Onsemí

AXM0F343 SDK Getting Started Guide

Contents

roduction

Hardware Setup	3
System Overview.	3
Headers Configuration	4
AXM0F343 IC Pinout and DVK connections	5

DE and SDK Setup	7
Prerequisites	7
IDE Installation	7
AXM0F343 SDK Installation	7

Working with Example Application	ns1	0
Importing and Building Applications		0
Advanced Configuration and Debugging		2

Introduction

The AXM0F343 combines the industry-leading AX5043 sub-GHz transceiver with a low-power Arm[®] Cortex-M0+ processor useful for various wireless applications. The AXM0F343 SDK includes the necessary firmware, software, example projects, documentation, and development tools to begin building end applications on the platform. This SDK is built on the Eclipse-based ON Semiconductor Integrated Development Environment (IDE), which is available as a free download from the <u>AXM0F343 product page</u>.

All example applications, device drivers, and application configuration files are delivered in a CMSIS pack format. This enables a modular approach that simplifies the set-up, compilation, and programming of reference example code on the AXM0F343 Development Kit boards. The following sections will describe the process of installing and using the SDK. Please refer to the readme files included with the example projects for additional descriptions of the applications and their configuration and use.

Hardware Setup

System Overview

The AXM0F343-X-X-1-GEVB are a series of evaluation boards intended for use in conjunction with the AXM0F343-SDK. The first -X represents the memory configuration, while the second represents the frequency.

For example, AXM0F343-256-915-1-GEVB has the IC variant with 256 kB of FLASH and the RF matching network is tuned for 915 MHz operation.

The board can be powered via USB, CR2032 battery, or an external 3.3V DC source via the Arduino-compatible header. Both SWD and Serial interfaces are provided via the J-Link On-Board. The AXM0F343 can be configured to output the RF signal via a differential load network, which supports both TX and RX, or a power-efficient single-ended network, which only supports TX. The block diagram of the system is shown below:



Figure 1 - AXM0F343-x-x-1-GEVB block diagram

NOTE: By default, the boards do not have the single-ended SMA installed. This is because the example software is designed to use the differential interface. Software configuration must be done to switch between single-ended and differential output networks.

Evaluation Kit Content

The AXM0F343-X-X-1-GEVK evaluation kit includes all what is needed to start testing and developing RF applications:

- 2x AXM0F343-X-X-1-GEVB boards pre-loaded with AX-Radio-TX and AX-Radio-RX examples;
- 2x Micro-USB cables;
- 2x whip antennas;
- Components bag with PCB mounting feet, extra headers, and an SMA connector that can be mounted when needed as shown in the figure below.



Figure 2: AXM0F343-x-x-1-GEVK content.

Headers Configuration

Figure 3 highlights several power headers available on the AXM0F343-X-X-1-GEVB that allow to connect/disconnect power domains and to monitor the currents:

- **Supply:** the yellow "Supply" arrow shows the main power selector. With this selector the power source can be toggled between battery operation (BATT) and USB or external voltage (USB/VIN).
- **J10:** this 10 pin header is the interface between the On-Board J-Link programmer and the AXM0F343 IC. The top four pairs connect the UART and SWD ports, while the bottom pair pulls the DBG_EN to VDD. In order to perform low power measurements with this PCB we recommend to disconnect these headers in order to avoid any leakage current.
- J12: by removing the parallel resistor R56, this header allows monitoring the current flowing from the battery.
- J8: by removing the parallel resistor R52, this header allows monitoring the current flowing to the MCU.
- J7: by removing the parallel resistor R58, this header allows monitoring the current flowing to the RADIO.
- J11: by removing the parallel resistor R57, this header allows monitoring the current flowing to the TCXO.



Figure 3 - AXM0F343-x-x-1-GEVB headers.

AXM0F343 IC Pinout and DVK connections

The AXM0F343 IC pinout and position on the AXM0F343-x-x-1-GEVB is shown in Figure 4. The available GPIOs are listed in Table 1, while the different connections to external peripherals and headers are explained in Table 2.



