



President's Corner



The 2024 Hamvention is a wrap. It went very well, and we got to visit in person with many TAPR old timers as well as new members. We introduced the new ezDV digital voice adapter, and we sold out all 49 units we had available from the first run! The ezDV project leaders, Dan, N4XWE, and Mooneer, K6AQ, along with TAPR store manager George, K9TRV, are all working hard to get these back in stock as soon as possible (likely by the end of July). We have a new web page, ezDV.org, to make it easier to get more information on ezDV. It is under construction, so be patient! Meanwhile, you can get on the order list at tapr.org/product/ezdv.

At the Hamvention TAPR booth, we also showcased new SDR software from Phil, KA9Q. Check out ka9q-radio.org for lots of great information on this new open-source software that runs on off-the-shelf hardware. It performs an FFT on 10 MHz of spectrum using a mid-grade PC, allowing you, for example, to decode the contents of the entire 2M band at once!

In other news, we have had to cancel 2024 ARRL/TAPR DCC scheduled for this September in Knoxville, Tennessee. We hope to return next September to a location yet to be determined.

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Summer is in full swing here in the northern hemisphere. Do you have a pet project you are working on? Don't keep it a secret! Take a break from the BBQ and warm up those soldering irons for a summer project! Then tell us about it in an article and submit it to PSR! Our editor, Stana, is always looking for new and interesting material.

73,

Scotty WA2DFI

###

Call for Nominations

Three Director positions on the TAPR Board of Directors are now open for nomination and nominations may be submitted now.

TAPR Board members serve three-year terms and their responsibilities include:

- 1) Attendance at both in-person board meetings each year. [One is held at the Hamvention in May, the other at the Digital Communications Conference (DCC) in September.]
- 2) Regular participation in the continuous board session, which is conducted over the Internet.
- 3) Active engagement in TAPR's management.

To place a person in nomination, please remember that he or she must be a member of TAPR. Also, confirm that the individual is willing to have his or her name placed in nomination. By September 21, 2024, send that person's name (or your own if you wish to nominate yourself), call sign, mailing address, e-mail address, phone number(s), and a biographical sketch (250 words maximum) via contact@tapr.org or via snail mail to TAPR, 1 Glen Ave., Wolcott, CT 06716-1442.

An online election will be held from October 6, 2024 to October 19, 2024.

###

TAPR Forum on YouTube

The 2024 TAPR Forum at Dayton Hamvention may be viewed on YouTube <<https://www.youtube.com/watch?v=gQ9tJjeTkfk>>.

The following presentations are available for viewing:

- Time Nuts Product Update by John Ackermann, N8UR
- Digital Voice Using ezDV by Mooneer Salem, K6AQ
- Low-cost Magnetometer System by Hyomin Kim, KD3MCR

Note that the TAPR Forum begins at approximately the 25:30 minute mark of the video.



TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.

TAPR Wear Available



###

Personalized Land's End clothing with the TAPR logo and your name and call sign are now available from the TAPR Store at

<http://business.landsend.com/store/tapr/>

Select from the Men's or Women's catalog. (To make shopping easier, there are "TAPR Recommended Shirts" in the Men's catalog including two styles of polo shirts, each available with or without pockets.)

The logo is available in three colors -- red, blue and white. The name/call sign monogram thread will match the logo color. (We recommend that you use the white logo with dark colored shirts.)

Prices are very reasonable and processing time is 5-7 days.

###

New Product

ezDV

ezDV is a handheld hardware device that allows easy use of FreeDV, whether on the go or at home. Powered by an ESP32-S3 microcontroller, its built-in Wi-Fi support allows completely wireless setup (with supported radios) along with enabling more modern functionality such as FreeDV Reporter reporting and wireless firmware updates.

For those radios without network capability, interfacing them with ezDV is straightforward through the use of the industry standard 3.5mm TRRS audio jack. This jack is configured similarly to what is used with wired headsets for mobile phones. Analog audio is also passed in and out from/to your wired headset using a second 3.5mm audio jack.

