





AN ARRL AFFILIATED CLUB

FEBRUARY ISSUE- 2009



What in the world is it? A bandpass filter, homebrewed by Dick-KR1G, that will allow hams to operate the winter field day contest at the clubhouse or theJune ARRL field day and be able to operate 2 hf rigs on 20 and 40/75 meters without intererfering with each other due to the close proximity of the antennas. Good job Dick!



Our magnificent tube collection located on the second floor of the clubhouse along with a fine collection of parts, test equipment, packet stations, hf rigs, etc...

IN THIS ISSUE: Ladder Line Myths... What's happening at the Clubhouse? W4RIG hosts an antenna raising party...

Welcome to CAARA:

CAARA, an ARRL affiliated club, operates the 2 meter W1GLO repeater on 145.130 MHz with antennas located on the Cingular tower in the Blackburn Industrial Complex in Gloucester Massachusetts. It has an average effective radius of 60 miles, and serves Eastern Massachusetts, Cape Cod, Rhode Island, Southern New Hampshire, and maritime mobile stations. CAARA also operates the W1GLO repeater on 224.900. The W1RK 443.700 repeater with antennas located in Magnolia is owned and operated by club member Ralph Karcher and it too is available for club use.

The Association is one of the few amateur radio clubs that has its own clubhouse. Located at 6 Stanwood Street in Gloucester, it includes a permanent HF station with rotating beam and vertical antenna along with a 2 meter packet station and 2 meter voice and 220 MHz transceivers.

Amateur radio exams are held on the second Sunday of each month at 12:00 noon at the CAARA clubhouse. Anyone who is considering a new license or an upgrade, is welcome to test with us. There is no pre-registration necessary. Contact the head of our VE team Bob Quinn if you have any questions about monthly testing.

Monthly member meetings are held on the first wednesday of each month at 7:30 PM except for July and August.

Each Sunday evening at 9:00pm, the club operates a 2 meter net on 145.130. This is an open and informal net which disseminates club news and prepares operators for emergency communications work. All are invited to check into the net as club membership is not a requirement.

EVERYTHING YOU WANTED TO KNOW ABOUT LADDER LINE BUT WERE AFRAID TO ASK!

Ladder line is great - extremely low loss, even at high SWR. However, many hams refuse to use it because they are afflicted by common misconceptions:

- "Ladder line radiates!" Baloney. Ladder line does not radiate any more than does coax, if terminated in a balanced antenna.
- "I tried it once, and it messed up my TV, my computer, and filled the shack with RF!" The trick here is simply to make sure you use a length of ladder line that is **not** a multiple of a half-wavelength on any band. Lengths like 43 and 86 feet work well. A resonant length of ladder line, just like the shield of coax, will pick up RF from the antenna and conduct it into the shack. The only difference is that the shield of the coax is grounded, and the ladder line is not, so it acts in common-mode to bring in and radiate induced RF. Again, simply avoid those resonant lengths.
- "It's too hard to work with! You have to keep it away from metal!" Well, yes, a couple inches or so. The general rule is twice the width of the line. It's easy to make stand-offs from half-inch PVC pipe.
- "It's too hard to bring into the shack!" Baloney! There are many waterproof ways to bring ladder line into any shack. One is shown below.
- "I can't buy a lightening arrestor for ladder line!" So just make them yourself, as shown below.
- "It flops around in the wind, and it breaks too easy!" (a) Windowed line should be twisted about a turn every two feet to prevent wind-induced oscillations. (b) Make a good feedpoint connection, with proper strain-relief. It doesn't hurt to wrap it over the top of your feedpoint insulator and then secure it to itself with cable ties. Also, the 14-gage stranded stuff is **much** more reliable than the old, cheap 18-gage solid stuff.

If you run an all-band dipole (with a tuner in the shack), you need ladder line. Coax is **very** lossy when operated at high SWR. It's easy to lose 90% of your power in your coax when operating on bands where the non-resonant dipole presents a high feedpoint impedance to the feedline.

Ladder Line Types

No one seems to know what to call it: ladder line, windowed ladder line, windowed twin-lead, "true" ladder line, open ladder line, open feeders, etc. etc.

