

HOT BANANAS

Oakville Amateur Radio Club

February / March 2004

VE3HB



Meetings: The Oakville Amateur Radio Club meets on the second Monday of the month at 7:30 p.m. from Sept. to June at the Red Cross, 167 Navy Street.

Breakfast: We also meet for breakfast at 7am most Saturdays at *Angel's Diner*, at 369 Speers Road.

Coffee: Finally, we meet at Friday 10:30 a.m. for coffee at Tim Horton's on Cross Road.

Please join us at all these meetings: All current and future radio amateurs are welcome!

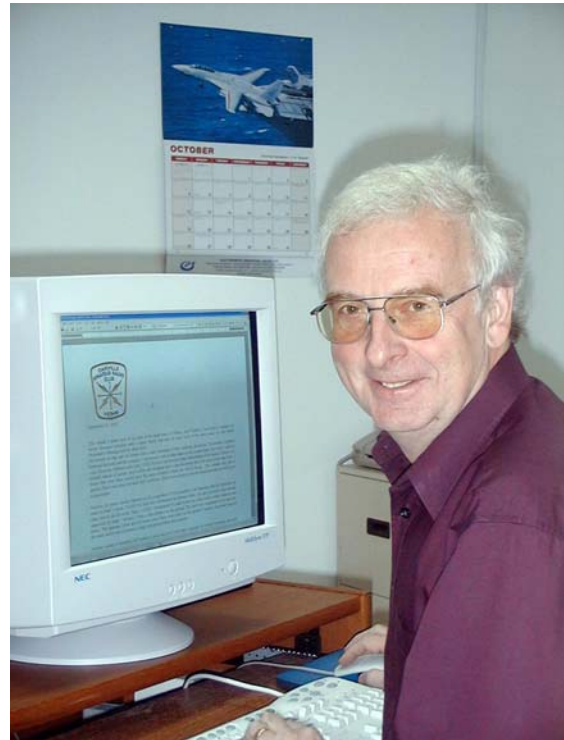
VE3OAK - 147.015 +.600 (131.8Hz CTCSS)
VE3OAK - 444.325 +5 MHz

NET: Mondays at 7:30 pm (except meeting nights and holidays) on 147.015 VHF.

www.oakvilleamateurs.net

President's Message

I know, I know, Hot Bananas is late again. I apologized in my February President's Message and I think it would be just as appropriate to do it again. Sorry!!



Well, as I mentioned last month, our editor Michael, VA3MVW is very busy with his business endeavors and there is no spare time left in his busy life for some other duties. No hard feelings, but I had to find substitution. So, I picked up the phone and right away I was quite lucky. Ian, VE3ESH agreed to step in and do the editing job of Hot Bananas 'till the summer issue. You should have seen the smile on my face!

Now we will need interesting articles from the club members to publish. If you have an interesting story

somewhere in the drawer, dust it off and send it to me for publishing (ve3okd@rac.ca). Why to me? In order to help our new editor, I agreed to collect the articles and then give it to Ian to assemble it neatly into the bulletin.

March, so far, was quite a busy month. At the beginning of the month, competitive team of our club (Peter, VE3HG; Harry, VA3EC; Greg, VA3GGF; Ian, VE3ESH, VE3RZ; Tony, VE3JAQ; Dennis) was involved in yet another contest. The results are not published yet, but the idea is the same as the original Olympic games motto. It is not important to win. It is important to participate.

Program of annual meeting for this month was advertised well in advance and I have to say it was good! Peter Shilton, VE3AX is a very good speaker and the topic he selected for his presentation – VHF/UHF signal propagation, was worth every minute we were listening to him. After all, 2 meter is the most popular frequency, so why not to learn something new and exploit the communication possibilities to its full extend. I hope we will be able to invite Peter again in the near future. At this point I have to raise the same old complaint. Attendance to the meeting was, how shall I put it politely – abysmal.

