visual engineering
LIGHTWARE

User's Manual

Bootloader software

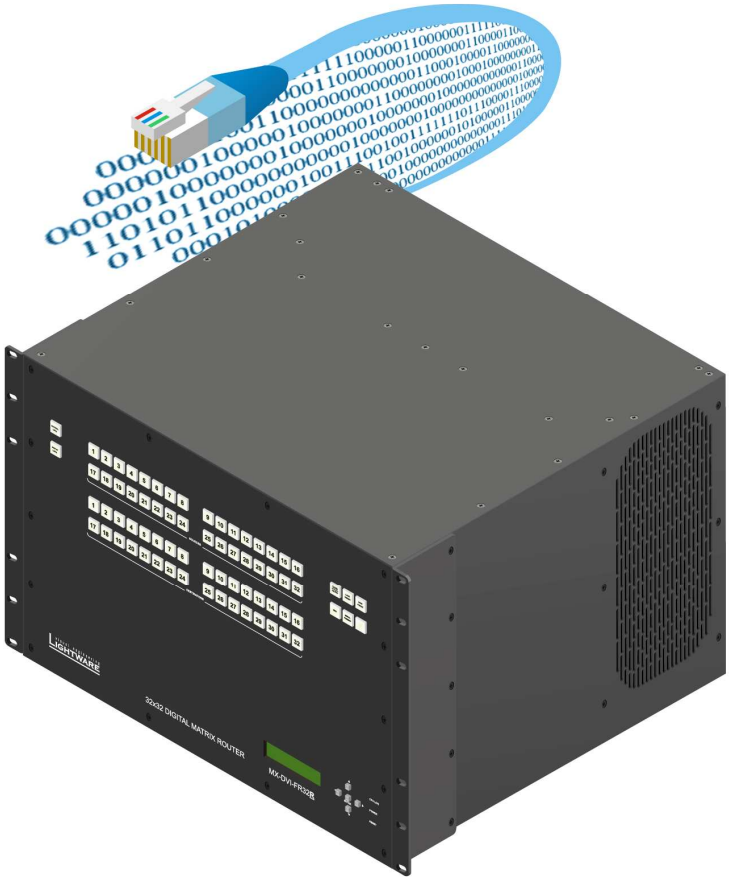


Table of contents

1. Introduction

Dear Customer,

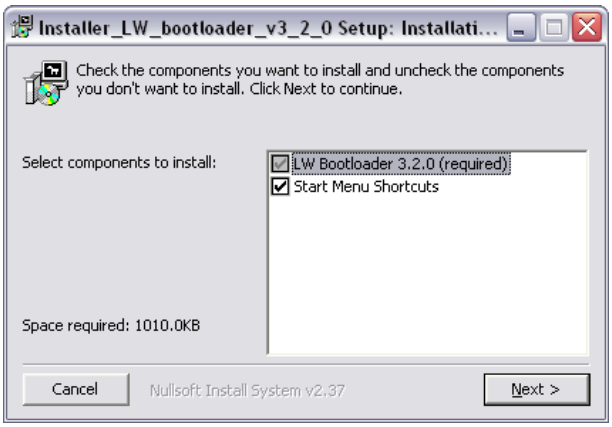
Thank you for purchasing products of Lightware Visual Engineering. This User's Manual is meant to help customers perform firmware upgrades on our products by giving a few tips on how to start and by explaining the features of the Bootloader software.

2. Installing the Bootloader

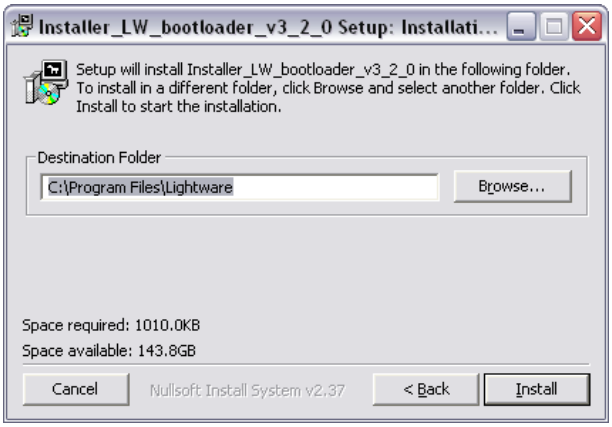
Lightware devices can be upgraded using Lightware Bootloader from a Windows based PC or Laptop via Ethernet, RS-232 or USB port.