Figure 4 - AXM0F343 pinout and chip position on the DVK

Name	GPIO	Pin	DVK	ADC	Comparator	Timer	USART	PWM	I2C	SPI	CLK & XOSC	MISC
PA0	GPIO0	30	J4-1	ANA_CH0	CMP0/1_MI	TIM0OUT		PWM2H		SPI_SEL1	HSXOSC_P	CAPT1
PA1	GPIO1	31	J4-2	ANA_CH1	CMP0/1_PL	TIM0/1/2OUT TIM0CLK	USART1_CLK	PWM0L PWM1H			HSXOSC_N	TSTART
PA2	GPIO2	32	USART1_RX J4-3, J2-1	ANA_CH2	CMP0/1_MI		USART1_RX	PWM0H	SDA	SPI_SCK SPI_SEL_IN		TSTOP CAPT2
PA3	GPIO3	33	LPXOSC J4-4	ANA_CH3	CMP0/1_PL	TIM1OUT			SCL	SPI_SEL0 SPI_SCK_IN	LPXOSC_P EXTCLK_IN	
PA4	GPIO4	34	LPXOSC J4-5	ANA_CH4	CMP0/1_MI ACOMP0	TIM1CLK				SPI_DOUT	LPXOSC_N EXTCLK_OUT	EXT_INT
PA5	GPIO5	35	LED_B J4-6	ANA_CH5	CMP0/1_PL		USART1_TX	PWM1L PWM3H		SPI_SEL2		CAPT0
PB0	GPIO8	18	USART1_TX J2-2	ADCTRIG	ACMPO0		USART1_TX	PWM0L		SPI_DIN	EXTCLK_OUT	CAPT1
PB1	GPIO9	19	LED_G J1-5			TIMOCLK	USART1_RX USART0_CLK	PWM1/2H	SDA	SPI_DOUT		
PB2	GPIO10	20	TCXO_EN J1-4			TIM0/1/2OUT		PWM3H	SCL	SPI_SCK SPI_SEL_IN		CAPT0
PB3	GPIO11	21	Button J1-3			TIM1OUT TIM2CLK		PWM0H		SPI_SEL0 SPI_SCK_IN		WAKEUP
PB4	GPIO12	22	SDA J1-9			TIM1CLK	USART0_TX	PWM2H	SDA	SPI_DIN		PC4 TSTART
PB5	GPIO13	23	SCL J1-10			TIM1OUT	USART0_RX	PWM3H	SCL	SPI_SCK SPI_SEL_IN		TSTOP
PB6	GPIO14	24	SWDIO J1-2					PWM1H		SPI_SEL0/1 SPI_SCK_IN		
PB7	GPIO15	25	SWCLK J1-1			TIM0/1/2OUT	USART0/1_CLK	PWM1L		SPI_DOUT SPI_SEL2		EXT_INT
PC0	GPIO16	17	Button J2-8	ADCTRIG		TIM0OUT		PWM3L		SPI_SEL0 SPI_CSK_IN	EXTCLK_OUT	CAPT3 TSTART, TSTOP
PC1	GPIO17	16	J2-7		ACMPO1	TIM2OUT TIM0CLK		PWM0L		SPI_SCK SPI_SEL_IN	EXTCLK_IN	EXTCLK_IN
PC2	GPIO18	15	J2-6			TIM2CLK	USART0_TX	PWM1L		SPI_DOUT SPI_SEL1		CAPT2 EXT_INT
PC3	GPIO19	14	J2-5		ACMPO0		USART0_RX	PWM2L		SPI_SEL2 SPI_DIN		
PC4	GPIO20	13	LED_R J2-4	ADCTRIG	ACMPO1	TIM0/1/2OUT TIM1CLK	USART1_CLK	PWM2H				PB4

Table 1 - List of GPIOs and crossbar configuration table

Pin	Pin Name	Connection on AXM0F343-x-x-1-GEVB
Number		
1	VDD_ANA	Connected to ground (GND) via a decoupling capacitor
2	GND	Ground connection
3	ANTP	Connected to the matching network and differential (TX/RX) SMA connector
4	ANTN	Connected to the matching network and differential (TX/RX) SMA connector
5	ANTP1	Connected to the matching network and single-ended (TX) SMA connector (not-fitted)
6	GND	Ground connection
7	VDD_ANA	Connected to ground (GND) via a decoupling capacitor
8	GND	Ground connection
9	FILT	CAL line, connected to Pin 37 - TST1
10	L2	Shorted to L1 via a 0Ω Resistor
11	L1	Shorted to L2 via a 0Ω Resistor
12	SYSCLK	Connected to J2-3
13	PC4	Connected to J2-4
14	PC3	Connected to J2-5. Could be used for a RGB LED (not-fitted)
15	PC2	Connected to J2-6. Could be used for a RGB LED (not-fitted)
16	PC1	Connected to J2-7. Could be used for a RGB LED (not-fitted)
17	PC0	Connected to J2-8
18	PBO	Used by the debugger for UART TX and connected to J2-1
19	PB1	D4 - Green LED
20	PB2	Supply for the 48MHz TCXO (RF reference oscillator)
21	PB3	Pushbutton and connected to J1-1
22	PB4	Connected to J1-9 and PMOD1-8 using pull-up resistors for I2C_SDA
23	PB5	Connected to J1-10 and PMOD1-7 using pull-up resistors for I2C_SCL
24	PB6	Connected to J6-2 and used by the debugger for SWDIO
25	PB7	Connected to J6-4 and used by the debugger for SWCLK
26	DBG_EN	Connected to J10 to enable debugging mode
27	RESET_N	Pushbutton and connected to J3-3
28	GND	Ground connection
29	VDD_IN	Power supply input
30	PA0	Connected to J4-1
31	PA1	Connected to J4-2
32	PA2	Used by the debugger for UART RX and connected to J4-3
33	PA3	32.768kHz crystal input/output (Microcontroller external reference oscillator)
34	PA4	32.768kHz crystal input/output (Microcontroller external reference oscillator)
35	PA5	Connected to J4-4
36	VDD_IN	Power supply input
37	TST1	CAL line, connected to Pin 9 - FILT
38	TST2	Used for ground connection
39	CLKN	TCXO input/output (RF reference oscillator)
40	CLKP	TCXO input/output (RF reference oscillator)

Table 2 - AXM0F343-x-x-1-GEVB connections

IDE and SDK Setup

Prerequisites

To begin, the following tools must be downloaded from the AXM0F343 product page at <u>https://www.onsemi.com/design/resources/design-resources/software?rpn=AXM0F343</u>:

- **ON Semiconductor IDE** This package includes the Eclipse-based IDE, the ARM GNU toolchain (compiler, linker, GDB debugger), and the J-Link software required program and debug the board.
- **AXM0F343 CMSIS Pack** This includes all example code, middleware, and device drivers for the radio and MCU peripherals.
- ARM CMSIS Pack This can either be downloaded automatically from inside of the IDE or installed manually. To install manually, first download the .pack file from the latest release at https://github.com/ARM-software/CMSIS_5/releases.
- **AX-ConfigurationUtility** optional GUI to generate custom radio projects compatible with the ON Semiconductor IDE.

