

# Hamgram

Newsletter of the Winona Amateur Radio Club, Inc. July 2004

<http://www.winonaarc.org>

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## Meeting Notice

The July meeting of the Winona Amateur Radio Club will be the summer picnic held at the **Lions Pavilion** at the foot of Hamilton Street. Events will start around 6:00 p.m. Bring your own meat and a dish to pass. Club members and their family members are welcome to attend this event. Some members may be tapped to supply a charcoal grill. The club will furnish soft drinks (coffee?).

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## WARC June 2004 Meeting Minutes

Meeting called to order by Club President Tom, KAØMLO at Dick's, NØVV, river cabin.

### Program

Our Speaker was Chuck Gysi, N2DUP, Rochester MN who is running for ARRL Section Manager in Minnesota.

The first part of his presentation was concerning the current Rochester MN experience, as HBC is in the final stages prior to a test run of broadband distribution over power lines in a small 10-block square of Rochester. The signal will cover 2–80 Mhz. At the present time amateurs in Rochester are measuring baseline levels of background noise on the ham bands so the average level of noise will be known before the startup of the broadband service. The manufacturer of the broadband system being installed is MainDotNet. If HBC feels the test is a success, the area of available service will be expanded in October. A broadband service is being tested in Cedar Rapids at this time. The Rochester Ham Club Public Information Officer has been in contact with the Rochester Power Co. that has contracted with HBC for this service. If a problem exists during the test, the local power company in Rochester indicates they will yank the new broadband service

The second part of Chuck's, N2DUP, talk concerned his campaign for ARRL Section Manager. This is the first time in many years that there has been a contest for the office. Chuck has been a freelance writer in the past for QST. He feels that he can put new life into amateur radio in our

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area and plans to appoint many persons to fill out the vacant positions in the ARRL service areas. He also hopes to fill out all our Emergency Coordinators throughout the state. He felt there was a lot of fixing to do in our ARRL section. For example, in the Twin Cities Area there is a power struggle between two competing amateur groups that should be mediated for better service to all hams in the metro area.

He also would like to get the legislators in the state of MN to modify the state scanner law so that if someone, (other than the ham, himself, who in MN has permission by the law to have a portable scanner in a vehicle), uses the ham's automobile with an installed scanner, the guest driver is not cited for a misdemeanor because of the presence of the scanner.

He also reported that many affiliated clubs have been classified as inactive by the ARRL when, over a two-year period, no reports have been received by the Newington CT office. 51% of club's members are required to have ARRL membership for the club to be affiliated. Some clubs get around this by having two classes of membership (voting members and non-voting members). You must be an ARRL member to become a voting member of these affiliated clubs.

The ballots for the ARRL Section election will be in the mail to members soon.

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## Business Meeting

The business meeting was called to order by President Tom, KAØMLO.

Motion to approve the May minutes as recorded in the June Hamgram by Clare, KØNY. Second by Tom, WØMK.

Ken, NØJP, pointed out that the June *Hamgram* was incorrectly labeled as the May Issue. Approved by voice vote with Ken's correction.

Motion by Dick, NØVV to approve the treasurer's report as presented in the June *Hamgram*. Second by Clare, KØNY. Approved by voice vote.

Shari, WA9IGK, and Clare, KØNY, were appointed to run the outgoing QSL service for the club.

Field Day is June 26. Walt, KEØXI, stated that all plans for field day at the Gun Club were proceeding well. The Gun Club has an event the same day and is offering a chicken dinner to each of our members participating in field day activities for a price of \$5.00. The count of participating field day amateur radio club members is estimated at about 25. This number will be given to the gun club so they can plan. Our club will provide soft drinks. Russ, NØQK, is supplying his motor home for the weekend. Some

participants will be camping out. Multiple separate groups will be set up in shelters to pursue different aspects of the contest. Matt said there would be 2 ALPHA, 2 HF and a GOTA (Get on the air) transmitters. Sunday morning there will be a pancake breakfast. Russ, NØQK, weather permitting, will land his paraglider at the site.

