

# HAMATEUR CHATTER

The Milwaukee Radio Amateurs Club

April 2013 Volume 21, Issue 4

One of the World's Oldest Continuously Active Radio Amateur Clubs—since 1917

## Board of Director's Minutes

Board of directors meeting called to order at 7:06 pm by Dave Shank, KA9WXN club president.

BOD Present: Dave, KA9WXN  
Dan, N9ASA  
Mark, AB9CD  
Al, KC9IJJ  
Joe, N9UX  
Hal, KB9OZN

BOD Absent: Mike, KC9CMT

Treasury report was passed around and Joe, N9UX explained the financials. All present had no questions about the report. It was stated how well both clubs, MRAC and MAARS, benefitted from the swapfest.

It appears that the swapfest is growing. It was also noted that most of the attendees this year were from Southeast Wisconsin rather than out of state as it was last year. American Science and Surplus was present and profited from the fest as well. Their intentions are to return next year.

The flyer next year was discussed and some minor changes to directions were made as well as purchasing tables. Five-hundred copies of the new flyer for 2014 was printed and ready for AES Superfest. Joe will be bringing more applications, new and renewal, forms with him.

Discussed was the phone line at the repeater site. It was stated that the hard line will be replaced with a Google Voice account which will save the club a significant amount.

Chris Tarr will be present at the March members meeting presenting a program on HD radio. During our April members meeting, Joe, N9UX, and Al, KC9IJJ, will be demonstrating HF Digital modes. It will also be our election for club officers.

The BOD will be asking for a Nomination Committee at the 3/28 meeting to discuss upcoming elections. Dave, WB9BWP, will assist. Al, KC9IJJ, stating he is willing to be a backup for the committee.

Field Day will be at Konkel Park in Greenfield the last full weekend in June. Dave, KA9WXN, was contacted by Greenfield, requesting that we move farther east this year since there will be a Farmers Market setup early Sunday morning. Gateway Technical College will be joining us on Field Day and run the GOTA Station.

The May club meeting will be our annual auction. The club will be selling a TS-430 at a very good price to include a power supply. Members will have the opportunity to have the club sell their personal items. Each seller will have the option of receiving all of the proceeds, or to donate a partial amount to the club, or donate all of the proceeds to the club.

Erv, N9YNU, is doing some public relations work at Superfest to obtain student interest for the 'on-the-air' classes. The questions will be from the General and Extra pool.

Dave, WB9BWP, presented via email to the BOD a Repeater Policy. It was read by each BOD member present at the meeting and it was agreed upon as is. Dan, N9ASA, will print copies of the MRAC Repeater Policy for the April membership meeting.



### MRAC Officers:

#### Terms Expiring in 2014

- President – Dave, KA9WXN
- V-President– Dan, N9ASA
- Secretary – Mike, KC9CMT
- Treasurer – Joe, N9UX
- Director – Vacant

#### Terms Expiring in 2013

- Director – Al, KC9IJJ
- Director – Hal, KB9OZN

The Club Phone Number is: (414) 332-MRAC or

(414) 332- 6 7 2 2

Visit our website at:

[www.w9rh.org](http://www.w9rh.org)

Mail correspondence to:

**M. R. A. C.**

**PO Box 26233  
Wauwatosa, WI**

**53226-0233**

Joe, N9UX, talked about the Simplex Contests. He indicated that the results will be posted by Superfest. Joe also stated the website will need a new webmaster since Mark, AB9CD, is stepping down. Dave, KA9WXN, will contact Dale, KC9SHB, to see if he is willing to take over the website.

Dave, KA9WXN, mentioned that W9RH use to do Ham Radio PR at local events. He would like to see MRAC attend events such as National Night Out, the State Fair, Safety Days, Mayfair Mall, etc. We are looking for low cost or free options to fulfill our public relations needs. Mark, AB9CD, can do seminars at our annual swapfest as it grows.

Dave, KA9WXN, stated he can obtain a table at the OZARES ham fest in May if someone would be able to man it. Dave may not be available due to work commitments. If you are interested, please contact Dave.

Meeting adjourned at 8:18 pm.

## Membership Meeting Minutes

The MRAC membership meeting was called to order at 7:03 pm by Dave, KA9WXM, club president. The Mic was passed around for introductions. A sign-in sheet was circulated for the recording of membership information and attendance.

### Tonight's Program:

Tonight's program is be on HDRadio, presented by Chris Tarr, W9JOL. Special thanks to Nautel, LTD. Nautel is a maker of transmitters. HD radio is on FM only, on AM it is thought to be dead. HD Radio provides traffic data to car receivers. HD stands really for Hybrid digital. Commercial advantages of HDRadio: Maintains Market Position, Substantial consumer improvements, single frequency Networking. HDRadio requires no new frequency assignments, uses the same power levels as analog channels, and also uses the same towers and antennas as FM stations. FM HDRadio is an OFDM system which creates a set of digital sidebands on each side of the normal FM carrier signal. The upper and lower sidebands are redundant.

FM HDRadio- Extended Hybrid Mode gives another 25K of data on each side of the carrier signal. Over-modulation issues: In some parts of the world this is a problem. Time Domain: the HDRadio RF envelope has amplitude variations over time. Linearity: its output signal follows its input signal in both amplitude and phase. In the case of HDRadio, these inter-mod products occur near the carrier. High level combined: New architecture uses an antenna combiner. Low level combined IBOC FM is more efficient, uses one transmitter to send both the analog and HD signal. Delay matching: analog signal is delayed 8 seconds to match phasing of the HD signal. HDRadio signals are attenuated at night. Everything in HDRadio transmitting is expensive

Dave, KA9WXN called for a 10 minute break, then the business meeting part of the night went on.

The club needs people to offer their names to the club for inclusion in the MRAC election process. The business meeting was very short this month.

Pancho is still looking for someone to help out during the club nets on Friday evening. We have a 10 meter and 2 meter net. At 8 and 9 pm respectively. On Tuesday nights there is an on-air class on the Club repeater at 8 pm. The class involves the questions for testing in the General, and Extra class question pool.

The club history book will updated by AES SuperFest and new DVD's are going to be made.

### New Business:

It was announced that Mark, AB9CD is stepping down as a director of the club and a replacement will be needed. The Wisconsin QSO party is coming up, and the club would like a good showing from its membership.

On **June 22nd & 23rd**, the MRAC/MAARS clubs will be holding a joint field day at Konkel park in Greenfield again this year with the support of the city of Greenfield. It is possible that another organization will be joining our two clubs at field day this year.

There will be a food gathering at Denny's with Pancho after the club meeting.

Dave accepted motions to adjourn the meeting at 9:32 pm. Motion made by Dan, N9ASA seconded by Pancho, N9OFA. The meeting adjourned at 9:34 pm. The room was then policed of trash and returned to an acceptable condition as found before the meeting commenced.