2.1. Installing and launching the Bootloader software

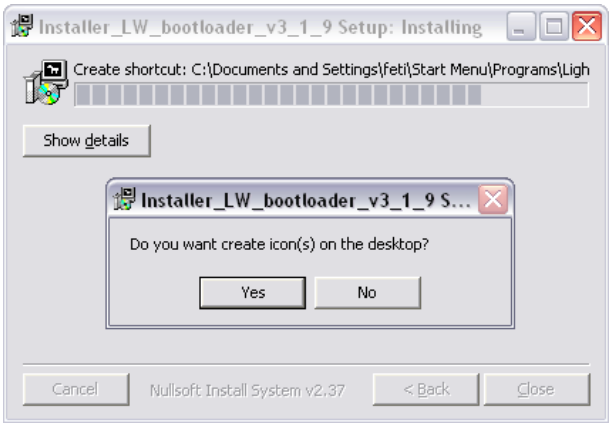
Step 1. Run Installer_LW_bootloader_vX_X_X.exe (X_X_X denotes the 3-digit firmware version of the Bootloader)



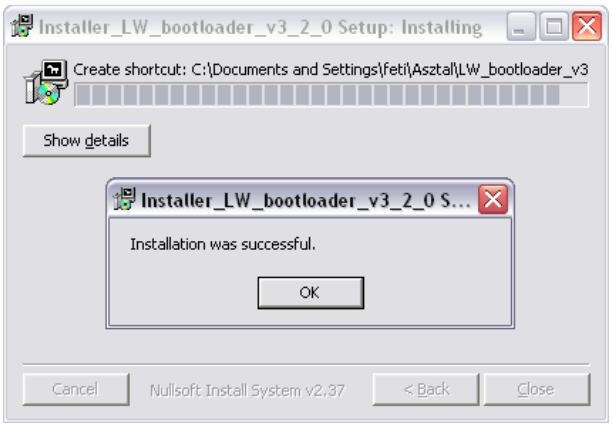
Step 2. Select destination folder and select **Install** (Using the default path is highly recommended)



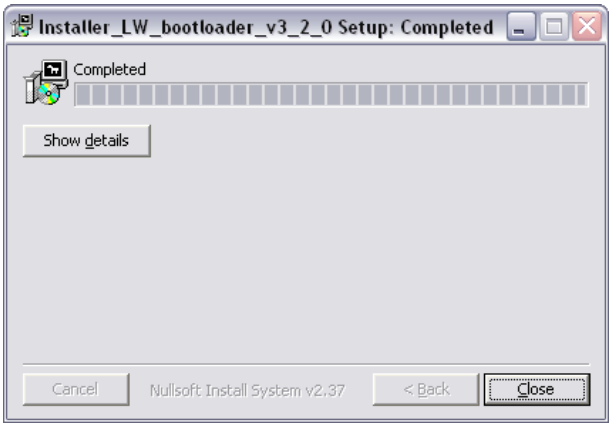
Step 3. If you want to create desktop icon select **Yes** in the next pop-up window:



Step 4. After the files have been copied, the following message appears:



Step 5. To finish the installation process, click on the **Close** button.



Step 6. To run Lightware Bootloader, find the shortcut icon in Start menu → Programs → Lightware → LW_bootloader_vX_X_X or on the desktop, and double click on it:

Uninstalling

To uninstall the Bootloader software, double click on: Start menu → Programs → Lightware → Uninstall_LW_bootloader_vX_X_X.exe

3. Upgrade process

3.1. Tips for the upgrade process

Cross UTP connection

To avoid packet loss caused by an overloaded network, it is recommended to use cross UTP connection directly from the upgrading PC to the Lightware device.

Disable other Ethernet devices

The Bootloader software always queries the PC's primary Ethernet adapter (which is usually the adapter that is connected to the Internet) for available Lightware devices. It is recommended to disable every other Ethernet device (secondary LAN, Wi-Fi, 3G modem) for the time of the upgrade. If the Bootloader cannot find the Lightware device because the device is connected to the secondary Ethernet adapter (cross UTP connection), you need to disable the primary adapter (Internet). This way the Ethernet adapter which is connected to the Lightware device will become the primary adapter and the Bootloader can query it for Lightware devices. If you disable an Ethernet adapter while the Bootloader is running, you need to restart the Bootloader to be able to query the Ethernet adapter again.

A second option in this case is that if you know the IP address and port number of the Lightware device, you may use the **Add IP** button which is described in section 1.1 Step 3.

Remove I/O connections

It is recommended to remove all video input and output connections from the Lightware device. Video sources and display devices may try to communicate with the Lightware device or send noise through the cable which may interfere with the upgrade process.

Latest Bootloader

Always perform the firmware upgrade with the latest Bootloader software. To get the latest Bootloader software, contact your local sales representatives or Lightware's support team at support@lightware.eu

Finishing the process with older versions of the Bootloader

Bootloader versions that are **older than v3.1.8** do not close the connection with the Lightware device automatically upon finishing the upgrade process. With these versions, if you remove the UTP cable or restart the Lightware device before you properly exit the Bootloader, the Lightware device will stay in a so called 'bootload mode' and will not return to normal operating mode. In such cases connect to the Lightware device with the Bootloader again and exit from it properly.

Restart the device

After a successful firmware upgrade, the device will restart itself but it is recommended to power down and up the device after finishing the upgrade.

3.2. Firmware upgrade

Lightware devices can be upgraded from a Windows based PC using Lightware Bootloader software via Ethernet, RS-232 or USB port (the steps are the same).

