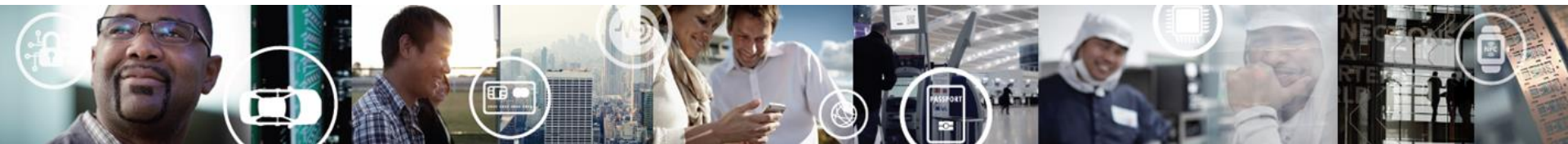


# NXP Security MCU Application Overview

## ARM Cortex M Solutions

May 2017

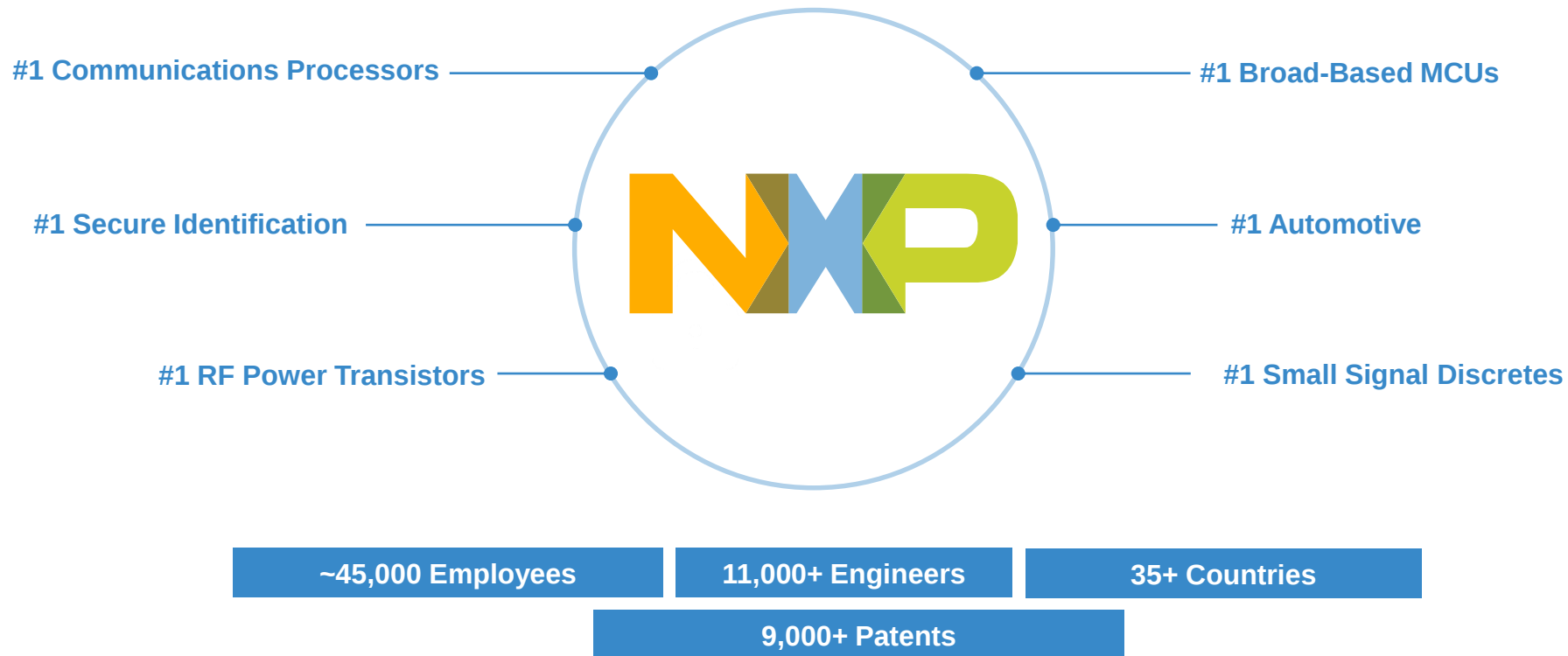


SECURE CONNECTIONS  
FOR A SMARTER WORLD

# Agenda

- NXP MCU Overview
- Enabling Secure Designs
  - PIN Entry Device
  - POS Solution - SLN-POS-RDR
  - Software Architecture
  - IDE & Debug

# A NEW POSITION OF STRENGTH



# NXP MCUs - Powerhouse Portfolio

|                      |                                                                                        |
|----------------------|----------------------------------------------------------------------------------------|
| ARM Expertise        | Broadest licensee of ARM cores in industry                                             |
| Expansive Portfolio  | Most scalable portfolio with optimized performance and capabilities                    |
| Development Tools    | Best-in-class hardware platforms and software solutions                                |
| Ecosystem Leadership | Industry leading partnerships for innovation and differentiation                       |
| Customer Centric     | Experienced global support team and professional services to accelerate time-to-market |

# 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



## Products

5. Kinetis and 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





# Strength in Product Longevity

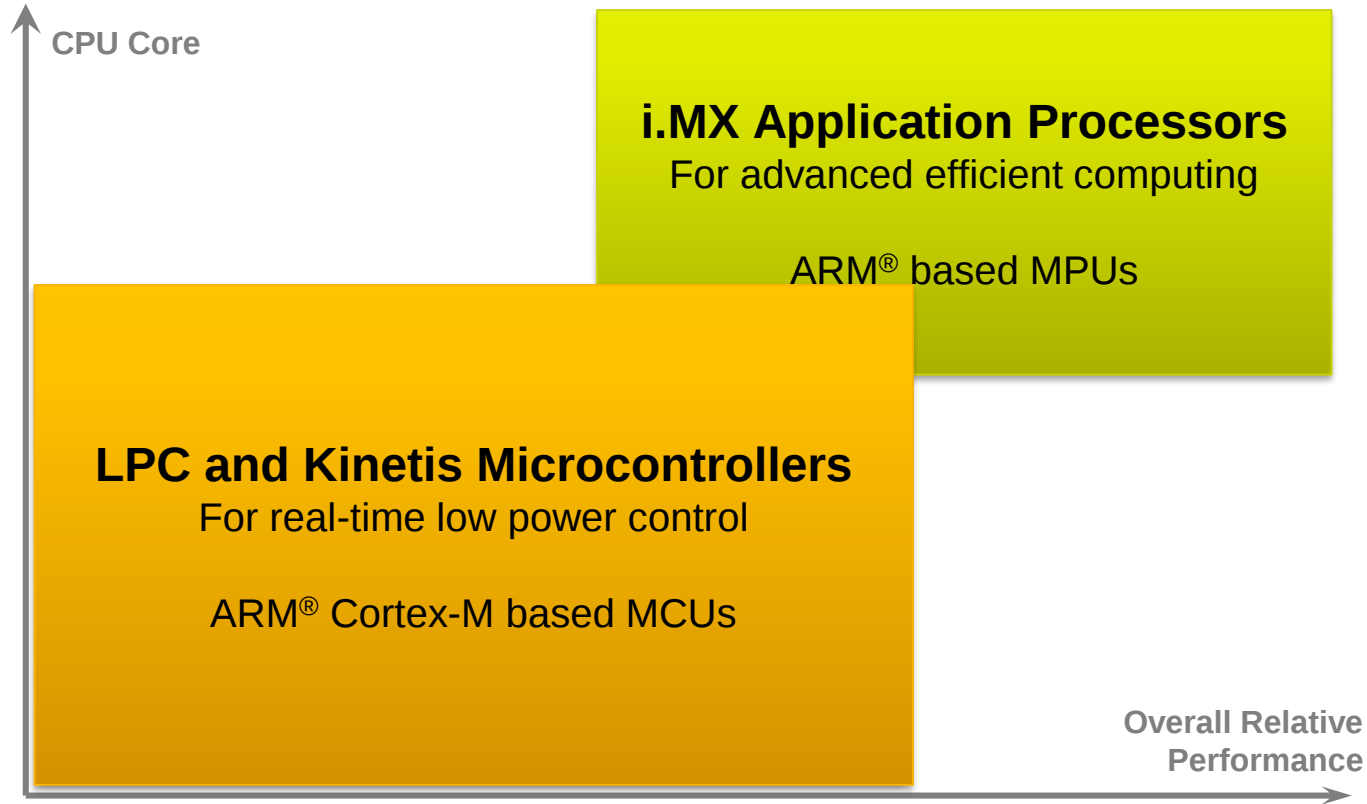
- ▶ NXP (both NXP LPC and former Freescale) have longstanding track records of **providing long-term production support** for our products
- ▶ NXP has a **formal product longevity program** for the market segments we serve
  - For the automotive and medical segments, NXP will make a broad range of solutions 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](http://nxp.com/productlongevity)



