Consumers expect driving experiences to align with their technology-oriented digital lifestyles. Each manufacturer is competing to provide the best “connected car” that also maximizes safety on the road. However, economic realities require meeting these goals with fewer resources, smaller budgets, and tighter schedules. Xilinx programmable logic devices yield proven results that go beyond silicon—getting designs to market faster and at lower cost.

The Xilinx Automotive Advantage

- Certified to ISO-9001, ISO-14001
- Support for vehicle networking standards including MOST®, CAN, APIX®, and Ethernet AVB
- Member of the Automotive Electronics Council (AEC) Technical Specification Committee
- Member of JASPAR, GENIVI Alliance, and MOST Cooperation
- Founding member of AVnu Alliance

Xilinx is the worldwide leading supplier of programmable logic devices to the automotive market with a proven track record of delivering platforms that go beyond silicon. The Xilinx Automotive (XA) product family is the programmable engine for many of today’s automotive electronic systems and a compelling choice for next-generation:

- Infotainment
- Driver assistance
- Driver information systems

With the freedom to upgrade products in the field, even after manufacturing, system developers can respond quickly to changing standards and application requirements.

Xilinx, with Alliance Program member companies and leading-edge automotive suppliers, provides key IP building blocks, operating system and software support, expert custom development, and system integration services.
TAILORED AUTOMOTIVE PLATFORMS

Xilinx enables automotive engineers to meet the demands for greater product differentiation, innovation, and flexibility with next-generation Targeted Design Platforms tailored for specific industry applications. With the Xilinx programmable advantage, the dynamic application requirements of multiple vehicle platforms can be addressed in a scalable, timely, and cost-effective manner.

Xilinx is at the forefront of the ‘Programmable Imperative’ with an integrated platform approach that combines the latest silicon innovations with complete advanced system development environments specifically tailored for automotive applications.

Xilinx programmable platforms enable automotive electronics developers to spend less time on the infrastructure of applications and more time creating value with designs that enhance the user experience of next-generation infotainment, driver assistance and driver information systems.

Addressing the Automotive Programmable Imperative
• Industry-leading silicon quality and value in price, power, performance
• Fully integrated hardware and software development platforms
• Smart design methodologies for fast time to innovation
• Programmability for flexible vehicle networking and connectivity
• Real-time performance for image processing and recognition
• High resolution video and graphics solutions for in-vehicle displays

Focus on Product Differentiation
Targeted Design Platforms from Xilinx ensure optimal performance, the highest quality results, and a superior design experience. Developers can focus on innovation and differentiation throughout product development with an integrated set of hardware and software elements, including silicon devices, IP, application software, design tools, and development kits with pre-validated reference designs.
Xilinx Automotive FPGAs offer low-cost digital signal processing with the higher bandwidth and lower power required for high-volume driver assistance (DA) systems, delivering the real-time processing performance that is ideal for vision-based applications requiring a throughput minimum of 30 frames per second.

The Challenges
- Real-time processing of high resolution images is beyond serial DSP capabilities
- Emerging market with changing standards, dynamic application requirements, and rapid algorithm evolution late in the development cycle

The Xilinx Advantage
- FPGA parallel processing provides high data throughput needed for real-time sensor data crunching
- Programmable devices and IP blocks enable late stage design changes without significant time-to-market impact
- Reconfigurable hardware offers the flexibility to implement “in-system” feature changes and product upgrades
- Range of FPGA densities and packages means that standard platforms can be easily scaled and features bundled based on application requirements

Vision-based Driver Assistance Applications:
- Night Vision
- Lane Departure Warning
- Park/Back-up Aid
- Surround Vision
- Blind-spot Detection
- Collision Warning
- Pedestrian Detection
- Stereo Vision
- Sign Recognition

BALE PLATFORM

Spartan-6 FPGA SP605 Evaluation Kit

The Spartan-6 FPGA SP605 Evaluation Kit delivers the base features of a Xilinx Targeted Design Platform in one flexible environment for system design. The kit integrates hardware, software, IP, and pre-validated reference design — and examples on how to leverage features such as high-speed serial transceivers, PCI Express®, DVI, and/or DDR3 — so designers can begin development right out of the box.

- The Spartan-6 FPGA SP605 Evaluation Kit is used as the base platform for the Surround View Targeted Design Platform with an additional camera interface board connected via the FMC (FPGA Mezzanine Card) connector and four cameras.
HIGH RESOLUTION VIDEO & GRAPHICS

Xilinx Automotive FPGAs provide the flexibility and scalability to support a wide range of high resolution video and graphics systems with the LCD/TFT interfacing capabilities required for automotive infotainment, driver information, and driver assistance applications.

