CLALLAM COUNTY AMATEUR RADIO CLUB

QTC

DECEMBER 08

BV RAMBLES:

As we, Bob, K6MBY, and I pass off the baton to the newly elected 2009 CCARC officials we want to take this opportunity to thank all of you who supported us, and the club the last two years. It was fun seeing all the new hams get their licenses and join the club.

We have over 120 paid members now. This represents over 100 percent growth of paid members since December of 2006.

Bob and I enjoyed bringing some different things to the club meetings like the raffle and introducing a break with coffee and cookies. A time where people can exchange greetings, get to know one another, ask a question or two (and maybe get an answer?). Sometimes we were lucky enough to have baked goods by Nita.

As directed by the bylaws we have used the board to approve all changes to the club. To Bob and I, the business of the club is done by and through the board, of which the President and Vice-President are non voting members. Our hats are off to 2007 Board Chairman, Roger Steelman, W7GRS, and 2008 Board Chairman, Tom Newcomb KE7XX. They did a tremendous job offering advice and recommendations for the good of the club.

While the thank you list could go on and on it is you the club members who by your spirit, encouragement, interest and support made the accomplishments of these last two years possible.

Bob and I will be part of the club for a long time to come, but it is time for a change in at helm. We believe this will bring about a stronger club. Thank you.

Finally please have a Merry Christmas, wonderful holidays and see you at the CCARC Christmas Party on the 14th.

73, Chuck

Society for the Preservation of Amateur Radio

SPAR Announces Winter Field Day 2009

Field Day is perhaps the most popular of the many activities enjoyed by Amateurs. Every June the bands come alive with improvised signals proving the ability to respond to emergencies. The event also offers an opportunity for camaraderie and a chance to test ourselves in less than ideal circumstances, however, emergencies and natural disasters don't always happen in the summer. Winter winds, icy limbs and bitter cold replace the thunderstorms and blistering heat of summer. To test our abilities to operate in the winter, in 2007 SPAR established a Winter Field Day event and invited all Amateur Radio operators to participate. In both 2007 and 2008 the event was enjoyed by many and considered a success and has been designated an annual event to be held the last full weekend each January. Therefore it is time to issue the invitation for the Third Annual SPAR Winter Field Day!

The 2009 Winter Field Day will be held from 1700 UCT (12:00 noon EST) Saturday January 24, 2009 through 1700 UCT (12:00 noon EST) Sunday January 25, 2009. The object of the event is familiar to most Amateur Radio operators: set up emergency-style communications and make as many contacts as possible during the 24 hour period. The rules encourage as many contacts on as many bands and modes as possible, because during a real emergency, the most important factor is the ability to communicate, regardless of band, mode or distance.

The official rules can be found at the SPAR web site. The event is open to all amateurs, although we encourage everyone to join in the discussions and other activities sponsored by SPAR. Information about SPAR can be found on the SPAR Home Page. Membership is free and open to all amateurs who want to encourage technical and operating skills. You can register by going to the SPAR Forum and registering, using your amateur callsign as your user name.

Please join with SPAR in promoting amateur radio and keeping our bands alive!

See page 3 for a complete set of Field Day rules.

73, Becky W7RJW

Society for the Preservation of Amateur Radio

The SPAR Winter Field Day

Purpose: To encourage emergency operating preparedness in the winter.

When: 24 hours from 1700 UCT (12:00 noon EST) January 24, 2009 to 1700 UCT (12:00 noon EST) January 25, 2009. Station set up may begin no earlier than 1300 UCT (8:00 AM EST) on January 24, 2009.

