

January Meeting on Fri 26th at the Hometown Buffet!

Notice: Name Change, Same Old Place!

Near SR 725 and Yankee Rd. in Centerville

Club Memorial Call **W8KSE** 10 & 3.4 GHZ Beacon, presently in Repair.

MVUS Sunday Net at 14:30 GMT (currently at 9:30 AM local time, EDT). The net frequencies are primarily **144.280 Mc and 28.960 Mc.**

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Upcoming Events Hamvention 18/19/20 May, 2007

Microwave Update see back page

There is the yearly Techfest at Sinclair College in Dayton coming up **on Feb 17/18**, where children from kindergarten age on get exposed to the technology that expects them in their life. This year DARA (the Dayton club) will have the van parked outside the door and two or three tables on the inside demonstrating ham radio. We try to show the little ones (6 to 10) how an x-tal detector works and how **microwaves** propagate and hope we might put something in their mind that makes them come back when they are teenagers and get flooded with electronic gizmos. If you have ideas or want to help get in touch with Steve, K8UD (937-255-5662) or me, WB8IFM (937-253-3993)

DE N8ZM.

Well folks, it has been a while since you have had to read my random musings, but the New Year always brings good and bad. As I write this on Sunday morning, it looks like we are finally getting our turn in the snow barrel. It is VHF contest weekend, and I should be up on “the hill” working new grids, but needed to get this done first. Then I’ll venture out in the snow to see if the roads are passable. I’ll also find out if the bands have opened up.

Lots going on in the next few months, so we need to get ourselves organized for them. The most pressing project is the 1296 beacon. We have been advised that we MUST have our antenna hardware ready to go no later than March 31st. That gives us a scant 10 weeks to resolve the antenna design and mounting problems. I think Mike, KA8ABR, has made a lot of progress on the radome, so we just need to keep the momentum going. I am still looking at the alternative PC board big wheels that I picked up from Kent Britain at MUD as a possibility. I need a little help with fabricating a Stripline feed for the stacked pair. Any takers?

Also, Gerd has been working on the transponder with the hope of having it on the air by Hamvention. He needs some help with fabricating the antennas and some work on the output cavities. Thanks to Mike Suhar and Steve Coy for their work on this project as well. Contact Gerd if you can help out with these construction projects.

Speaking of Hamvention, volunteers are needed to help with the booth and the VHF/Microwave forum. Red says he isn’t going to do the forum moderator job this year (he says that every year; maybe this time he means it!), but Mike Schulsinger will be involved and would no doubt appreciate some assistance. Although Gerd has retired from his heavy responsibilities as Chair of Advanced Registration, we should not interpret that as meaning that he will have a lot of time to honcho the booth, etc. So the rest of us need to pitch in. Contact Gerd to find out where and when you can be useful.

On the subject of the big show, do we want to continue our recently established tradition of putting beacons at Hara for the weekend? Usually John Human and Mike Suhar are the guys who make this go, so this question is mainly aimed at them. I do know that others have helped, so I don’t mean to slight anyone here. We can discuss it the meeting on the 26th.

Gerd has proposed a ‘Thank You’ event for the folks who volunteered to help make our MUD conference so successful. Possibly some Friday soon we will have Supper at the 2nd Street Market Deli, courtesy of MVUS. There may even be some additional appreciation given, so don’t miss out! More to come.

Well, the time has come for me to quit typing and let Gerd and Steve get this noise published! I am going to head out into the snow and back up the hill to see how many more contacts and grids we can roll up today. I sure feel sorry for the guys who are out being Rovers I this stuff.

See you on the 26th at the usual place.

Oh, and Happy New Year! de N8ZM.

This and That 1-07

Cell Phones. Accidentally activating or changing the settings of cell phones can be irritating. Some US phones prevent this by folding and thus protecting the keypad. The European handies, as they call them are mostly of the “non folding” type. They use a code, pushing two buttons that are far apart simultaneously, to activate and deactivate the keypad. So far so good, but I still have my US cell phone every so often switch to vibrate and was baffled why. Finally I found out. There is an exposed rocker type switch on the side, which regulates the ringer from, loud to medium to soft, and to, get this, vibrate. I was unaware of this feature, because there is a way to set this using the menu and regular keypad. You can’t win with to-days gadgets. [Gerd, WB8IFM]

Magic. You used to be able to open the hood of a car and understand, that’s the engine. Most people today look at technology and see magic. [Dean Kamen]

