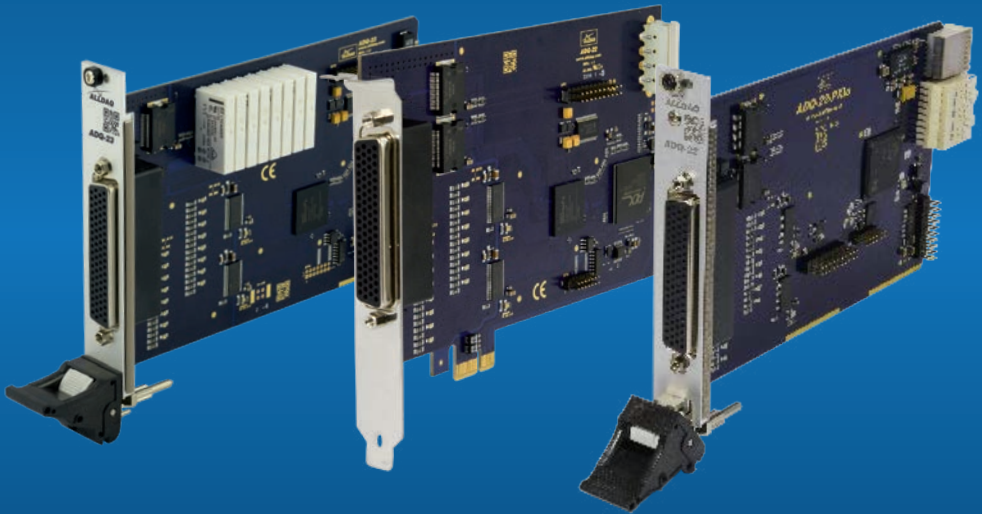**Competence in Measurement**

Manual

Rev. 1.1 EN

ADQ-22/23 (PXI/PXIe/PCIe)

Digital I/O boards with up to 32 isolated digital inputs, up to 32 isolated digital outputs, 16 TTL digital I/Os, ADQ-LINK, optional 8 change-over relays

Imprint

Manual ADQ-22/23-Serie
Rev. 1.1
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Manufacturer and support

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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 grateful at any time for notification of possible errors.

Trademarks mentioned are registered trademarks of the respective companies.

Contents

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 something was damaged during transport?

- Are there any signs of use on the unit?

You must never operate the appliance if it is damaged. If in doubt, contact our technical customer service.

Please read this manual carefully before installing the unit!

1.1   Scope of delivery

- ALLDAQ ADQ-22-PCIe or ADQ-22-PXI/PXIe or ADQ-23-PCIe or ADQ-23-PXI/PXIe

- 78-pin D-sub mating connector

- 25-pole Sub-D mating connector

- Additional slot bracket/panel with 25-pin Sub-D socket on 20-pin socket connector for cPCI (ADQ-AP-D25F-cPCI) or PCIe systems (ADQ-AP-D25F-PCIe)

- Data carrier with driver software and documentation

1.2   Safety instructions

Be sure to observe the following instructions:

- Ensure that the card is very well ventilated in the PC case, as the output drivers can get up to 100 °C hot under full load.

- It is essential to avoid touching cables and connectors etc. inside the PC with the board.

- Never expose the unit to direct sunlight during operation.

- Never operate the unit near sources of heat.

- Protect the unit from moisture, dust, liquids and vapours.

- Do not use the unit in damp rooms and never in potentially explosive areas.

- Repairs may only be carried out by trained, authorised personnel.

- When commissioning the unit, please observe the installation regulations and all relevant standards (incl. VDE standards), especially when operating with voltages greater than 42 V.

- We recommend connecting unused inputs to the corresponding reference ground to avoid crosstalk between the input channels.

- Always disconnect your field wiring from the power source before making or breaking cable connections to the board.

- Make sure that no static discharge can take place via the device when handling the card. Follow the standard ESD protection measures (see also chapter 2.1 on page 9).

- Never connect the units to live parts, especially not to mains voltage.

- Precautions to avoid unforeseeable misuse must be taken by the user.

ALLNET® GmbH Computersysteme accepts no liability for any damage resulting from improper use.

1.3 Installation and assembly site

The PC plug-in cards of the ADQ-22/23 series are digital I/O cards for industrial use. Depending on the version, the models of the ADQ-22/23 series are...

... for installation in a free PCI Express slot (ADQ-22-PCIe, ADQ-23-PCIe), or

... for installation in a free PXIe slot (ADQ-22-PXI/PXIe, ADQ-23-PXI/PXIe),

intended. PC plug-in cards must never be operated outside of suitable PC systems. For the procedure for installing a plug-in card, please read the chapter „Commissioning" in this manual and the operating instructions of your PC beforehand.

The ADQ-22/23 series may only be used in dry rooms. PC plug-in cards are not suitable for use in adverse environmental conditions (e.g. outdoors). Ensure that there is sufficient ventilation. Ensure that the connection cables are securely seated. Installation must be carried out in such a way that the cables (PC connection and external wiring) are not under tension, otherwise they may come loose.

1.4 Brief description

The digital I/O boards of the **ALLDAQ ADQ-22/23** series are for use in industrial automation and control technology. Models for **PXIe or standard PCI Express bus** are available. The galvanic isolation of 500 VACeff. between field wiring and PC effectively suppresses interference. To protect against contact bounce, these cards also offer the option of programming a digital filter per input port. Streaming operation enables continuous polling of all digital inputs or output of a bit pattern stream up to approx. 1 kHz.

The ADQ-22 has **32 (2 x 16 bit) isolated digital inputs** and the ADQ-23 has **24 (3 x 8 bit) digital inputs**. The isolated inputs have a Schmitt trigger characteristic according to IEC 61131-2 (type 1) and are designed for a max. input voltage of 35 V. All isolated inputs are equipped with status LEDs and can generate an interrupt in case of bit-pattern change, bit-pattern equality as well as in case of missing external supply.

The ADQ-22 has **32 (2 x 16 bit) isolated digital outputs** and the **ADQ-23 has 16 (2 x 8 bit) digital outputs**. Each output can drive up to 0.6 A. Multiple outputs can be connected in parallel to increase output current, eliminating the need for an external driver stage for many applications. An external voltage source in the range 11..35 V with sufficient power must be provided to supply the outputs. The output drivers are equipped with thermal overload protection, current limiting, short-circuit protection and undervoltage monitoring.

Via an adapter cable with slot bracket, a further **8 TTL digital inputs/outputs** can be used, which are addressed as a bidirectional 8 bit port. These are suitable for connecting accessory products, for example.

The ADQ-23 also has **8 changeover relays** (35 V/1 A)..

1.5   System requirements

1.5.1   Hardware

- PC system with a current Intel® or compatible processor based on the x86(-64) architecture.
- One free PCI Express x1 or CompactPCI Serial slot (4 TE)

1.5.2   Software

Included with the card is a Plug&Play driver for Windows Microsoft and higher (32 and 64 bit) as well as a function library (API) with code examples for high-level language programming. Please note the information in the corresponding help file adqSDK.chm.

