

# ModusToolbox™ Programmer GUI user guide

#### Version

5.3

A newer version of this document may be available on the web here.

# About this document

#### Scope and purpose

ModusToolbox<sup>™</sup> Programmer is a stand-alone, cross-platform, flash programmer tool that provides a graphical user interface to Program, Erase, Verify, and Read the flash of the target device. It is delivered with the ModusToolbox<sup>™</sup> Programming tools package, and it supports HEX, SREC, ELF, HCD and BIN programming file formats.

#### **Intended audience**

This document helps you learn how to use the ModusToolbox<sup>™</sup> Programmer GUI to perform various operations on devices.

#### **Reference documents**

Refer to the Infineon programming solutions website for more information as needed.

#### **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/folder names, directories, command line inputs, code snippets
File > New	Indicates that a cascading sub-menu opens when you select a menu item

#### **Abbreviations and definitions**

The following define the abbreviations and terms used in this document:

Term	Description
CMSIS	Arm <sup>®</sup> Cortex <sup>®</sup> Microcontroller Software Interface Standard.
CMSIS-DAP	CMSIS Debug Access Port.
OpenOCD	The Open On-Chip Debugger is the debugger tool that provides on-chip programming support. This tool acts as a backend of the ModusToolbox™ Programmer application.
Data File	The data file for programming in the hex or binary format
DP	The Debug Port register of the Arm Cortex CPU. Used for programming and debugging, along with the corresponding SWD-address bit selections.
Flash kernel/loader	The firmware file loaded into the MCU's RAM. Sometimes referred to as RAM program, Flash kernel, Flash loader.

# ModusToolbox™ Programmer GUI user guide



# About this document

Term	Description
GDB	GNU Project Debugger – GNU.org.
JTAG	Joint Test Action Group. Specifies the use of a dedicated debug port while implementing a serial communication interface for low-overhead access without requiring direct external access to the system address and data buses.
MCU	Microcontroller Unit.
PSOC™	A family of microcontroller integrated circuits. These chips include a CPU core and mixed-signal arrays of configurable integrated analog and digital peripherals.
Region	Logical areas within the target device the programmer operates on.
SWD	Serial Wire Debug interface.
QSPI	Quad Serial Peripheral Interface. A name used for SPI external memory interfaces



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### Overview

# 1 Overview

ModusToolbox<sup>™</sup> Programmer supports the following features:

- Programming Infineon MCUs' internal and external memories
  - PSOC<sup>™</sup> 6 MCUs, including corresponding starter kits and evaluation boards
  - PSOC<sup>™</sup> 4 MCUs, including corresponding starter kits and evaluation boards
  - PMG1, PAG2S and WLC1 MCUs, including corresponding evaluation boards
  - EZ-PD<sup>™</sup> CCG7S and CCG7D MCUs, CCG2, CCG3PA, CCG3PA2, CCG4, CCG6, CCG8
  - XMC7xxx, XMC5xxx, CYT4BB/BF, CYT2Bx, CYT3Bx
  - PSOC<sup>™</sup> Control C3
- AIROC<sup>™</sup> Wi-Fi/Bluetooth<sup>®</sup> platforms (CYW4390x, CYW4343W, CYW20829, CYW208xx, CYW55513 and others), including corresponding starter kits and evaluation boards
- Connectivity devices via support of development boards
- Windows, Linux, and macOS
- Programming external memory devices using PSOC<sup>™</sup> 6 external memory interfaces (EBI / QSPI)
- Programming external memory of AIROC<sup>™</sup> Wi-Fi devices
- KitProg3 and MiniProg4 hardware
- SEGGER J-Link Base and J-Link Ultra hardware
- OpenOCD via machine interface (MI) to 3rd party debug hardware
- Cross-platform CyBridge library I<sup>2</sup>C, SPI, UART communications and USB devices detection
- KitProg3 firmware update



Installing ModusToolbox™ Programmer

# 2 Installing ModusToolbox<sup>™</sup> Programmer

ModusToolbox<sup>™</sup> Programmer is delivered as part of the ModusToolbox<sup>™</sup> Programming tools package. A link is available to download/install from the IDC webpage here:

https://softwaretools.infineon.com/tools/com.ifx.tb.tool.modustoolboxprogtools

For installation details, see section 2 of the ModusToolbox™ Programming tools release notes.



# 3 Getting started

# 3.1 Run ModusToolbox<sup>™</sup> Programmer

To run the ModusToolbox<sup>™</sup> Programmer GUI application, navigate to the ModusToolbox<sup>™</sup> Programming tools install location, open the *mtb-programmer* folder, and run the executable. The GUI opens and looks similar to this:

In ModusToolbox™ Programmer – □ ×								
File View Options Help								
Programmer No pro Board Device	· · · · · · · · · · · · · · · · · · ·	ower Connect		Program	Read V	/erify		
Settings						×		
Program Settings File								
Reset Chip	$\checkmark$							
Probe Settings								
Log								
Info : [CyBridge] Start th Info : [CyBridge] The hard	e API initialization Ware initialization has completed i	.n 500 ms						
Please attach USB probe device	to proceed			No	t Connec	ted		

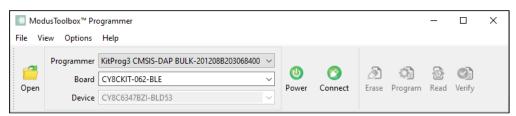
In this case, no kit or device is connected, and a message displays asking you to connect a device.

# 3.2 Select device

1. Connect the device to the host computer. Select the hardware programmer in the **Programmer** dropdown.

Mod	III ModusToolbox™ Programmer — □								
File Vi	ew Options	Help							
<mark>Г</mark> Ореп	Board	Select programmer  None KitProg3 CMSIS-DAP BULK-201208B203068400	Power	Connect	ð Erase	<b>D</b> Program	🙆 Read	Verify	
Settings									×

2. Select the kit name in the **Board** drop down.





ModusToolbox<sup>™</sup> Programmer displays information under **Probe Settings**.

M	1odu	isToolbox™ Pro	gramme	r						_		×
File	Vie	w Options	Help									
_	2	Programmer KitProg3 CMSIS-DAP BULK-201208B203068400 V		0		2	ι ch		ത			
Ope	on	Board	CY8CKIT	-062-BLE		$\sim$	Power	Connect	Erase	Program	Read	Verify
Opt	en	Device	CY8C63	47BZI-BLD53		$\sim$	Fower	Connect	EldSe	Plogram	Nedu	verny
Settin	igs											×
Prog	ram	Settings										
Fi	ile											
		Chip		$\checkmark$								
		Regions		_								
		nal Memory										
P	rogr	am Security Da	ita									
Prob	e Set	ttings										
Ir	nterfa	ace		SWD								
C	lock	(KHz)		2000								~
V V	oltag	ge (V)		2.5								$\sim$
R	eset	Туре		Soft								$\sim$
S	flash	Restrictions		Erase/Program Sf	lash prohibited							$\sim$
Log												
				e API initializ			503					
					tion has complet			on 2 60 1/	13			
	Info : Connected - KitProg3 CMSIS-DAP BULK-201208B203068400 FW Version 2.60.1443 Info : Selected Programmer: KitProg3 CMSIS-DAP BULK-201208B203068400											
		Selected Boa	-	-								
Press	s F1	for help						Powered: 25	525 mV	Not Co	onnected	d .

# 3.3 Load programming file

#### 1. Click Open.





2. On the Open Programming File dialog, navigate to the location of the HEX, SREC, ELF, or BIN file to load, select it, and click **Open**.

→ 👻 ↑ 📙 > This PC >	Windows (C:)	CY8CKIT-062-BLE	~ Ü	Search CY8CKIT-062-BLE	م
rganize 🝷 New folder				=== == ▼	. ?
🔩 Windows (C:)	^	Name		Date modified	Туре
artifacts		BlinkyLED_mainapp_final.elf		4/12/2019 5:35 PM	ELF Fil
📙 backup		BlinkyLED_mainapp_final		6/19/2019 2:02 PM	HEX F
CMakeFiles		CY8C6347BZI-BLD53_main.bin		8/2/2018 2:53 PM	BIN Fil
CY8CKIT-062-BLE		CY8C6347BZI-BLD53_main.sree	:	8/2/2018 2:53 PM	SREC I
cygwin64					
DOCS					
DRIVERS					
ESD					
📜 fw-loader					
📜 hex					
Iread	<b>*</b> .				
_	× ·	<			
File name: Blink	yLED_mainapp	_final	~	Programming Files (*.he:	x *.srec ~

# 3.4 Connect device

1. If the device is not powered, the status message "Not Powered" is displayed in the Status Bar. Click **Power** to power up the device.

