

# Kilowatter

The voice of the KW Amateur Radio Club

December 2006

Since 1922

Kitchener-Waterloo Amateur Radio Club  
133 Weber St. N. Suite #3-138  
Waterloo, Ontario  
N2J 3G9

EDITOR: Dennis Tabbert VA3DLT  
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Web site: <http://www.kwarc.org>

## MONDAY'S MEETING

**Date:** Monday December 4th 2006  
**Time:** 7:30pm  
**Place:** RCAF Wing 404 Club. End of Dutton Dr. Waterloo. Off Weber St. N  
**Topic:** Our Annual Christmas Gathering and Treat Exchange

## UPCOMING EVENTS

<a href="#">Big Event 29 Flea Market and Hamfest</a> Niagara Peninsula Amateur Radio Club, Inc. Saturday, February 3, 2007, St. Catharines, Ontario ON	<a href="#">BARC Spring Flea Market</a> Burlington Amateur Radio Club February 24, 2007, Burlington, ON
<a href="#">IARC Eleventh Annual Flea Market</a> Iroquois Amateur Radio Club Saturday, April 7, 2007, Iroquois ON	<a href="#">Ottawa Amateur Radio Club 11th Annual Hamfest</a> Ottawa Amateur Radio Club, Inc Saturday, September 1, 2007, Ottawa (Carp) ON
<a href="#">December KWARC Meeting</a> Please bring a non perishable item for the food bank	<a href="#">Lunch Bunch Annual KWARC Christmas Luncheon</a> Friday Dec 15th, 11:30 am Transylvania club, 16 Andrew St. Kitchener, Ont.
<a href="#">Annual K.W.A.R.C. Field Day</a> Doon Pioneer Village June 23rd - 24th	<a href="#">Central Ontario Hamfest &amp; Fleamarket</a> Guelph ARC & Kitchener Waterloo ARC June 9, 2007, Fergus ON

### KWARC Directors 2006-2007

<b>President</b>	Bob Pelling	VE3XNB	885-9995
<b>Vice President</b>	Dennis Tabbert	VA3DLT	463-9641
<b>Past President</b>	Gord Hayward	VE3EOS	744-7205
<b>Treasurer</b>	Al Macdonald	VA3TET	741-0281
<b>Secretary</b>	Ben Sasiela	VE3ST	748-0445
<b>Director</b>	Tedd Doda	VE3TJD	634-5949
<b>Director</b>	Bill Riddell	VE3WFR	571-9875

### The Executive Committee Chairs

<b>Program</b>	vacant		
<b>Technical</b>	Tedd Doda	VE3TJD	634-5949
<b>Packet</b>	Tedd Doda	VE3TJD	634-5949
<b>Database Mgr</b>	Dave Schwartz	VA3DGS	884-3594
<b>Bulletin Editor</b>	Dennis Tabbert	VA3DLT	463-9641
<b>Edu. Co-Ord</b>	Ron Gimbel	VE3DBD	584-2009
<b>Chief Examiner</b>	Vern Stroud	VE3RVS	743-9342
<b>Auto Patch</b>	Ben Sasiela	VE3ST	748-0445
<b>ARES Manager</b>	Larry Gorman	VE3LGN	884-6782
<b>CANWARN Mgr.</b>	Bob Pelling	VE3XNB	885-9995
<b>QSL Manager</b>	Gord Gibson	VE3NQG	893-5148
<b>Inventory</b>	Ben Sasiela	VE3ST	748-0445
<b>Field Day</b>	vacant		
<b>Webmaster</b>	Dennis Tabbert	VA3DLT	463-9641
<b>Bereavement</b>	Marg Cassel	VE3RE	634-5139
<b>Flea Market</b>	Dennis Tabbert	VA3DLT	463-9641
<b>QCWA Rep</b>	Harold Braun	VE3DWH	884-2388

### KWARC Owned Repeaters/Nodes

Mode	Call	Freq.	PL	patch	Location
Voice	VE3KSR	146.970	131.8		Baden Hill
Voice	VE3RCK	146.865	131.8	Open	Mannheim
Packet	VE3KSR-0	145.010			Baden Hill
Packet	VE3KWQ	145.090			Waterloo
Voice	VE3IXY	224.340	131.8		Mannheim
IRLP	VE3RBM	444.875	131.8		Mannheim
Echolink	VE3SED	53.370	131.8		Baden Hill
Voice	VE3SED	442.200	131.8		Baden Hill
Special Events		147.510			Kitchener

