



Full Quieting

The Official Journal of The Bellbrook Amateur Radio Club



April 2024 — Issue 32

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From the President & Editor

Greetings,

Spring is finally here, although in Ohio you can bet we're not out of cold weather yet!

It's going to be a busy month. Keep an eye on the skies on Monday April 8th for the total solar eclipse that will (weather permitting) be spectacular! Make sure you don't flub up and stare at the sun without approved glasses (or solar binoculars like me). We will be gearing up this month with plans for the Hamvention in May and Field Day in June. The POTA special interest group and Tech Night are in full force. Our technician license class should be taking their exams and getting on the air. Great opportunities for amateur radio lie ahead.

We wrap up the month with the famous Bellbrook Sugar Maple Festival on Apr 20th. BARC plays a key role in ensuring the parade runs smoothly. We will have amateur radio operators along the parade route, so new hams make sure you buddy up with some of us older Elmers to teach you the ropes.

On the 21st, there will be a Rookie Roundup contest. This one is geared to new hams, and BARC will be hosting this event at our clubhouse so you can try out your new license on our equipment. This may give you the bug to upgrade your license and buy some new equipment at Hamvention to get your own setup going. And that's how it goes in amateur radio!

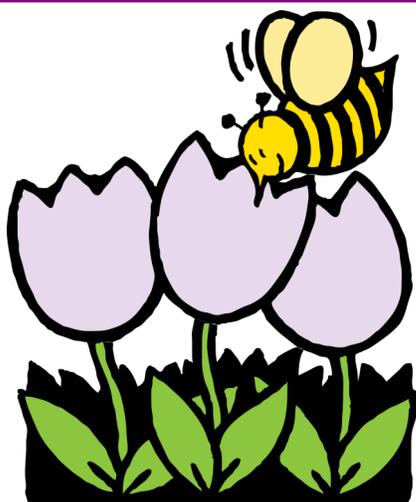
With all of this going on, I hope to see a lot of you at some of these events. Looking forward to it!

73, Ray Hitt, N8VMX

BARC President & *Full Quieting* Editor

Your views are important to BARC and to *Full Quieting*

Please make yourself heard at the club, via [email](#), and on the air...



2024 BARC Officers and Directors

President: Ray Hitt, [N8VMX](#)

Vice President: Jim Totten, [WA8HUB](#)

Secretary: Jim Gifford, [N8KET](#)

Treasurer: John Westerkamp, [W8LRJ](#)

Senior Director: Jim Lusk, [KC8EFD](#)

Junior Director: Bob French, [AC8ZU](#)

2023 Coordinators

Clubhouse: Jim Lusk, [KC8EFD](#)

Comm Center: John Westerkamp, [W8LRJ](#)

Contesting: Ken Gunton, [W8ASA](#)

Education: Paul Sharp, [WS8R](#)

Emergency Preparedness: Jim Lusk, [KC8EFD](#)

Field Day: Glenn Rodgers, [W8IO](#)

Full Quieting Editor: Ray Hitt, [N8VMX](#)

Hospitality & Librarian: Natinka Siwecki, [KD8NUA](#)

IT: John Westerkamp, [W8LRJ](#)

Lunch Bunch: Jim Totten, [WA8HUB](#)

Net: Paul Sharp, [WS8R](#)

Public Service: Don Parker, [KB8PSL](#)

QSLs: Roger Hoffman, [WB9BXT](#)

Repeater: Russ Roysden, [N8NPT](#)

TechNight/Workbench: Trevor Clarke, [K8TRC](#)

Webmaster: John Westerkamp, [W8LRJ](#)

BARC Net: Every Sunday, 8 PM Local

147.045 (+) (118.8 PL enc and dec) [Alt = 443.675]

Directions to BARC Clubhouse and Comm Center

Rooms 1 & 3 Lower Level Sugar creek Elementary School

51 S. East Street, Bellbrook (One block east & one block south from the traffic light in downtown Bellbrook)

Enter at South end of building

Member Interviews

BARC wants to hear from you!

Whether you're a long-time BARC member or a brand new one, young or old, please tell us about yourself. Here are some simple guidelines, although you're free to use whatever format you're comfortable with.

This page is all about you. It's your chance to let BARC members to get to know you better.

Here's are a few sample questions to help get you started, but you can write whatever you want.

Please send us some pictures of anything you want BARC to see (you, station, antennas, pets, family, anything)

- When you were first licensed?
- How did you learn about Ham Radio (HR)?
- Why did you become a Ham?
- What are your current HR interests?
- What are you most passionate about regarding HR?
- Tell us about your stations (past, present, and future)
- What was the most exciting thing that happened to you in HR?
- What do you do for a living?
- Would you like to say something about your family?
- Do you have other hobbies or interests?
- Any other comments for BARC?



What's Up BARC?

What's Up BARC?

Ray Hitt, [N8VMX](#)

Announcements regarding any member news including: new equipment, antennas, grandchildren, children, pets, operating news, etc.



Welcome New BARC Members!

Dean Heyne, **KF8AKQ**, Technician
Don Heyne, **KF8AKR**, Technician

District 3 Information on Upcoming Solar Eclipse

I've set up a page on the Ohio District 3 ARES website regarding the 8 April Eclipse here in Ohio.

On that I'll be posting information about amateur radio support to local authorities, as well as links to general eclipse information and resources.

It can be found on the main page or accessed directly at:

<https://ohd3ares.org/wp/?p=7274>

It's focused on District 3 as a whole, but I will link to County or local level information as it becomes available and is appropriate.

Let me know if you have any questions.

Randy KA0AZS

Sugar Maple Festival Parade—BARC Support Needed

The 2024 Bellbrook Sugar Maple parade is **Saturday April 20**. Amateur radio volunteers gather at [Bellbrook Community Church](#) (SR 725 and Vemco Dr.) at **9:30 AM** for updates and assignments. The parade begins at 10:30 A.M., we should be completed by 11:30 AM. We need 10 volunteers for various positions like Reviewing Stand, merging parade at W. Franklin and Little Sugarcreek, Dots Market, and vehicle line up on Vemco. Dr. Greg Goffe will cover net control. This is a great opportunity for new members to experience working a controlled net operation. Any new member will be placed with an experienced member, HT radio is not needed but, if you have one bring it.

Additional information will be sent out closer to the parade date. Since Don Parker, KB8PSL, aka the Big Kanuna, will be recuperating and not able to participate, please direct all questions to Ray Hitt, [N8VMX](#) or Jim Totten, [WA8HUB](#) who will both take his role this year (notice it takes two of us to replace one Big Kanuna). Get well soon, Don.



What's Up BARC? (continued)

1130 DMR Net—Monday through Friday 1130AM on DMR Talkgroup 310557

If you haven't joined us for the 1130 DMR Net, please give it a try!

The **1130 DMR Net** is a very informal net with rotating net control, currently it's been John **W8LRJ**, Ray **N8VMX**, Jim **WA8HUB**, but more are welcome to join in. The topic is DMR, amateur radio in general, what you've been up to, or whatever's on your mind. Nets usually run 30 minutes, but can go up to an hour if there's lively discussion. Unlike the other DMR nets where you check in and that's it, we go back around and give everyone the floor for as long as they like. This is a good way to make sure your DMR skills are up to par, your audio's OK, your hot spot isn't flaky, and so on. And it gives you a chance to get to know your amateur radio fellow travelers a little better. Please join us!

This talk group is accessible many ways; through your own DMR Wi-Fi hotspot, through Tim Procuniar, N8NQH's, East repeater in Bellbrook or West repeater near Carillon Park, or a local Brandmeister repeater near you ([see map](#)). Setting up your DMR radio to talk on this talk group is explained quite well on [Tim's website](#). If you need technical help, please contact [W8LRJ](#), [N8NQH](#), [KB8EMD](#) or [N8VMX](#) for assistance, we'd be glad to help.

New Springfield DMR Repeater, Plus Some DMR Tips

Springfield has a ham [DMR repeater](#) that just recently switched over to the Brandmeister network. To add this KC8NYH repeater to your radio, add this information (courtesy Brandmeister):

Rx: 442.5125

Tx: 447.5125

Color Code: 1

TS1: all other talkgroups (no published static talkgroups)

TS2: TG3139 (OH), 31394 (SW OH), 313915 (local Springfield chit-chat)

Also, for a couple of weeks, Tim Pecuniar, N8NQH, is setting up **TG 313915** group to be always active (static) on both his East & West repeaters on **timeslot 1 (TS1) on his repeater**. This will allow you to talk to the Springfield community throughout the greater Dayton area using Tim's repeaters.

In general you can also reach all Brandmeister groups (including our 310557) by accessing this repeater via RF. To talk to our 310557 talkgroup on the Springfield Repeater, add it to TS1 in your radio for the new Zone you set up for the Springfield repeater.

Here's a travel tip that Tim, N8NQH has shared in the past. In addition to the local and Springfield repeaters shown here, go ahead and make up a "Travel Zone" in your radio and add the DMR repeaters in the areas you're planning on visiting, add some key talkgroups, such as Tim's 310557, 3139 Ohio Statewide, and others. Copy them on both Time Slot 1 and 2 for each repeater you may use. Select the proper Time Slot based on what you find out the repeater's policy for time slots. You can delete the unused channels after you sort this out. Use [Brandmeister's Repeater search engine](#) to find out the details needed to set up your radio. Do this before you leave on your trip!

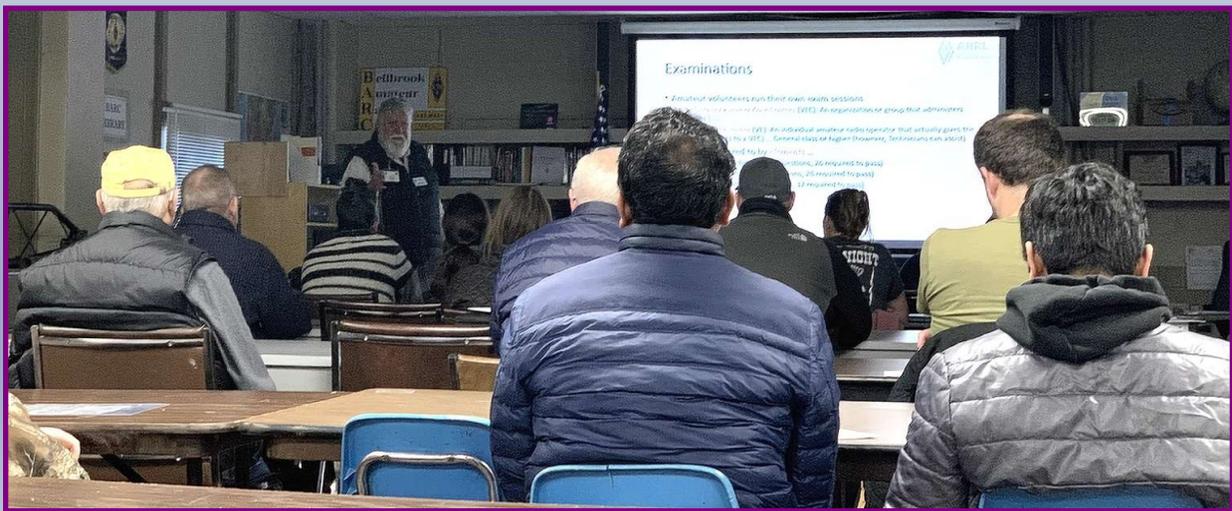


What's Up BARC? (continued)

Technician Class Training Nearly Complete!

