CLALLAM COUNTY AMATEUR RADIO CLUB

QTC

APRIL 05

BV Rambles:

We have had two meetings regarding Field Day – one for Food planning and one for actual operations. The Red Cross has agreed in principle to preparing and serving lunch on Saturday.

Before the operations meeting I went out and measured the area and found it to be roughly 400x400 ft, not sure how this compares to the Sequim Prairie Grange but it sure looks smaller. On the brighter side the trees, both inside and outside the fence area sure make my mind spin with endless possibilities for antennas. The Fair Ground Manager told me we could use the trees on the other side of the fence as needed.

From the ARRL 2008 Field Day packet of information: "**Field Day is officially an operating event not a contest.** The purpose remains today as it did in the beginning: **to demonstrate the communications ability of the amateur radio community in simulated emergency situations**. Groups across the continent use Field Day as a literal "show and tell" exhibition. At sites from the tundra of Alaska to the sandy beaches of Puerto Rico, amateur radio brings together its resources to show officials in government and various agencies what "amateur radio can do."

Many clubs use Field Day as the focus of their annual calendar. Many hams that are not otherwise interested in contesting or DXing find themselves meeting various challenges to help their club run a successful Field Day operation. Officially, Field Day is not a contest. But it is the thrill of the **"non-contest contest"** that brings out the best in thousands of amateurs who under most circumstances choose not to participate in the various sponsored contests.

What makes a good Field Day? Ask that question at any hamfest and you will probably receive a different answer from each person you interview. I offer a few basic ideas to keep in mind as you contemplate a Field Day operation.

First, and foremost, is **Field Day should be a fun activity**. Field Day serves as one of the biggest introductory "drawing cards" we offer in trying to expand interest in the hobby. A Field Day that is technical in set-up may well produce a good score. But remember that a Field Day that practices **the "KISS" principle (Keep It Simple, Silly)** is more likely to attract interest and participation than one which is run like a hard-core contest.

This doesn't mean you don't do the technical planning and preparation to ensure the operation is a good demonstration of what hams can do. It does mean that you should consider having a wide-range of activities and "jobs" which will encourage participation. Yes, 40-meter CW will probably be a great way to rack up points***. But make certain that there are things for the non-CW inclined members of your group to do.*** Standing around watching one or two operators make all the contacts is a sure-fire way to kill enthusiasm among your group. "

While I am an avid CW contester, I am aware that there are few within this club who relish CW, and simply point out that this club has (in the last five years or so) NOT had a separate CW tent and antennas until last year (when Theron and I put it together) and we plan to again this year. We had and will have again this year full blown SSB operations on all bands from two tents, a GOTO tent (for non-licensed and newer hams), a VHF/UHF tent, and Digital Operations. Last year there were some delays in getting parts of our overall operations going on time, something that just happened, as they say it is hard to do two things at once – try doing four!! *Overall anyone with a license should be able to find plenty of operating time.*

Back to contesting – while there were a few who expressed concern about making Field Day a contest, it was interesting to me that these same people had smiles on their faces about how many contacts had been made. It is also interesting; the ARRL keeps referring to contest logs, deferring to contest rules in disputes and lists each category in the QST magazine by score amounts. This all indicates competition!

To me we should strive to do our best, and as long as everyone is having fun, then all should have a great weekend.

Thanks for your time and space. Chuck

26th Annual Sea-Pac Amateur Radio Conference —– Seaside, Oregon on May 30th through June 1st

For those that are going …..keep this Spaghetti dinner in mind…..

The Sunset Empire Amateur Radio Club and the Seaside Tsunami Amateur Radio Society of Clatsop County, Oregon will be holding a combined fund raising dinner in the form of an All-You-Ca-Eat Spaghetti feed on Friday, May 30th (Opening day of Sea-Pac), to be held from 5pm to 8:30pm at the Seaside Fire Hall, 150 S. Lincoln, Seaside, Oregon. There will be info booths, demonstrations, lots of door prizes (over $750 worth and climbing), and lots of raffle prizes (over $2500 worth and climbing), of both Ham and non-Ham related items. General public and Hams alike are welcomed. Cost is $7 per person (adults), $5 per person (children 6-12), and children 6 and under free (children must be accompanied by parents/guardians). Licensed hams get $1 off at the door, and entry gets you one free door prize ticket. Donations (including meal ticket) are tax deductible. At least 2 door prizes will be awarded (must be present) every 15 minutes, and raffle tickets (need not be present to win) are $1 each (quantity discounts will be available for 5 or more, with increasing breaks for larger quantities). This is going to be a fun evening, and a great end to a drive-in to Sea-Pac, knowing that a great meal will be waiting for you. As always, Sea-Pac itself will have drive-in help on the local linked repeaters (145.450/146.660/444.775, all with standard offsets and a PL of 118.8), and the Spaghetti Feed will have drive-in help on the locally used Simplex frequency of 146.400. Hope to see you there!

Ken Lucke
SEARC/STARS Spaghetti Feed Dinner Committee Chairman

Netiquette

Today many people use e-mail reflectors and internet forums as a way to share ideas, thoughts and opinions on just about anything and everything. There are literally millions of people participating in this virtual town hall.

Too often we look at words on a screen and forget that we are actually interfacing with human beings. When people used to use pen and paper to exchange ideas there were numerous opportunities to explore our emotions and organize our thoughts before we sent a message to another person. However today many are quick to react and in a split second can fire off an often hurtful and degrading message.

