



EZ-USB SX3 Configuration Utility User Guide

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Contents

EZ-USB SX3 Configuration Utility User Guide.....	1
Contents.....	3
1. Introduction.....	5
System Requirement and Pre-requisites	5
Getting Started... ..	5
Technical Support.....	5
Abbreviations	6
2. EZ-USB SX3 Configuration Utility	7
EZ-USB SX3 Configuration Utility GUI.....	7
Configuring EZ-USB SX3.....	7
Device selection.....	8
Error Messages.....	10
Device Settings	11
Configuring USB Settings.....	11
Configuring GPIOs Settings.....	12
Debug Endpoints.....	12
Auxiliary Interface.....	12
Endpoint Settings.....	13
Video-Audio Source Config (For SX3 UVC only).....	13
Configuration Download	14
HDMI Source Configuration Table (For HDMI RX – Generic only)	14
Working with UVC Configurations (For SX3 UVC only)	15
Endpoint Settings.....	15
Format and Resolution.....	15
Camera Controls (enable/disable & Values).....	18
Processing Unit Controls (Enable/Disable & Values).....	19
Extension Unit Controls.....	20
Working with UAC Configurations (For SX3 UVC only)	20
Endpoint Settings.....	20
Configuring UAC Settings.....	21

Contents

Working with FIFO Master Configs.....	22
FIFO Master Configuration Download.....	22
Working with Slave FIFO Settings (For SX3 Data only)	23
Program Configuration.....	23
Revision History.....	25
Document Revision History.....	25

1.INTRODUCTION

Thank you for your interest in the EZ-USB SX3 Configuration Utility.

1.1 System Requirement and Pre-requisites

Windows OS: Windows 7 and above

Linux: Ubuntu 10

macOS: Cocoa

The SX3 Configuration Utility will work of earlier versions of Linux and macOS provided if Java 1.8 JDK installed and supported in the respective OS versions.

Pre-requisites:

We need to install Java 1.8 JDK before installing the Utility...

Download the Java 1.8 JDK for all the OS (Windows, Linux and MacOS) from the following Link:

<https://www.oracle.com/in/java/technologies/javase/javase-jdk8-downloads.html>

Installation guide for the 1.8 JDK (All Operating Systems):

https://docs.oracle.com/javase/8/docs/technotes/guides/install/install_overview.html

1.2 Getting Started

This user guide describes the features of the EZ-USB SX3 Configuration Utility and how to use it. The [EZ-USB SX3 Configuration Utility](#) section explains how to use the tool.

1.3 Additional Learning Resources

Go the following link for the additional information about the SuperSpeed Explorer Kit User Guide

<https://www.cypress.com/file/133836/download>

1.4 Technical Support

For assistance, go to www.cypress.com/go/support or contact our live customer support at +1 (800) 858-1810 (in the U.S.) or +1 (408) 943-2600 (international) and follow the voice prompt.

Abbreviations

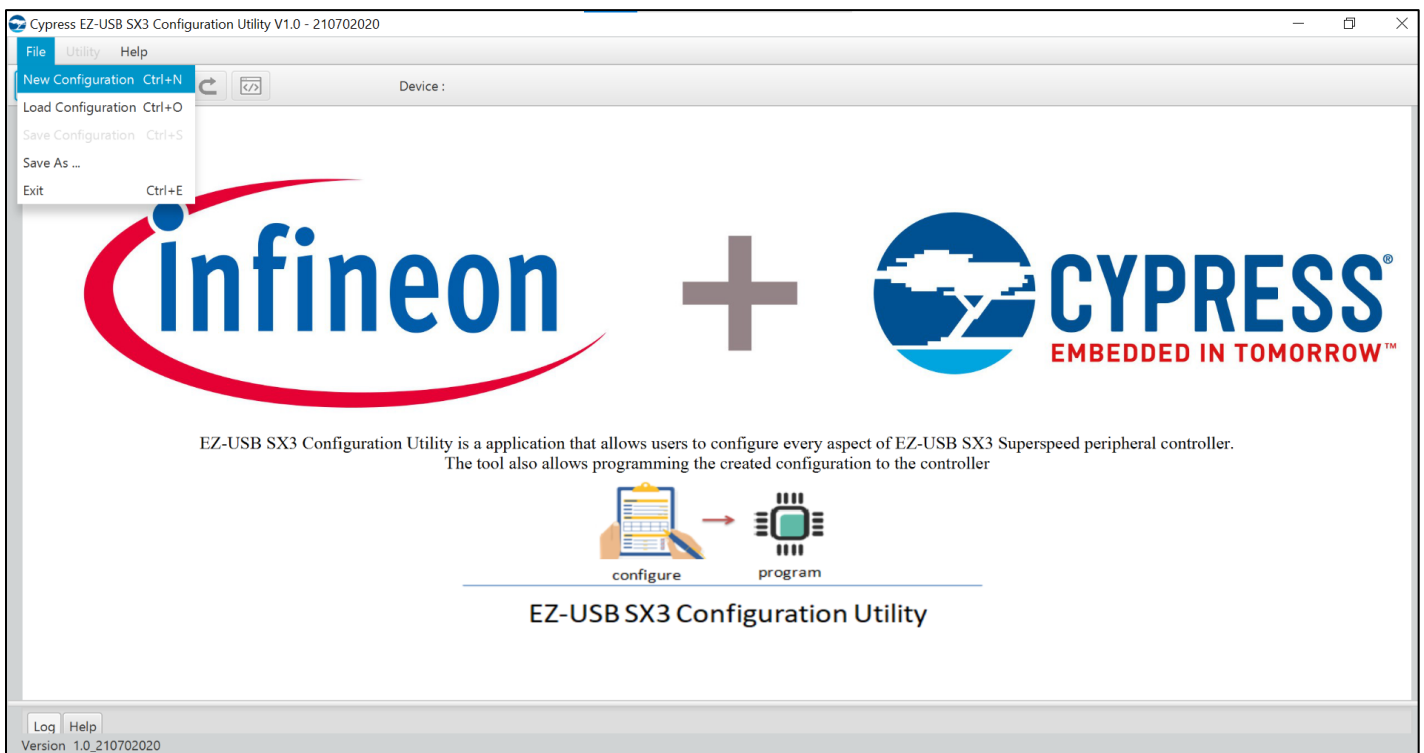
List of Abbreviations

Abbreviation	Meaning
GUI	Graphical User Interface
USB	Universal Serial Bus
UAC	USB Audio Control
UVC	USB Video Control
OS	Operating System

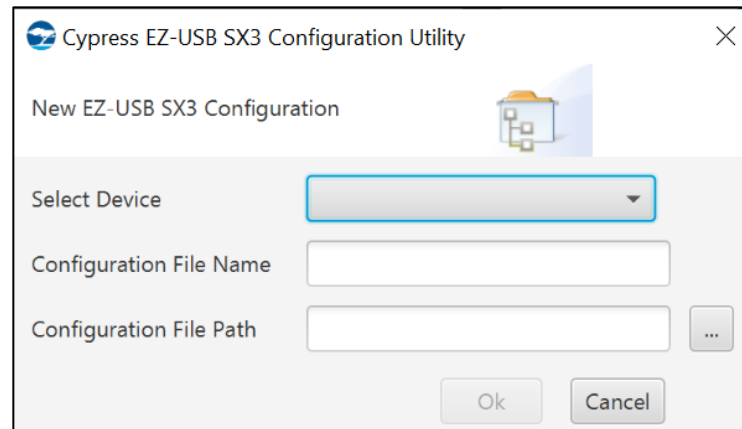
2. EZ-USB SX3 Configuration Utility

2.1 EZ-USB SX3 Configuration Utility GUI

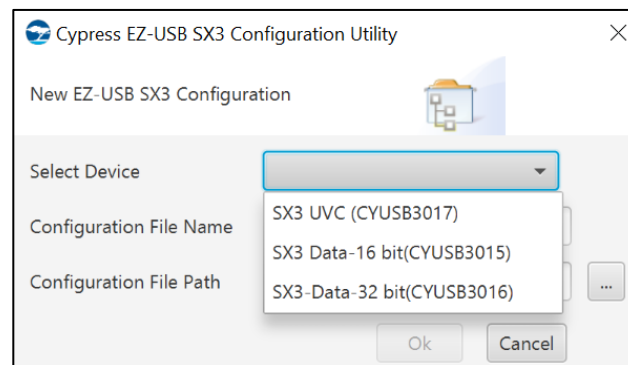
In Windows OS, start the EZ-USB SX3 Configuration Utility from **Start >All Programs >Cypress >SX3 Configuration Utility**.



