

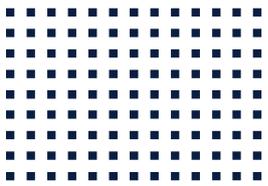


CETONI

CE CELED LED ARRAY CONTROLLER Hardware Manual



ORIGINAL OPERATING MANUAL 1.06 – OCTOBER 2018



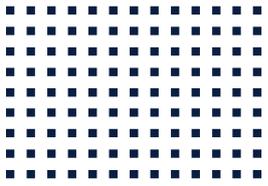
CETONI GmbH
Wiesenring 6
07554 Korbussen
Germany

T +49 (0) 36602 338-0
F +49 (0) 36602 338-11
E info@cetoni.de

www.cetoni.de

The information and data contained in this document are subject to change without prior notice. No part of this document may be copied or transmitted without the express consent of CETONI GmbH, irrespective of the means used for this purpose – electronic or mechanical. The general terms of CETONI GmbH apply. Agreements deviating from these terms must be made in writing.

Copyright © CETONI GmbH – Automation and Micro Systems. All rights reserved.



1 Overviews and Indexes

1.1 Content

1	Overviews and Indexes	5
1.1	Content	5
1.2	Revision History	7
2	Introduction	8
2.1	Foreword	8
2.2	Symbols and Keywords	8
3	Basic Information	9
3.1	Radiation Protection Advice	9
3.2	Standards and Guidelines	10
3.3	Intended Use	10
3.3.1	General Description of the Device	10
3.3.2	Safety Measures	11
3.3.3	Safe Operation Measures	12
3.3.4	Device Condition	12
3.4	Warranty and Liability	13
3.5	Scope of Supply	14
4	LED Array Quick Start	16
4.1	Connect Device with PC	16
4.2	Create Device Configuration	17
5	Device Overview	19
5.1	Introduction	19
5.2	Overview of Interfaces	19
5.2.1	Front Interfaces	19
5.2.2	Rear Interfaces	20

5.3	Status LEDs	21
5.3.1	Overview	21
5.3.2	Description of LED Status	22
5.3.3	Power LED – S1	22
5.3.4	Green Software and CAN Bus Status LED – S2	22
5.3.5	Red CAN Bus Error LED – S3	23
5.3.6	Red error LED – S4	23
6	Initial Startup	24
6.1	Software Installation	24
6.2	Connecting the LED Array Module	24
6.3	Connecting the Device to a PC	24
6.4	Establishing a Connection	25
7	Electrical Interfces	26
7.1	I/O Interface J8	26
7.1.1	Pin Assignment	26
8	Transport, Maintenance and Disposal	28
8.1	Transport and Storage	28
8.2	Maintenance and Care	28
8.3	Disposal	28

1.2 Revision History

REV	DATE	CHANGE
1.00	02.01.2015	Creation of 7elled LED array manual
1.01	03.05.2015	Text modification for 7elled LED array controller V2
1.02	01.06.2015	Added I/O interface section
1.03	14.07.2015	Added additional safety instructions, added Quick Start chapter.
1.04	21.10.2015	Updated device pictures Added error LED description
1.05	10.03.2016	Revision Guide Design
1.06	08.10.2018	Updated Quick Start Guide

2 Introduction

2.1 Foreword

Thank you for choosing a CETONI product. With this manual we would like to support you in using the device. For additional questions or comments please feel free to contact us directly.

Please read this manual carefully before operating the device.

2.2 Symbols and Keywords

This manual uses the following symbols, intended to help you navigate the document:



HINT. User tips and useful information to simplify the use of the software.



IMPORTANT. Important information and additional, particularly useful information. This symbol does not refer to dangerous or hazardous situations.



CAUTION. A potentially hazardous situation. Failing to avoid it may cause damage to the product or its environment.



WARNING. A potentially dangerous situation. Failing to avoid it may cause light or insignificant injury or material damage.

