



FEBRUARY 2021

Volume 10 Issue 2

VE3ERC-LUB

President: Brian VA3DXK
Vice-President: Ted VE3TRQ
Secretary: Kirk VA3KXS
Treasurer: Paul VA3PDC
Trustee: Wes VE3ML
QSL Manager: Kirk VA3KXS
Repeater Trustee: Wes VE3ML
Website Admin: Ted VE3TRQ
Lighthouse: Al VA3TET
Maple Syrup Display: Al VA3TET
Newsletter: Bob VE3IXX
ERC Website: <https://ve3erc.ca>

ERC REPEATERS

UHF 444.700 + TONE: 131.8
UHF 444.700 + TONE: 123.0
VHF 147.390 + TONE: 123.0
VHF 147.255 + TONE: 131.8
EMERGENCY SIMPLEX: 147.51
UHF-IRLP node 2404,ECHOLINK VE3ERC-L
VHF- IRLP node 2403,ECHOLINK VE3ERC-R

In an emergency, tune
Into our repeaters,
UHF 444.700 or
VHF 147.390 or
HF 3.755 LSB or
Simplex 147.510
For coordination and
assignments.



A photo of the Hoofbeat Challenge back in 2017. The handheld, in the shadow on the left, was used for communications to co-ordinate the horses which are just starting up the hill on the top right. See page 8 for more.



Radio Amateurs
of Canada

THE PREZ SEZ!

This club is Radio-ACTIVE
This club is Radio-ACTIVE

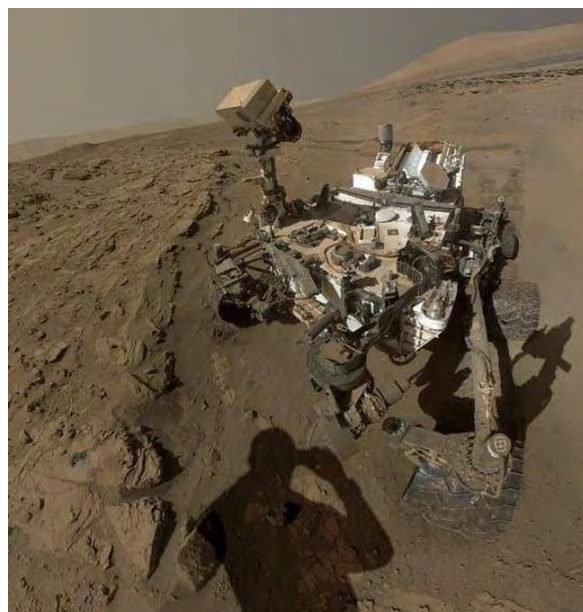
President's Update for February 2021

On February 18, Perseverance Rover made a successful landing on Mars, a great achievement for NASA. We all applaud this phenomenal accomplishment but in typical "ham" fashion we can add good humour, something everyone can use during this pandemic time. Enjoy it and get a good laugh.



Tony, VE3DWI sent this and wrote, "It had to happen. I couldn't resist."

Wes, VE3ML added the photo on the right and wrote, "This photo was taken shortly after the Perseverance Rover landed on Mars. "



Digital Radio Today

By Ted VE3TRQ

Digital Radio Bits - Using WebSDR & SDR Receivers for DigiModes

We have talked quite a bit about various digital modes, and about how well they do in a propagation-challenged world. Now it's time to use some receive-only tricks to find out what digital modes are available elsewhere in the world, and maybe even hear ourselves on another (distant) receiver. There are a few tools that are quite easily available to accomplish this task.

WebSDR - SDR Receivers on the Internet

First, and easiest to access, is the world-wide network of web-based, web-connected SDR receivers, often implemented with an RTL dongle, or perhaps an Airspy or SDRplay (RSP) or NooElec dongle. These web sites are set up by tech-savvy radio amateurs or non-amateur radio groups interested in radio propagation and research. Depending upon the capability of

A WebSDR is a Software-Defined Radio receiver connected to the internet, allowing many listeners to listen and tune it simultaneously. SDR technology makes it possible that all listeners tune independently, and thus listen to *different* signals; this is in contrast to the many classical receivers that are already available via the internet.


More background information is available [here](#). Questions and comments can be sent to [PA3FWM](#), the author of the WebSDR software and maintainer of this site; but please check the [frequently asked questions](#) first.

WebSDR servers can register themselves automatically on this site, leading to the below list of currently active WebSDR servers.

Since September 2018, the **Chrome** browser occasionally starts to play white noise on WebSDR sites. As a workaround, muting and unmuting usually restores normal audio. Chromium engineers are looking into the [problem](#). Alternatively, use a different browser, like [Firefox](#). In December 2018, Chrome v71 seems to have fixed this issue!

Currently there are 191 servers active, with 2002 users and 879 MHz of radio spectrum.

Filter band: and region: and ☐ mobile support and covering MHz.

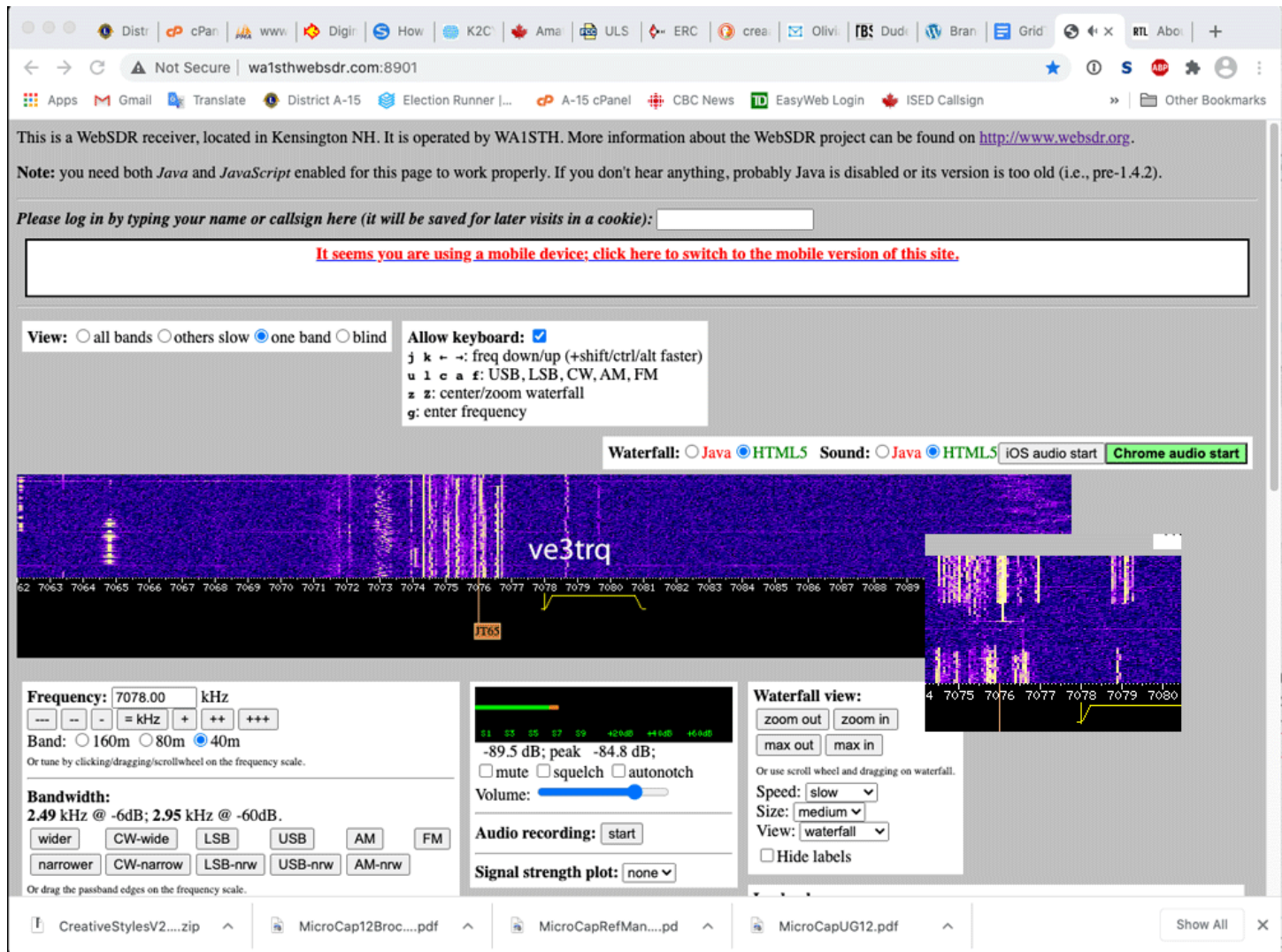
Location and URL	Frequency range	Antenna
 WebSDR at the University of Twente, Enschede, NL http://websdr.cwi.utwente.nl:8901/ JO32KF; 538 users	0.000 - 29.160 MHz	Mini-Whip

