



The Spectrum



Issue 11

Daylight Saving time ends: October 31

November 2004

Words From The President.

Keith, KG4ZXX

When I look at the Chesapeake Amateur Radio Service, I see an organization that is full of potential and promise. You should be proud of your club! In just a short period of time you have accomplished a lot of wonderful things! The new ham shack, The QRM room, is an example. We have a healthy membership with lots of ideas of where they would like to see the club go.

I was reluctant to become President at first. Let's be honest, this is not an easy task. I'm still a new amateur myself. However, the spirit that is in this club is infectious. The club is faced with some unique challenges this year and I would like to see the club continue in a positive direction.

So I have stepped to the plate and thank all of you for the confidence you have placed in not only me but our new Vice President, Reggie White, W5SSB. Our new Treasurer, Lee Vitasek, KI4CAV and Sonny Hood, K4WYS has taking on the responsibilities of Secretary. Jim Rogers, KG4WOJ is our new Communications officer. Ruth Bigio, KB4LIF is now our past president. Congratulations to all in their new positions and I would like to thank Ruth for the job she has done in the club these past several years.

Also you have a new newsletter editor, Rich Graham, KI4EUM. I'm sure that Rich is going to do great things with this newsletter. So please send him any articles or items of

interest you feel would be good for the membership to read each month.

Leo Kusuda, KG4PWC has remained on board as both Spring Fest Chairman and Public Service Coordinator. We also have Dee Dee Hunter, KI4DNN as the SkyWarn Coordinator. Good luck to all of you this upcoming year.

The first goal this year is to finish the work on the QRM room and get radio stations up and running. It's not going to be too long that we will have an operational ham shack for everyone to use and enjoy. I look forward to seeing us participate in some contests as winter sets in and everyone will want to stay inside.

I take my position seriously in the fact that I must do what I feel is in the best interests of the club. It is going to be impossible to please every member with decisions that must be made for the upcoming year. I'm sure that I speak for the other board members when I ask that if you disagree with us to remember we are all trying to do our best to make CARS to best amateur radio club in Tidewater.

Let me rephrase that. You are the BEST amateur radio club in Tidewater! I look forward to seeing this club do great things for the upcoming year. Thanks for inviting me along.

73's
Keith, KG4ZXX

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DON'T FORGET!!!

Last person out PLEASE leave on the lights!

When leaving the QRM room leave the lights in the stairwell on. This switch also controls the outside security lights and will provide a level of safety for those entering after dark!

Upcoming Events

CARS Meeting

Monday, November 1st, 2004 7:00 PM
General meeting.
QRM Room (Hamshack #2)

CARS Shack Day

November 6

License Exam Session:

PARC Exams: November 6

Contact Art Thiemens @ 757-484-2857
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Antenna Tuners, Trans-match Part 1

Leo Kusuda KG4PWC

I often like to use real world analogies to make it easier to understand what might be taking place. I say “might” because, science has a tendency to discover new findings that change the way we look at things. So two things come to mind when designing an antenna system.

First, like tuned strings, the greatest transfer of electrical energy in the form of moving electrons to electromagnetic energy or radio waves takes place if the antenna is resonant. Like the guitar string, a wire cut to the appropriate length can be resonant and generate an electrical standing wave similar to the vibrating string for a particular sound. This should be the length where a wire is most efficient at radiating energy. However, if you try to find this as a definition, you will be hard pressed. Electrically, resonance is the condition where we are dealing with pure resistance in a circuit handling alternating current. All the inductance and capacitance have canceled each other out. In a resonant dipole antenna the resistance at the feedpoint is around 73 ohms. If you use a large copper pipe instead of wire, this resistance can be lowered. The electrical energy being transferred between the two poles deals only with resistance when the antenna is resonant.. Shortening or lengthening the antenna will change the resonant frequency. You can force the string to vibrate at a non-resonant frequency, but it will take additional energy. Electrically, an antenna fed a non-resonant frequency imparts additional inductance or capacitance increasing the impedance. When there is an imbalance between the two ends of the dipole, either by length or material, the

addition of capacitance and inductance will change the relationship of the current to voltage relationship affecting radiation. In effect changing where you pluck the string. Using the same guitar analogy, the sound box behind the string has a tremendous influence on the sound. The ground and any other material in the vicinity of an antenna will have an effect on the propagation and “tuning” of the antenna.

This article will not cover antennas. The perfect antenna has 100% transfer of feedpoint energy to radiation that is of maximum strength in the direction of the receiving station. In this perfect antenna, none of the energy is absorbed by the ground or converted to heat.

