HANDS-ON WORKSHOP: MCUXpresso SOFTWARE AND TOOLS

CLARK JARVIS MCUXpresso SOFTWARE AND TOOLS PRODUCT MARKETER

AMF-DES-T2632 | MAY 2017



NXP and the NXP logo are trademarks of NXP B.V. All other product or service names are the property of their respective owners. © 2017 NXP B.V. PUBLIC





AGENDA

- Overview of MCUXpresso Software and Tools
 - -MCUXpresso IDE
 - -MCUXpresso SDK
 - MCUXpresso Config Tools
- Walk-through of Tools
- Hands-on Lab
 - MCUXpresso SDK Configuration and Build
 - MCUXpresso IDE Getting Started
 - MCUXpresso Config Tools Board Configuration





Overview of MCUXpresso Software and Tools

MCUXpresso IDE, SDK, Config Tools



MCUXpresso Software and Tools

COMMON TOOLKIT FOR THOUSANDS OF KINETIS® & LPC MICROCONTROLLERS

www.nxp.com/mcuxpresso

CFG

IDE

SDI

MCUXpresso Software and Tools

for Kinetis and LPC microcontrollers



MCUXpresso IDE

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

MCUXpresso SDK

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



SDK

MCUXpresso Config Tools

Online and desktop tool suite for system configuration and optimization



MCUXpresso Software and Tools

- Common toolkit across Kinetis and LPC microcontrollers
- Easy to use
- High quality
- Shared software experience and broader portfolio support
- Offers easy migration and scalability
- Supports large ARM® Cortex®-M ecosystem
- Built on the 'best of' Kinetis SDK, LPCXpresso and Kinetis Design Studio IDEs



MCUXpresso Software and Tools

- IDE
- SDK
- Config Tools

For NXP's ARM® Cortex®-M controllers

- Kinetis MCUs
- LPC Microcontrollers
- i.MX Application Processors





Origins of MCUXpresso Software & Tools

Kinetis and LPC SW

Independent software and tools

MCUXpresso Software and Tools

Supporting Kinetis & LPC Cortex-M MCUs





MCUXpresso IDE



MCUXpresso IDE



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

			M	CUXpresso I	DE		
	E	clipse	Framework f	or C/C++, extensit	le with many	plugins	
Quickst Panel	art I	Su S LP(pport for DK and COpen for		Peripheral View	Pov Measu	wer rement
Advanc Build Scr	ed [.] ipts	Cc	ARM® ortex®-M Cores	Combined Development Perspective	Instruction Trace	SWO ⁻ Prof	Trace / iling
New Pro Wizar	ject d	Lir N Cor	nker and lemory figuration		Data Watching	FreeRTC Aware	S Kernel eness
A	ARM	GC	C		A	RM GDB	C
newlib	nev na	vlib- ano	RebLib		CMSIS- DAP	P&E	Segger

- Feature-rich, unlimited code size, optimized for ease-of-use, based on industry standard Eclipse framework for NXP's Kinetis and LPC MCUs
- Application development with Eclipse and GCC-based IDE for advanced editing, compiling and debugging
- Supports custom development boards, Freedom, Tower and LPCXpresso boards with debug probes from NXP, P&E and Segger
- Free Edition: Full Featured, unlimited Code Size, no special activation needed, community based support
- Pro Edition: Email IDE support, Advanced Trace Features



Built for Ease-of-Use



- Quickstart Panel guides users to most commonly used options
 One-Click access to most used functions
- Develop Perspective for both project editing and debugging
 - Simplifies Eclipse usage



the Last Source Bafactar Manipute Search Pr	ect But FreeHTOS Window Help	and the second second	
0+2010-5+5+21×10-00	(人を大事に本)次月1日へん)	2110-0-9-00	-1.4 N 10 1
E + G2 + N di + 10 +		Clarit Ac	- E
54. X 3.4 24. CA. TO.	Or Denug 21		1 1+ c
→ Al MildFlittfault_Fried → E Brann → E Brann	 Mitself (11) Stand 1, Project, Derive Debug (1) (C). Sikself (11) Stand 1, Project, Derive Jebug) Mitself (11) Stand 4, 1 (Dropped) (Supervised (15)) Amministry and 1, 1 (Dropped) (Supervised (15)) 	/C++ (NEF Servicestautectory) NECo Application ENOV(Exx 10 (contex-m4)) nation/SERT bitternapt)	
- B CMDS	g brentwithin	sentre in streng sent. 16 6135	
s 25 friendeld s 25 friendeld	The df (dilect) (The cad+s y' sale illect character Y15]	e W (
Windowski (U Fragentia Windowski (U Fragentia	25- Weedler + Failth Maddler + Failth (55- Crass + 2035) Eliterator Table(cost, Um Fri Fri Chandler () - exit-GSR-(K) { / Chill +/istChansmithalled(cost, In 56- 1 101 - Pendif Fail + Failth - All States Failth - Chill States + All Provide University (1) - Failth - Chill States + All Provide University (1) - House + Chill States + All Provide University (1) - House + Chill States + All Provide University (1) - House + Chill States + All Provide University (1) - House + Chill States + All Provide University (1) - House + Chill States + All Provide University (1) - House + Chill States + All Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University (1) - House + Chill Provide University + All Provide University + All Provide University (1) - House + Chill Provide + Chill Provide University + All Provide + Chill Provi	milief, in, prostillast() /" iterat " as tanllar be badled the comman a); D	a terapi sil a
2 Mid-Rildon (Josef Francisco)	<pre>tii (L11_PrintPrampt(L0)) tii (L11_PrintPrampt(L0)) tii (L11_PrintPrampt(L0)) tii (L11_PrintPrampt(L0)) tii PrintPrampt(L0)) tii PrintPrampt(L0))</pre>		
MCUXpresso IDE (Pro Edition)	P10 1		
CHC	Marine Press, State 19	the state that and	
* Start here	Course Charles Courses 17 stores 1 1	and the second second	
Fine propert. Fine propert. Fine propert. Fine propert.	TC. Task Nerve Task Handle Teck Date (1) Tack 1 Social So	n Pri., Back Usaga Event Diga ad 110 1 100 / 15548	d faitre 000000
	1 3 Shall Subjective Marchael	ny 1/1 2728/21448	Cash and Cash
Stude WestPartelant 7, Project, Server (Deb	in the second seco	- 1. In 10 B R / 9.51 HB	
Stude WRG2PHIMBer(2, Fraget, Denv) (Deb Conv M064PhiMber(2, Fraget, Denv) (Deb	1 D.F. Date State	B (0) 16 B / 1.50 H	5-0 (5.3%) 5-0 (5.3%)
 Suid WEEPHMEner(LEnger, Server (Set) Cases WEEPHMENer(LEnger, Server (Set) Dating WEEPHMENer(LEngert, Denver (Set) 	1 ELF Free Scc Sccc Sccc Sccc Scccccc Sccc Scc Scc Sc	ani 2 di 🗧 110 8 / 1.55 kili TevrQ (Ru)	50(33%) 50(33%) 50(33%)