Bands: All bands, except 12, 17, 30 and 60 meters.
Modes: Any mode.
Categories:
a) Number of operators: 1, 2, Multi
b) Site: Indoor, Outdoor, Home
For example, 2 operators at a remote campground would be 2O, 1 person at home would be 1H, 5 club members operating from a community center would be MI.
Exchange: Callsign, True RS/T (not all 599), Category, local outside temperature (with F or C). For example 1 person from a campground where the temperature is 28 F might send "KX5XYZ 449 1O 28F" or "KX5XYZ 449 1O -2C"
QSO Points: 1 point per QSO, regardless of band and mode. The object is to be able to communicate and in an emergency it doesn't matter what band and mode is used. Busted exchanges will be penalized by 1 additional point for each missed exchange or callsign. Duplicate contacts (same station, band and mode) will not be counted, but will not be penalized.
Multiplier: Count 1 multiplier for each mode operated per band. For example, operating CW and Phone on 80, 40, 15 and 10 meters, CW and PSK31 on 20m, FM on 2 meters and satellite on 1.2 GHz would be a total multiplier of 12.
Bonus: Count 1000 points if commercial power is not used, 1000 points if outdoors and 1000 points if not at home. For example, operating outdoors in your backyard without commercial power would be 1000 + 1000 = 2000 points (outdoors, no commercial power), while operating from a campground tent using commercial power would be 1000 + 1000 = 2000 points (outdoors and not home).
Final Score: QSO Points x Multiplier + Bonus Points.
Logs: Logs should be submitted to "winterfd@spar-hams.org" by February 29, 2008 to be considered. All logs should contain the following information:
Frequency (kHz)
Mode (CW = CW, AM SSB FM = PH, Digital = DI, SSTV = TV, Satelite = SA)
Date and time (UTC)
Callsign, RS(T) and Exchange sent
Callsign, RS(T) and Exchange received
Results will be posted on the SPAR website and included in The Roundtable. Pictures, description of operations and logistics are encouraged and welcome.
Definitions:
Location - the place where an amateur station is setup for the contest.
Home - operating from the place where an amateur station is normally established. If the station used in the contest is setup before 8AM local time, it is a home operation.
Indoor - operating from inside a building at a temporary location where amateur radio is not normally available, including community centers, etc. If it has a permanent roof and walls, it's indoors.
Outdoor - operating from remote locations with no permanent building, including campgrounds, tents, RV's, etc.
Band - the normal amateur band allocations recognized by the ITU, i.e. 160, 80, 40, 20, 15, 10, 6, and 2 meters, plus the UHF bands. To be counted as a band, at least 1 valid QSO must have taken place on the band during the contest. 75 meters counts as part of 80 meters.
Mode - CW, Phone (including SSB, AM, FM), Digital (including PSK, RTTY, and soundcard modes), SSTV, satellite.
Operator - Any person that operates the radio, keyboard, microphone or CW key, including logging assistance. This does not include non-operators, such as someone who brings food, but does not participate in operating.
Miscellaneous:
- All rules governing amateur radio must be observed throughout.
- The decisions of the SPAR BoD is final.

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.

Clallam County ARES/RACES

Clallam County ARES/RACES is actively seeking new members and would like you to consider joining. This is a chance to prepare to be part of a solution during an emergency.

All RACES members will be required to pass the FEMA/NIMS training IS-100 and IS-700. These courses are free and have been mandated by Homeland Security. They are available on-line at http://training.fema.gov/EMIWeb/is/.

Dan Abbott, N7DWA, EC Clallam County

CLUB DUES TIME…..

It is time to prepare to re-up for the Clallam County Amateur Radio Club by submitting your 2009 Annual Dues of $20.00

You may begin bringing in your payments of Cash or Cheque (Payable to CC-ARC) to December's Meeting on the 10th (Please note: Dues will not be collected at the Christmas gathering on the 1st of December).

You may also mail them to:

CCARC

PO Box 2562

Sequim, WA 98382

Your dues will cover you (& your XYL, if not a licensed Operator) for the year as well as … (Chuck, fill in the rest). If you want a family membership where both members will have voting privileges, please send in $30.00. (see By-Laws Article IX, Pages 5-6, for further clarification: http://olyham.com/CCARC_By-laws_2007.pdf)

Dues not collected by the end of January 2009 will be removed from the Membership Roster.

Thanks for all you do to make our Clallam County Amateur Radio Club such a Great Organization!

David R. McCoy, KE7JEJ

We need articles for the QTC newsletter. This is after all your newsletter.

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

The more you submit the better our newsletter will be.

Thanks, the staff!

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.

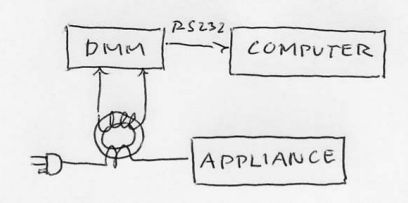
A current-sensing transformer to monitor appliance duty cycle

Do you ever wonder how often your furnace comes on and for how long it burns in a given time period? How about the duty cycle of your refrigerator or freezer? Camping alongside an appliance for hours or days and taking notes every time it turns on and off isn't my idea of a fun time. It probably isn't yours either. So, what to do? If you're lucky enough to have a Digital MultiMeter (DMM) with an RS-232 output and a PC or lap-top computer, you have a way to monitor and record events over long periods of time.