Mod	Image: ModusToolbox™ Programmer     -     □     ×												
File V	iew Options	Help											
2	Programmer	KitProg	CMSIS-DAP BULK-201208B203068400 V		-	~ <b>D</b>							
	Board	CY8CKI1	-062-BLE V			1. <u>1</u>	e	Varif.					
Open	Device	CY8C63	47BZI-BLD53	er Connect	Erase	Program	Read	Verify					
Settings	Settings ×												
Program	n Settings												
Verif Exte													
Probe S	ettings												
Inter	rface		SWD					- 1					
Cloc	:k (KHz)		2000					~					
Volta	age (V)		3.3					$\sim$					
Rese	et Type		Soft					~					
Sflas	sh Restrictions		Erase/Program Sflash prohibited					~					
Log													
Info : [CyBridge] Start the API initialization Info : [CyBridge] The hardware initialization has completed in 507 ms Info : Connected - MiniProg4 CMSIS-DAP BULK-0711062303210400 FW Version 2.60.1443 Info : Connected - KitProg3 CMSIS-DAP BULK-201208B203068400 FW Version 2.60.1443 Info : Selected Programmer: KitProg3 CMSIS-DAP BULK-201208B203068400 Info : Selected Board: CY8CKIT-062-BLE													
Press F1	1 for help			Not Pov	wered	Not	Connec	ted					



2. Click **Connect**. ModusToolbox<sup>™</sup> Programmer communicates with the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that it is connected.

ModusToolbox™ Prog	ammer		_		×
File View Options H	lelp				
Open Board C	tProg3 CMSIS-DAP BULK-201208B203068400 V Y8CKIT-062-BLE V Y8C6347BZI-BLD53 V	Disconnect Er	nase Program	ତ୍ରି Read	>
Settings					×
Program Settings File Reset Chip > Verify Regions External Memory Program Security Data	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex				
Probe Settings					
Interface Clock (KHz)	SWD 2000				~
Voltage (V) Reset Type	3.3 Soft				
Sflash Restrictions	Erase/Program Sflash prohibited				
Log					
Info : #5 : psoc6_wor Info : #6 : psoc6_sup Info : #7 : psoc6_eft Info : Flash banks de Info : cyp status: Ok Info : cyp_get_mpn		buswidth 0, chip buswidth 0, chi buswidth 1, chi	width 0 pwidth 0 pwidth 1		~
Connected to the target of	evice	Powered: 3315 mV	CY8C6347E	3ZI-BLD5	3



# 3.5 Program device

Click **Program**. ModusToolbox<sup>™</sup> Programmer downloads the program file onto the device and displays messages in the **Log**.

N	lodusTo	olbox™ Pro	ogramme	r		_		×	
File	View	Options	Help						
	Pr	ogrammer	KitProg	3 CMSIS-DAP BULK-201208B203068400 🛛 🗸		-	_		
		Board CY8CK		T-062-BLE 🗸 🔘 🔇			2		
Оре	en	Device		Power Discon	nect Erase	Program	Read	Verify	
		Device	CTOCOL	47621-62035					
Settin	gs							×	
Prog	ram Set	tings							
Fi	ile			C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex					
R	eset Ch	ip							
> V	erify Re	gions							
E	xternal	Memory							
Р	rogram	Security Da	ata						
Prob	e Settin	gs							
Ir	nterface			SWD					
C	lock (Kl	Hz)		2000					
V	oltage	(V)		3.3					
R	eset Ty	be		Soft					
S	flash Re	strictions		Erase/Program Sflash prohibited					
Log									
Info : [100%] [#################################] [ Erasing ] Info : [100%] [####################################									
Devi	ce prog	rammed su	ccessfull	/ Powe	ered: 3307 m <sup>v</sup>	/ Co	onnecte	d	

# 3.6 Save log file

Right-click in the Log section and select Save As.

Log				
Info : [100%] [####################################				^
Info : [100%] [####################################				
Info : wrote 45568 bytes from file C:/CY8CKIT-062-BLE/BlinkyLED_mair	Сору	Ctrl+C	2s (47.205 KiB/s)	
Info : ** Programming Finished **			-	
Info : cyp status: OK	Select All	Ctrl+A		
Info : cyp_get_mpn	Save As			
Info : ** Detected device PN: CY8C6347BZI-BLD53 SiliconID: E207 Revi	Clear		IE: PSoC6ABLE2	
Info : reset run				
Info : SWD DPIDR 0x6ba02477				$\sim$
Device programmed successfully	Powered:	3302 mV	Connected	

You can also select the **Select All** command to select the text, then copy and paste the text to the file you selected.

Note:



# 4 GUI description

ModusToolbox<sup>™</sup> Programmer contains menus and toolbar commands to perform actions. This chapter describes the various GUI elements.

_	lusToolbox™ Pro	-	r			-		×				
File Vi	iew Options	Help										
~	Programmer	MiniPro	g4 CMSIS-DAP BULK-0711062303210400 \vee		-	-	-	-				
1	Board	Custom										
Open	Device	CV9C62	ABZI-S2D44	Power Disconnect Erase Program Read Veri								
	Device	CTOCOZ	**************************************									
Settings								×				
Program	n Settings											
File			C:/CY8CPROTO-062-4343W/CY8C624ABZI-S2D44/CY8	BC624ABZI-S2D	044_BlinkF	ull.hex						
	et Chip											
	y Regions											
	rnal Memory											
Prog	Iram Security Da	ata										
Probe Se	ettings							^				
Inter	face		JTAG					$\sim$				
V JTA	G Chain	Ċ,										
ſ	01 CY8C624ABZ	I-S2D44	$\odot$									
Cloc	k (KHz)		2000									
Volta	age (V)		3.3									
Rese	et Type		Soft									
Log	[100%] [####		######################################									
Info : Info : in 3.19 Info : Info : Info : Info :	[100%] [#### wrote 45056 92891s (13.78 ** Programmi cyp status: cyp_get_mpn	bytes f 1 KiB/s ng Fini OK	#########################] [ Programming ] rom file C:/CY8CPROTO-062-4343W/CY8C624ABZI )			-						
Device p	programmed su	ccessfully	/	Powered	: 3303 m\	/ (	Connecte	ed .				

# 4.1 Menus

# 4.1.1 File

The **File** menu contains the following commands:

- **Open (Ctrl+O)** Opens the programming file.
- **Connect/Disconnect (Alt+Q)** Connects and disconnects the selected device.
- **Program (Alt+G)** Programs the selected device with the selected file.
- Erase (Alt+E) Erases the selected device.
- Read (Alt+R) Reads flash of the selected device into a HEX or SREC file.
- Verify (Alt+Y) Verifies that the selected device is programmed correctly.
- Recent Files Lists up to five recently loaded programming files.
- **Exit (Alt+F4)** Closes the ModusToolbox<sup>™</sup> Programmer application.

### 4.1.2 View

The **View** menu contains the **Settings** check box. Select it to view the **Settings** section of the window; unselect it to hide the **Settings** section. See <u>Settings</u>.



# 4.1.3 Options

The **Options** menu contains the following commands:

# 4.1.3.1 Programmer Options (Alt+T)

Opens the **Programmer Options** dialog to set the **Upgrade Firmware** mode and other options.

Programmer Options - ModusToolbox™ Programmer X								
Name	Value							
Upgrade Firmware	Show Pop-Up ~							
OpenOCD Telnet Port	4445							
	OK Cancel							

- Upgrade Firmware mode:
  - Automatically The firmware is updated automatically when the tool opens.
  - **Show Pop-up** A dialog displays asking if you want to upgrade the firmware.
  - **Ignore** The firmware is not updated and no prompt displays.
- **OpenOCD Telnet Port**: This option specifies the port number of the OpenOCD telnet connection.

# 4.1.3.2 Upgrade Firmware (Alt+U)

When this command is enabled, select it to upgrade the programmer firmware on the device.

# 4.1.4 Verify Regions

The Verify Regions menu is available only if Verify Regions option is selected in Program Settings.

- Add Region Adds a custom flash region to the Verify Regions list.
- **Reload Regions –** Resets the **Verify Regions** list to the default state corresponding to the flash map of the target.
- Undo (Ctrl+Z) Undo the last change in the Verify Regions list.
- Redo (Ctrl+Y) Redo the last change in the Verify Regions list.
- Verify Initiates the Verify device operation.

## 4.1.5 Help

The Help menu contains the following commands:

- View Help (F1) Opens this document.
- About ModusToolbox<sup>™</sup> Programmer Opens the About box.



# 4.2 Toolbar

The toolbar contains the **Open, Connect, Erase, Program, Read,** and **Verify** commands, which are also located on the <u>File menu</u>. This area also contains the following:

# 4.2.1 **Programmer, Board, and Device**

Use these pull-down menus to select the specific device to use.

# 4.2.1.1 Programmer

This displays a list of all currently connected probes with a serial number or other identifier (for example, COM port number) from which you can select the desired **Programmer**.

_	usToolbox™ Pro ew Options	grammer Help				_		×	
Copen	Programmer Board Device	KitProg3 CMSIS-DAP BULK-201208B203068400 None MiniProg4 CMSIS-DAP BULK-0711062303210400 KitProg3 CMSIS-DAP BULK-201208B203068400 KitProg3 CMSIS-DAP BULK-180715C900020400	(U) Power	Connect	<b>D</b> Erase	<b>D</b> Program	<b>e</b> ad	Verify	
Settings X									
Program File	Settings	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.r	nex						

# 4.2.1.2 Board

The **Board** pull-down allows you to choose the appropriate Kit name for the selected **Programmer**.

- Under the **Scanned Boards** entry, there is a short list of best matched Kit names detected by the tool.
- Under the **Others** entry, there is a list of all other Kit names available for the selected programmer device.
- When selecting the **Custom** board, the tool allows you to manually specify the particular target device connected to a stand-alone programmer (such as MiniProg4) or a KitProg3 with modifiable MCU module. **Custom** board is only available for KitProg3, MiniProg4 and JLink programmers.

