

# HOW TO LEVERAGE THE MCUXPRESSO CONFIG TOOL IN YOUR APPLICATION DEVELOPMENT

Clark Jarvis  
MCUXpresso SW and Tools Product Marketer

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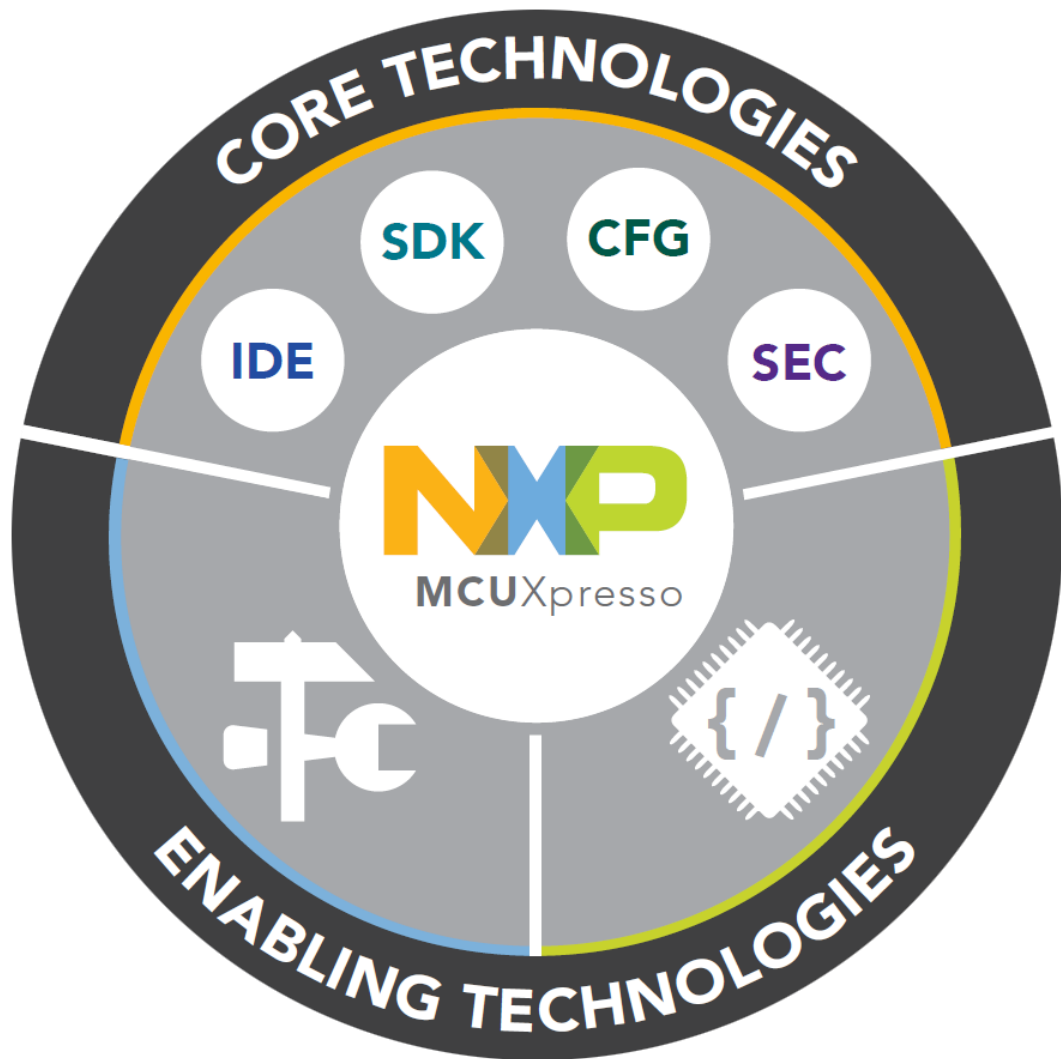
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# THE MCUXPRESSO ECOSYSTEM



- > **Core Technologies from NXP**
  - MCUXpresso IDE
  - MCUXpresso SDK
  - MCUXpresso Config Tools
  - MCUXpresso Secure Provisioning Tool
- > **Enabling Software Technologies**
  - Run time software libraries and middleware
  - Enable customers to focus on differentiation
  - From NXP and partners
- > **Enabling Tools Technologies**
  - Partner IDEs
  - Debug Probes
  - Development Boards
  - From NXP and partners

# MCUXPRESSO CONFIG TOOLS

## CONFIGURATION AND CODE GENERATION



**SDK Builder** packages custom SDKs based on user selections of MCU, evaluation board, and optional software components.

