The Ragchewer

September 2006

The monthly newsletter of the Lancaster & Fairfield County Amateur Radio Club

On the Web: www.k8qik.org

Send email to K8QIK@columbus.rr.com

Club Meetings :

1st Thursday of every month at 7:30 pm at the club house.

Radio Night:

Every Thursday except the 1st Thursday at the club house, 6:30 pm to 8:30 pm

VE Testing:

The third Sunday of every even numbered month. Register at 9:30 am and testing at 10:00 am

Club House Location:

On State Route 37 (Granville Pike) next to Beavers Field.

Net:

Mondays at 9:00 p.m. 147.03 MHZ (+.6)
146.70 MHZ (-.6) Alternate Freq.
443.875 MHZ (+5)

Club Packet BBS
145.53 MHZ
K8QIK-1 BBS
K8QIK-2: Ohio53

Weather Spotter Net:

146.76 Repeater with 123Hz tone every Tuesday at 7:30 p.m.
Alt frequency 147.24 MHZ

September Birthdays

Edward L Campbell	WX7C
Kevin Numbers	KC8MTV
Larry F Wright	KB8AHK
Robert F Sparrow	W8AEY
Joe Boyer	KC8ZQO
Donald L Stephenson	WD8PCF
John A Lawson	W8AGS
Kelly J Snoke	KB8GWB

Thursday Radio Night

Radio night is every Thursday at 6:30 p.m. (except the first Thursday which is the club monthly meeting). Bring your problems or questions and someone might be able to help you. Work a little HF, make a few DX contacts, maybe build something? How about a hot cup of coffee and a few good stories? We'll have them all waiting for you.

ARRL Membership

When you join the ARRL, or renew your membership through the club, we retain $15 for each new membership OR lapsed membership (of two years or more), and we retain $2 for each renewal. Please support our club, it doesn't cost any more. Send or give all paperwork to Treasurer with your money.

October VE Test:

The next VE test will be Sunday October 15th at the club house on Route 37. Register at 9:30 a.m. and testing at 10:00 a.m. Try it, you might surprise yourself.

2005/2006 Officers

President:
Don Stephenson
WD8PCF

Vice President:
Scott Snoke
WD8IXO

Treasurer:
Ed Campbell Sr.
WD8PGO

Secretary:
Robert Northrup
KC8PSW

Activities Manager:
Position open
(volunteer ?)

Station Engineer:
John Hilliard
W8OF

Trustee:
John Hilliard
W8OF

Editor:
Jack Travis
AE8P
(740) 687-1985

September 7, 2006 Meeting Minutes

At 7:30pm meeting called to order by President Stephenson who led the pledge of allegiance.

There were 20 members and 3 guests present.

Secretary Report: Robert Northrup, KC8PSW

Minutes are posted in the Ragchewer.

Treasurer's Report: Ed Campbell, Sr., WD8PGO.

Motion to accept by Ralph, W8BVH and second by Richard, W9ZZX. Passed.

Trustee Report: John Hilliard, W8OF

John reported revamped the Monday Night Net instructions and that some were available in the printer room for those interested as well as emailed to those with email addresses.

VP Report: Scott Snoke, WD8IXO

No Report

Activities Manager: Position open

No report.

Station Report: John Hilliard, W8OF

John said he had gone up to the repeater and tweaked the final circuit after the new final tubes had a chance to "cook in". The repeater should give us several years of trouble free service as the finals are running at 100 Watts RF and the tubes are good for 350 Watts continuous duty. John also stated there was a large bee nest near the door so entering and exiting the hut can be dicey.

VE Testing: Allan Sellers - KB8JLG

The next VE session will be October 15 at the clubhouse. Doors open at 9:00 AM, And testing will begin about 9:30 AM.

Monday Night Net: Position is open

Sept 11 John, W8AGS	Sept 25 Charlie, W8KZN
Sept 18 John, W8OF	Oct 2 OPEN

Ragchewer: Jack Travis - AE8P

Jack said he received one complaint about the "chewer" and that it was too big!!? Oh well.

Secretary note: Personally, I think Jack is doing a superb job with the "Chewer". Having been an editor and publisher of a newsletter for a local RC Model Airplane club, I know how difficult it is to assemble and prepare a newsletter. Jack – Keep up the great work!!!

If you wish to submit an article, news item, cartoon, or other Ham related bits of trivia, you can email him at k8qik@columbus.rr.com.

Emergency Coordinator: Ed Campbell, WD8PGO

Ed reported there were 9 members who helped out at the Sweet Corn festival. The Lancaster Holiday Parade will be held on or about November 18 this year and the organizers will need volunteers to help with the parade. More info will come next month. There is also a United Way 5K run scheduled for November 4 at the fairgrounds. We have been asked to help out with spotters so if you can help, get with Ed for details.

The local EMA office is scheduling training classes on Sept 30 at the Liberty Center. Call 740-654-4357 to get registered. The classes are IS100 and IS700 and prepare you for getting involved with the RACES effort. Hey—instead of rag chewing on your rig, why not put it to use in helping out your community in a time of crisis or emergency?

Safety Report: Scott Snoke, WD8IXO

No Report

The Flower Fund: Juanita Gaffney, KC8OYO

There was $14 collected for the fund and Gary Snider, W8GTS won half. He donated his winnings back to the club.

Old Business:

Charlie said the firehouse antenna project is still being worked and will attempt to install the 2 antennas soon. Get with Charlie to help.

Ralph Howes, W8BVH reported on the slate of 2006/2007 club officers. All currently in place have agreed to serve in the next year. So, a vote was held and all were re-elected. Swearing in will be held at the November meeting.

Kay Hanna, KC8HJW has agreed to service as our activity manager. She will be planning our Christmas party, which will be at the Ponderosa on east Main Street in Lancaster on December 15th or

16th. The October meeting will firm the date.

Editors note: I contacted Kay and she said the Christmas party was December 16th at Ponderosa on E. Main St. from 6:30 to 9:30pm.

President Don obtained pricing on printing the Club Brochures and this was discussed. The consensus was to continue printing at the clubhouse. Ed, WD8PGO said he recommended the club purchase an address stamp for marking the brochures and other literature we may have. Ed was authorized to make the purchase.

New Business:

This is a notice for past club officers/members who are no longer serving as an officer to return your club house key so that new officers may use them. Please come to the next meeting or mail your key to your club treasurer Ed Campbell, 1243 Quarry Rd SE, Lancaster, Oh 43130.

Members present voted to accept Robert Ruffner, KD8DXC, a tech ticket holder, into membership. Welcome Robert!!

Charlie, N8KZN reminded members of our annual Ham Fest that is held on the first Saturday in October (Oct 7). This will be after our October meeting so will have more info at that time.

Jack, AE8P asked about club insurance in light of the power panel main breaker going bad last month. Ed stated we have liability insurance for the premises and for the equipment on site but the county owns the building and is covered with their insurance.

Our Christmas party will have door prizes and other expenses. A motion was made by Ralph, W8BVH and second by Jack, AE8P to give Kaye Hanna $200 to purchase the necessary prizes.

Ralph, W8BVH reported he did a Google search on his call sign and that of his father and found all sorts of interesting things about both. For his father's call sign, Ralph found a link to an association that had his father's call sign plate and who subsequently sent it to him. So if you want something easy and interesting to do, do a search on your call sign.

Ed, WD8PGO reported the State of Ohio (SOH) will conduct 2 EMA related classes on Sept 20th and Oct 4th.

Motion to adjourn was made by Ralph, W8BVH and second by Robert, KI8JM.

Meeting adjourned at 8:23 PM.

Respectfully submitted,
Robert Northrup - KC8PSW

Upcoming Hamfests

September 17 is the GCARA Hamfest in Cincinnati. You can get more information at http://gcara.org

September 24 is the Cleveland Hamfest and Computer Show. You can get more information at http://www.hac.org

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Tubes For Sale

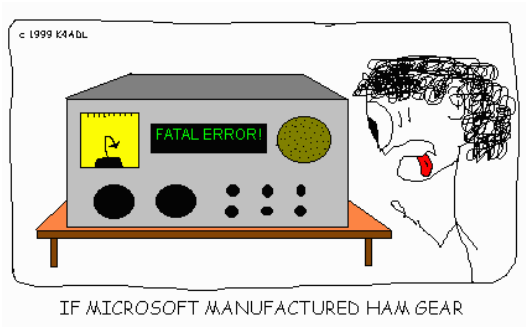
If you need tubes for your boat anchor or TV contact Jeff Bell WD8JLI at 614-774-2973 or email at jbell@imagearray.net he has a huge supply for most needs.