A parts raffle will start immediately after the meeting.



## Severe Weather Preparedness

### Derechos

#### INTRODUCTION

Long-lived convectively produced windstorms, known as **derechos**, continue to pose a significant hazard to life and property and remain a difficult forecasting and warning problem. One of the important early steps in the operational forecast process is the knowledge of relevant climatological information. However, as described below, criteria for identifying derechos and the geographical frequency distribution of derechos are still being debated in the literature.

Johns and Hirt were the first to develop specific criteria to define derechos and to estimate their preferred geographical regions. They define the term derecho to be associated with an extratropical mesoscale convective system that produces, what Fujita and Wakimoto call, a "family of downburst clusters". They identify derechos based on criteria that could be determined from the National Climatic Data Center's publication *Storm Data* and logs of severe weather events from operations at the National Severe Storms Forecast Center (the predecessor to the Storm Prediction Center; SPC). The geographical distribution of the 70 warm season events identified by JH87 suggests that warm season derechos occur most frequently in a region from the upper Midwest to the Ohio valley and are relatively infrequent in other locations.

Bentley and Mote examined the SPC database of convective wind gust reports between the years of 1986-1995 and identified 113 events from all months of the year in an attempt to better visualize the climatological distribution of derechos.

However, their method for identifying derechos differs somewhat in that it removed the requirement that three wind gust reports of F1 damage (or wind gust estimates or measurements greater than  $33 \text{ ms}^{-1}$ ) must be separated by at least 64 km. Additionally, they determined whether or not successive reports emanate from the same MCS by temporally mapping the reports instead of examining radar data.

Reducing the maximum elapsed time between successive reports to 2 h and requiring that the maximum distance between successive wind reports is no more than 2 degrees of latitude or longitude helps them make this judgment. In contrast to the results, warm season derechos are a much more common occurrence in the southern Great Plains than in the upper Midwest and identified a smaller maximum (in spatial coverage) near the OH/PA border.

Johns and Evans (2000) proposed some explanations for these differences. They believe that the removal of the  $33 \text{ m s}^{-1}$  wind gust criterion and the tighter report density criteria allows for the deficiencies of the convective wind report data base to have a larger effect on the results. They also suggested that clusters of individual thunderstorms or isolated supercells entered the dataset as a result of not examining the radar data and questioned the adequacy of a 10-year period to depict the true climatology.

Bentley and Mote argued that the  $33 \text{ m s}^{-1}$  wind criterion is unnecessary because Fujita and Wakimoto make no reference to wind gust magnitudes in the definition of downburst clusters, and is difficult to judge because of the uncertainties in the accuracy of wind gust/damage estimates in the SPC database.

In addition, they suggested that an anomalously strong ridge in the central U.S. during 1980 provided a pattern that was unusually favorable for derechos in the upper Midwest. Finally, they believe that the parent convective structure should not restrict the definition of derechos.

Bentley and Sparks add an additional 118 derechos from the period 1996-2000 and show a reemergence of the primary frequency axis across the upper Mississippi River valley, although a significant secondary axis is still present in the southern Plains. They suggested that the shifts in synoptic patterns favorable to producing derechos, particularly during the warm season, help to explain this northward shift in derecho activity over multi-year time periods.

The above section highlights that several factors, relating to the definition of derechos and the time-period of the investigation, could influence the different estimates of the derecho climatology.

#### DERECHO DEFINITION

##### What is a derecho?

A derecho (pronounced similar to "deh-REY-cho" in English, or pronounced phonetically as "**deretfo**") is a widespread, long-lived windstorm that is associated with a band of rapidly moving showers or thunderstorms. Because derecho is a Spanish word (see paragraph below), the plural term is "derechos." In this case there is no letter "e" after the letter "o."

##### What is the origin of the term "derecho"?

The word "derecho" was coined by Dr. Gustavus Hinrichs, a physics professor at the University of Iowa, in a paper published in the *American Meteorological Journal* in 1888. A defining excerpt from this paper can be seen in this figure showing a derecho crossing Iowa on July 31, 1877. Dr. Hinrichs chose this terminology for thunderstorm induced straight-line winds as an analog to the word tornado. Derecho is a Spanish word which can be defined as "direct" or "straight ahead" while tornado is thought by some, including Dr. Hinrichs, to have been derived from the Spanish word "tornar" which means "to turn". A web page about Dr. Gustavus Hinrichs' background has been created by National Weather Service Science and Operations Officer Ray Wolf, and he provides more details about Dr. Hinrichs' development of the term "derecho" in the late 1800s. He also mentions how the term "derecho" became more commonly used in the late 1900s.

## Severe Weather Preparedness

### **DERECHO-PRODUCING STORMS**

#### **What kind of storms cause derechos?**

Derechos typically are associated with bands of showers or thunderstorms (collectively referred to as "convection") that assume a curved or bowed shape. The bow-shaped storms are called [bow echoes](#). A derecho may be associated with a single bow echo or with multiple bows. Bow echoes themselves may consist of an individual storm, or may be comprised of a series of adjacent storms (i.e., a "squall line" or "quasi-linear convective system") that together take on a larger scale bow shape. Bow echoes may dissipate and subsequently redevelop during the course of given derecho. Derecho winds occasionally are enhanced when a rotating band of storms called a "bookend vortex" develops on the poleward side of the bow echo storm system. Derecho winds also may be enhanced on a smaller scale by the presence of embedded [supercells](#) in the derecho-producing convective system.

### **TYPES OF DERECHOS**

#### **Are there different kinds of derechos?**

Three main types of derechos may be distinguished. This classification largely is based on the overall organization and behavior of the associated derecho-producing convective system and reflects, in part, the dominant physical processes responsible for the thunderstorms that produce the damaging winds.

The type of derecho most often encountered during the spring and fall is called a [serial derecho](#). These are produced by multiple bow echoes embedded in an extensive squall line (typically many hundreds of miles long) that sweeps across a very large area, both wide and long. This type of derecho typically is associated with a strong, migratory low pressure system. An example of a serial derecho with a very extensive squall line and embedded smaller scale bow echoes is the one that affected Florida, Cuba, and adjacent parts of the Gulf of Mexico, the Caribbean Sea, and the Atlantic Ocean during the early stages of the "Storm of the Century" on [March 12-13, 1993](#).

