LC823455 Getting Started Guide

INTRODUCTION

Overview

LC823455 is an audio processing System-on-Chip (SoC) for recording and playback, with High-Resolution 32-bit & 192 kHz audio processing capability that provides the key functions required for portable audio solutions. The LC823455 Software Development Kit (SDK) includes firmware, software, example projects, documentation, and development tools. The Eclipse-based ON Semiconductor Integrated Development Environment (IDE) is offered for free to download.

This document helps you to get started with the LC823455 SDK. It guides you through the process of connecting your LC823455 Evaluation Board, installing an IDE, configuring your environment, and building and debugging your first LC823455 application.

Intended Audience

This manual is for people who intend to develop applications for LC823455. It assumes that you are familiar with software development activities.



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APPLICATION NOTE

SETTING UP THE HARDWARE

Prerequisite Hardware

The following items are necessary before you can make connections:

- LC823455XGEVK Evaluation Board
- A Micro USB Cable
- A Computer Running Windows 7 or Windows 10 Operating System (64 bit Version)

Connecting the Hardware

To connect the Evaluation Board to a computer:

- 1. Check the Jumper Positions:
 - Ensure that the jumper is the same as in Figure 1 to 5.



Figure 1. Evaluation Board with Pins and Jumpers



Figure 2.



Figure 3.



Figure 4.



Figure 5.

2. Set the two switches (SW611 and SW612) to the position shown in Figure 6. These switches are located in the lower left of Evaluation Board.



Figure 6.

Way to Run Software

There are two main ways to run the software on the Evaluation Board.

- 1. Write application binaries to eMMC memory.
- 2. Download the application to SRAM memory using the debugger.

Refer to the "Getting Started with the Sample Application" section for the first case and the "Getting Started with the Eclipse–Based IDE" section for the second case, and prepare the necessary software for each method.

GETTING STARTED WITH THE SAMPLE APPLICATION

Prerequisite Software

To run the Evaluation Board, download the LC823455 Sample Application Package from www.onsemi.com/LC823455.

The Package includes the following:

- USB/LC8234xx_19N_fw_data.bin
- USB/LC8234xx_19N_start_data.boot_bin
- LC823455_Sample_Application_User's_Manual.pdf

Procedure to Write Binary

It is necessary to write the application binary to the Evaluation Board in the initial state.

Follow the procedure below to write the binary to the initial board.

1. Connect CN2 and PC with USB cable. (Figure 7) CN2 is located in the bottom center and on the back side of the Evaluation board.



Figure 7.

2. A USB drive is added as shown in Figure 8, then copy the LC8234xx_19N_start_data.boot_bin into it.



Figure 8.

- : Sample Application binary
- : IPL2 (2nd Boot loader) binary
- : Sample Application Manual

3. Press the RESET switch (SW610) located in the lower left of Evaluation Board as shown in Figure 9.



Figure 9.

4. LC8234xx drive is added as shown in Figure 10, then copy the LC8234xx_19N_fw_data.bin into it.





5. Press the RESET switch (SW610) again.

When the sample application started, the status is displayed on the LCD.

For more information about sample applications, refer to the LC823455_Sample_Application_User's_Manual.

Procedure to Initialize the Evaluation Board

*When initialized, the eMMC is formatted and all files are deleted.

1. Set the two switches (SW611 and SW612) to the position as shown in Figure 11. These switches are located in the lower left of Evaluation Board.



Figure 11.

- 2. Press the RESET switch (SW610).
- 3. The red LED (LED602) shown in Figure 12 will blink. Initialization is complete when the flashing lights up.



Figure 12.

4. Return the two switches (SW611 and SW612) to the positions as shown in Figure 13.



Figure 13.

GETTING STARTED WITH THE ECLIPSE-BASED IDE

Prerequisite Hardware and Software

Install the latest version of J-Link. It is available from the SEGGER website.

To be able to use ON Semiconductor toolchain, you need to fulfill following conditions:

- LC823455 IDE Installer
- J-Link Base JTAG debug adapter or equivalent. https://www.segger.com/products/debug-probes/j-link/models/j-link-base/
- Windows 7 or Windows 10 operating system (64 bit version)
- Administrator rights
- Install J-Link software pack: <u>https://www.segger.com/downloads/jlink/JLink_Windows_V614d.exe</u>
- If command line will be used, J-Link bin directory should be added to "PATH" environment. To do that:
 - Open System -> Advanced System Settings -> Environment Variables.
 - Edit "Path" in the "System variables" window.
 - Check if correct path to Jlink_V614d is set. If not, correct path should be added.

