



HAMATEUR CHATTER



The Milwaukee Radio Amateurs Club

December 2011, Volume 19, Issue 12

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



Happy Holidays!

The Board of Directors of MRAC & I would like to wish all of you a safe and happy holiday season. We hope to see all of you back at our January 28th Membership meeting. Happy Holidays!

A Memory of Christmas Past

Christmas on, the corner block,
an iron post, A Roman clock; The
grocery store, was made of stone, a
poor old man, stood there alone.

A lamppost shined, a light at night,
the snow would glisten, very bright; A
dog would bark, a boy would play, on
down the hill, he'd ride his sleigh.

Christmas lights, on houses showed,
the blues and reds, and greens that
glowed; And Christmas trees, through
windows there, gave Christmas spirit,
everywhere.

Like a picture now, instilled in mind,
that's never really, hard to find; A
moment's joy, to carry through, this
Christmas wish, from me to you.

HAPPY HOLIDAYS



IT'S NEARLY CHRISTMAS

I write this in September
And I can already see my breath
Because the temperature is falling
To fifty degrees or less;
There are frosted mornings
And skies are turning gray;
Next thing, there'll be snowdrifts
Fit for a sleigh.

In stores, they're gearing for Halloween
With pumpkins on display;
After October 31, we'll count the days
To shop til Kris Kringle Day;
Just when I thought the craze was over
And the presents were put away,
Alas! I hear Santa "ho-hoing",
It's nearly Christmas Day.

Christmas is a magical time,
Is there any doubt?
But I'm going to need a psychotherapist
To get my anxieties out!
The sugarplums might be dancing,
But they're messing up my mind;
The silver bells aren't doing much
To help me unwind.

September comes and October goes,
November is just a glance;
Once again, there'll be invitations
To another holiday dance;
I'll decorate the Christmas tree
With icicles, stars, and lights,
But I'll need a ton of eggnog
To get me through this night!

--Joel Bjorling, Gilson, USA Age 58

MRAC Officers:

Terms Expiring in 2012

- President – Dave, WB9BWP
- V-President– Vacant
- Secretary – Mike, KC9CMT
- Treasurer – Vacant
- Director – Mark, AB9CD
- Director – Dave, KA9WXN

Terms Expiring in 2013

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

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

(414) 332- 6 7 2 2

Visit our website at:

www.w9rh.org

Mail correspondence to:

M. R. A. C.

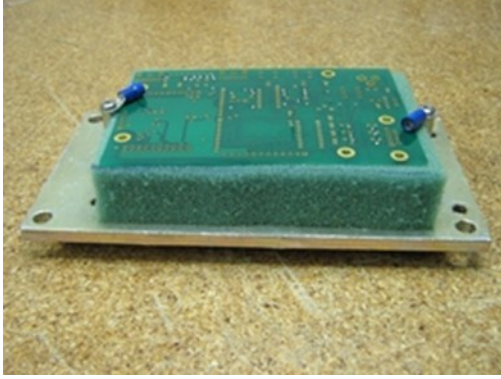
P.O. Box 240545

Milwaukee, WI 53223

News from the ARRL Newsletter

Hints and Kinks: Foam PCB Holder

Paul Jacobs, W2IOG, of Naples, New York, sent us this idea for assembling small PC boards. Contact Paul via [e-mail](#) for more information.



The W2IOG PCB holder in action, keeping components in place for soldering.

Here's a simple fixture that makes assembling small PC boards a snap. A

scrap piece of 1/4 inch aluminum sheet forms a base for the fixture. Mount two 1-inch standoffs about 1/2 inch farther apart than

the longest dimension of the PC board to be assembled. Now cut a piece of 1 inch thick soft foam packing material to slightly larger than the size of the board so that it fits snugly between the standoffs. Mount two crimp type insulated wire terminals to the standoffs; keep the screws slightly loose.

To use the fixture, insert several components into the board, turn both the board and the fixture vertical, press the component side of the board to the foam and return both to the horizontal position. Press down on the board to compress the foam and rotate the two wire terminals to hold the board in place. The weight of the fixture keeps the board in place and the pressure of the foam holds the components firmly to the surface of the board. Soldering them in place is easy.

Do you have an idea or a simple project that has improved your operating? Maybe you've taken something commonly found around the home and developed a ham radio use for it? Why not share your hints with fellow hams in "Hints and Kinks," a monthly column in QST. If we publish your hint in QST or The ARRL Letter, you will receive \$20. Send your hints via e-mail to [h&k\(at\)arrl\(dot\)org](mailto:h&k(at)arrl(dot)org) or to ARRL Headquarters, Attn: "Hints and Kinks," 225 Main St, Newington, CT 06111. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address.

