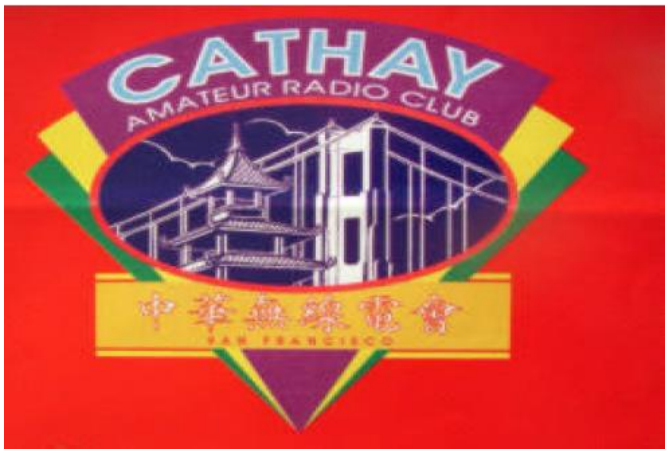


Cathay September 2023

www.cathayradio.org

President: George Chong, W6BUR **email:** *W6BUR@comcast.net*
Vice President North: Leonard Tom, *NX6E* **email:** nx6e@hotmail.com
Vice President South: Bill Fong, *W6BBA* - **email:** w6bba@arrl.net
Secretary/Membership: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Editor: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Treasurer: Vince Chinn aka Mingie, *W6EE* - **email:** vince@vincechinncpa.com
Web Master: Edison Fong – *WB6IQN* - **email:** edison_fong@hotmail.com
Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses. We support local community requests for HAM emergency communications. Several of us are trained in CPR/ First Aid and are involved with community disaster preparedness.

Monday Night Net Time: 9 PM Local Time/PST, As of 8/21/2023 we are switching over from using Repeater: WB6TCS to **Nick Carsion's Repeater: WA6GEL UHF 444.80000 Mhz, Offset +5Mhz, CTCCS/Tone PL 179.9 Hz.**

Please note: Repeater: N6MNV UHF 442.700 Mhz, Offset +5MHz, CTCSS/Tone PL 173.8 Hz in South San Francisco is cross linked every Monday Night Net at 9 p.m. to WB6TCS 2-meter repeater.

Formerly used repeater: Repeater: WB6TCS - RX 147.210, TX 147.810, Offset +0.6 MHz, CTCSS/Tone PL100 Hz, will serve as a backup repeater on a trial basis and have limited operational period: every Monday from 8:45 pm to 10:15 pm PST

The CARC Monday night net is the best way to find out the latest club news. All check-ins are welcome.

Message from the President: George Chong, *W6BUR*

Hello CARC Members and Friends;

Many thanks to Nick Carsion for the use of repeater – WA6GEL for our CARC Monday Night Net.

I wish to thank our CARC members that set aside their valuable time to participate in our Monday night's nets.

Introduction Tech Article:

The folks at MIT have figured way to turn a cement brick into an electric storage device.

To learn how this was done, please read the Tech Article.

Reminder: In Person Tech Session, Saturday September 9, 2023

Newsletter, Ed Fong *WB6IQN* is hosting a tech session on the latest Ham technology as mentioned in the previous newsletter, July 2023. Further details are at the end of this newsletter.

Please send your RSVP to Ed Fong <edison_fong@hotmail.com>

Public Service Announcements

HAM CRAM / HAM Licensing

For upcoming HAM Licensing locations please refer to:
http://www.arrl.org/find-an-amateur-radio-license-exam-session

Auxiliary Communications Service (ACS)

The Auxiliary Communications Service (ACS) is a unit of trained professionals who supply communications support to the agencies of the City and County of San Francisco, particularly during major events/incidents. ACS goals are the support of gathering and distribution of information necessary to respond to and recover from a disaster.

The ACS Net begins at 1930 hours (7:30 p.m. PT) local time each Thursday evening, on the WA6GG repeater at 442.050 MHz, positive offset, tone 127.3 Hz. The purpose of this net is to practice Net Control skills, practice checking in with deployment status in a formal net, and to share information regarding upcoming ACS events. Guests are welcome to check in. ACS members perform Net Control duty on a regular basis. On the second Thursday of each month, the net is conducted in simplex mode on the output frequency of the WA6GG repeater, 442.050 MHz no

offset, tone 127.3 Hz.

