

# The Open Feed Line

A Publication of the Michigan Amateur Radio Alliance (MARA)

Volume 13, Issue 2 - Friendship, Community Service & Advancement of the Hobby - Apr - June 2004

## Upcoming Events

*By Jim ki8jd*

May 29<sup>th</sup> through 31<sup>st</sup> ---- Operation Care coffee stop at the rest area on southbound US131, just north of 10-Mile Road. This is a joint effort of MARA and GRARA. We need all the help we can get to make this event a success. If you can afford 4 hours of your holiday weekend to sign up for a shift, many people would certainly appreciate it. In addition, you may even enjoy the experience. You can check the MARA website to see if any of the available shifts fit into your schedule. MARA's web address, as well as much other club information, can be found on page 2 of this newsletter.

June 5<sup>th</sup> --- IRA Hamfestival in Hudsonville, preceded by the potluck dinner the night before. See the flyer on page 8 of this newsletter for more information.

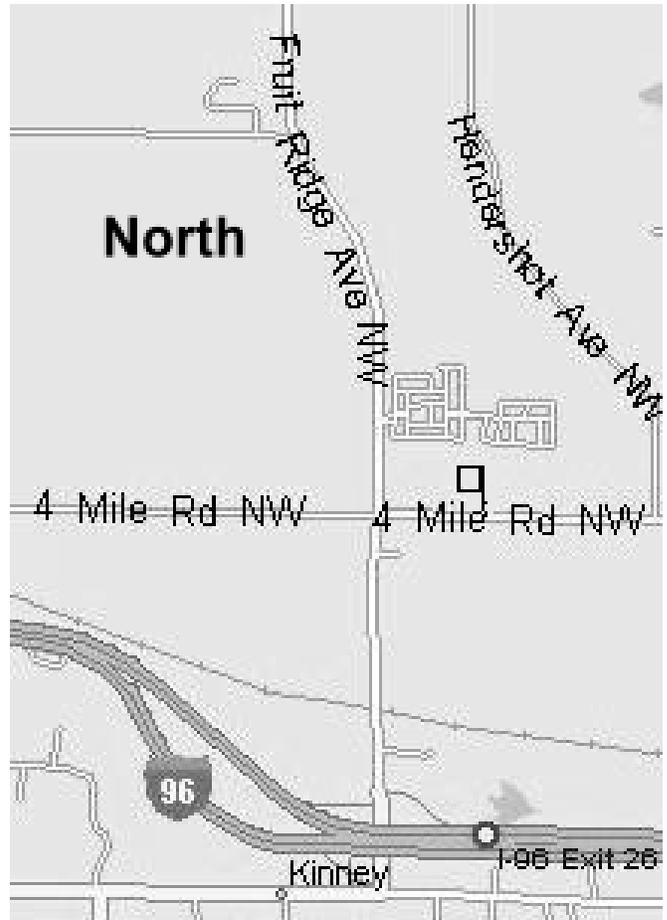
June 26<sup>th</sup> and 27<sup>th</sup> --- ARRL's Field Day. The actual event runs from 2:00 PM Saturday through 2:00 PM Sunday, with setup taking place Saturday morning, and teardown Sunday afternoon. Many clubs will be holding Field Day festivities in the Grand Rapids area, so get out of your cocoon, and enjoy some camaraderie with your favorite group.

MARA's Field Day will be held in the same place again this year, on the northwest corner of 4-Mile Road and Fruitridge. If you would like to operate a radio station, please say so. You don't even need a license.

July 3<sup>rd</sup> through 5<sup>th</sup> --- Operation Care coffee stop. Actual operating times have not been set yet, so I am just guessing. See the top of this column for more details.

## Field Day 2004

*By Richie K8JX*



This year, we're going to hold Field Day 2004 near the corner of 4-Mile Road NW and Fruitridge Ave NW. Take I-96 west to the 2<sup>nd</sup> exit past Alpine Ave. This is the Fruitridge exit. Go north (take a right) on Fruitridge Ave. about ¾ mile to 4-Mile Road. Take a right on 4-Mile and then a left into the first drive. We'll be holding Field Day in the large field on the NE corner of Fruitridge Ave. The drive is located just east of Fruitridge on 4-Mile Road NW. The driveway has large steel poles on both sides.