3 Basic Information

3.1 Radiation Protection Advice



WARNING. Emitted light can cause damage to skin and eyes (including the risk of blindness). Therefore, when integrating this device into your application you should take special care not to expose persons, animals or items to the emitted light inadvertently.

Persons operating the LED array must wear suitable gear to protect against dangers caused by artificial optical radiation. It must also be ensured that persons without UV-protection cannot enter the UV-radiation area. If required, the UV-radiation area must be enclosed by a radiation-proof barrier.



WARNING. Observe the provisions of the DIN EN 166:2002-04 for carrying CE marked protective equipment (eg protective eyewear) when working with the LED arrays.

Depending on the type of radiation, additional safety measures stipulated by the LED manufacturer may apply. Please be aware that the emitted radiation may cause various types of damage to skin and eyes.



WARNING. Note the warnings (for example power density and spectral width of the LEDs) in the device-specific user documentation and safety data sheets.



The following table shows possible types of radiation damage.

WAVE LENGTH	SKIN DAMAGE	EYE DAMAGE
280nm...400nm (UVA and UVB radiation is not visible)	Accelerated skin aging, stronger pigmentation, burns, risk of cancer	Corneal inflammation and conjunctivitis, lens opacity
400nm...800nm (visible spectrum)	Skin reddening, burns	Photochemical and thermal damage to retina and receptors
800nm...1550nm (IR radiation is not visible)	Skin reddening, burns	Lens opacity, retinal burns



WARNING. Always avoid direct radiation into the eyes. Even low radiation intensity can cause glare or even injury.



WARNING. Never look directly at (presumably) inactive LEDs. The LEDs in question may emit radiation outside of the visible spectrum, which can also cause damage or injury.

3.2 Standards and Guidelines



CETONI GmbH hereby declares under its sole responsibility that the ceLED LED array controller complies with the health and safety requirements of the relevant European guidelines.

3.3 Intended Use

3.3.1 General Description of the Device

The LED array controller controls LED array devices made by CETONI GmbH. These LED arrays are used for the irradiation of separate areas with LEDs of similar or different wavelengths. With this control unit the radiation intensity can be adjusted separately for each area / channel.

The maximum intensity and wavelength of the emitted radiation is governed by the number and type of LEDs being used on the connected LED arrays. At the time of creating this document, LEDs ranging from 255 nm to 1550 nm in wavelength are commercially available.



IMPORTANT. The device must not be used as a medical product or for medical purposes. The device must not be used on people or for therapeutic purposes.



WARNING. The device must not be used in potentially explosive environments. There is a risk of fire when exposing flammable substances/substrates.

3.3.2 Safety Measures

Operator safety and failure-free operation of the device can only be guaranteed when using original equipment parts. Warranty claims are void if damage was caused by using third-party equipment or third-party material.

The device was developed in such way as to largely rule out dangers, if used properly. Nevertheless, you should observe the following safety measures to rule out any residual danger.

- The device is not designed or intended for operation in potentially explosive environments. Therefore, using the device in such environments is forbidden!
- When operating the device the laws and regulations applicable at the place of operation must be observed. In the interest of a safe work process operators and users are responsible for observing such regulations.
- When radiating substrates with light (of various wavelengths) energy enters into the substrate. There is also a possibility of creating chemical (exothermic) reactions in the substrate. The substrate may ignite.
- The operator must make sure that there is no ignition. The operator must ensure that any ignition is extinguished immediately. Flammable substances may be exposed to radiation only under continuous supervision!
- Before each operation of the device the user has to ensure that the device is functioning safely and is in proper condition.
- The user must be familiar with the operation of the device.
- Before starting operation, the device and wiring must be checked for damage. Damaged wires and plugs must be replaced immediately.
- If a support or tripod is used, it must be sufficiently stable and able to support the required weight.
- Cables must be routed in such way as to rule out any trip hazards!
- If liquid enters the device, the main power plug must be pulled out of the mains socket immediately. The device must then be sent to CETONI GmbH for inspection and repair.

