



President's Corner

By Steve Bible, N7HPR



BIG Changes

The TAPR website will have a new look!

Led by John Ackermann, N8UR, the website rebuilding team (George Byrkit, K9TRV, Stana Horzepa, WA1LOU, and Bruce Raymond, ND8I) are completely revamping the website and it should be up and running around the first of the year. The website's URL remains the same (www.tapr.org).

Meanwhile, the TAPR office has moved to multiple locations to better serve the membership. As a result, TAPR's phone number and mailing address have changed to 972-413-8277 and 1 Glen Ave., Wolcott, CT 06716-1442, respectively.

2020 DCC News

The 2020 ARRL-TAPR Digital Communications Conference (DCC) takes place September 11-13, 2020 in Charlotte, North Carolina. The host hotel is remodeling and changing brands (from Marriott to Hilton), so registering for DCC accommodations is in a state of flux. Therefore, we recommend checking online (www.tapr.org/dcc) or landline (972-413-8277) to find out the best way to register during this transition. (Note that this only effects hotel registrations and has no effect for registering for the DCC itself.)

73,

Steve Bible, N7HPR, President TAPR

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TAPR Elections

Dave Larsen, KV0S, was nominated from the floor during the all-hands membership meeting at the 2019 Digital Communications Conference DCC). In the subsequent on-line election conducted in October, the candidates for director received the following votes:

John Ackermann, N8UR: 105

Bruce Raymond, ND8I: 80

Dave Larsen, KV0S: 76

Mark Thompson, WB9QZB: 61

As a result, N8UR, ND8I and KV0S will serve as board members for the next three years.

At the board meeting conducted on the eve of the DCC, the following officers were elected:

Steve Bible, N7HPR, President

Scotty Cowling, WA2DFI, Vice President

Tom Holmes, N8ZM, Treasurer

Stana Horzepa, WA1LOU, Secretary

Congratulations to the newly elected directors and officers. And thanks to Mark Thompson, WB9QZB, for his dedicated work during his six-year tenure as a director.

###

Misko and APRS in Reunion

By Miroslav 'Misko' Skoric, YT7MPB

The 7th edition of 2019 IEEE Radio and Antenna Days of the Indian Ocean (IEEE RADIO 2019), the international conference was held in Reunion Island September 23-26, 2019. I had a tutorial on amateur radio communications there, and this time I wanted to include even more practical demo and display than before. In that direction, I obtained a temporary French license for transmitting amateur radio signals and two special call-signs: TO0MPB and TO019IEEE. (TO0MPB was chosen to have a similar suffix as my original call-sign YT7MPB to permit easier communication, while TO019IEEE was chosen to celebrate that IEEE event in 2019.)

As usual, I wanted to announce my presence by using local APRS networks. Therefore my equipment included two groups of transmitting/receiving facilities. The first included a computer showing an APRS map, while the second simulated 'tracking' a ham radio vehicle. Having in mind geographical configuration of surrounding terrain (nearby hills and so on), as well as the distance to the other islands in the area, it was not expected that signals sent by my portable VHF/UHF radios would reach many recipients, if any. The HF setup included a radio and antenna, provided by local hams.

The conference performed well, especially the first day when my tutorial session was followed by another ham radio session where local authors from Reunion Island and Mauritius talked about their actualities in that part of Indian Ocean. It was concluded that radio amateurs should take an important role in emergency situations, such as observing weather forecasts when hurricanes approach eastern coastal regions of Africa and nearby islands surrounding Madagascar.

My next conference travel shall happen in December 2019 for a large engineering event in Goa, India, and after that, visiting universities and amateur radio groups in that country.

TAPR and PSR would be welcomed there too!

###

Deaths in the Family

TAPR lost three “family” members during the last quarter of 2019.

Barbara Holmes, N8EYW, the spouse of TAPR treasurer, Tom Holmes, N8ZM, passed away after a brief illness on November 19. Barb was the hostess of the hams who attended the annual Hamvention Saturday night cookout at the home of Barb and Tom in Tipp City. “Hostess with the mostest” was an understatement and she will be dearly missed by all.



