



# ROUNDTABLE

The Denver Radio Club Newsletter

Since 1917

June 2016

## PRESIDENT'S MESSAGE

By Gerry Villhauer – W0GV



**Hello DRC Members,**

Well it looks like spring is finally here and now we have thunderstorms, lightning, hail and tornados to deal with. Welcome to Colorado weather.

I would like to welcome our newly elected board member, Jan Alan Dickover (WY0J). Jan will fill the position vacated by Bryan Steinberg's resignation. Jan is excited to join the board of director's team and his experience will be very welcome. I also want to thank Bryan (KB0A) for his years of service to the club. He has been a valuable asset to the DRC having served not only on the board and technical committee but also being a Past President of the DRC. Bryan, you will be truly missed. God Speed in your new adventures.

Thanks to Bill Rinker (W6OAV) for his presentation on Small Loop Transmitting Antennas. We had nearly a full house in attendees which says this is a very interesting subject for our members. Thanks Bill, Great Job!

This Month's program will be presented by Doug Parker (N4ATA). Doug's program will be a two part presentation on High Power Radio Stations. I mean High Power, 50,000, 500,000 and 2 Megawatt transmitters. Now that is POWER! I have previewed some of Doug's program and I assure you it will be very informative and entertaining. Mark your calendars for our next meeting June 15th.

Our next big event will be Field Day. If you have participated in a Field Day Exercise you know how much fun it is. This is an opportunity to come out in the fresh mountain air, enjoy a fun RADIO weekend and learn about emergency communication operations. I know many of you have not had the opportunity to operate the HF radio bands, and, you are saying "I only have a Tech Class License". That is not an excuse for not operating Field Day. No matter your class of license or even if you are not yet licensed...you can come out and experience the fun of Field Day. Mark your calendar for June 25 & 26. We will again be at the Chief Hosa exit off I-70, only a few minutes from town. Look for more information in this issue of the RT.

Thanks to all of you who recently joined and made the DRC "Your Club". Please stay active on the air, come to meetings, programs and events. Your name and call will be listed in the body of the Round Table.

73 for now,  
Gerry (W0GV)  
President



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## MAY MEETING - WHAT'D I MISS?

By Jessie King, N0HI

There were 62 attendees. After introductions, Gerry Villhauer (W0GV) chaired an election to fill a board member position vacated by KB0A who moved to California. Jan Dickover (WY0J) was elected by an overwhelming majority. Dave Gillespie (K0HTX) then gave an update on a possible location for the upcoming DRC field day. The meeting was then turned over to the guest speaker, Bill Rinker (W6OAV). Bill's PowerPoint presentation titled "The Small Transmitting Loop (STL)" covered the following topics:

- Description of the STL which is also known as a Magnetic Transmitting Loop.
- Why STLs are popular in other countries and fast becoming popular in the US.
- The pros and cons of STLs compared to other antennas.
- Why an STL's signal to noise ratio is better than other antennas in certain environments.
- Why STLs work better indoors than other antennas.
- STL radiation patterns, when configured vertically or horizontally.
- Examples of commercial and military fixed and mobile STLs.
- Examples of amateur homebrew fixed and mobile STLs.
- Design considerations and the do's and don'ts.
- Audio recording of a test on 10 meters between Bill's station in San Jose and a station in Seattle. The test involved comparing the transmit and receive performance of Bill's homebrew STL mounted in his garage rafters with a G5RV and a ground plane above the house (See summary below).
- Video showing contacts made by a Finnish ham with an English ham (1327 miles) and an Italian ham (1642 miles) using an indoor STL and 5 watts. (See summary below).
- An example of using one of the many STL design calculators available on the internet to design a STL.
- Summary:
  - ◊ The audio recording of the 10 meters tests demonstrated that the STL's receive signal to noise ratio was better than that of the G5RV and the ground plane. As reported by the Seattle station the signal strengths from all antennas were comparable there.
  - ◊ The video showed that an STL, due to its local magnetic field, works very well as an indoor antenna compared to electric field antennas (dipoles, etc).
  - ◊ STLs work well for both low angle and high angle NVIS work.
  - ◊ The military and government stations in the Australian outback are successfully using mobile STLs, especially for NVIS communications. Many users report that the STLs outperform their large mobile whips.

The presentation concluded with good questions from the audience.



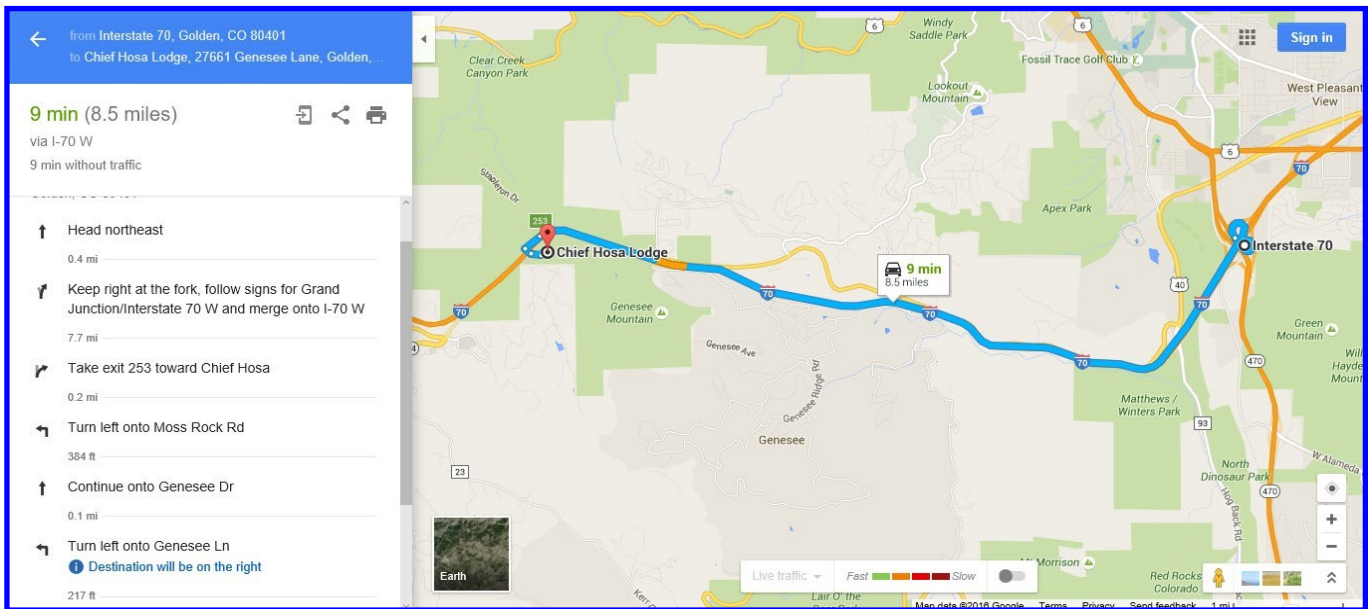
From left to right: Gerry (W0GV) introductions and announcements, Bill (W6OAV) presenting, Gary (KD0SQA), Bill (W6OAV), and Doug (N4ATA), and a part of the large crowd.