The Technician class training is underway at BARC. Here are a couple of photos of John W8LRJ and Glenn W180 teaching their respective classes.

This 9 week class covers all the chapters in the accompanying ARRL book, *The Ham Radio License Manual*. The class is nearly over, but we try to offer it in February and again in October. Good luck to the students!



Field Day Preparations Underway

Glenn Rodgers, W180, as the new BARC Field Day Coordinator, held his first meeting on Saturday March 16th. Several items were discussed including the antennas, shelter layout, and the Committee positions. The next meetings are planned for April 13, May 11, and June 8. Field Day will be held June 22-23 at Sackett Wright Shelter #1.

We need many volunteers to set up, tear down and operate overnight for a few examples. There are signup rosters at <https://bellbrookarc.org/wp/field-day-2024-volunteers/>. Since some of the activities involve moderate and occasionally heavy lifting, we would greatly appreciate the younger, able-bodied members to assist where they can. You'll find this to be an entertaining, educational, fun event that brings us all together. If you're interested, please set aside an hour or so for each of the upcoming meetings to keep informed. More information is also updated frequently on the BARC Website at <https://bellbrookarc.org/wp/field-day/>



What's Up BARC? (continued)

A Couple of Great BARC Tech Night Successes

We had two great Tech Nights, one was on Feb 28th and didn't make into the March Newsletter, the other was held on Mar 27th. We plan on doing one a month, and the topics vary, so keep in touch and come to a Tech Night soon!

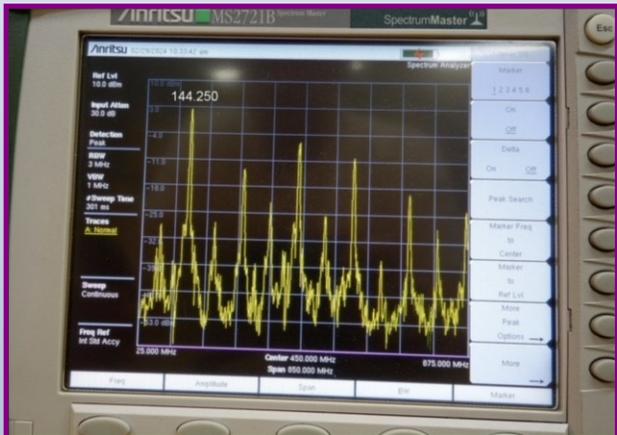
28 Feb Tech Night: Tim Procniar, N8NQH, gave a presentation discussing the spurious nature of some Chinese radios, followed by a live demonstration. This was around 30 minutes for the presentation, plus another 30 minutes for the live demonstration. These charts were from the presentation, and the spectrum plot was captured from a Baofeng UV82. It would make a decent comb jammer...



Spurious output

Your radio is transmitting on an unintended frequency.

In this specific...
Transmitting on multiple frequencies at the same time - unintentionally.



27 Mar Tech Night: Bob French covered "Microcontroller Radios for Long Range Communications", touching on subjects like LORA, communicating with low earth orbiting satellites, Meshtastic, APRS, solar power, purchasing or building small antennas, and open discussions. Bob talked about having a 4-hr session some upcoming Saturday, so stay tuned for that once the details are worked out.



Officer, Director, and Coordinator Inputs

Treasurer: John Westerkamp, [W8LRJ](#): There were lots of one-time yearly expenses in March including Zoom, Baofeng radios for new members, and our Flea Market booth at Hamvention. We did have Kroger Rewards for \$90.95 to offset the expenses, but expenses outpaced income by about \$500 this month.

We now have 141 BARC members. I hope you enjoyed the Membership Directory. Thanks to Russ Roysden, N8NPT, for putting it together.

We continue to be in great financial shape.

Repeater: John Westerkamp, [W8LRJ](#): Although it may be possible to hear broadcasts from remote systems through EchoLink on our repeater, a reminder that it is not a two-way connection due to issues with the router. I may disconnect the EchoLink node completely until we come up with a solution as it sometimes hangs the repeater which needs to be rebooted.

A reminder that when using Allstar or Echolink, if the repeater is in constant use and unable to drop the carrier, a local user will not be able to send a *73 to disconnect and the connection will remain active forever! I have since taken steps to prevent this, but if it happens to you, please text me at 937-271-3119 and I can disconnect the node for you. You can also use the Contact Form on the website to reach me.

Website: John Westerkamp, [W8LRJ](#): Field Day Planning has begun! We need lots of help and especially need some younger people to help with lifting and antenna set up. It is a lot of fun seeing how things go together and breakfast is delicious. You can sign-up to volunteer for various activities on the website under Programs...Field Day. There is also a list of Committee Chairpersons and copies of the Planning Meeting presentations there for your information.

And don't forget about the Member Forum where you can ask questions and make announcements. The website has a new section Mentors and Experts! You can find a list of experts by selecting Mentors and Experts under the Membership tab. Send your questions via the Contact page for our Experts!

Communication Center: John Westerkamp, [W8LRJ](#): The Rookie Roundup is coming up on Sunday, April 21! We will open the clubhouse and would love to see lots of rookie operators (amateurs licensed for 3 years or less) at the stations. Be sure to watch the website and your email for more information.

Future plans include updating all the grounding and bonding to move the lightning arrestors outdoors, adding some ground rods, and bonding everything together with the electrical service ground. Stay tuned!

Secretary: Jim Gifford, [KD8APT](#): As secretary I took notes at the Planning meeting and minutes at the General meeting. I also taught the Introductory Technician class and the class on Communication. I attended and helped in two other Tech classes.

BARC Net Manager: Paul Sharp, [WS8R](#): Every Sunday at 8:00 PM you can listen to and participate in the exciting BARC Net, on 147.045. For the 4 weeks in March 2024 there were approximately 54 check-ins lasting 111 exciting and informative minutes. Topics ranges from Open Mike, Parks on the Air, your favorite outdoor sports, Tech Night, what winter projects are you working on and tell us about any exciting contacts you made. We often have non BARC members checking in to enjoy the Net.

Our faithful Net Controllers are, Larry Darner, KD8RER, Joe Menchaca KE8UUQ, Tink Siwecki KD8NUA, Paul Sharp WS8R, and John Westerkamp W8LRJ. Jim Dean, W8UD, is an alternate.



BARC April 2024 Event Calendar

Tue Apr 2, 2024

6:30pm POTA SIG Where: BARC Clubhouse

Thu Apr 4, 2024

7pm Planning Meeting Where: BARC Clubhouse

Sun Apr 7, 2024

8pm Weekly Net Where: 147.045+ (118.8 Hz tone)

Tue Apr 9, 2024

11:15am Lunch Bunch Where: Cherry House Cafe

Sat Apr 13, 2024

9am Field Day Planning Meeting Where: BARC Clubhouse

Sun Apr 14, 2024

8pm Weekly Net Where: 147.045+ (118.8 Hz tone)

Thu Apr 18, 2024

7pm Membership Meeting Where: BARC Clubhouse

Sat Apr 20, 2024

9am Sugar Maple Festival Parade Where: Bellbrook Community Church

Sun Apr 21, 2024

2pm Rookie Roundup Where: BARC Clubhouse

Sun Apr 21, 2024

8pm Weekly Net Where: 147.045+ (118.8 Hz tone)

Tue Apr 23, 2024

11:15am Lunch Bunch Where: Another Broken Egg

Wed Apr 24, 2024

7pm Tech Night Where: BARC Clubhouse

Thu Apr 25, 2024

7pm Dessert & Movie Night Where: BARC Clubhouse

Sun Apr 28, 2024

8pm Weekly Net Where: 147.045+ (118.8 Hz tone)



BARC Movie and Dessert Night



So far for the 2024 Season of our BARC Movie and Dessert Night we've had an **Adventure** and a **Murder**. In April we have a *Double Feature: The Meg & The Meg 2*. You can stay for one or both of these action packed films. If you would like to recommend a movie we have three dates left! Our March movie was cancelled due to a scheduling conflict. If you would like to see the movie we had scheduled for March, **Paul, Apostle Christ**, in the future just let me know. It's a movie worth watching.

Upcoming Dates for Our 2024 BARC Movie & Dessert Nights:

April 25, 2024	The Meg & The Meg 2
May 23, 2024	Mission Impossible: Dead Reckoning Part One
June 27, 2024	The Call of the Wild
July 25, 2024	Father Goose
August 22, 2024	
September 26, 2024	
October 24, 2024	

Past movies and desserts:

January 25, 2024	The Adventures in Baby Sitting
February 22, 2024	Murder on the Orient Express
March 28, 2024	Paul, Apostle of Christ Cancelled due to scheduling conflict

All movie nights are held on the fourth Thursday of each month January through October at 7:00 PM in the BARC Clubhouse. We take November and December off for the holidays.

At each movie night we pop up, *fresh*, BARC's famous popcorn!

We'll see you in April at the Movies!

Tink/KD8NUA



Lunch Bunch

Jim Totten, [WA8HUB](#)

Hello my fellow lunch lovers. April 2024 is here. And time to renew our lunch meetings for this new year. To recap: Our club meetings are on Thursdays. The Planning meeting is the first Thursday of the month and the General meeting on the Third Thursday. Our Lunch Schedule is the Second and Fourth Tuesday of each month. If a scheduled Tuesday gets slammed by some unforeseen event the lunch is just cancelled. The invitation messages will go out Wednesday or Thursday of the previous week.