Incredibly Soft. You know about cotton, wool, silk, nylon and other synthetics, but how about bamboo? “Five years ago, Chinese engineers learned how to break down the fibers and spin them into thread. Now bamboo is sprouting up in dozens of products from sheets to baby suits. The fabric is incredibly soft and bamboo is easy to grow and doesn’t require pesticides or fertilizer like cotton. [Anne Underwood]

Ah So! “We have brought you winner after winner this year and things are only getting better! The 21st century home is one in which broadband is available in every room. This is already a reality for the wealthy, and is just now becoming a booming business as it spreads to the middle class house. Our next feature makes this all possible: Advanced Power line Technologies Stock: APWL Current Price:0. 100 Short Term Target: 0.27 Long Term Target: 1.10 Get in before this one takes off and ride it all the way to the bank!” [e-mail] The snake oil salesmen are getting in to wrench the last penny they can get from the BPL episode. Ed]

Makes Perfect Sense!? “With the introduction of HSUPA, this procedure has been put to the test again. The experience obtained through HSDPA showed that the increase of the PAR cannot be transferred 1:1 in dB to the required reduction of the transmit power...” [Wireless Technologies 2006]

Sense of Direction. Albert Einstein, one of the greatest physicists of our time who made incredible discoveries was not so good on the ground. His friends noted that he could not take a walk for fear of getting lost due to his poor sense of directions. [Holly Gerard]

Morse Code. Some hams derive sheer pleasure from communicating with their key sets. David Sumner likens it to sailing: “People just get more satisfaction hoisting a sail rather than puttering around with the motor turned on.” [Gary Sticks]

Mouse Potato. Television is suffering. There are so many other electrical media diversions, the computer and the Internet, of course, being the main culprit. What used to be a couch potato is more and more now replaced with a “Mouse Potato”

Good Excuse. To-date there have been 150 men in space, but only 7 women. Why so few women? NASA says the space suits only come in medium, large and extra large and most women would need a small!

Hair. Teenagers today watch for ten hours TV or play with other electronic gadgets; that doesn’t look so bad when you compare it with the 14 hours they spent in the 1950ties brushing their hair. [Bill Bryson]

Spam. A survey found that in October of 2006 the daily e-mail Spam count was 62 billion. Dividing this number up there are 207 for every man, women and child in the US. Lucky me, I only receive around a hundred a day of which my filter takes care of about 90%. The rest I eliminate manually which takes a few minutes about on a par with sorting through the junk that comes in the mail. [Gerd, WB8IFM]

Selecting Cells for a Battery

By Gerd. WB8IFM

I recently purchased a digital camera that uses two AA cells in series for power. Normally I would avoid such a camera, having had bad experiences with AA cells in cameras. But all the other features were right and in particular the price! But with the AA cells being the soft spot of the new camera, I was ready to apply a somewhat more elaborate battery selection process. A few months earlier I had acquired an “intelligent” charger that I now was going to put to good use. A few years ago this would have required a time consuming, painstaking effort. Now with the new charger it ought to be a piece of cake. Basically, I was going to measure a number of cells and then pick a couple that represented the closest match.

I purchased four of the best NiMH AAs from at a hamfest. Rated at 2700 mAh the cost was \$ 2.75 ea.

Getting home I inserted all 4 cells into my LaCross BC 900 battery charger. Using the “Refresh Mode” and the default current levels, the cells are individually discharged at 100 mA and then charged at 200 mA until, after a number of cycles, they reach their maximum potential. At this (slow but optimum) rate a cycle takes a full day or even more. To discharge a 2700 mAh cell at 100 mA takes 27 hours and to charge this cell at 200 mA takes 13.5 hours. So that total cycle lasts 40 hours.

Well, by the following Saturday morning all cells were at their final “Full” stage. One of the cells, however, was full already by Thursday. So this one cell took 3 to 4 cycles and the others 5 to 7. You can only estimate the number of cycles as the timer resets at each new cycle and you would have to take readings, maybe several times per day. I did take readings about twice a day but never bothered to write down the elapsed time for the present cycle.

Here are the results measured:

Cell	Hours Total (all cycles)	Initial mAh (after one cycle)	Final mAh
1	~134	798	2200
2	~86	588	2230
3	~134	810	2220
4	~134	607	2270

Comparing the initial capacities you find a variation of 38%, while looking at the final capacities the variation is reduced to 3%. I picked cells 2 and 3 for my digital camera. These are less than **a half percent** apart and should form a nice battery for many cycles to come!