### DENVER RADIO CLUB FIELD DAY

BY JASON SMALLWOOD, AC0UA

Again, the Denver Radio Club is proud to have Field Day on June 25-26, at Chief Hosa and everyone is invited. We reserved part of the campground. You can camp with us or come up for the day. Contact me by email at [sja-son67@msn.com](mailto:sja-son67@msn.com), or at my cell phone at (303) 907-1528 to camp with us at Chief Hosa.

ARRL Field Day is the most popular on-the-air event held annually in the US and Canada. On the fourth weekend of June 25-26, more than 35,000 radio amateurs gather with their clubs, groups or simply with friends to operate from remote locations. To work as many stations as possible on any and all amateur bands (excluding the 60, 30, 17, and 12-meter bands) and to learn to operate in abnormal situations in less than optimal conditions. Field Day is open to all amateurs in the areas covered by the ARRL/RAC Field Organizations and countries within IARU Region 2. DX stations residing in other regions may be contacted for credit, but are not eligible to submit entries. See the directions in the image below.

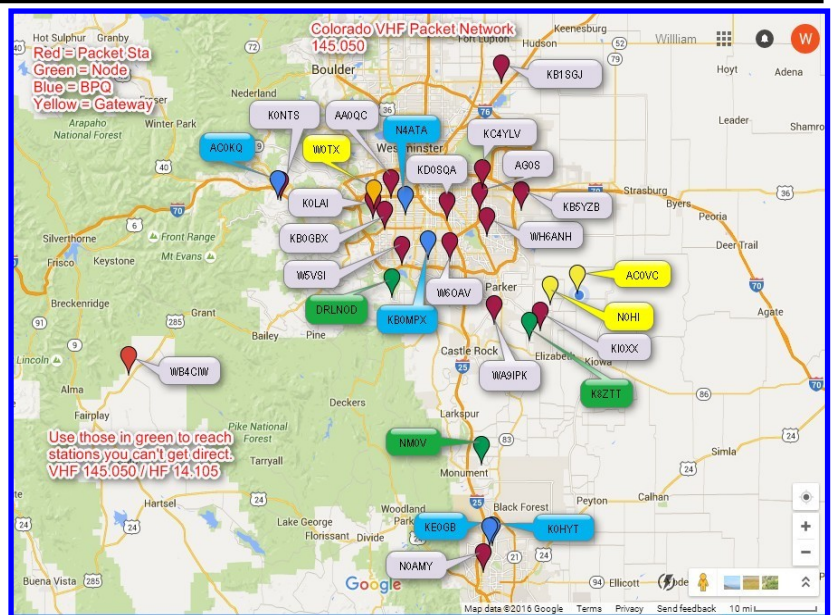


### COLORADO VHF PACKET NETWORK

BY JESSIE KING, N0HI

The Colorado VHF Packet Network map has been updated by Bill (AC0VC). It can be accessed on the Denver Radio Club website at: [http://www.w0tx.org/packet\\_network.htm](http://www.w0tx.org/packet_network.htm).

Thanks to Bill for his time and work maintaining the map for our members.



## DESIGN ADVANCES MAKE PORTABLE OPERATION EASIER, MORE FUN

BY DAN ROMANCHIK, KB6NU

I've just returned from the Dayton Hamvention. Dayton was a blast as usual, and if there's one thing I took away from this year's event it's that portable operation is not only becoming more popular, but more sophisticated as well. In fact, it's a virtuous circle. More sophisticated portable equipment is making portable operation more popular, which is spurring manufacturers to make more sophisticated equipment, which is making portable operation even more popular, and around we go.

This is perhaps most easily seen in the evolution of the Elecraft products. One of their first rigs was the K1, a small rig that was frequently toted out into the field, even though it wasn't really designed for that purpose. It had a small form factor, but had a conventional front panel layout.

The next evolution was the KX1. This CW-only radio was designed specifically for field work. It originally only covered 40m and 80m, and had a very limited front panel, but its built-in battery pack and KXPD1 paddle made it a great choice for portable operators when it was introduced in 2004.

A big leap forward was made when they introduced the KX3 in 2012. This radio combined a bunch of features never before found in a portable rig. The KX3 features an SDR architecture and covers all modes, including (SSB, CW, Data, FM, AM); used the same full-sized LCD display as the K3; has advanced DSP features; and can be connected to a computer via USB for firmware upgrades and for use with other ham radio software. The KX3 is so full-featured that many operators use it as their main rig with a suitable linear amplifier.

At Dayton 2016, Elecraft took this concept even further and introduced the KX2. It's about half the size of the KX3, but yet has almost all of the features of the KX3. There was a tremendous amount of buzz over this radio at Dayton among portable operation aficionados. The base price of the KX2 is \$750, and with options, will cost you about \$1,000.

Of course, Elecraft isn't the only company competing in this market. LNR Precision sells a radio called the LD-5, and at Dayton, they introduced the LD-11, which like the KX3 and KX2 features an SDR architecture and covers 160m - 6m. This radio goes for about \$800, and has also proven to be popular among portable operators.

Dayton also had a number of exhibitors that supplied products other than radios to aid portable operation. There were several portable antenna manufacturers, including Buddipole ([buddipole.com](http://buddipole.com)) and PackTenna

([packtenna.com](http://packtenna.com)), and BiEnno Power ([biennopower.com](http://biennopower.com)) was also there, showing off their new lithium-iron batteries,

While radios like the KX2 and LD-11, at relatively low prices, allow operators to easily get out into the field, portable operation would not be as popular as it is without organized activities. Programs like the Summits on the Air (SOTA, [www.sota.org.uk](http://www.sota.org.uk), [na.sota.org](http://na.sota.org)) and the National Parks on the Air (NPOTA, [npota.arrl.org](http://npota.arrl.org)) make portable operation even more fun. These programs do this by providing a structure in which operators can find one another and gain awards for operating. SOTA did not have a booth at Dayton, but NPOTA was a big part of the ARRL section there.

If you aren't already a portable operator, you should give it a try! You don't have to invest a bunch of money in a rig to just try it. KX1s have been had for less than \$400, and simpler QRP rigs cost a lot less. Getting outside and operating in the fresh air is a lot of fun and could give you a whole new perspective on amateur radio.

*Dan, KB6NU, is the author of the "No Nonsense" amateur radio license study guides, and blogs about amateur radio at [KB6NU.Com](http://KB6NU.Com), and you can contact him by e-mailing [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com). Listen for him operating his KX1 from the park or beach this summer.*

## ~ GET PUBLISHED ~

We welcome and encourage all members to share their experiences and stories so that we can all learn from one another. It can be long or short. If we can't fit it into one newsletter, we can split it across multiple issues.

