MRAC Hamateur Chatter

The Milwaukee Radio Amateurs Club

August 2015 Volume 23, Issue 8

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

ARRL News Letter

The Best Laid Plans …

I am often brutally reminded of how much influence our Sun has on propagation, both good and bad!

Hoping to enjoy some further contest work and improve my ear-brain-keyboarding skills, I had prepared everything for this Saturday's 24-hour **'KCJ' Contest**. The 'Keymen's Club of Japan' is an annual affair that seems to attract a lot of domestic JA activity, with bonus points when they work any DX stations. I checked my **N1MM Logger** software but it didn't seem to have the contest. I did find it in the program's UDC (User Defined Contests) section but had to download and install a unique 'Sections' file from a Japanese website, as the contest requires the Japanese to exchange their Prefecture abbreviations. I eventually had N1MM working perfectly for the KCJ contest and with the contest starting at 0500 locally, I tuned up everything for the normally excellent 40m path to Japan in the morning and went to bed.

Rising just a few minutes before the contest start, a quick check of 40m indicated that something was not right ... not a JA to be heard, in fact almost no signals to be heard! Checking the web for more info, I quickly discovered a 'K' index of '7', indicative of very disturbed conditions. Along with a strong southerly pointed **Bz**, it seemed that we were in the middle of some strong auroral conditions ... back to bed with hopes of the afternoon 15 or 20m path to Japan being better.

The afternoon path never really materialized either. Normally, propagation between the west coast and Japan is very good, with lots of strong signals being the norm ... but not today. Over the course of several hours, only four JA stations found their way into my log, and they were all a struggle.

The earth had been hit, rather unexpectedly, by another whopping '**coronal hole stream**' and propagation was truly dismal. With only a smidgen of keyboarding practice, I had to admit defeat ... the Sun had messed things up once again, as it has been doing for the past year as Cycle 24 slowly slides downhill. Unfortunately there is always a lot more flaring and streaming on the way down than on the way up. Hopefully the Sun will soon get this out of its system and radio conditions will quiet down and stabilize for the upcoming fall and winter DX season.

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The Experimenters' Bench

Basics of cooling transistors, IGBTs, and power FETs with heat sinks and PCBs

By Chris Francis

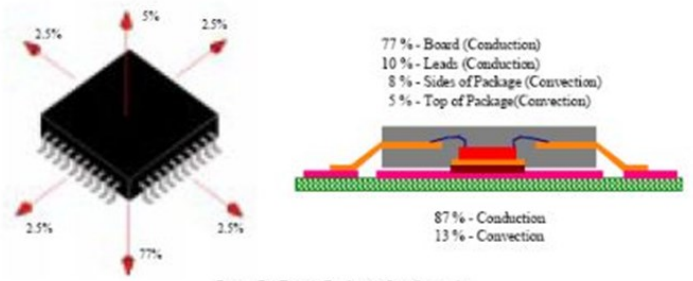
When designing any electronics that consumes a significant amount of power you need to consider where that power is going to go. With power electronics –such as IGBTs, power FETs, or power transistors — you might be expecting most of it to end up in your load but there will be some which doesn't. Even devices which are not considered as "power devices" need to be have their power consumption checked – high speed devices such as analog-to-digital converters (ADCs) and op amps can consume significant amounts of power and that power is not usually going into a load, so most will be dissipated in the device. Factor in that devices are getting smaller and so thermal resistance is increasing and the problem becomes worse.

Thermal resistance is usually quoted as a temperature rise (°C) per Watt of power. The temperature rise is between two points and under certain specified conditions. One of the two points is often the semiconductor device junction. The other point could be the ambient air but is more often the "case" of the device. However, with the devices becoming more sophisticated to try to dissipate power better, the "case" can really be the "case while soldered to a certain area of PCB". This is because the PCB is acting as a heatsink whereas with traditional power devices such as TO220 packages the heatsink is often a metal extrusion or pressing bolted or clipped to the device such as this one from Aavid Thermalloy.

These types of heatsink are simple to select. They are specified with the thermal resistance from the device to the air such as 13°C/W. Once you know the device thermal resistance from junction to case, say 4°C/W, you can add these together and work out your total temperature rise and see if you are still within the device maximum junction temperature. You are more likely to be doing the calculation the opposite way round – deciding on the maximum temperature rise you can allow and then calculating the smallest heatsink that will keep you within that.

Bear in mind that the "ambient" temperature is not necessarily the temperature of the equipment surroundings but the ambient air around the heatsink. If the equipment is in an enclosure then the temperature inside the enclosure can be a lot higher than the ambient air outside the enclosure. Also, the orientation of heatsinks makes a difference i.e. vertical or horizontal. A standard heatsink will usually specify which orientation the thermal resistance is quoted for.

Newer surface mount power devices are a somewhat more complex problem. The devices are smaller and in order to better dissipate power there are newer packaging solutions which often put a pad under the device to try to remove heat from the silicon. While they can look the same on the outside, on the inside they can be different resulting in better or worse thermal conductivity to the heatsink pad. Texas Instruments has its trademarked PowerPAD construction and a comparison of where the heat goes is in its 1998 SMI Conference presentation which can be downloaded as a pdf.



PowerPAD(tm) Package Configuration

Whereas a conventional package would conduct 80% of the heat through the legs, the PowerPAD construction would dissipate 77% through the board through the PowerPAD rather than through the legs. There are many small packages designed to dissipate power through the PCB either through the legs, a power tab or power pad but they all have one thing in common – the PCB is your heatsink. The problem with that is the difficulty in being certain of the thermal resistance from the device junction to the ambient air. You will find some guidance in datasheets.

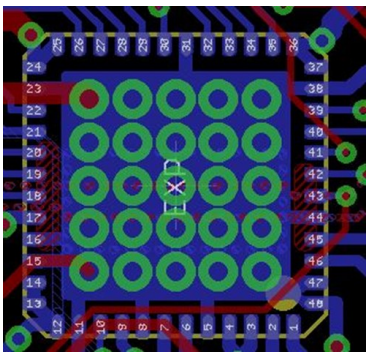
Table 2. DE Package, 12-Lead DFN

COPPER AREA			THERMAL RESISTANCE
TOPSIDE*	BACKSIDE	BOARD AREA	(JUNCTION-TO-AMBIENT)
2500mm²	2500mm²	2500mm²	40°C/W
1000mm²	2500mm²	2500mm²	45°C/W
225mm²	2500mm²	2500mm²	50°C/W
100mm²	2500mm²	2500mm²	60°C/W

* Device is mounted on topside

For example, the Linear Technology LT1763 regulator has a table for each of the device packages giving thermal resistances depending on the board area used for dissipating the heat.

