Flying Pigs QRP Club
Bacon Bits Quarterly

Flying Pigs QRP Club International, W8PIG
1900 Pittsfield St, Kettering, Ohio 45420
E-mail: n8ie@n8ie.com Web Page: https://fpqrp.org/

FPQRP membership is open to all licensed QRP operators who reside within 12,000 nautical miles of Cincinnati, Ohio.

April 2025

From the Editor

Welcome to the April 2025 issue of the ***Bacon Bits Quarterly Newsletter***!
I want to thank everyone who contributed articles, photos, and reports for this issue of our quarterly newsletter. Your input is greatly appreciated!

Our contributor's for this quarter are:

WA7GIL – Ron Taylor
KB9BVN – Brian Murrey
KK4ITX – John Leahy
W5AWS – Andrew Shead
W0EB – Jim Sheldon

73 and OO,
O. Alan Jones
N8WQ
FP#-4371
editor@fpqrp.org

A Homebrew QRP CW 5-band Field Radio
By Ron Taylor WA7GIL

I was inspired to build this rig by reading about the Penntek TR-45L and it's design that incorporated NO menus and plenty of buttons and knobs to do everything from the front panel with a single push or twist of each. It's a beautiful rig and really too bad it's no longer available.[1] I give Penntek all the credit for their operational ideas and front panel layout.

[1] https://www.wa3rnc.com/store/penntek-tr-45l-qrp-transceiver

My transceiver uses a Si5351/Arduino style VFO/BFO which can be found in many articles and many different flavors so I won't go into that part. I set it up so that I have a single button to change bands and another one to change tuning steps, plus the tuning encoder for very simple operation.

The rig features include: 40-15 meter bands, CW Only, FWD/REFL Power meter / S-Meter, high SWR LED indicator, semi-break-in or transmit hold option, a front panel power level adjustment for peaking on each band, the rig is capable of 5 watts out on all bands, sidetone level control, keyer speed control, separate paddle and straight key input jacks, switchable front end RF amplifier, a rotary switch to select the bandpass and low pass filters for each band, volume control, headphone jack, built-in speaker and a internal battery or external 12 VDC power selection. All controls are on the front panel, and again, there are NO menus!

The receiver is a conventional superhet with 6 MHz crystal filter in the IF. It's a simple Cohn filter design. Mixers are homebrew double balanced diode ring types. Post mixer and IF amplifiers are taken directly from circuits in “Experimental Methods in RF Design” by Hayward, Campbell and Larkin. The transmitter uses one output of the Si5351 which is switched to the displayed frequency during transmit, and is filtered and amplified via an adjustable driver to the final which is a single-ended design using a Mitsubishi RD16HHF1 RF MOSFET. This device is made for RF duty and will not fail on high SWR.

The bandpass filter is switched between bands using a FST3253 mux chip instead of relays since it carries only low signal levels. Because the mux chip can only handle 4 filters, I had to make the last one wide enough to cover both 17 and 15 meters. This filter board is also shared between the receiver and transmitter to clean up the output of the Si5351 before it goes on the transmitter driver stages.

The low pass filters and relay switching boards are from QRPLabs.

Sensitivity and selectivity are good. Harmonics are well below the FCC allowed maximum levels. Transmitter keying is clean. I'm looking forward to using this rig during ARRL Field Day 2025 in June.

73 … Ron

From Contest Admin Secret HQ:
Brian Murrey KB9BVN
FP-57

Calling all Flying Pigs!! Calling all Flying Pigs!!

Gang, the monthly Run for the Bacon Sprint is so much fun, and the band conditions are PERFECT for QRP, so why not join the flock and have a blast with us? It's easy! Here is a list of upcoming events through June 2025

Daylight Savings Time resumed on March 9th 2025 – Adjust your time accordingly!

April 20th - Run for the Bacon CW Sprint (2 Hours) 23:00Z to 01:00Z – Use the Auto logger.
May 18th - Run for the Bacon CW Sprint (2 Hours) 23:00Z to 01:00Z – Use the Auto logger.
June 15th - Run for the Bacon CW Sprint (2 Hours) 23:00Z to 01:00Z – Use the Auto logger.

RFTB Autologger is at https://qrpcontest.com/pigrun/

ALSO…for you Flying Pigs new to CW, or old to CW and want to participate in a slow code sprint event, we have the 40m Walk for the Bacon Slow Code CW Sprint. The WFTB sprints are 1 hour each night.

40m WFTB runs on the first back to back Wednesday and Thursday of every month. The Wednesday night sprint begins at 00:00Z Wednesday evening for 1 hour from 00:00Z to 01:00Z, then it continues Thursday night from 02:00Z to 03:00Z. All logging is done on the autologger.

Evening of Wednesday April 2nd at 00:00Z to 01:00Z on 40m 7050 Khz to 7065 Khz.
Evening of Thursday April 3rd at 02:00Z to 03:00Z on 40m. 7110 to 7115 Khz

Evening of Wednesday May 7th at 00:00Z to 01:00Z on 40m 7050 Khz to 7065 Khz.
Evening of Thursday May 8th at 02:00Z to 03:00Z on 40m 7110 to 7115 Khz .