Second, like light passing through lenses, every surface or change in material that the light beam tries to pass through can cause a reflection. Glass, air and water each have a different resistance to the passage of light. By using optical coatings on the lens, the amount of reflection can be reduced. If you ever look through a cheap set of binoculars, you can often see multiple images in the viewfinder corresponding to reflections within the lens system. Alternating current is like light. When the current passes through one medium to another, there can be reflections.

In a perfect system, there is no resistance so there is no loss. However, the reality is that there is always some resistance. In a direct current system, such as flashlight, the only resistance is the force that prevents electrons from moving through a piece of material. Whenever alternating current is conducted through metal components, coax or parallel wires (ladderline), antennas, etc, the components can behave like a combination of capacitors and inductors. If you remember your physics, capacitors cause current changes to lead voltage changes and inductors cause current to lag behind voltage changes. In the case of pure resistance, voltage and current changes occur at the same time or are in phase. Spacing and materials between the 2 conducting surfaces of a transmission line determines the amount of capacitance and inductance and are described by the transmission line’s characteristic impedance.

Transmission line theory is the subject of books. Suffice it to say, the transmission line impedance does not mean that the line acts as one big resistor. If it did, why would anyone want to use 450-ohm ladderline over 50-ohm coax? In fact 450-ohm ladderline has much lower loss than the 50 ohm coax. The most efficient transfer of energy occurs when the energy moves from one object to another with the same impedance. In such a system, the phase relationship of the current and voltage is preserved. In the ideal antenna system, the 50-ohm transmitter output feeds into a 50-ohm transmission line, which feeds into a 50-ohm antenna feedpoint and radiates from an antenna with a 50-ohm radiation resistance. The greater the mismatch between the components, the more electrical energy is reflected back.

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Antenna Tuners, Transmatch
continued

The more energy reflected back, the greater the chance a standing wave has the highest voltage or the peak or valley of the wave at the output of the transmitter. Most solid-state rigs cannot handle high reflected energy. Furthermore, the reflected energy in a lossy transmission line will be wasted as heat. Assuming the transmitter can handle the high SWR, using a low loss transmission line, the energy will still be radiated out the antenna. You can adjust where the standing wave hits the transmitter output by changing the transmission line length, but this will vary with frequency and can be impractical. A better solution is to use a transmatch or what is often called an antenna tuner.

For the purposes of this article, transmitter output is at 50 ohms. Most people call them antenna tuners, but in reality, a device that interfaces two components of different impedances is a transmatch. These devices typically are placed near the output of the transmitter since having the transmitter put out the maximum amount of energy with the least amount of energy reflecting back into it is a good thing. However, putting the transmatch at the transmitter does nothing for a mismatch between the transmission line and the feedpoint of an antenna. If using a 50-ohm coax for a transmission line, a transmatch would be more effective if placed at the feedpoint of the antenna. 50-ohm

coax is easier to work with, but has higher loss per foot than ladderline, so exposing the coax to a large mismatch will greatly increase the loss. Ladderline has very low loss, so a significant mismatch at the antenna feedpoint is not usually a serious problem. Therefore, the transmatch can be placed between the ladderline and the transmitter.

Most modern transmitter designs reference all voltages to ground. Coax is ideal for this arrangement and coax is not affected as much by nearby metallic objects. Induced currents on the outside of the coax shield can cause problems, but a choke filter easily blocks these. Ladderline is balanced and the alternating current and voltage changes on one wire are referenced to the other line. To interface a balanced line to a ground referenced system requires a balun. This can be as simple as connecting one end of the ladderline to ground and to the shield of the coax and blocking any stray current on the outer surface of the shield by making a coil out of the coax or placing ferrite beads on the outside (choke balun). Even the balun has optimum impedance. Exposing baluns beyond their rated impedance can cause heating of the balun and significant loss of energy. Baluns can be designed as a transformer with the ability to step up or down the impedance. By definition and design, they always interface a balanced to an unbalanced line.

Transmatches cancel out the capacitance and inductance components to bring the impedance as close to 50 ohms as possible. Ideally, the transmatch eliminates all phase changes such that the transmitter is dealing with pure resistance. In a single band system, this could be a single coil, capacitor or both. Transmatches designed to match a wide range of conditions have a means of varying the inductance and capacitance. In its simplest form, the transmatch has a variable capacitor and roller inductor. The more common arrangements of the inductor and capacitor can be described as a L-match, T-match or Z-match. Part II will go into these 3 types of transmatch configurations.

