LEADING THE CHARGE IN AEROSPACE & DEFENSE FOR 20 YEARS

The demanding requirements and environments under which mission-critical defense and aerospace electronics must operate place unprecedented challenges on semiconductor suppliers. Programmable platforms combine the time-to-market and cost advantages of off-the-shelf solutions with the functionality of custom solutions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>First field programmable gate array (FPGA)</td>
</tr>
<tr>
<td>1984</td>
<td>Xilinx founded</td>
</tr>
<tr>
<td>1989</td>
<td>First device qualified to MIL-STD-883</td>
</tr>
<tr>
<td>1991</td>
<td>First standard microcircuit drawing (SMD) device</td>
</tr>
<tr>
<td>1995</td>
<td>ISO 9002 certification</td>
</tr>
<tr>
<td>1997</td>
<td>First 0.35 &amp; 0.25m FPGAs; QML &amp; ISO 9001 certifications</td>
</tr>
<tr>
<td>2000</td>
<td>First 150nm Virtex-II Platform FPGA; First radiation tolerant Virtex FPGAs &amp; SPROMs</td>
</tr>
<tr>
<td>2001</td>
<td>QPRO Virtex FPGAs</td>
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<tr>
<td>2002</td>
<td>SEE Consortium Formed</td>
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<tr>
<td>2004</td>
<td>Xilinx on Mars</td>
</tr>
<tr>
<td>2004</td>
<td>QPRO Virtex-II FPGAs</td>
</tr>
<tr>
<td>2006</td>
<td>Xilinx Single-chip Crypto</td>
</tr>
<tr>
<td>2007</td>
<td>Virtex-4Q FPGA</td>
</tr>
<tr>
<td>2008</td>
<td>Virtex-4QV FPGAs</td>
</tr>
<tr>
<td>2009</td>
<td>Virtex-5Q FPGAs</td>
</tr>
</tbody>
</table>

As the world’s leading programmable logic supplier and trusted aerospace and defense (A&D) partner, Xilinx offers the broadest portfolio of COTS (Commercial-Off-the-Shelf) solutions with a migration path to defense—and space-grade field programmable gate arrays (FPGAs). Xilinx FPGAs are built on a foundation of proven, advanced process technology and surrounded by an extensive development ecosystem. Xilinx FPGAs provide advanced built-in features such as embedded processing, digital signal processing (DSP), and high-speed connectivity that enable developers to replace and integrate multiple ASIC and ASSP devices in a single programmable device. Xilinx solutions reduce system size, weight, power and cost (SWAP-C), while at the same time offer FPGAs that adapt to the ever-changing mission requirements of modern A&D systems.

Xilinx FPGAs are delivered with Xilinx targeted design platforms that enable rapid deployment across the full spectrum of A&D applications. Xilinx A&D solutions are backed by an in-depth knowledge of the market, proven track record of technology leadership, and development partnerships with key suppliers and government agencies. A complete range of services from design feasibility to full turn-key system design enable Xilinx A&D customers to choose an implementation model that best suits their needs.

Unwavering Commitment to the Market

• FIRST TO MARKET IN 1989 WITH QUALIFIED DEFENSE-GRADE FPGA SOLUTION (MIL-STD-883)
• LEGACY OF SERVICE AND SUPPORT TO THE A&D INDUSTRY FOR MORE THAN TWO DECADES
• TRACK RECORD OF DELIVERING SOLUTIONS TO MAJOR DEFENSE CONTRACTORS AND GOVERNMENTAL BODIES WORLDWIDE

AVIONICS
ELECTRONIC WARFARE
HIGH PERFORMANCE COMPUTING
MILCOM
MILSATCOM
MISSILES & MUNITIONS
RADAR
SECURE COMMUNICATIONS
SIGNAL INTELLIGENCE
SPACE
MISSION-CRITICAL DEFENSE APPLICATIONS

Xilinx understands the relentless push in today’s rapidly changing global environment to create increasingly complex electronics systems with shorter design cycles.

The Xilinx A&D offering includes a full range of off-the-shelf, reprogrammable commercial and defense-grade devices; along with application-specific tools, IP, and boards that give developers the ability to productize new capabilities or upgrade existing hardware. The net result is reduction of risk in all aspects of the defense product lifecycle.

