



ROUNDTABLE

PRESIDENT'S MESSAGE

By Gerry Villhauer – W0GV

Hello All,
 I hope your summer activities are progressing as you have planned. My wife and I attended Hamvention 2014 in Dayton Ohio. What an event it was! I think all hams should attend Hamvention at least once...It is a true spectacle. I purchased a new Force 12 HF Beam which I am looking forward to receiving and getting installed on my tower.

Welcome to our new members! THANK YOU! Your name and call signs are listed in this publication. We appreciate you choosing the DRC as YOUR radio club and encourage you to become active with club activities.

Being in Dayton, I missed Paul, WA2YZT's program at Lookout Mountain, KCNC Channel 4 transmitter site. All reports I have received were very positive and that there were nearly 50 in attendance. Paul thanks for all your efforts in putting on the presentation and for the refreshments. Also thanks to Scott Gill, WD5GYE and Don Hayford from Channel 9 for their assistance. Please pass along the club's thank you to them.

Our June program will be on Using and Understanding Doppler Weather Radar, presented by Barry Wilson, KA0BBQ. Barry's presentation will introduce to the layperson what Doppler Radar is, how it is used, and how we interpret the data. Sounds real interesting and very applicable to the severe weather we have been experiencing lately.

We now have the 147.330 repeater with the 100 Hz. tone voting from Lakewood and Aurora. The technical committee would appreciate reports on coverage, especially in the eastern areas of the city using HT's or low power mobiles. At this time, the site we are testing in Franktown on 147.330 with the 131.8 Hz. tone are totally separated operations.

That's all for this month, hope to see you all at the next meeting.

73

Gerry, W0GV
 President

**DRC - ARRL
 Field Day 2014**
Will be here before you know it.
*More information at the June Meeting
 and www.w0tx.org*

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JUNE MEETING - WHAT'D I MISS

By Bryan – KB0A

The May club meeting was a special event for our members. Paul Deeth, WA2YZT, who is Transmitter Technician for KCNC, Channel 4, arranged a tour of the station's transmitter site on Lookout Mountain. Anticipating a large group, Paul arranged for help in doing the tours so that the groups could be kept smaller. Assisting as tour guides were two KUSA, Channel 9 staff, Scott Gill, WD5GYE, Director of Technology, and Don Hayford, who is the RF Manager.

Broken down into two groups of about twenty we were off to view the technology. And, boy what a lot of technology there was. On the upper floor was the transmitters for Channels 9 and 20 both operate on UHF frequencies. An interesting note is that the channel your



HDTV tells you you're watching may not represent the actual frequency on which the signal is being transmitted. Also, on the upper floor was a large complex of copper piping which is actually the transmission lines for the signal from the transmitter to the antenna. The signals are routed through some wave guides to clean up the signals and assure they stay on frequency. There is

also a maze of these copper coax pipes that provide a form of signal combiner on the way to the antenna. There are also a number of smaller copper pipes which carry water to the transmitters for cooling. The upper floor also houses 2 diesel generators, each capable of powering a small town. In the event of a power outage both come on



and the first one to reach full speed (within about 90 seconds) provides power to the building. The other remains running for a few minutes to assure that nothing goes wrong with the first generator before it shuts down. These generators are fed from two buried fuel tanks where the diesel fuel is filtered continually to assure that no bacteria or mold form. While on the upper level we were able to walk out the back door to have a great view of the tower, microwave link antennas and the Front Range.

From there we went to the basement where we saw the KCNC transmitter, and Paul's, WA2YZT, work shop. This transmitter also has a backup power system to bridge the 90 seconds it takes for the larger generators to come on line during a power outage. The backup power systems use rotating flywheels to generate the large amount of power required to keep the transmitter on the air.

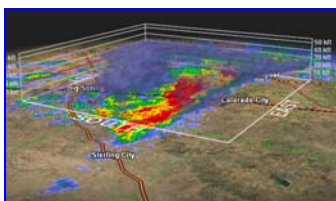


Thanks to Paul, Scott and Don for a very unique experience and a great opportunity to see the technology behind getting their TV signal on the air.

JUNE MEETING PRESENTATION

USING AND UNDERSTANDING DOPPLER WEATHER RADAR

By Barry – KA0BBQ



I am not a meteorologist and neither am I an expert in radar interpretation. I have an interest in weather radar out of necessity as an Aerostat Specialist in the U.S. Coast Guard. We used various radars

for International Law Enforcement and Interdiction work in the Gulf of Mexico, Atlantic Ocean and Caribbean Sea. We also had to utilize radar to protect our multi-million dollar Aerostats from weather hazards... we weren't always successful since we failed to outrun a hurricane, which I will share with you in my presentation. We also had our own lightning detection equipment to help determine storm strength along with our ability to detect storm conditions for hundreds of miles. Our radar was sensitive enough to detect a coffee can in the water at 65 nautical miles.



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My presentation will introduce laypersons to Doppler Radar, how is it used, and how do we interpret what the data means.

I will be introducing you to the tools (programs/data feeds) available to gather this data near real time for SKYWARN SPOTTERS and weather hobbyist. There will be live demonstrations of two of the systems I use... GREarth, GRLevel3, GR2Analyst and StormLab Professional on the computer as well as PYKL3 Radar for the mobile device.

The difference between using free NOAA NWS Data Feeds and Subscription services like Allison House. How near real time is the data that we use?

My hope is that you will leave the meeting with a better understanding of the tools available that can make you a better weather observer.

Who's New In The DRC

The DRC is a very active club in the Denver metro area and we'd like to have all of our members listen for this new call and personally make him feel welcome.

Barry Blasberg KB8BW

Welcome to our newest member. We have a number of activities throughout the year and we'd like very much for you to participate in serving your community. If you have questions please feel free to ask on any of the repeaters or see the contact information on the last page of this publication. Also please join us once a month at the regular club meeting on the 3rd Wednesday at 7pm. For new hams we have the Elmer session which starts at 6:00pm before the regular meeting.

More information can be found on the Denver Radio Club website at <http://www.w0tx.org>.

No Technical Committee Report this month. Watch next month's RoundTable for current updates on what is going on in the DRC.

THE ROUNDTABLE ARCHIVE

Have you been looking for a back issue of the Roundtable? Many are available on the DRC web site. Access <http://www.w0tx.org>. On the left side of the page, click on "Roundtable".

DRC SUPPORT OF WHEAT RIDGE SIREN TEST

By Jim – K0TOR

On April 16th the DRC supported the annual Wheat Ridge siren and listening site test. This year 15 siren sites and 11 listening sites were supported. Listening sites are selected by the city to help in their evaluation of siren coverage. The siren tests are performed in the spring to verify the sirens are functioning properly. With the recent weather it is good to know they are operating well.

The results of this years test showed 2 sites that exhibited some distortion and 1 site with poor audio quality.

This year there were a total of 32 hams that supported the siren test. All sites were covered and we had two ham operators on two sites for familiarization. We had one roamer as a backup that thanks to everyone was not needed.

A big thank you to Paul, K0WSU and Jack, W0JMC for their help in signing up hams to cover the siren test. And I thank each one of the following hams who supported the siren test; KC0UZU, N6LD, K0HTX, KX0I, N4ATA, KD0ZYF, K0WSU, AC7SX, KC0CXX, WZ0S, K0RCW, WG0N, N0LAJ, K0HRT, K0HMT, K0DPR, KF0UV, KD0SYD, N0PQV, K0BLM, N0ETV, K0LJW, N0BED, KB0USF, N0KEX, AA0JK, KD0WMO, N0JPL, W0JMC and KC0WWW. I commend each one of you for taking your time to support this siren test. This test could not be successful without the support of every one of you. JOB WELL DONE!!!

Commander Mark Cooney, Wheat Ridge Police Department, Lakewood/Wheat Ridge radio communications staff and the City of Wheat Ridge thank you for your help in testing the siren system.



(Continued on page 4)

THE LAKEWOOD SIREN TEST COMPLETED

By Jim – K0TOR

On May 14th the DRC supported the annual Lakewood siren physical inspection and verification of proper siren operation. This year the Lakewood siren system consisted of 27 sirens. Two new siren locations were added this year.

Net control operated from the DRC radio room in the Lakewood Emergency Operations Center. A total of 32 hams participated in the siren test this year. The test was supported by the following hams; AC0UA, AC0T, N3PQ, KD0SIY, N0KEX, KD0DUJ, KB0USF, N0PQV, KX0I, WB0HWP, KF0UV, KC0UZU, N4ATA, AC0KB, KD0NPP, WZ0S, AA0JK, N0LAJ, KA5DKS, K0HRT, KD0WMO, K0YES, K0LPR, W6OAV, KD0HMT, KA0BBQ, WG0N, N0JPL, KD0ZVA, W0JMC and KC0WWW. This represents a considerable commitment by each one. They felt it is important enough to take time from their schedule and I appreciate this. Many have supported this test over the years. I feel this speaks highly of their desire to help. I give a big THANK YOU to all of you who supported this years Lakewood siren test.

Following the test many met at the Lakewood Public Safety building for pizza and soda.

The results of this test showed all sirens functioned properly and voice announcements were loud and clear. From the reports it appeared the voice announcements were easier to understand this year. One new siren site exhibited poorer performance than had been hoped for. Siren verification and evaluation ensures functionality of the sirens should emergency situations occur. It is important to complete the testing prior to severe weather. These sirens showed their importance over this Memorial weekend when they were repeatedly put to use. Your support of this years' siren test was another job WELL DONE.

Brian Nielsen, Environmental Services Section Manager for the City of Lakewood and Mike Hillier, KD0WIZ, Lakewood Communications expressed their appreciation for your support of the siren test following pizza. I also received an email from Brian thanking us for our help and conveying thanks from the City of Lakewood.

A BIG THANK YOU JIM

By Bill – W6OAV

For the past eight years, the Denver Radio Club, under the leadership of Jim, K0TOR, has supported the annual Lakewood and Wheat Ridge siren tests. The purpose of these tests is to verify the physical condition and proper operation of the sirens prior to potential weather and safety threats.

Jim has been very dedicated to this project. Each year Jim has had to recruit approximately 25 to 30 volunteers, assign them siren sites and act as net control during the test. After the test,



Jim acting as the siren test net control at the Lakewood EOC.

he gathers the reports from the ham operators, compiles the data and presents it to the Lakewood and Wheat Ridge management and technicians. The technicians can then immediately rectify any reported problems. Both Wheat Ridge and Lakewood management are very appreciative as it would take a large amount of manpower to conduct this type of siren verification on their own. Many citizens have expressed thanks to our ham operators for verifying the siren system.

Jim said this is a team effort. He has help in contacting ham operators and making assignments to siren sites. And he is indebted to the hams that volunteer to help. I can not hope to do it alone. What seems to be a simple task of verifying the siren system can be key to preventing injuries and casualties by warning of impending emergency conditions. A working siren system can pay major dividends. The importance of these siren systems was demonstrated over this last Memorial Day weekend.

A big DRC THANK YOU goes to Jim. As Jim has stated in an earlier Roundtable article "It is important to our radio club as it demonstrates ability and commitment to support public service events. And it gives us the opportunity to showcase the value and benefit of our ham radio capability and skill".

REMEMBER WHEN

By Bill – W6OAV

The purpose of this memory article is to let the newer hams know what ham radio was like in the late 50s and early 60s and to bring back memories to the older hams like me.

Installing an HF radio into today's vehicles is fairly simple. Just connect the radio to a 12 volt source and away you go! Ever wonder how hams in the 50s and early 60s powered mobile vacuum tube receivers and transmitters which required high voltages for the tubes' control grids and plates? Well, hams used vibrator and dynamotor power supplies. So, what were these?

VIBRATOR POWER SUPPLY

A vibrator power supply converted an older car's 6 volt system or a newer car's 12 volt system to high voltage DC, usually around 250 volts, for the receiver's tubes.

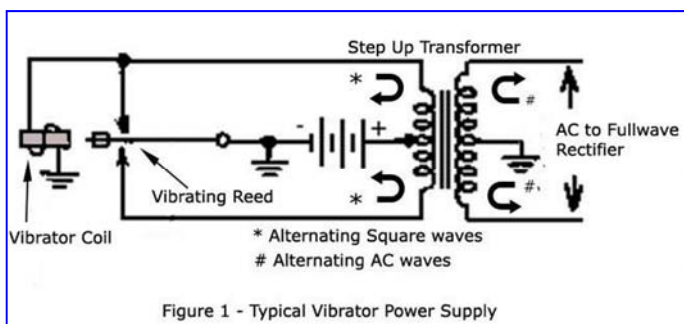


Figure 1 - Typical Vibrator Power Supply

Figure 1 shows the supply basically consisted of a mechanical vibrating reed which produced alternating plus and minus square waves. These square waves were fed into the primary of a step up transformer. The transformer secondary produced alternating high voltage rounded pulses which were in turn converted to high voltage DC by a full wave rectifier. This high DC voltage was then fed to a receiver's tubes.

Most hams would usually use an inexpensive military surplus PE-104 vibrator power supply. Others would obtain an AM tube radio from a wrecked car and salvage the radio's internal vibrator power supply.

The vibrator failure rate was fairly high as the switching reed would often develop dirty contacts, reed adjustments would loosen or they would often stick. Hams got very good at sawing open the reed canister and repairing or adjusting the reed.

DYNAMOTOR

A dynamotor converted a car's 6 volt or 12 volt systems to high voltage, high current DC for the transmitter tubes. A popular inexpensive dynamotor in the 50s and



Figure 2 - The PE103 Dynamotor

early 60s was the military surplus 40 pound PE-103. Figure 2 shows an ad for a PE-103 which appeared in a popular ham magazine. Figure 3 shows a very simplistic block diagram of a PE-103. Figure 3 below shows the PE-103 contained both 6 volt and 12 volt

motors which drove a high voltage DC generator. The two motors allowed the PE-103 to operate with either 6 volt systems or 12 volt systems.

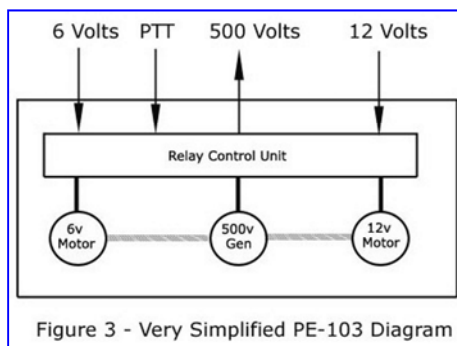


Figure 3 - Very Simplified PE-103 Diagram

The control unit contained many control and overload protection relays, fuses and filters.

When the transmitter's Push to Talk (PTT) was pressed, the proper motor would spin up the generator. The PE-103 supplied 500 volts DC at up to 160 ma, enough to drive an 80 watt AM transmitter. (Remember, SSB was experimental and not common in those days). The PE-103 drew 21 DC amps from a 6 volt system or 11 DC amps from a 12 volt system. This meant using 10 gauge or larger cables!

For a lot of hams there was a kind of thrill when pressing the PTT and hearing the generator spin up. At night, when pressing the PTT, the headlights would dim and then come up to normal brilliance as the generator spun up.

Some hams would modify the PE-103 to also supply 250 volts at 80 ma for the receiver. This modification removed the requirement for a vibrator supply. The down side was that the dynamotor had to be continuously running which consumed a lot of continuous power.

Unlike the vibrator supplies, the dynamotors were pretty reliable. They were well fused, had overload protection relays and thus protected from current over loads. Occasionally, the dynamotor end caps had to be removed to allow re-greasing the bearings.

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Needless to say, one did not run an HF mobile station for very long without the engine running. Besides the heavy current drawn by the vibrator and dynamotor supplies, one had to remember that the receiver and transmitter tube filaments were continually drawing quite a few amps. It is a good thing that the cars of the 50s and 60 had a lot of room. Imagine trying to install the large tube receivers, transmitters and the power supplies into today's cramped cars.

Field Day 2014 is On

The Denver Radio Club will be hosting Field Day June 28th and 29th.

If you have never been on HF and are willing to log your contacts then this is your chance to work the world. The DRC Field Day will Be held at the North Chief Hosa campground, exit 253 one the North side of the interstate.

Come and stay or come for the Day.

To get to the Field Day site go West on I-70 and take ramp "Exit 253 - Moss Rock Road" stay North and follow Moss Rock Road about 3 tenths of a mile Campground is on the left. Watch for DRC sign. More Information on www.w0tx.org

THINGS YOU SHOULD KNOW

RF Amplifier Impedance Matching

It often has been written and most people seem to believe that the output impedance of an RF amplifier should match the load impedance; so that for example, if an amplifier is driving a 50 ohm load, the amplifier output impedance should be 50 ohms.

That generally isn't true for the simple reason that contrary to popular belief, the efficiency would be poor. Consider a 1 KW amplifier with 50 ohms resistive source impedance driving a 50 ohm resistive load (both source and load tuned to resonance). The source and load impedances are in series, so 500 watts would be dissipated in waste heat within the amplifier and 500 watts would be delivered to the load.

To have high efficiency the source impedance must be small compared to the load impedance. Note that high efficiency is not the same as maximum power transfer which is the reason for the common misunderstanding. ©2005 Martek International All rights reserved.

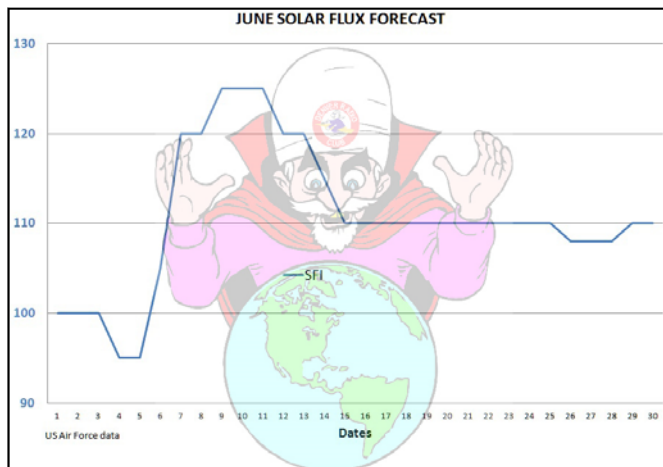
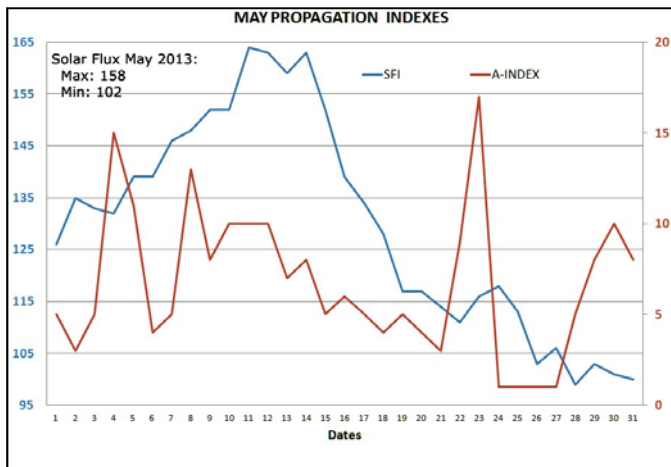
Don't forget to join in Wednesday nights at 7:30pm for the DRC Learning Net! 145.49/448.625 machines

PAST & FUTURE PROPAGATION CONDITIONS

By Bill – W6OAV

The charts below show the Solar Flux and "A" indexes for last month and the forecast for this month's Solar Flux index.

Refer to the September 2010 Roundtable for more complete information on interpreting these charts. Issues of the Roundtable are available at <http://www.w0tx.org/RoundtableAccessPage.htm>.



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UP COMING EVENTS

HAMFESTS & CONVENTIONS

The following are the HAMfests & Conventions which have been registered with the ARRL so far. More information can be found on www.arrl.org/hamfests.

- June 7 – MRC Tailgate Party**
Lions Club Pavilion, Delta, CO
<http://montrosehamradio.org/>
- June 28-29 – DRC~ARRL Field Day**
Chief Hosa Campground
More information at June Meeting and
At <http://www.w0tx.org>
- July 26 – PPRAA Megafest**
Lewis-Palmer High School
<http://ppraa.org/megafest>
- August 17 – DRC Hamfest**
Jefferson County Fairgrounds
<http://www.w0tx.org>
- Sept. 28 – PHC Pueblo HamFest**
First United Methodist South Building
Email: sworley.sw@gmail.com



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The Denver Radio Club
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JUNE 2014							<i>DRC Net Sunday's at 8:30pm Local on 145.490 & 448.625 (No PL)</i>
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
1 <i>Atlantic Hurricane Season Begins</i>	2	3	4 <i>Learning Net 7:30pm</i>	5  First Quarter	6	7	
8	9	10	11 <i>Learning Net 7:30pm</i>	12	13  Full Moon	14  <i>ARRL VHF QSO Party Starts 1800U</i>	
15 <i>ARRL VHF QSO Party Continues</i> <i>Father's Day</i> 	16 <i>ARRL VHF QSO Party Ends 0300U</i>	17	18 <i>DRC Meeting</i> Elmer 6:00pm General 7:00pm	19  Last Quarter	20	21 <i>ARRL Kid's Day 1800U to 2400U</i> <i>First Day of Summer</i>	
22	23	24	25 <i>Learning Net 7:30pm</i>	26	27  New Moon	28 	
29 	30						

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DRC REPEATERS

BAND	Freq / Shift / PL Tone	Additional Information
6m	53.090MHz (-1MHz) 107.2Hz PL	
Packet	145.05MHz<>14.105MHz	
2m	145.490MHz (-) 100Hz PL	Linked to the 70cm - 448.625MHz machine.
2m	147.330MHz (+) 100Hz PL	Voter Test Operation. Send signal reports to Tech Committee.
2m	147.330MHz (+) 131.8Hz PL	Test Mode Operation. Send signal reports to Tech Committee.
1.25m	224.380MHz (-) 100Hz PL	
70cm	447.825MHz (-) DCS-073; NB 12.5; +/- 2.5	Saint Anthony's Note: This is a narrow band repeater requiring DCS.
70cm	448.625MHz (-) 100Hz PL	Linked to the 2m - 145.490MHz machine.
70cm	449.350MHz (-) 100Hz PL	Wide area coverage with Echolink Node # 4140.
70cm	446.7875MHz (-)	MotoTRBO Repeater Slot 1 – DMR-MARC WW, Slot 2 – Local

EDITOR'S NOTE

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DRC members - this is your newsletter. If there is something which is club or amateur radio related that you'd like to see as a regular feature, email suggestions to the editor. Members are the heart of The Denver Radio Club, if you have an expertise or an interest in a particular segment of ham radio that you'd like to write about, you may email your submissions to AG0S@arrl.net. Submission deadline is the 25th of the Month. **Editor**