XMC1100 Boot Kit Getting Started





- DAVETM Setup
- Hardware Setup
- Boot Mode Index Configuration
- Getting Started Examples
 - □ <u>Simple Blinky</u> (Simple XMC1100 Blinky.zip)
 - □ <u>Blinky based on DAVE apps</u> (XMC1100 Blinky.zip)
- Example Projects Download
- Getting Started Videos

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■ DAVETM Setup

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DAVE[™] Setup



■ Download DAVETM installer package from:

http://www.infineon.com/cms/en/product/promopages/aim-mc/DAVE 3 Download.html

DAVE[™] Download



DAVE[™] version 3.1.6 Download Options There are two download options available:

■ DAVE[™] version 3.1.6 as regular installer package

This is a regular installer (setup.exe) that install DAVE[™] and the SEGGER J-Link drivers in a user defined target folder. In case an earlier version of DAVE[™] is already installed, the installer will uninstall the old version and install the new version in the same target folder. This ensures that workspaces from earlier versions of DAVE[™] can be used with the new version. The installer package includes also an installation of a complete set of DAVE[™] Apps and device descriptions if there are no DAVE[™] Apps installed yet. <u>DOWNLOAD</u> the installer package

DAVE[™] version 3.1.6 as zipped file package
 This package contains a zin file with all required files to run DA¹

This package contains a zip file with all required files to run DAVE[™] on a PC plus the installation setup for the SEGGER J-Link drivers. The zip file can be unzipped anywhere and DAVE[™] can be started form the ... \eclipse folder. The package is wrapped in an exe that users can accept the licenses conditions. <u>DOWNLOAD</u> the zipped file package

■ Note: For users who have downloaded DAVETM as a zipped file package, DAVETM can be started via DAVE-*.exe in the eclipse folder.

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DAVE BILG

DAVE[™] Setup

Download and unzip the installer package

Run *_Setup.exe file to install DAVE and Segger J-Link drivers

■ Open DAVETM program

■ Check for DAVE updates
Help → Check for Updates



DAVE-3.1.6_Master_Setup.exe



DAVE[™] Setup



Install DAVE Apps and Device Descriptions

Help \rightarrow Install DAVE Apps Library

Debug Windo	w Help		
🤹 🖯 🏶 🔳	2	Welcome	
	0	Help Contents	
	- 39	Search	
		Dynamic Help	
		Key Assist	Ctrl+Shift+L
		Tips and Tricks	
		DAVE Forum	
		DAVE Online Support	
		Cheat Sheets	
	2	Install DAVE Apps/Example Library	
		Check for DAVE App Updates	
		Uninstall DAVE App/Example Library	
		Check for Updates	
		Install New Software	
		About DAVE 3	

Note: You may skip the above step if you are not using DAVE Apps





Select DAVE Apps Library Manager in the drop-down menu

😜 Library Manager Wixerd			C 8
Download Libraries Page This wized page helps in downloading the libraries of type example p	njects or apps likewy		
Dave Site Work with : DHE Appo Library Manager		First more literary by working with the Literary Society	· Add_
Libraries			
Enter the keywords to filter :			
Name Library, DAYEApps Library, DAYEDeviceDeviceTonorptions	Venion	Path	
Select AB Develop AB			
Fitues Hide lares that are already downloaded Show only latest version			-
3		Kark Not > 1	Finish Caned

Select Library_DAVEApps and Library_DAVEDeviceDescriptions (for XMC1100 Device) and click Next

Library_DAVEApps

V Library_DAVEDeviceDescriptions





Accept terms of the license agreements and click Finish

IMPORTANT DOWNLOAD NOTICE

The software you have requested for download is protected by national and international copyright laws and may be protected by other intellectual property rights. You shall use the software only in accordance with the applicable licensing terms and conditions which may be different from the terms and conditions of the DAVE 3 Software License Agreement. For copyright information, licensing terms and additional information (e.g. on how to obtain the source code of such Open Source Software), please check the "Help Function", Section "Copyright and Licensing Information" of the software. By downloading the software, you acknowledge that you have read and understood this download notice.

