



## Manual Rev. 1.1 EN



## ADQ-153 & ADQ-63

ADQ-LINK and I2C converter

## Imprint

Manual ADQ-153 & ADQ-63  
Rev. 1.1

### Manufacturer and support

ALLNET® and ALLDAQ® are registered trademarks of ALLNET® GmbH Computersysteme. For questions, problems and product information please contact the manufacturer directly:

#### **ALLNET® GmbH Computersysteme**

Division ALLDAQ  
Maistrasse 2  
D-82110 Germering

### Support

E-Mail: [support@alldaq.com](mailto:support@alldaq.com)  
Phone: +49 (0)89 894 222 – 74  
Fax: +49 (0)89 894 222 – 33  
Internet: [www.alldaq.com/support](http://www.alldaq.com/support)

© Copyright 2020 ALLNET GmbH Computersysteme. All rights reserved.

All information contained in this manual has been compiled with the greatest care and to the best of our knowledge. Nevertheless, errors cannot be completely ruled out. Specifications and contents of this manual are subject to change without notice.

We are always grateful for notification of any errors.

Mentioned trademarks are registered trademarks of the respective companies.

# Index

<b>1. Introduction</b>	<b>4</b>
1.1 Scope of delivery	4
1.2 Safety instructions	5
1.3 Installation and assembly site	6
1.4 Brief description	6
1.5 System requirements	7
<b>2. Start of operation</b>	<b>8</b>
2.1 Connection of the box	8
<b>3. Function groups</b>	<b>9</b>
3.1 Block diagrams	9
3.2 LED display status	10
3.3 Rotary switch	10
3.4 Power supply	10
3.5 Example applications	11
<b>4. Annex</b>	<b>13</b>
4.1 Specifications	13
4.2 Pin assignment	15
4.3 Manufacturer and support	16
4.4 Packaging ordinance	16
4.5 Recycling advice and RoHS conformity	16
4.6 CE identification	17
4.7 Warranty	17

# 1. Introduction

Please check the packaging and contents for damage and completeness before commissioning. Should any defects occur, please inform us immediately.

- Does anything on the packaging indicate that anything was damaged during transport?
- Are there any signs of use on the device?

Under no circumstances may you operate the device if it is damaged. If in doubt, contact our technical service department.

Please read this manual carefully before installing the unit!

## 1.1 Scope of delivery

- ALLDAQ ADQ-153 or ALLDAQ ADQ-63 with mating connector

## 1.2 Safety instructions

### **Be sure to observe the following instructions:**

- Never expose the device to direct sunlight during operation.
- Never operate the device near heat sources.
- Protect the device from moisture, dust, liquids and vapours.
- Do not use the device in damp rooms and under no circumstances in potentially explosive areas.
- Repairs may only be carried out by trained, authorised personnel.
- Please observe the installation regulations and all relevant standards (including VDE standards) when commissioning the instrument, especially when operating with voltages greater than 42 V.
- We recommend to always connect unused inputs to the corresponding reference ground to avoid crosstalk between the input channels.
- Always disconnect your field wiring from the voltage source before you make or break cable connections to the card.
- When handling the board, make sure that no static discharge can occur through the device. Follow standard ESD protection measures.
- Never connect the devices to live parts, especially not to mains voltage.
- Precautions to avoid unpredictable misuse must be taken by the user.

**ALLNET® GmbH Computersysteme is not liable for improper use and resulting damage.**

## 1.3 Installation and assembly site

The ADQ-153 & ADQ-63 are designed for industrial use. The box may only be used in dry rooms. Ensure adequate ventilation. Make sure that the connecting cables are securely attached.

## 1.4 Brief description

Via the ADQ-LINK (point to point), two ALLDAQ products can be reliably and easily connected to communicate with each other via a physical differential connection. This makes the ADQ-LINK perfectly suited for use in harsh environments. The ADQ-LINK works stable even in tight spaces, where optimal cable routing and decoupling between power lines and analog or digital signal/control lines cannot always be maintained. The ADQ-LINK connects two devices up to 100m without loss of speed or signal integrity. For shorter distances, the power supply can also be looped from one subscriber to another through the same cable. The longer the cable, the higher the occurring shift of the respective ground potentials. However, this is no problem due to the capacitively insulated link cables.

The ADQ-153 and ADQ-63 extend a simple I2C bus. One bus is multiplexed into three independent I2C buses or ADQ-LINKs. As an example you could operate three devices with the same addresses on the same bus.

The ADQ-153 and ADQ-63 are suitable for use in industrial automation and control technology.

Eight different addresses can be set for the box with integrated multiplexer. This allows several boxes to be operated on the same bus. Each of the three multiplexed buses can be individually switched to standard I2C or ADQ-LINK by software. When using standard I2C, the internal pull-up resistors at 5V can be switched off. Already existing pull-up resistors and other bus voltages in the range of 2.7-5V can be used. Buses with different voltage levels can be combined.

