



The Spectrum

Issue 0306

March 2006

From The President

Well I hope everyone will be marking up their ham calendars for the next few months. Things are going to be getting busy with CARS.

First off, March 11th is the Monitor/Merrimac Special event station which is going to be held at the Mariners Museum in Newport News. If you are able to come out and help with set-up/take down, making contacts, etc... Please do so. We should have a good time.

April 2nd is our Spring Fest and it's at a new location! We will be holding the event at the Moose Lodge on George Washington Highway. We are going to need folks for traffic control, ticket takers, etc... So if you are able to help please listen for the call up. I'm sure we are going to have a few planning meetings in March to prepare for what should be the best Spring Fest yet!

We will have tickets and fliers to hand out soon. Know a ham that needs a ticket, make sure they get the ticket.

Tour de Cure is April 22nd. We help with communications during the bike event to raise money for Diabetes.

We currently have a general class in progress and looking to hold another tech class soon.

We have one of the tnc's that has been donated to the club by Bob Armstrong last year up and running. Presently it's sending out a packet beacon every ten minutes on 145.010 MHz. However, we should be able to do more with that as soon as

software is loaded. There is also a Rig blaster in the shack for PSK31, RTTY, etc on the Yaesu.

I would encourage all members of CARS who does not have access to a ham shack to get a code and use the shack to it's fullest. We have a first class facility that should be used more. For those who are in apartments, developments with restrictions the QRM room is the perfect answer to your quest for radio communications.

We have a great group of people, a lot of things are coming together. Let's all pull together and make these next several events the best we have ever had. Let's also have a lot of fun doing them too!

73's
Keith, KG4ZXX

Going Digital for less than \$8.00

A few weeks back I started dabbling in Slow Scan Television (SSTV) and various other forms of digital transmissions (RTTY, PSK31, etc).

I quickly found no need for big expensive equipment, pricey software or, extra equipment. As a matter of fact all you need is one patch cord, a home computer with a sound card and a HAM radio!

I thought this would be a great idea for those Technicians wanting to get more out of the 2 meter band.

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Links of Interest

[Virginia Beach Amateur Radio Club](#)

[Portsmouth Amateur Radio Club](#)

[Home - KG4ZXX.COM - IRLP and much more!](#)

[MMSSTV](#)

[WinPSK](#)

[AA9PW Morse Code Practice](#)

Upcoming Events

CARS Dinner Meeting

MAR 6th 2006, 6:30 pm
Silver Diner on Battlefield Blvd @ Volvo Pkwy.

VBARC

[Map of 717 Tucson Rd Virginia Beach, VA by MapQuest](#)

Monitor Merrimac Special Event Station - March 11

ARES./Public Service Meeting - March 15

Springfest

2nd of April

Tour De Cure – April 22nd

"Smithfield Ham"

Part II

Today we find Smithfield Ham in his Ham Shack, he has brought out another pack of matches after his latest escapade of fire. You know this Ham has new meaning, "putting fire to the wire".

Well, Smithfield Ham has done some preliminary trouble shooting and determined that he needs to have heavier wire. Deep in his secret Pig Cave buried beneath the Pig Pen, he has perfected a new type of electrical cable using his Commodore 64 computer with advance math programs including "PIE R SQUARED". By using a very unusual formula "pies are good to eat - squares = Link Sausage + Sub biscuit" = wire cable capable of handling the many of kilowatts he needs to power his 4-100,000s. Now he must run this new cable under the ground from the Shack to the Surry Power plant. He will pull the Sausage Link wire through the same tunnel that holds the burnt up cable from his last experiment. Smithfield Ham SQUALLS with joy!

He has contracted Amalgamated Wire and Sausage Company to manufacture the Sausage Link wire. As a matter of fact, "Wells HOG GO" is supposed to deliver the wire today by Chuck Wagon Train. Yep, there will be 30 Chuck Wagon Loads of Link Sausage wire ready to run this after noon. How does he do it? The wire segments, coupled together with a clever invention, "Role and Mustard Plasma" The "Roll" fits over two ends of two Link Sausage wire ends and the "Mustard paste" solders a perfect connection every time. Similar to the "GETTER" Effect in a vacuum tube, the mustard gels with the first electrons dissipates heat to remove all impurities, leading this application to a "Perfect" Connection. What a "Pig Brain", this Smithfield Ham is! WOW!