Here is a great web page about etiquette on the internet or
"netiquette" as it has been coined.
http://www.albion.com/netiquette/corerules.html

WARNING

When repairing an electromechanical component, such as a switch or insulating mounting bracket, if you use epoxy be sure that it does not contain metal particles. The popular JB Weld, for example, has metal filler so it would be risky to use when repairing a bandswitch.

The pure resin epoxies (usually clear or translucent) or cyanoacrylate glue would be a better choice in such an application.
Thanks, Carl KM1H and others)

EXTRA EXTRA READ ALL ABOUT IT

The Extra class (Element 4) was released December 1, 2007 and will become effective July 1, 2008.

The current Extra Pool will be valid until June 30, 2008.

CLALLAM COUNTY AMATEUR RADIO CLUB
Minutes of the General Meeting April 9, 2008

The meeting was called to order at 7:02 P.M. by club president, Chuck, N7BV.

The Pledge of Allegiance was given.

Introductions were made around.

Chuck N7BV announced Field Day is coming up (June 28-29) and he will pass a signup list around for those willing to help with various tasks. He also gave information on the Northwest DX Convention.

Bob AC7RK introduced the speaker for the evening's program: Scott Kennedy M.D., KC7UDY, from Olympic Medical Center, who gave a presentation on his Prescription for Healthy Older Adult. He noted that in Sequim, 45 % of the population is over 65. In the county, 22%. He talked about changes in medicine, the population, medical staff needs, etc. He spoke about things we can do to be healthy, such as exercise, balance, movement, flexibility, nutrition tips and more.

After a break, we learned that Wes W7MAW is ill with cancer.
It was moved and seconded to approve the minutes of the March General Meeting. Motion carried.
Chuck mentioned that there was a procedural error at the last Board meeting, and that it will be corrected at the next meeting of the Board of Directors.

A meeting to plan for food at Field Day had been held, and Burt KN7R will lead the effort.
Janet WA7JEP said the Red Cross will do Field Day lunch on Saturday as part of their training.

Dan N7DWA gave an update on ARES. For the next program, Jamye Wisecup is scheduled to do WEB EOC training. On Oct. 1st, there will be a County mass casualty training drill. Thirty "victims" (casualties) are needed. Dan also talked about the ARES registration process, and Chuck encouraged folks to get active in ARES.

Dennis WA6QWK and Bob K6MBY will lead a "Mini-Field Day" with Boy Scouts at Fort Flagler on April 19th. The Scouts want Ham Radio participation at all District gatherings.

The YL Luncheon will be this Friday at the Oak Table in Sequim.

Tom KE7XX advised that more VEs are needed to help with license testing on April 26th, as there will be 18 Technician candidates, 5 General and 4 Extra Class also. He asked for volunteers.

The drawing was held, and was won by Matt KC7EQO.

It was moved, seconded and passed to adjourn the meeting. Meeting adjourned at 9:00 PM.
There were 34 members and guests in attendance.

Minutes by Rich N7NCN

CLALLAM COUNTY AMATEUR RADIO CLUB
BOARD OF DIRECTORS MEETING May 1, 2008

Board members and officers present: Tom Newcomb KE7XX, Bob Sampson K6MBY, Rich Golding N7NCN, Chuck Jones N7BV, David McCoy KE7JEJ, and Bill Carter W7WEC.

The meeting was called to order at 1:45 PM by Tom Newcomb, Board President.

There was discussion about establishing a process to get desired changes to the bylaws. It was suggested that the secretary could extract the item to be changed from the minutes and keep it in a folder until time to discuss and vote on the changes.

Minutes of the board meeting of March 20 were read. (They had been approved by the board members via e-mail previously).

The motion was made and seconded to rescind from the record the motion passed in the last meeting that stated, "Moved: to move members from the active list and QTC list to an inactive list if dues are not paid by March 31st". The new motion passed.

It was moved and seconded that an activity list be formed enumerating responsibilities of the club officers to administer requirements for DNR, annual insurance, repeater coordination, and any other function that is required periodically. Motion passed. (The secretary was assigned to create the activity list.)

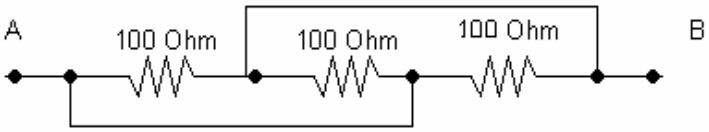
David McCoy reported the club has $3,349.40 in the checking account. There is a $1,000 CD coming due in May. There was discussion whether to cash it out or roll it over for another six months. It was moved and seconded to roll over the CD. The motion carried.

It was noted that the club has one hundred six members, including paid members and life members.

It was moved, seconded and passed, to adjourn the meeting. Adjourned at 2:32 PM

Minutes by Rich Golding

Here's a challenge for you. What's the resistance between point A and Point B? We'll have the answer in next months QTC.



Submitted by Bill Carter W7WEC

(you must also tell us where we would use this circuit Bill...ed.)

COMING EVENTS

Seaside Convention
May 30—June 1 in Seaside, Or

Field Day June 27– June 29
The winning ticket for the Kenwood D710A mobile will be drawn during dinner time on Saturday, June 28th.

Clallam County Amateur Radio Emergency Service (CCARES)

The Clallam County ARES is organized in two levels; as an affiliate of ARRL/ARES and as the recognized RACES organization by the Clallam County Division of Emergency Management. Membership in CCARES is open to all licensed Amateur Radio Operators that are residents of Clallam County, who first register with ARRL/ARES through the Emergency Coordinator. They are not required to attend training meetings and function as a second response unit in emergencies.