Brian Kantor, WB6CYT, passed away suddenly on November 21 at his home in San Diego. In the 1980s, Brian and Phil Karn, KA9Q, founded AMPRnet, the TCP/IP over amateur radio network. He continued to manage it until his passing. Brian also created and served as chair and CEO of Amateur Radio Digital Communications (ARDC), a charitable foundation funded by the sale of unused AMPRnet IPv4 addresses. ARDC promotes STEM education and amateur radio digital development through scholarships and by funding the development of open source hardware and software. Brian will be sorely missed and impossible to replace.



Paul Rinaldo, W4RI, of Burke, Virginia, died on November 29 after a period of failing health. First licensed in 1949, Paul’s focus was always in the arena of technical experimentation. He was a cofounder and served as president of the Amateur Radio Research and Development Corporation (AMRAD). In 1983,



Paul succeeded Doug DeMaw, W1FB, as ARRL Technical Department Manager and Senior Technical Editor. His efforts led to his appointment as Publications Manager and, 5 years later, as Manager of Technical Development with responsibility for preparing for the 1992 World Administrative Radio Conference. This led to Paul’s supporting role in the International Amateur Radio Union (IARU), and he attended IARU Administrative Council (AC) meetings from 1996 to 2008, serving on several occasions as recording secretary. In 1992, he established ARRL’s Technical Relations Office in the Washington, DC, area, which expanded as preparations for World Radiocommunication Conferences became an ongoing need. In 2004, the ARRL Board of Directors elected Paul as ARRL’s first Chief Technology Officer, a post he held until his retirement in 2008. A ham radio titan especially on the digital side of the hobby, Paul will be missed.

###



Introducing the TAPR TangerineSDR

By Scotty Cowling, WA2DFI

TangerineSDR's roots extend back to the 2018 ARRL/TAPR DCC in Albuquerque, NM. At that conference, the HamSCI [1] community asked for TAPR's help in developing a Software Defined Radio that they could use to collect ionospheric and other data. This radio, dubbed the Personal Space Weather Station (PSWS), needed particular capabilities, such as very accurate time-stamping of RF samples, ability to measure small fluctuations in the earth's magnetic field and most of all, capability to share data over a large network of receivers.

Our first thought was to simply find the commercial SDR (out of literally dozens) that best fit the scientists' requirements and then add to or modify the SDR hardware to obtain the required functionality. Oh, and did I mention that we have a cost goal of under \$500? While the technical goals seemed achievable, the cost goal would become the hardest one to meet.

After much research by John Ackermann, N8UR, it became obvious that we were not going to find an off-the-shelf SDR with the capabilities that we need at a price within our budget, especially taking into account we were going to have to add hardware to implement our new functions. These functions included a sensitive magnetometer, a GPS Disciplined Oscillator (GPSDO), networking and authentication, 24 hours of local data storage and amplitude self-calibration circuitry, all on top of a dual-channel, 0-60MHz direct sampling (DDC) receiver with 14-bit ADCs.

I felt that we had one more requirement to meet. A project of this magnitude requires a lot of volunteer hours and a lot of TAPR resources to complete. Can we design the TangerineSDR in such a way that it could be used for tasks other than just PSWS? That way we would attract a larger user base and be able to build more boards, thereby making the

hardware cheaper. A larger user base might also attract more software developers, who will create more applications for these users.

One of the ways we do this is through modularity. The concept of modularity is used heavily in the TangerineSDR by mounting the Magnetometer, Clock, RF and I/O expansion circuitry onto pluggable modules.

Basic Requirements

The PSWS is the initial use case, but there are others. Many of the basic features will be useful to other users and some will not. Here are the basic PSWS system requirements:

- Dual-channel, synchronous 14-bit direct sampling DDC receiver to 60MHz
- Eight 192kHz virtual receiver data streams
- Selectable attenuation and optional pluggable RF filtering to reduce overload
- Switchable on-board noise source for amplitude calibration
- Very accurate time stamping, to within 100ns
- Frequency accuracy, less than 30 ppb frequency error
- Gigabit Ethernet interface
- Networked receivers capable of secure communications with a global server
- Able to continuously store 24 hours of sample data history in a ring buffer
- 3-axis magnetometer with ~10nT resolution at 1 sample/second

While we don't have space to go into detail on how we will meet all of the requirements, we can show how we will achieve some of the more important ones.