Supporting a Broad Range of Defense Applications
• Avionics/Aircraft/Unmanned Aerial Vehicles (UAV)
• C4ISR systems (Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance)
• Electronic warfare
• Extreme form factor (bare die)
• Missiles and munitions
• Radar and sonar

Largest Portfolio of Defense-Grade FPGAs
• Domain-specific FPGA sub-families for logic, processing (embedded processing) and DSP
• Highest performance and integration capabilities
• Pin-compatible migration path from commercial grade
• Product Stability
• Fully qualified, characterized extended temperature product offerings
• Packaging variants including ruggedized plastic
• Tin-whiskering mitigation and solvent cleaning processes protection
• QML-certified product offerings and manufacturing flows

Base Platform
• Commercial grade silicon for COTS requirements
• Defense-grade devices for high stress operational environments
• Flexibility to move between commercial and defense-grade platforms
• Base-level IP, tools, and boards

Market-Specific Platform
• Ruggedized packaging for harsh environments
• Market-specific IP based on use qualification
• High assurance design U.S. RTCA/DO-254 and EUROCAE/ED-80 standards

Domain-Specific Platform
• DSP and processing (embedded processing-optimized) silicon
• Dedicated boards for quick prototyping
• Integrated design environment for quick design validation to move beyond the concept stage
• Domain-specific intellectual property (IP)

The Programmable Imperative
Dramatic shifts in the economic and technical landscape have created a need for more flexible, cost-effective approaches to developing and manufacturing electronic systems.

Xilinx targeted design platforms provide the optimum in flexibility, accessibility, applicability, and time to market.
THE FUTURE IS SECURE

One of the most critical challenges A&D product developers face is balancing the complex and high security requirements put forth by key agencies with the needs of sophisticated products for this market.

Leveraging the capabilities of its market-leading Virtex® FPGAs, Xilinx developed the first single-chip cryptography (SCC) methodology in collaboration with government agencies to enable reductions in SWAP-C through higher levels of integration. SCC allows functionality addressing strict security and reliability requirements that were previously implemented in multiple FPGAs to be implemented in a single FPGA.

Xilinx Single-chip Crypto:
The world's first and only cryptography in a single FPGA

The Challenge
• The highest levels of integration
• Type 1 and Type 2 cryptography
• Red (plain text) and black (cipher text) in one FPGA
• Secure communications with multiple independent levels of security (MILS)

The Solution
• On-chip channel isolation provides multiple-channel, red and black in a single FPGA
• Tamper-proof capabilities such as bitstream encryption
• Switching encryption algorithms and radio waveforms during service

The Benefits
• Minimal program risk due to pre-tested design platform
• Minimal mission risk due to flexibility of FPGA to change even while in-service
• Reduced size, weight and power due to single-chip integration of crypto functions
• Available products: Virtex-4Q and Virtex-5Q FPGAs
• Authenticity assurances for parts

The industry's most integrated and only reprogrammable Type-1 and Type-2 single-chip cryptography solution available today.

TARGETED DESIGN PLATFORM FOR SECURE COMMUNICATIONS

SINGLE-CHIP CRYPTOGRAPHY

SECURE RADIO
FALLURE IS NOT AN OPTION IN SPACE

New missions, from satellites to exploration of the outer reaches of deep space, will traverse some of the harshest environments.

Xilinx radiation-tolerant FPGAs are robust, designed, packaged and space-grade qualified to meet the performance, reliability and lifecycle demands of extreme environments, while enabling shorter design times, lower cost, and greater flexibility than feasible with traditional ASIC implementations.

The Benefit of Xilinx FPGAs in Space

- Time to market—“2 years off critical path”*
- No mask re-spin risk
- No non-recurring engineering charges
- Better performance per watt than competing solutions
- High integration—“We combined 3 boards into one”**

* Xilinx customer quote

Meeting the Radiation Requirements of Space

- Radiation-tolerant FPGAs
- Guaranteed total ionizing dose (TID) up to 300 krad(Si)
- Industry collaboration for single-event effects (SEE) testing
- Single event latchup (SEL) immunity

Long Mission Life through Quality and Reliability

- MIL-PRF-38535 QML-Q Certified, QML-V Certification pending
- High pin count, advanced packaging ceramic column grid array technologies
- Quality and reliability, radiation results, device qualification documentation, and “how to” application notes

Advanced Electronic Design

- Low cost prototyping with commercial grade devices
- SEE Mitigation Techniques and development productivity tools like automated triple-modular redundancy (TMRTool)
- Applications and radiation testing in collaboration with the Xilinx Radiation Test Consortium (XRTC)

Xilinx is the only PLD supplier to offer reprogrammable space-grade FPGAs with commercial prototyping and the logic capacity, performance, and advanced silicon features to enable payload applications.