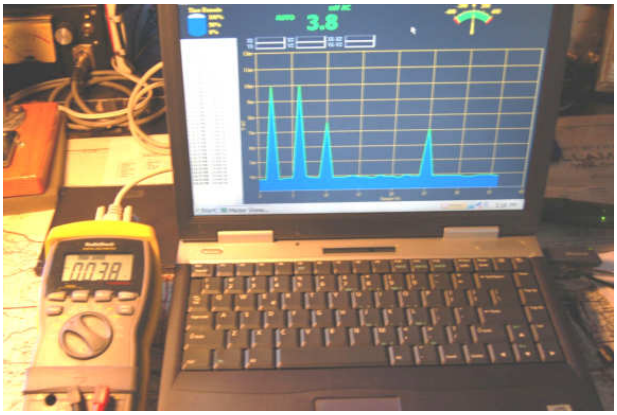
A simple AC current sensing transformer can be made from a toroid and a few turns of hook up wire. Here's how to do it. Start with a toroid core of about 1" diameter. The kind doesn't matter, Anything that will concentrate and confine a magnetic field will do. Wind as many turns of hook-up wire that will fit on the core. I used 18 gage insulated wire from *Radio Shack*, but anything will do. Current in the wire is negligible so size isn't important. This winding will be the secondary winding of a transformer and the output to your DMM.

Take a length of 3-wire line cord and strip back a foot or two of the outer covering to expose the individual wires. Wrap two or three turns of the black (hot) wire around the toroid to make the primary winding of the transformer. Be sure to wind the wire in the same direction you did for the secondary winding. Now connect one end of the line cord to a 3-wire plug and the other to a socket to make a short extension cord. Be sure the green wire is connected to the U-ground terminal at both the plug and the socket.

That's all there is to it. Plug the sampling extension cord into a wall outlet and to the appliance you want to monitor, connect your DMM to the secondary winding of the transformer and set it for a convenient reading. Mine puts out 35mVAC for an appliance current of 15A. The actual voltage isn't important, as long as it is enough to provide a distinct reading. All that is needed is a GO-NO GO response. Connect the RS 232 output from the DMM to a computer serial input. If you are using a lap-top, it probably won't have a DB-9 input connector so you'll have to use a DB-9 to USB interface



Your DMM should have software that displays data on the computer screen, sets a convenient sampling rate, and records time and voltage for each sample. You can go about your business and let the computer log events for you. You can print the data later for a permanent record.



Paul Honore' W6IAM

CLALLAM COUNTY AMATEUR RADIO CLUB
Minutes of the General Meeting November 12, 2008

The meeting was called to order at 7:00 P.M. by club president, Chuck, N7BV.

The Pledge of Allegiance was given, then, introductions were made around.

The program was a presentation given by Sue Rainey, a nurse from Olympic Medical Center, on hospital group communications. This had to do with training and integration of new staff into a group. Some notable points include the fact that when we train, we train in attitudes as well as a skill set. Nurses tend to adopt the personality of their "preceptor". It is important to call a spade a spade, and not lead trainees into false hopes. It is important to choose one's words carefully. (These points can be applied to any training.)

After break, Chuck N7BV asked users of the repeater to pay attention when they hear a repeater error announcement, and report it promptly to Chuck N7BV, Bob K6MBY, or Bill Johnston K7WZ.
Chuck put in a plug for the OMC programs which are available to the public.
The Mike and Key Club Flea Market is coming up. The date will be announced.
Al Fisk KD7TFK has some old handhelds to get rid of.
The Club budget has been created, and will be sent by e-mail to members for comments to David KE7JEJ, thence to the Board of Directors.
It was noted the club has 126 members.

Nominations were conducted for next year's club officers:

President: Nita Lyman KE7DRT. Vice President: Dennis Tilton AD7TV. Secretary: Lee Diemer KE7TTY.
Treasurer: David McCoy KE7JEJ. Board Member (3 years): Matt Lawson KC7EQO, Al Dawson W7YLV.
Board Member (2 years): Carol Harty KE7OMR, Steve DeBiddle W6MPD.
It was moved that the nominations be closed for this evening. Seconded and carried.
(Further nominations will be accepted at the December meeting.)

Chuck mentioned that Matt got the club generator working. While not in the best condition, it runs. It is a Honda 5 KW 120/240 Volt machine. (It will be advertised for sale in QTC.)