Magnetometer PMOD Board

A laboratory-grade magnetometer with enough sensitivity to be useful is very expensive and this PSWS requirement cannot be met with inexpensive cell-phone grade components. Our solution will be to "roll our own" in order to obtain a cost/performance ratio somewhere in between these two extremes.

Dave Witten, KD0EAG, has a working prototype of a remote sensor that can be mounted up to 100 feet away from the TangerineSDR hardware; for example, in your back yard away from house wiring and other antennas. The magnetometer has a resolution of 13nT and interfaces to the TangerineSDR via a standard PMOD port using a serial I2C interface.

Clock Module

While the PSWS requires the time-stamping accuracy of a GPS Disciplined Oscillator (GPSDO), most users will not need this option. A GPSDO is expensive, so we put it on an optional pluggable module. The clock (along with the RF Modules, below) is the most performance-defining piece of the TangerineSDR design and it will have a significant cost impact in its higher-performance versions. The least performant (and least expensive) TangerineSDR will have no Clock Module. A local clock oscillator will be installed on the Data Engine (DE) board. This part will be selected as a reasonable tradeoff between performance and cost.

The first TangerineSDR use case is a very demanding one: the PSWS. The PSWS requires very accurate frequency stability as well as a very accurate data arrival time stamp, down to 100ns (or at least as close as we can afford to get to that accuracy). Since this will require a GPS to stabilize or discipline the oscillator (hence the name GPS Disciplined Oscillator), this Clock Module will be expensive. For others who do not need the performance (and expense) of the GPSDO Clock Module, we will design an intermediate-performance Clock Module that will focus more on low phase-noise rather than highly accurate time stamping. John, N8UR and Rick Hambly, W2GPS, are working on the GPSDO Clock Module.

RF Module

The first (of many to follow) RF Module will be a dual-channel, 0-60MHz direct sampling (DDC) receiver with 14-bit ADCs and amplitude calibration. There will be two 14-bit data paths from the ADCs to the RFM connector. Each channel has an on-board noise source that can be switched onto the receive path for amplitude calibration. Each channel also has an optional in-line filter that can be used for additional shaping of the front-end response. These are typically used for high-pass or notch filters to prevent ADC overload. A passive step attenuator is used in order to keep as few active components as possible ahead of the ADC. The clock for the ADCs can come from either the clock oscillator installed on the DE or from the Clock Module, if one is present. Tom McDermott, N5EG, is working on the first to be released RF Module.

I/O Expansion (LEAF) Module

The TangerineSDR I/O expansion module is called a LEAF for Low-speed Expansion Adapter Fixture. The DE is designed to accommodate the higher-performance LEAF module as well as a Raspberry Pi Hat (Hardware Attached on Top), Arduino shield and a Beagle Bone Cape (due to its cape-like shape).

What distinguishes the LEAF Module from the Hat/Shield/Cape boards is the addition of a high-speed M.2 connector on the DE on the edge opposite the RPi low-speed expansion connector. This allows the LEAF to interface to higher speed devices, such as the Xilinx Ultra96 Board [2], which has a high-speed I/O expansion port. Many LEAF boards are planned, including ones that have Arduino Shield connectors, Cape connectors, a Click [3] interface, and others.

Networking and Authentication

The TangerineSDR diagram is shown in Figure 1. Notice that the SBC is paired with the SDR hardware [the Data Engine (DE) and its associated boards]. This gives us all the networking and authenticating software that is included in the Linux operating system running on the SBC. It also allows us to easily create software applications to customize the capabilities of the TangerineSDR.

Data Throughput

A common problem with many current SDRs is the lack of consistent high-speed data paths from RF to the computer. There are three wide, high-speed buses (two 17-bit inputs and one 14-bit output) between each RF Module and the FPGA. These buses can be differential (LVDS) or single-ended (LVCMOS), individually programmable in the FPGA.

The two input buses are used for digitized receive data from Analog-to-Digital Converters (ADCs) and the output port is used to send transmit data to a Digital-to-Analog Converter (DAC). Each of these three buses is capable of sustained transfer rates of over 500MByte/s. Only the most expensive SDR models provide these kinds of data rates between the antenna and the FPGA.