This is the way cells are picked to form batteries for satellites, they last for years and many cycles. I was involved picking cells in the 90s and at the time it was very time consuming and labor intensive. Sure I had a lot of “brakes” but at times I had to take readings every hour and towards the end of the charge or discharge, continuously. Work was “semi” automatic. Now this little chip in the battery charger does all this, you just sit back and relax!

Another Test.

I followed a matched set of AAs over a few discharge/ charge cycles and noticed that the capacity drops a few percent with each new charge, but, of course, did stay close together as required. This loss in capacity, if it remained at a few percent each time, would indicate that the cells have maybe 30 to 50 cycles left in them. At my present usage they still would last me a few years. I should mention that these were not the brand new “2700mAh” cells, but still fairly new with no more than a handful of previous cycles on them.

Solar Cell Development

By Gerd Schrick, WB8IFM

The good old **silicon** solar cell development has just about maxed out. The efficiency is as high as it will get, limited, of course by the partial use of the solar spectrum. Unfortunately, however, cost has not come down much, so they are mostly used on satellites, and to a much lesser extent “on the ground”.

So the search has been on for different materials that convert hitherto unused parts of the solar spectrum and it has been successful with efficiencies of 40%, about double of what they were before.

The second way to improve yield has been to concentrate solar radiation so that the cells are getting more radiation. It turns out that the cells can easily accommodate higher levels; in fact the efficiency goes up somewhat.

With the new combined approach of wider bandwidth, and/or multiple frequency cells and concentrating fixtures the price per delivered power has come down to a point where it is now comparable to what you pay for the electricity of your local power company which uses coal, or gas for its generation.

The main application for solar cells, of course, remains in satellites. But the price is now attractive enough to entice power companies to build solar cell plants alongside wind farms, both truly in the “green power” category. I haven’t come across this new technology for home use yet, but I hope this is just a matter of time.

Finally, an interesting thought, the solar cells on the ground extract radiation from the sun and therefore cool the area underneath, saving on air conditioning.

Concentrator Photo Voltaic (PV) Systems Explained (US Dept of Energy)

The primary reason for using concentrators is to be able to use less solar cell material in a PV system. PV cells are the most expensive components of a PV system, on a per-area basis. A concentrator makes use of relatively inexpensive materials such as plastic lenses and metal housings to capture the solar energy shining on a fairly large area and focus that energy onto a smaller area, where the solar cell is. One measure of the effectiveness of this approach is the concentration ratio—in other words, how much concentration the cell is receiving.

New Spectrolab Solar Cell Reaches 40 Percent Efficiency Facilities Management News

December 18, 2006—The US Department of Energy (DOE) announced recently that Spectrolab, Inc., has developed a new concentrator solar cell with a sunlight-to-electricity conversion efficiency of 40.7 percent--reportedly a new world record in solar cell efficiency.

The new cell uses a "multi-junction" structure, in which several layers each capture part of the sunlight passing through the cell. These layers allow the cell to **capture more of the solar spectrum** and convert it into electricity. The Spectrolab cell (also) relies on an optical concentrator to focus sunlight onto the cell.

Moon Bounce on a Discone

By Mike Suhar, WB8GXB

Down along latitude 33 in the southern United States are three transmitters that make up the Space Surveillance System formerly known as NAVSPASUR. The three transmitters feed an array, which generates a very narrow fan shaped beam straight up into space. Any orbiting object crossing this beam will produce an echo that is picked up by receivers also along the 33 parallel. Orbital parameters of the object can be calculated based on data recovered from these echoes.

The main transmitter is in Lake **Kickapoo**, Texas on **216.98 MHz**. The antenna is 3.2 Km long and consists of inverted-V antennas in a row. There are over 2500 of these. Calculating the gain from these numbers: the individual element with the ground as reflector has a 5dbi gain, each doubling the number of elements yield 3 dB additional gain, this adds up to $5+34=39$ dbi. To obtain the beamwidth, we divide 180 degree by the gain and obtain $180^{\circ}:2500=.07^{\circ}$. Each antenna is connected to a 300-watt transmitter for a total of 750 kW. This power multiplied with the gain comes out to an ERP of close to 6 billion watts. The signal is a straight CW carrier with no modulation. Official numbers given are 40 dBi gain, a .02 degree beam and 6.7 billion watts.