Virtex-4QV FPGAs are a pin-compatible member of the world’s first 90nm family fabricated in 1.2V, triple-oxide process technology.

Reprogrammable FPGAs for Space

- Industry’s only reprogrammable radiation-tolerant FPGAs in full production
- Space-qualified packages including ceramic quad flat packs and column grid arrays
- Full reliability, radiation data and reports available

Backed by Industry Standard Services

- Xilinx Design Services available to assist at any stage of project planning and execution
- Factory and field application support
- On-site ITAR-compliant Titanium dedicated engineering services

Full Range of Hard and Soft Processing Capabilities

- Dual PowerPC® processor blocks
- MicroBlaze™ soft processor cores
- Configuration memory error-correction IP
- TMRTool for automated triple modular redundancy
- DSP acceleration engines and IP libraries
XILINX A&D FPGAs

As a leader in supporting COTS requirements, Xilinx enables the use of commercial grade devices to reduce costs, development time, and risks.

In addition to commercial grade offerings, Xilinx offers the industry’s highest performance, largest capacity defense and space-grade FPGAs.

**Virtex Family of FPGAs:**
- Highest Performance with Ultimate System Integration
- Built-in Embedded Processor Cores
- Multi-Gigabit Serial Transceivers
- Hard-coded Ethernet MAC and PCIe+ Endpoint Blocks
- High Performance DSP Acceleration Engines
- Megabits of Embedded RAM, Clock Management Circuits with PLLs, and More

**Spartan® Family of FPGAs:**
- Low Power and Small Form Factors
- Optimized for Low Static and Dynamic Power
- Sophisticated Power Management Modes Including Hibernate and Suspend for Mobile and Battery Powered Applications
- High Levels of Component Integration, Including Embedded PCIe and Memory Interfaces

**Defense-grade FPGAs**
- One Hundred Percent Pin Compatible to Their Commercial Equivalent for Seamless Migration Between Prototyping and Low Rate Initial Production (LRIP)
- Extreme Operating Temperature Range—Industrial-Temp (-40 to + 125°C) and Military-Temp (-55 to + 125°C)
- Ruggedized Plastic Packaging—Standard Lead Content Eliminates Tin-Whiskering Concerns and Protects Against Caustic Processes
- Product Specifications and Functionality Stability
- Off-the-Shelf—Prequalified and Ready to Order

**Space-grade FPGAs**
- Radiation Tolerance—Resistant to Single Event Upset (SEU) and Latch-Up (SEL)
- Group Testing—Meets Strict Guidelines Setup by the Defense Supply Center Columbus (DSCC)
- Ceramic Packaging—Extreme Environmental Protection
## BOARDS AND KITS

### Off-the-Shelf Prototyping

**DOMAIN-SPECIFIC, FULL FEATURED EASY TO USE BOARDS AND STARTER KITS THAT ADDRESS UNIQUE MISSION-CRITICAL SYSTEM REQUIREMENTS**