# NXP is your one-stop source for scalable POS architectures

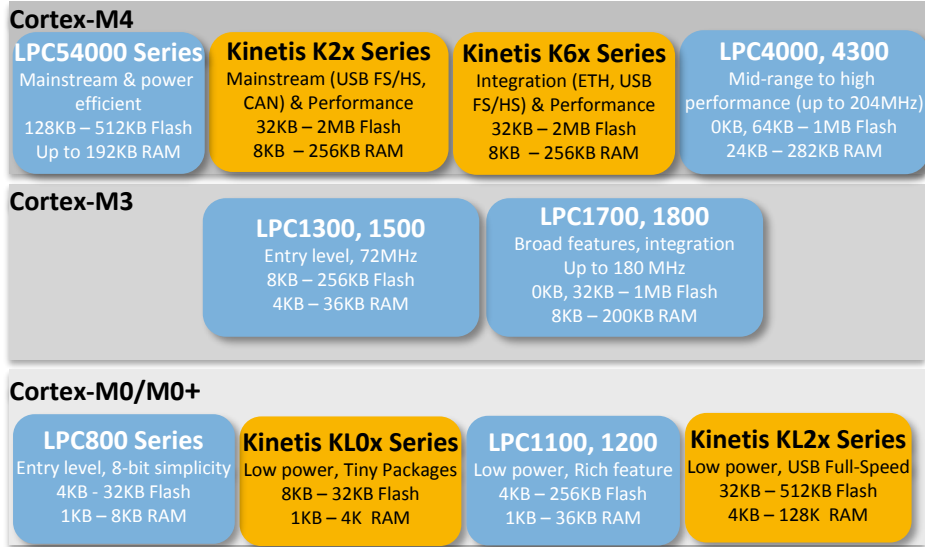


# Scalable ARM based Processors and Controllers



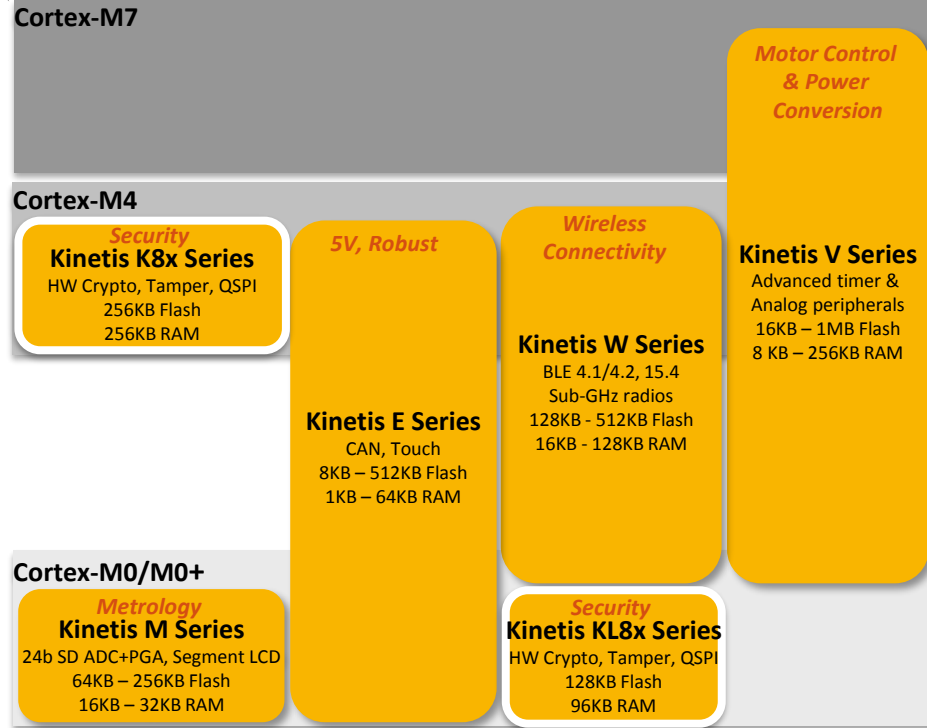
# Kinetis + LPC: A Powerhouse Portfolio of ARM-based MCUs

## General Purpose Families



Performance, Integration & Security

## Application Specific Families



Performance, Integration & Security



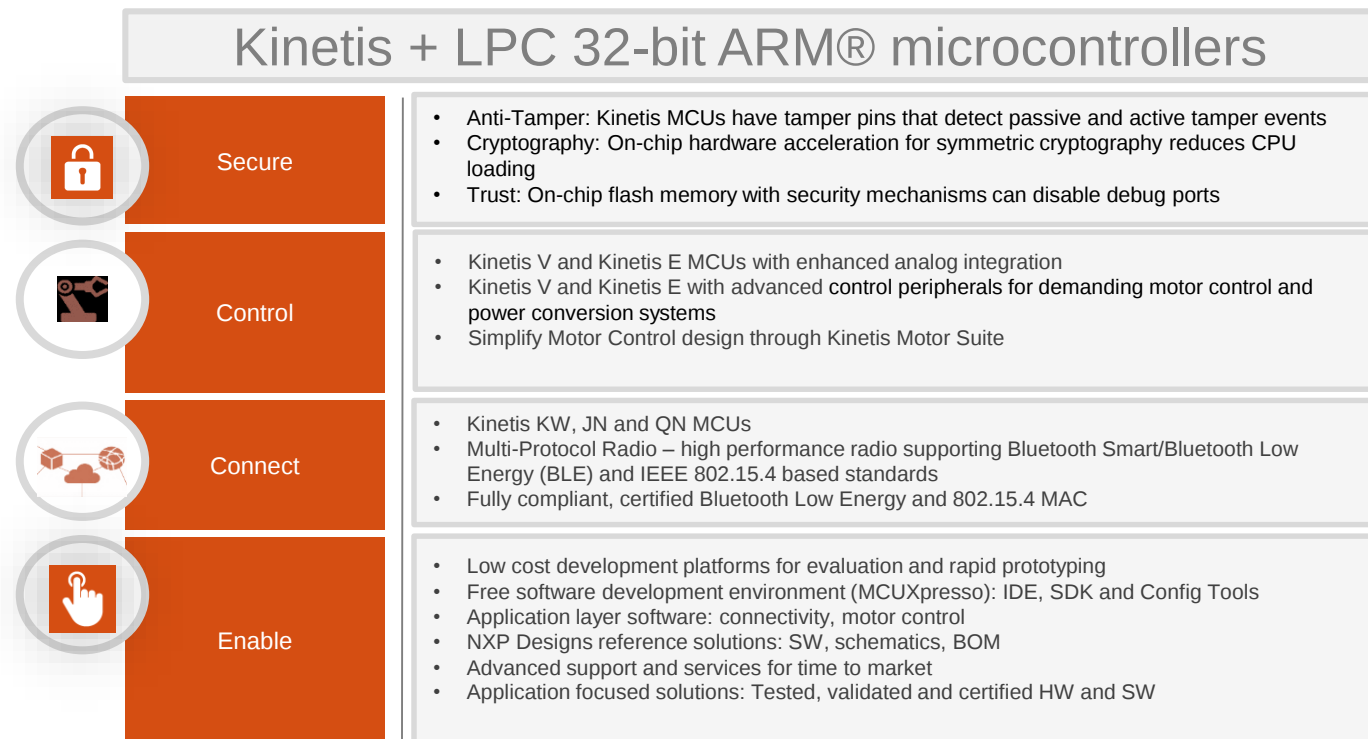
# NXP ARM Cortex-M MCUs Powerhouse Portfolio

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

(not a complete portfolio summary)

KMS = Kinetis Motor Suite

# NXP MCU Pillars



# 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 256kB 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



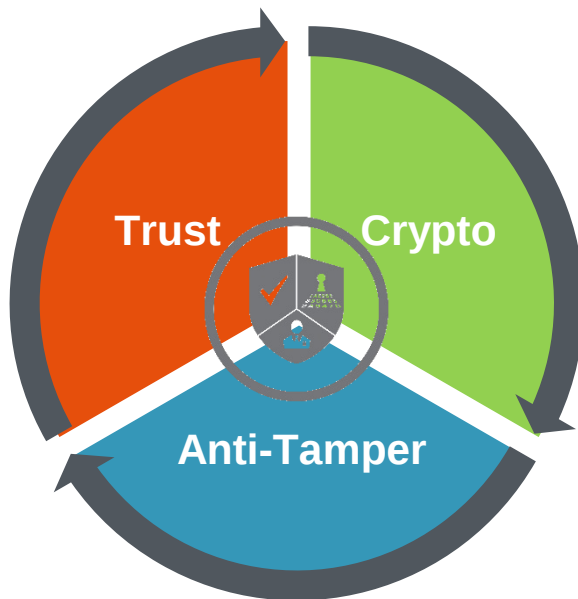
# ENABLING SECURE DESIGNS



# 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 <ul style="list-style-type: none"><li>- Physical<ul style="list-style-type: none"><li>▪ Enclosure Intrusion</li><li>▪ Drilling and Probing</li></ul></li></ul> | • Tamper Detection <ul style="list-style-type: none"><li>- Environmental<ul style="list-style-type: none"><li>▪ Voltage</li><li>▪ Temperature</li><li>▪ Frequency</li></ul></li></ul> | • Secure Storage |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|