Details on programming can also be found in the help file adqDriver.chm, which you can call up via the „ALLDAQ Manager" in the info area of the taskbar (usually at the bottom right) or the Windows Start menu.

2. Commissioning

2.1 Installation of the card

Before installing the card, please read the manual of your computer regarding the installation of additional hardware components.

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

Note the following procedure:

- Pull out the mains plug of the PC system.

- Open the housing as described in the manual of your PC system.

- Make sure that no static discharge can take place via the card when it is inserted. At least one hand should be earthed to discharge static charge.

- Only for PCI Express models: for the +5V supply of the card, an additional supply via the PC power supply unit is required (current consumption without load typ. 300 mA). To do this, connect a free power supply connector of your PC (as also used for supplying drives) to the corresponding MOLEX connector on the PCIe card (see the following illustration). If required, adapters (cables), e.g. from 13-pin SATA power supply plug to 4-pin MOLEX socket, are available from specialist dealers.
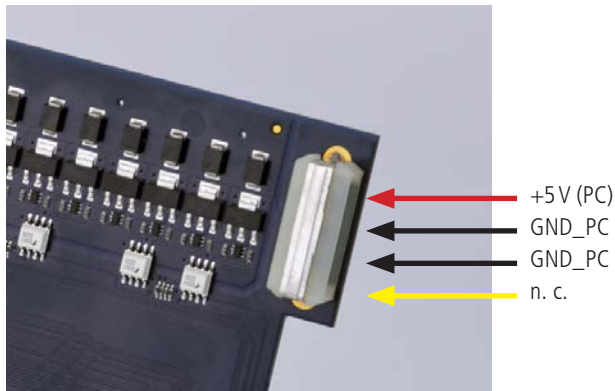

Fig. 1: 5 V supply for PCI Express models

- Insert the plug-in card carefully and with little pressure into the slot provided. Make sure that the card is not tilted and that it is fully inserted.

- If you want to use the additional slot bracket to use the TTL digital I/Os, select two adjacent slots for installation. Remove (if necessary) an additional blanking plate for the slot.

- Screw down all slot plates.

- Close the housing again as described in the manual of your PC system.

2.2   Software installation

2.2.1   Installation with Windows

Basically, the following procedure applies:

Start the menu-guided installation of the ALLDAQ driver by executing the ALLDAQDriverSetup64.exe (or ..32.exe) in the target directory of your download.

After successful installation, you will find the ALLDAQ Manager in the notification area of the taskbar, which gives you access to the Software Developer Kit (SDK), hardware manuals, help files and utility programmes.

ALLDAQ measuring cards are recognised by Windows after installation and hardware drivers are loaded automatically.

2.3   Testing programme

Simple test programmes can be found in the ALLDAQ SDK. There you will find a subfolder „Applications" for the respective programming language with test programmes for your ALLDAQ hardware.

With the ALLDAQ Manager you can query various information of the installed ALLDAQ hardware.

2.4   ALLDAQ Manager

The ALLDAQ Manager for Windows gives you a quick overview of the parameters of the ADQ driver system and provides central access to software tools and help files. You will find the ALL-DAQ Manager in the info area of the taskbar (usually in the bottom right-hand corner).

ALLDAQ Manager at a glance:

• Information about the installed ALLDAQ hardware at a glance

• XML export of the driver configuration for archiving and support

• Tool for interactive display of the pin assignment with possibility of PDF generation

• Tool for user synchronisation

• Convenient access to the Software Developer Kit (SDK) for high-level language programming with examples and simple test programs
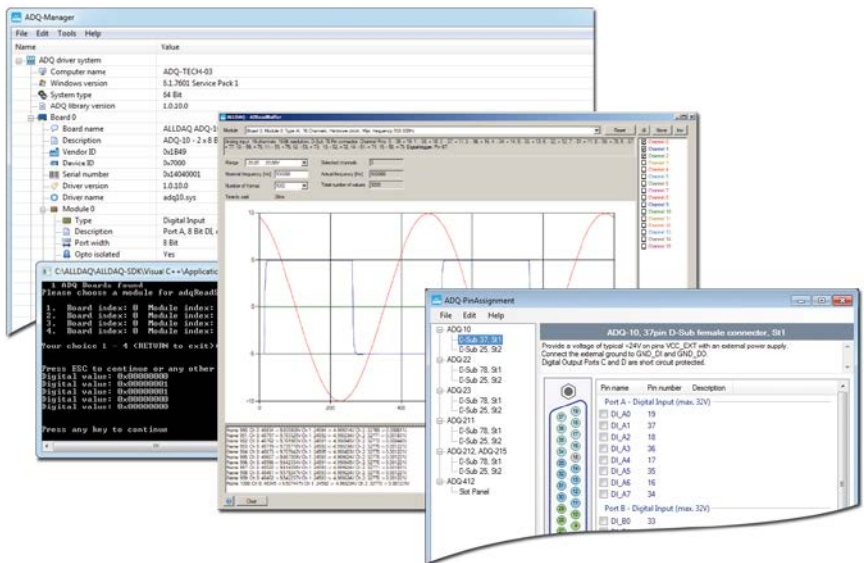
• Quick access to help files (*.chm)

Fig. 2: ALLDAQ Manager and SDK programmes

3. Function groups

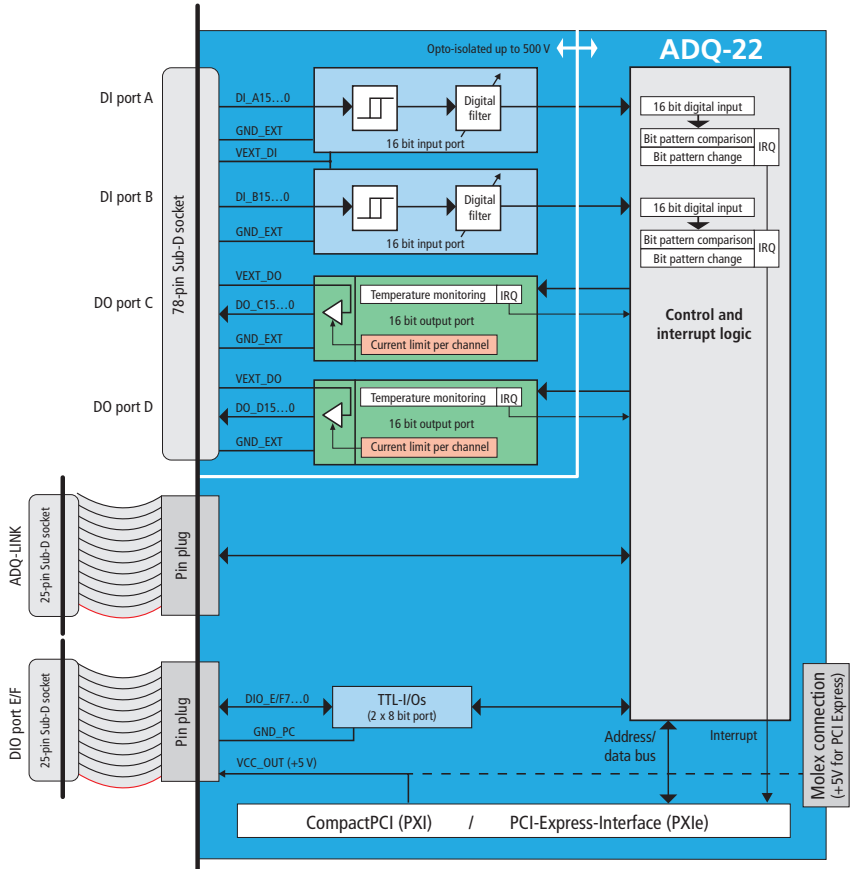## 3.1 Block diagrams

Block diagram ADQ-22

Fig. 3: Block diagram ADQ-22

- 32 isolated digital inputs (2 x 16 bit ports) with programmable filter

- 32 isolated digital outputs (2 x 16 bit ports)