Deadline Approaching for Hams to Recommend Updates to Microwave Band Plan

Attention microwavers! An ARRL Ad Hoc Committee has been tasked by the Board of Directors with recommending updates to the ARRL band plans for the amateur bands between 902 MHz and 3.5 GHz. If you are now active on any of these bands or are developing plans to do so, the committee would like to hear from you by Thursday, December 15.

The band plans for these bands may be found [here](#):

- 902-928 MHz
- 1240-1300 MHz
- 2300-2310 and 2390-2450 MHz

3300-3500 MHz

You can find additional background and a form for submitting information [here](#).

Next Regular Meeting

The next meeting will be January 28th at 7:00PM. We meet in the Fellowship Hall of Redemption Lutheran Church, 4057 N Mayfair Road. Use the south entrance.

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 **8:30 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) 332-MRAC or 332 - 6722



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.

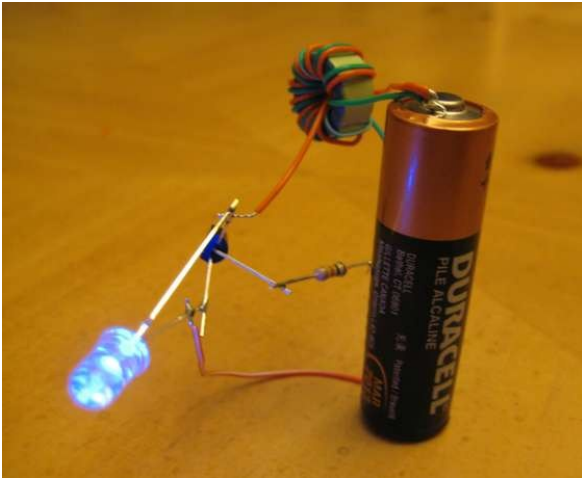
You may contact me or Submit articles and materials by e-mail at: Kc9cmt@earthlink.net

or by Post at:

Michael B. Harris

807 Nicholson RD

South Milwaukee, WI 53172-1447



The Instructable Joule Thief Circuit by Species

Yes, it's the infamous Joule Thief, in Instructable form! For those of you who don't know, the Joule Thief is a tiny little circuit that allows you to drive a white or blue LED from voltages as low as 0.5 volts. You think those batteries are dead? Don't throw them out yet! Hook them up to the Joule Thief to squeeze every last drop of energy out of them!

The idea and circuit came from [this](#) Make weekend project. Why don't you pay them a visit?

Step 1 Parts and Tools



For this project you will need very few tools and parts, as you will see in the picture below. But for those of you who like it in text, here it is:

Helping Hands (Optional)

Soldering Iron

Solder

A Blue or White LED (Other colors are fine, too)

2N3904 Transistor or equivalent

1k Resistor (Brown-Black-Red)

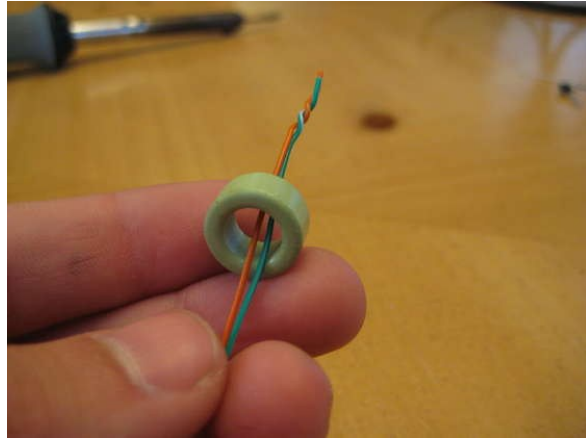
Toroid Bead

Thin wire, two colors (magnet wire works)

You can get the toroid and transistor from a dead CFL; the transistor is usually labeled 13002.

Also, if you use a 2N4401 or BC337 transistor, your LED will be brighter because they can handle more amps.

Step 2 Wind the Toroid



The first step is to wind the toroid. I found mine in an old computer power supply, and it works fine for me. Toroids are donut-shaped objects like in the picture, and can be attracted by a magnet. You can find toroids in a few places. Old computer motherboards, XBOX and X360 motherboards have them (don't take them unless it's dead!). You can find toroids in computer power supplies, or you could buy them at your nearest RadioShack.

