

Creating a ModusToolbox[™] 3.x BSP

About this document

Scope and purpose

This application note describes how to create a Board Support Package (BSP) using the ModusToolbox[™] BSP Assistant tool. This document explains the basics of a BSP along with the various use cases where the BSP Assistant tool can be useful during application development using ModusToolbox[™] version 3.1 or above.

Note: Applications developed with ModusToolbox[™] version 3.0 or above are not backward compatible with earlier versions of ModusToolbox[™].

Intended audience

This document is intended for anyone who needs to create a user-specific design board using an Infineon device supported inside the ModusToolbox[™] ecosystem.

Document conventions

Convention	Explanation
Bold	Emphasizes heading levels, column headings, menus and sub-menus.
Italics	Denotes file names and paths.
Courier New	Denotes APIs, functions, interrupt handlers, events, data types, error handlers, file names, directories, command line inputs, code snippets, etc.
File > New	Indicates that a cascading sub-menu opens when you select a menu item.

Abbreviations and definitions

Abbreviation	Meaning
BSP	Board support package
МСО	Microcontroller unit
MPN	Manufacturer part number

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1 Introduction

1 Introduction

1.1 What is a BSP?

BSPs are a set of files and directories that provide the necessary functionality to develop target applications on any given board. The board is typically a printed circuit board (PCB) used in any electronics product like a mobile phone, laptop, digital camera, etc. These boards usually have a microcontroller (or microprocessor) chip with various peripherals and other components that are wired together to meet the target application requirements.

Infineon has a range of microcontroller devices belonging to various families such as PSoC[™] 4, PSoC[™] 6, and XMC[™], and provides development kits (or boards) for the evaluation of these devices. The BSPs for these development boards are made available through the ModusToolbox[™] ecosystem in the Infineon GitHub website.

1.2 BSP Assistant overview

The BSP Assistant tool helps you create and manage custom BSPs for the board designed for your application using Infineon MCUs. The tool is available in both graphical user interface (GUI) and command line interface (CLI) versions.

C:/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.1 <u>File E</u> dit <u>S</u> ettings <u>V</u> iew <u>H</u> elp	0		_		×
BSP location: C:/Users/Public/Example/TARGET_MyBSP					
Name Devices V Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 V Libraries cat1cm0p core-lib core-make mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a Components Defines	Update Available	Remove	Please select a leaf node in the tree to see its properties.		
Add Configuration Add Library Finding MCUs compatible with this BSP mtb-template-cat1 asset found at C:/Users/follettcj/.modustoolbox/ MCUs compatible with this BSP found (7 ms)	olbox/global/mtb-templat global/mtb-pdl-cat1/rele	e-cat1/rele ase-v3.3.1 (1	sse-v1.0.0 (6 ms) ms)	Clos	~ se

Figure 1

BSP Assistant GUI



1 Introduction

1.3 Overview

This application note has the following sections to help you learn the following:

- **BSP design** Explains the BSP architecture
- Using the BSP Assistant tool Explains typical BSP Assistant tool use cases such as creating and modifying BSPs using the Hello World code example
- Advanced usage Explains advanced BSP Assistant tool use cases like BSP migration between generations

1.4 Software requirement

Software	Minimum required version
ModusToolbox™	3.1



2 BSP design

2 BSP design

As mentioned previously, a BSP is a set of files and directories with content specific to a target board that enables you to develop a target application. BSPs for evaluation boards of MCUs supported by ModusToolbox[™] are made available through the ModusToolbox[™] ecosystem via Infineon GitHub repositories.

2.1 Software

Software is provided in source or library form and contains a set of APIs to control and configure the microcontroller and other onboard components. A BSP specifies software that it requires as dependencies. For Infineon BSPs provided on GitHub, dependencies are specified in a manifest file. Once a BSP is created by the user, (either during application creation or by using the BSP Assistant) the dependencies are specified in a set of *.mtbx files in the BSP's deps subdirectory. These dependency files contain information for downloading the minimum set of libraries required to develop an application on the given board.

2.1.1 Peripheral Driver Library (PDL)

PDL contains a set of low-level APIs to control hardware peripherals such as UART and SPI. The interfaces are usually specific to a particular microcontroller or microcontroller family. For some MCU families, the low-level API library may use an alternative name for the low-level library APIs other than PDL mentioned in this section.

2.1.2 Hardware Abstraction Layer (HAL)

HAL contains a set of high-level APIs to control hardware peripherals; the interfaces are more portable than PDL in case of the following changes:

- Changing the pin assignments for the peripherals within the same microcontroller
- Porting to another microcontroller within the same family
- Porting to another microcontroller in a different family

2.1.3 Other libraries

These libraries provide the following functionality:

- **Abstraction libraries:** These typically abstract the RTOS to help in porting the application across different RTOS like FreeRTOS or to a different board.
- **Base libraries:** These libraries, such as core-lib, core-make, recipe-make are necessary for the build process.
- **Board utilities libraries:** These are libraries supporting various utilities available on the board other than the microcontroller, such as sensors and displays, and are used to control them.
- **MCU Middleware:** These include middleware that provides RTOS services, such as FreeRTOS, or peripheral services, such as capacitive sensing.

2.2 Documentation

BSPs have the following documentation accompanying them:

- **Docs/api_reference_manual.html:** Provides details of the APIs, structures, and macros that are provided as part of the BSP and details of the board design, including the available microcontroller, LEDs, buttons, memory, and sensors.
- **README.md:** Provides top-level information about the BSP and usually contains links to additional documentation.
- **RELEASE.md:** Provides information about various versions of the BSP and changes from one version to another.





2.3 Typical BSP contents





2.3.1 Startup code and linker files

Startup code is usually in assembly format and is the code that executes after a CPU reset. These are usually specific to a CPU and configure various microcontroller special-function registers such as the stack pointer.

Linker files are used to map various sections of the compiled source code into memory regions like flash and SRAM. These are used by the build system to generate the final binary that is programmed onto the target.

Both startup code and linker files are specific to a build environment like GCC. BSPs that accompany the ModusToolbox[™] ecosystem provides these items for the GCC, IAR, and Arm[®] build environments.

Since the startup code and linker files are CPU and toolchain dependent, they are located inside COMPONENT and TOOLCHAIN directories inside the BSP, which allows them to be included conditionally. For example, the directory COMPONENT_CM4/TOOLCHAIN_GCC_ARM would contain startup code and linker script files that are only used when building a project for the CM4 CPU with the GCC_ARM toolchain.

2.3.2 Configuration files

ModusToolbox[™] comes with various BSP configurator tools that enable you to configure the microcontroller peripherals. Typically, these configure the clock, pin, and other resource-related settings in the microcontroller. There are GUI tools like the Device Configurator to open/edit the configuration files, which are saved in XML format with a specific file extension like design.modus. When the configuration is saved, the tool generates the configuration code that is linked together with the application code during the build process.

The files for each BSP configurator are located in the config directory inside the BSP.

The following table summarizes the available BSP configurator tools, associated configuration file, and a brief description.



2 BSP design

Table 1 BSP co	onfiguration files	
Configurator tool name	Configuration file extension	Description
capsense-configurator	*.cycapsense	CAPSENSE [™] Configurator is used to create and configure CAPSENSE [™] widgets, and generate code to control the application firmware.
device-configurator	*.modus	Device Configurator is used to enable and configure device peripherals, such as clocks and pins, as well as standard MCU peripherals that do not require their own tool.
qspi-configurator	*.cyqspi *.cymem	The QSPI Configurator is used to open or create configuration files, configure memory slots, and generate code for your application when external flash devices are connected to the MCU using a Quad Serial Peripheral Interface (QSPI).
seglcd-configurator	*.cyseglcd	SegLCD Configurator is used to generate display structures for the SegLCD Driver.
smartio-configurator	*.modus	Smart I/O Configurator is used to configure the smart I/O pins in the MCU.
usbdev-configurator	*.cyusbdev	Universal Serial Bus(USB) configurator is used to configure USB device descriptors.

2.3.3 Generated source files

BSP Configurators generate related source/header files in the GeneratedSource subdirectory that are then included as part of the application build. This helps avoid writing lengthy configuration code.



2 BSP design

✓ (⇒ GeneratedSource)
> h cycfg_capsense_defines.h
> h cycfg_capsense_tuner_regmap.h
> c cycfg_capsense.c
> h cycfg_capsense.h
> c cycfg_clocks.c
> h cycfg_clocks.h
> c cycfg_connectivity_bt.c
> h cycfg_connectivity_bt.h
> h cycfg_notices.h
> cycfg_peripherals.c
> h cycfg_peripherals.h
> 🖸 cycfg_pins.c
> h cycfg_pins.h
> c cycfg_qspi_memslot.c
> h cycfg_qspi_memslot.h
> c cycfg_routing.c
> h cycfg_routing.h
> c cycfg_system.c
> h cycfg_system.h
> c cycfg.c
> h cycfg.h
cycfg.timestamp
gspi_config.cfg

Figure 3 Sample GeneratedSource subdirectory

2.3.4 Static source files

A BSP contains static source files with initialization routines for the board. These must be called by the application code before using any MCU peripherals. Typical BSP static source files that are included with ModusToolbox[™] BSPs are as follows:

- cybsp.c Provides initialization code for starting up the hardware contained on the Infineon board
- cybsp.h API header file for cybsp.c
- cybsp_doc.h Contains code for generating BSP html documentation
- cybsp_types.h Contains code for the states of button/pin/led on the Infineon board
- bluetooth/cybsp_bt_config.c Provides initialization settings for the Bluetooth[®] module
- bluetooth/cybsp_bt_config.h API header file for cybsp_bt_config.c

2.3.5 Documentation files

A BSP contains Doxygen/markup-based documentation for the application developer with the details of various libraries, release notes, etc.



3 Using the BSP Assistant tool

This section describes two basic use cases for working with the BSP Assistant tool:

- Creating a new BSP
- Customizing an existing BSP

These use cases show the tools in a Windows operating system, as well as using the Eclipse IDE. If you use another IDE/OS combination, the steps will be similar but may not be identical.

3.1 Creating a new BSP

Use this workflow to create a new BSP for the Infineon MCU board. You can create the BSP using an existing BSP as a starting point and then modify it for your needs, or you can create a BSP from scratch based on the devices the board contains. For demonstration, this workflow considers creating a BSP for a board based on the CY8C6347BZI-BLD44 MCU device. Each method is described in the following sections.

3.1.1 Create and configure the BSP using the existing sample board

- 1. Type **bsp-assistant** in the Windows search tool to open the BSP Assistant tool or look in the Window's menu under "ModusToolbox <version>".
- 2. After the tool loads, select File > New > From Sample Board to open the Create New BSP From Sample Board window.

Enter	filter text		Browse for BSP	- +	PSOC6-GENERIC	^
Kit Na	ame CYW9P62S1-4343 EVAL-XMC4800PS	8EVB-01 OC6M5-PS0	MCU/SOC/SIP AW-CU427 (CY8C DC6 CY8C624ABZI-S2	^ C6247B D44	This board support package is intended for creating custom PSoC™ 6 BSPs.	
> TI	KIT-BGT60TR13C- PSOC6-GENERIC RAVEO™ BSPs	EMBEDD	CY8C6247FDI-D0 CY8C6347BZI-BLI	2 D53	Kit Features: • This is a generic template, there is no corresponding	
< Destin	ation			>	physical board and hence no	~
Parent	directory:	C:/Users/P	ublic/Example		Browse.	•

Figure 4

Create New BSP dialog

- 3. Select **PSOC6-GENERIC** under the **PSoC[™] 6 BSPs** category or if the board you are creating is similar to an existing Infineon board, you can select it as the starting BSP.
- 4. Set the directory path where the BSP will be created in the **Parent Directory** text box.
- 5. Type a suitable name for the BSP in the **New BSP name: TARGET_** text box. This example uses the name **MyBSP**.
- 6. Click **OK**.