- a) We can either load an existing configuration file or we can create a new configuration file. Press New Configuration Button

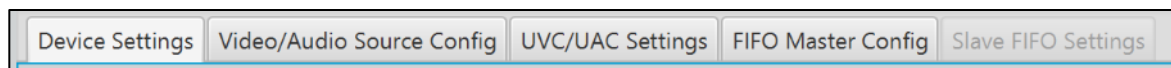


- b) In Select Device, 3 options will be listed. Please select as per your requirement.

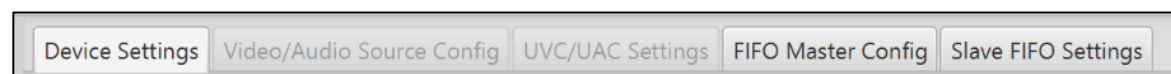


- c) Update the Configuration File Name and browse the path in your local system to save the Configuration File...

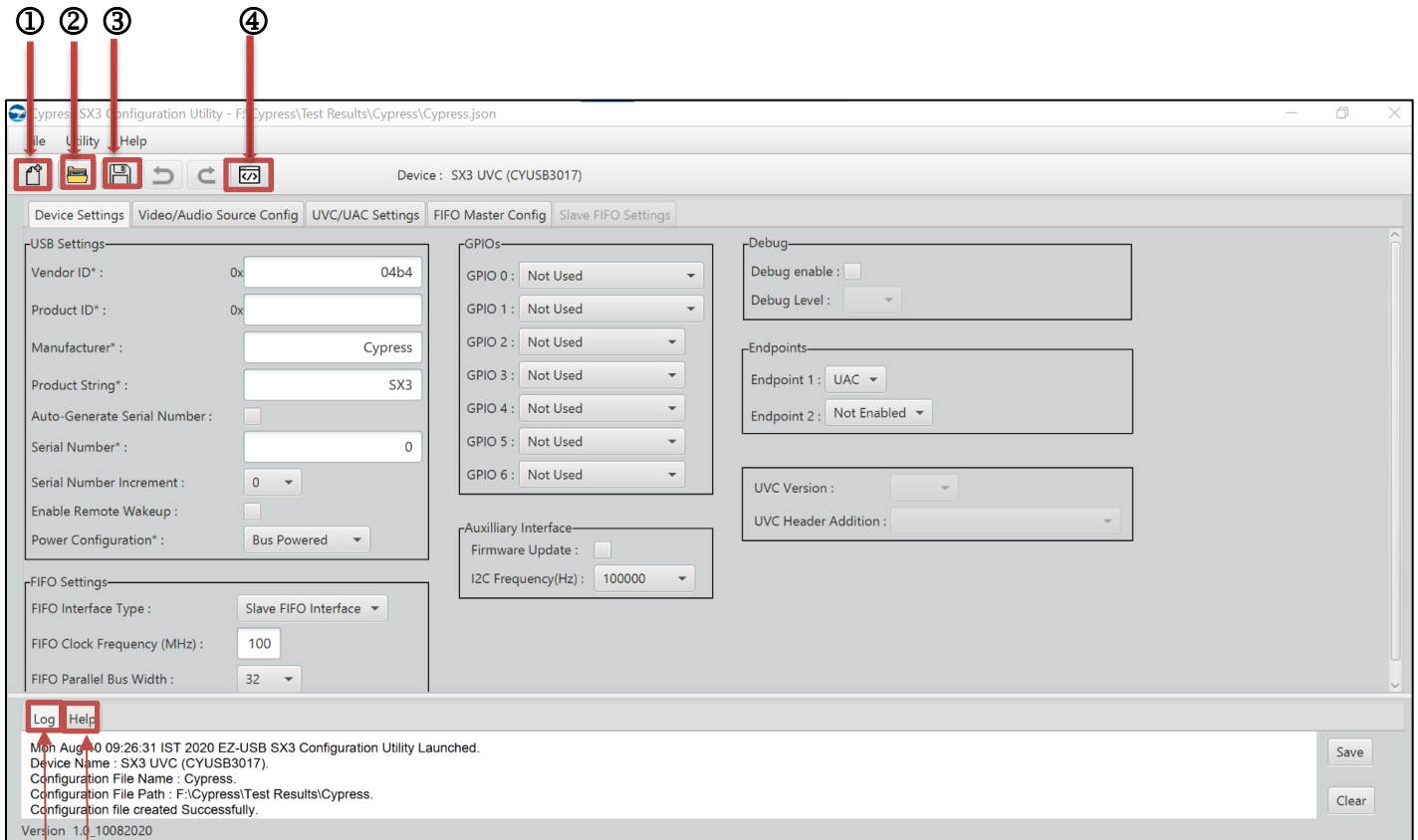
- 1) Selecting Device as "SX3 UVC(CYUSB3017)" will enable the following tabs in GUI



- 2) Selecting Device as "SX3 Data-16 bit (CYUSB3015)" or "SX3 Data-32 bit (CYUSB3016)" will enable the following tabs in GUI

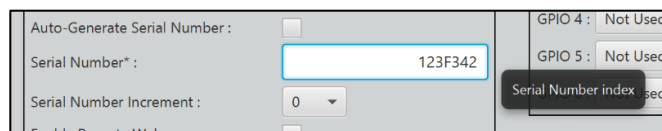


Default View of the Configuration Utility



- ① To create a new configuration file
- ② To load configuration from a file
- ③ Save a configuration.
- ④ Program the configuration file to a device.
- ⑤ Register all the changes in the Utility
- ⑥ Displays help content and description of each configuration.

Tool Tip (Will be Automatically pop up near Each Tab's entry)



Error Messages

An Error message will be popped up in RED color near the text field where we are entering the values

If the Field Width exceeds the defined value

Product ID* : 0x Max length 4 character.

Serial Number* : Max length 16

If the non-defined values are entered as input

Product String* : Please enter alphaNumeric value only (0-9,a-z)

Product ID* : 0x Please enter hexadecimal value only (0-F)

Serial Number* : Last character should be numeric.

Endpoint 1 Buffer Size (Bytes) : Choose the size (in bytes) for each buffer (should be a multiple of 16)

