

# Quantum CPU Operating System

## Upgrade and Update procedure

03/2014 eng  
Edition V1.0



## Purpose

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### Subject of this Chapter

This user's guide explains how to upgrade Quantum PLC's Operating System but also the firmware of Ethernet modules

- ✓ Upgrade a PLC from Concept to Unity, taking care of the PV of the 140CPU43212 U and A, coated or not ( see annexe 1)
- ✓ Update a PLC from Unity to Unity,
- ✓ Restore Concept IEC / LL984 on a Unity processor, taking care of the PV of the 140CPU43212 U and A, coated or not ( see annexe 1).
- ✓ Update Quantum embedded Ethernet modules.
- ✓ Upgrade Remote I/O Head and Drop:
  - S908 network based
  - For Ethernet IO network

**Note:** Examples and screen shots are provided in this documentation using OSLoader version 3.0. However, other versions, ranging from 2.0 to latest versions, may be used. The procedures described hereafter match all versions from 2.0, and the operating modes are the same for all versions. Please refer to chapter "Preparing a Quantum update" for more information.

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## 1. Preparing a Quantum update

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**Object of this Chapter** This chapter describes how to prepare a Quantum PLC in order to update or upgrade PLC's Operating System and / or Ethernet modules.

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**Prerequisites** This update requires a PC with Unity Pro installed and the binary file containing the OS firmware to download.

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**Software** The following softwares are required:

- ✓ Unity Version 2.0 mini must be installed on the PC (note that it is not necessary to launch Unity for an OS upgrade).
- ✓ The eCD "Unity OS firmware" is provided on [www.schneider-electric.com](http://www.schneider-electric.com) and contains all the OS for Quantum, Premium and M340 PLC's.
- ✓ The OS loader (provided with Unity Pro ). This tool allows the user to download PLC's Operating System and Ethernet modules firmware.

**Connecting the PC to the PLC for an OS update or upgrade**

The Quantum CPU OS can only be downloaded by a direct connection between the PC and the CPU by the MODBUS or MODBUS+ ports. Note that MODBUS+ is faster and takes significantly less time to download a binary. The CPU USB port doesn't allow downloading an OS.

**Important:** Using Modbus or Modbus Plus, only address 1 is allowed for downloading. **Ensure that no other device on the network is using address 1 .**

Several possibilities can be proposed to connect the PC to the PLC depending on the mix processor/protocol:

For Quantum CPU 140CPU 311 10, 140CPU 434 12U and 140CPU 534 14 BU:

- Using the RS232 COM port 1 of the PC by connecting the cable 990 NAA 263 20 (3.7 m) or 990 NAA 263 50 (15 m) to the MODBUS 9 pin sub-D of the Quantum PLC. The protocol used in this case is MODBUS.
- Using the cables 990NAD21110 (2.4m) or 990NAD21130 (6m) connected to the MODBUS+ 9 pin sub-D of the Quantum PLC. The protocol used in this case is MODBUS+.

For Quantum CPU 140 CPU 6x1y0 (65150, 65160, 65160S, 65260, 67160,67261, 67160S):

- Using the adapter 110XCA20300 connected to the RS232 9 pin sub-D connector of the PC (COM port) and to the RJ45 Modbus port of the PLC via a cable 110 XCA28201 (1m) , 110 XCA28202 (3m) or 110XCA28203 (6m). The protocol used in this case is MODBUS.
- Using the cables 990NAD21810 (2.4m) or 990NAD21830 (6m). The protocol used in this case is MODBUS+.
- Using the Modbus Plus Device TSXCUSBMBP

→ Have a look on Appendix 7 for **Modbus Plus** USB converter drivers installation in your PC.

In any case the right communication driver must be first installed on the PC.

**Note:** The most examples given in this document are using the Modbus protocol.

**Connecting the PC to the Ethernet module or PLC coprocessor to update the Ethernet firmware**

Although Ethernet allows a remote access via the network and then the upload / download procedure, we strongly recommend installing the processor with the embedded Ethernet module in a system consisting of only the CPU, Power Supply and Rack. Once done,

- ✓ Configure the PLC system with an empty program containing only the IP address configuration. Note that the Ethernet module must be on the same logical Ethernet network than the PC with the OS loader (for that both IP address, Subnet mask and default gateway must be compatible).
- ✓ Ensure the only devices connected to the Ethernet network are the PC running the OS loader and the CPU , NOE or CRP module,
- ✓ The CPU must be in Stop mode and the NOE and CRP modules must have no TCP traffic.

The physical connection between the PC running the OS loader and the CPU or Ethernet communications modules can be performed:

- ✓ by connecting directly a “crossed” Ethernet cable between the PC and the Ethernet Communication module
- ✓ by connecting the PC and the CPU or Ethernet Communication module with two “non crossed” Ethernet cables via a Hub.

In these 2 cases, FTP protocol is used and only the Ethernet Coprocessor firmware of the CPU can be updated by this way.

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## 2. Upgrading a Quantum PLC from Concept to Unity

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**Object of this Chapter** This chapter describes how to upgrade a Quantum PLC from Concept to Unity. The screens shots given below show how to upgrade a 140 CPU 434 12A (Concept) to 140 CPU 434 12U (Unity). The procedure is similar for an upgrade of 140 CPU 534 14A/B (Concept) to 140 CPU 534 14U/BU (Unity).

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**Important** Upgrading a PLC from Concept to Unity requires to perform three main phases:

- ✓ Phase 1 - Upgrade the PLC to Unity with an intermediate OS
- ✓ Phase 2 - Power OFF then ON the PLC
- ✓ Phase 3 - Update the Operating System with the appropriate file

**Those phases are mandatory and cannot be by-passed.**

Each phase is described in the following procedure.

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### Connecting the PC to the PLC

Refer to chapter “Prepare a Quantum Update / Connecting the PC to the PLC for an OS update or upgrade.”

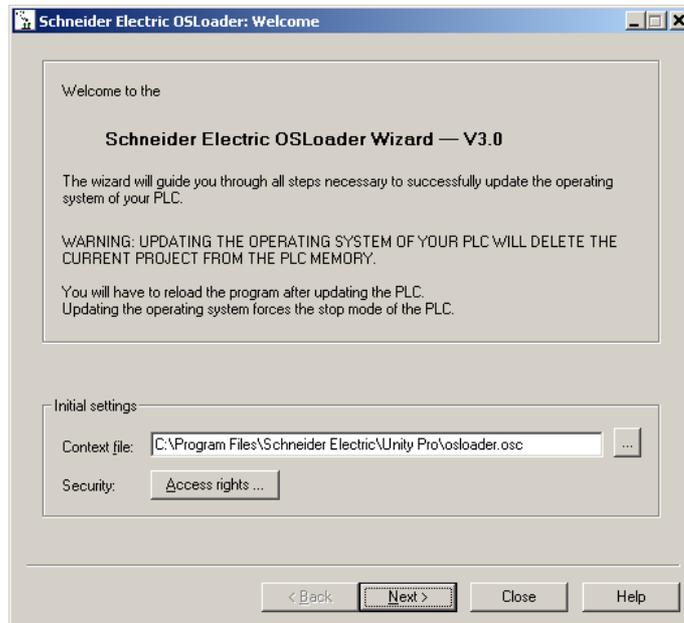


### Launching the OS loader

The OS loader (provided with Unity) allows the user to download the Operating System to the PLC. To open it click on **Start/Program/Schneider-Electric/Unity-PRO/OS loader**.



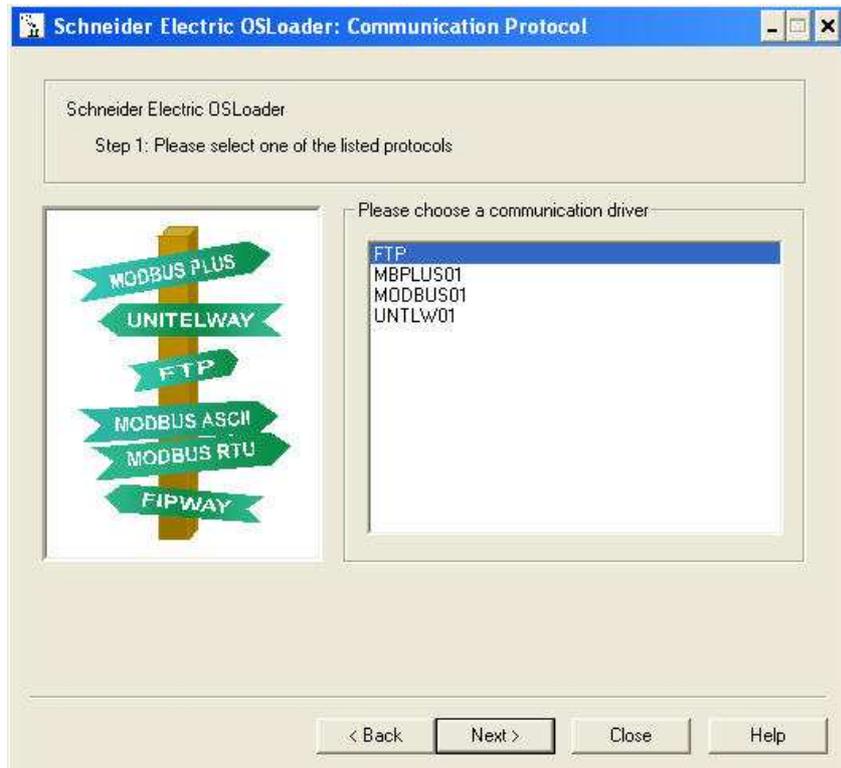
Once done, the following screen appears:



**Select the communication protocol**



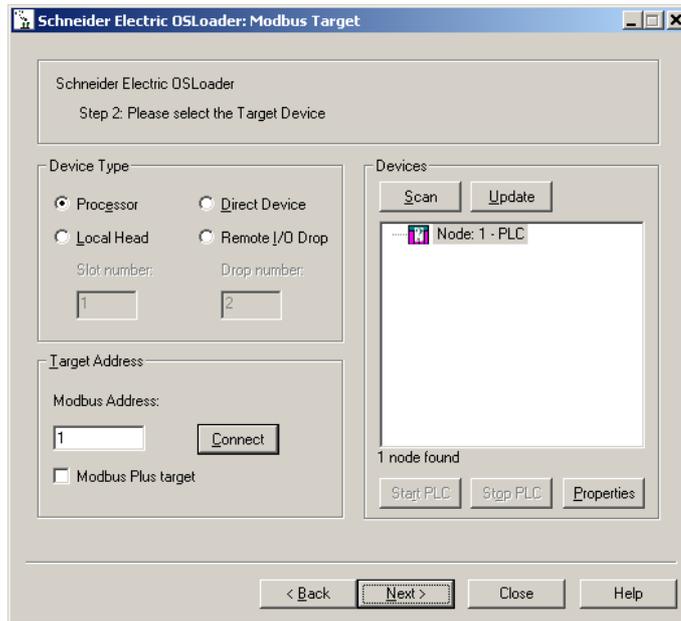
From the main screen of the OS loader, click on the **Next >** button. The following screen appears, the list of communication ways depends of the drivers installed:



To download the Operating System into the PLC select the right communication protocol (MODBUS01 or MBPLUS01, in accordance with established physical link) and click on the **Next >** button.