73
Leo
KG4PWC

LOCAL NETS

SKYWARN NET Fridays 1900 hours.	146.820 MHz
Old Dominion IRLP Net Sundays 2000 hours. IRLP Node #4865 (Simplex Frequency)	145.600 MHz
CARS 10 Meter Net 2000 hours on Mondays CARS doesn't meet	28.400 MHz
Hampton Roads Public Service Net Mon-Sat 2100 hours	146.970 MHz
VBARC 10 Meter Net 2000 hours on Thursdays VBARC doesn't meet	28.400 MHz
Portsmouth "RagChew" Net Monday & Wednesday 1930 hours	146.850 Mhz
Southeastern Virginia Traffic Net Sun, Tues, Thurs @ 2000 hours	146.850 MHz
Portsmouth Amateur Radio Emergency Services Net Fridays 2000 hours	146.850 MHz

Winter Storms The Deceptive Killers
Dee Dee KI4DNN

BE PREPARED... Before the Storm Strikes

At home and at work...

Primary concerns are the potential loss of heat, power, telephone service, and a shortage of supplies if storm conditions continue for more than a day.

Have Available:

Flashlight and extra batteries

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Winter Storms The Deceptive Killers

continued

Battery-powered NOAA Weather Radio and portable radio to receive emergency information. These may be your only links to the outside.

Extra food and water. High energy food, such as dried fruit or candy, and food requiring no cooking or refrigeration is best.

Extra medicine and baby items.

First-aid supplies.

Heating fuel. Fuel carriers may not reach you for days after a severe winter storm.

Emergency heating source, such as a fireplace, wood stove, space heater, etc.

Learn to use properly to prevent a fire.

Have proper ventilation.

Fire extinguisher and smoke detector.

Test units regularly to ensure they are working properly.

In cars and trucks...

Plan your travel and check the latest weather reports to avoid the storm!

Fully check and winterize your vehicle before the winter season begins.

Carry a WINTER STORM SURVIVAL KIT:

Blankets / sleeping bags;

Flashlight with extra batteries;

First-aid kit;

Knife;

High-calorie, non-perishable food;

Extra clothing to keep dry;

A large empty can and plastic cover with tissues and paper towels for sanitary purposes;

A smaller can and water-proof matches to melt snow for drinking water;

Sack of sand (or cat litter);

Shovel;

Windshield scraper and brush;

Tool kit;

Tow rope;

Booster cables;

Water container;

Compass and road maps.

Keep your gas tank near full to avoid ice in the tank and fuel lines.

Try not to travel alone.

Let someone know your timetable and primary and alternate routes.

On the farm: Move animals to sheltered areas. Shelter belts, properly laid out and oriented, are better protection for cattle than confining shelters, such as sheds.

Have a water supply available. Most animal deaths in winter storms are from dehydration.

DRESS TO FIT THE SEASON. Wear loose-fitting, light-weight, warm clothing in several layers. Trapped air insulates. Layers can be removed to avoid perspiration and subsequent chill. Outer garments should be tightly woven, water repellent, and hooded. Wear a hat. Half your body heat loss can be from the head. Cover your mouth to protect your lungs from extreme cold. Mittens, snug at the wrist, are better than gloves. Try to stay dry.

KEEP AHEAD OF THE STORM by listening to NOAA Weather Radio, commercial radio, and television for the latest winter storm watches, warnings, and advisories.

What to Listen For...

WINTER STORM WATCH:

Severe winter conditions, such as heavy snow and/or ice, are possible within the next day or two. Prepare now!

WINTER STORM WARNING:

Severe winter conditions have begun or are about to begin in your area. Stay indoors!

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Winter Storms The Deceptive Killers

continued

BLIZZARD WARNING:

Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill. Seek refuge immediately!

WINTER WEATHER ADVISORY:

Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life-threatening. The greatest hazard is often to motorists.

FROST/FREEZE WARNING:

Below freezing temperatures are expected and may cause significant damage to plants, crops, or fruit trees. In areas unaccustomed to freezing temperatures, people who have homes without heat need to take added precautions.

73s

Dee Dee

KI4DNN



**National Skywarn Recognition day is
December 4th, 2004**

(0000-2400) UTC

Musings of an Inveterate Catalog Surfer

Leo Kusuda KG4PWC

I've had the long held philosophy: it is better to "window shop" than shop. New "thing-a-ma-jigs" come and go all the time. Most items that look neat lose their appeal and collect dust. So if you dream about something, eventually, a new latest and greatest thing will supplant the old dream. Also, my wife has an aversion to Packrat Behavior so I can still park two cars in my two-car garage. However, having been a ham for 3 years, I seem to have collected or gone through some 8 radios! I justify my over indulgence as

being the clubs "Public Service Coordinator". Between demonstration stations, public service events and emergency communications, I do have an excuse (some would call it rationalization) for my purchases.