- 16 bidirectional TTL digital I/Os (2 x 8 bit ports) usable via supplied adapter cable if required

- 1x ADQ-LINK can be used via supplied adapter cable if required

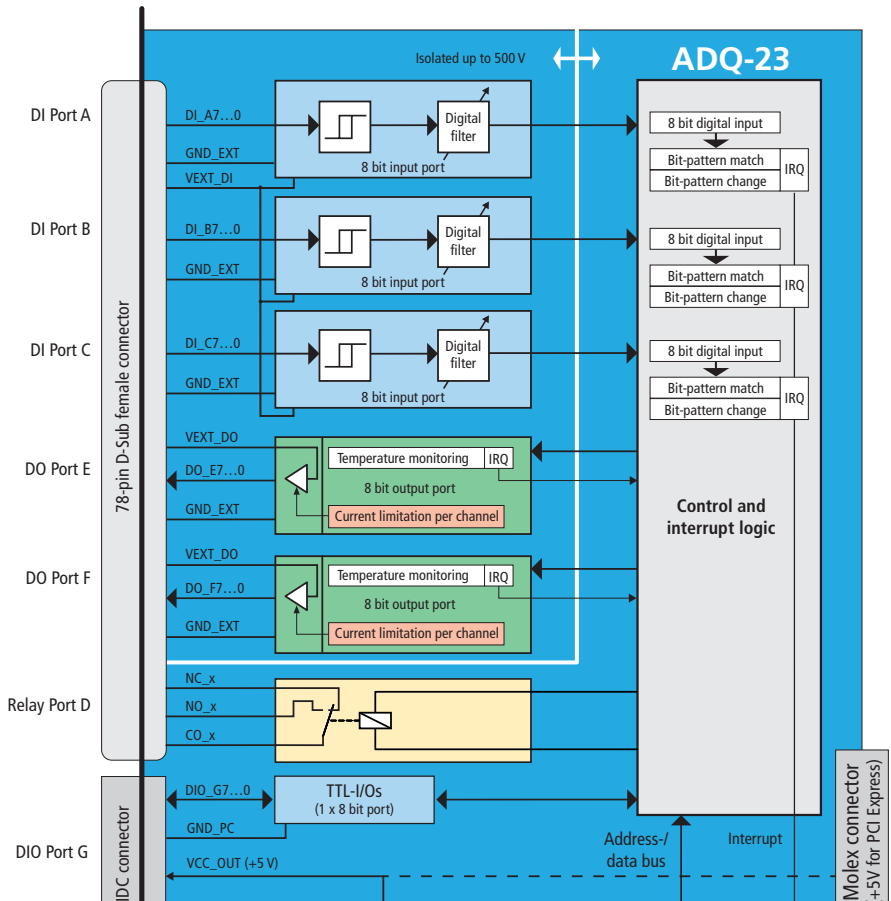## Block diagram ADQ-23

Fig. 4: Block diagram ADQ-23

- 24 isolated digital inputs (3 x 8 bit ports) with programmable filter

- 16 isolated digital outputs (2 x 8 bit ports)

- 8 bidirectional TTL digital I/Os (1 x 8 bit port) usable via supplied adapter cable if required

- 8 change-over relays (SPDT)

3.2   Isolated digital inputs

The **ADQ-22** has 2 isolated digital input ports with 16 bits each and the **ADQ-23** has 3 isolated digital input ports with 8 bits each. The isolated inputs have a Schmitt trigger characteristic according to IEC 61131-2 (type 1) and are designed for a max. input voltage of 35 V. All isolated inputs are equipped with status LEDs. The isolation voltage against PC ground is 500 VACeff according to EN60664-1 or UL1577.

If required, all inputs can be monitored for bit change or bit pattern equality and evaluated as an interrupt event. In addition, an interrupt can be triggered if the external voltage supply is too low (VEXT_DI < 8 V) or missing (VEXT_DI < 12.1 V).

3.2.1   Digital input filter

To prevent unwanted effects caused by contact bounce, you can programme a digital filter for each input port. Choose between the following values:

10 ms (N = 1248) / 3.2 ms (N = 400) / 1.0 ms (N = 125) / 10 µs (bypass). The scan frequency is 100 kHz (typ.).
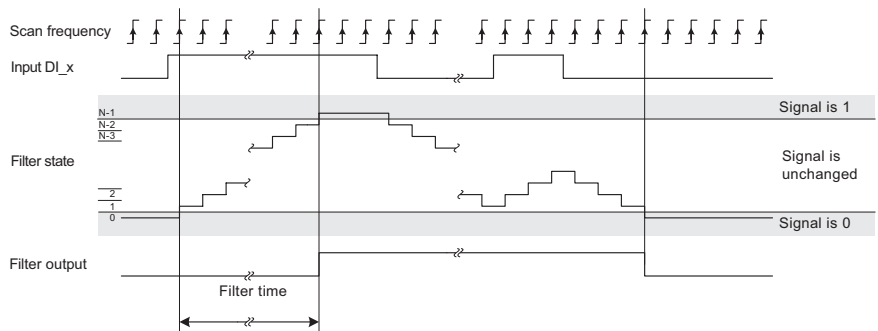

Fig. 5: Digital input filter

3.2.2   Wiring

The isolated inputs have a Schmitt trigger characteristic according to IEC 61131-2 (type 1) and are designed for the input high level UIH of typ. 24 V which is common in control technology. Observe the following conditions:

- Threshold voltage L x H: > 15 V @ VEXT_DI = 24 V

- Threshold voltage H x L: < 11 V @ VEXT_DI = 24 V

- Hysteresis: typ. 1 V

The external supply VEXT_DI can be in the range 9.6..35 V, we recommend 24 V. Note that a ground connection must always be made from the ext. circuitry to the reference ground of the isolated digital inputs (GND_EXT). The digital input section and the digital output section use GND_EXT together.
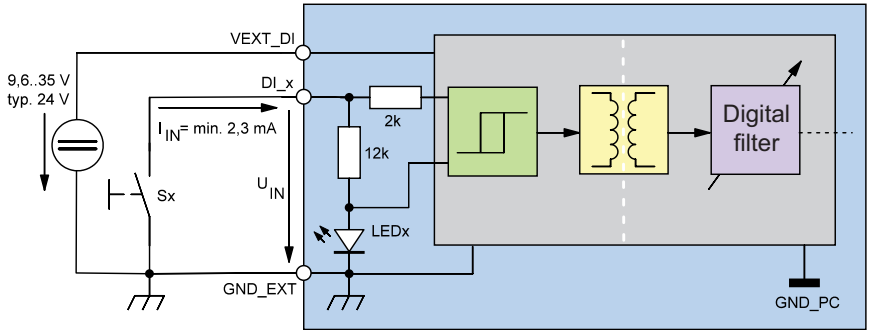
Fig. 6: Wiring of the isolated digital inputs

3.2.3   Programming

All input ports (DI_x) can be programmed independently of each other. The port direction is predetermined by the hardware.