- Twin-lead is the 300-ohm TV antenna line. Don't mess with it.
- Ladder line is any kind of parallel feedline except twin-lead.
- Windowed ladder line is just that: 1-inch twin-lead with windows punched in it. Some call it windowline. I just call it ladder line.
- The "true" ladder line is best called "open wire feed-line," to distinguish it from window line. This is the type made from two parallel wires, separated by spreaders.

What to Get

Get the 14-gage stranded window line from Cable-Xperts or Wireman. Don't get that solid-wire crap that many ham stores sell.

Brew Your Own

The one problem with window line is that it tends to change characteristics when wet, and the longer the run, the more tinkering you'll have to do with your tuner as the weather changes. The solution for long runs is to make your own open-wire feeders. It isn't hard or complicated.

- Get a 500-foot roll of #14 THHN or THWN insulated stranded (\$20 at builder's supply). Pick a color that blends with the background. Get some pressure-treated 2x4s, 10-12 feet long, and plant them in the ground every 100 feet or so. To change directions, use a 4x4 in cement.
- For spreaders, all you need is some kind of small, UV-resistant plastic tubing. Cut them 4 inches long, and make enough to put one every 5 feet or so. Use your table saw or table router to cut a notch in each end of each spreader, about 1/8th by 1/8th.
- String up two strands of the wire, appropriate length between trees. Pull them even. Insert a notched spreader every few feet. Inject a dab of hot-melt glue in each end of each one to secure it to the wires.
- Congratulations you just made modern, high-quality "true" open-wire ladder line, and you didn't even have to boil a bunch of wood dowels in paraffin!

Now attach it to your 2x4s with wire staples or electric fence insulators.

Note: Purists think you have to use "bare" wire - **baloney.** Why mess with wind static, rain static, and corrosion? The same holds true for all wire antennas. **Never use uninsulated wire.**

One more thing to consider: Bending ladder line at sharp angles can cause problems on the higher bands. This is because the magnetic field around the line will interfere with itself at the bend. Or so say the books! I have never had any problems bending window line at 90-degree angles - and I've even fed a 2-meter beam with window line, bent 90 degrees, and it worked great! Ham radio abounds with techno-myths...

Spacing and Impedance

Don't worry about it. A non-resonant antenna will present a feed point impedance of 10 to 5,000 ohms, with plus and minus reactance, at various frequencies - so who cares about the exact feed line impedance. Matching the antenna to the feed line simply has nothing to do with efficiency (unless your using coax).

Anything from 1 to 6 inches is acceptable spacing. 1-inch #14 line is 370 ohms. 1-inch #18 line is 450. 6-inch #12 is about 600. It just isn't at all critical - and don't let any geezer or guru tell you different! The spacing should not be over 1 percent of the wavelength, and that's the only real consideration with ladder line.

Length

As mentioned above, parallel feeders can pick up RF from the antenna and transport it into the shack as common-mode current (this simply means the two wires acting as one). The way to avoid this is to simply avoid resonant lengths of ladder line, and, if possible, bring the line away from the feedpoint perpendicular to the antenna (90 degrees) for a far as practical. Setting your bend-point will also help you take up slack when using a non-resonant length, without having to cut off the excess.

In other words, measure your total run, then increase that to the next available "good" (non-resonant) number, then route the line to take up the slack. A 300-foot open-reel tape measure is handy, and Harbor Freight has them

for well under \$30.

Lengths to avoid (in feet): 32, 65, 96, 130, and 260 and multiples of any of those.Don't let them make you buy 100 feet when you know that'll be too close to 96! Make them sell you 110 feet, for example.

Good lengths: Somewhere around 40, 80, 110, etc. Say you saw it here. If in doubt, consult the ARRL Antenna Book.



Ladder-Line Arc-Shunts

I constructed the shunts as follows: Using a piece of 1/8th-by-1 inch aluminum flat or angle stock, cut to about four inches long, drill three holes. Enlarge the two outer holes until you can force-thread two spark plugs into them. Use new, non-resistor-type plugs. Run a $1/4 \times 4$ -inch bolt down through the center hole and place a nut underneath. Now grind a couple of flats on the last inch of the bolt, so it will clamp easily in your ground rod clamp.

Attach the ladder line as follows: Measure and strip the incoming line and jumper lead. Crimp and solder uninsulated ring lugs. Apply a little grease and then place them under the spark plugs' caps. Tighten securely with pliers, but be careful not to twist off the small stud on the plugs! Seal the tops off with silicone caulk or Coax-Seal. Be sure to insulate all connections, particularly if you have curious children around, to prevent RF burns.

