QuarkLink Freemium Getting Started Guide

Version V1.00

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1 Scope

Welcome to the ***Crypto Quantique (CQ) QuarkLink (Freemium) Quick Start Guide***. This user guide is designed to provide information to users who have signed up for a Freemium version of the QuarkLink security platform.

2 Reference Material

The following additional reference material is recommended for review prior to using the Freemium QuarkLink security platform:

- QuarkLink User Guide V1.30
- QuarkLink Demonstration Videos (https://www.youtube.com/@CryptoQuantique)
- Crypto Quantique GitHub (https://github.com/cryptoquantique)

3 QuarkLink Freemium Hardware

The Freemium QuarkLink includes support for the Espressif Systems ESP32 family of RISC-V Wireless modules. The user requires an ESP32-C3 compatible module that includes USB connectivity in order to create a connected IoT device using the QuarkLink. Examples of ESP32 modules are available from electronics distributors. Some examples are shown below:

- M5eduKit (M5Stack)

- ESP32-DevKitM-1

4 Getting Started

Once a user has signed up to a Freemium version of QuarkLink (see ***Signup*** section of ***Freemium QuarkLink User Guide***) they will be sent an activation email with instructions on how to log into their new QuarkLink instance. It is assumed that the reader has completed this task and has access to their Freemium QuarkLink.

Signup can be accessed via the Freemium website : https://signup.quarklink.io/.

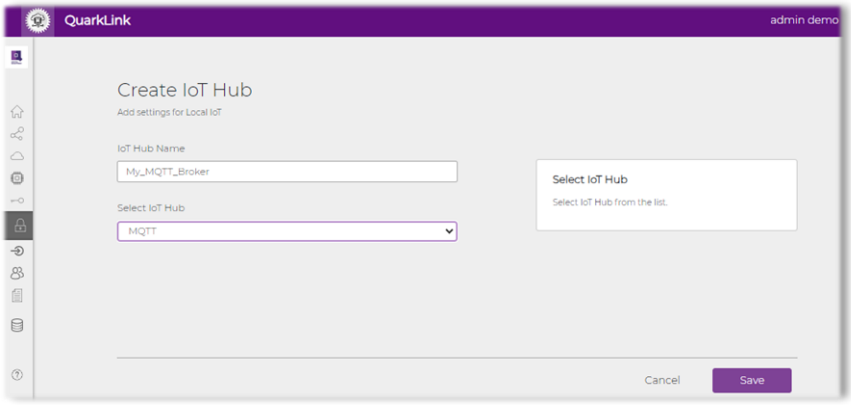
With access to a QuarkLink, a user can now build an IoT device (based on the ESP32) and connect it to either an IoT Hub (AWS or Azure), an MQTT broker or directly to a database (e.g.; Mongo Atlas).

This guide will take the user, step by step, through the process of provisioning an ESP32 such that it connects securely to the QuarkLinks local MQTT broker.

4.1 Creating an MQTT Broker

The QuarkLink needs to be configured to create and MQTT broker that will be used by the IoT device to receive and transmit messages (see ***Freemium QuarkLink User Guide*** section 12.4 for more information on MQTT broker support).

1. Log into the Freemium QuarkLink and click on the ***IoT Hubs*** menu option (left hand menu).
2. Click the ***Create IoT Hub*** button.



3. In the Create IoT Hub dialogue box enter the following information :

   IoT Hub Name : ***My_MQTT_Broker***
   Select IoT Hub : ***MQTT***

4. Click the ***Save*** button.

You have now created an MQTT broker instance for your QuarkLink. The MQTT broker URL and port is shown below :

