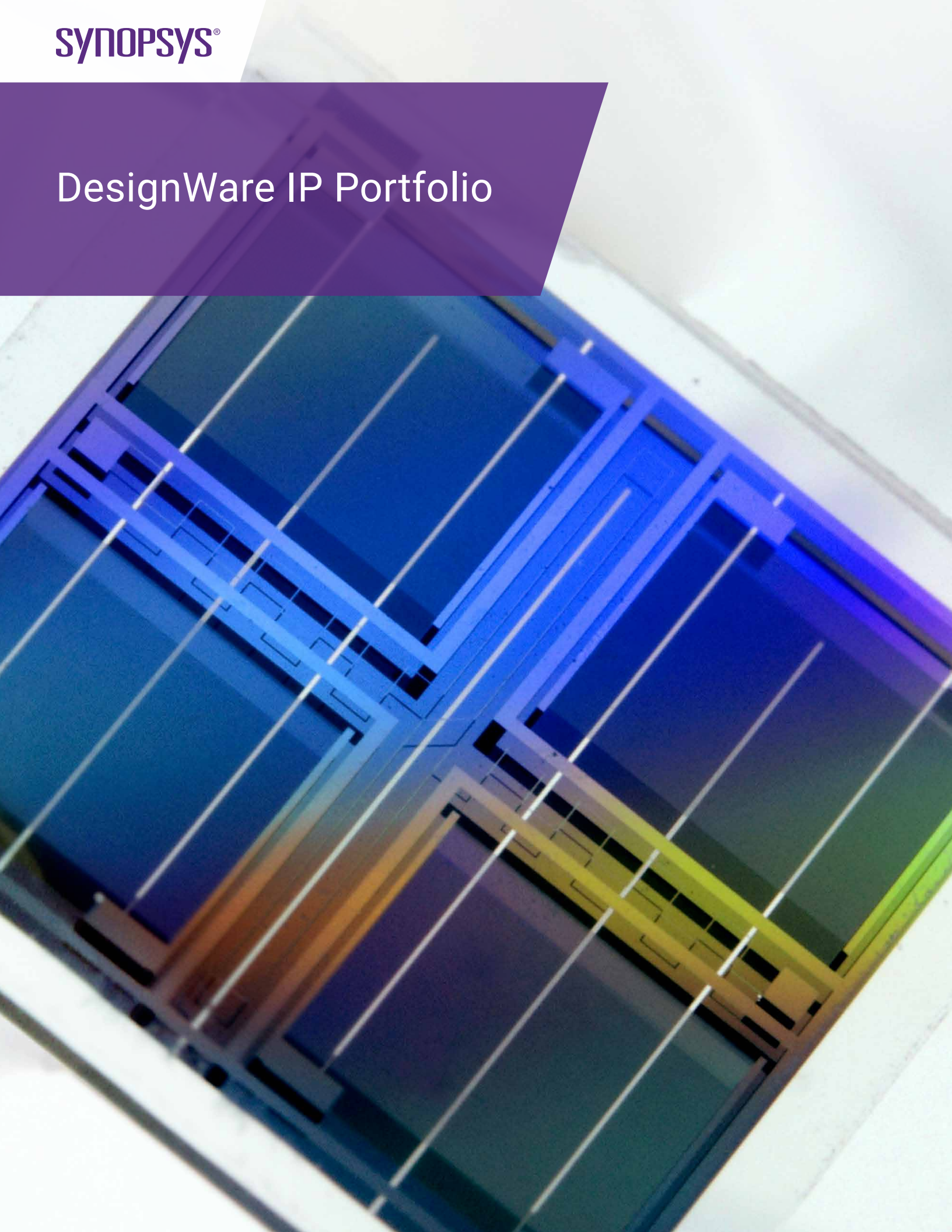


# DesignWare IP Portfolio



## Broad IP Portfolio

Synopsys is a leading provider of high-quality, silicon-proven IP solutions for SoC designs. The broad DesignWare® IP portfolio includes logic libraries, embedded memories, embedded test, analog IP, interface IP, security IP, embedded processors and subsystems.

To accelerate your product development cycle, Synopsys' IP Accelerated initiative offers SoC architecture design support, IP subsystems, signal integrity/power integrity analysis and IP hardening, IP prototyping kits, and comprehensive silicon bring-up support.

