

Sidebands

The Newsletter of the

EAST GREENBUSH AMATEUR RADIO ASSOCIATION
www.egara.club



April 2017

President - Tom Scorsone, KC2FCP
Secretary - Russ Greenman, WB2LXC

Vice-President - Ridge Macdonald, KB2HWL
Treasurer & Newsletter Editor - Bryan Jackson, W2RBJ

A Busy Spring On Tap for EGARA

April and May are shaping up to be busy months for members of the EGARA. On Saturday, April 1st, members will gather at the Masonic Temple at 11:30 am to inventory the club's equipment, as well as reorganize the many pieces of gear the club owns. It has been some time since a tally was taken and several pieces of gear have been added over time. Equipment to be inventoried includes transceivers, computers, coax lines, antennas, connectors and supplies used for events such as Hamfest. All members of the club are requested to attend so that the project can be completed quickly and efficiently. Lunch will also be provided.

Sunday, May 7th will bring the club's next major event -- the Rensselaer County Race for Literacy. EGARA has provided communications support for this event for several years and will do so again for 2017. However, this year's race will include a location change and will be held at the Schodack Island State Park on Route 9-J, approximately 8 miles south of the City of Rensselaer. Members are asked to be on-site at 8:30 am. If you plan to help, please email Ridge Macdonald at: kb2hwl@nycap.rr.com.



EGARA President Tom Scorsone assists with communication during last year's Race for Literacy

Those who participate are asked to bring a VHF/UHF HT radio. It is expected that the 440 mhz repeater will be used. Money raised by the annual 5K race is used to support literacy programs for both children and adults in Rensselaer County. Last year, nearly 400 individuals were served by the program.
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New EGARA Website Now Live!
www.egara.club

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EGARA Elections to be Held this Month

The club's annual election of officers will take place during the April 12th membership meeting. Offices to be filled include President, Vice President, Secretary and Treasurer. Any member in good standing is eligible to run for these offices and nominations are encouraged.

At the club's March meeting, a preliminary slate of candidates was nominated, including: Tom Scorsone, President (incumbent); Ridge Macdonald, Vice President (incumbent); Steve Van Sickle, Secretary; Bryan Jackson, Treasurer (incumbent).

However, prior to the election at the April meeting, nominations will also be accepted from the floor for any of these offices. All members are strongly encouraged to attend and to consider running for an office.

Save the Date! - Next EGARA Monthly Meeting is April 12th! Election of Club Officers
Now Pay Your Dues Online! www.egara.club/pay-dues It's Fast, Easy & Secure!

A Busy Spring for EGARA

May 13th will be EGARA's biggest spring event -- the club's annual Hamfest! Again this year, it will be held at the East Greenbush Fire House located at 68 Phillips Road.



The club is currently looking for volunteers to staff the Hamfest and members are urged to attend the monthly membership meeting on April 12th to discuss preparations and sign up for the various jobs that need to be filled. These include kitchen staff, parking and gate attendants, help with set up and break down, vendor assistance, and ticket sales for the various raffles that will be held. At least 15 club members will be needed to staff the Hamfest to make it run smoothly. Set up will begin the Friday evening before (May 12th) and members are asked to assist with those preparations as well.

Last year's Hamfest was a great success, with over 200 hams in attendance, including visitors from Vermont, New Jersey and Massachusetts. Additional publicity of this year's event will likely boost those numbers.

"Hamfest is our biggest fund raiser and provides much of the resources to keep the club running all year round," said Treasurer Bryan Jackson, W2RBJ. "It also builds the club's reputation and stature in the ham community -- so we want to make our best showing ever."

Following Hamfest, club members will barely have time to catch their breath before the next event -- the spring VE exam session that will be held on **Saturday, May 20th** at the East Greenbush Community Library. Doors for the session will open at 10 am, with the exam starting at 10:30 am.

EGARA's last big event before the summer break will be Field Day on the weekend of **June 24-25**. The club plans to run two stations for this year's event, with a goal of making over 1,000 contacts during the period. Field Day is always the fourth full weekend of June, beginning at 1800 UTC Saturday and running through 2059 UTC Sunday.

EGARA will headquarter its Field Day operations at the Masonic Temple and schedule shifts over the course of the two-day event for members who wish to participate.

Club Member Donates Gear

EGARA's equipment collection has gained an electronic keyer, paddle and Morse code program thanks to a generous donation by club member Joseph Jeavons, KD2DKR, who made the donation at the March membership meeting.



Code equipment donated to the club by Joe Jeavons at the March meeting

The new gear is expected to assist the club during the upcoming annual Field Day in June, as extra points are awarded for contacts made by code during the event.

