**Zynq UltraScale+ MPSoC**

**OVERVIEW**

Zynq® UltraScale+™ MPSoCs combine a high-performance Arm®-based multicore, multiprocessing system (PS) with ASIC-class programmable logic (PL). These devices, equipped with dual- and quad-core application processors, deliver maximum scalability and are capable of offloading critical applications, such as graphics and video pipelining, to dedicated processing blocks. Zynq UltraScale+ MPSoCs also feature a full complement of integrated peripherals and connectivity cores suitable for next-generation systems.

Fully integrated programmable logic enables custom co-processors and custom memory hierarchies to meet application-specific needs, including deep learning processing units (DPU) for AI/ML processing. The 16nm FinFET+ programmable logic communicates with the processing system through 6,000 interconnects, enabling bandwidth that is not possible with multichip solutions. Dramatic power savings are achieved through fine-grained control of power domains and gated power islands. With specialized processing elements for different workloads, Zynq UltraScale+ MPSoCs are optimal single-chip platforms for both cost-sensitive and high-performance applications.

**HIGHLIGHTS**

**Massive PS-PL Bandwidth Enables Efficient Accelerators**
- 6,000 interconnects between PS and PL to avoid multi-chip I/O limitations
- Extensive library of hardened and soft peripheral IP enables many interfaces
- High-level language converts software bottlenecks into hardware accelerators
- Multi-port hardened controller enables PS and PL access to common memory

**Packaging Innovation for Industry’s Highest Compute Density**
- Integrated Fan-Out (InFO) packaging for ultra-compact form factor (9.5x15mm)
- 60% less area (than flip-chip packaging) for better thermal & power distribution
- 5X compute density vs. comparable ASSPs (DMIPS/mm²)
- Available for ZU1, ZU2, and ZU3 devices

**Architectural Advantages vs. ASSPs**
- Custom memory hierarchy for highest throughput, lowest latency designs
- Tightly coupled memory enables full isolation of safety-critical functions
- Soft co-processors for offloading or extra processing capability
- AI/ML processing capable with custom deep learning processing units (DPU)
- Scalable with the full Zynq MPSoC portfolio, preserving your design investment

**TARGET APPLICATIONS**

**Industrial**
- Machine Vision
- Industrial Networking (Time-Sensitive Networking)
- Industrial Controllers
- Retail Analytics
- Robotics
- Drives

**Medical**
- Portable and Desktop Ultrasound
- External Defibrillators
- Endoscopy

**Automotive**
- Monitoring Systems
- Camera-enabled Driver Assist Systems

**AV Broadcasting**
- Portable Pico Projectors
- Small Form Factor Broadcast

**Aerospace & Defense**
- MILCOM Radio
- Missiles & Munitions
**FEATURES**

### PROCESSING SYSTEM

<table>
<thead>
<tr>
<th>Feature</th>
<th>CG Devices</th>
<th>EG Devices</th>
<th>EV Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Processing Unit</td>
<td>Dual-core Arm® Cortex®-A53</td>
<td>Quad-core Arm Cortex-A53</td>
<td>Quad-core Arm Cortex-A53</td>
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<tr>
<td>Real-Time Processing Unit</td>
<td>Dual-core Arm Cortex-R5F</td>
<td>Dual-core Arm Cortex-R5F</td>
<td>Dual-core Arm Cortex-R5F</td>
</tr>
<tr>
<td>Graphics Processing Unit</td>
<td>Arm Mali™-400 MP2</td>
<td>Arm Mali-400 MP2</td>
<td>Up to 8K @ 15fps Supports H.264/H.265</td>
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<tr>
<td>Video Codec Unit</td>
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<td>–</td>
</tr>
<tr>
<td>Embedded and External Memory</td>
<td>Embedded: 256KB On-Chip Memory w/ECC; 32KB L1 I/D Caches; 1MB L2 Cache</td>
<td>External: DDR4/3/3L &amp; LPDDR4/3 w/ECC; Quad-SPI; NAND w/ECC; eMMC</td>
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</tbody>
</table>

### PROGRAMMABLE LOGIC*

<table>
<thead>
<tr>
<th>Feature</th>
<th>CG Devices</th>
<th>EG Devices</th>
<th>EV Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Logic Cells (K)</td>
<td>600</td>
<td>1,143</td>
<td>504</td>
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<tr>
<td>DSP Slices</td>
<td>2,520</td>
<td>3,528</td>
<td>1,728</td>
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<tr>
<td>Transceivers</td>
<td>24 @ 16Gb/s</td>
<td>44 @ 16Gb/s</td>
<td>24 @ 16Gb/s</td>
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<tr>
<td>On-Chip Memory (Mb)</td>
<td>44.2</td>
<td>80.4</td>
<td>44.2</td>
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<tr>
<td>PCIe® Gen3</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Clock Management Tiles (CMTs)</td>
<td>8</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>High-Speed Connectivity</td>
<td>PCIe Gen2 x4; 2x USB3.0; SATA 3.1; DisplayPort; 4x Tri-mode Gigabit Ethernet</td>
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</tr>
</tbody>
</table>

### FEATURES OVERVIEW

- **Dynamic Power Management**
  - Multiple power domains with granular gating control
  - Platform Management Unit for power, safety, and reliability
- **Safety and Security Features**
  - Configuration Security Unit for anti-tamper and lockdown
  - Support for 4096-bit RSA keys with SHA-3 hash functions
  - Secure system boot with AES 256 decryption
  - Full Arm TrustZone support
- **Custom Memory Hierarchy**
  - Up to 10MB of internal local memory for co-processors and custom accelerators
  - Built-in DDR controller for low latency memory access
  - Tightly coupled memory enables isolated design flows for safety-critical applications
- **Deep Learning Processing Unit (DPU) Compatible**
  - Configurable computation engine dedicated to convolutional neural networks
  - Accelerate AI/ML functions easily with reference designs and pre-built AI models

*Maximum for each device family

## TAKE THE NEXT STEP

Zynq UltraScale+ MPSoCs are supported by comprehensive development tools, reference designs, an IP catalog, and evaluation platforms. For more information about Zynq UltraScale+ MPSoCs, visit [https://www.xilinx.com/zynq-ultrascale-plus.html](https://www.xilinx.com/zynq-ultrascale-plus.html). Evaluation kits sold separately; see the [Zynq UltraScale+ MPSoC Kit Selection Guide](https://www.xilinx.com) for details and place an order today.