New Project Wizard: Data Driven Device Support

* CR++ Library Setting

· Manager Tradigue

· Handson's company

+ SICU C Cample

Edward the al

Let Mania

- Watch

BOAR

and the second

- SDK MCUs (LPC and Kinetis)
- Preinstalled LPC and generic Cortex-M
- Installable device support through SDK packages (data driven)
- Selection of package, RTOS, drivers, utilities
- Standalone and linked projects
- Advanced project settings





MCUXpresso IDE Supported Debug Probes

LinkServer MCUXpresso Probes

- LPC-Link, LPC-Link2, including debug probes on LPCXpresso V2/V3 boards
- CMSIS-DAP (including CMSIS-DAP on Kinetis FRDM and TOWER boards)
- Segger (J-Link)
 - Native and OEM J-Link for Kinetis and LPC
 - OpenSDA Segger Firmware on FRDM/TOWER boards
 - LPC-Link2 Segger Firmware on LPC-Link/LPC-Link2
- **P&E** (Multilink)
 - Native Multilink for LPC and Kinetis
 - OpenSDA P&E Firmware on FRDM/TOWER boards









Automatic Probe Discovery and Configuration

- Discovery of attached supported probes
- Automatic creation of Debug Launch Configurations
- Setting to locate SEGGER GDB



Probes discovered			—	- 🗆	×
Connect to target: MK64FN1M 3 probes found. Select the probe	M0xxx12 to use:				
Available attached prob	es				
Name	Serial number/ID	Type LinkSen	Manu NXP Ser	IDE Debug N	Node
USB1 - Multilink Universal Re	PEM9C5FA9	USB1	P&E Mir	All-Stop	
J-Link OpenSDA	621000000	USB	SEGGER	All-Stop	
Supported Probes (tick/untick to MCUXpresso IDE LinkServer (P&E Micro probes	enable/disable) (inc. CMSIS-DAP) pr	obes			
Probe search options					
Search again	is Launch configura	tion)			
?			OK	Cance	el 🛛



Professional Edition

IDE

- PRO Edition License available for \$495
 - Extended PRO features perpetual
 - -SWO Interrupt Trace with interrupt trace table, including timeline
 - Data watch: one with free edition, up to four with PRO edition
 - -1 Year of email support for MCUXpresso IDE, ticket based
- Existing valid LPCXpresso PRO licenses automatically enabled for MCUXpresso







MCUXpresso SDK



MCUXpresso SDK



PUBLIC

14

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



Product Features

Architecture:

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

Integrated RTOS:

- FreeRTOS v9
- **RTOS-native driver wrappers**

Integrated Stacks and Middleware

- USB Host, Device and OTG
- IwIP, FatFS
- Crypto acceleration plus wolfSSL & mbedTLS
- SD and eMMC card support

Reference Software:

- Peripheral driver usage examples
- Application demos
- FreeRTOS usage demos

License:

BSD 3-clause for startup, drivers, USB stack

Toolchains:

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

Quality

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







MCUXpresso SDK – CMSIS Device Support





CMSIS-CORE provides a standard for a basic run-time system and user access to the core and the peripherals:

- Hardware Abstraction Layer (HAL) definitions for the SysTick, NVIC, FPU registers, and core access functions
- Standardized MCU header file format common register/bit access methods, system exception and interrupt naming
- Standard methods for system initialization for example, the <u>SystemInit()</u> function for essential system configuring
- Intrinsic functions used to generate CPU instructions that are not supported by standard C functions.

CMSIS-DSP is a suite of common signal processing functions including math, filters, matrix, transforms, motor control, statistical, and interpolation functions.

CMSIS-Driver is an API standard for common peripheral and on-chip interfaces.

Learn more at: www.keil.com/cmsis





MCUXpresso SDK – Peripheral Drivers





- Single driver for each peripheral
- Full peripheral coverage for each MCU
- All drivers include low-level functional APIs
- Communication peripheral drivers feature transactional APIs
 - Non-blocking, interrupt based
- Communication peripheral drivers also have optimized RTOS wrapper drivers
 - Uses native RTOS APIs no operating system abstraction



MCUXpresso SDK – RTOS





FreeRTOS kernel pre-integrated

- Demonstration applications
- RTOS Usage examples



RTOS examples include:

- freertos_dspi freertos_sem
- freertos_event
- freertos_generic _freertos_tickless

-freertos_swtimer

-freertos_uart

-ucosiii_hello

- freertos_hello
- freertos_i2c
- freertos_mutex
- freertos_queue





MCUXpresso SDK – USB Stack





MCUXpresso SDK USB Stack is a comprehensive, opensource device and host stack. It supports baremetal and RTOS application, multiple class implementations, several demo applications.

- **70+ demo applications** that support extensive features including:
 - 7 device classes with 3 composite examples
 - 5 host classes with USB hub support
 - Full-speed and high-speed under USB 2.0 specs

High quality stack, ready for production use

- USB-IF certification on both FS and HS
- Optimized for code size down to 6K flash and 2K RAM – and performance among competition
- Device demos have "Lite" versions that are even smaller in code size



MCUXpresso SDK – FatFS





FatFS is a generic FAT file system module for small embedded systems. Features include:

- ANSI C compliant and completely separated from disk I/O layer
- Windows compatible FAT file system
- Very small footprint
- Various configuration options
 - Multiple volumes (physical drives and partitions)
 - Long file name support in ANSI/OEM or Unicode
 - RTOS support
 - FAT sub-types: FAT12, FAT16 and FAT32.

