Volunteer and their new 2023 operating

event, [Volunteers On The Air](#).

This will be a year long on-air event where hams can participate in Volunteers On The Air (VOTA) and earn points for contacting ARRL members. The [rules](#) are listed on the ARRL.org web site.

All scoring is done via volunteer logs uploaded to LoTW.

### [Frequently Asked Questions](#)

If you enjoy making contacts and hopefully earning points then check out this event that starts January 1 and goes through December 31, 2023.

Was notified 12/28 by Yaesu that the FTM-400XDR and the FT-818ND radios have been discontinued. There was an issue with Yaesu being able to source parts to build them. You can search YouTube to view a video John Kruk did announcing this to the amateur world.

### **Ohio Distracted Driving Bill**

Last week the OH Legislature passed and forwarded to the Governor for his signature SB-288 that contains the distracted driving bill with the amateur radio exemption intact.

I concur with Don, W8PEN that more MVARC members need to become more active within your club. I hope to work the NA QSO contest using the club station this month and it would be great if we could fill the air waves with members that may have never worked a contest.

Finally, I collect used oil and transmission fluid to use in an oil burner furnace in my workshop. If you have any old oil that you haven't disposed of or don't know where to take, let me know and I will arrange to pick it up from you.

Until next month "Ham it UP!"



**VOLUNTEERS**  
**ON THE AIR 2023**

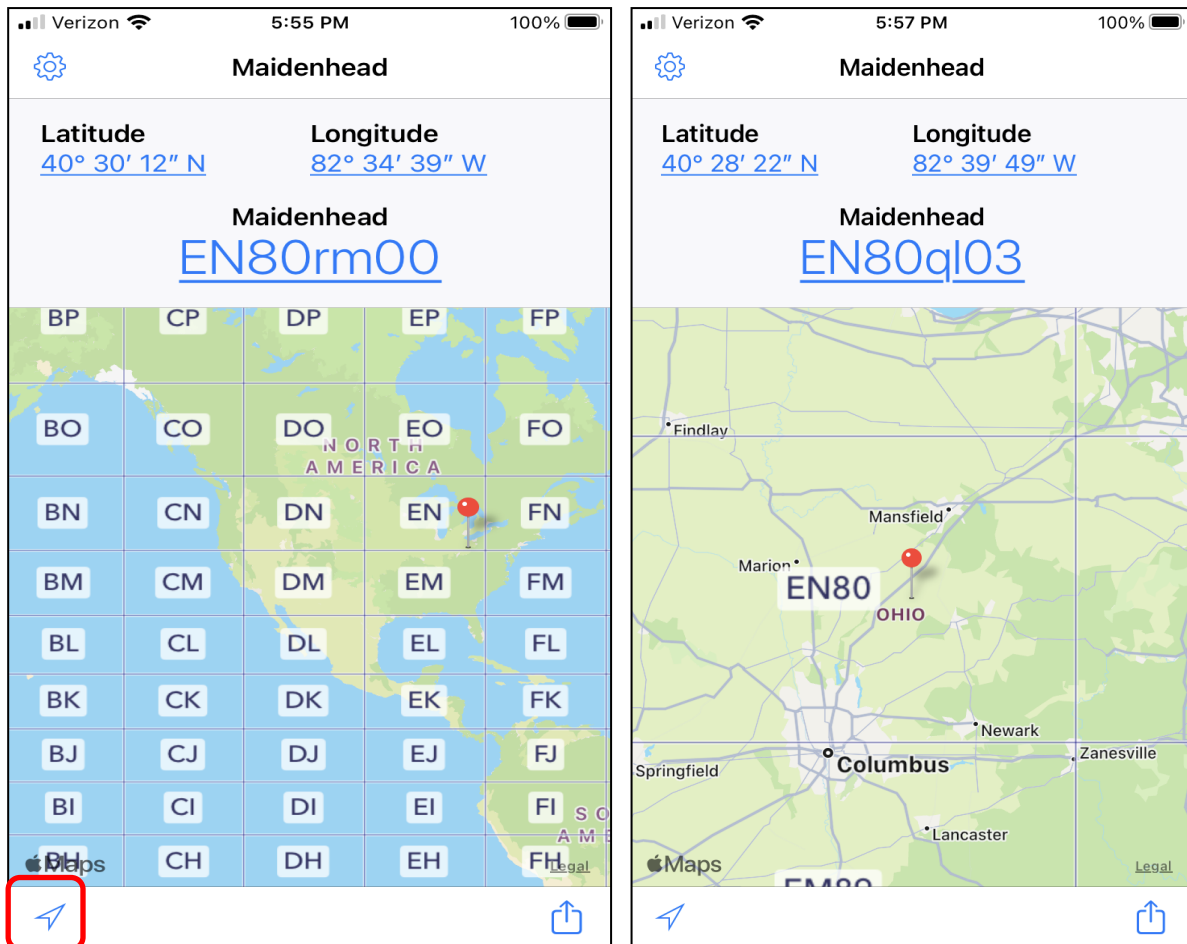
“...it would be great if we could fill the air waves with members that may have never worked a contest prior.” Terry, K18N

## Final Takeaway

### Maidenhead—Grid Mapping Mobile App

Last month I wrote about the Grid Mapper in QRZ.com. After that article Barry, N8PPF emailed me and told me about an easy to use phone app that does the same thing. The name of this app is Maidenhead. I downloaded it and have used it a couple of times during POTA activations and it is extremely easy to use.