"On behalf of all our members, I want to thank Joe for his gift and his support of our club," said EGARA President Tom Scoresone. "This donation will help us teach Morse code to those members who wish to become proficient in its use."

Save these Dates!

**April 1st - EGARA Inventory Project
11:30 am**

Members are asked to help inventory and organize the club's equipment stored at the Masonic Temple. Lunch will be included.

April 12th - 7 pm - Membership Meeting

Discussion of preparations for Hamfest, including job assignments and duties

May 13th - 6 am to 3 pm - Hamfest

All hands on deck please ! It's our biggest event and fund raiser of the year! We need volunteers to help with every aspect of Hamfest -- cooks, parking attendants, admissions, raffle sellers, setup and clean up. Please attend the April membership meeting to sign up for assignments.

Your support is greatly appreciated!

Taming (Tuning) Your Antenna

By Steve VanSickle, WB2HPR & L.D. Blake, VE3VDC

Get the best performance from your equipment investment

Begin with Your SWR Meter

Most modern ham radio transceivers are very efficient and quite similar in characteristics both when receiving and transmitting. In fact, the differences between today's equipment are so minimal that how well your station works is almost entirely a function of the *antenna and feedline*. So you should pay close attention to how well your antenna system is working. This was the topic of the club's March meeting.

How well an antenna system operates depends on a lot of variables. Radio signals are affected by antenna efficiency, nearby objects, intervening terrain, weather, feedline efficiency and more. It is rare that we can control all factors, so we try to take command of what we can control -- the antenna system -- consisting of the antenna and feedline.

The most common piece of test equipment used to tune and test antenna systems is an SWR meter. This handy device can give you a lot of information about an antenna. It can tell you if it's too long or too short. It can tell you an antenna's resonant frequency. It can help you adjust antenna impedance. Unstable SWR readings are usually an indication of problems in your feedline or antenna.

SWR In A Nutshell

SWR or "Standing Wave Ratio" is a measurement of antenna efficiency.

When you transmit you are sending Radio Frequency energy along your feedline (usually coax) to your antenna. The antenna then converts this RF energy into Electro-Magnetic energy which is radiated into space. If the antenna and feedline are not working at peak efficiency some of this energy is reflected back to your transmitter along the feedline. Because reflected power contributes nothing to your transmitted signal, it is essentially a waste of energy.

The difference between transmitted or "Forward" energy and the unradiated or "Reflected" energy can be measured and expressed as a ratio. This ratio can be calculated by hand as:

$$SWR = \text{Forward} + \text{Reflected} / \text{Forward} - \text{Reflected}$$

Most SWR meters are pre-scaled to let you read this ratio directly from their faces. On a single needle meter the ratio is read directly after calibrating for Forward energy. On dual needle meters the SWR is read from markings at the intersection of the two needles.

The table on the right shows the losses in radiated EM energy with increasing SWR ratios. Of course the goal is always a 1:1 SWR, which means your antenna is effectively putting all of the RF energy into the air. In most cases SWR under 1.5:1 is considered acceptable.

As SWR increases, not only do you begin to notice decreases in performance, the levels of standing waves on your coax increase which may contribute to "RF in the shack" problems and interference with other electronics in your immediate area. In fact, when troubleshooting RFI problems, the stations most prone to cause interference to televisions, phones, etc. are usually the ones with high SWR readings from their antenna systems.

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Steve VanSickle explains how to measure antenna resonance using an antenna analyzer

SWR	LOSS	ERP
1.0:1	0.0%	100.0%
1.1:1	0.2%	99.8%
1.2:1	0.8%	99.2%
1.3:1	1.7%	98.3%
1.4:1	2.8%	97.2%
1.5:1	4.0%	96.0%
1.6:1	5.3%	94.7%
1.7:1	6.7%	93.3%
1.8:1	8.2%	91.8%
2.0:1	11.1%	88.9%
2.2:1	14.1%	85.9%
2.4:1	17.0%	83.0%
2.6:1	19.8%	80.2%
3.0:1	25.0%	75.0%
4.0:1	36.0%	64.0%
5.0:1	44.4%	55.6%
6.0:1	51.0%	49.0%
7.0:1	56.3%	43.8%
8.0:1	60.5%	39.5%
9.0:1	64.0%	36.0%
10.0:1	66.9%	33.1%

