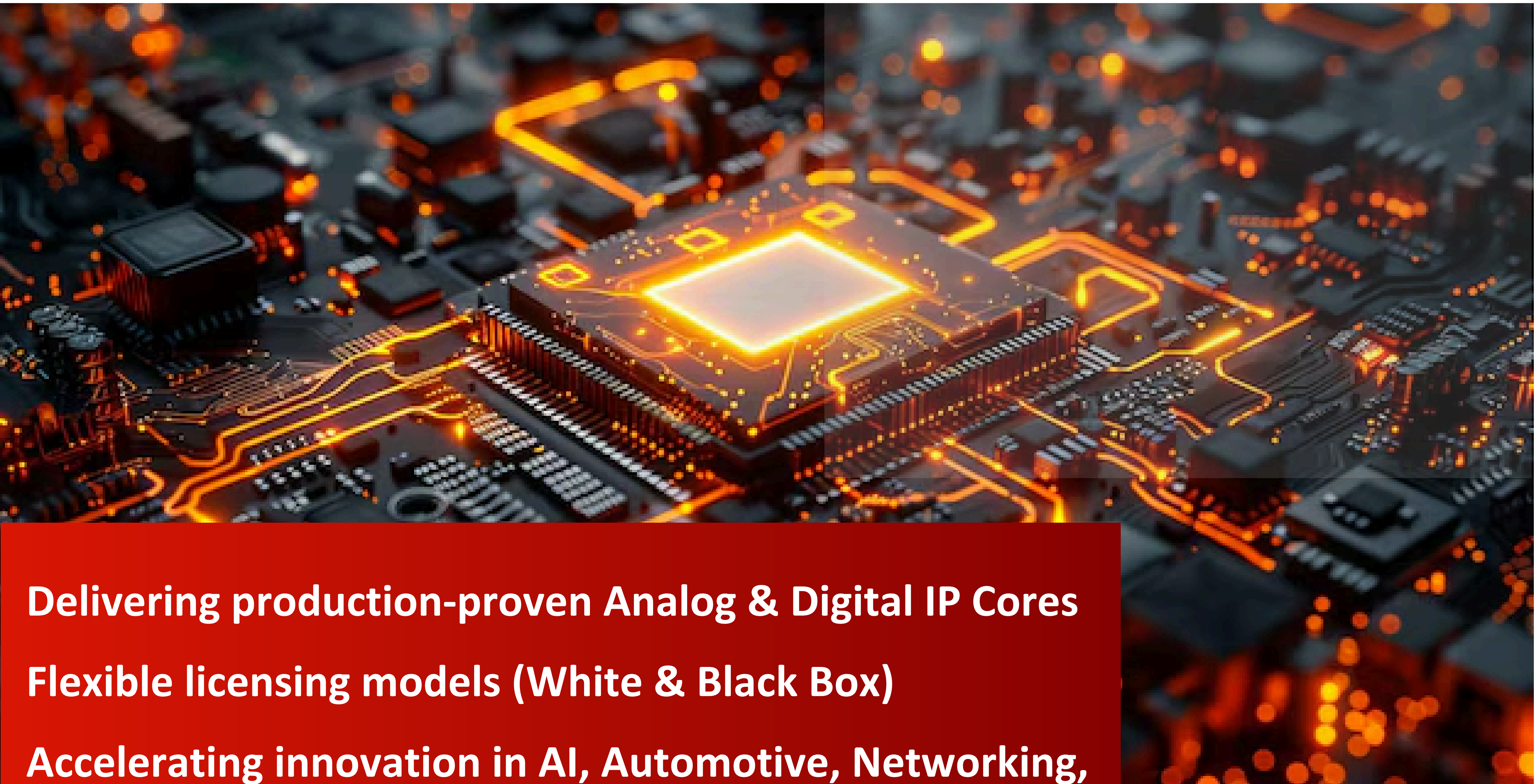


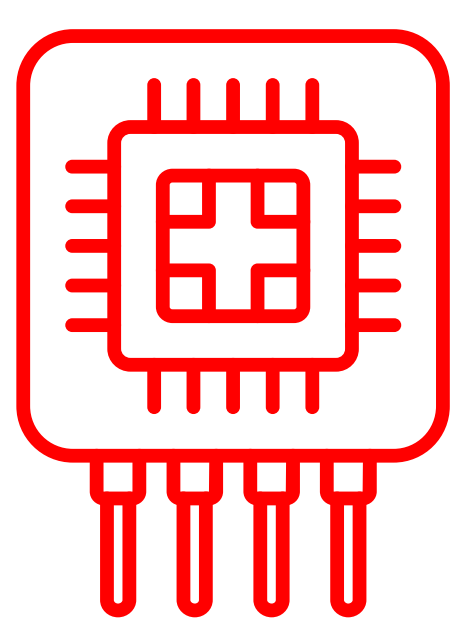
Leaders in high-performance, complex, silicon-proven Semiconductor IP Cores for advanced SoCs.