The Challenges
- Increased visual content for driver information and infotainment applications
- Support for LCD/TFT-based message centers, gauges, heads-up displays, and entire instrument clusters

The Xilinx Advantage
- Reconfigurable for a wide range of display types, resolutions and interfaces
- Scalable for common architecture and hardware across mid-to-high-end hybrid/reconfigurable clusters with any number and combination of LCD/TFT displays
- Lower non-recurring engineering (NRE) fees than semi-custom ASSP/ASIC solutions

Infotainment and Driver Information Applications:
- Head-Unit
- Rear-Seat Entertainment
- TV Tuner
- Audio/Multimedia Systems
- Game Consoles
- Hybrid Instrument Cluster
- Fully Reconfigurable Instrument Cluster
- Head-up Display

BASE PLATFORM

logiCRAFT6 Development Board

The Spartan-6 FPGA-based logiCRAFT6 Compact Multimeda Display Development Board provides many of the features required in emerging infotainment and driver information applications. This includes support for a variety of audio/video inputs/outputs, flexible TFT/LCD display interfacing, a high-performance memory configuration for video/graphic applications, and high-speed serial interfaces for remote digital camera or display interfacing. The small package size, automotive-grade power supplies, and vehicle networking support make this an ideal on-bench or in-vehicle prototype platform.

- Available from Xilinx Alliance Partner Xylon
- The logiCRAFT6 Development Board is part of the base platform of a complete Hybrid Instrument Cluster Targeted Design Platform. The associated fully functional reference design includes stepper motor/gauge control, dual TFT displays (including a HUD), and Rear Camera input/display. Image distortion correction is also implemented for both HUD and Rear Camera.

XILINX AUTOMOTIVE TARGETED DESIGN PLATFORM

Hybrid Instrument Cluster

The Xilinx Automotive Targeted Design Platform for hybrid, reconfigurable and head up display (HUD) instrument cluster display applications integrates stepper motor control of analog gauges, graphics control of digital displays, and support for multiple LCD/TFT and HUD displays and camera-based image processing.
VEHICLE NETWORKING & CONNECTIVITY

The programmable architecture and built-in connectivity of Xilinx FPGAs is ideally suited for automotive infotainment and in-vehicle networking applications, from development through production. The same hardware can be used for multiple car models with different feature offerings and connectivity added or updated as networking standards change over time. The integration of vehicle network connections along with audio/video processing acceleration or graphics subsystems on a single Xilinx device creates an efficient, cost-effective system that works independently or with other application-specific devices.

Today’s vehicles would require hundreds of dedicated point-to-point connections for switches, sensors, motors, and controls to handle the myriad of communications possibilities. Xilinx supports multiple in-vehicle networking standards that eliminate the need for bulky, expensive, and complex wiring. XA devices with integrated PCI Express® compliant blocks are especially well-suited for automotive infotainment applications for chip-to-chip communication, either as a complete FPGA-based system-on-chip, or as a dedicated companion chip to an ASSP, microcontroller or DSP-based device.

Robust Support for Vehicle Networking Standards

- Media Oriented Systems Transport (MOST™)
- Controller Area Network (CAN)
- Automotive Pixel Link (APIX)
- Ethernet Audio Video Bridging (EAVB)

The Challenges

- Infotainment is part of a fast changing, consumer-driven segment within the automotive market
- Changing networking standards can delay rollout or add costs across multiple platforms
- Limited support for automotive-specific interfacing standards with popular general-purpose microcontrollers and DSP-based processors

The Xilinx Advantage

- Ultimate flexibility with programmable interfacing options for different standards
- Scalable device density ensures optimal solution for target application
- Automotive-specific functions with extensive IP support
- Compatibility with standard chip solutions through collaboration with industry consortia and processing platform suppliers

Vehicle Networking and Connectivity Applications:

- MOST
- CAN
- APIX
- PCI Express
- Ethernet AVB
- LVDS
- RS485
- USB
- SD Card
- I/O Expansion
- I/O Hub

INFOTAINMENT COMPANION CHIP TARGETED DESIGN PLATFORM

The Xilinx Automotive Infotainment Companion Chip Targeted Design Platform provides flexible interfacing and is optimized to complement existing or preferred host processors. Available IP and software enables rapid extension of system interfaces, peripherals, or processing with minimal development effort. Various popular host processor interfaces are supported and can be changed quickly based on host availability and overall bandwidth required.

BASE PLATFORM

Companion Chip Rapid Prototyping System

The logiCRAFT-CC development board is part of the base platform of the Infotainment Companion Chip Targeted Design Platform. It provides complete host interface flexibility and several popular peripheral interfaces. In addition, eight expansion slots provide for enhanced application specific flexibility and can be used in various combinations. Expansion board layout templates are provided for users wishing to develop their own application specific boards, which enables full prototyping of specific end products.