The club budget was approved at the May meeting. Tom, KAØMLO, wondered whether we had sent the \$100 to the W1AW Fund, but our treasurer, Dick, NØVV, stated that it had not been sent yet.

Ken, NØJP, questioned the status of our ARRL affiliation. Tom, KAØMLO, stated that this was being addressed.

Ken, NØJP, presented a thank-you note from Jean, George's, KØDHI, widow which was read for all by Tom, WØMK. Ken also presented the bill for the funeral flowers to the club treasurer, NØVV.

Ken, NØJP, stated that we must vote for a member to serve as the at large board member for the second half of the year. Walt, KEØXI nominated Ken, NØJP. Second by Paul, KØZYV. Voice vote in favor. Railroad for Ken.

Ken, NØJP also presented two out-of-town QSL letters to the club generated by the Minnesota City Day club-operating event.

No other NEW BUSINESS.

Les, KØBAD, moved for adjournment.

President Tom, KAØMLO adjourned the meeting.

**Present at the meeting:**

Ken NØJP      Walt KEØXI      Tom WØMK  
Tom KAØMLO   Joe G. KCØMBL   Chuck      N2DUP &   XYL   Lisa  
Gordon NØTNC   Paul KØZYV                      Pete KC9ERG  
Jake KC9CRM   Matt KFØQ                         Dick NØVV  
Clare KØNY      Les KØBAD & XYL Jo  
Russ NØQK (Arrived by boat)

**Treats schedule 2004:**

**Jan:**      Holiday Party, no treats      **Jul:**      Picnic, no treats  
**Feb:**      Clare, KØNY                      **Aug:**      Joe, KCØMBL  
                 Shari, WA9IGK  
**Mar:**      Tom, KAØMLO                      **Sep:** Erik, WBØNIU  
**Apr:**      Delores, NØNUO                      **Oct:** Tom, WØMK  
**May:**      Bob, NØPDD                         **Nov:** Les, KØBAD  
**Jun:**      Dick, NØVV                         **Dec:** Lance, KBØYJU

Respectfully submitted,  
Tom Wilmot, WØMK, Secretary

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**The “New” Digital Modes  
(Why are digital signals more reliable?)**

Les, KØBAD

Digital signals are fundamentally more reliable when sent over a noisy transmission path than are analog signals.

An analog signal is an electronic representation of the original intelligence (modulating) wave. A voice signal, for instance, is sent in analog form as an electronic representation – usually the output of a microphone – of the spoken word. As the analog signal travels through the transmission medium (radio transmission or telephone lines) it becomes weak and transmission path noise is *added* to the signal or the signal itself can *fade*. Once noise is added to the signal or the signal itself fades below the noise floor the receiving equipment cannot distinguish between the legitimate voice analog signal and the distorted version (the received signal). If the weak and noisy analog signal is amplified the result is a strong – but still noisy and distorted – analog signal. Pulse noise limiters can remove certain types of noise from an analog signal but ultimately if the strength of the noise is high enough relative to the strength of the original analog signal information cannot be extracted from the analog signal even if it is amplified and made extremely strong. This is because the noise is amplified an equal amount and the signal itself is never able to rise above the noise level.

Analog *error prevention* schemes, such as frequency diversity, have been employed but, as one might expect, these schemes depend entirely upon preventing or limiting the amount of noise that appears in the information signal in the first place. Ultimately noise does appear, however, and once it is in the signal it cannot be removed.

Digital signals on the other hand are not simply amplified when they become weak and noisy. Digital signals are *rebuilt*. The rebuilding process usually involves error detection and correction processes that are not possible for analog signals. This is the fundamental difference between digital and analog signals. When a digital signal becomes weak and noisy the receiving equipment is able to analyze the signal. By applying mathematical functions, the receiving equipment can determine if an error (cause by additive noise or signal fading) exists. If so, the

equipment can correct the error or request a portion of the signal to be retransmitted. Once the receiving signal is convinced that the signal has been correctly received, the information obtained is used to create an entirely new signal that is noise free and undistorted by path losses and fades.

