Application Note

FESTO

Boot Application loading without CoDeSys V3.5

A brief explanation on how to load a new project to a Festo PLC over Ethernet without the use of the CoDeSys 3.5 software

CECC
CPX-CEC (V3)

100099

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1 Requirements

The examples will use a CECC-LK controller, but the principle is exactly the same for other CECC's and all CPX-CEC based controllers which use CoDeSys 3.5.

1.1 Overview

This document will explain, step by step, how you can implement the loading of a Boot Application to a Codesys V3.5 PLC, without the need of CoDeSys software. This can be useful for automated updating of the Boot Application or when somebody without CoDeSys 3.5 on his computer wants to change/update the project that's loaded in the PLC.

There are three ways to use this feature:

1.1.1 Using the Festo Field Device Tool

Advantages:

Easily done and no need for 'programming' skills. Mostly used by Service Engineers without an installed version of CoDeSys 3.5.

Disadvantage:

Is completely manual, PLC always reboots directly.

1.1.2 Using the Festo Field Device Tool with commands in the CMD.exe

Advantages:

Can be automated into an executable batch file. PLC keeps running, reboot can be done later.

Disadvantages:

Is a little complex to setup with the cmd.exe

1.1.3 Using an FTP client

Advantages:

Easy interface, can also be automated with 3rd party FTP clients. PLC keeps running, reboot can be done later.

Disadvantages:

FTP server needs to be activated on the PLC, this is not by default and requires a setup progress.

2 Preparation of Boot Application files

For updating the Boot Application two files are always required:

Application.app
Application.crc

2.1 Short explanation:

Open or create a new project like your used to in CoDeSys 3.5.

Create the boot files via the drop down menu: 'Online' --› 'Create Boot Application'.

Normally, when CoDeSys 3.5 is online connected with a PLC, this creates the boot application files and puts them automatically inside the PLC. After a power cycle the PLC will boot with those files.
Because CoDeSys 3.5 is not connected to a PLC it opens the file directory on your PC and you can save the Boot Application files. The following question may be asked by CoDeSys:

Application changed since last download: Do you want to generate new code for the boot project?
Answer with **'Yes'**

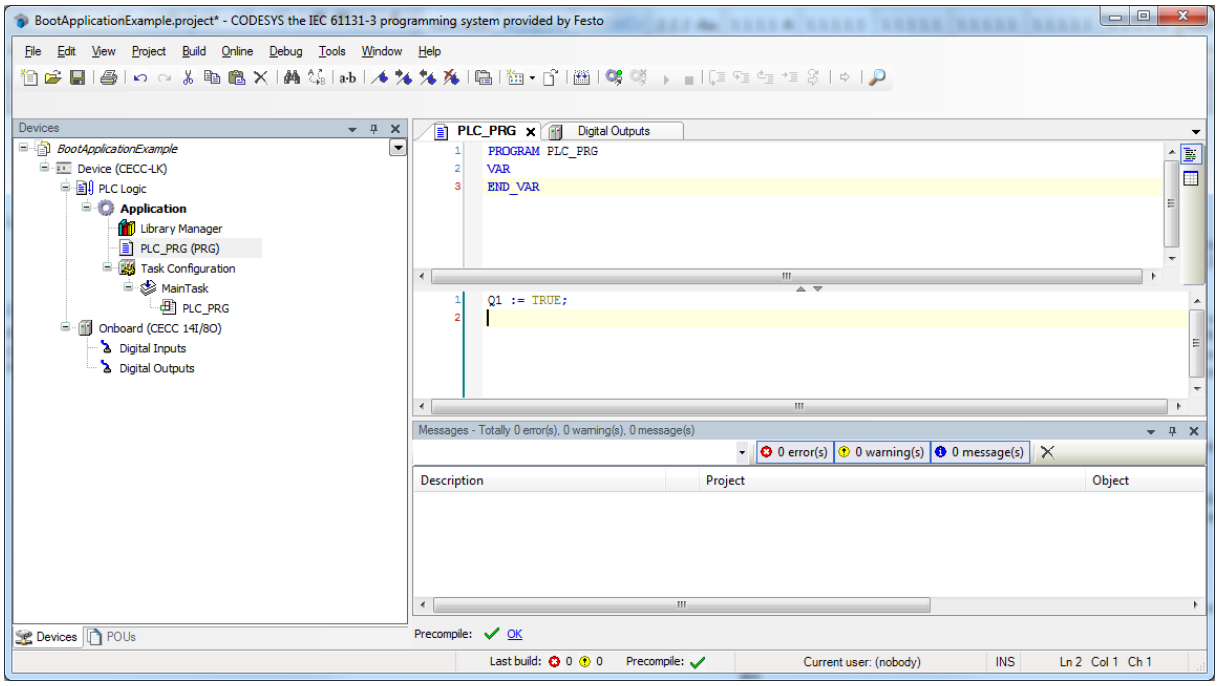
After saving the file there's a second question asked:
Do you want to save the Reference context for the boot project?
Answer with **'Yes'**

If no errors occur with building the code, there are two files created :
Application.app
Application.crc

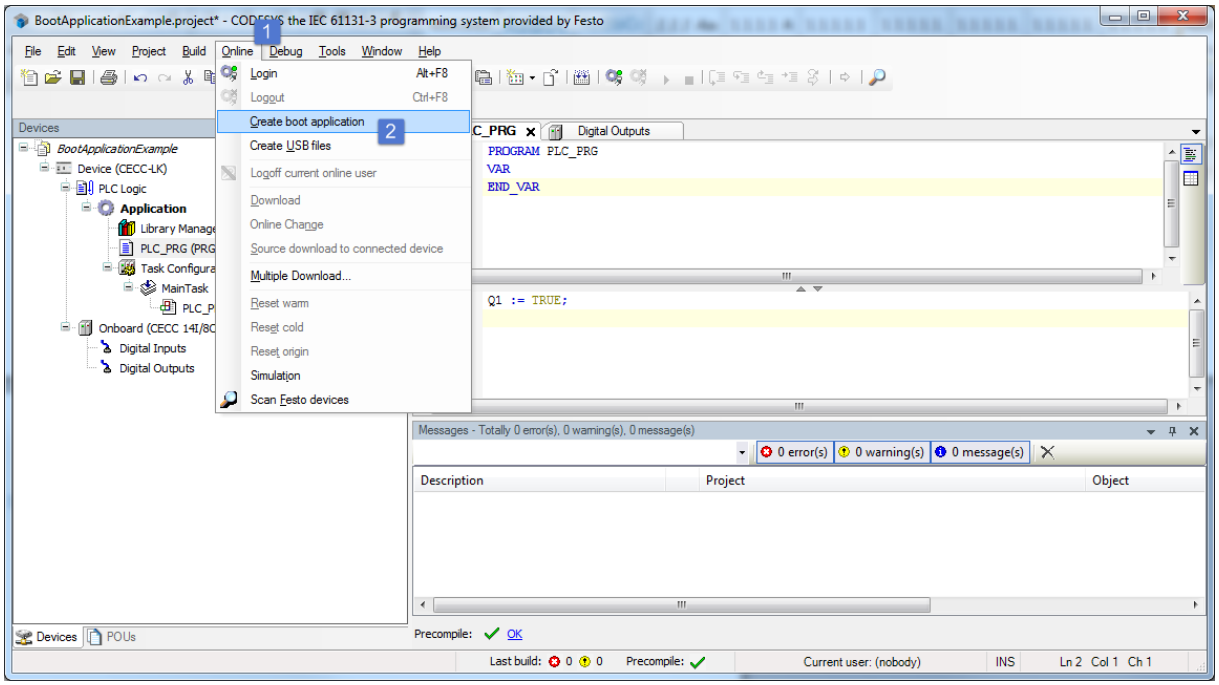
Attention: Do NOT change the names of these files!

2.2 Step by Step approach:

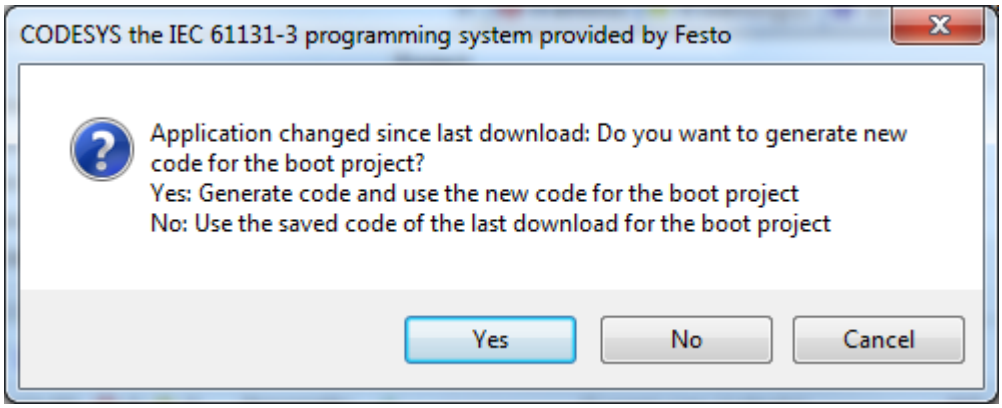
Open or create a project:



