



The RELAY)))

MAY 2020

The Official Publication of the Arrowhead Radio Amateur Club

A.R.A.C. Inc.

P.O. Box 7164 Duluth MN 55807-7164

<http://www.thearac.org>

Dues: Member \$20/Family \$25

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Ham Shack Shake Up

Spring Ham Shack Projects

In a normal year, it's common to break out of our cabin fever into the sunshine and enthusiastically plan spring and summer projects. As Hams, we definitely turn our thoughts to the ham shack and what we need to do next to establish it, repair it, improve it, or just change it up a little with something new or different.

This certainly has not been a normal year! Maybe some of us had more time than usual to do home ham shack projects during the cold months. Even so, many of us are thinking of "ham camping" (yeah, "hamping" is already different thing...), or doing a lake cabin ham project or setting up a rolling ham shack in our RV.

ANTENNA

Perhaps the first thing we think of this time of the year is our antenna, or in the case of Elmer AA0AW, antenna farm. I am honestly in awe of AA0AW's antenna array and the time & expertise it surely took to accomplish it...

Antenna repair or adjustment from winter or spring storms may be in order.

For example, If you own a multi-band trap antenna, one issue that can come up this time of year in places with colder winters like Minnesota, is trap repair. A trap, of course, is a common way to construct an antenna for multi-band use by installing parallel tuned circuits (traps). If you've troubleshot your cables & connections from your radio to your trap antenna and tune as you may you cannot receive a particular signal, you may need to remove the trap screws and pull the traps out for inspection. Coils are wrapped around plastic forms that can crack in two. This seems to happen when a small amount of moisture inside the trap freezes and then thaws. If the coil form cracks and makes a visible separation that you can see underneath the coil, you can order a replacement of course. You might be surprised, though, that you may be able to restore function to the trap without replacing the coil form at all. One no-cost thing to try: Take the afflicted trap apart and carefully wipe down the parts to ensure they're clean & dry. Then slip a piece

of PVC pipe vertically over the element rod with the plastic coil form on the bottom against a stable surface. The pipe should be large enough to slip over the element, of course, but smaller than the diameter of the coil form. Grasp the PVC pipe and tap firmly down on the coil form until there's no visible gap. Then reassemble the trap and antenna and test signal strength. Chances are actually pretty good that this



Photo courtesy Mosley Electronics

Continued on page 18



Join us on facebook!

Co-Editors:

Kim & Steve Waller

Kim - KEØNQS • Steve - KEØNQT

KEØNQS.mn@gmail.com
KEØNQT@gmail.com



Prez Sez ...

Hi ARAC members,

Well what can I say. We are still under the Governor's Shelter-in Place Order, so the May club meeting might have to be held on the radio like last month. We will just have to wait and see...

However, now is a good time to get on the radio and do some contacts on HF. If you are a Technician, this is a good time to study to upgrade to General class when testing becomes available. There is a whole new world out there on HF bands to explore and you can have a lot of fun!!

The ARAC Hamfest has been rescheduled for Saturday, September 26 at the Four Seasons Building in Carlton, Minnesota--right under the water tower.

We thank the Carlton County Ares/Races group for letting us use this date and location so we can hold Hamfest. We will need extra help setting up this year so please plan to volunteer your time. More info will come out as we get closer to that time. Hope to see a lot of you there.

Stay safe and have patience. We will get through this Covid-19 event!

73 Gene Ellefsen NØVRM

ARAC Board Meeting Minutes - April 7, 2020

PRESIDENT



NØVRM
Gene Ellefsen
371Ø Chambersburg Ave
Duluth, MN 55811
218-39Ø-3272
lspitech@mail.com

VICE PRESIDENT



NØPDG
Mike Lovold
386Ø Birchwood Rd
Downtown Arnold, MN
558Ø3
lovoldm@gmail.com

SECRETARY



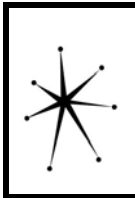
NØCALL
Robin Davis
218-391-3Ø77
davisfam2858@yahoo.com

TREASURER



KEØNIT
Bruce Carlson
9Ø6 Anderson Rd
Duluth, MN 55811
763-315-2967
carlsbr@gmail.com

3RD YEAR BOARD



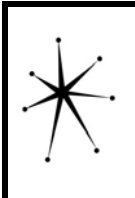
KD9ABS
Gary Minter
1621 N 26th St
Superior WI 5488Ø

2ND YEAR BOARD



AAØAC
Dave Davis
218-348-6649
aaØac@outlook.com

1ST YEAR BOARD



KDØYLN
Robert Boyd
5054 Boulder Dr
Hermantown, MN 55811

Present: Gene Ellefsen-NØVRM, Mike Lovold-NØPDG, Bruce Carlson-KEØNIT, Dave Davis-AAØAC, Gary Minter-KD9ABS, Bob Boyd-KDØYLN, Doug Nelson-AAØAW, Kim Waller-KEØNQS, Steve Waller-KEØNQY, Randy Wabik-KRØB, Bob Schultz-KCØNFB, Rollie Brockbrader-KBØCK, Thomas Dorr-KEØRHA

Guest: Elmer Berg-NGY, Randy Johnson-AAØME, Del Minter-KEØCLI
Called the meeting to order at 6:31 pm via telephone conference

Minutes:

Posted on the Web Page and in the Newsletter. Motion to approve by AAØAC, seconded by NØPDG, motion passed

Treasurer's Report:

Checking	1,193.67
Savings	1,373.40
Cash Subtotal	\$2,5467.07

Outstanding Check (Repeater # 1414)	-1,100.00
Outstanding Check (East HS)	-75.00

Winter CD	1,714.03
Summer CD	1,700.00
CD Subtotal	\$3,414.03

Grand Total

	\$4,806.10
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Next payment to church for use of their facilities? Due in June 2020.

Emailed out the Treasurer's Report, the short version and I had one email bounce back for AAØAC@Outlook.com. Dave-AAØAC corrected his email address for Bruce-KEØNIT. Motion to accept by Mike-NØPDG, seconded by Robin, motion passed

Ham Fest:

Have to cancel the 2020 Ham Fest. We have an offer from Carlton County RCES to use their date for our Ham Fest instead of them holding their Fall Fest. John Cavanaugh-KCØAFE is working on getting the whole building including the hockey rink area. Size could be an issue as it is a smaller facility to place a lot of tables but we could reduce the number of tables available. It is also the day of the Last Chance Ham Fest in Plymouth and the Ham Fest in Fargo. We could possibly use the Curling Club but they are busy the first weekend in May this year. It would be \$800.00 rental fee for the whole building, which is an increase from what we normally pay for Superior Fairgrounds. We can get tables from the VFW across the street

Other concerns? The extra cost is a concern because our funds are low, as we don't see a lot of income between now and August. We do have money but we're not broke

Robin has a conflict for that weekend, the last weekend in September, so she will be unable to run the Kitchen. They would have to make an adjustment for the food - maybe just brats and hot dogs with coffee and donuts. There is a kitchen on the first floor of the Four Seasons with a roll-up door similar to a concession stand. Does the \$800.00 include access to the kitchen? Suggestion to ask Grant Forsyth-KCØWUP if he would be interested

Upper floor, where the Fall Fest is normally held, could be used for testing, just a suggestion

Other concerns? If needed, we could raise the entrance fee. It might be tight for parking - something to check into before we agree.