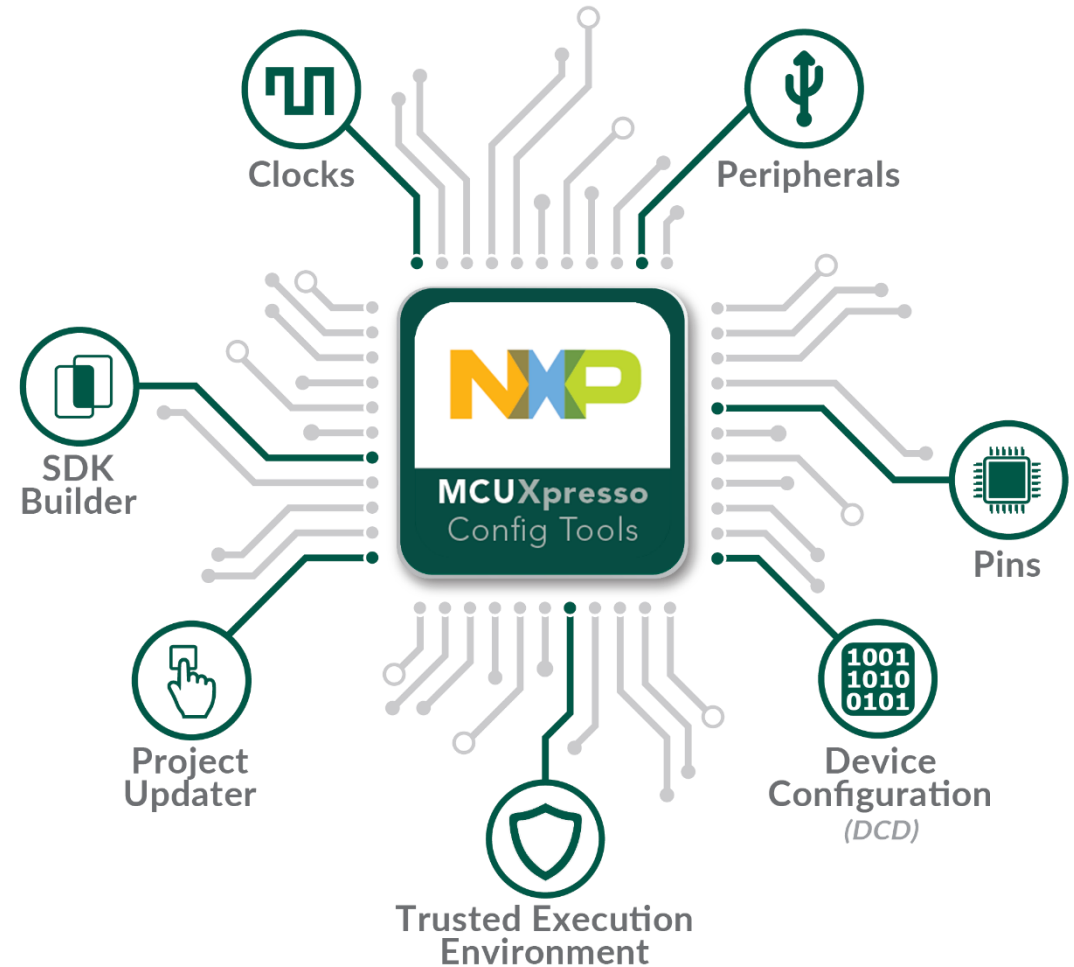
**Pins, Clocks, and Peripherals** tools generate initialization for custom board support.

**Project Updater** works directly with existing SDK-based IDE projects with generated Pins, Clocks and Peripherals source files.

**Device Configuration** tool allows DCD commands sequence config for pre-initialization of devices at boot time.

**Trusted Execution Environment** configures protection and isolation of sensitive parts of the application

**Project Cloner** creates standalone SDK project based on SDK examples (*available in standalone Config Tools*).



# MCUXPRESSO CONFIG TOOL - PINS

The screenshot displays the MCUXpresso IDE's Pin Configuration tool for the MK64FN1M0xx12 package. The 'Pins' table lists various pins and their configurations. The 'Routed Pins' table shows the final configuration for three pins. A dialog box for 'Peripheral LPTMR0' is open, showing routing options for ALT\_0, ALT\_1, and ALT\_2. The 'Routed Pins' table is as follows:

#	Peripheral	Signal	Route to	Label	Direction	GPIO initial state	GPIO interrupt	Slew rate	Open drain	Drive strength	Pull select	Pull enable	Passive filter	Digital filter
57	GPIOB	GPIO_21	PTB21	D12[3]/LEDRGB_BLUE	Output	Logical 1	n/a	Slow	Disabled	Low	Pulldown	Disabled	Disabled	n/a
68	GPIOB	GPIO_22	PTB22	D12[1]/LEDRGB_RED	Output	Logical 1	n/a	Slow	Disabled	Low	Pulldown	Disabled	Disabled	n/a
33	GPIOE	GPIO_26	PTE26	J2[1]/D12[4]/LEDRGB_GREEN	Output	Logical 1	n/a	Slow	Disabled	Low	Pulldown	Disabled	Disabled	n/a

# MCUXPRESSO CONFIG TOOL - CLOCKS

workspace - Welcome page - MCUXpresso IDE

File Edit Navigate Search Project ConfigTools Clocks Run Window Help

MK64FN1M0xxx | Update Project | Functional Group BOARD\_BootCl... | Run Mode RUN | MCG Mode PEE (PLL Engaged External)

Clocks Table | Clocks Diagram

Search elements in diagram ...

Overview | Code Pre... | Registers | Details | Clock Co...

**MCG**

FAST\_IRCLK 4 MHz → FCRDIV /2 → IRCS 2 MHz

SLOW\_IRCLK 32.768 kHz → IREFS → FLL Inactive \*640 → PLLS 120 MHz → CLKS 120 MHz → MCGOUTCLK 120 MHz

FRDIV /32 → 1.56... MHz → IREFS → FLL Inactive \*640 → PLL 120 MHz /15\*36 → PLLS 120 MHz → CLKS 120 MHz → MCGOUTCLK 120 MHz

OSCSEL 50 MHz

**SIM**

MCGIRCLK 2 MHz

MCGFCLK 1.56... MHz

Core clock [type:clock output, id: Core\_clock] 120 MHz

ARM Cortex M4 core clock

OUTDIV1 /1

OUTDIV2 /2

OUTDIV3 /3

OUTDIV4 /5

Flash clock 24 MHz

PLLFLSEL 120 MHz

MCG PLL/FLL/IRC48M clock 120 MHz

IRC48MCLK Inactive

OSCERCLK 50 MHz

OSC32KSEL Inactive

ERCLK32K Inactive

LPO clock 1 kHz

RTCCLKOUTSEL Inactive

RTC\_CLKOUT Inactive

**External Clocks**

EXTAL0 XTAL0 OSC 50 MHz → OSCERCLK

EXTAL32 XTAL32 RTC32kHz Inactive → RTC32KCLK

EXTAL32 XTAL32 RTC Inactive → RTC1HzCLK Inactive

IRC48M internal oscillator Inactive → IRC48MCLK

PMC LPO 1 kHz → LPOCLK

**Processor Details**

Name	A...	L...	Value
Core clock			120 MHz
System clock			120 MHz
Bus clock			60 MHz
FlexBus clock			40 MHz
Flash clock			24 MHz
Inactive			2 MHz
Inactive			1.56... MHz
Inactive			50 MHz
Inactive			1 kHz
Inactive			48 MHz
Initialize USB clock			yes
Trace clock input			120 MHz
Initialize Trace clock			yes
ENET IEEE 1588 timestamp clock			50 MHz
Initialize ENET 1588 clock			yes
ENET RMII clock			50 MHz
Initialize RMII clock			yes
SDHC clock			50 MHz
Initialize SDHC clock			yes
CLKOUT(FB_CLK)			40 MHz
Initialize CLKOUT			yes
OSC (System Oscillator)		<input checked="" type="checkbox"/>	50 MHz
OSC mode			Using external reference clock
Frequency Range			Very_high frequency range 8-32 MHz
System Osc. Capacity Load			0 pF
OSCERCLK Frequency			50 MHz

**CONSTRAINTS:**  
Output frequency must be lower than or equal to: 120 MHz  
**REQUIRED: (value is locked and cannot be changed by computation engine)**  
120 MHz ±0.1%  
VALUE: 120 MHz

Problems | Console | No consoles to display at this time.