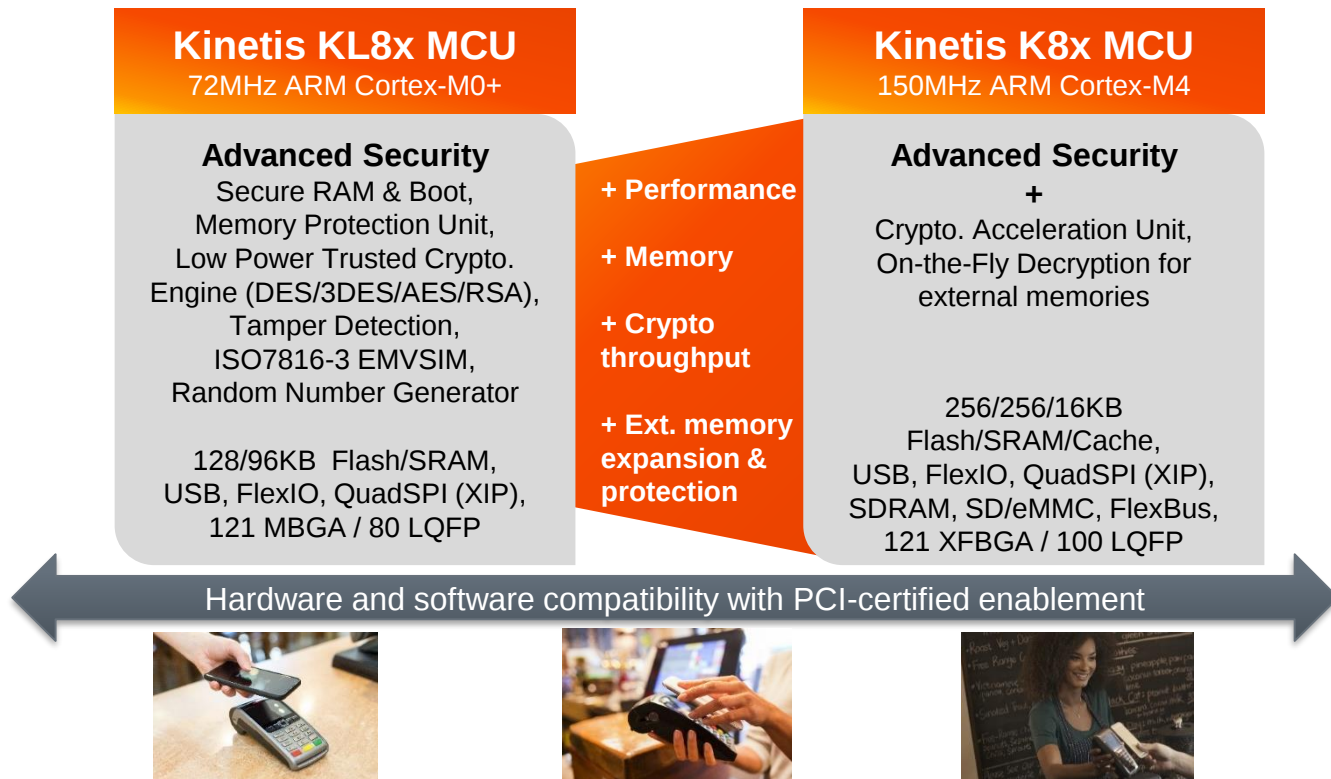
# Kinetis Secure MCU's – Product Lineup

| Key Features                           | KL81 <b>NEW</b>      | K81F <b>NEW</b>        | K21D                    | K21F                      | K63F           | K65F          |
|----------------------------------------|----------------------|------------------------|-------------------------|---------------------------|----------------|---------------|
| Flash                                  | 128 KB               | 256 KB                 | 512 KB                  | 1MB                       | 1 MB           | 2 MB          |
| RAM                                    | 96 KB                | 256 KB                 | 64 KB                   | 128 KB                    | 128 KB         | 256 KB        |
| Max Freq                               | 72 MHz               | 150 MHz                | 50 MHz                  | 120 MHz                   | 120 MHz        | 180 MHz       |
| Core                                   | M0+                  | M4F                    | M4                      | M4F                       | M4F            | M4F           |
| RNG                                    | TRNG                 | TRNG                   | Yes                     | Yes                       | Yes            | Yes           |
| DRYICE Secure Memory                   | 32 Bytes + 128 Bytes | 32 Bytes + 128 Bytes   | 32 Bytes                | 32 Bytes                  | 32 + 128 Bytes | 32 +128 Bytes |
| Secure RAM                             | N/A                  | 2 KB                   | N/A                     | N/A                       | N/A            | N/A           |
| No. of Tamper Pins                     | 8                    | 8                      | 3                       | 6                         | 6              | 8             |
| Frequency, Voltage, Temperature Tamper | Yes                  | Yes                    | Yes                     | Yes                       | Yes            | Yes           |
| DES/3DES/AES                           | LTC Enc. Engine DPA  | LTC Enc. Engine DPA    | MMCAU                   | MMCAU                     | MMCAU          | MMCAU         |
| RSA/ECC                                | LTC Enc. Engine      | LTC Enc. Engine        | MMCAU                   | MMCAU                     | MMCAU          | MMCAU         |
| SHA                                    | LTC Enc. Engine      | MMCAU                  | MMCAU                   | MMCAU                     | MMCAU          | MMCAU         |
| Protection on External Storage         | N/A                  | Y(QSPI)                | N/A                     | N/A                       | N/A            | N/A           |
| ISO7816-3 / EMV                        | EMVSIM               | EMVSIM                 | UART                    | UART                      | UART           | UART          |
| Others                                 | -                    | -                      | -                       | -                         | Ethernet       | Ethernet      |
| Package                                | 121MBGA/80LQFP       | 121 Thin MBGA /100LQFP | 121 MBGA/80LQFP         | 144MBGA/144LQFP/ 121 MBGA | 144 MBGA       | 169MBGA       |
| Available Date Sample/MP)              | Now/Q4 2015          | Now/Q4 2015            | Rev1.x: Now, Rev2.0:Now | Rev1.x: Now, Rev2.1: Now  | Now            | Now           |

PCI PTS V5

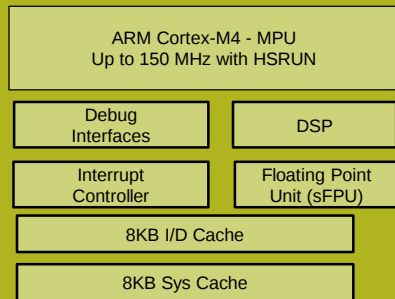
# Kinetis KL8x to K8x

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

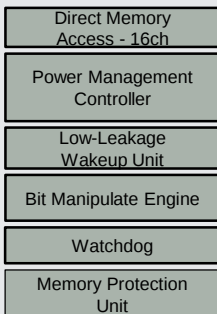


# K81 (256KB Flash, 256KB SRAM)

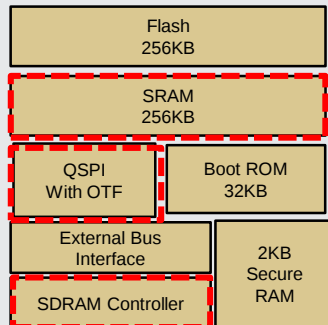
## Core



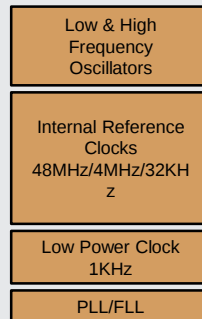
## System



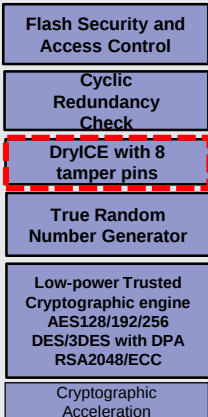
## Memories



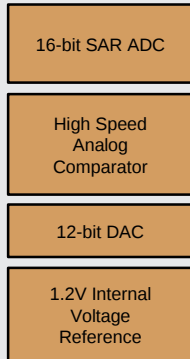
## Clocks



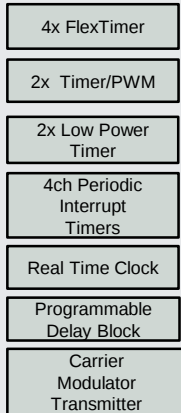
## Security



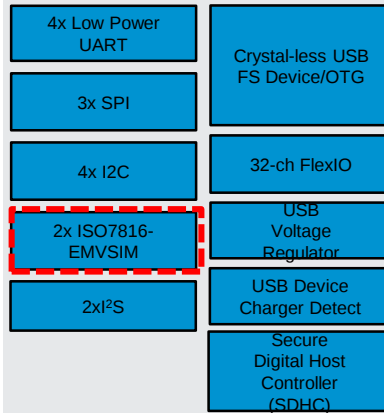
## Analog



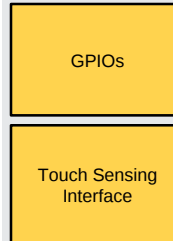
## Timers



## Communication Interfaces



## Human Machine Interface



## Packages

121MAPBGA 8x8x1.4/0.65mm  
100LQFP 14x14x1.4/0.5mm

## Temperature

-40-105C

## Features Highlight

Cortex-M4 with 8KB I/D-Cache  
FPU and MPU, BME  
up to 256KB Flash,  
up to 256KB SRAM  
QSPI Flash interface

**QSPI Flash interface with OTF**

**True Random Number Generator**

Crypto acceleration MMCAU

**160B(32B+128B) Secure RAM for Key storage**

**Enc. Engine (DES/3DES/AES/RSA)**

- RSA2048 support (3 decrypt and 1 encrypt <750ms)
- ECC: ECDSA and ECDH for up to P256
- DES/3DES with HW DPA
- AES256/192/128 with DPA

