LPC800 MICROCONTROLLERS

INNOVATION MADE EASY

A broad market microcontroller portfolio with exceptional ease of use and design flexibility

SECURE CONNECTIONS FOR A SMARTER WORLD

INTRODUCTION TO LPC800

With a clear increase in performance and improvements in power consumption and efficiency, you're likely to see significant benefits with a 32-bit microcontroller. You also get access to the broadest ecosystem of partners on the planet – the thriving Arm® Cortex®-M community.

Building on our experience as one of Arm's longest embedded partners, and as a result of our proprietary breakthroughs and technologies, our MCUs are remarkably easy to use, giving you an express route to get to market quickly.

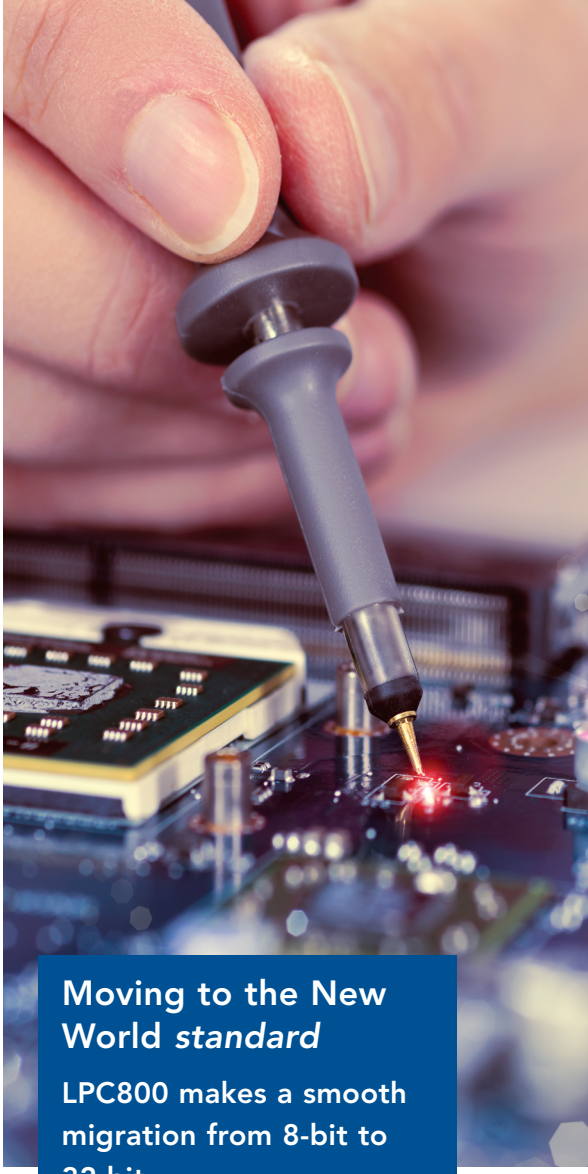
EASE-OF-USE WITH THE LPC800

Ease-of-use in the chip

- Efficient Cortex-M0+ core architecture
- Intelligent peripheral integration for connectivity, configurable logic, and control loop
- PCB friendly package and compact form factor package options

Ease-of-use beyond the chip

- Developer-friendly MCUXpresso ecosystem with various IDEs of choice, resourceful SDK, easy-to-use configuration and visualization tools
- Compact evaluation kit for fast prototyping, with easy-to-access pin headers
- Access to a vast variety of resources including reference designs, application notes, communities and other technical resources

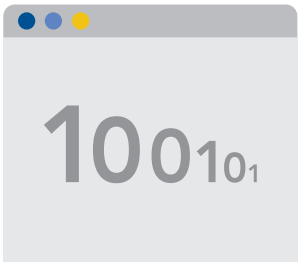


Moving to the New World *standard*

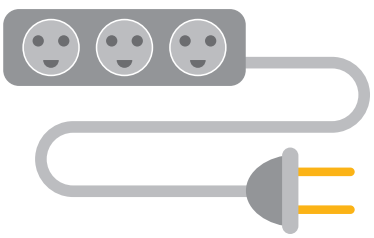
LPC800 makes a smooth migration from 8-bit to 32-bit

It may be possible to continue designing around 8-bit technology, but times have changed. Does it make sense – even economically – to stick to an increasingly limiting technology?

