Next Meeting: Friday July 24 6:30 PM on Zoom. Meeting is always the 4th Friday of the month.

ANOMALOUS PROPAGATION

June 2020

Newsletter of the Midwest VHF/UHF Society

Editor: Open

Please right-click this link to download the very small 'Anomalous-Propogation-article-template. doc' Word document as a template for articles sent to Jim (j.bacher@ieee.org) in Word format. Thank you!

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Beacons: 1296.079 W8KSE EM79ur Dayton, OH---- 2W to Big Wheel at 800' AGL. MVUS Skimmer -. http://www.reversebeacon.net/dxsd1/dxsd1.php?f=0&c=w8kse&t=de

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De N8ZM

Not too surprisingly, the virus hasn't gone away yet. A second wave of cases is expected for various reasons, which don't need to be reiterated here. For MVUS purposes, what matters is that we will again meet via Zoom this month. And probably next month as well. The Zoom meeting information will be in this issue, I believe, but Jim, WB8VSU, will also send it out to the MVUS list soon.

Last month's Zoom meeting went well, although there were only about 6 of us there. Hopefully there will be more this time. It actually worked very well for our meeting. Everyone gets to see and hear better, I think. And there isn't the restaurant background noise and mood music to contend with. And you can join via computer, cell phone, notepad, or landline phone. The latter may not have video but you will still be able to hear and participate.

More and more hamfests and events are being cancelled or modified to adapt to this unfortunate situation, although some are going ahead if they feel they can provide adequate distancing and clean facilities. Which brings me to our annual picnic in August. I would like for us to hold it but at this point I am taking a wait and see attitude. Daun, from a brief conversation recently, seems willing to host us again, but I am sure that we will need to make appropriate provisions for everyone's safety. For now, it is a work in progress. If any of you have opinions or thoughts about this, feel free to pass them along to me at n8zm@ mvus.org.

That's all for this month. Please be careful in your activities to avoid catching or spreading the virus, out of respect for yourself and for others. I hope to see many of you at this month's Zoom meeting on the 26th.

de N8ZM.



when soldering something that sinks a lot of heat. I had no issues putting solder down on a the copper ground plane of a double sided PCB.

The device is well constructed. The main body is aluminum. The heater/tip with the 1/8" plug is well designed.

Overall I think this is a very good mini iron with performance that is an improvement on earlier USB irons.

Mike W8RKO



This and That

Compiled by: Gerd Shrick, WB8ISM

Classical music is the kind we keep thinking will turn into a tune.	[Kin Hubbard]	
My music is best understood by children and animals.	[Igor Stravinsky]	
Anything that is too stupid to be sung is spoken.	[Voltaire]	
I don't know anything about music. In my line you don't have to.	[Elvis Presley]	
You can make a killing as a playwright in America, but you can't make a living!	[Sherwood Anderson]	
Support wildlife. Throw a party.	[Unknown]	
In America, you can always find a party. In Russia, the party always finds you.		
There is nothing for a case of nerves like a case of beer.	[Joan Goldstein]	
Reminds me of my safary in Africa. Somebody forgot the corkscrew and for several days we had to live on nothing but food and water. [W.C. Fields]		
Sometimes too much to drink is barely enough.	[Mark Twain]	
Wagner drives a nail into your head with swinging hammer blows.	[P.A. Fiorentino]	
Classical Music is written by famous dead foreigners.		
Status quo. Latin for the mess we are in.	[Jeve Moorman]	
An Intellectual is a person whose mind watches itself.	[Albert Camus]	
Never put off until tomorrow what you can do the day after tomorrow.	[Mark Twain]	
Certainty. There is only one thing about which I am certain, and that is that there is very little about which one can be certain. [W. Somerset Maugham]		

Characterizing a Switched Mode Power Supply

Author: Trevor R.H. Clarke, K8TRC

Part 1

Mean Well power supplies are well made and inexpensive switched mode power supplies (SMPS) that are used by many HAMs and have a reputation for working well for transceivers. A few months ago, I purchased a Mean Well LRS-150F-15 for about \$30 on Amazon. The intent was to use it to power a mobile 2m transceiver. This is a 150W/15V/10A SMPS with an output voltage adjustment trimmer. It can be adjusted down to 13.8V. If 12V equipment is the intended application, here is an LRS-150F-12 device which supplies 150W/12V for a slightly lower cost than this model.



The supply is an industrial unit in an enclosure with screw terminals and is designed to be added to industrial products as a turnkey power supply. I initially hooked up a two prong 120V power cord to the input terminals, adjusted the output voltage, and hooked up some Anderson Power Poles to the output terminals. The radio started up with no issues and has been running well since. I have a small plastic case for it, an IEC power plug with a built-in fuse, and an AC switch. This will make a nicer looking and safer setup for only a few dollars more.