### Boards

<table>
<thead>
<tr>
<th>Board Name</th>
<th>FPGA</th>
<th>Description</th>
<th>Processor</th>
<th>Interface</th>
<th>PowerPC</th>
<th>MicroBlaze</th>
<th>RocketIO</th>
<th>GTP</th>
<th>GTP Transceivers</th>
<th>TX</th>
<th>RX</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtex-5 FXT FPGA ML507 Evaluation Platform</td>
<td>XC5VFX100TFFG1738t</td>
<td><em>Implement Dual PowerPC 440 processors with FPGA fabric and I/O capabilities</em>&lt;br&gt;<em>High-speed RocketIO™ Multi-Gigabit transceivers</em>&lt;br&gt;<em>Two on-board 10/100/1000 Ethernet PHYs</em>&lt;br&gt;<em>Two PCI Express downstream connectors</em></td>
<td>PowerPC440</td>
<td>PowerPC440</td>
<td>10/100/1000</td>
<td>Flexible</td>
<td>GTP</td>
<td>GTP</td>
<td>Single-ended</td>
<td>1.8V to 3.3V</td>
<td></td>
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<tr>
<td>Virtex-5 LX FPGA ML501 Evaluation Platform</td>
<td>XC5VLX50FFG676</td>
<td><em>Develop feature-rich, low-cost evaluation/development platform</em></td>
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<tr>
<td>Virtex-5 LXT FPGA ML550 Networking Interface &amp; Power Measurement Platform</td>
<td>XC5VLX50T-FFG1136</td>
<td><em>Create and evaluate designs using PCI Express Gen 1 &amp; 2, and DDR3</em>&lt;br&gt;<em>PowerPC 440 embedded processor</em>&lt;br&gt;<em>Data-rate-adjustable RocketIO GTP transceivers</em>&lt;br&gt;<em>Single-ended and LVDS connections</em></td>
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<tr>
<td>Virtex-5 SXT FPGA ML506 Evaluation Platform</td>
<td>XC5VSX50TFF1136</td>
<td><em>Create DSP based and high speed serial designs</em>&lt;br&gt;<em>Utilizes Virtex-5 FPGA DSP48E slices and RocketIO GTP transceivers</em></td>
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<tr>
<td>Virtex-5 LXT FPGA ML521 RocketIO Characterization Platform</td>
<td>XC5VX50T-FF665</td>
<td><em>Evaluate Virtex-5 LXT FPGA RocketIO GTP Transceivers</em>&lt;br&gt;<em>RocketIO GTP Transceivers are accessible via 4 SMA connectors</em></td>
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### Kits

<table>
<thead>
<tr>
<th>Kit Name</th>
<th>FPGA</th>
<th>Description</th>
<th>Processor</th>
<th>Interface</th>
<th>PowerPC</th>
<th>MicroBlaze</th>
<th>RocketIO</th>
<th>GTP</th>
<th>GTP Transceivers</th>
<th>TX</th>
<th>RX</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PowerPC and MicroBlaze Development Kit</td>
<td></td>
<td><em>Efficiently develop Virtex-5 PPC 440 &amp; MicroBlaze embedded systems</em>&lt;br&gt;<em>Pre-installed and Pre-verified demonstrations and examples to accelerate design cycle</em></td>
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<tr>
<td>Virtex-5 LXT ML555 FPGA Development Kit</td>
<td>XC5VLX50T-FFG1136</td>
<td><em>Rapidly create and evaluate designs using PCI Express, PCI-X, and PCI interfaces</em>&lt;br&gt;<em>PCI Express endpoint designs in X1, X2, X4, and X8 configurations</em>&lt;br&gt;<em>PCI-X: 64b @ 66/100/133 MHz</em>&lt;br&gt;<em>PCI: 32b @ 33 MHz, 64b @ 33 MHz</em></td>
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<tr>
<td>Virtex-5 LXT FPGA Gigabit Ethernet Development Kit</td>
<td>XC5VLX50T-FFG1136</td>
<td><em>Accelerate DSP intensive applications development</em>&lt;br&gt;<em>Comprehensive development kit includes hardware, design tools, IP, and pre-verified reference designs</em>&lt;br&gt;<em>Unique combination of design technologies enabling thousands of DSP algorithms</em></td>
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</table>

**AEROSPACE & DEFENSE**

**BOARDS & KITS**
**DESIGN AND DEVELOPMENT TOOLS FOR A&D**

Complex A&D systems designs require sophisticated tools to streamline the product development process. Xilinx offers a variety of development tools with superior design and debug capabilities to provide the fastest means of designing, verifying, and deploying programmable solutions for defense and space applications.

**ISE Foundation Software**
- ISE® software provides a complete RTL design environment for Xilinx FPGAs
- Easy-to-use, built-in tools and wizards make I/O assignment, power analysis, timing-driven design closure and HDL simulation quick and intuitive

**System Generator for DSP**
- Integrated flow from design capture to FPGA hardware implementation
- Facilitates use of the Simulink® modeling and simulation environment
- DSP developers can easily exploit the performance and flexibility of FPGA-based signal processing without learning RTL

**Embedded Design Tools**
- Intelligent, platform-aware tools simplify design and accelerate the embedded development process
- Automated wizards walk engineers through the design process to reduce errors and ease learning curves
- Xilinx Embedded Development Kit (EDK) includes: award-winning Platform Studio tool suite as well as all the documentation and IP required to design embedded systems with Xilinx FPGAs and embedded PowerPC and MicroBlaze processor cores

