

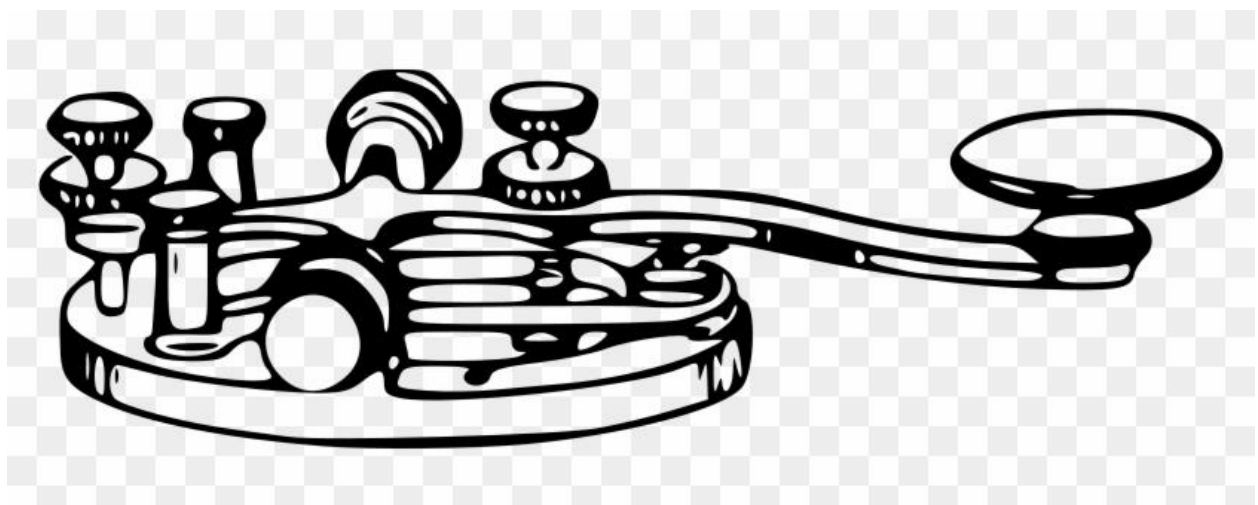


# QSA-5

## Marin Amateur Radio Society Monthly Newsletter

Established 1933

September 2024



When all else fails, you can count on Amateur Radio

## **From Our President:**

The Marin Amateur Radio Society is the sum total of the people who comprise it. For some it is a way to stay in touch with old friends and meet new ones. For others it supports activities the fuel their interests or channels their time into helping others. With our 91-year history MARS can seem to just be part of the landscape like Mt. Tam. The continued existence of the club is actually maintained by you, our members and a group of people who invest huge amounts of their time, energy, money, and love into making it a group that people want to be a part of.

Today I want to celebrate two of those people who have powered the club through contributions that I cannot possibly list in this space. Randy Jenkins KA6BQF – SK and Rita Brenden KG6WPN partners in life. In the February 2024 edition of QSA-5 I wrote about how Randy changed me for the better and I recommend you to reread that. Today I want to focus on Rita and Randy and their contributions to us all. I am often accused of what they call in the news business “burying the lead” meaning that I take forever to get to the most important news item in the story.

So here I am in the third paragraph. We just received a donation from Randy and Rita for \$10,000.00. This is to be split evenly between the Building Fund and the Repeater Fund. This is a very significant donation for us and will be put to good use. I need to again thank Rita and Randy for one more example of their generosity. With the donation Rita included a letter which I will excerpt here since she says it so much better than I could have done.

Dear president and club members,

It is my privilege to present to your club a donation from the Robert Randy Rushing Jenkins Living Trust. The gift to your club of \$10,000 is to be divided equally into your budget to allocate \$5,000 to the Building Fund and \$5,000 to the Repeater Fund.

Randy (KA6BQF) was a long-time participant in HAM radio club activities, dating back to the late 1970's. He held many officer positions from president through hospitality over his years of being a club member. He was a public service coordinator, educator, and one of the Volunteer Examiners for the club. Tandy often organized assistance for the annual picnic and the Christmas party. He loved HAM radio and enjoyed talking with fellow HAMs at the clubhouse...

... I originally met Randy at a License Exam session held in the East Bay in 2024. He eventually recruited me to get experience with my handy talkie by participating in public service events. He invited me to the Marin Club's Sunday morning gatherings to meet other HAMs. On a 100-mile cycling event, I rode shotgun with him as he drove a SAG vehicle. He responded to an accident wherein a cyclist hit loose gravel and was thrown down a ravine. We collected the bicycle after the ambulance drove away with the injured biker. Needless to say, I joined the club. He was a superb ambassador for the hobby.

Some of you may remember that Randy's speech started to have irregularities in 2014 and continued to worsen over time. By 2019 he only had a few single words i.e. Yes, no, maybe and later he began communicating with thumbs up, down or sideways. We stopped our public service and club activities when Randy's mobility became compromised. It was late 2018 when UCSF Memory and Aging Center defined his speech symptoms as Primary Progressive Aphasia (PPA) and his mobility issues as Progressive Supranuclear Palsy (PSP); these are both rare neurological conditions that strike younger people (50 yrs and older). They are part of the disease family known as Frontal Temporal Degeneration (FTD) It was recently acknowledged that celebrities Bruce Willis and Wendy Williams have FTD. Randy died December 30, 2023.

I have said it before, and I repeat it here. There is hardly a day that goes by that I don't miss him. Any time I deal with the governance of the club I recall some advice he gave or some lesson he taught me. Thank you, Rita and Randy, for everything.



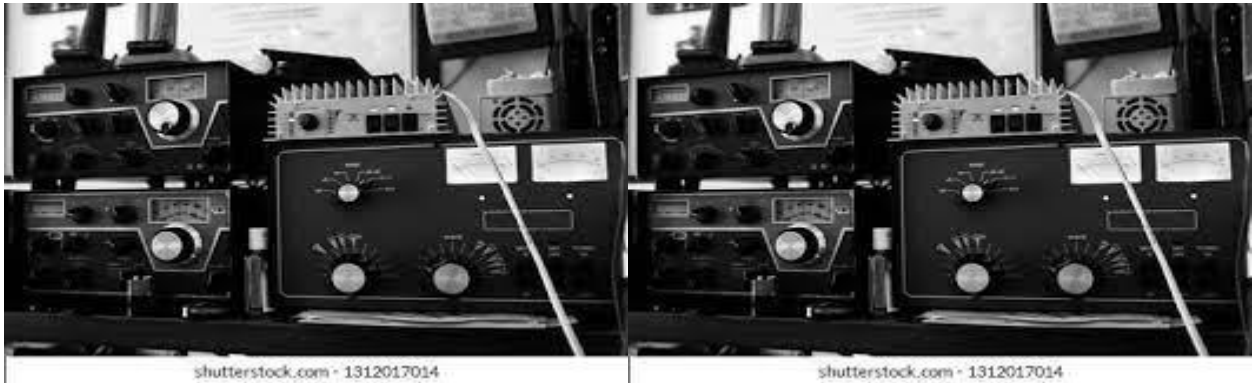
## **From the Editor:**

Summer is now in the rearview mirror. The dog days of August proved to be true with high temperatures across the area. Schools are back in session and the big box stores are getting their Christmas decorations out early. The 10-meter band is alive and well and should be red hot this fall and winter! All the bands are becoming more active creating a Disneyland for HF operators. Technology is driving the price of radio transceivers down and testing tools, which used to cost a small fortune, can be purchased for extremely low prices. In short, it's a great time to be involved in amateur radio.

Here at the QSA-5, we're busy writing articles regarding HF for beginners. I've written a few articles regarding some of the harder topics to comprehend, such as propagation. In fact, the first article is a beginner's guide to propagation. It's taken

from a larger guidebook on HF radio I wrote this summer. It is included in this month's issue of the QSA-5. Curtiss Kim, and the usual suspects, are contributing as well, so I must thank them for their much-needed help. The QSA-5 is always looking for contributions so if you have an idea email it to me. If you want to contribute an article, please do. With that said, have a great September everyone!

[QSA-5Editor@w6sg.net](mailto:QSA-5Editor@w6sg.net)



### **New Members:**

Francisco Alvarado KM6ZSW - San Francisco

Mohit Bhoite KE0JVM - Mill Valley

Tim Eisler KO6EMS - Kensington



**“Your parents hath given you a name. And the FCC hath given you another...”**

**Marin Amateur Radio Society**

**Board of Directors Meeting**

**08/08/2024**



**Call to Order:** 19:30 Hours (7:30 PM) CTA-19:36

**Attendance:**

**President:** Curtis Ardourel WA6UDS

**Director:** Richard Cochran AG6QR

**Director:** Ed Essick K6ELE

**Director:** Steve Toquinto KB6HOH

**Secretary:** James Saltzgaber KM6WWY

**Director:** Jeffrey Young KM6Y

**Treasurer:** Bruce Bartel N6VLB

**Trustee W6SG:** Marc Bruvry KF6VNT  
**Trustee K6GWE:** Brian Cooley K6EZX

**Members Present:** Skip Fedanzo AJ6ARL; Charlie Benet AI6TT, Dan Sobel N6HLZ, Ken Brownfield AB6JR, Mark Klein KM6AOW

**Adopt agenda:** MSC

**Approve minutes of:** 11 July board meeting – MSC to approve July Board Meeting minutes as published in QSA-5

**Secretary's Report/Communications:** No Secretary's Report available.

**Treasurer's Report:** Bruce – July report published in QSA-5.

**Committee and other Reports:**

- 1. Membership:** Curtis – Membership is currently 150 members, 91% of last year's total. We are near where we were at this time last year. Last year the board gave the president the ability to grant a free initial year's membership to anyone who receives their original license at our VE session. We have 4 new members via this avenue so far this year.
- 2. Facilities:** Skip –He has been unable to locate a gardener to come in and remove leaves along the west wall drainage area and do general vegetation management. He will contact Michael Fischer for his gardener's information as they have done it previously. Our tenant reported a plumbing problem and Dan's Plumbing was called and repaired it. Their rates have gone up. None of the repeater cabinets and other stuff in the back room has been disposed of. Skip suggested that we look toward doing some touchup painting on the clubhouse interior. The possibilities of a professional painter vs. a painting party were discussed.

