Setting up the IOT2000

SIMATIC IOT2020, SIMATIC IOT2040

https://support.industry.siemens.com/tf/ww/en/posts/155642/

Siemens Industry Online Support

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Table of contents

1 Task

1.1 Overview

Introduction

This Setting Up shows how to set up the SIMATIC IOT2000 with a SD-Card image provided through the Siemens Industry Online Support.

Goals

After working through this document you know how to

- Get remote access to the SIMATIC IOT2000
- Change the IP-Address of the SIMATIC IOT2000
- Create a new directory on the SIMATIC IOT2000

2 Requirements

2.1 Required Hardware

This chapter contains the hardware required for this Setting up.

SIMATIC IOT2000

Two different versions of the SIMATIC IOT2000 are available. The hardware of both versions is described in this document. However, this Setting Up will only use the SIMATIC IOT2020 as basis for all examples. In order to setup the SIMATIC IOT2040, proceed in the same way as described for the SIMATIC IOT2020.

SIMATIC IOT2020

Hardware Overview:

- Intel Quark® x1000
- 512 MB RAM
- 1 Ethernet Interface
- 1 USB Host Type A
- 1 USB Client microUSB

Figure 2-1

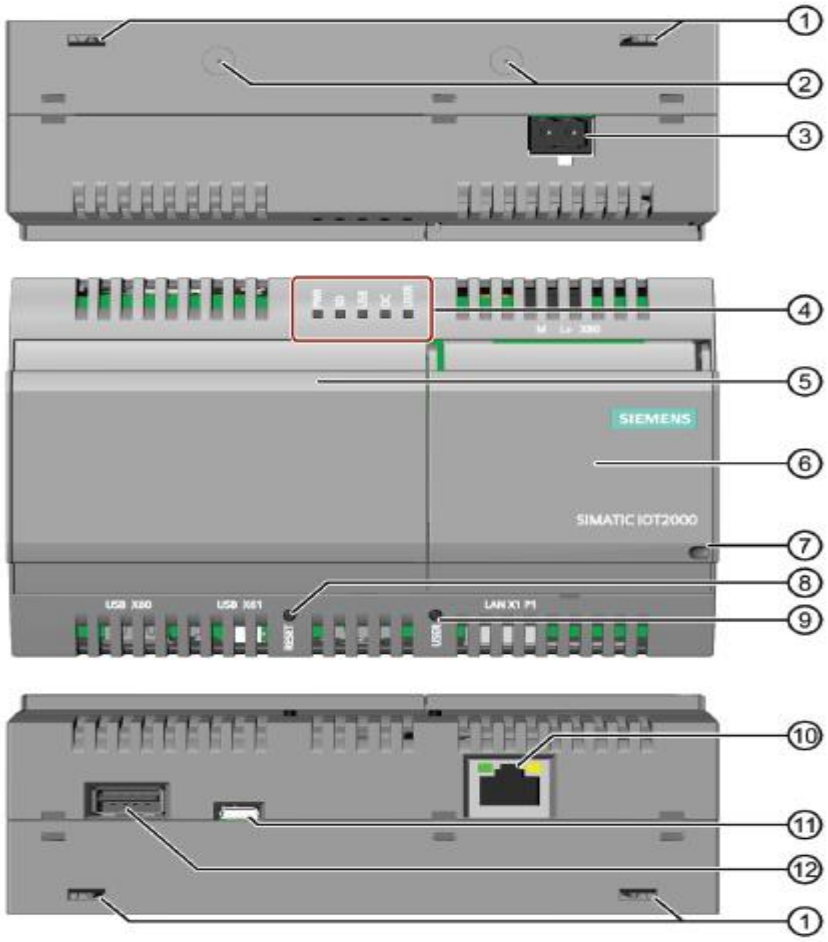


Table 2-1

No.	Description
1	Aperture for wall-mounting
2	Designation for integration of antennas
3	Connection for Power Supply
4	5 LED’s, 1 programmable USER LED
5	Left cap
6	Right cap
7	Aperture to lock the right cap
8	RESET button for the CPU
9	USER button
10	Ethernet Interface 10/100 Mbps
11	USB Typ Mini-B
12	USB Typ A

SIMATIC IOT2040

Hardware Overview:

- Intel Quark® x1020
- 1 GB RAM
- 2 Ethernet Interfaces
- 2 RS232/485 interfaces
- Battery buffered RTC

Interface Overview:

Figure 2-2

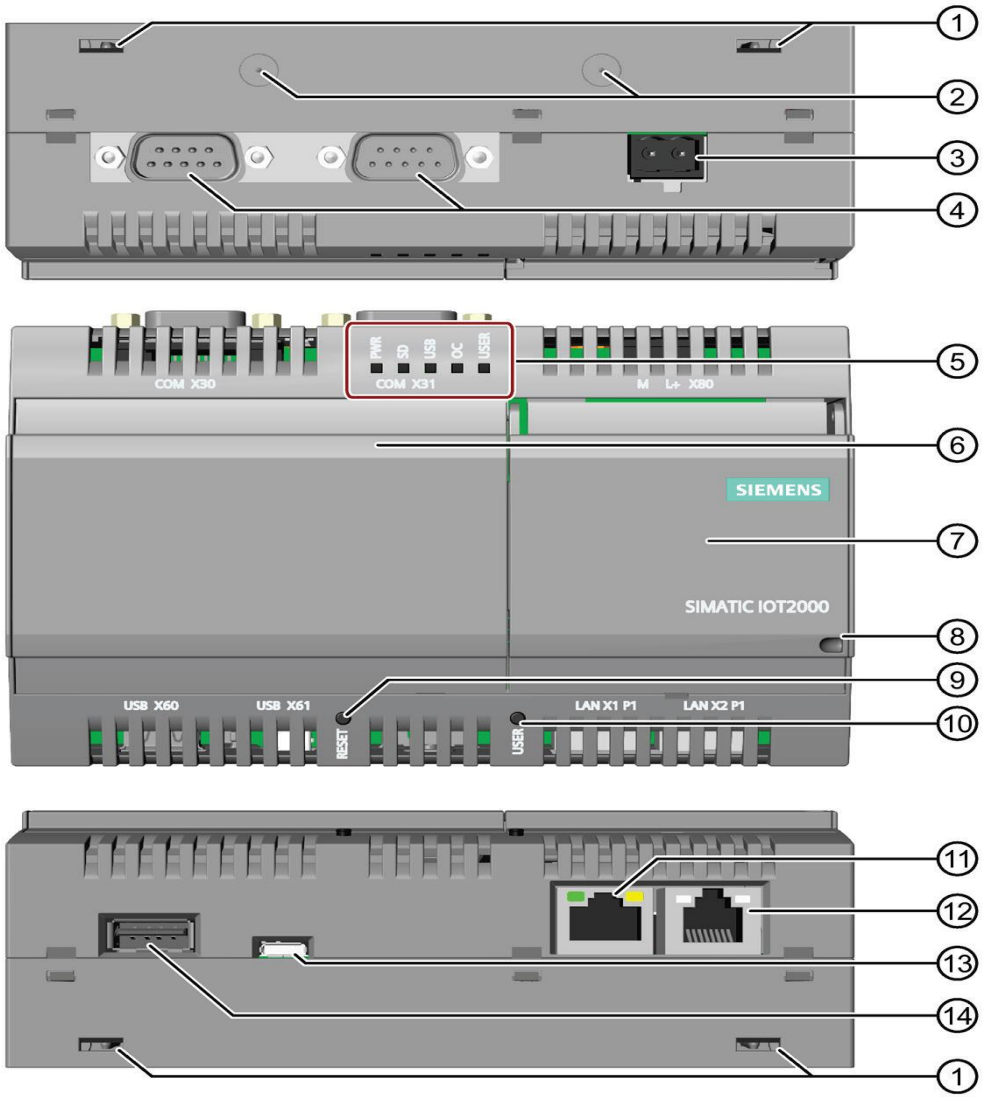


Table 2-1

No.	Description
1	Aperture for wall-mounting
2	Designation for integration of antennas
3	Connection for Power Supply
4	COM-Interfaces (RS232/485)
5	5 LED's, 1 programmable USER LED
6	Left cap
7	Right cap
8	Aperture to lock the right cap
9	RESET button for the CPU
10	USER button
11	Ethernet Interface 10/100 Mbps
12	Ethernet Interface 10/100 Mbps
13	USB Typ Mini-B
14	USB Typ A

Micro-SD Card

SIMATIC IOT2000 can be operated with a Yocto Linux Operating System, which requires the use of a Micro-SD Card.

The requirement for using SIMATIC IOT2000 with Yocto Linux Operating System is a Micro-SD Card with storage capacity from 8GB up to 32GB.

Engineering Station

To work with the SIMATIC IOT2000 an Engineering Station is required. In this Setting Up a PC with Windows 7 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 IOT2000 in order to establish a SSH connection and to download the Eclipse projects an Ethernet cable is required.

Power supply

In order to run the SIMATIC IOT2000 a power supply is required.

This power supply has to provide between 9 and 36V 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 IOT2000 a SD-Card Example Image with a Yocto Linux Operating System is necessary to be installed. This Image is provided through the Siemens Industry Online Support.

It can be downloaded here.

PuTTY

To get remote access to the SIMATIC IOT2000 software is required.

In this Getting Started “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.

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 SIMATIC IOT2000 using the hard- and software listed before.

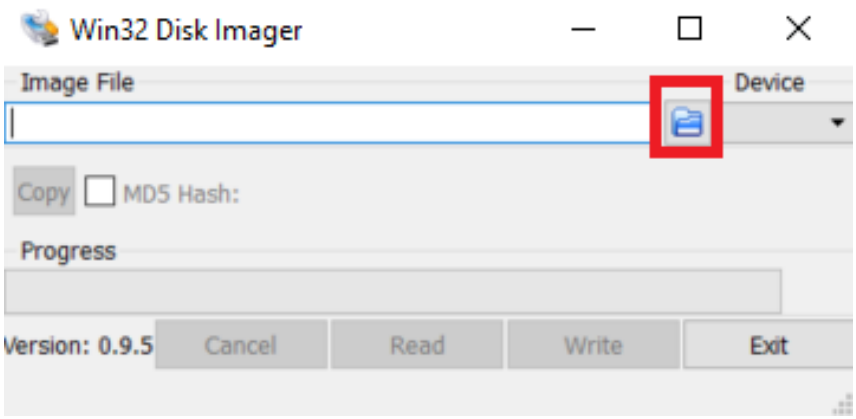
For the necessary software components please refer to the download links in Chapter 2.2

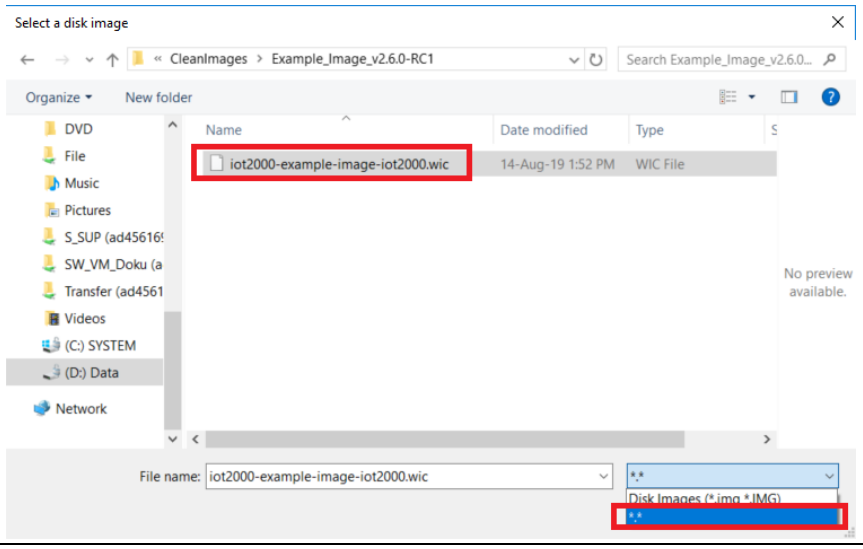
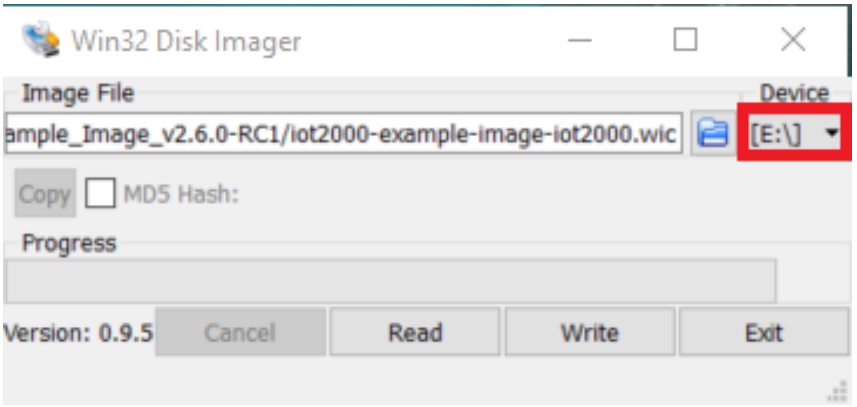
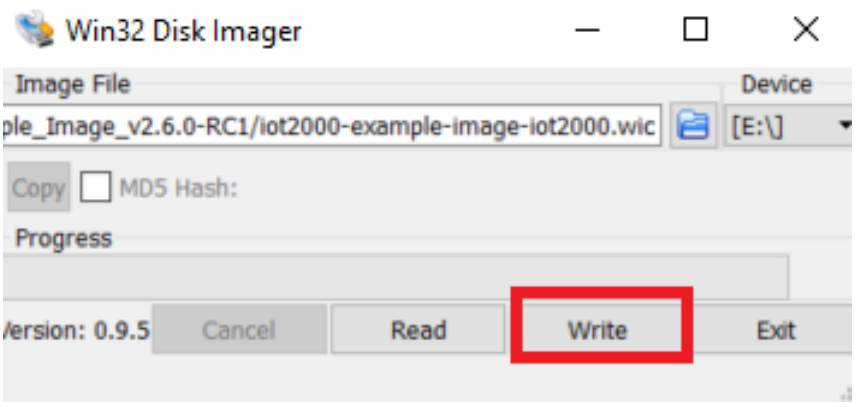
3.1 Installing the SD-Card Example Image

