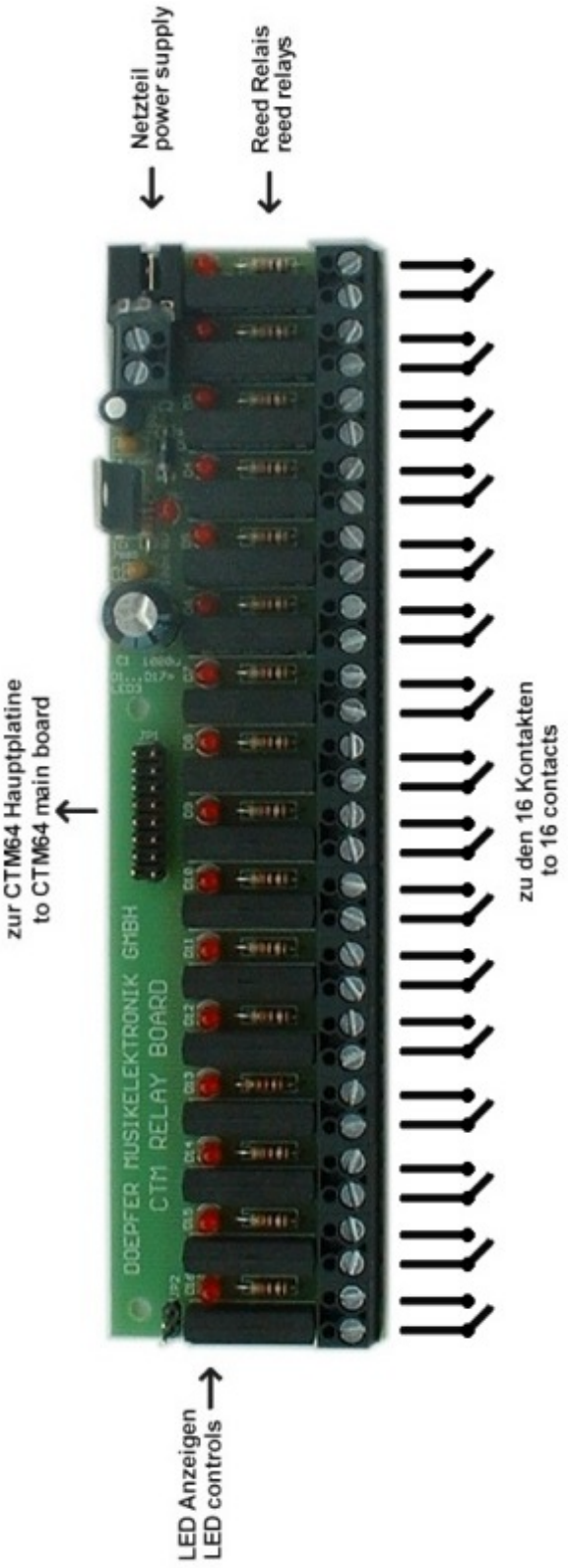
CTM64 Relay Board

Relay Expansion Board for CTM64 Main Board



Installation and User's Manual

The **CTM Relay Board** is an expansion board for the universal **MIDI control electronics CTM64**. The reason for this this additional board is the limited cable length between the CTM64 main board and the contacts (max. about 50 cm / 2 ft). By means of the relay board the cable length can be extended to 100m/300ft and even more.

The working principle is very simple: The relay board is equipped with 16 reed relays that can be switched via very long cables. The relay board is placed near the CTM64 main board and the contacts inside the relays are the new contacts for the CTM64 main board. Thus the cable length between the contacts and the CTM64 main board is less than 50cm but the cables used to switch the relay can be much longer. For each relay a screw terminal is available to connect a simple 2 pin cable with the controlling contact on the other side (e.g. a momentary or toggle switch). The relay board is operated with a separate power supply to obtain a complete galvanic separation between the relays and the CTM64 main board.

These are the most important features:

- 16 Reed relays, the contacts of the relays are used as the contacts for the CTM64 main board
- relay connections via 2 pin screw terminals
- cable length > 100m/300ft (cables up to 100m have been tested but probably even longer cables are possible)
- up to four CTM relay boards can be connected to one CTM64 main board
- separate power supply for the relay board(s), independent from the power supply of the CTM64 main board. An external power supply with 7-12V DC output is required. The current depends upon the number of relays that have to be switched actually. Each relay consumes about 10mA. The full installation (i.e. 4 relay boards, all relays in operation) requires a power supply with about 640 mA.
- additional screw terminal to operate several relay boards with one power supply only (if no galvanic separation is necessary even the power supply of the CTM64 main board can be connected to this terminal, provided that the power supply is sufficient)
- connection between each CTM relay board and the CTM64 main board via 16 pin ribbon cable, and one single cable (common line) that leads from the CTM64 main board to all relay boards
- the 16 pin ribbon cable is included with the relay board
- the power supply has to be ordered in addition (only one supply required, even if more than one relay board is used), see accessories and price list on our website.
- dimensions: about 164 x 42 x 18 mm

The sketch on page 6 shows the wiring of the Relay Board(s) with the CTM64 main board and the contacts/switches.