Step 1. Connect the Lightware device and the computer via

- Ethernet (hub, switch, router)
- Ethernet directly (with cross UTP cable)
- RS-232
- USB (listed as COM ports in the Available Devices window)

If you are connecting via **hub, switch or router**, then you can either set the Lightware device to have a fix IP (in which case make sure that there is no IP conflict on the network) or you can set the Lightware device to DHCP mode (in which case the Lightware device will acquire an IP address automatically). In this case the network must have a DHCP server. These settings can be done from the front panel LCD menu or via the supplied Lightware Matrix Controller software.

If you are connecting directly, via a cross UTP cable, you need to set up a fix IP and subnet mask on the Lightware device and the PC.

Step 2. Start the application

To run the Bootloader software, double click on the icon of the software on the desktop or select proper shortcut from Start Menu → Programs → Lightware folder.

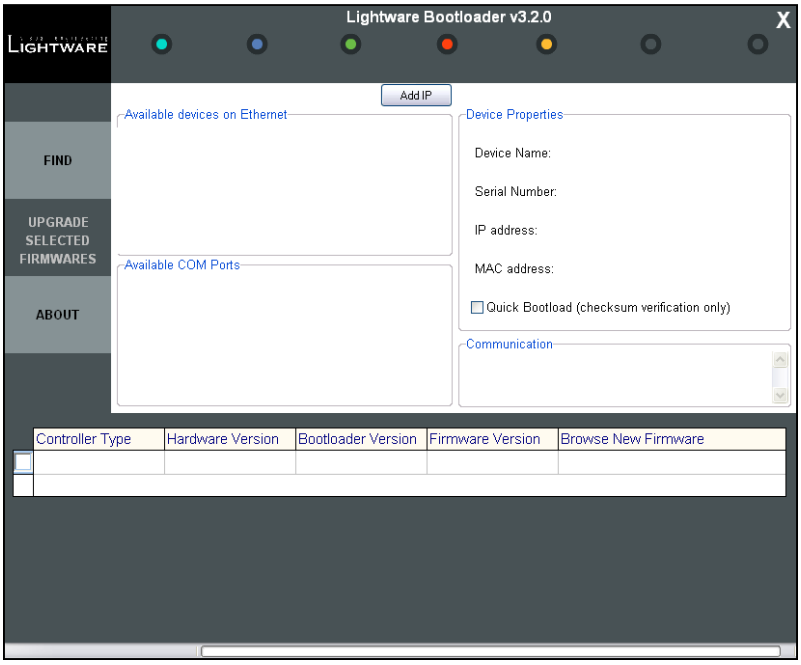


Figure 1. Bootloader software startup

Step 3. Find devices

Make sure that no active connection is made to the device (Lightware Matrix Controller software or web browser connected to the built-in website). Then click on the **FIND** button to query the Ethernet for Lightware devices. COM ports do not list any information about the connected devices, users must know which COM port is connected to the Lightware device.

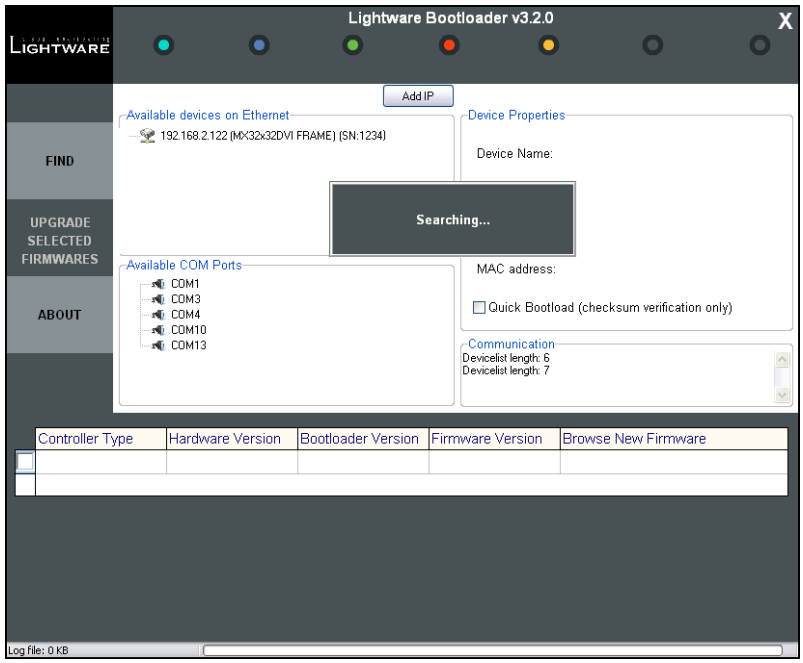


Figure 2. Searching for devices

The Bootloader software always queries the PC's primary Ethernet adapter (which is usually the adapter that is connected to the Internet) for available Lightware devices. It is recommended to disable every other Ethernet device (secondary LAN, Wi-Fi, 3G modem) for the time of the upgrade. If the Bootloader cannot find the Lightware device because the device is connected to the secondary Ethernet adapter (cross UTP connection), you need to disable the primary adapter (Internet). This way the Ethernet adapter which is connected to the Lightware device will become the primary adapter and the Bootloader can query it for Lightware devices. If you disable an Ethernet adapter while the Bootloader is running, you need to restart the Bootloader to be able to query the Ethernet adapter again.