1

Map showing the locations of active WebSDR servers across the world. The map includes labels for various countries and regions, such as Mexico, United States, Canada, Europe, and Africa. The map is powered by Leaflet and OpenStreetMap contributors.

Note: the locations on the map are only accurate to a few km, because they are derived from the QTH locators.

the computer hardware and the speed of the Internet connection, a single SDR site may be able to service from a few to hundreds of simultaneous users. All that is required to access these radio receivers is a modern web browser on pretty much any computer. In order to hear signals, the local computer need only have sound hardware to render the audio sent from the WebSDR site, either with computer speakers, or a set of headphones.



2- WEB SDR from WA1STH, NH, showing VE3TRQ JS8 Tx Line, plus Inset of FT8 / JS8 Traffic

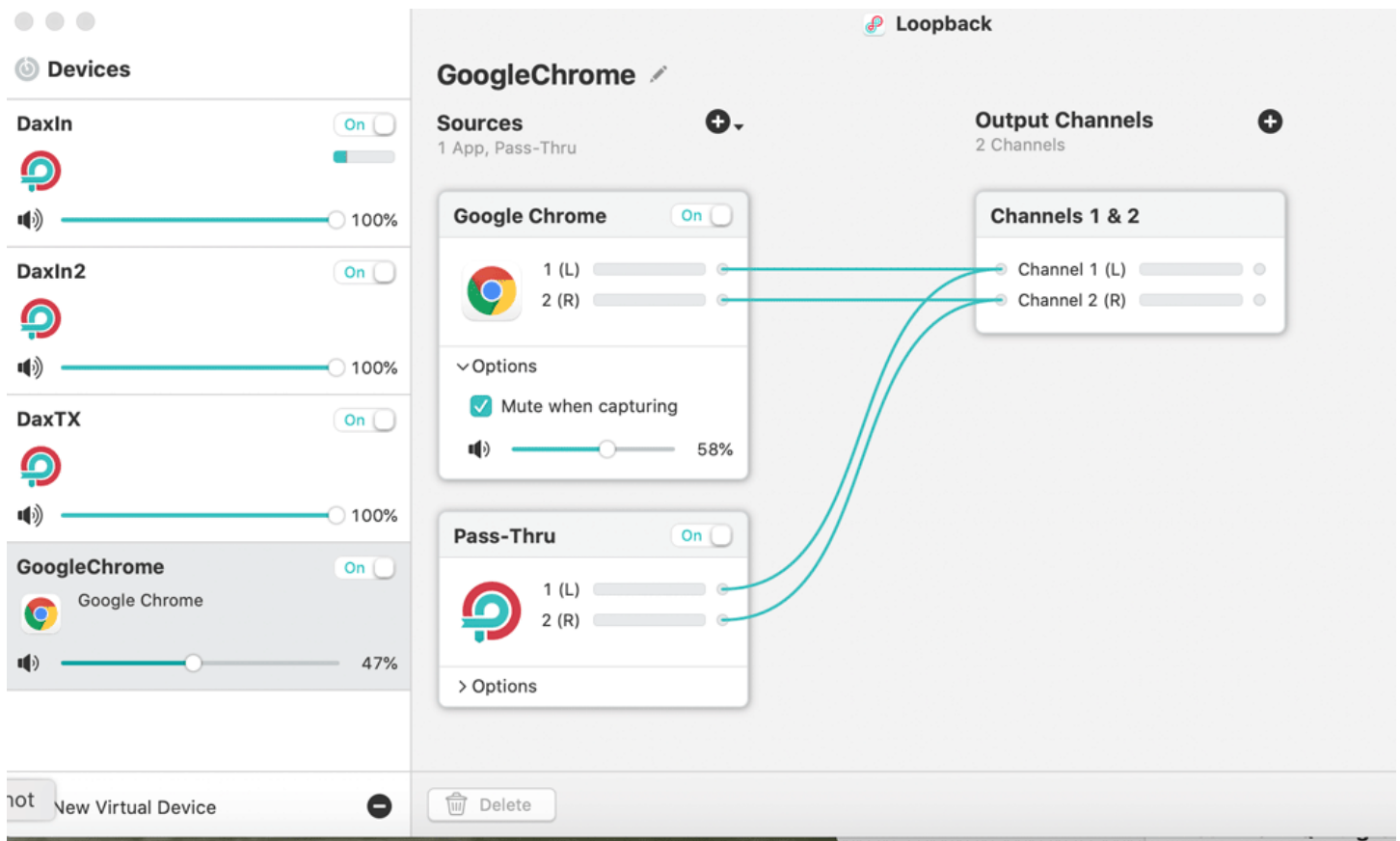
SDR Dongles - SDR Receivers attached to a computer and accessed locally

If you have access to decent antennas, a better computer, and are willing to find and set up some software, it is possible to have locally what the WebSDR sites use to pass signals to listeners. You will need to purchase a USB-based receiver dongle, such as an RTL device, a FunCube dongle, an Airspy, or an RSPuno/duo (the major difference between them is the number of antenna inputs) from SDRplay. I'll only mention these here, but not really go into what is required to make them work - it's too large a topic. There is a wealth of information available by searching on the Internet.

