

# THE SPLITROCK TIMES

The newsletter of the Splitrock Amateur Radio Association.  
January 2023 edition.

Welcome to the sixth edition of the Splitrock newsletter with its new name.

Editor: Fred Wawra W2ABE. [contact W2ABE@arrl.net]

**'The Splitrock Times'.**

## OFFICERS

President Bruce N2XP

Vice Pres. Bob K2RFH

Treasurer Bruce N2OQX

Secretary Tracey KD2ISX

Trustee Bruce N2XP

Member at Large/'assistant to the President', Fred W2ABE.

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**Important note: VE testing will be on the second Monday in January. VE testing is usually on the second Monday of the month at the Mount Arlington Civic Center-7pm registration.**

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Remember if you are a member of ARRL [and you should be] then subscribe to the weekly email update to

keep aware of conditions and activities on the bands and League announcements.

The Club Meets every second Tuesday at 7:30 at the Mount Arlington Civic Center [the log cabin building at the west end of Fern Place]. Come join us for fellowship and learning.

The Club's mailing address is: S.A.R.A. PO Box 528 Lake Hopatcong, NJ 07849 You can also contact us at:

[www.splitrockara.org](http://www.splitrockara.org) OR

[membership@splitrockara.org](mailto:membership@splitrockara.org)

The repeater is on 146.985, the offset is -600, and the PL is 131.8 Hz.

See the Member Profile  
Later in this issue!!

NOTICE: There will be NO  
zoom at the meetings for the  
time being due to WIFI issues

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Reminder....

Submissions for the  
newsletter need to be in  
word format or an email.

Reminder: there is a \$35.00  
fee paid directly to the FCC  
for new calls, vanity calls,  
and renewals. There is no  
FCC charge for upgrades.

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## THE PRESIDENT'S MESSAGE

To Splitrock Members,

I had a wonderful time at the  
Holiday Party. The food was great  
and everyone had fun, talking and  
handing out door prizes. Thanks to  
all of you that attended; that made  
the party a good event.

One of our long-time members,  
Jim Hoglund KC2SMU, has  
passed away. He was SARA's  
westerly Echolink outpost in  
Arizona during the winter months.  
I will miss his quick wit and  
friendship.

I'm lining up guest speakers and  
videos for future meetings. This  
new year will start off with a video.

If anyone has any ideas for topics,  
videos and guest speakers send  
me an email at  
President@splitrockara.org.

73,

Bruce N2XP

President

ECLECTIC TECHNOLOGY

By: Fred Wawra, W2ABE.

Subject: VACUUM TUBES!

This time the subject is the history and  
architecture of the vacuum tube. Last time I  
wrote about amplifiers and the role and  
development of vacuum tubes in their very  
early years. To reiterate, it all started with  
the Edison Effect. Followed by Fleming who  
discovered rectification. De Forest  
discovered that by adding a third element  
which resembles a ladder in structure  
between the heater and plate which is  
called a [control] grid, and that led to the  
discovery of amplification. [a small voltage  
at the input controlled a larger amount of

current at the output] the voltage drops across a resistor or transformer provided useable amplification. Going forward we will be talking about tube elements and architecture.

In a vacuum tube the least number of elements are a heater and plate therefore it is called a DIODE. In operation the heater, which is a bare filament which is heated by current passing through which then glows to incandescence and thereby 'boils' off electrons which are then able to 'flow' to the positively charged plate. If the plate is made negative, then the free electrons surrounding the heater or cathode are forced back to the cathode and no current flows. Thereby providing a means of one-way current flow or rectification which then can be used in power supplies or used for detection of radio signals.

This leads us to the heater or [CATHODES]. The raw heater needs to operate at a higher level of incandescence to be effective. A heater enclosed in a thin metal tube [cathode] can operate at lower level of incandescence due to electron emitting materials. Directly heated tubes using wire filaments as the cathode are/were primarily used in battery operated radios due to lower current requirement. Heaters with sleeves on the heaters are referred to as cathodes are used in AC powered radios to help prevent AC hum and other applications where special chemicals are used on the cathode sleeves. Cathode sleeves are a thin tube surrounding the heater element and are connected as a cathode in the circuit. Directly heated cathodes are just the filament as the cathode. The cathode is the

negative electron emitting element of a vacuum tube.