Synopsys' extensive investment in IP quality, comprehensive technical support and robust IP development methodology enables designers to reduce integration risk and accelerate time-to-market.

| Interface IP                  |                      |       |          |       |       |       |                |             |             |            |                          |  |   |
|-------------------------------|----------------------|-------|----------|-------|-------|-------|----------------|-------------|-------------|------------|--------------------------|--|---|
| USB                           | Process Technologies |       |          |       |       |       |                |             |             |            | Controllers/<br>Features | Verification IP  |   |
|                               | 65 nm                | 55 nm | 40/45 nm | 28 nm | 22 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |                          |  |   |
| USB 3.2                       |                      |       |          |       |       |       |                |             |             |            | ✓                        | Device   | ✓ |
| USB 3.1                       |                      |       |          |       |       |       | ✓              | ✓           |             |            | ✓                        | Dual-Role Device (Device & Host)                           | ✓ |
| USB-C 3.1                     |                      |       |          |       |       |       | ✓              | ✓           |             |            | ✓                        | Dual-Role Device (Device & Host)                           | ✓ |
| USB-C 3.1/<br>DisplayPort 1.4 |                      |       |          |       |       |       | ✓              | ✓           | ✓           |            | ✓                        | Device, Host, DisplayPort Tx, Subsystem Solution for 16FFC | ✓ |
| USB-C 3.1/<br>DisplayPort 1.3 |                      |       |          |       |       |       | ✓              | ✓           | ✓           |            | ✓                        | Dual-Role Device (Device & Host), DisplayPort Tx           | ✓ |
| USB 3.0                       | ✓                    | ✓     | ✓        | ✓     | ✓     | ✓     | ✓              | ✓           |             |            |                          | Dual-Role Device, Device, Host, HSIC                       | ✓ |
| USB-C 3.0                     |                      |       |          | ✓     | ✓     |       | ✓              | ✓           |             |            |                          | Device, Host   | ✓ |
| USB 2.0                       | ✓                    | ✓     | ✓        | ✓     | ✓     | ✓     | ✓              | ✓           | ✓           | ✓          | ✓                        | Device, Host, HSIC, Dual-Role Device                       | ✓ |
| USB-C 2.0                     | ✓                    | ✓     | ✓        | ✓     | ✓     | ✓     | ✓              | ✓           | ✓           | ✓          | ✓                        | Device, Host, Dual-Role Device                             | ✓ |
| HSIC                          |                      |       | ✓        | ✓     |       | ✓     | ✓              |             | ✓           |            |                          | Device, Host   | ✓ |

| PCI Express | Process Technologies |       |         |       |       |                |             |             |            | Controllers   | Configu-<br>ration  | Verification IP |
|-------------|----------------------|-------|---------|-------|-------|----------------|-------------|-------------|------------|---|---------------------|-----------------|
|             | 65 nm                | 55 nm | 40/45nm | 28 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |   |                     |                 |
| PCIe 5.0    |                      |       |         |       |       | ✓              |             | ✓           | ✓          | Endpoint, Root Port, Dual Mode, Switch, Embedded Endpoint | x1, x2, x4, x8, x16 | ✓               |
| PCIe 4.0    |                      |       |         | ✓     |       | ✓              | ✓           |             | ✓          | Endpoint, Root Port, Dual Mode, Switch, Embedded Endpoint | x1, x2, x4, x8, x16 | ✓               |
| PCIe 3.1    |                      |       |         | ✓     |       | ✓              | ✓           | ✓           | ✓          | Endpoint, Root Port, Dual Mode, Switch, Embedded Endpoint | x1, x2, x4, x8, x16 | ✓               |
| PCIe 2.1    | ✓                    | ✓     | ✓       | ✓     | ✓     | ✓              | ✓           |             | ✓          | Endpoint, Root Port, Dual Mode, Switch, Embedded Endpoint | x1, x2, x4, x8, x16 | ✓               |
| PCIe 1.1    | ✓                    | ✓     | ✓       | ✓     | ✓     | ✓              |             |             |            | Endpoint, Root Port, Dual Mode, Switch, Embedded Endpoint | x1, x2, x4, x8, x16 | ✓               |