- Battery powered for potentially all-day operation
- USB-C charging (no need to build your own power cable or find a properly sized/wired barrel plug)
- Wi-Fi connectivity for device configuration and interfacing with radios
- Wireless CAT control and audio I/O currently supported for the Flex 6000 series and Icom IC-705 radios
- Transmit and receive of FreeDV 700D, 700E and 1600 modes (along with analog audio passthrough)



- Wired headset support for the best speaker and microphone that you can take with you
- Open source firmware—new features are a pull request away

For Additional Information:

Presentation at the 2023 TAPR mini-DCC (with slide deck):
<https://www.youtube.com/watch?v=31KjMKXDR0k&t=11720s>

ezDV user's manual: <https://tmiw.github.io/ezDV/>

ezDV GitHub (firmware/schematics):
<https://github.com/tmiw/ezDV>

Free DV support including ezDV:
<https://groups.google.com/g/digitalvoice>

FreeDV Reporter: <https://qso.freedv.org/> (requires call sign and grid square)

FlexRadioSmartSDR reflector:
<https://groups.io/g/FlexRadioSmartSDR>

###

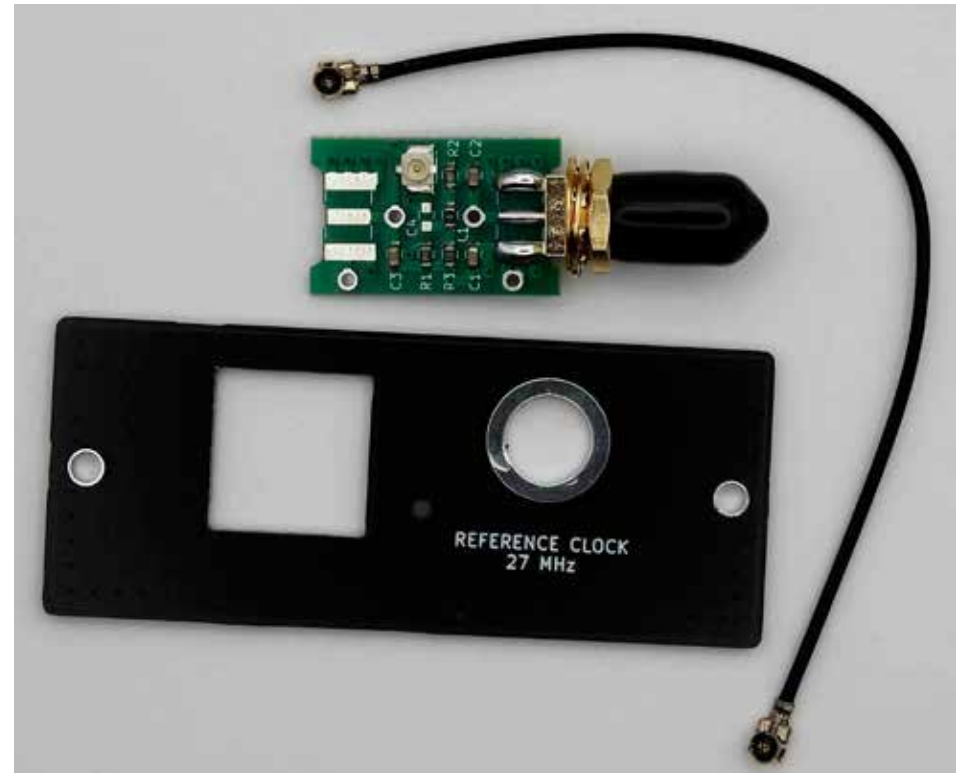
New Product

RX888 Clock Kit & Thermal Pad

The RX-888 is a high-performance SDR, and has proven very useful in applications that can make use of the full HF-band and beyond coverage. Many of these applications will benefit from a sampling clock having higher-accuracy than is provided by the RX-888 internal oscillator. Fortunately, this SDR includes a small connector on the circuit board that can be connected to an external 27 MHz reference clock.