CCARES members in good standing may register in the RACES program with the Clallam County Division of Emergency Management (CCEM) and serve as a primary responder during emergencies. RACES members are the core of the organization and are expected to attend training meetings and participate in drills and other events.

WSPR

WSPR is the name of a computer program. It is pronounced "whisper", and stands for "Weak Signal Propagation Reporter"; it implements transmitting and receiving functions for a digital soundcard mode called "MEPT_JT", which stands for "Manned Experimental Propagation Tests, by K1JT". WSPR generates and receives signals using structured messages, strong forward error correction, and narrow-band 4-FSK modulation. Its principal design goal is reliable copy at very low signal levels. In practice it works well at signal-to-noise ratios down to -27 dB in a reference bandwidth of 2500 Hz.

WSPR is being used on all band from 160 to 6 meters. It does not appear to do well at 2 meters. On 10 MHz. I have been heard as far away as Australia with 1 watt to a wire antenna and to the east coast on 1.8 MHz. with 5 watts to a wire antenna.

Who says you need high power to be heard??

Bob
K6MBY

“What is ham radio all about?” by Bob Sampson K6MBY

Over the years I have been many places where I am asked what ham radio is all about. I have always struggled with the answer tending to go right to the technical stuff because it was the easiest for me to answer. The dazed recipients walked away, however, still having no idea what ham radio was all about but is filled with lofty acronyms such as SSB, Ionosphere, 75 meters, MFSK, WSJT and RTTY.

I never gave a lot of thought to the right answer until recently. I was perusing an old 73 magazine given to me by Frank Doherty, KJ7SK, and ran across an article in a year 2000 issue by Donald Koehler, N7MGT. He wrote that "hams far to often push the hobby itself..... not what the hobby represents."

Yup, guilty of that. Not wanting to reinvent the wheel, I imagined that the ARRL must have some thoughts on “what the hobby represents.” I contacted Mark Spencer, WA8SME, who is the ARRL National Association for Amateur Radio Education and Technology Program Coordinator. Mark agreed that I had a $10,000 question and felt that some of the ARRL Boy Scout presentations may have the answer and agreed to mail them to me. While rummaging around on the ARRL Teachers Institute web pages if found these following words of wisdom.

> Amateur Radio provides integration of technology, math, science, geography, writing, reading, and speaking through hands-on application of these concepts either individually or in a group.
>
> Amateur Radio encourages investigation and experimentation as a basis for understanding technical subjects.
>
> Amateur Radio encourages communications via a variety of methods: voice, various digital techniques, Morse code, and even Amateur Television. They also communicate by using satellites and bouncing signals off the moon.
>
> Amateur Radio encourages public service through the links with state and federal disaster preparedness agencies.
>
> Amateur Radio holds few roadblocks for people with disabilities. Many people who are physically challenged or visually impaired are able to participate in communicating with simple adaptive devices.
>
> Amateur Radio offers a platform for life-long-learning through an active hobby that encourages competition in contesting, spreading international goodwill through friendships developed over years of communicating and advancement in technology by experimentation.

OK, now we are getting somewhere. These six points really do hone in on the question “what ham radio is all about?”

I knew Ward Silver, N0AX, did a great deal of public speaking when he was not wearing his lab coat so I emailed him seeking his thoughts. The following was received from Ward. (BTW, Ward will be our program speaker for the June CCARC meeting)

> “Hi Bob,
>
> Yes, that's a tough one...
>
> To pique their interest, I tell people that ham radio offers the most powerful package of communications technology available to the private citizen in the world. I point out that everything else - mobile phones, the Internet, CB, FRS, etc - is either controlled by third-parties or is far more limited in capability. That usually gets the discussion going.

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Once beyond that, I tell them that there are five reasons that amateur radio exists (these are based on the Basis and Purpose - FCC 97.1):

Providing emergency communications in the service of one's community. I use the "ants at a picnic" metaphor - no matter what happens, there will probably be a few of us that are able to show up and help provide communications until the guys with the green trucks show up. Because there are lots of us and because our equipment is portable and because we are flexible, we can serve as the glue to patch things back together in a limited, but very useful way. We work with governmental agencies and private institutions as well as individuals. Ham radio is an excellent way to support your fellow citizens and your community in time of need.

Exploring the magic of wireless technology. When I am operating on the traditional shortwave HF bands, I can literally hear the world turning as propagation changes with the position of the sun! Ham radio is a way to learn about and interact with the Earth's environment in a whole new way. Hams are aware of solar and geomagnetic phenomena the average citizen never experiences. We use basic physical principles to guide us in building our own antennas. Ham radio is a window on a set of experiences of which most people are completely unaware.

Learning new ways to communicate. Because ham radio is a hobby, hams are free to experiment and try all kinds of things. Ham radio generates a steady stream of inventions and innovations that benefit everyone. For example, hams invented packet radio that is now widely used to send data by radio for hundreds of different applications. Hams invent new types of antennas, discover ways that signals bounce around the Earth, and construct new types of equipment. Hams also put together different kinds of communication technology to create brand-new systems - for example, GPS receivers plus packet radio create APRS that tracks individuals, vehicles, wildlife, boats, etc. Melding email software with shortwave radio transmissions has created Winlink - a worldwide system of email exchange where the Internet can't go, useful for travel and in disaster relief.

Training private citizens in electronics and wireless technology. More people than ever are finding that it's fun to experiment with building, modifying, tinkering, inventing. Ham radio is the original electronics hobby that combines all of those things. Ham radio can be combined with robotics, astronomy, modeling, flying, hiking, biking, computers, geocaching, camping and RVing - any other hands-on type of activity. This provides an opportunity for the individual to learn and grow in an enjoyable and useful way. This is good for individuals and for our society - we depend on technology to keep our society going.

