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SIMATIC IOT2050 Firmware Update

SIMATIC IOT2050 Basic - 6ES7647-0BA00-0YA2

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



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1 Task

1.1 Overview

Introduction

To be able to use the **Example Image V1.3.1** and the **Industrial OS V3.x**, it is required to update the firmware of the following devices:

IOT2050 Basic	(6ES7 647-0BA00-0YA2)	FS:01
IOT2050 Basic	(6ES7 647-0BA00-0YA2)	FS:02
IOT2050 Advanced	(6ES7 647-0BA00-1YA2)	FS:01
IOT2050 Advanced	(6ES7 647-0BA00-1YA2)	FS:02
IOT2050 Advanced	(6ES7 647-0BA00-1YA2)	FS:03
IOT2050 Advanced	(6ES7 647-0BA00-1YA2)	FS:04

**WARNING**

After the firmware update it is **not possible** anymore to boot the following operating systems:

- Example Image V1.0.2
- Industrial OS V2.x

NOTE

The **Example Image V1.1.1 and V1.2.2** can be used with the old and new firmware on the mentioned devices

Goals

After working through this document, you should know how to

- Update the firmware of a SIMATIC IOT2050

2 Requirements

2.1 Required Hardware

This chapter contains the hardware required for the firmware update.

SIMATIC IOT2050 Basic / Advanced

The SIMATIC IOT2050 Basic (6ES7647-0BA00-0YA2) with **FS:01 and FS:02** and the SIMATIC IOT2050 Advanced (6ES7647-0BA00-1YA2) with **FS:01, FS:02, FS:03 and FS:04** are **required to be updated** in order to use Example Image V1.3.1 and Industrial OS V3.x

The SIMATIC IOT2050 Basic (6ES7647-0BA00-0YA2) with **FS:04** and the SIMATIC IOT2050 Advanced (6ES7647-0BA00-1YA2) with **FS:05** are **recommended to be updated** in order to use Example Image V1.3.1 and Industrial OS V3.x

µSD card / USB flash drive / eMMC

To boot from Example Image V1.1.1 / V1.2.2 to perform the update, either a µSD card or USB drive is required. For the IOT2050 Advanced the internal eMMC can be used as well

Power supply

In order to run the SIMATIC IOT2050 a power supply is required.
This power supply has to provide between 12 and 24V DC.

Engineering Station

To get remote access to the SIMATIC IOT2050 and to transfer files an Engineering station is required. In this example a PC with Windows 10 Enterprise is used.

Ethernet cable

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

2.2 Required Software

This chapter contains the software required for the firmware update.

Example Image V1.1.1 / V1.2.2

To update the firmware of the IOT2050, the Example Image **V1.1.1** or **V1.2.2** is required. The firmware update cannot be performed with Example Image V1.0.2 or Industrial OS V2.x.

NOTE For IOT2050 Basic from FS:02 and IOT2050 Advanced from FS:04 Example Image V1.2.2 is required to perform the update

Firmware Update tool and firmware file

To update the firmware, the firmware update tool and the firmware file itself are required.

- Tool: iot2050-firmware-update_0.2_arm64.deb
- Firmware: IOT2050-FW-Update-PKG-V01.03.01.01.tar.xz

Both files can be downloaded [here](#).

ssh Client

To get remote access to the SIMATIC IOT2050 software 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.

WinSCP or USB flash drive

To copy the files from the Engineering Station to the IOT2050 per Drag&Drop, the software WinSCP can be used.

WinSCP can be downloaded [here](#).

As an alternative a USB flash drive can be used to transfer the data

3 Operating

This chapter describes the steps necessary to update the firmware of the SIMATIC IOT2050 from any older version to version **2022.01-V01.03.01.01-0-gffc3caf** in order to be able to use Example Image from V1.3.1 and Industrial OS V3.x.

