

Quarter 1 - 2020

A PRODUCT MADE FOR CONVENIENCE

RIGrunner 4006U

See Page 7 for More Information



Pg 2-4
**The Festival of
Frequency Measurement**
by David Kazdan, AD8Y

Pg 5-6
West Mountain Radio in India
by Miroslav Skoric

Pg 7
Product Spotlight:
RIGrunner 4006U
by Marissa Nieves & Sholto Fisher,
K7TMG

Pg 8-9
**Using a VM to run the West
Mountain Radio CBA software
on macOS**
by Darren Rook, W9SYX

Pg 10
Bulletin Board

The Festival of Frequency Measurement by: David Kazdan, AD8Y



As noted in the last edition of West Mountain Radio's newsletter, 1 October 2019 marked the centennial of WWV. Amateur station WW0WWV ran a five-day special event station, the U. S. Department of Commerce's National Institute of Standards and Technology Time and Frequency Division had a formal ceremony with a wonderful radio station cake. The Undersecretary of Commerce, NIST Director Walter Copan was the featured speaker with HamSCI's own Phil Erickson, W1PJE, Assistant Director of MIT Haystack Observatory, at the podium to discuss the contemporary scientific uses of WWV.

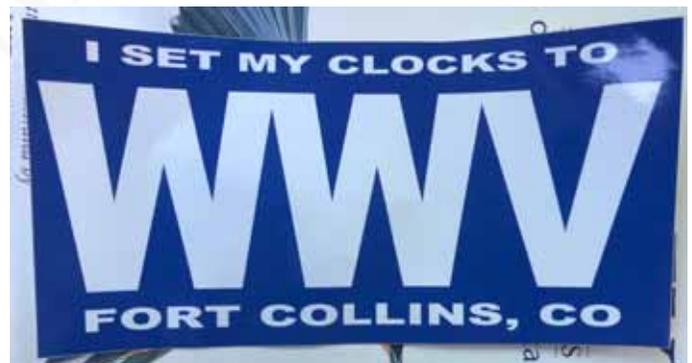


Four busy stations made about 10,000 contacts. While the rate of contacts was not as high as those achieved by the best of DXpeditions, well over 100 operators were scheduled into the operating positions and the work was done in the RF domain of WWV itself. Especially on 30 meters, where operations were only 1% in frequency away from the 10 kW of 10 MHz RF nearby, the entire operation was a test of operator skills, equipment quality, and patience on the part of the operators the world over who wanted that WWV centennial contact. "The heartbeat of the electromagnetic spectrum" has touched many lives and the amateur radio community holds it near and dear.



Members of the Case Amateur Radio Club of Case Western Reserve University, W8EDU

The event was run by the WWV Amateur Radio Club, WW0WWV, and the Northern Colorado Amateur Radio Club. Several other amateur radio clubs assisted, including the Case Amateur Radio Club W8EDU (CARC), of Case Western Reserve University. Six members traveled from Cleveland, Ohio to Fort Collins to operate the station and to be part of the ceremonies. They were particularly pleased to spend time with Dr. Copan, who is a four-degree alumnus of CWRU. By the time the day was over, they may have convinced Dr. Copan that he should obtain his own amateur radio license—perhaps in February, when he is scheduled to visit the university campus.



The Festival of Frequency Measurement was a simultaneously run event, designed to celebrate the radio functions of NIST and the

The Festival of Frequency Measurement by: David Kazdan, AD8Y



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science investigations of amateur radio. In its role as a research arm of HamSCI.org, the Amateur Radio Science-Citizen Investigation, CARC provided two opportunities for participating amateurs and shortwave listeners:

First, we invited school stations and others with a scholarly interest in radio to contact a fifth station run under the WW0WWV callsign. We had longer contacts from that station and we invited questions about WWV and physics metrology. We even had Matt Deutch, NORGT, WWV's chief engineer, greet by amateur radio his counterpart from Goddard Spaceflight Center's WWV centennial station (WWV started in what is now the visitor center of Goddard). Those stations were then further invited to go key-down for a "long dash" and have their frequency measured precisely. The Flex Radio transceiver's frequency reference was from a GPS disciplined oscillator, which was in turn under phase continuous comparison from WWV 10 MHz, which was in turn under control of the cesium clocks at NIST Boulder. The measurements made were therefore "NIST traceable" and indicated as such on the contact certificates. The process took a while and required good signals, so only about seven stations were able to participate, but it was a good learning process for everyone and unusual activity for a special event station.

Second, an announcement had been distributed about a month ahead of time for a Doppler shift data collection trial. The Case Amateur Radio Club and other parts of HamSCI are on research funding to prepare a distributed array of personal space weather stations. One of the stations' functions will be to monitor WWV and Canada's CHU beacons for Doppler shift and signal strength as space weather and the solar wind changes the "skip" path length in the ionosphere. We have been collecting such data sporadically for about a year and are now preparing daily data files.