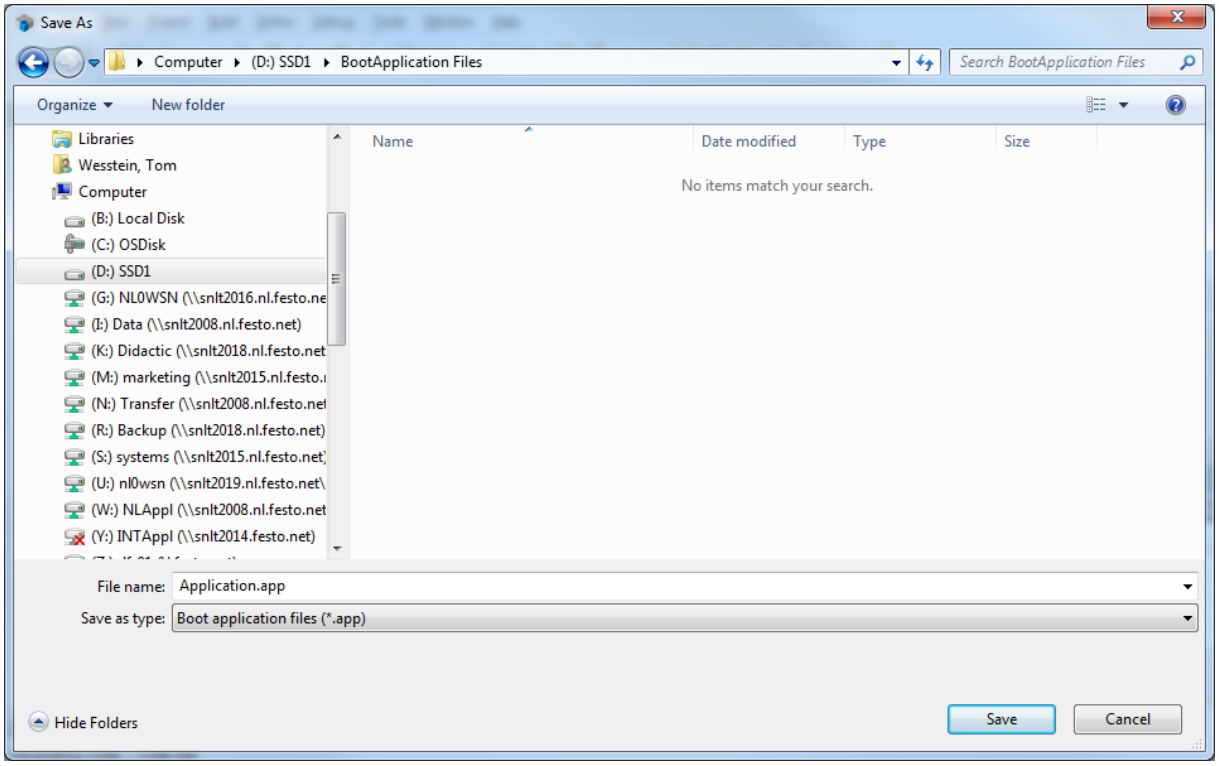
Create the Boot Application files



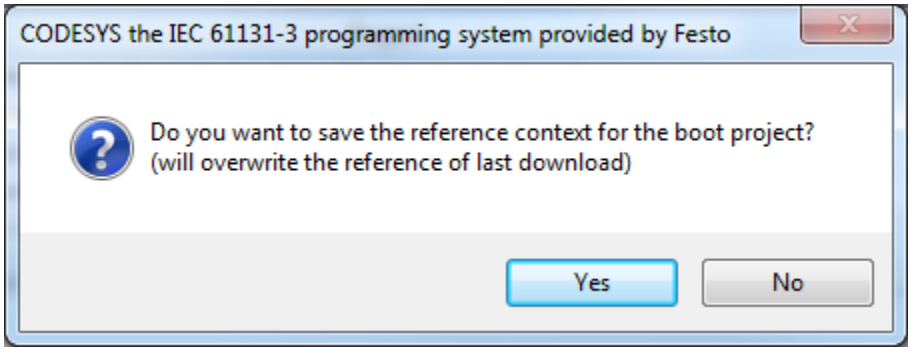
Answer the question with ‘Yes’:



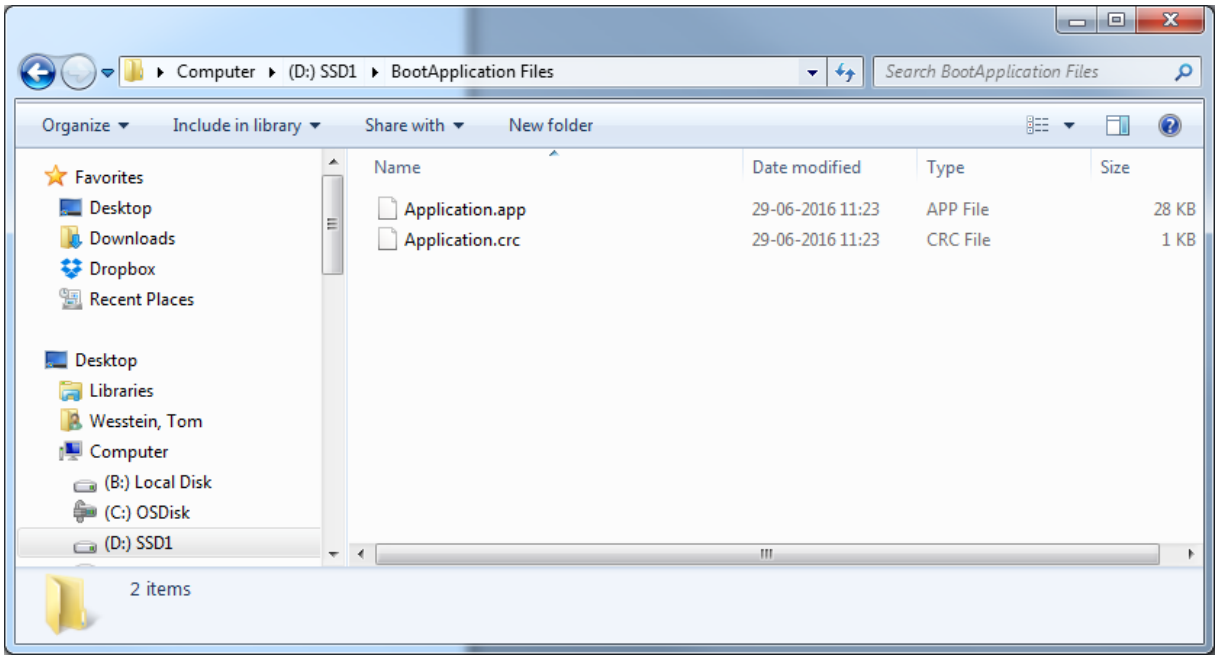
Save the files:



Answer the question with ‘Yes’:



The two files are created:

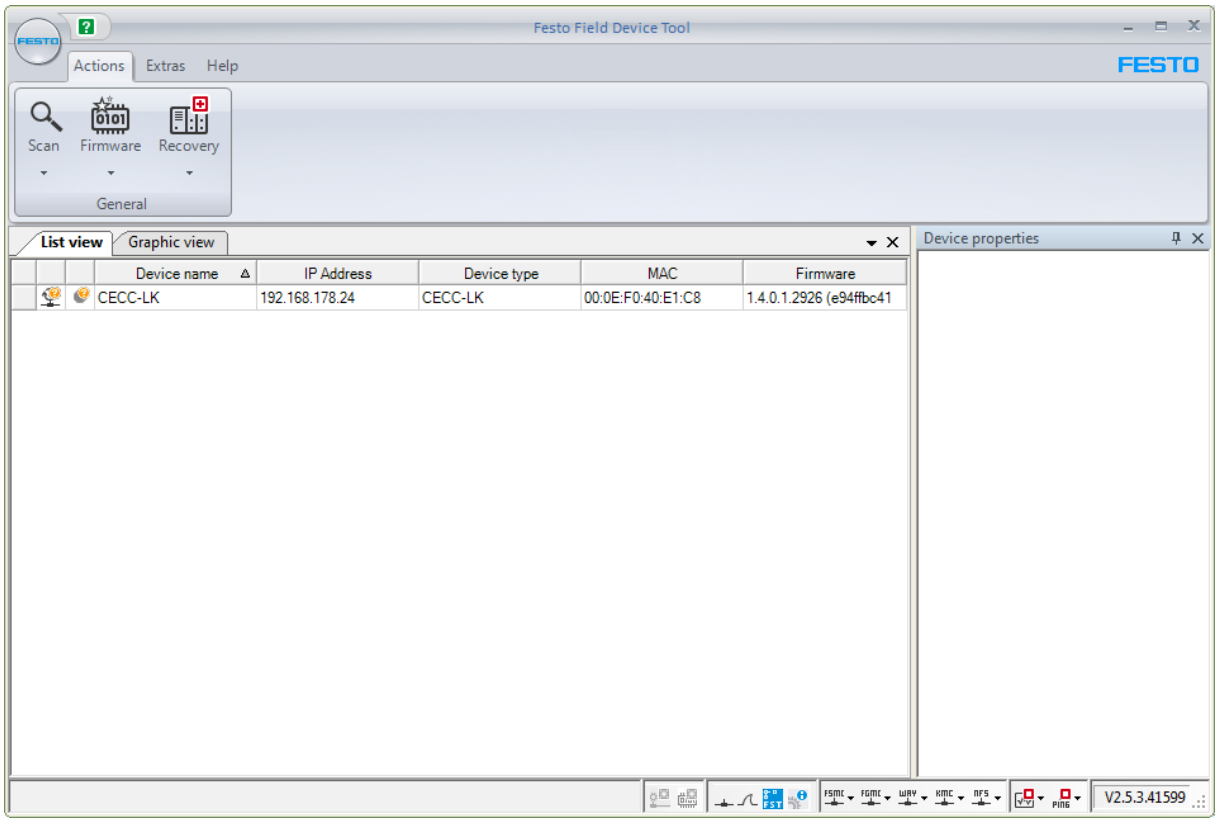


3 Loading the Boot Application with FFT:

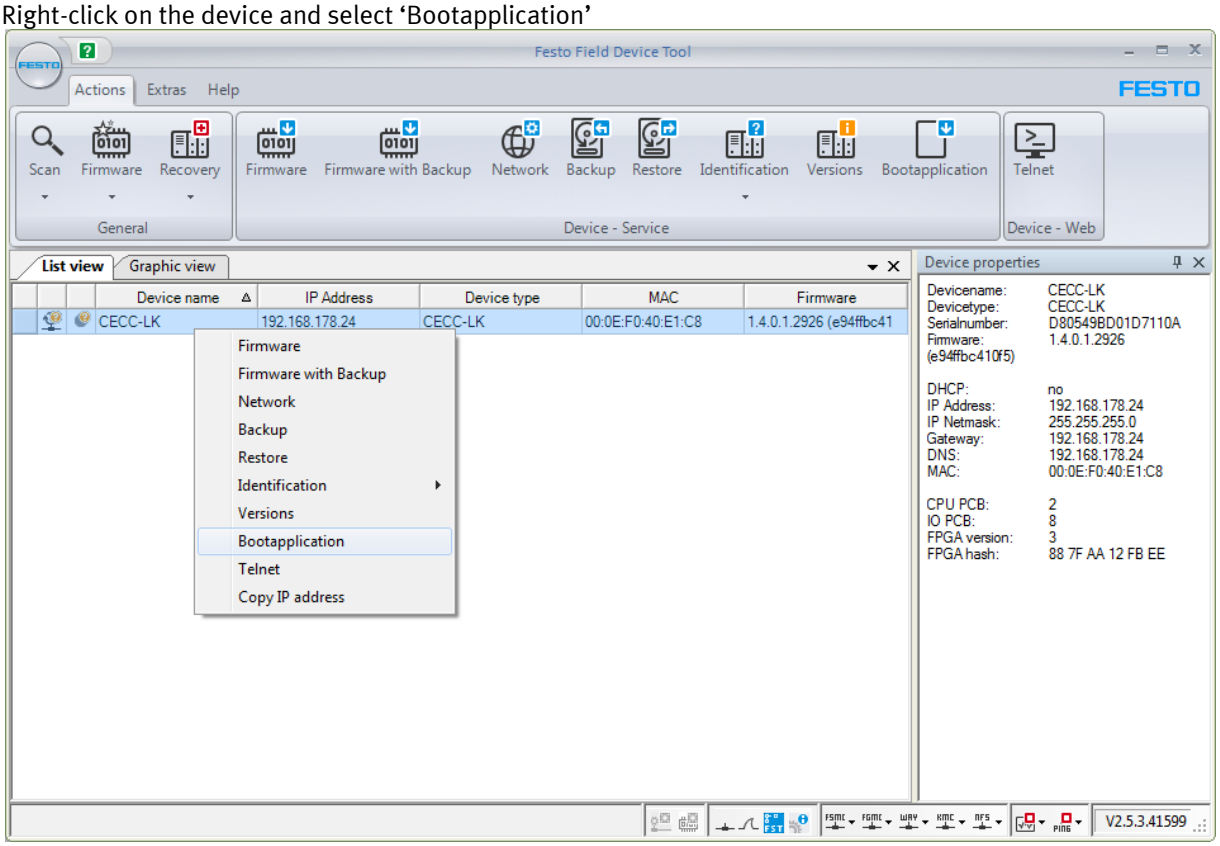
This chapter will explain how to easily load the two Application files to the CoDeSys controller with the Festo Field Device Tool. This can be useful for service engineers who are on location at a machine and want to load the new files they received from a programmer, without the use of CoDeSys software.

3.1 Step by Step approach:

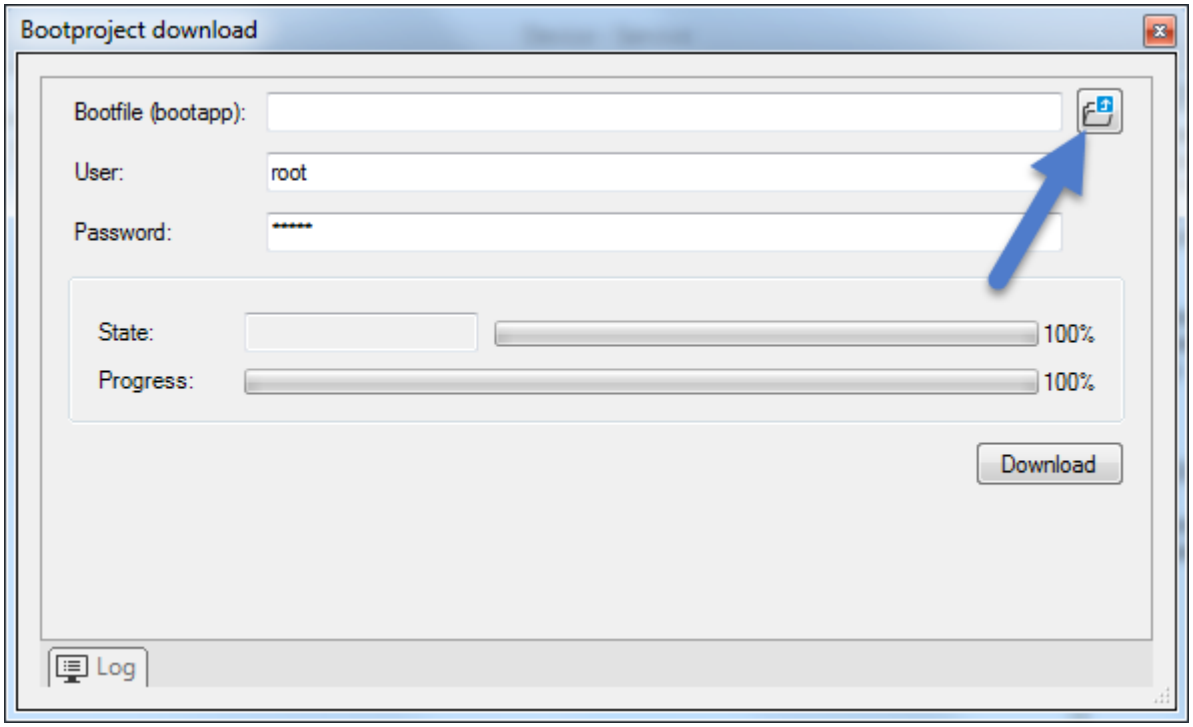
Open the Festo Field Device Tool and scan for the PLC, it should appear in the List View.



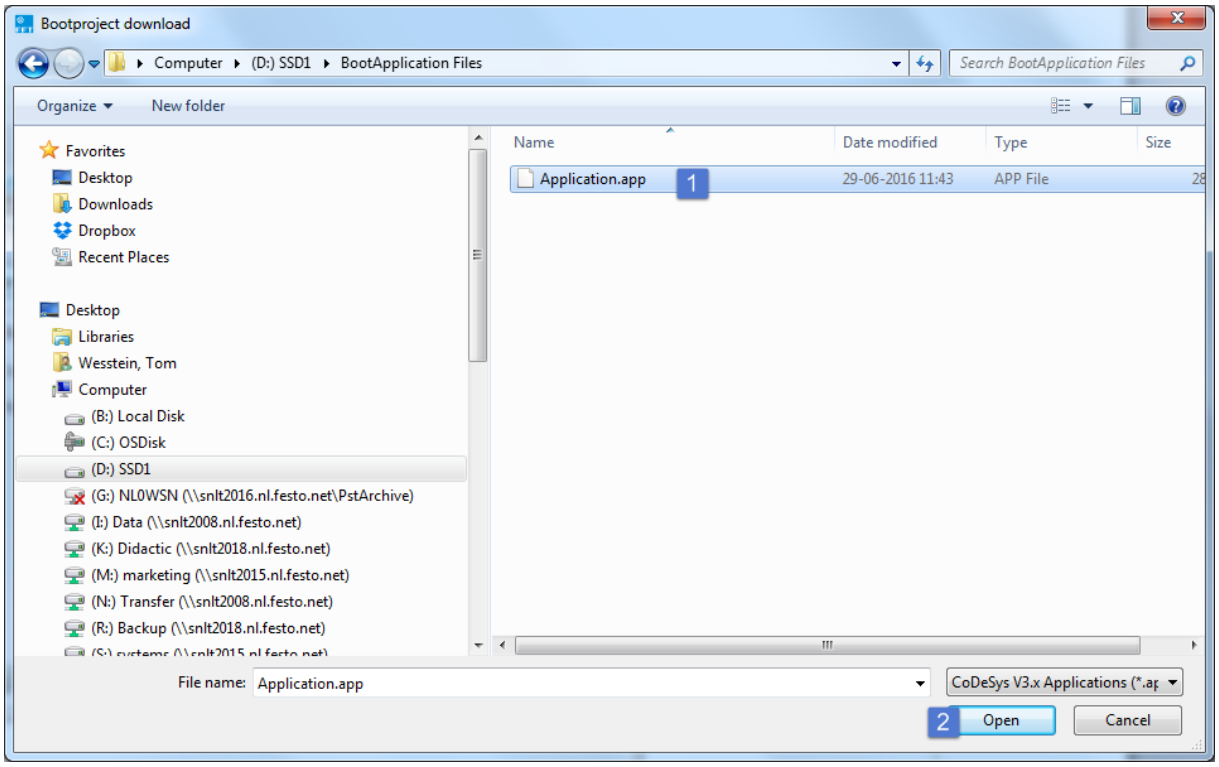
Right-click on the device and select ‘Bootapplication’



On the pop-up window, open the file directory:

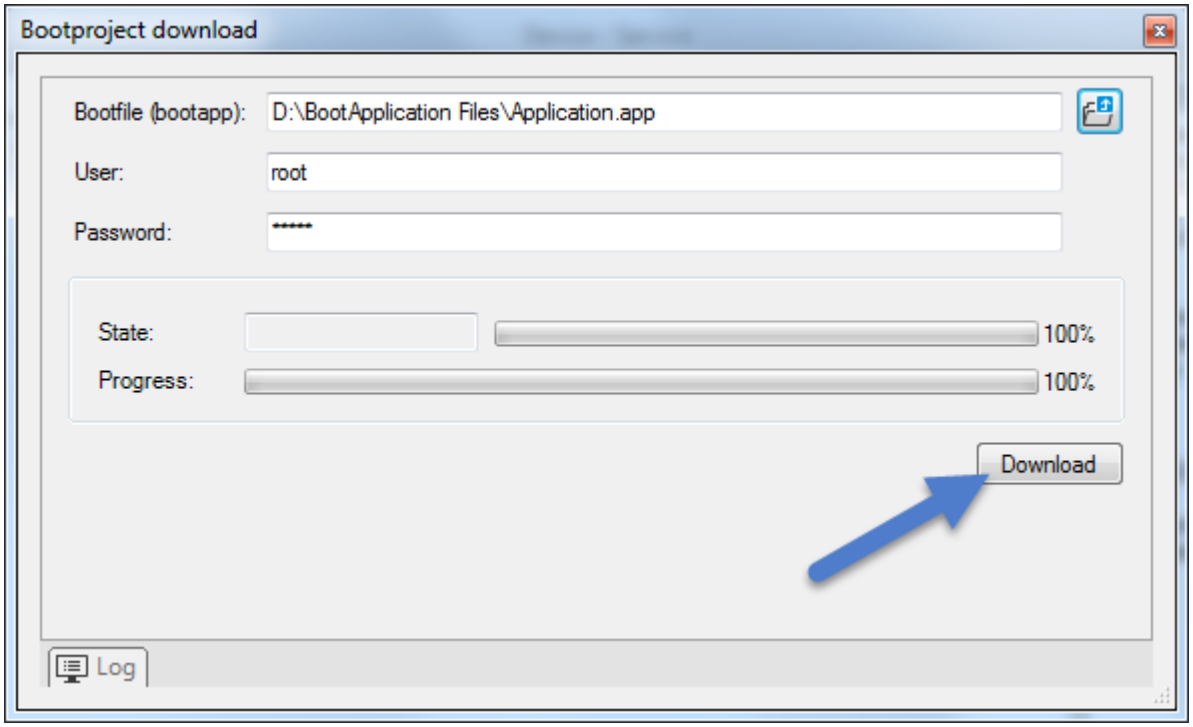


Select the ‘Application.app’ file and choose ‘Open’:

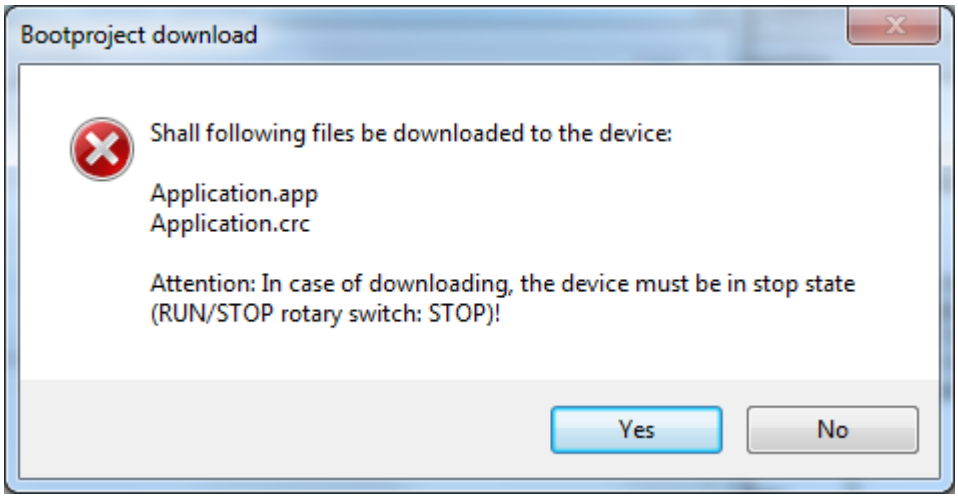


The location and filename should now show in the pop-up window.
By default the user/password are filled in:
User: root
Password: Festo

Choose download:

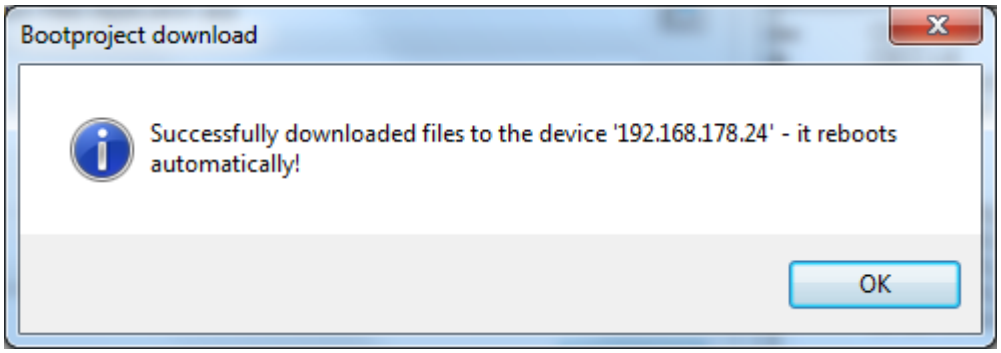


The following question is asked:

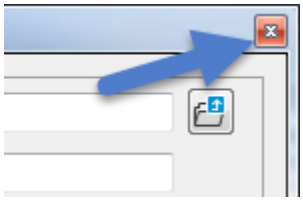


Attention: If the PLC is not put in stop manually, the Field Device Tool will **force** the PLC to a stop and therefore stopping the machine.

Please choose 'Yes' if you want to want to download the Boot Application.
If no error occurs, the following message will confirm the download:



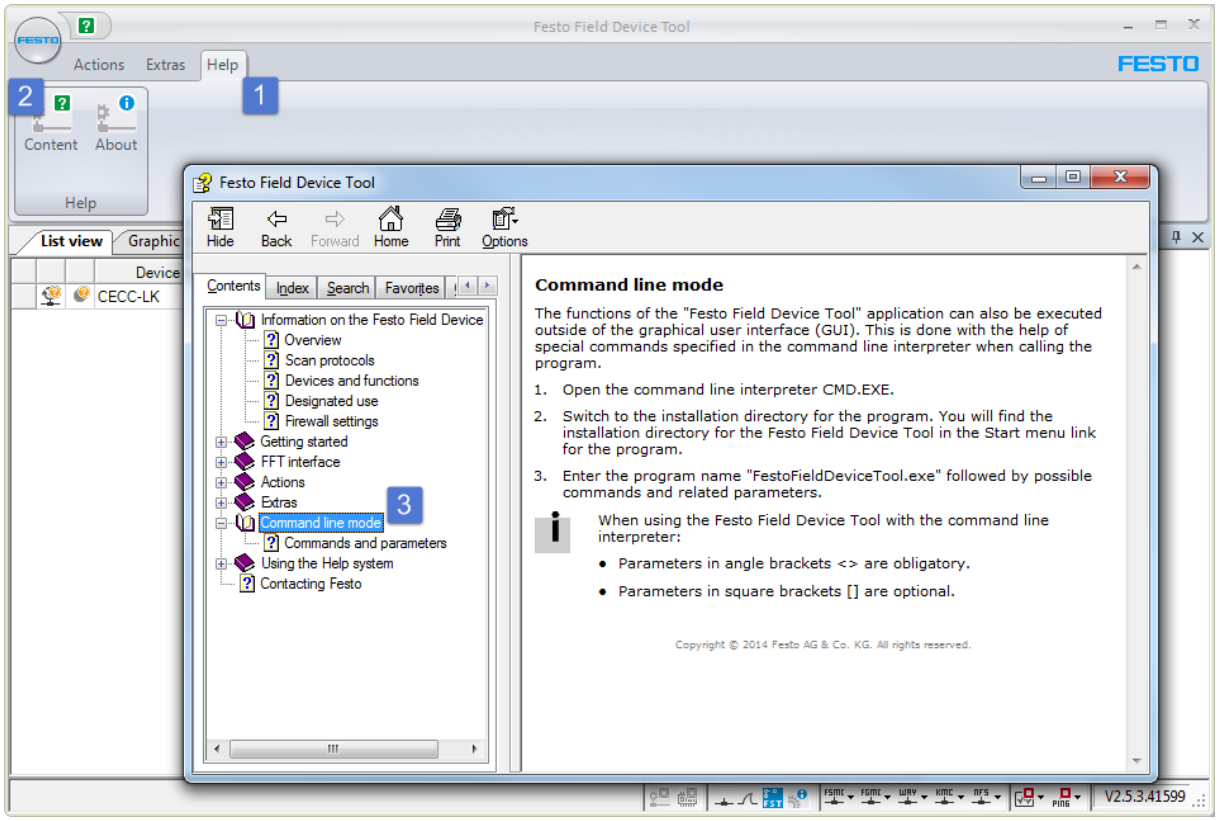
The Boot Application loader can now be closed:



4 Loading the Boot Application with FFT and the command prompt

In some cases, you want to automate the process shown above. This is possible via the Command Prompt (cmd.exe). The following chapter will show this method.

