



Official Publication of the
West Allis Radio Amateur Club

Hamtrix

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Volume 63, Issue 1 January, 2016

JANUARY CLUB HAPPENINGS

Club Meeting

St. Peter's Episcopal Church,
7929 W. Lincoln Avenue, West Allis
January 12, 2016 **7:00pm**

Program

Spotting and DX software
by Steve Dryja, NO9B

Join us for a pre-meeting dinner
at Johnny V's Classic Cafe
1650 S 84th St at 5:00pm



NUT NET

3.985mhz
Monday-Saturday
8:15am CT

Milwaukee-Florida Net
Every Day on 14.290 Mhz
7:00AM - 9:15AM ET
6:00AM - 8:15AM CT

Wisconsin QSO Party

**March 13, 2016 - 1800Z to 0100Z March
14**

**(1:00PM CDT to 8:00PM CDT on Sunday,
March 13)**

(The first day of Daylight Savings Time)

SWAPFEST

**SATURDAY - JANUARY 9, 2016 8:00AM
- 1:00PM
WAAUKESHA COUNTY EXPO ARENA**

WARAC 2-meter net

Every Wednesday at 8pm
MATC repeater 147.045 standard offset
127.3 Hz CTCSS



Club jackets and hats!
Go to club Web site and click on
The GOLD MEDAL IDEAS block
[For more info or click here](#)



The President's Shack January 2016

I hope you all had great Holidays and that you continue to have a **Happy New Year!** Yes, the Holidays are over and now it's Swapfest time!

As you all know, our annual **Swapfest is this Saturday, January 9.** Advance sales have been good and weather promises to be decent, so we should be in for another great 'fest. Again, **we need everyone's help** to continue our success with our primary fundraising event. See you all there, dark and early!

The program for the upcoming meeting on Jan. 12 will be on **Spotting and DX software** by Steve Dryja, NO9B. This is a broad topic and Steve will enlighten us about some of the interesting stuff that's out there.

In February, Mike Johnson, WO9B, will tell us about an antenna that has become very popular in recent years, the K4KIO Hexagonal Beam, also commonly called a **Hexbeam.**

Since our March meeting falls on March 8, just before the **Wisconsin QSO Party**, that will be our main program topic for that meeting. More to follow!

At the last meeting Mike, WO9B talked about getting involved **NPOTA - National Parks On The Air** sponsored by the ARRL. It started January 1 and seems to be generating a fair amount of on-the-air activity. Have you worked any parks yet? Stay tuned for more about our club participation.

Yes, it's only two months until the 2016 Wisconsin QSO Party! Make sure **Sunday, March 13** is on your calendar. If you haven't already done so, start thinking about possibly operating mobile or setting up a portable station in

another county. Or, how about a group of members getting together to do a multi-op station? Anyone interested in spearheading this? Along with this, it would be great to activate our club call, W9FK.

Don't forget to **submit your 10 Meter contest logs**, both to the ARRL and to Chuck Dellis, W9WLX, for the WARAC portion of the contest. The deadline is the January 12 meeting.

Several new members have **nametags** coming and Secretary Erwin has them. If you have one coming, find Erwin at the Swapfest to pick it up, otherwise he will have them at the next meeting.

Our club needs a "**sunshine**" **committee** to make sure we recognize club members who are hospitalized or suffer the loss of a family member. Volunteers?

Reminder: **Dues are due!** If you haven't settled up for this year, you need "pay" a visit to our Treasurer, Howard.

Are there any club matters that you think should be covered in this column? If so, please contact me - I'm open for suggestions!

Also don't forget our before-meeting dinner at **Johnny V's Classic Café, 1650 S. 84th St.** at 5:00PM. We have made arrangements to use the private room, located through the doors at the north end of the main dining room.

See you at the Swapfest and the meeting! Bring a friend to both!

Tom, K9BTQ

From the editor

Not only another month but another year has turned over. I hope everyone had a happy holiday season with lots of good fellowship with friends and family.

My wife and me enjoyed travel to Dallas for my niece's wedding. While there I set up my pixie transceiver in the hotel room. It was no surprise to me that it received every electronic noise around. Still fun to try. I will have to think about upgrading to a little better kit or what else is possible. The price was right

WARAC General Meeting Minutes

December 08, 2015

Introduction

The meeting was called to order at 19:02 by President, Tom Macon (K9BTQ). Overall meeting attendance was 22, including 1 visitor.