| Interface IP |                      |       |          |       |       |                |             |             |            |  |                 |
|--------------|----------------------|-------|----------|-------|-------|----------------|-------------|-------------|------------|--|-----------------|
| CCIX         | Process Technologies |       |          |       |       |                |             |             |            | Controllers                            | Verification IP |
|              | 65 nm                | 55 nm | 40/45 nm | 28 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |  |                 |
| CCIX 1.0     |                      |       |          |       |       | ✓              | ✓           |             | ✓          | Endpoint, Root Port, Dual Mode, Switch | ✓               |

| HDMI     | Process Technologies |       |          |       |                |             |             |            |  | Controllers | Verification IP |
|----------|----------------------|-------|----------|-------|----------------|-------------|-------------|------------|--|-------------|-----------------|
|          | 65 nm                | 55 nm | 40/45 nm | 28 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |  |             |                 |
| HDMI 2.1 |                      |       |          |       | ✓              | ✓           |             |            |  | ✓           | ✓               |
| HDMI 2.0 |                      |       | ✓        | ✓     | ✓              | ✓           |             |            |  | ✓           | ✓               |
| HDMI 1.4 | ✓                    | ✓     | ✓        | ✓     |                |             |             |            |  | ✓           | ✓               |

| DDR     | Process Technologies |       |          |       |       |                |             |             |            | Controllers                            | Platform Architect Support | Verification IP |
|---------|----------------------|-------|----------|-------|-------|----------------|-------------|-------------|------------|--|----------------------------|-----------------|
|         | 65 nm                | 55 nm | 40/45 nm | 28 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |  |                            |                 |
| LPDDR5  |                      |       |          |       |       |                |             |             |            |  |                            | ✓               |
| LPDDR4  |                      |       |          | ✓     |       | ✓              | ✓           | ✓           | ✓          | Protocol controller, Memory controller | ✓                          | ✓               |
| LPDDR4X |                      |       |          |       |       | ✓              | ✓           |             | ✓          | Protocol controller, Memory controller | ✓                          | ✓               |
| LPDDR3  |                      |       | ✓        | ✓     |       | ✓              | ✓           | ✓           |            | Protocol controller, Memory controller | ✓                          | ✓               |
| LPDDR2  | ✓                    |       | ✓        | ✓     |       | ✓              |             |             |            | Protocol controller, Memory controller | ✓                          | ✓               |
| DDR5    |                      |       |          |       |       |                |             |             |            |  |                            | ✓               |
| DDR4    |                      |       | ✓        | ✓     |       | ✓              | ✓           | ✓           | ✓          | Protocol controller, Memory controller | ✓                          | ✓               |
| DDR3    | ✓                    | ✓     | ✓        | ✓     |       | ✓              | ✓           | ✓           |            | Protocol controller, Memory controller | ✓                          | ✓               |
| DDR2    | ✓                    | ✓     | ✓        | ✓     |       |                |             |             |            | Protocol controller, Memory controller | ✓                          | ✓               |

| HBM  | Process Technologies |       |          |       |       |                |             |             |            | Controllers | Verification IP |
|------|----------------------|-------|----------|-------|-------|----------------|-------------|-------------|------------|-------------|-----------------|
|      | 65 nm                | 55 nm | 40/45 nm | 28 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |             |                 |
| HBM2 |                      |       |          |       |       | ✓              |             |             | ✓          |             | ✓               |

| Interface IP |                      |       |       |       |                |             |             |            |                           |                 |
|--------------|----------------------|-------|-------|-------|----------------|-------------|-------------|------------|---------------------------|-----------------|
| MIPI         | Process Technologies |       |       |       |                |             |             |            | Controllers               | Verification IP |
|              | 40/45 nm             | 28 nm | 22 nm | 20 nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |                           |                 |
| D-PHY        | ✓                    | ✓     | ✓     | ✓     | ✓              | ✓           |             | ✓          | CSI-2, DSI                | ✓               |
| M-PHY        |                      | ✓     |       |       | ✓              | ✓           | ✓           | ✓          | UFS, UniPro               | ✓               |
| CSI-2        |                      |       |       |       |                |             |             |            | Host, Device              | ✓               |
| DSI          |                      |       |       |       |                |             |             |            | Host, Device              | ✓               |
| DSI + DSC    |                      |       |       |       |                |             |             |            | DSI + DSC Encoder         | ✓               |
| UniPro       |                      |       |       |       |                |             |             |            | v1.6, v1.8                | ✓               |
| I3C          |                      |       |       |       |                |             |             |            | Master, Slave, Slave Lite | ✓               |

