GET STARTED FAST WITH THIS COMPREHENSIVE ENABLEMENT OFFERING FOR LPC800 MCUS

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NXP

SECURE CONNECTIONS
FOR A SMARTER WORLD

PUBLIC

GET TO MARKET FAST WITH LPC800 MCUS - A LOW-COST, ENTRY-LEVEL, 8-BIT ALTERNATIVE FOR YOU NEXT DESIGN

- Part I: Thursday, May 31, 10 AM Central (1 hour)
Thinking about migrating from 8-bit? Wait no longer - LPC80x MCUs are your 32-bit answer

- Part II: Thursday, June 7, 10 AM Central (1 hour)
Creative ways to leverage the LPC804 MCU's integrated programmable logic feature

- Part III: Thursday, June 14, 10 AM Central (1 hour)
Get started fast with this comprehensive enablement offering for LPC800 MCUs

- Part IV: Thursday, June 21, 10 AM Central (1 hour)
Got NFC? LPC8N04 does – learn how to leverage this unique feature in your next design?
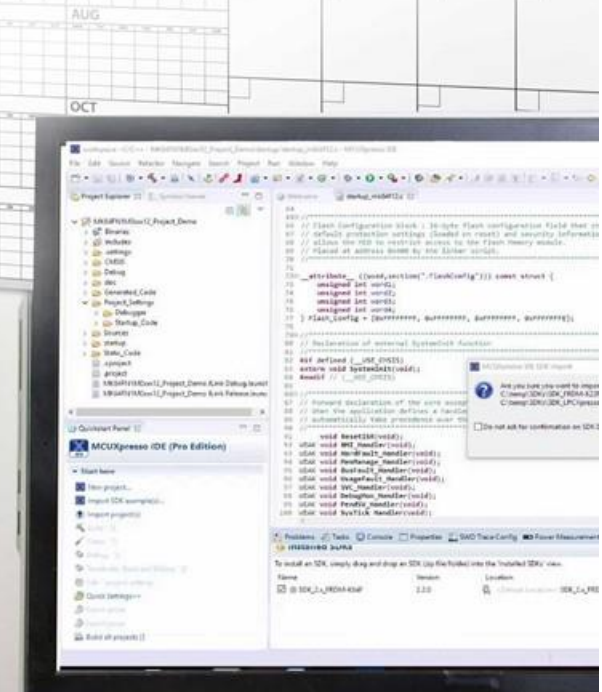
Agenda

- LPC800 Recap
- MCUXpresso SW & Tools Overview
- Live demo of MCUXpresso tools
- Conclusion / Where next

LPC Microcontrollers
Broad Market Leader

Architecting Scalable MCU Families with Flexible Integration
Enabling Fast Time & Platform Re-use