Upon downloading the app there is nothing to setup or register. Just open the app and the map shown below on the left appears. Click on the arrow on the bottom of the page (highlighted) and the map indicates your location.



I expanded the map and my home QTH is shown with a pin in the image above to the left. Note that it shows your Latitude, Longitude and Maidenhead (Grid).

Does anyone else have a app that you like and would be good for club members to use? Let me know and I will publish it in this section.



## MVARC Membership

It is time to renew your MVARC membership.

### MVARC Membership Form

Club dues run from January 1 to December 31 and are collected the last quarter of the year. You can mail your dues to the address shown below, bring them to a meeting, or give them to any club officer. Visit our web page at [www.mvarc.net](http://www.mvarc.net) for further club information.

Regular membership dues are \$20.00. Dues are \$15.00 for those over 65 years of age, additional members in the same family, or who do not hold an active FCC amateur radio license.

**Mount Vernon Amateur Radio Club**  
**812 Coshocton Avenue**  
**PMB #145**  
**Mount Vernon, Ohio 43050**

Name: \_\_\_\_\_ Call Sign: \_\_\_\_\_

Street or PO Box: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ License Class: \_\_\_\_\_

Email Address: \_\_\_\_\_

ARRL Member (Y/N): \_\_\_\_\_ Donation (Optional) \_\_\_\_\_

Suggestions for possible meeting programs:

## General Exam Sample Test Questions:

**G3C10** What is Near Vertical Incidence Skywave (NVIS) propagation?

- A. Double hop propagation near the LUF
- B. Propagation near the MUF
- C. Long path propagation at sunrise and sunset
- D. Short distance MF or HF propagation using high elevation angles

**G3C04** What does the term “critical angle” mean, as used in radio wave propagation?

- A. The short path azimuth of a distant station
- B. The highest takeoff angle that will return a radio wave to Earth under specific ionospheric conditions
- C. The long path azimuth of a distant station
- D. The lowest takeoff angle that will return a radio wave to Earth under specific ionospheric conditions

## Extra Class Exam Sample Test Questions:

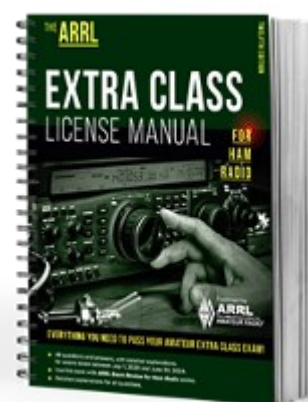
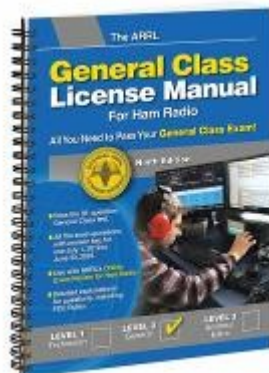
**E5D03** What is microstrip?

- A. Miniature coax used for low power applications
- B. Precision printed circuit conductors above a ground plane that provide constant impedance interconnects at microwave frequencies
- C. Lightweight transmission line made of common zip cord
- D. Short lengths of coax mounted on printed circuit boards to minimize time delay between microwave circuits

**E5D09** What happens to reactive power in an AC circuit that has both ideal inductors and ideal capacitors?

- A. It is repeatedly exchanged between the associated magnetic and electric fields, but is not dissipated
- B. It is dissipated in the formation of inductive and capacitive fields
- C. It is dissipated as kinetic energy in the circuit
- D. It is dissipated as heat in the circuit

These test questions are from the current test pools for their respective license classes. How did you do? The answers are on the last page. Practice tests for all license classes can be found here: <https://www.grz.com/hamtest/>. The ARRL license manuals shown are available from the [ARRL](https://www.arrl.org/), retailers, or Amazon for license studying.



## Miscellaneous Amateur Radio Information

Join us every Sunday night on the Mt. Vernon 146.79 repeater for our weekly **MVARC ARES Sunday Night Net. Check-in starts at 9 pm.**

Unable to access the repeater from where you are located? We are on IRLP (EchoLink) - Just look us up.  
K8EEN-R Node 809800.



### Ohio Traffic Nets

#### [The Ohio Single Side-Band Net \(OSSBN\)](#)

Ohio Single Side-Band Net; Ohio connection for what is going on in the Ohio Traffic System. The Net meets on 3.972.5 MHz at 10:30 am, 4:15 pm, and 6:45 pm daily. Alternate Frequency for all sessions is 3.968 MHz.



#### [Central Ohio Traffic Net](#)

The Central Ohio Traffic Net is a part of the Ohio Section of the National Traffic System. They meet daily to handle traffic; all licensed amateur radio operators are welcome to check in and to learn to handle traffic. COTN meets daily at 7:15 pm on 146.970, -.600 MHz, PL 123.0. Signal Operating Instructions and frequencies given here: <https://www.cotn.us/sop>.