| Ethernet  | Process Technologies |                |            | PCS | Controllers | Verification IP |
|---|----------------------|----------------|------------|-----|-------------|-----------------|
|   | 28nm                 | 14/16nm FinFET | 7nm FinFET |     |             |                 |
| 56G Ethernet  |                      | ✓              |            |     |             | ✓               |
| RXAUI/Double XAUI (6.25 G)  | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| 1000BASE-KX, Energy Efficient Ethernet, 10GBASE-KR, 10GBASE-KX4                                     | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| 40GBASE-KR4, 40GBASE-CR4, XLAUI   | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| 100GBASE-CR10, CAUI   | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| SGMII   | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| QSGMII  | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| XFI, SFI (SFF-8431)   | ✓                    | ✓              | ✓          | ✓   | ✓           | ✓               |
| GMII/MII, RGMII, RTBI, TBI, SMII, RMII, RevMII, XGMII, XLGMII                                       |                      |                |            | ✓   | ✓           | ✓               |
| IEEE TSN/AVB Standards: IEEE 802.1AS, 802.1AS-Rev, 802.1Qav, 802.1Qat, 802.1Qbv, 802.1Qbu & 802.3br |                      |                |            |     | ✓           | ✓               |
| 25G/50G Ethernet Consortium and IEEE specifications   |                      | ✓              | ✓          | ✓   | ✓           | ✓               |
| 2.5G/5.0G USXGMII   |                      | ✓              | ✓          | ✓   | ✓           | ✓               |
| Additional Enterprise Protocols   |                      |                |            |     |             |                 |
| OIF, CEI-6G/11G   | ✓                    | ✓              | ✓          |     |             |                 |
| CPRI, OBSI, JESD204 A/B   | ✓                    | ✓              | ✓          |     |             | ✓               |
| SRIO  | ✓                    | ✓              | ✓          |     |             |                 |

| SATA    | Process Technologies |      |         |      |                |            | Controllers  | Verification IP |
|---------|----------------------|------|---------|------|----------------|------------|--------------|-----------------|
|         | 65nm                 | 55nm | 40/45nm | 28nm | 14/16nm FinFET | 7nm FinFET |              |                 |
| SATA 6G | ✓                    | ✓    | ✓       | ✓    | ✓              | ✓          | Host, Device | ✓               |
| SATA 3G | ✓                    | ✓    | ✓       | ✓    | ✓              | ✓          | Host, Device | ✓               |

| Bluetooth, Thread, Zigbee      | Process Technologies |      |      |      | Controller (Link Layer / Mac) |
|--------------------------------|----------------------|------|------|------|-------------------------------|
|                                | 180nm                | 55nm | 40nm | 22nm |                               |
| Bluetooth 5.1                  |                      | ✓    | ✓    |      | ✓                             |
| IEEE 802.15.4 (Thread, Zigbee) |                      | ✓    | ✓    |      | ✓                             |
| Combo Bluetooth IEEE 802.15.4  |                      | ✓    | ✓    |      | ✓                             |

| Interface IP   |                      |      |                |             |             |            |             |                 |
|----------------|----------------------|------|----------------|-------------|-------------|------------|-------------|-----------------|
| Mobile Storage | Process Technologies |      |                |             |             |            | Controllers | Verification IP |
|                | 28nm                 | 22nm | 14/16nm FinFET | 12nm FinFET | 10nm FinFET | 7nm FinFET |             |                 |
| UFS            |                      |      |                |             |             |            | ✓           | ✓               |
| UniPro         |                      |      |                |             |             |            | ✓           | ✓               |
| M-PHY          | ✓                    |      | ✓              | ✓           | ✓           | ✓          | ✓           | ✓               |
| eMMC           | ✓                    |      | ✓              | ✓           |             | ✓          | ✓           | ✓               |
| SD             | ✓                    |      | ✓              | ✓           |             | ✓          | ✓           | ✓               |
| SDIO           | ✓                    |      | ✓              | ✓           |             | ✓          | ✓           | ✓               |

