



THE BEAVER VALLEY AMATEUR RADIO ASSOCIATION
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BEAVER COUNTYS ONLY 75 YEAR ARRL AFFILIATED CLUB!

The eQRM Newsletter

Home of W3SGJ/R
145.310- 100 Hz PL

Volume III, Issue 3

July 2009

Grant, KB3QFQ, Editor



Station Grounding Will we ever be able to dispel the myths?

By Steve Katz, WB2WIK/6 from [eHam](#)

This is a much beaten-up subject. Hardly a day goes by that on some ham radio board or reflector there isn't a question about "station grounding." Funny part is, the subject's been so discussed, that anyone asking a question must have not been paying attention for the past several (fill in: months, years, etc.)

I think the biggest problem is that a lot of commercially manufactured equipment comes complete with a "ground terminal," usually somewhere on the rear of its chassis. That, along with directions from the equipment manufacturers, implies the equipment owner ought to connect something to it.

I view this as an adjunct to the "SWR" dilemma. You know, the one that drives hams crazy believing that for an antenna to work properly it must have a low SWR. Or, sillier still, that an antenna with a low SWR must be working properly.

It's funny that before about 1960, few hams owned an SWR measuring instrument of any sort but somehow made DXCC, bounced signals off the moon, worked meteor scatter, aurora and E-skip, and just happily made contacts without having the foggiest idea what their antenna's SWR was. Commercial transmitters didn't have internal SWR bridges, and inexpensive bridges weren't on the market. The famous "Monimatch" circuit hadn't yet been published, so few hams knew how to build an SWR bridge, nor would they bother trying. Hams, and their transmitters, were perfectly content to be working each other, around the world, without this fabulous knowledge.

Now, back then it was also pretty common for a lot of equipment to not even have a ground terminal. Some of it did, some of it didn't, and it didn't matter much one way or the other. I think the best reason for a ground terminal would have been to help prevent equipment users from killing themselves due to internal short-circuits in equipment that was AC powered, back before 3-prong (and 3-wire) power cords



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Letters and Emails to the Editor

The eQRM welcomes letters/e-mails to the editor. Letters must be signed and contain your contact information for verification prior to publication. Preference will be given to letters of 200 words or less. Letters are subject to editing. Unused letters will not be acknowledged or returned.

The BVARA 10 Meter Net Lunch group will be meeting every Thursday at Kings in Center Twp at 11:00 AM. All area amateurs are invited and encouraged to attend the Thursday Morning Lunch.

VE TESTS are held by the W5YI VE Team at the American Red Cross in Brighton Township, Beaver, PA. IF YOU DESIRE TO TAKE A TEST, CONTACT DALE, KE3SV, FOR THE DATE OF THE NEXT TEST SESSION.

Report time is 6:15 sharp, to fill out 605 forms and check I.D. Testing begins at 6:45 PM. Information and registration on a test session can be obtained by calling VE Team Coordinator, Dale Neely, KE3SV after 6PM.

His address and phone number are as follows:

**Dale R. Neely Jr., KE3SV
444 Center St.
Zelienople, Pa. 16063
Phone: 724-452-3247**

**2009 BVARA
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**ROSSI WINERY
WIRELESS SOCIETY**



All area Amateur Radio Operators are invited to attend the weekly meeting of the Rossi Winery Wireless Society. The Society meets every Saturday evening at the Winery located in beautiful West Aliquippa. The meeting begins at 6:30 PM with a traditional vino toast followed by homemade Italian foods! The Winery is located on Main Avenue in the heart of West Aliquippa's Cultural & Historic District. Talk-in is on the ,31 repeater.



RACES & ARES



eQRM Urges ALL Beaver County Amateurs to Participate



As a matter of editorial opinion, the eQRM urges all Beaver County licensed amateur's to participate in the County's RACES and ARES programs.

Any Beaver County Amateur that is interested in participating in the RACES/ARES programs can do so by checking into the Beaver County Public Service Net which meets every Monday evening at 8:30 PM local time on the N3TN 146.850 MHz repeater (88.5 PL).

