Upgrade and Update Procedure

# Quantum CPU Operating System

Upgrade and Update procedure O3/2014 eng Edition V1.0





www.schneider-electric.com

Upgrade and Update Procedure

# Purpose

Subject of this Chapter	<ul> <li>This user's guide explains how to upgrade Quantum PLC's Operating System but also the firmware of Ethernet modules</li> <li>Upgrade a PLC from Concept to Unity, taking care of the PV of the 140CPU43212 U and A, coated or not (see annexe 1)</li> <li>Update a PLC from Unity to Unity,</li> <li>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).</li> <li>Update Quantum embedded Ethernet modules.</li> <li>Upgrade Remote I/O Head and Drop: <ul> <li>S908 network based</li> <li>For Ethernet IO network</li> </ul> </li> </ul>
	<b>Note:</b> 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.

Upgrade and Update Procedure

### Summary

1. Preparing a Quantum update	4
2. Upgrading a Quantum PLC from Concept to Unity	7
3. Updating a Quantum PLC from Unity to Unity	23
4. Restoring a Quantum PLC from Unity to Concept	
5. Upgrading a Quantum Hot Standby PLC	
Special Intermediate OS, for 140CPU43212U/A PV>= 16	

### 1. Preparing a Quantum update

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.
Prerequisites	This update requires a PC with Unity Pro installed and the binary file containing the OS firmware to download.
Software	<ul> <li>The following softwares are required:</li> <li>✓ Unity Version 2.0 mini must be installed on the PC (note that it is not necessary to launch Unity for an OS upgrade).</li> <li>✓ The eCD "Unity OS firmware" is provided on <u>www.schneider-electric.com</u> and contains all the OS for Quantum, Premium and M340 PLC's.</li> <li>✓ The OS loader (provided with Unity Pro ). This tool allows the user to download PLC's Operating System and Ethernet modules firmware.</li> </ul>

Connecting the	The Quantum CPU OS can only be downloaded by a direct connection
PC to the PLC	between the PC and the CPU by the MODBUS or MODBUS+ ports. Note
for an OS update or upgrade	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 <u>CPU 140CPU 311 10, 140CPU 434 12U and 140CPU 534 14 BU</u>:

- 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 <u>CPU 140 CPU 6x1y0 (65150, 65160, 651608, 65260, 67160, 67261, 671608):</u>

- 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

 $\rightarrow$  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.

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).
Important	Upgrading a PLC from Concept to Unity requires to perform three main phases:
	<ul> <li>✓ Phase 1 - Upgrade the PLC to Unity with an intermediate OS</li> <li>✓ Phase 2 - Power OFF then ON the PLC</li> <li>✓ Phase 3 - Update the Operating System with the appropriate file</li> </ul>
	Those phases are mandatory and cannot be by-passed.

Each phase is described in the following procedure.

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



Launching the OS loader

Phase 1 Phase 2 Phase 3 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:

Welcome to	he
Sch	neider Electric OSLoader Wizard — V3.0
The wizard w system of you	ill guide you through all steps necessary to successfully update the operating r PLC.
WARNING: I CURRENT F	JPDATING THE OPERATING SYSTEM OF YOUR PLC WILL DELETE THE ROJECT FROM THE PLC MEMORY.
You will have Updating the	to reload the program after updating the PLC. operating system forces the stop mode of the PLC.
Initial settings	
	C:\Program Files\Schneider Electric\Unity Pro\osloader.osc
Context <u>f</u> ile:	
Context <u>f</u> ile: Security:	Access rights

### Select the communication protocol

Phase 1

Phase 2

Phase 3

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

	Please choose a communication	n driver
MODBUS PLUS	MBPLUS01 MODBUS01	
MODBUS ASCH		
FIPWAY		

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.

Select the Target Device	Schneider Electric OSLoader: Modbus Target
Phase 1 Phase 2 Phase 3	Schneider Electric OSLoader       Step 2: Please select the Target Device       Device Type       Processor       Device Type       Processor       Device Type       Processor       Device Type       Scan       Update       Scan       Scan       Update       Scan       Scan       Update       Scan       Image: Dop number:       Image: Dop n
	< <u>B</u> ack <u>Next</u> > Close Help

On the Device Type field, select Processor.

Get the Concept version (Optional)	Knowin if for an proceed	ng which Concept version is installed on the processor could be useful ny reason a restore function from Unity to Concept is needed. For that as follows:
Phase 1	1	Select the PLC
Phase 2	2	Click on the Connect button to connect the PC to PLC.
Phase 3	3	Click on the Properties button to get info from the PLC.

	<ul> <li>The following screen gives to the user some information regarding the PLC status:</li> <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>
	Project Project Name : Station PLC State: RUNNING
4	Device           Device Name:         140-CPU-x34-1x           Hardware ID :         0008 0006           OS Version :         1.35
	Description: QUANTUM-486A/586A Firmware V1.35E CC26 SR4 09/11/2007
	Close
5	Note this version number to avoid compatibility issues between the application program and the OS if Concept has to be restored
6	Press the Close button to return back to the OS update process.