The BSP Assistant tool starts downloading the contents from the Infineon GitHub website; when finished, the screen should look like the following:



	Hadata Aug 201	D					
Devices	Opdate Available	Kemove	MCU/SOC/SIP:	CY8C6347	'BZI-BLD53		
Configurations			 Device Info: 	Open CY80	C6347BZI-BLD53 Docume	ntation	
Device Configurator 4.10 Smart I/O Configurator 4.10		8	Connectivity module:	None			
 Libraries 		~	CM0+ pre-built firmw	are image:	This image starts CM4 of	ore at CY_COR	TEX ·
core-lib core-make mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a Components Defines		XXX	Using HAL interface:		CY_USING_HAL		
Add Configuration Add Library many arc may parter assess inding MCUs compatible with this BSP mtb-template-cat1 asset found at C:/Users/follettcj/.modustoolbox/gla MCUs compatible with this RSP found (7 ms)	ox/global/mtb-templa obal/mtb-pdl-cat1/rele	te-cat1/rele ase-v3.3.1 (ase-v1.0.0 (6 ms) 1 ms)				

Figure 5 BSP Assistant finished loading content

- 7. Change the MCU device to **CY8C6347BZI-BLD44** by selecting it from the **MCU/SOC/SIP** drop-down menu under the **Devices** section as shown and click **Save**.
 - *Note:* You can start typing the MCU name in the drop-down box to filter the choices.

er, esere, r asire, example, n itder_inyboi					
Name	Update Available	Remove	MCU/SOC/SIP: Device Info: Connectivity module: CM0+ pre-built firmwa Using HAL interface:	CY8C6347BZI-BLD44 CY8C6347BZI-BLD33 CY8C6347BZI-BLD34 CY8C6347BZI-BLD43 CY8C6347BZI-BLD43 CY8C6347BZI-BLD53 CY8C6347BZI-BLD54 CY_USING_HAL	
Add Configuration Add Library mung mees compatible with this oprim mtb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox mtb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox MCUs compatible with this BSP found (13 ms)	olbox/global/mtb- /global/mtb-pdl-c	template-c at1/release	at1/release-v1.2.0 (9 ms) v3.4.0 (4 ms)		

Figure 6 Changing MCU device

Messages appear in the output console ending with **Saving changes to BSP succeeded.** as follows:



	The first of the second	N A CH L A C O C A CH D		an ava d		
Devices			010003471			
Configurations		Device Info:	Open CY8C	6347BZI-BLD44 D	ocumentation	
Device Configurator 4.10 Smart I/O Configurator 4.10	8	Connectivity module:	None			
Libraries cat1cm0p core lib	Ş	CM0+ pre-built firmw	are image:	This image starts	CM4 core at C	Y_COR
core-make	- 😪	Using HAL Interface.		CT_03ING_HAL		
mtb-hal-cat1	$-\mathbf{X}$					
mtb-pdl-cat1	<u> </u>					
recipe-make-cat1a						
Components						
Defines						
d Configuration Add Library						
ease vo.a.oprops.json set device crocodarozi beda						
d Configuration Add Library						

Figure 7 Output console messages

8. Under the **Configurations** section, click **Device Configurator 4.10**, and then click the **Edit Configuration** button to open the Device Configurator tool.

P location: C:/Users/Public/Example/TAR	GET_MyBSP		
lame Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Libraries cat1cm0p core-lib core-make emwin	Update Available Remove	Location: C:/Users/Public/Example/TARGET_MyBSP/config/design.modus Modify: Edit Configuration Image: The state of the state	
mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a Components Defines dd Configuration Add Library	× × ×		
levice-db asset found at C:/Users/follettcj/. oading data from device-db bata loaded from device-db inding the mtb-template-cat1 (release-v1.0 inding the mtb-template-cat1 (release-v1.0 inding the mtb-template asset inding MCUs compatible with this BSP ntb-template-cat1 asset found at C:/Users/follett ntb-template-cat1 asset found at C:/Users/follett	modustoolbox/global/device-db/release-v4.2).0) asset follettcj/.modustoolbox/global/mtb-template cj/.modustoolbox/global/mtb-pdl-cat1/releas	0 (6302 ms) -cat1/release-v1.0.0 (6 ms) se-v3.3.1 (1 ms)	

Opening Configurator from BSP Assistant

9. For this demo, make the following changes:

Figure 8

- Name the pin *P5[0]* as *CYBSP_DEBUG_UART_RX* from the **Pins** tab.
- Name the pin *P5[1]* as *CYBSP_DEBUG_UART_TX* from the **Pins** tab.
- Name the pin *P13*[7] as *CYBSP_USER_LED* from the **Pins** tab.
- Disable CLK_ALT_SYS_TICK from the **System** tab, **System Clocks > Miscellaneous**.



Y8C6347BZI	BLD44						P5[1] (CYBSP_DEBUG_UART_TX) -	Parameters	Ð
eripherals	Pins	Analog-Routing	System	Peripheral-Clocks	DMA		Enter filter text		20 🖻
nter filter tex	t			27 🖻 🖽	* 🗎	0 3 3 3	Name	Value	
source	Name	u(c)	Personality		^		✓ Overview		
Port 0	Nume	(3)	reisonanty			A	⑦ Configuration Help	Open GPIO D	ocumentation
Port 1						n m m m 🛑 🖶 🖾 💭 B n m m m m m 📾 🛑 🖨 C	✓ General		
Port 5							⑦ Drive Mode	Analog High-	Z. Input buffer off
🗹 P5[0)] CYBSP	DEBUG UART RX	Pin-3.0 ×				Initial Drive State	High (1)	
✓ P5[1	CYBSF	DEBUG UART TX	Pin-3.0 ×				✓ Input		
P5[2	21 ioss 0	port 5 pin 2					⑦ Threshold	CMOS	
	l ioss 0	port 5 pin 3				о т т т т т т т т т т н о т т т т т т т т т т т т т т т т т т т	Interrupt Trigger Type	None	
□ P5[4	1 ioss 0	port 5 pin 4				a (m) (m) (m) (m) (m) (m) (m) (m) (N) (4782)-BLD44 (124-BGA-SP)	✓ Output		
	1 ioss 0	port_5_pin_4				pel One Ore and Dro	Slew Rate	Fast	
					~	< >	P5[1] (CYBSP_DEBUG_UART_TX)	- Parameters	Code Preview
tice List									Ð
_		-	-						

Figure 9 Changing pin settings 1

CY8C6347BZI-B	LD44					P13[7] (CYBSP_USER_LED) - Param	ieters	Ð
Peripherals	Pins Analog-Routing	System	Peripheral-Clocks	DMA	x	Enter filter text	Æ	ت 🗆 😈
Enter filter text			🖉 🔻 🖻 🖽	* 🛙	633	Name	Value	
Resource	Name(s)	Personality		^	13 12 11 10 9 8 7 6 5	 Overview 		
P13[0]	ioss 0 port 13 pin 0					⑦ Configuration Help	Open GPIO Documenta	tion
□ P13[1]	ioss 0 port 13 pin 1					✓ General		
□ P13[2]	lioss 0 port 13 pin 2	_				⑦ Drive Mode	Analog High-Z. Input be	uffer off 🗠
□ P13[2]	lioss_0_port_13_pin_2					Initial Drive State	High (1)	~
□ P13[4]	ioss 0 port 12 pin_5					✓ Input		
□ P13[4]	lioss_0_port_13_pin_4					⑦ Threshold	CMOS	~
□ P13[3]	loss_0_port_13_pin_5					Interrupt Trigger Type	None	~
	loss_0_port_13_pin_6	D: 2.0			CY8C634782-8LD44 (124-9GA-1	✓ Output		
P13[7]	CYBSP_USER_LED	Pin-3.0 V			e becom set	Slew Rate	Fast	~
Port 14				~	< >>	P13[7] (CYBSP_USER_LED) - Para	meters Code Preview	(
Notice List								Ð
O a r	A aw : 🕞 a	T I 🙆 o						
U Errors			Infos					
\[Locatio

Figure 10 Changing pin settings 2



CY8C6347BZI	Save							CLK_ALT_SYS_TIC	K - Parameters [DISABLED]	8
Peripherals	Pins Ar	nalog-Routing	System	Peripheral	I-Clocks	DMA		Enter filter text	Æ	ບັ 🖻
Enter filter tex	ct				R	7 🗉	e / 8 6 9 9 9 8	Name	Value	
× FLL+PL > FLL+PL > High Fi > Input ✓ Miscell	LL requency laneous CLK_ALT_SYS CLK_BAK	_TICK srss_0_cld	ock_0_altsyst	ickclk_0				⑦ Confi	guration Help <u>Open SysTi</u>	<u>ck Docum</u> e
	CLK_LF CLK_PUMP CLK_TIMER	srss_0_cld srss_0_cld srss_0_cld	ock_0_lfclk_0 ock_0_pumpo ock_0_timerc	:lk_0 lk_0 ✓				¢		
	CLK_LF CLK_PUMP CLK_TIMER	srss_0_cld srss_0_cld srss_0_cld	ock_0_lfclk_0 ock_0_pumpo ock_0_timerc	slk_0 k_0				< CLK_ALT_SYS_T	CK - Parameters [DISA	Code Pr
<	_ CLK_LF CLK_PUMP CLK_TIMER	srss_0_cld srss_0_cld srss_0_cld	ock_0_lfclk_0 ock_0_pumpo ock_0_timerc	clk_0 lk_0 v		1		CLK_ALT_SYS_T	CK - Parameters [DISA	Code Pr

Figure 11 Changing clock settings

- **10.** Click **File > Update All Personalities** and then click **File > Save**.
- **11.** Close the Device Configurator tool.
- **12.** On the BSP Assistant tool, under the **Libraries** section, check that the BSP includes the following dependent libraries that will be used for an application:
 - cat1cm0p
 - core-lib
 - core-make
 - mtb-hal-cat1
 - mtb-pdl-cat1
 - receipe-make-cat1a



C, Osers/ Public/ Example/ MROLI_Myb3P		
Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Libraries cat1cm0p core-lib core-make mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a Components Defines	Update Available Remove	Please select a leaf node in the tree to see its properties.
Add Configuration Add Library acrops.isonset-device CYB06447BZI-D54force"	Annant menter anticipater a titelak hin halaan den a	serstronetteljinnoaastaansant grosantinte par eartitretease tsistit

Figure 12 Checking libraries

13. If you need any additional **Libraries** other than those listed above, click **Add Library** button to view the list of available libraries. For example, the following image shows adding the **emwin** package.

Note: If you click the filter button, only enabled dependencies will be listed.



SP location: C:/Users/Public/Example/TARGET_M	ЛуBSP		
SP location: C:/Users/Public/Example/TARGET_N Vame Devices Configurations Device Configurator 4.10 Smart (/O Configurator 4.10 Libraries cat1cmOp core-lib core-make mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a Components Defines	/JyBSP Update	Available Remove	Please select a leaf node in the tree to see its properties.
Add Configuration Add Library orops.jsonset-device CYB064478ZI-D54force Saving changes to BSP succeeded.	ישטושטאון אוסטטון שבירכב שטן דב י	ובעזבי די הבוסן אַרטאַזייַזיין בע	Save Close
ady			
Add libraries - BSP Assistant 1.10	The second	× GGER emWin nbedded graphic rary and graphical er interface (GUI) imework.	

Figure 13 Adding "emwin" to the list of libraries

14. After the necessary libraries are added, click the **Save** button to save the BSP.



opdate / wallable	Remove	
	\mathbf{x}	
	$\mathbf{\hat{\mathbf{x}}}$	
	\mathbf{Q}	Please select a leaf node in the tree to see its properties.
	\mathbf{S}	
	X	
	X	
	•	
Data/Local/Infineon Technolo	aies AG/Modus	sToolbox/Device Configurator ini"
	Date // acel //afenana Tackanala	

Figure 14 Saving the updated BSP

Otherwise, there will be a warning as shown when you exit the tool.

BSP Assistant 1.10
You have pending changes that have not been saved. Do you really want to exit without saving them?
<u>Y</u> es <u>N</u> o

Figure 15

BSP saving missed warning

This completes the BSP creation; you can exit the tool now. If you changed any libraries, you might see the following warning while leaving the tool; you can ignore the warning since the BSP is not yet being used in any applications:

BSP Assistant 1.10
The libraries are modified. They must be updated in any applications that use this BSP either by using the Update feature of the Library manager or by running make getlibs.
OK

Figure 16

Warning can be ignored

3.1.2 Create and configure the BSP using MPN

- 1. Type **bsp-assistant** in the Windows search tool to open the BSP Assistant tool or look in the Windows menu under "ModusToolbox <version>".
- 2. After the tool loads, select File > New > From Contained MPNs to open the Create New BSP window.



Create New BSP From Contained M CY8C6347BZI-BLD44	IPNs - BSP Assistant 1.10			
MCU/SOC/SIP:		Companion:		
 ✓ PSoC[™] 6 MCUs CY8C6347BZI-BLD 	044	None		
Destination				
Parent directory:	C:/Users/Public/Examp	le_MPN		Browse
New BSP name: TARGET_	MyBSP			
			ОК	Cancel

Figure 17 Create New BSP window

- **3.** Enter the first few characters of the MPN **CY8C6347BZI-BLD44** in the search bar and select the MPN **CY8C6347BZI-BLD44** in the pane MCU/SOC/SIP from the results.
- **4.** Select **None** in the **Companion** paneas the BSP we create in the example does not have any connectivity device connected to the MCU.
- 5. Set the directory path where the BSP will be created in the **Parent Directory** text box.
- 6. Type a suitable name for the BSP in the **New BSP name: TARGET_** text box. This example uses the name **MyBSP**.
- **7.** Click **OK**.

The BSP Assistant tool starts downloading the contents from the Infineon GitHub website; when finished, the screen should look like the following. Ignore any warnings in the bottom pane at this stage, as it will be fixed in the following steps.



