

MIDI128

MIDI master controller

ver. 4.x

hook-up info

www.midi-hardware.com
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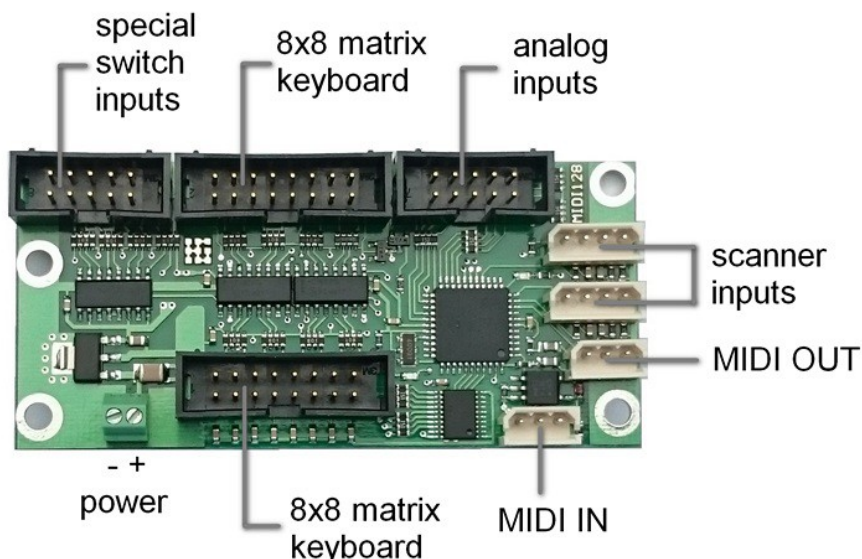
Overview

This document describes the layout and connections of MIDI128 MIDI master controller. All user settings and description of compatible scanners are described in "*MIDI User Settings & Scanners GUIDE*".

The board described here is most likely to be used in small virtual organs, typical setup with 2 manuals and pedals (pedals need PDS or BBSP scanner). It can be expanded with more manuals, stops/pistons, displays, expression pedals, potentiometers and so on. On-board interfaces include 2 diode-matrix scanners for typical modern keybeds, 8 analog inputs for use with potentiometers, or expression pedals, and 8 switch inputs. All of those inputs can be individually configured in terms of their function, generated MIDI event, and MIDI channel. By default all analog inputs are configured as MIDI CC in channel one, while switch inputs are configured mostly as transposers, and channel changer. But this is only default setting, you can change it at any time.

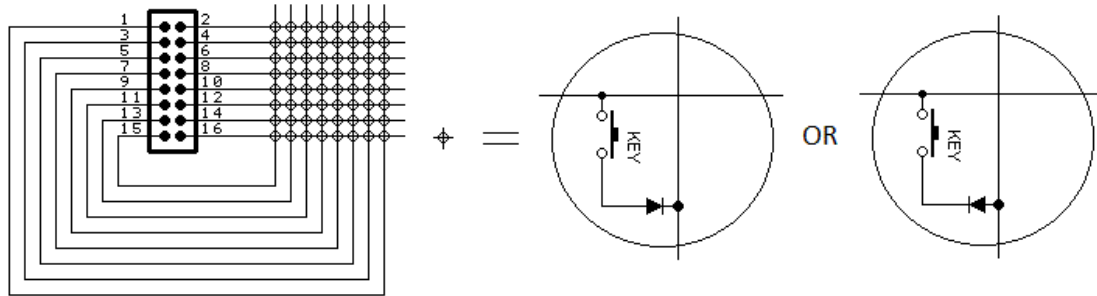
If this is not enough, there are also 2 expansion connectors. Each can add another 2 keyboards. It's possible to add more analog inputs, or displays this way.

Connections



Keyboard interfaces need to be connected to keybed switches via diode matrix. There are many ways to build a diode matrix, and MIDI128 can work with most of them. The only requirements are that contacts to be organized in 8 groups of 8 contacts, and that one side of the matrix is connected to odd pins of MIDI128 connector, and the other side – to even pins.

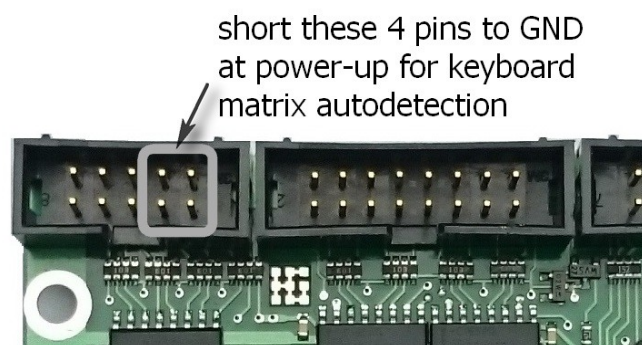
Or in another words one row of pins goes to rows of 8x8 matrix, while the other row goes to columns of 8x8 matrix.



