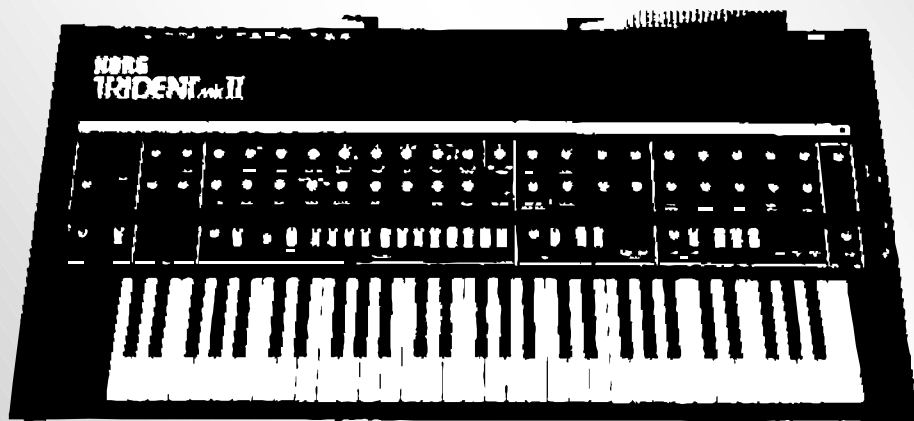


TR2-KBD

MIDI Interface for KORG TRIDENT (Mk I / Mk II)

Model 8-436
ver. 1.0



OWNER'S MANUAL
Rev. 2





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1 INTRODUCTION

TR2-KBD is a MIDI retrofit for Korg Trident Mk I and Trident Mk II synthesizers. It allows Korg Trident to be controlled via MIDI commands as a MIDI expander. The interface works in one direction only – it only receives MIDI data.. The Trident’s keyboard, control panel sliders and switches **are not transmitted** as a MIDI data!

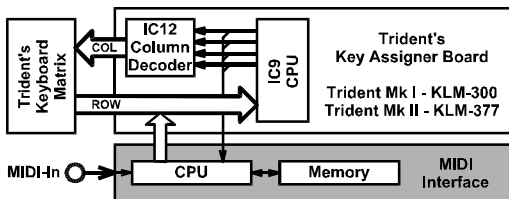
1.1 INTERFACE FUNCTION

The interface controls instrument’s keyboard in parallel manner - own instrument’s keyboard can also be used together with the MIDI Notes (see pic. 1). **No other control elements** (switches, sliders, etc.) or sound parameters of the instrument are driven via MIDI.

Parameters stored in permanent interface’s internal memory (see pic. 2) control all functions of the interface. Table 1 shows default factory settings of the parameters after factory reset. Parameters in permanent internal interface’s memory can be changed with Bulk Dump SysEx message ④ (see chapter 4.2). After reset (during each instrument start-up), parameters stored in permanent internal interface’s memory are copied to edit buffer ① and they control the all interface’s functions from there.

During the interface operation, parameters in edit buffer (that affect the interface directly) can be changed via MIDI CCs ② (see chapter 3.1.2) or via SysEx messages ③ (see chapter 3.3). All these changes are temporary only – they are lost when the instrument is switched off!

Pic. 1 – Interface function



Pic. 2 – Interface’s internal memory structure

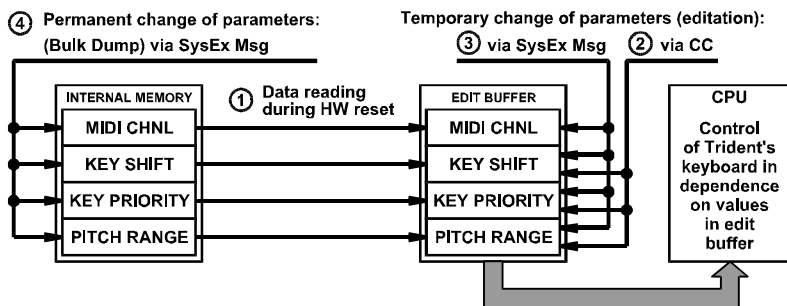


Table 1 – “Factory Reset” settings of the interface parameters (functions)

Function	Setting	Value of corresponding parameter [dec]
MIDI channel choice	1 st MIDI channel	MIDI Channel : 0
Keyboard shift setting (transpose)	+36 semitones	Key Shift : 36
Key priority setting	Last key priority	Key Priority : 0
Pitch Bend range setting	±12 semitones	Pitch Bend Range : 12



2 INTERFACE BASIC OPERATION

There are no controllers or indicators on the interface. All interface parameters / functions are adjustable only via MIDI commands transmitted from a MIDI data source (DAW, sequencer, ...).