Phil Gural (W9NAW) discussed Y2016 Swapfest plans. The volunteer registration signup sheet was passed around.

Future Programs

January '16: Spotting/DX software - Steve Dryja (NO9B)

February '16: Hex beam – Mike Johnson (WO9B)

March '16: WIQP

Tom (K9BTQ) discussed and gave an invitation for Arduino project presentations at future meetings.

Phil Gural (W9NAW) suggested "Bluetooth & ham radio" as a future topic

Tonight's Program

The evening's program topic is "Arduino Projects". Projects presented were:

"Son of Zero Beat" - Howard Smith (WA9AXQ)

CW Decoder - Frank Humpal (KA9FZR)

SWR and Power Meter using a PIC microprocessor - Jim Casamassa (WB9IXS)

SWR Display using Arduino instead of an analog meter & potentiometer - Tom (K9BTQ)

Business

Motion was made and accepted to approve the November general meeting minutes as published in Hamtrix.

Erwin (WI9EV) will order replacement nametags for all those who need them and want to pay \$7.75 per tag. Attachment will be pin. Price includes postage to Erwin.

Howard Smith (WA9AXQ) & Tom Macon (K9BTQ) mentioned membership renewal form & dues reminder.

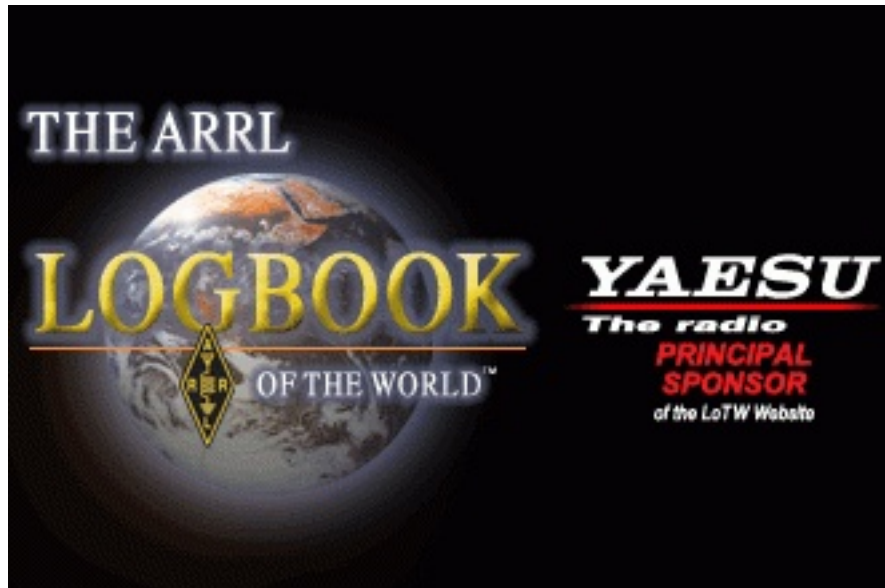
Steve Dryja (NO9B) introduced the concept of having a club Queen of Hearts raffle for meetings. The members voted to have the raffle. Steve will get the appropriate State of Wisconsin license.

Mike Johnson (WO9B) promoted W.A.R.A.C. participation in the National Parks on the Air event. Potential 2016 dates are May 14, 15, Memorial Day or 1st weekend in June.

Howard Smith (WA9AXQ) gave a status report regarding Ten-Tec being purchased.

The meeting was adjourned at 21:26.

Respectfully submitted,
Erwin von der Ehe (WI9EV)
Secretary, W.A.R.A.C.
2015-12-08



W9FK Logging on LOTW By Chuck Dellis, W9WLX W9FK Trustee

QSOs made using the club call, W9FK, are now being logged in the ARRL's Logbook of the World. The number of requests for QSLs via LOTW has been steadily increasing and the time had come to make the transition.

WO9B, KD9CVA, and N9KPH, Mike Johnson, Matthew Johnson, and Bill Reed's use of the club call during the 2015 Wisconsin QSO party spiked the number of requests along with the increasing number from Field Day. Their WIQP log and logs from Field Day 2015 & 2014 were uploaded to LOTW. Currently there are 2,667 QSO records loaded with 670 confirmed QSLs!

Using LOTW sets the club up well for participation in events requiring its use. National Parks on the Air is once such event that is taking place throughout 2016. Stay tuned for more information about WARAC's participation in NPOTA from Mike Johnson, WO9B.

