RaSCSI for 68k Macs

Background, Current Status and Roadmap

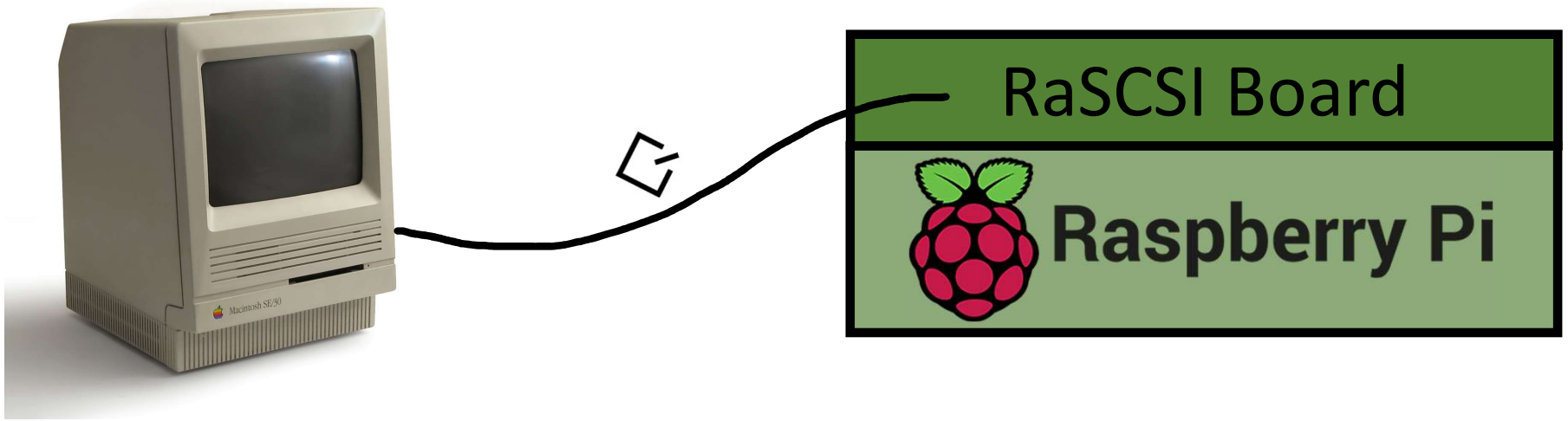
FOSDEM 21

Tony Kuker

07-Feb-2020

What is RaSCSI?

Raspberry Pi + Parallel SCSI = RaSCSI



SCSI: Small Computer System Interface

What use cases is RaSCSI *NOT* trying to fill?

- Wide SCSI, high performance SCSI
- Serial Attached SCSI (SAS)
- Mission critical use cases

Server Rack Image – *CC BY-SA 4.0 Trique303*

What use cases is RaSCSI trying to fill?

Replacement for failing vintage mechanical drives

- Hard disks, CD-ROM, Magnetic Media

Emulation of rare vintage SCSI Peripherals

- SCSI Ethernet Interface
- SCSI Display Adapter (ex: Scuzzy Graph)

“Host Bridge” (X68000)