## **The Open Feed Line**

The Open Feed Line is published quarterly. It is the official journal of the Michigan Amateur Radio Alliance, or MARA for short.

MARA, an American Radio Relay League affiliated club, was created to provide opportunities for friendship, community service, increasing technical knowledge, and upgrading our skills in the hobby of Amateur Radio.

You may freely reprint any material in the Open Feed Line, but please credit the Open Feed Line, the original author, and the original publication, if given.

Everybody is encouraged to submit original articles on topics relevant to the hobby of Amateur Radio to the editor. The deadline for submission is the end of January, April, July, and October, and the newsletter will be published within the following month.

### **Publisher**

Michigan Amateur Radio Alliance  
Post Office Box 670  
Comstock Park MI 49321-0670  
Visit our website- <http://www.w8usa.org>

E-mail us at- [w8usa@arrl.net](mailto:w8usa@arrl.net)

### **Editor**

James M Cordes KI8JD  
1235 Morgan NW  
Grand Rapids MI 49504  
616-459-1195 or 459-5415  
E-mail- [jcordes@iserv.net](mailto:jcordes@iserv.net)

### **Editor's Assistant & Printer**

Richard M. Ranta K8JX  
812 Graceland NE  
Grand Rapids, MI 49505  
E-mail- [rranta@sbcglobal.net](mailto:rranta@sbcglobal.net)

### **Membership Information**

Annual dues to MARA are \$20. Family memberships are an additional \$5. Persons aged 70 and over - \$5.00. Membership is free to students under 21. Memberships expire on December 31<sup>st</sup>, and club dues are due on January 1<sup>st</sup>. MARA membership is open to all interested persons.

Please send change of address information and membership applications to the club secretary.

### **Great Lakes Award**

Send inquiries regarding the Great Lakes Award to the Awards Manager  
Larry Dells KC8KVR c/o  
MARA  
P.O.Box 670  
Comstock Park MI 49321-0670  
E-mail- [LLDGRD@netscape.net](mailto:LLDGRD@netscape.net)

## **MARA Club Officers**

### **President**

Wayne Dowling KB8VOZ  
2442 West Collier Ave.  
Kentwood MI 49546  
616-957-4641  
[wdowl26686@msn.com](mailto:wdowl26686@msn.com)

### **Vice President**

Larry Dells KC8KVR  
4317 Willow Dr. NE  
Grand Rapids MI 49525  
616-363-8235  
[LLDGRD@netscape.net](mailto:LLDGRD@netscape.net)

### **Secretary**

Richard Douglas KC8NKA  
3903 Oriole Ave. SE  
Wyoming MI 49509  
616-531-6218  
[kc8nka@arrl.net](mailto:kc8nka@arrl.net)

### **Treasurer**

Jerry Wittkoski W8MSK  
1025 Kendalwood St. NE  
Grand Rapids MI 49505  
616-363-6146  
[jeromeW551@aol.com](mailto:jeromeW551@aol.com)

## **Appointed Positions**

### **Awards Manager**

Larry Dells KC8KVR  
4317 Willow Dr. NE  
Grand Rapids MI 49525  
616-363-8235  
[LLDGRD@netscape.net](mailto:LLDGRD@netscape.net)

### **Club Trustee**

Richard Douglas KC8NKA  
3903 Oriole Ave. SE  
Wyoming MI 49509  
616-531-6218  
[kc8nka@arrl.net](mailto:kc8nka@arrl.net)

### **Membership Director**

Larry Dells KC8KVR  
4317 Willow Dr. NE  
Grand Rapids MI 49525  
616-957-4641  
[Wdowl26686@aol.com](mailto:Wdowl26686@aol.com)

### **Education Director**

James Cordes KI8JD  
1235 Morgan NW  
Grand Rapids MI 49504  
616-459-1195 or 459-5415  
[jcordes@iserv.net](mailto:jcordes@iserv.net)

### **Bereavement Director**

Jerry Wittkoski W8MSK  
1025 Kendalwood St. NE  
Grand Rapids MI 49505  
616-363-6146  
[jeromeW551@aol.com](mailto:jeromeW551@aol.com)