If you wish to use the club call for an event, here are a few key items to remember. In order to submit the log, an electronic file is necessary. The preference is to get the log in both ADIF and

Cabrillo format. The popular N3FJP and N1MM+ loggers both provide an export feature in these formats. Additionally, the State, County, and grid square of W9FK at the time of the QSO is required to provide accurate QSL confirmation. Please reach out if you need any help with electronic logging.

Looking forward to additional activation of W9FK in 2016!

What, Swapfest time again?

**Phil, W9NAW
Swapfest Chairperson**

Another year is about to end and it is time for the WARAC Annual Midwinter Swapfest event. This time it is our 44th and will take place on January 9, 2016. The location will once again be in the Waukesha County Expo Arena.

Pre-event preparations are moving along and we have already had some calls about VE Testing. For the 2016 event, VE Testing will be at a site that is across from the Expo Center and about a ¼ mile east in the Center Court Sports Complex. In the arena, we are using the same table layout as last year and several sellers have already asked for their same tables.

Let's go over some information that is worth repeating:

Advance Ticket sales from members. Club members are encourage to take some advance tickets and sell them to other hams. It is a way for guests to save \$1 per ticket and helps our attendance. See Phil, W9NAW, at the December general meeting.

Want to sell or donate something? Again, there are a couple of ways to do this. If it is equipment you want to sell, you need to bring to the table over by the concession area. Other electronic parts/components or donations need to be delivered to Louie, W9GSV. As of this time, table information is not available. Labels are required and available to state your name, call, selling price and other details.

How is the swapfest going to operate? As was done in the 2015 event, sellers will bring their material thru the two loading areas on either side of the stage. **We will start this operation at 6 AM.** Steve, NO9B, will be in charge and assigned WARAC members will man carts and hand trucks. The idea here is to assist sellers in getting their items to their assigned table(s) in an expedited manner. After unloading by the seller, the WARAC manned cart will be returned to the loading area for another assignment. Any sellers in the balcony area will have their material delivered to the nearest balcony stair, unloaded and watched over by a WARAC member assigned to that stair. Movement of material thru the loading dock will require priority help. We request that where ever possible be ready to pitch in.

Assignments: Additional help will be needed at doors, ticket sales/checkers, floor directors as well as the loading dock. Assignments will be discussed at the December general meeting. We are asking members/friends to arrive about 5:30 AM. Please wear your WARAC hat/badge and, if available, bring your HT (tuned to 147.40 MHz simplex). All volunteers will be given a door prize ticket, free lunch voucher and have pre-event coffee/donuts available.

Thank you for helping and hope you have a good time---observing/buying/selling.

10 Meter Contest Wrap-up By Chuck Dellis, W9WLX

The 2015 ARRL 10 meter contest is history with a less than stellar performance. While not a total bust, there has been better propagation in recent years.

As a friendly reminder, please be sure to submit your log and submission form to participate in the friendly WARAC 10 meter competition. The submission form can be found in the December 2015, Hamtrix. Certificates will be distributed at the WARAC Annual Dinner in autumn. So far, three submissions have been received, WO9B, KA9JCP, and WA9BZW, Mike, Ron, and Al, with a promise by W9NAW, Phil, to submit shortly.

In the absence of competitive band conditions, I decided to take the opportunity to begin preparing for Field Day! There were a few final tweaks necessary to make the Flex 6500 and N1MM+ contest ready; the 10 meter contest was the perfect platform to get that accomplished. I'm now comfortable with taking the Flex to Field Day and presenting in a way everyone can operate.

Next up—the WARAC Swapfest, Wisconsin QSO Party and our Field Day planning meeting. Be there!

Tales from HeathKit is on vacation this month but plans to be back next month with more tales

HAMFEST 2016

Buy/Sell Amateur Radio Equipment, Electronics and Computer Gear



Sunday
March 20, 2016
Free Parking!



Admission: \$6.00 8' Table Space - \$8.00/ea pre-registration (\$10.00/ea day of Fest)
Amateur Volunteer Exams (ARRL VE Team - N9VE) starting at 9:30 AM

Presented by: TRI COUNTY AMATEUR RADIO CLUB - W9MQB
Talk-in on the 145.49 Repeater CTCSS of 123

JEFFERSON COUNTY FAIRGROUNDS
ACTIVITY CENTER
503 NORTH JACKSON AVE.,
JEFFERSON, WI 53549

- Vendors will be admitted at 6:00 AM.
- Vendors-only unloading zone on West side.
- Food and beverages available
- General Admission and Sales begin at 8:00am

Take I94 to Exit 267, (Johnson Creek) Head South on Hwy 26 to the Hwy 18 Exit. Exit East on Hwy 18 and turn left onto Jackson Ave. Look for the Fairgrounds sign.

