



# **SiFive Learn Inventor Getting Started Guide**

**Version 1.1**

© SiFive, Inc.

## Proprietary Notice

Copyright © 2019, SiFive Inc. All rights reserved.

Information in this document is provided “as is,” with all faults.

SiFive expressly disclaims all warranties, representations, and conditions of any kind, whether express or implied, including, but not limited to, the implied warranties or conditions of merchantability, fitness for a particular purpose and non-infringement.

SiFive does not assume any liability rising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation indirect, incidental, special, exemplary, or consequential damages.

SiFive reserves the right to make changes without further notice to any products herein.

## Release Information

<b>Version</b>	<b>Date</b>	<b>Changes</b>
1.1	December 27, 2019	Updated links and formatting
1.0	November 26, 2019	Initial Release

# Contents

<b>1</b>	<b>Overview</b> .....	<b>2</b>
<b>2</b>	<b>Required Hardware</b> .....	<b>3</b>
2.1	SiFive Learn Inventor .....	3
2.2	USB Cable .....	3
<b>3</b>	<b>Set Up the Hardware</b> .....	<b>4</b>
<b>4</b>	<b>Set Up the Development Environment</b> .....	<b>5</b>
<b>5</b>	<b>Build the Amazon FreeRTOS Demo Project</b> .....	<b>6</b>
<b>6</b>	<b>Run and Debug the Amazon FreeRTOS Demo Project</b> .....	<b>7</b>
<b>7</b>	<b>Troubleshooting</b> .....	<b>8</b>

# Chapter 1

## Overview

This tutorial provides instructions for getting started with the SiFive Learn Inventor development system. If you do not already have the SiFive Learn Inventor, visit here:

<https://pimoroni.com/sifive>

You can find the development IDE, user manual, toolchain and SDK for the board here:

<https://www.sifive.com/boards>

Before you begin, you must configure AWS IoT and your Amazon FreeRTOS installation to connect your device to the AWS Cloud. See the following chapters for instructions. In this tutorial, the path to the Amazon FreeRTOS download directory is referred to as `amazon-freertos`.

## Chapter 2

# Required Hardware

Using the SiFive Learn Inventor requires the following hardware.

### 2.1 SiFive Learn Inventor

The SiFive Learn Inventor is a development board for the FE310-G003, a microcontroller with an E31 RISC-V RV32IMAC CPU.

### 2.2 USB Cable

A standard USB Type A Male to Micro-B Male cable is used to connect a host system to the SiFive Learn Inventor. A USB connection is used for power and communication.

- USB cable example:

<http://store.digilentinc.com/usb-a-to-micro-b-cable/>

## Chapter 3

# Set Up the Hardware

No special setup for the SiFive Learn Inventor is required - just plug it into your computer with a USB cable. Before doing so, it is recommended that you install drivers for the built-in Segger J-Link OB debug module.

See the following link to download the J-Link Software and Documentation pack for your platform:

<https://www.segger.com/downloads/jlink/#J-LinkSoftwareAndDocumentationPack>

Once you have connected the board to your computer, you will have two serial ports and the J-Link debugger available. One serial port is used for SiFive CPU debug output, and the other serial port outputs ESP32 Wi-Fi module log messages.

Both serial ports are configured to use 115200 8N1.

As the board uses a Wi-Fi internet connection, you will need a Wi-Fi access point available.

## Chapter 4

# Set Up the Development Environment

1. Download **Amazon FreeRTOS** from SiFive's Amazon FreeRTOS repository:

<https://github.com/sifive/Amazon-FreeRTOS>

Be sure to select the proper configuration for the SiFive Learn Inventor.

2. Download the Windows, macOS, or Linux version of **Freedom Studio** from SiFive:

<https://www.sifive.com/boards>

Follow the installation steps in the **Freedom Studio User Manual**, available from:

<https://static.dev.sifive.com/dev-tools/FreedomStudio/2019.08/freedom-studio-manual-4.7.2-2019-08-2.pdf>

## Chapter 5

# Build the Amazon FreeRTOS Demo Project

1. Open Freedom Studio and enter a name for a new workspace.
2. From the **File** menu, choose **Import**.  
Expand **General** under **Import**, choose **Existing Projects into Workspace**, then choose **Next**.
3. In **Select Root Directory**, locate the download folder for Amazon FreeRTOS and enter:  
  

```
projects\sifive\hifive1_rev_b\freedom_studio\aws_demos
```
4. The `aws_demos` project should be selected by default.
5. Choose **Finish** to import the project into Freedom Studio.
6. From the **Project** menu, choose **Build All**.
7. Confirm that the project compiles without any errors.



## Chapter 6

# Run and Debug the Amazon FreeRTOS Demo Project

1. With the SiFive Learn Inventor connected to your computer with a USB cable, open Freedom Studio.
2. From **Project Explorer**, right-click `aws_demos`, choose **Debug As**, then choose **Debug Configurations**.
3. In the **Debug Configurations** dialog, right-click on **SiFive GDB SEGGER J-Link Debugging** and create a **new** debug configuration.
4. Click on the **Target DTS** tab and select the following **DTS File** path within the project:

```
aws_demos\application_code\sifive_code\bsp\PapayaConfig.dts
```

5. Click on the **Debugger** tab.  
In the **Device Name** drop-down, select **FE310 (use for HiFive1-revB)**.
6. Choose **Apply**, then click **Debug**.
7. When the debugger stops at the breakpoint in `main()`, from the **Run** menu, choose **Resume**.

## **Chapter 7**

# **Troubleshooting**

There are no known issues at this time.