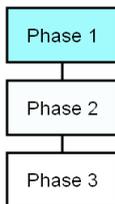
## Upgrading a Quantum PLC from Concept to Unity

### Select the Target Device

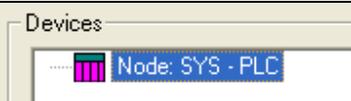


On the Device Type field, select Processor.

### Get the Concept version (Optional)



Knowing which Concept version is installed on the processor could be useful if for any reason a restore function from Unity to Concept is needed. For that proceed as follows:

<b>1</b>	Select the PLC 
<b>2</b>	Click on the  button to connect the PC to PLC.
<b>3</b>	Click on the  button to get info from the PLC.

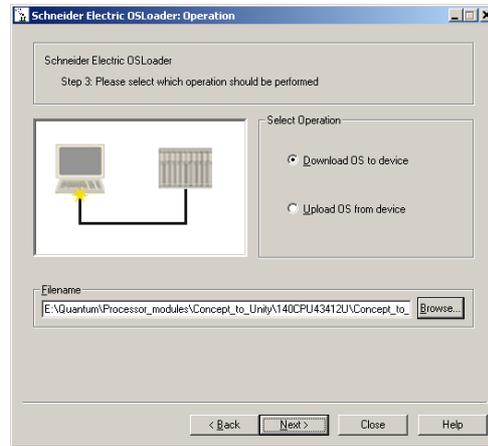
<b>4</b>	<p>The following screen gives to the user some information regarding the PLC status:</p> <ul style="list-style-type: none"> <li>✓ Not configured, Started, stopped</li> <li>✓ Processor type (in this example: 140CPUx341x)</li> <li>✓ The Hardware identification (for Schneider internal use only)</li> <li>✓ The OS version (in this example the OS version is 1.35)</li> </ul> <div data-bbox="778 548 1227 1155" style="text-align: center;"> </div>
<b>5</b>	<p>Note this version number to avoid compatibility issues between the application program and the OS if Concept has to be restored.</p>
<b>6</b>	<p>Press the  button to return back to the OS update process.</p>

## Upgrading a Quantum PLC from Concept to Unity

### Select the Download Function



From the screen described above in the section “Select the Target Device” press the  button. A new screen is proposed: select “Download OS to device”.



## Upgrading a Quantum PLC from Concept to Unity

### Select the file to download

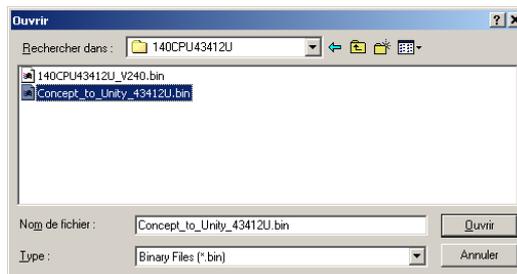


Click on the **Browse...** button in order to select the file to download into the PLC. In this example we will update the OS from 140CPU43412A to 140CPU43412U. For that select the folder: Quantum\Processor\_modules\Concept\_to\_Unity (in your case, select the binary according to your processor).

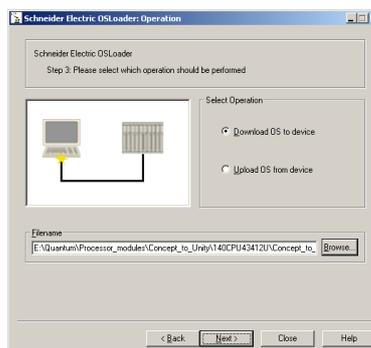


For an upgrade from Concept to Unity two binary files can be selected:

- ✓ Concept\_to\_Unity\_43412U.bin (allows to “format” the processor for Unity)
- ✓ 140CPU43412U\_V320.bin is the OS that will finally be download in the processor.



In our example we have to “format” the processor (remember, we still are in the Phase 1) then select and validate “Concept\_to\_Unity\_43412U.bin”.

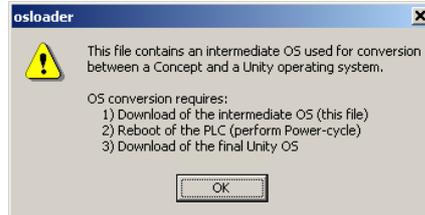


Once done click on the **Next >** button.

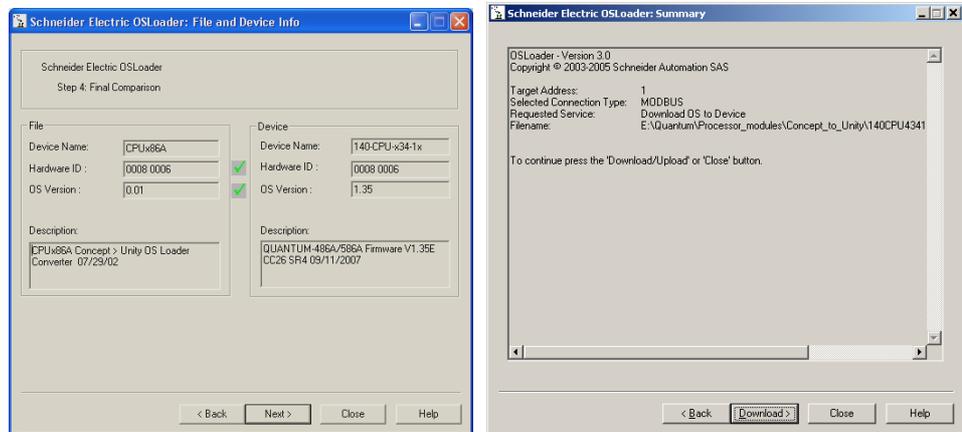
**Download the intermediate OS**



Once the previous screen is validated a warning is displayed:



Click the  button. Two screens that give information regarding the file, the processor and the download are now displayed:



**Note:** If the system detects a discrepancy on the hardware or on the OS version, the download will not be possible. This is indicated by a red cross and the  button becomes unavailable.



Solve this issue and continue. When the hardware and OS are compatible, clicking on the  button launches the download of the intermediate OS file.

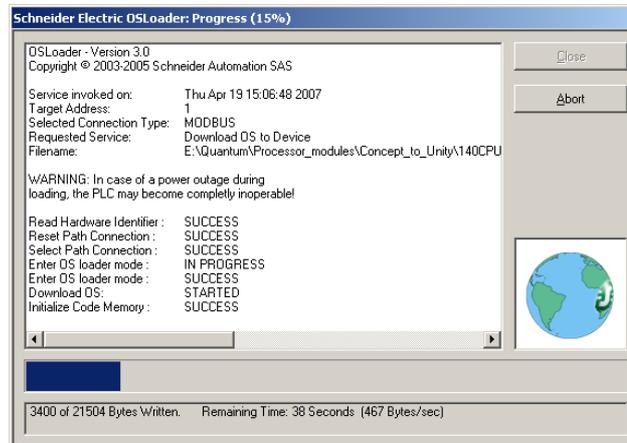
## Upgrading a Quantum PLC from Concept to Unity

## Upgrading a Quantum PLC from Concept to Unity

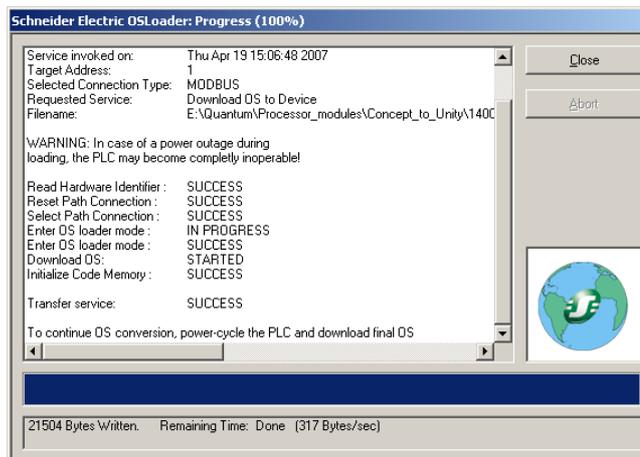
### Download the intermediate OS file (cnt'd)



During the download the remaining time is displayed:



Once the download has successfully completed, the screen below is displayed. Click twice on the  button and go to the Phase 2 (Power OFF then ON or reset the PLC).



**Note:** During intermediate download of OS, CPU LEDs do not change state, Ready LED remains steady and RUN LED keeps blinking.

## ⚠ CAUTION

### EQUIPMENT DAMAGE

During the download:

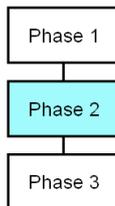
- Do not power OFF the PLC
- Do not power OFF the PC
- Do not disconnect the cable
- Do not shut down OS loader

Any loss of communication during the update procedure can cause severe damage to the CPU or NOE module.

**Failure to follow these instructions can result in injury or equipment damage.**

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### Reset the PLC



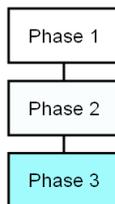
Once the download of the intermediate binary file has completed, the PLC has to be initialized. This task can be performed by one of the two following actions:

- ✓ Reset the PLC by pushing on the Restart button located on the CPU (for more information, refer to the PLC technical documentation).
- ✓ Power OFF then ON the PLC.

Once the PLC has restarted, If steady Run light and no connection with OS loader, Reset the PLC. If State of PLC is steady Ready and blinking Run light, Proceed for phase 3: download the final Unity OS file.

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### Presentation

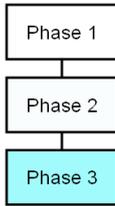


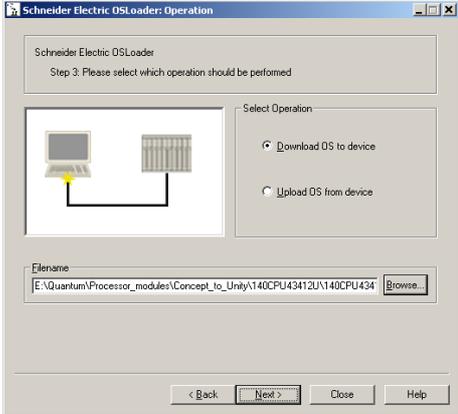
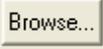
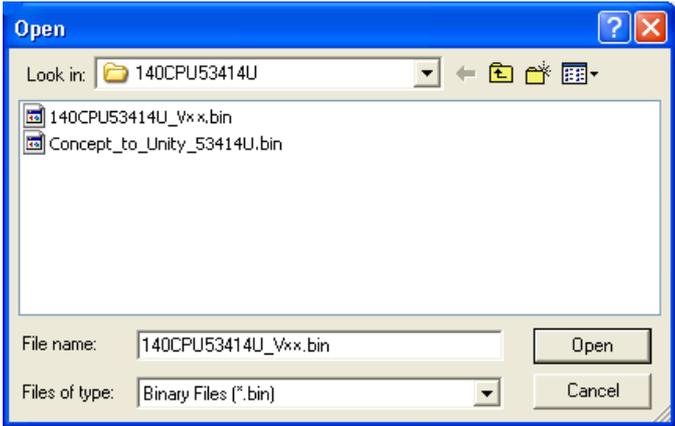
The final binary file “140CPU43412U.bin” (For the selected CPU in our example) has to be downloaded.