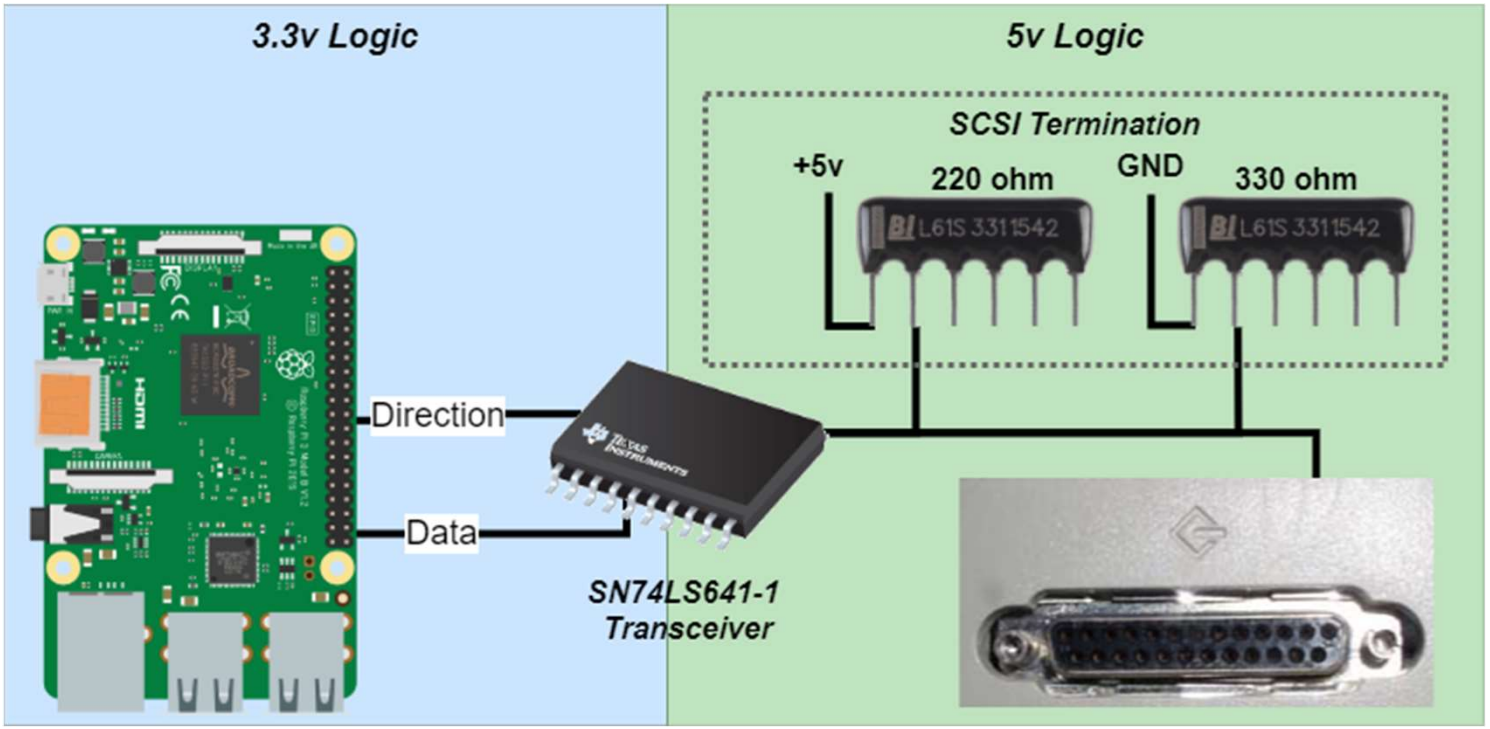
ScuzzyGraph – Fair use
DaynaPort – Fair use

Where has it successfully been used?

https://github.com/akuker/RASCSI/wiki/Compatibility

Mac Images licensed under CC-SA by Danamania
X68000 image licensed under CC BY-SA by Manupkp
AKAI Sampler – Public Domain

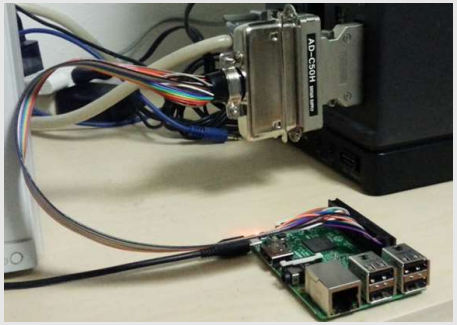
How does it work?



Resistor: CC BY 2.0 – Sparkfun
SN74LS641 – © Texas Instruments, Fair Use
SCSI Port – CC BY-SA 3.0 Charles Bunnell CB1226
Raspberry Pi – CC BY-SA 4.0 Butix, based on works by Lucasbosch and Cmykey

Types / Configurations

Direct Link



- No transceivers
- Directly connect Pi GPIO to SCSI
- Cable & PCB versions
- Potential for long-term damage to Pi