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ARAC Board Meeting Minutes - Continued from page 3

Motion to move the Ham Fest to Carlton, MN, on September 26, 2020, Bob-KD0LYN moved, Gary-KD9ABS seconded, motion passed. Gene-N0VRM will talk to John-KC0AFE to get details and start the process. Bob-KC0NFB will talk to the Superior Fairgrounds about cancelling due to the ongoing issues. He will wait to hear from Gene-N0VRM to send out the 600 emails updating the cancellation of the May Ham Fest and directing them to the reschedule - new location, new date. The information will need to be updated on the poster for the Ham Fest and who updates the poster? Doug-AA0AW does it

April Club Meeting:

Shelter in place rules may be extended so the April meeting may have to be cancelled. Is there a possibility to use Zoom for an online meeting? Yes, the free option has up to 100 people on it. For the meeting on Thursday, could you set up Zoom for us to use? We have a webinar set up with ARRL. General meeting on Zoom and then go to the ARRL webinar. There is a limitation on Zoom, as you need high-speed internet and not everybody has internet at home. There is a phone option, where you don't need a camera or internet but can use a phone. Kim and Steve will set up a Zoom meeting for the April Membership meeting.

Field Day:

Any other business? Field Day? Are we committed to the site at Spirit Mountain? Do we have a deposit that has been put down on the rental? Spirit Mountain doesn't require a deposit. We do rent a portable toilet. ARRL is recommending that this year participants do Field Day from home. With Grandma's Marathon being cancelled, we should convert it to a virtual Field Day from home. We need to do a courtesy call to Spirit Mountain to let them know we are cancelling this year so we don't lose the site for next year because of the Covid-19 issues. Gene-N0VRM will call Spirit Mountain

Testing:

Three (3) sessions registered with ARRL for April and May – first one in May will be cancelled because building is closed and the Ham Fest postponed. There are one additional session scheduled for May right now, on May 12th, which is the last day for the Community Education Class. Reminder that the Extra class questions will expire at the end of June

Education:

Class is on hold at the present time. Bob-KC0NFB is emailing the class members with a small lesson each week. Once everything calms down, we will consider the options. Everyone has been refunded the fees for Community Education Classes. Bob-KC0NFB is willing to teach some classes at the church and/or schedule test sessions for the class members if they wish

Ham Fest - Revisited:

Kim-KE0NQS will give Thomas-KE0RHA the updated Relay (newsletter) information for the web page. Gene-N0VRM will contact John-KC0AFE tonight and get back to Bob-KC0NFB and Doug-AA0AW. Question raised on raising the entrance fee before we update the poster. We make the most money from the entrance fee and not from the table rental. One vote for not raising the entrance fee. It is closer for folks driving to it. We may end up with multiple Ham Fests over that weekend. Bob-KC0NFB will contact ARRL to make the changes. Suggestion to let it go for this year at the same price - the Ham Fest entrance fee. Changing location and date. Thank you to Carlton County for offering the date and the place. Doug-AA0AW will update the poster tonight and send out copies tonight

Rollie-KB0CX has a \$250.00 debit card from Thrivent for the May Ham Fest. He will see if we can use it for the September event. Bruce-KE0NIT asked him to check the expiration date on the card. He thinks it is 90 days from the day it is activated. Suggestion to put up a sign or a banner from Thrivent for the \$250.00 card expressing thanks for the gift card

Motion to adjourn by Dave-AA0AC, seconded by Mike-N0PDG at 7:13 pm. Thank you to Kim-KE0NQS and Steve-KE0NQT for facilitating the phone conference





ARAC Club Meeting Minutes

April 9, 2020

Present:

President Gene Ellefsen-N0VRM
Vice President Mike Lovold-N0PDG
Treasurer / Membership Bruce Carlson-KE0NIT
Secretary Robin Davis
Third Year Board Dave Davis-AA0AC
Second Year Board Bob Boyd-KD0YLN
First Year Board Gary Minter-KD9ABS
Special Events – Open / Gene Ellefsen-N0VRM acting
Ham Fest / Education Bob Schultz-KC0NFB
Newsletter / Historian Kim Waller-KE0NQS
Newsletter Steve Waller-KE0NQT
Repeater Randy Wabik-KR0B
Testing Doug Nelson-AA0AW

Absent:

Chaplain (Visiting) Rolland Bockbrader-KB0CK
Parliamentarian Grant Forsyth-KC0WUP
Property / Picnic Scott Ahlgren-N0VYU
Repeater Derek McCorison-W0DNF
Repeater Randy Haglin-N0BZZ
Web Site Thomas Dorr-KE0RHA

Meeting called to order on 94 Repeater at 7:02 pm by Gene-N0VRM

Due to the Covid-19 Virus, we are doing this meeting on the Repeater. We don't know how long this will last but in response to the Governor's request, we are not gathering together but sheltering in place

Minutes:

Minutes posted on the web page and in the Newsletter. Any objections? Hearing none, consider it approved

Treasurer's Report:

Bruce-KE0NIT could you give a quick Treasurer's Report?

Checking	1,193.67
Savings	1,373.40
Cash Subtotal	\$2,567.07
Outstanding Check (Repeater # 1414).....	-1,100.00
Winter CD	1,714.03
Summer CD	1,700.00
CD Subtotal	\$3,414.03
Grand Total.....	\$4,806.10

Thank you to Bruce. Any questions about the Treasurer's Report? Hearing none, we will consider that approved

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ARAC Club Meeting Minutes

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Education:

Currently on hold along with everything else. Holding classes via email, weekly. We will see if we could meet after this Shelter in Place ends. We will meet to give a test, possible in May

Ham Fest:

As you may know, on Tuesday, April 7, 2020, the Board approved the change of the Ham Fest date and location. We will combine with the Carlton County RCES group. They offered and after discussion, the Board agreed. The new date will be September 26, 2020, at the Four Seasons building in Carlton, MN. We will have the whole building. Vendors on the main floor (hockey), with testing on the second floor. Cost to the vendors will probably be about the same. The Web site has been updated with the flyer. The email notifications are being sent out as we speak. Brainerd Ham Fest has been rescheduled from the 18th but they have no date yet. We will need volunteers to help set up, using the tables from the VFW across the road. This is our Fest so we will need volunteers to make this work. We will be making modifications, including the kitchen. Robin has another commitment so we definitely need some folks to step up for the kitchen

Testing:

April 20th and May 2nd testing sessions have both been cancelled. We have another one scheduled for May 12th. We are holding off cancelling this one until we hear from the Governor. We will be flexible with our scheduling for now following the Governor's request to Shelter in Place. Thank you, Doug-AA0AW

Skywarn Training:

Is Jeff Nast-KC0MKS here? He is here. Deferring to Jeff-KC0MKS who posted it on our Facebook page. Skywarn Training will be done online this year. On the National Weather web site, Duluth signup is available only for this week and next. The entire class will be online. If you want to attend, respond quickly. Thank you to Jeff-KC0MKS. The National Weather Service requires that you must attend a session every four (4) years. We ask that you attend every two (2) years to keep your certification

Repeater:

Randy Wabik-KR0B are you online to talk about the Repeater? Appears that he is not available at this time

Update – Randy-KR0B is now on air. I did talk to Randy Haglin-N0BZZ and he is sheltering in place. Everything is on hold as far as the Mahtowa Repeater is concerned

Property:

Scott Ahlgren-N0BYU, are you on the Repeater? Apparently a no show here today

Old Business:

Nothing heard

New Business:

Kim Waller-KE0NQS asks all to check your newsletter on page 23, for the Easter Egg Contest. We are looking for the photos by April 17, 2020. We will be posting the photos on the 18th and 19th of April It is a fun contest

Field Day:

ARAC board decided that we are not be holding a Field Day this year at Spirit Mountain. The ARRL is also recommending we hold Field Day from our homes this year and we are following their request

Membership Meeting:

May 14, 2020, is our next scheduled meeting. We will make a decision as to whether or not we will hold the May meeting or not, possibly using the 94 Repeater or using Zoom

Anything else to discuss? Adjourn the meeting at 7:18 pm by President Gene-N0VRM. Returning the Repeater to normal Amateur Radio Use. Thank you for listening and participating

Matt Holden-K0BBC (ARRL Dakota Regional Director) will be presenting a webinar for us. Go grab your coffee and snacks. 73s and thank you

Arrowhead Radio Amateur Club **HAM FEST!**

Sat. Sept. 26, 2020 9:00am – 1:00pm

Four Seasons Sports Complex and Events Center

90 Chestnut Avenue Carlton, Mn. 55718

Under the water tower in downtown Carlton

Admission: \$7.00 (12 & under FREE!)

