Install Example Image on eMMc

SIMATIC IOT2050 Advanced - 6ES7647-0BA00-1YA2

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1 Task

1.1 Overview

Introduction

The first batches of the IOT2050 Advanced are delivered without any OS pre-installed on the eMMc. This document describes how to install the Example Image to the eMMc of the IOT2050 Advanced.

Goals

After working through this document, you know how to

- Install Example Image to the eMMc of IOT2050 Advanced

2 Requirements

2.1 Required Hardware

This chapter contains the hardware required for this Setting up.

SIMATIC IOT2050

This document is only valid for the IOT2050 Advanced (6ES7647-0BA00-1YA2) since only the Advanced version has an internal eMMc.

Micro-SD Card / USB flash drive

A Micro-SD card or USB flash drive is used for running the Example image and transfer the image to the eMMc.

Engineering Station

To work with the SIMATIC IOT2050 an Engineering Station is required. In this document a PC with Windows 10 Enterprise is used.

The Engineering Station has to include the following Interfaces:

- SD Card Slot
- Ethernet Port

Ethernet cable

For an Ethernet Connection between the Engineering Station and the SIMATIC IOT2050 in order to establish a SSH an Ethernet cable is required.

DisplayPort Cable (Male-Male) and Monitor

If you would like to have local connection to the SIMATIC IOT2050, you need to have DisplayPort Cable and a monitor that supports DisplayPort.

Keyboard

If you would like to have local connection to the SIMATIC IOT2050, you need to have a keyboard connected to IOT2050.

Power supply

In order to run the SIMATIC IOT2050 a power supply is required.

This power supply has to provide between 12V and 24V DC.

2.2 Required Software

This chapter contains the software required for this document.

Micro-SD Card Example Image

To use the full functionality of the SIMATIC IOT2050 a SD-Card Example Image with a Debian based Linux Operating System is necessary to be installed. This Image is provided through the Siemens Industry Online Support.

It can be downloaded here.

ssh Client

To get remote access to the SIMATIC IOT2050 a ssh client is required.

In this document “PuTTY” is used. With this software it is possible to establish a connection to different devices for example via Serial, SSH or Telnet.

The “PuTTY” software can be downloaded here.

NOTE Instead of PuTTY you also can use Windows 10 or Linux built-in ssh client.

Win32 Disk Imager

In order to put the SD Card image to the µSD Card software is needed.

In this Setting Up the Win32 Disk Imager is used.

The “Win32 Disk Imager” can be downloaded here.

NOTE All existing data on the SD Card will be removed!

3 Operating

This chapter describes the steps necessary to install and start up the Example Image to/from the eMMc of the SIMATIC IOT2050 Advanced.

For the necessary software components please refer to the download links in chapter 2.2

3.1 General description

For flashing the Example Image to the eMMc we need a running OS on the IOT2050. Therefore, we use the Example Image installed on a USB flash drive or SD card.

We copy the file *"IOT2050_Example_Image_V1.0.2.img"* to the same or a different removable device.

When running the Example Image we can make use of the Linux tool ***dd*** to flash the *"IOT2050_Example_Image_V1.0.2.img"* file to the eMMc.

Basically, we use the Example Image running on a removable device to flash the Example Image to the internal eMMc.

There are two different ways to do so:

1. Using one single USB flash drive / SD card
2. Using two different USB flash drives / SD card
    a. One for running the Example Image
    b. One for transferring the Example Image to the eMMc

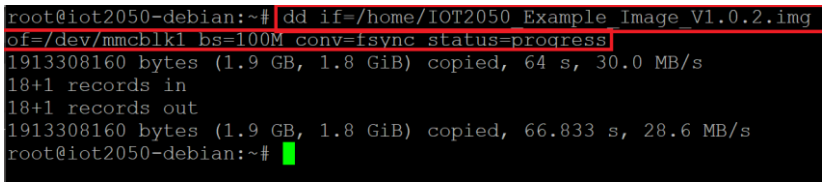
3.2 Prerequisites

- You know how to flash the SD-Card Example image to a SD-card or USB flash drive. This is described in the document **SIMATIC IOT2050 Setting Up**
- The eMMC is empty! This procedure works only for the first time with an empty eMMC.

3.3 Use one single USB flash drive

For this procedure you need a Linux PC in order to access the file system of the USB flash drive the Example Image is written to.