SP location: C:/Users/Public/Example_MPN/TARG	ET_MyBSP					
Vame	Update Available	Remove ^	MCU/SOC/SIP:	CY8C6347	BZI-BLD44	
Devices						
 Configurations 			 Device Info: 	Open CY8C	6347BZI-BLD44 Docum	<u>entation</u>
Device Configurator 4.10 Smart I/O Configurator 4.10		8	Connectivity module:	None		
 Libraries cat1cm0p 		×	CM0+ pre-built firmw	are image:	This image starts CM4	core at CY_COR
core-lib		- X	Using HAL interface:		CY_USING_HAL	
mtb-hal-cat1		\sim				
mtb-pdl-cat1		A				
recipe-make-cat1a		× ×				
dd Configuration Add Library Jobal/mtb-pdl-cat1/release-v3.4.0/props.jsonse	et-device CY8C6347BZI-BLD44	torce"				
SP created.						
Setting default values						
aving changes						

Figure 18 BSP Assistant finished loading content

8. Select the **Device Configurator 4.10** from the **Configurations** item in the left pane. Then click the **Edit Configuration** button to update the MCU configuration to match that of the BSP created in section 3.1.1.



C./ Osers/Fublic/Examp	ole_MPN/TARGET_MyB	SP					
Name Devices	Update Available	Remove	ocation:	C:/Users/Public/Example_MP	N/TARGET_MyBSI	P/config/design.modus	
 Configurations 		N	1odify:	Edit Configuration			
Device Configurator 4.10			Help:	Open Device Configurator 4.	10 Documentation	<u>n</u>	
Smart I/O Configurator 4.10		<u>A</u>					
 Libraries 							
cat1cm0p		X					
core-lib		- X -					
core-make		X					
emwin							
mtb-hal-cat1		X					
mtb-pdl-cat1		<u> </u>					
ad Configuration Add Library							
ACUs compatible with this BSP four	nd (15 ms)			, , , ,			
ady ∴/Users/Public/Example_MPN/TARGET_My8SP/ le _Edit _Settings _View _Help	'config/design.modus - Device	e Configurator 4.10				Sa	Close
ady ::/Jsers/Public/Example_MPN/TARGET_MyBSP/ e Edit Settings View Help in the View Help Y8C6347BZI-BLD44	'config/design.modus - Device)	e Configurator 4.10			Parameters	Sa	ve Close
ady 2/Users/Public/Example_MPN/TARGET_My8SP/ e Edit Settings View Help Particle Contemporation Y8C6347BZI-BLD44 eripherals Pins Analog-Rou	(config/design.modus - Device)	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	Sa	ve Close
ady :/Users/Public/Example_MPN/TARGET_My8SP/ le Edit Settings View Help With Control of the set	config/design.modus - Device	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	Sa	ve Close
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ady E/Users/Public/Example_MPN/TARGET_My8SP/ le Edit Settings View Help Processory Comparison V8C6347BZI-BLD44 Peripherals Pins Analog-Rou hter filter text assource Name(s) Port 0	Config/design.modus - Device	e Configurator 4.10 eripheral-Clocks	DMA	× • • • • • • • • • • •	Parameters	Sa	ve Close
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ady E:/Jsers/Public/Example_MPN/TARGET_My85P/ le Edit Settings View Help Part Settings View Help Part 0 Port 0 Port 1 Port 5 Port 6	iconfig/design.modus - Device	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	t an enabled resource to	ve Close
ady C/Users/Public/Example_MPN/TARGET_My85P/ le Edit Settings View Help Comparison of the setting of the settin	iconfig/design.modus - Device	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	t an enabled resource to	ve Close
ady C/Users/Public/Example_MPN/TARGET_My85P/ le Edit Settings View Help State of the setting of	iconfig/design.modus - Device atting System Pr Personality	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	t an enabled resource to	ve Close
ady C/Users/Public/Example_MPN/TARGET_My8SP/ le Edit Settings View Help CY8C6347BZI-BLD44 Peripherals Pins Analog-Round nter filter text esource Name(s) Port 0 Port 1 Port 5 Port 6 Port 7 Port 8 Port 9	ting System Pr	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	st an enabled resource to	ve Close
ady C/Users/Public/Example_MPN/TARGET_MyBSP/ le Edit Settings View Help C/USEC6347BZI-BLD44 Peripherals Pins Analog-Round nter filter text esource Name(s) Port 0 Port 1 Port 5 Port 6 Port 7 Port 8 Port 9 Port 10 Port 20 Port 10 Port 20 Port 20	ting System Pr	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	Sa t an enabled resource to	ve Close
ady	fconfig/design.modus - Device uting System Pr Personality	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	t an enabled resource to	ve Close
ady	config/design.modus - Device	e Configurator 4.10 eripheral-Clocks	DMA		Parameters	t an enabled resource to Code Preview	ve Close
ady C/Users/Public/Example_MPN/TARGET_MyBSP/ le Edit Settings View Help C/USEC6347BZI-BLD44 Peripherals Pins Analog-Round nter filter text essource Name(s) Port 0 Port 1 Port 5 Port 6 Port 6 Port 7 Port 8 Port 9 Port 10 Port 11 Port 12 Doct 12	Config/design.modus - Device	e Configurator 4.10 eripheral-Clocks			Parameters Selec Parameters	t an enabled resource to	ve Close
Ady C:/Users/Public/Example_MPN/TARGET_My85P/ le Edit Settings View Help C:/Users/Public/Example_MPN/TARGET_My85P/ le Edit Settings View Help C:/Users/Public/Example_MPN/TARGET_My85P/ Iver filter text SSOURCE Name(s) Port 0 Port 1 Port 5 Port 6 Port 7 Port 8 Port 9 Port 10 Port 11 Port 12 Dot 13 Port 10 Port 10 Port 12 Por	iconfig/design.modus - Device	e Configurator 4.10 eripheral-Clocks			Parameters Select	t an enabled resource to	ve Close

Figure 19 O

Opening the Device Configurator

9. Enable and add the name for the following pins in the **Device Configurator**.

Table 2Adding identifier to the pin

Port and pin number	Name
P5[0]	CYBSP_DEBUG_UART_RX
P5[1]	CYBSP_DEBUG_UART_TX
P6[4]	CYBSP_SWO
P6[6]	CYBSP_SWDIO
P6[7]	CYBSP_SWDCK
P13[7]	CYBSP_USER_LED



.Y8C6347BZI-	BLD44						P13[7] (CYBSP_USER_LED) - Paran	neters		Ð
Peripherals	Pins	Analog-Routing	System	Peripheral-Clocks	DMA		Enter filter text		<u>// U</u>	
/bsp				7 🖻 🗉 🤸 🗎	D Q	1 4 22	Name	Value		
esource Port 5	Nam	e(s)	Personality			13 12 11 10 9	 Overview Configuration Help 	<u>Open G</u>	PIO Documentation	
✓ P5[0	CYBS	P_DEBUG_UART_RX P_DEBUG_UART_TX	Pin-3.0 V Pin-3.0 V				General Orive Mode Drive Drive State	Analog	High-Z. Input buffer off	
Port 6		D CIVIO	D: 20			988 966	Initial Drive State	High (1)		
✓ P6[4	I CYBS		Pin-3.0 V			966 966	? Threshold	CMOS		
✓ P6[7	1 CYBS		Pin-3.0 ~				Interrupt Trigger Type	None		
Port 13		-				CY8C63478 August	✓ Output			
☑ P13[7] CYBS	P_USER_LED	Pin-3.0				(?) Slew Rate	Fast		
						< >	P13[7] (CYBSP_USER_LED) - Para	meters	Code Preview	
ntice List										5

Figure 20 Adding identifier to the pin

10. For the pin P6[4], set the Drive Mode in the Parameter pane to Strong Drive. Input buffer off.

CY8C6347BZI-B	LD44				P6[4] (CYBSP_SWO) - Parameters		8
Peripherals	Pins Analog-Ro	uting System	Peripheral-Clocks	DMA	Enter filter text	<u> </u>	U E
cybsp			7 🖻 🖻 ⊀ 🗎	n 9, 9, X	Name	Value	
Resource	Name(s)	Personality		5 4 3 2 1	✓ Overview		
✓ Port 5					⑦ Configuration Help	Open GPIO Documentation	
✓ P5[0]	CYBSP_DEBUG_UA	RT_RX Pin-3.0			✓ General		
✓ P5[1]	CYBSP DEBUG UA	RT_TX Pin-3.0 ~		000	⑦ Drive Mode	Strong Drive. Input buffer off	~
Y Port 6					Initial Drive State	High (1)	~
✓ P6[4]	CYBSP_SWO	Pin-3.0			Y Input		
✓ P6[6]	CYBSP_SWDIO	Pin-3.0			⑦ Threshold	CMOS	~
✓ P6[7]	CYBSP_SWDCK	Pin-3.0			Interrupt Trigger Type	None	~
Y Port 13				(GA-517)	✓ Output		
P13[7] CYBSP_USER_LED	Pin-3.0			(?) Slew Rate	Fast	~
				< >	P6[4] (CYBSP_SWO) - Parameters	Code Preview	
Votice List							8
A	A						
0 Errors	0 Warnings		Infos				

Figure 21 Updating the pin drive mode setting

- **11.** Update the following settings in the **System > System Clocks** block:
 - a. Enable the FLL
 - b. Set the Desired Frequency (MHz) as 48.000



nalog-Routing System	Peripheral-Clocks		Enter filter text	🖉 🖸 📄
	🖉 🔻 🖻 I			
NI ()		🖽 🐔 🖽 ! 🛸 🛸 👘	Name	Value
Name(s)	^		⑦ Configuration Help	Open FLL Documentation
srss_0_clock_0 srss_0_clock_0_fil_0 srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr	nux_0 nux_1 nux_2 nux_3 nux_4		 General Source Frequency Configuration Desired Frequency (M Multiplier (1-262143) Reference (1-8191) Lock Tolerance (0-511 Actual Frequency 	□ 8 MHz ± 1% Automatic 9 #8.000 504 □ 42 10 10 □ 48 MHz ± 2.4%
	>		FLL - Parameters Code Previ	ew
				Ð
	srss_0_clock_0 srss_0_clock_0_fll_0 srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr srss_0_clock_0_pathr	srss_0_clock_0 srss_0_clock_0_fil_0 srss_0_clock_0_pathmux_0 srss_0_clock_0_pathmux_1 srss_0_clock_0_pathmux_3 srss_0_clock_0_pathmux_4 srss_0_clock_0_pathmux_4 srss_0_clock_0_pathmux_4	srss_0_clock_0 srss_0_clock_0_pathmux_0 srss_0_clock_0_pathmux_1 srss_0_clock_0_pathmux_2 srss_0_clock_0_pathmux_3 srss_0_clock_0_pathmux_4 crss_0_clock_0_pathmux_4 sr	srss_0_clock_0 srss_0_clock_0_fll_0 srss_0_clock_0_pathmux_0 srss_0_clock_0_pathmux_1 srss_0_clock_0_pathmux_2 srss_0_clock_0_pathmux_3 srss_0_clock_0_pathmux_4 srss_0_clock_0_pathmux_

Figure 22 Updating the FLL settings

- **12.** Update the following settings in the **System > System Clocks** block:
 - a. Enable the PLL
 - **b.** Set the **Desired Frequency (MHz)** as 144.000

V8C6347B7		(DI	I - Parameters			Ð
Peripherals	Pins	Analog	-Routing	System	Peripher	al-Clocks	DMA		En	ter filter text			
nter filter tex	t				I.	7 6 0	∓ ⊀	• • • • • •	Na Na	ame		Value	
esource			Name(s)		^	, 				② Source I	requency	📋 8 MHz ± 1%	
9	PATH M	UX0	eres 0 clo	ck 0 pathmu	× 0					2 Low Free	quency Mode		
2	PATH M	UX1	srss 0 clo	ck 0 pathmu	× 1					? Configu	ration	Automatic	
2	PATH M	UX2	srss 0 clo	ck 0 pathmu	x 2		- Dens	ACTAN ACTAN	er Owar	⑦ Desired	Frequency (MHz)	144.000	
2	PATH M	UX3	srss 0 clc	ck 0 pathmu	x 3		- Dece			⑦ Optimiz	ation	Min Power	
2	PATH M	UX4	srss 0 clo	ck 0 pathmu	x 4		ege	0.05 000 P	*	⑦ Feedbac	:k (22-112)	<u> </u>	
	PLL		srss 0 clc	ck 0 pll 0			107		~	? Reference	ce (1-18)	<u></u> 1	
> High F	requency		5155_6_616	ek_o_ph_o	_			and the second se		Output	(2-16)	<u></u> 2	
> Input										Actual F	requency	📋 144 MHz ± 1%	
 Miscel 	laneous				~						Carla Daviero		
									-	LL - Parameters	Code Preview		
tice List													6
0 Errors	<u> </u>	/arnings	🗐 0 Та	sks 👩 0 I	nfos								
	_	-											