Just a couple of days after the meeting, members of the club and many visitors had a chance to see the memorabilia collection of Gren Schrader, VE3GLS. Gren had dusted off his basement museum and put it on display in the hall of Anglican Church. I have to praise him again. The amount of work he put into the preparation of this show is immeasurable. It is literally the labor of love. Love, for the technology and memories slowly fading away. Morse keys, railway telegraphs, pictures and books on display were just part of the show atmosphere. Talking to the people who were using this technology during their working years was another pleasure. Gren invited a couple of them to share the memories.

For all of you, who missed the show or those who want to refresh your memory, visit the club's web site photo gallery at www.oakvilleamateurs.net and see for yourself.

Now back to the future. Those of you, who were present at our club meetings noticed, that visitors from the Mississauga and Burlington clubs are coming to visit us. I have attended a couple of meetings in Burlington and I enjoyed every one of them. I would like to encourage all members of our club to visit the neighboring clubs and make new friends. At the

beginning of this fiscal year I sent a letter to the presidents of these clubs, offering an "Olive branch" as a symbol of cooperation. We are trying to work together and we have to do it actively. After all, you can find out all information about the club programs at our web site or directly at the www.barc.ca or www.marc.on.ca

The date for April meeting coincides with Easter Holidays, so the plan is to move the meeting to the FIRST MONDAY, April 5th, 2004. This time we will not have any official speaker. We are planning a discussion club meeting. If there is something on your mind, bring your soapbox, stand up on it and tell us. Should it be a technical issue or something related to the club organization. Keep in mind, all suggestions are appreciated.

Plans are also slowly emerging for this year's Field Day. I heard some discussion at the Saturday breakfast gathering, that this year's Field Day operations will be organized in the "boonies" at Mike's farm. (VE3QSK) Volunteers and radio operators will be needed.

First, we should get rid of all that snow, get in the spring mood and wait for the good weather. We will need it for the installation of new antennas.

Until then

73, Denny
VE3OKD

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CQ CQ CQ

Executives & Coordinators

| | | |
|----------------|----------------|--------|
| President | Denny Zidek | VE3OKD |
| Vice President | Brian Kremer | VE3DNF |
| Secretary | Greg Foster | VA3GGF |
| Treasurer | Carvell Pelkey | VE3CPQ |
| Membership | Russ Schwandt | VE3JUJ |

CLUB COORDINATORS:

| | | |
|---------|--------------|--------|
| Program | Denny Zidek | VE3OKD |
| | Brian Kremer | VE3DNF |
| | Doug Smith | VE3RG |
| | Ian Amos | VE3ESH |

| | | |
|-----------------------|---------------|--------|
| Emergency Coordinator | Rick Harrison | VE3YRH |
|-----------------------|---------------|--------|

| | | |
|----------------------------|------------------|--------|
| Regional Emergency Liaison | Russ Schwandt | VE3JUJ |
| | Jack Livingstone | VE3ITM |

| | | |
|----------------|-----------------|-------|
| Help Committee | Harry Kosterman | VA3EC |
|----------------|-----------------|-------|

| | | |
|--------------------|-------------|--------|
| VHF Net Activities | Denny Zidek | VE3OKD |
|--------------------|-------------|--------|

| | | |
|-----------------------------|-------------------|--------|
| Repeater Programming/Maint. | Greg Foster | VA3GGF |
| | Gary Hetherington | VE3TGH |
| | Harry Kosterman | VA3EC |

| | | |
|---------|-----------------|--------|
| Website | Michael Willems | VA3MVW |
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|---------------|-----------------|--------|
| Club Bulletin | Michael Willems | VA3MVW |
|---------------|-----------------|--------|

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|---------------------------|------------------|--------|
| Training-Basic & Advanced | Jack Livingstone | VE3ITM |
|---------------------------|------------------|--------|

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| Examiner | Jack Livingstone | VE3ITM |
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| Equipment/Shacks | Mike Brown | VA3GRL |
| | Jack Livingstone | VE3ITM |

Editor's Note

Welcome to a double issue of Hot Bananas, which will include items collected from February and March. As you are aware Michael has been very busy at home and work and has been pressed for time to work on Hot Bananas, so I have volunteered to help out for a couple of months until Michael's life calms down a bit. The volunteering stuff was Denny twisting my arm around my back until I said yes.