Your License Expiration!

Have you checked your ticket's expiration date recently? Even with the two-year grace period, it's easy to forget to renew. Better check it now. You probably *won't* receive a reminder in the mail unless it's from some group who wants you to pay to have them do it for you. See one of your local VEs instead.

Free Swap and Sell

If you have anything ham radio related, you can swap it or sell it here. List your items for free. Give a price and how to contact you. Send the list to K8QIK@columbus.rr.com



IF MICROSOFT MANUFACTURED HAM GEAR

The Wayback Machine #3

By Bill Continelli, W2XOY

Amateurs entered the summer of 1912 with a new Radio Act in place. Thanks to the Titanic disaster and the fear that commercial interests would try to monopolize the radio spectrum, the government stepped in and set up a licensing structure administered by the Secretary of Commerce. In the new law, amateurs (actually "private stations") were limited to a wavelength of 200 meters and a maximum power of 1kw. Since the known usable spectrum at that time ran from about 300 to 3000 meters (1000 kHz to 100 kHz), it was widely believed that amateur radio would fade away, without expensive government enforcement.

At first, it appeared that the bureaucrats were correct. Before the Radio Act, there were an estimated 10,000 stations. Now, there were only 1200 licenses issued by the end of 1912. Amateurs were finding it difficult to get their spark stations going on 200 meters, and, when they did, they discovered their maximum range was 25-50 miles, instead of the 250-500 mile range they had on the longer wavelengths. Amateur radio was slowly heading for oblivion.

The big stumbling block to effective communications on 200 meters (or indeed any wavelength) was the spark transmitter and unamplified detector, both of which were extremely inefficient. On the transmitting end, no method, other than spark, was known. As for the receiver, there had been two developments in the vacuum tube area. J.A. Fleming had developed the diode detector in 1904. It cost a lot of money, provided no amplification, and used expensive batteries. It was not practical at the time, but it was covered by a patent. In 1906, Lee deForest took Fleming's valve, added a third element, called a grid, and named the result the Audion. In the right circuit, the Audion could amplify by a factor of 5x. Still, because of the cost, battery requirement, and the ever popular patent fights of the time, it went unnoticed and unused until 1912, when a 22 year old amateur made an important discovery.

Edwin H. Armstrong was an experimenter and almost militant individualist. He had obtained an Audion for use in his station. Dissatisfied with the poor amplification, he tried different circuits. At one point, he "fed back" a portion of the output back to the input to be re-amplified. Instead of just a 5x amplification, the output was now 100x stronger than the input. He also discovered that if too much feedback was used, the tube began to oscillate. This regenerative circuit was the most important discovery in radio in years. One tube could amplify more than 100x, two tubes in series could give a gain of 2000+. In addition, an alternative to spark was now available. Instead of a raspy, broad inefficient signal that took up hundreds of KHz, the Audion could be made to oscillate a stable, pure signal on one frequency. In fact, that's where the phrase CW comes from, (a continuous wave on one frequency rather than a broad, intermittent wave on many). Although it would take 10+ years to develop the stability in transmitters and receivers to fully utilize CW, King Spark was doomed.

Realizing the importance of his regenerative design in both transmitting and receiving, but lacking the money to develop it, in January 1913 Armstrong had the diagrams of his circuit notarized. This was only the first of many spectacular inventions Armstrong would come up with. Within 10 years, he would also develop the superheterodyne (now used in ALL receivers), and the super regenerative (the basis of all VHF and UHF receivers from the 20's to the 50's, and still used today in children's walkie-talkies). Even his first design, the regenerative circuit, is used by Ten-Tec and MFJ in their receiver kits. The crowning achievement in Armstrong's career came in the 30's, when he developed Frequency Modulation. With all due respect for those who flock to Loomis, Tesla, or Marconi as the father of radio, my vote goes to Armstrong, for without him, wireless would be stuck at the 1912 level. Armstrong had a tempestuous life, full of public and private battles, advancements, setbacks and lawsuits, before his tragic death in 1954. The final legal battles didn't end until 1967. The Wayback Machine will devote an entire column to Armstrong this fall.

Meanwhile, back in 1913, word of the regenerative circuit spread quickly throughout the amateur world. Experimenters who added the Audion to their receivers discovered that distances of up to 350 miles were now possible on 200 meters. The Audion, already scarce and expensive, became even more so under the laws of supply and demand. The search for an Audion to the amateur was like the Quest for the Holy Grail. In fact, it was this search which led to the second pivotal event in amateur radio history.

Hiram Percy Maxim was a 44 year old engineer and inventor who had a 1kw amateur station in Hartford, CT. He wanted an Audion for his receiver and was unable to locate one. Finally, he heard of an amateur in Springfield, MA, who had one for sale. Hartford was (and still is) only 30 miles from Springfield, yet Maxim's station could not cover the distance. He found a station midway between the two cities that was willing to relay his purchase offer. Maxim thought about this and eventually realized that a national organization was needed to coordinate and standardize message relay procedures, as well as act as a national lobby for amateur radio interests. On April 6, 1914, Maxim proposed the formation of the American Radio Relay League. With the backing of the Radio Club of Hartford, who appropriated $50, and some volunteers, Maxim developed an application form explaining the purpose of the ARRL and inviting membership. These were sent out to every known major station in the country.

Maxim, like Armstrong, was a prolific inventor. Unlike Armstrong, however, Maxim was also an expert in publicity and public relations. By July, national magazines such as Popular Mechanics were writing favorable reports about the ARRL. Maxim also traveled to Washington, D.C., to explain the ARRL to the Department of Commerce and the Commissioner of Navigation.

The P.R. blitz paid off. By September, 1914, there were 237 relay stations appointed, and traffic routes were established from Maine to Minneapolis, and Seattle to Idaho. Realizing that long distances on 200 meters were not possible at that time, even with a regenerative receiver, Maxim got the Department of Commerce to authorize special operations on 425 meters (706 kHz) for relay stations in remote areas.

Boosted by the publicity, the number of amateur stations, as well as the relay stations in the ARRL, continued to grow. By 1916, there were 6000 amateur licenses, (of which 1000 were ARRL relay stations) and 150,000 receivers in use. The emphasis in the ARRL was on the word RELAY; ARRL stations were expected to handle traffic on the 6 Main Trunk Lines (3 North/South and 3 East/West) that served more than 150 cities. And there was traffic. The general population (to whom phones were a luxury, long distance an exotic concept, and telegrams expensive) flocked to the idea of coast to coast free messages. As a P.R. exercise to test the system nationwide, on Washington's Birthday, 1916, a test message was sent to the Governors of every State, and President Wilson in Washington, D.C.. The message was delivered to 34 States and the President within 60 minutes. By 1917, the system was so refined that a message sent from New York to California took only 45 minutes. To deal with the increasing number of relay stations, the ARRL started a little magazine, which they called QST.

Other amateur activities in this period brought favorable publicity to the hobby. In March 1913, a severe windstorm had knocked out power, telegraph and telephone lines in the Midwest. Battery powered amateur stations handled routine and emergency traffic until regular service was restored. This was the first documented emergency communications in amateur radio history. In 1915, amateur station 2MN determined that the powerful Telefunken station at Sayville, Long Island, was sending information concerning Allied and neutral shipping to submarines at sea. Thanks to the work of this amateur, the government took over the station.

However, the war in Europe was getting closer. In April, 1917, based on continued violations of our neutrality and unrestricted submarine activity, Congress declared war against Germany.

With the U.S. now in World War I, a message went out from the Secretary of Commerce to all private stations. By order of the Chief Radio Inspector, all transmitting AND RECEIVING stations were to be closed AND DISASSEMBLED, and all antennas taken down. Complete radio silence was to remain until the war ended and the order was revoked. Amateurs by the thousands packed away their stations and marched off to war. The 200 meter band was silent. In September 1917, with no radio activity permitted and 80% of the amateurs at war, QST ceased publication.

Would amateur radio survive the war? Stay with us next month as the Wayback Machine waits for Johnny to come marching home again.

Recharging HT Batteries

By Michael S. Higgins (K6AER)

Many hams often wonder why their batteries last only a few years while other hams are using their rechargeable batteries 6 years after buying their HT with long use cycles. You're charging and discharge habits have more to do with your battery life cycles. These tips will optimize performance and obtain longer life cycles from your rechargeable batteries.