Available demos:

- sdcard_fatfs
- usb_host_msd_fatfs (baremetal & FreeRTOS)



MCUXpresso SDK – IwIP





- IwIP the lightweight Internet Protocol
- A full scale TCP/IP stack for embedded systems
- IwIP supports the following protocols:
 - ARP DHCP
 - IPv4 and v6 ICMP
 - TCP IGMP
 - UDP PPP
 - DNS PPPoE
 - SNMP
- Example applications include:
 - lwip_httpsrv
 - lwip_ping
 - lwip_tcpecho
 - lwip_udpecho





MCUXpresso Config Tools

contig Tools

VICUXpresso



MCUXpresso Config Tools



Integrated configuration and development tools for LPC and Kinetis MCUs



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



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



Pins, Clocks, and **Peripheral** tools generate initialization C code for custom board support. Features validation of inputs and cross-tool conflict resolution.



Project Generator creates new SDK projects with generated Pins and Clocks source files.



Project Cloning creates a standalone SDK project based on a example application available within SDK release.



Power Estimation tool provides energy and battery-life estimates based on a user's application model. Available as a standalone tool for select devices.



MCUXpresso Config - Pins Tool



Easy-to-use muxing and pin assignments for Kinetis & LPC microcontrollers

tini (🖞 Pakahar	n .					- n.	O Pathage 11				Q	000	[2]	Trepter Dieg 2 ter	nee 25
	III fair liber									122. 1	480 IP	TRANK .		16	ployment ployments	
5	Pinname	Libel		Maritim .	690	WART	R+		- 2	1885 8	55	558.6 <u>5.</u>	1.1	- 11	/*	14 State 14 State
7	PERSONAL PROPERTY AND	115(G	SD_CAR_	30HC_CD	2111	WARTS_CTLA	π		545	5556. E	1855 es		145 - C	- 11	* All rights reserved.	Pressiale bestconductor, In-
10	- 10 JP	122(3)	NM_M8C	USB_DF					868	S S S S S S S S S S S S S S S S S S S	******		52	- 11		
ц		122(2)	VG4_MEC-	188,344					- 331	CONTRACT V	700338	110.010	7.7	- 11	 Reductringtion and u are permitted provid 	or in source and kinney fore
2		V813	ITALU C.	REALER												
7		19429	OUTINE SP.	HALDS	in the second		- CM	TTERLORU PAL			101	1.000	- 83		* o wailing Dutions of	source code must vetage the
1		12(21)	MINDEL	ACCEL SCI	PILIP	UAUTA_DX		PTENLINU PA				1075		E	· of conditions and	the following discusser,
Ч.	Annie	1000	ORMANC.	ACCH, SVA	1112	CARTA, KK		INTERNATION.	1000			RIM.	- 193	0.001	" o Redictributions in	kinery form matt reproduce
2	FILE	1410	aviater-	LED_GROUP		more carb		-1001_508a	10.0			i'M	223	E TOP	* list of coeditions	and the following discials
2		140,744	D. ISAARD P	DAMO DACE	art as		8	401,00071210	1766	1		SPICE .	- 114	0,181,	a cover suffer tald are	ovined with the bill institu-
1		Long L	LUBARD R	BARRY BUTT	BURNEY.		2	MECHENNER,	a arts		130	BHOR	- 104	D KOTY T	* a tellber the name a	f Freescale Regionskatur,
2		arries.	1005400 6	TAGE ENDS	Plats.		2	PTCS-	@ 9*01	0.0			- 161	M	 castributors may in 	e used to endorse or prueots
i.		1030	1.04.00	25400 (255.0%	PT414	MARTE TO	S	PRODUMENTS, TW.	CARD I			100	- 84	D. KLER	· suffere etthout a	berith balos matters baunt
		10.91	LUNDER T.	RAMS TOPP	17211	DARTE SY.		100.00	1040			812	Pla PU		* THES SEPTEMBE IN FRO	AUDED BY THE COPYRIGHT HOLEY
į.		10020	LENGO T-	F8400 THD9	PINE	MARTS CTS 64.1	411	PTCINGARD_BU	18240	1.18		174	- 14	LAUNCE	* MAY EXPRESS ON DOPLE	ID WRRANTIDS, DELUDING, B
41		111312	195400 T_	FMED THDE	PTAIT	LIARTE RTS &	. 1911	FTER	1984		10.	SUMPLY	10	0.00	* DISCLASSED, 38 50 CV	dational the converging of
56		1030	FINER.	EXTADORNEL R.L.	PEdd	21212/222	n	PTERSDAU FILL	China	diamit in the		D-MCR		No.	* ANY DIRECT, INDIRECT	, INCIDENTAL, SPIELAL, EXDIT
52		03301	OB494(I)	FINED_MOUT	P180		11	PTEILDRUPEL			4/12		- 00	304		
54		. (0.90	199400	RMID, MOC	#781		PE	PTENLEM, PH	1000		-		- 81	N2E		
μ	C Planting of	1011	UMITE RI	DEBUG_MART_RE	FTRM.	MARTE NO.	EL .	ABOL CREATEN	- Children				- 00	00 mm	A Postdown 72	
ŧŧ,	(Hall Hand D	100[1]	/LWRITO_TH	DEBUG_UNIT_TA	P1817	UARTE TX	71	FIETOM WE'					- 49	OW	and the respect to the second second	
Ŧ	PTRIS	0120	ARRING	reyLSD	100.0				.005.0	4FN1MOVEL	12-LOFP	100 placka	190.		1 Cartheren	
*	P7822	0171	/100408	ALD_RED										1.12	Leut Sour	Grigin
N		AMID)	25947	WEACER, NTT	PTUB				5,8,8	第日日津会 社員	121111		68			
81		14(6)		ACCE, INTO	PILL	UNITA CTS 6	1.1		-225	3001824	895885	2585873	192			
ŝ							¥.	+ C		100 -		9,5855		14	N	
	dPre															
ñ	u hait															
	Tes Ö	0														
	Periphanal	Signal	Route to	Label		Metter	Directo	n Saw tele	Open dram	Drive strength	Pullument	Pullenskie	Paulos filter	Digital th	her	
	0106	6(40,21	P18/1	012150-120408	SLUE	multip.	Output	Stew	Deatlied	Low	Pulkners	Dostind	Disabled	ata		
	690.0	6990, 32	FTEZZ	012[1]/160408	RED	LED NED	Output	Saw	Distant	Low	Fulfation	Disting	Disabled	1.16		
	CONTRACT OF	0010 20	07536	UNITED COMING	THEORY COM	THE LET'S COMPANY	Damas	Minut	Distingt	Low .	Pulleban	Desident	Disabled	2.2		

