



The
Wave Bender
 January 2011

**DEVELOP A PLAN FOR IMPROVED
 GROUNDING - CONT. FROM LAST MO**

John specifies copper for a simple reason: Aluminum quickly develops an oxide outer layer, and the effective resistance rapidly increases. Save yourself the headache and use copper for grounding leads.

As for making the connection, never use soft (lead) solder. Not only will it rot within 15 years, it may melt away even sooner (tomorrow?) in a lightning strike. Once the connection has melted, it may not be nearly as effective as it was. The next strike will go through your equipment rather than the now-damaged soft solder ground connection. Acid core will fail even sooner! Plus it will begin to eat away the copper.

Make the connection

Before you start silver soldering or cad welding, you must have a fire extinguisher or a full bucket of water on hand. This is particularly important when working outside in summer or fall. Dry grass burns quickly. If you can't stomp it out immediately, use the extinguisher.

Remember to clear a space around the area before you start work.

Two points to remember when soldering to copper: First, copper is a great conductor and carries heat very well. Second, it will remain hot longer than you think.

An alternative to silver soldering is cad welding. This exothermic welding provides *Continued page 3*

PRESIDENT'S QST



Wow the first year is done. We need to start planning next year. Get involved and make this the best club in the valley. Don't just sit back and wait for someone else to do everything for you. The board can only do so much, but with all of your help we will be No. 1. If you are not having FUN then tell a board member what you think the club should be doing.

As a new club we have done several events that have been highly accepted by the people running them. This tells us that we are doing things right.


Dues are due for next year by the end of January. This is according to our By-Laws. If they are not paid up, you will have to rejoin as a new member.

Tell all of your Ham friends about WRARC and all the FUN things that we are doing. Bring a friend to a meeting. Get someone new into Ham Radio. Bring a family member to a meeting. Do what you can to promote the Club.

*'Till next month.
 73 Allan, AB8AA*



**MAP TO
 A LA CART
 CATERING
 CANFIELD**



Winter Party: January 16, 3:00 P.M.
 at **A La Carte** in Canfield

Officer's Meeting: Jan 16, short meeting after the Holiday Party

Regular Meeting: January 18, 7:00 P.M.
 Davidson's, in Cornersburgh - **Dues are Due**

Program: Carol D. Shreiner PH.D. - Plastics their application and recycling

THINGS YOU MIGHT OR NEED TO KNOW

Ohm's Law

Ohm's Law defines the relationships between (P) power, (E) voltage, (I) current, and (R) resistance. One ohm is the resistance value through which one volt will maintain a current of one ampere.

(I) **Current** is what flows on a wire or conductor like water flowing down a river. Current flows from negative to positive on the surface of a conductor. Current is measured in (A) amperes or amps.

(E) **Voltage** is the difference in electrical potential between two points in a circuit. It's the push or pressure behind current flow through a circuit, and is measured in (V) volts.

(R) **Resistance** determines how much current will flow through a component. Resistors are used to control voltage and current levels. A very high resistance allows a small amount of current to flow. A very low resistance allows a large amount of current to flow. Resistance is measured in Ω ohms.

(P) **Power** is the amount of current times the voltage level at a given point measured in wattage or watts. Ohm's Law defines the relationships between (P) power, (E) voltage, (I) current, and (R) resistance. One ohm is the resistance value through which one volt will maintain a current of one ampere.

To make a current flow through a resistance there must be a voltage across that resistance. Ohm's Law shows the relationship between the voltage (V) or Electromotive force (E), current (I) and resistance (R). It can be written in three ways:

$V(E) = I \times R$ or $I = V(E) / R$ or $R = V(E) / I$

where: V(E) = voltage in volts (V)

I = current in amps (A)

R = resistance in ohms (Ω)

or: V(E) = voltage in volts (V)

I = current in milliamps (mA)

R = resistance in kilohms (K Ω)

For most electronic circuits the amp is too large and the ohm is too small, so we often measure current in milliamps (mA) and resistance in kilohms (k Ω). 1 mA = 0.001 A and 1 k Ω = 1000 Ω .