IDE Installation

Install your new ON Semiconductor IDE by running *ON_Semiconductor_IDE.msi*. The ON Semiconductor IDE is installed in this location by default: *C:\Program Files (x86)\ON Semiconductor\IDE_V*<version>.

You are prompted to install SEGGER J-Link. You need the J-Link software to download and debug applications on the Evaluation and Development Board. The **J-Link Installation Check** screen will guide you through the process of installing J-Link if no valid J-Link installation is found.

NOTE: If using a separately installed J-Link toolchain, version 6.71c or greater is required to support the AXM0F343 device family.

The release version and build number are stored in the *REVISION* text file at the root of the installed ON Semiconductor IDE.

AXM0F343 SDK Installation

To install the AXM0F343 CMSIS Pack:

- 1. Open the ON Semiconductor IDE.
- 2. From the launch screen create and / or select a directory to contain a workspace. The workspace contains all active projects and user IDE settings such as UI theming.
- 3. In the top right corner of the workbench perspective, click on the *Open Perspective* icon, select *CMSIS Pack Manager*, then click *Open*. (See Figure 3).

NOTE: If you cannot see the *CMSIS Pack Manager* item, re-install the IDE in your user folder (i.e., C:\Users\<user_name>)

TX-RX-Tests-Final - ON Semiconductor IDE						- 🗆 X			
File Edit Source Refactor Navigate Search Project Run	Window Help						Open Perspective		×
S O E ···· V No Launch Co	nfigurations 🗸 on:	v o [13 - ka]	0 0 - 5 - 0	× 3 · 6 · 6 · 6 ·	· · · · · · · · · ·	6 - 10 10 - 1	- open respective		~
※ 重 + () ・ 約 ・ 〇 今 ・ 今 ・						Quick Access			
Project Explorer 🛛 🔁 🧐 🕼 🤗 🖶 🗆				13	■ D 8:0- 11 1.	84. 50 90	C/C++ (default)		
There are no projects in your workspace. To add a project: 					There is no active edit	or the index an outline.	CMSIS Pack Manager		
En Create a new Makelie project in a directory containing existing_code Tel Create a new C or C++ project							E CodeRed		
Create a project							CVS Repository Exploring		
the import projects							参 Debug		
							Docker Tooling		
							🐲 GDB Trace		
							员 Git		
							LTTpg Kernel		
							OS Tracing Overview		
							(III) Planning		
							Resource		
							^f [□] Team Synchronizing		
							Tracing		
							V VM		
	🛃 Problems 🔝 🖉 Tasks 🕀 Console 📺	Properties				30 20			
	0 items	Name of the second second						 	
	Description	Resource Path	Location	Type					
							Open	Cance	el
-									

Figure 3: Open CMSIS Pack Manager perspective

4. Click on the *Import Existing Packs* icon, then select the pack file – *ONSemiconductor.AXM0F343.*<version>.pack. (pack versions are formatted with three numbers such as 1.2.0).

	Import Packs				×
	← → v ↑ 📕 > Thi	is PC > Documents > TEMP	~ Ŭ	Search TEMP	Ą
	Organize - New folde	r		100 -	. 🔳 🕜
	TEMP ^	Name	Date modified	Туре	Size
	Working	ONSemiconductor.AXM0F343.1.2.0.pack	28-Sep-20 9:10 AM	PACK File	65,440 KB
	🧢 This PC				
	3D Objects				
	Desktop				
L ▼ : 😕 🗁 🔗 ▼ ! ⊿ 🐨 ! ½ 🤸 🖓 ▼ 🏷 🗢 ▼ 🔿 ▼ 🛛 🛄	Documents				
	Downloads				
ples from installed packs 🛛 🖑 😴 🐸 🔐 🕐 🔍 🖤 🗖 🗀 🖆 Pack Prope	Music				
	Pictures				
Import Existing Packs	Videos				
Description	II & OVETENA (CO	<			,
	File nam	e: ONSemiconductor.AXM0F343.1.2.0.pack	~	Pack Files (*.pack)	~
				<u>O</u> pen	Cancel
					.:

Figure 4: Import CMSIS Pack

5. You will be prompted with a license agreement.

CMSIS Pack Manager: ONSemiconductor AXM0F343 License Agreement To continue with SETUP, you must accept the terms of th To accept the agreement, click the checkbox below. [ON SEMICONDUCTOR AXM0F343 SOFTWARE & REUSABLE CODE LICENSE AG IMPORTANT - READ BEFORE DOWINLOADING, COPYIN DO NOT USE OR INSTALL THIS SOFTWARE OR REUSABLE CODE, YOU A ON WISH TO SO AGREE, DO NOT DOWINLOAD, CO REUSABLE CODE. If you agree to this Agreement on behalf of a company	3.12.0 —
License Agreement To continue with SETUP, you must accept the terms of th To accept the agreement, click the checkbox below. [N SEMICONDUCTOR AXMOF343 SOFTWARE & REUSABLE CODE LICENSE AC IMPORTANT - READ BEFORE DOWINLOADING, COPYIN DO NOT USE OR INSTALL THIS SOFTWARE OR REUSAB CAREFULLY READ THE FOLLOWING TERMS AND COND OR USING THE SOFTWARE OR REUSABLE CODE, YOU J DO NOT USE TO SO AGREE, DO NOT DOWINLOAD, CO REUSABLE CODE. If you agree to this Agreement on behalf of a company	the License Agreement. GREEMENT VG, INSTALLING, OR USING. BLE CODE UNTIL YOU (THE LICENSEE) HAVE DITIONS, SY DOWNLOADING, COPYING, INSTALLING, AGREE TO THE TERMS OF THIS AGREMENT. IF YOU COPY, INSTALL, OR USE THE SOFTWARE OR
To continue with SETUP, you must accept the terms of th To accept the agreement, click the checkbox below. Jox SEMICONDUCTOR AUM0F343 SOFTWARE & REUSABLE CODE LICENSE AC IMPORTANT - READ BEFORE DOWNLOADING, COPYIN DO NOT USE OR INSTALL THIS SOFTWARE OR REUSAB CAREFULY READ THE FOLLOWING TEMIS AND CONC OR USING THE SOFTWARE OR REUSABLE CODE, VOL DO NOT WISH TO SO ACREE, DO NOT DOWNLOAD, CO REUSABLE CODE.	the License Agreement. GREEMENT NG, INSTALLING, OR USING. BLE CODE UNTIL YOU (THE LICENSEE) HAVE DITIONS SY DOWNLOADING, COPYING, INSTALLING, AGREE TO THE TERMS OF THIS AGREMENT. IF YOU COPY, INSTALL, OR USE THE SOFTWARE OR
(b) ESEMICONDUCTOR AXM0F343 SOFTWARE & REUSABLE CODE LICENSE AC IMPORTANT - READ BEFORE DOWNLOADING, COPVIN DO NOT USE OR INSTALL THIS SOFTWARE OR REUSAG CAREFULY READ THE FOLLOWING TEMS AND CONDO ON USING THE SOFTWARE OR REUSABLE CODE, VOL DO NOT WISH TO SO AGREE, DO NOT DOWNLOAD, CO REUSABLE CODE.	GREEMENT VG. INSTALLING, OR USING. BLE CODE UNTIL YOU (THE LICENSEE) HAVE DITIONS. BY DOWNLOADING, COPYING. INSTALLING, AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU COPY, INSTALL, OR USE THE SOFTWARE OR
IMPORTANT - READ BEFORE DOWNLOADING, COPYIN DO NOT USE OR INSTALL THIS SOFTWARE OR REUSAB CAREFULLY READ THE FOLLOWING TEMSS AND COND OR USING THE SOFTWARE OR REUSABLE CODE, OU DO NOT WISH TO SO AGREE, DO NOT DOWNLOAD, CO REUSABLE CODE.	NG, INSTALLING, OR USING. BLE CODE UNTIL YOU (THE LICENSEE) HAVE DITIONS BY DOWNLOADING, COPYING, INSTALLING, AGREE TO THE TEMMS OT THIS AGREEMENT. IF YOU 'OPY, INSTALL, OR USE THE SOFTWARE OR
DO NOT USE OR INSTALL THIS SOFTWARE OR REUSAB CAREFULLY READ THE FOLLOWING TERMS AND COND OR USING THE SOFTWARE OR REUSABLE CODE, YOU A DO NOT WISH TO SO AGREE, DO NOT DOWNLOAD, CO REUSABLE CODE. If you agree to this Agreement on behalf of a company	BLE CODE UNTIL YOU (THE LICENSEE) HAVE DITIONS. BY DOWNLOADING, COPYING, INSTALLING, AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU :OPY, INSTALL, OR USE THE SOFTWARE OR
	ny, you represent and warrant that you have authority
I agree to all the terms of the preceding License Agre	reement to these terms will be recorded as the
	OK Cancel

Figure 5 - License Agreement

6. After the IDE is finished importing the pack, the available example applications can be viewed. Note that there is an example for each variant of flash memory (64K and 256K).