1 Innovative ARM MCU Portfolio.

2 Ecosystem & Partners.

3 Supply, Longevity & Quality.

4 Local Support Network.

5 Extensive Software & Tools.

» Accelerating Transition from 8-bit to **Entry-level Cortex-M0+ based MCUs**

LPC 32-bit Microcontrollers for the Mass Market

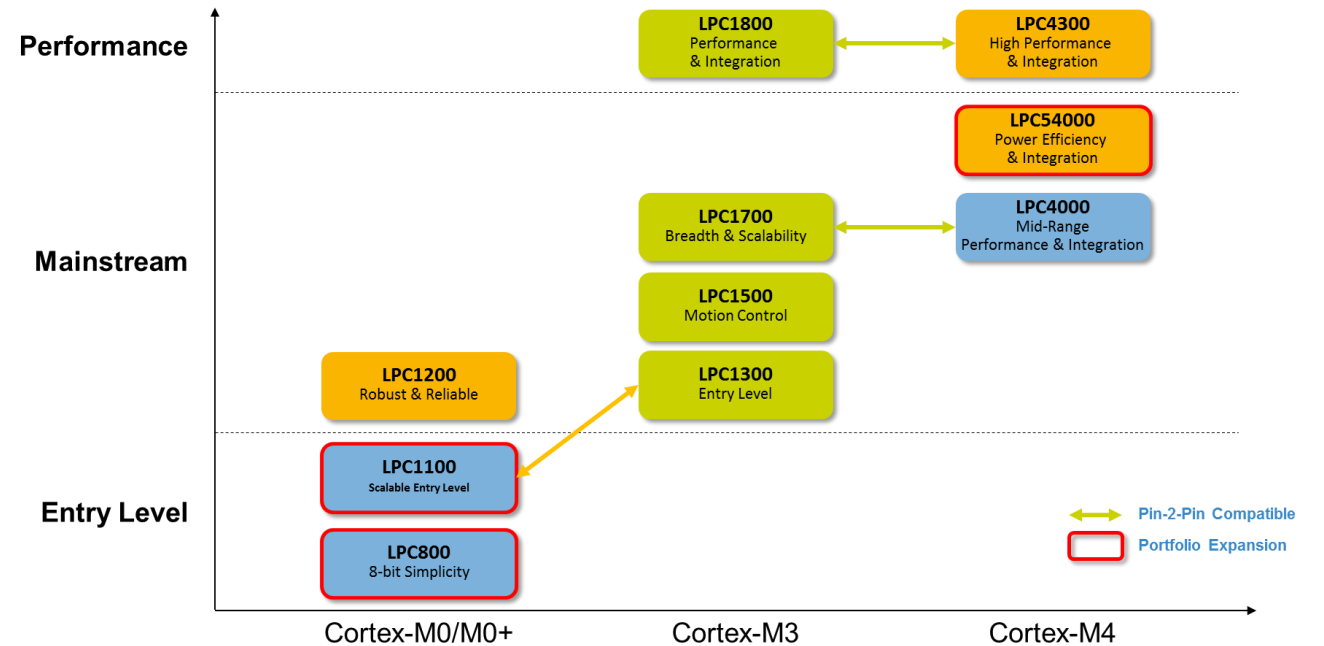| Over 1B units shipped	>400 part numbers	Thriving ecosystem	Complementary professional development suite (HW/SW)

Open Development Environment

- **MCUXpresso IDE with Easy to Use Software Code Bundles**

- **Development, Debug & Expansion Boards**

- **Developer Community**

Easy Development

Complete Portfolio of Cortex-M MCUs

Performance

| LPC1800 Performance & Integration | ← → | LPC4300 High Performance & Integration |

| | LPC54000 Power Efficiency & Integration |

Mainstream

| LPC1700 Breadth & Scalability | ← → | LPC4000 Mid-Range Performance & Integration |

| LPC1500 Motion Control |

| LPC1200 Robust & Reliable | LPC1300 Entry Level |

Entry Level

| LPC1100 Scalable Entry Level |

| LPC800 8-bit Simplicity |

Cortex-M0/M0+　　　Cortex-M3　　　Cortex-M4

← → Pin-2-Pin Compatible
▭ Portfolio Expansion

Scalable Expansion

LPC800 Enablement Overview

Runtime Software	Software Development Tools	Hardware Development Tools	Application Specific	Support

Runtime Software

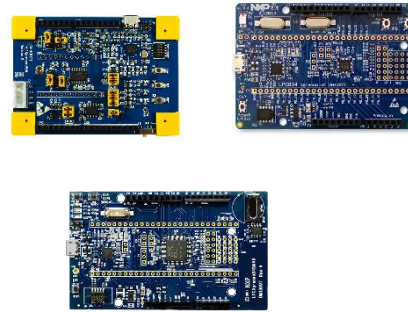NXP Solutions:

RTOS, Middleware Partners:

Software Development Tools

IDE / Toolchains:

Hardware Development Tools

Evaluation Kits:

Partner Solutions

Application Specific

- Cloud connectivity
- NFC / NTAG
- PLU integration

Connectivity Solutions

Support

Broad Market:

- OOB Walkthroughs
- NXP Community
- Solution Designs
- Application Notes
- Schematics

High Touch:

- Professional Support
- Professional Services

| Comprehensive frameworks and solutions for low-power, connected, and secure embedded systems | Industry leading IDE support and intuitive software configuration tools to accelerate application development | Low cost hardware platforms for evaluation and application development. Partner solutions for hardware debugging solutions | Software frameworks and development tools for targeted applications and certified connectivity solutions | Get started quickly and get the support you need, when you need it |