- Part of the MCUXpresso suite of system configuration tools
- Muxing and pin configuration with consistency checking
- ANSI-C configuration code
- Graphical processor package view
- Multiple configuration blocks/functions
- Wizard for optimized assignments of functionality to available pins
 - Selection of Pins and Peripherals
 - Package with IP blocks
 - Routed pins with electrical characteristics
 - Registers with configured and reset values
 - Source code for C/C++ applications
- Documented and easy to understand source code
- Report generation
- · Integrates with any compiler and IDE



MCUXpresso Config - Clocks Tool







- Part of the MCUXpresso system configuration tools
- System clock configuration with consistency checking
- ANSI-C initialization code
- Graphical clock diagrams
- Multiple configuration blocks/functions
- Easy-to-use guided graphical user interface
 - Selection of Clock Sources
 - Configuration of prescalers and clock outputs
 - Details and Full Diagram views with clock path
 - Registers with configured and reset values
 - Source code for C/C++ applications
- · Documented and easy to understand source code
- Report generation



MCUXpresso Config – Project Cloner





Create a standalone copy of an MCUXpresso SDK example project

	Create a new configuration	-
Start development with the selected MCUXpresso SDKv2 Package (SDK can be obtained a	Clone an SDK example	1
Select SDK folder: C/NXP\SDK_22_MK04FX512xx012 + Browne		
 Create new configuration Use this option to create empty configuration for selected processou/board/bit/tem Clone an example project Select this option if you want mample project with all sources for selected toolchair 	Select an SDK example Type filter test # FROM-KS4F	ect. Tool
Start development without an MCIIXnesso SIX Parkage	a Exemples	100
Use this option of the set of the	 cmst_driver_examples demo_apps aid:tD_low_power bubble dac_adc 	later
Project base directory	ecompass ftm pdb adc16	
C:\Useri\r83857\workspace.IAR	ftm_quad_decoder	
Project name bubble Select tookcham @ MCUXpresso IDE	helo, world mbedtis/mbedtis_benchmark mbedtis/mbedtis_sefftest power_mode_switch ntc_func	
	shell wolfssl/wolfssl_benchmark wolfssl/wolfssl_selftest > driver_examples	e
1	Select version	
	Name your configuration	
< Back Next >	bubble	l

- Ability to generate a fully standalone MCUXpresso project cloned from one of the many included examples.
- Provide a native IDE project for any toolchain supported in your SDK configurations
- Available in the desktop version on the MCUXpresso Config Tool as part of the "New configuration dialog"
- Available in the online version of the MCUXpresso SDK Builder and webpage.
- Clones example projects can be downloaded directly from the MCUXpresso webpage. Online cloned projects provide all project and SDK files required to quickly have an application running on a support NXP development board in a single download.



MCUXpresso Config – Project Generator





Create a new SDK project incorporating the generated source code available in the MCUXpresso Config Tools

Project Ge	nerator			Project Configuration				
SDK Path:				Project name:	2		[rara	1
	2 2 2 EPDM V6/E				Filter by name/description	1	N N N N N N N N N N N N N N N N N N N	:Q:
C. (NAP (SDI	K_2.2_1100W-R041		* Browse	Hello_world	Name	Version	Description	
Base project	directory (workspace	e):		RTOS				
C·\llsers\r8	3857\worksnace kds	1-2	- Desire	Baremetal	adc16	200	ADC16 Driver	
0.103013110.	Sost (Workspace.kus	· •	• browse	FreeRTOS		2.1.0	Clock Driver	
Toolchain		Language				2.0.0	CMP Driver	
MCUX	presso IDE	O C C++			🖂 🥑 cmt	2.0.1	CMT Driver	E
					¬ ♥ ♥ common	2.0.0	COMMON Driver	
				(D)	crc	2.0.1	CRC Driver	
		(b) Cre	ate Project		🗐 🥑 dac	2.0.1	DAC Driver	
					🗐 🥑 dmamux	2.0.2	DMAMUX Driver	
Board desc	ription: FRDM-K64F				📄 🥑 dspi	2.1.4	DSPI Driver	
FRDM-K64	F: Freedom Developr	nent Platform for Kinetis	K64, K63, and		📃 🥑 edma	2.1.1	EDMA Driver	
K24 MCUs					🗕 📃 🥑 enet	2.1.1	ENET Driver	
			Ψ.		🔄 🥝 ewm	2.0.1	EWM Driver	
				1	🔽 🥑 flash	2.2.0	Flash Driver	
Problems	X 🔄 Log				📃 🥑 flexbus	2.0.1	FLEXBUS Driver	
type filter te	d				📄 🥑 flexcan	2.2.0	FLEXCAN Driver	
	-				🔄 🥝 ftm	2.0.2	FTM Driver	
Level	Issue		Origin		🔽 🧭 gpio	2.1.1	GPIO Driver	
					📃 🥑 i2c	2.0.3	I2C Driver	
					🔄 🥑 Ilwu	2.0.1	LLWU Driver	
					🔄 🥝 Iptmr	2.0.0	LPTMR Driver	
	m				dbg 🚫 🥅	2.0.1	PDB Driver	*

- Part of the MCUXpresso suite of system configuration tools
- Provide a quick process for integrating output from the Pins, Clocks, and Peripheral tools into a user's custom application.
- Creates a standalone MCUXpresso SDK application, with all required SDK driver files.
- Includes validation checks to ensure that driver files and utilities required as specified by the MCUXpresso Config Tools are included in the generated project.
- One-click solution to reduce the number of included SDK driver to only those required for the project.
- Allows for iterative development by providing the ability to create a new application or update an existing application previously created with Project Generator.
- Available as part of the desktop MCUXpresso Config Tool application.



