



# Zero Beat

May 2021

**General Meeting**  
**Wednesday April 2021**  
**7:30 pm on Zoom**  
**With Socializing**  
**At 7:00 pm**

## The President's QTX May 2021

We head into the second half of Spring 2021 after a busy month. In the Michigan QSO Party, the HPARC Contest team was among the statewide leaders by earning an impressive composite score during the weekend contest.

We welcome our new members Gary WB8OFU, Lee W8CTF, Vera KE8RFQ and James KE8QLO to the club. The Mentoring Committee will be reaching out to all of you shortly for an introduction to the club's activities and to provide operating and technical guidance.

Our Special Presentation at the April Membership Meeting given by Jerry W9NPI was an introduction to a handy piece of test equipment, the Multifunction Component Tester. We thank Jerry for bringing us up to speed on this welcome addition to any member's workbench for testing a wide array of electronic components in a convenient battery powered handheld unit.

Elections for the Board of Directors will be certified this month and this year, the newly elected Board will be tackling a wide range of issues affecting the club's activities, projects and finances.

Assuming the current trend of lower pandemic numbers continues, having an in-person Field Day at Scout Park this year looks promising. The Field Day Planning Committee has taken steps towards arranging the club's first in-person event in over 14 months. At the same time, the Swap Meet Committee is in discussions about sponsoring a full-blown Swap Meet next January. Bill's Kitchen will be providing members and

## Club Officers

<b>President</b>	Joe WB8ADX joeraznik@gmail.com
<b>1st. VP</b>	Jim K8ABZ k8abz@arrl.net
<b>2nd. VP</b>	Aaron W8VIP tobin292@gmail.com
<b>Secretary</b>	Reuven KB3EHW rgevaryahu@gmail.com
<b>Treasurer</b>	Bob N8REL rlau6@aol.com
<b>Parliamentarian</b>	Marvin N8HZM marvstasak@gmail.com
<b>Director</b>	Bill N8QVS n8qvs@arrl.net

visitors the best Barbecue eating in all of Hazel Park during both weekend events. The club also reached out to the Hazel Park Community Center about reserving a location for in-person meetings beginning again next September.

The Detroit Area Repeater Team (DART) is pleased to announce that Siren Testing will soon be returning to the DART. This important Public Service ensures the network of Alert Sirens throughout Oakland County will be fully functional during a time of critical need. Volunteers are always encouraged to join this important community activity that keeps Oakland County residents safe.

Your help is needed to update the DART's Voice-ID's. Club members who haven't done so already, are encouraged to create a friendly Repeater ID greeting that will be heard during the automated station identifications. This has been a revered club tradition over the decades so for further information, contact John AA8UU or John W8TOY for further details.

Finally, the HPARC Contest Team is looking for member and guest participants in the upcoming Hamvention QSO Party on May 16<sup>th</sup>. In the meantime, don't miss the upcoming May Member Zoom Meeting on May 12<sup>th</sup> when election results will be announced and a 2021 Field Day presentation will be made.

73's,  
Joe WB8ADX

## **2021-04-14 HPARC General Meeting Minutes on Zoom**

Meeting called to order by President Joe WB8ADX @7:31pm

Pledge of allegiance

New member recognition

Presentation by Jerry W9NPI on TC-1 Component-Tester.

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Nominees for Board of Directors and the Election Calendar was shown. Later in the meeting there was further discussion of the Board of Directors elections process.

Joe WB8ADX - The June Banquet will be cancelled this year due to the ongoing COVID situation. However, Field Day and the Club Picnic are likely, depending on the numbers. We hope in-person meetings can resume in the fall, if so, the meetings will simultaneously be streamed online for the benefit of those unable to make the meeting in person.

Joe WB8ADX -Michigan QSO party will be an HPARC official club event. It may be the last major contest prior to Field Day 2021 that the club will participate in as a group. W8TOY will again be the "zoom master" coordinating things.

Treasurer's report/Budget approval - Bob N8REL - Went over proposed budget, \$5000 repeater expenses is the big difference, our end bank balance would be around \$3300. Aaron W8VIP- We should pursue grants to cover part of this expense. Marsha- This is a good budget. Motion to approve, Les KF8UU second. Discussion. Vote with zoom poll, 28 yes, 2 abstain. Board recommended budget passes.

Repeater East Site upgrade presentation by WB8ADX, new antennas, feedline, etc. will be funded from the 2019/2020 year's repeater budget. Discussion on coverage map, other remote receive sites

Marsha N8FE- We would like to move the siren test net back to the DART once things are working well.

Education update- W9NPI Need to make plans for the next set of classes, W9NPI looking for additional instructors.

Website update- Media team will soon be completing the installation of an HTML based online payment system for joining or renewing membership with Paypal. The next project will address the need to secure the roster.