In all cases they are relying on 2,500 mm² of area dissipating heat on the underside of the PCB with varying amounts of topside area also used for heat dissipation. It is unlikely that you would dedicate 2,500 mm² to heatsinking on both sides of the PCB. Also, it is rather ironic that while trying to make devices smaller and smaller you now need to allow 200 times the area of the device as a PCB heatsink to keep it cool! Hopefully the space will not be dedicated to being a heatsink but will be ground plane under other circuitry.



You will also find more complex examples where a four layer board is assumed and inner layers are used for dissipation. Also, vias in power pads are usually used to try to conduct heat to the inner layers or bottom PCB layer. Again, these would normally be specified on the datasheet so you know what the assumptions were in the quoted thermal resistance figures.
Ultimately though, the only way to be certain is to build something and test it using a thermal camera or other method to determine device temperature. If you have a large margin in your power calculations then testing will not be critical.
Another way of dissipating power is to use a metal-backed or metal-cored PCB. As these are usually only single or dual-layer PCBs they are generally reserved for specific power applications such as high-power LED mounting although you can metal back multilayer PCBs.
Using Alumina rather than fiberglass (FR4) for a PCB would help dissipate heat because Alumina has 100 times the thermal conductivity of FR4. However, it is rather a specialized solution.
Don't neglect the benefits of air movement. Any airflow over the PCB reduces the temperature rise, which is why fans are used in equipment. Standard heatsinks often give a graph of effective thermal resistance against airflow.

Even water cooling is possible. I worked on a project which was heating and pumping water. The power device controlling the heater was mounted so it was thermally connected to the cold water flow. This had a double benefit as it kept the power device cool but also the heat wasn't wasted – it preheated the water which was due to be heated anyway.

Severe Weather Awareness

A Brief History of the Storm Prediction Center

Stephen Corfidi

The NOAA Storm Prediction Center (SPC) prepares forecasts of hazardous weather affecting the continental United States. The SPC, formerly known as the National Severe Storms Forecast Center, is a component of the National Weather Service's (NWS) National Centers for Environmental Prediction (NCEP).[1] In addition to issuing tornado and severe thunderstorm watches on an as-needed basis, the SPC also produces scheduled severe weather and fire weather outlooks, as well as short-term forecasts for heavy rain and winter storms. The SPC operates around-the-clock, with an on-duty staff that varies between 3 and 5 forecasters depending on the time of day.

Early Severe Weather Forecast Efforts

Although SPC's immediate history dates to the early 1950s, the roots of severe weather prediction in the United States may be traced much further. The development of a centralized weather forecast program by the U. S. Army Signal Corps in 1870 made apparent the need for improved documentation and increased understanding of destructive local storms. Leading the Corps in this effort was Sgt. John P. Finley.

In the mid 1880s, Finley organized a team of more than 2000 "reporters" to document tornadoes and their associated weather conditions over the central and eastern United States. Using the data thus collected, Finley assembled maps of characteristic tornado-producing weather patterns that were then used to issue tornado "alerts." Finley's forecasts fell out of favor, however, in the late 1880s as the Corps (and, later, the Weather Bureau, predecessor of the NWS) felt that mention of the word "tornado" provoked undue fear amongst the public.

Little progress was made in the understanding and forecasting of severe local storms in the United States during the first part of the 1900s. Although forecasts occasionally mentioned the potential for severe weather, Weather Bureau policy continued to prohibit use of the word "tornado" in forecasts. Airplane and kite observations sparked renewed interest in severe weather in the 1920s and 1930s. Interest increased with the development of radiosondes and the growth of military aviation in World War II. Nevertheless, even though the ban on the word "tornadoes" was lifted in 1938, very few forecasts made mention of tornadoes during the 1940s.

1948 witnessed the single event that most directly led to the establishment of a centralized severe weather forecast program in the United States. Based on work by Weather Bureau researchers A. K. Showalter, J. R. Fulks, and others --- and on their own investigation of the conditions that produced a damaging tornado at Tinker Air Force Base in Oklahoma City on 20 March 1948 --- Air Force weather officers E. J. Fawbush and R. C. Miller successfully predicted the fortuitous occurrence of another tornado at the base five days later on 25 March. The forecast's accuracy drew considerable attention; soon the officers were responsible for Air Force tornado prediction over much of the central United States. Three years later, the Severe Weather Warning Center, a formal Air Weather Service unit with responsibility for all Air Force sites on the United States mainland, was established under Fawbush and Miller's leadership.

The Birth of SELS

The success of the Air Force tornado program --- along with media pressure to adopt the program for civilian use --- led the Weather Bureau to establish its own severe weather unit on a trial basis at the Weather Bureau-Army-Navy (WBAN) Analysis Center in Washington, DC in March 1952. Fifteen forecasters, including members of the WBAN analysis staff and others from the Bureau's central office and field stations, were selected to staff the unit. Several weeks of techniques development and practice forecasts preceded the release of the unit's first public tornado "bulletin" on 17 March. This forecast mentioned the possibility of tornadoes in parts of Texas, Oklahoma, Arkansas and Louisiana during the late night and early morning of the 17th - 18th. Although two tornadoes did occur in Texas, they were not in the outlook area.

The group experienced more success with its second forecast, which was issued on 21 March for parts of east Texas, southern Arkansas, southeast Oklahoma and northern Louisiana. An update extended the forecast into parts of Tennessee, Kentucky and Indiana. Thirty-six tornadoes that began during the afternoon and continued through the night caused 208 deaths in Arkansas, Mississippi, Louisiana, Alabama, Tennessee, Kentucky and Missouri.

The WBAN severe weather operation became permanent on 21 May 1952 when the group was formally recognized as the Weather Bureau Severe Weather Unit (SWU). Forecast responsibility that had been limited to tornadoes was now expanded to include large hail, high winds, and extreme convective turbulence.