AXM0F343 SDK Getting Started Guide

····	V No Launch Configurations V on:	× ♥ 🖬 🖷 🖷 🕼	- E - S - S - C - E - M - M - M - M - M - M - M - M - M	% ₹ (⊖ /	ダ ▼ 월 ▼ 初 ▼ ひ ひ ▼ ひ ▼	Quick Access	2 🕫 🙆
Devices 🖾 📓 Boards	E E 🙀 🕐 🔻 🗆	🔋 🙆 Packs 📑 Examples 🛛		🗹 Only	y show examples from installed packs 🛛 🖑 🍣 🐸 💕 🕐 🦈 ⋍	📮 🛤 Pack Properties 🛛 🖽 🖼	? ▽ □
rch Device		Search Example				type filter text	
vice	Summary	Example		Action	Description	▲ Solution AXM	0F343.1.2.0
🕸 All Devices	35 Devices	ADC (DVK-AXM0F3)	43-64-1-GEVB)	💠 Copy	DVK-AXM0F343-64-1-GEVB board ADC driver example	> 🖬 Boards	
> 🔮 ARM	33 Devices	ADC (DVK-AXM0F3)	43-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board ADC driver example	> 💠 Components	
 ONSemiconductor 	2 Devices	AES (DVK-AXM0F3)	43-64-1-GEVB)	Copy	AES Example Firmware for DVK-AXM0F343-64-1-GEVB b	> Devices	
🗸 🍄 AXM0F343 Series	2 Devices	AES (DVK-AXM0F3)	43-256-1-GEVB)	Copy	AES Example Firmware for DVK-AXM0F343-256-1-GEVB	Examples	
AXM0F343-64	ARM Cortex-M0+ 40 MHz, 8 KB RAM, 64 KB	AXRadio-RX (DVK-	AXM0F343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board AXRadio Receiver Exa		
AXM0F343-256	ARM Cortex-M0+ 40 MHz, 32 KB RAM, 256 k	AXRadio-RX (DVK-	AXM0F343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board AXRadio Receiver Ex		
		AXRadio-Tests (DV	K-AXM0F343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board AXRadio RF Tests Exa		
		AXRadio-Tests (DV	K-AXM0F343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board AXRadio RF Tests Exa		
		AXRadio-TX (DVK-	AXM0F343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board AXRadio Transmitter E		
		AXRadio-TX (DVK-	AXM0F343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board AXRadio Transmitter		
		Blinky (DVK-AXM0)	-343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board Blinky driver example		
		Blinky (DVK-AXM0)	-343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board Blinky driver example		
		Flash (DVK-AXM0F)	DVK-AXM0F343-64-1-GEVB)		DVK-AXM0F343-64-1-GEVB board Flash driver example		
		Flash (DVK-AXM0F)	343-256-1-GEVB)	🔶 Сору	Flash Example Firmware for DVK-AXM0F343-256-1-GEVB		
		GPIO (DVK-AXM0F	GPIO (DVK-AXM0F343-64-1-GEVB)		GPIO Example Firmware for DVK-AXM0F343-64-1-GEVB b		
		GPIO (DVK-AXM0F	0F343-256-1-GEVB)	Copy	GPIO Example Firmware for DVK-AXM0F343-256-1-GEVB		
		I2C-Master (DVK-A)	XM0F343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board I2C Master driver exa		
		I2C-Master (DVK-A)	XM0F343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board I2C Master driver exa		
		I2C-Slave (DVK-AX)	M0F343-64-1-GEVB)	Copy	DVK-AXM0F343-64-1-GEVB board I2C Slave driver examp		
		I2C-Slave (DVK-AX)	M0F343-256-1-GEVB)	Copy	DVK-AXM0F343-256-1-GEVB board I2C Slave driver exam		
		PMU (DVK-AXM0F)	343-64-1-GEVB)	Conv	GPIO Example Firmware for DVK-AXM0F343-64-1-GEVB b		
		PMU (DVK-AXMOF	343-256-1-GEVB)	Conv	GPIO Example Firmware for DVK-AXM0F343-256-1-GEVB		
		PWM (DVK-AXM0F	343-64-1-GEVB)	Conv	DVK-AXM0E343-64-1-GEVB board PWM driver example		
		PWM (DVK-AXM0F	343-256-1-GEVB)	Conv	DVK-AXM0E343-256-1-GEVB board PWM driver example		
		PWM-RGB-LED (D)	/K-AXM0F343-64-1-GEVB)	Conv	DVK-AXM0E343-64-1-GEVB board PWM driver example u		
		PWM-RGB-LED (D)	(K-AXM0F343-256-1-GEVR)	Copy	DVK-AXM0F343-256-1-GEVB board PWM driver example		
		SPI-Master (DVK-A	XM0F343-64-1-GEVB)	Conv	DVK-AXM0E343-64-1-GEVB board SPI driver example		
		SPI-Master (DV/K-A	YM0F343-256-1-GEV/R)	Copy	DVK-AXM0E343-256-1-GEVB board SPI driver example	- ~	
Concolo M El Drograss						R. 61 (R) 🚽 🖬 🗸	
19:54: Tenonting Back O	Wenniconducton AVMAE242 1 2 0 completed						
10.04. Importing Pack O	asemiconductor. AArmors45.1.2.0 completed						

Figure 6 - Available Applications shown after pack import

7. To install the Arm CMSIS pack, repeat the process in step 4 to unpack the *ARM.CMSIS.*<version>.*pack* file. If it is desired to install this pack directly from the CMSIS pack manager, select the blue *Check for Updates on Web* icon, and let the manager download the index to all available CMSIS packs. Once complete, select the ARM.CMSIS pack and click *Install*.

NOTE: If using the AX Configuration Utility to generate code for custom radio examples, then version 5.8.0 of the ARM.CMSIS pack should be installed. The pack can be downloaded at <u>https://github.com/ARM-software/CMSIS_5/releases/tag/5.8.0</u>

Working with Example Applications

Importing and Building Applications

To import an application:

- 1. From the CMSIS Pack Manger perspective, select the Boards tab and enter "AXM0F343" into the search field.
- 2. Select the development board corresponding to the part that is being used either AXM0F343-64... or AXM0F343-256...
- 3. Select the *Examples* tab to the right to view all the available applications for the selected board. (See Figure 8)
- 4. Select *Copy* next to the desired application to copy the application into the IDE Workspace. If the perspective does not automatically change from the CMSIS Pack Manager, select the C/C++ perspective icon in the upper right corner of the IDE.