Select the<br/>Download<br/>FunctionFrom the screen described above in the section "Select the Target Device"<br/>press the Next> button. A new screen is proposed: select "Download<br/>OS to device".

Phase 1
Phase 2
Phase 3

Step 3: Please si	elect which operation shou	uld be performed	
		Select Operation	
		<ul> <li>Download OS to device</li> </ul>	
T		C Upload OS from device	
ilename			
. vguantum vrioces	sol_modules/concept_to_	Onity (140CP0434120 \Concept_to_ 1	NSG.

### Select the file to download



Phase 1 Phase 2 Phase 3

button in order to select the file to download into the Click on 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).

Ouvrir		<u>? ×</u>
<u>R</u> echercher dans :	🗋 Concept_to_Unity 💽 🗢 🛍 📸 🎫	
140CPU43412U		
110070334140		
1		
Nom de fichier :		<u>O</u> uvrir
<u>T</u> ype :	Binary Files (*.bin)	Annuler

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)
- $\checkmark$ 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".

E	Schneider Electric OSLoader: Operation	_ 🗆 🗙
	Schneider Electric OSLoader Step 3: Please select which operation should be performed	
	Select Operation         © @vericed D5 to device           C	
	< gack Head Close H	elp
Once done click on the	Next > button.	



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

Schneider Electric OSI gader: File and Device Info	🚡 Schneider Electric OSLoader: Summary
Schneider Electric OSLoader: File and Device Info     Image: Comparison       Schneider Electric OSLoader     Step 4: Fnal Comparison       File     Device Name:     CPUx66A       Hardware ID :     0008 0006       OS Version :     001       OS Version :     001       Description:     Description:       IPUtx66A Concept > Unity OS Loader     Description:       Converter 07/25/02     Caster	Schneider Electric OSLoader: Summary  Stage Address:  Targe Address:  Selected Cornection Type: MODBUS Requested Service:  El-NQuantum/Processor_modules\Concept_to_Unity\140CFU4341 To continue press the 'Download/Upload' or 'Close' button.
< Back Next > Close Help	<

**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 Next > button b

button becomes unavailable.

File		11	Device	
Device Name:	CPUx86A		Device Name:	CPUx86A
Hardware ID :	0008 0006		Hardware ID :	0008 0008
OS Version :	0.01		OS Version :	0.01

Solve this issue and continue. When the hardware and OS are compatible,

clicking on the Download > button launches the download of the intermediate OS file.

Download the<br/>intermediateDuring the download the remaining time is displayed:OS file (cnt'd)Schneider Electric OSLoader: Progress (15%)

Phase 1
Phase 2
Phase 3

Schneider Electric OSLoade	er: Progress (15%)	
OSLoader - Version 3.0 Copyright © 2003-2005 Schi	neider Automation SAS	Close
Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Thu Apr 19 15:06:48 2007 1 MODBUS Download OS to Device E:\Quantum\Processor_modules\Concept_to_Unity\140CPU	Abort
WARNING: In case of a pow loading, the PLC may becom	ver outage during e completly inoperable!	
Read Hardware Identifier : Reset Path Connection : Select Path Connection : Enter OS loader mode : Enter OS loader mode : Download OS: Initialize Code Memory :	SUCCESS SUCCESS SUCCESS IN PROGRESS SUCCESS STARTED SUCCESS	
<ul> <li></li> <li></li> <li>2400 ≤ 21504 Pates 1//ittes</li> </ul>	Description Time 20 Concerds (407 Datas Jaco)	
3400 of 21504 Bytes writter	i. Hemaining Time: 36 Seconds (467 Bytes/sec)	

Once the download has successfully completed, the screen below is

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

Schneider Electric OSLoad	er: Progress (100%)	
Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Thu Apr 19 15:06:48 2007 1 MODBUS Download OS to Device E:\Quantum\Processor_modules\Concept_to_Unity\1400	<u>C</u> lose
WARNING: In case of a pow loading, the PLC may becom	ver outage during e completly inoperable!	
Read Hardware Identifier : Reset Path Connection : Select Path Connection : Enter OS loader mode : Enter OS loader mode : Download OS: Initialize Code Memory :	SUCCESS SUCCESS SUCCESS SUCCESS SUCCESS SUCCESS STARTED SUCCESS	
Transfer service:	SUCCESS	
To continue OS conversion,	power-cycle the PLC and download final OS	
21504 Bytes Written. Rei	maining Time: Done (317 Bytes/sec)	

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

# 

### 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.
- $\checkmark$  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.