THE HAM'S HOROSCOPE

BY MADAM ZELDA, ST1ARS

That's Gold	I'm Happy	Can't Complain	Not Happy	Turn Down the Heat

Sign	Romance	Home & Family	Finances	Career	General
Aries					
Taurus					
Gemini					
Cancer					
Leo					
Virgo					
Libra					
Scorpio					
Sagittarius					
Capricorn					
Aquarius					
Pisces					

Madam Zelda Speaks!

Greetings, mundane beings. It is I, Madam Zelda. This month, I have Seen the most stunning revelation in the Crystal Ball. I have seen a man scuba-diving at the junction of the Ohio and Beaver Rivers, near the Pittsburgh, Pennsylvania region, and I have Seen him find gold. But I have also Seen him being ate by a giant catfish that is over six feet long, just after he had discovered the gold. If you, mundane beings, manage to find this gold and escape unscathed, please send 10% of your earnings to me.



Just recently, I have Seen the most astonishing vision. On the Seventh Full Moon of the year two-thousand-and-nine, a certain city in New Mexico will be visited yet again by a group of Other-Worldly Beings. This Vision, as you can guess, has given me great distress.

I first discovered that I had the Seeing Eye in my youth. I was sitting at the dinner table eating with my family, when I was presented with The First Vision in the Mind's Eye. In this astonishing Vision, I saw my father coming home from work and slipping on a drop of toothpaste. After the First Vision was completed, I returned to the Mundane World and warned my family of this dreadful future. Sadly, they did not listen, and my father was sore the next day. Luckily, he did not die.

In the name of the stars,
Madam Zelda, ST1ARS



**STUDY GUIDES
TO BE USED IN
UPCOMING
BVARA
LICENSE
CLASSES**

Technician Class—*The No-Nonsense, No-Code Technician Class License Study Guide* is based on a method developed by Bruce W8BBS. What he did for the earlier question pool is to rephrase each question in the form of a statement and then organize the statements to make them readable. Bruce was unable to update his manual for the question pool that went into effect in July 2006, so he gave us permission to do it.

General Class—*The No-Nonsense, General Class License Study Guide*. This is the study guide for those taking the General Class license exam after July 1, 2007. It follows the same format as the Technician Class Study Guide. Note, though, that there are more questions in this pool, and in general, the questions are more technical than the Tech Class, so be prepared to study longer and harder than you did for the Tech test. Visit: <http://kb6nu.com/techmanual/> for more info on these guides.

BY BECOMING A MEMBER OF THE BVARA, YOU CAN HELP SECURE THE FUTURE OF AMATEUR RADIO IN BEAVER COUNTY. ADDITIONALLY, THE BVARA RECEIVES A PORTION OF EACH ARRL AND/OR WORLD RADIO SUBSCRIPTION YOU PURCHASE!

Join the BVARA, ARRL and World Radio

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<input type="checkbox"/> BVARA STUDENT MEMBERSHIP	15.00	
<input type="checkbox"/> BVARA ASSOCIATE MEMBERSHIP	10.00	
<input type="checkbox"/> BVARA SPOUSE/CHILD MEMBERSHIP	5.00	
<input type="checkbox"/> ONE YEAR ARRL MEMBERSHIP	39.00	

Subtotal: _____
 ARRL MEMBER ? YES NO Donation: _____
 Total: _____

Your License Class (if any):

<input type="checkbox"/> Novice	Name _____
<input type="checkbox"/> Technician	Address _____
<input type="checkbox"/> General	_____
<input type="checkbox"/> Advanced	_____
<input type="checkbox"/> Extra	Phone _____

Your Call Sign: _____ Exp. date _____
 Signature _____

**Make Check or Money order payable to:
 The Beaver Valley Amateur Radio Association, P.O. Box 424
 South Heights, PA 15081**

A BIG THANK YOU!

**To the family of Donald McMurdy, WB3AIF
 for the donation of the IC-765 and Drake TR-4C
 and to
 George, NN3J for the donation of the Yaesu FT101ZD**

Station Grounding

Continued from front page

plugs and outlets became common. Ironically, the most unsafe equipment back in those days was thousands - if not millions - of inexpensive, AC-line powered broadcast radios, including bedside "All American Five" type radios and clock radios, which did not use AC line isolation transformers. To minimize production cost, a lot of these radios directly rectified the AC line and fed a full 120 volts AC to a series string of tube filaments. The string totaled around 120 volts, so no filament transformer was needed. One side of the AC mains was connected directly to the radio chassis (preferably, the "cold" side of the mains!), and to prevent people from touching the chassis, the little radios were installed in plastic enclosures and used plastic knobs over the control shafts. These radios did not have 3-wire power cords.