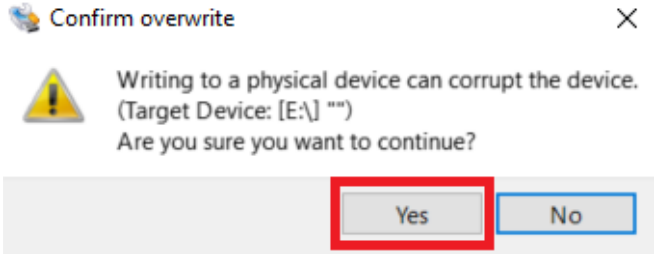
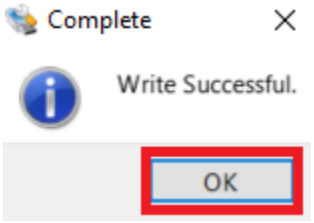
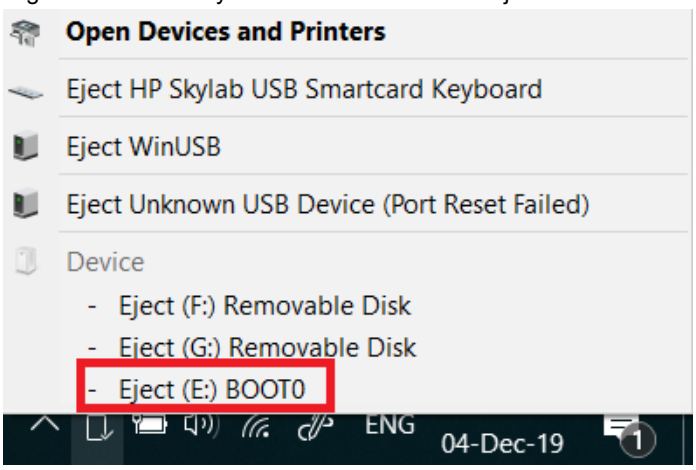
The first step to work with the SIMATIC IOT2000 is to set up a Micro-SD Card with the Image provided through the Siemens Industry Online Support.

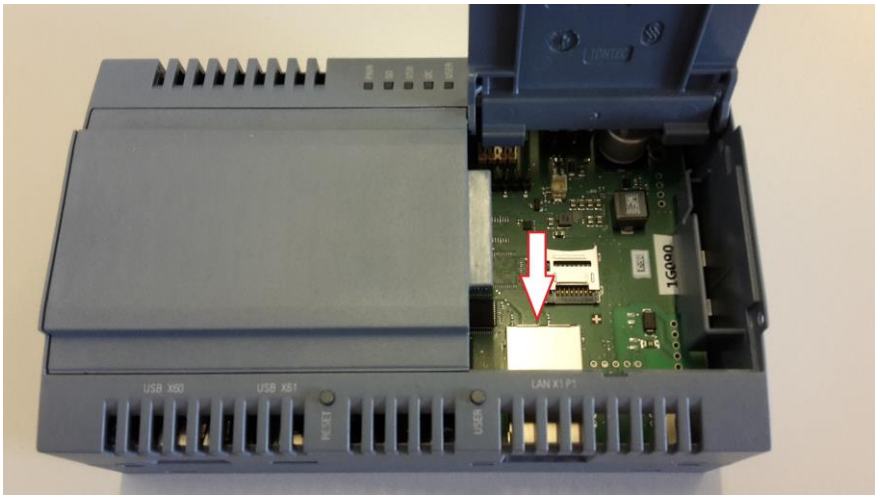
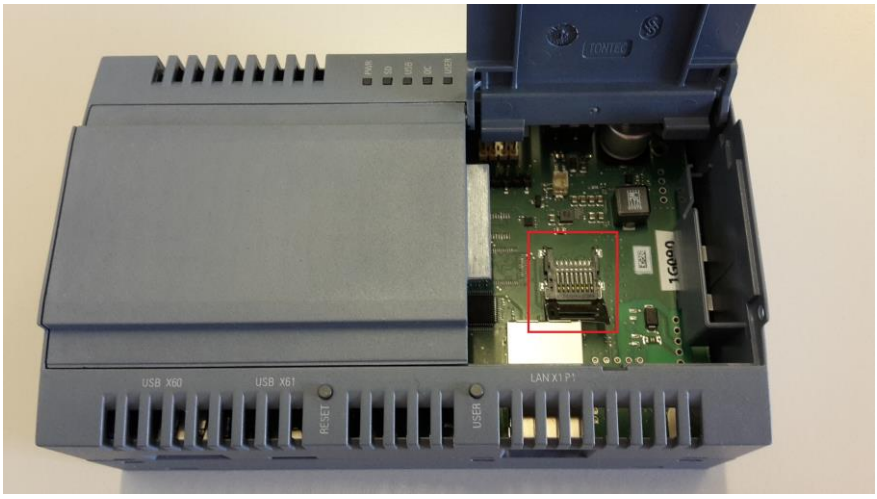
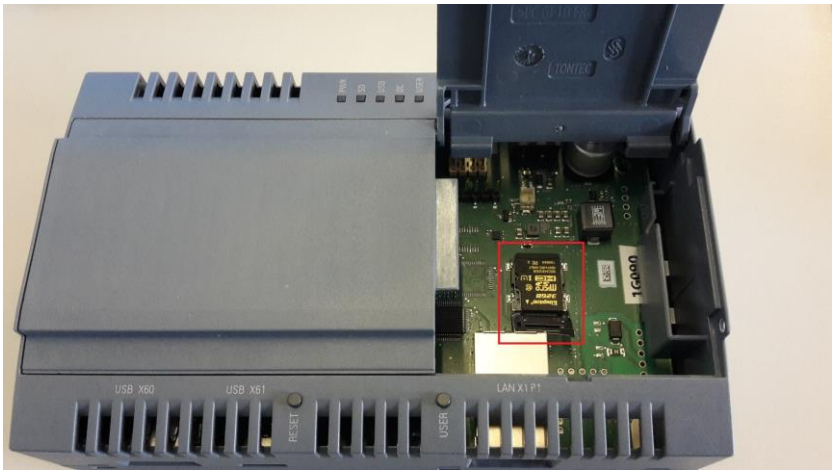
The following table shows the required steps to transfer the SD-Card Image to a Micro-SD Card.