For that, follow the same procedure as the one described in the Phase 1.

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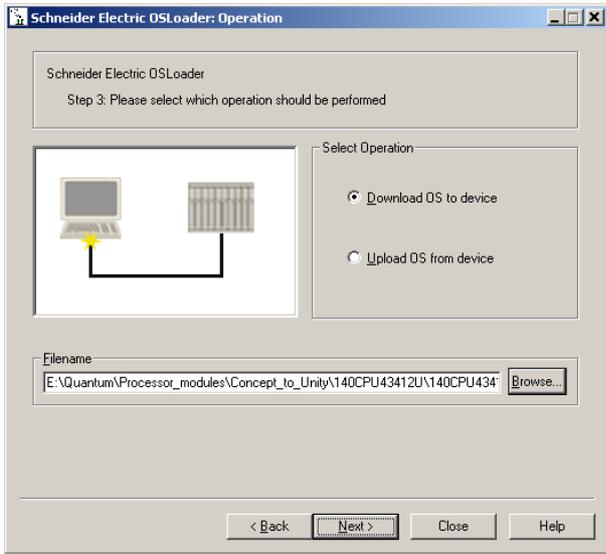
**Download procedure**



As all the necessary actions to download the final Unity OS have been already fully described in the Phase 1, they are shortly reminded here after:	
<b>1</b>	Open the OS loader (the PC should be still connected to the PLC).
<b>2</b>	Select the Protocol – Refer to Phase 1.
<b>3</b>	<p>Select the target device and click on the  button. The next screen appears after few seconds.</p> 
<b>4</b>	<p>Click on the  button and select (in our example) the file 140CPU43412U_Vxyz.bin located on the CD OS. Then validate this screen.</p> 

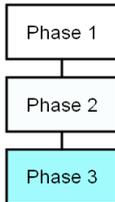
## Upgrading a Quantum PLC from Concept to Unity

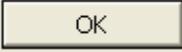
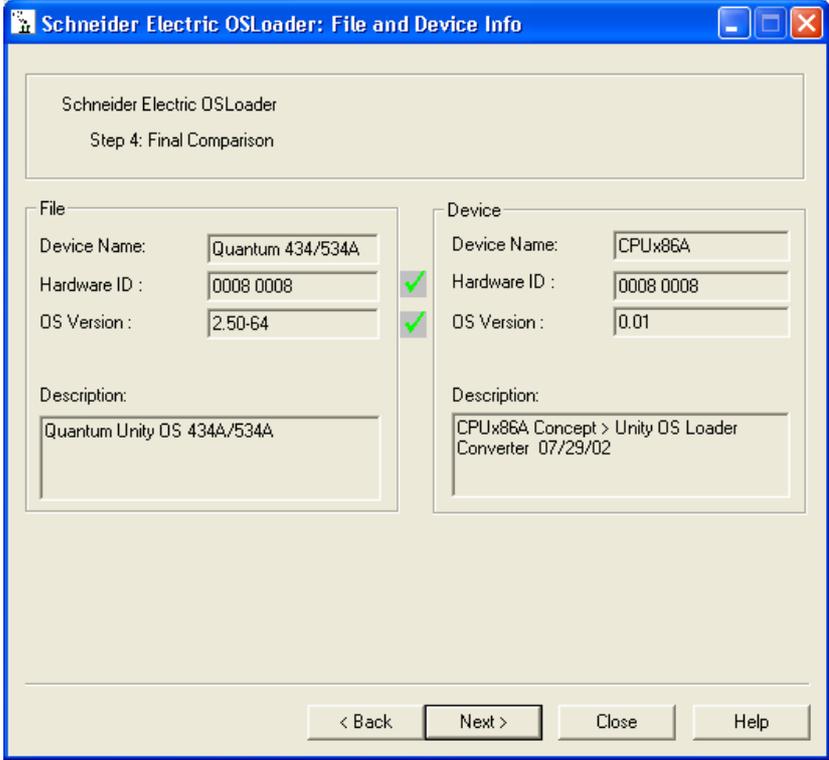
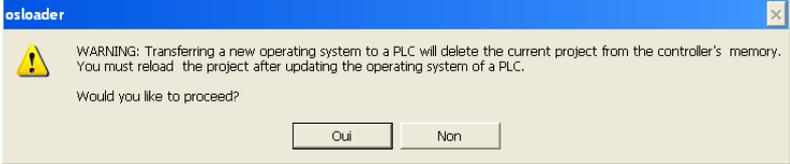
5



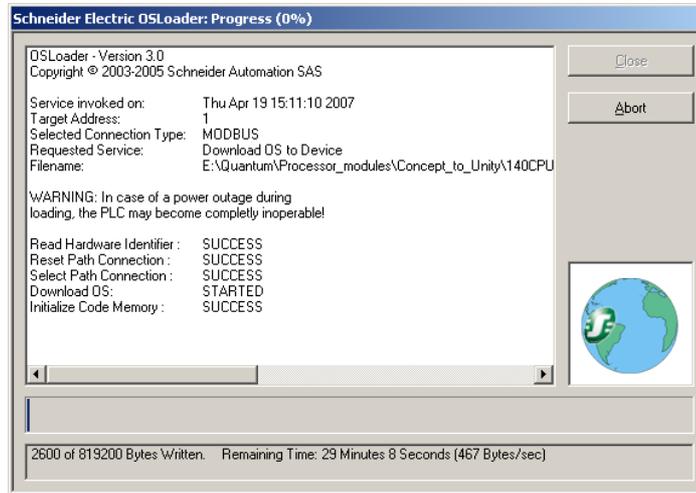
Select the operation to perform (Download OS to device) and press on the **Next >** button.

**Download procedure (cnt'd)**



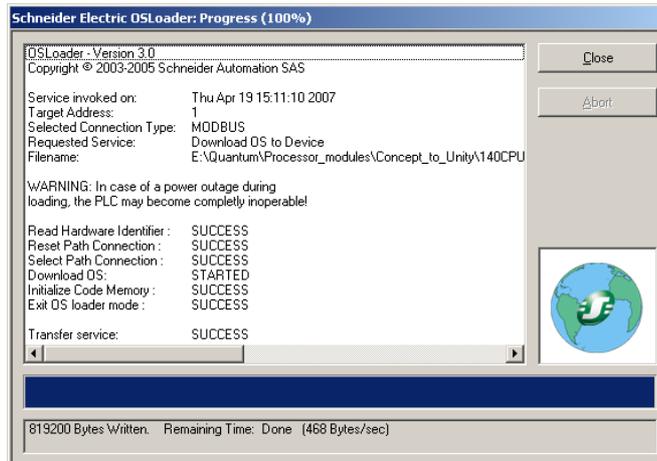
<b>6</b>	<p>At this stage, and if no functional Operating System is present in the PLC the screen may display “???” in the field “OS Version” and an error message. Click  to validate this message.</p>  <p>Then click on the  button.</p>
<b>7</b>	<p>Click on  and validate the warning message displayed on the screen to launch the download of the final OS file.</p> 

During the download (duration may vary according to the protocol) the remaining time is displayed:



8

Once the download has successfully completed, the screen below is displayed:



Click twice on the  button to exit from the OS loader tool.

9

Reset or power OFF then ON the PLC.

## **⚠ CAUTION**

### **EQUIPMENT DAMAGE**

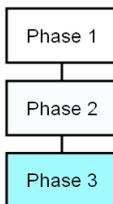
During the download:

- Do not power OFF the PLC
- Do not power OFF the PC
- Do not disconnect the cable
- Do not shut down OS loader

Any loss of communication during the update procedure can cause severe damage to the CPU or NOE module.

**Failure to follow these instructions can result in injury or equipment damage.**

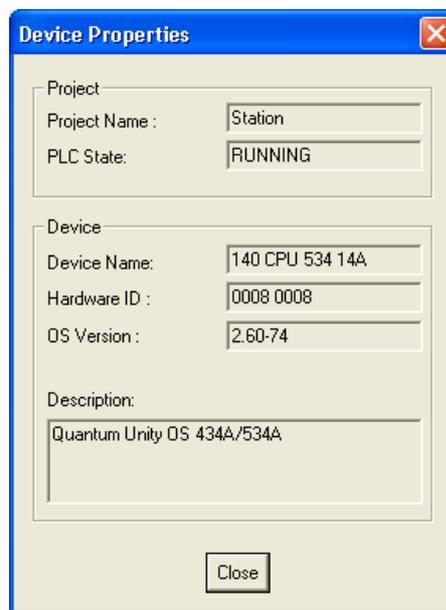
### **Checking version (not mandatory)**



If needed, you can check the new CPU version. For that

- ✓ Open the OS loader tool
- ✓ Select the protocol

- ✓ Click on 
- ✓ Click on 



In our example, the CPU has been upgraded to 140CPU43412U and the OS version is 2.60.

### 3. Updating a Quantum PLC from Unity to Unity

**Object of this Chapter** This chapter describes how to update a Quantum PLC from Unity version higher than V2.0 to a more recent one. Note that the update from Unity V1.0 to V2 and above is not covered by this document. The screens shots given below show how to update a 140CPU65150 processor.  
**Note:** This procedure can be adopted for all Quantum platforms (High End and Legacy platforms).

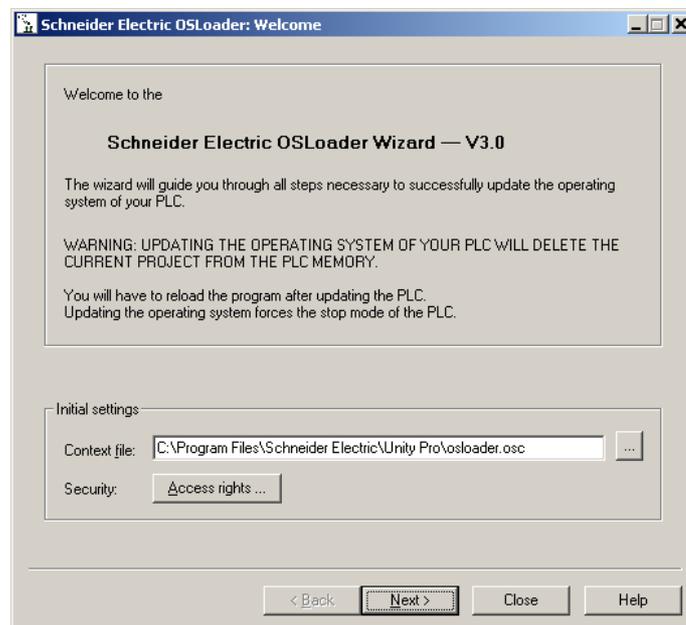
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**Connecting the PC to the PLC** Refer to chapter “Prepare a Quantum Update / Connecting the PC to the PLC for an OS update or upgrade.”