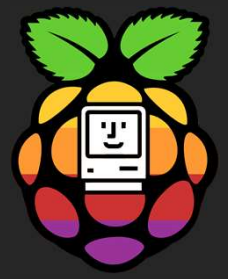
Target Only

- Operates as SCSI Target Only
- Direction of data lines hard-wired to IO signal

Full spec

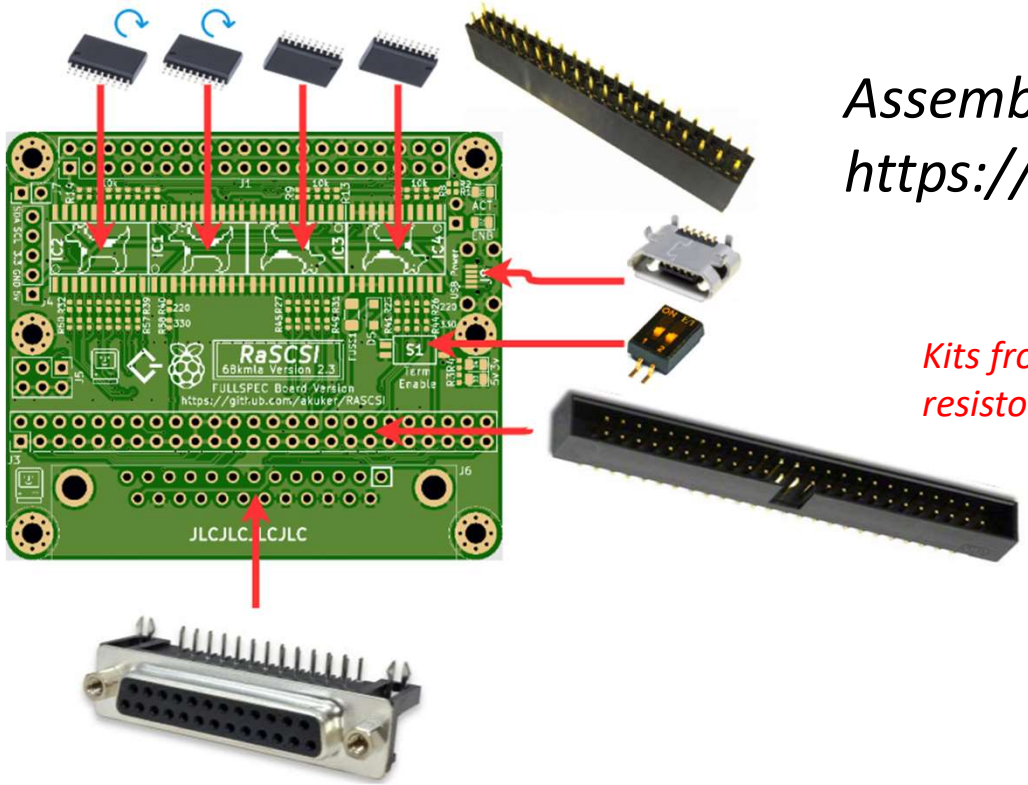
- Supports SCSI Target or Initiator modes
- Able to create disk images

Comparison to other SCSI emulator devices



	RaSCSI (68kmla edition)	RaSCSI (GIMONS)	BlueSCSI	SCSI2SD	MacSD
Hard Disk	✓	✓	✓	✓	✓
CD-ROM	✓	✓	✗	✓	✓
Floppy Disk	✗	✗	✗	✓	✗
Magneto-Optical	✓	✓	✗	✓	✗
Ethernet	✓ (Beta)	✓	✗	✗	✗
CD Audio	✗	✗	✗	✗	✓
Cost	$45 ($30 kit) + Pi Approx €37 (€25)	7,200 JPY + Pi Approx $65 Approx €57	$25 (complete kit) Approx €20	$62 Approx €51	$129 Approx €107