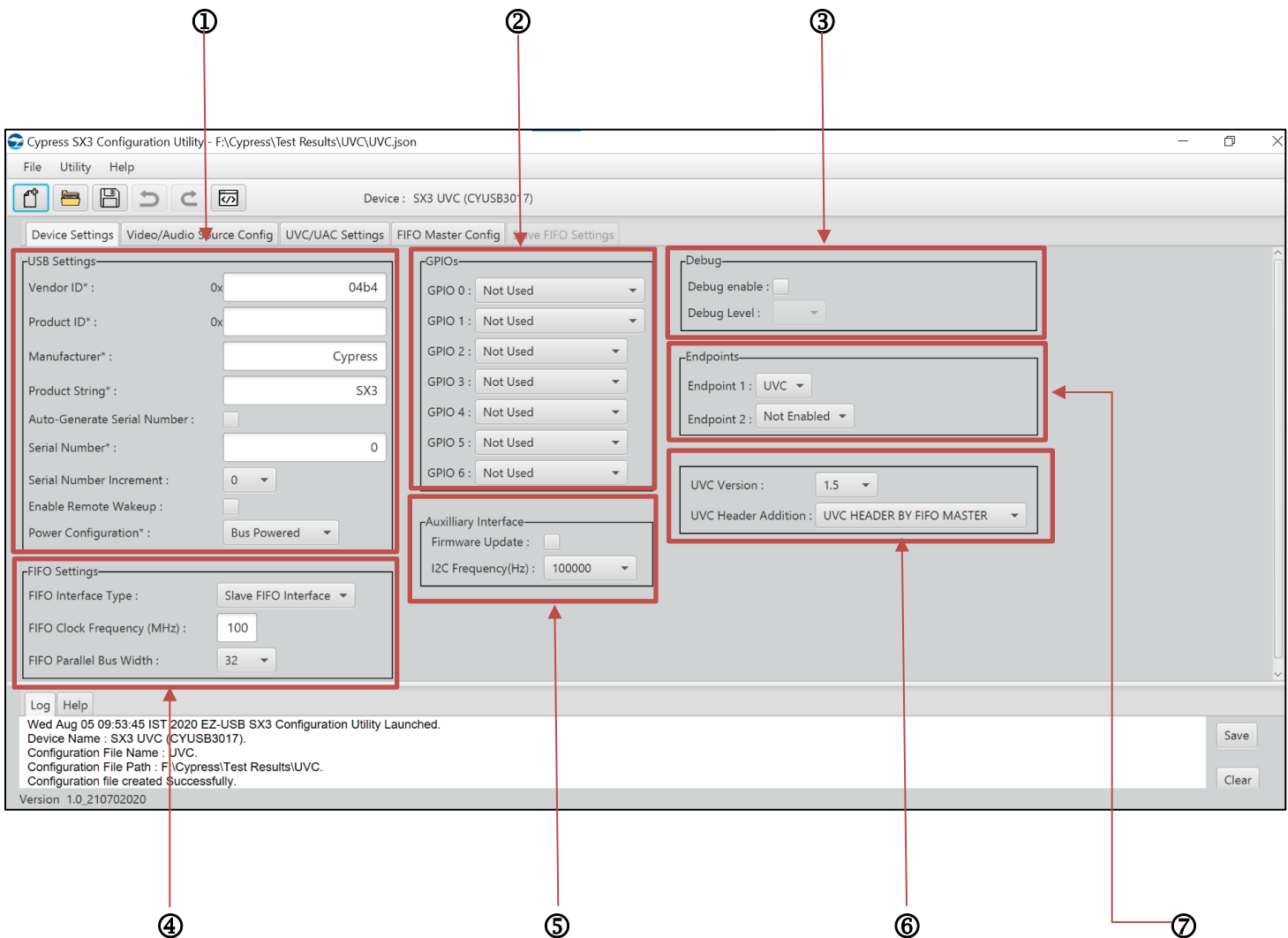
If the values are left empty then it will be listed in Log while saving the configuration

FIFO Clock Frequency (MHz) : 100

Log Help

Vendor ID : 04b4.
 Choose the size (in bytes) for each buffer (should be a multiple of 16).
 Error : FPGA I2C slave address should not be empty.
 Error : Endpoint 1 Video Source Config I2C slave address should not be empty.
 Error : Endpoint 1 S.No. 1 Sensor config should not be empty in format and resolution.
 Error : Endpoint 1 S.No. 1 Image Format should not be empty in format and resolution.
 Configuration saved.

Device Settings



The screenshot shows the Cypress SX3 Configuration Utility window. The 'Device Settings' tab is active. The interface includes a menu bar (File, Utility, Help), a toolbar, and a status bar. The main area is divided into several sections, each highlighted with a red box and a numbered callout:

- ① USB Settings:** Includes fields for Vendor ID* (0x04b4), Product ID* (0x), Manufacturer* (Cypress), Product String* (SX3), Auto-Generate Serial Number (checkbox), Serial Number* (0), Serial Number Increment (0), Enable Remote Wakeup (checkbox), and Power Configuration* (Bus Powered).
- ② FIFO Settings:** Includes FIFO Interface Type (Slave FIFO Interface), FIFO Clock Frequency (MHz) (100), and FIFO Parallel Bus Width (32).
- ③ GPIOs:** A list of GPIO pins (GPIO 0 to GPIO 6) all set to 'Not Used'.
- ④ Auxiliary Interface:** Includes Firmware Update (checkbox) and I2C Frequency(Hz) (100000).
- ⑤ Debug:** Includes Debug enable (checkbox) and Debug Level (dropdown).
- ⑥ Endpoints:** Includes Endpoint 1 (UVC) and Endpoint 2 (Not Enabled).
- ⑦ UVC Settings:** Includes UVC Version (1.5) and UVC Header Addition (UVC HEADER BY FIFO MASTER).

The status bar at the bottom displays the following information:

```

Log Help
Wed Aug 05 09:53:45 IST 2020 EZ-USB SX3 Configuration Utility Launched.
Device Name : SX3 UVC (CYUSB3017).
Configuration File Name : UVC.
Configuration File Path : F:\Cypress\Test Results\UVC.
Configuration file created Successfully.
Version 1.0_210702020
  
```

Buttons for 'Save' and 'Clear' are located in the bottom right corner.

① **USB Settings** (All Fields marks in * are mandatory).

The Description of all the fields will be displayed in the Help Tab.

Vendor ID---Vendor ID (assigned by USB---IF)

Product ID---Product ID (assigned by the manufacturer)

Manufacturer---Index of string descriptor describing manufacturer

Product String---Index of string descriptor describing product

Auto Generate Serial Number---Auto generates unique serial number

Serial Number---Index of string descriptor describing the device's serial number

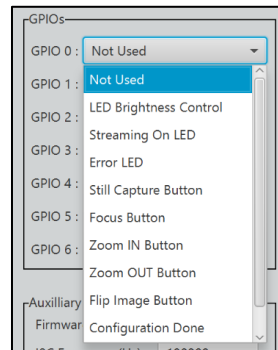
Serial Number Increment By---Select increment value. The serial number increments by the chosen value every time the user clicks "Program" button

Enable Remote Wakeup---Enable remote wakeup option (Enable/Disable)

Power Configuration---Choose power configuration of the device (Self Powered/Bus Powered)

② GPIOs configurations...

Update the GPIO from 0 to 6 as per your requirements using the drop-down menu...



③ Debug

Debug enable---Enable Debug via USB COM port

Debug Level---Range from 0 to 4, 0 = Only important messages and 4 = All messages

④ FIFO Settings

FIFO Bus width---Select your FIFO Bus Width from the dropdown Menu. Max value of 32 for SX3 UVC and SX3 Data (32 Bit) and Max value of 16 for SX3 Data (16 Bit)

FIFO Clock Frequency (MHz)---Update the FIFO Clock Frequency...Max value is 100 MHz

⑤ Auxiliary Interface Settings

Firmware Update---Check Box. Enable for Firmware update over HID interface

I2C Frequency---Drop down Box to select I2C Clock frequency

⑥ UVC Version and UVC Header Addition (Option should be shown if atleast one endpoint type is UVC)

UVC Version---From drop down, Select the UVC Version

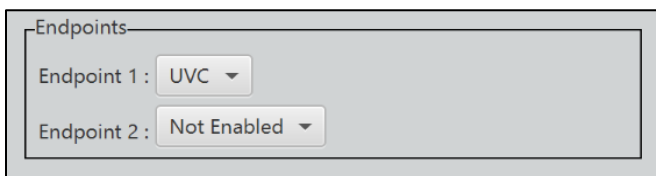
UVC Header Addition---From drop down, choose whether UVC header needs to be added by SX3 or FIFO Master

⑦ Endpoints

Select your Endpoints as per your requirement. We have two Endpoints and the option can be chosen from drop down menu for Both UVC and Data Devices.

