

PISTORM



LOGO DESIGN BY @EDU_ARANA

A 68000 CPU REPLACEMENT

Andrew (LinuxJedi) Hutchings

About Me

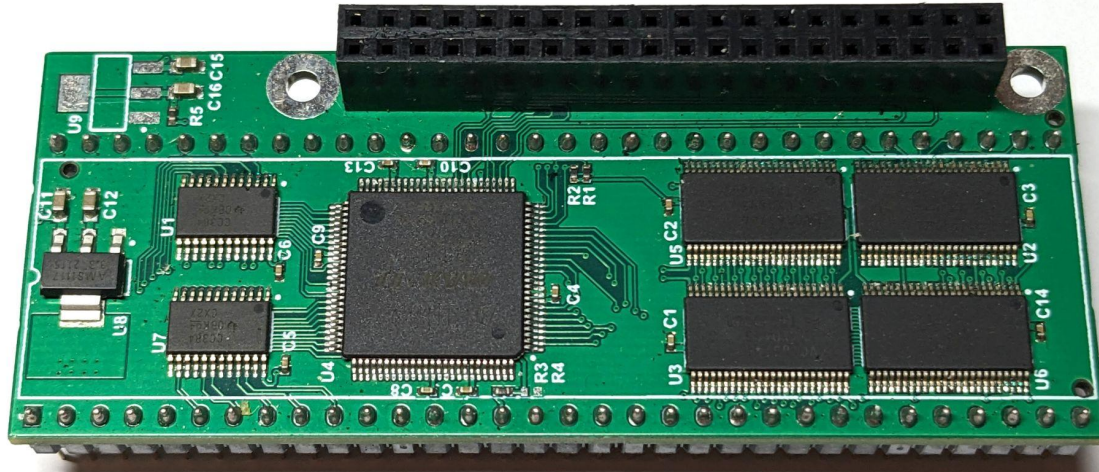


About PiStorm

- Project created by Claude Shwartz
- A fast budget accelerator for an Amiga
- It only emulates the CPU, the rest of the Amiga motherboard is used
- Adds drivers to talk to the Pi hardware (RTG and virtual SCSI)
- Everything is open source



The First PiStorm



- Released late 2020
- Fits in the 68000 CPU socket of an Amiga
- Rectangle chips do voltage translation and latching
- Square chip is a CPLD (programmable logic chip)

The First PiStorm



- Uses a Raspberry Pi 3A+
 - Also 3B+ with modification and Zero 2W
- Ran Musashi 68000 CPU emulator
- Interface software mostly by BNU (Bjorn)

The First PiStorm

SYSINFO Version 4.4 Classic Amiga System Information Program
Contact information SysInfo@d0.se http://sysinfo.d0.se

SYSTEM SOFTWARE INSTALLED **LIBRARIES** **INTERNAL HARDWARE MODES**

Software	Size	Address	Version
kickstart	(512K)	\$00F80000	V46.143
utility	32BitRAM	\$400001B0	V45.2
graphics	32BitRAM	\$40007A34	V45.27
layers	32BitRAM	\$4000AD0C	V45.30
keymap	32BitRAM	\$4000B220	V45.1
intuition	32BitRAM	\$4000CA64	V40.87
dos	32BitRAM	\$40065714	V40.5

SPEED COMPARISONS **EXPAND**

Processor	Cache	Freq	Dhrystones	You
A600	68000	7MHz	12443	23.52
B2000	68000	7MHz		17.80
A1200	EC020	14MHz		10.22
A2500	68020	14MHz		6.05
A3000	68030	25MHz		2.68
A4000	68040	25MHz		0.68
Mips			12.98MFlops	6.22
Chip Speed vs A600				0.84

INTERNAL HARDWARE MODES

Clock **CLOCK FOUND**
DMA/Gfx **ECS AGNUS - 2Meg**
Mode **PAL:High Res**
Display **ECS DENISE**
CPU/MHz **68030 725.00**
FPU **68881**
MMU **68030 (NOT IN USE)**
VBR **\$00000000**
Comment **MOTOROLLIN'**
Horiz KHz **15.60**
EClock Hz **789379**
Ramsey rev **N/A** ICache **ON**
Gary rev **N/A** DCache **ON**
Card Slot **NO** IBurst **ON**
Vert Hz **50** DBurst **OFF**
Supply Hz **50** CBack **N/A**

