CY8CKIT-064S0S2-4343W Provisioning Guide

Overview

This document provides instructions to provision the "Standard Secure" - AWS Wi-Fi BT Pioneer Kit (CY8CKIT-064S0S2-4343W) for connecting to AWS IoT Core. This is part of the AWS Getting Started with the Cypress CY8CKIT-064S0S2-4343W guide. Provisioning is a process whereby secure assets like keys and security policies are injected into the device. See the "Secure Boot" SDK User Guide for details about the PSoC 64 "Secure Boot MCU" provisioning process.

Install "Secure Boot" SDK

Follow these steps to install the "Secure Boot" SDK:

1. Install Python 3.7.4 or later on your computer. You can download it from https://www.python.org/downloads/.
2. By default, the Python installation adds itself to the system paths. If you have multiple versions of Python, follow these steps to ensure your system is using the correct version.
   a. Add the *python.exe* file location to the system variable "Path." For example: C:\Python37\
   b. Add the <Python installation directory>/Scripts subfolder to the system variable "PATH." For example: C:\Python37\Scripts
3. For setting up the Path environment variable:

   Windows: If Python 2.7 is also installed in the computer, make sure that Python37 and Python37\Scripts have higher priority in PATH than C:\Python27

   a. Open Control Panel, go to **System > Advanced System Settings > Environment Variables**.
   b. Find "PATH" in the list of user variables.
   c. Click **Edit**.
   d. Move "C:\Python37" and "C:\Python37\Scripts" to the top.
   e. Save changes and exit Control Panel
   f. Open a command-line/terminal program and run: `python --version` to verify python version.

   Linux: Most distributions of Linux should already have python2 and python3 installed. To verify that 'python' by default points to python3, run:

   ```
   python --version
   ```

   If python3 is not set as default run the following commands. The number at the end of each command denotes a priority

   ```
   update-alternatives --install /usr/bin/python python /usr/bin/python2.7 1
   update-alternatives --install /usr/bin/python python /usr/bin/python3.7 2
   ```

   MacOS: By default, 'python' points to /usr/bin/python which is python2. To make 'python' and 'pip' resolve to python3 versions, execute the following:

   ```
   echo 'alias python=python3' >> ~/.bash_profile
   echo 'alias pip=pip3' >> ~/.bash_profile
   source ~/.bash_profile
   ```

To verify that ‘python’ and ‘pip’ by default point to python3, run:

```
python --version
Python 3.7.4
pip --version
pip 19.0.3 from
/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/site-packages/pip
(python 3.7)
```

4. Install the "Secure Boot" SDK package by running the following command in your terminal window:

   ```
   pip install -U cysecuretools
   ```

5. Install the libusb dependency for pyOCD. Please check the README.md for the latest instructions on installing libusb.

   Note: During installation, there can be possible errors when installing colorama, protobuf and jsonschema. These can be safely ignored. For reference, you can use the following command to show the path to the installed package:

   ```
   pip show cysecuretools
   ```

   How to install libusb depends on your OS:

   - **macOS**: use Homebrew: brew install libusb
   - **Linux**: should already be installed.
   - **Windows**:

     a. Download libusb from libusb.info and place the DLL in your Python installation folder next to python.exe.

     b. Make sure to use the same 32- or 64-bit architecture as your Python installation.

     Note: Due to a known issue, the current recommendation is to use libusb version 1.0.21 on Windows instead of the most recent version.

Provision the Kit

Follow these steps to provision the kit:

1. Open your command-line/terminal program
2. In the command-line/terminal program navigate to:

   <freertos>/vendors/cypress/MTB/psoc6/psoc64tfm/security

3. Set up the FreeRTOS Workspace with the "Secure Boot" SDK.

   What does this step do?

   "CySecureTools" provides default policies and other secure assets that can be used to quickly set up the chip with development parameters, this step sets up the folder with all the required assets.

   Run the following command. You will be asked to overwrite files.