Additional information about the use of this feature can be found in the 'Help' directory of the Festo Field Device Tool:



4.1 Step by Step approach:

To command the FFT via the Command prompt we need to prepare a .txt file which points to the following locations:

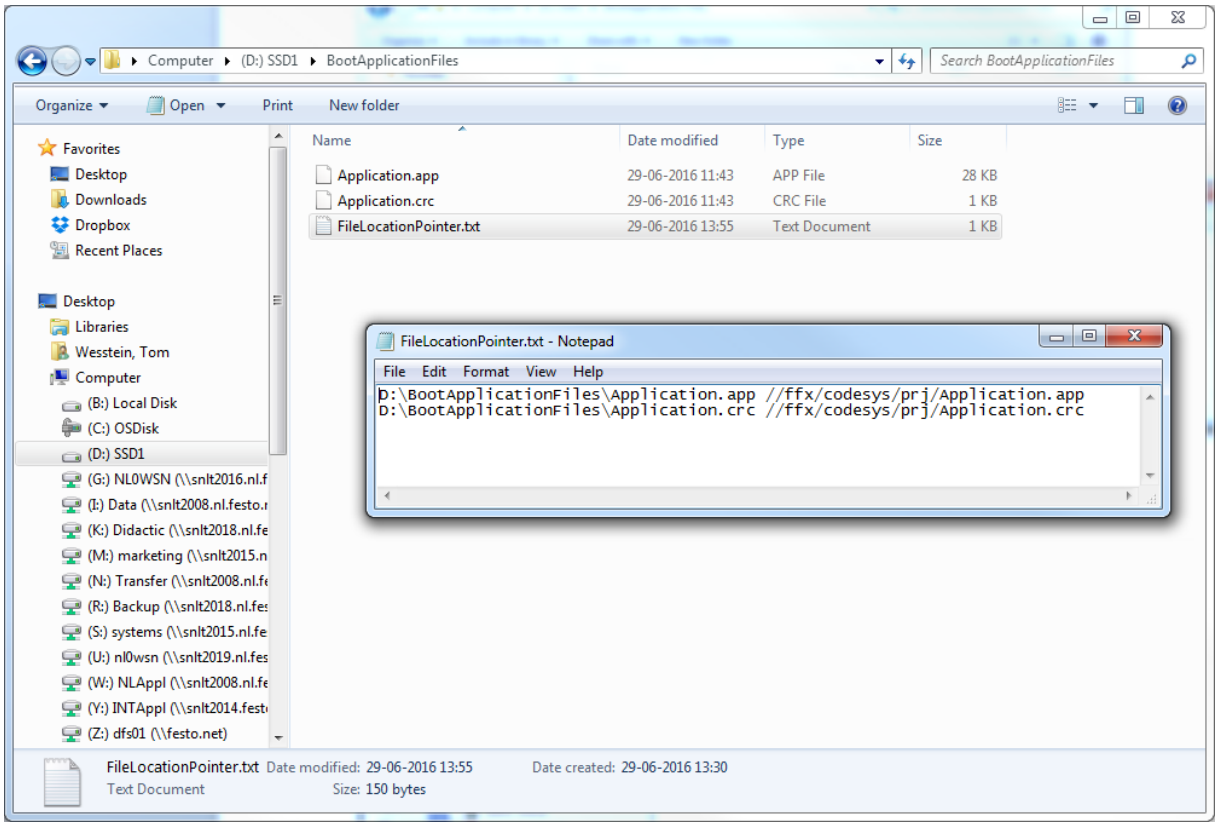
- Location of the 'Application.**app**' file on the PC
  - Location where the file should be placed inside the PLC
- Location of the 'Application.**crc**' file on the PC
  - Location where the file should be placed inside the PLC

In this example the following text will be:

D:\BootApplicationFiles\Application.app //ffx/codesys/prj/Application.app
D:\BootApplicationFiles\Application.crc //ffx/codesys/prj/Application.crc

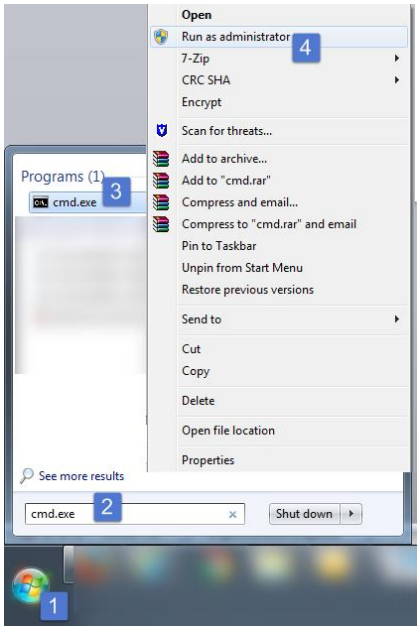
You can put the 'FileLocationPointer.txt' anywhere on your pc, but the most logical place is inside the same directory as the Boot Application-files.

Attention: all used folders/subfolders and files may **NOT** contain any spaces! Make sure all file names and folders are single words!



Now you can open the **cmd.exe**, please execute it as 'Administrator' by 'Right-clicking' the executable and selecting 'Run as administrator'.

This makes sure you can access the 'Program Files' directory on the C:\ disk.



First, we need to point to the Festo Field Device Tool directory. On x64 machines the default location is:

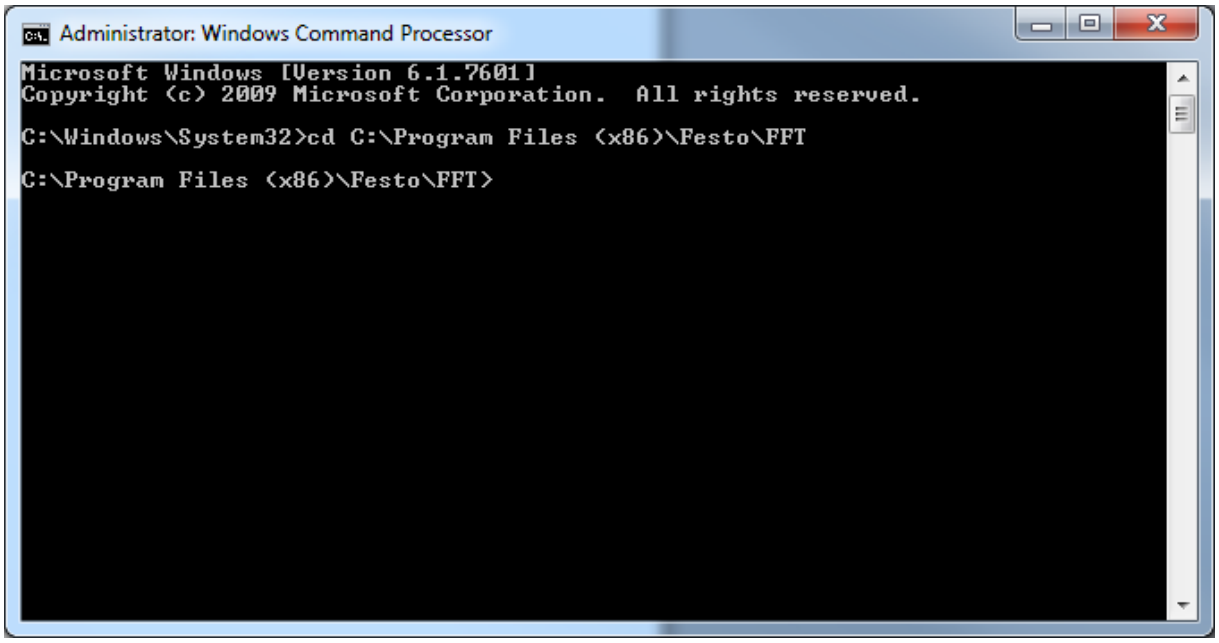
C:\Program Files (x86)\Festo\FFT

Point to this location with the following command:

cd C:\Program Files (x86)\Festo\FFT

and select 'Enter'

The cmd.exe should now look like this:



Now, we need to prepare the command line to download the Boot Application Files. This command line needs the following information:

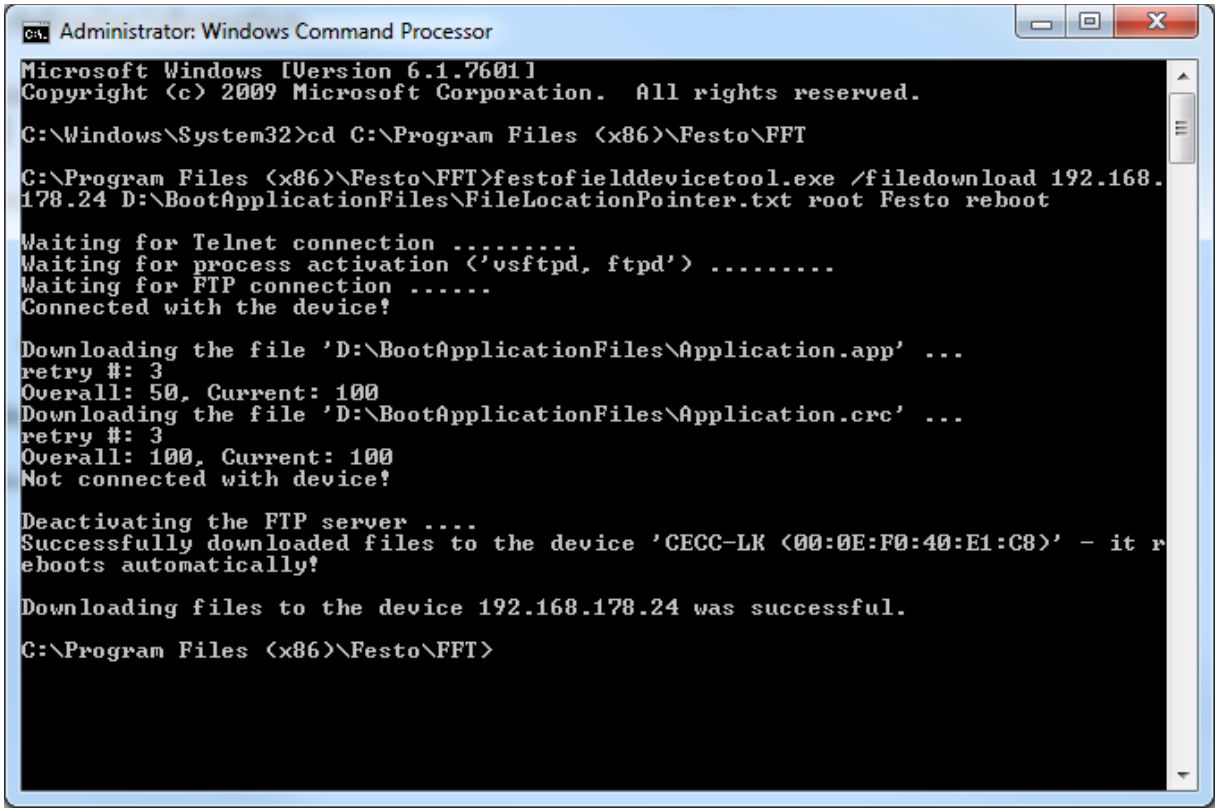
festofielddevicetool.exe	‹-- This selects the FFT
/filedownload	‹-- This selects the file downloading procedure
‹IP adres PLC›	‹-- The IP address of the PLC should be located here
‹Location of xxx.txt pointer›	‹-- This should contain the location of the .txt file created earlier
‹Username›	‹-- By default this is 'root'
‹Password›	‹-- By default this is 'Festo'

(reboot) ‹-- This commands the PLC to do a reboot after file downloading (not mandatory)

For this example, the command line looks like this:

festofielddevicetool.exe /filedownload 192.168.178.24 D:\BootApplicationFiles\FileLocationPointer.txt root Festo reboot

Executing this command line will result in the following screen, the text *'Downloading files to the device 192.168.178.24 was successful.'* confirms the correct download.



