



Official Publication of the  
West Allis Radio Amateur Club

# Hamtrix

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Volume 63, Issue 4 April, 2016

## APRIL CLUB HAPPENINGS



### 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

### Club Meeting

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

April 12, 2016 7:00 pm

### Program

QRP presenter Mike Johnson WO9B

Connectors presenter Frank Humpal KA9FZR

[Join us for a pre-meeting dinner](#)

[at Johnny V's Classic Café](#)

[1650 S 84th St at 5:00pm](#)

The May meeting will be our second annual **pizza and auction party**. Start looking for items for the auction. It's a great way to make room at home! **We will be asking for a \$5.00 donation to help defer the cost of food and drinks.**

**2016 Field Day planning meeting is scheduled for Tuesday, April 19.**

**(see pg 5 for more info.)**



### 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 April 2016*

The 2016 edition of the Wisconsin QSO Party appears to have gone quite well with good weather conditions and fair to good propagation. Forty meters went totally long an hour or two before the end, so intra-state Q's may be down a bit. But quite a bit of 75 meter activity may have offset that. When all the data is analyzed we'll have a better picture.

The level of on-the-air activity seemed to be very good, both phone and CW, especially CW with most of the big-gun mobiles of recent years on the road again. Again, hats off to them for their contributions to our Party!

Log submissions are going well, too, at around 275. Paper logs and non-cabrillo electronic logs seem to be down a bit - a good thing! We have less than a week before the submission deadline, so make sure you've sent yours in. If anyone needs help with their submission, please contact me or another WIQP team member. By the way, the **Michigan QSO Party** looms! It's April 16 and it runs for 12 hours, from 11:00AM to 11PM CDST. We're not that far away from most of Michigan, so you'll hear lots of activity. Visit <http://www.miqp.org/> for details.

The program for the upcoming meeting will be about **QRP operation** by Mike Johnson, WO9B, plus a short presentation by Frank Humpal, KA9FZR, about **installing coax connectors**. We'll also talk about WIQP and we want to hear about everyone's experiences in the contest.

We had hoped to have a program on Skywarn for the upcoming meeting, but the scheduling with them did not work out for this meeting, so we'll have that program at a future time.

Believe it or not, **Field Day isn't that far away** -

a little over 2 months. So come to the Field Day planning meeting on April 19 and see where you'll fit in. See Chairman Chuck's article elsewhere in this issue for more information.

The **May program** will be our annual **Pizza Auction**. Save up your stuff to bring and save up your money to buy stuff other people bring. Don't be misled by the name of this event - we don't plan to auction off any pizzas. But we do ask for a \$5 donation to offset the cost of pizza, soda, etc. And be sure to **come early and come hungry**. Festivities start at 6:30PM.

Amateur Electronics' annual Superfest was last Saturday and **thanks to Al, WA9BZW, Howard, WA9AXQ and anyone else** that helped set up and man our club table.

Don't forget our usual before-meeting dinner at **Johnny V's Classic Café, 1650 S. 84th St.** at 5:00PM. Also, don't forget that in May we will skip this dinner in favor of pizza at the club meeting.

See you at the meeting! Bring a friend!  
Tom, K9BTQ

## **From the Editor**

In my mind we are in what I would say is a typical Wisconsin spring. You have various weight coats readily available because you don't know which one you will need on a day to day or even hour to hour basis. Layers anyone? I remember as a kid going down to my mom's hometown in central Illinois for Easter where they always seemed to have the springs they showed on TV and movies (you know with flowers coming up). In my memory those didn't come til much later when it was almost summer. HI HI

For some reason Software Defined Radios (SDR) have been intruding in my ham radio life. I saw a video on the new Icom IC-7300 which is a SDR that looks like a regular radio. Mike WO9B got himself a Flex 1500 that he is dialing in. We will be having a presentation on them at a coming meeting. So I included an

**Goto Editor pg 11**

# **WARAC General Meeting Minutes**

## **March 08, 2016**

### **Introduction**

The meeting was called to order at 19:03 by President, Tom Macon (K9BTQ). Overall meeting attendance was 20 members, plus 3 visitors.

### **Future Programs**

- April '16: ARRL? Skywarn?
- May '16: Pizza & Auction
- June '16: Field Day 2016

### **Tonight's Programs:**

- WIQP presentation by Chuck Dellis (W9WLX)
- Discussion of past data review by Tom Macon (K9BTQ)
- Presentation of logs and logging programs – primarily N3FJP by Howard Smith (WA9AXQ)
- N3FJP demo by Howard (WA9AXQ) & Tom (K9BTQ)

### **Business**

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

National Parks on the Air – Mike Johnson (NO9B) was on the air.