Do I hear a stampede, YES I do! It is the Chuck Wagon Train Rolling up to the Pig Pen with the newly formulated "Link Sausage Wire" With enough Cholesterol to kill everyone in these 50 states, the Master Ham, begins to unroll and install the wire.

Seven Days later, Smithfield ham emerges from the trench in Surry and Hitch Hikes back to his "Shack in the Pig Pen".

LOCAL NETS

SKYWARN NET 146.820 MHz
Fridays 1900 hours.

CARS 2M Net
Sundays 2030 Hours
146.820 MHz

CARS 10 Meter Net 28.400 MHz
2000 hours on Mondays CARS doesn't meet

Hampton Roads Public Service Net 146.970 MHz
Mon-Sat 2100 hours

VBARC 10 Meter Net 28.400 MHz
2000 hours on Thursdays VBARC doesn't meet

Portsmouth "RagChew" Net 146.850 Mhz
Monday & Wednesday 1930 hours

Southeastern Virginia Traffic Net 146.850 MHz
Sun, Tues, Thurs @ 2000 hours

Portsmouth Amateur Radio Emergency Services Net
Fridays 2000 hours 146.850 MHz

Tidewater Radio Association WT4RA net
Thursday 1930 hours 147.195 MHz
(code drill follows net)

"This will be a great event firing up my BIG Amplifier for the DX contest tomorrow night", Smithfield Ham Declares! The next night as the Sun Fades and the "D" Layer dissipates, Smithfield is preparing to "Put the Fire to the Wire" and tune up the rig. The amplifier it is actually working. The power output watt meter shows 200, 000 watts continuous power, an SWR of 15:1, OKAY! The rig is powered up. The tubes are glowing purple and red. The shack is heating up as Smithfield Ham turns on full speech compression and SQUEALS, CQ CQ CQ into his D 104 Vintage Microphone. The lights are dimming!

BAM POP BAM BOOM BOOM BOOM - Fire Balls are all around, then it is total darkness, and in a faint shrill voice we hear, "**does anyone have a match?????**"

Do I smell burnt Ham Hocks & Linked Sausage wire???
Smoked Ham anyone!!!!

The Master Ham has done it again. While Homeland Security refuses to confirm, **Smithfield Ham** has struck again and saturated the Surrey Nuclear Plant.

Tune in another time to see if Smithfield Ham has his QRP rig on the air using ECHOLINK, unless K4PRB deletes this episode from his computer, or N5RAG works DXCC on 6 meters and burns up the "F" Layer.

By...Rich
WA4BUE

The Dipole Antenna

A wire antenna that is composed of 2 equal length pieces that are not connected and are fed against each other is called many things. In the classic case where the total length of the antenna is a half wavelength, the antenna is referred to as a dipole. If the antenna length is not a half wavelength, it is often referred to as a doublet. If it is fed by ladder line, some people refer to it as a double Zepp.

One can Google search wire antennas or go to <http://www.arrl.org/tis/tismenu.html> to look for construction details. The website that has the most detailed analysis is www.cebik.com. He recently added an analysis of the Inverted Vee. This refers to the geometric shape of the antenna when viewed from the side. Dipoles can be horizontal, vertical, sloping or in either an Inverted Vee (“V” shaped) or Vee configuration. The main area of radiation occurs in the middle so that the height of the feedpoint has the most influence on propagation. The ends can droop or be bent in the horizontal plane to form a “Z” shape when viewed from above. For the money and time spent constructing and hanging a dipole or doublet, nothing can beat it.

