

Arm Cortex-R Processor Comparison Table

The Cortex-R series of processors deliver fast and deterministic processing and high performance, while meeting challenging real-time constraints in a range of situations. They combine these features in a performance, power and area optimized package, making them the trusted choice in reliable systems demanding high error-resistance.

Feature	Cortex-R4	Cortex-R5	Cortex-R7[†]	Cortex-R8	Cortex-R52	Cortex-R52+	Cortex-R82
Architecture	Armv7-R	Armv7-R	Armv7-R	Armv7-R	Armv8-R AArch32	Armv8-R AArch32	Armv8-R AArch64
Instruction Set	Arm(32), Thumb(T32)	Arm(32), Thumb(T32)	Arm(32), Thumb(T32)	Arm(32), Thumb(T32)	Arm(32), Thumb(T32)	Arm(32), Thumb(T32)	A64
Pipeline Depth	8 stage in-order, dual issue	8 stage in-order, dual issue	11 stage out-of-order, superscalar	11 stage out-of-order, superscalar	8 stage in-order, superscalar	8 stage in-order, superscalar	8 stage in-order, triple issue
Address Bits	32	32	32	32	32	32	40
Addressable Memory	4GB	4GB	4GB	4GB	4GB	4GB	1TB
ECC on Memories	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MPU or MMU	MPU	MPU	MPU	MPU	MPU	MPU	Both
Maximum MPU Regions	12	16	16	24	24+24	24+24	32+32
Symmetric Multi-Processing (SMP) Support	1 core, No coherency	2 core, IO coherency	Up to MP2	Up to MP4	Up to UP4, No coherence	Up to UP4, No coherence	Up to MP8
Floating Point Unit (FPU)	Optional	Optional	Optional	Optional	Optional	Optional	Optional
SIMD (Neon)	No	No	No	No	Optional	Optional	Optional
DMIPS/MHz*	1.67	1.67	2.5	2.5	2.09	2.09	3.71
CoreMark®/MHz*	3.47	3.47	4.35	4.62	4.3	4.3	6.28
Maximum # External Interrupts	Up to 480	Up to 480	Up to 480	Up to 480	Up to 960	Up to 960	External, GICStream v3.1

Feature	Cortex-R4	Cortex-R5	Cortex-R7[†]	Cortex-R8	Cortex-R52	Cortex-R52+	Cortex-R82
Bus Protocol	AXI3	AXI3	AXI3	AXI3	AXI4	AXI4	AXI5 and CHI-E
Instruction TCM	0–8MB	0–8MB	0–128KB	0–1MB	0–1MB	0–1MB	0,16KB–1MB
Data TCM	0–8MB	0–8MB	0–128KB	0–1MB	0–1MB	0–1MB	0,16KB–1MB
Instruction Cache	0, 4KB–64KB	0, 4KB–64KB	0, 4KB–64KB	0KB–64KB	0KB–32KB	0KB–32KB	16KB–128KB
Data Cache	4KB–64KB	4KB–64KB	4KB–64KB	0KB–64KB	0KB–32KB	0KB–32KB	16KB–64KB
L2 Cache	N/A	N/A	N/A	N/A	N/A	N/A	0, 128KB–4MB
Dual Core Lock-Step (DCLS)	No	Yes	No	No	Yes	Yes	No
Safety Package	No	Yes	No	No	Yes	Yes	No
Software Test Library	No	Yes	No	No	Yes	Yes	No

[†] Arm products undergo continual development and improvement. The Cortex-R7 processor is no longer available to license and is included here for comparison purposes only.

Cortex-R series processors support compatibility, enabling software reuse and migration as functionality and/or additional processing power is required.

*See individual Cortex-R product pages for further information.

For more information, contact your Arm account manager today or explore the processors in more detail here:

developer.arm.com/ip-products/processors/cortex-r