### **Field Day Chairperson**

Mike Eilers K8OOK  
3565 4-Mile Rd. NE  
Grand Rapids, MI 49505  
616-363-4998  
[k8ook@iserv.net](mailto:k8ook@iserv.net)

### **Operation Care Chairperson**

Wayne Dowling KB8VOZ  
2242 West Collier Ave.  
Kentwood, MI 49546  
616-957-4641  
[wdowl26686@msn.com](mailto:wdowl26686@msn.com)

### **Super Swap Chairperson - MARA**

\*OPEN\*

### **Webmaster -- Richard M. Ranta K8JX**

812 Graceland NE, Grand Rapids, MI, 49505 616-361-5975  
[rranta@sbcglobal.net](mailto:rranta@sbcglobal.net)

\* Some of these offices are still open. If you'd like to volunteer, contact one of the board members and let them know what your interested in. \*

## **Club activities**

MARA holds their weekly 2-meter Net, every Thursday, at 8 PM on the MARA W8USA repeater, 145.230 MHz -600Khz PL. 94.8. MARA holds their monthly meetings on the 2nd Wednesday of the month at 7:30PM, at the Steepletown Building, located on the SW corner of 5th street and Davis NW, in Grand Rapids. This site is handicap accessible, with additional parking on the West side of the building. All are welcome to attend our meetings.

## IRA Swap

*By Richie K8JX*

You know summer is here when the IRA holds their swap. Once again, they will be having their famous "Roadkill Potluck" on Friday night, possibly followed by an informal sing along. But you'll have to be there on Friday night to find out what that is about. Saturday is the swap, with V.E. exam at 10:30AM and the MIARC Repeater Council's meeting at 1:00PM. For more detailed information, see the attached flyer. "See you there!"

## SK N8HLM

*By Richie K8JX*

Roger A. Smith, N8HLM, of Belding, Michigan, passed away on March 16, 2004 from complications of diabetes. Roger was an Extra Class ham and a former I.R.A. Board Member who assisted for many years. For a while, Roger hosted and maintained the I.R.A. Belding link receiver at his home QTH. There are two other hams in the family, Matt, N8ILM and Julie, N8ILP. Deepest sympathy to the Smith family from the I.R.A.

## MARA's First Foxhunt

*By Jim ki8jd*

Chris KC8MIL came up with the idea that MARA should hold a foxhunt. It was a good idea, since foxhunts are both fun and educational. He had brought it up at a few meetings, and the membership also liked the idea. Chris did some research, and presented many ideas to the club. Wayne, our Prez, appointed Chris to the task of organizing this event.

To cut to the bottom line, the event was a great success. A good time was had by all, and almost all of us learned something.

Chris, the fox, wanted the hunt to be a challenge, and it certainly was! The hunt started a few minutes after 2:00 PM. Due to the challenge level involved, it took over 2 hours to find the fox.

*Continued on page 7*

## CW Abbreviations, Prosigns, etc.

*By Jim ki8jd*

*With all the renewed interest in CW, we've had requests for information on CW abbreviations, prosigns, etc.*

The following prosigns are sent as a single character (i.e. no space between the letters):

AR - means "end of message" or "over", often followed by station identification

AS - means "please stand by" used in case of phone call, spilled coffee, etc.

BT - indicates a break in the text, often used instead of a period, sometimes repeated as a filler while you sort your thoughts

DN - means "stroke", "slash", or "slant bar"

K - means "go", "go ahead", "any station transmit", or "over"

R - means "message received", sometimes repeated a couple times

SK - means "end of contact" or "signed clear, but listening"

AC - The latest character, maybe not even official yet, represents the '@' symbol, as in an e-mail address. (It has been many, many years since a new character has been added.)

The following prosigns are sent as either a single character, or as 2 characters.