Digital *error detection and correction* schemes are not perfect but they are becoming increasingly sophisticated. The level of accuracy of modern digital signal transmissions easily exceeds that of manual Morse code which has often been treated as the ultimate reference for weak signal transmission accuracy.

Next month I will look at ways in which digital signals encode analog and other information signals. I will then discuss some error detection and correction schemes that are employed in digital systems.

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## **Test Your Amateur Radio Knowledge-Part 1**

by Len Litvan KCØRSX

The following are from the FCC exam pool—Technician, General and Amateur Extra.

#1 - Which of the following is a prohibited amateur radio transmission?

- A. Using an autopatch to seek emergency assistance
- B. Using an autopatch to pick up business messages
- C. Using an autopatch to call for a tow truck
- D. Using an autopatch to call home to say you are running late

#2 - What is the approximate open-circuit voltage from a modern, well illuminated photovoltaic cell?

- A. 0.02 VDC
- B. 0.2 VDC
- C. 1.38 VDC
- D. 0.5 VDC

#3 - How are the capacitors and inductors of a low-pass filter pi-network arranged between the network's input and output?

- A. Two inductors are in series between the input and output and a capacitor is connected between the two inductors and ground
- B. Two capacitors are in series between the input and output and an inductor is connected between the two capacitors and ground
- C. An inductor is in parallel with the input, another inductor is in parallel with the output, and a capacitor is in series between the two
- D. A capacitor is in parallel with the input, another capacitor is in parallel with the output, and an inductor is in series between the two

Answers to Exam Pool Questions (Part 1):

#1-- (B) [97.113a3]; #2—(D); #3 - (D)

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## **Test Your Amateur Radio Knowledge – Part 2**

by Len Litvan KCØRSX

The following are from the FCC exam pool—Technician, General and Amateur Extra.

#1 - If the FCC rules say that the amateur service is a secondary user of a frequency band, and another service is a primary user, what does this mean?

- A. Nothing special; all users of a frequency band have equal rights to operate
- B. Amateurs are only allowed to use the frequency band during emergencies
- C. Amateurs are allowed to use the frequency band only if they do not cause harmful interference to primary users
- D. Amateurs must increase transmitter power to overcome any interference caused by primary users

#2 - At what frequencies does the human body absorb RF energy at a maximum rate?

- A. The high-frequency (3-30-MHz) range
- B. The very-high-frequency (30-300-MHz) range
- C. The ultra-high-frequency (300-MHz to 3-GHz) range
- D. The super-high-frequency (3-GHz to 30-GHz) range

#3 - For what portion of a signal cycle does a Class AB amplifier operate?

- A. More than 180 degrees but less than 360 degrees
- B. Exactly 180 degrees
- C. The entire cycle
- D. Less than 180 degrees

Answers to Exam Pool Questions (Part 2)

#1-- (C) [97.303]; #2—(B); #3 - (A)

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## **Ken and Delores Spittler celebrated their 50<sup>th</sup>**

Leslie Hittner, KØBAD

We had a great time at St. Matthew's Church on Saturday, July 10 at the 50<sup>th</sup> anniversary celebration of Ken and Delores Spittler (NØJP and NØNUO). Many WARC club members were in attendance as were several members of the Winona area "Red Hat Society."

Delores that was an absolutely *beautiful* wedding dress!

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## **BPL – a High School Student’s Perspective**

(As posted on the QRZ web SITE – Thanks to Matt Burt, KFØQ)

Reply Comments to the Notice of Proposed Rulemaking by Benjamin S. Gelb, KF4KJQ, a graduating senior at Thomas Jefferson High School for Science and Technology in Alexandria, Virginia.

Before the Federal Communications Commission Washington, D.C. 20554

In the Matter of Carrier Current Systems, including Broadband over Power Line Systems : ET Docket No. 03-104

Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems : ET Docket No. 04-37

To: The Commission

Reply Comments to Notice of Proposed Rule Making (04-37)  
Reply Comments to the Notice of Proposed Rulemaking by Benjamin S. Gelb

I have been a licensed Amateur Radio operator for eight years, completed multiple physics and electronics courses and have countless hours of hands-on experience experimenting with radio and electronics equipment. I am a graduating senior at Thomas Jefferson High School for Science and Technology in Alexandria, Virginia and will be attending MIT in the fall.