Five permanent SWU forecasters were selected during the summer of 1952 to provide continuous shift coverage; temporary staff continued to cover shifts as necessary until the permanent staffing was completed in September. The new forecasters were young; most had been with the Weather Bureau less than ten years and had attended meteorology school with the military during World War II. Comparatively new forecasters were intentionally chosen as it was thought that they would be less likely to harbor preconceived notions about severe storm prediction. Three of the original five permanent SWU forecasters left the group before its move to Kansas City in 1954. Only Joseph Galway, the first forecaster to join the unit and the originator of the well-known atmospheric stability parameter, the "lifted index," remained with the SWU after 1955.

Although the first few severe weather forecasts were issued directly to the public via teletype, tornado forecasts through the remainder of 1952 were released by the affected Weather Bureau district offices --- usually after consultation with the SWU. Consecutively-numbered "Severe Weather Bulletins," the forerunner of today's "watches," were initiated in May 1952. As is the case today, the objective was to keep the threat areas as small as possible, with only as much lead time as believed necessary to allow for adequate public response. These early "watches" were not necessarily parallelograms; some were odd-shaped trapezoids or even circles. The Severe Weather Unit evolved rapidly in 1953 --- a year that coincidentally produced an unusually large number of tornadoes. In January, an experimental program to issue daily outlooks of the severe weather potential of the upcoming day was initiated. These trial forecasts, called "Severe Weather Discussions," were intended as guidance for selected Weather Bureau district offices for the noon - midnight (CST) time period.

They became operational in February and were renamed "Convective Outlooks" when regular transmission began on the "Service A" teletype network in April 1955.
The unit was renamed the Severe Local Storm Warning Center (SELS) on 17 June 1953 --- shortly after death-dealing tornadoes struck Flint, MI, Waco, TX, and Worcester, MA. Devastating storms on 7-9 June alone claimed more than 200 lives. These events tested the endurance of the Center's relatively inexperienced staff. Although the storms on 7- 8 June were well forecast, the Worcester tornado on the 9th caught forecasters by surprise; one forecaster requested (and was granted) a transfer out of the unit. By the end of the year, SELS supervisor Kenneth M. Barnett also had requested a transfer as the group came under increasing scrutiny regarding both the size and accuracy of its forecasts. Because of pressure to issue smaller "bulletins," tornado forecast areas decreased in size from nearly 38,000 square miles in 1952 to 27,000 square miles during the first half of 1953. (By comparison, average tornado and severe thunderstorm watches today cover about 25,000 square miles).

The Move to Kansas City

SELS continued to change in 1954. Staffing increased to include a supervisor, 7 forecasters, 6 chartists, a research forecaster and a research assistant. In addition, a new supervisor, Donald C. House, was selected to replace Barnett. House's enthusiasm for severe weather was immediately apparent: on busy days he often worked the forecast desk. Under his direction, the size of tornado forecasts continued to decrease; average "bulletin" size in 1954 dropped to just 15,000 square miles. House also strived to enhance the scientific integrity of the unit by furthering staff research efforts started under Barnett. A series of contributions by SELS meteorologists Ferdinand Bates, Robert Beebe, James Carr, Donald Foster, Joseph Galway, Bernard Magor, Jean Lee, and others advanced the science of severe weather forecasting beginning in the mid 1950s; many of these studies remain relevant today. House also emphasized the importance of high-level (jet stream) data in forecast preparation, incorporating the recent work of Herbert Riehl. House's emphasis on science, very much supported by Weather Bureau Chief Francis Reichelderfer and Regional Director Clayton Van Thullenar, was to a large extent responsible for the high level of respect that SELS commanded by the late 1950s.

In September 1954, SELS relocated from the WBAN Center in Washington to the Bureau's District Forecast Office on the 9th floor of the Federal Building in downtown Kansas City, Missouri. The move was made, in part, to allay media pressure to locate the office in a region more prone to severe weather. In addition, Kansas City was a major teletype circuit switching center. This allowed for more timely access to nationwide surface observations, and for faster forecast dissemination. But the move also recognized an existing local severe weather operation that had been established in January 1952 when J. R. Lloyd, Meteorologist-In-Charge of the Kansas City office, assembled a small group of forecasters to test the techniques of Fawbush and Miller. Oklahoma at that time was part of the District Office's area of responsibility. Lloyd's effort was the subject of scrutiny as pressure increased to have the Weather Bureau issue tornado forecasts like those of the Air Force. Lloyd intended to use the results of the test group to issue actual forecasts beginning in 1953 or 1954. His efforts were instrumental in hastening the Weather Bureau's decision to issue routine severe weather forecasts in May 1952.

The success of the Air Force and Weather Bureau severe weather programs, in addition to educational efforts that included brochures and presentations on tornado safety, significantly reduced public opposition to tornado forecasts during the mid 1950s. Many in fact praised the forecasts as a means of saving lives. During this period, a typical SELS tornado forecast would read as follows: "...possibility of an isolated tornado along and thirty miles either side of a line from Amarillo, TX to 20 miles north of Gage, OK, from 5:15 to 9:00 PM." Such a forecast would have first been telephoned to the district offices(s) involved. If it were agreed that a public tornado forecast was indeed prudent, the district forecaster would notify the local Weather Bureau offices under his jurisdiction, in addition to the media. If the proposed forecast affected only one district office, that office had final say as to whether or not tornadoes would be mentioned in the public forecast.

If, on the other hand, a proposed tornado forecast involved more than one district office, SELS made the final decision. It was not until 1958 that SELS assumed total authority for public tornado and severe thunderstorm forecasts.

Maturity

Throughout the 1950s and early 1960s, SELS data plotting and analysis were performed by hand. Analysis skills increased significantly with the installation of an IBM 1620 computer in April 1963. The 1620 allowed forecasters to access diagnostic fields of convergence and divergence that were difficult or impossible to manually compute. Automated plotting of surface and upper air observations commenced with the arrival of a CDC 3100 system in November 1965. This computer also was used for data tabulation and research by the District Forecast Office.