Johan KO6I stated his HF station is available for use on contest Saturdays. He also proposes having a hands-on class for soldering and kit building, on Jan. 10, 17, and 24. If interested, contact Johan. (KO6I@olypen.com)

From Chuck: VE sessions (class and testing) will be held in April and September. Except for these two sessions, a minimum of 5 applicants will be required. Testing can be arranged at other times and places if needed.
The Christmas Party will be given on December 14th at St. Andrews Episcopal Church in Port Angeles. Please RSVP to Leah WB8BVK or Chuck N7BV by December 7th. Kayla

It was moved that the meeting be adjourned. Seconded and carried. Adjourned at 8:37 PM.

There were 32 members and guests present.

Minutes by Rich N7NCN.

MS Publisher vs MS Word

You may have noticed that the newsletter is back in the Publisher format. Microsoft Word for this type of document just did not work very well.

Since most club members do not have MS Publisher on their computers, it is Chuck and my recommendation that the club purchase two copies of Microsoft Publisher to be given to two new volunteer editors.

Several of you mentioned interest in editing the QTC. If you still have an interest and would like to learn MS Publisher (not difficult) please let Chuck or me know.
73, Bob K6MBY

Ham Radio – Early Activities
by Paul Benadum, WB8BVK

No, I'm not trying to do a Top 40 recall of my years as a ham radio operator. It is amazing though how much the equipment and technology has changed in the intervening years. As much as it seemed to be an ordeal taking the exam for General it was just one of my activities in radio leading up to that day and set me up for the next year. Up until getting my license I spent many hours helping my Dad and brother building electronic kits (Heathkit, Knight-Kit, etc.). I don't think I learned much electronic theory building the kits although reading and trying to understand the "Circuit Description" sections of Heathkit's manuals probably rubbed off on me. I did learn how to solder and be able to tell the difference between a soldering gun and a soldering iron. One thing that I'll probably never forget is the resistor color code (and no fancy adage to help remember it by). Two years of electronic shop at school didn't hurt either. I also put in a lot of radio time. Although, without the license I couldn't transmit, I could listen all I wanted. Not only did this help with learning the code (especially on HF) but I could also check out the local ham activities on VHF (6 and 2 meters). One of the kits we built the previous year was a Knight-Kit TR-106, a 6-meter AM transceiver and an external VFO (variable-frequency oscillator) with a whopping 10 watts input to the final stage. I can still see the blue crackle finish on the radio instead of the traditional black on military surplus equipment. At that time there were several groups that held either daily or weekly nets, just chewing the fat. By the time I got my license I knew several of the people by their callsign. I had never met them but I knew who they were. One of the net discussions was talk of the upcoming high school football season and the "football net". It seemed that a group of hams in the Dayton area would set up a net on Friday evening and report the scores of the various games as they happened. Wow! Live reporting so to speak. Remember, this was 1968. It was handled on 2-meters AM. I asked the main net control op if they needed anybody to cover the Xenia High School games. "Yes, of course", was the response and I was encouraged to join in the fun. He also mentioned that usually you could get into the games for free if you asked the right person. That sure seemed like icing on the cake. The "right person" was the school sports director who also gave you permission to set up a station at the football stadium. Looking back, a purist might say that getting in for free could be construed as payment for services. But that is 20/20 hindsight and we were providing a much needed public service (at least in my youthful mind). My Dad had given me a gift, for getting my license, a used… ahem, previously operated, 2 meter AM transceiver. It was a Heathkit HW-20 Pawnee, an AM tube-type transceiver that could also handle CW and MCW (modulated CW). This 10-watt out, 15-20 pound rig would be my "portable" station at the football games. But I get ahead of myself.

The way the football net worked was to have an NCS (net control station) somewhat centrally located in the area of coverage. It was usually someone who was at a decent elevation or had a tower with a good beam (Yagi) antenna that was horizontally polarized (the elements were horizontal like a TV antenna instead of the typical vertical configuration of 2-meter FM antennas now). Us "scouts" were located at the various athletic fields. I only covered my high school's home games. Some really diehard hams drove between 2 or more stadiums and reported from their mobile stations. The current crop of hams probably can't believe all the trouble we went to just to pass football scores around. My station consisted of the 2-meter radio, 25' of electrical extension cord, two 5' TV antenna masts, a 5-element 2-meter beam antenna (that folded up) and a pair of headphones (that doubled as ear muffs as the season progressed and temperatures fell). With the help of my brother we got to the stadium about an hour before game time. Trying to carry everything in one trip, we hauled the equipment to the top of the grandstand (the all metal, solid flooring type) near the press box. First thing was to run the power cord into the press box and get the radio plugged in so that it would be all warmed up by game time. Then we'd clamp the first antenna mast to the metal railing at the very top of the grandstand. Unfold the antenna and clamp it to the second mast and then set it on top of the first. This gave us enough height to keep people from walking into any of the elements. More importantly it gave us as much height as possible to get our signal out. We would also inform the press box announcer that we would be providing scores from other games throughout the course of the evening. This was important as they never seemed to remember what we were doing just ten feet away. It also gave us an ego boost as they would give us credit during the half-time activities. Sometime