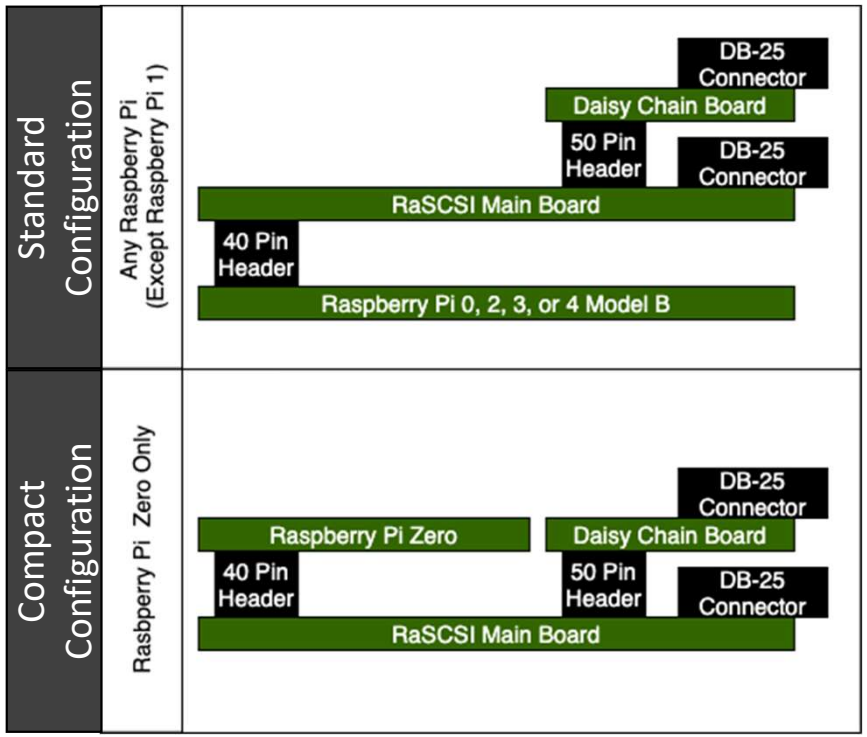
Assembly



Assembly demonstration:
https://youtu.be/tUgxcchH2yg

Kits from Tindie have small surface mount resistors, LEDs, fuse and diode pre-installed