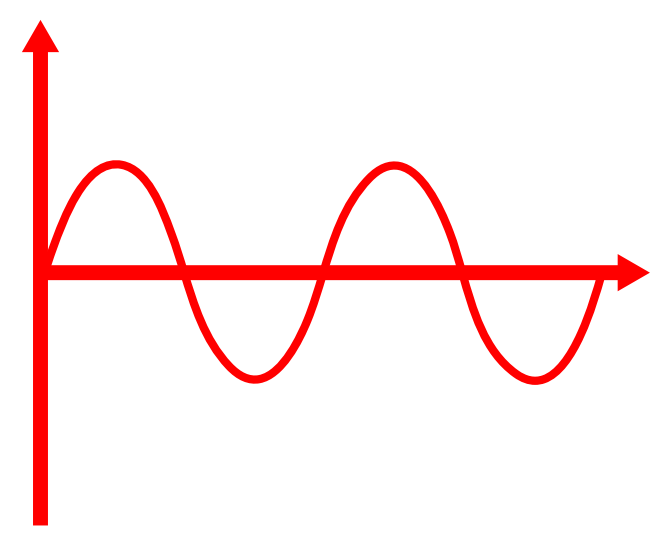
**Delivering production-proven Analog & Digital IP Cores**

**Flexible licensing models (White & Black Box)**

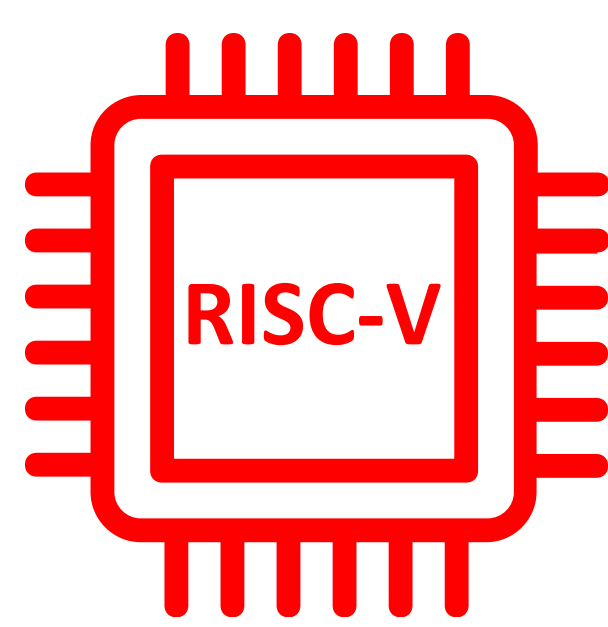
**Accelerating innovation in AI, Automotive, Networking, IoT, Wearables, Consumer Electronics SoCs**