Used and like new radios, supplies, equipment, and computer related items including software and hardware! Personalized Ham items also available!

Yaesu Representative John N9UPC will be on site with new radio equipment displayed and for sale.

<<< QSL card checking for ARRL awards program by Mike Cizek W0VTT >>>

Mike's email: mgcizek@gmail.com



This is an A.R.R.L. sanctioned event.

Talk-in on W0GKP Repeater:
146.940(-) [103.5] Duluth
147.000(-) [103.5] Mahtowa
146.940(-) [114.8] 2-Harbors

Testing on site!

10:00 AM 4-H Building
Contact: Doug Nelson
AA0AW / 218-391-5874
aa0aw@arrl.net

www.thearac.org

Dealer / Vendor Tables:
4 foot table: \$5.00
8 foot table: \$10.00
Vendor setup starts at: 7:00am

Table Reservations:

Robert Schulz, KC0NFB
115 Eden Lane
Duluth, MN 55805-1533
218-481-7458
arac_hamfest@charter.net

Hourly Drawings!

Contest Calendar - May 2020

+ NCCC RTTY Sprint	0145Z-0215Z, May 1
+ NCCC Sprint	0230Z-0300Z, May 1
+ AGCW QRP/QRP Party	1300Z-1900Z, May 1
+ RSGB Hope QSO Party	1430Z-1600Z, May 1 (CW)
+ Araucaria World Wide VHF Contest	0000Z, May 2 to 1600Z, May 3
+ 10-10 Int. Spring Contest, CW	0001Z, May 2 to 2359Z, May 3
+ RCC Cup	0300Z-0859Z, May 2
+ SBMS 2.3 GHz and Up Contest and Club Challenge	(cancelled due to COVID-19)
+ Microwave Spring Sprint	0800-1400 local, May 2
+ ARI International DX Contest	1200Z, May 2 to 1159Z, May 3
+ 7th Call Area QSO Party	1300Z, May 2 to 0700Z, May 3
+ Indiana QSO Party	1500Z, May 2 to 0300Z, May 3
+ RTTYOPS Weekend Sprint	1600Z-1959Z, May 2
+ FISTS Spring Slow Speed Sprint	1700Z-2100Z, May 2
+ Delaware QSO Party	1700Z, May 2 to 2359Z, May 3
+ New England QSO Party	2000Z, May 2 to 0500Z, May 3 and 1300Z-2400Z, May 3
+ RSGB Hope QSO Party	0830Z-1000Z, May 4 (FT4)
+ RSGB 80m Club Championship, SSB	1900Z-2030Z, May 4
+ MIE 33 Contest	2300Z, May 4 to 0300Z, May 5
+ ARS Spartan Sprint	0100Z-0300Z, Jun 5
+ RSGB Hope QSO Party	1000Z-1130Z, May 5 (SSB)
+ RTTYOPS Weeksprint	1700Z-1900Z, May 5
+ Phone Fray	0230Z-0300Z, May 6
+ RSGB Hope QSO Party	1130Z-1300Z, May 6 (CW)
+ CWops Mini-CWT Test	1300Z-1400Z, May 6 and 1900Z-2000Z, May 6 and 0300Z-0400Z, May 7
+ UKEICC 80m Summer Series	1800Z-1900Z, May 6
+ RSGB Hope QSO Party	1300Z-1430Z, May 7 (RTTY)
+ RTTYOPS Weeksprint	1700Z-1900Z, May 7
+ NRAU 10m Activity Contest	1800Z-1900Z, May 7 (CW) and 1900Z-2000Z, May 7 (SSB) and 2000Z-2100Z, May 7 (FM) and 2100Z-2200Z, May 7 (Dig)

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Contest Calendar - May 2020, continued

<u>+ UKEICC 80m Summer Series</u>	1800Z-1900Z, May 6
<u>+ RSGB Hope QSO Party</u>	1300Z-1430Z, May 7 (RTTY)
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, May 7
	1800Z-1900Z, May 7 (CW) and 1900Z-2000Z, May 7 (SSB) and 2000Z-2100Z, May 7 (FM) and 2100Z-2200Z, May 7 (Dig)
<u>+ NRAU 10m Activity Contest</u>	1900Z-2100Z, May 7
<u>+ SKCC Sprint Europe</u>	0145Z-0215Z, May 8
<u>+ NCCC RTTY Sprint</u>	0230Z-0300Z, May 8
<u>+ NCCC Sprint</u>	1430Z-1600Z, May 8 (SSB)
<u>+ RSGB Hope QSO Party</u>	1200Z, May 9 to 0800Z, May 10
<u>+ SARL VHF/UHF Digital Contest</u>	1200Z, May 9 to 1200Z, May 10
<u>+ VOLTA WW RTTY Contest</u>	1200Z, May 9 to 2400Z, May 10
<u>+ SKCC Weekend Sprintathon</u>	1200Z, May 9 to 1159Z, May 10
<u>+ CQ-M International DX Contest</u>	1400Z, May 9 to 0200Z, May 10
<u>+ Arkansas QSO Party</u>	1700Z-2100Z, May 9
<u>+ FISTS Spring Unlimited Sprint</u>	2300Z, May 9 to 0300Z, May 10
<u>+ 50 MHz Spring Sprint</u>	1000Z-1400Z, May 10
<u>+ WAB 7 MHz Phone/CW</u>	0000Z-0200Z, May 11
<u>+ 4 States QRP Group Second Sunday Sprint</u>	0830Z-1000Z, May 11 (CW)
<u>+ RSGB Hope QSO Party</u>	1000Z-1130Z, May 12 (FT4)
<u>+ RSGB Hope QSO Party</u>	1700Z-1900Z, May 12
<u>+ RTTYOPS Weeksprint</u>	0230Z-0300Z, May 13
<u>+ Phone Fray</u>	1130Z-1300Z, May 13 (SSB)
<u>+ RSGB Hope QSO Party</u>	1300Z-1400Z, May 13 and 1900Z-2000Z, May 13 and 0300Z-0400Z, May 14
<u>+ CWops Mini-CWT Test</u>	1900Z-2030Z, May 13
<u>+ RSGB 80m Club Championship, Data</u>	1300Z-1430Z, May 14 (CW)
<u>+ RSGB Hope QSO Party</u>	1700Z-1900Z, May 14
<u>+ RTTYOPS Weeksprint</u>	1800Z-1900Z, May 14
<u>+ UKEICC 80m Summer Series</u>	0145Z-0215Z, May 15
<u>+ NCCC RTTY Sprint</u>	0230Z-0300Z, May 15
<u>+ NCCC Sprint</u>	1430Z-1600Z, May 15 (RTTY)
<u>+ RSGB Hope QSO Party</u>	0600Z-2100Z, May 16
<u>+ UN DX Contest</u>	0800Z-1100Z, May 16 and 0800Z-1100Z, May 17
<u>+ NZART Sangster Shield Contest</u>	

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Contest Calendar - May 2020, continued

