



CLALLAM COUNTY  
AMATEUR RADIO  
CLUB

QTC  
SEPTEMBER 19

## **BV RAMBLES:**

My thanks to Doug WB4KGY; Paul W6IAM, Dennis AD7TV, Joe KG7JWW for their input.

Due to the Labor Day Holiday there was no Club Board meeting for September to report on.

Spent yesterday, Saturday over at Dennis's putting up his latest antenna. It defies a description and category. Dennis promises to write it up for next months QTC. I hope he does! I came home and thought I would draw it up in my EZNEC antenna analyzing software program, however after about an hour—the program threw me off telling me get real!

As I am finishing up this newsletter, Mike, VE3WDM in New Brunswick is finding for the first time in his life what a hurricane (Dorian) can do. See [https://www.amateurradio.com/hurricane-dorian-welcomes-us-to-new-brunswick/?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+amateurradiocom+%28AmateurRadio.com%29](https://www.amateurradio.com/hurricane-dorian-welcomes-us-to-new-brunswick/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+amateurradiocom+%28AmateurRadio.com%29)

Don't forget the Salmon Run (Washington State QSO Party) September 21-22. See: <http://www.wwdxc.org/salmonrun/>

73, Chuck N7BV

I miss the good old days...  
When you could actually  
have an opinion without  
Offending somebody.



**AMATEUR RADIO LICENSE CLASS**

**Dates: October 19, 26, &  
November 2 2019  
Time: 0900 to 1700**

**EXAM: November 2 at 1300**

**PA Fire 5th and Laurel Street**

**Chuck Jones N7BV  
ARRL VE-L**

**General Meeting  
Program**

**Nothing Received, but  
unofficially heard a rumor  
Dennis will present his latest  
antenna venture.**

**CCARC QTC Newsletter**

**Just a little background on the QTC.**

We use ccarcqtcc@yahoo.com as a repository for information for the newsletter. So if you have something for the QTC, please send it to the yahoo address. Do not sent it to one of the editors as they will just have to turn around and resend it to the yahoo address.

Please make sure the article or information is complete. As we rotate editing the newsletter you cannot be sure which editor will be piecing the newsletter together.

Please remove as much formatting from within whatever program you are using if you know how, before sending it to ccarcqtcc. We do not edit, except to change fonts to a standard non-serif font (Arial which is easier to read than Times Roman). We will run a spell checker.

When first conceived the editors were given free license, it still is that way. It was understood they would endeavor to include everything submitted, within reason. For instance, off color jokes etc. are not going to be printed. Thanks,

Have an idea for a club program?  
Pass them along to the members  
of the program committee.

Thanks.

We need articles and input for the QTC newsletter. This is your newsletter.

Tell us how you became interested in Ham Radio. What did you do over the summer (just like school) huh!

Did you put up a new antenna, buy a new radio? Tell us about it.

Did you try a new mode again tell us about it.

The more you submit the less blank space we will have!

**2 METER NETS**

**CCARC :**

Every Thursday 7:00 pm on the W7FEL Repeater.

**ARES/RACES:**

Every Tuesday except 1st Tuesday of the month at 7:00 pm on W7FEL Repeater.

**W7FEL Repeater:** 146.76 MHz, offset down 600 KHz. with a tone of 100 Hz.

## CCARC Ham Meeting 8-14-19

Meeting opened at 7:02 p.m. by President Ross Tyler with Pledge of Allegiance

Minutes approved as printed in the QTC.

No Board Meeting was held in August-nothing to discuss.

VP- nothing to discuss

Committee reports: COB, Net Coordinator, PR, Health and Welfare, ARES, Website-nothing to report.

Repeaters: Putting cabinets together. Forks is fabricating brackets for tower. Will be a free standing tower. Several improvements to tower.

Treasurers report: checking account balance \$7989.29. Fireworks profit was \$3671.00.

91 active members,

VEL- Dates obtained, will announce in the near future.