Standard MIDI Channel commands (MIDI Channel Nr. is user definable) and Common System commands or System Exclusive Messages are used for the interface control (see chapter 2.4).

2.1 MIDI CHANNEL PARAMETER

This parameter sets the basic MIDI channel for communication with MIDI DAW / sequencer. Any of the 16 available channels can be set as well as MIDI OMNI mode¹.

Parameter values are 0 to 16. Values 0 to 15 represent MIDI channels 1 to 16. Value 16 is for OMNI MODE.

Value of this parameter in edit buffer can be adjusted only by MIDI System Exclusive Message (see chapter 3.3).

2.2 KEY SHIFT PARAMETER

This parameter transposes range of the instrument's keyboard in whole scale of MIDI notes. The parameter value specifies exactly the number of MIDI Note which is assigned to the lowest key of the instrument's keyboard.

Values of the parameter can be from 0 to 67. If value 0 is set (transposition is 0), the lowest key of the keyboard corresponds to MIDI Note Nr. 0 and the highest key corresponds to MIDI Note Nr. 60. If value 1 of the parameter is set, (transposition is +1), the lowest key of the keyboard corresponds to MIDI Note Nr. 1 and the highest key corresponds to MIDI Note Nr. 61. Etc., up to value 67 of the parameter (transposition is +67) when the lowest key of the keyboard corresponds to MIDI Note Nr. 67 and the highest key corresponds to MIDI Note Nr. 127. See pic. 3 for more details.

The value in edit buffer can be adjusted by MIDI CC #16 (see chapter 3.1.2) or by SysEx message (see chapter 3.3).

2.3 KEY PRIORITY PARAMETER

Value of the parameter adjusts incoming MIDI Note On/Off commands processing in case of all eight tone generators of the instrument are being used (all eight voices are sounding).

The parameter value is 0 to 3:

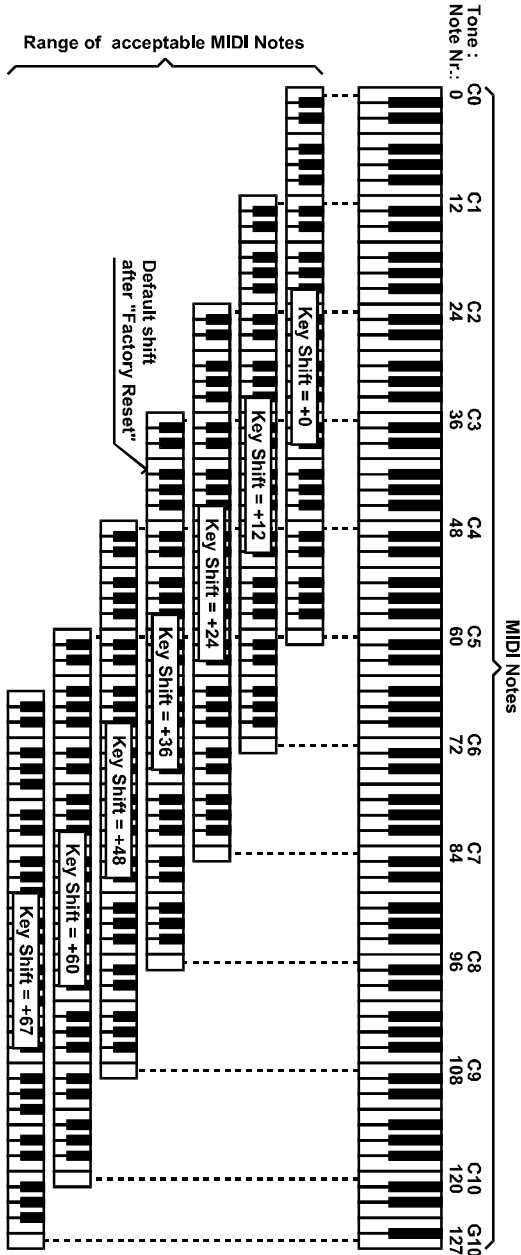
- 0 → LAST: Last key priority – the last pressed key always replaces the first key pressed.
- 1 → HIGHER: Higher key priority – if the last pressed key is of higher tone than any of the previously pressed keys, the lowest key tone is replaced.
- 2 → LOWER: Lower key priority – if the last pressed key is of lower tone than any of the previously pressed keys, the highest key tone is replaced.
- 3 → NONE: No priority – if all eight tone generators are being used, all Note On commands are ignored at the MIDI input.

