

## 1. HIGH-SPEED STORAGE & MEMORY INTERFACE

Category	Protocol & Feature Specification	Foundry / Status
UFS & UniPro	UFS 4.0/3.1 Host & Device Controllers UniPro 2.0/1.8/1.6 Host & Device controllers (Optional support AES-XTS 128/192/256)	TSMC 4nm Proven UMC 22nm Proven SS 14nm Proven
SD & eMMC	SD 6.1 Host & Device IP eMMC 5.1 Host & Device IP (Optional support PRO feature)	SMIC 22nm Proven SMIC 40nm Proven
NAND Storage	ONFI 5.2 Digital PHY Subsystem Nandflash Controller (BCH/LDPC optional) OtaNAND CTRL with SPI	TSMC 3/56nm Proven SMIC 40nm Proven
Memory IF	LPDDR5/SX Controller & Digital PHY LPDDR4/X Controller (Customization available)	Ongoing Development

## 2. PQC & ADVANCED SECURITY ENGINES

Domain	Algorithm & Implementation Detail	Key Highlights
Quantum Security	ML-KEM-512/768/1024 (Kyber) ML-DSA-44/65/87 (Dilithium) (Support PUF as Entropy Source)	Silicon Ready Quantum-Resistant Hardware Accelerated
Crypto Engine	AES-XTS/ECB/CBC 128/192/256 RSA-1024/2048/4096 ECC P-256/384/521 SM2/SM3/SM4 Chinese Standard	SMIC 40nm Proven Comprehensive Suite Support Custom Curves
System Security	TRNG (Row/PUF-based) SHA-3 256/512 SHAKE128/256 HWAC-SHA256 Implementation	SMIC 40nm Proven ISO-Compliant

## 3. FOUNDATION & CONNECTIVITY

Type	Core IP Features	Foundry / Status
Peripherals	UART, I2C/I2C, E/JTAG Combo IP Scalable Interface Design	SMIC 40nm Proven
Error Correction	LDPC 1K/2K/KK with Configurable Parity BCH 512B/1K/2K RS 255B	SMIC 40nm Proven

### Mastering the Link, Securing the Path

#### Astro Circuit Design

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