

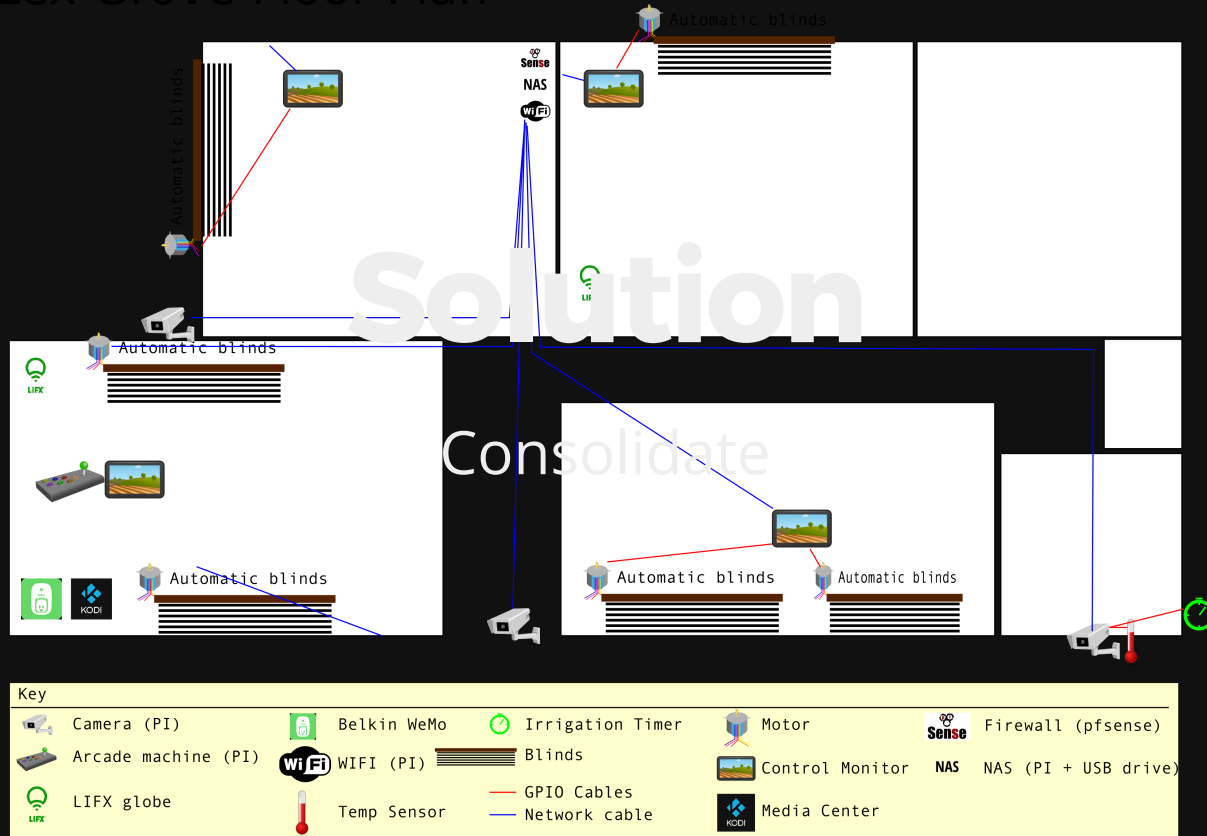
Power

It's expensive running a lot of computers all the time.

Problem

7 computers are on at all times.

Lex Grove Floor Plan



Comms Rack

Device	Qty
Firewall (pfsense)	1
Raspberry Pis (WIFI & NAS)	2
Switch	1
Total power (\$ p/yr)	\$100

