

Introduction to the ARM processor

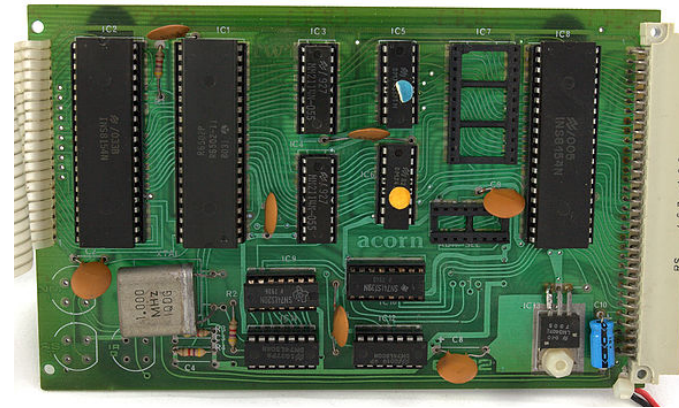
arm

https://en.wikipedia.org/wiki/Acorn_Computers

<http://www.computinghistory.org.uk/det/897/acorn-computers/>

ARM – Early computers

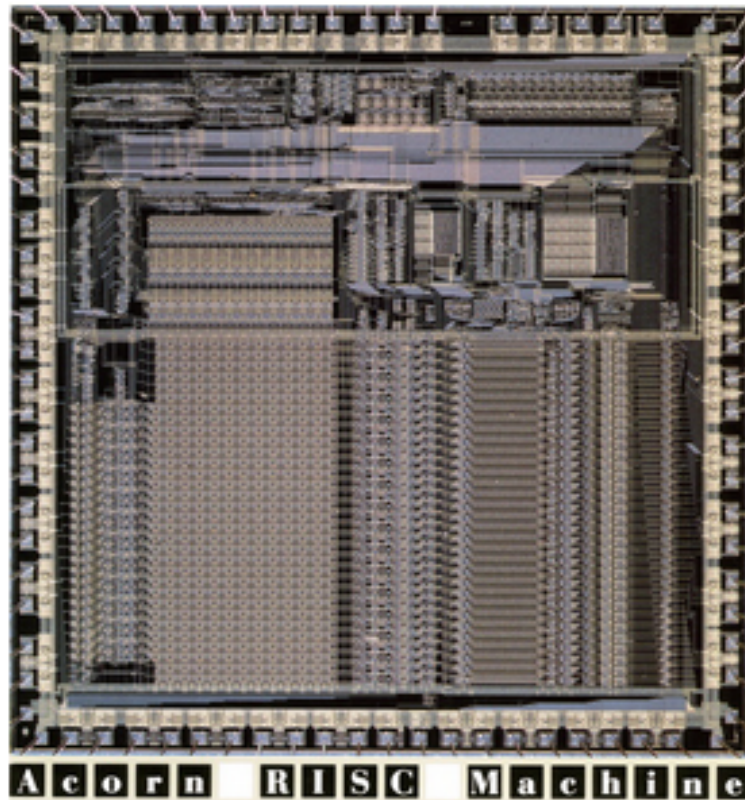
- ❑ **1979 – “Acorn Computers”**
Acorn System 1 (MOS 6502)



- ❑ **1981-1994 – BBC micro**
8-bitars (MOS6502-processor, 2 MHz)
Mer än 1,5 miljon sålda enheter



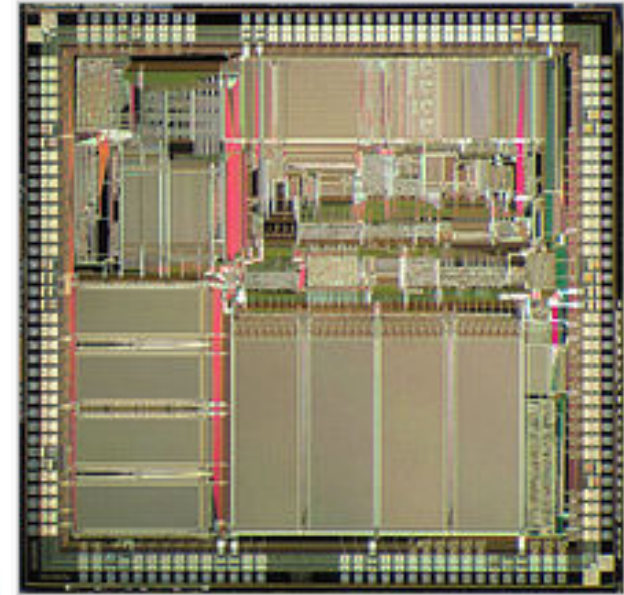
- ❑ **1987 – 1990 – Archimedes**
32-bitars (ARM1-processor, 8 MHz)