**CORE Generator IP Library**
- Xilinx CORE Generator™ system provides a library of user-customizable functions for RTL design flows
- Range in complexity from basic building blocks such as memories and FIFOs to complex system-level building blocks
- Streamlines the design process, improves design quality, and helps designers to finish faster

**Xilinx DSP IP Library**
- Blockset IP library delivered with System Generator for DSP suite
- Produce optimized logic for Xilinx programmable devices
- Over 90 DSP building blocks available for the Simulink modeling environment

**Xilinx IP Library for Embedded Design**
- Pre-verified processor system IP catalog includes a wide variety of processing peripheral cores for customizing embedded systems
- Source drivers are included for all IP components

**Xilinx TMRTool**
- Industry’s first development tool to automatically generate Triple Module Redundancy (TMR) for reprogrammable FPGAs
- The TMRTool simplifies the process of providing full SEU and SET immunity for high reliability FPGA designs

---

**TMRTool Software Automatic Implementation of Triple Redundancy for SEU Mitigation**

The TMRTool Software automates triple modular redundant (TMR) design for radiation tolerant applications.
Corporate Headquarters
Xilinx, Inc.
2100 Logic Drive
San Jose, CA 95124
USA
Tel: 408-559-7778
www.xilinx.com

Europe
Xilinx Europe
One Logic Drive
Citywest Business Campus
Saggart, County Dublin
Ireland
Tel: +353-1-464-0311
www.xilinx.com

Japan
Xilinx K.K.
Art Village Osaki Central Tower 4F
1-2-2 Osaki, Shinagawa-ku
Tokyo 141-0032 Japan
Tel: +81-3-6744-7777
japan.xilinx.com

Asia Pacific Pte. Ltd.
Xilinx, Asia Pacific
5 Changi Business Park
Singapore 486040
Tel: +65-6407-3000
www.xilinx.com

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For more information on Xilinx A&D,
visit: www.xilinx.com/esp/aerospace.htm
## Space-Grade FPGAs

<table>
<thead>
<tr>
<th>Logic Resources</th>
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<tbody>
<tr>
<td>Part Number</td>
<td>B0</td>
<td>X</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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</tr>
<tr>
<td>Core Voltage</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.5V</td>
<td>1.5V</td>
<td>2.5V</td>
<td>2.5V</td>
<td>2.5V</td>
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<tr>
<td>Slices (1)</td>
<td>69,088</td>
<td>24,576</td>
<td>35,280</td>
<td>63,168</td>
<td>14,336</td>
<td>33,792</td>
<td>3,072</td>
<td>6,912</td>
<td>6,912</td>
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<tr>
<td>Logic Cells</td>
<td>20,048</td>
<td>55,286</td>
<td>56,880</td>
<td>142,128</td>
<td>32,256</td>
<td>76,032</td>
<td>6,912</td>
<td>15,552</td>
<td>15,552</td>
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<tr>
<td>CLB Flip-Flops</td>
<td>178,176</td>
<td>49,152</td>
<td>50,560</td>
<td>126,936</td>
<td>28,672</td>
<td>67,584</td>
<td>6,144</td>
<td>13,824</td>
<td>13,824</td>
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<tr>
<td>Memory Resources</td>
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<tr>
<td>Maximum Distributed RAM (Mb)</td>
<td>1,392</td>
<td>384</td>
<td>395</td>
<td>987</td>
<td>448</td>
<td>1,056</td>
<td>1,711</td>
<td>3,523</td>
<td>3,523</td>
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<tr>
<td>Block RAM/FIFO w/ECC (19Kbits each)</td>
<td>335</td>
<td>320</td>
<td>232</td>
<td>552</td>
<td>96</td>
<td>144</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Total Block RAM (Mb)</td>
<td>6,048</td>
<td>5,760</td>
<td>4,176</td>
<td>9,936</td>
<td>1,728</td>
<td>2,592</td>
<td>64</td>
<td>96</td>
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<td>Clock Resources</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Digital Clock Manager (DCM)</td>
<td>12</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>12</td>
<td>12</td>
<td>4</td>
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<td>I/O Resources</td>
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<tr>
<td>Maximum Single-Ended I/Os</td>
<td>960</td>
<td>640</td>
<td>576</td>
<td>896</td>
<td>720</td>
<td>1,104</td>
<td>316</td>
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<tr>
<td>Maximum Differential I/O Pairs</td>
<td>480</td>
<td>330</td>
<td>224</td>
<td>448</td>
<td>360</td>
<td>552</td>
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<td>Digitally Controlled Impedance</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Embedded Hard IP Resources</td>
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<tr>
<td>DSP Slices</td>
<td>95</td>
<td>512</td>
<td>128</td>
<td>192</td>
<td>—</td>
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<tr>
<td>1x1 Multiplexors</td>
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<td>—</td>
<td>—</td>
<td>95</td>
<td>144</td>
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<td>1Gbps Ethernet MAC Blocks</td>
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<td>M</td>
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<td>MVB</td>
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<td>&gt;125</td>
<td>&gt;125</td>
<td>&gt;125</td>
<td>&gt;160</td>
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### NOTES
1. Each slice comprises two 4-input logic function generators (LUTs), two storage elements, wide-function multiplexers, and carry logic.
2. For information on DSCC SMD availability contact Xilinx.
3. The BG728 and CG717 packages are footprint / pin compatible.
4. The CF1144 and FF1152 packages are footprint / pin compatible.
5. The CF1140 and FF1148 packages are footprint / pin compatible.
6. For the XQR4VLX200, the CF1509 and FF1513 packages are footprint / pin compatible. For the XQR4VF140, the CF1509 and the FF1517 are footprint / pin compatible.

