



# Zero Beat

A Publication of the  
Hampden County Radio Association  
[HTTP://WWW.HCRA.ORG](http://www.hcra.org)

MARCH 2007

## Show & Tell

Friday, March 2 at 7:30 pm  
Details on Page 3

The board would like to wish Johnny—Ki1a (HCRA President) a speedy recovery from his recent surgery. Johnny had surgery on February 15th and will not be able to make the meetings for a few months. We're all wishing you well Johnny!

## Field Day 2007

is June 24, & 25<sup>th</sup>  
at Dufresne Park in Granby, MA.

This being our 60<sup>th</sup> Anniversary, my first year as Field Day Chair, I'm hoping for the best Field Day ever. We will seek a balance between the Non-contest fervor, and having fun! Yes, Virginia, Field Day is not a contest! It a national disaster drill, with incentive points. We are looking for help. It takes people power to have a successful Field Day. We need someone to step forward as a cook. My wife Kathy (her 4<sup>th</sup> field Day) has agreed to help out overseeing the food end of field day. She will help plan anything that needs a helping hand. She will also make sure the

tickets are printed, and sold so people will know who to pay for the meals this year. I know it's still early but we have the opportunity to get involved in planning more and better this year. We plan to have a day to check out the



equipment to make sure it is in working and easily assemble-able shape. We need people to get involved in GOTA. An effort is going to be made early ( before everyone leaves for summer vaca ) to get the word out. GOTA was underused for the last two years and we need to Get people On The Air..

If you would like to get involved in Field Day Go to Yahoo.com Go to groups and sign in to the HCRA-FD group. Or you can use the HCRA e-mail to contact me, or you can get me at [KB1JVF@arrl.net](mailto:KB1JVF@arrl.net), or [jldhjr@verizon.net](mailto:jldhjr@verizon.net). See you next month. Jim Harring-

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### Meeting Location:

Meetings are held at the Feeding Hills Congregational Church, 21 North Westfield Street, Feeding Hills, MA 01030.

The church is located right next to a Dunkin Donuts and across from a gas station.

Parking is in back of the church. Access is HP accessible.

Talk-in is available on the 146.94 repeater.

# SK: HossTraders

To All Radio Amateurs...  
From the HossTraders, Joe K1RQG, Bob  
W1GWU, and Norm W1ITT  
February 2007  
Re: HossTraders Tailgate Swapfest

*The October 2006 event was the last Hosstraders. After careful consideration, we have decided to discontinue hosting the event. A combination of factors have led to this difficult decision. We've been running Hosstraders for a third of a century, but we've always done it "our way" and we feel that the result has been an event unique in the Amateur Radio world, certainly in New England. A number of things have been taken into account, but foremost in our mind is that we want Hosstraders to be a quality experience in every way, and not to slowly run it into the ground just for the ride. We want to take things out on a high note, while we can still be proud of our efforts.*

*Briefly, the factors that led us to this point are problems with site logistics, the changing face of flea marketing due to internet commerce, changes in directions of Amateur Radio, and just the fact that we have done it for a third of a century and we are getting old and tuckered out. It is not our intent to elaborate further on these matters. Nor do we intend to anoint or endorse any successors, or go into the business of Hamfest Consulting, so please don't ask. We are unaware of any person or group in the region with the experience to "take over". Therefore, be very cautious of anyone who comes forward claiming to be the "new Hosstraders". Running an event of Hosstraders' size and impact is more challenging than it appears! What's the next step? Well, for us, we plan to relax and play radio. For the rest of the Amateur community in the Northeast, we'd suggest that you get off the internet and on the air. Support your local clubs, and their events. Put up an antenna for some ham who needs a bit of assistance, and help to maintain the fraternal aspects of our hobby.*