All kidding aside, I was rushing to make the end of the month deadline for the bulletin, so I have changed a few things but tried to keep the look and feel of the bulletin the same.

Also, to help out I have written a series of articles on propagation, and you guessed it the first one is in this issue.

Hope you enjoy the bulletin

73s

Ian, VE3ESH

Hot Bananas is published 10 times per year from September to June and is distributed to all members of the OARC. Articles may be reproduced without additional permission provided credit is given to *Hot Bananas* and the Oakville Amateur Radio Club. Submit story ideas, feedback, comments, articles or artwork to va3mvw@oakvilleamateurs.net or mail to:

Hot Bananas

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Publisher:

Oakville Amateur Radio Club
President Denny Zidek, VE3OKD

President's Message

(from the month of February)

The first half of February is behind us and I am struggling to find the time and write the President's Message. Also, last month the bulletin was delayed, because Michael's travel and business engagements kept him out of his office and away from his editor's work. So, even though I owe you an apology for all those delays, I will also say, that those few people, who are involved in running the club affairs have only 24 hours a day to do all the work. Please be patient.

You know that old true adage – either drought or deluge. And so it is with organizing the program for our meetings. For the February meeting, I promised the presentation by long time Canadian

Railway Morse communication operator Gren, VE3GLS. The planned presentation has been moved to March and suddenly I was sitting empty handed in front of my computer. Well, plan B was put into action. Plan B means that I do not have any plan and I better start sending e-mails or calling around – fast.

I was lucky. My first e-mail was to Peter, VE3HG and bingo! Peter agreed to talk about the contest software and immediately started to put the plan together. Those of you, who came to our club's regular meeting, have experienced an interesting and entertaining program. The technology is advancing fast and there is nothing better, than seeing and hearing how the computer can extend the performance of the radio. Peter set-up his older receiver with a notebook computer to show us different versions of PSK31 and a whole list of digital communication software. In the second half of the presentation, Harry, VA3EC had a hands-on "show and tell" about Write Log software. This is truly sophisticated contesting software, with lots of options and specific functions. The amount of information presented, might have been a bit too much for an inexperienced ham operator, never the less everybody gained some valuable information. Thanks guys, it was good.

Now, to the future!

In March we will have two presentations. First, for our regular meeting on March 8th I invited Peter Shilton, VE3EX to talk about the signal propagation on VHF/UHF frequencies. A high percentage of club members are mainly using these frequencies and better knowledge of the principles of propagation will help them communicate on longer distance. Peter is also

involved in research of EME (moon bouncing) communication. So, if people in the audience will be interested and time permits, Peter will be ready to talk about this subject as well. This sounds like a very interesting meeting.

The second presentation, originally announced for February, was prepared by Gren, VE3GLS. Gren was a telegraph operator for Canadian Railways and his experience and above all his collection of Morse keys and other memorabilia is definitely worth of seeing. This show will be on Saturday, March 13th, 2004 at St. Luke's Anglican Church in Palermo - Junction of HWY 25 & 5. Time is 1 PM to 4 PM. Detailed information about this event is on another page of this publication.

Not very often is there such an occasion to see this antique equipment working and the opportunity to talk to the people, who are – considering their life experience and knowledge – rare and valuable antiques as well.

This month I was invited to the Burlington Radio Club's meeting. This time the meeting was in a different location than usual. We met at Burlington's Salvation Army building. Our friends to the west have similar problems with their permanent address as we have and they are looking for a solution. That is prompting me to inform you about our situation. I requested the information about the building situation last month. Our liaison person with the Red Cross, Rick VA3NV sent me an e-mail stating that we can stay in our present location for an undefined time. So, I assume we will hopefully complete this fiscal year of our club without the hassle of moving.

The last item on my list for this issue of the President's Message is not exactly related to our club activities, but should be important to ever ham radio operator.

All of you probably know the acronym BPL – Broadband over Power Line. If I can simplify - it is a technology, where some companies are trying to distribute an Internet signal and other commercial signals over the power line. This technology, as much as we are assured about the opposite will pollute short wave radio frequencies with high level of noise. ARRL and RAC are leading the fight against the spread of this technology. Well, now it is up to us, to join the ranks of RAC members and support this cause. Think about that! I am not trying to exaggerate.

Enjoy the winter with your radio, in your cozy shack. Spring is just around the corner!

73, Denny VE3OKD

HF Propagation Part 1 - Understanding the Basics

By: Ian S. Amos, VE3ESH

Introduction

When someone starts to talk about propagation most people just nod their heads and say “yes” or “that sound about right”. Most hams know that the sun is a very complex nuclear reactor that is hard to understand. And of course there is the ionosphere with all of its different layers D, E, F and F2, with refraction and ionization, so who really knows. Well, like many technical things if you do not understand the basics you are lost from the start.

Understanding propagation is one of the key elements of communicating by radio, particularly when the sunspot cycle is trending down.

I remember well, in years gone by, you jumped on a band and listened and if it was dead, you had three choices:

- 1) Give up,
- 2) Change bands and try again, or
- 3) Call CQ.

Many gave up or just listened, but if you knew that an opening was possible because you understood propagation better, you might just call CQ. I used to call CQ on 10 and 15 meters all the time, and I was frequently amazed at the stations that would call back. I worked some of my best DX this way, as you could actually have a good long QSO, and get to know these rare (and sometimes not so rare) hams. On the other hand, if no opening was possible, I would call until frustrated, which was not a good thing either. Since then, I have learned about propagation to help me communicate smarter and better.

Now, with the availability of the Internet, all of the solar and ionospheric data is being posted in real-time, we can take advantage of this data to get better at predicting propagation. Therefore, to predict propagation, all you really need, is just the “Basics”.

The Basics

To understand propagation better you need an understanding of four main things. These are:

1. The Ionosphere,
2. Solar Radiation (Solar Flux),
3. The Earth’s Magnetic Field (Geomagnetic Activity) and,
4. An understanding of how these three inter-relate.

1) The Ionosphere

The ionosphere is the region of the upper atmosphere that is responsible for effecting radio communication. It is located approximately 40 miles above the earth’s surface (the “D” layer) and ends at approximately 250 miles above the earth’s surface (the F2 layer). We describe the ionosphere as a series of layers, because each layer has a different effect on propagation. Propagation is effected by the level of ionization in each layer and the level of ionization is determined mainly by solar radiation. Ionization occurs in the ionosphere because air pressure is low enough to allow electrons to be bumped from an atom and to then move freely for longer period of time before they bump into another atom and recombine into a neutral atom. It is these free electrons that radio waves are bent (refracted) against. As the level of ionization increases, the more a radio wave is bent. If the level of ionization is

high enough, the radio wave will bend enough to be returned to the earth's surface (See Figure 1). Remember that lower frequencies, bend easier than higher frequencies, so as ionization increases the more radio waves will be bent back towards earth.

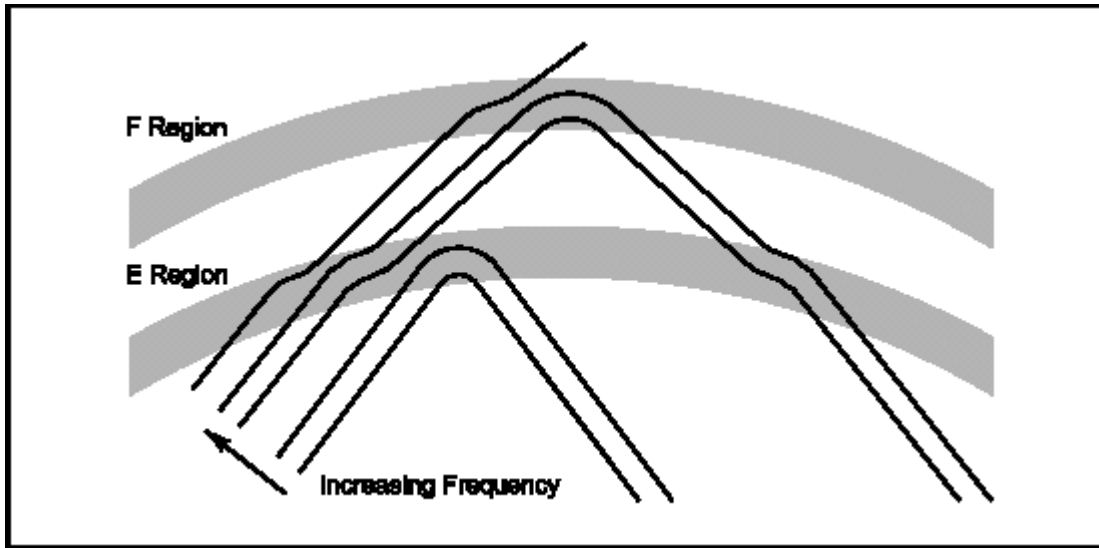


Figure 1 – Radio Waves traveling through the ionosphere will bend depending on the Amount of ionization and the frequency

The maximum useable frequency (MUF), is the highest frequency that a radio wave will bend enough to be returned to the earth. Therefore, as ionization increases, so does the MUF. Ionization continues to increase as the sun rises in the sky because of the increased solar radiation and falls as sunset approaches. This is the reason why 17 through 10 meters are better in the daytime than at night. Also note that, radio waves bend on their way up through the ionosphere as well as on the way down. The amount of bending determines the distance between hops or skips of the signal. The wave may continue to follow this pattern for multiple hops making long distance communication possible. Remember that with each hop or skip, the radio wave's strength decreases until it is unusable.

2) Solar Radiation

High Frequency (HF) band conditions are constantly changing because of varying levels of ionization, which occurs mainly because of solar radiation. The levels of ionization are dependant on time of day, time of year, but most importantly the solar cycle. The sun emits a constant stream of radiation that rises and falls with the solar cycle. Also, sunspots and solar flares give off large amounts of additional radiation, which further increase the amount of ionization in the ionosphere.

Solar Flux is a measure of how much radiation is being received by the earth from the sun and is measured in Solar Flux Units (SFU). The solar flux is measured in Canada every day and is related to the amount of ionization in the ionosphere. This co-relationship between radiation received and ionization, gives a very good indication of how HF propagation will be. The solar flux number can vary typically from 50 to 300, with a low number (usually less than 100) means poor HF propagation and an SFU of 150 or greater will mean good propagation particularly on the higher HF bands. An SFU of 200 or greater is usually measured at the peak of a solar cycle. SFU of 300 or greater will be seen for only short periods of time and are usually during solar storms.

The three main sources of solar radiation are: 1) the general radiation from the sun itself, 2) sunspots, and 3) solar flares. Sunspots are caused by extremely intense magnetic fields breaking through the sun's surface. After the

surface is broken, a large amount of magnetic particles are ejected from the surface, causing the spot to form. Sunspots usually occur in pairs (or groups), which are made up of 2 sides, one positively charged and the other negatively charged. The sunspot continues to emit magnetic radiation until the magnetic field disturbance subsides. As the magnetic disturbance decreases, the sunspot slowly fades. Solar flares can also happen at anytime throughout the solar cycle and if they are pointed at the earth they will create disturbances in the ionosphere. A solar flare usually occurs near sunspots, along its dividing or neutral line. A solar flare occurs when built up magnetic energy, stored in the solar atmosphere is suddenly released. If this sudden increase in radiation is large enough, an ionosphere storm will occur. These storms can range from minor to severe, and if severe enough it can cause a total radio “black out”.

