ZFS Small Server Build

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> **This page is still under construction.**

Introduction

- FreeNAS hardware best practices

Off-the-shelf alternatives:

- iXsystems FreeNAS Mini (not distributed in Europe)
- OSNET NAS Mini ZFS: spec sheet and WD Red spec

Case

Chenbro SR301(69)

Figure 1: Closed Chenbro SR30169 case

Figure 2: Chenbro SR30169 with opened door

Figure 3: Chenbro SR30169 drive bays

Figure 4: Inside of the Chenbro SR30169 case

CPU & motherboard

Buying an Intel Atom C2xxx? Make sure it is a C0 stepping!

In January 2017, Intel first publicly acknowledged the issue with flawed `LPC` clock outputs on its Atom C2000 system-on-chips. This happened very sneakily in the form of bug AVR54 in the product specification errata list. This happens to be a very serious issue. It literally is a ticking time bomb under one's infrastructure. According to the Intel data-sheet, `LPC_CLKOUT0` and `LPC_CLKOUT1` are driven by the processor to provide essential timing signals to hardware on the board, including the boot ROM. If this signal stop ticking, the rest of the electronics stops, too.

C0 stepping

By the end of April 2017, Intel revealed that its Atom C2000 chip family has a new C0 stepping, up from the previous B0, meaning at least some parts of the chip have been redesigned.

Free Super Micro repair through direct RMA

For EU consumers: The defect existed in the processor contained within the product at the time of manufacture, therefore it was *"not of merchantable quality"* when acquired. When the failure eventually occurs or whether the product is still under warranty does not matter.

return merchandise authorization (RMA)

Super Micro: RMA services, contact information, «merchantability Atom C2550 failing clock recall», «free ECO update»

References

Intel's Atom C2000 chips are bricking products — and it's not just Cisco hit

Intel Atom chips have been dying for at least 18 months — only now is truth coming to light — Vendors clocked C2xxx flaw when returns spiked

Intel redesigns flawed Atom CPUs to stave off premature chip death

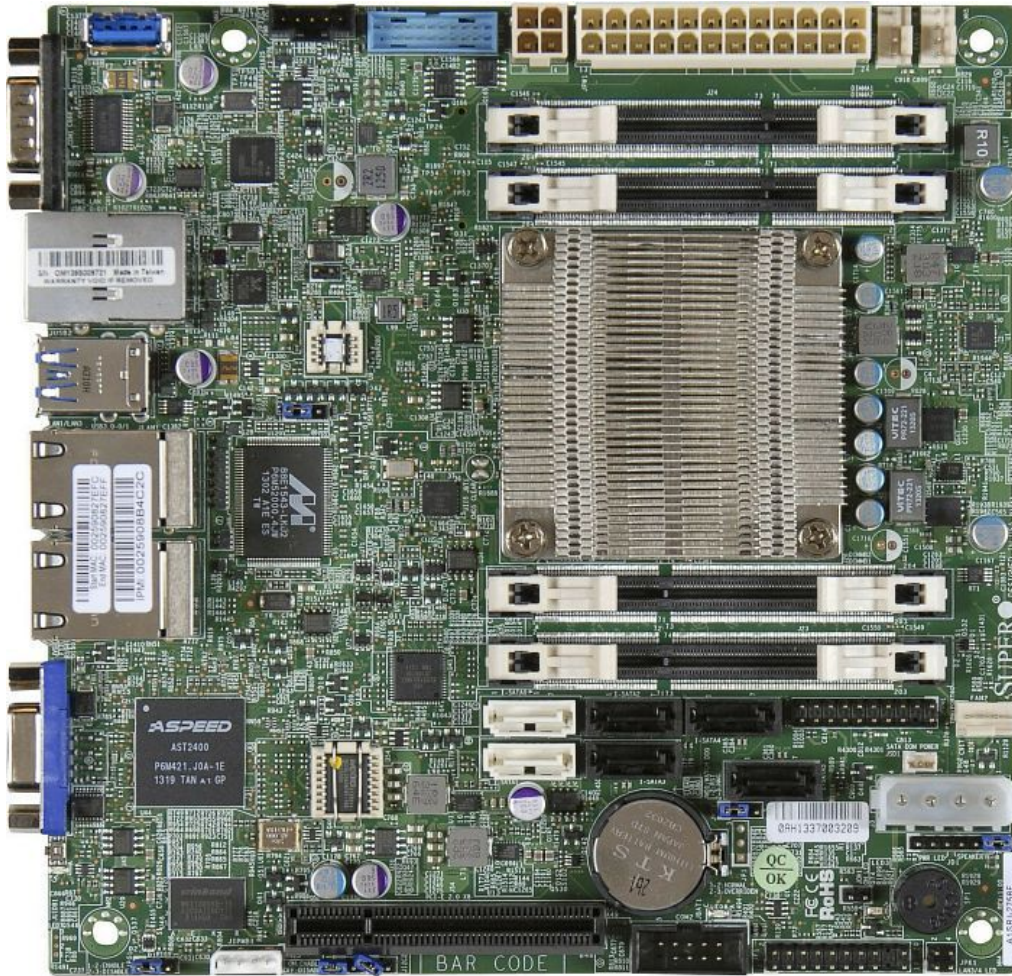Intel Atom C2000 C0 Stepping Fixing the AVR54 Bug