*We wish to thank you for your great support these many years. We often hear from hams who have been attending Hosstraders since those early days in Seabrook. Since that first event, where 61 of us met on a flat grassy field, we've had lots of fun, and made lots of memories. We've also donated over 1.3 million dollars to the Shriners' Hospitals for the care and support of severely burned and crippled*

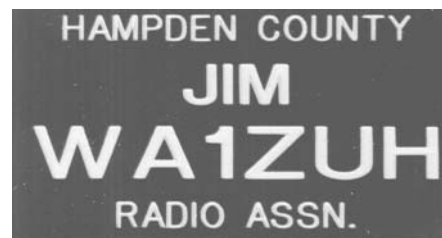
*kids. We are proud of that, and those who participated can share in that pride. The need still exists at the Hospitals, so if you wish to make someone happy, perhaps each year on the anniversary of Hosstraders, you could send a check along to Boston, Springfield or Montreal. They will not waste it!*

*We hope you'll remember the times we all had together at Seabrook, Deerfield, Kingston (!), Rochester and Hopkinton. You can be sure that we will never forget.*

Visit : <http://www.qsl.net/k1rqg/>



**Wear it Proudly!**  
HCRA Name Badges



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Show the world you belong to the oldest club in the Pioneer Valley.

Jim, WA1ZUH: [jmullen@rockys.com](mailto:jmullen@rockys.com) or (413) 245-3228

# Project Night at HCRA



As it sit here in front of the TV, wondering how to get over the writer's block and get this article out to Larry before midnight, what I really should be doing is building a project for this month's "Show & Tell". Then I ask myself the question, "am I really suffering from "builder's block"? I wonder what the tell-tale signs of that are?

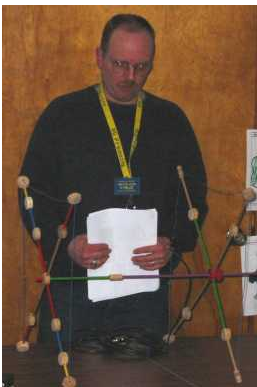
Anyway, if you are reading this article then you still have time to get something whipped up in time and compete to win a \$50 Gift Certificate to HRO. Wouldn't that be nice? I'll bet there are a lot of things at the candy store that would look good in your shack. And you even get to take your project back home too! (there is no destructive testing at Show & Tell). Do you need to know a little more about Show & Tell. It's pretty simple, build a project or write some software, bring it to the meeting and tell the crowd about your creation. A team of volunteer judges will score all the projects and announce the winner in each category. The categories this year are Technician and Expert.



So, how do you overcome 'builders block'? Check out these pictures of some of the past entries for a starting point. Isn't it amazing what our members can come up with? Not only are many of the projects unique but the craftsmanship is truly outstanding too. Get any ideas yet? OK, maybe the next step is to look through a few ham magazines and see what others have been doing, or browse through some to the ads in the back of QST. A lot of small companies make some unique products that you can R&D (rob & duplicate) for Show & Tell. Still stumped? A trip through a ham flea market can not only give you ideas for a project but yield stuff to build it with too. The proverbial 'win-win' situation we always hear so much about. Last but not least you can always take a walk up and down the aisles in Radio Shack. They don't have as many parts as in the past but there are still some good ideas waiting for just the right person.



Once you pick your project, acquire the parts and assemble your entry don't forget about the paperwork. Part of the judging will be the quality of the documentation accompanying your entry. Like everything else the project isn't complete until the paperwork is complete!



So lets get to it, time is not on your side about now and one of those \$50 prizes could be yours. Good luck and see you Friday night.

Jim, KK1W

# The Real Ham Radio Receiver

At this time I am unable to provide a complete photo and description of my hack, but I do have a piece of equipment in the shack that I am very proud of. This is a custom built, one of a kind receiver. A

friend built this receiver about 10 to 15 years ago. It has been in my shack since that time. During this time it has required absolutely no maintenance. How many other receivers can brag about this performance?

As you can see in the photo the works for this receiver are sealed inside a metal enclosure.