- Figure 23 Updating the PLL settings
- **13.** On the **System > System Clocks > High Frequency** block, update the following settings:
 - a. Set the Source Clock for CLK_HF0 as CLK_PATH1
 - **b.** Set the **Divider** for **CLK_PERI** as **2**
- **14.** On the **System > System Clocks > Miscellaneous** block, update the following settings:
 - a. Enable the **CLK_TIMER**



- **15.** On the **Peripheral-Clocks** tab, update the following settings:
 - a. Update the name for 8 bit > 8 bit Divider 7 as CYBSP_TRACE_CLK_DIV
 - **b.** Enable the **16 bit > 16 bit Divider 15** clock

CY8C6347BZI-BLD44						
				16 bit Divider 15 - Parameter	S	
Peripherals Pins A	nalog-Routing	System Peripheral-Clocks	DMA	Enter filter text		<u>/</u> U E
inter filter text		2 7 E	E 🖌 🗎 🕻	Name	Value	
Resource	Name(s)	Personality		∧ ✓ Overview		
🗌 8 bit Divider 0	peri_0_div_8_0			(?) Configuration He	p Open Peripherals Clock Divid	ers Documentat
8 bit Divider 1	peri_0_div_8_1			✓ General		
8 bit Divider 2	peri_0_div_8_2			Source Clock Divider	CLK_PERI (72 MHz ± 1%)	
8 bit Divider 3	peri_0_div_8_3			() Divider	1 72 MUL + 10/	
8 bit Divider 4	peri_0_div_8_4			Frequency Start on Reset	72 MHZ ± 1%	
8 bit Divider 5	peri_0_div_8_5			() Start Off Reset		
8 bit Divider 6	peri_0_div_8_6			(?) Peripherals	<unassigned></unassigned>	
✓ 8 bit Divider 7	CYBSP_TRACE_CLK	_DIV Peripheral Clock-3.0 ×				
Y 16 bit				 16 bit Divider 15 - Parameter 	code Preview	
otice List						D'
Fix Description eady C:/Users/Public/Example_MPN/TA	RGET_MyBSP/config/design	n.modus* - Device Configurator 4.10				- 0
Fix Description	RGET_MyBSP/config/design iew <u>H</u> elp	n.modus* - Device Configurator 4.10		16 bit Divider 15 Decementary		- 0
Fix Description	RGET_My8SP/config/desig. iew Help	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter	S	- 5 6 8 05 D
Fix Description	RGET_My8SP/config/desig iew <u>H</u> elp Malog-Routing S	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text	s	- 6 6 2 0 E
Fix Description	RGET_My8SP/config/desig iew Help nalog-Routing S	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name	s Value	- 6 8
Fix Description	ARGET_MV8SP/config/desig iew Help	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name	s Value P Open Peripherals Clock Divid	- 0 P ers Documenta
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Fix Description eady C/Users/Public/Example_MPN/TA ile Edit Settings V ile Edit Settings V CY8C6347BZI-BLD44 Peripherals Pins A inter filter text Resource 16 bit Divider 1 1	RGET_My8SP/config/desig iew Help Analog-Routing S Name(s) peri_0_div_16_9 peri_0_div_16_10 peri_0_div_16_11 peri_0_div_16_11	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name	s Value P <u>Open Peripherals Clock Divid</u> CLK_PERI (72 MHz ± 1%)	- 0 6 2 0 E
Fix Description eady C/Users/Public/Example_MPN/T# ile Edit Settings V ile Edit Settings V CY8C6347BZI-BLD44 Peripherals Pins / Enter filter text Resource 16 bit Divider 1 175 bit	RGET_My8SP/config/desig iew Help Analog-Routing S Name(s) peri_0_div_16_10 1 peri_0_div_16_11 2 peri_0_div_16_12 2 peri_0_div_16_12	n.modus* - Device Configurator 4.10	DMA T K III (16 bit Divider 15 - Parameter Enter filter text Name	s Value P <u>Open Peripherals Clock Divid</u> CLK_PERI (72 MHz ± 1%) 1 ~ 72 MHz ± 1%	- 0 ers Documenta
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Fix Description eady C/Users/Public/Example_MPN/T/ ile Edit Settings Y CY8C6347BZI-BLD44 Peripherals Pins / inter filter text Resource 16 bit Divider 1 16	RGET_MyBSP/config/desig iew Help Nalog-Routing S Peri_0_div_16_9 peri_0_div_16_10 1 peri_0_div_16_11 2 peri_0_div_16_12 3 peri_0_div_16_13 4 peri_0_div_16_14 5 peri_0_div_16_15	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name Overview ⑦ Configuration He ✓ General ⑦ Source Clock ⑦ Divider ⑦ Frequency ⑦ Start on Reset ⑦ Peripherals	s Value P Open Peripherals Clock Divid CLK_PERI (72 MHz ± 1%) 1 72 MHz ± 1% v <unassigned></unassigned>	- 0 ers Documenta
Fix Description eady C/Users/Public/Example_MPN/T/ ile Edit Settings Y CY8C6347BZI-BLD44 Peripherals Pins A inter filter text Resource 16 bit Divider 1 24.5 bit 24.5 bit	RGET_MyBSP/config/desig iew Help Nalog-Routing S Peri_0_div_16_9 Peri_0_div_16_10 peri_0_div_16_11 peri_0_div_16_12 peri_0_div_16_13 peri_0_div_16_14 peri_0_div_16_15	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name Overview ? Configuration He General ? Source Clock ? Frequency ? Start on Reset ? Peripherals	s Value Value P Open Peripherals Clock Divid CLK_PERI (72 MHz ± 1%) 1 72 MHz ± 1% v 	- 0 ers Documental
Fix Description eady C/Users/Public/Example_MPN/T/ ile Edit Settings Y CY8C6347BZI-BLD44 Peripherals Pins / Inter filter text Resource I 16 bit Divider 1 I 6 bit 0 I 6 bi	RGET_My8SP/config/desig iew Help Nalog-Routing S Peri_0_div_16_9 peri_0_div_16_10 1 peri_0_div_16_11 2 peri_0_div_16_12 3 peri_0_div_16_13 4 peri_0_div_16_15 5 peri_0_div_16_15	n.modus* - Device Configurator 4.10	DMA T	16 bit Divider 15 - Parameter Enter filter text Name Overview ⑦ Configuration He ✓ General ⑦ Source Clock ⑦ Divider ⑦ Frequency ⑦ Start on Reset ⑦ Peripherals 16 bit Divider 15 - Parameter	s Value Den Peripherals Clock Divid CLK_PERI (72 MHz ± 1%) 1 72 MHz ± 1% v <unassigned> ers Code Preview</unassigned>	- 0 ers Documenta
Fix Description Eady C/Users/Public/Example_MPN/T/ ile Edit Settings V CY8C6347BZI-BLD44 Peripherals Pins A Inter filter text Resource 16 bit Divider 1 24.5 bit otice List	RGET_MyBSP/config/desig iew Help Nanalog-Routing S Peri_0_div_16_9 peri_0_div_16_10 1 peri_0_div_16_11 2 peri_0_div_16_13 4 peri_0_div_16_15 5 peri_0_div_16_15	n.modus* - Device Configurator 4.10	DMA	16 bit Divider 15 - Parameter Enter filter text Name Overview ? Configuration He General ? Source Clock ? Divider ? Frequency ? Start on Reset ? Peripherals 16 bit Divider 15 - Parameter	s Value Value P Open Peripherals Clock Divid CLK_PERI (72 MHz ± 1%) 1 72 MHz ± 1% v <unassigned> ers Code Preview</unassigned>	- 0 ers Documenta

Figure 24 Updating the Clock Dividers

- **16.** On the **System > Debug** tab, update the following settings:
 - a. Enable Trace Mode-Serial setting
 - b. Set the Trace Clock>Clock as 8-bit Divider 7 clk(CYBSP_TRACE_CLK_DIV) [USED]
 - c. Set the Trace Pins>SWO as P6[4] digital_out(CYBSP_SWO)[USED]
- **17.** Click **File > Update All Personalities** and then click **File > Save**.
- **18.** Close the Device Configurator tool.
- **19.** If you need any additional **Libraries** other than those listed above, click the **Add Library** button to view the list of available libraries. For example, the following image shows adding the **emwin** package.



lame	Update Available	Remove	MCU/SOC/SIP:	CY8C6347	'BZI-BLD44
Devices			Device Info:	Open CV9C	6347BZI-BI D44 Documentation
Configurations		0	Device mio:		Documentation
Device Configurator 4.10			Connectivity module:	None	
Libraries					
cat1cm0p		×	CM0+ pre-built firmwa	are image:	This image starts CM4 core at CY_COR
core-lib		- X	Using HAL interface:		CY_USING_HAL
core-make		- <u>X</u>			
mtb-hal-cat1		X			
mtb-pdl-cat1		~			
Components		\wedge			
Defines					
dd Configuration Add Library					
'ARNING:[WARNING] Retrying to obtain c	lipboard.				
ady Add libraries - BSP Assistant	1.10				Save Close
ady Add libraries - BSP Assistant EMW	1.10		2 7 🖻	Ē.	Save Close
Add libraries - BSP Assistant	1.10		<u>/</u> 7 E	Ē	Save Close
Add libraries - BSP Assistant	1.10 nared Version		2. 7 E	(†	emwin SEGGER emWin
Add libraries - BSP Assistant	1.10 nared Version		2. 7 E	Ē	emwin SEGGER emWin embedded graphic
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ady Add libraries - BSP Assistant EMW Name Sh Middleware emwin	1.10 nared Version Latest 6.X release	9 ~		Ē	emwin SEGGER emWin embedded graphic library and graphical
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ady Add libraries - BSP Assistant EMW Name Sh Middleware emwin M	1.10 nared Version Latest 6.X release	9 ~		Ē	emwin SEGGER emWin embedded graphic library and graphical user interface (GUI) framework.
ady Add libraries - BSP Assistant EMW Name Sh Y Middleware emwin	1.10 nared Version Latest 6.X release	e ~		Ē	emwin SEGGER emWin embedded graphic library and graphical user interface (GUI) framework.
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ady Add libraries - BSP Assistant EMW Name Sh Y Middleware emwin V	1.10 nared Version Latest 6.X release	e ~	<u>_</u> 7 E	Ē	emwin SEGGER emWin embedded graphic library and graphical user interface (GUI) framework.
ady Add libraries - BSP Assistant EMW Name Sh Y Middleware emwin V	1.10 nared Version Latest 6.X release	e ~		Ē	emwin SEGGER emWin embedded graphic library and graphical user interface (GUI) framework.
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Add libraries - BSP Assistant EMW Name Sh Middleware @ emwin @	1.10 nared Version Latest 6.X release	e ×		(+	emwin SEGGER emWin embedded graphic library and graphical user interface (GUI) framework.



20. After the necessary libraries are added, click on Save button for saving the BSP.



Smart I/O Configurator 4.10 r Libraries cat1cm0p core-lib core-make mtb-hal-cat1 r to the second		Device Info: Connectivity module: CM0+ pre-built firmw Using HAL interface:	Open CY8C None are image:	6347BZI-BLD44 Doc This image starts C CY_USING_HAL	<u>umentation</u> M4 core at CY_	COR
recipe-make-cat1a emwin Components Defines	×,					
dd Configuration Add Library						
/ARNING:[WARNING] Retrying to obtain clipboard.						

Figure 26 Saving the updated BSP

21. Click the **Save** button at the bottom to save the changes.



A XXXX	Partie Designet Varies Designet Tare Designet
	Venue Liefe College Several States 1 I
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	- 0
	- Ö
nove 🏠	- 6
nove	— Ø MCU/SOC/SIP: CY8C63478ZI-BLD44
nove ^	
nove	CY8C6347BZI-BLD44 Open CY8C6347BZI-BLD44 Documentation
nove	CY8C6347BZI-BLD44 CY8C6347BZI-BLD44 Documentation Connectivity module: None
nove ^	MCU/SOC/SIP: CY8C6347BZI-BLD44 Device Info: Open CY8C6347BZI-BLD44 Documentation Connectivity module: None
nove	CY8C6347BZI-BLD44 COnnectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY COB
nove	CV8C6347BZI-BLD44 CV8C6347BZI-BLD44 Device Info: Open CY8C6347BZI-BLD44 Documentation Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR
nove	CV8C6347BZI-BLD44 CV8C6347BZI-BLD44 Documentation Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR Using HAL interface: CY_USING_HAL
nove	CV_USING_HAL
nove	CY8C6347BZI-BLD44 CY8C6347BZI-BLD44 Device Info: Open CY8C6347BZI-BLD44 Documentation Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR Using HAL interface: CY_USING_HAL
nove î	CMCU/SOC/SIP: CY8C6347BZI-BLD44 Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR Using HAL interface: CY_USING_HAL
nove	CV3CC/SIP: CY8C6347BZI-BLD44 Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR Using HAL interface: CY_USING_HAL
nove	CV8C6347BZI-BLD44 MCU/SOC/SIP: CY8C6347BZI-BLD44 Device Info: Open CY8C6347BZI-BLD44 Documentation Connectivity module: None CM0+ pre-built firmware image: This image starts CM4 core at CY_COR Using HAL interface: CY_USING_HAL

Figure 27

Saving the BSP

22. Otherwise, there will be a warning as below while exiting the tool.



Figure 28

Warning on missed BSP saving



This completes the BSP creation; you can exit the tool now. If you changed any dependencies, you might see the following warning while leaving the tool; you can ignore the warning since the BSP is not yet being used in any applications.