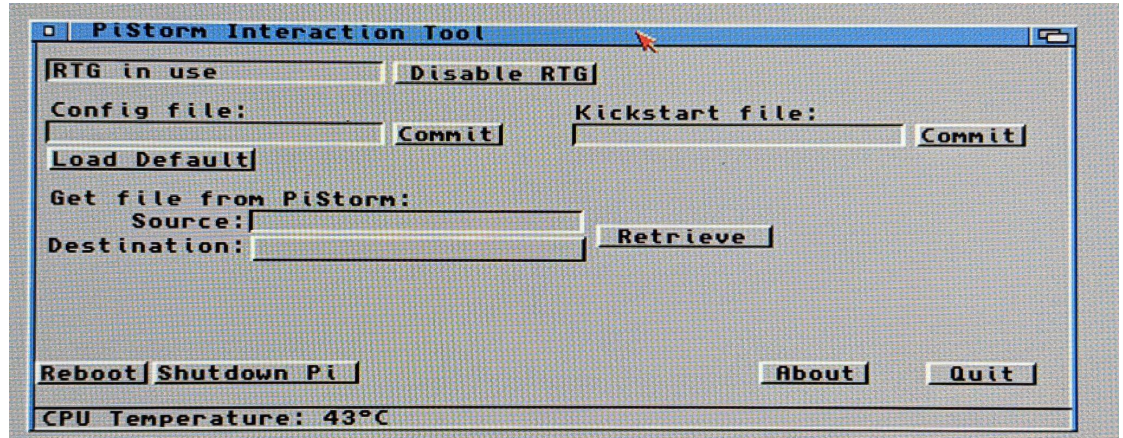
QUIT **MEMORY** **BOARDS** **ICACHE** **IBURST** **ICBACK**
DRIVES **SPEED** **PRINT** **DCACHE** **DBURST** **ALL**

How I Got Into PiStorm

- Hardware testing
- Joined the community in early 2021
- Started providing patches
- Helped build a community
 - Over 7000 members on Discord, over 3000 on Facebook

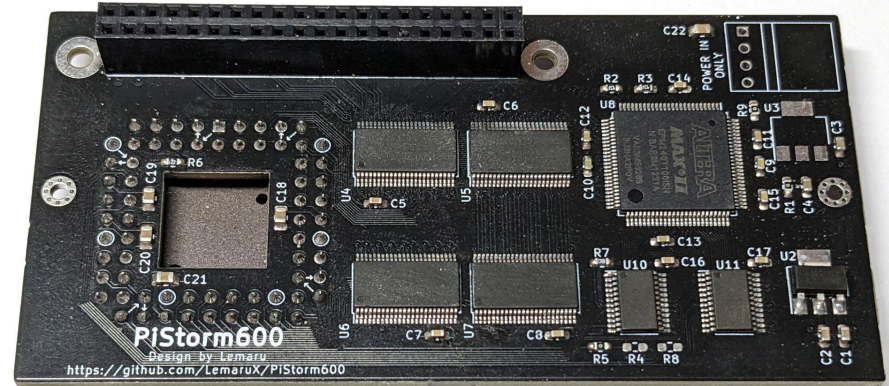
Things I Have Done

- Bug fixes
- ROM identification and byte swap code
- Original PiStorm GUI and PiStorm drive
- Improved CPLD flash scripts
- Built a few hundred PiStorms
- Given lots of support