The value in edit buffer can be adjusted by MIDI CC #17 (see chapter 3.1.2) or by SysEx message (see chapter 3.3).

¹ OMNI mode enables the instrument to receive data on all 16 MIDI channels simultaneously.



Pic. 3 - "Key Shift" parameter description





2.4 PITCH BEND RANGE PARAMETER

This parameter adjusts maximum range of the pitch bend controlled by the "Pitch Bend" ("Pitch Wheel") MIDI command².

Valid parameter values are 0 to 24. The 0 value switches the pitch bend off - MIDI command "Pitch Bend" is ignored. The values of 1 to 24 set the bend range in semitones, The ± 2 octave transposition is available thus.

The value in edit buffer can be adjusted by MIDI CC #18 (see chapter 3.1.2 or by SysEx message (see chapter 3.3).

² Pitch Bend MIDI command affects only tones launched by MIDI Notes. Own instrument's keyboard is not affected.



3 MIDI IMPLEMENTATION

The interface only receives MIDI commands. The interface recognizes MIDI Channel commands, Common System commands and System Exclusive messages.

3.1 CHANNEL COMMANDS

The interface receives MIDI commands on selected MIDI channel (parameter "MIDI Channel" – see chapter 2.1). In OMNI mode, interface receives data on all 16 MIDI channels simultaneously.

3.1.1 NOTE ON/OFF

The interface recognizes MIDI Note On/Off commands with note numbers in range of 5 octaves. "Key Shift" parameter (see chapter 2.2) defines assignment of MIDI notes to instrument's keys. When eight valid MIDI notes are received (all eight instrument's voices are sounding), all following received MIDI Note commands are processed according to "Key Priority" parameter setting (see chapter 2.3).

3.1.2 CONTROL CHANGES (CCs)

The interface recognizes standard MIDI CCs Nr. 64, 120, 121, 123. Other CCs are used for adjusting of the interface's parameters in edit buffer (CCs Nr. 16 to 18 - see ② on pic. 2).

Table 2 – Acceptable CCs overview

CC Nr.	Name	Function	Valid value
CC #16 ¹⁾	Key Shift	Controls "Key Shift" interface's preset parameter (See chapter 2.2)	0 ~ 127
CC #17 ¹⁾	Key Priority	Controls "Key Priority" interface's preset parameter (See chapter 2.3)	0 ~ 31 = Last 32 ~ 63 = Higher 0 ~ 31 = Lower 65 ~ 127 = None
CC #18 ¹⁾	Pitch Bend Range	Controls "Pitch Bend Range" interface's preset parameter (See chapter 2.4)	0 ~ 127
CC #64 ¹⁾	Hold	Standard MIDI function	0 ~ 63 = Off 64 ~ 127 = On
CC #120 ¹⁾	All Sound Off	Standard MIDI function	0
CC #121	Reset All Controllers	Standard MIDI function	0
CC #123 ¹⁾	All Notes Off	Standard MIDI function	0
Remark: ¹⁾ The CC is only relevant for received MIDI notes, not for own instrument's keyboard			

The interface recognizes standard MIDI CCs Nr. 64, 120, 121, 123. Other CCs are used for adjusting of the interface's parameters in edit buffer (CCs Nr. 16 to 18 - see ② on pic. 2).

CC #64 – Standard controller: Hold

The CC #64 works in a standard way: Holds the tone generators sounding³ when the "Hold" pedal is pressed⁴. Values 64 to 127 of the CC #64 are recognized as ON (pedal pressed), values 0 to 63 are recognized as OFF (pedal released).