Devices Boards 😫		💼 Packs 😁 Examples 🕄		🛛 Only show examples from installed packs 🛛 🦑 🍣 🐸 🔐 🕐 💿 🔝 👘	🖩 Pack Properties 😫 🖽 🖂 💿 🐨 📟
axm		Search Example			type filter text
Board ¹⁴ J. Al Boards ¹ OVK-ADA0F343-64-1-GEVB (Ver 1.1) ¹ Mounted Devices ¹ ANOUF343-64 ¹ OVK-ADA0F343-256-6158 (Ver 1.1) ¹ Mounted Devices ¹ AXM0F343-256 ¹ AXM0F343-256	Summary 4 Boards 2 AdM/F343-64 1 Device AMM Cottex-MOI-40 MHz, B KB RAM, 64 KI 2 MMK Cottex-MOI-40 MHz, 12 KB RAM, 256 AMM Cottex-MOI-40 MHz, 12 KB RAM, 256	Example ASC (DVK-AXM0F343-256-1-GEVB) AASC (DVK-AXM0F343-256-1-GEVB) AASR (DVK-AXM0F343-256-1-GEVB) AASRaid=TK2 (DVK-AXM0F343-256-1-GEVB) Flash (DVK-AXM0F343-256-1-GEVB) GPA (DVK-AXM0F343-256-1-GEVB) CAM325 (DVK-AXM0F343-256-1-GEVB) CLC State (DVK-AXM0F343-256-1-GEVB) CLC State (DVK-AXM0F343-256-1-GEVB) DVM (DVK-AXM0F343-256-1-GEVB) PVM (DVK-AXM0F343-256-1-GEVB) PVM (DVK-AXM0F343-256-1-GEVB) PVM (DVK-AXM0F343-256-1-GEVB) DVM (DVK-AXM0F343-256-1-GEVB) Time (DVK-AXM0F343-256-1-GEVB) Time (DVK-AXM0F343-256-1-GEVB) UART (DVK-AXM0F343-256-1-GEVB)	Action Copy Copy	Description VVK-AXM07343-256-1-GEVB board ADC driver example ASE Sample Immware for DVK-AXM07343-256-1-GEVB VVK-AXM07343-256-1-GEVB board XABaio Reverve Ex. DVK-AXM07343-256-1-GEVB board LXBaio Reverve Ex. DVK-AXM07343-256-1-GEVB board LXC Matter driver example Ran Example Firmware for DVK-AXM07343-256-1-GEVB	 ♥ ONSemiconductorAX00F343.120 > Ø Soards > Ø Components > ■ Devices > ○ Examples
Console 17 mg Progress					1 🖉 👘 🖻 🕈 🗂 🖷 🖷
MSIS Console					

Figure 7 - Available applications for the selected 256K FLASH memory size.

- 5. To build a project, as shown in Figure 8:
 - a. Select the configuration corresponding to the desired project (Debug / Release);
 - b. Select either Run or Debug;
 - c. Select "Build" to build the configuration or "Debug" to build, flash, and enter Debug mode.



Figure 8 - Select Configuration and Build Project.

6. After the build is completed, the results are displayed in the console:



Figure 9: Build Results.

NOTE: For each project copied, a Debug and Release configuration are generated:

- Debug includes debugging symbols so that single-step debugging can occur using the GDB server in the Debug Perspective of the IDE.
- Release is optimized for production builds where debugging symbols are excluded from the compiled application code to reduce flash and RAM usage.

NOTE: There are two configurations for flashing the chip:

- Debug launches GDB server and automatically halts at MAIN, ready for single step debugging.
- Run uses the GDB server to download the image to the device, but starts the application and terminates the GDB server. This is useful for quick testing where single-step debugging is not required.

Once the application is running, either via Debug or Run, (and if *printf* is enabled in the *.rteconfig* file) the serial output can be observed in the IDE built-in terminal or any other serial monitor application. To enable the *Terminal Panel* search though the menu bar *Window / Show View / Terminal*.

Once the terminal window opens, select the terminal icon as shown in Figure 10, then select *Serial Terminal* from the drop down menu. Configure the serial port settings as shown, selecting COM[X] that corresponds to the Serial COM port assigned to the board by the PC.



Figure 10: Open *New Terminal* icon, COM port selection, and Serial Terminal output.

Advanced Configuration and Debugging

CMSIS Configuration Wizard

Several applications in the AXM0F343 SDK, such as the peripheral examples and AXRadio examples, include application parameters that can be modified within the IDE using the *CMSIS Configuration Wizard*. As shown in Figure 11, the *CMSIS Configuration Wizard* is a GUI tool that allows users to select from a list of available options and change key parameters used by the application.

To open the *CMSIS Configuration Wizard*, right-click the *user_config_wizard.h* file from the <Example>/RTE/Application folder, and select *Open With -> CMSIS Configuration Wizard* as shown in Figure 12.

💠 AXRadio-RX-AXM0F3 🚸 AXRadio-TX-AXM0F3	🚸 AXRadio-Te	ests-AXM	.c main.c	😑 user_config_wizard.h	82	- 8
CMSIS Configuration Wizard					۱.	- ?
Option Power mode and SRAM(s) selection Power on/down SRAM bank(s) for AXM0F343-64 Power on/down SRAM bank(s) for AXM0F343-256 User Application Configuration Enable printf() Output over UART Transmit Packet on PB3 Press Instead of Wakeup time Clock Source Wakeup every_seconds Transmit packet every_milliseconds	Value Sleep Mode - HSC Active mod • Sleep Mode Hibernate N Shutdown N Sleep Mode	2SC as Core clo e - HSOSC as Cr fode Mode - LPOSC as Co	ore clock			
Power Mode Choose power mode Default power mode is active Source Editor CMSIS Configuration Wizard						





Figure 12 - Open user_config_wizard.h in CMSIS Configuration Wizard.