Table 3-1

No.	Action
1.	Flash the Example Image to an USB flash drive or SD card using e.g Win32DiskImager
2.	Boot the IOT2050 once from this stick to resize the filesystem of the USB flash drive. Otherwise the flash drive is too small to perform step 3. Boot is finished if STAT LED flashes green.
3.	Mount this USB flash drive or SD card to a Linux PC and copy the file *"IOT2050_Example_Image_V1.0.2.img"* to it (e.g to /home)
4.	Plug the USB flash drive or SD card into the IOT2050 and connect power. The IOT2050 should boot up.
5.	Connect to the IOT2050 using ssh or a monitor and login as root
6.	Use *dd* to flash the *"IOT2050_Example_Image_V1.0.2.img"* from the USB flash drive / SD card to the internal eMMc: ***dd if=/home/IOT2050_Example_Image_V1.0.2.img of=/dev/mmcblk1 bs=100M conv=fsync status=progress***  *if=/home/IOT2050_Example_Image_V1.0.2.img:* This is the image file path *of=/dev/mmcblk1:* This is the block device path of the eMMC *bs=100M:* Write 100MB at a time *conv=fsync:* Sync to device before finishing *status=progress:* Show progress status
7.	Power off the IOT2050
8.	Remove the USB flash drive / SD card
9.	Power on the IOT2050. The IOT2050 boots now into eMMc

3.4 Use two different USB flash drives

If you cannot perform step 2 of chapter 3.3 because you don't have a Linux PC, you can use another USB flash drive to copy the file *"IOT2050_Example_Image_V1.0.2.img"* to.

Table 3-2

No.	Action
1.	Flash the Example Image to the first USB flash drive or SD card using e.g Win32DiskImager
2.	Plug the first USB flash drive or SD card into the IOT2050 and connect power. The IOT2050 should boot up.
3.	Copy the file *"IOT2050_Example_Image_V1.0.2.img"* to a second USB stick
4.	Connect the second USB stick with file to the IOT2050
5.	Connect to the IOT2050 using ssh or a monitor and login as root
6.	Mount the second USB stick to the file system: **mkdir /mnt/USB** **mount /dev/sdb1 /mnt/USB** `root@iot2050-debian:~# mkdir /mnt/USB` `root@iot2050-debian:~# mount /dev/sdb1 /mnt/USB` `root@iot2050-debian:~# cd /mnt/USB` `root@iot2050-debian:/mnt/USB# ls` `IOT2050 Example Image V1.0.2.img 'System Volume Information'` `root@iot2050-debian:/mnt/USB#` It is most likely /dev/sdb1 if using USB flash drive as device in step 1 It is most likely /dev/sda1 if using SD card as device in step 1 You can doublecheck with the command *fdisk -l* before mounting
7.	Use *dd* to flash *"IOT2050_Example_Image_V1.0.2.img"* from the second USB flash drive to the internal eMMc: ***dd if=/mnt/USB/IOT2050_Example_Image_V1.0.2.img of=/dev/mmcblk1 bs=100M conv=fsync status=progress*** `root@iot2050-debian:~# dd if=/mnt/USB/IOT2050_Example_Image_V1.0.2.img of=/dev/mmcblk1 bs=100M conv=fsync status=progress` `1913308160 bytes (1.9 GB, 1.8 GiB) copied, 51 s, 37.3 MB/s` `18+1 records in` `18+1 records out` `1913308160 bytes (1.9 GB, 1.8 GiB) copied, 53.9229 s, 35.5 MB/s` `root@iot2050-debian:~#` *if=/mnt/USB/IOT2050_Example_Image_V1.0.2.img:* This is the image file path *of=/dev/mmcblk1:* This is the block device path of the eMMC *bs=100M:* Write 100MB at a time *conv=fsync:* Sync to device before finishing *status=progress:* Show progress status
8.	Power off the IOT2050
9.	Remove the USB flash drives / SD card
10.	Power on the IOT2050. The IOT2050 boots now into eMMc

4 Related links

Table 4-1

	Topic
\1\	SIMATIC IOT2050 forum https://support.industry.siemens.com/tf/ww/en/threads/309w
\2\	Download SD-Card Example Image https://support.industry.siemens.com/cs/ww/en/view/109780231
\3\	Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/109779016
\4\	Initial Setup (Setting Up) of the IOT2050 https://support.industry.siemens.com/tf//ww/en/posts/238945/

5 History

Table 5-1

Version	Date	Modifications
V1.0	06/2020	First version