Evening of Wednesday June 4th at 00:00Z to 01:00Z on 40m 7050 Khz to 7065 Khz.
Evening of Thursday June 5th at 02:00Z to 03:00Z on 40m 7110 to 7115 Khz.

WFTB 40m logger is at: https://qrpcontest.com/pigwalk40/

20m WFTB runs on the third Wednesday and Thursday of every month. The Wednesday night sprint begins at 00:00Z Wednesday evening for 1 hour from 00:00Z to 01:00Z, then it continues Thursday night from 02:00Z to 03:00Z. All logging is done on the autologger.

Evening of Wednesday April 16th at 00:00Z to 01:00Z on 20m 14061 Khz to 14065 Khz.
Evening of Thursday April 17th at 02:00Z to 03:00Z on 20m 14061Khz to 14065 Khz.

Evening of Wednesday May 21st at 00:00Z to 01:00Z on 20m 14061 Khz to 14065 Khz.
Evening of Thursday May 22nd at 02:00Z to 03:00Z on 20m 14061 Khz to 14065 Khz.

Evening of Wednesday June 18th at 00:00Z to 01:00Z on 20m 14061 Khz to 14065 Khz.

Evening of Thursday June 19th at 02:00Z to 03:00Z on 20m 14061 Khz to 14065 Khz.

WFTB Autologger is at: https://qrpcontest.com/pigwalk20/

Good luck and we hope to hear from everyone on the air!!

Sprint Statistics for January through March 2025

DATE	EVENT	LOGS SUBMITTED	TOP SCORE	TOP FLYING PIG
01/19/25	RFTB	10	370	NQ2W - Will
02/16/25	RFTB	9	430	KA2KGP - TOM
03/16/25	RFTB	14	448	NQ2W - Will
01/01/25	WFTB40	9	36	WB0CJB - Paul
02/05/25	WFTB40	20	53	WB9HFK - Mark
03/05/25	WFTB40	18	67	WB9HFK - Mark
01/15/25	WFTB20	8	12	KT4WA - Izzy
02/19/25	WFTB20	16	37	WB8HFK - Mark
03/19/25	WFTB20	9	24	WB0CJB – Paul

By the time the second quarter is over at the end of June, it'll be summer time, the Hamvention and FDIM will be over, and Field Day will be just another great memory.

Lot's of Amateur radio going on in the next three months.

Slow Scan Television (SSTV) decoder

W0EB – Jim Sheldon

A little over 2 months ago, a friend pointed me to a website where a gentleman by the name of Jonathan P. Dawson (unknown if he's a ham) posted a circuit and some software he wrote to utilize a Raspberry Pi PICO microprocessor and a 2.8" color touch screen display to receive off-the-air SSTV transmissions and display the pictures that were transmitted.

I built one on a breadboard like he did, loaded his program onto the PICO and sure enough, it did what he said it would. It was a little troublesome trying to use the breadboard setup in the ham shack to copy the SSTV activity on 20 meters (14.230 to 14.235 MHz) so I set out to work up the hardware. I first built one on a piece of perfboard and then had a friend (N5IB) do a PC board layout for me. I got a few boards made and once I had that running right, I used my laser engraver/cutter and some nice 4mm thick plywood to make a decent cast for the unit so it could sit next to the rig out of the way and the input audio could be connected to the radio's line output jack.

In the picture below, the back of the unit is shown. It has a 7805 regulator on the PC board so the unit runs nicely on shack power (actually works from 9-15 VDC). Audio in is an 1/8" stereo jack (both sides connected together so it works from either channel seamlessly).

It got a little frustrating though, not being able to save the pictures, especially when conditions were really good and the guys were sending one pix right after the other.
Enter my good friend Ron Pfeiffer, W2CTX (FP#-4318) who is a super programmer!
I can program a bit myself, but I'm better with hardware, so we collaborated on the project and added the ability to save the incoming pictures to a Micro SD card mounted on the back side of the case and also re-display the saved pictures later as well as remove the SD card and use it to transfer the pictures to a computer for editing/use in other programs, etc. It took a while, but a number of program refinements later, we have a pretty well finished program running now and it's lots of fun.

By the way, Dawson's program will actually copy most of the main SSTV modes used today though it won't copy the early, pioneering "ROBOT" modes. This isn't too much of a problem as they aren't used much anymore anyway. The main ones are called "Scottie 1, Scottie 2, Martin 1, Martin 2" and a number of formats with the "PD" prefix such as PD50, PD90, PD120, PD160 and PD180 which the program can copy. The numbers in the PD series indicate the approximate number of seconds it takes to transmit the image.

As you can see in the above photo, there are only 3 controls. Power On/OFF, a Program Reset (top button) and an Image Save/Recall button (bottom one). Once an image has been fully received, a short press of the bottom button saves it to the SD card. A longer 2-3 second press recalls/re-displays it. If more than one image has been saved to the SD card, short presses of the bottom button recalls the next in sequence until the last one.