#### 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.

Download procedure	As all t already	the necessary actions to download the final Unity OS have been fully described in the Phase 1, they are shortly reminded here after:
Phase 1	1	Open the OS loader (the PC should be still connected to the PLC).
Phase 2	2	Select the Protocol – Refer to Phase 1.
Phase 3		Select the target device and click on the screen appears after few seconds.
	3	Schneider Electric OSLaader         Sep 3: Please select which operation should be performed         Site 3: Please select which operation should be performed         Select Operation         © Download OS to device         © Lipload OS from device         Elename         E:\Quantum\Processor_modules\Concept_to_Unity\140CPU43412U\140CPU434         @ Lipload OS from device         @ Lipload OS from device         @ Lipload OS from device
	4	Click on the Browse button and select (in our example) the file 140CPU43412U_Vxyz.bin located on the CD OS. Then validate this screen.

	Schneider Electric OSLoader: Operation
	Schneider Electric OSLoader Step 3: Please select which operation should be performed
5	Select Operation         © Download OS to device         © Upload OS from device         Elfename         E:\Quantum\Processor_modules\Concept_to_Unity\140CPU43412U\140CPU4347
	< <u>B</u> ack <u>Next&gt;</u> Close Help
	Select the operation to perform (Download OS to device) and press on the Next> button.

Download procedure (cnt'd) Phase 1		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 OK to validate this message.
Phase 2 Phase 3	6	Schneider Electric OSLoader:   Schneider Electric OSLoader   Step 4: Final Comparison     File   Device Name:   Quantum 434/534A   Hardware ID :   0008 0008   OS Version :   2.50-64   V   Description:   Quantum Unity OS 434A/534A     V   Ardware ID :   0008 0008   OS Version :   0.01   Description:   Quantum Unity OS 434A/534A     V   Converter   07/23/02     V     V     V     Device Name:   CPUx86A   Hardware ID :   0008 0008   OS Version :   0.01   Description:   Converter   Converter   07/23/02     V     V     V     Description:     Converter     V     V     V     V     V     V     V     V     V     V     V     V     V     V     V     V     V     V     V </th
		Then click on the Next> button.
	7	Click on and validate the warning message displayed on the screen to launch the download of the final OS file.

	During the download (duration may vary according to the protocol)
	the remaining time is displayed:
	Schneider Electric OSLoader: Progress (0%)
	OSLoader - Version 3.0 Copyright © 2003-2005 Schneider Automation SAS
	Service invoked on:       Thu Apr 19 15:11:10 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download 0S to Device         Filename:       E:\Quantum\Processor_modules\Concept_to_Unity\140CPU
	WARNING: In case of a power outage during loading, the PLC may become completly inoperable!
	Read Hardware Identifier:     SUCCESS       Reset Path Connection:     SUCCESS       Select Path Connection:     SUCCESS       Download DS:     STARTED       Initialize Code Memory:     SUCCESS
	2600 of 819200 Bytes Written. Remaining Time: 29 Minutes 8 Seconds (467 Bytes/sec)
8	Once the download has successfully completed, the screen below is
	displayed.
	Schneider Electric OSLoader: Progress (100%)
	OSLoader - Version 30 Copyright © 2003-2005 Schneider Automation SAS
	Service invoked on: Thu Apr 19 15:11:10 2007 Target Address: 1 Selected Connection Type: MODBUS
	Requested Service: Download OS to Device Filename: E:\Quantum\Processor_modules\Concept_to_Unity\140CPU
	WARNING: In case of a power outage during loading, the PLC may become completly inoperable!
	Read Hardware Identifier:       SUCCESS         Reset Path Connection:       SUCCESS         Select Path Connection:       SUCCESS         Download DS:       STARTED         Initialize Code Memory:       SUCCESS         Exit DS loader mode:       SUCCESS
	Transfer service: SUCCESS
	819200 Bytes Written. Remaining Time: Done (468 Bytes/sec)
	Click twice on the Close button to exit from the OS loader tool.
9	Reset or power OFF then ON the PLC.

# **A**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 Connect ✓ Click on Properties	
Phase 3	Device Properties       Image: Constraint of the system         Project       Project Name :       Station         PLC State:       RUNNING         Device       Device Name:       140 CPU 534 14A         Hardware ID :       0008 0008         OS Version :       2.60-74         Description:       Quantum Unity OS 434A/534A         Close       Close	

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

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. <b>Note:</b> This procedure can be adopted for all Quantum platforms (High End and Legacy platforms).
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 <b>Start/Program/Schneider-Electric/Unity-PRO/OS loader.</b>
	Once done, the following screen appears:

hneider Elec	tric OSLoader: Welcome
Welcome to t	he
Schr	eider Electric OSLoader Wizard — V3.0
The wizard w system of you	Il guide you through all steps necessary to successfully update the operating r PLC.
WARNING: U CURRENT P	IPDATING THE OPERATING SYSTEM OF YOUR PLC WILL DELETE THE ROJECT FROM THE PLC MEMORY.
You will have Updating the	to reload the program after updating the PLC. operating system forces the stop mode of the PLC.
-Initial settings-	
Context <u>f</u> ile:	C:\Program Files\Schneider Electric\Unity Pro\osloader.osc
Security:	Access rights
	< Back. Next> Close Help

Select the Communication protocol

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

Step 1: Please select one	of the listed pr	otocols		
	- Pleas	e choose a com	munication driver	
	MB MC UN	IDBUS01 ITLW01		
FTP MODELIS ASCIL				
MODBUS RTU	8			
FIPWAY				

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.