in the last 30 minutes before the start of the game the NCS would come on the air and start asking for check-ins to see which games were actually being covered. This time was also used to zero in on the frequency and get our antennas pointed in the correct direction. These weren't rock stable synthesized rigs. They had tuning dials and also drifted (especially when they were designed to be used in the comfort of a warm ham shack not outdoors in 50° humid conditions).

By game time we had checked in and could settle down and wait for our game to start, passing the time making up a sheet of paper with a grid of games covered and quarterly scores. After that it was pretty simple. At the end of each quarter I'd call in the current score for our game. Concurrently I'd be copying down the NCS's list of scores from other games. Many times the NCS conducted a round-robin of all the stations and then read the list of scores back so that everyone got a copy. Sometimes I could hear other stations but mostly all I heard was net control. Once we had an updated list my brother would run it to the press box announcer so they could read out scores of interest over the P.A. system. Towards the end of the season the press box would start getting antsy for league play scores as the result of one of the other games could affect the result of our game. After the game it was our "goal", pardon the pun, to tear down the station as fast as possible and haul everything back to the car and home where we could warm up.

Contrast that experience with how it would be done today. I remember, in the late 70's, how "easy" the operators had it. Where with lightweight FM HT's and repeaters they didn't need to set up an antenna system and the crystal, or better yet synthesized, rigs meant set and forget the frequency. Present day one would wonder what all the fuss was about. Individual fans can talk to friends at other games or better yet text them. Maybe even send pictures/video. At my first couple of games we got comments from the press box that this was so much better than having someone run out to a pay phone and call up another stadium to get scores. Now practically everybody carries a cellphone. What really seemed like a needed and useful application of ham radio back then has fallen victim to ever evolving technology. Ah, the good ol' days indeed!

Figure 1 is a picture of the Pawnee radio. Transmit and receive frequencies could be set separately or combined together with one knob. Alas, I am not aware of any pictures taken of our operation at the football stadium. In fact I don't think we ever took any pictures of us working the radios until Field Day operations in the 1980's. The antenna we used was described as a "broomstick beam" in the ARRL "The Radio Amateur's V.H.F. Manual", 1968, pgs. 200-202. I made boom from a piece of 1" x 2" pine that was cut in two and held together with a small door hinge, thus allowing it to be folded for transport. When unfolded a U-bolt spanned across the two halves to keep it rigid and attach the antenna to a mast. Holes were drilled through the mast at the appropriate locations and the wire elements passed through. They were held in place with hot-melt glue. With some thought it could probably be adapted for vertical polarization and used for an emergency antenna. They are pretty cheap to make. I made a second one with a piece of scrap conduit and heavy fence wire. The design seems to be fairly forgiving and for a beginner that is pretty important.

Figure 1 Heathkit HW-20 Pawnee

Electronic Fundamentals, Part-1 (Analog Circuits)

Unit-9 Transistors

The invention of the transistor is shrouded in a fog of controversy. Near the end of WW-II, Bell Labs put together a team of scientists and engineers to come up with an alternative to the vacuum tube switch that was then being used to route transcontinental telephone calls. The team was headed by Bill Shockley but the actual invention of the transistor is still being disputed in claims and counter-claims. I remember Dr. Shockley storming into the Stanford High Energy Physics Lab, where I was working. He tossed a handfull of what looked like pinheads sprouting wisps of copper wire onto my workbench. "Try these," he said, and he stormed out again without further comment.