ACS holds its General Meetings on the third Tuesday of each month from 1900 hours to 2100 hours local time. Currently meetings are exclusively conducted over Zoom during the COVID-19 pandemic, ACS looks forward to meeting in person again as soon as possible.

Upcoming meeting dates in 2023 are:

- September 19, 2023
- October 17, 2023
- November 21, 2023

Location of in person future ACS meetings are yet to be determined as the regular location is under reconstruction. All interested persons are welcome to attend. For further information, contact Corey Siegel KJ6LDJ <kj6ldj@gmail.com>.

For more information, please attend an ACS meeting, check in on the ACS radio net, or call 415-558-2717.

Free Disaster Preparedness Classes In San Francisco – NERT Taught by San Francisco Fire Department (SFFD).

http://sf-fire.org/calendar-special-events

+ TBD

Spring into Readiness!
This Virtual Drill will take place from 9am-12pm with virtual skill rotations and words from some special guests!

Invitation and sign-up coming next week!

+ Recertifications - Coming Soon!

Now that San Francisco has entered the Red Tier for COVID-19 Transmission (see https://covid19.ca.gov/safer-economy/#county-status for more details), we are working to schedule recertification trainings for NERTs who were current as of December 2019 or later. Stay tuned for details and times over the next month!
(At this time, all class 5&6 recerts will take place outdoors only, at the SFFD Division of Training at 19th St & Folsom St in the Mission.)

***SFFD DOT** is the Fire Department Division of Training. All participants walking, biking or driving **enter through the driveway gate on 19th St.** between Folsom and Shotwell. Parking is allowed along the back toward the cinderblock wall.

Visit ***www.sfgov.org/sffdnert*** to learn more about the training, other locations, and register on line. Upcoming Special NERT Events.

San Francisco Police Department: Auxiliary Law Enforcement Response Team (ALERT)

The Auxiliary Law Enforcement Response Team (ALERT) is a citizen disaster preparedness program designed. The ALERT program is for volunteers 16 years of age or older, who live, work, or attend high school in San Francisco.

Graduates of the San Francisco Police Activities League (P.A.L) Law Enforcement Cadet Academy are also eligible to join.

ALERT volunteers will no longer need to complete the Fire Department's Neighborhood Emergency Response Team (NERT) (www.sfgov.org/sfnert) training and then graduate into two 8 hour Police Department course specifically designed for ALERT team members.

ALERT members will work closely with full-time and/or Reserve Police Officers in the event they are deployed after a disaster. The Basic ALERT volunteer will have no law enforcement powers other than those available to all citizens.

SFPD ALERT Training (New Members)

The next SFPD ALERT training class has been scheduled for: TBD

* Class date indicated are only for new members

IMPORTANT- All participants must complete the background interview process in order to be eligible to attend the ALERT training class.

Eligible ALERT participants may register for a training class by contacting the ALERT Program Coordinator, Marina at sfpdalert@sfgov.org, or by telephone at 415-401-4615.

SFPD ALERT Practice/Training Drill

All active/trained ALERT members are asked to join us for our next training drill, via scheduled for on TBD

For more information on the San Francisco Police Department ALERT Program, email us at sfpdalert@sfgov.org, or call Lt. Marina Chacon (SFPD Ret.), SFPD ALERT Program Coordinator, at (415) 401-4615.

For additional information on the web please refer to:
https://sfgov.org/policecommission/alert