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DAVE Apps and DAVE device descriptions are installed



■ DAVETM Setup

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- XMC1100 Boot Kit
 - □ Consists of an XMC1100 CPU Card
 - □ Compatible with Arduino[™] Shields (*http://shieldlist.org*)



XMC1100 CPU Card



Arduino[™] Shield





■ XMC1100 CPU Card for ArduinoTM



Hardware Setup



Connect XMC1100 CPU Card to PC via USB cable CPU Card is powered up (as indicated by LED on the card)





Note: Supported Application Card may be additionally connected to the CPU card





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Boot Mode Index Configuration



- Boot Modes available
 - UART Bootstrap-Loader Mode
 - □ User Mode (Halt After Reset)
 - User Mode (Debug) Default Mode of device on Boot Kit
 - □ User Mode (Productive)
- Boot Modes can be configured via:
 - DAVE
 - Download DAVE

http://www.infineon.com/cms/en/product/promopages/aim-mc/DAVE 3 Download.html

MemTool

Download MemTool

http://www.infineon.com/cms/en/product/channel.html?channel=ff80808112ab681d0112ab6b50fe07c9

For more information on how to configure the BMI value, please refer to the XMC1000 Tooling Guide.



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1. Open DAVE[™]



- In DAVE[™] workspace, create a new "Empty Main" project:
 - □ File->New->DAVE Project
 - Give the project a name e.g.
 "XMC1100_Blinky"

Select "Empty Main Project"



3. Select the device accordingly

Target Selection Page			
Select the controller for which	the project has to be create	st	
V Processessinfo MAC4000 MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 A V XMC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie MAC4000 Serie	s 5 ALDO Series 10 1028F0064 a		
Device Features Package:: PG-TSSOP-38 ROM= 64 KB Flash RAM:: 56 KB RAM InOute: 34 digital IVO ADC:: 12 ADC Channels, 12	-bit, Analog-to-Digital Com	verter	. [24]
Device Features Package: PG-TSSOP-38 ROMe 64 K8 Risch RAM: 56 K8 RISCH RAM	-bit, Analog-to-Olgital Com	verter	1 (11) ·
Device Features Package: PG-TSSOP-38 ROM= 64 K8 Rash RAM: 55 KB Rash InVide: 34 depital I/O ADC:: 12 ADC Channels, 12 Workaround for Silicon Bugs Start up File preferences I Add/Update start up files	-bit, Analog-to-Digital Com	verter	· ("H)

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- For this project, we will use
 - □ System clock frequency of 8MHz
 - □ LED on Port pin 0.5
 - ¬ LED is toggled in the SysTick interrupt service routine
 - □ System timer, SysTick, as the time base for the interrupt
 - ¬ Time base of 0.2s
- Next, we will show you how to
 - 1. Set up the System or Main Clock (MCLK)
 - 2. Configure Port pin
 - 3. Configure SysTick and define its exception service routine



- 1. Set up System or Main Clock (MCLK)
 - □ MCLK configured via **IDIV** and **FDIV** bit fields in register **CLKCR**
 - □ CLKCR and all registers of the XMC1100 are defined in **XMC1100.h**



IDIV and FDIV are protected bits, therefore access has to be opened prior to configuration via register **PASSWD**

Configuration in Main.c





- 2. Configure Port pin
 - Port registers are defined in XMC1100.h
 - Ports-related macros and functions are provided in the header file, gpio_xmc1100_tssop38.h