This connector, however, is tied more or less directly to the input of the RX-888s clock generator chip, and so is a very high impedance port. There are clamp diodes on this connection which will cause asymmetrical clipping if the input clock is not AC-coupled. The clamps and unterminated cable can cause distortion and ringing on the clock signal, which will cause improper operation of the RX-888 clock generator.

The Turn Island Systems RX-888 Clock Kit, designed by Paul Elliott, WB6CXC, includes an interface board that provides the appropriate termination, attenuation, and isolation for an external reference clock, as generated by a Bodnar or similar GPSDO. The kit also includes a replacement back-panel and a 10 cm jumper cable. Please note that once this modification has been completed the RX-888 will not operate without the external clock. This modification can be easily reversed, restoring normal operation. The RX-888 can get pretty hot. To reduce any thermal problems, two changes are suggested:



- Reduce the sampling rate. This is a matter of software and is not covered in this document.
- Add a large thermal pad to the bottom of the board. This makes good contact to the chassis and heat sink.

Thermal Pad Installation

The RX-888 Clock Adaptor Kit includes a thermal pad assembly, which allows for a much improved transfer of heat from the RX-888 circuit board to the external heat sinks. The materials used are:

Both sides of the thermal pad have adhesive, and the copper foil allows the pad to slide into the RX-888 enclosure while providing good thermal conductivity. In the kit, the foil tape and pad are separate.

KA7OEI has a blog post on this topic. He suggests a 45mm by 65mm piece of the Laird thermal pad material.

<http://ka7oei.blogspot.com/2024/03/using-external-clock-with-rx-888-mk2.html>

<http://ka7oei.blogspot.com/2023/08/improving-thermal-management-of-rx-888.html>

The manual is available online at Turn Island Systems:

RX888 Clock Kit Manual:

<https://turnislandsystems.com/wp-content/uploads/2024/05/RX888-Kit-2.pdf>

###

Wanted: New Treasurer

TAPR is looking for a new Treasurer. After nearly 21 years, it is time for Tom, N8ZM, to turn the job over to someone younger and better looking.

Duties include paying the bills (of course), keeping the books up-to-date, working with our accountant to get the tax return filed (as a 501c(3), it's merely an exercise in wasteful government paperwork) and advising the Board on financial matters.

The Treasurer is elected by the Board annually. He/she has to be a TAPR member, but does not have to be a TAPR Board member.

Training and backup support will be provided while learning the job. Figure on maybe two hours/week on average. We prefer volunteers to draftees. If interested, Contact N8ZM at n8zm@tapr.org for an interview and Q&A about the position.

###

New Product

HF Receiver Isolation Transformer

It's hard to keep noise out of HF radio receivers, particularly broadband SDRs used with wide-frequency antenna systems. One of the most frequent problems is common-mode coupling, which means that unwanted signals are present on the outer shield of the antenna cable and get into the receiver that way. Common-mode coupling is often the way noise from computers or switching power supplies gets into the radio.

A way to reduce this interference mechanism is to isolate the antenna shield from the radio chassis. And one of the best ways to do that is to use an isolation transformer — a 1:1 transformer with its primary terminals connected to the antenna center conductor and shield, and its secondary terminals connected to the radio antenna input and ground. The isolation between the two windings blocks the common mode current and keeps it out of the radio.

The TAPR Receiver Isolation Transformer is a small PCB with SMA connectors (male on one end, female on the other) and a MiniCircuits T1-1 transformer. It does a good job removing common mode interference from the antenna system. TAPR provides the circuit board with connectors installed and the through-hole transformer which is user-installed (six solder connections). A piece of clear heat shrink tubing acts as an enclosure.

Note that you can buy similar looking transformer boards



from eBay and other Chinese sources. The ones we've seen use a different, less expensive, type of transformer that is not as effective at blocking common mode noise. The T1-1's design ensures minimum capacitance between the windings, maximizing common mode rejection.

The T1-1 transformer has less than 1 dB loss from 1 MHz to well over 100 MHz. It has less than 3 dB loss down to about 100 kHz.

NOTE: This product is for use with receivers only. It is not intended to handle any level of transmitted signal.