BSP Ass	istant 1.10	X
	The libraries are modified. They must be updated in any appl this BSP either by using the Update feature of the Library ma running make getlibs.	lications that use nager or by
		ОК

Figure 29 Warning can be ignored

3.1.3 Create an application

With the BSP creation and configuration complete, create a **Hello World** application from a code example template using the following steps.

1. Open Eclipse IDE for ModusToolbox[™] from the Windows start menu and create a workspace as follows:

Eclipse IDE for ModusToolbox™ 3	1 Launcher				×
Select a directory as workspac	2				
Eclipse IDE for ModusToolbox™ 3.1	uses the workspace directo	ory to sto	ore its preference	es and development artifacts.	
Workspace: C:\Project\BSPappNot	e\BSPassistant	~	<u>B</u> rowse		
Use this as the default and do no	t ask again				
• <u>R</u> ecent Workspaces					
				Launch Cance	əl

Figure 30Create Eclipse IDE workspaceClick File > New> ModusToolbox™ Application.

2.



New	Alt+Shift+N >	□ Project 전 ▼ ♥ ♥ ♥ ♥ ♥ ♥ ■	c
Open File		D Other Ctrl+N	🖁 Outline 🛙
Open Projects from File System Recent Files	>	ModusToolbox [™] Application Ctrl+7	There is no active editor provides an outline.
Close Editor	Ctrl+W		
Close All Editors	Ctrl+Shift+W		
Save	Ctrl+S		
Save All Revert	Ctrl+Shift+S		
Move Rename Refresh Convert Line Delimiters To	F2 F5		
Print	Ctrl+P		
import Export			
Properties	Alt+Enter		
Switch Workspace Restart Exit	>		
		Console 🛛 🖞 Problems 🛛 Memory 🦑 Terminal	R 🖬 🕅 🖻 🔻 🛙
		ModusToolbox™ Console	
		Log file(s) for this session are stored at: <u>C:\Users\PALAWI-1\AppData\Local\Temp\Logs1532660306768647966</u>	ž
		<	

Figure 31 Create new ModusToolbox[™] application

The Project Creator tool opens on the **Choose Board Support Package** window.

Source Template								
Enter filter text	Create	from MPN Br	owse for BSP	∃ ⊞				
 Kit Name > AIROC[™] Bluetooth® BSPs > AIROC[™] Connectivity BSPs > PSoC[™] 4 BSPs > PSoC[™] 6 BSPs > TRAVEO[™] BSPs > Wireless Charging BSPs > XMC[™] BSPs 	MCU/SOC/SIP	Connectivity						
misneu loaung the mannest uat	a (10004 1115)							
"inished loading the device db (1 NFO:Using the executable path for WARNING:"CY8CKIT-040T" "relea WARNING:"CY8CKIT-040T" "relea WARNING:"CY8CKIT-040T" "relea) error(s) 3 warning(s)	9604 ms) or the tools direct se-v0.5.0" requires se-v0.5.0" requires se-v0.5.0" requires	ory. "core-make" "re "mtb-pdl-cat2" "recipe-make-c	elease-v3.0.0-Beta "release-v2.0.0-B at2" "release-v2.0	1" which is not prese eta1" which is not pr .0-Beta1" which is no	ent in the manife esent in the man ot present in the I	st data. ifest data. manifest da	ta.	

Figure 32

Project Creator tool

3. Select the BSP created in the previous section by clicking the **Browse for BSP** button and navigating to the directory containing the previously created BSP and choosing it.



Source Te	emplate		_		
Enter filt	er text	Create from MPN Browse for BSP.	. 8 🖷		
Kit Nam	ne MC	U/SOC/SIP Connectivity			
> AIRC	C™ Bluetooth® BSPs				
> PN	Select Folder				>
> PS	$\leftarrow \rightarrow \checkmark \uparrow \blacksquare \rightarrow$ Thi	is PC > Windows (C:) > Users > Public	> Example > TARGET_MyBSP	v U 🔎	Search TARGET_MyBSP
> PS	•				
> Wi	Organize New folde	er			!≕ ▼ (?)
> XN	MTB3_1 ^	Name	Date modified	Туре	Size
	Project	COMPONENT CM0P	12-04-2023 20:48	File folder	
	📜 temp	COMPONENT_CM4	12-04-2023 20:48	File folder	
	OneDrive - Person	📜 config	17-04-2023 14:36	File folder	
		deps	13-04-2023 00:31	File folder	
	S This PC	📙 docs	12-04-2023 20:48	File folder	
	3D Objects				
misneo	Desktop				
inished	Documents				
NFO:Us	Downloads				
VARNIN	Pietuse				
VARNIN	Videos				
enor(s	Windows (C)				
	windows (C.)				
Teaco	Intwork 🔮 🔮				
	~				
	Californ				

Figure 33 Importing BSP

4. The BSP you selected is listed as shown. Select it and click Next >.



Enter filter text	Cre	ate from MPN	Browse for BSP 🖻 🖽	This is an imported BSP, located	at C:/Users	s/Public/
Kit Name > AIROC [™] Bluetooth® BSPs > AIROC [™] Connectivity BSPs ♥ Import MyBSP > PMG BSPs > PSoC [™] 4 BSPs > PSoC [™] 6 BSPs > TRAVEO [™] BSPs > Wireless Charging BSPs > XMC [™] BSPs	MCU/SOC/SIP	Connectivity		Example/TARGET_MyBSP.		
Summary:						
3SP: MyBSP						

Figure 34 Selecting imported BSP

5. On the Select Application page, select Hello World from the template application under Getting Started. Enter a new name to the application such as Hello_World under the New Application Name column as shown. After that, click Create.



Farget IDE:	lipse IDE for ModusToolbox							
		TM					\sim	
hello		Æ	Browse for	Application 🍸	ofia on ofia on	⊨ 🖽	This code exam	iple
Template Application	^	New Applica	ation Name	New BSP Name			communication a "Hello World"	n by printir " message
Peripherals LZ4 compression	and decompression demo						resource. For more detail <u>README on Gr</u>	ls, see the t <u>Hub</u> .
BSP: C:/Users/Public/Examp Template Application(s): He Application(s) Root Path: C;	le/TARGET_MyBSP ello World /Users/Public/HelloWorld							

Figure 35 Select Application

The application download from GitHub starts and after successful completion, the project will be visible in the Eclipse IDE Project Explorer as follows:





New application in Eclipse IDE for ModusToolbox™



3.1.4 Code Build

1. Click **Build Application** in the **Quick Panel** pane as follows. If there are no errors, the build should pass successfully.

Eile Edit Navigate Search Project Run Window E	lp				
🗂 🕶 🔛 🔞 👻 🔦 🕶 🔛 🏘 👻 🔕 💌 🎒 🛷 🖛		1 v		Q	1 🖻 📔
🗅 Project 💈 🎋 Debug 🕮 Registers 🧏 Peripher 🦈	□ README.md 🛛			🗄 Outline 🛛 👘 🖻	8 🗆 🗆
 ✓ ≦ Hello_World > & Binaries 	HAL: Hello world		^	 h1. HAL: Hello world h2. Requirements h2. Supported toold 	chains
> @ Includes > @ bsps > @ build > @ deps	This code example demonstrates a simple UART con message on a terminal and blinking an LED using a t HAL(Hardware Abstraction Layer) libraries.	nmunication by printing the "Hello world" imer resource. The code example is based on	~	h2. Supported kits (n h2. Hardware setup h2. Software setup h2. Using the code e	make • examp •
> 🗁 images	Markdown Source Preview			<	>
✓ eritos > If main c	Console 🛛 🗈 Problems 🖷 Progress 🛛 Memory 🖑 Terminal		- ∀ ∀ ∀	<u>8</u> 10 80 - 10 1	• • •
ILICENSE Makefile README.md Set mtb_shared	Calculating memory consumption: CY8C6347BZI-BLD44 GCC Section Name Address Size	ARM 			1
⊇Quick P [™] Variables ∜ Expressi [®] Breakpo [©] Eclipse IDE for ModusToolbox™	- cy_m0p_image 0x10000000 6540 .text 0x100001000 45224 .ARM.exidx 0x10001000 8 .copy.table 0x10000408 8 .copy.table 0x10000408 8 .exor.table 0x10000408 8				
• Start	.data 0x0800228c 1596				
✓ Hello_World (MyBSP)	.noinit 0x080028d8 228				
Suild Application	.bss 0x080029bc 1864 .beap 0x08003108 276216				
Clean Application		'			
Launches	Total Internal Flash (Available) 1048576				
Tools	Total Internal Flash (Utilized) 55072				
PCD Configuration (Mt.RCD)					
' BSP Configurators (WybSP)		(m. 22 - 62			- 1
Hello_World Library Configurators	03:10:54 Build Finished, 0 errors, 0 warnings, (took	1m:235.602m5)			
Hello_World Library Configurators Hello_World API Documentation	03:10:54 Build Finished. 0 errors, 0 warnings. (took	1m:235.602ms)			

Figure 37 Successful build

This completes the use case demonstration.

3.2 Customizing an existing BSP

This use case happens when you want to make changes to an existing BSP. There are two cases:

- Open and edit existing BSP on its own
- Open and edit an existing BSP from an application

3.2.1 Open and edit existing BSP on its own

The steps below show example updates to an existing BSP using the BSP created in the section Create and configure the BSP using the existing sample board. These updates to the BSP are just for demonstration. The user may perform updates depending on their application requirements. The following changes are made on top of the previous BSP:

- Add the freertos and retarget-io libraries
- Add the corresponding component definition for the freertos library that was added in the above step
- Adding a new macro to enable the conversion of LF to CR&LF in STDOUT while using retarget-io library
- 1. Open the BSP Assistant application. Click File > Open



Untitled - BS														_
	P Assistant 1.10												_	D
le <u>E</u> dit	Settings	View	Help											
<u>N</u> ew			•											
<u>O</u> pen			Ctrl+O											
<u>E</u> xport	as ZIP file		Ctrl+E											
Open i	n System <u>E</u> xp	lorer												
Exit			Alt+F4			To begin usi	ng BSP As:	sistant, you	ı can					
				1		5	Open a B	SP						
						Create a PCD	(hered on							
					2	Create a DSP	Dased on	i a sample p	Doard					
					<u>Creat</u>	<u>te a BSP by s</u>	pecifying t	the MPNs if	<u>t contains</u>					
					<u>Creat</u>	<u>te a BSP by s</u>	pecifying t	the MPNs if	<u>t contains</u>					
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					 Creat	te a BSP by s	pecifying t	the MPNs it	t contains	 	_	Save		Closs
					 Creat	te a BSP by s	pecifying t	the MPNs it	t contains	 		Save		Close

Figure 38 Open existing BSP

2. To browse the directory containing the existing BSP, click **Select Folder** button to open the BSP in the **BSP Assistant** application.

₩ Untitled - BSP Assistant 1.10 File Edit Settings View Help	22 over Tuerror Catalogo R9			×		- 0 ×
	← → × ↑ → This PC > Windows (C) > Users > Public >	Example > TARGET MyRSP >	v & O Search	TARGET M		
	Crannina = Newfolder		- o Jealch	Res - O		
	Concision - Server The SPC Serverset Serv	Date modified 01-64-2023 08/19 01-64-2023 08/19 01-64-2023 16/19 01-66-2023 16/31 01-66-2023 08/19 01-66-2023 08/19	Type Size File folder File folder File folder File folder File folder File folder			
	Folder: TARGET_My85P		Select Folder	Cancel		
Ready					Save	Close

Figure 39

Browse Existing BSP

The following window opens:



Name			Update Available	Remove	MCU/SOC/SIP	CY8C6347B7LBLD44		
Devices					MCU/SOC/SIP:	CY8C6347B2I-BLD44		
 Configurations 					 Device Info: 	Open CY8C	6347BZI-BLD44 Documen	<u>tation</u>
Device Config Smart I/O Co	urator 4.10 nfigurator 4.10			8	Connectivity module:	None		
 Libraries 				~	CM0+ pre-built firmw	are image:	This image starts CM4 co	ore at CY_COR
cat i cmup				Lising HAL inte				
core-make			A	- 2 -	Using HAL interface:		01_001110_11/12	
emwin				X				
mtb-hal-cat1				X				
mtb-pdl-cat1				A *				
Add Configuration	Add Library							
oading BSP								
inding the mtb-tem	olate-cat1 (relea	ase-v1.2.0) asset						
inding MCUs comp	tible with this E	SP						
	set found at C:	/Users/palaniswamy/	.modustoolbox/global/mt	b-template-c	at1/release-v1.2.0 (7 ms)			
ntp-template-cat1 a								

Figure 40

BSP opened in BSP Assistant

3. Click the Add Library button and select the check boxes to add freertos and retarget-io libraries. Click OK after selecting the libraries to add them to the BSP. You can use the filter box at the top of the window to narrow down the list of libraries.