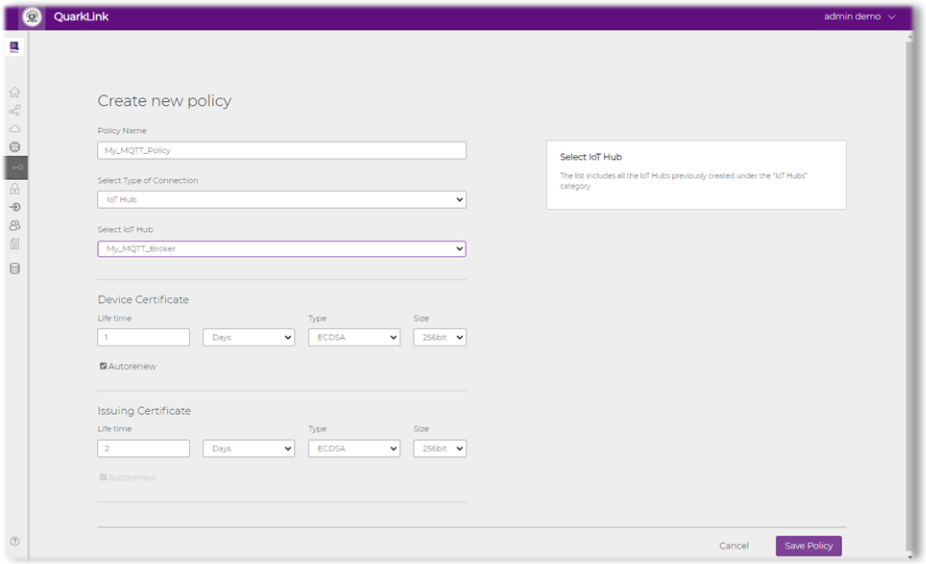
https://<quarklink_instance_name>.quarklink.io:8883

The IoT device that will be created can publish and subscribe to topics via this URL and port. Topics will be handled by the broker as appropriate supporting one to many and many to one capabilities.

4.2 Configuring the MQTT Policy

When an IoT device enrols onto the QuarkLink and has been securely authenticated, it will then be sent device credentials which include end point information and signed certificates dependant on what type of cloud service the device has been configured to connect to. The QuarkLink must be configured such that each enrolled device is sent the correct information based on a secure policy. The next step is to create a security policy for the MQTT broker created in section 4.1.

5. Click on the ***Policies*** menu option (left hand menu) of the Dashboard.
6. Click the ***Create new policy*** button.



7. In the Create new policy dialogue box enter the following information :

   Policy Name : ***My_MQTT_Policy***
   Select Type of Connection : ***IoT Hub***
   Select IoT Hub : ***My_MQTT_Broker*** (will be in dropdown menu).

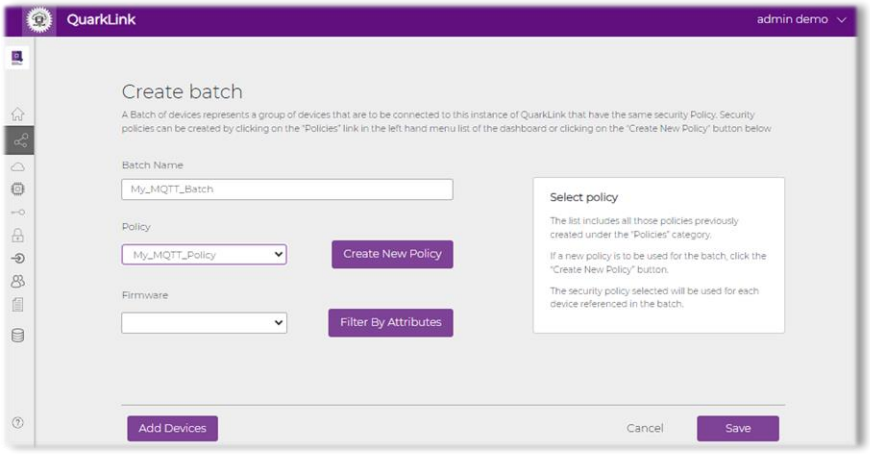
   All other inputs leave as default (see above).
8. Click the ***Save Policy*** button.

4.3 Creating a Batch

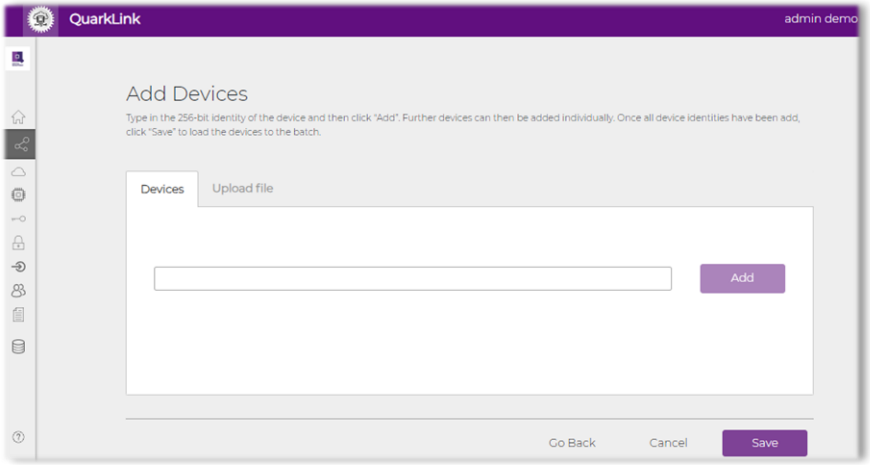
Prior to a device being recognised and authenticated by QuarkLink, the IoT devices identity must be configured into a ***Batch***. A ***Batch*** is a group of IoT devices that are associated with a security policy. The ***Batch*** links the IoT devices identity to a security policy. In this section we create a ***Batch*** that is associated with our security policy (see section 4.2). There a now IoT device identities that we can enter into the batch at this stage because we have not provisioned our IoT device. The provisioning step will program the IoT device and automatically load the IoT device identity into the ***Batch*** created in this section.