Curtis noted that there is a lot of "stuff" screwed to the walls in the clubhouse, and that he is of the opinion that we don't want to pay



professional painters to detach and re attach those items. No action necessary. Skip also requested “See Something, Say Something!”, meaning that anyone who sees any problems at the clubhouse please report them to him.

- 3. VOAD/RCV:** Skip reported on VOAD/RCV. Loss of the VOAD funding has made long term status of the VOAD uncertain, Adriana is still moving forward. RCV and RACES do not presently have any access into the EOC radio room. RCV planning meeting is tomorrow, exercise details for the Great Shakeout will be planned, as well as a possible tabletop exercise with the CBO’s. A recent RCV operator survey of field equipment and capabilities was taken for future planning. Approx. 50% have responded and represented a wide range of portable equipment. Dan N6HLZ noted that portable battery backup battery systems may be available for PG&E customers subject to shut off.
- 4. Technical:** Milt – Not present. Curtis reported for Milt that upgrade work has been done on Mt. Barnabe. Week after next, the Winlink station removed from the Salvation Army will be installed at the San Rafael Raquet Club.
- 5. Public Service:** Rob – Not Present.
- 6. VE Testing:** Jim – Not Present.
- 7. Comm Truck:** Jim – Not Present.
- 8. NBAM:** Bruce – See “Expanding the NBAM Locker” in Old Business. Bruce noted that Mark Klein has requested an inventory of the NBAM equipment in the locker as well as putting asset tags on it. Skip offered to give the NBAM committee the source of MARS’ inventory tags. There has been a suggestion that an “inventory party” at the clubhouse with the help of North Bay 2-meter critical mass on one of their Sunday’s would help do the inventory. Schedule for inventory TBD. There is a need to catch up on this. Jeff noted that Rob had the previous Asset Tag software, and everything obtained prior to the end of last year was on inventory. Jeff will get with

Rob to get the existing system from him. Next NBAM meeting will be on 8/22. Bruce and Curtis need to get an NBAM bank account at B of A.

**9. Picnic:** Steve (not present) – Curtis reported that we have secured the Stafford Lake Area 1 location. We also have approval to supply hot coals if anyone wishes to cook their own food in lieu of the BBQ chicken and BBQ Ribs that will be supplied. He will be sending out another notice/RSVP request soon.

**10. Bylaws:** Curtis – Table for future meeting.

### **Old Business:**

**1. Paint the Clubhouse Fund:** Curtis – The fund is presently \$9250, less than our \$15,000 goal but above our budget of \$6000. Web page S Meter is at \$4.5.

**2. Clubhouse cleaning:** Molly Maids cleaned the clubhouse in early July, and we were very satisfied with the service, and they have insurance for their employees. Discussion regarding their cost - \$352 for the two cleaners, they worked in a professional manner and provided their own supplies, vacuums etc. A motion was made to continue Molly Maids for six months, 2 cleaners, once a month, seconded and carried by show of hands. Skip will attempt to get them to invoice Bruce directly.

**3. Revitalizing Babble Class:**

**4. Donations Committee Charter:** Curtis -Reviewed the proposed charter for the Donations Committee (Attached). The anticipated budget will be \$1000. The major points are: donations requesting cash back will not be accepted, "Museum", equipment with no value will not be accepted, we may assist the owner with the disposal of the item; Towers require professional assistance, we will not remove them, but will recommend professionals who may wish to remove them at the owner's expense. Curtis requested

that the committee be allowed to begin working within the guidelines of this charter. There will be changes to the charter before it is voted on by the board. It was agreed to allow the committee to begin.

- 5. Expanding the NBAM locker:** Current locker is 4' X 8' if the locker is extended across the back wall an additional 4' X 7' – NBAM is requesting the locker be extended by the full 4' x 7' available. Construction to be done by NBAM and materials from NBAM grant \$240, no cost to MARS. Discussion on expanding the locker, as well as the future goal of NBAM. Ed questioned whether there were plans for operating equipment in the locker or simply storage. Storage only currently. Motion to approve the expansion of the NBAM cabinet made by Bruce, second by Ed, and carried without objection.
- 6. Clearing foliage, especially bamboo in clubhouse back lot:** Skip knocked down the bamboo and a large vine that was coming through the fence, cut them up and put them in the green garbage bin. A loose board in the fence was repaired. He cautioned anyone working along the fence that there are loose boards and to be careful not to disturb it.

#### **New Business:**

- 1. Project storage in clubhouse:** Curtis – we need to designate an area to store parts, pieces and “stuff” for Club Approved projects. Discussion included that we have a process for approving club projects. No action required currently.
- 2. NBAM MOU template:** Mark Klein suggested that the MARS board approve the attached boiler plate MOU for use at NBAM sites (attached). Discussion followed on various details, including the reason for the need to have MOUs for site use vs. “Handshake agreements”. Jeff Young noted that this is the same MOU that NBAM has been using for sites that have equipment installed. He suggested that the MOU include Electricity (if provided, and type provided), and contact names for both MARS and the agency providing equipment to be installed. The need to provide MARS insurance certificates

was questioned and it was suggested that it should be on an as required basis. Curtis suggested that in view of the questions, we send the MOU template back to the NBAM steering committee for further discussion and the committee may return it to the board. Mark Klein requested that he be permitted to present the present MOU format to Napa County. This was decided to be ok as he will be bringing the MOU back to the board for final approval.

**3. Large donations:** Curtis- We have received the following donations:

- a) Alan Bowker WA6DNR SK - \$10,000 general fund
- b) Randy Jenkins KA6BQF SK - \$10,000
  - i. Building Fund \$5000
  - ii. Repeater Fund \$5000
- a) Antonis Papatsaras AA6PP \$500 Paint the Clubhouse Fund

This is the largest recent donation total. No board action required. Bruce – These donations are very helpful to balance our income from donations vs. our income from rent and grants for IRS tax purposes.

**4. Nomination Committee –** Curtis- At the November general meeting he must present a slate of candidates for the board seats that will be expiring. We are currently out of synch with the mandated board election cycles. We need a nominating committee appointed by the board. Members of the nominating committee cannot be a board member who is running for re-election. He will have the details at the September board meeting.

**5. Google non-profit status:** Bruce – One of the by-products of the work Jeff Young did get us involved with Tech Soup (software applications for non-profits), Bruce applied for and received approval for 50% discount for Zoom products, and got approved by Google for Nonprofits, which gives us access to Google workspace. It helps with administering our IT needs such as Gmail, storage, calendaring, Google docs, web space, all for zero \$ cost. Curtis, Bruce, and Brian Cooley will discuss this in more detail and report further to the board.

**Good of the Order:**

**Executive Session:** Not required

**Adjourn:** MSC to adjourn the meeting at 21:15

**Next Regular Meeting 6 September 2024**

**Next Board Meeting 12 September 2024**

**Minutes notes taken by:** Rich Cochran AB6QR, Transcribed by Jim Saltzgaber  
KM6WWY

**Attachments:** Molly Maids Quote, Donations Committee Charter

### **Molly Maids Quote**

From: Anthony Fedanzo <drferret@comcast.net>

Sent: Tuesday, July 16, 2024 2:15 PM

To: curtis@ardourel.com; Jim Saltzgaber <fairfaxjim@saltzgaber.com>;  
bruce.bartel [bruce.bartel@gmail.com](mailto:bruce.bartel@gmail.com)

Subject: FW: Do not Delay! Schedule your Appointment with Molly Maid today!

Here is the quote for monthly Molly Maid service. As I read it the cost is \$150/month starting the 5th month due to the \$25/month discounts at startup. Work includes cleaning the kitchen, office, bathrooms. Vacuuming meeting space, wiping down tables and surfaces. Workers are instructed to avoid radio room, workshop and back room.

Thanks,  
Skip

From: Molly Maid of Marin, Berkeley and West Contra Costa County  
[mailto:marinberkeley@mollymaid.com]

Sent: Tuesday, July 16, 2024 11:42 AM

To: Anthony Fedanzo

Subject: Re: Do not Delay! Schedule your Appointment with Molly Maid today!

Dear Customer.

We are very happy to know that our services met your expectations. The service would be charged by the hour as well; however, considering that this will be a monthly sequence we can offer a special hourly rate of \$150.00 (\$75.00 per maid per hour). This will also be combined with a \$100.00 coupon (A \$25.00 discount will be applied to the next 4 recurring appointments). Please let us know if we should proceed.

Maurice Ortega

Molly Maid of Marin, Berkeley, and West Contra Costa  
3095 Kerner Boulevard, Suite K, San Rafael, CA 94901

415-454-3600

marinberkeley@mollymaid.com

Secure Credit Card Authorization - [Click Here](#) or use QR Code

Why Choose Molly Maid? - [YouTube Video](#)

### **Donations Committee Charter Mission Statement**

Provide policy for and practical management of donations to the Marin Amateur Radio Society in accordance with the following goals.

1. Provide a one stop contact for point for amateurs and/or their families to dispose of no longer needed or wanted amateur radio equipment.
2. Furnish the donor with a thank you letter consistent with IRS guidelines.
3. Articulate and implement a consistent policy on the disposal donated equipment in a timely manner.

4. Ensure that the club house does not become a repository of old equipment.
  5. Get donated items into the hands of folks who can use them
- Implementation

### **Donations Committee Charter Mission Statement**

1. Create a committee to implement the mission statement. This was done by the MARS board on 5/9/24 with committee members Rob Rowlands NZ6J, Curtis Ardourel WA6UDS, Steve Toquinto KB6HOH, Milt Hyams KM6ASI, and Rich Cochran AG6QR.
2. Committee to meet and address the following:
  - a. How is committee membership governed? – Membership candidate from committee or any member of the board and approved by the board.
  - b. How is the committee chairperson determined? – Board president determines First Among Equals.
  - c. Who will report the committee's actions to the board? – FAE or designee.
  - d. Create a charter for the committee which once agreed by the committee would be submitted to the MARS board for approval. – This document
  - e. Determine when and how committee meetings will be scheduled. – Called by any member or at the call of the Board President.
  - f. Determine if the committee will need a budget. \$1000 authorized by a board member. Sales of items can refill this budget up to the \$1000 threshold any funds beyond that would go to the club general fund.