(Glad that it has required no maintenance!) The radio comes with a key (Not shown in photo.)

that can be used to unlock the working mechanism. Use of this key is discouraged, since opening the interior is similar to letting the smoke out of a transistor. Once opened the useful life of the radio is terminated.

As for the performance of the radio: The audio is not what you would call HiFi, but adequate. Note the small speaker on the front panel. The internal noise level of this receiver is the lowest of any receiver I have ever heard. However the sensitivity and selectivity do leave a little to be desired.

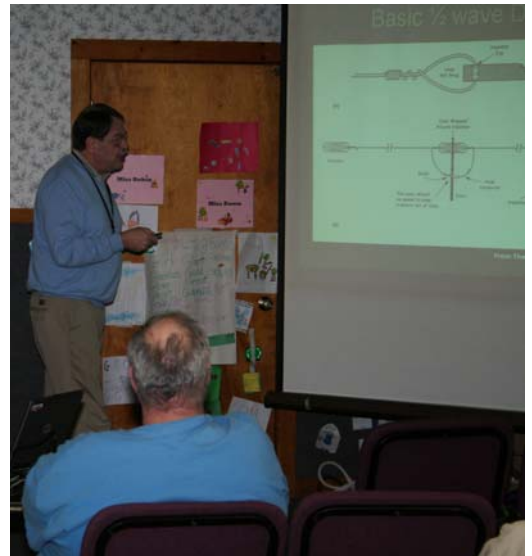
The unit requires no external power and no external antenna. The bandwidth is truly DC to Daylight.



# February Meeting Photos

By Mark—W1MRB

*"Official Zero Beat Meeting Photographer"*



Questions, Comments, and Suggestions  
Can Be Directed To:

## HCRA OFFICERS

### President

Johnny Lenville, KI1A  
(413) 543-9367 KI1A@comcast.net

### Vice-President

Dave Cain, AA1YW  
(413) 569-6801 AA1YW@arrl.net

### Treasurer

Greg Stoddard, N1AEH  
(860) 668-5143 gstoddard@rcn.com

### Secretary

George Collins, KC1V  
(860) 749-2701 gjcollins@cox.net

## HCRA DIRECTORS

### At Large

Jim Harrington, KB1JVF  
(413) 862-3230 jldhjr@verizon.net

### Program

Jim Mullen, KK1W  
(413) 245-3228 jmullen@rockys.com

### Membership

Eric Richardson, KB1JVI  
(413) 283-6351 kb1jvi@arrl.net

### Zero Beat

Larry Krainson, WB1DBY  
(413) 567-3505 wbl1dby@comcast.net

### Technical

John Stark, N1JIO  
(413) 747-8169 n1jio@earthlink.net

## STATION TRUSTEES

### WINY Trustee

Don Johnson, W1UPH  
(413) 566-3560 w1uph@arrl.net

### WB1Z Trustee

Jim Mullen, KK1W  
(413) 245-3228 jmullen@rockys.com

### IRLP Trustee

John Pise, Kx1x  
(413) 532-7474 kx1x@arrl.net

# General Class

Starting Date: Tuesday March 6

Number of Classes, currently tentatively 12 weeks, may be cut down to 8 weeks.

VE Session will be either on the 13th week, or the 9th week.

Location: Noble Hospital, Westfield, MA

Hospital Information: Enter the hospital on West Silver Street. DO GO THROUGH THE EMERGENCY ENTRANCE. Upon entering the hospital, take a left down the hall to the elevators. Take the elevator down to the ground floor. Upon exiting the elevator, look for the sign directing you to Conference Room A.

Classes will start at 7:00 P.M., and end at 9:00 P.M. every Tuesdays.

Classes are FREE

Required Materiel: ARRL General Class License Manual (5th Edition) Individuals may either order their books from ARRL for \$19.95, plus shipping.