A digital filter can be programmed for each port: 10 ms / 3.2 ms / 1 ms / 10 µs (bypass).

3.2.3.1 Read single value

In this operating mode, you can read in one digital value at a time in the respective port width.

Follow the procedure described in the online help.

3.2.3.2 Streaming operation

The software-controlled streaming mode enables the continuous reading of the digital inputs up to 1 kS/s port by port.

Follow the procedure as described in the online help.

3.2.3.3 Interrupt modes

If required, the isolated input ports can be monitored for bit change or bit pattern equality and evaluated as an interrupt event. In addition, an interrupt can be triggered if the external voltage supply is missing or too low. Programming is done in the „Interrupt" operating mode.

3.2.3.3.1 Bit change

In the „bit change" operating mode, one or more input bits can be masked that are to be monitored for a change of state. One bit mask each for rising and falling edge defines which bit and which edge should trigger an interrupt. As soon as a corresponding edge arrives at at least one bit masked with a „1", an interrupt is triggered (see Fig. 6).
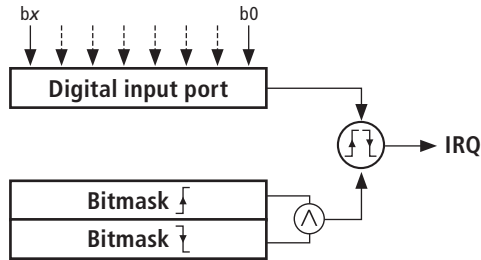
Fig. 7: Bit change

Example for bit change:

- By passing the value FFHex in the parameter `uiPortBitChangeRisingEdge` of the structure `SADQIRQEnable` in function `adqEnableIRQ()` for example, all bits of a port are monitored for rising edge. If only individual bits are to be monitored (e.g. monitoring bit b2 for a rising edge), the corresponding bit of the mask must be set to „1" (e.g. `uiPortBitChangeRisingEdge` = 04Hex).

- An interrupt is triggered as soon as a rising edge arrives at bit b2.

- The interrupt event is evaluated with the parameters `uiPortBitChangeRisingEdge` or `uiPortBitChangeFallingEdge` of the structure `SADQIRQStatus` in function `adqWaitIRQ()`. You receive the information which bit has triggered the interrupt with which edge (rising/falling)..

3.2.3.3.2 Bit pattern comparison

In the operating mode „bit pattern comparison", a previously defined reference bit pattern is compared with the bit pattern present at the corresponding input port. If the bit patterns are identical, an interrupt is triggered (see Fig. 7).
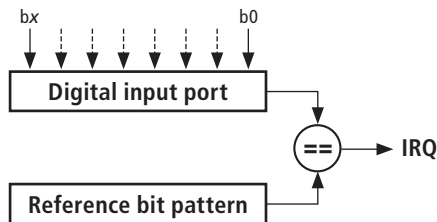

Fig. 8: Bit pattern comparison

Example for bit pattern comparison:

- The reference bit pattern is defined in the `uiPortBitPatternValue` parameter of the `SADQIRQEnable` structure in function `adqEnableIRQ()`.

- Enable the interrupt by passing the boolean value TRUE in the parameter `bPortBitPatternCompare` of the structure `SADQIRQEnable` in function `adqEnableIRQ()`.

- As soon as all bits on the input port match the reference bit pattern, an interrupt is triggered.

- The interrupt event is evaluated with parameter `bPortBitPatternCompare` of the structure `SADQIRQStatus` in the function `adqWaitIRQ()`. TRUE indicates that bit pattern equality is present.

3.2.3.3.3 Supply voltage missing

If required, an interrupt can be triggered in the absence of an external power supply (VEXT_DI < 12.1 V).

3.2.3.3.4 Supply voltage too low

If necessary, an interrupt can be triggered if the external voltage supply is too low (VEXT_DI < 8 V).

3.3 Isolated digital outputs

The **ADQ-22** has 2 isolated digital output ports with 16 bits each and the **ADQ-23** has 2 isolated digital output ports with 8 bits each. The outputs are equipped with a power FET in the high path that switches up to 0.6 A per channel. The isolation voltage against PC ground is 500 VAC$_{eff}$.

3.3.1 Wiring

The outputs are designed for the usual high level of 24 V (UOH = 11..35 V) in control technology. The max. output current IO is 0.6 A per channel. To increase the output current, several outputs can be connected in parallel. A ground reference to the external output circuitry must be established via GND_EXT. The digital output section and the digital input section use GND_EXT together.

The output stage offers comprehensive overload protection, including:

- Short-circuit-proof outputs (current limitation per channel)

- Switch-off at current peaks of typ. 1.4 A, e.g. with inductive loads

- Overvoltage protection for VEXT_DO > 47 V

- Undervoltage cut-off: VEXT_DO = min. 7 V/max. 10.5 V, restart at max. 11 V, hysteresis: typ. 0.5 V

- Thermal overload protection with automatic restart. In case of overload (TTSD = typ. 135°C) the respective channel switches off and switches on again automatically as soon as the junction temperature has dropped by 10°K. In the event of an overload, the driver module (per port) can send an interrupt to the PC.

To supply the output stage, an external voltage source that can provide sufficient power must be connected to the VEXT_DO pins. At full load, this is up to 19.2 A for the ADQ-22 and up to 9.6 A for the ADQ-23. Therefore, connect all Vext and GNDext pins as well.