The following are reply comments to various comments on the NRPM (04-37) by Current Technologies and Ambient Corporation.

Current Technologies asserts that "Current Technologies implementation of BPL is noninterfering." I dispute Current Technologies' assertion that "Current Technologies implementation of BPL is non-interfering." There seems to be a great division between those who believe BPL will be a source of harmful interference, and those who do not. I contend this division is not a result of "misunderstandings about how BPL works" on the part of amateur radio operators and many other individuals and organizations but rather a misunderstanding of basic physics on the part of

both the Commission and Current Technologies.

Current Technologies states on page 14 that "Access BPL devices do not use power lines as antennas. They use power lines to conduct data

signals, not radiate them." I'm sure that Current Technologies' goal is to conduct signals rather than radiate them. Unfortunately, Current Technologies, no matter how much they wish to deny it, is bound by the same laws of physics as every one else. When an RF current is coupled into a conductor, that conductor will radiate. Period. This is because of the electric and magnetic fields created by the charge and current on the conductor.

In coaxial cable the fields are contained by a shield at ground potential. In balanced line, equal and opposite fields from correctly spaced parallel conductors mathematically cancel. Power lines have RF characteristics that are irregular and variable, and do not resemble either type of feed line. Therefore, BPL systems that couple RF to the power line will cause the power line to radiate. Period.

This has been shown to be true in the real world. A video<sup>1</sup> produced by the American Radio Relay League demonstrates actual received interference in four trial areas, one of which is operated by Current Technologies.

Because of the great disagreement between BPL promoters and those who stand to be impacted by the implementations of BPL systems, it seems that the Commission ought to be obligated to, at the very least, conduct some sort of real world testing of its own to determine the radiation characteristics of power lines. To date, no effort to validate the claims of either side has been made by the Commission.

So far, the Commission's attitude seems to be to accept the word of BPL manufacturers as fact, no questions asked, despite the fact that many statements made by BPL proponents and subsequently parroted by the Commission are embarrassingly nonsensical to someone with even the most rudimentary technical education (e.g. stating that the characteristics of a power line are "somewhere between a waveguide and an antenna" in the NPRM). Meanwhile, the Commission has dismissed actual testing and analysis conducted by many technically adept individuals, as well as organizations such as the ARRL, AMRAD, and the NTIA as "unsupported claims" that cannot "stand in the way of such an innovation as BPL."<sup>2</sup>

Current Technologies states that the debate has been "complicated further by the existence of several different technical approaches to BPL, each of which works differently."

Current Technologies seems to say that while some implementations of BPL may cause power line radiation, its own implementation does not.

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This cannot be for the reason addressed previously - all BPL systems will cause power line radiation - but assuming for a moment that Current has found a way around the laws of physics, it is clear that each of the "different technical approaches" to BPL needs to be addressed individually in the new rules, because even if Current Technologies' implementation may not cause interference, other implementations will. More curiously, no sufficient detail has been provided regarding the operations of ANY of the "different technical approaches" or what technical property gives Current Technologies' system the ability to prevent power lines from radiating. It boggles the mind to think that the Commission plans to implement effective new rules without evaluating such technical details.

1 ARRL BPL Video. [http://216.167.96.120/BPL\\_Trial-web.mpg](http://216.167.96.120/BPL_Trial-web.mpg)

2 The statement of Commissioner Adelstein on the NPRM. Current Technologies' assertion that "BPL bandwidth has no effect on interference" is incorrect.

This is not a matter of science, but one merely of common sense. A wider signal bandwidth means that BPL signals will occupy a greater set of frequencies. Therefore there are more frequencies where interference may occur. An isolated interfering signal of narrow bandwidth often does not constitute harmful interference because, while annoying, it can be easily avoided by simply moving to another frequency. A broad band BPL signal, on the other hand, could quite easily consume an entire BAND of operating frequencies, which are normally only a few hundred kHz wide in the HF range. There is a grave difference between a single narrow band signal and a broad band one like BPL.