Not a writer? We have volunteers that will listen to your story and put it into an article, and of course you will have the opportunity to review and approve prior to publication. Your contribution to the club is welcomed and appreciated. ~Editor

### Who's New In The DRC?

By Bob Willson, KC0CZ

The DRC is a very active club in the Denver metro area and we'd like to have all of our members listen for these new calls and personally to make them feel welcome. Welcome to our newest members. We have a number of activities throughout the year and we'd like very much for you to participate in serving your community.

David G Taylor	KB0OLE
Mark Habers	KD0LAC
Kendell A. Dickinson	AF0B

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 7:00 p.m. For new hams we have the Elmer session which starts at 6:00 p.m. before the regular meeting.

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

### TECHNICAL COMMITTEE REPORT

By Bill Rinker, W6OAV



The following is an overview of the subjects discussed at the May Technical Committee meeting. The project coordinators' call signs are in red.

#### AllStar Link Voter System (W0GV)

Goal: Determine the feasibility of establishing an AllStar Link Voter network.

Status: W0GV is working with KD0WHB, and K0LAI, to install the main server with Asterisk software and get familiar with it. N0ETV is building a remote AllStar Link receiver for testing. W0GV is looking for a volunteer to wire up N0ETV's receiver. W0GV will order additional equipment this month. One voter is in test mode.

#### DRC/TSA Aurora Site (W0GV)

Goal: Maintain contact with TSA relative to establishing a "communications room" for the DRC.

Status: W0GV is attempting to meet with the new TSA contact. The TSA contact has had medical issues so the meeting is on hold for a while.

#### Noise at Station 4 (W6OAV)

Goal: Monitor noise level.

Status: Xcel has replaced equipment on a nearby pole. The noise level is now back to the original level. The gateway is working well. W6OAV is monitoring the gateway's performance.

#### Redesign Packet Gateway (W6OAV)

Goal: Re-design the gateway for more reliability.

Status: AC0UA has given the DRC a long term loan of a FT-950 transceiver. W6OAV will build interface cables for the receiver and a PK900. The new configuration will replace the existing KAM and TS-430. The DSP filtering in the transceiver and the PK900 should improve the gateway's performance.

#### Establish a DRC YouTube Channel (KB0A)

Goal: Provide access to various DRC videos.

Status: N0LAJ will administer the channel.

#### Fusion Repeater Upgrade (KB0A)

Goal: Equip the Fusion repeater with a Wires-X Link unit to connect it to the Wires network.

Status: KB0A will mentor AC0UA who will take over administering the upgrade.

*~ Editor's Note: The Technical Committee meeting is open to members of the DRC. It is held in the Arvada room, starting at 6:00 p.m. on the evening of the DRC monthly meeting.*

### INEXPENSIVE CABLES

By Bill Rinker, W6OAV

Interested in purchasing inexpensive HDMI, Cat, and other types of cables? If so, check out Goodwill and ARC stores. They often have piles of these used cables for a very reasonable price. Sometimes they may have unused cables. Also, they usually have piles of wall warts (AC/DC converter modules that plug into 120 volt outlets).

**HAM SITE OF THE MONTH**

**[DX Maps](#)**

**ELMER SESSION START TIME**

The Elmer Session Starts at 6 p.m.  
before the regular 3rd Wednesday DRC Meeting!

***Come join in on the sharing of information.***

## DRC SUPPORT OF LAKEWOOD SIREN TEST

BY JIM BEALL, K0TOR

On May 13<sup>th</sup> the DRC supported the annual Lakewood siren physical inspection and proper siren operation verification. The Lakewood system consists of 27 sirens.

This test was supported by the following hams; Paul (K0DPR), Wallis (AC0T), Charles (N0AY), Orlen (WW0LF), Reid (KD0NRO), Kevin (AD0GX), Don (KB0USF), Terrence (N0PQV), Grace (KC0UZU), Larry (K0LAI), Chris (KD0DUJ), Robert (KX0I), Doug (N4ATA), Harvey (KE0CNU), James (KC0OLW), Ronald (WB0HWP), Fred (AA0JK), Bill (WZ0S), Ken (KA5DKS), Howard (K0HRT), Steve (KD0WMO), Ken (K0YES), Bill (W6OAV), Lloyd (K0LJW), Barry (KA0BBQ), Dave (WG0N), Cary (KE0CNS), Dave (K0HTX), Brennan (KE0FBK) AND Jim (K0TOR).

The majority of radio communications were conducted on the 145.490/448.625 MHz repeaters with the alternate 147.330 MHz West repeater. The net control station used the DRC radio station located in the Lakewood Emergency Operations Center. A total of 30 hams supported this test. This involved a minimum of 2 hours personal time by each ham. So this represents a significant commitment by each one. They took time from their schedule with some taking time from work to support this public service effort. This speaks highly for their desire to support the siren test. Also many have supported this test over the years. This year 20 hams covered the same siren site as they covered last year. A big THANK YOU goes out to all of the hams who supported this year's Lakewood siren test.

After the test, those that could went to the Lakewood Public Safety Building for pizza and soda.

The results of this test showed there were no significant problems. There was a stutter noted in the siren tone at one site, one siren site had a bird nest on top of the siren, two sites had solar panel cover glass that needed cleaning and one solar panel cover glass that appeared to be pitted. Siren verification and evaluation ensures functionality of the sirens for emergency warning should an emergency situation occur. It is important that these tests be performed prior to severe weather season. Again this year is a Job Well Done!

Following the siren test I received thanks from Jesse Miller, Emergency Manager and Mike Hillier, Radio Communications Technician for the City of Lakewood. They are very grateful for our help in making the City of Lakewood safer during critical events and severe weather conditions. Our support is very much appreciated. The DRC has supported Lakewood siren testing for over 25 years.



**Don't forget to join in Wednesday nights at 7:30p.m. for the  
DRC Learning Net on 145.49/448.625 Repeaters!**

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## MY HAM RADIO STORY

By Larry Irons, K0LAI

### ***How did you get interested in ham radio?***

I built my first AM receiver while in grade school. I enjoyed listening to AM radio and then later FM radio. I got a short wave receiver and listened to Deutsche Welle and the BBC. My father had a Motorola commercial VHF radio system with a repeater. Every vehicle had a two-way radio. I got a lot of practice using the 2-way radio and the old 10-codes. In my junior year of high school I started my flying lessons which led to my private pilot license from the FAA. Two-way radios are a necessary form of communication for flying. I got a restricted radio telephone permit at the start of flight school.

After graduating from high school, I attended the United States Military Academy at West Point, New York. My German instructor was a licensed ham and he would invite me to his home on Sunday afternoons for lunch and to show me his amateur radio. If I had more time I would have started studying for my ham license. When I left the Academy I never thought about amateur radio, but I kept up my 2-way radio communications in the air and in the truck.

