

DIO Schaltbox 4A

Instructions for Use

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Any semiconductor devices have an inherent chance of failure. You have to protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy,

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fire protection, and prevention of over-current levels and other abnormal operating conditions. The safety and handling instructions in this document have to be followed strictly.

EC Conformity

The herein described component is designed, intended and authorized for assembly in an end product by qualified persons who are fully aware of the EMC implications. It is the assembler's responsibility to ensure that a product which is housing the DIO Schaltbox 4A complies with the requirements of all applicable directives for this product.

This product is compliant with the European Community Directive 2011/65/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

Revision History

Document number: 3-00450001-D11

| Version | Date | Description |
|---------|-------------|---------------|
| D1V0-F | 24-Jan-2025 | First release |

Related Hardware / Software Versions

| Product | Reference No. | Version | Remarks |
|-----------------|---------------|---------|---------|
| DIO Schaltbox4A | 3-00450001 | 01 | |

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1 General


1.1 Intended User Group

This product may only be used by expert technicians and/or engineers who are qualified and familiar with electronic components and systems.

Each person involved with setup or operation of the product must

- be a qualified technician or engineer
- strictly adhere to this manual
- receive a briefing by an authorized person

| | |
|---|---|
|  | NOTICE |
| | If you are unsure of how to use the product as intended or have any questions about the use of the product, please discontinue use of the product immediately and contact the STAR ELECTRONICS Support. |

| | |
|---|--|
|  | ⚠ WARNING |
| | The product may only be used by expert technicians and/or engineers who are qualified and familiar with electronic components and systems! The use of the product by non-professionals is not permitted and strictly forbidden! |


1.2 Intended Use


The DIO Schaltbox 4A is testing equipment. It was developed to increase the switching capacity of the digital output of the FL3X Device L/L².


For this intended use, the DIO Schaltbox 4A offers the following options:

- Increasing switching capacity

Any deviation from the intended use and/or installation in a testing vehicle is only permitted with specific prior written approval of STAR ELECTRONICS GmbH & Co. KG.



| | |
|---|---|
|  | ⚠ WARNING |
| | Any use of the device to control an actuator outside a fully controlled testing and/or laboratory environment may result in death or serious injury due to unpredictable behavior of a vehicle and/or potentially missing, deactivated or malfunctioning safety devices on a vehicle! |

| | |
|---|---|
|  | NOTICE |
| | The device is not a calibrated measurement device. STAR ELECTRONICS GmbH & Co. KG accepts no liability whatsoever for the correctness of any measurement results. |

| | |
|---|--|
|  | ⚠ WARNING |
| | The DIO Schaltbox 4A is NOT designed, intended, or authorized any may NOT be used for or in connection with the following purposes and/or devices: - use as part of medical systems |

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| | |
|--|---|
| | <ul style="list-style-type: none"> - life support applications - aviation, space, nuclear, or military applications - use in areas where combustible or explosive gas mixtures are likely to occur - any other purposes / devices deviating from the intended use of the product specified by STAR ELECTRONICS GmbH & Co. KG. |
|--|---|

| | |
|---|---|
|  |  WARNING |
| | <p>The product may only be used by expert technicians and/or engineers who are qualified and familiar with electronic components and systems!</p> <p>The use of the product by non-professionals is not permitted and strictly forbidden!</p> |

1.3 Used Pictograms

The meaning of used pictograms is shortly described below.

Follow the specific instructions in the document where these pictograms are placed.

| | |
|---|--|
|  |  WARNING |
| | Used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  |  CAUTION |
| | Used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. |
|  | NOTICE |
| | Used to indicate a situation which may result in an operating failure. Damage of the product may occur, but there is no hazard of injury if not avoided. |
|  | Information |
| | Used to indicate information provided only for purposes of clarification, illustration, and general information. |
|  | Reference |
| | References to other documents. |
|  | Product marking which shows the compliance of the product with the European Waste Electrical and Electronic Equipment Directive 2012/19/EU. |

1.4 Safety and Handling Instructions

Please read the instructions for use carefully. To protect the device or the application against damage, or to avoid personal injury the DIO Schaltbox 4A has to be handled as described herein.


Changes or modifications of the DIO Schaltbox 4A are not allowed for safety and warranty reasons!

STAR ELECTRONICS GmbH & Co. KG is not liable for any damages arising from non-observance of the product information.

