The Sitara™ AM335x ARM Cortex-A8 microprocessors from Texas Instruments Incorporated (TI) are the industry’s first low-power ARM Cortex-A8 devices to incorporate multiple industrial communication protocols on a single chip. The six pin-to-pin and software-compatible devices in this generation of processors, along with industrial hardware development tools, software and analog components, provide a total industrial system solution. Using this solution, developers can get to market faster with their industrial automation designs, including input/output (I/O) devices, human machine interface (HMI) and programmable logic controllers (PLCs).

30 percent BOM reduction
The unique PRU+ARM architecture in the Sitara AM335x ARM microprocessors eliminates the need for an external ASIC or FPGA to reduce system complexity and save on bill of materials (BOM) costs by more than 30 percent. The Sitara AM335x ARM microprocessors also include other key industrial peripherals on-chip for additional BOM savings, including CAN, ADC, USB+PHY and two-port Gigabit Ethernet with IEEE 1588 to enable fast network connectivity and rapid data throughput, as well as connection to sensors, actuators and motor control.

Scalability
Designers can take advantage of the pin-to-pin and software compatibility of the Sitara AM335x ARM Cortex-A8 microprocessors

Key features and benefits
- Multiple, on-chip, production-ready industrial Ethernet and Fieldbus communication protocols with master and slave functionality including:
  - EtherCAT®
  - Ethernet/IP
  - PROFINET®
  - PROFINET®
  - POWERLINK
  - SERCOS III
- Unique Programmable Real-time Unit (PRU) + ARM architecture eliminates the need for an external ASIC/FPGA to reduce system complexity and save on bill of materials (BOM) costs by more than 30 percent
- One scalable ARM Cortex-A8 processor platform (275 MHz to 720 MHz) for many different industrial automation applications enables reuse with pin-to-pin and software-compatible devices
- Quick and easy time to market with industrial-specific reference designs, production-ready comprehensive software, including communication protocols and signal chain solution
- Software frameworks for SYS/BIOS™ real-time kernel
- Broad software support for Linux®, Windows® Embedded Compact 7 and StarterWare™ in addition to a variety of third-party RTOS offerings providing design flexibility
- Fully integrated solution including other key industrial peripherals such as CAN, 2-port Gigabit Ethernet switch, USB+PHY, graphics acceleration and LPDDR1/DDR2/DDR3 reduces BOM costs

A look at the system configuration using the AM335x industrial solution
and design several end equipments with the devices that best fit their industrial automation need, such as:

- **Drives and I/O-level devices:** Specifically targeted to enable sensors, actuators, motor drives, communications modules and gateways needing industrial slave communications the AM3357 and AM3356 ARM® microprocessors offer a low-performance 275-MHz solution. These two devices do not require an external memory or an operating system making the system solution simple and compact.

- **Industrial PLC applications:** Offering high-performance of up to 720 MHz, the AM3357 and AM3359 ARM microprocessors are well-suited for high-performance PLC applications that need to control various I/O devices in an automation system such as electric motors, pneumatic or hydraulic cylinders, magnetic relays solenoids and more.

- **HMI products:** Perfect for designing HMI products, the AM3354, AM3358 and AM3359 ARM microprocessors offer an on-chip 3D graphics accelerator, which combined with the integrated touch-screen controller, enables rich and intuitive graphical user touch-screen interfaces. For HMI applications not requiring integrated industrial communications, the AM3354 and AM3352 ARM microprocessors offer low-cost options.

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**Industrial hardware and software tools**

Accompanying the Sitara AM335x ARM microprocessors are two industrial hardware development tools to enable customers to easily incorporate industrial communication standards in their industrial automation products:

1. **AM3359 Industrial Development Kit (IDK)** (TMDXIDK3359) from TI is available for $895 USD. The IDK is an extensive development platform enabling customers to evaluate all popular industrial communications and motor-control applications. The IDK has many different evaluation features such as 512 MB of DDR2 memory, dual motor drivers, digital I/O, a C2000™ Piccolo™ microcontroller with integrated analog-to-digital converters, a Stellaris® ARM Cortex™-M3 microcontroller, USB, Ethernet, SPI, I²C and much more.

(continued)
2. AM3359 Industrial Communications Engine (ICE) (TMDXICE3359) from TI is available for $99 USD. It is a pocket-sized, cost-optimized and form-factor optimized reference design for I/O devices and sensors needing to add industrial communications quickly and easily.