Comms Rack Solution

Use the firewall for WIFI, NAS & Firewall

Firewall

www.yawarra.com.au



Configure WIFI

1. Insert card into firewall (PCI-e)
2. Upgrade pfsense 2.4 (for WIFI support)
3. Configure WIFI

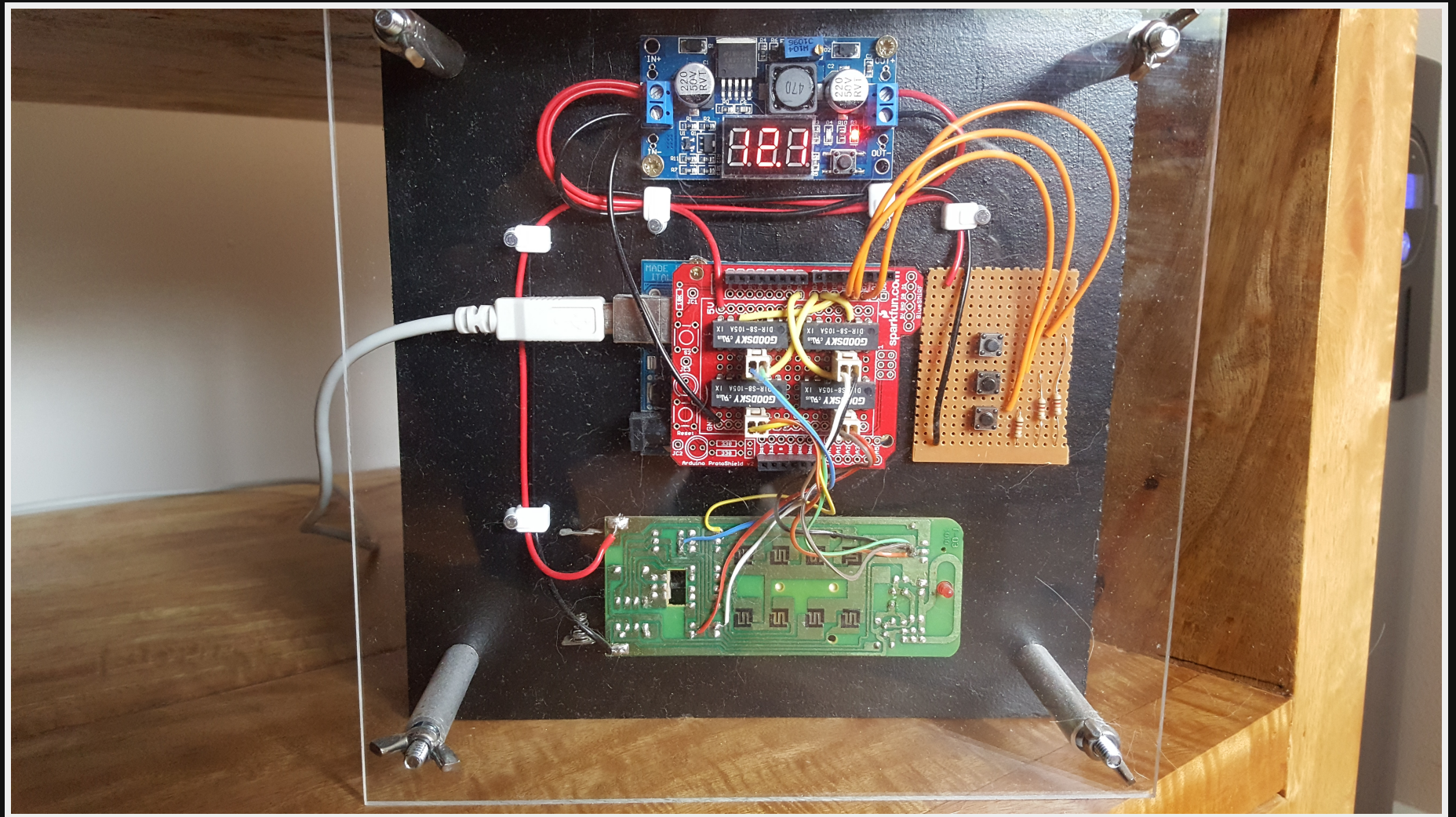
Configure NAS

1. Attach USB 3.0 drive to back of pfsense
2. Format as UFS (FreeBSD compatible)
3. Use SCP to transfer backups to drive

Entertainment Unit

Device	Qty
Media Center PC	1
UPS	1
HD Homerun (dual tuner)	1
Soundbar	1
TV	1
Smart Switch	1
Total power (\$ p/yr)	\$417

Smart Switch



Internet switch

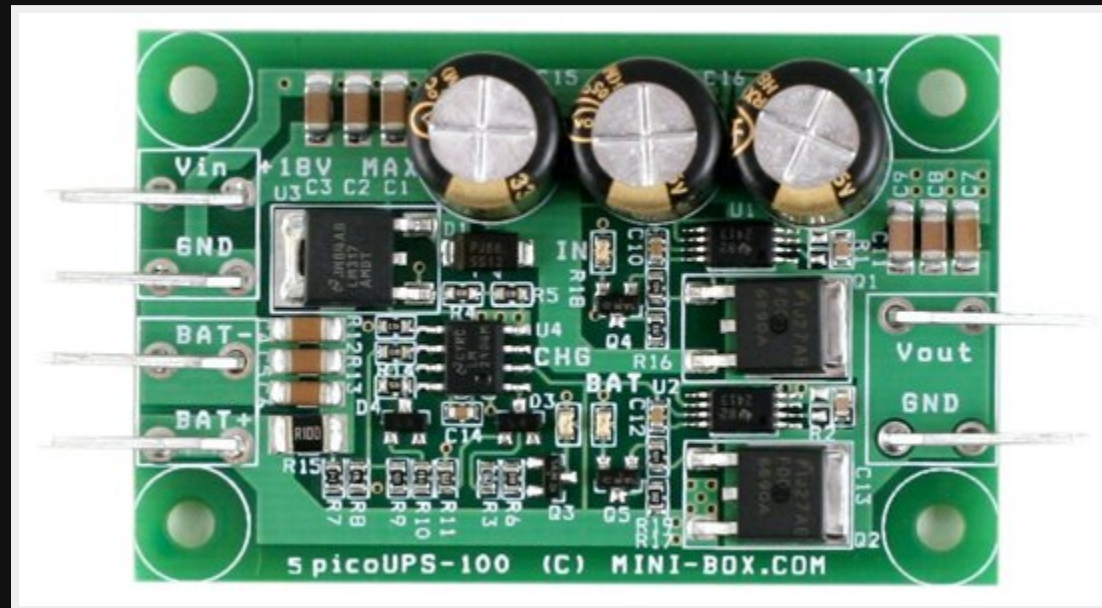
- Turns off Amp, TV & light in lounge
- Control over web/mobile/scripts
- Completely open source