### Other Area Repeaters/Nodes

Mode	Call	Freq.	PL	patch	Location
Voice	VE3ERC	444.700	N		Elmira
Voice	VE3KFM	442.000	Y	open	Kitchener
Voice	VE3RND	145.330	Y		Plattsville
Voice	VE3SWR	146.790	N		Cambridge
IRLP	VE3WFM	147.090	N		Waterloo
Voice	VE3WWW	146.835	N		U of W
Voice	VE3RSS	147.030	N	members	Acton
ULR Link	VE3BHR	447.075	Y		Baden Hill
Voice	VE3RKL	443.850	N		Guelph
Voice	VE3ZMG	145.210	N		Guelph
Packet	VE3VIQ	145.570			Guelph
TCP/IP	VE3MKY	145.570			Guelph
TCP/IP	VE3UOW	145.570			U of W B
Voice	VE3BAY	442.350	Y		Kitchener

## [Pres Sez Bob Pelling VE3XNB President KWARC](#)



Hello again. Welcome to the December issue of the KILOWATTER. I was shocked to learn of Gerry ORobko's VE3DYY Heart Attack. A Heart Attack is no fun; I know I've been there. Fortunately I

understand he is resting well and recovering in St. Mary's Hospital. All our best wishes go out to Gerry and his family for a speedy recovery.

On a happier note, I hope you all have your Christmas wish list into the Jolly Old Elf. Maybe this year you will find that ultimate super rig under the tree. Once again this year our December meeting will be a Social Gathering. Everyone is asked to PLEASE bring along a little something for the goodies table. As well PLEASE bring along a non-perishable donation for the K-W Food Bank. These donations will go to help out someone in the community less fortunate than us. Also bring along the significant other as well as the harmonics. Invite a close friend or too as well.

The snow (sorry about the four letter word) will soon be upon us. It is not too early to start getting ready for it both at home and in the family chariot.

It has been said the Antennas erected in

the bad weather tend to stay up, while Antennas erected in good weather come down in bad. Just some food for thought. Also coming soon is our annual show and tell. You still have time to dig out all those treasures gathering dust in the dark corners of the shack or elsewhere and show them off.

You might even find goodies to take to Fergus in June, after all, one mans junk is another mans gold. Also with June comes Field Day. It is not too early to start to think about and planning for Field Day. Get your bid for your band in early. Again we are confirmed at Doon for 2007. If you have any ideas as to a better location, please contact the executive. It is not too late to change our plans yet.

Dennis is always looking for contributions to the KILOWATTER. If you have any thoughts, ideas, tidbits or submissions to contribute, please contact Dennis VA3DLT.

Finally, on behalf of myself Bob VE3XNB, Bonnie VA3BLM and the entire KWARC executive, may you have a safe and Happy Holiday Season. Merry Christmas and Happy New Year.

73 de Bob VE3XNB

## [The SuperT E/H antenna Al Macdonald VA3TET](#)

Many of you are aware of efforts to make smaller efficient antennas for HF using short radiators (about a 1/16 th. of a wave length and shorter). The results of experiments prove that there is merit in the EH antenna approach, but why does it work????

After reading an article by Ken MacLeish (QST Nov 1992)-courtesy Bill Graham- my thinking on how short radiator antennas radiate has changed.

This is my interpretation of Ken's dissertation.

Lets imagine a stationary electron (think small). The static electric field (coulomb field) around the electron emanates in all directions. It is always present – even when the electron is not in motion. The

coulomb field does not contribute to radiation, but does however, account for the energy needed to start to move an electron from its normal position. All electrons have a constant drag when you try to move them. We must apply an additional force to overcome this “drag” before we can push these guys around. This is expressed as the free space impedance (377 ohms).

Now for the good stuff!!

I will not quote chapter and verse of all the established theories that apply, but will try to expand the understanding of some poorly understood phenomena of antenna radiation.

**The Fields:** *For the sake of the explanation* we will make a distinction between **magnetic/electrical** fields and their associated **radiation fields**.

