Arm Cortex-A Processor Comparison Table

The Cortex-A series of applications processors provide a range of solutions for devices undertaking complex compute tasks, such as hosting a rich operating system (OS) platform, and supporting multiple software applications.

Feature	Cortex-A5	Cortex-A7	Cortex-A9 †	Cortex-A15 †	Cortex-A17 †
Architecture	Armv7-A	Armv7-A	Armv7-A	Armv7-A	Armv7-A
Main Extensions		LPAE Virtualization		LPAE Virtualization	LPAE Virtualization
Pipeline	In order	In order	Out of order	Out of order	Out of order
Superscalar	No	Partial	Yes	Yes	Yes
Physical Addressing (PA)	32-bit	40-bit	32-bit	40-bit	40-bit
TrustZone for Cortex-A	Yes	Yes	Yes	Yes	Yes
Neon and Floating Point Unit	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Included
Floating Point Unit only	Optional	Optional	Optional	Optional	Included
Interrupt Controller	Optional Integrated GIC v1 (MP only) Integrated GIC v1 (MP only)	Optional Integrated GIC v2	Internal Integrated GIC v1 (MP only)	Optional Integrated GIC v2	Optional Integrated GIC v2
Bus Protocol	AXI	ACE	AXI	ACE or CHI	ACE
L1 I-Cache/D-Cache	4-64kB	8-64kB	16-64kB	32kB/ 32kB	32-64kB/ 32kB

Feature	Cortex-A5	Cortex-A7	Cortex-A9 †	Cortex-A15 †	Cortex-A17 †
L2 Cache	External L2C-310	Up to 1MB	External L2C-310	512kB-4MB	256kB-8MB
L3 Cache	N/A	N/A	N/A	N/A	N/A
Dual Core Lock-Step (DCLS)	No	No	No	No	No
Functional Safety Support	No	No	No	No	No
Cryptography Unit	No	No	No	No	No
Error Code Correction (ECC)/Parity	No	No	Optional	Optional	Yes
Accelerator Coherency Port (ACP)	Optional	No	Optional	Optional	Optional
Peripheral Port	No	No	No	No	No
Generic Timer	No	Yes	Yes	Armv8-A	Armv8-A
Non-intrusive debug (trace)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)

Feature	Cortex-A32	Cortex-A34	Cortex-A35	Cortex-A53	Cortex-A55	Cortex-A57 [†]	Cortex-A65	Cortex-A65AE	Cortex-A72	Cortex-A73	Cortex-A75	Cortex-A76	Cortex-A76AE	Cortex-A77	Cortex-A78	Cortex-A78AE
Architecture	Armv8-A (AArch32 only)	Armv8-A (AArch64 only)	Armv8-A	Armv8-A	Armv8.2-A	Armv8-A	Armv8.2-A (AArch64 only)	Armv8.2-A (AArch64 only)	Armv8-A	Armv8-A	Armv8.2-A	Armv8.2-A (AArch32 at EL0 only)	Armv8.2-A (AArch32 at EL0 only)	Armv8.2-A (AArch32 at EL0 only)	Armv8.2-A (AArch32 at EL0 only)	Armv8.2-A (AArch32 at EL0 only)
Main Extensions					Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions		Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions			Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions	Armv8.1 extensions Armv8.2 extensions Armv8.3 (LDAPR instructions only) Armv8.4 Dot Product Cryptography extensions RAS extensions
Pipeline	In order	In order	In order	In order	In order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order	Out of order
Superscalar	Partial	Partial	Partial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physical Addressing (PA)	40-bit	40-bit	40-bit	40-bit	40-bit	40-bit	44-bit	44-bit	44-bit	40-bit	44-bit	40-bit	40-bit	40-bit	40-bit	48-bit
TrustZone for Cortex-A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neon and Floating Point Unit	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable) with Dot Product, and IEEE FP16	Included	Included with Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16	Included	Included	Included with INT8 Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16	Included with INT8 Dot Product and IEEE FP16
Floating Point Unit only	N/A	N/A	N/A	N/A	Optional	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Interrupt Controller	External GICv3	External GICv3	External GICv3	External GICv3	External GICv4	External GICv3	External GICv4	External GICv4	External GICv3	External GICv3	External GICv3	External GICv4	External GICv4	External GICv4	External GICv4	External GICv4

