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Setting up the IOT2050 with Example Image

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



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1 Task

1.1 Overview

Introduction

This Setting Up shows how to set up the SIMATIC IOT2050 with a SD-Card image (“Example Image”) provided through the Siemens Industry Online Support.

Goals

After working through this document, you know how to

- Locally access to the SIMATIC IOT2050
- Get remote access to the SIMATIC IOT2050
- Change the IP-Address of the SIMATIC IOT2050
- Install software on the SIMATIC IOT2050
- Change the boot order of an IOT2050

2 Requirements

2.1 Required Hardware

This chapter contains the hardware required for this Setting up.

SIMATIC IOT2050

Two different versions of the SIMATIC IOT2050 are available. However, this Setting Up will only use the SIMATIC IOT2050 Basic (6ES7647-0BA00-0YA2) as basis for all examples, but it is valid for SIMATIC IOT2050 Advanced (6ES7647-0BA00-1YA2) as well.

SIMATIC IOT2050 (6ES7647-0BA00-0YA2)

Hardware Overview:

- TI SOC AM6528 GP Dual Core
- 1 GB RAM (DDR4)
- 2 Ethernet interfaces 100/1000 Mbps
- 2 USB Type A
- 1 COM interface (RS232/422/485)
- 1 DisplayPort 1.1 A

2 Requirements

Figure 2-1

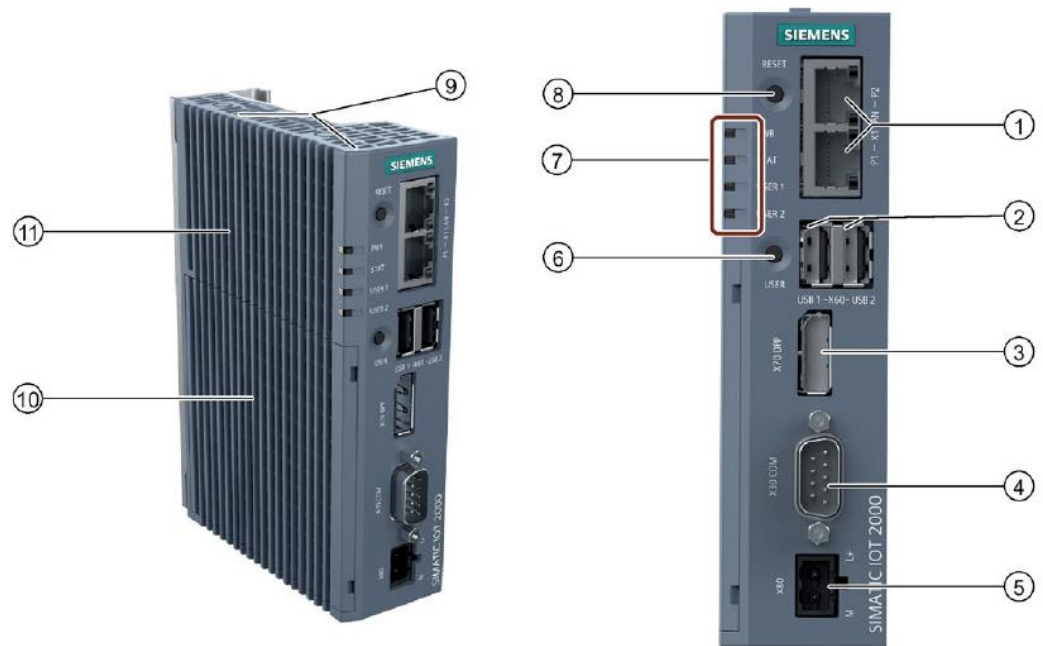


Table 2-1

No.	Description
1	Ethernet interfaces 100/1000 Mbps
2	USB Type A
3	DisplayPort 1.1 A
4	COM interface (RS232/422/485)
5	Power supply connector
6	USER button, programmable
7	LED display
8	RESET button for the CPU
9	Markings for mini PCIe installation accessory
10	Shield cover
11	Top housing

Micro-SD Card

SIMATIC IOT2050 can be operated with a Debian based Linux Operating System, which requires the use of a Micro-SD Card.

The requirement for using SIMATIC IOT2050 with Debian based Linux Operating System is a Micro-SD Card with storage capacity from 8GB up to 32GB.

Engineering Station

To work with the SIMATIC IOT2050 an Engineering Station is required. In this Setting Up 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 connection and to download the Eclipse projects an Ethernet cable is required.

UART cable (optional, but recommended)

To establish a serial connection to the IOT2050 in order to get into the u-boot shell a 3.3V USB-UART cable is needed.

There are many hardware possibilities, good experiences were made with [this cable](#).

DisplayPort Cable (Male-Male) and Monitor

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

As alternative an **active** DP-HDMI converter can be used.

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 12 and 24V DC.

2.2 Required Software

This chapter contains the software required for this Setting up.

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.

The download and information about compatibility can be found [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.

Win32 Disk Imager

In order to put the SD Card image to the μ SD 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 SIMATIC IOT2050 using the hard- and software listed above.

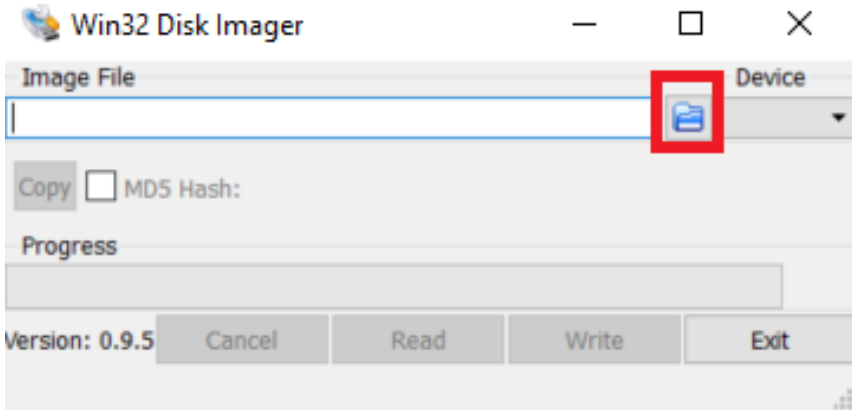
For the necessary software components please refer to the download links in [Chapter 2.2](#)

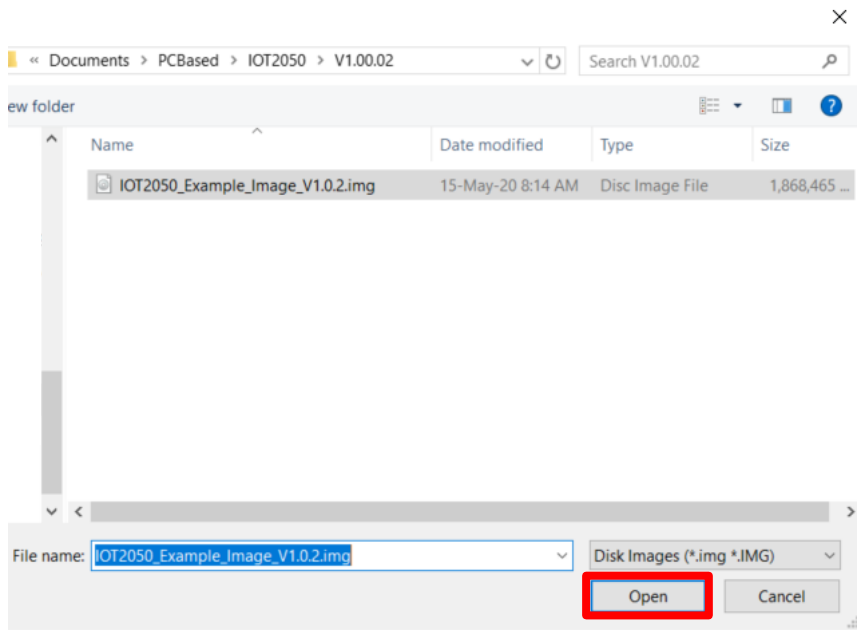
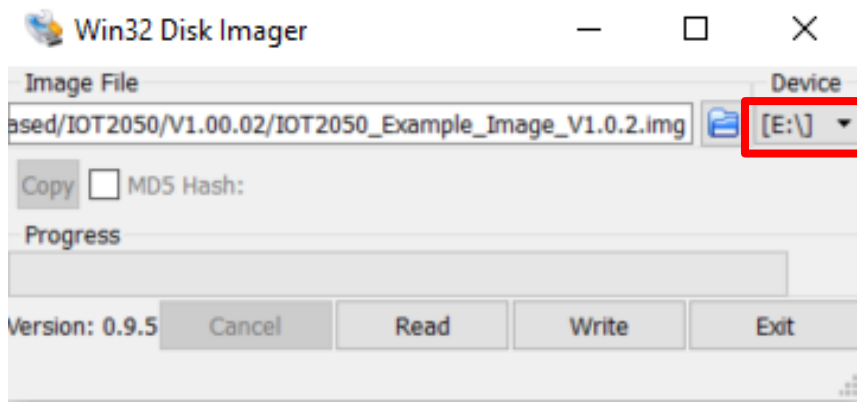
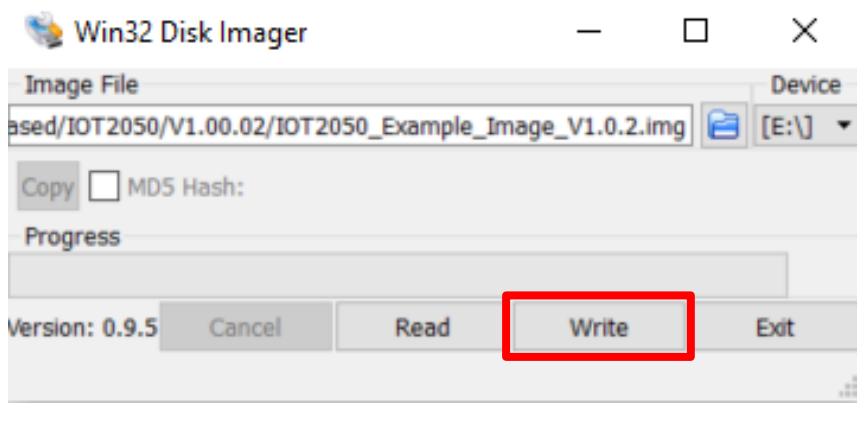
3.1 Installing the SD-Card Example Image

