

# The NEWSLETTER

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Mercury Amateur Radio Association - MARA - North America - North East



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**CERTIFIED APRIL  
FOOL'S JOKE FREE**

## OTHER STUFF

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*Links that will take you to web locations referenced in this newsletter are shown in [blue text](#).*

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# Grandma Mara's RAMBLINGS

We've been having code practice over one of the local two meter repeaters, every Sunday night at seven p.m., for anyone who wanted to learn or brush up on their CW. Walter put together a simple circuit that both his microphone and the audio output of his laptop plug into, in turn connecting to the mic jack. He sends a short code string to the circuit which keys his two meter rig and then he starts sending code. If he pauses for more than five seconds, the rig un-keys and returns control to the mic. He starts out slow at five words per minute, increasing to seven, ten, fifteen, twenty, and finally thirty. All this over a period of an hour. At the end, after the code is all sent, he tells those listening where the text can be found, usually in the Saturday edition of the local paper, so they can check their copy against his sending.

Wendy gets on to listen and copy, every Sunday night that she can. I usually turn on my handheld and copy in my head while I'm doing something else.

On the last Sunday evening in March, I had forgotten to switch on the handheld. Wendy called, all excited, and asked me if I was listening to the code practice session. When I replied that I wasn't, she informed me that I needed to do it right away. She wouldn't tell me why I needed to do so, just giggled and told me that I'd find out!

When I turned on the handheld, the ten word per minute segment was just concluding. There was a slight pause, and over the air came the following message,

--- .- .-. .-  
.-.- .- .-. .-. .-.  
-.-.- -.- .-  
--- .- .-. .-. -.-  
--- .- .-. .-. .-. .-. .-

repeated three times! Walter paused again, and then continued on with the next group.

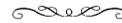
Now, this didn't come as a complete and total surprise, because he and I had been out on a few dates and a couple of family get-togethers since the ward's Valentine dance. All my children and their spouses liked him; some even suggesting that he would be a "good catch", and others hinting that I had been alone too long! With encouragement like this, I had been thinking about it as well,

weighing the pros and cons. After the thinking was done, the number of reasons on the 'yes' side were far and away more than those on the "no" side. The top of the page reason was that I really liked Walter - a lot!

I waited patiently until he sent the question after doing the fifteen wpm part. Then in the pause after his rig un-keyed, I puckered up and in my best imitation of a CW tone, whistled, "Yes Yes Yes", followed by my call sign.

Wendy broke in and managed to hum a few bars of "Here Comes the Bride" before she had to quit from laughing. Others who knew either Walter or myself chimed in with congratulations. Walter never did get to finish the rest of the practice session.

Some of you are wondering - did Walter kiss me when he walked me to my door the night of the ward Valentine's Day get-together? Maybe yes, maybe no - Grandma Mara does not kiss and tell!



## CULTURED CORNER by ANØNMS

**THIS PAGE  
IS STILL  
TEMPORARILY  
OUT OF ORDER**

**REPAIR SERVICE HAS BEEN NOTIFIED!**

**HOWEVER,  
THEY ARE ON A WORK TO RULE.**

# TECHSTUFF

By VE1VQ

Last month I wrote about a linear mode 13.8 volt 25 amp DC power supply I designed and built quite some number of years ago, to power my one hundred watt station transceiver. It was a more or less straight forward design, with over-voltage and over-current protection, intended to replace a car battery and a trickle charger. Parts for making a linear supply were readily available at the time. Building a switch mode supply back then was possible, but much more difficult than the more common linear. Even now, those hams who still enjoy construction would likely buy rather than build the relatively more complicated switching supply. Occasionally, you do see a construction article in one of the magazines by some adventurous soul.<sup>1,2</sup> I suspect it's the complexity of the theory and the difficulty of sourcing parts that keeps people from doing more to "roll" their own.

At the end of February, I had a bit of spare change in the equipment budget and, after reading a review in QST Magazine<sup>3</sup> and several on [Eham.net](http://Eham.net), I ordered the [ALINCO DM-330MV](http://ALINCO DM-330MV).

I don't know why it is that things I order always seem to be larger in the picture in the catalog or on-line than when I take them out of the box! This thing is small! The size is 175mm wide x 67mm high x 165mm deep and weighs 2kg. For those of you who are [metrically challenged](#),

these translate into 6.9 inches wide x 2.64 inches high x 6.5 inches deep and 4.4 pounds in weight. It is capable of supplying 30 amps continuous and 32 amps peak. Output voltage can be adjusted from 5 to 15 volts DC with a front panel control. There is a pre-set position where the selected voltage is locked so that a bump of the front panel control does not change the output setting.

There is a handy output socket on the front panel that ALINCO call a cigar-plug socket. With smoking being on the unfavorable list these days, it is usually called an accessory socket by most everyone else. This will supply a maximum of 10 amps. The other front panel terminals



The front panel view of the ALINCO DM-330MV. The power on/off switch is the one on the far right. The switch to the left of that is the meter select switch. Above these are the variable voltage and noise offset controls.

supply a maximum of 5 amps.