<u>+ Portuguese Navy Day Contest</u>	0900Z, May 16 to 1700Z, May 18
<u>+ Hamvention QSO Party</u>	1200Z-2400Z, May 16
<u>+ His Maj. King of Spain Contest, CW</u>	1200Z, May 16 to 1200Z, May 17
<u>+ Aegean RTTY Contest</u>	1200Z, May 16 to 1200Z, May 17
<u>+ Feld Hell Sprint</u>	1600Z-1759Z, May 16 and 2000Z-2159Z, May 16
<u>+ Run for the Bacon QRP Contest</u>	1900Z-2400Z, May 17
<u>+ RSGB FT4 Contest Series</u>	1900Z-2030Z, May 18
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, May 19
<u>+ Phone Fray</u>	0230Z-0300Z, May 20
<u>+ CWops Mini-CWT Test</u>	1300Z-1400Z, May 20 and 1900Z-2000Z, May 20 and 0300Z-0400Z, May 21
<u>+ UKEICC 80m Summer Series</u>	1800Z-1900Z, May 20
<u>+ NAQCC CW Sprint</u>	0030Z-0230Z, May 21
<u>+ QRP Minimal Art Session</u>	1600Z-2200Z, May 21
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, May 21
<u>+ NCCC RTTY Sprint</u>	0145Z-0215Z, May 22
<u>+ NCCC Sprint</u>	0230Z-0300Z, May 22
<u>+ EU PSK DX Contest</u>	1200Z, May 18 to 1200Z, May 19
<u>+ Baltic Contest</u>	2100Z, May 23 to 0200Z, May 24
<u>+ Day of the YLs Contest</u>	0001Z, May 24 to 2359Z, May 25
<u>+ QRP ARCI Hootowl Sprint</u>	0000Z-0100Z, May 25
<u>+ QCX Challenge</u>	1300Z-1400Z, May 25 and 1900Z-2000Z, May 25 and 0300Z-0400Z, May 26
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, May 26
<u>+ SKCC Sprint</u>	0000Z-0200Z, May 27
<u>+ Phone Fray</u>	0230Z-0300Z, May 27
<u>+ CWops Mini-CWT Test</u>	1300Z-1400Z, May 27 and 1900Z-2000Z, May 27 and 0300Z-0400Z, May 28
<u>+ UKEICC 80m Summer Series</u>	1800Z-1900Z, May 27
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, May 28
<u>+ RSGB 80m Club Championship, CW</u>	1900Z-2030Z, May 28
<u>+ PODXS 070 Club Three Day Weekend Contest</u>	0000Z, May 29 to 2359Z, May 31
<u>+ NCCC RTTY Sprint</u>	0145Z-0215Z, May 29
<u>+ NCCC Sprint</u>	0230Z-0300Z, May 29
<u>+ Feld Hell Sprint</u>	0000Z-2359Z, May 30
<u>+ CQ WW WPX Contest, CW</u>	0000Z, May 30 to 2359Z, May 31

CW Abbreviations

AR End of Message	AS Pse QRX	BK Back to You	SK End of Contact
TU Thank You	PSE Please	K Invite to Transmit	
QST Calling all Amateurs	QRL Are You Busy?	QRU Have anything for me	
QRV Are You Ready?	QRX Standby	QRS Transit Slower	

A	●■■■	M	■■■■	Y	■■■■●
B	■■■■●	N	■■■●	Z	■■■■●●
C	■■■■●●	O	■■■■■	1	●■■■■■
D	■■■■●●●	P	■■■■●●●	2	●●■■■■■
E	●	Q	■■■■●●●	3	●●●■■■■■
F	●●■■■■	R	■■■■●●	4	●●●●■■■■
G	■■■■●●	S	●●●	5	●●●●●
H	●●●●	T	■■■	6	■■■■●●●
I	●●	U	●●■■■	7	■■■■●●●●
J	■■■■■■■	V	●●●■■■	8	■■■■●●●●●
K	■■■■●●●	W	■■■■●●●	9	■■■■●●●●●
L	■■■■●●●●	X	■■■■●●●●	0	■■■■■■■■



US Amateur Radio Bands

US AMATEUR POWER LIMITS

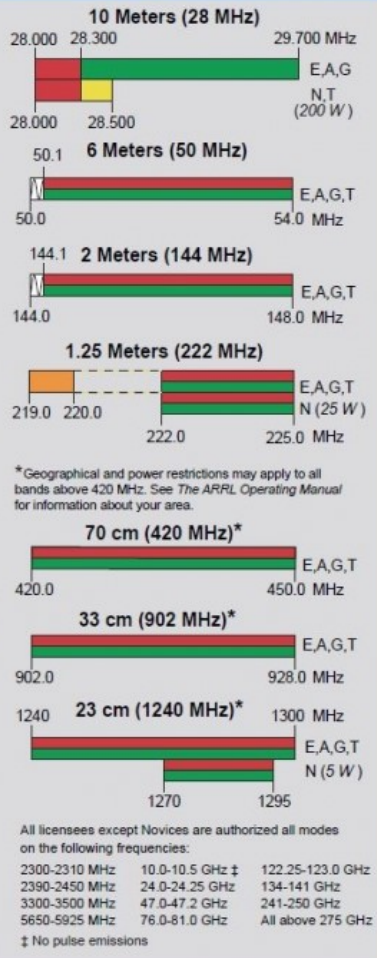
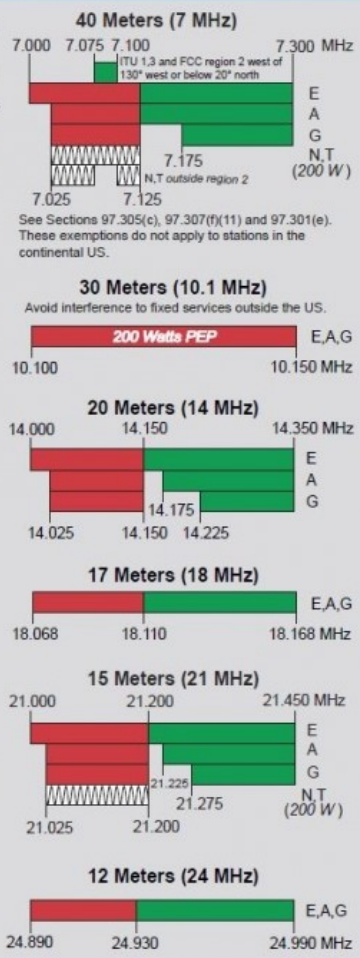
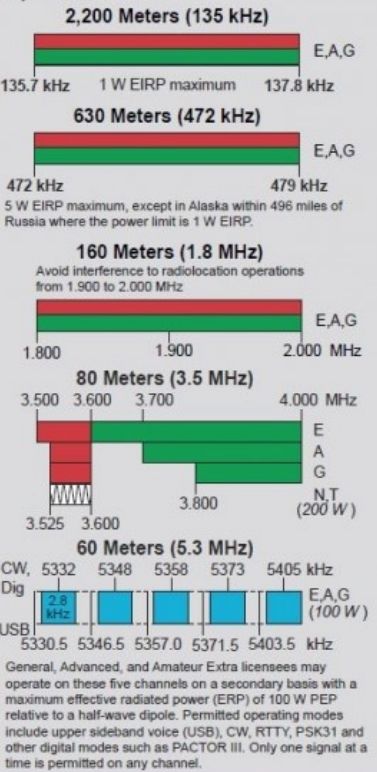
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Effective Date for
2,200 and 630 Meters
to be announced



The national association for
ARRL AMATEUR RADIO

On March 28, 2017, the Federal Communications Commission adopted rules that will allow Amateur Radio access to 472-479 kHz (630 meters) and to 135.7-137.8 kHz (2,200 meters). However, amateurs cannot use these frequencies until 30 days after the Report and Order is published in the Federal Register and the final procedures for registering stations with the Utilities Telecom Council (UTC) have been approved and announced. At the time this chart was created, the Report and Order had not been published and the UTC online registration site is not yet available. Follow ARRL news for further information. New charts will be published at www.arrl.org/graphical-frequency-allocations when the bands are fully available for use.



KEY

Note:
CW operation is permitted throughout all amateur bands.
MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.
Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems only

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See ARRLWeb at www.arrl.org for detailed band plans.