Getting the Audio into the Digital Radio Application

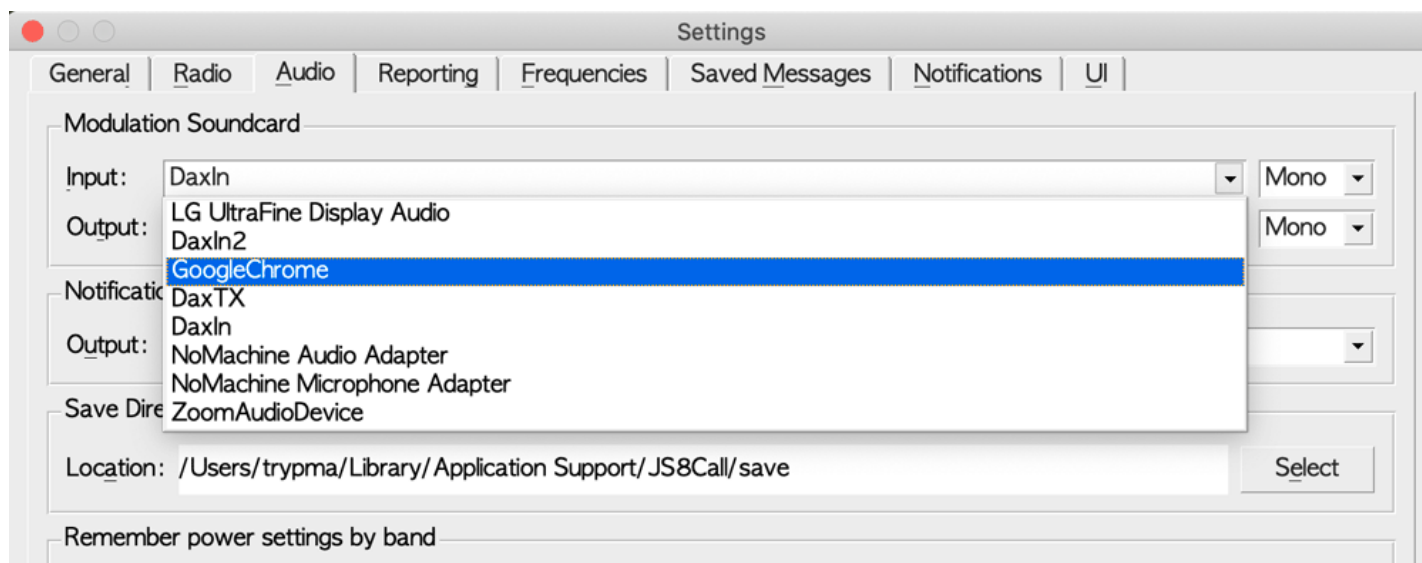
WebSDR sites output audio to the web browser application, so that they can be heard on computer speakers or headphones. To decode the audio from digital modes requires getting the

audio from the web browser application to the digital application. Doing this requires what is known as a *virtual audio cable*. In the case of a Macintosh computer, a number of solutions exist, some free, some not. In general, the paid software functions better than the free software, or is easier to use. I use *Loopback*, a product sold by Rogue Amoeba Software, costing approximately \$75. Google "Virtual Audio Cable software" and add "for MacOS", "for Windows", or "for Linux" to narrow the search to your O/S. Use what works for you.



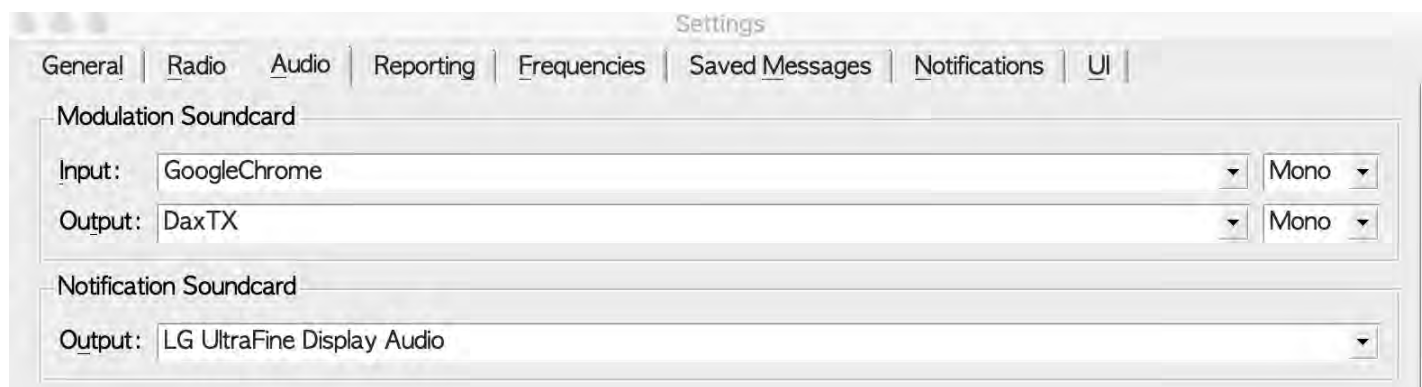
3- Loopback VAC Tool Configuration for Google Chrome

The next step is to reconfigure JS8Call (or whatever digital program you are using) to take the audio input from the browser application. I have set up a virtual device named **Google-Chrome**, and associated it with the Chrome browser application. It will appear in the list of input devices for the digital app, as shown in the following image.



4- JS8Call Audio Configuration Screen with Virtual Audio Device for Chrome Browser

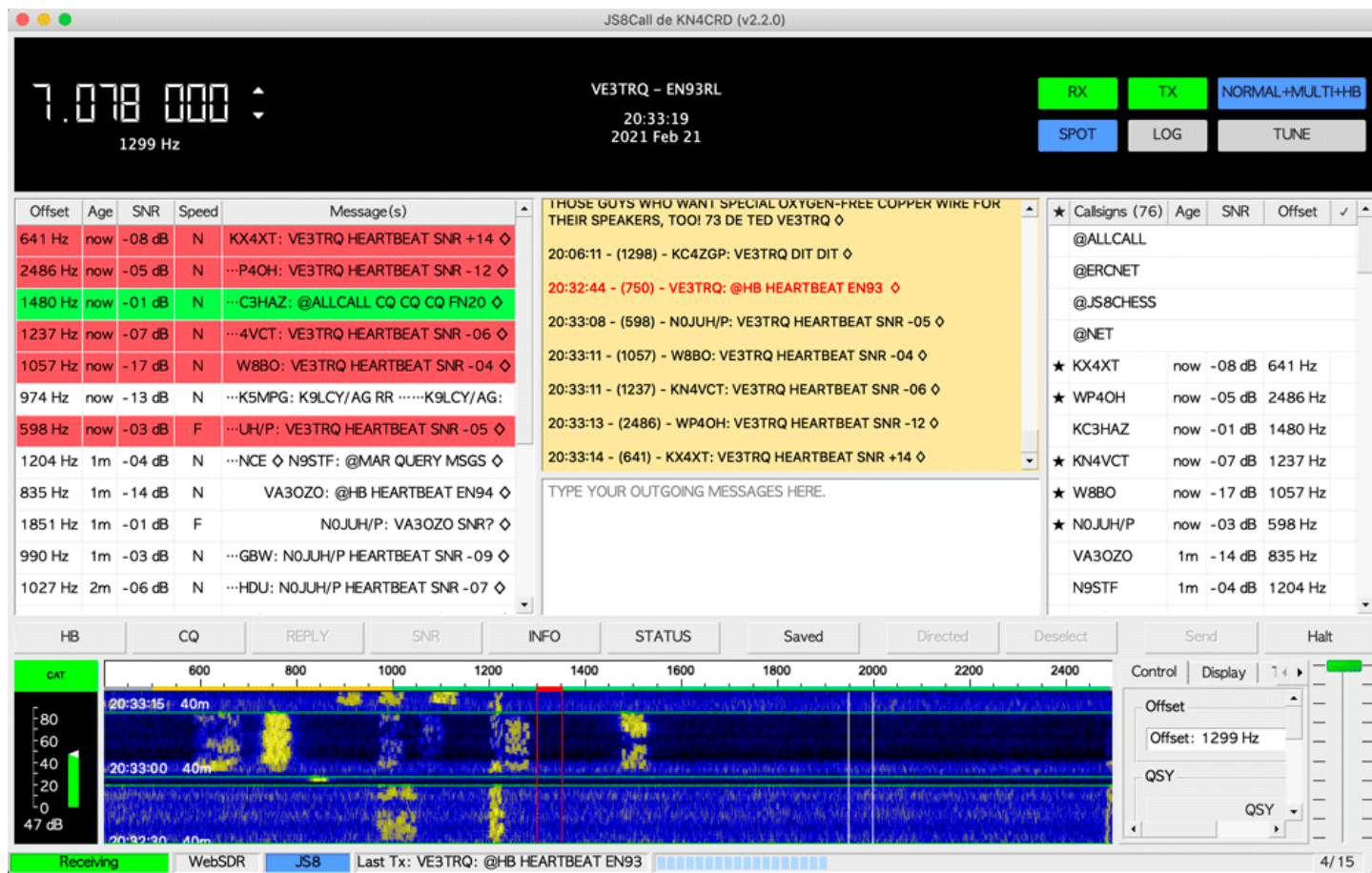
The *Radio* configuration has been left connected to the Flex radio for Tx *Audio Output* and rig control, so split transmit and receive can be accomplished. The Flex radio will transmit locally, but the JS8Call *Input* will come from the WebSDR at WA1STH in New Hampshire.