Modu	I ModusToolbox™ Programmer – □ ×									
File Vi	ew Options	Help								
Copen	Programmer Board	KitProg3 CMSIS-DAP BULK-201208B2030684	~	()	0	ð	0			
	Device	Custom Scanned Boards	^	Power	Connect	Erase	Program	Read	Verify	
Settings		CY8CKIT-062-BLE							×	
Program	Settings	CY8CKIT-062-WiFi-BT CYW943012P6EVB-01	ſ							
File		Others		l.hex						
Reset Chip		CY7110								
Verify	y Regions	CY7111								
Programming Mode		CY7112 CY7113	~						~	
Probe Settings										



#### Device 4.2.1.3

This displays a list of all supported target devices. It is enabled only if you select **Custom** for the **Board** option.

Mode	I ModusToolbox™ Programmer – □									
File Vi	ew Options	Help								
Copen	Programmer Board		~	(U) Power	Connect	Erase	Program	Read	Verify	
Open	Device	CY7C65219-40LQXIT CY7C65219-40LQXIT	~	Power	connect	LIASE	Flogram	Neau	veniy	
Settings		CY8C4024AXI-S402							×	
File	Settings	CY8C4024AXI-S412 CY8C4024AZI-S403 CY8C4024AZI-S413	a	l.hex						
Verify	t Chip y Regions ramming Mode	CY8C4024AZQ-S413 CY8C4024FNI-S402							~~	
Probe Settings Interface		CY8C4024LQA-S411 CY8C4024LQA-S413	~							

#### **Auto-completion** 4.2.1.4

Board and Device pull-downs support auto-completion.

Start typing the name of the Kit in the **Board** pull-down and the tool will suggest corresponding board names.

© ModusToolbox™ Programmer File View Options Help									×
0pen	Programmer Board Device	062-  ~ CY8CKIT-062-BLE CY8CKIT-062-WiFi-BT	(U) Power	Connect	<i>∑</i> Erase	Program	Contraction Read	<b>N</b> erify	
Settings		CY8CPROTO-062-4343W							×

Start typing the device's part number in the Device pull-down and the tool will suggest corresponding target devices.

ModusToolbox™ Programmer									
File Vi	ew Options	Help							
(1) Open	Programmer	KitProg3 CMSIS-DAP BULK-061B12C8002874	00 ~					-	
	Board	Custom	$\sim$	U U	$\bigcirc$		-Q_]	e	
	Device	CY8C62	~	Power	Connect	Erase	Program	Read	Verify
:		CY8C6244AZI-S4D12	^	L					
Settings		CY8C6244AZI-S4D62							
Program	Settings	CY8C6244AZI-S4D82							
File	-	CY8C6244AZI-S4D83		ample-psc	oc6-hello-wor	ld boy			
	t Chin	CY8C6244AZI-S4D92		campie-psc	JCO-Hello-wol	IU.IIEX			
Reset Chip Verify Regions		CY8C6244AZI-S4D93							
1		CY8C6244AZQ-S4D92	~						
Prog	ramming Mode	INESEL	_	1					

#### 4.2.2 **Power**

Use the **Power** button to power on and off the selected device.

#### 4.2.3 Connect

Use the **Connect** Use the **Connect** button to connect to and disconnect from the selected device.



# 4.2.4 Settings

The **Settings** section of the tool allows you to update the program and probe/target settings as follows:

# 4.2.4.1 **Program Settings**

- File Use this to select the programming file to perform actions on or with.
- **Offset** This is an optional offset parameter; it can be an integer or hexadecimal value. The relocation offset is added to the base address for each section in the image when the image is programmed. This option is visible only if a binary or elf file is selected for programming operations.
- **Reset Chip** Use this to reset the chip after the Program operation completes. This option resets the target chip and runs the programmed firmware on it.
- Verify Regions Use this option to define flash regions used during device verification. This allows to verify user defined flash regions of the PSOC<sup>™</sup> MCU. This option does not change behavior of the Program operation. See <u>Verify Custom Flash Regions of PSOC<sup>™</sup> 6 MCU</u> for details.
- **External Memory** Enables/disables the programming of external memory in the target device. For PSOC<sup>™</sup> 6x MCUs, this option enables programming of the QSPI regions. This is also used for programming external memory of AIROC<sup>™</sup> Wi-Fi devices.
- **Program Security Data** Allows programming security regions if the target device supports this capability. For example, for PSOC<sup>™</sup> 61 PSOC<sup>™</sup> 62, and PSOC<sup>™</sup> 63 MCUs, this option enables programming the eFuse region.
- **Target AP** Allows you to select the target access port (DAP) that will be used for programming. Possible values include: CM0, CM4, and SYS\_AP. This option is available only for PSOC<sup>™</sup> 64 MCUs.
- Flash Size Limit Limits the size of application flash available for programming operations. This option is available only for PSOC<sup>™</sup> 64 MCUs.
- **Programming Mode** Use this option to define programming mode for PMG1 devices. The mode options include:
  - Reset: This programming mode enables acquisition of the target device in the Test mode.
  - PowerCycle: In this mode, the programmer cycles power to acquire the device.
- **Flashloader** Use this option to select the patched QSPI CMSIS flashloader file (in FLM format). This flashloader is used for external flash programming.

Note: To be able to program custom external flash you should also provide the appropriate QSPI configuration file (qspi\_config.cfg), generated by the ModusToolbox™ QSPI Configurator tool. This file should be located in the same directory as the patched flashloader file.

- **Debug Certificate** Use this option to specify the location of the debug certificate binary file. The debug certificate is used for programming AIROC<sup>™</sup> CYW20829 targets in Secure lifecycle mode.
- **ECC Config** Use this option to enable or disable the ECC error reporting. This option is only applicable for read flash operations of some MCUs.



# 4.2.4.2 Probe Settings

The Probe settings allow you to configure the programming and target device before you connect to it. These settings are available when ModusToolbox™ Programmer is not connected to the device.

- **Interface** To select the hardware (debug) interface for communication with the target device. The possible values include: SWD and JTAG if supported by the device.
- **JTAG Chain** To select the interested target device in the JTAG chain. This option is only available for probes supporting JTAG interface. See <u>Program PSOC<sup>™</sup> 6/Control C3 MCU in JTAG Chain</u> for details.
- **Voltage (V)** –To select the power supply voltage of the target device in Volts. This option is available only if the selected probe has the power control capability.
- **Clock (KHz)** To select the frequency of the hardware interface in KHz. This option is available only if the selected probe supports configurable frequencies.
- **Reset Type** Specifies the type of the Reset Chip operation. The possible values include: Soft and XRES:
  - Soft is a software reset type that sends the system reset request to the ARM core.
  - XRES is a hardware reset type that toggles the XRES hardware line.
- **Sflash Restrictions** Specifies the Sflash programming behavior. This option is available only for PSOC<sup>™</sup> 61/62/63, XMC7xxx/XMC5xxx, FX3G2, CYT4Bx, CYT4DNJ and CYT2Bx MCUs. The possible values include:
  - Erase/Program of Sflash is prohibited.
  - Erase and Program of USER/TOC/KEY is allowed.
  - Erase of USER/TOC/KEY and Program of USER/TOC/KEY/NAR is allowed.
  - Erase and Program of entire Sflash is allowed.



# 5 **Programming Operations**

This chapter covers the various programming operations you can perform using the ModusToolbox™ Programmer tool.

# 5.1 Erase Device

- 1. Connect to the device (see <u>Connect Device</u>).
- 2. Click the **Erase** button.

ModusToolbox<sup>™</sup> Programmer erases the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was erased successfully or that an error occurred.

Mod	lusToolbox™ Pro	grammer	-	- 🗆	$\times$					
File V	iew Options	Help								
g	Programmer	KitProg3 CMSIS-DAP BULK-201208B203068400								
	Board	CY8CKIT-062-BLE		<b>2</b>	Verify					
Open	Device	CY8C6347BZI-BLD53	t Erase Progra	m Read	verity					
Settings					×					
Program	n Settings									
File		C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex								
	et Chip									
	fy Regions									
	rnal Memory									
Prog	gram Security Da	a								
Probe S	ettings									
Inter	rface	SWD								
Cloc	:k (KHz)	2000								
Volta	age (V)	3.3								
Rese	et Type	Soft								
Sflas	sh Restrictions	Erase/Program Sflash prohibited			$\sim$					
Log										
Info : [100%] [################################ [ Erasing ] Info : erased sectors 0 through 63 on flash bank 1 in 0.026148s Info : ** Erasing bank 0 ** Info : [100%] [####################################										
Device	erased successfu	ly Powered	i: 3317 mV	Connecte	ed					



## 5.2 **Program Device**

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in <u>Load Programming File</u> section.
- 3. Connect to the device (see <u>Connect Device</u>).
- 4. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that device was programmed successfully or that an error occurred.