- logiCRAFT-CC is available from Xilinx Premier Alliance Member Xylon
DEDICATED AUTOMOTIVE PRODUCT LINE

Xilinx Automotive FPGA and CPLD product lines offer automotive-qualified devices in a variety of densities, packages, and extended temperature grades. All devices are pin-compatible with commercial parts for full migration support and tested using a robust qualification process that exceeds AEC-Q100 requirements. Xilinx delivers continuous improvements to ensure world-class quality and reliability.

XA Spartan-6 FPGA Family
Designed for cost-sensitive applications requiring high-speed connectivity, XA Spartan-6 FPGAs offer an optimal balance of cost, power, and performance with:
- Intelligent mix of logic and hard IP for greater system integration
- Embedded 3.125Gbps low-power serial transceivers, 250MHz DSP slices, hardened memory controllers, and PCI Express interface cores
- XA Spartan-6 LX FPGAs for cost-optimized logic and memory
- XA Spartan-6 LXT FPGAs for high-speed serial connectivity

XA Spartan-3 FPGA Extended Family
- Multiple domain-optimized device families with unique dual power management modes and Device DNA security
- XA Spartan-3A DSP FPGAs for cost-sensitive DSP algorithmic and co-processing applications requiring significant DSP performance with embedded MAC blocks
- XA Spartan-3A FPGAs for lowest cost I/O with up to 1.4M system gates and up to 375 I/Os with support for industry-standard and emerging I/O standards
- XA Spartan-3E FPGAs for lowest cost logic with system gates ranging from 100K to 1.6M gates, and I/Os ranging from 66 to 376 I/Os

XA CoolRunner™-II CPLDs
- High performance and ultra-low power consumption in 0.18-micron non-volatile technology
- Ultra low power of 28.8 µW and 16 µA typical standby
- Multiple device options with densities from 32 to 284 macrocells, multi-voltage I/O operation from 1.5V to 3.3V, and smallest form factor packaging
- Up to 303 MHz performance with less than 100 µA standby current
- 500mV input hysteresis, advanced security, clock management, input gating, and voltage banking capabilities

XA9500XL CPLDs
- Cost-optimized silicon with free design tools and unparalleled support
- Lowest cost per macrocell
- High-performance, nonvolatile programmable logic with 5v, 3.3v and 2.5v I/O interfacing
- Maximum design flexibility with multiple densities, package options and I/O capacities
- Fast in-system programming, second-generation pin locking, and enhanced data security
INTEGRATED SOFTWARE DESIGN ENVIRONMENT

Get designs done faster and high quality products to market with the proven development and verification tools in the ISE Design Suite. Our award-winning ISE software brings sophisticated FPGA technologies to the automotive design community with domain-specific tool configurations optimized for logic, DSP, embedded processing, and system-level design.

The award-winning ISE Design Suite provides a fully integrated front-to-back design environment tailored for the way engineers work, whether they are developing real-time image processing systems using DSP tools or building sophisticated networking control functions using embedded processors. With seamless interoperability between domain-optimized design configurations and tightly integrated flows, automotive developers can rapidly create and integrate embedded, DSP, IP and custom blocks into a single programmable system-on-chip.

Complex Design Made Logical

- Logic Edition for logic and connectivity designers with the complete FPGA tool flow, base-level IP, and bitstream generation & device programming utilities
- Embedded Edition for embedded systems designers (hardware and software programmers) incorporating one or more processors into their FPGA designs with embedded tools and IP, as well as base-level FPGA tools and IP
- DSP Edition for algorithm, system, and hardware developers with DSP tools and IP, along with base-level FPGA tools and IP
- System Edition for system designers with all the tools, technologies, and IP in the Logic, DSP, and Embedded Editions
<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data 1</td>
<td>Data 2</td>
<td>Data 3</td>
<td>Data 4</td>
<td>Data 5</td>
</tr>
<tr>
<td>Data 6</td>
<td>Data 7</td>
<td>Data 8</td>
<td>Data 9</td>
<td>Data 10</td>
</tr>
<tr>
<td>Data 11</td>
<td>Data 12</td>
<td>Data 13</td>
<td>Data 14</td>
<td>Data 15</td>
</tr>
<tr>
<td>Data 16</td>
<td>Data 17</td>
<td>Data 18</td>
<td>Data 19</td>
<td>Data 20</td>
</tr>
</tbody>
</table>

**Notes:**
- Column 1 contains important data related to the XA Product Line.
- Column 2 includes some technical specifications.
- Column 3 provides additional notes and details.
- Column 4 offers further breakdowns or criteria.
- Column 5 summarizes the key findings or conclusions.
<table>
<thead>
<tr>
<th>Model</th>
<th>Width</th>
<th>Height</th>
<th>Model</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

*Note: The table above represents the dimensions of various models.*