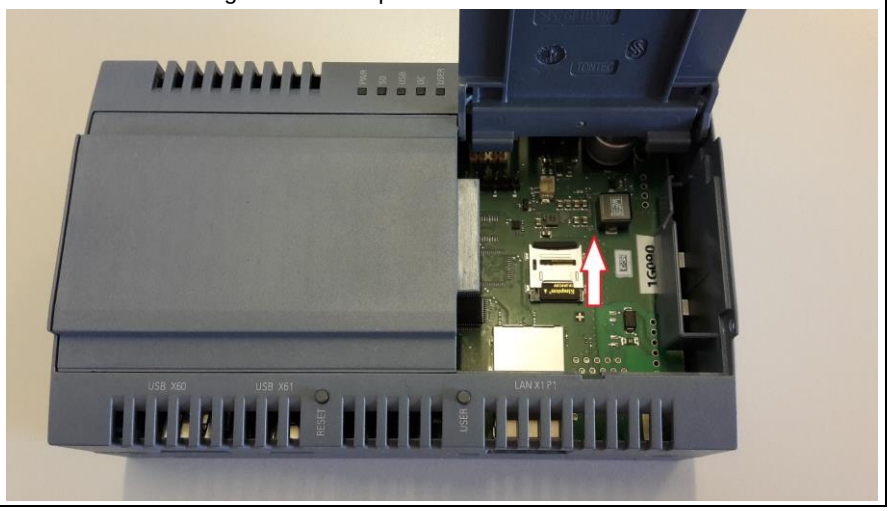
Table 3-1

No.	Action
1.	Insert the µSD-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.	Select “*.*” in the right bottom corner Then select the “iot2000-example-image-iot2000.wic” file in the retrieved SD Card Image folder 
7.	Select the drive letter of your SD Card 
8.	Click the “Write” button 

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

No.	Action
12.	Insert the µSD-Card into the µSD-Card Slot of the SIMATIC IOT2000 as follows: 1. Slide the locking down  2. Open the locking  3. Insert the µSD-Card 

No.	Action
	4. Close the locking and slide it up 

3.2 First Commissioning of the SIMATIC IOT2000

Ethernet cable

The following table shows how to connect the SIMATIC IOT2000 and the engineering station with an Ethernet cable.

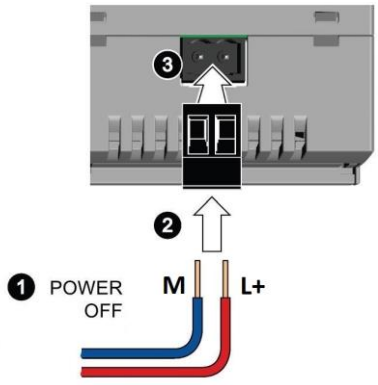
Table 3-2

No.	Action
1.	Connect one end of the Ethernet cable to an Ethernet-Port of the Engineering Station
2.	Connect the other end of the Ethernet cable to the Ethernet-Port X1P1 of the SIMATIC IOT2000. Note: If you use the SIMATIC IOT2040 X1P1 is the left port.

Power supply

The following table shows how to connect the SIMATIC IOT2000 to a power supply.

Table 3-3

No.	Action
1.	Power off the power supply
2.	Connect the cable to the connecting terminal
3.	Connect the connecting terminal to the SIMATIC IOT2000
4.	Power on the power supply
	

CAUTION	Only use a DC 9…36V power supply!

3.2.1 Remote access with Putty SSH Connection

The Software “Putty” can be used to get remote access from the Engineering Station to the SIMATIC IOT2000 via Serial, SSH or Telnet.

In this Example the SSH connection is used.

NOTE The SIMATIC IOT2000 has a static IP address by default.

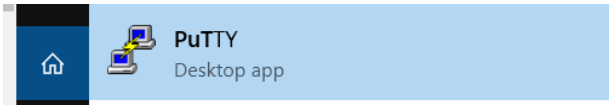
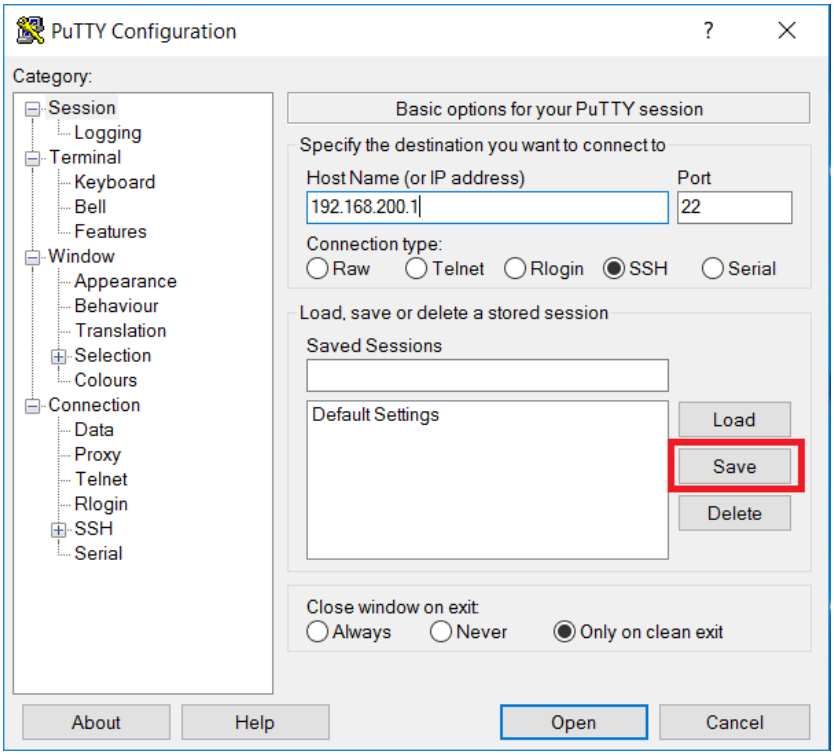
This address is **192.168.200.1.**