A second option in this case is that if you know the IP address and port number of the Lightware device, you may use the **Add IP** button above the Available Devices on Ethernet window.

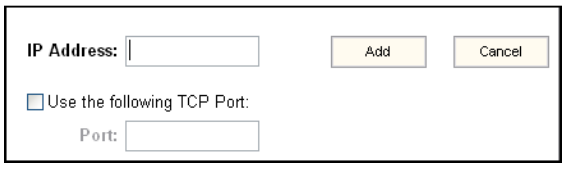


Figure 3. Add IP

If the Lightware device is connected to the secondary Ethernet adapter (or for any other reason) and the Bootloader doesn't list it in the available devices window, you can manually add its IP address and TCP Port number. This way the device name and IP address won't be displayed, but double clicking on the IP address will establish the connection.

Step 4. Connect to a device

If the Bootloader finds one or more Lightware devices then they will be listed in the tree view window. This window shows the device type, IP address and serial number of the found Lightware devices. COM ports do not query these information, users must know which COM port is connected to the Lightware device. Double click on one of the available devices. The Bootloader will ask if you really want to connect to the device. Select **YES** to establish the connection. It will take 10-15 seconds to get all the information from the Lightware device. After establishing the connection the device enters bootload mode and suspends normal operation.

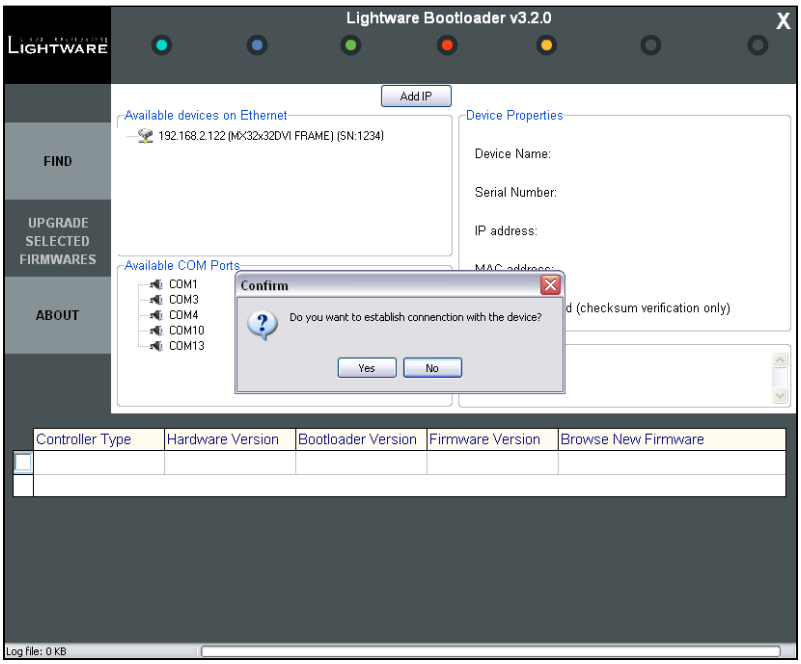


Figure 4. Establishing connection

Step 5. Requesting device information

After clicking on the **YES** button, the device name, serial number, IP address, MAC Address and current firmware versions are displayed.

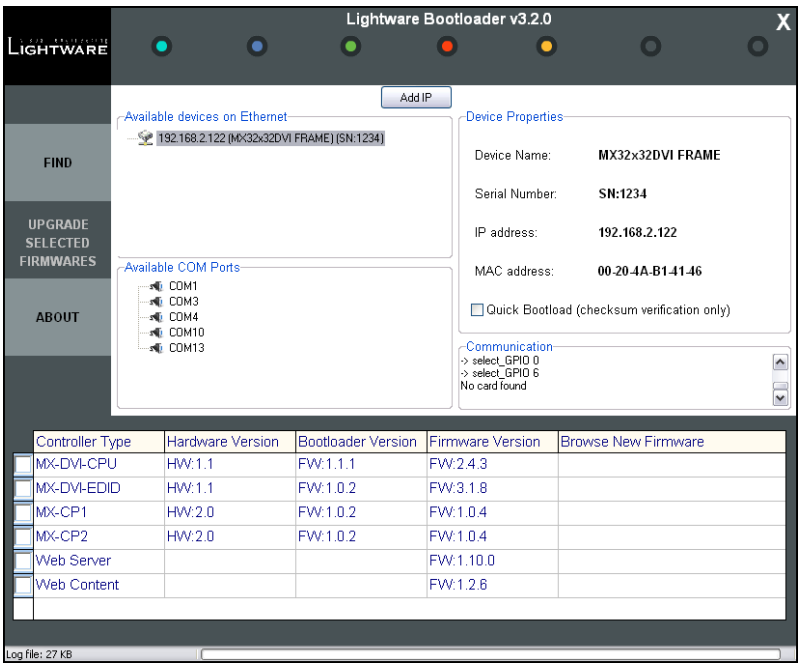


Figure 5. Details of the device

Step 6. Select firmwares to upgrade

To upgrade a firmware, click in the field in the line of the controller (marked with pink in the picture below). Click on **YES** in the pop-up window to modify the path to the new firmware file. Controller types are described in Appendix A.