With the ADQ-63, the main bus acts as a control line from an external ADQ-LINK/I2C controller. On the ADQ-153, the main bus is the main bus of the USB-to-I2C converter and is therefore led out before the multiplexer.

## 1.5 System requirements

### Hardware

- PC system with a current Intel® or compatible processor based on the x86(-64) architecture
- One free USB port (ADQ-153 only)
- Optional ALLDAQ driver

### Software

On the ALLDAQ homepage you will find drivers for Windows 7 SP2 and higher (32 and 64 bit) as well as a function library (API) with code examples for high-level language programming.

Please refer to the notes in the corresponding help file adqSDK.chm. Details on programming can also be found in the help file adqDriver.chm, which can be accessed via the „ALLDAQ Manager“ in the info area of the taskbar (usually bottom right) or the Windows start menu.

### I2C control

The ADQ-63 can also be used without ALLDAQ driver and independent of ALLDAQ peripherals. An I2C instruction set is available to configure the box. Please contact our support (support@alldaq.com) for further information.

## 2. Start of operation

### 2.1 Connection of the box

The box should be handled with care to ensure that the device is not damaged by electrostatic discharge (ESD), mechanical stress or unauthorized current surges. Precautions should also be taken to avoid electric shock. Follow standard ESD protection measures.



#### ADQ-153



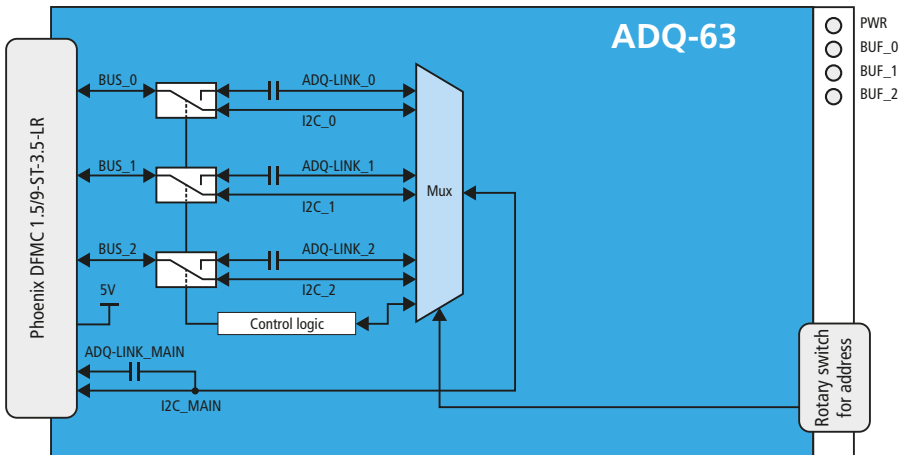
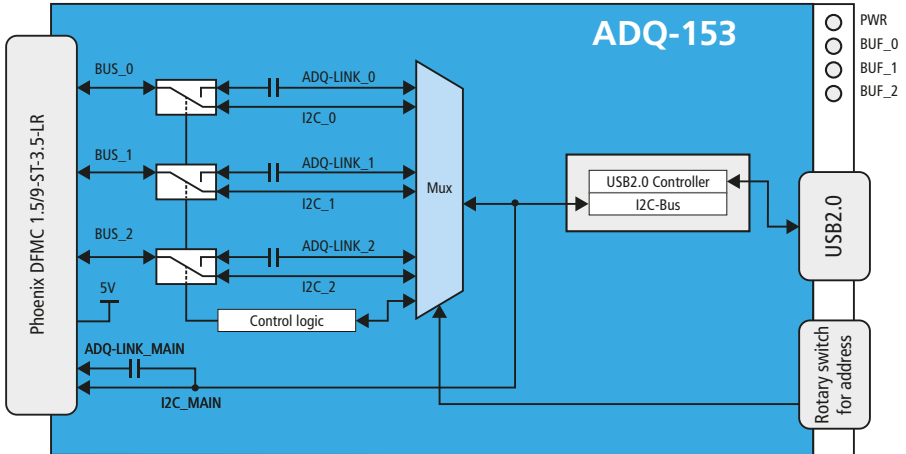
#### ADQ-63





### 3. Function groups

#### 3.1 Block diagrams



## 3.2 LED display status

LED	Description
PWR	Green = On, Orange = ADQ-LINK_MAIN OK, Flashing = Link activity (ADQ-153 only)
BUF_0	Off = Standard I2C, Red = ADQ-LINK, Orange = ADQ-LINK OK
BUF_1	Off = Standard I2C, Red = ADQ-LINK, Orange = ADQ-LINK OK
BUF_2	Off = Standard I2C, Red = ADQ-LINK, Orange = ADQ-LINK OK

## 3.3 Rotary switch

Use the rotary switch to set the address of the box. The addresses must be unique for each independent bus.