The second type of derecho is called a [progressive derecho](#). These are associated with a relatively short line of thunderstorms (typically from 40 miles to 250 miles in length) that may at times take the shape of a single bow echo, particularly in the early stages of development. In some cases, the width of a progressive derecho and its associated bow echo system remain relatively narrow even though they may travel for hundreds of miles. An example of this type is the ["Boundary Waters-Canadian Derecho"](#) that occurred on July 4-5, 1999. In other cases, the progressive derecho and associated bow echo system begin relatively small, with a narrow path, but over time grow to exceed 250 miles in width. The line of thunderstorms of a progressive derecho often begins as a single bow echo that evolves into a short squall line, typically with more than one embedded bowing segment. Such development occurred with the ["I-94 Derecho"](#) over the north central United States on July 19, 1983 (see Fig. 2 in that event's discussion page). Progressive derechos may travel for many hundreds of miles along a path that is relatively narrow compared to those of serial derechos. Often they are associated with an area of weak low pressure at the surface.

The third type of derecho is known as a "hybrid" derecho; these have characteristics of both the "progressive" and "serial" types. For example, the "Southern Great Lakes Derecho of May 30-31, 1998 was associated with a strong migrating low pressure system. However, the derecho path and the associated bow echo system had many characteristics of a progressive derecho event.

In contrast to most derecho-producing thunderstorm systems which typically occur in association with very moist air, bands of widespread wind-producing storms sometimes occur in environments of very limited moisture. These systems are referred to as [low dewpoint derechos](#). Such derechos most often occur between late fall and early spring in association with strong low pressure systems and are a form of serial derecho.

### **STRENGTH AND VARIATION OF DERECHO WINDS**

#### **How strong are derecho winds?**

By definition winds in a derecho must meet the National Weather Service criterion for severe wind gusts (greater than 57 mph) at most points along the derecho path. In the stronger derecho events winds can exceed 100 mph. For example, as a derecho roared through northern Wisconsin on [July 4, 1977](#), winds of 115 mph were measured. More recently, the derecho which swept across Wisconsin and Lower Michigan during the early morning hours of [May 31, 1998](#) produced a measured wind gust of 128 mph in eastern Wisconsin, and estimated gusts up to 130 mph in Lower Michigan.

#### **Are wind speeds relatively constant during the course of a derecho?**

The winds associated with derechos are not constant and may vary considerably along the derecho path...sometimes being below severe limits (57 mph or less) and sometimes being very strong (from 75 mph to greater than 100 mph). The swaths of stronger winds embedded in the general path of a derecho are called [downbursts](#), and these often occur in clusters. A derecho is made up of a ["family" of downburst clusters](#) and by definition must be at least 240 miles in length. The derecho of [July 4-5, 1980](#) is a good example of an event that exhibited wide variation in observed wind speeds.

### **CASUALTY AND DAMAGE RISKS FROM DERECHOS**

#### **Who is most at risk from derecho events?**

Because derechos are most common in the warm season, those involved in outdoor activities are most at risk. Campers or hikers in forested areas are vulnerable to being injured or killed by falling trees. People in boats risk injury or drowning from storm winds and high waves that can overturn boats. Those in cars and trucks also are vulnerable to being hit by falling trees and utility poles. Further, high profile vehicles such as semi-trailer trucks, buses, and sport utility vehicles may be blown over. At outside events such as fairs and festivals, people may be killed or injured by collapsing tents and flying debris.



Even those indoors may be at risk for death or injury during derechos. Mobile homes, in particular, may be overturned or destroyed, while barns and similar buildings can collapse. People inside homes, businesses, and schools are sometimes victims of falling trees and branches that crash through walls and roofs; they also may be injured by flying glass from broken windows. Finally, structural damage to the building itself (for example, removal of a roof) could pose danger to those inside.

Another reason that those outdoors are especially vulnerable to derechos is the rapid movement of the parent convective system. Typically, derecho-producing storm systems move at speeds of 50 mph or greater, and a few have been clocked at 70 mph. For someone caught outside, such rapid movement means that darkening skies and other visual cues that serve to alert one to the impending danger (e.g., gust front clouds -- see photo at top of page) appear on very short notice. In summary, the advance notice given by a derecho often is not sufficient for one to take protective action.



A shelf cloud along the leading edge of a derecho photographed in [Minnesota](#).

### Do special hazards exist when a strong derecho hits a city?

Whether in an urban or rural area, those out-of-doors are at greatest risk of being killed or injured in a derecho. But a hazard of particular significance in urban areas is the vulnerability of electrical lines to high winds and falling trees. In addition to posing a direct hazard to anyone caught below the falling lines, derecho damage to overhead electric lines sometimes results in massive, long-lasting power outages. Hundreds of thousands of people may be affected; in the worst events, power may not be restored for many days. It is the dense concentration of overhead distribution feeders in urban areas, and their frequent proximity to large shade trees, that make cities especially vulnerable to electrical outages following wind storms. Examples of cities in which derechos have resulted in prolonged power outages that affected large portions of the metropolitan area include Baltimore, Maryland (June 29, 1980), Kansas City, Missouri ([June 7, 1982](#)), and Memphis, Tennessee ([July 22, 2003](#)).

## DERECHO CLIMATOLOGY

**Where and when are derechos most frequent in the United States?** Derechos in the United States are most common in the late spring and summer (May through August) and typically occur along two axes. One axis extends along the "Corn Belt" from the upper Mississippi Valley into the Ohio Valley. The other warm season axis extends from the southern Plains into the mid Mississippi Valley. During the cool season (September through April), derechos are not as frequent but are most likely to occur from eastern Texas into the southeastern states. Although derechos are extremely rare in that portion of the United States west of the Great Plains, isolated derecho events have occurred in the interior portions of the western United States, especially during spring and early summer.

### Do derechos occur in other areas of the world besides North America?

Derechos likely occur in other areas of the world where meteorological conditions are favorable for their development. However, only one such event has been formally documented in recent years. On July 10, 2002, a serial derecho occurred over [eastern Germany](#) and adjacent portions of neighboring European countries. In Berlin and surrounding areas, 8 people were killed and 39 were injured, mainly from falling trees. In Bangladesh and adjacent parts of India, a type of storm known as a "[Nor'wester](#)" occasionally occurs in the spring. From various descriptions and knowledge of the meteorological environments involved, it appears that some of these storms may be [progressive derechos](#).

## **TORNADOES IN DERECHO ENVIRONMENTS**

### Can derechos and tornadoes occur with the same storm system?

Derechos and tornadoes can occur with the same convective system. This is particularly so with [serial derechos](#) associated with strong, migratory low pressure systems. The tornadoes may occur with [isolated supercells](#) (rotating thunderstorms) ahead of the derecho producing squall line, or they may develop from storms within the squall line itself. An example of a serial derecho that produced both extremely damaging straight-line winds and significant tornadoes from supercells embedded in the derecho-producing squall line is that which affected Florida during the early stages of the "Storm of the Century" of [March 12-13, 1993](#). Although not as common, tornadoes sometimes occur with progressive derechos. When they do, the tornadoes typically form within the bow echo storm system itself, and only rarely are associated with isolated supercells ahead of the bow.