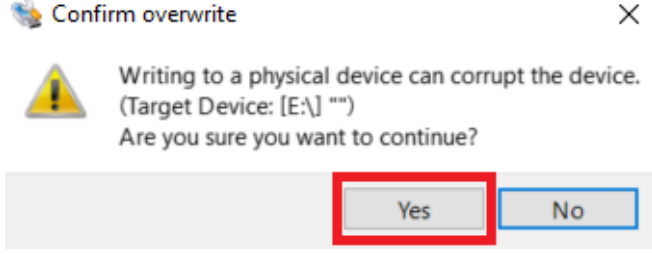
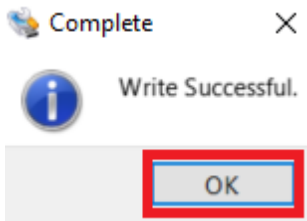
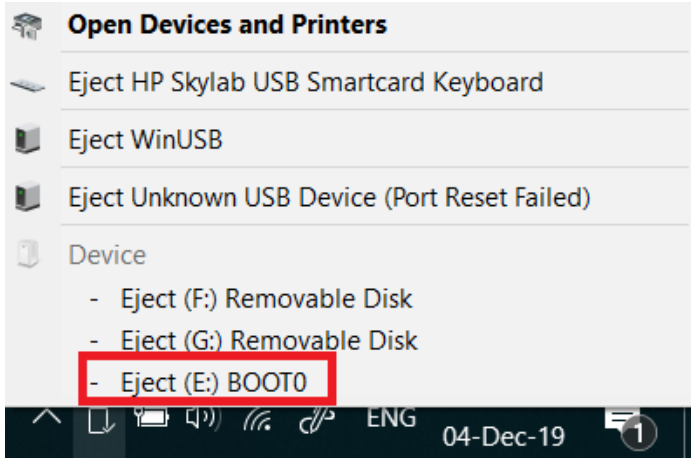
The first step to work with the SIMATIC IOT2050 is to set up a Micro-SD Card with the Image provided through the [Siemens Industry Online Support](#).

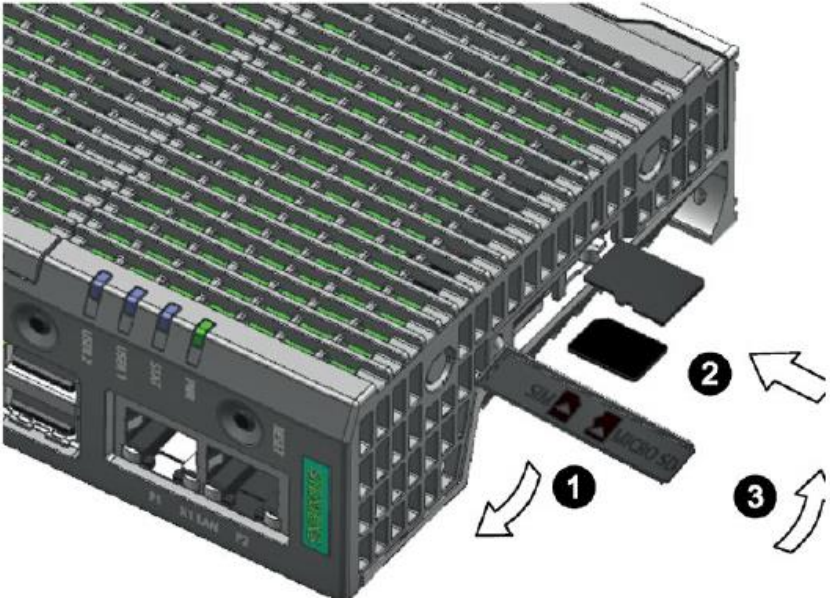
The following table shows the required steps to transfer the SD-Card Image to a Micro-SD Card.

Table 3-1

No.	Action
1.	Insert the μ SD-Card via SD-Card Adapter in the SD-Card Slot of your Engineering Station
2.	Retrieve the downloaded SD Card image .zip-file
3.	Install the downloaded "Win32DiskImager-x.x.x-install.exe"
4.	Start the Win32 Disk Imager
5.	Click on the folder 

No.	Action
6.	<p>Then select the "IOT2050_Example_Image_Vx.x.x.img" file in the retrieved SD Card Image folder</p> 
7.	<p>Select the drive letter of your SD Card</p> 
8.	<p>Click the "Write" button</p> 

No.	Action
9.	<p>Confirm the warning message</p> <p>NOTE: All data will be deleted</p> 
10.	<p>You will receive a success message if the transfer is done</p> 
11.	<p>Right click on "Safely Remove Hardware and Eject Media"</p>  <p>Choose the SD Card</p>

No.	Action
12.	<p data-bbox="507 304 1283 360">Insert the μSD-Card into the μSD-Card Slot of the SIMATIC IOT2050 as follows:</p> <ol data-bbox="555 398 1353 595" style="list-style-type: none"><li data-bbox="555 398 986 427">1. Open the card cover on the bottom.<li data-bbox="555 454 1353 539">2. Push the Micro SD card/Nano SIM card correctly into the supporting frame. The contacts of the Micro SD card/NanoSIM card must point in the direction of the motherboard.<li data-bbox="555 566 863 595">3. Push the card cover back.  <p>The diagram illustrates the process of inserting a micro SD card into the SIMATIC IOT2050. It shows a perspective view of the device with a grey cover partially open. Three numbered arrows indicate the steps: 1. An arrow points to the bottom of the cover, indicating it should be opened. 2. An arrow points to a micro SD card being inserted into a slot on the motherboard. 3. An arrow points to the cover being pushed back into its original position.</p>

3.2 First commissioning of the SIMATIC IOT2050

Power supply

The following table shows how to connect the SIMATIC IOT2050 to a power supply.

Table 3-2

No.	Action
1.	Power off the power supply
2.	Connect the cable to the connecting terminal
3.	Connect the connecting terminal to the SIMATIC IOT2050
4.	Power on the power supply

The diagram illustrates the connection process. On the left, a SIMATIC IOT2050 device is shown with its terminal block labeled '3'. A black terminal block labeled '2' is connected to the device. To the right, a power supply is shown with a red wire (+) and a blue wire (-). The power supply is labeled '1 POWER OFF'. Arrows indicate the connection from the power supply to the terminal block (2), and from the terminal block (2) to the SIMATIC IOT2050 terminal block (3).

CAUTION Only use a DC 12...24V power supply!

3.2.1 Local access

The following table shows how to connect the SIMATIC IOT2050 using a DisplayPort supported monitor via DisplayPort cable and a keyboard.

