World's first general purpose Arm® Cortex®-M33 based MCU

LPC55S6x MCU Family

The LPC55S6x MCU family brings to market advancements that stretch far beyond a new core technology, including advanced energy efficiency and real-time performance with breakthroughs in embedded security and protection, in addition, exceptional mixed-signal integration, leveraging NXP's cost effective 40nm embedded flash technology.

TARGET APPLICATIONS

▶ Consumer electronics

▶ Diagnostic equipment

▶ Building control and automation

▶ Secure applications

▶ Industrial IoT

▶ Machine learning

OVERVIEW

The LPC55S6x MCU family builds on the world's first general purpose Cortex-M33 based microcontroller as the first family introduced as part of NXP's new LPC5500 MCU series. This high efficiency family leverages the latest Armv8-M architecture, introducing new levels of performance and advanced security capabilities including TrustZone and co-processor extensions. The LPC55S6x MCU family enables these co-processors extensions and leverages them to bring significant signal processing efficiency gains from a proprietary DSP accelerator offering a 10x clock cycle reduction. An optional second Cortex-M33 core offers flexibility to balance high performance and power efficiency.

As part of the LPC5500 MCU series which provides a comprehensive offering, scalable options and several families, the LPC55S6x MCU family, like its related members, benefits from 40nm NVM based process technology cost advantages, broad scalable packages and memory options, as well as a robust enablement including MCUXpresso Software and Tools ecosystem and low-cost development boards.

BREAKTHROUGHS IN EMBEDDED SECURITY AND PROTECTION

The LPC55S6x MCU devices feature a unique integrated security ecosystem providing layers of protection for embedded systems while protecting end products from unknown or unexpected threats over its life cycle, including SRAM PUF based root of trust and provisioning, real-time execution from encrypted images and debug authentication. Furthermore, the LPC55S6x MCU family series introduces additional features from Armv8-M TrustZone providing a level of isolation within the MCU that creates trusted execution environment with full access to the system memory map and rich execution environment with no access to security critical registers and data.

COMPREHENSIVE ENABLEMENT SOLUTIONS

Comprehensive MCUXpresso SDK

▸ Extensive suite of robust peripheral drivers, stacks, and middleware

▸ Example code, including SHA/AES, SRAM PUF, and secure boot startup enablement

Integrated Development Environments (IDE)

▸ MCUXpresso IDE

▸ IAR® Embedded Workbench
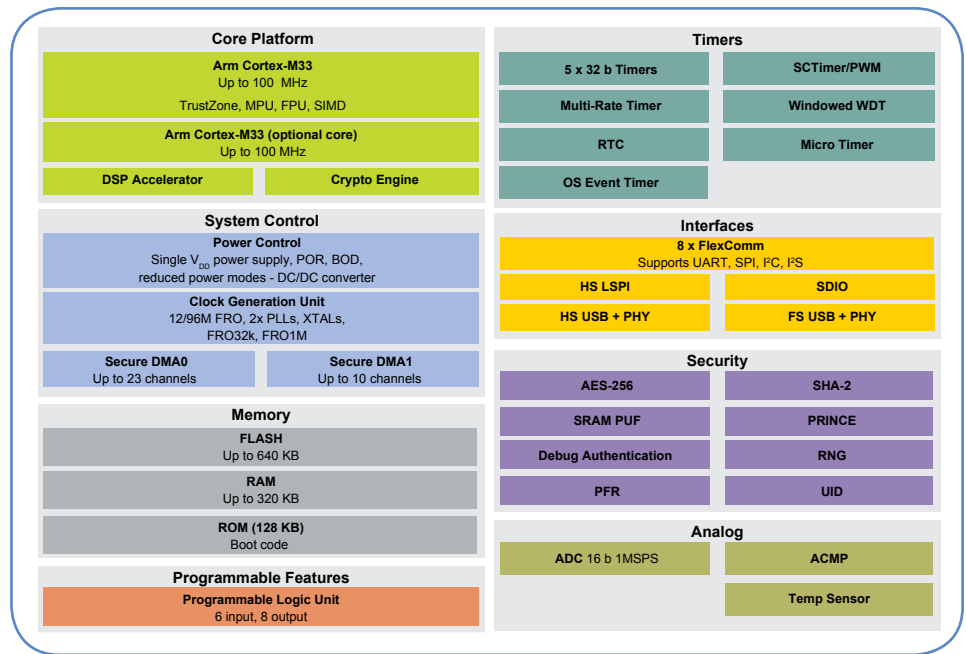
▸ Arm Keil® Microcontroller Development Kit

