OUR 26TH YEAR!

EPARA BEACON

VOL. 6, NUMBER 5 THE OFFICIAL NEWSLETTER OF THE EASTERN PENNSYLVANIA AMATEUR RADIO ASSOCIATION MAY 2022

NEXT CLUB MEETING: MAY 12TH

Monroe County Public Safety Center, 100 Gypsum Rd Stroudsburg, PA 18360

Welcome to the EPARA Beacon! This newsletter is published monthly and is the official newsletter of the Eastern Pennsylvania Amateur Radio Association. EPARA has served the amateur radio community in the Pocono Mountains for over 25 years. We have been an ARRL affiliated club since 1995. We offer opportunities for learning and the advancement of skills in the radio art for hams and non-hams alike. EPARA supports Monroe County ARES/RACES in their mission of providing emergency communications for served agencies in Monroe County. Feel free to join us at one of our meetings or operating events during the year. The club meets on the second Thursday of every month, at the Monroe County 911 Emergency Control Center. The business meeting starts at 7:30 P.M. Anyone interested is invited to participate in our meetings and activities.

ZOOM Meeting Info: Meetings begin at 7:30PM!

https://us02web.zoom.us/j/85463346031?pwd=bU1KcVZoaVZiVEUvdjRsUXlNNHZkZz09

Meeting ID: 854 6334 6031 Password: 244632

From The President

It's May already! So, with the warmer weather we can start thinking about antenna projects. We will be rehanging the 911 center OCF dipole on May 3rd, if you have volunteered for this project, we will be meeting at 4PM. I will be bringing a motion to discuss and approve funds to replace the computer in the radio room at the May meeting. A new computer will make it possible to run digital modes more effectively, not only for the club members but ARES/RACES as well. The ARES group will be installing the HF and replacing the VHF antenna at the Red Cross Chapter house this month as well. I'm sure some of you are planning antenna installs as well so if you need help be sure to ask around, that's one of the benefits of being involved with ham radio clubs.

We began the planning for our Hamfest this fall, and we will be discussing our Field Day plans at the May meeting. June is coming fast so clear your calendar for the 4th weekend in June, Field Day is always a great time up at Big Pocono State Park! The EME team is designing our antenna array so look ahead to several nights this summer bouncing radio waves off the moon! I'm looking forward to a fun and busy year with EPARA, I hope you are too.

That's it for now. Our next meeting is on May 12th, and I hope to see you all then.
73, Chris AJ3C

CONTACT INFORMATION

President Chris Saunders AJ3C: aj3c@gmx.com	Vice President Bill Carpenter AB3ME: bill47@ptd.net
Secretary Kevin Forest W3KCF: w3kcf@outlook.com	Treasurer Scott Phelan KC3IAO: kc3iao@hobbyguild.com
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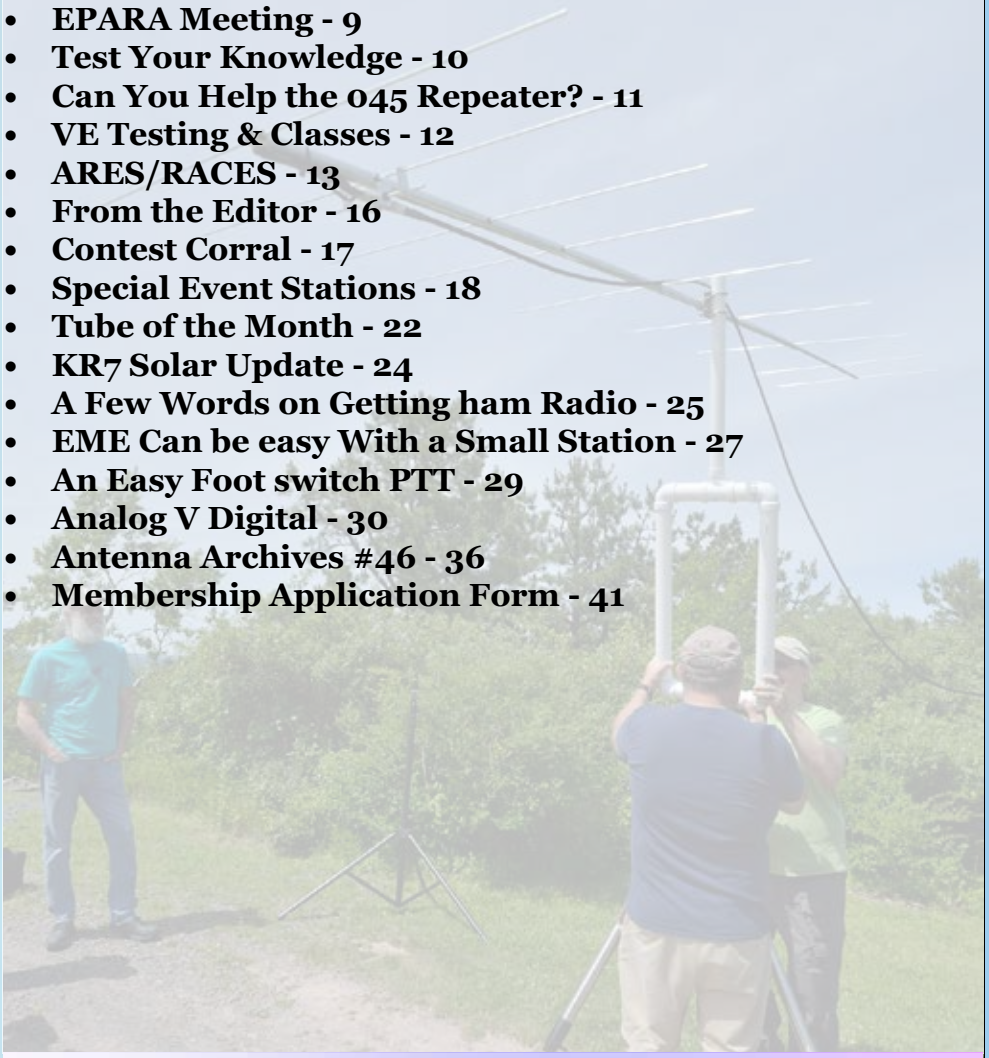
What's INSIDE this ISSUE



EPARA Net list

Monroe county ARES-RACES – Sunday's 8:30 PM, 146.865 MHz, PL -100 Hz

The Monday Night Pimple Hill repeater 8:30 PM (Repeater freq = 447.275 with a - 5MHz offset) DMR TECH Net on TG314273* Time Slot 2

SPARK Information/Swap Net – Tuesday's 8:30 PM, 147.045 MHz, PL 131.8 Hz

The Wednesday Night EPARA Hot Spot DMR Rag Chew net at 8:30 PM, TG 3149822* Time Slot 2 (N3IS Talk Group)

EPARA Tech Net – Friday's 8:30 PM, 147.045 MHz, PL +131.8 Hz

*TG = Talk Group

Announcements
AND UPCOMING EVENTS

EPARA Club Dues
Club dues were due January 1st and are temporarily extended due to COVID reasons. For those that missed the chance to stay current, there are two (2) methods available to pay to help make this easy for all. Contact Scott KC3IAO via his email: KC3IAO@hobbyguild.com and you can send him a check or pay via PayPal.

VE Sessions
VE sessions have returned. Please contact Chris AJ3C for dates and info should you require a test session.

Hamfest!
EPARA will host its annual hamfest this year on Sunday, September 18th, 2022. There is a new location this year - the Moose Lodge # 1336 at 705 Stokes Mill Rd., East Stroudsburg. An official flyer will come shortly. There is a huge field area and extensive parking available!

Shack Photos for our Facebook page
We are looking for shack photos from members to post on our Facebook group page, so those that are interested please send them to Bob W3BMM and they will get posted!

ARES/RACES
There will be a Tabletop exercise for the official S.E.T planned for Sunday, October 2nd. The exercise is planned for Friday May 20th between 7 and 9pm. Contact Charlie KB3JUF for further info if needed.

FIELD DAY 2022

Field Day!!
Field Day will be held again at Big Pocono State Park on June 24th, 25th and 26th. Plan for some serious fun, contacts, good food and who knows what else can happen!!

Field Day on Social Media!
Click below to join the ARRL Field Day Facebook Group. Share your plans, tips and tricks to a successful Field Day. When posting content from Field Day, use hashtag #ARRLFD on all social media to receive 100 bonus points! Join the ARRL Field Day Facebook group!

Rule #1 of Amateur Radio, it is a hobby, unless you figured out a way to fashion a living out of it.
Rule #2 of Amateur Radio, life is not a hobby and typically carries heavy responsibilities of everything that is not a hobby.
Rule #3 of Amateur Radio, never give up a LIFE event for a Ham event. You may make some great memories at the Ham event, but the guilt you may carry missing a LIFE event can be a terribly heavy millstone.
Rule #4 of Amateur Radio, as technology moves forward, so does Ham Radio - do what makes you happiest, experiment with other elements of Ham Radio as LIFE allows.
Rule #5 of Amateur Radio, it is only Ham Radio, when confused always refer to Rule #1 through #4.

EPARA GENERAL MEMBERSHIP MEETING AGENDA

EPARA General Membership Meeting Agenda
April *14th 2022*

General Membership Meeting 7:30Pm

Open meeting:

Meeting called to order at 7:30 pm on April 14th 2022 by Chris AJ3C

Declaration of Quorum.
Total members attending: 28 Members at 911 Center: 23 - Zoom members present: 5 - Visitors present: 0

Pledge of Allegiance / Moment of silence:

Membership Meeting - Minutes March 10th, 2022
Secretary - Kevin W3KCF:

Meeting minutes for March 10th, 2022 were posted on the EPARA website. Chris – AJ3C asked members if they had seen and read the minutes from our previous meeting. He then asked if there were any questions or objections to the minutes as they were presented. With no objections, Chris asked for a motion to accept the minutes as presented:

Motion to accept minutes as presented: By Alex – KD2FTA 2nd by RuthAnn – W9FBO Motion Passed

Treasurers report:

Treasures report read by Scott, KC3IAO
April 2022 EPARA Club Meeting

Bank Account Statement Opening Balance (3/31/22 statement.): $4314.99

Expenses:
Chk 125, $78.51 Ink for the Radio Room Printer. Chk 158, $389.90 EME Antenna purchase.
Chk 159, $27.00 Zoom meeting charges.

Income:
$100.00 Dues; KB3JUF (15), KA3ZBA (15), W3HXX (15), KB2YED (20), N3HBY (15), KE2KY (15).
$5.00 Donation.
$0.18 Bank interest.

Closing Balance: $3919.76

Our PayPal Account: 3/31/22 statement opening balance of $339.05
Expenses: None

Income:
$35.00 Dues; KC3BZJ (20), KA2TSM (15)
Fees: $1.68

Closing balance of $372.37

Motion to accept reports by Bob -W3BMM 2nd by ED – KC3OLB Motion Passed

Correspondence:

EPARA GENERAL MEMBERSHIP MEETING AGENDA

None

Reports of officers and committee's:

Bill AB3ME – Program Committee:

Bill stated he would like to see us use some type of logging program for the nets. He thought it might be beneficial to try and get the person that wrote the program to give a presentation to the club via zoom at some point. He also asked again for members to step up and provide some sort of presentation.

Charlie KB3JUF – ARES/RACES:

Charlie reiterated that all involved in ARES need to be motivated. Make sure you attend our meetings on the 4th Friday of the month and keep your Task Books up to date. Complete any and all training required and stay enthused. Charlie also stated, please check in on the Sunday Night ARES Net.

Charlie said we received a new printer for the radio room and the old one would be moved to the Red Cross Chapter House. With printer access, Charlie said it was time to get Winlink up and running at both locations.

In June, there will be a simulated exercise on opening and setting up a shelter by the Red Cross. Members are invited to attend.

Ruth Ann, W9FBO – PIO:

Ruth Ann said she is putting information out for events the club has planned for the year. She'd also like to get the word out regarding Amateur Radio to the younger generations. Starting with Jr High/High School students, she'd like to introduce them to the multi facets of the hobby. (EME, Digital, ISS, Etc.). RuthAnn is looking for anyone interested in helping out. She'd also like to start prepping and getting the word out for this year's Field Day.

Bob - W3BMM said he has a friend at ESU who is the Dean of Physics and would talk to him about getting the word out about Amateur Radio at the school.

Chris AJ3C -- Instruction and Training:

Tech class is going very well. We have 12 students enrolled.

In June, Chris mentioned we would be starting a General Class. Start date has not been finalized yet.

Chris AJ3C – Website: Nothing to report

Bob W3BMM – Social Media:

Bob said that he and his wife are still actively involved in managing our social media accounts and are looking for events to post. We are looking into YouTube, Rumble and other avenues to pursue, which would give us a greater footprint on the web to promote our club. Bob then asked for feedback and suggestions on what information to add to the account.

EPARA GENERAL MEMBERSHIP MEETING AGENDA

Al, KB3OVB: Membership:

Current membership is 69. Not all members have paid their dues for the new year. Our 2022 Dues are due and payment can be made by check or PayPal. Any member who does not pay their dues by March 31st will be removed from the membership rolls.