3.3.3 Safe Operation Measures

3.3.3.1 ELECTROMAGNETIC EMISSIONS

The device is designed for usage in any facility, including living areas and facilities directly connected to a public supply network that also supplies buildings used for residential purposes.

3.3.3.2 ESD DISCHARGE

Floors should be wood or concrete or covered with ceramic tiles. If floors are covered with synthetic material, relative air humidity must be at least 30%.

3.3.3.3 ELECTRICAL DISTURBANCES

Supply voltage quality should be equal to a typical business or hospital environment.

3.3.3.4 MAGNETIC DISTURBANCES

Power lines, including those of other devices, should not be placed near the device or its cables. Portable and mobile two-way radios should be kept at the minimum safe distance from the device and its wiring.

3.3.4 Device Condition

Despite flawless workmanship, the device may be damaged during operation. Therefore, you should visually inspect the device before each use. Pay particular attention to crushed cables and deformed plugs. If you find any damage, please refrain from using the device and contact CETONI GmbH immediately. We will repair your device as soon as possible. Never attempt to repair the device yourself.

3.4 Warranty and Liability

The device has left our facilities in perfect condition and may only be opened by CETONI GmbH. If the device is opened by an unauthorized person, all warranty and liability claims shall be void, in particular those referring to personal injury.

The warranty period is 1 year from the day of delivery. Any work done on the device within this period shall not extend or renew the warranty.

CETONI GmbH assumes responsibility for its devices with respect to safety, reliability and function only if installation, readjustment, changes, extensions and repairs are done by CETONI GmbH or an authorized party, and if the device is used in accordance with the user manual.

The device complies with the applicable safety rules and standards. CETONI GmbH reserves all property rights for the relevant wiring, processes, names, software and devices.

3.5 Scope of Supply

The following items should be included in the delivery:

24V POWER SUPPLY



USB CABLE 3M

(1x USB 2.0 plug A - 1x USB 2.0 plug Mini-B)



USB-RS232 ADAPTER



RS232 CONNECTION CABLE



CD-ROM QMIXELEMENTS, INCLUDING:

- Device driver
- QmixElements Software
- Qmix SDK
- Device configuration

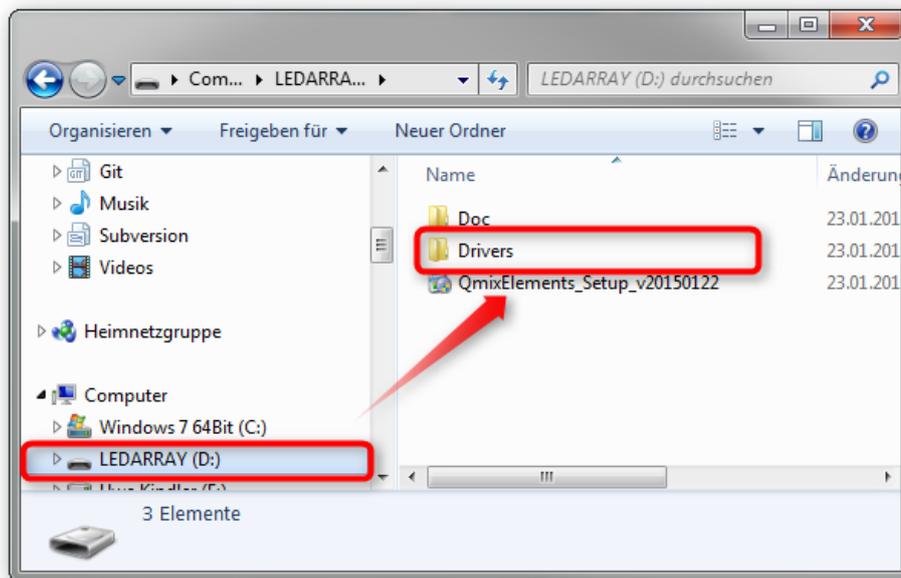


4 LED Array Quick Start

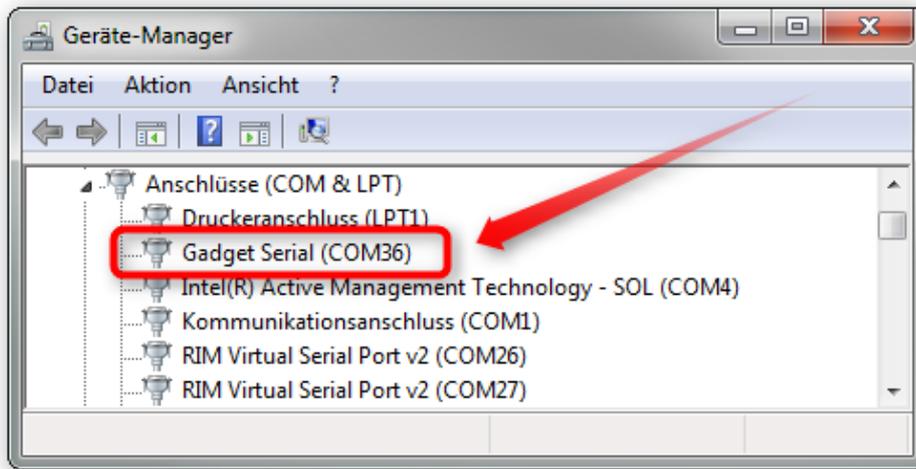
4.1 Connect Device with PC

Do the following steps for initial LED Array installation and setup:

- (1) Connect the power supply to your LED array and turn the LED array on, by pressing the power switch on the front. The controller will now start and after about 6 seconds the green status LED should blink.
- (2) Now connect the mini-USB port on the LED array via the supplied cable to the USB port of your PC **after** you have powered on your LED array device. The PC detects a new removable disk with the name **LEDARRAY**.
- (3) Open on this disk the folder **Drivers/LED-Array** and start the file **install.bat** by double click. This starts installation of the LED Array USB interface device drivers.



- (4) After installing the device drivers, a **Gadget Serial** device or a similar serial USB device should be present in the device manager under the item **Ports**.

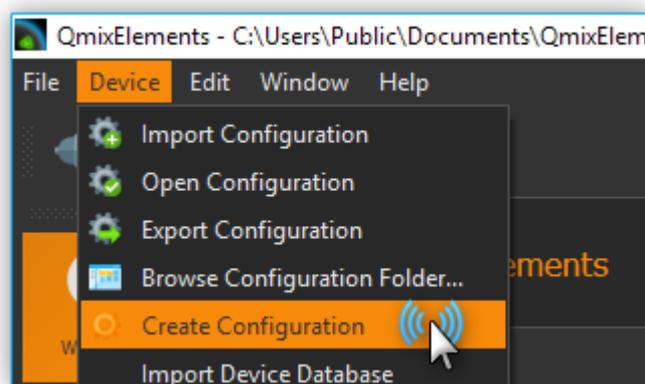


HINT. If there are any problems with the driver installation, please remove the USB cable and use the RS232 cable supplied together with the USB-RS232 converter.