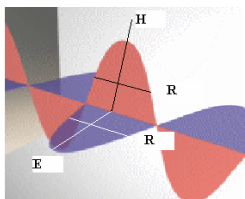
Lets vibrate an electron (overcoming it's [Coulomb field] natural drag) in a conductor by applying an alternating current. This causes two fields to be generated.

- 1) The dynamic magnetic field – a direct result of AC **current** flowing on the conductor and the intensity of this field is directly proportional to the current. The magnetic **radiation** intensity is a direct result of current magnitude.
- 2) The dynamic electric field. – This is an AC **voltage** driven field and its intensity is directly proportional to the amplitude of the voltage applied. The **Electrical** field is at 90 degrees to the magnetic field– (one of the established theories). The electrical **radiation** is a direct result of voltage magnitude.
- 3) The magnetic and electrical field energy always equal each other.

Radiation Fields - This is where it gets a little hairy

When an antenna is at resonance the current (**H**) and voltage (**E**) fields are in phase as in the drawing below - remember this for latter!!

If you look at the sine wave drawing you can see that sine wave has a **Horizontal** and **Vertical** component to it. The classic E field (Voltage amplitude) and H field (Current flow) are comprised of these components. Note that the “Radiation” [**R**] (horizontal components) are at right angles to the (**E**) & (**H**) fields. These are the **magnetic** and **electrical radiation fields**.



**What actually happens:**

**By definition**, the Electrical (**E**) and Magnetic (**H**) fields exist at right angles. If we create a large sine wave **E field**, the **horizontal** component of the sine wave **E** field is magnetic, and we obtain magnetic radiation. By the way, the opposite is also true. Create a sine wave (**H**) magnetic field and you will radiate an electrical field (the vertical component of the sine wave).

We usually transmit using a sine wave shaped wave- form (no harmonics). The law of conservation of energy dictates that if we reduce the current, we must increase the voltage accordingly to maintain energy unity. The E field energy and the H field energy reciprocate. These two fields

account most of the energy radiated. We will probably have some heat (resistance) radiated also. The magnetic component of the E field (The horizontal component of the sine wave) radiates magnetic energy. This is an indirect method of generating a magnetic field in a short radiator antenna.

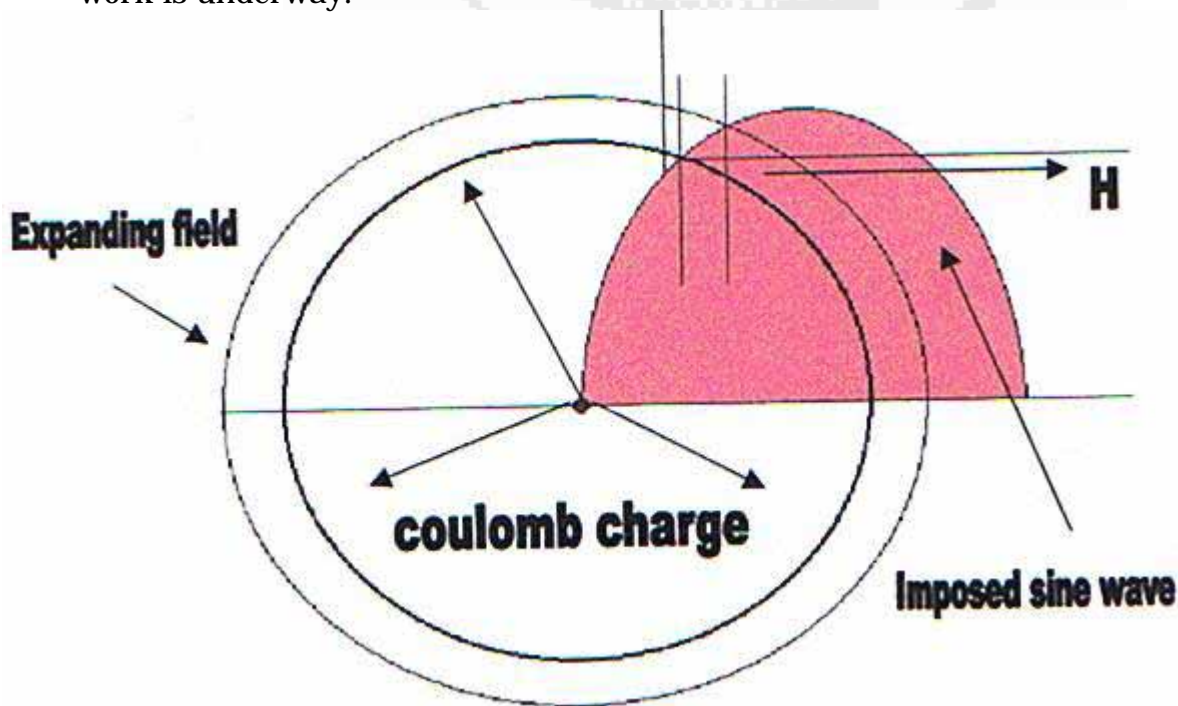
So in summary, a sine wave driven **E** field generates a magnetic field due to the horizontal components in the sine wave, and the consequence of generating a large E field is electrical **and magnetic** radiation.