Eastern Pennsylvania Amateur Radio Association
P.O. Box 521, Sciota, Pa 18354

KC3IAO@hobbyguild.com

Eric N3SWR – Newsletter:

Eric said all is good and asked if anyone had articles they'd like to share, please send them to him at eparanewsletter@ptd.net.

Sat-Com / EME Group:

The second M2 2M9SSB antenna has arrived. The group brain stormed on the best way to utilize both antennas and possible set up a demonstration during field day.

Old business:

2020 / 2021 audit:

The 2020 budget audit will be conducted along with the 2021 audit in January 2022. Audit team will consist of Ed - KC3OLB, Eric - N3SWR, and Bill - AB3ME. Scott is in the process of preparing the material and will be available soon.

OCF Dipole Repair

Replacement or the antenna rope for the OCF Dipole was postponed due to inclement weather. We need to reschedule this tonight. It was decided that Tuesday May 3nd at 1600 would work for those that could attend.

Any other old business:

None

New business:

Camp Minsi Update – Walt W3NFZ:

Walt informed us that one of the Boy Scout camps had been sold. Most thought it would be Camp Minsi, but they sold Trexler instead. He had no further details, as the sale is still on going. Someone asked if there were any radio equipment at Trexler and if so, would it be available for Camp Minsi.

Work has been approved for the antenna and tower which will be located next to the shower house. Prep of the building for the needed power and cost of the project is still pending.

Any Other New Business

Field Day:

Chris mentioned that field day this year would be the 24th - 26th of June. Brad said he would be setting up a folded Di-Pole and Bob would be setting up a 2m sideband station.

EPARA GENERAL MEMBERSHIP MEETING AGENDA

Hamfest 2022:

Walt informed us that 2022 Hamfest would be held at the Moose Lodge #1336 this year. It is schedules for Sunday Sept 18th and is located at 705 Stokes Mill Rd. in East Stroudsburg. The facility is much large and an incredible parking area. The cost to our club is Free.

Walt said the details are now being worked out and the flyers are being updated. He is going to check with KJI regarding door prizes and follow up on other leads.

Votes / New members:

None

Announcements:

None

50/50 Raffle:

AL -KB3OVB was the big winner of the $74.00 pot, giving him $37.00

Adjournment…

Meeting was adjourned at 2030: Motion to close by RuthAnn – W9FBO 2nd by Alex – KD2FTA Motion passed

Secretary
Kevin Forrest
W3KCF

EPARA MEETING

TEST YOUR KNOWLEDGE!

What transmit frequency might generate an image response signal in a receiver tuned to 14.300 MHz and which uses a 455 kHz IF frequency?

A. 13.845 MHz
B. 14.755 MHz
C. 14.445 MHz
D. 15.210 MHz

Last month's answer was, D. The letters I/Q stand for in-phase and quadrature. In-phase and quadrature refer to two signals that are 90° out of phase. The I and Q components are then combined together to create a modulated signal.

DMR
DIGITAL MOBILE RADIO

The EPARA HOT SPOT Wednesday night DMR rag chew is here!

Wednesday evenings at 8:30 PM local, 0:30 UTC!

Tune your DMR radios to Talk Group 3149822 TS2 to join the

N3IS EPARA Hot Spot rag chew DMR net.

Listen to the Tech Net Friday nights on the 147.045 repeater to learn more about joining this net and for upcoming ZOOM meetings announcements to learn more about programing your radios and hot spots!

To: All EPARA Members and Users of the WA3MDP Repeater System

Re: The 147.045 Repeater Malicious Interference

Over the past few years the 147.045 repeater here in Monroe County has been plagued with an increasing amount of deliberate and malicious interference. While some of this interference has been directed at some specific operators the end results has been a wide area large foot print repeater that get little to no use except for a few regularly scheduled nets.

This is not a problem that is special to just the 147.045 system. Nationwide FM repeaters (and HF bands for the matter) are also being interfered with deliberately and the FCC lacks the manpower and ability to search out the people causing the issues.

The ARRL in conjunction with the FCC reorganized the Volunteer Monitor program a while back to assist in tracking down QRM on all of the amateur bands. While some progress has been made there obviously is a lot more to be done.

A small dedicated group has been tracking the QRM locally by various means for over a year. While some of the sources have been narrowed down it is now time to get the rest of the local ham community involved.

What we are asking people to do is when you listen to the 147.045 repeater also listen to the "input" frequency which is 147.645 (no tone is required). If you should hear any of the malicious and deliberate QRM occurring, do the following:

1) DO NOT ENGAGE IN A CONVERSATION WITH THESE INDIVIDUALS.

2) If you hear farting, cat calls, high pitch cartoon voices, music, etc write down the DATE, TIME, YOUR LOCATION and APPROX STRENGTH OF THE QRM STATION. If you have a beam antenna and can provide a heading that would be great too!

3) Send your listening report to the email address LIDSonzero45@gmail.com.

ALL information will be kept confidential and with this added information we hope to narrow down the locations that have already been identified.

In closing let me assure you that the people looking for the sources of the interference are doing so with the blessing of the repeater owners. It is our desire to see the 147.045 repeater system return to the quality repeater that it used to be many years ago.

Thank you in advance for your cooperation.

VE Testing & Classes

Anyone looking to take an exam is encouraged to contact Chris AJ3C to preregister at least one (1) week in advance of the test date. If you have any questions or to register, Chris can be reached via email AJ3C@GMX.COM. VE sessions are being held the 4th Friday of each month at 6pm at the Monroe County 911 training center. Seating is limited for the time being so we can follow the health guidelines set forth by the county and state.

VE sessions are back - contact Chris AJ3C for further information!

AMATEUR RADIO CLASSES

ARES/RACES meetings are now being held on the fourth Friday of each month at 7PM. The meetings are once again being held at the 911 call center. These meetings will serve as training sessions covering several aspects of amateur radio emergency communications. We will start with traffic handling and the use of Radiograms and the ICS 213 general message form. Future sessions will cover the use of several ICS forms and the setup and use of digital communication modes including Winlink, Packet Radio, APRS, and the FLDIGI software program. Meeting are open to all, you do not need to be an ARES/RACES team member to attend.

Want to Put Your Ham Radio Skills to Good Use? Get Involved in

EmComm!

One of the missions of the Amateur Radio Service is for amateur radio operators to provide public service and emergency communications (EmComm) when needed. We act as a voluntary noncommercial communication service and pitch in to help our communities and first responders.

So, what organizations are out there for community-minded amateur radio operators and what can we do to help?

Join In

One good entry point into public service and emergency communications is to join SkyWarn, a volunteer program run by the National Weather Service (NWS) with more than 290,000 trained severe weather spotters. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to the NWS.

Not all of these weather spotters are amateur radio operators, but many are. Amateur radio communications can report severe weather in real time. When severe weather is imminent, SkyWarn spotters are deployed to the areas where severe weather is expected. A net is activated on a local repeater and SkyWarn spotters who are Hams check into that net. The net control advises the spotters when they might expect to see severe weather, and the spotters report conditions such as horizontal winds, large hail, rotating clouds, and even tornadoes.

To become a SkyWarn spotter, you must attend a class that teaches you the basics of severe weather, how to identify potentially severe weather features, and how to report them. The classes are free and typically last about two hours. Check your local NWS website for class schedules.

ARES/RACES/CERT

Another way Hams can become involved in public service and emergency communication is to join an ARES or RACES group. Technically, these are two separate services—the Amateur Radio Emergency Service (ARES) is run by the ARRL, while the Radio Amateur Civil Emergency Service (RACES) is a function of the Federal Emergency Management Agency (FEMA). Amateur radio operators who typically take part in one also take part in the other.

To participate in RACES, you'll need to take some self-study FEMA courses in emergency preparedness and emergency-response protocols. Classes may or may not be required to participate in ARES. These requirements are set by each individual ARES group. To get involved with either ARES or RACES, ask your local club members when they meet. You can also contact the Section Manager or Emergency Coordinator for your ARRL section. To contact them, click here and find the section that you live in.

Amateur radio operators belonging to ARES (and its predecessor, the Amateur Radio Emergency Corps) have responded to local and regional disasters since the 1930s, including the 9/11 attacks, and Hurricane Katrina and Hurricane Michael, among others.

The Community Emergency Response Team (CERT) program trains volunteers—both Hams and non-hams—how to be prepared for disasters that may impact their area. They provide basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a nationwide approach to volunteer training and organization that first responders can rely on during disaster situations, allowing them to focus on more complex tasks.

What Gear Do You Need?

For most local needs, a 5-watt VHF/UHF handheld transceiver is sufficient for utilizing local repeaters to relay messages and report on conditions as they exist. Replacing the radio's stock antenna with a higher gain antenna or connecting it to a magnetic mount on a vehicle will increase range significantly.

Even better is a VHF/UHF mobile radio installed in your vehicle with 25 or more watts output and a good mobile antenna. In the event the repeater loses power, you can talk over a considerably larger area in simplex mode with the extra power and a good mobile antenna.

If you work with an ARES or RACES group, you may be asked to act as a county control station. In this capacity, you'd need both HF and VHF transceivers in a fixed location, such as your house, with a good antenna system and emergency power capabilities like a generator or batteries. This allows you to make contacts within your state and throughout the U.S.

Helping Hams

Ham radio can play a key role in emergency situations. Here are a few examples:

- Ham radio connected firefighters and police departments, Red Cross workers, and other emergency personnel during the 2003 blackout that affected the northeast United States.
- In 2017, fifty amateur radio operators were dispatched to Puerto Rico to provide communications services in the wake of Hurricane Maria.
- Amateur radio operators provided communications in the aftermath of the Boston Marathon bombing when cellphone systems became overloaded.

- During Hurricane Katrina, more than one thousand ARES volunteers assisted in the aftermath and provided communications for the American Red Cross.
- During the devastating Oklahoma tornado outbreak that began in May 1999, amateur radio operators—giving timely ground-truth reports of severe weather—played a critical role in the warning and decision-making processes at the NWS Weather Forecast Office in Norman, Oklahoma.
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Credit: https://www.onallbands.com/want-to-put-your-ham-radio-skills-to-good-use-get-involved-in-emcomm/

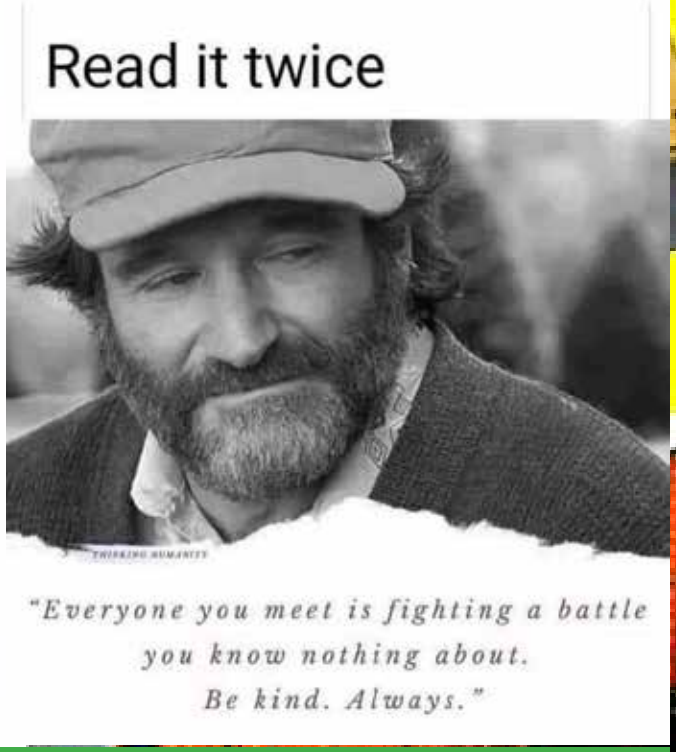
It seems I was just sitting here thinking of things to write just days ago. I guess the good point is warmer weather seems to be sneaking around the corner and winter is finally over with. I cut my lawn today and managed to study the new growth branches around my wire antenna too. Looks like i will be climbing a tree or two before the leaves grow back.

I've been spending time repairing a friends Astron power supply that looks like it tried to self destruct internally. It's usually just a couple of items that let go but in this case he will getting a back a bag of destroyed parts that boggles the mind. I'm not sure what to think anymore about Astron engineering.

This coming May 3rd we are meeting at the 911 call center to repair our off-center fed dipole at 4pm. I managed to kick this cold or whatever I caught finally and feel a bunch better. I haven't been that sick in around two decades which makes be doubt it was a normal cold too.

Enjoy the warmer weather coming and get ready for Field Day too!

Eric
N3SWR



"Basic research is what I am doing when I don't know what I am doing."
- Wernher von Braun.