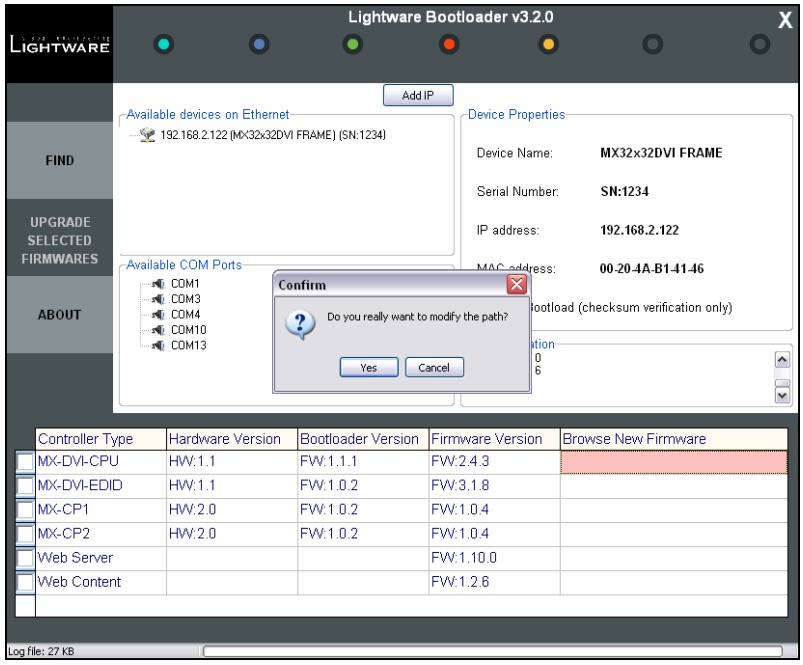


Figure 6. Selecting new firmware files

Step 7. Enable the upgrade and Quick Bootload mode

After selecting the new firmware file, you must enable the upgrade by clicking the checkbox left to the controller type (marked with a red circle in the picture below). You may enable Quick Bootload mode by clicking the checkbox next to it (marked with a red rectangle in the picture below). Quick Bootload mode speeds up the process by not reading back the written data, only verifying the checksum. It can be enabled and disabled any time during the upgrade process.

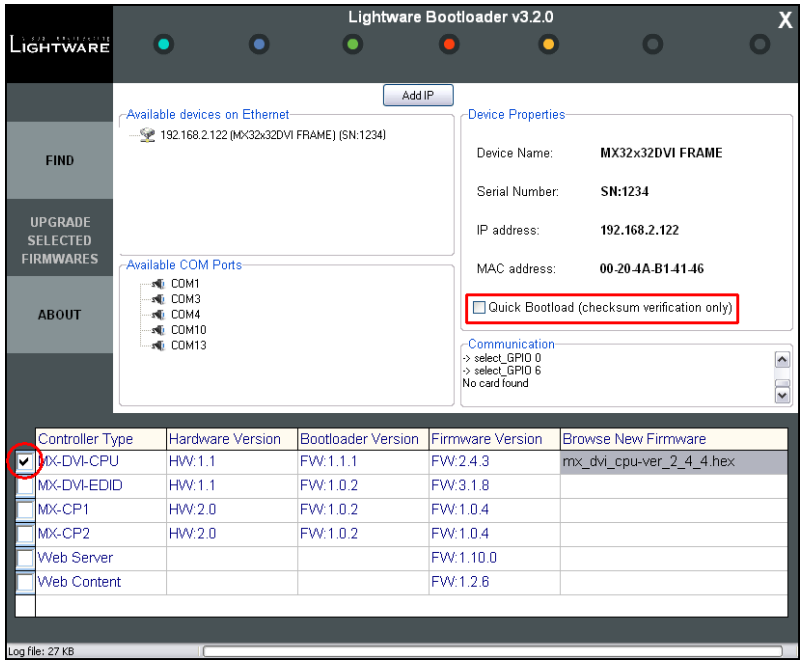


Figure 7. Enabling the upgrade and Quick Bootload mode

Step 8. Starting the upgrade process

After selecting all the firmwares that need to be upgraded, click on the **UPGRADE SELECTED FIRMWARES** button. Then click on **YES** in the appearing window to start the process.