Position	Address (7 bit)
0	0x70
1	0x71
2	0x72
3	0x73
4	0x74
5	0x75
6	0x76
7	0x77
8	invalid
9	invalid

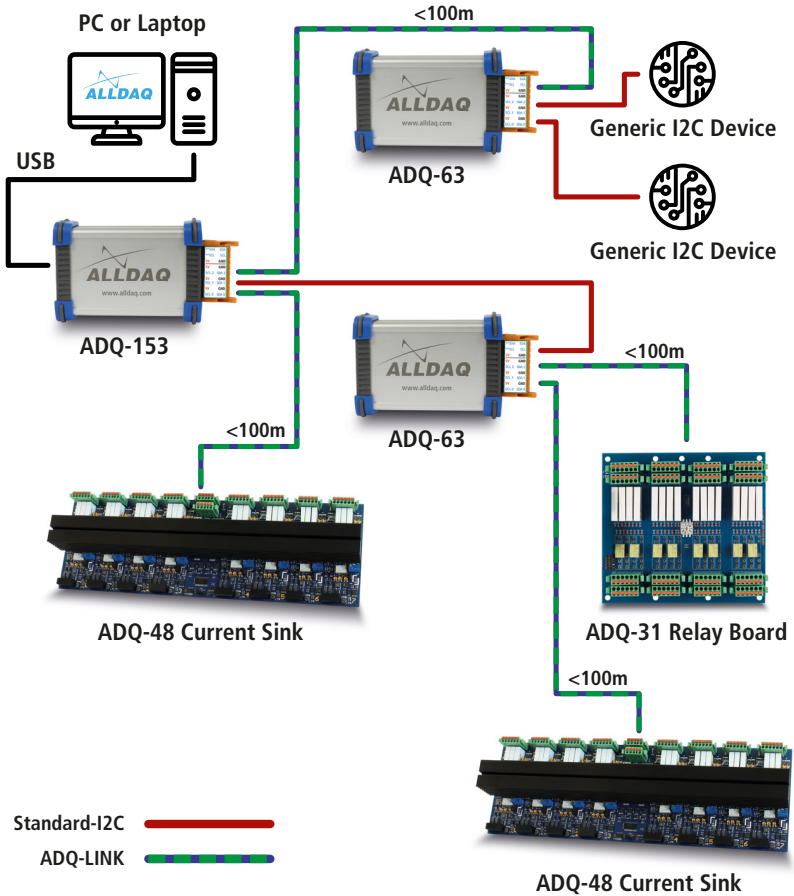
## 3.4 Power supply

The ADQ-63 must be externally supplied with 5VDC. The ADQ-153 is self-powered via USB, but it cannot power I2C devices.

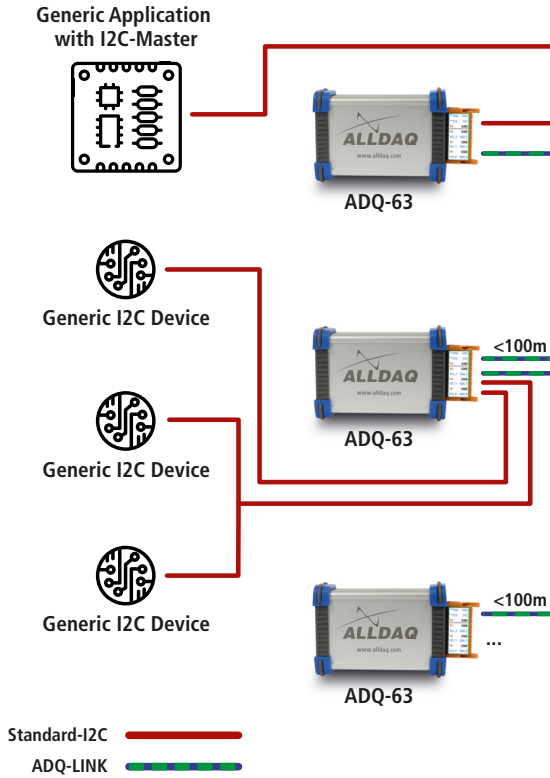
Via the 5V input, currents up to 8A can be fed in to supply I2C terminals.