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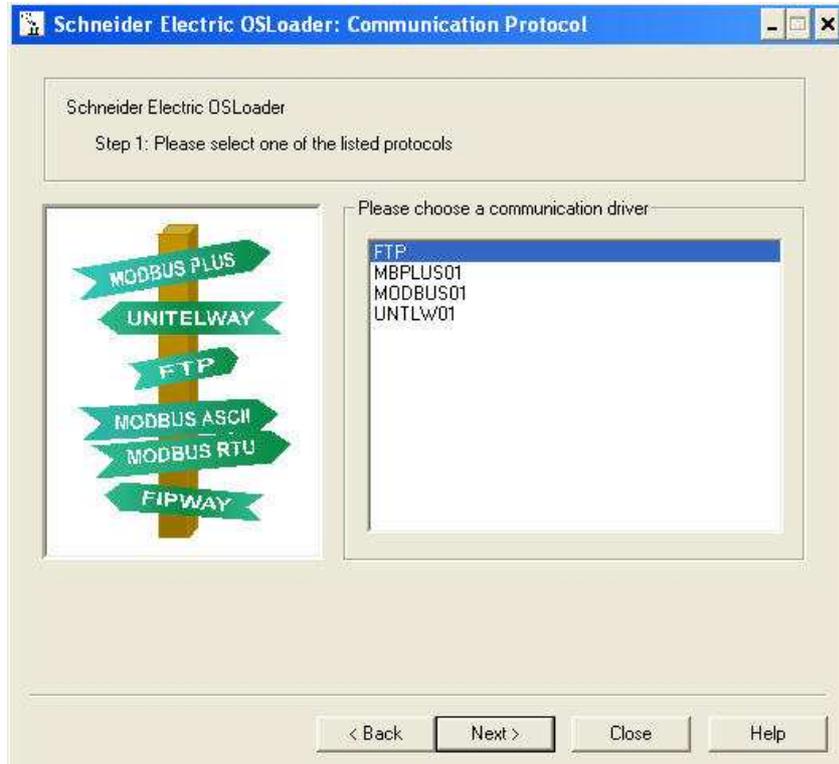
**Launching the OS loader** The OS loader (provided with Unity) allows the user to download the Operating System to the PLC. To open it click on **Start/Program/Schneider-Electric/Unity-PRO/OS loader**.

Once done, the following screen appears:



**Select the  
Communication  
protocol**

From the main screen of the OS loader, click on the  button. The following screen appears:

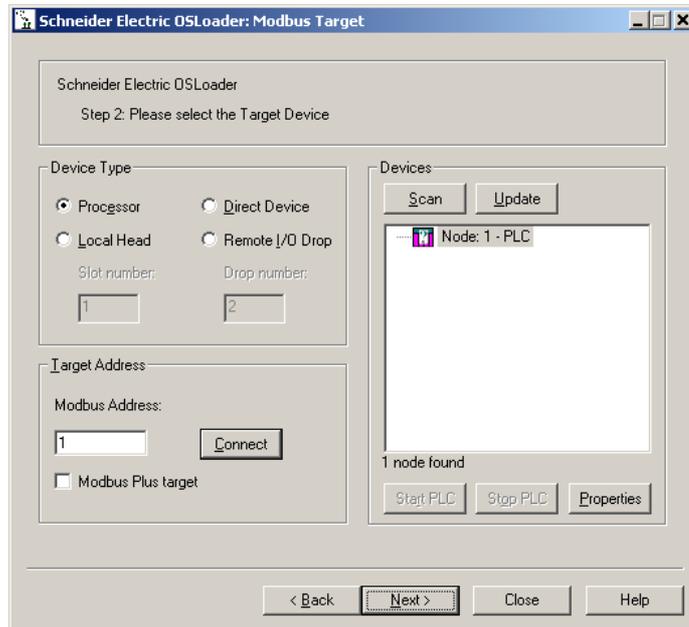


To download the Operating System into the PLC select the right communication protocol (MODBUS01 or MBPLUS01 for Quantum CPU, in accordance with established physical link) and click on the  button.

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## Updating a Quantum PLC from Unity to Unity

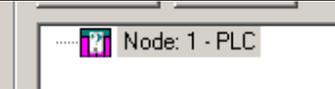
### Select the Target Device

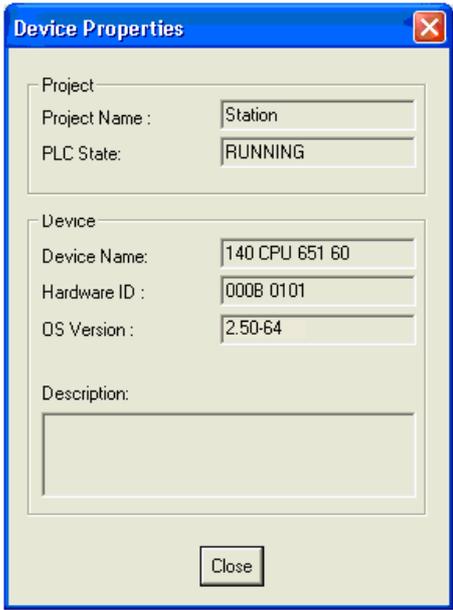


On the Device Type field, select Processor.

### Get the Unity version (optional)

Before the update, knowing which Unity version is already installed on the processor may be useful if for any reason a restore function is needed. For that proceed as follows:

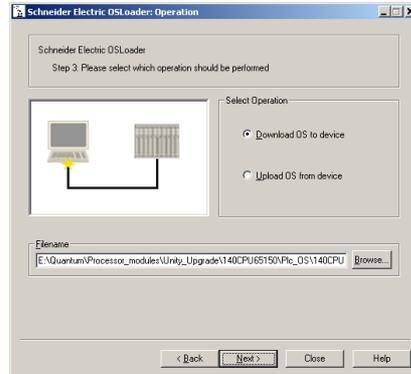
<b>1</b>	Select the PLC 
<b>2</b>	Click on the  button to connect the PC to PLC.
<b>3</b>	Click on the  button to get info from the PLC.

4	<p>The following screen gives the user some information regarding the PLC status</p> <ul style="list-style-type: none"><li>✓ Started, stopped, Not Configured</li><li>✓ Processor type (in this example: <i>140CPU65150</i>)</li><li>✓ The Hardware identification (for Schneider internal use only)</li><li>✓ The OS version (in this example the OS version is 2.6)</li></ul> <div data-bbox="764 539 1217 1149" style="text-align: center;"></div>
5	<p>Note this version number to avoid compatibility issues between the application program and the OS if the previous version has to be restored.</p>
6	<p>Press the  button to return back to the OS update process.</p>

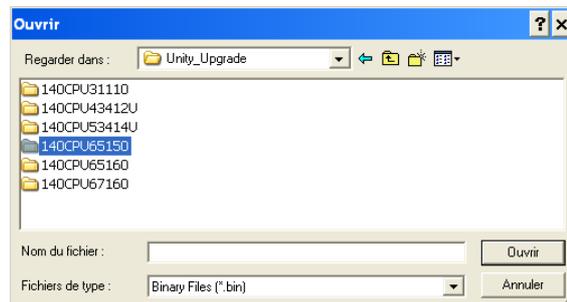
## Updating a Quantum PLC from Unity to Unity

### Select the Download Function

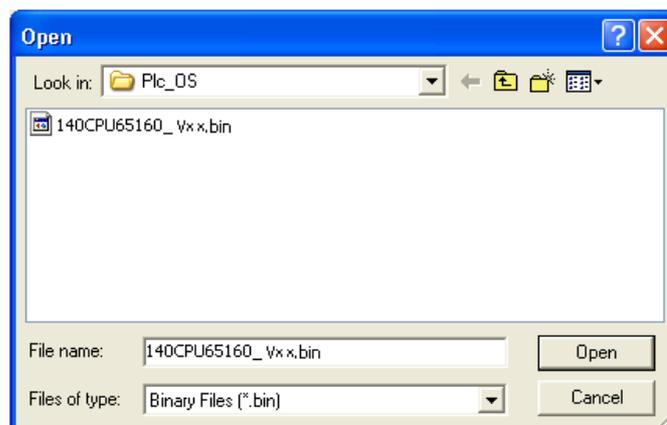
From the screen described above in the section “Select the Target Device” press the  button. A new screen is proposed: select “Download OS to device”.



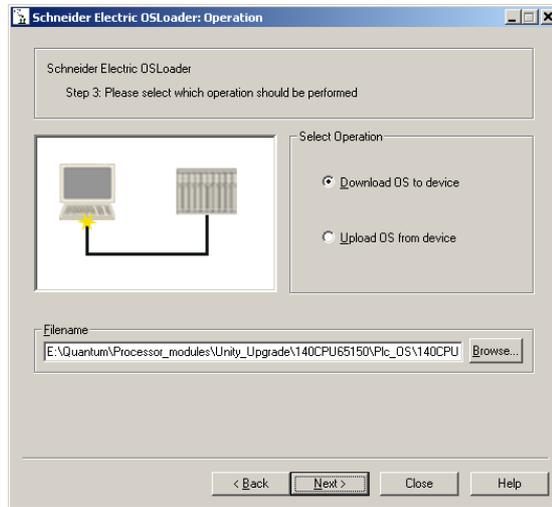
Click on the  button in order to select the file to download into the PLC. In this example we will update the 140CPU65150 OS from version 1.0 to version 2.6. For that select the folders: Quantum\Processor\_modules\Unity\_upgrade (in your case, select the folder according to your processor type):



Finally, by browsing the successive sub-directories (PLC\_OS) select the binary file “140CPU65150\_Vxyz.bin”.



**Select the file to download**



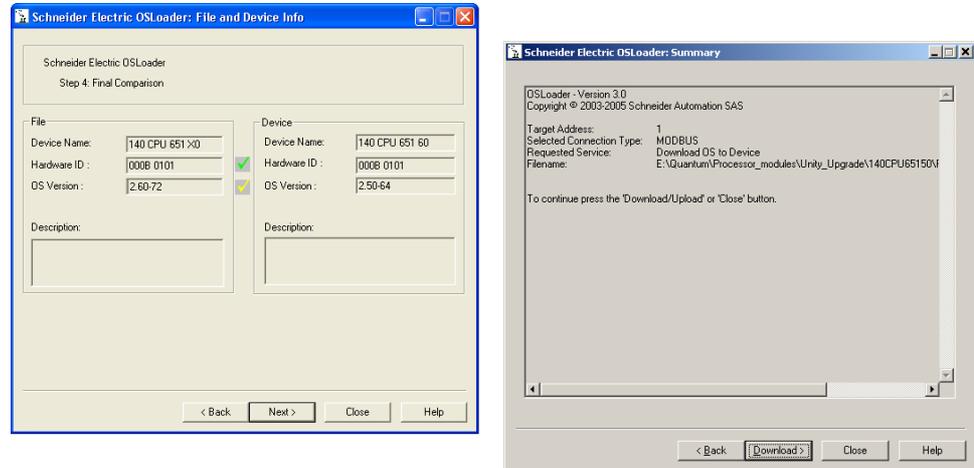
Once done click on the  button.