Those were accidents waiting to happen, of course. Untold thousands of people received electrical shocks from these radios, and they were responsible for more than a few fires. Sadly, some probably lost their lives due to such shabby design. And while those radios really indicated an actual need for a chassis (earth, safety) ground, they didn't have any provision for one.

But we don't use radios like that any more. Now, we have equipment that uses isolation transformers, and 3-wire power cords plugged into grounded outlets. And a lot of our equipment is powered by low voltage DC, where a shock hazard is literally nonexistent. (You can be hurt by low voltage DC, but not electrocuted. The major source of injuries to people working with low voltage DC is in the form of burns caused by jewelry shorting out the DC power supply's output bus, which can often pump dozens of Amperes through a ring or bracelet before shutting down - if it ever shuts down.)

So, why do we ground? Really good question. I guess

I'd preface my answer with this simple statement:

I've been a licensed ham for 39 years, and continually active. I run legal-limit amplifiers and power output on 160 meters through 10 meters, a kilowatt on 6 and 2 meters, and a couple hundred watts on 135cm and 70cm, and sometimes on 33cm and 23cm, too. I've used dozens of different antenna configurations and have operated from all over the world, but mostly from any of the fifteen home-station hamshacks I've built over the years at the various homes I've owned.



And in all that time, I've never once had a "station ground" of any sort. And in all that time, I've never had any problem that

grounding would solve.

I've operated mobile, marine mobile, maritime mobile and aeronautical mobile and never had a ground on any of these vehicles, either. Especially when operating from an aircraft, that's hard to do. I've also set up dozens of field operations, including Field Day and other contests, without ever owning a ground rod or feeling the need to drive one in, anywhere.

Therefore, you can see I'd be a tough one to convince that a "station ground" serves any particular purpose. Not to say it cannot help, in some situations. But in most all those situations, better station engineering would help more.

(For clarification: Nowhere in this article will I say it's a bad thing to ground your equipment. I just discuss the counterpoint, that grounding your equipment usually isn't necessary, and if you're spending any time deliberating on this issue, that's time wasted that you could be operating, instead.)

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Station Grounding

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RF grounding

There's surely such a thing, and it's a good thing. If I ever use a voltage-fed antenna or a random wire, I usually place my antenna tuner outdoors, or at least in an open window, so the entire antenna is literally outside, and then I have a very short and direct path to Mother Earth for the return current. The earth completes the current path from transmitter to antenna and back, and everything is happy. This is a great situation. But you really need to have the tuner laying on the ground, or very darned close to it, to accomplish this feat - because a tuner sitting on a desk in the shack is often too far from ground to be effectively grounded.

Usually, however, I use current-fed antennas and I match the antennas to their transmission lines (by adjusting the antennas themselves). Most of my lines are coaxial cable, but some are twin lead. If I use coax to feed a balanced antenna, I use a current balun at the antenna feedpoint. If I use twin lead to feed a balanced antenna, I don't need a balun, except perhaps in the shack where I transition to 50 Ohm equipment. In all cases, the lines are cool and quiet and don't seem to bring any RF back "down the pipe" from antenna into the shack.

That's the result of matching, choking and cable routing to minimize this problem. That not only works better than grounding the station equipment, but it's also easier to accomplish, usually.

It's true that most antenna designs won't provide a good match over more than maybe 2% of the operating frequency. So what? My 80 meter inverted vee is resonant at 3.750 MHz, and its SWR rises to >3:1 at both band edges (upper and lower). Yep, that's about 25% reflected power. Okay, I'll repeat: So what? I use my amplifiers as antenna tuners, can transfer all the power generated to the load just fine, and have zero RFI, RF "feedback," or other problems. No "hot mikes," no burns from accessories, no nothing, nada, zip. The secret is station engineering. That is, my antennas are located sufficiently far from my equipment that very little radiates back into places I don't want it to be. And, I do use current baluns in the form of coaxial RF chokes and the like; and, for stubborn cases (especially on the very lower frequency bands, where it's difficult to escape the antenna's near field) I use ferrite isolators on

the feedlines, installed just outside the shack wall. I obviously don't need any station "RF ground," and never made any attempt to have one.