Select the Target Device	Schneider Electric OSLoader: Modbus Target
	Schneider Electric OSLoader Step 2: Please select the Target Device
	Device Type         Processor       Direct Device         Local Head       Remote L/O Drop         Slot number:       Drop number:         1       2         Larget Address:       Inde found         Modbus Address:       Inde found         Modbus Plus target       Start PLC         Start PLC       Stop PLC
	<u>≺B</u> ack <u>N</u> ext> Close Help

On the Device Type field, select Processor.

Get the Unity version (optional)Before the update, knowing which Unity version is already installed or processor may be useful if for any reason a restore function is needed. that proceed as follows:			
	1	Select the PLC	
	2 Click on the Connect button to connect the PC to PLC		
	3	Click on the <b>Properties</b> button to get info from the PLC.	

4	The following screen gives the user some information regarding the PLC status <ul> <li>Started, stopped, Not Configured</li> <li>Processor type (in this example: 140CPU65150</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> Device Properties   Project   Project Name:   State:   RUNNING   Device Name:   140 CPU 651 60   Hardware ID:   0008 0101   OS Version:   2.50-64   Description:
5	Note this version number to avoid compatibility issues between the application program and the OS if the previous version has to be restored.
6	Press the <b>Close</b> button to return back to the OS update process.

Select the<br/>Download<br/>FunctionFrom the screen described above in the section "Select the Target Device"<br/>press the Next> button. A new screen is proposed: select "Download

OS to device".



Click on the Browse... 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):

Ouvrir					? ×
Regarder dans :	🗁 Unity_Upgrade	ŀ	• 🗢 🗈	-11 1	
140CPU31110					
a 140CPU53414U					
140CPU65150					
140CPU67160					
Nom du fichier :					Ouvrir
Fichiers de type :	Binary Files (*.bin)			•	Annuler

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

Open			? 🛛
Look in: 🔎	Plc_OS	🔹 🕂 🔁 🖻	* <b></b> •
■ 140CPU65	160_ V××,bin		
File name:	140CPU65160_Vxx,bin		Open
Files of type:	Binary Files (*.bin)	•	Cancel



Download the<br/>OS fileOnce the previous screen is validated, two screens display the current OS<br/>version, the processor and the OS file to download:

🚡 Schneider Electric OSLoader: File and Device Info	
File         Schreider Electric OSLOader: File and Device Into           Schreider Electric OSLoader         Step 4: Final Comparison           File         Device Name: 140 CPU 651 X0           Hadware ID :         0006 0101           OS Version :         2 80 72           Description:         OS Version :	Schneider Electric OSLoader: Summary  Schneider Version 3.0  Copyright ® 2003 2005 Schneider Automation SAS  Target Addres: Selected Correction Type: 100BUS Requested Service: Download OS to Device Flename: E-\Quartum\Processor_modules\Umky_Upgrade\140CPU65150V To continue press the "Download/Upload" or "Close" button.
K Back Next Liose	<pre></pre>

**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 Next >

button becomes unavailable.

File		8 8	Device	
Device Name:	140 CPU 671 60	1	Device Name:	140 CPU 651 50
Hardware ID :	000B 0102	×	Hardware ID :	000B 0101
OS Version :	2.40-46	- 🗸	<b>BS</b> Version :	2.40-46

Solve this issue and continue. When the hardware and OS are compatible,

click on the Download > button and validate the warning message displayed on the screen to launch the download of the OS file.

osloader	×
	WARNING: Transferring a new operating system to a PLC will delete the current project from the controller's memory. You must reload the project after updating the operating system of a PLC.
	Would you like to proceed?
	<u>Yes</u> <u>N</u> o

Download the<br/>OS file (cnt'd)During the download (the duration depends on the protocol used, roughly 60<br/>minutes with Modbus) the remaining time is displayed:

Scl	Schneider Electric OSLoader: Progress (2%)					
	OSLoader - Version 3.0 Copyright © 2003-2005 Schr	eider Automation SAS	Close			
	Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Tue Apr 17 10:30:07 2007 1 MODBUS Download OS to Device E:\Quantum\Processor_modules\Unity_Upgrade\140CPU65	Abort			
	WARNING: In case of a pow loading, the PLC may becom	ver outage during e completly inoperable!				
	Read Hardware Identifier : Reset Path Connection : Select Path Connection : Enter OS loader mode : Enter OS loader mode : Download OS: Initialize Code Memory :	SUCCESS SUCCESS SUCCESS IN PROGRESS SUCCESS STARTED SUCCESS				
	•[					
	56400 of 2097152 Bytes Wri	itten Remaining Time: 1 Hour(s) 5 Minutes 24 Seconds (520 By	tes/sec)			