³ Hold MIDI command affects only tones launched by MIDI Notes. Own instrument's keyboard is not affected.



CC #120 – Standard controller: All Sound Off (ASO)

When the CC #120 is received, all tone generators are muted independently if they are active by "Note On" command or the "Hold" MIDI controller⁵.

CC #121 – Standard controller: Reset All Controllers (RAC)

When the CC #121 is received, "Hold" MIDI controller is switched off and "Pitch Bend" MIDI controller is adjusted into center position.

CC #123 – Standard controller: All Notes Off (ANO)

When the CC #123 is received, all tone generators are muted if the "Hold" MIDI controller is inactive. If the "Hold" is active, "All Notes Off" command is executed after the "Hold" pedal release⁶.

CC #16 – Own controller: Key Shift

Received value of the CC #16 adjusts the "Key Shift" parameter (see chapter 2.2). Conversion of the CC #16 value to the parameter value shows table 3. Value of the parameter in edit buffer is adjusted only temporarily - until next instrument restart.

Table 3 – Conversion of CC #16 value to "Key Shift" parameter value (shift in semitones)															
CC	Shift	CC	Shift	CC	Shift	CC	Shift	CC	Shift	CC	Shift	CC	Shift	CC	Shift
0	+0	16	+8	32	+17	48	+25	64	+34	80	+42	96	+51	112	+59
1	+0	17	+9	33	+17	49	+26	65	+34	81	+43	97	+51	113	+60
2	+1	18	+9	34	+18	50	+26	66	+35	82	+43	98	+52	114	+60
3	+1	19	+10	35	+18	51	+27	67	+35	83	+44	99	+52	115	+61
4	+2	20	+10	36	+19	52	+27	68	+36	84	+44	100	+53	116	+61
5	+2	21	+11	37	+19	53	+28	69	+36	85	+45	101	+53	117	+62
6	+3	22	+11	38	+20	54	+28	70	+37	86	+45	102	+54	118	+62
7	+3	23	+12	39	+20	55	+29	71	+37	87	+46	103	+54	119	+63
8	+4	24	+12	40	+21	56	+29	72	+38	88	+46	104	+55	120	+63
9	+4	25	+13	41	+21	57	+30	73	+38	89	+47	105	+55	121	+64
10	+5	26	+13	42	+22	58	+30	74	+39	90	+47	106	+56	122	+64
11	+5	27	+14	43	+22	59	+31	75	+39	91	+48	107	+56	123	+65
12	+6	28	+14	44	+23	60	+31	76	+40	92	+48	108	+57	124	+65
13	+6	29	+15	45	+23	61	+32	77	+40	93	+49	109	+57	125	+66
14	+7	30	+15	46	+24	62	+32	78	+41	94	+49	110	+58	126	+66
15	+7	31	+16	47	+24	63	+33	79	+41	95	+50	111	+58	127	+67

CC #17 – Own controller: Key Priority

Received value of the CC #17 adjusts the „Key Priority“ parameter (see chapter 2.3). Conversion of the CC #17 value to the parameter value shows table 4. Value of the parameter in edit buffer is adjusted only temporarily - until next instrument restart.

⁴ If the CC #64 is active (ON) and the Note On command for an already playing note is received, the envelope generator is **not triggered** again - percussive sounds **will not be played** this way.

⁵ All Sound Off MIDI command affects only tones launched by MIDI Notes. Own instrument's keyboard is not affected.

⁶ All Notes Off MIDI command affects only tones launched by MIDI Notes. Own instrument's keyboard is not affected.

**Table 4 – Conversion of CC #17 value to "Key Priority" parameter value**

CC	Priority	CC	Priority
0 ~ 31	Last	64 ~ 95	Lower
32 ~ 63	Higher	96 ~ 127	None

CC #18 – Own controller: Pitch Bend Range

Received value of the CC #18 adjusts the "Pitch Bend Range" parameter (see chapter 2.4). Conversion of the CC #18 value to the parameter value shows table 5. Value of the parameter in edit buffer is adjusted only temporarily - until next instrument restart.