Next year's date: March 19, 2017

Hamfest Advanced Registration Form

Registration DEADLINE is: March 17, 2016

Admission: _____ X \$6.00 = \$ _____ Note: Table Reservation does not include Admission.

8' Tables: _____ X \$8.00 = \$ _____ Total Amount: \$ _____

Name: _____ Call Sign: _____

Email: _____ @ _____

Street: _____ City: _____

State: _____ Zip: _____

A Nixie Clock Project

Bringing Past Technology Back to Life

By Steve Dryja My Story

What are Nixie Tubes?

Take a look at any digital display, say on a clock, stove, or media player. Most likely they'll have red or bluish-green digits. If they're red, LEDs are probably being used and if they're bluish-green, it's vacuum fluorescent display (VFD) that are behind the scenes. No matter the color, both of these display sources use "segments" in separate bars to make their displays so prominent.

Before LEDs and VFDs overtook displays in consumer products, there were Cold Cathode Numerical Display Tubes, or Nixie tubes. They were originally used primarily in measuring and scientific instruments like frequency counters, calculators, voltmeters and multimeters.

Nixie tubes are essentially glass tubes containing a wire-mesh anodes and shaped wire cathodes, filled with a low pressure gas. Although they resemble vacuum tubes, they do not operate like them. Instead collisions between atoms, electrons and ions are responsible for releasing a photon which produces an attractive neon orange glow.

The name Nixie is actually a brand name, it comes from "NIX I", an abbreviation for, "Numeric Indicator eXperimental No. 1", named by Burroughs Corporation, who were the first to introduce Nixie tubes back in 1955. "Nixie" came about accidentally, after "NIX I" was misinterpreted, but the name stuck.

My Nixie Clock Project

I fell in love with Nixie tube displays. ANYTHING with a Nixie tube gets my attention! I love that the digits appear to move when changing, giving a 3 dimensional look to the display. One day, I saw two clock-like displays up for auction on E-Bay. I didn't pay much attention to the details, the fact they were Nixie was all I needed to place my bet.

Nixie TubesNixie Tube

Once I got them home and took them apart, it was clear that they were just displays, not really a clock, since there was no logic inside to keep time. There were two large Cannon (military) connectors on the back, wired in parallel, which led me to believe that originally there was a very large cable with 46 wires. This cable would have carried the 5VDC "time" signals to the boards with transistors that are inside.

Nixie tubes run off of 170-300VDC and you need a transistor to sink the 18-22mA of current at that voltage to turn on the digits, plus you need a transistor for every digit. 5VDC is used to drive the transistor to its ON state in order to light a single digit. I confirmed this by applying AC to the

displays and applied 5VDC to each digit to make sure all the Nixie tubes were good.

I am an Amateur Radio Operator (Ham) and we use Greenwich Mean Time (GMT) in our logs. We usually have two clocks, one displays GMT and the other local time in 24 hour military format. I thought, why not make the "clock" logic to drive the digits and make each of these into a standalone clock, one for GMT and one for local time?

Designing and Building My Nixie Project

Working with Multisim Blue, many parts, datasheets, and Eagle layout software, I came up with a design.

My project requirements were:

- Standalone, no external timing
- Use the 60Hz AC for clock timing
- Circuit board had to fit inside the display case
- 24 hour display only
- Able to be set by hand
- Cheat on 5 VDC by using a wallwort instead of designing a 5 VDC power supply

SchematicNixie Clock Project Circuit Diagram (click to enlarge)

I created a breadboard design using CD4017 decade counter chips since these came in DIP and SOIC packages. These chips were perfect since only one output is on with each clock cycle, and it had 10 outputs (one for each digit). Once I got the basic clock circuit working, I wired it to the Cannon connector, and it worked perfectly!

60Hz Pick Off Circuitry

I used Multisim Blue to proof out a design and then put it on a breadboard. The idea was to create a voltage divider and feed that into a CD4017. In the process, I blew up my Heathkit digital trainer board because the 120VAC wire popped out of the breadboard and touched the 5VDC supply wire, letting the magic smoke out of not only the trainer but every CD4017 on the breadboard! After re-ordering more CD4017s and replacing them, I was able to take on the task of the 60 Hz division.

