

Welcome to the Coconino Amateur Radio Club (CARC) Monthly Newsletter. CARC is a non-profit club devoted to providing communication services to local volunteer agencies and events. Meetings are held the second Thursday of each month at the East side Sizzlers Restaurant Highway 66 at Fanning Dr. Flagstaff, at 7:00PM. All persons interested in amateur radio, whether licensed or not, are welcome to attend.

*Coconino SkyWarn meets 1900 every Monday evening on the 146.98 repeater and at 1930 on the Navajo Mountain CACTUS repeater and 146.480 simplex.*

*Coconino ARES meets 1900 every Wednesday evening on the 146.98 repeater and at 1930 on the Navajo Mountain CACTUS repeater and 146.480.*

## Calendar of Events for 2015:

3/ 12:	Northland Prep Balloon Launch, 3/13, 3/25 alternated dates
4/29:	PFAC Exercise- Wildland Fire Exercise - alternate 5/6
5/15-17	Overland Expo, Licensing Exam
6/6	Sacred Mt. Prayer Run Sandy Meadowcroft
6/27-28	Field Day (Outdoor Mkt) Need coordinator
7/19	Snowbowl Run Janice Enloe
8/1	Fat Tire Bike Race Need Coordinator
8/8	Big Brothers Big Sisters
9/26-27	100 Mile Stagecoach Run Bill Smith
10/10	Soulstice Run Bob Meadowcroft
11/?	Girls On The Run Sandy Meadowcroft
12/5	Skywarn Recognition Mike Clever
12/?	Christmas Party Meadowcrofts

## Officers:

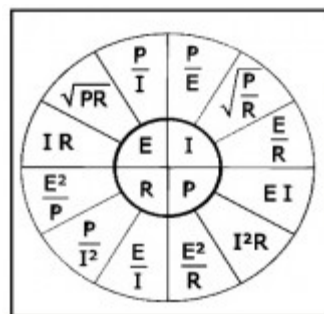
President: Sandy Meadowcroft KF4JHC

Vice-President: Tom Shehan W7TGS

Secretary: Erv Perelstein, KE7QFI

Treasurer: Pat Traber, KE7QFG

PIO: Janice Enloe, KI6WCK



E = voltage I = current  
 R = resistance P = power

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**Can you name all of the components of this circuit?**

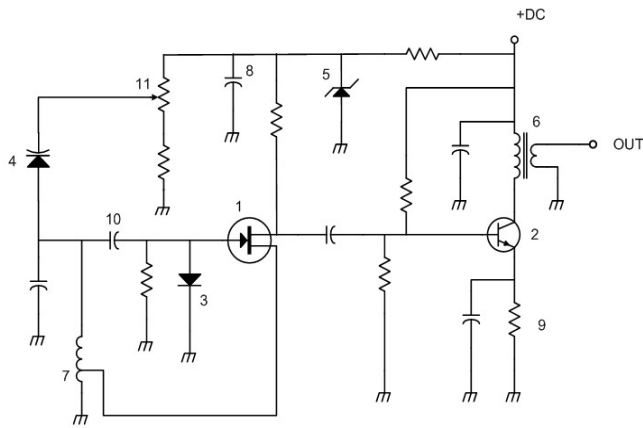


Figure G7-1

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## Reminders:

Club membership dues for 2015 are due at the January meeting: \$25 for individuals and \$30 for a family. Please plan to pay the treasurer at the February meeting

Thank you to all who have run the Monday and Wednesday night nets:

Flagstaff: Tom W7TGS, Erv KE7QFI, Mike KD8RQV

Page: Lee KF7YRS and Vince WB7UWW

If anyone one would like to help with the nets, please let Tom know. It is good practice for radio skills and the script is written for you to use.