Feature	Cortex-A32	Cortex-A34	Cortex-A35	Cortex-A53	Cortex-A55	Cortex-A57 †	Cortex-A65	Cortex-A65AE	Cortex-A72	Cortex-A73	Cortex-A75	Cortex-A76	Cortex-A76AE	Cortex-A77	Cortex-A78	Cortex-A78AE
Bus Protocol	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI	ACE or CHI
L1 I-Cache/D-Cache	8-64kB	8-64kB	8-64kB	8-64kB	8-64kB	48kB/ 32kB	16-64kB	16-64kB	48kB/32-64kB	32kB/32-64kB	64kB	64kB	64kB	64kB	64kB	64kB
L2 Cache	128kB-1MB	128kB-1MB	128kB-1MB	128kB-2MB	64-256kB	512kB-2MB	64-256kB	64-256kB	512kB-4MB	256kB-8MB	256-512kB	128-512KB	128-512KB	256-512kB	256-512kB	256-512kB
L3 Cache	N/A	N/A	N/A	N/A	Optional 256kB-4MB	N/A	Optional 512kB-4MB	Optional 512kB-4MB	N/A	N/A	Optional 512kB-4MB	Optional 512kB-4MB	Optional 512kB-4MB	Optional 512kB-4MB	Optional 512kB-4MB	Optional 512kB-4MB
Dual Core Lock-Step (DCLS)	No	No	No	No	No	No	No	Yes (in Lock-mode)	No	No	No	No	Yes (in Lock-mode)	No	No	Yes
Functional Safety Support	Yes	Yes	Yes	Yes	ASIL D Systematic[1]	Yes	ASIL D Systematic1	ASIL D Systematic[1] and ASIL D Diagnostic[2]	Yes	No	ASIL D Systematic[1]	ASIL D Systematic[1]	ASIL D Systematic[1] and ASIL D Diagnostic[2]	No	ASIL D Systematic[1]	ASIL D Systematic[1] & ASIL D Diagnostic[2]
Cryptography Unit	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)	Supported (with cryptography extensions)
Error Code Correction (ECC)/Parity	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Yes	Optional	Yes	Optional	Optional	Yes	Optional	Optional	Yes
Accelerator Coherency Port (ACP)	Optional	Optional	Optional	Optional	Optional	Yes	Optional	Optional	Optional	Yes	Optional	Optional	Optional	Optional	Optional	Optional
Peripheral Port	No	No	No	No	Optional	No	Optional	Optional	No	No	Optional	Optional	Optional	Optional	Optional	Optional
Generic Timer	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A	Armv8-A
Non-intrusive debug (trace)	Supported (separately licensable)	Supported (separately licensable)	Supported (separately licensable)	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Feature	Cortex-A510	Cortex-A710	Cortex-A715
Architecture	Armv9.0-A	Armv9.0-A	Armv9.0-A
Main Extensions	Up to Armv8.5 extensions SVE2 extension Memory Tagging Extension Cryptography extensions RAS extensions	Up to Armv8.5 extensions SVE2 extension Memory Tagging Extension Cryptography extensions RAS extensions	Up to Armv8.5 extensions SVE2 extension Memory Tagging Extension Cryptography extensions RAS extensions
Pipeline	In order	Out-of-order	Out-of-order
Superscalar	Yes	Yes	Yes
Physical Addressing (PA)	40-bit	40-bit	40-bit
Security	TrustZone, Secure-EL2	TrustZone, Secure-EL2	TrustZone, Secure-EL2
Neon, Floating Point Unit and SVE	Included	Included	Included
Floating Point Unit only	Included	Included	Included
Interrupt Controller	GIC interface, GICv4.1	GIC interface, GICv4.1	GIC interface, GICv4.1
Bus Protocol	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E
L1 I-Cache/D-Cache	32KB or 64KB	32KB or 64KB	32KB or 64KB
L2 Cache	Optional, 128KB, 192KB, 256KB, 384KB, 512KB	256KB or 512KB	256KB or 512KB
L3 Cache	Optional, 256KB to 16MB	Optional, 256KB to 16MB	Optional, 256KB to 16MB
Dual Core Lock-Step (DCLS)	No	No	No
Functional Safety Support	No	No	No
Cryptography Unit	Optional	Optional	Optional
Error Code Correction (ECC)/Parity	Yes	Yes	Yes
Accelerator Coherency Port (ACP)	Optional	Optional	Optional
Peripheral Port	Optional	Optional	Optional
Generic Timer	Armv9.0-A	Armv9.0-A	Armv9.0-A
Non-intrusive debug (trace)	Included	Included	Included