Table 3-3

No.	Action
1.	Connect one end of the DisplayPort cable to a Display-Port of the monitor
2.	Connect the other end of the DisplayPort cable to the Display-Port of the SIMATIC IOT2050.
3.	Connect a keyboard to USB port of SIMATIC IOT2050

3.2.2 Remote access with Putty SSH Connection

Ethernet cable

The following table shows how to connect the SIMATIC IOT2050 and the engineering station with an Ethernet cable.

Table 3-4

No.	Action
1.	Connect one end of the Ethernet cable to an Ethernet-Port of the Engineering Station
2.	<p>For V1.0.2: Connect the other end of the Ethernet cable to the Ethernet-Port <i>X1P2</i> of the SIMATIC IOT2050.</p> <p>As of V1.1.1: Connect the other end of the Ethernet cable to the Ethernet-Port <i>X1P1</i> of the SIMATIC IOT2050.</p>

The Software “Putty” can be used to get remote access from the Engineering Station to the SIMATIC IOT2050 via Serial, SSH or Telnet.

In this Example the SSH connection is used.

NOTE The SIMATIC IOT2050 has a static IP address by default.

This address is **192.168.200.1**.

For V1.0.2 this IP address is set for *X1P2*

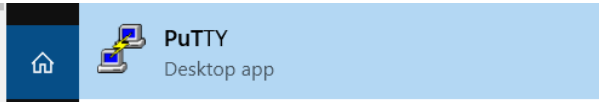
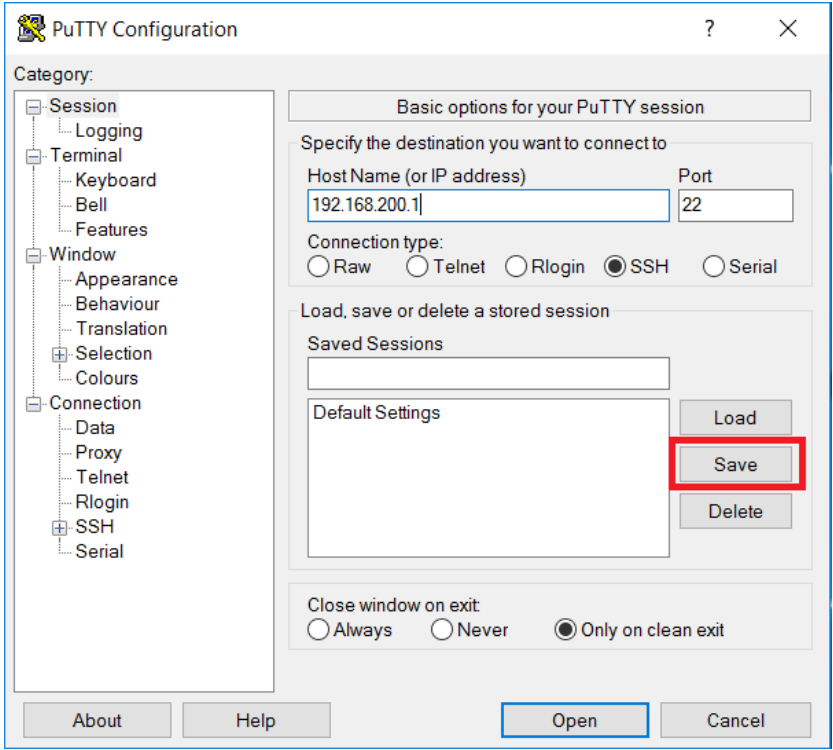
As of V1.1.1 this IP address is set for *X1P1*

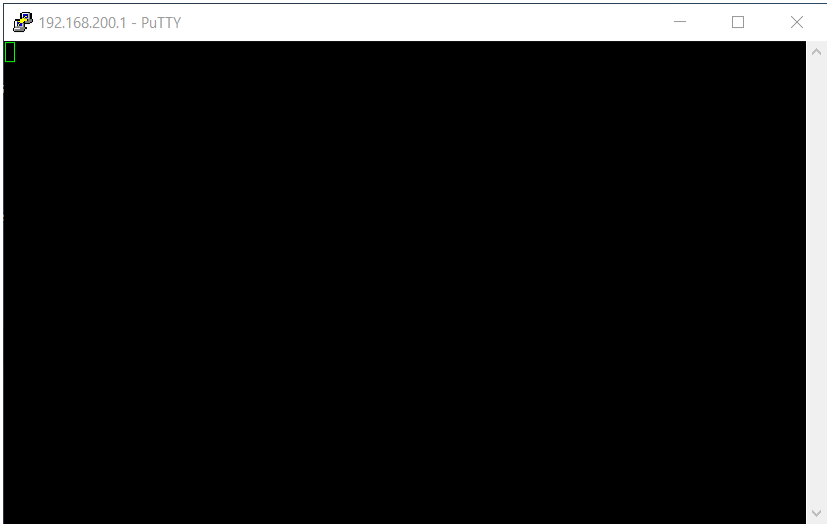
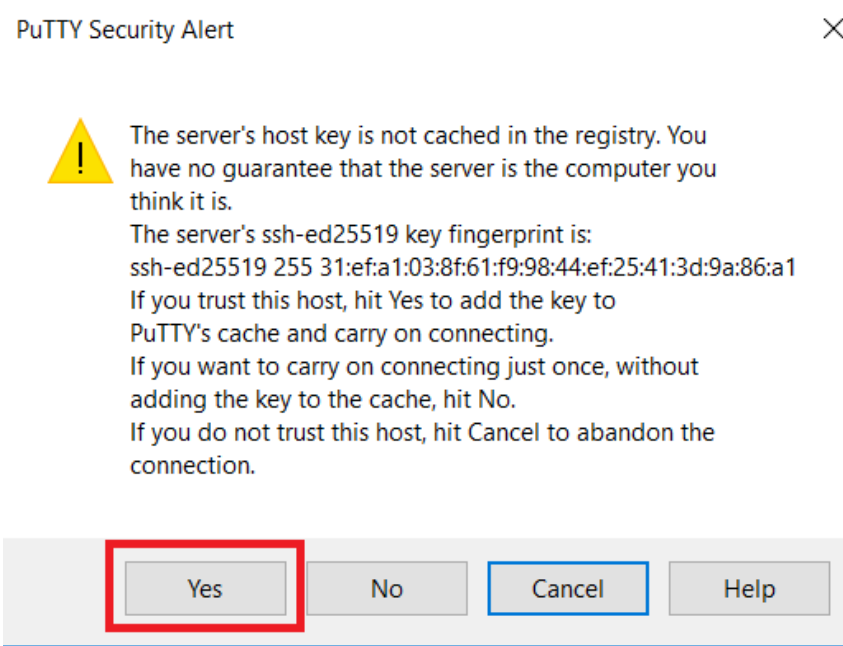
The Engineering Station has to be in the same subnet as the SIMATIC IOT2050 to establish a SSH connection!

NOTE The first boot may last a few minutes –up to 2 – because the filesystem is resized automatically. The time is depending on the SD card you are using.

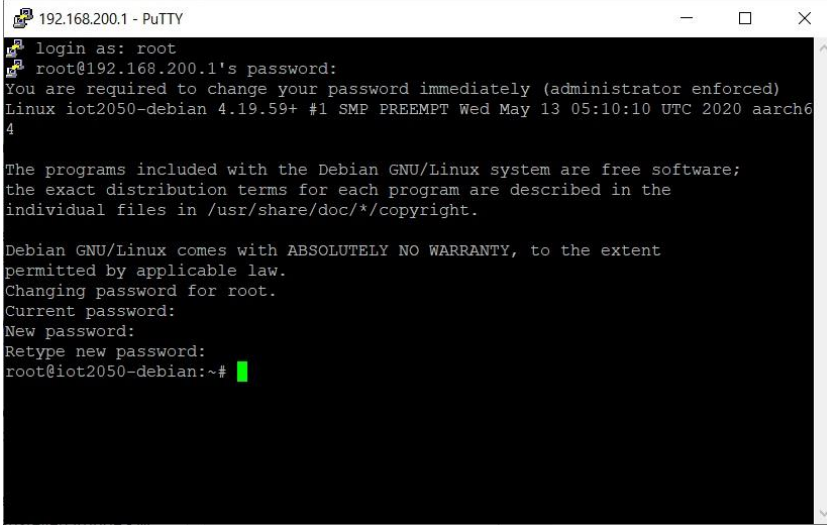
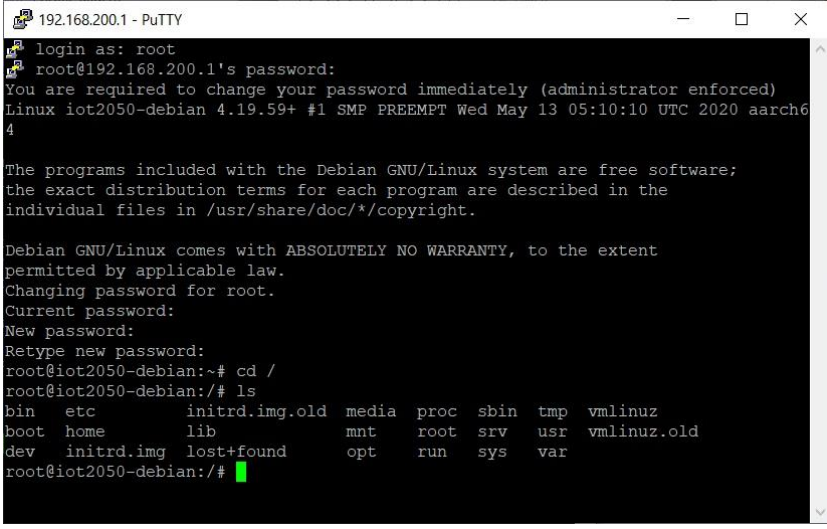
The following table shows how to use Putty.