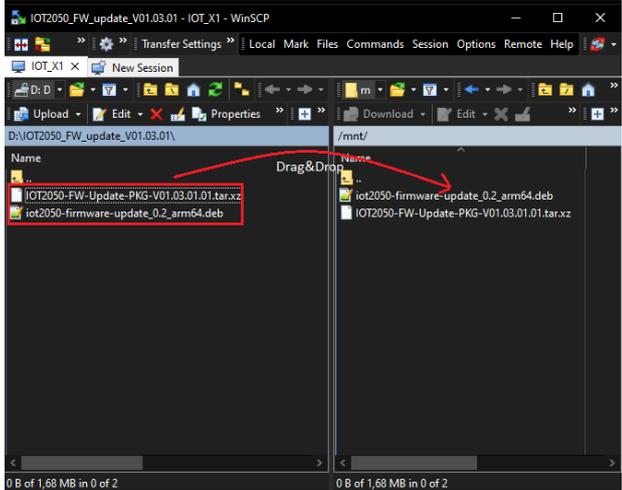
Precondition

The IOT2050 is set up with the **Example Image V1.1.1 or V1.2.2!**
Otherwise the firmware update cannot be executed.

3.1 Transfer required software

Both, the firmware update tool and the firmware file, need to be copied from the Engineering station to the IOT2050. In this example both files are copied to the directory `/mnt`

Table 3-1

No.	Action
1.	<p>Make sure the IOT2050 is running Example Image V1.1.1 / V1.2.2</p> <pre data-bbox="507 884 1134 1272">cat /etc/os-release root@iot2050-debian:~# cat /etc/os-release PRETTY_NAME="Debian GNU/Linux 11 (bullseye)" NAME="Debian GNU/Linux" VERSION_ID="11" VERSION="11 (bullseye)" VERSION_CODENAME=bullseye ID=debian HOME_URL="https://www.debian.org/" SUPPORT_URL="https://www.debian.org/support" BUG_REPORT_URL="https://bugs.debian.org/" BUILD_ID="V01.02.02-0-g883c59c" VARIANT="IOT2050 Debian Example Image" VARIANT_VERSION="1.0" root@iot2050-debian:~# █</pre> <p>If you ran <code>apt upgrade</code> before, the firmware update won't work, because the <code>BUILD_ID</code> is removed from this file. In this case use a fresh Example Image V1.1.1 / V1.2.2</p>
2.	<p>Establish a connection with WinSCP to copy the downloaded files to the IOT2050</p> 

3.2 Optional: Clean eMMC on IOT2050 Advanced

Since the Firmware V1.3.1 is not able to boot the Example Image V1.0.2 and Industrial OS V2.x, it may be required to clear the eMMC before updating the firmware when either Example Image V1.0.2 or Industrial OS V2.x is installed on it.

The update asks whether the current boot order should be kept or set back to defaults.

If your current boot order has *mmc0* or *usbx* as first boot device and you keep the current settings, erasing the eMMC is not mandatory.

If mmc1 is the first boot device or you reset the current settings, clearing the eMMC beforehand is mandatory to guarantee the device will run after the update and not stuck due to an incompatible OS.

Table 3-2

No.	Action
1.	<pre> Clear the eMMC mkfs.ext4 /dev/mmcblk1 root@iot2050-debian:~# mkfs.ext4 /dev/mmcblk1 mke2fs 1.46.2 (28-Feb-2021) Found a dos partition table in /dev/mmcblk1 Proceed anyway? (y,N) y Discarding device blocks: done Creating filesystem with 3885056 4k blocks and 972944 inodes Filesystem UUID: 46032714-53df-4644-ab95-af2290f1c25a Superblock backups stored on blocks: 32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208 Allocating group tables: done Writing inode tables: done Creating journal (16384 blocks): done Writing superblocks and filesystem accounting information: done root@iot2050-debian:~# █ </pre>

3.3 Install firmware update tool

In order to update the firmware of the IOT2050 the latest version of the update tool needs to be installed.