## The Experimenters Bench

### Building a Dummy Load and Measuring Power Accurately by Ken, K4EAA

This is a take-off on a Dummy load that I've built in many different forms over the years. It uses a number of [non-inductive resistors](#) in parallel to achieve 50 Ohms over a wide frequency range. It is submerged in oil to allow somewhat extended operation during tuning or repair procedures. The advantages are: (1) It's cheap, (2) It provides a very pure 50 Ohm resistive load through 30MHz and beyond, (3) You can easily add power measurement and rig testing capability.

This one is conservatively designed for rigs that have power output levels up to 130W, such as the Kenwood [hybrid](#) lineup. I built it into a one-quart paint can, readily available at Ace Hardware for about 89 cents. I've used it for about a year now. A few hundred of your service rigs that people have sent to me have been loaded up into this dummy, and it is still like the day it was built. I know, because I had to take it apart to take these photos! It still measures 49.9 Ohms, even after all those rigs, all that power!

*Note: The normal failure mode for resistors is to go UP in resistance value. If you think you have "fried your dummy," check it's resistance value - If it is much higher than 50 ohms, you have successfully cooked it. This dummy load will be very hard to destroy.*

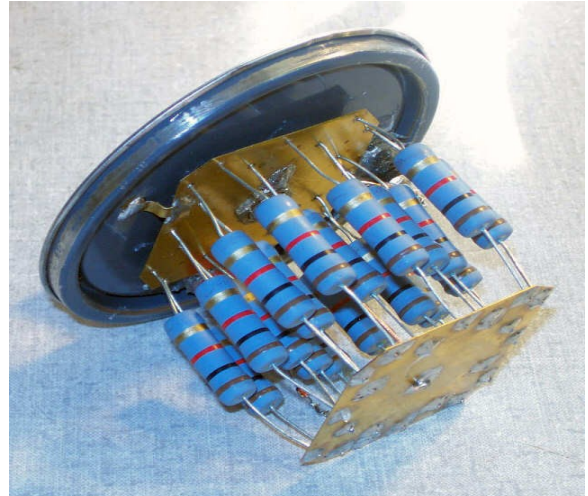
The parts required to build it are the Ace Hardware one-quart paint can or similar, **twenty 1K 3W** metal film or metal oxide resistors, a small brass sheet, also available at Ace, and an SO-239 connector, preferably single hole mount. Mine was built with a BNC connector, because all my home-brew rigs use BNC, but you'd probably find it more convenient using the SO-239, for your PL-259 plugs.

To add the optional power measurement capability, you'll also need a pair of red and black banana jacks or binding posts, and a BAV21 signal diode or similar, 7 cents quantity one at Mouser.

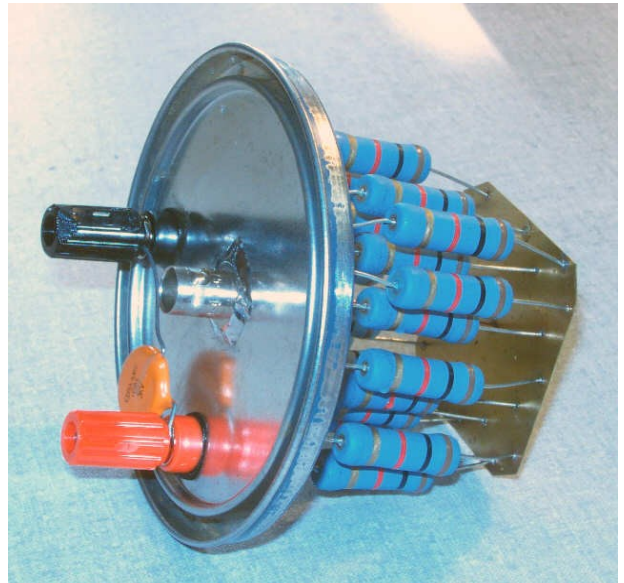
#### Construction Details

Drill a hole in the center of the paint can lid that will accommodate your connector. Cut out two pieces of brass sheet using tin snips to a size that will easily fit into the paint can. It's quick to just cut two squares and the snip the corners off, forming an approximation of an octagon. Stack these brass octagon sheets and drill 20 holes staggered around the periphery. Nothing is critical, you simply want to keep the resistors spaced apart a bit in the oil bath. After drilling the brass sheets, including a hole for your SO-239 connector in the center at the top, and a small hole for the lead for the center conductor on the bottom sheet, you can solder the resistors in place.

*Note on easy assembly* - Solder all 20 resistors to one plate, and then, starting at one corner, and working toward the opposite corner, cut the lead lengths starting from your minimum length, to progressively longer as you work towards the opposite corner. This will allow you to insert a few leads at a time as you combine the two plates. If they are all the same length, it will be very hard indeed to thread the 20 resistor leads into the bottom plate! Here is a photo of a [completed](#) assembly connected to the paint can lid.

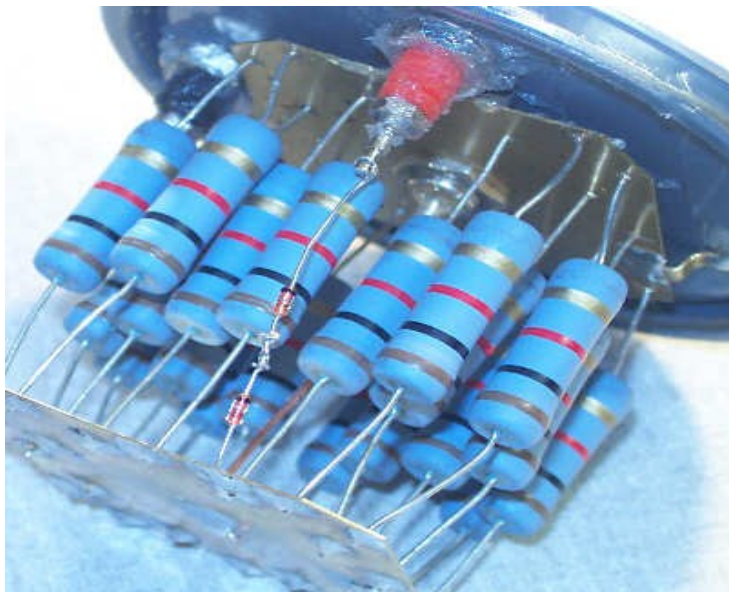


Here is another picture of the assembly, showing the connector and the optional binding posts. I used a BNC connector, but you probably want to use an SO-239.