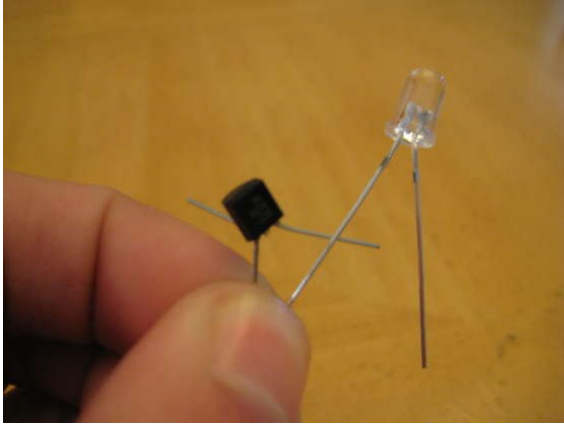
Take your two strands of wire, and twist the ends together. You don't have to do this, but it makes winding a little easier. Thread the twisted end through the toroid, then take the other two ends (Not twisted together) and wind it once around the toroid. Don't twist the wires; make sure that two wires of the same color are not right next to each other.

Keep winding, making sure you wind the coils tight. It will still work if they are kind of loose, but it is better to have them tight.

Ideally, you want about 8-11 turns on your toroid. Even if you can fit more, don't put more on. Make sure the turns are spaced evenly around the toroid.

Once you wind around the whole toroid, cut off the extra wire, making sure you leave a couple of inches for soldering.

Strip some insulation off the wires, then take a wire from each side, making sure they are of the OPPOSITE COLOR. Twist them together, and then you're done with the toroid.

Step 3 Solder it all Together

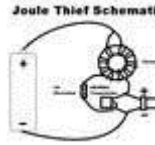
Now we are going to solder the whole thing together. You could put it on a board if you like, but in this Instructable, we're going to free-hand solder it. Or whatever you call it. You can follow these written instructions, or take a look at the pictures. They explain it very well.

First, take the two outer leads of the transistor and bend them outwards a little ways, and bend the middle lead backwards. Bend the LED's leads outwards, too. You don't have to, but it makes it easier to solder.

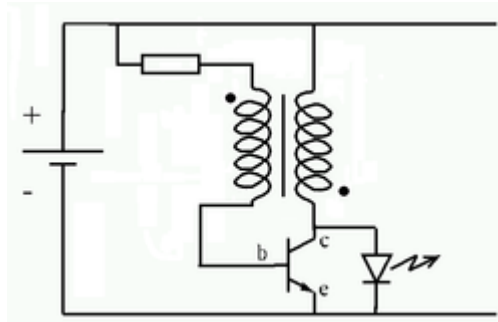
Take one of the wires coming from the toroid that is alone; that is, not twisted together with another wire. Solder it to one side of the resistor. Solder the other end of the resistor to the middle lead of the transistor.

Take the other single wire from the toroid, and solder it to the collector of the transistor. Solder the positive side of the LED to the collector as well, and solder the negative side to the emitter.

All that's left to do now is solder an extension wire to the negative side of the LED. Take a piece of that wire you had earlier and solder it to the transistor's emitter.

Step 4 Try it Out!

And that's it! You're finished with your Joule Thief. Touch the twisted wires coming from your toroid to the positive side of a battery, and the extension wire to the negative side. If all is working well, the LED will light up! If not, try using thinner wire on your toroid. I've included a schematic in the pictures if you prefer.

The illuminated LED man (or The Joule Thief man)

Example of a joule thief circuit driving an LED. The [coil](#) consists of a standard [ferrite toroid core](#) with two windings of 20 turns each using 0.15 mm (0.006 inch) diameter wire (38 [swg](#)) (34-35 [AWG](#)). The circuit can utilize an input voltage down to about 0.35 V and can run for weeks using a 1.5 V [LR6/AA](#). The battery voltage is usually 1.5 V. The resistor is $\sim 1 \text{ k}\Omega$, 1/4 W. The [transistor](#) could be a BC547B, 2SC2500, BC337, PN2222, 2N4401 or other NPN. $V_{ce0} = 30 \text{ V}$, $P = 0.625 \text{ W}$. A white [light-emitting diode](#) with $V_f = 3.2 \text{ V}$ might be used.