In its comments, Ambient cites President George W. Bush's recent speech on broadband technology. "So how is some guy in remote Wyoming going to get any broadband technology? Regulatory policy has got to be wise and smart as we encourage the spread of this important technology. There needs to be technical standards to make possible new broadband technologies, such as the use of high-speed communication directly over power lines. Power lines were for electricity; power lines can be used for broadband technology. So the technical standards need to be changed to encourage that.

Ambient strongly supports the President's conclusion that '... technical standards need to be changed to encourage ...' the use of high-speed communication directly over power lines."

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Ambient supports the conclusion that "technical standards need to be changed," but what about that guy out in Wyoming? Ambient seems to have artfully chosen its words so it can later deny promises of rural broadband. This is because, as I explained in my original comments to the NPRM, Access BPL is no more viable in a rural area than cable or DSL service. For the benefit of the Commission, I have reproduced those earlier comments here (paragraph references refer to paragraphs in the NPRM).

Access BPL will not provide service to rural areas for the same reasons that cable and DSL are not available in rural areas. As is stated in paragraph 3, access BPL is a means of "last mile" delivery." A BPL signal can only travel a few thousand feet down a power line. Neighborhood distribution lines still must be connected to the Internet via fiber optic cable, as is outlined in paragraph 4. This is viable in an urban or suburban setting, where the number of potential customers can justify the cost of the fiber backhaul, but will not float in a rural environment. The Commission seems to subscribe to a misconception that the national power grid can be magically connected to BPL and turn every outlet in America into an Internet connection. This is not the case. A substantial amount of new infrastructure must be constructed in the area of BPL service, and therefore will not promote BPL in rural areas any more than other broadband technologies.

As the promise of rural service is the sole pretense for the Commission's blind rush to deploy BPL at all costs, perhaps it might behoove the Commission to consider BPL for what it really is and reconsider its motivation for promoting it so relentlessly.

Ambient states that it "believes that such coexistence of BPL with other critical uses of spectrum is a goal which can be achieved."

The coexistence of Access BPL with other critical uses of spectrum is not a goal to be achieved; it is a BEDROCK REQUIREMENT for operation under the non-interferences conditions of the Part 15 rules. Compliance to this condition must be demonstrated PRIOR to operation of Access BPL systems. To apply regulatory power in any other way would simply turn Part 15 on its head.

To quote from the Part 15 label on the back of a small electronic device on my desk, "this device may not cause harmful interference." This is a stark contrast from the interpretation of the rules regarding BPL, which goes something like, "BPL systems may cause interference, as long as some effort is made to correct said interference once it is identified by a party receiving interference." This is simply backward. The responsibility of

identifying and initiating corrective action for interference must not fall on the licensed user of spectrum. Access BPL equipment must be conclusively proven to be able to operate under non-interference conditions through a thorough, documented technical analysis. To date, no such analysis exists.

There is a growing body of evidence, however, that suggests that Access BPL systems cannot be implemented without causing interference. Technical analyses by AMRAD, the ARRL and the NTIA point to a severe interference problem. An official interference complaint<sup>3</sup> has been filed by E. Alan Crosswell, a resident who lives in the area of Ambient's BPL trial in New York.

In the interest of protecting licensed users of spectrum, the Commission must undertake some effort to more thoroughly evaluate the interferences risks of BPL. To date, no thorough technical analysis exists that suggests BPL can be implemented in a manner consistent with the noninterference conditions of the Part 15 rules, and many analyses, as well as real world observation and simple physics, suggest the contrary.

Respectfully submitted,

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Dues: \$25.00 per calendar year per license holder.  
\$30.00 per calendar year per license holder and members  
of the same family within the same household.

Dues should be sent to: Richard Kolter, Treasurer

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***Hamgram* is published monthly by  
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Monthly club meetings are held on the third Thursday. The submission deadline for the *Hamgram* is Wednesday of the week *prior* to that of the club meeting.

***Hamgram***  
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