We promote contacts (literally) between people of all backgrounds, all over the world. Ham radio includes children and senior citizens, garage tinkerers and Nobel prize recipients, blue collar workers and CEOs. On the international shortwave bands, communication between people is direct and effective with no intervening telephone or data network. Competitive events (contests) bring thousands of people to the airwaves all at once to have a big international sporting event in which everyone can participate from every corner of the globe.

I have grown to have more and more appreciation of Part 97.1 - it states clearly the justification for what we do and why we are encouraged to do it. The technology will change, but these principles will remain consistent.

Does that help?

73, Ward N0AX"

Wow, between Ward's wonderful description and the ARRL Teachers Institute input we ought to be able to put together a great brochure for field day. The brochure outline could also be used by you and I as an outline to answer the question, "What is Ham Radio all about?"

Look for the brochure in next months QTC. In the meantime, feel free to use the above talking points when attempting to answer the question, "What is Ham Radio all about?"

VE Testing

Saturday, 26 April was a beautiful day for being outside – for those of us who participate in our club's VE training sessions and exams it was also a great day.

Our training sessions on 12, 19 and the morning of the 26th of April were attended by 13 Technician class and 4 General class candidates. This was the first running of both the Technician and General Class levels together. We used two separate rooms most of the time, bringing the groups together for several common chapters.

The exam session consisted of 28 persons; 19 of them took their Technician level exam; two of these went on to pass their General level exams, along with 6 others who upgraded to General; and two of our club members took and passed the Extra class exam. There was one failed exam.

So the final totals were 16 new Technicians; 8 new Generals; and 2 new Extra class licenses.

We even had a few scores of 100% impressive – yes, especially on the Extra Class.

The session was the largest I have seen since immigrating up here in the fall of 2002.

Congratulations to all from the VE Test Team

Taking the exam

VEs grading the exams

SB QST @ ARL $ARLB008
ARLB008 Court Finds FCC Violated Administrative Procedure Act in BPL Decision

ZCZC AG08
QST de W1AW
ARRL Bulletin 8 ARLB008
From ARRL Headquarters
Newington CT April 25, 2008
To all radio amateurs

SB QST ARL ARLB008
ARLB008 Court Finds FCC Violated Administrative Procedure Act in BPL>Decision

The US Court of Appeals for the District of Columbia Circuit today released its decision on the ARRL's Petition for Review of the FCC's Orders adopting rules governing broadband over power line (BPL)>systems. The Court agreed with the ARRL on two major points and remanded the rules to the Commission. Writing for the three-judge panel of Circuit Judges Rogers, Tatel and Kavanaugh, Judge Rogers summarized: "The Commission failed to satisfy the notice and comment requirements of the Administrative Procedure Act ('APA') by redacting studies on which it relied in promulgating the rule and failed to provide a reasoned explanation for its choice of the extrapolation factor for measuring Access BPL emissions."

The Court agreed with the ARRL that the FCC had failed to comply with the APA by not fully disclosing for public comment the staff studies on which it relied. The Court also agreed with the ARRL that the Commission erred in not providing a reasoned justification for its choice of an extrapolation factor of 40 dB per decade for Access BPL systems and in offering "no reasoned explanation for its dismissal of empirical data that was submitted at its invitation." The Court was not persuaded by the ARRL's arguments on two other points, on which it found that the Commission had acted within its discretion.

The conclusion that the FCC violated the APA hinges on case law. "It would appear to be a fairly obvious proposition that studies upon which an agency relies in promulgating a rule must be made available during the rulemaking in order to afford interested persons meaningful notice and an opportunity for comment," the Court said, adding that "there is no APA precedent allowing an agency to cherry-pick a study on which it has chosen to rely in part."

The Court continued, "The League has met its burden to demonstrate prejudice by showing that it 'has something useful to say' regarding the unredacted studies citation omitted that may allow it to 'mount a credible challenge' if given the opportunity to comment." Information withheld by the Commission included material under the headings "New Information Arguing for Caution on HF BPL" and "BPL Spectrum Tradeoffs." The Court concluded that "no precedent sanctions such a 'hide and seek' application of the APA's notice and comment requirements."

With regard to the extrapolation factor, the Court ordered: "On remand, the Commission shall either provide a reasoned justification for retaining an extrapolation factor of 40 dB per decade for Access BPL systems sufficient to indicate that it has grappled with the 2005 studies, or adopt another factor and provide a reasoned explanation for it." The studies in question were conducted by the Office of Communications, the FCC's counterpart in the United Kingdom, and were submitted by the ARRL, along with the League's own analysis showing that an extrapolation factor closer to 20 dB per decade was more appropriate, as part of the record in its petition for reconsideration of the FCC's BPL Order. The Court said that the FCC "summarily dismissed" this data in a manner that "cannot substitute for a reasoned explanation." The Court also noted that the record in the FCC proceeding included a study by the National Telecommunica

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tions and Information Administration that "itself casts doubt on the Commission's decision."

The briefs for the ARRL were prepared by a team of attorneys at WilmerHale, a firm with extensive appellate experience, with assistance from ARRL General Counsel Christopher D. Imlay, W3KD. Oral argument for the ARRL was conducted by Jonathan J. Frankel of WilmerHale. Oral argument was heard on October 23, 2007; the Court's decision was released more than six months later.