###

M17 Launches Open-Source Innovations in Hardware, Software and UHF/VHF Digital Voice Protocols

Funded by a grant from Amateur Radio Digital Communications (ARDC), M17 is excited to announce enhancements to their current hardware solutions for amateur radio operators as well as a new hardware offering:

- Module17 – an M17 modem that converts a 9600 baud capable radio into an M17 transceiver;
- OpenHT – a cutting-edge QRP dual-band handheld transceiver (HT) that utilizes SDR technology; and
- [NEW] Remote Radio Unit (RRU) – a comprehensive, UHF FM/M17 ‘repeater in a box’, optimally designed for close antenna placement, enhancing signal strength and reliability.

Module17 is undergoing significant enhancements, evolving from revision 0.1e to 1.0. Improvements to Module17 will focus on design and ergonomics, featuring an extruded aluminum case for aesthetic appeal. The anticipated release of revision 1.0 is forthcoming. In the interim, a preview revision 0.99 is available, which addresses previous non-critical hardware bugs.

OpenHT is one of the pioneering open-source SDR HTs available, potentially the first of its kind. Its prototype, released last year, supports 70cm and 13cm bands, offering versatile transmission capabilities such as FM (including M17), AM, SSB, BPSK/QPSK, and higher order modulations, such as 16QAM.

M17’s ongoing development efforts include VHSIC Hardware Description

Language (VHDL) code for the programmable logic components of the radio, further enhancing its functionality.

Work is also underway for the development of a RRU transceiver, aiming to provide a comprehensive FM/M17 repeater for remote sites or masts. The RRU includes features such as an N connector for direct antenna connection, eliminating the need for a long coax, and a multimode optical fiber duplex pair, allowing for improved RF performance. The RRU supports SDR IQ transceivers, allowing for additional modes, and can also output RF power exceeding 50W (CW). The current working prototype, revision B, facilitates linking to M17 reflectors and integrates Raspberry Pi interface software for M17 reflector linking.

All of the aforementioned hardware is developed entirely from open-source designs, adhering to TAPR, CC BY-NC-SA 4.0 and/or GNU GPLv2/v3 licenses, exemplifying M17’s commitment to innovation and community collaboration.

“I believe the work done by our Project’s team and contributors will free the amateur radio community from the use of proprietary digital voice modes, also allowing for easier data

transfer,” says M17 Founder and Lead Developer Wojciech Kaczmarek (SP5WWP). “We have achieved a lot already, yet still there’s plenty of work ahead of us. I encourage everyone to join the effort, as the Project won’t succeed without community’s help.”

To learn more about M17, visit <https://m17project.org/>.

About M17 Project

The M17 Project is an open-source initiative that offers a new digital communication protocol tailored specifically for amateur radio enthusiasts. Unique to this project is its commitment to transparency and community involvement, allowing users, developers, and hobbyists to engage with each other and enhance the protocol. The M17 Project provides cutting-edge features, such as digital voice and data communication, as well as robust encryption options to ensure secure transmissions. Most importantly, it is compatible with existing amateur radio hardware, facilitating an easy adoption process for users. For more information about the M17 Project, please visit <https://m17project.org/>.

About Amateur Radio Digital Communications (ARDC)

Amateur Radio Digital Communications (ARDC) is a California-based foundation with roots in amateur radio and the technology of internet communication. The organization got its start by managing the AMPRN address space, which is reserved for licensed amateur radio operators worldwide. Additionally, ARDC makes grants to projects and organizations that follow amateur radio’s practice and tradition of technical experimentation in both amateur radio and digital communication science. Such experimentation has led to advances that benefit the general public, including the mobile phone and wireless internet technology. ARDC envisions a world where all such technology is available through open source hardware and software, and where anyone has the ability to innovate upon it.

To learn more about ARDC, please visit <https://www.ardc.net/>.

###

VE4KLM Report

By Maiko Langelaar, VE4KLM

April 25, 2024 - 6W7RV 10 meters - Southern Chile to Winnipeg

Talk about luck, conditions, unbelievable - certainly a good catch.