1. Initialize your new battery by charging overnight before using it. Nickel Cadmium or Nickel Metal Hydride: 14-16 hours. Lithium Ion: 1 to 2 additional hours after charger light turns green.
2. New, non-initialized batteries must be stored in well ventilated, cool and dry locations. Batteries stored in these conditions may be stored: Nickel Cadmium - up to 2 years. Nickel Metal Hydride - up to 18 months Lithium Ion/Polymer - up to 18 months
3. If used batteries are removed from service for periods longer than 30 days, they should be discharged to about 50% of their capacity before storage.
4. Batteries which have been stored for more than two months should be fully discharged NODXA RAG September-October 2005 Page 6 charged and recharged.
5. Do not leave your radio and fully-charged battery in the charger when not charging. Continuous charging will shorten battery life.
6. Only charge a battery when it needs it. If it is not fully discharged, do not recharge it. Carry a spare.
7. Stabilize batteries to room temperature (72 F) before charging.
8. Do not return fully charged batteries to the charger for an "extra boost". Repeated short cycle charging will shorten battery life.
9. Batteries will not store indefinitely. Do not buy a spare battery to use in a few years after your present one dies. The battery will last longer with careful use than sitting on the shelf indefinitely waiting for initial use. Buy your replacement battery when you need it.
10. Store batteries at room temperature. Batteries exposed to low or freezing temperatures will have a shortened life.
11. Do not quick charge batteries from a high current source. It will separate the internal acid gel and you risk explosion from heat build up.
12. Not all battery packs are built the same or have the same quality. Buy cheap and buy often is the caveat in the two way audio world.

Cleaning Aluminum Antenna Components

The use of steel wool in cleaning aluminum antenna components can create more problems than it solves. Small particles of steel that are difficult to see will become imbedded into the aluminum causing problems later.

Try using 3M Scotch (or similar) pads. They work wonders in cleaning aluminum. You can find these green pads at many of the "Super stores" (Home Depot, Walmart, etc.). Scotch pads are about 6 X 9 inches in size. To improve handling, you will probably want to cut them in half. Ordinary scissors make quick work of this.

To begin the antenna cleaning process, get the Scotch pad wet and simply start rubbing the aluminum surface in question. You will be amazed how fast it removes corrosion from the aluminum. Just rinse the Scotch pad frequently and before you know it, you're looking at a clean antenna. In addition, you will discover an added bonus--no steel slivers in your hands.

If you choose to avoid wearing rubber gloves when scrubbing antenna components, be prepared for a bad case of "The Ugly Gray Hands." This is not a healthy practice since the fine aluminum powder that results from this activity will get into the pores/cracks of exposed skin.

Emergency Power Generators

Gasoline is expensive, difficult to transport, dangerous to store, and deteriorates over time. Approximately 55 percent of U.S. homes have natural gas service. Where natural gas is available, natural gas power generators eliminate the fuel transportation and storage problems. It costs less to generate electrical power from natural gas than from gasoline. In fact, in some places it costs less to generate electrical power from natural gas than to buy it from a power company. The cost of natural gas power generators is similar to the cost of gasoline generators. They run clean and are 'environmentally-friendly'. In the unlikely event that electrical power and natural gas supplies both fail, natural gas generators can be run on propane.

I've Got My License, Now What ?

Welcome to ham radio's "Twilight Zone." If you are a newly licensed ham, that's where you probably are, know it or not. You may realize soon, if you haven't already, that there is surprisingly little information easily available for new hams. If you're interested in getting a ham license, there are tremendous amounts of resources. If you've been a ham for a while and have found your niche, you also have access to lots of information.

But if you've only recently earned your license, simple, easy to understand help can be tough to find. It can be difficult even to learn such fundamental things as how to find other hams on the bands, how to make a call, and what is proper on-air courtesy. Probably the best way to learn about ham radio is by just listening, but that can produce a slow learning curve, and is bound to generate a lot of questions. Sometimes you just want to get your hands on some quick, ready information.

If you're looking for reading material, a couple of excellent books for new hams are Ham Radio Made Easy, by *QST* magazine Editor Steve Ford, WB3IMY, and Ham Radio for Dummies, by Ward Silver, N0AX. You may be able to find both of them at your local Borders or Barnes and Noble book stores, or you can quickly purchase each through Amazon.com.

The Internet offers a wealth of information on just about any topic, but if you enter something like "getting started in ham radio" in a search engine, you'll probably find a ton of sites helping you to earn your first license. If you already have your license, that's not information you need. There are some excellent web sites for new hams. Good ones you might try are: "Beginners Guide to Ham Radio (www.irony.com/ham-howto.html), "Help for New Hams" (www.cvil.wustl.edu/~gary/Ham/ham_new.html), "Ham Resource Center" (www.qsl.net/k8zt/hamhelp.html), and "Guide to Amateur Radio for New Hams" (www.eham.net/newham). And the site www.ac6v.com, while not totally for beginners, is absolutely loaded with information.

For the personal touch, get an Elmer, an experienced ham who can help you find your way through this wonderful hobby. One of the greatest things about ham radio is that experienced members are often only too happy to help newcomers. Whether it's finding active repeaters, getting advice on buying a rig, or plowing through the jargon, an Elmer can be one of your biggest allies. And, of course, ask questions at our monthly meetings. There are probably very few questions a beginner might ask that *somebody* at one of our meetings couldn't answer.

A 12 Volt Standby Power System

Anthony Whobrey KC4JTV

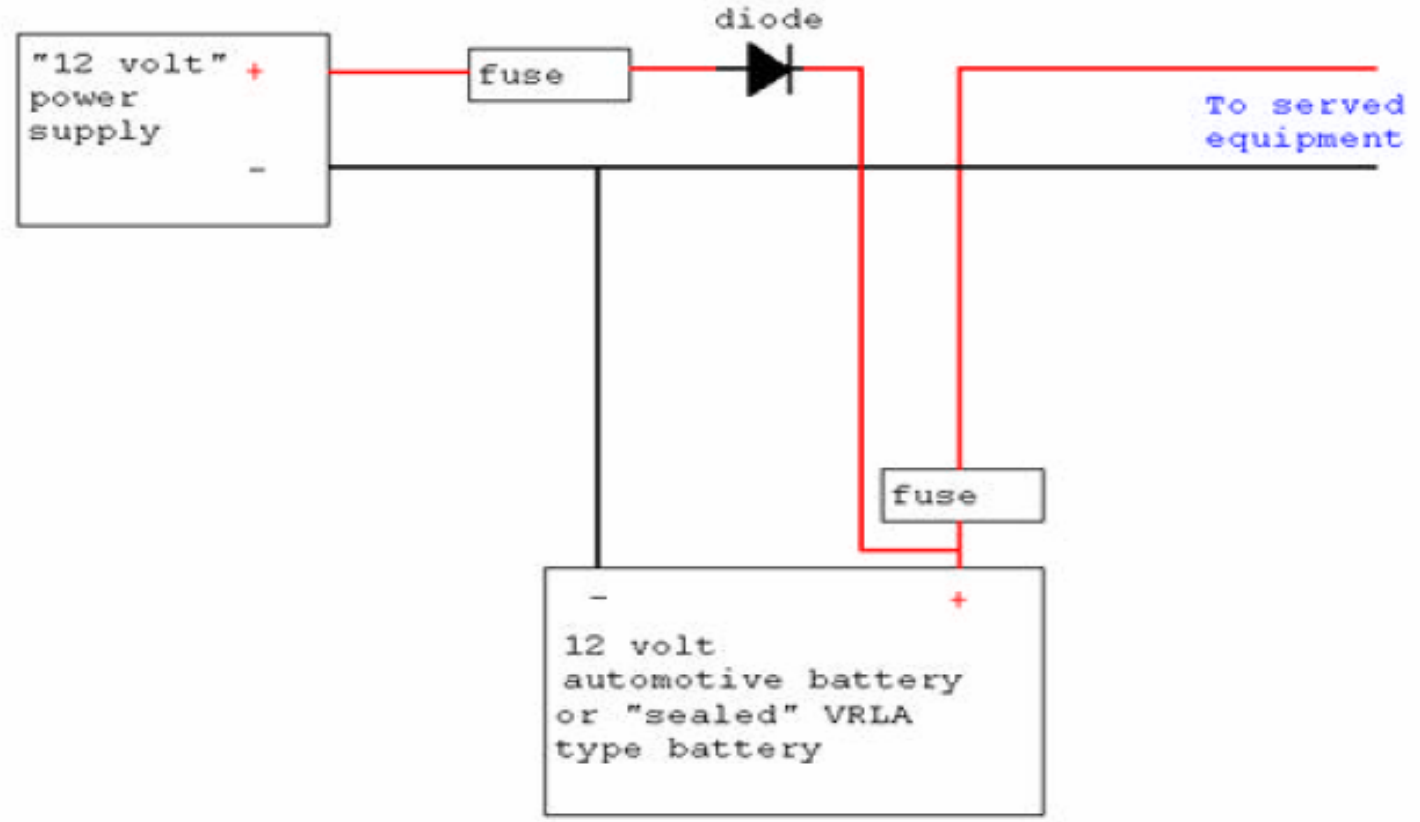
This simple system will provide a back up source of 12-volt power for your station. It has no moving parts, and is silent while operating. The major components are a regulated 12-volt power supply of 6 to 20 amp rating, and a 12-volt automotive battery. Many people would use the power supply as a float charger across this battery to produce a simple source of continuous power. This approach is easy, but can be improved with at minimal cost and with little effort. Place your battery in a safe well-ventilated location. Nearly all batteries produce explosive gas while charging; it is best to have your battery in an area separate from your operating position. My battery box is in a garage adjacent to my shop, with 8-gauge wire running about 15 feet to my radio. I used a plastic box designed to house a trolling motor battery; they are not too expensive.