I placed a CD4017 right after the 120VAC voltage divider and wired the now 2.5VAC (rms) to the clock end of the chip. Viewing the waveform revealed the output had some jitter and wasn't quite square. I did three things, added a diode after the voltage divider to create a DC voltage, changed the voltage divider to give a little more voltage and added a CD4018 Quad AND gate chip. I needed the AND gate for the 24 hour reset signal anyway and I decided to use one of the left over gates as a nice 5VDC buffer. I ran the now 3VDC half wave signal to both inputs of the gate. It worked! A nice clean 5VDC square wave came out of the CD4017. I tied the "6" digit

output to the reset line which gave me a Divide By 6 signal and fed that to another CD4017. The Carry Out (CO) signal produces a Divide By 10, thus a perfect 1Hz signal. I would argue that the 60Hz signal is a good time base. There is an informative white paper on the accuracy of the 60Hz.

Setting the Circuit

You might think setting the circuit is pretty straightforward, but it's not since buttons have "bounce" which can cause extra transitions that are seen by the chips. I added multiple capacitors and resistors based on research regarding switch debouncing. I also added capacitors on each chip (5VDC) as close as I could get them to the chip, as recommended by many electrical engineers.

Getting a Custom Circuit Board

With every change in the design, I always update the schematic in Eagle and layout the board again. I always use Eagle's "Auto Route" feature to route the circuit board traces instead of doing it by hand. There were a couple wires I had to move by hand after the router was finished. Once I finally got the layout I wanted with the right size, I started looking for a board house to produce them for me. The first board house wanted \$800 for 10 boards! Well, that was not going to fly with my wife, so I kept searching. My next attempt got me closer at \$400, but was still too much. After searching and finding nothing really cheaper than \$300, I put my project on the shelf.

I told everyone I knew about my clock project, and one day I found out about Seeed Studios. They allowed me to reduce the size and quantity of the boards, and the price reduced accordingly. I ordered 5 boards for \$16; two boards were for the clocks, one was for "show and tell" and two in case I screwed up the design and need to hack up the boards with red wires. The boards are excellent quality and the best part, the design was PERFECT, no red wires were needed.

Lessons Learned

This was my very first circuit board design and the only help I had was my research. I recommend that you do the design and put it on a breadboard to make sure things work the way you thought they would. It's also good to lay it down for a short while; sometimes you will get a really good idea by backing off the project for some time. I also learned that things don't always work the way they are designed, as was evident with the 60Hz to 1Hz circuitry.

When it comes to soldering, tin one pad of the SOIC chips and solder, and then do one other leg on the other side. This will allow a nice solder joint, and the chip and its legs will sit flat. Tinning all the pads first causes the chip caps and resistors to be up on one end and SOIC chips to not sit flat either.

I replaced the Military AC input connector to a typical "D" type computer AC cord, since they are so plentiful. Also, I added a switch to turn off the 250 volts to the Nixies so that if I am sleeping or not home, the Nixies don't need to be on, but the timing circuitry still runs.