Connections

Power Supply BU1

The relay board requires a power supply that is connected to this socket. A plug-in type external power supply (AC adapter) is used. The power supply is not included with the relay board and has to be purchased separately. One reason for this feature is electrical safety. Keeping danger voltages (main) out of the board increases the electrical safety. Therefore an external power supply of high quality and safety should be used. If the device is used in Germany the external power supply has to be VDE approved. Another reason for the external power supply is the fact that line voltages and plug types vary considerably from country to country. Using a plug-in external supply the board can be used any where with a locally purchased power supply, thus keeping the retail price down.

The power supply must be able to deliver 7-12 V DC unstabilized or stabilized voltage, as well as a minimum current of 160mA (if more than one relay board has to be powered by the same power supply the required current depends upon the number of the relay boards). The board is powered by plugging the AC adapter into a wall outlet and connecting it to the socket BU1 on the relay board. There is no separate ON/OFF switch. If the polarity of the power supply is incorrect, the relay board will not function. However, there is no danger of damage to the circuitry since it is protected by a diode. The correct polarity is: outside ring = GND, inside lead = +7...12V.

The LED D17 below the screw terminal X17 is used as power display. This LED has to turn on as soon as the power supply is plugged into the socket BU1. Otherwise the power supply has the wrong polarity, unsuitable electrical properties (voltage/current) or is defective.

Screw terminal X17

This screw terminal is internally connected to the power supply socket BU1 and is used to pass on the power supply to other relay boards if applicable. In this case only one power supply is necessary. The power supply is connected to socket BU1 of one relay board only. The other relay boards are connected via the screw terminals X17 among one another. But even a separate power supply for each relay board can be used. In this case the screw terminals X17 remain unconnected. Each relay board requires about 160mA. Consequently for the maximum extension (i.e. four relay boards) a power supply with at least 640mA is required. To be on the safe side we recommend the usage of a power supply that has a little bit more current available than required (e.g. 700 mA or 800 mA for the maximum extension).

One of the screw terminals X17 can be even used to supply the CTM64 main board (the main board requires additional 100mA). In this case only one power supply is required for the complete assembly but the CTM64 main board and the relay boards are no longer galvanically separated from each other. This may cause problems especially with long cables. We recommend to use a separate power supply for the CTM64 main board and the relay boards.

JP2 (2 pin connector)

The terminals of this pin header are internally connected (a 2 pin connector is used only because of the improved mechanical stability compared to a one pin connector). One of the pins is connected to the common connector JP6 on the CTM64 main board with a simple single-pole cable. If two or more relay boards are used JP2 of each board is connected to JP6 on the CTM64 main board. It is also possible to connect JP6 of the CTM64 main board to JP2 of the first relay board and to daisy chain the JP2's of all relay boards.

JP1 (16 pin connector)

This pin header is connected to one of the pin headers JP1 (range 1...16), JP2 (range 17...32), JP3 (range 33...48) or JP4 (range 49...64) on the CTM64 main board. For the connection a 16 pin ribbon cable with a female connector on each side is used. Up to four relay boards can be combined with one CTM64 main board. Connecting the cable in the wrong to JP1...JP4 on the CTM64 main board will cause no damage. Only the sequence of the inputs will be mixed up.

X1 ... X16 (2 pin screw terminals)

These are the control inputs of the 16 relays. Each terminal corresponds to one relay and has to be connected to the controlling contact (e.g. momentary switch or toggle switch) with a simple two-pole cable. The contacts are simple on/off switches. Cables up to 100m have been tested but probably even longer cables are possible.