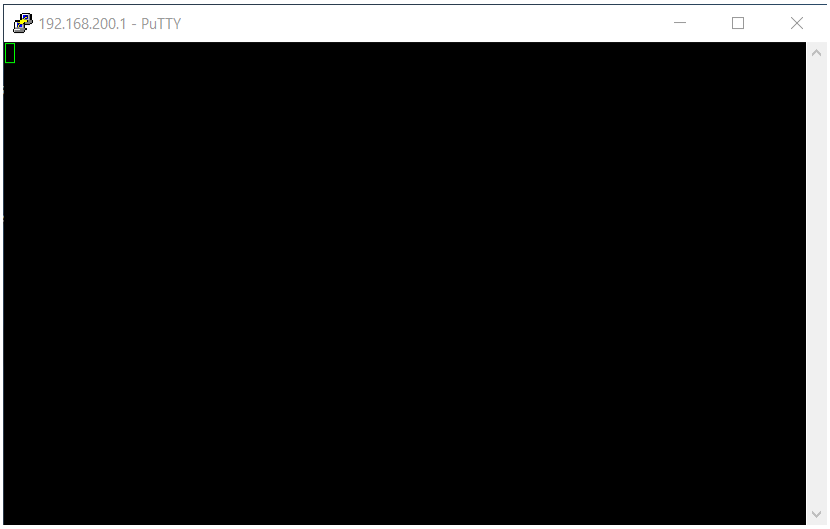
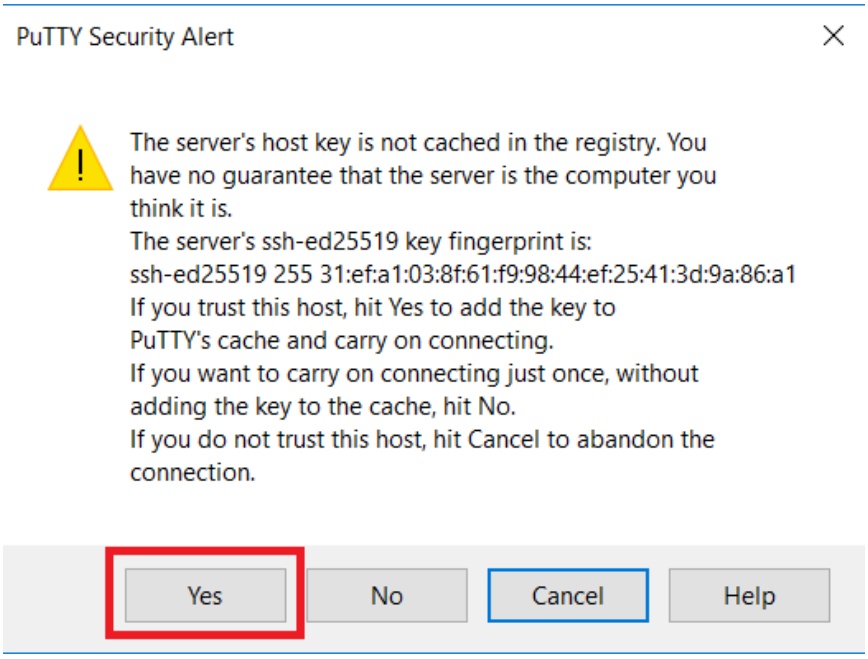
The Engineering Station has to be in the same subnet as the SIMATIC IOT2000 to establish a SSH connection!

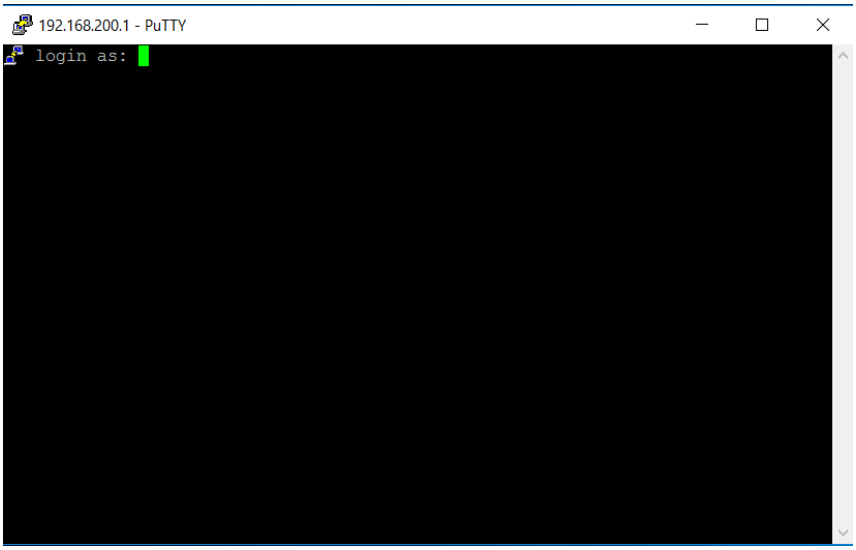
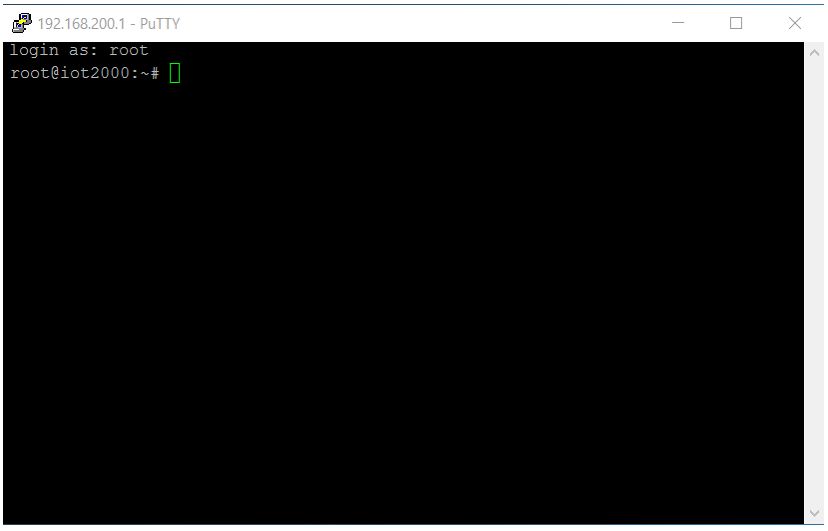
NOTE The first boot may last a few minutes –up to 5 – because the filesystem is resized automatically. The time is depending on the SD card you are using.