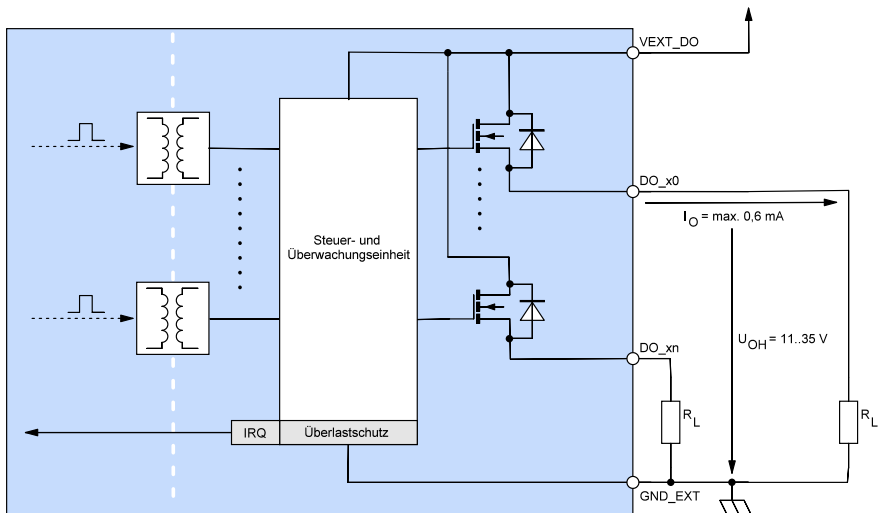**Attention: the 78-pin sub-D connector (ST1) can heat up!**

Fig. 9: Wiring of the isolated digital outputs

3.3.2 Programming

The output ports (DO_x) can be programmed independently of each other. The port direction is predetermined by the hardware.

3.3.2.1 Single-value issue

In this operating mode, you can output one digital value at a time in the respective port width.

Note: An output port can also be read back!

Follow the procedure as described in the online help.

3.3.2.2 Streaming operation

The software-controlled streaming mode enables the continuous output of a bit pattern stream up to 1 kS/s port by port.

Follow the procedure as described in the online help.

3.3.2.3 Interrupt mode

If the output stage is overloaded, the port concerned is automatically switched off and an interrupt is generated.

Observe the procedure as described in the online help.

3.4 Bidirectional digital inputs/outputs

The ADQ-22 series has a bidirectional 16 bit digital I/O port (DIO_x). The ADQ-23 series has a bidirectional 8 bit digital I/O port (DIO_x). If required, the port can be tapped via the 25-pin sub-D socket ST2. Depending on the form factor used, an additional slot bracket for PCI/PCIe slots (ADQ-AP-D25F-PCI) or a front panel for cPCI slots (ADQ-AP-D25F-cPCI) is included in the scope of delivery for this purpose (see pin assignment on page <?> and page 30).

After switching on the supply, all ports are switched to input.

3.4.1 Wiring

When wiring the inputs and outputs, make sure that the TTL level is maintained (see specifications on page 25) and that a reference to PC ground (GND_PC at ST2) must be established. The max. output current is $I_O = I_{OL} = I_{OH} = 10$ mA.
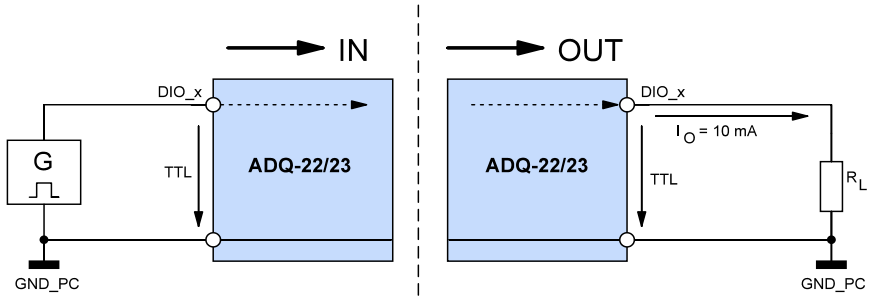
Fig. 10: Wiring of the digital inputs/outputs

3.4.2 Programming

The bidirectional 8 bit digital I/O ports (DIO_x) can be programmed port by port as input or output. After switching on the supply, all ports are switched to input.

3.4.2.1 Single value input/output

In this operating mode, you can read in or output a digital value port by port. The port direction is defined by the software.

Note: A port configured as an output can also be read back!

Follow the procedure as described in the online help.

3.4.2.2 Streaming operation

Depending on the port direction, the software-controlled streaming operation enables the continuous reading of the digital inputs or the output of a bit pattern stream up to 1 kS/s.

Follow the procedure as described in the online help.

3.5 Relay

The actual current carrying capacity of the relays depends on several factors. The sum of the resistances per channel (connector, conductor track, relay contact) is typically 200 mΩ (max. 250 mΩ). This results in a power loss of 0.2 W/channel.

Note:

Always select sufficiently dimensioned cable cross-sections for the connection. E.g. 0.14 mm^2 to 1 A. Suitable connection cables can be found on page 32.

3.5.1 Wiring

When switching electromechanical relays, induction voltages and high inrush currents occur depending on the load (resistive or inductive). Therefore, the use of a contact protection circuit is strongly recommended. To ensure the effectiveness of the protective circuit, it should not be placed more than 20 cm from the contact. The following figure shows a suggested circuit.

The values depend on the load and the relay characteristics. The capacitor CNC/NO suppresses the discharge when the contact opens, the resistor RNC/NO limits the current at the next switching operation. The circuit is equally suitable for DC and AC voltage. Since you have both a normally open and a normally closed contact available on the ADQ-23, you must always provide the protective circuit for each contact that switches an appreciable load.

You can use the following values as a guide for selecting RNC/NO and CNC/NO:

- $R_{NC/NO}$: 0.5..1 Ω per 1 V of the switching voltage U
- $C_{NC/NO}$: 0.5..1 µF per 1 A of the switching current I

Note: When the computer is switched off and switched on, the common contact (CO_x) is connected to the normally closed contact (NC_x).
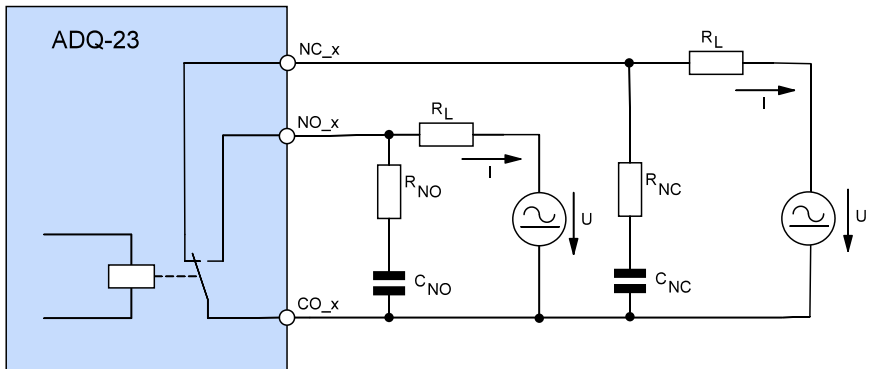

Fig. 11: Wiring of the relays

3.5.2 Programming

The relays are programmed like a digital output port. The port direction is output.

Follow the procedure as described in the online help.