MCUXPRESSO OVERVIEW

Introducing …

MCUXpresso Software and Tools

for Kinetis and LPC microcontrollers

MCUXpresso IDE

Edit, compile, debug and optimize in an intuitive and powerful IDE

MCUXpresso SDK

Runtime software including peripheral drivers, middleware, RTOS, demos and more

LPC800 Family
support launched
in May 2018

MCUXpresso Config Tools

Online and desktop tool suite for system configuration and optimization
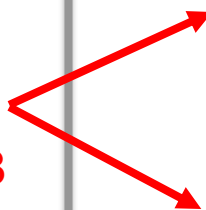
MCUXpresso IDE

Free Eclipse and GCC-based IDE for C/C++ development on Kinetis and LPC MCUs

MCUXpresso IDE

Eclipse Framework for C/C++, extendible with many plugins

Integrated MCUXpresso Config Tools – Pins, Clocks, Peripherals

Quickstart Panel	Support for SDK and LPCOpen for ARM® Cortex®-M Cores	Combined Development Perspective	Peripheral View	Power Measurement
Advanced Build Steps			Instruction Trace	SWO Trace/ Profiling
New Project Wizard	Linker and Memory Configuration		Data Watching	FreeRTOS Kernel Awareness

| ARM GCC | | | ARM GDB | | |
| newlib | newlib-nano | RedLib | CMSIS-DAP | P&E | Segger |

For supported boards   With supported probes

Product Features

- **Feature-rich**, **unlimited code size**, optimized for **ease-of-use**, based on **industry standard Eclipse** framework for **NXP's Kinetis** and **LPC MCUs,** and **i.MX RT1050 Crossover Processors**

- **Application development** with Eclipse and GCC-based IDE for advanced **editing**, **compiling** and **debugging**

- **Integrated configuration tools** for easy project updating

- Supports **custom** development boards, **Freedom**, **Tower** and **LPCXpresso** boards with debug probes from **NXP**, **P&E** and **Segger**

- **Advanced Trace Features**, including instruction trace, SWO trace and profiling

- Non-intrusive, **real-time data watch and printf** via SWD

- **No activation** needed and community based support

MCUXpresso SDK

The software framework and reference for Kinetis & LPC MCU application development
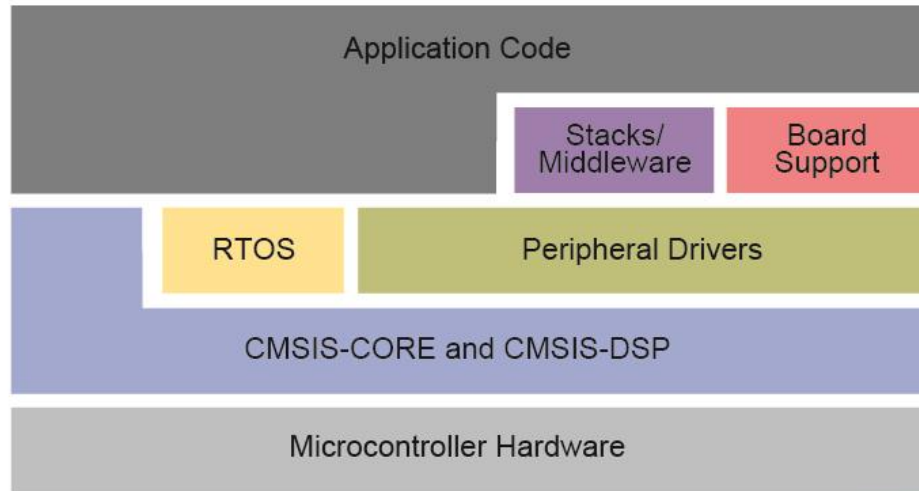
Product Features

Architecture:
- CMSIS-CORE compatible
- Single driver for each peripheral
- Transactional APIs w/ optional DMA support for communication peripherals

