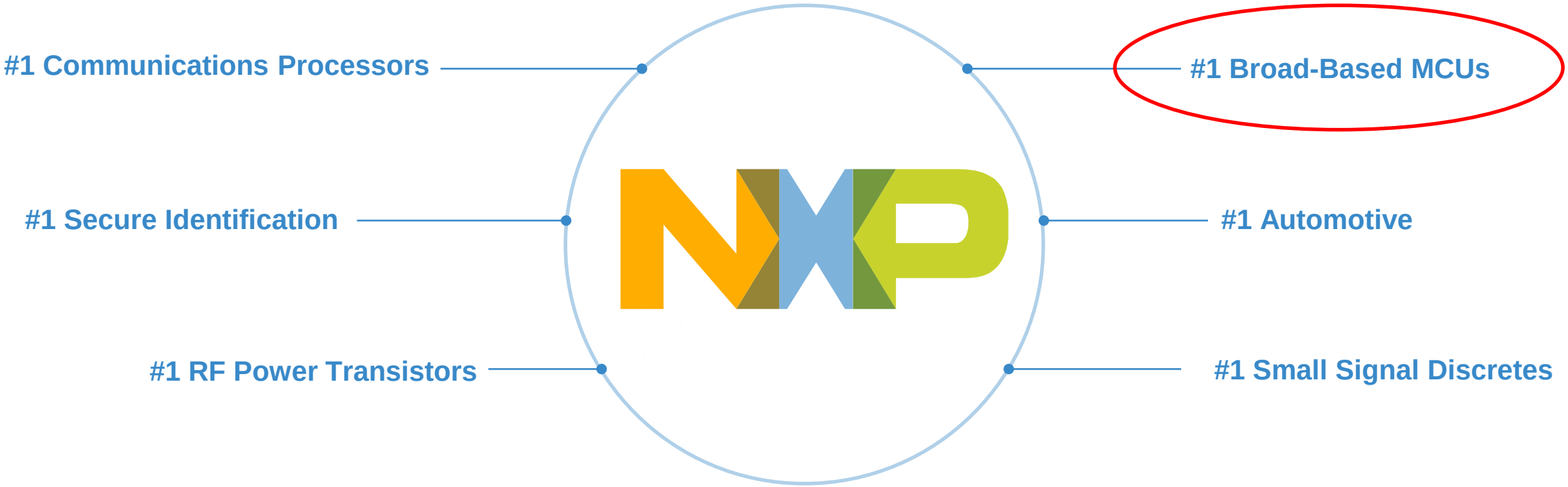
NXP MICROCONTROLLERS
OVERVIEW

JAMES HUANG
REGIONAL MARKETING, BL MICR
GREATER CHINA

MAY 2017

SECURE CONNECTIONS
FOR A SMARTER WORLD

NXP MICROCONTROLLERS A New Position of Strength



~45,000 Employees | 11,000+ Engineers | 35+ Countries

9,000+ Patents

MICR BL

Why Customers Choose Us

- Comprehensive portfolio supporting the diverse IoT landscape
- Extensive software and development environment
- Industry leading customer support, quality, and longevity
- Broad ecosystem of partners enabling system solutions
- Ease of use solutions tailored for mass market

Example Customers

BOSCH Invented for life, AVNET, arrow, Digi-Key, Electrolux, ABB, EMERSON Network Power, FLEXTRONICS, GREE, Haier, GARMIN, Continental, Honeywell, Insulet Corporation, Microsoft, MOUSER ELECTRONICS, SONOS, SONY, LAB126, Schneider Electric, SIEMENS, Whirlpool

Products

Kinetis & LPC 32-bit ARM® Microcontrollers	i.MX ARM® Applications Processors

Applications

Wearable / Healthcare
- Health / Fitness & Wireless Healthcare
- Diabetes & Cardiac Care
- Diagnostics & therapy

Smart Home
- Smart meters & grid
- Integrated wireless connectivity solutions
- Home energy control

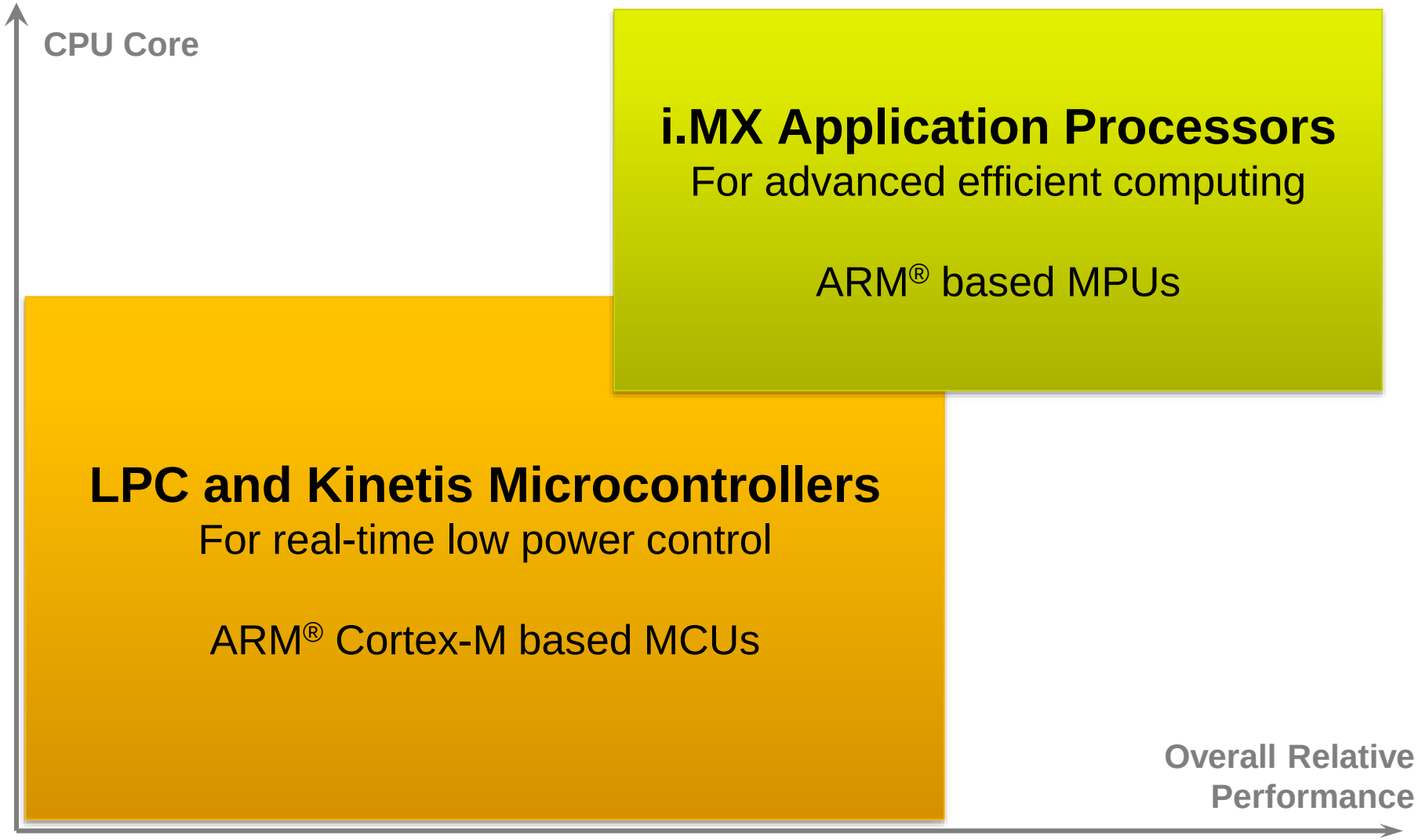
Smart Accessories
- Game controllers and consoles
- Wearable computing
- eReaders, tablets, portable navigation

Vehicle Networking & Information
- Infotainment, software define radio
- Navigation systems, E-call

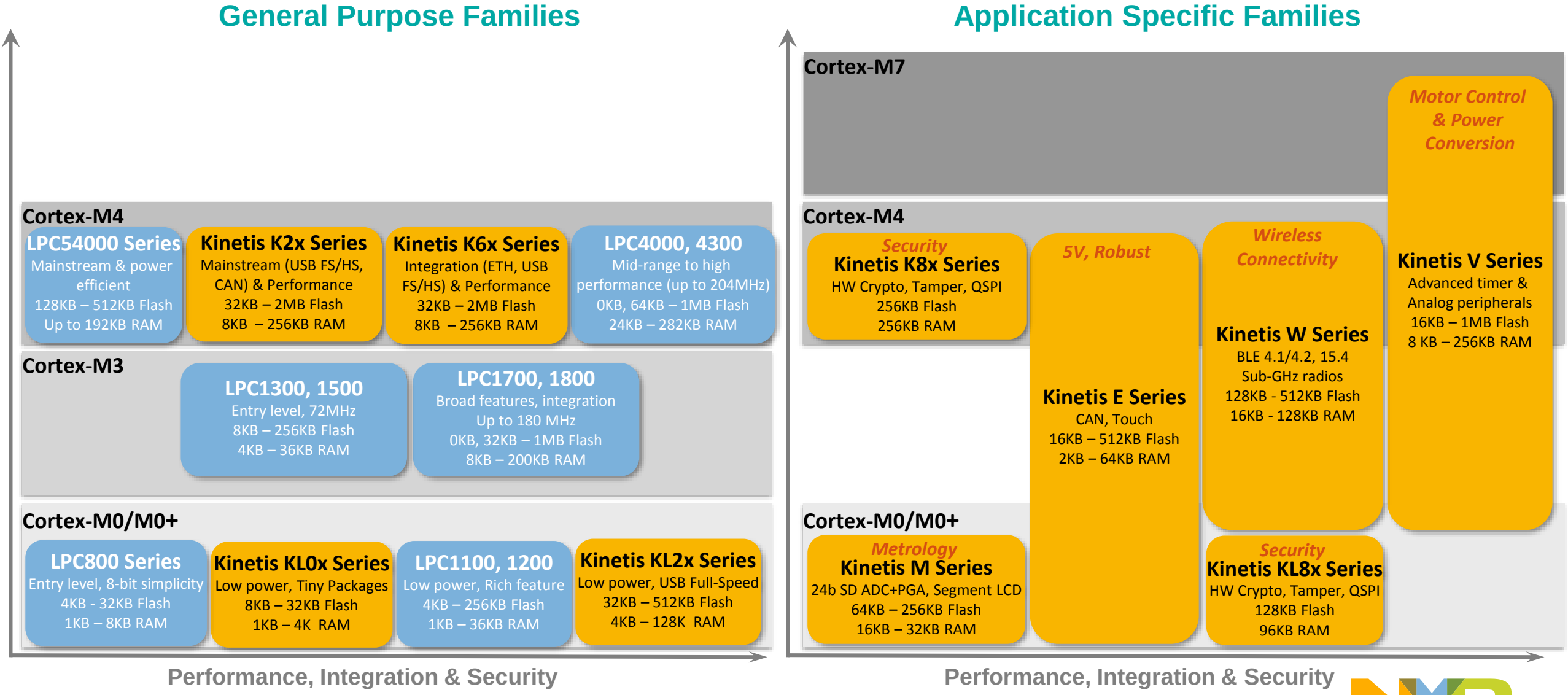
Home Appliances
- Energy efficient refrigerators, dishwashers
- Human-machine interface
- Connected appliances

Factory Automation & Drives
- Machine-to-machine
- Motor control
- Industrial networking

Scalable ARM based Processors and Controllers



Kinetis + LPC: A Powerhouse Portfolio of ARM-based MCUs



NXP ARM Cortex-M MCUs Powerhouse Portfolio

	ATTRIBUTES	PORTFOLIO M0/M0+	PORTFOLIO M3/M4	PORTFOLIO M7	TARGET APPLICATIONS
General Purpose	Performance efficiency		**LPC5410x, M4 w/M0+ Copr.** 100MHz Power Efficiency up to 512K Flash, 104K SRAM **LPC5411x, M4 w/M0+ Copr.** Flex Comm Interfaces, Voice Triggering, X-less USB, up to 256K Flash, 192K SRAM		**Always-on devices Voice control IoT**
	Advanced integration	**KL80/81, M0+** HW Security Crypto, USB, FlexIO up to 128K Flash, 96K SRAM	**K64/66/65, M4** ENET, USB FS/HS, Security (K65) up to 2MB Flash, 256K SRAM **K80/81, M4** HW Security Cryto, Tamper, QSPI, USB up to 256K Flash, 256K SRAM **LPC1800, M3** 180MHz, 2x HS USB, LCD, CAN, ENET Flashless, up to 1M Flash, 200K SRAM **LPC4300, M4 w/M0+ Copr.** 204MHz, 2x HS USB, LCD, CAN, ENET Flashless, up to 1M Flash, 282K SRAM		**Industrial control Payment, Metering Wearables, Display UI Printers**
	Mainstream	**LPC1100, M0+/M0** Options CAN or USB, EEPROM up to 256K Flash, 36K SRAM **KL28, M0+** 72/96MHz, FlexIO, BootROM, more I/O up to 512K Flash, 128K SRAM **KL17, M0+** FlexIO, BootROM Up to 256K Flash, 32K RAM **KL27, M0+** FlexIO, BootROM, x-less USB Up to 256K Flash, 32K RAM	**LPC4000, M4** Graphic LCD, FS USB, ENET, CAN up to 512K Flash, 96K SRAM **K22/24/26, M4** Large memory, x-less USB Up to 2M Flash, 256K RAM **LPC1700, M3** Graphics LCD, FS USB, ENET, CAN up to 512K Flash, 96K SRAM **LPC1500, M3** CAN, Advanced Analog,PWMs up to 256K Flash, 36K RAM		**Consumer/Gaming Accessories Wearables Home Automation Data Concentrators Industrial**
	Low-cost & Small Form Factor	**LPC81x/82x, M0+** 30MHz, ADC, Low Pin Count up to 32K Flash, 8K RAM **KL05, M0+** Low Power, DAC, TSI 8-32K Flash, 1-4K RAM **KL02/03, M0+** Small Form Factor, Low Power 8-32K Flash, 1-4K RAM			**Wake-up unit System task/Co-processor Power Management Control System**
Application Specific	Wireless Connectivity	**KW20/30/40Z, M0+** 802.15.4+BLE 4.1 Radio, DC/DC 160K Flash, 20K RAM **KW21/31/41Z, M0+** 802.15.4+BLE 4.2 Radio, DC/DC, Balun Up to 512K Flash, Up to 128K RAM **KW01, M0+** Sub-GHz 512K Flash, 128K RAM	**KW2xD, M4** 802.15.4 Radio, Thread Up to 512K Flash & 64K RAM		**Home Automation Thread BLE Apple HomeKit**
	Motor Control & Power Conversion	**KV1x, M0+** BLDC, entry-level PMSM Up to 128K Flash, Up to 16K RAM	**KV3x, M4** Mid-range PMSM, UPS power control, KMS Up to 512K Flash, Up to 96K RAM **KV4x , M4** High-perf motors, UPS, solar & mid-range AC/DC control, KMS Up to 256K Flash, Up to 32K RAM	**KV5x, M7** Higher perf, precision analog, ENET, KMS Up to 1MB Flash, Up to 256K RAM	**BLDC / PMSM motors Photo voltaic Industrial Controls**
	5V Robust	**KE02/4/6, M0+** ADC, CAN (KE06) Up to 128K Flash, Up to 16K RAM, 256B EEPROM	**KE1xF (M4F) / KE1xZ (M0+)** Higher perf. & more comm. interfaces 256K / 512K Flash, 32K / 64K RAM, 2xCAN, new TSI (Z)		**Appliance Smart Lightning**

(not a complete portfolio summary)

KMS = Kinetis Motor Suite

Strength in Product Longevity

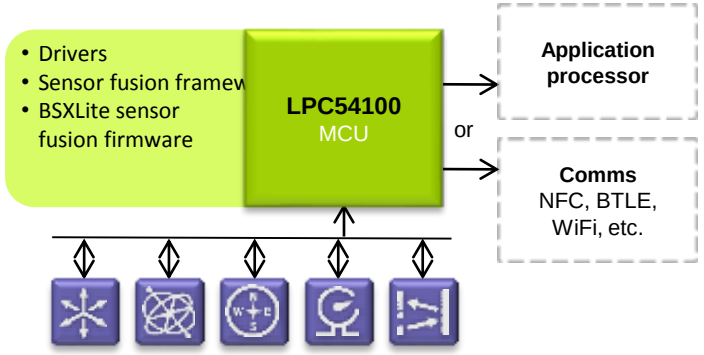
- NXP (both NXP LPC and former Freescale) have longstanding track records of **providing long-term production support** for our products
- NXP has a **formal product longevity program** for the market segments we serve
  - For the automotive and medical segments, NXP will make a broad range of solutions available for a minimum of **15 years**
  - For all other market segments in which NXP participates, NXP will make a broad range of solutions available for a minimum of **10 years**
  - **Life cycles** begin at the time of launch
  - Includes NXP's standard end-of-life notification policy
- For a complete list of participating products, visit, nxp.com/productlongevity

LPC REFERENCE DESIGN/DEMOS

Reference Design 1 — Wearable

Features:

- Targeting sports, environment and health
- Support NFC, Single BT BLE & Dual band BT
- Support true color 160*128 OLED
- Onboard 1MB SPI Flash and 1Mbit SRAM
- Buzzer and vibration motor
- Easy to measure power consumption