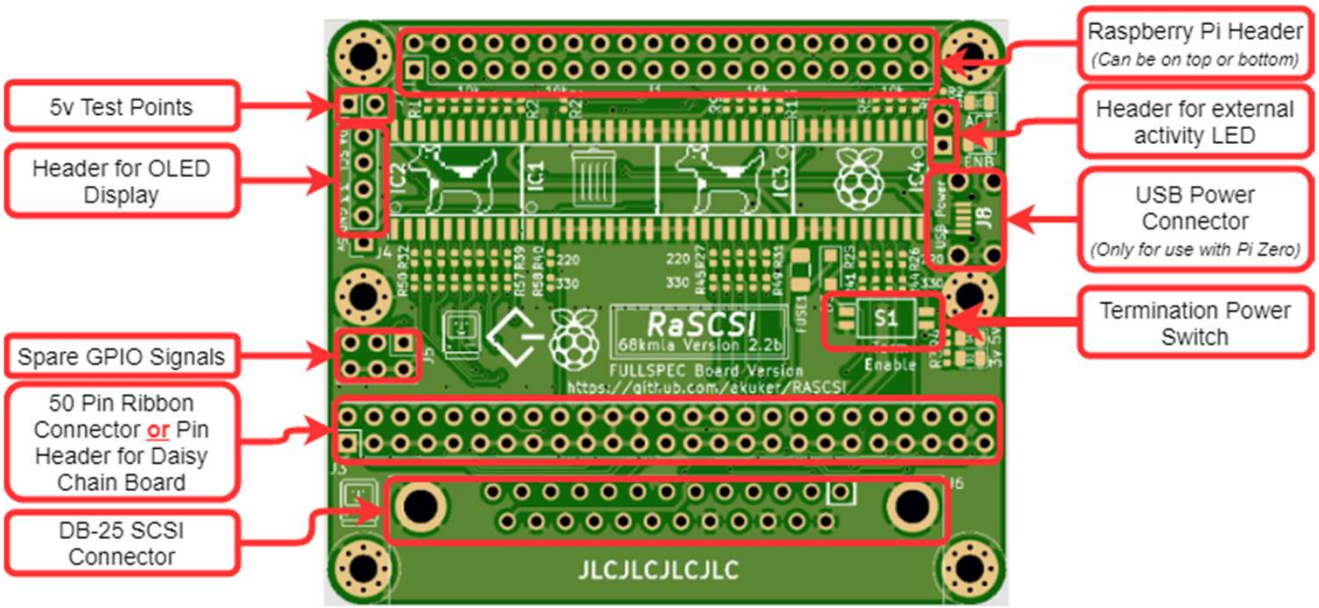
Assembly Options



3D Printed case

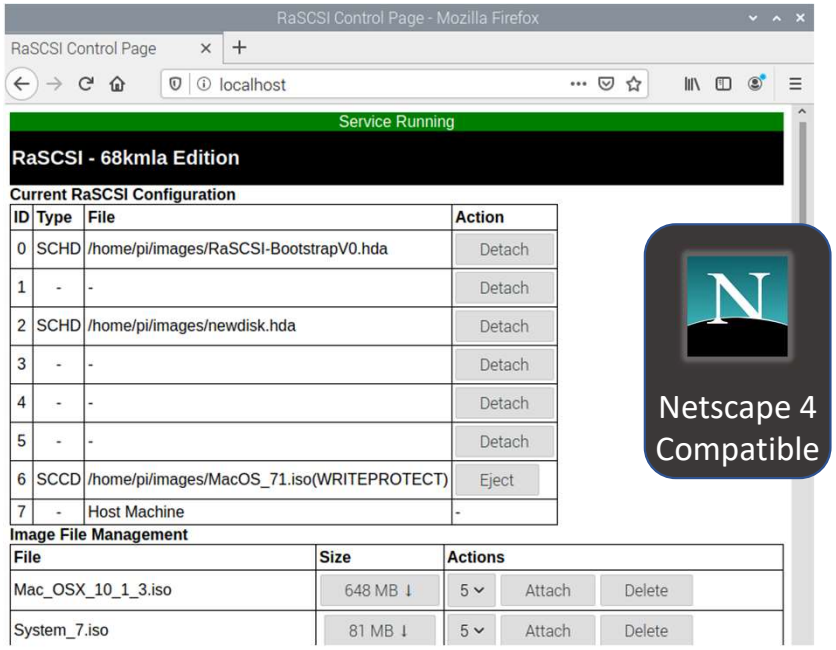
https://www.etsy.com/shop/PotatoFi

Anatomy of a RaSCSI



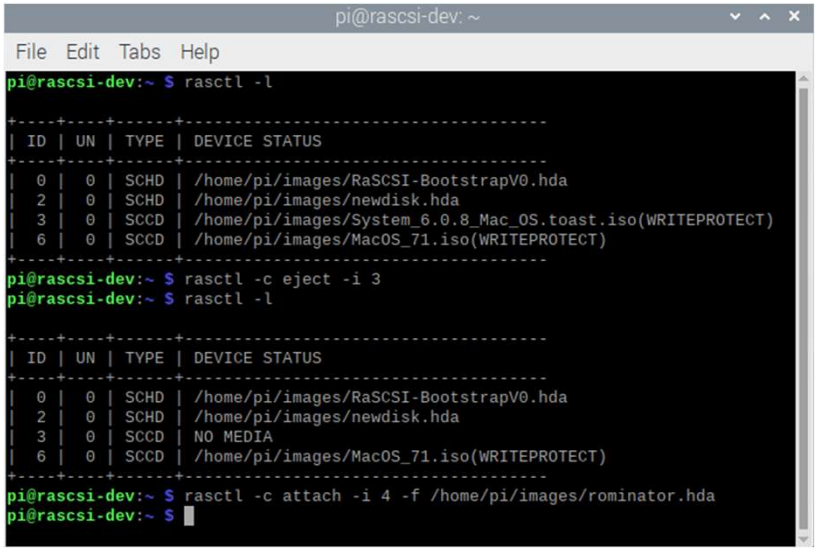
How to Control RaSCSI

Web Interface

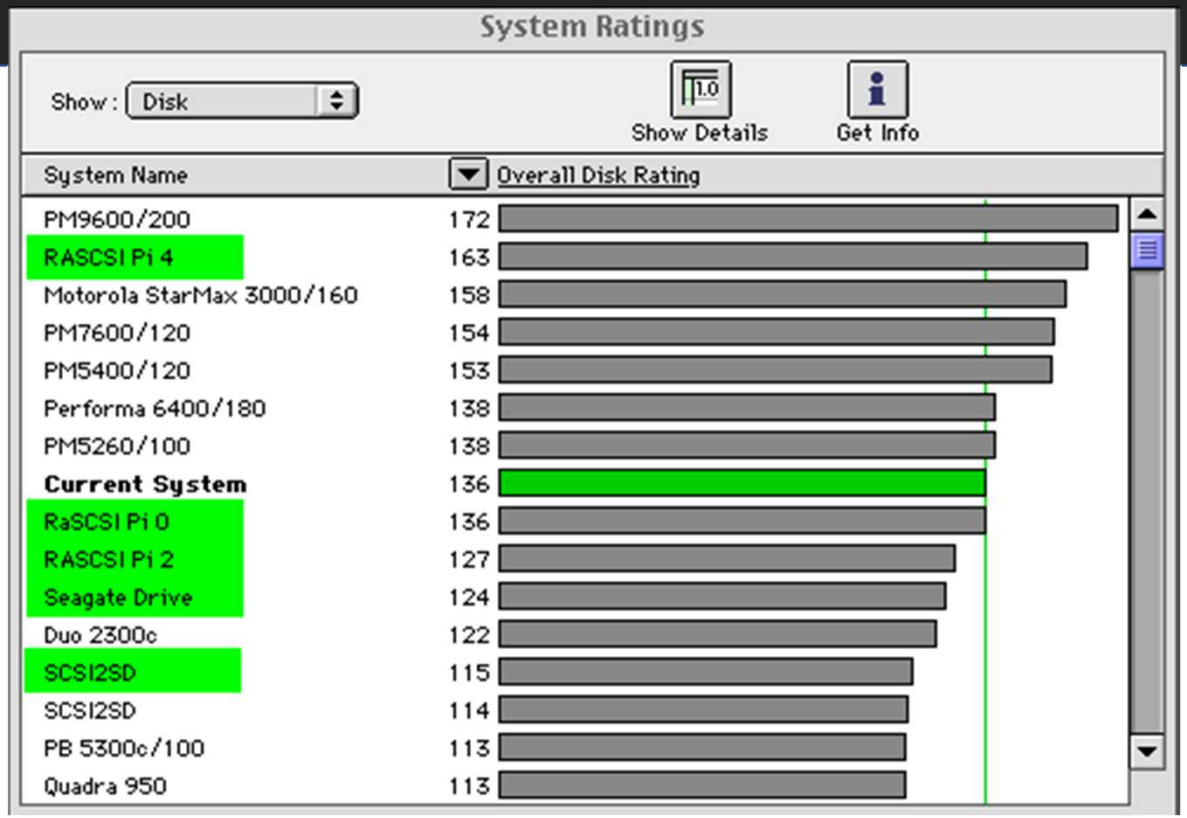


Netscape 4 Compatible

Command Line Utility



Benchmarks

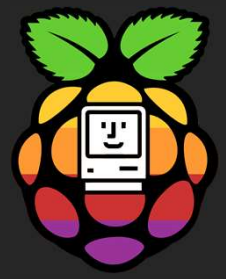


Test platform:

Macintosh Quadra 840av

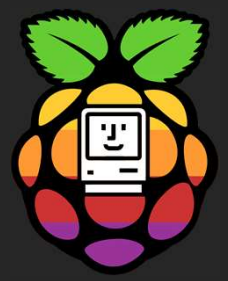
- 68040 Processor at 40MHz
- 128MB RAM
- 1MB VRAM
- Seagate ST3600N 500MB HD w/stock Apple firmware
- MacOS 8.1
- Drive cache configured at 128KB
- Norton System Info 3.5

History



- 2017 – Original RaSCSI version created by Gimons
  - Support for Hard disks, Magneto-Optical, CD-ROM and X68000 Host Interface
- 2017 - K55 started thread on 68kmla.org
- 2020 – Created version with DB-25 and 50-pin SCSI connectors *(akuker)*
- 2020 – Code translated to English and uploaded to Github *(akuker)*
- 2020 – rascsi.com wiki page created & organized *(phrax0, nulleric, akuker)*
- 2020 – OLED status display added *(akuker)*
- 2020 – Python-based rascsi-web control interface *(nulleric)*
- 2020 – Easy install script created *(sonique6784 & nulleric)*
- 2020 – System 6 screen mirroring proof of concept *(jcs)*
- 2021 – Beta SCSI Ethernet functionality released *(akuker)*