ARRL
We're At Your Service

ARRL Headquarters:
860-594-0200 (Fax 860-594-0259)
email: hq@arrl.org

Publication Orders:
www.arrl.org/shop
Toll-Free 1-888-277-5289 (860-594-0355)
email: orders@arrl.org

Membership/Circulation Desk:
www.arrl.org/membership
Toll-Free 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

Getting Started in Amateur Radio:
Toll-Free 1-800-326-3942 (860-594-0355)
email: nowham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

NETS

Have a favorite HF/6m/2m/1.25m/70cm net that you check into or listen in on? Also, please send corrections and we will add it to the list below - Kim KEØNQS at my email KEØNQS.mn@gmail.com.

- **Northland Weather Group Net:** Mondays 2000 on the ARAC repeater (146.940 MHz with a tone of 103.5 and standard offset).
- **Minnesota D-Star Net:** Sundays at 19:30 on Reflector 53A
- **Minnesota Section Net** 1200 and 1730 on 3.860 [Net Manager: NØYR] http://www.mn-section.org/dept_stm.html
- The non-non-net: Evenings 2000 144.200 USB except for Sunday evenings.
- Badger WX Net: 0500-0715 on 3.985. Give 24 hour high/low/current temperature, precipitation and snowfall.
- **PICONET:** 3.925 from 0900-1100 CT Mon-Sat and 1600-1700 CT Mon-Fri. Info at: <http://www.piconet3925.com>
- Michigan Upper Peninsula Net: 1600 (CST) on 3.921 MHz Sun-Sat and 1200 Sun. Info: <http://www.michupnet.com>
- Great Lakes Marine/Maritime Mobile Net: Morning 07:30 - 3.932; 08:15 - 7.261 MHz and evening 18:30 - 3.1730927; 19:15 - 7.268 MHz. Weekend extra net: 10:00 - 7.261/7.268 MHz. All CST, LSB and +/- QRM. See: <http://www.sailblogs.com/member/glimmnet/>
- MIDCARS: 07:30-13:00 - 7.258 MHz. See: <http://www.midcars.net>
- Iowa snowbird net on 14.257MHz, M-W-F at 10:00 am Local Time. This is an open net.
- Spider Web Net (Marco Island FL) on 14.347 every morning at 0730 CST/CDT: <http://www.spiderwebnet.net>
- Maritime Mobile Service Network: Daily at 1100—2100 Central on 14.300. <http://mmsn.org> and <http://www.14300.net>
- RV Radio Network: Every day at 1900 Central on 7.265 MHz. Web site: <http://www.rvradionetwork.com>
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Wisconsin Sideband Net: Daily @ 5:15 PM – 3985 [or 3982.5] KHz LSB
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Hobby Helpers Net - Tuesday @ 8 PM – 28.330 MHz USB (Isanti MN) LSB [Net Manager: WOØA].
- Northstar Trader Net: 3.908 +/- at 0830 CST Sundays
- WARFA: 3.908 +/- Sun/Tue/Thu nights at 2200 CST, <http://warfa.org/>
- Youth Net: 14.320-14330 Sundays 1800-1900 UTC, Net Control: AC8PI
- YACHT: Saturdays 1900 CST on EchoLink #481872, <http://yachthams.webstarts.com>
- Northwestern Ontario ARES Net: Evenings at 20:15 (Central) on +/- 3.750Mhz
- The Iron Range Net: Saturdays at 0800 Central time on or near 3.919 Mhz. Look them up on Facebook!
- FORX Net: Mondays at 1900 Central at 3.941 Mhz +/- QRM. WAØJXT — Grand Forks, North Dakota
- HF CW: Fridays 08:00 CST, 7.112 MHz. Informal slow speed CW Net. W8IRT NCS. Email: w8irt@aol.com
- Minnesota ARES Digital Net: Thursdays at 2000 CST, 3.5835 MHz USB +/- QRM, Mode: Olivia 8/500.
- SARA Digital Net: Sundays at 1900 Local, 3.582.150 MHz USB +/- QRM, Mode: BPSK31/BPSK63
- Spider Web Net (Marco Island FL): 14.347 every morning at 0730 CST/CDT: <http://www.spiderwebnet.net>
- Broadcaster Net: 7.231 or 3.855 M/W/F @ 1500 UTC. 14.255 M-F @ 2130 UTC. <http://www.cbsretirees.com/ham.htm>
- Old Military Radio Net: 7.268 +/- nightly at 0200z. Other times/Frequencies too. See: <http://www.mrca.ar88.net/>
- Rag Chew Crew/Tailgaters/Freewheelers Nets: 3.916 +/- nightly at 1900 CST, <http://www.tailgatersnet.com>
- North South Net: 7.214.6 +/- at 0700 CST, Monday-Saturday



Next ARAC Board Meeting*

Tuesday, May 5, 2020
@ 6:30 p.m.

**via conference call; Board Members will be informed of the call-in number*

Next ARAC Club Meeting

Thursday, May 14, 2020
7 p.m.
on the 94 Repeater

Tune into the
Sunday night ES Net
on May 10th at 9:00 p.m. for
more instructions on whether
we can meet in person after
all, as well as accessing
the program portion of the
club meeting

*Interested in providing a program,
or have an idea for one?
Contact Mike NØPDG at
lovoldm@gmail.com*

CLUB REPEATER
WØGKP

146.94 (-)
CTCSS TONE
103.5

KCØNFB Bob, would like to remind all hams to **make sure your license is current** and up-to-date on your address. You can visit the FCC ULS to check it and make changes at www.fcc.gov/uls.

“Stay tuned” for future information on the resumption of Amateur Radio License Class and General & Expert License Study Group

by visiting our club website at www.thearac.org and tuning into the Sunday night net at 9:00 p.m.

Duluth Area Repeaters



ARAC System WØGKP

Freq.	Offset	Tone	Location
146.940	minus	103.5	Duluth
146.940	minus	107.2	Lakeside (rcv)
146.940	minus	151.4	Two Harbors (rcv)
146.940	minus	100.0	Gary-New Duluth (rcv)
146.940	minus	123.0	Solway (rcv)
146.940	minus	110.9	Cloquet (rcv)
147.000	minus	103.5	Mahtowa
444.100	plus	103.5	Duluth UHF Link

N9MMU/N9QWH System (WI)

145.310	minus	110.9	Duluth
145.490	minus	110.9	Solon Springs
147.255	plus	110.9	Hayward
145.110	minus	110.9	Rice Lake
147.345	minus	136.5	Holcombe
145.230	minus	110.9	Eau Claire

WECOMM – WI Statewide Linked System WE9COM

147.075 plus 110.9 Meteor Hill (closest repeater to Duluth)

LSAC System #1

147.330	plus	151.4	Proctor
147.330	plus	103.5	Duluth (rcv for Proctor)
147.330	plus	156.7	Duluth (North) (Fish Lake)
147.270	plus	114.8	Two Harbors
147.270	plus	103.5	Wales
147.090	plus	114.8	Silver Bay
145.410	minus	114.8	Finland
147.300	plus	114.8	Isabella
145.150	minus	103.5	Washburn, WI
146.700	minus	103.5	Bayfield, WI
443.850	+5.00	none	Bayfield, WI
147.165	plus	110.9	Hurley, WI
146.640	minus	151.4	Ely
443.500	+5.00	141.3	Gilbert
147.060	plus	103.5	Virginia
147.360	plus	162.2	Cook
147.165	plus	114.8	Coleraine
443.925	+5.00	110.9	Brainerd

NARC System NAØRC

145.45Ø	minus	1Ø3.5	Solway Twp
145.45Ø	minus	114.8	Park Point (rcv)
147.135	plus	114.8	Park Point (rcv)
147.135	plus	1Ø3.5	Knife River

Stand Alone Repeaters

145.21Ø	minus	11Ø.9	Clam Lake, WI
146.88Ø	minus	123.Ø	Grand Rapids
146.91Ø	minus	146.2	Duxbury, MN

Fusion and D Star

Fusion (Analog has tone and C4FM digital with no tone)