Newsletter: Convention was great, Joe Taylor, FT8, discussed persons bending the rules, IE working off a surfboard. No live person aboard.

New Business: Ross asked about presentation for handheld antenna building at the next meeting.

Bruce: Goat Run September 7<sup>th</sup>, 5 k. Need Volunteers to assist runners.

Meeting adjourned at 7:30 p.m. 24 members present. Social afterwards.

Respectfully submitted,

Rosemary Day KI7MZH  
Secretary

## ANTENNA MYTHS

At the end of our August meeting Ross posed a question about 'wanting to know about these antennas that are thrown up in trees' to enhance signals. This is only a reality with HF signals not VHF signals.

For VHF, one could make a vertical dipole and tape it to a stick or better make the dipole by pulling the center conductor back through the shield to form the dipole. If you have a 300ohm J-pole antenna the same goes for it—probably the best option. These antennas could then be thrown up in a tree or better, attached to a fiberglass pole, raised so the antenna is X-higher than a handheld.

Remember if your handheld doesn't have a 19" rubber ducky it has a compromised antenna and just about anything you do to make it closer to full size will enhance your coverage. However, be careful about the length and type of coax used as attenuation factor may eat up anything you gain in signal enhancement.

These fiberglass poles are readily available and as a substitute a fishing 'crappy pole' can be used. See [https://www.amazon.com/Flagpole-Go-Ultimate-Tailgaters-Portable/dp/B000OWNMRM/ref=sr\\_1\\_6?keywords=fiberglass+mast&qid=1566924745&s=gateway&sr=8-6](https://www.amazon.com/Flagpole-Go-Ultimate-Tailgaters-Portable/dp/B000OWNMRM/ref=sr_1_6?keywords=fiberglass+mast&qid=1566924745&s=gateway&sr=8-6) which adds in a tire mount to secure the mast.

The myths about throwing a wire up in a tree in HF communications comes from deployments where a quick and dirty antenna is needed. These usually end up being an end-fed X-wavelength antenna that is matched to the HF equipment with an antenna tuner.

All things considered for HF it would be better to invest in a 30ft fiberglass pole and use a Delta Loop or dipole antenna with an antenna tuner. Delta loop antennas can be fed at three different points giving different properties to radiated signals.

<http://www.n6cc.com/tactical-antenna-systems>

As RR use to say 'CU down the coax'.

73, Chuck N7BV



Front view of 440 Mhz link to Gunderson from

Doug  
WB4KGY



440 Mhz link to Gunderson from Striped Peak equipment shelf under test.



The smoke finally got out after thirty years.

## Emergency Preparedness by Joe Wright KG7JWW

I was one of the club/ARES members to spend some time as a volunteer at the county's Emergency Management booth at the county fair. During that time fair goers were asked to take a very quick and simple 1 question quiz. There was a scale that indicated how prepared you thought you were for an emergency. Sadly there are many who have never been outside of their neighborhood and many are not prepared at all but many are at least ready for a couple of weeks. Of course there was lots of information to give out to help people get ready and to even get involved in their community. Even the kids got a chance to spin the wheel and answer a question about being ready and different kinds of events. On the fun side there were even a few questions about Zombies and Vampires to keep them on their toes.

Since we were talking about preparedness that included more than just the anticipated earthquake I wanted to share an article from the American Legion. Besides belonging to all the usual and local clubs and organizations I belong to TALARC. That's The American Legion Amateur Radio Club. I'm not sure how many of us there are in this part of the world but The American Legion is doing their part and sharing the message of preparedness as you will see below!

## COMMANDER'S MESSAGE

## Preparation is our responsibility

By the time you read these words, Americans will be near the peak of hurricane season. So I hope this month's message is a waste of space.

Even if all remains calm weather-wise, however, there is never a bad time to prepare for a natural disaster. Just as The American Legion advocates for combat readiness, we are every bit as concerned about helping our communities recover from the havoc sometimes wreaked by Mother Nature.