Always place a fuse at the positive battery terminal; I use a large paper cartridge fuse (non-30). This fuse is available at any electrical supply store. All equipment except the power supply should be connected though this fuse. Use a quality fuse holder and wire of adequate gauge for the fuse rating. Remember that the battery can supply hundreds of amperes for a considerable time, don't cut corners here.

Connect your power supply through a suitable fuse and a large rectifier to the positive terminal of your battery. Place the fuse near the power supply output and the rectifier at or near the positive battery terminal, in this way the wire is protected from a short circuit from both ends. Most power supplies will overcharge a battery; the voltage is

usually a bit high. Use of a rectifier will drop the power supply voltage by .7 volt or so and also protect the battery from discharge through the supply during a power outage. Check with the manufacturer of your battery to determine the recommended float charge voltage (generally 12.8 to 13.2 volts). It may be necessary to adjust the power supply voltage slightly, or alternatively, use two rectifiers in series to further reduce the charging voltage.

Schematic:



While running the wiring, it isn't a bad idea to find a place for a 12-volt light. Use an automotive type dome light to supply a handy source of emergency illumination. A couple of sources offer a 12-volt "trouble light" with a magnetic base and retractable cord; they are nice if your budget isn't too tight.

After an outage of a few hours duration, your power supply will recharge the battery within a day or so, depending on its current capacity. In the event of a prolonged outage, consider other means of recharging the battery to near full capacity, before turning on your power supply. Most power supplies in common use are not current limited, and the load presented by a deeply discharged battery may blow the output fuse. If your battery becomes deeply discharged, use an automotive type charger (or your automobile) to bring it to nearly full charge before placing your power supply back in service.

This system is not too expensive to build, and offers instant transfer to back up power; it will switch to or from battery power while your radio is in operation without the slightest interruption. Many commercial and public safety base stations use battery and charger systems, the same concept is also used in telecommunications offices. This system, while on a somewhat smaller scale, will work well for the average emergency operator.

Notes:

1. If a vented battery is used, adequate ventilation should be provided to prevent build up of hydrogen gas.
2. The diode should be capable of passing at least the full rated current of the power supply. A heatsink will probably be required.
3. The value of both fuses should be comparable to the rated power supply current.

Addendum from Tony, KCJTV:

I just saw the posting of my article about the 12 volt power system. Today I learned that most Astron power supplies will fail prematurely if they are used directly across a battery. This is due to the

feedback of voltage from the battery to the supply when the A.C. power fails; the regulator I.C. will sometimes fail if the voltage on it's output is substantially above the voltage on the regulator's input.

I mention this because the article implies that most power supplies can be used directly across a battery. Obviously, such would not be the case with Astron supplies. FYI, the circuit as drawn works well with an Astron supply, I use one myself.

The Balun

by Bill, W0LPQ

Ham radio is about learning, and sharing what you learn, it's something I like to do. I hope this can help others who may be struggling with "hobby funding". Just keep in mind, some-times the simplest answer, is the best answer.

For several years, I've used a simple home made dipole using a home made center insulator, electric fence "dog bones" and antenna wire from "the Shack". Everything worked fine. But, all this stuff about baluns, coax, ladder line, etc. made deciding how to make the best functional, low cost antenna a real chore.

Ok, my simple 126' horizontal dipole, (63 feet each side) center fed (pvc pipe cap and plug with so-239 and screws) with RG8-X (so it would be light weight being end supported) worked fine from 6m to most of 160, it even found sweet spots on 2m. Go figure. I even put up some for my friends, all with close to the same good results.

Then it happened. My friend Mike K7JML, (a fictious name and call) called, said his radio worked horribly, except on 80m, he was really frustrated. So after some research, checking coax, connections etc, I found he had modified the dipole we put up with a really nice new 80m BALUN.

Ok, new center insulator shouldn't make much difference, but it did. Now this simple, and very functional dipole, didn't function except on 80m. This really bothered me. So, I started asking questions, and got some really good answers:

"Baluns: Some swear by them, others at them. Do you need one, Nope."

Here are the answers I got.

Personally, I do not have a balun. What I did was (in fact all my antennas) wind an RF Choke at the antenna end of the coax. Wind maybe 6-8 turns of RG-213 (or whatever you are using) about a foot below the dipole center insulator. If you make the 6-8 turns maybe 8-12 inches in diameter and tape it together then let it drop down. Leave an extra 3-4 feet of coax in your feed line and wind the coil—this is an RF Choke. ARRL handbooks show this also.

A Balun does not "eliminate" RF. What the balun does, as Glen (K9STH) and other have pointed out is convert the unbalanced Coax to a balanced antenna. In the process of conversion RF is not really eliminated, just put somewhere else.

A dipole is a balanced antenna. Period. However people for eons have used coax to feed a dipole. A dipole, by definition is about 70 ohms. RG-8/58/213 is 50 ohm stuff. TV coax, RG-6/59 is 75 ohm and in reality is a better match for a dipole than the 50 ohm stuff. But, that said, people for eons have used 50 ohm coax. The resulting SWR mismatch is on the order of 1.3:1 so...it can be said also no big deal at all. It will work just as well either way.

In older days, we used to feed a dipole with 72 ohm feedline (like a zip cord) and then at the shack end, install a Heathkit Balun and then RG-8 to the antenna relay. Most rigs did not have built in antenna changeover relays until later on. 72 ohm coax, twin lead or any open wire feeder has its own problems in mounting. You just don't mount it like coax, twisted to the mast or antenna support. It has to be "stood off" from the mast and antenna. Hence the name of "Stand Off's" that you see in pictures.

However, that is ancient history. Many others have tried to answer your questions about baluns. I think that Tex (WA0KZL) did a pretty good job also. I have known Tex for years.

Do you need one? Nope. Some swear by them, others at them.

However, if you are running a single wire, and want it to operate multiband, forget the balun. Period.

I run a dipole that has wires for 20/40/80 and it works just fine. No balun. Period No Balun. I do have an RF Choke (Coil) but no balun. If you want to run balanced line (450 ohm) then it would be desirable to have a balun, but at the bottom end of the feed chain, not at the antenna.

Antenna Problem

When I tried to buy an antenna mast at Universal Radio in Reynoldsburg I was told they quit selling them about 10 years ago. You can buy any antenna or beam, but what do you mount them on? After searching the national radio suppliers and finding nothing, I thought I'd try the club membership and see if there were any suggestions. The following was sent to all members who have email.

- - - - - - - - - - - - - - - -

After moving to my new home last year, it seems appropriate to get an antenna up so I can talk HF. Preferably before the cold weather sets in. I'm finding that a very hard thing to do for a number of reasons.

I'd like to solicit your suggestions and will (if I get enough responses) write an article for the next Ragchewer of my experiences and of the suggestions you make.

I live on a very small lot in the city. There is no chance of putting up a vertical in the back yard like I had at my last residence. If it were to come down, it would land on live electric wires.

After much consideration, I've come to the conclusion that I need a dipole running from one end of my house to the other. I concluded that to do this I will have to have an antenna mast at the ends to hang my dipole on. Have any of you tried to buy an antenna mast lately? Don't even suggest Radio Shack. I won't buy anything there.

I've checked the normal suppliers of Amateur Radio gear and find that NONE of them carry antenna masts. You can buy antennas and beams there but what do you attach them to? There are no trees of value in my quest to put up an antenna.

I'm open to any reasonable suggestion and as I say, your suggestions will be the subject of an article for the Ragchewer. If you don't want your name attached to the suggestions, just tell me.

Please, I'm desperate. How many of you can respond to my problem? I'm sure I'm not the only one who has faced this problem. Jack, AE8P

- - - - - - - - - - - - - - - -

The following were kind enough to respond.