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## Updating a Quantum PLC from Unity to Unity

### Download the OS file

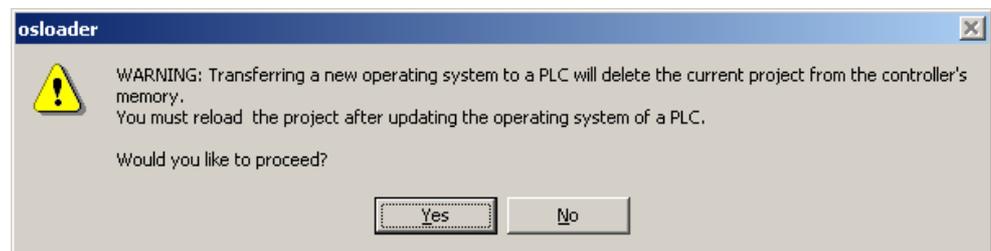
Once the previous screen is validated, two screens display the current OS version, the processor and the OS file to download:



**Note:** If the system detects a discrepancy on the hardware or on the OS version, the download will not be possible. This is indicated by a red cross and the  button becomes unavailable.

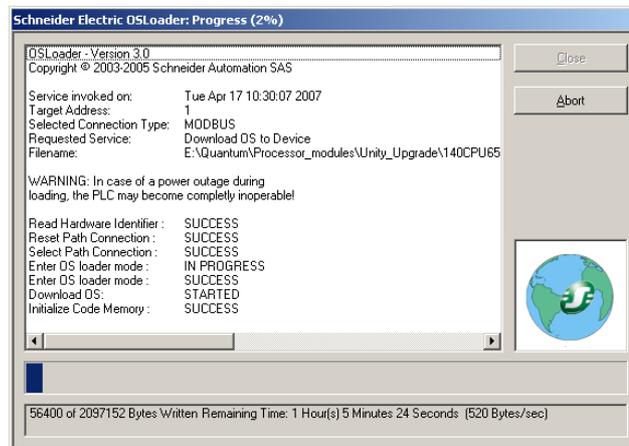


Solve this issue and continue. When the hardware and OS are compatible, click on the  button and validate the warning message displayed on the screen to launch the download of the OS file.

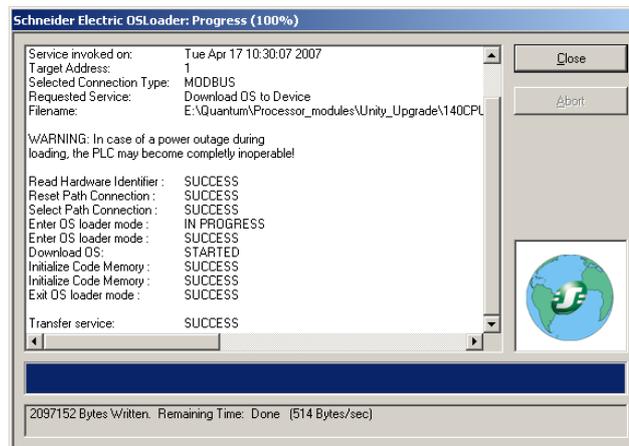


**Download the OS file (cnt'd)**

During the download (the duration depends on the protocol used, roughly 60 minutes with Modbus) the remaining time is displayed:



Once the download has successfully completed, the screen below is displayed:



Click twice on the  button.

---

## **⚠ CAUTION**

### **EQUIPMENT DAMAGE**

During the download:

- Do not power OFF the PLC
- Do not power OFF the PC
- Do not disconnect the cable
- Do not shut down OS loader

Any loss of communication during the update procedure can cause severe damage to the CPU or NOE module.

**Failure to follow these instructions can result in injury or equipment damage.**

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### **Reset the PLC**

Once the download of the OS file has completed, the PLC has to be initialized. This task can be performed by one of the two following actions:

- ✓ Reset the PLC by pushing on the Reset button located on the CPU (for more information, refer to the PLC technical documentation).
  - ✓ Power OFF then ON the PLC.
-

## Updating a Quantum PLC from Unity to Unity

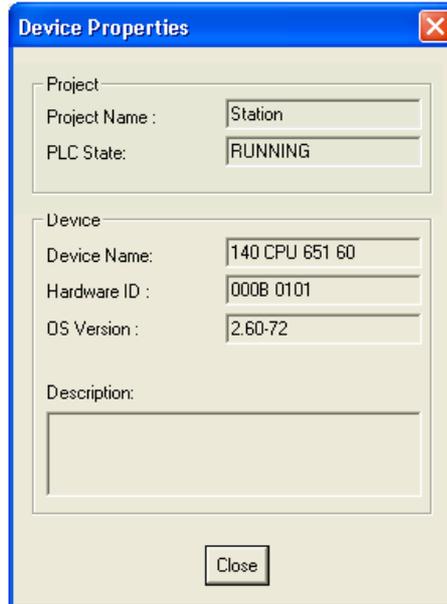
### Checking version (optional)

If needed, you can check the new CPU version. For that

- ✓ Open the OS loader tool
- ✓ Select the protocol

✓ Click on 

✓ Click on 



In our example the CPU has been updated to the version 2.60.

---

## 4. Restoring a Quantum PLC from Unity to Concept

---

**Object of this Chapter** This chapter describes how to restore a Quantum PLC from Unity to Concept. The screen shots given below show how to restore a 140CPU43412U (Unity) to 140CPU43412A (Concept).

---

**Important** Restoring a PLC from Unity to Concept requires to perform three main phases:

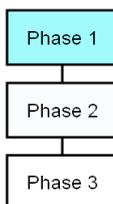
- ✓ Phase 1 – Restore the PLC to Concept with an intermediate OS.
- ✓ Phase 2 - Power OFF then ON the PLC.
- ✓ Phase 3 – Restore the Operating System with the appropriate file.

**Those phases are mandatory and cannot be by-passed.**

Each phase is described in the following procedure.

---

**Connecting the PC to the PLC** Refer to chapter “Prepare a Quantum Update / Connecting the PC to the PLC for an OS update or upgrade.”

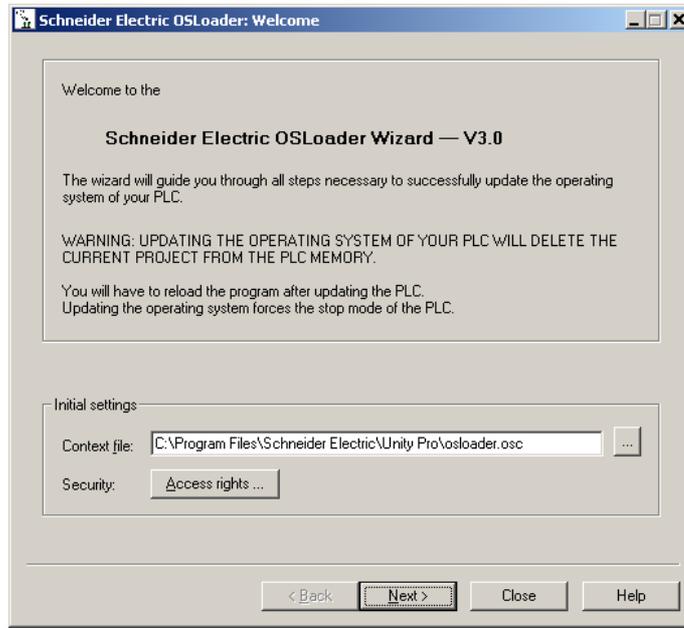


**Launching the OS loader**



The OS loader (provided with Unity) allows the user to download the Operating System to the PLC. To open it click on **Start/Program/Schneider-Electric/Unity-PRO/OS loader**.

Once done, the following screen appears:



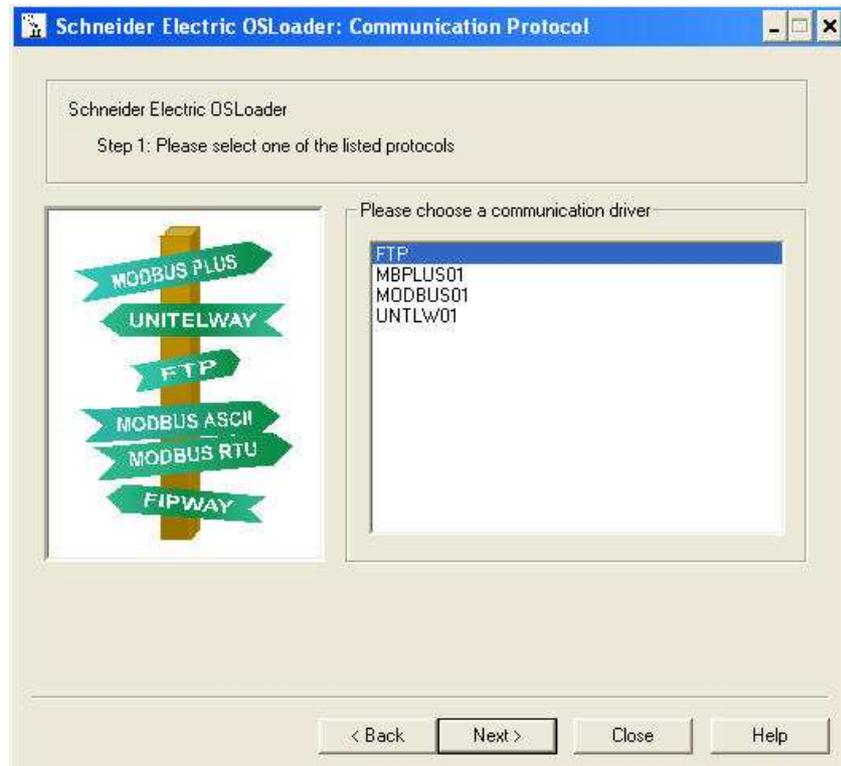
The next steps are fully described later in this document.

---

## Restoring a Quantum PLC from Unity to Concept

### Select the Communication protocol

From the main screen of the OS loader, click on the  button. The following screen appears:

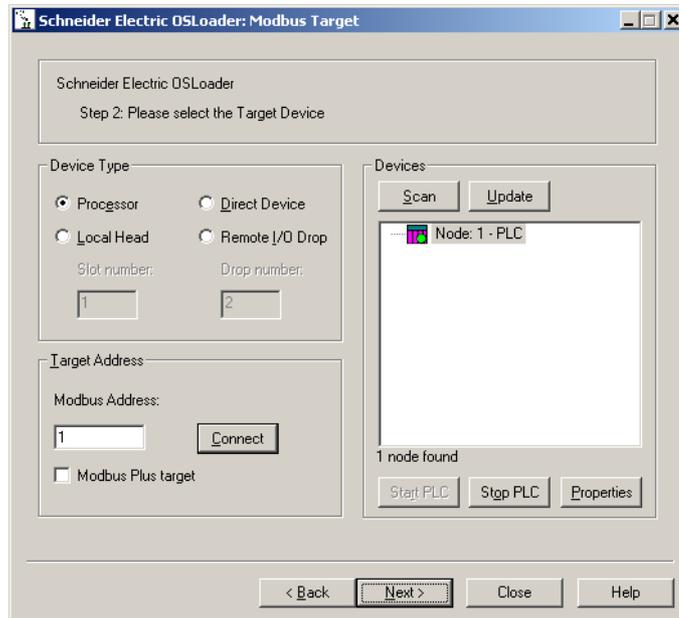


To download the Operating System into the PLC select the right communication protocol (in accordance with established physical link) and click on the  button.