LC823455 IDE Installation Procedure

ON Semiconductor toolchain is provided as an installer. To install the toolchain please follow the steps below:

- 1. Download installer file from <u>www.onsemi.com/LC823455</u>
- 2. Double click on "LC823455 IDE Setup64bit.exe" to start installation process
- 3. Click "Next" on the welcome page shown in Figure 14.



Figure 14.

4. License agreement must be accepted to continue the installation as shown in Figure 15.

🕕 ON Semiconduct	or LC82	3455 IDE Setup — 🗆	×							
ON Semicond	luctor*	License Agreement Please review the license terms before installing ON Semiconductor LC823455 IDE.								
Press Page Down to	o see the	e rest of the agreement.								
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If you accept the to agreement to instal	I If you accept the terms of the agreement, click the check box below. You must accept the agreement to install ON Semiconductor LC823455 IDE. Click Next to continue.									
I <u>a</u>ccept the ten Nullsoft Install System	ms of the v3.01 –	e License Agreement								
		< <u>B</u> ack <u>N</u> ext > Ca	incel							

Figure 15.

5. On the components page, you can decide which parts of toolchain shall be installed shown in Figure 16. It is highly recommended to install all parts (full installation)

🕦 ON Semiconductor LC823455 IDE Setup 🛛 — 🗆 >											
ON Semiconductor*	hoose Components Choose which features of ON Semiconductor LC823455 IDE you want to install.										
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.											
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Space required: 833.6MB											
Nullsoft Install System v3.01 –											
	< <u>B</u> ack	Next > Cancel									

Figure 16.

6. The install location page allows to select a destination directory where the installer will install all the needed files as shown in Figure 17.

ON Semiconductor LC82	3455 IDE Setup	—		×
ON Semiconductor*	Choose Install Location Choose the folder in which to install (IDE.	ON Semicond	uctor LC82	3455
Setup will install ON Semico different folder, dick Brows	nductor LC823455 IDE in the following f e and select another folder. Click Next	folder. To ins to continue.	tall in a	
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Space required: 833.6MB Space available: 52.6GB				
Nullsoft Install System v3.01 -	< <u>B</u> ack	<u>N</u> ext >	Cano	el

Figure 17.

7. The start menu page allows to create the shortcut in the start menu as shown in Figure 18. By default, shortcuts are created inside the start menu and on desktop. It can be disabled by checking the "Do not create shortcuts" checkbox.

🕦 ON Semiconductor LC8	23455 IDE Setup	– 🗆 X
ON Semiconductor*	Choose Start Menu Folder Choose a Start Menu folder for the IDE shortcuts.	ne ON Semiconductor LC823455
Select the Start Menu fold can also enter a name to c	er in which you would like to create ti reate a new folder. ass mel	he program's shortcuts. You
7-Zip Accessibility Accessibility Accessories Administrative Tools Altium Autodesk Cadence Design Systems Canon MG6100 series Chime Cisco Dell		^ ~
Do not create shortcuts Nullsoft Install System v3.01	< <u>B</u> ack	Install Cancel

Figure 18.

8. After the extraction of toolchain is completed, click "Next" as shown in Figure 19.

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ON Semiconductor*	
Completed	
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Completed	
Nullsoft Install System v3.01	

Figure 19.

9. Click "Finish" on the finish page to close the installer shown in Figure 20. There is a <u>www.onsemi.com</u> link on the finish page so you can visit the ON Semiconductor website.

ON Semiconductor LC82	3455 IDE Setup — 🗆 🗙									
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	Click Finish to dose Setup.									
ON Semiconductor [®]										
	www.onsemi.com									
	< Back Finish Cancel									

Figure 20.

10. When you execute "Eclipse for LC823455 IDE" initially, the window shown in Figure 21 appears. The directory selection page allows to select a destination directory of workspace to store its preferences and development artifacts.

🖨 Eclipse Launcher										
Select a directory as workspace										
Eclipse uses the workspace directory to store its preferences and development artifac	IS.									
Workspace: C:\Users\ffynjy\workspace	~	<u>B</u> rowse								
Use this as the default and do not ask again										
01	(Cancel								



11. When eclipse is loaded, you can see standard Eclipse "welcome screen" as shown in Figure 22. It contains basic Eclipse functions and information.



Figure 22.

12. After closing "welcome screen", C development view appears as shown in Figure 23.



Figure 23.

The installed IDE has LED blinking software built-in. You can use this software to run the debugger as the simplest software. If you want to use the Sample Application with debugger, download the LC823455 Sample Application Package separately. And then, import each software into the IDE. Please refer to "Import the LED Blinking Software" and "Import the Sample Application Software" sections which explain how to import.

