USING RASPBERRY PI FOR HAM RADIO (PART 2)

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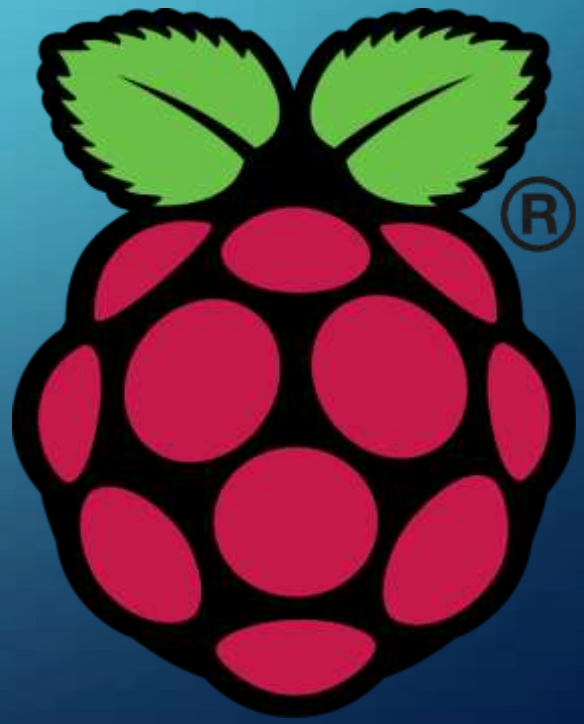


W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0

- Custom-built ham radio software image chock full of applications:

FlDigi Suite	CHIRP	CQRLog
WSJT-X	BlueDV	wsjtx_to_n3fjp
JS8Call	ADS-B Flight Tracker	Pat WinLink + ARDOP
CubicSDR	NOAA Weather Imaging	CW Applications
GQRX	DX Cluster Client + Server	Ham Test Trainers
Direwolf	Xnecview	GPredict
Xastir	YAAC	Support for SDR Hardware
D-Rats	TrustedQSL	…and DOZENS MORE!

HOW / WHERE CAN I DOWNLOAD THE W3DJS RASPBERRY PI FOR HAM RADIO V2.0 IMAGE?

- http://bit.ly/W3DJSRasPiv2img or http://bit.ly/32Xpi74
- First image is compressed with BZip and is ~5GB, second is uncompressed and 16GB download
- 16GB download version available on BitTorrent.
- Over 2,000 direct downloads to date!

WHERE DO I GET SUPPORT FOR W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0?

- Raspberry-Pi-4-Ham-Radio Forum on Groups.io
  - https://groups.io/g/RaspberryPi-4-HamRadio/topic/w3djs_raspberry_pi_ham_radio/39671852
- QRZ
  - https://forums.qrz.com/index.php?threads/w3djs-raspberry-pi-ham-radio-image-v2-0-released.680336/
- GARS Workshops!

HOW CAN I PUT IMAGE ON (MICRO) SD CARD?

- You just can't copy the image as a file on to the (micro) SD card.
  - (some people have tried – and failed)
- One solution: dd (for Linux)
- But what if I have a Windows PC?
- Solution: BalenaEtcher, available at https://www.balena.io/etcher/

WHAT IS THE INITIAL USERNAME AND PASSWORD?

- Username: pi
- Password: raspberry

- Security note: please change the password to something unique, especially if you put your Raspberry Pi on the Internet like me.

HOW CAN I CHANGE THE PASSWORD?

- Quick answer: run “passwd” command from command line / shell
  - (will need old password to change it, unless you are logged in as root)

HOW CAN I CHANGE THE USERNAME “PI”?

- YOU DON’T – It causes a huge security risk, according to Kyle, W4KDA.