Interface



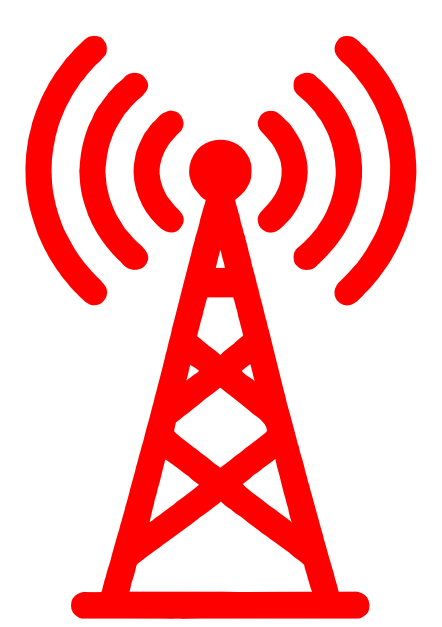
Analog



RISC-V



Wireless RF










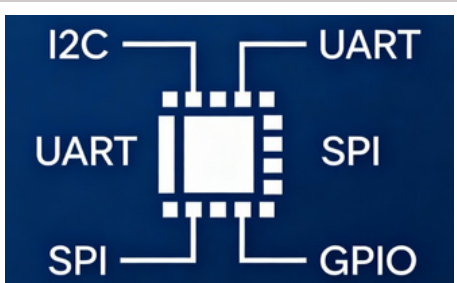


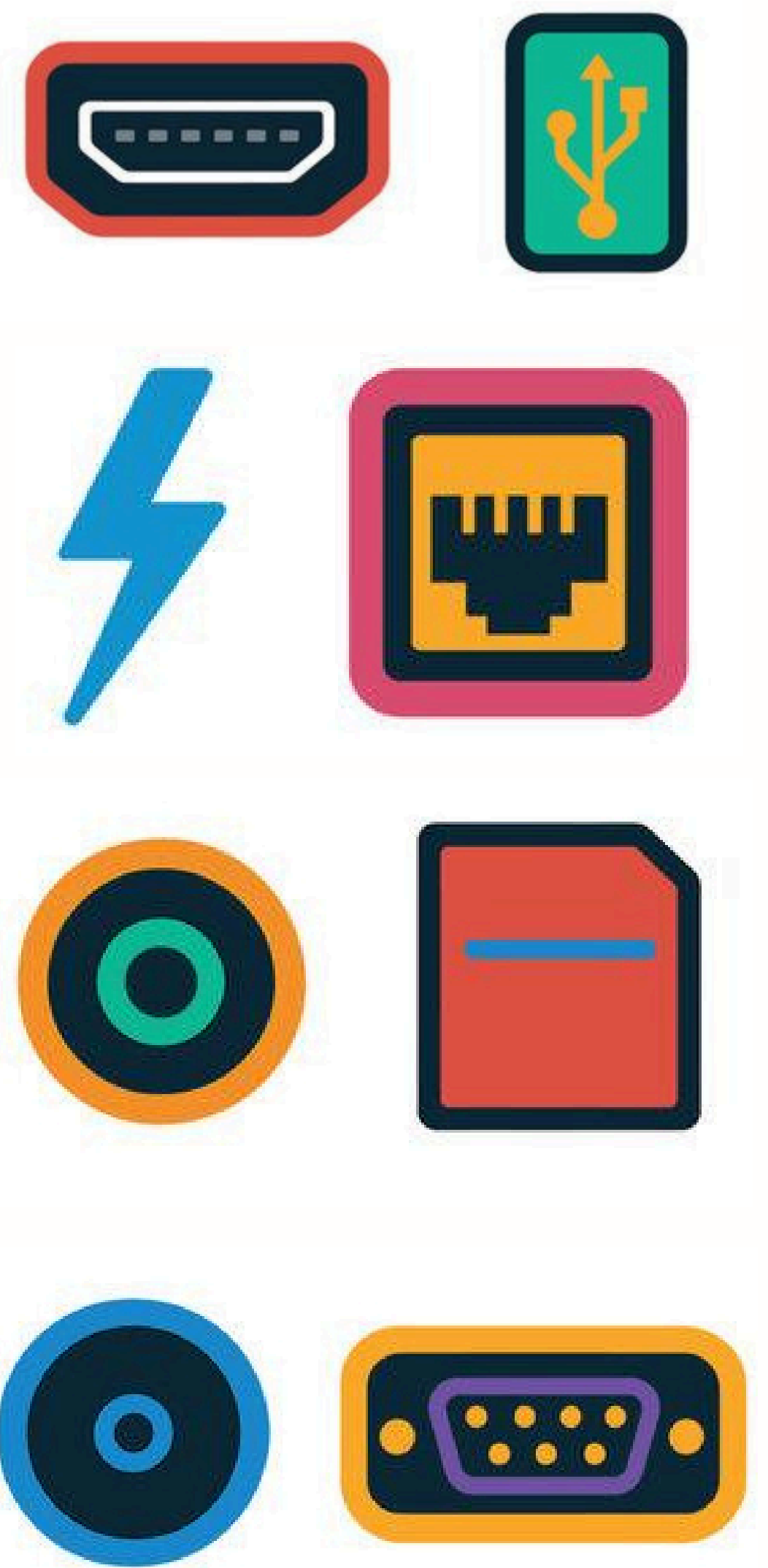
Cellular

**contact@t-2-m.com**  
**www.t-2-m.com**



## Interface IP Cores

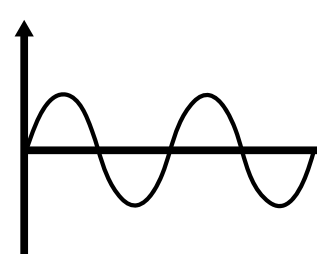



	<b>Ethernet IP</b>	25G/10G/2.5G/1G/100M/10M Ethernet PHY & MAC IPs up to 800G, supporting BaseT, BaseT1 functionality
	<b>Automotive IP</b>	ASA-ML SerDes, CAN 2.0B, CAN FD, CAN XL, LIN 2.0 & FlexRay Controller IPs with ASIL A/B/C/D qualification
	<b>USB IP</b>	USB 4.0, USB 3.2, and USB 2.0 PHY and Controller IPs supporting Host, Device, OTG, and Type-C functionality
	<b>MIPI IP</b>	D-PHY v2.1, C-PHY v2.1, M-PHY v4.1 PHY IPs DSI-2, CSI-3, UFS, UniPro, and RFFE Controller IPs
	<b>PCIe IP</b>	PCIe 5.0, 4.0, 3.0, 2.0 PHY and Controller IPs supporting Root Complex and Endpoint functionality