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## Licensing Exams for 2015:

11 April	NAU
17 May	Overland Expo/Mormon Lake
30 May	License Class ???
18 July	Williams Hamfest
17 October	TBA

<http://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp>

Arizona Newsletter: <http://www.arrl.org/>

Tutorials: <http://www.arrl.org/tutorials>

**Congratulations for passing their licensing exams:**

Mathias Rupp: Technician

Janice Enloe: General

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## **Next Business Meeting:**

Our next business meeting will be February 12, 2015 at the East side Sizzlers at the corner of Highway 66 and Fanning. Guest speaker Kaci Heins will be presenting information for the upcoming balloon launch for Northland Preparatory School scheduled for March 12. Alternate dates are March 13 or March 25.

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## **Solar Energy for Your Radio:**

The solar generator has a 105 amp hour marine battery with an 800 watt inverter for AC power, multiple Anderson Powerpole connections, and automotive cigarette lighter plug type connections for 12 volt DC power, and multiple USB connections for 5 volt DC power. The battery is charged with a 100 watt bendable solar panel or with an AC powered battery charger.

Tom Shehan, W7TGS

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## **Minutes of the Coconino Amateur Radio Club**

**1/8/2015**

**Meeting Started: 7:00 pm**

### **Guests:**

**1. Guest Speaker: Gina Byars** from Sun Sounds of AZ, a radio reading and information access service for people who cannot read print due to a disability. Their organization provides broadcast on commercial FM which is piggybacked on KNAU Radio. They use a sub-carrier on the KNAU broadcasts using a specially modified FM radio at no charge. They provide 12 shows a day in Flagstaff, mostly news-talk from national and local newspapers, magazines, publications as well as books, a Described Video movie of the month, Spanish-language programs and occasional radio theater productions. In addition to Radio broadcasts, they also offer a telephone access system called Sun Dial, a Web service at [sunsounds.org/listen](http://sunsounds.org/listen) and they have Cable Partners throughout AZ. Gina made an appeal for volunteers to act as readers, board operators, engineers and to help modify commercial FM radios with the circuits that provide the subcarrier. She also would like any new ideas of other areas of service that they could supply to their clients.

**2. Guest Speakers: Ian Torrance and Emily Harrison:** from the Stagecoach 100 Mile Race 2015. Ian told us that they were very disappointed about the weather cancellation that was necessary this year so they are moving the race to September 26, 27 for 2015. Their runners enjoyed the Sunday 55K race so much that they decided to keep it as a stand-alone, secondary feature this year. They are very appreciative of the radio support we provide for them. He requested that we eliminate Tub Ranch from radio coverage and switch to Cedar Ranch, which might be a better radio location for us. Bill Smith has volunteered to be the CARC Radio Coordinator for the 2015 race.

**Secretary's Report:** The minutes of the November meeting were published in the newsletter. Tom asked if there were any changes of corrections to November's newsletter. There being none, Scott moved and Diane seconded a motion to accepted the minutes as corrected. Unanimously accepted.

**Treasurer's Report:** The closing bank balance for 1/8/2015 was \$2,064.49 Membership was 9, consisting of 5 paid members and 4 lifetime members. Erv moved and Bob Meadowcroft seconded a motion to accept the Treasurer's Report. Unanimously accepted.

**President's Report:** Sandy welcomed members to our new meeting room which seems to be working out very well. She said that she thought 2015 would be a good year for new members.

Tom discussed speakers for future meetings. He asked for a volunteer to coordinate a class and demo on Cross-Band operation. Many members have radios that will support this move but few admitted to having used it yet. We will try for an outside demo in April or May. Tom recommended that we have more demonstrations at our meetings to mix in with the speakers. He volunteered to give a demo on his project to build a solar generator. Erv volunteered to talk and demo digital comm in an upcoming meeting.

Tom thanked Bob and Sandy Meadowcroft for hosting the Christmas Party is on Sunday, Dec 7th at their home. The potluck was delicious and the company was excellent.

Tom commented on our recent support of the Skywarn Recognition Day hosted by the National Weather Service (NWS) at Camp Navajo. Mike Clever was the coordinator and they made over 100 contacts with other NWS stations throughout the country. Other HF operators that helped were: Joe, Tom, David, Sandy, Bob and Erv.