Mod	lusToolbox™ Pro	grammer	_		×			
File Vi	iew Options	Help						
Open	Board	KitProg3 CMSIS-DAP BULK-201208B203068400 CY8CKIT-062-BLE CY8C6347BZI-BLD53 V KitProg3 CMSIS-DAP BULK-201208B203068400 Power Disconnect Disconnect Disconnect Citerase	<b>O</b> Program	🙆 Read	<b>V</b> erify			
Settings					×			
File Rese > Verif	n Settings et Chip fy Regions rnal Memory gram Security Da	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex						
Probe Se Inter	2	SWD 2000			~			
	age (V) et Type	3.3 Soft						
Sflas	h Restrictions	Erase/Program Sflash prohibited			$\sim$			
Log Info : [100%] [####################################								
Device p	programmed su	cessfully Powered: 3317 mV	Co	nnecte	d			



# 5.3 Program Device and Reset Chip

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the Load Programming File section.
- 3. Connect to the device (see <u>Connect Device</u>).
- 4. Select the **Reset Chip** check box under **Program Settings**.
- 5. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

Mod	dusToolbox™ Pro	grammer		- C	× נ
File V	view Options	Help			
	Programmer	KitProg3 CMSIS-DAP BULK-201208B203068400			
	Board	CY8CKIT-062-BLE	ຼິ 🔇 🧷	୍ 🖓 🔕	
Open	Device	CY8C6347BZI-BLD53	Disconnect Erase	Program Read	Verify
Settings					×
Program	n Settings				
File	2	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex			
Rese	et Chip				
	fy Regions				
	ernal Memory				
Prog	gram Security Da	a			
Probe S	Settings				
Inte	rface	SWD			
Cloc	ck (KHz)	2000			
Volt	age (V)	3.3			
Rese	et Type	Soft			
Sflas	sh Restrictions	Erase/Program Sflash prohibited			
Log					
Info : Info : Info : Info : Info : Info : Info :	[100%] [#### wrote 45568 ** Programmi cyp status: cyp_get_mpn	Nevice PN: CY8C6347BZI-BLD53 SiliconID: E207 Revisio	-	·	
Device	programmed su	cessfully	Powered: 3316 mV	Connect	ed .

The target device is reset and running.



# 5.4 Program Binary File with Offset

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the binary programming file as described in the <u>Load Programming File</u> section.
- 3. Connect to the device (see <u>Connect Device</u>).
- 4. Enter the desired address in the **Offset** field under **Program Settings**.
- 5. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

*Note:* Offset options is available only for binary programming files.

Mod	lusToolbox™ Pro	ogramme	r					_		×
File Vi	iew Options	Help								
	Programmer	KitProg	3 CMSIS-DAP BULK-201208B203068400	$\sim$			-		-	
	Board	CY8CKI	T-062-BLE	$\sim$	U	8			2	
Open	Device	CVOC62	47BZI-BLD53		Power C	Disconnect	Erase	Program	Read	Verify
	Device	CTOCOS								
Settings										×
Program	n Settings									
File			C:/CY8CKIT-062-BLE/BlinkyLED_mainap	p_final	.bin					
Offs	et		0x10000000							
Rese	et Chip		$\checkmark$							
	fy Regions									
	rnal Memory									
Prog	gram Security Da	ata								
Probe S	ettings									
Inter	rface		SWD							
Cloc	:k (KHz)		2000							$\sim$
Volta	age (V)		3.3							$\sim$
Rese	et Type		Soft							$\sim$
Sflas	sh Restrictions		Erase/Program Sflash prohibited							$\sim$
Log										
<pre>Log Info : [100%] [####################################</pre>										
Device	programmed su	iccessfully	/			Powered:	3315 m\	/ Co	onnecte	d .



# 5.5 Program External Memory

- 1. Attach and select a device that supports external memory (for example, CY8CKIT-062-WiFi-BT with QSPI support).
- 2. Select the External Memory option under Program Settings.

Settings		×
Program Settings		
File	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex	
Reset Chip	$\checkmark$	
Verify Regions	_	
External Memory		
Program Security Data		
Probe Settings		
Interface	SWD	
Clock (KHz)	2000	$\sim$
Voltage (V)	3.3	$\sim$
Reset Type	Soft	$\sim$
Sflash Restrictions	Erase/Program USER/TOC/KEY allowed	$\sim$

- 3. Select the programming file as described in the <u>Load Programming File</u> section. The programming file should contain external memory region(s) and correct QSPI configuration data.
- 4. Select Erase/Program USER/TOC/KEY allowed option under Probe Settings > Sflash Restrictions.
- 5. Connect to the device (see <u>Connect Device</u>).
- 6. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

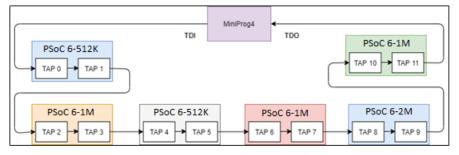
Mod	lusToolbox™ Pro	grammer	- 🗆 X						
File Vi	iew Options	Help							
Open	Board	KitProg3 CMSIS-DAP BULK-201208B203068400 CY8CKIT-062-BLE CY8C6347BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53 CY8C7BZI-BLD53	Image: Second						
Settings			×						
File Rese > Verif Exter	n Settings et Chip fy Regions rnal Memory gram Security Da	C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_final.hex							
	rface	SWD							
Volta	:k (KHz) age (V) et Type	2000 3.3 Soft							
	sh Restrictions	Erase/Program USER/TOC/KEY allowed							
Log									
Info : [100%] [####################################									
Device	programmed su	cessfully	Connected						



# 5.6 Program PSOC<sup>™</sup> 6/Control C3 MCU in JTAG Chain

1. Connect the host computer to a MiniProg4 or J-Link probe attached to several MCU targets in the JTAG chain.

The following hardware configuration is used in this example:



The sample JTAG chain configuration contains six serially-connected PSOC<sup>™</sup> MCU targets.

- 2. Select the MiniProg4 probe and target device in the **Programmer, Board, and Device** drop-downs, and ModusToolbox<sup>™</sup> Programmer will display information under **Probe Settings**. Ensure the JTAG chain is powered.
- 3. Select the JTAG interface in the Interface drop-down.

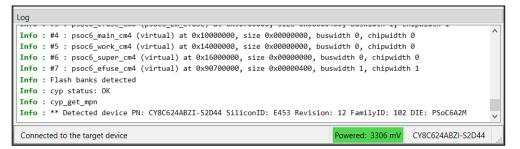
Image: ModusToolbox™ Programmer     -     -     ×       File     View     Options     Help											
Copen	Programmer Board Device	Custom	g4 CMSIS-DAP BULK-1D1016CB00086400 ~ 45AZI-S3D72 ~	<b>O</b> Power	Connect	<b>D</b> Erase	<b>O</b> Program	<b>e</b> Read	<b>Nerify</b>		
Settings ×											
Program Settings File Reset Chip Verify Regions External Memory Program Security Data			C:/hex/psoc6/CY8CKIT-062-WIFI-BT/mtb-exar	nple-psoc	6-hello-world	.hex					
Probe Se	ettings								^		
Inter	face		SWD						$\sim$		
Clock (KHz)			SWD	SWD							
Voltage (V)			JTAG								
Reset Type			Soft ~								
Sflas	h Restrictions		Erase/Program Sflash prohibited						$\sim$ $\checkmark$		



ModusToolbox<sup>™</sup> Programmer queries the JTAG chain and displays detected devices under the **JTAG Chain** option in **Probe Settings**. The list of devices in the chain contains target names for supported devices and ID codes for those which are not supported.

Mod	usToolbox™ Prog	ammer	_		×
File Vi	ew Options I	łelp			
	-	tiniProg4 CMSIS-DAP BULK-1D1016CB00086400 ~			
Open	Device (	Y8C624ABZI-S2D44 Power Connect Erase	e Program	Read	Verify
Settings					×
File Rese Verify Exter Prog Probe Se Inter	face G Chain	JTAG	lo-world.hex		~
[ [ [ [ [ Clock Volta	0) CY8C6245AZI-1 1) CY8C637BZI-M 2) CY8C6245AZI-1 3) CY8C637BZI-M 4) CY8C627BZI-M 4) CY8C637BZI-M k (KHz) nge (V)	D76 3D72 2D76 22D44 2000 3.3			~
	t Type	Soft			<b>v</b>

- 4. Select the desired target device in the list by clicking the radio button next to the target name.
- 5. Select the programming file as described in the <u>Load Programming File</u> section.
- 6. Click **Connect**. ModusToolbox<sup>™</sup> Programmer communicates with the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that it is connected.





7. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

ModusToolbox™ Pro			-		×
File View Options	Help				
Programmer	MiniProg4 CMSIS-DAP BULK-1D1016CB00086400 🗸		-		
	Custom				
Open Device	CY8C624ABZI-S2D44	onnect Erase	Program	Read	Verify
Settings					×
Program Settings					
File	C:/hex/psoc6/CY8CPROTO-062-4343W/HelloWorld/mtb-examp	ple-psoc6-hello-	world.hex		
Reset Chip		the procession			
> Verify Regions					
External Memory					
Program Security Da	ta				
Probe Settings					^
Interface	JTAG				$\sim$
✓ JTAG Chain	¢.				
[0] CY8C6245AZ	C2D72				
[1] CY8C637BZI-					
[2] CY8C6245AZ					
[3] CY8C637BZI-					
[4] CY8C624ABZ					
[5] CY8C637BZI-					
Clock (KHz)	2000				$\sim$
Voltage (V)	3.3				$\sim$
Reset Type	Soft				$\sim$
					v
Log	/#####################################				
	######################################				^
	<pre>pytes from file C:/hex/psoc6/CY8CPROTO-062-4343W/HelloWorl</pre>	ld/mtb-example	e-psoc6-h	ello-	
world.hex in 4.6286	/4s (11.018 KiB/s)				
Info : ** Programmi					
Info : cyp status:	JK				
<pre>Info : cyp_get_mpn Info : ** Detected</pre>	device PN: CY8C624ABZI-S2D44 SiliconID: E453 Revision: 12	FamilvID: 10	2 DIE: PS	DC6A2M	
Info : reset run	STITCHE CONTRACT SERVICE STITCHED, CASS REVISION, IL		- 512. 15	- Joneli	~
Device programmed su	Pow	vered: 3308 mV	Cor	nnected	
bevice programmed su	POW	cica. 5506 mv	COL	mecteu	



## 5.7 Verify Device

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the Load Programming File section.
- 3. Connect to the device (see <u>Connect Device</u>).
- 4. Click the **Verify** button.

ModusToolbox<sup>™</sup> Programmer performs the Verify device operation and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was verified successfully or that an error occurred.

Mod	lusToolb	oox™ Pro	gramme	r				-		×			
File Vi	iew C	ptions	Help										
g	Board		KitProg	CMSIS-DAP BULK-201208B203068400									
			CY8CKI1	Y8CKIT-062-BLE		8		្ត្		2			
Open		Device	CY8C63	47BZI-BLD53	Powe	r Disconnect	Erase	Program	Read V	erify			
Settings										×			
Program	n Setting	ns											
File	r betan	90		C:/CY8CKIT-062-BLE/BlinkyLED_mainapp_fi	nal hex								
	t Chip												
> Verif		ns											
Exter	rnal Me	mory											
Prog	jram Se	curity Da	ta										
Probe Se	ettings												
Inter	rface			SWD									
Cloc	k (KHz)			2000 ~									
Volta	age (V)			3.3 ~									
Rese	et Type			Soft ~									
Sflas	sh Restri	ictions		Erase/Program Sflash prohibited									
Log													
Info : Info : Info : Info : Info : Info : Info : Info : Info :	** Pro flash ** Pro flash ** Ve verif: cyp s' ** Ve cyp_g ** De	obing b 'psoc6 obing b 'psoc6 rifying ied 451 tatus: rified et_mpn tected	ank 2 * ' found ank 3 * _efuse' image 44 byte 0K 0K ** device	at 0x16000000		ion: 23 Fami	LyID: 10		SoC6ABLE2	*			
Device	verified	successf	ully			Powered	: 3324 m	IV C	Connected				



# 5.8 Verify Device with External Memory

- 1. Connect the device that supports external memory (for example, CY8CKIT-062-WiFi-BT with QSPI support) to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the <u>Load Programming File</u> section. The programming file should have external memory region(s).
- 3. Select the External Memory option under Program Settings.

Mod	ModusToolbox™ Programmer     —     □     ×										
File Vi	iew Options	Help									
4	Programmer	KitProg3	CMSIS-DAP BULK-201208B203068400	~				~ <b>`</b>			
	Board	CY8CKIT	-062-BLE	$\sim$	U Power	Connect	ð		🕑 Read		
Open	Device	CY8C63	/8C6347BZI-BLD53			connect	Erase	Program	Nedu	Verify	
Settings	Settings ×										
Program	Program Settings										
File			C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD5	53_sm	if_SFDP.he	ex					
Rese	t Chip										
Verif	y Regions										
Exter	rnal Memory										
Prog	ram Security Da	ata									
Probe Se	ettings										
Inter	face		SWD								
Clock (KHz)			2000							~	
Volta	Voltage (V)		3.3							~	
Reset Type			Soft ~								
Sflas	h Restrictions		Erase/Program Sflash prohibited							~	

- 4. Connect to the device (see <u>Connect Device</u>).
- 5. Click the **Verify** button.



ModusToolbox<sup>™</sup> Programmer verifies the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was verified successfully or that an error occurred.

	/lodusT	oolbox™ Pro	gramme	r					-	-		×
File	View	Options	Help									
2	P	rogrammer	KitProg	3 CMSIS-DAP BULK-201208B203068400	$\sim$				-			٦
		Board	CY8CKI	Г-062-BLE	$\sim$	O	<b>S</b>	S 🔊		<b>9</b>		
Ор	en	Device	CY8C63	47BZI-BLD53		Power	Disconnect	Erase	Program	Read	Verify	
Settir	ngs							1				×
Prog	ram Se	ttings										
-	ile	-		C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD	53_sm	if_SFDP.he	x					
F	Reset Cl	hip										
> \	/erify R	egions										
E	xternal	Memory										
P	rogran	n Security Da	ita									
Prob	e Setti	ngs										
h	nterfac	е		SWD								
0	Clock (K	(Hz)		2000 ~								
V	/oltage	(V)		3.3 ~								
R	Reset Ty	pe		Soft								$\sim$
S	flash R	estrictions		Erase/Program USER/TOC/KEY allowed								$\sim$
Log												
				10 0A1000000								^
		Probing b		* found at 0x90700000								
		Probing b										
				found at 0x18000000								
Info	o:**	Verifying	image	C:/CY8CKIT-062-BLE/CY8C6347BZI-B	LD53_	smif_SFDF	hex offse	et:0 **				
	Info : verified 62552 bytes in 0.486981s (125.438 KiB/s)											
	Info : cyp status: OK Info : ** Verified OK **											
		p get mpn	UK									
	-		device	PN: CY8C6347BZI-BLD53 SiliconID:	E207	Revisior	n: 23 Famil	LyID: 10	Ø DIE: P	SoC6ABI	LE2	~
Devi	ice veri	fied successf	ully				Powere	d: 3317 r	mV	Conne	cted	



# 5.9 Verify Custom Flash Regions

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the Load Programming File section.
- 3. Connect to the device (see <u>Connect Device</u>).
- 4. Expand **Verify Regions** option in **Program Settings** to see the list of flash regions available for verification. By default, only supported by target device regions are displayed:
  - application
  - AUXflash
  - Sflash
  - eFuse
  - QSPI

Settings		×
Program Settings		
File	C:/CY8CKIT-062-BL	E/CY8C6347BZI-BLD53_smif_SFDP.hex
Reset Chip		
<ul> <li>Verify Regions</li> </ul>		
From	То	
0x10000000	0x100fffff	
0x14000000	0x14007fff	
0x16000000	0x16007fff	
0x90700000	0x907003ff	
0x18000000	0x18080000	
External Memory	$\checkmark$	
Program Security Data		

5. Right-click on **Verify Regions**, or any region entry, to open the context menu.

Set	ttings				×
Pr	ogram Settings				
	File C:/CY8CKIT-062-		C:/CY8CKIT-062-B	LE/CY8C6347BZI-BLD53_smif_SFDP.hex	
	Reset Chip				
~	Verify Regions	Add Reg	gion		
	From	Poload Pogio			
	0x1000000	Undo	Ctrl+Z		
	0x1400000	Redo	Ctrl+Y		
	0x1600000	Verify			
	0x9070000	0	0x907003ff		
	0x1800000	0	0x18080000		
	External Memor	У			
	Program Securit	ty Data			

6. To add a custom flash region, select **Add Region**. Select the added list entry, and enter the correct values for start and end addresses of the region.

Settings		×
Program Settings		
File	C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD53_smif_SFDP.hex	
Reset Chip	$\checkmark$	
✓ Verify Regions		
From	То	
0x1000000	0x100fffff	
0x14000000	0x14007fff	
0x16000000	0x16007fff	
0x90700000	0x907003ff	
0x10001000	3 0x10100000	
External Memory		
Program Security Data		



7. To remove any region in the list, right-click the desired region entry and select **Remove Region**.

Settings			×				
Program Settings							
File	C:/CY8CKIT-062-B	C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD53_smif_SFDP.hex					
Reset Chip	$\checkmark$						
<ul> <li>Verify Regions</li> </ul>							
From	То						
0x10000000	0x100fffff						
0x14000000	0+14007fff						
0x16000000	Add Region		h				
0x90700000	Remove Regi		U				
0x10001000	Undo	Ctrl+Z					
External Memory	Redo	Ctrl+Y					
Program Security Data	Verify						
Probe Settings	Redo	Ctrl+Y					
Interface	Cut	Ctrl+X					
Clock (KHz)	Сору	Ctrl+C	~ · · · ·				
Voltage (V)	Paste	Ctrl+V	~ ·				
Reset Type	Delete		~				
Sflash Restrictions	Select All	Ctrl+A	~				
100			1				

- 8. To revert any previous change, select **Undo**.
- 9. When finished with the list of regions, start device verification by clicking the **Verify** button on the toolbar.