* Thank you to WA4ZKO (Jeff) for keeping the community in the loop, otherwise this would have been missed

Using my spare 1/4 wave sloper (cut for 30 meters) with counterpoise, aimed south. Feeding a DX-394 Radio Shack receiver. Dial frequency was 28.148 MHz, upper sideband, with audio feeding the SCS PTC-IIusb, configured for Robust Packet 300, interfaced (kiss mode) to a JNOS instance I was running. It was not setup to gate to the APRS internet system, but no matter, the packet trace below says it all. One lone packet, never heard from them again. I wrote a simple C program weeks later to decode the compressed latitude and longitude, which was then passed to www.openstreetmap.org to provide the map.

```

/* uncomposit.c - 08May2024, Maiko (VE4KLM) */
#include <stdio.h>

int main ()
{
    char y[4] = { 0x62, 0x79, 0x22, 0x3e };
    char x[4] = { 0x3c, 0x22, 0x32, 0x3f };

    float la, lo;

    // formula taken from APRS Protocol Reference Version 1.0
    la = 90 - ((y[0]-33)*753571 + (y[1]-33)*8281
              + (y[2]-33)*91 + y[3]-33) / 380926.0;

    lo = (-180) + ((x[0]-33)*753571 + (x[1]-33)*8281
                 + (x[2]-33)*91 + x[3]-33) / 190463.0;

    printf ("%E,%E\n", la, lo);

    return 0;
}

make uncomposit
./uncomposit
-40.500317,-73.122154


Then use a browser to visit the link below for the map
https://www.openstreetmap.org/?mlat=-40.500317&mlon=-73.122154

```

```

Thu Apr 25 13:06:28 2024 - saptc recv:
KISS: Port 0 Data
AX25: 6W7RV-10->APTSCS v RPN1-1 UI pid=Text
0000 00 82 a0 a8 a6 86 a6 e0 6c ae 6e a4 ac 40 74 a4 .. (.s.w`l.n0,0t0
0010 a0 9c 62 40 40 63 03 f0 2f 31 38 30 32 33 30 68 ..b@0c.p/180230h
0020 2f 62 79 22 3e 3c 22 32 3f 52 3f 6d 57 4f 6e 20 /by*<*22R7mW0n
0030 74 68 65 20 72 6f 61 64 20 61 67 61 69 6e 2e 20 the road again.
0040 37 33 73