Feature	Cortex-A320	Cortex-A520	Cortex-A720	Cortex-A725	Cortex-A520AE	Cortex-A720AE
Architecture	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A
Main Extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions	Up to Armv8.7 extensions QARMA3 extensions SVE2 extensions Memory Tagging Extensions (MTE) (Including Asymmetric MTE) Cryptography extensions RAS extensions
Pipeline	In order	In order	Out of order	Out of order	In order	Out of order
Superscalar	Partial	Yes	Yes	Yes	Yes	Yes
Physical Addressing (PA)	40-bit	40-bit	40-bit	40-bit	48-bit	48-bit
Security	TrustZone, Secure-EL2 Included	TrustZone, Secure-EL2 Included	TrustZone, Secure-EL2 Included	TrustZone, Secure-EL2 Included	TrustZone, Secure-EL2 Included	TrustZone, Secure-EL2 Included
Neon, Floating Point Unit and SVE	Included	Included	Included	Included	Included	Included
Floating Point Unit only	Included	Included	Included	Included	Included	Included
Interrupt Controller	External GICv4.1	External GICv4.1	External GICv4.1	External GICv4.1	External GICv4.1	External GICv4.1
Bus Protocol	AMBA AXI5	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E	AMBA AXI5 or CHI.E
L1 I-Cache/D-Cache	32KB or 64KB	32KB or 64KB	32KB or 64KB	32KB or 64KB	32KB or 64KB	32KB or 64KB
L2 Cache	Optional, 128KB, 192KB, 256KB, 384KB, 512KB	Optional, 128KB, 192KB, 256KB, 384KB, 512KB	128KB, 256KB, 512KB	128KB, 256KB, 512KB, 1MB	Optional, 128KB, 192KB, 256KB, 384KB, 512KB	128KB, 256KB, 512KB
L3 Cache	No	Optional, 256KB to 32MB	Optional, 256KB to 32MB	Optional, 256KB to 32MB	Optional, 256KB to 32MB	Optional, 256KB to 32MB
Dual Core Lock-Step (DCLS)	No	No	No	No	Yes	Yes
Functional Safety Support	No	No	No	No	Yes	Yes
Cryptography Unit	Optional	Optional	Optional	Optional	Optional	Optional
Error Code Correction (ECC)/Parity	Yes	Yes	Yes	Yes	Yes	Yes
Accelerator Coherency Port (ACP)	No	Optional	Optional	Optional	Optional	Optional
Peripheral Port	No	Optional	Optional	Optional	Optional	Optional
Generic Timer	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A	Armv9.2-A
Non-intrusive debug (trace)	Included	Included	Included	Included	Included	Included

† Arm products undergo continual development and improvement. These Cortex-A processors are no longer available to license and are included here for comparison purposes only.

[1] Suitable for up to ASIL D systematic development

[2] Contributes towards up to ASIL D hardware diagnostic metrics

For more information, contact your Arm account manager today or explore the processors in more detail here: developer.arm.com/ip-products/processors/cortex-a