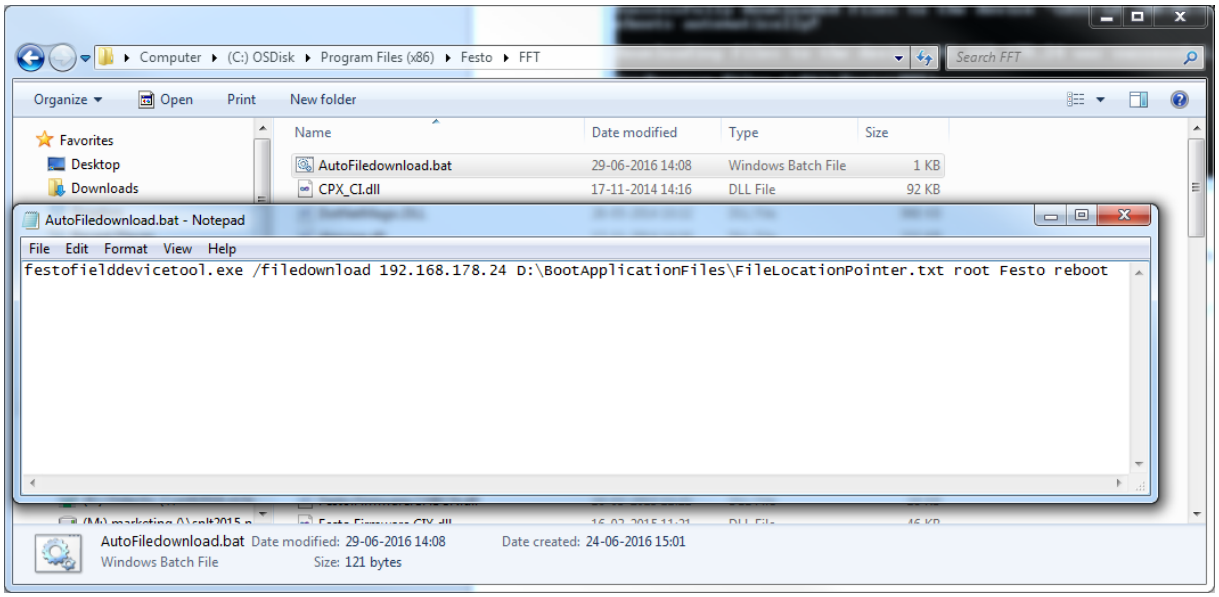
After reboot the PLC will boot the new Application.

4.2 Automated batch file

If you want to automate this, you can create an executable batch file. This batch file needs to be saved inside the Festo Field Device Tool directory.

Simply create a .txt file with the command line and change the extension to '.bat'.

For example:



Double clicking the 'AutoFiledownload.bat' will open the command prompt and automatically executing the line. After completion it exits.

Attention: the cmd.exe will not check if the download was successful, it always closes!

5 Loading the Boot Application with an FTP client

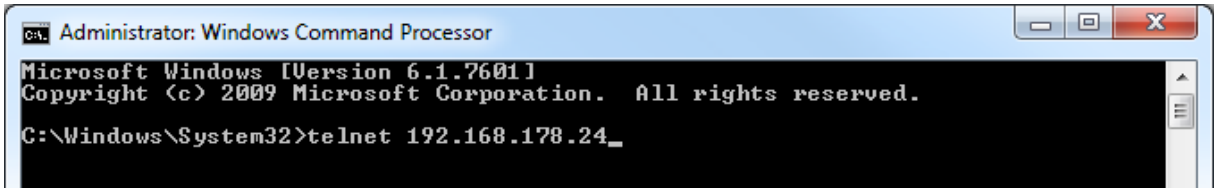
Multiple different FTP clients can be used to download the Boot Applications to the PLC, this explanation will use FileZilla.

5.1 Activating FTP server

To save processor speed the FTP server is not activated in the PLC by default. This can be activated in multiple ways but I will explain the easiest one.

The first time we need to manually start the FTP server, this can be done with the cmd.exe.

Type in *'telnet 192.168.178.24'* and press enter:

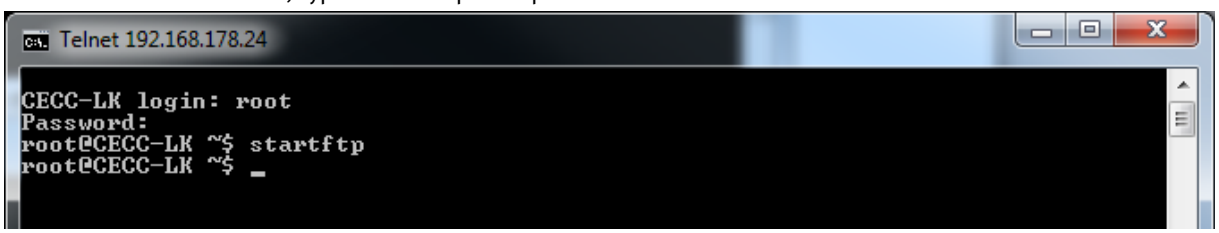


The following screen should show:

As username, type in 'root' and press enter:

As password, type in 'Festo' and press enter: (note that when typing, no letters or asterisk's occur)

To activate the FTP server, type in 'startftp' and press enter:



To check if the FTP server is running, type in ‘ps’ and press enter, the line ‘/sbin/vsftpd’ should be shown at the bottom:

The command prompt may now be closed.

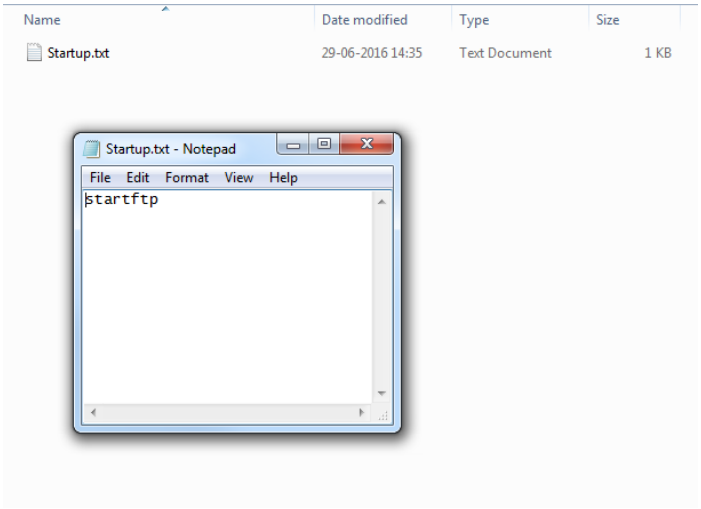
Note: If you reboot the device, you have to start the FTP server AGAIN. If you want to start the server every time your device powers up, please follow the next steps.