Those that live along the 33rd parallel have the best chance to receive echoes off of objects in space but even in Ohio we can play around with this system. A working receive set up would be an SSB receiver that can tune 216.980 MHz +/- at least 10 kHz for Doppler. A PC with a sound card and some type of FFT software to produce a waterfall display becomes the detector. A small Yagi antenna will help overcome the weaker signals for those of us not along latitude 33. A Yagi for 220 MHz or even a TV antenna will work fine. 216 MHz is just above TV channel 13.

Larger objects such as the International Space Station are easy to detect. You must account for Doppler if you expect to find the echo. There are two parts to the Doppler shift. You have the Doppler going up to the object and then the Doppler of the echo back to your receiver. The Doppler on the ISS, for example, could be as much as 10 kHz. Sometimes the Doppler cancels so it may be only 1 kHz on another pass. Satellite tracking software can determine the Doppler. Two calculations are necessary. One from Texas to the object and then another from the object down to your location. Add the two together. For example TX to ISS may be - 5 kHz while ISS to Dayton may be + 3 kHz. The total is then -2 kHz. The duration of the echo "ping" will only be a second or two.

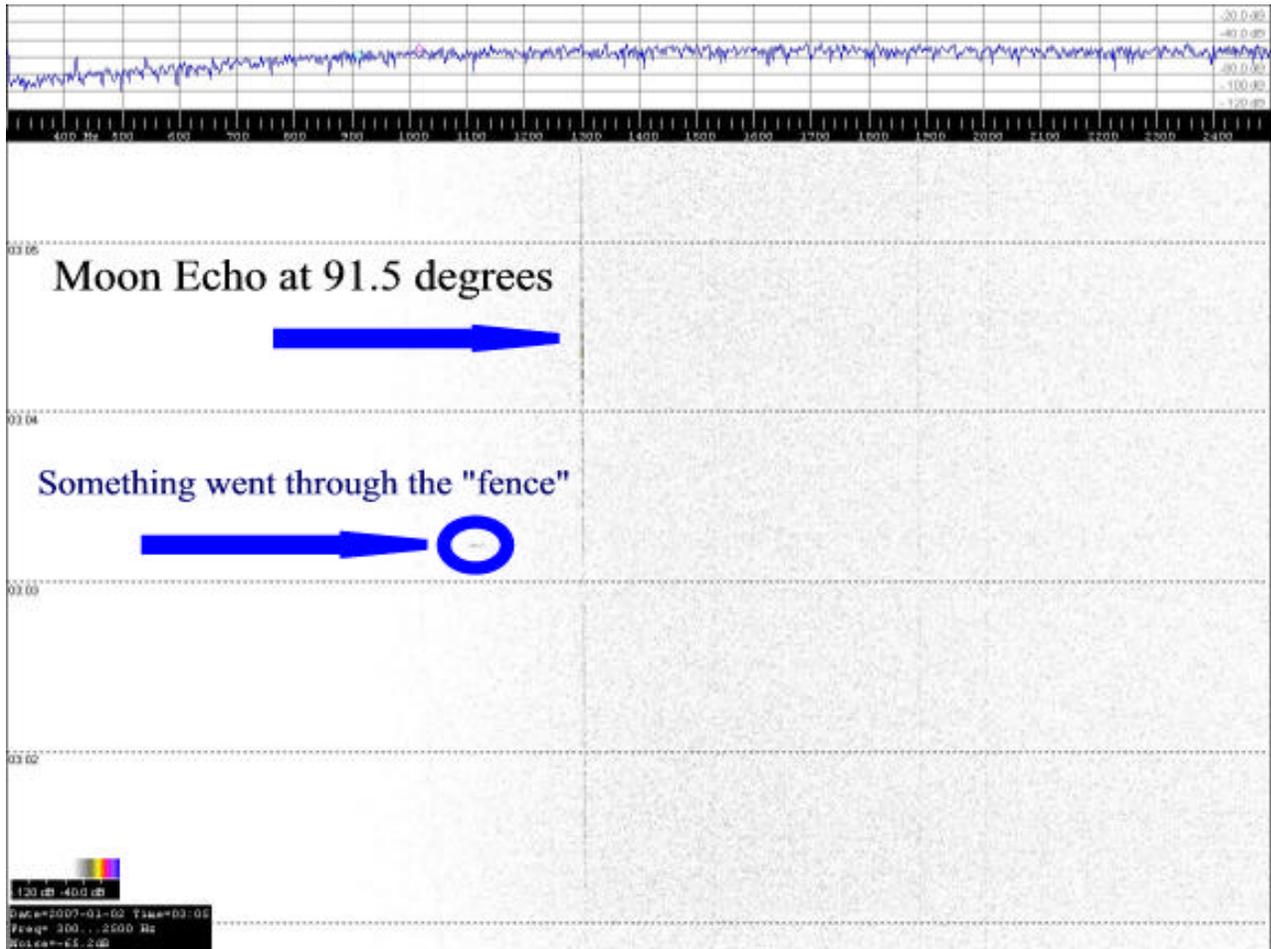
Ionized meteor trails can also be detected. The echo will last longer than what you receive from an object in orbit. The Doppler shift will also be different, as the ionized trail is not moving as an object in orbit.