**ARES Report:** Scott talked about assigning a SKYWARN number to all SKYWARN members. He said he could make business cards for each SKYWARN member. Pat made a motion that we reimburse Scott for the cost of the business cards. Joe seconded the motion, which passed unanimously. Phyllis recommended that we ask the Coconino County Emergency Manager, Rob Rowley to update us on the upgrade to the NACET facility near Buffalo Park which will be his new office. They have plans for increasing radio access and allow Ham Operator access.

Joe told us about several projects we are working with Kacy Hines, a teacher at Northland Preparatory Academy, (NPA). The first project is the students are building an underwater vehicle from kits. Joe is looking for several volunteers to supervise and help the students with PVS cutting, drilling and assembling the vehicles and then soldering the electronics elements. Secondly, NPA is planning another Hi-Altitude Balloon Launch on March 11th, of this year. Needed are chase car drivers and radio operators. Tom volunteered to drive his vehicle and Scott volunteered to accompany him. They will be leaving about 9:00 am on the 11th.

Joe confirmed that we will offer a license testing session on Jan 17th at the Bilby Facility on NAU campus. He has enough VE's for the testing. He also reminded us about the PFAC Exercise scheduled for April 29th with a weather back up of May 6th. We will be providing radio support to CERT personnel.

**OLD BUSINESS:** Sandy reminded very one to check out the newly modified CARC Website, much improved by Phil and Ron. They are doing a great job with the site. They are looking for any recommendations for further improvement.

Sandy announced that we have several people signed up for the Licensing Classes we will offer from March 7th to May 30th. We are advertising the classes to other Disaster Organizations such as CERT, SAR as well as NWS, MOAA, the Daily Sun, ARRL and flyers. We hoping to get up to 20 students for the classes.

Joe discussed the Emergency Management, (EM) project of installing HF radios up north, (Page, Fredonia, locations on the Navajo Reservation). We assisted in the testing of those installations and the communications was good. However, the EM is having trouble finding permanent locations for the radios and getting licensed volunteers to operate them in an emergency. Work continues on this project.

**NEW BUSINESS:** Joe talked about the Overland Expo for 2015. He is planning on providing Ham License Testing again this year and we could have as many as 40 testing candidates. He reminded us that the Expo gives us a free demonstration space, (these spaces are normally very expensive), and that having CARC

presence is good for our public image, especially with groups like the Forest Service and the Park Service. Tom volunteered to be the coordinator for the Expo with help by Mathias Rupp. We all agreed to support the Overland Expo again this year.

Following is a list of the races as now scheduled for the 2015 season along with proposed coordinators:

6/6	Sacred Mt. Prayer Run	Sandy Meadowcroft
6/27-28	Field Day (Outdoor Mkt)	Need coordinator
7/19	Snowbowl Run	Janice Enloe
8/1	Fat Tire Bike Race	Need Coordinator
8/8	Big Brothers Big Sisters	Dan Boone ?
9/26-27	100 Mile Stagecoach Run	Bill Smith
10/10	Soulstice Run	Bob Meadowcroft
11/?	Girls On The Run	Sandy Meadowcroft
12/5	Skywarn Recognition	Mike Clever
12/?	Christmas Party	Meadowcrofts

**50/50 Drawing** Kay Perelstein won the 50/50 drawing this month.

**Meeting Ended: 9:05 pm.** Scott moved to adjourn, Sandy seconded and it was passed unanimously.

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**CARC website:** Hello to all CARC members, others who read the newsletter and everyone that views our website. We have updated some of the information on the website and made technical changes to improve it. Now we need your input. If you see anything that is incorrect or if you have ideas on how the website could be improved upon please let us know. Phil Brunner and I are committed to making the site informative and user friendly. Forward your ideas to Ron Gerlak <mailto:rbgerlak@gmail.com>. Visit the CARC website at [CocoRadio.org](http://CocoRadio.org).