An 8 Gigabyte Micro SD card will hold up to 160-180 received images and the unit will accept any size Micro SD card up to 32 Gigabytes. By the way, a 32 Gig SD will hold 700-720 pictures. The actual saved picture size varies a bit depending on the mode it was transmitted in and it varies from about 25Kb to 40-45Kb.

JPEG file of an actual image received off the air with this program.

This thing doesn't draw a tremendous amount of current and will actually run on 5 volts DC. We've found that a 5-6 volt battery (9 or 12 is better though) will actually run the unit and it can easily be used in the field while on SOTA or POTA outings or just out in the woods for an afternoon playing portable ham radio.

I've included the schematics and a few tech specs to round things out and will post the program source code (program the PICO using the Arduino programming IDE) in a "zip" file to the files section on the W8PIG Facebook page.

For those piggies not on Facebook, an email to me (w0eb@cox.net) requesting the code will get you a return email with the zip file attached. The operating manual, extra software and board libraries needed and the complete source code are included in the zip file.

– Jim, W0EB

Tech info:
Several fully built units were tested for current draw both at 5.1 volts DC from a battery and from a 13.8V 30 amp shack power supply. Both functioned quite well with a bit more current drawn from the lower voltage battery supply as 5 volts is below the input threshold for the 7805 voltage regulator on board. The regulator gives the capability of using any input voltage up to around 30 Volts DC as this is the high end of tolerable input voltage for a 7805 regulator IC.

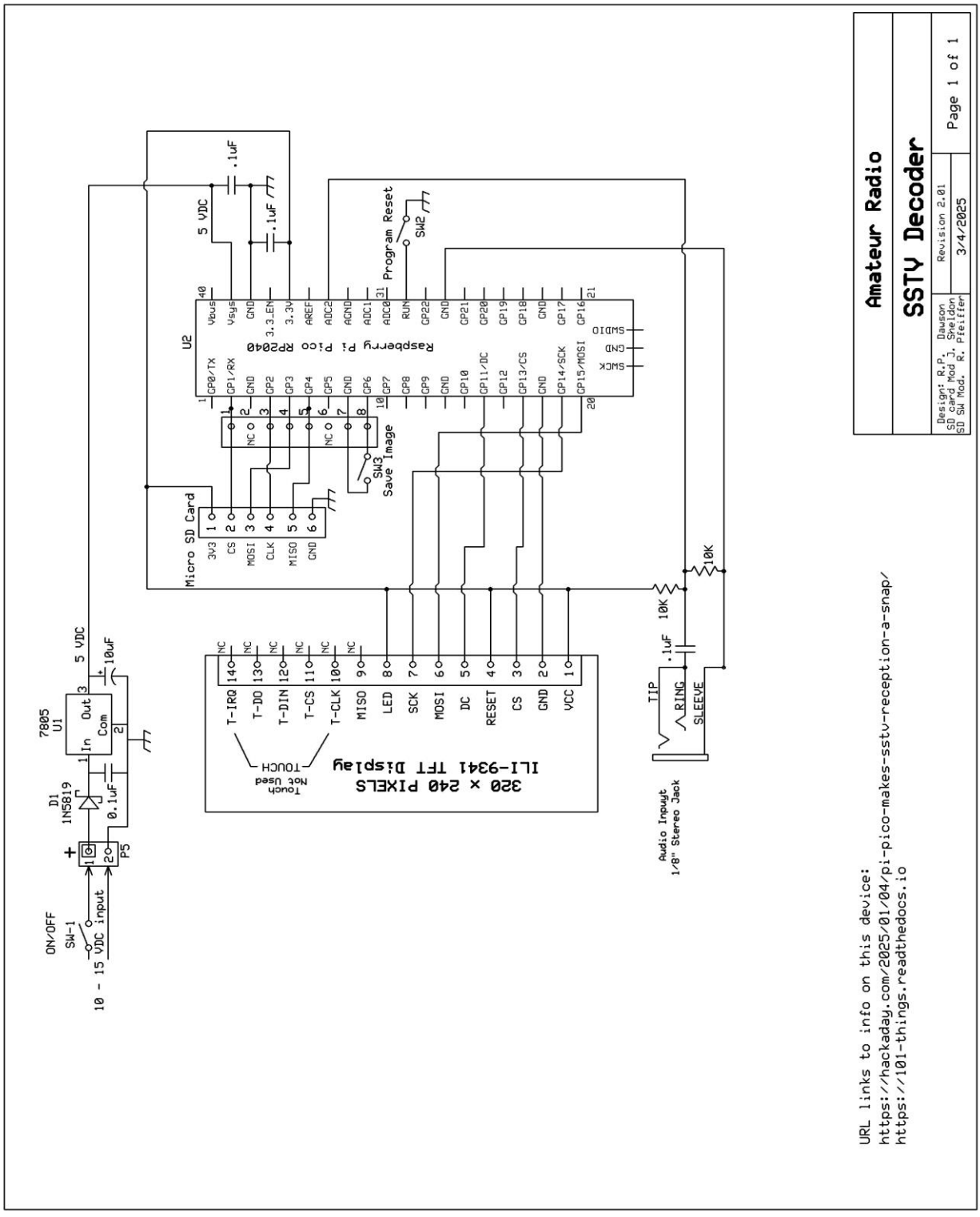
At startup with the input voltage measured at 13.8 VDC, the initial surge was just shy of 1 Amp (charging all the capacitors in the power chain and on the Pi Pico) and within less than a second it settled down to 74.1 milliamps resting current with the Splash screen being displayed.