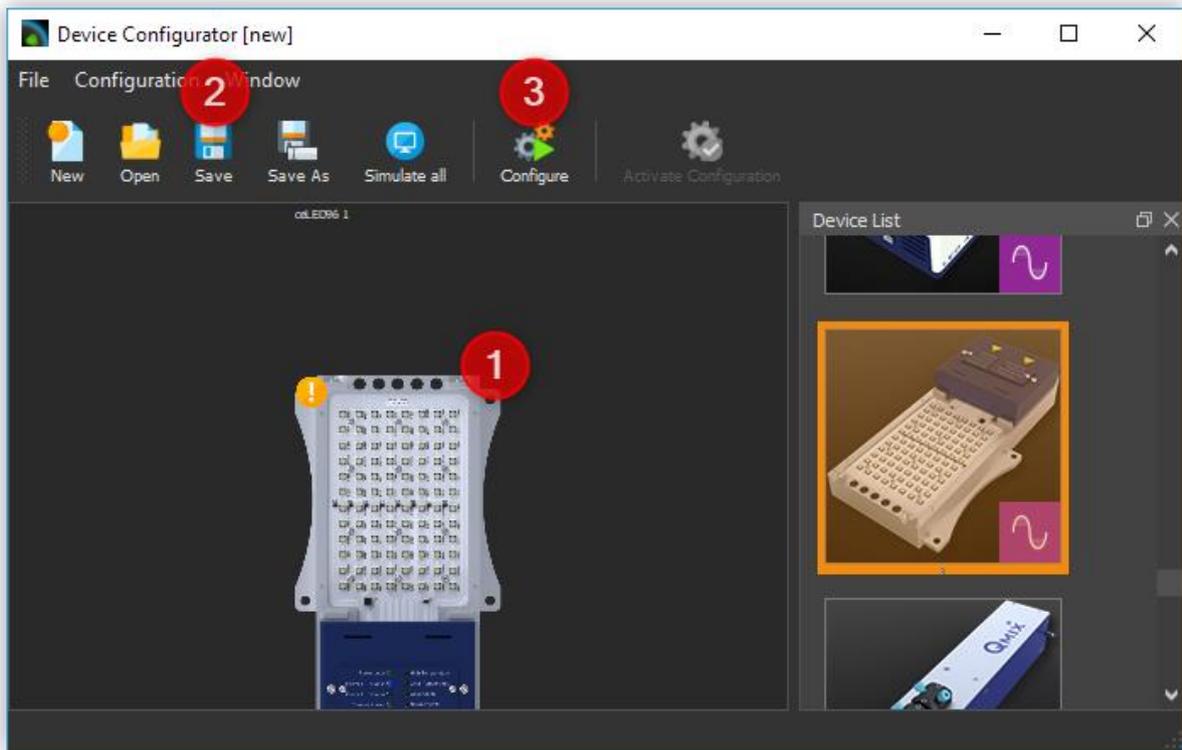
- (5) Now install the software **QmixElements_Setup.exe** from the root directory of the removable disk **LEDARRAY** and start the QmixElements software after installation has finished.

4.2 Create Device Configuration

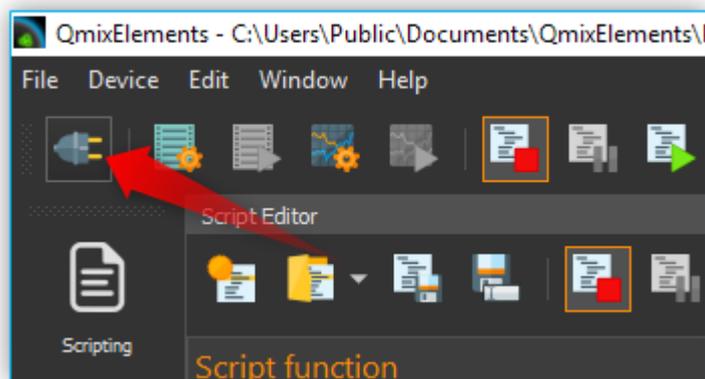
- (1) From the main menu of the QmixElements software select **Device** → **Create Configuration**.



- (2) In the Device Configurator, create a configuration that contains a single LED array. 1



- (3) Save the configuration by clicking **Save** ②.
- (4) Now start the configuration wizard by clicking on **Configure** ③.
- (5) Follow the instructions of the configuration wizard and confirm the restart of the software at the end of the configuration process.
- (6) The software is now loaded with the created device configuration. Click the **Connect** button to connect the software with the device.



HINT. More information on using the QmixElements software and the LED Array plugin can be found in the QmixElements software manual.