The Ohm's Law equations work if you use V, A and Ω , or if you use V, mA and k Ω . You must not mix these sets of units in the equations so you may need to convert between mA and A or k Ω and Ω

The VIR triangle

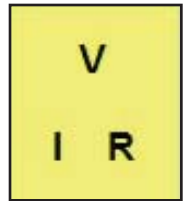
You can use the VIR triangle to help you remember the three versions of Ohm's Law. Write down V, I and R in a triangle like the one in the yellow box on top right.

• To calculate **voltage, V**: put your finger over V, this

leaves you with I R, so the equation is $V = I \times R$

• To calculate **current, I**: put your finger over I, this leaves you with V over R, so the equation is $I = V/R$

• To calculate **resistance, R**: put your finger over R, this leaves you with V over I, so the equation is $R = V/I$



Ohm's Law Calculations

Use this method to guide you through calculations:

1. Write down the **Values**, converting units if necessary.
2. Select the **Equation** you need (use the VIR triangle).
3. Put the **Numbers** into the equation and calculate the answer.

It should be **Very Easy Now!**

- 3 V is applied across a 6 Ω resistor, what is the current?
 - o **Values:** V = 3 V, I = ?, R = 6 Ω
 - o **Equation:** I = V/R
 - o **Numbers:** Current, I = 3/6 = 0.5 A
- A lamp connected to a 6 V battery passes a current of 60 mA, what is the lamp's resistance?
 - o **Values:** V = 6 V, I = 60 mA, R = ?
 - o **Equation:** R = V/I
 - o **Numbers:** Resistance, R = 6/60 = 0.1 k Ω = 100 Ω (using mA for current means the calculation gives the resistance in k Ω)
- A 1.2 k Ω resistor passes a current of 0.2 A, what is the voltage across it?
 - o **Values:** V = ?, I = 0.2 A, R = 1.2 k Ω = 1200 Ω (1.2 Ω ks converted to 1200 Ω because A and k Ω must not be used together)
 - o **Equation:** V = I \times R
 - o **Numbers:** V = 0.2 \times 1200 = 240 V



CHRISTOPHER WESTON FUND

Amateur Radio Operators form The Christopher Weston Fund

The local Amateur radio community has pulled together to raise money for the children of Christopher Weston. Contributions will be used to provide Christmas gifts and needed assistance for the children of Christopher Weston.

The fund, THE CHRISTOPHER WESTON FUND, has been set up at Key Bank. Monetary donations of any amount can be made at all Key Bank branches in NE Ohio. All funds will be used to buy Christmas presents and provide assistance for the children, who recently lost both parents.

Christopher Weston, 44, of Lordstown, died in a robbery last Tuesday afternoon. The police report said four shell casings from a *Continued page 3*

GROUNDING - CONTINUED FROM PAGE 1

a controlled burn that generates a white-hot heat to weld the metal pieces together. Keep in mind three things when firing a cad weld: First, it will produce sparks and a plume of smoke, so step away. Second, don't look at the charge; it will be very bright. Third, it will remain hot much longer than you think.



(L - R) Fig 5: This copper-strap clamp secures the strap to the ground rod; Fig. 6: Seven-strand copper wire can be used as a pigtail; Fig. 7: This cad weld is ready to fire; Fig. 8: Use a stainless-steel wire wheel to clean the strap before soldering.

John has, at times, silver soldered a copper strap directly to the driven rod. It will take time. The rod must be hot enough for the silver solder to wick to it.

You do not want to solder in wind. The wind will pull just enough heat from the rod or strap to make a good connection difficult.

John recommends using a turbo-torch with MAPP gas, which burns hotter. The silver solder itself is \$70 for a one-pound tube of sticks. Expensive, but not a point to scrimp.

Other tools include a set of welding leather gloves and multiple needle-nose vise grips and/or C-clamps. Tight connections require less silver solder.

A clean surface is important. John uses a battery-powered drill and a stainless steel wire wheel (Fig. 8) to clean the area of the strap or straps.