That said, upgrading or outfitting our club QRM room set me to dreaming. We have 3 rooms, 1 tower, an ICOM 706 mkIIIG, an old Kenwood HF transceiver and 2 transmatches. Certainly if I could have 3 rooms to setup rigs (pipe or coax dream) I would have a DX/contest station, satellite station, digital station and a VHF/HF voice/digital station. I would worry about an Amateur TV station with my mobile station upgrade! The dilemma is which to outfit first?

As a club, the repeater is certainly the primary means of communication between members (excluding e-mail and the telephone). Amazingly, the club does not have a dedicated VHF/FM rig. These rigs are small and certainly can be removed for special events. The rigs that allow simultaneous monitoring of 2 frequencies are especially nice. These include the Alinco DR 605 and DR 620, ICOM IC 2720, Kenwood TH V7a and d700a, and Yaesu FT 8800R and 8900R. Of the above only the Alinco DR 620 does not do crossband repeat. In my humble opinion, the Yaesu's have the nicest display and may be less prone to intermod. The blue display of the Kenwood V7A can be hard to see in certain lighting conditions, but the 2 at the Chesapeake EOC (Emergency Operations Center) work very well. All can be hooked up to 9600 baud TNC for packet and APRS operations. The Kenwood d700a does have a built in TNC but for its cost you could almost get one of the other radios and a dedicated TNC. Separate TNC's have more features, can allow you to set up local bulletin boards (e-mail without spam, lack of popularity has its positive side) and can be attached to other radios.

Most of us stay in Amateur Radio because of the opportunity to make new contacts and friends. The largest playing field involves the HF bands. HF communications frequently involve antennas that take up more space than we are allowed at our QTH. One of the websites that have a lot of opinions is www.eham.net/reviews. It is interesting to read the ratings and comments. It is quite obvious there are a lot biases, different level of experiences and interests. Also all manufacturers seem to produce their fare share of lemons. A person's assessment of customer support depends upon the individual's level of patience. Some of the most interesting reviews are for the Radio Shack HTX 10. It is apparent that when band conditions are good, anything can work. It is also apparent that some radios such as the Icom IC 765, Icom IC 751a, Kenwood TS850 and others from Yaesu and TenTec are very good used radios. Some older rigs don't have DSP

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Pictures of the Month

(digital signal processing) but you can now buy a number of audio DSP units that plug into the audio output and do very well. A major concern is the strong RF around the QRM room. If you are interested in DX, The Complete DX'er by Bob Locher, W9KNI is excellent reading. Almost all modern radios can perform well. However, if the radio is affected by strong out of band or nearby signals, a preselector or external bandpass filter, which are often used by multi-op contest stations maybe necessary. These rigs can be very expensive with high-end rigs being more than \$10,000. What amazes me is that high-end rigs of 10 and 20 vintage were also in excess of \$10,000, which in today's dollar and even then could buy a very nice car! If you add a linear amplifier, the world class HF station will compete very nicely with a water ski or family motorboat. For comparisons, www.arrl.org has a page on transceiver specifications. Elecraft in touting their product also has a nice comparison chart on their website www.elecraft.com.

Satellite rigs allow for crossband full duplex operations and often allow easier tracking of Doppler shifts. Since 10-meter operation is required for some satellites, at least the Yaesu FT 847 and Kenwood TS2000 cover the full HF range. But these do everything rigs do have compromises. The Icom IC 910H is a nice dedicated VHF/UHF all mode transceiver but costs almost as much as the other two rigs and it won't cover 6 meters!.

Digital stations require the addition of a computer and some form of interface. During the downside of the sunspot cycle, digital modes are able to make contacts when voice signals are unintelligible on HF. Technology to interface all frequencies to the Internet for e-mail is now available. HF digital interfaces generally are more expensive.

The reality is that we never have enough money to get the things we dream about, but you can do very well with most rigs. As a club it is nice to have a variety of radios to use (play with), which can help you determine the features you really like. If you have a preference, please contact Jim Rogers, KG4WOJ. DREAM ON!

73
Leo
KG4PWC



Jungle Jim starts his climb while.....



His able bodied "safety observer" looks on



As a result, the first antenna is now in place at the QRM Room

October 4, 2004 G General Meeting Minutes

The October 4, 2004 general meeting of the Chesapeake Amateur Radio Service was called to order at 7:08 PM by President Ruth Bigio, KB4LIF, at the QRM Room. 17 people were present.