For those of you that wish to add [power monitoring](#) capabilities, you have to add two binding posts by drilling two additional holes, and mounting the posts. The following picture shows two 1N4148 signal diodes wired in series from the center conductor to the red binding post. I recommend the BAV21 250V signal diode. I used the two 1N4148's after checking their reverse breakdown, because I had lots of them. The "goop" around the base of the binding posts is some silicone bathroom caulk added to keep the oil from





Next, we fill the quart paint can with mineral oil, which is a safe (You can actually drink it! - No PCB's for our dummy!), inexpensive, and readily available. The mineral oil works very well for conducting heat away from our resistors - It enables us to use 60W worth of resistors safely with a 130W rig.

Lastly, we complete assembly by attaching the lid to the mineral-oil filled paint can.



Now we'll find out how to use the optional diodes and binding posts that we've included in the dummy load..

### Measuring Power Accurately

The signal from your transmitter or transceiver is an almost perfect sine wave. We know this because the harmonics are at least 40 dB down from the carrier. When we measure the peak voltage from the detector (the BAV21), we are measuring within one percent of the true peak value of our carrier, not including the diode drop; we will add that back in later.

For power measurements, I recommend that a 0.01uf disk ceramic of at least 250V rating be connected between the binding posts. This will charge to the peak voltage applied to the 50-Ohm load, less the diode drop. You can then measure this voltage with your DVM.

Let's assume you measure 99.6V with your DVM. Add 0.4V for the forward drop across the BAV21 for a total peak voltage reading of 100V. The diode drop is a constant, always add 0.4V to your reading! (*This assumes you are using a DVM or scope with an input impedance of 10 Megohms. For 100V DC, the forward current will be 10ua, for a forward drop of 0.4V*)

Since this is a peak voltage, we need to divide by the square root of two to get RMS voltage. Take your calculator and divide by 1.414. 100 divided by 1.414 equals 70.72 Vrms.

To calculate power, we take the RMS voltage, square it, and divide by the load impedance, which in our case is ALWAYS 50 Ohms!



## The Experimenters Bench

### Other Measurements

Once you have the rectified output signal available from your dummy load, you can make other measurements. By selecting a filter capacitor and a parallel resistor across your binding posts to tailor your time constant, you can check the CW keying waveform across your binding posts, for instance. Here is the schematic for the load.

Now we'll find out how to use the optional diodes and binding posts that we've included in the dummy load..

### Measuring Power Accurately

The signal from your transmitter or transceiver is an almost perfect sine wave. We know this because the harmonics are at least 40 dB down from the carrier. When we measure the peak voltage from the detector (the BAV21), we are measuring within one percent of the true peak value of our carrier, not including the diode drop; we will add that back in later.

For power measurements, I recommend that a 0.01uf disk ceramic of at least 250V rating be connected between the binding posts. This will charge to the peak voltage applied to the 50-Ohm load, less the diode drop. You can then measure this voltage with your DVM.

Let's assume you measure 99.6V with your DVM. Add 0.4V for the forward drop across the BAV21 for a total peak voltage reading of 100V. The diode drop is a constant, always add 0.4V to your reading! *(This assumes you are using a DVM or scope with an input impedance of 10 Megohm. For 100V DC, the forward current will be 10ua, for a forward drop of 0.4V)*

Since this is a peak voltage, we need to divide by the square root of two to get RMS voltage. Take your calculator and divide by 1.414.

100 divided by 1.414 equals 70.72 Vrms.

To calculate power, we take the RMS voltage, square it, and divide by the load impedance, which in our case is ALWAYS 50 Ohms!

$$(70.72)^2 / 50 = 100W$$

So the output power, dependent on the accuracy of your DVM, is nearly 100W. If your DVM is accurate, say within 1% on DC voltage measurements, you have nailed your rig's output power within 2%, or 2W!

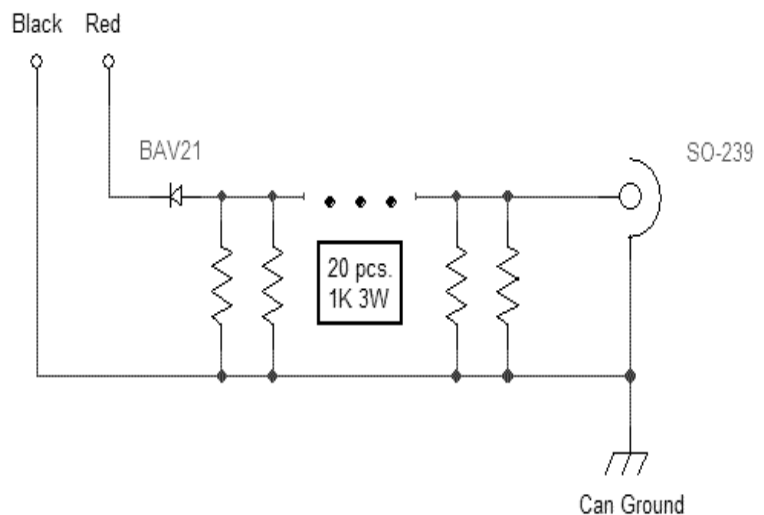
That's good. Consider a Bird Wattmeter. Their specified accuracy, when new & calibrated, is 5.0% of full-scale when the measurement is at 1/2 scale.

So, for example, a 200W element used to measure the 100W output of your rig can fall within 10W, so your 100W rig might measure 90W to 110W and still be within the calibrated accuracy specification. That's 20W of ambiguity. On the other hand, when power is measured by looking at the peak voltage, accuracy is a function of your DVM accuracy, plus the distortion in your output signal, the total of which may be on the order of 2% - - That's a 98W to 102W measurement, substantially more accurate!

### One More Time

We'll do this once more, just for drill. Assume you measure 49.6V across the 0.01uf capacitor. Add 0.4V for the diode drop, for a total of 50V peak. Divide by the square root of 2, or approx. 1.414. That gives us about 35.4Vrms. Square and divide by 50 Ohms, and we get 25W. Half the voltage, one-fourth the power.

If you place your power meter inline while you are taking this measurement, you can then calibrate it to your calculated power output measurement. I use these measurements, together with a calibrated Fluke DVM, to calibrate my power meters, and then I know my power measurements into my dummy load, or any 50 Ohm resistive load, are quite accurate.



## Early Radio: Military Communications

### AMBUSH

During my time in Viet Nam the ambush was the major form of operations used in my area. In the early part of my tour company and platoon operations were the norm. By the time I left the typical day would find my company broken down into five man ambush patrols. It took a lot of fun out of being a company commander when you rarely saw them all together. The ambush patrol was honed to a fine art in Ranger School and I was well prepared for this kind of warfare. The thing that made it different in Viet Nam (other than the real bullets) was the fact that we did it day and night.