In August 1965, Donald House left SELS for a position with the newly-formed Environmental Science Services Administration (predecessor of NOAA) in Washington, and Allen D. Pearson was appointed SELS Director. Early the following year, the entire Weather Bureau Office in Kansas City (including SELS and the District Forecast Office) was renamed the National Severe Storms Forecast Center (NSSFC) to better reflect its national scope. In addition, SELS' tornado and severe thunderstorm forecasts were renamed "watches" to more directly correspond with the suite of products issued by the National Hurricane Center. Shortly thereafter, NSSFC moved to the 17th floor of the new Federal Building at 601 E 12th Street, where it remained until relocating to Norman, Oklahoma in 1997.

A series of computer upgrades significantly enhanced NSSFC's data processing and communication capabilities during the late 1960s and 1970s. But one of the more important developments of the period occurred with the establishment of the Techniques Development Unit (TDU) in April 1976. This group was formed to provide software development and to assist with the evaluation of new forecast techniques. It also provided a link to the severe weather research community. TDU's formation marked the first formal research/development program to be associated with SELS/NSSFC since the National Severe Storms Project, the original research component of SELS, departed Kansas City to become the National Severe Storms Laboratory (NSSL) in Norman in March 1964.

Frederick P. Ostby became the Director of NSSFC in May 1980, shortly after the transfer of Pearson to NWS Central Region Headquarters. Ostby oversaw NSSFC's entry into the age of interactive computing with the arrival of the Centralized Storm Information System (CSIS) in February 1982. This system, developed at the University of Wisconsin, enabled forecasters to overlay objective analyses of conventional surface and upper air data with real-time radar and satellite imagery. Watch areas could be formulated directly on the appropriate radar and satellite displays, and different objective analyses could be simultaneously displayed. Later upgrades allowed the user to "roam" and "zoom" across the entire nation. Mesoscale Discussions, unscheduled products used to describe ongoing convective trends and hazardous weather situations, were instituted in 1986 --- partly in response to the availability of timely analyses on CSIS.

Recent years

As part of a decade-long effort to modernize the nation's weather services around the newly-deployed Doppler radar network, NSSFC was renamed the Storm Prediction Center (SPC) in October 1995, with former TDU chief Joseph T. Schaefer selected to succeed Ostby as Director. The McIDAS-based work stations that had been a mainstay of operations since 1982 gradually were replaced by UNIX-based workstations known as NAWIPS.

Early in 1997 and after more than 40 years of severe weather forecasting in Kansas City, the Center moved to Norman, OK. There, on the site of the former Norman U.S. Naval Air Station (now part of the University of Oklahoma), the SPC rejoined the organization that it had in part given birth to three decades earlier --- the National Severe Storms Laboratory. Shortly thereafter, the Mesoscale Discussion program was expanded to include short-term forecasts of hazardous winter weather and heavy rainfall, and a separate program was instituted to address the meteorological conditions favorable for wild fires in May 2000.

In September 2006 the SPC moved once again --- this time just a few miles south --- to join several other federal, state and Oklahoma University weather organizations in the new National Weather Center (NWC). Located on the University of Oklahoma Research Campus on Jenkins Avenue, the NWC offers opportunities for expanded operations-research collaboration to improve the forecasting and understanding of severe local storms. Improved ensemble forecasts and the development of a nationally-acclaimed operations-research test bed are just two positive effects that already have resulted from the relocation. SPC Science Support Branch (SSB; successor to the TDU) chief Russell S. Schneider was selected to succeed Schaefer as SPC Director in August 2010.

RECON PLATOON

One day after a few months in Delta Company the battalion commander sent word that he wanted to see me, he told me that I had been doing a good job and that he had another job for me. He said that I had my choice of three jobs. I could be a company executive officer, the S-3 air or the Recon platoon leader.

The simplest and safest job would have been that of company XO. I would have been in charge of the company rear and worked under the general supervision of the battalion XO. My main job would have been to support the troops in the field.

S-3 air was a choice job. I would have been the staff officer responsible for air movement and air support. I could have gotten in a lot of chopper time. It was a good career choice and probably the one to take.

The most potentially dangerous job was that of Recon Platoon Leader. OUR Recon Platoon was engaged in combatting the Viet Cong infrastructure in our area. It spent most of its time in villages trying to ferret out the bad guys. It was considered a glamour job so I took it, of course. The Battalion Commander said that he was glad that I had chosen that job and that it would be the most challenging.

He told me that Recon was a rowdy group that needed to be cleaned up. (I just recently [8/96] talked to my predecessor. During his tenure Recon was used as a "fire brigade" or ready reaction force. The change to a less combat intensive mission probably called for a different leadership style). I wondered if I had done the right thing. When I joined Recon, it was occupying a perimeter sector at the Thu Duc water plant. The plant was a $20 million facility just off the main road between Long Binh and Saigon. The platoon area consisted of a GP small for the platoon leader and platoon HQ and several bunkers on the perimeter for the men.

The platoon itself consisted of about thirty US troops, a half dozen Vietnamese National Policemen (Camh Sat) and a few Kit Carson scouts or "KC"'s. KC's were former Viet Cong who had turned their coats and were supposedly working for us -- supposedly. The platoon rarely walked anywhere but rather ran the roads of the AO in jeeps. The jeeps were loaded down with a M-60 machine gun on a pedestal mount, sand bags on the floor for mines and what we called the toy boxes which were mortar ammunition boxes full of explosives such as Bangalore torpedo's and claymore mines and C4. A piece of angle iron was welded to the front bumper. It was higher than a sitting man and the last six inches were notched and angled forward. It was designed to cut wire that might be stretched across the road and designed to decapitate someone driving in a jeep with its windshield down. I never heard of that happening but it probably did happen at least once.

The colonel was right about the platoon. It was a rowdy crew that looked like they had rarely seen a barber. I had my work cut out for me. There is an old saying the it easier to loosen up than to tighten up. Whoever said that must have had a recon platoon.

My first night there I went to check the platoon area. I only found a few sentries and asked the platoon sergeant where the hell everyone was. He told me that they had all gone to a whore house called Bebop's. I couldn't believe my ears. First of all we were not supposed to leave the wire after dark for safety reasons. Even more important than that, the platoon was the battalion's emergency reaction force. We were supposed to be able to conduct offensive operations on a moment's notice. Christ, the men probably couldn't pull up their pants on a moment's notice.