5 Device Overview

5.1 Introduction

Each ceLED LED array consists of an LED array controller and one or several LED array modules. The LED array modules vary in the number and typical wavelength of the LEDs used in them, and are often customized.

The LED array controller contains the control electronics for the LED array modules and PC interfaces.



Image 1 – celled LED array controller V2

5.2 Overview of Interfaces

5.2.1 Front Interfaces

The front panel contains all interfaces needed to connect the LED array controller to a PC or other controller.

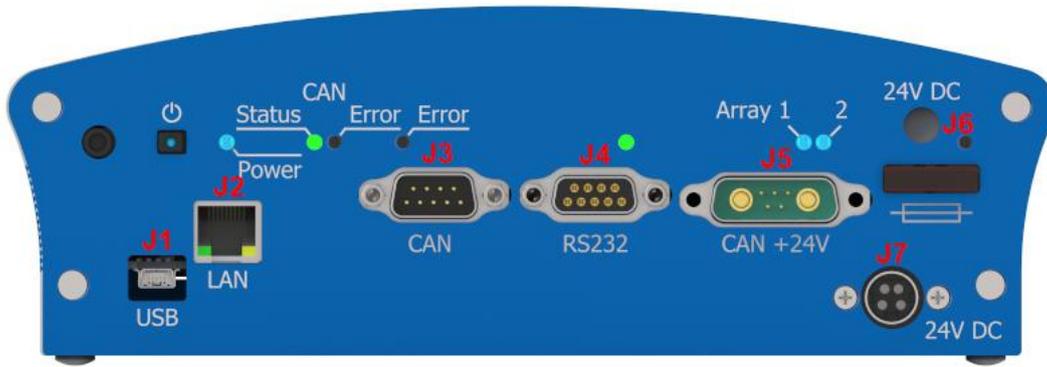


Image 2 – Front Panel Interfaces

CONNECTOR	INTERFACE
J1	USB device interface (optional)
J2	Ethernet interface (optional) – unused
J3	CAN interface (optional)
J4	RS232 interface to connect a PC or other controller
J5	CAN + 24 V interface for connection to Qmix systems
J6	Power connection J6
J7	Alternative power connection J7

5.2.2 Rear Interfaces

The rear panel contains all interfaces needed to connect LED arrays to the LED array controller.

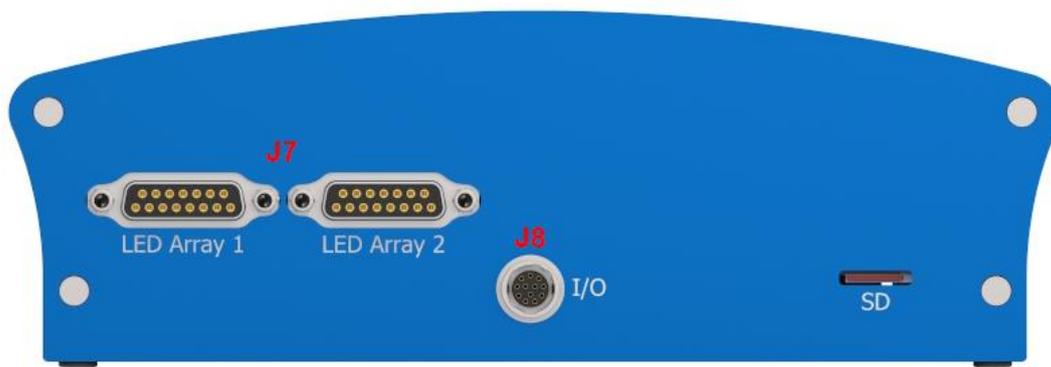


Image 3 – Rear panel interfaces

CONNECTOR	INTERFACE
J7	Connector for LED array 1 and LED array 2 (optional)
J8	I/O interface (optional) to connect external I/O signals

5.3 Status LEDs

5.3.1 Overview

The front panel contains various LEDs showing you the status of the device.