Traditional antenna's are magnetic radiator predominate (current). Shortened radiator antenna's can be forced to be electrical field predominate.

How do we use these facts? - Manipulate the ratio of voltage (**E**)/(**H**) magnetic fields Create a high voltage and low current condition in the antenna where the current and voltage are in phase (resonance). You now have the conditions suitable for an efficient radiation system. A large magnetic field is being indirectly generated from the **E** fields horizontal components and adding to the existing magnetic field. Note: a non-resonant antenna will not have the current and voltage components in phase so they will tend to partially cancel each other and radiation efficiency will be reduced due to this out of phase condition. This is also true for **H** field radiation. E and H field energy will ultimately equal each other after all the transformations. As energy is radiated into free space, the amplitude of these fields diminish accordingly.

***Please be aware that electrical field radiation does not propagate farther than about a 1/6 of a wavelength from the antenna - not a valuable characteristic for amateur radio. By this distance the electrical field ( poor radiator) has been converted into a magnetic field and magnetic radiation accounts for most of the energy. Magnetic fields are responsible for most energy dissipation in antenna's. However, electrical fields are a major player in shortened radiator radiation.***

We are attempting to change the antenna to be E field predominate and less dependant on radiator length to gain performance. With very short radiators, (less than 10% of a wave length); the antenna has an omni directional radiation pattern similar to an isotropic antenna. Further work is underway.



## [Do you have a Kenwood TS-440S/AT? Is your meter bulb burned out?](#)

This article will take you by the hand and show you how easy it is to convert the standard 80mA 12 volt bulb to a high output LED (Light Emitting Diode). By following the text and pictures, you should be able to do the job in less than 30 minutes.

Before we get into the actual swap, you have to decide what colour of LED to use. I found that the bright white units are the closest match to the frequency display, but if you want to make your radio standout, blue, green, red and yellow are commonly available.

First, PLEASE make sure that the power plug has been disconnected! Working around a live radio will always produce other problems which will make changing the meter bulb seem trivial. Both the top and bottom cases have to be removed. If you can't do this by yourself, there is a basket weaving class starting at the local college next week :)

Once the cases have been removed, you will have to loosen the 4 screws which will allow the display unit to swivel down. These are on the side of the radio just behind the plastic faceplate. On all the units I've worked on, you just have to loosen them as the top two are slotted.



*Here I'm swiveling the front display down*

Next, to make life easier, the CW/VOX switch should be removed.



*Here is the switch before removal*



*After switch removed (note that the wires are long enough that the switch can be tied back out of the way.)*

Underneath the switch you will see the light bulb and rubber filter. I find it easier to first remove the bulb by pulling the two wires towards the right side of the radio. Once the bulb is out, grab the rubber filter and it should come right out. Save the filter as it will be used later.