A high-bandwidth path from the ADC to the FPGA (which we have) does little good if the data path from the FPGA to the PC is restricted in bandwidth. For example, the 100Mbit/s data rate of Fast Ethernet can accommodate a 16-bit I/Q data stream of $100\text{M bit/s} / 32 \text{ bit/sample} = 3.125\text{Msps}$. This is before we account for the channel overhead of about 6%, leaving us with just under 3Msps. GbE will boost this to about 30Msps, but if we increase the sample width from 16 bits to 24 bits, our I/Q sample becomes 6 bytes (48 bits). Doing the math ($1\text{G bit/s} / 48 \text{ bit/sample} * 0.94 \text{ efficiency}$) = 19.5Msps.

At HF frequencies and narrowband modes, either 30Msps or 20Msps of simultaneous bandwidth is adequate, but at VHF, UHF and above, it may not be. The TangerineSDR implements a three-port GbE switch (FPGA-RJ45-RJ45) that allows the reasonably high-speed data communications discussed above. TangerineSDR also implements one USB 3.0 SuperSpeed port. This port is one full-duplex lane at 5Gbit/s or roughly 5 times the speed of GbE. The SBC is unlikely to be able to keep up at this breakneck speed, but higher-powered computers can.

Typical SDRs provide only one communications interface usually at a lower throughput than on the RF side. This limits the simultaneous bandwidth and/or the number of output streams. TangerineSDR provides both GbE and SS USB 3.0 at 5Gbit/s communications interfaces. Future