Radiation is at a minimum off the ends of the doublet when operating at its resonant frequency or higher. In a resonant dipole that is greater than $\frac{1}{2}$ wavelength above ground the radiation is dumbbell shaped with maximum radiation perpendicular to the antenna. When the antenna is less than $\frac{1}{2}$ wavelength in height, the radiation is more omni directional with most of the energy radiating skyward. The upward direction becomes more pronounced the closer the ends are brought to the ground. When operating at frequencies higher than the resonant length, the radiation becomes more complex with 4 or more lobes forming. This can cause an increase in gain in certain directions. However, by drooping the ends such that the Inverted Vee is more acute than 60 degrees (each end more than 30 degrees down from horizontal) the radiation again becomes omni directional and upward. An Inverted Vee also has a feedpoint impedance closer to 50 ohms.

The law of reciprocity states that the transmission and reception properties of the antenna are the same. Therefore the direction of maximum transmission of RF is the direction of best reception. Remember the F layer is some 200 miles high. A takeoff angle of 45 degrees will result in a 400-mile skip. When sending within the state of Virginia and North Carolina, a takeoff angle of 45 degrees or more is preferred. This is often called Near Vertical Incident System (NVIS) or cloud burner. In an emergency situation, a low dipole is actually more useful than a high one.

A wire doublet is designed to have radiation or reception of RF only from the 2 wire components. The oscillation of electromagnetic energy is between each wire half. Modern transceivers look at the alternating current and voltage relative to ground. The shield in a coax is usually attached to ground. The RF currents on the outside of the shield are different from the inside. Interaction of the currents from the inside and outside of the shield at the feedpoint of a doublet antenna and at the radio can cause problems. To eliminate the interaction, a “choke” balun (balanced to unbalanced), which can be as simple as 5-6 turns of the coax or ferrite beads on the outside of the coax, is placed at the feedpoint.

Insulated wire theoretically decreases noise from static created by snow and rain. Insulated wire will also change the velocity factor of the wire making the insulated wire behave electrically longer so that a shorter piece of insulated wire will be needed for the same frequency when compared to bare wire. RF energy travels on the outside or “skin” of the conductor. Copper has excellent conduction, where as steel is not so good. However, copper clad steel has low stretch and high power handling capabilities. When suspending the wire antenna from only the ends, the coax feed with or without a balun can produce enough strain to stretch the wire and change the resonant frequency.

A resonant dipole in free space has a feedpoint impedance of about 72 ohms. This will change with the drooping of the ends, proximity to objects, and height above ground. TV coax can be used to feed the antenna. A 72-ohm to 50-ohm mismatch will result in a SWR of 1.4. This is still very good with only a few percent loss in power. A non-resonant dipole can have very significant feedpoint impedances both very low and very high. An antenna tuner may be cost prohibitive particularly operating at high power. It may be easier to make multiple dipoles fed at the same feedpoint (fan dipole). Another option for portable antennas is to clip on wire lengths with alligator clips. Trap (parallel inductance and capacitance) or inductors can make the wire antenna behave with different lengths for each band. Trap systems will shorten the antenna but the bandwidth of the operating frequencies in each band will be lower than a resonant dipole and the traps can be heavy.

Continued on next page

A discussion on trap dipole design can be found at <http://www.arrl.org/tis/info/Trapped.html>. There are other ways to even out the impedance at the feedpoint. These modifications include the windom, Carolina Windom, and G5RV.

To understand what size copper wire to use I did a simple analysis using Ohm's Law and watts = volts x amps.

1500 watts transmitter/amplifier output

Transmission Line	Current (amps)	Voltage (volts)	Minimum copper wire size #/ga*	Commercially available size
450 Ohm ladderline	1.8	833	19	14, 16 and 18
300 Ohm ladderline	2.2	682	18	Twinlead = 23,20 Ladderline = 18
50 Ohm coax	5.5	272	14	9913 = 9.5 RG8U / 218 = 12

100 watts transmitter

Transmission Line	Current (amps)	Voltage (volts)	Minimum Copper wire size #/ga*	Commercially available size
450 Ohm Ladderline	0.47	213	24	14,16 and 18
300 Ohm Ladderline	0.58	172	23	Twinlead = 23, 20 Window ladderline = 18
50 Ohm coax	1.4	83	20	RG58 = 20 RG8X = 16

*Wire size requirements from http://www.powerstream.com/Wire_Size.htm

In an RF environment current minimums and maximum vary along the line. Along the antenna there can be high voltage with low current or low voltage with high current flow; however, overall power will be no more than the input.