Replace UPS

Instead of using a UPS for 240volts use a 12volt UPS or None.

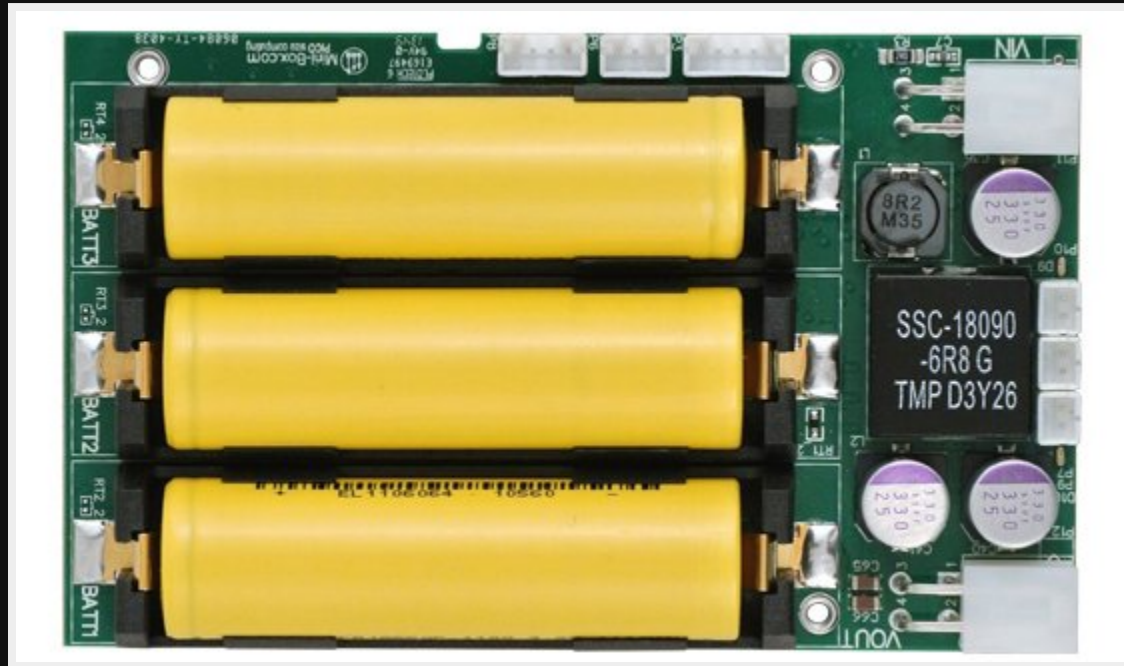
- Should be less power loss
- Smaller

PicoUPS-1000 (\$30 + 12V batt)



- Really small (58x36x20mm)
- Output 12V/10A
- Standard 12V battery

OpenUPS2 (\$109 + batts)