Device Type	Field	Options	Description
SX3 UVC	Endpoint 1	UVC UAC	Choose USB Video Class (UVC) for Video Choose USB Audio Class (UAC) for Audio
SX3 UVC	Endpoint 2	UVC UAC	Choose USB Video Class (UVC) for Video Choose USB Audio Class (UAC) for Audio
SX3 DATA	Endpoint 1	IN OUT	Choose Endpoint Direction
SX3 DATA	Endpoint 2	IN OUT	Choose Endpoint Direction

UVC Device

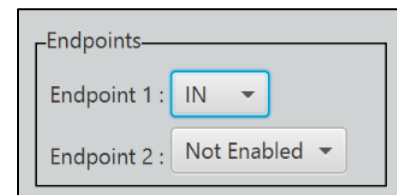


Endpoints

Endpoint 1 : UVC ▾

Endpoint 2 : Not Enabled ▾

Data Devices

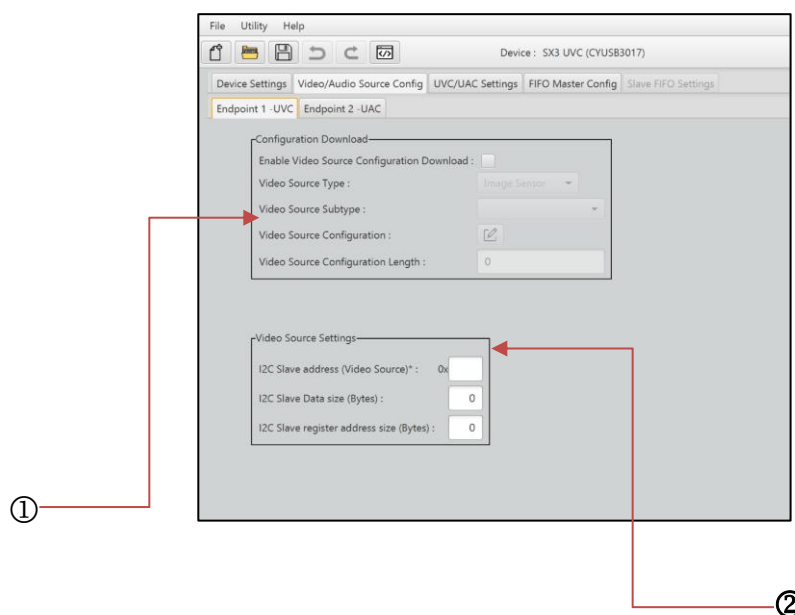


Endpoints

Endpoint 1 : IN ▾

Endpoint 2 : Not Enabled ▾

Video/Audio Source Config (For SX3 UVC Only)



① Configuration Download

Enable/Disable for Video Source Configuration download ---Check box to Enable Video Source Configuration

Video Source Type---Select Video Source Type from the option Image Sensor/ HDMI Source

Video Source Subtype---Drop down Will be enabled if Video Source Type is selected as HDMI Source. Select from the option HDMI RX --- ITE6801/HDMI RX --- Generic

Video Source Configuration Download---Will show sensor config entry GUI with button to browse to .txt file.

Video Source Configuration Length---Length of Video Source Configuration file in bytes

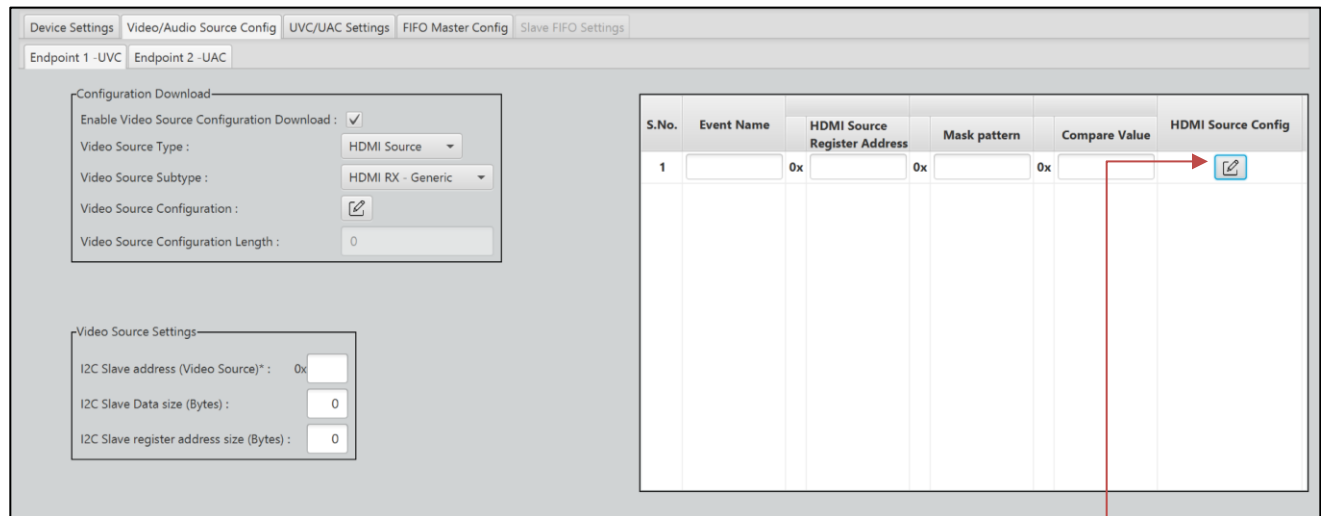
② Video Source Settings

I2C Slave address (Video Source) ---Enter the I2C Slave address for Video Source

I2C Slave Data size (Bytes)---Enter the Data Size for I2C Registers in Video Source

I2C Slave register address size (Bytes)---Enter the Register Address size for I2C Registers in Video Source

HDMI Source Configuration Table (Only enabled if Video Source Subtype is "HDMI RX - Generic")



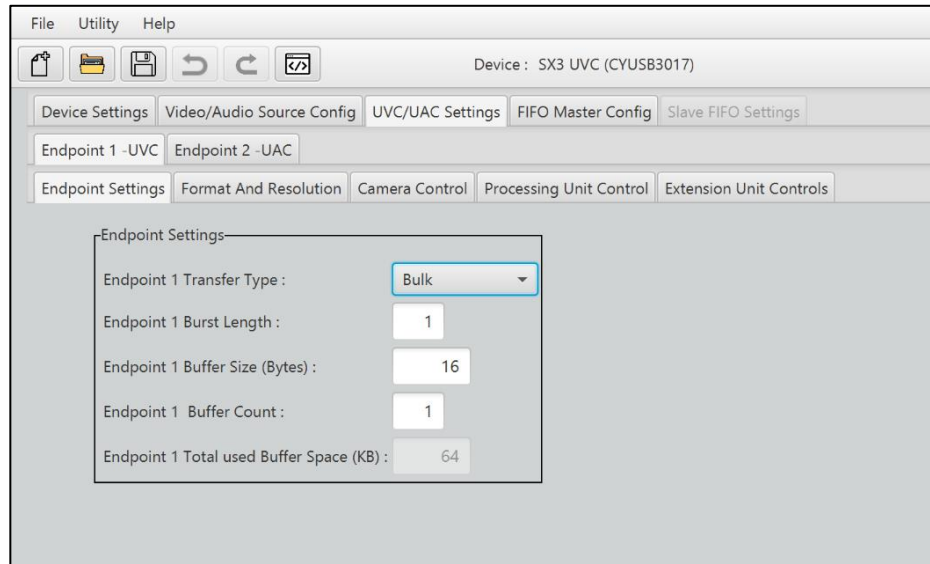
The screenshot shows the Cypress configuration tool interface. On the left, there are sections for 'Configuration Download' and 'Video Source Settings'. The 'Configuration Download' section includes a checkbox for 'Enable Video Source Configuration Download', a dropdown for 'Video Source Type' (set to 'HDMI Source'), a dropdown for 'Video Source Subtype' (set to 'HDMI RX - Generic'), a button for 'Video Source Configuration', and a text field for 'Video Source Configuration Length' (set to 0). The 'Video Source Settings' section includes text fields for 'I2C Slave address (Video Source)*' (set to 0x), 'I2C Slave Data size (Bytes)' (set to 0), and 'I2C Slave register address size (Bytes)' (set to 0). On the right, there is a table titled 'HDMI Source Configuration Table'. The table has columns: S.No., Event Name, HDMI Source Register Address, Mask pattern, Compare Value, and HDMI Source Config. The first row has S.No. 1, Event Name, HDMI Source Register Address 0x, Mask pattern 0x, Compare Value 0x, and a button in the HDMI Source Config column. A red arrow points from this button to a circled '1' below the table.