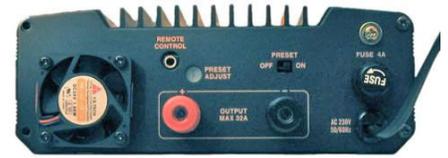
As mentioned by Jeff in his power supply articles in the last several month's NEWSLETTERS, birdies or spurious outputs getting into the stations receiver may be a problem with switching type power supplies. The ALINCO has a front panel control that varies the switching frequency. If a spurious happens to fall on your listening frequency, turn the control to move it away. For your information, I haven't found any birdies in the couple of months that I've been using it.

It does have a cooling fan but if it has activated I haven't heard it. Reports that I've read on-line indicate that it is very quiet.

The short circuit protection cuts in at 32 amps.

A back-lit analog front panel meter (say that quickly ten times!) displays either voltage or current, selectable with a switch next to the power on-off switch.

All in all, a nice power supply. Small and light weight. The price was less than I could have constructed one for. Hardly a reason for building your own!



ALINCO DM-330MV rear panel. This is of a 220VAC input model (MVE) but the layout for the 120VAC version (MVT) is the same.

<sup>1</sup> QST Magazine - December 1998 and January 1999  
A 13.8-V, 40-A Switching Power Supply, Part 1 & 2  
Manfred Mornhinweg, XQ2FOD

<sup>2</sup> QST Magazine - May 2002  
The St Louis Switcher  
Matt Kastigar, N0XEU

<sup>3</sup> QST Magazine review Sep 2000  
Switching Power Supplies Revisited (Alinco DM-330MV;  
Diamond GZV4000)  
Author: Bottiglieri, Joe, AA1GW



# ALL ABOUT POWER SUPPLIES

## PART 3

by JEFF - A17D

recently retired from Acopian Technical Company

This month, we will focus specifically on the switching and linear types of supplies, giving simple examples of how each works.

Both types are generally voltage regulated, meaning constant voltage out for various amounts of loading, or for a change in input voltage. Each can be current regulated also, or in theory, just current regulated.

### LINEAR MODE

A linear regulated power supply uses transistors to drop and regulate the voltage to the desired output. Most frequently, barrier junction transistors are used, and they are used together in groups for higher power applications. NPN transistors, with the collectors tied together and the bases tied together and a resistor in each emitter, and then together as a parallel group.<sup>1</sup>

The AC input would go to a transformer which provides isolation, and would step down or step up the voltage as needed. Then a rectifier, and capacitor. This provides the "bulk" unregulated voltage which is higher than the output voltage required.

The transformer ratio must provide enough voltage so that the regulator can operate at maximum rated load and minimum input line voltage. When operating at less than max output, and say 120VAC input, you will have quite a bit more voltage than you might suppose to keep the regulator going. In addition, the ripple voltage of the unregulated but rectified DC must never go below the output voltage, or the regulator will drop out, and the output ripple will be great. The extra voltage between the unregulated bulk and the regulated output constitute wasted watts of energy.

If you try to draw more current than the circuit is designed for, or short the output, then the resulting voltage across the linear pass transistors is very large. For this reason, linear power supplies need to have fast acting current limiting circuits to prevent severe damage to the transistors.

**"...linear power supplies need to have fast acting current limiting circuits to prevent severe damage to the transistors."**

Now there would be a regulator circuit to measure the output voltage, (perhaps also the output current too) This adjusts the current through the bases of the transistors, and in so doing adjusts the voltage drop across the pass element transistors. Looking at it another way, the transistors act as variable resistors to control the output voltage.

### SWITCH MODE

A switch mode power supply, aka. switcher, is a whole different idea than a linear. You can have AC input (or DC), and regulated DC output, constant current or constant voltage, but what goes on inside is something else.

I used to tell customers that it was like the difference between a front wheel drive and rear wheel drive car, but it is greater than that. Both might get you to church on Sunday, but what goes on inside is dramatically different.

In a switching supply the AC goes in the front or back of the box, then maybe a fuse, then an inrush

mediation device of some kind, then an EMI filter, and then rectifier and now some switching circuitry. Then a transformer, rectifier, inductors and capacitors for output filtering, as well as common mode capacitors to chassis ground. Now add the control circuitry, PWM (pulse width modulator), and over current protection, and you have it. That is, if there is not a power factor correction stage too.

In a switcher, the regulation and power conversion both take place as a result of high frequency switching with saturated transistors. Linear supplies use the linear portion of the transistor operating curve, switchers use all the way off, or full on (or saturated condition). For this reason, the transistor runs much cooler, and would be 100 efficient as a switch except for small losses of various kinds.