	<b>DisplayPort IP</b>	DisplayPort 2.1, 2.0, 1.4, 1.2 PHY and Controller IPs Tx & Rx functionality with DSC 1.2 and HDCP 2.3 support
	<b>HDMI IP</b>	HDMI 2.1, 2.0, 1.4, 1.3 PHY and Controller IPs Tx & Rx functionality with DSC 1.2 and HDCP 2.3 support
	<b>Serdes IP</b>	112G to 1G multiprotocol SerDes JESD204B/C PHY & Controller IPs high-speed connectivity
	<b>Memory IP</b>	DDR5/DDR4/DDR3/DDR2 with GDDR / LPDDRx support SD v4.1/eMMC v5.1 and UHS-III PHY and Controller IPs
	<b>Peripheral IP</b>	SPI(Octal/Quad/Dual/eSPI), I <sup>3</sup> C, I <sup>2</sup> C, UART, SPMI SMBus, PMBus, GPIO, JTAG Controller IPs

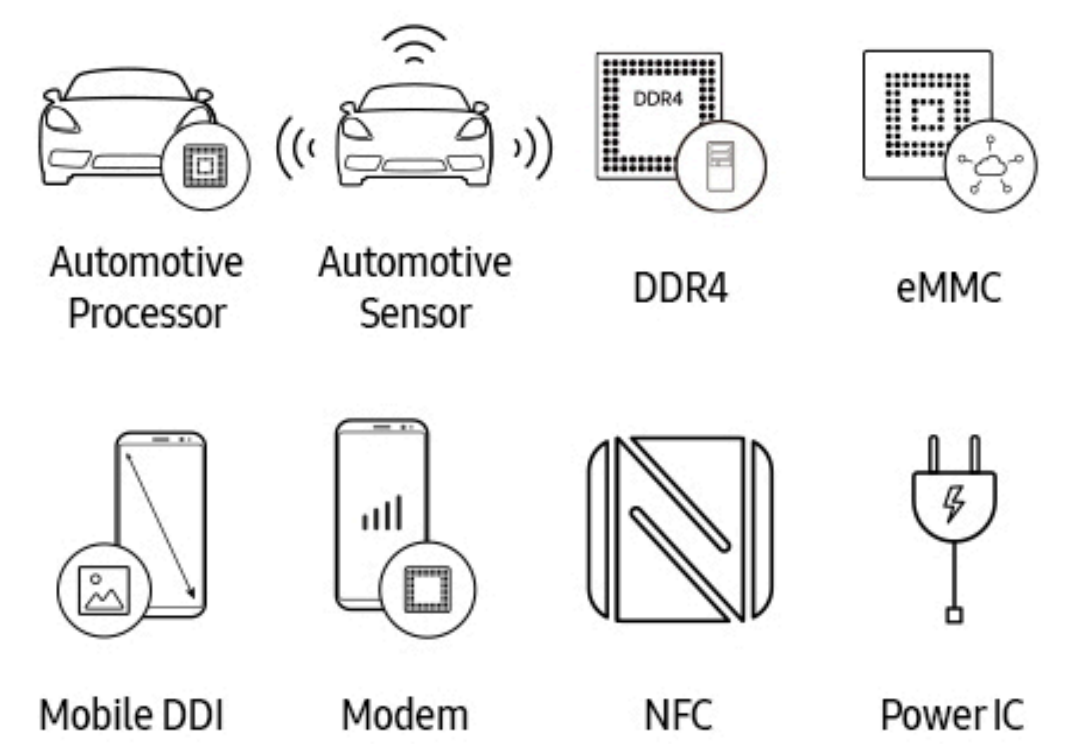


## Ethernet PHY IP Industry Leaders (25G to 1G)



- Multi-Rate Ethernet PHYs down to 14nm
- Automotive, Networking, Industrial applications
- White Box & Black Box licensing
- Smallest Area
- Lowest Power