Lightning

I live in Los Angeles, which has the lowest incidence of lightning strikes of anywhere in the U.S. (fewer than 5 lightning incidents annually on average, and that's recorded in the mountains or high desert, not where I live). But, it doesn't matter. I grew up in New Jersey (70+/year) and have lived in Florida (90+ but it seems like a million), and have operated from many tropical places where lightning is so common that people miss it if it doesn't happen daily.

Fact is, grounding your equipment chassis inside your home doesn't do anything to prevent lightning damage, anyway. The last place you want lightning energy to find a path to earth is inside your home. The only place you want lightning energy to find a path to earth is outside your home. Volumes have been written on this subject by people more knowledgeable than I, so I'd refer you to those volumes for more information.

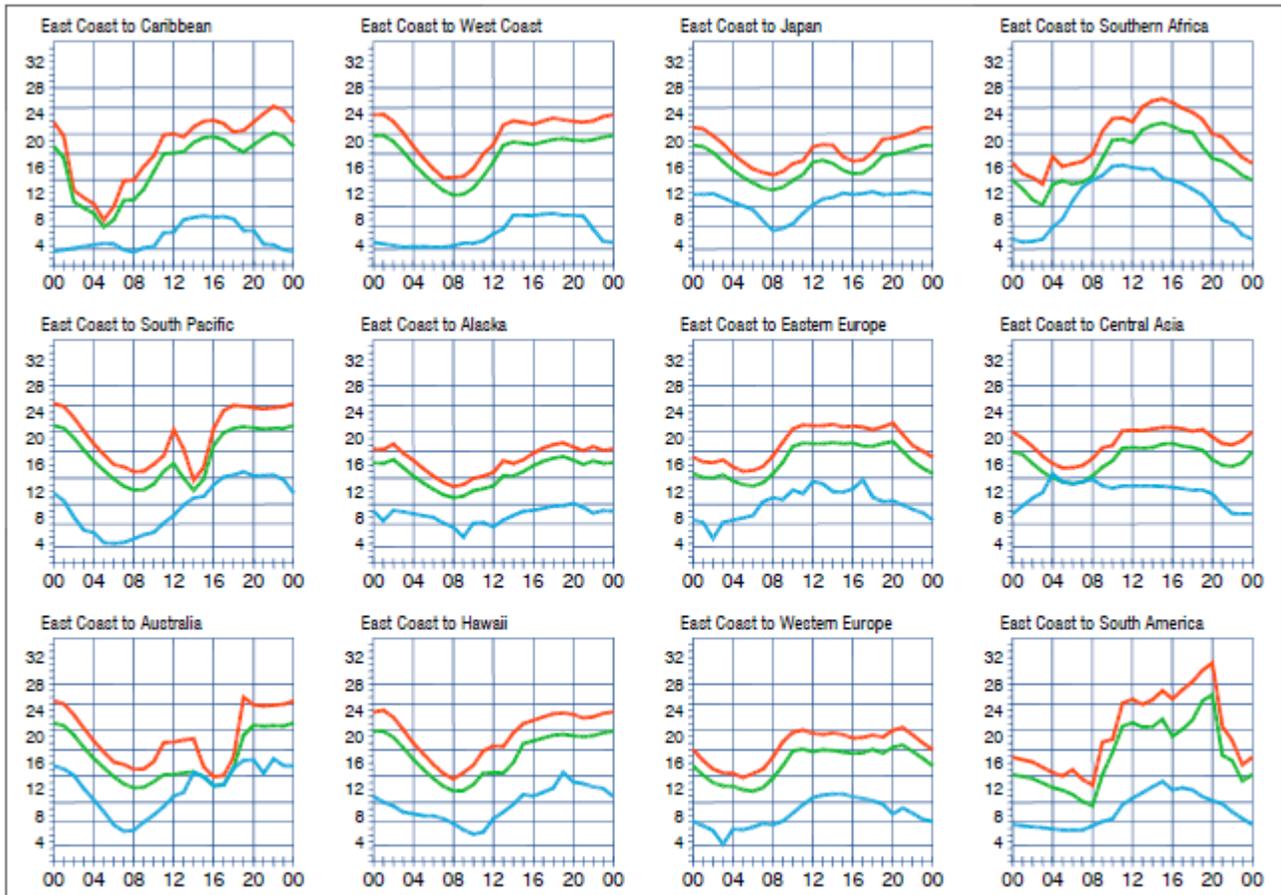
The only thing I'll say is, "Equipment (chassis) grounding is not helpful with regard to lightning protection." And that fact ought to be self-evident to anyone who understands electricity.