Update the Event Name, HDMI Source Register Address, Mask Value and Compare Value in the respective tabs.

① Each entry should consist a list of Register Address (2Bytes), Register Value (4Bytes) and Slave Address (2 bytes).
Max 30 entries Allowed in this table.

UVC/UAC Settings

UVC-Endpoint Settings



File Utility Help

Device : SX3 UVC (CYUSB3017)

Device Settings Video/Audio Source Config UVC/UAC Settings FIFO Master Config Slave FIFO Settings

Endpoint 1 -UVC Endpoint 2 -UAC

Endpoint Settings Format And Resolution Camera Control Processing Unit Control Extension Unit Controls

Endpoint Settings

Endpoint 1 Transfer Type : Bulk

Endpoint 1 Burst Length : 1

Endpoint 1 Buffer Size (Bytes) : 16

Endpoint 1 Buffer Count : 1

Endpoint 1 Total used Buffer Space (KB) : 64

Endpoint Transfer Type---Type of endpoint (Bulk/ISOC)

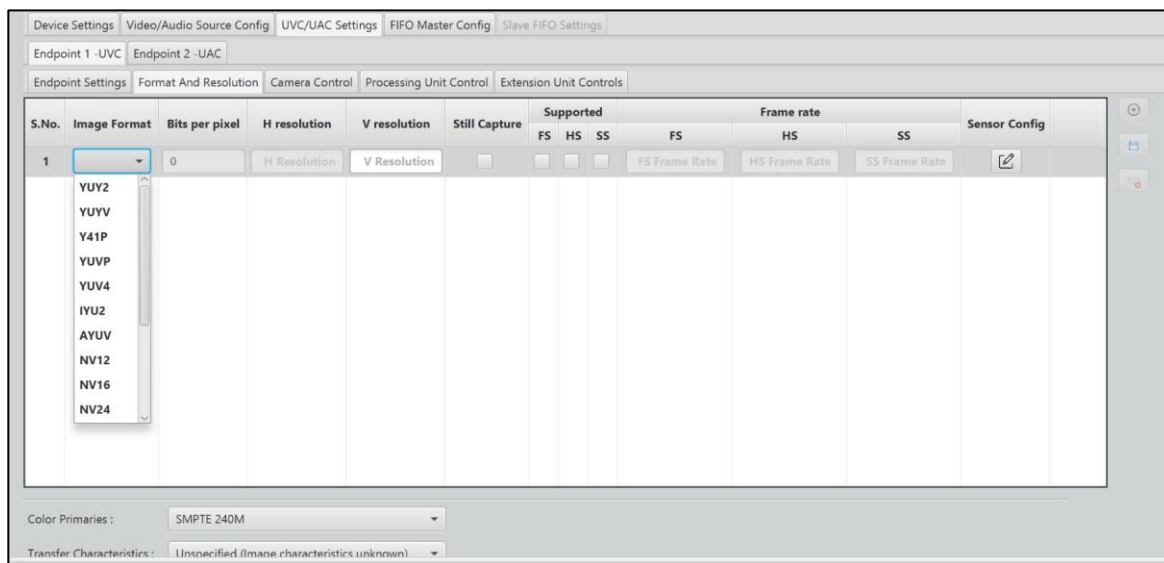
Burst Length---Choose the number of bursts per transfer

Buffer Size (Bytes) ---Choose the size (in bytes) for each buffer (should be a multiple of 16)

Buffer Count ---Choose the number of buffers per endpoint

Total used Buffer Space (KB)---Amount of buffer size used by active endpoints

Format and Resolution



Device Settings Video/Audio Source Config UVC/UAC Settings FIFO Master Config Slave FIFO Settings

Endpoint 1 -UVC Endpoint 2 -UAC

Endpoint Settings Format And Resolution Camera Control Processing Unit Control Extension Unit Controls

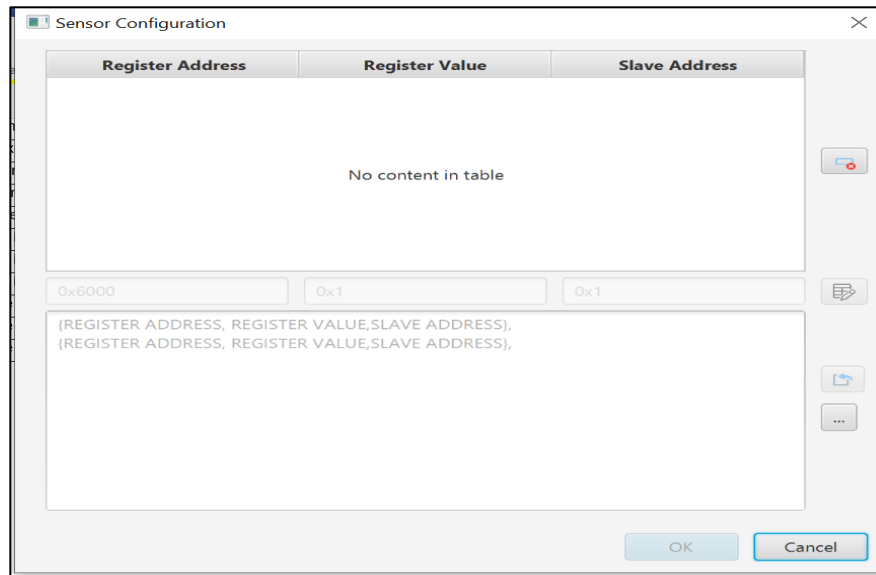
S.No.	Image Format	Bits per pixel	H resolution	V resolution	Still Capture	Supported			Frame rate			Sensor Config
						FS	HS	SS	FS	HS	SS	
1	YUY2	0	H Resolution	V Resolution					FS Frame Rate	HS Frame Rate	SS Frame Rate	
	YUYV											
	Y41P											
	YUVP											
	YUV4											
	IYU2											
	AYUV											
	NV12											
	NV16											
	NV24											

Color Primaries : SMPTE 240M

Transfer Characteristics : Unspecified (Image characteristics unknown)

The Description of all the fields will be displayed in the Help Tab.

Sensor Configuration File:



Register Address	Register Value	Slave Address
No content in table		

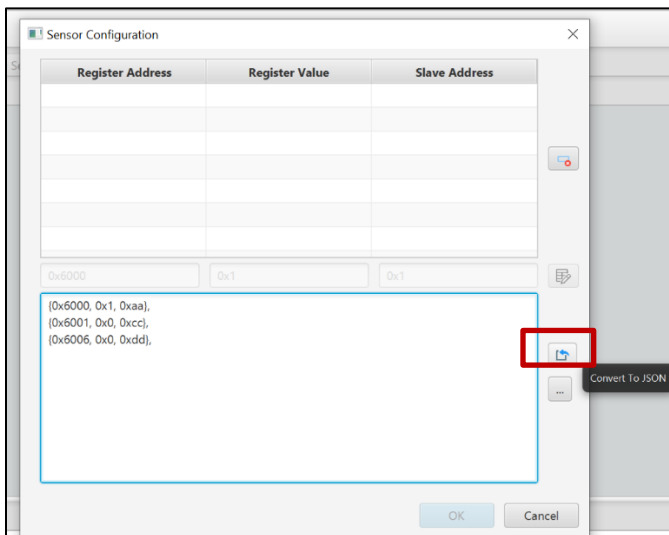
0x6000 0x1 0x1

{REGISTER ADDRESS, REGISTER VALUE,SLAVE ADDRESS},
{REGISTER ADDRESS, REGISTER VALUE,SLAVE ADDRESS},

OK Cancel

Example for configuring the Sensor Configuration file:

- 1) User can enter comma separated values into this table. Enter the Register Address, Register Value and Slave Address (Max 80 rows). Press the Convert to JSON button highlighted in the below screen shot...The following value will be converted in JSON accordingly.