Status of club raffle – waiting for State certification from Steve Dryja ()

Interesting Heathkit article in Hamtrix by Howard Smith (WA9AXQ). Suggestion is that he should write a book.

The meeting was adjourned at 21:14.

Respectfully submitted,  
Erwin von der Ehe (WI9EV)  
Secretary, W.A.R.A.C.  
2016-03-08

# **W.A.R.A.C. Board Meeting**

**March 22, 2016**

Howard Smith (WA9AXQ), called the meeting to order at 19:00.

Present: Tom Macon (K9BTQ), Steve Dryja (NO9B), Howard Smith (WA9AXQ), Erwin von der Ehe (WI9EV), Dave Garnier (WB9OWN), Al Hovey (WA9BZW), Frank Humpal (KA9FZR).

We discussed the WIQP logs & issues.

Howard (WA9AXQ) gave the monthly Treasurer's report. The general fund and scholarship fund are in good shape.

AES Superfest is April 2nd. W.A.R.A.C. table manning schedule and logistics was discussed.

## **Programs**

April, 2016: Topic to be determined. Tom (K9BTQ) will contact presenter

May, 2016: Pizza Night & Auction – \$5 donation for pizza is requested

June, 2016: Field Day 2016 – Chuck Dellis (W9WLX)

July, 2016: Software defined radio

## **Future Program Ideas**

FM38 Repeater System

Badger Weather Net – Sullivan

SO2R Contest operating

Logger 32

SO2R Contest Operating

## **Other Items**

Amendments to W.A.R.A.C. Constitution and Bylaws were discussed and changes recommended for final draft. Potential changes will be reviewed at the April board meeting.

W.A.R.A.C. operation manual is scheduled to be updated and reviewed in the April board meeting.

Various members have assignments for various club functions

Tom & Erwin will update membership database content. Also, make a procedure for use. Also, improve some features in progress.

2-meter net continues and needs some more check-ins.

Replacement of the club video projector was discussed.

Meeting was adjourned at 20:26.

Respectfully submitted,

Erwin von der Ehe (WI9EV)

Secretary, W.A.R.A.C.

2016-03-22

## Field Day 2016 Planning Meeting—Tuesday April 19

The 2016 Field Day planning meeting will take place on Tuesday, April 19. The permit documentation and fees have been submitted but not yet approved for the same site as last year in New Berlin. We should have the permit and full confirmation for the site soon. The location of the planning meeting is:

St. Mary's Parish, Hales Corners  
Tuesday, April 19, 7 pm  
9520 W. Forest Home Ave

We will meet in "Room 1". Everyone should enter through the doors between the two buildings, go a little to the left and enter the parish office. Once there, tell the greeter that you are attending the meeting scheduled in Room 1.

Hope to see you there and get your thoughts for Field Day 2016!

## Pictures from our booth at 22nd AES Superfest thanks to Al WA9BZW



**John N9LJD Tom K9BTQ and Bill K9BTP  
ride for the QSO party**



# Software Defined Radio, SDR, Tutorial

- tutorial and information about the basics of the software defined radio, SDR, and links of software defined radios to JTRS, and general SDR receiver technology.

In this section

Software defined radio overview

SDR hardware

Software communications architecture

The software defined radio, SDR, sometimes called a software radio has been the aim of many radio developments for a number of years. The roots of software defined radios can be traced back to the days when software was first used within radios and radio technology.

The basic concept of the SDR software radio is that the radio can be totally configured or defined by the software so that a common platform can be used across a number of areas and the software used to change the configuration of the radio for the function required at a given time. There is also the possibility that it can then be re-configured as upgrades to standards arrive, or if it is required to meet another role, or if the scope of its operation is changed.

One major initiative that uses the SDR, software defined radio, is a military venture known as the Joint Tactical Radio System, JTRS. Using this a single hardware platform could be used and it could communicate using one of a variety of waveforms simply by reloading or reconfiguring the software for the particular application required. This is a particularly attractive proposition, especially for coalition style operations where forces from different countries may operate together. Radios could be re-configured to enable communications to occur between troops from different countries, etc.

The SDR software radio concept is equally applicable for the commercial world as well. One application may be for cellular base stations where standard upgrades frequently occur. By having a generic hardware platform, upgrades of standards can easily be incorporated. Migrations for example from UMTS to HSPA and on to LTE could be accommodated simply by uploading new software and reconfiguring it without any hardware changes, despite the fact that different modulation schemes and frequencies may be used.

There are many opportunities for considering the use of the software defined radio, SDR, concept. As time progresses and the technology moves forward, it will be possible to use the concept in new areas.

## Software defined radio definition

Although it may sound a trivial exercise, creating a definition for the software defined radio is not as simple as it seems. It is also necessary to produce a robust definition for many reasons including regulatory applications, standards issues, and for enabling the SDR technology to move forwards more quickly.

Many definitions have appeared that might cover a definition for a software defined radio, SDR.

The SDR Forum themselves have defined the two main types of radio containing software in the following fashion:

**Software Controlled Radio:** Radio in which some or all of the physical layer functions are Software Controlled. In other words this type of radio only uses software to provide control of the various functions that are fixed within the radio.

**Software Defined Radio:** Radio in which some or all of the physical layer functions are Software Defined. In other words, the software is used to determine the specification of the radio and what it does. If the software within the radio is changed, its performance and function may change.

Another definition that seems to encompass the essence of the Software Defined radio, SDR is that it has a generic hardware platform on which software runs to provide functions including modulation and demodulation, filtering (including bandwidth changes), and other functions such as frequency selection and if required frequency hopping. By reconfiguring or changing the software, then the performance of the radio is changed.

To achieve this the software defined radio technology uses software modules that run on a generic hardware platform consisting of digital signal processing (DSP) processors as well as general purpose processors to implement the radio functions to transmit and receive signals.

In an ideal world the signal at the final frequency and at the correct level would emanate, and similarly for reception, the signal from the antenna would be directly converted to digits and all the processing be undertaken under software control. In this way there are no limitations introduced by the hardware. To achieve this, the Digital to Analogue conversion for transmission would need to have a relatively high power, dependent upon the application and it would also need to have very low noise for receive. As a result full software definition is not normally possible.

## **Levels of SDR**

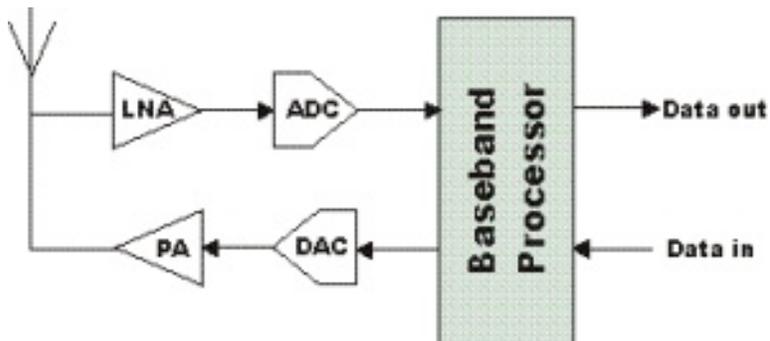
It is not always feasible or practicable to develop a radio that incorporates all the features of a fully software defined radio. Some radios may only support a number of features associated with SDRs, whereas others may be fully software defined. In order to give a broad appreciation of the level at which a radio may sit, the SDR Forum (now called the Wireless Innovation Forum, WINNF) has defined a number of tiers. These tiers can be explained in terms of what is configurable.

Tier 0: A non-configurable hardware radio, i.e. one that cannot be changed by software.

Tier 1: A software controlled radio where limited functions are controllable. These may be power levels, interconnections, etc. but not mode or frequency.

Tier 2: In this tier of software defined radio there is significant proportion of the radio is software configurable. Often the term software controlled radio, SCR may be used. There is software control of parameters including frequency, modulation and waveform generation / detection, wide/narrow band operation, security, etc. The RF front end still remains hardware

based and non-reconfigurable.



Tier 3: The ideal software radio or ISR where the boundary between configurable and non-configurable elements exists very close to the antenna, and the "front end" is configurable. It could be said to have full programmability.

## Block diagram of an ideal Software Defined Radio

Block diagram of an 'Ideal' Software Defined Radio

Tier 4: The ultimate software radio or USR is a stage further on from the Ideal Software Radio, ISR. Not only does this form of software defined radio have full programmability, but it is also able to support a broad range of functions and frequencies at the same time. With many electronic items such as cellphones having many different radios and standards a software definable multifunction phone would fall into this category.

Although these SDR tiers are not binding in any way, they give a way of broadly summarising the different levels of software defined radios that may exist.

## SDR waveform portability

Apart from the fact that the software defined radio can reconfigure itself, another major advantage is that of waveform portability. There are several reasons for the need for SDR waveform portability:

**Cost savings:** With the waveforms for various transmissions, military and commercial, costing huge sums to develop, there is a real need to be able to re-use waveforms on different projects and this is likely to involve very different platforms

**Obsolescence mitigation:** A similar requirement comes as hardware technology develops and it is necessary to transfer existing waveforms onto newer platforms

**Interoperability** To provide complete interoperability a customer may request the use of a particular waveform being used across the equipment from several manufacturers.

Complete SDR waveform portability is not always easy to achieve. However it is necessary to incorporate measures at the earliest stages of the design to ensure the optimum level portability. Elements such as the use of SCA - Software Communications Architecture, and CORBA, a form of middleware associated with SCA..In addition to the use of SCA and CORBA general good structured programming techniques are needed - short-cuts that may work on one platform are

certainly not likely to work on another. It is often necessary to be able to re-compile the code for use the different platforms, so all code should be in a format that can be compiled on the foreseeable platforms.

## **SDR security**

Another area of growing importance is that of SDR security. Many military radios, and often many commercial radio systems will need to ensure the transmissions remain secure, and this is an issue that is important for all types of radio. However when using a software defined radio, SDR, there is another element of security, namely that of ensuring that the software within the radio is securely upgraded. With the growing use of the Internet, many SDRs will use this to medium to deliver their updates. This presents an opportunity for malicious software to be delivered that could modify the operation of the radio or prevent its operation altogether. Accordingly SDR software security needs to be considered, if the Internet is used for software delivery or where there could be security weaknesses that could be employed maliciously.

## **SDR interoperability testing**

With the need to transfer waveforms from one radio or platform to another it is necessary to undertake full interoperability testing. This needs to assure that the code can be transported from one platform to another and provides the correct functionality for the particular waveform in case. To achieve this the waveforms generally need to be certified and accredited.

The SDR, software defined radio is a reality today, and it is being used in many areas. However there are a number of limitations that prevent them being used in as many applications as some would like. One is the sheer processing power that is required, and the resulting power consumption. It is necessary to undertake a power consumption / processing power trade-off, and this is one of the core decisions that needs to be made at the outset. As a result of this it is not feasible to use SDR for cellphone designs, but cellphone base-stations are using them as power consumption and space are normally not issues and the software can be upgraded to enable the moving standards to be tracked. Also software defined radios are being used by the military, and already some handheld designs are appearing. As technology progresses software defined radios will be used in more applications, yet there will always be a decision to be made as the SDR is not the right decision for all radios. For small cheap radios where changes will be few, the SDR is definitely not right. But for more complicated systems where length of service is an issue and where change is likely, then the SDR is definitely a good option to be considered.

By Ian Poole

found at <http://www.radio-electronics.com/info/rf-technology-design/sdr/software-defined-radios-tutorial.php>

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

Interesting site for finding where lightning is striking.  
<http://www.lightningmaps.org/realtime?lang=en#y=42.887718987092;x=-88.03295898437534;z=6;t=2;m=sat;r=0;s=0;d=2;a=2;dc=0;o=0;n=0;>

Another propagation site. Sort of fun to watch and to see how it matches to what you hear on the radio.

<http://www.bandconditions.com/>

### Editor from pg 2

interesting article on them that I found on the Internet. It will be interesting to see where this all goes. More and more I'm hearing about them and finding that touch screens leave a lot to be desired. A blind friend first clued me in to that when he mentioned he couldn't use a stove he had at his house because the touch panel that controlled the burners gave him no feed back. He couldn't tell where the pretend button was. I saw other articles on how distracting they can be in a automobile environment where it can force you to take your eyes off the road to even find the buttons much less the right one. I think we all see that going between radios might be worse with no feed back.

Not much else to share. I'm keeping busy as usual. I hope to see many of you at the meeting next week and if you have any ideas for articles be sure to let me know.  
Your Editor  
Frank KA9FZR

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Al Hovey, WA9BZW  
  
Newsletter Editor  
Frank Humpal, KA9FZR  
fhump@milwpc.com  
  
Webmaster  
Tom Macon, K9BTQ

West Allis Radio Amateur Club, Inc.  
Tom Macon, K9BTQ  
3547 S. 95 St  
Milwaukee, WI 53228



## WEST ALLIS RADIO AMATEUR CLUB, INC.

PO Box 1072  
Milwaukee, WI 53201  
W9FK  
<http://www.warac.org>

***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.