147.15Ø	plus	151.4	NTØB Gilbert Fusion Rptr
145.17Ø	minus	11Ø.9	WA9KLM Superior – Douglas County RACES/ARES Fusion Repeater

443.1ØØ +5.ØØ 1Ø3.5 KBØYHX Cloquet – Carlton County RACES/ARES Fusion Repeater

444.3ØØ +5.ØØ 1Ø3.5 NØEO Spirit Valley Amateurs Fusion Repeater WIRES-X NØEO

147.375 plus NØEO D Star
442.2ØØ plus NØEO D Star

[Repeater list compiled by Dr. Frequency—KCØWDQ]

ST. Louis County Department of Emergency Services Net Control Roster

N9DMG	Scott Swanson	NØVRM	Gene Ellefsen
AAØAW	Doug Nelson	KCØWDQ	Paul Dallavia
WØNWO	Dave Miller	WØDIO	Dennis Anderson
KØDSL	Diane Saunders	AAØME	Randy Johnson

Sunday Nights at 21ØØ on the ARAC System
(See Calendar for net control schedule)

Ten Meter SSB Net Control Roster

AAØAW	Doug Nelson	WØLWU	Joe Meese
NUØW	Gary Hanson	K9KDK	Al Babcock
WØDIO	Dennis Anderson	NØVRM	Gene Ellefsen
AAØME	Randy Johnson	KØDSL	Diane Saunders

Sunday Nights at 2ØØØ on 28.45Ø MHz USB

Ten Meter CW Net Control Roster

AAØAW	Doug Nelson	NØPDG	Mike Lovold
-------	-------------	-------	-------------

Sunday Nights at 193Ø on 28.125 MHz

Northland Weather Group Net Control Roster

KCØMKS Jeff Nast

Monday Nights at 2ØØØ on the ARAC System

Douglas County Net

Tuesday Nights at 2ØØØ on 145.49Ø (N9QWH System)

Central Carlton County Net

Tuesday Nights at 2Ø3Ø on the ARAC System

Lake County RACES/ARES Net

2nd & 4th Wednesday Nights at 19ØØ on the LSAC 1 System

Elmers

El-mer / el-mær/ [el-mer]

1. a male given name: from Old English words meaning "noble" and "famous."
2. an adhesive used to bond like or unlike materials
3. An experienced ham radio operator who mentors new and prospective hams.

Name	Call	Expertise
Jeff Nast	KCØMKS	APRS, EchoLink, WinLink, Fusion, Contesting
Bob Schulz	KCØNFB	Contesting
Jim Anderson	NØJWA	QsoNet
Doug Nelson	AAØAW	HF, VHF/UHF, Contesting, Packet, APRS, Morse Code, VE testing, Echolink, Allstar, EmCom...

Membership E-mail Directory

Ahlgren, Scott NØVYU
sahlgren01@msn.com

Anderson, Jim NØJWA
kcØmko@centurylink.net

Anway, Allen KC9LJN
allen@a2d2.com

Anway, Dorothy KC9LSG
dorothy@a2d2.com

Bakke, Richard KDØQHE
rabakke46@aol.com

Barnes, Ray KEØZN
KEØZN@outdrs.net

Blodgett, Warren KDØXI
kdØxi@aol.com

Blotti, Nick KBØMHD
NickBlotti@hotmail.com

Bockbrader, Jonah KEØCXD
j@pelirrojo.ninja

Bockbrader, Rollie KBØCK
Rollie.bockbrader@q.com

Clemens, Butch KBØSMG
kbØsmg@2z.net

Currier, Barb
bjcurrier@peoplepc.com

Dall, Jim WDØGVW
Dall, Teresa KAØCDO
wdØgvw@gmail.com

Dallavia, Paul KCØWDQ
kcØwdq@yahoo.com

Daly, Ed KØYMF
eddalymn@aol.com

Ellefsen, Gene NØVRM
Ispitech@mail.com

Ferch, Tim AKØTF
akØtf@aol.com

Fisher, Bud NØGGF
nØggf@arrl.net

Ferguson, Tom WBØDHB
tferg5@msn.com

Fleischman, Bill KCØZZL
wfleisch@d.umn.edu

Forsyth, Grant KCØWUP
forsythgrantc@gmail.com

Frederick, Jerry NØBNG
nØbng@mchsi.com

Frederick, Julie NØPIE
jfreds@mchsi.com

Freeman, Roger NØGRX
rf2134@aol.com

Gibbs, Rex NØKXT
nØkxt@yahoo.com

Godbout, Med WØEEZ
wØeezmedgodbout@centurytel.net

Hanson, Gary NUØW
captaingary@chartermi.net

Harstad, Ben KEØJDB
coast_guard_aux_duluth@yahoo.com

Hawkinson, Garry WØELH
garryhawkinson@yahoo.com

Jakubek, Patrick KDØSGK
kdØsgk@gmail.com

Johnson, Randy AAØME
randy@nsw4x4.com

Leslie, Shirl KBØSBM
dsleslie@centurytel.net

Makowski, Cletus KBØLBS
kbØlbs52@msn.com

Makowski, Karen NØWEZ
k-wez1@hotmail.com

Marchetti, Jim KEØLHX
jimmarchetti@live.com

Mattson, Bing KCØKRA
, Kathy KCØTIV
HamToHam@msn.com

McCorison, Derek WØDNF
derek1Ø68@hotmail.com

Meese, Joe WØLWU
rxcpd@yahoo.com

Miller, Dave WØNWO
dmiller@nwoutlet.com

Mullozzi, Anthony (Nick)
AJ KDØYQA
Ben KDØYPZ
Joe KDØYQB
KDØYQC
amulloz@hotmail.com

Murray, Edwin W1ELM
w1elm@arrl.net

Nast, Jeffrey KCØMK5
kcØmks@gmail.com

Nelson, Doug AAØAW
aaØaw@chartermi.net

Nelson, Glen KAØGGG
mgnelsonØ1@gmail.com

Nelson, John KBØSUW
jon275@q.com

Nordin, Al WBØDBQ
anordin@aol.com

Olson, Lloyd Sr. KCØSJB
rdrunner5Ø7@aol.com

Olson, Lloyd Jr. KC9JTC
kc9jtc@yahoo.com

Pearson, Wayne WØKRH
meppsy@netzero.net

Pettit, Kathy KCØYVM
kcØyvm@gmail.com

Pomroy, Deb KCØUKC
dpomroy@d.umn.edu

Pyrlik, David KEØHHQ
David.pyrlik@gmail.com

Reger, Bernard KB9KQZ
Mike KB9KRA
Brian KB9KUX
Chris KB9WJQ
bjr5488@yahoo.com

Contact Kim or Steve Waller to include your name in this listing!

Contact Kim or Steve Waller to include your name in this listing!

Rosell, Dawson KEØHEL
rosel032@d.umn.edu

Saunders, Diane KØDSL
kØdslae@gmail.com

Scholz, Greg KDØUYN
kdØuyn@gmail.com

Schreyer, Dave WAØAWZ
kaØfyb@mediacombb.net

Schulz, Robert KCØNFB
kcØnfb@charter.net

Snyder, Mark ACØLE
snyds1118@msn.com

Stark, John KCØYVH
johnviny1@yahoo.com

Stroud, Butch KCØPDK
kenwren@netzero.net

Swanson, Scott N9DMG
sswanson6749@charter.net

Waller, Kim KEØNQS
keØnqs.mn@gmail.com

Waller, Steve KEØNQT
keØnqt@gmail.com

Whelan, Jacqui KBØJIM
cndymx@gmail.com

Whelan, John KØJRW
jr-whelan@hotmail.com

Winterscheidt, Heinz
KD6FSA
alter.skipper@gmail.com

Wulf Gar WU1FGR
wu1fgr.ham@gmail.com

Members, please check your name and email address for accuracy. If you are not on this list and want to be on the list, contact us with your info. If you need to make a change, please let us know at KEØNQS.mn@gmail.com Or KEØNQT@gmail.com