The next day I read the riot act to the platoon. I put Bebop's off limits until further notice. I told the men they would have to begin soldiering, including looking like soldier's. I told them that anybody that didn't like it could transfer to a line company. At first I thought that the whole platoon would transfer, but they didn't. Perhaps they thought they could always transfer later or perhaps they didn't want to bear the stigma of not being able to cut it in Recon. It was a near thing but things got better rapidly.

For several weeks we worked on the basics. We practiced ambushes and tactical operations in general. The men began to act like soldiers and they even began to look like soldiers. They were proud of the fact that we wore camouflage jungle fatigues and bush hats instead of the normal jungle fatigues and steel pots. We began to look pretty good. Sure they still wore their peace medallions and love beads but on the whole they looked more like soldiers than pirates.

Haircuts ranged from good to marginal but were greatly improved. They were definitely children of the 60's. One of the jeeps sported the name "the Grateful Dead" I wonder if its driver is a middle aged "Deadhead" today. The battalion commander complimented me on the platoon's appearance. All they had to do was to play the game. I just had to remind them of the rules.

The platoon sergeant said that we should reward the men with a little time at Bebop's. I said that I agreed but that we would have to control who went and make sure they could return on a moment's notice. We soon had a field telephone "hot line" to Bebop's. I let the NCO's decide who could go each night. I said I wanted it on a rotational basis but that it was a privilege they had to earn. The heck with fines and company punishment, I had the ultimate weapon. Each night we had six to ten men on our own version of R & R. The men seemed happy and Recon could even react to an emergency with most of the men sober.

I hit it off real well with Madame Be Ba or Bebop to the troops. Her place was divided into the whorehouse and her home. Neither the customer or her girls could come into her home unless the were invited. Since I represented a good piece (no pun) of her business, she was very nice to me. She invited me into her living room to have cool drink. She asked me if I wanted a girl. I told her that I didn't but that my driver would appreciate one. Needless to say, after that I rarely had any trouble getting someone to drive me.

I had many good evenings at her house. It was like a home away from home for me. I met several interesting people at her dinner table. Many of them were probable VC but what the hell. One night we had just finished a nice crab dinner and were sitting around drinking wine and chatting when all of a sudden, the doors and windows burst open.
Camouflaged men with guns filled the room. I about had a heart attack. I thought that a hit squad was about to get me. In a second I recognized some of my troops. Where was my driver, the leader asked? It seemed that he was supposed to go on an ambush patrol that night but that he volunteered to drive me instead. They brought his gear and a replacement driver. They left a minute later with a none to happy trooper with them.

Madame Bebop was an interesting lady. She said that she had been one of Madame Nhu's entourage when Madame Nhu went to the United Nations. She said that Henry Cabot Lodge had been a frequent late-night visitor to Madame Nhu's bedroom. Bebop was very proud of her wardrobe and never tired of showing me her new dresses. She was a nice lady. I decided that I had to be a straight arrow as far as she was concerned to maintain my credibility with her and with my men.

Among other things Bebop was quite a hypochondriac. She was always telling me of her ailments. One day she asked me if I could get the battalion surgeon to examine her. I thought that was a good idea as he could also examine the girls to help keep the clap rate down. The next day I approached the Doc. I didn't really know him as he was new in country. Of course he was a Captain but that didn't mean much to a doctor. He gave me all he reasons why he shouldn't do it and I countered every one. I told him to let his people know that he was playing poker in the recon area. If an emergency happened, we could reach him on the hot line and get him back through the wire in five minutes. He finally agreed but only on the condition that I get him back early.
About two o'clock the next morning I was saying, "Doc, we have to ge back to the water plant ....
Please let's go!!! It was even harder getting him to leave than it was to get him to go in the first place. Doc became a regular. He used to brag that he could recognize each girl by viewing her pussy. What some guy's won't do for their country. Besides the VD rate went down.
Bebop's was a real morale factor for the men. Once they restructured their thinking to consider it a privilege to be earned, I had it made. At least I thought so. One day one of the troops asked me if he could volunteer for guard duty on post number two. I was mildly curious as the troop in question was hardly the type to volunteer, in fact, it had been quite some time since he had been allowed to make the run to Bebop's. I told him that I didn't care but that he had to clear it with the platoon Sergeant. When he asked me to lend him ten dollars, I decided to ask my NCOIC just what the hell was going on.

He was somewhat evasive but when I persisted he told me. It seemed that every night some free-lance short time girls would come up to the wire at post number two to offer their wares to the sentry. I don't imagine that it was as comfortable as a bed at Bebop's, but any port in a storm .....
The water plant was a pretty cushy billet, especially for the recon platoon. We went on VCI operations during the day and had to man a small AP each night. The ambush wasn't a big deal and, since it only involved a few men and the AO wasn't too hot. Also since our main mission at night was the battalion Ready Reaction Force (RRF), I rarely went on ambush. I would go once in a while to observe the men and to maintain credibility but it was more important to ride herd on my rowdies.
The best thing about the water plant is that we had unlimited hot water and a beautiful chrome, tile and steel shower facility. It made the luxury of Dian seem crude and the shower buckets of FT Apache barbaric in comparison. One of the more unpleasant sides of duty at the water plant were the rats. The damn things were all over the place, especially in our bunkers. I got tired of having them scurry over me at night and decided to do something about it.
I got hold of a trap. It was one of the "humane" types that locked the prey in a cage without hurting them. Every night I would set my trap and bait it with anything handy. The next morning I would have a rat to dispose of. Being very careful not to harm one of natures creatures, I would take the trap to the water settling tank and drown the little bastard. This went along pretty well until I ran into THE RAT. We're talking big!!!

Early Radio: Military Communications

The first time I suspected he existed was when my trap was tripped and the bait gone but no rat. After this happened a few times I figured that whatever was taking the bait must be so big that the door couldn't close with its head in the trap. Brother Rat may be big, but he was no match for a Ranger Trained infantry officer. I decided to use some of the booby trap tricks I had learned to solve the problem.