RTE Configuration

Each CMSIS Pack example project includes an *.rteconfig* file. The purpose of this file is to configure which libraries are made available to the application at build time. This tool can be used to actively modify files that are either linked during build process or actually copied into the project directory. Examples of this include selecting which physical layer configuration file (PHY) is used by a radio application or which device drivers are linked in to the project.

						a 🗆
Components @ Nes	SOIVE	1		1	1	0 @
Software Components	Sel.	Variant	Vendor	Version	Description	
AXM0F343-256			ONSemiconduc		ARM Cortex-M0+ 40 MHz, 32 KB RAM, 256 KB ROM	
 Application 						
>	-					
🗸 🔶 PHYs						
PHY 1	\checkmark		ONSemiconduc	1.2.0	915 MHz GFSK 4.8 kbps	
PHY 2			ONSemiconduc	1.2.0	868.3 MHz GFSK 4.8 kbps	
PHY 3			ONSemiconduc	1.2.0	915 MHz 802.15.4 SUN FSK 50 kbps	
PHY 4			ONSemiconduc	1.2.0	915 MHz 802.15.4 SUN FSK 100 kbps	
PHY 5			ONSemiconduc	1.2.0	868.3 MHz 802.15.4 SUN FSK 50 kbps	
PHY 6			ONSemiconduc	1.2.0	868.3 MHz 802.15.4 SUN FSK 100 kbps	
CMSIS					Cortex Microcontroller Software Interface Components	
CMSIS Driver					Unified Device Drivers compliant to CMSIS-Driver Specifica	
🗸 🚸 Device					Startup, System Setup	
🗸 🔶 Drivers						
ADC			ONSemiconduc	1.2.0	Analog Digital Converter (ADC) driver for AXM0F343	
AES			ONSemiconduc	1.2.0	Advanced Encryption Standard (AES) driver for AXM0F343	
CCMP			ONSemiconduc	1.2.0	Capture Compare (CCMP) driver for AXM0F343	
CMP			ONSemiconduc	1.2.0	Analog Comparator (CMP) driver for AXM0F343	
CMU			ONSemiconduc	1.2.0	Clock Management Unit (CMU) driver for AXM0F343	
Common			ONSemiconduc	1.2.0	Common driver support for AXM0F343	
DMA			ONSemiconduc	1.2.0	DMA driver for AXM0F343	
FLASH			ONSemiconduc	1.2.0	Flash memory driver for AXM0F343	
GPIO			ONSemiconduc	1.2.0	GPIO driver for AXM0F343	
I2C			ONSemiconduc	1.2.0	I2C driver for AXM0F343	
PMU			ONSemiconduc	1.2.0	PMU driver for AXM0F343	
PWM			ONSemiconduc	1.2.0	PWM driver for AXM0F343	
Radio			ONSemiconduc	1.2.0	Radio driver for AXM0F343	
SCHEDULER			ONSemiconduc	1.2.0	Scheduler driver for AXM0F343	
SPI			ONSemiconduc	1.2.0	SPI driver support for AXM0F343	

Figure 13 - RTE Configuration Wizard.

Register Viewer

In debug mode, the IDE offers several advanced features, including a register viewer. This is based on a .svd file, which provides a description of the register mapping on the chip. For AXM0F343, all peripheral registers, including those for AX5043, are made available in the peripheral register viewer. To open this,

- 1. Select the Peripherals tab on the right panel of the Debug perspective.
- 2. Check the box next to the peripheral of interest.
- 3. Select the Memory tab in the bottom panel of the Debug Perspective to view the selected registers.
- 4. Halt the processor or place a breakpoint at a section of interest in the code. When the processor stops, the register contents are displayed. Entering a number into the *Value* field will manually overwrite the register content on the device.

NOTE: By default, the console tab in the bottom panel is configured to return itself to focus whenever there is an output from the debugger. To disable this, right-click on the *Console* while in debug mode, and select *Preferences*. Then uncheck *"Show when program writes to standard out"* and select *"Apply and Close"*. Now the Memory tab can remain in focus while debugging.

NOTE: To search for a specific register, right-click in the register list in the Memory tab, and select "*Add Filter*". Enter a text string, and the list will filter to show only matching registers.