Also, note that a higher amount of solar radiation takes several days of increased values to actually improve ionization and hence improve propagation. This is also true of a decreased amount of solar radiation. As you can see the ionosphere reaction to solar radiation is a key factor in our ability to communicate on the HF bands.

3) Geomagnetic Activity (A & K Numbers)

The earth’s magnetic field is constantly changing and is referred to as “Geomagnetic Activity”. There are 2 main indicators of the level of geomagnetic activity, and they are the “A” and “K” indices. These two indices give an indication of the severity of magnetic fluctuations, which in turn, relate to how disturbed the ionosphere is. The more disturbed the ionosphere gets, the worse HF propagation will be. The magnetic disturbance is measured through out the day at various observatories around the world. The largest number is selected, and then the “K” index is calculated for the day. The “A” index is a daily average of the earth’s magnetic field values. The magnetic disturbances can be local in nature to the observatory, so all of the “K” and “A” values are averaged from all of the observatories around the world to give the “Kp” and “Ap” or the planetary values. Table 1 shows the relationship between the two indices.

| Table 1 – Relationship between The A and K Indices | | |
|--|---|-------------------|
| A | K | Definition |
| 0 | 0 | Quiet |
| 2 | 1 | Quiet |
| 3 | 1 | Quiet |
| 4 | 1 | Quiet to Unsettle |
| 7 | 2 | Unsettle |
| 15 | 3 | Active |
| 27 | 4 | Active |
| 48 | 5 | Minor Storm |
| 80 | 6 | Minor Storm |
| 132 | 7 | Severe Storm |
| 208 | 8 | Very Severe Storm |
| 400 | 9 | Very Severe Storm |

As the solar cycle rises towards its peak, geomagnetic activity also increases because of the increase in radiation. When this higher level of radiation hits the ionosphere, it can affect the ionosphere by creating ionospheric storms, which in turn will reduce HF communication across all bands. Therefore, the lower the K and A indices are, the better HF propagation will be.

4) The Inter-relationship of Solar Flux, the Ionosphere and Geomagnetic Activity

There is a delicate balancing act between the ionosphere and the earth's magnetic field. Each has their own internal activity, which in turn affects the other, as well as, solar radiation has a large affect on how they both react on a daily basis. Generally speaking as the ionosphere receives more solar radiation, HF propagation improves, but if radiation increases too much, an ionospheric storm will occur, reducing HF propagation. If the earth's magnetic field is quiet, HF propagation will improve. However, as the earth's magnetic field become active or disturbed, it causes disturbances in the ionosphere, which reduces HF propagation. Also, increasing solar radiation will cause the earth's magnetic field to become more active, particularly in the polar regions.

The bottom line is, a SFU of 150 for a few days will yield good solid HF propagation. The higher the "A" and "K" indices are the worse HF propagation will be and the MUF will decrease. A "K" value of less than 2 for a few days will also indicate good HF propagation.

Finding Solar Data (Web sites)

Use the Radio Amateurs of Canada site www.rac.ca and click on the propagation link.

Also very good website for all kinds of solar information and other related links is www.spaceweather.com, or simply search on solar indices to find other related web sites.

If you are an ARRL member, there are lots of great articles, etc. on propagation, as well as you can subscribe to the K7RA Weekly Propagation Report by e-mail. This report is loaded with propagation related information and is one of the best ways to stay on top of propagation conditions.