Topics of Interest

Have an idea you would like to share with your fellow hams? Interested in one of the new exotic digital modes and would like to get others interested in it too? Found a blog somewhere that you think others would find interesting? Members are encouraged to submit items of interest for publication. Submitted articles (are suggested) to be no more than a page or two in length and may be edited for content and grammar. The EPARA officers and newsletter editor reserve the right to determine which items will be included in The Beacon. The deadline for publication is the 15th of the month. The publication date will be at the end of each month. Copyrights are the property of their respective owners and their use is strictly non-profit/educational and intended to foster the spirit of amateur radio.

If you've taken pictures at an event and would like to submit them for possible inclusion in the newsletter, forward them to the newsletter editor. Please send action shots, if possible. Faces are often preferable over the backs of heads. Many hams may be way too overweight, so please consider using a wide-angled lens.

Disclaimer

The Beacon is not representative of the views or opinions of the whole organization, and such views and opinions expressed herein are of the individual author(s).

Bruce Draper, AA5B, aa5b.corral@gmail.com

Contest Corral

May 2022

Check for updates and a downloadable PDF version online at **www.arrl.org/contest-calendar**.
Refer to the contest websites for full rules, scoring information, operating periods or time limits, and log submission information.

Start - Finish Date-Time		Start - Finish Date-Time		Bands	Contest Name	Mode	Exchange	Sponsor's Website
1	1300	1	1900	3.5-28	AGCW QRP/QRP Party	CW	RST serial class (A/B)	agcw.de/contest/qrp-qrp
2	0000	2	0100	1.8-28	K1USN Slow Speed Test	CW	Name SPC (max 20 WPM)	www.k1usn.com/sst.html
2	1630	2	1729	3.5, 7	OK1WC Memorial (MWC)	CW	RST serial	memorial-ok1wc.cz
3	0100	3	0159	1.8-50	Worldwide Sideband Activity Test	Ph	RS OM/YL/Youth	wwsac.com/rules.html
3	0100	3	0300	3.5-28	ARS Spartan Sprint	CW	RST SPC power	arsqrp.blogspot.com
3	1700	3	1900	3.5-14	RTTYops Weeksprint	Dig	Other's call your call serial name	rttyops.com
4	1200	4	1300	1.8-28	A1Club AWT	CW	RST name	a1club.org/contest/awt
4	1300	4	1400	1.8-28	CWops Test (CWT)	CW	Name mbr or SPC	cwops.org/cwops-tests
4	1700	4	2000	144	VHF-UHF FT8 Activity Contest	FT8	4-char grid square	ft8activity.eu/index.php/en
4	1900	4	2000	1.8-28	CWops Test (CWT)	CW	Name mbr or SPC	cwops.org/cwops-tests
4	2300	5	0300	All	MIE 33 Contest	CW Ph	RS(T) age	www.ztv.ne.jp/isoda/33/annual/44/44rule-e.html
5	0000	6	0300	7	Walk for the Bacon QRP Contest	CW	RST SPC name mbr or power (<13 WPM)	qrpcontest.com/pigwalk40
5	0300	5	0400	1.8-28	CWops Test (CWT)	CW	Name mbr or SPC	cwops.org/cwops-tests
5	0700	5	0800	1.8-28	CWops Test (CWT)	CW	Name mbr or SPC	cwops.org/cwops-tests
5	1700	5	1900	3.5-14	RTTYops Weeksprint	Dig	Other's call your call serial name	rttyops.com
5	1800	5	2200	28	NRAU 10-Meter Activity Contest	CW Ph Dig	RS(T) 6-char grid square	nnrlcontest.no/index.php/nnrl-contests
5	1900	5	2000	3.5, 7	EACW Meeting	CW	RST mbr name EA province or country	eacwspain.es/eacwmeeting
5	2000	5	2200	1.8-50	SKCC Sprint Europe	CW	RST SPC name mbr or "none"	skccgroup.com
6	0145	6	0215	1.8-21	NCCC RTTY Sprint	Dig	Serial name QTH	ncccsprint.com
6	0230	6	0300	1.8-21	NCCC Sprint	CW	Serial name QTH	ncccsprint.com
6	2000	6	2100	1.8-28	K1USN Slow Speed Test	CW	Name SPC (max 20 WPM)	www.k1usn.com/sst.html
7	0001	8	2359	28	10-10 International Spring Contest, CW	CW	Name mbr or "0" SPC	www.ten-ten.org
7	0300	7	0859	3.5-28	RCC Cup	CW Ph	RS(T) mbr or ITU zone	rcccup.ru
7	0800	7	1400	All above 902	Microwave Spring Sprint	All	6-char grid square	sites.google.com/site/springvhfupsprints
7	1200	8	1159	3.5-28	ARI International DX Contest	Ph CW Dig	RS(T) 2-letter Italian province or serial	www.ari.it
7	1200	8	1200	3.5-144	F9AA Cup, Digi	Dig	RST serial	site.urc.asso.fr/index.php
7	1200	8	2359	1.8-50	SKCC Weekend Sprintathon	CW	RST SPC name mbr or "none"	www.skccgroup.com
7	1300	8	0700	1.8-28	7th Call Area QSO Party	CW Ph Dig	RS(T) 7th-area state/county or SPC	7qp.org
7	1500	8	0300	1.8-28	Indiana QSO Party	Ph CW	RS(T) IN county or SPC	www.hdxcc.org/inqp/rules.html
7	1700	8	2359	1.8-VHF	Delaware QSO Party	CW Ph Dig	RS(T) DE county or SPC	www.fsarc.org/qsoparty/rules.htm
7	2000	8	2359	3.5-28	New England QSO Party	CW Ph Dig	RS(T) New England county/state or SPC	neqp.org/rules
8	1000	8	1400	7	WAB 7 MHz Phone	Ph	RS serial WAB square or country	wab.intermip.net/Contests.php
9	0000	9	0200	1.8-28	4 States QRP Group Second Sunday	CW Ph	RS(T) SPC mbr or power	4sqrp.com/SSS/sss_rules.pdf
9	1900	9	2030	3.5	RSGB 80-Meter Club Championship, SSB	Ph	RS serial	www.rsgbcc.org/hf
11	1700	11	2000	432	VHF-UHF FT8 Activity Contest	FT8	4-char grid square	ft8activity.eu/index.php/en
14	1200	15	1159	1.8-28	CQ-M International DX Contest	CW Ph	RS(T) serial	cqm.srr.ru/en-rules
14	1200	15	1200	3.5-28	VOLTA WW RTTY Contest	Dig	RST serial CQ zone	www.contestvolta.com
14	1700	15	0300	7-28	Canadian Prairies QSO Party	CW Ph	RS(T) VE4/5/6 district code or SPC	cpqp.ve6hams.ca
14	2300	15	0300	50	50 MHz Spring Sprint	All	4-char grid square	sites.google.com/site/springvhfupsprints
15	2300	16	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST SPC mbr or power	qrpcontest.com/pigrun
18	1700	18	2000	1.2G	VHF-UHF FT8 Activity Contest	FT8	4-char grid square	ft8activity.eu/index.php/en
18	1900	18	2030	3.5	RSGB 80-Meter Club Championship, Data	Dig	RST serial	rsgbcc.org/hf
19	0000	20	0300	14	Walk for the Bacon QRP Contest	CW	RST SPC name mbr or power (<13 WPM)	qrpcontest.com/pigwalk20
19	0030	19	0230	3.5-14	NAQCC CW Sprint	CW	RST SPC mbr or power	naqcc.info
19	1900	19	2000	3.5-14	NTC QSO Party	CW	RST mbr or "NM" (25 WPM max)	qsl.net/ntc/party.html
21	0300	22	0900	50-1296	SARL VHF/UHF Digital Contest	Dig	RST 6-char grid locator	www.sarl.org.za
21	0600	21	2100	3.5-28	UN DX Contest	CW Ph	RS(T) Kazakhstan district code or serial	undxc.kz/rules-eng
21	0800	21	1959	3.5-28	YOTA Contest	CW Ph	RS(T) age	www.ham-yota.com/contest
21	0800	22	1100	3.5	NZART Sangster Shield Contest	CW	RST serial Branch number (if ZL)	nzart.org.nz/activities/contests
21	1200	22	1200	1.8-28	His Majesty King of Spain Contest, CW	CW	RST EA province or serial	concursos.ure.es/en
21	1200	22	1200	3.5-28	EU PSK DX Contest	Dig	RST EU area or serial	eupsk.club/eupskdx/eupskdxrules.pdf
21	1400	22	0200	1.8-144	Arkansas QSO Party	CW Ph Dig	RS(T) AR county or SPC	www.arkqp.com
21	1600	21	2159	1.8-50	Feld Hell Sprint	Dig	Mbr SPC grid	sites.google.com/site/feldhellclub
21	2100	22	0200	3.5	Baltic Contest	CW Ph	RS(T) serial	lrsf.lt/en/balticcontestrules
23	0000	23	0100	1.8-28	QRP ARCI Hootowl Sprint	CW	RST SPC mbr or power	qrparci.org/contest
25	0000	25	0200	1.8-50	SKCC Sprint	CW	RST SPC name mbr or "none"	www.skccgroup.com
26	1400	26	2200	3.5, 7	QRP Minimal Art Session	CW	RST class number of components	qrpcc.de/contestrules
26	1900	26	2030	3.5	RSGB 80-Meter Club Championship, CW	CW	RST serial	www.rsgbcc.org/hf
28	0000	29	2359	1.8-28	CQ WW WPX Contest, CW	CW	RST serial	www.cqwpx.com
30	1900	30	2030	3.5-14	RSGB FT4 Contest	FT4	4-char grid square	www.rsgbcc.org/hf

There are a number of weekly contests not included in the table above. For more info, visit: **www.qrpfoxhunt.org**, **www.ncccsprint.com**, and **www.cwops.org**.
All dates and times refer to UTC and may be different from calendar dates in North America. Contests are not conducted on the 60-, 30-, 17-, or 12-meter bands. Mbr = Membership number. Serial = Sequential number of the contact. SPC = State, Province, DXCC Entity. XE = Mexican state. Listings in blue indicate contests sponsored by ARRL or *NCJ*. The latest time to make a valid contest QSO is the minute listed in the "Finish Time" column. *Data for Contest Corral is maintained on the WA7BNM Contest Calendar at* **www.contestcalendar.com** *and is extracted for publication in QST 2 months prior to the month of the contest. ARRL gratefully acknowledges the support of Bruce Horn, WA7BNM, in providing this service.*

Amateur Radio Special Event Stations!

04/29/2022 | Handiham 55th Anniversary Special Event

Apr 29-May 1, 1900Z-1900Z, W0ZSW, Minneapolis, MN. Handiham Radio Club. 14,265.000 7,040.000. QSL. Handiham Program, 3915 Golden Valley Road, Mail Route 78446, Minneapolis, MN 55422. On Saturday, April 30th, the Handiham Program will celebrate its 55th anniversary of helping people with disabilities get involved in the amateur radio hobby. This is a pretty special accomplishment for any organization! Listen out for CQ Handiham 55 on phone and CW! handiham.net

04/30/2022 | Hams for PanCAN

Apr 30-May 1, 1400Z-2020Z, N3P, New Kensington, PA. WQ3Q. 3.960. 7.172. Certificate & QSL. Richard Ryba /PanCAN, 2777 Leechburg Rd., New Kensington, PA 15068. This special event station is set up to raise awareness and support for pancreatic cancer research and resources for patients through PanCAN Purple Stride Day. in Pittsburgh. https://secure.pancan.org/site/TR/PurpleStride/PurpleStride?px=3163046&pg=personal&fr_id=2357 rybar1949@gmail.com

04/30/2022 | UGA Sanford Stadium Special Event

Apr 30-May 1, 1700Z-1700Z, N1D, Athens, GA. Athens Radio Club. 3.930 MHz 7.230 MHz 14.330 MHz 28.430 MHz. QSL. Athens Radio Club, P.O. Box 782, Athens, GA 30603-0782. Athens Radio Club is hosting a special event station from Sanford Stadium April 30 - May1, 2022 from 1700 to 1700. If you're a Bulldog fan, or if you're not, give us a call! athensradioclub.org

05/07/2022 | 40th Anniversary Celebration

May 7-May 8, 1300Z-0100Z, N4B, Moulton, AL. Bankhead Amateur Radio Club, Inc.. 7.150 14.200 SSB. QSL. Moulton ARC, N4IDX, 215 County Road 599, Moulton, AL 35650. www.n4idx.com

05/07/2022 | Celebrating National Train Day

May 7, 1300Z-2109Z, W4LX, Fort Myers, FL. Fort Myers Amateur Radio Club. CW 7.040 14.040; PSK31 14.070; SSB 7.260 14.260. Certificate & QSL. Fort Myers Amateur Radio Club, P.O. Box 61183, Fort Myers, FL 33906. From the Railroad Museum of South Florida www.fmarc.net

05/07/2022 | Golden Spike Special Event Station - W7G

May 7-May 10, 1500Z-2300Z, W7G, Corinne, UT. Ogden Amateur Radio Club - OARC. 14.255 7.235 14.040 7.040. QSL. Ogden Amateur Radio Club - OARC, PO Box 3353, Ogden, UT 84409. Commemorating the Anniversary of the 1869 Driving of the Golden Spike, Completing the Transcontinental Railroad at Promontory Summit, Utah. Golden Spike National Historical Park, 6200 North 22300 West, Promontory Summit, UT 84307. w7g.org

05/07/2022 | Suffolk County (NY) Radio Club 75th Anniversary

May 7, 1500Z-2359Z, W2DQ, Yaphank, NY. Suffolk County Radio Club. 7.256 14.240 21.295 28.350. Certificate. Suffolk county radio club, PO Box 302, Medford, NY 11763. suffolkcountyradioclub.com

05/07/2022 | Wings Over the Rockies B29/ Warbirds Fly-in

May 7, 1400Z-2200Z, W0R, Parker, CO. Parker Radio Association. 14.222 7.222. QSL. W0R, PO Box 3241, Parker, CO 80134. B-29 and warbirds Fly-in parkerradio.org

05/14/2022 | 103rd Anniversary of Peace Conference

May 14-May 15, 1300Z-2300Z, WW1USA, Kansas City, MO. World War 1 Museum and Memorial. 7.030 7.250 14.030 14.250. Certificate & QSL. Charles Van Way, N0CVW, 2 Memorial Dri., Kansas City, MO 64108. Send QSL card to receive one. Send certificate request to WW1USA@theworldwar.org. https://www.theworldwar.org/amateurradio

05/14/2022 | Armed Forces Day Crossband Test

Amateur Radio Special Event Stations!