Increasing the diameter of the antenna element can make the SWR curve of the antenna flatter increasing its coverage of the band. However, it is easier to "fool" the RF by making the antenna out of 2 or more strands separated a short distance. In other words 2 wire strands parallel to each other can approximate a copper tube.

An adjustable matching transformer can correct for mismatches. Large mismatches can incur significant loss within the matching transformer or along the feedline. This can be compensated for with low loss (e.g. ladderline) transmission lines and very robust transmatches.

The following table is from <http://davisrf.com/> and shows line losses for various coax at different frequencies. High SWR will only accentuate the line loss.

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Cable Attenuation (all #'s in dB)

Cable	1 MHz	10 MHz	50 MHz	100 MHz	200 MHz	400 MHz	700 MHz	900 MHz	1 GHz
RG-58	0.44	1.4	4.1	4.8	7.5	11.8			
RG-8X	0.2	0.78	2.0	3.0	4.5	6.0	7.9	8.8	
RG-213	0.17	0.55	1.3	1.9	2.5	4.1	7.5	8.0	8.2
RG-6	0.16	0.57	1.4	2.0	2.8	4.3	5.6	6.0	6.1
RG-11	0.14	0.42	1.0	1.5	2.2	3.5	4.1	5.2	6.6
RF9913**	0.15	0.4	0.9	1.4	1.8	2.6	3.6	4.2	4.5
BURY-FLEX™*	0.26	0.52	1.1	1.5	2.0	2.9	3.8	4.9	5.3
RG-59	0.6	1.1	2.4	3.4	4.9	7.0	9.7	11.1	12.0
RG-214	0.17	0.55	1.3	1.9	2.7	4.1	6.5	7.6	9.0

Notes:

* Bury-Flex attenuation is very close to LMR400 (2.1 dB @ 400 MHz)
 ** RG-8 (#WM106) {Not listed on table} has somewhat higher attenuations as compared to Bury-Flex (note that Bury-Flex has a 20+ year abrasive resistant jacket of PE, whereas RG-8 is a Non-Contaminating PVC). RG-8 (WM106) has a double shield.
 *** RF9913 (#WM102) Flexi-XL is stranded. Attenuation is slightly higher than standard 9914, but still very low loss.

Ladderline is cheap and has much lower loss, but it can be difficult to use since it does not tolerate sharp bends and must be several widths away from any object, especially metal or imbalance in the line will occur. Particularly when the ladderline comes into the shack, stray RF due to the effects of objects in proximity of the ladderline can be troublesome.

Selecting an antenna size, height, shape and/or orientation depends upon your need for radiation directivity, angle of radiation for better DX or close in (200 mile) contacts and space restrictions. If possible, stringing up 3 wire doublets can give you excellent coverage. If you have only one tall center support, string one end of each wire antenna hung as sloping antennas from the center support like spokes in a wheel. If you have 3 supports, hang the wire antennas in the shape of a triangle.

Where space and support is available, stacked doublets can increase gain. There are a variety of arrays based upon combining 2 or more doublets such as the Lazy-H and the W8JK antennas. These are beyond the scope of this article. However, you can find more information in the ARRL Antenna Book or at www.cebik.com.

73
 Leo
 KG4PWC



CARS is being noticed!

From: K7NYS [mailto:K7NYS@cox.net]
Sent: Friday, February 17, 2006 1:21 PM
To: w4car@yahoo.com
Subject: Newsletter

Hello,

I stumbled across your site while looking for RDF info and saw your newsletter. I am impressed. It is one of the best NL's I have seen! Keep up the good work
73, Pat K7NYS

The PL tone has been taken off the 146.82 repeater

A lot of folks who may not have been able to access the repeater due to a tone issue should now be able to access it with no problem. If you already have tone programmed into your radio you do not really have to take it off. It will not cause any problem with it on. But if you feel that you must, please go ahead and take it off.