David Harrington, W8EZE
Fred Stutske, W8FZ
Mike Amirault, KB8GHW
Mike Doty, W0MNE
Jerry Canfield, KC8VUS
Joe Boyer, KC8ZQO
Tom Medlin, WA5KUB
John Hilliard, W8OF
Mark Urbine, KC8TUW
Tom Moore, KB8USK
Allen Sellers, KB8JLG

I have not identified which suggestions came from who, to protect the innocent. Thank you all for the suggestions.

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Boy that is a problem if you can't get a vertical say 25' or so without getting into power. How can we get masts up high enough to string the dipole. Ouch! The best quick fix would be, "of course money is no problem" buy or rent enough property in the country to put up a 100' tower with one of those big stepper flame throwers. Feed it with a remote transmitter connected to a computer linking it to a fancy computer controlled radio. There you have it! I would say $250,000.79 will get you there. Seriously what bands do you want to operate on and what are the dimensions of the lot? How high can we go? Good luck and I'll give it some serious thought.

I went back and reread your request, you did say reasonable. I'm sorry to waste your time.

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If I were you, you can buy pipe black or aluminum from Lancaster Hardware on S Columbus Street You can get up to 21 ft sections. It's not light duty such as antenna mast but heavy duty which might be best. I bought an Alpha Delta sloper 60 ft long and don't need 3 things to hold like a dipole. It works well on all bands 10-160 but the hardware will even deliver the pipe if you buy the 21 footers. Also Lowes carries the same kinda pipe

- - - - - - - - - - - - - - - -

I moved to a new location about 3 years ago. At my old home I had a tower up, beams, 300FT long wires, inverted V's and more. When I moved to the new place I couldn't put up a tower. But I have been very happy.

I have worked over 100 countries here running only 100 watts. Here is what I have. I bought one of the SGC antenna tuners. It's the SC-237. It will take a random length wire from 8 ft to 130 ft

It tunes automatically on any band. All you have to do it to put a little RF into it and it tunes perfectly on any freq. This allows you to work any band 160-6 meters without having to have multiple antennas. My installation is very crude but works great.

I have the tuner mounted in a plastic box at ground level. I have a piece of wire hooked to it that goes vertical for about 60 ft then it goes over a tree limb and then horizontal for about 70 ft. NO

INSULATORS. It works great. At the base I have some ground rods and some buried radials.

This tuner will tune about anything for all bands. It will tune rain gutters, lawn chairs, etc. You just need to get a piece of wire out and it can be small wire that is almost invisible to the eye from the street. You will be surprised how well it works. You don't have to worry about any fancy mast pipes etc. Just get the wire up above the ground. Hook it to the end of the house run it to a tree or chimney or out to a telephone pole and attach maybe 10 ft off the ground. Bend the wire any shape, run it horizontal and vertical. Don't worry about length. I promise you, it will tune automatically within about 1 second of putting RF on it. It then keeps that in memory. Put the tuner up in the attic at the end of the attic where you have the vent louvers. Hook a wire on it and run it out the louvers. Use your imagination.

Here is more information on the tuner. http://www.qsl.net/oe3mzc/sgc237.html

The nice thing about the auto antenna tuner is that you can place it outside at the feed point of the antenna. You can run coax out your rig to the tuner. It is automatic and tunes almost instantaneously.

I put in a 30' telephone pole five feet in the ground, then extended it with schedule 40 PVC, two 10' sections with a five foot overlap on the telephone pole. The PVC gets kinda soft in the sun and takes on a bit of a curve, then straightens out in the late evening. I fixed that problem by ripping a 2x4 to go inside the PVC.

I did this with three poles to support a Windom antenna. The middle pole supports the balun and feed line, and of course the end poles support the ends of wire. It's a bit of overkill but it is up 40' and it works. It has survived one winter and I'm looking forward to a few more. I have seen masts for sale on e-bay.

How much do you want to spend?

Here is one site I know of off the top of my web. It is pretty good

www.dxzone.com/catalog/Antennas/Wire/

This whole DX zone site is kinda cool. There are 1000's of antennas out there just do a search on wire antennas

Radio Works, Wire Man and many have a great selection of parts or pre built antennas.

Try going to Lowe's or Snyder electric and purchase some 10' sticks of 1" or 1 1/4" rigid aluminum conduit. It will never rust and they screw together pretty easy or you can go to down to South High street metal supply house and purchase 20' sticks of black steel pipe. They screw together also but they are heavy and require painting.

Have you tried Lowe's? They have a small selection of T.V. mast pipe.

The penultimate problem of hams - not enough room to put up an antenna farm :-) We might be able to offer some viable solutions with a little more info. Is this a house or apartment? Do you have an attic space? If yes, dimensions? What are the physical dimensions of the lot? Given the limitations, do you have a band(s) of preference? Are you looking for a resonant antenna or do you have a matching unit? What type of rig are you running - power output? There's a lot of difference between an antenna that will handle QRP levels vs. running a KW :-)

A little more info would help in offering some suggestions.

If you are looking for a mast, how about two 10' sections of 1.5" PVC pipe joined together? Guyed at about the 12' point, this should hold your dipole with no problem with your dipole acting as guys for the top of the mast. Given that the height of a 5BTV (I have one as well) is a fraction over 25' and this height would put you in to the power lines, it appears that any mast that you use is going to be shorter than the ideal ¼ wave length above ground. A single center mast with the dipole installed as an inverted-V.

Another alternative, if you don't want to go even to the 20' height would be consider using two 20-meter ham sticks (mobile antenna). A PVC mast, cut to the height you feel is comfortable, and the two antennas mounted to this as a horizontal dipole. This is similar to the construction of the "Buddipole" antenna but for a single band. Just as a point of fact, I used a Buddipole for field day two years ago. Mounted at just 10' above ground, I made 102 CW contacts on 40 meters running between 1W and 4W. Contacts were all over the states and Canada. The nice thing about this configuration, even though it is predominantly NVIS, is that you can rotate the dipole to favor one direction or another.

Is this heading in the right direction or were you looking for something else? For really tight spaces the closed loop antenna is always a possibility. The disadvantage of course is the reduced bandwidth without retuning and careful consideration of

components to avoid arcing at higher power levels.

This is probably a good topic for radio night next Thursday where you can give some layout details and we can scribble ideas on paper.

On page 41 of QST Sept 2006 is an ad for an Isotron 40/20. It has a small foot print and needs only 20' vertical. It's a whimsical looking thing right out of Oz. Isotron Antennas - Low Profile Limited and Restricted Space Antennas for HF

I don't know anything about your home configuration, but will give you my story. Having purchased a home in an antenna "unfriendly" neighborhood, I finally decided to put up an antenna or antennas. I have no trees to run a wire to so my next choice was to put a dipole in the attic of my house.

I purchased an Alpha Delta DX-CC (I think that's the correct model number) and installed it on the inside at each end of the attic. I ran the coax down the boxed in area that houses the vent stack for the gas water heater which goes from the basement to the attic. Since my station is in the basement, it worked out great.

I was even able to set up two five element 2M Yagis, one pointed North and one pointed South. I have a coax switch to pick the direction I want.

The Yagi is a 10, 15, 20, and 40 M version. The 40 is electrically shortened using coils. It works great.

Go to Lowe's. I believe they still carry mast or something that can replicate one at least (go to the pipe or fence section). Have you ever tried one of those clothes line poles that folds up like an umbrella? If you can find one of those contraptions, I believe we can solve you problem. Or, just maybe create one! Once you locate one of these buggers and cart it home, this is what you do with it. Dig a three foot hole a little bigger than the diameter of the pole. Get your neighbor to do this if you're so inclined. Offer him a few beers, it works for me! Pour a 10# bag of "Quikrete "in the hole (of course after your neighbor mixes it!) surrounding the clothes pole once you have it in the place that you desire. Next; in place of the clothes line, replace it with # 16 or 18 gauge un-insulated wire. Wind it through the holes like you would the clothes line; starting at one end going across to the other and back again to the side that you started (weaving pattern). This is my modified "bug catcher" antenna. You can tap the wire with alligator clips for the frequencies that you want. This is a really compact antenna and doesn't take up any space in your back yard. NOTE: If this doesn't work for your radio, it will surely kill all the bugs in you back yard that are still flying around; once you put some juice (current) to it! In any event, let me know what you think. Heck, you can still use it to hang-up your clothes and your neighbors won't be any wiser! And when you invite your neighbor over (the one who you got to dig the hole and mix the cement) for that back yard barbecue, there won't be any flying bugs to bother you!