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

Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Tue Apr 17 10:30:07 2007  MODBUS Download OS to Device E-Munachuk/Strongssor.modules/Unity. Ungrade/140/CPI Abort			
WARNING: In case of a pov loading, the PLC may becom	ver outage during le completly inoperable!			
Read Hardware Identifier : Reset Path Connection : Select Path Connection : Eriter OS Ioader mode : Download OS: Initialize Code Memouy : Initialize Code Memouy : Initialize Code Memouy : Exit OS Ioader mode : Transfer service: ◀	SUCCESS SUCCESS SUCCESS IN PROGRESS SUCCESS SUCCESS SUCCESS SUCCESS SUCCESS SUCCESS	)		
2097152 Bytes Written. Rer	maining Time: Done (514 Bytes/sec)			
vice on the Close button.				

# 

### 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 PLCOnce the download of the OS file has completed, the PLC has to be<br/>initialized. This task can be performed by one of the two following actions:<br/>✓<br/>Reset the PLC by pushing on the Reset button located on the CPU (for
  - more information, refer to the PLC technical documentation).
  - $\checkmark$  Power OFF then ON the PLC.

Checking version (optional)	If n ✓ ✓ ✓	needed, you can check the new CPU version. For that Open the OS loader tool Select the protocol Click on Connect Click on Properties			nat		
					evice Properties Project Project Name : PLC State: Device Device Name: Hardware ID : OS Version : Description:	Station RUNNING 140 CPU 651 60 000B 0101 2.60-72	3

Close

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

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:
	<ul> <li>✓ Phase 1 – Restore the PLC to Concept with an intermediate OS.</li> <li>✓ Phase 2 - Power OFF then ON the PLC.</li> <li>✓ Phase 3 – Restore the Operating System with the appropriate file.</li> </ul>
	<b>Those phases are mandatory and cannot be by-passed.</b> 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.** 

Phase 1
Phase 2
Phase 3

Once done, the following screen appears:

	he
Sch	neider Electric OSLoader Wizard — V3.0
The wizard w system of you	ill guide you through all steps necessary to successfully update the operating rr PLC.
WARNING: I CURRENT F	JPDATING THE OPERATING SYSTEM OF YOUR PLC WILL DELETE THE ROJECT FROM THE PLC MEMORY.
You will have Updating the	to reload the program after updating the PLC. operating system forces the stop mode of the PLC.
Initial settings	
Context <u>f</u> ile:	C:\Program Files\Schneider Electric\Unity Pro\osloader.osc
	Access rights
Security:	

The next steps are fully described later in this document.

### Select the Communication protocol

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

Phase 1	🙀 Schneider Electric OSLoader: Communication Protocol	<b>- 0 ×</b>
Phase 2	Schneider Electric OSLoader Step 1: Please select one of the listed protocols	
Phase 3	Please choose a communication driver FIP MODBUS ASCI MODBUS ASCI MODBUS ASCI MODBUS RTU FIP MODBUS RTU	
	<pre></pre>	Help

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

	Next≻	
click on the		button.

Phase 1	Schneider Electric Step 2: Please	DSLoader select the Target Device	
Phase 2 Phase 3	Device Type Processor Local Head Slot number: I Larget Address Modbus Address: Modbus Address:	Direct Device     Remote [/0 Drop     Drop number:     2      Connect get	Devices Scan Update Node: 1 - PLC 1 node found Start PLC Stop PLC Properties

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

### Select the Download Function

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

Phase 1	Schneider Electric OSLoader: Operation
Phase 2	Schneider Electric OSLoader Step 3: Please select which operation should be performed
	Select Operation  Download OS to device  Upload OS from device
	Filename

Select the file to be downloaded



Click on the Browse... 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.

Ouvrir		? ×
Regarder dans :	🔁 Unity_to_Concept 🗾 🗢 🖻 💣 📰 🗸	
► 140CPU43412A ► 140CPU53414A		
, Nom du fichier :		Ouvrir
Fichiers de type :	Binary Files (*.bin)	Annuler

- 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)
- $\checkmark$  q5rv135E.bin is the OS that will finally be downloaded in the processor

Ouvrir				? ×
Regarder dans :	140CPU43412A	▼ 🗢 🛍	-111	
ा q5rv124E.bin ा Unity_to_Conce	pt_43412A.bin			
Nom du fichier :				Ouvrir
Fichiers de type :	Binary Files (*.bin)		•	Annuler

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".

	Ouvrir	? ×
	Regarder dans :	🔁 140CPU43412A 💽 🗢 🖻 📸 📰 -
	g5rv124E.bin     Unity_to_Conc	ept_43412A.bin
	Nom du fichier :	Unity_to_Concept_43412A.bin Ouvrir
	Fichiers de type :	Binary Files (".bin)
Once done click	on the	Next > button.