9. Click on the ***Devices*** menu option (left hand menu) of the Dashboard.
10. Click the ***Create Batch*** button.
11. In the Create Batch dialogue box enter the following information (see below) :

    Batch Name : ***My_MQTT_Batch***
    Policy : ***My_MQTT_Policy***
    Firmware : no entry



12. Click the ***Add Devices*** button.



The ***Devices*** will be automatically added during the provisioning step (see section ?????). No information is required to be added in this dialogue box (see above).

13. Click the ***Save*** button.

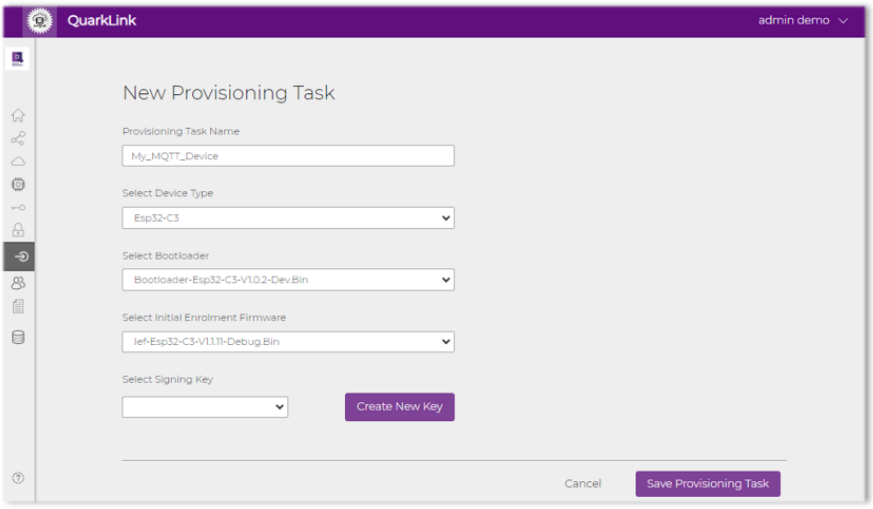
4.4 Creating a Provisioning Task

At this stage of the procedure the QuarkLink has been prepared to enrol, create and deliver security credentials' to an IoT device once it has been authenticated. This next step is required to configure the QuarkLink provisioning tool which will carry out the following :

a. Program the IoT device with a secure bootloader
b. Program the IoT device with an Initial Enrolment Firmware
c. Extract the IoT device identity and add it to ***My_MQTT_Batch***.
d. Configure the IoT device with the local WiFi credentials to allow it to connect to the local WiFi network.

14. Click on the ***Provisioning*** menu option (left hand menu) of the Dashboard.
15. Click the ***New Provisioning Task*** button.
16. In the New Provisioning Task dialogue box enter the following information (see below) :

    Provisioning Task Name : ***My_MQTT_Device***
    Select Device Type : ***Esp32-c3***
    Select Bootloader : ***Bootloader-Esp32-C3-V1.0.2-Dev.Bin***
    Select Initial Enrolment Firmware : ***Ief-Esp32-C3-V1.1.11-Debug.Bin***