What about the moon? The moon reaches an inclination of +28 degrees once a month. The east-west fan beam from Texas will intercept the moon while it is 91.5 or 271.5 degrees in azimuth from the Texas. This puts the moon over the Atlantic for the 91.5 degree path. With the high power Kickapoo transmitter the moon echo can be received on a small antenna such as a dipole. The screen shot shows the moon as received on my Discone antenna. The signal was quite weak to the point that I could not hear the audio on my Icom R7000 receiver. The Doppler will only be 150 to 300 Hz.

Now is the time to experiment with this 216 MHz system, which will be retired in a few years and replaced with a microwave frequency, possible S-band.

See graph on next page! The moon echo can be observed as a vertical line in the center of the graph. The peak amplitude was when the moon was 91.5 degrees from Texas as calculated using NOVA. In this display frequency is horizontal and time is vertical. While I observed the moon echo something went through the "fence" and I heard a 1-second ping. The faint vertical lines to the right of the moon echo (at 1900 and 2000 Hz) represent a spurious receiver response. They don't go away when I pull the antenna! The graph shown was obtained using a Discone antenna connected to an Icom R7000 receiver. Bandwidth setting of the FFT was 1(one)Hz.

Next month I will use a larger Yagi cut for 216.98 MHz and we will see what I get.

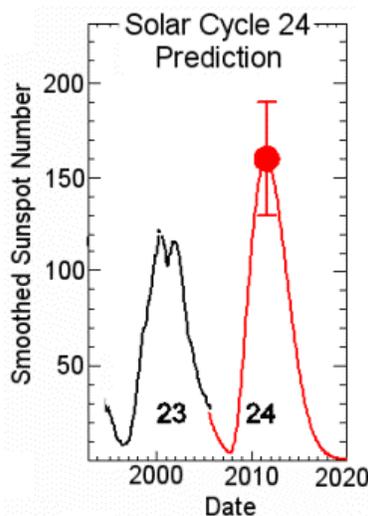


Addendum 1-18-07

On the 27th of this month the moon will be in a position for another try. I hope to have a larger antenna looking at it. My 12-element yagi for 216 MHz is laying on the garage floor. If we get a good weekend before the 27th without rain, or bitter-cold, I will get it mounted on a temporary pole.

I will also try to figure out what those "pings" are with no Doppler shift. One can be observed to the left of the moon echo as noted on the image.

Mike, WB8GXB



Scientists Predict Big Solar Cycle 12.21.2006

Evidence is mounting: the next solar cycle is going to be a big one. Solar cycle 24, due to peak in 2010 or 2011 "looks like its going to be one of the most intense cycles since record-keeping began almost 400 years ago," says solar physicist David Hathaway of the Marshall Space Flight Center. He and colleague Robert Wilson presented this conclusion last week at the American Geophysical Union meeting in San Francisco.

SAVE THE DATES

Microwave Update 2007 is Thurs October 18, Friday Oct 19, and Sat Oct 20th, 2007

The Mt Airy VHF Radio Club, aka "Pack Rats" will be planning and hosting this conference, along with other area clubs and sponsors. The conference will be held in King of Prussia, PA, between Philadelphia and historic Valley Forge. We have booked facilities at a hotel, which is currently a Hilton, but will be undergoing a name change this month and will likely become a Wyndham. As soon as the hotel changeover is complete, you will be able to register for the conference and also be able to book rooms there at the special conference rate. Details will be listed at the www.microwaveupdate.org web site.