Secretary's Report: The Secretary's report was accepted as corrected.

Treasurer's Report: The Treasurer's report was read and accepted as presented.

A discussion regarding CARs registered agent was tabled.

Committee Reports:

Repeater Committee: None

Springfest: Possible locations for next Springfest were discussed. Steve McGowan, KI4EIN, has location idea. Moose Lodge on George Washington Highway was discussed along with Riverwalk.

Old Business:

Richard Siff was awarded three tickets for naming the new hamshack, The QRM Room.

Sonny presented a list of comments regarding suggested goals and objectives from five speakers from the previous general meeting and suggested that they be put in the minutes and newsletter. This list was read by President Ruth to those present. A motion that the Board of Directors review these objections passed. The following five goals are included herein from Sonny's suggestion...

Suggested Goals and Objectives for the 2004-2005 Club Year

Goal: Establish a functioning radio station at the new meeting location.

Objectives: 1) Set up operating positions for 75-40M, 20-10M & VHF/UHF bands by installing the equipment and cables
2) Install antennas on the tower for the operating positions established

Goal: Establish a monthly get-together at the meeting place for a coffee/donut social exchange of ideas and interests, (not a work party or event, just a good time get-together).

Objectives: 1) Select a monthly date and time. 2) Provide club funds to provide the coffee and donuts 3) Future expand the social get-togethers to dinner gatherings

Goal: Training and Education program

Objectives: 1) Establish a yearly schedule for Ham Classes, minimum of one a year. 2) Get members to sign up for teaching the training classes. 3) Establish a support group for license upgrades of members

Goal: Support, maintain and improve W4CAR repeaters

Objectives: 1) Provide remote control for using PL tones 2) Restore operation of all club owned repeaters. 3) Service and realign all repeaters for maximum efficiency

Goal: Support the City of Chesapeake with back up communications

Objectives: 1) List functions that the city wants assistance from the club. 2) Have a fun time exercise to determine the club's ability. 3) Develop a list and method of getting the club's assistance in service

There will be an exam session October 23rd at the QRM Room.. There will be a \$12.00 fee and a picture ID is required.

Continued on next page

Sonny Hood, K4WYS, presented the following motion to the membership to direct the board of directors to assign the following duties to the Vice-president in accordance to the bylaws, due to the recent acquiring the new meeting place for the club. This motion which follows was denied...

"The Vice-president shall be responsible for the maintenance, security and modifications directed by the membership for the club's meeting place. He/she will be the liaison to the City of Chesapeake for matters related to the use of the facilities at 116 Reservation Road" Thus, the Communication Officer is still responsible for these items.

Sonny also presented a second motion which passed. This motion stated:

"the new Board of Directors present an operating budget for the 2004-2005 Club Year for the approval of the membership."

The City is to fix the lighting for the QRM Room. CARS is not to do any electrical work until the responsibility is clarified.

Elections: Elections were held... the following person were nominated and :elected...

President - Keith Ainsley, KG4ZXX

Vice-president - Reggie White, W5SSB

Secretary - Sonny Hood, K4WYS

Treasurer - Lee Vitasek, KI4CAV

Communications Officer - Jim Rogers, KG4WOJ

There will be a pseudo mountain topping QRP operation on November 12, 14,15.

The \$8.00 50/50 was won by Jim Wesseling, KF5LI.

The Hampton Air and Space Museum needs operators for three hour shifts once a month.

The need for a 2 drawer file safe was discussed. It is estimated that they cost from \$309.00 to \$399.00. Also, the need for a fire extinguisher for the QRM Room was noted.

Next general meeting will be November 1st at 7:00 PM.

There being no further business, the meeting was adjourned at 8:14 PM.

The Spectrum

Monthly newsletter of the Chesapeake
Amateur Radio Service (CARS)

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CARS Repeaters:

146.610 MHz

146.820 MHz

444.000 MHz

W4CAR Trustee:

Ruth Bigio KB4LIF

CARS OFFICERS & CHAIRPERSONS

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Keith Ainsely KG4ZXK

Vice President:

Reggie White W5SSB

Secretary:

Sonny Hood K4WYSI

Treasurer:

Lee Vitasek KI4CAV

Past President:

Ruth Bigio KB4LIF

COM Coordinator:

Jim Wesseling KF5LI

Public Service Coordinator:

Leo Kusuda KG4PWC

Repeater Committee Chairman:

TBD

Spring Fest Coordinator:

Leo Kusuda KG4PWC