I got some claymore wire, a radio battery and an electric blasting cap. The blasting cap was used as a primer to ignite a man explosive charge. It was a metal tube about one quarter inch in diameter and three inches long. It was closed on one end and had wire leading from the other end which was sealed with a wax- like substance for water proofing. The explosion was powerful enough to be dangerous. It could easily blow off a few fingers on a careless GI.
I set the trap so that if the door moved one half inch, two wires would touch making an electrical circuit. I stuck the blasting cap into a chunk of Slim Jim sausage and put it in the bait holder. After setting the trap, I armed it by attaching the battery. That night I went to sleep, forgetting about the trap. The explosion scared the hell out of me, I thought that we were under attack. A blasting cap isn't that loud, but in a bunker, it sounded like a bomb going off. It sure as hell worked. The headless rat that I found by the cage was as big as a cat. I showed off my trophy the net morning. My KC's were impressed and asked me if they could have it for dinner.

Some of my fondest memories of Viet Nam came from my time with the Recon Platoon. Our typical operation was to cruise the roads and visit villages in our AO. On Sundays we would set up road blocks so that our Camh Sat could check ID's. It was good duty. We enjoyed looking at the girls and finding the occasional weapon provided some excitement. We would usually do that on Sundays because that wasn't a good time to visit village chiefs in the looking for information about the Viet Cong. The most exciting operations we pulled were "snatch jobs" They were midnight kidnappings of supposed Viet Cong. I sometimes wondered whether we were helping some Vietnamese eliminate a rival.

Another operation that could be exciting was a village search. We would usually do those with a Vietnamese unit. One time we were fanned out searching when all of a sudden the ARVIN's began shooting into the ground and hollering. They had found a possible air hole for a tunnel. We pushed smoke grenades into the hole and looked for other places where the smoke came out. It was kind of scary waiting for a Viet Cong to jump out of a hole.

We pulled one dead guy out of a hole. He was dyed violet from the smoke grenade but seemed otherwise uninjured. We finally noticed that he had a tooth missing. Evidently one bullet had knocked out the tooth and buried itself in his body without exiting.
Another time I was poking around some loose ground and leaves near a hoo hooch. When the ground began to move, I jumped about three feet in the air. There was a boa constrictor or python in the pile. The KC's immediately grabbed the snake and wired its mouth shut with trip wire. They put him into a sand bag and carried him along until dinner. Fresh meat. It kind of tasted like chicken.

Lieutenant KY was one of the more unsavory characters that I met in Vietnam. He was the head of the Thu Duc District Intelligence Operating Center or DIOC ("Dee-ock"). His job was to interrogate prisoners and develop intelligence. I made a courtesy visit to his headquarters soon after joining Recon. He proudly showed me his interrogation (read torture) chamber. It had manacles and chains on the walls. Prominently displayed was a hand cranked electrical generator with clip-on connectors. He invited me to observe an interrogation but I passed.

As mush as I disliked him, I had to operate with him on occasion. One time I observed the "water treatment". They grabbed a suspect and pull his tee shirt over his head. They then got buckets of water from the pond that served as a latrine for the village. They kept pouring water over the guy's face, just barely avoiding drowning him, until he said what they wanted to hear.
Another time he squatted next to a smiling suspect. Vietnamese smile as a gesture of submission or helplessness. Ky was also smiling but for different reasons. He has a small hardwood stick about a half inch in diameter and two feet long in his hand. As he asked a question he began tapping the suspect on his shin. He didn't tap hard, just incessantly. When he got an answer he didn't like, he would give a sharper tap and the suspect would scream. The really bad thing was that KY enjoyed his work.

I soon learned that when Ky began to do his "thing" to take my men out of the area. After my first experience, I reported Ky to the US Army Senior Province Advisor. He told me that I was pissing into the wind, that Ky's actions were condoned by his superiors and that it was much more likely that I would be replaced than Ky. I have never been one to tilt with windmills so I told my superiors about Ky and tried to avoid the problem. I'm not too proud of that.

Early Radio: Military Communications

Every once in a while we would get some butter from the mess hall in the morning and take it along. We would stop at a bakery and buy loaves of French bread right out of the oven. It doesn't get much better than that. Other times we would get red cans of Japanese mackerel and spread it over the bread. It was pretty good with a liberal sprinkling of hot sauce. Those same red cans were the type that we saw time and again made into booby traps by the Viet Cong.

We made quite a sight with our camouflage fatigues, bush hats and seven to nine gun jeeps. We were hot shit and knew it. We would zoom around paying little attention to the speed limit. The MP's that patrolled the main roads caused us more trouble than the Viet Cong. We has a drill set up that never ceased to entertain us. When we were stopped by MP's I would announce very mechanically and as cold bloodedly as I could muster,

"My name is 1LT Heller, I am the Reconnaissance Platoon leader of the 2nd battalion, eighteenth infantry, First Infantry Division. I am on an operational mission. If you have a problem contact my battalion commander. Now get the hell out of my way!!" About that time some of the machine gunners would make menacing gestures with their guns. It never failed. The MP's would salute and wish us luck on our mission and we would zoom off. I never really got in trouble but the battalion commander made a comment at a staff meeting that the Recon Platoon should stop harassing the MP's. He was smiling when he said it.

One unusual thing about the job of recon platoon leader is that I worked for the S-3, a major and for the Combat Support Company (CSC) commander. The CSC commander was my nominal superior, but since he didn't rate me and since I out-ranked him anyway, I would ignore him when I felt like it.

MAJ Spurlock, the S-3 was a good soldier and a good man to work for. He never told me how to do something just to do it. Frequently he would get some hot intel from the intelligence officer (S-2) and give me an emergency reaction mission. It was fun and exciting. MAJ Spurlock was riding in a chopper with the battalion commander one day, using the rotor wash to part the nipa palms and elephant grass, looking for a Viet Cong. The guy popped up and shot the helicopter down with his AK 47. The battalion commander wasn't badly hurt but MAJ Spurlock wasn't so lucky. We missed him.

We never got into any big contacts but we got more kills than most of the line companies. I had a good stock of "attaboys" with the battalion commander. One night I used most of them up. I had a five man ambush out. The normal procedure was for the battalion Net Control Station (NCS) would contact all ambushes each hour for a situation report SITREP. The radio contact would go like this, "Darkness 26 this is Darkness 52, if SITREP is negative, break squelch twice." The resulting rushing sound on the radio would let NCS know that the AP was awake and that nothing was happening. One night I was called into the battalion TOC. The S-3 told me that my AP had missed its SITREP and that it continued not to answer repeated calls. The three said that we should crank up the Quarter Cav and investigate.