May 14, 1300Z-2200Z, Many, Salado, TX. Department of Defense - Armed Forces. 5330.5 USB 14438.5 USB 14383.5 USB. QSL. Armed Forces Day, 13164 FM 2484, Salado, TX 76571. Military stations will transmit on DOD channels and announce the amateur frequency they are monitoring. A complete list of participating stations, modes, channels, and times will be available after 1 April at website www.dodmars.org. https://www.dodmars.org/mars-comex-information-website/armed-forces-day
05/14/2022 | Celebrating the Anniversary of Minnesota Statehood

May 14, 1400Z-2200Z, K0M, Inver Grove Heights, MN. South East Metro Amateur Radio Club. 7.035 7.250 14.250 18.100. Certificate. Downloadable from website, one month after, event, MN. www.semarc.org
05/14/2022 | Jamestown Landing Day Event

May 14, 1400Z-2000Z, K4RC, Williamsburg, VA. Williamsburg Area Amateur Radio Club. 7.265 14.265. Certificate & QSL. QSL Manager, K4RC, P.O. Box 1470, Williamsburg, VA 23187. Commemorating the 415th anniversary of England establishing the oldest English-speaking colony on the American continent in May 1607. info@k4rc.net or k4rc.net
05/14/2022 | Minnesota Fishing Opener at Ham Lake Park

May 14, 1500Z-2200Z, N0F, Anoka, MN. Anoka County Radio Club. 7.250 14.255. QSL. Anoka County Radio Club, P.O. Box 982, Anoka, MN 55303. www.anokaradio.org
05/14/2022 | North Fulton Amateur Radio League 45th Anniversary

May 14, 1200Z-2300Z, NF4GA, Roswell, GA. North Fulton Amateur Radio League. SSB, CW and Digital on 40 and 20 meters; 7.260 14.260. QSL. North Fulton Amateur Radio League, P.O. Box 1741, Roswell, GA 30077. Operating from West Island GA 027L. SASE please. https://nfarl.org
05/14/2022 | USS Midway Museum Ship Special Event: Battle of Coral Sea

May 14, 1600Z-2300Z, NI6IW, San Diego, CA. USS Midway (CV-41) Museum Ship. 7.250 14.320 14.070 (PSK31); D-STAR (Papa Sys Rept). QSL. USS Midway Museum Ship COMEDTRA, 910 N Harbor Drive, San Diego, CA 92101. www.qrz.com/db/ni6iw
05/14/2022 | WHOA Weekend, Scouts BSA

May 14, 1300Z-1900Z, W1M, Russell, MA. Western Mass Council, Scouts BSA. 7.190 10.115 14.060 14.290. QSL. Tom Barker, WA1HRH, 329 Faraway Road, Whitefield, NH 03598. Monthly seasonal outdoor activities for scouts and the general public including "ham radio in the woods". Paper logging. Qsl via SASE and eqsl.

05/15/2022 | Dog Island IOTA DXpedition

May 15-May 27, 0001Z-2359Z, K4D, Carribelle, FL. K5TEN. SSB: 7.185 14.260 21.285 28.310; CW: 7.027.5 7.110 10.110 14.027.5 21.027.5 28.010; Also 6m operation for Sporatic-E. QSL. Bruce Brady, 208 Mount Tabor Rd., Hot Springs National Park, AR 71913. Rare NA-085 IOTA island and VHF/UHF Grid Square EL79. QSL SASE and DX $1 plus SAE. k5ten@aol.com

05/15/2022 | FMCA-ARC Spring Rally

May 15-May 17, 0000Z-2300Z, W4B, Crossville, TN. FMCA-ARC. 7.240 7.330 14.240 14.330. QSL. Dennis Tuchalski, 5854 Moro Rd., Moro, IL 62067. Celebrating the Family Motor Coach Association - Amateur Radio Chapter Spring Rally. Possible POTA activation also. Will spot on DX reflector. https://fmcaarc.com

05/15/2022 | National Police Week - Honor Our Fallen Heroes

May 15-May 21, 0000Z-2359Z, K3FBI/0-9, Quantico, VA. FBI Amateur Radio Association. 14.275; all bands, all modes.. Certificate. Jay Chamberlain, NS4J, 27 Fox Run Ln., Fredericksburg, VA 22405. Multiple club members operating from

Amateur Radio Special Event Stations!

around the country. Downloadable PDF certificate only. See website for details. www.qrz.com/db/k3fbi

05/15/2022 | Winchester CT 250th Anniversary

May 15-May 21, 0000Z-2359Z, W1N, Winsted, CT. Wireless Operators of Winsted. 14.270 7.240 3.950. QSL. Dana Borgman, 72 Wetmore Ave, Winsted, CT 06098. WB1DJU@ARRL.NET

05/16/2022 | Memorial Day 2022

May 16-May 31, 0000Z-0000Z, K1A, Cleburne, TX. Club KC5NX. 14.255 14.045 7.240 7.235. QSL. Club KC5NX, 9200 Summit Ct. W., Cleburne, TX 76033-8212. Club KC5NX will be on the air again this year in remembrance of the lives lost in the service of our United States Military.. We will have multi operators working most bands and modes from CW to SSB to Digital in order to touch base with as many people as we can. Also an Aeronautical Mobile at 41,000 feet.....We have a super nice K1A QSL waiting for you... E-Mail to KC5NX or call Ric @ 817-298-7937 https://www.qrz.com/db/kc5nx

05/20/2022 | Celebrating Charles Lindbergh's Solo Flight Across the Atlantic- 95th Anniversary

May 20, 1400Z-2000Z, K2CAM, Garden City, NY. Cradle of Aviation Museum/ Sponsored by The Long Island Mobile Amateur Radio Club. 14.240 approximate 7.240 FT8 20 and 40. QSL. LIMARC, P.O. Box 392, Levittown, NY 11756. Band conditions will determine our operating frequency so keep looking for us. Any Questions contact education@limarc.org. www.QRZ.com/db/k2cam or https://limarc.org/special-events/

05/20/2022 | International Jet Boat Race Rogue River Gold Beach

May 20-May 22, 0816Z-0816Z, R0GUE, Gold Beach, OR. Gold Beach Amateur Radio Society, Inc.. 164.7400. Certificate. Thomas Dockery, 94015 Doyle Point Road, Gold Beach, OR 97444. Local call ins via repeater as it has a radius of some 50 miles due to mountainous terrain and our location at the coast of Southern Oregon. Positive offset, 88.5 tone. www.gbhams.org

05/21/2022 | Armed Forces Day

May 21, 1600Z-2130Z, W5KID, Baton Rouge, LA. Baton Rouge Amateur Radio Club. 7.040 7.250 14.040 14.250. QSL. USS KIDD Amateur Radio Club, 305 S. River Road, Baton Rouge, LA 70802. Operation aboard the USS KIDD (DD-661). WW II Fletcher class destroyer. www.qrz.com/db/w5kid

05/21/2022 | Shenandoah Caverns 100th Anniversary

May 21, 1300Z-2100Z, K4S, Quicksburg, VA. Woodstock Amateur Radio Breakfast Group. 7.240 7.040 14.240 14.040. Certificate. Carl M. Dennis, NX3A, 2224 Graveltown Rd., Quicksburg, VA 22847. The Woodstock Amateur Radio Breakfast Group will operate K4S to commemorate the 100th anniversary of Shenandoah Caverns. Shenandoah Caverns is the only caverns in Virginia that has an elevator to the caves. It bills itself as Virginia's most unique and beautiful cave. Open daily for tours, which will pass by the special event station. More information on the caverns available at https://shenandoahcaverns.com/. The station will be operated from inside the cave, approximately 90 feet underground. A certificate is available to anyone working the station if you provide a QSL card verifying the contact as well as a large (9' X 12") envelope with sufficient postage.

05/27/2022 | Memorial Day - Remembering those that served

May 27-May 31, 1600Z-1600Z, K5E, Sherman, TX. KI5DQ. 14.260 usb 7.220 lsb. QSL. James Hunt, 1026 Valentine Drive, Sherman, TX 75090. Memorial Day is an American holiday, observed on the last Monday of May, honoring the men and women who died while serving in the U.S. military. Memorial Day 2022 will occur on Monday, May 30.

05/28/2022 | Birthplace of Memorial Day

May 28-May 30, 1400Z-2200Z, W3M, State College, PA. Nittany Amateur Radio Club. 7.245 14.245. QSL. W3M c/o Nittany ARC, P.O. Box 614, State College, PA 16801. nittany-arc.net

05/29/2022 | Red Skelton Museum Festival 2022

Amateur Radio Special Event Stations!

May 29-Jun 11, 0000Z-2359Z, K9R, Vincennes, IN. K9GX. 80, 40, 20 and higher bands as conditions permit. QSL. Mark Steven Williams, POB 5973, Elizabeth, IN 47117-5973. A special event celebrating the Red Skelton Festival, Parade and "Laughing Stalks" exhibit at the Red Skelton Museum of American Comedy, Vincennes, Indiana, June 10-11, 2022. Honoring the legacy and 109th birthday of one of America's most beloved talents. Operating schedule and updates on the K9R QRZ page and K9R Red Skelton Museum Special Event FB group page. QRV on 80, 40, 20 and higher bands as conditions permit. K9Rspecialevent@gmail.com or www.qrz.com/db/k9r

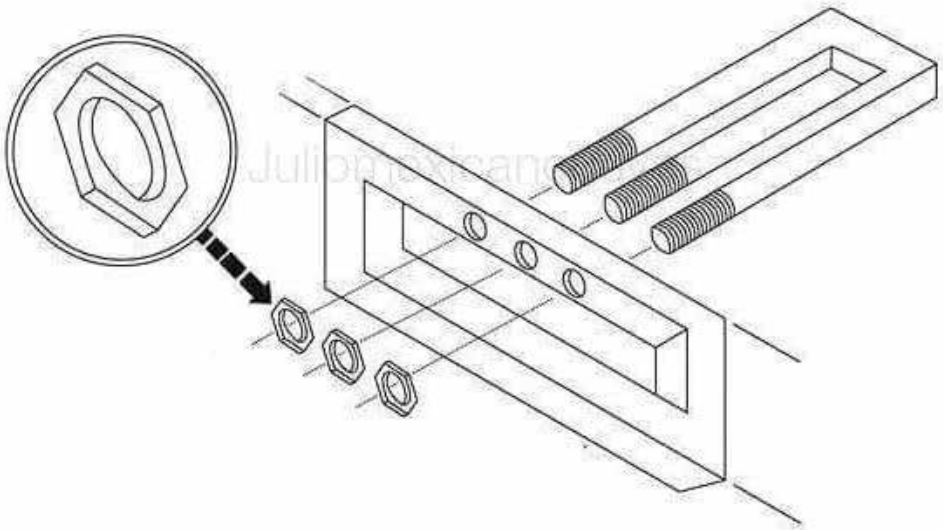
05/30/2022 | Memorial Day Commemoration

May 30, 1600Z-2130Z, W5KID, Baton Rouge, LA. Baton Rouge Amateur Radio Club. 7.040 7.250 14.040 14.250. QSL. USS KIDD Amateur Radio Club, 305 S. River Road, Baton Rouge, LA 70802. Operation aboard the USS KIDD (DD-661). WW II Fletcher class destroyer. www.qrz.com/db/w5kid

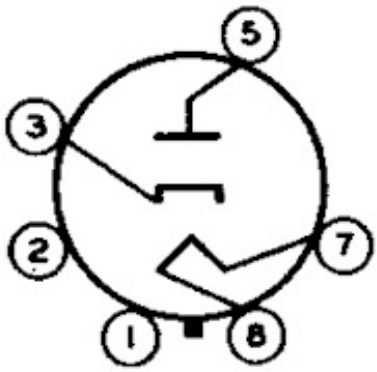
05/30/2022 | Memorial Day Special Event

May 30, 1800Z-2200Z, N3TAL, Lanham, MD. American Legion Post 275 ART. 7.275mhz +/- 5 khz LSB. QSL. American Legion Post 275 ART, 8201 Martin Luthor King Jr. Hwy, Lanham, MD 20706. wa3dvo@verizon.net

It gets worse the longer you look at this.