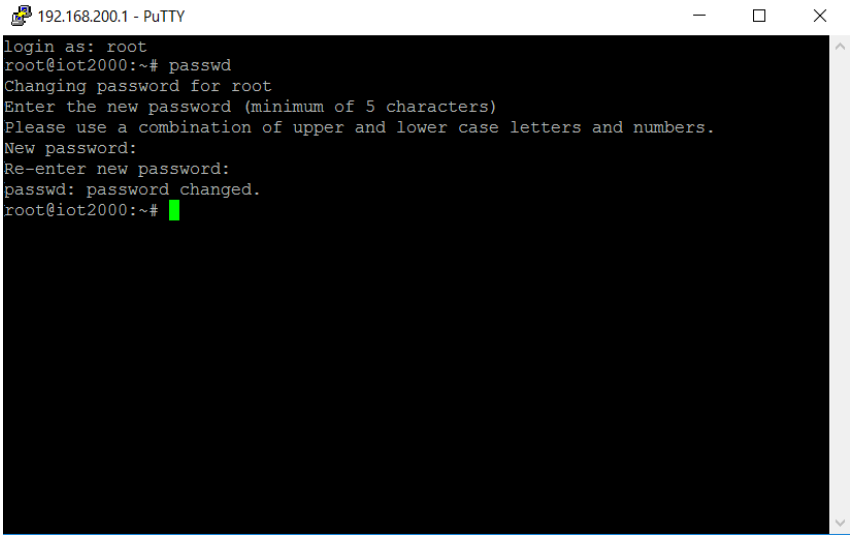
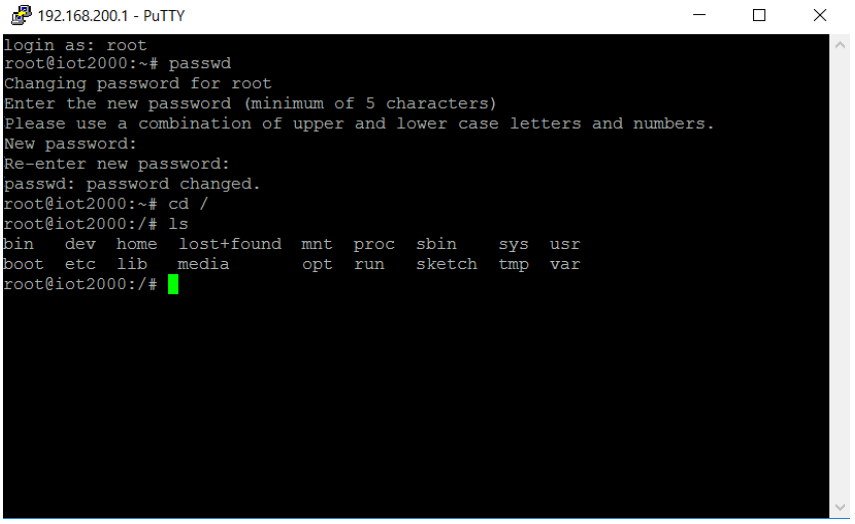
The following table shows how to use Putty.

Table 3-4

No.	Action
1.	Open downloaded Putty.exe with double-click 
2.	Configure the connection as follows: 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 **Hint** Under Window > Translation Tab, set ISO-8859-15:1999 (Latin-9, "euro") for proper character set. 

No.	Action
3.	Click on “Open” button for opening the communication to the SIMATIC IOT2000 via SSH. 
4.	Connecting the first time via SSH a Warning dialog will appear. It is necessary to update the SSH key. Press the “Yes” button. 

No.	Action
5.	If once confirmed a login dialog appears 
6.	Type “root” and press the Enter key  The login was successful. Note: There is no password set per default.

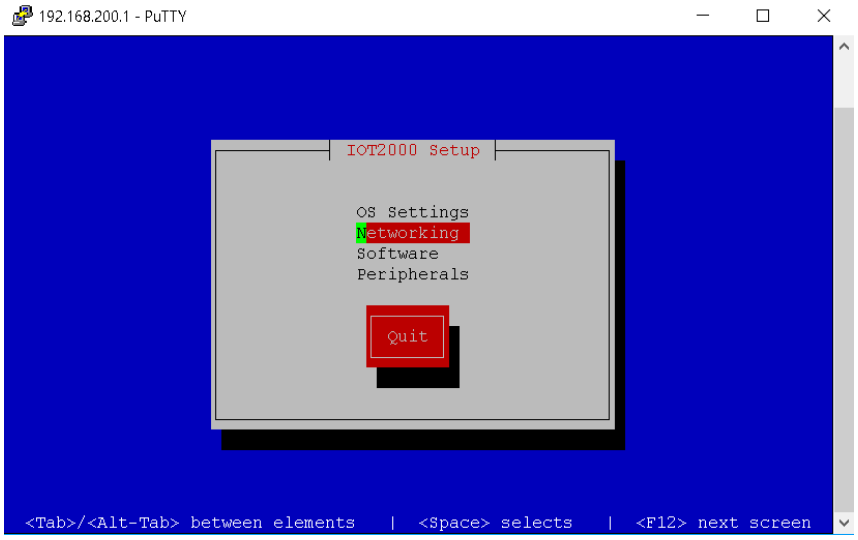
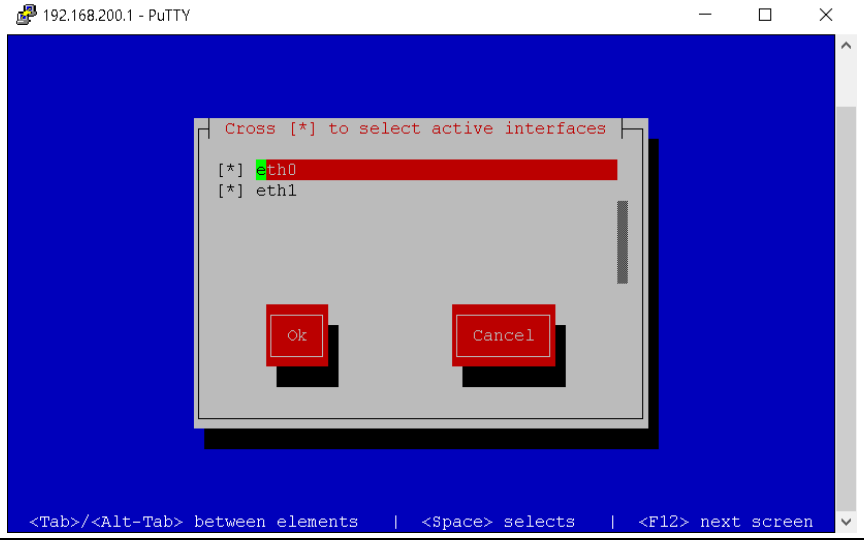
No.	Action
7.	Set a password for the login “root” because of security issues: 1. Type in “passwd” 2. Set a new password (input is hidden) 3. Confirm the password (input is hidden) 
8.	Now a few Linux commands can be tested. For example, “cd /” to get in the file system and “ls” to list the folders in the current directory 