### **Policies and Procedures**

1. Provide a document to potential donors for their signature prior to MARS accepting any donated material. – This document needs to be written and presented to the MARS board for approval
  - a. MARS is forbidden by the IRS from assigning value to non-cash donations.

**b.** Donations to MARS will be disposed of entirely at the discretion of MARS

**c.** Some potentially donated items, while they may have a perceived value to the original owner or doner, are in fact e-waste and need to be disposed of as such. We will assist the doner in arranging for disposal of those items.

**d.** MARS is not an electrical or building contractor and although we will assist with disconnecting and removing equipment we cannot repair structural or electrical modifications to the premises made by the owner of the equipment.

**e.** In general we will provide services at no charge to the doner. The removal of towers will require a professional to do so safely and we can recommend a contractor if requested.

**f.** We will schedule a site visit to assess how to proceed.

**2.** Triage – Donations usually include a variety of items ranging from very expensive equipment to plain junk. At least two or three members of the committee will agree a time and sort the donations into categories

**a.** Something the club will retain for club use

**b.** Sale or donation by the club to a third party

**c.** E-Waste

**3.** Disposal

**a.** Club asset

**i.** Tag with asset tag if the club intends to keep and use it.

**b.** Sale to public – Tag with a received date.

**i.** Silent auction

**1.** Club event

**2.** Special auction event

**ii.** MARS Online auction

**iii.** Auction site Ebay, ARRL, Hamradioauctions.com, etc.

**iv.** Other club's events

**c.** Give away – Tag with a received date. – Committee members cannot take give away items until the disposal time has expired

**i.** Raffel



1. Christmas Party
2. Public Service Kick Off
3. Club Picnic
  
4. General meeting
  - ii. New ham
  - iii. Club award
  - iv. Put out for anyone who shows up but we will send to e waste after a month.
  
4. Storage and tracking
  - a. Choose finite storage and force disposal when area is full then this committee has to meet.
  - b. Database of items for sale listing under disposal for items of a certain value for example over \$200

### **Memorandum of Understanding**

This Memorandum of Understanding (hereinafter "MOU ") is entered into on \_\_\_\_\_, between Marin Amateur Radio Society (hereinafter "MARS"), having principal address at (27 Shell Road, Mill Valley, CA 9494; PO Box 6423 San Rafael, CA 94903). and, \_\_\_\_\_, having principal address at \_\_\_\_\_ (hereinafter "\_\_\_\_\_"). North Bay Area Mesh (hereinafter "NBAM") is a project being executed by MARS.

**Recitals:**

NBAM is a volunteer led project to install a resilient, high-speed wireless network throughout Marin and Sonoma County for use during disasters, emergencies and large community events by responders, volunteers and served agencies. NBAM owns and operates wireless broadband radio repeater systems in Napa County, Sonoma County and Marin Counties.

\_\_\_\_\_ has a facility,

\_\_\_\_\_ and  
which is their \_\_\_\_\_ and  
capable of  
supporting radios and infrastructure.

NBAM and \_\_\_\_\_ desire by this MOU to set forth in writing the terms of their  
mutual  
arrangement.

Understanding:

\_\_\_\_\_ provides and will continue to provide antenna/radio space and  
equipment shelter

space, for the NBAM broadband network at \_\_\_\_\_

NBAM will provide liability insurance coverage naming \_\_\_\_\_ as an  
additional insured.

NBAM agrees to will provide the names of the NBAM personnel having access to  
the site. NBAM

will not access the site without being accompanied by \_\_\_\_\_ personnel or  
having

specific approval for a visit.

NBAM agrees to operate and maintain its broadband data system equipment at  
\_\_\_\_\_ in accordance with good engineering practice and

good amateur

radio practice, and agrees not to cause harmful interference to any other radio  
service present

at the site. NBAM further agrees to notify \_\_\_\_\_ in advance of any  
change in

equipment or operating parameters of its broadband data systems.

NBAM agrees to assist \_\_\_\_\_ in connection with any reasonable request  
made to NBAM.

This MOU shall continue in force and effect until mutually terminated by the  
parties or until a

party gives 90-day notice in writing of termination or modification hereof.

\_\_\_\_\_ Marin Amateur Radio Society

By: \_\_\_\_\_ By:

\_\_\_\_\_ Name: \_\_\_\_\_ Curtis Ardourel, President

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## Marin Amateur Radio Club

### Balance Sheet Comparison

As of August 31, 2024

	TOTAL	
	AS OF AUG 31, 2024	AS OF AUG 31, 2023 (PY)
ASSETS		
Current Assets		
Bank Accounts		
B of A Facilities Account - 8795	4,884.90	5,948.61
B of A General account - 4328	78,958.61	51,868.24
Cash on hand		
MESH Grant (deleted)	0.00	500.00
<b>Total Cash on hand</b>	<b>0.00</b>	<b>500.00</b>
CD	0.00	0.00
Money Market	0.00	0.00
VE Session Cash	0.00	-129.00
VE Session Cash Received	0.00	
<b>Total Bank Accounts</b>	<b>\$83,843.51</b>	<b>\$58,187.85</b>
Other Current Assets		
Uncategorized Asset	385.00	-95.00
<b>Total Other Current Assets</b>	<b>\$385.00</b>	<b>\$ -95.00</b>
<b>Total Current Assets</b>	<b>\$84,228.51</b>	<b>\$58,092.85</b>
Fixed Assets		
club house- 27 Shell Rd. MV	58,983.00	58,983.00
<b>Total Fixed Assets</b>	<b>\$58,983.00</b>	<b>\$58,983.00</b>

<b>TOTAL ASSETS</b>	<b>\$143,211.51</b>	<b>\$117,075.85</b>
LIABILITIES AND EQUITY		
Liabilities		
<b>Total Liabilities</b>		
Equity		
Opening Balance Net Assets	124,400.00	124,900.00
Retained Earnings	13,748.91	-20,412.57
Net Income	5,062.60	12,588.42
<b>Total Equity</b>	<b>\$143,211.51</b>	<b>\$117,075.85</b>
<b>TOTAL LIABILITIES AND EQUITY</b>	<b>\$143,211.51</b>	<b>\$117,075.85</b>

## Marin Amateur Radio Club

### Profit and Loss

January - August, 2024

TOTAL

JAN - AUG, 2024    JAN - AUG, 2023 (PY YTD)

Income		
Christmas Party Income	640.00	
Donations	23,370.00	1,699.17
Dues	8,920.51	7,074.75
Interest Income		792.77
Public Service Refund	168.15	450.00
Rent	23,053.00	20,800.00
Unapplied Cash Payment Income	385.00	
<b>Total Income</b>	<b>\$56,536.66</b>	<b>\$30,816.69</b>
GROSS PROFIT	\$56,536.66	\$30,816.69
Expenses		
Accounting	1,480.00	1,095.00
Awards		299.99
Car & Truck	2,224.89	2,327.80
Car & Truck Gas	88.02	258.02

<b>Total Car &amp; Truck</b>	<b>2,312.91</b>	<b>2,585.82</b>
Christmas Party	2,970.23	
Contractors	21,109.00	
Field day	854.66	659.26
Food	76.89	
Garbage	402.48	386.04
Housekeeping	839.85	
Insurance	2,832.50	1,683.00
Comm Van Insurance	2,241.52	2,582.50
<b>Total Insurance</b>	<b>5,074.02</b>	<b>4,265.50</b>
Meals	235.24	
Office Supplies & Software	18.00	
Other Business Expenses		104.93
Picnic	387.80	
Public Service Expense	4,009.18	1,379.96
Reimbursable Expenses	20.00	2,448.73
Repair & Maintenance	320.06	
Repeater	2,138.67	1,567.50
Taxes & Licenses	4,099.67	25.00
Utilities	2,957.90	2,984.29
VE Session		129.00
Water	1,330.79	797.25
<b>Total Expenses</b>	<b>\$50,637.35</b>	<b>\$18,728.27</b>
<b>NET OPERATING INCOME</b>	<b>\$5,899.31</b>	<b>\$12,088.42</b>

### Marin Amateur Radio Club

Profit and Loss  
January - August, 2024

TOTAL

JAN - AUG, 2024    JAN - AUG, 2023 (PY YTD)

Other Income		
MESH Grant Income		500.00

<b>Total Other Income</b>	<b>\$0.00</b>	<b>\$500.00</b>
Other Expenses		
MESH Grant Disbursement	836.71	
<b>Total Other Expenses</b>	<b>\$836.71</b>	<b>\$0.00</b>
<b>NET OTHER INCOME</b>	<b>\$ -836.71</b>	<b>\$500.00</b>
<b>NET INCOME</b>	<b>\$5,062.60</b>	<b>\$12,588.42</b>

# LIFE IS SIMPLE



# **MARS Club News**

## **Steve Toquinto's Birthday**

Another trip around the sun...or maybe I should say MARS for the voice of the Sunday morning net, KB6HOH, Steve Toquinto. The operator celebrated his birthday at a regular Thursday lunch in Novato by 16 club members in attendance. After a rousing meal, a chocolate cake provided by Bruce Bartel, N6VLB was shared by all. Toquinto has been a licensed operator for almost 40 years. He can be heard every Sunday morning hosting the MARS net disseminating current information, updates and timely reminders. Toquinto is often heard hosting "Tech Net" following the Sunday morning roll call. KB6HOH got hooked on two-way radio back in the early '70's during the CB craze while in the military at Fort Carson in Colorado Springs, CO. Next came a stint in The U.S. Army Military Auxiliary Radio System. (MARS) His familiar voice has anchored the Sunday morning exercise for many years frequently calling out names as well as their associated call sign. Toquinto's dedication has seen him host the net from remote locations including the Mill Valley clubhouse and Field Day. It is safe to say, Toquinto's familiar voice has provided a common denominator encouraging club membership and a shared love of amateur radio. Happy Birthday Steve and many more.



## Sixteen Days Until the Club Picnic



### Club Picnic

Saturday, 14 September 2024

11:00 am to 5:00 pm

Stafford Lake Park - Area 1  
3549 Novato Blvd, Novato CA





Please RSVP as soon as possible if you are planning to attend. We need to get a final head count to the caterers.