- 2.5" footprint
- Input 11-24V
- Output 12-24V/5A
- Removable battery

Media Center PC



Specs

CPU	i7 2700K
GPU	Nvidia Geforce 980
Mem	20GB
HD	2 x SSD (raid 1), 1x6TB, 1x3TB

Uses

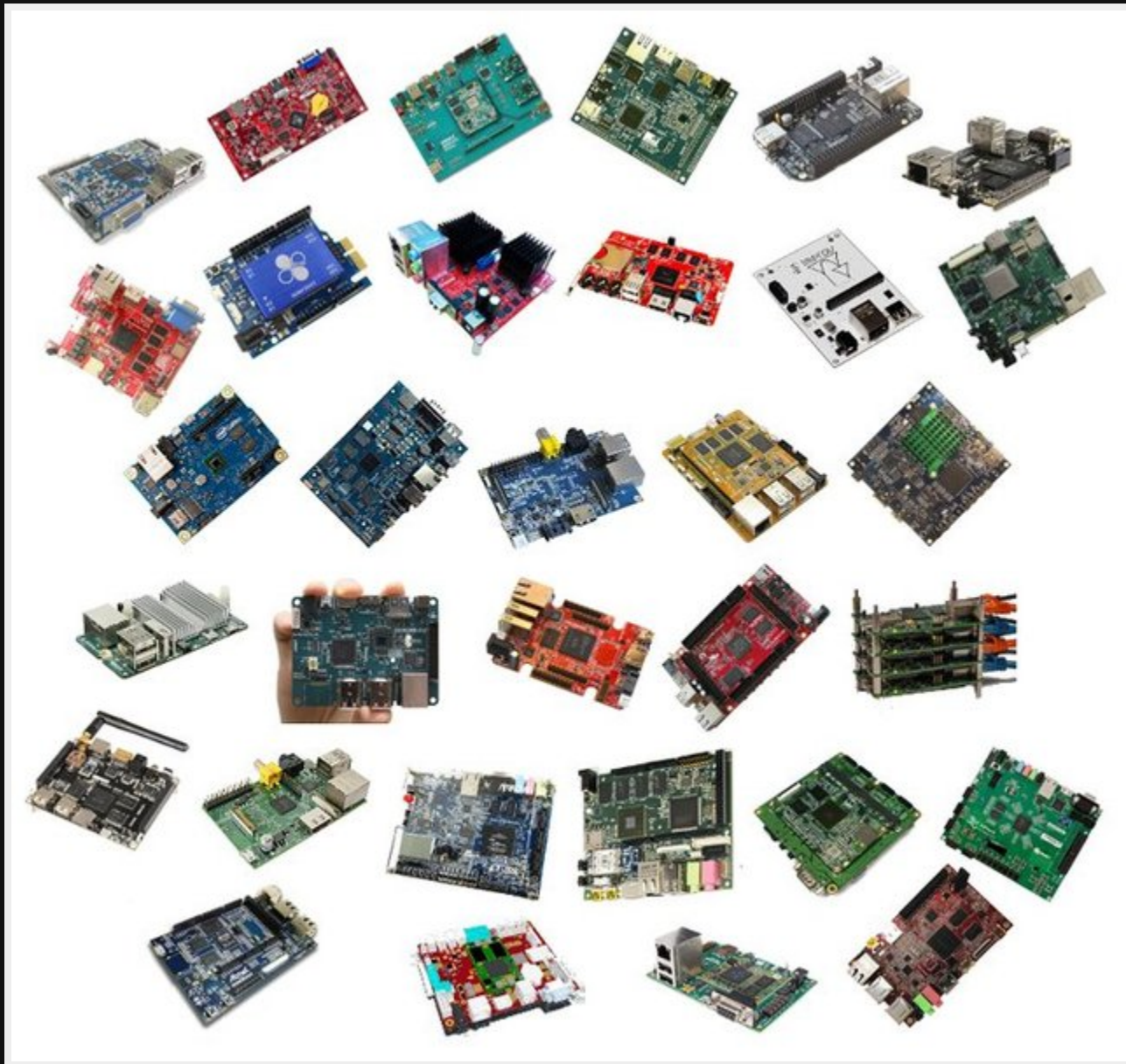
- MLUG website
- Kodi
- Tvheadend (watch, record TV)
- Youtube, Twitch, streaming services (Netflix, Stan, Spotify)
- LTSP server
- Gaming
- Browsing internet