After torrential floods struck Fort Gibson, Okla., last spring, members of Frank Gladd American Legion Post 20 stepped up by serving more than 15,000 meals to displaced citizens and first responders. We've seen responses like this before. American Legion posts across the nation became safe havens and temporary homes following hurricanes Katrina, Harvey, Irma and Maria, as well as Superstorm Sandy and too many other disasters to list here. The stories of Legionnaires who helped lead their communities through difficult times have been told many times in the pages of this magazine. They continue to inspire.

While I sincerely hope you will never have a need for assistance from the Legion's National Emergency Fund (NEF), history and science tell us that preparation is never in vain. It's a responsibility.

The NEF, which has provided almost \$9 million in grants to Legion Family members and posts affected by natural disasters, is just one of many ways our organization is a leader in nearly 13,000 communities across the nation.

The American Legion Amateur Radio Club (TALARC) has more than 2,100 ham radio operators standing by to assist in times of emergency, especially when traditional means of communication are down.

Many Legionnaires, myself included, have experience as first responders. Others served as medics, combat engineers or heavy equipment operators in the military. In addition to caring deeply about our communities and country, the American Legion Family has its own army of skilled volunteers that can be a lifeline to populations that have lost everything.

Whether it's a tornado, hurricane, flood, fire or terrorist attack, no town or city is immune from possible catastrophe. If your post doesn't already have a disaster preparedness and response chairman, why not volunteer? The Legion has the tools and resources to help you succeed, including a downloadable Disaster Preparedness Guide at [legion.org/publications](http://legion.org/publications).

This is a commitment you won't have to make alone. In addition to your American Legion Family, the Community Emergency Response Team (CERT) program offers training in basic disaster-response skills. You can receive training by registering at the CERT website, [ready.gov/community-emergency-response-team](http://ready.gov/community-emergency-response-team).

You may never need to draw on this training, but a strong disaster response plan is something every community should have in place, at minimum. For 100 years, The American Legion has been an advocate for a strong America. And that means being a prepared America.




National Commander  
Brett P. Reistad

### MEMORANDA

#### FOLLOW LEGACY RUN ONLINE

The 14th annual Legacy Run departs Aug. 18 from Lady Lake, Fla., and arrives Aug. 22 in Indianapolis, site of the 101st National Convention. Legion Riders and supporters will raise money for the Legacy Scholarship Fund along the way. Follow coverage of this year's run online.

[legion.org/riders](http://legion.org/riders)

#### "TO STRENGTHEN A NATION"

Episodes of a new centennial documentary on the history and influence of The American Legion are available for viewing online.

[youtube.com/americanlegionHQ](http://youtube.com/americanlegionHQ)

[legion.org/legiontv](http://legion.org/legiontv)  
(under "To Strengthen a Nation")

#### PURPLE HEART DAY

Aug. 7 is Purple Heart Day. On that date in 1782, George Washington established the Badge for Military Merit – forerunner of the Purple Heart. The award we know today was created in 1932, during the bicentennial of Washington's birth. The National Purple Heart Hall of Honor in New York estimates that approximately 1.8 million Purple Hearts have been awarded.

Chuck Jones <n7bv@yahoo.com>

Aug 26 at 12:47 PM

Message: 6

Date: Mon, 26 Aug 2019 13:38:22 -0400 (EDT)

From: donovanf@starpower.net

To: cq-contest@contesting.com

Subject: [CQ-Contest] 160th Anniversary of the Sept 1, 1859 Carrington Event

Message-ID:

<412655151.755762.1566841102268.JavaMail.root@starpower.net>

Content-Type: text/plain; charset=utf-8

The Carrington Event was the strongest geomagnetic storm known to have hit the Earth since at least the 14th century. Based on examinations of ice samples, scientists believe that geomagnetic storms two and three times stronger have occurred prior to the 14th century. Here's a first hand report of the effects on telegraph operations, as reported on September 5th, 1859 in the New York Times.