Name	Update Available Rem	ove					
Devices	Add libraries - BSP Assistant 1.10						×
 Configurations 							
Device Configurator 4.10	freertos		L	7 🗖 🖽	freertos	^	
Smart I/O Configurator 4.10	^						
 Libraries 	Name	Shared	Version		A FreeR	TOS is a	operties.
cat1cm0p	 Bluetooth® 				small op	or	
core-lib	bluetooth-freertos		Latest 3.X re	elease	microco	ntrollers. A	
core-make	 Core 				FreeRTO	S kernel is	
mth-hal-cat1	☑ freertos		Latest 10.X	release	distribut	ed as	
mtb-pdl-cat1	freertos-posix		Latest 1.X re	elease	files with	a C source	
dd Configuration	 Middleware 				configur	ation	
Add Eistary	□ freertos-pkcs11-psa		80292d2 Re	lease	header f	ile.	
oading BSP	−			×		Diselaiman	
inding the mtb-template-cat1 (release-v1.2.0) asset					OK	Cancel	1
inding MCUs compatible with this BSP					UK	Cancer	
ntb-template-cat1 asset found at C:/Users/palaniswar	my/.modustoolbox/global/mtb-tem	plate-cat1	1/release-v1.2	.0 (7 ms)			
ady						S	- 0
ady :/Users/Public/Example/TARGET_My8SP - 8SP Assistant 1.10 e _Edit _Settings _View _Help ::::::::::::::::::::::::::::::::::::						S	- D
ady :/Users/Public/Example/TARGET_My8SP - BSP Assistant 1.10 e Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_MyBSI	Update Available Rem	ove				S	- 7
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ady E/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.10 le Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_MyBSI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10	D Update Available Rem SP Assistant 1.10	ove î	MCU/SOC/SI	P: CY8C63	:47BZI-BLI ×	D44 ZI-BLD44 Docu	- 8 mentation
ady E/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.10 le Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_MyBSI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Smart I/O Configurator 4.10 Name	D Update Available Rem SP Assistant 1.10 Shared Version	ove î	MCU/SOC/SI	P: CY8C63 retarget-io The Retarget IO	147BZI-BLI ×	D44 ZI-BLD44 Docu	- a mentation
ady C/Users/Public/Example/TARGET_My8SP - 8SP Assistant 1.10 le Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_My8SI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Smart I/O Configurator 4.10 Cubraries cat1cm0p	D Update Available Rem SP Assistant 1.10 Shared Version	ove î	MCU/SOC/SI	P: CY8C63 retarget-io The Retarget IO library provides for transmittion	i47BZI-BLI × APIs	D44 ZI-BLD44 Docu mage starts CM	mentation
ady C/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.10 le Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_MyBSI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Smart I/O Configurator 4.10 Corre-lib core-lib core-lib core-lib core-lib	D Update Available Rem SP Assistant 1.10 Shared Version I arget-io ≅ Latest 1.X relea	ove	McU/soc/si	P: CY8C63 retarget-io The Retarget IO library provides for transmitting messages to or	i47BZI-BLI × APIs from	D44 21-BLD44 Docu mage starts CM SING_HAL	mentation 14 core at CY_COR
ady C/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.10 le _Edit _Settings _View _Help SP location: C:/Users/Public/Example/TARGET_MyBSI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Smart I/O Configurator 4.10 Smart I/O Configurator 4.10 Core-lib core-lib core-make freetore	D Update Available Rem SP Assistant 1.10 Shared Version I arget-io ⊠ Latest 1.X relea	ove	MCU/SOC/SI	P: CY8C63 retarget-io The Retarget IO library provides for transmitting messages to or the board via	i47BZI-BLI × APIs from	D44 TI-BLD44 Docu mage starts CM SING_HAL	mentation 14 core at CY_COR
Ady C/Users/Public/Example/TARGET_MyBSP - BSP Assistant 1.10 le Edit Settings View Help SP location: C:/Users/Public/Example/TARGET_MyBSI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Core-nib core-nib core-make freertos mtb-hal-cat1	> Update Available Rem SP Assistant 1.10 Shared Version I arget-io ☑ Latest 1.X relea	ove î	McU/SOC/SI	P: CY8C63 retarget-io The Retarget IO library provides for transmitting messages to or the board via standard printf/ for thirty provides	APIs from scanf	D44 D44 mage starts CM SING_HAL	mentation
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ady C/Users/Public/Example/TARGET_My8SP - BSP Assistant 1.10 le Edit Settings ⊻iew Help SP location: C:/Users/Public/Example/TARGET_My8SI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Core-lib core-lib core-lib core-make freertos mtb-hal-cat1 mth-ndl-cat1 mt	D Update Available Rem SP Assistant 1.10 Shared Version arget-io ☑ Latest 1.X relea ny/.modustoolbox/global/mtb-tem	ove	MCU/SOC/SI	P: CY8C63 retarget-io The Retarget IO library provides for transmitting messages to or the board via standard printf/ functions using UART connectio which is general connected to a machine. OK Car :0 (7 ms)	APIs from scanf a nn host	D44 ZI-BLD44 Docu mage starts CM SING_HAL	mentation
Add y C/Users/Public/Example/TARGET_My8SP - BSP Assistant 1.10 le Edit Settings ⊻iew Help SP location: C:/Users/Public/Example/TARGET_My8SI Name Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Core-nike core-make freertos mtb-hal-cat1 mth-ndl-cat1 mth-ndl-cat1 mth-ndl-cat1 mth-ndl-cat1 mth-ndl-cat1 mth-ndl-cat1 mth-ndl-cat1 asset inding the mtb-template-cat1 (releas inding the mtb-template-cat1 asset found at C:/Users/palaniswam/.m d/Cls compatible with this BSP found (15 mc)	p Update Available Rem SP Assistant 1.10 Shared Version I arget-io ≥ Latest 1.X relea my/.modustoolbox/global/mtb-tem odustoolbox/global/mtb-pdl-cat1/	ove î	MCU/SOC/SI	P: CY8C63 retarget-io The Retarget IO library provides for transmitting messages to or the board via standard printf/ functions using UART connectio which is general connected to a machine. OK Car	APIs from scanf a in lly host	244 21-BLD44 Docu mage starts CN 5ING_HAL	mentation

Figure 41 Adding libraries

- **4.** To add a component, do the following:
 - a. Click the **Components** section
 - b. Click Edit Additional Components...
 - c. In the Component to add field, enter FREERTOS
 - d. Click Add
 - e. If you do not have additional component to add, click **OK** This closes the **Edit Component** window.



P location: C:/Users/Public/Example/TARGET_MyE	iSP	
ame core-lib core-make freertos mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a emwin retarget-io Components	Update Available Remove	PHE: C:/OSETS/Public/Example/TARGET_MYBSP/OSP.Iffk Components intrinsic to the MCU and/or connectivity MPNs BLESS-IPC, CAT1, CAT1A, PSOC6_01 Components specified via selections in the Devices section CMOP_SLEEP Additional components
Defines dd Configuration Add Library pading BSP inding the mtb-template-cat1 (release-v1.2.0) asset inding the mtb-pdl-cat1 asset inding MCUs compatible with this BSP thb-template-cat1 asset found at C:/Users/palanisw	 amy/.modustoolbox/global/mtb-template	Edit Additional Components

Figure 42 Add a component

- **5.** To add a define, do the following:
 - a. Click the **Defines** section
 - b. Click Edit Additional Defines..
 - c. In the **Define to add** field, enter CY_RETARGET_IO_CONVERT_LF_TO_CRLF
 - d. Click Add
 - e. Since we have no additional defines to add, click OK

This closes the **Edit Defines** window.

Name	Update Available Remove	File: C:/Users/Public/Example/TARGET_MyBSP/bsp.mk
core-lib core-make freertos	▲ X	Defines intrinsic to the MCU and/or connectivity MPNs
mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a		Defines specified via selections in the Devices section
emwin retarget-io	X	Additional defines
Defines	v	Edit Additional Defines 2.
Add Configuration Add Library Loading BSP Finding the mtb-template-cat1 (release-v1.2.0) asset		Edit Define - BSP Assistant 1.10
Finding the mtb-pdl-cat1 asset Finding MCUs compatible with this BSP mtb-template-cat1 asset found at C:/Users/palaniswar mtb-pdl-cat1 asset found at C:/Users/palaniswary/.m MCUs compatible with this RSP found (15 ms)	ny/.modustoolbox/global/mtb-template- odustoolbox/global/mtb-pdl-cat1/release	3. 4.
		5. 01/ Currel

Figure 43 Add a define

6. Click the **Save** button to save the changes.



lame		Update Available	Remove	MCU/SOC/SIP	CV8C6347		
core-lib			X	1000,000,001	0000047	521 02044	
core-make		A	$-\mathbf{X}$	 Device Info: 	Open CY8C	6347BZI-BLD44 Docum	<u>entation</u>
freertos			$-\mathbf{X}$	Connectivity modules	Maria		
mtb-hal-cat1			- X	connectivity module:	None		
mtb-pdl-cat1			8				
recipe-make-cat1	a	A		CM0+ pre-built firmware image:		This image starts CM4	core at CY_COR
emwin				Using HAL interface:		CY USING HAL	
retarget-io			- X				
Components							
Defines							
dd Configuration Ac	d Library						
oading BSP							
inding the mtb-template	e-cat1 (release-v	I.2.0) asset					
inding the mtb-pdl-cat1	asset						
inding MCUs compatible	with this BSP						
ntb-template-cat1 asset	found at C:/User	s/palaniswamy/.modustoolbox/global/mt	b-template-	cat1/release-v1.2.0 (7 ms)			
		FAIL 18/ 4FT11/// FT1/ 1/11/11/17/7/17/////////////////////	CALIFIERS				

Figure 44 Save updated BSP

A Saving changes to BSP succeeded. message shows in the console window.

Name	Update Available	Remove				
coro lib	opdate / value/	×	MCU/SOC/SIP:	CY8C6347	BZI-BLD44	
core-make	A	- 	 Device Info: 	Open CY8C	6347BZI-BLD44 Documenta	tion
freertos	^	$-\Sigma$				
mtb-hal-cat1		- 2 -	Connectivity module:	None		
mtb-pdl-cat1		<u>a</u>				
recipe-make-cat1a	A	- X I	CM0+ pre-built firmw	are image:	This image starts CM4 core	e at CY_COR
emwin		X	Using HAL interface: CY USING		CV LISING HAI	
retarget-io		- X	osing the interface.		01_05/17/2	
Components						
Defines						
Add Configuration Add Library						
, au comgatational , tau Liotat jai						
Finding the mtb-pdl-cat1 asset						
Finding MCUs compatible with this BSP			14(1 1 2 2 (7)			
mtb-remplate-cat1 asset found at C:/Users/palani	swamy/modustoolbox/global/mti	o-template- .cat1/roleas	cat 1/release-v1.2.0 (7 ms)			
MCUs compatible with this BSP found (15 m	s)	cati/releas				
	-,					
Saving changes						

Figure 45 Save message

7. Click the **Close** button to close the BSP Assistant. While exiting, a warning is displayed to update the application using the library manager. This warning can be ignored as we are yet to create an application from this BSP.



		Undete Aveilable Demo	
Vame Devices Configuration Device Co Smart I/C Libraries cat1cm0ş core-lib core-lib core-mał emwin freertos mth-hal- Add Configuratic rinding the mtb Finding MCUs co mtb-template-ca mtb-pdl-cat1 as: Saving changes. Saving changes i	15 onfigurator 4.10) Configurator 4.10 o ce cat1 n Add Library -pdi-cat1 asset mpatible with this BSP at1 asset found at C:/Users/palaniswamy/.modusto set found at C:/Users/palaniswamy/.modustoolboo le with this BSP found (15 ms) to BSP succeeded.	oolbox/global/mtb-temp x/global/mtb-pdl-cat1/re	vie Defines intrinsic to the MCU and/or connectivity MPNs Defines specified via selections in the Devices section CY_USING_HAL Additional defines CY_RETARGET_IO_CONVERT_LF_TO_CRLF Edit Additional Defines
BSP Ass	sistant 1.10		

Figure 46

Library update warning

3.2.2 Open and edit an existing BSP from an application

The steps below show an example update to the BSP that is already part of an application. The application that was created in the Create an application section will be used as the starting point. These updates to the BSP are just for demonstration purposes. The user may choose updates depending on his/her updated application requirements.

The following changes are made on top of the previous BSP:

- Add the freertos library
- Add the corresponding component definition for the freertos library that was added in the above step
- Add a new macro to enable the conversion of LF to CR&LF in STDOUT while using the retarget-io library
- 1. Open the Eclipse IDE for ModusToolbox[™] from the Windows start menu. Click **Browse** to browse the previously created workspace directory containing the application and then click the **Launch** button.