5- Split Receive and Transmit Configuration for JS8Call Audio

JS8Call HeartBeat Transmission and Responses Received via WebSDR

The image below shows the JS8 HeartBeat transmission responses to the VE3TRQ HB sent from Waterloo, and received at WA1STH New Hampshire. Note you do not see the actual heartbeat transmission because the transmitter is active. The image in *Figure 2* above shows the transmission from VE3TRQ, both in the main screen, and in the inset. *Figure 6* below shows the JS8Call window which used the audio configuration shown in *Figure 5*.



6- JS8Call Window Showing HeartBeat (Beacon) Response to VE3TRQ on Remote SDR Receiver

This makes it possible to have a two-way conversation without relay with someone who can hear you, but you cannot hear - greatly expands the reach of your digital conversations.

Summary

You don't need to spend any money, nor configure much software to use an SDR radio - just use someone else's radio on the Internet! Or buy an inexpensive RTL-SDR dongle, and free software, and play. Of course for that you need to have a spare receive antenna.

A few websites where more information is available: <https://www.sdrplay.com/>, <http://airspy.com/>, <https://www.rtl-sdr.com/buy-rtl-sdr-dvb-t-dongles/>.

Ted VE3TRQ



**From
the**

PAST



Thanks to Al Dee VA3DZZ for this photo of the crew responsible for communications for the Hoofbeat Challenge. We were not sure what year this was taken but there are a lot of familiar faces.

Front Row from left: Frank VA3FJM, Wes VE3ML, Barry VE3SLD, Bob VE3SFW, Linda VE3ILJ, Mike VE3MKY.

Back Row: Al VA3DZZ, Bill VA3QB and Bruce VE3QB.

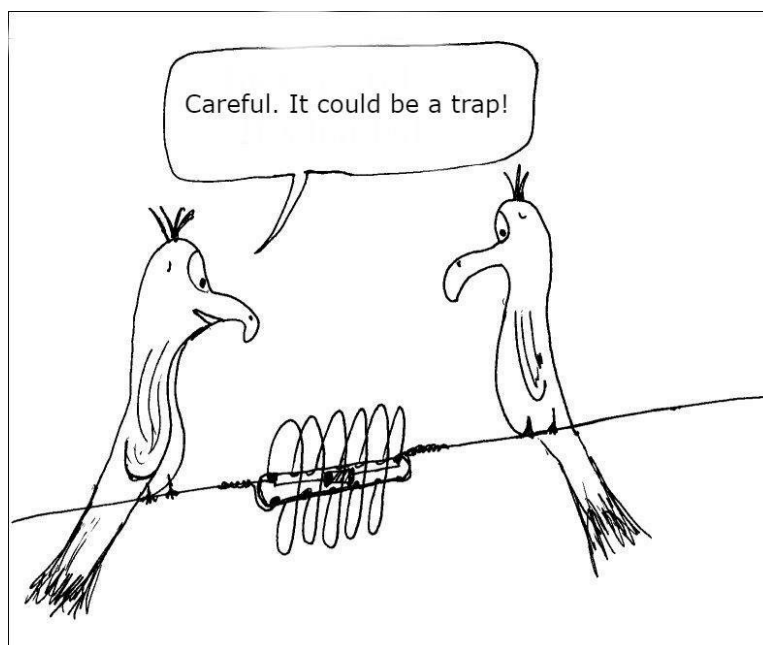
CONTRIBUTIONS TO VE3ERC-CLUB NEWSLETTER

Do you have an article you'd like to submit? Or photos? Do you have any comments you'd like to make?

Perhaps you'd like to share a photo of your shack, a special project you are working on or a special interest!

SEND THEM TO:

**Bob bobve3ixx@gmail.com
(519-787-2279)**



WEDNESDAY NITE NET CONTROLLERS

FEBRUARY 3 - BILL VA3QB

FEBRUARY 10 - WES VE3ML

FEBRUARY 17 - PAUL VE3PVB

FEBRUARY 24 - MEETING

MARCH 3 - AL VE3DZZ

MARCH 10 - BRIAN VA3DXK

MARCH 17 - BOB VE3IXX

MARCH 24 - MEETING

MARCH 31 - TED VE3TRQ

APRIL 7 - AL VA3TET

APRIL 14 - KIRK VA3KXS

APRIL 21 - REG VE3RVH

APRIL 28 - MEETING

MAY 5 - FRANK VA3FJM

MAY 12 - TOM VE3DXQ

CORRESPONDENCE



Thanks to Tony VE3DWI for sending us these insightful predictions from Wiarton Willie.

Ted VE3TRQ who writes the Digital Radio Today articles for the Newsletter has made available another powerpoint presentation. Ted writes:

Here's a presentation I gave to KWARC a few years ago - still relevant, I think. Explores using a Pi for FLDigi and wsjt-x.

<https://www.dropbox.com/s/oiggpm7gic0h4o7/RPiDigitalKWARC.pptx?dl=0>

73,

Ted VE3TRQ

ERC Elmira Radio Club Inc. - Meeting Minutes

February 24, 2021

<u>Attendance - Members</u>	<u>Attendance - Officers</u>
Bill Reid VA3QB	Ted Rypma VE3TRQ - Vice President
Bob Koechl VE3IXX	Paul Curtin VA3PDC - Treasurer
Bruce McLellan VE3QB	Wesley Snarr VE3ML - Trustee
Frank Monteith VA3FJM	Kirk Sinclair VA3KXS – Secretary
Graham Bauman VE3BYP	
Harold Braun VE3CD	<u>Guests:</u>
Jack Sinclair VA3WPJ	Judd Hodge N4WXU/VE3WXU
Jim Heidmiller VE3JMU	Colin Jones VA3BLW
John Linnerth VE3OVO	Cameron Jones VE3FBY
Ken Buehler VE3KCY	Gary Kornstein VE3JGK
Reg Horney VE3RVH	
Rich Clausi VE3DCC	
Rod Murray VA3MZD	
Roger Sanderson VE3RKS	
Tony Lelieveld VE3DWI	

Meeting Location: Zoom

Meeting Minutes

1. Call to Order:

- a. Meeting was called to order by Vice-President, Ted Rypma VE3TRQ at 7:34pm and he welcomed everyone present.