The Quarter Cav was a platoon from the 1st Squadron Fourth Cavalry, the divisions cav squadron. The platoon consisted of four ACAV's or armored cavalry vehicles. They were M113 armored personnel carriers, modified with extra armor an guns. If there is anything a cav trooper hates more than operating in a wooded area, it's moving after dark. The cav definitely wasn't happy with me and mine. I left the platoon sergeant in charge and went with the cav.

We moved along a road to within 100 meters of where the ambush was supposed to be and halted. Now, it's kind of hard to sneak up on anyone in an ACAV but we managed. The AP still didn't answer our radio calls. Finally, I started yelling at them and the ACAV's honked their horns. I dreaded the idea of going any closer on foot. After a few minutes of that, the AP called the NCS and reported a lot of noise to the east. No shit!!!. I called them and they asked what the problem was. When we linked up the said that they were having radio problems and couldn't make the SITREP's. Bull shit, they were asleep and everyone knew it. We all mounted up and went back to the water plant.

I thanked the cav platoon leader who acknowledged with a grunt and headed to the TOC. I figured that I might as well get it over with and take my ass chewing. The Three was still in the TOC and I reported in to him. I told him that I would take care of the problem and that it wouldn't happen again. I asked him if the Commander wanted to see me. He said that he didn't. Was I relieved. The battalion commander was one of the finest soldiers I had ever worked for or with. The worst think he could say to you was that he was disappointed in you. He was the kind of guy that you would cut off your arm rather than let him down. He reserved his ass chewings for those individuals who were too stupid to know that they had screwed up. I definitely knew that I had screwed up. I never heard anything about it.

My first duty assignment in the army had been in a mechanized infantry unit. In a mech unit maintenance was of paramount importance. It was the thing that could get a commander relieved quicker than anything else. When I took over Recon, I enquired about our maintenance program. I didn't see much maintenance going on but the jeeps always seemed to run. When there was a problem with a jeep, the platoon sergeant would ask permission to go to Saigon and before you knew it, the problem was solved.

It soon became obvious that the platoon regarded Saigon as a big motor pool and parts supply store. Our jeeps never seemed to get old. Dents would vanish overnight and bad engines would heal themselves. I told the men that if they didn't keep the vehicles running that we would be conduct operations afoot. Talk about power. One day they carried things too far. They came back from Saigon with a white jeep. Needless to say, it didn't blend in too well with our vehicles and those of the rest of the army. It made it damn hard for me to pretend that I didn't know what was going on.

My platoon sergeant was quite a character. He seemed to be competent enough but you weren't sure. One day as we left the water plant, just where the road swerved to the left, he fell out of his jeep. Luckily he wasn't injured. The men seemed to like him and he did what I said. We never got into a major firefight so I didn't know how he would react under fire. I was glad to see him again.

One of my chronic underachievers was a young man named Demelli. Ironically, Demelli had been my nemesis when I was at First Admin. He was always getting into minor scrapes. It was hard not to like the guy he was good natured, always smiling and never got into bad trouble. Finally, I asked Demelli what I should do about him. He said that his alternate MOS was Infantryman and that I should send him to a line unit. That seemed like a good solution. If I had known that he would continue to plague me a few months later, I would have seen that he went to a different brigade if not a different war.

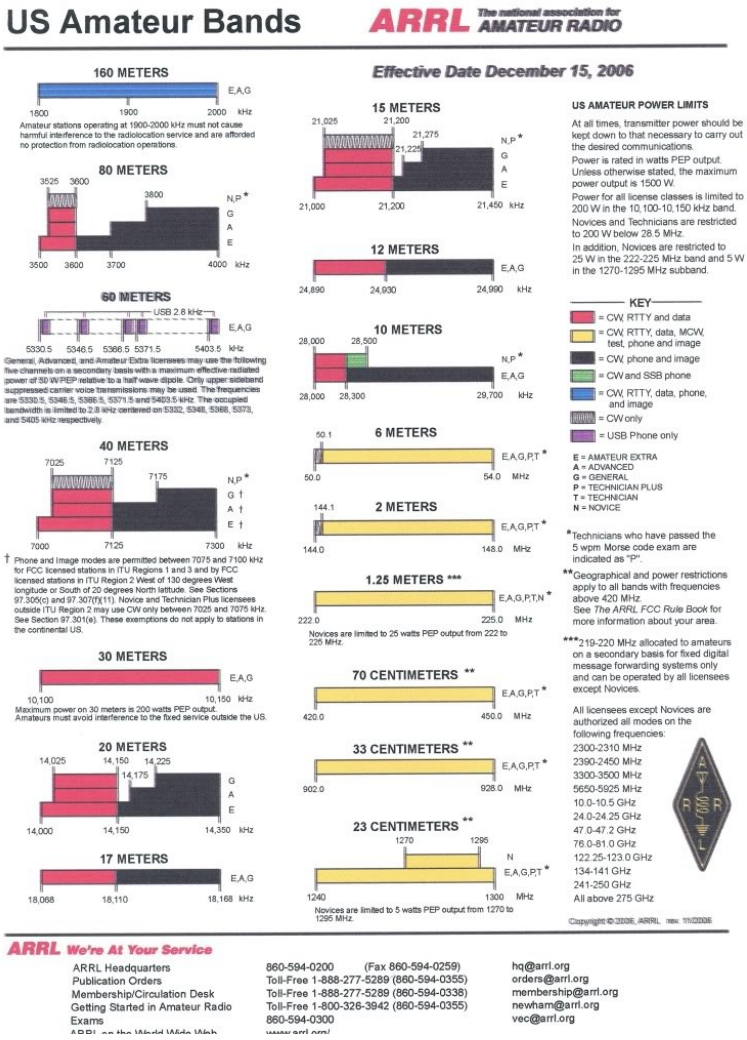
Another interesting guy was the battalion S-2. He was nice enough but he had a minor character flaw. He may not have been a coward but he sure as hell avoided leaving the confines of the TOC area, perhaps the best guarded part of the battalion. As he got shorter and shorter he was leerier and leerier of exposing his body to danger. One day I decided to play a trick on him.

I arranged a mock ambush that I would take him into. It took a hell of a lot of persuasion but I finally got him to accompany me on a mission. He had his steel pot and a flack jacket on and he looked worried.