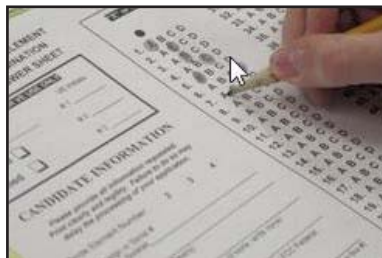
(Although a stainless steel wire wheel is harder to find, they are available at Grainger. When you use a regular steel wire wheel to clean the copper, tiny fragments of steel are left embedded in the soft copper strap; these make it harder for the silver solder to bond to the copper. Also the steel may rust later, making the connection less effective.)

For further reference, John suggests the websites of Erico/Caddy, Harger Lightning and Grounding and www.amgroundsystems.com AM Ground Systems.

Adding additional ground rods takes time, but you'll be impressed with the payoff.

John Bisset marked his 40th year in radio in broadcasting recently. He is a past recipient of the SBE's Educator of the Year Award. Reach him at johnpbisset@gmail.com. He can be reached at (603) 472-5282. Faxed submissions can be sent to (603) 472-4944.

EXAMS: NCVEC RELEASES NEW GENERAL CLASS QUESTION POOL



The new General class question pool is valid from July 1, 2011 through June 30, 2015.

The Question Pool Committee (QPC) of the National Conference of Volunteer Examiner Coordinators (NCVEC) released the new General class (Element 3) question pool on Tuesday, December 7. This new question pool -- including graphics and diagrams -- will become effective for all General class examinations administered on or after July 1, 2011; it will remain valid until June 30, 2015. The current General question pool that became effective July 1, 2007 will expire June 30, 2011. The new General pool contains 457 questions, from which 35 are selected for an Element 3 examination. The current Technician class question pool that was effective July 1, 2010 is valid through June 30, 2014. The current Amateur Extra class pool that was effective July 1, 2008 is valid until June 30, 2012.

GENERAL CLASS
JANUARY 5, 2011
AT THE AVNET'S, 2050 E. SOUTH
RANGE RD. NEW SPRINGFIELD
(330-549-3051)

FUND - CONTINUED FROM PAGE 2

.22-caliber gun were found in the store where he worked. Weston was found with his wallet open next to his body, and had been shot twice in the back. He was pronounced dead at the scene by emergency personnel.

Christopher served in the Navy during the first Gulf War, and leaves two sons, Christopher, 12, and Steven, 8. Both boys lived with their father. Their mother, Terri Stevens, died in March of a heart ailment.

You need not be an amateur radio operator to contribute in the giving.

Amateur radio, often called ham radio, is both a hobby and a service in which "hams" use radio communications equipment to communicate with other radio amateurs for public services, recreation and self-training. The term "amateur" denotes the fact that the amateur radio operator is not paid for his or her efforts.

Please stop by any Key Bank location in NE Ohio with any help you can provide.

Questions to Jim Cessna, KB8N (330) 881-4600
 Sent from Mark Ludwick, W8BBQ

THE AMATEUR



I think it is time that we look at the amateur as maybe our equipment looks at us. Is it possible for our equipment to have an opinion about each one of us? After all, it cannot think or talk. Or can it? It is possible that we just are not listening or looking at what it is telling

us. I asked myself "self, how is the best way to do this?" Well, believe it or not, self came up with an answer. All I have to do is interview the equipment. That is easy enough, so here I go interviewing some radio equipment.

My first interview was with a two-meter handheld radio. As I gently picked it up, and looked it all over, it was easy to tell that it had a few hard times. The rubber duck antenna was bent. The case was scuffed some. The belt clip was missing. The battery case did not fit very well, but it was useable. This looked like a good piece of equipment to interview. While space will not allow me to reproduce the whole interview here, so I'll just hit the most important parts.

While holding it carefully in my hand, I asked it what it would like to be called. "HT" came the cheerful reply. Well, I said, "it appears that you may have been in some exciting times in your lifetime so far." "Yes, I have" came the excited reply. "What would you like to hear about first?" "Well," I said, "one couldn't help but notice that your rubber duck is bent." "Oh yes" HT exclaimed. "The ham that owns me is careless about a lot of things. He would clip me on the side of his pants, and the rubber duck would run against his side. This did not feel so good as it put a BIG strain on my antenna connector. Oh, how that would pull on my insides. My circuit board did not like it at all."