---

## Restoring a Quantum PLC from Unity to Concept

### Select the Target Device

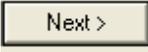


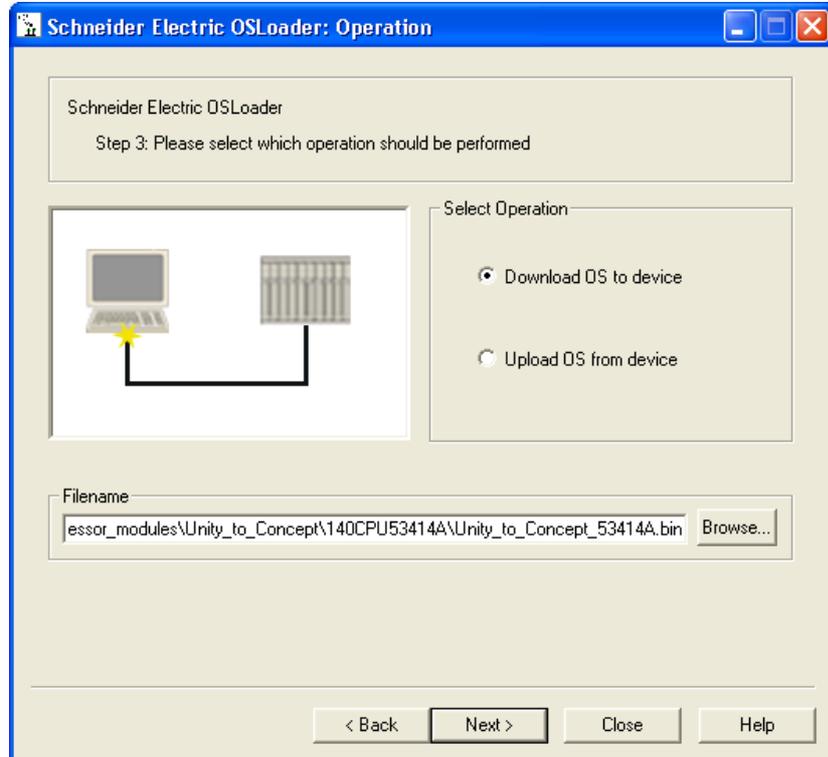
On the Device Type field, select Processor and the other needed parameters (Modbus address....). Then connect to the selected PLC (Node).

---

## Restoring a Quantum PLC from Unity to Concept

### Select the Download Function

From the screen described above press the  button. A new screen is proposed: select “Download OS to device”.

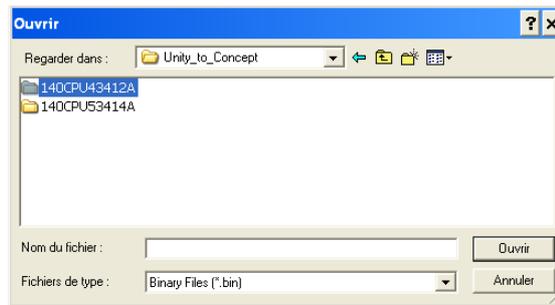


## Restoring a Quantum PLC from Unity to Concept

### Select the file to be downloaded

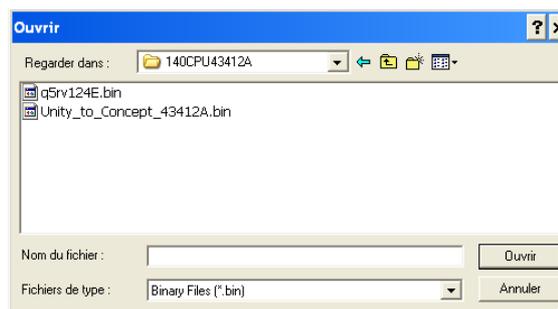


Click on the  button in order to select the file to download into the PLC. In this example we will restore the OS from 140CPU43412U to 140CPU43412A. For that select the following folders: Quantum\Processor\_modules\Unity\_to\_Concept.

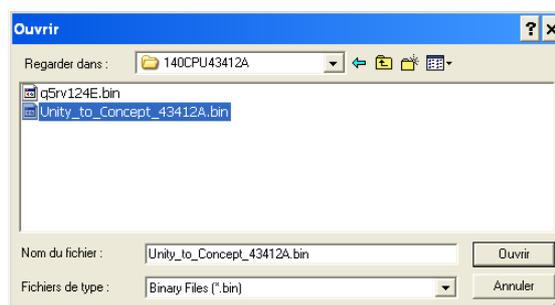


To restore the OS from Unity to Concept, two binary files can be selected:

- ✓ Unity\_to\_Concept\_43412A.bin (allows to “format” the processor to Concept)
- ✓ q5rv135E.bin is the OS that will finally be downloaded in the processor



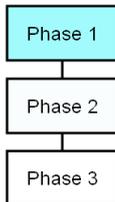
In our example we have to “format” the processor (remember, we still are in the Phase 1) then select and Validate “Unity\_to\_Concept\_43412A.bin”.



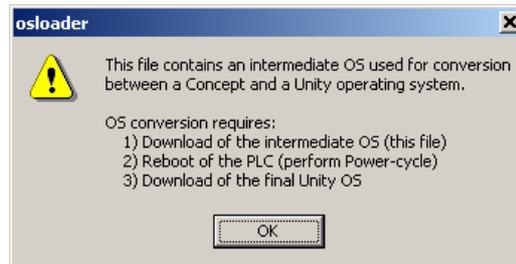
Once done click on the  button.

## Restoring a Quantum PLC from Unity to Concept

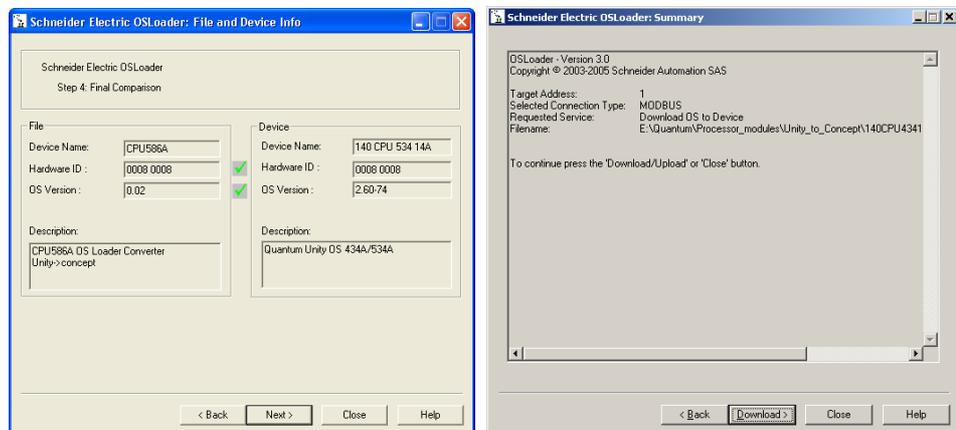
### Download the intermediate OS



Once the previous screen is validated a warning is displayed:



Click the  button. Two screens that give information regarding the file, the processor and the download are now displayed:



**Note:** If the system detects a discrepancy on the hardware or on the OS version, the download will not be possible. This is indicated by a red cross and the  button becomes unavailable.



Solve this issue and continue. When the hardware - OS are compatible, click on the  to launch the download of the intermediate OS file.

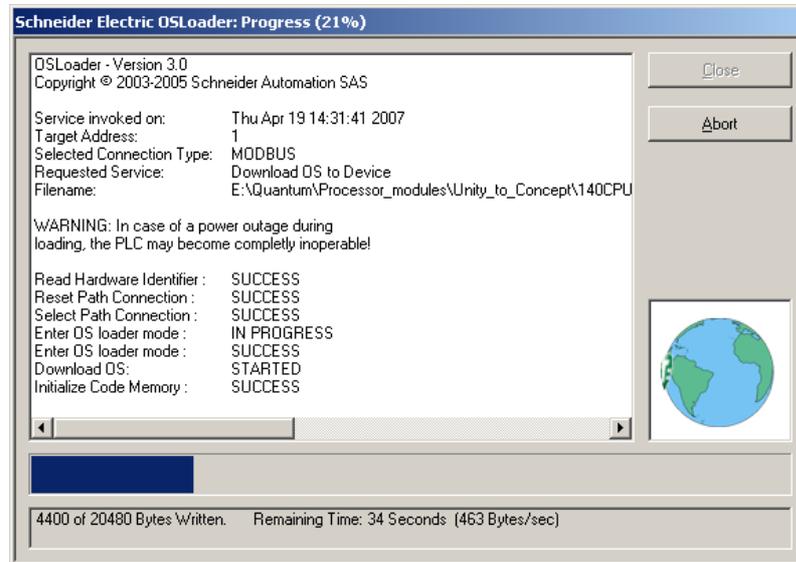
Restoring a Quantum PLC from Unity to Concept

## Restoring a Quantum PLC from Unity to Concept

### Download the intermediate OS file (cnt'd)

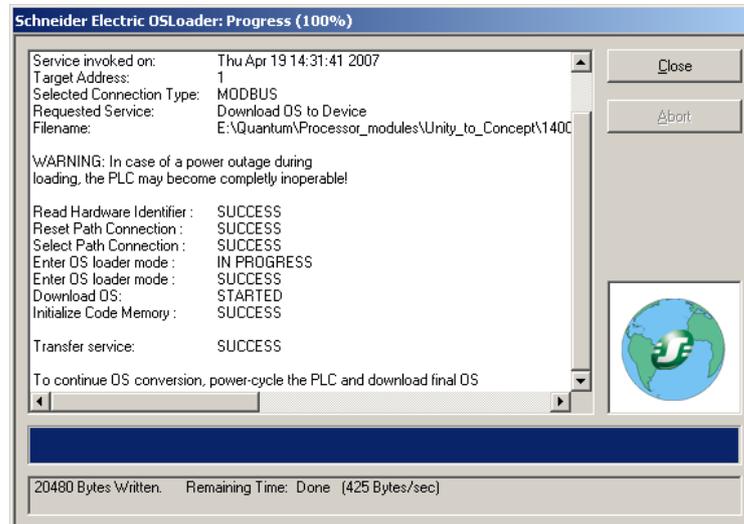


During the download the remaining time is displayed:



Once the download has successfully completed, the screen below is

displayed. Click twice on the  button and go to the Phase 2 (Power OFF then ON or reset the PLC).