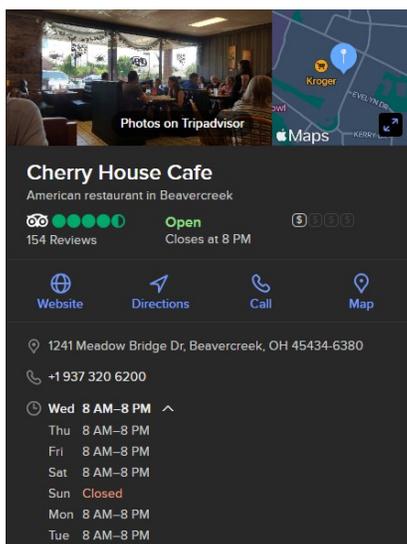
Now, how will the lunches be selected? Accompanying this information page is the same chart in last months FQ listing our current set of restaurants. The April restaurants are highlighted. I updated all of the dates for 2024. This published list is the order we will select each lunch day. You now know what the whole order is and know what's coming next.

February had some excellent eating. We ate at the new City Barbeque in Kettering and Marion's Piazza Beavercreek. Good parking and lots of seating. Last time we were there I had a Rueben Sandwich instead of pizza. Excellent. In March we were at the end of our scheduled list.

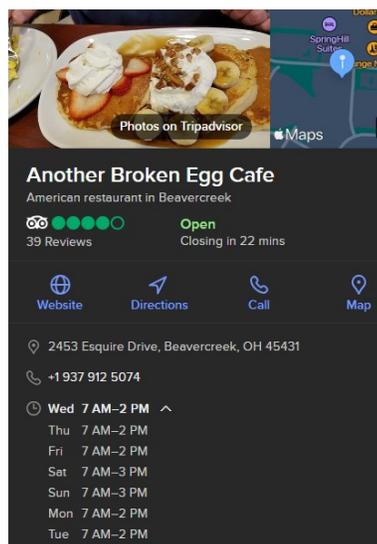
April starts the new season. The TOP of the list. April 9, 2024 is one of the most favorite restaurants on the list, The Cherry House Cafe. Address, 1241 Meadowbridge Dr., Beavercreek, OH 45434. (937) 320-6200. People show up here if they don't any other time. The food is outstanding. I have to call in ahead to insure we have enough seats. April 23, 2024 we move to probably another most favorite, Another Broken Egg Cafe. Address, 2453 Esquire Dr., Beavercreek, OH 45431. (937)912-5074. We have to eat on time as their hours are from 7:00am to 2:00pm.

That's a wrap for this month. Happy eating.

Tuesday, April 9, 11:15am



Tuesday, April 23, 11:15am



Lunch Bunch 2023 List

Jim Totten, [WA8HUB](#)

Date	Restaurant	Address	City	Phone Number
4/9/24	Cherry House Cafe	1241 Meadowbridge Dr.	Beavercreek, OH 45434	(937) 320-6200
4/23/24	Another Broken Egg Cafe 7:00 am to 2:00 pm	2453 Esquire Dr.	Beavercreek, OH 45431	(937) 912-5074
5/14/24	China Garden Buffet	112 Woodman Dr. Airway Shopping Center	Dayton, OH 45431	(937) 781-9999
5/28/24	First Watch 7:00 am to 2:30 pm	5245 Cornerstone North Blvd	Sugarcreek Township, OH 45440	(937) 732-9013
6/11/24	Submarine House	3195 Dayton-Xenia Rd.	Beavercreek, OH 45434	(937) 429-8650
6/25/24	Roosters Wings	2430 N. Fairfield <i>The Shoppes at FC</i>	Beavercreek, OH 45431	(937) 702-9500
7/9/24	Golden Corral Buffet and Grill	2490 Commons Blvd.	Beavercreek, OH 45431	(937) 613-5478
7/23/24	Yaffa Grill Mediterranean Food	2844 Colonel Glenn Hwy	Fairborn, OH 45324	(937) 429-4959
01/09/24	Chic-Fil-A	5301 Cornerstone N Blvd,	Sugarcreek Township, OH 45440	(937) 439-1700
01/23/24	Culp's Cafeteria	1000 Carillon Blvd	Dayton, OH 45409	(937) 293-2841
02/13/24	City Barbecue	2001 E. Dorothy Lane	Kettering, OH 45420	(937) 200-1006
02/27/24	Marion's Piazza	1320 N Fairfield Rd.	Beavercreek, OH 45432	(937) 429-3393
03/12/24	Red Robin	2671 Fairfield Commons Blvd.	Beavercreek, OH 45431	(937) 320-9800
03/26/24	Beavercreek Pizza Dive	4021 Dayton-Xenia Rd.	Beavercreek, OH 45432	(937) 431-8669



Build-A-Hotspot (BAH)

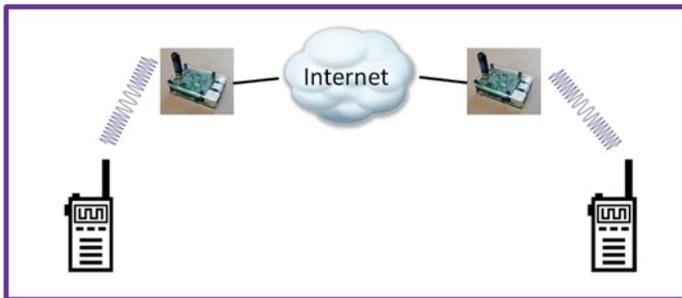
Ray Hitt, [N8VMX](#)

Some of you are new to digital radio and might be asking, “So, what’s all this talk about hotspots? Why get into Digital Mobile Radio (DMR), DSTAR, or Yaesu System Fusion (YSF)? My analog radio is just fine.” True, analog FM radios are fine for most of what we do. But more and more of us supplement analog with these new digital modes that offer some interesting features; clear audio, the ability to send texts, pictures in some cases, and the ability to connect to other users across the world.



Digital hotspots are useful to connect you with others when you’re out of range of a normal repeater, for example when you’re mobile traveling across the state or country. I use them a lot when I’m babysitting in the basement and don’t have good reach to our local repeater down there in the man-cave. You can also run your radio at its lowest power setting and transmit hours longer than when you’re cranked up to hit a moderately distant repeater.

The way a hotspot works is to take a small computer, usually a Raspberry Pi variant, attach an RF modem, usually an open-source Multi-Mode Digital Voice Modem (MMDVM) variant. Inside the hotspot, the MMDVM transmits and receives to/from your digital radio. It then routes the digital audio to the Raspberry Pi that is connected to the Internet and servers that route the audio to other repeaters and hotspots around the world. This all takes a fraction of a second and is all behind the scenes once you’re up and running. The Raspberry Pi and MMDVM are combined in a small case with a status display. That’s a snapshot of what a hotspot is.



This picture portrays what I’m describing. You could have any number of hotspots around the world connected to their regional servers, all listening to your talkgroup. Repeaters (like Tim’s [N8NQH DMR repeater](#)) are connected to the Internet the same way as hotspots and can interact with both local users and remote hotspots and remote repeaters too. Any typical DMR net will have a mix of repeaters and hotspots all talking to each other.

This level of connectivity relies on a functional Internet, but when the Internet fails, a local repeater can fall back to local operation that users can continue to use directly via RF. A hotspot on the other hand is useless without the Internet. How it gets to the Internet is not important, you can use your home Internet, a Wifi Internet hotspot in your phone or your car’s Internet if it’s equipped. You can use the Internet at the BARC clubhouse if you’re there too. Or a Starlink terminal if you’re rich!



Build-A-Hotspot (BAH) (continued)

My goal here is to reach those of you who are interested in DMR (and YSF and P25 and DSTAR) and would like a hotspot to assist your radio. I'll be hosting a Tech Night at the BARC clubhouse sometime soon (May or June?) and show how to build your own hotspot from scratch with the parts readily available. I have three examples, 1) a pocket-sized mini-hotspot with a limited range antenna optimal for use in your car, 2) a mid-sized hotspot useful in the car or at home, and 3) a top-of-the-line duplex hotspot with a touch screen and all the bells and whistles. You can compare the costs and see which is right for you. Over time, I have built and tested all three types and like them all, for different reasons.

Here's a [link](#) to an analysis performed by Boca Raton Amateur Radio Association showing the differences in power draw and capability between the Pi Zero, the Pi 3A+ and Pi 3B+. They drew many of the same conclusions I did that the Pi 3A+ has good capability and draws less power than the Pi3 B+ and would make a good choice for a hotspot. Since that article was written, the Pi Zero 2W came out with more processing and Wifi which makes it a good contender for a small hotspot.

So, lets dive in...

Option 1: Mini simplex hotspot

The smallest option makes use of a Raspberry Pi Zero 2W. This is a compact hotspot you can throw in your pocket. The performance is not bad, just right for a DMR hotspot. It is only around 3"W x 1.4"L x 1.4"H. The MMDVM hat I chose was the N5BOC simplex model, with the SMA connector left off but a patch antenna installed instead. This limits the range but is more than enough for vehicle use. I've operated it up to 30 feet through walls in my house. The case has two clear plastic tops, one with an antenna hole, the other without, so choose the one right for your MMDVM board, and keep the other one for when you change your mind later!



This mini-hotspot is comparable to a TGIFSpot [Junior Spot](#) which you can buy for \$179.00, so by doing it yourself you can save a few \$\$\$ and learn how these are built from the ground up!

The price list for the components is in tables on the next page. There are two options using different MMDVM boards, the first (recommended) uses the N5BOC MMDVM without SMA, the other uses an AURSINC (Chinese) clone MMDVM board that is inferior and requires frequency calibration. The N5BOC boards are made in Texas and individually burned in before shipping and they have superior design. If this is not important to you, you can swap out the board and save a few dollars. They both come with this small OLED display (you may need glasses to read it).

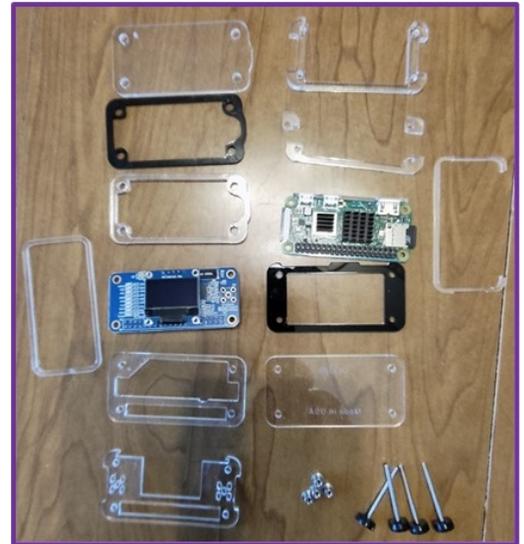
Build-A-Hotspot (BAH) (continued)

Case	C4Labs - JRZ-1S	https://www.amazon.com/gp/product/B07TWN5Q29/	\$ 19.99
PC	Raspberry Pi Zero 2W	https://www.amazon.com/Raspberry-Quad-core-Bluetooth-onboard-Antenna/dp/B0CCRP85TR/	\$ 23.93
MMDVM	N5BOC (OLED, Patch antenna)	https://www.store.n5boc.com/product-page/mmdvm-simplex-1v8	\$ 101.50
microSD	PNY 32 GB (cost each in 5 pack)	https://www.amazon.com/PNY-Elite-microSDHC-	\$ 4.40
Recommended Option			Total
			\$ 149.82

Case	C4Labs - JRZ-1S	https://www.amazon.com/gp/product/B07TWN5Q29/	\$ 19.99
PC	Raspberry Pi Zero 2W	https://www.amazon.com/Raspberry-Quad-core-Bluetooth-onboard-Antenna/dp/B0CCRP85TR/	\$ 23.93
MMDVM	AURSINC MMDVM	https://www.amazon.com/Hotspot-Display-Support-Raspberry-Pi-Zero/dp/B07VW819NW/	\$ 45.89
microSD	PNY 32 GB (cost each in 5 pack)	https://www.amazon.com/PNY-Elite-microSDHC-Memory-5-Pack/dp/B09WW69YRD/	\$ 4.40
Budget Option			Total
			\$ 94.21

Here's a look to the right at the case and components unassembled. These cases are fun to build, you start from the bottom (lower right of the photo) and work your way up.

