

Jon Marler - K4CHN - Aug 2023

Amateur Radio Digital Modes Without a Pi

SBC alternatives to the Raspberry Pi for Ham Radio Digital Modes



K4CHN / Jon Marler

Amateur Radio Operator / Hacker

- First radio - Lafayette KT-200
- Passed Technician @ DefCon 27
- Passed General @ DefCon 28
- Passed Extra & DefCon 29
- 40m voice
- Fairly active on 40m FT8
- Monitor 14.230 SSTV
- Breaker and fixer of all things



N COMEDY SPECIAL

JON MARLER *LIVE AT SECOND CITY!*

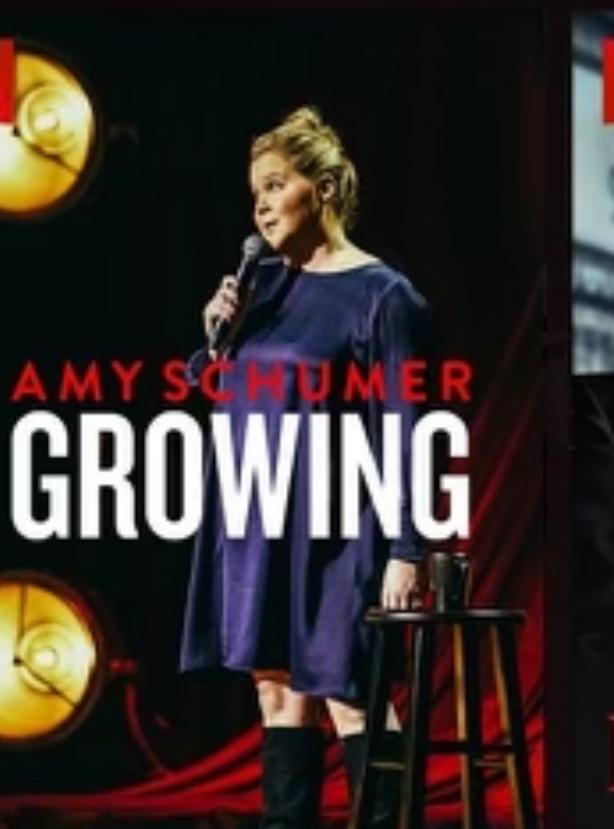
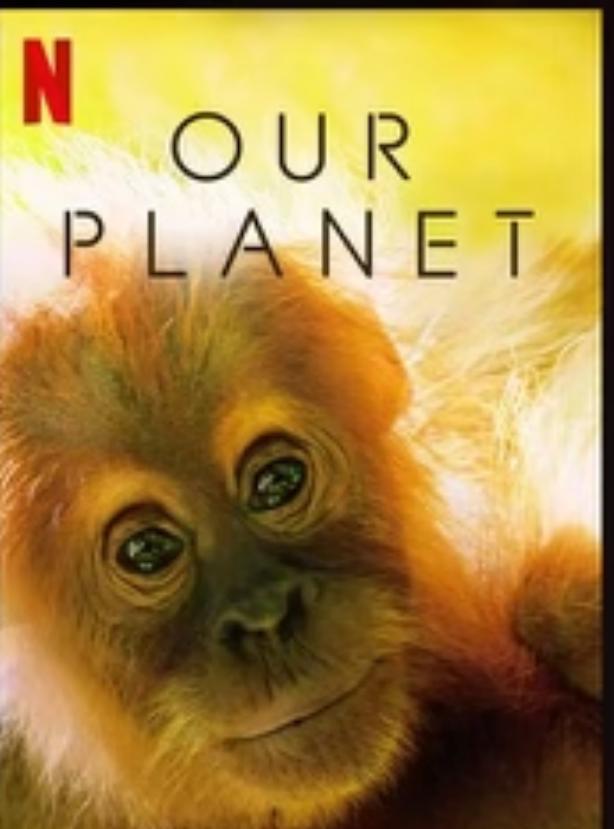
From kpop to curling to the cyber security world's darkest secrets, this 4 hour standup special will leave you saying... "wait what?"