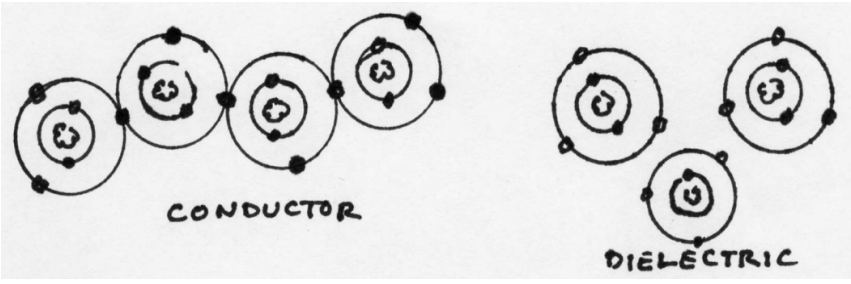
The mysterious bits of metal were germanium *point transistors* --prototypes of a technology that would soon revolutionize the electronics industry . After burning out most of them, trying to figure out what they were and how to use them, I got one to respond in a crude sort of way. It didn't impress me much. A few days later, Dr. Shockley returned and demanded, "What do you think?" I told him. I never saw him again. I went on active duty with the Navy and he started a manufacturing company in Palo Alto.

It took several more years for the transistor to catch on. No one realized at the time that those mysterious little lumps that Bell Labs envisioned back in the 1940s would come to redefine the 20th century and transform the south Bay Area from a center of microwave research into what we've come to love or to hate as "Silicon Valley".

The transistor operates much like the vacuum tube in practice There are connections labeled **"Emitter", Base** and **"Collector"** that function like the cathode, control grid and plate in a vacuum tube but that's about as far as it goes. The physics of operation is quite different.

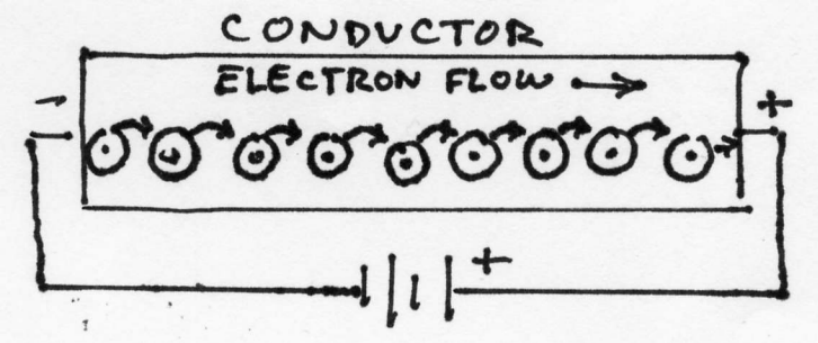
Atoms of matter comprise a positively charged core surrounded by a cloud of orbiting electrons. The classic view is something like the solar system with the sun (core) at the center and planets (electrons) orbiting in neat, predictable tracks around it. it's an okay view but, in reality, it's a bit more complicated. The core or **nucleus**, is composed of positively charged particles, (**protons)** and neutral particles, **(neutrons). Electrons**, equal in number to the protons, orbit the nucleus in layers. These layers are like clouds and it is impossible to predict the exact position of a given electron at a given time.

In a conductive material, such as copper, adjacent atoms are closely spaced and electrons in the outer orbits are shared between atoms, adding to their unpredictability but giving them a potential for mobility.



(Fig 9-1)

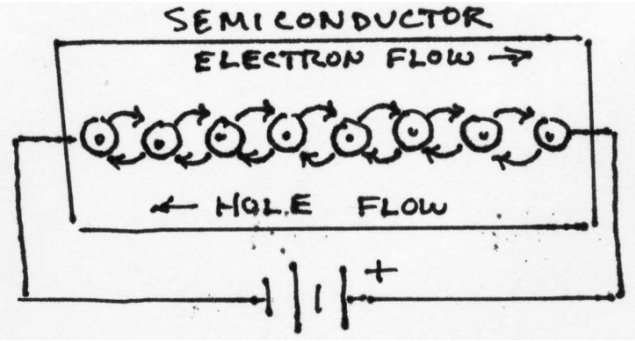
If a difference of potential is applied across the conductor, electrons are attracted from the more negative to the more positive charge. They move to adjacent atoms which, in turn, release electrons that move to other atoms, and so forth. The result is that current flows in the conductor.



(Fig 9-2)

In an insulating material (**dielectric**), the atoms are widely spaced and their electrons are bound more tightly to the nucleus so they are not free to move from atom to atom as they do in a conductor. A semiconductor, however, has it both ways.

In a crystalline material such as Germanium or Silicon, electrons are bound to the nucleus in a rather loose fashion so that it takes only a small amount of energy to free them and the material switches from an insulator to a conductor. Here's where things get complicated. When energy is added to a semiconductor, electrons, (negative charges) are freed from their atoms and leave positively charged **"holes**" behind. The electrons move in one direction along the crystalline lattice to create a conventional flow of current. At the same time, electrons from adjacent atoms move in the opposite direction to fill the holes.