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

🚡 Schneider Electric OSLoader: File and Device Info	Schneider Electric OSLoader: Summary
Schreider Electric DSLoader         Step 4: Final Comparison         File         Device Name:       [CPU596A]         Hardware ID :       [0008 0006]         OS Version :       [0.02]         Description:       [CPU596A]         Description:       [CPU596A]         Description:       [CPU596A]         [CPU596A]       Quartum Unity OS 434A/534A	SLoader - Version 3.0 Copyright © 2003-2005 Schneider Automation SAS Target Address: 1 Selected Correction Type: MDBUS Requested Service: E. Download OS to Device Fferance: E. SQuartum/Processor_modules/Unity_to_Concept/140CPU4341 To continue press the 'Download/Upload' or 'Diose' button.
KBack Next> Llose Help	<u> </u>

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

Next> and the

button becomes unavailable.

Schneider Elect Step 4: Fina	ric OSLoader I Comparison			
File Device Name: Hardware ID : OS Version : Description: ICPU586A OS Los Unity->concept	[CPU595A  0008-0008  0.02  der Converter	*	Device Device Name: CPUSB Hardware ID : 0008 00 OS Version : 0.02 Description: CPUSB& 0S Loader Converte Unity->concept	а, 06 и
	< 84	nck	Next> Close	Help

Solve this issue and continue. When the hardware - OS are compatible, click ownload >

		D
on	the	

to launch the download of the intermediate OS file.

Download the intermediate OS file (cnt'd)

Phase 1
Phase 2
Phase 3

During the download the remaining time is displayed:

Schneider Electric OSLoad	er: Progress (21%)	
OSLoader - Version 3.0 Copyright © 2003-2005 Schi	neider Automation SAS	Close
Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Thu Apr 19 14:31:41 2007 1 MODBUS Download OS to Device E:\Quantum\Processor_modules\Unity_to_Concept\140CPU	Abort
WARNING: In case of a pov loading, the PLC may becom	ver outage during le completly inoperable!	
Read Hardware Identifier : Reset Path Connection : Select Path Connection : Enter OS loader mode : Enter OS loader mode : Download OS: Initialize Code Memory :	SUCCESS SUCCESS SUCCESS IN PROGRESS SUCCESS STARTED SUCCESS	
4400 of 20480 Butes Writter	Remaining Time: 34 Seconds (463 Butes/sec)	
	. Trendming find, of occords (400 bytes/sec)	

Once the download has successfully completed, the screen below is

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

Schneider Electric OSLoad	er: Progress (100%)	
Service invoked on: Target Address: Selected Connection Type: Requested Service: Filename:	Thu Apr 19 14:31:41 2007 1 MODBUS Download OS to Device E:\Quantum\Processor_modules\Unity_to_Concept\1400	<u>C</u> lose
WARNING: In case of a pow loading, the PLC may becom	ver outage during ue completly inoperable!	
Read Hardware Identifier : Reset Path Connection : Select Path Connection : Enter OS loader mode : Enter OS loader mode : Download OS: Initialize Code Memory :	SUCCESS SUCCESS SUCCESS IN PROGRESS SUCCESS STARTED SUCCESS	
Transfer service:	SUCCESS	
To continue OS conversion,	power-cycle the PLC and download final OS	
20480 Bytes Written. Rei	maining Time: Done (425 Bytes/sec)	

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

# 

### 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**

Phase 1 Phase 2 Phase 3 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).
- $\checkmark$  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.

Download As all the necessary actions to download the final Concept OS have been procedure already fully described in the Phase 1, they are shortly reminded here after: Open the OS loader (the PC should be still connected to the PLC). Phase 1 1 2 Select the Communication Protocol - Refer to Phase 1. Phase 2 Next > Select the target device and click on the button. The next Phase 3 screen appears after few seconds. Schneider Electric OSLoader: Operation Schneider Electric OSLoader Step 3: Please select which operation should be performed Select Operation Download OS to device 3 C Upload OS from device Filename Quantum\Processor\_modules\Unity\_to\_Concept\140CPU53414A\Q5RV135E.BIN Browse... < Back Close Help Next > Browse... Click on the button and select (in our example) the file q5rv135E.bin located on the CD OS. Then validate this screen. ? × Rechercher dans : 🔁 140CPU43412A - 🗧 🖆 📰 g5rv124E.bin Unity\_to\_Concept\_43412A.bin 4 Nom de fichie q5rv124E.bin <u>O</u>uvrir <u>T</u>ype Binary Files (\*.bin) • Annuler

	Schneider Electric OSI oader: Operation
5	Schneider Electric OSLoader: Operation         Schneider Electric OSLoader         Step 3: Please select which operation should be performed         Select Operation         © Download OS to device         © Upload OS from device         Elename         Elename
	Select the operation to perform (Download OS to device) and press on the Next> button.