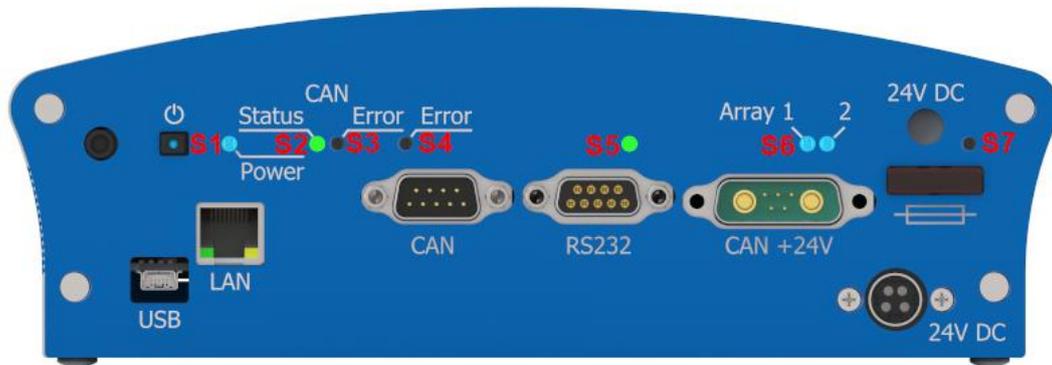


Image 4 – LED signals on front panel

LED	INTERFACE
S1	blue Power LEDs – illuminates when connected to a power supply
S2	green Software and CAN Bus Status LED
S3	red CAN Bus Error LED – signals CAN bus errors or missing CAN connection
S4	red Error LED – signals fatal software errors
S5	RS232 LED – flashes during data transfer via RS232 interface
S6	LED array 1 and LED array 2 status LEDs – illuminate when the connected LED array is illuminated
S7	Fuse LED – illuminates red if fuse is blown or missing

5.3.2 Description of LED Status

CONDITION	DESCRIPTION
off	permanently deactivated
on	permanent illumination
flashing	flashing at 10 Hz: 50 ms on / 50 ms off
flashing	flashing at 2.5 Hz: 200 ms on / 200 ms off
one flash	short illumination (200 ms), then off for 1000 ms
two flashes	two short illuminations (200 ms), then off for 1000 ms
three flashes	three short illuminations (200 ms), then off for 1000 ms
four flashes	four short illuminations (200 ms), then off for 1000 ms
flashing slowly	flashing at 0.5 Hz : 1000 ms on / 1000 ms off
Individual interruption	extended illumination (1000 ms), then off for 200 ms

5.3.3 Power LED – S1

LED CONDITION	MEANING
off	no power – device is off
on	logic voltage present – device is on

5.3.4 Green Software and CAN Bus Status LED – S2

LED CONDITION	MEANING
off	booting phase – firmware loading (approx. 10 seconds)
flashing	device in CANopen NMT state - PRE-OPERATIONAL
on	device in CANopen NMT state - OPERATIONAL
one flash	device in CANopen NMT state - STOPPED

5.3.5 Red CAN Bus Error LED – S3

LED CONDITION	MEANING
off	no error
flashing	Invalid configuration / general configuration error
one flash	too many error frames on CAN bus (one of the CAN controller error counters has reached its warning limit)
on	the CAN-interface is in bus off state – no CAN communication possible

5.3.6 Red error LED – S4

LED CONDITION	MEANING
off	no error
on	Fatal software or device error

6 Initial Startup



IMPORTANT. Please carefully read this manual and the associated software manual as well as the LED array manual before starting up your LED array.

6.1 Software Installation

Install the supplied software drivers before connecting the system. The installation is described in the software manual, which is stored on the supplied CD or USB stick as QmixElements_Handbuch_DE.pdf in the Manual folder.



IMPORTANT. Install the QmixElements software + device drivers as described in the software manual, before connecting the device to a PC via USB.