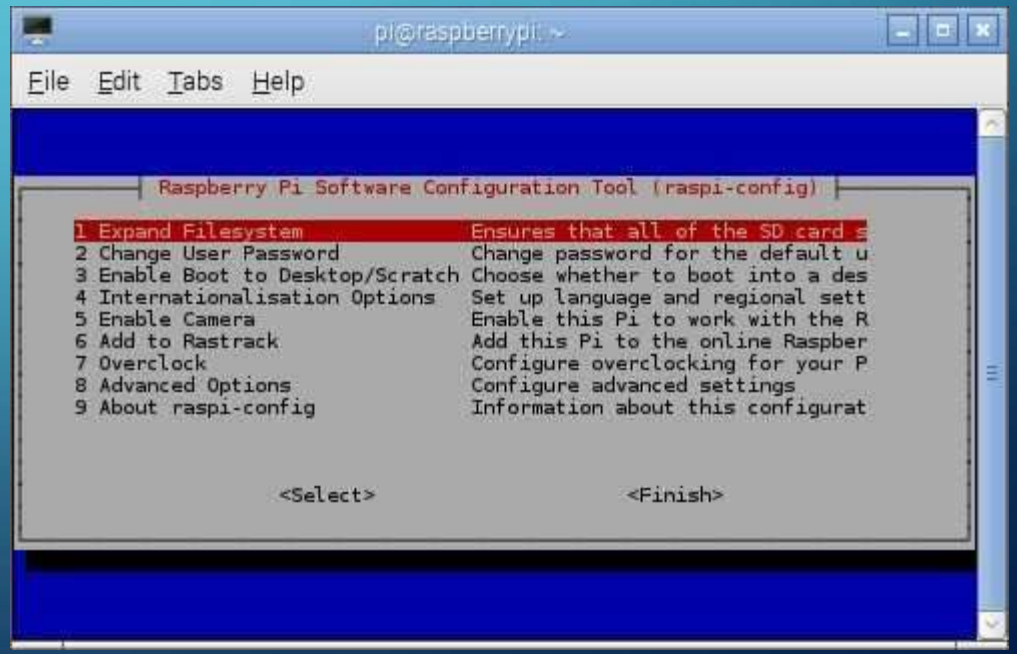
- But you can add a new user to the system!
  - sudo adduser <username>
  - Don’t forget to add security groups!
  - sudo groupmems –group dialout ---add <username>

HOW CAN I PERMANENTLY CHANGE THE WIFI SETTINGS?

- This one was an error in judging my audience. My bad!
  - sudo systemctl disable autohotspot.service
  - sudo nano /etc/dhcpcd.conf
    - Remove line: “nohook wpa_supplicant”
  - Reboot, and voila, GUI WiFi interface is now functional!

HOW DO I EXPAND THE IMAGE TO USE ENTIRE (MICRO) SD CARD?

- You have a 128GB microSD card and the Pi is only using 16GB. What do you do?
- This is automatic on Raspbian Buster
- On older versions of Raspbian:
  - sudo raspi-config
    - Expand Filesystem



HOW DO I CONNECT THE PI TO MY RADIO?

- Short answer: USB
  - Cable from RIG
  - USB Sound Card
    - SignaLink: $135
    - Sabrent USB Sound Adapter $7
- Another short answer: DRAWS Ham Radio HAT by NW Digital Radio $150

HOW TO KEEP ACCURATE TIME ON THE PI?

- In the Hamshack: use timedatectl and NTP
  - Command: timedatectl
  - Command: ntpdate –q 0.us.pool.ntp.org
  - For more info, see https://raspberrytips.com/time-sync-raspberry-pi/
- In the Field: use GPS receiver & gpsd
  - GLONASS GPS Tracker Module for Raspberry Pi: $8
- Alternative: RTC Module $15
- Alternative: DRAWS Hat GPS Receiver $150

HOW DO I POWER MY RASPBERRY PI?

- In the Ham Shack: Power Adapter aka “wall wart”
- Also in the Ham Shack: Power over Ethernet (PoE) $20
- GPIO Pin #2 (5V) GPIO Pin #6 (GND)
  Dangerous – only use if you know what you’re doing
- Mobile Power – USB Battery Pack $15+
- MoPi 2 – Hot-Swap Mobile Power £29
- PiJuice Solar Panels

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: OPERATING DIGITAL MODES

FlDigi Suite by W1HKJ	**gnss-sdr - GLONASS satellite system Software Defined Receiver**
WSJT-X - Weak Signal (FT8, FT4, etc.) by W1JT	linpsk - amateur radio PSK31/RTTY program via soundcard
GridTracker - Graphical mapping companion program for WSJT-X or JTDX	multimon - multimon - program to decode radio transmissions
JTDX - Alternate client for Weak Signal (FT8, FT4, etc.)	multimon-ng - digital radio transmission decoder
JS8Call - Messaging built on top of FT8 protocol by KN4CRD	psk31lx - a terminal based ncurses program for psk31
JS8CallTools - Get Grid coordinates using GPS	twpsk - a psk program