Table 3-5

No.	Action
1.	Open downloaded Putty.exe with double-click 
2.	Configure the connection as follows: <ol style="list-style-type: none"> 1. Choose the Connection Type "SSH" 2. Enter the IP address 192.168.200.1 3. The port is 22 by default 4. This configuration can be saved as Default Settings (Mark Default Settings and press the "Save" Button) 

No.	Action
3.	<p>Click on "Open" button for opening the communication to the SIMATIC IOT2050 via SSH.</p> 
4.	<p>Connecting the first time via SSH a Warning dialog will appear. It is necessary to update the SSH key. Press the "Yes" button.</p> 

No.	Action
5.	<p>If once confirmed a login dialog appears</p> 
6.	<p>Type "root" and press the Enter key Type "root" for the password and Enter key You are prompted to change the root password at the first login</p> 

No.	Action
7.	<p>Change the password for the login "root":</p> <ol style="list-style-type: none"> 1. Type in the current password ("root") 2. Set a new password (input is hidden) 3. Confirm the password (input is hidden) 
8.	<p>Now a few Linux commands can be tested.</p> <p>For example, "cd /" to get in the root file system and "ls" to list the folders in the current directory</p> 


No.	Action
9.	<p>To create another user type “adduser” and the name of the user you want to add Enter password for the user.</p>  <pre>192.168.200.1 - PuTTY root@iot2050-debian:~# adduser siemens Adding user `siemens' ... Adding new group `siemens' (1000) ... Adding new user `siemens' (1000) with group `siemens' ... Creating home directory `/home/siemens' ... Copying files from `/etc/skel' ... New password: Retype new password: passwd: password updated successfully Changing the user information for siemens Enter the new value, or press ENTER for the default Full Name []: Siemens Room Number []: Work Phone []: Home Phone []: Other []: Is the information correct? [Y/n] Y root@iot2050-debian:~# █</pre> <p>You can add the user to sudo group by typing “adduser siemens sudo”</p>  <pre>192.168.200.1 - PuTTY root@iot2050-debian:~# adduser siemens sudo Adding user `siemens' to group `sudo' ... Adding user siemens to group sudo Done. root@iot2050-debian:~# █</pre>

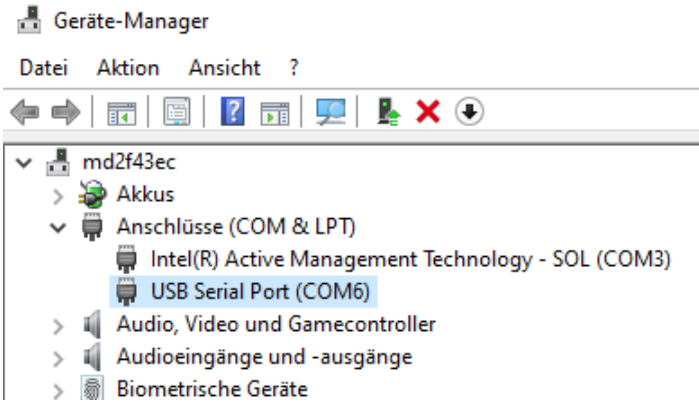
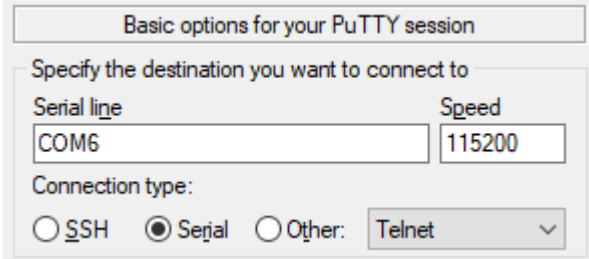
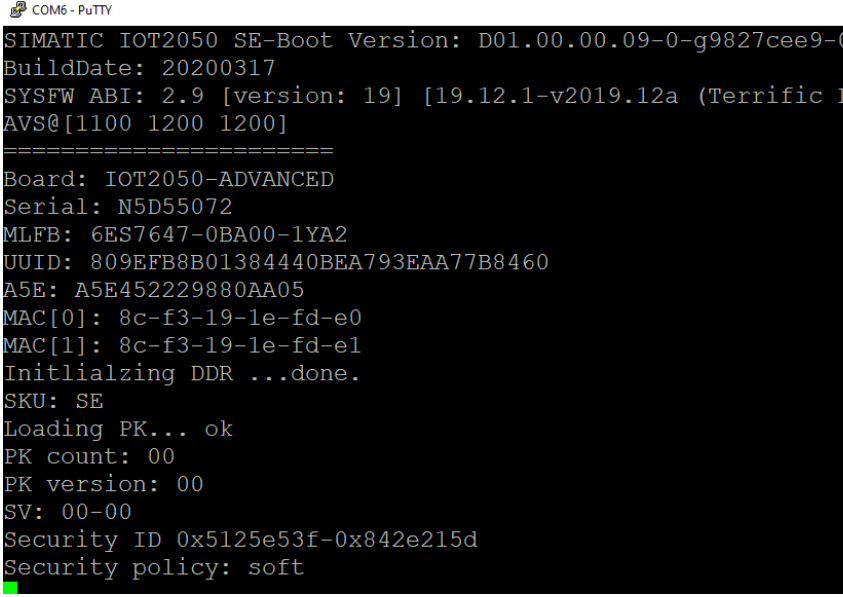
3.2.3 Remote access using UART connection

A [UART cable](#) is a very helpful device because you can establish a serial connection via putty and interrupt the boot.

This can be helpful in many cases:

- To change boot order permanently
- To select to boot from SD card / USB only for the upcoming boot
- To connect to a system serially instead of using ssh (e.g. IP address is not known and there is no monitor)
- Detect the problem, when IOT2050 does not boot for some reasons

No.	Action
1.	Power off the IOT2050
2.	<p>The UART cable needs to be connected to the IOT2050 to X14. Therefore it is required to open the lid for the Arduino interface to access X14. The M wire (black in this example) needs to be connected to the pin 1</p> 
3.	Connect the USB part of the cable to your PC. Drivers may need to be installed, please check the website of the vendor of the used cable.