MCUXpresso Config - Power Estimation Tool



Estimate and optimize your system's power consumption



Helps you design for efficient use of energy

MCU 5e	Section: MWZ2FN512x	w12.4		Power	Modes.	Class	s Perspine	enti	Consumptio	on Gr	uph biso	harge Graph	Notes		
Series:	Kinetis K			100	m#1 (8)	in 1)		3 (Run 2)				5 (1	Run 2) 9 (Ri	un 4)
HOU:	MK22PN512xxx12			101	nA: A		-				4 (6)	WE 17	_	7 (12 34 m	T.
Sattery	Selection										_		-		
100 15 19 11 State 11 State	lungry States e #1 (Run 1): 23.1% e #3 (Run 2): 23.1%	r of bet of bet		101	un -		2 (VLL50 1)	,		+				B (VILLS	9.3)
11 52 464	e #5 (Run 3): 23.1%	of bat						-		_			-		
i: State	e #9 (Run 4): 23,1% e #4 (Stop 1): 6,8% o	of bat A batt		0 µ	A O	View	a.0 ms 0 Total	ent e	12.0 ma HEU-care ca	3.0.3 Miterri	Prituties	nio 24.0 m als current	a 10.0 ma	ade cruseur	e.0 ms
i, Statu i: State empera	e #0 (Run 4): 23,1% e #4 (Stop 1): 6,8% o ature & Power Supply	of bat 9 batt 8	ĸ	0 pr	A O	Ultree	4.0 ma (ent 💿	32.0 ma INCU-care os	10.1 Miterri	Dinte 20.0	nių 24.0 m als surrent	a 20.0 ma	age corrent	e.0 ms
i: State i: State emperi lemper	e #9 (Run 4): 23.1% e #4 (Stop 1): 6.8% o sture & Power Supply where 25 °C/77.0 °	of bat of batt	~	0 pr	A O The Equation (Control of the (Control of t	Ul rea	4.0 min (Tabel surve	e D Hia tiff 💿	32.0 ma REU-care o	10. Miterri	Bine 20.0	110 24.0 m als current	a 10.0 ma	age current.	 Profil
I: State i: State emperi Iemperi IDD Por IDD A P	e #9 (Run 4): 23.1% e #4 (Stop 1): 6.8% o ature & Power Supply ature: 25 °C/77.0 ° wer Supply: Yower Supply:	of bat # batt # E 3.3 V 3.3 V	ĸ	0 pr	A O The Equiv The Eq	Cit ma View	a 0 ma () Tatal carro Duration	ent •	32.0 ma NCU-core co	10) NTERT	Binne 20.0 Printphee SystemCore	ma 24.0 m ski surrent Bus	Flash	32.0 mis 3 age current FlexBus	- Profil
I: State i: State remperi /DD Po /DDA P	e #9 (Run 4): 23,1% e #4 (Stop 1): 6.8% o ature & Power Supply where [25 °C/77.0 ° wer Supply: Yower Supply:	of but f batt f a a 3.3 V 3.3 V	×	0 pe	A O me Equa me Andle X + Name Rum 1	Ultree View	4.0 ms 1 Total corre Duration 1 ms (2.7%)	ED HA BIR • P	32.0 ms RCU-mre of	10.1 Arrent ACG 5 EL 6	Dime 20.0 Philiphee SystemCore 80 MHz	Hig 24.0 m ski starrett Bus 40 MHz	Flash 26.67 MHz	FlexBus 20 MHz	Profil Fill 80
i: State State emperi OD Po ODA P	e #9 (Run 4): 23,1% e #4 (Stop 1): 6.8% o ature & Power Supply where: 25 °C/77.0 ° wer Supply: Yower Supply:	of but f batt f a E 1.9 V 3.3 V	×	0 p Time State 1 2	A o - Equar - Equar	Ultree View	4.0 ms 1 Tata una Duration 1 ms (2.7%) 10 ms (27.0	E D Hi4 111 • P) R (3%) V	12.0 ma RCU-care of ower Mode M un f LLSO (Annent Acco s FL &	Dime 20.0 Perturne SystemCore 80 MHz . OFF	Bus 40 MHz OFF	Plags 26.67 MHz OHF	ResBus 20 MH2 OFF	Fill Profil Prof
: Statu Statu emperi DD Po DDA P	e #0 (Run 4): 23,1% e #4 (Stop 1): 6,8% e ature & Power Supply ature: 25 °C/77,0 ° wer Supply: Yower Supply:	of bat f batt f E 1.3 V 3.3 V	ec.	D po The State 1 3	A o me Equa or Proble X 1 Narre Aun 1 VILSO 1 Run 2	e Viene	4.0 ms 1 Total uppe Duration 1 ms (2.7%) 10 ms (2.7%) 1 ms (2.7%)	E D Hia crift • P (3%) V (3%) V	32.0 ma PICU core co ower Mode M un f LLSO C un f	10.1 4CG 5 TL 1 3FF 1 TL 1	D HIU 20.0 Pritphie SystemCore 80 MHz OFF 80 MHz	Bus 40 MH2 OFF 40 MH2	Plash 26.67 MHz 26.67 MHz	ResBus 20 MH2 OFF 20 MH2	 Profil Profil PLL 80 047 80
: Statu : Statu empeti emperi /DD Por /DDA P	e #0 (Run 4): 23,1% e #4 (Stop 1): 6,8% e ature & Power Supply where: 25 °C/77,0.4 www.Supply: *Kwer Supply:	of bat f batt. F 1.0 V 3.3 V	×	D po The State 1 2 3	A o 	4 4 View 4	4.0 ms 1 Table upper Duration 1 ms (2.7%) 10 ms (2.7%) 10 ms (2.7%)	E D mil ant • P 3 % 3 % 3 % 3 %	12.0 ms HCU-core of ower Mode M un f LLSO t un f f Tran (10.1 4CG 5 #1 8 2FF 0 #1 1	D HIU 20.0 Pritphen SystemCore 80 MHz 00FF 80 MHz 2010	Bus 40 MHz OFF 40 MHz 204	Plads 26.67 MHz 0HF 26.67 MHz 0LU	ResBus 20 MH2 OFF 20 MH2 CTD	- Profil FLL 80. 097 80
I: Statu i: Statu emperi /DD Po /DDA P	e #0 (Run 4): 23,1% e #4 (Stop 1): 6,8% e ature & Power Supply offwer: 25 %C/77,6.% www.Supply: Yower Supply:	of bat f batt F 1.3 V 3.3 V	×	D po The State 1 2 3 5	A o me Equa er Pedile X + Narre Run 1 VLLSO 1 Run 2 Run 3	View View	4.0 ms (7 state upper Duration 1 ms (2.7%) 10 ms (2.7%) 10 ms (2.7%) 11 ms (2.7%)	ED mi+ mi ●) R (3%) V) R (3%) K	12.0 ms NCU-core of ower Mode 3 un f LLSO 0 un f Un f		D miu 20.0 Pritulies SystemCore 80 MHz OFF 80 MHz 80 MHz 80 MHz	Bus 40 MHz 0FF 40 MHz 2000 40 MHz	 20.0 ms Ave Plash 26.67 MHz OHF 26.67 MHz Cubi 26.67 MHz 	ResBus 20 MH2 0FF 20 MH2 CTJ 20 MH2	Profil FLL SQ 1 CoFF BQ 1 CoFF BQ 1 SQ 1 SQ 1 SQ 1
I: Statu i: Statu remper /DD Por /DDA P	e #0 (Run 4): 23,1% e #4 (Stop 1): 6,8% e ature & Power Supply offwer: 25 %C/77,0.% wer Supply: Yower Supply:	of bat f batt E 1.3 V 3.3 V	×	D particular de la comparticipación de la com	A o 	U ma	4.0 ms 1 Table unit Duration 1 ms (2.7%) 10 ms (2.7%) 10 ms (2.7%) 10 ms (2.7%) 1 ms (2.7%) 1 ms (2.7%)	ED mii mil●) R (3%) V) R (3%) V) R) V	12.0 ms HCU-care of ower Mode M un f LLSO t un f LLSO t un f LPW s	10.3 40.66 5 11 6 11 1 11 1 11 1 11 1 11 1 11 1	D mili 20.0 Prittike SystemCore 80 MHz 0FF 80 MHz 80 MHz 2 MHz 2 MHz	Bus 40 MHz 0FF 40 MHz 20Hz 2 MHz	Plash 26.67 MHz 0HF 26.67 MHz 26.67 MHz 657 KHz	FlexBus 20 MH2 0FF 20 MH2 0FF 20 MH2 20 MH2 1 MH2	FLL 901 007 801 007 801 007

