How to update firmware in TIA Portal

This guide shows you how to update firmware in TIA Portal for an S7-1500 CPU. You check the network connection to the PLC, download the correct firmware from Siemens, load it with the Firmware loader, and verify the new version. The guide also covers the offline method that uses a SIMATIC Memory Card.

Prerequisites

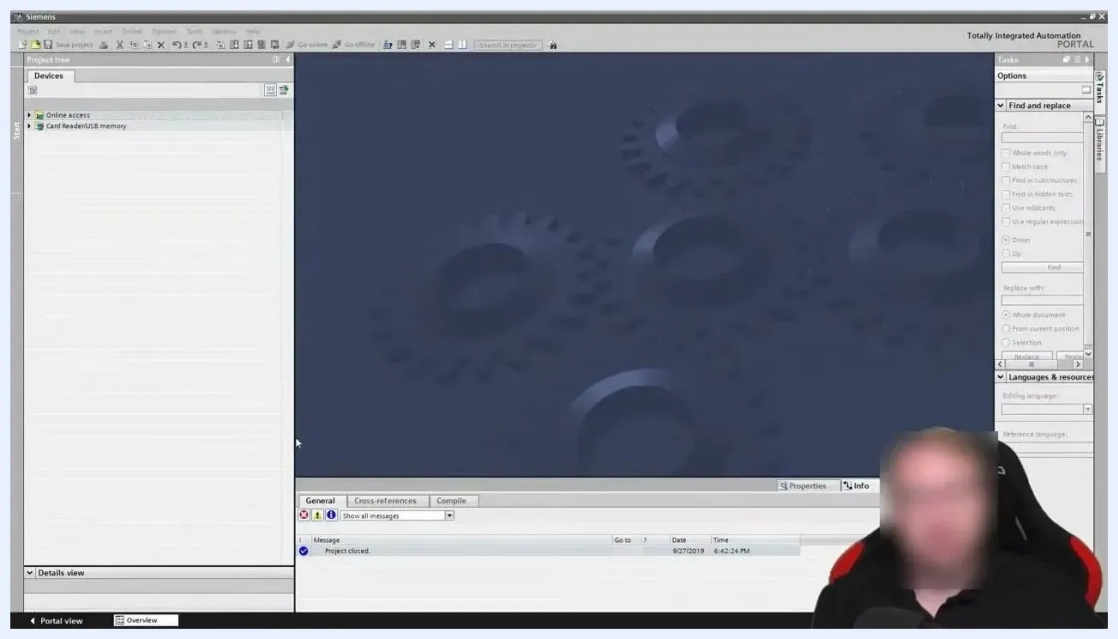
Before you start, make sure you have the following:

- TIA Portal installed on your PC. You don't need to open a project to perform a firmware update.
- A PLC that is reachable on your network. Your PC and the PLC must be on the same subnet.
- A Siemens Industry Online Support account to download firmware. Account creation may require manual verification and can take one or two days.
- Your PLC's article number, for example 6ES7 516-3AN00-0AB0.
- For the offline method only: a SIMATIC Memory Card (SMC) and, if your PC has no memory card slot, an external USB card reader.

Check the connection to your PLC

Step 1: Open TIA Portal

Launch TIA Portal on your PC. The main window opens with no project loaded, and the left panel shows **Online access** and **Card Reader/USB memory**.

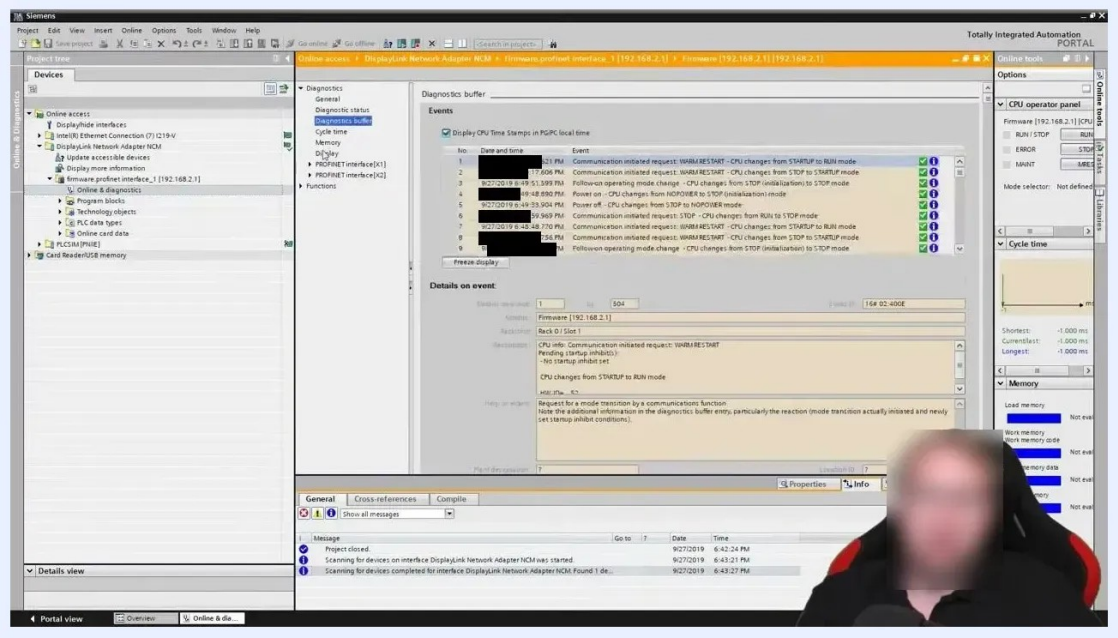


TIA Portal main window with no project loaded, showing Online access and Card Reader/USB memory in the left panel

Step 2: Find your PLC under Online access

In the **Project tree**, expand **Online access**. This section lets you connect to PLCs and other devices on your network.

Expand your network interface (for example, "DisplayLink Network Adapter NCM") to see the connected devices. Your PLC is listed with its IP address, for example "firmware.profinet interface_1 [192.168.2.1]". Confirm that the PLC is visible and accessible.



Project tree with Online access expanded, showing the network interface and the PLC at IP address 192.168.2.1

Step 3: Check network compatibility

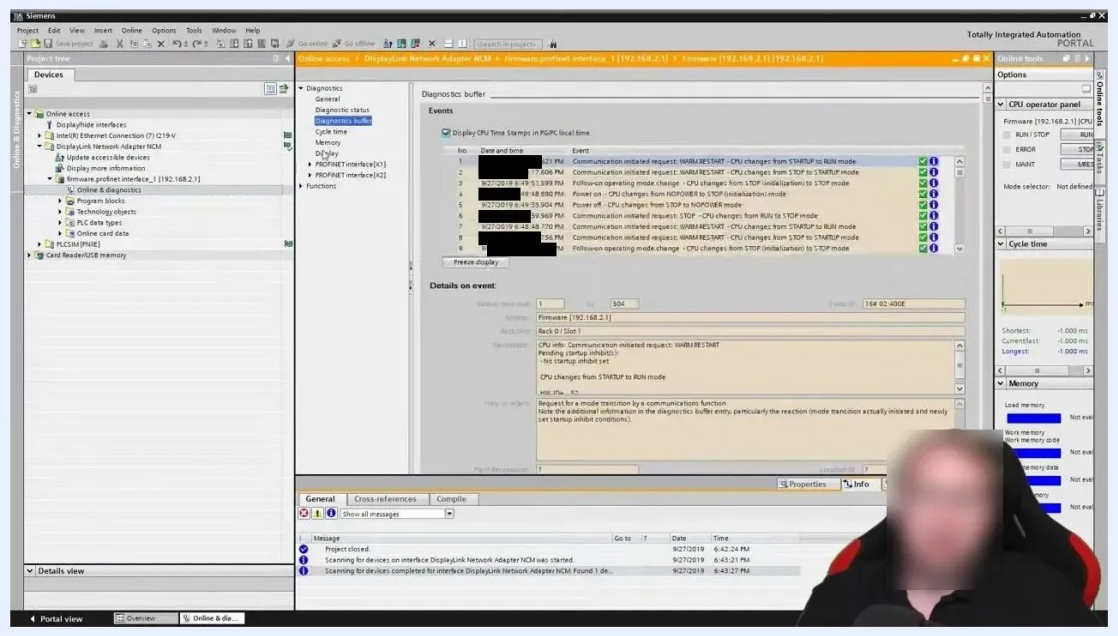
Make sure your PC is on the same subnet as the PLC. For example, if the PLC IP address is 192.168.2.1 and the subnet mask is 255.255.255.0, your PC's IP address must also start with 192.168.2.x.