Faster code execution



Smaller code size



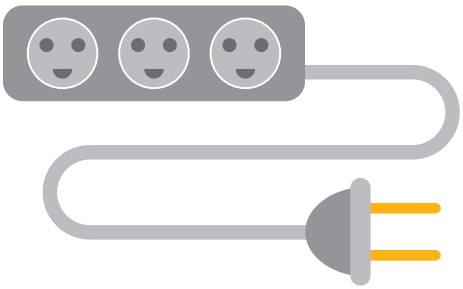
Lower energy consumption

DESIGNED WITH KEY FEATURES

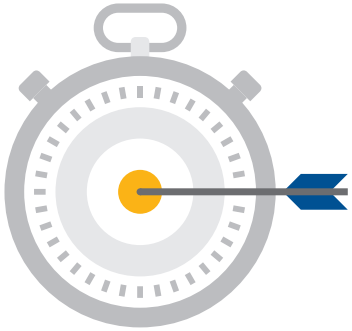
Flexible, easy-to-use peripherals

- ADC
- Analog Comparator
- Code Read Protection
- Flexible IO Ports
- GPIO Pin Manipulation
- I²C
- I3C
- Multi Rate Timer
- Pattern Match Engine
- Power Modes
- ROM Drivers
- SPI
- State Configurable Timer/PWM FlexTimer
- Switch Matrix
- USART

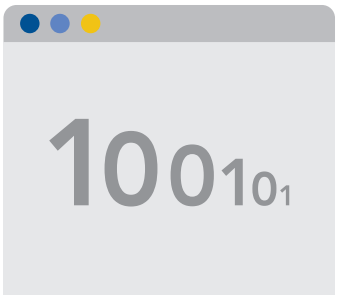
Simplicity



2-3x power saving compared to 8/16-bit MCUs



High performance at a low price point



40-50% smaller code size than 8/16-bit MCUs

2-10x higher performance than 8/16-bit MCUs

Single cycle IO access

Ultra-low-power Arm Cortex-M0+ core, up to 60 MHz, delivers deterministic, real-time performance.

Conserving Flash is critical in small packages. Putting drivers and special functions in ROM makes the LPC800 exceptionally easy to use and leaves more Flash for application code.

A Flash sector size of 64 bytes simplifies code management by enabling developers to program Flash in smaller page size and use Flash like an EEPROM.

Power profiles give developers fine-grained, real-time control over power consumption. Together with four power modes, they reduce power consumption to uAs/MHz in active mode.

The patent-pending SCTimer/PWM peripheral implements virtually any timing or PWM function found on popular 8-bit MCUs, without loading a CPU.

An integrated analog comparator reduces BOM and footprint.

ENJOY THESE KEY BENEFITS

Boost Code Efficiency

- Simple C pointer: Unlike the 8-bit architecture, the LPC800 series handles standard C pointer operations easily
- Easier and more efficient math operations
- More compact Flash memory usage, **cutting memory requirements by 70%**

Boost Power

- Boosted power efficiency with up to 1:50 gain of performance against 8-bit MCUs
- Significantly fewer clock cycles needed for operation
- Improved recovery time with flexible options for various sleep modes, and improvements in recovery time from sleep to run
- Higher performance with low consumption results. While the LPC800 series of 32-bit Cortex-M0+ MCUs can achieve higher performance, the current consumption results are lower.
- Cortex-M0+ excels at getting the work done quickly and efficiently

Design Scalability

- Future proofing: The Cortex-M0+ based MCUs, like the LPC800 series, provide an easier path to upgrade more features to your product by migrating into other Cortex-M core architectures like the Cortex-M33 based MCX series

LPC800 PRODUCT HIGHLIGHTS

Switch Matrix

- Provides functions in the hardware for ultimate flexible signal routing inside the chip
- Most functions can be assigned through the switch matrix to any external pin which is not a power or ground pin

State Configurable Timer

- It's timer, but with a state machine!
- The SCTimer/PWM peripheral implements virtually any timing PWM function found on popular 8-bit MCUs, without loading a CPU

Pattern Match Engine

- Configurable logic block for interrupt triggering
- DIY your interrupt condition from a Boolean expression of 8 input pins

LPC800 APPLICATIONS

The LPC800 series provides an entry-level backbone across consumer, industrial, wearable, personal computers, and gaming markets.

Environmental sensor gateway for building automation

- Low-power solution for broad range of applications
- Range of analog sensors
- Range of digital sensors

Power monitoring & battery management

- Low power solution for data center power monitoring or battery management
- Digital temperature and humidity monitors

Remote control

- Low-power solution for remote control
- ADC for analog battery monitor functionality
- GPIO for interface
- Compact package for size limited control

Lighting control

- ADC and/or ACMP
- SCTimer/PWM
- GPIO to handle switch inputs

LPC800 series MCUs will be your first and easiest choice. When you're ready to make the move to 32-bit architecture, we have the expertise and resources to make everything as simple as possible using our streamlined MCUXpresso development flow.

