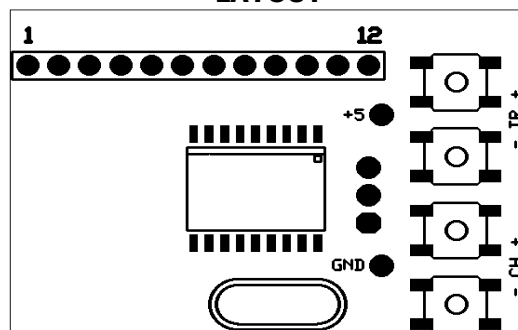


USER MANUAL

for
MIDI4B – MIDI keyboard controller
firmware version B3.1

- This model scans up to 32 keys and generates MIDI notes with constant velocity/dynamics. It can be powered from batteries and utilizes auto-power-off feature to save power after some time of no use.
- Each usage of transposition buttons causes the keyboard to shift in one semitone steps. Transposition is available with 2 small tactile buttons on board marked “- TR +”.
- Two other buttons marked as “- CH +” change MIDI channel.
- Transposition and channel settings are protected against accidental changes, that means pressing them for a short time triggers no action. You have to press the buttons for about 0.2-0.5s to activate their functions.
- Notes are generated with constant velocity parameter chosen when placing order. The same value is used in both note-on and note-off messages. There is no “running status”.
- Power supply should be 3xAA cells only. Although the board is equipped with typical 9V battery clip, it's only to be used with supplied 3AA battery holder. Powering the board with 9V battery, or any voltage greater than 5V will damage the board. It is possible to use external power supply, but the voltage must not exceed 5V. Current consumption is about 1mA when working, drops down to 100 times less when in “power-off” mode.
- When keyboard is left in idle state for more than 3 minutes it turns itself into power-saving mode, reducing power consumption 10 times. After another period of about 2.5 hours it turns into power-off mode, drawing only about 10uA of current from batteries. Theoretically it could be powered in this state for 5 years using standard batteries.
- Keyboard response time during normal operation is about 3ms for key on, and about 12ms for key off. Longer release time is introduced to suppress contact bouncing.
- When in power-saving mode, first usage of any key turns the board into normal operation. That first touch of a key may have longer response time, up to 30ms.
- To turn the board on after it has entered the power-off mode, simply press any key for at least 1 second. Appropriate note-on message will be sent and the board will work at full speed after that.

LAYOUT

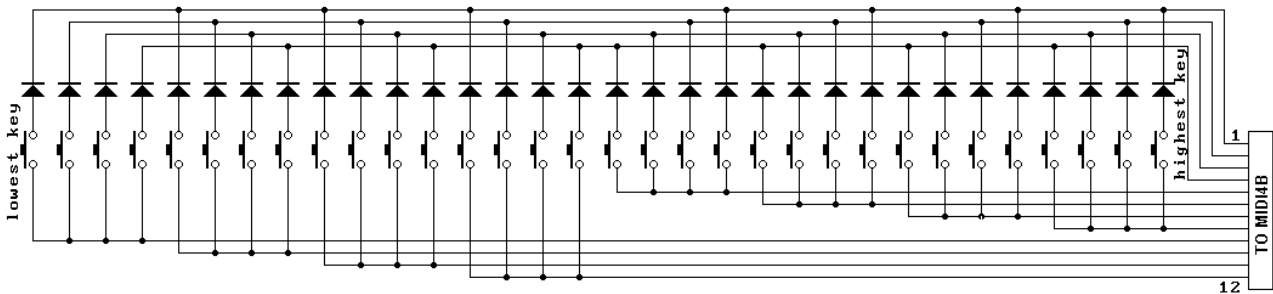


MIDI socket (please use included cable with DIN5 connector) counting from the top:

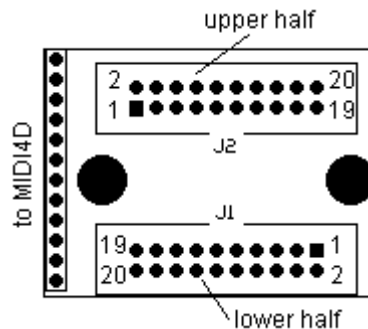
- DIN5-4(+5V)
- DIN5-5(data)
- DIN5-2(GND)

SCHEMATIC OF CONTACT KEYS

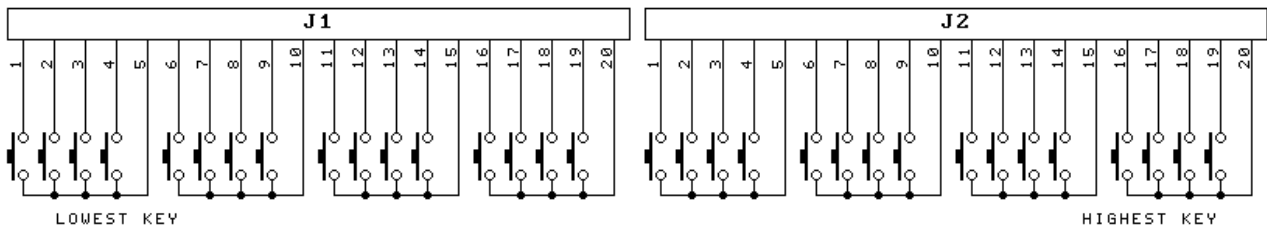
Keyboard scanned by this board must be equipped with diode matrix exactly as shown in schematic below. If there are no diodes at the keyboard, optional diode matrix board (described later) can be used.



PINOUT OF OPTIONAL DIODE MATRIX BOARD



Diode matrix board fits 12x1 connector of the controller board. Two 20-way connectors connect lower and upper half of the keyboard. J2 can be left open if the keyboard has no more than 16 keys. If standard IDC connectors with flat cables are used to connect keyboard switches, the wires of those flat cables, counting from pin 1 marked usually with red stripe, should be connected to the keys as follows:



- 1-4 individual wires of 1st group
- 5 common wire of 1st group
- 6-9 individual wires of 2nd group
- 10 common wire of 2nd group
- 11-14 individual wires of 3rd group
- 15 common wire of 3rd group
- etc.

Lowest key is on pin 1 of J1, highest on pin 19 of J2. The "commons" are always the 5th wires in groups for 4 adjacent keys. The "commons" **must not** be connected together, they have to be electrically separate in order to work properly. This board is not intended for single common bus topology.

It's recommended to place the matrix board in the middle of the keyboard, then 2 flat cables can go the opposite directions. That simplifies making them as short as possible, which is the key for reliable performance and interference-free operation.