### Manufacturing Grades


### Grade | Description | Temperature
--- | --- | ---
V | QPro Radiation Hardened QML Class V Military Ceramic | T<sub>r</sub> = -55°C to +125°C
H | QPro Flip-Chip Radiation Tolerant Ceramic | T<sub>r</sub> = -55°C to +125°C
B | SMD Radiation Tolerant and Non-RT SMD Military Ceramic | T<sub>r</sub> = -55°C to +125°C
N | Military Plastic | T<sub>r</sub> = -55°C to +125°C
M | Military Ceramic or Plastic | T<sub>r</sub> = -55°C to +125°C (Plastic), T<sub>r</sub> = -55°C to +125°C (Ceramic)
I | Industrial Plastic | T<sub>r</sub> = -40°C to +100°C
## Configuration PROMs

<table>
<thead>
<tr>
<th>Defense-Grade Configuration PROMs</th>
<th>Space-Grade QPro Radiation Tolerant Configuration PROMs</th>
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<tr>
<td>XQ1701L</td>
<td>XQ1701L</td>
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<tr>
<td>XQ17V16</td>
<td>XQ17V16</td>
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<tr>
<td>XQ18VQ4</td>
<td>XQ18VQ4</td>
</tr>
<tr>
<td>XQF32P</td>
<td>XQF32P</td>
</tr>
</tbody>
</table>

### Core Voltage

- XQ1701L: 3.3V
- XQ17V16: 3.3V
- XQ18VQ4: 3.3V
- XQF32P: 3.3V
- XQR1701L: 3.3V
- XQR17V16: 3.3V

### Storage Bits

- XQ1701L: 1M
- XQ17V16: 16M
- XQ18VQ4: 4M
- XQF32P: 32M
- XQR1701L: 1M
- XQR17V16: 16M

### Manufacturing Grades

- M, N
- M, N
- N
- M
- M, V
- M, V

### Total Ionizing Dose (krad)

- CC44, VQ44
- CC44, VQ44
- VQ44
- VQ48
- CC44
- CC44

### Packages

- CC44: ceramic chip carrier
- VQ44: plastic thin quad flat package
- VQ48: plastic TSOP package

### Notes

1. Xilinx configuration PROMs have adjustable I/O voltages for compatibility with all Xilinx FPGAs.
2. The CC44 and PC44 packages are footprint/pin compatible.
3. For information on DSCC qualification contact Xilinx.

### Manufacturing Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>QPro Radiation Hardened QML Class V Military Ceramic</td>
<td>$T_c = -55C \text{ to } +125C$</td>
</tr>
<tr>
<td>H</td>
<td>QPro Flip-Chip Radiation Tolerant Ceramic</td>
<td>$T_c = -55C \text{ to } +125C$</td>
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<tr>
<td>B</td>
<td>SMD Radiation Tolerant and Non-RT SMD Military Ceramic</td>
<td>$T_c = -55C \text{ to } +125C$</td>
</tr>
<tr>
<td>N</td>
<td>Military Plastic</td>
<td>$T_c = -55C \text{ to } +125C$</td>
</tr>
<tr>
<td>M</td>
<td>Military Ceramic or Plastic</td>
<td>$T_c = -55C \text{ to } +125C \text{ (Plastic)}$</td>
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<tr>
<td>I</td>
<td>Industrial Plastic</td>
<td>$T_c = -40C \text{ to } +100C$</td>
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## Defense-Grade FPGAs