12AX4 - Rectifier Tube

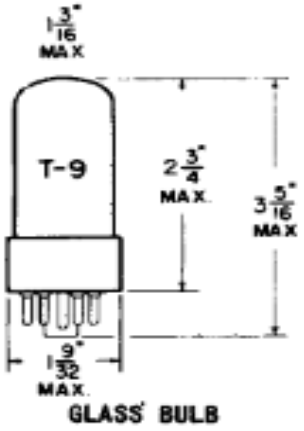


TENTATIVE DATA

12AX4GTB

TUNG-SOL

DIODE



GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.6±6% AMP.
AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW

INTERMEDIATE-SHELL
5 PIN OCTAL
4G5

THE 12AX4GTB IS A HEATER-CATHODE-TYPE SINGLE DIODE INTENDED FOR USE AS THE DAMPING DIODE IN THE HORIZONTAL-DEFLECTION CIRCUIT OF TELEVISION RECEIVERS. IT IS PARTICULARLY USEFUL IN AUTOTRANSFORMER DEFLECTION SYSTEMS IN WHICH HIGH PULSE VOLTAGES ARE APPLIED TO THE CATHODE OF THE DAMPER TUBE.

EXCEPT FOR HEATER RATINGS, THE 12AX4GTB IS IDENTICAL TO THE 6AX4GTB AND ← IS UNILATERALLY INTERCHANGEABLE WITH THE 12AX4GTA.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITHOUT EXTERNAL SHIELD

CATHODE TO PLATE AND HEATER	8.5	μμf
PLATE TO CATHODE AND HEATER	5.0	μμf
HEATER TO CATHODE	4.0	μμf

RATINGS
INTERPRETED ACCORDING TO DESIGN MAXIMUM SYSTEM[A]

TV DAMPER SERVICE

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	5000	VOLTS
MAXIMUM PLATE DISSIPATION	5.3	WATTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	1000	MA.
MAXIMUM DC OUTPUT CURRENT	165	MA.
MAXIMUM HEATER-CATHODE VOLTAGE:		
HEATER POSITIVE WITH RESPECT TO CATHODE		
DC COMPONENT	100	VOLTS
TOTAL DC AND PEAK	300	VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE		
DC COMPONENT	900	VOLTS
TOTAL DC AND PEAK	5000	VOLTS
HEATER WARM-UP TIME (APPROX.)*	11.0	SECONDS

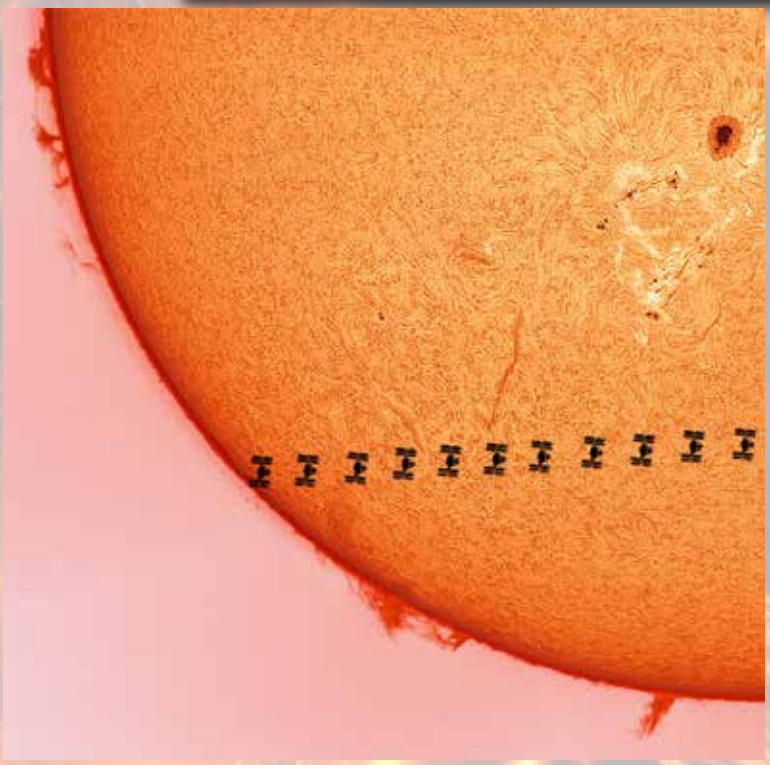
→INDICATES A CHANGE

*HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE HEATER TO REACH 80% OF ITS RATED VOLTAGE AFTER APPLYING 4 TIMES RATED HEATER VOLTAGE TO A CIRCUIT CONSISTING OF THE TUBE HEATER IN SERIES WITH A RESISTANCE OF VALUE 3 TIMES THE NOMINAL HEATER OPERATING RESISTANCE.

CONTINUED ON FOLLOWING PAGE

TUNG-SOL ELECTRIC INC. ELECTRON TUBE DIVISION BLOOMFIELD, NEW JERSEY, U.S.A. DECEMBER 1, 1960 PLATE #6052

K7RA Solar Update



Many solar flares and CMEs occurred over the reporting week (March 24-30) but with glancing blows and near misses, it wasn't reflected in the geomagnetic indicators until Thursday, the last day in March.

The Planetary A index reached a high for the reporting week of 19 on March 27. Average daily planetary A index rose by a modest amount from 6.3 to 10.

Average daily sunspot number rose from 33.4 to 80.1, while solar flux went from 99.9 to 132.7.

The rising solar activity brought us a tremendous amount of 10 meter coverage. Every day I have received reports from all over North America from operators hearing my K7RA/B propagation beacon on 28.2833 MHz.

Predicted solar flux is 150, 145, and 130 on April 1-3, 115 on April 4-5, 110 on April 6-8, then 118, 115, and 110 on April 9-11, 105 on April 12-14, 108 on April 15, 105 on April 16-19, 110 on April 20-21, 115 on April 22, 125 on April 23-26, then 123, 118 and 118 on April 27-29, then 108 on April 30 through May 2, 112 on May 3, 115 on May 4-6, and 112 on May 4, then dropping to 105 through the middle of May.

The predicted planetary A index is 32, 10, 15 and 10 on April 1-4, 819, on April 5-6, 5 on April 7-19, 10 on April 20-21, then 5, 15 and 10 on April 22-24, then 5 on April 25-29, 12 and 8 on April 30 and May 1, and 5 on May 2-15.

A report from F.K. Janda, OK1HH: "We have a week of somewhat wilder development behind us. Its first indication were two sunspot groups on the northeastern limb of the solar disc on March 24. The second of them, region 2976 was larger.

"Region 2975 had a more complex magnetic structure and grew gradually. A proton solar flare was observed on March 28 at 1129 UTC, accompanied by a significant increase in proton levels. And above all, it was followed by a CME heading to Earth!

"Exactly as predicted, the arrival of the CME caused a geomagnetic disturbance on March 31. Its positive phase of development was accompanied, especially in the UTC morning hours, by a significant improvement in the shortwave propagation conditions on a global scale.

"Another solar flare was observed in the same area on March 30 with a maximum at 1737 UTC. Although X-ray levels rose more than on March 28, followed by CME again (albeit weaker, at 1823 UT), there is no expectation that it would be followed by a similar increase in geomagnetic activity."

A Few Words on Getting Into Ham Radio

How to Get Started In Ham Radio

When individuals ask me about amateur radio, one of the main threads in the conversation usually is "How do I get started?" This is a bigger question than it first appears, because it involves not only getting a license, but also what to do after one gets that license. Questions involve things like the equipment involved, the space allotted to the hobby in the home, the mounting of the antenna, etc. Each of these discussions could and has filled entire books on the subject, so here we will just skim the surface. An in-depth discussion will occur naturally as the new ham gains experience and the knowledge necessary to join the process.

Obviously, the first step in becoming a licensed amateur radio operator is to obtain the training guides. Books on each of the three license classes, Technician, General and Extra are available from the American Radio Relay League and also from several other sources. They may even be available at your local bookstore. If you are lucky enough to have a ham radio retailer in your area, they are almost always for sale there. The best advice I can give anyone interested in getting their license is to set aside a certain amount of time each day to devote to the training. These texts are not like reading a novel; they are more like learning the rudiments of a foreign language.

The best comparison I can come up with is that the process is similar to taking one of the courses offered by the Coast Guard Auxiliary to get certified as a boat operator. There is a bit of "lingo" to adapt to, a fair quantity of specific "rules of the road" to absorb, and a modicum of "the best way to accomplish this is....." When it comes to ham radio and the entry level "Technician" license, there is very little actual knowledge of electronics required. Even at the "General" stage, electronics skill is very secondary to knowledge of the rules pertaining to amateur radio and the operating practices required to be a proficient operator on the airwaves. Ascending to the "Extra" license class, therefore, one would expect that the test would be heavy with arcane questions about the inner secrets of electronic theory. One would think so, but one would be wrong. The electronic theory questions on the Extra Class license exam are there, but anyone, and I mean anyone, can learn the material necessary to answer these questions. There are Extra Class operators who got their "ticket" (as we like to call the license sometimes) when they were only 12 years old. There are Extra Class operators out there who had no experience in electronics in their daily careers, but who had no trouble at all in learning the concepts and information required to pass the exam. One important fact may influence your decision to become a "Ham" operator. There is NO Morse Code test anymore. The code is still a valid method of communication, make no mistake, and indeed is the only mode authorized for Technician Licensees on certain HF frequencies. Learning the Code is now a voluntary activity, not a requirement.

After you have "read the book" as it were, the next step is to practice taking the test. There are quite a number of sites on the Internet that offer practice exams that can be taken on-line repeatedly, and for free. Each time you take a practice exam, a new test is created from the overall question pool, so there is no sense of memorizing the test. Each test uses 35 or 50 questions, depending on the license class being tested. The question pool that those tests are built from contains over 600 questions! The chances of getting the same exam even once are pretty remote.

After you have taken enough practice exams to feel comfortable with it. The next step is to find a Test session being offered near you. Most ham radio clubs will have a testing session at least once every three months. With the many clubs that exist around the country, that means that a testing session is scheduled virtually every week within 50 miles of your home. The test is all multiple choice, no "essay" answers required. If you are going for the Technician License, all you need to bring is proof of your identity, a photo id like a driver's license or similar. If you are coming back to upgrade to General or Extra, then the only other item you will need is a copy of your current amateur radio license. The photo id will be returned to you, the copy of your current radio license goes with the paperwork after the exam that gets sent to the Federal Communications Commission (FCC). You will be asked to fill out some paperwork that will be sent to the FCC as your application for a license when you pass the exam. You will also be required to pay an administrative fee that is set by the FCC to cover the costs associated with the exam session.

Each exam session is run by at least three Volunteer Examiners. These are Extra Class licensees (for the most part) who have been trained and certified by their Volunteer Examiner Coordinator (VEC) in the proper way to run the exam session. Each tester's exam answer sheet is verified and scored by three different examiners before giving a pass or fail result. Those passing the test will have their paperwork submitted by the VEC to the FCC so that the FCC can issue the license. Once the results and paperwork is submitted to them, generally, it will take from a week to ten days for the FCC to issue the license. If your name and call sign appear in the FCC database, then you have a license. The paper license that the FCC sends you is merely an indicator that your information appears in the database. If for some reason, The FCC cancels your license and it no longer appears in the database, the possession of the paper license is no help; your license is still void

.

Why would the FCC cancel your license? The rules you learned about in studying for the exam are not just words. They are meant to be followed by all amateur radio operators. The penalties for egregious violation of these rules can be severe. In addition to cancellation of the license, the FCC can levy fines into the thousands of dollars. In really serious situations, where a rogue operator might repeatedly violate the FCC's regulations over a long period of time, jail time can result. The regulations are there for a purpose. They ensure that all users of the radio spectrum have reasonable access to their assigned frequencies, without interference from other

users. After you receive your license from the FCC, the next question, of course, is "what now?" You have a license, now you need equipment to utilize that privilege. The ARRL is a fountain of information on the radio equipment that ham operators use. There are many ways to approach the purchase of amateur radio equipment. New, used, fancy, simple, the choices may seem endless. With a little thought about your purpose in getting your "ticket", you will quickly narrow your choices down to a manageable level. I will say only a few things about your first transceiver.

If your budget permits, get a dual-band unit. That is a radio that operates on both two meters (144 MHz to 148 MHz) and 70 centimeters (430 MHz to 450 MHz). I say this because in many areas of the US, virtually all of the available two meter repeater frequency sets have already been assigned. This means that any new repeaters will be 70 centimeter units. Having the dual-band capability will increase the possible options for you to operate on.