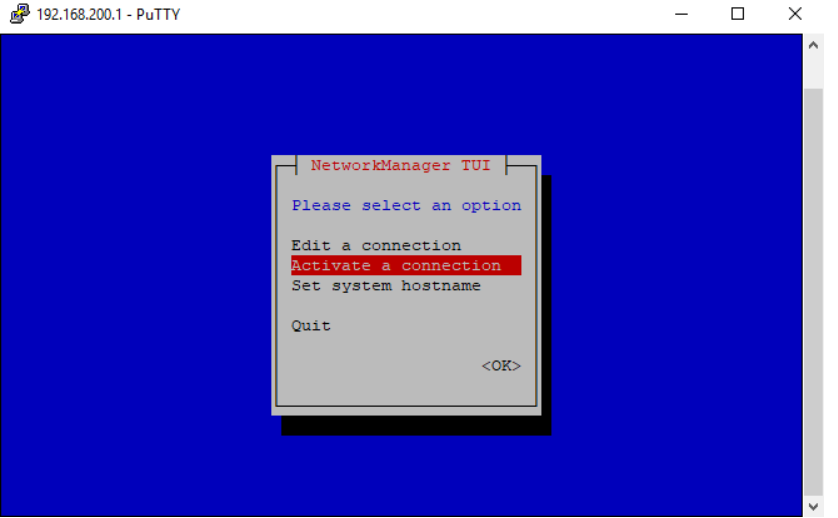
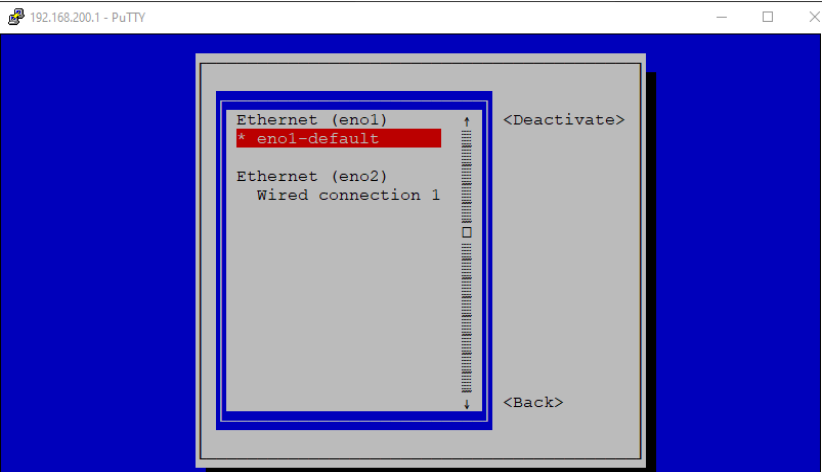
No.	Action
4.	<p>Go to Device Manager of your PC and check the assigned COM port</p>  <p>NOTE: If there is no COM port assigned and the device appears as an unknown device, it is needed to install the drivers for the cable</p>
5.	<p>Open putty and configure the connection like this (COM port can differ) and click on Open</p> 
6.	<p>Power on the IOT2050. It is now possible to see the whole boot process</p>  <pre> SIMATIC IOT2050 SE-Boot Version: D01.00.00.09-0-g9827cee9-0 BuildDate: 20200317 SYSFW ABI: 2.9 [version: 19] [19.12.1-v2019.12a (Terrific L AVS@[1100 1200 1200] ===== Board: IOT2050-ADVANCED Serial: N5D55072 MLFB: 6ES7647-0BA00-1YA2 UUID: 809EFB8B01384440BEA793EAA77B8460 A5E: A5E452229880AA05 MAC[0]: 8c-f3-19-1e-fd-e0 MAC[1]: 8c-f3-19-1e-fd-e1 Initializing DDR ...done. SKU: SE Loading PK... ok PK count: 00 PK version: 00 SV: 00-00 Security ID 0x5125e53f-0x842e215d Security policy: soft </pre>
7.	<p>For further actions at the very first boot, see here</p>

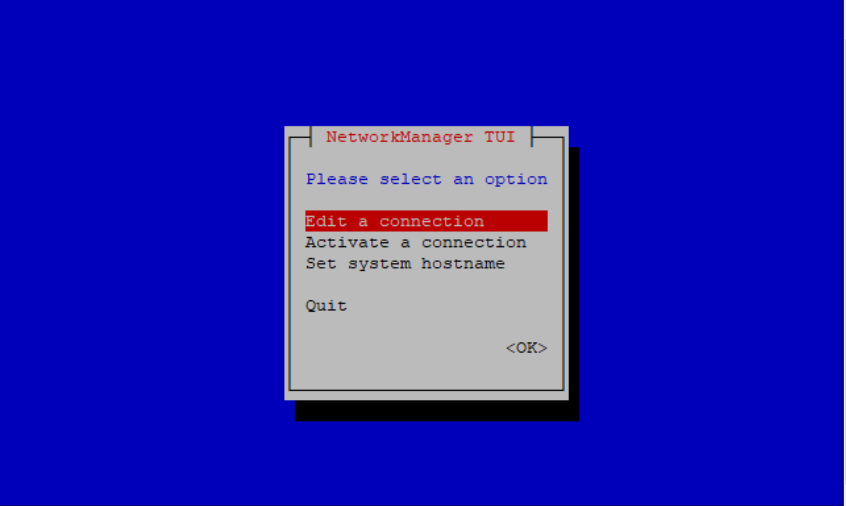
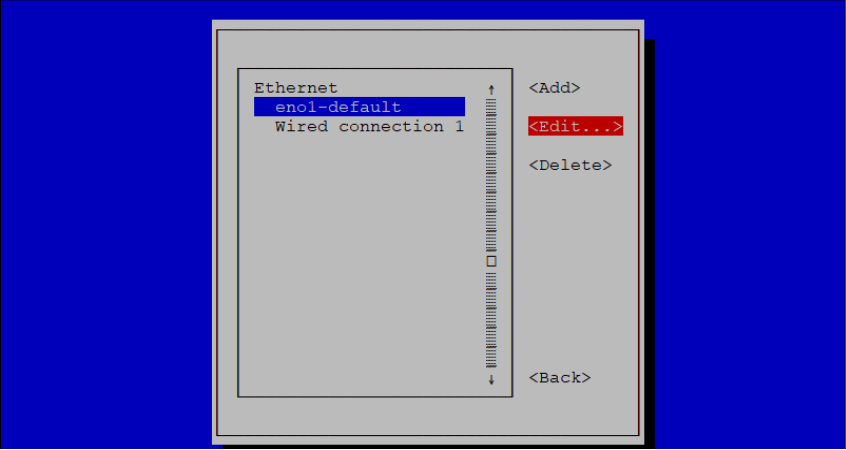
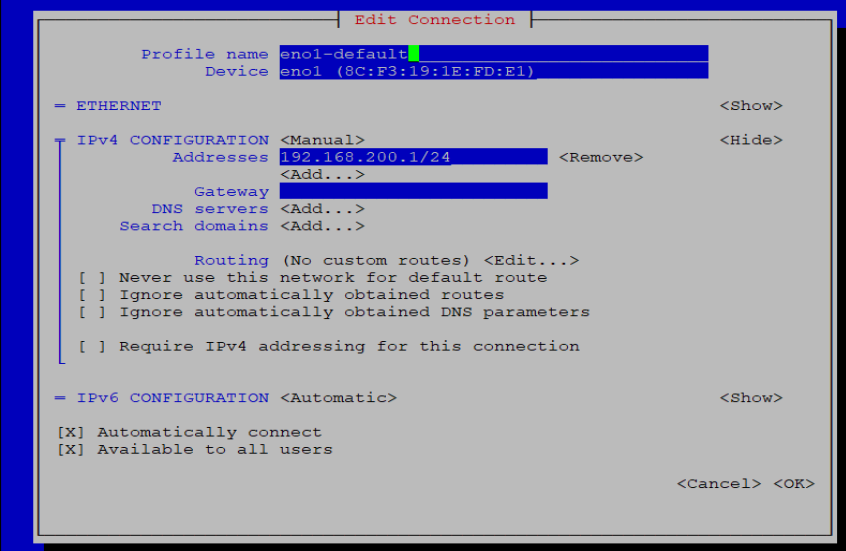
3.2.4 Setting up network interfaces