Note: A gap of .025 will not arc RF at 100 watts on any band. Higher power may require a wider gap, so watch your SWR meter carefully the first time you QRO on each band.

If you want the lightening arrestors to arc at a lower voltage, you'll need to obtain a couple of gas-filled arc shunts (commonly used in coaxial arrestors), or obtain commercial MOVs rated for RF service.

NOTE: No arrestor will protect your radio! All are meant to arc at a much higher voltage than your radio can stand. Always disconnect during storms! The arrestors shown here are meant to keep the disconnected jumper from arcing inside the house - **not** to protect the radio!

The Radio Amateur is:

CONSIDERATE...never knowingly operates in such a way as to lessen the pleasure of others.

LOYAL...offers loyalty, encouragement and support to other amateurs, local clubs, and the American Radio Relay League, through which Amateur Radio in the United States is represented nationally and internationally.

PROGRESSIVE...with knowledge abreast of science, a well-built and efficient station and operation above reproach.

FRIENDLY...slow and patient operating when requested; friendly advice and counsel to the beginner; kindly assistance, cooperation and consideration for the interests of others. These are the hallmarks of the amateur spirit.

BALANCED...radio is an avocation, never interfering with duties owed to family, job, school or community.

PATRIOTIC...station and skill always ready for service to country and community. Paul M. Segal, W9EEA, 1928.



Dick-KR1G, our master electronic technician, at the second floor clubhouse workshop.



The 2 meter packet station at the clubhouse.



BOARD OF DIRECTORS

President: Curtis Wright AA3JE Vice Pres: Briggs Longbothum AB2NJ Treasurer: Hank McCarl W4RIG Clerk: Dean Burgess KB1PGH Directors: Jon Cunningham K1TP William Poulin WZ1L Charles Downey N1OCT Thomas Andrew KA1GTA Richard Copithorne KR1G David Delakas KB9YOZ James Mondello W1DDX

CAARA is pleased to announce that it is going to hold a General Class License Course on the 4th wednesday of each month starting in January. This course will start on Wednesday January 28th, Starting at 7:30 PM at the CAARA clubhouse on 6 Stanwood Street in Gloucester. This course is also open to all non members as well. This course will be headed by our club President Curtis Wright-AA3JE and Bill Canty-W1OKD. There will be no cost for this course but we do ask that you please register in advance. You can register by e-mailing me at <u>dburg101@aol.com</u>. So please spread the word if you know of anyone who is looking to upgrade to General class as this is a perfect opportunity to do so.



Antenna Party

Hank-W4RIG hosted an old fashioned Antenna Raising Party on Eastern Avenue in Gloucester on Monday, December 29, 2008. The new tribander was assembled partially in the house and completed in the side yard with the help of volunteer CAARA club members. It was a sunny day and the temperature was in the mid 40's and Dunkin Donuts was conveniently located across the street. What more could you ask for?

Dave- KB9WOZ was adjusting the Gamma Match with great precision. Dick-KR1G brought his friends bucket truck and the ninstallation was a success. I belive the antenna is a HyGain TH3. Missing from the pictures is Dick-WB1W, who was busy measuring elements.

Pictures by Jon- K1TP





Briggs-AB2NJ held the instructions while Hank-W4RIG, Dick-KR1G, and Dave-K9WOZ worked away double checking measurments. They also mounted 2 and 6 meter beams on top of the tribander.

Letter	Pronunciation	Letter	Pronunciation	Number	Pronunciation
А	Alpha (AL fah)	Ν	November (no VEM ber)	0	ZEE row
В	Bravo (BRAH VOH)	0	Oscar (OSS cah)	1	WUN
С	Charlie (CHAR lee)	Р	Papa (pah PAH)	2	TOO
D	Delta (DELL tah)	Q	Quebec (keh BECK)	3	TREE
E	Echo (ECK oh)	R	Romeo (ROW me oh)	4	FOW er
F	Foxtrot (FOKS trot)	S	Sierra (see AIR rah)	5	FIFE
G	Golf (GOLF)	Т	Tango (TANG go)	6	SIX
Н	Hotel (hoh TELL)	U	Uniform (YOU nee form)	7	SEVEN
Ι	India (IN dee ah)	V	Victor (VIK tah)	8	AIT
J	Juliet (JEW lee ETT)	W	Whiskey (WISS key)	9	NINE er
Κ	Kilo (KEY loh)	Х	X Ray (ECKS RAY)		
L	Lima (LEE mah)	Y	Yankee (YANG key)		
Μ	Mike (MIKE)	Ζ	Zulu (ZOO loo)		



We had MR Mike Neilsen W1MPN- the newly elected ARRL Eastern Mass Section Manager come to speak about his new section management team and the goals that he is setting for the ARRL affiliated clubs in the area. He also talked about the organization of MEMA and how it plays out in our states emergency communications.