Most people would probably think that a soldier on an ambush in a real war would have trouble falling asleep. Wrong! It may be true on your first 'bush but pretty soon you have the opposite problem. It is extremely difficult to stay awake after humping all day. The typical ambush might have 100% alert until midnight, 2 people plus radio watch until stand to some ungodly hour in morning when you would go back to 100 percent.

It's pretty scary when you wake up to find everyone asleep. Occasionally I would fire a signal flare to wake everyone up and incidentally scare the shit out of them. Its easy to imagine that you see movement in your kill zone. Then you quietly wake everyone and get ready to detonate your claymores. False alarm. You don't know whether the troops are mad that you woke them or glad that they avoided a fire fight. One night I kept imagining that I heard music. I crawled over to my radio watch to find that he had a transistor radio stuck in his ear. I'm afraid that I violated noise discipline when I broke the damn thing over his helmet.

The jungle can be a noisy place at night. I remember spending most of a night shaking a bush to silence a cricket. He chirped so loud, I couldn't hear a thing. Two other interesting sounds were the "Re-Up" bird and the "fuck you" lizard. Re-up is GI slang for reenlist. When the bird's comment was answered by the lizard, the troops were always amused and generally shared the sentiment.

I remember a few memorable ambushes. Soon after I joined Delta Company at Ft Apache an ambush almost resulted in my being physically assaulted by the mess sergeant. I had set up a textbook ambush about 500 meters from Apache. After a few hours our starlight scope picked up a Vietcong to our rear. Damn! I guess that he didn't read the same textbook that I did.

The only real problem was that Ft Apache lay in the line of fire. There was a lot of pressure on us to produce a body count so I decided to give it a go. I called the radio watch at Apache and told him to warn everyone to get down. A few seconds later I told the machine gunner to fire a burst. My first confirmed kill. The next day we marched back to Apache for a rest. I was eager to present my trophy to the company commander and claim the accolades due the conquering warrior. As we approached the gate I saw the mess sergeant with his hands on his hips.

His eyes were wide open and he was obviously overwrought. When I pulled up next to him, I heard him babble something that sounded like, "G\*\*\*\*\*t EL TEE, (LT or Lieutenant) didn't they teach you at Fort Benning not to shoot up your G\*\*\*\*\*d mess hall. I thought he was going to strangle me. Mess deflated my euphoria somewhat and I began to wonder if I had done the right thing.

I went in the corrugated metal building where the CO and the platoon leaders bunked. CPT Blue seemed in a fairly good mood. I only later found out that he had scratched his butt sliding on the rough concrete floor trying to put on his pants. He was too gracious to point out the new bullet holes in the 4 x 8 sheet of plywood that served as a company manning chart just by his bed. The other LT on ambush that night discovered a hole in his gas mask that had been in a duffle bag in his bed. He was not as gracious as the CO.

The next day Mess showed me the several bullet holes through the walls of the mess hall, just above the oil drum Wall and a few feet above his bunk. I guess he didn't trust himself to say anything. I kept quiet too.

A favorite ambush was one where nobody got hurt, in fact, our intended victim literally felt no pain. New Year's Eve, 1968, found us on the inevitable ambush, this time near a small village. My men laid out the ambush with practiced dispatch and we settled in for the night. Around midnight, I heard some singing. We could see fairly well, perhaps because of the moon. I don't remember. The singing grew louder and louder. We were all awake and ready to kill. In a few minutes, a skinny old man on a bicycle weaved his way into sight. He was taking swigs on a bottle he was carrying and singing. My finger tightened on the clacker of my claymore. As he reached the center of our kill zone, he fell off of his bicycle. He sat there laughing and singing.

He tried to get back on his bike only to fall again. He kept laughing and singing. I heard other laughter around me as my men couldn't hold it back at the comical sight. Pretty soon we were all laughing. I didn't have the heart to kill him. The next morning several men came up to me and said they were glad I let him go. So was I. Hell! He was probably the local party secretary.

Before I took over the Recon Platoon they had an interesting ambush that some of the participants told me about later. The mission was to stop the nighttime use of the main road between Saigon and Long Binh. That was kind of like ambushing I-35. They were told not to blow any holes in the road as that would slow up the legitimate daytime traffic. After a while they saw a headlight heading south toward Saigon.

They opened up on motorcyclist with small arms and M-60 fire. Tracers went through his spokes and ricocheted all around the rider's head. He wailed on through until his lights faded in the distance. It was kind of embarrassing, not the kind of thing to enhance the Recon Platoon's warrior reputation. Vowing to do better next time, they waited.

A little while later two widely spaced headlights approached from the north. The same thing happened. They must have fired half their basic load at the guy. The sky turned red with muzzle flashes and tracers to no avail. Their effort was rewarded only by a slight shriek from the rider. The third guy must have seen what happened because he stopped and headed back north. He stopped after a hundred meters or so and turned around again.

He approached the area of the ambush and stopped, apparently weighing the situation. His need to get to Saigon was greater than his respect for Recon's accuracy and he decided to go for it.

I don't know whether it was out of respect for the guy's bravery or out of fear that they would miss again but the platoon leader decided to let the guy go. I think the guys swore each other to secrecy because I never heard the story from anyone else.

Another kind of ambush that was widespread was the "mechanical ambush. Some unit came up with the idea and got lucky killing almost a whole platoon of enemy. USARV got word of it and decreed that each ambush patrol would set up two mechanical ambushes.

It was really a booby-trap made of claymores daisy chained with detonating (det) cord. This nasty device was activated by a trip wire. We took a the handle of a plastic C ration spoon and put a small hole in one end to which the trip wire was attached. Then we put electrical wire on a clothes pin so that the ends of the wire touched when the jars were closed. The clothes pin was attached to a stake and the end of the spoon was inserted into the clothes pin preventing electrical contact. The wire was stretched across a trail, the whole thing was camouflaged and only then was the battery attached.

When the unsuspecting quarry tripped the wire, the electrical spark set off the claymores and hundreds of small steel ball bearings would mow down anyone in the kill zone. There were a few problems with the mechanicals. First of all, since they were unattended, Charlie could (and did) move your ambush so that the troops retrieving them in the morning would wind up the victim. Also, you had to be absolutely sure where you were when moving into your AP location so you did not stumble into a mechanical employed by another unit. I hope the damn things killed more gooks than friendlies. Another interesting ambush happened soon after I joined Delta Company. One of my fellow platoon leaders had set up an ambush on a main rice paddy berm. A berm was much larger than a paddy dike and was usually used for travelling between villages. He had set up a strange ambush with a very small kill zone. He was in good shape if the enemy came through the rice paddy but that was unlikely. As it was, only one or two people could bring fire to bear to the front or rear of the berm. A claymore had been set up at either end of the berm.