Table 5 – Conversion of CC 18 value to "Pitch Bend Range" parameter value (in semitones)

CC	Range	CC	Range	CC	Range	CC	Range	CC	Range
0 ~ 4	±0	25 ~ 29	±5	50 ~ 54	±10	75 ~ 79	±15	100 ~ 104	±20
5 ~ 9	±1	30 ~ 34	±6	55 ~ 59	±11	80 ~ 84	±16	105 ~ 109	±21
10 ~ 14	±2	35 ~ 39	±7	60 ~ 64	±12	85 ~ 89	±17	110 ~ 114	±22
15 ~ 19	±3	40 ~ 44	±8	65 ~ 69	±13	90 ~ 94	±18	115 ~ 119	±23
20 ~ 24	±4	45 ~ 49	±9	70 ~ 74	±14	95 ~ 99	±19	120 ~ 127	±24

3.1.3 PITCH BEND (PITCH WHEEL)

"Pitch Bend" ("Pitch Wheel") command has a standard function - it changes the tune⁷ of the notes played⁸. The minimal / maximal range of the tune bend is adjusted by the "Pitch Bend Range" parameter from ±0 to ±24 semitones (see chapter 2.4).

3.2 COMMON SYSTEM COMMAND - RESET

The interface uses only "Reset" Common System MIDI command. All other Common System commands are ignored.

Complete interface reset is done after receiving the "Reset" command – all parameters are set to their default values stored in internal memory.

3.3 SYSTEM EXCLUSIVE MESSAGES

System Exclusive communication enables the user to adjust values of all interface parameters in internal interface's permanent memory (see ④ on pic. 1 and chapter 4.2) or in edit buffer (see ③ on pic. 1 and chapter 4.1).

System Exclusive communication is described in detail in standalone manual.

For easier creation of SysEx messages, please use the software generator available at manufacturer's web pages: www.chd-el.cz

⁷ Since the interface does not have direct access to the control voltage (CV) of the tone generators, the tone **is not detuned continuously** but in semitone steps. Together with the tuning changes, the envelope generators are triggered.

⁸ The Pitch Bend command is valid only for tones activated by MIDI Notes. It doesn't work with tones activated from own keyboard of the instrument.



4 SYSEX MESSAGES GENERATOR

As a support for the users we have made software generator to create System Exclusive messages to control the interface. Any necessary SysEx message can be created with this generator without difficult calculating of binary or hexadecimal numbers.

The generator is based on Java scripts so it can run on any computer with web browser (Windows, OSX, etc.)⁹. To send the generated commands you will also need an utility to send the generated text¹⁰ as a MIDI SysEx dump (see chapter 5 for recommended software¹¹).

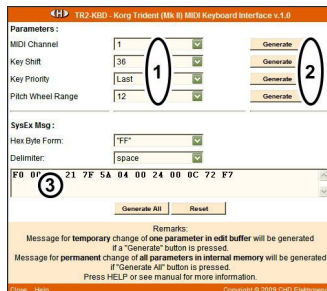
Visit our website and download the "tr2kbd_syxgen.zip" archive. Expand the archive to a selected folder on your computer's hard drive (i.e. "tr2kbd.html" and "tr2kbd_help.html" files and "media" sub-folder).

To launch the SysEx messages generator, simply open the "tr2kbd.html" file in your web browser (e.g. by clicking on the file icon). The generator window opens.

4.1 INDIVIDUAL PARAMETER SETTING

To temporary change / adjust one interface's parameter in edit buffer:

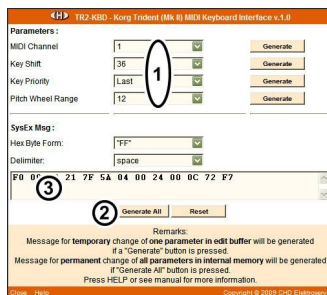
1. Select value of one requested parameter ①.
2. Click the corresponding "Generate" button (in the same row) ②.
3. The hexadecimal MIDI SysEx message is generated as a text in text field on bottom of the window ③.
4. Copy the text in clipboard (CTRL+C) and paste (CTRL+V) to a MIDI Sysex software¹².
5. Send the message to the interface.
6. The interface starts operation with the new parameter immediately. No reset is necessary.
7. Note that the parameter value is changed only in edit buffer. For saving to permanent memory, see chapter 4.2.