- Available as a standalone desktop application
- · Models application states and estimates the power profile
- Provides immediate energy consumption & battery life estimations
- · Generates consumption and battery discharge graphs
- Provides ability to save & load profiles and generate reports
- · Local and online versions to be available
- English & limited Chinese language support
- · Backed by real power measurement data
- Quickly evaluate which Kinetis MCU fits your use-case and power budget
- Accelerates learning curve for advanced power management features
- Ideal tool for developing wearable and other battery-operated applications.





Walk-through of tools

MCUXpresso SDK Builder, IDE, Config Tools (desktop)



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

- MCUXpresso SDK Builder
- MCUXpresso SDK Archive
- Online MCUXpresso Config Tools



MCUXpresso IDE

- MCUXpresso SDK Installation
- Quickstart Panel

- all lockates I LO CMOS

a 🔄 board

in 125 drivers

a (2) source

in 🔝 startup

+ 10 without

Ide doc

+ Start lare Marr project.

Boppet IDK example(i)-

Dunk Settingsi ...

| 2 beard.c

· A beath · R clock_configu

· A stock cantight preprinter. A pin much

a all halls, world.

Development Perspective





MCUXpresso Config Tools (Desktop Version)

- Pins and Clock Configuration
- Code Generation
- Conflict Resolution

100 test (11) 100 te		Provide B top B house 1 Provide B hou	© 2017 NXP B.V.
Procyane and ULTIMANE. ULTIMANE. HETIMANE. HETIMANE HETI ULTIMANE HETI ULTI ULTIMANE HETI ULTIMANE HETI ULTIMANE HETI ULTIMANE HETI ULTIMANE. ULTIMANE. ULTIMANE. HETIMANE. ULTIMANE. HETIMANE. HETIMANE. HETIMANE.	Image: Notion of the second		Construction of the second class in the second class in the second class in the second class and class the second class in the second class i
		Excited for - WE look 10.00 heperforms	Activities A

MCUXpresso Config Tools

ПП

Ð

<u>111111</u>



Hands-on Lab

SDK Configuration and Build, Getting Started with IDE, Board Configuration using Config Tools



Import Example Project

- Prerequisite:
 - Workspace: C:\MCUXpressoSW_Lab
 - SDK_2.x_FRDM-K64F installed in IDE
- Use Quickstart Panel to "Import SDK example(s)..."
- Select frdmk64f board image
- Locate "hello world" project (listed under demo_apps)
- Redirect printf to UART