After reading the decision, General Counsel Imlay observed, "The decision of the Court of Appeals, though long in coming, was well worth the wait. It is obvious that the FCC was overzealous in its advocacy of BPL, and that resulted in a rather blatant cover-up of the technical facts surrounding its interference potential. Both BPL and Amateur Radio would be better off had the FCC dealt with the interference potential in an honest and forthright manner at the outset. Now there is an opportunity to finally establish some rules that will allow BPL to proceed, if it can in configurations that don't expose licensed radio services to preclusive interference in the HF bands." ARRL Chief Executive Officer David Sumner, K1ZZ, added: "We are gratified that the Court decided to hold the FCC's feet to the fire on such a technical issue as the 40 dB per decade extrapolation factor. It is also gratifying to read the Court's strong support for the principles underlying the Administrative Procedure Act. Now that the Commission has been ordered to do what it should have done in the first place, we look forward to participating in the proceedings on remand, and to helping to craft rules that will provide licensed radio services with the interference protection they are entitled to under law."

ARRL President Joel Harrison, W5ZN, concluded: "I am very pleased that the Court saw through the FCC's smoke screen and its withholding of valid engineering data that may contradict their position that the interference potential of BPL to Amateur Radio and public safety communications is minimal. The remand back to the FCC regarding their use of an inappropriate extrapolation factor validates the technical

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competence of Amateur Radio operators and especially of the ARRL Lab under the direction of Ed Hare, W1RFI. We are grateful for the work of our legal team and especially for the unflagging support of the ARRL membership as we fought the odds in pursuing this appeal."

CCARC Program for Wednesday, May 14th, 7 pm, at PA Fire Station

Our presentation this month will be one of the many fascinating facets of Paul Honore, W6IAM. Paul, when not teaching new Tech students as a volunteer instructor for our club, serving as the Resource Manager for the ARES group, among his many volunteer endeavors, has developed the curriculum for a Basic Electronics class he is also teaching to Club members. No moss grows on him! Not even when he was in the jungles of Borneo tracking down headhunters!

In 1973, Paul was asked to produce the sound track for a film documentary on Iban headhunters. What began as an innocent "What if?" quickly evolved into the ultimate "Expedition" – but without the radios.

He explains, "In one of my former lives, I was owner and chief bottlewasher of a motion picture production studio in Santa Clara, California. After some negotiation and much promise of remuneration, it was decided that I would provide a film crew to travel to Sarawak, Borneo, to track down and record the exploits of one Rumah Rentap, a renegade Iban who, in defiance of Malaysian law, was known to have taken several heads earlier that year. I assembled a crew of myself, as sound technician, a writer, two cinematographers and a couple of backup personnel and we made two month-long expeditions up the Skrang and Rejang Rivers in search of our quarry. We didn't get what we were after -- exactly -- but it turned out to be one hell of an adventure anyhow! Just thought the club might be interested in something a little different."

Electronic Fundamentals (Unit-3)

Resistance; Kirchoff's Laws

There are three things that characterize every electronic circuit, **resistance, capacitance, and inductance**. Individually or in combination, they can be a real pain. They can also be useful if they are deliberately introduced and kept under strict control. For the moment, we'll consider them useful as individual circuit components.

In this unit, I'll discuss **resistance**. The unit of measurement for resistance is the **Ohm**, **(Ω)** Remember Ohm's Law from Unit-1? It is named for the German Mathematician and teacher, Georg Ohm, who found that the current carrying capacity of a conductor is directly proportional to its cross section and inversely proportional to its length. Even a "perfect" conductor has some resistance to the flow of current. That's why the *National Electric Code* specifies maximum fuse sizes for standard gage wiring -- so that the heat generated by the resistance of the wire to a current flowing though it does not exceed safe limits. The relationship between Voltage, current and resistance -- Ohm's Law -- is a cornerstone of electrical theory and application.

Besides the resistance of the conducting material itself, which we don't want, we often introduce specific amounts of resistance into a circuit to limit current flow and to divide voltages. To this end, standard sizes and values of resistors are available. They can be classified into two broad categories: Fixed and variable. The schematic symbols for them look like this.

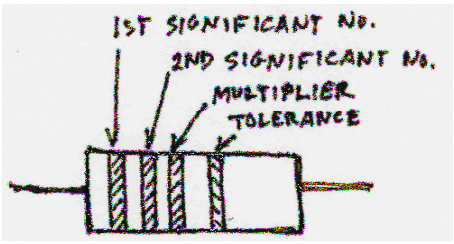
(Fig-1)

The effect of resistance, wanted or unwanted, is to convert electrical energy into heat, so resistors are manufactured in assorted wattage sizes to dissipate heat safely without burning up. Smaller wattage resistors are generally made from carbon composition or metallic film deposited on plastic or ceramic cores. Larger sizes are usually wire-wound on ceramic or glass.

Resistors in the ¼ to 2W range are color coded in **ohms,** and tolerance in **% of marked value**.

VALUE	COLOR	TOLERANCE	COLOR
0	**Black**	**20%**	**None**
1	**Brown**	**15%**	**Silver**
2	**Red**	**10%**	**Gold**
3	**Orange**	**1% and better have printed markings**	
4	**Yellow**		
5	**Green**		
6	**Blue**		
7	**Violet**		
8	**Gray**		
9	**White**		

During WW-II there was a ditty that worked as a memory aid having to do with "Bad boys" and "Victory Garden Walls" but it's too raunchy to print. After the war, the part about Victory garden walls was changed and the result was even raunchier so I can't mention that one either. You'll have to make up your own limerick to help you remember the colors. Here's how the color code works.