4.2 BULK DUMP ALL PARAMETERS

To change / adjust all interface's parameters in permanent memory:

1. Select values of all parameters ①.
2. Click the "Generate All" button ②.
3. The hexadecimal MIDI SysEx message is generated as a text in text field on bottom of the window ③.
4. Copy the text in clipboard (CTRL+C) and paste (CTRL+V) to a MIDI Sysex software¹³.



⁹ Note that scripts and ActiveX elements must be enabled in web browser for proper function of the generator.

¹⁰ The generated format of the message is text. The text can not be saved as a *.syx or *.mid file directly, hence a text to SysEx utility is needed.

¹¹ It is not necessary to use the recommended utility. The same function is provided by various DAW and MIDI SysEx software. For required text format and instructions check the documentation of your DAW/software.

¹² See chapter 5.2 for recommended MIDI SysEx software.

¹³ See chapter 5.2 for recommended MIDI SysEx software.



5. Send the message to the interface.
6. The interface stores new values of parameters to permanent memory.
7. Note that the changes becomes audible till after reset of the interface¹⁴.

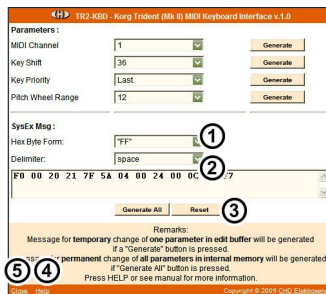
4.3 OTHER FUNCTIONS

Select "Hex Byte Form" ① and "Delimiter" character ② as required for your MIDI SysEx software¹⁵. Default setting of the generator is optimized for the recommended **Pocket MIDI** utility¹⁶ (see Chapter 5). However some DAW or MIDI SysEx utilities require different format of the generated text message. Required form of hex bytes and delimiter must be set before a Generate button is pressed.

To clear the text field and return all values to their defaults, click the "Reset" button ③.

"Help" link ④ opens new window with brief help.

"Close" link ⑤ closes browser panel with this SysEx Generator window.



¹⁴ Switch the instrument off and on again after a moment so that the new parameters values are accepted.

¹⁵ See the documentation of your DAW for required format.

¹⁶ The default format is also compatible with Bome SendSX and various other softwares.



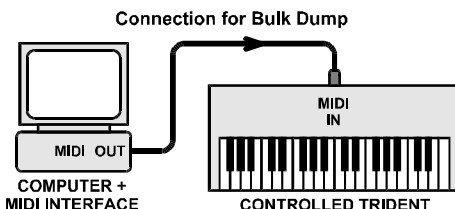
5 RECOMMENDED MIDI SOFTWARE

The hexadecimal MIDI SysEx messages created in the Generators (as described in chapter 5) are in plain text format. The text can not be saved as a *.syx or *.mid file directly, hence a text to SysEx capable utility or DAW is needed.

Pocket MIDI¹⁷ is a utility that can be used to send the text as a SysEx message. It is a simple MIDI monitoring tool for both Windows and Mac OSX platforms. **Pocket MIDI** is a freeware for commercial, non-profit or private use.

5.1 SETTING UP THE COMPUTER¹⁸ AND SOFTWARE

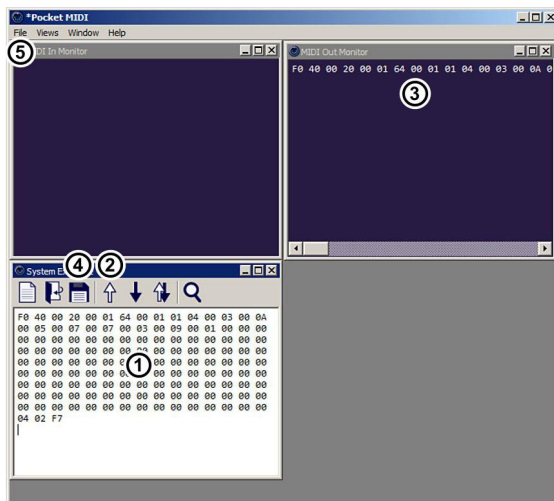
1. Download the **Pocket MIDI** utility at <https://www.morson.jp/pocketmidi-website/>
2. Install the utility in your computer.
3. Connect the instrument with the interface accordingly to the picture "Connection for Bulk Dump".
4. Select the MIDI interface **Outputs** to device where the interface is connected to (drop-down menu **Views → MIDI Settings → Input Port / Output Port**).