If the subnet or the first three numbers of the IP address don't match, you have limited access to PLC features.

Step 4: Open Online & diagnostics

Right-click the PLC node, or expand it, and select **Online & diagnostics**. This opens a detailed diagnostics view with multiple diagnostic points and device information.

You see all diagnostic options only if your PC is correctly networked with the PLC.



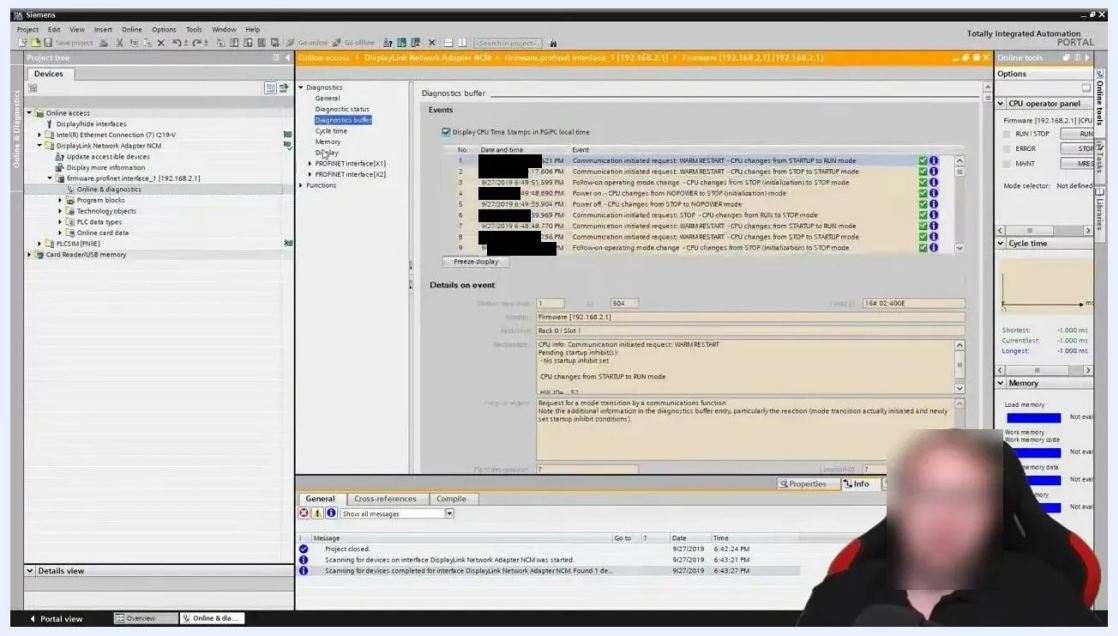
Online & diagnostics view showing the diagnostics buffer, event log, and CPU status for the selected PLC

Step 5: Verify the PLC network settings

In the diagnostics view, select the **PROFINET interface [X1]** node and review the IP parameters:

- IP address: 192.168.2.1
- Subnet mask: 255.255.255.0

Confirm that these settings match your PC's network configuration.



PROFINET interface settings showing IP address 192.168.2.1, subnet mask 255.255.255.0, and port status

Step 6: Verify your PC's IP address

The first three numbers (octets) of your PC's IP address and subnet mask must match those of the PLC, for example 192.168.2.x and 255.255.255.0. If you're unsure of your PC's IP address, check it as follows:

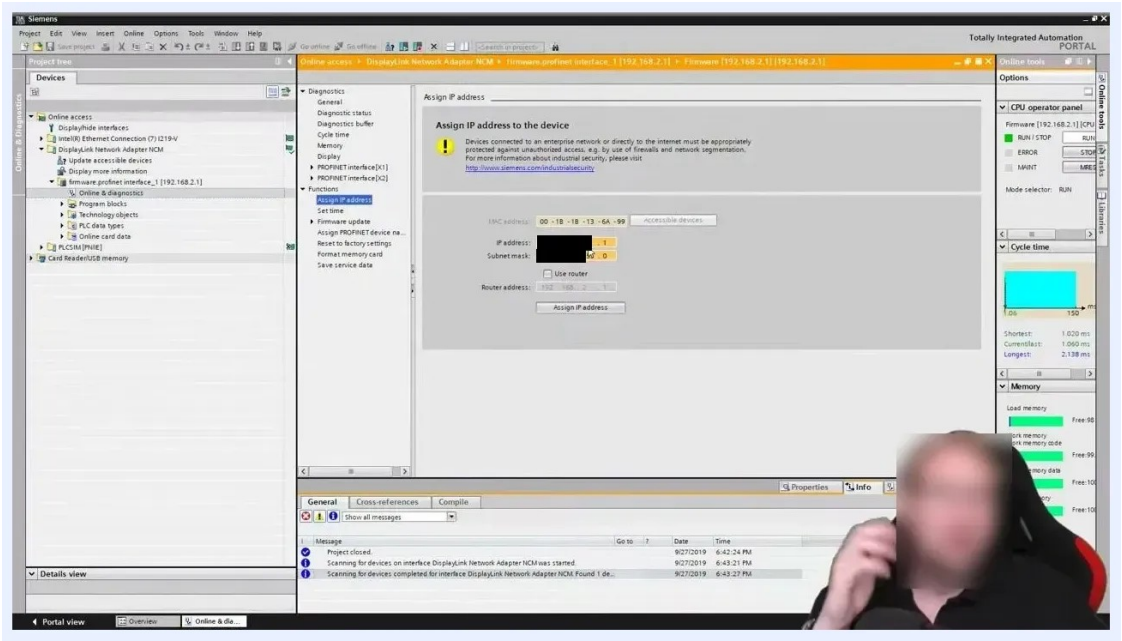
1. Press the Windows key, type CMD, and press Enter to open the Command Prompt.
2. Type ipconfig and press Enter.
3. Find the network adapter you are using, for example the Ethernet adapter.
4. Read the IPv4 Address line (for example, 192.168.2.41) and the Subnet Mask line (for example, 255.255.255.0).
5. Confirm that the first three octets match the PLC's network (for example, 192.168.2).

Your PC may have multiple IP addresses. Use the one that belongs to the correct network adapter.

Step 7: Assign or change the PLC IP address (if needed)

If your PC and PLC aren't on the same subnet, use the **Assign IP address** function:

1. In the diagnostics view, under **Functions**, select **Assign IP address**.
2. Enter a compatible IP address (for example, 192.168.2.1) and the subnet mask (255.255.255.0).
3. Click **Assign IP address** to apply the changes.



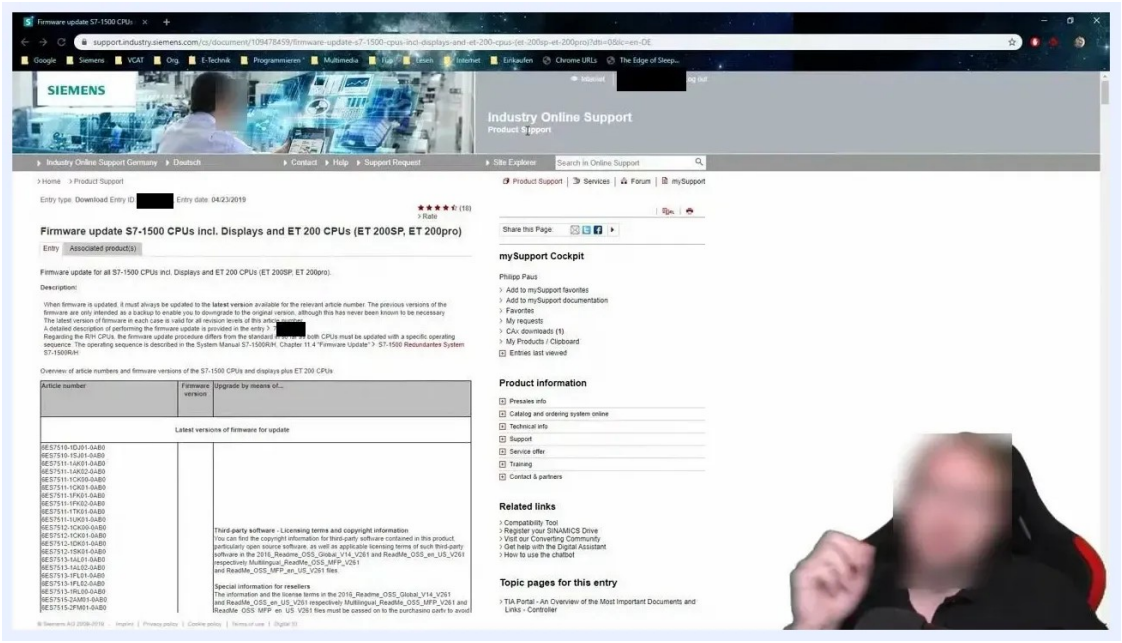
Assign IP address dialog with fields for MAC address, IP address 192.168.2.1, and subnet mask 255.255.255.0

Check the current firmware version

Step 8: Open the Firmware update function

With your PLC selected under **Online access**, expand **Functions** in the diagnostics view and click **Firmware update**. You see options to update the PLC, local modules, or the display. For this example, select **PLC** to update the main controller.