Up to 8 Tamper Pins

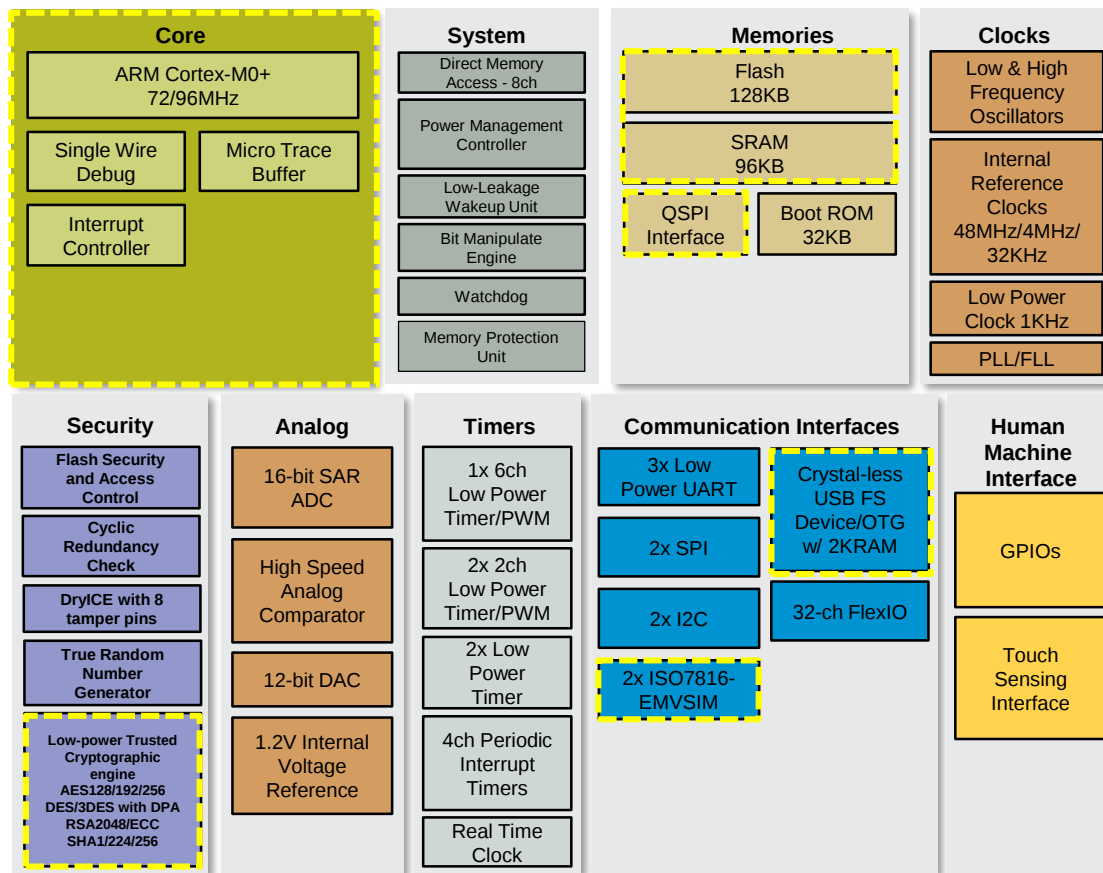
Independent Real-Time Clock (RTC)

**2x EMV compatible ISO7816-3 interfaces**

Crystal-less USB Device

32-ch FlexIO

# KL81 (128KB Flash, 96KB SRAM)



## Packages

121MAPBGA 8x8x1.4/0.65mm  
80LQFP 12x12x1.4/0.5mm

## Features Highlight

Cortex-M0+  
MTB, BME  
up to 128KB Flash,  
up to 96KB SRAM  
QSPI Flash interface

### True Random Number Generator

160B(32B+128B) Secure RAM for Key storage

### Enc. Engine (DES/3DES/AES/RSA)

RSA2048 support (3 decrypt and 1 encrypt <750ms)  
ECC: ECDSA and ECDH for up to P256  
DES/3DES with HW DPA  
AES256/192/128 with DPA  
SHA1/224/256

Up to 8 Tamper Pins

Independent Real-Time Clock (RTC)

2x EMV compatible ISO7816-3 interfaces

Crystal-less USB Device w/2K dedicated USB RAM  
32-ch FlexIO

## Availability

Sample Sep'15

Production Nov'15

# Kinetis K8x/KL8x MCUs: Enablement

## TWR-POS-K81 PIN Pad Reference Design



TWR-POS-K81

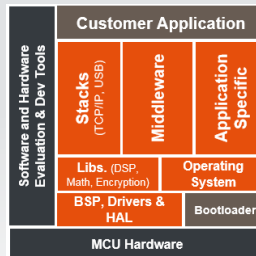
- POS PIN Pad Reference Design for customers seeking Payment Card Industry certifications
- Kinetis K81/KL81 MCU: tamper pins, chip security, EMV SIM, Kinetis SDK w/ Cryptographic Driver s/w
- Chip-and-PIN keypad based on Cirque® SecureSense™ technology (PCI PTS compliant without requiring physical protection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

## Tower & Freedom Modules



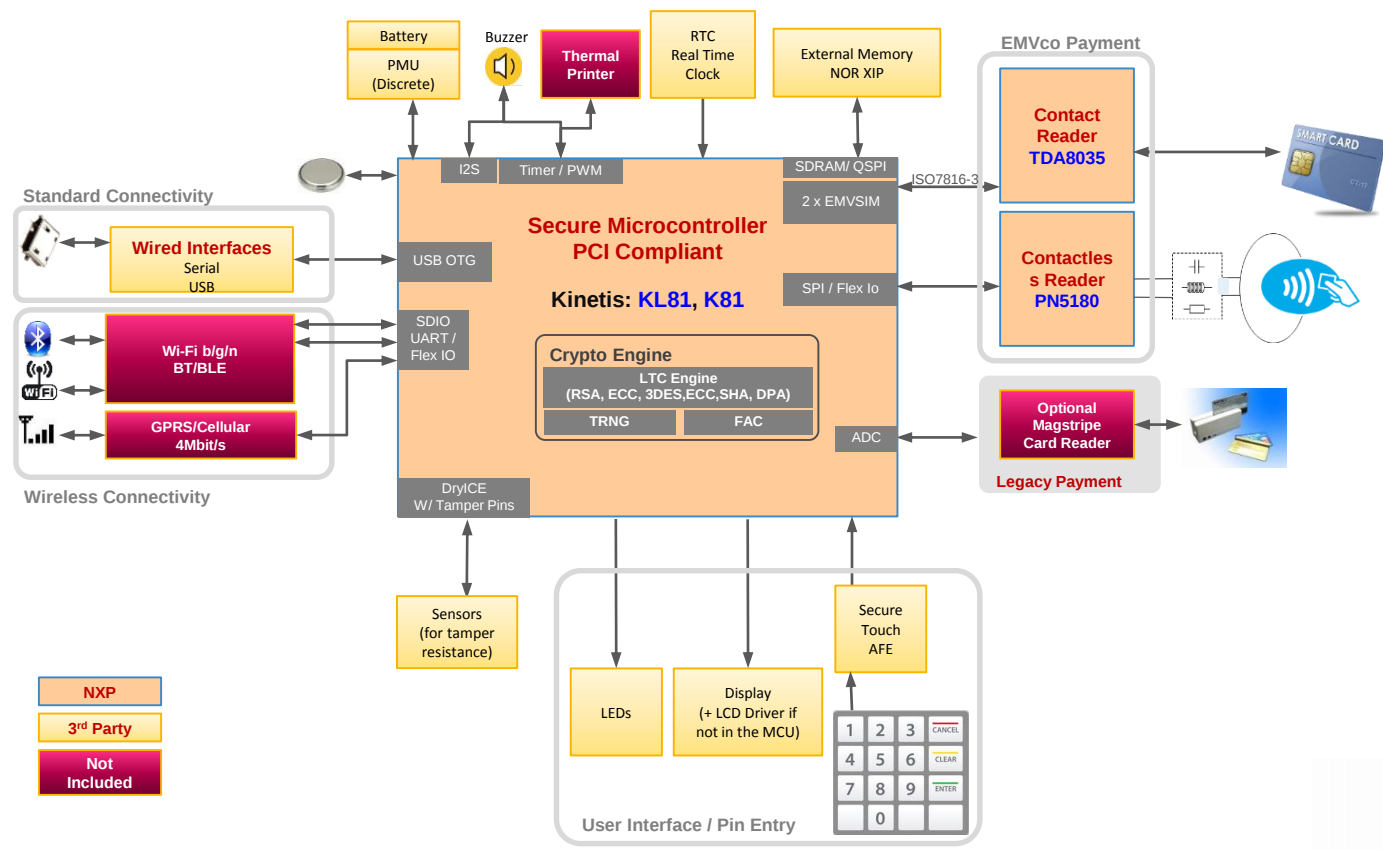
- TWR (full evaluation) or FRDM (entry-level) development modules
- KL8x MCU
  - [TWR-KL82Z72M](#)
  - [FRDM-KL82Z](#)
- K8x MCU:
  - [TWR-K80F150M](#)
  - [FRDM-K82F](#)
- 8MB SDRAM, 8MB Serial NOR Flash
- Multiple TWR and Arduino™ form-factor compatible peripheral modules
- Available (K8x/KL8x)