5.2 Automatically activating FTP server:

Create a text file with the following name:
Startup.txt

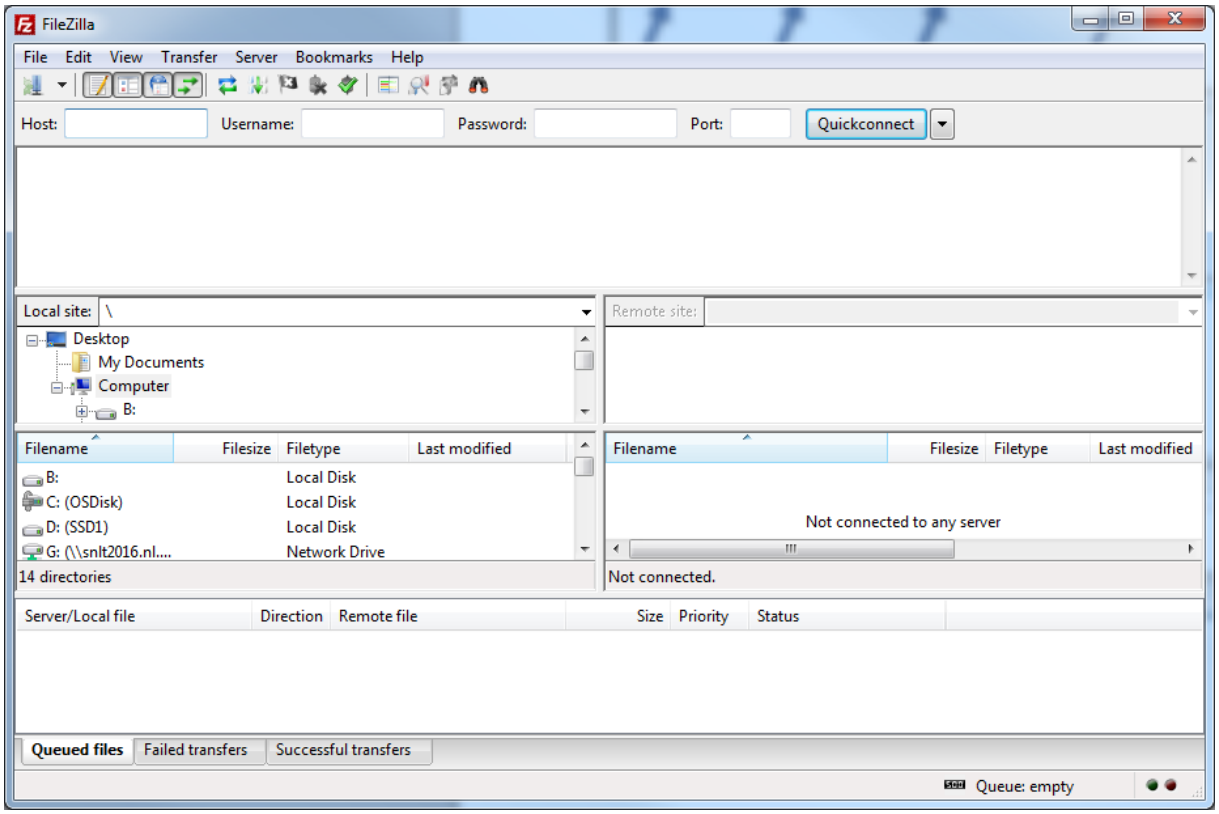
Inside the this file enter the following text:
startftp
Attention: do not use capital letters!

It should look like this:

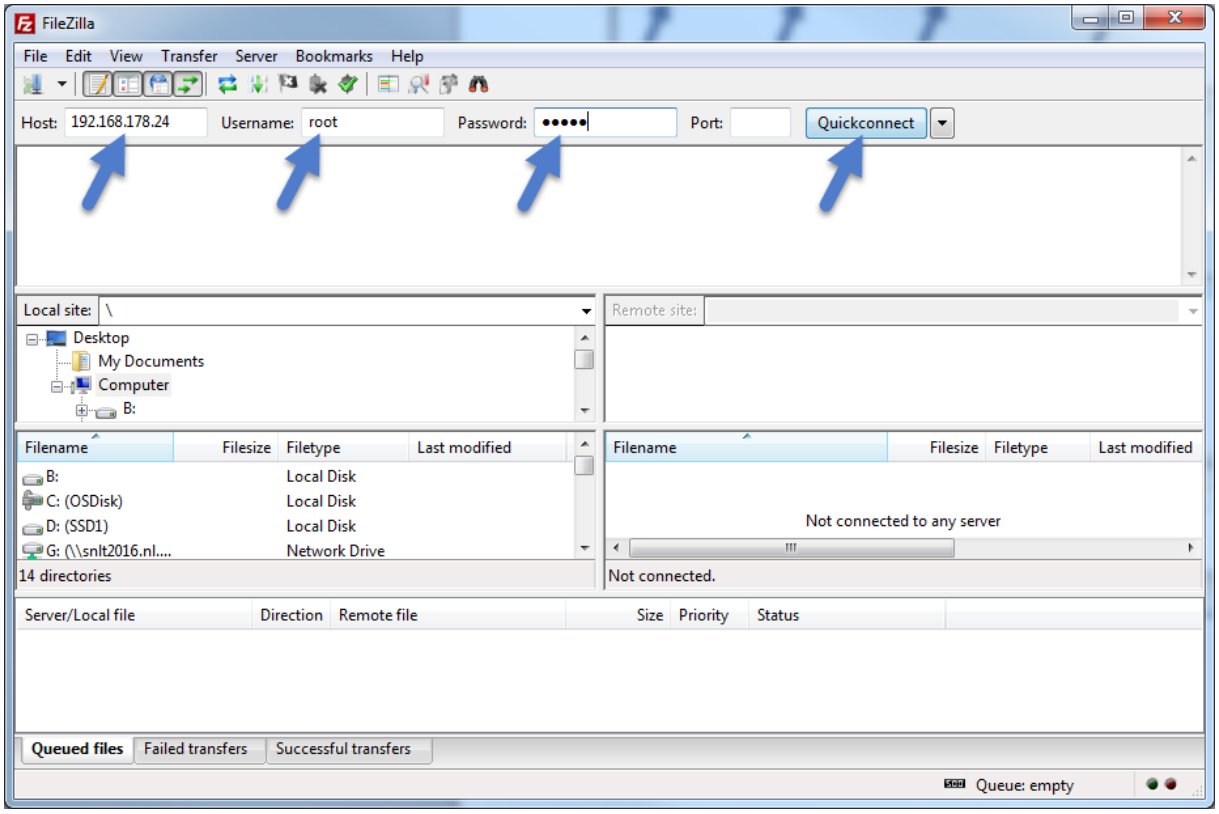


By placing this file inside the project directory on the PLC, it will automatically boot the FTP server.

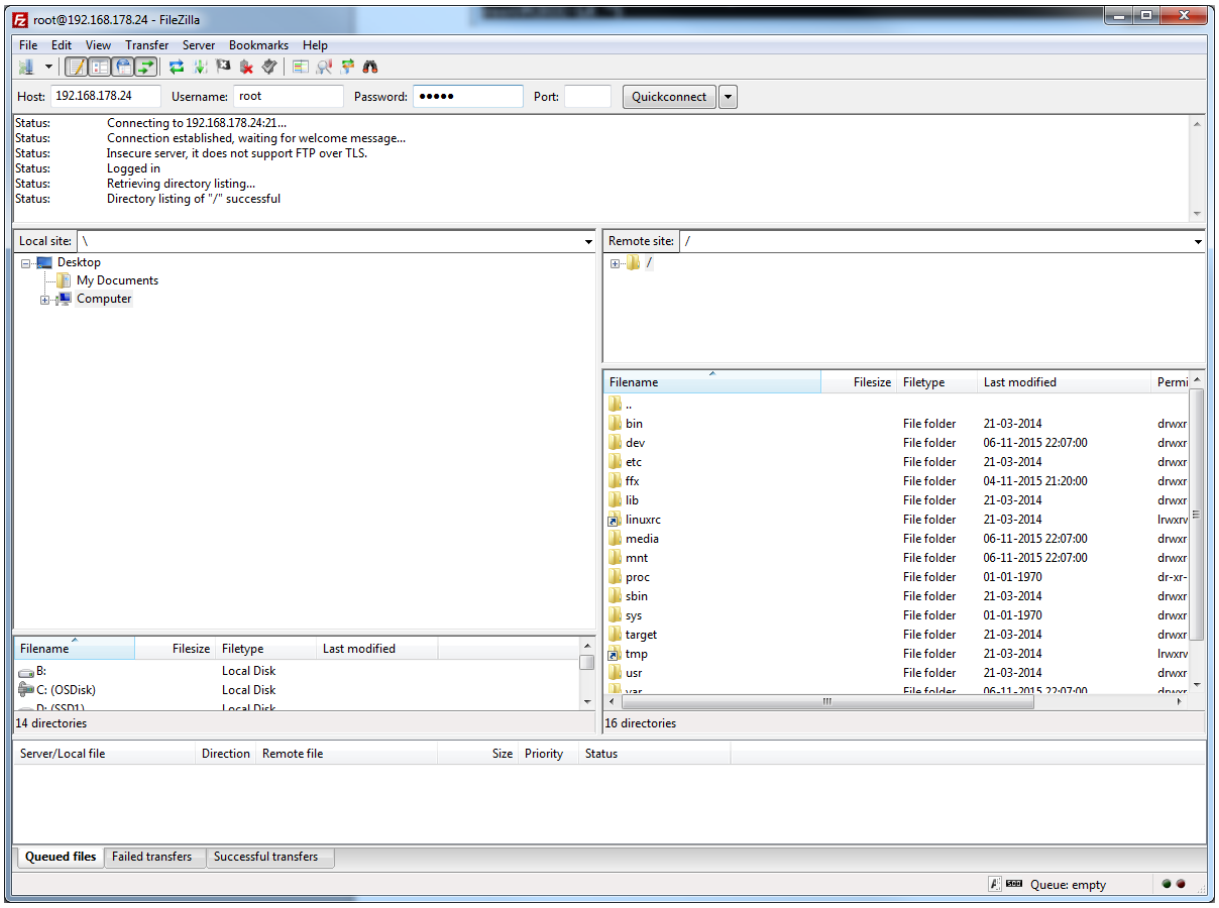
Open an FTP client program. In these examples the program FileZilla is used:



Type in the IP-adress, username and Password of the PLC and select on ‘Quickconnect’.
By default:
Username: root
Password: Festo