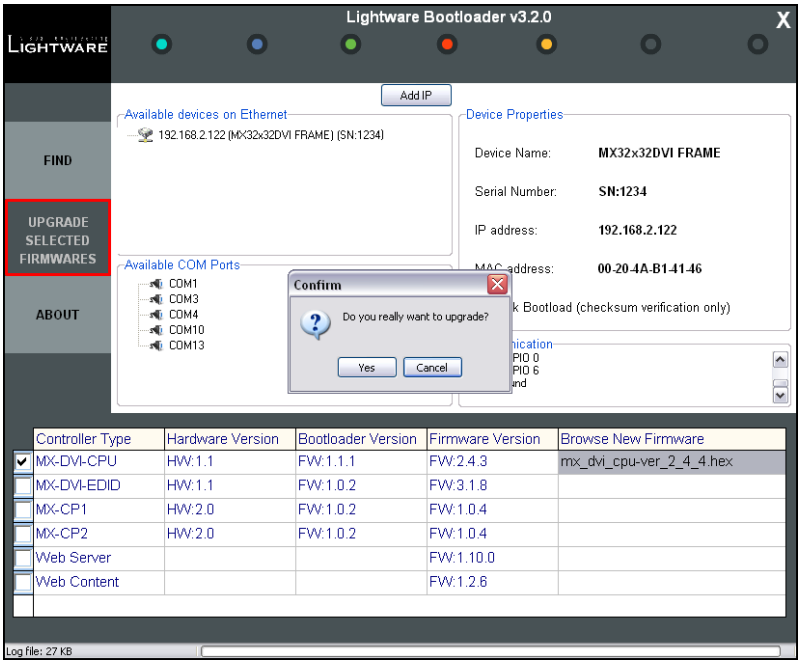


Figure 8. Starting the upgrade process

Step 9. Upgrading

The Bootloader will first erase the content of the controllers and then write the new firmware data. This process can be monitored in the communication window and the progress bar (both are marked with red rectangles in the picture below).

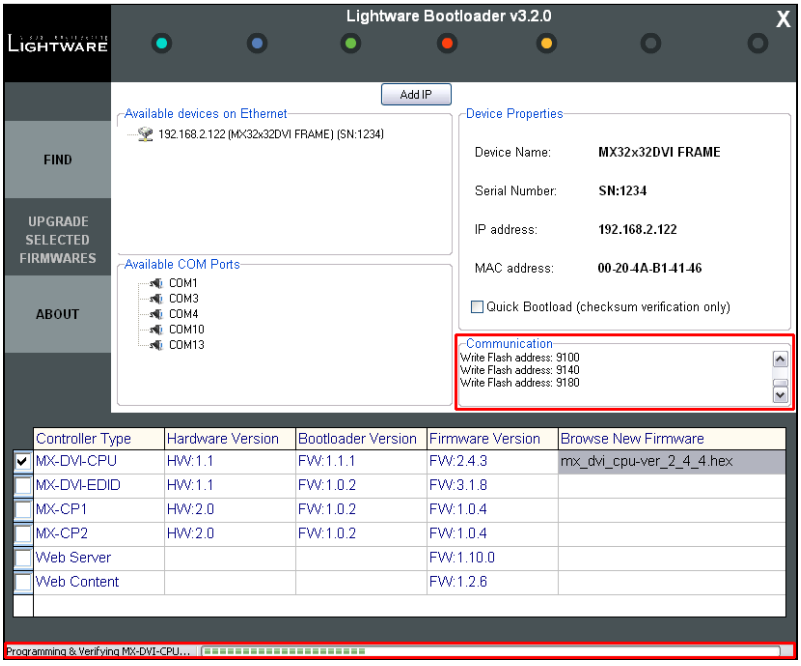


Figure 9. Upgrading

Step 10. Closing connections

After all controllers are upgraded, the Bootloader will close the connection with the Lightware device, which will reboot itself and return to its normal operating mode.

Warning *Bootloader versions that are older than v3.1.8 will not close the connection and restore the Lightware device until you exit the Bootloader.*

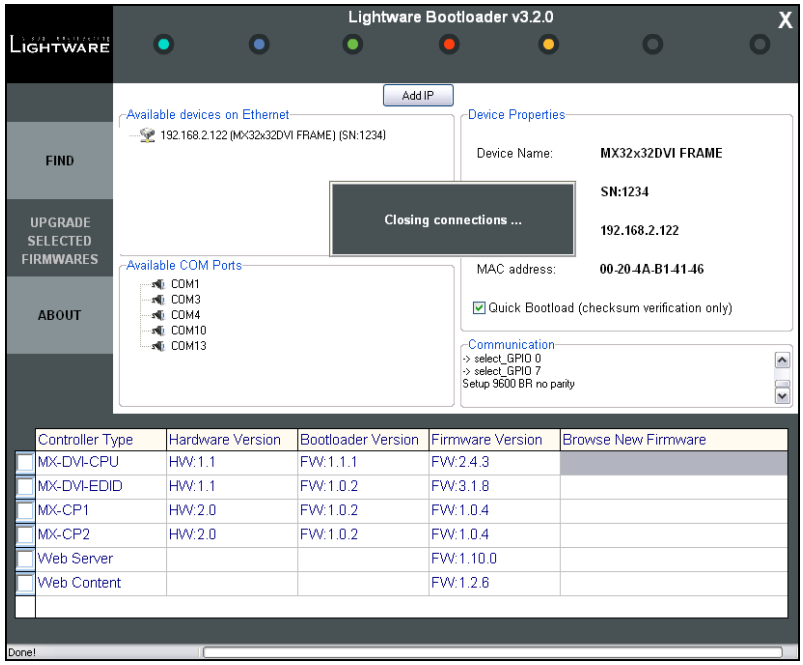


Figure 10. Closing connections

Step 11. Upgrade successful

If the connections are closed and no errors occurred, the firmware upgrade is SUCCESSFUL. Click on the **OK** button and then you may exit the Bootloader or connect to another Lightware device to perform firmware upgrades.

