Sitara™ AM437x processor with ARM® Cortex®-A9 core

Texas Instruments

Key Features and Benefits

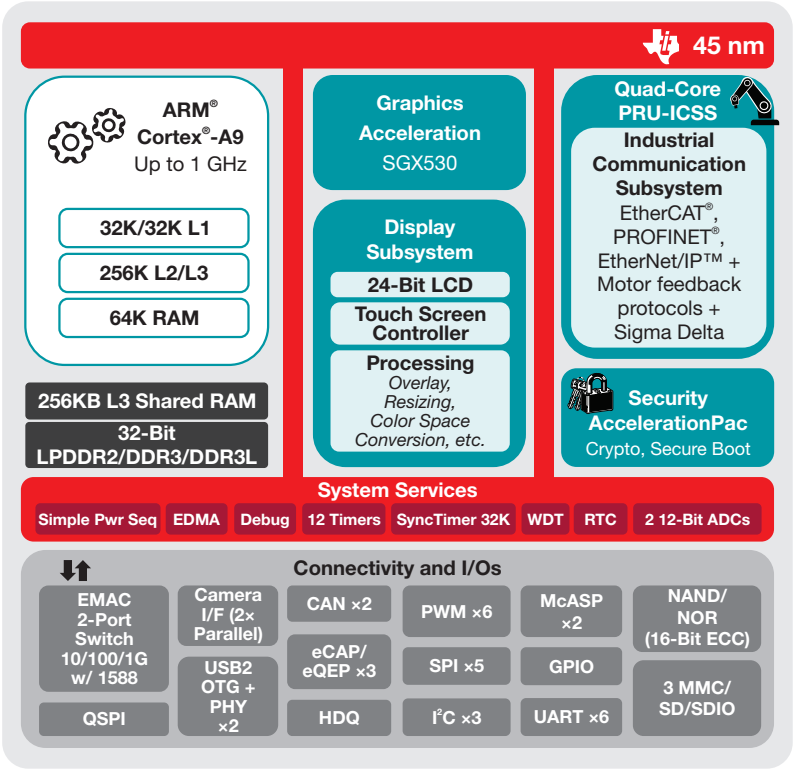
- Feature-rich ARM® Cortex®-A9-based solution with performance up to 1 GHz
- Quad-core PRU-ICSS (industrial communications subsystem) connectivity peripheral supporting dual, simultaneous industrial protocols such as EtherCAT®, EtherNet/IP™, PROFIBUS®, PROFINET®-RT/IRT, POWERLINK, SERCOS® III, IEC 61850, as well as motor feedback protocols like EnDAT
- On-chip quad-core Programmable . Real-time Unit (PRU) coprocessor for deterministic, real-time processing, direct access to I/Os and ultra-low-latency requirements
- Highly integrated with new peripheral options:
  - Dual-port 1Gb Ethernet switch for networking
  - Two parallel camera ports for applications such as bar code scanners
  - Two independent, up to 867ksps, eight-channel ADCs for servo motor control, audio sampling and sensor monitoring
  - Improved Vector Floating-Point unit for motor control and audio algorithms
  - 9-channel Sinc³ filter sigma-delta ADC for higher precision current sensing, a trend in industrial drives

Overview

Texas Instruments (TI) continues to optimize and expand its portfolio of Sitara processor solutions for the embedded market. With the Sitara AM437x processors support for the ARM Cortex-A9 core, extending performance by up to 40 percent over the current Sitara AM335x processor line. These high-performance successors to the popular Sitara AM335x platform integrate additional features to support a variety of markets from human machine interfaces (HMI) to IoT gateways to industrial automation. The Sitara AM437x processors run at 1 GHz and feature a Programmable Real Time Unit (PRU) subsystem that enables simultaneous industrial Ethernet protocols and motor feedback protocols, such as EnDAT. Leveraging the PRU, this processor is optimized for industrial drive applications, offering integrated industrial Ethernet communications, motor control peripherals, sigma-delta modulator for current sensing, position feedback protocols and various fieldbus communication options on a single chip.

In addition to the support of industrial applications, with the Sitara AM437x processor, you have access to additional peripherals including:

AM437x block diagram



Sitara™ Processor Family

	AM335x	AM437x
Core	Cortex-A8 up to 1 GHz	Cortex-A9 up to 1 GHz
DMIPS	Up to 2,000	Up to 2,500
3D graphics acceleration	Supported	Supported
Memory	LPDDR1/DDR2/DDR3	LPDDR2/DDR3
OS	Linux®/Android™/ StarterWare/RTOS	Linux/Android/RTOS-based Industrial software
Key features	PRU-ICSS, Cryptography, Touchscreen controller	2× PRU-ICSS, Display subsystem, QSPI, Camera, PWM, GbE 2-port

- 512 kB of on-chip memory
- POWERVR SGX™ 3D graphics accelerator and a display subsystem that enables color space conversion, overlays, resizing and more.

