

MTC64 Driver Board

User's Manual

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Electronic basic knowledge is required to install the MTC64 driver board and to connect the elements driven by the board. When you are not sure if your knowledge is sufficient please consult an expert. We cannot take back modules that became defective because of wrong installation or wrong connections. We also cannot take back modules which have been soldered by the user.

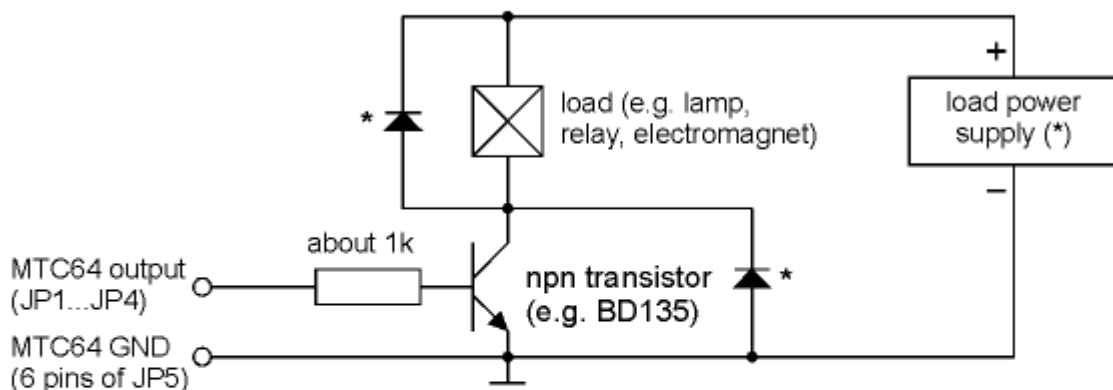
The MTC64 outputs are able to drive only very small loads (max. 3 mA) at a very small output voltage (about 4.5 V). Therefore an additional driver for each output is necessary as soon as more than 3mA and/or more than 4.5V are required (refer to the last pages of the MTC64 user's manual). For that purpose a special MTC64 driver board for 16 outputs each was developed. The driver permit currents up to 0.5A without additional heat sinks resp. up to 1.5A with additional heat sinks that cool the transistors, and voltages up to 40V.

The schematics below shows one of the 16 identical transistor drivers. By means of the driver board for example relays, incandescend lamps, magnets or DC motors can be controlled. Each load (i.e. relay/lamp/magnet/motor....) is connected between the collector of the corresponding transistor (= one of the output terminals of the driver board) and the positive terminal of the power supply for the loads. The power supply has to be suitable for the loads in question. If you want to drive e.g. 16 lamps with 24V and 100mA each you need a power supply with 24V and at least 1.6A (16 x100mA = 1.6A). The internal +5V of the MTC64 main board can be used only if the loads can be driven with 5V and the total current is less than 100mA. Otherwise the internal +5V of the MTC64 cannot be used as power supply for the loads driven by the MTC64 output board !

In case that inductive loads (e.g. magnets, relays, motors) have to be switched, one of the protecting diodes (marked with an asterisk in the schematics) is required. The diodes are alternatively, i.e. only one is necessary. For relays the diodes may already be included with the relay (please refer to the data sheet of the relay).

If loads above 500mA have to be switched some modifications have to be carried out: the 2k2 base resistor of the switching transistors has to be reduced to about 270 Ohm .The shift register circuits CD4094 at the main MTC64 board have to be replaced by 74HC4094 as these are able to deliver a higher current. From about 2005 all MTC64 basic boards will be equipped with 74HC4094.

Output driver for MTC64



Remark (*):

The required voltage of the load power supply depends upon the voltage for the load(s). E.g. if 24V lamps are used the voltage has to be 24V. If 5V relays are used the voltage needs to be 5V. The required current of the load power supply depends upon the total load current. E.g. if 20 lamps with 50 mA each are used the power supply needs to deliver 20x50mA = 1A.