## Security Software



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

# Point of Sale (POS) Reader Solution Architecture

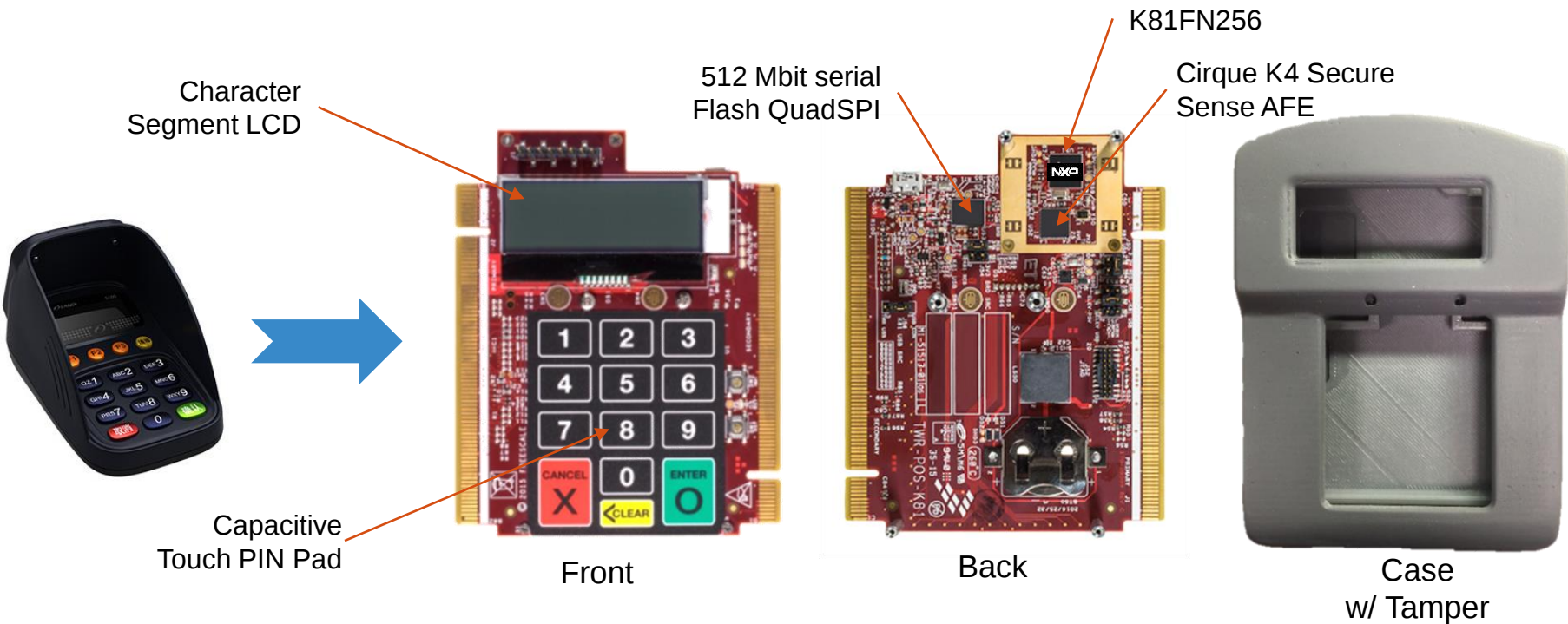


# PIN ENTRY DEVICE

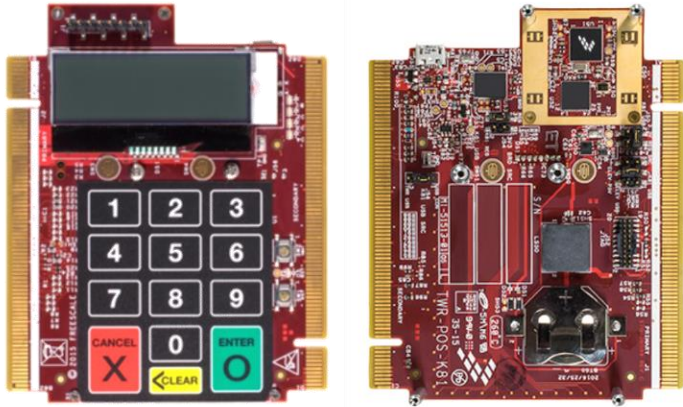


# PIN Entry Device – TWR-POS-K81

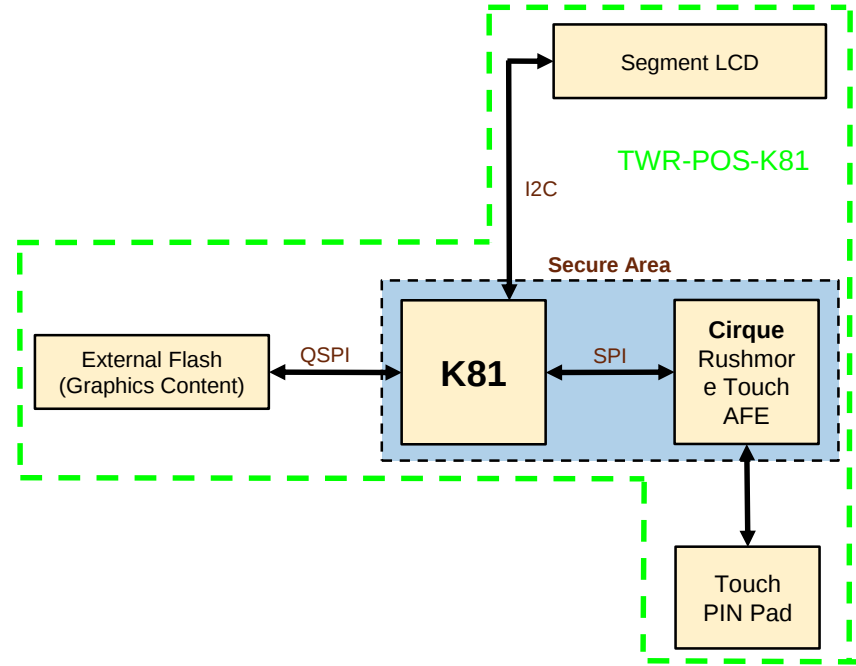
PCI 4.1 Certified as Pen Entry Device (PED)



# PIN Pad POS Solution



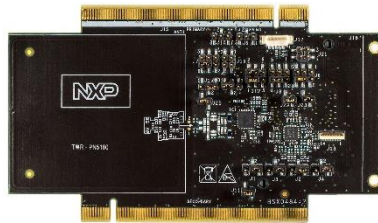
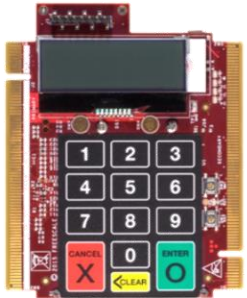
- K81 Secure Micro w/ Tamper and Crypto
- Secure Capacitive Touch (by Cirque) Pin Pad
- Tamper Header providing access to 8 tamper signals
- Chip on glass 2 lines x16 Character segment LCD
- 4 user controlled status LEDs
- Independent, battery-operated power supply for real-time clock (RTC) module
- Production Quality Software EMVCo L1
- Production Quality Documentation
- PCI 4.x Certified



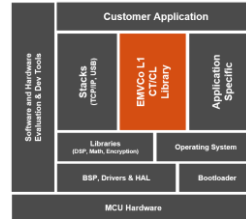
# POINT OF SALE (POS) SOLUTION



# Point of Sale (POS) Solution – SLN-POS-RDR



The software framework and reference for Kinetis MCU application development



[www.nxp.com/sln-pos-rdr/startnow](http://www.nxp.com/sln-pos-rdr/startnow)

# POS-RDR-SLN Kit Box



# POINT OF SALE (POS) SOLUTION PLATFORM

HW

- Reference design
- Secure Touch PIN Pad, CT/CL

SW

- Professional Grade EMV L1/L2
- Full Transaction Simulation

Support

- Application Expertise
- Detailed software documentation

Certification

- PCI 4.1 PED Certification
- EMV L1/L2 CT/CL pre-certification

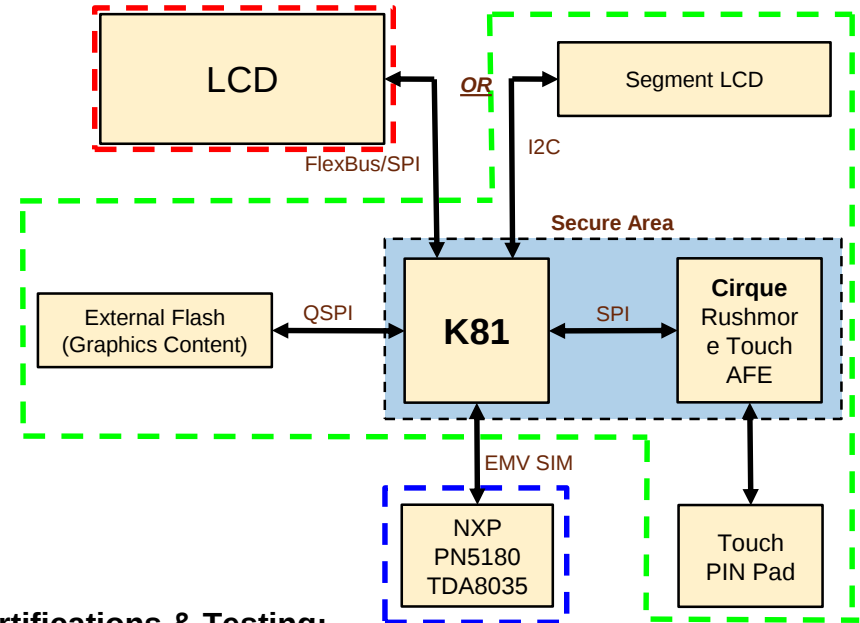
- Benefits:
- Reduced Time to Market
  - Reduced Risk
  - Reduced Development Cost