6.2 Connecting the LED Array Module

Connect the LED array modules to the LED array connector 1 (J7) on the rear panel of the LED array controller using the supplied cable set.

6.3 Connecting the Device to a PC

Connect the USB-plug of the supplied USB RS232 adapter to a free USB-socket on the PC (USB type A). Connect the RS232 DSub plug of the USB-RS232 adapter with the DSub socket of the RS232 connection cable. Plug the DSub plug of the connection cable into the RS232 socket (J4) on the LED array controller.

Connect the power supply to the 24V connector (J6) on the LED array controller. Connect the power cable of the power supply to the mains power outlet.



WARNING. Risk of injury due to damaged wires and plugs! Before operating the device, check the device and all wires for damage. Never operate the device with damaged wires or plug connectors!

6.4 Establishing a Connection

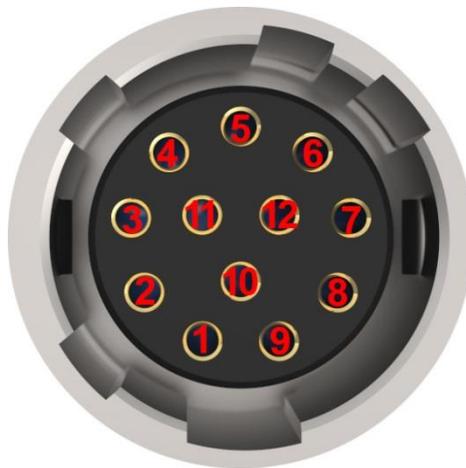
Launch the QmixElements software and establish a connection to the device. Additional details about software operation can be found in the QmixElements software manual. A PDF-file of the software manual is stored on your computer during the installation of QmixElements software.

7 Electrical Interfaces

7.1 I/O Interface J8

The device is equipped with an accessory port or can be equipped with it as an optional extra. The additional port allows the use of external sensors and trigger signals. The pin assignment of the connector at the module and the wire colors of the connecting cable, which can be purchased from CETONI, can be found in the following table. A matching connector plug is available from Hirose (order number HR10A-10P-12P(73)).

7.1.1 Pin Assignment



PIN	SIGNAL	DESCRIPTION
1	Analog input AI1	0-5 V (to Pin 12)
2	Analog input AI2	0-5 V (to Pin 12)
3	Digital input 1	$<0,8\text{ V} \triangleq$ Low $>2\text{ V} \triangleq$ High 24 V max.
4	Digital input 2	$<0,8\text{ V} \triangleq$ Low $>2\text{ V} \triangleq$ High 24 V max.
5	Digital input 3	$<1,7\text{ V} \triangleq$ Low $>4,2\text{ V} \triangleq$ High 24 V max.
6	Digital output 1	NPN Max. 1 A Aktiv: 0 V (GND) Inaktiv: offen
7	Digital output 2	NPN Max. 1 A Active: 0 V (GND)

Inactive: open

8	Digital output 3	NPN Max. 1 A Active: 0 V (GND) Inactive: open
9	Digital ground	
10	+24 V Out	+24 VDC / <1 A
11	+5 V Out	+5 VDC / <150 mA
12	Analog ground	

8 Transport, Maintenance and Disposal

8.1 Transport and Storage

If possible, use the original package for transporting and shipping the device. Otherwise, use a stable box and a sufficient amount of padding material.

8.2 Maintenance and Care

When used properly the device is maintenance-free. Should you experience problems that you can't fix yourself or that require opening the device, please contact CETONI GmbH to discuss further actions. The device may only be opened by CETONI GmbH or authorized service personnel. Violation of this rule will void the warranty and liability.

The software manual provides additional information about problems in connection with operating software.

Wipe the device with a moist (not wet) cloth. Make sure that no liquid can enter the inside of the device. For stronger soiling you may use a small amount of detergent or alcohol.

8.3 Disposal

Please return your old devices to CETONI GmbH. We will take care of proper disposal according to the relevant electrical and electronic device regulations.