Next, an SSTV signal selected at random was sent to the unit and the current actually dropped to 72.3 milliamps at the start of image reception, varying between a low of 72.3 ma and a high of 72. 8 ma peak.

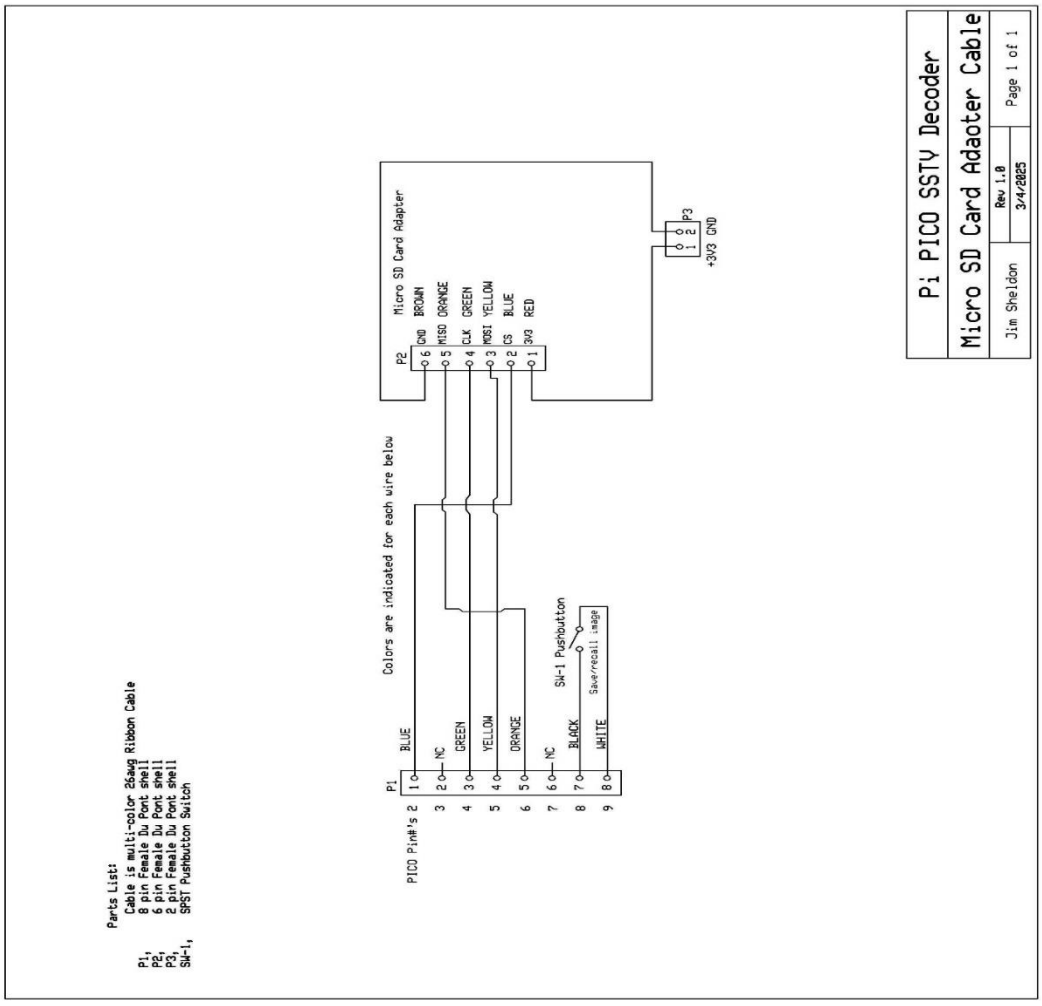
When saving the image to the SD card, the current was a steady 72.5 ma. Recalling the same image was a little higher with the result being 85.9 ma while the image was scrolling back onto the screen. Once reloading the image was complete, the idling current while displaying it was 72.5ma.

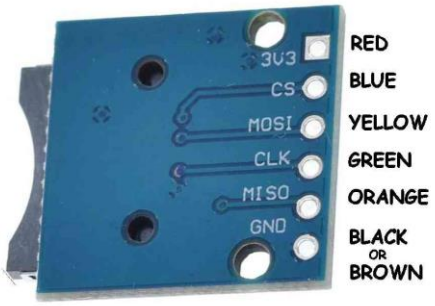
With 5.1 VDC input:
Startup 1 amp, Idle was 103.2 ma. During reset it jumps to 200 ma and drops almost immediately back to 103.2 ma.
Receiving, 104.5 ma max
Saving 103.5 ma
Recalling 123.5 ma
Idling during on screen display was 100.6 ma.