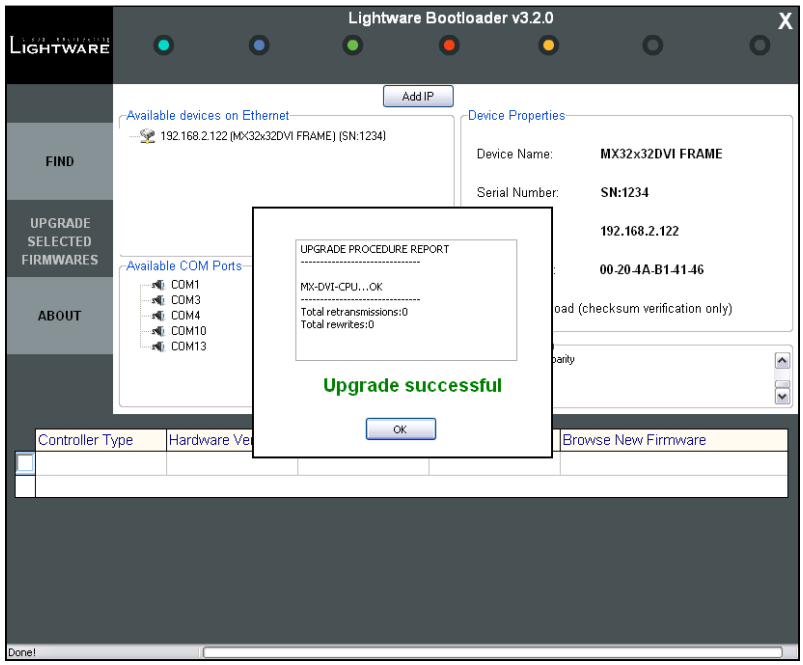


Figure 11. Upgrade successful

Step 12. Restart the device

The Lightware device will restart itself automatically, but it is recommended to completely power down and power up the device after exiting the Bootloader.

3.3. Troubleshooting

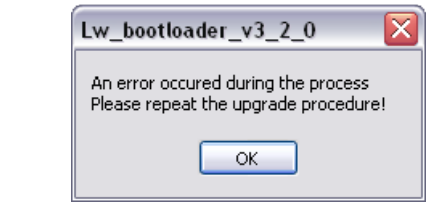
The Bootloader cannot find the matrix

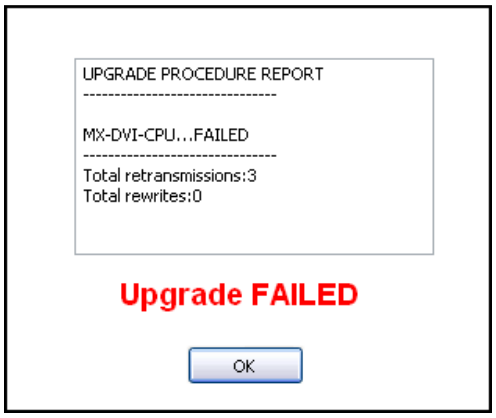
The Bootloader software always queries the PC's primary Ethernet adapter (which is usually the adapter that is connected to the Internet) for available Lightware devices. It is recommended to disable every other Ethernet device (secondary LAN, Wi-Fi, 3G modem) for the time of the upgrade. If the Bootloader cannot find the Lightware device because the device is connected to the secondary Ethernet adapter (cross UTP connection), you need to disable the primary adapter (Internet). This way the Ethernet adapter which is connected to the Lightware device will become the primary adapter and the Bootloader can query it for Lightware devices. If you disable an Ethernet adapter while the Bootloader is running, you need to restart the Bootloader to be able to query the Ethernet adapter again.

A second option in this case is that if you know the IP address and port number of the Lightware device, you may use the **Add IP** button above the Available Devices on Ethernet window. For more information see section 1.1 Step 3

Upgrade FAILED

If the connection is unreliable and the Bootloader cannot communicate with the Lightware device, then the following warning messages appear.





The Bootloader retries the transmission 3 times. If it doesn't succeed, then the upgrade procedure will have FAILED. In this case exit the Bootloader, try to establish a reliable connection with the Lightware device and repeat the upgrade process. It may happen that when you try to find the device again, the **Available devices** window will only show the IP address of the Lightware device but not the device type and serial number. The reason for this is that the Lightware device may still be in bootload mode and the controllers cannot send any information about themselves. You can still double-click on the IP address and the Bootloader will establish the connection.

No controller selected to upgrade!

If you didn't check any checkboxes left to the controller types then the **No controller selected to upgrade!** message appears. Click at least one of the checkboxes before you click on the **UPGRADE SELECTED FIRMWARES** button.