5.2 SEND THE TEXT SYSEX MESSAGE TO THE INTERFACE

Basic procedure to send any SysEx data to a MIDI device:

1. Generate required SysEx message in the SysEx Messages Generator (as described in Chapter 5)¹⁹.
2. **Copy** the text in clipboard (CTR+C) and **paste** (CTRL+V) in "System Exclusive" window ①.
3. Click the "↑" ("Transmit") arrow ② to send the data to the interface.
4. The sent message appears in the "MIDI Out Monitor" window ③.
5. Alternatively you can **save** the file for future use (either by the floppy icon ④ as a *.txt file or in the drop-down "File" menu ⑤ as a *.pocketmidi file).



¹⁷ Pocket MIDI is Copyright © MORSON JAPAN Co.,Ltd. All rights reserved.

¹⁸ Computer MIDI interface must be active / switched on and all necessary MIDI drivers correctly installed.

¹⁹ The correct "FF" Hex Byte Form and " " (space) for Delimiter are the initial values after the SysEx Generator is launched, so there is no need to change them for Pocket MIDI.

**6 APPENDICES****6.1 MIDI IMPLEMENTATION CHART**

Device : TR2-KBD

Date : 12 / 2009

Model : 8-436

Version : 1.0

Function		Transmission	Reception	Remarks
Basic Channel	Default Changed	X	1 1~16	¹⁾
Mode	Default Messages	X	Mode 3 X	²⁾
Note Number		X	0~127	³⁾
Velocity	Note ON Note OFF	X X	X X	
After Touch	Key's Channel's	X X	X X	
Pitch Bender		X	0	
Control Changes	16 17 18 64 120 121	X X X X X X	0 0 0 0 0 0	Own CC – Key Shift Own CC – Key Priority Own CC – Pitch Wheel Range Hold All Sound Off Reset All Controllers
Program Change		X	X	
System Exclusive		X	0	See description
System Common	Song Position Song Select Tune	X X X	X X X	
System Real Time	Clock Command	X X	X X	
Others	Local ON/OFF All Notes Off Active Sensing Reset	X X X X	X 0 X 0	
Notes :				
¹⁾ Can be changed by SysEx Msg				
²⁾ Can be changed to Mode 1 by SysEx Msg				
³⁾ Only 61 Notes can be accepted at a time - range depends on "Key Shift" parameter setting				

Mode 1 : **OMNI ON, POLY**Mode 2 : **OMNI ON, MONO****0** : YesMode 3 : **OMNI OFF, POLY**Mode 4 : **OMNI OFF, MONO****X** : No



6.2 ERROR STATUS INDICATION

If any fatal errors occur during the interface operation (eg. MIDI communication), the software stops automatically the device and the user is informed by the permanently sounding tone generators C2 + D#2 + F#2.

In that case, it is necessary to reset the interface for proper operation refresh - it is necessary turn the instrument off and turn it on repeatedly after a moment.

6.3 WARRANTY CONDITIONS

Equipment comes with **thirty-months warranty** starting from the date of equipment take-over by the customer. This date must be specified on warranty list together with dealer's confirmation.

During this period of time, all defects of equipment or its accessories, caused by defective material or faulty manufacturing, will be removed free of charge.

Warranty repair is asserted by the customer against the dealer.

Warranty period is to be extended for the time period, during which the product was under the warranty repair.

Relevant legal regulations take effect in case of cancellation of purchase contract.

Customer will lose the right for free warranty repair, if he will not be able to submit properly filled out warranty list or if the defects of the product had been caused by:

- unavoidable event (natural disaster),
- connecting the device to incorrect supply voltage,
- inputs or outputs overloading by connecting the signals source or load source with not-corresponding characteristics etc.,
- faulty equipment operation, which is in conflict with instructions referred-to in the operating manual,
- mechanical damage caused by customer during transportation or usage of equipment,
- unprofessional interference with the equipment or by equipment modification without manufacturer's approval.



Document :
8436_manual_rev2

Manufacturer :
CHD Elektroservis
Nad kundratkou 27, 19000 Praha 9, Czech Republic

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