My "Bug Catcher" antenna was never designed to work. I just felt like sending you a bunch of B.S. regarding your dilemma! However, there is some merit to the design. Not so much for radio purposes, but for killing bugs!

It appears that you have a good idea of an antenna for your location. Are you thinking of using it as an all-band doublet fed with ladder-line from a tuner? CQ magazine's Lew McCoy called this the "Real McCoy" and recommended it highly.

Electrical conduit comes as Galvanized Steel or Aluminum in ten foot lengths. I can recommend the former.

Galvanized water pipe has a thicker wall but I don't think this necessary. In the fifties, before telescoping thin wall masts, everyone used black iron pipe for their TV antennas.

I have an idea for your antenna. Put it in your attic (if you have one). Put screw eye bolts at each end of your attic and attach the antenna to the eyebolts. It will also hide the antenna from all of the neighbors.

If you can't do this, try at Lancaster Sales on route #33 south in Lancaster. You just might find the antenna mast there. They have a lot of things that other stores don't carry including antenna tower.

Editors note: Several of the suggestions are worth pursuing and I will be doing just that in the month ahead. I won't make a final decision until after the Findlay Hamfest September 10th. Thanks again guys, was this of value to anyone else? I hope so.

THE WELL GROUNDED AMATEUR

By John E. Ogden

The above title could mean that there is such a thing as a ham with a strong electronic background, or that he uses the old well on his property to ground his equipment. Setting grammar aside, let's talk about grounding our equipment etc. Grounds may be divided into four categories (disregarding grounds for divorce and other side effects of ham radio).

1. A.C. LINE GROUND: There is (or should be) an electrical "holy-point" ground located at the point in a building where electrical power enters. This ground is specified precisely by the National Electrical Code. Its purpose is to provide electrical safety to the inhabitants of the building.

2. CHASSIS GROUND: Classical well-designed amateur radio equipment normally uses a metallic chassis and cabinet to provide shielding of stray fields. The internal circuitry uses this chassis as a "ground" or common return point for internal circuits. It is normally connected to the sheath of any coax or mike wire shielding.

3. ANTENNA GROUND: Beneath any antenna system of practical height, the earth acts as a (poor) conductor and as such, there are induced currents flowing in it which modify the radiating pattern of the antenna by virtue of the fields generated by these ground currents. This is the antenna ground system.

4. LIGHTNING GROUND: Weather changes produce small locally ionized air pockets (if you could see them they would look like balloons) floating around in the air. Because the molecules are ionized (displaced electrons) the balloons become better conductors of electricity than normal air is. When a large charged air mass moves overhead there is a likelihood of static discharge via these balloons to earth. We call it lightning. If an elevated conductor is connected to the earth it has a tendency to discharge the balloons nearby arid reduce the likelihood of a lightning strike. This is the function of the so-called lightning rod. The earth acts as a grounded plate of a large capacitor. The classification of these "grounds" into categories is based on the functions they perform. In some instances a particular physical "ground" may perform more than one of these functions. But generally, one must "design" each of these grounds around achieving its particular function(s) efficiently and effectively. For example, grounding a 50 ft. steel tower using a coiled-up hank of #20 wire might perform well in good weather. If a really bad storm were to come by, the discharge current might melt the wire and leave the tower ungrounded and a perfect target for a lightning strike. Even a bad storm might produce a discharge current less than five amps, but the current in a strike could reach several thousand amps. So let's look at some of the details of each of these categories

ELECTRICAL GROUND: If there were no "holy-point" ground and the center-tap conductor of a 220 volt power transformer were to fail, that would place all of the household utilities in series across 220 volts. As each utility was turned on it would change the balance of voltage across the other utilities and could cause a fire or electrical shock. (This happened to my in-laws once- what a mess!) If the ground became ineffective then the metal case of any equipment connected to the third (green) wire could be capacitively coupled to the hot wire producing a shock hazard.

Your ham gear is adequately grounded if it has a third wire in the power cord. If not, then it is probably classed as "doubly insulated" and no ground is needed. As a precaution, some folks connect a wire from the chassis to the power-line ground. However, be careful. Grounding the equipment to another ground that is isolated from the "holy-point" ground at the service entrance, could result in dangerous ground currents. I have seen folks install a copper ground plane under the top surface of a work-bench or operating table. This can be fatal. It is generally unwise to connect all your chassis together via a bus-bar running along the back of the equipment. It is unnecessary. Check to be sure that each piece of gear is properly grounded with a three-wire power cord. You could get a mean jolt when disconnecting a coax cable if the chassis ground is at a different potential than the coax cable sheath ground.

CHASSIS GROUND: It is especially important that the shielding system for a transmitter be maintained intact. RF. currents flow on the surface of conductors. Self-induction in a conductor keeps the R.F. from penetrating and this is called "skin effect". At ham frequencies, the skin is less than 1/100oth of an inch. RF. current flowing down a coax line results in a skin current on the inside of the sheath and the outside of the center-conductor. No current should flow on the outside skin of the sheath. There is a

strong analogy to water flowing down a pipe. There should be no "leak-holes".

The inside skin of the metal case of a transmitter confines the RF. energy to the inside of the case. The R F. energy is developed inside the case and flows like water down the coax "pipe" to the antenna. Thus there should be no RF. Energy radiating inside the shack. If there is RF. in your shack, then check the shielding integrity. No amount of external grounding can stop the RF. When building or modifying RF. equipment it is often necessary to maintain a "holy-point" ground for each stage. This prevents the currents flowing in one stage from sharing a path (impedance) with another stage. Such sharing would cause undesired coupling. Grounding a component to the chassis does not necessarily around it. The current flowing in the chassis is very important. Ground loops are generally undesired currents flowing in the chassis or ground wiring that result in coupling between circuits due to the shared impedance of the ground circuit. A six-by-six inch piece of metal is not a "short circuit" at radio frequencies. It still has impedance.

ANTENNA GROUND: Induced currents flow in the ground under an antenna. If the ground is resistive, then some energy is lost. Sometimes it is worthwhile to reduce these losses by installing ground radial conductors under the antenna. Obviously, the radials should be made of copper or aluminum to keep resistance down. Steel wire should never be used because hysteresis and eddy current losses in iron compounds are very high. Besides, most iron compounds corrode. To be effective, a ground radial system should be at least 1/2 wavelength long. The ground radial system can do double duty by acting as a ground for a static (lightning) discharge system.

Ground radials are particularly useful for current-fed verticals. The high feed current will cause very high ground losses unless the ground system resistance at the feed point is low (P=IA2 R). Voltage-fed verticals still require some kind of ground system but the feed-point losses are generally smaller.

LIGHTNING GROUND: The path to ground of any elevated metallic structure should be direct and very low impedance (at frequencies from kHz to high MHz). The current path should have no twists or turns. The pulses of current involved act like very high frequencies.

If possible, bury coax feed lines a few inches underground in soil pipe. Where the line enters the pipe at the antenna end, the outside skin of the coax should be grounded. An R.F. choke should be connected from the center conductor to the sheath if at all practical. This provides a D.C. path to ground for both inner and outer conductors.

Where the line exits the soil pipe, the outer sheath of the coax should be grounded. If this is at the entry to the building, this ground should be tied to the "holy-point" ground for the electrical system. This will reduce the risk of the coax being at a different ground potential (at 60 Hz) from the house wiring. If gas discharge type arrestors are to be used, they should be placed at the building entrance, (in a weatherproof box).

So much for grounding. Remember to try to optimize each type.

Tips for Driving a Ground Rod

Jeff Bauder, N3JBH

I have heard many different ideas on how to drive a ground rod into the ground. And I assure you there is several different ways to accomplish this task as well. But being the sort of fellow I am I always like to find the easy way out. Ok so I can hear you now - easy way - pay some kid to do this. Well that probably is the simple thing but I want suggest a few ways for the do it your self types here.

The first method.

I call the barbarian method. Please let me explain. We take ground rod in hand and place it in the location of our picking and then with one free hand we strike it with a hammer or other blunt instrument. Results? Well usually you never get that ground clamp on. Secondly you probably have several banged up parts all over your upper appendages. And finally you'll get disgusted and saw it off long before you have it deep enough to do any real benefit. This is the hard and wrong method.

The second method.

Is simply an improved version of the above where we fashion a covering device such as section of iron pipe with a cap screw on. And pound it in the same fashion. End result about same as above.

The third method.

Now this will get you all wet that I promise you. But here we go. We construct our own piece of machinery here folks. So get ready to visit your local hardware store. You will need a piece of ¾ inch steel

conduit 10 feet long if you doing an 8- foot rod add 3 feet for 12-foot rods. I like EMT for this. You'll need 1 bronze hose adapter and lastly a garden hose. Now to assemble are parts. You need to have the conduit thread with national standard pipe thread on one end. This is where you screw the bronze adapter on.