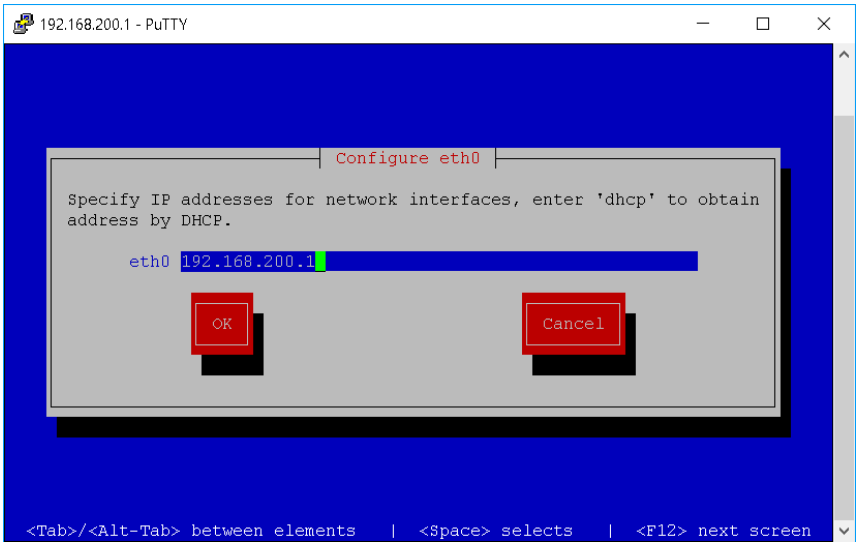
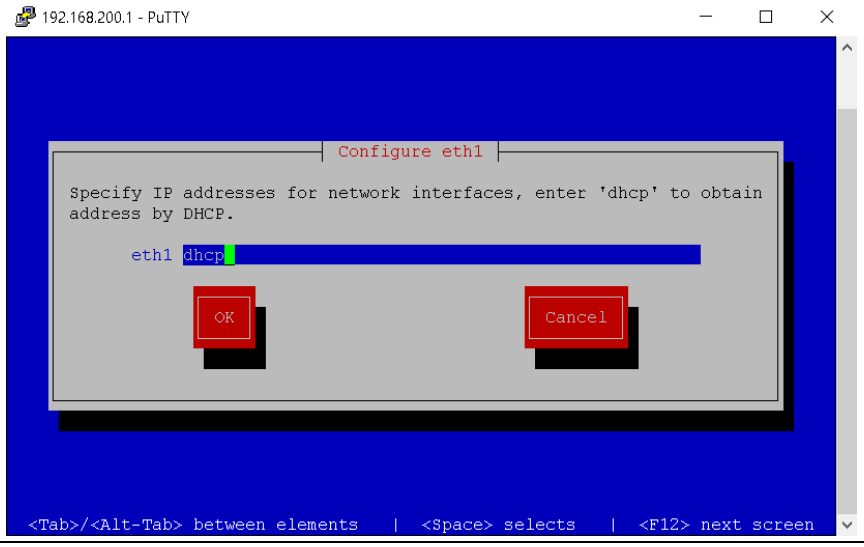
3.2.2 Change IP Address

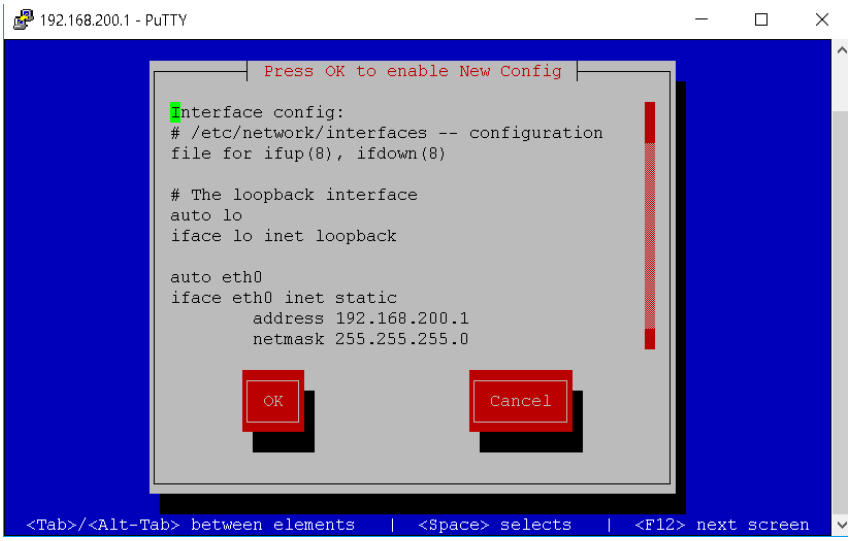
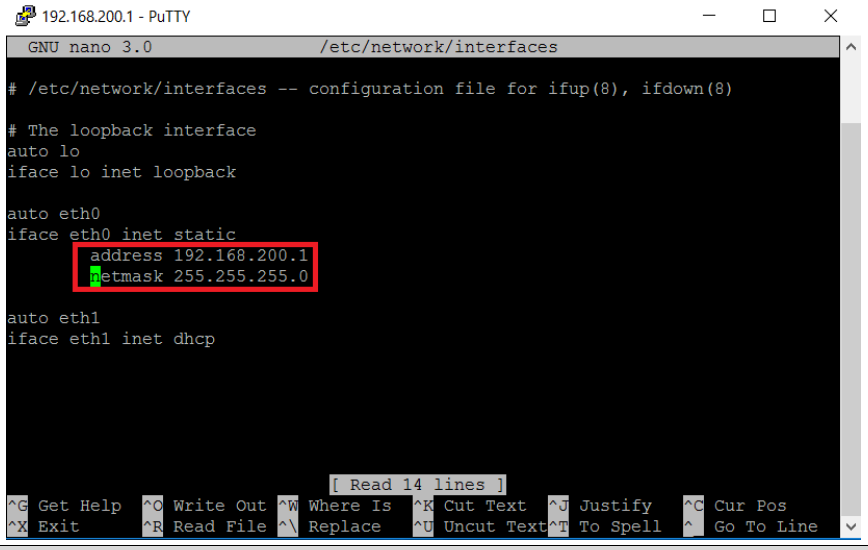
In the default settings of the SIMATIC IOT2000's Image, the IP address is set to **192.168.200.1**. Thus, if another static IP address or a DHCP address is required, this can be set with the iot2000setup tool