4.   Annex

4.1   Specifications

Isolated digital inputs

Conditions: VEXT_DI = 24V ±5%, T_A = 25°C

Element	Condition	Specification
Quantity	ADQ-22	2 x 16 bit digital input ports
	ADQ-23	3 x 8 bit digital input ports
Type		Isolated digital inputs (unidirectional) with Schmitt trigger characteristic according to IEC 61131-2 (type 1)
Insulation voltage		500 VAC according to EN60664-1 resp. UL1577
Overload protection	if the external supply is too low	Shutdown min. 8.0 V; Startup max. 9.6 V; Hysteresis typ. 1 V
	in the absence of external supply	Switch-on threshold min. 12.1 V; switch-off threshold max. 13.9 V
Input level	VEXT_DI = 24 V	LxH: > 15 V; HxL: < 11 V; hysteresis: typ. 1 V
Input current	VEXT_DI = 24 V	min. 2.3 mA per channel
Status LEDs		per channel
Input filter (programmable per port)	Filter off (bypass)	typ. 10 µs (N = 1)
	Filter time 1	typ. 1 ms (N = 125)
	Filter time 2	typ. 3.2 ms (N = 400)
	Filter time 3	typ. 10 ms (N = 1248)
Scan frequency	For filter	typ. 100 kHz
Operable		Simple input, streaming operation, interupt (bit change, bit pattern equality).
Streaming mode	per port	max. 1 kS/s (via software timer)
External supply	VEXT_DI	9.6..35 VDC, typ. 24 VDC for control technology
Ground reference		GND_EXT (isolated from PC ground GND_PC)

Isolated digital outputs

Conditions: VEXT_DO = 15…30 VDC, T_A = -25…+125°C

Element	Condition	Specification
Quantity	ADQ-22	2 x 16 bit digital output ports
	ADQ-23	2 x 8 bit digital output ports
Type		Isolated digital outputs (unidirectional) according to IEC 61131-2 (type 1)
Insulation voltage		500 VAC according to UL508 & EN 61131-2

Element	Condition	Specification
Output level	U_{OH}	11..35 V
Output current	U_O = typ. 24 VDC	I_O max. 0.6 A per channel (parallel connection possible)
DC short-circuit current	VEXT_DO = 24 VDC R_L = 10 mΩ	min. 0.7 A; max. 1.7 A
Undervoltage cut-off	VEXT_DO	min. 7 V/max. 10.5 V, Restart at max. 11 V, hysteresis: typ. 0.5 V
Overvoltage protection	VEXT_DO	min. 47 VDC
Dissipation energy with inductive load	per channel	max. 1 Joule
Resistance with active output	I_O = 0.5 A; T_A = 25°C	typ. 150 mΩ, max. 200 mΩ
Leakage current with inactive channel		typ. 5 µA, max. 30 µA
Cut-off current with inductive loads		typ. 1.4 A
t_{on} (switch-on time)	R_L = 47Ω, up to 90% U_O	typ. 64 µs; max. 120 µs
t_{off} (switch-off time)	R_L = 47Ω, up to 10% U_O	typ. 89 µs; max. 170 µs
dUO/dt(on) (slope when switching on)	von 10..30% U_O, R_L = 47Ω, VEXT_DO = 15V	typ. 1 V/µs; max. 2 V/µs
dUO/dt(off) (slope when switching off)	from 70..40% U_O, R_L = 47Ω, VEXT_DO = 15V	typ. 1 V/µs; max. 2 V/µs
Switch-off temperature		min. 135 °C
Thermal hysteresis		10°K
Operable		Simple output, streaming operation
Monitoring	per channel	IRQ in case of thermal overload
Streaming operation	per channel	max. 1 kS/s (via software timer)
External supply	VEXT_DO	11..35 VDC; typ. 24 VDC for control technology
Ground reference		GND_EXT (isolated from PC ground GND_PC)

Relay

Conditions: T_A = 25°C

Element	Condition	Specification
Anzahl		8 change-over relay (type C)
Typ		NAIS APE3005 or compatible
Dauerbelastbarkeit	Direct current	max. 35 VDC/1 A
	Alternating current	max. 35 VAC/1 A
Widerstand	per channel	typ. 200 mΩ; max. 250 mΩ
Isolationswiderstand		min. 103 MΩ at 500 VDC

Element	Condition	Specification
Breakdown voltage	Contact to contact	1000 V
	Contact to coil	4000 V
Tightening time		max. 8 ms
Release time		max. 4 ms
Lifetime		> 5 x 10^6 Switching cycles (depending on type of load)

Bidirectional digital I/Os (TTL)

Conditions: $T_A = 25°C$

Element	Condition	Specification
Quantity	ADQ-23	1 x 8 bit digital input/output port
	ADQ-22	2 x 8 bit digital input/output port
Type		TTL (bidirectional, direction configurable port by port)
Mass reference		PC ground (GND_PC)
U_{IH}	VCC = 5V	min. 2.0 V
U_{IL}	VCC = 5V	max. 0.8 V
I_I		typ. ±1 µA
U_{OH}	I_O = -24 mA	min. 2.4 V
U_{OL}	I_O = 24 mA	max. 0.5 V
I_O		±24 mA
Streaming operation	per channel	max. 1 kS/s (via software timer)

General

Element	Condition	Specification
PC interface (depending on model)	PXIe models	PXIe Serial Rev. 1.0a
	PCIe models	PCI-Express x1 Rev. 1.0a
+5 V supply	only for PCI-Express	+5 V supply via Molex connector for connection to PC power supply unit
Power consumption	PXIe models	+12 V via backplane: typ. 0.6 A (incl. load via VCC_OUT)
	PCIe models	+3.3 V via slot: typ. 450 mA (Quiescent current); +5 V via Molex connectors: max. 1 A (incl. load via VCC_OUT)
Operating temperature	Operation	0..70 °C
	Storage	-40..100 °C
Humidity	Operation	20%..55% (non-condensing)
	Storage	5%..90% (non-condensing)
Dimensions (without slot bracket and connector)	PXIe models	3 HE PXIe Serial card (4 TE)
	PCIe models	158 mm x 111.15 mm (W x H)

Element	Condition	Specification
Connections	PXIe models	78-pin Sub-D socket (ST1), 25-pin Sub-D socket (ST2) via additional slot plate
	PCIe models	78-pin Sub-D socket (ST1), 25-pole Sub-D socket (ST2) via additional slot plate, + Molex connector (+5 V)
Certifications		EC Directive 2004/108/EC, Emission EN 55022, Immunity EN 50082-2, RoHS
Manufacturer warranty		36 months