While SMPS have traditionally been avoided in favor of linear supplies for radio use this has been changing over the past couple of decades as the quality of SMPS have improved and noise

has dropped. However, I thought it would be useful to see just how well this supply performs. I'll measure some key power supply figures such as ripple, output noise, startup time, and maximum power supplied. I don't have a load capable of sinking 150W and I've always wanted an adjustable electronic load so this article will consist of two parts. In Part 1 I will use an oscilloscope to measure the various power quality figures. In Part 2 I will discuss the electronic load I build and test the supply for maximum output power.

The advertised specifications [1] and the verification test report [2] are available and should prove accurate on average but device to device variance is not available. Testing will be performed with the radio monitoring with a 2m J pole antenna attached but no signal above squelch and with the radio transmitting at full power on a 2m J pole antenna. The attached radio is a Kenwood TK-780 transmitting at 25W. Only values on the output side of the supply will be tested. Continued from page 5 Power On

These plots show the initial rise when first powering on the supply with the radio connected. Aside from the small pulse just before the rise, it's a fairly smooth slope with an overshoot of about 2%, well within the advertised specification of <5%.



Figure 1: Power On



Figure 2: Power On, Pulse detai

Continued on page 7



Figure 3: Power On, Slope detail

Low Load

The next set of plots show the ripple and noise details when the transceiver is on and receiving. Ripple is low at about 50mV.



Figure 4: Low Load, High Frequency Noise



Figure 5: Low Load, Low Frequency Noise



Transmit Load

When transmitting at full power, the switching controller changes to a different mode with a higher switching frequency. As expected, ripple is much higher at about 150mV which is at the advertised value.

Continued on page 9



Figure 7: Transmit Load, High Frequency Noise Detai



Figure 8: Transmit Load, Low Frequency Noise

References

[1] Mean Well LRS-150F datasheet https://www.meanwell-web.com/content/files/pdfs/productPdfs/MW/ LRS-150F/LRS-150F-spec.pdf

[2] "Test Report: LRS-150F-15" https://www.meanwell-web.com/content/files/pdfs/productPdfs/MW/LRS-150F/LRS-150F-15-rpt.pdf

Trevor, K8TRC

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Product Review of the TS-80 USB-C Soldering Iron

Author: Mike Suhar, W8RKO

USB soldering irons came out a few years ago. Most of them ran on the 5 Volts from USB 2. They were not very good for the most part. An upgraded version using USB-C is now available. The TS-80 is available from various sources including Amazon. The price depends on the what comes with the base unit. A full package that includes the QC-3 USB-C power supply, iron, one heater/tip, USB-C silicon cord, grounding strap runs \$114 on Amazon. You might find it lower from Adafruit or other sources from China. It is not battery powered. It requires a USB-C QC-3 wall-wart power supply. To make it truly portable you could get a USB-C QC-3 battery pack for charging smartphones. The silicon USB cable is nice as it appears the insulation won't melt if you should happen to let it contact the hot tip.

It comes with one tip and you can find one of two in most kits. The standard is a 2.5 mm flat tip. The other is a 0.2mm conical tip. I was replacing a very old NiCad battery soldering iron with a very fine tip I chose the 0.2mm for small circuit board work. Other tips are available on Amazon. Note that the "tip" and heater are in a single unit. When you buy a tip it comes as an assembly with the heater and temperature sensor. The tip/heater uses a 1/8" stereo plug to connect to the base unit. That combination brings the cost of getting a new tip to the \$30 range.

The base unit contains the electronics that runs the device. There is a tiny OLE display on the device for setting menu items and temperature. The handle also





has a two button switch so you need to read the instructions to figure out the two buttons. EEVblog on YouTube, from 2018, has a good video where the device was taken apart to see how it works. He got a couple of things wrong in his video. For example he indicates you re-

move the heater/tip by unscrewing the cap on the end. Actually you just pull the cap it and it pops out the heater/tip.

The unit claims to be an 18watt iron. It runs on the 9V side of the QC-3 power supply. In the menu you can set the power to 24watts and it appears to use the 12V option of the QC-3 specification. The iron powers up on USB2 5 volts but the heater does not operate. This voltage, as well as USB2, allows you to upgrade the firmware from a PC if needed. Speaking of firmware, the website shows the firmware as 1.07 but my devices shows firmware 1.22. It looks as if the website is not being updated.

The temperature sensor is in the tip so it responds quickly to tip temperature changes

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