I attended the University of Nebraska at Lincoln in the 70s and the CW McCall CB craze took place. Everyone was getting CB radios for their cars and home. I did not get one, but my future brothers-in-law did. The popularity was so intense that the FCC gave up on licensing. During this time my father pointed out amateur radio callsign license plates. He said that I should look into getting my ham license.

Again I did not think much more about it until 2007, because that was the year that the CW code requirement was removed. Finally in 2010 I decided it was time to get my license and I was awarded my technician license in October 2010 callsign KDØMXC.

### ***What are your favorite activities in the hobby?***

I enjoy 2-meter and 70-cm rag chewing. I have a packet station and I have gotten involved in 20-meter HF packet. I love PSK31. I recently took a CW class and can do slow code. I want to practice my CW some more to improve my speed. I also participate in ARES and love providing communications for athletic events in areas with no cell phone coverage. I also like APRS. On vacations I will take my HF rig and some antennas and setup a station wherever I can.

### ***What is your most memorable experience(s)?***

The State of Texas has a Texas State Parks QSO Party every year. I made a contact with the Battleship Texas in the Houston Ship Channel. I have visited the BB Texas twice in the past, so it was fun to make this contact.

I also participated in the Nebraska QSO party and won the Colorado portion of the contest for making the most Nebraska county contacts from Colorado.

### ***What is your background?***

I graduated from the University of Nebraska in 1977 with a B.Sc. in geology, and in 1979 with a M.Sc. in geology and mathematics minor. I spent two field seasons in Antarctica using airborne radar to map the ice thicknesses and internal structures. While in college I purchased my first personal computer, a TRS-80.

*(Continued on page 8)*

(Continued from page 7)

My first job out of college was as a geophysicist. We used 2-way radios for communication and for synchronizing the data acquisition. I have worked as a geophysicist for 36 years.

### **What are your additional hobbies?**

I enjoy a number of hobbies besides amateur radio. My oldest and favorite hobby is collecting and painting toy soldiers and playing wargames with them. I have authored and published a few sets of rules for playing wargames as well. I also enjoy playing board wargames.

Related to wargames, I also like to study military history from ancient times up to modern times. I also like to collect military firearms and take them to the range and shoot them.

My second oldest hobby is brewing beer at home. I started brewing beer while in high school. My father told me that my beer was better than my grandfather's. I did not know that my dad's father was a home brewer until then. I have won awards for my beers both in amateur and professional contests.

And finally personal computing and computers are also a favorite pastime of mine. Back in the early days of personal computing I noticed that there were programs even then for CW decoding and encoding. I published a program for analyzing gravity data using TRS-80 BASIC in 1979 in my Master's Thesis. In the early 1990s I started learning Linux. I was fascinated with how I could build new kernels to support various types of hardware. Linux has come a long ways since those early days and in my opinion is the best operating system out there.

I have combined my personal computing hobby with the other hobbies as well, including using the computer to help with wargames and with recipe formulation for brewing, and of course, for digital operations in amateur radio.

**~Editor's Note:** As long as we have material, we will continue to publish a monthly column profiling DRC members' stories about how they got into the ham radio hobby, their interests and backgrounds. The purpose of this column is to introduce DRC members to each other and to find commonalities between them. Please participate by answering the questions as shown in the article above. We will publish in the order we receive them. Please use Microsoft Word set to Arial and 10 point and submit your story to [w6oav@arrl.net](mailto:w6oav@arrl.net). *Thanks to Larry for his story.*

### **JUNE MEETING PRESENTATION**

By Doug Parker, N4ATA

For the June 2016 DRC Wednesday Meeting I will be presenting two different short programs about HIGH Power Radio Stations.

#### **The World's Most Powerful Broadcasting Station**

There will be a 30 minute video hosted by Randy Hall, (K7AGE), about the WLW 700 KHz AM transmitter site in Mason, Ohio, that was increased from 50,000 Watts to 500,000 Watts in 1932. Several other HAMS also contribute to the program.

For more information, here is a link to the YOUTUBE video that will be presented.

<https://www.youtube.com/watch?v=CbHjcwloTiY>

#### **US Navy Radio Station NAA – Cutler, Maine**

The second program will be a brief PowerPoint presentation about NAA (U.S. Navy), a 2 Megawatt VLF transmitter used for Submarine Fleet Broadcast. While this presentation will focus on NAA Cutler, other VLF stations will be mentioned.

For more information, here is a link to more information about NAA Cutler Maine.

<http://navy-radio.com/commsta/cutler.htm>

73, Doug - N4ATA



**VE SESSION RESULTS**

By Tom Kocialski, KC2CAG



*Left to Right: Gerry (W0GV), Empty Chair Tom (KC2CAG), Kevin (AD0GX), Bill (WZ0S), Art (N0AFM), & George (WA9TCD)*

The Denver Radio Club VE Team supported the scheduled exam session at Hamcon Colorado, at the Keystone Conference Center on May 16. Typical conference attendees are experienced radio amateurs, so as expected, most candidates were seeking an upgrade.

We did, however, administer a Tech class exam to a congenial and experienced ham from Russia, Aleksandr (R2DAG). He passed with flying colors. In addition to Aleksandr, Bill (WB9KPT) and Steve (KD0JLE) upgraded to Extra and Terrence (KE0HNW) upgraded to General.

Congrats to all! And a special thank you to all candidates for providing the team with copies of your current license to include with our paperwork submittal to the ARRL. This was also the first time in my memory that we set up the team's tables behind the candidates. It seemed to work well and likely minimized distractions for the candidates. A good idea for next time!

The VE participants included 5 members of the DRC VE team, and a volunteer from Estes Park who wanted to donate his time in thanks for our club's continued participation in these sessions. Thank you, team members:

- |                          |                         |                        |
|--------------------------|-------------------------|------------------------|
| George Bartling (WA9TCD) | Gerald Villhauer (W0GV) | William Rogers (WZ0S)  |
| Arthur Mutschler (N0AFM) | Kevin Schmidt (AD0GX)   | Tom Kocialski (KC2CAG) |

**ATTENTION**

**Have you ever thought about being a net control station for our Sunday night net? We are looking for some net control operators to fill this important position. Contact Jim Beall (K0TOR) if you are interested. His contact info is on the last page of this newsletter or at the DRC Website, [w0tx.org](http://w0tx.org).**

## REMEMBER WHEN?

By Bill Rinker, W6OAV

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

Hams today are used to carrying small pocket sized VHF/UHF HTs. Back in the 50's this was something hams never expected to see.

**Figure 1** shows a QST ad for what hams back then thought was the ultimate! The figure shows a Hallicrafters HT-21/HT-22 "Hand Carry" unit. The HT-21 covered 25 to 50 MHz FM and the HT-22 covered 150 to 170 MHz FM. Both models were crystal controlled.