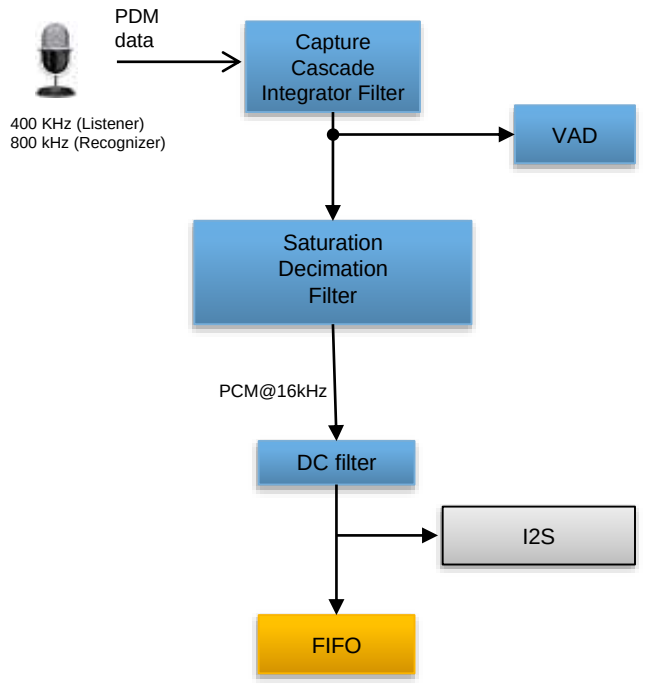


Reference Design 2 — Voice triggering implementation with H/W VAD

Features:

- Stereo PDM-PCM decimation, DC filtering, saturation
- H/W VAD Wave Envelope and floor noise detection

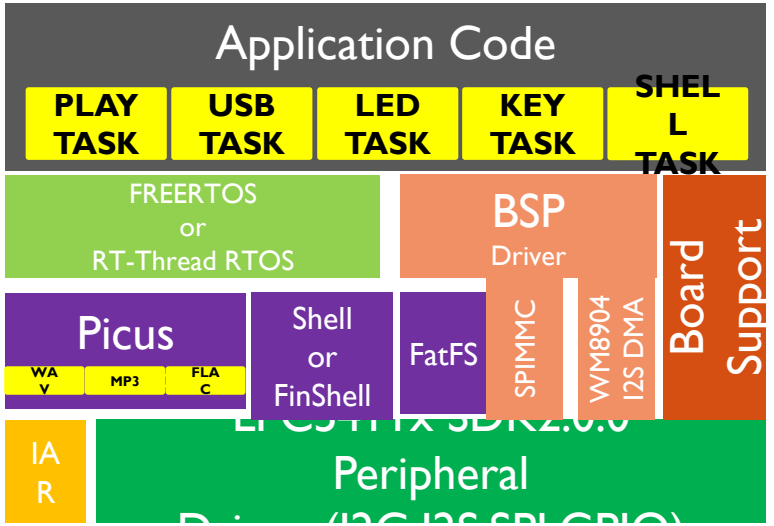
Voice Detection Stages		Uses	Average current
Stage 1	**Always on listening** • Detects audio envelope change • No audio batching • Runs only under quiet environment	• DMIC at lowest sample rate • VAD • WD osc (600 kHz)	*<50µA
Stage 2	**Detects possible speech** • Audio data batching • Speech envelope detection	• FRO (12 MHz) and nominal DMIC sample rate (800kHz) • M4 • DMA	*<300µA
Stage 3	**Recognizer** • Trigger command recognition	• FRO (48 MHz) • M4	*<1.5mA

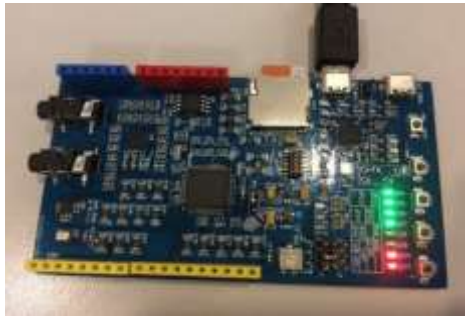


Reference Design 4 — Audio Decoder

Features:

- Based on LPC5411x series
- Single CM4F for audio decoder
- Based on SDK2.0.0 and IAR
- Based on xFSL Picus Audio decoder library
- Support FreeRTOS with Shell & FatFS
- SPI connect with TFcard
- Support wav, mp3, flac
- Support play, pause, next song, volume +/-
- USB MSC update music





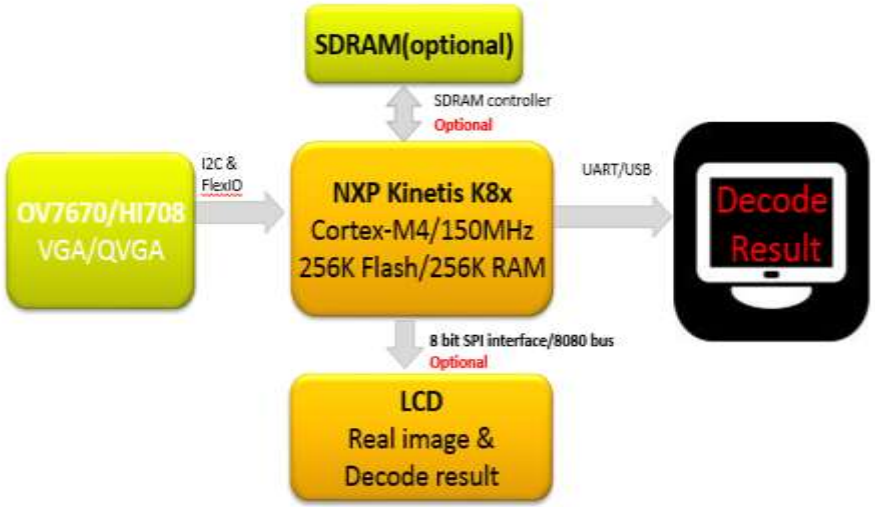
KINETIS REFERENCE DESIGN/DEMOS

Reference Design 1 – QR Decoder

QR decoder can quickly scan and decode both 1D and 2D barcode information. It is based on the NXP tower system, utilizes the Kinetis SDK FlexIO camera driver to bring in image data and display the decode result on TWR-LCD and/or a terminal.

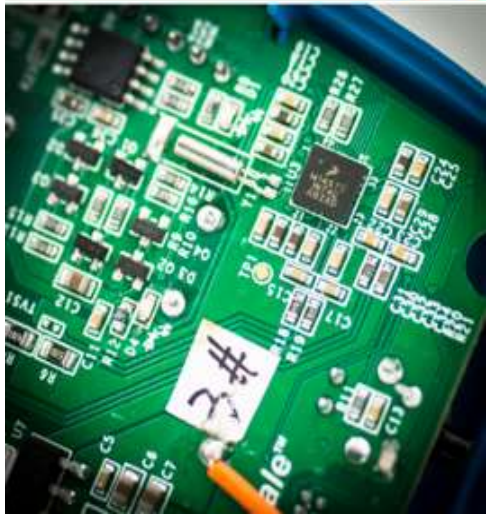
Supported Symbologies:

- QR(Quick Response Code)
- UPC-A UPC-E
- EAN8 EAN13 EAN128
- ITF-6 ITF-14 Interleaved 2 to 5
- CODE39 CODE128
- CodaBar



Reference Design 2 – Smart Plug

- Based on the Kinetis MKM14Z64 MCU
  - a low-power high-performance 32-bit ARM® Cortex™-M0+ core @50MHz
- Cost optimized solution with single-phase meter and wireless control.
- Includes two parts
  - Metering part is used to measure electronic power in single-phase
  - WiFi part is used for wireless control.
- Users can use application in an android phone to check plug status, e.g current active power, reactive power, grid frequency, history run time, etc, and control it by setting it to ON/Off, setting timer for ON/Off at fixed time.

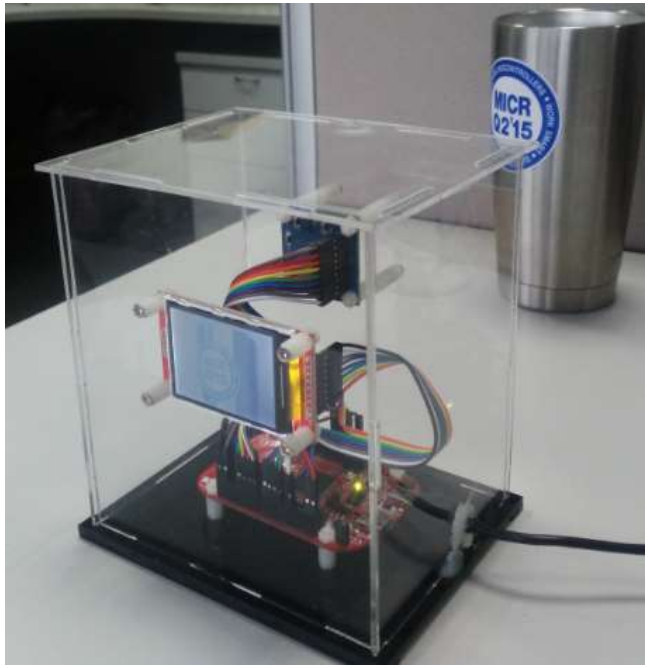


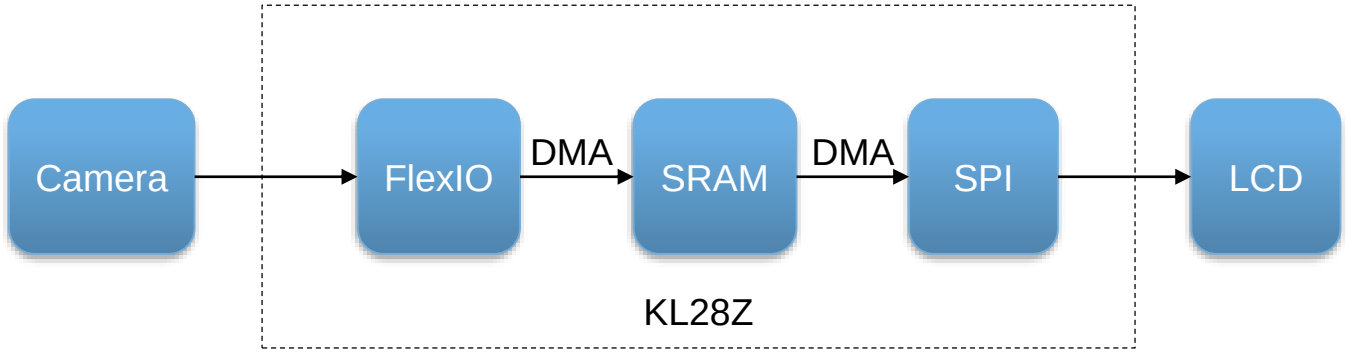
Reference Design 3 – Three Phase Power Meter

- Low cost NXP ARM Cortex™ M0+ SoC KM14 for metering
- Conforms to China National Grid Standard
- High performance of 0.5% accuracy for Active and Reactive energy under full temperature range
- ESD performance up to +/- 12KV
- High accuracy RTC clocking with 5ppm resolution

Demo 1 - FlexIO Camera Demo

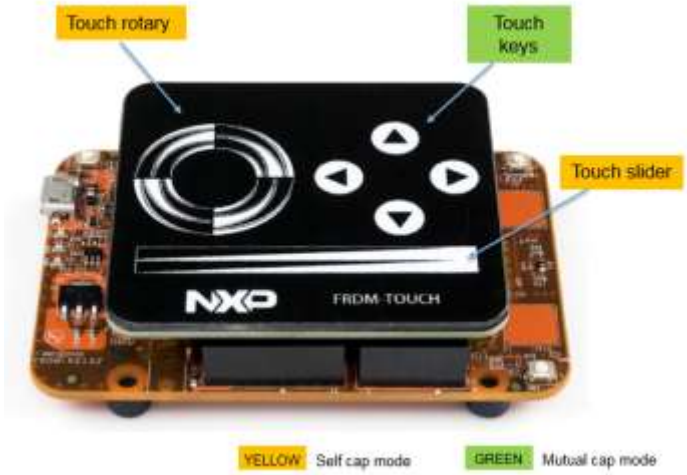
- Based on FRDM-KL28Z EVK board.
- FlexIO emulates camera interface
- Captures 320x240 QVGA images via 8-bit width data bus.
- Displays images on a TFT LCD via SPI bus.
- The sample rate is up to 15fps.





Demo 3 – New TSI Demo

- FRDM-TOUCH is a shield board connected to the FRDM-KE15Z board which integrates new generation touch sensing interface
  - supporting both self capacitance and mutual capacitance mode
  - 16-bit conversion resolution and configurable sensitivity to handle different overlay material, thickness
  - IEC61000-4-6 certified (both 3V/10V), immunity to a wide range of noise
- Demo touch keys, touch slider, rotary & touch key matrix
- When you touch the keys on FRDM-TOUCH board, the RGB LED is turned on. When you touch the slider, the blue LED will gradually illuminate based on the distance your finger moved on the touch slider



FRDM-TOUCH

TSI-EVB

INTRODUCING
LPC MICROCONTROLLERS
FOR THE BROAD MARKET

Where Does LPC Fit in the Market

LPC Our Product Positioning

Maintain Global Leadership in the Broad Market by Continuing to Invest in Innovative & Differentiated Technologies

LPC800 MCU Series

- Cortex-M0+ up to 30 MHz
- Differentiated features
- From 8 to 64K flash range
- Down to TSSOP 16

LPC54000 MCU Series

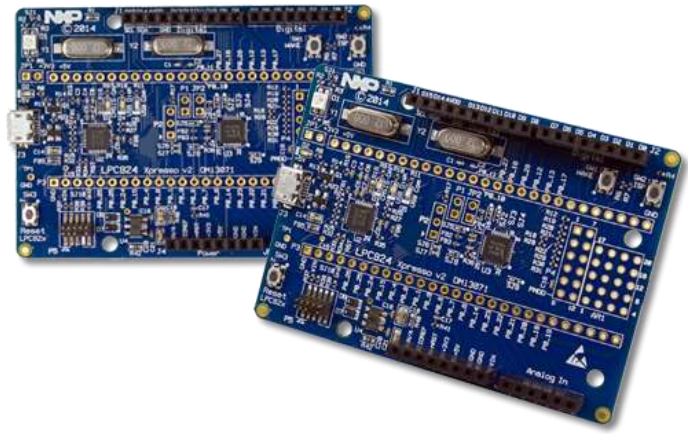
- Cortex-M4 100MHz & 180MHz platforms
- Improved power-efficiency
- Flexible comm. Interfaces
- Advanced Peripheral Integration
- From 128K to 512K Flash

INTRODUCING

LPC800 MCU SERIES CORTEX-M0+

FOR THE BROAD 8-BIT MARKET

LPC800 Entry-Level Microcontrollers



Expanding our Cortex-M0+ based LPC800 MCU series,

- Addressing market's aggressive move from 8- to 32-bit architecture
- Satisfying need for improved power-efficiency & portfolio scalability
- Simple Code Bundles & ROM drivers
- Differentiated features in a low-price MCU

Entry
LPC800 Series
Cortex-M0+

Q2	Q3	Q3
LPC845	**LPC802**	**LPC804**
Peripheral & Memory Expansion from NXP's Popular LPC824	**Addressing the Growing Demand for 8-bit Alternative MCUs**	**NXP's Game Changing 8-bit Alternative MCU**
64K Flash, 8-16K RAM	16K Flash, 2K RAM	32K Flash, 4K RAM
[QFN, LQFP]	**[TSSOP]**	

** Information Subject to Change*

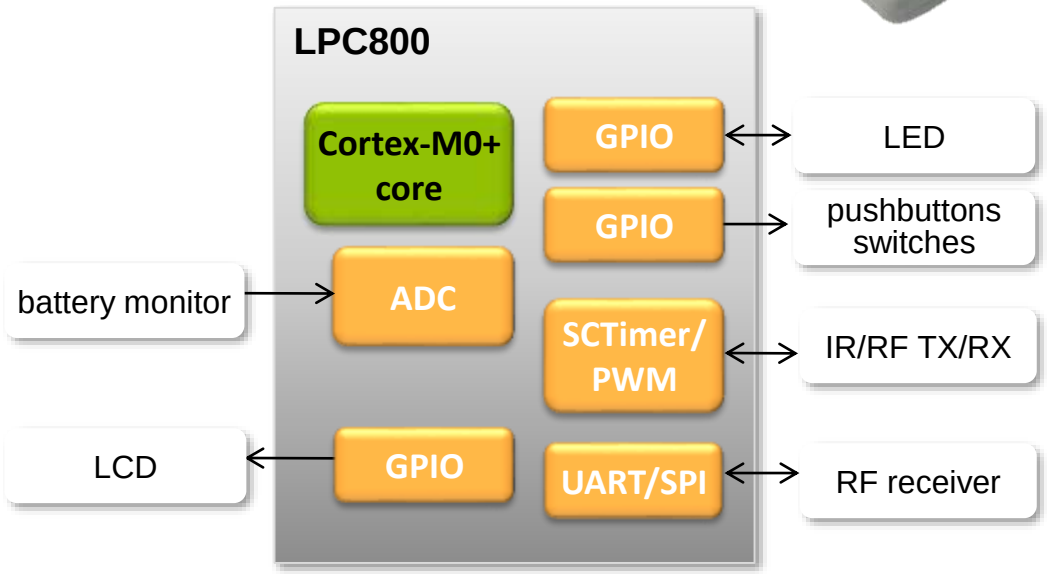
LPC800 MCU Series
Global Market Success

Brief Global Overview
More China Success in Later Session

- Low-power Cortex-M0+ based solution
- LPC800 provides
  - ADC for analog battery monitor functionality
  - SCTimer/PWM handles IR/RF signal generation without CPU intervention
  - UART and SPI peripherals for interface to external RF frontends
  - GPIO for interface to
    - LED and LCD control
    - Pushbuttons/switches