Import projects Project name prefix frdmk64f_ Use default location Location: C:\Users\r83857\Documents\MCUXpressoIDE_10.0.0_344\workspace\frdmk64f_ Project Type @ C Project @ C Project C ++ Project @ C Project C ++ Project @ C project Wame > @ demo_apps > @ demo_apps > @ demo_apps > @ mbedtls @ addl6_low_power @ bubble @ dec_adc @ ecompass @ ftm_quad_decoder Ø hello_world @ power_manager @ power_manager @ power_managers @ multiprocessor_examples > @ multiprocessor_examples > @ multiprocessor_examples > @ multiprocessor_examples	You have selected	'1' projects to import.	
Project name prefix frdmk64f_ ✓ Use default location Location: C:\Users\r83857\Documents\MCUXpressoIDE_10.0.0_344\workspace\frdmk64f_ Project Type	Import pro	ojects	
 ✓ Use default location Location: C:\Users\r63857\Documents\MCUXpressoIDE_10.0.0_344\workspace\frdmk64f_ Project Type ● C Project ● C++ Project ● C Static Library ● C++ Static Library Examples type to filter Name ● ● ● cmsis_driver_examples ● ● ● demo_apps ● ● ● mbedtls ● ■ demo_apps ● ● ● mbedtls ■ ■ dc16_low_power ■ bubble ■ ≤ ccmpass ■ ftm_pdb_adc16 ■ ftm_quad_decoder ♥ ● ● hello_world ● power_monager ■ power_mode_switch ■ tc_func ■ shell ● ● ● mmcau_examples ● ● ● mmcau_examples ● ● ● mmcau_examples ● ● ● multiprocessor_examples 	Project name prefix:	frdmk64f_	
Location: C:\Users\r83857\Documents\MCUXpressoIDE_10.0.0_344\workspace\frdmk64f_ Project Type © C Project © C++ Project © C Static Library © C++ Static Library Examples type to filter Name > © cmsis_driver_examples > © demo_apps > © demo_apps > © demo_apps > © defo_low_power © bubble © dac_adc © ecompass © ftm_pdb_adc16 © ftm_quad_decoder Ø hello_world © power_manager © power_mode_switch © ftro_func © shell > © driver_examples > © mncau_examples > © multiprocessor_examples > © rtos_examples	Use default loca	tion	
Project Type	Location: C:\Users	\r83857\Documents\MCUXpressoIDE_10.0.0_344\workspace\frdmk64f_	
 C Project C++ Project C Static Library C++ Static Library Examples type to filter cmsis_driver_examples demo_apps demo_apps imbedtls adc16_low_power bubble dac_adc ecompass ftm_pdb_adc16 ftm_quad_decoder hello_world power_mode_switch ftc_func shell driver_examples multiprocessor_examples multiprocessor_examples multiprocessor_examples rto_examples rto_examples 	Project Type		
Examples type to filter Name cmsis_driver_examples demo_apps demo_apps mbedtls adc16_low_power bubble dac_adc ecompass ftm_pdb_adc16 ftm_quad_decoder hello_world power_manager power_mode_switch trc_func shell endriver_examples multiprocessor_examples multiprocessor_examples endstate 	C Project C	++ Project 💿 C Static Library 💿 C++ Static Library	
Examples type to filter Name cmsis_driver_examples demo_apps demo_apps imbedtls mbedtls imadcl6_low_power imbuble imadcl6_low_power imbuble implb_adcl6 impltm_quad_decoder imple_mode_switch imp			
type to filter Name 	Examples		
Name cmsis_driver_examples demo_apps mbedtls mbedtls adc16_low_power bubble dac_adc ecompass ftm_pdb_adc16 ftm_quad_decoder hello_world power_manager power_mode_switch rtc_func shell mmcau_examples multiprocessor_examples multiprocessor_examples rtos_examples 	type to filter		
Image: consis_driver_examples	Name		
▶ ■		river evamples	
 Image: Second second	⊿ ■ ≡ demo a	pps	
mbedtls mbedtls mbble	⊳ 🔲 🗧 lwip		
 adc16_low_power bubble dac_adc ecompass ftm_pdb_adc16 ftm_quad_decoder hello_world power_manager power_mode_switch rtc_func shell driver_examples mmcau_examples multiprocessor_examples rtos_examples rtos_examples 	D 📄 🗧 mbe	edtls	
 bubble dac_adc ecompass ftm_pdb_adc16 ftm_quad_decoder ftm_quad_decoder hello_world power_manager power_mode_switch rtc_func shell driver_examples mmcau_examples multiprocessor_examples rtos_examples rtos_examples 	🔳 🔤 adc1	L6_low_power	
<pre>dac_adc dac_adc d</pre>	🔲 🖉 bub	ble	
<pre> ecompass ftm_pdb_adc16 ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_gover_manager ftm_gover_manager ftm_total ftm_tota</pre>	🔲 🗮 dac_	_adc	
<pre>ftm_pdb_adcl6 ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_quad_decoder ftm_power_manager ftm_power_mode_switch ftm_ftm_tc_func ftm_ftm_tc_func ftm_ftm_tc_func ftm_ftm_tc_func ftm_ftm_tc_f</pre>	ecor	mpass	
<pre>image: image: imag</pre>	l ≣ ftm_	pdb_adc16	
<pre> inclosevorid inclosevorid</pre>	i i i i i i i i i i i i i i i i i i i	quad_decoder	
<pre>power_mode_switch</pre>		er manager	
□ □		er mode switch	
□ ■ shell ▷ □ ■ driver_examples ▷ □ ■ mmcau_examples ▷ □ ■ multiprocessor_examples ▷ □ ■ rtos_examples	□ = pow	uunc	
▷ □ </td <td>🔲 🗐 shel</td> <td>I de la construcción de la constru</td> <td></td>	🔲 🗐 shel	I de la construcción de la constru	
▷ □ </td <td>⊳ 🔲 🗧 driver_e</td> <td>xamples</td> <td></td>	⊳ 🔲 🗧 driver_e	xamples	
 multiprocessor_examples m = rtos_examples 	Image:	_examples	
Image: tos_examples	D E multipre	ocessor_examples	
	Image: Image: book image: b	mples	



Hello World – Build and Debug

Connect FRDM-K64F board (mini USB to OpenSDA)

- Board may need to enumerate USB connection

- Connect terminal application (Virtual COM port)
- Use IDE Quickstart Panel to:
 - -Clean
 - Build
 - Debug



Quickstart Panel 🔀 (x)= Global Variables (x)= Variables (🕒 🕒 Break	points 📴 Outline				
MCUXpresso IDE (Free Edition)			_			
Start here						
New project	Pro	bes discovered	and the second second			
Import SDK example(s)	Conn	ect to target: MK64FN	1M0xxx12			
Import project(s) from file system	1 pro	be found. Select the prob	e to use:			
Build 'frdmk64f_demo_apps_hello_world' [Debug]			1999 (M. 1997)			
Clean 'frdmk64f_demo_apps_hello_world' [Debug]	Avai	lable attached pro	obes			
Debug 'frdmk64f_demo_apps_hello_world' [Debug]		Name	Serial number/ID	Туре	Manufacturer	IDE Debug Mode
	×	MBED CMSIS-DAP	02400226c3033e5e0000	LinkServer	MBED	Non-Stop



Add SysTick Delay Timer

- Code additions to "hello_world.c"
 - Global Variables:
 - DelayTimerTick = 0
 - Functions:
 - InitSysTick(void) /* Initialize SysTick Registers */
 - SysTick_Handler(void) /* Override Interrupt Handler Function for SysTick */
 - Delay_SysTick(uint32_t SysTicks) /* Delay based on SysTick Counter */
 - -Main() Additions
 - Call InitSysTick()

*All code changes are detailed in "MCUX SW and Tools Lab.docx"



MCUXpresso Config Tools – Pins Configuration (Output)

- Pin muxing configuration for:
 - -PTB21: "Blue LED"
 - -PTB22: "Red LED"
 - -PTE26: "Green LED"
- Routed Pins Table
 - Selection of "MY_LED" identifier
- Export Generated Code
 pin_mux.c / pin_mux.h