OR

Send a check for \$19.95, payable to N1JIO, John Stark. Send checks to Norm Gregoire, 510 Bliss Road, Longmeadow, MA 01106. Books will be available at the first class. Checks must be received no later than February 28, 2007.

Contact: Norm Gregoire, telephone 413-567-5782, or e-mail [W1BMK@COMCAST.NET](mailto:W1BMK@COMCAST.NET). Request everyone register using the registering web site on HCRA.ORG. I will respond to everyone who registers using the web site.

If you are receiving Zero Beat by email then you are enjoying all the **color** and photos in each issue. If you receive Zero Beat by postal mail, then you are missing the vibrant color throughout each Zero Beat.

Please consider receiving Zero Beat by email saving the club the postage costs AND giving you a much more exciting issue to read each month.

The Presidents message and HCRA Ham Shacks will return in the March issue.

Thank you and 73,

Larry—WB1DBY, editor  
wb1dby@comcast.net

Each month we showcase ham shacks from HCRA members. If you would like to submit your shack, please do the following: take a digital picture so you or someone you know can email it, write a description of the shack with equipment, model numbers, etc. Plus a comment on the type of operating that you prefer. Don't forget your name and call. Please send it all to: [wb1dby@comcast.net](mailto:wb1dby@comcast.net)

## **WE NEED YOUR SUGGESTIONS**

We are asking for your suggestions and ideas for future HCRA meetings. The recent success of HCRA has been, in part, because of its interesting and timely key speakers and topics.

If you can help, please contact Jim, KK1W at [jmullen@rockys.com](mailto:jmullen@rockys.com) or (413) 245-3228

## **HCRA 10m Net**

Join NCS, Tom Doyle (n1muv),  
each Monday night at 7:30 PM (local) on

# **28.375 MHz**

Get the latest local word, join good friends,  
take part in good conversation each week!!!  
Anyone can join in, don't be shy!!!

# HF Antennas for Morons — Part 1

-or-

## *Beating the Pseudo-Brewster Angle*

By Rick Lindquist, N1RL

Now that *everyone* has HF privileges, you may want to know just enough to put up an antenna of the sort that's not already attached to your radio. After all, the antenna is the most important component of your ham station. I'm going to try to do this without making your head explode.

As much as I like antennas — they're one of the technical aspects of Amateur Radio that hasn't left a lot of us in the dust — when I open up most antenna books, my eyes immediately glaze over, what with the diagrams, charts, formulas and tables and even something called “the Pseudo-Brewster Angle.” I'm *not* making this up. As Bart Simpson would say, “¡Ay, caramba!”

Well, as ARRL's antenna guru Dean Straw, N6BV (who really prefers “antenna czar”) likes to say: “RF gotta go *somewhere*.” Of course, we all want to believe that the vast majority of our signal is indeed scrambling up that feed line to whatever comprises our “skywire.”

The most basic of all antennas is the halfwave ( $\lambda/2$ ) dipole (that upside-down “y” symbol is the lower-case Greek letter *lambda*, and it represents one wavelength). We'll disregard the “rubber duckie” on your handheld VHF or UHF transceiver; expert opinions vary on whether it's really an antenna or an *anti*-antenna. We'll also ignore the *isotropic* radiator, that pesky — and theoretical non-directional, “point source” — radiator antenna books insist you know about. You'll never hear anyone say, “The rig here is a TS-940 putting 100 W into an isotropic at 50 feet.

The halfwave dipole is the gold standard, the antenna by which all other antennas are evaluated in terms of gain — the *antenna di tutti antenni* (with apologies to *The Godfather*). It's called a “dipole” because it has two (di) equal legs (pole), with the feed line connected at the center. It also is considered to have “unity gain” — ie, *no* gain. A halfwave dipole radiates at right angles to the wire, equally in both directions — hence, the oft-heard cry, “I can't copy him. He must be off the end of my antenna.”