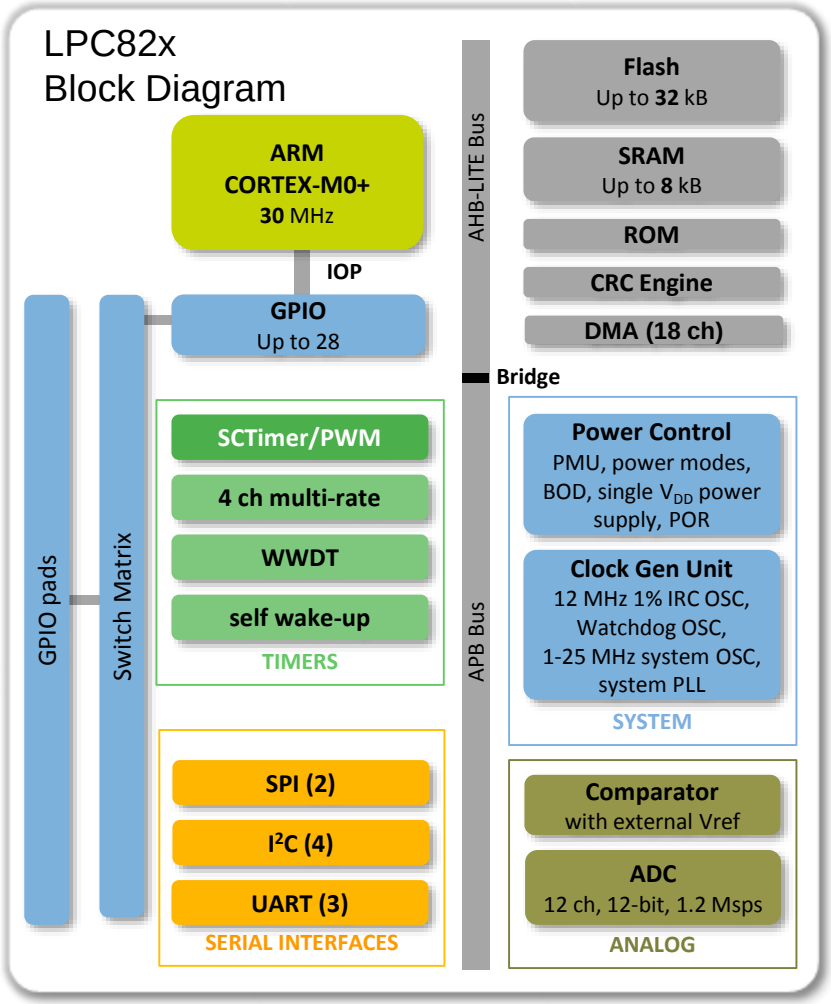
Industrial RFID Tag & Reader

Smart Home Remote Control



LPC82x Overview

Builds on LPC800 Series Power Efficiency & Flexibility



- **System**
  - 30-MHz Cortex-M0+ ARM core
  - **32 kB Flash, with 64 B page size**
  - 8 kB RAM
  - **18-channel DMA**
- **Exceptional power efficiency**
  - **Down to 90 µA/MHz (active)**
  - Five power modes
  - **Power profile APIs for simple runtime power optimization**
  - Integrated PMU
- **Ample serial connectivity**
  - 4 I²C (1 Fm+, 3 Fm), 2 SPI, 3 UART
  - 29 GPIO with **pattern matching**
- **Switch matrix for flexible I/O pin assignment of common blocks**
- **Analog**
  - **1.2 Msps ADC: 12 ch, 12-bit** with flexible triggers to optimize power use
  - **Comparator**: four input pins, external or internal VREF
- **Timers:**
  - **SCTimer/PWM**
  - multi-rate
  - windowed watchdog
  - **self wake-up**
- **Single power supply: 1.8 to 3.6V**
- **Temperature range: -40 to +105 °C**
- **Packages: TSSOP20, HVQFN33**

LPC824-Lite Board Introduction

- NXP LPC824 in HVQFN33 package based on Cortex-M0+ Cores
- Debug interface
  - On-board CMSIS-DAP debug interface
  - 10 pins JTAG connector, support SWD mode
  - mbed tools and USB virtual COM
- One adjustable potentiometer
- Four buttons
- Eight user LEDs
- Three debugger LEDs
- Expansion options
  - Arduino UNO R3-compatible connectors
  - Prototyping area

- LPC824-Lite Board Kit
  - Schematic (Format: PDF, ORCAD)
  - Chip documents
  - User guide
  - Virtual COM tool and driver
  - Target firmware
  - Example code

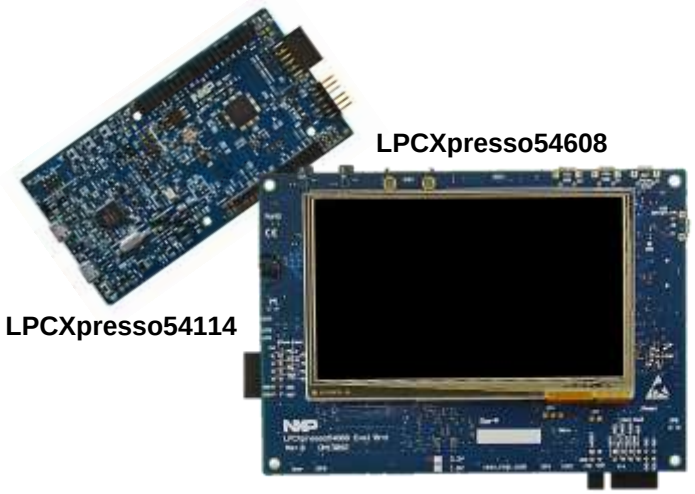
INTRODUCING

LPC54000 MCU SERIES

CORTEX-M4

FOR THE BROAD MAINSTREAM MARKET

LPC54000 Mainstream Microcontrollers



Expanding our Cortex-M4 based LPC54000 MCU series,

- Address market's need for scalable, mainstream portfolio
- Range of power & performance scalability
- Differentiated set of features

Mainstream
LPC54000 Series
Cortex-M4

Q1	Q2	Q3	Q4
LPC546xx Family of Microcontrollers			
Up to 180 MHz Core 256-512K Flash 16K EEPROM 136-200K RAM Memory Expansion **[LQFP, TFBGA]**	**NXP's Latest Mainstream MCU; Upgrade Path from LPC1700** ***Ultimate Power & Performance Scalability with Numerous Connectivity & HMI Options*** Updated Peripherals, Added Security & Protection	**Up to 180 MHz Core** 0K Flash 360K RAM Memory Expansion **[LQFP, TFBGA]**	**More to Come**

Providing our developers on LPC1768 platform with an upgrade path

** Information Subject to Change*

Migration to LPC54xxx

Legacy part	Migrating part
LPC23xx/24xx LPC175x/176x (80/100pin)	LPC54605/54606
LPC2000, LPC17xx/40xx (180/208pin)	LPC5460x
LPC213x (64pin)	LPC54101 or LPC5411x

Introducing LPC54000 Series of Power-efficient Microcontrollers

LPC5410x

Cortex-M4F at 100 MHz

256-512 KB Flash
104 KB RAM

LPC5411x

Cortex-M4F at 100 MHz

128-256 KB Flash
96-192 KB RAM

FRO, FS USB,
DMIC Subsystem

LPC546xx MCU Series

Broad Family of Products Offering
Scalable performance, advanced integration & flexible connectivity

Cortex-M4F at 180 MHz	**Cortex-M4F at 180 MHz**
256-512 KB Flash 136-200 KB RAM	0 KB Flash 360 KB RAM
FRO, FS/HS USB, DMIC Subsystem	FRO, FS/HS USB, DMIC Subsystem
Six product families, TFT-LCD Controller, Ethernet, CAN2.0 / CAN FD, Optional Security	**Six product families,** TFT-LCD Controller, Ethernet, CAN2.0 / CAN FD, Optional Security

- **Boards, Samples and Software (IAR/Keil) available today**
- **Mass Production shipping January-2017**

LPC54000 MCU Series
Global Market Success

Brief Global Overview
More China Success in Later Session

In Home Display for Smart Energy

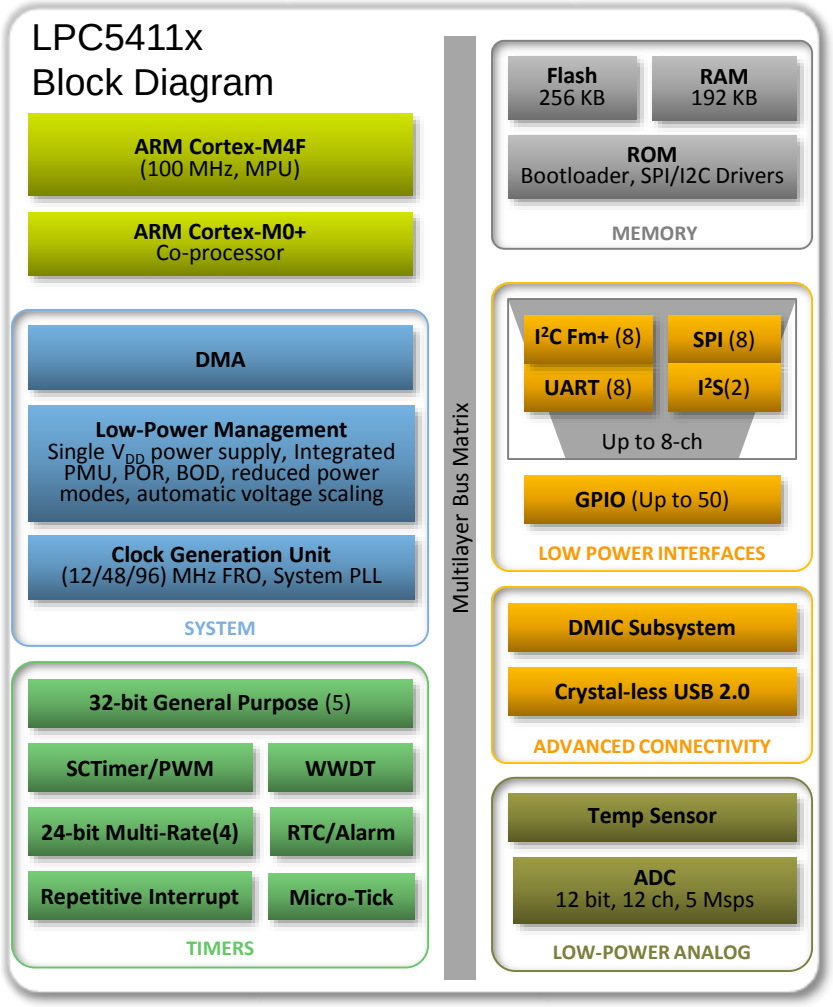
Standard TFT display (Parallel LCD)

Elderly Care Monitoring w/ Voice Activation

- Power-efficient LPC54000 MCU Series
  - Options for Large SRAM
  - Advanced Peripherals digital sensor interface, external wireless connectivity
- Integrated Graphics Controller,
  Digital Microphone Subsystem to detect voice triggers

LPC5411x Overview

Low-Power Microcontrollers Based on Cortex-M4 Cores With Optional M0+ Co-processor



- **CPU**
  - **100MHz Cortex-M4F**
  - **Cortex-M0+ Co-processor**
- **Memory**
  - 256 KB Flash, **192 KB RAM**
- **Interfaces for connectivity & sensors**
  - **Stereo DMIC subsystem** (PDM, decimator, HW VAD)
  - **8 Flexcomm interfaces: 8 SPI, 8 I2C, 8 UART, 2 I²S channels.** Max 8 channels
  - **Crystal-less FS USB**
  - Power-efficient **5.0 Msps, 12-bit ADC**: full-spec performance (1.62 to 3.6V, -40 to 105 °C)
- **Clocks & timers**
  - **12/48/96 MHz FRO**
  - 100 kHz-1.5MHz WDOG OSC,
  - 32 Xtal OSC
  - external clock input
  - Basic & advanced timers including SCTimer/PWM
  - Asynchronous peripheral bus
- **Packages**
  - LQFP64 (10 x 10 mm)
  - WLCSP49 (3.45 x 3.45 mm)
- **Other**
  - Operating voltage: 1.62 to 3.6V
  - Temperature range: -40 to 105 °C

Low Active Currents for Always-On Processing

- ❑ 900µA @12MHz w/ 2µs wakeup time in Sleep mode
- ❑ 7µA w/ 19µS wakeup time in Deep Sleep mode
- ❑ 300nA w/ 1.2mS wakeup time in Deep Power Down mode

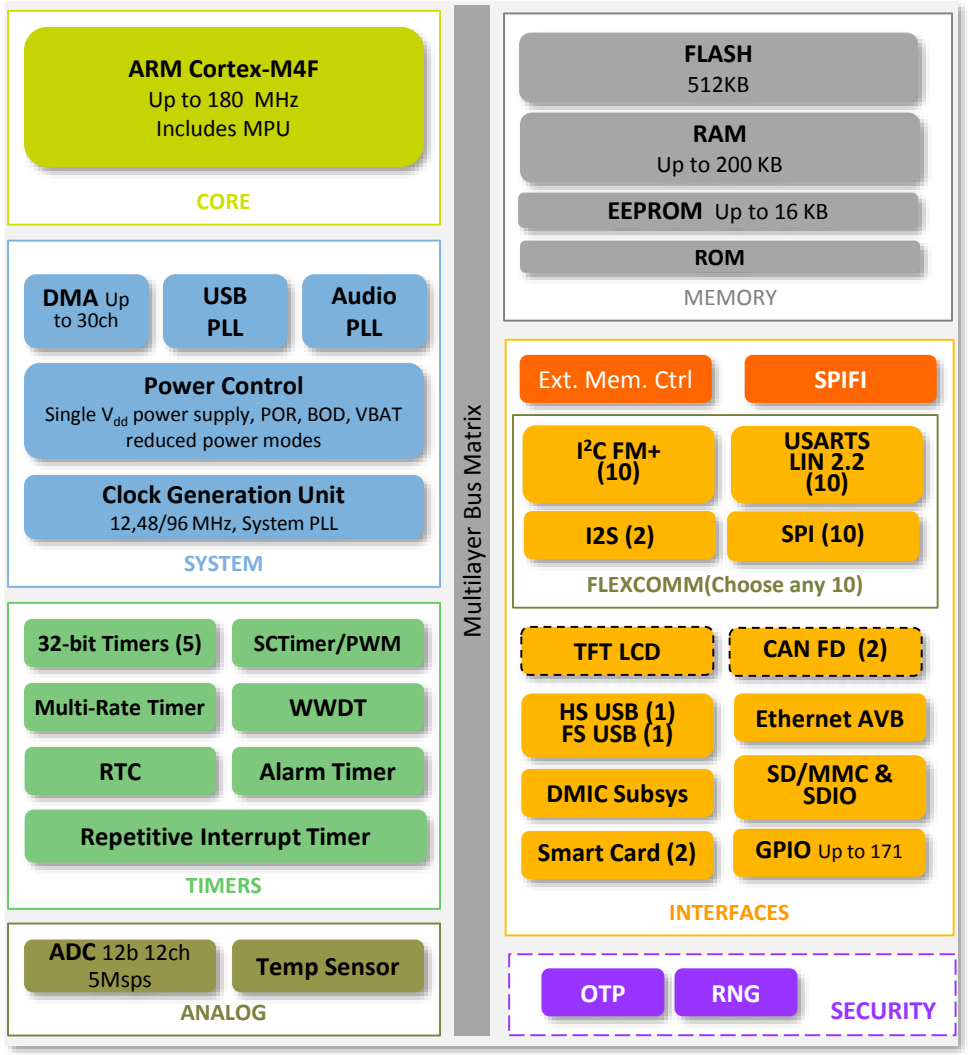
LPC54114-Lite Board Introduction

- LPC54114J256BD64 Cortex-M4/M0+ Dual Core
- Debug interface
  - On-board CMSIS-DAP debug interface
  - 10 pins JTAG connector, support SWD mode
  - mbed tools and USB virtual COM
  - ISP jumpers
- One adjustable potentiometer
- Four user buttons and one reset button
- Four user LEDs for and one power LED
- One set of 3.5 mm audio jack
- One TF card interface, One stereo Mic
- One I2C temperature sensor, One SPI Flash

- Expansion options
  - Arduino UNO R3-compatible connectors
  - Prototyping area
- LPC54114-Lite Board Kit
  - Schematic
  - Chip documents
  - User guide
  - Virtual COM tool and driver
  - Target firmware
  - Example code

LPC546xx Overview

Power-Efficient Microcontrollers (MCUs) With Advanced Peripherals



Connectivity, High-end Graphical UI & Security

- **Core & Memory**
  - Cortex-M4F, 180MHz
  - 1.71 V to 3.6 V, -40 C to 105 C
  - Up to 512 KB Flash & Up to 200 KB RAM
  - 16 KB EEPROM
  - XIP from QSPI via SPIFI
  - External Memory Ctrl (up to 32 bits)
- **Key Features**
  - Graphic LCD with resolutions up to 1024 x 768
  - CAN-FD controller x2
  - Digital mic subsystem supporting voice detection
  - Hi-Speed and Full Speed USB
  - USB: 1x HS (H/D) w/on-chip HS PHY
  - XTAL-less FS USB (H/D)
  - FlexComm-flexible serial connectivity
    - 10 Flexcomm interfaces: 10 SPI, 10 I2C, 10 UART, 2 I²S channels. Max 10 channels
- **Advanced Security Option**
  - OTP for enhanced CRP
  - True Random Number Generator
  - verification
  - Single and dual-image boot support

LPCXpresso54608 Board Introduction

❑Key Features

- 272x480 color LCD with capacitive touch screen
- On-board, high-speed USB, Link2 debug probe with CMSIS-DAP and SEGGER J-Link protocol options, support for external debug probe
- UART and SPI port bridging from LPC546xx target to USB via the on-board debug probe
- 3 x user LEDs, plus Reset, ISP (3) and user buttons
- Multiple Expansion options, including Arduino UNO and PMod
- Built-in power consumption measurement for target LPC546xx MCU
- 128Mb Micron MT25QL128 Quad-SPI flash
- 8MB Micron MT48LC8M16A2B4 SDRAM
- Knowles SPH0641LM4H digital microphone
- Full size SD/MMC card slot
- NXP MMA8652FCR1 accelerometer
- Stereo audio codec with line in/out
- High and full speed USB ports with micro A/B connector for host or device functionality
- 10/100Mbps Ethernet (RJ45 connector)

❑Support Materials

- NXP.com Board Page
- Start Guideline
- LPCXpresso54608: Out of Box & Getting Started Introduction
- Board Schematics
- Board User Manual