#### [The Ohio ARES HF Digital Net—OHDEN](#)

Tuesday at 7:45 pm 1804.5 MHz, USB, Olivia 8-500 with waterfall frequency 1500.  
Sunday at 4:00 pm 3584.5 MHz, USB, Olivia 8-500 with waterfall frequency 1500.

### Local Amateur Radio Clubs

Delaware Amateur Radio Association: <http://k8es.org/>

Newark Amateur Radio Assoc: <https://www.n8ara.org/>

InterCity Amateur Radio Club (Mansfield): <https://iarc.club/>

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“We could use a little more participation from club members for these events. Hopefully when members see how much fun we are having, the participation will grow.” Don, W8PEN

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## FCC and License Updates



### First-Time Exam Applicants Must Obtain an FCC Registration Number before Taking an Exam

All amateur examination applicants are required to provide an FCC Registration Number ([FRN](#)) to the Volunteer Examiners (VEs) BEFORE taking an amateur exam. **Social security numbers are no longer accepted at exam sessions.**

Amateur candidates who already have an FCC license, whether for amateur radio already have an FRN and can use the same number. All prospective new FCC licensees, however, will be required to obtain an FRN *before* the examination and provide that number to the volunteer examiners on the Form 605 license application

All applications will be required to contain an email address for FCC correspondence. Applicants will receive an email direct from the FCC with a link to the official electronic copy of their license whenever a license is issued or changed.

### FCC Application Fee and VEC Filed Applications

EXAMINEES MUST PAY WITHIN 10 DAYS.

Examinees do **NOT** have to wait for the email from the FCC to pay the fee. As soon as an the application file number is issued by

the FCC, they can pay by logging into the CORES [Payer FRN System](#).

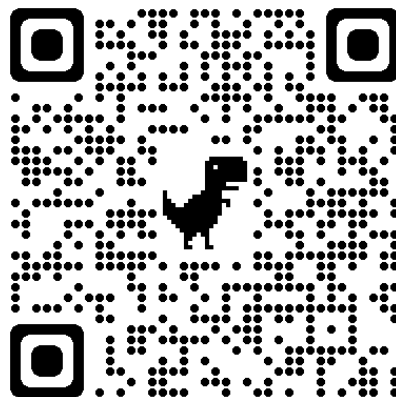
Application File Number search using an FRN: [FCC Application File Number Search](#)

### FCC Legacy CORES System—Retired

The Federal Communications Commission (FCC) retired the [Legacy version](#) of its Commission REgistration System (CORES) on July 15, 2022.

CORES is designed to identify those who hold certain types of FCC licenses and FCC authorizations, including amateur licenses, and organize them in an easily accessible manner under a common FCC Registration Number (FRN) regardless of whether one holds a single such authority or more.

Starting on July 15, 2022, the Legacy CORES website will re-direct users to the [Commission's updated CORES](#) site. Although some functionalities in the old system will continue to work for a short time, the [FCC has urged all users](#) to transition to the updated CORES system to take advantage of its enhanced security and functionality.





# MVARC

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President

Frank Counts, KC8EVS

Vice President

Barry Butz, N8PPF

Secretary

Scott Yonally, N8SY

Treasurer

Terry Windsor, KI8N

Club Call Trustee

Don Russell, W8PEN

Equipment Trustee

Barry Butz, N8PPF

Directors

Michael Jacobs, KE8HGE

Arlin Bradford, KD8EVR

Roger Gorrell, KE8ICI

Steve Harvey, N8RLW

Scott Yonally, N8SY

Bill Stroud, KD8WHQ

Newsletter Editors

Frank Counts, KC8EVS

## Note

The Friday morning breakfast is meeting at McDonalds. 111 Newark Road, Mount Vernon (next to Southside Diner).

This is to accommodate parking since the Academy Building visitor parking is not available during week-day work times. The group has temporarily decided to relocate to a meeting location that is easier for club members, guests, and visitors to access.

If you have any questions or comments please express them at a club meeting.

## Contact Us

MVARC

812 Coshocton Ave.

PMB #145

Mount Vernon, OH

43050

Email

admin@mvarc.net

## Answers to sample test questions on page 20.

**G3C10:** D– Short distance MF or HF propagation using high elevation angles

**G3C03:** B – The highest takeoff angle that will return a radio wave to Earth under specific ionospheric conditions

**E5D03:** B – Precision printed circuit conductors above a ground plane that provide constant impedance interconnects at microwave frequencies

**E5D09:** A– It is repeatedly exchanged between the associated magnetic and electric fields, but is not dissipated



### Editors Notes

**The MVARC Newsletter is delivered to club members by email containing a link to the MVARC webpage.**

***Thanks to all for your assistance with the MVARC Newsletter; in 2022 we were selected as the second best newsletter in the Ohio Section.***

Please note the contact email for the MVARC newsletter is: [admin@mvarc.net](mailto:admin@mvarc.net).