Eclipse IDE	for ModusToolbox™ 3.1 Launcher	×
Select a dire	ctory as workspace	
Eclipse IDE fo	r ModusToolbox™ 3.1 uses the workspace directory to store its preferences and development artifacts.	
Workspace:	C:\Users\Public\Example	
<u>H</u> onopuce.		
Use this as	the default and do not ask again	
Recent Wo	rkspaces	
	<u>L</u> aunch Ca	incel
<u>U</u> se this a: <u>R</u> ecent Wo	the default and do not ask again rkspaces	incel

Figure 47 Open an application in Eclipse IDE

2. When the application finishes loading in the Eclipse IDE, you can run the BSP Assistant tool by clicking the **BSP Assistant <version>** link in the **Quick Panel** as shown.



Figure 48 Launching BSP Assistant

3. Click the **Add Library** button to add the **freertos** library. Click **OK** after selecting the library to add the library to the BSP.



Name	Update Available Remove MCU/SOC/SIP	
Devices		
 Configurations 	Device Info: <u>Open CY8C6347BZI-BLD44 D</u>	ocumentation
Device Configurator 4.10 Smart I/O Configurator 4.10	Connectivity module: None	
 Libraries 	Add libraries - BSP Assistant 1.10	×
cat1cm0p		VI4 core at CY_COR
core-lib	free 🖉 🏹 🕒 🕂 freertos	
core-make		
emwin	Name Shared Version A FreekTOS is a small operating	
mtb-hal-cat1	* Bluetooth® system for	
mtb-pdl-cat1	Latest 3.X release microcontrollers.	
Add Configuration Add Library	Core A FreeRTOS kernel	
	Interview of the second s	
Ending the mtb-template-cat1 (release-v1.2.0) asset	freertos-posix Latest 1.X release files with	
Finding the mtb-pdl-cat1 asset	 Middleware configuration 	
inding MCUs compatible with this BSP		
ntb-template-cat1 asset found at C:/Users/palaniswamy	OK Cancel	
ntb-pdl-cat1 asset found at C:/Users/palaniswamy/.moc	u	

Figure 49 Add Library

- **4.** To add a component, do the following:
 - a. Click the Components section
 - **b.** Click **Edit Additional Components...**
 - c. In the Component to add field, enter FREERTOS
 - d. Click Add
 - e. If you do not have additional component to add, click **OK**
 - This closes the Edit Component window.

	· · · · · · · · · · · · · · · · · · ·		
Name	Update Available Remove	File: C:/Users/Public/Example/Hello_World/bsps/	TARGET_MyBSP/bsp.mk
cat1cm0p	\diamond	Components intrinsic to the MCU and/or conne	ctivity MPNs
core-lib			,
core-make	· · · · · · · · · · · · · · · · · · ·	BLESS-IPC, CALL, CALLA, PSOC6_01	
mth-hal-cat1	$\mathbf{\hat{\mathbf{x}}}$	Components specified via selections in the Devi	ces section
mtb-ndl-cat1			
recipe-make-cat1a	▲ ×	CM0P_SLEEP	
		Additional components	
Components	• •	2.	
Defines			
	·	Edit Additional Components	
dd Configuration Add Library		Edit Component - BSP Assistant 1.10	×
ad comgaration			
.oading BSP			
inding the mtb-template-cat1 (release-v1.2.0) asset		3.	4.
inding the mtb-pai-cat i asset			
ntb-template-cat1 asset found at C:/Users/palaniswa	mv/.modustoolbox/global/mtb-template-c	at1, Component to add: FREERTOS	Add
ntb-pdl-cat1 asset found at C:/Users/palaniswamv/.m	nodustoolbox/global/mtb-pdl-cat1/release	-v3.	Cancel

Figure 50 Add a component

- **5.** To add a define, do the following:
 - a. Click the **Defines** section



- **b.** Click **Edit Additional Defines..**
- c. In the **Define to add** field, enter CY_RETARGET_IO_CONVERT_LF_TO_CRLF
- d. Click Add
- e. Since we have no additional defines to add, click **OK**

This closes the Edit Defines window.

carrier Copuse Available Mellove catalcmOp Core-lib core-make Company freertos Components muth-pal-cat1 Components Defines Components dd Configuration Add Library ading BSP Add Library nding the mtb-pal-cat1 (release-v12.0) asset ading BSP nding the mtb-pal-cat1 asset 3. nding MCUs compatible with this BSP 3. tb-pal-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 3. Ubefine to add; CY_RETARGET_IO_CONV OK Cancel			
cat ic mup core-lib core-make freertos mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a emwin Components 1. Defines Defines 2. Edit Additional Defines 2. Edit Additional Defines 2. Edit Define - BSP Assistant 1.10 xading BSP nding the mtb-template-cat1 (release-v1.2.0) asset nding the mtb-template-cat1 asset nding the mtb-template-cat1 asset nding the mtb-template-cat1 (release-v1.2.0) asset nding the mtb-template-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 (b-template-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 (CY_RETARGET_IO_CONN Add OK Cancel			File: C:/Users/Public/Example/Hello_World/bsps/TARGET_MyBSP/bsp.mk
core-make freertos mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a emwin 1. Defines Components 1. Defines 2. Edit Additional Defines 2. Edit Additional Defines 2. Edit Additional Defines nding the mtb-template-cat1 (release-v1.2.0) asset nding the mtb-template-cat1 asset nding the mtb-template-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-template-cat Ub - pdl-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v1.2.0 (CV_S compatible with this BSP found (14 ms)	cat i cmUp	\diamond	Defines intrinsic to the MCU and/or connectivity MPNs
freetos mtb-hal-cat1 mtb-pdl-cat1 recipe-make-cat1a emwin Components L Defines L d Configuration Add Library Add Library A	core-lib		
Indexed of mtb-hal-cat1 Image: Components in the Devices section emwin Image: Components in the Devices section Components in the Devices section CY_USING_HAL Defines specified via selections in the Devices section CY_USING_HAL Additional defines Image: Components in the Devices section Id Configuration Add Library Add Configuration Add Library adding BSP Image: CyUsers/palaniswamy/modustoolbox/global/mtb-template-cat1 nding the mtb-template-cat1 (release-v1.2.0) asset 3. nding the mtb-template-cat1 (release-v1.2.0) asset 3. Additional at C/Users/palaniswamy/modustoolbox/global/mtb-template-cat1 asset found at C/Users/palaniswamy/modustoolbox/global/mtb-pdl-cat1/release-CUS compatible with this BSP found (14 ms) OK	freetos	^ <u> </u>	
mtb-pdl-cat1 recipe-make-cat1a emwin Components 1. Defines (CY_USING_HAL Additional defines 2. (Edit Additional Defines	mth-hal-cat1	\sim	Defines specified via selections in the Devices section
recip-make-cat1a emwin Components L Defines 2. dd Configuration Add Library Add Configuration Add Configuration CY_RETARGET_IO_CONV Add OK Cancel	mtb-pdl-cat1	<u>A</u>	
emwin Components I. Defines Additional defines Letit Additional Defines 2. Edit Additional Defines 3. Edit Define - BSP Assistant 1.10 X Edit Define - BSP Assistant 2.0 X Edit Define - BS	recipe-make-cat1a	A X	CT_OSING_HAL
Components 1. Defines 2. Edit Additional Defines 2. Edit Additional Defines 2. Inding BSP Edit Define - BSP Assistant 1.10 Add Configuration Add Library Define mtb-template-cat1 (release-v1.2.0) asset 3. nding MCUs compatible with this BSP 3. tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v OK Cus compatible with this BSP found (14 ms) 0K	emwin	X	Additional defines
Defines 2. Edit Additional Defines 2. Edit Define - BSP Assistant 1.10 X Maing the mtb-template-cat1 (release-v1.2.0) asset 3. nding MCUs compatible with this BSP 3. tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat Define to add: CY_RETARGET_IO_CONV Vor Cancel OK	Components 1.		
dd Configuration Add Library bading BSP Edit Define - BSP Assistant 1.10 nding the mtb-template-cat1 (release-v1.2.0) asset 3. nding the mtb-pdl-cat1 asset 3. nding the mtb-template-cat1 (release-v1.2.0) asset 3. nding the mtb-template-cat1 asset 6 nding the mtb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v 0K Cus compatible with this BSP found (14 ms) 0K Cancel	Defines		2.
dd Configuration Add Library Add Library × bading BSP adding BSP x nding the mtb-template-cat1 (release-v1.2.0) asset 3. 4. nding the mtb-template-cat1 asset 3. 4. betterplate-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 Define to add: CY_RETARGET_IO_CONV Add Ucls compatible with this BSP found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 OK Cancel		~	Edit Additional Defines
bading BSP nding the mtb-template-cat1 (release-v1.2.0) asset nding the mtb-pdl-cat1 asset nding MCUs compatible with this BSP tb-template-cat1 asset found at C/Users/palaniswamy/.modustoolbox/global/mtb-template-cat Us compatible with this BSP found (14 ms) CUs compatible with this BSP found (14 ms)	dd Configuration Add Library		Edit Define - BSP Assistant 1 10
ading BSP nding the mtb-template-cat1 (release-v1.2.0) asset nding the mtb-template-cat1 asset ading MCUs compatible with this BSP tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 tb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v CUs compatible with this BSP found (14 ms) Add	nad Elbrary		
nding the mtb-template-cat1 (release-v1.2.0) asset nding MCUs compatible with this BSP tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat1 tb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v CUs compatible with this BSP found (14 ms)	ading BSP		
hding MCUs compatible with this BSP tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat tb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v CUs compatible with this BSP found (14 ms)	nding the mtb-template-cat1 (release-v1.2.0) ass	et	3. 4.
tb-template-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-template-cat tb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v CUs compatible with this BSP found (14 ms)	adung the path adl cot accot		
tb-pdl-cat1 asset found at C:/Users/palaniswamy/.modustoolbox/global/mtb-pdl-cat1/release-v CUs compatible with this BSP found (14 ms) OK Cancel	nding the mtb-pdl-cat1 asset ading MCUs compatible with this BSP		
CUs compatible with this BSP found (14 ms)	nding the mtb-pdl-cat1 asset nding MCUs compatible with this BSP tb-template-cat1 asset found at C:/Users/palanis	wamy/.modustoolbox/global/mtb-template-o	cal Define to add: CY_RETARGET_IO_CONVAdd
	nding the mtb-pdl-cat1 asset nding MCUs compatible with this BSP tb-template-cat1 asset found at C:/Users/palanis tb-pdl-cat1 asset found at C:/Users/palaniswamy	wamy/.modustoolbox/global/mtb-template- //.modustoolbox/global/mtb-pdl-cat1/release	Cal Define to add: CY_RETARGET_IO_CONV_Add

Figure 51 Add a define

6. Click the **Save** button to save the changes.



Figure 52

Save Updated BSP

A Saving changes to BSP succeeded. message shows in the console window.



SP location: C:/Users/Public/Example/Hello_World/bsp:	s/TARGET_MyBSP		
Jame Devices ~ Configurations	Update Available	Remove	The [C, Osers/Public/Example/Helio_wond/osps/TAKGET_WigsP/Osp.mk
Device Configurator 4.10 Smart I/O Configurator 4.10 Libraries cat1cm0p core-lib core-make freertos mtb-hal-cat1 mtb-odl-cat1 Add Library	*		Defines specified via selections in the Devices section CY_USING_HAL Additional defines CY_RETARGET_IO_CONVERT_LF_TO_CRLF Edit Additional Defines
inding the mtb-pdl-cat1 asset Finding MCUs compatible with this BSP htb-template-cat1 asset found at C:/Users/palaniswamy htb-pdl-cat1 asset found at C:/Users/palaniswamy/.moc MCUs compatible with this BSP found (14 ms) Saving changes. aving changes to BSP succeeded.	/.modustoolbox/global/mt lustoolbox/global/mtb-pdl	o-template-cat1 cat1/release-v3	/release-v1.2.0 (14 ms) 4.0 (6 ms)

Figure 53 Save message

7. Click the **Close** button to close the BSP Assistant. While exiting, a warning is displayed to update the application using the library manager. You can run library manager after closing the BSP Assistant tool.