Schematic Diagram of the SSTV Decoder:



Micro SD Card Adapter Cable:





Micro SD Card Socket Wire Colors

Hams often take pride in being cheap penny pinches, QRPers pride themselves with doing even more with less! As an RVer I often take it one step further..... think multi-use.

There was discussion on a QRP email reflector concerning the need for a low cost scope for a computer to inspect and trouble shoot projects. I mentioned that I use either my cell phone or iPad Mini to do this kind of thing and got some good reaction so I thought I should share.

I took my PCB holder (Fig 1) and my iPad and attached some Velcro in the appropriate places (Fig 2).

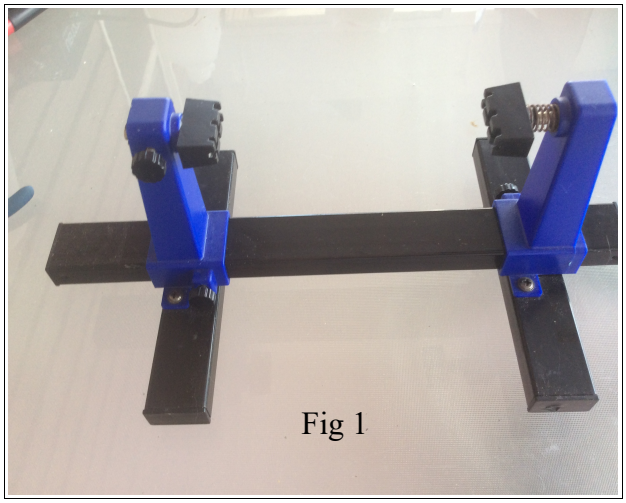


Fig 1

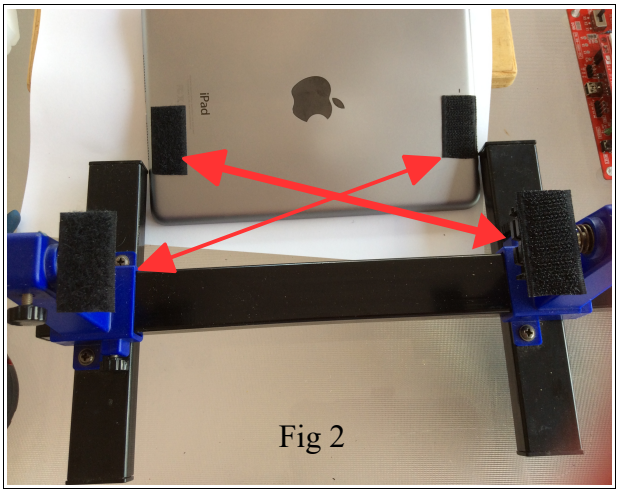


Fig 2

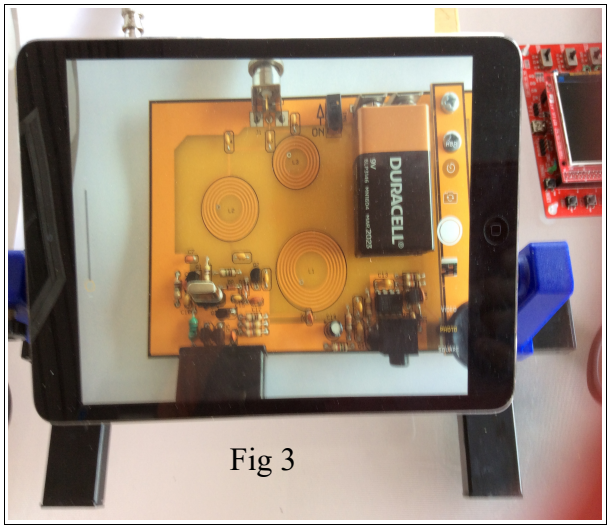


Fig 3

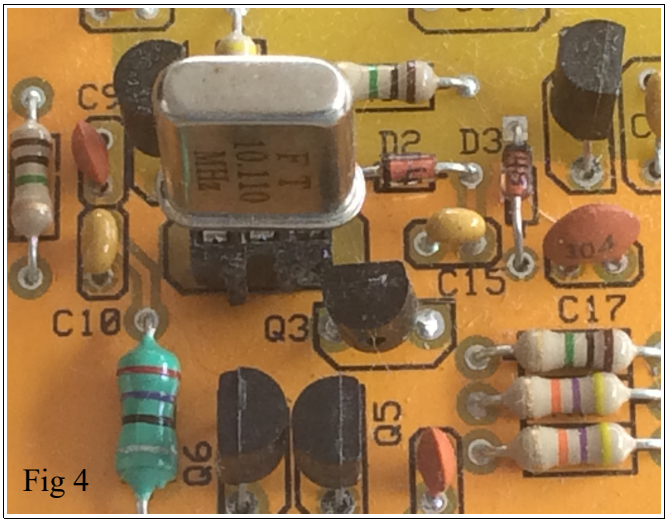


Fig 4

The left arm of the PCB holder has a set screw to allow tilting and adjusting of the iPad. The Zoom feature is certainly adequate for inspection and the object can be freely moved below. I use the 3 second timer to take a clear steady picture if needed. Any phone or tablet should work for you.