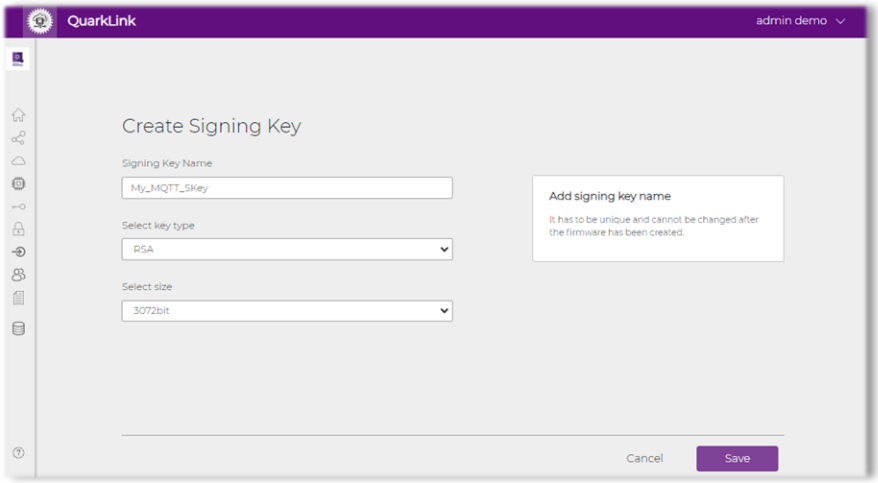


17. Click the ***Create New Key*** button.

    In this step, we will create a signing key that will be used to sign any firmware that is uploaded to the IoT device and is verified by the secure bootloader.

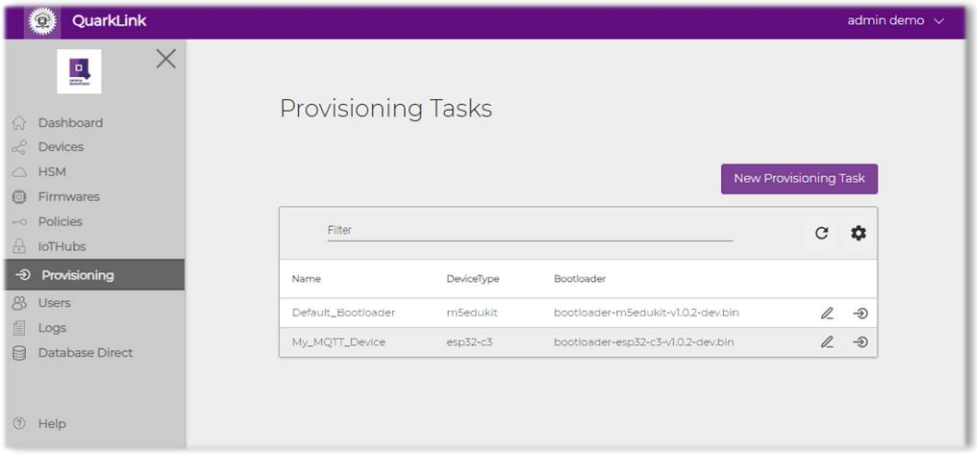
18. In the Create Signing Key dialogue box enter the following information (see below):

    Signing Key Name : ***My_MQTT_SKey***
    Select Key Type : ***RSA***
    Select Size : ***3072bit***



19. Click the ***Save*** button.

    The new provisioning task with be shown in the ***Provisioning Tasks*** table.



The QuarkLink is now ready to program an IoT device.

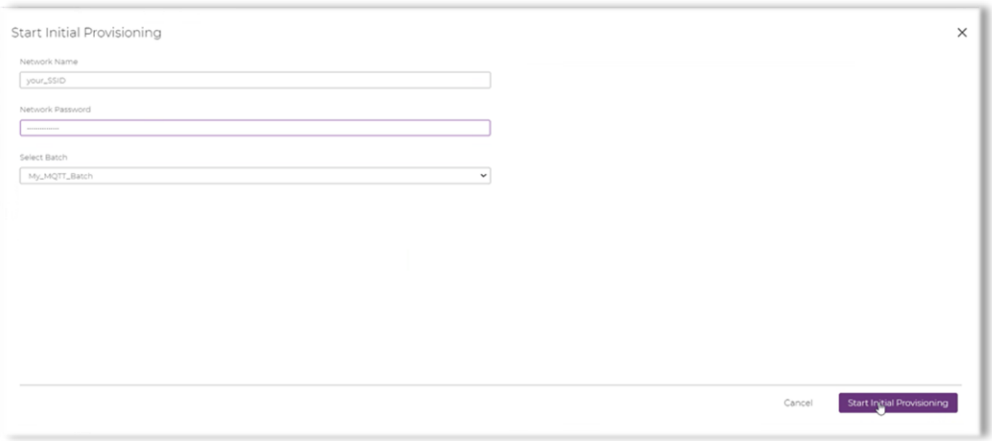
4.5 Provisioning an IoT device

Now we will prepare an IoT device for connection (enrolment) onto a QuarkLink, capability to receive firmware updates and communication with an MQTT broker. Once provisioned, the provisioning tool will extract the IoT device identity and copy it to the selected ***Batch***.