### Part Number
- XQ4VLX25
- XQ4VLX60
- XQ4VLX100
- XQ4VLX160
- XQ4VSX55
- XQ2VP40
- XQ2VP70
- XQ2V1000
- XQ2V3000
- XQ2V6000

### Logic Resources
- **Core Voltage:** 1.2V
- **Slices:** 10,752
- **Logic Cells:** 24,192
- **CLB Flip-Flops:** 21,504

### Memory Resources
- **Maximum Distributed RAM (Kbits):** 168
- **Logic RAM (18kbits each):** 72
- **Total Block RAM (Kbits):** 1,296

### Clock Resources
- **Digital Clock Manager (DCM):** 8

### I/O Resources
- **Maximum Single-Ended I/Os:** 448
- **Maximum Differential I/Os:** 224
- **Digitally Controlled Impedance:** Yes

### Embedded Hard IP Resources
- **DSP Slices:** 48
- **18 x 18 Multipliers:** —
- **RocketIO Transceivers:** —

### Miscellaneous
- **Speed Grades:** -10
- **Configuration Memory (Mbits):** 4.8
- **Manufacturing Grades:** M
- **Packages:** SF363, FF668

**NOTE 1.** Each slice comprises two 4-input logic function generators (LUTs), two storage elements, wide-function multiplexers, and carry logic.

### Manufacturing Grades

**http://www.xilinx.com/products/milaero/rpt003.pdf**

<table>
<thead>
<tr>
<th>Grade</th>
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<th>Temperature</th>
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<tr>
<td>V</td>
<td>QPro Radiation Hardened QML Class V Military Ceramic</td>
<td>$T_c = -55^\circ$ to $+125^\circ$</td>
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<tr>
<td>H</td>
<td>QPro Flip-Chip Radiation Tolerant Ceramic</td>
<td>$T_c = -55^\circ$ to $+125^\circ$</td>
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<tr>
<td>B</td>
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<td>Military Plastic</td>
<td>$T_c = -55^\circ$ to $+125^\circ$</td>
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<tr>
<td>M</td>
<td>Military Ceramic or Plastic</td>
<td>$T_c = -55^\circ$ to $+125^\circ$ (Plastic)</td>
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<td>$T_c = -40^\circ$ to $+100^\circ$</td>
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# Defense-Grade FPGAs

## Virtex-5Q FPGAs

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<th>Part Number</th>
<th>XQV/LX30T</th>
<th>XQV/LX85</th>
<th>XQV/LX110T</th>
<th>XQV/LX115T</th>
<th>XQV/LX1220T</th>
<th>XQV/LX320T</th>
<th>XQV/LX90ST</th>
<th>XQV/LX95ST</th>
<th>XQV/LX240T</th>
<th>XQV/FX10T</th>
<th>XQV/FX130T</th>
<th>XQV/FX200T</th>
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<td>Slice</td>
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<td>17,280</td>
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<td>8,160</td>
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<td>EF668 (27 x 27 mm)</td>
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<td>840 (20)</td>
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</tbody>
</table>

**NOTES**

1. A single Virtex-5Q CLB comprises two slices, with each containing four 6-input LUTs and four Flip-Flops (twice the number found in a Virtex-4 slice), for a total of eight 6-LUTs and eight Flip-Flops per CLB.

2. Virtex-5 logic cell ratings reflect the increased logic capacity offered by the new 6-input LUT architecture.

3. Digitally Controlled Impedance (DCI) is available on I/Os of all devices.

4. I/O standards supported: HT, LVDS, LVDSX, RSDS, BLVDS, ULVDS, LVPECL, LVCMSO33, LVCMSO5, LVCMSO18, LVCMOS19, LVTL, PCI33, PCI66, PCI-X, GTL, GTL+, HSTL (1.2V, 1.5V, 1.8V), HSTL II (1.5V), HSTL III (1.5V), HSTL IV (1.5V), SSTL II, SSTL II, SSTL18, SSTL18 II, SSTL18 III.

5. One system monitor block included in all devices.

6. Available I/O for each device-package combination: number of SelectIO pins (number of RocketIO transceivers).

**Manufacturing Grades**