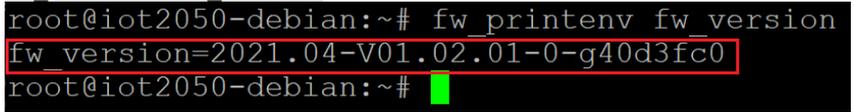
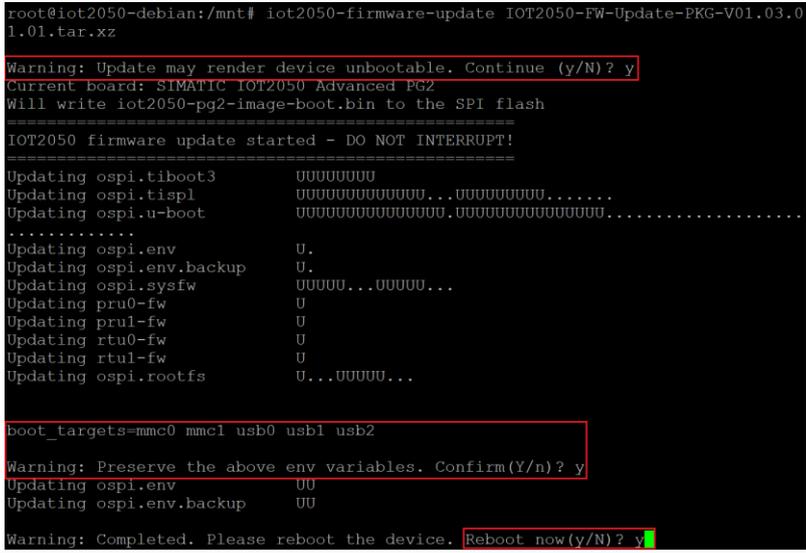
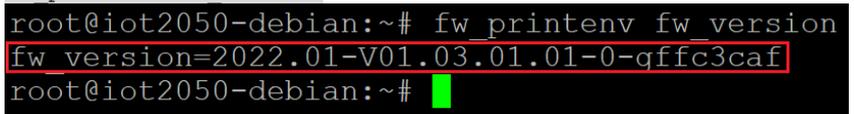
Table 3-3

No.	Action
1.	Uninstall the pre-installed update tool <pre>dpkg -r iot2050-firmware-update root@iot2050-debian:~# dpkg -r iot2050-firmware-update (Reading database ... 58008 files and directories currently installed.) Removing iot2050-firmware-update (0.1) ... root@iot2050-debian:~# █</pre>
2.	Change directory to <code>/mnt</code> (or any other directory, where the two files have been copied to) <pre>cd /mnt</pre>
3.	Install the proper version of the update tool <pre>dpkg -i iot2050-firmware-update 0.2 arm64.deb root@iot2050-debian:~# cd /mnt root@iot2050-debian:/mnt# dpkg -i iot2050-firmware-update_0.2_arm64.deb Selecting previously unselected package iot2050-firmware-update. (Reading database ... 58005 files and directories currently installed.) Preparing to unpack iot2050-firmware-update_0.2_arm64.deb ... Unpacking iot2050-firmware-update (0.2) ... Setting up iot2050-firmware-update (0.2) ... root@iot2050-debian:/mnt# █</pre>

3.4 Update firmware

Now the firmware can be updated.

Table 3-4

No.	Action
1.	<p>Check currently installed firmware</p> <pre>fw printenv fw version</pre>  <p>NOTE: The update can be performed from any older firmware as well.</p>
2.	<p>Update the firmware</p> <pre>iot2050-firmware-update IOT2050-FW-Update-PKG-V01.03.01.tar.xz</pre> <p>and confirm that the device may become unbootable with (Y) This won't be the case if everything is done as described!</p> <p>The update process will begin</p> <p>After that the current boot order is displayed. Decide whether to keep it (Y) or reset it to defaults (n)</p> <p>Reboot the device with (Y)</p> 
3.	<p>Check installed firmware version after reboot</p> <pre>fw printenv fw version</pre> 

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\	How to setup the IOT2050 with Example Image https://support.industry.siemens.com/tf/ww/en/posts/238945/
\4\	Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/109779016

5 History

Table 5-1

Version	Date	Modifications
V1.0	01/2022	First version
V1.1	03/2022	Added requirement to clear eMMC before update
V1.3	04/2023	Change process to firmware V1.3.1