Release_1_1_0 - AXRadio-TX-AXM0F343-64/RTE/Device/AXM0F343-64/drv_pmu	J.c - ON Semiconductor IDE										
File Edit Source Refactor Navigate Search Project Run Window H	elp										
🐔 🗱 🐞 Debug 🗸 🔀 AXRadio-TX-AXM0F343-64	Debug ~ 🌞 🗄 🗂 🖷 🕼	🗟 🖸 🔪 🕩 🗉 🔳 🕅 7	8. 🛪 .e 10 🗟 🕫	. & ≒ + • • • •	% - Ø	6 1 .	12 2 2	· 51 • 00 0	→ + ⇔ +	Quick Access	昭 🙆 🎋
🎋 Debug 🖾 Project Explorer 🛛 🙀 🖬 🗢 🗖	AXRadio-TX-A 🖻 main	n.c 🖸 drv_pmu.c 🔀 🖬 pmu.c	c 💽 scheduler.c	»3	- 0	(x)= Variable	es 💊 Breakpoin	ts of Expressi	ons 🛋 Modules 🔀 Pe	ripherals 🛛 🚺 📶 🖂	9 ~ - 0
C AXRadio-TX-AXM0F343-64 Debug [GDB SEGGER J-Link Debugging]	143 DRV_ERROR : Driver control and configuration failed.					Peripheral	6	Address	Description		~
AXRadio-TX-AXM0F343-64.elf					ADC	0x40700000	ADC interface contains	registers used to enable and	d r.u.		
✓ P Thread #1 57005 (Suspended : Signal : SIGTRAP:Trace/breakpoint trap			AES	0×40900000	Hardware Accellerated	AES Encryption and Decryptir	io				
DRV_PMU_Control() at drv_pmu.c:164 0x7ac			AX5043-group-1	0x41900000	Radio registers						
PMU_EnterPowerMode() at pmu.c:134 0x1a48			AX5043-group-2	0x41900000	Radio registers						
wtimer_idle() at scheduler.c:524 0x212e	149 #ifdef DEBUG_DRV_PM	J					CMP	0x40600000	Analog comparators int	terface is used to configure th	ch
main() at main.c:114 0x48ca	150 if (pmu.b_init:	lalized == false)					CMU	0x40300000	Clock Management Uni	it is used to configure clocks.	5.
JLinkGDBServerCL.exe		口品	CPWM0	0x41400000	Capture/PWM Module						
arm-none-eabi-gdb			0%	CPWM1	0x41500000	CPWM1					
Semihosting and SWV	154 #endif		02	CPWM2	0x41600000	CPWM2					
	<pre>155 switch ((pmu_ctrl)ctrl_param)</pre>						CPWM3	0x41700000	CPWM3		
	157 Case PMU PWR MC			CRC	0x40D00000	The Cyclic Redundancy	Check Module is a periphera	al			
	158			DMA	0x40800000	DMA acts as another bu	us master on the AHB Bus to f	fa			
	159 pmu.p_base_			FLASH	0x40C00000	Flash controller is used	to erase or program the flash	h			
	160 SCB->SCR = 4			GPIO	0x40000000	GPIO block, is a general	-purpose I/O interface unit th	th			
	161ISB();					02	I2C	0x41D00000	The I2C interface is con	patible with the Inter-IC Bus	s S
	163			02	MSPI	0x41900000	MSPI				
	164 break;						MTB	0x30000000	Micro Trace Buffer is av	ailable. See CoreSight MTB-N	M
	165						PMU	0x40400000	NEBO has an advanced	power management unit (PM	M
	166 case PMU_PWR_MO	D_DEEPSLEEP:					SPI	0x41A00000	SPI		
	16/			TEST	0x41F00000	Test and Lock control in	terface allows re-configuring	ıg			
	<pre>100 publ_poss_reg*/rwter_nout_p.nuter_nout = //m_nuter_nout_nuter_nout_siter; 100 SGB-SGR = SGB_SGR_SLEEPDEEP_Msk; 170ISB(); 171WFL();</pre>						TICK	0x41000000	TICK timer enables soft	ware to schedule events on g	gi
							TIM0	0x41100000	TIM: 16-bit count up/de	own timer with prescaler	
							TIM1	0x41200000	TIMER1		
	172 173						TIM2	0x41300000	TIMER2		
	173 Dreak;						TRNG	0x40A00000	The True Random Num	ber Generator is a peripheral	l g
	175 case PNU PWR NOD HIBERNATE:						USARTO	0x41B00000	USART		
	175 Deter //G						USART1	0x41C00000	USART1		
							WDOG	0x40F00000	The watchdog module	applies a reset to a system in	1 t
						No details to display for the current selection.					
	187 SCB->SCR = : 188 ISB(); 189 WFI(); 190 WFI(); 191 break;	3C8_SCR_SLEEPDEEP_Msk;	A_SLEEPDEEP_Msk;								
	192 102 DMI (DTO EN)										
	Coords IIII Peninterr (1) 1	rableer. 🔿 Sverutabler 💷 Debue	naar Canrola 👖 Mamr		>	inal 52			E	A M I AS REALES I	
	- courses and medianely MT h	novenia 🕜 executatives 🕷 peopl	ind fine 🔝 weard	ota ⊞ 98 86 ▼ ▽	CON	A40 83			-	a a l all ma White H	
	Monitors 🔒 🐭 🎉	AX5043-group-1: 0x41900000	New Rendering		TX :35						
	A AV5012 arround Devices						n Low Power M	de by Wakeu	p Timer		
	ANJOHO-GROUP-1	Register Address Value					Levi Deve - M	da hu 11at	Times		
		✓ ☆ AX5043-group-1 0x41900000			TX :37	4 :37					
	3131 SILICONREVISION 0x41920000 0x51					MCU wake up from Low Power Mode by Wakeup Timer					
		BIST SCRATCH	0x41920004	UKAA	TX :38	FX :38					
		0x41920008	000	MCU Ent	MCU Entering Low Power Mode						
		IN POWSIAI	0x4192000C	0.07	MCU wak	ce un from	n Fower Mode	de by Waken	n Timer		
		IN POWSTICKYSTAT	0x41920010	0.00	TX :39	to up it to	- con i ower re	oc oy nakeu	P. CAMER		
		BIST POWIKUMASK	0x41920014	0x00	MCU Ent	tering Low	v Power Mode				
		ACHIVIDUM 1010	0841920018	UXUU	MCD Ent	tering in	v Power Mode				1
		IN IDOMASKO	0-41020010	0-00	PICO ENC	cer any con		4. 4. 44.7			

Figure 14 - Peripheral register view during debugging.

onsemi,OnSemi, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including complicance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification. Buyer shall indemnify and hold onsemi and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs,

PUBLICATION ORDERING INFORMATION

LITERATURE FULLFILLMENT:

Literature Distribution Center for ON Semiconductor 19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA

Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada Email: orderlit@onsemi.com N. American Technical Support: 800-282-9855 Toll Free USA/Canada

Europe, Middle East and Africa Technical Support: Phone: 421 33 790 2910 ON Semiconductor Website: https://www.onsemi.com/

Order Literature: https://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative