

MPOT32 – MIDI pots controller

www.midi-hardware.com

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Overview

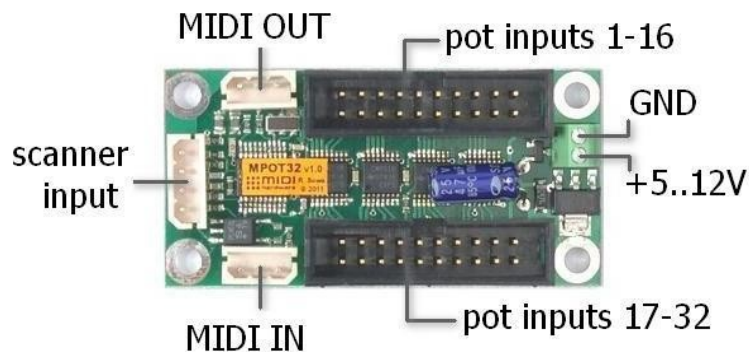
This document describes the layout and connections of MPOT32 master controller. All user settings and compatible scanners are described in *"MIDI User Settings & Scanners GUIDE"*.

The board described here is small standalone controller for MIDI control surfaces, with lots of knobs, and buttons, usually used as VST human interface. By itself it can only work with 32 analog inputs (potentiometers or voltages). But with addition of external scanners it may grow considerably. There is 1 scanner input, and it can take up to 128 keys if keyboard scanners are connected, together with up to 64 additional potentiometers on pot scanners. It is possible to combine keyboard and potentiometer scanners on this input, thus 128 keys and 96 pots can be used in total.

Features:

- 32 inputs for potentiometer
- 1 scanner input for additional keyboards and potentiometers
- MIDI merging input - add MPOT32 MIDI activity to any existing MIDI traffic
- user defined MIDI channel for each potentiometer and keyboard/split
- user defined MIDI event for each pot and keyboard split
- user defined split for keyboards
- independent transposition for keyboards/splits
- dial MIDI Program Change together with Bank Select from keypad
- all settings remain after disconnecting power
- DC power supply (5V-12V DC)

Connections



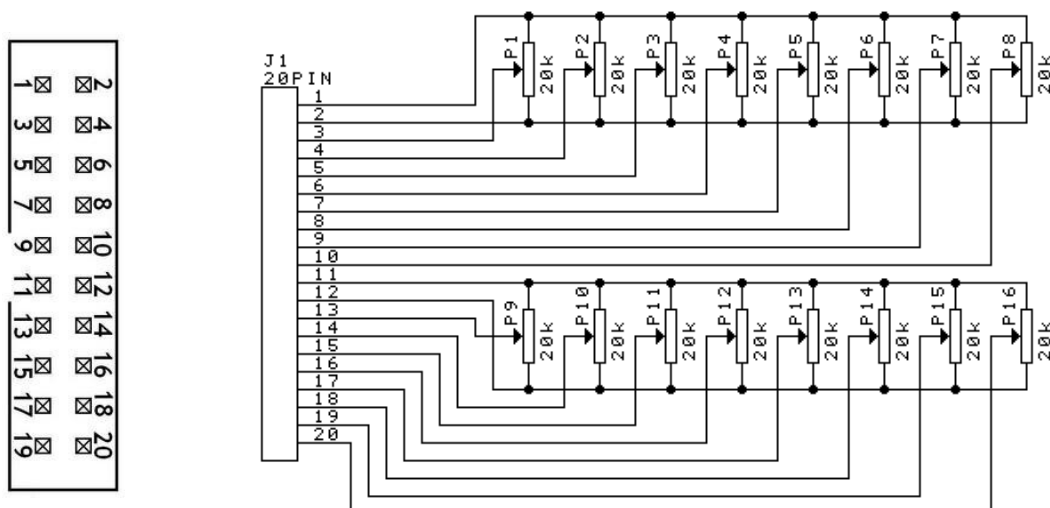
Power to entire MIDI set (including optional scanners) is applied at screw terminal on the right side of above picture.

There are two 3-way connectors, depicted in the picture as MIDI IN and OUT.

Included with order you can find matching cables with typical DIN5 panel mount socket. MIDI IN is used for merging MIDI data with any existing MIDI equipment, and also for user settings via System-Exclusive messages.

4-way connector at the left is for connecting one chain of scanners, be it contact scanners, or pot scanners, so you can add more analog and switch inputs according to your needs. Available scanners are described in *"MIDI User Settings & Scanners GUIDE"*.