| AMBA  | Synthesizable IP | Verification IP |
|---|------------------|-----------------|
| AXI 3 and AXI 4 bus fabric, bridges, and infrastructure IP                        | ✓                | ✓               |
| AHB and AXI DMA controllers   | ✓                | ✓               |
| AMBA peripherals (SSI for SPI/xSPI bus, I <sup>2</sup> C, I <sup>2</sup> S, UART) | ✓                | ✓               |
| Timers, interrupt controllers, GPIOs, interconnect matrices                       | ✓                | ✓               |

| Datapath IP              | Synthesizable IP | Simulation Models (C++, Verilog) | Verification Models |
|--------------------------|------------------|----------------------------------|---------------------|
| Floating point functions | ✓                | ✓                                | ✓                   |
| Fixed point functions    | ✓                | ✓                                | ✓                   |
| Trigonometric functions  | ✓                | ✓                                | ✓                   |

| Analog IP          |                      |       |      |      |      |      |      |      |                |            |            |                             |
|--------------------|----------------------|-------|------|------|------|------|------|------|----------------|------------|------------|-----------------------------|
| Data Converters    | Process Technologies |       |      |      |      |      |      |      |                | Bits       | MSPS       | Channel Configuration       |
|                    | 180nm                | 130nm | 90nm | 65nm | 55nm | 40nm | 28nm | 22nm | 12/16nm FinFET |            |            |                             |
| >1000 MSPS ADCs    |                      |       |      |      |      |      |      |      |                | 12         | 3000       | Single, Dual                |
| 300-1000 MSPS ADCs |                      |       |      |      |      | ✓    | ✓    | ✓    | ✓              | 12         | 320        | Single, Dual                |
| 150-300 MSPS ADCs  |                      |       |      |      |      | ✓    | ✓    | ✓    | ✓              | 10, 12     | 160 to 250 | Single, Dual                |
| 10-150 MSPS ADCs   |                      |       |      | ✓    |      | ✓    | ✓    | ✓    | ✓              | 10, 12     | 80 to 125  | Single, Dual                |
| <10 MSPS ADCs      | ✓                    |       | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓              | 10, 12, 14 | 1 to 5     | Single                      |
| >1000 MSPS DACs    |                      |       |      |      |      |      |      |      |                | 12         | 3000       | Single, Dual                |
| 300-1000 MSPS DACs |                      |       |      |      |      | ✓    | ✓    | ✓    | ✓              | 10, 12     | 320 to 640 | Single, Dual                |
| 100-300 MSPS DACs  |                      |       |      | ✓    |      | ✓    | ✓    |      |                | 10, 12     | 160, 300   | Single, Dual, 1 to 6 (VDAC) |
| <100 MSPS DACs     |                      |       |      | ✓    |      | ✓    | ✓    | ✓    | ✓              | 11, 12     | 20         | Single                      |

| Memories and Logic Libraries                               |                      |      |         |      |      |                |             |            |
|--|----------------------|------|---------|------|------|----------------|-------------|------------|
| Embedded Memories  | Process Technologies |      |         |      |      |                |             |            |
|  | 65nm                 | 55nm | 40/45nm | 28nm | 22nm | 14/16nm FinFET | 12nm FinFET | 7nm FinFET |
| Ternary Content-addressable Memory (TCAM)                  |                      |      |         |      |      |                |             | ✓          |
| High-Density Single Port SRAM, High-Density Dual Port SRAM | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Density 1P RF, High-Density 2P RF                     | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Density ROM   | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Speed Single Port SRAM                                | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Speed Dual Port SRAM                                  | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           |            |
| High-Speed 1P RF (Cache)                                   | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Speed Asynchronous 2-Port Register File               |                      |      | ✓       | ✓    |      | ✓              |             |            |
| UHD 1P RF  |                      |      |         |      |      |                |             | ✓          |
| UHD 2P RF  | ✓                    | ✓    | ✓       | ✓    |      | ✓              | ✓           | ✓          |
| UHD 2P SRAM  |                      |      |         | ✓    |      | ✓              |             | ✓          |
| STAR Memory System Embedded Test and Repair                | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| STAR Hierarchical System                                   | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |

| Logic Libraries                  | Process Technologies |      |         |      |      |                |             |            |
|----------------------------------|----------------------|------|---------|------|------|----------------|-------------|------------|
|                                  | 65nm                 | 55nm | 40/45nm | 28nm | 22nm | 14/16nm FinFET | 12nm FinFET | 7nm FinFET |
| High-Speed Library               | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Speed Multi-channel         |                      |      | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| High-Speed POK                   | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              |             | ✓          |
| High-Density Library             | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              |             | ✓          |
| High-Density Multi-channel       |                      |      | ✓       | ✓    | ✓    | ✓              |             | ✓          |
| High-Density POK                 | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              |             | ✓          |
| UHD Library, UHD POK             | ✓                    | ✓    | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| UHD Multi-channel                |                      |      | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| Ultra-low leakage (thick oxide)  |                      |      | ✓       |      |      | ✓              | ✓           |            |
| High-Performance Core Design Kit |                      |      | ✓       | ✓    | ✓    | ✓              | ✓           | ✓          |
| Enhanced Reliability Kit         |                      |      |         |      |      | ✓              |             |            |

| Non-Volatile Memory                          | Process Technologies |           |          |          |       |       |       |                |       | Bit Counts         | Endurance (Write Cycles) |
|--|----------------------|-----------|----------|----------|-------|-------|-------|----------------|-------|--------------------|--------------------------|
|  | 150/180nm            | 110/130nm | 80/90 nm | 55/65 nm | 40 nm | 28 nm | 22 nm | 14/16nm FinFET | 12 nm |                    |                          |
| One-Time Programmable (OTP)                  | ✓                    | ✓         | ✓        | ✓        | ✓     | ✓     |       | ✓              | ✓     | 16 bit to 1 Mbit   | 1 per instance           |
| Multi-Time Programmable (MTP) Medium-Density | 180nm                |           |          |          |       |       |       |                |       | 16 bit to 512 Kbit | Up to 1,000              |
| MTP EEPROM                                   | 180nm                |           |          | ✓        | ✓     |       |       |                |       | 128 bit to 8 Kbit  | Up to 1,000,000          |
| MTP ULP                                      | ✓                    |           |          |          |       |       |       |                |       | 64 bit to 4 Kbit   | Up to 100,000            |
| Few-Time Programmable Trim                   | ✓                    | ✓         |          |          |       |       |       |                |       | 64 bit to 4 Kbit   | Up to 1,000              |

| Security IP                                |                  |          |
|--|------------------|----------|
| Security                                   | Synthesizable IP | Software |
| Cryptography IP                            | ✓                | ✓        |
| Security Protocol Accelerators             | ✓                | ✓        |
| Hardware Secure Modules with Root of Trust | ✓                | ✓        |
| Content Protection IP                      | ✓                | ✓        |

## Accelerate Development of Performance-Efficient SoCs

Synopsys' DesignWare ARC® Processors are a family of 32-bit CPUs that SoC designers can optimize for a wide range of uses, from deeply embedded to high-performance host applications in a variety of market segments. Designers can differentiate their products by using patented configuration technology to tailor each ARC processor instance to meet specific performance, power and area requirements. The DesignWare ARC processors are also extendable, allowing designers to add their own custom instructions that dramatically increase performance. Synopsys' ARC processors have been used by over 230 customers worldwide who collectively ship more than 1.9 billion ARC-based chips annually.

All DesignWare ARC processors utilize a 16-/32-bit ISA that provides excellent performance and code density for embedded and host SoC applications. The RISC microprocessors are synthesizable and can be implemented in any foundry or process, and are supported by a complete suite of development tools.