**Note:** During intermediate download of OS, CPU LEDs do not change state, Ready LED remains steady and RUN LED keeps blinking.

## ⚠ CAUTION

### EQUIPMENT DAMAGE

During the download:

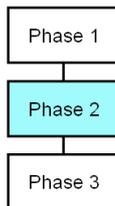
- Do not power OFF the PLC
- Do not power OFF the PC
- Do not disconnect the cable
- Do not shut down OS loader

Any loss of communication during the update procedure can cause severe damage to the CPU or NOE module.

**Failure to follow these instructions can result in injury or equipment damage.**

---

### Reset the PLC



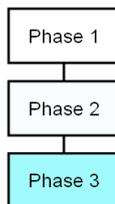
Once the download of the intermediate binary file has completed, the PLC has to be initialized. This task can be performed by one of the two following actions:

- ✓ Reset the PLC by pushing on the Restart button located on the CPU (for more information, refer to the PLC technical documentation).
- ✓ Power OFF then ON the PLC.

Once the PLC has restarted, go to Phase 3: download the final Concept OS.

---

### Presentation



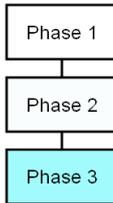
The final binary file “q5rv135E.bin ” (140CPU34312 in our example) has to be downloaded.

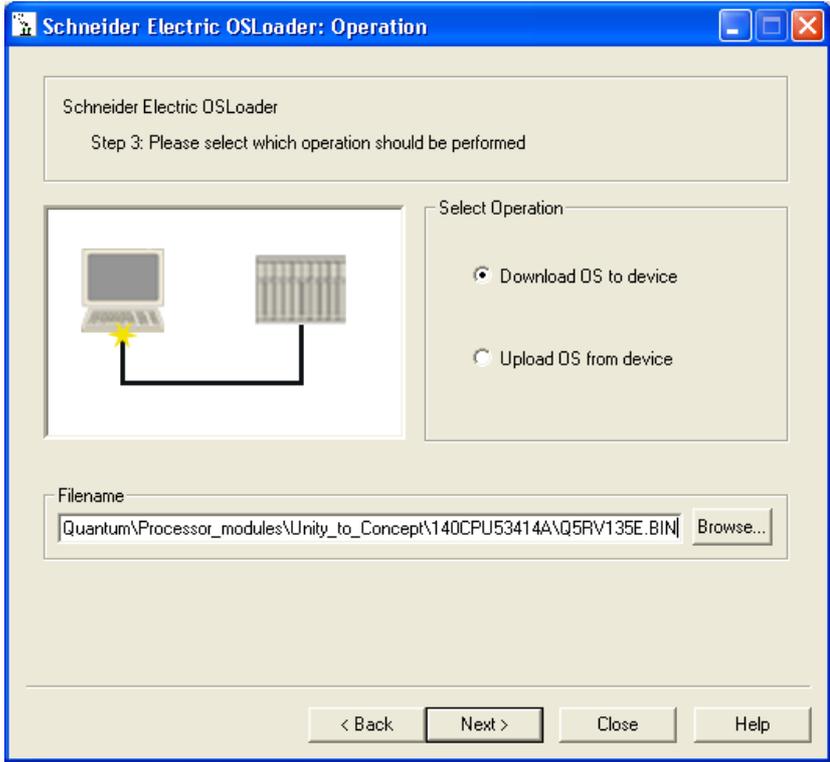
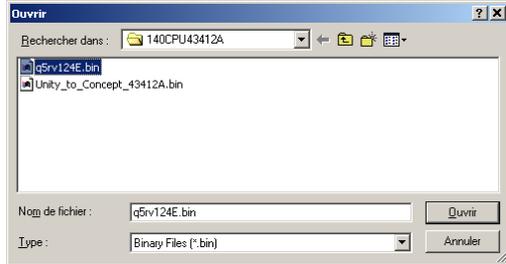
For that, follow the same procedure as the one described in the Phase 1.

---

## Restoring a Quantum PLC from Unity to Concept

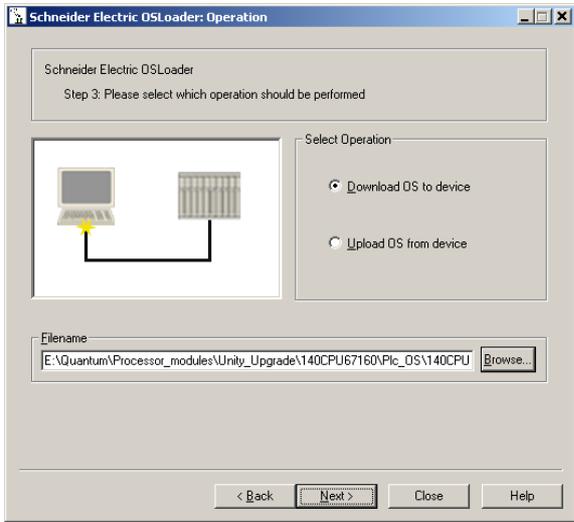
### Download procedure



As all the necessary actions to download the final Concept OS have been already fully described in the Phase 1, they are shortly reminded here after:	
<b>1</b>	Open the OS loader (the PC should be still connected to the PLC).
<b>2</b>	Select the Communication Protocol – Refer to Phase 1.
<b>3</b>	<p>Select the target device and click on the <b>Next &gt;</b> button. The next screen appears after few seconds.</p> 
<b>4</b>	<p>Click on the <b>Browse...</b> button and select (in our example) the file q5rv135E.bin located on the CD OS. Then validate this screen.</p> 

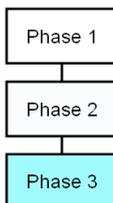
## Restoring a Quantum PLC from Unity to Concept

5

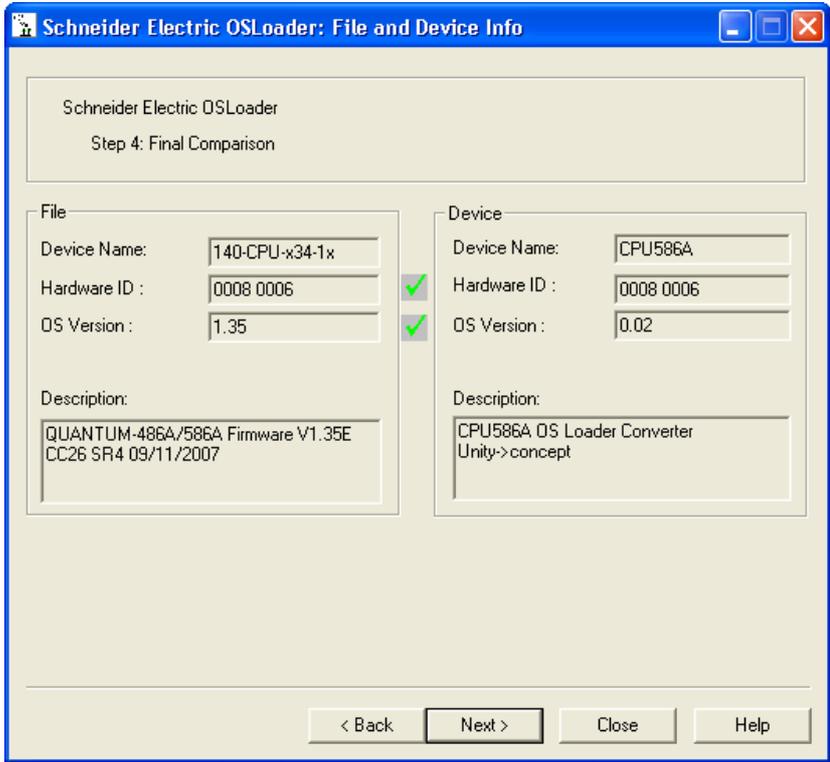


Select the operation to perform (Download OS to device) and press on the  button.

### Download procedure (cnt'd)

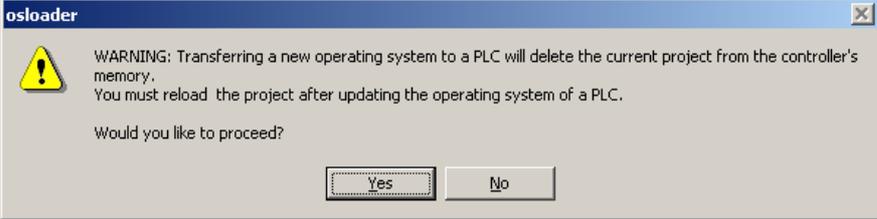


6



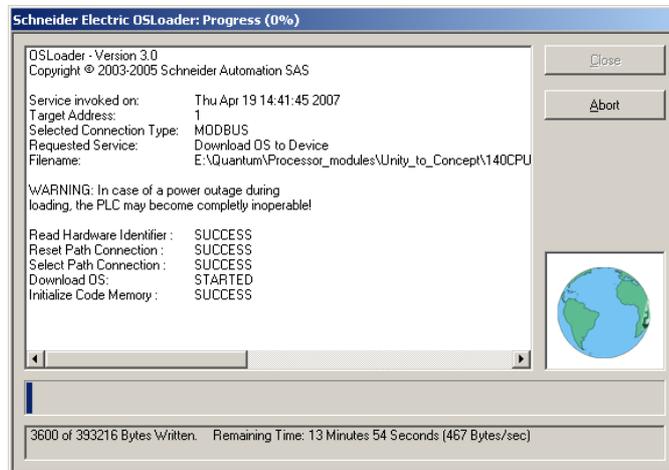
Then click on the  button.

## Restoring a Quantum PLC from Unity to Concept

<b>7</b>	<p>Click on  and validate the warning message displayed on the screen to download the final OS file.</p> 
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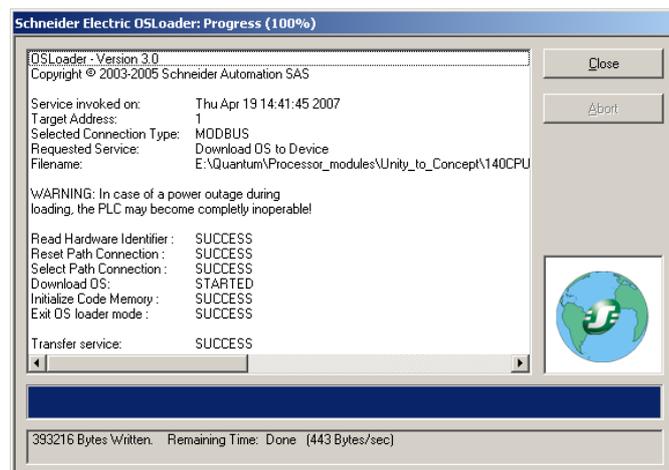
## Restoring a Quantum PLC from Unity to Concept

During the download (duration may vary according to the protocol) the remaining time is displayed:



8

Once the download has successfully completed, the screen below is displayed:



Click twice on the  button to exit the OS loader tool.

9

Reset or power OFF then ON the PLC.