2. Roll Call:

- a. President Brian Filbey VA3DXK sends his regrets.
- b. Roll call established those present and it was noted quorum had been attained.

3. Approval of Agenda:

- a. Ted displayed the agenda on screen, which had also been circulated prior to the meeting.
 - i. Request by Kirk VA3KXS to add an item to Unfinished Business regarding renewal of RAC membership/insurance
 - ii. Request by Kirk VA3KXS to add an item to New Business regarding the QSL Manager position
- b. MOTION to approve the agenda as amended.

Motion by: Bill VA3QB

Carried

4. Secretary Report: Presented by Kirk Sinclair VA3KXS.

- a. Correspondence Received: None.
- b. Per New Business item 9.c.i from the January 27th meeting, I can confirm President Brian Filbey was contacted regarding renewal of RAC Membership and Insurance. We will ask Paul VA3PDC to provide an update under Unfinished Business below.
- c. Tony VE3DWI passed on an inventory list from Reg VE3RVH. I have not yet incorporated this in the online Inventory file, but will do soon and have the revised copy posted.
- d. A Corporation Profile report was ordered and received from the Ontario Government which confirms the updates to our Directors & Officers requested in September of 2020 was completed. Copies of this report can be provided to any members who are interested.
- e. Minutes of the January 27, 2021 meeting were emailed to members on the same day.
 - i. The word "amended" should be removed from item 5.b., which was the motion to approve the Treasurer's report. No amendments to the report were noted.
 - ii. The word "Summery" in item 9.b. should just be "Summer", in reference to Summer Field day.
- f. *MOTION to approve the amended minutes of January 27, 2021.*

Motion By: Jack VA3WPJ

Carried

5. Treasurers Report: Presented by Paul Curtin VA3PDC

- a. Paul displayed the details of the transactions for the month of January.
- b. *MOTION to accept the Treasurers Report*

Motion By: Paul VA3PDC

Carried

6. Presidents Report: Presented by Vice-President Ted Rypma VE3TRQ.

- a. No official report. Items Brian mentioned in agenda - reminder that dues are due in March. \$40 for RAC members, \$50 for non-RAC members. AGM is in May and elections for club officers will be held during that meeting.

7. Committee Reports:

- a. Safety Officer - Kirk Sinclair VA3KXS
 - i. Nothing to report.
- b. Nominations Committee - Rich Clausi VE3DCC & Tom Mahony VE3DXQ
 - i. Nominees have been found for all positions except for VP. If anyone would like to volunteer, they will be added to the slate.
 - 1. Frank VA3FJM volunteered to stand for the VP position, Rich will add him to the slate of nominees.
- c. Winter Field Day - Bill Reid VA3QB
 - i. Bill VA3QB presented a summary of the scores for club members who participated and linked their loggers to the club website: <http://ve3erc.ca/contests/>. The club scoreboard is a good way for members

to enjoy friendly competition during the contest. The URL is accessible to anyone who wishes to observe the contest.

- ii. Rich had a question about the requirement for a 30 minute break in the Winter Field Day rules. Bill clarified that is to prevent multi-operator, single-radio sites from running for the full 48 hours.
- d. Summer Field Day - Bill Reid VA3QB
 - i. Bill VA3QB is planning an outdoor field day, based on the assumption most folks will be vaccinated by that time. Bill will again approach the owner of the runway near Elmira to see if that property is available. Rules this year may allow people to operate at home again.
 - ii. It would be good to sort out Internet access - mobile data? Network to Rich VE3DCC's house? To be determined.

8. Unfinished Business:

- a. Club Membership Roster
 - i. Paul VA3PDC sent out an updated roster when Rod VA3MZD joined. This still needs to be updated on the ve3erc.ca website under the ERC Roster and ERC Business section. Ted VE3TRQ will make the update.
 - ii. Members are encouraged to review the roster information and send any changes to Paul va3pdc@rac.ca. If you need the password for either of the ERC Roster or ERC Business sections of the website, please contact one of the Executive.
 - iii. Paul provided another reminder that dues are due in March.
 - 1. eTransfer for membership dues is preferred, however if folks want to send a physical cheque, Paul VA3PDC's home address can be found on QRZ.com.
 - 2. eTransfers can be sent to this email address: elmiraradioclub-funds@gmail.com.
 - 3. When you send in your dues, please also include your RAC number and confirm that you are paid up with RAC.
 - 4. We have to maintain a minimum 51% of ERC members with RAC memberships to qualify for the RAC Insurance program.
- b. Renewal of RAC Membership & Insurance - update from Paul VA3PDC
 - i. Paul VA3PDC sent the renewal forms to RAC a month ago. We have not yet received the invoice for the Insurance component. Payment of this is not optional as the club requires insurance for club events. Additionally, we do not have insurance coverage in 2021 until this is paid.
 - 0. Question from Kirk VA3KXS - how much does it normally cost? Paul confirmed it is usually around \$420 or \$430
 - ii. *MOTION To authorize Paul VA3PDC to pay the RAC Insurance invoice as soon as it arrives.*

Motion By: Paul VA3PDC

Carried

9. New Business:

- a. Elmira Maple Syrup Festival usually in April is a Virtual Expo on March 27th this year due to COVID-19
 - i. Question from Ted - should we try to do anything for the virtual festival?
 - ii. Consensus is no.
- b. Dues Accommodations for Family Members - Paul VA3PDC, Ted VE3TRQ

- i. Paul VA3PDC commented that other clubs have a discounted rate for multiple members in one household.
- ii. *MOTION to adopt a household membership plan whereby if the first member of the household is a RAC member and pays the ERC membership fee for RAC members, then additional members of the same household who wish to join the club will only pay an ERC membership fee of \$10 for the year.*

Motion By: Paul VA3PDC

Carried

- iii. Question of whether the bylaws need to be updated? A quick review by Kirk VA3KXS suggested no, but on further review it appears a change will be required. Kirk to take an action to recommend a Bylaw amendment.

c. QSL Manager Position - Kirk VA3KXS

- i. I noticed in the newsletter that Tom VE3DXQ is listed as the QSL Manager. Tom transferred all of the QSL records & supplies to me in September and I have been performing those duties since then. I'm not sure if we need a motion to formalize that transfer of responsibilities, or just a request to Bob VE3IXX to update the newsletter.
- ii. Consensus is to just ask Bob VE3IXX to update the newsletter to formalized Kirk VA3KXS as the QSL Manager.