There were three models: LDS (0.5 watt out), LWS (0.5 watt out) and HWS (1.0 watt out). Hams would purchase these units and easily modify the HT-21 for 6 meters and the HT-22 for 2 meters. The LDS model was preferred by hams as it worked off high voltage dry cells whereas the other two models required heavier rechargeable 2.0 volt wet cells and had power consuming inverters to develop higher voltages.

Also, the LDS model weighed only 10 pounds whereas the other models weighed 14 pounds! The LDS model measured 13"x8.25"x3.5" whereas the other two models measured 16"x8.25"x3.5". The units contained 22 subminiature vacuum tubes!

**Figure 2** shows these tubes which were high tech back then. They were very small and consumed less power than the standard miniature vacuum tubes common then. These sub-miniature tubes were sometimes referred to as "pencil" tubes because of their small size. They were approximately a quarter of the size of the miniature tubes. Instead of pins they had flexible leads just like today's transistors. Most subminiature tubes drew a filament current in the range of 30 to 50 ma at 1.5 volts and a plate current in the range of 0.125 to 0.50 MA at 45 volts.

The HT-21/HT-22 LDS model operated off a 1.5 volt filament supply battery and three 45 volt tube supply battery connected in series.

**Figure 3** shows the size of the batteries used in the unit. They were large, heavy and didn't last long when making lengthy transmissions.

By today's standards, these units are extremely antiquated. However, they provided a lot of fun portable operations back in the 50's! We thought it would never get any better than that!

**hallicrafters**  
*littlefone*

**NEW 2-WAY  
FM RADIO-TELEPHONE**

A new Hallicrafters product—the "Littlefone"—is now ready for thousands of important uses in hundreds of industries.

- FULL TWO-WATT ANTENNA OUTPUT\*
- Weighs only 14 pounds!
- Complete, self-contained 2-way radio-telephone station!
- Rugged, weatherproof
- Powered by Dry, or Wet Rechargeable Batteries (can be recharged from car battery or 117 Vols AC)
- 22 sub-miniature tubes on dual super heterodyne and phase modulated transmitter.

**HAND CARRY**  
HT-21 (25-50 Mc.)  
HT-22 (150-174 Mc.)

*Walter Ashe* RADIO CO.  
1125 Pine Street, St. Louis 1, Mo.

Figure 1 - Ad for HT21/22 Hand Carry

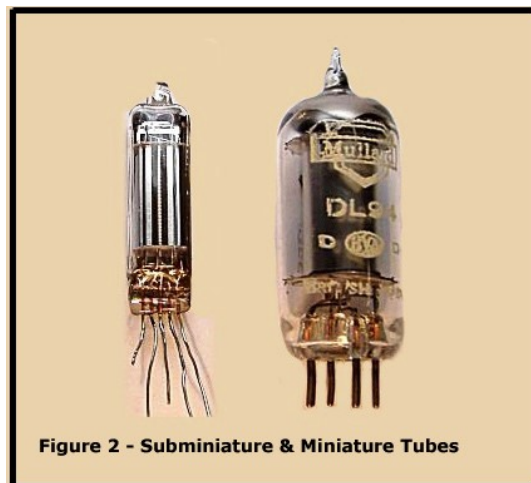


Figure 2 - Subminiature & Miniature Tubes



Figure 3 - HT 21/22 Handy Carry Batteries

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**LEARNING NET REPORT**

BY FRED HART, AA0JK



Learning Net and Yahoo Learning group topics discussed this past month of May:

- Self-study material for test preparation
- Keystone convention
- Lakewood and Wheat Ridge siren tests
- Use of test equipment
- Crystal frequency shift in older radios
- AMSAT
- Satellite tracking
- Weather tracking
- Third party traffic as per part 97.115
- Non-licensed operation opportunity's with licensed amateur radio operator's control.
- Antennas and methods of installation
- Poor propagation (Note this month's Solar report for insight into why propagation was so poor).

This and more.

There were great topics from our group. We certainly enjoy everyone's participation. Thanks to all.

We would like to thank our net control operators for a great job in running the Learning Net. Your participation is greatly appreciated. Thank you to Steve (KD0WMO), Gary (KD0SQA), and Larry (K0LAI).

If you are listening and don't yet have your license, you can contact us at the [W0TX web-site](http://w0tx.org) , [w0tx@w0tx.org](mailto:w0tx@w0tx.org) or at [elmer@w0tx.org](mailto:elmer@w0tx.org). If we don't have the answer here on the net, we have a lot of experienced hams in the club that can help.

Questions can also be submitted on the [YAHOO Learning Net](http://www.yahoo.com) web page. Here you will also find information from past activity that you might find of interest.

Getting that first Technician license? Upgrading to General or Extra? We're here to help. We encourage those who have been Hams for several years to also join us. Your experience and input is welcomed.

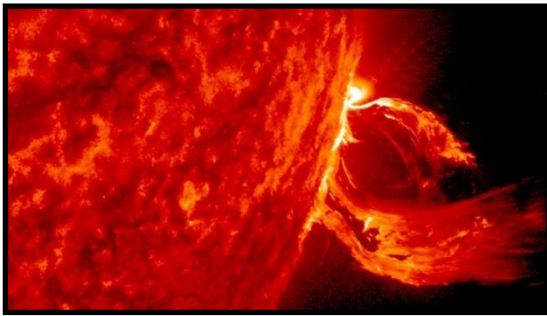
What topics would you like to discuss? Join us Wednesday nights at 7:30 PM, on 145.490 or 448.625.

(Note: The third Wednesday of the month is devoted to the DRC club meeting. See the [W0TX web-site](http://www.w0tx.org) for additional information.

73, Fred (AA0JK)

**SOLAR UPDATE**

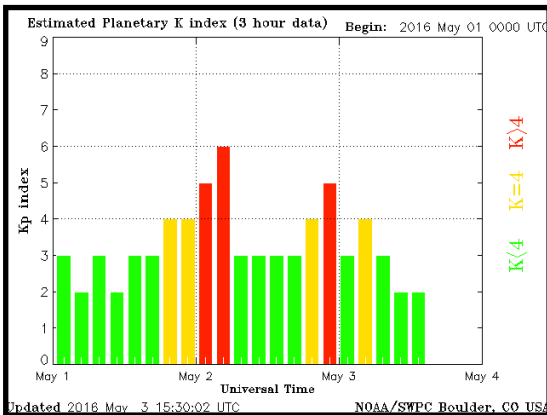
PROVIDED BY FRED HART, AA0JK



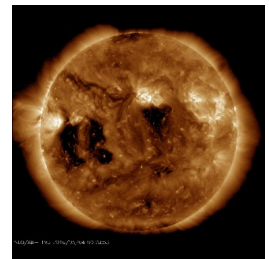
**Week One of May 2016**  
*Negative Magnetic Fields Sparked Intermittent Geomagnetic Storms.*

The first week of May opened with Earth crossed through a fold in the [heliospheric current sheet](#), a vast undulating system of electrical currents. The negative-polarity of the magnetic field opened a crack in our planet's magnetosphere, allowing solar wind to pour in and disrupting HF communications.