Mod	ModusToolbox™ Programmer – □									$\times$
File V	iew Options	Help								
	Programmer	KitProg	3 CMSIS-DAP BULK-201208B203068400	-	-					
	Board	CY8CKI	T-062-BLE	$\sim$	U	<b>N</b>	Erase	<b>O</b> Program	🙆 Read	<b>V</b> anifi
Open	Device	CY8C63	47BZI-BLD53	~	Power	Disconnect	L LIASE			Verify
Settings										×
Program	n Settings									
File			C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD53_smif_SFDP.hex							
Rese	et Chip		$\checkmark$							
<ul> <li>Verify Regions</li> </ul>										
From			То							
0x10000000			0x100fffff							
0x14000000			0x14007fff							
	×1600000		0x16007fff							

You can also select **Verify** on the context menu.

Settings		×
Program Settings		
File	C:/CY8CKIT-062-BLE/CY8C6347BZI-BLD53_smif_SFDP.hex	
Reset Chip	Add Region	
<ul> <li>Verify Regions</li> </ul>	Reload Regions	
From	Tc Undo Ctrl+Z	
0x10000000	0x Redo Ctrl+Y	
0x14000000	0x Verify	
0x16000000	03	
0x90700000	0x907003ff	

ModusToolbox<sup>™</sup> Programmer verifies only the regions specified in the **Verify Regions** list. Then, a message in the Status Bar indicates that the device was verified successfully or that an error occurred.



10. To reset the **Verify Regions** list to its default state select **Reload Regions** from the context menu. This action will remove all custom regions and load default regions corresponding to the flash map.

Settings			>
Program Settings			
File		Y8CKIT-062-BLE,	/CY8C6347BZI-BLD53_smif_SFDP.hex
Reset Chip	Add Regio	n	
<ul> <li>Verify Regions</li> </ul>	Reload Red		
From	Undo	Ctrl+Z	
0x10000000	Redo	Ctrl+Y	
0x14000000	Verify	Cutti	
0x16000000	verity		
0x90700000	0x9	07003ff	
Eutomal Manany			

# 5.10 Read Device

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Connect to the device (see <u>Connect Device</u>).
- 3. Click the **Read** button.

Mod	usToolbox™ Pro	ogrammer					_		$\times$
File Vi	ew Options	Verify Regions Help							
P	Programmer	KitProg3 CMSIS-DAP BULK-201208B203068400	$\sim$			-	-		
	Board	CY8CKIT-062-BLE	$\sim$	Power	0 Disconnect		Program	2 Dead	Vorifi
Open	Device	CY8C6347BZI-BLD53	~	Power	Disconnect	Eldse	Program	Read	verny
Settings									×

4. On the **Read Device to File** dialog, navigate to the location of the HEX or SREC file to be saved, enter the file name, select the file type in the **Save as type** drop-down, and click **Save**.

Read Device to File			×
← → ∽ ↑ 📕 <	CY8CKIT-062-BLE > read	✓ ♥ Search read	م
Organize 👻 New f	folder		
<ul> <li>Documents</li> <li>Downloads</li> <li>Music</li> <li>Pictures</li> <li>Videos</li> <li>Windows (C:)</li> </ul>	Name N	Date modified o items match your search.	Туре
	~ <		>
	read_kp3_dev rogramming File (*.hex)		~
∧ Hide Folders		Save	Cancel

Note:

Under Ubuntu Linux, specify the full file name with an extension (e.g. kp3-dev.srec); otherwise, the file will be saved in HEX format.



ModusToolbox<sup>™</sup> Programmer performs the Read device operation and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was read successfully or that an error occurred.

Mo	dusToolbox™ Pro	ogrammer	r						_		×
File \	/iew Options	Help									
B	Programmer	KitProg3	CMSIS-DAP BU	LK-201208B20306840	0 ~				-		
		CY8CKIT	-062-BLE		$\sim$	Power	Disconnect		<b>Q</b>	<b>e</b>	Varifi
Open		CY8C634	47BZI-BLD53		$\sim$	Power	Disconnect	Erase	Program	Read	Verify
: Settings	5										×
Progra	m Settings										
File	-		C:/CY8CKIT-062	-BLE/CY8C6347BZI-BL	.D53_sm	if_SFDP.he	ex				
Res	et Chip										
> Ver	ify Regions										
Exte	ernal Memory										
Pro	gram Security Da	ata									
Probe S	Settings										
Inte	erface		SWD								
Clo	ck (KHz)		2000								$\sim$
Volt	tage (V)		3.3								$\sim$
Res	et Type		Soft								$\sim$
Sfla	sh Restrictions		Erase/Program	USER/TOC/KEY allowe	ed						$\sim$
Log											
	. TANGET. PSOC		adda 0x180000	00 size 0x0400000		0-46220	POE ocizo (		-0011		^
	: set SMIF_DAM : region 1 add				o psize	0X40259	OUE ESIZE 6	XC6Z9A	200}}		
				, size: 0x0400000	)						
				sers/ShevchukOlek,		a/Local/	Temp/dump_8	40265	3184.bin '	**	
			es in 519.138	550s (126.240 KiB,	(s)						
	: cyp status: : Converting r		arv files to (	C:/CY8CKIT-062-BLE	/read/	read kn3	dev.hex				
	: ** Read devi				.,	. 100_np5					
Info :	Info : cyp_get_mpn										
Info	: ** Detected	device H	PN: CY8C6347B	ZI-BLD53 SiliconI	D: E207	Revisio	n: 23 Famil	yID: 10	00 DIE: P	SoC6ABL	.E2 🗸
Device	read successfull	y to C:/CY	8CKIT-062-BLE/r	ead/read_kp3_dev.he	x		Powered: 3	316 mV	Cor	nnected	

*Note: Read Device feature is not available for the boards based on WICED-Bluetooth hardware programmers.* 

# 5.11 Program eFuse Region of PSOC<sup>™</sup> 6/TRAVEO<sup>™</sup> T2G/XMC7xxx/XMC5xxx MCU

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the <u>Load Programming File</u> section. The programming file should contain valid eFuse data region (at address 0x90700000).
- 3. Select the **Program Security Data** check box under Program Settings.

M	odusToolbox™ Pro	ogramme	r				_		×
File	View Options	Help							
Ope	Board	Custom	g4 CMSIS-DAP BULK-0711062303210400 ~ ~ 47BZI-BLD53 ~	Pow	Connect	<b>D</b> Erase	Program	<b>e</b> ad	Verify
Setting	gs								×
Fi Re Ve	am Settings le erset Chip erify Regions cternal Memory		C:/hex/efuse/efuses.hex						
	ogram Security Da	ata							

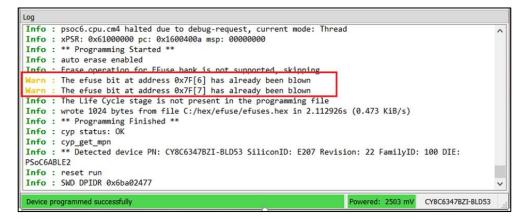


- 4. Connect to the device (see <u>Connect Device</u>).
- 5. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

	lusToolbox™ Pri iew Options	-	-		×
Open	Programmer Board	MiniProg4 CMSIS-DAP BULK-11170B2303210400         CY8CPROTO-062S3-4343W         CY8C6245LQI-S3D72			
Settings					×
File Rese > Verif Exte	n Settings tt Chip y Regions rnal Memory jram Security Da	C:/!SS/!WW2413/PSoC6_512k/efuse_secure.hex			
Probe S	ettings				_
Inter	face	SWD			$\sim$
Cloc	k (KHz)	2000			$\sim$
Volta	age (V)	2.5			$\sim$
Rese	t Type	Soft			$\sim$
Sflas	h Restrictions	Erase/Program entire Sflash allowed			$\sim$
Info Info Marn Info Info Info	: Padding 34 : Padding im : Erase oper : The target : wrote 1024				~
Device	programmed su	iccessfully Powered: 2502 mV	Con	nected	

If some eFuse bits have been already programmed before, a warning message "The efuse bit at address xx has been already blown" appears in **Log**.





# 5.12 Program PSOC<sup>™</sup> 4 MCU With Protected Flash

Flash protection allows you to protect any PSOC<sup>™</sup> 4 flash rows from being written. Applying protection to the user data with ModusToolbox<sup>™</sup> Programmer is nothing more than programming a data file containing appropriate flash protection region (at the address 0x90400000).

Programming data into protected flash region disabled.

_	usToolbox™ Pro	-	r					-	_		×
File Vi	iew Options	Help									
a	Programmer	KitProg	3 CMSIS-DAP BULK-0D1D07B303105400 ${\scriptstyle\!$					-	•		
Open	Board	CY8CKI	T-041-41XX ~	Powe	r Dir	sconnect	<b>C</b> Erase	Program	알 Read	Verify	
Open	Device	CY8C41	46AZI-S433 ~	FOWE	i Di	sconnect	LIASE	Flogram	Neau	verity	
Settings											×
Program	n Settings										
File	2		C:/hex/psoc4/042 not flprotected.hex								
Rese	t Chip										
> Verif	y Regions		_								
Probe Se	ettings										
Inter	face		SWD								
Cloc	k (KHz)		2000								$\sim$
Rese	et Type		Soft								$\sim$
Log											
Info :	** Device ac	quired	successfully								~
Info :	** Programmi	ng Star	ted **								
	auto erase e										
	Only mass er [ 10%] [###	ase ava	ilable, erase skipped! (psoc4 mass_ [ Programmin]								
	[ 10%] [### [ 13%] [####	ł	] [ Programmin ] [ Programmin		•• F1	ash algo	rithm r	enorted +	Failure	- "Ro	
			vided is a protected row"	5 ]1110		abii argo		cpor ccu	urranc		
Error:	error writin	g to fl	ash at address 0x00000000 at offset	0×0000	9000						
Error:	cyp status:	ERROR									
	Program devi										
			lodusToolboxProgtools-1.1/mtb-progra	nmer/./s	scrip	ots/cyp_b	ase_def	ault.tcl	38: Er	ror: *	*
-	nming Failed in procedure		an davd as t								
			am_device n/Tools/ModusToolboxProgtools-1.1/m	th-prog	ammo	er/./scri	nts/cvr	hase de	Fault +	c1".	
line 38		2.11 21160	,	co progr	annie		P - 37 - 9F	_susc_de		,	
Info :	cyp_get_mpn										~
Error: Pr	rogram device fa	ailed				Powere	d: 3367	mV	Conne	cted	

Use the **Erase** button to un-protect user flash rows from writing.