If you read this note in the newsletter and have not been able to check into the Skywarn net on Friday evenings at 7 P.M. Please rejoin the net. You should now be heard.

CARS CLUB MEETING MINUTES 2/6/06

(Not yet approved by membership)

Meeting called to order at 7:00 pm by Vice-President Bill, WF4R. President Keith KG4ZXK was absent due to illness. 23 attendees, including 2 guests

Paul, K4PRB, read previous club meeting minutes. Don, KB4NKP moved to accept as read. Seconded and approved.

Rich, N5RAG, read the Treasurer's report. Paul moved to approve as read. Seconded and approved.

COMMITTEE REPORTS:

ARES / Public Service: Leo, KG4PWC announced the following schedule of events:

- ARES meeting Feb. 15, 7:00 pm at the QRM room;
- General License class begins Feb. 21;
- Monitor Merrimac Special Event station operation March 11, 10:00 – 4:00;
- Springfest April 2;
- Tour De Cure PS event April 22.

Skywarn: Bill, KF4EPI announced Official Skywarn training by NWS Wakefield personnel
April 27, 6:00 pm, Indian River Library, 2320 Old Greenbriar Rd.;

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Field Day: Bob, KI4NMC announced Field Day will be held at Deep Creek Locks Park, main shelter #1. Our location at Great Bridge Locks Park was previously reserved in December by some City agency. Now that we are documented as being a City agency by the Parks & Rec. Dep't., we can apply prior to Jan. 1 and have a better chance of getting our choice of location next year.

Repeaters: Bill, WF4R, and Reggie, W5SSB reported the crystals for the new vhf and repeaters were on order.

NEW BUSINESS:

Bill, WF4R, announced that all members can get security codes to access the Shack. Members were reminded to transmit only within the limits of their licenses unless an appropriate control operator was present and supervising for higher priviledges.

Paul, K4PRB moved that the club approve the membership applications of John Ficke, WT4M, and Chris Tichenor, KI4NIH. Seconded and approved.

Leo, KG4PWC, moved to authorize purchase of a West Mountain Rig Blaster and "Mix W" software (cost not to exceed \$150.00) by Bill, WF4R. Seconded and approved.

50/50 raffle – Dennis, K4DKR won the pot and donated his winnings to the club.

Meeting adjourned 8:35 pm.

Going digital from page 1

First off let's talk software. For SSTV I am using freeware call MMSSTV available from [MMSSTV](#). For PSK and RTTY a good freeware program can be found at [WINPSK](#).

Now for the equipment. Of course you will need your 2 meter rig. 1 patch cord (\$3.99 from Radio Shack). A home computer with a sound card.

We need to get the received digital signal from your radio into your computer. To do this simply plug one end of the patch cord into your earpiece / speaker jack, on your 2 meter rig, and the other end into the line input or microphone input on your computer. That's it! You are now ready to receive SSTV and other digital modes. But why stop there. Let's Transmit!

Here is where the expensive part comes in. You will need another \$3.99 patch cord. Hence the title of this article "Go Digital for less then \$8.00".

There are two ways to transmit your digital signal. First, if you sprung for the second patch cord, you will need to connect this to your radio via the mic jack. Not all 2 meter radios have phono plugs that you can plug this cord into. Most HTs do. If yours does not, don't worry. Connect the other end to your headphone jack on your computer. The headphone jack provides the necessary audio to your radio and when you key your radio, the data is transmitted. No phono mic jack? All you have to do is turn your computer speakers up, hold your mic close, key your mic, start your data transmission. That's it! The 2 meter band provides for digital comms on 144.9 -145.2. SO FIRE IT UP AND ENJOY. If you want to play, get set up, and give me a call. There are some adjustments to be made with in the programs for a nice clear picture.

73s
Rich
N5RAG

This picture was transmitted and received over the 2 meter band using the procedure above.



The Spectrum

Monthly newsletter of the Chesapeake
Amateur Radio Service (CARS)

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CARS : Repeaters

146.610 MHz (PL 100.0)
146.820 MHz
444.000 MHz

W4CAR Trustee: Bill Runyon WF4R

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