10. Presentations

- a. Emergency Back-Up Power - Tony VE3DWI

11. Announcements

- a. Next Club meeting will be held via Zoom and is on Wednesday, March 24th, 2021 at 7:00pm.
- b. Annual Club Membership dues are due in March

12. Adjournment

- a. *MOTION to adjourn at 9:09pm*

Motion By: Bruce VE3QB

Carried

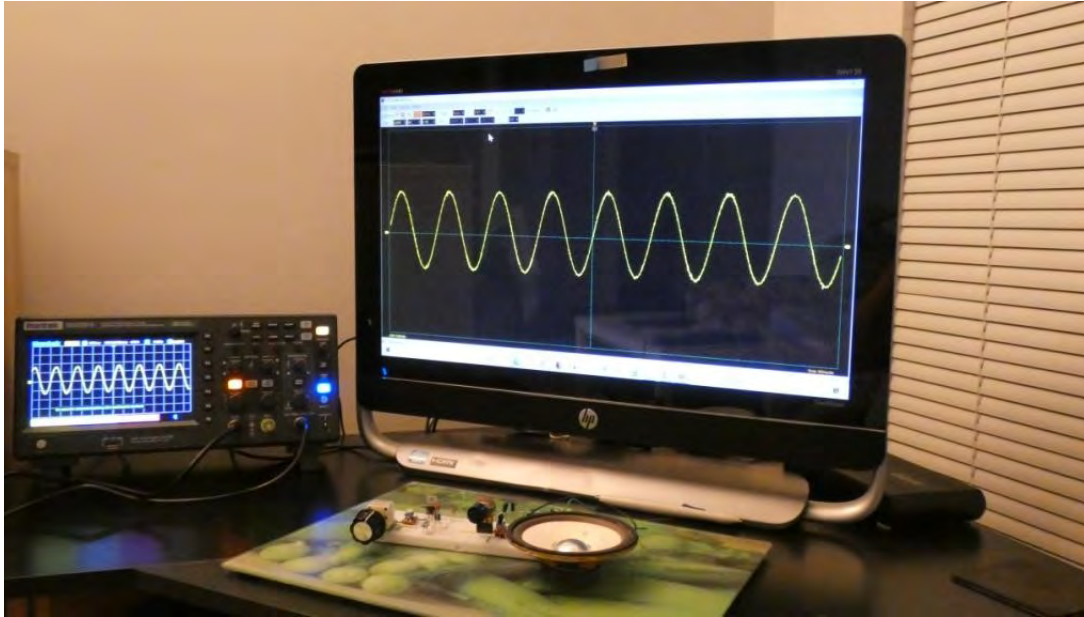
Action Sheet:

Action Required	Reference(s)	Action By	Deadline Date
Update the ve3erc.ca website with the latest roster.	8.a.i	Ted Rypma VE3TRQ	ASAP
Pay the RAC Insurance invoice when it arrives.	8.b.ii	Paul Curtin VA3PDC	Upon receipt of invoice
Review Constitution & Bylaws and recommend changes to align with update ERC membership fee structure	9.b.iii	Kirk Sinclair VA3KXS	Before next meeting
Update newsletter to indicate the QSL Manager is Kirk VA3KXS	9.c.ii	Bob Koechl VE3IXX	Next newsletter

Deep Memory and Digital Phosphor in Digital Oscilloscopes

By Daniel Romila VE7LCG

Since I just became the new owner of a digital oscilloscope, I decided to look on the Internet and refresh some terms that I used and to try to find, understand and eventually exemplify some of those terms. First of all I have to tell you I bought a DSO (digital storage oscilloscope), just because it was the best bang for the buck – a Hantek 2D15. It is not what I need; it is just what I can afford.



What I need is an MDO (or the DSO I just bought and a NanoVNA). In January 2021 the Hantek 2D15 was a good deal for me; in the moment when this article would eventually be published probably other models will be cheaper and better. But – in order to see what the esoteric terms like Deep Memory and Digital Phosphor mean, let's start with the oscilloscope itself because – trust me – otherwise those terms are just a kind of smart talking, without much sense.

Analog Oscilloscopes – they trace signals. There is a screen and a luminous dot that goes on the screen left to right (in the most common measurements). The speed can be set to be slower or faster. But what is important for us, hobbyists, is that analog oscilloscopes are no longer the best, they are heavy and expensive, and delicate, because they contain a CRT (cathodic ray tube) for display, exactly like the old big and heavy TV sets had.

Digital Oscilloscopes – they are dedicated computers, with a display – and sometimes not even their own incorporated display. Digital oscilloscopes sample signals, analyze them and display them. They are cheaper, lighter, and can do many-many things analog oscilloscopes cannot do. Just remember that it is a computer.

I was telling you I bought a DSO, while what I need is an MDO. There is an article which gives plenty of information at: <https://www.tek.com/document/online/primer/xyzs-scopes/ch2/oscilloscope-types>

DSO = Digital Storage Oscilloscope

DSOs provide permanent signal storage and extensive waveform processing. Conventionally, DSO employs a serial-processing architecture to capture and display a signal on its screen. This is more and more debatable, because few oscilloscopes actually follow this structure anymore.

DPO = Digital Phosphor Oscilloscope

DPOs are DSOs which add a third dimension to the signal, the frequency-of-occurrence. While literature states a clear difference between DSOs and DPOs, those definitions remained somehow obsolete. What the reader must understand from frequency-of-occurrence is – for example – that let's say if our signal

we measure is almost always sine, and just from time to time our oscillator shortly malfunctions and generates rectangle instead of sine, most oscilloscopes would not have enough samples and enough processing power to show us sine and rectangle. If those images would be shown and our eyes would re-compose the image in our head, we will believe we see both the rectangle and the sine, and the rectangle is less frequent, because it is not so bright on the screen. Old analog oscilloscopes used phosphorus and developed technologies to control the brightness of the phosphorus layer. Parallel processing is used to achieve the number of samples necessary for the kind of phosphorus effect we are talking about. In plain English, the digital oscilloscope works for showing on the screen the signal, but it also works behind the scene to capture and analyze more samples than it needs for showing us a nice image. It uses a parallel processing architecture to perform these functions.

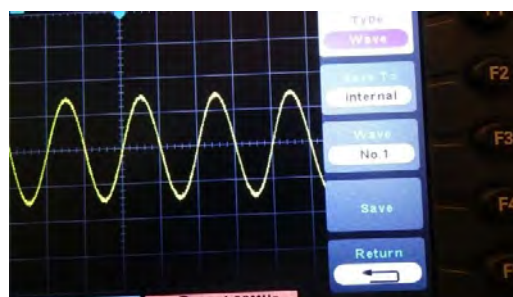


The above Tektronix DPO2014B costs more than 3 thousand CAD. It boasts 1 GSa/s. While this made the Tektronix model to be named one of the best digital phosphorus oscilloscopes in 2020:

<https://www.circuitstoday.com/best-digital-storage-oscilloscope>

1 GSamples/second is no longer a big technical achievement. My under 300 CAD oscilloscope also has 1 GSamples/second. Mine also employs some parallel processing, and it can show less luminous some transient signals superimposed on an image of the dominant image (somehow). While it might not respect the definition of digital phosphorus, in many aspects it fulfills the phosphorus purpose. Some companies even declare all their oscilloscopes are actually digital phosphorus oscilloscopes, with a more lax or exact interpretation of the term, because technology allows us to do many things so fast.

What about the simple, less "techie" understanding of the analog phosphorus? In analog times there was an image on the screen, and it could become persistent for a while, to allow the human user to see it. Nowadays even cheap digital oscilloscopes can wait and hunt for a burst of signal, memorize it and after show it forever on their screen.