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## From the ARES Field Resource Manual:

### Wilderness Protocol

The Wilderness protocol (see page 101, August 1995 QST) calls for hams in the wilderness to announce their presence on, and to monitor, the national calling frequencies for five minutes beginning at the top of the hour, every three hours from 7 AM to 7 PM while in the back country. A ham in a remote location may be able to relay emergency information through another wilderness ham who has better access to a repeater. National calling frequencies: 52.525, 146.52, 223.50, 446.00, 1294.50

The base monitoring time is 5 minutes. I also found suggestions to start monitoring 5 minutes before the hour every other time so that minor differences on the clock of monitoring hams and hams in the woods would not cause them to miss each other. Making daily contact with a hiker to know an extended hike is going without incident, or to pass routine traffic to and from family was another suggested use for hams with opportunity to monitor the Wilderness Protocol frequencies regularly.

Some Hams in Nevada monitor the upper 60 meter band frequency of 5403.5 KHz USB following the Wilderness Protocol.

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## **A Request for Help From Northland Preparatory Academy**

We received a grant from SeaPerch for 8 underwater ROV kits. SeaPerch is sponsored by the Office of Naval Research and is a great step up from our Lego robotics that wraps up in December. The students started working on the ROV kits in January. Here is a website with more information. <http://www.seaperch.org/index>



We will be soldering in the coming weeks and need additional help with this project. Students have some experience with soldering but need adult supervision for safety for this project. We meet every Tuesday from 3:30-4:45. We might have some Saturday meetings depending on our progress. Please let Joe Hobart W7LUX know if you can help.

## **A Little Soldering Q&A: Select the best answer**

1. What is solder made of?

- Aluminum and copper or aluminum and lead
- Tin and lead or tin and copper
- Bronze and copper or bronze and tin
- Tungsten and tin or tungsten and lead

2. How hot should a soldering iron be in order to solder leaded solder?

- 400-600 degrees Fahrenheit
- 900-1000 degrees Fahrenheit
- 800-1000 degrees Fahrenheit
- 650-800 degrees Fahrenheit

3. It is good to use a lot of solder when placing components on boards?

- Yes
- No

4. What tools are needed to solder circuit boards?

Soldering iron, solder, flux  
Pliers, soldering iron, magnet  
Screwdriver, heat tape, soldering iron  
Soldering iron, adhesive, pipe cleaners

5. What is a "cold" solder joint?

Solder that was not heated adequately to make a strong bond with the board.  
A piece of solder lain across two parts without heating.  
Solder that has cooled to room temperature.  
A refrigerated solder connection.

6. Is it safe to eat or drink while soldering?

Yes  
No

7. When soldering, a technician needs to take care not to damage the board by wearing a wrist strap to protect the board from ESD. What is ESD?

Electrostatic discharge  
Electro Superficial Discharge  
Electrical Stationary Damage  
Electrical Sweeping Damage

8. What are common names for some primary discrete components used on circuit boards?

Fuse clamp, chassis, probe  
Header, receptacle, via  
Silicon, ceramic, conformal coating  
Resistors, capacitors, diodes

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## **Amateur Radio Buffs Around the World Can Thank a Fried Wire**

Fried cable sparked EE profession

Rick Merritt -January 28, 2015 This article was originally posted on EE Times.

A fried transatlantic telegraph cable sparked the birth of the electrical engineering profession, a bizarre beginning described by a keynoter at DesignCon.

The work of paper baron Cyrus West Field on a cable connecting Newfoundland and Ireland in the mid-1800s inadvertently turned "electrical engineering from an amateur hobby to a full-on profession," said Thomas H. Lee (below), a Stanford professor and entrepreneur. "EEs have been making trouble ever since," he said.

It was Field's failure with his first big effort that spawned the unexpected success. The 1857 cable was only an inch in diameter and performed horribly on its mission of delivering one to two words a minute for \$10/word.