   ```
   cysecuretools --target CY8CKIT-064S0S2-4343W init
   ```

Provisioning Policy Overview:

The *policy_multi_cm0_cm4_tfm.json* file provided with the FreeRTOS repository sets up the chip with common security parameters used during development. The following table shows a high-level overview. For a detailed description of the policy parameters, refer to the "Secure Boot" SDK User Guide.

Feature	Policy setup
"Secured" co-processor Debug Port	Open
CM4 Debug Port	Open
SysAP Debug Port	Open
"Secured" co-processor (TF-M) Flash Size	320KB
CM4 (Application) Flash Size	1152KB
External Memory Enabled for Update?	Yes
Re-provisioning Enabled?	Yes

4. Create a new signing key pair(s) (mandatory).

   What does this step do?

   "CySecureTools" looks at the provided policy, which specifies how many keys are needed to provision the chip. For this project, two key pairs are generated under the /keys/ folder with the name TFM_S_KEY and TFM_NS_KEY.

   "CySecureTools" generates keys in two formats, PEM and JSON. Both the PEM and JSON files represent the same key.

   For a full description of what this does, refer to the "Secure Boot" SDK User Guide.

   The FreeRTOS package has default keys available, you can choose to create a new key pair to sign your firmware by running the below command.

   Note You will also be asked to overwrite files:

   ```
   cysecuretools --policy ./policy/policy_multi_CM0_CM4_tfm.json --target CY8CKIT-
   064S0S2-4343W create-keys
   ```

5. Connect the CY8CKIT-064S0S2-4343W Kit to your computer using the provided USB cable through the KitProg3 USB connector (J6).

   Ensure that the jumper shunt from J26 is removed to change VTARG voltage to 2.5 V and make sure jumper shunt on J14 is placed in VCC_3V3 position (between pin 2 and 3) before plugging in the kit to the computer. The 2.5 V supply is necessary for the next step, where PSoC 64 "Secure Boot" MCU eFuses are blown.

   Ensure the kit is in DAPLink mode. The Status LED (LED2) will be ramping ON/OFF fast (~2Hz) in this mode.

   Windows 7 KitProg3 driver issue:

   There is a known, sporadic issue with KitProg3 and Windows 7 that can prevent the kit from being recognized when you plug it in. Refer to the Troubleshooting section of the KitProg3 User Guide for information on how to resolve this.

6. Provision the device.

   What does this step do?

   This step sends the provisioning packet to the PSoC 64 "Secure Boot MCU" to finish provisioning.

   Run the following command in the command-line:

   ```
   cysecuretools --policy ./policy/policy_multi_CM0_CM4_tfm.json --target CY8CKIT-064S0S2-4343W provision-device
   ```

   Note: If you are using a pre-production kit, you will see a message such as:

   > *Early Production Units detected, please get earlier version of tools by running 'pip install --upgrade --force-reinstall cysecuretools==2.1.0'*

   If you have a kit which already has been provisioned before to allow re-provisioning, run the following command to re-provision it

   ```
   cysecuretools --policy ./policy/policy_multi_CM0_CM4_tfm.json --target CY8CKIT-064S0S2-4343W re-provision-device
   ```

7. Move the kit back to 3.3V.

   Disconnect the kit from power and then put a shunt back on jumper J26 to the power to 3.3 V.

8. Move the kit back to CMSIS-DAP Bulk mode.

   Reconnect the kit to power then press and release the Mode button (SW3) one or more times until the KitProg3 is in CMSIS-DAP Bulk mode. The Status LED (LED2) will be solid in this mode.

Congratulations! Your kit is now provisioned and is ready to accept signed firmware.

Revision History

Document Title: CY8CKIT-064S0S2-4343W Provisioning Guide

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Revision	ECN No.	Change Descriptions
**	6944129	Initial document.
*A	7072803	Changed "optional" to "mandatory" in section 1.2 step 4.
*B	7121985	Updated instructions to include a message about pre-production versions of the kit.