KN - means "go only", and indicates that you do not wish a third party to break in

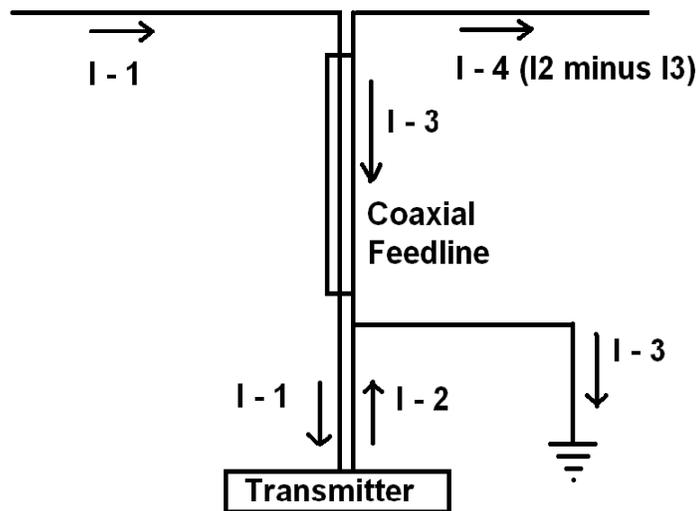
BK - invites the other station to transmit immediately, so you don't send anything after BK (often sent as single character)

CL - means "I am shutting off the switch, don't bother calling me"

CQ - (should be sent as 2 characters) means "calling any station", usually a 3X2 call is sufficient, such as CQ CQ CQ de ki8jd ki8jd

As far as abbreviations, there is a boatload of them, so we will only cover the most common. They are sent as 2 characters. You can even make up your own, simply by leaving out a vowel, or by spelling the word as it sounds. Example: WRK for work, WTTS for watts, SHUD for should, SUM for some, etc. It really comes quite natural with practice.

*Continued on page 6*



## Common-mode Current on Coax

By Jim ki8jd

(A few months ago, Gale N8GS loaned me a copy of *Reflections II*, written by M. Walter Maxwell. I finally got a chance to start reading it, and this article is a result. I should also mention that many ARRL publications were also used, including a few license manuals, *The Antenna Book*, *The Handbook*, etc.)

### ~Coaxial Cable (Coax)~

Most of us have seen the inside of coax, but did you know that coax actually has 3 conductors? When radio frequency electricity travels along any conductor, it only travels on the skin of the conductor (this is called "skin effect"). So here are your 3 conductors: the skin of the center conductor, the inside skin of the shield, and in some cases, the outside skin of the shield. Because of skin effect, the current on the outside of the shield is isolated and independent from the current on the inside of the shield.

### ~The Above Drawing~

At 7 MHz, all of the arrows in the drawing are changing direction 14 million times per second, so please don't get hung up on which way the arrows are pointing. The letter "I" is used to represent current. I-1 is the current on the center conductor, and also on one leg of the dipole. I-2 is the current traveling on the inside of the shield. I-3 is the current traveling on the outside of the shield, heading for ground. I-4 is the current on the other leg of the dipole, and is equal to I-2 minus I-3.

### ~Common-Mode Current~

It is difficult to determine the exact value of I-3, as it changes with the length of the coax, and with the operating frequency. In addition, the electrical length of the outside of the shield is difficult to determine, as is the exact path to, and location of, ground. If the path to ground for I-3 is an odd multiple of  $\frac{1}{4}$  wavelength ( $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{5}{4}$ , etc.) then I-3 will be very small and insignificant. If the path for I-3 is closer to a multiple of  $\frac{1}{2}$  wavelength, the amount of current will be substantial. In a case like this, one leg of your dipole is almost being "shorted-out". Published velocity factors do not apply to the outside of the shield, so it would be difficult for the average ham to trim the coax to minimize the current on the outside of the shield. This current flow on the outside of the coax is often called "common-mode" current. The current inside the coax is called "transmission" current.

### ~Effects on SWR~

If current is able to flow from the feed-point of the antenna to ground, then obviously the impedance at the feed-point will be lowered. This will cause false and confusing SWR readings. Often, it will be noticed that the SWR changes when you touch the meter. This is because your body is changing the path to ground for the common-mode current, thus changing the feed-point impedance, and the SWR.

*Continued on page 5*

## Common-mode Current on Coax

*Continued from page 4*

### ~Other Results of Common-Mode Current~

This current may flow right through your station. It can even flow on your power cords, and get into the house wiring, on its way to ground. As you might guess, this RF can cause interference to your computer, phone, TV, etc. Common-mode current is almost always unwanted and detrimental, however, there can be situations where it is accidentally beneficial. More often than not, it is a good idea to prevent common-mode current. This is especially true in the case of a beam antenna, where the radiation from the common-mode current can skew the radiation pattern of the beam. Baluns and gamma matches are examples of effective devices to prevent common-mode current resulting from feeding a balanced antenna (such as a dipole or beam) with unbalanced feedline (coax). It seems to me that a store-bought beam would have provisions to prevent common-mode current.