## **⚠ CAUTION** **EQUIPMENT DAMAGE**

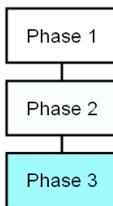
During the download:

- Do not power OFF the PLC
- Do not power OFF the PC
- Do not disconnect the cable
- Do not shut down OS loader

Any loss of communication during the update procedure can cause severe damage to the CPU or NOE module.

**Failure to follow these instructions can result in injury or equipment damage.**

### **Checking version (optional)**

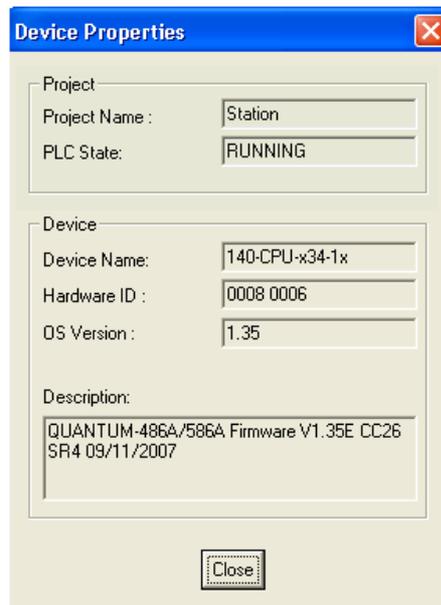


If needed, you can check the new CPU version. For that

- ✓ Open the OS loader tool
- ✓ Select the communication protocol

✓ Click on 

✓ Click on 



In our example, the CPU has been restored to 140CPU43412A, version 1.60.

## 5. Upgrading a Quantum Hot Standby PLC

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**Object of this Chapter** This chapter describes how to upgrade a Quantum Hot Stand By PLCs (CPU 67160 , CPU 67261, CPU 67260 ). This Upgrade can be managed by one of the two communications methods available in the OS loader:

- ✓ Modbus
- ✓ Modbus Plus

**Important:** the procedure below only gives, step by step, the procedure to follow. The upgrade procedure itself is described in the chapter 3 of this document.

---

**Compatibility issues** **Important:** To upgrade a Modicon Quantum Hot Standby with Unity OS loader without shutting down the process, the current application program must be executable by the new OS. Observe this requirement when installing minor revisions targeted for bug fixes or minor enhancements. When a major function enhancement needs to be made, maintaining this compatibility may not be possible. In this case, to perform an OS upgrade requires a system shut down.

**Connecting Hot Standby without S908 RIO drop.** The error A and error B leds of the RIO Head (CRP) indicate the communication status between RIO Head and RIO Drop. When using CRP module with firmware version lower than 2.00, the led 'fault' is on but this has no impact on communication between the two RIO heads. To have the error leds not returning a detected error, it is mandatory to:

- update the CRP module with a firmware 2.00 or higher (on both Primary and Standby side).
- update the Quantum Hot Standby processor with a firmware 2.70 or higher (on both Primary and Standby side).
- install Unity Pro V4.1 or higher. Select the HotStandby processor V2.70 in the Unity Pro application and take the processor into account through a 'Rebuild All'. Make the full download in both PLCs.
- CPU 67261 is compatible with Unity Pro V5.0 or higher with a firmware 2.80 or higher.

**Ethernet RIO** At the moment only Head communication module 140CRP31200 is concerned by this procedure.

**Important:**

- The both CRPs must have the same SoftwareVersion .
  - Begin the update by CPUs then CRP modules.
-

## Upgrading a Quantum Hot Standby PLC

**Upgrading PLC while the process is running** The Executive Upgrade feature allows upgrading the OS of the Standby controller while the Primary controller continues to control the process. However, during the upgrade, the system can no longer be considered as redundant. That is, there is no Standby available to assume control if the Primary should fail before the Standby upgrade is complete.

---

**Upgrading the OS without stopping** Under normal operating conditions, both controllers in a redundant system must have the same versions of firmware. In fact, there are checks done by the controllers to detect if there is a mismatch in firmware.

Normally, when a mismatch exists, performing a switchover would not be possible because the Secondary controller would not be allowed to be Standby.

However, to allow an OS Upgrade without stopping the application, it is possible to set the “upgrade without stopping” command in Command Register system word %SW60 (bit %SW60.4 - Details on the Modicon Quantum Hot Standby with Unity command register can be found in Understanding the Unity Command Register, p. 113).

**Note:**

- ✓ Enabling OS upgrade without stopping the application disable the checking between the Primary and Standby configuration. Disable the “upgrade without stopping” bit as soon as the OS upgrade is finished.
  - ✓ OS upgrade is possible only with compatible firmware.
-

**Upgrade  
procedure**

**Important:** Using Modbus or Modbus Plus, only address 1 is allowed for downloading. Ensure that no other device on the network is using address 1.

1. Connect to the Primary (through Modbus, Modbus Plus or USB).
2. Access the Command Register system bit %SW60.4 and set this bit to 1.
3. Disconnect the PC from the Primary CPU.
4. Depending on the communication media chosen for the upgrade procedure, note the Modbus or Modbus Plus address of the Standby CPU using the keyboard functions (in “PLC Communications / Communications Serial Port” for Modbus or in “PLC Communications / Communications Modbus Plus” for Modbus Plus).
5. Stop the Standby CPU with the keyboard functions.  
**Note:** The standby CPU goes to STOP Offline mode; the Primary operates without a Standby.
6. Disconnect all the communication links (Hot Standby fiber optic cable, Ethernet cables, Modbus Plus cables ...) from the Standby rack and remove the CRP module from the Standby rack.
7. Switch off the power of the Standby rack.
8. When using an application in the PCMCIA card:
  - 8.1. Remove the PCMCIA card from the Standby CPU.
  - 8.2. Remove the PCMCIA batteries to empty the card content.

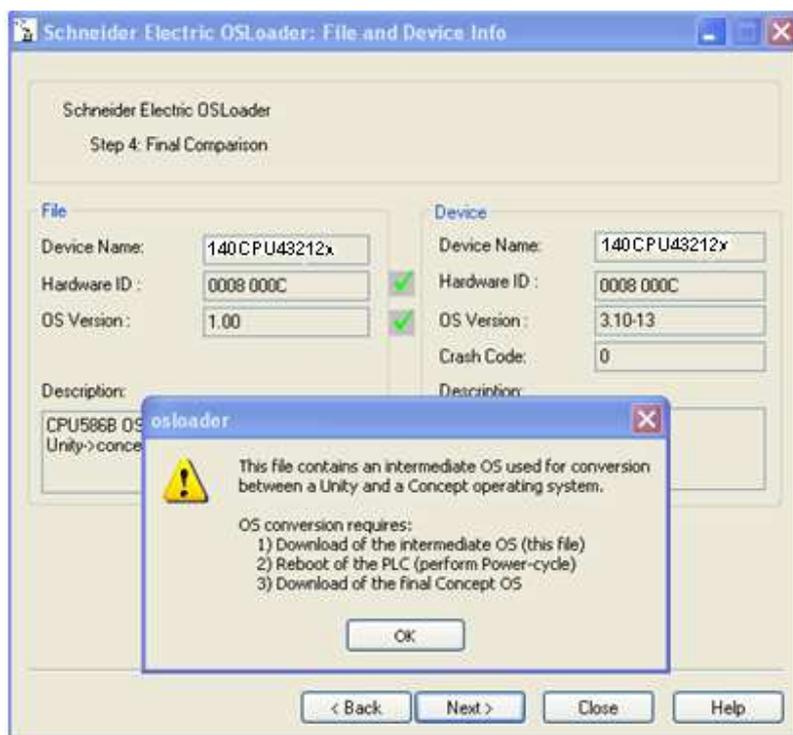
9. Power on the Standby CPU.
10. If not set to 1, change the Modbus or Modbus Plus address of the Standby CPU to 1 with the keyboard functions (in “PLC Communications / Communications Serial Port” for Modbus or in “PLC Communications / Communications Modbus Plus” for Modbus Plus).
11. **Coprocessor Upgrade Step:** please see “*Error! Reference source not found.*”. Don’t forget to power cycle the CPU at the end of the procedure.
12. **CPU OS Upgrade Step:** please see “3. *Updating a Quantum PLC from Unity to Unity*”
  - 12.1. Connect the PC to the Standby CPU using Modbus or Modbus Plus.
  - 12.2. Open the OSLoader tool.
  - 12.3. Select the Modbus or Modbus Plus communication option.
  - 12.4. Connect to the Standby using address 1.
  - 12.5. Download the OS to the Standby.
13. Disconnect the PC from the Standby CPU.
14. Switch off the power of the Standby CPU.
15. When using an Application in the PCMCIA :
  - 15.1. Insert the PCMCIA batteries.
  - 15.2. Insert the PCMCIA card in the Standby CPU.
16. Power on the Standby CPU.  
**Note:** the CPU must be in “No Conf” state.
17. Check the Copro and OS versions in the LCD Screen.
18. Reconnect all the communication cables (CRP module, Ethernet cables, ...) but not the Hot Standby fiber optic cable.
19. At last, reconnect the fiber optic cable to both CPUs.
20. Check the application program is automatically transferred to the Standby CPU ("Transfer ..." on screen for a short time and then "Run Standby CPU"). If not, perform the transfer with the keyboard.  
**Note:** Ensure that the Modbus or Modbus Plus address is the same as the address noted in Step 4.
21. Put in RUN mode.  
**Note:** Ensure Primary CPU is in Run Primary Mode and Standby CPU is in RUN Standby Mode.
22. Perform a switchover by stopping the Primary CPU with the keyboard.  
**Note:** Ensure Standby CPU becomes Primary CPU on the LCD screen.
23. Repeat Steps 4 through 21 on the new Standby.
24. Connect to the new Primary CPU with the PC and Unity Pro (through Modbus, Modbus Plus or USB).
25. Access Command Register system bit %SW60.4; set bit to 0.
26. Disconnect the PC and ensure Primary CPU is in RUN Primary Mode and Standby CPU is in RUN Standby Mode.

## Special Intermediate OS, for 140CPU43212U/A PV >= 16.

Due to a hardware ID incompatibility between 140CPU43412U with PV >= 16 and the ones produced before this PV ( PV < 16 ), we have generated a new Intermediate OS, allowing the hardware ID compatibility.

Previous Quantum 140CPU43412U's had a hardware ID of 0008 0008 but newer ( PV >= 16 ) 140CPU43412U's have a hardware ID of 0008 000C.

By this way the user will get the capacity to make the change either from Unity to Concept or from Concept to Unity if this new hardware is used.



Intermediate OS are :

- Unity\_to\_Concept\_43412A\_pvget16.bin
- Concept\_to\_Unity\_43412U\_pvget16.bin

to be found in "Shopping kiosk" or in Schneider electric web site.

Note that the "final" Unity firmware is to be adapted to the PV too, so after the use of special pvget 16 Intermediate OS , a dedicated firmware is to be download .

Firmware to download are:

- 140CPU43412U\_V320\_pvget16.bin