<https://timesmachine.nytimes.com/timesmachine/1859/09/05/79574906.pdf>

<http://www.solarstorms.org/SS1859.html>

What will happen to our technology intense civilization the next time? this happens?

73 Frank W3LPL

## **Solar weather has real, material effects on Earth**

On Sep. 1, 1859, solar astronomer Richard Carrington [witnessed sunspots that suddenly and briefly flashed brightly before they disappeared](#). Just before dawn the next day, auroras erupted over most of the Earth, reaching as far south as the Caribbean and Hawaii while southern lights were seen as far north as Chile. The event produced not only a visible light show in areas where they do not typically appear, [but it also sent telegraph systems around the world haywire](#).

Given the state of technology during Carrington's time, the impact of a geomagnetic storm was limited to disruptions of telegraph service. If something similar happened today, the world's technological infrastructure could grind to a halt. Extreme space weather events such as geomagnetic storms are [more disruptive now](#) than in the past. This is because of our greater dependence on technical systems that can be affected by electric currents and energetic particles high in the Earth's atmosphere.

**Read more at** <http://theconversation.com/solar-weather-has-real-material-effects-on-earth-118453>

## Are you missing out by remaining a Technician Class ham? Paul Honore W6IAM

At last count there were more than a thousand ham licenses registered in Clallam County and CCARC classes graduate twenty or more Technician licensees every year. Many have never advanced to General class. One can only wonder why. The Technician license keeps the newbie ham operator on a short leash, limiting transmission to VHF and UHF frequencies with limited opportunity to communicate beyond the visual horizon. Many are satisfied with these limitations and the meager extensions provided by Repeaters. If you're one of these, you don't know what you are missing.

Much has been made in recent years of the global society brought about by the internet. But to quote Old Testament King Solomon "There is nothing new under the sun." Globalization has been around a lot longer than the internet. It has been present since the first amateur radio operator put his hand to a telegraph key, called CQ and was answered by another amateur in a far off land. The communicants may have espoused very different philosophies and political viewpoints but they shared an enthusiasm for amateur radio that transcends national boundaries and differences of personal opinion. Like Col Colt's famous .44 cal. six-shooter, ham radio is a great equalizer, uniting students, professors, housewives, factory workers and politicians without regard to education or technical acumen. Consider some of the people who are or were ham radio operators and whom you might meet or might have met "on the air" without knowing it"

One such notable was Paul Tibbits, pilot of B-29 "Enola Gay" who dropped the first atomic bomb on Japan, helping to bring an end to WW-II. Tibbits shared the hobby with countless military personnel including General Curtis Le May, boss of Strategic Air Command during the cold war. Another was Soviet Cosmonaut Yuri Gagarin, the first man into space. Incidentally, most astronauts, American and foreign, are or have been radio amateurs. One has even earned a "Worked All States" certificate by making 2 meter contacts in each state as the ISS passed overhead. (I filed a formal complaint to the ARRL stating that he was given an unfair advantage not available to the rest of us.) I was told not to comment on the subject again. Well, I'm not politically correct and I am commenting on it. I'm 85 years old with one foot on a skateboard and the other on a banana peel. . What more can they do to me?

The number of politicians and government officials world-wide with ham licenses is legion, Senator Barry Goldwater was among them as well as virtually every Middle Eastern and Far Eastern head of state. Other noteworthy hams included broadcaster Walter Cronkite and aviation pioneer Howard Hughes. Compilers of statistics like to mention Ray Dolby's brother as a ham operator. He would remain obscure except that brother Ray was the inventor of the Dolby noise reduction system that has been in general use for some time. Ray was a high school classmate of mine -- a thoroughly dislikable fellow who never passed up an opportunity to remind everyone that he was a genius. He considered ham radio



beneath his dignity and refused to participate in such a "childish venture." I didn't know he had a brother. Maybe Ray didn't know it either.