Tech Article

Massachusetts Institute of Technology

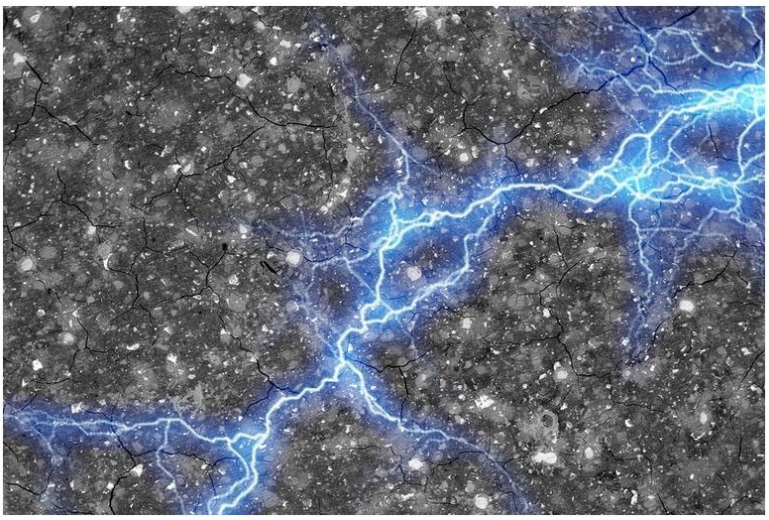
MIT News
ON CAMPUS AND AROUND THE WORLD

https://news.mit.edu/2023/mit-engineers-create-supercapacitor-ancient-materials-0731

MIT engineers create an energy-storing supercapacitor from ancient materials

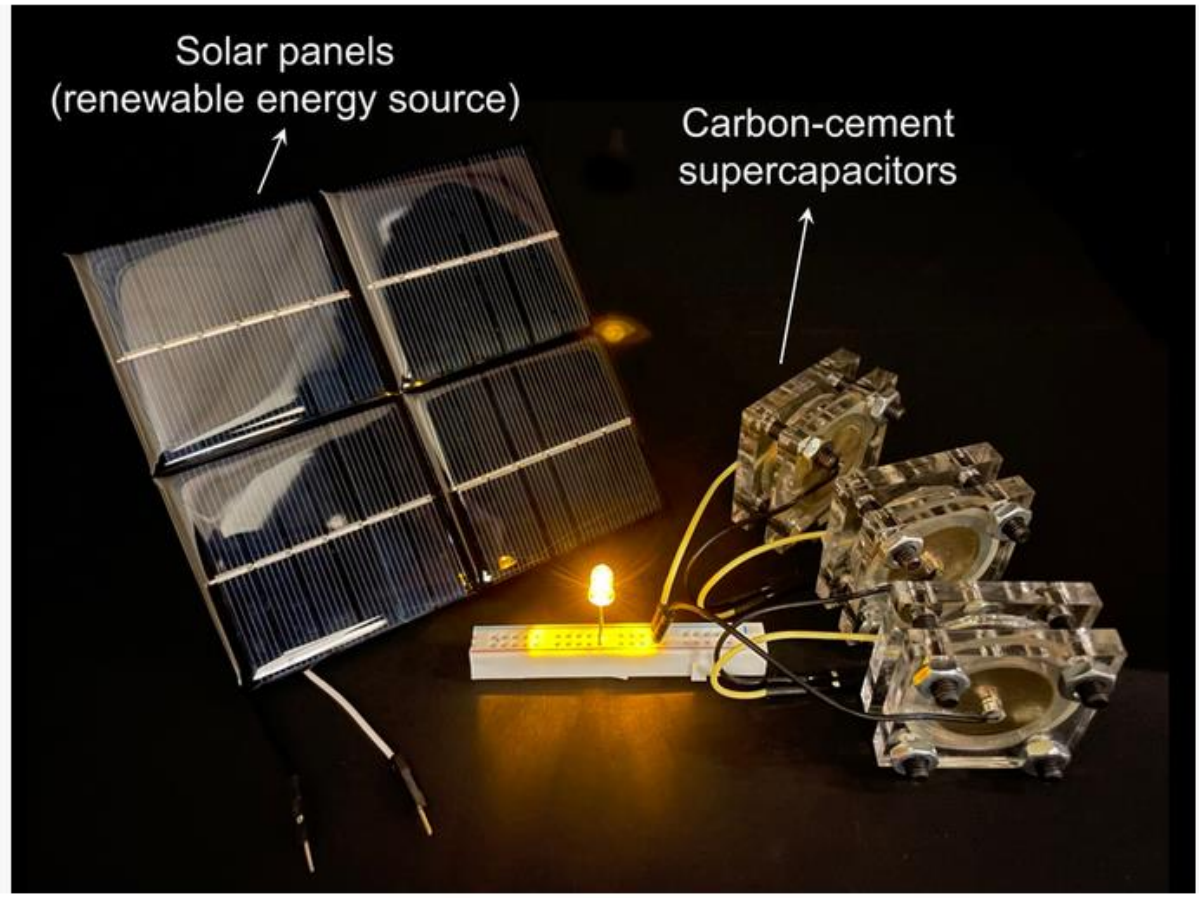
Made of cement, carbon black, and water, the device could provide cheap and scalable energy storage for renewable energy sources.