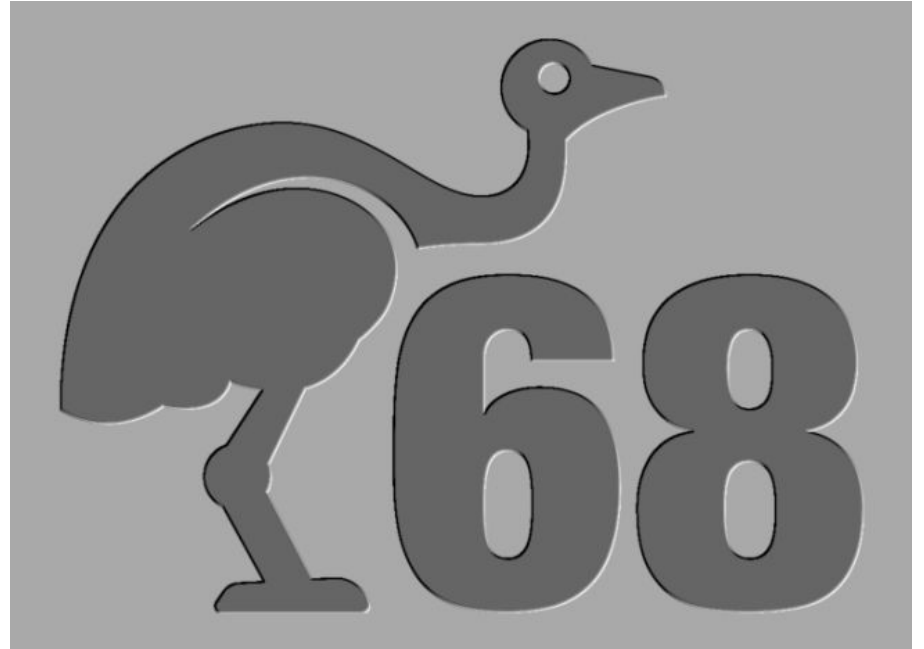
PiStorm 600 and 2K

- Based on the original PiStorm
- PiStorm 600
 - Created by Lemaru
 - For Amiga 600
 - Sits on the CPU and disables it
- PiStorm 2K
 - Created by madgrizzle
 - For the Amiga 2000
 - Fits in the co-processor slot
 - Need to remove original CPU



Emu68

- Bare-metal 68000 for the Pi
- Created by Michal Schulz
- Became an option for PiStorm in August 2021
- JIT based emulation



Emu68 - Performance

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Contact information SysInfo@d0.se <http://sysinfo.d0.se>

SYSTEM SOFTWARE INSTALLED				<input checked="" type="checkbox"/> LIBRARIES	INTERNAL HARDWARE MODES	
kickstart	(512K)	\$00F80000	V47.96		Clock	CLOCK NOT FOUND
utility	FAST RAM	\$00200250	V47.3		DMA/Gfx	ECS AGNUS - 1Meg
graphics	FAST RAM	\$00203A0C	V47.4		Mode	PAL
layers	FAST RAM	\$00206CB4	V46.2		Display	STD DENISE
keymap	FAST RAM	\$002071C8	V47.1		CPU/MHz	68060
intuition	FAST RAM	\$00208B7C	V47.51		FPU	N/A
dos	FAST RAM	\$0020B468	V47.23		MMU	68060 (NOT IN USE)

SPEED COMPARISONS				<input checked="" type="checkbox"/> EXPAND
Dhrystones	789573	You		
A600 68000 7MHz	1492			
B2000 68000 7MHz	1129			
A1200 EC020 14MHz	648			
A2500 68020 14MHz	384			
A3000 68030 25MHz	170			
A4000 68040 25MHz	43			
Mips	824.18	MFlops	N/A	
Chip Speed vs A600	0.96			

QUIT	MEMORY	BOARDS	ICACHE	IBURST	CBACK
DRIVES	SPEED	PRINT	DCACHE	DBURST	ALL

Comment: Virtual Amiga?

Horiz KHz 15.60
EClock Hz 789379
Ramsey rev N/A ICache ON
Gary rev N/A DCache OFF
Card Slot NO IBurst ON
Vert Hz 50 DBurst ON
Supply Hz 50 CBack OFF