If 5V power supply is required and the total current is less than 100mA the +5V of the MTC64 (available at 4 pins of JP5) can be used.

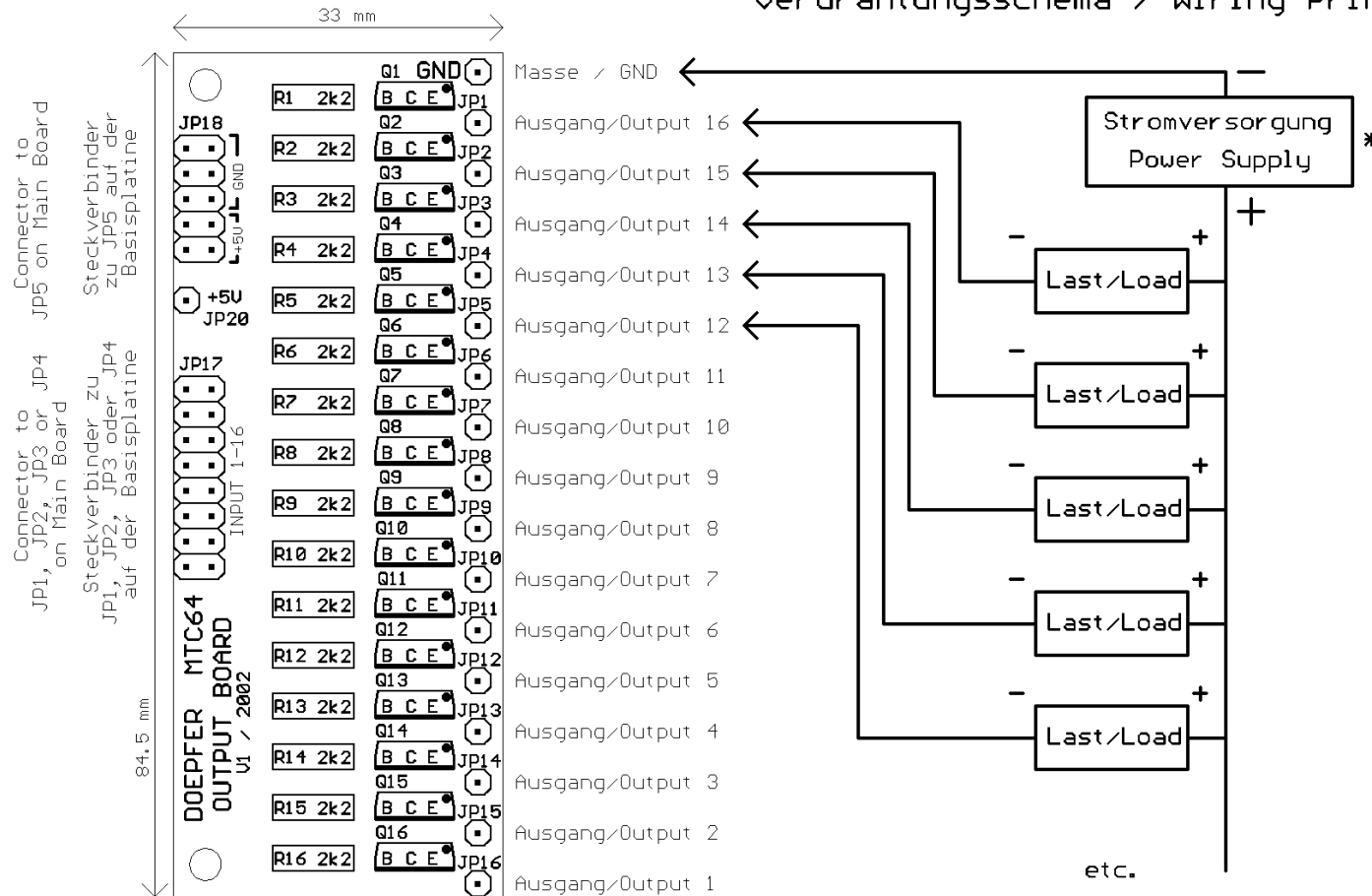
The sketch on the next page shows the wiring of the MTC64 driver board and the loads (relays, magnets, motors or similar) to be controlled by the MTC64 driver board. As mentioned a suitable power supply has to be used for the loads. Only if the loads can be driven with 5V (e.g. LEDs or 5V reed relays) and the total current for all loads (i.e. the sum of the currents of all loads) is less than 100mA, the internal +5V of the MTC64 main board can be used. In this case the +5V are available at the solder terminal labelled JP20/+5V on the MTC64 driver board.