I used to tell customers, you want to know how a switcher works? Go to your dining room. Let

us assume you have an incandescent bulb in the ceiling light fixture. Now you have an on/off switch on the wall, make it a toggle switch. Switch up, light *on*, switch down light *off*. Still with me here? Now, you start flipping the

**"Linear supplies use the linear portion of the transistor operating curve, switchers use all the way off, or full on (or saturated condition)."**

**"Switchers are smaller, more efficient, lighter weight, and can operate over wider input voltages."**

## CONTEST UPDATE

**LDS AMATEUR  
RADIO  
PIONEER DAY  
JULY 21, 2012**

I thought the comments regarding the more restrictive rules for an LDS Amateur Radio Pioneer Day contest in last month's NEWSLETTER might generate a response or two on the e-mail reflector. Nary a word however issued forth! Perhaps, there is no real interest after all.

Originally, there seemed to be some enthusiasm for the idea. Maybe it's the onset of spring and the promise of warmer weather turning our thoughts to outside family activities.

Que sera sera.

## DI-DAH-DI-DAH!

The counselor in our Branch Presidency approached me one Sunday morning a couple of months back. He is also my Home Teaching partner. This time however it was not to discuss visiting appointments, it was a talk assignment for the Sunday two weeks in the future. Topic of my choice, he said. So, for the next two weeks I thought over what I wanted to talk about. Then on the Saturday night before, I started putting my thoughts on the computer.

My topic ended up being up, "I could have been a hermit"!

Being an only child gives you a head start on hermit-hood! My father being an only doesn't make for a lot of aunts, uncles, or cousins. My mother was the youngest of three sisters, one who never married, while the other one had two children. Not a lot on that side either. Until I

switch on and off, faster and faster. (Maybe the kids are watching, wondering what is wrong with dad?) Go faster and faster, and the light appears to dim. Fast enough, and maybe you cannot see the flickering of the bulbs. By now your wife is starting to wonder what you are up to. Now, keeping the rate of flipping the switch *on* and *off* the same, but varying the relative *on* to *off* time, you are making a pulse width modulator. You can vary the brightness of the bulbs in the ceiling. Now your dog Phydeaux is looking at you and about to run into another room.

You have just emulated the way a switching power supply works. The switch is either all the way open, or all the way closed, and does not dissipate heat.

If you want to make a linear regulator, get a peanut butter jar, and fill it with salty water and use two stripped wires closer or farther apart to vary the resistance and the brightness of the bulbs in the ceiling. Better yet, forget it, chlorine gas may bubble out of the water, and your wife might call the police.

Switchers are smaller, more efficient, lighter weight, and can operate over wider input voltages. They can more easily have wide voltage adjustment ranges without dissipating a lot of heat. Bad news, they generate some electrical noise due to the switching action.

<sup>1</sup> TECHSTUFF column March 2012

[http://ne.mara.net/pdf/newsletter/2012\\_news\\_mar.pdf](http://ne.mara.net/pdf/newsletter/2012_news_mar.pdf)

As before, any questions or suggestions would be welcome.

Jeff - AI7D

Jeff can be reached at [ai7djeff@ptd.net](mailto:ai7djeff@ptd.net)

## QUOTE OF THE MONTH

*If you want the rainbow, you've got to put up with a little rain.*

~Dolly Parton

was five and started school, there weren't any kids my age in our small rural neighborhood. No such thing as 'play dates' back then!

Ham radio, while having the possibilities of meeting and learning about others, tended for me to be a solitary pursuit, what with a preference for building stuff and working on antennas by myself.

My first full time job was as a two-way radio tech. One of the main parts of that was working on the radio system for the provincial department of lands and forests installing radios in fire towers in the spring and removing them in the fall. I often thought about what a great job it would be to work as a fire tower operator. Take a month's worth of food and books at a time into a remote fire tower site, along with my ham radio gear, nothing but lots of quality spare time on my hands.

But life conspired against me. A girlfriend, who became my wife. Then there were children and the responsibility of family. The companies I worked for changed over the years until I became my own boss with my own company.

Here I am, just finished celebrating my sixty-fourth birthday, with the usual spare tire around the mid section from too much sitting at a desk and too little physical work.

Looking back, maybe if I had worked harder at it I could have made a good hermit!

Until next month,  
VE1VQ



**June 23-24,  
2012**

**ARRL Field Day is the largest on-the-air operating event in Amateur Radio. It draws tens of thousands to the airwaves each year, bringing both new and experienced amateur radio operators together for a weekend of fun!**

## **Pictures and Words**

How about sending a picture of you and your station? If so inclined, send me a bit of a write-up about your ham radio career. And if you have one, send me a copy of your QSL card.

You're thinking, "no one wants to hear about me!" That's not true because everyone has an interesting story to tell.

Send it to [VE1VQ@eastlink.ca](mailto:VE1VQ@eastlink.ca) in whatever format you want - even scribbled in pencil on a piece of paper.