EGARA March Meeting Minutes

- The monthly membership meeting was held March 8th at the Masonic Temple and was called to order by President Scoresone at 7:20 pm;
- Members were reminded that membership dues for 2017 are now due. Treasurer Bryan Jackson reported that as of March 8th, 20 members have paid, with 23 still outstanding. President Scoresone requested that outstanding members please submit their dues as soon as possible;
- Treasurer Bryan Jackson reported on the club's finances and reported he had paid for the club's annual liability insurance policy;
- Vice President Ridge Macdonald reminded members that volunteers are needed for the upcoming "Race for Literacy," which will be held May 7th at the Schodack State Park on Route 9-J. The event begins at 8 am and those who will participate are asked to email him at: kb2hwl@nycap.rr.com;
- It was announced that the April 12th membership meeting will discuss preparations for this year's Hamfest, which will be held on May 13th at the East Greenbush Firehouse. All members are requested to attend and sign up for work assignments. At least 13-15 members will be needed to adequately staff the event;
- EGARA annual election of officers will take place during the April 12th membership meeting. A slate of candidates was nominated (see story on page 1). However, prior to the voting, nominations will also be accepted from the floor. All members are urged to attend and to consider running for one of the offices;
- Members were reminded that the club is permitted free use of the Masonic Temple for its meetings and events in return for cleaning the building once per month. Members were asked to assist with the cleaning, which is held the 2nd Monday of the month at 7:15 pm. Cleaning the building can be done in about an hour with sufficient help;
- An inventory of club equipment stored at the Masonic Temple will take place on April 1st at 11:30 am. Members are requested to help with the project, which will also reorganize the club's gear. Lunch will be provided;
- EGARA plans to run two stations during this year's annual Field Day during the weekend of June 24-25 and members are urged to participate. The club hopes to log 1,000 or more contacts. Shifts will be set up to staff the event over the two days;
- It was announced that the club's next VE exam session will be held May 20th at the East Greenbush Community Library beginning at 10 am;
- The program for the March meeting was a discussion and demonstration on antenna matching and efficiency presented by Steve VanSickle. Steve also answered a number of technical questions asked by those in attendance;
- Pizza and refreshments were served;
- Members in attendance assisted with the storage of tables and chairs used during the meeting and the meeting was adjourned at 8:55 pm.

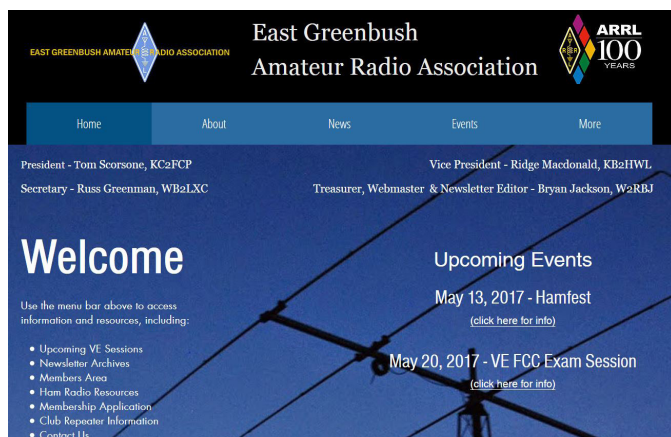
EGARA Builds New Website

EGARA has a new Internet address and a new website that offers many new features for its members.

The new site can be found at: www.egara.club. The old URL (W2EGB.org) is no longer in service.

In addition to a complete redesign, the new site offers several new resources, including an archive of past newsletters, a members only area (requires a login), news and event pages, online dues payments, links to ham resources & more.

Members are asked to visit the site and send along any suggestions they have for addition content they would like to see added to the site.



Why are there so many Techs?

By Dan Romanchik, KB6NU

Recently, one of my readers asked, "Why do most people have a Technician license and not a General or Extra? Is it simply not interesting enough to get more privileges?"

This is a very interesting question, and one that I've written about before. I think there are several issues at play here:

- It's pretty easy to get a Tech license, so a lot of people get them just for the challenge, but really never intend to use it.
- Some people get a Tech license, but then find out that amateur radio isn't what they thought it was going to be.
- Some people get a Tech license, then can't find an Elmer to help them. They lose interest and give up.
- Some people get a Tech license, buy an HT, and think that's all there is to amateur radio. They quickly lose interest in amateur radio, because talking on the repeaters just isn't all that interesting.
- Some people get licenses to participate in local emergency communications or CERT organizations. There's no need for them to get anything more than a Tech license.
- Since it's so easy to get a Tech license, even those that aren't technically inclined get them. Getting a General Class license requires a fair amount of study, and because they don't see the benefits of putting in that kind of work, they just don't bother.

I posted this question to my blog and got several interesting replies. Perhaps the most cogent was by Kenneth, W6KWF. He wrote: "The only thing General/Extra gets you is HF, which is becoming an increasingly small fraction of the possibilities of the amateur hobby. Amateurs could easily spend their whole lives moving from FM repeaters to microwave to VHF packet to EME to CERT/event support, etc, etc, without having any interest to explore what few facets of the hobby need HF privileges."