A 😂 XMC1100_Blinky [Active - Debug]	22 #define OUTPUT_PP_AF6 0x80U
Binaries	23 #define OUTPUT PP AF7 ØxB8U
b) Includes	24 #define OUTPUT OD GP 0xC0U
Debug	25 #define OUTPUT OD AF1 ØxC8U
Startup	26 #define OUTPUT OD AF2 ØxDØU
h gpio_xmc1100_tssop38.h	
Main.c	37 STATIC THUTNE word PO A set mode (wints + mode)
ARM toolset settings Debug jink	30 DODTA . TOCDA &
ReadMe.txt	30 PORTO >TOCHO d= mode of 0:
XMC1100 Blinky Jaunch	39 PORTO->IOCKO [= mode << 0;
 XMC1100 Blinky.ld 	40]

672 /** @brief Port 0 (PORT0) 673 674 = / 675 676 typedef struct { 677 IO uint32 t OUT; 678 O uint32 t OMR; I uint32 t RESERVED0[2]; 679 IO uint32 t IOCR0; 680 681 IO uint32 t IOCR4; 682 IO uint32 t IOCR8; 683 IO uint32 t IOCR12; 684 I uint32 t RESERVED1; I uint32 t IN; 685 686 I uint32 t RESERVED2[6]; 687 IO uint32 t PHCR0; 688 IO uint32 t PHCR1; 689 I uint32 t RESERVED3[6]; I uint32 t PDISC; 690 691 I uint32 t RESERVED4[3]; 692 IO uint32 t PPS; 693 IO uint32 t HWSEL; 694 } PORTØ Type;

With this header file, we can easily initialize the port pin 0.5 as a general purpose output pin in Main.c, using the provided macro

49 #include "gpio_XMC1100_tssop38.h"

- 63 //----PIN-SETUP-----
- 64 P0_5_set_mode(OUTPUT_OD_GP);
- 65 //-----



3. Configure SysTick and define its exception service routine

Initialization function is defined in core_cm0.h

A Strain Stra	641STATIC_INLINE uint32_t SysTick_Config(uint32_t ticks)	
 	642 { 643 if (ticks > SysTick_LOAD_RELOAD_Msk) return (1); 644	/* Reload value impossible */
 C:/DAVE-3.1.4_20130201/ARM-GCC/arm- C:/DAVE-3.1.4_20130201/CMSIS/Include m arm_common_tables.h m arm_math.h 	<pre>645 SysTick->LOAD = (ticks & SysTick_LOAD_RELOAD_Msk) - 1; 646 NVIC_SetPriority (SysTick_IRQn, (1<<_NVIC_PRIO_BITS) - 1); 647 SysTick->VAL = 0; 648 SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk </pre>	/* set reload register */ /* set Priority for Systick Interrupt */ /* Load the SysTick Counter Value */
 in core_cm0.h in core_cm0plus.h in core_cm3.h 	649 SysTick_CTRL_TICKINT_Msk 650 SysTick_CTRL_ENABLE_Msk; 651 return (0); 652 }	/* Enable SysTick IRQ and SysTick Timer */ /* Function successful */

SysTick exception handler is defined in startup_XMC1100.s



C Main.c

77

□ Initialize the SysTick in **Main.c**

```
74
      //----SYSTICK-SETUP
      SystemCoreClockUpdate();
75
```

```
76
```

```
SysTick_Config(SystemCoreClock / 5); // 0.2s interrupt base
```

Define the SysTick exception handler routine in Main.c

```
¬ Toggle the LED
```

```
55 void SysTick Handler(void)
56 {
57
      P0 5 toggle();
58 }
```

// 0.2s interrupt base



Build project

- 1. Click 👼
- 2. Wait for Build to finish
- Download code
 - 1. Click 🕸
 - 2. Switch to TASKING Debug view
 - 3. Click **i** to run code

LED blinks every 0.2s



DAVE CE 🗄 DAVE IDE

Properties

hex filename

TASKING De...

d28 XMC1100 Blinky.elf

C:\DAVE-3.1.4 20130201\ARM-GCC/bin/arm-none-eabi-size" -- form

dec

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🕺 Active Project Problems 📮 Console 🖾

bss

'Finished building: XMC1100 Blinky.siz'