For the Festival, about fifty amateurs agreed to use fldigi's frequency analysis module with their frequency-accurate receivers, tying up their amateur stations for the entire day, to measure WWV 10 MHz shift for 1 October 2019 UTC. They uploaded or emailed data files for us, and we have been hard at work preparing MATLAB and Python code to analyze ionospheric traveling waves in the data.

hamsci.org/article/hamsci-aga-2019
(See a list of all HamSCI presentations!)

HamSCI's LOW-COST DOPPLER SHIFT RECEIVER FOR IONOSPHERIC MEASUREMENTS WITH HAM RADIO:

Diagram illustrating the Doppler shift measurement setup. A WWV station (left) and a station (right) are separated by a fixed distance. The ionosphere is shown above, with a virtual ionospheric beam between them. Labels include: MULTIPLE REFLECTION BEAM, SKIP DISTANCE, DOPPLER SHIFT, NIGHT, DAY, IONOSPHERE, WWV, WV000, FIXED DISTANCE, and VIRTUAL IONOSPHERIC BEAM.

How to MEASURE Doppler SHIFT w/ your SHORTHAVE RECEIVER:

- 1) Tune in to WWV. Record the difference in freq between remote freq and a local GPSDO. (You can use Freq Analysis Mode in fldigi.)
- 2) Send your file to HamSCI! (We're working on a database for this.)
- 3) Watch hamsci.org as we fill in the map!

YOU WILL NEED:

- One (1) Frequency Standard such as a cesium or rubidium clock or a GPS-disciplined oscillator.
- An HF receiver (our Standard Station Run is coming soon, but a regular ham rig works too!)

WHY DO THIS?

The ionosphere is under-sampled, and we want to know more about TIDs. Also, we love amateur radio, citizen science!

LEARN MORE:

hamsci.org
info@case.edu
 PO BOX 54430-5213 - Poster Hall
 Columbus South, Ohio 43212-0000

kd8y@case.edu

The Festival of Frequency Measurement by: David Kazdan, AD8Y



(Continued from previous page)

A smaller practice run involved about ten stations on the first of August.

We very much appreciate everyone's help. Kristina Collins KD8OXT and others from CWRU presented a research poster at the American Geophysical Union research conference in December and it attracted a great deal of attention. The Space Weather Woman herself, Tamitha Skov WX6SWW paid us a nice visit as did many other radio amateurs involved in geophysics research. Some are doing work related to ours and we look forward to remaining in touch with them.

The poster may be viewed at:
<https://w8edu.wordpress.com/2019/12/20/american-geophysical-union-fall-meeting-bonus-visit-to-kph-ksm/>

The next meeting of HamSCI will be 20-21 March 2020 on the campus of University of Scranton, hosted by their amateur radio club and its faculty advisor, Dr. Nathaniel Frissell, W2NAF. The theme is The Auroral Connection; details may be found at:

<https://hamsci.org/hamsci2020>

We'll see you in Scranton!

73,

David and the officers of the Case Amateur Radio Club W8EDU



West Mountain Radio in India by Miroslav Skoric



I had a pretty complex conference and presentation tour in India in December 2019. At first I arrived to Hyderabad to meet radio amateurs at NIAR (National Institute of Amateur Radio). The plan was to introduce them with my activities at home where I practiced packet-radio with WMR RIGblaster Plug & Play (Fig. 1).



Fig. 1

The second activity was a 3-day ham radio workshop at GMRIT institute in Rajam, Andhra Pradesh state. There I had an opportunity to work with three groups of students from ECE and CSE departments, and also visit the local amateur radio club in the campus. The students liked to have a photo with me (Fig. 2).



Fig. 2

Every day I was brought to the presentation rooms by an electrical cart, "Buggie". The school rooms were full of young boys and girls, and also some teachers of ECE and CSE departments. Among the instruments I talked about, there was WMR RIGblaster Advantage (Fig. 7 & 8).



Fig. 7



Fig. 8

West Mountain Radio in India by Miroslav Skoric



(Continued from previous page)

After returning back to Hyderabad, I repeatedly discussed on WMR RIGblaster line with local hams (Fig. 9).



Fig. 9

My next talk (2-day session) was with the Vardhaman College of Engineering. I was escorted to Vardhaman campus by radio amateurs from Hyderabad and Gwalior, who then also shared some lecturing time with me, by introducing Indian ham radio to the students. The school's authorities were also there (Fig. 13).