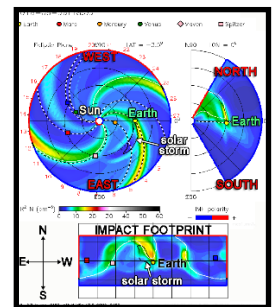
A brief period of Moderate G2 level storming was reported May 2 @ 09:00 UTC. Kp indices rose to K6 levels then lowered down to Kp 4 levels over the next 24 hours. Only to jump to Kp 5 levels on May 2nd.



**May 4th**  
 Solar wind flowing from a massive coronal hole was observed and expected to reach Earth by May 7th. HF propagation was reported to be fare May 5th, until the arrival of a solar storm. Solar wind, was expected to arrive, decreasing propagation on the lower bands. HF communications were expected to decline rapidly and without warning once the A-Index rise, and the K-index approached level 4.



The Impact Footprint here shows the solar winds track as it impacted Earth. May 7th, Again Kp levels jumped to level 5 disrupting HF communications. High Noon Net control operators had their work cut out for them. Relays were the norm for those trying to check-in.



**Week Two**

Solar wind flowing from indicated coronal hole was expected to reach Earth on May 9th – 10th. SDO/AIA Week two began with a strong G3-class geomagnetic storm as Earth moved through a region filled with negative – polarity magnetic fields.

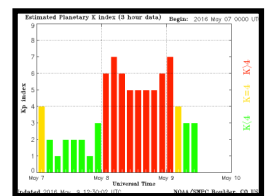
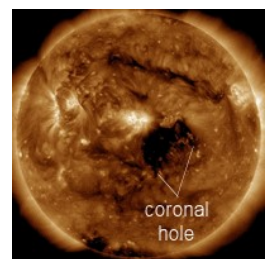
This type of interplanetary magnetic field is referred to as a “negative IMF” or “southward – pointing B-sub-z.” Such fields easily link to Earth’s magnetic field, opening a crack in our planet’s magnetosphere. Solar wind can pour in to fuel spectacular auroras, and wreak havoc with electronic communications, GPS. (You’re self-driving Google car??).



Kp indices rose to levels as high as 7. HF propagation was very poor as the SFU had fallen below 100, and HF was sporadic. Coupled with the passing G3 solar storm and an A-index at 70, propagation was in very bad shape. HF was expected to experience fading without warning.

**May 15, 2016 @ 22:40 UTC**  
**Geomagnetic Storm Watch**

A high speed solar wind stream was expected to become geoeffective during the next 24 hours. Enhanced geomagnetic activity, possibly reaching minor (G1) storm levels were possible.



**Solar Wind Ineffective:****May 15**

Earth was moving through a stream of high speed solar wind. Magnetic fields inside the stream were not well connected to our planet's magnetic field. As a result, the encounter did little to spark geomagnetic activity May 17th. No storms detected. A solar wind stream predicted to generate minor geomagnetic storming had failed to materialize. The next 48 hours were a period of quiet conditions.

**May 19th**

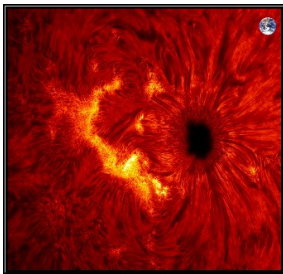
NOAA forecasters estimated a chance of minor G1- class geomagnetic storms when Earth was to enter a stream of solar wind flowing from a coronal hole.

**May 20th**

Co-Rotating interaction Region: NOAA forecasters predicted a chance of G1-class geomagnetic storms as a co-rotating interaction region (CIR) was expected to hit Earth. CIRs are transition zones between slow-and fast-moving streams of solar wind. Strong magnetic fields and density gradients inside CIRs often do a good job sparking auroras and HF propagation disturbance.

**Big Sunspot Stares at Earth:**

Sun spot AR2546 was facing Earth. Note the size relation of this sun spot to Earth.

**Week Four  
May 25th****Solar sector Boundary Crossing:**

Late on Wednesday, the Earth was crossing a fold in the Heliospheric current sheet. This region of space was filled with negative polarity magnetic fields. Such fields can open a crack in Earth's magnetosphere, allowing solar wind to pour in and fuel geomagnetic disturbances. G1-class storms were expected.

**Forecast:**

- No S1 (Minor) or greater solar radiation storms are expected.
- No significant active region activity favorable for radiation storm.
- Production are forecast.

**NOAA Radio Blackout Activity and Forecast:**

- No radio blackouts were expected for May 25-May 27 2016.
- No significant flare activity in the forecast.

73, Fred (AA0JK)

**ATTENTION**

The DRC Board of Directors meetings are held on the 4th Wednesday of the month and are open to any member. Due to scheduling of meeting space, the board does not always meet at the same location and on occasion meetings are held via Skype. Anyone wishing to attend, please contact a board member prior to meeting night for specific information.

LOOKING BACK AT THE DRC PROVIDED BY WOODY LINWOOD (W0UI) ROUNDTABLE, DECEMBER 1960

Ham plates an issue and Christmas meeting location back then.

December, 1960



# The Round Table

The Denver Radio Club, Inc.

## FUN FOR FAMILY AT CHRISTMAS MEETING

### DECALS FOR HAM PLATES

A recent issue of a local daily carried instructions (complete with pictures), on how and where to affix your 1961 license plate decals. As set forth by the Motor Vehicle Dept., it is to be placed just above the "dash" that separates the letters from the digits.

The call letter plates provide a different problem. Hence no digits, no "dash." Through the time and efforts of Les Richards, WØICR, the Motor Vehicle Dept., was contacted.

Yes, it was an oversight. It has been recommended and officially approved that on call letter plates, the decal is to be placed on the right hand side of the plate about one-half inch above the present 60 (which is in the lower right hand corner). Les also recommended that a note be printed and enclosed with the little tab, which would bring this to the attention of those with call letter plates.

Those getting call sign plates this year for the first time, will receive 1960 plates with the decal to be attached. There are several presently issued "ham" plates in Denver County, of which no application

*(Continued on Page Seven)*

### CHRISTMAS MEET IS DEC. 21

The DRC will hold their regular December meeting as usual in Sabin Hall, Colorado General Hospital. The meeting will again be a Christmas gesture. A tree is to be decorated at the meeting and everyone is requested to bring an ornament of some kind. There will be prizes for the best, most original, etc.

After our program the tree will be donated to the children of the hospital. So little here means so much there.