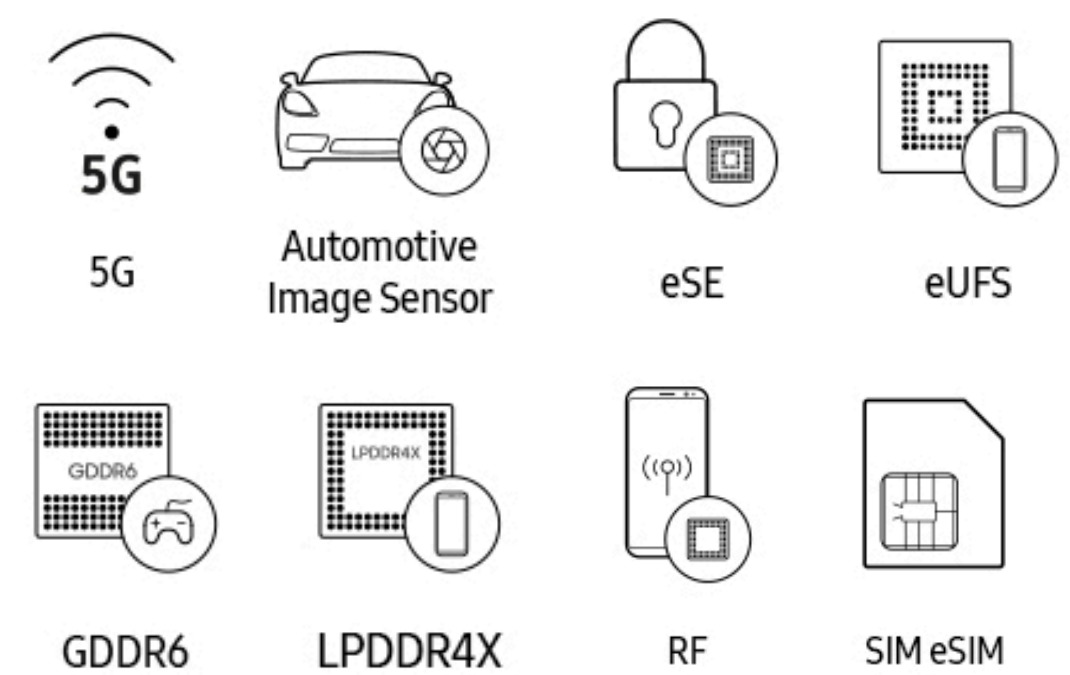
## Analog IP Cores

	<b>ADC/DAC IP</b>	24-bit to 8-bit ADC & DAC IPs supporting upto 32 GS/s IQ, Pipeline, SAR, Sigma-Delta implementations
	<b>PLL/OSC IP</b>	High-frequency crystal/RC oscillators (OSC) upto 256MHz and integral/fractional PLLs upto 2GHz and SSC support
	<b>PMU IP</b>	POR, BOR, Bandgap, DC-DC, LDO, Capless LDO IPs for power management & monitoring
	<b>Sensor IP</b>	PVT sensors with $\pm 2^{\circ}\text{C}$ accuracy, IR sensors, Temperature sensors, Voltage detector, and Op Amp IPs