The entertainment industry includes too many hams to list. Among the most recognizable are -- or were -- Broadcaster Arthur Godfrey, Donnie Osmond of Donnie and Marie fame,, Guitarist Chet Atkins, bandleader Tex Beneke, actors Marlin Brando, Burl Ives, Stuart Granger, Andy Devine and Austrian borne Fem Fatale Hedy Lamarr, inventor of spread spectrum communication. She was recognized by both the ARRL (American Radio Relay League) and IEEE. (Institute of Electrical and Electronic Engineers) for pioneering contributions to radio technology. Regrettably, most of these folks, familiar to techno-fossils like myself, have passed on (Silent Keys). They have been replaced by others, familiar to younger generations of hams.

You may never get the opportunity to meet any of them face to face and you're not likely to strike up a casual conversation on your cell phone. But, on the air, who knows? You may be surprised at who'll turn up at the other end of a casual contact. Perhaps you may find yourself discussing the weather with Princess Siridhorn, heir to the throne of Thailand or comparing the merits of vertical vs. horizontal antennas with Prince Grimaldi of Monaco. Yes, they share the hobby with you. But you'll never have the opportunity if you don't upgrade your license to General Class.

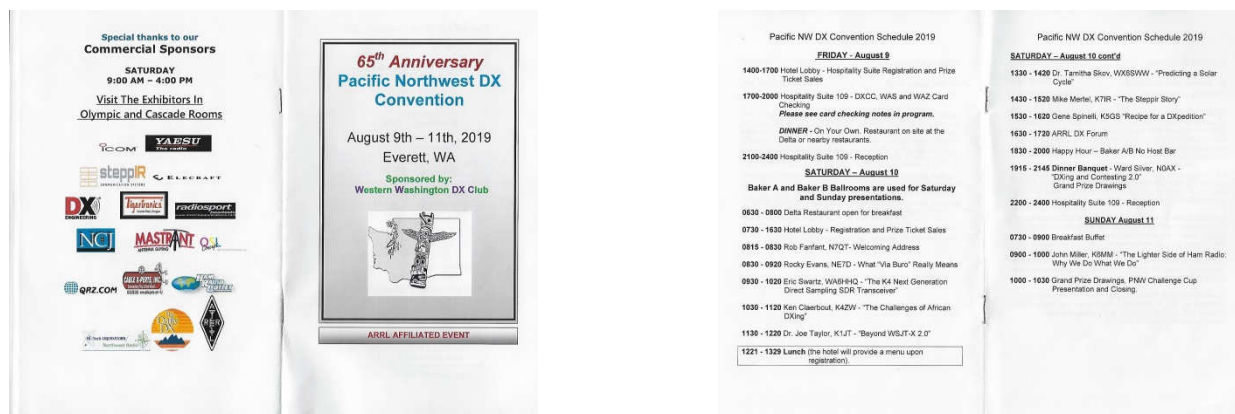
**Editors Notes:** If you do upgrade to General or above use your privileges to gain on the air experience with HF radio communications. It is not the same as VHF in that it is noisier and difficult because you have to tune in each signal vice a channel switch.

I am reminded of the story told in British Ham Radio lure of a British ham telling King Hussain of Jordan (JY1) that his callsign was incomplete because it required a suffix to complete his call!! King Hussain politely replied that he was the king and no suffix was required for him.



## PACIFIC NORTHWEST DX CONVENTION

In the August club newsletter Chuck Jones commented on the PNW DX Convention that we had just returned from. For those who missed it, you missed a great weekend!



There were an amazing number of top drawer sponsors along with a list of top shelf speakers that you rarely have the chance to hear and rub elbows with. It doesn't matter whether you are interested in contesting, finding out about the latest and greatest technology, or rag chewing and finding that next distant contact! This was the place to be to hear about it all while being able to see the new toys or purchase some old ones from an electronics supplier who even carries some of the old reliable used radios. Some of those radios sold before the dust settled on the selling tables! The bottom line is that I will be working very hard to make sure I get to the next convention in Clackamas, Oregon. They're calling it Portland but it's my old neighborhood and I want to see what they have been doing with it since we left.