The current firmware version, for example V1.8.1, is displayed. Firmware updates can improve safety and add new features. Keeping firmware up to date is recommended, but if you have no specific need, updating is optional.



Firmware update screen for the PLC showing the current firmware version V1.8.1 and the firmware file and update fields

Download the firmware

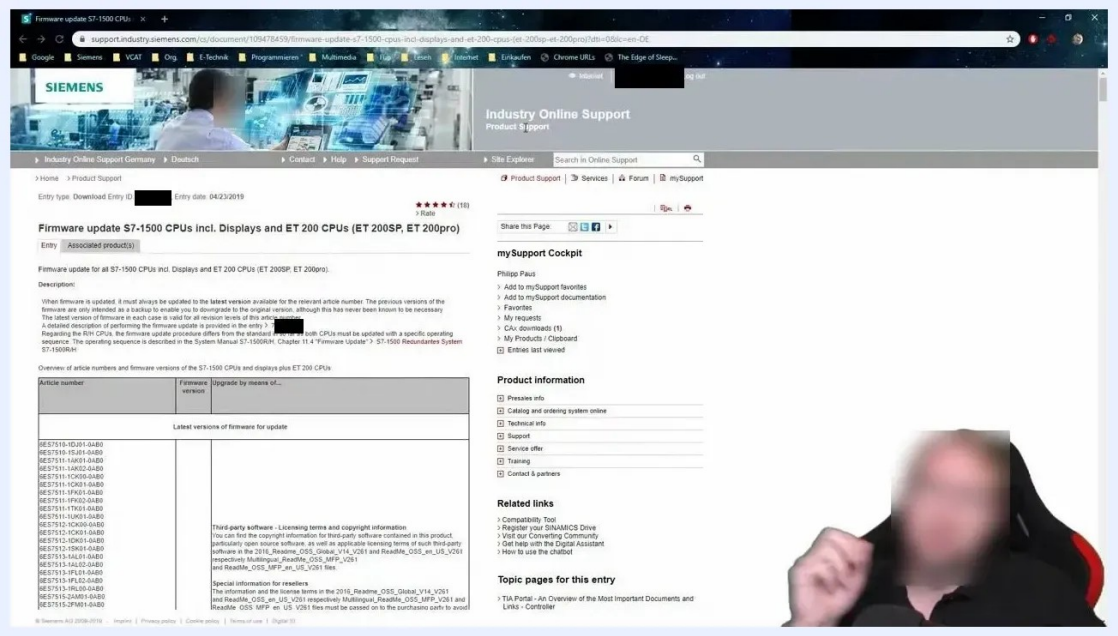
Step 9: Open the Siemens Industry Online Support website

Open the Siemens Industry Online Support page for firmware updates, and make sure you're logged in to your Siemens account. If you don't have an account, create one first.

The page provides:

- Download links for the latest firmware versions for S7-1500 CPUs, displays, and ET 200 CPUs.
- Descriptions and compatibility information for each firmware version.
- A table listing article numbers and their corresponding firmware versions.

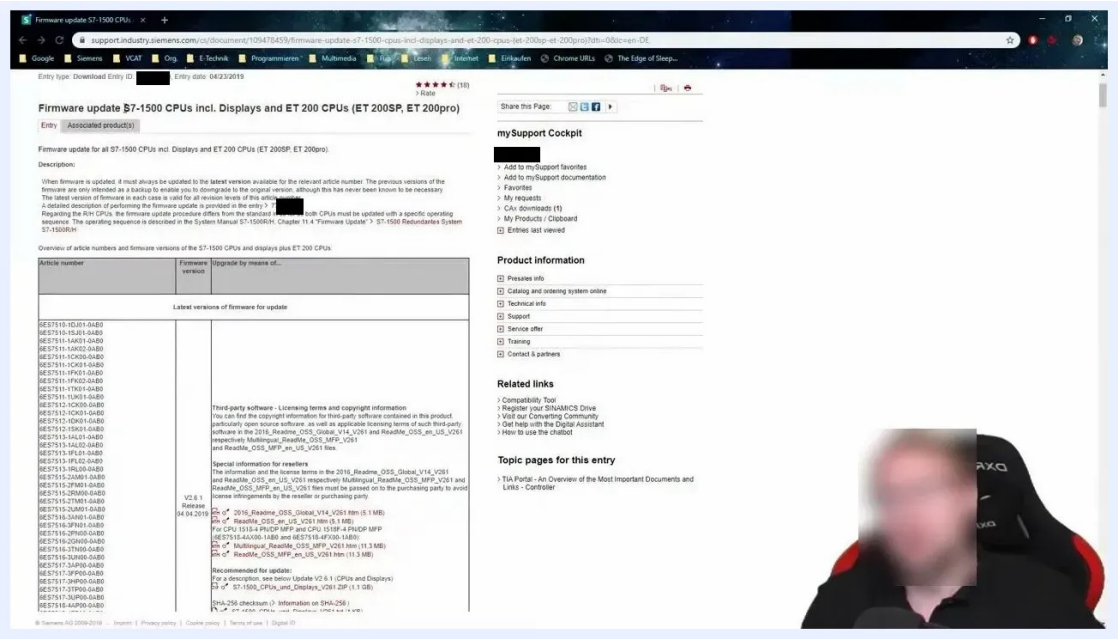
Download requests may require manual verification and can take one or two days to process.



Siemens Industry Online Support firmware page for S7-1500 CPUs and ET 200 CPUs with description, article numbers, and version tables

Step 10: Review the firmware update page

The page lists many components that are eligible for firmware updates. Scroll down to find detailed information about each firmware version, including the changes or improvements it introduces. Differences between versions are described in the lower section of the page.



Siemens support page showing firmware update details, version notes, and the update V2.5.0 section

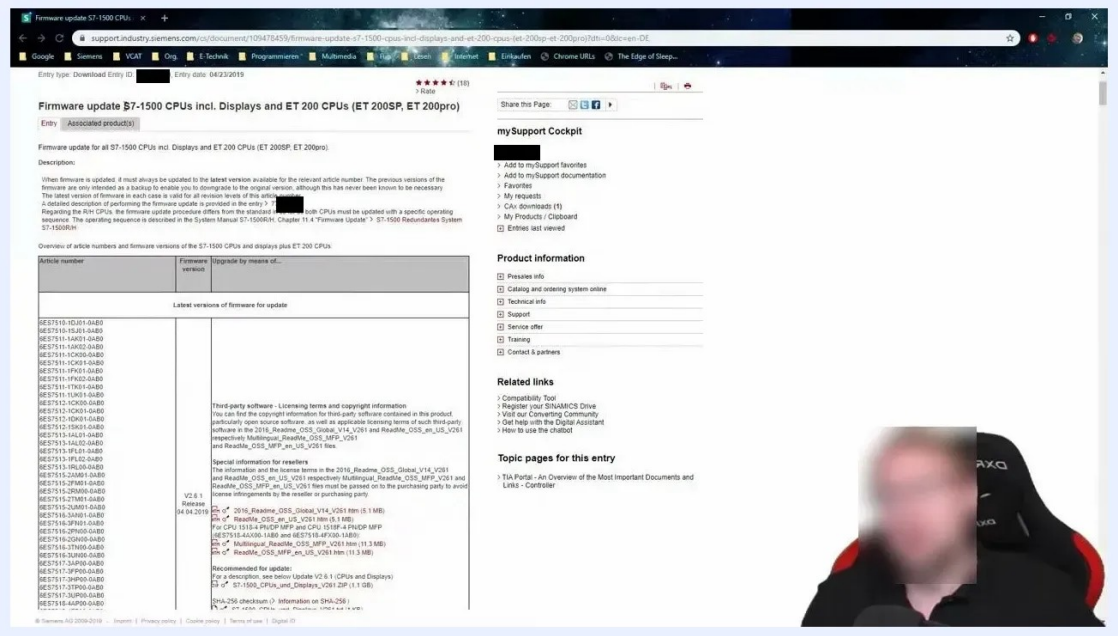
Step 11: Locate the firmware for your PLC

The page you opened is specific to S7-1500 CPUs. For a different device, enter your PLC's article number in the search field at the top of the page to filter the results.