If I had a 3D printer I would make a couple of adapters to fit on the PCB holder, grooved so that the iPad or cell phone would just slide in and get locked with plastic screws.

Pictured is the Four States 30m Cricket 3/4w CW transceiver. The PCB holder is under $10 from various vendors. Fig. 3 was taken with my XYL's iPad.

The closeup (Fig. 4) is really crisp and clean, errors and issues show up quite easily.

John Leahy, KK4ITX@arrl.net

Zephyr Park

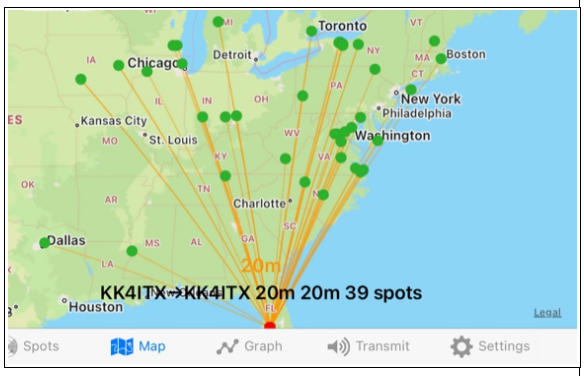
We are very fortunate in Florida to have so many parks and beaches to play radio, and of course the weather that entices one to partake in the outdoor splendor. Zephyrhills has its share of history and parks and this is the first in a short series exploring this unique QRP inviting area.

The area itself was founded in the late 1800's and became a popular tourist area early on mostly because the very first official (military) road in the state (now US301) came right through town, running between Tampa (Fort Brooke) and Ocala (Fort King). In the very early days the Tin Lizzies were often seen at this park camping out and enjoying the lakes in the park. The photo above right shows Zephyr Park in use early in its life. In the real early days Henry Ford used the Spanish Moss that hangs from the trees as fill for the seats of the Model T's.

So today I had a few hours to spare and there was "Sasquatch" QRP event to play in so off I went. Of course the wind picked up and a few raindrops were in the air but no skeeters or lightning threats. I choose my 20m homebrew loop and FT-818 for tools and brought along a new toy to play with too. My setup usually takes about 5 minutes because the loop stays assembled and ready to be connected to the rig.

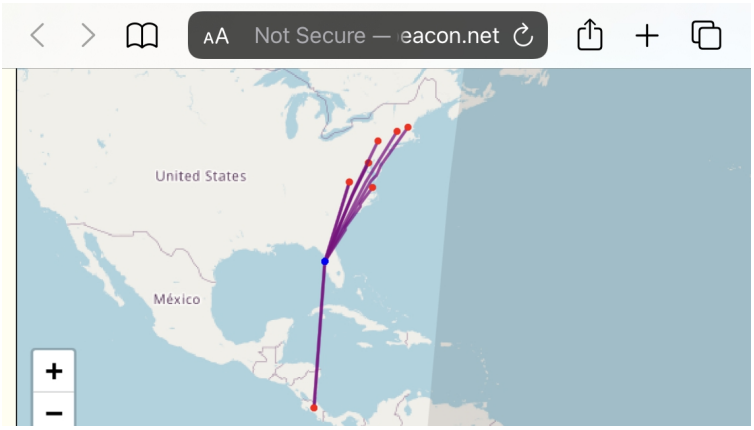
As has become my standard practice, I run WSPR to check the propagation. Today I am using my new toy (QCX-Mini) with it's WSPR ability. After 6-10 minutes of viewing where the signal is going and confirming my antenna is working I switch off the WSPR and run the FT-818. The photo below shows the Mini and today's results. I am aware that usually I am transmitting WSPR at 200mw

with a WSPRLite but today using the Mini we are at 5w. The Red Dot is me , the Green Dots are the folks that copied me. So at this point I can assume that IF there's anybody on the air I should have some activity. In just a few seconds I change from WSPR to the FT-818 and QRL? And then CQ on 14.061.



I worked for quite sometime before I got an answer but it's not at all surprising for a Friday afternoon to be quiet. Finally around 3:45pm I made my first contact to VA (W4RJH) and at 4:00 (W4NLT) also VA. Raindrops started to increase and I had evening plans so I wrapped it up.

Checking the RBN I noticed something odd. All of the RBN hits were packed together but by the WSPR spots, you would think it was a different day and antenna !



The loop is 3/8" copper tubing on a $4.00 Flea Mkt tri-pod and tuned with the MFJ-9232 QRPPocket Loop Tuner, 15ft RG-58 and CW Morse 3d printed key. It's great to get out !

72, John, KK4ITX
Zephyrhills, FL/Wells, ME/Spring Grove, MN

1 Motivation

When operating CW, one doesn't need much power to be heard far away. Some operators have extremely portable, lightweight rigs. My equipment is medium to lightweight, easily portable. Lately, my thoughts turned again to lighter-weight rechargeable power with a stable output voltage maintained even at the bottom end of a battery-pack discharge curve. When operating QRP, RF output power declines with decreasing voltage output by the battery pack, so keeping the system power supply voltage steady at an optimum operating value is a desirable attribute.