I think this is a great point. When incentive licensing was put into place in the late 1960s, HF was where the action was. Nowadays, more of the "cool stuff" is happening on VHF, UHF and microwaves. Getting additional HF privileges is not really a big deal anymore for many hams.

Yet another new license class?

Right on the heels of this discussion, the ARRL posted a news item, "ARRL Seeks Opinions Concerning Possible New Entry Level License" (<http://www.arrl.org/news/arrl-seeks-opinions-concerning-possible-new-entry-level-license>). According to this report, the ARRL Board of Directors set up an An Entry Level License Committee in September 2016.

The committee is gathering member input via an online member survey (<http://www.arrl.org/license-1>) and will make recommendations to the Board for possible rules changes to submit to the FCC. They note, "The result could mean changes to the Technician license, but it could also be an additional, but simpler, license with privileges that would give a newcomer a taste of most facets of ham radio from HF to VHF and UHF. The survey will be online until April 7, 2017."



Dan Romanchik, KB6NU

According to the survey page, the committee is trying to address several issues, including:

- * The declining population of new hams under the age of 30.
- * A decline in the number of new licensees who actually get on the air.
- * Amateur Radio's lack of appeal for those under the age of 30, compared to other technical hobbies.
- * The increasing challenge of engaging and retaining Technician licensees.
- * A reluctance in much of the amateur community to embrace newer technologies of interest to the younger segment of the population.

Personally, I don't think that coming up with a new entry-level license class with privileges that are even more limited than the Technician Class is a bad idea, but whether or not it's successful will depend completely on the implementation. Unless the new class of license is accompanied by some kind of program that will help these new licensees really become engaged with amateur radio, then we're just creating another class of inactive licensees. I don't know exactly what this program would consist of, but without it, this effort is doomed to failure.

And, who's going to develop and run this program? The only organization that has the horsepower to make this work is the ARRL. They are going to have to step up big time. Most clubs don't have the people or resources to do it properly. If you have any thoughts on this, I urge you to contact your ARRL division director (<http://www.arrl.org/divisions>).

Dan blogs about amateur radio at KB6NU.Com, writes the "No Nonsense" amateur radio study guides, and teaches ham classes. Contact him by e-mailing: cwgeek@kb6nu.com.

The International Distress Signal That Predated 'SOS'

By Stacy Conradt

Whether you send "SOS" in Morse code or spell it out in seashells on a desert island, a vast majority of the world will understand that you're in need of help. But before "SOS" was the international distress symbol, "CQD" did the job.

As the Marconi Company became the leader in wireless telegraphy in the early 1900s, it decided a new signal was needed to signal for help. They kept "CQ" for its familiarity, but modified it with the extra "D" to denote distress.

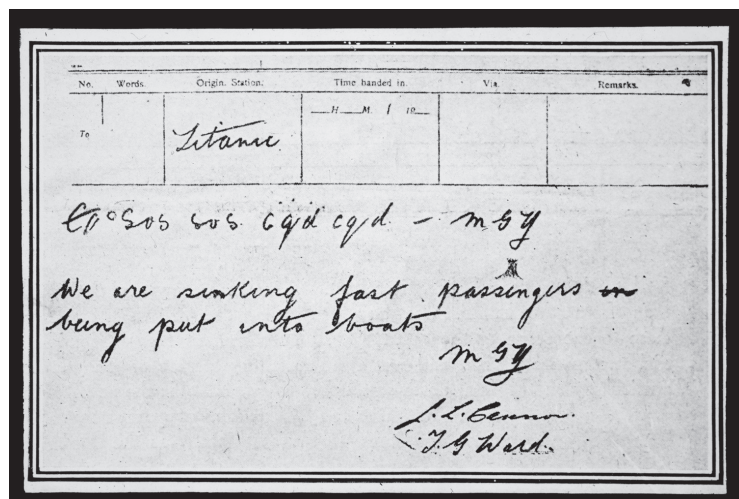
Though some retroactively applied the phrase "Come Quick Danger" to the letters, Marconi himself once said that the letters weren't meant to be an acronym: "It [CQD] is a conventional signal which was introduced originally by my company to express a state of danger or peril of a ship that sends it."

Despite Marconi's push for "CQD," not all nations were on board. The British used it, but the Americans kept "NC," which meant "call for help without delay." Meanwhile, the Germans used "SOE," while Italians liked the unmistakable "SSSDDD."

Unfortunately, the signal "CQD" became less effective over time. "CQ" was commonly used by telegraphers and wireless operators to address all stations at once. But it became so overused that it lost the urgency it was meant to convey when it was sent as a "CQD."