### 3.5 Example applications

#### Example network with ALLDAQ driver



### ADQ-63 as I2C repeater without ALLDAQ driver



## 4. Annex

### 4.1 Specifications

#### Standard I2C

Element	Condition	Specification
Frequency		100kHz
Input level	LOW	1.5V (max.)
	HIGH	3.5V (min.)
Output current	LOW ( $V_{OL} = 0.4V$ )	7mA (typ.)
	LOW ( $V_{OL} = 0.6V$ )	10mA (typ.)
pull-up resistors	intern	2.2k $\Omega$ ( $\pm 1\%$ ) at 5V
	extern	User-specific at 2.7V to 5V

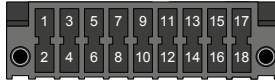
#### ADQ-LINK

Element	Condition	Specification
Frequency		100kHz
Isolation	ADQ-LINK+/-	50VDC
Cable lenght	2-core twisted	max. 100m

## General

Element	Condition	Specification
PC interface	USB2	USB2.0 Fullspeed (downwards compatible 1.1,1.0)
Power supply	intern	5V (max. 500mA)
Temperature range	Operation	0..70 °C
	Storage	-40..100 °C
Humidity	Operation	20%..55% (non-condensing)
	Storage	5%..90% (non-condensing)
Dimensions	Without cables	90x63x33mm (LxWxH)
Connections	ADQ-63	Phoenix Contact DFMC 1.5/ 9-ST-3.5-LR - 1790551
	ADQ-153	Phoenix Contact DFMC 1.5/ 9-ST-3.5-LR - 1790551 USB2.0 type B (higher engagement force)
Certifications		EG Directive 2004/108/EC, Emission EN 55022, Interference immunity EN 50082-2, RoHS
Manufacturer warranty		36 months

## 4.2 Pin assignment



Type: Phoenix Contact DMC 1.5/ 6-G1F- 3.5-LR P26THR 1874454

Pin	Description	Buffer activated	Buffer deactivated
1	SCL_0+	ADQ-LINK_0+	SCL_0
2	SDA_0	ADQ-LINK_0-	SDA_0
3	5V	Input and output of 5V supply (max. 8A)	
4	GND	Mass reference	
5	SCL_1+	ADQ-LINK_1+	SCL_1
6	SDA_1	ADQ-LINK_1-	SDA_1
7	5V	Input and output of 5V supply (max. 8A)	
8	GND	Mass reference	
9	SCL_2+	ADQ-LINK_2+	SCL_2
10	SDA_2	ADQ-LINK_2-	SDA_2
11	5V	Input and output of 5V supply (max. 8A)	
12	GND	Mass reference	
13	5V	Input and output of 5V supply (max. 8A)	
14	GND	Mass reference	
15	SCL_BUF	ADQ-LINK_MAIN+	
16	SCL	SCL_MAIN	
17	SDA_BUF	ADQ-LINK_MAIN-	
18	SDA	SDA_MAIN	

## 4.3 Manufacturer and support

ALLNET® is a registered trademark of ALLNET® GmbH Computersysteme. For questions, problems and for product information of all kinds please contact the manufacturer directly:

ALLNET® GmbH Computersysteme  
Division ALLDAQ  
Maistrasse 2, D-82110 Germering  
E-Mail: [support@alldaq.com](mailto:support@alldaq.com)  
Phone: +49 (0)89 894 222 – 474  
Fax: +49 (0)89 894 222 – 33  
Internet: [www.alldaq.com](http://www.alldaq.com)

## 4.4 Packaging ordinance

„Both manufacturers and distributors are basically obliged to ensure that sales packaging is taken back from the final consumer after use and is reused or recycled. (according to § 4 sentence 1 of the Packaging Ordinance). If you as a customer have problems with the disposal of packaging and shipping materials, please write an e-mail to [info@allnet.de](mailto:info@allnet.de).



## 4.5 Recycling advice and RoHS conformity

ALLNET® products are manufactured RoHS compliant (RoHS = Restriction of the use of certain hazardous substances).







## 4.6 CE identification

The ADQ-SCU bears the CE marking. This device meets the requirements of the EU Directive 2004/108/EC, Directive on Electromagnetic Compatibility and Mutual Recognition of Conformity. Conformity with the above directive is confirmed by the CE mark on the device.

## 4.7 Warranty

Within the warranty period, we will eliminate manufacturing and material defects free of charge. You will find the warranty conditions valid for your country on the homepage of your distributor. If you have any questions or problems concerning the application, you can reach us during our normal opening hours at the following telephone number +49 (0)89 894 222 - 474 or by e-mail to: [support@alldaq.com](mailto:support@alldaq.com).



ALLNET® GmbH Computersysteme  
Division ALLDAQ  
Maistrasse 2, D-82110 Germering  
E-Mail: [support@alldaq.com](mailto:support@alldaq.com)  
Phone: +49 (0)89 894 222 – 474  
Fax: +49 (0)89 894 222 – 33  
Internet: [www.alldaq.com](http://www.alldaq.com)