0 2056 3368

CDT Build Console [XMC1100_Blinky] 'Invoking: ARM-GCC Print Size

data

**** Build Finished ****

text

1312



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1. Open DAVE[™]



- In DAVE[™] workspace, create a new "DAVE CE" project:
 - □ File->New->DAVE Project
 - Give the project a name e.g. "XMC1100_Blinky_withApps"
 - Select "DAVE CE Project" as Project Type



3. Select the device accordingly

arget Selection Page	
Select the controller for which the project has to be created	
A IV Processorshife	
# 🖂 XMC4000	
XMC4500 Series	
XMC4400 Series	
XMC4200_XMC4100 Series	
A V XMC1000	
2 (2) XMC1100-T038F0064	
> III XMC1200 Series	
XMC1300 Series	
Package= PG-TSSOP-38 ROM- 64 K8 Flosh RAM= 16 KB RAM IPOut= 34 digital I/O	ĺ
ADC= 12 ADC Channels, 12-bit, Analog-to-Digital Converter	
Workaround for Silicon Bugs	
Start up file preferences	
Add/Update start up files	
(?) « Back Next	> Einish Cancel

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 - □ System clock frequency of 8MHz
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 - 3. Configure SysTick and define its exception service routine

ᡖ S/W App Connectivity View 🔀

UIEditor

Remove

CLK002/0

Getting Started Example Blinky based on DAVE apps

- Set up System or Main Clock (MCLK) 1.
 - Select **CLK002** app from the **App Selection View** window
 - Open CLK002 **UIEditor** by double-clicking or right-click->UIEditor on the app in **S/W**

Connectivity View

In UIEditor, under the **Clock Configuration** П tab, change the **Desired Frequency** of the MCI K to 8MHz



CLK002_0 23		
Main Clock Frequency - MCLK		
Desired Frequency 8000	KHz	-
Peripheral Clock Selection - PCLK		
PCLK = MCLK		
PCLK = 2*MCLK		
Configured Parameters		
Configured MCLK	MHz	-
Configured PCLK	MHz	
RTC Clock Selection		
32.768kHz Standby Clock for RTC		
Clock Configuration Clock Configuration	on Data for Bootup	Firmware



- 6

- 2. Configure Port pin
 - Select IO004 app from the App Selection View window
 - Open IO004 UIEditor by doubleclicking or right-click->UIEditor on the app in S/W Connectivity View
 - In UIEditor, under the Configure Pin tab, enable the Output Driver and set Output Level to High by checking the respective check-boxes







- Assign pin to P0.5
 - Right-click on app->Manual Pin Assignment
 - In Manual Pin Assignment window, set **pin** as Resource, **P0.5** as Port-Pin

Solve And Save

App	Resource	Port-Pin/Pin Nu	mber
10004/0			
	pin	P0.5 / #22	
	Not Selected	Not Selected	

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3. Configure SysTick and define its exception service routine

□ Initialization function is defined in **core_cm0.h**



□ SysTick exception handler is defined in **startup_XMC1100.s**



Insert_ExceptionHandler SysTick_Handler

□ Initialize the SysTick in **Main.c**

- 74 //----SYSTICK-SETUP------
- 75 SystemCoreClockUpdate();
- 76 SysTick_Config(SystemCoreClock / 5); // 0.2s interrupt base
- 77 //-----

Define the SysTick exception handler routine in **Main.c**



53 void SysTick_Handler(void)
54 {
55 IO004_TogglePin(IO004_Handle0);
56 }

// 0.2s interrupt base



Generate code

- 1. Click 📓
- Build project
 - 1. Click 👼
 - 2. Wait for Build to finish

Download code

- 1. Click 🕸
- 2. Switch to TASKING Debug view

😰 🏇 TASKING De... 👹 DAVE CE 🛛 DAVE IDE

- 3. Click in to run code
- LED blinks every 0.2s

CDT Build C	onsole [XN	1C1100_Bli	nky_withAp	ops]					
'Invoking	: ARM-GO	C Print	Size'						
"C:\DAVE- text	3.1.4_20 data	130201\A bss	RM-GCC/b	in/arm- hex	none-e filena	abi- <mark>siz</mark> e" me	format=b	erkeley	XMC1100_B1
2792	0	2056	4848	12f0	XMC110	0 Blinky W	withApps.elf		
'Finished	buildin	g: XMC11	00_Blink	y_with4	Apps.si	z'	10.00		