Follow the

- a) specific safety and handling instructions placed at dedicated document positions
- b) general safety and handling instructions below:

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| NOTICE | |
|---|--|
|  | <p>To prevent damage to the DIO Schaltbox 4A, or consequential damages:</p> <ul style="list-style-type: none"> • Do not open the DIO Schaltbox 4A. • Do not connect any other signals to the interfaces as described in the chapter “Interfaces”. Ensure that all signals are within the specified range. • High temperatures can damage the DIO Schaltbox 4A. Keep the DIO Schaltbox 4A away from heaters, stoves, fireplaces, and other sources of heat. • Do not expose the DIO Schaltbox 4A to rain or use it near water. • Do not use the DIO Schaltbox 4A in areas of explosion hazard. |

1.5 Meaning of Text Styles

In this document *filenames* marked with a different text format.

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2 Product Description

2.1 DIO Schaltbox 4A at a glance

The DIO Schaltbox 4A increases the switching capacity of the DIO output from a FL3X Device L/L².

Field of application

Switching power relays etc.

2.2 Accessory Parts

For further information about accessories for the DIO Schaltbox 4A see chapter 7.2 Accessory Parts.

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3 Technical Data

3.1 Electrical Characteristics

| | | | |
|----------------------------|--|-------|--|
| Supply voltage | None, supplied from the FL3X Device L/L ² | | |
| Switching current max. | | 4,0 A | |
| Supply current - quiescent | typ: is supplied from the FL3X Device L/L ² | | |
| Supply current - operating | typ: is supplied from the FL3X Device L/L ² | | |

Table 1: Electrical characteristics

3.2 Physical Characteristics

| | |
|------------------------------|--------------------|
| Connectors | MQS-936287 |
| Weight approx. | 50g |
| Dimensions approx. L x W x H | 46mm x 32mm x 20mm |

Table 2: Physical characteristics

3.3 Environmental Conditions

| | |
|-------------------|--|
| Temperature | Operating: -40 - +85°C Non-operating: -40 - +85°C Storage: -20 - +65°C |
| Relative Humidity | 10 - 90 % r.H., Non-condensing |

Table 3: Environmental characteristics

3.4 Block Diagram

Simplified representation of the circuit.

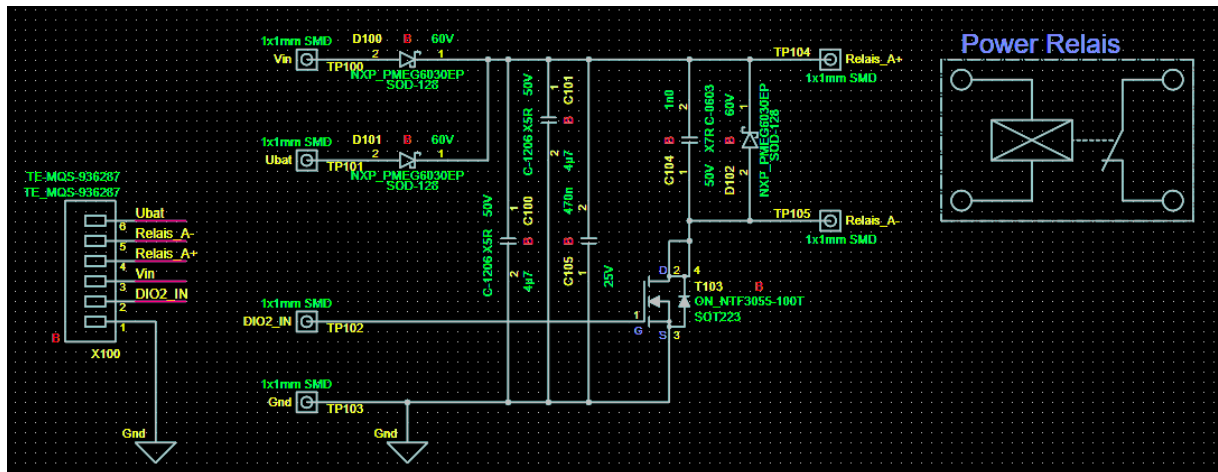


Figure 1: Basic circuit diagram

3.5 Layout Diagram

The DIO Schaltbox 4A should be external powered and connected between the FL3Xdevice L/L² and the Power-Relais.