Building upon this integration and giving customers the option of using flexible, discrete power designs, the Sitara AM437x processors include simplified power sequencing. Additionally, the companion power management IC TPS65218 offers high-efficiency converters with integrated power path and added benefits such as a high-accuracy, integrated voltage supervisor and the lowest power mode, reducing power consumption by 70 percent. This is ideal for systems requiring a low-capacity coin-cell battery to support greater than five-year shelf life. The availability of quad-SPI allows execute-in-place (XIP) so the system can run directly from low-cost NOR Flash.

Getting started

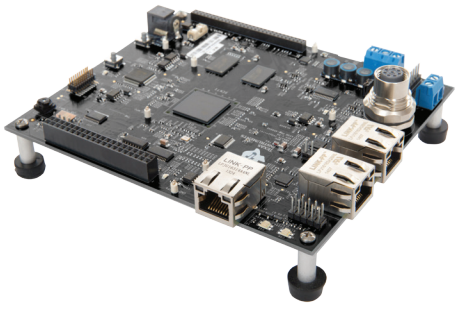
Hardware, software and support to make development easy

- Evaluate the processor features on the included LCD touch screen within minutes of opening the EVM box
- Linux™ support
- Android™, Windows® Embedded and various RTOS supported by Ecosystem partners
- Responsive design support and active online TI E2E™ community: **e2e.ti.com**.

The AM437x processors, based on the ARM Cortex-A9 core, are available to evaluate today at **ti.com/am4379**. Development is easy and can begin in minutes with TI's all-inclusive development kit, which includes a 7" LCD touch screen and Gigabit Ethernet. Designers can begin development today with the $599 USD **TMDSEVM437x** general-purpose Evaluation Module.

▲ *AM437x Evaluation Module*

The **AM437x Industrial Development Kit (IDK)** is an application development platform for evaluating the industrial communication and control capabilities of Sitara AM4379 and AM4377 processors for industrial applications, including drives, sensors and I/O units, communications gateways and programmable logic/automation controllers (PLC/PAC) with integrated industrial communications such as EtherCAT and feedback such as EnDat.



▲ *AM437x Industrial Development Kit*

The **AM437x Starter Kit** provides a stable and affordable platform to accelerate development for HMI, industrial and networking applications. It is a low-cost development platform that is integrated with options such as dual Gigabit Ethernet, DDR3L, camera and a capacitive touchscreen LCD.

▲ *AM437x Starter Kit*

Community support

TI's online community at **e2e.ti.com** supports AM437x ARM Cortex-A9 processors. Ask questions, share knowledge, explore ideas, and help solve problems with fellow engineers.

Sitara AM437x processors are specifically designed to address the latest challenges in connected drives used in industrial automation. For increased automation, more and more drives are connected using real-time industrial communications such as EtherCAT®, PROFINET® and EtherNet/IP™ to PLC and HMI systems. There is also an increasing trend towards newer standards such as EnDAT2.2 for precise position feedback and high-performance position control and developers are looking for all these new features to have a smaller footprint and lower power consumption.

Robust software eases development

As TI continues to invest in its powerful Industrial Software Development Kit (SDK), customers continue to reap the benefits. By adding PROFINET RT and EtherNet/IP to the currently supported PROFIBUS® and EtherCAT protocols, TI shows its commitment to supporting

multiple protocols on a single device with an integrated on-chip PRU, making industrial automation easy and affordable for original equipment manufacturers (OEMs). The Industrial SDK supports all Sitara processors using A-series cores (including AM335x and AM57x processors) and by extending this software to the AM437x product line, OEMs will have the same access to production-ready software to accelerate time to market of their industrial automation designs, including programmable logic controllers (PLCs) and I/O devices such as sensors and drives. Advancement of this industrial SDK furthers TI's unmatched commitment to simplifying product development.

Processor SDK is a unified software platform for TI embedded processors providing easy setup and fast out-of-the-box access to benchmarks and demos. All releases of Processor SDK are consistent across TI's broad portfolio, allowing developers to seamlessly reuse and migrate software across devices. Developing scalable platform solutions has never been easier than with the Processor SDK and TI's embedded processor solutions. Processor SDK supports both Linux® and TI-RTOS operating systems.

Getting to market faster with system solutions

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 and microcontroller options to complement the AM437x processors. With easy-to-use development platforms and ecosystem software support, Texas Instruments offers the entire industrial automation solution.

Additional information

For more information including selection guides, datasheets and application notes, please visit **www.ti.com/automation**.

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