Safety ground?

As I mentioned earlier, there are very valid reasons for "safety" grounding, although I've never once had an equipment fault that would have caused a safety concern whether the equipment was grounded, or not. But, it's possible. And, it's the reason that all construction in the past 30+ years in America (and many other places) used 3-wire grounded outlets throughout. The third (green, ground) wire should be connected to the ground buss in the building's electrical service panel, which should be grounded directly to earth via an 8'

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QST Propagation Charts



When are the bands open? These charts, generated using CAPman, show probabilities for average HF propagation in the month of July 2009 for the paths indicated. The horizontal axes show Coordinated Universal Time (UTC), and the vertical axes frequency in MHz. On 10% of the days of this period, the highest frequencies propagated will be at least as high as the upper red curves (HPF, highest possible frequency) and on 50% of the days they will be at least as high as the green curves (MUF, classical maximum usable frequency). The blue curves show the lowest usable frequency (LUF) for a 1000-W CW transmitter. For SSB or a lower transmitter power, the LUF will be somewhat higher than the blue curves indicate. See Oct 1994 QST, pp 27-30, and Feb 1995 QST, pp 34-36, for more details. The predictions assume an observed 2800-MHz solar flux value of 89. This is a Low level of solar activity. See the detailed propagation tables on The ARRL Antenna Book CD-ROM.

The above chart is for the month of July.

FOR INFORMATION ON HOW TO READ THESE CHARTS, [CLICK HERE](#)

W3SGJ
Beaver Valley Amateur Radio Association
P.O. Box 424
South Heights, PA 15081, USA
ITU 8, CQ 5, Grid EN90ur, Beaver County

HAMS LOVE TO EAT!

Recipe of the Month: LEMON SQUARES DESSERT

Ingredients

Bottom Layer:

1/2 cup/125 mL butter
1 cup/250 mL flour
1/2 cup/125 mL chopped pecans
1 tsp/5 mL [Butter Extract](#)

Cream Layer:

1 cup/250 mL powdered sugar
8 oz/227 g fat-free or light cream cheese (at room temperature)

1 tsp/5 mL [Original Double-Strength Vanilla](#)
Half of a 1-quart/liter container of whipped topping

Lemon Layer:

1 pie filling recipe from Watkins Lemon Dessert package, using
2-1/2 cups/625 mL water, [Lemon Dessert Mix](#)
1 tbsp/15 mL lemon juice

Cooking Directions

Combine bottom layer ingredients and pack into an **11 x 7"/28 x 18 cm baking pan**. **Bake at 375°F/190°C for 15 minutes**. Cool completely.

Cream together powdered sugar and cream cheese. Add whipped topping and fold in. Prepare lemon pie filling; add lemon juice and let cool.

Spread a thin layer of cream mixture over baked bottom layer. Spread lemon filling on top; spread rest of cream mixture on top of that. Chill. (Note: Chilling after applying lemon layer may make it easier to spread top layer.)

Cut in large squares.

(Note: Other Watkins Dessert Mixes may be used in place of Lemon.)



This recipe is brought to you by Watkins
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Station Grounding continued from page 6

ground rod driven into earth at the nearest practical location, usually directly under the panel.

It's possible that even this excellent protocol can fail, but it's rare. In the event it does fail, a secondary earth ground for station equipment is a "belt and suspenders" approach that probably can't hurt. I must say, though, that having owned hundreds of pieces of AC-powered electronic equipment in my nearly 40 year ham career, I've never seen a fault occur that would cause an electrical shock during normal operation. So, I do believe this is a pretty rare event.