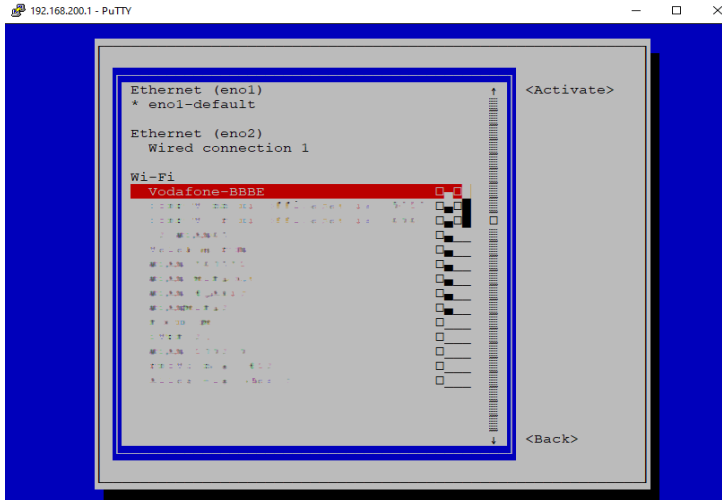
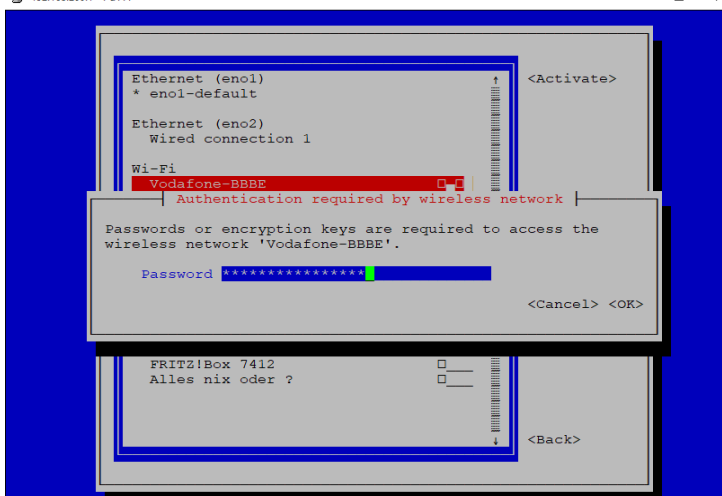
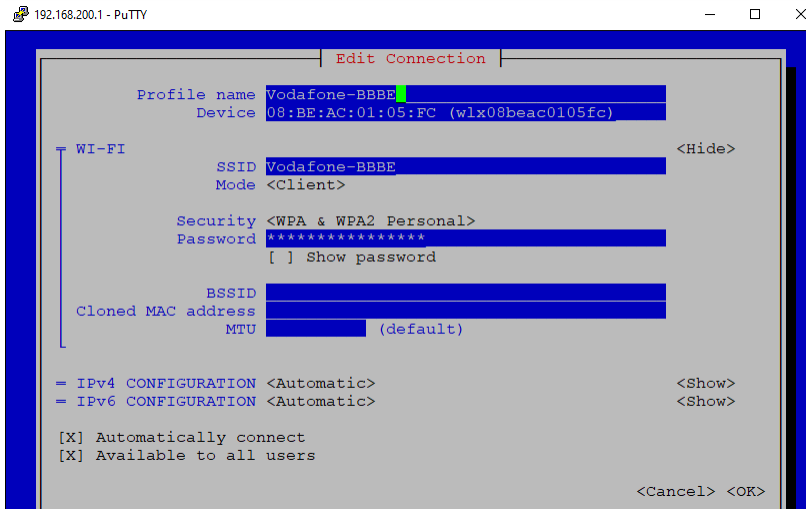
In the default settings of the SIMATIC IOT2050's Image, the IP address is set to **192.168.200.1**. Thus, if another static IP address or a DHCP address is required, this can be set with the **nmtui** tool

The following table displays the procedure for configuring the IP address settings.

Table 3-6

No.	Action
1.	Open a valid serial Putty connection and login as root
2.	<p>Type in "nmtui" to open the network manager tool, navigate to "Activate a connection" and press "Enter"</p> 
3.	<p>Select the interfaces to activate.</p> <p>For V1.0.2 the interfaces are called eth0 and eth1 As of V1.1.1 the interfaces are called eno1 and eno2</p> <p>eth0/eno1 is activated as default eth1/eno2 is deactivated as default, but gets activated automatically when a LAN cable is connected</p> 

No.	Action
4.	<p>You can edit the IP addresses of your interfaces from "Edit a connection".</p>  <p>The screenshot shows a terminal window titled "192.168.200.1 - PuTTY" with a blue background. A white box titled "NetworkManager TUI" is centered on the screen. It contains the text "Please select an option" followed by a list of options: "Edit a connection" (highlighted in red), "Activate a connection", "Set system hostname", and "Quit". A "<OK>" prompt is at the bottom right.</p>
	 <p>The screenshot shows the same terminal window. A white box displays a list of network connections under the heading "Ethernet". The connections listed are "enol-default" (highlighted in blue) and "Wired connection 1". To the right of the list are buttons: "<Add>", "<Edit...>" (highlighted in red), and "<Delete>". At the bottom right is a "<Back>" button.</p>
	 <p>The screenshot shows the "Edit Connection" dialog box. It contains the following configuration details:</p> <ul style="list-style-type: none"> Profile name: enol-default Device: enol (8C:F3:19:1E:FD:E1) ETHERNET: <Show> IPv4 CONFIGURATION: <Manual> <Hide> <ul style="list-style-type: none"> Addresses: 192.168.200.1/24 <Remove> <Add...> Gateway: <Add...> DNS servers: <Add...> Search domains: <Add...> Routing (No custom routes) <Edit...> <ul style="list-style-type: none"> <input type="checkbox"/> Never use this network for default route <input type="checkbox"/> Ignore automatically obtained routes <input type="checkbox"/> Ignore automatically obtained DNS parameters <input type="checkbox"/> Require IPv4 addressing for this connection IPv6 CONFIGURATION: <Automatic> <Show> <input checked="" type="checkbox"/> Automatically connect <input checked="" type="checkbox"/> Available to all users <p><Cancel> <OK></p>

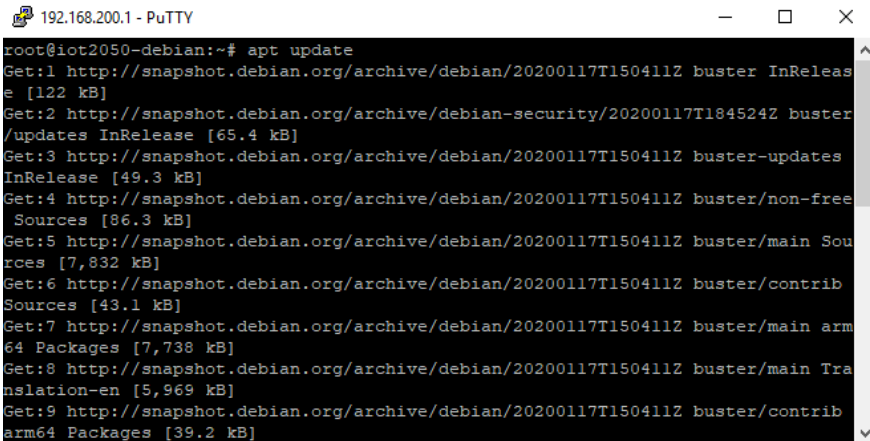
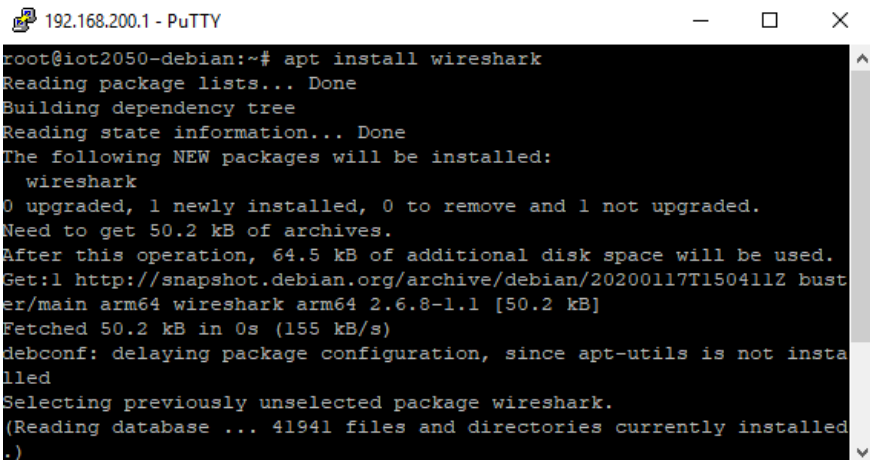
No.	Action
5.	<p>You can connect the IOT2050 to Wireless Access Point via USB Wifi Dongle. Insert your USB wifi dongle to IOT2050 and go to "Activate a connection" and select the Wireless AP to connect and provide the password.</p>   <p>To make changes in your Wireless Connection, go to "Edit a connection". Here you can make all the changes you needed.</p> 

3.2.5 Install new software packages on the SIMATIC IOT2050

Provided example image includes apt package manager so that by using apt package manager new software can be installed on SIMATIC IOT2050.

The following table shows how to install new software packages on the SIMATIC IOT2050.