Notes for the wiring procedure:

- Connect the pin header JP18 of the driver board to the pin header JP5 of the main board with a 10 pin ribbon cable with 10 pin female connectors on both ends. Pay attention to the correct alignment of both connectors (GND and +5V are printed on both boards).
→ **ATTENTION!** *If two or more driver boards are used a special 10 pin ribbon cable with the corresponding number of female connectors has to be used (one for JP5 of the main boards one for each JP18 of the driver boards). The maximum assembly is one main board and 4 driver boards. For this version a ribbon cable with 5 female connectors is required. You can order a suitable ribbon cable from Doepfer if you are not able to built the cable by your own. In this case please specify the cable: number of female connectors and the distances between the connectors.*
- Connect the pin header JP17 of the driver board to one of the pin headers JP1, JP2, JP3 or JP4 of the MTC64 main board with a 16 pin ribbon cable with 16 pin female connectors on both ends.
- Connect the GND terminal of the power supply used for the loads with the terminal GND/JP19 of the driver board.
→ *not applicable if the internal +5V are used as power supply for the loads*
- Connect the positive terminal of the power supply used for the loads with the positive terminals of all loads. Some loads are not polarized, i.e. it does not matter which terminal is connected to the positive terminal of the power supply. Lamps, magnets or relays are normally not polarized, motors are normally polarized. But in every case you have to look at the specifications of the loads to find out if they are polarized.
→ *not applicable if the internal +5V are used as load power supply. In this case the terminal labelled +5V/JP20 of the driver board is used as positive power supply terminal.*
- Connect the second terminal of each load with one of the outputs of the MTC64 driver board (JP1...JP16). For polarized loads these are the negative or GND terminals.
- *In case that inductive loads (e.g. magnets, relays, motors) have to be switched, then one of the protecting diodes (marked with an asterisk in the schematics) is required. The best solution is to solder the diode in parallel to the load as the load has to be soldered in any case. For relays with built-in diode the diode is not necessary.*
- *In case that loads above 500mA have to be switched the following modifications have to be carried out: The 2k2 base resistors of the switching transistors have to be reduced to about 270 Ohm. It is not necessary to remove the 2k2 resistors. The best solution is to solder 270 Ohm resistors in parallel to the 2k2 resistors. The shift register circuits CD4094 on the MTC64 main board have to be replaced by 74HC4094 as these are able to deliver a higher current. You could order a modified version for the driver and main board if you know in advance that the loads will exceed 500 mA.*
- Power up the MTC64 main board (i.e. insert the wall outlet power supply)
- Power up the power supply for the loads
- If the loads behave inverse the polarity has to be changed (jumper 5 / JP7 on the main board)