The next discovery by DE FOREST led to the development of TRIODES, that is a diode tube with a grid, [which is called a control grid] which is composed of a set of fine wires arranged in ladder fashion, with the cathode or heater inside and a cylinder of metal or plate surrounding the whole works. When the grid is made more negative, less electrons can get to the plate and when the grid is made more positive, more electrons can get to the plate so that a small voltage change at the grid makes for a large current change in the plate circuit and that is used to provide a voltage drop across a resistor which is used to control the next circuit or provide a useable output to some other device. In some cases that is a transformer for audio or an RF signal. The grid and plate have interelectrode capacitance and that is undesirable which led to the addition of another grid called the SCREEN grid and in that configuration the tube is known as a TETRODE.

TETRODES have another grid called the SCREEN GRID spaced between the control grid and plate and provides an electrostatic shield thus reducing the grid to plate capacitance. This capacitance is further reduced by placing a bypass capacitor between the screen grid and the cathode. Another desirable effect of having the screen grid is that the plate current is much less influenced by plate voltage changes.

Next is PENTODES where there is another grid added between the screen grid and the plate. In all electron tubes, there is a condition called secondary emission, where

electrons striking the plate, at a sufficient speed dislodge other electrons that can cause lowering of the plate current and limit the operating range of the tube. This grid is called the SUPPRESSOR GRID and is usually connected to the cathode. The effect of the suppressor grid is to increase the dynamic operating range of the pentode.

Lastly, we have the BEAM POWER tube. In this tube there is sometimes no suppressor grid but then the electrodes are spaced so that the secondary emission from the plate is suppressed by space charge effect between the screen grid and the plate. In the beam power tube, there are beam confining electrodes at cathode potential which helps control and define electron flow and limits secondary emissions thereby providing more dynamic range and useable power from the tube.

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IF you are up early in the morning and want to get on the air there is the 'friendly net' on 7.235 from 7am to 8am 365 days a year. It is a non-political "G' rated net open to all.

There is also the 'Awful Awful Ugly net on 3855, with check ins and rag chewing at 8pm and net starting at 9pm.

REMINDER: VE sessions are back on schedule being the second Monday of the month!

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Don't forget the 'Swap n' Shop/Tech net every Sunday night at 8 pm!

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## The history of The Splitrock Amateur Radio Association (SARA)

The club was formed in 1972 when a group of Hams got together, built a 2-meter repeater, and installed it near the Splitrock Reservoir, hence the club's name. They then registered the club with the IRS and the state of NJ as a non-profit entity.

The repeater was moved a number of times to unique locations, and over that time, underwent several technical upgrades. The repeater is FCC-authorized to operate on 146.985 MHz, with a PL of 131.8 Hz and an offset of minus 600 kHz.

Today we have a commercial grade repeater located in Roxbury Township at the Mooney Mountain cell site (since 2001) where the antenna is atop a 125-foot cell tower, and the repeater electronics are

housed in a secure, climate-controlled building, with emergency backup power. A remote receiver is being installed in Randolph, NJ to improve the repeater's coverage to the East.

The repeater has been registered with the FCC over its lifetime using a number of callsigns, including: WR2ADB, WR2AKI, K2RF, KB2UGK, NJ2SR, K2GG, N2XP and currently: WS2R. The FCC license is maintained by the club Trustee.

SARA offers its members technical communication activities related to the amateur radio service, as well as volunteering communications support to local communities, and non-radio member social activities. This is through sponsoring events such as the ARRL Field Day (an emergency exercise), the Northern NJ Hamfest, Olde Succasunny Day, the March of Dimes Walk, and our SARA Holiday Party. Many members participate in emergencies through the FEMA-sanctioned Radio Amateur Civil Emergency Service (RACES) or the ARRL-sponsored ARES program. (The ARRL is the **National Association for Amateur Radio** in the United States, headquartered in Newington, Connecticut.)

Some members participate as Volunteer Examiners conducting monthly FCC license exams (to become a Ham) and license upgrade exams for all Hams.

SARA holds a Swap'n'Shop and Technical Net on Sundays at 8 pm local time on the club repeater, which is open to all Hams in our coverage area.

SARA is an ARRL-affiliated club, meeting monthly on the 2nd Tuesday at 7:30 pm in the Mt. Arlington, NJ Community Center (the log cabin located at 1 Fern Place).

**Next, we have an article from our President, N2XP. On different battery types.**

With all the different kinds of batteries on the market, it can be difficult to choose the right type for your application. It is recommend that you take a few moments to find out more about the 5 most common types of Batteries.

#### 1.Flooded Batteries

This is the traditional engine start, tractor and deep cycle-style battery. The liquid electrolyte is free to move in the cell

compartment. The user has access to the individual cells and can add distilled water as the battery dries out. Popular uses are engine starting and deep cycle designs.

For this type of battery, the typical absorption voltage range is 14.4 to 14.9 volts; typical float voltage range is 13.1 to 13.4 volts.