By 1906, delegates at the second International Radio Telegraphic Conference realized that a new international signal was desperately needed, and proposed "SOS" for both its ease of transmission and because its unique pattern was easy to pick out:

dit, dit, dit ---dah, dah, dah --- dit, dit, dit



105 year ago this month, Titanic's radio operators used both the old "CQD" distress call, as well as the newly adopted "SOS" distress call as the ship sank in the North Atlantic. Of the 2,224 passengers aboard, only 715 were saved by the Carpathia, which answered the stricken ship's call for help that night. Titanic's wireless station was assigned the call letters "MGY."



The Titanic's use of "SOS" as it sank in April 1912 soon lead to it being adopted worldwide as the call for distress

This pattern in Morse code was simple and immediately recognizable -- even in static and poor band conditions. It was officially ratified by all conference members by 1908 -- except for the United States, which took a bit longer to adopt the practice.

Still, it took some time for "CQD" to leave the vernacular. In fact, the night the Titanic went down in 1912, the wireless operators were still using it. They also tried "SOS" after the ship's junior wireless operator, Harold Bride, joked to senior operator Jack Phillips that it might be his last chance to use the new distress call. Sadly, it was -- Phillips went down with the ship. Not long after that, the U.S. adopted "SOS" as its official distress signal.

Though "CQD" is long gone, "CQ" is still used by ham radio operators around the world to establish contact -- just as British operators used it more than a century ago.

(See related story on page 7)

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On the Beam

News & Notes

Radio Shack Files Bankruptcy -- Again

Once the go-to store for radio amateurs, electronics tinkerers, and shortwave listeners, RadioShack has filed for Chapter 11 bankruptcy for the second time in two years, placing the future of its remaining stores in jeopardy. The 1743 retail outlets that survived RadioShack's 2015 bankruptcy were acquired by General Wireless Inc which received US Bankruptcy Court approval to acquire the inventory and assume the leases of the RadioShack stores. Following the takeover, some stores improved their inventory of discrete parts, making ready access to some common components and connectors a little easier for hams. Whether that will continue is yet unknown.

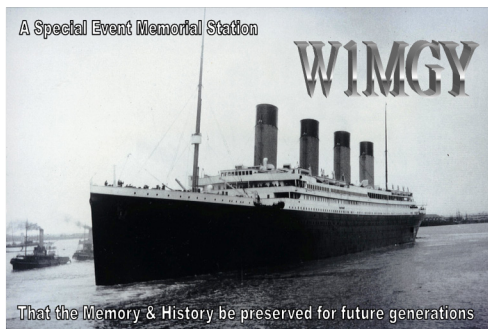


Now down to 1,500 stores, RadioShack once boasted more than 5,000 stores nationwide. At least some of RadioShack's 5,900 employees could be affected. "RadioShack.com, stores and dealer locations across the country are still currently open for business and serving customers," the company said in a news release. "The Company is closing approximately 200 stores and evaluating options on the remaining 1,300. The Company and its advisors are currently exploring all available strategic alternatives to maximize value for creditors, including the possibility of keeping stores open on an ongoing basis."

After the first bankruptcy, plans called for "co-branding" about 1440 of the surviving stores with cellular phone provider Sprint Corp. RadioShack also closed more stores and slashed operating expenses by more than 20%, but it wasn't enough. CEO Dene Rogers cited weak mobile phone sales as a factor. Chapter 11 gives RadioShack another opportunity to restructure and stay in business. The retailer joins other brick-and-mortar stores forced to shutter outlets in the face of declining sales and fiscal losses. Electronics stores have been especially hard hit, including Best Buy and the now-defunct Circuit City.

RadioShack once offered entry-level short-wave receivers, Citizens Band gear, a wide array of discrete components — including transistors, resistors, and capacitors — and, for a time, a fairly popular two meter hand-held transceiver and two different models of 10 meter single-band transceivers.

Cape Cod National Seashore to Host W1MGY Titanic Memorial Special Event



Cape Cod National Seashore in Massachusetts has invited organizers of an Amateur Radio special event in April marking the 105th anniversary of the RMS Titanic disaster to set up at its Salt Pond Visitor Center. The Titanic/Marconi Memorial Radio Association of Cape Cod — W1MGY — is sponsoring the worldwide commemoration to honor the approximately 1,500 passengers and crew who died when the Titanic — thought to be unsinkable — struck an iceberg and sank on its maiden voyage from England to the US. W1MGY operators have permission to operate from the national park for three days and two nights.

Sponsors point out that the 740 Titanic survivors were rescued by the Carpathia as a result of wireless messages sent from Marconi's Wellfleet Station, today preserved within Cape Cod National Seashore as its "Marconi Beach" site. Between April 13 and April 22, the national park will host commemorative events, including the special event, centering on the Titanic disaster and the evolution of wireless communication, culminating in the worldwide International Marconi Day. All Titanic events will be held at the Salt Pond Visitors Center in Eastham. Events are free and open to the public.