# 5.13 Program Chip-Protected PSOC<sup>™</sup> 4 MCU

The chip-level protection mechanism restricts access of the programmer application to silicon resources. In this mode, access to flash, SRAM, and most of the registers in the PSOC<sup>™</sup> 4 are disabled. Chip protection can be activated by programming a HEX file with a special protection region at address 0x90600000.

If you try to connect ModusToolbox<sup>™</sup> Programmer to a chip-protected PSOC<sup>™</sup> 4/PMG1/WLC1 device, a warning message indicates that device is in protected mode. The only available operation is **Erase** device in this case.

Mod	lusToolbox™ Pro	grammer		_	
File Vi	iew Options	Help			
- 7	Programmer	KitProg3 CMSIS-DAP BULK-0D1D07B303105400			
Open	Board	CY8CKIT-041-41XX V Disconn	ect Erase Pr	rogram Rea	ad Verify
open	Device	CY8C4146AZI-S433	Liuse I	ogram ne	id veniy
Settings					×
Program	n Settings				
File		C:/hex/psoc4/4100S/CE216873 ADC with Breathing LED_lock.he	x		
Rese	et Chip	$\checkmark$			
Verif	y Regions				
Probe Se	ettings				
Inter	rface	SWD			
Cloc	k (KHz)	2000			
Rese	et Type	Soft			$\sim$
Log					
	gdb port dis				^
	accepting 't Open On-Chip	elnet' connection on tcp/4445			
	init_target	Depugger			
		p_examine of psoc4.cpu			
		ine command to examine it manually!			
		quiring the device (mode: reset)			
	cyp status:	acquire PSoC 4 device in Test Mode			
	*******	*******************			
Warn :	* PSoC 4 dev	ice is in PROTECTED mode.			
		e Device to clear protection. All data will be lost!			
	reset run	***************************************			
		p examine of psoc4.cpu			
	-	ine command to examine it manually!			~
Device p	programmed su	ccessfully Powe	red: 3373 mV	CY8C4146	AZI-S433

Use the **Erase** button to clear chip protection and move target to the open state.



# 5.14 Program Secure AIROC<sup>™</sup> CYW20829 MCU

You can program the flash of an AIROC<sup>™</sup> CYW20829 device in Secure lifecycle mode only by providing a valid debug certificate file.

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the <u>Load Programming File</u> section.
- 3. Click on the **Debug Certificate** option under **Program Settings** and select the certificate file in the dialog.

#### The path will display under Settings.

Mod	usToolbox™ Pro	ogramme	r				_		×
File Vi	iew Options	Help							
Open	Programmer Board Device	CYW920	CMSIS-DAP BULK-0D1D07B303105400            I829M2EVB-01            I29A0LKML	<b>O</b> Power	Connect	<b>D</b> Erase	Program	<b>e</b> ad	Verify
Settings									×
Program	n Settings								
File			C:/hex/CYW20829A0LKML/CYW20829A0LKML	_secure_	no_cm33_app	o.hex			
	t Chip y Regions								
Flash	nloader		Default						~
Debu	ug Certificate		C:/hex/CYW20829A0LKML/debug_cert_oem.b	in					~
Probe Se	ettings								
Inter	face		SWD						- 1
Cloc	k (KHz)		2000						$\sim$
Rese	t Type		Soft						$\sim$

- 4. Connect to the device (see <u>Connect Device</u>).
- 5. Click the **Program** button.

## 5.15 Program QSPI memory with patched flashloader

This feature is supported by AIROC<sup>™</sup> CYW20829 devices, as well as XMC7100/7200 and CYT4Bx MCUs. It allows you to specify the patched flashloader file in FLM format along with the appropriate QSPI configuration. Patched flashloaders contain data about how your external memory is configured.

- 1. Connect the device to the host computer and select it in the **Programmer, Board, and Device** drop-downs.
- 2. Select the programming file as described in the <u>Load Programming File</u> section.
- 3. Select the External Memory option under Program Settings (if supported).
- 4. Click on the Flashloader option under **Program Settings** and select the patched flashloader (FLM) file in the dialog.



The path will display under **Settings**.

Modu	usToolbox™ Pro	grammer				-		×
<u>F</u> ile <u>V</u> i	ew <u>O</u> ptions	Help						
Open	Programmer Board Device	KitProg3 CMSIS-DAP BULK-0D1D07B303105400            CYW920829M2EVB-01            CYW20829A0LKML	(U) Power	<b>O</b> Connect	<b>D</b> Erase	Program	Constant Read	Verify
Settings								×
Program	Settings							
File		C:/hex/CYW20829A0LKML/CYW20829A0LK	AL_secure_	_no_cm33_ap	p.hex			
Reset	t Chip	$\checkmark$						
Vorify	y Regions				1			
Flash	lloader	C:/hex/CYW20829A0LKML/FLM/CYW208xx	SMIF.FLM					~
Debu	ug Certificate	None						~
Probe Se	ettings							
Inter	face	SWD						1
Clock	k (KHz)	2000						~
Reset	t Type	Soft						~

- 5. Connect to the device (see <u>Connect Device</u>).
- 6. Click the **Program** button.
- Note:

To be able to program custom QSPI memory, you should also provide the appropriate QSPI configuration file (qspi\_config.cfg) generated by the ModusToolbox<sup>™</sup> QSPI Configurator tool. This file should be placed in the same directory as the patched flashloader file; it is located and read by ModusToolbox<sup>™</sup> Programmer automatically.

*Refer to the <u>QSPI Configurator user guide</u> for more information about patching flashloaders.* 

## 5.16 Program AIROC<sup>™</sup> CYW955513EVK-01 and CYW9M2BASE-43012BT boards

- 1. Connect the device to the host computer and perform recover device procedure as described in <u>section 6.2</u>.
- 2. Click the **Programmer** pull-down and select 'WICED Bluetooth-PortXX' programmer.

Mod	usToolbox™ Pro	grammer				-
<u>F</u> ile <u>V</u> i	ew <u>O</u> ptions	<u>H</u> elp				
	Programmer				-	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Open	Board	None KitProg3 CMSIS-DAP BULK-14060A5102122400	Power	Connect	<b>Erase</b>	Program
	Device	WICED Bluetooth-COM29				_

Note:

The CYW9M2BASE-43012BT board should be switched to Dual UART mode first, otherwise the WICED Bluetooth programmer will be unavailable in the **Board** pull-down menu. To do this, press the hardware 'Mode' button on the Kit, hold it for 3 seconds, then release it.

# ModusToolbox<sup>™</sup> Programmer GUI user guide



#### **Programming Operations**

- 3. Open the **Board** pull-down and select the appropriate board name (e.g. CYW955513EVK-01)
- 4. Select the programming file as described in the Load Programming File section.
- 5. Connect to the device (see <u>Connect Device</u>).
- 6. Click the **Program** button.

ModusToolbox<sup>™</sup> Programmer programs the device and displays various messages in the **Log**. Then, a message in the Status Bar indicates that the device was programmed successfully or that an error occurred.

							$\times$				
File V	Board	WICED Blu CYW95551			~	<b>O</b> Power	8 Disconnect	<b>D</b> Erase	<b>O</b> Program	Read	<b>Verify</b>
Settings		CYW55513	BIUBG		~						×
File	Program Settings										
Inter	Probe Settings Interface UART Reset Type None										
Info : Info : Info : Info :	COM29 Device detec HCI port : C	KNOWNTYPE HCI cted SUCCE COM29	UNKNOWNID UNKNOWNID	115200							^
Info : Info : ModusTo bt/Hato Info : Info : Info :	oolboxProgtoo chet1/mtb-exa Done cyp status: ** Programmi	FW e -BLUETOO ols-1.1/mtl ample-threa OK ing Finish	b-programmer/B adx-empty-app_	M29 -BAUDRATE T/CYW955513EVK_ download.hex" -	_01/CYI	W9555x.	btp" -NOERAS			ex/wice	ed-
Info : cyp_get_mpn         Info : reset run         Device programmed successfully         Connected							~				



### Troubleshooting

# 6 Troubleshooting

### 6.1 Limitations

- ModusToolbox<sup>™</sup> Programmer does not support RAM programming, you can program only the flash memory of a target device, except for devices that support only RAM such as CYW9M2BASE-43012BT and CYW955513EVK-01 kits.
- Programming devices in DAPLink mode is not supported. You have to switch your device into CMSIS-DAP BULK mode by pressing the mode selection button.