To improve the connection, the chief electrician on the project, E.O. Wildman Whitehouse, increased voltage across the 3,000 km line until at 1,500V it was fried. A scandal followed in which the public thought the cable and Field were frauds.

A British commission investigated the failure. It put inventor William Thomson (later Lord Kelvin) in charge of a second effort and called for standards in what had been known as the electric arts where there were no metrics or degree programs.

Thomson led the design of a better, thicker cable that ultimately carried eight to ten words a minute, still at the whopping price of \$10/word. The “freakishly brilliant” Thomson developed a highly sensitive receiver for the cable and even invented what was effectively the first equalizer for it.

The entire circuit for the transatlantic cable [below] fit on a single slide and carried 150V max, so we would not have another antifuse experiment,” quipped Lee.

As a result of the British investigation, the first standards of measure for electricity were created in the 1870s — the ampere, ohm, and volt. In the US the first EE programs were formed at Cornell and MIT in about 1882.

Lee, who worked on early CMOS radios, briefly recounted the modern innovations in semiconductors.

“Today we produce 100 transistors for every ant and that is still growing exponentially -- that’s amazing to me,” said Lee who has founded a handful of electronics companies. “We are selling four million cellphones a day — imagine something of that complexity, just so we can send some 250,000 largely content-free text messages per second,” he quipped.

“We’ve been on a rocket ship of Moore’s Law he told an audience of several hundred engineers here. “We are still on this slope, we are just getting ready for another phase of this history and you are in it,” he said.

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## Definitions:

**Anode:** The element of an analog device that accepts electrons or toward which electrons flow.

**Cathode:** The element of an analog device that emits electrons or from which electrons are emitted or repelled.

**Closed-loop Gain:** Amplifier gain with an external feedback circuit connected.

**Gate:** The control electrode of a field-effect transistor.

**Hysteresis:** In a comparator circuit, the practice of using positive feedback to shift the input setpoint in such a way as to minimize output changes when the input signal(s) are near the setpoint.

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## **Ham Radio Licensing Class: Technician Level**

March 7: Introduction to the ARRL, CARC  
Chapter 1- Introduction and Welcome to Amateur Radio  
Chapter 2- Radio Waves and Signals

March 14:  
Chapter 2- Modulation and Bandwidth  
Chapter 3- Electricity

March 21: VOM Operation, Battery, Diode and Resister  
Chapter 3- Ohms Law. Power and the Metric System  
Chapter 3- Electronic Components

March 28: HF and DX  
Chapter 3- Types of Radio Circuits  
Chapter 4- Propagation

April 5: No class

April 11: Antennas and Feed Lines  
Chapter 4- Antennas and Feed Lines  
Chapter 4- Practical Antenna Systems

April 18: Presentation of Radio Equipment, Digital Communications  
Chapter 5- Basic Amateur Radio Equipment  
Chapter 5- Power Sources and Interference

April 25: VHF, UHF, Repeaters, Cross Band  
Chapter 6- Communication with Other Hams Parts I & II

May 2: QSL Cards  
Chapter 7- License Regulations and License Privileges  
Chapter 7 & 8- Call signs and Operating Regulations Part I

May 10: No class- Mother's Day

May 16: Station Grounding  
Chapter 8- Call signs and Operating Regulations Part II  
Chapter 9- Safety and Amateur Radio

May 30: License Exam

- Cost: Ages 21 and over- \$25, Under 21- \$10
- CARC members may audit at not charge if space available
- Ham Radio License Manual Level I Technician, 3<sup>rd</sup> edition required. Available through ARRL.org or from Joe Hobart W7LUX (928) 525-9222
- 10 Saturday mornings including testing
- Class time- 10:00AM to 12:00 Noon
- Lab time available to enhance your learning- 8:00AM – 9:50AM each class day
- Homework assignments- pre-read chapters for discussion
- Location- Northern Arizona Center for Entrepreneurship and Technology
- 2225 Gemini Dr, Flagstaff
- For additional information contact- Sandy Meadowcroft (928) 660-8323