HT goes on to tell me that after a few times he decided to call his owner short circuit. He now knew why they were called amateur radio operators. Any professional operator would know better. HT went on to explain that he did not bend the rubber duck, but it got bent when short circuit clipped me to his back side, and walked around as a net control, nevertheless walking in circles with his front side facing the repeater, and not thinking that the signal would have to pass his body to get to MY antenna, and I was not receiving as well as I should. Short circuit just could not figure that out at all. Well, he got tired and figured it was time to sit down. "Where was I?" HT asked. "I was clipped to his backside. Now, picture what happened next when he sat down with his back on a wooden chair." "Ouch," I cried with a loud voice, and my duck bent under the strain. "My circuit board was in a lot of pain also. Did short circuit ease up

any? NO WAY. Not only was he complaining that I was not doing a good job of receiving and transmitting as we were fairly close to the repeater."

"Just because we were inside a steel building had nothing to do with it." HT goes on to say that under the conditions that he was forced to operate, he figured he was doing a really good job. Inside a steel building plus short circuit's body was between the rubber duck and the repeater, and it was being crushed and bent at the same time, what did he think would happen?

I just had to ask HT what happened to his belt clip? "Well," exclaimed HT, "wouldn't you know someone did explain how to use it properly. What did he do, but remove it from my person. He acted as if that would solve all his problems. I felt naked without it," HT exclaimed,

"But, I soon got used to not having it. After a few times of trying to use me without the belt things got worse." HT went on to say, "I then changed his name to blanked out, as we are not allowed to use those names." HT was a little upset, as I could tell it in his voice. "What this so-called amateur," HT continued to say, "would do, was to try and clip me to his side and no belt clip. Well, he dropped me several times, and messed up my battery case and scuffed up my case. He even dropped me into a water puddle a few times. Some people just never learn." HT told me.

I had to ask HT if all this amateur treatment affected him as to how he went about performing his job? "NO," HT replied, "he would do his best until his dying day. He would not let the way he was handled stop him from doing his job. He was designed to do a job, and he was going to do it no matter what happened to him in the performance of his duties." HT and I said our goodbys and went our separate ways. I miss the little guy.

*Bill McClaren KB8MNE, Trustee SAARA
Salem Area Amateur Radio Association, Salem, OH
Reprinted from SAARA Speaks 1st quarter 2011*



DECEMBER TEST SESSION

At our December 15 test session, we had five Hams wanting to upgrade their licenses. Two tried for their Extra, one passed the other missed by one question but didn't want to try again. We had three Hams going for their General two passed and sadly one came to the test session without his current license and wasn't able to go home to get it - too far.

Congratulations to **Steve KC8SOY** and **Maureen KD8NXS** both passed their General!

The VEs for the Session were: Al Avnet AB8AA, contact VE; Jane Avnet K8JAA; Jim Jickess KB8QDZ; Bob McCully AB8OP; Wes Boyd W8IZC; Dave Beatty KC8WY. Thanks for your help.

January 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31 Happy Birthday KD8DWV & KC8WY 					1  Happy NEW Year!
2	3	4	5 ARES Net 8:30 P.M. 146.745 General Class 7:00PM	6	7 WRARC Net 9:00PM 145.270	8
9	10	11 Eat'n Park Boardman 8:30 A.M. Ham Community Breakfast	12 General Class 7:00PM	13 Happy Birthday KD8LDY 	14 WRARC Net 9:00PM 145.270	15
16 Winter Party 3:00PM A La Cart 	17	18 WRARC Meeting 7:00P.M.	19 General Class 7:00PM	20	21 WRARC Net 9:00PM 145.270	22
23	24	25 Eat'n Park Boardman 8:30 A.M. Ham Community Breakfast	26 General Class 7:00PM	27	28	29

2011 DUES ARE DUE - DUES MUST BE PAID BY THE END OF JANUARY TO MAINTAIN MEMBERSHIP.