The club house is in need of the following items...

2 picnic tables, one gas grill, one lawn mower shed, 4'x8' in any condition, newer desk chairs, five leg caster type, card files/ parts cabinets for small parts, solder, tape vynal electrical coax RG-58, RG-8 types

two digital multi meters one good, one cheapie, ss pots and pans for kitchen, 2-3 computers, must be win xp, no old junkers, 4 port USB hubs, 3-4 regular telephones, not cordless, an MFJ antenna analizer

Most of this stuff, some one, some where, has surplus to their needs, or could donate there old one and get some new for them selves. Remind everyone about the tax status of donations

We may have to buy this stuff with cash if we don't find it other wise, so we will have to work to raise the \$, for instance, I think the time moving and fixing a lawn mower shed as a club project, is better than raising money. Dick-KR1G

Solder Smoke from the Second Flor

Attention CAARA members, the club is coming alive again!

On JAN 4 2009, the club had a great day of activity! Several members have started to

bring in their parts/projects to share and work on. We are redeveloping a parts base that can be used by the membership, as well as some test equipment. Coming soon an assortment of RF FETs for pre amps converters etc.

Charlie, WI1U opened up and put out the coffee and donuts as usual, Larry, W1ZBE came and started things off, I Dick C. KR1G came along and got the upstairs lab area heat cooking. My ongoing work was to get the upstairs operating stations in shape for the upcoming WINTER FIELD DAY (24-25 jan).



In that area there were several things brought to my attention.

- 1. The TENTEC TRITON cw rig was intermittent in several ways.
- 2. It's keyer hadn't worked for years.
- 3. The 80/40M station always bothered the 20M station at every event.

The interference is being solved by the creation of a low pass filter for the 80/40M stn, blocking all harmonics, and a high pass filter for the 20/15/10M stn so it can't be bothered by 100W on 40M nearby.)

The TENTEC had not been serviced for many years.



Upon removing the covers, I was able to remove all the loose/ extra parts! Then I started poking around to see where they came from. The radio uses 4-40 screws with plain nuts, they were loose all over the place. Some scrounging the

hardware collection produced enough nylock nuts to really set it up stylin. The digital readout board had been floating free on its screws! Each board was adjusted to clean their contacts (same as wiggling ic,s

to clean their connections). Put back together, there is one problem left.... When cold the L.O. doesn't start up, leave it on for 10-15 min and reboot, Walla...well...I guess we can make it work for now.

Sunday, Stan, W4HIX dug into the keyer and quickly found the filter cap floating on one lead! It was replaced with a new one from stock. After contact cleaning it performed like new. A strange turn of events.

The day before, John, K1TP had dropped by and gave me an MFJ-949 antenna tuner to look at that wasn't acting...normal. "No rush, just look at it in the next few months." So naturally I dropped everything to chek it out!

I set it up in line. A radio (FT-940), the tuner, the clubs drake tuner and a dummy load. Both tuners should read the same forward and reflected...yes his read quite incorrectly, but so did the drake... so I rearranged things...swapped coaxes...scratched my head and put my almost new MFJ in the line also. Incredibly both his tuner and the drake were out of whack!Opening up his tuner everything looked new, soon an ohm meter sorted out that all was fine except both diodes in the SWR bridge were out to lunch. Once replaced I calibrated it against my mfj unit and all is A-OK. Now the Drake.

Well, with my new knowledge I was hot! So Sunday I took the 47 screws out of the drake tuner cover, again all looked new, again the ohm meter said bad diodes in the bridge, I put new, knowing it was licked I put all 47 screws back in, you guessed it, now the SWR meter was dead!!! Again folks, never, never, NEVER put the cover on till you test

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47 screws back in, you guessed it, now the SWR meter was dead!!! Again folks, never, never, NEVER put the cover on till you test. After removing the 47 screws...again, I found the meter it self was open, SWR bridge working fine.