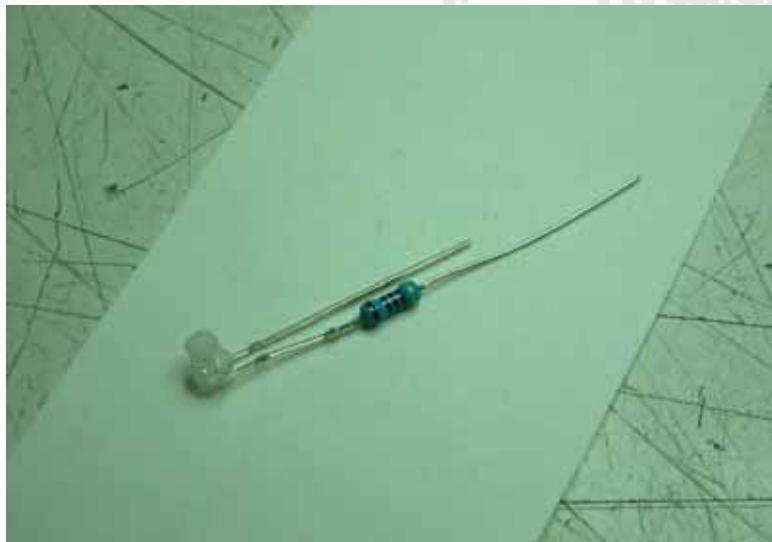
Next we will concentrate on the LED itself. When you buy an LED it will have a round lens on the "business" end of the diode. What you want to do is file this just enough so it's flat. What this will do for you is increase the beam width of the light. I usually start with a flat file, then use some 220 grit sandpaper. DON'T GO TOO FAR! Looking at the side of the LED, you can clearly see the cathode and anode connections within the plastic shell. Try and

stay about 1 mm away from these. While you are at it, roughen up the side of the lens with the sandpaper. You want to defuse the lens so that the light energy will be a soft glow.

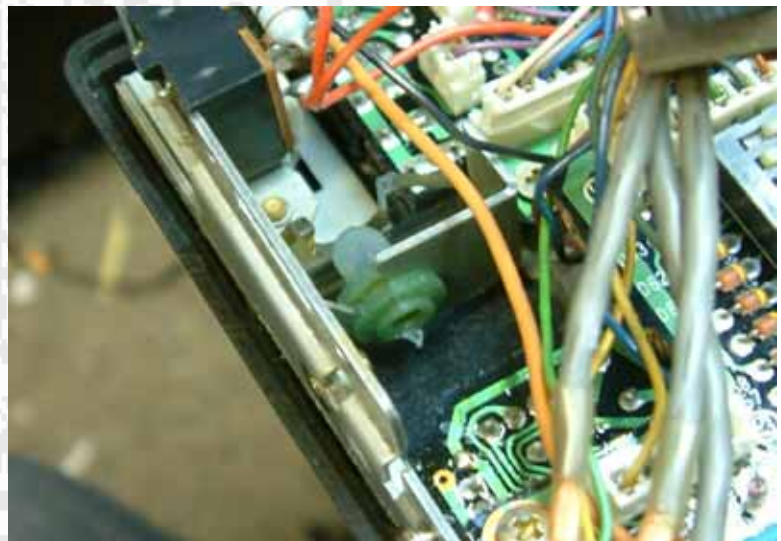


*Notice how rough the surface is!*

After the LED modifications are complete, bend the LED's leads so that they are at a right angle to the body. Also, because the original bulb runs off 12 volts, you will have to install a dropping resistor in series with the LED. The white LED requires 20mA of current and has a forward voltage drop of 4.5 volts (NOTE: different colour LEDs have different voltage drops). Using ohms law:  $R=V/I$  Where R is in Ohms, V is in Volts and I is in Amps



*LED bent with resistor soldered on. I shortened the anode lead before soldering the resistor in place.*



*Rubber filter*

V is equal to how much voltage the resistor must DROP. In this case  $14-4.5= 9.5$ . I always use 14 as the operating voltage because most cars will run at 14 to 14.2 volts while the engine is running.

So now we know V (9.5) and I (.020 amps). The rest is easy:

$$R= 9.5/.020 = 475 \text{ Ohms.}$$

As this is a non-standard value, use 470 Ohms. Another habit I got into was to install the resistor into the anode end of the LED. Why? I don't know. It will work equally well if connected to the cathode! For those of you who haven't played with LEDs much, the cathode (or negative) lead can be determined 2 ways. It's always the shorter of the 2 leads. But what if you've cut the leads already and don't know which one was the shortest? Without power applied to the LED, look straight down the business end of the led. You will notice that somewhere around the base of the LED there is a flat section. The lead on the same side of this flat is also the cathode.

At this point, go and plug in your hot glue gun so it will be ready for the next step. The following picture shows the complete LED assembly with both leads covered in heat shrink tubing. I also trim both leads to the same length. WHAT! How will I know which lead is positive and which is negative?? Remember my old trick of installing the resistor on the anode? Well, you can clearly see the resistor (by the big bump!) even with the heat shrink tubing in place.