[I might also say that I've received numerous electrical shocks over the years, all of which were purely my fault (like replacing wall outlets and switches without bothering to turn them off first), so I deserved every one of them. And they didn't feel so bad. I can say from experience: 240v hurts much more than 120v. If you're going to shock yourself, go for 120. It's much nicer. In Japan, their mains voltage is only about 100 volts. Now I know why: It hurts even less.]

Daisy chain grounding

This is not recommended at all, but we all have it, in one way or another. Unless your station is set up an inch from your service panel, where a SPG (single point ground) connects every single thing going to and from your home and the impedance between all those items is zero: You, too, have some form of a daisy-chain ground.

This is nothing more than having equipment grounded via multiple paths, both serial and parallel, that have varying impedances to earth. It's difficult to avoid.

For example: If your antennas are mounted on your tower, and your tower's grounded, your antennas, unless completely isolated from their supporting structure, are grounded, too. Now, you use coaxial cable to connect those antennas to your station tuner, coax switches, amplifiers, rigs, or whatever, and you have a ground path from your antennas far, far away to your station equipment right in front of you, via all the coaxial shields. The DC resistance of all those shields is an unknown, although you could probably calculate or even measure it, if you try. But, if you have four antennas fed with four runs of 100 feet each RG-213/U, you've got four parallel ground paths that probably have a DC resistance less than one Ohm.

So, even if you disconnect every intentional earth ground you have in your station, your station equipment is still grounded, anyway. It's just a rather unpredictable ground. If you don't

have a tower, but use a mast on the chimney to support your antenna, that mast should be grounded by a wire of substantial diameter directly to a ground rod via the shortest possible path. If you use a doublet antenna that is fully isolated from ground, then its feedline should be grounded via a lightning arrestor or similar device prior to entering your shack.

No matter how you cut it, your stuff is grounded (if you have an engineered installation), like it or not. So, the "safety ground" consideration, to prevent electrical shock in the event of internal equipment malfunction, is very likely covered. A 1 Ohm connection to earth will keep a 120v line down to 15v before it trips the 15A circuit breaker or fuse in a conventional household circuit. You won't feel the 15 volts.

If your home is equipped with 3-wire grounded outlets and your power supplies or other equipment containing AC-powered circuits have 3-wire power cords, now you have another ground, in parallel with that one.

If you added still another chassis ground simply because you wanted to, now you have still another ground, in parallel with the other two. But the circuit is more complex than just parallel branches to earth, and from an AC (RF) perspective it's more complex still.

As far as I'm concerned, the only important consideration in all of this is that the transmission line from my antennas to my station equipment should have considerably higher ground impedance than the outdoor ground connection from those same antennas to earth. So, when in doubt about that, I use more coax than needed for the path. This is purely a lightning protection issue, and I live where lightning hasn't been witnessed in sixteen years; but I try to follow that rule, anyway.

Still want to connect something to that little terminal?