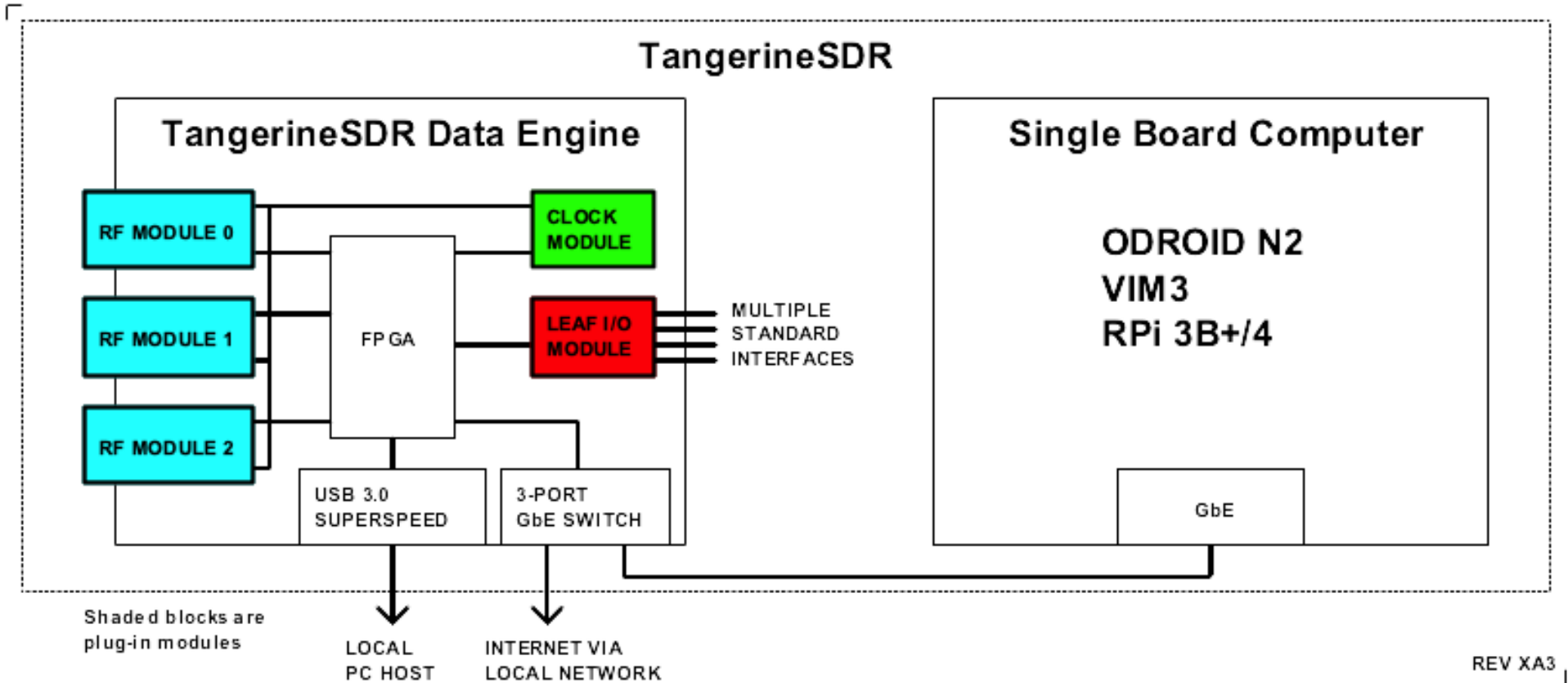


Figure 1. TangerineSDR System Block Diagram

DE implementations have an upgrade path to 10Gigabit Ethernet (10GE) or 40Gigabit Ethernet (40GE) or future higher-speed versions of USB. TangerineSDR can't eliminate the data rate restrictions of the interfaces, but we can at least minimize them by implementing multiple high-speed communications channels to the outside world.

Reducing the Output Data Rate

What is the FPGA going to do with all this data? We can reduce the data rate using a mathematical process known as decimation. By performing decimation on a stream of data, we reduce the data rate. At the same time, we reduce the information content of the stream. It may seem obvious that (for example) a 122.88Msps data stream contains more data than a 192Ksps data stream, but how we derive the lower-rate stream from the higher-rate stream is not so obvious.

We will leave that discussion for later; let it suffice to say that we will need these slower data rates. Even with GbE, we will require some reduction of the input data rate. And here is a thought to ponder: it is not likely that our SBC will be able to keep up with the demodulation and filtering (DSP tasks traditionally performed by the PC in an SDR system) at full Gigabit Ethernet speeds. The characteristics of Ethernet networking will allow the FPGA to split the high-speed input stream into many smaller (decimated) output streams that can be directed at multiple SBCs (or more powerful PCs). The higher the communications speed, the more streams we can accommodate. Remember, there are two very high-speed input streams from each RF Module.

Modularity

A mechanical mock-up was made (see Figure 2) from copper-clad

PCB stock and the actual connectors used in the design. The GbE and USB 3.0 circuitry are part of the DE, while the Clock Module (CKM), the three RF Modules (RFMs) and the LEAF are pluggable options. The CKM and LEAF Modules mount on the top side of the DE while RFM0 and RFM1 mount underneath the DE. RFM2 is shown to the left (under the coin) and plugs into the left side of the DE. It accepts an existing RF board and will be used to bring up the DE before other RFMs are available. A typical PMOD expansion board is shown plugged into the right side of the DE; this is where the magnetometer will go.

Use Cases

Now that we have described the hardware, what can we use it for? In other words, what are our use cases? They vary from simple (listen to SSB on my favorite 40M frequency) to difficult (PSWS). Following is a partial list of TangerineSDR use cases. If you have others, please let me know.

- PSWS
- Satellite Ground Station (requires new RF Modules)
- High Performance HF transceiver
- WSPRnet/RBN on multiple bands simultaneously
- HF noise sniffing/calibrated receiver
- Remotely controlled stations
- Radio Astronomy (Project Jove [4], SARA [5] pulsar detection)
- Academic Learning