Fig. 13

The main part of my talks was packet-radio and other 'data' modes, including a demo with APRS. WMR RIGblaster Plug & Play was used for that part (Fig. 15).



Fig. 15

After leaving Hyderabad, I continued my conference travel to Goa where I had a 3-hour ham radio tutorial session with IEEE ANTS 2019. The event was organized in BITS Pilani, Goa Campus (Fig. 18).



Fig. 18

There, I also joined local radio amateurs who assisted in explaining local practices in that part of India.

In general, that 3-week educational tour to India was successful. The only thing I missed was a reciprocal amateur radio license that could have enabled me to provide experiments 'on the air' fully independently from other hams. Nevertheless, Indian hams were quite helpful. I expect my license application to be resolved before my next travel there, which is planned for 2020. WMR RIGblaster line of sound-card interfaces will be there again!

73,

Miroslav "Misko" Skoric
YT7MPB

**Product Spotlight:
RIGrunner 4006U
by Marissa Nieves & Sholto Fisher, K7TMG**



RIGRUNNER 4006U

Built for CONVENIENCE

Keep devices CHARGED

Keep ORGANIZED

Our product spotlight this quarter is the RIGrunner 4006U. The RIGrunner 4006U can deliver up to 40 amps total through 6 outlets and includes a dual USB socket for charging all your portable devices that need a USB socket for charging. It also includes a blown fuse LED indicator, and each port has RFI protection.

The USB sockets make it super convenient and useful! You can charge a cell phone, tablet or power any USB device. It uses a dedicated charging controller (with current limiter) and monitors the USB data lines. What this means is that it can provide the “electrical signatures” required for certain devices (e.g. Apple) and charge them optimally.

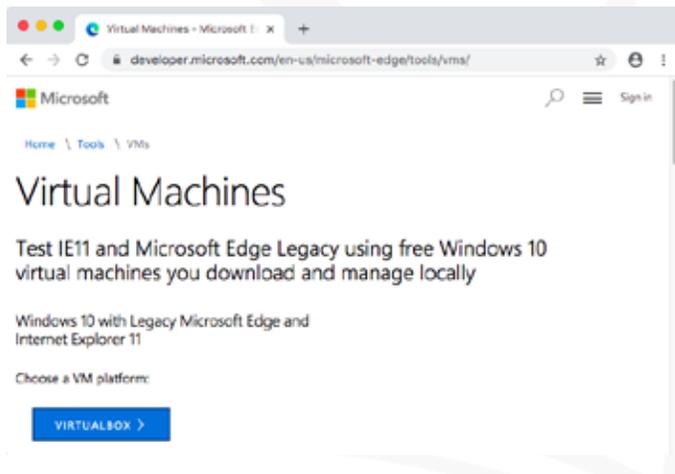
All of our RIGrunners use Anderson Powerpoles® which have been adopted by the ARRL and Amateur Safety Foundation. Many of our competitor products don’t feature these. The Powerpoles are much safer to use (less likely to hook up the wrong way) and are very convenient.

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Using a VM to run the West Mountain Radio CBA software on macOS by Darren Rook, W9SYX



The Computerized Battery Analyzer (CBA) by West Mountain Radio is a fantastic tool for testing and profiling any kind of power supply, battery or solar cell. The software for running the CBA is developed for Microsoft Windows, meaning Apple macOS users won't be able to run the software. One option for macOS users is to use Apple's Boot Camp to boot into an installation of Windows. The problem with this solution is that you need to partition a large portion of your hard drive to the Windows installation, and while Windows is running macOS is not and thus you cannot use macOS programs while Windows is running. Another option for macOS users is to use a virtual machine (VM) to run Microsoft Windows and Apple macOS at the same time.



A VM is achieved thru a process call virtualization, a method which multiple operating systems (OS) can run in parallel. This is different than emulating, where software emulates another processor and computer in order to run the OS. Since virtualization does not require any emulation, as code is run

as-is on the processor, virtualization runs much faster and more efficiently than emulation. Emulation would be needed if you wanted to run code meant for a different processor than what is on the computer (for example, would be needed if your PC has an Intel x86 processor but you wanted to run code for an ARM).

The software that runs a VM is called a hypervisor, and there are several that are available. One hypervisor that is popular with Apple users is Parallels, which was developed for use on macOS. The one that I've always used is Oracle's VirtualBox, and this is the one that I will be discussing.