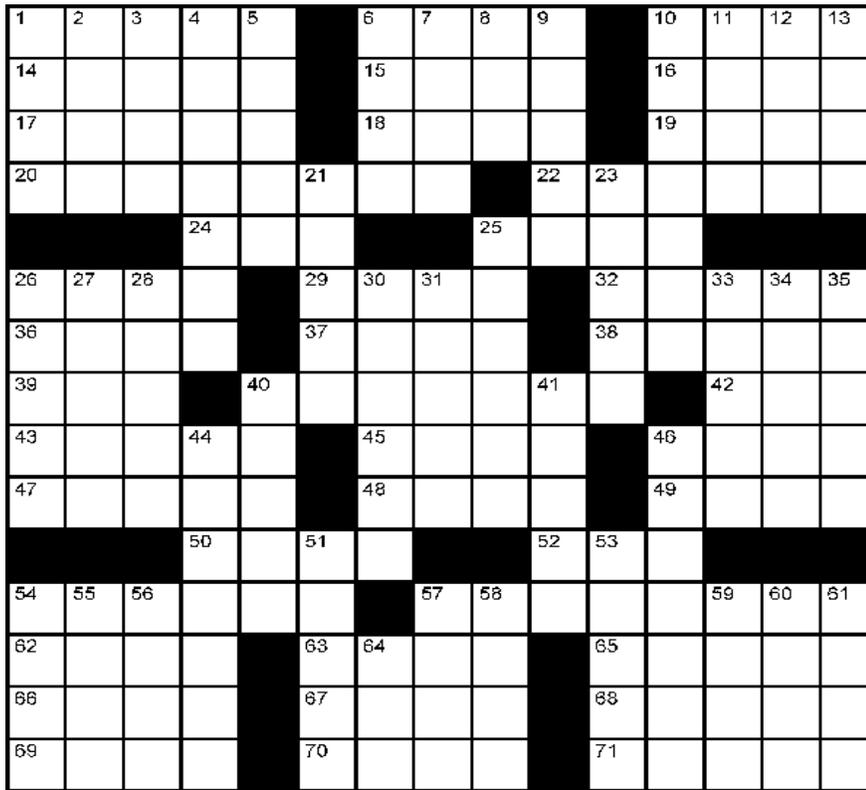
Go ahead, if you want to. But think about why. "Because the terminal is there" isn't a very good reason. The little pictograms in the ham radio equipment owners' manuals (especially the JA stuff) isn't a very good reason, either. My Kenwood owner's manual has the little grounding pictorial, along with a warning to be sure the equipment is grounded, with no explanation at all as to "why." Interestingly, I have lots of Kenwood audio equipment that doesn't even have a 3-wire power cord, and there's no ground terminal on any of it. Same company, different philosophy.

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CROSSWORD PUZZLE - "INTERFACE"

The human-radio interface that is... and it has little to do with computers.

from the [ARRL Website](#)



Down

1. Atlantic fish
2. Innocent antenna configuration?
3. Prefix with VOX
4. Brass instruments not meant for, but useable for, sending CW
5. 19th century G poet
6. DR on CW
7. Pupil's place
8. "What?", on 7.005, say
9. Expensive sports car
10. Where plugs go
11. Old alpha alternative, in the military, say
12. ZK2 place
13. Footfall
21. Spanish prefix
23. XE units
25. Docked /MM
26. With 35-down, it's where 6, 20, 57, 67-across, 10, and 44-down are located
27. Part of SWR
28. Digital mode
30. ___ public
31. Congo prefix
33. Balearic prefix
34. Armenian prefix
35. See 26-down
40. Plant again
41. A full circle
44. Interface devices manipulated by a digit
46. Radio pioneer
51. Crystals, familiarly
53. SV/A Mount
54. Hiker's sack
55. Its length determines frequency
56. KL followers
57. VE8 forecast
58. Networks
59. One method of ant. elev. measurement
60. Lake for which a bug fist is named
61. Flex, SoftRock and others
64. QSO at start of SS