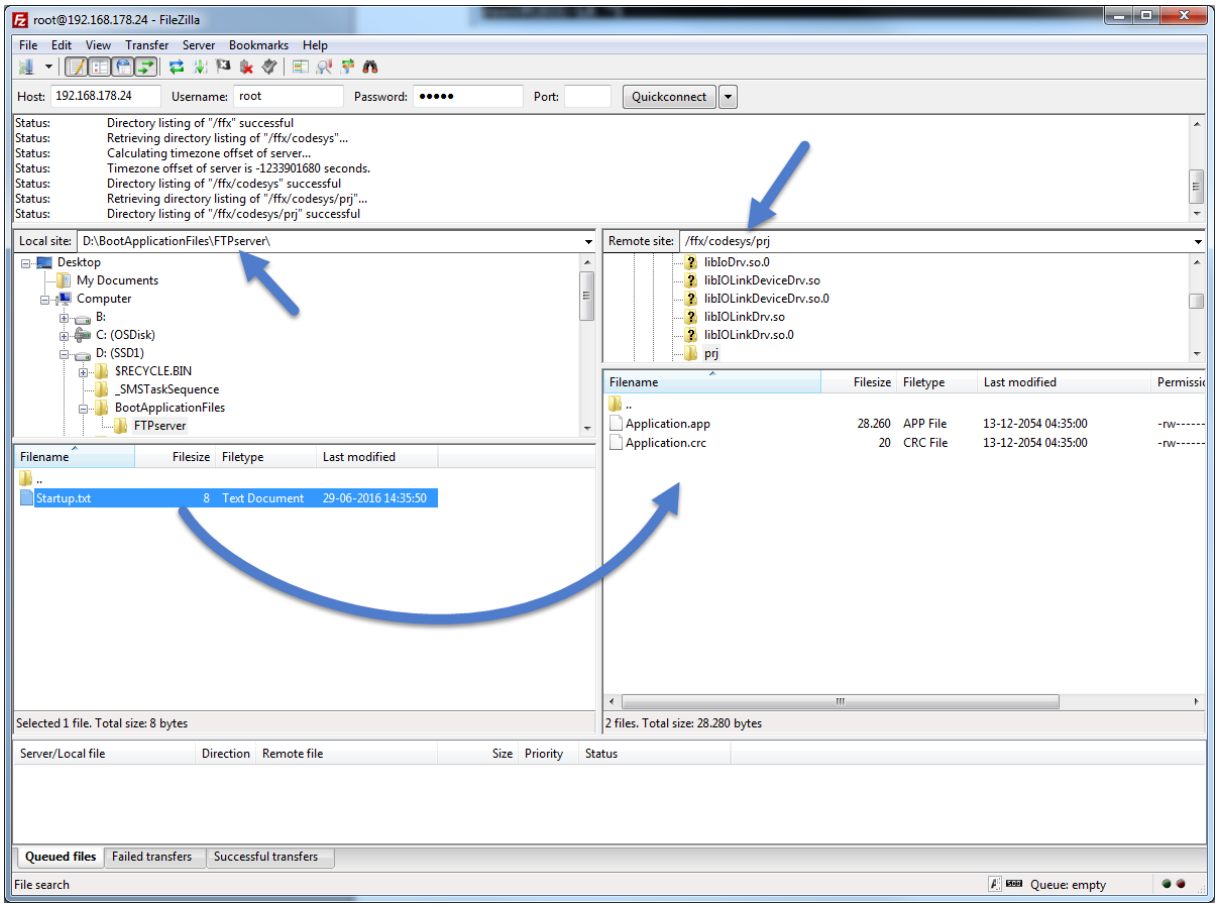
If the connection is established, the file directory on the PLC should be shown on the right:



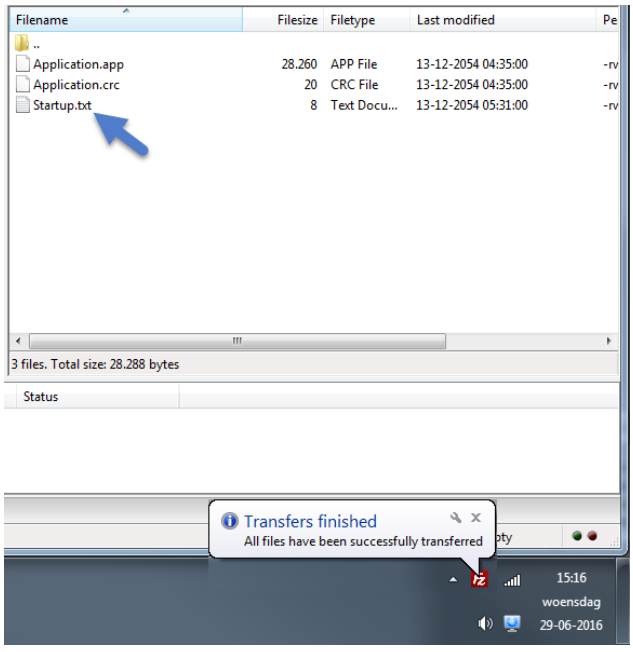
Search for the created file ‘startup.txt’ on the left (local site) and search for the project directory on the right (Remote site). The location for the project directory on the PLC is:

/ffx/codesys/prj

Copy the file to the PLC by dragging it to the right:



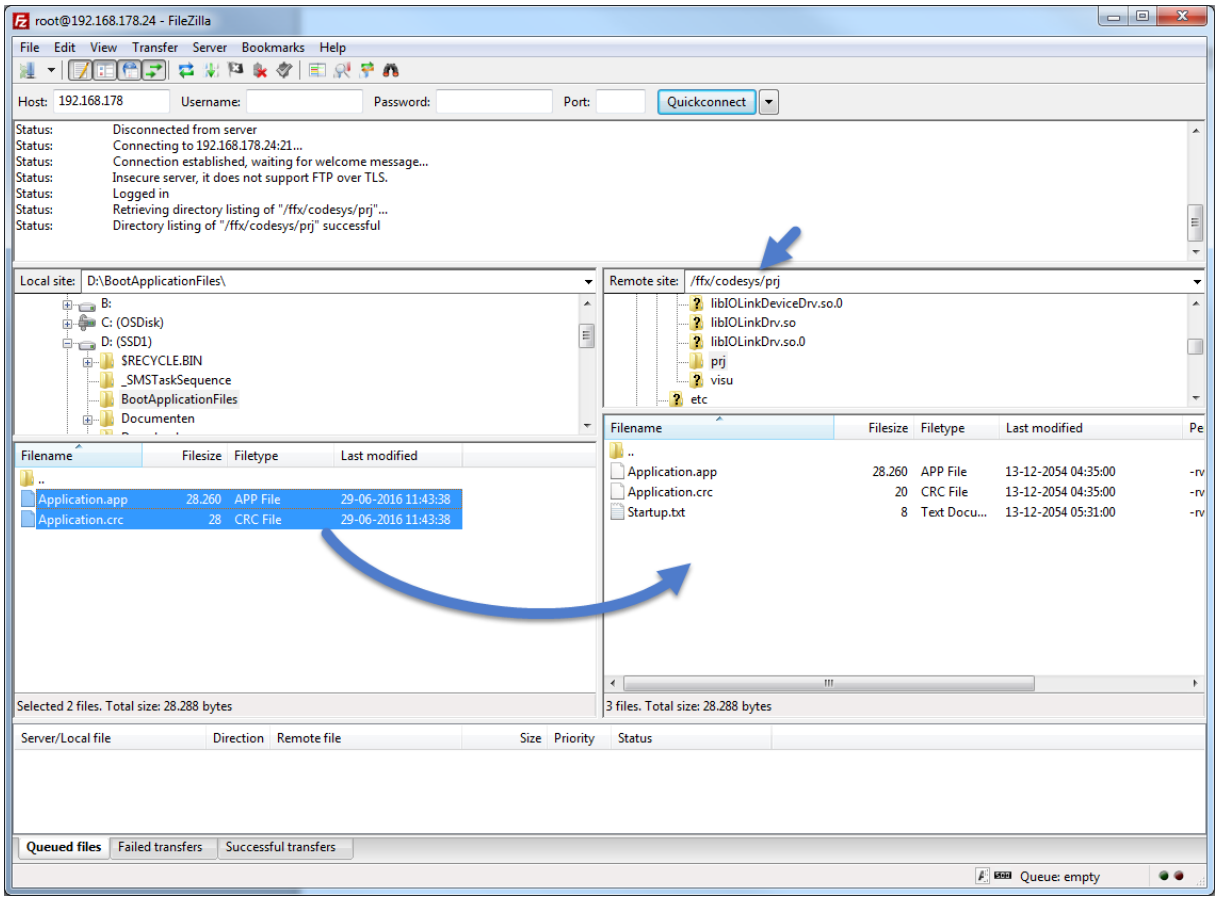
The program should confirm the transfer by a pop-up balloon and the file is now also shown on the right:



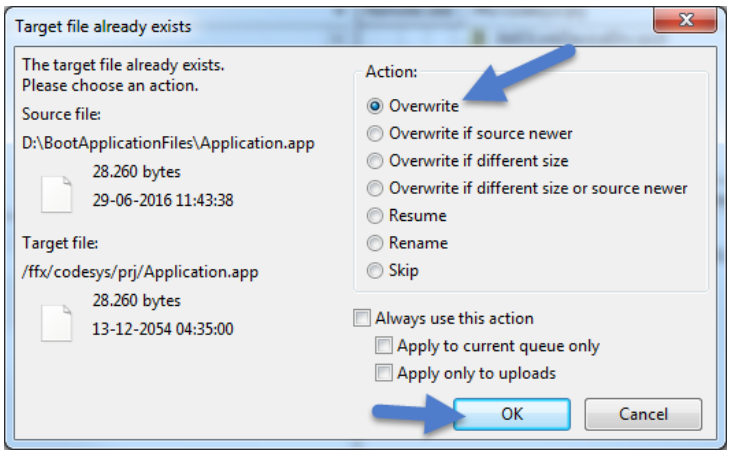
With this done, the FTP server should start with every reboot

5.3 Loading the Boot Application with FileZilla:

The loading of a Boot Application works just the same as transferring the startup.txt. Just drag the two files (Application.app and Application.crc) to the project directory on the PLC:



When prompted, choose ‘overwrite’ and ‘OK’ to overwrite the existing files. *(2x)*



6 Links

Festo Field Device Tool can be downloaded via the Support Portal:
https://www.festo.com/net/en-gb_gb/SupportPortal/default.aspx?q=Festo+Field+Device+Tool&tab=4&s=t#result

The FTP client used in the examples can be downloaded via the following link:
https://filezilla-project.org/