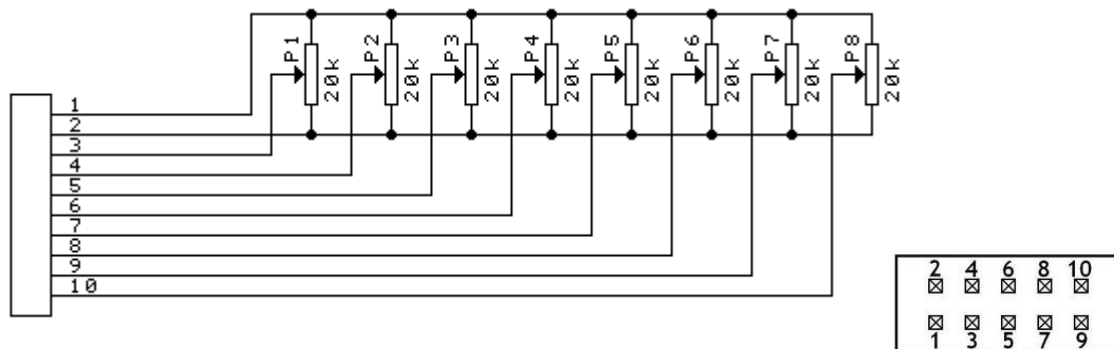
The order of notes as well as orientation of diode in the matrix is not predefined, MIDI128 will find proper matrix layout during keyboard setup procedure. However, keys cannot be connected in random order. Each group of 8 notes must be continuous and arranged in one direction (up or down), although it does not matter if those groups are in horizontal or vertical lines of matrix. Likewise, the groups must also come in order. It also does not matter what is the orientation of diodes, but obviously all of them must be in the same direction. **Matrix layout must be the same in both keyboards.** If you mix 2 different keyboards, it will not be possible to have correct order of notes on both.

Automatic diode matrix selection can be invoked by shorting pins 7, 8, 9, 10 of “special switch inputs” connector at once to GND while the MIDI128 is powered off. Turn the power on for MIDI128 while holding those 4 pins connected to GND. It can be easy done with banana cable connected to GND. You can gently push a banana plug in the middle of those 4 pins, so all 4 have contact with GND. When the power is already on, release the connection so all those 4 pins are left open. Then press 2 lowest keys on the keyboard together, usually those will be „C” and „C#”. That ends the procedure and MIDI128 will play those 2 lowest notes via MIDI.

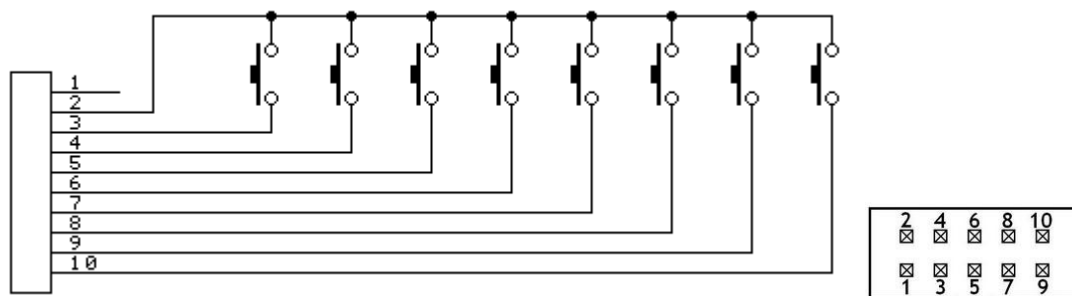
This is much easier when you already have buttons connected there.



Analog inputs share common leads for top and bottom ends of potentiometers, and should be connected according the schematics:



Switch inputs use very similar pinout as potentiometers, but there's no connection to pin 1. All switches must have common GND, so only pin 2 is used for commons, which is GND of MIDI128.



Default configuration of control inputs is described below, with connector layout. All function except the EDIT input (pin 10) are user assignable

1. no connect
2. GND, common point for control buttons
3. global transpose +1 semitone
4. global transpose -1 semitone
5. global transpose +1 octave
6. global transpose -1 octave
7. channel setup +1 for last played device
8. channel setup -1 for last played device
9. MIDI Control Change 9
10. EDIT button (MIDI128 enters EDIT mode when this pin shorted do GND)

MIDI IN and OUT are available at small 3-pin connectors matching the cable(s) included with order. MIDI input can merge to MIDI OUT any incoming MIDI from other equipment, or can be used to control via MIDI all LEDs and LCDs connected to MIDI128. But never both – you have to disable MIDI merger inside MIDI128 in order to send text messages to LCD panels, or change state of LEDs in LITSW scanners.

