Application Notes

Lightware Bootloader Software
1.1. Introduction

The Lightware Bootloader software is developed to perform a simple firmware upgrade process on a Lightware device. **DIFFERENCE!** The software is not suitable for using files with LFP or LFP2 extension. Please use LDU or LDU2 for those files.

1.2. Preparation

The software is able to upgrade one device at a time. If you want to upgrade the firmware of the desired device, you need the following:

- **Firmware package file:** a ZIP file containing all the necessary binary and other files.
- **Bootloader software installed on your PC.**

Both can be downloaded from www.lightware.com/downloads.

1.3. Bootloader Installation

**ATTENTION!** The software can be installed on Windows PC only.

**Step 1.** Run the installer.

**Step 2.** Select the destination folder and press the **Install** button.

**Step 3.** If you want to create a desktop icon, select **Yes** in the following pop-up window.

**Step 4.** After the files are copied, the following message appears:

**Step 5.** Press the **Close** button to finish the installation process.
1.4. 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.

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 that is available at www.lightware.com/downloads.

Finishing the process with older versions of the Bootloader
Boostrap 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 process, the device will restart itself but it is recommended to power down and up the device after finishing the upgrade.

1.5. 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 to the computer via
- Ethernet: via a hub, switch, router, or directly by a cross-link UTP cable,
- RS-232, or USB (may be listed as COM port in the Available Devices window).

If you connect 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 Lightware Device Controller software.

If you connect directly by a cross UTP cable, you need to set up a fix IP and subnet mask on the Lightware device and the PC.
Step 3. Find devices

Make sure that no active connection is made to the device (Lightware Device 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, hence users must know which COM port is connected to the Lightware device.

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). Thus, the Ethernet adapter that 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 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.

Searching for devices

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 bootloader mode and suspends normal operation.

**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.

**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). Press the Yes button in the pop-up window to modify the path to the new firmware file.
**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 red circles 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). For certain controller types, 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.

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**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.
Step 9. Upgrading

The Bootloader will now write the new firmware data. Depending on the device type, the Bootloader may first erase the memory of the device and start the programming afterwards. This process can be monitored in the communication window and the progress bar (both are marked with red in the picture below).

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.
Step 11. Upgrade successful

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

Step 12. Restart the device

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

1.6. 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.

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 a so-called bootloader 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 did not 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.

In this case, please contact Lightware Support.
# Controller Types

<table>
<thead>
<tr>
<th>Controller name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP-UMX</td>
<td>Front side control panel for UMX4x4-Pro matrix.</td>
</tr>
<tr>
<td>DA2DVI-PRO</td>
<td>Main controller of DA2DVI-Pro</td>
</tr>
<tr>
<td>DVI-DOCTOR</td>
<td>Main controller of DVI-Doctor</td>
</tr>
<tr>
<td>DVI-OPT-RX220-PRO</td>
<td>Main controller of DVI-OPT-RX220-Pro</td>
</tr>
<tr>
<td>DVI-OPT-TX200</td>
<td>Main controller of DVI-OPT-TX200</td>
</tr>
<tr>
<td>DVI-OPT-TX220-PRO</td>
<td>Main controller of DVI-OPT-TX220-Pro</td>
</tr>
<tr>
<td>DVI-TP-RX100R</td>
<td>Main controller of DVI-TP-RX100R</td>
</tr>
<tr>
<td>HDMI-OPT-RX200</td>
<td>Main controller of HDMI-OPT-RX200</td>
</tr>
<tr>
<td>HDMI-OPT-TX200</td>
<td>Main controller of HDMI-OPT-TX200</td>
</tr>
<tr>
<td>MX-CP</td>
<td>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.</td>
</tr>
<tr>
<td>MX-DVI-CPU</td>
<td>The main processor in modular and non-modular matrices</td>
</tr>
<tr>
<td>MX-DVI-EDID</td>
<td>The processor that handles EDID Management in modular and non-modular matrices</td>
</tr>
<tr>
<td>MX-DVI-EDID (HDCP)</td>
<td>The processor that handles EDID Management in HDCP compliant modular and non-modular matrices</td>
</tr>
<tr>
<td>MX-DVI-EDID (SLIM)</td>
<td>The processor that handles EDID Management in MX16x16DVI-Slim and MX12x12DVI-Slim matrices</td>
</tr>
<tr>
<td>PWR_SUM</td>
<td>The controller that handles Power Management and Summarizing in redundant frames</td>
</tr>
<tr>
<td>UMX4x4-PRO</td>
<td>The main controller of UMX4x4-Pro.</td>
</tr>
<tr>
<td>WEBCONTENT</td>
<td>The controller that handles the built-in website in devices with Ethernet port</td>
</tr>
<tr>
<td>WEB-UMX4x4</td>
<td>The controller that handles the built-in website in UMX4x4-Pro.</td>
</tr>
<tr>
<td>WEBSERVER</td>
<td>The controller that handles Ethernet communication in devices with Ethernet port</td>
</tr>
<tr>
<td>WEBSERVER (MULTIUSER)</td>
<td>The controller that handles Ethernet communication in devices with Ethernet and with multiuser access capability</td>
</tr>
<tr>
<td>WEBSERVER (MX-RCP)</td>
<td>The controller that handles Ethernet communication in MX-RCP16 and MX-RCP32 remote control panels</td>
</tr>
<tr>
<td>WEBSERVER (UMX4x4-Pro)</td>
<td>The controller that handles Ethernet communication in UMX4x4-Pro.</td>
</tr>
</tbody>
</table>

# List of Devices and Upgrade Interfaces

### Device name

- **CPU2**: Second generation CPU board in modular matrix frames (FR17, FR33, FR33R, FR80R, FR9)
- **DA2DVI-Pro**: USB (listed as COM port)
- **DVI-Doctor**: RS-232
- **DA2DVI-Pro**: RS-232
- **DVI-OPT-RX220-PRO**: RS-232
- **DVI-OPT-TX200**: RS-232
- **DVI-OPT-TX220-PRO**: RS-232
- **HDMI-OPT-RX200**: RS-232
- **HDMI-OPT-TX200**: RS-232
- **MX12x12DVI-Slim**: Ethernet
- **MX16x16DVI-Slim**: Ethernet
- **MX4x4DVI (1RU high)**: N/A *
- **MX4x4DVI (1RU high)**: N/A *
- **MX4x4HDSI**: N/A *
- **MX6x6DVI (3RU high)**: Ethernet
- **MX8x8DVI (3RU high)**: Ethernet
- **MX8x4DVI-Pro**: N/A *
- **MX8x4HDSI**: N/A *
- **MX8x8DVI (3RU high)**: Ethernet
- **MX8x8DVI-Pro**: N/A *
- **MX8x8HDSI**: N/A *
- **MX8x8DVI-Pro**: N/A *
- **MX8x8HDSI**: N/A *
- **MX-FR series**: Ethernet

* The device is not compatible with this Bootloader software. Please contact Lightware Support for details.