"We will operate from there on April 13, 14, and 15 until 0527 UTC, the time the Titanic's last radio message was heard by the Virginian. The vessel foundered 20 minutes later," said Barry Hutchinson, KB1TLR — the new trustee of W1MGY, which itself recalls the Titanic's MGY call sign. W1MGY, which has been on the air for past Titanic on-the-air events, will transmit a message at the time the ship foundered. For more than a decade, W1MGY special operations have marked Titanic anniversaries. ARRL Lab staffer Mike Gruber, W1MG, became W1MGY's trustee in 2003, and he and others operated Titanic special events in April from the Titanic Museum in Indian Orchard, a part of Springfield, Massachusetts.

Want a Better Signal? Focus on Your Antenna

(continued from page 3)

In severe cases, transmitters can be damaged by high SWR. Solid state transmitters are far more prone to fail with high levels of returned energy than tube transmitters ever were.

While most mid to high end radios do incorporate some kind of built in high SWR protection, most entry level and many older radios do not. This is why most SWR meters have a red marking from about 3:1 up. It's there to warn you that it may be unsafe to operate your transmitter at anything but minimum power.

Feedline Issues

Coaxial cable, the most common feedline, delivers energy to an antenna in an unequal or "unbalanced" state. RF energy is delivered to the antenna along the center lead. In a perfect system with a 1:1 SWR there will be no current flowing on the coax shield at all. All RF power from your transmitter is radiated away by the antenna. However, antennas are seldom perfect and quite often there is current flowing on the shield of the coax.

Common mode currents

The worst of these conditions occurs when feeding a balanced antenna such as a dipole or loop antenna with coax. This is a natural mismatch in feed methods --balanced antenna : unbalanced feedline -- and that just begs for problems.

The illustration on the right shows the end of a piece of coax where it connects to a dipole antenna. The arrows represent a moment in time.

The blue arrows represent antenna currents. If the antenna cannot get rid of all of the RF energy current will flow on the inside of the coax shield. This is normal and in this condition the currents are fully contained within the coax.

However, when a balancing mismatch occurs, it is entirely possible for current to flow on the outside of the coax shield, as shown by the red arrow. This undesirable current is not contained inside the coax and can radiate from the coaxial feedline, getting into nearby electronics in very undesirable ways. This is called "common mode" current since it is actually in phase with the center lead of the coax.

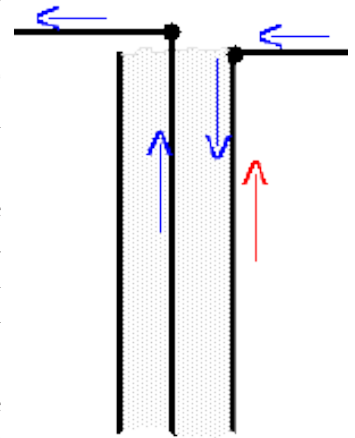
This can also happen with unbalanced antennas as well. This most often occurs where the antenna or it's support structure is not grounded or when the antenna's "ground plane" is less than adequate.

If you are having common mode current problems you will notice the SWR of your antenna system changing during a rain storm or when the coax is moved or touched. In severe cases, touching your radio equipment can affect the SWR of your antenna. A very simple way to test for common mode currents is to suspend your coax away from the antenna's support structures, take a reading and then see if the SWR changes when you place it against the support structures.

Fortunately there are relatively easy fixes for this problem...

If you are feeding a balanced antenna such as a dipole or loop you should always use a Balun designed for the range of frequencies in use. A balun is a transformer mechanism that takes the naturally unequal signal from coax and transforms it to a balanced two-wire signal delivering equal but opposite energies to both sides of the antenna. You are thus feeding a balanced antenna with a balanced signal which should keep both feedline and antenna happy.

If you are feeding an unbalanced antenna such as a mobile whip, ground plane or co-linear antenna you can add a common mode choke. This can often be as simple as a few coiled up turns of coax positioned near the antenna. The choke forms an inductor with the outside of the coax shield making it an uninviting place for current to flow. (The internal signals should not be affected) The size of the coil and the number of turns is best determined experimentally; use just enough to eliminate the problem.



-continued on page 9-

More on Tuning Antennas

Two meter choke

An excellent article on the construction of common mode chokes, also called Ugly Baluns, can be found on the Ham Universe website (<http://www.hamuniverse.com/>).



Despite their larger sizes on HF, the VHF and UHF versions are actually quite compact. As the photo shows, for some two meter antenna projects, you can simply wind five turns of the RG-8x coax right around the mast pipe and the antenna should settle right in.

It is a good idea to use common mode chokes or baluns on all your projects.

While not absolutely necessary in all cases, this simple precaution harms nothing if not needed.

Getting Ready

Whenever possible you want to adjust the antenna in place on its mounting structure. In this way you are taking the structure and other nearby objects into consideration.

Because of highly variable conditions, mobile antennas absolutely must be tuned in-place on the vehicle. You should park the vehicle as far from any buildings, light posts or metallic objects as possible. Always take your measurements with all doors or hatches closed.

Portable antennas need to be tuned "in the clear", suspended from a non-conductive cord or standing on a non-conductive mount with as much free space around them as you can get. Those with fold-down stands should be tuned on their mounting structure, simulating real-world conditions.

Omni-directional base station antennas that can't be tuned in-place, should be mounted on a temporary structure, as far from nearby objects as is convenient.

Directional antennas should be pointed straight up with their reflectors as far above ground as is convenient.

Always keep yourself, your kids, your pets and others well back from antennas while tuning. Beyond the risk of RF burns, there is the matter their body capacity is going to upset your readings. It is best to run a length of feedline to the antenna and set up a testing station, where you take your readings at least 1/4 wavelength away.

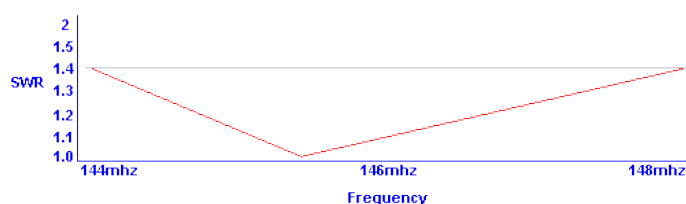
Still Need to Send in Dues? Pay Online!
Visit the club's website to use your debit or credit card to pay your 2017 dues. It's easy and secure!
WWW.EGARA.CLUB/PAY-DUES

Safety first: NEVER activate your transmitter while anyone or anything is touching the antenna!

Tuning Goals

The primary goal in tuning an antenna is to make it usable all across the band(s) it is designed for.

Antennas are resonant devices. That is to say they work best at a single frequency. As you move above or below that frequency their efficiency rolls off, producing standing waves. In order to achieve the goal of usability, you will want to tune the antenna for equal SWR readings at each end of the band. Below is a plot of the SWR for a theoretical well tuned antenna.



You want to end up with equal SWR readings at each end of the band you are tuning for. So long as the antenna's design is basically sound, the lowest SWR will naturally occur inside the band, at the antenna's resonant frequency.

Most antennas behave a little differently below resonance than above and it is rare that you will get the lowest reading exactly in the center of the band. The important goal is equality at the band edges. This ensures the antenna is usable all across the entire band.

Hooking Up The Meter

Your SWR meter needs to be connected into the coax between your radio and antenna. Connect one end of the jumper to the back of your radio and the other end to the "Transmitter" socket on the SWR meter. The antenna's coax now connects to the "Antenna" socket on the meter. Double check to make sure they're not backwards or you will not get accurate readings as the signal functions will be reversed.

Testing and Adjusting

To reduce the risk of interference with other hams or nearby equipment you should always use your transmitter's minimum power setting when adjusting SWR.

The actual adjustments you will make depend entirely on the type of antenna you are tuning. Those with impedance matching devices are more complex than those with simple top whips. Multi-band antennas introduce a whole new level of complexity. But with time and patience, it's all possible.

- See Antenna Tuning Tips on Page 10 -

The EGARA Quick Guide to Antenna Tuning

The general measuring procedure is always the same...

1. Set your radio to CW or FM mode (not SSB);
2. Tune to the LOW edge of the band you are adjusting for;
3. Transmit and, if necessary, calibrate your SWR meter according to its instructions*;
4. Transmit and take an SWR reading and write it down;
5. Tune to the HIGH edge of the band you are adjusting for;
6. Transmit and, if necessary, re-calibrate your SWR meter*;
7. Transmit and take an SWR reading and write it down.
8. These readings will tell you if the antenna is too long or too short:
9. If the low edge has the lower SWR, the antenna is *too long*.
10. If the high edge reads lower the antenna is *too short*.

The adjustments you make based on this information will depend on the type of antenna you are adjusting (see below)

*Generally applies only to single-needle type SWR meters

Whips, Mobiles and Groundplanes

These antenna types are adjusted by changing the length of the radiating element(s). There is usually a provision to slide the element(s) in and out for tuning. If the antenna reads too long, adjust the element shorter. If it reads too short, make it longer.

Wire Antennas, Dipoles and Loops

Wire antennas should always be deliberately cut too long at the start. The only adjustment you have here is to clip a little bit off the end. Be careful to keep the sides of dipoles the same length and make sure the feedpoints of loops stay centered. Cut carefully and in small increments. If you get too short, making them longer is going to be a huge undertaking that might well result in antenna failure once the weather gets at your splices.