To find your article number in the list:

1. Press Ctrl + F to open the browser's search function.
2. Type or paste your article number, for example 6ES7 516-3AN00-0AB0.

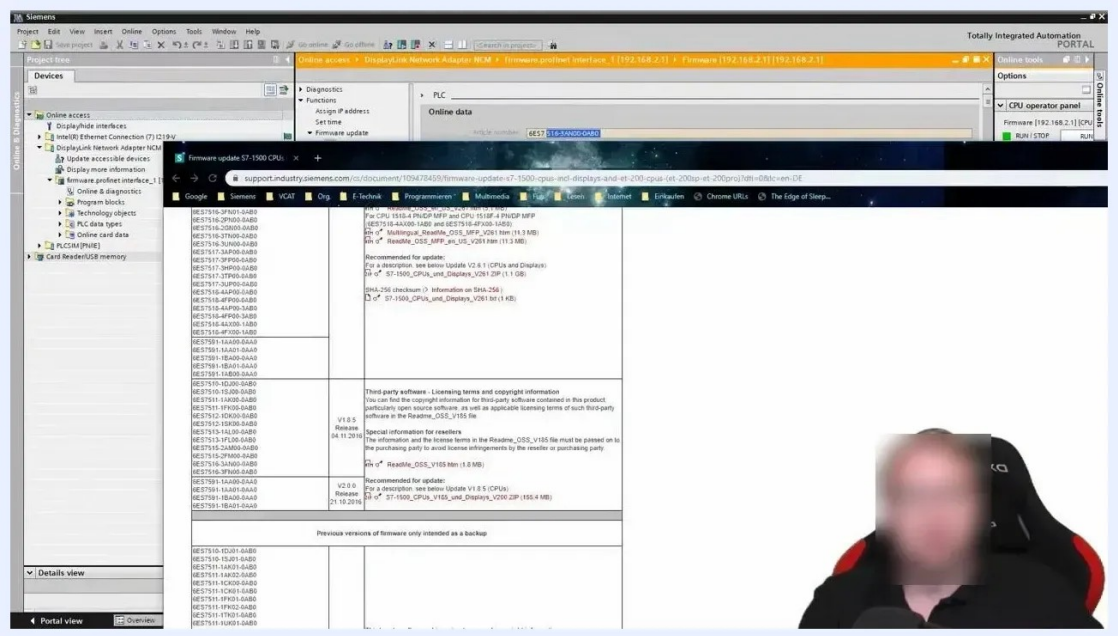
3. Press Enter to jump to it in the list.



Firmware update page for S7-1500 CPUs listing article numbers, firmware versions, and download links

Step 12: Choose the firmware version

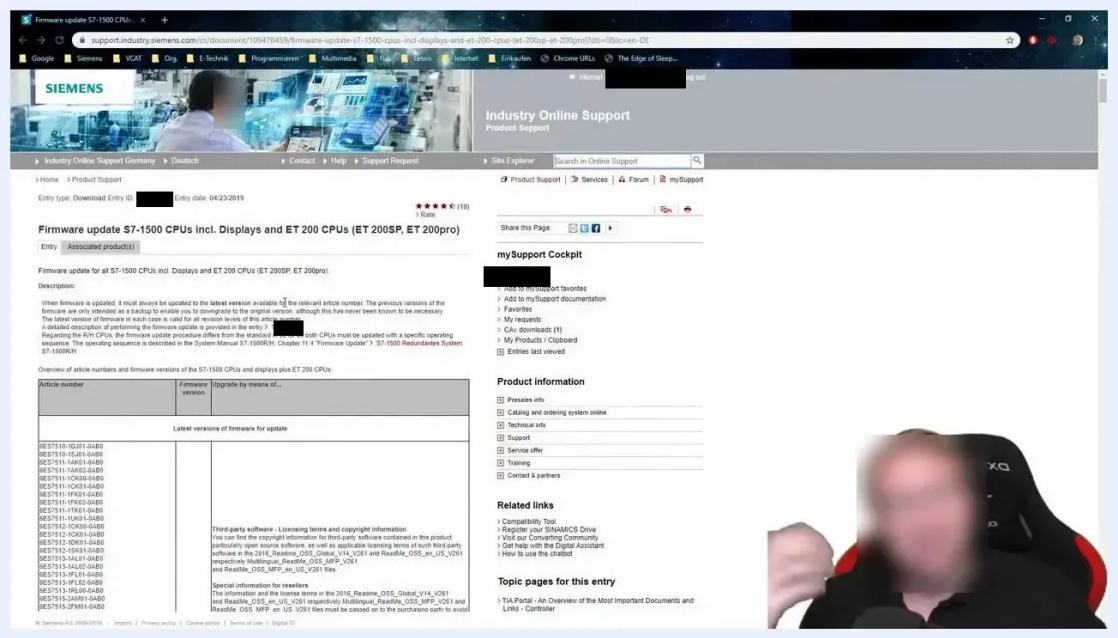
Review the firmware versions available for your article number, for example V1.8.2, V1.8.4, and V1.8.5, and note the latest one. The newest version is generally recommended unless you have a specific need for an older one.



Firmware table with article numbers, firmware versions, and download links, with the searched article number highlighted

Step 13: Verify the article number

Double-check that the highlighted article number matches your PLC's model. Multiple entries may exist for similar models, so always select the exact match for your hardware. Then continue to the download.



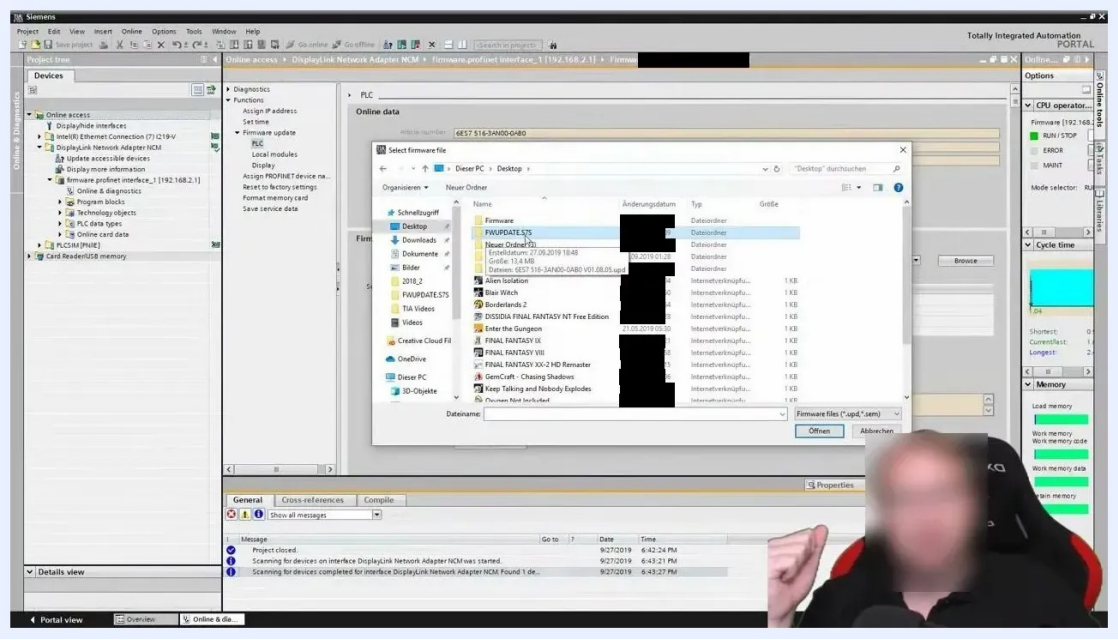
Firmware table with the matching article number highlighted among several listed firmware versions

Step 14: Download the ZIP archive

Click the download link for your article number and the version you want, for example 6ES7516-3AN00-0AB0_V185.ZIP. Save the ZIP file to your computer.