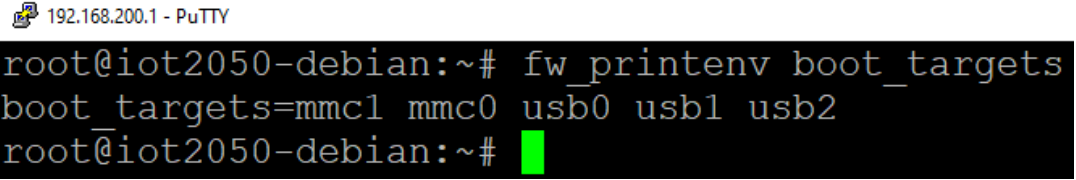
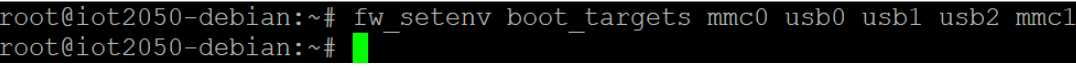
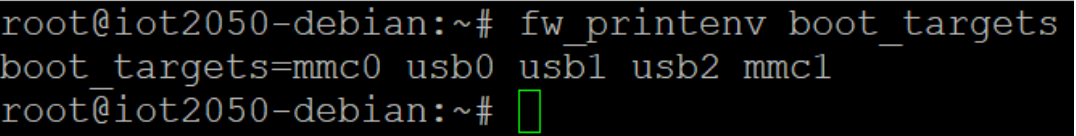
Table 3-7

No.	Action
1.	Open a valid serial Putty connection and login as root
2.	<p>Before installing any software package, update repositories by typing “apt update”</p>  <pre> 192.168.200.1 - PuTTY root@iot2050-debian:~# apt update Get:1 http://snapshot.debian.org/archive/debian/20200117T150411Z buster InRelease [122 kB] Get:2 http://snapshot.debian.org/archive/debian-security/20200117T184524Z buster/updates InRelease [65.4 kB] Get:3 http://snapshot.debian.org/archive/debian/20200117T150411Z buster-updates InRelease [49.3 kB] Get:4 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/non-free Sources [86.3 kB] Get:5 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/main Sources [7,832 kB] Get:6 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/contrib Sources [43.1 kB] Get:7 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/main arm64 Packages [7,738 kB] Get:8 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/main Translation-en [5,969 kB] Get:9 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/contrib arm64 Packages [39.2 kB] </pre>
3.	<p>Type “apt install <nameofsoftware>” For example: install wireshark – it is a software to track network packages. Accept the licenses during installation.</p>  <pre> 192.168.200.1 - PuTTY root@iot2050-debian:~# apt install wireshark Reading package lists... Done Building dependency tree Reading state information... Done The following NEW packages will be installed: wireshark 0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded. Need to get 50.2 kB of archives. After this operation, 64.5 kB of additional disk space will be used. Get:1 http://snapshot.debian.org/archive/debian/20200117T150411Z buster/main arm64 wireshark arm64 2.6.8-1.1 [50.2 kB] Fetched 50.2 kB in 0s (155 kB/s) debconf: delaying package configuration, since apt-utils is not installed Selecting previously unselected package wireshark. (Reading database ... 41941 files and directories currently installed.) </pre>
4.	Type “apt purge <nameofsoftware>” to completely remove the software with its configuration file.

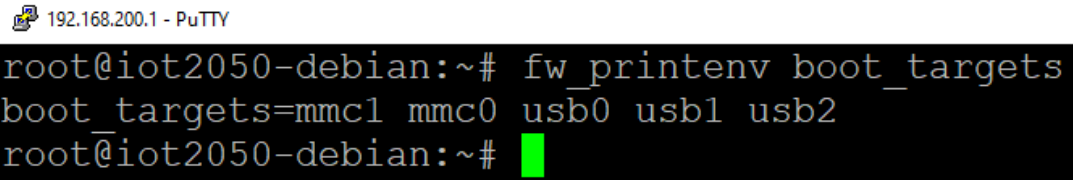
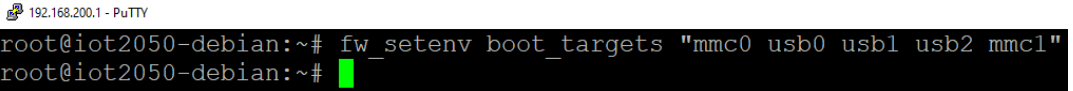
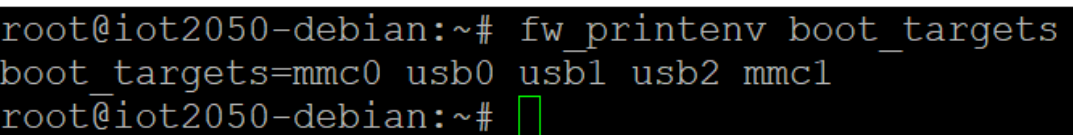
3.3 Change boot order of IOT2050

The IOT2050 Advanced has an internal eMMC, which is set at first boot device by default for FS:01, FS:02 and from FS:04 of the IOT2050 Advanced. More information about the FS (Functional State) can be found [here](#).

3.3.1 With Example Image V1.0.2 / V1.1.1

No.	Action
1.	<p>To check the current boot order the command <code>fw_printenv boot_targets</code> can be used:</p>  <pre> root@iot2050-debian:~# fw_printenv boot_targets boot_targets=mmc1 mmc0 usb0 usb1 usb2 root@iot2050-debian:~# █ </pre> <p>NOTE: mmc1 = eMMC mmc0 = SD card usbx = USB slots</p>
2.	<p>To change the boot order the command <code>fw_setenv boot_targets [devices]</code> can be used. This is an example to have the external boot devices prior to the internal eMMC:</p>  <pre> root@iot2050-debian:~# fw_setenv boot_targets mmc0 usb0 usb1 usb2 mmc1 root@iot2050-debian:~# █ </pre>
3.	<p>To check whether this was successful, call <code>fw_printenv boot_targets</code> again:</p>  <pre> root@iot2050-debian:~# fw_printenv boot_targets boot_targets=mmc0 usb0 usb1 usb2 mmc1 root@iot2050-debian:~# █ </pre>

3.3.2 As of Example Image V1.2.1

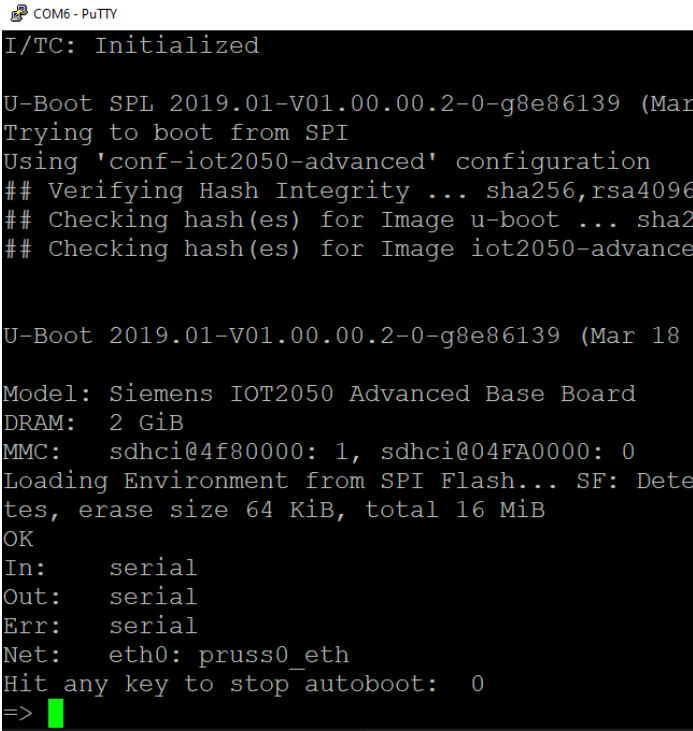
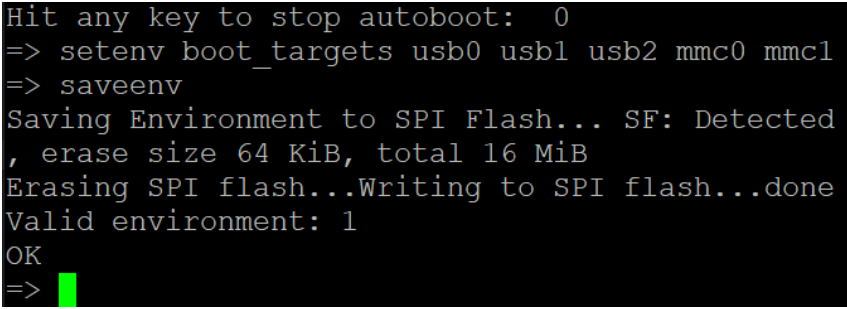
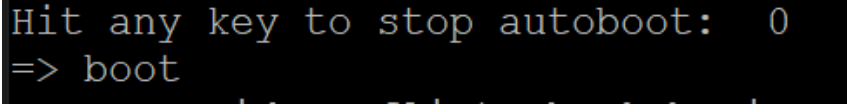
No.	Action
1.	<p>To check the current boot order the command <code>fw_printenv boot_targets</code> can be used:</p>  <pre>192.168.200.1 - PuTTY root@iot2050-debian:~# fw_printenv boot_targets boot_targets=mmc1 mmc0 usb0 usb1 usb2 root@iot2050-debian:~# █</pre> <p>NOTE: mmc1 = eMMc mmc0 = SD card usbx = USB slots</p>
2.	<p>To change the boot order the command <code>fw_setenv boot_targets ["devices"]</code> can be used. <u>It is important to set the devices in quotes!</u> This is an example to have the external boot devices prior to the internal eMMc:</p>  <pre>192.168.200.1 - PuTTY root@iot2050-debian:~# fw_setenv boot_targets "mmc0 usb0 usb1 usb2 mmc1" root@iot2050-debian:~# █</pre>
3.	<p>To check whether this was successful, call <code>fw_printenv boot_targets</code> again:</p>  <pre>192.168.200.1 - PuTTY root@iot2050-debian:~# fw_printenv boot_targets boot_targets=mmc0 usb0 usb1 usb2 mmc1 root@iot2050-debian:~# █</pre>