4.2   Pin assignments

4.2.1   ADQ-22

4.2.1.1   78-pin Sub-D socket (ST1)
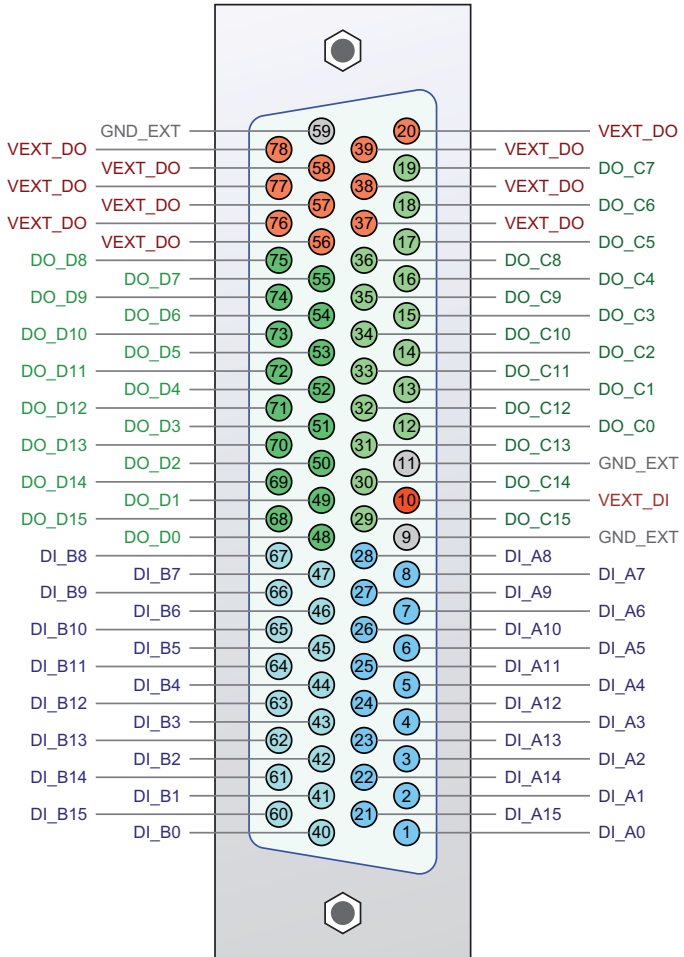
Fig. 12: ADQ-22 Pin assignment 78-pin D-sub socket (ST1)

4.2.1.2 25-pin Sub-D socket (ST2)
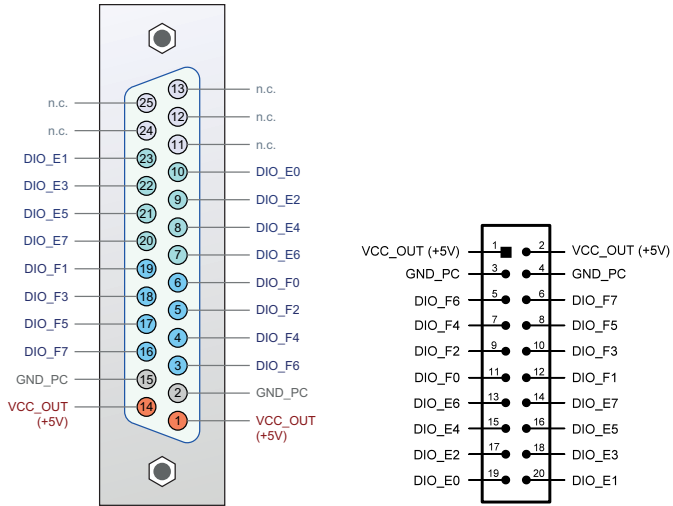
Fig. 13: Pin assignment 25-pin Sub-D socket (left) and pin connector strip ST2 (right)

4.2.1.3 25-pin Sub-D socket (ADQ-LINK)
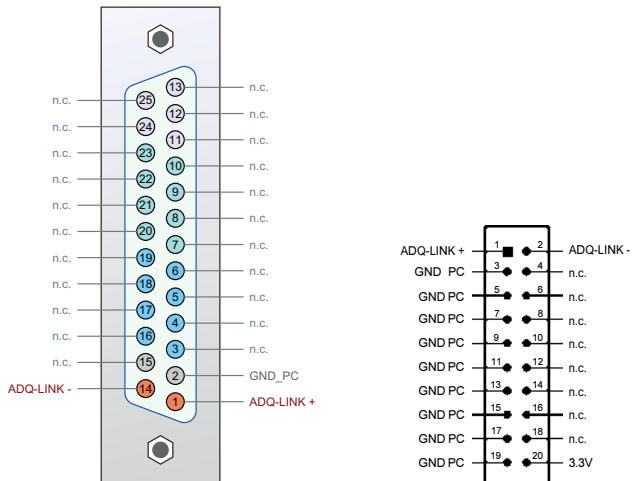
Fig. 14: Pin assignment 25-pin Sub-D socket (left) and pin connector strip ST2 (right)
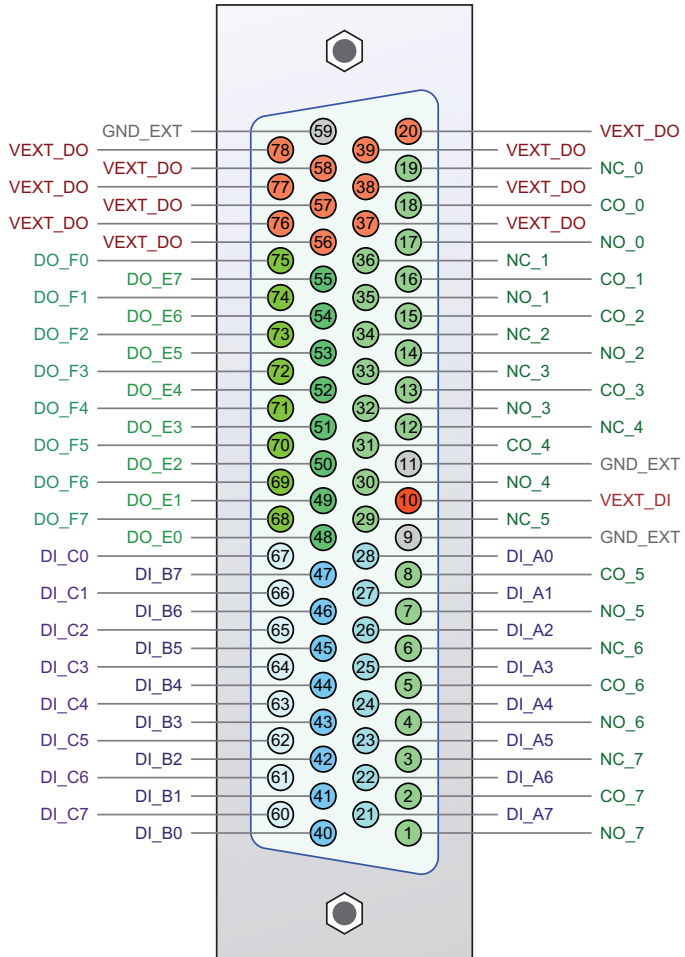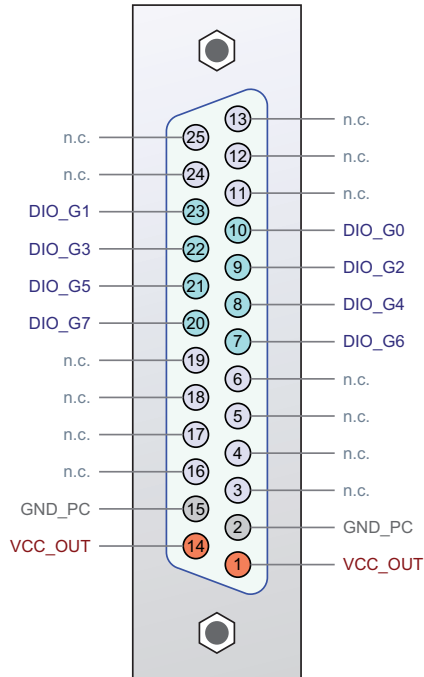
4.2.2   ADQ-23

4.2.2.1   78-pin Sub-D socket (ST1)

Fig. 15: ADQ-23 Pin assignment 78-pin Sub-D socket (ST1)

4.2.2.2 25-pin Sub-D socket (ST2)

Fig. 16: ADQ-23 Pin assignment 25-pin Sub-D socket (ST2)

4.2.3 Adapter cable with additional slot plate

To use the TTL digital I/Os (ADQ-22: port E or ADQ-23: port G), you need an adapter cable with additional slot plate from the board's pin connector to 25-pin sub-D socket (included in delivery).