Depending on your own situation, the choice of a hand-held radio (walky-talky) or a vehicle or home mounted mobile radio will be up to you. Eventually you probably will have both, since the ham radio hobby is no different than any other, we all acquire more gear as we progress within the hobby. This is true no matter what the field, just ask any golfer, or boat owner. For your first radio, however, the choice should be tied to your location, your needs, and what repeater facilities are around you. If the available repeaters are distant from where you will be using the radio, the extra transmit power of the mobile rig may be vital. If the repeaters are close and the extra power is not needed, then a hand held radio probably will suffice. Joining a local ham radio club and asking your fellow club members will guide you here.

Once you have purchased a radio (and an antenna and the coax that joins the whole thing together, in the case of a mobile rig, and the power supply to operate it if you plan to operate from your home) the next step is to program the radio with the frequencies of interest in your locality. Read the manual that came with your rig carefully, almost all of the answers you need are in there. If you need more help, ask your fellow club members who may own a similar radio, for help. Another neat source of assistance is the Yahoo Groups at Yahoo.com. There are specific groups for almost any kind of amateur radio gear ever made. Many of these groups have files and information that will answer almost any question you can think of. If the files are of no help, then the other major aspect of the Groups comes into play. As a member of a group, you have the ability to post your question on the group web page, and any other member who has an answer for you can post his or her answer. In addition to the posting, the member's response will be emailed to you directly.

Some radios manufactured now even have the ability to be programmed from your PC. A computer program on a disc and an interface cable not unlike the one that came with your digital camera, allows you to preset all the frequencies, repeater offsets, tones and even power levels on the computer, and then download them into the radio with one or two keystrokes. You can actually save these files in your computer and create different files for different situations. If you go elsewhere in the country to vacation, or visit family, you can create a file that reflects the radio spectrum available in that area and load that into your radio before you go. When you come back home, another download and your radio is back home too.

BY far the most important things to do after you get your amateur radio license are: Join the ARRL, and join your local amateur radio club. The ARRL because the member benefits are truly outstanding and the ARRL is our voice to the FCC, other governmental agencies, and the many other agencies that ham radio assists, like the Red Cross and Salvation Army Disaster Relief Organizations. The ARRL can even renew your license for you (for free) when that time comes. They produce a truly amazing range of publications on amateur radio and the ARRL Handbook is truly an industry standard across all radio modes, even the commercial and military applications. The ARRL monthly magazine, "QST" is the "bible" for ham radio and makes ARRL membership worth it, even if that was the only benefit. There are many other benefits, however, so check the ARRL out at www.arrl.org and see what I mean.

Your local club, because anyone in any hobby needs fellow hobbyists to learn from and perhaps impart information to. We all want to associate with others who share our interests and who can provide a measure of support when involved in new activities. A local club provides that comfortable spot where we socialize with others who share our interests. The learning that results is compounded by the mutual interest in the hobby, whether it be amateur radio or canoeing.

If you have ever considered becoming an amateur radio operator, now is the time to act on that thought. Whether for the hobby itself, or for the tools it brings to the assistance of others in times of disaster, or for the opportunity to learn more about others and indeed yourself, ham radio is a hobby with aspects to fascinate anyone. From radios to computers to television to satellites in space, the ham radio hobby has it all.

Credit: http://www.n1gy.com/getting-started-in-amateur-radio.html

EME CAN BE EASY WITH A SMALL STATION!

Of course, the suggestions on my "2M EME TIPS" page still apply, but setting up a small or portable station for 2m EME can actually make it quite easy to make contacts, since many of the complexities are avoided. For example, here are some guidelines which would enable a small station to make contact with dozens of the larger 2m stations around the world:

1. ANTENNAS - In the simplest station, you would need only one very good antenna. For best results, the antenna should be the longest Yagi possible. Using only a single antenna immediately simplifies things because there are no power dividers or phasing lines - just a single transmission line. It also makes aiming easier, since the pattern is broader (the antenna only needs to be moved every 20 minutes or so), and you do not have to worry about multiple Yagi's getting out of alignment by pointing different directions. In a simple/portable station, it is frequently very effective to further simplify the aiming by keeping the antenna pointed at the horizon only, and using "Armstrong" manual rotation (in which case, the azimuth can be determined with a simple protractor placed around the mast). Usually, it is very easy to put a Yagi up on a portable mast that is only about 7m tall - high enough to be out of the way and low enough to have a short feedline. A 2m antenna that high above the ground will typically have its main lobe at about 5 degrees elevation, with a second, weaker, lobe up around 12 degrees elevation. That usually means that the moon (either rising or setting) will slowly pass through two antenna lobes within the course of a one hour schedule.

If desired, manual elevation is also very easily accomplished by mounting a protractor on the rear end of the boom, and watching the reading indicated by a stiff wire mounted through a hole in the center of the protractor (the wire is free to pivot and always hangs straight down due to gravity). I have successfully used such arrangements for hundreds of EME contacts when I was operating from C6A. The boom-to-mast clamp was simply a pivot, and the antenna can be held at the proper elevation by tying a nylon string (attached to the rear end of the Yagi) down to a rock or concrete block. Very low tech, but it doesn't break and it isn't expensive! Remember, though, that you lose ground gain if you point the antenna up in the sky!

A very effective single Yagi for 2m (especially designed for portable use) is the "2M8WL" 15 m long Yagi manufactured by M-Squared in California. The antenna comes in a box only 20 cm x 20 cm x 218 cm long (weighing about 12 kg) and 1999 costs were in the $339 range. More information can be obtained by contacting M-Squared at (559) 432-8873 (telephone) or (559) 432-3059 (FAX).

2. GROUND GAIN - By pointing on the horizon, you make the installation very simple. You also take advantage of GROUND GAIN, which can add 6-8 dB more gain than the single antenna would have if pointed up in the sky! That can make it equal to as many as 6 Yagi's! To get that much ground gain, you must use a **horizontally polarized antenna**.

The ground gain is especially good if the antenna can "look out" over salt water to see the moon setting or rising. That can mean amazing performance for a very small antenna! For example, the first time I operated from ZF8, I had only a 7 element beam (the horizontal 7 elements of a 14 element satellite Yagi) and 500 watts, yet I made half a dozen random EME contacts on my moonrise (out over the ocean). If you have a flat, clear horizon - especially if is is over salt water - **put it to work for you!**

3. FEED LINE - With a portable station it frequently is possible to have very short feedline. This makes the transmitted signal louder, and makes it possible to hear stations without a preamplifier mounted on the antenna itself. A 15 or 20 m length of a good low loss coax such as LMR600 "ultra flex" would make an excellent installation.

4. RECEIVING PREAMPLIFIER - If the transmission line is short and low loss, the receiving preamplifier can be located right at the operating position. This greatly simplifies the installation, since relays and preamplifier do not need to be located up on the tower (along with their separate coaxial and power cables).

5. AMPLIFIER - The biggest problem with a smaller station is that it will be difficult for larger, more powerful stations to hear you, even though you will hear them (especially when the moon is near your horizon!). If you can achieve more than 200 w at the antenna, you should be able to make contacts with at least 10 of the larger stations on 2m EME. If you can have 400+ watts at the antenna, you can probably make contacts with a couple dozen stations, and if you have 800+ watts at the antenna, it should be possible to make many contacts - especially if you use the ground gain on the horizon. And, of course, if you have a 1500 watt amplifier, you probably will be able to complete a contact with just about everybody you can hear.

An amplifier that has been very successfully used by many portable EME stations during DXpeditions is an amplifier using the 3CX800 tube. It only requires 25 watts drive, is compact and easily transported, and can put out 800-1000 watts if the AC power provided is adequate. These are available commercially from several manufacturers around the world (Command Technologies, for example), or there are plans in various publications showing how they can be constructed. A larger amplifier (that can be used on both 6m and 2m) using a pair of 3CX800's is available from Alpha-Power.

IN SUMMARY, You don't need a huge station to have fun and successfully make 2m EME contacts! Why not get started and try it out!

Credits: http://www.bigskyspaces.com/w7gj/smallemestn.htm

An Easy Foot Switch PTT

When I built my Boom Mic for my home station and posted the details on this site I forgot to include details of the foot switch I use to operate the boom mic. It is very easy to construct and much cheaper than any of the foot switch PTTs that are available commercially.

To start with a company on the East coast of Florida called MPJA (Marlin P Jones and Associates) offers a suitable foot switch for only $5.95 (part # 18150SW) This unit comes with about 6 feet of 3 conductor electrical cord un-terminated at the far end of the cord. This cord will be removed and discarded.

The foot switch must be disassembled (not hard) by removing one of the C-clips at one end of the pivot shaft and sliding the shaft out of the assembly. Be careful not to lose the coil spring between the upper and lower halves of the switch. Loosen the clip that holds the cable in place and de-solder the wires from the switch inside. There are two terminals on the end of the switch and one on the side. The switch is capable of either normally open or normally closed configuration depending on which one of the end terminals one wires in conjunction with the common terminal on the side. For our purpose we will wire it for a normally open configuration.

Once the original electrical wiring has been removed, substitute a 2-conductor cable of suitable length for your needs and terminate it with a mono-plug suitable for your boom mic. You probably will have to refer to the circuit on the Boom Mic page to see how to create a jack that brings the PTT line out from the mic cable. I use 1/8" mono plugs and jacks at my QTH. You may have to add a bit of rubber bushing around the cable where the retention clip contacts it or you can use a vise to flatten the clip so it holds the smaller cable securely.

The Footswitch. This particular foot switch is very comfortable to operate in contrast to some of the units available from places like Harbor Freight which require an odd placement of the foot. They can be used by placing the switch sideways to the foot and pressing on the top of the switch but why spend over twice as much for the switch to begin with.

Here is a photo of the 3.5mm mono plug that is the termination of the cable. This plugs into a 3.5 mm inline jack that is wired across the PTT line and the chassis ground of the radio. Both are easily determined by a little research in your radio's manual or on line. The connecting cable should be sized to give sufficient length to get from the jack on the mic line to a suitable position under your operating position. I made mine a good deal longer so that I could move it out of the way when I have to go under the desk to work on all the wires and coax that live behind the said desk.

Credit: http://www.n1gy.com/an-easy-foot-switch-ptt.html

Analog vs. Digital

Overview

We live in an analog world. There are an infinite amount of colors to paint an object (even if the difference is indiscernible to our eye), there are an infinite number of tones we can hear, and there are an infinite number of smells we can smell. The common theme among all of these analog signals is their **infinite** possibilities.

Digital signals and objects deal in the realm of the **discrete** or **finite**, meaning there is a limited set of values they can be. That could mean just two total possible values, 255, 4,294,967,296, or anything as long as it's not ∞ (infinity).

Real-world objects can display data, gather inputs by either analog or digital means. (From left to right): Clocks, multimeters, and joysticks can all take either form (analog above, digital below).

Working with electronics means dealing with both analog and digital signals, inputs and outputs. Our electronics projects have to interact with the real, analog world in some way, but most of our microprocessors, computers, and logic units are purely digital components. These two types of signals are like different electronic languages; some electronics components are bi-lingual, others can only understand and speak one of the two.

In this tutorial, we'll cover the basics of both digital and analog signals, including examples of each. We'll also talk about analog and digital circuits, and components.

The concepts of analog and digital stand on their own, and don't require a lot of previous electronics knowledge. That said, if you haven't already, you should peek through some of these tutorials:

- Voltage, Current, Resistance and Ohm's Law
- What is a Circuit
- And some mathematics concepts: reading graphs, and understanding the difference between finite and infinite sets.

Analog Signals

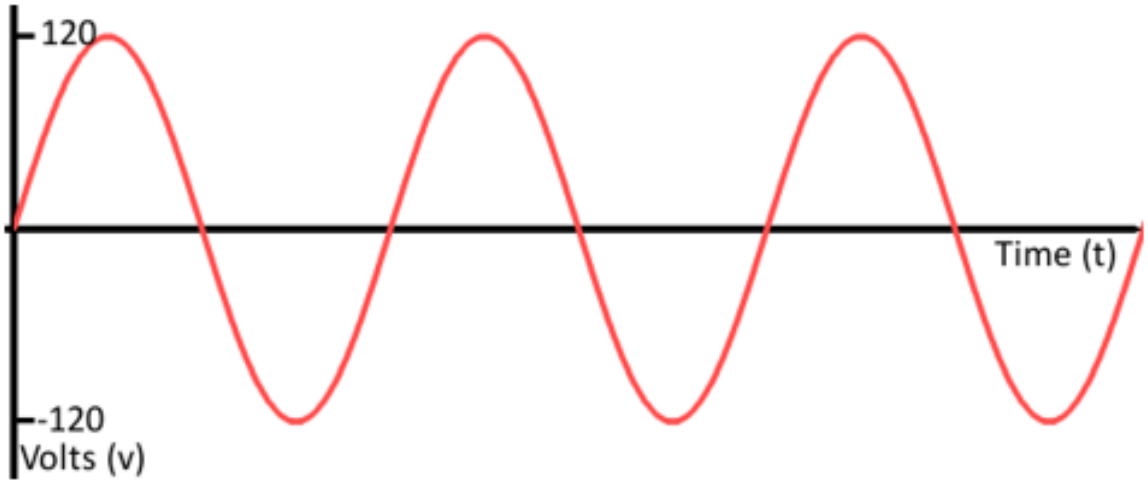
Define: Signals

Before going too much further, we should talk a bit about what a *signal* actually is, electronic signals specifically (as opposed to traffic signals, albums by the ultimate power-trio, or a general means for communication). The signals we're talking about are **time-varying** "quantities" which convey some sort of information. In electrical engineering the *quantity* that's time-varying is usually **voltage** (if not that, then usually current). So when we talk about signals, just think of them as a voltage that's changing over time.