Integrated RTOS:
- FreeRTOS v9
- RTOS-native driver wrappers

Integrated Stacks and Middleware:
- USB Host, Device and OTG
- Amazon Web Service IoT
- QCA WiFi Stacks
- USB Type-C Power Delivery Stack
- lwIP, FatFS
- Crypto acceleration plus wolfSSL & mbedTLS
- SD and eMMC card support

Reference Software:
- Peripheral driver usage examples
- Application demos
- FreeRTOS usage demos

License:
- BSD 3-clause for startup, drivers, USB stack

Toolchains:
- MCUXpresso IDE
- IAR®, ARM® Keil®, GCC w/ Cmake

Quality:
- Production-grade software
- MISRA 2004 compliance
- Checked with Coverity® static analysis tools

Also available as CMSIS Device Family Pack

Application Code		
	Stacks/ Middleware	Board Support
RTOS	Peripheral Drivers	
CMSIS-CORE and CMSIS-DSP		
Microcontroller Hardware		

CMSIS COMPLIANT
ARM® Cortex™ Microcontroller
Software Interface Standard

freeRTOS

CERTIFIED USB™

Open Source Initiative

MCUXpresso Config Tools

Integrated configuration and development tools for LPC and Kinetis MCUs
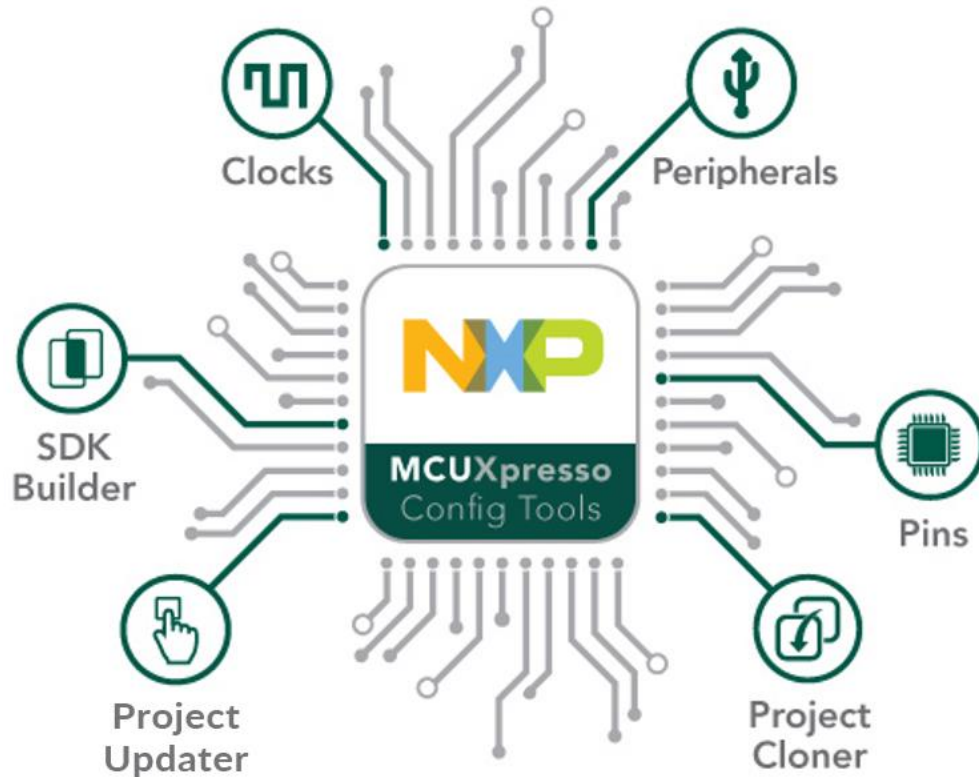
MCUXpresso Config Tools is a suite of evaluation and configuration tools that helps guide users from first evaluation to production software development.

SDK Builder packages custom SDKs based on user selections of MCU, evaluation board, and optional software components.
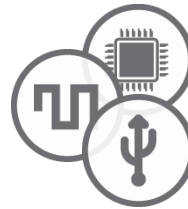
Pins and **Clocks** tools generate initialization C code for custom board support. Features validation of inputs and cross-tool conflict resolution.