Note: The scope of delivery can optionally include an adapter cable with a 20-pin or 26-pin socket connector. The pin assignment of ST2 is the same in both cases.

CompactPCI cover (4TE) with 25-pin Sub-D
socket on 20-pin socket strip

PCI/PCIe slot bracket with 25-pin Sub-D
socket on 20-pin female connector strip
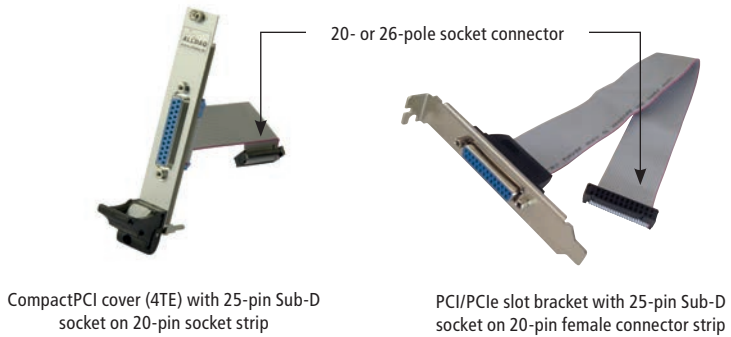
Fig. 17: Additional slot plate/panel

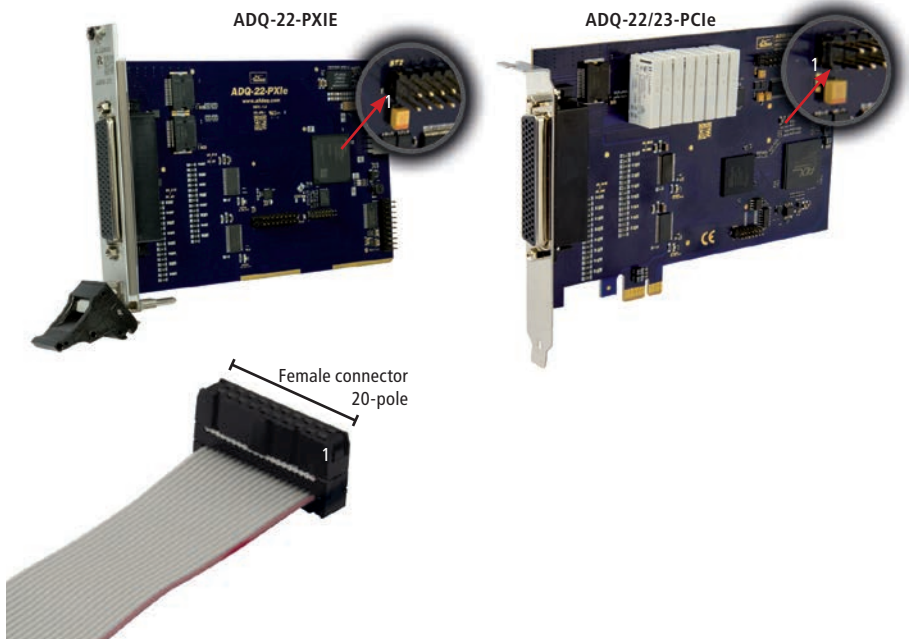**Connection adapter cable with slot bracket**

Fig. 18: Connection ribbon cable for ST2

When plugging in the adapter cable, make sure that you plug pin 1 of the ribbon cable (red marked wire) to pin 1 of the pin header ST2 as shown above.

4.3   Accessories

ADQ-TB-D25M-HUT (Art.-No. 111749)

25-pin terminal block for DIN rail mounting, 25-pin Sub-D connector on Phoenix terminals

ADQ-TB-D78M-HUT (Art.-No. 111751)

78-pin terminal block for DIN rail mounting, 78-pin Sub-D connector to Phoenix terminals

ADQ-CR-D25M-D25F-1,8m (Art.-No. 111752)

Round cable shielded from 25-pin Sub-D plug to 25-pin Sub-D socket, length: 1.8 m

ADQ-CR-D78M-D78F-1,5m (Art.-No. 111754)

Round cable shielded from 78-pin Sub-D plug to 78-pin Sub-D socket, length: 1.5 m

ADQ-AP-D25F-cPCI (Art.-No. 111755 - included in the scope of delivery of ADQ-22/23-cPCIS)

CompactPCI cover (4TE) with 25-pin Sub-D socket on 20-pin socket strip

ADQ-AP-D25F-PCI (Art.-No. 111756 - included in the scope of delivery of ADQ-22/23-PCIe)

PCI slot bracket with 25-pin Sub-D socket on 20-pin female connector strip

 or...

ADQ-AP-D25F26-PCI (Art.-No. 113788 - optional for 111756)

PCI slot bracket with 25-pin Sub-D socket on 26-pin socket strip

4.4   Manufacturer and support

ALLNET® is a registered trademark of ALLNET® GmbH Computersysteme. If you have any questions, problems or require product information of any kind, please contact the manufacturer directly:

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Phone: +49 (0)89 894 222 74
Fax: +49 (0)89 894 222 33
Internet: www.alldaq.com

4.5   Important notes

4.5.1   Packaging Ordinance

„In principle, manufacturers as well as distributors are obliged to ensure that sales packaging is taken back by the final consumer after use and recycled or reused. (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.

4.5.2   Recycling notice and RoHS conformity

Please note that parts of ALLNET® GmbH products should be handed in at recycling centres or may not be disposed of with household waste (printed circuit boards, power supply units, etc.)..

ALLNET® products are manufactured in compliance with RoHS (Restriction of the use of certain hazardous substances).

4.5.3   CE marking

The ADQ-22/23 series carries the CE marking.

This unit complies with the requirements of the EU Directive 2004/108/EC, Directive on Electromagnetic Compatibility and the mutual recognition of its conformity. Conformity with the above directive is confirmed by the CE mark on the unit.

4.5.4   Warranty

Within the warranty period, we will remedy manufacturing and material defects free of charge. You can find the warranty conditions valid for your country on the homepage of your distributor. If you have any questions or problems regarding the application, you can reach us during our normal opening hours at the following telephone number +49 (0)89 894 222 - 74 or by e-mail: support@alldaq.com.

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W

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