Flooded batteries are common and found in many applications, such as automotive starting batteries, motorcycle batteries, with all the different kinds of batteries on the market, it can be difficult to choose the right type for your application.

## **2. Sealed Batteries**

This term can refer to a number of different constructions, including only a slight modification to the flooded style. In that case, even though the user does not have access to the cell compartments, the internal structure is still basically the same as a flooded battery. The only difference is that the manufacturer has ensured that a sufficient amount of acid is in the battery to sustain the chemical

reaction under normal use throughout the battery warranty period.

Other types of lead acid batteries are also sealed, as explained below.

Very popular uses are engine starting and limited starting/deep cycle applications. For this type of battery, the typical absorption voltage range is 14.2 to 14.7 volts; typical float voltage range is 13.1 to 13.4 volts.

## **3. VRLA Batteries**

This stands for Valve Regulated Lead Acid battery. This is also a sealed battery. The valve regulating mechanism allows for a safe escape of hydrogen and oxygen gasses during charging. For this type of battery, the typical absorption voltage range is 14.2 to 14.5 volts; the typical float voltage range is 13.2 to 13.5 volts. VRLA batteries are common and found in many applications, such as medical mobility scooters batteries and toy and alarm batteries.

#### **4. AGM Batteries**

The Absorbed Glass Mat construction allows the electrolyte to be suspended in close proximity with the plate's active material. In theory, this enhances both the discharge and recharge efficiency. Actually, the AGM batteries are a variant of Sealed VRLA batteries, just a more advanced design. Popular usage includes high performance engine starting, power sports, deep cycle, solar and storage batteries. For this type of battery, the typical absorption voltage range 14.4 to 15.0 volts; typical float voltage range 13.2 to 13.8 volts. AGM batteries are common and found in many applications such as RV batteries, boat batteries, motorcycle batteries, ATV batteries, and UPS & Telecom batteries for generators.

#### **5. GEL Batteries**

The Gel Cell Battery is similar to the AGM battery style because the electrolyte is suspended, but different because technically the AGM battery is still considered to be a wet cell. The electrolyte

in a gel cell battery has a silica additive that causes it to set up or stiffen. The recharge voltages on this type of cell are lower than the other styles of lead acid battery. This is probably the most sensitive cell in terms of adverse reactions to over-voltage charging. Gel batteries are best used in VERY DEEP cycle application and may last a bit longer in hot weather applications. If the incorrect battery charger is used on a Gel Cell battery, poor performance and premature failure is certain. Battery chargers with gel profile will have information either on the unit, or in the manual, about gel compatibility. For this type of battery, the typical absorption voltage range 14.0 to 14.2 volts; typical float voltage range 13.1 to 13.3 volts. A note about Gel Batteries: It is very common for individuals to use the term Gel Cell when referring to sealed, maintenance-free batteries, much like one would use Kleenex when referring to facial tissue or "Xerox machine" when referring to a copy machine.

Continued,

Be very careful when specifying a charger. More often than not, what someone thinks to be a Gel Cell is really a sealed, maintenance-free VRLA or AGM-style battery. Learn more about differences between gel cell vs an AGM battery. Gel batteries are not as common as AGM batteries but are often found in deep discharge situations such as wheelchair and medical mobility batteries, trolling motor batteries, and RV deep cycle batteries, and flooded batteries for solar and emergency backup systems.

No member profile submitted

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**THE SPLITROCK TIMES IS ALWAYS LOOKING FOR ARTICLES** on kit builds, GO BOX builds, or an article about your shack or another electronic project. Ham radio experiences are also welcome. Thank YOU! Please submit them in WORD format so they can be added into the newsletter. They may be edited for space [so they fit] or clarity.

**We had a fabulous Holiday party! Present were 24 of us!**

**In attendance were:**

N2ELC-George, N2OQX-Bruce,  
K2RFH-Bob and his wife,  
KD2ZSW-Mike,  
W2ABE-Fred, KC2LTM-Judith,  
K2GG-Sid, KB2UNZ-Ed ,  
KD2CRI-Nino and his wife,  
KC2CSV and his wife  
KE2RG-Hugh, KC2HDZ-Janet,  
N2XP-Bruce, N2TM-John,  
N2GPH-Jack, WB2UFF-Tom,  
N2JFA-John, KD2ISX-Tracey,  
KB2VZI-Hugo, N2IFA-Steve,  
AC2JI-Joe, and his wife.

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**Do not forget to go to the ARRL website and look at the 100-year handbook that is offered for sale!**

**See You at the Club meeting on the second Tuesday of each month.**