MK64FN1M0xxx12\_Project | NXP MK64FN1M0xxx12 (MK64FN...oject)

# MCUXPRESSO CONFIG TOOL - PERIPHERALS

**workspace - Welcome page - MCUXpresso IDE**

File Edit Navigate Search Project ConfigTools Peripherals Run Window Help

MK64FN1M0xx Update Project Functional Group BOARD\_InitSDH

Peripherals Components

type filter text

Peripheral	Used in
<input type="checkbox"/> ADC0	
<input type="checkbox"/> ADC1	
<input type="checkbox"/> DMA	
<input type="checkbox"/> FTM0	
<input type="checkbox"/> FTM1	
<input type="checkbox"/> FTM2	
<input type="checkbox"/> FTM3	
<input type="checkbox"/> GPIOA	
<input type="checkbox"/> GPIOB	
<input type="checkbox"/> GPIOC	
<input type="checkbox"/> GPIOD	
<input type="checkbox"/> GPIOE	
<input type="checkbox"/> I2C0	
<input type="checkbox"/> I2C1	
<input type="checkbox"/> I2C2	
<input checked="" type="checkbox"/> LPTMR0	LPTMR_1
<input checked="" type="checkbox"/> PIT	PIT_1
<input type="checkbox"/> SPI0	
<input type="checkbox"/> SPI1	
<input type="checkbox"/> SPI2	
<input type="checkbox"/> UART0	
<input type="checkbox"/> UART1	
<input type="checkbox"/> UART2	
<input type="checkbox"/> UART3	
<input type="checkbox"/> UART4	

**LPTMR\_1**

Name: LPTMR\_1  
Mode: General  
Peripheral: LPTMR0

**General LPTMR configuration** Default setting for LPTMR

LPTMR interrupt   
Interrupt setting

Interrupt: LPTMR0\_IRQn  
Enable priority initialization:   
Enable custom handler name:   
Interrupt handler name: BOARD\_LPTMR\_1\_IRQHANDLER

**LPTMR configuration**

Time or pulse counter mode: Time Counter mode  
LPTMR pulse input pin select: ALT, 0 » CMP0\_output  
Input pin polarity: Pulse Counter input source is active-high

Free running:   
Bypass prescaler/glitch filter:   
Clock source: LPO clock - BOARD\_BootClockRUN: 1 kHz, BOARD\_BootClockVLP: 1 kHz  
Clock source frequency: 1 kHz (BOARD\_BootClockRUN)  
Prescaler or glitch filter value: Clock divided by 2, glitch filter disabled  
Timer period or offset: 1000000 us  
Resulting input clock frequency: 1 kHz

**Timer period or offset** [type:string, id: timerPeriod]  
In free running mode, this property represents offset (delay) between counter overflow and interrupt invocation. The value is lower than interrupt period (defined by timer overflow). Otherwise, the time in this property represents interrupt period. The value can be defined as a period or as a frequency by adding unit (default unit is [us]).  
**VALUE:**  
1000000 us

**peripherals.c** peripherals.h

```
/* BOARD_InitSDHCPeripheral defines for LPTMR0 */  
/* Definition of peripheral ID */  
#define BOARD_LPTMR_1_PERIPHERAL LPTMR0  
/* Definition of the clock source frequency */  
#define BOARD_LPTMR_1_CLK_FREQ 1000UL  
/* Definition of the prescaled clock source frequency */  
#define BOARD_LPTMR_1_INPUT_FREQ 1000UL  
/* Definition of the timer period in us */  
#define BOARD_LPTMR_1_USEC_COUNT 1000000UL  
/* Definition of the timer period in number of ticks */  
#define BOARD_LPTMR_1_TICKS 1000UL  
  
/* Global variables */  
extern const uart_config_t BOARD_DEBUG_UART_config;  
extern const i2c_master_config_t BOARD_ACCEL_I2C_config;  
extern const pit_config_t BOARD_PIT_1_config;  
extern const lptmr_config_t BOARD_LPTMR_1_config;  
  
/* Initialization functions */  
void BOARD_InitPeripherals(void);  
void BOARD_InitBUTTONSPeripheral(void);  
void BOARD_InitLEDsPeripheral(void);  
void BOARD_InitDEBUG_UARTPeripheral(void);  
void BOARD_InitACCELPeripheral(void);  
void BOARD_InitSDHCPeripheral(void);  
  
/* BOARD_InitBootPeripherals function */  
void BOARD_InitBootPeripherals(void);  
  
#if defined(__cplusplus)  
}  
#endif  
  
#endif /* _PERIPHERALS_H_ */
```