By: David L. Chandler | MIT News Publication Date: July 31, 2023



MIT engineers have created a “supercapacitor” made of ancient, abundant materials, that can store large amounts of energy. Made of just cement, water, and carbon black (which resembles powdered charcoal), the device could form the basis for inexpensive systems that store intermittently renewable energy, such as solar or wind energy.

Credits: Courtesy of the researchers



Since the new “supercapacitor” concrete would retain its strength, a house with a foundation made of this material could store a day’s worth of energy produced by solar panels or windmills, and allow it to be used whenever it’s needed.

Credits: Courtesy of the researchers

Two of humanity's most ubiquitous historical materials, cement and carbon black (which resembles very fine charcoal), may form the basis for a novel, low-cost energy storage system, according to a new study. The technology could facilitate the use of renewable energy sources such as solar, wind, and tidal power by allowing energy networks to remain stable despite fluctuations in renewable energy supply.

The two materials, the researchers found, can be combined with water to make a supercapacitor — an alternative to batteries — that could provide storage of electrical energy. As an example, the MIT researchers who developed the system say that their supercapacitor could eventually be incorporated into the concrete foundation of a house, where it could store a full day’s worth of energy while adding little (or no) to the

cost of the foundation and still providing the needed structural strength. The researchers also envision a concrete roadway that could provide contactless recharging for electric cars as they travel over that road.

The simple but innovative technology is described this week in the journal *PNAS*, in a paper by MIT professors Franz-Josef Ulm, Admir Masic, and Yang-Shao Horn, and four others at MIT and at the Wyss Institute for Biologically Inspired Engineering.

Capacitors are in principle very simple devices, consisting of two electrically conductive plates immersed in an electrolyte and separated by a membrane. When a voltage is applied across the capacitor, positively charged ions from the electrolyte accumulate on the negatively charged plate, while the positively charged plate accumulates negatively charged ions. Since the membrane in between the plates blocks charged ions from migrating across, this separation of charges creates an electric field between the plates, and the capacitor becomes charged. The two plates can maintain this pair of charges for a long time and then deliver them very quickly when needed. Supercapacitors are simply capacitors that can store exceptionally large charges.

The amount of power a capacitor can store depends on the total surface area of its conductive plates. The key to the new supercapacitors developed by this team comes from a method of producing a cement-based material with an extremely high internal surface area due to a dense, interconnected network of conductive material within its bulk volume. The researchers achieved this by introducing carbon black — which is highly conductive — into a concrete mixture along with cement powder and water, and letting it cure. The water naturally forms a branching network of openings within the structure as it reacts with cement, and the carbon migrates into these spaces to make wire-like structures within the hardened cement. These structures have a fractal-like structure, with larger branches sprouting smaller branches, and those sprouting even smaller branchlets, and so on, ending up with an extremely large surface area within the confines of a relatively small volume. The material is then soaked in a standard electrolyte material, such as potassium chloride, a kind of salt, which provides the charged particles that accumulate on the carbon structures. Two electrodes made of this material, separated by a thin space or an insulating layer, form a very powerful supercapacitor, the researchers found.

The two plates of the capacitor function just like the two poles of a rechargeable battery of equivalent voltage: When connected to a source of electricity, as with a battery, energy gets stored in the plates, and then when connected to a load, the electrical current flows back out to provide power.

“The material is fascinating,” Masic says, “because you have the most-used manmade material in the world, cement, that is combined with carbon black, that is a well-known historical material — the Dead Sea Scrolls were written with it. You have these at least two-millennia-old materials that when you combine them in a specific manner you come up with a conductive nanocomposite, and that’s when things get really interesting.”

As the mixture sets and cures, he says, “The water is systematically consumed through cement hydration reactions, and this hydration fundamentally affects nanoparticles of

carbon because they are hydrophobic (water repelling).” As the mixture evolves, “the carbon black is self-assembling into a connected conductive wire,” he says. The process is easily reproducible, with materials that are inexpensive and readily available anywhere in the world. And the amount of carbon needed is very small — as little as 3 percent by volume of the mix — to achieve a percolated carbon network, Masic says.