Across

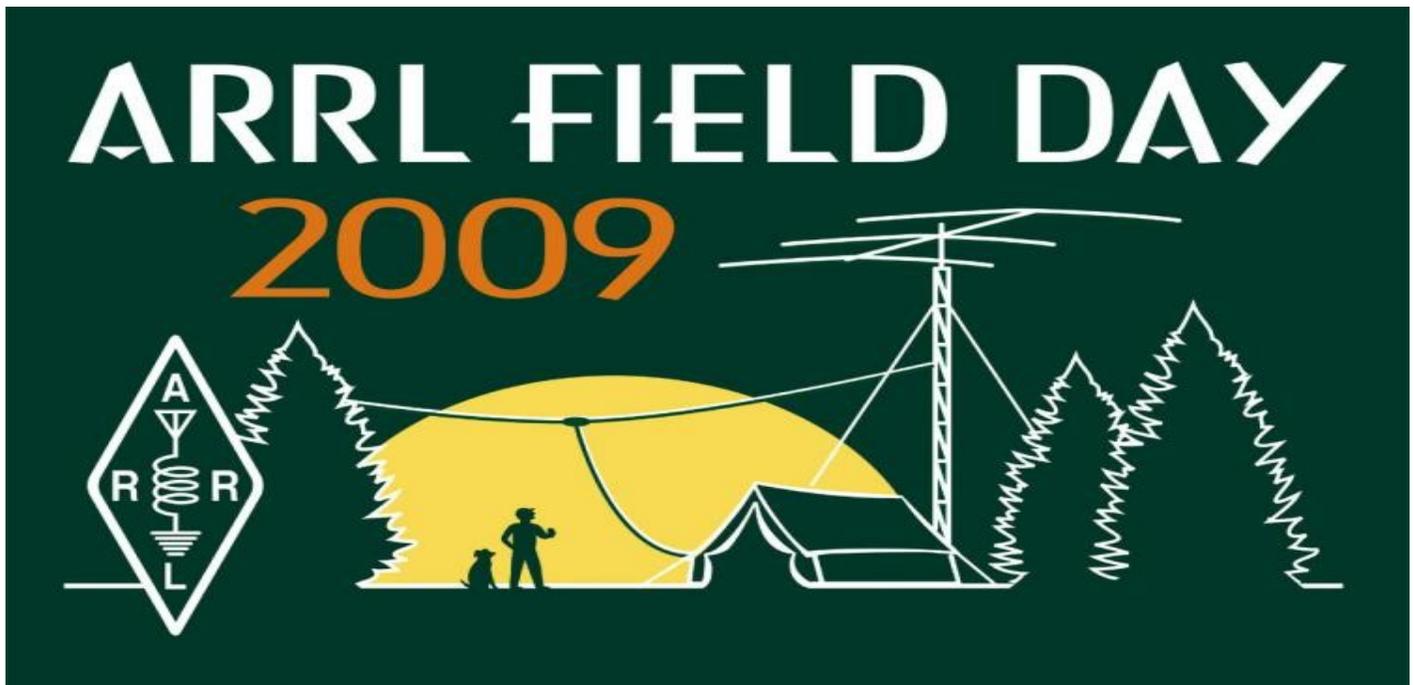
1. Radio room
6. Analog tuning device
10. F-land without
14. Simple /MM vehicle
15. It follows that
16. SK item
17. Henry amp last name
18. "If it ___ broke ..."
19. This
20. They help you read 6-across and other 67-acrosses
22. Rig or antenna maintenance
24. Sometime AMSAT launcher
25. Related degree hams sometimes have
26. Campus org, informally
29. Not fooled by
32. Prepare, as tea
36. Chips that store
37. Dahdit dahdit
38. JA port
39. Hall-of-Famer Mel
40. Comebacks
42. Ham, to Noah
43. Weeper of myth
45. Once again
46. Go for the gold
47. Inductor shape, sometimes
48. Overhaul
49. Figure skater's jump
50. Whig's rival
52. Good thing to break on the links
54. Art's transceiver
57. Rotary, slide, and others
62. Bigger than a pico
63. Speaker part
65. Stockpile
66. Shakespeare's river
67. Interface device manipulated by digits
68. Where hams want to be
69. Livens (up)
70. Puts in stitches
71. FD, repeater, and others

Amateur Radio Technician License Class

Every Wednesday evening at 6:00 PM
at the Baden Legion, Baden PA

STARTING AGAIN THIS FALL!

REGISTER BY CONTACTING JACK SPENCER, KZ3Z.



On June 26-28, the BVARA participated in Field Day 2009. We had five stations set up at Brady's Run Park and made over 150 contacts, including **Alaska**, **Canada**, the **Virgin Islands**, and almost **every state** in the US! **THANKS** to everyone who made Field Day such a **HUGE SUCCESS!**

Station Grounding

continued from page 9

Maybe Kenwood believes that because amateur transceivers are capable of transmitting, they -- unlike receivers -- need a ground?

Even more interesting is the fact that the stereo equipment really could benefit from an earth ground. In one case of RFI I had personally, adding a ferrite choke filter to the AC power cord, and a chassis ground to a "surround sound" stereo receiver, completely eliminated the interference.

Let the flames begin.

The "must ground" crowd - and there is one, somewhere - will likely disagree with all of this. That's fine. Remember, this whole piece is not about lightning protection in any way; it's about interior station equipment grounding. Since I've never used any in 39 years, I probably never will. I'm not suggesting that equipment grounding is wrong, just that it's usually unnecessary - and if you find it to be necessary, you've got other problems that can be fixed in other ways.