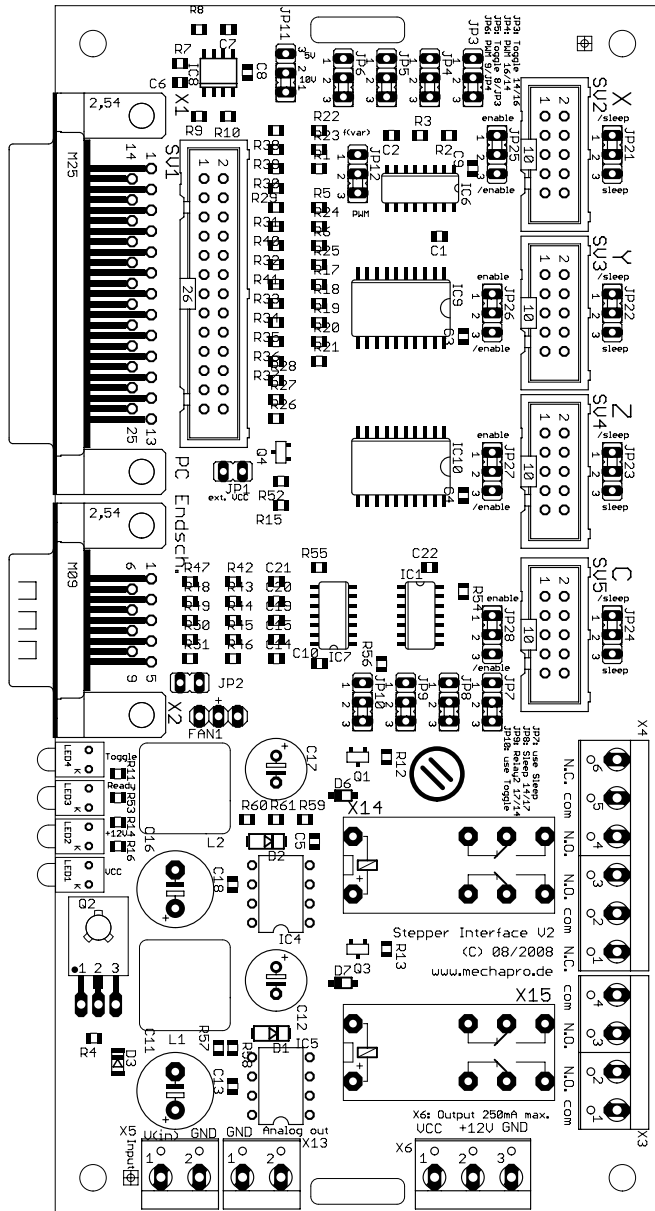


## Documentation for Stepper motor interface II

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### Disclaimer, EMC-compliance

Even though all parts of the circuitry have been thoroughly checked and tested, mechapro® does not give any warranty or other assurance as to the operation or functionality of the circuitry or the documentation. To the full extent permissible by law we disclaim all responsibility for any damages or losses (including, without limitation, financial loss, damages for loss in business projects, loss of profits or other consequential losses) arising from the use and/or operation of the presented circuitry.

The stepper motor interface II card is an OEM-product for further processing by industry or other, in electronics specialized, personal. In line with §5 of the EMC-regulation the stepper motor interface II does not have to carry a CE-Label. Wiring and the individual components being used as well as the complete environment in which the interface card is operated will influence its EMC behaviour. Therefore, if CE-compliance is required, a system in which one or more interface cards have been installed for operation has to be evaluated as a whole unit. Of course, when developing the circuitry for the interface II all possible aspects for an EMC-suitable design have been taken into account.

### Initial operation

Before using the board, set all jumpers to the desired settings according to this manual. Afterwards the board can be mounted in a case or cabinet and get wired to the machine and the PC. When all connections are done, the board is ready to operate.

### Connectors

The following gives you a short overview about the functions of the different connectors. The detailed pinout is explained afterwards.

- The connectors X1 and SV1 are intended to connect the board directly to a PC printerport or an optocoupler board. The pinout is aligned to PCNC, for other programmes an adaptor cable or -box may be necessary. Many Windows based programmes support a configuration of the pinout within the software.
- X2 is the connector for all switch inputs. The emergency switch has to be a „normally closed“ (NC) contact, connected to ground. All other switches may be NO or NC contacts. An open emergency contact disables both relays and motor drivers.
- SV2-SV5 are the connectors for the motor drivers. 5V logic supply is available at these

connectors.

- The outputs of the relays are accessible on clamp blocks X4 (relay1) and X3 (relay2). The pinout is printed on the board. The abbreviations mean: normally closed=NC (relay1 only), normally open=NO, common contact=com. Max. voltage/current up to 250V~/8A. When working with voltages > 50 volt, the installation has to be inspected from an expert!
- X5 is the connector for the supply voltage of the board. The input voltage range is 15-45V=. Please take care of the polarity, according to the print on the board (Vin=+)!
- The internal switch mode regulators are used to supply 12V for the relays and 5V for the logic from the supply of the board (15-45 Volt). The 12V can also be used to drive fans (e.g. for cooling of the power drivers). Max. external current is 250mA. Both voltages are supplied at X6.
- The board converts a PWM input signal to an analog output (0-10V or 0-5V) to control a frequency converter of a main spindle. This analog output is fed to X13.