For the readers who want to read more about the comparison between DSOs and DPOs, there is a good material, with pictures, at:

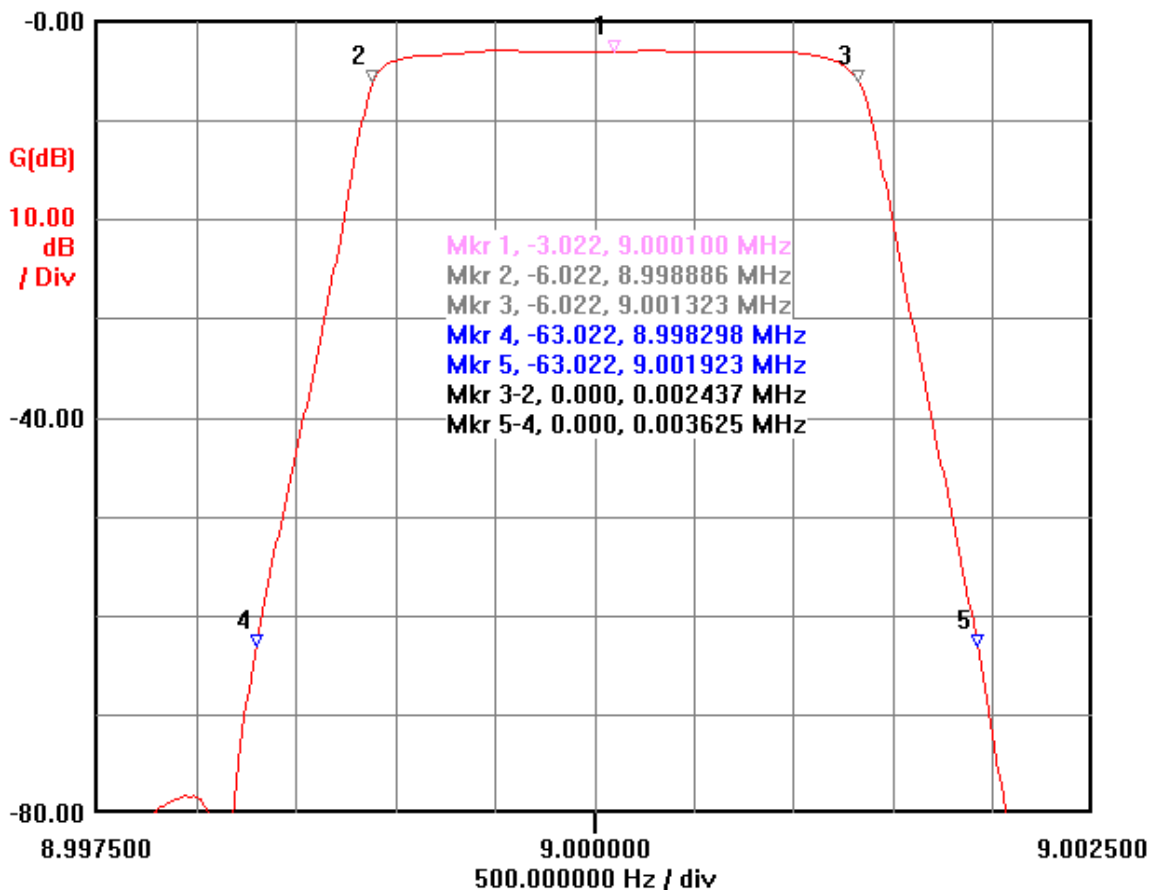
<https://community.keysight.com/community/keysight-blogs/oscilloscopes/blog/2016/09/01/dso-versus-dpo-what-s-the-difference>

Just for the sake of finishing with categorizing digital oscilloscopes, after we saw what is DSO (digital storage oscilloscopes), DPOs (digital phosphorus oscilloscopes), the theory forces me to also talk about:

MDOs = Mixed Domain Oscilloscopes

I saw many smart definitions that the reader can find in the above mentioned links in my article, so please allow me to say in plain English the MDO is capable not only to show time on the x axes and amplitude on y axes, but instead of time on x axes can show frequency. A spectrum analyzer. For example you have a 9 MHz SSB crystal filter, on the x axes you will have frequencies around 9 MHz, and you will see the amplitude of the signal being strong inside the bandpass of the filter and attenuated outside the bandwidth.

INRAD #2310, 2400Hz SSB



From: https://martein.home.xs4all.nl/pa3ake/hmode/IF_filters.html

This is what usually hobbyists do with a much cheaper NanoVNA than with a dedicated spectrum analyzer, or MDOs, which are 10 times up to 100 times costlier. Of course, the price represents more measurements the device is capable of in comparison with a NanoVNA.

MSOs = Mixed Signals Oscilloscopes

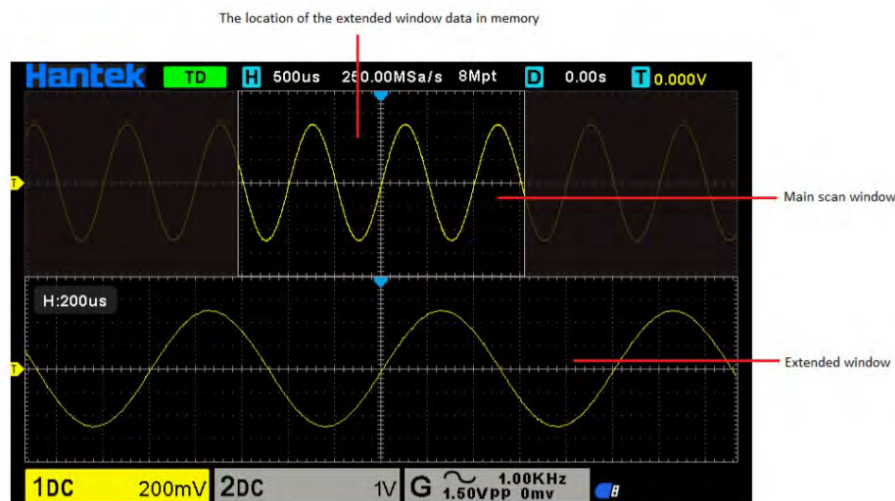
They combine the performance of a DPO with the basic functionality of a 16-channel logic analyzer, including parallel/serial bus protocol decoding and triggering.

In plain English, an MSO will have plenty of inputs, like 16 of them, and displays all of them on the screen. They are used for visualizing digital signals from microprocessors, microcontrollers, from various busses at once. There are accessories which can be added to some 2 or 4 channels oscilloscopes, to make them capable of showing 16 channels or more. So again the definitions between what is one kind of digital oscilloscope in comparison with another kind is more of an academic thing than something that can scare us in the practice of ham radio and – generally – electronics. If the text up to here did not convince you enough of terms being more of an academic thing, let me tell you also there are theoretically defined

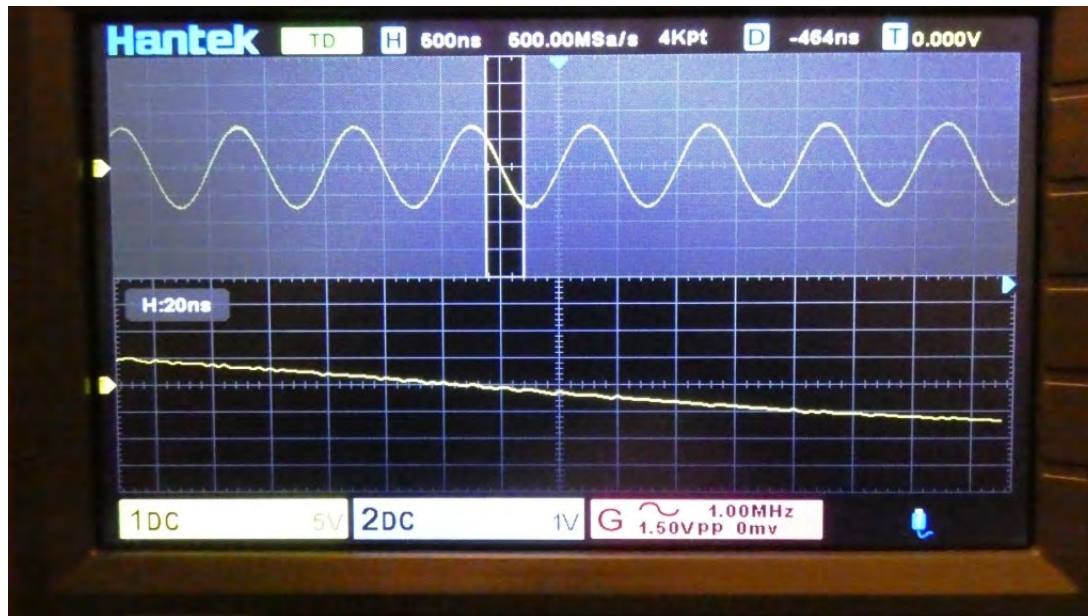
DSOs = Digital Sampling Oscilloscopes

Well, up to now DSOs meant digital storage oscilloscopes. It's more than enough to simply say that digital sampling oscilloscopes do the sampling of the signal before any amplification or attenuation of it.