Project Update works directly with existing SDK-based IDE projects with generated Pins and Clock source files (IAR/Keil tools)

Project Cloning creates a standalone SDK project based on a example application available within SDK release (IAR/Keil tools)

MCUXpresso Development flow
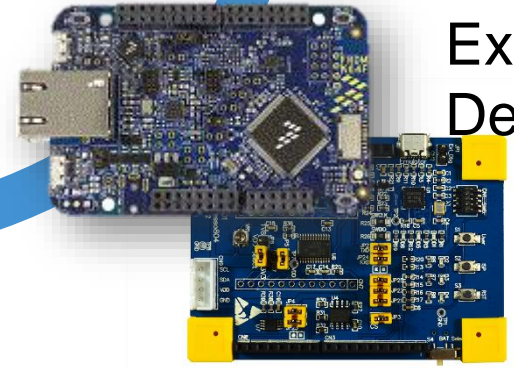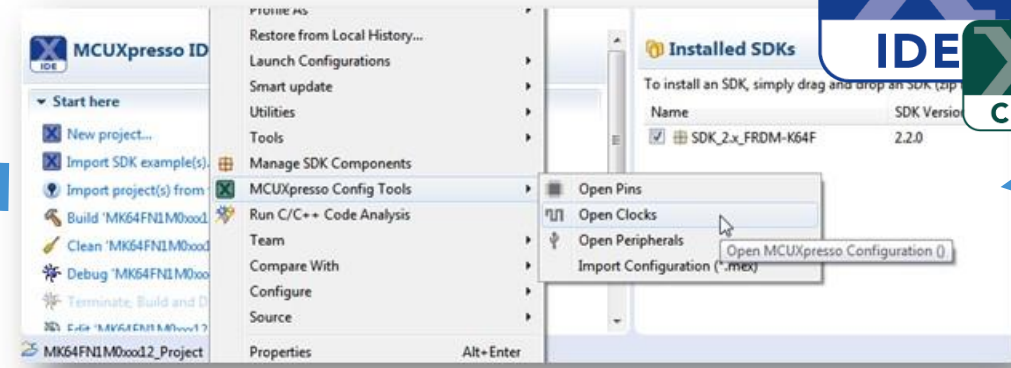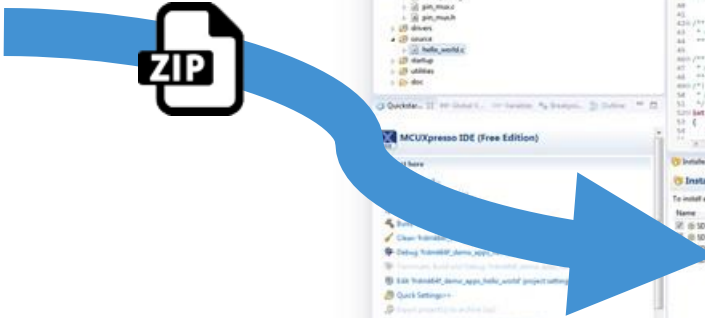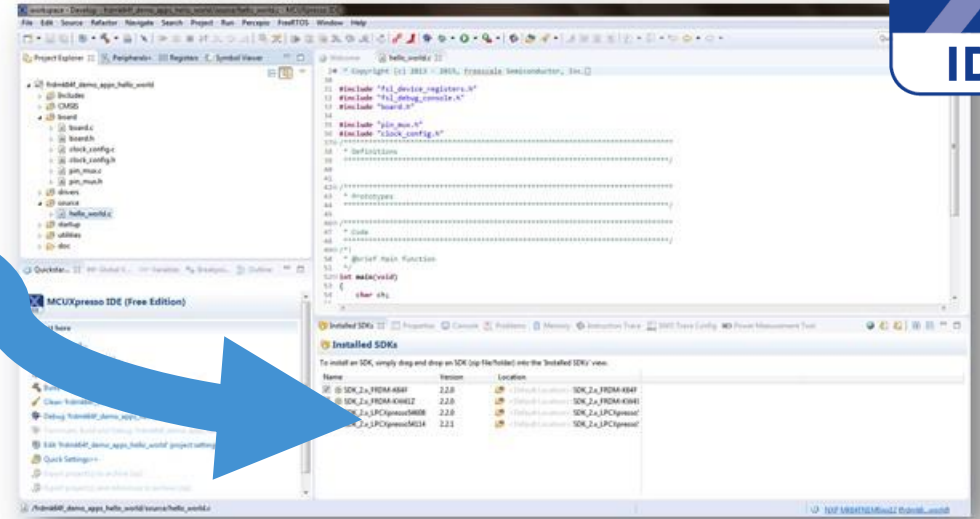
Examples, Demo Apps