NXP Point of Sale  
(POS) Reader Solution  
SLN-POS-RDR

# Point of Sale (POS) Reader Solution – SLN-POS-RDR

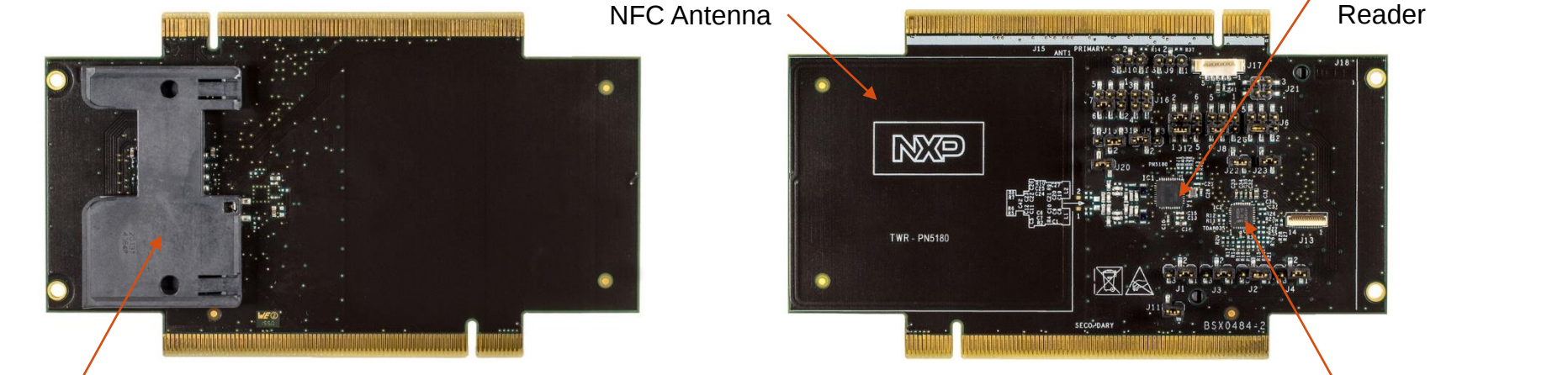
- POS Reader Reference Design for applications requiring Payment Card Industry certifications, supporting QVGA display
- NXP PN5180 Contactless, TDA8035 Contact card reader module with KSDK driver support
- Hardware and software, including all drivers, cryptographic libraries, NXP Secure Kinetis K81/KL81 MCUs - Pin to pin compatible, covering range of performance and price targets
- Chip-and-PIN keypad based on Cirque® SecureSense™ technology
- CardTek L2 CT/CL EMVCo Certifiable Stack
- **Target Applications:**
  - Point of Sales Terminals, Contact & Contactless
  - Automatic Teller Machine PIN Pad + Reader
  - Building and Home Automation, Secure Access Control
- **Availability:** Q1 2017



- **Certifications & Testing:**
  - TWR-POS-K81 PCI 4.1 Certified as PIN Pad \*
  - PCI silicon pre-certification
  - Side channel attack testing \*
  - CAVP (crypto assurance validation program) certified
  - TRNG entropy evaluation
  - EMVCo L1 CT/CL pre-certified



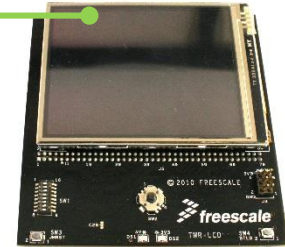
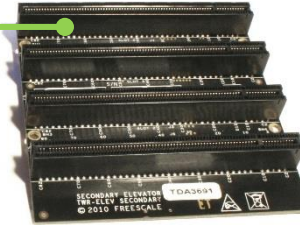
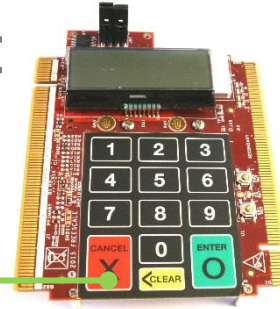
# TWR-POS-PN5180



- Point of Sale Card Reader Board
  - PCB Antenna for contactless payment
    - **NXP NFC: PN5180 NFC Front end**
    - **Full EMVL1 2.5 compliant stack available in KSDK**
    - **EMVCo L1 report from independent test house**
  - Smart Card reader PHY
    - **NXP: TDA8035 Smart card interface**
    - **EMVL1 4.3 compliant stack available in KSDK**
    - **EMVCo L1 report from independent test house**

# POS-RDR-SLN Kit – Material List

- The cube
  - TWR-POS-K81
  - TWR-POS-PN5180
  - TWR-LCD
  - TWR-ELEV
- Coin battery
- Cables
- Demo payment card



# SOFTWARE ARCHITECTURE & OVERVIEW

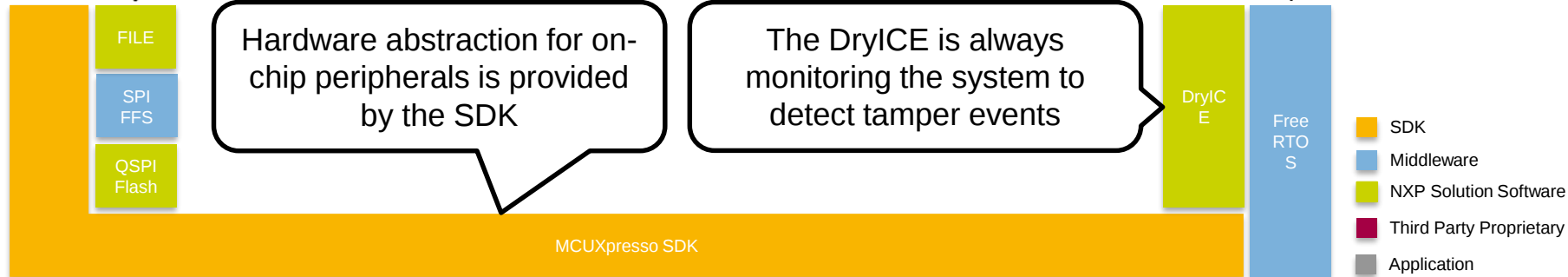
# Software Layering Model – System Layers

The File System is used to store configuration, runtime data, and code in the external QSPI flash

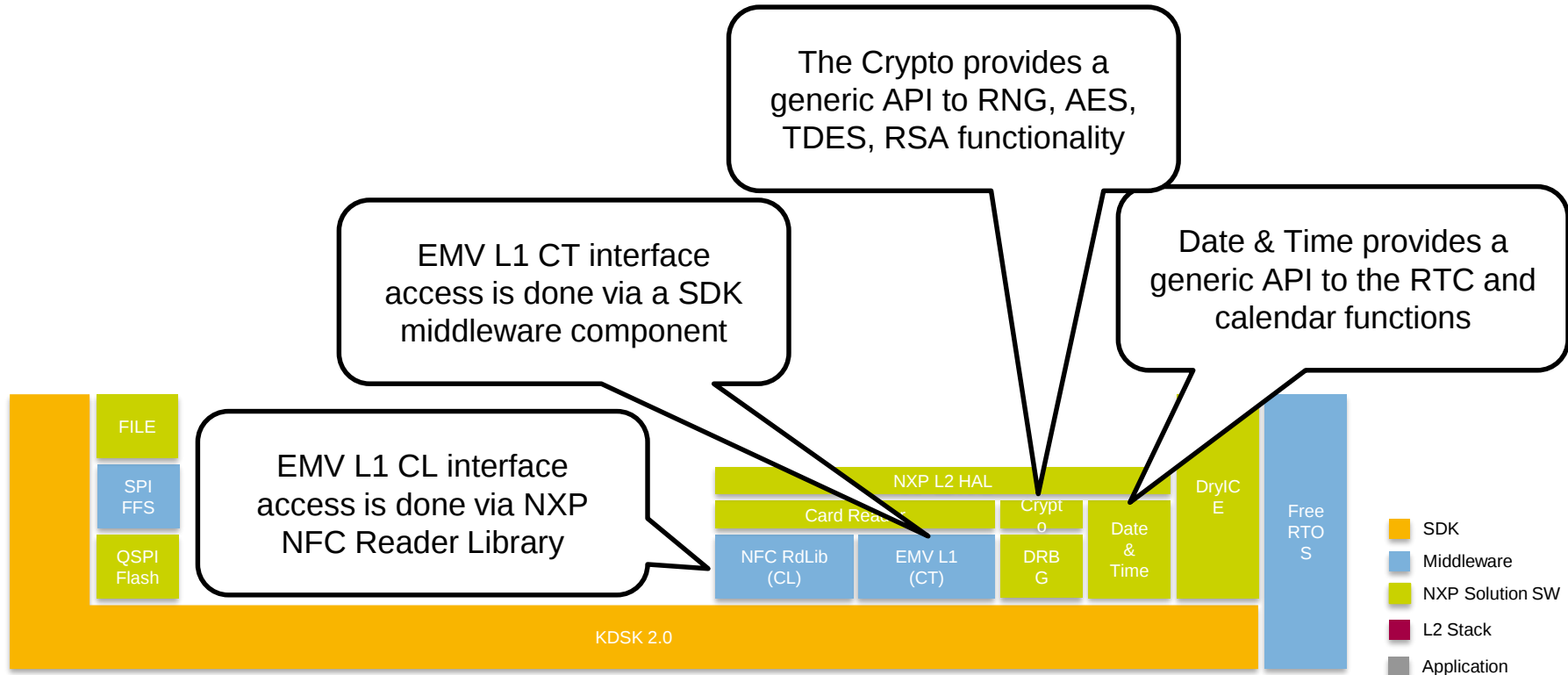
Since there are multiple external interfaces, an RTOS is used to increase overall system robustness and enable the best user experience