Email to [rsvp@w6sg.net](mailto:rsvp@w6sg.net)

**General Information:**

The Marin Amateur Radio Society will once again be celebrating our ANNUAL PICNIC - and this year we will be at Stafford Lake Park, in the same location where we recently held Field Day. We will be having some public information available as well as at least one Get On The Air station for park staff, public officials and general public. We will be enjoying professionally-made BBQ ribs and chicken along with sides, drinks and dessert.

**A few words on protocol and etiquette:**

We are guests of the park and need to be considerate of the park rules and other guests of the park

- Parking is free and will only be in the public parking lot.

- Those needing mobility assistance, please reach out on VHF Simplex 147.585 and we will have a shuttle to take to and you from the parking lot and the pavilion.
- DO register for and attend the event if possible. Socializing with each other on blue sky days will help us all operate better together when it really counts.
- DO wear your club ID badge or one provided at the event.
- DO Bring family or non-Ham friends if they are interested, but remember to RSVP for them by sending an email at [rsvp@w6sg.net](mailto:rsvp@w6sg.net).
- DO feel free to grill your own burgers, franks, or whatever - we will have BBQ space available.
- DON'T attend if you are feeling ill on the day of the picnic. COVID is on the rise right now.

### **How can I help?**

The main reason we are having the picnic is to get together in the sun and not in little zoom rectangles. It is also an opportunity to meet the Marin community and introduce them to Amateur Radio. We are looking for a few volunteers to help pull this together. When you RSVP, please let us know if you are willing to help out in one or more of these categories:

- Radio Operators: We are looking to setup and operate a station at the site. Please use the rsvp email address to let us know if you also want to setup something nice and special.

- Greeters: we will be inviting park rangers, local officials, the media and of course, your families! Those who don't already know us will feel more comfortable if someone welcomes and orients them! We also need to had out name tags for those who do not have badges.
- Setup and Cleanup: In 2023 we had about 50 people attend the picnic and we are expecting something near that this year. We need folks to come in early and help setup the area. We will also need a few to cleanup afterwards so we leave the park as we found it.

**Where are we?**

Follow the blue line to parking



## 2024 MARS Public Service dates

If you're interested in getting involved in the public service branch of our club, here is a list of the events scheduled for this year. Radio communication is the glue that often holds these events together. As with most events, finding enough volunteers is challenging. If you're interested in helping the club, contact Rob Rowlands NZ6J: rowlands47@gmail.com

- 1. Kaiser 5k and half marathon: SFARC Sunday, February 4, 2024**  
DMR Radio required DMR Repeater (W6PW) Digital channel RX:444.225, TX:449.225 Color Code (CC): 1 Timeslot (TS): 2 Talkgroup(TG) 9
- 2. Public service briefing and lunch: Saturday April 6, 2024, 1100 to 1400 hrs, Location: to be decided**
- 3. [Ridge to Bridge](#): Saturday, April 14** Requesting 16 MARS volunteers:
- 4. MCBC Jane Fondo Saturday April 27 2024** Womens mountain bike event  
18 at aid stations, 3 accompany SAGs, 1 moto, 1 biker  
Don Magdanz, Event Organizer at Net Control
- 5. [Miwok 100K](#), Saturday, May 4, 2024**  
18 at aid stations, 3 hikers
- 6. [Dipsea](#): 113th Annual Dipsea will be run on Sunday, June 9th, 2024** 7am-2pm 20 needed



(Stinson/County CommTruck)  
Don Magdanz, Finish Truck and Information Tent

7. **Field Day**: June 22/23, 2024 Stafford Lake Park 1800z (11am) to 2100z (2pm Sunday) <http://www.arrl.org/field-day-rules>
  
8. **MCBC Dirt Fondo**: Saturday, July 20, 2024, 6am - 3pm 18 needed (/Fort Cronkhite/CommTruck)  
Don Magdanz, Event Organizer at Net Control
  
9. San Francisco Marathon **Saturday/Sunday July 27-28, 2024**
  
10. **Marin Century**: Saturday August 3, 2024, 5:00am-8pm 34 needed (Stafford Lake/CommTruck) Don Magdanz, Event Organizer at Net Control
  
11. **Double Dipsea: Saturday August 24, 2024**, (Comms Organizer TBD)  
6:30am-1:30pm 18 needed (Stinson/CommTruck)
  
12. **MCBC Adventure Revival**. Saturday, September 21, 2024 7:30am-3pm. 15 needed. (San Geronimo former golf course/CommTruck?) Don Magdanz, Event Organizer at Net Control
  
13. **ZBC Dipsea Hike**: Saturday, September 21, 2014 (Comms Organizer TBD)  
7am-2pm, 8 needed (Old Mill)
  
14. **Breast Cancer Prevention Partners Peak Hike**: Moved to Pacifica in 2023, no MARS radio support required.

**15. MDARC Pacificon ham convention San Ramon Marriott October ? 2024**

**16. Dolphin Club Escape from Alcatraz Sunday, October 5, 2024 10am-6pm. 8 needed (Old Mill) Could certainly use 20, if more folks are interested, please!**

## **North Bay Critical Mass Report**

We didn't receive a monthly report regarding the North Bay Critical Mass meeting. The North Bay Critical Mass sessions are useful for newly licensed amateur radio operators. But it's also a chance for experienced hams to gather and learn new tips, and to become an Elmer to assist those hams who are just learning how to operate their new radios.

For any new Marin Amateur Radio Society members, this is a great gathering to join. You'll meet many experienced amateur radio operators and learn something new and interesting. Here are some photographs from the August gathering:











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## ACS/RCV Mission Statement

**Mission:** During national, regional, or local emergencies provide effective backup radiocommunications in support of the EOC/VOAD and Community Based Organizations (CBOs) or other non-public safety agencies within the Marin County OA when requested by competent authority.

**Capabilities:** Proven ability to establish and maintain radio communications between OA EOC/VOAD and CBOs during exercises including the three annual Golden Eagle and two Great Shakeout exercises. Ability to deploy and operate

portable stations as needed to establish reliable communications in areas that are otherwise out of touch with the EOC/VOAD.

**Resources:** Develop and maintain the resources that may be needed to support the overall mission:

1. Operators – A corps of trusted radio operators with: (1) basic skills and a commitment to establishing radio communications when needed; (2) ongoing participation, training, and practice in accurately passing message traffic using a variety of basic analog and specialized digital means.
2. Mobile stations – Individual operators routinely test and maintain their own radio transceivers and related equipment including power supplies, which can be deployed to locations otherwise lacking reliable communications with the EOC/VOAD or between two or more CBOs.
3. Relationships – Establish on-going relationships of familiarity and trust between RCV operators and with key staff of served agencies, including EOC and VOAD.

## VE Examination News

The Marin Amateur Radio Society Volunteer Examiners are holding the final testing session of the year on October 13<sup>th</sup>, 2024. Testing starts at 1:00pm. All test candidates should plan on arriving 30 minutes early.

The Marin Amateur Radio Society's VE Program is an extremely important component of amateur radio. The national program MARS is a part of allows member radio clubs to administer licensing tests on behalf of the FCC. What this means to people getting into ham radio is that there are more test locations and a more flexible schedule for taking the license exam. Jim Saltzgaber, KM6WWY, is the Lead VE. There has been some disruption to the VE services at the ARRL. Here's an article from the ARRL:

**ARRL VEC Services Update During Systems Disruption:** This applies to a specific period of time during which the problems occurred.

<https://www.arrl.org/news/arrl-vec-services-update-during-systems-disruption>

**IMPORTANT NOTE:** If you are upgrading to Extra-Class, the new question pool is effective as of July 1<sup>st</sup>. This means any testing dates after July 1<sup>st</sup> will use the new question pool. If you've been studying for a test date after July 1<sup>st</sup>, using an older Extra-Class study guide, you'll have to pick up a current study guide with the new question pool. You're not going to lose the knowledge you acquired through studying with the old book, but you will have to be prepared for the possibility of some different questions added to the new test (the number of questions remains the same). In short, get an updated study guide!

The first scheduled testing session was on January 13<sup>th</sup>, 2024. The test started at 1:00pm. Our first testing session has passed, and we have three more remaining:

**January 13<sup>th</sup>** (Completed, we had 7 applicants, 6 successful. 4 new Technician Class and 2 new General Class).

**April 13<sup>th</sup>** (Completed, we currently had 7 registered applicants. Note: **This was the last VE session before the current Extra Class pool expires and is replaced with a new one on July 1<sup>st</sup>**). **All applicants passed!**

**July 13<sup>th</sup>** The third session of the year. As of our last board meeting, we had zero sign ups.

**October 13<sup>th</sup>** Fourth session of the year.

All exams are held at the MARS clubhouse. Check-in is 1:00pm. Information on Exam Registration is at: [Register for the Exam | Marin Amateur Radio Society \(w6sg.net\)](#)

The application form can be found at: [MARS VE Exam Application Form](#)

Jim S. KM6WWY

From Curtiss Kim, regarding the April 2024 testing session:



# HF Radio 101

## Propagation for Beginners

Starting this month, the QSA-5 is going to include a section regarding HF radio for beginners. We'll cover all the basics from propagation to antennas to transceivers and station setup. One of the areas new HF operators have trouble with is propagation, that magic that happens when your signal leaves your antenna and heads off to the ionosphere. The following is from a larger body of writing I did on propagation and HF radio:

### **Propagation: The Journey of a Radio Wave**

Propagation refers to the behavior of radio waves as they travel through the atmosphere. It's a critical factor influencing communication range and quality. Propagation, the behavior of radio waves as they travel through the atmosphere, is a cornerstone of ham radio. It determines the range, quality, and reliability of communication. Understanding propagation is essential for successful operation.

The ionosphere, a layer of the Earth's atmosphere, plays a significant role in reflecting radio waves. This phenomenon, known as skywave propagation, allows for long-distance communication on HF (High Frequency) bands. However, the ionosphere's characteristics are influenced by solar activity, time of day, and season, making propagation conditions dynamic and unpredictable.

Frequency also impacts propagation. Lower frequencies tend to penetrate the ionosphere more easily, enabling longer-distance communication. Higher frequencies are more likely to travel in a line-of-sight path, suitable for shorter distances and urban environments. Additionally, atmospheric conditions, such as weather patterns and temperature inversions, can affect propagation.



By understanding propagation principles and monitoring conditions, ham radio operators can optimize their equipment and operating techniques. This includes selecting the appropriate frequency, antenna, and operating time to maximize the chances of successful communication.