Signals are passed between devices in order to send and receive information, which might be video, audio, or some sort of encoded data. Usually the signals are transmitted through wires, but they could also pass through the air via radio frequency (RF) waves. Audio signals, for example might be transferred between your computer's audio card and speakers, while data signals might be passed through the air between a tablet and a WiFi router.

Analog Signal Graphs

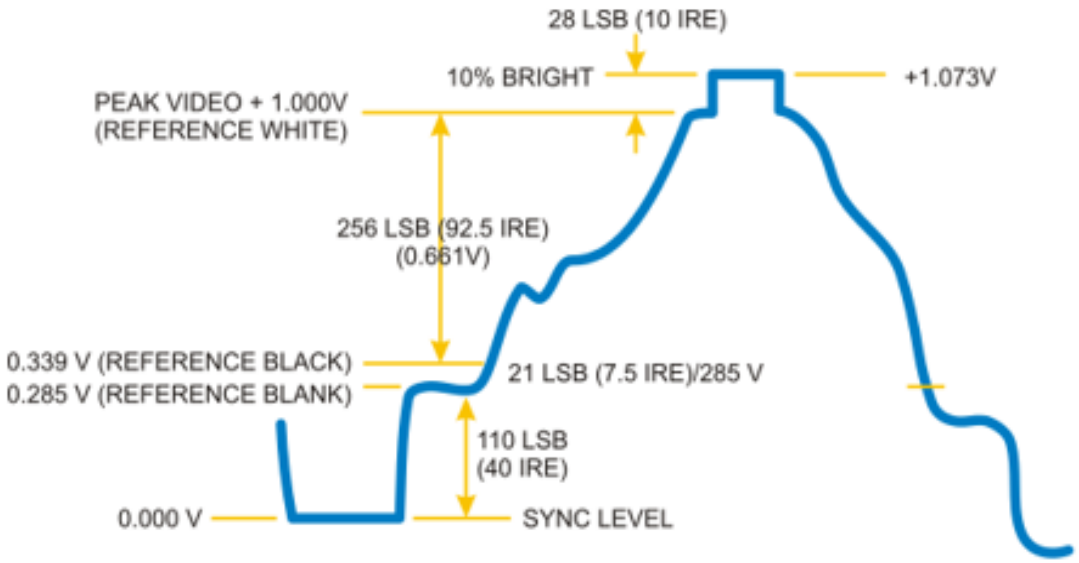
Because a signal varies over time, it's helpful to plot it on a graph where time is plotted on the horizontal, *x*-axis, and voltage on the vertical, *y*-axis. Looking at a graph of a signal is usually the easiest way to identify if it's analog or digital; a time-versus-voltage graph of an analog signal should be **smooth** and **continuous**.



While these signals may be limited to a **range** of maximum and minimum values, there are still an infinite number of possible values within that range. For example, the analog voltage coming out of your wall socket might be clamped between -120V and +120V, but, as you increase the resolution more and more, you discover an infinite number of values that the signal can actually be (like 64.4V, 64.42V, 64.424V, and infinite, increasingly precise values).

Example Analog Signals

Video and audio transmissions are often transferred or recorded using analog signals. The composite video coming out of an old RCA jack, for example, is a coded analog signal usually ranging between 0 and 1.073V. Tiny changes in the signal have a huge effect on the color or location of the video.

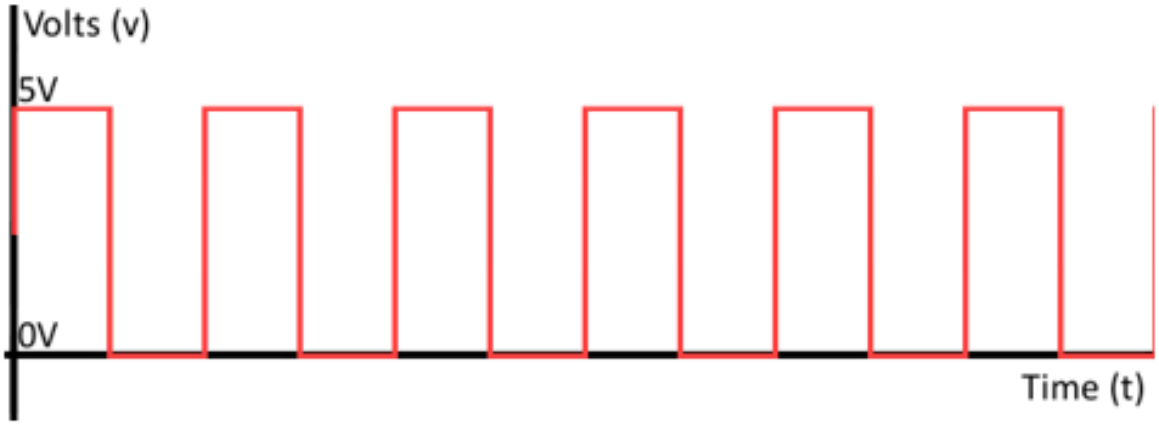


An analog signal representing one line of composite video data.

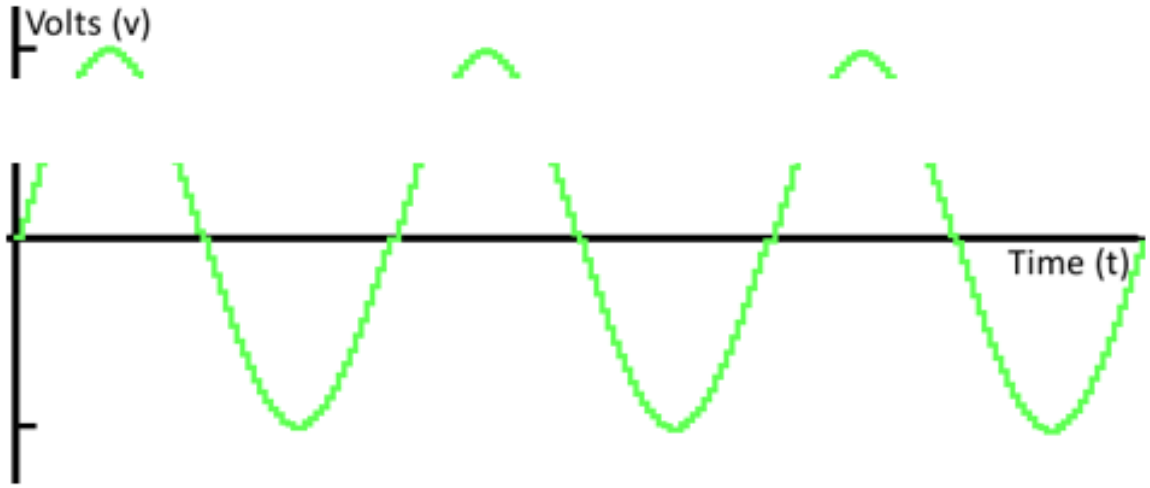
Pure audio signals are also analog. The signal that comes out of a microphone is full of analog frequencies and harmonics, which combine to make beautiful music.

Digital Signals

Digital signals must have a finite set of possible values. The number of values in the set can be anywhere between two and a-very-large-number-that's-not-infinity. Most commonly digital signals will be one of **two values** – like either 0V or 5V. Timing graphs of these signals look like **square waves**.



Or a digital signal might be a discrete representation of an analog waveform. Viewed from afar, the wave function below may seem smooth and analog, but when you look closely there are tiny discrete **steps** as the signal tries to approximate values:

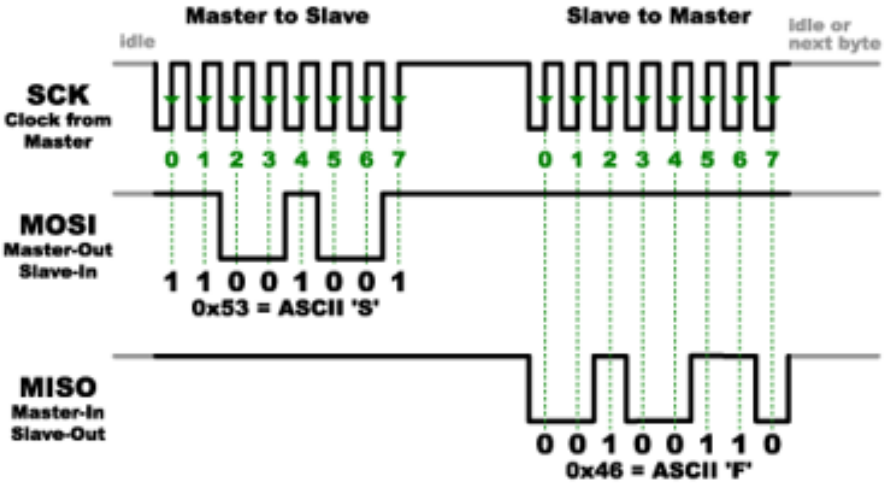


That's the big difference between analog and digital waves. Analog waves are smooth and continuous, digital waves are stepping, square, and discrete.

Example Digital Signals

Not all audio and video signals are analog. Standardized signals like HDMI for video (and audio) and MIDI, I²S, or AC'97 for audio are all digitally transmitted.

Most communication between integrated circuits is digital. Interfaces like serial, I²C, and SPI all transmit data via a coded sequence of square waves.

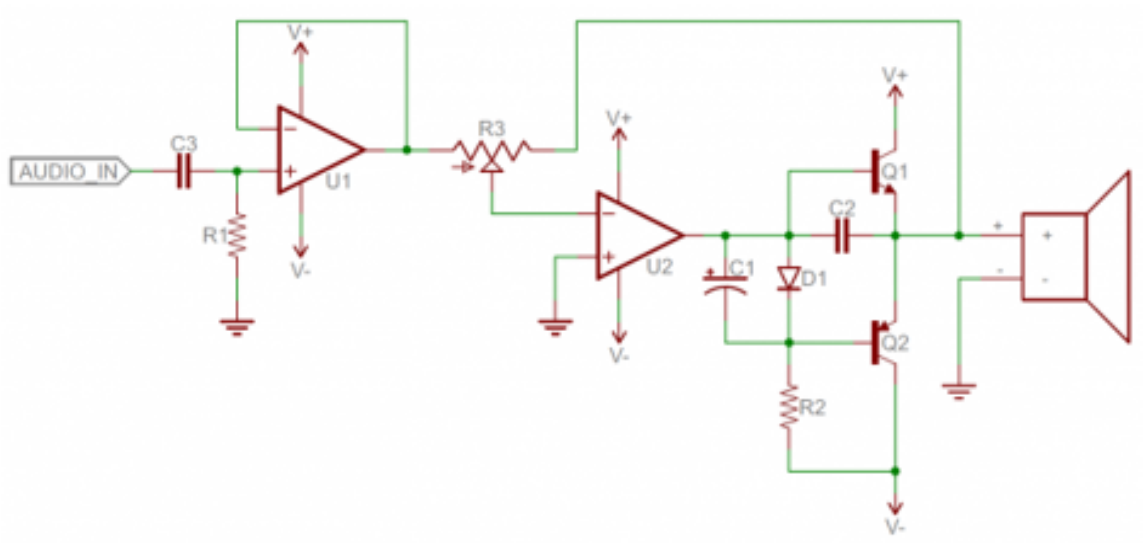


Serial peripheral interface (SPI) uses many digital signals to transmit data between devices.

Analog and Digital Circuits

Analog Electronics

Most of the fundamental electronic components – resistors, capacitors, inductors, diodes, transistors, and operational amplifiers – are all inherently analog. Circuits built with a combination of solely these components are usually analog.



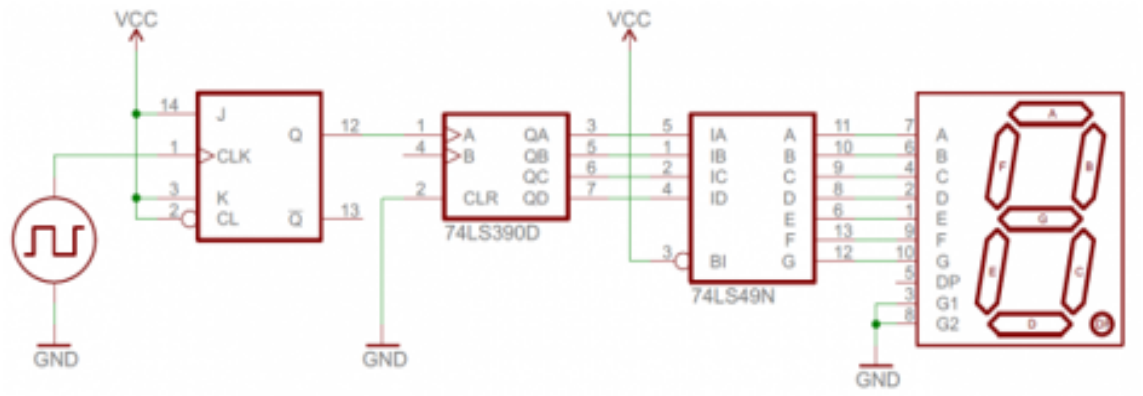
Analog circuits are usually complex combinations of op amps, resistors, caps, and other foundational electronic components. This is an example of a class B analog audio amplifier.