Scanner inputs allow for some degree of expansion. It is possible to add 4 more keyboards a chain of boards for potentiometers, as well as LCD panels. The limits per input are 2 keyboards (basically any contact scanners), 64 potentiometers and 100 LCD modules. But potentiometer input boards and LCDs must not be split between 2 inputs. You can have them all on one or another, or LCDs at one and pots at the other one.

Power supply

Recommended power supply range is **from 5 to 12V DC**. It is possible to run your MIDI set from lower voltage (even below 3V), but this will make it work out of MIDI specifications, and your instrument or sound module may not receive MIDI reliably. Higher supply voltage is acceptable **up to 18V**, but only for setups without extensive current draw, that means when there are no multiple LCDs and LITSW. When using LCD modules it is recommended to have at least 5.2V supply voltage, otherwise changes in backlit and contrast may be sometimes noticeable.

Scanner connectors of MIDI128 provide power to all additional boards, so you **must NOT connect any power supply anywhere else** in entire MIDI system than the screw terminal shown in picture above. Connecting power in reverse will not cause any damage, but of course it will only work with proper power polarity.

Current consumption greatly depends on the number of attached optional boards and can vary from 4 to over 200mA.

Input Addressing in MIDI Sys-Ex setup

The MIDI128 user settings can be programmed either by special KEYPAD or by MIDI System-Exclusive messages. General syntax of MIDI System-Exclusive received by MIDI128 is described below. All numbers are shown in hexadecimal format (hex), as it is commonly used by software capable of generating System-Exclusive messages.

1. Sys-Ex header: **F0**
2. manufacturer ID for MIDI-hardware.com: **00 20 7A**
3. product ID for MIDI128: **06**
4. input ID: one byte in range **00 .. 5B**
5. the command: one byte in range **01 .. 11**
6. command's parameters, dependent on what command was used, 1 to 32 bytes
7. Sys-Ex footer: **F7**

Detailed description of all Sys-Ex commands is described in *"MIDI User Settings & Scanners GUIDE"*, this chapter only defines the *input IDs*, specific for MIDI128.

The *input ID* byte determines which controller device - keyboard, special switch input, or potentiometer, will be affected by sending this Sys-Ex. Those ID numbers are pointing to specific switch or analog inputs, internal ones of MIDI128, and those added in connected scanners. Lowest ID numbers are reserved for 4 keyboard splits on internal 2 keyboard interfaces. Next 8 go for splits on additional keyboards connected to 4-pin scanner inputs. Lowest number is always associated with the scanner connected the closest to MIDI128, and every next one takes higher and higher numbers. Mixing in one chain contact scanners and pot scanners does not influence their *input IDs*. The IDs for keyboards are always the lowest ones, and pots or special switch inputs start with ID=12 (0C in hex).

here is how the input IDs for MIDI128 are organized:

- 00, 01: keyboards connected to on-board interfaces (or their lower splits)
- 02, 03, 04, 05: keyboards connected to external scanners (or their lower splits)
- 06, 07: upper splits of on-board keyboard interfaces
- 08, 09, 0A, 0B: upper splits of keyboards on external scanners
- 0C – 13: on-board analog inputs
- 14 – 1A: on-board special switch inputs
- 1C – 5B: analog inputs in external scanners

With LCD module connected it is easy to check the Device ID. Open MIDI monitor by entering #971 code from KEYPAD, and play the controller you want to check. Its ID will be displayed as first data, for example like this: "D:27". But here's a catch – the LCD

displayed value is a decimal number, so you have to convert it to hexadecimal in order to use the value in Sys-Ex editor.

Factory defaults

MIDI128 has a lot of features to set and you may sometimes go one step too far, so it may be useful to have last resort in form of factory defaults reset. It can be done in 3 ways.

In first method enter command #979 either from the keypad if you have one, or EDIT, A, G, A from the musical keyboard, using lowest 10 keys as numbers from 0 to 9. About one second later MIDI128 is ready to use with all factory settings in place. If MiDisp module is used, this process is clearly indicated at the display.

The 2nd method requires operation on internal pins only. First, switch the power supply off. Then short pins 3,4,5 and 6 of "special switch inputs" to GND (pin 2 of the same connector). This is like simultaneously pressing first 4 special buttons. With those pins shorted to ground turn the power on. Again, after about 1 second, the board is ready to use, with all channels, events and starting notes returned to defaults.

Defaults can be also loaded when sending this System Exclusive message to MIDI128:

F0 00 20 7A 06 00 09 4F F7

This is actually equivalent of #979 command entered from KEYPAD.