## Security IP Cores

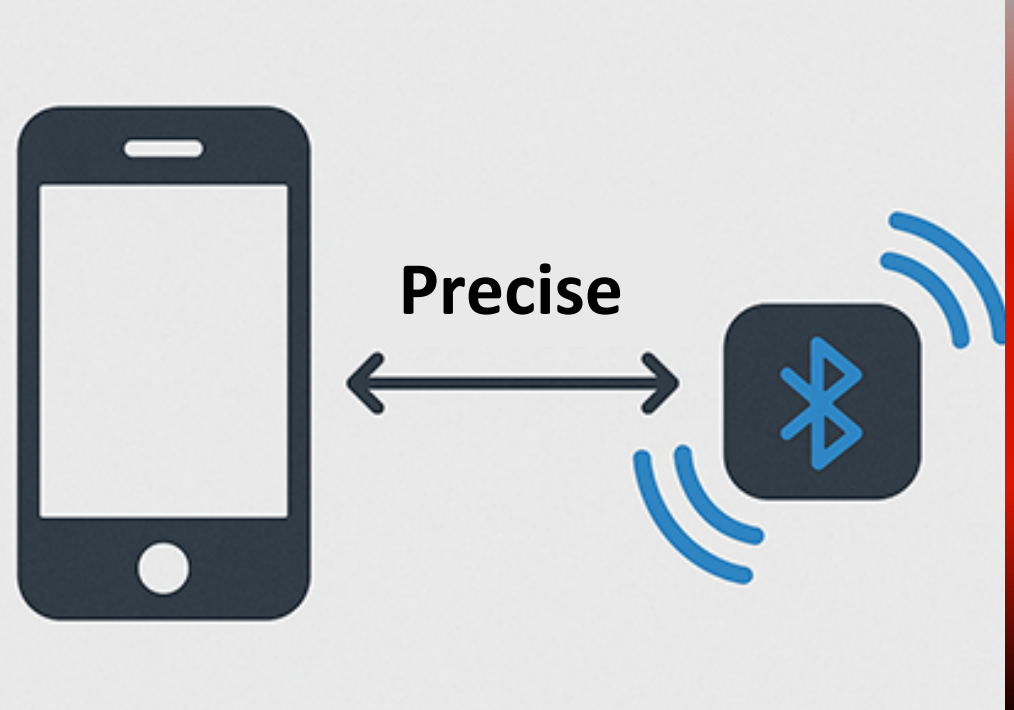
	<b>AES / SHA-2 IPs</b>	AES, SHA2, and 3DES Symmetric IPs for encryption and hashing for secure data transfer and integrity
	<b>ECC / ECDSA IPs</b>	ECC, ECDSA, and RSA Asymmetric IPs for digital signatures, secure key exchange and authentication





## Channel Sounding

- BLE 6.0 precise distance measurement & direction
- +10dBm power
- 0.5mm<sup>2</sup> RF IP
- TSMC 22 & GF 22fdx



## ASIC Services

### Concept to Silicon

- Complete turnkey RF ASIC services
- Low-power/high-performance RF SoCs
- Integrating RF, AFE, Modem, PMU
- Single-chip including test & manufacturing

## ASIC Platforms

### Customisable

- **CGM:** AFE, BLE 5.x, NFC, MCU, PMU, memory
- **TPMS:** ULP design, AEC-Q100 qualified, <100nA Sleep Mode Current
- **SATCOM:** DMSS for secure, low-latency, low-power sensor-to-satellite links



## Bluetooth RF IP Cores

<b>Bluetooth 6.0</b>	<b>Dual Mode RF IP</b> (BR, EDR, BLE, 15.4)	Production in 22/40/55nm TSMC, GF, SMIC, UMC, HLMC Supports HDT, 15.4, Zigbee, Thread, Matter
<b>Bluetooth 6.0 Low Energy</b>	<b>Low Energy RF IP</b> (BLE, 15.4)	Proven in 22/40/55nm in leading Fabs incl. Modem Channel sounding, LE Audio, Zigbee, Thread, Matter

## Bluetooth IP Cores

<b>Bluetooth 6.0</b>	<b>Dual Mode IP</b> (LinkLayer, SW Stack)	Optimized memory footprint, Stack Integrated in PTS BT-SIG testing tool, integrates with third-party radio
<b>Bluetooth 6.0 Low Energy</b>	<b>BLE IP</b> (LinkLayer, SW Stack)	Ultra-low power, Channel sounding, LE Audio Supports 15.4, Zigbee, Thread, Matter

## Wi-Fi RF IP Cores

<b>Wi-Fi 7</b>	<b>Wi-Fi RF IP</b>	Available in 22nm, Tri-band, 4096 QAM, BW 80~160MHz High performance for AP router with FEM
<b>Wi-Fi 6</b>	<b>Wi-Fi + BLE RF IP</b>	Proven in 22nm, Dual-band, 2x2, 1024 QAM & BW 80MHz, BLE+15.4 for IoT, Access Point Gateway

## NFC IP Cores

<b>NFC</b>	<b>NFC IP</b>	Available in 22/40nm Mixed-Signal, RF & Controller ISO/IEC 14443-A/B/15693/18092/18000-6C Tag & Reader
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## Cellular RF IP Cores