Antennas with Gamma, Y or T Matches

These antennas require multiple adjustments. The best plan here is to set everything on the manufacturer's recommended starting points then move the matching device's rods a little bit, test again and see if you went the right way. Once you know the correct direction, adjust the matching device for the lowest SWR. Then, once you find the lowest SWR by this means, try adjusting the length of the driven element to get the SWR equal at the band edges. This might send you back to re-adjusting the matching device. With patience, each cycle will result in smaller movements as you zero in on the perfect settings.

J-Pole Style Antennas

These are also antennas with matching devices. Fortunately they are a lot easier to adjust than a beam. Here you move the coax up and down on the matching stub to find the lowest SWR. If the antenna reads too long or too short after adjusting the stub, you can try adjusting the length of the long radiating element a little bit.

Ring Matched Antennas

These antennas use a sliding contact on a ring device. The general procedure is to set the radiating element at the factory recommended length then adjust the sliding contact for the lowest SWR. If the antenna reads too long or too short you can generally adjust the length of the radiating element a little bit to even out the ends of the band.

Dual/Multi-Band Antennas

These antennas are a fair bit more complex to adjust. Here you adjust the length of the shortest section for the highest frequency band. Then move to the next section along the antenna for the next lower band and so on, moving to longer sections for lower frequencies, until you have all sections matched. You may need to go back and forth a few times to get everything working right. Also note that multi-band antennas use coils and chokes along their length so these adjustments can be quite sensitive.

Once you have your antenna all tuned up, don't forget weatherproofing. Any place water can get in will cause problems. Use tape on your connectors, put weather caps on tubes, apply liquid rubber to exposed RF connections, etc.

CALENDAR

April 1, 2017 - EGARA Equipment Inventory - 10 am, East Greenbush Masonic Temple. Members requested to help.

April 12, 2017 - Monthly EGARA Membership Meeting - 7 pm, East Greenbush Masonic Temple. Election of Officers and Hamfest preparations.

May 7, 2017 - Run for Literacy, 8 am - Schodack State Park, Route 9J - Volunteers needed for communications team.

May 13, 2017 - EGARA Hamfest 2017 - East Greenbush Fire Department - 7 am to 3 pm

May 20, 2017 - VE Session Sponsored by EGARA - 10 am at East Greenbush Library. Bring exam \$15 fee, ID and FCC license.

Pro Tip

Common Mistakes When Using a Multimeter

Remember that you are dealing with electricity, so it's important to use caution when using a multimeter. Some of the most common mistakes people make include:

- Not remembering to switch the test leads (jacks) when switching between current sensing and voltage/resistance testing;
- Exceeding the max input of the meter;
- Function switch is in the wrong function for attempted measurement;
- Using a meter above its stated ratings;
- To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears. Also, keep your fingers behind the finger guards on the test probes when making measurements;
- Some simple mistakes can cause serious injury, even death. Be sure to always test the leads and make sure the dial is in the correct position, and never use a meter where the leads have been damaged;
- Never use a meter on circuits that exceed 4800 watts and be careful when working with voltages above 60 VDC or 30 VAC rms, as they may pose a serious shock hazard;
- Always pay close attention to the safety ratings of a tool and never use one that isn't rated properly;



Wanted to Buy

- **Inexpensive Rotor for 6 meter beam** - Contact Peter Mattice by email at: kd2jkv@gmail.com.

For Sale

- **Yaesu Model VX-8GR** - hand held, dual band 2M/70M, with GPS, case and extra battery - \$325.00. Contact Bob Stark at: bob.claudias@gmail.com
- **Heathkit Antenna Tuner Model - SA-2060A** Excellent condition - \$ 300.00. Contact Tom Scorsone by e-mail at: kc2fcp@nycap.rr.com.
- **Ameritron Model AI-811H** - Linear amplifier uses (4) 811's - with manual - great condition - \$700 or best offer; Contact: Steve VanSickle, WB2HPR, by phone at 326-0902.
- **Kenwood Ts-480 Hf Rig** - 200 w PEP output, w/manual, cable, and microphone - like new - \$800 obo; Contact: Steve Van Sickle, WB2HPR, by phone at 326-0902.

Looking to Buy, Sell or Swap?

Send your info to W2RBJ@outlook.com

The East Greenbush Amateur Radio Association

Organized in 1998, by Bert Bruins, N2FPJ, (Silent Key) and Chris Linck, N2NEH, the East Greenbush Amateur Radio Association, an ARRL affiliate, is committed to providing emergency services, educational programs, and operating resources to the amateur radio operators and residents of the Capital Region of New York State. The club station is W2EGB. The club also has several VHF and UHF repeaters open to club members and the public.