W0BLK
BLACK HILLS AMATEUR RADIO CLUB, INC

3288 Sandstone Lane
Rapid City, SD 57701-5388

Call to Order: The BHARC meeting was called to order at 7:00 pm on 19 Aug 2022 by President Ryan Lindblom KE0LXT. The meeting was held in the Electrical Engineering/Physics building at the South Dakota School of Mines and Technology, room 208. The online GoToMeeting was not offered as an option to participate in the meeting.

The following attended the meeting in-person:
Ryan Lindblom KE0LXT
Mike Moore KE0QIB
Chris Jaques KD0RAS
Andy Pattantyus KF0ARA
Terry Fuller AD0HL
Gary Peterson K0CX
John Murphy AJ0GM
Betty Rush KA7PJQ
Bianka Miller - passed the exam, no call sign yet
Bob Henriksen KF0AM
Ken Kjar W0SEB
Don Jarvinen K0DAJ
Nathan Purdy KF0FLB
Eric Neuman N4QFD
Dave Minnick N9FI
Don Jarvinen K0DAJ
Lee Boyles K0LGB
John Wilson W8JSW
Jim Woods N0NAC
Delbert Long KD0AYN
Gary Anderson KF5XW
Robert Olsen WA0FPR
James Dietz KC0USQ
Steve Bates N0MHQ

Treasurer's Report: Chris Jaques provided the treasurer's report:

Current Balances:
Regular share: $20,011.83
Checking: $1,112.73

QCWA: $352.33

Outstanding Payments
$10 Clubhouse Lease, to SDSMT
$101.67 Clubhouse Electric, to SDSMT
$131.96 Terry Fuller (SOTA BBQ)

Secretary's Report: The minutes from the JulyMeeting were sent out to the club members after this meeting on July 15th. Chris Jaques KD0RAS provided the actual June financials for inclusion in the June minutes. Upcoming filings include SD Secretary of State and ARRL club affiliation.

Betty Rush KA7PJQ moved, Ken Kjar W0SEB seconded, to approve the June and July minutes and Nathan amended to add the Treasurer's report for approval. Vote: none opposed, motion approved

Committee Reports:

Engineering/Technical Committee: Mike Moore KE0QIB reports
Lightning strike, backup controller from Harry, 444.575 back on line. DMR is turned off.
Ryan mentioned that repeater ownership needs to be sorted out before spending more money to repair the repa

Public Relations and Recruitment Committee: Betty Rush KA7PJQ reports.
Committee met on Wednesday.
Oct. Bob Henriksen
Nov. Andy Pattantyus on RF Safety
Chris Stallkamp in March

Activities Committee: Terry Fuller AD0HL reports
12 people on July 16/17 Summits on the Air (SOTA) weekend
National recognition for Ryan and Chris spotting and reporting the small forest fire.
Balun Building for NVIS build was a joint project with ARES
Veteran's March in September
Gene and Delbert and Betty participated in the Heart of the Hills, run by Karen Hill City

Old Business:
Water line at the clubhouse. Plumbing improvements are still underway. Pump will not hold the prime. Polyline to be trenched in.
Linked repeaters donations were $400.
The club will donate $1000 straight up, and will pledge another $1000 in matching funds.
Waiting to hear about the grant application, and ready to apply for another.
Salem is back on the air.
Testing in November

Tailgate party - 85 year proclamation from ARRL
Thank you note from Lauren Jacobson WA0ELA, from Colorado Springs
Arrow has free shipping, use code CPN3

New Member Applications:
No new membership applications.

New Business:
Annual Meeting - Sept 11 4;00pm at Pizza Ranch by Sam's Club

Nominations for Officers and Board Members
For Treasurer, Chris Jaques, Betty Rush nominates, Gary Peterson seconds
For Secretary, Andy Pattantyus, Betty Rush nominates, Gary Peterson seconds
For VP, Mike Moore, Chris Jaques nominates, Bob Henriksen seconds
For President, Ryan Lindblom, Chris Jaques nominates, Betty Rush seconded

For the board, there are 3 openings:
Chris Jaques
Bob Henriksen
Bruce "Brad" Bradfield

Ryan calls for nominations for the board positions:
Bob nominates Chris Jaques, Lee seconds,
Chris nominates Bob Henriksen, Betty seconds,
Bruce "Brad" Bradfield was not at the meeting, so his nomination was deferred.

Delbert moves to pre-approve $500 expenditures for a backhoe and materials for the water plumbing. Nathan and Terry seconds. Vote: none opposed, motion approved

Eric Neuman will donate 25 ft of poly tubing.