	Contractory and	a views	Lieb.									
Pina II	* Periphi	eralo			O Packa	ge 🗐 Routes	Pins				Sources 11 🛄 Registers 📄 Log	
田田	LED				type filb	n text					pin_muse pin_mush	
9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	_LED t name E26 B21 B22	Label 12[1]/D D12[3]/ D12[1]/	Identifier LED_GREEN LED_BLUE, LED_RED;M	GPIO L PTIAL L PTERL PTERL	type fibb #oute 62 63 33 67 68	d Pers Perspheral UARTO UARTO UARTO UARTO GPICE GPICE GPICE	5 O Signal RX TX GPI0, 20 GPI0, 22	Route to UARTO_FX UARTO_TX PTE26 PTE21 PTE22	Labei U7/4/JUARTO_8X U10/J/UARTO_8X XQ1/012/4/J.E D12/JJ/012/4/J.E. D12/JJ/1EDR58	Mertifie DEBUG_UART_RX DEBUG_UART_TX LLD_GREEN LED_BUE MY_LED	<pre>ph_mux.c pm_mux.h /* PORTBIS (number 62), U7[4]/UMATB_RX */ adefine BOARD_INITPINS_DEBUG_UMAT_RX_PERIPHERAL adefine BOARD_INITPINS_DEBUG_UMAT_RX_SIGNUL adefine BOARD_INITPINS_DEBUG_UMAT_RX_LARC, adefine BOARD_INITPINS_DEBUG_UMAT_RX_SIGNAL adefine BOARD_INITPINS_DEBUG_UMAT_RX_LARC, adefine BOARD_INITPINS_DEBUG_UMAT_RX_LARC, adefine BOARD_INITPINS_DEBUG_UMAT_RX_NAME /* FORTE26 (number 35), 12[1]/DII[4]/LEDBBE_DEBEU */ adefine BOARD_INITPINS_LED_BEEM_GPIG adefine BOARD_INITPINS_LED_GREEN_PIN_MAME adefine BOARD_INITPINS_LED_GREEN_NAME adefine BOARD_INITPINS_LED_ROM Adefine BOARD_INITPINS_LED_ROM</pre>	*32[1] kPI
							ŧ.				<pre>#define BOARD_INITFINS_LED_BLUE_LABL #define BOARD_INITFINS_LED_BLUE_NAME edefine BOARD_INITFINS_LED_BLUE_DAME /* PORTB22 (number GB), D12[1]/LEDROB_RED */ #define BOARD_INITFINS_NV_LED_PORT</pre>	k91
	h			•	BOARD	InitFins O					* [



Blinky LED

- Code additions to "hello_world.c"
 - Peripheral Initialization
 - GPIO Driver: "fsl_gpio.h"
 - BOARD_InitPeripheral(void) /* GPIO Peripheral Initialization Function */
 - -User Integration (updated main while loop)
 - Delay_SysTick /* User created delay function based on SysTick */
 - GPIO_TogglePinsOutput /* SDK GPIO Driver API */
 - -Main() Additions
 - Call BOARD_InitPeripheral ()
 - New while(1) loop

*All code changes are detailed in "MCUX SW and Tools Lab.docx"



Switch LED Pin using Config Tool

- Change "MY_LED" identifier to different LED
- Export updated code
- Refresh (F5) in IDE
- Build and Debug

enite	r text					
outed	Pins 🕒	5 💽 🖌				
ŧ	Peripheral	Signal	Route to	Label	Identifier	Direction
62	UART0	RX	UART0_RX	U7[4]/UART0_RX	DEBUG_UART_RX	Input
63	UART0	ТΧ	UART0_TX	U10[1]/UART0_TX	DEBUG_UART_TX	Not Specified
33	GPIOE	GPIO, 26	PTE26	J2[1]/D12[4]/LE	LED_GREEN	Output
67	GPIOB	GPIO, 21	PTB21	D12[3]/LEDRGB	MY_LED	Output
		CD10 00	DTDDD	D12(11/LEDDCD		Output



MCUXpresso Config Tools – Pins Configuration (Input)

- Pin muxing configuration for:
 - -PTA4: "SW3"
 - -PTC6: "SW2"
- Routed Pins Table
 - Selection of "SW2" identifier
- Export Generated Code
 - -pin_mux.c / pin_mux.h

Pins 🛛 🦞 Peripherals 📃 🗖						📮 Package 🔂 Routed Pins							
👔 😰 sw							type filter text						
Pin	Pin name	Label	Identifier	GPIO	FT	R	Routed	d Pins 🖸 7 💽 🔨		✓			
✓ 38 ✓ 78	PTA4 PTC6	SW3 U8[11]/	SW3 SW2;ACCE	PTA4 PTC6	FT		#	Peripheral	Signal	Route to	Label	Identifier	
							62	UART0	RX	UART0_RX	U7[4]/UART0_RX	DEBUG_UART_RX	
							63	UART0	TX	UARTO_TX	U10[1]/UART0_TX	DEBUG_UART_TX	
							33	GPIOE	GPIO, 26	PTE26	J2[1]/D12[4]/LE	LED_GREEN	
							67	GPIOB	GPIO, 21	PTB21	D12[3]/LEDRGB	LED_BLUE	
							68	GPIOB	GPIO, 22	PTB22	D12[1]/LEDRGB	MY_LED	
							38	GPIOA	GPIO, 4	PTA4	SW3	SW3	
							78	GPIOC	GPIO, 6	PTC6	U8[11]/SW2	SW2	
						1 -							
						1 -							

Interrupt Push Button

- Code additions to "hello_world.c"
 - Peripheral Initialization
 - Update BOARD_InitPeripheral(void) /* GPIO Peripheral Initialization Function */
 - GPIO Driver: "fsl_port.h"
 - Global Variable:
 - g_count = 0 /* Global Counter for pushbutton */
 - Functions:
 - PORTC_IRQHandler(void) /* User created delay function based on SysTick */

*All code changes are detailed in "MCUX SW and Tools Lab.docx"



MCUXpresso Config Tools – Clock Configurations

- Changing Core Clock
 - -60 MHz?
 - -64 MHz?
- Export Generated Code
 - -clock_config.c / clock_config.h
- Additional clock mode functions (VLPR – 4MHz)





MCUXpresso Software and Tools

COMMON TOOLKIT FOR THOUSANDS OF KINETIS[®] & LPC MICROCONTROLLERS



MCUXpresso Software and Tools Additional Resources

Web pages

- -MCUXpresso Software and Tools <u>www.nxp.com/mcuxpresso</u>
- MCUXpresso SDK <u>www.nxp.com/mcuxpresso/sdk</u>
- MCUXpresso IDE www.nxp.com/mcuxpresso/ide
- MCUXpresso Config Tools www.nxp.com/mcuxpresso/config

Supported Devices: <u>Supported Devices Table (Community Doc)</u>

Communities

- MCUXpresso Software and Tools https://community.nxp.com/community/mcuxpresso
- MCUXpresso SDK- https://community.nxp.com/community/mcuxpresso/mcuxpresso-sdk
- MCUXpresso IDE- https://community.nxp.com/community/mcuxpresso/mcuxpresso-ide
- MCUXpresso Config Tools -<u>https://community.nxp.com/community/mcuxpresso/mcuxpresso-config</u>







SECURE CONNECTIONS FOR A SMARTER WORLD

NXP and the NXP logo are trademarks of NXP B.V. All other product or service names are the property of their respective owners. © 2017 NXP B.V.