Step 15: Extract the ZIP archive

Right-click the ZIP file on your desktop and select **Hier entpacken** (Extract here), or a similar extraction option.

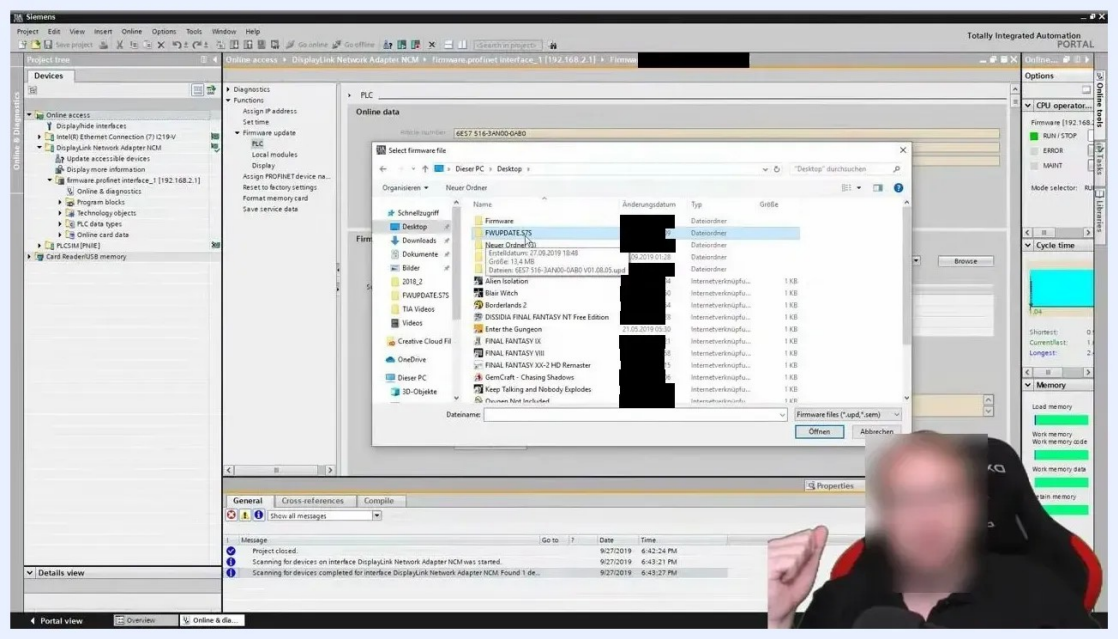


Desktop with the ZIP file selected and the right-click menu showing extraction options

Load the firmware with the Firmware loader

Step 16: Open the Firmware loader and browse for the file

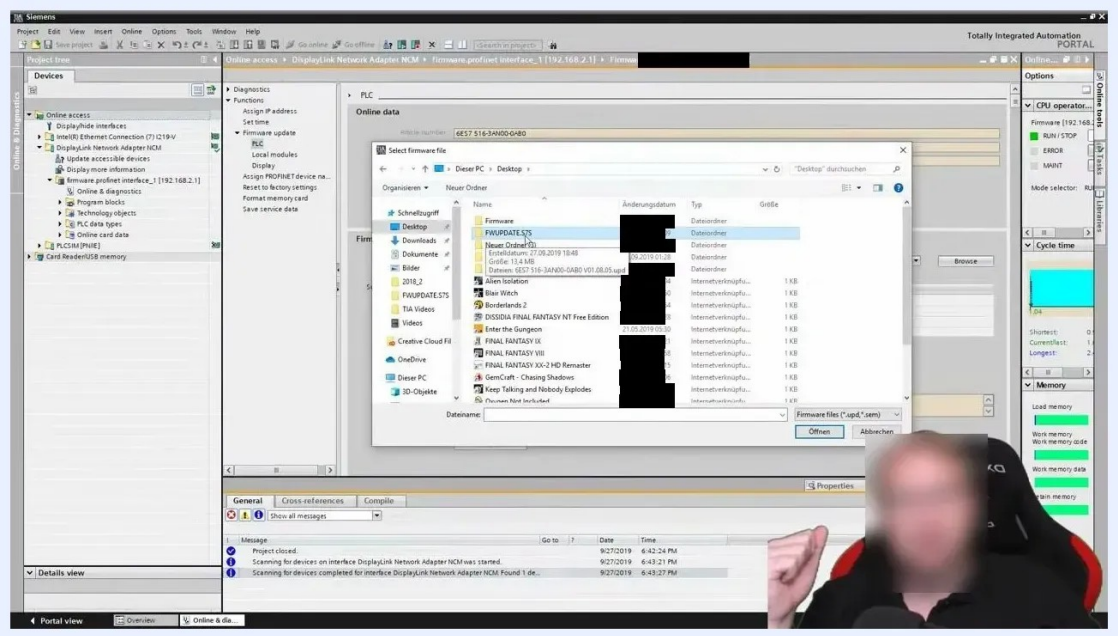
In TIA Portal, go to **Online & diagnostics** for your PLC and select **Firmware update**. In the **Firmware loader** section, click **Browse** to locate the extracted firmware file.



Online & diagnostics with the Firmware loader panel open and the Browse button highlighted

Step 17: Open the extracted firmware folder

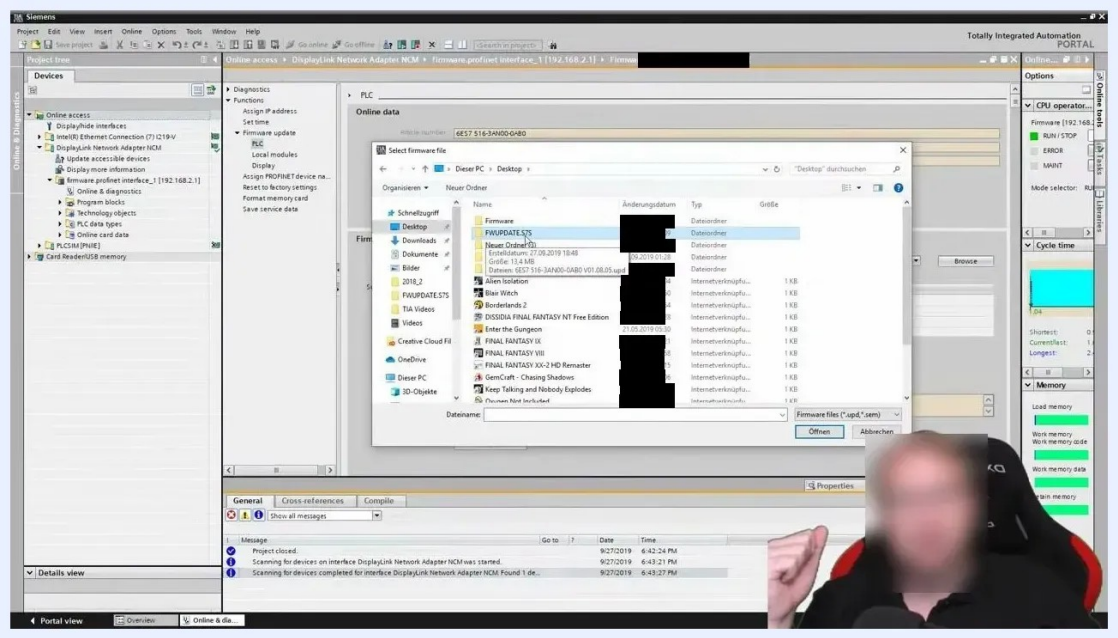
In the file browser dialog, go to the folder where you extracted the firmware files, for example the FWUPDATE.S7S folder on your desktop. Open the folder to view the available firmware files.



File browser open to the Desktop with the extracted firmware folder FWUPDATE.S7S highlighted

Step 18: Select the firmware file for your CPU

Choose the file that matches your article number and version, for example 6ES7 516-3AN00-0AB0 V01.08.05.upd. Click **Open** to load it into the Firmware loader.