Problems Console

Level	Issue	Origin
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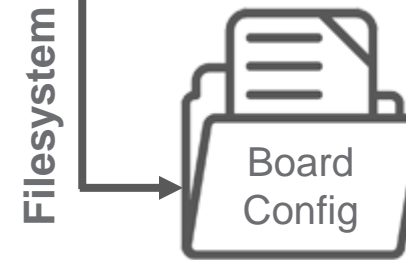
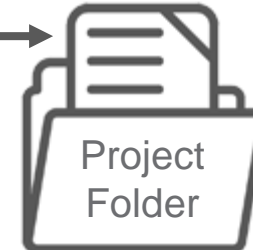
MK64FN1M0xxx12\_Project NXP MK64FN1M0xxx12 (MK64FN...oject)

# MCUXPRESSO CONFIG TOOLS STANDALONE TOOL WORKFLOW



The standalone **MCUXpresso Config Tools** are developed specifically for working with non-MCUXpresso IDEs

**1** Use the MCUXpresso Config Tools to **clone** an existing SDK Project



Filesystem

Generated **.MEX** file can be exported / imported to other projects to share board settings

**2** Use the MCUXpresso Config Tools to configure **Pins, Clocks, and Peripherals**



**3** **Update Code** from Config Tools to write the generated files directly to the project folder

Supporting

arm KEIL

IAR  
SYSTEMS

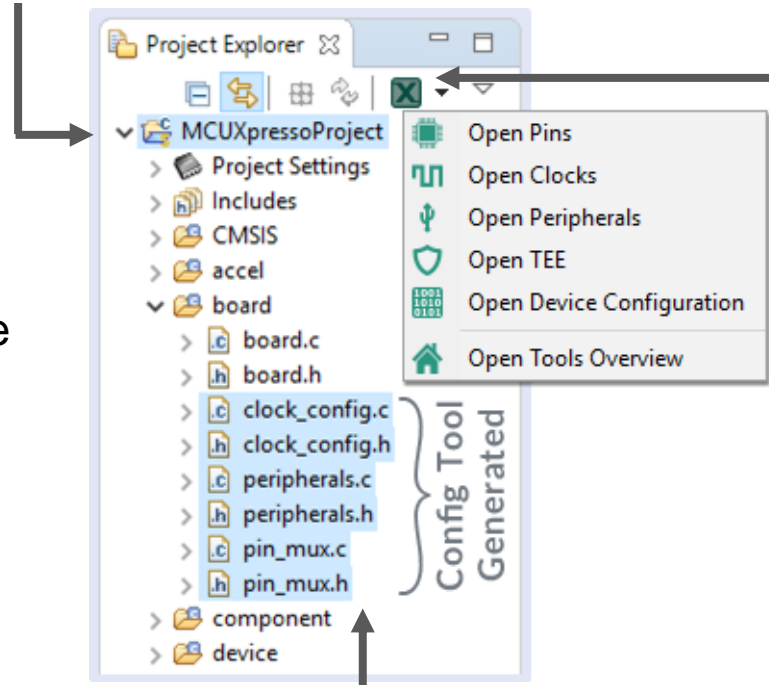


# MCUXPRESSO CONFIG TOOLS INTEGRATED IDE WORKFLOW



1 Use the MCUXpresso IDE Quick Start Panel to **import** an existing SDK Project or **create** a new one

2 Use the IDE project menu bar to switch to a Config Tool **perspective**

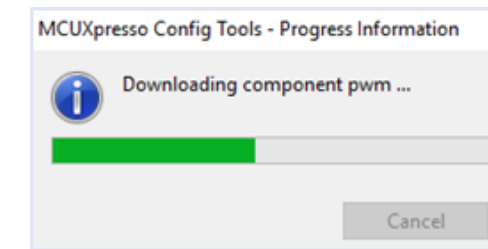


The perspective icons can also be used to switch between config tools or return to the development perspective

3 Use the config tools perspective to configure **pins**, **clocks**, and **peripherals**



Config Tool data will download on demand



4 **Update Code** from Config Tools to write the generated files directly to the project folder and return to the development perspective



# MCUXpresso Software and Tools

UNIFIED SUITE OF  
TOOLS FOR EASY  
DEVELOPMENT  
WITH NXP MCUs



## MCUXPRESSO SOFTWARE AND TOOLS ADDITIONAL WEB RESOURCES



MCUXpresso Software and Tools Overview Page:  
<https://www.nxp.com/mcuxpresso>

MCUXpresso Software and Tools Community Site:  
<https://community.nxp.com/community/mcuxpresso>



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## Support devices

[Supported Devices Table \(Community Doc\)](#)