- ❑ **1990 – 1992 – R260**
ARM3-processor, 30 MHz
16MB minne



- ❑ **1992 Apple Newton**
 - ARMv3 arkitektur**
 - ARM610 processor**
 - 35 000 transistorer**
 - 33 MHz**



- ❑ **1996 – RISC arbetsstation**
StrongARM-processor, 233 MHz



❑ **1996 – 1998**
"Referenskonstruktioner"

- ingen serieproduktion

Fast NC

Desklite

Acorn Stork Notebook

Phoebe

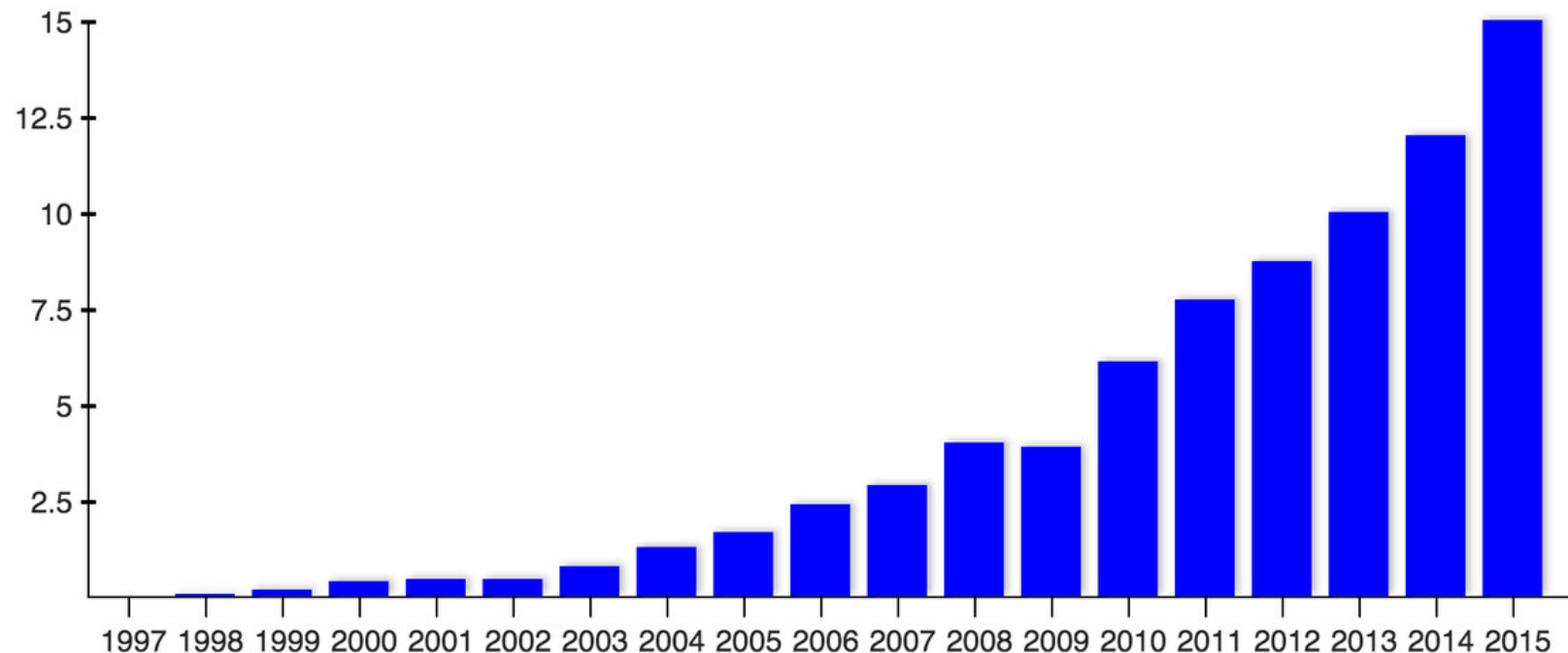


<http://www.computinghistory.org.uk/>

ARM - Licensed IP

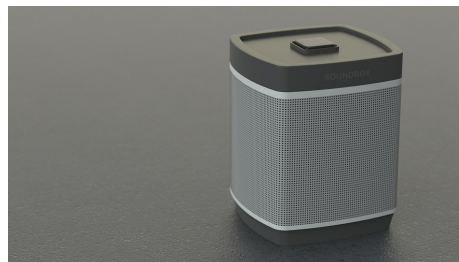
En lång rad företag använder i dag ARM-arkitektur på licens i sina produkter:

AMD, Applied Micro, Broadcom, Caldexa, Freescale (numera NXP) Huawei, IBM, Infineon, Intel, Renesas, Rockchip, Samsung, STMicroelectronics



Antal miljarder sålda enheter baserade på ARM 1997-2014

ARM – in today's consumer products (not only!)



ARM – in Apple (2019): iPhone, iMac, MacBook, Apple Watch, HomePod...

<u>A11 Bionic</u>	APL1W72		10 nm FinFET (TSMC)	87.66 mm ² ^[143]	4.3 billion	ARMv8.2-A ^[144]	2.39 GHz hexa-core (2x Monsoon + 4x Mistral)	L1i: 64 KB L1d: 64 KB L2: 8 MB L3: none ^[145]	Apple Custom GPU (triple-core)	64-bit Single-channel 2133 MHz LPDDR4X ^{[146][147]} (34.1 GB/sec)	September 2017	- iPhone 8 - iPhone 8 Plus - iPhone X