A couple of lessons here. One, you may want to wear surgical gloves when you assemble these cases or else your fingerprints will end up on every piece. There's no harm in spraying a glass cleaning cloth and wiping down every case piece as they are put together. Please don't try to clean any electronic parts though. The second lesson regards the clear rectangular piece to the left of the N5BOC board in the picture. It is meant to go around the circuit card but is very tight. I broke the piece trying to get it around the circuit board. Luckily, [C4Labs](#) is in Washington (state) and their customer support is excellent. I was able to get a replacement piece sent to me. Yet another reason to not buy Chinese parts from Amazon, in my opinion.



The Raspberry Pi Zero 2W board is very small! Here it is to the right. Please note that there are two identical micro-USB ports to the lower right. The port to the extreme lower-right is for power only. **Don't apply power to the micro-USB port to the left of it.** Zoom into the picture and you can see they are labeled **USB** and **PWR IN** on the circuit board. The second micro-USB port would be useful to connect a USB-to-Ethernet adapter or in my case, a GPS puck to measure position and time.



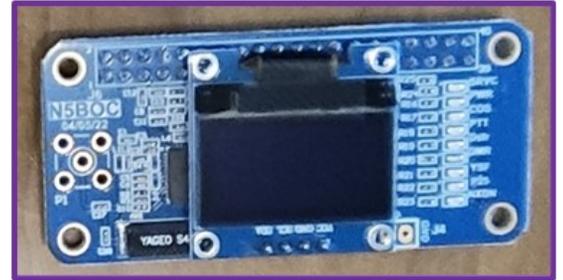
(Continued on next page)

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Build-A-Hotspot (BAH) (continued)

Here's a look at the N5BOC MMDVM board without an SMA connector. There's a built-in patch antenna that works fine for a few meters, then drops off. Ideal for mobile use. Lesson here: be **very careful** to align the N5BOC socket with the pins on the Raspberry Pi Zero 2W when it comes time to install it in the case. I have bent pins before installing this. The good news is they can be carefully bent back, but why tempt fate!



Option 2: Mid-sized simplex hotspot

This hotspot uses a different case and processor, but the same MMDVM boards as the other hotspots. I chose a Raspberry Pi3 A+ which is a little smaller than a Raspberry Pi3 B+ that you may be familiar with. The Pi3 A+ has one USB port instead of 4, no Ethernet, and less memory. I have a Raspberry Pi3 B+ already and have an older hotspot that works fine with it and wanted to see how a Pi3 A+ compared. The Pi3 A+ consumes half the power, which is a big plus, but in the process you give up Ethernet and three of the four USB ports. I don't use those ports for hotspots though, except for maybe connecting a GPS puck. Ironically, the case for the Pi3 A+ was extended to the side much more than I expected, so the size advantage wasn't as great as I hoped it would be once you take the case into account. C4Labs might very well use a common subset of parts for the Pi-3B+ case they also sell, but I for one would love the extra 0.75" or so case reduction instead.



If you prefer a Raspberry Pi3 Model B or B+ or already have one, you can certainly use it instead. The proper case for a Raspberry Pi3 Model B+ would be a [C4Labs ZRPi-1AS](#) at \$32.99. Everything else would be the same as for the Raspberry Pi3 A+. The Pi Zero 2W, 3A+ or 3B+ all use far less power than a Raspberry Pi-4 which is overkill for a hotspot so you'd be OK with any of them. They also don't require cooling fans even in a sealed case, where a Raspberry Pi4 would. I've been using an older Pi-3 B+ DVMEGA hotspot since 2018 and it's not gone above 60° C when in an indoor environment.

The cost estimates for the mid-sized simplex hotspot are below and on the next page. The same MMDVM choices as used in the mini-hotspot are driving the sole cost difference between the two estimates for the mid-sized hotspot.

Case	C4Labs - ZRPiA-1AS	https://www.amazon.com/gp/product/	\$ 32.99
PC	Raspberry Pi 3 A+	https://www.amazon.com/Raspberry-Pi-3-Computer-Board/dp/B07KKBCXLY/	\$ 39.99
MMDVM	N5BOC (OLED, External antenna)	https://www.store.n5boc.com/product-page/mmdvm	\$ 116.50
microSD	PNY 32 GB (cost each in 5 pack)	https://www.amazon.com/PNY-Elite-microSDHC-Memory-5-Pack/dp/B09WWW69YRD/	\$ 4.40
Recommended Option			Total
			\$ 193.88

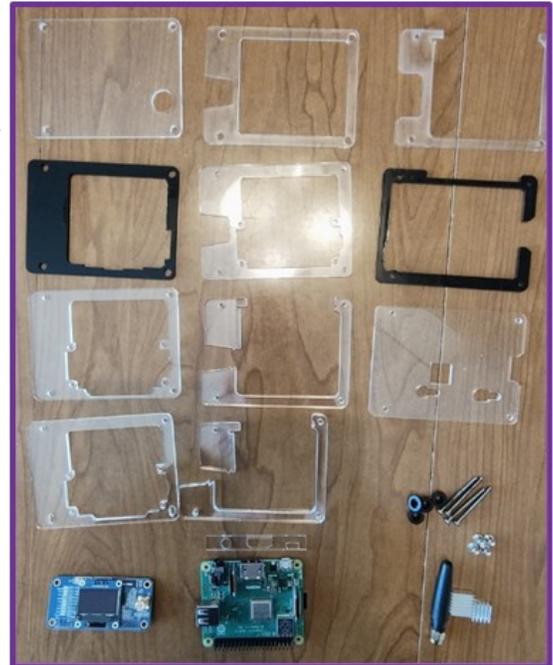


Build-A-Hotspot (BAH) (continued)

Case	C4Labs - ZRPiA-1AS	https://www.amazon.com/gp/product/B07RQNVXYQ/	\$ 32.99
PC	Raspberry Pi 3 A+	https://www.amazon.com/Raspberry-Pi-3-Computer-Board/dp/B07KKBCXLY/	\$ 39.99
MMDVM	AURSINC MMDVM	https://www.amazon.com/Hotspot-Display-Support-Raspberry-Pi-Zero/dp/B07VW819NW/	\$ 45.89
microSD	PNY 32 GB (cost each in 5 pack)	https://www.amazon.com/PNY-Elite-microSDHC-Memory-5-Pack/dp/B09WW69YRD/	\$ 4.40
Budget Option			Total
			\$ 123.27

At publication time, I didn't find a commercial equivalent to this configuration. Most hotspots are either the mini or the full-capability style with a large Nextion screen not the little OLED screen used here. I don't use my hotspot display much at home since I can call up the web page on either my laptop nearby or even my tablet or cell phone, so the OLED is fine most of the time for me.

Here's a look at the Pi3 A+ case and components disassembled (right). You start out at the lower right corner and work your way up to put this case together. It really goes together with little or no difficulty. I would also use surgical gloves to put this case together to reduce fingerprints.



Here's what the Pi3 A+ looks like (left). You can see it's a bit smaller than the Pi3 B+, and some ports are omitted. Other than that, it connects to power with a microUSB connector (lower left), and the 40-pin connector header is devoted to the MMDVM board.

This N5BOC MMDVM board (below right) is electrically the same as the one used for the mini hotspot. The only difference is the removal of the RF patch antenna in lieu of an SMA connector and external antenna. This will give this hotspot more flexibility for increased range, and even connecting to a larger roof mount antenna if you want to cover your entire property. You'd be surprised how far this 10 mw can travel.



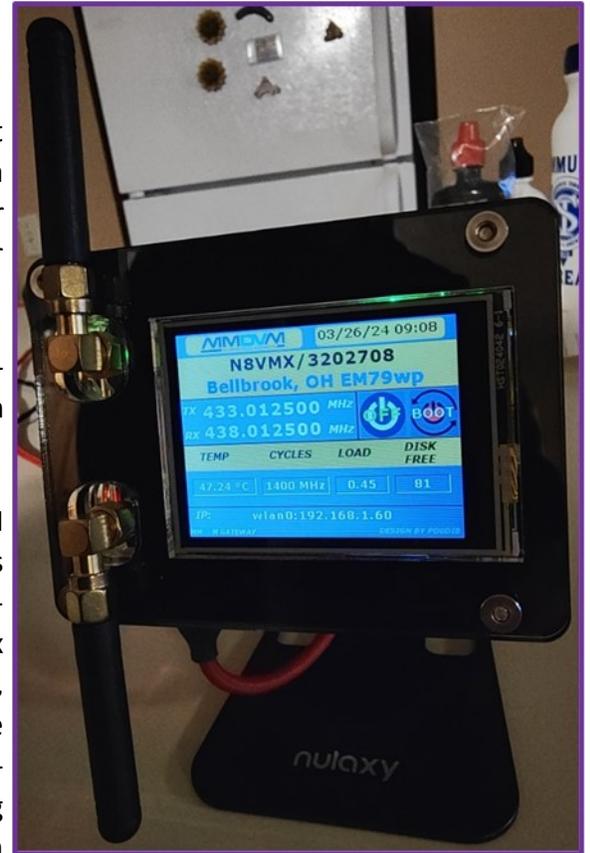
Build-A-Hotspot (BAH) (continued)

Option 3: Top-of-the-Line Duplex Hotspot:

If you want to spare no expense and build up the best hot spot possible, you'll want to look at this. This option makes use of a larger Pi3-B+ case, a duplex MMDVM, and a 2.4" Nextion color touch screen. You can even splurge and spring for an even larger case and 3.5" Nextion screen for an additional \$25 upcharge.