### **What is HF Propagation?**

One of the biggest differences between HF and VHF/UHF radio is propagation. With VHF/UHF radio, you're relying on line-of-sight and the use of repeaters to get your signal from your transceiver to another transceiver. With HF radio, you're sending your signal up into the furthest parts of the Earth's atmosphere where it is then bounced back to Earth. It's not really bounced back, but we'll get into that later. When your radio's signal gets far enough up into the atmosphere, it's effected by the Sun. This means that you need to consider solar conditions when trying to communicate over long distances. In HF radio, the action takes place in the ionosphere.

HF (High Frequency) radio bands rely heavily on ionospheric propagation for long-distance communication. Ionospheric conditions play a major role in whether your transmission is successful or not. The ionosphere, a layer of the Earth's atmosphere ionized by solar radiation, acts as a reflective medium for radio waves. The signal that comes out of your antenna travels at an angle to the ionosphere where it then comes back down to earth at another angle. This allows signals to travel far beyond the horizon, enabling global communication. Ionospheric conditions are dynamic and influenced by factors such as solar activity, time of day, and season. This variability makes HF propagation challenging. These conditions can change hourly!

To maximize the chances of successful HF communication, operators often rely on propagation forecasts and real-time band conditions. By understanding the factors affecting ionospheric propagation and utilizing the appropriate frequencies, antennas, and operating techniques, hams can enjoy long-distance contacts and explore the exciting world of DXing (long-distance communication).

## **The Ionosphere and HF Radio**

The ionosphere is a region of the Earth's upper atmosphere where atoms and molecules are ionized by solar and cosmic radiation. This ionization creates charged particles, which affect the propagation of radio waves. It's a dynamic layer, changing constantly in response to solar activity, time of day, and geographic location.

For HF (High Frequency) radio communications, the ionosphere is crucial. Radio waves transmitted at these frequencies can be refracted, or bent, by the ionosphere back towards the Earth. This phenomenon, known as skywave propagation, allows for long-distance communication. Different layers within the ionosphere, such as the D, E, and F layers, have varying effects on radio waves. The F layer, in particular, is responsible for most long-distance HF communication.

However, the ionosphere is not static. Solar flares and sunspot activity can significantly impact its characteristics. During periods of high solar activity, the ionosphere can become more ionized, affecting radio propagation. This can lead to improved conditions on some bands while causing issues on others. Additionally, the angle of the sun relative to the Earth's surface, which changes throughout the day and year, affects the ionosphere's behavior.

Understanding the ionosphere is crucial for successful HF communication. By monitoring ionospheric conditions and adjusting operating frequencies accordingly, ham radio operators can optimize their chances of making long-distance contacts.

## **How do HF Radio Waves Get from One Place to Another**

### **The Journey of an HF Radio Wave**

HF (High Frequency) radio waves, often referred to as shortwave, rely on a unique method of propagation to travel vast distances. Unlike VHF and UHF signals that typically travel in a straight line, HF waves can bounce off a layer of the Earth's atmosphere called the ionosphere. This process, known as skywave propagation, enables communication over thousands of kilometers.

The ionosphere is a region of the upper atmosphere where atoms and molecules are ionized by solar radiation. The degree of ionization varies depending on



factors such as time of day, season, and solar activity. When an HF radio wave encounters the ionosphere at the correct angle, it can be refracted back towards the Earth. This process can occur multiple times, allowing signals to hop around the planet.

However, skywave propagation is not always predictable. Factors like solar flares and geomagnetic storms can significantly impact ionospheric conditions, causing rapid changes in signal strength and propagation paths. This is why HF communication can be challenging but also rewarding for experienced radio operators.

To ensure reliable communication, HF operators often use multiple antennas and frequency bands, and they closely monitor propagation conditions. By understanding the complex nature of skywave propagation, hams can optimize their equipment and operating techniques to achieve successful long-distance contacts.

### **Does an HF Signal Really Bounce Off of the Ionosphere?**

While the concept of HF radio waves "bouncing" off the ionosphere is a helpful simplification, the actual process is more complex.

The ionosphere is a layer of the Earth's atmosphere containing charged particles. When a radio wave encounters this layer, it interacts with the free electrons. This interaction causes the wave to change direction, a process known as **refraction**. It's this refraction, rather than a direct bounce, that allows the radio wave to return to Earth.

Think of it like a stone skipping across the water. The stone doesn't actually bounce off the water's surface but is deflected by the interaction with the water molecules. Similarly, the radio wave is deflected by its interaction with the charged particles in the ionosphere.

This process, often referred to as "skywave propagation," is essential for long-distance communication on HF bands. However, the exact behavior of the wave is influenced by factors such as the frequency of the signal, the angle at which it enters the ionosphere, and the ionosphere's electron density.

## Propagation Modes

High Frequency (HF) radio propagation, the behavior of radio waves in the HF bands, is a complex and fascinating phenomenon. Several factors influence propagation, including the ionosphere, solar activity, time of day, and season. Understanding these factors is crucial for successful HF communication.

The ionosphere, a layer of the Earth's atmosphere containing charged particles, plays a vital role in reflecting HF radio waves. This reflection allows for long-distance communication, often referred to as "skywave" propagation. However, the ionosphere's characteristics are dynamic and influenced by various factors, making propagation conditions unpredictable.

Solar activity, particularly sunspots, significantly impacts the ionosphere. During periods of high solar activity, the ionosphere becomes more ionized, leading to improved propagation on certain HF bands. Conversely, during solar minimum, the ionosphere is less dense, making communication more challenging.

Time of day also affects propagation. The angle of the sun relative to the Earth's surface influences the ionization of the ionosphere. During daylight hours, the ionosphere is more ionized, particularly in the F layer, which is essential for long-distance communication. However, as the sun sets, the ionosphere changes, allowing for improved propagation on lower HF bands.

Seasonality also plays a role in HF propagation. The Earth's position relative to the sun varies throughout the year, affecting the ionosphere's characteristics. During the summer months in the northern hemisphere, the ionosphere is generally more ionized, while the winter months can bring different propagation conditions. By understanding these factors, ham radio operators can adapt their operating techniques and frequency choices to optimize communication. Several propagation modes are possible on HF bands:

- **Ground Wave:** This is when the radio wave travels along the Earth's surface. It's effective for shorter distances, especially at lower frequencies.
- **Skywave:** This is when the radio wave is reflected by the ionosphere back to Earth. It's responsible for long-distance communication.

- **Line-of-Sight:** While not as common on HF, this occurs when the radio waves travel directly from transmitter to receiver without being reflected.

### **Factors Affecting HF Propagation**

HF (High Frequency) radio propagation, the behavior of radio waves in the HF bands, is a complex phenomenon influenced by various factors. Understanding these factors is crucial for successful communication and optimizing operating techniques.

One of the primary factors affecting HF propagation is the ionosphere, a layer of the Earth's atmosphere containing charged particles. The ionosphere's characteristics, such as its density and composition, are influenced by solar activity, time of day, and season. During periods of high solar activity, the ionosphere becomes more ionized, leading to improved propagation conditions on certain HF bands. Conversely, during solar minimum, the ionosphere is less dense, making communication more challenging.

Time of day also significantly impacts HF propagation. The angle of the sun relative to the Earth's surface affects the ionization of the ionosphere. During daylight hours, the ionosphere is generally more ionized, particularly in the F layer, which is essential for long-distance communication. However, as the sun sets, the ionosphere changes, allowing for improved propagation on lower HF bands.

Seasonality also plays a role in HF propagation. The Earth's position relative to the sun varies throughout the year, affecting the ionosphere's characteristics. During the summer months in the northern hemisphere, the ionosphere is generally more ionized, while the winter months can bring different propagation conditions.

Geographic location is another factor to consider. The latitude of a station can influence the propagation paths and conditions. Operators located closer to the equator may experience different propagation characteristics compared to those in higher latitudes.

Solar activity, particularly sunspots, is a major driver of ionospheric conditions. Sunspots are dark areas on the Sun's surface that correspond to intense magnetic activity. Periods of high solar activity, marked by increased sunspot numbers, can lead to improved propagation on certain HF bands. However, extreme solar

events, such as solar flares and coronal mass ejections, can disrupt communication by causing sudden ionospheric disturbances (SIDs).

Atmospheric conditions can also affect HF propagation. Weather patterns, such as temperature inversions and tropospheric ducts, can create localized propagation paths. These conditions can enhance or degrade signal strength, depending on the specific circumstances.

Understanding these factors and monitoring propagation conditions is essential for successful HF communication. By adapting their operating techniques and frequency choices, ham radio operators can optimize their chances of making long-distance contacts and overcoming challenges posed by varying propagation conditions. Several factors influence HF propagation:

- **Sunspot Activity:** Solar flares and sunspots affect the ionosphere, impacting signal strength and propagation conditions.
- **Time of Day:** The angle of the sun affects the ionosphere, leading to different propagation conditions during day and night.
- **Frequency:** Different HF bands are affected differently by the ionosphere. Higher frequencies tend to penetrate the ionosphere more easily.
- **Season:** Seasonal changes in the Earth's position relative to the sun affect ionospheric conditions.
- **Geographic Location:** The Earth's magnetic field and latitude impact propagation.

## **Factors Affecting HF Propagation in More Detail**

### **Sunspots and HF Communication**

Sunspots are dark areas on the Sun's surface that correspond to intense magnetic activity. The number of sunspots varies in an approximately 11-year cycle, known as the solar cycle. These sunspots and the overall solar activity directly impact the Earth's ionosphere, the layer of the atmosphere responsible for reflecting HF radio waves. During periods of high sunspot activity, the ionosphere is more ionized, leading to better long-distance communication on higher HF bands. Conversely,

during solar minimum, when sunspot activity is low, the ionosphere is less dense, and propagation conditions are often challenging, with communication primarily limited to lower HF bands and shorter distances.

Sunspots are a key indicator of solar activity. These regions of intense magnetic activity influence the Earth's ionosphere, the layer of the atmosphere responsible for reflecting HF radio waves. Periods of high sunspot activity, known as solar maximum, lead to increased ionization in the ionosphere, improving propagation conditions on certain HF bands.