Designers can also utilize the previously announced AM335x EVM. Available to aid development is free, production-ready, certified system solution software for industrial automation protocols, including industrial design-specific demos, applications notes and videos to make development easy. Software resources required for physical and data link layer implementations of many industrial communications standards are available as well as software frameworks for SYSBIOS™ real-time kernel and applications stacks for industrial communication standards, allowing customers to focus on the differentiating application level aspects of their system.

TI offers the ability to complete an entire industrial system design with TI analog ICs, including industrial Ethernet and isolated CAN transceivers, motor drivers, temperature sensors and power management devices, plus wireless connectivity options to complement the AM335x ARM microprocessors.

Community support
TI’s online community at e2e.ti.com supports AM335x ARM Cortex-A8 MPUs. Ask questions, share knowledge, explore ideas, and help solve problems with fellow engineers.

Industrial Automation Solutions
Industrial Communication portfolio at a glance

High-Performance Analog Solutions

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<thead>
<tr>
<th>Description</th>
<th>Device</th>
<th>Key Benefits</th>
</tr>
</thead>
</table>
| 5kVrms Isolated CAN Transceiver | ISO1050 | • Reduced components and board space  
| | | • Life span > 25 years @ 125°C  
| | | • Allows longer cable length  
| Low-Power Dual-Channel Digital Isolator | ISO7420E/FE | • Signaling rate above 50 bps  
| | | • Low power consumption: 2.5 mA per ch @ 25 Mbps  
| | | • Low propagation delay: 7 ns  
| Isolated RS-485 (PROFIBUS) Transceiver (ISO1176T with Integrated Transformer Driver) | ISO1176/1176T | • Reduced components and board space  
| | | • Life span > 25 years @ 125°C  
| Industrial Ethernet PHY | TLK110 | • Lowest deterministic channel latency  
| | | • Handles both MII and RMII interface  
| | | • PROFINET®, EtherCAT® and SERCOS III friendly  
| | | • Robust ESD protection  
| Power | TPS 65910A | • All power functions integrated in one IC  
| | | • Take care of the correct processor  
| | | • Power up/down sequencing  
| | | • Complete reference design /schematic available  
| SVA Temperature Sensor | LM94022 | • Analog output temperature sensor  
| | | • Wide temperature range up to 150°C  
| | | • High accuracy ±1.5°C  
| | | • Footprint compatible with the industry-standard LM20/TMP20  
| HVAL | SN65HVS882/TPIC2810 | • Cost optimized control of eight outputs with serial I2C interface (TPIC2810)  
| | | • High input density (cascadeable to >160) (SN65HVS882)  
| | | • Reduced system power consumption over voltage (SN65HVS882)  

Embedded Processing Solutions

<table>
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<tr>
<th>Description</th>
<th>Device</th>
<th>Key Benefits</th>
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| Sitara™ ARM9™ and ARM® Cortex™-A8 Microprocessors (MPUs) | AM18x, AM35x, AM335x, AM37x, AM389x | • Up to 450-MHz ARM9 to 1.5-GHz Cortex-A8 devices  
| | | • Extensive peripheral set (PRU, EMAC, PCIe, CAN, USB, multiple UARTs, ...)  
| | | • Flexible industrial communication protocols  
| | | • Linux® Community, Android™, Windows® Embedded CE and RTOS ecosystem of development partners  

For more information including selection guides, datasheets and application notes please visit www.ti.com/automation
# TI Worldwide Technical Support

## Internet

TI Semiconductor Product Information Center
Home Page
support.ti.com

TI E2E™ Community Home Page
e2e.ti.com

## Product Information Centers

### Americas

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<th>Country</th>
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<tr>
<td>Mexico</td>
<td>0800-670-7544</td>
<td>+1(972) 927-6377</td>
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### Mexico

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The European Free Call (Toll Free) number is not active in all countries. If you have technical difficulty calling the free call number, please use the international number above.

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<td>+7 (4) 95 98 10 701</td>
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### Asia

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<td>+8621-23073686</td>
<td><a href="mailto:tiasia@ti.com">tiasia@ti.com</a> or <a href="mailto:ti-china@ti.com">ti-china@ti.com</a></td>
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