AIROC™ Execute-in-Place (XIP) application support guide

ModusToolbox™

About this document

Scope and purpose

This document explains how to use the Execute In-Place (XIP) feature on Infineon AIROC™ Bluetooth® platforms.

The scope of this document is to provide information to the developers, so that they can use the XIP feature on AIROC™ Bluetooth® platforms.

Intended audience

This document is intended for application developers creating and testing designs based on Infineon Bluetooth® Software Development Kit (BTSDK) for platforms that support the XIP feature.

Abbreviations and definitions

In most cases, acronyms and abbreviations are defined on first use.

For a comprehensive list of acronyms and other terms used in Infineon documents, go to **www.cypress.com/glossary**.

IoT resources and technical support

In most cases, acronyms and abbreviations are defined on first use.

Infineon provides a wealth of data at **https://www.cypress.com/internet-things-iot** to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Infineon provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates. Customers can acquire technical documentation and software from the Infineon Community website (**https://community.cypress.com/**).

Table of contents

About this document **1**
Table of contents **2**
1 Introduction **3**
1.1 Features overview 3
2 Flash layout and compilation command **4**
Revision history **5**

1 Introduction

The Execute-in-Place (XIP) feature allows you to enable applications to run in-place from either on-chip flash (OCF) or external flash in Infineon AIROC™ Bluetooth® devices that support the XIP feature. Platforms based on the CYW208xx or CYW89820 devices use XIP; others do not.

1.1 Features overview

The XIP feature implements support for building an application to run in-place from on-chip flash (OCF). This feature is helpful for applications with a large code size and limited SRAM constraints. By placing the application and the profile library code in flash, the application can save SRAM space. The *.text* section and *.rodata* section from the application and the profile libraries execute from flash. The remaining sections are loaded to the SRAM. Patches will be executed from the patch RAM.

The flash start address to place the XIP section is calculated by adding `CY_CORE_APP_SPECIFIC_DS_LEN` (default set in *<TARGET>.mk*) to `ConfigDSLocation`, from the platform *btp* file found in the platform folder *wiced_btsdk/dev-kit/baselib/<device>/platforms*. Currently, the `CY_CORE_APP_SPECIFIC_DS_LEN` value is set to a minimal offset of 0x80 (128) bytes. This allows just enough room for some required early DS configuration records. It is not recommended to modify this. The XIP itself occupies a special DS configuration record and is part of the DS Section as shown in **Figure 1**. Other DS configuration records follow the XIP record to make up the rest of the DS section.

Executing the code from flash will impact the speed and power. Therefore, do not place time critical functionality (such as interrupt service routines) in the XIP section. A named section attribute has been defined for this in the baselib header files:

```
#define PLACE_TEXT_IN_RAM __attribute__((section(".text_in_ram")))
```

Place the part of the application code RAM using the section attribute as follows:

```
PLACE_TEXT_IN_RAM void foobar(void)
{
0
}
```

2 Flash layout and compilation command

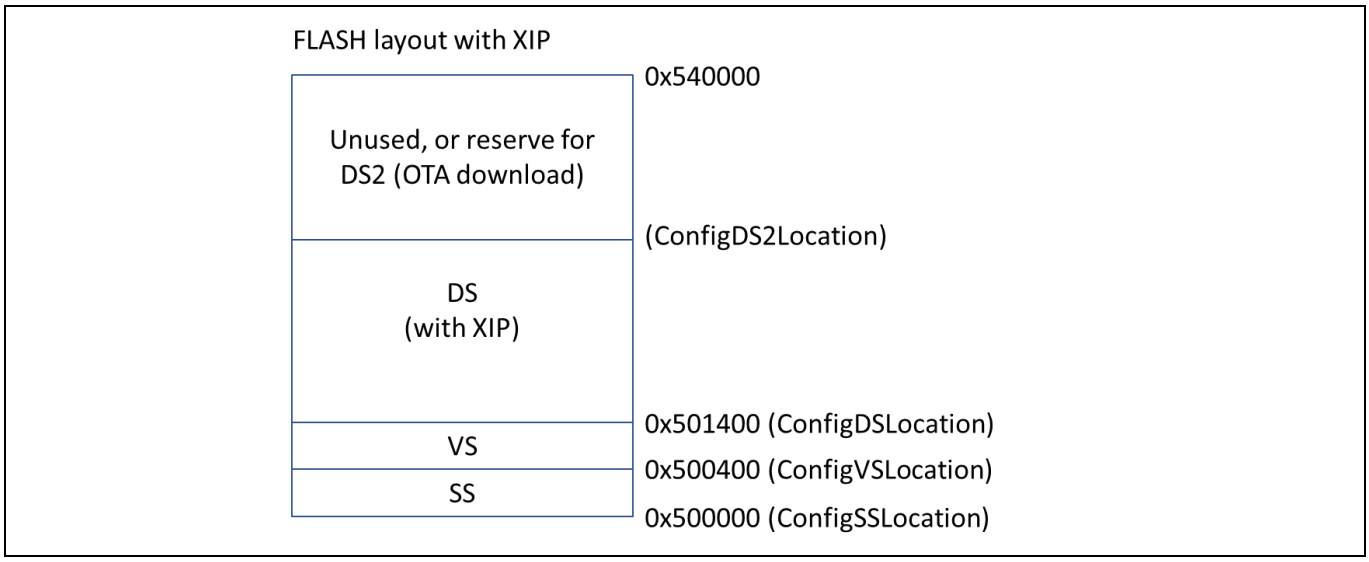


Figure 1 Typical 208XX flash layout with XIP image

In the flash layout with XIP image:

- SS = Static section, where `BD_ADDR` and location of other sections are stored
- VS = Volatile section, where Link keys and app NV data are stored
- DS/DS2 = Dynamic section, where patches, configuration, and application code are stored. There are two sections to support fail-safe OTA upgrades.

Revision history

Major changes since the last revision

Date	Version	Description
02/19/2019	**	Initial release.
04/24/2019	*A	Removed Associated Part Family in page 1. Updated Flash Layout and Compilation Command (for BTSDK release).
10/16/2019	*B	Updated path and filename references (for ModusToolbox 2.0) in Introduction.
01/29/2020	*C	Updated Introduction and Flash Layout and Compilation Command (As XIP is now embedded in DS record structure).
2021-03-03	*D	Updated to Infineon template. Completing Sunset Review.
2021-10-28	*E	Updated terminology per Bluetooth® SIG and marketing

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2021-10-28
Published by

Infineon Technologies AG

81726 Munich, Germany

© 2021 Infineon Technologies AG. All Rights Reserved.

Do you have a question about this document?

Go to **www.cypress.com/support**

Document reference
002-22870 Rev. *E

IMPORTANT NOTICE
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics (“Beschaffenheitsgarantie”) .

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (**www.infineon.com**).

WARNINGS
Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies’ products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.