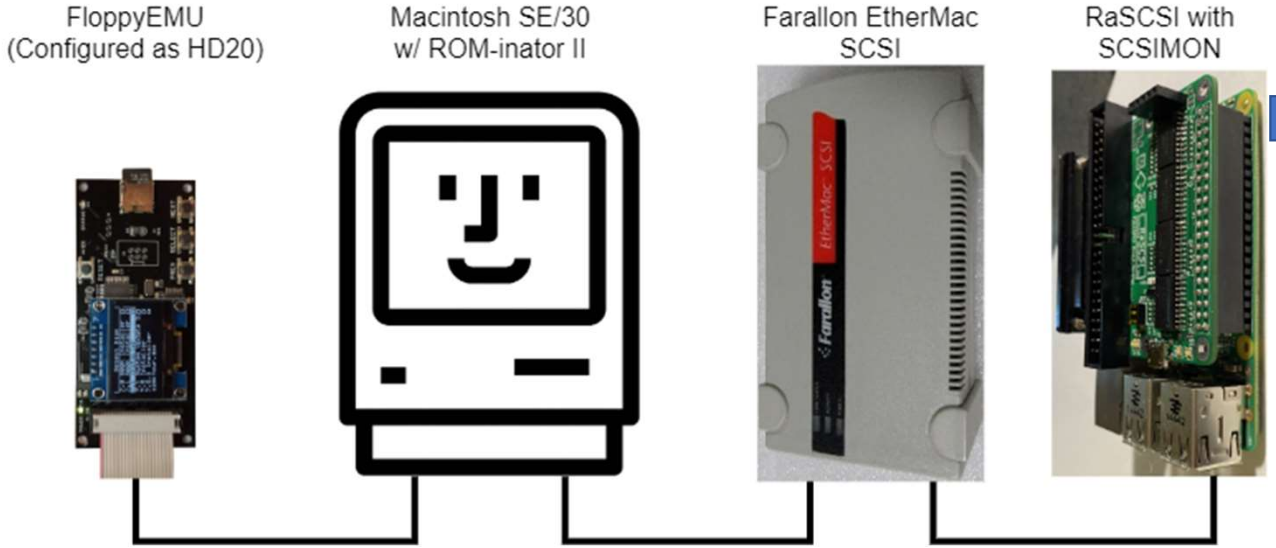
Plans for 2021

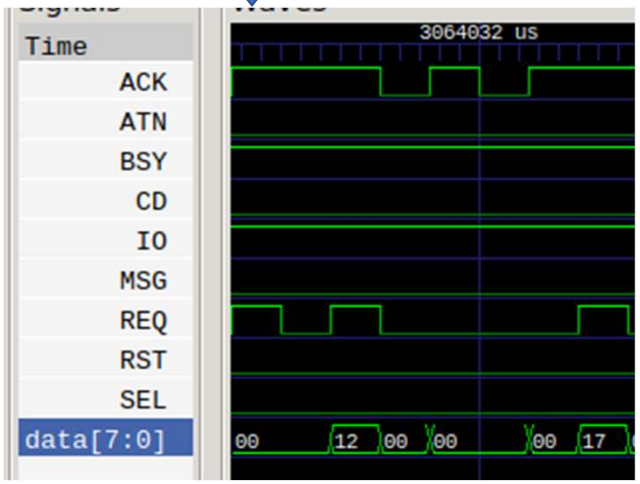


- Release Ethernet over SCSI into production build
- PowerBook compatible hardware version
- Add support for un-patched Apple CD-ROM driver
- Better support for different disk image formats
  - .toast .img
- Configuration & Logging improvements

Reverse Engineering - SCSIMON

Note: Farallon EtherMac SCSI is a rebranded DaynaPort SCSI/Link

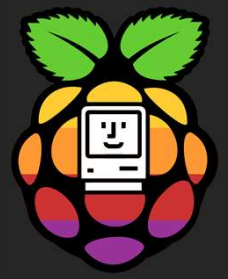




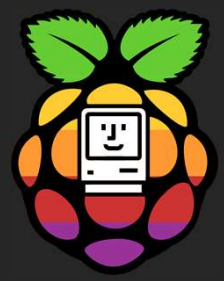
Special thank you to @PotatoFi for generously loaning out his Farallon EtherMac SCSI for this project!

ROM-inator II – BMOW
Floppy EMU – BMOW
Farallon EtherMac – PotatoFi
GTKWave – GTKWave Project

How can I get involved?



- Build your own
  - Schematics, Gerber files, bill of materials available on Github
- Order one from Tindie – Kit or Pre-Assembled
  - *If out of stock – more will be coming in late February*
- Join us on Discord - https://discord.gg/et8ENMGU3X
- Join the discussion on 68k Mac Liberation Army
- Try it out on your vintage hardware!



Thank you!