Replace Media Center

Requirements

1. Linux Compatible
2. Low power
3. Fast enough for all main activities
4. Under \$400
5. Flexible

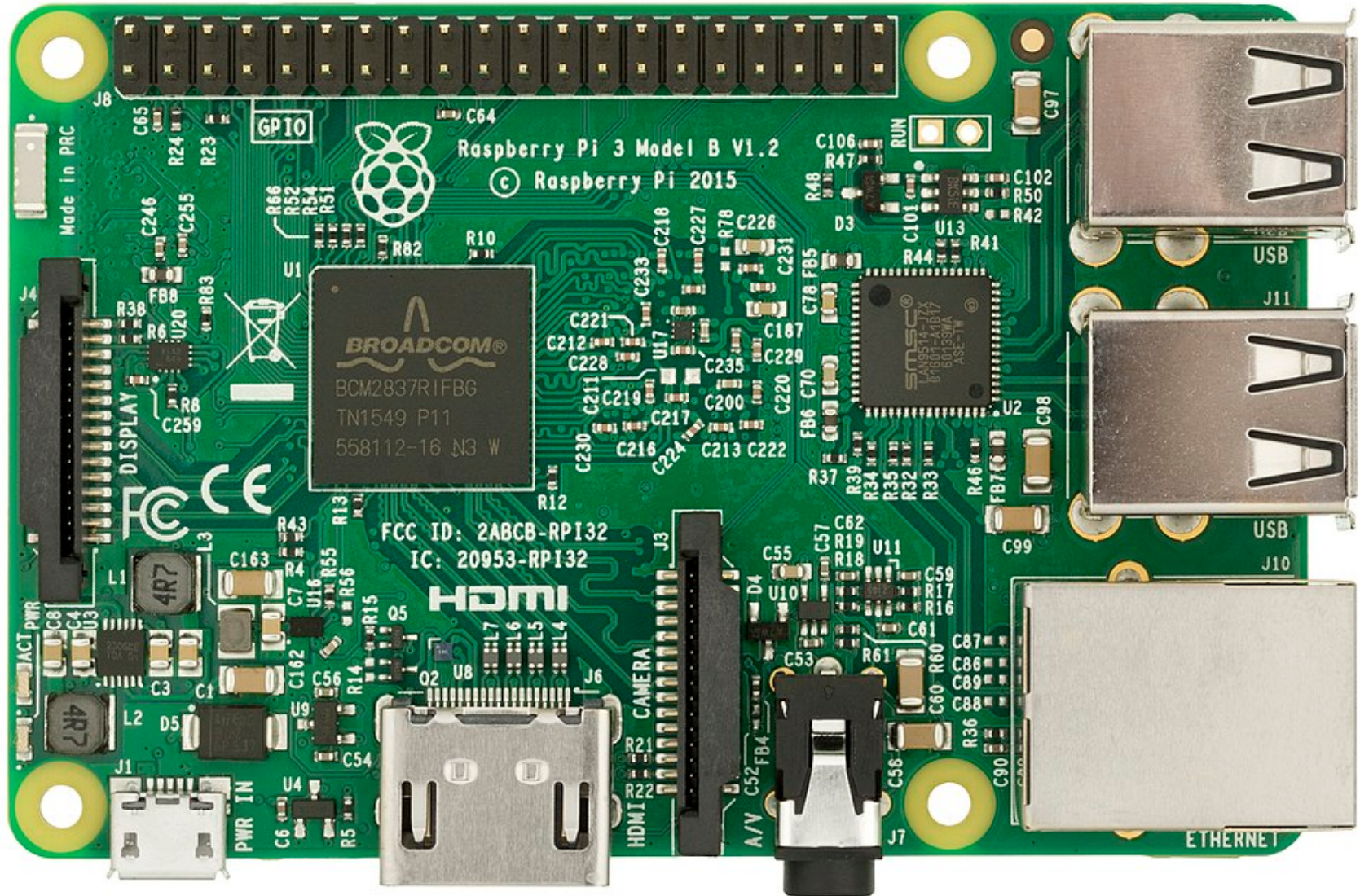
Single Board Computers



Options

1. Raspberry PI 3 with LibreElec
2. Raspberry PI 3 with Raspbian + Kodi
3. ASUS Tinker
4. Udo0 x86 Advanced Plus

Raspberry Pi (\$50)



LibreElec

Pros

- Easy (Everything configured through Kodi)
- Fast Kodi + TVheadend
- Plays HD content from Youtube & Live TV