Reminder there is the Saturday morning breakfast 9am at Cozy Cabin.

Meeting closed at 9:13pm  
Respectfully Submitted,  
Reuven KB3EHW  
HPARC Secretary

## Your Friend, The Voltage Regulator.

Chris Warren February 13, 2021

### An old concept.

The voltage regulator has been around since the days of the vacuum tube. Modern radios are especially dependent on them. What are they, and why do they matter? In electronics, current can and does vary but voltage usually does not, or should not. Radios generally do not like voltages that swing all over the place. How do we control the chaos of varying voltage from common off grid power sources such as solar panels, batteries, wind turbines, and so on?

### Voltage regulators to the rescue!

Luckily, the voltage regulator provides a steady, stable output voltage when the source voltage varies or is different from what the load requires. Having a basic understanding of these devices and the terminology related to them is useful when operating off grid systems.

As a radio amateur, you're already using voltage regulators: They are in your power supply. The guts of an average modern radio probably has dozens of them. A solar controller is just a glorified voltage regulator. Solid state semiconductors replaced glass tube regulators decades ago. Without the humble voltage regulator, modern radio equipment would not be possible. Voltage regulators are sometimes referred to by the generic term *DC-DC converter*.

There are two basic type of voltage regulators: Linear and switching. They each have pros and cons but in general linear regulators are less desirable. We'll explain why in a moment.

### The linear voltage regulator.

Linear voltage regulators work on the principle of Ohm's Law. They take an input voltage and via resistance drop it to the desired output voltage. These types of devices are also called *buck converters*. The difference, or dropped power, is dissipated as heat. As you can probably guess, this is not very efficient. Some applications will waste more energy than they actually provide as an output

On the plus side, linear voltage regulators are cheap, as in *really* cheap. Amazon will sell you a 15-pack of the hugely popular LM7812 for just \$6.00, which makes them less than \$0.50 each. Also, linears have simple design requirements. You don't need a lot of external components or a lot of money to make effective DIY devices.

Linear voltage regulators are a good choice for low current applications (such as driving an LED or charging small batteries), when component cost is a factor, when the difference between the input and output voltage is not large, or when circuit simplicity is desired.

### The switching voltage regulator.

Switching regulators work by switching the source power on and off as it flows through a capacitor-inductor network that temporarily stores electrical energy. When the device is in the "on" state, the network is charging. When it is in the "off" state, the network discharges. Therefore, the switching voltage regulator can supply constant voltage even though it is powered on only part of the time.

The switching function is performed by a transistor responding to feedback from the output. Feedback will increase or decrease the on-off cycle according to the load. The greater the the load, the faster it needs to cycle to keep recharging the capacitor-inductor. This system is much, much more efficient than the linear voltage regulator.

While linear regulators can only reduce or step down (buck) a source voltage, switchers can be configured to increase or step up voltage. These are referred to as *boost* regulators. There are even switching regulators that can step voltage both up or down. These are called *buck-boost* regulators.

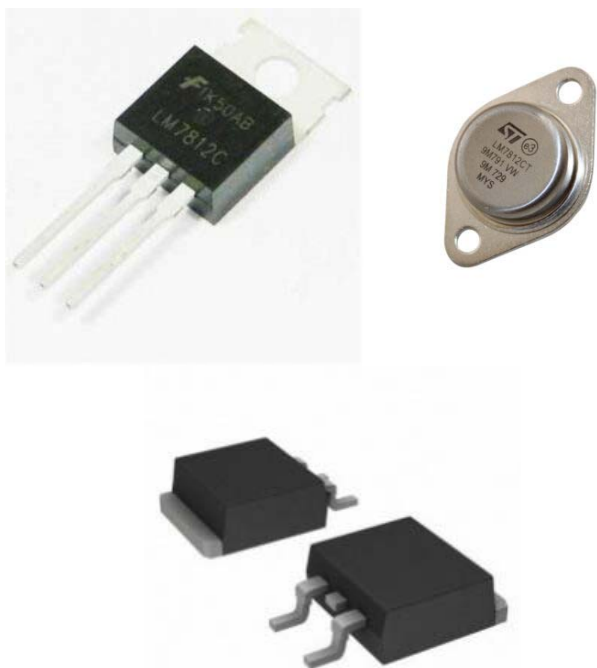
There are some disadvantages to switching regulators. First, they are more expensive than linears. Depending on what you want to do, expect to pay from a few dollars up to over \$20. Second, switchers are more technically complex and require more external components. Lastly, the switching sequence has the potential to create noise in your radio

## Voltage regulators in the ham shack.

As already mentioned, your power supply and solar controller are iterations of a voltage regulator. Battery chargers & maintainers are in the club too. Power management devices such as those from [West Mountain Radio](#) are also just voltage regulators with added features wrapped in a cool package. No matter how fancy, or how basic, they all do essentially the same thing.