It was almost a success in spite of the poor tactical setup. A bad guy came diddy bopping down the berm. He was picked up by the starlight scope and the platoon leader got ready to blow the bush. He coolly waited for the guy to get close so that he would blow the hell out of him with the claymore. When the guy was in the right place the PL squeezed the claymore clacker, causing an electrical spark to ignite the blasting cap that was screwed into the claymore. Instead of a huge explosion there was only a loud pop. It seemed that someone had taken the C4 out of the claymore and used it to heat his C rations. All the blasting cap did was blow the back off the claymore.

My colleague swung up his CAR 15 to shoot the guy but only got off one round before it jammed. It just wasn't his day. The gook shot him in the arm and disappeared into the dark. I was designated by the battalion commander to conduct an investigation into what went wrong. I had plenty to write about. While checking out the area I found a CHICOM pistol, complete with holster and belt. I foolishly gave it to the platoon leader who had been shot. I kept the belt and the plastic poncho that was on the belt.

Early into the war the M-16 rifle had a reputation for jamming easily. That problem had largely been solved but not on the CAR 15. Its proper nomenclature was XM 177, Submachine gun, Commando. It was really neat looking. It was like an M-16 but with a short barrel and a telescoping stock. I later got one when I was recon platoon leader. I kept it for a week or so. One day I decided to test fire it and it would jam every three or four rounds. I sent it to the rear and asked the armorer to send me out an M-16.

## The Dead Man in the O-Club

We had just returned to the DiAn after a particularly trying mission. The company had lost four men to booby traps -- luckily none were killed. Booby traps are very frustrating to the troops. On top of the normal fear you are pissed that you can't kill anybody.

We were tired to the bone. All we wanted was to shower and to get quietly drunk. After cleaning up, I went to our battalion Officer's Club to start on the latter when I was joined by my platoon leaders. We started a poker game. The stakes were low as were our spirits. We were playing only as a prop for our drinking.

After a while I heard a commotion at the bar. Chief Jimmino, our battalion maintenance warrant was having an argument with Jack, one of the company Executive Officers. Jack was rather obnoxious and Chief was very direct. I looked up to see Chief cold-cock Jack who fell over backwards, his head hitting the floor with a sickening thud. It didn't look good for him.

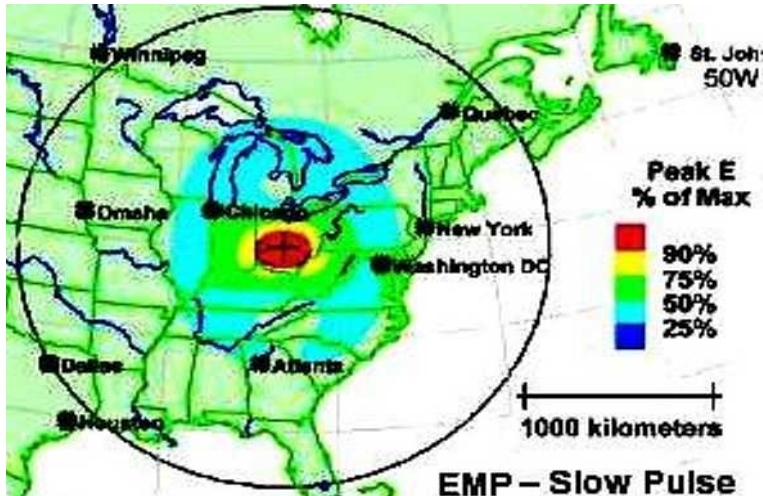
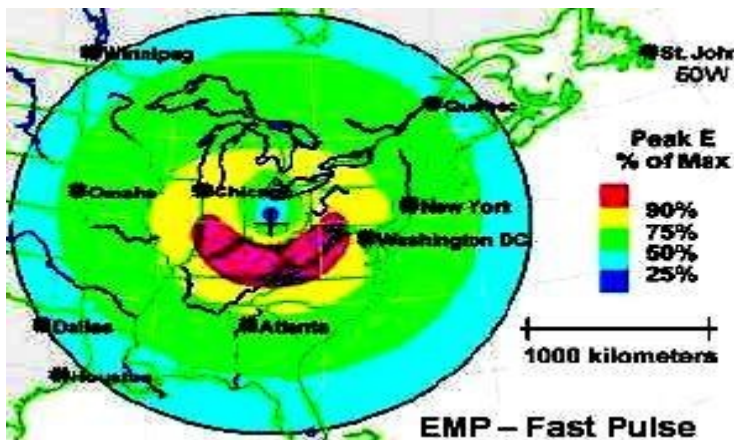
Jack lay there for about five minutes. I wasn't too interested as Jack wasn't on my morning report and besides, he was an A\*\*\*\*\*e. "Kitch," one of my platoon leaders folded and got up for a refill. I told him he might as well check Jack since he almost had to step over him anyway.

Kitch looked down at Jack, felt a pulse and said, "He's dead" in a matter-of fact tone of voice. One of the REMF officers said unbelievably "He's WHAT???" Kitch confirmed with "He's DEAD!!!" I got up to look at Jack and what Kitch said seemed to be a fact. Jack's eyes were wide open and fixed and I didn't detect any breathing.

I shrugged my shoulders, said that there was nothing we could do and went back to our poker game. Jack lay there for about fifteen minutes when some medics with a stretcher arrived and hauled him off. A few minutes after that the battalion Executive Officer arrived and closed the club for the night. We felt that closing the club was unnecessary, especially because we were behaving ourselves.

The next morning we found that Jack survived with nothing worse than a bump on his head and a hangover. I slept well that night. Before I drifted off I did think about Jack though. I was sure as hell glad that I wasn't signed for him.





EMP Sky Burst

## Next Regular Meeting

The next meeting will be on Thursday, April 25th at 7:00PM. We meet in the Fellowship Hall of Redemption Lutheran Church, 4057 N Mayfair Road. Use the south entrance. Access the MRAC Yahoo group for important details about the February Meeting.

### Meeting Schedule:

May 30th, 2013

June 27th, 2013

**Please do not call the church for information!**

## Club Nets

Please check in to our nets on Friday evenings.

Our ten meter SSB net is at **8:00 p.m.** at **28.490 MHz USB**. Our two meter FM net follows at **9:00 p.m.** on our repeater at **145.390 MHz** with a minus offset and a **PL of 127.3 Hz**.