```

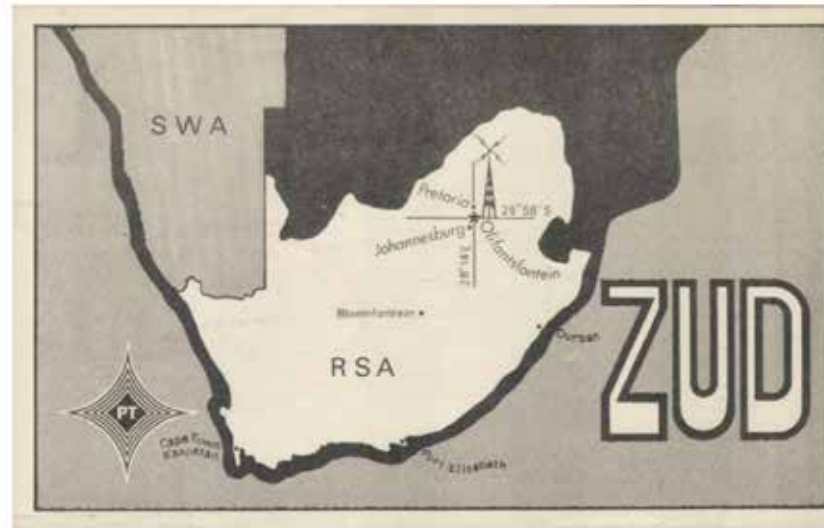


* map is courtesy of openstreetmap.org

April 17 to May 9 - Research Vessel Polarstern back again on 30 meters

It's always nice to see the ship return every year, and being able to track it's journey. It was on it's way back from Antarctica. According to their website, the Research Vessel and Icebreaker Polarstern is the most important tool of the German polar research, and the flagship of the Alfred Wegener institute. A ship unlike any other. The first APRS packet I received was in mid April, showing it to be off the coast of South Africa. It was direct, no digipeaters used, and I was receiving a minimum one packet each day from April 17 to May 9 included. Some days I got lots of position reports. Many stations heard the ship. To me, this is remarkable, showing a very practical side of HF radio, a backup perhaps over satellite systems. This was also a great catch, since the last time I heard anything else from that part of the world was in 1983, when I picked up the time utility station ZUD, during my teenage years, when short wave listening kept me out of trouble. The map is courtesy of openstreetmap.org, and the QSL card arrived in my mailbox long long ago.

###



Write Here!

Your *PSR* editor is working on the next issue of *PSR* and hopes to find a few good writers, particularly ham radio operators working on the digital side of our hobby, who would like to write about their activities and have them published here in *PSR*.



You don't have to be Hiram Percy Maxim to contribute to *PSR* and you don't have to use *Microsoft Word* to compose your thoughts.

Your *PSR* editor can handle just about any text and graphic format, so don't be afraid to submit whatever you have to wallou@tapr.org – she can handle it!

The deadline for the next issue of *PSR* is October 15, so write early and write often.

###

On the Net

By Mark Thompson, WB9QZB

Facebook

As you may know, TAPR has a Facebook page, www.facebook.com/TAPRDigitalHam.

However, I also created a TAPR Facebook Group, www.facebook.com/groups/TAPRDigital/.

If you have a Facebook account, “Like” the TAPR Facebook page and join the TAPR Facebook Group.

If you join the group click on the Events link and indicate you're Going to the events.



On Twitter, Too

Access the TAPR Twitter account at www.twitter.com/taprdigital.



Also on YouTube

TAPR now has its own channel on YouTube: the TAPR Digital Videos Channel: www.youtube.com/user/TAPRDigitalVideo.



At this time, there are a slew of videos on our channel including many from the TAPR-ARRL Digital Communications Conference (DCC) that you may view at no cost, so have at it!

###

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Submission Guidelines

TAPR is always interested in receiving information and articles for publication. If you have an idea for an article you would like to see, or you or someone you know is doing something that would interest TAPR, please contact the editor (wallou@tapr.org) so that your work can be shared with the Amateur Radio community. If you feel uncomfortable or otherwise unable to write an article yourself, please contact the editor for assistance. Preferred format for articles is plain ASCII text (OpenOffice or *Microsoft Word* is acceptable). Preferred graphic formats are PS/EPS/TIFF (diagrams, black and white photographs), or TIFF/JPEG/GIF (color photographs). Please submit graphics at a minimum of 300 DPI.

Production / Distribution

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PSR Advertising Rates

Full Page Ad for 1 issue: \$100, 4 issues: \$350

Half Page Ad for 1 issue: \$75, 4 issues: \$250

Quarter Page Ad for 1 issue: \$50, 4 issues: \$175



Membership Application

TAPR

1 Glen Ave., Wolcott, CT 06716-1442

Phone +1 972 413 8277, Monday–Friday, 9AM–5PM Eastern Time

E-mail contact@tapr.org URL www.tapr.org

Join or renew online at <https://tapr.org/product/tapr-membership>

Benefits of a TAPR Membership:

- Subscription to the quarterly PSR
- 10% off most TAPR kits and publications
- Access to the TAPR digital library
- Latest information on TAPR R&D projects
- Co-sponsor of the annual TAPR-ARRL Digital Communications Conference (DCC)

Name _____ Call Sign _____

Address _____

City _____ State/Province _____ Postal Code _____

Country _____ Daytime Phone No. _____

E-mail Address _____

New Renewal \$30 X _____ number of years = \$ _____ total

Payment Method: Check Credit Card Money Order Cash Don't send cash through the mail !

STOP! Provide the following information only if paying by mail with a credit card:

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TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.