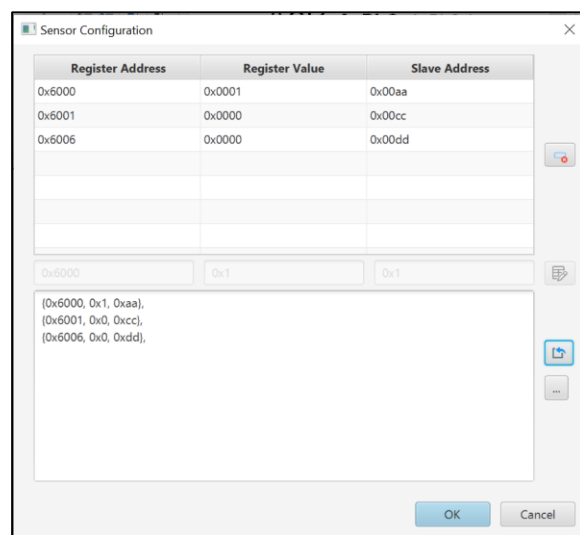
Register Address	Register Value	Slave Address

0x6000 0x1 0x1

{0x6000, 0x1, 0xaa},
{0x6001, 0x0, 0xcc},
{0x6006, 0x0, 0xdd},

Convert To JSON

OK Cancel



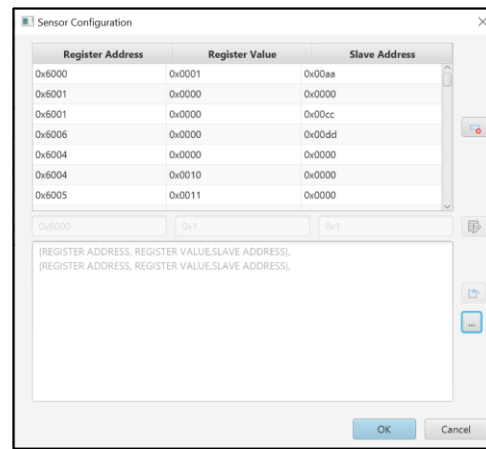
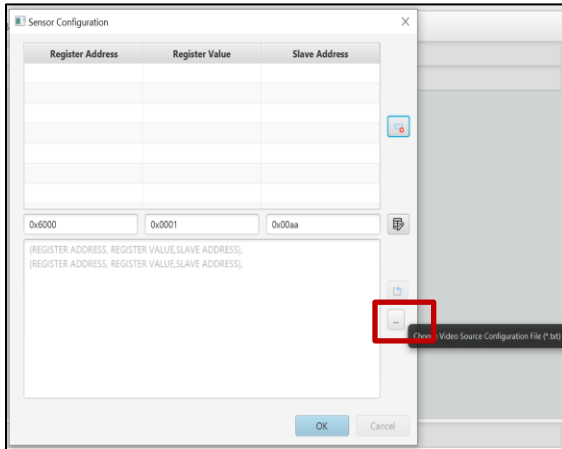
Register Address	Register Value	Slave Address
0x6000	0x0001	0x00aa
0x6001	0x0000	0x00cc
0x6006	0x0000	0x00dd

0x6000 0x1 0x1

{0x6000, 0x1, 0xaa},
{0x6001, 0x0, 0xcc},
{0x6006, 0x0, 0xdd},

OK Cancel

2) We can also choose the data from a text file by selecting the *.txt from the below button.



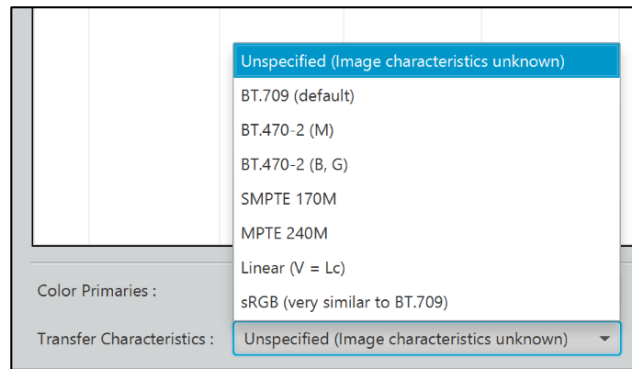
Color Matching Descriptor:

Color Primaries :	Unspecified (Image characteristics unknown) ▼
Transfer Characteristics :	Unspecified (Image characteristics unknown) ▼
Matrix Coefficients :	Unspecified (Image characteristics unknown) ▼

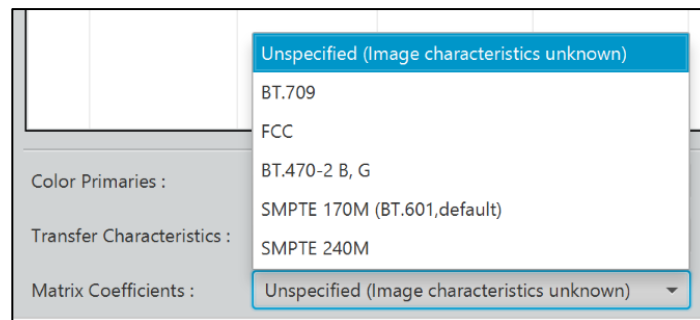
Select the ColorPrimaries for the color matching descriptors from the drop-down menu...

<div> <div>Unspecified (Image characteristics unknown)</div> <div> BT.709, sRGB (default) BT.470-2 (M) BT.470-2 (B, G) SMPTE 170M SMPTE 240M </div> </div>	
Color Primaries :	Unspecified (Image characteristics unknown) ▼

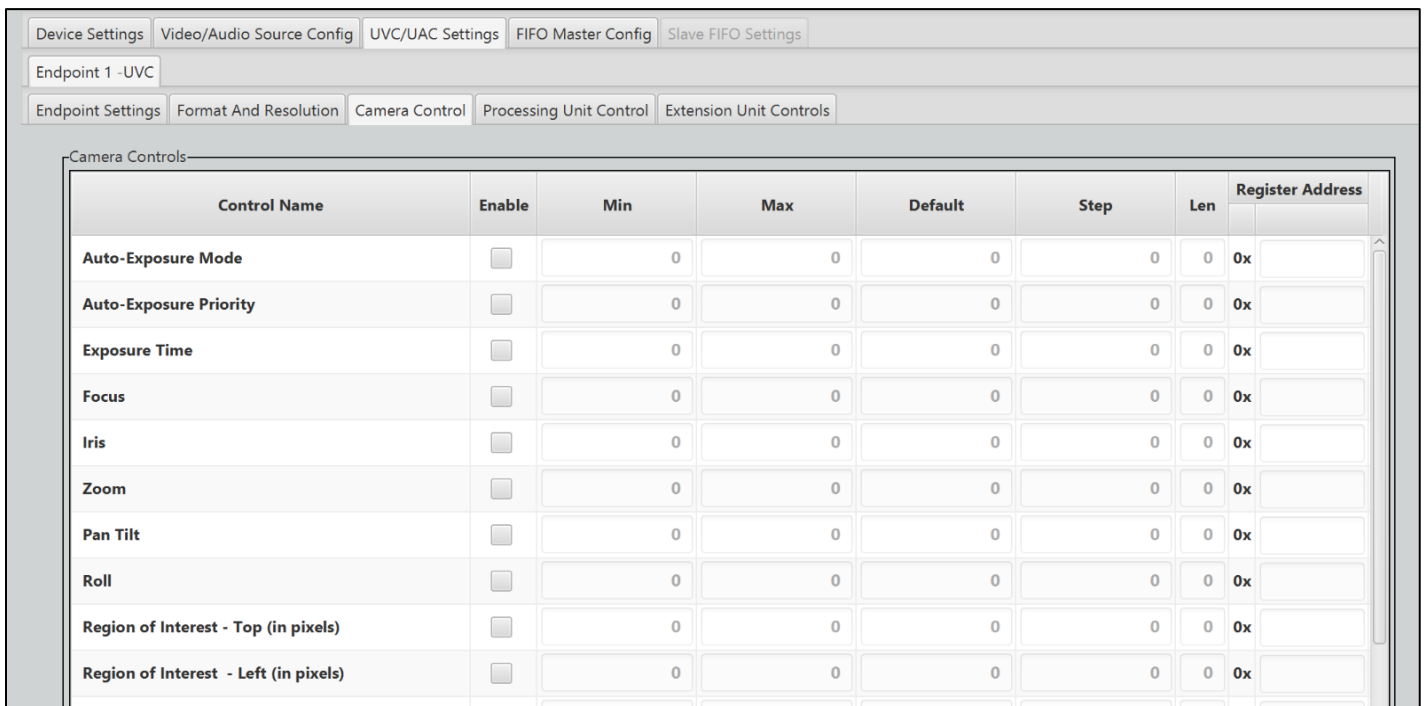
Select the Transfer Characteristics for color matching descriptor from the drop-down menu