Cons

- No Browser

Raspbian + Kodi

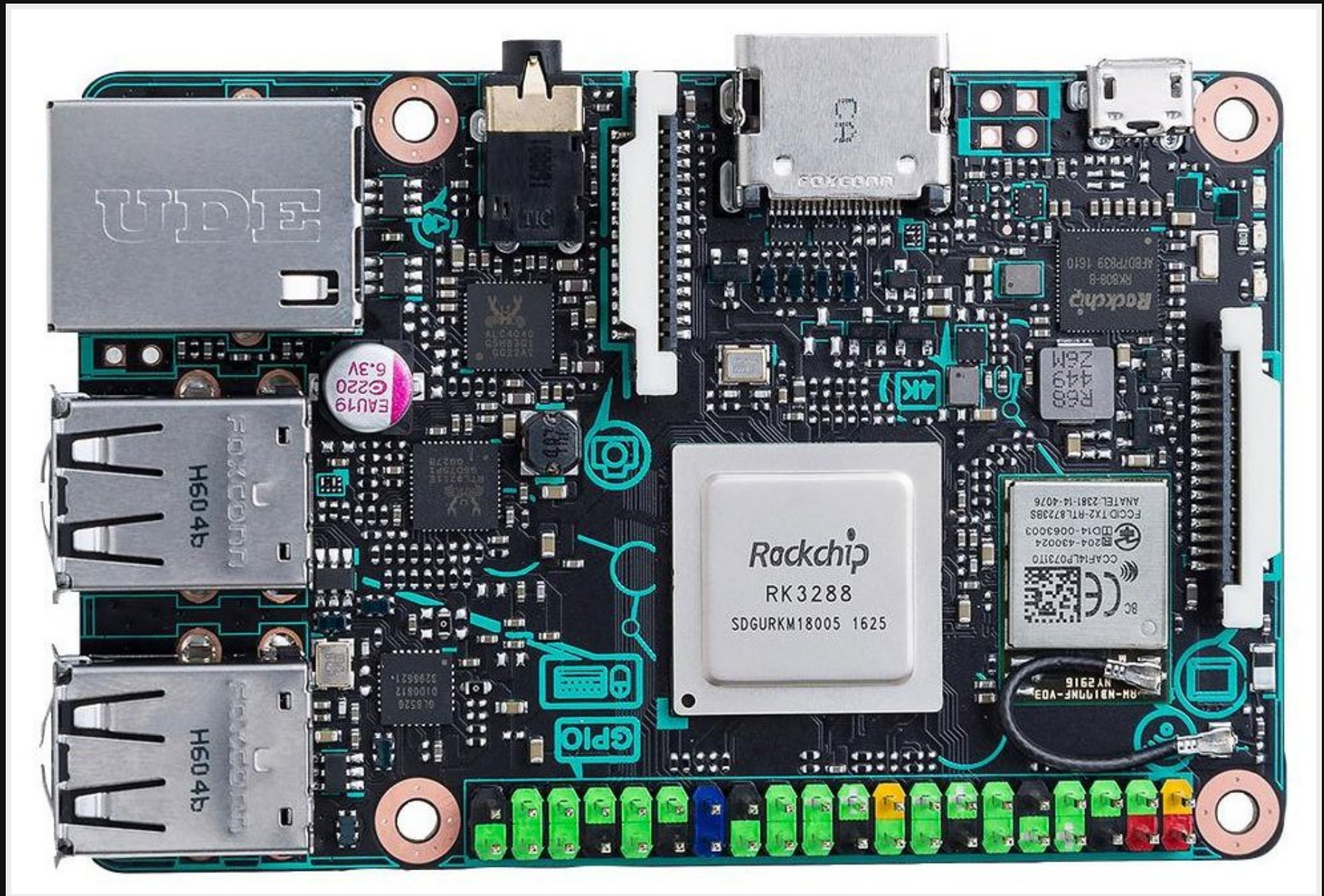
Pros

- Has a browser
- Kodi would work, but slow

Cons

- Too slow
- No gaming
- No LTSP server

ASUS Tinker Board (\$100)