Supercapacitors made of this material have great potential to aid in the world’s transition to renewable energy, Ulm says. The principal sources of emissions-free energy, wind, solar, and tidal power, all produce their output at variable times that often do not correspond to the peaks in electricity usage, so ways of storing that power are essential. “There is a huge need for big energy storage,” he says, and existing batteries are too expensive and mostly rely on materials such as lithium, whose supply is limited, so cheaper alternatives are badly needed. “That’s where our technology is extremely promising, because cement is ubiquitous,” Ulm says.

The team calculated that a block of nanocarbon-black-doped concrete that is 45 cubic meters (or yards) in size — equivalent to a cube about 3.5 meters across — would have enough capacity to store about 10 kilowatt-hours of energy, which is considered the average daily electricity usage for a household. Since the concrete would retain its strength, a house with a foundation made of this material could store a day’s worth of energy produced by solar panels or windmills and allow it to be used whenever it’s needed. And, supercapacitors can be charged and discharged much more rapidly than batteries.

After a series of tests used to determine the most effective ratios of cement, carbon black, and water, the team demonstrated the process by making small supercapacitors, about the size of some button-cell batteries, about 1 centimeter across and 1 millimeter thick, that could each be charged to 1 volt, comparable to a 1-volt battery. They then connected three of these to demonstrate their ability to light up a 3-volt light-emitting diode (LED). Having proved the principle, they now plan to build a series of larger versions, starting with ones about the size of a typical 12-volt car battery, then working up to a 45-cubic-meter version to demonstrate its ability to store a house-worth of power.

There is a tradeoff between the storage capacity of the material and its structural strength, they found. By adding more carbon black, the resulting supercapacitor can store more energy, but the concrete is slightly weaker, and this could be useful for applications where the concrete is not playing a structural role or where the full strength-potential of concrete is not required. For applications such as a foundation, or structural elements of the base of a wind turbine, the “sweet spot” is around 10 percent carbon black in the mix, they found.

Another potential application for carbon-cement supercapacitors is for building concrete roadways that could store energy produced by solar panels alongside the road and then deliver that energy to electric vehicles traveling along the road using the same kind of technology used for wirelessly rechargeable phones. A related type of car-recharging system is already being developed by companies in Germany and the Netherlands, but using standard batteries for storage.

Initial uses of the technology might be for isolated homes or buildings or shelters far from grid power, which could be powered by solar panels attached to the cement supercapacitors, the researchers say.

Ulm says that the system is very scalable, as the energy-storage capacity is a direct function of the volume of the electrodes. “You can go from 1-millimeter-thick electrodes to 1-meter-thick electrodes, and by doing so basically you can scale the energy storage capacity from lighting an LED for a few seconds, to powering a whole house,” he says.

Depending on the properties desired for a given application, the system could be tuned by adjusting the mixture. For a vehicle-charging road, very fast charging and discharging rates would be needed, while for powering a home “you have the whole day to charge it up,” so slower-charging material could be used, Ulm says.

“So, it’s really a multifunctional material,” he adds. Besides its ability to store energy in the form of supercapacitors, the same kind of concrete mixture can be used as a heating system, by simply applying electricity to the carbon-laced concrete.

Ulm sees this as “a new way of looking toward the future of concrete as part of the energy transition.”

The research team also included postdocs Nicolas Chanut and Damian Stefaniuk at MIT’s Department of Civil and Environmental Engineering, James Weaver at the Wyss Institute, and Yunguang Zhu in MIT’s Department of Mechanical Engineering. The work was supported by the MIT Concrete Sustainability Hub, with sponsorship by the Concrete Advancement Foundation.

Tech Session in Sunnyvale, Saturday September 9, 2023 (includes free lunch).

Time: Saturday September 9th 2023 – 12 noon – 3PM

Topic: uSDX+ all mode compact transceiver – *Ed Fong WB6IQN and Ron Quan KI6AZB*

Place: 1163 Quince Ave. Sunnyvale, 408-245-8210

Menu - lasagna, salad, drinks, and chips. Ice cream for dessert.

Optional – bring a desert to share

Cost: FREE

Raffle Tickets: $5 each or 3 for $10

Grand Prize - uSDX+ All Mode HF portable transceiver or Lenovo i5 laptop or QB25 quad band 25 watt transceiver or Nano 1.5 GHz VNA.