2 Design

For greatest flexibility of operation, maintenance, and repair, I decided to separate the battery pack from the buck-boost functionality. Main reason for this is that the buck-booster is an inexpensive, disposable module from Amazon at a cost of $20 in round figures. Also, I could use the buck-booster separately with alternative sources of stored DC energy.

Figure 1: AA Battery Pack

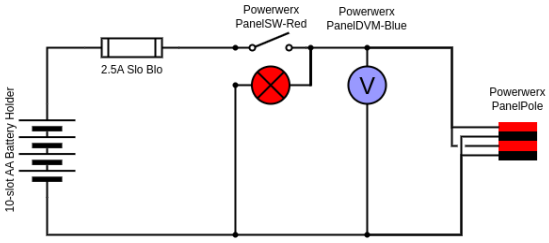
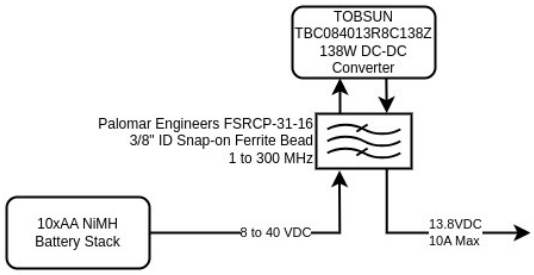


Figure 2: Battery Pack with Buck-Boost Converter



A predictable problem with the buck-booster is RFI caused by its boost function, indeed so it proved—the radio-frequency interference was horrible. However, attaching a clamshell ferrite bead around both input and output wires eliminated the interference.

A separate battery pack allows us to have more than one that is easily exchanged in the field with a fully charged replacement. An inline fuse rated at 2.5A slo-blo provides short-circuit protection, particularly when the possibility exists that the rechargeable cells could be replaced with Lithium AA cells that can deliver more current. I intend this design for use with 2800mA/H NiMH batteries.

The illuminated switch, digital voltmeter, and Anderson PowerPole connector are unused parts from another project. Lit like a Christmas tree, there is almost no chance the operator will leave the PSU energized unattended, consequently discharging the battery pack. By monitoring the PSU voltage, the operator can easily see when it is time to recharge the batteries instead of discharging below the critical voltage of the cells. Without a battery-pack voltmeter, when using the pack with the buck-booster there would be no indication of state-of-charge until it stops working altogether.

2.1 Bill of Materials

1. Tobsun, DC-DC Buck-Boost Converter, Pt. No. TBC084013R8C138Z. 8–40VDC input, 13.8VDC output, 138W.

https://www.amazon.com/dp/B089M5KYZM

2. Hammond Enclosure, 1591XXSBK, 4.3 x 3.2 x 1.60 inches.

   https://www.hammfg.com/part/1591XXSBK?referer=1182

3. Battery Holder, Eagle Plastic Products, 12BH310A-GR.

   http://www.mouser.com/access/?pn=12BH310A-GR

4. Powerwerx Panel Mount Red Switch for 12V Systems, PanelSW-Red, 840128902530.

   https://powerwerx.com/panel-mount-red-switch

5. Powerwerx Panel Mount Digital Blue Volt Meter for 12/24V Systems, PanelDVM-Blue, 840128902349.

   https://powerwerx.com/panel-mount-digital-volt-meter-blue

6. Powerwerx PanelPole2, Panel Mount Housing for Two Powerpole Connectors with a Weather Tight Cover, PanelPole2, 840128906057.

   https://powerwerx.com/panelpole-panel-mount-powerpole-black-dual

7. Littelfuse In-Line Fuseholders for 2AG or 5×20mm Fuses.

   https://www.mouser.com/ProductDetail/Littelfuse/01500274ZXU?qs=HS3fcsxbgMwxzHo3fy8LGg%3D%3D

8. Littelfuse 2AG Cartridge Fuses 250V 2.5A Slo-Blo.

   https://www.mouser.com/ProductDetail/Littelfuse/022902.5MXP?qs=8QfiMw8FY5PMsACUjS54fQ%3D%3D

9. Tenergy Premium PRO Rechargeable AA Batteries, High Capacity Low Self-Discharge 2800mAh NiMH AA Battery, 20 Pack, 10446.

   https://power.tenergy.com/tenergy-premium-pro-rechargeable-aa-batteries-high-capacity-low-self-discharge-2800mah-nimh-aa-battery-20-pack/

10. Tenergy TN160 12-Bay AA/AAA NiMH/NiCd LCD Smart Battery Charger, 01160.

    https://power.tenergy.com/tenergy-tn160-12-bay-aa-aaa-nimh-nicd-lcd-smart-battery-charger/

11. Palomar Engineers, Ferrite Snap on/Ring Combo Pack, Mix 31, RFI Range 1–300 MHz – 16 filters, FSRCP-31-16.

    https://palomar-engineers.com/ferrite-products/ferrite-beads/Ferrite-Snap-on-Ring-Combo-Pack-Mix-31-RFI-Range-1-300-Mhz-16-filters-p78504431

2.2 Batteries

About the most convenient form-factor for DC power is the rechargeable AA battery. Nickel-metal Hydride (NiMH) battery chemistry has two to three times the capacity of Nickel-cadmium (NiCd) batteries, and is not subject to the memory effect of NiCd cells, though NiMH cells can develop voltage depression from repeated partial discharge. Voltage depression is reversible with a few full charge-discharge cycles.