A dipole is a *complete* antenna. Unlike a quarter-wave vertical or end-fed wire, it needs no radials nor even an especially good ground system to perform well.

### Build or Buy?

Yes, you can buy ready-made wire antennas off the shelf, although you're still responsible for getting them up and smoking. Dipoles, off-center feds, loops and other wire configurations are readily

available, and most will work just fine.

What makes me absolutely *nuts* are some of the outrageous claims expounded by antenna makers or pundits that some new dipole configuration or another either exhibits appreciable gain over a “conventional” dipole or will work all bands with a low SWR (standing wave ratio, a way of expressing reflected power) and no antenna tuner — or both — through some mystical sleight of hands that may or may not involve small animal sacrifices or pagan rituals. Beware of advertisers' antenna performance claims. If they sound too good to be true, they probably are.

Another thing Dean Straw likes to say is: “You can't beat the laws of physics.” Translation: You can't get something for nothing.

### The Basic of Antenna Basics

The halfwave dipole forms the basis of pretty much any antenna you'll use on HF, including those fancy, expensive multi-element beams you drool over in the AES catalog. Let's start with the plain-vanilla halfwave wire (or “wahr,” as our southern brethren drawl) dipole. You *can* make one yourself!

You'll need some wire for the antenna element (the part that radiates). There's a debate about whether stranded or solid conductor, bare or insulated is best. No matter! They *all* radiate, and that's the goal here. While solid wire can be somewhat easier to work with, it breaks more easily when stressed. Here in New England, extremely low temperatures can make wire more brittle too.

If possible, use hard-drawn copper wire, especially for longer antennas. It won't stretch and queer your SWR over time as your antenna changes length. Avoid copper-clad (“Copperweld”) wire, because the iron core eventually leeches rust. Besides, it's like handling a gigunda spring.

I'd recommend #12 wire, but #14 is okay too. My own dipoles are constructed of solid #8 wire, but that's because I bought this mammoth roll of it at The Home Depot.

You'll also need insulators (end and center) and feed line. More on those in a bit.

### Math Alert . . . Whoop, whoop whoop!

You can *roughly* determine the length of a halfwave HF wire dipole that's going to be suspended horizontally and away from any metal



objects (or your house) by dividing the magic number 468 by the intended operating frequency. (My somewhat aged edition of *The ARRL Antenna Book* does not share this confidence with the reader until Chapter 4.) Why 468? *Fahgeddaboudit!* Just consider it a mystery you're not meant to understand. Plenty of books explain it in brain-numbing detail.

This means to operate 40 CW with your newfound Technician HF CW privileges and assuming a center frequency of 7.05 MHz, the dipole you're going to erect should be 66.382978723404255319148936170213 feet, more or less. Naw, I'm just jerking your feed line. The formula yields an *approximate* length, so 66 and a half feet is close enough.

**General rule:** If your antenna's going to hang below one-half wavelength or if its ends will be near ground (as in an inverted-V configuration), it will end up being *shorter* than the formula length and have a lower feed point impedance too.

**Also remember:** when you're cutting your wire, you'll need to allow enough to loop it around the insulators at the center and ends. The formula doesn't take that into account. So initially cut your wire *long* by a couple of feet or so (bigger is better in this instance). Only when you attach the insulators do you need to trim to formula length, and even then, you can leave it a bit long for later pruning. Measure the antenna's length from where the feed line attaches to each wire in the middle to the end of each loop.

## Insulators and Feed Line

Insulators are really cheap and available at every respectable ham radio flea market, although you can roll your own (see *The ARRL Antenna Book*). Most are made of plastic these days, but good ol' fashioned glass or ceramic insulators still can be had. The catalogs offer a variety of nifty insulators too, including center insulators. Your Elmer may have some spares in his junk box too (your Elmer *does* have a junk box, right?).