During solar maximum, the F layer of the ionosphere becomes denser and more ionized, allowing for long-distance communication on frequencies like 20 and 15 meters. However, extreme solar events, such as solar flares and coronal mass ejections, can disrupt communication by causing sudden ionospheric disturbances (SIDs). These disturbances can lead to temporary blackouts or severe degradation of HF signals.

Conversely, during solar minimum, when sunspot activity is low, the ionosphere becomes less ionized. This can make it challenging to achieve long-distance communication on higher HF bands. However, lower frequencies, such as 80 and 40 meters, may experience improved propagation during solar minimum.

Understanding the relationship between sunspots and HF propagation is crucial for ham radio operators. By monitoring solar activity and adjusting their operating frequencies accordingly, operators can optimize their communication during different solar cycles.

### **Time of Day and HF Communication**

The time of day significantly impacts HF radio propagation. During daylight hours, the ionosphere is more ionized due to solar radiation, affecting how radio waves propagate. Higher frequencies tend to be absorbed, while lower frequencies might experience better conditions. This is why long-distance communication on HF bands is often better during the night when the ionosphere is less ionized. As the sun sets and darkness falls, the ionosphere begins to change, allowing for longer-distance propagation on higher frequencies. Understanding these diurnal variations is crucial for successful HF communication. By carefully selecting

operating frequencies based on the time of day, ham radio operators can optimize their chances of making long-distance contacts.

The time of day also influences HF radio propagation, as it affects the ionization of the ionosphere. The angle at which sunlight strikes the Earth's surface determines the degree of ionization in different regions of the ionosphere.

During daylight hours, the ionosphere is more ionized, particularly in the F layer, which is essential for long-distance communication. This leads to improved propagation conditions on higher HF bands, such as 20 and 15 meters. However, as the sun sets, the ionosphere begins to cool and become less ionized, affecting propagation conditions.

As the night progresses, the D layer of the ionosphere dissipates, reducing its absorption of radio waves. This allows for improved propagation on lower HF bands, such as 80 and 40 meters. These bands can offer reliable long-distance communication during nighttime hours, especially during periods of low solar activity.

Understanding the relationship between time of day and HF propagation is crucial for optimizing communication. By carefully selecting operating frequencies based on the time of day, ham radio operators can maximize their chances of making successful contacts and overcoming challenges posed by varying ionospheric conditions.

## **Frequency and HF Communication**

Frequency is a fundamental aspect of radio communication. It determines the characteristics of a radio wave, including its propagation behavior and the type of information it can carry. In HF (High Frequency) radio, different frequencies are affected differently by the ionosphere, leading to varying propagation conditions. Lower HF bands, such as 80 meters, are often more reliable for long-distance communication during the night due to their ability to penetrate the ionosphere more effectively. Higher HF bands, like 20 meters, are typically better for daytime propagation but can be influenced by solar activity. By understanding the relationship between frequency and propagation, ham radio operators can

optimize their communication by selecting the appropriate frequency band for their desired conditions.

Frequency, measured in Hertz (Hz), is a fundamental parameter in HF (High Frequency) radio communication. The choice of frequency significantly impacts propagation characteristics and the effectiveness of communication.

Lower HF frequencies, such as 80 and 40 meters, tend to penetrate the ionosphere more easily, allowing for long-distance communication even during periods of low solar activity. These frequencies are often referred to as "grayline" frequencies, as they can provide reliable communication during the twilight hours when the ionosphere is transitioning between day and night conditions.

Higher HF frequencies, like 20 and 15 meters, are more susceptible to ionospheric conditions. They are often better suited for daytime propagation, especially during periods of high solar activity. However, these frequencies can be affected by sudden ionospheric disturbances (SIDs) and may experience fading or absorption.

The choice of frequency depends on the desired range, time of day, season, and solar activity. By carefully selecting the appropriate frequency, ham radio operators can optimize their communication for various conditions and achieve successful contacts.

### **Seasons and HF Communication**

The Earth's position relative to the sun significantly influences HF radio propagation. During the summer months in the northern hemisphere, the ionosphere is more ionized due to increased solar radiation, leading to better propagation on higher frequency bands. However, as the days shorten and the sun's angle decreases, the ionosphere becomes less dense, affecting propagation conditions. Lower frequency bands often become more reliable during the winter months. These seasonal variations, combined with other factors like solar activity, make HF radio propagation a dynamic and challenging aspect of amateur radio.

Understanding seasonal trends is crucial for successful HF communication. By anticipating changes in propagation patterns, operators can adjust their operating

frequencies and times to maximize their chances of making long-distance contacts.

The Earth's position relative to the sun significantly influences HF (High Frequency) radio propagation. Seasonal changes affect the ionosphere's characteristics, impacting the behavior of radio waves.

During the summer months in the northern hemisphere, the ionosphere is generally more ionized due to increased solar radiation. This can lead to improved propagation conditions on higher HF bands, such as 20 and 15 meters. However, as the days shorten and the sun's angle decreases during the winter months, the ionosphere becomes less dense, affecting propagation on these bands.

Conversely, lower HF bands, such as 80 and 40 meters, may experience improved propagation during the winter months. The reduced ionization of the ionosphere allows for deeper penetration of these frequencies, enabling long-distance communication even during periods of low solar activity.

Understanding seasonal variations is crucial for successful HF communication. By monitoring solar activity and adjusting operating frequencies accordingly, ham radio operators can optimize their chances of making long-distance contacts throughout the year.

## **Geographic Location and HF Communication**

A ham radio operator's location on the Earth significantly impacts their communication experience. Latitude and longitude play crucial roles in determining the best frequencies and times for long-distance contacts. For instance, operators located closer to the equator often have an advantage in terms of HF propagation due to the ionosphere's characteristics in those regions. Additionally, the Earth's curvature affects the maximum range of ground wave propagation, which is essential for shorter-distance communication.

Understanding the relationship between geographic location and HF propagation is vital for optimizing communication strategies and achieving successful contacts.

Geographic location plays a significant role in HF (High Frequency) radio propagation. The latitude of a station can influence the propagation paths and



conditions experienced. Operators located closer to the equator may have different propagation characteristics compared to those in higher latitudes.

The Earth's curvature also affects the range of ground wave propagation. Ground waves, which travel along the Earth's surface, are more effective for shorter distances. Operators located in coastal regions may benefit from ground wave propagation over saltwater, which is a good conductor.

Additionally, the geographic location of a station can influence the availability of certain frequencies. Regulatory restrictions may vary depending on the country and region, limiting the use of specific bands. Understanding these geographic factors is essential for optimizing HF communication and selecting the appropriate operating frequencies.

By carefully considering their location and the surrounding environment, ham radio operators can make informed decisions about antenna placement, frequency selection, and operating techniques to maximize their chances of successful communication.

## **Understanding Propagation Predictions**

To maximize your chances of successful communication, it's helpful to understand propagation predictions. These forecasts, often available online or in specialized software, provide information about expected band conditions based on solar activity and other factors.

Propagation predictions are essential tools for ham radio operators, providing insights into the expected behavior of radio waves in the HF (High Frequency) bands. By analyzing factors such as solar activity, ionospheric conditions, and time of day, propagation forecasters can predict the optimal frequencies for long-distance communication.

Propagation forecasts are typically presented in the form of charts or graphs, showing the expected signal strength or absorption for different frequencies over time. These charts can be used to identify the best bands for communication at a given time. Additionally, some propagation prediction software provides real-time

updates, allowing operators to make informed decisions based on current conditions.

While propagation predictions are valuable, it's important to remember that they are not always 100% accurate. Ionospheric conditions can be unpredictable, and sudden changes can occur. Therefore, it's advisable to monitor real-time band conditions and adjust operating frequencies accordingly.

By understanding propagation predictions and using them effectively, ham radio operators can increase their chances of making successful long-distance contacts and optimize their communication strategies.

### **Practical Tips for HF Operators**

Effective HF (High Frequency) radio operation requires a combination of knowledge, skill, and experimentation. By following these practical tips, operators can optimize their communication and achieve successful results.

One of the most valuable skills for a ham radio operator is experimentation. Trying different frequencies, antennas, and operating techniques can help you discover the best approach for your specific goals and conditions. Don't be afraid to step out of your comfort zone and explore new possibilities.

An antenna tuner is an essential tool for many HF operators. It allows you to match the impedance of your antenna to your transmitter, improving power transfer and reducing standing waves. By using an antenna tuner, you can often achieve better performance with a wider range of antennas and frequencies.

Propagation software can provide valuable insights into current and predicted propagation conditions. By monitoring these forecasts, you can make informed decisions about which frequencies to use and when to expect favorable conditions for long-distance communication.

Antenna direction is also a critical factor. For directional antennas like beams, it's essential to point the antenna towards the desired direction for maximum signal strength. Experiment with different orientations to find the optimal position for your location and the desired communication path.

Finally, don't forget the importance of listening. Pay attention to other operators on the frequency, learn from their techniques, and engage in conversations. The amateur radio community is full of knowledgeable and experienced individuals who can offer valuable advice and support. By combining technical knowledge with practical experience and a willingness to experiment, you can become a successful and enjoyable ham radio operator.

- **Experimentation:** Try different frequencies and times of day to find the best conditions for your communication.
- **Antenna Tuning:** A well-tuned antenna is essential for efficient propagation.
- **Propagation Software:** Use software to predict band conditions and plan your operating schedule.
- **Antenna Direction:** Point your antenna in the general direction of the station you want to contact.
- **Listening:** Listening is a skill the best amateur radio operators have. Listen carefully to the way in which other operators work the bands. Practice listening to faint signals so you can hear important information, such as callsigns.

## **HF Signals and the F Layer**

If you plan on operating between 3-30 MHz, the HF bands, you'll need to understand how HF signals and the F layer of the Earth's atmosphere work together. While you could just skip over this section, you'll quickly find yourself in the dark, so to speak, when you suddenly can't find anyone on the bands.

The F layer of the ionosphere is a crucial component of HF (High Frequency) radio propagation. This layer, located at an altitude of approximately 150-300 kilometers, is responsible for reflecting radio waves back to Earth, enabling long-distance communication. The density and characteristics of the F layer are influenced by solar activity, time of day, and season.

During daylight hours, the F layer is typically more ionized, leading to improved propagation conditions for higher HF frequencies, such as 20 and 15 meters. However, as the sun sets, the ionosphere begins to cool, causing the F layer to descend and become less ionized. This can result in improved propagation on lower HF bands, like 80 and 40 meters.