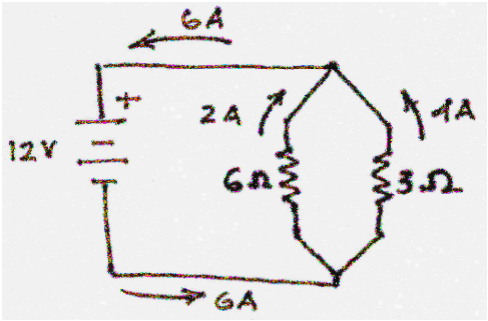


(Fig-2)

The color bands are grouped at one end of the resistor. The first two bands are read directly as significant numbers and the third is a multiplier. For example, **red, red, yellow** would read 2, 2 and 4 zeros or **220,000Ω (220K)**. Color bands of **black, green, brown** would read 0, 5, and one zero, or **50Ω** If this were followed by a silver band **(10%)**,

the actual value of the resistor could be anywhere between 45 and 55Ω, and if the band were gold **(5%),** the measured resistance could fall anywhere between 47.5 and 52.5Ω. Fixed resistors of more than 2W are usually wire-wound with printed markings.

We are at a point now where we need to examine some more laws, this time by the Prussian scientist Gustav Kirchoff. He took Ohm's Law a step farther and postulated **that *The sum of the currents flowing toward any junction or node, is equal to the sum of the currents flowing away from that junction.*** This is known as **Kirkhoff's 1st law**. **Kirchoff's 2nd law** states that ***The algebraic sum of the voltages around any closed path is zero***. These laws may be self evident or they may look like pure gibberish. It's best to visualize them in actual circuits to see how they work. Let's see what Kirchoff's First Law looks like in practice:



(Fig-3)

We'll connect a **6**Ω resistor and a **3**Ω resistor as loads across a **12V** battery. This is called a ***parallel circuit***. For two resistors in parallel, there is a shorthand method of calculating their equivalent resistance -- **the product of the resistors divided by their sum**. In this case:

6Ω X 3Ω divided by 6Ω + 3Ω, 18 / 9 = 2Ω.

Ohm's Law tells us that the current flowing from the negative battery terminal, through the load, and back to the positive terminal is **I = E / R.** therefore,

I = 12 / 2, I = 6A.

Now let's se if Mr. Kirchoff has it right. He states that the sum of the currents flowing through the individual resistors must equal the current flowing in and out of the battery. First, we'll calculate the current flowing through each resistor.

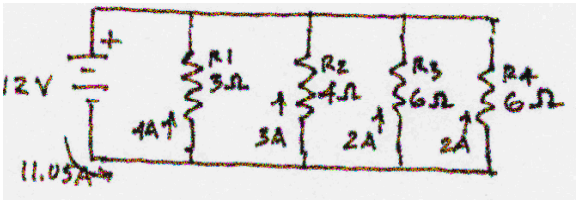
The current flowing through the **6**Ω resistor is **12 / 6 = 2A,**
and the current through the **3**Ω resistor is **12 / 3 = 4A**.
So, we have a total of **2A+4A = 6A.**

Ohm and Kirchoff agree, so far. Now, let's examine Kirchoff's 2nd law. The algebraic sum of the load currents and the supply current should equal zero. We know that the supply current is **6A** and the load currents are **2A** and **4A**, respectively, therefore:.

6 - (2+4) = 0.

Again, Mr. Kirchoff is vindicated. You might wonder why do all this math to prove the obvious? Because, in the real world of troubleshooting, nothing is obvious. There is often a current drain through some hidden load and this is a way to ensure that all currents in a circuit are accounted for.

Before we leave parallel circuits, I'd better say that the shorthand method for calculating resistors in parallel doesn't work for networks of more than two resistors. For three or more resistors, you'll; have to use the formula: **R total = 1 / (1/R1 +1/R2 +1/R3 +1/R4, ETC)** Let's try this for a network of parallel resistors equal to **3**Ω**, 4**Ω**, 6**Ω, and **6**Ω**.** across a **12V** battery**.**



(Fig-4)
R total = 1 / (1/3+1/4 +1/6 +1/6), R total = 1 / (.33 +.25 +.17 +.17),
R total = 1 / (.92), R total = 1.087Ω.

Using ohm's law, we can now calculate the current from the battery and the currents flowing through the individual resistors.

The total current , I = E / R is **12 / 1.087 = 11.05A.**

As a check, let's calculate the current through each of the resistors and see if they add up.
R1 current is **12 / 3 = 4A**
R2 current is **12 / 4 = 3A**
R3 current is **12 / 6 = 2A**
R4 current is **12 / 6 = 2A.**
Adding them together we get **4+3+2+2 = 11A**
(Not to worry. The difference between 11 and 11.05 is the number of places carried by my calculator. The result is close enough for jazz.)

Now, let's take another example, this time for a complex current flow.

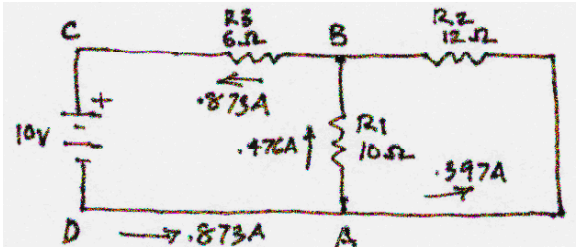


Fig-5)
Current leaves the battery and divides at junction A to flow through resistors R1 and R2, where it re-combines at junction B to flow through R3. The circuit can be broken into two parts with Resistors R1 and R2 comprising a parallel circuit which, in turn, forms a series circuit with R3. The first thing to do then, is to solve for the equivalent value of the parallel circuit.

(R1XR2) / (R1+R2). (10X12 / (10+12), 120 / 22, R equivalent = 5.45.