	Click on Download > and validate the warning message displayed on the screen to download the final OS file.
	osloader 🔀
7	WARNING: Transferring a new operating system to a PLC will delete the current project from the controller's memory. You must reload the project after updating the operating system of a PLC.
	Would you like to proceed?
	<u>[¥es</u> ]] <u>№</u> о

	During the download (duration may vary according	g to the protocol)
	the remaining time is displayed:	
	Erbanidau Electuic OEL andau Dunguner (00%)	
	OSLoader - Version 3.0	Cioce
	Copyright © 2003-2005 Schneider Automation SAS	
	Target Address: Selected Connection Type: MDDBUS Requested Service: Download DS to Device Filename: E:\Quantum\Processor_modules\Unity_to_Concept\140CPU	
	WARNING: In case of a power outage during loading, the PLC may become completly inoperable!	
	Read Hardware Identifier : SUCCESS Reset Path Connection : SUCCESS Select Path Connection : SUCCESS Download OS : STARTED Initialize Code Memory : SUCCESS	
	3600 of 393216 Bytes Written. Remaining Time: 13 Minutes 54 Seconds (467 Bytes/sec)	
8	Once the download has successfully completed, the	e screen below is
0	displayed.	
	Schneider Electric OSLoader: Progress (100%)	
	Schneider Electric OSLoader: Progress (100%) OSLoader - Version 3.0 Copyright © 2003-2005 Schneider Automation SAS	<u></u> lose
	Schneider Electric OSLoader: Progress (100%)  □SLoader - Version 3.0  Copyright © 2003-2005 Schneider Automation SAS Service invoked on: Thu Apr 19 14:41:45 2007 Target Address: 1 Selected Connection Type: MODBUS	Close
	Schneider Electric OSLoader: Progress (100%)         IDSLoader - Version 3.0         Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       Thu Apr 19 14:41:45 2007         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E:\Quantum\Processor_modules\Unity_to_Concept\140CPU	 
	Schneider Electric OSLoader: Progress (100%)         DSLoader - Version 3.0         Dopyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download DS to Device         Filename:       E: VQuantum/Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       loading, the PLC may become completly inoperable!	Close Abort
	Schneider Electric OSLoader: Progress (100%)         DSLoader - Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download DS to Device         Filename:       E:\Quantum\Processor_modules\Unity_to_Concept\140CPU         WARNING:       In case of a power outage during         Ioading, the PLC may become completly inoperable!         Read Hardware Identifier :       SUCCESS         Select Path Connection ::       SUCCESS         Select Path Connection ::       SUCCESS         Download DS :       STARTED         Initialize Code Memory ::       SUCCESS         Exit OS loader mode ::       SUCCESS	 Abort
	Schneider Electric OSLoader: Progress (100%)         OSLoader - Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E: VQuantum/Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       loading, the PLC may become completly inoperable!         Read Hardware Identifier:       SUCCESS         Reset Path Connection:       SUCCESS         Download OS:       STARTED         Initialize Code Memory:       SUCCESS         Exit OS loader mode :       SUCCESS         Transfer service:       SUCCESS	<u>Close</u> Abort
	Schneider Electric OSLoader: Progress (100%)         OSLoader - Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E:\Quantum\Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       Ioading, the PLC may become completly inoperable!         Read Hardware Identifier:       SUCCESS         Select Path Connection:       SUCCESS         Select Path Connection:       SUCCESS         Select Path Connection:       SUCCESS         Exit OS loader mode :       SUCCESS         Transfer service:       SUCCESS         Imitiaze code Memory:       SUCCESS         Transfer service:       SUCCESS	Close Abort
	Schneider Electric OSLoader: Progress (100%)         OSLoader: Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E: VQuantum/Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       loading, the PLC may become completly inoperable!         Reset Path Connection:       SUCCESS         Select Path Connection:       SUCCESS         Select Path Connection:       SUCCESS         Download OS:       STARTED         Initialize Code Memory:       SUCCESS         Transfer service:       SUCCESS         Imitialize Success       Imitialize         Success       Imitialize         Transfer service:       SUCCESS         Imitialize Success       Imitialize         Success       Imitialize         Success       Imitialize         Imitialize Success       Imitialize         Imitialize Success       Imitialize         Imitialize Success       Imitialize         Imitialize Success       Imitialize         <	Cose Abort
	Schneider Electric OSLoader: Progress (100%)         OSLoader: - Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E:\Quantum/Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       loading, the PLC may become completly inoperable!         Read Hardware Identifier:       SUCCESS         Select Path Connection :       SUCCESS         Download OS:       STARTED         Initialize Code Memory :       SUCCESS         Exit OS loader mode :       SUCCESS         Transfer service:       SUCCESS         Image Success       Image Success         Image Select Switten.       Remaining Time: Done (443 Bytes/sec)	Qose       Abort
	Schneider Electric OSLoader: Progress (100%)         OSLoader - Version 3.0       Copyright © 2003-2005 Schneider Automation SAS         Service invoked on:       Thu Apr 19 14:41:45 2007         Target Address:       1         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E:\Quantum\Processor_modules\Unity_to_Concept\140CPU         WARNING: In case of a power outage during       Ioading, the PLC may become completly inoperable!         Read Hardware Identifier:       SUCCESS         Select Path Connection:       SUCCESS         Select Path Connection::       SUCCESS         Transfer service:       SUCCESS         Transfer service:       SUCCESS         Transfer service:       SUCCESS         Imiaiaze Code Memory:       SUCCESS         Transfer service:       SUCCESS         Image: Success       Image: Success         Transfer service:       SUCCESS         Image: Success       Image: Success         Transfer service:       SUCCESS         Success       Image: Success         Image: Success       Image: Success         Transfer service:       SUCCESS         Success       Image: Success <tr< th=""><th>Dose Abort</th></tr<>	Dose Abort
•	Schneider Electric OSLoader: Progress (100%)         Image: Address       0         Selected Connection Type:       MODBUS         Requested Service:       Download OS to Device         Filename:       E: Quantum/Process_modules/Unity_to_Concept/140CPU         WARNING: In case of a power outage during       loading, the PLC may become completly inoperable!         Read Hardware Identifier:       SUCCESS         Select Path Connection:       SUCCESS         Download OS:       STAPTED         Initialize Code Memory:       SUCCESS         Transfer service:       SUCCESS         Transfer service:       SUCCESS         Transfer service:       SUCCESS         Close       button to exit         Bays216 Bytes Written:       Remaining Time: Done (443 Bytes/sec)	Lose Abort