To connect your basic halfwave dipole to your transceiver, you'll need some sort of feed line. Let's stick with coaxial cable — called "coax" — for now. Most coax for Amateur Radio purposes has a characteristic impedance of 50 ohms, but sometimes you can get 75-ohm military surplus or excess cable TV coax really cheap or even for free, every ham's favorite price. It will work just fine, although your antenna system may exhibit *some* reflected power. *Not to worry, dude!* Some folks still believe a 1:1 SWR ensures they'll "get out" okay. *T'ain't so.* A *dummy antenna* has a 1:1 SWR, and it doesn't get out very well at all.

**Don't skimp on your feed line.** Translation: avoid RadioShack and that fat guy with three days' growth of whiskers selling used coax out of his battered Chevy van at the flea market. Get good-quality coax with at least 95 percent braid coverage. Unless you're planning to run *truly* high power, small-diameter coax will suffice.

I happen to like RG-8X (sometimes called "mini 8"), which has a stranded center conductor and foam dielectric. It can handle 1 kW, assuming a reasonably low SWR, and it's super easy to work with. It's also far less likely than a heavier feed line like RG-8 or

RG-213 to drop your antenna like a bad habit during the next ice storm. Avoid *any* type of RG-58, *period*. Some good resources on coaxial cable characteristics are on the Internet. See [www.hamuniverse.com/coaxdata.html](http://www.hamuniverse.com/coaxdata.html), for example, or Google "coaxial cable characteristics."

**Solder all connections!** If at all possible, do your soldering indoors or at least out of the breeze, using a high-wattage soldering iron or gun or even a torch. Use good-quality solder, and make sure you apply plenty of heat. Cold solder joints can lead to consequences to terrible to mention. Consider taping all joints with electrical tape or by applying clear silicone goop to protect them from the elements.

## Hang 'em High!

Unless you're installing your own antenna supports, you're at the mercy of Mother Nature and her arboreal bounty. Pick your two best trees, but make sure they're far enough apart to support your halfwave (ie, 67 feet plus a foot or two on either end for a 40-meter dipole). Moving trees farther apart is generally not an option. Since your dipole radiates off the "sides," pick trees/supports that will fire in the desired direction.

Try to get your dipole up at least one halfwave off the ground: for 80 meters, this can be tough, since we're talking about (remember the formula!) some 65 feet in the air. This is to keep your skywave radiation angle as low as possible, which is only a requirement if you plan to do a lot of DXing (you *do* remember that HF signals can bounce off the ionosphere, right?).

A lower antenna (even a *really* low one) will radiate too — and is better than no antenna at all and even most verticals for that matter — but its higher radiation angle will bring your skywave signal back down to Earth closer to its point of origination. For local work, though, that may be just fine.

How you get it up there is your call. I use an *EZ-Hang* (see photo; essentially a slingshot coupled with a Zebco casting reel) to shoot some lightweight fishing line over the treetop, then tie the support rope (*always* use rope, never wire or clothesline that has a wire center) onto the fishing line and *verrrrry* carefully — just like you're reeling in that big one — pull the rope up and over the tree branches. It's much harder than it sounds, and the neighbors likely will stare in wide-eyed wonderment. It's best if you can install your dipole for easy raising, lowering and pruning when you're tuning it to resonance (ie, as close to a 1:1 SWR as possible). By the way, I buy polypropylene rope 1000 feet at a time from The Home Depot, and it performs quite well.

## Testing, Testing 1-2-3

Once it's up, route the coax into your shack and install a coax plug (PL-259) on the end. In addition to the plug itself, you will need a screw-in adapter to accommodate smaller-diameter coaxial cable (one fits RG-59 and RG-8X; the other fits RG-58). Do *not* use "solderless" PL-259s, but do encourage your CBer friends to buy them.

*Continues on page 10*

Hook the feed line to your transceiver through an SWR meter (you *do* have an SWR meter, or bridge, right?). If using the SWR meter built into your radio, *disable* the internal antenna tuner or your readings will be inaccurate.