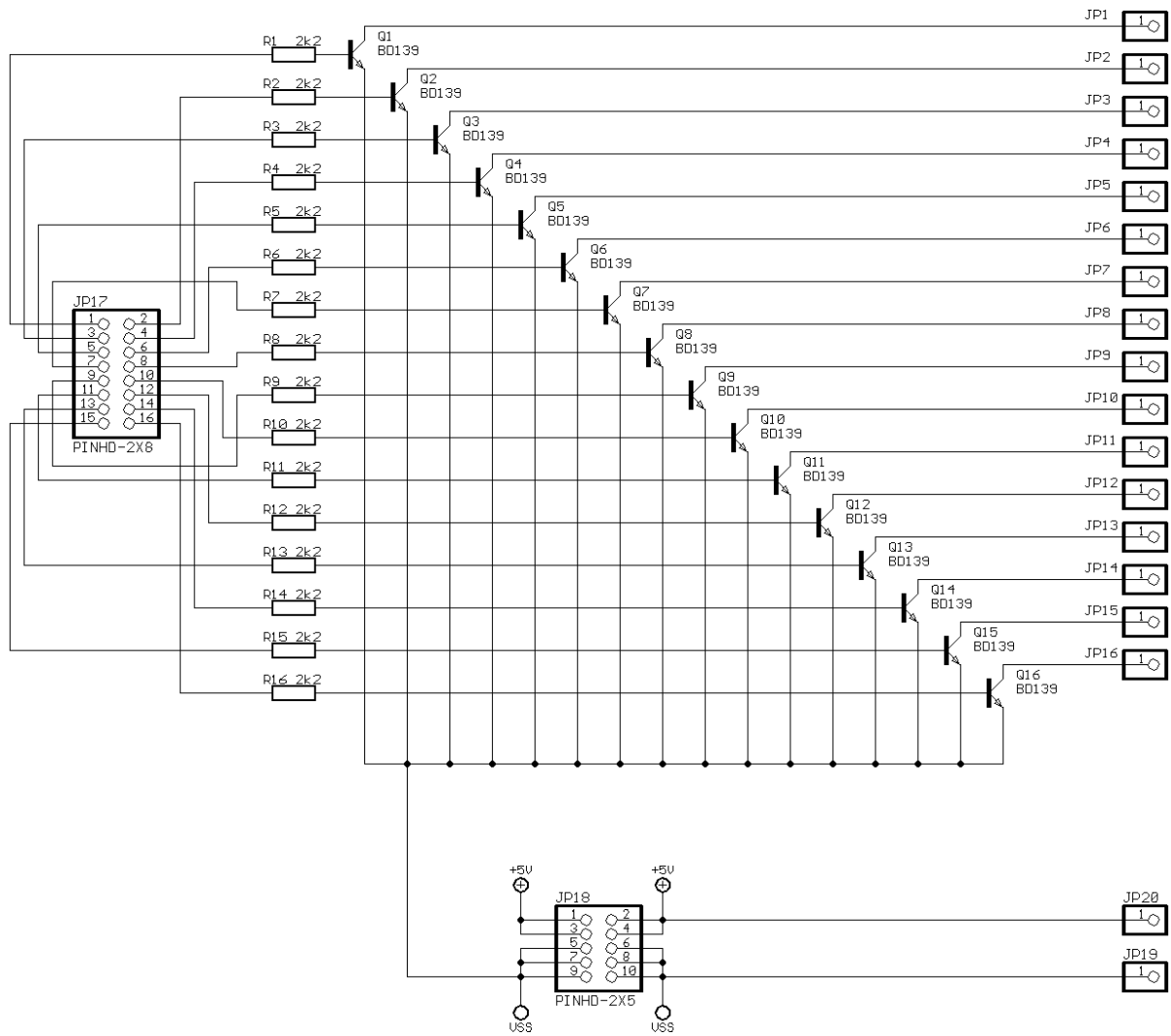
MTC64 Ausgangsplatine / Output Board

Verdrahtungsschema / Wiring Principle:



* Der Spannungswert und der maximale Strombedarf richtet sich nach den angesteuerten Lasten.
 Beispiel: Sollen 32 Relais mit 24V und 100mA gesteuert werden, so ist eine Stromversorgung mit 24V und mindestens 3.2A erforderlich

* The voltage and current of the power supply depends upon the loads to be controlled
 Example: 32 relays with 24V and 100mA each are used. In this case a power supply with 24V and at least 3.2 A is required



Schematics MTC64 driver board
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