Play

+ My List



Popular on Netflix



Presentation Agenda

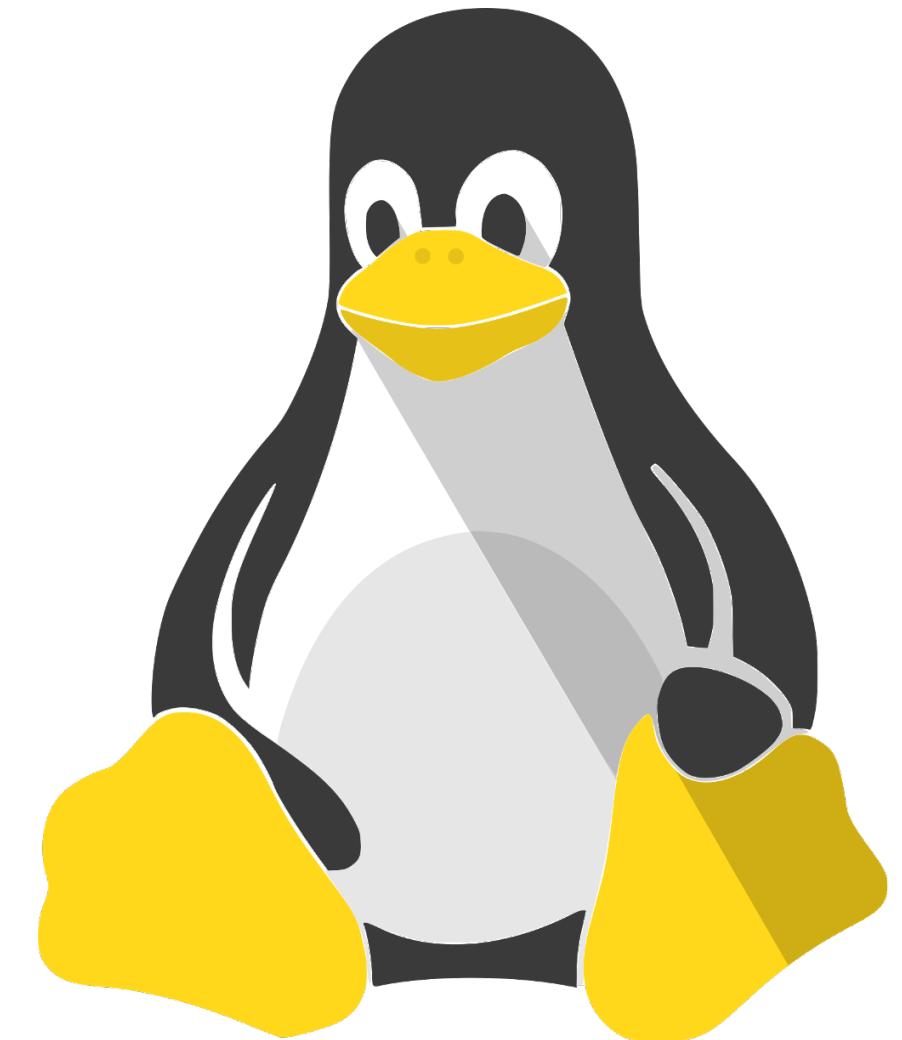
SBC Alternatives to the Raspberry Pi for Ham Radio Digital Modes



What is an SBC?