Select the Matrix Coefficients for the color matching descriptor



Camera Control



Control Name	Enable	Min	Max	Default	Step	Len	Register Address
Auto-Exposure Mode	<input type="checkbox"/>	0	0	0	0	0	0x
Auto-Exposure Priority	<input type="checkbox"/>	0	0	0	0	0	0x
Exposure Time	<input type="checkbox"/>	0	0	0	0	0	0x
Focus	<input type="checkbox"/>	0	0	0	0	0	0x
Iris	<input type="checkbox"/>	0	0	0	0	0	0x
Zoom	<input type="checkbox"/>	0	0	0	0	0	0x
Pan Tilt	<input type="checkbox"/>	0	0	0	0	0	0x
Roll	<input type="checkbox"/>	0	0	0	0	0	0x
Region of Interest - Top (in pixels)	<input type="checkbox"/>	0	0	0	0	0	0x
Region of Interest - Left (in pixels)	<input type="checkbox"/>	0	0	0	0	0	0x

Device Settings
Video/Audio Source Config
UVC/UAC Settings
FIFO Master Config
Slave FIFO Settings

Endpoint 1 - UVC

Endpoint Settings
Format And Resolution
Camera Control
Processing Unit Control
Extension Unit Controls

Region of Interest - Left (in pixels)	<input type="checkbox"/>								0x
Region of Interest - Bottom (in pixels)	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Right (in pixels)	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto Exposure	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto Iris	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto White Balance	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto Focus	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto Face Detect	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Auto Detect and Track	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Image Stabilization	<input type="checkbox"/>		0	0	0	0	0	0	0x
Region of Interest - Higher Quality	<input type="checkbox"/>		0	0	0	0	0	0	0x
Window Control - Top (in pixels)	<input type="checkbox"/>		0	0	0	0	0	0	0x
Window Control - Left (in pixels)	<input type="checkbox"/>		0	0	0	0	0	0	0x

The Description of all the fields will be displayed in the Help Tab.

Processing Unit Control

Device Settings
Video/Audio Source Config
UVC/UAC Settings
FIFO Master Config
Slave FIFO Settings

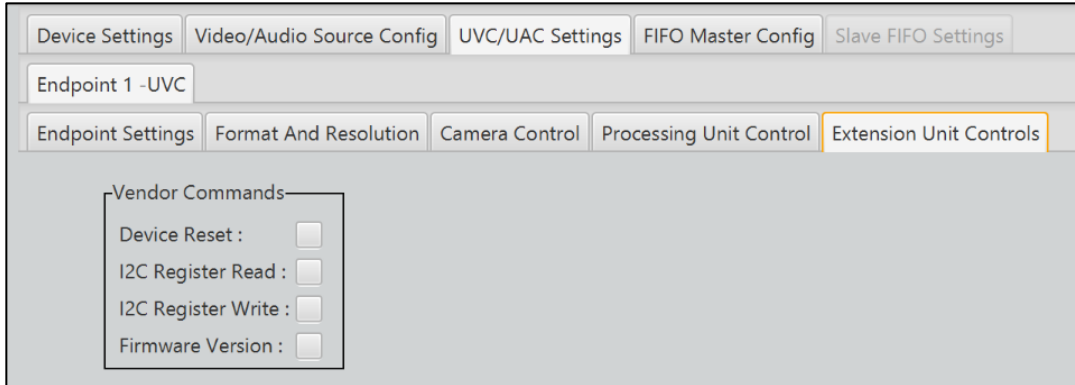
Endpoint 1 - UVC

Endpoint Settings
Format And Resolution
Camera Control
Processing Unit Control
Extension Unit Controls

Processing Unit Controls

Control Name	Enable	Min	Max	Default	Step	Len	Register Address
Brightness	<input type="checkbox"/>	0	0	0	0	0	0x
Contrast	<input type="checkbox"/>	0	0	0	0	0	0x
Saturation	<input type="checkbox"/>	0	0	0	0	0	0x
Hue	<input type="checkbox"/>	0	0	0	0	0	0x
Sharpness	<input type="checkbox"/>	0	0	0	0	0	0x
Gamma	<input type="checkbox"/>	0	0	0	0	0	0x
White Balance Temperature	<input type="checkbox"/>	0	0	0	0	0	0x
White Balance Component	<input type="checkbox"/>	0	0	0	0	0	0x
Backlight Compensation	<input type="checkbox"/>	0	0	0	0	0	0x
Gain	<input type="checkbox"/>	0	0	0	0	0	0x
Power Line Frequency	<input type="checkbox"/>	0	0	0	0	0	0x

Extension Unit Controls (Check Boxes)



Device Settings Video/Audio Source Config UVC/UAC Settings FIFO Master Config Slave FIFO Settings

Endpoint 1 - UVC

Endpoint Settings Format And Resolution Camera Control Processing Unit Control Extension Unit Controls

Vendor Commands

Device Reset : ☐

I2C Register Read : ☐

I2C Register Write : ☐

Firmware Version : ☐

Device Reset---Checkbox to Support vendor command for Device Reset

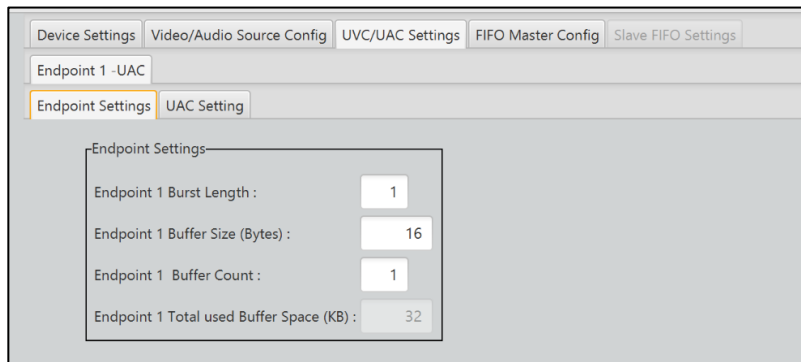
I2C Register Read---Checkbox to Support vendor command for I2C Register Read

I2C Register Write---Checkbox to Support vendor command for I2C Register Write

Firmware Version---Checkbox to Support vendor command for Firmware Version

UAC Settings

UAC -End point Settings



Device Settings Video/Audio Source Config UVC/UAC Settings FIFO Master Config Slave FIFO Settings

Endpoint 1 - UAC

Endpoint Settings UAC Setting

Endpoint Settings

Endpoint 1 Burst Length : 1

Endpoint 1 Buffer Size (Bytes) : 16

Endpoint 1 Buffer Count : 1

Endpoint 1 Total used Buffer Space (KB) : 32

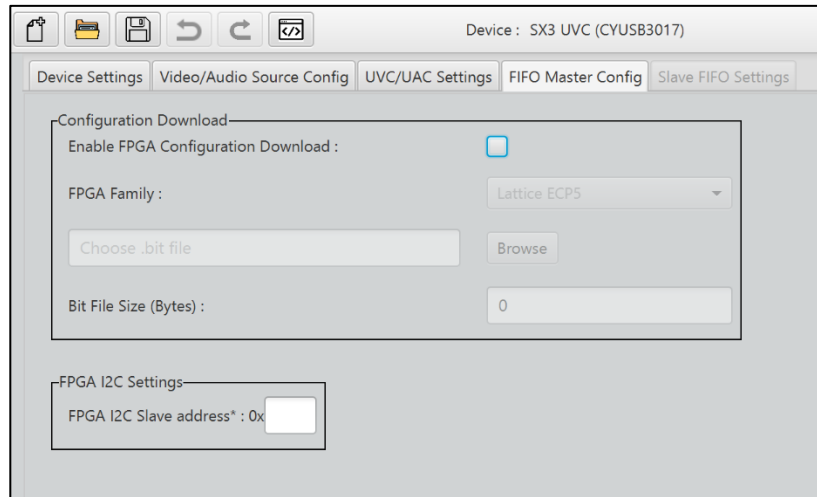
Burst Length---Choose the number of bursts per transfer