Now, this value can be added to R3 to obtain the total circuit resistance.

5.45+6 = 11.45

The total current flowing in the circuit is:

I = E / R, I = 10 / 11.45, I = .873A.

Next, we must calculate the voltage drop across the parallel branch of the circuit.

I = E / R, .873 = E / 5.45, .873 X 5.45 = E, E = 4.76V.
The current through R1 is **I = E / R, I = 4.76 / 10, I = .476A.**
The current through R2 is **I = E / R , I = 4.76 / 12, I = .397A.**
This adds up to **4.76+.397 = .873A.**

All of this current will flow through R3. As a double check, we can calculate the voltage drop across R3 and see if Mr Kirchoff is right this time.

I = E / R, .873 = E / 6, 6X.873 = E, E = 5.24V.

The voltage from junctions A-B , added to the voltage from junctions B-C should equal the battery voltage at C-D. **4.76 + 5.24 = 10.** Just as it should!

A series circuit is a lot less complicated. Regardless of their number, resistors in series simply add in value. To prove it, let's build a ***series circuit*** using the same resistors and battery.

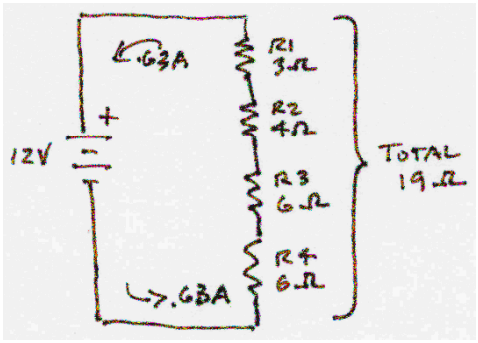


Fig-6)

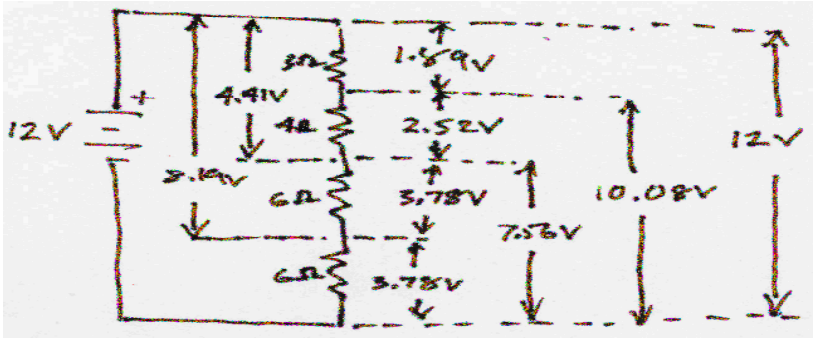
Since the resistors are in series, their values simply add for an equivalent load of **19**Ω. According to Ohm's law, current flow in the circuit is.

I = E / R, I = 12 / 19, I = .63A.

Current is the same in all parts of a series circuit, so we can now calculate the voltage drop across each resistor.

The voltage drop across **R1** is **.63 X 3 = 1.89V**
The voltage drop across **R2** is **.63 X 4 = 2.52V**
The voltage drop across **R3** is **.63 X 6 = 3.78V**
The voltage drop across **R4** is **.63 X 6 = 3.78V**
For a total of **(1.8+2.52+3.78+3.78) = 11.97V**

In theory, the battery voltage minus the voltage drops across all of the resistors should equal zero but, once again, I've been done in by my calculator. The difference of .03V is not enough to worry about and is quite acceptable. The circuit just illustrated is a useful and common ***voltage divider*** -- a way to obtain more than one voltage from a single source. As shown, a lot of different voltages can be obtained from the circuit.



(Fig-7)

Using ohm's law and Kirchoff's laws, you should be able to calculate the equivalent resistance of the most complex circuit. In this unit, I described the resistor as a circuit element, introduced Kirchoff's Laws, and showed how to calculate the equivalent resistance of series and parallel circuits. In the next unit, I'll introduce the multimeter and describe its operation..

Paul Honore' W6IAM

FOR SALE OR TRADE

~ ~ ~ ~ ~ ~ ~ ~ ~

I am looking for work on weekends and after school (2:30) to make money to pay for my Drivers Ed. I can be reached at (360)452-6614 **or ke7lka@yahoo.com Thanks, Jody**

~ ~ ~ ~ ~ ~ ~ ~ ~

2m/440 dual band J-pole antenna. Excellent antenna and price $20. Similar to http://arrow-antenna.com/j-pole.html Made by KN7R. Proceeds to ARES**. Chuck, N7BV or Burt, KN7R**

~ ~ ~ ~ ~ ~ ~ ~ ~

M F J Deluxe Versa Tuner II MFJ-949E Used very little. Price $100.00
Tom Newcomb KE7XX Ph: 452 8228

~ ~ ~ ~ ~ ~ ~ ~ ~

►ICOM IC-746 transceiver with power supply and speaker
►includes CT-17 interface
►MFJ-986 Differential tuner
►Heil microphone and cable for ICOM radio
I would like to sell it complete, as a bundle, asking $1000.00. The radio has been boxed since 2003 due to our move. All are in great shape with no issues.
Scott, NF7Y, 683-8771

~ ~ ~ ~ ~ ~ ~ ~ ~

HI, I have a Drake T4XC and R4C for sale or trade.
Would like Swan gear, or an MFJ antenna analyzer. The Drake's work FB, although cosmetically they are abt a 5-6 on a scale of 1-10.
Also have a shure desk mic, in poor condition but it does work. It is missing the battery cover on the bottom. Also included is the Power supply for the drake XMTR, which is also missing the case. These radios have FULL output (150W) on 80-40-20 and 15M, slightly less on 10M (75-90W).
You can contact me on the striped peak repeater, eamil me at: **foureyes779@gmail.com, or call me at 360-928-0127. Thanks Theron**