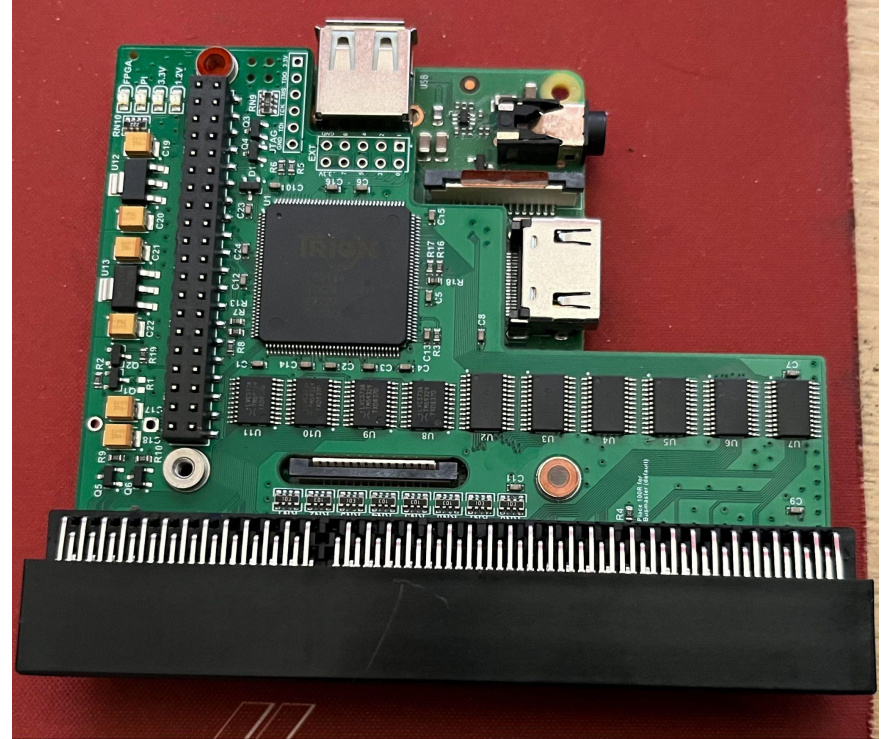
PiStorm32

- Designed to use a Pi CM4
- For the Amiga 1200
- New firmware from the ground-up
- Uses an FPGA
- Emu68 first class citizen
- Never released



PiStorm32-Lite

- Uses a Pi 3A+ / 3B+ / 4
 - CM4 adapter available
- No extra ports needed (hence “Lite”)
- FPGA much easier to solder
- Released January 2023



PiStorm32-Lite

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SYSTEM SOFTWARE INSTALLED **LIBRARIES** **INTERNAL HARDWARE MODES**

kickstart	(512K)	\$00F80000	V47.111
utility	32BitRAM	\$08003548	V47.3
graphics	32BitRAM	\$08003D88	V47.10
layers	32BitRAM	\$0800875C	V46.2
keymap	32BitRAM	\$08009030	V47.1
intuition	32BitRAM	\$0800AEDC	V47.52
68040	32BitRAM	\$08015F30	V1.3

SPEED COMPARISONS **EXPAND**

Dhrystone	1614644	You	
A600 68000 7MHz	3052		
B2000 68000 7MHz	2309		
A1200 EC020 14MHz	1326		
A2500 68020 14MHz	785		
A3000 68030 25MHz	348		
A4000 68040 25MHz	88		
Mips	1685MFlops	1767	
Chip Speed vs A600	1.57		

INTERNAL HARDWARE MODES

Clock	CLOCK NOT FOUND
DMA/Gfx	AGA ALICE - 2Meg
Mode	PAL
Display	AGA LISA CHIP
CPU/MHz	68040 7.09
FPU	68040+68882
MMU	68040 (NOT IN USE)
VBR	\$00000000
Comment	Virtual Amiga?
Horiz	KHz 15.60
EClock	Hz 789379
Ramsey rev	N/A ICache ON
Gary rev	N/A DCache ON
Card Slot	YES IBurst ON
Vert	Hz 50 DBurst ON
Supply	Hz 50 CBack OFF

QUIT **MEMORY** **BOARDS** **ICACHE** **IBURST** **CBACK**
DRIVES **SPEED** **PRINT** **DCACHE** **DBURST** **ALL**

Demo Time

"The Amiga is not powerful enough to run DOOM."

- John Carmack 1994

Common FAQs

Can PiStorm increase “Chip RAM”?

Can it emulate a PowerPC accelerator for Amigas?

Can I use PiStorm in other 68000 based machines?

Future

- Other 68K machines (Atari and Apple)
- Amiga CD32 / 3000 / 4000 versions
- Amiga native video injection device

Sponsor PiStorm Development

Claude has a donate button on his PiStorm32-Lite GitHub page

Michal has a Patreon to sponsor the development of Emu68