arm

Pi Alternatives

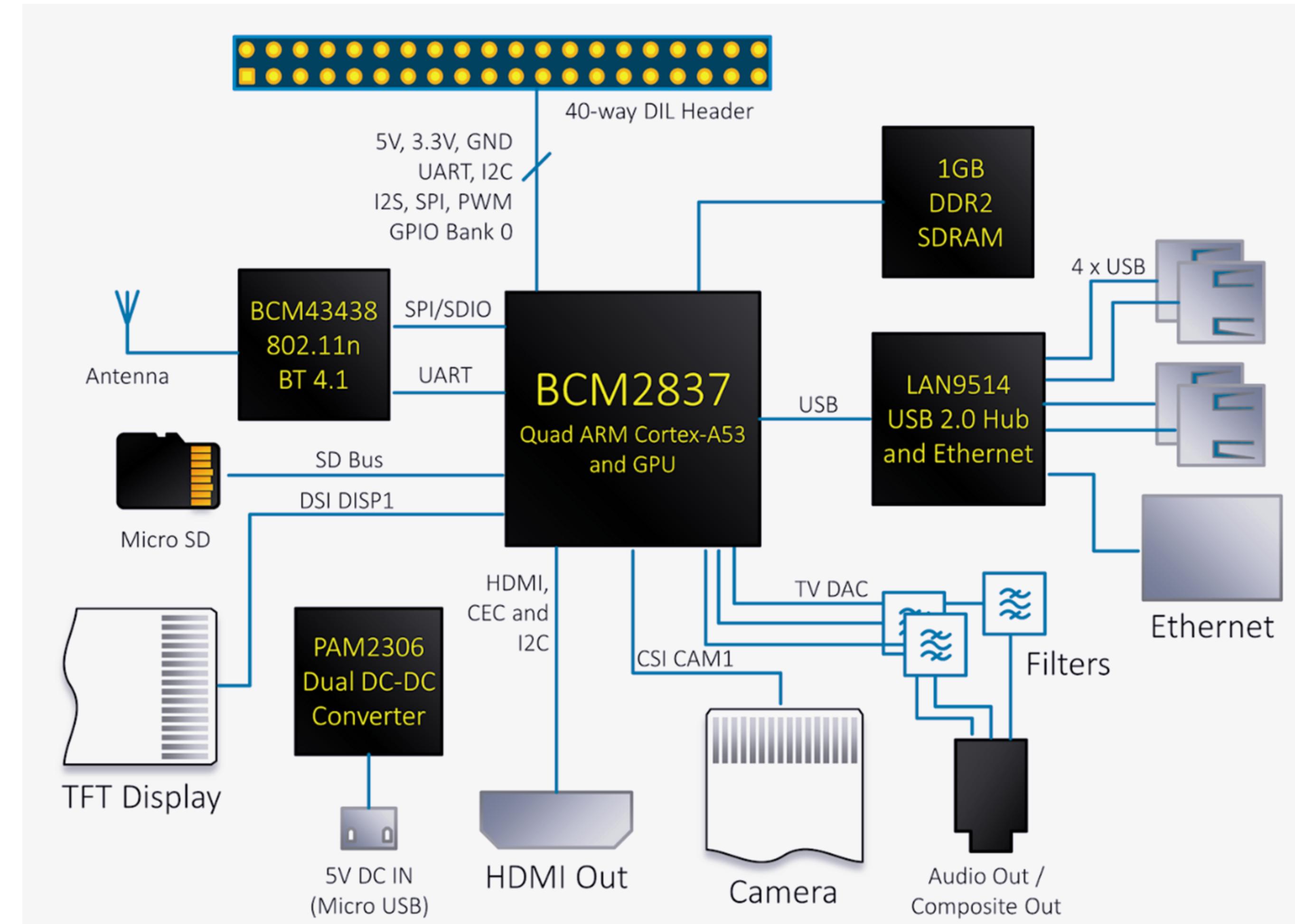


Linux OS

What is a Single Board Computer?

Single Board Computers Intro

What is a single board computer (SBC) ?



Raspberry Pi Alternatives

Libre Computing

Which Libre boards have I tested and recommend?

- Libre Renegade
 - 4GB DDR4 BT WiFi5 4 Core 1Gb Ethernet CPU **\$50.00**
- Libre Potato
 - 2GB DDR3 100Mb Ethernet CPU **\$35.00**

Orange Pi

Which Orange Pi boards have I tested and recommend?