Co-Editors,
Kim & Steve Waller
KEØNQS & KEØNQT



MAY


CLUB EVENTS

SUNDAY NIGHT NETS

1930 - CW - 28.125 MHz USB-CW
 2000 - USB 28.450 MHz
 2100 - Southern St. Louis County
 Emergency Services Net
MONDAY NIGHT NETS
 2000 - Northland WX Net - ARAC Repeater

TUESDAY NIGHT NETS

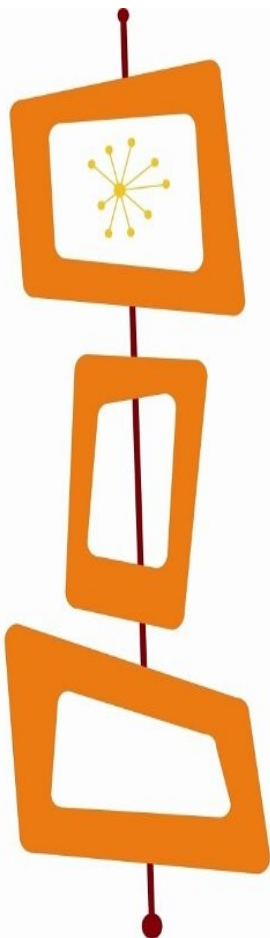
2000 - Douglas Cty 145.490 MHz
 2030 - Central Carlton County
WEDNESDAY NIGHT NETS
 1900 - Lake County - LSAC1
 2nd & 4th Wednesdays
 2100 - BWAR

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3 CW 1930 AA0AW USB 2000 AA0AW ES 2100 AA0ME	4 WX 2000 KC0MKS	5 ARAC BOARD MEETING Via conference call DC Net 2000 CC Net 2030	6 2100 - BWAR	7	8	9
10 CW 1930 N0PDG USB 2000 W0LWU ES 2100 N9DMG	11 DC ARES/ RACES Mtg 1900 DC EOC WX 2000 KC0MKS	12 DC Net 2000	13 Lake County ARES/RACES Meeting 1800 Lake County Net 1900 2100 - BWAR	14  ARAC Club Meeting 94 Repeater 7 pm	15	16
17 CW 1930 AA0AW USB 2000 K9KDK ES 2100 AA0AW	18 WX 2000 KC0MKS	19 DC Net 2000 CC Net 2030	20 St. Louis County ARES/ RACES Mtg 1630 Pike Lake EOC 2100 - BWAR	21	22	23
24 CW 1930 N0PDG USB 2000 W0DIO ES 2100 KC0WDQ	25 WX 2000 KC0MKS	26 DC Net 2000 CC Net 2030	27 Lake County Net 1900 2100 - BWAR	28 Carlton County ARES/RACES Meeting 1900 CC EOC	29	30 Club Breakfast @ The Chalet 0800-0900
31 CW 1930 AA0AW USB 2000 N0VRM ES 2100 W0NWO						

Get this newsletter *faster*
via email!
Email Doug AAØAW at
aa0aw@arrl.net

Next Meeting: Thursday,
May 14, 2020 - 7 pm
On the 94 Repeater

ARAC Committee Chairs



Club License Trustee:

Ray Barnes KEØZN

Control Operators:

AAØAW - NØKXT - KCØNFB

Newsletter:

Kim KEØNQS & Steve KEØNQT
Waller

Education Chair:

Bob Schulz KCØNFB

Hamfest Chair:

Bob Schulz KCØNFB

Chaplains:

Visiting Chaplain:

Denny Anderson WØDIO

Parliamentarian:

Grant Forsyth KCØWUP

Website:

Thomas Dorr KEØRHA

Membership:

Bruce Carlson KEØNIT

Property Chair:

Wulf Gar WU1FGR

Testing:

Doug Nelson AAØAW

Field Day:

Dennis Anderson WØDIO

Picnic Chair:

Scott Ahlgren, NØVYU

Repeater Chairs:

Randy Haglin NØBZZ
Randy Wabik KAØJZV

Contest Calendar at www.contestcalendar.com

National Contest Journal at www.ncjweb.com

QSO Party Note: State/Province/National QSO Parties are abbreviated with the 2 or 3 letter abbreviation for the state/province/national designation followed by QP for QSO Party:

Examples: Minnesota QSO Party is MNQP
British Columbia QSO Party = BCQP

QRZ web site at www.qrz.com

VHF Propagation site at www.aprs.mountainlake.k12.mn.us

Reminder: The Contest Corral monthly listing of contests can be found in each issue of QST. ARRL sponsored contests can be found in Contest Corral, highlighted, or on the ARRL's web site at arrl.org.

Ham Shack Shake Up, Continued from Page 1

will restore normal function to the trap if there are no longer visible signs of separation in the coil form. Have a story about your antenna repair? Share it with us at ke0nqs.mn@gmail.com and we'll publish it next month.

Considering building your own antenna?

There are lots of kits available from sellers to "build" you own antenna, which of course means **assemble** your own antenna and I'm actually a big fan of that idea, as you have access to years of experience from Elmers who have designed the kits and carefully written instructions for you. What's more, they are generally very accessible to answer any questions that may arise during your project. To **build** your own antenna, of course, is starting from scratch, selecting and sourcing the necessary materials for your desired antenna and devising a plan. Safety comes first, so analyze your installation location and take all precautions with best practices and proper equipment. Talk to a Club Elmer about the desired type of antenna and run through your plans with him. If you're brand-spanking new to antenna building, first read through WikiHow's article, **How to Build Several Easy Antennas for Amateur Radio** at www.wikihow.com/Build-Several-Easy-Antennas-for-Amateur-Radio. An quick and easy read, it's a great overview of the subject compiled by several Elmer contributors.

As always, there are many great web sites of Hams who gladly share their expertise in your desired antenna. Seasoned Ham **Claude Joliet VE2DPW** from Quebec, Canada has several excellent e-books available to amateur radio operators at very little cost. Visit his website e-book page to select from four very informative titles at www.hamradiosecrets.com/antenna-basics.html and select from several formats.

Considering buying a portable tri-pod antenna for hiking, camping or popping up at your lake cabin?

My current favorite is **Super Antenna's MP1LXMAX**. At \$499.99, it's not inexpensive, but is somewhat reasonable compared to other full-featured portable antennas on the market.

The maker, Super Antenna describes the functionality as follows: ALL BANDS 80m, 75m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 11m, 10m, 6m, meters (3.5MHz to 30MHz tuning) plus simultaneous 2 meters (144 to 148 MHz) with a good SWR. Continuously tunes all frequencies Marine, Government, NGO, CAP, MARS, EmComm, Shortwave, CB, and everything in between. TUNING METHOD: Antenna tunes by calibrated manual slip of the SuperSlider Coil grip, with no need for external power, separate antenna tuner, or analyzer. FEATURES: New type of Dual Band HF + plus 2 meters antenna, with the MC2 SuperPlexer 2 meter adapter. The durable SuperWhip is an indestructible Titanium metal alloy, so flexible that it can be rolled up in an 12 inch diameter circle and stowed on the Go Bag. The TM4 Large Deluxe Tripod sets up on any surface. The UM3 SuperMount can also be used with the included SP3 SuperSpike for quick low-profile setup on the ground, lawn, or sand. Antenna requires manual HF tuning using included SuperSlider.



SUPER ANTENNA

MP1LXMAX SuperWhip Deluxe Tripod Portable HF - VHF Antenna System Specifications and Features

HF

2 metres

Simultaneously.