Operation remarks

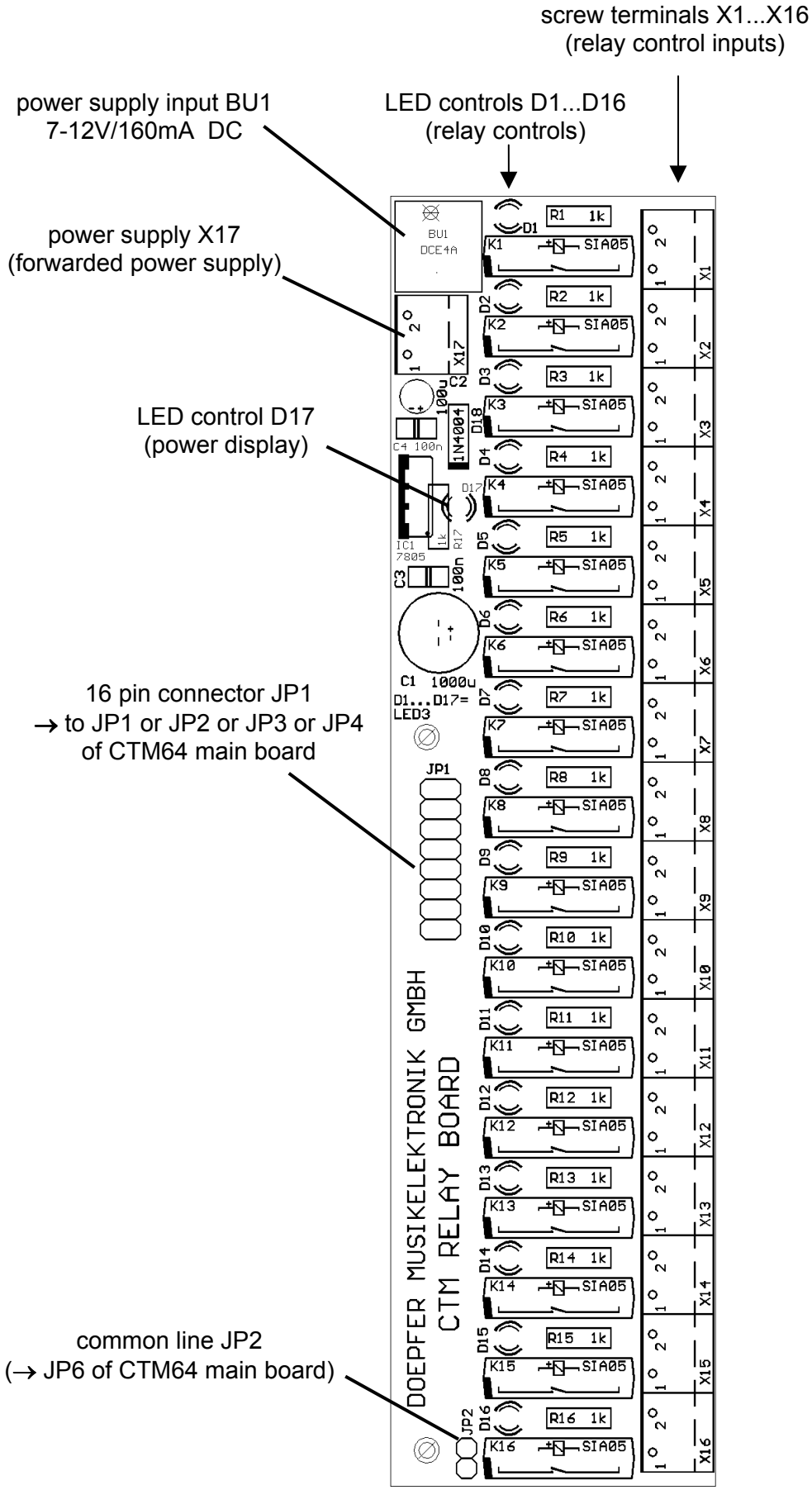
Before the relay terminals X1 ... X16 are wired for the final installation it is a good idea to test the CTM64 main board in combination with the relay boards in advance.

The CTM64 main board has to be adjusted to the desired Midi channel, mode (note or program change messages), note number/program number range and polarity as described in the manual of the CTM64 main board. Check the CTM64 main board (still without relay boards) as described in the manual of the CTM64 main board (check list on page 12). If the CTM64 main board is working as it should the relay board(s) is/are connected to the CTM64 main board as described on the previous pages of this manual.

Then the complete construction is powered by plugging the AC adapters into a wall outlet and connecting them to the corresponding sockets of the CTM64 main board (BU3) and the relay board (BU1).

For a first test one of the relay terminals X1 ... X16 has to be shortened by using a short wire. The corresponding LED of the relay board has to turn on and at the Midi output of the CTM64 main board the corresponding Midi message (note on/off or program change) has to be sent. Short even some of the other relay terminals (X1...X16) and check the corresponding LED and Midi Out to make sure that everything is working as it should.