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

Table 3-5

No.	Action
1.	Open a valid serial Putty connection and login as root (i.e. See topic 3.3)
2.	Type in "iot2000setup" to open the setup tool, navigate to "Networking" and press "Enter" 
3.	Select active interfaces by putting cross and press "OK" eth0 = X1P1, eth1 = X2P1 

No.	Action
4.	Change the static IP address of your interfaces here, if required. If a DHCP address is required, write “dhcp” to your interface  

No.	Action
5.	Default netmask 255.255.255.0 will be added to /etc/network/interfaces configuration file.  If you want to change the netmask you have to edit the file “interfaces” in the directory “/etc/network” Therefore, type in “nano /etc/network/interfaces” and change the netmask for your interface After changing do the following: a. Press Ctrl+X to Exit b. Press Y to save c. Press Enter 

NOTE You can use the iot2000setup tool for many other settings. Just have a look at it.

3.2.3 Create new directory on the SIMATIC IOT2000

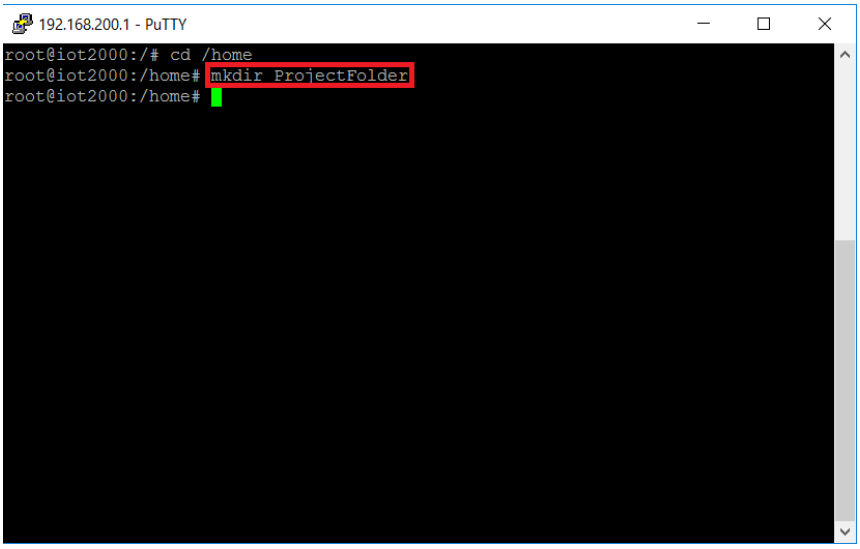
The default storage path for scripts, created with the Eclipse IDE, on the SIMATIC IOT2000 is the directory “tmp”. The files present in this directory, will be automatically deleted after a reset or power failure of the SIMATIC IOT2000.

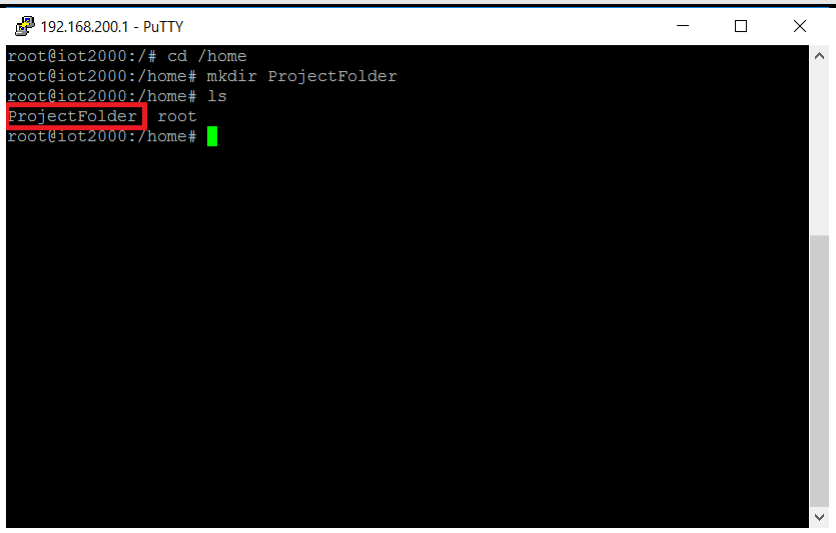
In order to avoid the loss of scripts, a new directory can be created where the files will be stored.

This is only an example; the projects can be stored in other locations too.

The following table shows how to create a new directory in the SIMATIC IOT2000’s filesystem.

Table 3-6

No.	Action
1.	Open a valid serial Putty connection and login as root (i.e. See topic 3.3)
2.	Type in “cd /home” command to change the current directory to the home directory of filesystem, and then press the Enter key.
3.	Type in “mkdir <Foldername>” to create a new directory and then press the Enter key (i.e mkdir ProjectFolder) 
4.	Type in “ls” to show all directories

No.	Action
	 The created folder is now present in the directory “/home”.

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 IOT2000
4.	Connect the Ethernet cable
5.	Connect the Power Supply
6.	Establish a SSH with PuTTY
7.	Change IP-Address
8.	Create a new storage directory for the Eclipse projects

5 Related links

Table 5-1

	Topic
\1\	SIMATIC IOT2000 forum www.siemens.com/iot2000-forum
\2\	Download SD-Card Example Image https://support.industry.siemens.com/cs/ww/en/view/109741799
\3\	SIMATIC IOT2000 Getting Started https://support.industry.siemens.com/tf/ww/en/posts/155643/
\4\	Operating Instructions https://support.industry.siemens.com/cs/document/109741658/simatic-iot2020-simatic-iot2040?dti=0&lc=en-WW

6 History

Table 6-1

Version	Date	Modifications
V1.0	09/2016	First version
V2.0	01/2017	Added chapter “Resize the SD card partition”
V2.1	08/2017	Added iot2000setup tool for changing IP Removed manually resizing of filesystem
V2.6	12/2019	Updated network configuration via iot2000setup tool