Import the LED Blinking Software

To import the LED blinking software, please follow the steps below:

- 1. Right-click on the Project Explorer to display the menu shown in Figure 24.
 - Select New-> Project...

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Figure 24.

2. Select Blinky application shown in Figure 25 and click "Next".

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 > > General > > C/C++ > > ON Semiconductor > Blinky application > > RPM > > Tracing > > Examples 			
(?) < Back Next > Einish	(Cancel	

Figure 25.

3. Set the Project name and click "Finish". Figure 26 shows an example of entering "Blinky".

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4. Project is imported as shown in Figure 27. You can start working with the code, build a project and start a debug session.

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😂 Blinky				1	1	·

Figure 27.

Import the Sample Application Software

To import the new project, please follow the steps below:

1. Right-click on the Project Explorer to display the menu as shown in Figure 28. Select Import...

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Figure 28.

2. By clicking General > Existing Projects into Workspace, and click "Next" as shown in Figure 29.

🖨 Import —	□ ×
Select Create new projects from an archive file or directory.	Ľ
Select an import wizard:	
type filter text	
 ✓ ➢ General Archive File ➢ Existing Projects into Workspace File System Preferences Projects from Folder or Archive > ➢ C/C++ > ➢ Git > ➢ Install > ➢ Romote Systems > ➢ RPM > ➢ Run/Debug > ➢ Tasks Team 	~
(?) < Back Next > Einish	Cancel



3. By clicking "Browse", select the destination directory to place the new project files, and click "Finish". Figure 30 shows an example of selecting "C:\LC823455 IDE".

🖨 Import				- 🗆 🗄	×
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?	< <u>B</u> ack	<u>N</u> ext >	<u>F</u> inish	Cancel	

Figure 30.

4. Project is imported as shown in Figure 31. You can start working with the code, build a project and start a debug session.

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Figure 31.

Build and Debug Operation

Describes build and basic debugging using Blinky application and J-Link Base JTAG.

Build Operation

1. Click the hammer icon to start building the selected project.

Figure 32 is the Console Window when the process ends normally.



Figure 32.

Debug Operation

1. After turning off the power of the Evaluation Board by the disconnecting USB cable from CN2, connect J–Link SWD connector to CN601, then connect J–Link USB to PC. CN601 is located in the upper right side of Evaluation Board shown in Figure 33.



Figure 33.

2. After turning on the board by the connecting USB cable to CN2, press the black inverted triangle icon at the right of the debug icon, then select "1 Blinky_JLink" in the pull-down menu as shown in Figure 34.



Figure 34.

3. The Confirmation Window appear as shown in Figure 35. Selecting "Yes" will switch to the Debug Window.



Figure 35.

4. After the Blinky starts running, the LED601 and LED602 blink repeatedly shown in Figure 36.



Figure 36.

5. Debug Window is displayed after execution immediately as shown in Figure 37.

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								\sim
C								<u> </u>
		Figur	e 37.					

Figure 37.

6. When you press the Suspend icon, the execution stops and the following screen display appears as shown in Figure 38. In the example below, processing stops at line 33 of main.c.

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		1		
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Figure 38.

Other general Eclipse operation methods are not mentioned in this document.

MORE INFORMATION

Documentation

Documentation in the LC823455 Sample Application Package

You can access the operation manual of LC823455XGEVK through the LC823455 Sample Application Package. It can be downloaded from <u>www.onsemi.com/LC823455</u>.

The package includes the following:

• LC823455 Sample Application User's Manual Operation manual for Sample Application.

Documentation in the LC823455 Sample Software Package

You can access all of the software documentation including LC823455 IDE through the LC823455 Sample Software Package. It can be downloaded from <u>www.onsemi.com/LC823455</u>.

The package includes the following:

- LC823455 IDE The Sample Software development environment including code, library, makefile, etc.
- LC823455 Sample Software Reference Information for developing using the Sample Software.
- Interface Specification API specifications for each module (IPL, OS, Middleware, Driver, etc.) included in the Sample Software.

Application Notes

For more information, see the following Application Notes. It can be downloaded from <u>www.onsemi.com/LC823455</u>.

- System Functions User's Manual for LC823455 Software Development Describes all the system functional features provided by the LC823455 SoC, including how these features are configured and how they can be used. This application note is a good place to start when you are designing audio application using LC823455 SoC.
- Audio Functions User's Manual for LC823455 Software Development Describes all the audio functional features provided by the LC823455 SoC, including how these features are configured and how they can be used. This manual is a good place to start when you are designing audio application using LC823455 SoC.

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