LPCXpresso54608 front

LPCXpresso54608 Demo

LPCXpresso54608 back

INTRODUCING

KINETIS PORTFOLIO

FOR MARKET SPECIFIC APPLICATIONS

Winning across segments with Kinetis MCUs

Microsoft

Kinetis K2x
Kinetis KL1x

MUL-T-LOCK

Kinetis K1x
HomeKit

ALLEGION SCHLAGE

Kinetis K1x
HomeKit

nest

Kinetis K2x
Kinetis KL1x

EMERSON
Climate Technologies

Kinetis KL3x

Kinetis K3x

Honeywell

Kinetis KL1x

BIGASS FANS

Kinetis K1x
Kinetis KV3x

sleep number

Kinetis K, Kinetis W

GARMIN

Kinetis K2x

Saeco

Kinetis KE0x

dyson

Kinetis KE0x

Electrolux

Kinetis KE0x
Kinetis KV3x

sensus
The Measure of the Future

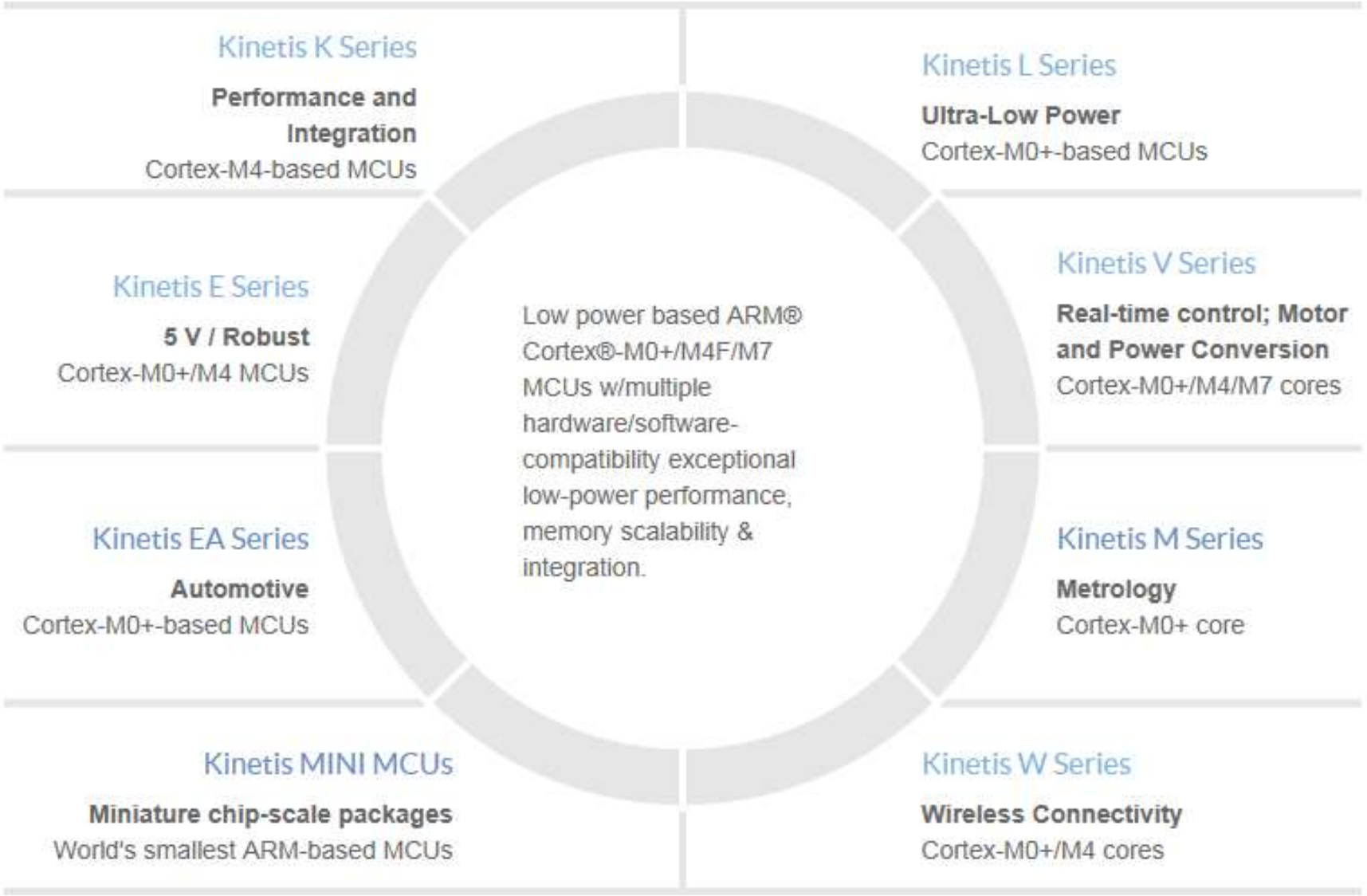
Kinetis K2x

ISKRAEMECO

Kinetis K2x

NXP

Kinetis Microcontroller Portfolio



NXP Kinetis Microcontroller Portfolio

Performance & Integration

General Purpose
23 Packages

- From 50 to 180 MHz
- 32kB to 2MB Flash
  8 to 256 kB SRAM
- Memory Expansion
- High Precision Analog
- Options with
  - ›Advanced Security & Protection
  - ›FS/HS+PHY USB
  - ›CAN, Ethernet
  - ›Segment/Graphics LCD
  - ›PGA/OpAmps
  - ›FlexIO

K Series

Wireless Connectivity

Application Specific
4 Packages

- Sub-1GHz and 2.4GHz *(inc. BLE & 802.15.4, Zigbee, Thread)*
- 128 to 512kB Flash
  16 to 64 kB SRAM
- High Precision Analog
- Options with FS USB

W Series

Secure

Application Specific
4 Packages

- From 72 to 120 MHz
- HW Cryptography
- Anti-Tamper
- 128 to 256lB Flash
  128 to 256KB RAM
- QSPI

K8x
KL8x

Control & Power Conversion

Application Specific

5 Packages

- From 75 to 168 MHz
- 16 to 512kB Flash
  8 to 96 kB SRAM
- Fast, High Precision Analog, Timers/PWM
- Real-time computation and math acceleration
- Options with CAN

V Series

5V / Robust

Application Specific
10 Packages

- From 20 to 168 MHz
- 8kB to 512kB Flash
  1 to 64 kB SRAM
- Enhanced ESD/EMC Performance
- High Current Output
- Options with
  - ›CAN
  - ›New touch sensor
  - ›FlexIO

E Series

Ultra-Low Power

General Purpose
19 Packages

- From 48 to 72 MHz
- 8kB to 512kB Flash
  1 to 128 kB SRAM
- Smart, Autonomous Peripherals/Timers
- High Precision Analog
- Options with
  - ›Advanced Security & Protection
  - ›FlexIO

L Series

Metrology

Application Specific
4 Packages

- From 50 to 75 MHz
- 64kB to 256kB Flash
  16 to 32 kB SRAM
- AFE w/ up to Quad 24b Sigma-Delta ADCs
- Options with
  - ›LCD

M Series

ARM Cortex-M4 Based MCUs

ARM Cortex-M7 Based MCUs

ARM Cortex-M0+ Based MCUs

Summary of Devices in Production Today

KINETIS CONNECT

ZigBee 3.0 Better Together

JN5169

Low power, High Performance 802.15.4 wireless microcontroller

32b RISC @32MHz
32kB RAM
512kB flash
Tx Power +10dBm
Rx Sensitivity -96dBm
Tx 23.3mA, Rx 14.7mA
QFN40 6x6mm
Tamb -40°C / +125°C

Development Kit

HA and lighting integrating **easy and secure NFC** commissioning

Modules

NXP Modules

Target Applications

HBA, Lighting., Smart meters
Energy metering

Availability

Now

JN5174/78/79

Low power, High Performance 802.15.4 wireless microcontroller

Cortex M3 @32MHz
32kB RAM,
160/256/512kB flash
Tx Power +10dBm
Rx Sensitivity -96dBm
Tx 22.5mA, Rx 14.8mA
QFN40 6x6mm
Tamb -40°C / +125°C

Development Kit

HA and lighting integrating **easy and secure NFC commissioning**

Modules

NXP Modules

Target Applications

HBA and Lighting

Availability

Sampling Now
Full Release June 2016

THREAD

KW2xD

High Performance 802.15.4 wireless microcontroller

Cortex M4 @50MHz
64kB RAM,
512kB flash
Tx Power +8dBm
Rx Sensitivity -102dBm
Dual-PAN, Antenna Div.
Tx 19mA, Rx 17mA
LGA 8x8mm
Tamb -40°C / +85°C

Development Kit

FRDM, USB Dev Boards

Modules

From Partners

Target Applications

Home and Building Automation

Availability

Now

KW21Z

Very Low power, High Performance 802.15.4 wireless microcontroller

Cortex M0+ @48MHz
128kB RAM,
512kB flash
Tx Power +4dBm
Rx Sensitivity -101dBm
Dual-PAN, Antenna Div.
Tx 6.5mA, Rx 6.5mA
QFN 7x7mm, WLCSP
Tamb -40°C / +105°C

Development Kit

FRDM, USB Dev Boards

Modules

From Partners

Target Applications

Home and Building Automation

Availability

Sampling April 2016
Full Release Sept 2016

Bluetooth SMART

KW31Z

Very Low power, High Performance BLE 4.2 wireless microcontroller

Cortex M0+ @48MHz
128kB RAM,
512kB flash
Tx Power +4dBm
Rx Sensitivity -96dBm
TRNG
Buck Boost DC/DC from 0.9V to 4.2V
Tx 6,5mA,Rx 6,5mA,
QFN 7x7mm, **WLCSP**
Tamb -40°C / +105°C

Development Kit

FRDM, USB Dev Boards

Modules

From Partners

Target Applications

Secure BLE applications, Home Automation

Availability

Sampling April 2016
Full Release Sept 2016

QN9080

Ultra Low Power, High Performance BLE 4.2 wireless microcontroller

Cortex M4 **with FPU**
128kB RAM,256kB ROM
512kB flash
Tx Power +2dBm
Rx S -95dBm w/o DC-DC
Rx S -93dBm w/ DC-DC
Tx 3.4mA, Rx 3.6mA,
ADC: 14 ENOB @ 32 kHz
Fusion Sensor processor
QFN 6x6mm, **WLCSP**
Tamb -40°C / +105°C

Development Kit

EVB, miniDK

Modules

To be defined

Target Applications

Watches and wristband

Availability

1H 2017

ZigBee THREAD Bluetooth SMART

KW41Z

Very Low power, High Perfs '15.4 / BLE 4.2 wireless microcontroller

Cortex M0+ @48MHz
128kB RAM,
512kB flash
Tx Power +4dBm
TH Rx Sens -101dBm
BLE Rx Sens -96dBm
Dual-PAN, Antenna Div.
Tx 6.5mA, Rx 6.5mA,
QFN 7x7mm, **WLCSP**
Tamb -40°C / +105°C

Development Kit

FRDM, USB Dev Boards

Modules

From Partners

Target Applications

Home and Building Automation

Availability

Sampling April 2016
Full Release Sept 2016

NFC

NXP NFC I²C TAG

NTAG I²C *plus* connected NFC tag solution by NXP

ISO/IEC 14443-2/3, NFC forum compliant - Type 2 Tag
888B EEPROM or 1904B EEPROM
Access Protection via RF : WRITE ONLY per 16 Btyes
Pass through mode: 64B SRAM buffer to transfer data
Signal output : To detect RF field or synchronise data
Energy harvesting : To power external components
SOT902 (leadless) – TSSOP8 (8pin)

PN7120

Best plug'n play full NFC solution – easy integration into any OS environment

ISO15693 compliant -longer read range than ISO14443
Reading distance up to 70mm
MIFARE Classic security (CRYPTO1 HW)
Host protocol : NCI 1.0
Host Software : Android driver and Linux driver
Host interface :I²C
VFBGA49

Kinetis KW41Z/31Z/21Z

Core/System
- Cortex-M0+ running up to 48 MHz
- Four independently programmable DMA controller channels

Memory
- Up to 512kB Flash
- Up to 128 kB SRAM

Radio
- Support for BLE v4.2, 802.15.4, Generic FSK
- -95 dBm in BLE mode, -100 dBm in 802.15.4 mode
- -30 to +3.5 dBm programmable output power
- 6.8 mA Rx & 6.1 mA Tx (0dBm) current target (DC-DC enabled)
- On-chip balun with single ended bidirectional RF port

Communications/HMI/Timers
- 2xSPI, 2xI2C, LP-UART, GPIO with IRQ capability (KBI)
- Carrier Modulated Timer (CMT) for infrared transmissions
- Hardware Capacitive Touch Sensing Interface (TSI)
- 3xFlexTimer (TPM) with PWM & quadrature decode support
- Low Power (LPTMR), Programmable Interrupt (PIT) and RTC timers

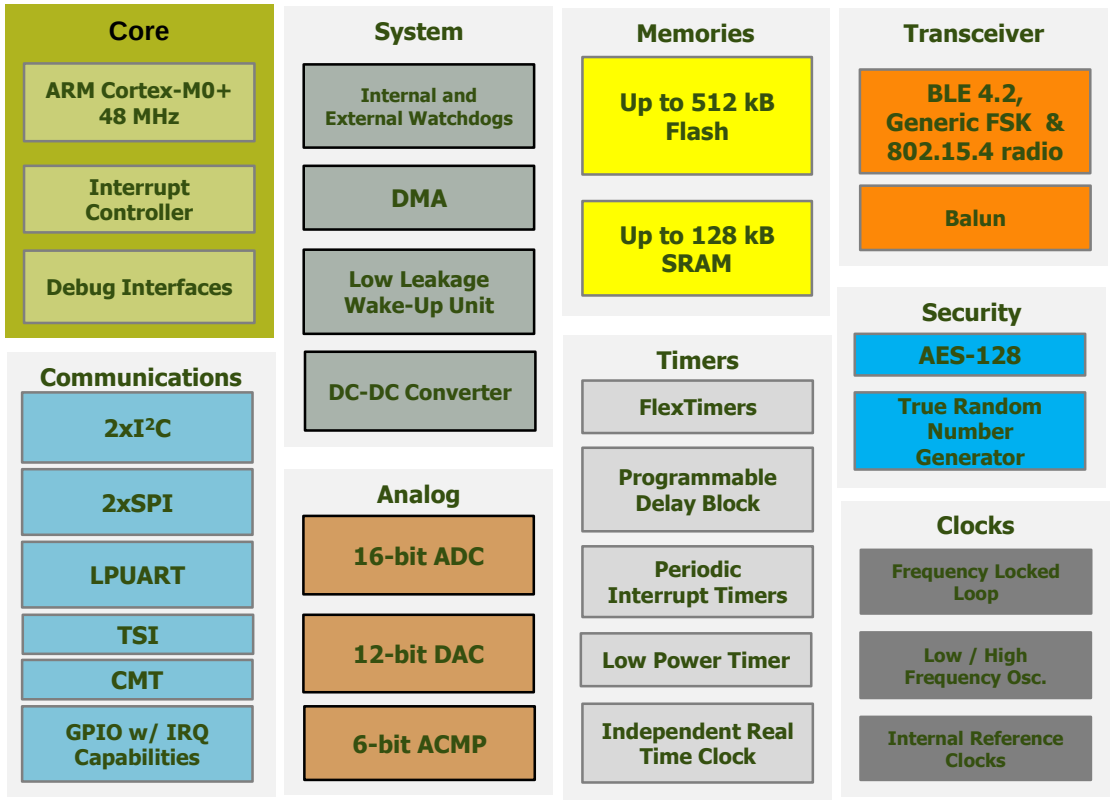
Analog
- 16-bit ADC with integrated temperature sensor and battery monitor
- 12-bit DAC and 6-bit High-speed Comparator

Security
- AES-128 Accelerator and True Random Number Generator
- Advanced flash security

Integrated DC/DC Converter
- Normal: 1.71V to 3.6V
- Buck : 2.1V to 4.2V for coin cell operation
- Boost : 0.9V to 1.795V for single alkaline battery operation

Unique Identifiers
- 80-bit unique device ID programmed at factory
- 40-bit unique media access control (MAC) subaddress can be used for Bluetooth Low Energy or IEEE 802.15.4 MAC Address

-40ºC to +105ºC (QFN)
-40ºC to +85ºC (WLCSP)



Device	Memory (Flash/RAM)	Protocol	Package
MKW21Z512VHT4 **MKW21Z256VHT4**	**512 kB / 128 KB** **256 kB / 128 KB**	802.15.4	7x7 48-pin Laminate QFN 4x4 75-pin WLCSP
MKW31Z512VHT4 **MKW31Z256VHT4**	**512 kB / 128 KB** **256 kB / 128 KB**	BLE v4.2 / Generic FSK	7x7 48-pin Laminate QFN 4x4 75-pin WLCSP
MKW41Z512VHT4 **MKW41Z256VHT4**	**512 KB / 128 KB** **256 KB / 128 KB**	BLE v4.2 / Generic FSK / 802.15.4 (Supports concurrent operation)	7x7 48-pin Laminate QFN 4x4 75-pin WLCSP

Features	Description
Software and Protocol Stacks	Bluetooth Smart Host Stack & Profiles Generic FSK (250 kbps, 500 kbps, 1Mbps) Thread Stack, IEEE 802.15.4 MAC, SMAC Thread + BLE Multi-Protocol Stack KSDK, RTOSes, IAR & KDS Support

Kinetis KW41Z/31Z/21Z: Key Differentiators

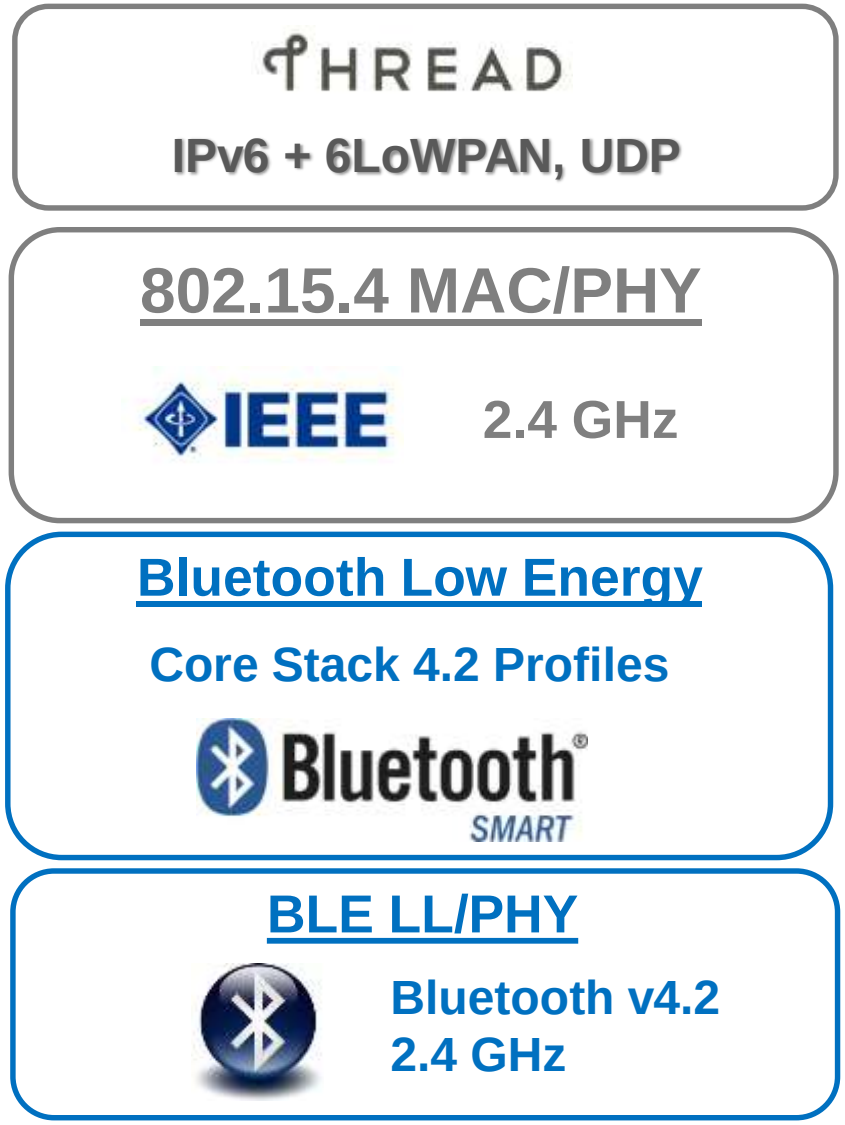
Multi-Protocol Radio – High performance radio supporting Bluetooth Smart/Bluetooth Low Energy (BLE) v4.2, Generic FSK and IEEE 802.15.4 (Thread) based standards

Large Memory – Enough memory to adequately contain desired networking stack(s) with ample room remaining for custom applications

Low Power – Low transmit, receive and standby currents that maximizes battery life, including standard coin-cells

Complete Enablement – Fully compliant, certified Bluetooth Low Energy, Thread and 802.15.4 MAC/PHY. Support for Generic FSK, BLE Mesh, SMAC, multiple RTOSes, KSDK 2.0, KDS and IAR IDEs.

Complete Enablement: Software



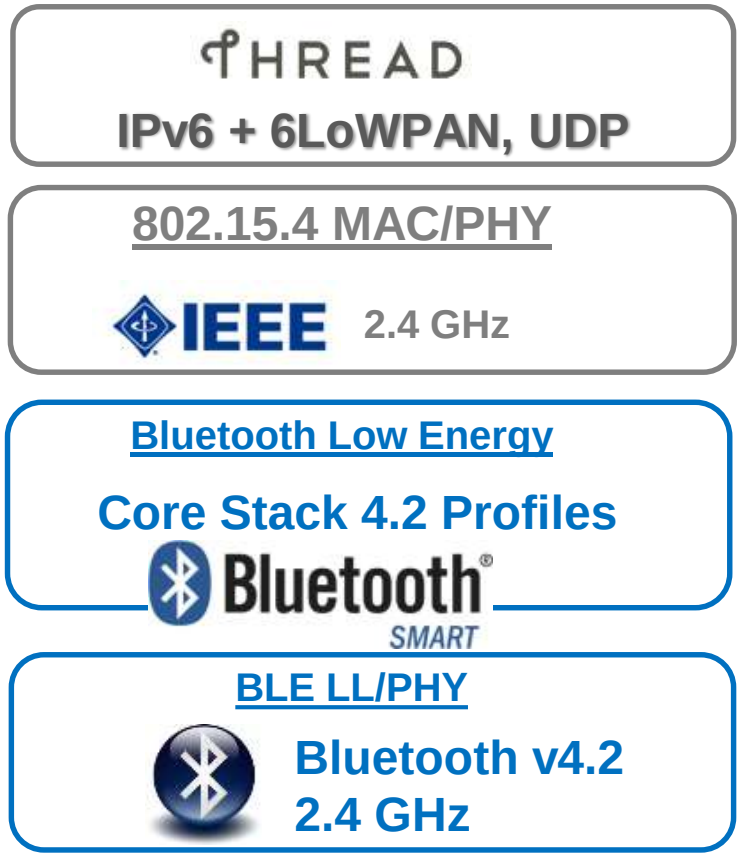
- ✓ Thread R1.1 Compliant Network Stack
- ✓ Thread + BLE Combo Stack
- ✓ IEEE 802.15.4 MAC/PHY
- ✓ Qualified Bluetooth Low Energy v4.2 Stack + Application Profiles
- ✓ Bluetooth Low Energy Mesh Stack
- ✓ IPv6 over BLE
- ✓ Generic FSK at 250, 500 and 1000 kbps
- ✓ SMAC w/ Connectivity Test for Regulatory Certification
- ✓ Support for Host MCU and MPU (Linux®) Processors
- ✓ Full integration with Kinetis SDK
- ✓ Multiple RTOS, including FreeRTOS and uCOSII (BLE)
- ✓ Kinetis Design Studio (KDS)
- ✓ IAR Embedded Workbench®

KW41Z Development Hardware

- **FRDM-KW41Z** Freedom Development Hardware
  - Can be configured as Host or Shield for connection to Host Processor
  - Supports all DC-DC configurations
  - PCB inverted F-type antenna
  - Minimum number of matching components
  - FCC Part15 & EN300 328 compliant
  - Serial Flash for OTA firmware upgrades
  - On board NXP FXOS8700CQ digital sensor, 3D Accelerometer (±2g/±4g/±8g) + 3D Magnetometer
  - OpenSDA and JTAG debug
  - Full KSDK support
  - Resale $145 (2 boards/kit)

- **USB-KW41Z** USB Dongle
  - Ideal for BLE/802.15.4 sniffer or connection to PC/Tablet
  - FCC Part15 & EN300 328 compliant
  - Resale $60

KW41Z Development Software



- ✓ Thread R1.1 Compliant Network Stack
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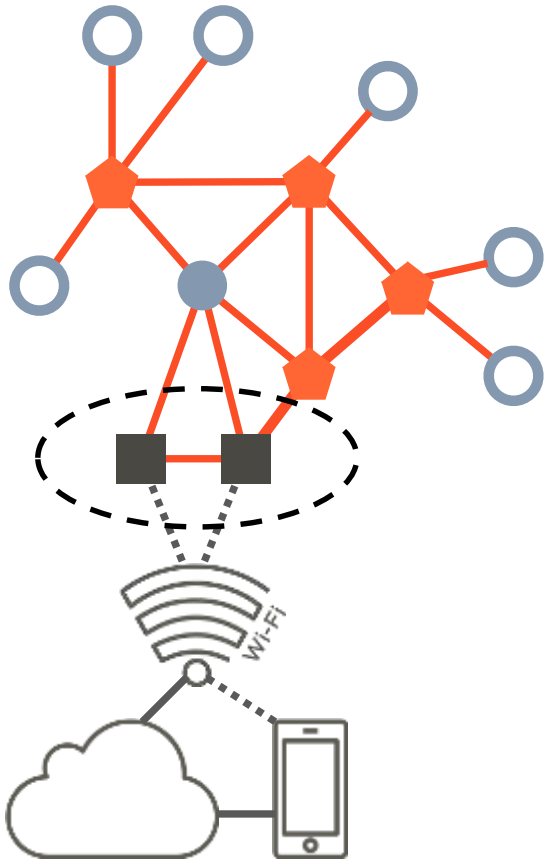
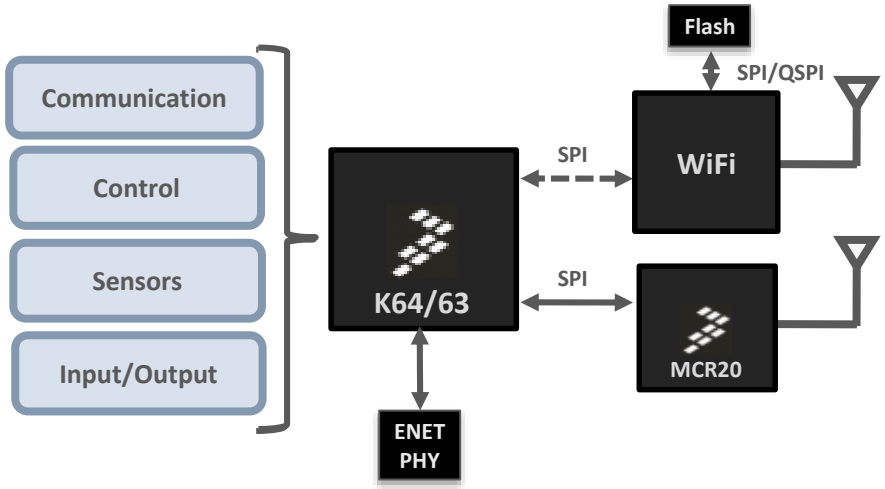
Thread Router (Ethernet/Wi-Fi)

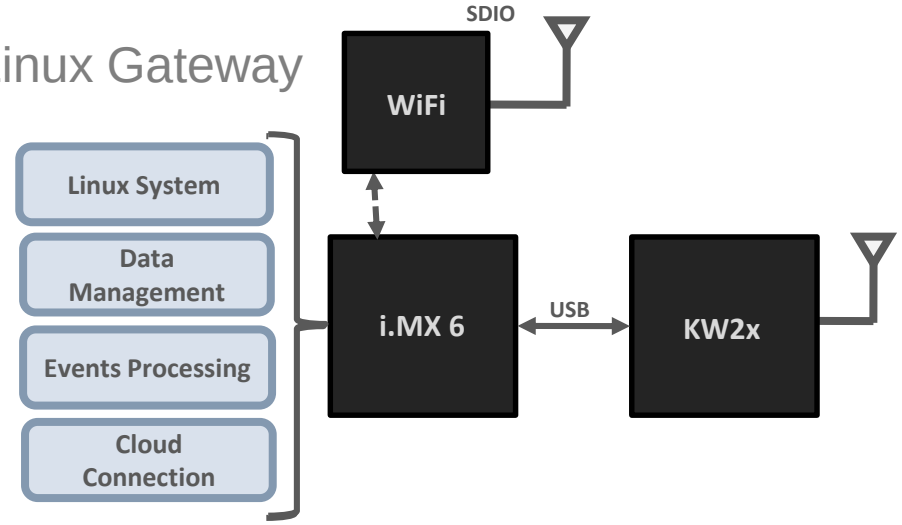


RTOS Boarder Router



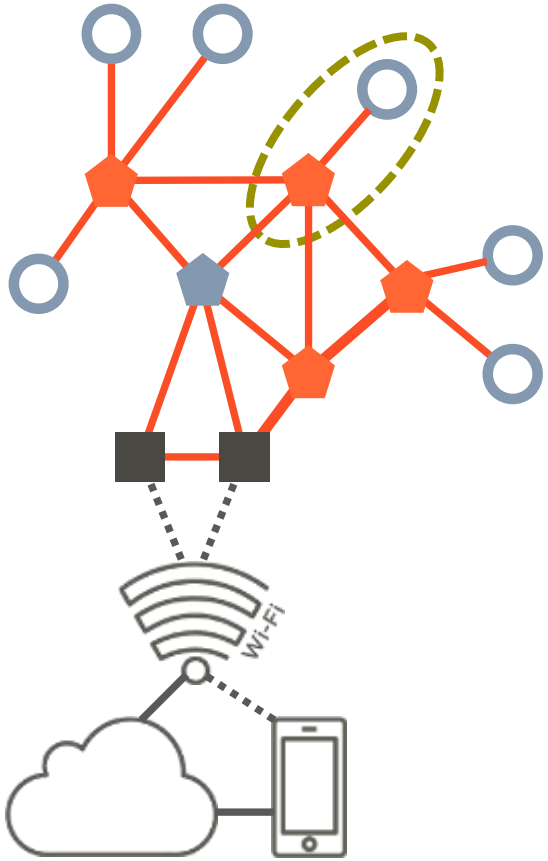
- Kinetis **K64** is standalone MCU with up to 1MB Flash, up to 256K RAM and embedded Ethernet
- Kinetis **K63** MCU adds tamper protection DryIce module
- **MCR20** is an 802.15.4 transceiver
- Thread, Wi-Fi and Ethernet share same IP stack

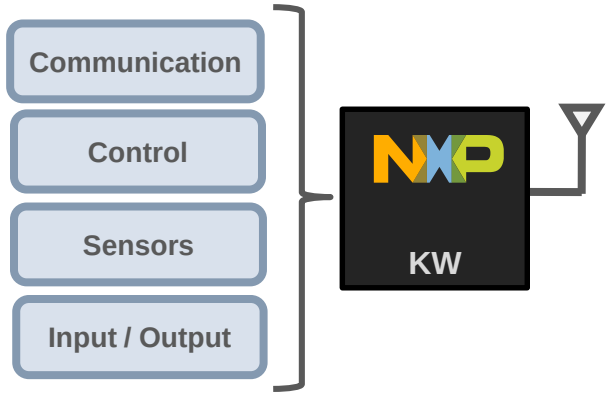
Linux Gateway



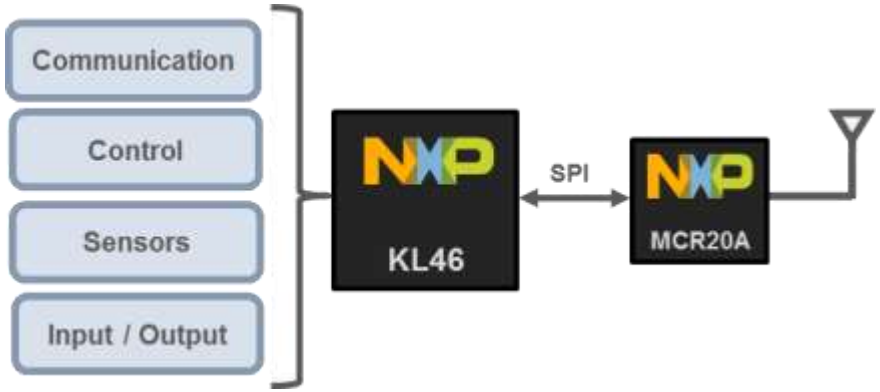
- **i.MX 6** Linux system handles Data Management and Analytics, Events Processing and Cloud Connection
- Kinetis **KW2x MCU** runs the Thread Border Router functionality

Thread Router and End Device





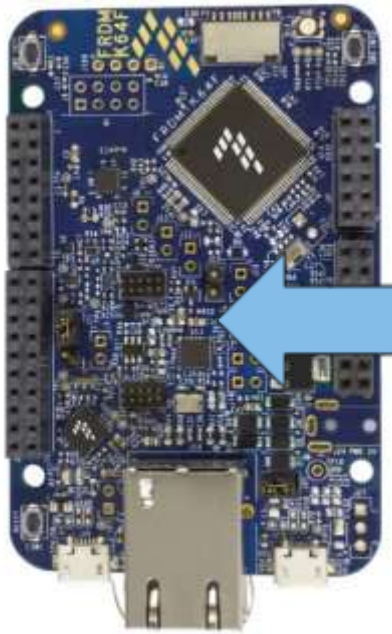
- **KW** devices with 512kB Flash and 64k RAM can run **Border Router or Router Eligible End Device** configurations with an Application
- **KW** devices with 32kB RAM can run Thread End Device configurations with an Application



- **Kinetis L** devices with 32kB RAM can run 802.15.4 MAC/PHY, Thread Network and Application as an **End Device**
- MCR20A is the 2.4GHz Transceiver

Target Development Systems: Gateways/Border Routers/End Nodes

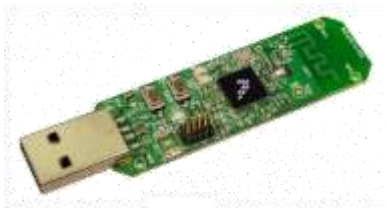
K64F
RTOS Border Router



K64F Freedom Board

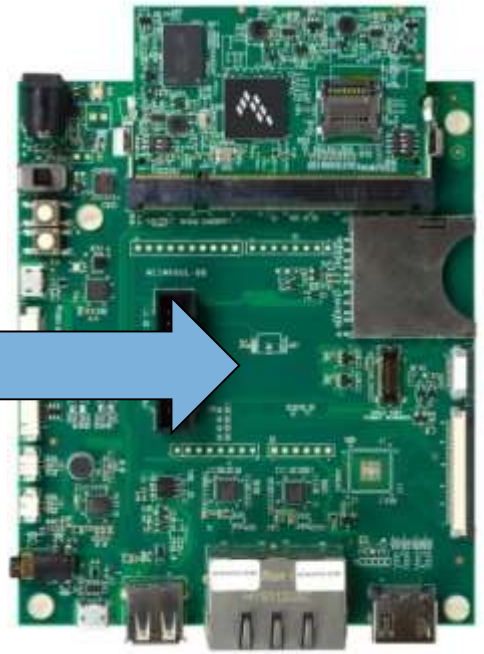
- 120 MHz Cortex-M4F
- Up to 1 MB Flash, UP to 258 KB RAM
- Integrated Ethernet
- Thread and ZigBee
- Launching Oct 6th

KW2x
FRDM-KW24D512



USB-KW24D512

i.MX6UL
Linux Gateway/Border Router

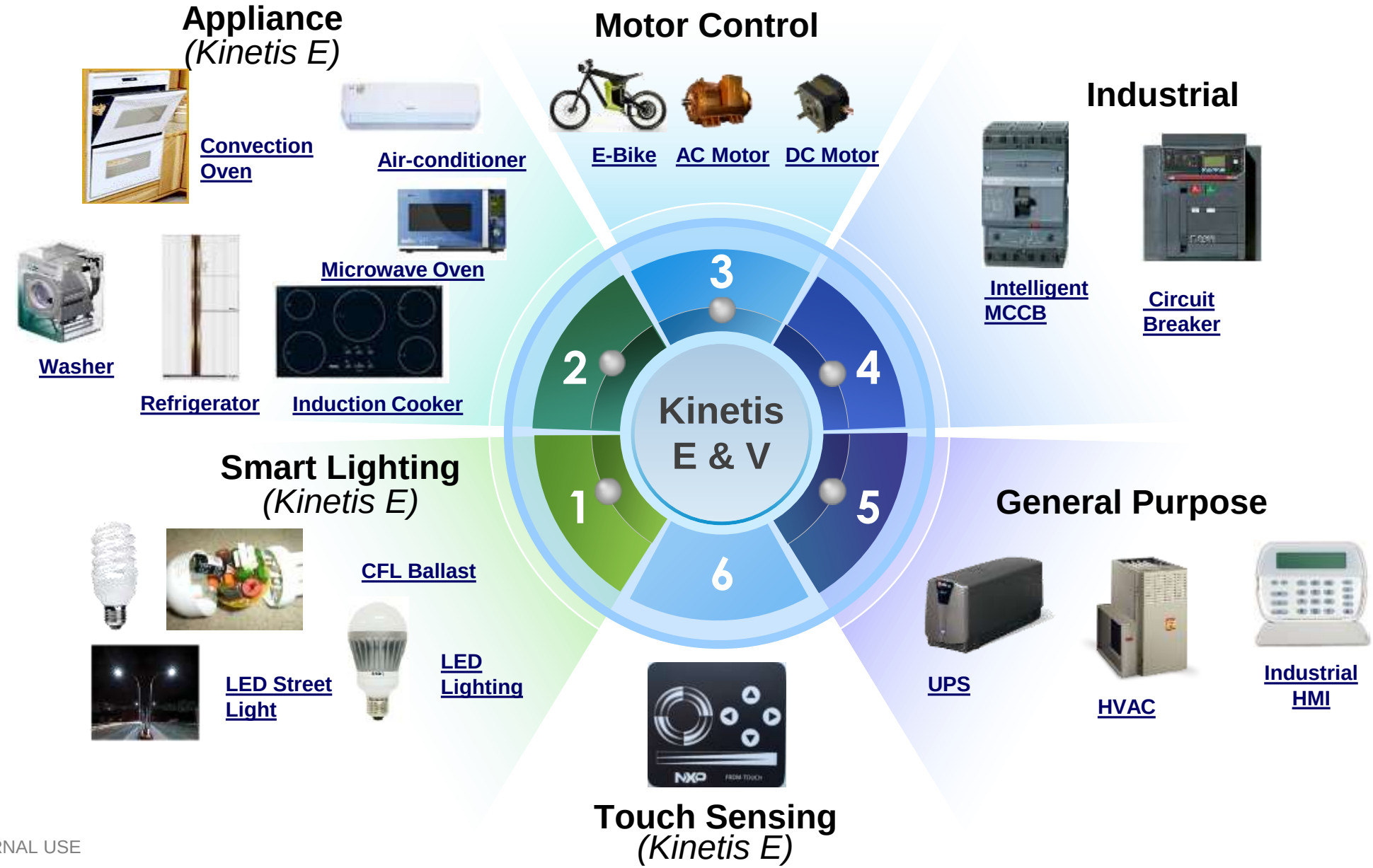


i.MX6Ul EVK

- 528MHz Cortex-A7 CPU
- 4 GB DDR3L DRAM memory
- 256 MB Quad SPI Flash
- Arduino/Freedom connector
- Launching Oct 6th

KINETIS CONTROL

Target Market and Applications



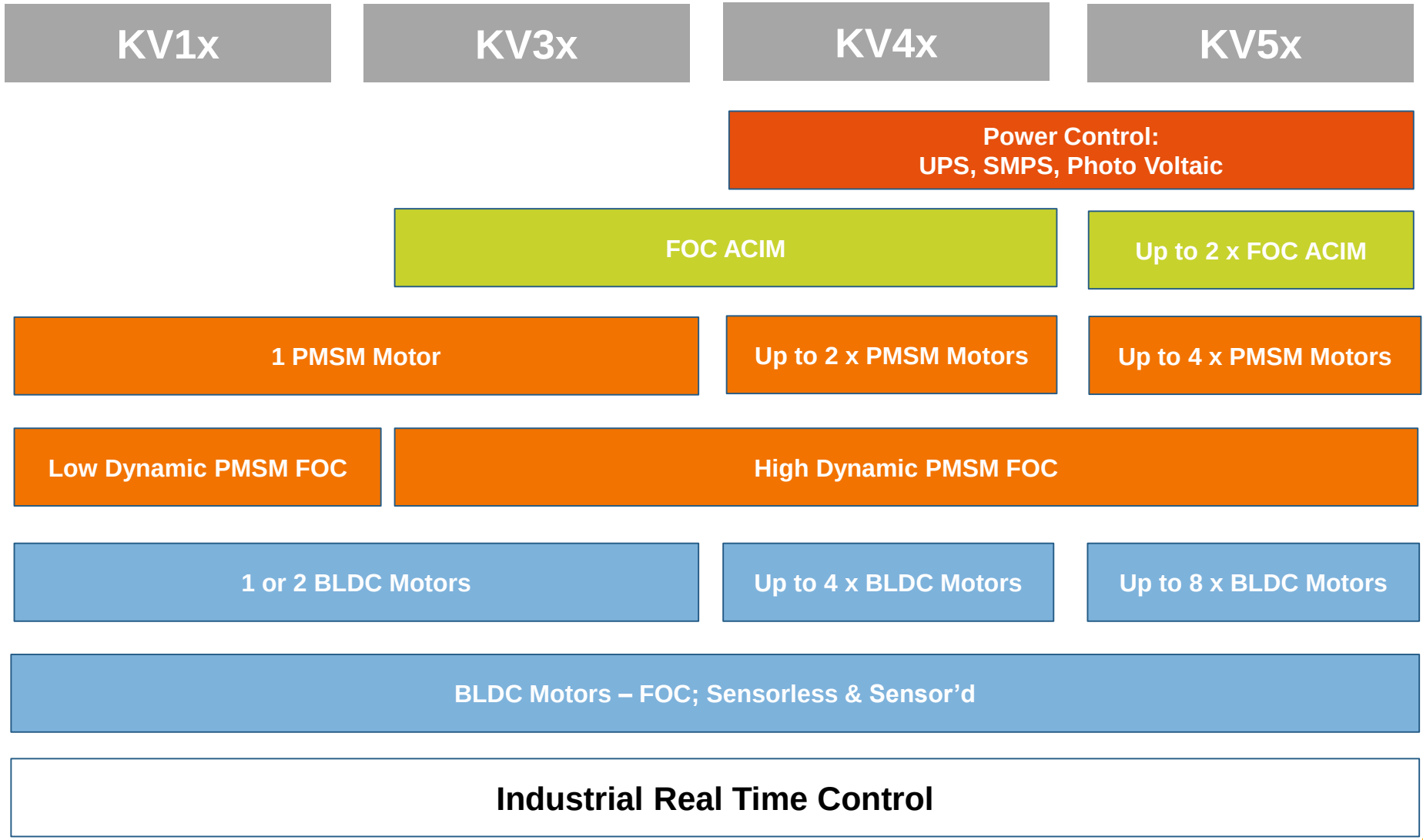
Kinetis V series MCU

For Motor Control & Digital Power Conversion

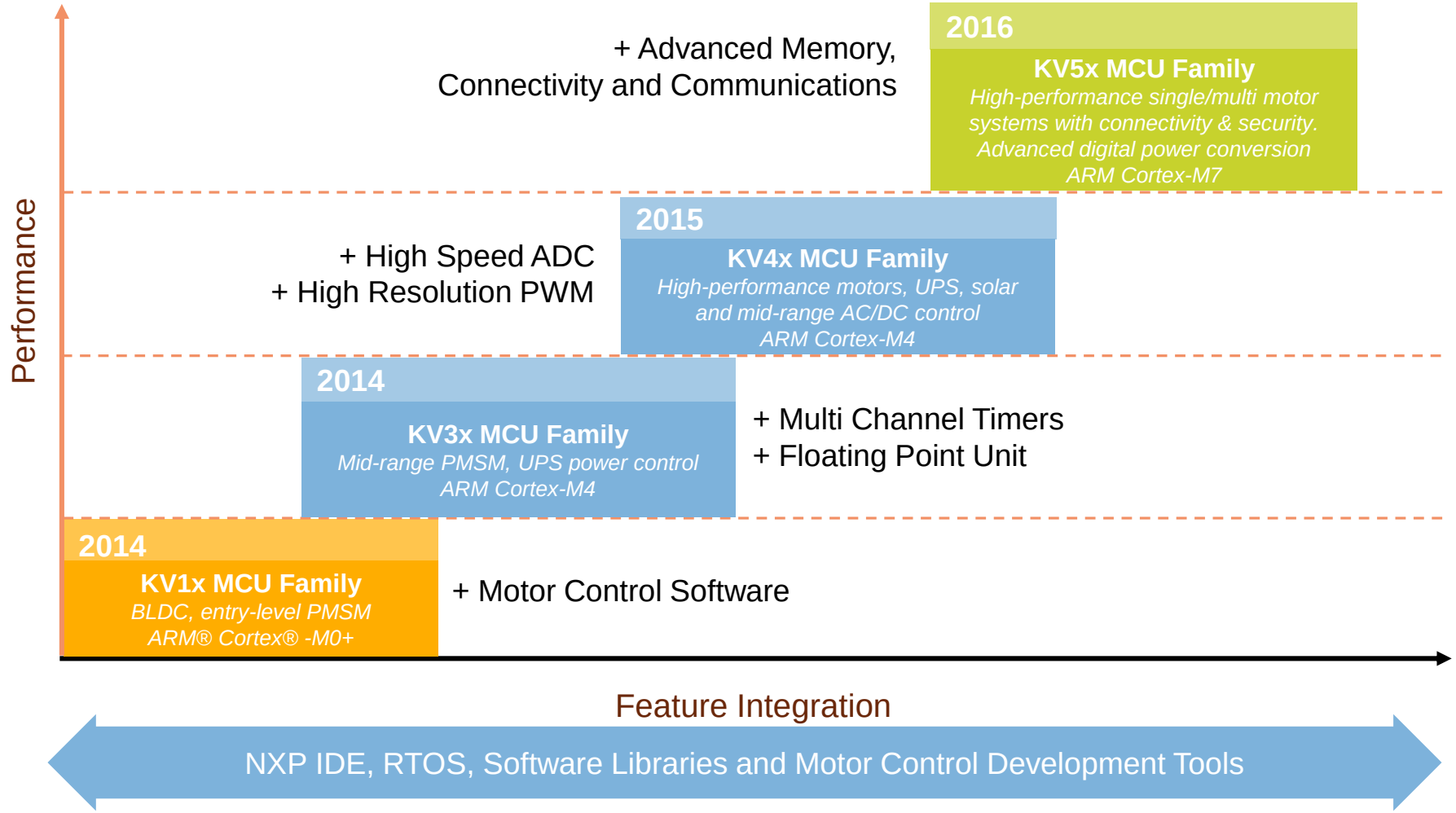
- April 26, 2017

- ARM Cortex-M0+ / M4 / M7 cores bring broad choice, and smooth upgrade.
- Scalable MCU families from 75MHz to 240MHz MCUs, maximize resource reuse and flexibility
- Optimized MCU performance and high speed/resolution analogy peripherals.
- Tower and FRDM boards, Libraries and KMS (Kinetis motor suite) reduced motor control learning curve and speed time to market.

Kinetis V - Target Applications



New Levels of Performance, Reliability and Power Efficiency for Motor Control and Digital Power Conversion



Kinetis E series MCUs Based on ARM® Cortex® Cores

5V

- Wide range power supply 2.7V – 5.5V

Robust

- EMC/ESD technology to ensure strong noise immunity

Scalable Performance & High Efficiency

up to 40x higher performance than 8/16-bit MCUs

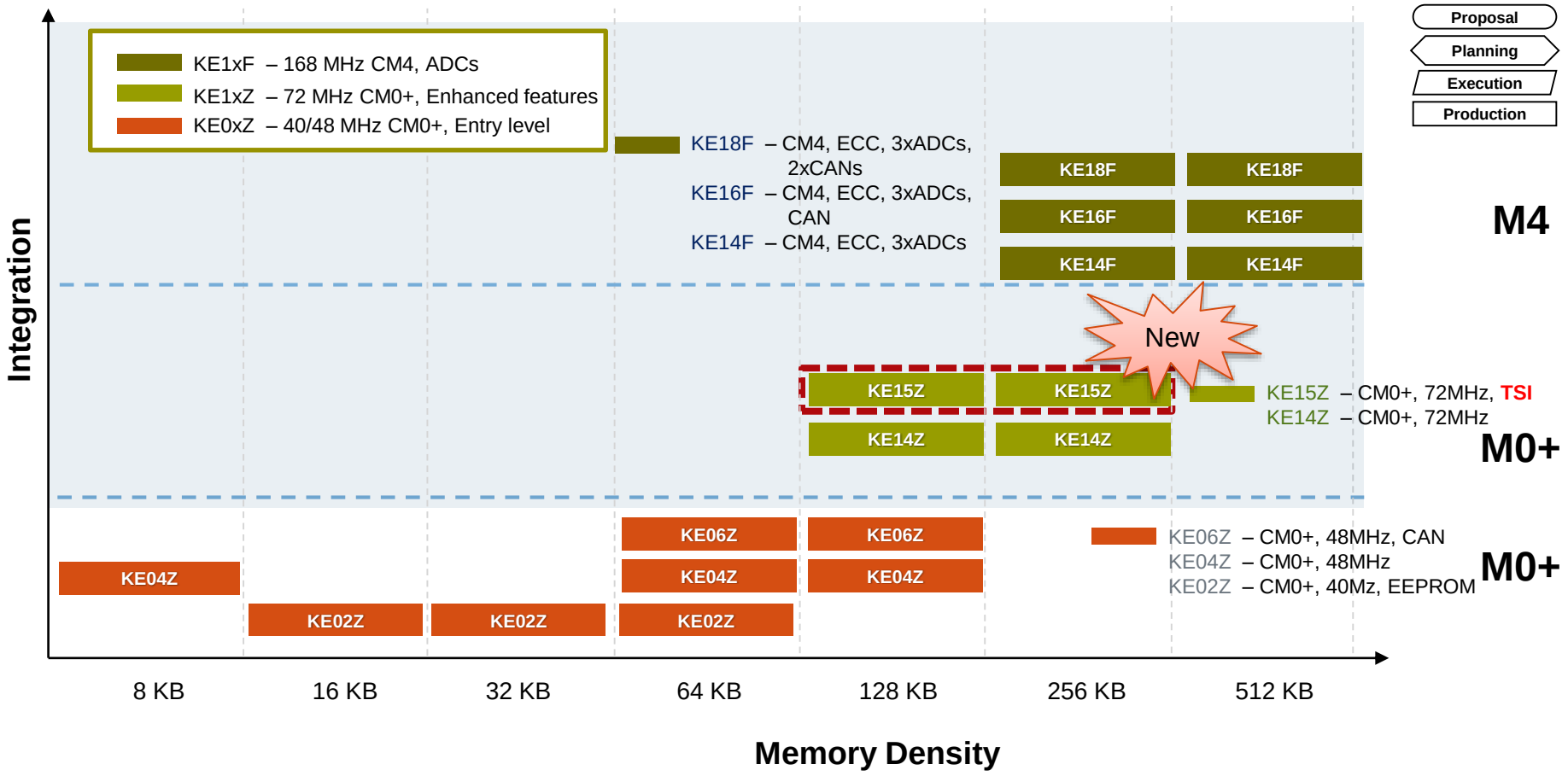
- ARM Cortex M0+ core up to 72MHz
- ARM Cortex M4 core up to 168MHz

Low Cost

- Optimized for cost-sensitive applications
- Offering low pin count options

Kinetis E Series Product Roadmap

2.7-5.5V MCUs with high reliability and robustness,
Based on ARM® Cortex-M® with best-in-class Enablement



Touch Sense Interface Value Features

- ❑ Two operation modes
  - Self-cap: up to 25 keys
  - Mutual: up to 36 keys
- ❑ Advanced robust in EMC
  - Pass IEC61000-4-6 standard test
- ❑ Advanced robust in waterproof
- ❑ High sensitivity and resolution
- ❑ No need for CPU interfere
- ❑ Ease of use
  - NXP Touch Library support
  - SDK touch APIs support
- ❑ No need for external components

KE15Z/14Z Block Diagram

Key Features:

Core/System
- ARM® Cortex® -M0+ up to 72MHz
- 8ch eDMA
- TRGMUX
- MMDVSQ

Memory
- up to 256KB Flash with ECC
- up to 32KB SRAM
- up to 32KB FlexMemory / 2KB EEPROM
- Boot ROM