I have built and tested the duplex hotspot with 2.4" Nextion display. I have been looking at the 3.5" screen but haven't gotten one yet.

The duplex MMDVM is different than the simplex MMDVM boards the other smaller hot spots use. It has two simultaneous frequencies available, one for transmitting and the other for receiving. This allows things that aren't possible with a simplex MMDVM; for example, you can be listening to a conversation, and strike up a conversation on another talkgroup at the same time. You can send a power-off or reboot request from your radio even if the hotspot is transmitting to you. With all that being said, it is certainly possible to use a simplex MMDVM board in these top-of-the-line hot spots if that's your desire, I just haven't provided a cost estimate for that option here. If you do decide to do that, just use the part numbers for the MMDVM boards for the mini and mid-sized hotspots. In fact, if you chose the N5BOC MMDVM board, only their simplex board would be compatible with this case style. While N5BOC makes a duplex board, it's not designed for use with a Raspberry Pi3 without difficulty, so even though its performance is superior, I can't recommend it here.



Here is the cost estimate for the duplex hotspot with 2.4" Nextion display. This cost estimate makes use of an AURSINC Chinese board, which I use, but required a one-time calibration to work well with my radio. We can cover calibration during a future Tech Night and Newsletter article.

For comparison, the TGIFSPOT 2.4 Nextion is \$288, and the TGIFSPOT 3.5 Nextion is \$368. The [ZUMSpot 3.5](#) with a Raspberry Pi4 is \$250.

Case with 2.4" Nextion display	C4Labs DRPi-1NSX	https://www.amazon.com/C4-Labs-DRPi-1NSX-Raspberry-Enhanced/dp/B07JMW99PR/	\$ 64.99
PC	Raspberry Pi 3 B+	https://www.amazon.com/ELEMENT-Element14-Raspberry-Pi-Motherboard/dp/B07BDR5PDW/	\$ 49.99
MMDVM	AURSINC Duplex MMDVM	https://www.amazon.com/gp/product/B086418C2R/	\$ 59.99
microSD	PNY 32 GB (cost each in 5 pack)	https://www.amazon.com/PNY-Elite-microSDHC-Memory-5-Pack/dp/B09WW69YRD/	\$ 4.40
Total			\$ 179.37



Build-A-Hotspot (BAH) (continued)

Here's a look at the unassembled case and components. I added an optional cell phone tilt stand to hold the hotspot up with the antennas mounted up and down. I mounted the antennas that way to minimize their RF interference with each other. This also provides a tilt display to allow view of the display from whatever angle suits you. I used a couple of small Velcro pieces on the bottom of the hotspot case to keep it attached to the tilt stand.

The Nextion display itself is in the lower right corner. It is installed towards the end of the case assembly process. It plugs directly into a 4-pin connector on the AURSINC duplex MMDVM board.



Here's a look at the Raspberry Pi 3 B+ board installed in an early step of the case assembly. You can see that the case pieces mate perfectly with the micro-USB, HDMI, and audio connectors on the front. The board fits snugly inside the case pieces and doesn't move around at all.

Here's the AURSINC MMDVM duplex board. You can also tell it's a duplex board because it has two SMA connectors, one for transmit and the other for receive. This board plugs into the 40 pin header on the Raspberry Pi 3 B+. There is also a white 4-pin connector that mates with the Nextion display. I had to solder this connector cable to the 4 pins on the center right side of the board.



(Continued on next page)

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Build-A-Hotspot (BAH) (continued)

Well, now you have seen the choices available (and there are many variations of these choices I haven't shown). My goal if you're interested in building one of these, that you go ahead and order the parts now and attempt to assemble the components into the case you decide on. Then, go back to my earlier Newsletter articles about making a WPSD memory card and installation ([Dec 2023](#) pages 14-17 and [Jan 2024](#) pages 17-21) and go ahead and prepare the boot image on the micro-SDCard. I will set up a Tech Night at BARC this summer once enough folks are ready to proceed and walk through setting up a hotspot for anyone needing additional help or troubleshooting. We should also be able to add the appropriate programming to your radio to accommodate the additional hotspot channels you would like access to.

73, Ray, [N8VMX](#)

References:

DMR: Choosing a pi for your pi-star hotspot: <https://brara.org/BLOG/2019/11/04/dmr-choosing-a-pi-for-your-pi-star-hotspot/>

Mini hotspot C4 Labs Case JRZ-1S: <https://www.c4labs.com/product/zebra-jumbospot-pi-screen-case-raspberry-pi-zero-zero-w-jumbospot-color-and-top-options/>

Mid-size hotspot C4 Labs Case ZRPiA-1AS (Raspberry Pi3 A+): <https://www.c4labs.com/product/zrpi-1as-case-for-raspberry-pi-3-a-and-zumspot-with-attached-1-3-oled/>

Mid-size hotspot C4 Labs Case ZRPiA-1AS (Raspberry Pi3 B+): <https://www.c4labs.com/product/zrpi-1as-case-for-raspberry-pi-3-b-and-zumspot-with-attached-1-3-oled/>

Full-size hotspot C4 Labs Case ZRPi-1NSX (2.4" Nextion Display): <https://www.c4labs.com/product/screen-case-raspberry-pi-3-b-zumspot-mmdvm-and-2-4-nextion-screen-black-ice/>

Alternate Full-Size hotspot C4Labs DRPi-3.5NSX (3.5" Nextion Display): <https://www.c4labs.com/product/drpi-3-5nsx-case-for-raspberry-pi-4b-3-b-duplex-mmdvm-v1-0-3-5%e2%80%b3-enhanced-nextion-screen-included/>



Building a PiAware ADS-B Decoder

John Westerkamp, [W8LRJ](#)

What Is ADS-B?

Have you ever used the [FlightAware](#) website to monitor a flight before take-off or landing? Where do the data come from that are used to display the flight track, velocity, and altitude? It turns out that all aircraft are now required to broadcast flight information using a protocol known as ADS-B, [Automatic Dependent Surveillance–Broadcast](#). In this article, we will look at building an ADS-B ground station and sending the data to *FlightAware*.



The ADS-B Decoder

The *FlightAware* website has detailed step-by-step instructions on how to build a [PiAware ADS-B decoder](#) using a Raspberry Pi 3B+ (minimum) and their own *PiAware* software image for the RPi. You can also find a complete kit from *FlightAware* that includes their own SDR dongle (Software-Defined Radio) and a 1090 MHz antenna. I would recommend the following parts if you want to build your own (this is what I did).

- RTL-SDR V3 (SDR USB dongle)
- Micro SD card (16 GB or larger)
- 1090 MHz Bandpass Filter
- LNA4All (low noise amplifier)
- 1090 MHz Antenna (build your own; see below)

FlightAware
Products Industries ADS-B Flight Tracking Community Company

American Airlines 814
AAL814 / AAB14
Upgrade account to see tail number
EN ROUTE AND ON TIME
Arriving in 1 hour 9 minutes

LAX
LOS ANGELES, CA
left GATE 41
Los Angeles Intl. LAX
WEDNESDAY 20-MAR-2024
06:18AM PDT (6 minutes early)

PHL
PHILADELPHIA, PA
arriving at GATE C24
Philadelphia Intl. PHL
WEDNESDAY 20-MAR-2024
(on time) 02:39PM EDT

45 12m elapsed
1,997 mi flown

5h 21m total travel time

1h 8m remaining
463 mi to go

NOT YOUR FLIGHT? AAL814 flight schedule

Set Up Unlimited Flight Alerts & More
Check out premium account features for aviation professionals and enthusiasts.
Discover FlightAware Premium
Show Features

Get Alerts

Flight Details updated a few seconds ago
View track log Track inbound plane
All flights between LAX and PHL

Departure Times	
Gate Departure	Takeoff
06:18AM PDT	06:39AM PDT
Scheduled 06:24AM PDT	Scheduled 06:34AM PDT
Taxi Time: 21 minutes	
Average Delay: Less than 10 minutes	

Arrival Times	
Landing	Gate Arrival
02:29PM EDT	02:39PM EDT
Scheduled 02:07PM EDT	Scheduled 02:23PM EDT

80K+ Available SKUs in Stock

I recommend finding the [combined 1090 MHz filtered preamp](#) that combines the bandpass filter and the amplifier (also available on Amazon but they are currently out of stock). The bandpass filter and amplifier help to extend the range of your ADS-B receiver by cutting out out-of-band noise and boosting the ADS-B signal. Power to the amplifier is provided by the RTL-SDR using its *Bias Tee* capability (power is supplied over the coax connection).

I also recommend building your own 1090 MHz antenna because it's easy and fun! Let's do that next.



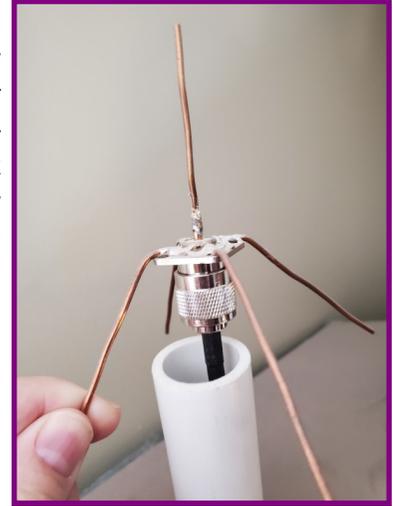
Building a PiAware ADS-B Decoder (continued)

Building a 1090 MHz Antenna

The basic design for a simple 1090 MHz antenna is a quarter wave ground plane antenna. This design uses a single vertical with four radials. Since the frequency is so high, the length of the vertical and the radials is on the order of 2.5-3.0 inches. You can use the [ground plane antenna calculator](#) to get your lengths. Attach everything together with a chassis mount N-type female or SO-239 connector and you have a very nice antenna.

For the wires, I used some *Romex* residential wiring cable and stripped off all the insulation. The *Romex* wire is very stiff, so holds up on the antenna very nicely. The vertical wire should be soldered into the back of the connector (where the conductor would go) with the coax side facing downward. The radials can be soldered to the base or connected with machine screws and lock washers and nuts. Note that soldering to the base is tricky as the heat is easily conducted away. The radials should be bent to form a 45 degree down angle with the horizontal. The 45 degree angle ensures that the impedance of the antenna is 50 ohms. Adjusting the angle will change the impedance.

I mounted the chassis on top of a short length of PVC and ran the coax through the PVC to the chassis. This was so the antenna would stand on a top shelf in my shack.