File browser showing the selected .upd firmware file inside the extracted folder, ready to open

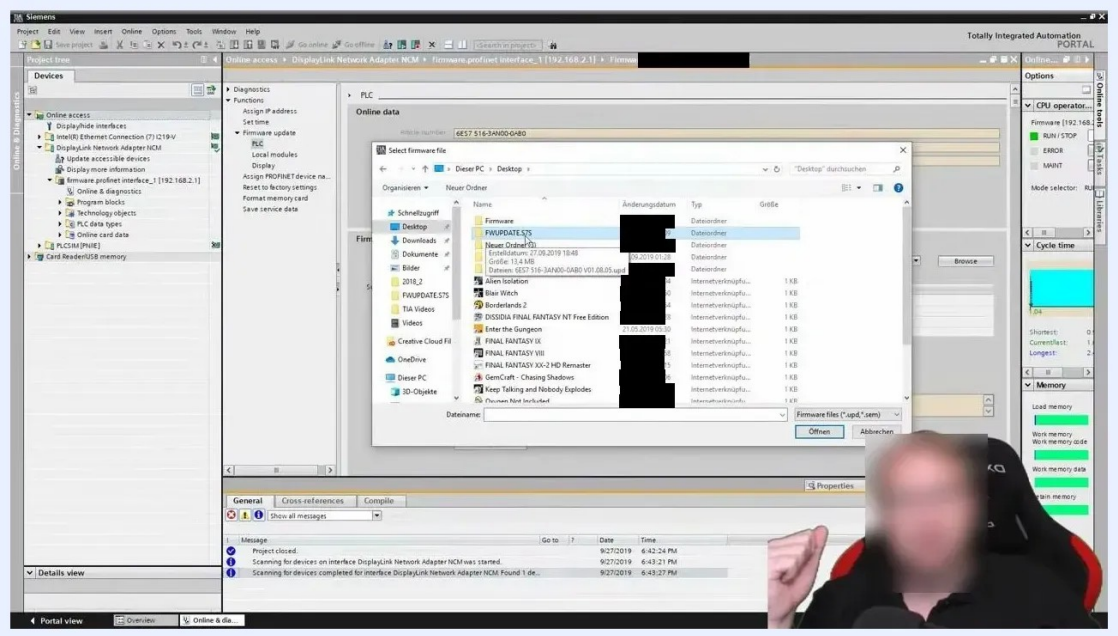
Step 19: Confirm the version and compatibility

The Firmware loader displays the selected file and its version, for example V1.8.5. If your current firmware is older, for example V1.8.1, proceed with the update.

If the selected firmware isn't compatible with your local modules or displays, TIA Portal displays a warning and prevents the update. Always verify that the firmware file matches your CPU's article number and hardware version.

Step 20: Run the update

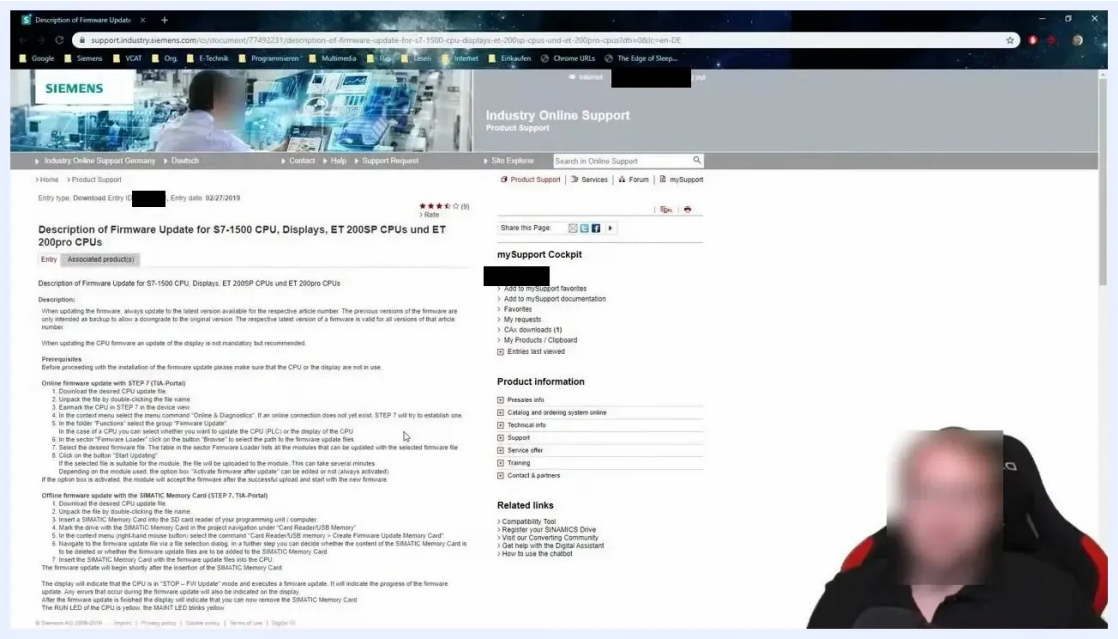
Click **Run update** in the Firmware loader. When TIA Portal asks "To load the firmware file, the operating mode of the CPU must set to STOP.", click **Yes** to set the PLC to STOP mode.



Confirmation dialog stating that the CPU operating mode must be set to STOP to load the firmware file, with Yes and No options

Step 21: Wait for the update to finish

Monitor the progress bar in the **Firmware update** dialog. It shows the progress percentage and the estimated remaining time in seconds, for example "72% completed, Remaining time in seconds: 7". Don't interrupt the process until it finishes.

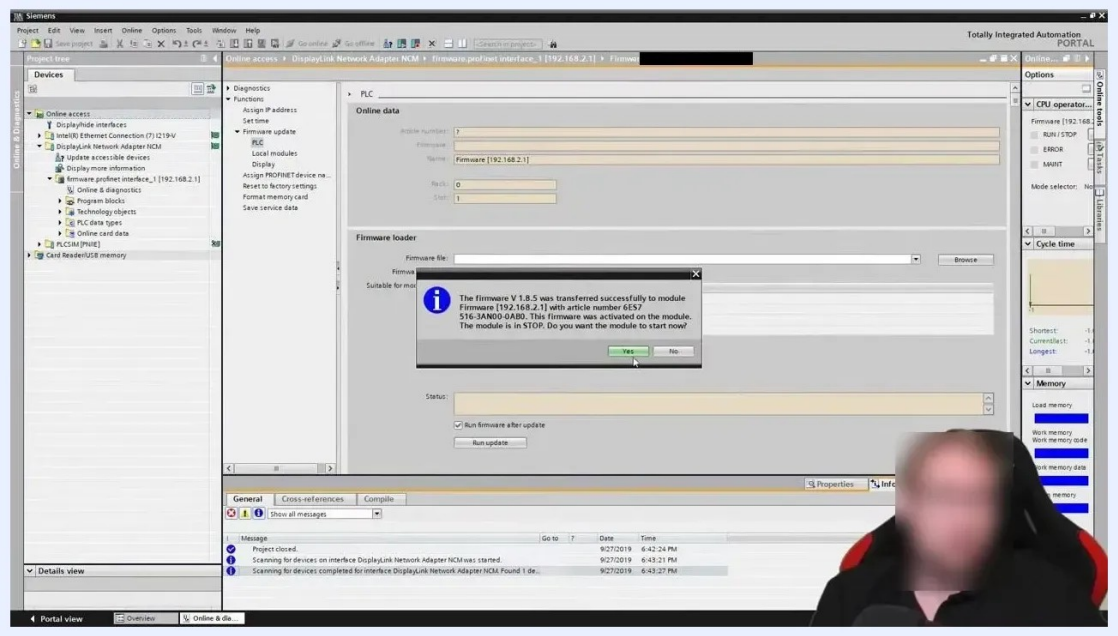


Firmware update progress dialog at 72% completion with the remaining time displayed

Step 22: Start the module

When the update completes, TIA Portal displays a confirmation: "The firmware V1.8.5 was transferred successfully to module Firmware [192.168.2.1] with article number 6ES7 516-3AN00-0AB0. This firmware was activated on the module. The module is in STOP. Do you want the module to start now?"

Click **Yes** to start the module. Check the CPU operator panel to make sure the module changes from STOP to RUN mode.