<u>A12 Bionic</u>	APL1W61		7 nm FinFET (TSMC)	83.27 mm ² ^[148]	6.9 billion	ARMv8.3-A ^[149]	2.49 GHz hexa-core (2x Vortex + 4x Tempest) ^[150]	L1i: 128 KB L1d: 128 KB L2: 8 MB L3: none ^[151]	Apple Custom GPU (quad-core)	64-bit Single-channel 2133 MHz LPDDR4X ^{[152][153]} (34.1 GB/sec)	September 2018	- iPhone XS - iPhone XS Max - iPhone XR
<u>A12X Bionic</u>	APL1083		7 nm FinFET (TSMC)		10 billion	ARMv8.3-A ^[149]	2.49 GHz octa-core (4x Vortex + 4x Tempest)	L1i: 128 KB L1d: 128 KB L2: 7 MB L3: none	Apple Custom GPU (hepta-core)	64-bit Dual-channel 2133 MHz LPDDR4X (68.2 GB/sec)	October 2018	- iPad Pro (11.0-inch) - iPad Pro (12.9-inch) (3rd gen.)

S3 Non-LTE and LTE	TBC		TBC	TBC	ARMv7s ^[165]	Dual-core	TBC	TBC	LPDDR4	Qualcomm MDM9605M (Snapdragon X7 LTE)	September 2017	Apple Watch Series 3
S4 Non-LTE and LTE	TBC		TBC	TBC	ARMv8-A (LP32) ^{[164][166]}	Dual-core	TBC	TBC	TBC	TBC	September 2018	Apple Watch Series 4

T2	APL1027 ^[167]				ARMv8-A		TBD	LPDDR4			December 2017	- iMac Pro 2017 - MacBook Pro (13-inch, 2018) - MacBook Pro (15-inch, 2018) - Mac mini (2018) - MacBook Air (2018)
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W2	338S00348 ^[168]		TBC	TBC	TBC	TBC	TBC	No GPU	TBC	4.2	September 2017	Apple Watch Series 3
W3	TBC	TBC	TBC	TBC	TBC	TBC	TBC	No GPU	TBC	5.0	September 2018	Apple Watch Series 4

https://en.wikipedia.org/wiki/Apple-designed_processors