One of the highlights for me was the last speaker, John Miller on "The Lighter Side of Ham Radio, Why We Do What We Do"! There were some very funny and relatable pictures and comments along with some great history! One of the things that impressed me was a segment of his talk where he reviewed some of the famous people that are or were in ham radio. I posted the video from Walter Cronkite, one of the most respected journalist of all time for me. Back then we heard the true story with a lot of sincerity when needed. But I checked out a couple of websites including, <http://www.dx-qsl.com/famous-ham-radio-operators.html> that have an amazing list of people.

For us up here in the Northwest expecting the next big shaker the list includes, Henry Richter, W6VZA who is the brother of Charles Richter, the guy who's name is on the Richter Scale.

Then there were others like Arthur Godfrey who beat Tim Allen to having a ham radio on the screen in Glass Bottom Boat. Arthur Godfrey was K4LIB.

The list goes on with Bob Moog, K2AMH who invented the Moog Synthesizer, Jim Croce WN3OQW, Joe Walsh WB6ACU of the rock groups The Eagles and the James Gang, and then there were a bunch of Dolby's like his brothers and one brother's wife, G3TZH, F5VBY and F5VBX.

As I posted on our club page it was a great time and a load of fun since it was shared with members of our club and a great carpool experience with Chuck Jones. And it was truly amazing to meet and talk to people including a Nobel Prize winning physicist who is the guy behind FT8 and FT 4.

73!  
Joe KG7JWW

## **An Arduino Controlled Stepper Motor Driven Tuning Unit for a Helically Wound Linear Loaded Magnetic Loop Antenna**

By Dennis Tilton AD7TV

Some years ago, Bob Sampson K6MBY built a Magnetic Loop antenna conceived by Rich Fusinski K8NDS. The construction details can be found at <https://www.eham.net/articles/26572> .

This antenna ultimately ended up in my back yard (Thank you Bob!).

The tuning unit used a simple DC gear motor driving a vacuum variable capacitor. The direction was controlled by a couple of switches and the speed of the motor was adjusted by a pulse-width modulated controller. There was no feedback denoting the position of the capacitor.

I used this setup for a couple of years, mainly on Coast Guard Auxiliary frequencies. I used my MFJ 259 as a tuning indicator.

The antenna is capable of tuning from below the 80 meter band to just below the 20 meter band. The Q of the antenna is very high so the tuned band width is only about 9 kHz. This is not a problem if you are working fixed frequencies on nets or doing digital communications.

Since there was no direct feedback of capacitor position, it was a bit of a pain to tune around looking for a VSWR dip. This led to the decision to add some feedback and more precision control capability.

I choose to use the Arduino micro-controller system because it is low cost and relatively easy to program.

The pictures show the hardware configuration. The tuning capacitor is a Russian, 25 kV, 500 pF vacuum variable capacitor (VVC). It is directly driven by a NEMA 17 bipolar 64 oz/in 2 Amp stepper motor. The motor is driven by a TB6600 4A 9-42 Volt stepper controller. All of these parts are located in a weather tight box on the base of the antenna loop.