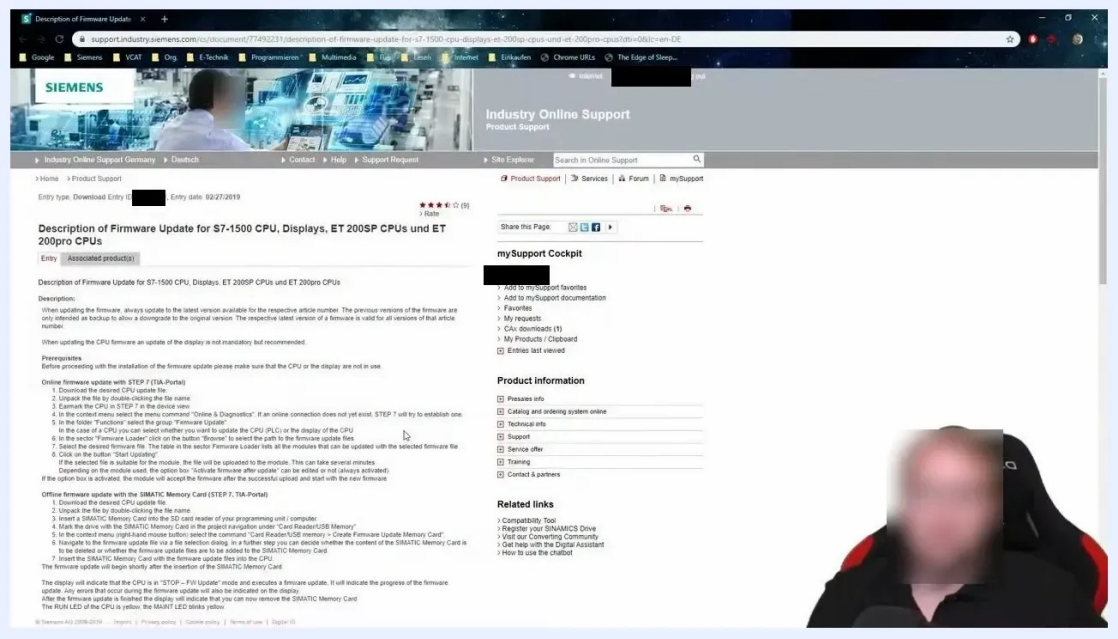
Confirmation dialog reporting a successful firmware transfer and asking whether to start the module now

Update firmware offline with a SIMATIC Memory Card

Step 23: Open the Siemens update documentation

You can also update firmware without an online connection. Open the Siemens support page "Description of Firmware Update for S7-1500 CPU, Displays, ET 200SP CPUs and ET 200pro CPUs".

Review the "Online firmware update with STEP 7 (TIA Portal)" section. The documentation outlines prerequisites, online update steps, and offline update procedures.



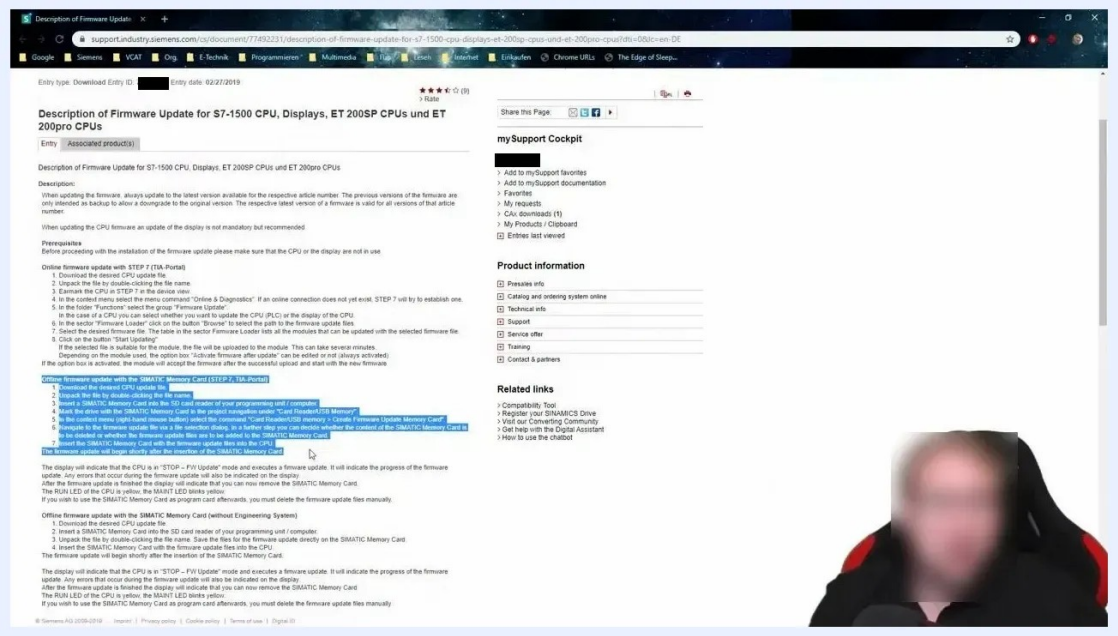
Siemens support page with detailed instructions for online and offline firmware updates for S7-1500 CPUs

Step 24: Prepare the SIMATIC Memory Card

The SMC is not a standard SD card. It is a dedicated SIMATIC Memory Card. To update offline:

1. Download the update file for your CPU.
2. Insert the SMC into the SD card reader of your programming unit or computer.
3. Copy the firmware update files onto the SMC as described in the documentation.
4. Insert the SMC into the CPU to start the update.

The documentation highlights this procedure in the section "Offline firmware update with the SIMATIC Memory Card (STEP 7, TIA Portal)".



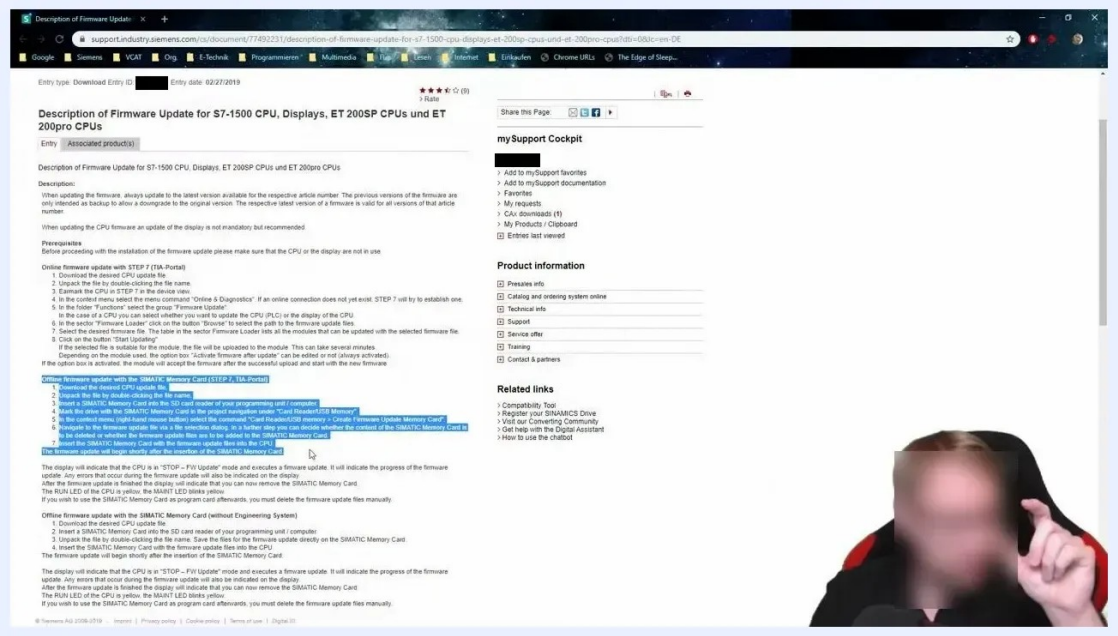
Support page with the section on offline firmware update with the SIMATIC Memory Card highlighted

Step 25: Use an external card reader if needed

If your PC has no memory card slot, use an external card reader:

1. Connect the card reader to your PC through USB.
2. Insert the SIMATIC Memory Card into the reader.
3. Copy the required firmware files from your desktop to the SMC.