MCUXpresso SDK Builder (http://mcuxpresso.nxp.com)

- MCUXpresso Dashboard
- MCUXpresso SDK Builder
- Online MCUXpresso Config Tools

MCUXpresso IDE

- MCUXpresso SDK Installation
- Development Perspective
- Integrated MCUXpresso Config Tools
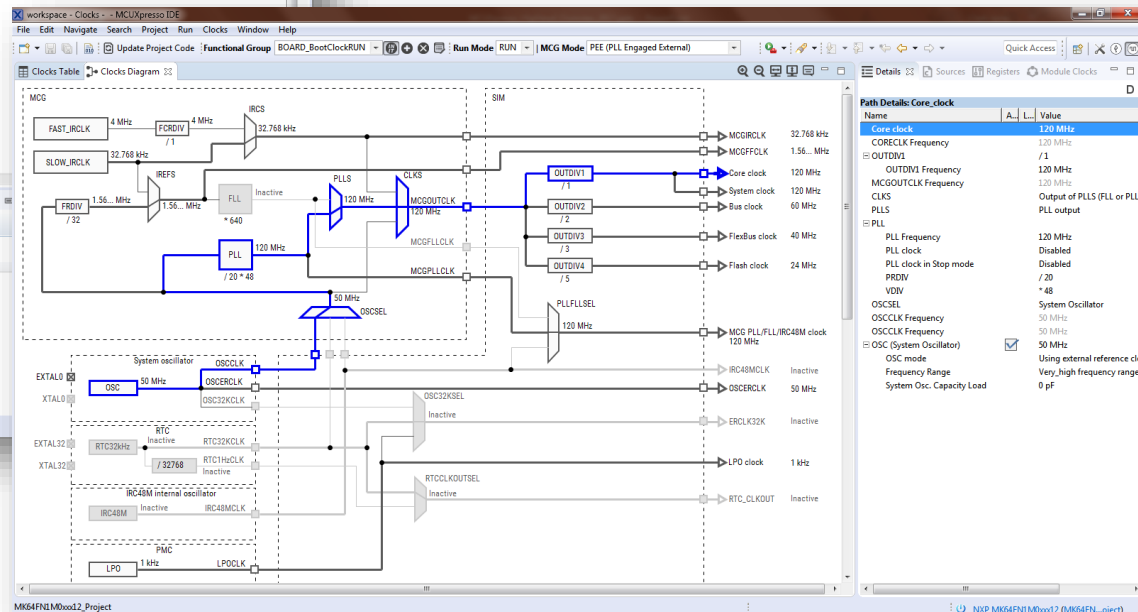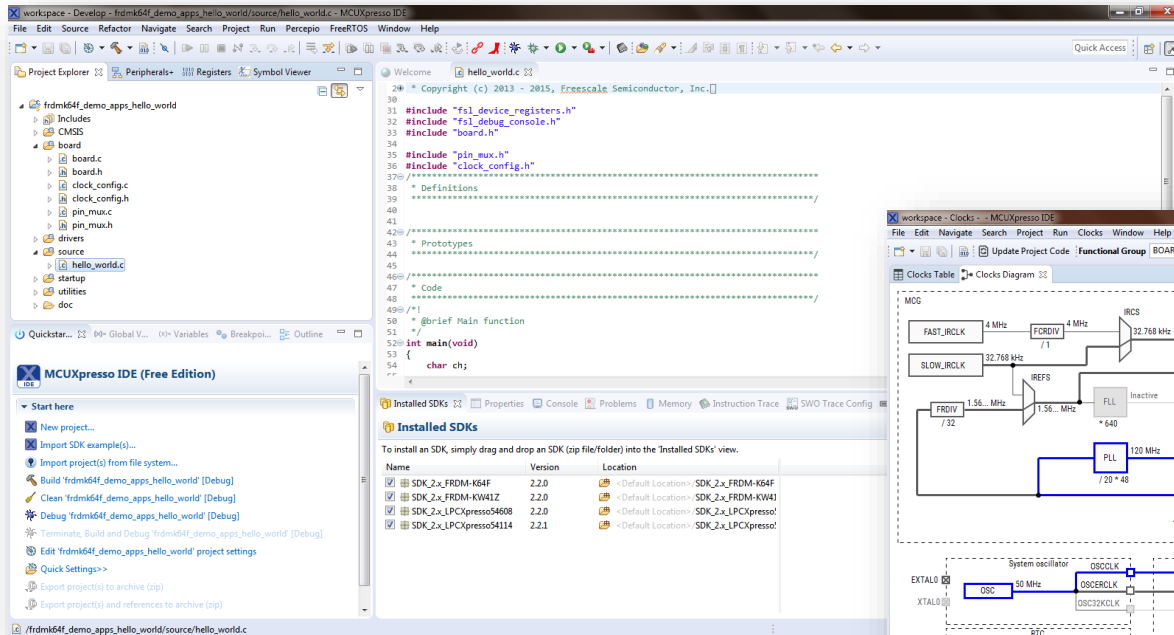
MCUXpresso Config Tools