Communications
- 3 x LPUART / 2 x LPSPI / 2 x LPI2C / FlexIO

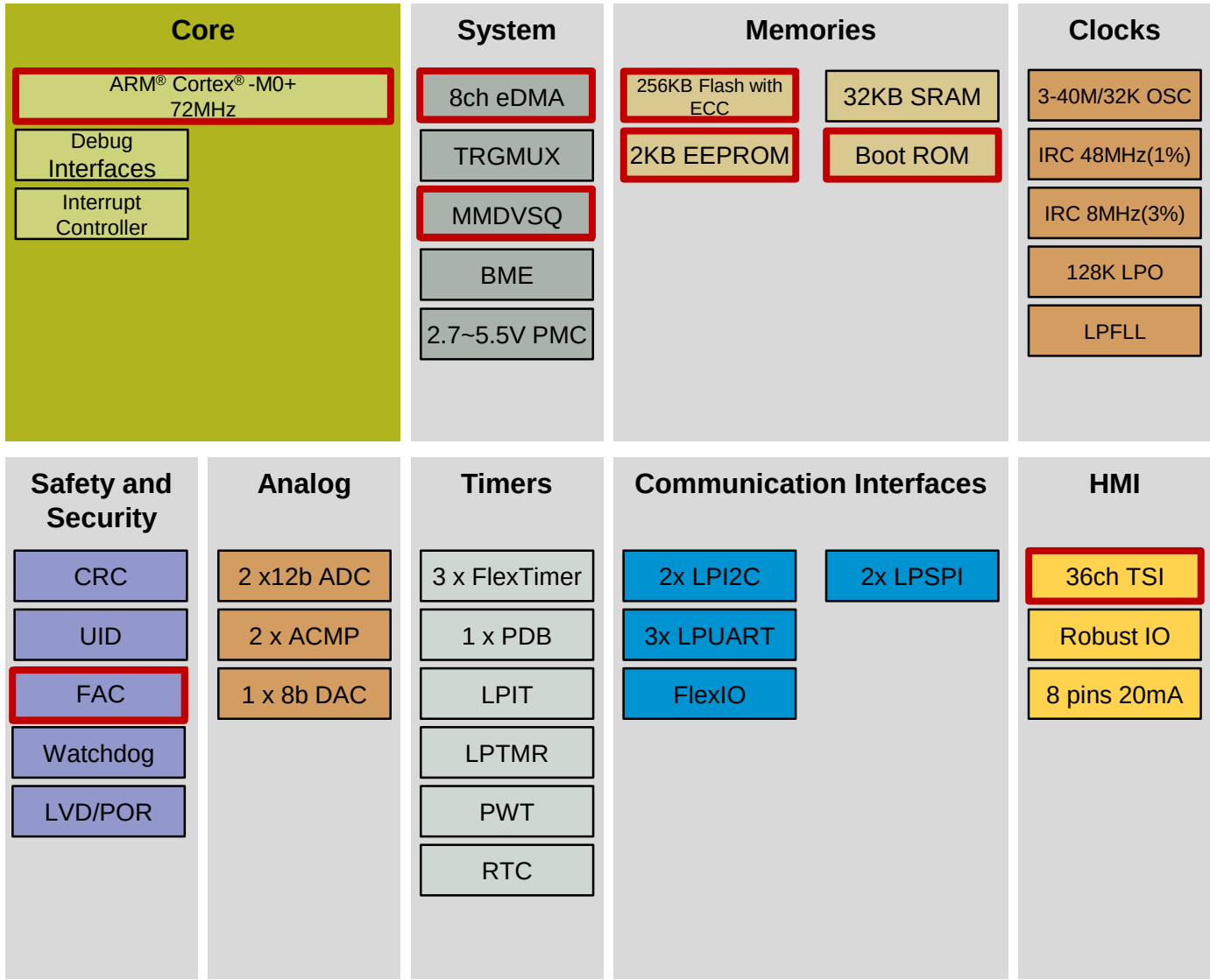
Analog
- 2 x 12b ADC, 1MSPS
- 2 x ACMP
- 1 x 8b DAC

Timers
- 1 x 8ch FTM (PWM)
- 2 x 4ch FTM (PWM/Quad Dec.)
- 1 x PDB
- 1 x 4ch LPIT / 1 x LPTMR / 1 x PWT
- 1 x RTC

Others
- Up to 36ch TSI (KE15Z only)
- Up to 89 GPIO with glitch filter
- 2.7-5.5V, -40 to 105°C

Packages
- 100LQFP(0.5mm pitch)
- 64LQFP(0.5mm pitch)

Pin compatible within KE



KE1xF Master Block Diagram

Key Features:

Core/System
- ARM ® Cortex ® -M4F up to 160MHz
- 16ch eDMA
- TRGMUX
- MPU

Memory
- up to 512KB Flash with ECC
- up to 64KB SRAM with ECC
- up to 64K FlexMemory / 4KB EEPROM
- 8KB I/D Cache
- Boot ROM

Communications
- 2 x FlexCAN
- 3 x LPUART / 2 x LPSPI / 2 x LPI2C / FlexIO

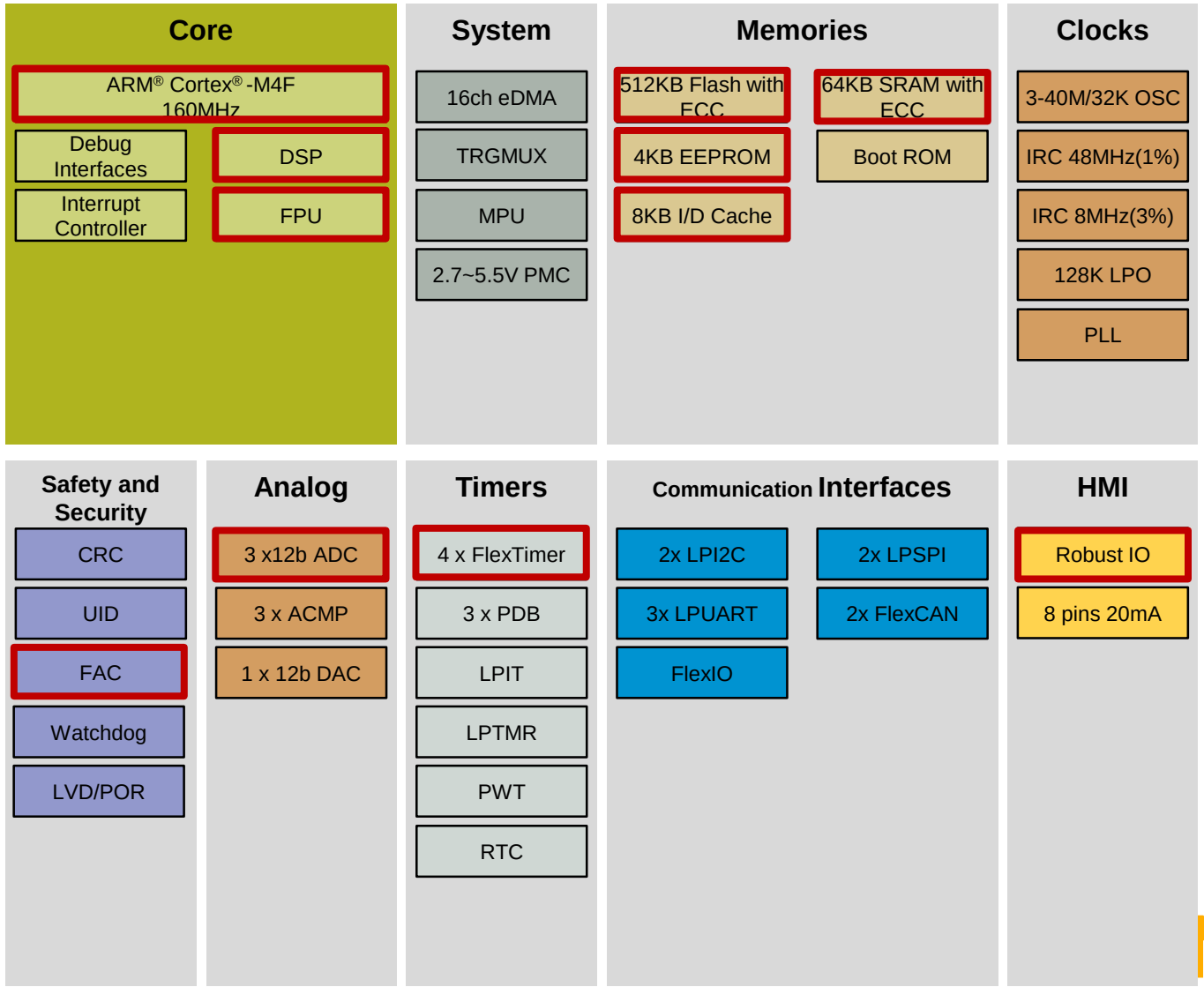
Analog
- 3 x 12b ADC, 1MSPS
- 3 x ACMP
- 1 x 12b DAC

Timers
- 2 x 8ch FTM (PWM)
- 2 x 8ch FTM (PWM/Quad Dec.)
- 3 x PDB
- 1 x 4ch LPIT / 1 x LPTMR / 1 x PWT
- 1 x RTC

Others
- Up to 89 GPIO with glitch filter
- 2.7-5.5V, -40 to 105oC

Packages:
- 100LQFP(0.5mm pitch)
- 64LQFP(0.5mm pitch)

Pin compatible within KE



Kinetis E Touch HW and SW Support

Freedom Platform

FRDM-KE15Z

- Ultra low-cost/power development platform
- Form factor compatible with Arduino platform
- Compatible with Freedom shield
- Support touch pad

Freedom Shield

FRDM-TOUCH

- Daughter card of FRDM-KE15Z.
- Easy and simple way to evaluate the touch pad, slide and wheel. Including self-cap and mutual-cap mode.

TSI Evaluation Board

RD-KE15Z-TSI

- Evaluation board for new TSI hardware and software design
- More touch keys and types

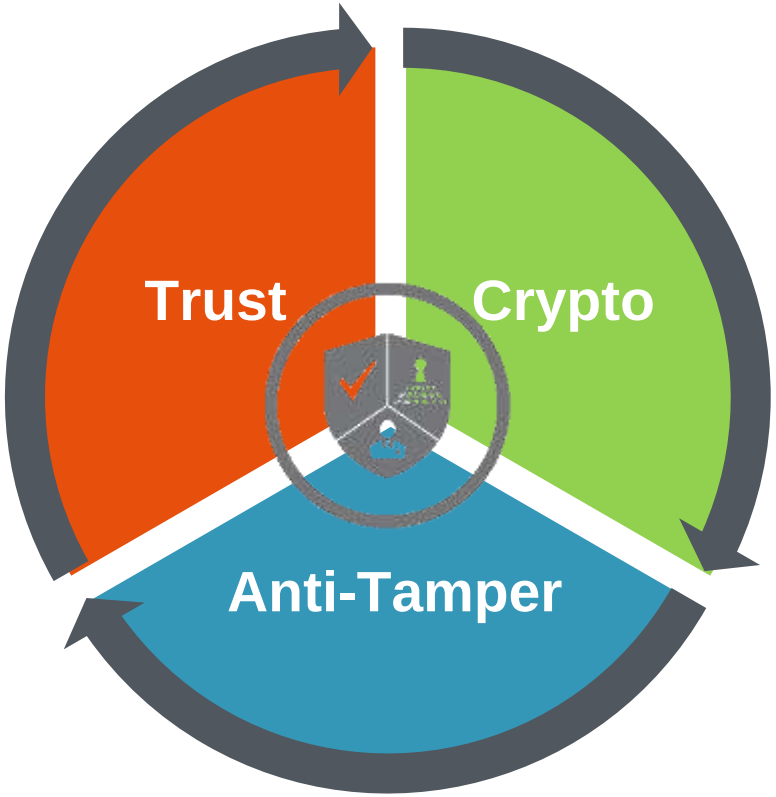
NXP Touch Library v2.x / NXP KSDK v2.0

KINETIS SECURE

Kinetis Security Overview

Authorized Access

- Code I/P Protection
  - Internal Memory Protection
  - External Memory Protection
- Debug Port Protection
- Authentication
  - Software Updates
  - Device Verification
- Secure Boot



Data Protection

- Symmetric Encryption
  - DES/DES3, AES
- Asymmetric Encryption
  - RSA, ECC
- Hashing
  - CRC, MD5, SHA
- True Random Number Generation
- Security Protocols
  - SSL, HomeKit, Thread

Monitoring of physical and environmental attacks

- Tamper Detection
  - Physical
    - Enclosure Intrusion
    - Drilling and Probing
- Tamper Detection
  - Environmental
    - Voltage
    - Temperature
    - Frequency
- Secure Storage

Kinetis KL8x to K8x

World's most secure ARM® Cortex®-M based MCUs

Kinetis KL8x MCU

72MHz ARM Cortex-M0+

Advanced Security

Secure RAM & Boot,
Memory Protection Unit,
Low Power Trusted Crypto.
Engine (DES/3DES/AES/RSA),
Tamper Detection,
ISO7816-3 EMVSIM,
Random Number Generator

128/96KB Flash/SRAM,
USB, FlexIO, QuadSPI (XIP),
121 MBGA / 80 LQFP

+ Performance

+ Memory

+ Crypto throughput

+ Ext. memory expansion & protection

Kinetis K8x MCU

150MHz ARM Cortex-M4

Advanced Security

+

Crypto. Acceleration Unit,
On-the-Fly Decryption for
external memories

256/256/16KB
Flash/SRAM/Cache,
USB, FlexIO, QuadSPI (XIP),
SDRAM, SD/eMMC, FlexBus,
121 XFBGA / 100 LQFP

Hardware and software compatibility with PCI-certified enablement

Kinetis K8x/KL8x MCUs: Enablement

TWR-POS-K81 PIN Pad Reference Design

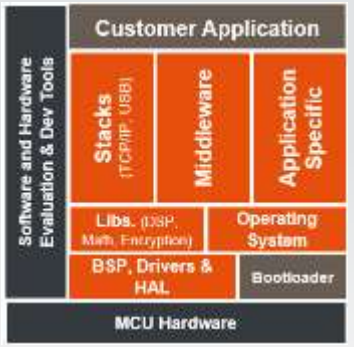
TWR-POS-K81

- POS PIN Pad Reference Design for customers seeking Payment Card Industry certifications
- Kinetis K81/KL81 MCU: tamper pins, chip security, EMVSIM, Kinetis SDK w/ Cryptographic Driver s/w
- Chip-and-PIN keypad based on Cirque® SecureSense™ technology (PCI PTS compliant without requiring physical protection for touch sensor)
- Available under NDA (incl. pre-PCI4.x certification reports. Full PCI 4.1 Certification expected Oct 2016)

Tower & Freedom Modules

- TWR (full evaluation) or FRDM (entry-level) development modules
- KL8x MCU
  - **TWR-KL82Z72M**
  - **FRDM-KL82Z**
- K8x MCU:
  - **TWR-K80F150M**
  - **FRDM-K82F**
- 8MB SDRAM, 8MB Serial NOR Flash
- Multiple TWR and Arduino™ form-factor compatible peripheral modules
- Available (K8x/KL8x)

Security Software



- Freescale Kinetis SDK software drivers for public key cryptography
- Support for multiple toolchains including GNU GCC, IAR, Keil, and Kinetis Design Studio

KINETIS GENERAL

KS22 Series MCU

- Member of Kinetis K series
- Initiated from China market demand, designed & manufactured locally
- Same quality standard as NXP Kinetis MCU
- Longevity Program to ensure a minimum of 10 years supply
- Both English and Chinese language technical support (websites, documents, community) provided by China team

Cost Effective with Optimized Performance

- ARM Cortex-M4 @120MHz
- DSP and Floating point unit (FPU)

Power Efficiency

- Leverages the ultra low power technology of Kinetis L series MCUs
- Integration of low-power peripherals
- Run mode power consumption is as low as 158μA / MHz

Smart Integration

- Reduce BOM & system cost: Crystal-less USB device
- Various communication interfaces: CAN, I2S, UART, SPI, LPI2C
- Flexible Communication Interface: FlexIO

KS22 Target Applications

Car audio
Smart audio

CAN Bus
GPS Tracker
Car Infotainment co-processor

General Market

High performance,
Low power

Smart Devices
Wearables

Finger printer

KS22_128/256 Block Diagram

Key Features:

Core/System
- Cortex-M4 @ 120MHz / FPU / DSP

Memory
- 128KB/256KB Flash
- 64KB SRAM

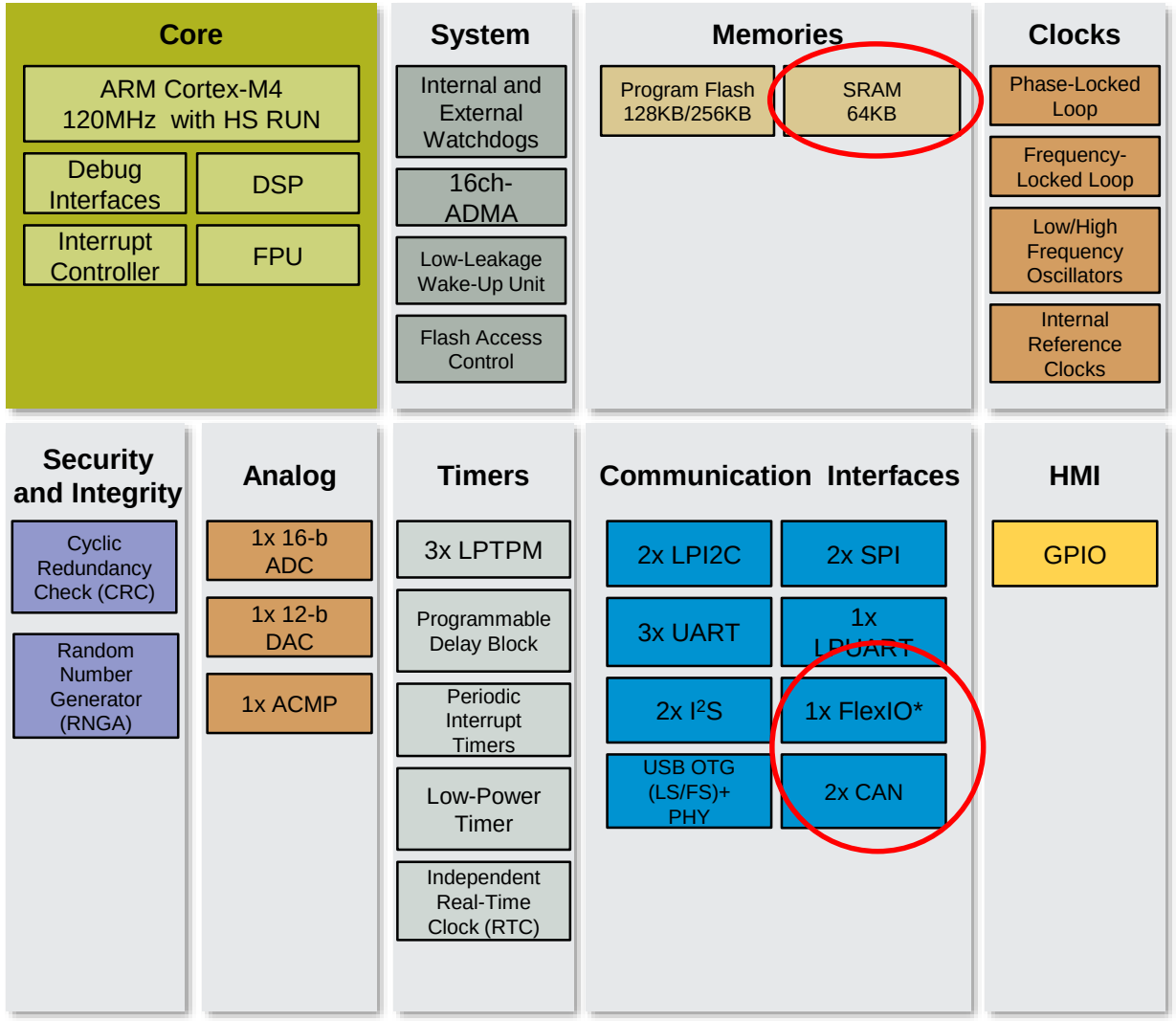
Communications
- USB OTG FS/LS
- 2* + 3x UART, 1x LPUART
- 2* + 2x SPI
- 2* + 2x LPI2C
- 2* + 2x I2S (SAI)
- 2x CAN
- FlexIO*

Analog
- 1x 16-bit ADC, 1x 12-bit DAC
- 1x ACMP

Timers
- 1x 6ch LPTPM, 2x 2ch LPTPM
- Low Power Timer
- Periodic Interrupt Timers (PIT)
- RTC with independent Vbat. Supply

Others
- 8 high-drive I/Os (20mA) – SPI / LPI2C
- 1.71V-3.6V; -40C to 105C

Packages
100LQFP, 64LQFP, 48QFN



* FlexIO can emulate 2x UART, or 2x SPI, or 2x I2C, or 2x I2S, or PWM, etc

KS22 Orderable Part Numbers

GIBC is open for registration

Features	MKS22FN256			MKS22FN128			MKS20FN256			MKS20FN128		
	VLL12	VLH12	VFT12*	VLL12	VLH12	VFT12*	VLL12	VLH12	VFT12*	VLL12	VLH12	VFT12*
Performance	ARM Cortex-M4, up to 120MHz											
Flash	256K			128K			256K			128K		
SRAM	64K											
UART	4 (3x UART + 1x LPUART)											
SPI	2											
I2C	2 (LPI2C)											
I2S	2											
CAN	2 (FlexCAN)						1 (FlexCAN)					
FlexIO	FlexIO can emulate 2x I2C, 2x SPI, 2x UART, 2x I2S or 4x PWM											
USB	Yes (USB FS OTG + PHY)											
Temperature	-40 ~ 105C											
GIBC	Yes											
Package	LQFP-100, 14x14	LQFP-64, 10x10	QFN-48, 7x7	LQFP-100, 14x14	LQFP-64, 10x10	QFN-48, 7x7	LQFP-100, 14x14	LQFP-64, 10x10	QFN-48, 7x7	LQFP-100, 14x14	LQFP-64, 10x10	QFN-48, 7x7
10K #SRP	$2.58	$2.39	$2.34	$2.09	$1.92	$1.88	$2.46	$2.27	$2.26	$1.99	$1.82	$1.80

* PK Sample is now available. Mass production on July 2016 for 48QFN.

NXP MICROCONTROLLER
ECOSYSTEM & ENABLEMENT

NXP Microcontroller Enablement Consolidation

Hardware Development Tools

Baseline Evaluation Kits

LPC Xpresso

Freedom Development Platform

Tower System

Expansion & Partner Solutions

MCU Expansion boards from NXP & 3rd Parties

SEGGER www.segger.com

mbed

1 SYSTEM

LPC-Link2

LAUTERBACH DEVELOPMENT TOOLS

Low cost hardware platforms for evaluation and application development. Partner solutions for hardware debugging solutions

Runtime Software

Baseline

Kinetis SDK/LPCOpen

- Drivers
- System Services
- FreeRTOS
- USB
- emWIN
- TCP/IP
- Filesystem

FreeRTOS · Micrium · ARM mbed · expresslogic · SEGGER www.segger.com · wolfSSL · Green Hills SOFTWARE

Comprehensive frameworks and solutions for low-power, connected, and secure embedded systems

Expansion – Connect, Control, Graphics

HomeKit

- HomeKit SDK
- Motor Control
- Wireless Charging
- Sensor Fusion
- MFi
- Graphics Partners
- POS / EMV
- Connectivity Solutions

Bluetooth SMART · 6LoWPAN · EtherNet · Wi Fi · THREAD GROUP · 802.15.4

Software frameworks and development tools for targeted applications and certified connectivity solutions

SW Development Tools

IDE Toolchain

LPCXPRESSO · Kinetis Design Studio · freescale · IAR SYSTEMS · ARM KEIL Microcontroller Tools · SOMNIUM DRT · atollic

Configuration Tools

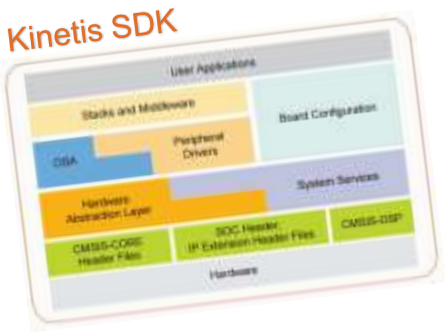
- Power Estimation
- BSP Tools
- Project Generator
- Power Analyzer

Industry leading IDE support and intuitive software configuration tools to accelerate application development

NXP Microcontroller Enablement Consolidation

LPC X PRESSO

LPCOpen v2/3



MCUXpresso Software and Tools

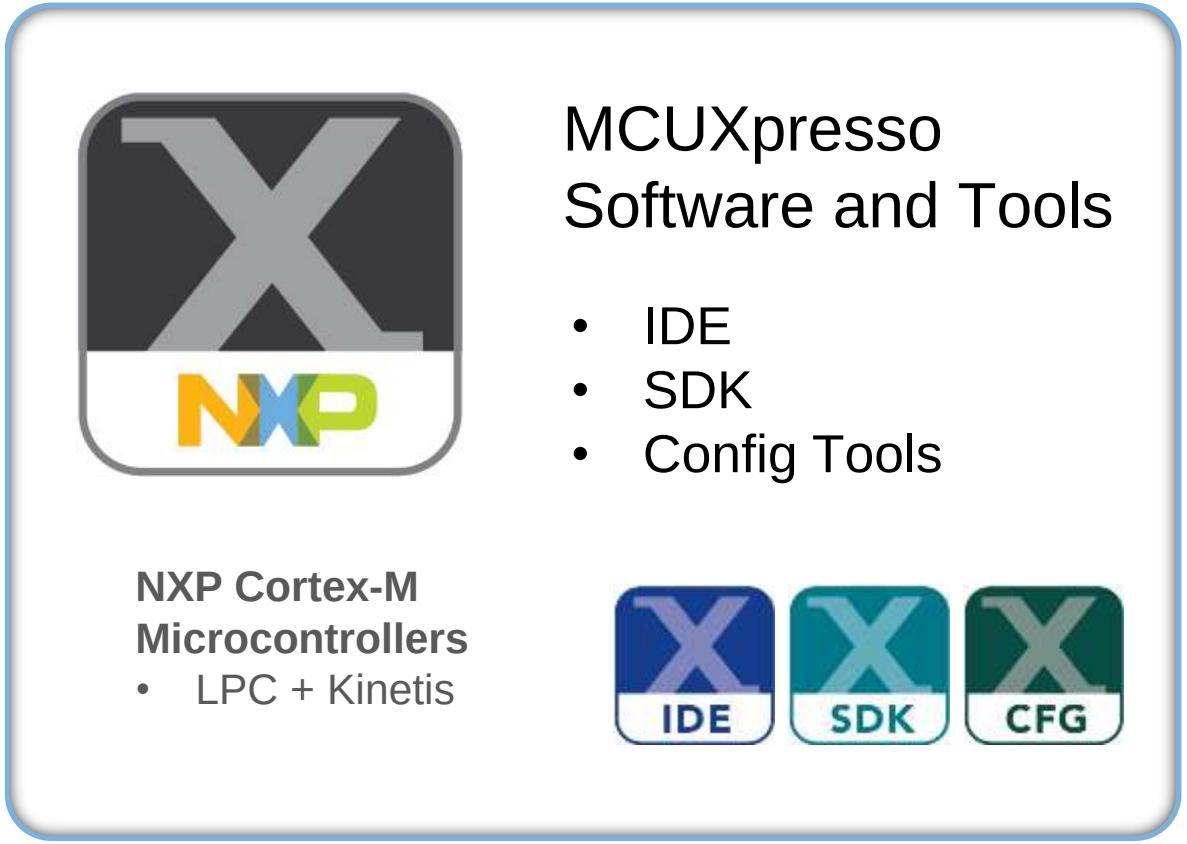
- IDE
- SDK
- Config Tools

NXP Cortex-M Microcontrollers

- LPC + Kinetis

MCUXpresso Software and Tools

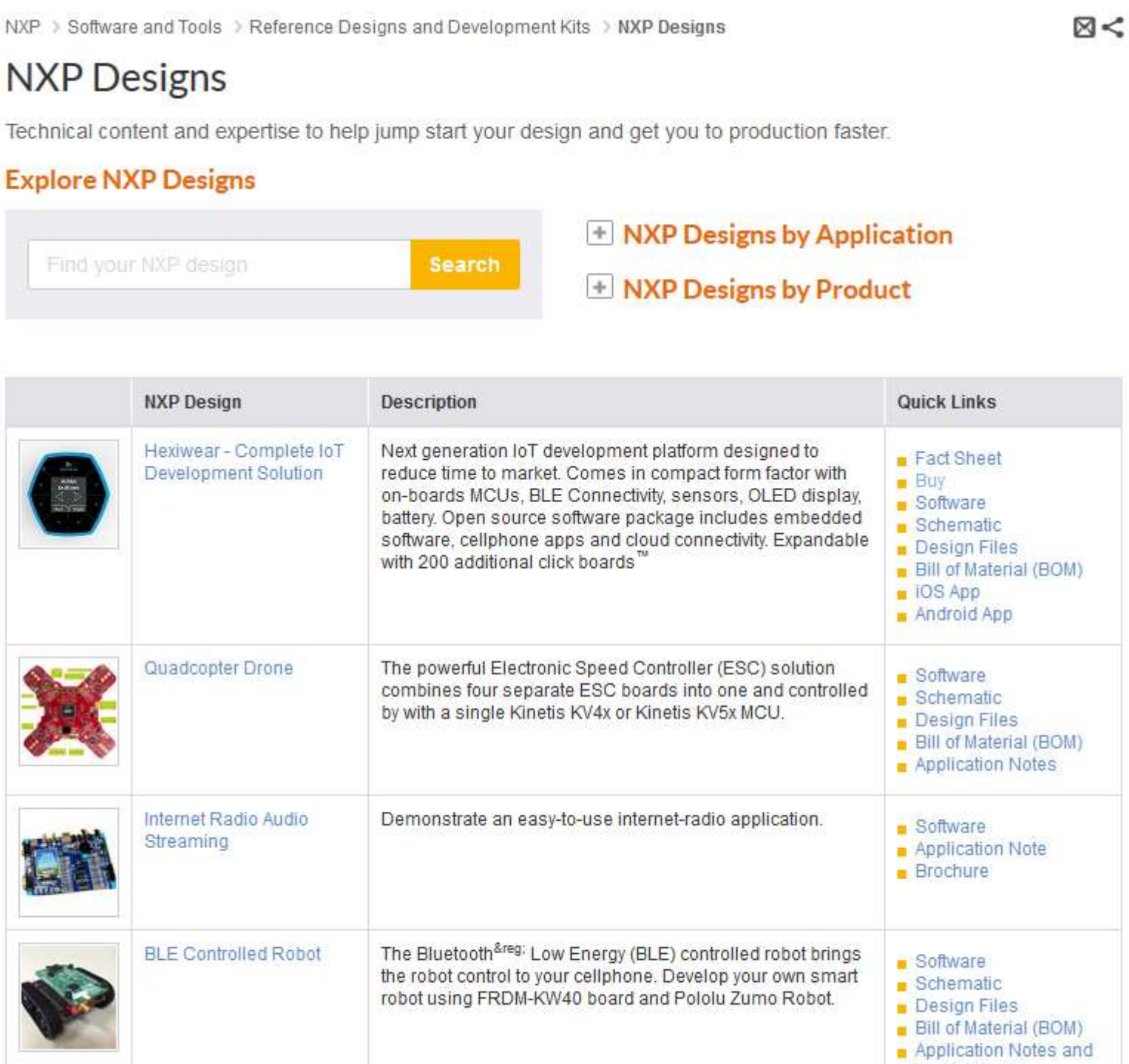
for LPC & Kinetis Microcontrollers



NXP Designs

- A one-stop-website to help customers develop their embedded design using complete NXP technology with,
- Projects, solutions and reference designs using NXP technology
- Access to information such as software, schematics and user documentation for quick use and customization
- Designed by NXP technical experts and third party partners

www.nxp.com/nxpdesigns



Hexiwear Next Gen IoT Solution for Innovators

Value Proposition

Fastest Time to Market
Versatile solution created to reduce development and design time for IoT applications

Path to Manufacturing
Designed to accelerate the customer's time to manufacturing. The BOM is readily available in the market and the design files/schematic is open source.

Optimized Hardware Design
The hardware design is optimized and includes several best practices suggested for designing low power IoT applications

Robust Software
The software includes everything from the embedded drivers to the cloud connectivity - all open source, easy to use and optimized

Community Supported
Hexiwear is a true community based solution and enables customers to access the rich pool of resources created by community

Target Applications

IoT end nodes & Wearables

Key Components

Total NXP BOM
$16 - 7 NXP components: MCUs, connectivity, sensors and battery charger - Kinetis K64 MCU based on ARM Cortex-M4 core

Kinetis KW40Z multimode BLE and 802.15.4 radio SoC

Color OLED Display, Rechargeable battery, External flash

Design Resources Available

Software

Schematic, Design Files, Bill of Material (BOM)

iOS and Android App

Software Development Environment

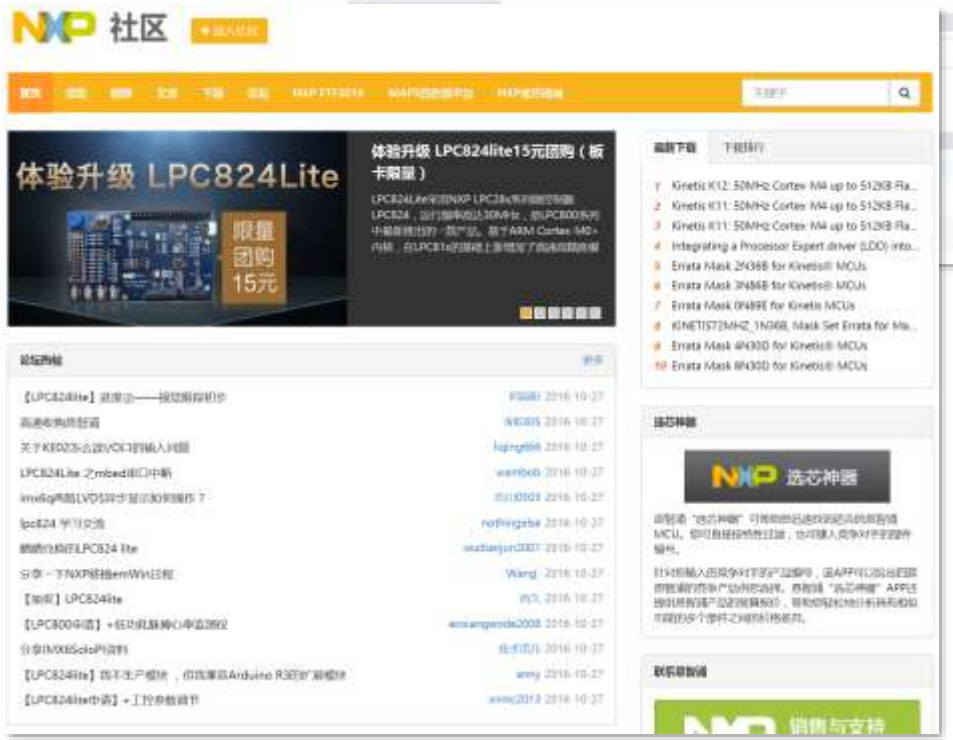
Kinetis SDK *(Open-source and Free)*

Kinetis Design Studio *(Open-source and Free)*

FreeRTOS *(Open-source and Free)*

Visit Us Online

LPCmcu.org
English



NXPic.org
Chinese

Thank You.

Partnerships
Built on Trust.

SECURE CONNECTIONS
FOR A SMARTER WORLD