The Experimenters Bench Continued

This is a guy built out of resistors and a LED that can light up using the [Joule Thief](#) circuit (The big one is meant, the small one is exactly the same like brunoip's)

A special thanks goes to [1up](#) for the [Joule Thief](#) circuit from his instructable "[Make a Joule Thief](#)" and [brunoip](#) with his slideshow "[The led guy](#)" that brought me to the idea to make a glowing LED man.

I don't know why, but the photos appear in poor quality here, although I uploaded them in quite good quality. If someone knows the reason and how to solve the quality problem, please leave a comment. If you can't read the speech balloons, here's a link to a better image of the whole comic: <http://img188.imageshack.us/img188/3219/ledcomic.jpg>

Have a look on its [big brother](#) too!



Joel was born around April of 2010 and he loves to steal dead batteries. He was inspired by <http://www.instructables.com/id/The-illuminated-LED-man-or-The-Joule-Thief-man/>

He consists of:

- Solid core copper wire for a skeleton
- Vibration mounts for his feet
- Filtering toroid for his torso
- Red enamel wire for a nervous system
- Crimp-on spade and ring terminals for hands
- Prototyping PCB for a head
- A 10-K trimmer for a mouth
- NPN transistor for his nose

- 2 white leds for eyes
- Some sort of copper bushing
- Wire and solder
- And a [Sparkfun](#) sticker for character (the flame is a registered trademark of [Sparkfun](#), the sticker was purchased from them).

Early Radio: Christmas in Vietnam, Songs

AWAY IN A HAMLET

Tune: "Away in a Manger"

Away in a hamlet,
No crib for his bed,
The little Westmoreland,
Lay down his sweet head.

DASHING THROUGH PLEIKU

Tune: "Jingle Bells"

Dashing through Pleiku,
With the First Air Calvary,
VC to my left,
And a Rhade on my knee.

DECK THE HALLS WITH VICTOR CHARLIE

Tune: "Deck the Halls"

Deck the halls with Victor Charlie,
Tra la la la la, la la la la.
'Tis the season to be jolly,
Tra la la la la la la la la.
Don we now our black pajamas...

THE FIRST HOTEL

Tune: "The First Noel"

The first hotel,
To be zapped was the Brink.
And the last was the Metropole,
Westmoreland thinks....

GOD REST YE, GENERAL WESTMORELAND

Tune: "God Rest Ye Merry Gentlemen"

God rest ye, General Westmoreland,
Let nothing you dismay,
The First Air Cavalry,
Was wiped out yesterday.

The Big Red One will get it next,
Out at Michelin.

Oh, tidings of comfort and joy,
Comfort and joy,
Oh, tidings of comfort and joy.

O LITTLE TOWN OF BAN ME THUOT

Tune: "O Little Town of Bethlehem"

O little town of Ban Me Thuot,
How still we see thee lie.
The good Rhade are all at play,
Uprising in the night.

Yet in the dark streets shineth,
A blazing FULRO flag.
The bad Jarai will have to die,
As ARVN they do fight.

[T]WELVE DAYS OF CHRISTMAS

Tune: "The Twelve Days of Christmas"

Note: Lucien Conein insists that the correct title is the
"Welve Days of Christmas."

On the first day of Christmas, the VC gave to me:

Some plastic in a Dauphine.
Second day...two hand grenades
Third day...three punji stakes
Fourth day...four fallen flowers
Fifth day...five claymore mines
Sixth day...six satchel charges
Seventh day...seven birds a shrinking
Eighth day...eight bar girls drinking
Ninth day...nine Saigon teas
Tenth day...ten tanks of napalm
Eleventh day...eleven Montagnards
Twelfth day...twelve butterflies

YOU BETTER BUG OUT

Tune: "Santa Claus is Coming to Town"

Oh, you better bug out,
You better get high,
Draw your weapon,
I'm telling you why,
Ho Chi Minh is coming to town.

He knows when ARVN's sleeping,
MACV is never awake,
He knows your ammo is never good,
So bug out for goodness sake!

Then all of a sudden his phone gave a jingle,
(This happened quite often since he was still single).

USMC

'Twas COUP DAY

[NOTE: Written by John Granger and Volney Warner, Psychological Warfare Section, at the time of the coup. The version in the Lansdale collection is performed by John Muldoon and the Cosmos Tabernacle Choir.]

'Twas siesta on "coup" day and all through Saigon,
Not a soldier was stirring, not even big Don.
The plans were all checked by Minh with great care,
In hopes that a victory they soon would declare.