Super Micro A1SAi-2550F

Figure 5: Super Micro A1SAi-2550F top view

Figure 6: Super Micro A1SAi-2550F side view

DDR3 ECC SO-DIMM

2× Kingston KVR16LSE11/8 8GB PC3L-12800 (1600MHz) CL11 204-Pin ECC SO-DIMM spec sheet

Figure 7: Kingston KVR16LSE11/8

Power supply

LC-Power LC7300 v2.3 300W 80PLUS Silver certified; spec sheet

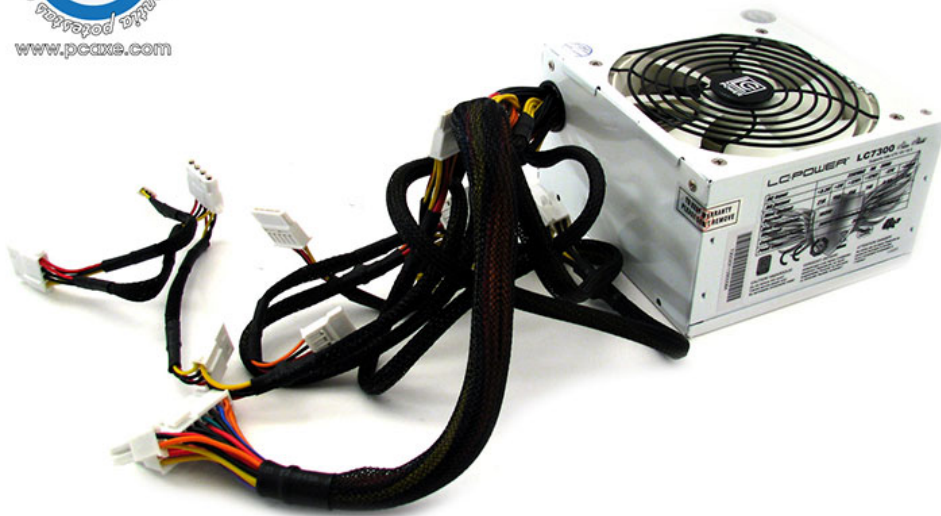**Figure 8:** LC-Power LC7300 v2.3

Solid state system drive

SATA cables

Figure 9: Chenbro SR30169 SATA connections

4× InLine 27703L left-angled 6 Gbps SATA cable, 0.3 m; spec sheet

Figure 10: InLine 27703L

Internal USB 3.0 cable

The case comes with a dual USB 2.0 port at the front. However, the motherboard does not carry an internal USB 2.0 connector. It does feature a 20-pin USB 3.0 connector. There is also a 9-pin COM2 connector which, at first sight, might be mistaken for a 9-pin internal USB 2.0 connector. Luckily, the USB 2.0 cable assembly can be demounted to be replaced by a 20 pin female USB 3.0 internal connector to dual port cable (see picture). Make sure you grab one with the right USB connector separation distance. For the model shown here, I only had to saw off a bit of each lug to make it fit. The original screws and some hot glue keep the connector head in place.

Figure 11: Female 20-pin USB 3.0 internal connector to dual port cable

Hard drives

Price

- March 22, 2015
- csv.de

quantity	description	item price	subtotal
1	Super Micro A1SAi-2550F retail, C2550 Mini-ITX Mainboard	€ 296.77	€ 296.77
2	KINGSTON 8GB 1600MHZ DDR3L ECC	€ 91.60	€ 183.20
1	Chenbro SR30169, Mini-ITX-Gehäuse	€ 119.62	€ 119.62
1	LC-Power Pro-Line LC7300 V2.3 Silver Shield 300W Netzteil	€ 39.69	€ 39.69
4	0,3m SATA 6Gb/s Anschlusskabel rund, abgewinkelt links, blau	€ 5.66	€ 22.64
1	20-pin female USB 3.0 internal connector to dual port cable	€ 3.75	€ 3.75
4	WD Red hard drives	NA	NA
	VAT included, shipping excluded	**TOTAL**	**€ 665.67**