Visit our website at: [www.w9rh.org](http://www.w9rh.org)

Or phone **(414) 332-MRAC** or **332 - 6722**



Name of Net, Frequency, Local Time	Net Manager
<b><u>Badger Weather Net (BWN)</u></b> 3984 kHz, 0500	<a href="#">W9IXG</a>
<b><u>Badger Emergency Net (BEN)</u></b> 3985 kHz, 1200	<a href="#">NX9K</a>
<b>Wisconsin Side Band Net (WSBN)</b> 3985 or 3982.5 kHz, 1700	<a href="#">KB9KEG</a>
<b>Wisconsin Novice Net (WNN)</b> 3555 kHz, 1800	<a href="#">KB9ROB</a>
<b>Wisconsin Slow Speed Net (WSSN)</b> 3555 kHz, Sn, T, Th, F, 1830	<a href="#">N1KSN</a>
<b>Wisconsin Intrastate Net - Early (WIN-E)</b>	<a href="#">WB9ICH</a>
<b>Wisconsin Intrastate Net - Late (WIN-L)</b>	<a href="#">W9RTP</a>
<b><u>ARES/RACES Net</u></b> 3967.0 kHz, 0800 Sunday	<a href="#">WB9WKO</a>
* Net Control Operator needed. Contact Net Manager for information.	

## Chatter Deadline

The **DEADLINE** for items to be published in the **Chatter** is the **15th of each month**. If you have anything (announcements, stories, articles, photos, projects) for the 'Chatter, please get it to me before then.

You may contact me or Submit articles and materials by e-mail at: [Kc9cmt@earthlink.net](mailto:Kc9cmt@earthlink.net)

or by Post to:

Michael B. Harris

807 Nicholson RD

South Milwaukee, WI 53172-1447



## VE Testing:

April 27, 2013 - AES - 9:30 AM  
 May 25, 2013 - AES - 9:30 AM  
 No testing in June  
 July 27, 2013 - AES - 9:30 AM

ALL testing takes place at: Amateur Electronic Supply  
 5720 W. Good Hope Rd. Milwaukee, WI 53223

## Area Swapfests

**May 4th, 2013 Ozaukee Radio Club's May Ham-fest** Location: Cedarburg, WI Type: ARRL Hamfest  
 Sponsor: Ozaukee Radio Club  
 Website: <http://www.ozaukeeradioclub.org>

**May 5th, 2013 THE DEKALB HAMFEST**  
 Location: Sandwich, IL Type: ARRL Hamfest  
 Sponsor: Kishwaukee Amateur Radio Club  
 Website: <http://www.karc-club.org>

**July 6th, 2013 Swapfest '13** Location:  
 Oak Creek, WI Type: ARRL Hamfest  
 Sponsor: South Milwaukee ARC  
 Website: <http://www.qsl.net/wa9txe>

## MRAC Working Committees

### 95th Anniversary:

- Dave—KA9WXN

### Net Committee:

- Open

### Field Day

Dave—KA9WXN, Al—KC9IJJ

### FM Simplex Contest

- Joe – N9UX
- Jeff – K9VS

### Ticket drum and drawing

- Tom – N9UFJ
- Jackie – No Call

### Newsletter Editor

- Michael-KC9CMT

### Webmaster

- Mark Tellier—AB9CD

### Refreshments

- Hal—KB9OZN



## Membership Information

The Hamateur Chatter is the newsletter of MRAC (Milwaukee Radio Amateurs' Club), a not for profit organization for the advancement of amateur radio and the maintenance of fraternalism and a high standard of conduct. MRAC Membership dues are \$17.00 per year and run on a calendar year starting January 1st. MRAC general membership meetings are normally held at 7:00PM the last Thursday of the month except for November when Thanksgiving falls on the last Thursday when the meeting moves forward 1 week to the 3rd Thursday and December, when the Christmas dinner takes the place of a regular meeting. Club Contact Information

Our website address <http://www.w9rh.org>

Telephone (414) 332-MRAC (6722)

Address correspondence to:

**MRAC, PO Box 26233, Wauwatosa, WI 53226-0233**

Email may be sent to: [w9rh@arrrl.net](mailto:w9rh@arrrl.net) . Our YAHOO newsgroup: <http://groups.yahoo.com/group/MRAC-W9RH/>

## CLUB NETS:

- The Six Meter SSB net is Thursday at 8:00PM on 50.160 MHz USB
- Our Ten Meter SSB net is Friday at 8:00PM on 28.490 MHz  $\pm$  5 KHz USB.
- Our Two Meter FM net follows the Ten meter net at 9:00PM on our repeater at 145.390MHz - offset (PL 127.3)

The HamChatter is a monthly publication of the Milwaukee Radio Amateurs' Club.

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MRAC Website: <http://www.W9RH.org>

Editor: Michael B. Harris, Kc9cmt, [kc9cmt@Earthlink.net](mailto:kc9cmt@Earthlink.net)

## Milwaukee Area Nets

Mon.8:00 PM 3.994 Tech Net

Mon.8:00 PM 146.865- ARRL Newsline

Mon.8:00 PM 146.445 Emergency Net

Mon.8:00 PM 146.865- Walworth County ARES net

Mon.8:45 PM 147.165- ARRL Audio News

Mon. 8:00 PM 442.100+ Railroad net, also on EchoLink

Mon. 8:00 PM 442.975+ WARC W9CQ net also on EchoLink 576754

Mon. 9:15 PM 444.125+ Waukesha ARES Net on the 1st, 3rd, and 5th Monday of each month.

Mon. 9:00 PM 147.165- Milwaukee County ARES Net

Tue.9:00 AM 50.160 6 . Mtr 2nd Shifter's Net

Tues. 8:00 PM 145.390- General Class

Tue. 9:00 PM 145.130 MAARS HandShakers Net

Tue. 8:00 PM 7.035 A.F.A.R. (CW)

Wed. 8:00 PM 145.130 MAARS Amateur Radio Newsline

Wed. 8:00 PM 147.045+ West Allis ARC net

Wed. 8:00 PM 147.270+ Racine County ARES net

Wed. 9:00 PM MAARS SwapNet, AllStar link to FM-38

Thur. 8:00 PM 145.130- General Class

Thur. 8:00 PM 50.160, 6 Mtr SSB Net

Thur. 9:00 PM 146.910 Computer Net

**Fri. 8:00 PM 28.490 MRAC W9RH 10 Mtr Net SSB**

**Fri. 9:00 PM 145.390 W9RH 2 Mtr. FM Net**

Sat. 9:00 PM 146.910 Saturday Night Fun Net

Sun 8:30 AM 3.985 QCWA (Chapter 55) SSB net

Sun 9:00 AM 145.565 X-Country Simplex Group

Sun 8:00 PM 146.91 Information Net

Sun 8:00 PM 28.365 10/10 International Net (SSB)

Sun 9:00 PM 146.910 Swap Net

**First Thursday of the month 8:00 PM 442.200+ Round Table Tech Net**

2meter repeaters are offset by 600KHz - - 70 centimeter repeaters are offset by 5 MHz

SSB frequencies below 20 meters are LSB and for 20 Mtr and above are USB.

