

msed64

Stop piston MIDI encoder/decoder

* user's guide *

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1. What is msed64?

msed64 is an combined MIDI encoder-decoder for scanning/controlling illuminated organ pistons. It can work with the most common momentary pistons with incandescent lamps as well as with momentary pistons with LEDs. It can scan/control up to 64 such pistons, plus 7 additional discrete (on/off) inputs and 4 analog (0..+5V) inputs for continuous control.

It has standard MIDI input, where it expects MIDI messages for lamps control and standard MIDI output where it transmits MIDI messages reporting piston contacts activity. This way the master (supposing Hauptwerk or another virtual organ) will be able to display its current stops status on piston's lamps, and be aware of each manual actuation of piston for changing the position of corresponding virtual stop.

The unit covers a range of 64 consecutive MIDI notes for stops control, with user-selectable starting note. Its additional discrete and analog inputs have factory-assigned MIDI controllers that can be changed upon request. The overall MIDI channel, on which the unit operates, is user-selectable.

2. Connecting and using

Up to 64 illuminated pistons can be connected to this unit. Each of its 8 slots can handle up to 8 such pistons. Each slot has 8 inputs for piston's contacts and 8 driver outputs for piston's lamps, common line (GND) for contacts and common line (+12V or other per power supply voltage) for lamps. The power for lamps is supplied by the unit itself, so there is no need of separate power supply for the lamps. The wiring diagram in **Appendix A** illustrates how pistons, switches and potentiometers should be wired to **msed64**. All unused inputs/outputs can be left unconnected.

The power supply (not included) must be able to source sufficient current at rated voltage. The **msed64** requires about 100mA of current at 12 - 18V DC, so the power supply must be able to supply this current plus as much current as necessary for the lamps. Considering 20mA current per each lamp, the power supply must be able so source $100+64*20 = 1380\text{mA}$, cca 1.4A. This figure may vary upon lamps/pistons type.

The MIDI connection goes thru two HU3-DIN5F cables (included). The **msed64** MIDI input must be connected via standard MIDI cable to the host's MIDI output. The **msed64** MIDI output must be connected to host's MIDI input. Since **msed64** does not do merging, MIDI messages received on its MIDI input won't be retransmitted on its MIDI output. This way MIDI loops are prevented.

The power supply voltage should be wired to **msed64** thru screw terminal block, with respect to the correct polarity. Only DC voltage can be used. There is on-board protective diode for preventing user from applying reverse voltage.

All necessary cable plugs are included with the board. No pistons, potentiometers and switches are included.

After the unit has been connected, DIP switch has been set and power applied, the piston lamps will be controllable by NoteOn/NoteOff messages arriving from the host on user-selected MIDI channel. Each piston will be sending NoteOn upon actuation and NoteOff upon release on same MIDI channel. The discrete inputs (when

connected) will be triggering discrete on/off controllers (factory-assigned). The potentiometers will be triggering continuous controllers with data in 0-127 range. Controller numbers for these are factory-assigned as well.

The MIDI channel for NoteOn/Off and Control Change messages is user selectable and can be any in range 1-16.

The host must be configured to transmit/receive Stop messages on same MIDI channel in same note range as the **msed64**.

The additional discrete and analog inputs can be used for controlling additional functions on host. For example, one or more analog inputs can be used for controlling Swell, Expression, Crescendo etc. organ functions. The host must be set accordingly so that it "understands" and interprets the messages triggered by these inputs.

Unlike other units produced by MGB, this unit cannot merge additional MIDI devices because of the need of MIDI loops prevention. So its decoder part (MIDI input) and its encoder part (MIDI output) must be first in MIDI chain if such chains presents.

3. Settings

Two parameters can be set/changed by user for **msed64**.

➤ MIDI channel

The MIDI channel on which **msed64** operates (receives and transmits) can be set using 4 DIP switches. Any MIDI channel can be set.

Table 1 MIDI channel settings

MIDI channel	Bit1	Bit2	Bit3	Bit4
1	On	On	On	On
2	On	On	On	Off
3	On	On	Off	On
4	On	On	Off	Off
5	On	Off	On	On
6	On	Off	On	Off
7	On	Off	Off	On
8	On	Off	Off	Off
9	Off	On	On	On
10	Off	On	On	Off
11	Off	On	Off	On
12	Off	On	Off	Off
13	Off	Off	On	On
14	Off	Off	On	Off
15	Off	Off	Off	On
16	Off	Off	Off	Off

➤ Note range

The note range can be set to any contiguous 64-note sub-range within 0..123 MIDI note range, in steps of 4, via another 4 DIP switches.

Table 2 MIDI note range settings

MIDI note range	Bit5	Bit6	Bit7	Bit8
0-63	On	On	On	On
4-67	On	On	On	Off
8-71	On	On	Off	On
12-75	On	On	Off	Off
16-79	On	Off	On	On

20-83	On	Off	On	Off
24-87	On	Off	Off	On
28-91	On	Off	Off	Off
32-95	Off	On	On	On
36-99	Off	On	On	Off
40-103	Off	On	Off	On
44-107	Off	On	Off	Off
48-111	Off	Off	On	On
52-115	Off	Off	On	Off
56-119	Off	Off	Off	On
60-123	Off	Off	Off	Off

Each change of Configuration takes place immediately and does not require power cycle.

The factory settings are shown in red.

➤ Additional buttons/switches

This unit can scan up to 7 additional switches or momentary buttons, connected to "Control1" header as shown in wiring diagram. These have factory-assigned Control Change numbers from CC80 to CC86. Each switch will be then triggering its CC with Data 0 upon contact make and Data 127 (hex 7F) upon break. These Control Change numbers can be changed in factory upon request. Non-connected switches will be interpreted as switch left in OFF position, causing single transmission of respective CC with Data value of 127 once upon reset.

➤ Potentiometer events

The 4 additional analog inputs on "Control2" header can be used for reading up to 4 potentiometers. Each of potentiometers can trigger pre-assigned MIDI Control Change with data byte in range 0..127 indicating the potentiometer position in range MIN..MAX (normally is considered that MIN = 0 Ohm, MAX=10 kOhm). Non-connected (hanging) analog inputs will be interpreted as potentiometer permanently left at MAX position (or switch left in OFF position), causing sending the respective Continuous Controller with Data value of 127 once upon reset.

➤ Factory CC assignment

Unless other requested, each unit is set by manufacturer for following Controller numbers

Table 3 *Factory CC numbers*

Input	Controller	Comment
Button #1	CC80	All messages go on user-selected MIDI channel
Button #2	CC81	
Button #3	CC82	
Button #4	CC83	
Button #5	CC84	
Button #6	CC85	
Button #7	CC86	
Pot #1	CC07	
Pot #2	CC08	
Pot #3	CC09	
Pot #4	CC10	

Table 4 *Technical parameters*

Parameter	Value	Unit	Comment
Power supply voltage	12 - 18	V DC	External power supply (not included)
Typical current drawn (with no pistons attached)	100	mA	
Max. number of pistons	64	-	Normally open contact, incandescent lamp per piston
MIDI messages	NoteOn/NoteOff, CC	-	
MIDI note range	Any 64 consecutive notes within 0-123 range	-	User-selectable
MIDI channel	1-16	-	User-selectable
Approx. size	26.2 x 8.7 x 2.5	cm	10.30" x 3.42" x 1"
Weight	116	g	4.1 oz

Appendix A. Wiring diagram for *msed64*