Buffer Count---Choose the number of buffers per endpoint

Buffer Size (Bytes)---Choose the size (in bytes) for each buffer

Total used Buffer Space (KB)---Amount of buffer size used by active endpoints

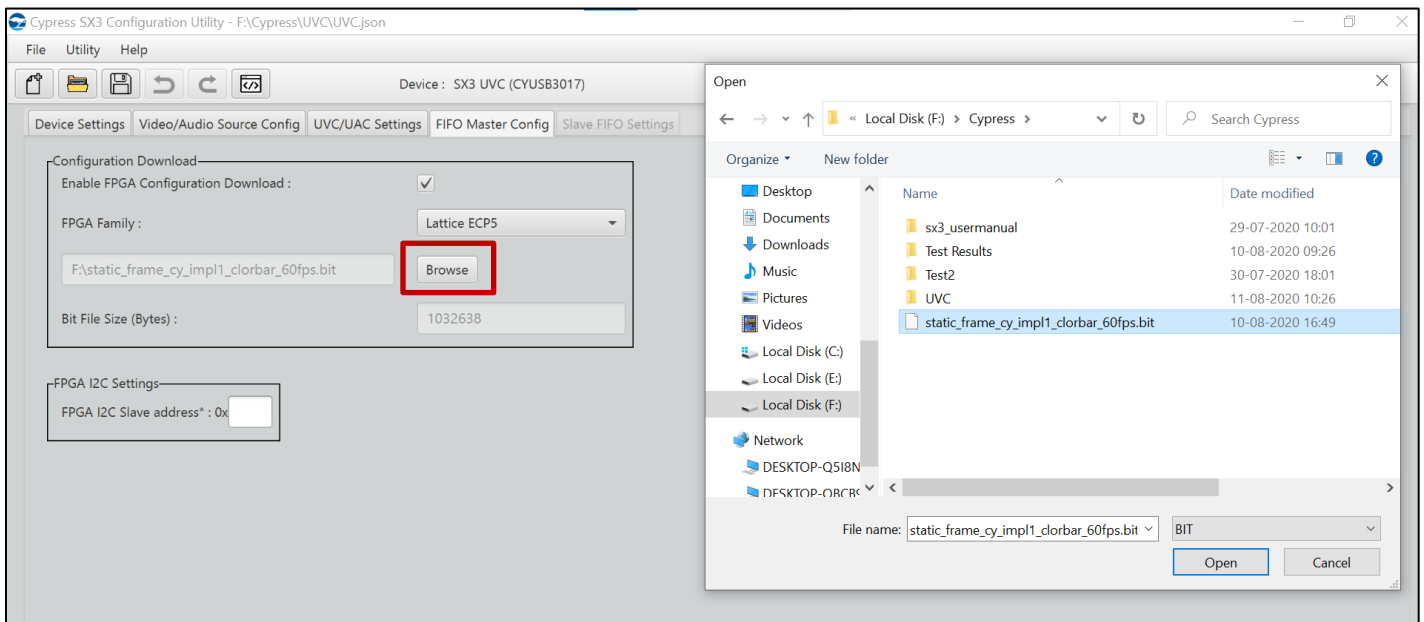
FIFO Master Config



FIFO Master Configuration Download

Enable FIFO Master Configuration Download---Check box to Enable FIFO master configuration from SX3
 Choose .bit file ---File picker to select the *.bit format
 FPGA Family---To handle FPGA configuration procedure differences between the FPGA families in the SX3 firmware
 I2C Slave Address---Enter the I2C Slave address
 Bit File Size---File size of the chosen bit file
 I2C Slave Address---Enter the I2C Slave address for the FIFO Master

FPGA Configuration with an Example



Select the "Browse" button and choose your *.bit file. It will also display the size of the Bit file you chosen in **Bit File Size** Tab

Slave FIFO Settings

Device Settings		Video/Audio Source Config		UVC/UAC Settings		FIFO Master Config		Slave FIFO Settings	
Endpoint 1 - IN					Endpoint 2 - OUT				
Burst Length :	1								
Buffer Size (Bytes) :	16								
Buffer Count :	1								
Total used Buffer Space (Bytes) :	64								

Burst Length-Choose the number of bursts per transfer

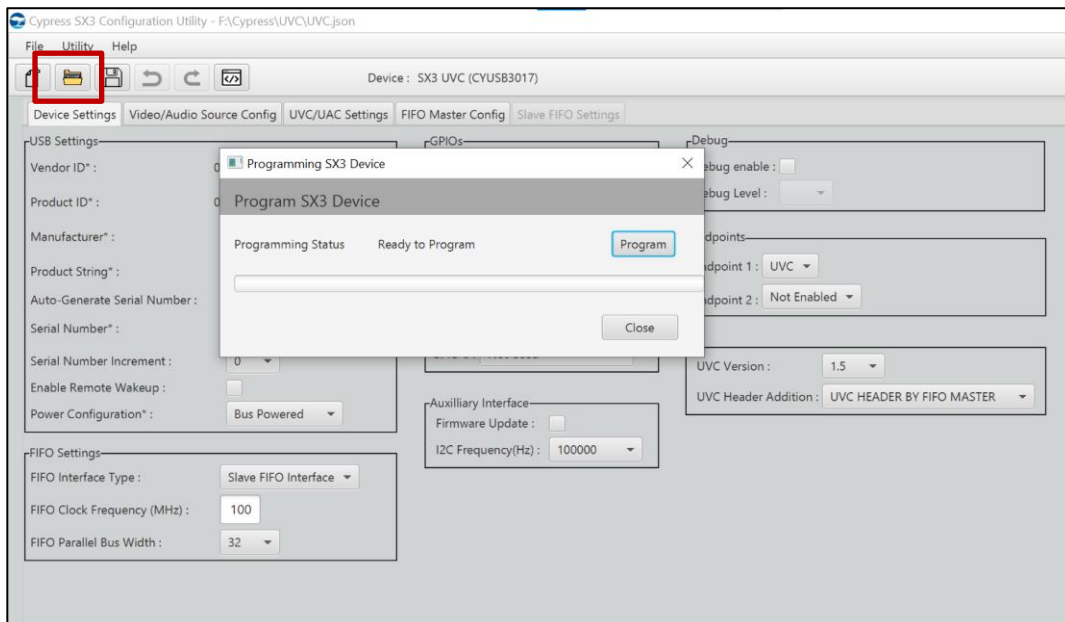
Buffer Count-Choose the number of buffers per endpoint

Buffer Size (Bytes)-Choose the size (in bytes) for each buffer

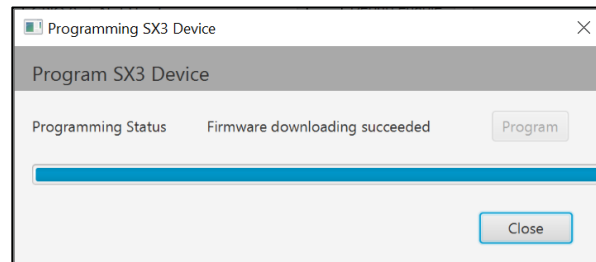
Total used Buffer Space (KB)-Amount of buffer size used by active endpoints

PROGRAM the Configuration Device

After the required configurations are done, select the “Program Button” Highlighted below. Make sure you connected the SuperSpeed Explorer Kit connected with a Type C USB Cable to your System with proper drivers installed.



Click on the “Program” button in the Pop-up window...



Once the successful completion, the device will be programmed as per your requirements...

Document Revision History

Document Title: Cypress EZ-USB SX3 Configuration Utility User Guide			
Revision	Issue Date	Origin of Change	Description of Change
**	12/08/2020		Initial revision
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