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Example Projects Download



- Two sets of Example Projects available
 - □ Additional Application Examples
 - \neg Can be downloaded directly from the web
 - □ DAVETM Project Library Examples
 - \neg Can be downloaded from library in DAVETM
 - Can also be downloaded directly from the web

Example Projects Download Additional Application Examples



Additional Application Examples available

- Running LEDs Example (Simple_XMC1100_RunningLEDs.zip)
- UART Example
 (Simple_XMC1100_UART.zip)

Can be downloaded from the web <u>HERE</u>



■ Download Example Projects via DAVETM library store

\Box Help \rightarrow Install DAVE Example Library

Debug Window	Help		
😺 🖯 🗰 🗉 😫		Welcome	
	?	Help Contents	
	22	Search	
		Dynamic Help	
		Key Assist	Ctrl+Shift+L
		Tips and Tricks	
		DAVE Forum	
		DAVE Online Support	
		Cheat Sheets	
	2	Install DAVE Apps/Example Library	
		Check for DAVE App Updates	
		Uninstall DAVE App/Example Library	
		Check for Updates	
		Install New Software	
		About DAVE 3	



□ Select DAVE Project Library Manager in the drop-down menu

Library Manager Wizard			D
Jownload Libraries Page			
This wizard page helps in downloading the libraries of type example	e projects or apps library		
Dave Site			
Work with DAVE Project Library Manager			- Add.
		Find more library by working with th	e Library Update Sites preferences
Libraries			
Enter the keywords to filter :			
Name	Version	Path	
> 📰 XMC4000			
Select All Deselect All			
Description			
or a composition			*
Filters			
V Hide items that are already downloaded			
Show only latest version			
3		C Rack Need	Each Cancel
U		A DACK MEET	Cancel



□ Select Examples in the Libraries window and click Next

😜 Library Manager Wizard	- • ×
Download Libraries Page	
This wizard page helps in downloading the libraries of type example projects or apps library	
Dave Site	
Work with : DAVE Project Library Manager	• Add
Find more library by working with the Library Update Sites prefer	rences
Libraries	
Enter the keywords to filter :	
Name Version Path Ø DAVE 3 Example Projects with DAVE Apps Ø Service Apps Examples Ø Service Apps Examples Ø Timed-Input-Output Ø Analog Ø Service Apps Examples Ø Communication Ø Service Apps Examples Ø Service Apps Examples Ø File System Ø Networking Ø Service App Select All Description Ø	
Fitters Fitters that are already downloaded Show only latest version	
Kat Finish	Cancel



□ Accept terms of the license agreements and click Finish



I do not accept the terms of the license agreements

□ DAVE Example Projects are installed



Download Example Projects from the web

<u>http://www.infineon.com/cms/en/product/promopages/aim-</u> <u>mc/DAVE 3 Support Portal/DAVE Example Project Download.html</u>

- Download the project zip file
- □ Open DAVE[™] and go to File → Import → Infineon → DAVE Project
- □ Check "Select Archive File"
- □ Browse to the downloaded DAVE project zip file

□ Press "Open"



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Getting Started Videos



Getting Started Videos



- Video Series: XMC1000 Boot Kit Getting Started
 - □ Introduction
 - □ <u>DAVE[™] Setup</u>
 - Boot Mode Index Configuration via DAVE or MemTool
 - □ XMC1100 Hardware Setup
 - □ <u>Simple Blinky Example</u>
 - □ Blinky Example based on DAVE[™] Apps
 - Example Projects Download



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