ASUS Tinker Board + Kodi

ASUS default OS is Debian

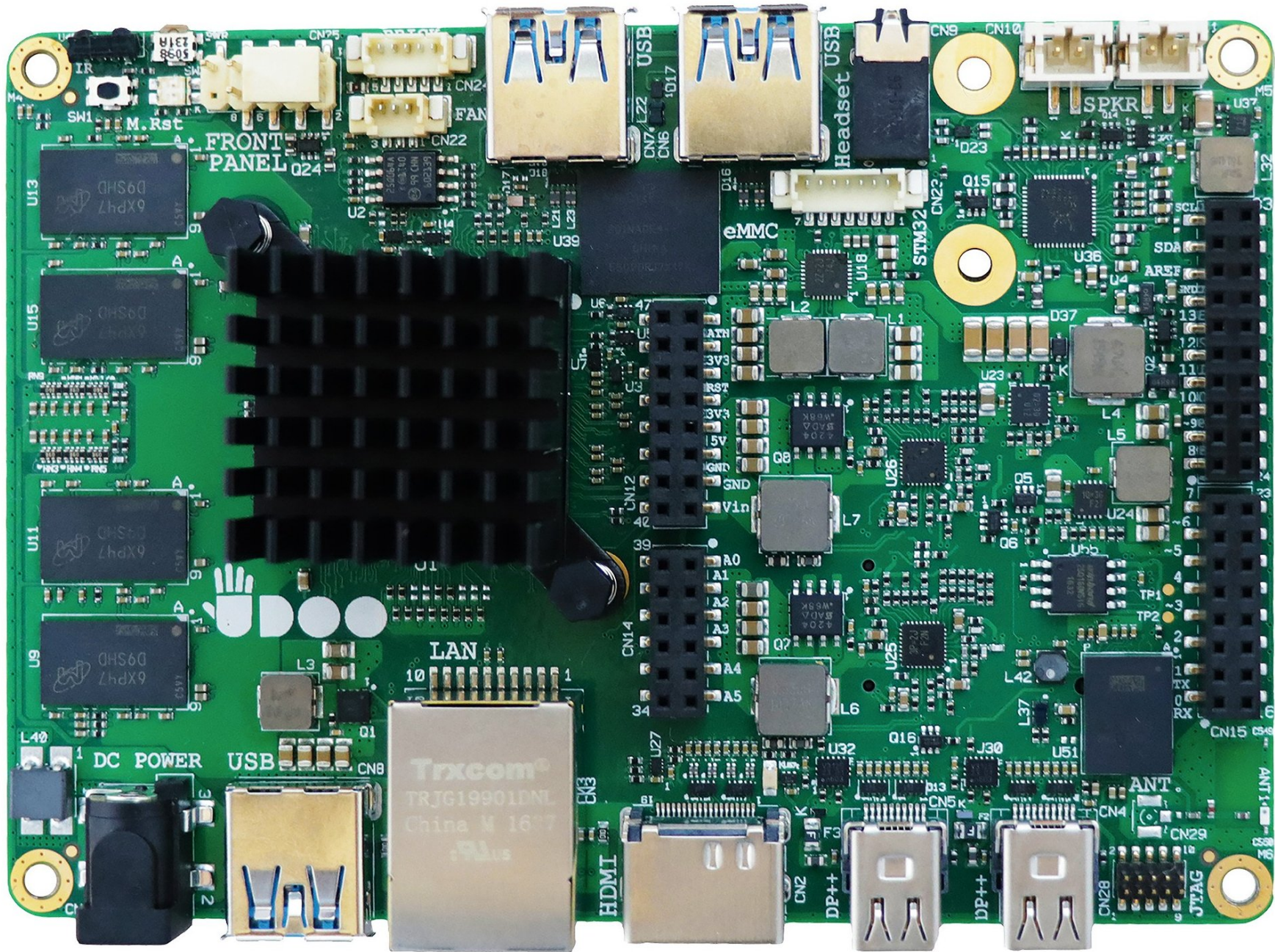
Pros

- Small
- Cheap

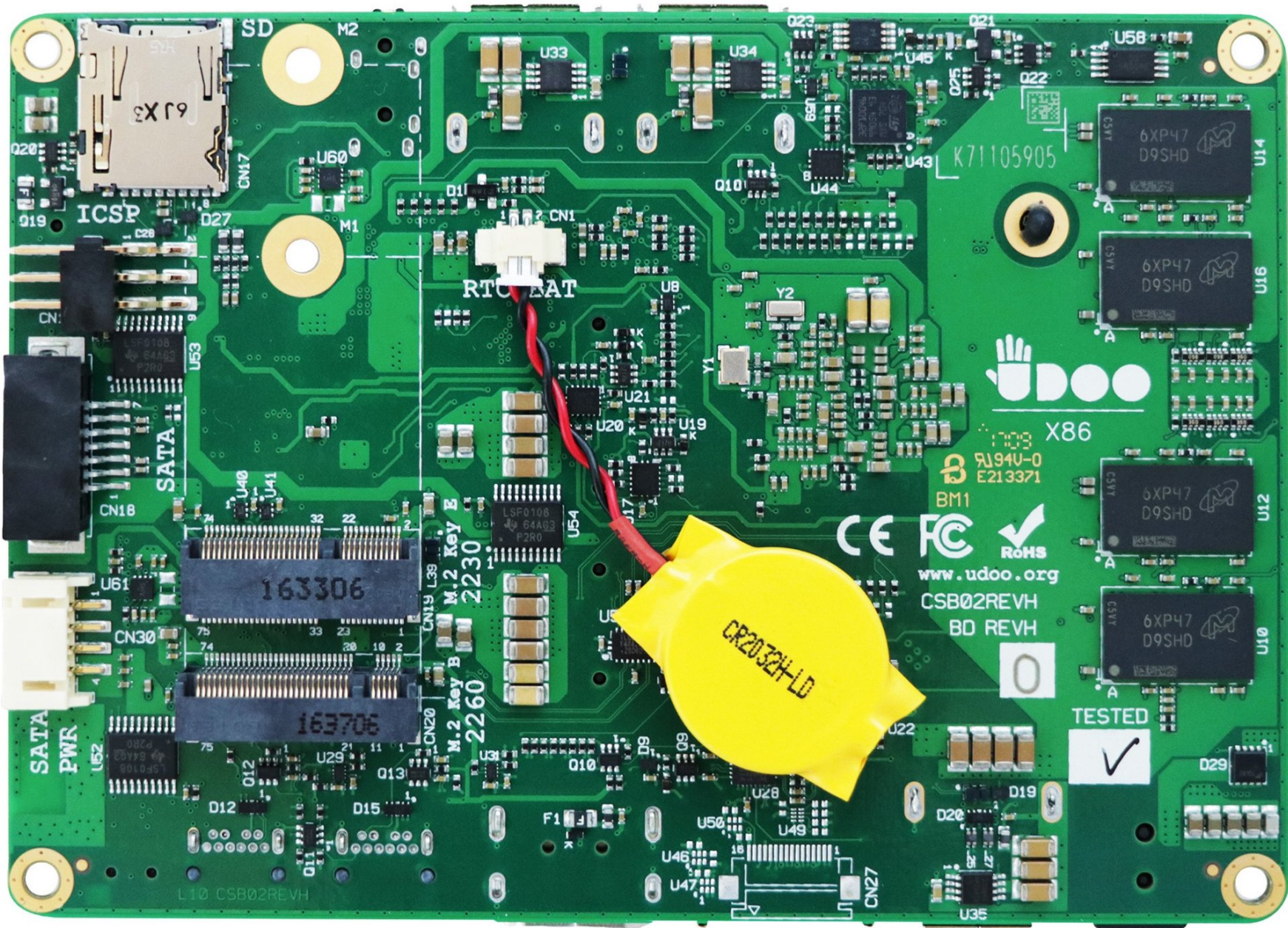
Cons

- Hard to get
- Low powered
- No community

Udoo x86 Advanced Plus front (\$250)