Fire up (transmit a carrier) on an appropriate empty frequency at the lowest power necessary to enable the SWR meter to operate properly while minimizing interference. Find out where your antenna is *really* resonant (here's where the weakness in that formula show up) by tuning across the band while feeding minimal power into the feed line. The SWR should dip to a minimum at some point, and that frequency is where your dipole is resonant. If it's higher than the center point of where you'll be operating, the antenna is too short. If it's lower, it's too long. Prune or adjust as needed.

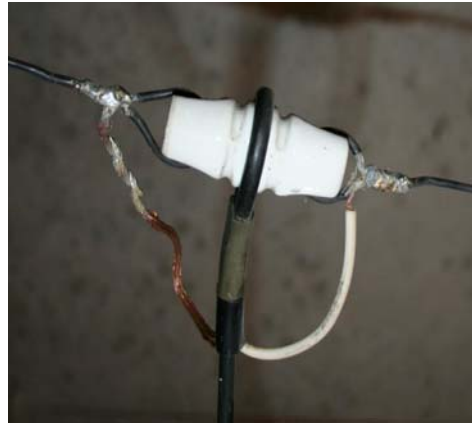
By the way, if you trim just so, a 40-meter halfwave dipole will resonate (ie, work) on 15 meters, where Technicians also have HF CW privileges, without compromising the SWR or performance too much on either band. It will *not*, however, radiate in the same manner on 15 as it does on 40, since it's *longer* than a half-wave on the second band. In fact, it may even exhibit a slight bit of gain in some directions (and nulls in others – you don't get something for nothing). This is why a 40-meter dipole often was the first antenna of choice for new Novices back in “the Olden Days” (the 60s to my youngest daughter).

### When to Use a Tuner

A few parting words on antenna tuners. These also are really easy to build yourself, although a vast array of tuners is available on the new and used market. An antenna tuner is *not* a miracle worker. It can tune your antenna system (the wire and feed line combined) to your operating frequency if your system exhibits too high an SWR for your transceiver's comfort (most modern transceivers will automatically roll back power output in the face of elevated SWR). It also lets you get a bit more bandwidth (ie, the range of frequencies at which your antenna resonates) out of your system, although you have less leeway with a coaxial feed line than with an “open-wire” feed line. That's a subject for another day.

In a pinch, you may be able to tune your 40-meter dipole to work on 20 meters or 10 meters, but it might not “get out” as well (or in the desired direction). If you can get your antenna system to resonate without a tuner, all the better, because all tuners introduce loss.

In a future installment, I'll talk about how to roll your own directional arrays from combinations of dipoles and other assorted pieces of wire. In the meantime, have fun! If you have questions, please e-mail me: [n1rl@earthlink.net](mailto:n1rl@earthlink.net).



One way to secure your coax feed line is to loop it over the center insulator. Solder all connections using sufficient heat! You may want to protect your solder joints by wrapping them with electrical tape.

Use good-quality coax for your feed line. Small-diameter coax such as RG-8X (mini-8) will work as well as this heavy-duty cable for most applications. The connectors seen here are PL-259s. The ARRL *Handbook* shows the proper method of installing these on the end of your feed line.



The EZ-Hang is one way to get your antenna support lines up in the trees. They cost \$40-50.

Some ceramic (top and bottom) and plastic (left and right) insulators suitable for Amateur Radio antennas.



## Have you tried IRLP yet?

IRLP is the Internet Radio Linking Project, connecting radios over the Internet. With your 2m radio, you make contacts all over the world. HCRA sponsors an IRLP node, in South Hadley, MA. It is there for your use, please give it a try (at least turn it on and listen) 146.46 simplex, 114.8hz PL Kx1x, Node #7270, S.Hadley, MA

For a list of IRLP nodes and other IRLP information, go to:  
<http://www.irlp.net/>

*Hampden County Radio Association  
P.O. Box 562  
Agawam, Massachusetts 01001*



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