Summary

I have glossed over a lot of the detail to give a quick review of how to read and use the solar flux and geomagnetic indices. My next article will be HF Propagation Part 2 – Predicting Propagation. I will explain how to predict propagation, using a propagation software program by Sheldon C. Shallon, W6EL. This program will allow you to predict propagation from your QTH to any part of the world by using the basic solar data that was discussed in this article.

Acknowledgements for this Article

I would like to thank Tad Cook, K7RA for his "always" fantastic propagation reports from the ARRL and various QST articles for the charts and information that helped me prepare this article.

Stay tuned for more

73

Ian, VE3ESH

QRT by VE3HG



The February meeting of OARC featured a hands-on demonstration of ham-radio software. Because we're not experts we billed this as a demonstration and not an explanation. Harry, VA3EC; Greg, VA3GGF; and myself did a quick review of what is out there for ham radio. We set up a transceiver with an interface to a computer and a very simple receiver with audio feed split from the loudspeaker and plugged directly into a laptop computer. Unlike some demonstrations we've tried in the past, this one actually worked pretty good.

Ham-radio software can be divided into two categories of logging software and utility software. The logging software can be divided into two types: contest and non-contest. For the most part, we were familiar with Writelog (www.writelog.com) which is a commercial contesting program. It not only logs but can send and decode CW and RTTY. It can store and send CW, RTTY and voice messages from a computer's soundcard to the audio input of most transceivers. It can run a packet cluster in the background and show the stations on a band map which can be controlled via the rig's VFO. The band map can show stations worked, stations needed and multipliers all in different colours. This is pretty cool stuff. I used it the next weekend on the CQ WW WPX RTTY contest and it ran flawlessly.

A DOS-based logging program called CT (www.k1ea.com) is now available for free. This is another powerhouse contesting program and remains extremely popular. I've used it and it is lightening fast even on old computers. It's probably the way to go if your computer has less than 300 MHz in processing power.

Another new contest logging program N1MM (<http://pages.cthome.net/n1mm/>) is free and under development. A couple of the guys have tried it and liked it. None of us had tried any non-contesting logging programs but there's lots out there like DX4WIN (<http://www.dx4win.com/>) among others.

When it comes to digital modes many wouldn't be possible if it weren't for software. It seems like everyone has put together a PSK-31 software package. Some do logging as well as decoding. Of course we've all heard of DigiPan (see <http://www.qsl.net/wm2u/digipan.html> on how to run it and see <http://www.digipan.net/> for your free download) but there's zillions of others such as MultiPSK (see <http://www.storm.ca/~ve3iay/digisoft.html> which has lists of links to the digital ham-radio world), Hamscope, MixW and WinWarbler. For RTTY one of the best is MMTTY which is available for free. The MMTTY engine can be plugged into the Writelog program for a super RTTY contesting program.

One of the nice features of MultiPSK is its panoramic mode where it horizontally decodes about 20 lines of PSK-31 simultaneously. MultiPSK will also lock on and decode HF slow scan TV (look around 14.230 MHz and up for an undulating unmusical note). This is the program that I just plugged right into the audio-in plug on the laptop at the club demonstration. I didn't use an interface and it worked fine for receiving if I kept the audio input down to avoid overloading the soundcard. This isn't contesting software but it's really easy to use and understand.

The other site which has links to all the software mentioned here and more is www.contesting.com. Look under resources on the left side of the home page and open product reviews and look for ham-radio software (logging and other).

Check out the utility software which will do everything from connecting your computer to a packet DX cluster to updating your computer's clock to the time signal standard to showing you the sun's terminator as it passes across the surface of the earth. Some of this stuff is free or has a short evaluation period after which there is a small cost. Check out DX Monitor (<http://www.benlo.com/dxmon.html>) if you're into chasing DX.

This is the way of the future. Soon the ham radio station will come on a computer card which we'll plug into a computer slot and we'll run the entire station from the keyboard. Now if we could only figure out a way to miniaturize a three-element beam and 2-KW amplifier but that's a column for another day.