#### X1 / Printer port connector

| Pin number         | function  |
|--------------------|---|
| Pin 1              | relay 1, e.g. main spindle on/off   |
| Pin 2              | direction Motor X   |
| Pin 3              | /clock Motor X  |
| Pin 4              | direction Motor Y   |
| Pin 5              | /clock Motor Y  |
| Pin 6              | direction Motor Z   |
| Pin 7              | /clock Motor Z  |
| Pin 8              | direction Motor 4 or Toggle signal  |
| Pin 9              | /clock Motor 4 or PWM signal  |
| Pin 10, 12, 13, 15 | outputs for signals from end and limit switches                                   |
| Pin 14             | current reduction, toggle signal, PWM signal or relay 2, e.g. coolant pump on/off |
| Pin 11             | output for drives ready signal  |
| Pin 16             | Toggle signal or PWM signal   |
| Pin 17             | current reduction (low active) or relay 2   |
| Pin 18-25          | signal ground (0V, GND)   |

#### X2 / Connector for end and limit switches

| Pin number | function                                     |
|------------|--|
| Pin 1      | limit switch X (forwarded to pin X1.13)      |
| Pin 2      | limit switch Y (forwarded to pin X1.12)      |
| Pin 3      | limit switch Z (forwarded to pin X1.10)      |
| Pin 4      | limit switch axis 4 (forwarded to pin X1.15) |
| Pin 5      | emergency switch                             |
| Pin 6      | +5V (VCC)                                    |
| Pin 7-9    | Ground (GND)                                 |

Please note: The inputs on pin 1-4 may be used or configured for other functions, according to the software that is used. End or limit switches may get connected in

series (NC contacts) or in parallel (NO contacts), so safe inputs for other functions. But in this case it can't be distinguished which switch was operated!

#### SV2-SV5 / Connectors for stepper drivers

| Pin number | function  |
|------------|---|
| Pin 1      | (not used)  |
| Pin 2      | /clock, (each rising flank triggers a step)           |
| Pin 3      | /error, open collector error signal from power driver |
| Pin 4      | dir, direction of motor movement                      |
| Pin 5      | enable, enable signal to the power driver             |
| Pin 6      | /sleep, current reduction output                      |
| Pin 7-8    | +5V (VCC), logic supply for the power driver          |
| Pin 9-10   | ground (GND)  |

#### Jumper settings

|         |   |
|---------|---|
| JP1     | Activate 5V on pin 26 of SV1 (for optocoupler board)  |
| JP2     | Disable the monitoring of the emergency switch (recommended for testing purposes only)                            |
| JP3     | Toggle signal from Pin14 (1-2) or <u>Pin16 (2-3)</u>  |
| JP4     | PWM signal from Pin16 (1-2) or <u>Pin14 (2-3)</u>   |
| JP5     | Use Toggle signal from Pin8 (1-2) or <u>from JP3 (2-3)</u>  |
| JP6     | Use PWM signal from Pin9 (1-2) or <u>from JP4 (2-3)</u>   |
| JP7     | Use current reduction signal (Sleep) (1-2) or <u>don't (2-3)</u>  |
| JP8     | Sleep from Pin14 (1-2) or <u>Pin17 (2-3)</u>  |
| JP9     | Control Relay 2 with <u>Pin17 (1-2)</u> or with Pin14 (2-3)   |
| JP10    | Use Toggle signal (charge pump safety function) (1-2) or <u>don't (2-3)</u>                                       |
| JP11    | Range of analog output signal <u>0-10V (1-2)</u> or 0-5V (2-3)  |
| JP12    | Input signal for analog output is frequency variable (1-2) or a pulse width modulated ( <u>PWM</u> ) signal (2-3) |
| JP21-24 | Polarity of current reduction signal (for each driver) is <u>low active (1-2)</u> or high active (2-3)            |
| JP25-28 | Polarity of enable signal (for each driver) is <u>high active (1-2)</u> or low active (2-3)                       |

#### LEDs

|      |   |
|------|---|
| LED1 | Logic supply (5V) ready   |
| LED2 | Relay supply (12V) ready  |
| LED3 | ready is signaled to PC (no emergency stop, no error from the drivers)  |
| LED4 | Toggle signal is valid. If monitoring of Toggle is activated, both LED3 and LED4 must be lit to enable the drives and relays! |

#### Technical data

Supply range: 15-45V=

Current consumption (typical): 100mA

Minimum frequency of Safety signal: approx. 250Hz

Minimum frequency of PWM signal: 200Hz

Maximum frequency for frequency variable input: approx. 2kHz