20. Connect an Esp32-C3 IoT device (see section 3) to the PC/Laptop that is running the QuarkLink in a browser via a USB cable.

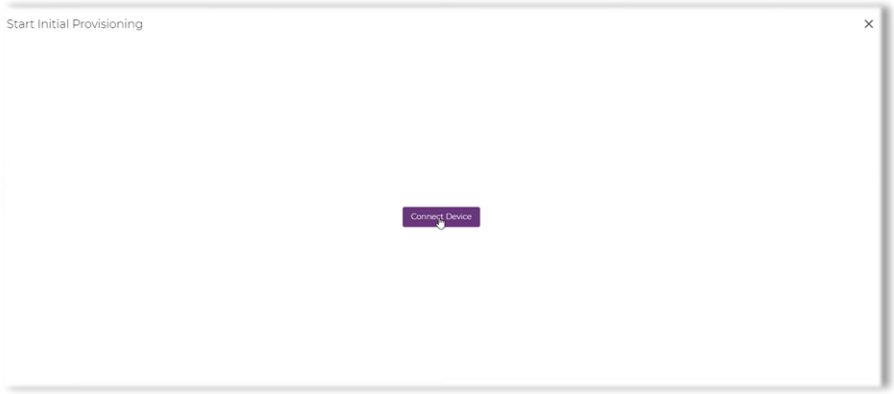
21. Click the  button.
    In the dialogue box that opens, enter the following information (see below):

    Network Name : The SSID of your local WiFi network (no spaces)
    Network Password : WiFi network password
    Select Batch : ***My_MQTT_Batch***



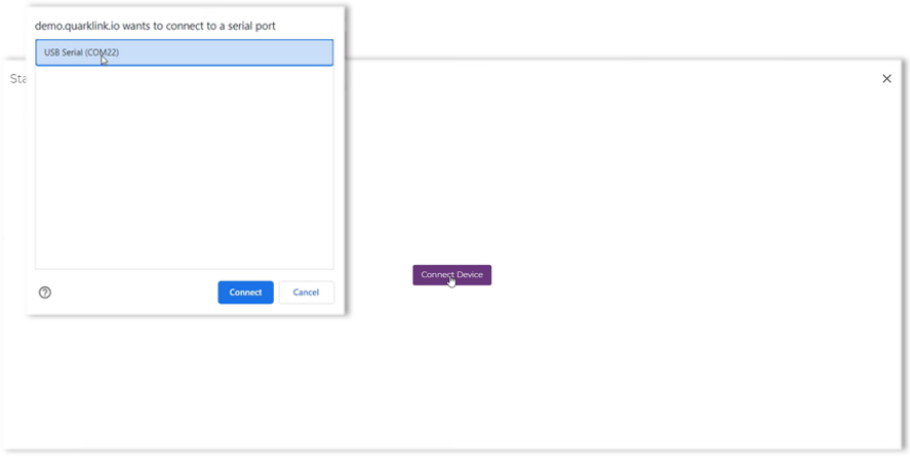
22. Click the ***Start Initial Provisioning*** button.

The dialogue box below will be shown.

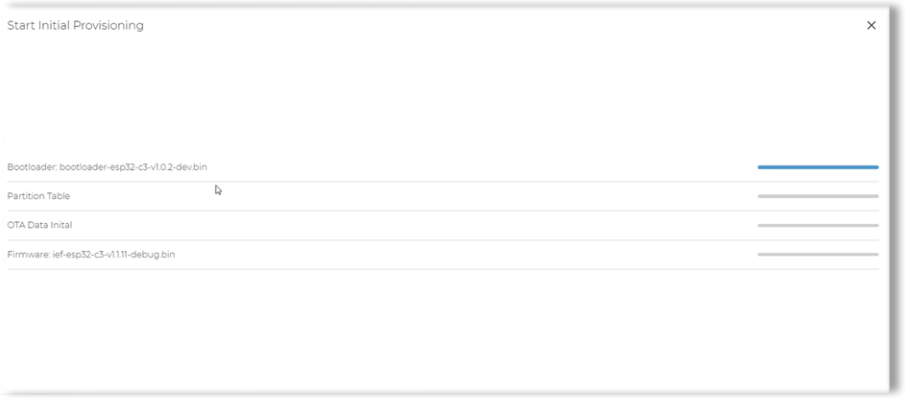


23. Click ***Connect Device***.
    The provisioning tool will now search the COM Ports of the PC/Laptop and display their descriptions.