# 6.2 How to Recover AIROC<sup>™</sup> Bluetooth<sup>®</sup> Devices on Failure

If the program operation for an AIROC<sup>™</sup> Bluetooth<sup>®</sup> device fails, it is possible the memory on the board has been corrupted by a previously loaded application, or the application used a custom baud rate that the download process does not detect.

To recover from this, it may be necessary to reset the board to factory defaults, as follows:

- 1. Press and hold the **Recovery** button (SW1).
- 2. Press the **Reset** button (SW2).
- 3. Release the **Reset** button (SW2).
- 4. Release the **Recovery** button (SW1).



#### Troubleshooting

# 6.3 Incorrect PSOC 6 device names (MPN) in JTAG chain

Some PSOC<sup>™</sup> 6 target devices may be displayed with incorrect part numbers in the JTAG chain. This issue shows only those PSOC<sup>™</sup> 6 targets having incorrect value written to JTAG IDCode register.

Moo	■ ModusToolbox <sup>™</sup> Programmer – □ ×												
File V	View Op	ptions	Help										
Open		Board	Custom	-	BULK-1D1016CB00	0086400 ~ ~ ~	<b>O</b> Power	8 Disconnect	<b>D</b> Erase	<b>o</b> Program	🙆 Read	<b>S</b> Verify	
: Settings	5								1				×
Program File Res	m Setting	15		C:/hex/wiced-	bt/Hatchet1/mtb-e	xample-threa	dx-empty-a	app_downloa	ad.hex			(	
Pro	gram Sec Settings	-	ta				ectly de in JTAC						^
	erface			JTAG	_	-						~	/
Clos	AG Chain [0] CY8C6 ck (KHz) tage (V) tet Type	537BZI-I	C MD76	2000 3.3 Soft			Real phy arget de						
Log						1							
Info : Info : Info : Info : Info : Info : Info :	Info : JTAG tap: psoc6.bs tap/device found: 0x2e200060 (mfg: 0x034 (Cypress), part: 0xe200, ver: 0x2) Info : [psoc6.cpu.cm0] Cortex-M0+ r0p1 processor detected Info : [psoc6.cpu.cm0] target has 4 breakpoints, / watchpoints Info : ***********************************												
Selecte	ed device	does no	ot match	the physical ta	rget device			Powered	l: 3304 m\	CY8	C6247BZ	ZI-D54	

You can ignore this inconsistency in device names if you see the warning "Selected device does not match the physical target device" after clicking **Connect** button.



**Upgrading firmware** 

# 7 Upgrading firmware

The ModusToolbox<sup>™</sup> Programmer application allows you to upgrade KitProg2, KitProg3, and MiniProg4 device firmware.

# 7.1 Upgrade KitProg2 firmware

The following upgrade process is based on the CY8CKIT-062-WIFI-BT hardware.

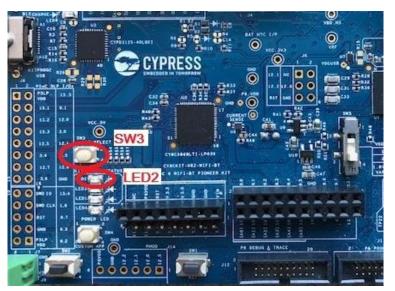
- 1. Run the ModusToolbox<sup>™</sup> Programmer application.
- 2. Go to **Options > Programmer Options** and select the Show Pop-Up value for the **Upgrade Firmware** option.

olbox™ Programmer X						
Value						
Show Pop-Up $\sim$						
4445						
OK Cancel						

- 3. Click **OK** to apply the changes.
- 4. Connect the device with the KitProg2 firmware to the host PC. Ensure that the KitProg2 device is in Native KP2 mode.

_	lusToolbox™ Pro iew Options	-					_		×
Copen	Programmer Board Device	KitProg2-2012088203068400	<ul><li>✓</li><li>✓</li><li>✓</li></ul>	<b>O</b> Power	Connect	<b>D</b> Erase	<b>O</b> Program	Contraction Read	>>

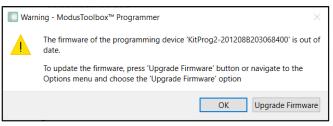
5. If **LED2** is off, press the **SW3** (Mode Select) button and hold it for about 1 second. When **LED2** is on, the device is ready for upgrading the firmware.





#### **Upgrading firmware**

A warning dialog displays with the "Firmware is Out of Date" message.



6. Click the **Upgrade Firmware** button to start the upgrade process.

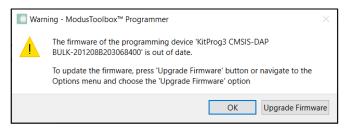
After the upgrade process completes, the message "Firmware of 'KitProg2-xx' upgraded successfully" displays in the **Log** view. The KitProg2-xx programmer disappears from the **Programmer** drop-down. The **Board** drop-down is populated with the names of the supported KitProg3 Kits.

ModusToolbox™ Programmer						
File Vi	ew Options	Help				
<b>a</b>	Programmer	KitProg3 CMSIS-DAP BULK-201208B203068400 ~	Ø			
Onon	Board	CY8CKIT-062-BLE	Dowe			
Open	Device	Custom ^	Powe			
	Derice	Scanned Boards				
Settings		CY8CKIT-062-BLE				
Settings		CY8CKIT-062-WiFi-BT	-			
Program Settings		CYW943012P6EVB-01				
File		Others				
Reset Chip		CY7110				
Verify	y Regions	CY7111				

# 7.2 Upgrade KitProg3 on kit or MiniProg4 firmware

Follow this process to upgrade KitProg3 on a kit or MiniProg4 firmware:

- 1. Run the ModusToolbox<sup>™</sup> Programmer application.
- 2. As needed, go to **Options > Programmer Options** and select the Show Pop-Up value for the **Upgrade Firmware** option.
- 3. Connect the KitProg3/MiniProg4 device to the host PC. A warning dialog with the "Firmware is Out of Date" message displays.



4. Click the **Upgrade Firmware** button to start the upgrade process.

After the upgrade process completes, the message "Firmware of 'KitProg3-xx' upgraded successfully" or "Firmware of 'MiniProg4 xx' upgraded successfully" displays in the **Log** view.

# **Revision history**

# **Revision history**

Version	Date	Description
**	2023-07-18	New document.
		Updates for Production milestone:
* ^	2010 10 20	Various screen captures
*A	2018-10-30	Description of the Platforms pull-down menu
		Description of the Clock option in Probe Settings
		Updated to version 2.1.
*5	0010 07 10	Added Verify Regions menu.
*В	2019-07-19	Added JTAG Chain instructions.
		Added Verify Custom Flash Regions section.
		List of changes:
		User Guide clean-up in whole document
**		Updated section "Features"
*C	2019-10-11	Updated section "Limitations"
		Updated section "Settings"
		<ul> <li>Added section "How to Recover AIROC<sup>™</sup> Bluetooth<sup>®</sup> Devices on Failure"</li> </ul>
		List of changes:
		• Updated to version 3.0
* D	2020-05-04	Updated screenshots across the document
*D		<ul> <li>Made modifications with new features of CYP 3.0</li> </ul>
		<ul> <li>Added section "Program eFuse Region of PSoC<sup>™</sup> 6 MCU"</li> </ul>
		Corrected mistakes.
		List of changes:
		• Updated to version 4.0.
		Updated all sections with new screenshots
*Е	2021-03-18	<ul> <li>Updated sections "Getting Started", "Settings", "Program PSoC™ 6 MCU in JTAG Chain"</li> </ul>
		<ul> <li>Added section "Program Chip Protected PSoC<sup>™</sup> 4 MCU"</li> </ul>
		Corrected mistakes
-		List of changes:
+	0000 00 45	Updated to version 4.0.1
*F	2022-03-15	Updated section "Introduction"
		Updated section "Installing CYP"
		List of changes:
*G	2022 10 29	Updated to version 4.1.0
G	2022-10-28	Minor updates across the document
		List of changes:
		Updated to version 4.2.0
*Н	2023-02-14	Updated section 4.2.4.1
	2023 02-17	Added sections 5.14 and 5.15
		Minor updates across the document





# **Revision history**

Version	Date	Description		
*1	2023-09-12	<ul> <li>List of changes:</li> <li>Updated to version 5.0.0</li> <li>Changed title of the tool and user guide to ModusToolbox<sup>™</sup> Programmer.</li> <li>Tool is now part of Programming tools package; installation instructions now included in the release notes.</li> </ul>		
*J	2024-04-29	<ul> <li>List of changes:</li> <li>Updated to version 5.1.0</li> <li>Added section 3.2 - Select device</li> <li>Updated most screen-shots across document due to updates in toolbar's design (Program, Board and Device drop-downs)</li> <li>Updated section 4.2.1</li> <li>Updated section 5.6, 5.12</li> <li>Added section 5.16, 6.3</li> </ul>		
*К	2024-06-03	List of changes: • Updated to version 5.2.0 • Updated devices in section "Overview"		
*L	2024-08-16	Updated to version 5.2.x for back-end changes.		
*M	2024-10-04	Updated PSoC <sup>™</sup> product category trademark to PSOC <sup>™</sup>		

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