*After the resistor is installed, cover both leads with heat shrink tubing and trim the leads to be the same length.*

At this point we have to modify the rubber filter taken out of the radio near the beginning. If you have a grommet with the same sized slot, you can use it, but

due to the fact that you will never have to change the meter illumination again, use the original. All that has to be done is to cut the dome from the filter, leaving just the grommet section.

Now, put the LED assembly through the grommet so that the middle of the lens is about 7mm from the grommet and put a bead of hot glue on both sides to hold it in place. The assemble runs cool to the touch so the use of hot glue is adequate. If you are leery about using hot glue, 5 minute epoxy would work as well.



Remember the old bulb? Cut the leads from it as close to the bulb as possible. Trim about 1/8" of the insulation off of both leads. Unlike bulbs, LEDs have to be hooked up so that the anode goes to positive and the cathode goes to negative. To find out which is which, I use the continuity tester of my digital multi-meter (some call this a diode tester). Ground one of the leads of your DMM to the chassis of the radio, and connect the other lead to each one of the old bulb leads. The one that shows a lower resistance to ground is usually ground (make power switch is OFF and still unplugged). You can't do any damage if you hook up the LED backwards ..... it just won't work!

*Complete LED assembly ready for installation*

sure the

On the TS-440, the positive leads runs to the power switch, so you can verify it that way.

After finding out which is positive, place some heat shrink on both of the power leads and solder the positive lead to the anode (the one with the resistor) and the negative lead to the cathode (the one without the resistor). Slide the heat shrink in place and contract (careful to not burn any other wires).



With all the hard work done, slide the completed assembly back into the metal rails on the back of the display unit, MAKING SURE that the business end of the LED is lined up with the plastic "light rail". This light rail delivers the light from the LED to the meter. Usually pointing the LED straight down works well.

*Completed LED assembly in it's new home!  
Tuck the wires so that they don't get pinched  
when you put the CW/VOX switch or the display unit back in place.*

Once this is completed, remount the CW/VOX switch and put the display unit back in place and tighten the 4 screws on side. You can test it now to make sure you hooked everything up properly. Once you have verified proper operation, reinstall the top and bottom covers.

So that wasn't hard, was it?

Was it worth it ..... YOU BETCHA! Just knowing that you should never have to change the meter bulb again makes it all worthwhile, not to mention that the colour looks great!

The next two pictures are before and afters.....



*Is there a radio in here somewhere?*

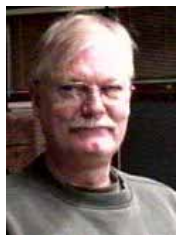


*All done! Notice how vibrant the colours of the meter are!*

Tedd Doda  
VE3TJD  
[www.ve3tjd.com](http://www.ve3tjd.com)

### [KWARC General Meeting Minutes Nov 6 2006](#)

Meeting called to order by President Bob VE3XNB at 7.50 Pm with 43 members and guests present



Dennis VA3DLT was asked to take the minutes as our secretary had an urgent family matter and could not attend.

Bob passed the microphone for individual introductions.

Bob introduced our guest speaker Bob Hammer VE3X00,  
The topic was "Toxicity of Pesticides"  
He talked at length on the LD50 of various pesticides and also common household items. The following is the definition found on the Google Website

*“LD stands for "Lethal Dose". LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals. The LD50 is one way to measure the short-term poisoning potential (acute toxicity) of a material.*

*Toxicologists can use many kinds of animals but most often testing is done with rats and mice. It is usually expressed as the amount of chemical administered (e.g., milligrams) per 100 grams (for smaller animals) or per kilogram (for bigger test subjects) of the body weight of the test animal. The LD50 can be found for any route of entry or administration but dermal (applied to the skin) and oral (given by mouth) administration methods are the most common.”*

The smaller the LD50 value the more toxic the chemical

He went on to explain that without pesticides, only 35-40% of our food supply would be left.