For More Information

The TangerineSDR project is open source and we are making as

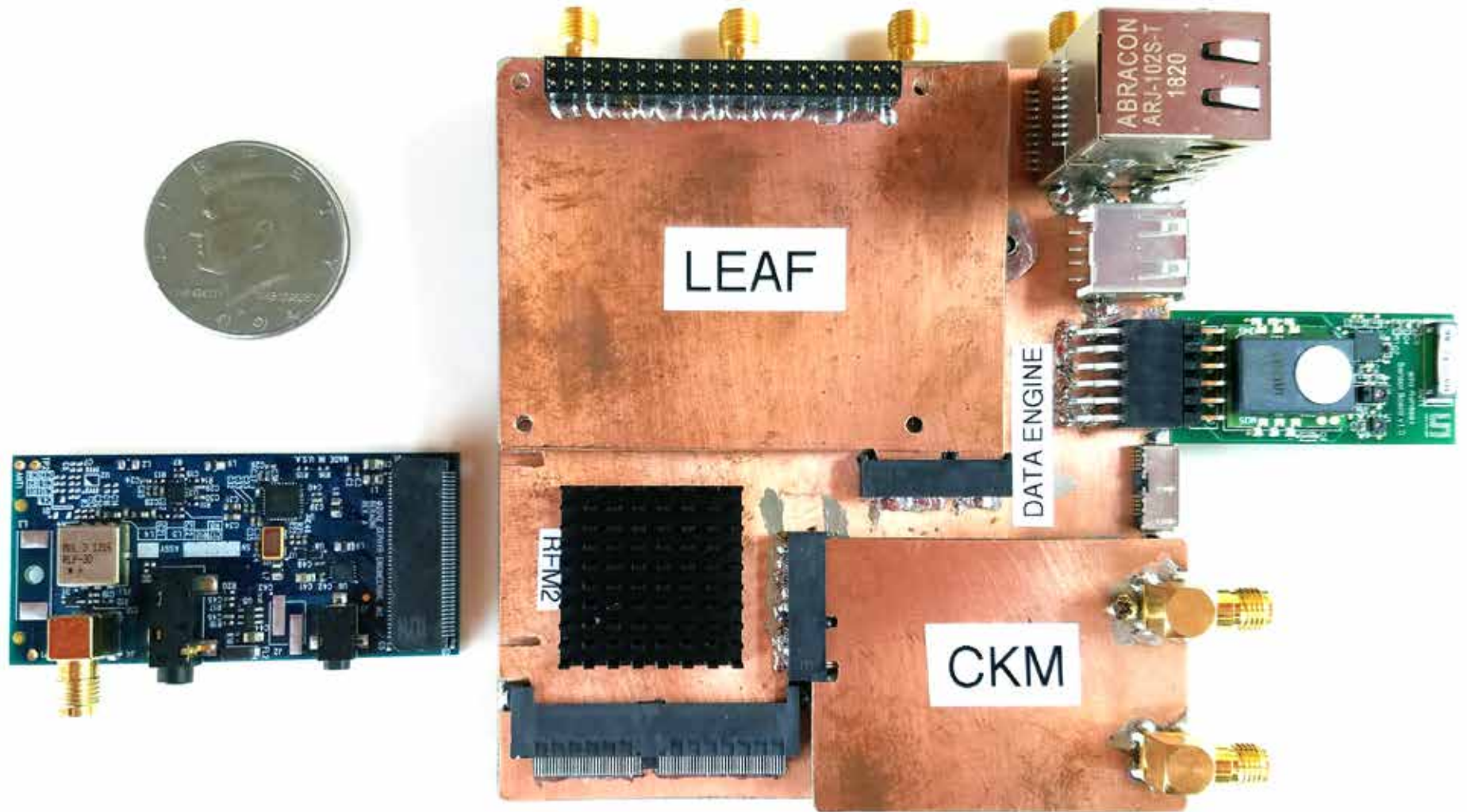


Figure 2. Mechanical Mock-up of TangerineSDR

many use cases for the hardware as we can. Stay tuned as we cover the evolution of the TangerineSDR here and in *QEX* magazine. TAPR's involvement with OpenHPSDR started more than a decade ago. I suspect to see an awful lot of TangerineSDR development the next decade!

For more information, visit our web site, TangerineSDR.com. You will find a wealth of links, video and audio recordings and how to subscribe to the TAPR TangerineSDR e-mail list. We also have a weekly Teamspeak VoIP online net on Monday evenings at 2100 Eastern Time (currently 0200Z on Tuesday). See the webpage for instructions on how to participate. I also encourage you to subscribe to *QEX* [6] magazine for more technical information on TangerineSDR and many other interesting projects.

Notes:

[1] Ham Radio Science Citizen Investigation, or HamSCI, is a group of hams and scientists (many are both) dedicated to advancing scientific research through amateur radio activities. Visit hamsci.org for more information.