In order to run a VM of another OS, you normally need the installation media and a license to run that OS. If you are experimenting with this for the first time and do not want to purchase a license for Microsoft Windows, Microsoft does make two different prepared VMs available to use in a limited basis. The first VM they make available is for Microsoft software development that includes Visual Studio and other software development tools. This VM is quite large, and can be found by Googling 'Visual Studio VM' (<https://developer.microsoft.com/en-us/windows/downloads/virtual-machines/>). The second VM they make available is for web developers who need to test web apps on Microsoft Edge browser. This VM can be found by Googling 'Microsoft Edge VM' (<https://developer.microsoft.com/en-us/microsoft-edge/tools/vms/>). Both of these VMs expire in 90 days, and you should also review their licenses to make sure your usage of it would not be in violation. Both of the download pages for the two mentioned Microsoft Windows VMs offers you the choice

WE WANT TO HEAR FROM YOU!

If you would like to submit an article for consideration in future newsletters please contact marketing@westmountainradio.com

Using a VM to run the West Mountain Radio CBA software on macOS by Darren Rook, W9SYX



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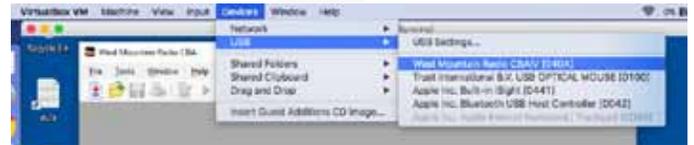
of which hypervisor to download for. Since I am using VirtualBox for this discussion, I am going to download the VirtualBox version of that VM. Once downloaded, run VirtualBox and choose File->Import Appliance from the macOS menu bar. VirtualBox will then ask for the OVF file to import, and if you downloaded one of the VMs from Microsoft you may need to unzip the file to get it. Once imported into VirtualBox, view the properties and settings of the VM before launching it. For example, the Microsoft Edge Oracle VirtualBox VM downloaded from Microsoft had USB disabled and thus I needed to enable it in order to use the CBA.

Once you are satisfied with the VM configuration, start the VM. In a few seconds you will see the Microsoft Windows boot-up screen in a macOS window. Viola!

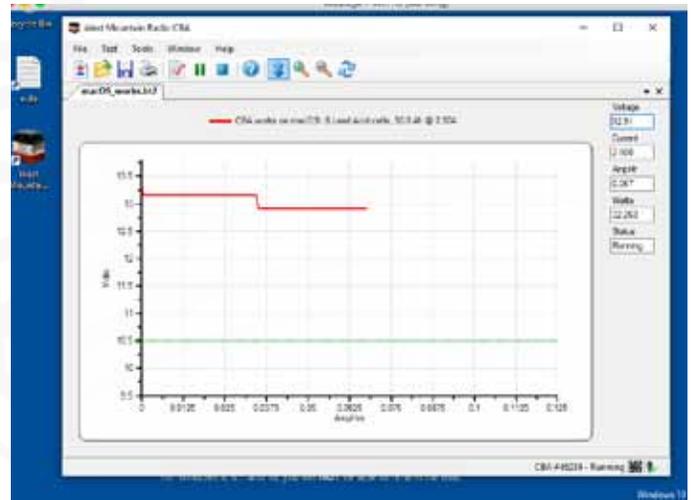
When Microsoft Windows has finished booting, run the Microsoft Edge browser and download the CBA software from West Mountain Radio's website and then run it to install the software. Installing the software also installs the USB drivers needed for the CBA software.

Once installed, run the software. Initially, the software will run but it will not be seeing any CBAs connected over USB. You can verify this by looking at the USB icon at the bottom right of the CBA software, if there is a red X on the icon then the software is not seeing a compatible CBA. Connect a CBA to the Mac via a USB cable. Some hypervisors will auto connect a USB device to the hypervisor when it's plugged in, but Oracle VirtualBox does not do this by default. To connect the CBA to your Windows VM in VirtualBox, choose Devices->USB->West Mountain Radio CBAIV from the macOS menu bar. The will then connect the CBA to the Windows VM, and since the CBA software already installed the drivers it should then be ready to go once Windows has finished connecting the CBA. You can tell when the CBA software is ready when the USB

icon on the bottom right of the screen has a green check-mark next to it.



Your macOS can now use the Microsoft Windows CBA software, and you can run a test with the CBA by pressing the 'New Test' button the CBA software's menu. While this article focused on using a hypervisor to run Microsoft Windows on macOS, using a VM has many other applications that you may find useful; running MS-DOS as a second operating system to run old amateur radio software requiring the real-time nature of DOS, running Linux as a second OS, running Windows in a Linux OS, running a second OS with a history snapshot that you can revert to back to after altering the OS, etc.



Bulletin Board

Visit Our Booth!

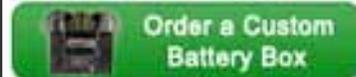
**Plano Ham Com
June 12 - 13**

**EAA
July 20 - 26**

Due to COVID-19, production has been delayed. West Mountain Radio encourages all the hams to keep communication going through these hard times over radio! Stay healthy!



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