Our Pres Bob presented our guest with a certificate of our appreciation

50/50 Draw

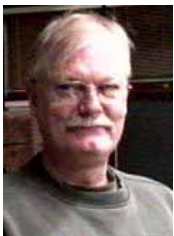
Dennis VA3DLT, Congratulations Dennis, won 50/50 Draw

Business Reports

Our treasurer noted that he submitted a financial report to the Kilowatt

### [KWARC Executive Meeting Minutes Nov 7 2006](#)

Meeting call to order at 7:40 PM at the Ratz Bechtel Funeral Home



President Bob Pelling presided.

Those present were:

Bob Pelling President

Dennis Tabbert Vice President

Al MacDonald Treasurer

Tedd Doda Director

Bill Riddell Director

Regrets:

Ben Sasiela Secretary

Gord Hayward. Past President

The agenda was very brief with a motion on the floor to continue getting our coffee and donuts from Tim Hortons, since no one has taken over the coffee job. Tedd will pick up a 40 cup urn and donuts. Tedd was thanked for helping out.

Carried, all in favor

It was decided to cut back the number of Kilowatt's printed to 7 copies as more members are opting to read it on the website.

Motion to adjourn Bill, seconded by Tedd

Minutes taken by Dennis Tabbert



*"Your home is probably the most important investment and the single largest piece of equity you own. That's why I know you would want to deal with a person who puts your interests above all else. In dealing with changes in your Real Estate ownership, Buying, or Selling, call VA3MRJ for professional Real Estate service."*

**David Johnson**, Sales Representative  
Coldwell Banker Peter Benninger Realty  
508 Riverbend Drive, Kitchener  
742.5800 ext. 2169  
David-Johnson@coldwellbanker.ca



**PETER BENNINGER REALTY**



*KWARC Membership Renewal*

Please cut out the following renewal form and enclose it with your payment as your renewal date comes due. When you enter the birthday information; just your month and day are needed.

<b>PLEASE MAIL TO:</b> Kitchener-Waterloo Amateur Radio Club 133 Weber Street North, Suite #3-138 Waterloo Ontario N2J 3G9	
<b>First Name</b>	<b>Call:</b>
<b>Address1:</b>	<b>Last Name:</b>
<b>City:</b>	<b>Address2:</b>
<b>Postal Code:</b>	<b>Email Address:</b>
<b>Phone Number: ( ) -</b>	<b>Birthday: ___ Month ___ Day</b>
<b>This is a [ ] RENEWAL or [ ] NEW APPLICATION</b>	<b>Kilowatter Preference [ ] MAIL [ ] From WEB</b>
<input type="checkbox"/> Full Membership @ \$20.00 <input type="checkbox"/> Family membership adder @ \$5.00 <input type="checkbox"/> Seniors Membership @ \$10.00 <input type="checkbox"/> Student or Challenged individuals @ \$10.00	<input type="checkbox"/> Associate (non voting) @ \$10.00. I am a member of the _____ Club. <input type="checkbox"/> Printed Kilowatter Newsletter "Mailed" @ \$8.00
<b>Comments:</b>	
<b>Total Amount Enclosed: \$</b>	<b>Your Cheque Number :</b>

 <p><b>INFORMATION GATEWAY SERVICES</b></p> <p>Kitchener-Waterloo Cambridge and Guelph</p>	<p>Information Gateway Services (Kitchener-Waterloo) Inc. 151 Frobisher Dr., Suite E-118, Waterloo, Ontario, N2V 2C9</p> <p>Owner Operator : Don Sinclair VE3ICD</p>
<p>Information Gateway Services (IGS) provides a complete range of Internet services ranging from entry level personal accounts for beginners, right up to the requirements of large commercial organizations.</p> <p align="center"><b>SPECIAL OFFER TO KWARC MEMBERS</b></p> <ol style="list-style-type: none"> <li>No activation fee on standard personal accounts for KWARC members. A \$25.00 saving</li> <li>\$50 per six months or \$75 per year paid in advance for 5 hours/month --- (extra hours at \$2.00 per hour). OR \$15/month \$150 year for 30 hours/month (<i>this popular package has just been increased from 20 hrs</i>)</li> <li>N E W . . . . Now get <b>UNLIMITED FREE</b> time from midnight until 7am</li> <li>One free KWARC e-mail address <i>urcall@kwarc.org</i> for KWARC members <i>No coupons or other discounts can be used in conjunction with these special offers to KWARC members ONLY.</i></li> </ol> <p align="center"><b>For complete details, call Don Sinclair VE3ICD at 884-7200</b></p>	