Another advantage of the AA form-factor is that an operator could use non-rechargeable AA batteries in place of NiMH rechargeable batteries.

2.3 Battery Pack

Since a NiMH AA battery produces a nominal 1.2V output, a ten-slot series-battery holder will produce 12V. In practice, a fully charged stack of batteries in good condition produces a no-load measured voltage of 13.56Volts.

2.4 Charging

A fully charged cell supplies an average 1.25V per cell during discharge, declining to about 1.0–1.1V/cell, with further discharge liable to cause permanent damage to cells in a multi-cell pack. Over discharge can cause polarity reversal in one or more cells of a multi-cell pack. Therefore, when the battery-pack voltage drops to 10 Volts, it is time to recharge the cells.

2.4.1 Charging Procedure

Given the inevitable slight physical variations between individual cells, manufacturing tolerances, and failure modes, best practice is to remove the cells from the pack and charge them individually in a multiple-cell NiMH charging unit that also performs health checks on each cell.

2.5 Indicator Load

Total measured load of the indicators is 18 mA:

- Voltmeter = 7mA
- Switch LED = 11mA

3 Construction

3.1 Enclosure

Installing the parts into the Hammond enclosure produced a tight fit with barely enough space to get everything inside, but it all worked out in the end.

Inside the enclosure, there are posts on which it is possible to install PCBs, both in the body of the enclosure and in the lid. I removed these posts by cutting them away with a pair of end cutters.

3.1.1 Mounting Holes

To cut the holes for the switch, DVM, and connector, I used a step-drill in a battery operated variable-speed drill motor running slowly.

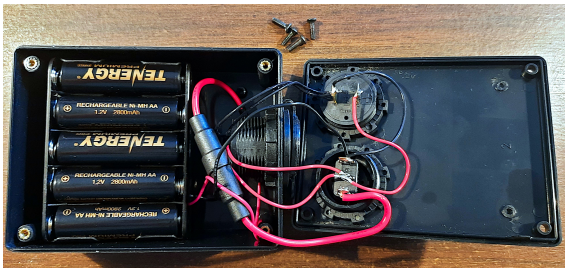
3.2 Connections

In-line solder joints I covered with heat-shrink tubing.

I installed the connector first after populating the connections with wire pigtails.

All interconnections I made by soldering to the terminals of the switch and meter.

3.3 Completion Images



4 References

i. Nickel-metal Hydride battery:

https://en.wikipedia.org/wiki/Nickel%E2%80%93metal_hydride_battery.

5 Glossary

CW.....Continuous Wave, synonymous with Morse code
DC.....Direct Current
DVM.....Digital Volt Meter
LED.....Light Emitting Diode
mA.....milliAmps
mA/H.....milliAmps per Hour
NiMH.....Nickel Metal Hydride
PCB.....Printed Circuit Board
QRP.....Low power, 5W CW, 10W SSB.
RFI.....Radio Frequency Interference
SSB.....Single Sideband.
V.....Volts
W.....Watts

OUR MISSION:
1. Have Fun.
2. No Rules
3. Be a friendly group which enjoys ham radio and sharing skills with their fellow hams.

CLUB MEMBERSHIP:
To join the Flying Pigs QRP Club, visit https://fpqrp.org/join.php

CLUB DISCORD SERVER:
https://discord.gg/6G9z9grDx6

CLUB EMAIL POLICY:

To subscribe to the club email reflector, send a message to fpqrp+subscribe@groups.io with the subject "subscribe" or go to the Flying Pigs groups.io page at https://groups.io/g/fpqrp and click on the "Join" button. Don't forget that all upcoming Flying Pigs related contests are advertised on our email reflector!

These are not rules—just common sense. Club email is not moderated, as we are not a stuffy group. You can send off topic messages about most subjects but please keep conversations clean and in good taste. We do like good-natured-ribbing and joking with each other, but we will not tolerate flaming other members of spamming the group. We will remove offenders who abuse our open policy. The word eBay is allowed.

CLUB WEB PAGE:
The club web page is our forum for sharing projects, and information about us. You are encouraged to submit your ideas and projects to be added to the web page https://fpqrp.org/

CONTEST RESOURCES:
https://qrpcontest.com
http://qrpspots.com

FPQRP OFFICIAL FREQUENCIES:

160m – 1.814MHz 80m – 3.564MHz 40m – 7.044MHz 30m – 10.110MHz
20m - 14.062MHz 17m – 18.100MHz 15m – 21.064MHz 12m – 24.910MHz
10m – 28.064MHz 2m Hamfest Frequency – 145.72 Simplex

PROBLEM REPORTING:
If you are having problems with email, the web pages, or a fellow club member, please report this to either:
Dan, N8IE at dann8ie@gmail.com
Jim, W0EB at W0EB@cox.net