DesignWare ARC processors are supported by a broad ecosystem of commercial and open source tools, operating systems and middleware. This includes offerings from leading industry vendors who are members of the ARC Access Program as well as a comprehensive suite of free and open source software available through [embARC.org](http://embARC.org).

| Processor IP          |               |             |     |     |                            |                           |     |                |       |
|-----------------------|---------------|-------------|-----|-----|----------------------------|---------------------------|-----|----------------|-------|
| ARC 32-bit Processors | Max CCM Size  | Cache Size  | DSP | MPU | Safety Enhancement Package | Enhanced Security Package | MMU | Floating Point | Trace |
| EM4                   | 2MB           |             |     | ✓   | ✓                          | ✓                         |     | ✓              | ✓     |
| EM6                   | 2MB           | 32K         |     | ✓   | ✓                          | ✓                         |     | ✓              | ✓     |
| EM5D                  | 2MB           |             | ✓   | ✓   | ✓                          | ✓                         |     | ✓              | ✓     |
| EM7D                  | 2MB           | 32K         | ✓   | ✓   | ✓                          | ✓                         |     | ✓              | ✓     |
| EM9D                  | 2MB           |             | ✓   | ✓   |                            | ✓                         |     | ✓              | ✓     |
| EM11D                 | 2MB           | 32K         | ✓   | ✓   |                            | ✓                         |     | ✓              | ✓     |
| EM4SI                 | 2MB           |             |     | ✓   | ✓                          |                           |     | ✓              | ✓     |
| EM5DSI                | 2MB           |             | ✓   | ✓   | ✓                          |                           |     | ✓              | ✓     |
| SEM110                | 2MB           |             |     | ✓   |                            |                           |     | ✓              |       |
| SEM120D               | 2MB           |             | ✓   | ✓   |                            |                           |     | ✓              |       |
| 605 LE                | 512KB         |             |     | ✓   |                            |                           |     |                |       |
| 710D                  | 512KB         |             | ✓   | ✓   |                            |                           |     | ✓              | ✓     |
| 725D                  | 512KB         | 64K         | ✓   | ✓   |                            |                           |     | ✓              | ✓     |
| 770D                  | 512KB         | 64K         | ✓   | ✓   |                            |                           | ✓   | ✓              | ✓     |
| 610D                  | 512KB         |             | ✓   | ✓   |                            |                           |     | ✓              | ✓     |
| 625D                  | 512KB         | 32K         | ✓   | ✓   |                            |                           |     | ✓              | ✓     |
| AS211SFX              | 512KB         | 32K         | ✓   | ✓   |                            |                           |     | ✓              | ✓     |
| AS221BD (dual-core)   | 512KB ea core | 32K ea core | ✓   | ✓   |                            |                           |     | ✓              | ✓     |

| Processor IP             |              |            |     |              |          |     |                |       |
|--------------------------|--------------|------------|-----|--------------|----------|-----|----------------|-------|
| ARC HS 32-bit Processors | Max CCM Size | Cache Size | DSP | L1 Coherency | L2 Cache | MMU | Floating Point | Trace |
| HS34, HS34x2, HS34x4     | 16MB         |            |     |              |          |     | ✓              | ✓     |
| HS36, HS36x2, HS36x4     | 16MB         | 64K        |     | ✓            |          |     | ✓              | ✓     |
| HS38, HS38x2, HS38x4     | 16MB         | 64K        |     | ✓            | 8MB      | ✓   | ✓              | ✓     |
| HS44, HS44x2, HS44x4     | 16MB         |            |     |              |          |     | ✓              | ✓     |
| HS46, HS46x2, HS46x4     | 16MB         | 64K        |     | ✓            |          |     | ✓              | ✓     |
| HS48, HS48x2, HS48x4     | 16MB         | 64K        |     | ✓            | 8MB      | ✓   | ✓              | ✓     |
| HS45D, HS45Dx2, HS45Dx4  | 16MB         |            | ✓   |              |          |     | ✓              | ✓     |
| HS47D, HS47Dx2, HS47Dx4  | 16MB         | 64K        | ✓   | ✓            |          |     | ✓              | ✓     |

| Embedded Vision Processors | CNN Engine (MACs)   | Vision CPU MACs | DMA | 32-bit Scalar | 512-bit Vector DSP | L1 Cache Coherency | Floating Point Unit (FPU) | Vector Floating Point Unit | Safety Enhancement Package |
|----------------------------|---------------------|-----------------|-----|---------------|--------------------|--------------------|---------------------------|----------------------------|----------------------------|
| EV61                       | 880, 1,760 or 3,520 | 64              | ✓   | 1             | 1                  |                    | ✓                         | ✓                          | ✓                          |
| EV62                       | 880, 1,760 or 3,520 | 128             | ✓   | 2             | 2                  | ✓                  | ✓                         | ✓                          | ✓                          |
| EV64                       | 880, 1,760 or 3,520 | 256             | ✓   | 4             | 4                  | ✓                  | ✓                         | ✓                          | ✓                          |