ROM

▸ Dedicated Bootloader for the LPC5500 MCU Family

▸ In-system flash programming over serial connection: erase, program, verify

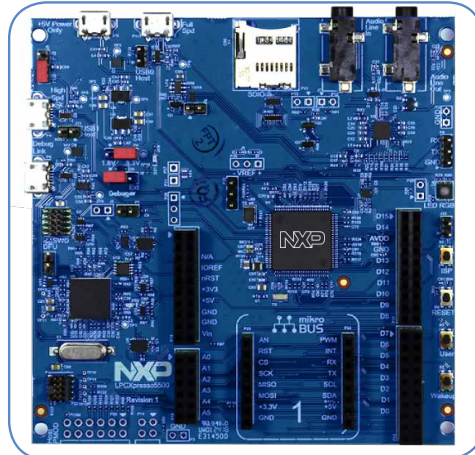▸ ROM or flash-based bootloader with open-source software and host-side programming utilities

Development Hardware

▸ LPCXpresso development boards

  – LPC55S69 dual-Cortex-M33 core processor

  – Onboard, high-speed USB, Link2 debug probe

  – Flexible expansion – Arduino, Mikroe and PMod headers

  – Various on-board interfaces and components

LPC55S6X MCU FAMILY BLOCK DIAGRAM

Core Platform
- Arm Cortex-M33, Up to 100 MHz, TrustZone, MPU, FPU, SIMD
- Arm Cortex-M33 (optional core), Up to 100 MHz
- DSP Accelerator | Crypto Engine

System Control
- Power Control: Single V_DD power supply, POR, BOD, reduced power modes - DC/DC converter
- Clock Generation Unit: 12/96M FRO, 2x PLLs, XTALs, FRO32k, FRO1M
- Secure DMA0 Up to 23 channels | Secure DMA1 Up to 10 channels

Memory
- FLASH Up to 640 KB
- RAM Up to 320 KB
- ROM (128 KB) Boot code

Programmable Features
- Programmable Logic Unit: 6 input, 8 output

Timers
- 5 x 32 b Timers | SCTimer/PWM
- Multi-Rate Timer | Windowed WDT
- RTC | Micro Timer
- OS Event Timer

Interfaces
- 8 x FlexComm: Supports UART, SPI, I²C, I²S
- HS LSPI | SDIO
- HS USB + PHY | FS USB + PHY

Security
- AES-256 | SHA-2
- SRAM PUF | PRINCE
- Debug Authentication | RNG
- PFR | UID

Analog
- ADC 16 b 1MSPS | ACMP
- Temp Sensor

LPCXPRESSO55S69 DEVELOPMENT BOARD (LPC55S69-EVK)

LPC55S6X MCU FAMILY OPTIONS

Part Number	CPU Freq (MHz)	Flash	SRAM	Dual Core	DSP Accelerator	TrustZone	Secure Boot	Crypto Accel	Real Time Decrypt	FS&HS USB	Package
LPC55S69JBD100	100	640 KB	320 KB	Yes	Yes	Yes	Yes	Yes	Internal	Yes	HLQFP100, 14x14, 0.5mm pitch
LPC55S66JBD100	100	256 KB	144 KB	Yes	Yes	Yes	Yes	Yes	Internal	Yes	HLQFP100, 14x14, 0.5mm pitch
LPC55S69JET98	100	640 KB	320 KB	Yes	Yes	Yes	Yes	Yes	Internal	Yes	VFBGA98, 7x7, 0.5mm pitch
LPC55S66JET98	100	256 KB	144 KB	Yes	Yes	Yes	Yes	Yes	Internal	Yes	VFBGA98, 7x7, 0.5mm pitch