Hardware abstraction for on-chip peripherals is provided by the SDK

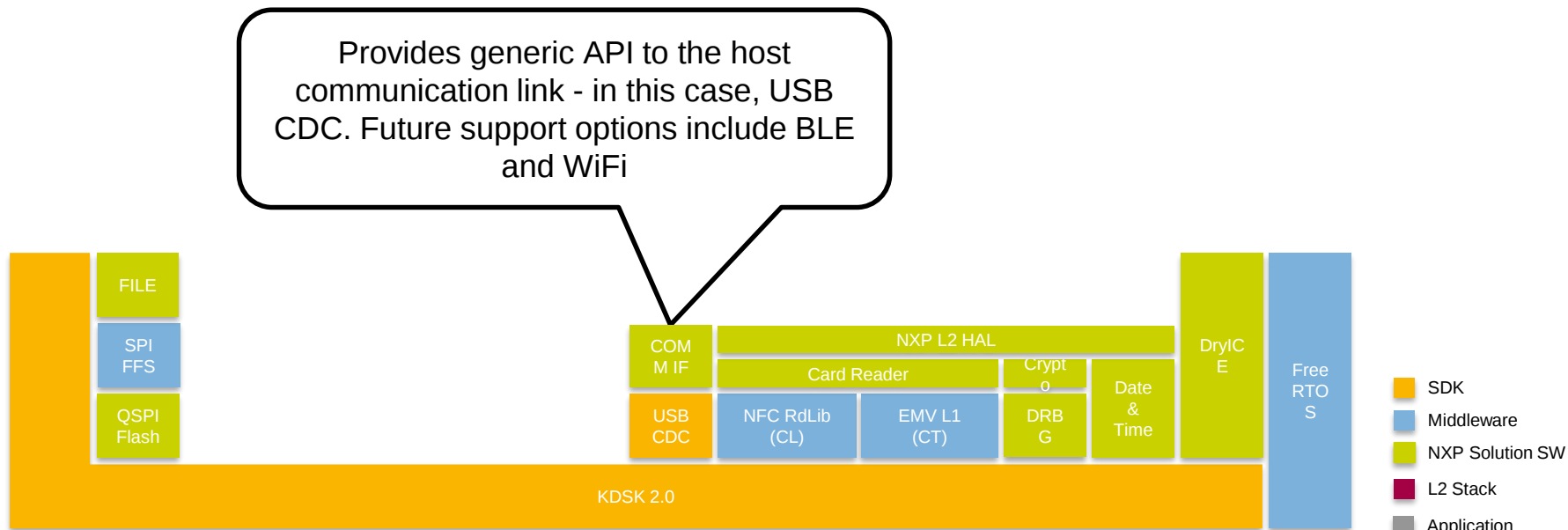
The DryICE is always monitoring the system to detect tamper events



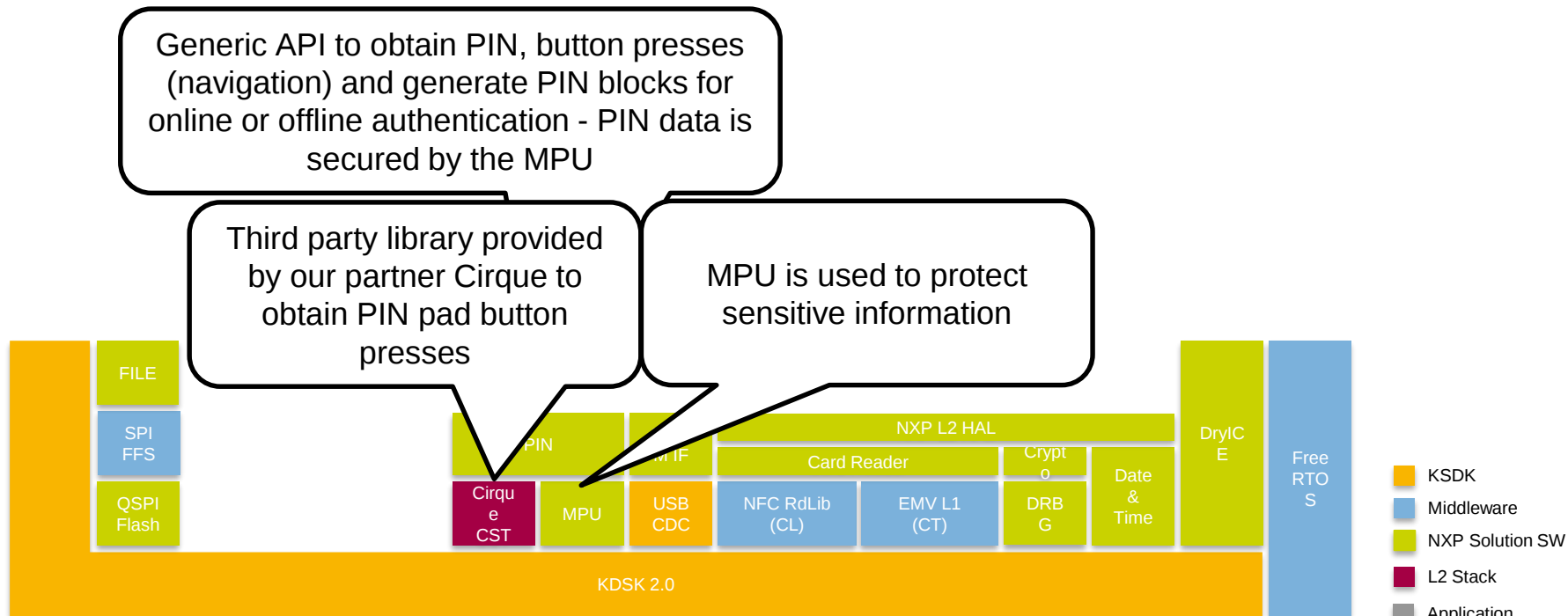
# Software Layering Model – NXP L2 HAL



# Software Layering Model – COMMIF (Host Interface)



# Software Layering Model – PIN Entry



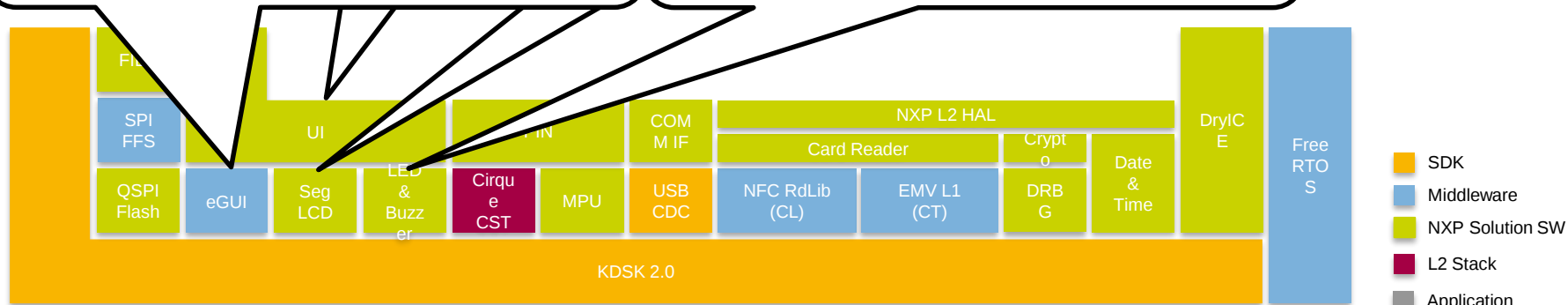
# Software Layering Model – User Interface

Generic API providing access to all UI-related elements. In most applications, this would most likely be customized

The segment LCD is used to display various messages for the payment application

The graphical LCD (TWR-LCD) leverages the open source eGUI graphics package

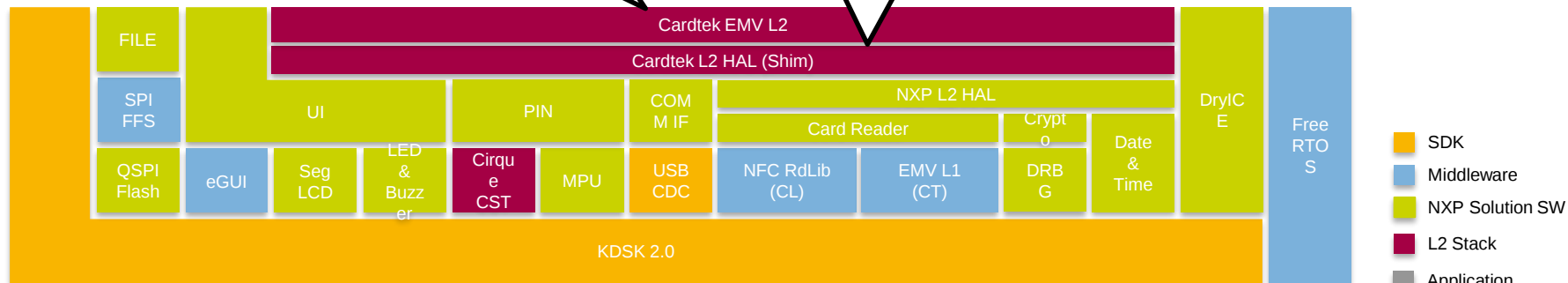
Provides an RTOS-friendly way to enable/run LEDs and the buzzer. The LEDs are virtualized on the graphical LCD