FOR SALE OR TRADE

Hallicrafter SX 99 with speaker, make offer

Call Laurel Parker 452-8564

VOC Frank Doherty ARRL VE

~ ~ ~ ~ ~ ~ ~ ~ ~

Hi all:
Ed Hammer, W7WVY(?) has asked me to post a long list of equipment he has for sale. You can view at: http://www.robin-wood.com/Ham/equipment.htm

It looks to be mostly 1950-1970's vacuum tube gear. I know nothing about items so you'll have to contact him for further info.
Contact info is available in the posting.

Please pass the word. I only sent this to those in my address book I thought might be interested.

73's, Neil, WA7NBF

~ ~ ~ ~ ~ ~ ~ ~ ~

WANTED:

Older lap top computer, (any brand,) that is still serviceable and will accept Windows XP. I want it for field day logging programs, and other amateur related programs only. **Bruce Thompson W7DNA**

Thursday Night Club Net

Congratulations to the following for 100% CCARC Net checkins for April
N7BV, Chuck
KE7DRT, Nita
N7HFL, Chuck McGilvra
W6IAM, Paul
AC7IY, Mary
KE7JEG, Roy Grafstrom
K7NIA, John
KE7RFO, John Coffel ..1st time 4 him..:)
WX7RIK, Rik Scairpon ..1st time for Rik as well!! :)
W7RJW, Becky
K7WZ, Bill
W7YLV, Al

Good job!

Nita KE7DRT NC Coordinator while John on vacation.

Electronics Fundamentals class

Session 1 15 March
Session 2 5 April
Session 3 10 May
Session 4 19 June

Paul Honore' W6IAM

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.

77 Hz tone for Carlsborg Receiver and 186.2 Hz tone for the Ellis Receiver.

Treasurers Report
As of May 2nd, 2008:

First Federal Savings & Loan of Port Angeles Balance is: $4,016.25

Outstanding Cheques:	- 517.00
Current Book Balance:	$3,499.25
CD at WestSound Bank (6-month):	$1,000.00
CD at WestSound Bank (18-Month):	3,000.00
Total Cash Assets:	$7,499.25

The 6-Month CD is due to mature this month and the Board has decided to reinvest it at WestSound Bank for another 6-months (along with interest earned) at the prevailing rate on the day of maturity (will be less that the original rate due to a decline in the market).
David—KE7JEJ

May and early June Birthdays

Ray, Jody	KE7LKA	May-07
Carter, William	W7WEC	May-14
Dundas II, John	W6SU	May-21
Stearns, Bob	KI7ZC	May-28
Wilkinson, Herb D	KA7PXL	May-31
Baker-Wilson, Jan	N7JAN	Jun-02
Golding, Rich	N7NCN	Jun-05

Yls Birthdays

Falls, Darlene	KD7TFL	May-07
Moore, Barbara	K7NIA	May-17
Ladwig, Genevieve M.	WB0NAI	May-30
Jones, Karen	N7BV	Jun-05
Dundas II, Jody	W6SU	Jun-06

Happy Birthday!

NEXT YL LUNCHEON

9 June
Danny's
JC Penny Plaza
Time: 11:30 a.m.

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

2008 - CCARC Ladies Luncheon Schedule
Reservations are made for 11:30 – 2nd Friday of each month

April – Oak Table – 292 W. Bell – Sequim
May – Downriggers – 115 E. Railroad Ave. – Port Angeles
June – Danny's - JC Penny Plaza – Next to Police Sta. – Sequim
July – Michaels – 117 – 1st St. – Port Angeles
August – Tarcisios – 609 W. Washington – Sequim
September – Sergios – 205 E. 8th – Port Angeles
October – Fortune Star – 145 E.Washington - Sequim
November – Chestnut Cottage – 929 E. Front – Port Angeles
December – Paradise – 703 S. Sequim Ave. - Sequim

Description	Time/Date	Location	Contact
Clallam County ARES/RACES meeting	7 pm, first Tue of every month	Clallam County Courthouse EOC, 223 E. 4th St., PA	Chuck Jones N7BV 360-452-4672
Clallam County Amateur Radio Club general meeting	7 pm, second Wed of every month	Port Angeles Fire Station 5th & Laurel Streets, PA	Tom Newcomb KE7XX 360-452-8228
Clallam County Amateur Radio Club social breakfast	8 am, first Sat of every month	Joshua's Restaurant Hwy. 101 & Del Guzzi Dr.	Tom Newcomb KE7XX 360-452-8228
Clallam Country Amateur Radio Club YL social lunch	11:45 am 2d Fri of every month	Rotates - announced on Thursday night Net	

CLUB OFFICERS For 2008

President: Chuck Jones N7BV	360-452-4672	n7bv@yahoo.com
Vice President: Bob Sampson K6MBY	360-582-9116	k6mby@olypen.com
Secretary: Rich Golding N7NCN	360-683-9309	n7ncn@myfam.com
Treasurer: David McCoy KE7JEJ	360-461-5470	mccoy.d.r@olypen.com
Chairman of the Board: Tom Newcomb KE7XX	360-452-8228	ke7xx@arrl.net
Board Member: Bob Kennedy AC7RK	360-457-6177	ark@tenforward.com
Board Member: Bill Carter W7WEC	360-681-4375	bcarter@olypen.com