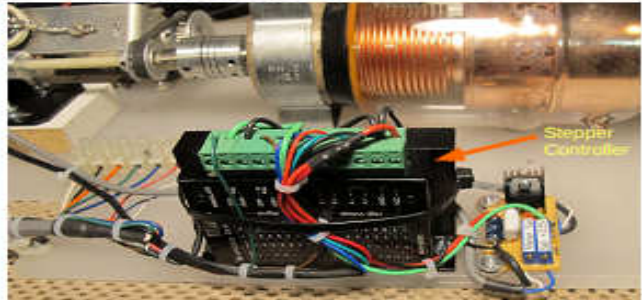
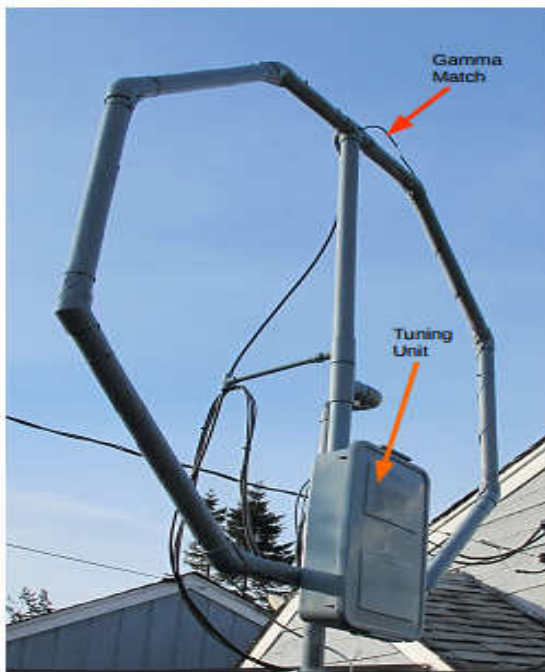
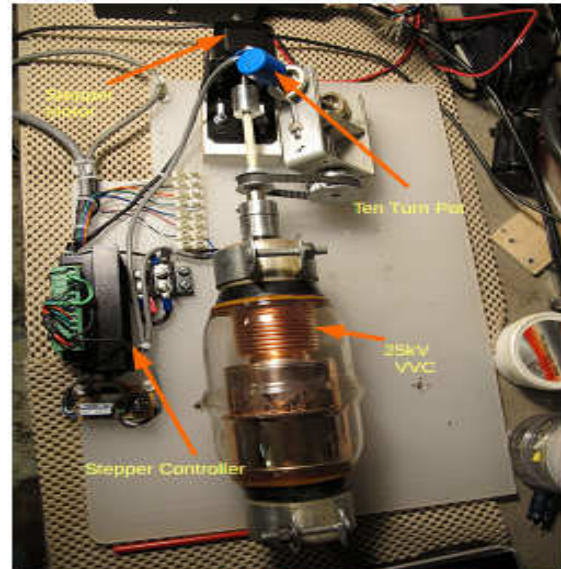
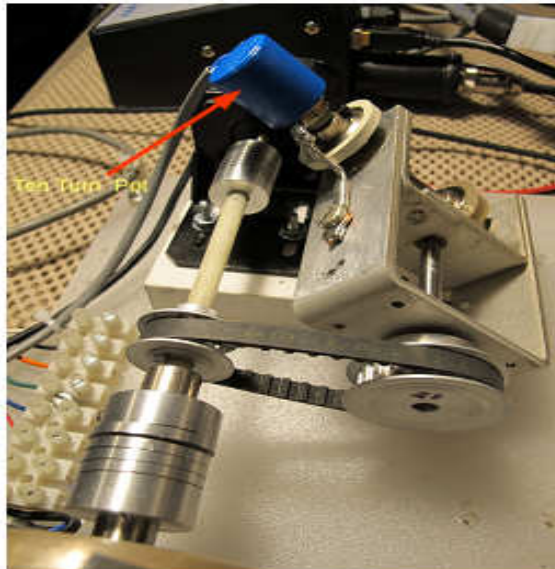
The remote control unit contains the Arduino UNO, a one axis joy-stick I stole from an old RC transmitter, an op amp to interface the joy-stick and an analog meter that is marked with the rough frequency location of the VVC.

The joy-stick allows control of the motor from a rate of one step/sec to about 200 steps/sec. The motor has 200 steps/rev. The capacitor requires 35 revolutions to go from about 20 pF to 500 pF.

The meter face is now marked with tape showing the frequencies I use.