READY, SET, GO!

4 Go!

Plug in the board, update device drivers, compile and run the demo. **You're done!**

3 Download Code Bundles or examples

- Application code hub; software examples, code snippets, application software packs
- Code bundles for 8-bit migration

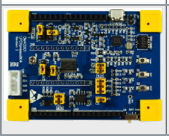
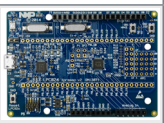
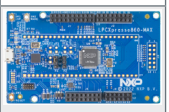
2 Download your toolchain

Select your IDE of choice; MCUXpresso for Visual Studio code, MCUXpresso IDE, IAR, or Keil. Then use our configuration and provisioning tools.

1 Set up your development board

Begin with your LPCXpresso development board at nxp.com

LPC800 FAMILIES

	LPC802	LPC804	LPC810	LPC820	LPC830	LPC840	LPC860
Core Freq.	15 MHz	15 MHz	30 MHz	30 MHz	30 MHz	30 MHz	60 MHz
Flash (KB)	16	32	16	32	32	64	64
RAM (KB)	2	4	4	8	4	16	8
Boot ROM	UART ISP	UART ISP	UART ISP	UART ISP	UART ISP	Yes (16 KB, support UART, I²C, SPI ISP)	Yes (8 KB, support UART ISP)
FAIM	-	-	-	-	-	256 bits	-
CGU	15 MHz FRO (±1%), 1 MHz LPOsc (±3%)	15 MHz FRO (±1%), 1 MHz LPOsc (±3%)	12 MHz IRC (±1.5%) 10 KHz LPO (±40%) 1-25 MHz XOSC PLL	12 MHz IRC (±1.5%) 10 KHz LPO (±40%) 1-25 MHz XOSC PLL	12 MHz IRC (±1.5%) 10 KHz LPO (±40%) 1-25 MHz XOSC PLL	30 MHz FRO (+/-1%), 10 KHz LPO (±40%) 1-25 MHz XOSC PLL	60 MHz FRO (+/-1%), 1 MHz LPOsc (+/-3%) 1-25 MHz XOSC PLL
12-b ADC	480 KSPS, 12-ch.	480 KSPS, 12-ch.	-	1.2 MSPS, 12-ch.	1.2 MSPS, 12-ch.	1.2 MSPS, 12-ch.	1.9 MSPS, 12-ch.
DAC	-	1x 10b	-	-	-	2x 10 b	-
ACMP	1	1	1	1	-	1	1
Timer/PWM	32-b Ctimer	32-b Ctimer	SCTimer	SCTimer	SCTimer	SCTimer + 32-b CTimer	6-ch. + 4-ch. FlexTimer
Timers	2-ch. MRT, WWDT	4-ch. MRT, WWDT	4-ch. MRT, WWDT	4-ch. MRT, WWDT	4-ch. MRT, WWDT	4-ch. MRT, WWDT	4-ch. MRT, WWDT
RTC	32-b WKT	32-b WKT	32-b WKT	32-b WKT	32-b WKT	32-b WKT	32-b WKT
Switch Matrix	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAP touch	-	Yes	-	-	-	Yes	-
PLU	-	Yes	-	-	-	Yes	-
UART / SPI / I²C	2 / 1 / 1	2 / 1 / 2	3 / 2 / 1	3 / 2 / 4	1 / 2 / 1	5 / 2 / 4	3 / 2 / 1
I3C	-	-	-	-	-	-	1x I3C
DMA	-	-	-	18-ch.	18-ch.	25-ch.	16-ch.
Voltage	1.71 to 3.6 V	1.71 to 3.6 V	1.8 to 3.6 V	1.8 to 3.6 V	1.8 to 3.6 V	1.8 to 3.6 V	1.8 to 3.6 V
Packages	16/20	20/24/33	8/16/2020	20/33	20/33	33/48/64	33/48/64
Development boards							
Part Numbers	OM40000 LPCXpresso802	OM40001 LPCXpresso804	OM13055 LPCXpresso812	OM13071 LPCXpresso824-MAX	OM13055 LPCXpresso812	OM13097 LPCXpresso845	LPCXPRESSO-860-MAX LPCXpresso860-MAX
LPCXpresso Development Boards							

LPC800 | MORE INFORMATION

LPC800 Overveiw

Software Options

LPC Community

LPC800 Designs

LPC800 Support

Training & Design Support

www.nxp.com/LPC800

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