3.3.3 Using UART connection

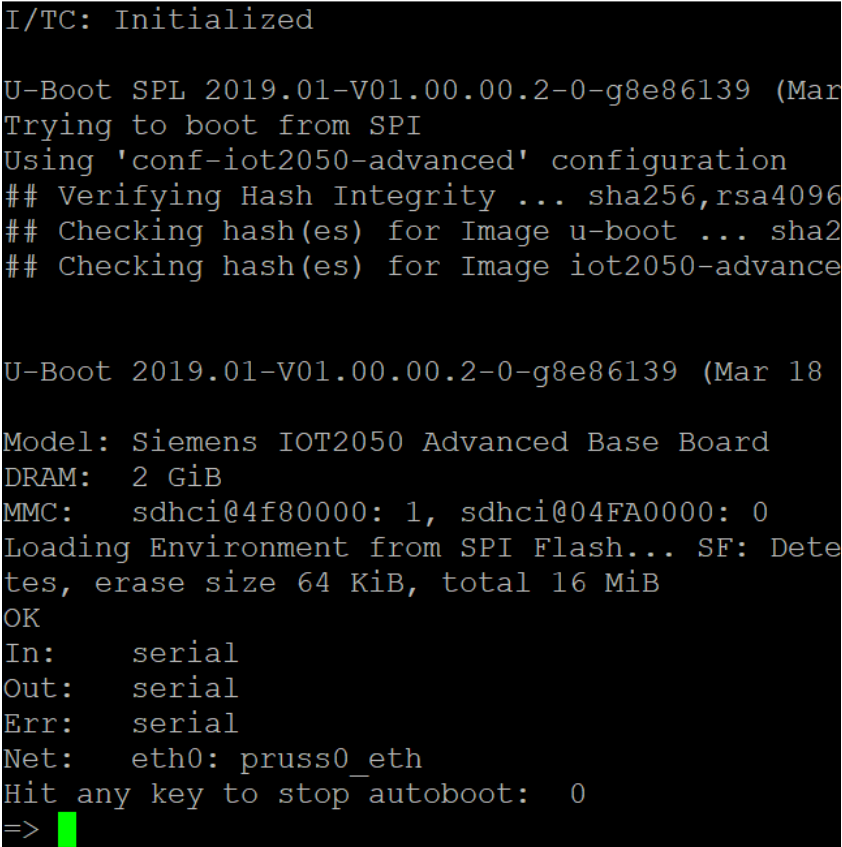
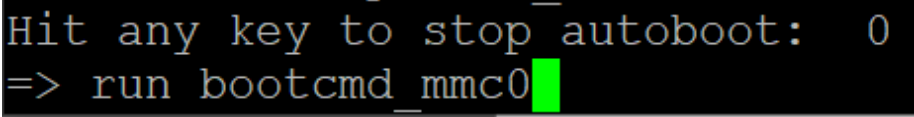
The UART connection can be used to enter the u-boot shell and change the boot order / choose a specific boot device for the upcoming boot process.

How to establish a UART connection see [chapter 3.2.3](#)

Change boot order permanently

No.	Action
1.	<p>Interrupt the boot process at the point <i>Hit any key to stop autoboot</i> by hitting any key. This will end up in the u-boot shell (indicated by => or IOT2050>)</p>  <pre> COM6 - PuTTY I/TC: Initialized U-Boot SPL 2019.01-V01.00.00.2-0-g8e86139 (Mar 18 2022) Trying to boot from SPI Using 'conf-iot2050-advanced' configuration ## Verifying Hash Integrity ... sha256,rsa4096 ## Checking hash(es) for Image u-boot ... sha256 ## Checking hash(es) for Image iot2050-advanced ... sha256 U-Boot 2019.01-V01.00.00.2-0-g8e86139 (Mar 18 2022) Model: Siemens IOT2050 Advanced Base Board DRAM: 2 GiB MMC: sdhci@4f80000: 1, sdhci@04FA0000: 0 Loading Environment from SPI Flash... SF: Detected, erase size 64 KiB, total 16 MiB OK In: serial Out: serial Err: serial Net: eth0: pruss0_eth Hit any key to stop autoboot: 0 => </pre>
2.	<p>Here change the boot order with the command <code>setenv boot_targets [devices]</code> and save the configuration with <code>saveenv</code></p>  <pre> Hit any key to stop autoboot: 0 => setenv boot_targets usb0 usb1 usb2 mmc0 mmc1 => saveenv Saving Environment to SPI Flash... SF: Detected, erase size 64 KiB, total 16 MiB Erasing SPI flash...Writing to SPI flash...done Valid environment: 1 OK => </pre>
3.	<p>Type in <code>boot</code> to continue booting with the changed boot order</p>  <pre> Hit any key to stop autoboot: 0 => boot </pre>

Select boot device only for the next boot

No.	Action
1.	<p>Interrupt the boot process at the point <i>Hit any key to stop autoboot</i> by hitting any key. This will end up in the u-boot shell (indicated by => or IOT2050>)</p>  <pre> COM6 - PuTTY I/TC: Initialized U-Boot SPL 2019.01-V01.00.00.2-0-g8e86139 (Mar 18 2019) Trying to boot from SPI Using 'conf-iot2050-advanced' configuration ## Verifying Hash Integrity ... sha256,rsa4096 ## Checking hash(es) for Image u-boot ... sha256 ## Checking hash(es) for Image iot2050-advanced ... sha256 U-Boot 2019.01-V01.00.00.2-0-g8e86139 (Mar 18 2019) Model: Siemens IOT2050 Advanced Base Board DRAM: 2 GiB MMC: sdhci@4f80000: 1, sdhci@04FA0000: 0 Loading Environment from SPI Flash... SF: Detected, erase size 64 KiB, total 16 MiB OK In: serial Out: serial Err: serial Net: eth0: pruss0_eth Hit any key to stop autoboot: 0 => </pre>
2.	<p>Enter <code>run bootcmd_<device></code> to boot from one specific device</p>  <pre> Hit any key to stop autoboot: 0 => run bootcmd_mmc0 </pre>

3.3.4 Skip eMMC as of firmware V1.2.1

To use the Example Image V1.2.1 with the IOT2050 Advanced of FS:01, FS:02, FS:03 and the IOT2050 Basic of FS:01, it is required to update the firmware of those devices. More information and a How-To can be found [here](#)

With the firmware V1.2.1 it is possible to neglect/skip the eMMC as boot device and only check external devices for bootable images.

No.	Action
1.	Press and hold the USER button
2.	Power on / Reset the IOT2050 Advanced
3.	Hold the USER button until the STAT LED gets orange
4.	Release the USER button
5.	IOT2050 is booting only from external media

4 Checklist

This chapter contains a Checklist which summarizes all important steps in this Setting up.

Table 4-1

No.	Action
1.	Download the software listed
2.	Write the image to the μSD Card
3.	Insert the μSD-Card to the SIMATIC IOT2050
4.	Connect the Power Supply
5.	Establish a SSH connection with PuTTY
6.	Establish a UART connection with PuTTY
7.	Setting up network interfaces
8.	Install new software package on the SIMATIC IOT2050
9.	Change boot order / Skip eMMC

5 Related links

Table 5-1

	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

6 History

Table 6-1

Version	Date	Modifications
V1.0	06/2020	First version
V1.1	10/2021	Added network interface changes as of Example Image V1.1.1
V1.2	02/2022	Added UART connection Added information about changing the boot order and skip eMMC with firmware 1.2.1