[2] Ultra96 MPSoC FPGA development board. See 96boards.org/product/ultra96

[3] Click is a small I/O module that uses mikroBUSTM. See mikroe.com/mikrobus

[4] Project Jove studies radio emissions from the planet Jupiter, the Sun and our galaxy. See radiojove.gsfc.nasa.gov

[5] Society of Amateur Radio Astronomers (SARA). See radio-astronomy.org

[6] *QEX*, the ARRL Forum for Communications Experimenters. See arrl.org/qex

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, for example, after adding the logo and monogram, a mesh pocket shirt is \$36.95. Processing time is 5-7 days, plus shipping.

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

2020 ARRL / TAPR Digital Communications Conference

Make your reservations now for three days of learning and enjoyment at the Renaissance Charlotte Suites. The Digital Communications Conference schedule includes technical and introductory forums, demonstrations, a Saturday evening banquet and an in-depth Sunday seminar. This conference is for everyone with an interest in digital communications— beginner to expert.

September 11-13
Charlotte, North Carolina

Call Tucson Amateur Packet Radio
at: **972-413-8277**, or go online to
www.tapr.org/dcc



Renaissance Charlotte Suites

Board Meeting Minutes

September 19, 2019

“Detroit,” MI

Attendees:

George Byrkit, K9TRV
 John Ackermann, N8UR
 Steve Bible, N7HPR
 Scotty Cowling, WA2DFI
 Tom Holmes, N8ZM
 Stana Horzepa, WA1LOU
 John Koster, W9DDD
 Bruce Raymond, ND8I
 Mark Thompson, WB9QZB
 Tom McDermott, N5EG guest
 Joe Muchnij, N8QOD guest
 Wally Ritchie, WU1Y guest
 Kegan Ritchie, K3GAN guest

9:39 AM Called to order by N7HPR

Office transition planning

K9TRV: Because Koster's are getting older and rent is too high,

Use the cloud so anyone can work on it

N8UR: Some planning and movement already performed. We have various people to do various parts of the job. Use Quickbooks on the cloud to save accountant fees

All: Discussion of Peachtree vs Quickbooks

N8UR: Move to adopt Quickbooks cloud version \$70/month lease to use by Jan 1

WA2DFI seconded

Motion approved unanimously

Missing monthly financial reports discussion

N8ZM to contact accountant to get reports.

N8UR: Stop using NeonCRM membership management tool ASAP because we are not using it. Use a simpler tool via the new website.

Do we need current system for anything?

Must download the database for use with new system

K9TRV: Move to download database and stop using NeonCRM

WA2DFI seconded

Motion approved unanimously

Inventory discussion

Use Amazon?

ND8I, K9TRV and N8UR to handle ordering and inventory

Amazon will handle faster moving items, we will handle slower moving items?

Narrow our product line.

Ready to ship items to be handled by ND8I

Hamvention/Hamcation order page on new website

Where does the office sit? Do we need a new phone number?

Office supplies discussion

Hamvention Event Manager volunteer?
 N8ZM volunteered

New street address for TAPR? ND8I's address

Credit Card for TAPR now in W9DDD's name

Action Item: ND8I and N8ZM to research a

TAPR CC with TAPR's EIN

Motion approved unanimously

Data engine will be built by years end

Expense Reports – who gets them?

New Website

Data engine and RF board be ready to show at Hamvention if there are no gotchas

W9DDD will continue putting kits together

Content management system (CMS)

\$500 is price goal

New Website

Link to legacy website

Software TBD

Move website to new Wordpress friendly server

N8UR: Motion to transition to Wordpress site to be announced at membership meeting to go live Jan 1

Future grants to fund continuing project?