If you are into emergency communications or preparing for [SHTF](#), it would be a wise idea to build some simple battery chargers and solar controllers and have them at the ready. Of course, keep a stock of spare parts too. Explicit instructions on how to build these devices is beyond the scope of this article, but there are plenty of YouTubes and on line resources to guide you. Product data sheets are a wealth of information too.

Almost every type of voltage regulator is available in different packages, or formats. There is no functional difference between the various packages. It's simply a matter of physical design requirements. The most common formats are TO-220, TO-3, and TO-263. The TO-263 format is also known as D2PAK or DDPAK. There are many other package formats; we're just covering a few here.



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Do not be intimidated. It's really not that hard. Here is a simple DIY [solar controller](#) and a [battery charger](#). Both use a linear regulator from the previously-discussed LM78xx family. Even the most inexperienced ham on a low budget can successfully assemble these in a weekend.

### Data sheets.

Every semiconductor has a [data sheet](#). A data sheet is a short summary of all the specifications of a given component. For example, it will list physical characteristics, maximum and minimum operating temperatures, voltage and current parameters, and much more. There is more information on a data sheet than the average ham will ever need.

Data sheets are not that critical if you are building someone else's design and they've already

sorted out the technical details for you. If you are gutsy (or smart) enough to create an original circuit, or modify an existing circuit, data sheets are **esYes, you can do this!**

DIY projects are seldom as good as commercially made devices, but they are very easy and inexpensive and will work surprisingly well. You'll also have the benefit of knowledge. If something goes wrong, you'll be familiar with how to troubleshoot the device because you built it. They're excellent learning projects and SHTF backups.

### What we learned today.

You should now be able to:

- Define what a voltage regulator is and what it does.
- Understand the importance of voltage regulators and the types of devices that use them.
- Understand and describe the basic characteristics of linear and switching voltage regulators.
- Recognize and identify the TO-220, TO-3, TO-263, D2PAK, and DDPAK semiconductor packages.
- Define and understand the terms *buck*, *boost*, *buck-boost*, and *DC-DC converter* in the context of a voltage regulator.
- Locate on line resources on how to build useful devices with voltage regulators.

Know what data sheets are and their importance to circuit design & construction.

## Chairmen

Repeater	Joe WB8ADX
W8JXU Trustee	Bill N8QVS
Swap	John KD8NYF
Field Day	John AA8UU
Education	Jerry W9NPI
Sunday Net	Bob N8REL
Zero Beat Editor	Rick KB5OO
Public Information Officer (PIO)	Rick KB5OO
Webmaster	Mike K8WU
Banquet	John W8TOY
Club Picnic	Jay WB8SBI

## HPARC Nets

### HPARC Official Sunday Night 2-meter Phone Net

Every Sunday a 9:00 Pm local time on the DART repeater, 146.64 (PL 1 00), catch up on club news and information, and just to keep in touch. All amateurs are welcome to check in.

### ARPSC Thursday Night 2-meter phone net

Every Thursday at 8:00 PM on the W8OAK repeater, 146.90 (PL 100). The Hospital radio check net takes place on the last Thursday each month at 7:30 PM on the W8OAK repeater. <http://www.arpsc.com>

## Around Town

### HPARC Buddy Breakfast every Saturday at 9:00 AM (or so)

Cozy Cabin Diner, 2129 E. 12 Mile Rd, Warren, MI  
Come in early for the socializing. Park in the restaurant parking lot.

## Volunteers

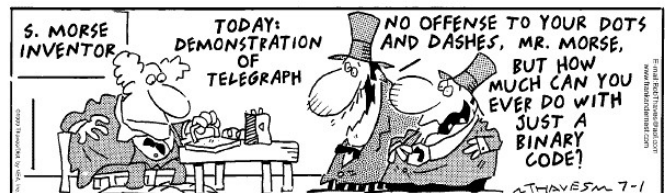
LoTW Manager	Murray KE8UM
Refreshments	Brenda N8AQ
Club Cook	Bill N8QVS
Holiday Meeting	Board of Directors
Equipment Inventory	Jim K8ABZ
Audio/Video Specialist	Ken KE8LIG
Lark in the Park	John AA8UU
Meeting Greeter	OPEN
Net Control Operators	Lee KD8TBC John W8TOY Mike K8WU Bob N8REL
HPARC Media Dream Team	Hugh KE8BED Rick KB5OO Al K8ALH John AA8UU Mike K8WU Jim K8ABZ John W8TOY

### Oakland County ARPSC Siren Testing, 1st Saturday at 1:00 PM.

March through November. Contact Marsha, N8FE, at [n8fe@arrl.net](mailto:n8fe@arrl.net), to volunteer and be assigned a siren to test.

### Amateur Radio Licensing Testing

Testig is currently on hold until the covid pandemic is over and we can get back to normal



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