

## Cadence VIP for Memory Models

### Overview

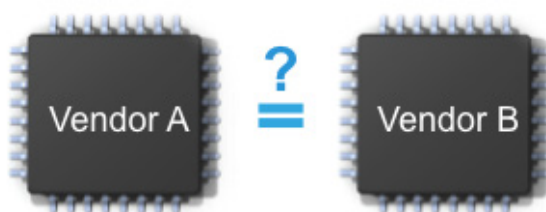
Memory is a major part of every electronic product. Every system on chip (SoC) contains embedded memories and must also interface with external memory components. The operation of these interfaces impacts both SoC functionality and performance, making memory interface verification a crucial step in the SoC development process.

Cadence® Memory Models are the gold standard for memory interface verification. Used by more than 500 customers, Cadence Memory Models provide support for 6,000 memories spanning 60 memory interface types and 85 memory manufacturers.



### Vendor Certification

Memory models for commercial memory components are based on the manufacturer's datasheets and are then provided to the manufacturer for certification. This closed-loop quality control process means that you can trust your simulation results. Models for new external memory standards that do not yet have commercial component providers and models for internal memory standards are based upon the specifications provided by the controlling standards body, such as JEDEC, ONFI, and SD Association. Cadence works closely with our early-adopter customers to ensure the quality of these models.



### Second-Source Evaluation

Memory models are inserted into a testbench as generic models that are then associated with a personality file to represent a specific component. This makes it easy to do second-source evaluation of memory components. Just use the same testbench and re-run your simulation with the personality file for the second-source candidate.

### Accurate Timing Analysis

When memory models represent actual memory chips and modules, the memory models include full timing parameters that support accurate gate-level simulations. Timing specs are conveniently displayed in the PureView tool and can be overridden for what-if analysis.

## Portfolio License

The Memory Model Portfolio enables all the memory models shown in the table below. A single license enables multiple instances of all the models in a single simulation session. Multiple licenses are needed to enable multiple simultaneous simulation sessions.

Memory Model	Device Type	Memory Model	Device Type
SDIO	Card Memory	SD Card	Card Memory
SD Card 3.0	Card Memory	Cellular SRAM	SRAM
Compact Flash	Card Memory	eMMC 1.0, 2.0, 3.0, 4.4	Card Memory
Memory Stick	Card Memory	Memory Stick Pro	Card Memory
DDR DIMM (DDR Inline Memory Module)	DRAM	DDR 1, 2, 3	DRAM
DDR SDRAM	DRAM	DDR Synchronous Graphics RAM	DRAM
DDR 2	DRAM	Enhanced SDRAM	DRAM
FCRAM (Fujitsu Consumer RAM)	DRAM	FIFO	SRAM
LL DRAM: Low-Latency DRAM	DRAM	LPDDR 1, 2: Low-Power DDR	DRAM
LR DIMM (Load-Reduced DIMM)	DRAM	RLDRAM 1, 2, 3 (Read-Reduced Latency DRAM)	DRAM
GDDR 2, 3, 4 (Graphics DDR)	DRAM	DDR Synchronous RAM	SRAM
Wide I/O	DRAM	Embedded SSRAM	Embedded/FPGA
Embedded SSRAM TI	Embedded/FPGA	Register File	Embedded/FPGA
Delayline	Miscellaneous	Scratchpad	Miscellaneous
Flash (Basic)	Non-Volatile	Flash ONFi	Non-Volatile
Flash Toggle NAND	Non-Volatile	Flash Toggle NAND 2	Non-Volatile
LBA NAND (Logical Block Addressing NAND Flash)	Non-Volatile	NAND Flash	Non-Volatile
NOR FLASH Spansion	Non-Volatile	OneNAND Flash	Non-Volatile
PROM (Programmable ROM)	Non-Volatile	Pseudo Burst SRAM	SRAM
QDR SRAM (Quad Data Rate SSRAM)	SRAM	Rambus DRAM	DRAM
Rambus Turbo Mode	DRAM	Synchronous DRAM	DRAM
Synchronous Mask ROM	Non-Volatile	Synchronous RAM NEC	SRAM
DFI	DDR PHY I/F		

## A La Cart Licenses

The following memory models are available as a la cart licenses.

DDR3	DDR4	eMMC 4.5	eMMC 5.0	Flash ONFi 3.0, 4.0
Flash Toggle NAND 2	High Bandwidth Memory (HBM)	Hybrid Memory Cube (HMC)	LPDDR3	LPDDR4
LRDIMM	DDR4 LRDIMM	Flash PPN DDR	SD Card 4.0	UFS 2.0
Wide I/O	Wide I/O 2			



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