Solar activity also plays a significant role in F layer dynamics. During periods of high solar activity, the F layer becomes denser and more ionized, enhancing propagation on a wider range of HF frequencies. Conversely, during solar minimum, the F layer is less ionized, limiting long-distance communication on higher frequencies.

Understanding the behavior of the F layer is essential for successful HF communication. By monitoring solar activity and adjusting operating frequencies accordingly, ham radio operators can optimize their chances of making long-distance contacts and overcoming challenges posed by varying ionospheric conditions.

### **The F Layer: The Heart of HF Communications**

The F layer is the most critical layer of the ionosphere for HF radio propagation. It's divided into the F1 and F2 layers, with the F2 layer being particularly important for long-distance communications. The F layer's electron density varies greatly based on factors such as solar activity, time of day, and geographic location. During the day, the F layer often splits into two distinct layers, F1 and F2. The F2 layer is typically the highest and most dense, reflecting HF radio waves back to Earth for long-distance communication.

The behavior of the F layer is crucial for HF operators. When the F layer is highly ionized, it can reflect higher frequency radio waves, allowing for long-distance communication on bands like 20 and 15 meters. Conversely, during periods of low solar activity, the F layer becomes less dense, making it difficult to propagate higher frequencies. In such conditions, lower bands like 80 and 40 meters often provide better propagation. Understanding the characteristics of the F layer is essential for predicting and optimizing HF communication.

Solar activity significantly impacts the F layer. Periods of high solar activity, marked by sunspots, lead to increased ionization in the F layer, affecting radio propagation. Flares and coronal mass ejections can cause sudden ionospheric disturbances (SIDs), leading to radio blackouts. On the other hand, during solar minimum, the F layer is less dense, and propagation conditions can be challenging.

By monitoring solar activity and understanding the behavior of the F layer, HF radio operators can make informed decisions about frequency selection, antenna orientation, and operating times. This knowledge is essential for achieving successful long-distance communication on the HF bands. Here are the key concepts you need to remember regarding the F layer:

### **Key characteristics of the F layer:**

- **Existence:** Present both day and night, unlike the E layer which disappears at night.
- **Height:** Typically, between 150 and 400 kilometers above Earth's surface.
- **Ionization:** Primarily caused by solar radiation, with variations due to sunspot activity.
- **Critical Frequency:** The maximum frequency that can be reflected back to Earth by the F layer at vertical incidence.

### **How HF Signals Interact with the F Layer**

There's a dance that takes place between HF signals and the F layer. While not a dance in the sense of human dance, it's a complex relationship between the two that joins them together.

HF (High Frequency) radio waves interact with the F layer of the ionosphere in a complex and fascinating manner. The F layer, a region of the upper atmosphere containing charged particles, acts as a reflective medium for these radio waves. The specific interaction between HF signals and the F layer depends on several factors, including the frequency of the signal, the angle at which it enters the ionosphere, and the density of the F layer itself.

When an HF radio wave encounters the F layer at a suitable angle, it can be refracted back towards the Earth. This process, known as skywave propagation, allows for long-distance communication. The density of the F layer determines how effectively it reflects the radio waves. A denser F layer can reflect higher frequency signals, while a less dense layer may only reflect lower frequencies.

The angle at which the radio wave enters the ionosphere also plays a crucial role. If the angle is too steep, the wave may pass through the ionosphere without being reflected. If the angle is too shallow, the wave may be absorbed by the ionosphere. The optimal angle for reflection varies depending on the frequency of the signal and the ionospheric conditions.

Understanding the interaction between HF signals and the F layer is essential for successful long-distance communication. By monitoring the F layer's characteristics and adjusting operating frequencies accordingly, ham radio operators can optimize their chances of making contacts with stations around the world.

HF (High Frequency) radio waves interact with the ionosphere, a layer of the Earth's atmosphere containing charged particles. This interaction can result in reflection, refraction, or absorption.

Reflection occurs when a radio wave encounters a boundary between two media with different densities. In the case of the ionosphere, the boundary is between the ionized layer and the neutral atmosphere. If the angle at which the wave strikes the ionosphere is suitable, it can be reflected, back towards the Earth. This is the basis for skywave propagation, which enables long-distance communication.

Refraction occurs when a radio wave passes from one medium to another with a different density. The ionosphere's density varies with altitude and is influenced by factors such as solar activity and time of day. As a radio wave travels through the ionosphere, it can experience refraction, causing it to change direction. This bending of the wave is crucial for skywave propagation.

Absorption occurs when a radio wave loses energy as it passes through the ionosphere. This can happen due to collisions between the wave's electrons and the ions in the ionosphere. Absorption is more pronounced at higher frequencies and during periods of increased ionospheric density. Understanding the

relationship between reflection, refraction, and absorption is essential for understanding how HF radio waves propagate and how to optimize communication. Here's what you need to remember:

- **Reflection:** HF radio waves, when directed at an angle towards the F layer, are bent back towards Earth. This allows for long-distance communication.
- **Refraction:** The F layer refracts (bends) the radio waves, changing their direction. This is essential for skywave propagation.
- **Absorption:** Some of the radio wave's energy is absorbed by the F layer, reducing signal strength.

### **Factors Affecting F Layer Propagation**

The F layer, the most important layer for HF (High Frequency) radio propagation, is influenced by various factors. Understanding these factors is crucial for optimizing communication and predicting propagation conditions.

Solar activity significantly impacts the F layer. Periods of high solar activity, marked by sunspots, lead to increased ionization in the F layer, improving propagation on certain HF bands. However, extreme solar events, such as solar flares and coronal mass ejections, can disrupt communication by causing sudden ionospheric disturbances (SIDs).

Time of day plays a crucial role in F layer dynamics. During daylight hours, the F layer is generally more ionized, leading to improved propagation on higher HF frequencies. As the sun sets, the F layer cools and becomes less ionized, affecting propagation conditions.

Seasonality also influences the F layer. The Earth's position relative to the sun varies throughout the year, impacting the ionosphere's characteristics. During the summer months in the northern hemisphere, the F layer is generally more ionized, while the winter months can bring different propagation conditions.

Geographic location also affects F layer propagation. The latitude of a station can influence the angle at which radio waves interact with the ionosphere, impacting the likelihood of reflection or absorption. Additionally, the Earth's magnetic field

can influence the behavior of the ionosphere, particularly in regions near the poles. Here are the key concepts to remember:

- **Sunspot Activity:** High sunspot activity leads to a more ionized F layer, enabling longer-distance communication on higher frequencies.
- **Time of Day:** The F layer's characteristics change throughout the day, affecting propagation conditions.
- **Season:** Seasonal variations in solar radiation influence the F layer's behavior.
- **Geographic Location:** The Earth's magnetic field and latitude impact how the F layer affects radio waves.

### **F Layer and HF Band Conditions**

The F layer of the ionosphere is a crucial component of HF (High Frequency) radio propagation. Its characteristics, influenced by solar activity, time of day, and season, significantly impact the behavior of radio waves in the HF bands.

During periods of high solar activity, the F layer becomes more ionized, leading to improved propagation conditions on higher HF bands, such as 20 and 15 meters. These bands can offer long-distance communication even during daylight hours. However, extreme solar events, like solar flares and coronal mass ejections, can disrupt communication by causing sudden ionospheric disturbances (SIDs).

During solar minimum, the F layer is less ionized, making it challenging to achieve long-distance communication on higher HF bands. However, lower frequencies, such as 80 and 40 meters, may experience improved propagation during these periods. These bands can offer reliable communication even under quiet solar conditions.

Understanding the relationship between the F layer and HF band conditions is essential for successful communication. By monitoring solar activity and adjusting operating frequencies accordingly, ham radio operators can optimize their chances



of making long-distance contacts and overcoming challenges posed by varying ionospheric conditions.

The F layer is responsible for long-distance communication on HF bands, especially during the night when the D and E layers are less dense. However, the specific behavior of the F layer varies depending on the HF band:

- **160 meters:** Relies heavily on the F layer for long-distance communication, especially during nighttime and winter months.
- **80 meters:** Can use both ground wave and skywave propagation, with the F layer being crucial for long-distance contacts.
- **60 meters:** The F layer's characteristics primarily affect the propagation of higher HF bands like 20 and 15 meters, making 60 meters less dependent on its conditions.
- **40 meters:** Offers a good balance of ground wave and skywave propagation, with the F layer playing a significant role.
- **30 meters:** Primarily relies on the F layer for long-distance communication.
- **20 meters:** Offers a mix of ground wave and skywave propagation, with the F layer being essential for long-distance contacts.
- **17 meters:** The F layer significantly influences propagation on the 17-meter band, especially during periods of high solar activity.
- **15 meters:** Primarily relies on the F layer, especially during daylight hours.
- **10 meters:** Heavily dependent on the F layer, with propagation often influenced by solar activity.

Understanding the F layer is essential for effective HF communication. By monitoring ionospheric conditions and adjusting your operating frequency accordingly, you can maximize your chances of successful contacts. Next month, we'll look at How HF Signals Travel: A Detailed Journey! We'll also look at basic antenna theory and what you need to know!

# Ham Radio News

Each month, QSA-5 searches the internet for stories about amateur radio in the news. As editor of our publication, I merely present these articles and do not take a position regarding their message or content. Our first article comes from the Osprey Observer regarding introducing non-hams to ham radio:

**Amateur Radio is Put in A New Light Thanks To Brandon Radio Club:** The Brandon Radio Club is getting people interested in amateur radio by getting them on the air at their events.

<https://www.ospreyobserver.com/2024/07/amateur-radio-is-put-in-a-new-light-thanks-to-brandon-radio-club/>

**Estate Planning for Hams (What happens to all your stuff?):** This is an important topic. Brought to you by the ARRL.

<https://www.arrl.org/news/estate-planning-for-hams-what-happens-to-all-your-stuff>

**Amateur Radio Communications SAG Wagon Support for Cycling Events:** A great Article from Cycle Chat regarding the assistance that amateur radio clubs provide for cycling events.