Connect water hose and insert rod in to conduit. Place the unit over where you want the rod and turn on the water. You may want to install a ball cock valve on conduit between bronze adapter and conduit to start and stop water flow. Now you simply want the water rushing out the pipe dig your hole for you. I like this method it is not fast and don't work in rocks. But hey you have the tool left for whom ever may want use it. And they think your pretty darned smart to have made this gizmo.

My fourth and final method.

I like this the best. Now we need to take a trip to our local tool rental center. What we want is an electric jackhammer around a 30 ponder is perfect.

Now before we get too far a point I must raise if you tell the guys your going to drive ground rods with this they may frown and not rent it. So get a bit any bit tell them your busting block wall with it.

Now you have the jackhammer what you need is to place the ground clam loosely over the ground rod so it will slide to bottom easily. Place jack hammer over the ground rod and drive it home. This method works in rock soil darned near any place. It is fast simple. And cost around $20.00 to rent the hammer all day. Best part is no sweat no bumps or bruises. And you'll have the rod down faster then our beer. Not that I would dare think a ham would drink beer during work oh no. Well again as always folks I like to thank you and the great staff of eHam.net for permitting me to do this little how to thing.

How about Mobile Operation ?

By Rick Fornes KA6Y

Amateur radio is such a fun and diverse hobby. There are so many interesting things to try like mobile operation. Many Hams have experienced the fun of mobile operation with VHF radios in their car, but why not try a fully operational HF/VHF/ UHF set-up. You could work DXCC mobile on HF, or talk to Hawaii via VHF during some sporadic propagation condition? Or just rag chew with a buddy while stuck in traffic. One of the advantages of mobile operation is that you can operate without putting up large antennas. If you have antenna height restrictions due to local rules and regulations, why not go mobile. The number of new mobile operators is growing and many are avid contesters.

So what are some of the issues when installing a mobile radio? Well there are a lot of new radios that work very well in a mobile environment and some of the new mobile antennas are very power efficient. But before you install a mobile radio, you must first do your homework. The biggest problem with mobile operation is noise, noise and more noise. Broadband noise, ignition noise, electronic generated noise, WOW there are a lot of noise generator's in cars today. To make matters worse, newer cars are loaded with complex electronic systems and many of the old RFI fixes don't work.

However don't despair we can lick most of these noise problems with good installation techniques and a few calls to the manufacture. So let's look at some basic instillation rules according to "good engineering practices" that will help you minimize noise and have a great time hamming in mobile style.

1. Mobile equipment should be mounted in such way that normal operation will not interfere with driving.
2. Power leads should be large enough to handle large currents, especially for mobile HF rigs.
3. Keep high current leads as short as possible.
4. Run wiring as close to the metal vehicle as possible (capacitive coupling will help eliminate noise).
5. The power leads should be twisted (this reduces differential-mode noise) also, connect the power ground directly to the battery ground. This will eliminate ground loops, which cause RFI.
6. The power and antenna leads should be routed along the body structure, away from vehicle wiring harnesses and electronics.
7. Use the best coax cable available (98-99% braid coverage or braid/foil). The cable should be grounded to the vehicle at both ends, all around the cable circumference (no pig tails)
8. The antenna should be mounted on a good ground plane, as far from the engine and the vehicle electronics as possible (see ground planes in the ARRL handbook).
9. MATCH THE ANTENNA for a very low VSWR. How low is low enough? Please come to the May meeting I will be talking about this.

10. Make sure your radio has a good NOISE BLANKER, this will help reduce noise.
11. Review installation and RFI guidelines in the ARRL handbook and RFI book.

Well we could spend days on this subject however these basic rules should get you started. Please feel free to contact me if you're having problems with noise. Together along with the ARRL we can minimize noise and make mobile operation fun.

Locate Radio or Television Interference in a Home

All steps should be performed while interference is active

1. Go to your main circuit breaker or fuse panel with a battery powered AM radio tuned between stations so all you hear is the offending noise. (If *at night or in an enclosed room, be sure to have a working flashlight)*
2. If the noise is present and corresponds to the disturbing interference, shut off all power to your premises by turning off the MAIN circuit breaker or equivalent enclosed device. (DO NOT ATTEMPT TO REMOVE CARTRIDGE FUSES or OPERATE EXPOSED or OPEN-TYPE DISCONNECTS IF PHYSICAL CONTACT WITH ELECTRICAL CIRCUITS IS AT ALL POSSIBLE.) If the noise on the AM radio stops while the power is off, the source of the interference is within your own residence.
3. Restore the main circuit breaker. Don't forget to reset clocks after the interference source is located.
4. Assuming the noise stopped while the electric was off, you can now locate the circuit supplying the power to the noise source. While monitoring the battery powered AM radio as before with the noise present, turn off and on the individual circuit breakers one at a time until the noise stops while a breaker is in the off position. Leave off the breaker that stops the noise.
5. You must now determine what has been turned off by going from room to room, if necessary, checking outlets, appliances, and lights for the absence of electricity. The offending noise will be something on this circuit. Turn the breaker back on and wait for the noise to return.
6. With the noise back on and using the AM radio to monitor, return to the area of the noisy circuit and unplug everything on this circuit one at a time until the offending device is found.

Things most commonly found causing interference:

- Door Bell Transformers
- Electric Blankets
- Heating Pads (of all kinds)
- Recessed Ceiling Lights
- Furnace Control Circuits
- TV Top Amplified Antennas
- Aquarium Heaters
- Low Energy (screw in) Florescent Lights
- Clean Air Machines (table top and furnace type)
- *Screw In Photocells
- *Touch Control Lamps
- *Light Dimmer Controls

(*) Radio Interference Only

These devices, when causing interference, are in violation of Federal Communications Commission rules & regulations and are a nuisance to you and your neighbors. It is important for your own benefit to have the offending device repaired or replaced to insure normal safe operation. Most radio and television interference sources are arcing. This arcing will get hot and could create a fire hazard. Your interest and assistance is sincerely appreciated. For more information about RFI & TVI contact

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Log It

By Dick Arnold, AF8X

Since the FCC no longer requires logging contacts, most of us don't any more. However there are good reasons to log your contacts even if not required by law. I am guilty of giving up logging due to nothing more than laziness, but I intend to resume the practice because of the reasons listed below.

A written log of your transmissions might just be the thing to prove your innocence in a lawsuit. A record of dates, times, frequencies, etc. will be evidence as to your operating times and dates and would be invaluable in a TVI complaint. There is also the pleasure of looking back through the log at the contacts made years ago, and of course the information recorded to be included on a QSL card. I have been embarrassed when receiving a QSL card

and not having a record of the contact to respond with a valid time and signal report.

The format of the logbook can be your own personal preference and by using a common composition book with bound pages, add information in the order that makes sense to you. On the other hand, there are a number of commercial logbooks with ruled pages available from the ARRL and other sources. If you are a computer person, there are a number of computer logging programs available, many of them are free downloads from the Internet. Contesters almost always use computers to log.

As far as the information to be entered in the log, the essentials are date, time, frequency, mode, signal report, name and QTH. Personally, I like to add comments about the contact's rig and antenna and his fist, if pertinent.

When entering the time, always use UTC or Zulu, as I like to call it. That way there can be no confusion as to time zones or daylight saving time mistakes.

In order to keep your logbooks looking neat and orderly, jot down all the data necessary on a note pad while operating and then at a later time, transcribe the information into the logbook in your best script. I also advise using a pen with ink that does not smear from hand contact.

I have all but one of the logbooks that I have kept and I really enjoy going through them from time to time. The very first logbook when I was a novice is the one missing and I would dearly love to find it.

Let me relate a short tale about logging. This happened a long time ago at a ham friend and mentor's house. I was watching John, W8URM tune up his rig. Remember the tube type rigs that had to be tuned- peak the grid and dip the plate stuff? Well I saw John tune his rig, identify with his call on CW then…log the transmission time, date and frequency in his logbook! Boy, talk about record keeping…but that was John, strictly legal and an A1 operator.

Good RF Grounds - Are They Needed ?

By Rick Fornes KA6Y

First we need to know the difference between a safety ground (power line ground) and an RF ground.