### ~Induced Common-Mode Current~

Common-mode current can also be induced. In the above drawing, the coax is at 90 degrees with respect to both legs of the dipole. Any common-mode current induced by one leg is canceled by the current induced by the other leg. In real life, however, the coax may leave the antenna at some other angle, which causes it to be closer to one leg than the other. With this asymmetrical situation, the outside of the coax couples with the closest leg, which can cause common-mode current to flow on the outside of the coax. Routing the coax perpendicular to the antenna for as much distance as possible can minimize this effect. Any device located at the feedpoint of the antenna will probably not prevent, or even reduce, induced common-mode current. However, a person could install a choke at the point where the coax enters the shack, to help prevent the flow of RF into the shack. Those snap-on ferrite chokes are quite effective, although several of them may be required.

### ~Baluns~

The word "balun" is short for "balanced-to-unbalanced". There are many different types of baluns, and whole books have been written about these devices. The easiest to build is the "choke balun", and is made by coiling up a few turns of the coax, to make an inductive coil. This coil impedes the flow of common-mode current, without affecting the transmission current. It also acts as a transformer, and tends to force equal currents into both legs of the dipole. The only drawback of the choke balun is that at frequencies below 14 MHz, they tend to be large and heavy. Frequency-specific designs can be found in the ARRL Antenna Book, but a coil of 10 feet of RG8X with 7 turns will work to some degree.

Another good option is the W2DU balun, which is made by sliding a few dozen ferrite beads over a short piece of coax. Specific ferrite materials are used, so if you use just any old beads, your results may vary. You can buy the W2DU balun pre-made, for about the same amount of money as the materials. The W2DU balun is smaller and lighter than the choke balun, and so is better suited for use at the feed-point of an antenna. This is also a current type balun, and as such forces equal currents into both legs. The W2DU balun is broad-banded, and so could be used on many different bands.

There are many other types of baluns, including voltage baluns, but I will not recommend them at this time.

### ~Conclusion~

To sum up, I believe that every coax-fed dipole should have a balun at the feed-point of the antenna. When I get around to it, I am going to order a W2DU balun (about \$25) from AES or The Wireman. They even offer W2DU baluns optimized for 160 meters, VHF, etc. The use of a good balun should keep the radiation on the antenna, where it belongs, make tuning much easier, and provide a better performing antenna. This is not to say that a coax-fed dipole without a balun won't work. It may work just fine. But then again, considering the facts given in this article, you have to wonder if it is worth fooling around without a balun.

## CW Abbreviations, Prosigns, etc.

*Continued from page 3*

Do not feel that you must use abbreviations; it is optional. If you don't use them, the other guy shouldn't either.

ABT - about  
AGN - again or please send again  
ANT - antenna  
BCNU - be seeing you  
BK - back  
BN - been  
BUG - semi-automatic key  
B4 - before (not used much)  
C - yes, often in response to QRL?  
CUD - could  
CUL - see you later  
DE - 'from' or 'this is'  
DR - dear (DX stations often use this to indicate affection, such as "dr Tom")  
DX - foreign station  
ES - and  
FB - fine business  
FER - for  
GA - go ahead  
GB - good-by or God Bless  
GE - good evening  
GG - going  
GM - good morning  
GN - good night  
GND - ground  
GUD - good  
HI - telephonic laugh (usually sent twice)  
HR - here or hear  
HV - have, also sent HVE  
HW - how  
LID - poor operator  
NR - number  
NW - now  
O - 'zero', (as in "50 watts) primarily used by those with automatic key. Compare with 'T', listed below.  
OM - old man (term of endearment)  
OP - operator  
PSE - please  
PWR - power  
RCVR - receiver  
RFI - radio frequency interference  
RPT - repeat

SASE - self addressed stamped envelope  
SIG - signal  
SKED - schedule  
SRI - sorry  
T - zero (as in 1TT watts) primarily used by those with straight key. It is sent as an extra long dash. Compare with 'O', listed above.  
TNX or TKS - thanks  
TU - thank-you (often used in contests)  
U - you  
UR - your, you're  
URS - yours  
VY - very  
WKD - worked  
WL - will or well  
WUD - would  
WX - weather (very common)  
XYL - wife  
YL - Young lady or any female  
73 - best regards or best wishes  
88 - love and kisses (I've never used this one!)