The Nhus were all nestled so snug in their beds,
While visions of power danced through their heads.
With Diem in his nightshirt and Nhu in his cap,
Both settled down for a hot sweaty nap.

When out on the roof there arose such a clatter,
Diem rose from his bed to see what was the matter.
Then what to his wondering eyes did appear,
But 30s and 50s inspiring such fear.
('Cause they were all shooting, not there but here.)

The tanks and the hows and the planes how they came, He
started to think, "How short-lived is fame!" "Give up and
live, or resist and die, We'll give you 'til six to say no or aye."
He picked up his pants, down the staircase he flew, "If I had-
n't listened to dear Madame Nhu, I'd still have control, in-
stead of the coup.

"But now that it's here, I'd better get brother
To come up with crack troops and put down another
Attempt to take over the reigns of this realm,
And let me get back to steering the helm."

So putting his fingers up to his nose,
He gave them the sign that everyone knows;
And moving the bookcase so grand and so tall,
Uncovered a doorway into a hall.

This passage was secret, not even Nhu knew,
That this was built in for such a coup.
It led to an alley outside of the grounds,
To a spot that was in back of the loud banging sounds.

"We made it," cried Nhu with a voice loud and clear,
But Diem stated wisely, "We are still too near.
So let's take that vehicle parked over there,
I once drove an APC (It was a dare)."
They captured the driver and vehicle intact,
And moved it out smartly, (The vehicle was tracked).
Over the river and away from the coup,
Dash away, dash away, dash away Nhu.

And all you could hear as they drove out of sight,
Was "Merci beaucoup, don't shoot all night."
The next day we heard so few of the facts,
The rumors were flying about many pacts.

But one thing we feel is essentially true,
Some old is preserved, but there ain't no more Nhu.

X-MAS 1965, GETTING OUT OF "SYNC"

by N.A. DOC BLAND

Some of this is kinda fuzzy, but I am sure that I spent X-mas day of '65 flying TWA to RVN.

Dec. 21: Leave Evansville, In..... Dad, mom, & and girl I had met while home on leave, and spent two days and a real unforgettable night with. She give me a real nice letter to read right before I boarded plane, turned out to be a "Dear John" letter.

Only the second time I ever saw my dad with "tears" in his eyes, remember wondering "why." My dad had served in South Pacific during WW 2, with Marine Corps. After I was in country about 3 minutes I knew "why."

Had stop and change of planes in St. Louis, Mo. Next stop San Francisco. Checked in Oakland Repo-Depo, think I spent a day or two here. Don't remember anything except they made sure we had on Class A's summer uniform on and gave "strict instructions" that we keep them on until we arrived in RVN. Think we left from Oakland in daytime. On TWA.

Stopped at Seattle, Washington.... had to get off plane while they refueled. A few of us got together and went to Booze store for a larger group. Had to run about a mile in cold and snow on ground in short sleeves to store, as I remember we had to go there because the airport was not allowed to sell booze by the Bottle.

When we got there the line was real long standing outside. We started at back and asked folks if we could get in front of them, telling them we were on our way to Viet-Nam and had to be back on plane in about 30 minutes or so. Everyone was so nice and let us go ahead of them, one guy even pitched in a few bucks, had one ass-hole that didn't want to let us ahead of him about halfway through the line.

Some real big "logger" looking guy that was a few spots ahead, overheard this (expletive Deleted), come back and grabbed him by his shirt collar and took him off to the side for a little "talk", someone at the front said right away "you guys hurry up and get right up front of me," wonder what the "logger" said to the ass-hole?

Seems like it got dark real fast while here. Everyone got a arm load of booze, think store manager even give us a few free bottles.

So anyway we got back to plane with 3 minutes to spare. Next stop Anchorage, Alaska, Dec 24th, bright sunlight but real cold, had to get off for some reason (fuel?).

All I remember is everyone was making comments about the cold and having short sleeve shirts on.

Don't seem like hardly any time at all went by and it was dark again.

Do remember that the pilot announced that we would cross international dateline soon and that X-Mas Day would only be 7 hours and some minutes long. Can remember one of the stewardesses took our booze and fixed everyone up to three drinks, started serving them when we crossed that dateline, and it was X-Mas.

Think most every one only had one or two drinks, and I remember it got real quite and stayed that way until we got ready to land in Tokyo, by then it was the 26th. Remember looking at Cameras there.

Next Stop: "Viet-Nam."

