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.

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IoT resources and technical support

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

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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

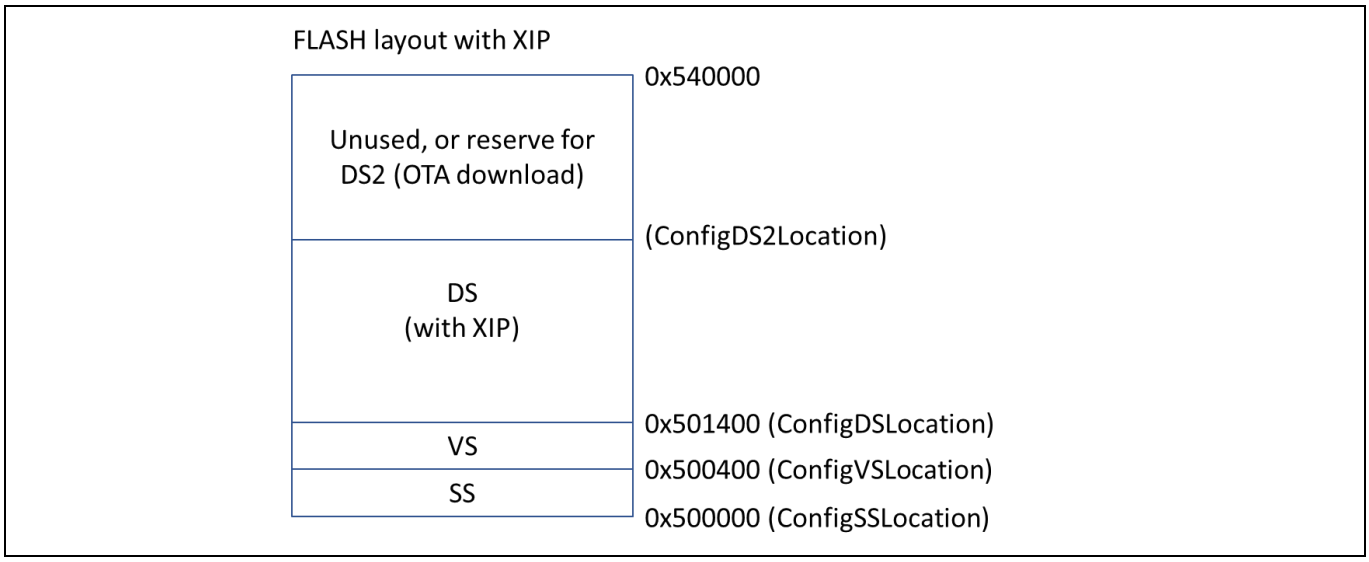

Figure 1 Typical 208XX flash layout with XIP image

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

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