Now I have some familiarity with meters, having a lot of older stuff and working a bit with an old timer that had a repair business. He did SIMPSONS, TRIPLETTS and panel meters of all types. So I just dug in. The front just pops off this type, and partly holds the scale in place, double stick tape was used for the scale, I put very small dabs of silicon cement upon assembly. This meter is of the taught band suspension type, where the bobbin has a very fine band of beryllium copper attached to each end and connected to the coil. Then there are two springs that pull outward to provide the suspension. In this case the rear one is insulated and has a lead going to one terminal.Many older meters in ham Equipment suffer the same fate, as this one has done.

Due to dissimilar metals used in construction, microscopic corrosion sets in over time.

This is a close up of the mounting tab on the right where the lock washer sits, corrosion.

Once all hardware was cleaned and a thin coating of silicon grease applied, it was reassembled, tested and ...onto the next one



Rick, WZ1B is really happy, the TRITON CW station is back in shape.



Dave KB9YOZ showing some of his unbuilt his QRP kits, he figures if they're at the club at least he might build one or two.



Briggs, AB2NJ putting power pole connectors on a pulse desulfator, for his deep cycle battery system. And a dreaming DEAN, KB1PGH

President's Corner



Well we've turned the corner, the heavy winter clothes are out of the stores, the days are getting longer (at last) and Hank and I chose this month to put up out antennas. Nothing brings out the fun of ham radio like clinging to an icy ladder in a strong January wind.

This month's activities include the Winter Field Day, and preparations for our first HAMFEST in quite a long time. March 14th of 2009 we will hold a hamfest at the Pigeon Cove Circle.

This means it is the time for you to start looking in your closets and junk drawers. We will be holding a club table, so we will sell you stuff for you, if you desire. Get digging in those junk drawers, because this is a once a year opportunity to turn old gear into money for new gear.

We will also be starting our new educational and upgrade program. Bill Canty and I will be holding general class upgrade classes the fourth WED of each month, starting in January. Remember, there is no more morse, so no more excuses.

Best of the season to you all, and remember, HAM RADIO is the cheapest entertainment in town in hard economic times.

Curtis Wright, AA3JE CAARA Presidnet

DXing Via Echolink from Iceland

Stan Stone W4HIX

January 13, 2009

Being a new ham (August, 2008), I was looking for ways to extend my hobby a bit. My family planned a trip to Reykjavik Iceland for Christmas 2008, so I did some investigating on operating in Iceland. While studying for my license during the summer, some of the questions had to do with reciprocal operating agreements.

LICENSING ISSUES

Depending on the country you are visiting, the agreements differ. It is best to consult the ARRL website for details (<u>http://www.arrl.org/FandES/field/regulations/</u> io/#us). Here is a brief overview:

US Amateurs may operate their Amateur Stations in several foreign countries, via one of the following authorizations:

• **Reciprocal Operating Agreement** between the US and a foreign country named in the reciprocity list below. If such an agreement exists (see below for the current FCC list of countries with which the US has such an agreement), operation in that country is possible. Several of these countries may require US Amateurs to complete a special application and submit an application fee. See the ARRL Web for specific country-by-country details at: <u>http://www.arrl.org/field/</u> regulations/io/recip-country.html For US operations in Canada, see footnote1.

• **CEPT.** US amateurs visiting CEPT-participating European countries may operate in those countries under the terms of the CEPT guidelines. For US Amateurs, operation in a CEPT country is permitted when the US amateur carries a copy of the FCC June 7, 1999, CEPT Public Notice, proof of US Citizenship (Passport) and the original hardcopy FCC-issued Amateur Operator license. There are two Classes of CEPT; Class 1, allowing full HF equivalent privileges in the foreign country to US Amateur Extra and Advanced class licensees. Class 2, allowing VHF and above equivalent privileges is available to US General and Technician Class licensees if Class 2 has been implemented in the CEPT country.

• International Amateur Radio Permit (IARP). For amateurs US Amateurs traveling to those Central or South American countries participating in the IARP, operation is permitted based on possession of a permit document issued by the ARRL For any of the above operations while visiting the foreign country, you must identify your operation by giving the Foreign call district you are traveling in, followed by your US call sign (e.g. "this is G3/W1ABC near London England").

The bottom line is "know before you go," and I admit, I didn't have all of the details worked out.

PACKING UP GEAR (2m)

I was hoping to monitor the repeaters in Reykjavik and to have a backup during the long car trips we took. Iceland is about the size of Kentucky, and the ring road that circles the island (Rt. 1) is 900 miles long. The population of Iceland is around 320,000 with about a third living in and around Reykjavik. Once you get away from the city, it gets very desolate, very quickly. On our first trip to Thingvillar, we drove through snow covered lava fields where there was nothing but the road–no houses, power lines, fences–nothing. We were fortunate that I was able to find a map for my Garmin GPS online and I was able to install it before we left.

The roads are well constructed, but the secondary roads are typically gravel and the tertiary roads require four-wheel drive and often closed in the winter. Guardrails and shoulders are pretty much non-existent. If you drive off of the road in most spots, you are likely to roll your vehicle.

Though I didn't know the condition of the Icelandic roads when I left, we rented a car for the week we spent there. It was great to have—we had the freedom to go where we wanted when we wanted, though there is a thriving bus excursion business, as well as "super jeeps" that will take you out to places you can't normally get to, like the glaciers. Both the buses and the jeeps are pretty expensive.

It turns out that when I got to the hotel and opened my suitcase, I found the two HT antennas I had bought as Christmas gifts for myself, but no HT. Since the bag hadn't been out of my possession during the trip I figured I had left the HT at home during the last minute packing and upon arriving home, I found it on my desk.

OPERATION VIA ECHOLINK AT THE HOTEL

My wife had purchased a new MacBook Air just

before Christmas with having a computer available for the trip. The MacBook Air was great because it was very thin and light. EchoMac is available for the Mac and I had installed it before we left. I had never used Echolink before, so this was new experience. In Reykjavik, I was able to get an Echolink connection to a server, but not to the local node. This meant that I couldn't hear the repeater through EchoMac, probably due to port blocking on the hotel's router, but I could transmit. I monitored the repeater on the Nicecast using iTunes. Pressing the transmit button on EchoMac, I could hear my transmission delayed by several seconds through iTunes. Success!

I set my alarm for 1:45 AM Reykjavik time to make sure everything worked. At 2:00 AM zulu, CAARAnet started. I listened to check-ins and when the Echolink check-ins were requested, I pressed the transmit button. My signal was highly distorted, due to the fact that I was too close to the microphone on the Mac as pointed out by Jon, K1TP. I was trying to keep the noise down so I didn't wake my wife and daughter. Listening to the distorted signal (delayed by several seconds), I decided that a short QSO was advised. Speaking to Briggs later, he pointed out that having two software packages for the transmission and reception was like the old days before modern transceivers—a separate transmitter and receiver.

BRAVE NEW WORLD

So, is Echolink really radio, or just a cheap way to get a long distance phone patch? Personally I think it is radio—it certainly was a thrill to not only be able to hear the CAARAnet while we were so far away, but to let my radio buddies know I was out there too. It's all part of the other.



SUNDAY JAN 18 At CARRA...Dick- KR1G

It was a stormy Sunday again, but out came the troopers! Heat in the club house is a good thing.

Charlie, WI1U had the coffee on and the doughnuts out, with stories of changing an in ground well pump at the VFW during the cold snap.

Dave, KB9YOZ hauling more goodies, this is one serious collection of QRP parts. Briggs, AB2NJ must starve that poor dog.

We had further planning for winter field day, more testing with the new SG-237 tuner on the dipole.

The snow and wet made for some serious problems, we'll have to see what happens next weekend for the contest. The tuner worked like a champ yesterday.

Dave, KB9YOZ is getting close on his 20M direct conversion rcvr, the kit had a 100k resistor you could swear was marked brown black orange, 10k. (he has a good solder sucker).

Rick, WZ1B found out/figured out the offset and zero beat controls are out of kilter on the TEN-TEC, and he can't work any stations! More stuff to fix





Keeping things working is getting busy.



Sunday morning crew...

AN AUTOMATIC ANTENNA TUNER FOR THE CLUB

Background: Our club house has two floors, several operating positions and currently three basic HF antennas. A triband beam, a vertical and a 40M dipole, on a very small lot.

Situation: On all operating events two basic problems occur. #1. When more than one station is on they wipe each other out, add a digital station and it's QRM city. #2. Certain computers and their power supplies are very sensitive to stray RF fields and shut down/lock-up.

Most of the first situation is being solved by low pass and high pass filters, Isolating bands and any stray signals from each setup. Transmitters are not always perfectly clean and transmit some energy on the other frequency. Receivers can't always hold off 100 milliwatts coming down on another band.

With the second situation we need to clean up the stray transmitter signals in the shack. Each setup has a tuner to get that perfect match, but...when using a tuner one must remember, anything on its output is an antenna and is resonant some how. RF can be inside or outside the coax. Many people put ferrites on the coaxes... now the shack tuner has to match a new situation and more and different stay signals result. With a building wired with

multi coaxes going to HF, VHF, and UHF antennas, as well as between operating positions, a little stray RF on the outside of a coax can wreck havoc.

The answer is to do the matching the right way to start with, at the source of the mismatch. The radio is made for 50 ohms, the coax is made for 50 ohms, it's the actual antenna that presents the mismatch. Put the tuner at the antenna.

It seems the are three basic remote tuner vendors on the market, LDG, MFJ and SGC.

Several people in the club had reports of problems with LDG units, so they're kind of out for us, although I couldn't get a clear picture. I thought the MFJ unit looked



OK, some positive comments followed, and it fits the budget. But the SGC was the choice unit, bullet proof they say... On the field trip to HRO we found the SGC \$100 more than the MFJ... I say go with MFJ! But...well... they don't have one, a call to MFJ and we find they're on back order, not a good thing if you're in a hurry. (winter field day approaching) An SG-237 is now owned by CAARA! (and waddya know, SGC has a nice non weather proof unit for less than an MFJ!)

It's small, less than 8x10x2 inches, very easy to hook up, needs 12vdc, and has a very short book! It just works. It has the option of tune lock so if mobile it won't keep retuning if passing a truck. An option for a reset button, and a tuned indicator. Once tuned at each freq. it remembers the settings so next time it sees that freq it's tuned in a split second, you don't see it. I hooked it right up to a whip/longish wire and... It didn't work. It turns out it needs a certain amount of RF, 15-20W, to see a mismatch and start tuning, my IC-751 ALCed down below this due to SWR. Probably can tweak the 751 up, but QRPers take note. The TEN-TEC had no problems.

The basic premise was to put the tuner at the point where the feedline goes out and up to the 40M dipole. (to be replaced by a G5RV) A switch was added to swap the braid of the coax from ground to the output terminal so the dipole could be loaded as a T antenna.

Also we wanted to plan on removing it for field use, field day, EMCOM drills etc.

The manual clearly shows a 4 conductor shielded cable for power/control, into the junk box we dive, but not so fast...It says 300 ma draw, 13.8vdc nominal. Now I wanted a good long cable so it would be ready for anything, and phone line isn't shielded and is kinda small for the dc. Down in the depths of the cellar I found a very rotten spool of cable it looked shielded... It turned out to be high quality, shielded with braid, 90', with 18 VERY small wires, no meaningful #s on spool or cable. The question, could it some how carry the 13.8vdc 90'? how to find out? Measure the resistance of one small wire, one way.

I chose to measure the diameter of the conductor and look it up in the ARRL handbooks wire table. I used a 1971 handbook as it is, well, handier. Carefully twisting the strands, I seemed to get a stable reading on the calipers, apx .014". Digital or dial calipers are a great tool for your tool box, and \$29 ones work well. Wire charts are generally for solid wire, so the stranded will be a bit bigger(more air) for the same amount of copper, 28 gauge 12.6 thousandths,



.0126". by the chart seemed to fit the picture. Wires generally come in even sizes so #27 wire not likely. 66.7 ohms per 1000', 160 circular mils, circular mils is the area (thousandths of a sq inch) of copper.

We know every time we double up the wire we halve the resistance and double the circ mils. The braid will carry the ground/-13.8vdc and is quite stout, no prob. Say 6.7 ohms for 100' 28 ga. Ohms law, IR=E, .300 amps times 6.7 = about 2 volts, sounds a bit much so if we double it twice, use 4 or more wires it will bring it down to .5 volts or less.



As it turned out the cable had a red striped white wire and a black striped white wire, just like the tuner, for the indicator and the reset (very low power). I folded up a small box out of shielding tin, omitted the locking switch and we have a remote.