I have purchased an AA-30 Zero antenna analyzer from Rig Experts that plugs directly into the Arduino UNO. The plan is to put the tuner under analyzer control to automate the tuning process.

This has been a fun and educational project.



### Treasurer Report

None received.

Respectfully, Joe Edwards KI7RBS  
CCARC Treasurer

#### FOR SALE TOWER HARDWARE \$25.00

Due to a failure in the drive system of my towers lifting mechanism I have removed the entire system and will be converting my tower to a fixed height use. I have the motor, the control box, and the remote control box that I built when I purchased the tower second hand. All of the material is for sale for one price for anyone who wants to salvage parts that they may need. Total price is \$25.00

This is for local pick up only as the cost of shipping would be excessive based on the weight of the material. If interested send an email to [adwjoe1207@gmail.com](mailto:adwjoe1207@gmail.com).



### CCARC Standing Committees

**Field Day Co-Chairs:** Al Fisk KD7TFK, Sheldon Koehler N7XEI

**Health and Welfare:** Nita KE7DRT

**Membership Chair:** Joe Edwards KI7RBS

**Net Coordinator:** Cori Rice KF7VZZ

**Public Relations:** Jeannine C Tyler

**Publications (Newsletter):** Chuck Jones N7BV,

**Technical Committee Coordinator:** Doug Welcker, WB4KGY, Bob Sampson K6MBY, Bill Peterson K7WWP

**VE Education and Training:** Chuck Jones N7BV

**Web Site Administrator:** Bill Peterson K7WWP

### CCARC Special Committees

**Roster:** Joe Edwards KI7RBS

**NEXT YL Luncheon**

**September 13**  
**Cafe Garden**  
**1506 East 1st St.**  
**Port Angeles**

*Find us on the web at*  
**www.olyham.net**  
**Check it out. Lots of**  
**information about ham**  
**radio in Clallam County!**

**2019 - CCARC Ladies Luncheon Schedule**

Reservations are made for 11:30 -  
 2nd Friday of each month

**September - Cafe Garden - 1506 East 1st St - Port Angeles**

**October – Paradise – 703 No. Sequim Ave – Sequim**

**November - Chestnut Cottage - 929 E. Front - Port Angeles**

**December - Cedars at Dungeness - 1965 Woodcock Rd. -  
 Sequim**

Description	Time/Date	Location	Contact
Clallam County ARES/RACES meeting	7 pm, 1st Tue of every month	Clallam County Courthouse EOC, 223 E. 4 <sup>th</sup> St., PA	
Clallam County Amateur Radio Club general meeting	7 pm, 2d Wed of every month	Port Angeles Fire Station 5th and Laurel, PA	
Clallam County Amateur Radio Club social breakfast	8 am, 1st Sat of every month	Bi-Monthly Joshua's Restaurant, PA & Mariner Restaurant, Sequim	
Clallam Country Amateur Radio Club YL social lunch	11:45 am 2d Fri of every month	Rotates - announced on Thursday night Net (See QTC Newsletter)	

[CC-ARC Welcomes new member/s:](#)

NFI

**CLUB OFFICERS For 2019**

**President:** Ross Tyler KI7WVG

**Vice President:** [Sheldon Koehler, N7XEI](#) 360-670-4799

**Secretary:** Rosemary Day KI7MZH 360-457-6895 [rosemaryday2000@yahoo.com](mailto:rosemaryday2000@yahoo.com)

**Treasurer:** Joe Edwards KI7RBS 360-808-5282 [ki7rbs@gmail.com](mailto:ki7rbs@gmail.com)

**Board Chair Person:** Jeramey Johnson, KF7PMC

**Board Member:** Cori Rice KF7VZZ 360-912-2395 [kf7vzz@gmail.com](mailto:kf7vzz@gmail.com)

**Board Member:** Jeannine C Tyler (360) 460-4236 [weblairs@olypen.com](mailto:weblairs@olypen.com)