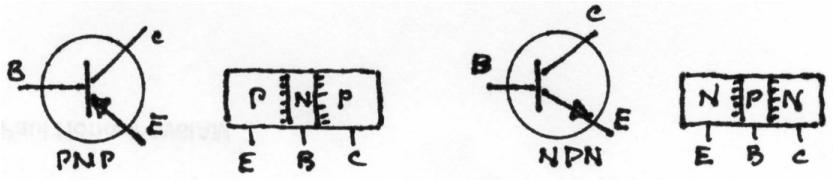
(Fig 9-3)

The effect is that the holes appear to be flowing in the opposite direction to the electron flow. It's like firing a bullet at a mirror. Imagine an electron as the bullet and the approaching hole as its reflection. Two kinds of current flow in the semiconductor -- negatively charged electrons and positively charged holes.

By adding impurities such as phosphorus or arsenic to the semiconductor crystals as they are grown, the balance of electrons and holes can be controlled to produce a permanent imbal-

ance of atomic charge. Material with a net positive charge is called **P - type** material. Material with a net negative charge is called **N - type** material. By choosing which way we sandwich P-type and N-type materials together, we can make complementary transistors, allowing design approaches not available to the folks struggling with vacuum tubes alone.

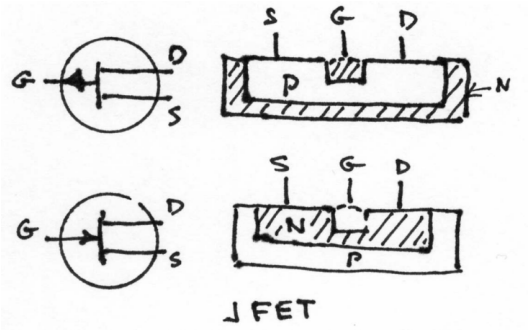
A **PNP** transistor has two outer layers of P-type material (positively charged) , separated by a layer of N-type material (Negatively charged).). Its complementary type, **NPN**, consists of two layers of N-type (Negatively charged) material separated by a layer of P-type material (Positively charged).



(Fig 9-4)

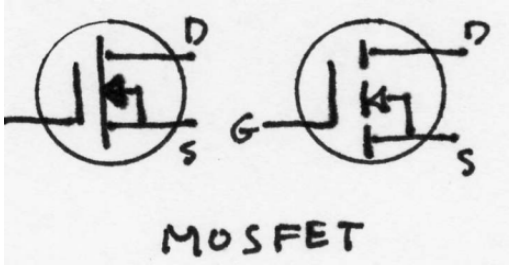
A diffusion layer at the boundary between P and N materials behaves like an insulator, preventing neither holes nor electrons to move until a signal is applied to the junction. Depending on the strength and polarity of the signal, current will flow across the junction and the transistor becomes a current amplifier, much like a vacuum tube

The **FET**, or Field Effect Transistor. Is quite different from the other types It is also a sandwich of P and N type materials but they are configured in such a way as to form a "channel" of either P or N material through which current flows. Instead of emitter, base, and collector, the connections to a FET are labeled **Source, gate,** and **drain.** The device is symmetrical in construction, so the source and drain connections are interchangeable in practice. A signal, applied to the gate connection, creates an electric field across the channel to control the current flow



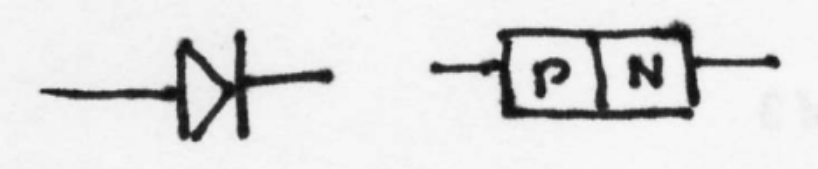
(Fig 9-5)

There are two kinds of FETs, the *junction field effect transistor* (**JFET**), which is the type just described, and the *metal oxide semiconductor field effect transistor* (**MOSFET**), which contains a dielectric such as silicone dioxide between the P and N layers to increase the impedance of the device and to broaden the range of gate control.