<b>5G</b>	<b>Sub 6GHz RF IP</b>	Proven in 22LP, 3GPP 5G/sub6 upto 200MHz RF BW Very low EVM transmitter, small die area
<b>SDR</b>	<b>SDR RF IP</b>	Proven in 22/40nm, 200MHz~7.3GHz, BW: upto 30MHz +23 dBm Tx PA, Low Power Rx ~10mW

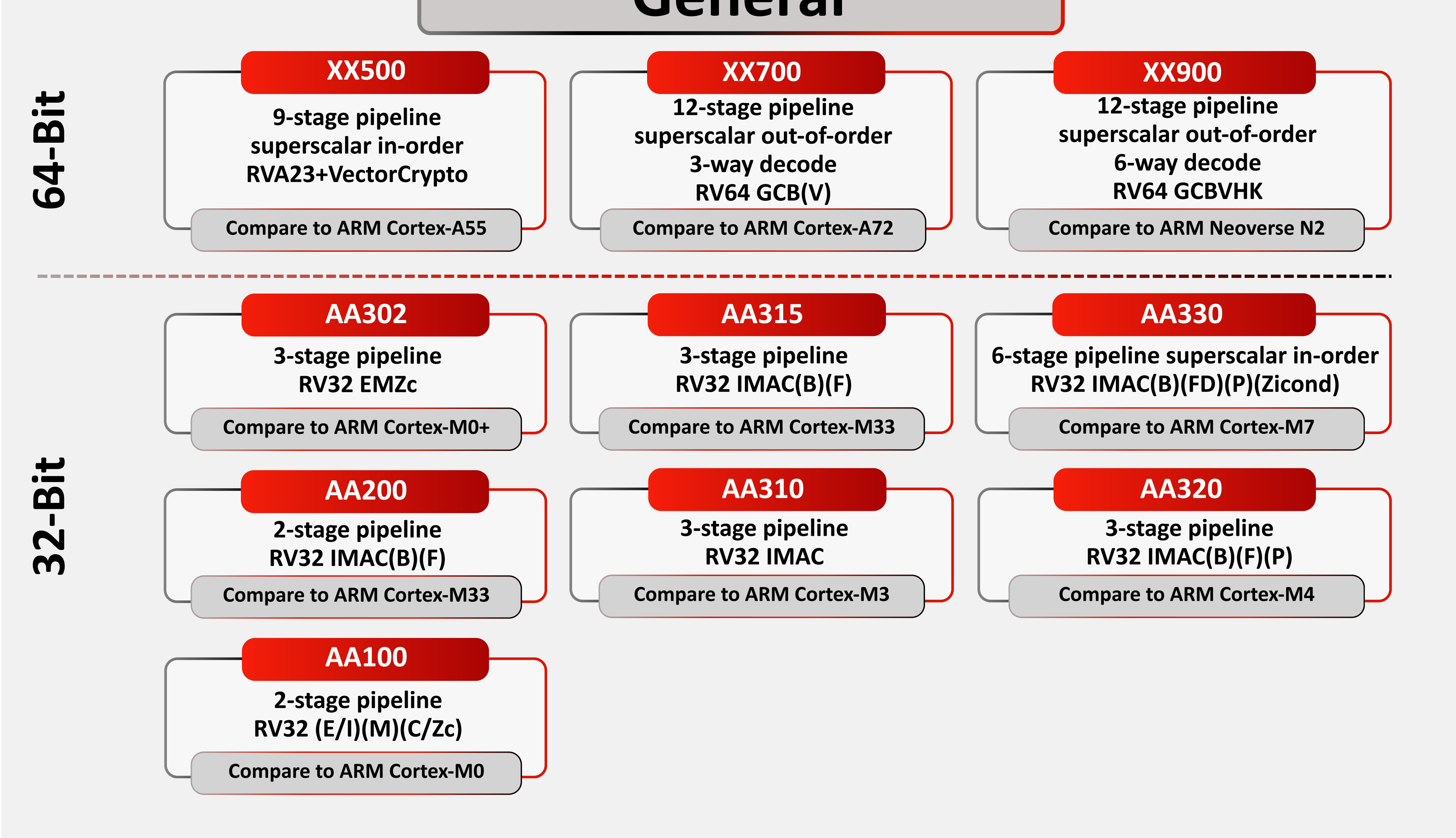
## Satellite IP Cores & NTN

<b>GNSS</b>	<b>GNSS IP</b>	Proven in 22nm, L1/L2/L5/L6/E6 & Multi-Constellations Anti-jamming, High-precision positioning
<b>NTN</b>	<b>NTN</b> (System Test Bench)	End-to-end NTN simulation platform 3GPP Rel 17 & 18, customisable, developed for ESA
<b>NTN</b>	<b>Protocol SW Stack</b>	3GPP Rel-17 NTN Stack in ANSI C, PSM + eDRX, NB1/NB2 upto 160 kbps, Flash: 700kB, RAM: 319kB