Well, I was also going to include Q-signals, but ran out of room.

Q-signals, when used properly, replace an entire sentence, or at least most of a sentence. However, it is fairly common nowadays to hear Q-signals used as nouns instead of as sentences.

There is even a whole set of special Q-signals that are used in CW nets, and they are called QN-signals.

## Q signals you have not heard on the air (yet)

*By Mike K800K*

QAC You send CW like a duck  
QBO See you at Bono's in the AM  
QIB Quibbling is for infants  
QIL No sunspots? Try quilting  
QIR Quirky operator  
QIT Quitting, QRM too bad  
QIZ Quiz me, I know everything  
QKI Thanks for the quickie (QSO)  
QUE Queer guy for the straight key

respectfully? submitted by K800K

# MARA's First Foxhunt

*Continued from page 3*

There were 4 teams, of 2 amateurs per team. The hilly terrain in northern Kent County provided us with many misleading signal reflections. Two of the teams found the fox. One team got sidetracked by a reflection, and followed it out of range. I'm not sure what happened to the other team.

Carl WA8AAT and myself arrived at Wabasis Lake about the same time as Jack AB8ND and Phil N8ITY. However, the winners were to be determined by the lowest number of miles driven. According to the guidelines that Chris had set, we knew the fox was hiding in a public place, less than 100 feet from a parking spot.

Wabasis Lake sets in the bottom of a large bowl, with steep hills all around it. This bowl was filled with RF as Chris transmitted. There is a large park at the lake. The 4 of us were down by the boat launch when I got the idea to put the homemade yagi away. I borrowed Carl's rubber duck antenna, and wandered off in a direction that seemed correct. As I looked up the hill, I could see part of a cave. "There he is", I thought. So up the side of that steep hill I went. I didn't want to rack up any more miles on my odometer, so I left Carl down at the bottom, with Phil and Jack.

When I got up there, I found that the cave was empty. I could see that a road ran past the cave, a little higher up the hill. It was still very difficult to figure out where the signal was coming from, so I tried removing the rubber duck, which seemed to help. I kept the hand-held, with no antenna, tight against my belly. I was careful to not change the position of the radio in relationship to my body. As I slowly walked along a footpath, turning my torso first to the right, and then to the left, I got the feeling that I was on the right path. Soon, I walked through a tiny little county park, which overlooked the lake from atop the hill. This park wasn't on my map, and I was unaware of its existence. At this point, I should have known that I was less than 100 feet from the fox, but I was at one with the machine. About 50 feet past the little park, I suddenly couldn't get a bearing on the signal. As I stood there, spinning in circles, I finally got the idea to turn the volume down on my hand-held. I am a little hard-of-hearing, and I had the volume cranked up so that I could hear any hiss on Chris's signal. As soon as I turned the audio down, I could hear Chris's voice just to my left.

It sounded like he was about 6 feet away, but I couldn't see him with my middle-aged eyes. Chris was having a hard time containing his laughter, and all of a sudden, I saw the ground move! There was air under my feet as I yelled "Holy Camoly". There was Chris, laying on the side of the hill, wearing bow-hunter's camouflage, covered with camouflaged netting, and, as if it were necessary, a layer of leaves. I don't even think a deer would have seen him! The netting hid his equipment. The reason I lost my radio bearing was that I was standing right under his antenna. His antenna was a vertical design by Abe W8HVG, recently published in QST magazine. The antenna and coax blended in with the heavy tree growth very well.

Soon, Jack and Phil consummated their hunt, and we all went to Chris and Pam's house for a nice potluck dinner.

While the fox and hunters were away, Pam and other club members were busy having a good time playing cards, and listening to the hunt on the base antenna. Obviously, I wasn't there during the hunt, so I can't comment further on their activities.