# Software Layering Model – L2 and L2 HAL Shim

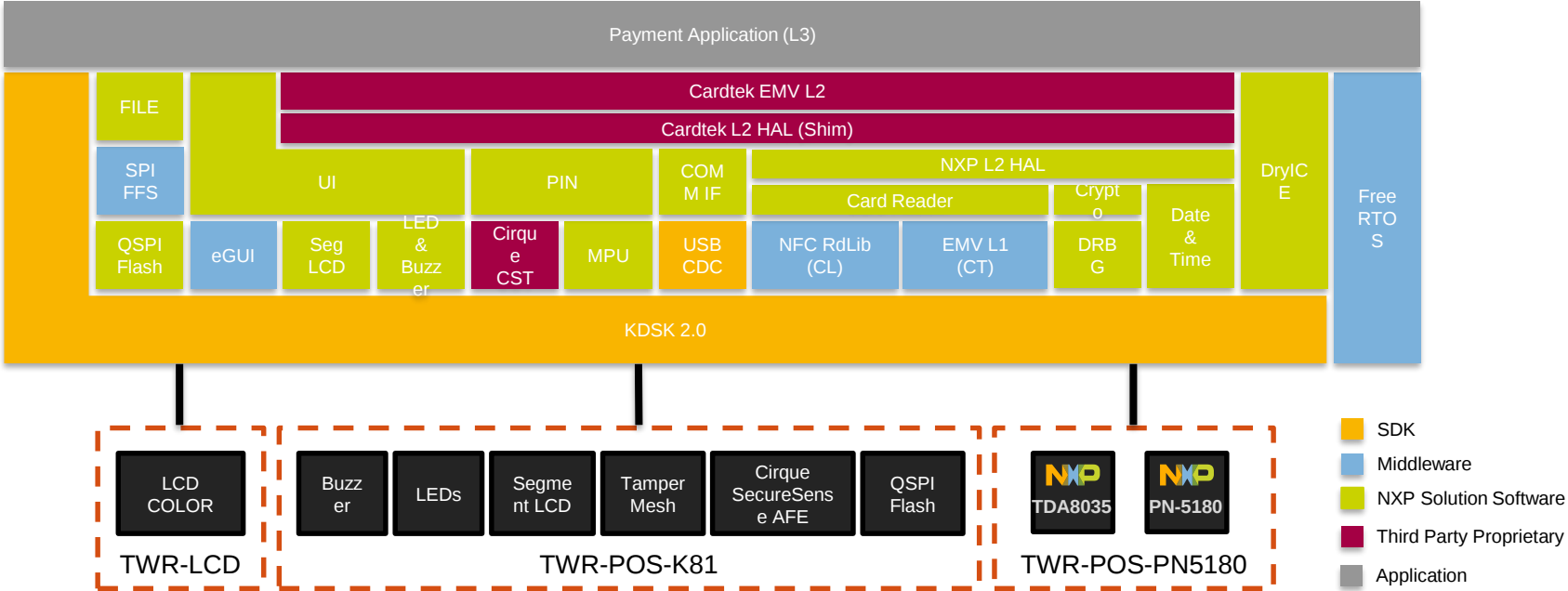
The L2 stack is provided by our partner Cardtek. It contains all L2 functionality including entry point, kernel and supports both CT (EMV 4.3) and CL (EMV 2.6, Visa) interfaces

The L2 HAL Shim is the “glue” between the L2 stack and the rest of the system. This translates the L2 HAL API into calls to our Solution software



# Software Layering (payment\_demo)

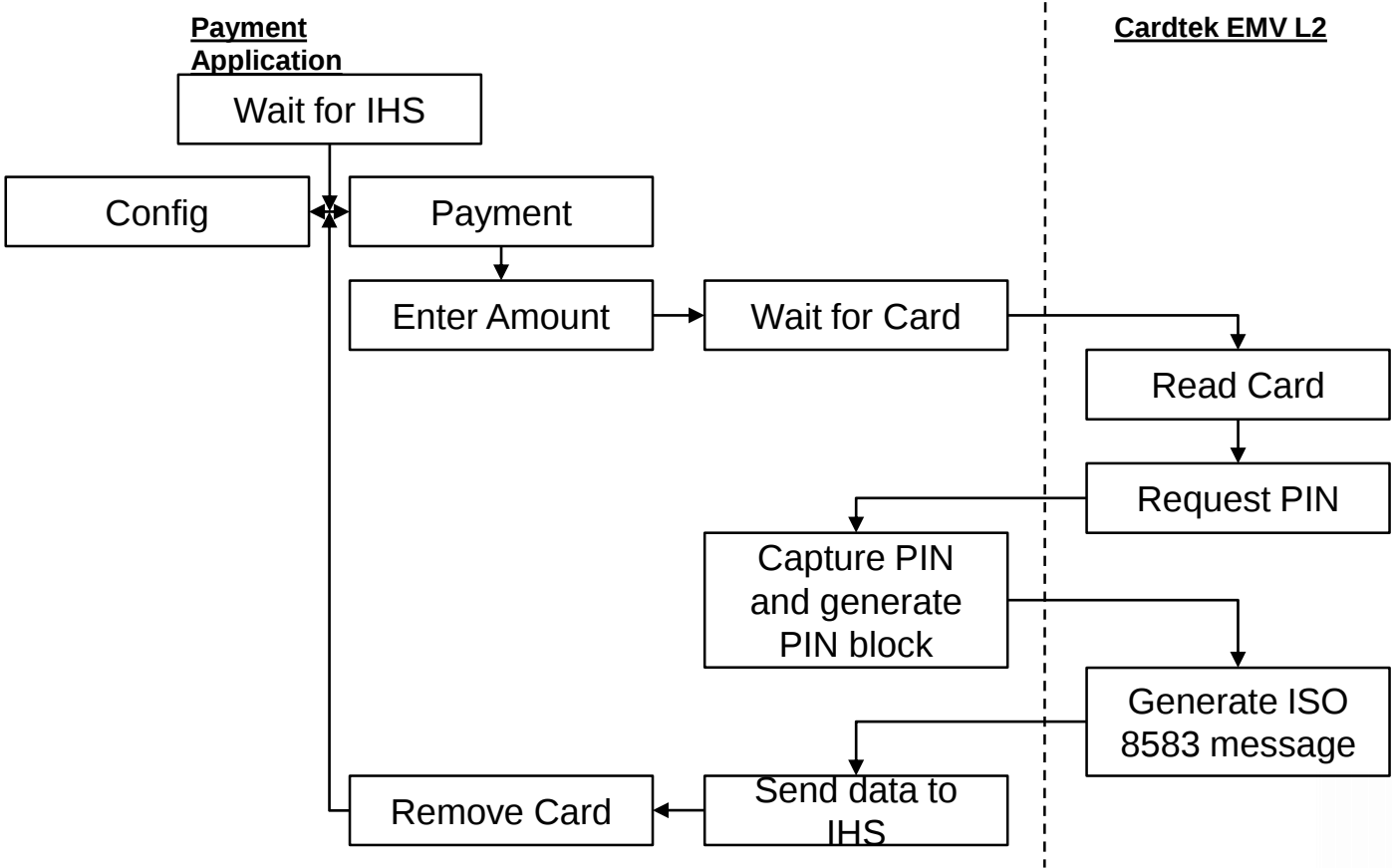
Issuer Host Simulator – PC Application



# Demo Applications

- **payment\_demo:** Full payment demonstration application leveraging Cardtek's EMV L2 stack and issuer host simulator tool (IHS). The IHS tool can simulate online and offline transactions in addition to advanced features such as issuer scripting. All NXP Solution Software modules are used in this application.
- **emvco\_loopback:** Provides a mechanism for customers to run CT and CL EMV L1 certification. This demo also doubles as a reference for using some of the NXP Solution Software modules without the Cardtek L2 and L2 HAL shim.

# Payment Demo



# IDE & DEBUG

# Required Hardware

- Segger JTAG Probe J-Link Base + 19-pin Cortex-M Adapter
  - [https://www.segger.com/jlink\\_base.html](https://www.segger.com/jlink_base.html)
  - <https://www.segger.com/jlink-adapters-19pin-cortexm.html>
  - SW Package: <https://www.segger.com/downloads/jlink>



# Integrated Development Kit (IDE)

- Two IDEs solutions are available for this project:
  - IAR – Minimum required version is 7.70.0
  - KDS – Minimum required version is 3.2.0  
[GET KDS Link](#)
- Demonstration
  - Go Live (steps in following slides)

# Application Mapping



|                                                       |              | Smart POS                            | Traditional POS          | Telephone POS                     | mPOS                                   | PINPAD & Secure Card Reader |
|-------------------------------------------------------|--------------|--------------------------------------|--------------------------|-----------------------------------|----------------------------------------|-----------------------------|
| NXP Security MCU                                      |              | KL81, K81F, K21D, K21F (Coprocessor) | i.MX6UL-3, i.MX7D        | K81F, K21F, K63F, K65F, i.MX6UL-3 | KL81, K81F, K21D, K21F, i.MX6UL-3      | KL81                        |
| NXP CT/CL                                             |              | TDA8026/TDA8035/PN5180               | TDA8026/TDA8035/PN5180   | TDA8026/TDA8035/PN5180            | TDA8035/PN5180/PN7462                  | TDA8035/PN5180 or PN7462    |
| Supported Band Card Types                             | Magnetic     | √(EOL 2015)                          | √(EOL 2015)              | √(EOL 2015)                       | √(EOL 2015)                            | √(EOL 2015)                 |
|                                                       | IC           | √(Must have)                         | √(Must have)             | √(Must have)                      | √(Must have)                           | √(Must have)                |
|                                                       | Contactless  | √                                    | √                        | √                                 | √                                      | √                           |
| Pin-Pad                                               |              | √                                    | √                        | √                                 | √                                      | √                           |
| Display                                               |              | Graphic/Segment                      | Graphic/Segment          | Graphic/Segment                   | Graphic/Segment                        | Optional                    |
| Interface to Smart Devices (Mobile phone, tablet, PC) |              | N/A                                  | N/A                      | N/A                               | Audio Jack, USB, BT                    | USB, Audio Jack             |
| Security Certification                                | PCI-PTS      | √                                    | √                        | √                                 | Mandatory EMEA/AMEC, Optional in China | √                           |
|                                                       | EMV          | √                                    | √                        | √                                 | √                                      | √                           |
|                                                       | OSCCA & PBOC | Must in China                        | Must in China            | Must in China                     | Must in China                          | Must in China               |
| Printer                                               |              | Mandatory and Integrated             | Mandatory and Integrated | Mandatory and Integrated          | Optional                               | N/A                         |
| Applications running location                         |              | Natively                             | Natively                 | Natively                          | Natively/Smart Phone/Tablet            | Desktop Equipment           |



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