4. Remove the SMC from the reader and insert it into the CPU to perform the update.



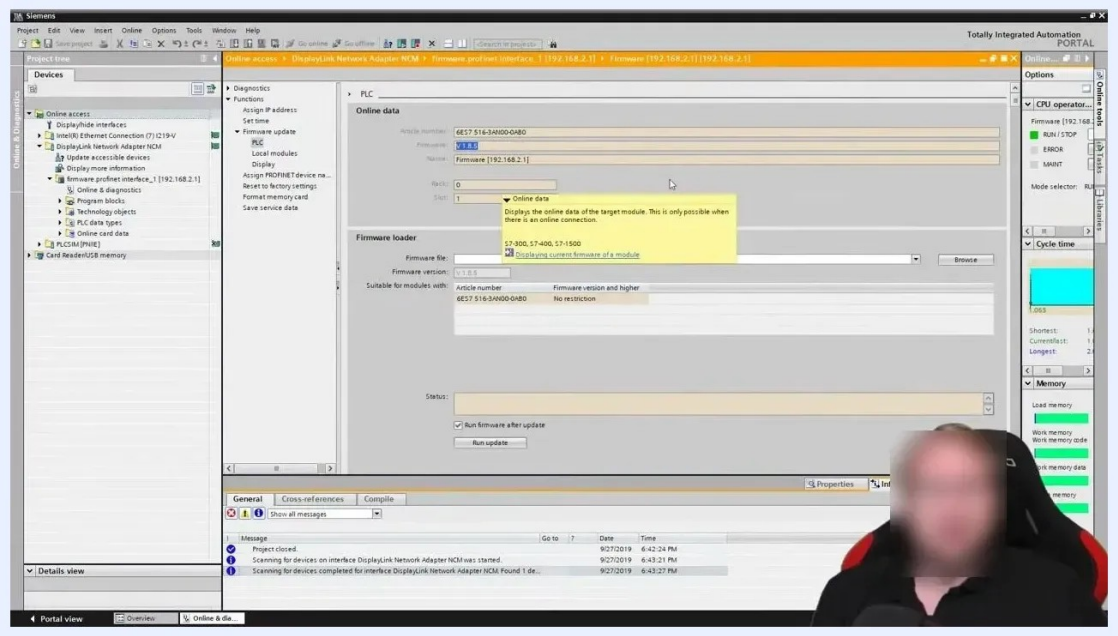
Support page with the offline update section highlighted, showing the card reader option for PCs without a memory card slot

Verify the updated firmware

Step 26: Check the firmware version in Online data

In TIA Portal, check the **Online data** section for the CPU. Confirm that the **Firmware** field shows V1.8.5 and that the article number matches your device, 6ES7 516-3AN00-0AB0.

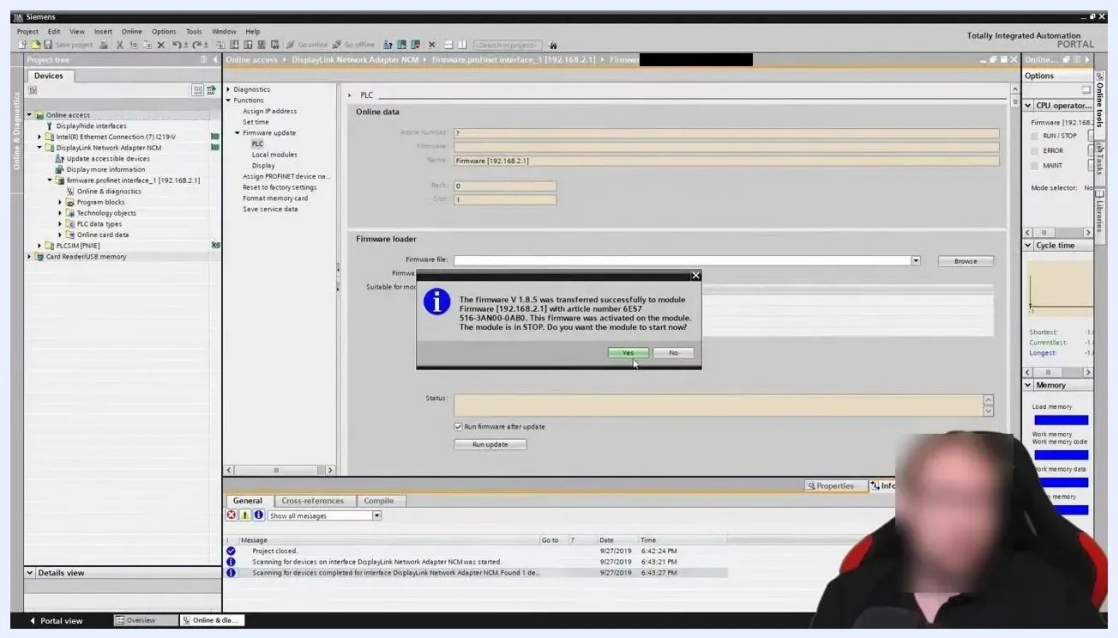
Hover over the firmware version if you need more details. A tooltip may appear with module compatibility information.



Online data section showing firmware version V1.8.5 and the article number, with a tooltip for additional information

Step 27: Finish the update and save your project

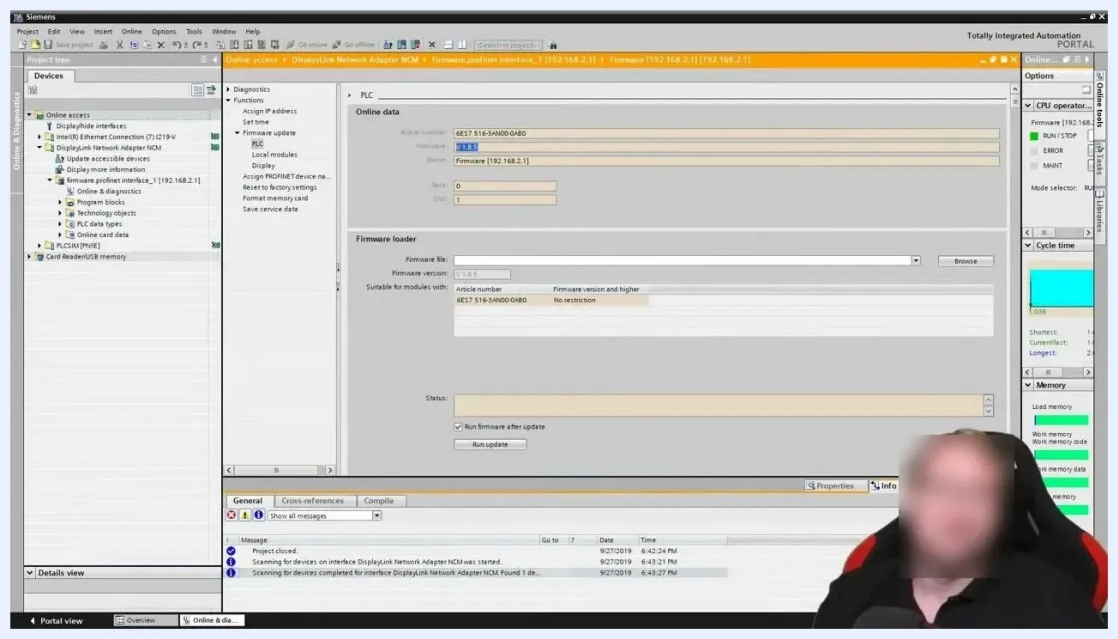
Confirm that the Firmware loader section is idle and its status field is empty. The **Run firmware after update** checkbox should be unchecked if you need no further updates. Save your project if you made any changes.



TIA Portal after the firmware update, showing the updated firmware version and no active update process

Step 28: Close TIA Portal

If you need no further configuration, close the TIA Portal application.



TIA Portal in its final state after the update is complete

What's next

Always verify the firmware version and article number after an update. For additional questions or troubleshooting, consult the Siemens Industry Online Support documentation.

Summary

To update firmware in TIA Portal, you:

- Confirm that your PC and PLC are on the same subnet, using 192.168.2.1 and 255.255.255.0 as the example values.
- Check the current firmware version under **Firmware update**.
- Download and extract the correct firmware ZIP for your article number from Siemens Industry Online Support.
- Select the .upd file in the **Firmware loader**, click **Run update**, and confirm the switch to STOP mode.
- Start the module when the update completes and verify the new version under **Online data**.

If you prefer, you can perform the update offline with a SIMATIC Memory Card.