If all is OK the final wiring of the relay terminals X1...X16 is carried out. The terminal screws have to be tightened very fast to avoid slipping out of the cables. Unused relay inputs are simply left open. By means of the control LEDs on the relay board(s) it is very easy to find out if one of the relays is not controlled in the right way – e.g. because of a broken wire or a loose connection.


screw terminals X1...X16
(relay control inputs)
power supply input BU1
7-12V/160mA DC
LED controls D1...D16
(relay controls)
power supply X17
(forwarded power supply)
LED control D17
(power display)
16 pin connector JP1
→ to JP1 or JP2 or JP3 or JP4
of CTM64 main board
common line JP2
(→ JP6 of CTM64 main board)
BU1
DCE4A
X17
C2
100u
C4 100n
1N4004
D18
D17
IC1
7805
C3
100n
C1 1000u
D1...D17=
LED3
JP1
JP2
DOEPFER MUSIKELEKTRONIK GMBH
CTM RELAY BOARD
R1 1k
R2 1k
R3 1k
R4 1k
R5 1k
R6 1k
R7 1k
R8 1k
R9 1k
R10 1k
R11 1k
R12 1k
R13 1k
R14 1k
R15 1k
R16 1k
K1 SIA05
K2 SIA05
K3 SIA05
K4 SIA05
K5 SIA05
K6 SIA05
K7 SIA05
K8 SIA05
K9 SIA05
K10 SIA05
K11 SIA05
K12 SIA05
K13 SIA05
K14 SIA05
K15 SIA05
K16 SIA05
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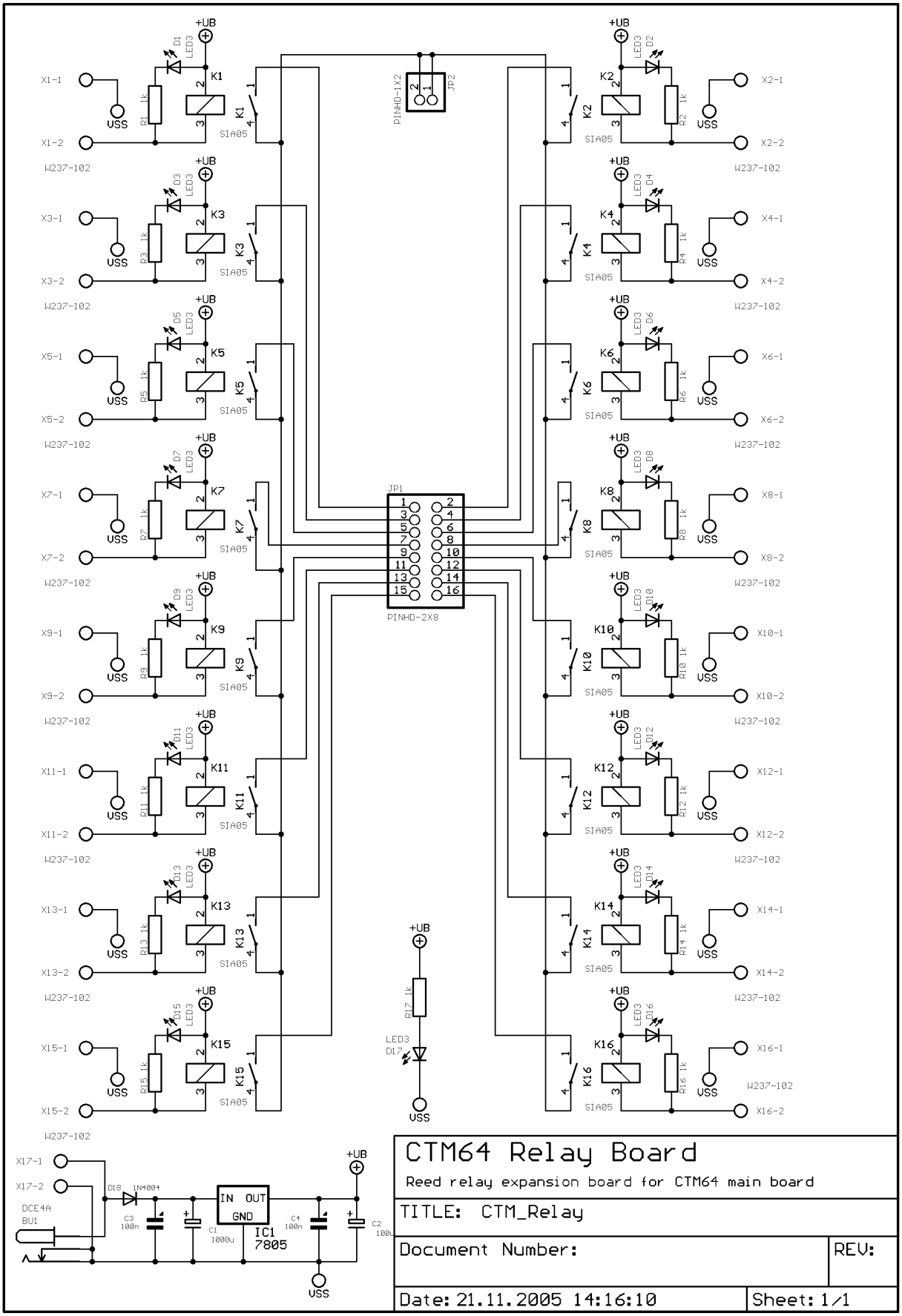

Schematics CTM Relay Board

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