Putting It All Together

Building the *PiAware* ADS-B decoder essentially involves burning the *PiAware* software image onto a Micro SD card, placing the SD card into the Raspberry Pi (RPI), and booting. You should be connected to the Internet with either an Ethernet cable or by setting up the optional WiFi on the SD card before booting it in the RPi. This will allow the *PiAware* software to “phone home” to *FlightAware* so that you can set up your client on the *FlightAware* website (details are on the *PiAware* website).



Before firing up the RPi, connect everything together as shown in the photos. The antenna is connected to the 1090 MHz bandpass filter which then goes to the LNA4ALL low-noise amplifier. This is connected to the RTL-SDR via an SMA connector and then to the RPi over a USB cable.



Building a PiAware ADS-B Decoder (continued)

Enabling Bias T

If you use the LNA4ALL, you will need to download and install *rtl_biast* and then make sure it runs before the *PiAware* software startup. This enables the Bias Tee output on the RTL-SDR to power the LNA. First, download and build the *rtl_biast* software using the following Linux commands:

```
git clone https://github.com/rtl-sdrblog/rtl-sdr-blog
cd rtl-sdr-blog
mkdir build
cd build
cmake .. -DDETACH_KERNEL_DRIVER=ON
make
```

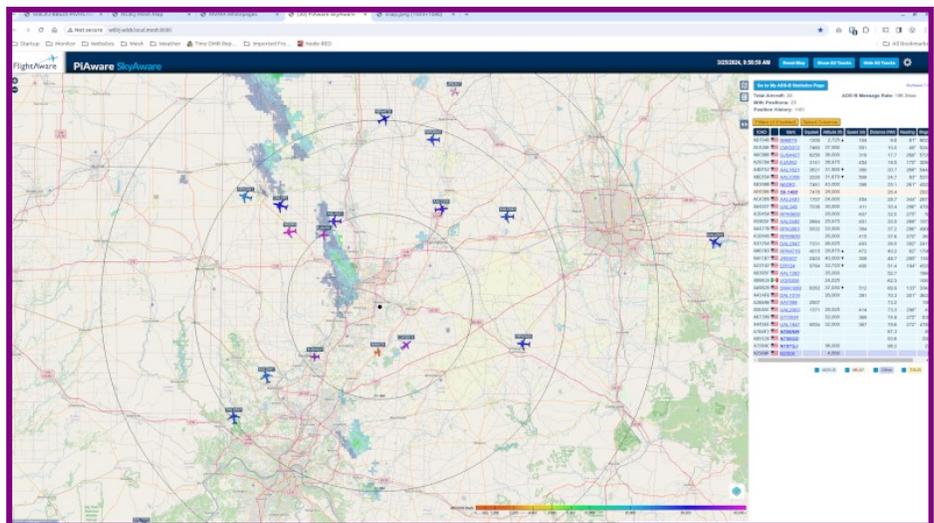
Next, copy the *rtl_biast* software to the */usr/bin* directory.

```
cd src
sudo cp ./rtl_biast /usr/bin/rtl_biast
```

Now go to the directory */etc/systemd/system/dump1090-fa.service* and create a file called *bias-t.conf* and add the following to it with your favorite editor (you may need to use the *sudo* command with your editor).

```
[Service]
ExecStartPre=/usr/bin/rtl_biast -b 1
```

Now reboot the RPi and you should be up and running! Just point your browser to your RPi IP address and add *:8080* to use the *PiAware* port and you should see the screen below. Click on any airplane and you can bring up its *FlightAware* details. You can use the little gear in the upper right corner to format your display to your liking (like setting your location, adding weather, and adding range circles as shown).



73 de [W8LRJ](#)



From Farm Boy to Telecommunications Expert at Collins Radio

Jim Gifford, [N8KET](#) and Richard Rogers, Jim's friend

A few weeks ago I attended the 90th birthday party of a very special friend, Richard Rogers. Richard and his wife were members of a church I pastored several years ago in Bellbrook. I knew Richard was a brilliant technician who excelled at all things electronic, but I had never heard the following story until his party. Richard had typed it out and handed it to me, and just had to share it. He gave permission to publish in our *Full Quieting* newsletter. While he wasn't involved in ham radio, he worked for Collins Radio, of which many of you are familiar. He visited the Johnson Space Center in Houston a few years ago. I hope you enjoy his story...



Farm Boy, Richard Rogers

"The recent launching of the rocket into space reminded me of the trip I took to Houston some time in 2010. We visited the control room which I was seeing for the first time. We stood in the bleachers above the control room and looked through the glass at the many desks below, where the crew controlled the space flight.

"Somewhere down there was the desk of Chris Craft, the voice of the first space flight of man, and many other flights. I remembered vividly and with much emotion again as I recalled those words of Chris Craft saying, 'Gemini do you read me', 'Gemini do you read me', again and again and again for what seemed like an eternity, until finally after three minutes and many calls, we heard this cool and calm and confident voice saying, 'Houston I read you loud and clear'.

"That doesn't seem like much to get emotional about, but as usual there is more to the story.

"I graduated from Purdue University and got my first job with Collins Radio Company in Cedar Rapids, Iowa. Collins was in the midst of making an Ultra High Frequency (UHF) Transmitter/Receiver (radio) for the space program. It's kind of strange how things go. Before I enrolled in Purdue I had just spent a year, working on radios made by Collins, as a Radio Repairman on the top of a lonely mountain in Korea. I started at zero and became an expert who everyone came to when they had a problem they couldn't solve with those Collins Radios.

"Before my tour was over, I was made Airman in Charge of the radio shack on that mountain, and just before returning to the states I was given a formal commendation by the Communications Officer. By the way, I volunteered to drive the truck and haul my crew to the mountain top and back. So, I got to drive a truck which I had wanted to do since entering Basic Training.

"I don't know how anyone thought I could repair radios. In my early childhood I lived in houses without running water or electricity, so when I went into the Air Force I didn't even know how to turn on a light switch. I had farmed all my life and driven farm tractors and trucks since I was ten years old. I



From Farm Boy to Telecomms Expert at Collins Radio (continued)

thought I was a great truck driver and wanted to be a truck driver in the Air Force. However, when the results of my aptitude tests came back, they told me I didn't qualify to be a truck driver, but I scored high on Radio Repairman, so I would have to be a Radio Repairman.

"I told them I didn't even know how to turn on a light switch and they said, 'You'll learn'. So, I did.

"The Air Force training must have been good. After completing my four years in the Air Force, I enrolled in Purdue University and received a BSEE degree. So, like they said, I did learn and now I was qualified to turn on a light switch, and also drive a truck. So here I am at Collins Radio Company ready to start making a highly reliable radio to go up in the first space module for the astronaut to communicate back to earth.

"It had never been done before and no one knew for sure it could ever be done. The radio had been mostly designed when I came on board. I started by mathematically calculating the stress on every component of the radio. Any part that was at more than fifty percent of its rating had to be redesigned by the design engineer. Then I tested the radio to all extremes of environment such as temperature, vibration, shock and life. Any component that failed was analyzed by me and redesigned by the design engineer.

"Then I tested again and redesigned and then tested until we calculated nearly 100 percent probability that the mission would be successfully completed. That process went on for several months and then it was finally time for launch of the first astronaut into space with our radio as the only contact between the astronaut and Earth, and it had to work.

"It would be severely shocked and vibrated and heated to extreme temperatures and it still had to work. On the day of launch every person in that huge building at Collins Radio sat at a television screen and watched every minute, but more importantly, they analyzed the quality of every word uttered by the astronaut and Chris Craft.

"We knew that the most critical time was at reentry of the module into the atmosphere because there was much heat generated on the module and no one knew for sure the radio or the astronaut would survive.

"They told us that there was so much heat generated on the module that the radio waves would not go through the heat and there would be a three minute silent period at the peak of the reentry. When the module reentered the atmosphere and we waited the three minute silent period, with Chris Craft calling every few seconds, and we finally heard those words, 'Houston, I read you loud and clear,' we knew it was time to celebrate and cheers went up that could have been heard for miles around.

"So, that's the rest of the story." - **Richard Rogers**



EchoLink — What, How, When

Jim Totten, [WA8HUB](#)

This is the story of EchoLink. Why would I write this? A few days ago in conversation on the 11:30 DMR net (11:30am Monday thru Friday on Talk Group 310557), the subject of EchoLink came up. I started to talk about what and how, then realized that was not the place or time. That brings me to here. Example: Every morning at 10:00am EDT or EST the World Wide Friendship Net (WWFN) is active 365 days per year (the proper time is 1400 UTC/Zulu). This net operates through a server in Michigan. On that server is the Michigan Conference. It turns out there are 245 conferences available through EchoLink. In fact while writing this I connected to one of the conferences (DODROPIN). Many of the operators on the WWFN use this conference. Darryl, VO1UKZ connects the DODROPIN to the Michigan Conference.



Now to the meat. What is EchoLink? EchoLink is a downloadable software package allows licensed Amateur Radio stations to communicate with one another over the Internet, using streaming-audio technology. The software allows the user to communicate between computers, either individuals and repeaters. The software has to be installed on both ends of the conversation.

How do you get EchoLink? Here is the 'magic'. Go to this url <<https://www.echolink.org>>. That starts your journey. At this site there are documents that explain EchoLink, tell you how to get the software, and especially how to validate that you are indeed a properly licensed Amateur Radio Operator. You can and should download and install the software as instructed. You will then be instructed how validate your status. The group that manages EchoLink will show the method to identify you as a person and verify your license.

When?? RIGHT NOW. The site is always open. The only delay is the time it takes for the managers to do their verification.

Remember this gives you world wide access to hams every where and anytime.



Answers to Amateur License Test Questions (from page 30)

T0A02 (D)	G0B10 (A)	E1A06 (B) [97.303(h)(1)]
T3A07 (C)	G2E06 (B)	E6B07 (B)
T3B01 (D)	G6B07 (A)	E6E01 (B)
T4B06 (D)	G9C05 (A)	E7H13 (D)



Special Event Stations

Paul Sharp, [WS8R](#)

Special Event Stations (SES) Newsletter information for April 2024, Paul Sharp, WS8R.

Here are a 2 links you can follow to find many SES that suit your varied interest. I may repeat and update some of these links as there are only a few many sites focused on SES.

http://www.arrl.org/special_events/search/page:2/model:Event.

https://www.qsl.net/va3rj/spevents_dx.html.

Here is my pick of the litter of SES that I think will be of interest to my fellow BARC members. Something for everyone! This month there are SES for: the solar eclipse, pilots at Sun N Fun, Hatch Green Chili Pepper lovers, radio stations, libraries, shark's teeth, USS Midway, titan missiles, lighthouses, Marconi fans and pancreatic cancer. Such a deal, all for the price of yearly dues!