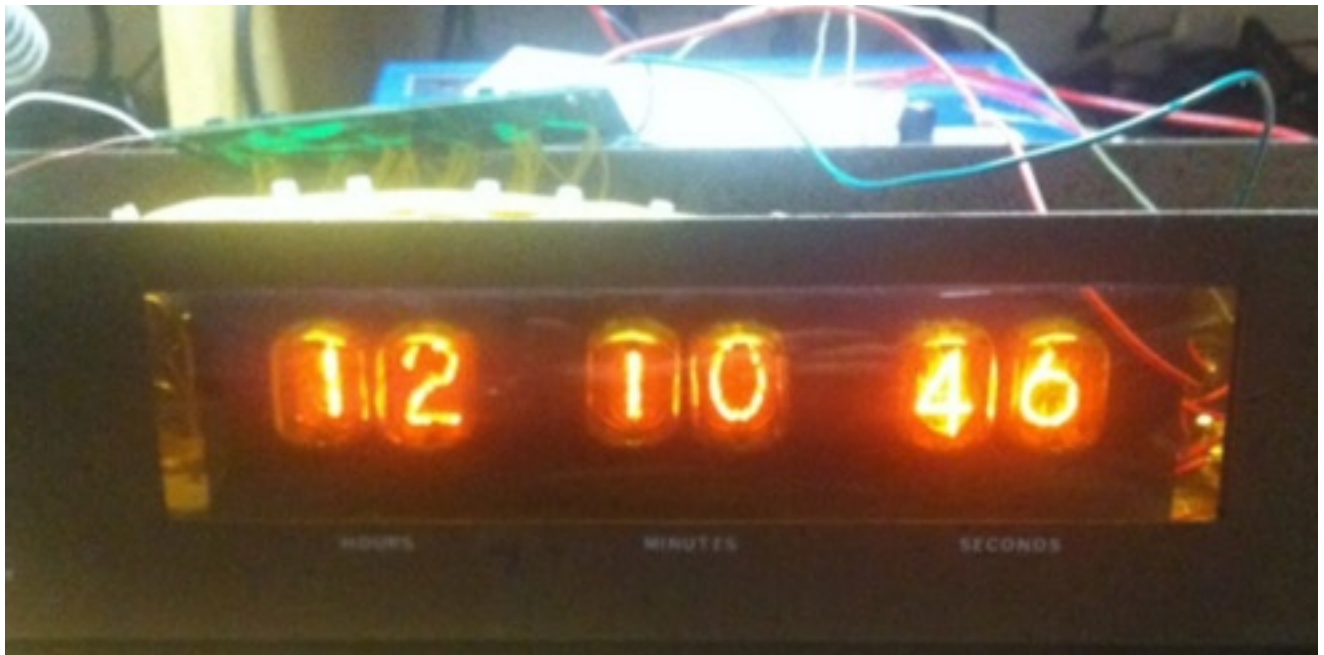
I had great fun and enjoyed every minute of bringing these old units back to life. I learned a lot and hope this article inspires you to do some project that gives you great joy. If you lack the skills or knowledge of design, (I'm self-taught), try it anyway! Letting magic smoke out of things teaches you a lot fast!

How have you used electronics to liven up your holiday decorations? Share your stories at MyStory@Jameco.com.

Steve Dryja is from Milwaukee, Wi. and is a consultant assigned to an Industrial Automation manufacturer testing their energy related firmware and web applications using LabVIEW and eggPlant. His hobbies include meteorology, electronic gadget design, and ham radio. He has been a Jameco customer for too many years to remember.

Complete article with pictures and circuit diagram available at http://www.jameco.com/Jameco/workshop/MyStory/Steve-nixie-clock.html%20?trk_msg=4VKCVUD39NT4156R6DUKLJ54F4&trk_contact=A784EOJRJJFL8VFGJJ3L7F2S74&utm_source=Listrak&utm_medium=Email&utm_term=Nixie+Tube&utm_campaign=November+Newsletter+2015

Thank you to Steve Dryja and jameco for permission to use article



Ham Radio on the Internet
(click on red web address)

Anyone can submit websites for this column. I'll check them out and include them. The editor

This sites were sent in by Ron N9AU well worth reading.

For about ten years, I taught classes at trade shows on the topic of power and grounding for audio and video contractors. Slides for those sessions are at

<http://k9yc.com/InfoComm-PowerSystems2012.pdf>

<http://k9yc.com/InfoComm-Grounding2012.pdf>

An extensive "White Paper" on the topic is at

<http://k9yc.com/SurgeXPowerGround.pdf>

Earlier in this thread I posted a link to a tutorial I have given at Pacificon and at several ham clubs on the topic, this time focused on ham installations. I'll post it again. It's exactly what Matt is looking for, and it's what any ham ought to be studying carefully.

<http://k9yc.com/GroundingAndAudio.pdf>

73, Jim K9YC

Editor

and it has been a good experiment. Great way to learn.

This weekend is our annual swapfest. It looks like we will have good weather for it. The cold weather is scheduled for Sunday how unusual is that. Being that it is in January even in the short time I have been going to it, I have seen some interesting weather swings.

There is not much else to report so I'll keep it short

73

Frank

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***See our Web Page or contact us
for more information on***

- WARAC Memorial Scholarships
- Wisconsin QSO Party
- Midwinter Swapfest
- Worked all Wisconsin Counties Award
- Amateur Radio Classes

WARAC holds meetings on the second Tuesday of each month and board meetings on the fourth Tuesday of each month. Meetings are held at 7:00 PM at:

**St Peter's Episcopal Church
7929 W. Lincoln Avenue
West Allis, WI**

Entry is off the alley at the rear of the church.
A wheel chair ramp and chair-lift are available.