Based on previous Christmas programs, we can be sure of a nice evening, and let us say in advance, Many Thanks to all those who participated. Come, and bring the whole family. Christmas gift exchange, bring one, receive one. Approximate value \$1.00.

Ø—Ø—Ø

### 10 KVA GENERATOR DONATED TO CLUB

The Denver Radio Club has received a 10 KVA power generator as a donation

*(Continued on Page Eleven)*

*This puzzle is provide courtesy of Chris Codella - W2PA. The URL for his website is <http://www.w2pa.com>. The solution for the puzzle is on page 16.*

# Propagation

**Across**

- 1. "WRTC grand \_\_\_" - working all 1x1 calls
- 5. Parts supplier McMaster-\_\_\_
- 9. Sword handles
- 14. Digital music std.
- 15. Silent Key article, briefly
- 16. Fill with joy
- 17. Antenna restrictions might be on this
- 18. A craving for that last multiplier, say
- 19. Northern city with F call prefix
- 20. DXers' mood swings?
- 23. Decades over S9
- 24. Sharpens
- 26. Early term for static crash (1920's)
- 28. Nothing more, on CW
- 30. Ocean
- 32. "Air" for an early ham
- 33. \_\_\_ gum - a thickening agent
- 34. Hams xmit and rev with them
- 35. The way, for signals
- 38. A non-radio bug
- 39. A hamfest of the Internet
- 40. Type of eel
- 41. Code inventor, for short
- 42. A comfortable ham shack might be here
- 43. Law school course
- 44. VK animal
- 47. Baseball glove
- 48. A six or ten meter DXer's hope
- 54. Do this on your meter to measure line voltage
- 56. Board here, for going /MM
- 57. Capacitor dielectric material
- 58. CW predecessor
- 59. Medical breakthrough

1	2	3	4		5	6	7	8		9	10	11	12	13
14					15					16				
17					18					19				
20				21					22					
			23					24				25		
	26	27					28	29				30		31
32					33					34				
35					36					37				
38					39					40				
41					42					43				
	44		45	46				47						
			48				49	50				51	52	53
54	55					56					57			
58						59					60			
61						62					63			

- 60. Vy much
  - 61. DC power sources, briefly
  - 62. Cluster item
  - 63. Maine prefix, possibly
- Down**
- 1. Tiny parts (abbr.)
  - 2. In \_\_\_ of (instead of)
  - 3. Gulf of \_\_\_, off the 70 coast
  - 4. Where not to change horses
  - 5. VK was once a British one
  - 6. Borders on
  - 7. A microprocessor type, briefly
  - 8. Non-military RATT
  - 9. "\_\_\_ radio" (testing, sometimes)
  - 10. SETI call answerer
  - 11. Calling CQ TEST one minute before the contest begins
  - 12. Kind of logic ckt
  - 13. You can do it with ATV
  - 21. Lively
  - 22. Boorish sort
  - 25. Told someone to wait, on CW
  - 26. Winning several contests in a row
  - 27. It might increase your amplifier's blower speed
  - 28. Holy book, in HZ-land
  - 29. R-rated, maybe
  - 31. Grayish
  - 32. Oval insulators
  - 33. Jeer
  - 34. A contester, in a broader sense
  - 36. Fragrant wood
  - 37. Ham it up, in a way
  - 43. FCC license, slangily
  - 45. Like an untouched Heathkit
  - 46. Freezes a digital VFO
  - 47. Prefix with chip or wave
  - 49. They feed DSP ckts, usually
  - 50. Arrange, as hair
  - 51. Prefix with watt
  - 52. Clickable image
  - 53. Gourmet cracker spread
  - 54. Particularly slim type of AM
  - 55. 3-land ARRL section

**FACT OF THE DAY**

**Electron Facts**

Electrons are the obvious basis of everything electronic. Electric voltage, electric current, electromagnetism, radio wave emissions, infrared emissions, light emissions, x-ray emissions, cosmic ray emissions, chemical reactions, and many other things depend on properties of electrons. However, despite their importance and the fact that the electron was the first subatomic particle to be discovered, after many years of intense study important electron properties remain unknown. For example, the diameter of an electron is unknown. Electrons behave in some ways as point-like particles with no measurable dimensions and in other ways like large particles with embedded point-like charges. Despite all the electric and electronic applications that are so important to modern life, some of the most fundamental aspects of electrons remain unknown. ©2005 Martek International All rights reserved.



**~ Ham Tip ~**

If you have knowledge of a **GREAT** ham radio related website or just a general tip, let us know and we will share it with the rest of the DRC membership here in the RoundTable. Send to [n0hi@arrl.net](mailto:n0hi@arrl.net).

**THE ROUNDTABLE ARCHIVE**

Go to: <http://www.w0tx.org/RoundtableAccessPage.htm>

**THE ROUNDTABLE ARTICLE INDEX**

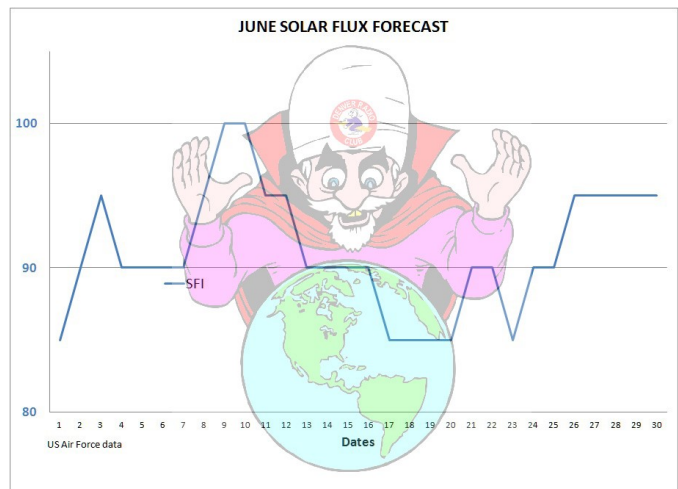
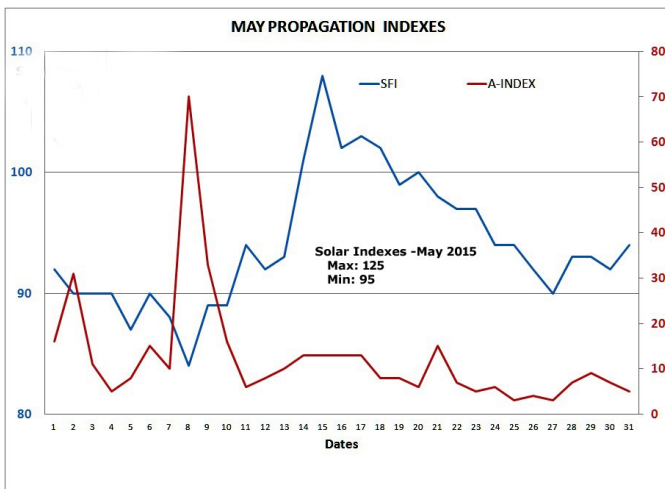
Go to: <http://www.w0tx.org/RoundtableArchive/-RoundTables-Index.pdf>