Lunch break 11:50 AM to 1:00 PM

WADFI seconded

Charlotte DCC

Recruit students in NC for DCC if we can get another ARDC grant

Treasurer's Report - N8ZM

HamSCI 2020

Video

ARDC to fund DCC video

WA2DFI: Motion to accept treasurer's report

University of Scranton – March 20-21

K9TRV seconded

Hamcation 2020

New Packet Radio – WB9QZB

Motion approved unanimously

WA2DFI willing to go again – need reimbursement (about \$650) plus booth (\$375)

No show despite invite to DCC

ARDC Grant Spent

K9TRV: Motion \$1000 max travel expenses

Chicago DCC in 2022 – WB9QZB

\$7219

ND8I seconded

Maybe

Election of Officers

Motion approved unanimously

Tucson DCC – WA2DFI 40th Anniversary

K9TRV: Motion to reelect current slate of officers

Hamvention 2020

Maybe

ND8I seconded

2 tables vs 3 tables? 3 agreed upon

Increase Membership Fees

Tangerine SDR

Lock down PSR for members only for a period of time

Membership levels

Take poll at membership meeting

ND8I: Motion effective Jan 1

WA1LOU seconded

WA2DFI: Nay, All others: Aye

Changing Term of Membership

Needs change of TAPR bylaws so forget about it

Increase DCC price by \$25

Friday by \$10, Saturday by \$10, Sunday by \$5

Early bird to \$130

Regular to \$150

Sunday to \$35

ND8I: Motion

WA1LOU: Seconded

Motion approved unanimously

Membership Discounts for TAPR purchases (hardware)

Discussed

Army Order – WA2DFI

What kind of mark-up? Try 50%

WA2DFI: Motion to go forward without GSA at 50%

ND8I seconded

Motion approved unanimously

N8UR Project

Open Source GPSDO, Phase measurement device

Meeting adjourned at 4:00 PM

Donate to TAPR

TAPR is now participating in the AmazonSmile program!

When you shop using the AmazonSmile program, Amazon makes a donation to TAPR equal to 0.5% of the price of your eligible AmazonSmile purchases.

AmazonSmile is the same Amazon you know. Same products, same prices, same service.

Bookmark the TAPR AmazonSmile Program link:

<https://smile.amazon.com/ch/86-0455870>

That link takes you to a special login portal where you enter your normal Amazon credentials and get redirected at the same Amazon home page except there will now be a notice that you are supporting TAPR.

Other ways to donate to TAPR:

http://www.tapr.org/tapr_donate.html

###

Annual Meeting Minutes

Romulus, MI
21 September 2019

Meeting brought to order by President Steve Bible, N7HPR, at 4:45 PM.

The new officer corps was announced, which was elected at the Board meeting on 9/19/2019.

The treasury report was presented.

Nominations from the floor for BoD:

Current directors all agreed to run again.

Dave Larsen, NV0S, was nominated from the floor.

George Byrkit, K9TRV, moved to close nominations. Phil Erickson seconded the motion. All in favor? 100% aye.

Scotty Cowling, WA2DFI, reported on successful attendance at Hamcation 2019, and successfully running a day of forums.

Tom Holmes, N8ZM, John Ackermann,

N8UR, and George Byrkit attended a meeting of the Toledo TMRA and John presented a ‘what is TAPR’ show. We have been invited back to present again at the Great Lakes Division meeting.

TAPR also presents at the HamSCI workshop. We have presented both at the 2018 (NJIT) and 2019 (CWRU) workshops. TAPR is actively participating with HamSCI on the Personal Space Weather Station project.

Current projects:

Tangerine SDR: designed for hams to use to collect data to be used by scientists (HamSCI).

A new Open (source/hardware) GPSDO receiver

If you have any ideas, please contact us about developing your ideas.

People were reminded about donating to TAPR and putting TAPR in their will.

John Ackermann talked about the ‘re-do’ of the TAPR website. TAPR is also trying to get more ‘in the cloud’ and transition to a Wordpress-based website with a better electronic storefront. It will also handle membership.

Next year, the DCC will be in Charlotte, NC, September 11, 12, and 13, 2020. Room rates are \$99.

Some ideas about improving DCC include taking 5 minutes off each presentation so that we can have a 10 minute break between every other presentation.

Meeting adjourned at 5:25 PM

Respectfully submitted

###

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 January 15, so write early and write often.

If *PSR* publishes your contribution, you will receive an extension to your TAPR membership or if you are not a member, you will receive a TAPR membership.

###

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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PSR

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TAPR Office Hours: Monday to Friday, 9 AM to 5 PM Eastern Time

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 (w11lou@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

PSR is exported as Adobe Acrobat and distributed electronically at www.tapr.org

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