Events Stations:

03/30/2024 | Total Solar Eclipse in Hunt county Texas. Mar 30-Apr 10, 0000Z-2359Z, W5E, Greenville, TX. Sabine Valley Amateur Radio Association. 7.235 14.280 21.400 28.450. QSL. K5GVL Sabine Valley Amateur Radio Association, PO Box 843, Greenville, TX 75403-0843. The Sabine Valley Amateur Radio Association will be celebrating a once in a lifetime solar event. On April 8th 2024 our favorite star the sun will be totally eclipsed for over 4 minutes! This will allow direct observation of the sun's corona in real time. The SVARA will be operating W5E "Whiskey 5 Eclipse" from March 30th until April 10th to celebrate this unique and magical event! <https://k5gvl.com/w5e-total-solar-eclipse-special-event-station>

04/06/2024 | Eclipsefest 2.0. Apr 6-Apr 8, 1300Z-0300Z, K2BSA/9, Makanda, IL. Greater St Louis Area Council BSA. 7.190 14.290 24.960 3.940. QSL. Shawn Banks, 1713 S 22nd St, Herrin, IL 62948. Questions can be directed to K9PWW. To receive a QSL, send your QSL & SASE. www.qrz.com/db/k9pww

04/08/2024 | Solar Eclipse 2024. Apr 8, 1600Z-2100Z, W2E, Rochester, NY. Roc-Ham Radio Network. 20M/14.313 10M/28.405 All Star 2585. QSL. John Derycke, W2JLD, 85 Amherst St., Apt. 2, Rochester, NY 14607. Help us celebrate the solar eclipse of 2024 www.roc-ham.net

04/09/2024 | Sun N Fun Aerospace Expo. Apr 9-Apr 13, 0300Z-1200Z, W4S, Lakeland, FL. Sun N Fun Fly In Inc. 146.685 (127.3) 14.225 7.250. QSL. Geoff Schuck, PO Box 90853, Lakeland, FL 33804. Frequencies will be spotted throughout the day on DX Summit. QSL cards are sent to all HF Contacts.



Special Event Stations (continued)

04/11/2024 | Silver Jubilee of Kargil Vijay Diwas. Apr 11-Apr 18, 0600Z-1800Z, AT25KVD, Kargil, INDIA. Mumbai Amateur Radio Institute. All bands; all modes. Certificate. See website, for QSL, information, INDIA. Scheduled to operate from a vantage point at 13,000 feet, facilitated by the "Forever In Operations" Division of the Integrated HQ of the Ministry of Defence (Indian Army), our mission is to establish a week-long communication link with amateur radio stations across the globe, fostering a sense of unity and remembrance. at25kvd@mari-hams.org.in or <https://www.at25kvd.radio>

04/12/2024 | Celebrating 60 Years of Friendship and Ham Radio with the Hatch Green Chili Pepper Run to 33 NM Counties. Apr 12-Apr 22, 1400Z-0600Z, N5M, All New Mexico. WA5LHM and WA5POK. 7.060 7.260 14.060 14.260. Certificate. Scott Kendall, WA5LHM, 1804 Louise St., Georgetown, TX 78262. <https://www.facebook.com/groups/996268021434046>

04/12/2024 | Halifax Resolves Special Event Station. Apr 12-Apr 13, 0000Z-2100Z, N4C, Halifax, NC. N4WFU. 7.180 14.250 21.325 28.350. Certificate & QSL. Barry Evans/N4C, P.O. Box 1533, Roanoke Rapids, NC 27870. If requested, a certificate and QSL card will be provided to Ham operators around the world that make contact with this special event station; can also request a "QSL" card confirming the contact. Please sent a self addressed stamped envelope to: N4C P O Box 1533 Roanoke Rapids, NC 27870 Commemorating the signing of the Halifax Resolves April 12, 1776. Halifax Resolves was the first written instrument, in existence leading to our independence from England. The resolves were unanimously approved at the Fourth Provincial Congress gathered in Halifax, NC. It authorized the NC delegates, being sent to the Continental Congress, to vote for, and encourage other colony's delegates to the support independence.

04/12/2024 | National Library Week 2024. Apr 12-Apr 13, 1600Z-2100Z, K8L, Youngstown, OH. WF8U and KC3GFU. 14.074 7.074. QSL. K8L, 239 Elvira Ct., McDonald, OH 44437. Help us celebrate National Library Week 2024. We will be operating on both SSB & FT8, 20m and 40m. Send us a QSL to be displayed in our local libraries and share the magic of amateur radio! In return you will receive a SES QSL card with this year's theme. Please send QSL to: K8L, 239 Elvira Ct., McDonald, OH 44437. Find more information on QRZ or email kd8ely@gmail.com. www.qrz.com/db/kd8ely

04/12/2024 | Remembering Abraham Lincoln. Apr 12-Apr 15, 0001Z-2359Z, K9L/W9L, Effingham, IL. National Trail Amateur Radio Club. 14.312. QSL. NTARC/K9UXZ, P.O. Box 903, Effingham, IL 62401. www.nationaltrailarc.org or www.qrz.com/db/k9uxz

04/13/2024 | Commemorating USS Midway conducting first airship ops on CV. Apr 13, 1600Z-2300Z, NI6IW, San Diego, CA. USS Midway Museum Ship. 7.250 14.320; 140.070 PSK31; DSTAR on PAPA System repeaters. QSL. USS Midway Museum Ship COMEDTRA, 910 N Harbor Drive, San Diego, CA 92101. www.qrz.com/db/ni6iw



Special Event Stations (continued)

04/13/2024 | Venice Shark's Tooth Festival. Apr 13-Apr 14, 1500Z-2000Z, K4S, Nokomis, FL. Tamiami ARC. 14.320 SSB. QSL. Tamiami ARC, PO Box 976, Nokomis, FL 34274. Celebrating the area in Florida known as the "Shark's Tooth Capital of the World". All QSLs with SASE receive custom event QSL and a genuine, prehistoric shark's tooth memento of the contact. tamiamiarc.org

04/15/2024 | WORLD AMATEUR RADIO DAY 2024. Apr 15-Apr 22, 1600Z-1600Z, W2W, Rochester, NY. ROC-HAM RADIO NETWORK. ECHOLINK CONFERENCE ROC-HAM 531091 ALLSTAR 2585, 47620, 47918, 531310 14.313 28.405. QSL. W2JLD/JOHN DERYCKE, 85 AMHERST ST, APT2, Rochester, NY 14607. This will be our 9th annual WORLD AMATEUR RADIO DAY celebration. Many conferences and nodes will be connecting for this event. Special event. T-shirts will be available to mark the occasion. Special event net is on APRIL 18TH@1700 UTC-0200 UTC CHECK OUT ROC-HAM.NET for more details roc-ham.net

04/17/2024 | SRH Special Event Station at the Titan Missile Museum. Apr 17, 2000Z-2200Z, K6SRH, Sahuarita, AZ. Sam's Radio Hams (SRH). 14.315. QSL. Paul Craft, 357 Morningside Terrace, Palmdale, CA 93551. See QRZ website for digital QSL and other event information www.qrz.com/db/K6SRH

04/19/2024 | Battle of Hobkirk's Hill . Apr 19-Apr 23, 1700Z-2359Z, K4H, Camden, SC. Kershaw County Amateur Radio Club. 14.325 21.325 28.325. Certificate. E-certificate only. Email, info@kc4rc.com for details. "2nd Battle of Camden"/Battle of Hobkirk's Hill <https://kc4rc.com>

04/26/2024 | Handiham Program 57th Anniversary. Apr 26-Apr 28, 1900Z-1900Z, W0ZSW, Minneapolis, MN. Handiham Radio Club. 28.350 21.350 14.250 7.200. QSL. Courage Kenny Handiham Program, 3915 Golden Valley Rd, MR 78446, Minneapolis, MN 55422. The Handiham Radio Club will be celebrating 57 years of the Handiham Program with a special event station. The Handiham Program is a non-profit dedicated to helping people with disabilities get licensed and stay active in the amateur radio hobby. Listen for CQ Handiham 57 from W0ZSW and from other Handiham members who will be using their own call signs! handiham.net

04/27/2024 | Bolivar Lighthouse. Apr 27, 1600Z-2300Z, K5S, Port Bolivar, TX. Beaumont Amateur Radio Club. 7.220 14.250 28.405 146.520. Certificate. Beaumont Amateur Radio Club , 4839 Hwy 326N, Kountze, TX 77625. w5rin.com

04/27/2024 | International Marconi Day 2024. Apr 27, 1700Z-2300Z, W1M, Rochester, NY. ROC-HAM RADIO NETWORK. 20M/14.313 10M/28.405 Allstar2585, 47620, 47918, 531310. QSL. W2JLD/JOHN DERYCKE, 85 AMHERST ST, APT2, Rochester, NY 14607. roc-ham.net



Special Event Stations (continued)

04/27/2024 | International Marconi Day Award Station. Apr 27, 1300Z-2100Z, K3S, Baltimore, MD. Nuclear Ship Savannah ARC. 7.1 14.1 21.1 28.1. QSL. K3LU, 980 PATUXENT ROAD, Odenton, MD 21113. Single transmitter SSB and CW aboard N/S Savannah. Please check spotting networks for frequencies. Info on QRZ.com qrz.com/db/k3s

04/27/2024 | MERT20 Special Event. Apr 27, 1200Z-2359Z, KG4NXO, Ocala, FL. Marion County Emergency Management. 14.262 7.262; D-STAR 146.790 REF-037; 3.862. Certificate & QSL. Kraig Pritts, 6637 NE 5th Lane, Ocala, FL 34470. www.mert20.org

04/27/2024 | N1D - Number One Dawgs. Apr 27-Apr 28, 1700Z-1700Z, N1D, Athens, GA. Radio Club at the University of GA. 3.925 7.250 14.200. QSL. Athens Radio Club, P.O. Box 782, Athens, GA 30603. Celebrating the National Championship University of Georgia football team. We will be operating from the Tate Center, adjacent to Sanford Stadium. <https://www.athensradioclub.org>

04/28/2024 | HAMS for PanCAN-Bonus station. Apr 27-Apr 28, 0200Z-2300Z, N3P/PanCan, New Kensington, PA. Skyview Radio Society. 3.960. 7.172. Certificate. Skyview Radio Society, N3P, 2335 Turkey Ridge Rd., New Kensington, PA 15068. This special event's purpose is to raise awareness of the PanCAN resources for patients and families affected by pancreatic cancer. This bonus station is for an additional contact recognition for participants who can make contact with this remote station's location.



Expanding Our Community

The 2024 Hamvention is scheduled for May 17-19. Planning continues and we are looking forward to a great event.