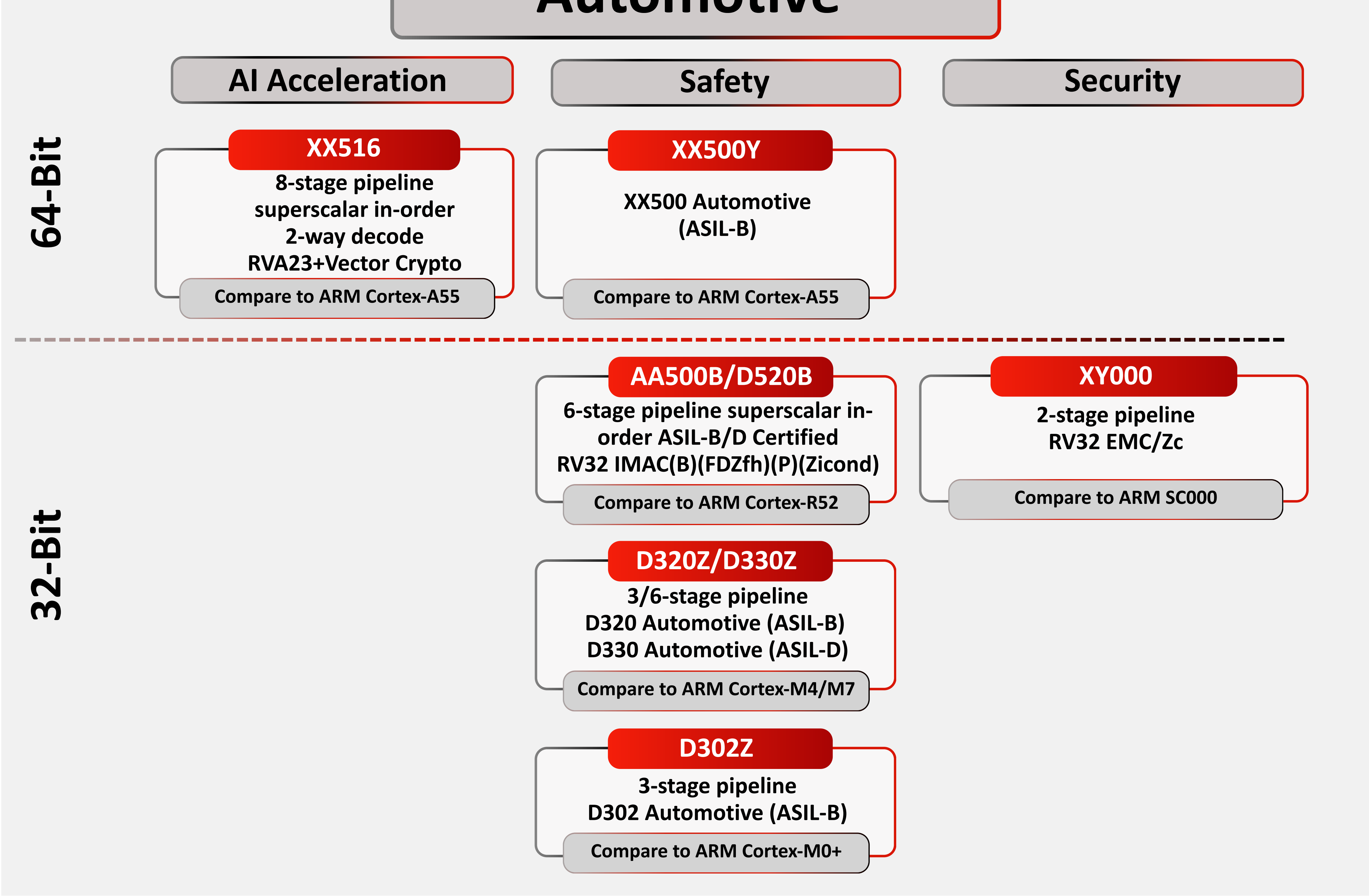


# RISC-V CPU IP Cores

## General



## Automotive



Extracted From Production Chips