## IP Accelerated Initiative

With IP Accelerated, Synopsys has augmented its broad portfolio of silicon-proven DesignWare IP with SoC architecture design support, IP subsystems, signal integrity/power integrity analysis and IP hardening, IP prototyping kits, and comprehensive silicon bring-up support to accelerate your product development cycle.

| IP Subsystems                   |                          |                       |   |   |
|---------------------------------|--------------------------|-----------------------|---|---|
| ARC Processor IP Subsystems     | Supported ARC Processors | Hardware Accelerators | Integrated Peripherals  | Included Software   |
| Data Fusion IP Subsystem        | EM5D, EM7D, EM9D, EM11D  | ✓                     | SPI, I <sup>2</sup> C, I <sup>2</sup> S, I3C, UART, PDM, ADC I/F, APB I/F, GPIO | DSP library, audio processing library, peripheral I/O drivers (bare metal), reference designs |
| Sensor and Control IP Subsystem | EM4, EM6                 | ✓                     | SPI, I <sup>2</sup> C, PWM, UART, ADC I/F, DAC I/F, APB I/F, GPIO               | DSP library, motor control library, peripheral I/O drivers (bare metal), reference designs    |
| SoundWave Audio Subsystem       | AS211SFX, AS221BD        | ✓                     | I <sup>2</sup> S, S/PDIF, analog codec I/F, reset, clock management             | Multi-core media framework, MM MQX audio post-processing software                             |

| Interface IP Subsystems         | Supported IP  | Multi-Protocol Support | Integrated Logic   | Included Scripts  |
|---------------------------------|---|------------------------|--|---|
| IP Protocol-Specific Subsystems | USB, PCIe, DDR, Ethernet, HDMI, MIPI, AMBA, Security, MACsec, IPsec, PCIe switch, Ethernet switch | ✓                      | AMBA or native bus, clock management, reset, DMA, interrupts, memory, power management, debug and test logic | Configuration scripts, test environment, test scripts, linting, CDC checks, RDC checks, synthesis scripts, implementation scripts |



| Signal/Power Integrity Analysis & IP Hardening |                        |  |
|--|------------------------|--|
| Supported IP                                   | Multi-Protocol Support | Consultation Expertise   |
| DDR, LPDDR, PCIe, USB, MIPI, Ethernet, HDMI    | ✓                      | On-chip decoupling capacitance, power and ground pins, PHY & SDRAM termination strategy, SoC package design, PCB stack-up and trace width/spacing, performance at required data rate, read/write/address, command/control timing budgets |

| IP Prototyping Kits and Software Development Kits |                                 |   |
|---|---------------------------------|---|
| Protocol/Standard                                 | IP Prototyping Kit with ARC SDP | IP Prototyping Kit with PCIe Connection to PC |
|   | Soft Deliverable                | Soft Deliverable                              |
|   | HAPS-80                         | HAPS-80                                       |
| USB 3.1 Host                                      |                                 | ✓   |
| USB 3.1 Device                                    |                                 | ✓   |
| USB 3.0 Host                                      |                                 | ✓   |
| USB 3.0 Device                                    |                                 | ✓   |
| PCIe 3.1 Endpoint                                 |                                 | ✓   |
| PCIe 3.1 Root Complex                             | ✓                               |   |
| PCIe 2.1 Endpoint                                 |                                 | ✓   |
| PCIe 2.1 Root Complex                             | ✓                               |   |
| CCIX 1.0  | ✓                               |   |
| DDR 4/3   | ✓                               |   |
| LPDDR 4   | ✓                               |   |
| JEDEC UFS Host                                    | ✓                               |   |
| MIPI CSI-2 Device                                 | ✓                               |   |
| MIPI DSI Host                                     | ✓                               |   |

For more information on DesignWare IP, visit [synopsys.com/designware](https://www.synopsys.com/designware).