24. Click on the correct IoT device description for your device and then click the ***Connect*** button (see below).

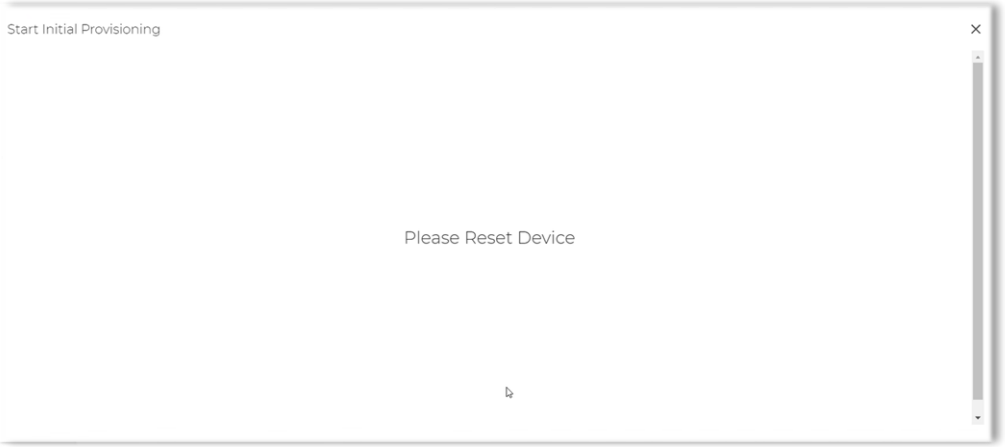


The provisioning tool will now provision the IoT device. The following screens will be displayed during the provisioning process.

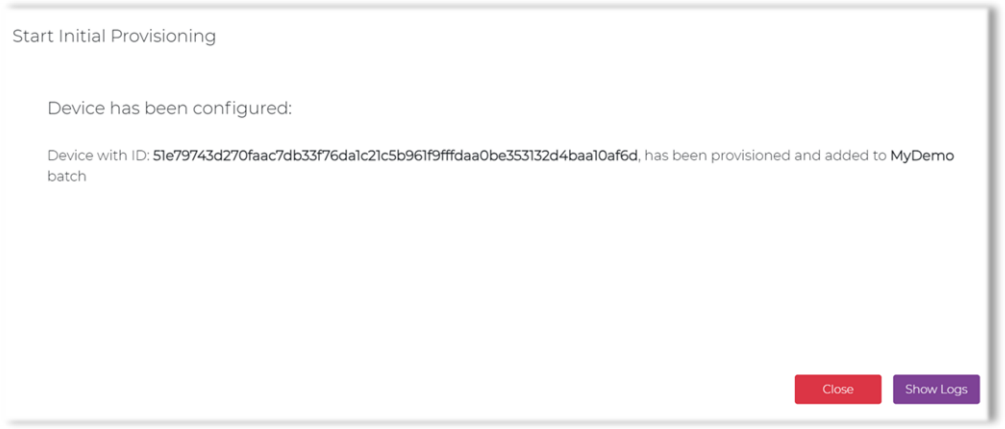


On completion of this screen the IoT device bootloader and IEF have been programmed.

On completion of this step, the WiFi credentials have been programmed into the device, the unique device identity has been extracted and sent to the Batch in the QuarkLink.



25. Press the reset switch/button on the Esp32-C3 IoT device.
    The IoT device will now reset and the provisioning tool will display the configuration settings of the IoT device that has just been provisioned. The dialogue box will also include a log of the entire provisioning process (see below).



Please note the ***DeviceID*** (recommend to copy and save to a file on the PC/Laptop).

26. Optionally, click the Show ***Logs*** button to display the log of the provisioning process (see below).

27. Close the ***Start Initial Provisioning*** dialogue box by clicking on the ***Close*** button.

5 Revision History

Freemium Getting Started Guide

Rev.	Date	Owner	Description
1.00		CDJ	Original document

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