Hard to believe that I was under serious consideration for CMH while there, yet found myself in Jail for "vagrancy" X-Mas of 67.

PS: Sitting here with tears in my eyes thinking and wondering about the "guys" I shared that plane ride with, would I recognize any of them, doubt it. Never saw any of them before or after that X-Mas ride. God it hurts to think about how young and innocent we were, and knowing a bunch of them didn't get to come home sitting up in a seat, like I was lucky enough to do.

I sit here in this "lab" and see the kids, and think to my-self, "was I really that young, how the hell did I survive it?"

Will X-Mas ever be that "special" again for me, are the "best" of times over for this old medic?

One last personal note, if could share one thing with folks about X-Mas season and giving I would say "Give of your self, the 'stuff' passes out of our lives for the most part, Warm Memories Stay for a life-time."

That stewardess warmed my heart so much that when I came back and was on a flight headed to Kentucky to see my folks, I gave the "stewardess" one of two "yard" bracelets that had been given to me by a couple of real "special" yards. If you really want to do something special for X-Mas, if you see someone with that scary, lost, pained where-am-I look in their eyes, try to just give them a warm compassionate smile. You never know--that "smile" just might save their life.



VE Testing:

Saturday, January 7th, 2012 - AMF Lanes (WARAC Swapfest)- 9:00 - 11:15 AM (Not at AES)

Saturday, January 28th, 2012 - AES - 9:30 AM

Saturday, February 25th, 2012 - AES - 9:30 AM

Saturday, March 31st, 2012 - AES (Superfest) - 8:00 - 11:00 AM

Saturday, April 28th, 2012 - AES - 9:30 AM

Saturday, May 26th, 2012 - AES - 9:30 AM

Saturday, July 28th, 2012 - AES - 9:30 AM

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

Area Swapfests

Jan. 7th, 2012 **40th Annual Midwinter Swapfest** Location: Waukesha, WI

Type: ARRL Hamfest Sponsor: West Allis Radio Amateur Club

Website: <http://warac.org>

Jan. 12th, 2012 **Mid-Winter Hamfest** Location: St. Charles, IL

Type: ARRL Hamfest Sponsor: Wheaton Community Radio Amateurs

Website: <http://www.w9ccu.org>

Feb. 18th, 2012 **MRAC/MAARS Midwinter Interclub Swapfest**

Location: Brookfield, WI Type: ARRL Hamfest

Sponsor: Milwaukee Radio Amateurs' Club

& Milwaukee Area Amateur Radio Society

Website: <http://w9rh.org/>

March 4th, 2012 **Sterling-Rock Falls ARS Hamfest** Location: Sterling, IL

Type: ARRL Hamfest Sponsor: Sterling-Rock Falls

Amateur Radio Society Website: <http://www.w9mep.org>

March 10th, 2012 **25th Annual Equipment Auction**

Location: Eau Claire, WI

Type: ARRL Hamfest Sponsor: Eau Claire Amateur Radio Club

Website: <http://www.ECARC.org>

MRAC Working Committees

95th Anniversary:

- Open

Net Committee:

- Open

Field Day

- Open

FM Simplex Contest

- Joe – N9UX
- Jeff – K9VS
- Brian— K9LCQ

Ticket drum and drawing

- Tom – N9UFJ
- Jackie – No Call

Newsletter Editor

- Michael-KC9CMT

Webmaster

- Joe Schwartz—N9UX

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, Box 240545, Milwaukee, WI 53223

Email may be sent to: w9rh@arri.net. Our YAHOO newsgroup:

<http://groups.yahoo.com/group/MRAC-W9RH/>

CLUB NETS:

- Our 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)

Milwaukee Area Nets

Mon.8:00 PM 3.994 Tech Net

Mon.8:00 PM 146.865- ARES Walworth ARRL News Line

Mon.8:00 PM 146.445 Emergency Net

Mon.8:00 PM 146.865- ARES Net Walworth

Mon.8:45 PM 147.165- ARRL Audio News

Mon. 9:15 PM 444.125+ Waukesha ARES Net

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

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

Tue. 7:00 PM 145.130 MAARS Trivia Net

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

Wed. 8:00 PM 145.130 MAARS Amateur Radio Newslne

Wed. 9:00 PM 145.130 MAARS IRLP SwapNet d FM-38 Repeaters (IRLP 9624)

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 146.91 Swap Net

2 meter 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.

Billion Dollar Weather Disasters 1980 - 2010