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: LOGGING

- Software included:
  - TrustedQSL - LotW client
  - CQRlog - Ham Radio Logging Application
  - PyQSO - Logging software (written in Python)
  - klog - The Ham Radio Logging program
  - tlf - console based ham radio contest logger
  - tucnak2 - VHF/UHF/SHF Hamradio contest log version 2
  - twlog - basic logging program for ham radio
  - wsjtx_to_n3fjp - Logging adapter to allow WSJT-X to log to N3FJP by yours truly, W3DJS
  - xlog - GTK+ Logging program for Hamradio Operators

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: APRS

- Software included:
  - Direwolf - Software "soundcard" AX.25 packet modem/TNC and APRS encoder/decoder
  - Xastir - APRS GUI client / Digipeater / Igate
  - YAAC - Yet Another APRS Client
  - APRS Message App for JS8Call
  - aprsdigi - digipeater for APRS
  - aprx - APRS Digipeater and iGate
  - soundmodem - Sound Card Amateur Packet Radio Modems

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: CW / MORSE CODE

aldo - Morse code training program	**morse - training program about morse-code for aspiring radio hams**
cw - sound characters as Morse code on the soundcard or console speaker	morse2ascii - tool for decoding the morse codes from a PCM WAV file
cwcp - Text based Morse tutor program	morsegen - convert file to ASCII morse code
xcwcp - Graphical Morse tutor program	qrq - High speed Morse telegraphy trainer
cwdaemon - morse daemon for the serial or parallel port	twcw - sends morse code via the sound card or serial card (Needs RTC installed)
ebook2cw - convert ebooks to Morse MP3s/OGGs	xdemorse - decode Morse signals to text
ebook2cwgui - GUI for ebook2cw	rscw - Receive CW through Soundcard

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: D-STAR

- Software included:
  - d-rats - A communication tool for D-STAR
  - BlueDV - Client for D-Star and DMR (Phone)

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: SOFTWARE DEFINED RADIO (SDR)

CubicSDR - Software Defined Radio receiver	SoapyMultiSDR - Multi-device support module for SoapySDR
cutesdr - Simple demodulation and spectrum display program	SoapyNetSDR - Soapy SDR module for NetSDR protocol
GQRX - Software defined radio receiver	SoapyRemote - Use any Soapy SDR remotely
SDRAngel - SDR player	SoapyRTLSDR - Soapy SDR module for RTL SDR USB dongle
lysdr - Simple software-defined radio	SoapySDR - Vendor and platform neutral SDR support library
quisk - Software Defined Radio (SDR)	SoapySDRPlay - Soapy SDR module for SDRPlay
SoapyAudio - Soapy SDR plugin for Audio devices	
SoapyHackRF - SoapySDR HackRF module	(More SDR HW to be supported in v3 image)

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: SATELLITE COMMUNICATION

- Software included:
  - Gpredict - Satellite prediction
  - predict-gsat - Graphical Predict client
  - gnss-sdr - GLONASS satellite system Software Defined Receiver
  - wxtoimg - NOAA weather imaging software

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: WINLINK / EMCOMM

- Software included:
  - Pat WinLink - WinLink for Raspberry Pi (and other platforms)
  - ARDOP support for Pat WinLink
  - ARDOP-GUI - Provides graphical representation of ARDOP connections
  - Find ARDOP - Retrieves local ARDOP sources by KM4ACK
  - AX25 support for Pat WinLink
  - PMON - a PACTOR® Monitoring Utility for Linux

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: ANTENNA MODELING

- Software included:
  - antennavis - Antenna Visualization Software
  - gsmc - A GTK Smith Chart Calculator for RF impedance matching
  - nec2c - Translation of the NEC2 FORTRAN source code to the C language
  - xnecview - NEC structure and gain pattern viewer
  - yagiuda - software to analyse performance of Yagi-Uda antennas
  - VOACAP - HF propagation prediction

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: HAM TRAINING / TESTING

- Software included:
  - fccexam - Study tool for USA FCC commercial radio license exams.
  - hamexam - Study guide for USA FCC amateur radio (ham radio) license examinations.

W3DJS RASPBERRY PI FOR HAM RADIO IMAGE V2.0 USE CASE: MISCELLANEOUS APPLICATIONS

- Software included:
  - CHIRP - Radio Programming Software
  - QTel - EchoLink client
  - QSSTV - Slow Scan TV (e.g. "Fax")
  - FreeDV - Free digital voice vocoder
  - WsprryPi - WSPR software
  - ADS-B Flight Tracking Software
  - Xdx is a DX-cluster client
  - DXSpider - DX Cluster Server

THE W3DJS RASPBERRY PI IMAGE V2.0 SUPPORTS

- The Father's Rights Movement – 50/50 Shared Parenting