# **A**CAUTION

### **EQUIPMENT DAMAGE**

During the download:

- Do not power OFF the PLC •
- Do not power OFF the PC ٠
- Do not disconnect the cable ٠
- 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 If needed, you can check the new CPU version. For that Open the OS loader tool  $\checkmark$  $\checkmark$ Select the communication protocol Connect Click on  $\checkmark$ Phase 1 Properties  $\checkmark$  Click on Phase 2 Phase 3 **Device Properties** X Project Station Project Name : RUNNING PLC State: Device 140-CPU-x34-1x Device Name: 0008 0006 Hardware ID : OS Version : 1.35 Description: QUANTUM-486A/586A Firmware V1.35E CC26 SR4 09/11/2007 Close

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

version (optional)

### 5. Upgrading a Quantum Hot Standby PLC

Object of this Chapter	<ul> <li>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:</li> <li>✓ Modbus</li> <li>✓ Modbus Plus</li> </ul> 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	<b>Important</b> : 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.	<ul> <li>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.</li> <li>To have the error leds not returning a detected error, it is mandatory to: <ul> <li>update the CRP module with a firmware 2.00 or higher (on both Primary and Standby side).</li> <li>update the Quantum Hot Standby processor with a firmware 2.70 or higher (on both Primary and Standby side).</li> <li>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.</li> <li>CPU 67261 is compatible with Unity Pro V5.0 or higher with a firmware 2.80 or higher.</li> </ul> </li> </ul>
Ethernet RIO	<ul> <li>At the moment only Head communication module 140CRP31200 is concerned by this procedure.</li> <li>Important: <ul> <li>The both CRPs must have the same SoftwareVersion .</li> <li>Begin the update by CPUs then CRP modules.</li> </ul> </li> </ul>

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).
	<ul> <li>Note:</li> <li>✓ 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.</li> </ul>

 $\checkmark$  OS upgrade is possible only with compatible firmware.

Upgrading a Quantum Hot Standby PLC

Upgrade procedure	<b>Important:</b> Using Modbus or Modbus Plus, only address 1 is allowed for downloading. Ensure that no other device on the network is using address 1.
	<ol> <li>Connect to the Primary (through Modbus, Modbus Plus or USB).</li> <li>Access the Command Register system bit %SW60.4 and set this bit to 1.</li> <li>Disconnect the PC from the Primary CPU.</li> <li>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)</li> </ol>
	<ol> <li>Stop the Standby CPU with the keyboard functions.</li> <li>Note: The standby CPU goes to STOP Offline mode; the Primary operates without a Standby.</li> </ol>
	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.
	<ol> <li>Switch off the power of the Standby rack.</li> <li>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.</li> </ol>

- 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.
  - 15.1. 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

**Note:** Ensure that the Modbus or Modbus Plus address is the same as the address noted in Step 4.

- 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.

Annexe 1

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

Du to an hardware Id incompatibility between 140CPU43412U with  $PV \ge 16$  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.

Schneider Elect Step 4: Fina	ric OSLoader I Comparison				
File			Device		
Device Name:	140CPU43212x	<u>I</u>	Device Name:	140CPU43212x	
Hardware ID :	0008 000C	]	Hardware ID :	0008 000C	
OS Version :	1.00		OS Version :	3.10-13	
			Crash Code:	0	
Description:			Description	-	
CPU586B OS 01 Unity->conce	Ander This file contains between a Unity OS conversion re 1) Download of 2) Reboot of t 3) Download o	an interr and a Ci quires: f the intr he PLC () f the fini OK	mediate OS used for oncept operating sys ermediate OS (this fi perform Power-cycle al Concept OS	conversion tem.	

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