Conference chairmen are Phil Theis-K3TUF and Dave Fleming-KB3HCL

Papers and speakers are being sought by program chairs: Paul Drexler-W2PED pdrexler@hotmail.com and

Marc Franco-N2UO lu6dw@yahoo.com

Thursday 10/18 is time for a surplus tour and area sight-seeing

Hospitality room will be available Thurs-Fri-and Sat eves

Vendors will be on site. Fri eve flea market is planned. Big Banquet Sat eve. Plan to come with your family or significant other as there's plenty to see and do in the Philadelphia area.

C U there, Rick, K1DS, president, Pack Rats

Find sales, coupons, and free shipping, all in one place! MSN Shopping Sales & Deals

<http://shopping.msn.com/content/shp/?ctid=198,ptnrid=176,ptnrdata=200639>

Need a Good Laugh? [This came (as is) as an e-mail]

We have brought you winner after winner this year (2006 Ed.) and things are only become better!

The 21st century home is one in which broadband is available in every room. Video streams to wherever you choose to watch it. Home appliances are seamlessly integrated into a comprehensive network. This is already a reality for the wealthy, and is just now becoming a booming business as it spreads to the middle class house. Our next feature makes this all possible, and is bringing it to the world!

Advanced Powerline Technologies

Stock: APWL

Current Price: 0.100

Short Term Target: 0.27

Long Term Target: 1.10

An incredible announcement is expected out of the company very soon. This will be backed up by a PR blitz and I'm sure you can guess what will happen to the price of this issue! Tech companies blast off on news like this. Get in before this one takes off and ride it all the way to the bank!

Scientists Predict Big Solar Cycle 12.21.2006

Evidence is mounting: the next solar cycle is going to be a **big one**. Solar cycle 24, due to peak in 2010 or 2011 "looks like its going to be one of the most intense cycles since record-keeping began almost 400 years ago," says solar physicist David Hathaway of the Marshall Space Flight Center. He and colleague Robert Wilson presented this conclusion last week at the American Geophysical Union meeting in San Francisco.

Baffled Again

By Gerd, WB8IFM

I had this Yaesu 736 for some time. It is a so-called satellite radio, meaning its two radios in one, so you can simultaneously transmit and receive on different bands. The bands are 2m and 70 cm. I have had troubles with the numerous buttons from day one, the difficulty being the multiple uses of the same button. The other problem is with unclear labeling; many times you have to guess and when you guessed wrong, tough luck.

Of course, you can read the manual, but even the manual is a challenge and besides how much time do you have? Just the other day it was impossible to set the right tx frequency and by the time I was leafing through the manual my schedule partner had given up! The funny thing was, I had inserted a note in the manual explaining in notation that I could understand the exact problem that I was trying to solve. So this was a recurring problem I had encountered earlier.

One summer I was on a trip and I had left the 736 and some antennas for the field day group to do some satellite work. They never could get the radio to work and gave up!

Here is in Yaesu's own words a description of the problem:

*“Sections 4.8 through 4.13 describe some of the more complex operating features involving programmable features, memories, scanning and tone squelch. **We do not recommend random experimentation** with the controls until after you have followed these procedures. Some keys and switches alter or disable other functions and may cause confusion: you may have to turn the transceiver off and turn the backup switch (Section 2.2(1)) off and back on to reset the microprocessor if you loose track of operation...”*

How about that? Most of us want a “radio” and not a computer with all the known bad features. The radio should have an on/off switch, a frequency (rotating) knob, a band switch (if multiple bands), volume control knob, screwdriver adjust for the mike, and a mode switch. A meter should indicate S-units, power output and SWR. That's about it! Everything else, sometimes referred to as bells and whistles, I can do without!

To me it is strange that hams get excited about Morse code, when more important things like simple and standardized radios ought to be offered by the manufacturers.

Maybe it is time for someone with common sense, versed in electronics and a big garage to start a new business and for a change listen to experienced hams and not try to sell whistles and pushbuttons for the kiddies.

Jan '07 MAD EN82 report

Small crowd. K8MD, WE9Y and myself. Did some signals on 903 and 1296. Looked for W9SZ, W2RG, the Cincinatti group, and any other activity. Nothing heard.

73, Lloyd Ellsworth Ne8i

QTH Grid EN82jm Beverly Hills Mi & Rover 160M - 47GHz e-mail: ne8i@arrl.net

POBox 338 Birmingham Mi 48012-0338 USA