Just before we got to a prearranged location, the Platoon Sergeant set off a quarter pound block of C4 explosive. My driver pulled over to the side of the road and we jumped into a ditch. We started shooting into the air and every time the S-2 looked up, I would push his head down. After a brief "firefight" we routed the enemy and returned to the TOC. The S-2 was shaking. Everyone in the TOC was in on the joke. He probably put himself in for a Bronze Star with "V" device for valor.

Twenty-two months after being commissioned, I was promoted to Captain. We had a little ceremony by the TOC and the battalion commander pinned me. I tell everyone that they sent it out with the ration truck. I was going to go on an R&R before taking a new assignment, but before that I was going to throw a promotion party. I wanted to do something different. I had no desire to have a party with the REMF's at battalion rear so I decided to have a party in a local village and invite the local village chiefs as well as the recon platoon. I got a jeep trailer and filled it with ice and beer. I added a few bottles of whiskey ad headed to Long Tan My, my favorite village. I also invited Captain Blue and a few other officers. The party was a great success and lasted until well after dark. At one time a little boy brought me a .45 pistol and told me that my Platoon sergeant had dropped it. I found him dead drunk and had him poured into a jeep. I got the village officials drunk as hell by drinking toasts with the whiskey that I had brought for that purpose. I faked drinking the toasts and soon drank my friends under the table. It was getting late and we really shouldn't have been out after dark. I wasn't too worried about Viet Cong since we were probably drinking with the local village party secretary but it was time to go home. I had some men carry the village chief to his house where we dumped him on his porch.

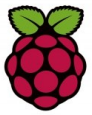
The next day when I drove through the villages almost everyone smiled and waved at me. I had gained a lot of face by drinking the Viets under the table. I later learned that the chiefs thought that I couldn't drink because I usually only drank a beer or two each time I had visited in the past. So much for duty and temperance. I probably would have gotten much more information had I gotten drunk more often.



Name of Net, Frequency, Local Time	Net Manager
Badger Weather Net (BWN) 3984 kHz, 0500	W9IXG
Badger Emergency Net (BEN) 3985 kHz, 1200	NX9K
Wisconsin Side Band Net (WSBN) 3985 or 3982.5 kHz, 1700	KB9KEG
Wisconsin Novice Net (WNN) 3555 kHz, 1800	KB9ROB
Wisconsin Slow Speed Net (WSSN) 3555 kHz, Sn, T, Th, F, 1830	N1KSN
Wisconsin Intrastate Net - Early (WIN-E) 3555 kHz, 1900	WB9ICH
Wisconsin Intrastate Net - Late (WIN-L) 3555 kHz, 2200	W9RTP
ARES/RACES Net 3967.0 kHz, 0800 Sunday	WB9WKO
* Net Control Operator needed. Contact Net Manager for information.	

Next Regular Meeting

The next meeting will be on Thursday, **September 24th,** 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:

October 29th 2015 - 7 pm

Please do not call the church for information!

The MRAC/MAARS join picnic will be on August 8th, 2015 at Greenfield park, picnic area number 2.

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**

Or phone (414)-459-9741

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: W9rhmrac@Gmail.com

or by Post to:

Michael B. Harris

807 Nicholson RD

South Milwaukee, WI 53172-1447

VE Testing:

September 26th, 9am—11:30am

No testing: June, August, or December

Location: Amateur Electronic Supply Time: 9:30 AM (Walk-ins allowed)
ALL testing takes place at: Amateur Electronic Supply 5720 W. Good Hope Rd. Milwaukee, WI 53223

Area Swapfests

August 29th, Circus City Swapfest Location: Baraboo, WI Type: ARRL Hamfest
Sponsor: Yellow Thunder Amateur Radio Club
Website: http://yellowthunder.org

September 11th, 63rd W9DXCC Convention Location: Schaumburg, IL Type: ARRL Convention
Sponsor: Northern Illinois DX Association
Website: http://www.w9

MRAC Working Committees

100th Anniversary:

- • Dave—KA9WXN
- Dan—N9ASA

Net Committee:

- Pancho, K9OFA

Field Day

- Dave—KA9WXN,
- Al—KC9IJJ

FM Simplex Contest

- Joe – N9UX
- Mark - AB9CD

Ticket drum and drawing

- Tom – N9UFJ

Newsletter Editor

- Michael-KC9CMT

Proofreader

- Pancho-KA9OFA

Webmaster

- Dave, KA9WXN

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)-459-9741**

Address correspondence to:

MRAC, PO Box 26233, Milwaukee, WI 53226-0233

Email may be sent to: **w9rh@arrl.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 ± 5 KHz USB.
- Our Two Meter FM net follows the Ten meter net at 9:00PM on our repeater at 145.390MHz - offset (PL

The MRAC HamChatter is a monthly publication of the Milwaukee Radio Amateurs' Club. Serving Amateur Radio in Southeastern Wisconsin & all of Milwaukee County
Club Call sign – W9RH
MRAC Website: http://www.W9RH.org
Editor: Michael B. Harris, Kc9cmt, 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. 8:00 PM 442.100+ Railroad net, also on EchoLink

Mon. 8:45 PM 147.165- ARRL Audio News

Mon. 8:00 PM 442.875+ WIARC net also on EchoLink 576754

Mon. 8:30 PM 146.820 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

Tue. 9:00 PM 145.130+ MAARS Hand Shakers 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 28.365Mhz 10/10 International Net

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

Wed. 9:00 PM 145.130+MAARS SwapNet, Allstar FM-38

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

Thur. 8:00 PM 443.800+ Tech Net

Thur. 9:00 PM 146.910+ Computer Net

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

Fri. 9:00 PM 145.390+ W9RH 2 MTR. FM Net

Sat. 7:30 AM MW Classic Radio Net , Freq.—3885 AM

Sat. 8:00 PM 146.910+ YL's Pink HAMsters Net

Sat. 9:00 PM 146.910+ Saturday Night Fun Net

Sun 8:00 AM, State ARES Net 3967/3977.5/145.470

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 146.910+ Information Net

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

Sun 9:00 PM 146.910+ Swap Net

Daily: Milwaukee — Rag Chew Net: 7:00 AM, 3850 SSB + Florida Net 7 am, 14.290 mhz.

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.