- Orange Pi 4 LTS
 - 4GB DDR4 16GB MMC 2+4 Core CPU **\$72.90**
- Orange Pi 5B
 - 4GB DDR4 32GB MMC BT5 WiFi6 4+4 Core CPU **\$85.00**
- Orange Pi 5
 - 4GB DDR4 PCIE 4+4 Core CPU **\$74.90**

Linux OS for Ham Radio

Libre Renegade Notes

Notes specific to this board

- Boots Libre's Raspbian without issues and includes pi libraries
- Use rasp-config to enable ssh and NetworkManager
- Does not have WiFi on-board. Must use a USB dongle. I used an RTL8811AU device.
 - I followed the instructions at <https://github.com/morrownr/8821au-20210708> and chose the AP driver to enable the “hotspot” package provided by build-a-pi
- Install the gnome-classic package if you want the classic menus

Orange Pi LTS 4 Notes

Notes specific to this board

- Armbian for non-raspberry pi board doesn't include pi libraries
 - sudo apt-get install libraspberrypi0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libbcm_host.so /usr/lib/libbcm_host.so.0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libvcos.so /usr/lib/libvcos.so.0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libvchiq_arm.so /usr/lib/libvchiq_arm.so.0
 - sudo ldconfig
- Includes WiFi on the board. Worked without any issues
- Recent updates break HDMI output. Install an older stable release and don't update until it is fixed. LFMF.

Orange Pi 5b Notes

Notes specific to this board

- Armbian for non-raspberry pi board doesn't include pi libraries
 - sudo apt-get install libraspberrypi0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libbcm_host.so /usr/lib/libbcm_host.so.0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libvcos.so /usr/lib/libvcos.so.0
 - sudo ln -fs /usr/lib/aarch64-linux-gnu/libvchiq_arm.so /usr/lib/libvchiq_arm.so.0
 - sudo ldconfig
- The release armbian image is **not** configured for the 5b board (no emmc)
 - Open armbianenv.txt and change fdtfile=rockchip/rk3588s-orangepi-5.dtb to fdtfile=rockchip/rk3588s-orangepi-5b.dtb
- Install to emmc with the armbian-install command
- Includes WiFi on the board. Worked without any issues.
- The date may be very wrong. This will cause endless problems and prevent apt from working

KM4ACK's build-a-pi Script - Intro

Easily install ham tools using KM4ACK's installation script

- Clone from git
 - `git clone https://github.com/km4ack/pi-build.git`
- Launch the installer
 - `./pi-build/build-a-pi`
- Select packages
- You may need some credentials depending on what you choose
- 

KM4ACK's build-a-pi Script - Packages

What packages make for a good base to start from?

- HAMLIB
- DIREWOLF
- AX25
- PULSE
- CHIRP
- JS8CALL
- WSJTX
- QSSTV
- GRIDTRACKER
- TQSL

General Notes

Notes not specific to either board

- Install the `gnome-classic` package if you want the classic menus installed by the script if using raspbian. For armbian, install the `lxde` and `lxdm` packages and use the `lxde` session when logging in
- Use `armbian-config` in armbian or `raspi-config` in raspbian to configure system
- If you want remote desktop use RealVNC
 - <https://downloads.realvnc.com/download/file/vnc.files/VNC-Connect-Installer-1.3.0-Linux-ARM64.tar.gz>
 - Don't use the `.deb` installer as I had to fight with it to make it work due to missing libraries
 - Armbian is the worst with these library issues
 - VNC is great for using apps like `wsjtx`, `gridtracker`, and anything GUI
 - For text apps, install `tmux` so you can open multiple text window sessions that survive after logout

Fin

Stay in Touch

How to stay in touch with me

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- Github: <https://www.github.com/jmarler>
 - <https://github.com/jmarler/DefCon31HRVPresentations>