Each black 20-way connector holds inputs for 16 potentiometers, and they are laid out as in the schematics below. Notice orientation of the slot, it determines pin count direction. The layout applies to both 20-way connectors.



All potentiometers must be linear taper (not audio) in range 10-50k, preferably 20k.

Power Supply

Recommended power supply range is between **5.3 and 9V DC**. It is possible to run this your MIDI set from lower voltage (even below 3V), but this is out of MIDI specification, and your instrument or sound module may not receive MIDI properly then. Higher supply voltage is acceptable **up to 15V**, but only for setups without extensive current draw, that means when there are no multiple LCDs, LITSW, and all potentiometer's resistance is not lower than recommended 20k.

Scanner connectors of MPOT32 provide power to all scanners, 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 pots and scanners and can vary from 2 to over 50mA. One potentiometer of recommended 20k value adds 0.5mA to total current consumption, regardless if it is connected directly to MPOT32 or with use of pot-capable scanner (like POT12 or BBSP). With LCD modules it rises by about 15mA per each display.

Input Addressing in MIDI Sys-Ex setup

The MPOT32's user settings can be programmed by MIDI System-Exclusive messages. General syntax of MIDI System-Exclusive received by MPOT32 is described below. All numbers are shown in hexadecimal format (hex), as it is commonly used by majority of 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 MPOT32: **03**
4. input ID: one byte in range **00 .. 63**
5. the command: one byte in range **01 .. 11**
6. command's parameters, dependent on what command was used
7. Sys-Ex footer: **F7**

Detailed description of all Sys-Ex commands is available separately, this chapter only defines the *input IDs*, specific only for MPOT32.

The *input ID* byte determines which controller device - keyboard, or potentiometer, will be affected by sending this Sys-Ex. Lowest ID numbers are reserved for 4 keyboard splits - they can be added by connecting contact scanner to 4-pin scanner input of MPOT32. All numbers above that are pointing to specific analog inputs, internal ones of MPOT32, and up to 64 added by connected scanners. Those can be POT12, LITSW, PDS, BBSP, KEYPAD, and LCD modules. Lowest number is always associated with the scanner connected the closest to MPOT32, and every next one

takes higher and higher numbers. Mixing in one chain contact scanners and pot scanners does not change anything in counting of their *input IDs*. The IDs for keyboards and pots are counted separately, so the same addressing will be used if contact scanners are first, or last ones in the chain.

here is how the input IDs for MPOT32 are organized:

- 00 and 01: keyboards connected with contact scanners (or their lower splits)
- 02 and 03: upper splits of those keyboards
- 04 to 23: analog inputs on MPOT32 board (32)
- 24 to 64: analog or special inputs in chain of connected scanners (64)

Let's say you have MPOT32 and a chain of scanners: BBS-1K, POT12, POT12, LITSW. So the inputs on the first POT12 in chain have IDs from 24 to 2F (hex), inputs of 2nd POT12 have IDs from 30 to 3B (hex), and LITSW, if configured in CC value mode, will occupy IDs from 3C to 53. If you remove one of POT12 from this chain, lowest 12 inputs of LITSW will takeover functionality (events and channels) of last POT12. This is because IDs are always counted over all existing inputs. The table below contains input IDs associated with every input pin on MPOT32, and chain of 5 POT12 scanners.

MPOT32 pot 1-16		MPOT32 pot 17-32		1st POT12		2nd POT12		3rd POT12		4th POT12		5th POT12	
pin	ID	pin	ID	pin	ID	pin	ID	pin	ID	pin	ID	pin	ID
3	04	3	14	3	24	3	30	3	3C	3	48	3	54
4	05	4	15	4	25	4	31	4	3D	4	49	4	55
5	06	5	16	5	26	5	32	5	3E	5	4A	5	56
6	07	6	17	6	27	6	33	6	3F	6	4B	6	57
7	08	7	18	7	28	7	34	7	40	7	4C	7	58
8	09	8	19	8	29	8	35	8	41	8	4D	8	59
9	0A	9	1A	9	2A	9	36	9	42	9	4E	9	5A
10	0B	10	1B	10	2B	10	37	10	43	10	4F	10	5B
13	0C	13	1C	11	2C	11	38	11	44	11	50	11	5C
14	0D	14	1D	12	2D	12	39	12	45	12	51	12	5D
15	0E	15	1E	13	2E	13	3A	13	46	13	52	13	5E
16	0F	16	1F	14	2F	14	3B	14	47	14	53	14	5F
17	10	17	20	-		-		-		-		-	
18	11	18	21	-		-		-		-		-	
19	12	19	22	-		-		-		-		-	
20	13	20	23	-		-		-		-		-	