Please RSVP to edison_fong@hotmail.com as to how many in your party are attending this event

Directions:

If you need precise directions from where you are coming from, go to www.googlemaps.com. They seem to give the best directions or give me (Ed Fong) a call on the phone.

Topic - Overview of the uSDX+ all mode HF transceiver

COVID-19 is finally over and we are bringing back the annual technical session at my house.

So, what is the newest fad in the world of ham radio? It is the uSDX+ all mode portable transceiver. This is a full software defined transceiver base on the Silabs synthesizer chip and the Atmel ATMEGA 328P FPGA. The entire radio including the 4000mAh Lion battery is only 1 lb 2 oz. The radio can operate all weekend on a single charge.

General coverage receiver – 3.5MHz- 30 MHz

Transmits on 80-10 meters including all WARC bands and even CB band

Built in CW decoder, keyer, all DSP filter from 4KHz to 50 Hz, DSP noise reduction

Output - 5 watts for CW - for SSB slightly under 10 watts.

What is interesting about this new gem is the Class E output amplifier. Class E is a switching amplifier, so although efficient, it cannot be directly used as a SSB output stage which historically requires a less efficient linear amplifier. So how do that achieve linear SSB amplification from a switching amplifier and achieve 80%+ efficiency? The key is in the 800 kHz sigma delta modulator. Come by and learn the new method of generating SSB is executed.

Raffle prizes – tickets are $5 each or 3 for $10. – below are the top 4 prize choices.

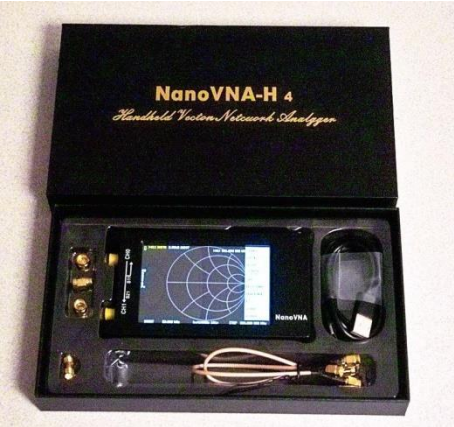
Winner gets choice of four prizes just in case they already own the uSDX+ transceiver

uSDX+ - QRP HF transceiver - Covers 80-10 meters – SSB, CW, digital QRP transceiver. 5 watts CW – 10 watt SSB. Built in CW decoder, full DSP noise reduction. Complete with 4000 mAh Li-ion battery, AC adapter/charger, Speaker/microphone

1st Prize Lenovo – Thinkpad X240 i5 processor with 8GB of memory and 256 GB SSD drive

Windows 10 operating system
CNET rates this laptop a 4.3/5
Up to 15 hours battery life.
PC benchmark 4,717 - very respectable.

Less than 3 pounds 0.8 inches thick
USB 3.0
12.5 inch screen - just perfect to carry around.
Intel HD4400 graphics processor
USB 3.0
Intel Cetrino Wifi.



Nano VNA - H4 - 4 inch 1.5 GHz VNA - Tuned antennas, duplexers, filters etc. Full touch screen. Latest version includes functions for TDR – time domain reflectometer.

Includes cables and full calibration kit.

3rd Prize Radioddity QB25 - Quad Band Mobile 25 watt transceiver.

This radio boast 200 memories, full software programmability, great bullet proof front end with 0.25 uV sensitivity, full FM broadcast radio, direct microphone key pad entry, absolutely the best color display out there and more.

If you have been looking to get on 220 MHz, this is the latest and greatest. You will be a proud owner of one of these radios.

Comes with programming cable and programming software.

Other Prizes UV5R Baofeng dual band handie talkie

UV5R Baofeng dual band handie talkie

VHF/UHF handie talkie 136-174 MHz 400-520 MHz
128 fully programmable channels
Li-ion 1800 mAh battery with smart charger
Built in LED flashlight
4 watts output
FM broadcast radio (65-108 MHz)

Choice of three for 2 nd prize

ATS-20 All Mode AM/FM/SSB/CW 100KHz-30 MHz - FM Stereo Receiver

DVM - digital multimeter