- Pin and Clock Initialization
  - Peripheral support for LPC8xx in future release
- Code Generation
- Conflict Resolution

LPCXpresso804 Development board
(OM40001)

Host debug and power USB connector

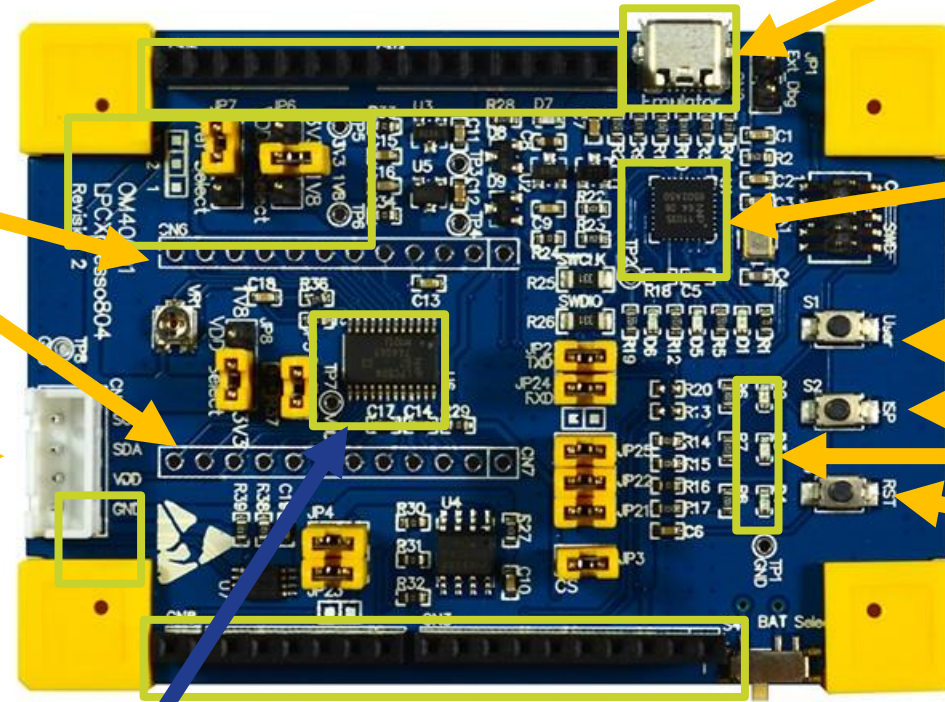CMSIS-DAP Debug probe Incl. VCOM port

User Button

ISP Button

User LEDs

Reset Button

Access header for LPC804 pins

Grove I2C Connector

LPC804 Cortex M0+ MCU SPI, I2C, USART, PLU

Arduino Expansion Header

LIVE DEMO

Other software for LPC8xx Devices

LPCOpen

- Software drivers and libraries for pre-2017 LPC Cortex-M devices
  - LPC81x and LPC82x
- MCU peripheral device drivers
- Common APIs across device families
- http://www.nxp.com/lpcopen