SP location: C:/Users/Public/Example/Hello	_World/bsps/TARGET_MyBSP	
Jame Devices Configurations Device Configurator 4.10 Smart I/O Configurator 4.10 Libraries cat1cmOp core-lib core-make freertos mtb-hal-cat1 mtb-odl-cat1	Update Available Remov	Press (Exposed of Public Example) relief world objes (Price E-MyBSP/USP.IIIK Defines intrinsic to the MCU and/or connectivity MPNs Defines specified via selections in the Devices section CY_USING_HAL Additional defines CY_RETARGET_IO_CONVERT_LF_TO_CRLF Edit Additional Defines v
inding the mtb-pdl-cat1 asset inding MCUs compatible with this BSP ntb-template-cat1 asset found at C/Users/ reb. pdl.cat1 asset found at C/Users/	alaniswamy/.modustoolbox/global/mtb-templa	re-cat1/release-v1.2.0 (14 ms)
inding the mtb-pdi-cat1 asset inding MCUs compatible with this BSP ntb-template-cat1 asset found at C:/Users/ ntb-pdl-cat1 asset found at C:/Users/palani ACUs compatible with this BSP found (14 m aving changes aving changes to BSP succeeded.	alaniswamy/.modustoolbox/global/mtb-templa wamy/.modustoolbox/global/mtb-pdl-cat1/rele ;)	te-cat1/release-v1.2.0 (14 ms) ase-v3.4.0 (6 ms) Save Close
inding the mtb-pdi-cat1 asset inding MCUs compatible with this BSP ntb-template-cat1 asset found at C:/Users/palani ACUs compatible with this BSP found (14 m aving changes aving changes to BSP succeeded.	alaniswamy/.modustoolbox/global/mtb-templa wamy/.modustoolbox/global/mtb-pdl-cat1/rele s)	te-cat1/release-v1.2.0 (14 ms) ase-v3.4.0 (6 ms) Save Close
inding the mtb-pdl-cat1 asset inding MCUs compatible with this BSP ntb-template-cat1 asset found at C:/Users/palani ACUs compatible with this BSP found (14 m iaving changes iaving changes to BSP succeeded. BSP Assistant 1.10 The libraries this BSP eith running ma	alaniswamy/.modustoolbox/global/mtb-templa wamy/.modustoolbox/global/mtb-pdl-cat1/rele s are modified. They mus her by using the Update ke getlibs.	te-cat1/release-v1.2.0 (14 ms) ase-v3.4.0 (6 ms) Save Close Save Close to be updated in any applications that use feature of the Library manager or by

Figure 54

Library update warning



8. Click the Library Manager link in the Quick Panel.



Figure 55 Launch Library Manager

9. On the Library Manager window, click the Update button.

nter filter text		Properties De	escription
Name	Update Available Remove 🕯	Property	Value
BSPs		Nerre	6
MyBSP (ACTIVE)	<u>a</u>	Name	ireertos
Hello_World Libraries		Version	10.4.306 release ~
abstraction-rtos	<u>e</u>	Tures	
cat1cm0p	<u> </u>	туре	Shared Git Repo
clib-support	<u></u>	Location	C:/Users/Public/Example/mtb_shared/freertos/release-v10.4.306
cmsis	<u> </u>		
core-lib		Source	https://gitlab.intra.infineon.com/repo-staging/freertos
core-make		*.mtb file location	n C:/Users/Public/Example/Hello_World/libs/freertos.mtb
freertes			
neertos			
Add BSP Add Library			

Figure 56

Update libraries

When the library updates complete, the message **Successfully Updated Application** shows in the console.



pplication Directory:	C:/Users/Public/Example/He	ello_World				Browse
inter filter text				Properties RI	EADME.md Description	
	Name	Update Available	Remove	Property	Value	
 BSPs 				Name	freertos	
MyBSP (A	CTIVE)		8			
 Hello_World Libra 	aries			Version	10.4.306 release	~
abstraction-rt	os		8	Type	Shared Git Pepo	v
cat1cm0p			8	Type	Shared Git Kepo	
clib-support				Location	C:/Users/Public/Example/mtb_share	d/freertos/release
cmsis				Sourco	https://gitlab.intra.infingon.com/ron	o staging (froortos
core-make				Source	https://gittab.intra.inineon.com/rep	o-staging/neertos
emwin		<u>^</u>	A	Reference Docum	nentation:	
freertos				FreeRIOS: FreeR	IOS for Infineon MCUs - Overview	
	Libran					
Add BSP Add I	Library					
Summary:						
Successfully updated	application "Hello_World"					
Successfully refreshe	d dependencies					

Figure 57

Library Manager update status



4 Advanced usage

ModusToolbox[™] BSPs that are either custom to a user application or preconfigured made available in GitHub can belong to different generations. You can find out the generation the BSP through the following:

Table 3 BSP generations

BSP root directory contains the file	BSP Generation
version.xml and not props.json	3
props.json and not version.xml	4

The BSP Assistant is only available for generation 4 BSPs using ModusToolbox[™] version 3.0 or later.

Please note that BSP generation and BSP version have different meaning and should not be used interchangeably.

4.1 Differences between ModusToolbox[™] BSP generations

BSP generation tools version 3 and 4 differ in the following ways:

Property	BSP generation 3	BSP generation 4
BSP configuration directory name	COMPONENT_BSP_DESIGN_MODUS	Config
BSP build toolchain linker file	<platform>_<cpu>.sct for Arm[®]</cpu></platform>	linker.sct for Arm [®]
name	<platform>_<cpu>.ld for GCC</cpu></platform>	linker.ld for GCC
	<platform>_<cpu>.icf for IAR</cpu></platform>	linker.icf for IAR
BSP version information	version tag in version.xml file in the BSP root directory	version field in props.json file in the BSP root directory
BSP makefile name	<bsp_name>.mk</bsp_name>	bsp.mk
BSP locate_receipe.mk file	Present	Not present

Table 4BSP generation 3 and 4 differences

Further, the contents of the Makefile differs significantly between the generations and the below figure shows a sample comparison:



n <u>F</u> ile <u>E</u> dit Sea <u>r</u> ch <u>V</u> iew <u>T</u> ools <u>H</u> elp	New version avail
	A & 3
Sessions All Diffs Same Context Minor Rules Format Copy Edit Next Section Pr	ev Section Swap Reload
C:\\TARGET_CY8CPROTO-062-4343W-latest-v3.X\CY8CPROTO-062-4343W.mk 🗸 🖓 🇁 🗲	👔 C:\\TARGET_CY8CPROTO-062-4343W-latest-v4.X\bsp.mk 🛛 🗸 🏷 🗁
29-03-2022 10:32:44 2,199 bytes Everything Else ▼ ANSI ▼ UNIX	30-05-2023 23:38:24 2,740 bytes Everything Else ▼ ANSI ▼ UNIX
	A MPN LIST:=CY8C624ABZI-S2D44+LBEE5KL1DX
38 DEVICE:=CY8C624ABZI-S2D44	47 DEVICE:=CY8C624ABZI-S2D44
⇒ 39 #•Additional•devices•on•the•board¶	· · · · · · · · · · · · · · · · · · ·
40 #····If·you·change·the·additional·device·here·you·must·also·update·the·design	
41 #····the·device·configurator.·You·may·aiso·need·to·update·the·COMPONENI·varia	
43 ADDITIONAL DEVICES:=CYW4343WKUBG¶	48 ADDITIONAL DEVICES:=CYW4343WKUBG
⇒ 44 #•Default•target•core•to•CM4•if•not•already•set¶	¢
45 CORE?=CM49	
<pre>46 #•Basic•architecture•specific•components9</pre>	
47 COMPONENTS+=\$(TARGET) CAT1 CAT1A	
48)	
50 #•Additional.components.supported.by.the.target¶	
51 COMPONENTS+=CM0P_SLEEP+BSP_DESIGN_MODUS+PSOC6HAL+4343W+MURATA-1DX+HCI-UART	49 DEVICE_COMPONENTS:=4343W · CAT1 · CAT1A · HCI - UART · MURATA - 1DX · PSOC6_02
52 #•Use · CyHAL 9	50 DEVICE_CY8C624ABZI-S2D44_CORES:=CORE_NAME_CM0P_0+CORE_NAME_CM4_09
	51 DEVICE_CY8C624ABZI-S2D44_DIE:=PSoC6A2M9
	52 DEVICE_CY8C624ABZI-S2D44_FEATURES:=NA
	53 DEVICE_CY8C524ABZI-S2D44_FLASH_KB:=20485
	55 DEVICE_CT8C0244B21-32044_SRW1_K8.=1024 J
53 DEFINES+=CY_USING_HAL [®]	56 DEVICE_CYW4343WKUBG_FLASH_KB:=0
54 endif9	57 DEVICE_CYW4343WKUBG_SRAM_KB:=5129
•	58 DEVICE_LIST:=CY8C624ABZI-S2D44+CYW4343WKUBG
	59 DEVICE_TOOL_IDS:=bsp-assistant.bt-configurator.capsense-configurator.capse
	<pre>[60 RECIPE_DIR:=\$(SEARCH_recipe-make-catia)]</pre>
47: 33 <	٢
-NCOMPONENTE	

Figure 58 BSP Makefile Differences

4.2 Migrating the ModusToolbox[™] BSP

ModusToolbox[™] custom BSPs generated through version 2.x tools can be migrated to version 3.x tools using one of the following two methods so that the user application can take advantage of the latest features of the ModusToolbox[™] ecosystem.

4.2.1 Using the BSP Assistant tool

- 1. Create a new BSP with the BSP Assistant tool by following the steps described in the Creating a new BSP section of this document.
- 2. Update the following files in the newly created custom BSP with the settings from the corresponding version 2.x files:
 - BSP configuration files including design.modus, etc.
 - BSP linker files
 - Add any other dependencies for the BSP other than the default dependencies by using the Add Library button in the BSP Assistant tool
- 3. Import the newly created custom BSP into your ModusToolbox[™] application by running the Library Manager tool in your ModusToolbox[™] application directory by clicking **Add BSP** and then clicking **Browse** on the Add or Import BSP dialog as follows:



17	Add bor Clorary Mar	loger Erro						
pl	Source Template							Browse
te	Enter filter text	<i>[</i>] C	reate from I	MPN Brow	se for BSP 📄 🕀			
	Kit Name > AIROC™ Bluetooth	Select Folder						×
~	 > AIROC[™] Connectiv > PMG BSPs 	\leftrightarrow \rightarrow \checkmark \uparrow	« Users	ightarrow Public $ ightarrow$	Example >	5 V		
	> PSoC [™] 4 BSPs> PSoC [™] 6 BSPs	Organize 🔻 🛛 N	ew folder					. 🕐
	 > TRAVEO[™] BSPs > Wireless Charging 	💻 This PC		^	Name		Date modified	Туре
	> XMC [™] BSPs	🧊 3D Objects			mtw_3.1		5/26/2023 8:13 AM	File fold
		Desktop			TARGET_MyBSP		5/26/2023 8:06 AM	File fold
	Dectination	Documents			TARGET_5-24-23		5/25/2023 1:40 PM	File fold
	Destination				TARGET_5-17-23		5/23/2023 2:43 PM	File fold
	Parent directory:	Downloads			TARGET_MyBSP-5-4-2	13	5/16/2023 2:43 PM	File fold
A .	New BSP name: TARGE	J) IVIUSIC						
		Pictures						
		Videos						
ir frest	ned all dependencies for	🏰 Windows (C	:)					
error	(s), 0 warning(s)			¥	<			>
cces	sfully acquired the inform		Folder:	TARGET MyB	SP			

Figure 59 Browsing to the BSP folder Caption

4. Make the new BSP active and click **Update**.

253-4343W Remove
253-4343W
253-4343W
$\stackrel{\bigcirc}{\times}$
\times

Figure 60

Selecting the BSP Caption

This completes the migration of the BSP from version 2.x to 3.x using the BSP Assistant tool.

4.2.2 Without using the BSP Assistant tool

- **1.** Delete the version.xml file.
- **2.** Delete the deps directory.



- **3.** Create a new file called props.json and add the various properties by looking into a similar file from preconfigured 3.x BSPs in GitHub.
- **4.** Rename the BSP configuration directory COMPONENT_BSP_DESIGN_MODUS to config.
- 5. Rename the BSP makefile <bsp_name>.mk to bsp.mk.
- 6. Update the bsp.mk file by comparing with an existing 3.x format bsp.mk file because there are significant changes between the 2 generations.
- **7.** Rename the linker files in the directory COMPONENT_CM0P and COMPONENT_CM4 as follows:
 - <platform>_<cpu>.sct to linker.sct for Arm[®]
 - <platform>_<cpu>.ld to linker.ld for GCC
 - <platform>_<cpu>.icftolinker.icfforIAR
- 8. Delete the locate_recipe.mk file.
- **9.** Follow the steps in Create an application to import the new BSP to the application.

This completes the migration of the BSP from version 2.x to 3.x without using the BSP Assistant tool.



References

References

- **1.** ModusToolbox[™] home page
- 2. AN228571 Getting started with PSoC[™] 6 MCU on ModusToolbox[™] software
- **3.** ModusToolbox[™] tools package user guide
- **4.** ModusToolbox[™] BSP Assistant user guide
- 5. Creating Custom BSPs in ModusToolbox KBA230822 (Specific to version 2. x BSPs)
- 6. Migrating ModusToolbox[™] applications from version 2.x to version 3.x KBA236134



Revision history

Revision history

Document version	Date of release	Description of changes
**	2022-10-18	Initial release.
*A	2023-06-09	Updated for ModusToolbox [™] version 3.1.

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