**PAST & FUTURE PROPAGATION CONDITIONS**

By Bill Rinker, 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/RoundtableArchive/2010-RoundTables/RT201009\(SEP\).pdf](http://www.w0tx.org/RoundtableArchive/2010-RoundTables/RT201009(SEP).pdf)



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## UPCOMING EVENTS

### HAMFESTS & CONVENTIONS

Event	Date	Location	Sponsor Website
MARC Tailgate Party	06/04/16	Delta, CO	<a href="#">Montrose Amateur Radio Club</a>
PPRAA Megafest	07/09/16	Monument, CO	<a href="#">Pikes Peak Radio Amateur Association</a>
Denver Radio Club Hamfest	08/21/16	Golden, CO	<a href="#">Denver Radio Club</a>
BARCfest	10/02/16	Longmont, CO	<a href="#">Boulder Amateur Radio Club (BARC)</a>

## UPCOMING ARRL CONTESTS

[ARRL CONTEST CALENDAR](#)

Contest	Start Date	Start Time	End Date	Stop Time	Notes
<a href="#">June VHF</a>	06/11/2016	1800 UTC	06/13/2016	0259 UTC	
<a href="#">Kids Day</a>	06/18/2016	1800 UTC	06/18/2016	2359 UTC	
<a href="#">Field Day</a>	06/25/2016	1800 UTC	06/26/2016	2059 UTC	
<a href="#">IARU HF World Championship</a>	07/09/2016	1200 UTC	07/10/2016	1200 UTC	

## UPCOMING QSO PARTIES

*The following are the Contests not sponsored by the ARRL. Please submit additions for future issues.*

State/Province	Start Date	End Date	Sponsor Website	Notes
Alabama	06/04/2016	06/05/2016	<a href="#">Alabama QSO Party</a>	
West Virginia	06/18/2016	06/19/2016	<a href="#">West Virginia State Amateur Radio Council</a>	
Maryland-DC	08/13/2016	08/14/2016	<a href="#">Anne Arundel Radio Club</a>	
Kansas	08/27/2016	08/28/2016	<a href="#">Kansas QSO Party</a>	
Hawaii	08/27/2016	08/29/2016	<a href="#">Hawaii QSO Party</a>	
Ohio	08/27/2016	08/28/2016	<a href="#">Ohio QSO Party</a>	
Colorado	09/03/2016	09/04/2016	<a href="#">Pikes Peak Radio Amateur Association</a>	Based on 2015 date.
Tennessee	09/04/2016	09/05/2016	<a href="#">Tennessee QSO Party</a>	Based on 2015 date.
New Jersey	09/17/2016	09/18/2016	<a href="#">New Jersey QSO Party</a>	
Washington	09/17/2016	09/18/2016	<a href="#">Western Washington DX Club</a>	Based on 2015 date.
New Hampshire	09/17/2016	09/18/2016	<a href="#">Port City Amateur Radio Club</a>	
Maine	09/24/2016	09/25/2016	<a href="#">Wireless Society of Southern Maine</a>	
Texas	09/24/2016	09/25/2016	<a href="#">Texas QSO Party</a>	

**DRC REPEATERS**

BAND	Freq / Shift / PL Tone	Additional Information
6m	53.090MHz (-1MHz) 107.2Hz PL	
Packet	145.05MHz<>14.105MHz	<b>2 meter / 20 meter gateway. Useable by Technicians on 2 meters. See January 2015 RT.</b>
2m	145.490MHz (-) 100Hz PL	<b>Linked to the 70cm - 448.625MHz machine.</b>
2m	147.330MHz (+) 100Hz PL	<b>Local Area, Members Auto-Patch Does Not TX a PL!</b>
2m	147.330MHz (+) 131.8Hz PL	<b>Test Mode Operation. Send signal reports to Tech Committee.</b>
1.25m	224.380MHz (-) 100Hz PL	
70cm	447.825MHz (-) DCS~073; NB 12.5; +/- 2.5	<b>Saint Anthony's Note: This is a narrow band repeater requiring DCS.</b>
70cm	448.625MHz (-) 100Hz PL	<b>Linked to the 2m - 145.490MHz machine.</b>
70cm	449.350MHz (-) 100Hz PL	<b>Wide area coverage with Echolink Node # 4140.</b>
70cm	449.775 MHz (-) 100Hz PL	<b>Yaesu Fusion Digital / Analog, 100 Hz Tone Required for Analog.</b>
70cm	446.7875MHz (-)	<b>MotoTRBO Repeater   Slot 1 – DMR-MARC WW, Slot 2 – Local</b>



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**e-mail: denver@hamradio.com**

<b>JUNE 2016</b>							<i>DRC Net Sunday's at 8:30 p.m. on 145.490 / 448.625 (No PL)</i>
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
			<b>1</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>2</b>	<b>3</b>	<b>4</b>  New Moon	
<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>9</b>	<b>10</b>	<b>11</b> <b>ARRL</b> June VHF Begins 1800 UTC	
<b>12</b>  First Quarter	<b>13</b> <b>ARRL</b> June VHF Ends 0259 UTC	<b>14</b> <i>Flag Day</i> 	<b>15</b> <b>DRC Meeting</b> Elmer 6:00 p.m. General 7:00 p.m.	<b>16</b>	<b>17</b>	<b>18</b> <b>ARRL</b> Kids Day Begins 1800 UTC Ends 2359 UTC	
<b>19</b> <i>Father's Day</i> 	<b>20</b>  Full Moon	<b>21</b>	<b>22</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>23</b>	<b>24</b>	<b>25</b> <b>ARRL</b> Field Day Begins 1800 UTC	
<b>26</b> <b>ARRL</b> Field Day Ends 2059 UTC	<b>27</b>  Last Quarter	<b>28</b>	<b>29</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>30</b>			

**DRC BOARD OF DIRECTORS**

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Web Master	N0LAJ	Bill Hester	Check Roster	Check Roster

**Please Let Us Know**

Over the years we occasionally hear from hams who have read the RoundTable in other states and countries around the world. We appreciate the comments and we would like to know where you are located. So if you live outside the Front Range or Denver Metro Area and read the newsletter either online, email or hard copy please send a short note via email with your *City, State or City, Country*.

We will publish it at a later date in our new regular feature called RoundTable RoundWorld.

To respond to this request send your information to [n0hi@arrl.net](mailto:n0hi@arrl.net).

*Subject: I'm located in...*

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DRC members - this is your newsletter. Please email your club or amateur radio related suggestions to the editor. Members are the heart of The Denver Radio Club, so 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 [n0hi@arrl.net](mailto:n0hi@arrl.net). The submission deadline is the 20th of the Month. ~ Editor