

The OggBox – An open hardware music player

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What is the OggBox?

- Open hardware music player/recorder
- Designed with open source tools
- Running open source firmware

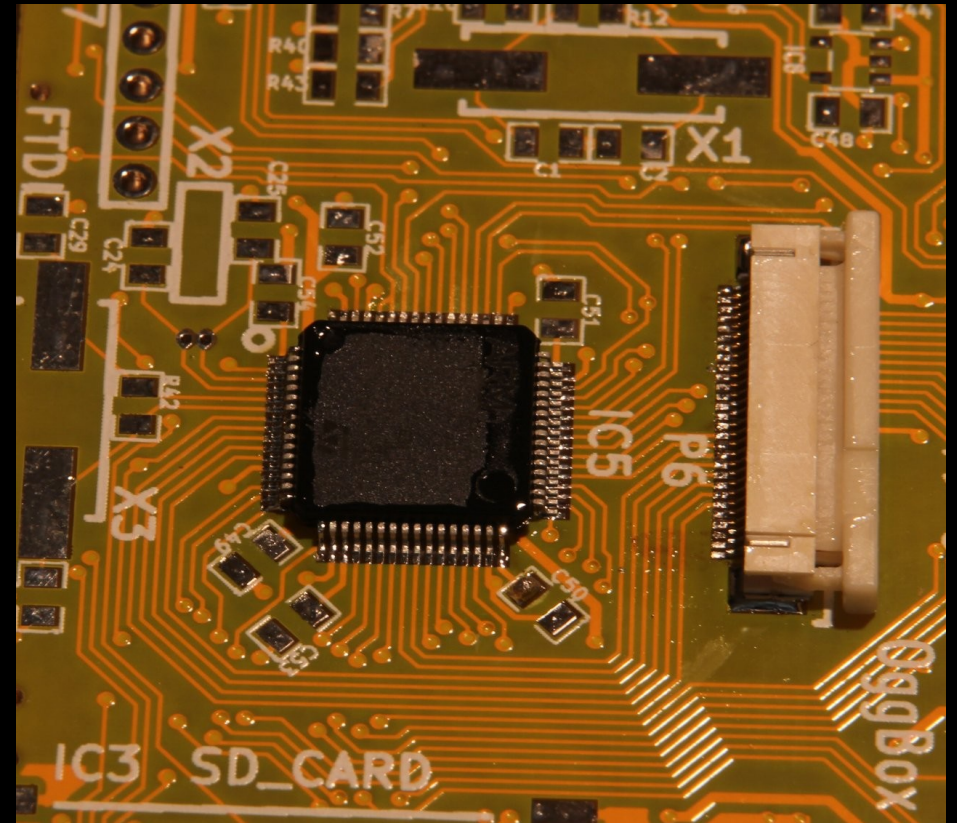


Motivation

- A broad project, software, hardware
- A more hackable platform
- Project was started in a different time...
- Personal itch

Hardware Overview

- ARM Cortex M3 microcontroller
- VS1053/8053 CODEC and amplifier chip
- 128x64 Graphic LCD
- SD Card
- LiPo battery
- USB charging socket
- 8 push switches and 1 slider “hold” button



Software Overview

- All written in vanilla C
- Asynchronous (interrupt/DMA driven) SD to Codec file playing routines.
- Basic screen driving routines.
- SD card file io (stdio syscalls)
- File playback progress
- Ogg Vorbis meta data handling (incomplete)
- Track database (incomplete)

What does this show about Open Hardware?

- The Open Source EDA tools used are complete and of professional quality.
- Guidelines for open hardware are maturing but not settled (logo dispute for example)
- Sharing complex designs is easy with open tools
- Complex “professional” designs can be done on a shoestring budget

How was it done – Hardware

- Full source in GIT
- Schematic and PCB design in KiCAD
- Gerber and drill files from KiCAD sent directly for manufacture
- BOM managed with Libre Office
- Hand assembled

How was it done – software

- GCC for ARM Cortex built using “summon-arm-toolchain” script (see github)
- The hardware support library is libopencm3 library – LGPL
- Newlib C library used
- Programming done via serial port using GPLv2 “stm32flash” program

Conclusions

- Needs a Rev B hardware release
- Software is taking shape but not done
- Stands as an example of a moderately complex project executed entirely with open source.
- Should make a good hardware CV!

More info...
oggbox.nathandumont.com