More interesting for the hobbyist than the above terms and definitions is **Deep Memory**. In order to understand what it is let's say we watch a nice sine on the screen of an oscilloscope, and there is some glitch on a very small part of the screen. Wouldn't be nice to have the possibility to magnify and see what is happening there? It's like seeing a picture on our computer, with a man having a newspaper in his hand. If the picture has enough resolution we would be able to magnify and magnify the digital image until we see the date of the newspaper, or the plate of a car showed in a general traffic picture. We would see the details we want only if the image has enough pixels – it has been memorized "deep" enough to magnify and magnify until we see what we want. Exactly the same for the oscilloscopes.



Mine, for example, shows the image on a 7 inch display, with a resolution of 800 by 480 pixels, color, that is 64K color TFT as declared in the technical specifications. But it memorizes more information, so it can magnify and show more details. In the particular case of my oscilloscope the procedure is called "dual window".



Agilent Technology has a more didactic material about deep memory.

http://www.techni-tool.com/site/ARTICLE_LIBRARY/Agilent%20-%20Demystifying%20Deep%20Memory%20Oscilloscopes.pdf

This article wanted to make light about some terms used by oscilloscope manufacturers and vendors. What was high performance and clearly defined some 5 years ago can become blurred, unclear and even obsolete today. The radio amateur has to be brave to navigate between many marketing terms, many academic terms and to use only what it is necessary in his/her particular case. Bombastic terms and words never helped understanding, while we do require some common terms to use when talking with other ham radios and reading/writing articles.

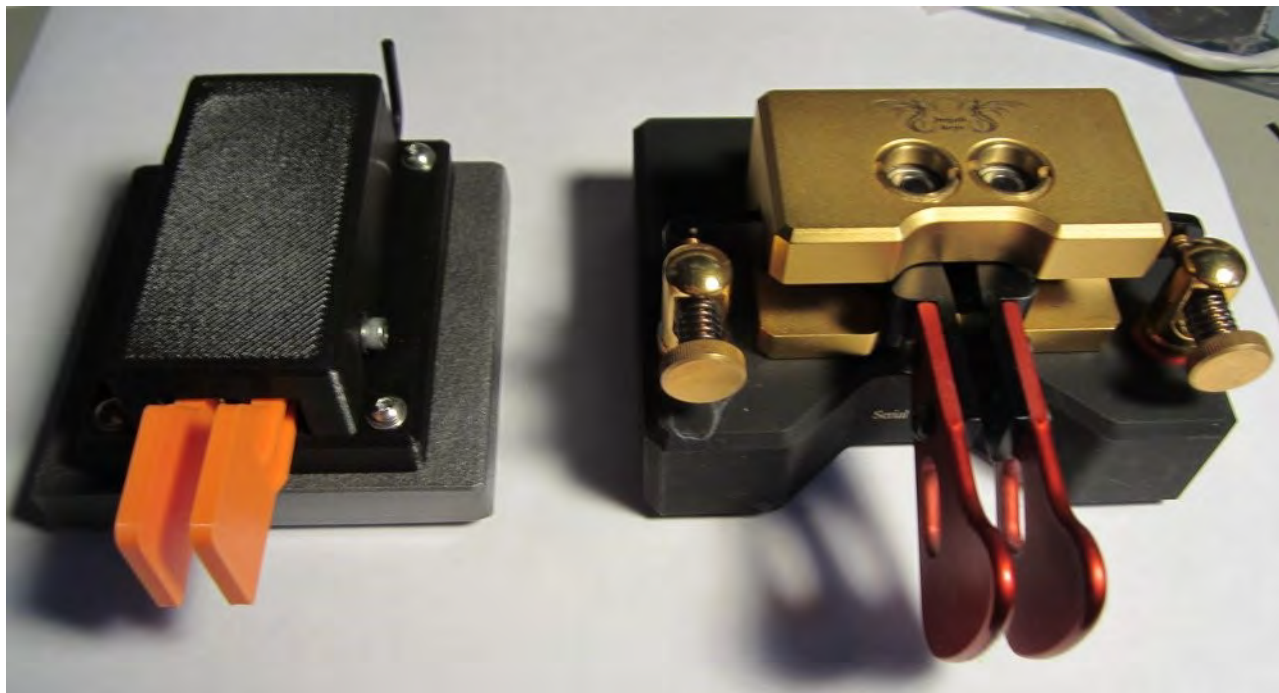
Thanks to Daniel VE7LCG for kindly sending us his article. Ed.

It's not a Begali, but....

By Dan Romanchik, KB6NU

One of the questions I'm most frequently asked is, "What is a good paddle for a beginner?" My usual answer to this question is to look for a used Bencher BY-1 at a hamfest or on one of the online venues. You used to be able to get them for \$60 or less. Now, however, there are few hamfests and the price has gone up. Now, used Benchers are close to \$80.

Another option that newcomers might consider is the CW Morse paddle (shown in photo below). They cost \$60 with a steel base (\$43 without), and are available from 3rd Planet Solar and Gigaparts. I purchased one recently, and used it for a couple of days. To be honest, I was prepared to hate it, but it actually works pretty well. It's not a Begali, but it's good enough that I'd recommend it as a starter key.



These keys are mostly made from 3D-printed plastic parts. You can tell this from the finish. While not as bad as some 3D-printed parts, they do look a little rough. I wouldn't be surprised if they go to molded parts, though, at some point. In high volumes, it has to be cheaper to mold the parts rather than print them.

The key does have metal parts where it counts, though. The contacts are all brass, the base is made from 1/2-in. cold-rolled steel, and the levers pivot on sealed ball bearings. My key weighed 22.5 oz (1.4 lbs.), and was quite stationary on the silicone mat that I use for my keys. The Begali is, of course, a lot heavier at nearly 60 oz. (3.75 lbs.).

A spring between the levers provides the tension. Two screws allow you to adjust the contact spacing. Unlike the Begali, whose adjustment screws have a very fine thread to give you plenty of adjustability, these screws are standard thread screws. What this means is that it can be a bit tricky to set the contact spacing. The screws are spring-loaded to prevent the adjustment from changing, but the springs don't seem to be very beefy, and I can see where the adjustment might change after a lot of use.

The ball bearings give the key a nice action. During my tests, I had the speed cranked up to 23 wpm, and this key performed well at that speed. One thing I didn't like very much is that the arms tend to flex more than I like, but I actually have the same problem with the plastic Begali finger pieces. That's why I use the aluminum finger pieces on the Begali.

Overall, though, I'm quite happy with this key. And, for sixty bucks, which is about one-fifth of the price of a new Begali Magnetic Pro, I can certainly recommend this key to newcomers getting started in CW.

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