The controller was not upgraded

Make sure that the checkbox next to the controller type is checked before you click on the **UPGRADE SELECTED FIRMWARES** button. These checkboxes enable the firmware upgrade on the different controller types.

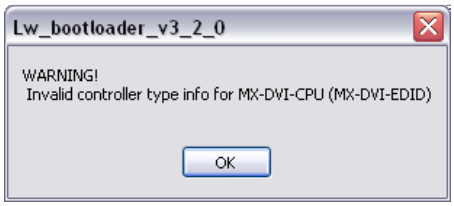
An invalid file has been selected

The Bootloader checks if valid firmware files have been selected for the controllers. If an invalid file (not firmware file) has been selected, then the following warning messages appear.

Please select a valid firmware file.

Firmware selected for the wrong controller

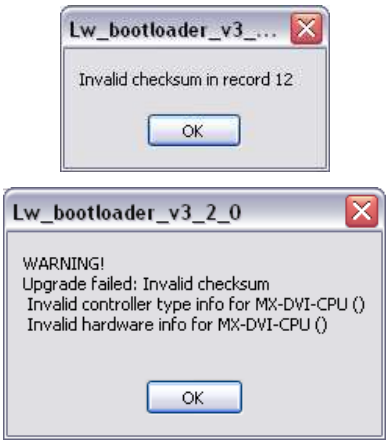
If an otherwise valid firmware file has been selected but for the wrong controller, the following warning message appears.



Please select the appropriate firmware file for the controller.

Corrupt firmware file

If the correct firmware file is selected for the controller but it somehow became corrupted (the checksum is incorrect), then the following warning messages appear.



Please contact your local sales representative or Lightware's support team at support@lightware.eu and ask for the correct firmware files.

4. Appendix A – Controller types

Controller name	Description
MX-CP	Front side control panel for modular and non-modular matrices. If multiple control panels are installed, the same firmware can be used for all of them.
MX-DVI-CPU	The main processor in modular and non-modular matrices
MX-DVI-EDID	The processor that handles EDID Management in modular and non-modular matrices
MX-DVI-EDID (HDCP)	The processor that handles EDID Management in HDCP compliant modular and non-modular matrices
MX-DVI-EDID (SLIM)	The processor that handles EDID Management in MX16x16DVI-Slim and MX12x12DVI-Slim matrices
PWR_SUM	The controller that handles Power Management and Summarizing in redundant frames
WEBCONTENT	The controller that handles the built-in website in devices with Ethernet port
WEBSERVER	The controller that handles Ethernet communication in devices with Ethernet port
WEBSERVER (MULTIUSER)	The controller that handles Ethernet communication in devices with Ethernet and with multiuser access capability
WEBSERVER (MX-RCP)	The controller that handles Ethernet communication in MX-RCP16 and MX-RCP32 remote control panels
DA2DVI-PRO	Main controller of DA2DVI-Pro
DVI-DOCTOR	Main controller of DVI-Doctor
DVI-OPT-RX220-PRO	Main controller of DVI-OPT-RX220-Pro
DVI-OPT-TX200	Main controller of DVI-OPT-TX200
DVI-OPT-TX220-PRO	Main controller of DVI-OPT-TX220-Pro
DVI-TP-RX100R	Main controller of DVI-TP-RX100R
HDMI-OPT-RX200	Main controller of HDMI-OPT-RX200
HDMI-OPT-TX200	Main controller of HDMI-OPT-TX200

5. Appendix B – List of devices and upgrade interfaces

Device name (in alphabetical order)	Upgrade interface
DA2DVI-Pro	USB (listed as COM port)
DVI-Doctor	RS-232
DVI-OPT-RX220-PRO	RS-232
DVI-OPT-TX200	RS-232
DVI-OPT-TX220-PRO	RS-232
HDMI-OPT-RX200R	RS-232
HDMI-OPT-TX200R	RS-232
MX12x12DVI-Slim	Ethernet
MX16x16DVI-Slim	Ethernet
MX4x4DVI (1RU high)	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX4x4DVI-DL (1RU high)	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX4x4HDSDI	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX6x6DVI (3RU high)	Ethernet
MX6x6DVI-DL (3RU high)	Ethernet
MX8x4DVI-Pro	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX8x4HDSDI	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX8x8DVI (3RU high)	Ethernet
MX8x8DVI-DL (3RU high)	Ethernet
MX8x8DVI-HDCP-Pro	Ethernet
MX8x8DVI-Pro	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX8x8HDMI-Pro	Ethernet
MX8x8HDSDI	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX8x8HDSDI-DL	RS-232 (not compatible with this Bootloader software, please contact support@lightware.eu)
MX-FR16	Ethernet
MX-FR32	Ethernet

Device name (continued)	Upgrade interface
MX-FR32R	Ethernet
MX-FR80R	Ethernet
MX-RCP16 (RCP32)	Ethernet
UMX4x4-Pro	Ethernet, RS-232

6. Document Revision history

Document	Release Date	Changes	Checked by
Rev 1.0	05-10-2010	Released	Tibor Fejes