Code Bundles

- Available for all LPC8xx devices
- Drivers and examples
- Simple, register-level examples
- Ideal for customers transitioning from 8 or 16 bit MCUs
- https://www.nxp.com/LPC800-Code-Bundles

LPCOpen and Code Bundles do not require
SDK package installation in MCUXpresso IDE

Using Code Bundles / LPCOpen packages

- LPC800 Code Bundles are included in the IDE installation
  - Also available from nxp.com/lpc800-code-bundles
- Simple to install:
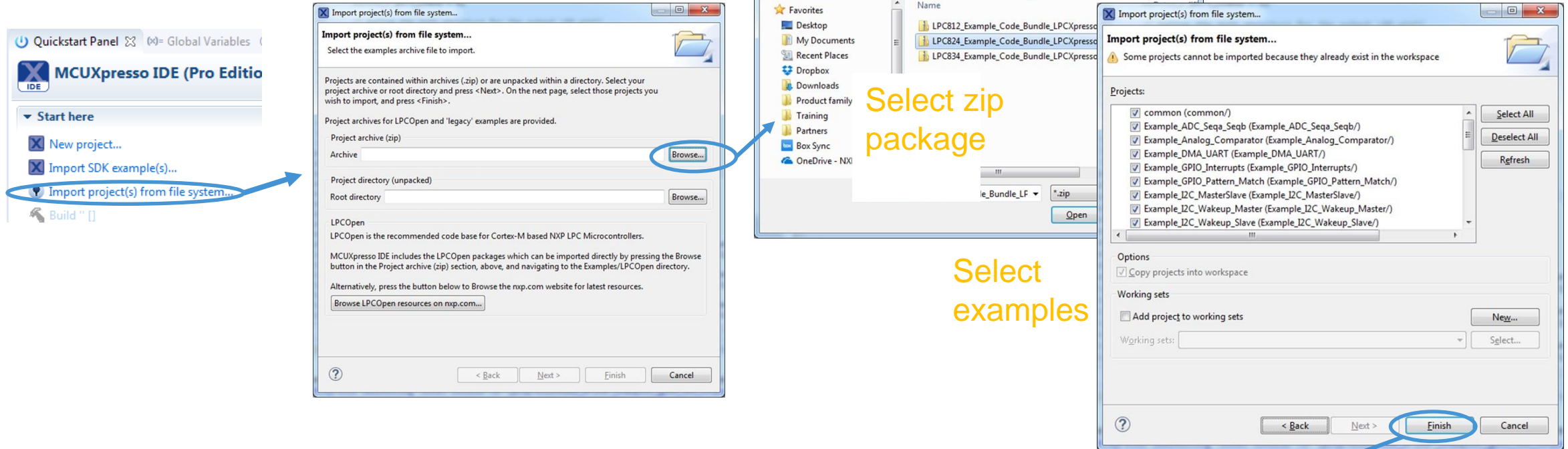
Select zip package

Select examples

Click Finish to import

Edit/Build/Debug, as with SDK

PROGRAMMABLE LOGIC UNIT (LPC804)

PLU Design Tool

Mapping of inputs, outputs and flops

LUT configuration

Schematic capture area

LUT, I/O and Flip-flop primitives

Generated source

MCUXpresso Software and Tools Additional Resources

Web pages
- LPC80x Webpage: http://www.nxp.com/lpc80x
- MCUXpresso Software and Tools – www.nxp.com/mcuxpresso

  - MCUXpresso SDK – www.nxp.com/mcuxpresso/sdk
  - MCUXpresso IDE – www.nxp.com/mcuxpresso/ide
  - MCUXpresso Config Tools – www.nxp.com/mcuxpresso/config

Supported Devices: Supported Devices Table (Community Doc)

Communities
- LPC microcontrollers – https://community.nxp.com/community/lpc

  MCUXpresso Software and Tools - https://community.nxp.com/community/mcuxpresso

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