Analog circuits can be very elegant designs with many components, or they can be very simple, like two resistors combining to make a voltage divider. In general, though, analog circuits are much **more difficult to design** than those which accomplish the same task digitally. It takes a special kind of analog circuit wizard to design an analog radio receiver, or an analog battery charger; digital components exist to make those designs *much* simpler.

Analog circuits are usually much more **susceptible to noise** (small, undesired variations in voltage). Small changes in the voltage level of an analog signal may produce significant errors when being processed.

Digital Electronics

Digital circuits operate using digital, discrete signals. These circuits are usually made of a combination of transistors and logic gates and, at higher levels, microcontrollers or other computing chips. Most processors, whether they're big beefy processors in your computer, or tiny little microcontrollers, operate in the digital realm.



Digital circuits make use of components like logic gates, or more complicated digital ICs (usually represented by rectangles with labeled pins extending from them).

Digital circuits usually use a binary scheme for digital signaling. These systems assign two different voltages as two different logic levels – a high voltage (usually 5V, 3.3V, or 1.8V) represents one value and a low voltage (usually 0V) represents the other.

Although digital circuits are generally easier to design, they do tend to be a bit **more expensive** than an equally tasked analog circuit.

Analog and Digital Combined

It's not rare to see a mixture of analog and digital components in a circuit. Although microcontrollers are usually digital beasts, they often have internal circuitry which enables them to interface with analog circuitry (analog-to-digital converters, pulse-width modulation, and digital-to-analog converters. An analog-to-digital converter (ADC) allows a microcontroller to connect to an analog sensor (like photocells or temperature sensors), to read in an analog voltage. The less common digital-to-analog converter allows a microcontroller to produce analog voltages, which is handy when it needs to make sound.

Resources and Going Further

Now that you know the difference between analog and digital signals, we'd suggest checking out the Analog to Digital Conversion tutorial. Working with microcontrollers, or really any logic-based electronics, means working in the digital realm most of the time. If you want to sense light, temperature, or interface a microcontroller with a variety of other analog sensors, you'll need to know how to convert the analog voltage they produce into a digital value.

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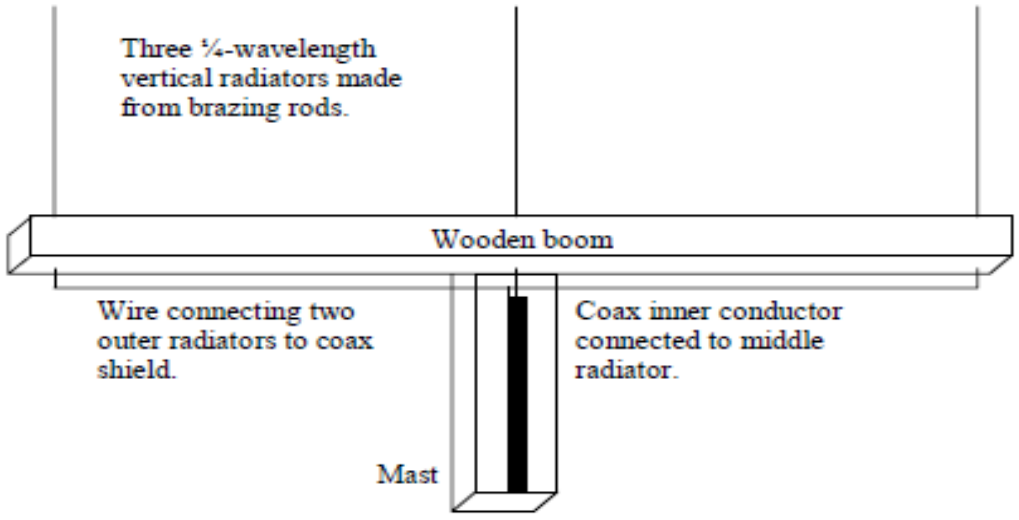
73 AMATEUR RADIO ANTENNA ARCHIVES #46

Weekend Antennas No. 1
A Bobtail Curtain for 2m

Welcome to the first installment of my new column, which I hope will become a regular feature in Radio ZS. Each installment will present a practical and interesting antenna design that can be built in a weekend with simple tools and common materials. Although the column will be first and foremost a practical one, I shall also attempt to explain in each case how the antenna works and the theoretical performance expected of it, aided where appropriate by computer simulations. I welcome questions and other correspondence about these or other antenna ideas and will attempt to publish answers to any questions when space allows.

This month's subject is a vertically polarized bi-directional antenna for the 2m band with a free-space gain of 6.0 dBi, which is about 4.7 dB better than the traditional quarter-wave vertical, making it ideal for accessing distant repeaters. The aerial is easy to construct, provides an excellent match to 50Ω coax and is easy to tune because it has a wide bandwidth (the 2:1 SWR bandwidth is about 7 MHz) over which the pattern and gain remain consistent. It even has an interesting name, the "Bobtail Curtain"!

The design of the antenna is simple (see diagram below). It consists of a 1.8 m wooden boom, with three vertical ¼ wavelength radiators. The two outside radiators are connected together, and fed against the central radiator.



The antenna is fed through a simple choke balun (not shown in the diagram), which prevents unbalanced currents on the feed-line that might otherwise cause the feed-line to radiate.

Construction Details

To build it, you will need:

- A piece of wood 1.8m long for the boom. I used a standard sized pine from the local hardware shop, 22mm x 22mm x 1.8m long.
- Another piece of wood to use as a mast.
- Three brazing rods made of brass or copper, at least 65 cm long. The thickness is not critical, provided they are strong enough to stand upright in the wind, but thin enough so you can trim them to size. Mine were 3mm in diameter.
- 1.8 m of stranded insulated electrical wire. The 1mm^2 "panel wire" available from electrical shops works well.
- A 60mm length of 40mm diameter white plastic plumbing pipe.
- A few metres of RG-58 coax that will serve as the connection to the antenna with a suitable connector (for instance, a PL-259 UHF connector) on one end.
- A quickset epoxy-resin adhesive.
- Paint or varnish to weatherproof the boom and mast.
- Cable clips (the nail-in "saddles") to attach the coax cable to the mast.
- Self-vulcanizing rubber tape.
- Nails or screws to attach the boom to the mast.

Screw, nail and/or glue the centre of the boom to the top of the mast, at right angles. The mast should be attached to one side of the boom, so that the bottom of the boom remains accessible, as in the diagram above. Varnish or paint the whole assembly to weatherproof it, and leave it to dry overnight.

Drill three holes just big enough to fit the brazing rods through the boom from top to bottom. One hole should be in the middle of the boom, the others should be 15mm from each end of the boom, and all should be centered from side to side. Cut the brazing rods to 65 cm long (it is important that they are all the same length) and epoxy them into the holes so that 5 mm of each rod comes out of the bottom of the boom.

Cut the insulated electrical wire so it is just long enough to connect the two outside radiators. Remember to leave enough spare wire for the solder joint on each end. Carefully remove about 5mm of insulation from the middle of the wire. Solder the ends of the wire to the two outer radiators where they protrude below the boom.

To make a simple choke balun drill two holes through one side of the plastic plumbing pipe about 1cm from either end. The holes should be just large enough for

the coax to fit through; 5.5 mm works well with RG-58 coax. Pass the free end of the coax (the end without the connector) through one of the holes, from the inside of the pipe to the outside. Wind six or seven turns of coax around the pipe, then pass the end through the hole at the other side of the pipe, this time from the outside to the inside, leaving about 6 cm of coax protruding from the inside of the pipe to connect to the antenna. Secure the turns with cable ties or a little glue from a glue-gun. (See picture for details).

Detail of the Choke Balun

Strip 2.5 cm of the outer insulation from the coax (the end protruding from the choke balun) and about 1 cm of the inner insulation. Solder the inner conductor of the coax to the middle radiator where it protrudes below the boom, and the shield (braid) to the middle of the wire connecting the two outside radiators, where you previously stripped 5mm of the insulation. Wrap the joints with self-vulcanizing rubber tape to prevent the coax inner and outer from short-circuiting. (In a pinch you can use normal insulation tape, but self-vulcanizing rubber tape is much more weather-proof.)

Secure the choke balun to the mast using cable clips around the coax immediately above and below the balun. Run the coax down the mast, attaching it to the mast every 20cm or so using cable clips (these are important to take the strain off the solder connections).

Raise your new antenna in the clear (away from conductive objects, including yourself) and use an SWR meter or antenna analyzer to trim the radiators for the best match to 50Ω (minimum SWR). You should trim the same amount off each of the

radiators, so the three radiators remain the same length. The final SWR should be very close to 1:1 since this antenna has a feed-point impedance of almost exactly 50Ω at resonance. Trimming is easy due to the wide bandwidth of the antenna.

The Completed Antenna (excluding Balun)

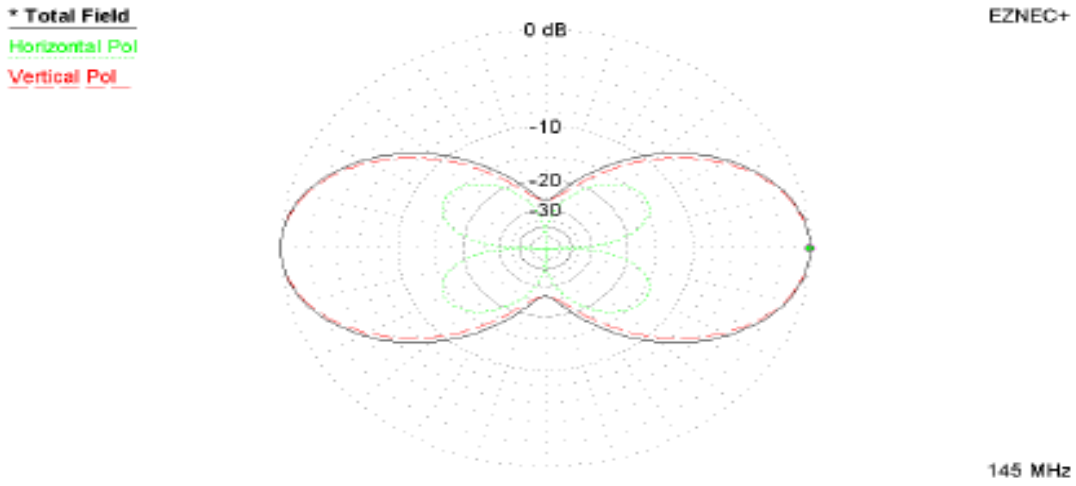
How it Works

The Bobtail Curtain operates as a broadside array of three ¼-wave radiators in phase. Broadside (that is, at right angles to the beam) the fields from the three radiators reinforce each other, so in these directions the radiation is at its maximum. In the direction of the boom, the radiation fields from the two outer radiators cancel the field from the middle radiator, so these are the directions of least radiation. The wire connecting the braid of the coax to the two outside radiators acts as a phasing line, keeping the currents in the radiators in the correct phase relationship (in this case, in-phase for all three radiators).

The feed arrangement, with the middle element being fed against the two outer elements, ensures that the current in the middle element is twice that in each of the outer elements, which is just the right ratio to get the desired pattern. Note that the pattern is bi-directional as shown in the plot below – that is, it radiates equally well in both (horizontal) directions at right angles to the boom.

Since neither of the feed-point connections is at RF earth potential, good practice dictates the use of a balun to prevent radiation from the feed-line. The balun used here is a choke balun consisting of six or seven turns of coax wound around a plastic

former. Any unbalanced RF currents flowing in the coax will generate a varying magnetic field, and the choke will act as an inductor, exhibiting a high (reactive) impedance to common-mode (unbalanced) currents. However balanced (equal and opposite) currents flowing in the coax generate no net magnetic field, so the choke balun has low impedance for differential currents.



Radiation Pattern of the Bobtail Curtain

The diagram shows an azimuth plot (i.e. seen from above) of the far-field radiation pattern of the Bobtail Curtain. The free-space gain is 6.0 dBi. The small horizontally polarized component is contributed by the phasing lines.

MEMBERSHIP APPLICATION

E P A R A

Eastern Pennsylvania Amateur Radio Association

Address: PO Box 521, Sciota, PA 18354

Email: N3IS@qsl.net

Website: www.qsl.net/n3is

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* **Note**: We do not publicize your phone or email information.

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