Our theme of "Expanding Our Community" is one that describes every Elmer's efforts. They give back to the hobby by teaching and encouraging others to either start or expand

their radio knowledge. This takes many forms. Some of these are electronic knowledge, new modes of radio communications, learning emergency communication requirements, and finding unrelated fields/hobbies that augment radio communication and knowledge. Experimentation is the bedrock of Amateur Radio. How are you expanding our community?

We must keep our eyes and ears open around us to take advantage of growth opportunities.

Additionally, this year, we host and feature the ARRL National Convention. They will have excellent speakers and opportunities to learn.

This is your chance to see all your radio friends from around the world. It is exciting to be part of the Amateur Radio Community.



When is the show?

Friday May 17th 9:00 AM – 5:00 PM
Saturday May 18th 9:00 AM – 5:00 PM
Sunday May 19th 9:00 AM – 1:00 PM

Where is the show?

Greene County Fair and Expo Center
210 Fairground Road, Xenia 45385
Coordinates are 39.702 N – 83.9420 W

<https://hamvention.org/>



Amateur License Test Questions

In honor of our Amateur Radio Training classes, here are some questions pulled from the Technician, General, and Extra question pools. Try to answer them and see how you did. **Answers are on page 25.**

Technician

T0A02

What health hazard is presented by electrical current flowing through the body?

- A. It may cause injury by heating tissue
- B. It may disrupt the electrical functions of cells
- C. It may cause involuntary muscle contractions
- D. All these choices are correct

T3B01

What is the relationship between the electric and magnetic fields of an electromagnetic wave?

- A. They travel at different speeds
- B. They are in parallel
- C. They revolve in opposite directions
- D. They are at right angles

T3A07

What weather condition might decrease range at microwave frequencies?

- A. High winds
- B. Low barometric pressure
- C. Precipitation
- D. Colder temperatures

T4B06

Which of the following controls could be used if the voice pitch of a single-sideband signal returning to your CQ call seems too high or low?

- A. The AGC or limiter
- B. The bandwidth selection
- C. The tone squelch
- D. The RIT or Clarifier



Amateur License Test Questions (continued)

General

G0B10

Which of the following is a danger from lead-tin solder?

- A. Lead can contaminate food if hands are not washed carefully after handling the solder
- B. High voltages can cause lead-tin solder to disintegrate suddenly
- C. Tin in the solder can “cold flow,” causing shorts in the circuit
- D. RF energy can convert the lead into a poisonous gas

G6B07

Which of the following describes a type N connector?

- A. A moisture-resistant RF connector useful to 10 GHz
- B. A small bayonet connector used for data circuits
- C. A low noise figure VHF connector
- D. A nickel plated version of the PL-259

G2E06

What is the most common frequency shift for RTTY emissions in the amateur HF bands?

- A. 85 Hz
- B. 170 Hz
- C. 425 Hz
- D. 850 Hz

G9C05

What is the primary effect of increasing boom length and adding directors to a Yagi antenna?

- A. Gain increases
- B. Beamwidth increases
- C. Front-to-back ratio decreases
- D. Resonant frequency is lower



Amateur License Test Questions (continued)

Amateur Extra

E7H13

Which of the following is a technique for providing highly accurate and stable oscillators needed for microwave transmission and reception?

- A. Use a GPS signal reference
- B. Use a rubidium stabilized reference oscillator
- C. Use a temperature-controlled high Q dielectric resonator
- D. All these choices are correct

E6B07

What is the failure mechanism when a junction diode fails due to excessive current?

- A. Excessive inverse voltage
- B. Excessive junction temperature
- C. Insufficient forward voltage
- D. Charge carrier depletion

E6E01

Why is gallium arsenide (GaAs) useful for semiconductor devices operating at UHF and higher frequencies?

- A. Higher noise figures
- B. Higher electron mobility
- C. Lower junction voltage drop
- D. Lower transconductance

E1A06

Where must the carrier frequency of a CW signal be set to comply with FCC rules for 60 meter operation?

- A. At the lowest frequency of the channel
- B. At the center frequency of the channel
- C. At the highest frequency of the channel
- D. On any frequency where the signal's sidebands are within the channel



Editorial Policy and Style Guidelines for *Full Quieting*

Editorial Policy

Full Quieting welcomes articles from BARC members on any ham radio subject that is relevant to BARC. Our focus is our BARC members. We will not reprint items or articles that are easily available by other means (web, magazines, etc.).

Most articles will be “how to” or “what I did” articles that focus on technical or operational subjects such as a construction (antennas, equipment, stations, etc.), the use of hardware or software, operating in unique/challenging circumstances, or a memoir.

Full Quieting will also consider an occasional article on policy issues regarding the various national licensing/regulatory agencies and/or amateur radio associations so long as the article is relevant to BARC members and constructive in tone and recommendations.

Although all *Full Quieting* articles represent the experiences and points-of-view of their authors and not BARC, articles that focus on policy issues will be specifically labeled as a reflection of the author’s opinion.

Regardless of subject, when you submit an article you acknowledge that you are the original author or creator and you grant publication rights to BARC. Anything you submit remains your property and you may have it published elsewhere without the need for permission from *Full Quieting*.

Style Guidelines

Language: English is the official language of *Full Quieting* and all articles should be submitted in English. Don’t be concerned if English is not your first language: just tell your story in your own voice and use translating tools such as Google Translate to help if necessary.

File format: Submit your article as a Word, Word Perfect, OpenOffice or text file attachment to an email. A shared document available for download (such as a Google Doc) is also okay. **Do not submit as an email or PDF file.**

Pictures and other graphics: Do not embed pictures or tables in the article. Please submit as an email attachment or a shared image available for download. Please reduce the file size of the images before you send them to *Full Quieting*. Large files can be attached to a series of emails. Keep file size in mind regarding publication quality: for example, a half page image in the final PDF version of *Full Quieting* should be at least 400 pixels wide. If a photograph or graphic was taken or created by someone else, you should have their permission to use it and the permission of anyone identifiable in the image. **If you capture images from the web, provide a citation (URL) for that source and make sure the source does not prohibit use of the image in *Full Quieting*.**



Editorial Policy and Style Guidelines for *Full Quieting*

(Continued from previous page)

Use these style conventions

- We are hams, not Hams, and our hobby is ham radio This is a change to our original format
- The name of our organization is: Bellbrook Amateur Radio Club or BARC
- The code we use is Morse (capitalize the M)
- We use Yagi antennas (capitalize the Y)
- Q codes should be capitalized: QRM, QSB QSY
- The plural of QSO is QSOs, not QSO's
- Modes should be capitalized: CW, SSB, FT8, RTTY
- Bands are written as 10 m, 15 m etc.
- The abbreviation for a Silent Key is SK.
- You might have had an Elmer, not an elmer

Bruce N7RR has provided a [two-page check list](#) of common International System of Units (SI) formats and abbreviations.

Use these formatting conventions:

- Set all borders to 1 inch. The preferred font is Calibri, 12 point.
- Do not use tabs or spaces at the beginning of a paragraph
- Use only a single paragraph or carriage return at the end of each paragraph
- To enhance readability, use two spaces after the period at the end of a sentence.



Misc BARC Info

REGULARLY SCHEDULED NETS

Daily (Sunday through Saturday) 1030, 1615 and 1845 Ohio Single Sideband Net (OSSBN) Primary: 3972.5 KHz LSB Alternates: 3968 & 7272 KHz LSB

Weekdays (Mon-Fri) 1130 DMR Net Brandmeister Talk group 310557. Accessible via hotspot, 444.875 (+) CC13 TS2(Dayton East), 444.4375 (+) CC11 TS2 (Dayton West)

Sundays 1900 Newcomers & Elmers Net (Cincinnati) 146.670 (-) (123.0 PL)

Sundays 2000 **BARC Weekly Net 147.045 (+) (118.8 PL) [Alt 443.675 (+) (118.8 PL)]**

Sundays 2100 Miami Co. Voice & Data Net (Data Net follows Voice Net) 145.230 (-) (no PL)

Winlink Tuesdays GCARES Winlink Net Any time on Tuesdays Eastern Time Send To: W8LRJ, Cc: KE8FMJ W8GCA-10 445.010 (S), W6CDR-10 145.010 (S)

Tuesdays 1900 Dayton Veterans Admin Amateur Radio Club Net (W8DVA) 443.850 + 107.2 pl

Tuesdays 1915 Ohio ARES HF Net W8SGT Net Control at OEMA HQ Primary: 3902 KHz LSB (+/- QRM) Alternate: 7240 KHz LSB (+/- QRM)

Tuesdays 1945 Ohio Digital Emergency Net Primary: 3584.5 KHz USB (1500 WF) Alternate: 7072 KHz USB

Tuesdays 2000 MoCoARES Weekly Net 146.640 (-) (123.0 Hz PL) (Except—No Net on last Tuesday of even months (MoCoARES meeting) (Except—On 2nd Tuesday: Voice and Data Net on 444.250 (+) (123.0 PL)

Tuesdays 2030 Greene County DMR Net Primary: 444.875+, Color Code 13

Tuesdays 2100 GCARES Net (Voice & Data) 146.910 (-)(no PL) [Alt = 442.725]

Ohio Winlink Wednesdays OH ARES Winlink Net Any time on Wednesdays Eastern Time Send To: K8EAF, Cc: W8LRJ, KE8FMJ W8GCA-10 445.010 (S), W6CDR-10 145.010 (S)

Wednesdays 2000 Ohio District 3 ARES Net (West Central Ohio Regional Net) Primary: 145.110 (-) (67.0 PL) Alternate: 146.820 (-) (77.0 PL)

Wednesdays 2000 Beginners Net (Dayton Area) 444.875 (+) (94.8 PL)

ZOOM-Basic Setup & Configuration

Here's a link to the Zoom Video Tutorials: [Zoom how-to video tutorials – Zoom Help Center](#)

Also see: "Join a Meeting" and the "Joining & Configuring Audio & Video" tutorials for new users. Send questions or problems to John, [W8LRJ](#) ASAP but BEFORE the next meeting.

BARC Fundraising Opportunity — Kroger's Rewards Program Please use your Kroger Card when shopping at Kroger's and support BARC. If you haven't signed up and need help, bring your Kroger Card to the next BARC meeting, and we'll help you get registered (contact the [BARC Treasurer](#)).

ARRL Discounted Membership Offer One of the benefits of club membership is the opportunity to become an ARRL member at a discounted price. BARC is an ARRL affiliated club and receives a commission for new first-time ARRL memberships transacted through the club. BARC passes on this commission (discount) as a club membership benefit to promote ARRL membership. BARC members currently receive a \$15 discount on a NEW first year ARRL membership cost when placed through the Club. Please contact the [BARC Treasurer](#) for details.