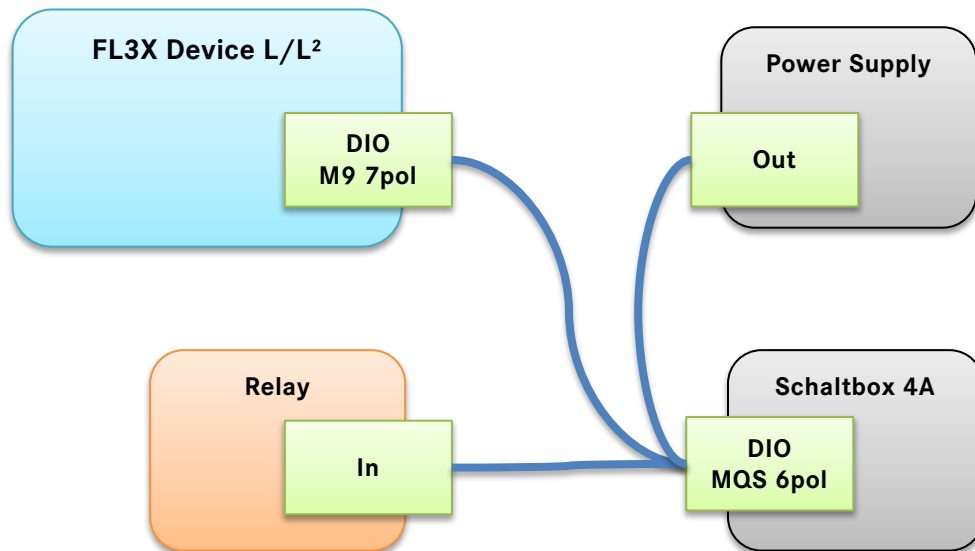


Figure 2: Wiring principle of the DIO Schaltbox4A

3.6 Interfaces


| Connector MQS-936287 | | |
|----------------------|-------------|---|
| Pin | Signal Name | Description |
| 1 | GND | Reference ground signal |
| 2 | DIO2_IN | Digital input from the FL3X Device L/L ² |
| 3 | Vin | Power input from the FL3X Device L/L ² |
| 4 | Relais_A+ | Positive signal to the relay, powered from Vin and Ubat |
| 5 | Relais_A- | Negative signal to the relay, switched to GND |
| 6 | Ubat | Power input from the external power supply |

Table 4: Connector pinout of the DIO Schaltbox4A

4 Getting Started

4.1 Assembly and Line-up


Read and follow these instructions when connecting and using the DIO Schaltbox 4A:

| | |
|---|---|
|  | NOTICE |
| | <p>Ensure that all signal lines connected to the DIO Schaltbox 4A are in the allowed range.</p> <p>Be sure to connect all cables as described in this manual.</p> <p>Never insert anything metallic into the openings of the DIO Schaltbox 4A.</p> <p>Ensure to grasp the plug and not the cable when disconnecting the DIO Schaltbox 4A.</p> |

4.2 Configuration and Operation

See chapter 3.5 and chapter 3.6. Connect each pin of the connector as described in Table 4.

5 Shipping, Maintenance and Disposal

| | |
|---|--|
|  | <p>Dispose off properly per regulations of the country where end-of-life occurs.</p> |
|---|--|

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6 Troubleshooting

This chapter contains some frequently asked questions about the DIO Schaltbox 4A.

| | | |
|----------|----------|--|
| 1 | Effect | |
| | Solution | |

7 Ordering Information

7.1 DIO Schaltbox 4A

| Product | Description | Ordering number |
|------------------|-------------|-----------------|
| DIO Schaltbox 4A | | 3-00450001-01 |

7.2 Accessory Parts

| Product | Description | Ordering number |
|-------------------------|-------------|---|
| Customer specific parts | | Please contact STAR ELECTRONICS GmbH & Co. KG |

7.3 Related Documents

| Document | Description | Ordering number |
|----------|-------------|-----------------|
| [1] | | |
| [2] | | |
| [3] | | |

8 Appendix

8.1 Appendix A: Guideline for handling ESD sensitive Products

- Any tester, equipment, or tool used at any production step or for any manipulation of semi-conductor devices must have its shield connected to ground.
- The product itself and the carrier system of the product respectively must be placed on a conductive table top or covered by an antistatic surface (superficial resistivity equal to or higher than $0.5M\Omega/cm^2$), grounded through a ground cable (conductive cable from protected equipment to ground isolated through a $1M\Omega$ resistor placed in series).
- All manipulation of finished goods has to be made at such a grounded worktable.
- The worktable must be free of all non-antistatic objects.
- An antistatic floor covering grounded through a conductive ground cable (with serial resistor between $0.9M\Omega$ and $1.5M\Omega$) should be used.
- It is recommended that you wear an antistatic wrist or ankle strap, connected to the antistatic floor covering or to the grounded equipment.
- If no antistatic wrist or ankle strap is worn, touch the surface of the grounded worktable before each manipulation of the ESD sensitive product.
- It is recommended that antistatic gloves or finger coats be worn.
- It is recommended that nylon clothing be avoided while performing any manipulation of parts.

8.2 Appendix B:

8.2.1 Acronyms and Abbreviations

| Item | Definition |
|------|-------------------------------|
| BD | Bus driver |
| BP | Bus plus |
| BM | Bus minus |
| ECU | Electronic Control Unit |
| EMC | Electromagnetic Compatibility |
| ESD | Electro Static Discharge |
| FR | FlexRay |
| NC | Not Connected |
| PCB | Printed Circuit Board |
| PL | Physical Layer |

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