Udoo x86 Advanced Plus back



ICSP

RTC BAT

SATA

SATA PWR

163306

163706

M.2 Key B
2230
2260

CE FCC RoHS

www.udoo.org

CSB02REVH
BD REVH

TESTED



L10 CSB02REVH

CR2032H-LD



X86

9194V-0
E213371

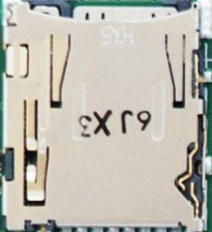
BM1

6XP47
D9SHD

6XP47
D9SHD

6XP47
D9SHD

6XP47
D9SHD



SD

M1

M2

U29

D12

D15

D19

D29

U28

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Udoo x86 Advanced Plus Specs

CPU	Intel N3160 (Quad core 2.24Ghz x86)
Mem	4GB (8GB in Ultra)
GPU	Intel HD 400 @ 640Mhz (HDMI, 2 x Mini DP)
HD	32GB eMMC, SATA, M.2 Key B, Micro SD
Net	1 Gbit (optional 2 x Gbit on M.2)
WIFI	Optional using M.2 Key E connector
Ports	3xUSB 3.0, 2xUART, Audio
Extra	IR, RTC, PXE, 2xI2C, GPIOs (Arduino Intel Curie)
Power	12V3A

Udoo x86 Advanced Plus

Pros

- x86 64bit
- Could do 90% of the tasks of my current unit
- Very low power (Idle 3Watts, Average 11Watts)
- Standard 12V3A barrel connector
- BIOS exists

Cons

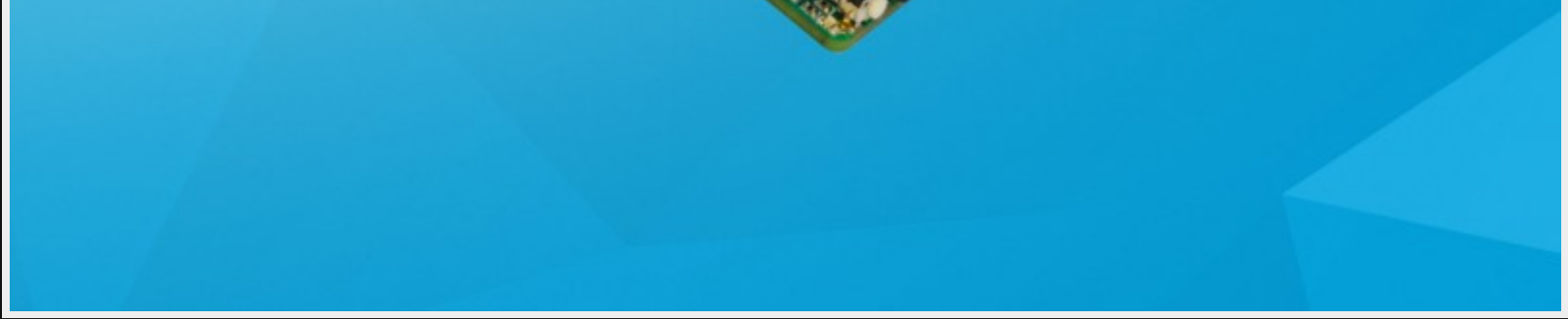
- Not powerful enough for proper gaming
- More expensive than a PI or ASUS Tinker
- Linux doesn't use the CPU burst rate Ref: [1](#), [2](#), [3](#)

UP Squared (\$333)

CPU	Intel N4200 (Quad core 2.5Ghz x86)
Mem	4GB
GPU	Intel 500/505HD (2xHDMI, 1xeDP)
HD	eMMC up to 128GB, M2 Key E, SATA3
Net	2xGbit
WIFI	Optional using M.2 Key E connector
Ports	2xUSB2.0, 4xUSB3.0, mini-PCle
Extra	GPIO (PI compatible), RTC, PXE
Power	5V6A

UP Squared





UP Squared (UPS)





UP Squared

Pros

- Faster CPU & GPU
- Smaller
- UPS hat option

Cons

- GPIO is not Arduino compatible You have to use the FPGA which is harder to program
- CPU is on the bottom, makes casing the unit hard.

References

- <http://au.mouser.com> - Australia supplier (udoo & UP squared)
- <https://en.wikipedia.org/wiki/M.2>
- <https://shop.udoo.org/other/home/udoo-x86-advanced-plus.html>
- <http://www.mini-box.com>
- <https://www.slant.co/topics/1629/~single-board-computers>

Questions

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