<https://www.cyclechat.net/threads/amateur-radio-communications-sag-wagon-support-for-cycling-events.299152/>

**Ham radio may be more important than you think:** Addressing the importance of amateur radio.

<https://www.mystateline.com/news/ham-radio-may-be-more-important-than-you-think/>

**Amateur radio club has changed my life:** This is a wonderful article that touches on the benefits of amateur radio for folks with disabilities

<https://www.bbc.com/news/articles/cd17nj8wpl8o>

**How local amateur radio enthusiasts in Colorado assist with public safety:** A good reminder of the importance of amateur radio in an emergency.

<https://coloradocommunitymedia.com/2024/07/25/how-local-amateur-radio-enthusiasts-in-colorado-assist-with-public-safety/>

**Amateur Radio Participates in World's Largest Naval Exercise:** An interesting piece from the ARRL.

<https://www.arrl.org/news/amateur-radio-participates-in-world-s-largest-naval-exercise>

**Ham radio operators showcase emergency readiness:** As the adage goes, "When all else fails." Here's an article about emergency readiness and amateur radio.

[https://lufkindailynews.com/news/local/ham-radio-operators-showcase-emergency-readiness/article\\_976174fe-f0b1-527d-a56a-4d2dd1614c0b.html](https://lufkindailynews.com/news/local/ham-radio-operators-showcase-emergency-readiness/article_976174fe-f0b1-527d-a56a-4d2dd1614c0b.html)

**Ham Radio? Is That Still A Thing?** In today's world of technological advances, is ham radio still something to be considered as relevant?

<https://incompliancemag.com/ham-radio-is-that-still-a-thing/>

## FCC Regulatory News

Here are the current regulatory changes and FCC news as it applies to Amateur Radio. This section of the QSA-5 newsletter was introduced last year. We will add new regulations and rules monthly, removing the older regulations and rules as new regulations/rules are introduced. As of the August 2021 issue of the QSA-5

newsletter, this list of FCC regulations and changes will be reduced, only covering this year's new regulations and rules. The newest regulations and changes will appear at the top of the list. Note that we are not able to cover every change the FCC has made this year within our publication. Looks like there's nothing new at the FCC, so here's last months news:

**Solar Activity Significantly Affecting Ionosphere, FCC Opens Docket for Comments on Impact:** The impact of solar activity has been driven the FCC to solicit comments regarding it's impact:

<https://www.arrl.org/news/solar-activity-significantly-affecting-ionosphere-fcc-opens-docket-for-comments-on-impact>

**FCC to Require Two Factor Authentication for CORES Users:** It seems that the powers that run the big show have found yet another fee to tack on to the amateur radio operators ability to operate:

<https://www.arrl.org/news/fcc-to-require-two-factor-authentication-for-cores-users>

**FCC To Vote on Removing Symbol Rate Restrictions:** From the ARRL regarding the digital modes.

<https://www.arrl.org/news/fcc-to-vote-on-removing-symbol-rate-restrictions>

**Job Posting: FCC Recruiting Field Agents:** In case any of you have wanted to become a field agent. Does it come with a badge?

<https://www.arrl.org/news/job-posting-fcc-recruiting-field-agents>

**FCC Grants an ARRL Emergency Request to Permit Higher Data Rate Transmissions for Hurricane Relief Communications:** The FCC has granted an [ARRL](#) emergency request for a 60-day temporary waiver intended to facilitate amateur radio emergency communications for hurricane relief.

<https://www.arrl.org/news/fcc-grants-an-arrl-emergency-request-to-permit-higher-data-rate-transmissions-for-hurricane-relief-c>

## Propagation News

Here are some links dedicated to propagation conditions, space weather, sunspot cycle information and all things related to solar conditions:

**The K7RA Solar Update:** This is the K7RA solar update, which is updated regularly:

<https://www.arrl.org/news/the-k7ra-solar-update-843>

**DX.QSI Propagation:** A simple, straightforward website for propagation conditions that is regularly updated:

<https://dx.qsl.net/propagation/>

**Radio Society of Great Britain: What's New and Propagation Now:**

A great resource from the UK version of the ARRL regarding solar activity and propagation:

<https://rsgb.org/main/technical/propagation/whats-new-propagation-now/>

**SunSpotWatch.com:**

A good general interest site for amateur radio operators who follow solar activity:

<http://sunspotwatch.com/>



## DIY Radio References

We have added a few additional links to our list and will continue to do so as we discover more websites related to the Do-It-Yourself movement! QSA-5 is going to keep adding to the original list of online resources, bringing you more resources as we find them. If there is anything you think would be useful to other club members, contact me and I will be happy to include it in this reference section.

**Microcontrollers and Single Board Computers:** With the advent of the Arduino micro-controller board, the Raspberry Pi (a single board minicomputer) and Texas Instrument's Launchpad (also a single board microcontroller), Amateur Radio enthusiasts can build both accessories, such as antenna tuners, and fully functioning transceivers. I have spent the last year at the University of California studying these devices, learning how to use them and incorporate them into electronic projects. I was able to build two HF receivers based on the Arduino and Raspberry Pi devices. The best news of all is that these devices are inexpensive! I encourage you to check these websites out!

**Arduino:** The Arduino microcontroller board was the first to popularize these devices. They are inexpensive and can be used for a variety of radio related projects.

I will include some links to radio related Arduino projects in the next issue of the QSA-5. Here's a link to the Arduino homepage:

<https://www.arduino.cc/>

**Raspberry Pi:** Did you every wish you could have a PC small enough to fit into your shirt pocket? Your dream has come true. The Raspberry Pi 4 is a fully functional Quadcore 1.6 GHz computer, about the size of a package of playing cards. It has an Ethernet jack, two USB 2 ports, two USB 3 ports and two HDMI ports. Next month, I'll post some links to radio related Raspberry Pi projects. Here's a link to their homepage.

<https://www.raspberrypi.org/>

**Texas Instruments TI Launchpad:** The Launchpad is Texas Instruments answer to the Arduino. The Launchpad is geared more towards advanced projects and is slightly more expensive. However, the Arduino still holds it own against this device. The Arduino also has more in the way of opensource software. Here is a link to the TI Launchpad homepage.

<https://www.ti.com/design-resources/embedded-development/hardware-kits-boards.html>

**Tools for electronics:** It is a lot easier to build or repair your electronics if you have the right tool. Paperclips and duct tape are not the solution to everything (unless you are McGyver – hopefully, you got the reference). Therefore, we added some links to suppliers of electronics tools.

**All Electronics:** A one stop electronics shop that has a variety of tools for your repair and building needs:

<https://www.allelectronics.com/category/780/tools-and-supplies/1.html>

**Jameco Electronics:** A supplier of decent tools at a reasonable price:

<https://www.jameco.com/Jameco/content/tools.html>

**Electronic Printed Circuit Boards (PCB):** If you design and build projects that require specific circuit boards, you know how difficult it is to find a board that will work for your purposes. Designing a board and then having it made can be expensive. Here is a company that has a large number of radio PCBs you can purchase and then add components to. They also can take your design and fabricate a PCB at a very reasonable cost. The company's name is **PCBway**:

<https://www.pcbway.com/project/>

**Electronic Components and Parts:** Many of us involved in amateur radio are constantly tinkering with electronics. It seems to be part of our genetic makeup! Here are some links to companies that sell electronic components and parts, starting with San Rafael's own Electronics Plus (Support local business).

**Electronics Plus:** It's great to have an electronics store close by for those times when you need a part immediately:

<https://www.electronicplus.com/>

**Digikey:** A good source for DIY and Maker projects as well as parts. They claim to have the world's largest selection of electronic components.

<https://www.digikey.com/>

**Jameco:** This company is a good source for almost everything, especially mainstay items such as resistors, capacitors, etc.

<https://www.jameco.com/>

**Homemade Antennas:** Many new amateur radio enthusiasts put a great deal of time and effort into researching their first radio. However, they often neglect the



most important component to a successful radio experience, the antenna. Even if you have some ham radio experience, antennas can be a daunting subject. Commercially manufactured antennas can be expensive and beyond your budget during these hard financial times. Even if you have the funds available to purchase an antenna, reading through the antenna's specs can be akin to reading some long lost ancient language. A good solution for increasing your knowledge of antennas and radio wave propagation, not to mention cutting the costs down, is to build them yourself. Here are some links to DIY (do it yourself) sites to give you a start:

Antenna building basics:

<https://www.wikihow.com/Build-Several-Easy-Antennas-for-Amateur-Radio>

Good Reference for several antenna types:

<https://www.hamradiosecrets.com/homemade-ham-radio-antennas.html>

A step-by-step guide for building a simple antenna:

<https://geardiary.com/2012/07/21/building-a-simple-ham-radio-antenna-without-soldering/>

Instructions for a VHF/UHF dual band antenna:

<https://www.instructables.com/Quarter-Wave-Dual-Band-VHFUHF-Ham-Radio-Antenna/>

Build an HF dipole antenna:

<https://www.electronics-notes.com/articles/antennas-propagation/dipole-antenna/hf-ham-band-dipole-construction-80-40-20-15-10-meters.php>

Introduction to antennas:

<https://www.onallbands.com/ham-radio-antenna-options-for-home-and-portable-operations/>

**Ham Radio QRP Transceiver Kits:** With the advent of SDR (Software Defined Radio), building fully functioning ham radios has become a lot easier and extremely inexpensive. While, having fewer bells and whistles, as well as being low power units, many have fully functional touchscreens and cover many of the HF bands:

An easy to build QRP transceiver. No soldering needed to build:

<https://www.hfsignals.com/>

An easy to build, single band CW kit:

<https://grp-labs.com/>

Offering several kits and finished transceivers:

<https://youkits.com/>

**Propagation Websites:** Propagation is a key factor in successful radio communications. Here are some links to websites that will help you with all your basic propagation needs:

Real time band conditions:

<https://qrznow.com/real-time-band-conditions/>

VOACAP band conditions:

<https://www.voacap.com/hf/>

ARRL Propagation Page:

<http://www.arrl.org/propagation>

Real Time HF Propagation Prediction:

<https://hamwaves.com/propagation/en/index.html>

**Ham Radio Websites of general interest:**

**Ham Radio News:** Here are some sites and articles you may find of interest regarding ham radio.

ARRL News Page, which is a good place to find national news regarding ham radio:

<http://www.arrl.org/news>

QRZ Now. Another good site for ham radio news from around the globe:

<https://qrznow.com/>

The Amateur Radio Newsline. An AP styled news feel page for amateur radio:

<https://www.arnewsline.org/>