A safety ground is a power line ground required by building codes to insure the safety of life around electrical systems. **ALL** equipment must be bonded together and tied to the electrical ground to prevent electrical shock and damage. Now let's discuss an RF ground. The first question we must ask is do we need an RF ground. It's worth pointing out that a properly designed shack should have very low levels of RF radiation. If all the antennas are properly matched, the equipment is well shielded (per FCC requirements) and all interconnects are done correctly, there should be very little RFI. However, since most of us have less than the perfect setup this is hard to achieve, especially if an antenna tuner is used. Some of the problems RFI can cause are:

- Receiver de-sensing (RFI overloads the receiver, reducing sensitivity)
- Radiation into other systems. (TV's, phones, radios)
- Poor relations with your neighbors
- So lets talk about good RF grounding techniques. There are many ways to ground a radio station however there is only one way that really works.
- Each piece of radio gear should be connected separately to a single point ground. (A common bus single point ground works well)
- The single point ground should be connected to a rod driven into the ground at least 8'.
- The ground rod needs to be as close to the radio equipment as possible. Multiple ground rods close to each other and tied together will reduce the RF ground impedance.
- All the ground connects must be shorter than 1/4l at the highest operating frequency. At a 1/4l the ground is ineffective. For 10 meter operation, grounds must be less than 9ft long. This is difficult to achieve.
- Do not connect the grounds in a daisy-chained fashion (from box to box in a closed loop fashion) this can cause a ground loop, which will act like an antenna and radiate.
- Use good ground straps and proper connections (See ARRL handbook)
- Once the RF ground is achieved make sure you connect the RF ground rod to the Electrical box ground rod. THIS IS VERY IMPORTANT TO PREVENT ELECTRICAL SHOCK. (Connect only the ground rods to prevent ground loops)
- If you can't make the ground lengths shorter than a ¼ length at the highest operating frequency, then you must use a different grounding technique such as ground radials.
- If all else fails and you still have radiation problems, buy all new equipment.

HF Frequencies and Best Time

By international agreement, the radio spectrum has been divided up among various users. While there are some exceptions, most nations and the stations they authorize do follow the allocations described below:

1800 to 2000 kHz: This is the 160-meter ham radio band. Most voice communications will be in LSB, with best reception at night during the fall and winter months.

3500 to 4000 kHz: This is the 80-meter ham radio band. The 3500 to 3750 kHz range is used for CW and RTTY communications, and the rest of the band is used for LSB voice. The 3900 to 4000 kHz range is used for broadcasting in Europe and Africa. Best reception is at night.

7000 to 7300 kHz: The 7000 to 7100 kHz range is allocated exclusively to ham radio worldwide, although an occasional broadcaster will show up here. The 7100 to 7300 kHz range is allocated exclusively to ham radio in North and South America, but is used for broadcasting in the rest of the world. Several station transmit programs intended for reception in North and South America in this range. As a result, interference is often very heavy here during the night and evening hours. Hams use CW and RTTY from 7000 to 7150 kHz, and mainly LSB from 7150 to 7300 kHz. Best reception is from the late afternoon to early morning, although some hams can usually be heard here around the clock.

10100 to 10150 kHz: This is the 30-meter ham radio band. Because it is so narrow, operation here is restricted to CW and RTTY.

14000 to 14350 kHz: This is the 20-meter ham radio band. The lowest 100 kHz is reserved for CW and RTTY use, with USB popular in the rest of the band (although U.S. hams cannot transmit in SSB below 14150 kHz). Best reception is during the daytime and early evening.

18068 to 18168 kHz: This is the 17-meter ham radio band, where CW, RTTY, and USB are used.

21000 to 21450 kHz: This is the 15-meter ham radio band. CW and RTTY is mainly found in the first 200 kHz, and USB is used in the rest of the band. Best reception here is in the daytime hours.

24890 to 24990 kHz: This is the 12-meter ham radio band, used for CW, FSK, and USB work. Reception is usually limited to the daytime during years of high sunspot activity.

28000 to 29700 kHz: This is the 10-meter ham radio band. Most activity is in USB from 28300 to 28600 kHz, with FM used on 29600 kHz. Best reception is during daytime in years of high sunspot activity or during a sporadic-E propagation opening.

Pre Electrical Wireless Systems

By Vern Eubanks K0LVS

"One if by land two if by sea" – When patriot agents learned British soldiers were moving on Concord to destroy a militia armory, the sexton of Boston's Old North Church hung two lanterns aloft in the belfry. "Two lanterns" – it was a simple code conveying only two bits of prearranged information. The British were enroute to Concord, and their route was via a boat crossing of the Charles river, rather than an overland march. Pre - electrical "wireless" systems (typically visual signaling systems, though drums and trumpets were also used) from ancient Greek signal torches to native American smoke signals, shared the same shortfall of the patriots' one/two lantern system.

The system could only transmit a prearranged one or two bit alert, and only over very short distances between signaling nodes. Couriers traveling by foot, horse, or ship could carry complete orders and reports; however they were extremely slow when great distances were involved. These limitations of courier and ineffective visual signaling over long distances had strategic implications on world affairs. For example, the famous Battle of New Orleans in which Gen. Andrew "Old Hickory" Jackson's outnumbered and ragtag forces embarrassingly trumped the British forces, was fought two weeks after the US and Britain ended the War of 1812.

With the invention of the telescope by Hans Lippershey in 1608, the range of human eyesight was extended and signaling nodes could be located farther apart. More importantly, a greater signaling vocabulary could be exchanged since the receiving signalman could observe greater detail on the transmitting apparatus. The first useful visual signal network was the Chappe Semaphore (also known as

the Chappe Telegraph), a French network of signaling towers at 10 mile intervals. Initial links of that network were set up in France as early as 1793.

The Chappe system did not spell out words; the angular positions of a central pivoting arm and two paddles (see accompanying figure) needed to be decoded from a secret codebook of 8000 words and phrases. While slow from today's perspective, the network did contribute to French military victories. Napoleon even had portable Chappe towers constructed to use on the battleground. Claude Chappe coined the term "telegraph" (distance writing), which is still in use today. The last fixed semaphore station was taken down in 1880. It connected an offshore island with a telegraph station on the coast of Sweden.

Little Known Fact

He came from a very poor home. And it was necessary for him to go to work at a very early age. So he did. He started out as a jeweler's apprentice. He did that to support his widowed mother. But two things ended that career: one, his heart wasn't in it; and two, he was a terrible jeweler. He once wrote that his creations in gold and silver were so bad that people would hide them from public view.

So, of course, he turned to acting. He told his mother that he was going to pursue a career on the stage. He even wrote two stage plays. That didn't last long either, but this time for a different reason. One day he got his hands on a popular science book of the day and that changed everything - both for him and for us. He fell in love with science, and especially electricity.

He was able to work his way through a local college as an administrative assistant. There he excelled. He dove into every science book he could find, and in 1817, there really were not too many science books to be found. But he did find the writings and discoveries of a genius named Benjamin Franklin to be fascinating. Electricity had just been discovered a few years earlier, and he was beside himself with anticipation.

He put together the first homemade batteries and started experimenting with the idea of wrapping different lengths and diameters of wire around a soft iron core. Back then what little wire existed wasn't insulated, so he used wax to insulate the wires. Yes, he invented insulation for electric wires. And he found that with a simple little 21-pound piece of iron and some wire and a little current, he could lift more than 750 pounds with ease. That, of course, literally changed everything. He had invented the electromagnet.

And if you think about it folks, it would be difficult to name a piece of machinery that does not use a transformer or electric motor today. It was considered the invention of the century. Considering how it changed the world, I guess it was.

And you may want to know one more little invention he came up with. Something that was probably the other great invention of the century: a way for people to communicate over long distances instantly. Yes, the telegraph. He invented it. So we want to thank and honor the inventor of the electromagnet and the telegraph: Joseph Henry!

Yeah! Joe Henry. Yes, I know you've been told that Sam Morse invented it the telegraph, but he didn't! It's a Little Known Fact that Joseph Henry invented the telegraph nine years before Sam Morse. As a matter of fact Joe taught Sam Morse how it worked.

Now, to give credit where credit's due, Morse did invent the code that is used on the telegraph. And he is the one who patented it and got all the credit. But it was Joseph Henry who invented it. Sam Morse said so many times, too. He tried to give the credit to Joe, but too many people had come to believe that since he invented the code, that he also invented the device. But he didn't. So our hats are off to you Joe. You literally changed the world - twice!

Transmission Line Radiation

All RF transmission lines other than waveguides and totally-shielded coax radiate some amount of energy. Transmission line radiation is undesirable because a portion of the energy sent to an antenna or a receiver is lost, because the lost energy may interfere with the normal operation of near-by receivers, audio systems, and other types of electronic equipment, and because the lost energy usually distorts antenna directional patterns to some extent.

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