- Frequency Range: 80 metres through 2 metres Amateur Bands HF 3.5 MHz to 148 MHz continuous coverage, 80m/60m/40m/30m/20m/17m/15m/12m/10m/6m plus MARS-CAP-Marine-shortwave-CB-etc
- Operation on VHF 2 metre band 144-148 MHz Simultaneously with an HF band or 6 metres
- Good SWR with smooth Manual adjustment, no tuner needed, but can help
- Power Rating: 500W SSB, 300W CW / DIGITAL
- Lightweight for travel carrying and packing
- For indoor or outside field use
- Antenna Fittings: Standard 3/8"-24 threads
- Assembly: Easy set up in ten minutes by one person, no tools needed
- Antenna packs down to a single Go Bag size: 13" x 9" x 3.5" (33 x 23 x 9 cm) fully loaded: 4.8 pounds (2kg)
- Tripod packs down to a single Go Bag 25" (63cm) long, fully loaded: 3 pounds (1.4kg)
- Fully extends up to 12 feet (3.6m) high for maximum efficiency operation
- Ground mount for lightweight and quick set up in the yard, garden, forest, or beach
- Standard SO-239 fittings for PL-259 connector
- Ruggedized whip for travel and backpacking
- Color: Stealth Black & Metallic

Super Antenna Ad from Amazon.com

Users' feedback on this antenna is excellent, giving it high ratings for quality and ease of set-up and changing bands with straightforward instructions. Buyers also found tuning very simple using the device provided and liked the quality of the 2 carrying bags provided.

I don't own this antenna but am enthusiastically considering it for the lake and RV. If anyone has comments on this or any other portable antenna, feel free to shoot us an email at ke0nqs.mn@gmail.com

BUILD YOUR OWN USEFUL HAM SHACK COMPONENTS

There are all kinds of useful things you can buy to add efficiency, safety and value to your ham shack. As you know, many of these things can be built on your own and can be very satisfying to do on a rainy day.

Great plans on the internet can be found for CW

Continued on page 19

Ham Shack Shake Up, continued from Page 18

keyers, CW decoders, antenna tuners, RF PWR and SWR Meters, APRS trackers, antenna switches, battery chargers, 12-V DC boost regulators, 12-V junction boxes, and microphones—to name just a few.

www.HamRadioSecrets.com has an excellent how-to on making your own front-end receiver protector that is better than any commercial product on the market. Check out the step-by-step guide that explains every detail, from concept, to raw materials, to building and testing, at www.hamradiosecrets.com/ham-radio-projects.html

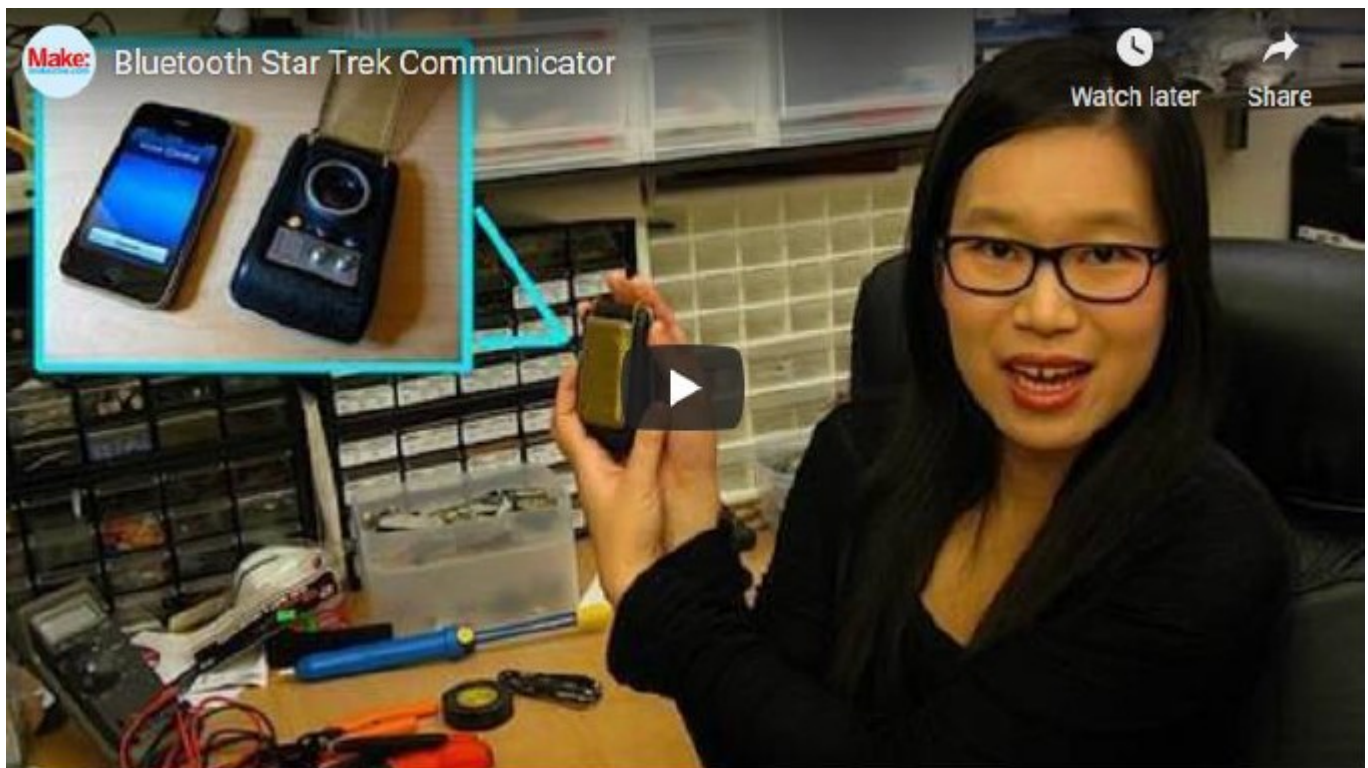
WING-DING FUN

Yep, sometimes we do things “just cuz”—because we can, for the sheer, impractical joy of it. I’ve heard from several Hams who create really interesting gadgets just for the fun of it. For example, whether you’re Trekkie or not, you might be interested in building a “Star Trek” Bluetooth Communicator of your own. It’s not particularly hard and you may have already heard of it.

Diana Eng KC2UHB created this project several years ago using a toy Star Trek communicator, taking it apart and added a Bluetooth module and a microcontroller. This is a super fun project that’s a cool conversation piece and makes a great gift. She says it can be used with a cell phone or a “Yaesu VX-8R ham radio”. A power amplifier can be added to make the audio even louder.

She shared her project with Make: magazine and they still have instructions, schematics and a video for the project.

For all the details on this and more fun project sjust visit Make: at:
<https://makezine.com/2009/11/02/star-trek-bluetooth-communicator/>



Whatever ham shack shake ups you’re planning to do this spring and summer, share them with the Club for publication in a future issue by emailing me photos, ideas and descriptions at ke0nqs.mn@gmail.com ★



April Relay Contest Results

EASTER EGG PHOTO CONTEST WINNER!



ARROWHEAD RADIO AMATEURS CLUB

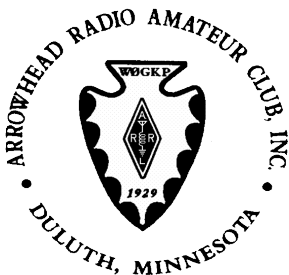
Thank you for your donation to Second Harvest Northern Lakes Food Bank! You have helped feed Northland families, children and seniors in need.

Donation Amount: \$25

This photo was submitted as “Anonymous”, with instruction to donate \$25 to Second Harvest Food Bank if the winner.

Congratulations to the artist and thanks for donating your winnings to a great cause on behalf of ARAC!

The ARAC RELAY



Published monthly and distributed free to members, “The RELAY” is the official publication of the Arrowhead Radio Amateur Club, Inc. Members are encouraged to submit articles, opinions, and classifieds. Your submission will be placed as soon as possible providing it does not conflict with the bylaws of the Arrowhead Radio Amateur Club, Inc. The editors reserve the right to omit any submission that is not a required item. If a submission is questionable, it will be presented to the Board of Directors at the next scheduled board meeting for authorization.