(Fig 9-6)

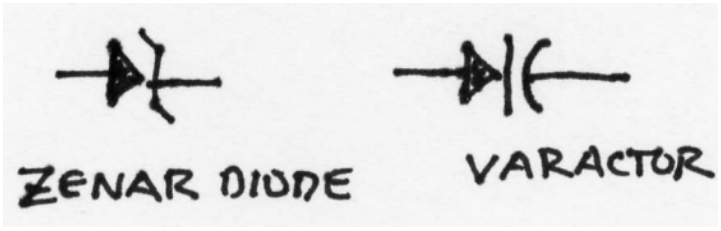
Besides transistors, there are a whole raft of semiconductor diode types, from small signal detectors to high current rectifiers and voltage regulators. They are essentially **unijunction** devices with single layers of P and N material.



(Fig 9-7)

They behave much like vacuum tube diodes but, schematically, they are drawn according to the ancient tradition of current flow from positive to negative. The direction of the arrow is toward the cathode (from the P-type positive material toward the N-type negative material.) In practice, the conventional marking for an axial lead diode is a marking stripe at the cathode end. Heat sink mounted diodes are marked with the schematic symbol pointed toward the cathode end of the device.

Besides the conventional diode, there are two special types worth mentioning . They are the **zenar diode** and the **varactor.**



(Fig 9-8)

The zenar diode is used as a voltage regulator, much like a gas-filled rectifier. The varactor behaves like a "voltage tuned" capacitor and opens up a whole spectrum of control applications More about these applications in later units.

In this unit, I've introduced the transistor and the semiconductor diode. In the next unit, we'll use what we've learned to construct a simple DC power supply.

Terms to remember

Base	**Regulates flow of electrons or holes in a transistor**
Collector	**Attracts electrons or holes in a transistor**
Drain	**Collecting element of a field effect transistor (interchangeable with source)**
Electron	**Negatively charged particle**
Emitter	**Emits electrons or holes in a transistor**
FET	**Field effect transistor**
Gate	**Control element of a field effect transistor**
Holes	**Mobile positive charges**

IC **Integrated circuit**
Neutron **Neutrally charged particle**
NPN transistor **Transistor with negatively charged layers of semiconductor material separated by a positive charged layer**
PNP transistor **Transistor with positively charged layers of semiconductor material separated by a negatively charged layer**
Proton **Positively charged particle**
Source **Emitting element of a field effect transistor (interchangeable with drain)**

Paul Honore; W8IAM
(rev-1 Nov '08)

Club members, I have boxes of older QST's in my garage that are packed full of idea's, articles, and just about anything you would be interested in pertaining to Ham Radio. I would like to find a new home for them. No, I want them gone actually. If interested, contact me before the end of the year, or they'll go to recycle or to the library. These were passed on to me to store temporarily, and it's now been 3 years. It's time for a new home. If you think you would like to store them for others to have access to, to check out when they have a project and need some guidance, or keep them for yourself, let me know on the air, at a meeting, or at the annual Christmas party on the 14Th., {hint hint}, then we can make arrangements to pass them on. Last chance. Thanks for the space to advertise!
Nita~KE7DRT

Rather than print the rules, for the few who might do the event, here is the web address:

http://www.spar-hams.org/contests/winterfd/index.php?pg=2

73, Chuck

Treasurer's Report

First Federal Savings & Loan of Port Angeles Balance: $ 2,220.88
Outstanding Cheques: - 0.00
Current Book Balance: $ 2,220.88
CD at WestSound Bank (6-month, 3.40% APY): + 1,037.74
CD at WestSound Bank (18-Month, 5.13% APY): + 3,000.00
Total Cash Assets: $ 6,258.62

Birthdays for December, 2008 and the first week of January, 2009:

Gilbert, Ray	K7VQF	Dec-09
Cloud, James	WA7LDM	Dec-16
McCarty, Michael	N7MLM	Dec-16
Sipes, George E.	KI7JJ	Dec-17
Klaus, Jeffery A.	KC9HNL	Dec-24
Flatt, Steve	AE7EA	Dec-28
Kennedy, Robert A.	AC7RK	Dec-30
Barello, Bess	KC7NMN	Jan-02
Coulter, James	K7QCK	Jan-07

YL's Birthdays:

Uhden, April (Roger)	(K7RGR)	Dec-24

Thanks,

David R. McCoy,
KE7JEJ -.- . --... .--- . .---
CC-ARC Treasurer

YL LUNCHEON

December 12th Paradise
703 S. Sequim, Sequim

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

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 360-452-8228 ke7xx@arrl.net

Board Member: Bob Kennedy AC7RK 360-457-6177 ark@wavecable.com

Board Member: Bill Carter W7WEC 360-681-4375 bcarter@olypen.com