Chris moves to reimburse Terry for the SOTA BBQ, $75 reservation, and $69 for food, for a total of $131.96. John seconded, Vote: none opposed, motion approved

Bob Olsen is looking for a net control for ARES on 3960 on Sunday morning 8am 1x per month

Mike Moore mentioned that ICOM is releasing the 905 QRP rig, VHF to 10 GHz, same size as the 705.

Steve is looking for a 2022 Field Day pen to complete his collection
KI0D Chris Stallkamp

Adjourn:
Mike Moore KE0QIB made a motion to adjourn the meeting; Bob Henriksen KF0AM seconded.

Vote: none opposed, motion approved
The meeting was adjourned at 7:38 pm.

Andy Pattantyus, KF0ARA
BHARC, Secretary

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Program - Gary Peterson K0CX on Grounding and Bonding

What is ground? Connection to the earth. Earth acts as an electron sink, or source.

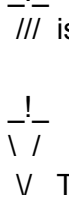
Connection to earth is problematic. Earth (dirt, rocks) is a poor conductor.

Saltwater is a good conductor.

Ground rod driven into the earth is like a bunch of radial resistors.

Sometimes you need multiple ground rods

Symbols for ground


/// is chassis ground

Triangle is like a circuit common

Why do we want earth connections?
* Safety - lightning
* Service to house is 7200 volts, center tap on transformer is connected to earth
* Panel has neutral (grounded) and two feeds

Electrical receptacle is referenced to an earth connection

A few thousandths of an amp is enough to
National Electrical Code (NEC) has all kinds of rules

Service panel is grounded with an 8ft ground stake, which should measure 25 ohms or less.

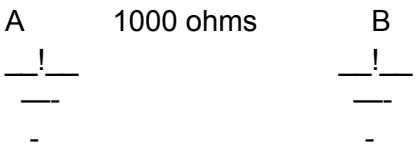
If above 25 ohms, drive a 2nd rod and call it good.

Reasons for ground:
* Lightning - kilo-amperes
* Electrical Safety
* RF

RF does not do too much for HF thru VHF. Long connections have inherent inductance.
100W Transceiver with a dipole. With or without ground, will work equally well.

Because ground is such a poor conductor.

Ground at 2 points 20 feet apart:



Multiple ground rods must be bolted together.

How to protect the radio?
* connect all the grounds together, is called bonding

Best protection, if all equipment is at the same potential

Bonding needs to be low impedance, such as copper.

Inductance can be the enemy, because lighting has a rapid rise time

Large conductors, thin and flat is better than round. Use braid from old coax, crimp and solder some lugs.

Don’t use braided conductors outside.

Make it flat, wide and short, and avoid sharp bends.

Several pieces of equipment, connected to a copper pipe connected to earth ground. Not good, because it forms loops. A better approach is to daisy chain, to reduce the loop size.

The ground stud and the wing nut is inconvenient. Use 2 green Anderson Power poles on the lug, for daisy chain to adjacent equipment. Bundling cables helps.

Audio wires between equipment are usually unbalanced.

Balanced is two conductors surrounded by a shield, and is immune.

Most home audio cables are unbalanced, because the shield is a signal conductor. If the two pieces of equipment are not bonded together. Wall warts and power supplies establish a difference in potential. Hum comes from current flowing in the shield, which induces noise on the center conductor.

Building a HAM shack from scratch.
* Create a single point ground panel. Connect electrical ground, copper plumbing, and all services. Attach a bulkhead mount lightning arrestor polyphaser or alpha delta.
* Connect HAM shack computer via WiFi instead of ethernet cable

RF noise.
* Every conductor in the HAM shack is a potential receive antenna. Earth connections don't really help, due to the inductance in the wires.
* If RF getting into a line. Use toroidal ferrites. Always mark the ferrites. Impedance goes up with the square of the number of turns. Don't put the turns too close together due to capacitance.

Tutorials for choking RF
URL http://k9yc.com

Mike. Bonding the chassis will not correct audio hum

Gary. Pin 1 problem. RCA connectors connect to the circuit board. The shell of an RCA connector should connect to the metal chassis. XLR connector pin 1 should connect to the metal cabinet, and not the PC board.

Chassis to Chassis bonding will protect for lighting and electrical shock.

Wall warts are UL approved, so the device does not have to be UL approved.

John Murphy bought an MFJ "artificial ground" which is for tuning out the reactance for a ground connection, such as for an end fed antenna.

The ground line between ground panel and ground rod should be in a PVC conduit, but not a metal conduit, which will act as a choke.