Participation in the day's festivities was good, and so there is not room to mention all those involved.

All had a good time, and so the day was a success. It was determined that Carl and myself drove 23.5 miles, and Jack and Phil had driven 32 miles.

A big thank-you to Chris and Pam for the effort and hospitality that made this event a success.

## The Next Foxhunt

*By Jim ki8jd*

As the winners of the last foxhunt, it is up to Carl and myself to orchestrate the next hunt, which will be coming soon. We have given some thought to this task, and will try to finalize plans soon. The same guidelines will be used for the second hunt, with a minimal amount of change. I was thinking that an urban setting would be good.

As it will be light until 10:00 PM soon, and as some people have to work Saturdays, I was thinking that a 5:00 PM starting time might be good. The Saturday workers that I talked to get done around 3:00 PM, and should be able to attend a hunt at 5:00 PM. If anyone needs a later starting time for dinner or whatever, they should speak up, and we could push it back to 6:00 PM.

Plans include a shorter hunt (who knows?) and liquid refreshments at the fox's location.

# GRAND RAPIDS, MICHIGAN I.R.A. ANNUAL HAMFESTIVAL

West Michigan's Largest  
Hamfest & Computer Fair

Saturday, June 5, 2004.....8 A.M. until it's over.

Convenient location with great facilities at the spacious Hudsonville Fairgrounds. It's bigger and better every year! 14 miles west of Grand Rapids, two miles north of I-196 exit 62.

HUGE INDOOR FACILITIES with CONVENIENT ACCESS and FREE PARKING. OVER 22,000 SQUARE-FEET INDOORS, 8' tables for sellers and dealers, \$8 ea. Friday night set-up available after 7 P.M. or 6:00 A.M. start on Saturday. Trunk sales spaces, 10' @ \$6 ea. CAMPING available, \$10 fee. Showers and electricity available for camping. Plenty of electrical outlets available inside and outdoors. Camping and table & space rental not an admission to Hamfest; tickets are required. All reservations with SASE please. Reservations held until 8 A.M. Saturday. Food and drinks available in comfortable indoor sit-down eating facilities. Children under 12 years admitted free accompanying an adult. Handcapped parking and access.

## - FAMOUS "ROADKILL-CHILI" POTLUCK FRIDAY EVENING

Bring a dish to pass and join-in the fun @ 7:00 P.M. after helping with setup. Hamfest tickets will be available for purchase.

## - FOUR MAJOR PRIZES PLUS DOZENS MORE!

## - VINTAGE HAM EQUIPMENT, MILITARY RADIO EQUIPMENT AND ALTERNATIVE ENERGY EXHIBITS

## - VE AMATEUR EXAMS - 10:30 A.M. START

All walkins. Technician, General and Extra Class. Please bring original and a copy of your license, any C.S.C.E.'s with some form of photo ID and a check made out to "ARRL / VEC".

## - MICHIGAN REPEATER COUNCIL QUARTERLY MEETING AT 1 P.M.

Write for table reservations to:  
Independent Rptr. Assoc., Inc.  
562 92nd Street S.E.  
Byron Center, MI 49315

TICKETS: \$5.00 ea.  
Tables: \$8.00 ea.  
Trunk spaces: \$6.00 ea.  
Camping fee: \$10.00

INFO: Call Kathy at (616) 698-6627 after  
4 P.M. (E.D.S.T.) for info / reservations.  
Check out the IRA Web-site at:  
[www.w8hvg.org](http://www.w8hvg.org) for more info.

DEALERS: BRING YOUR  
HAM EQUIPMENT, COAX,  
COMPUTER EQUIPMENT,  
SOFTWARE, ALTERNATIVE  
ENERGY EQUIPMENT, WIRE,  
BOOKS, PARTS, JEWELRY,  
SWEAT-SHIRTS, CAPS, ETC.,  
TO SELL.....BE THERE!

HAMS: BRING YOUR USED  
EQUIPMENT TO TRADE OR  
SELL.....BE THERE!

COMPUTER HOBBYISTS:  
BRING YOUR EXCESS  
HARDWARE, SOFTWARE,  
BOOKS, ETC., TO TRADE  
OR SELL.....BE THERE!

TALK-IN ON 147.16 LINK-SYSTEM