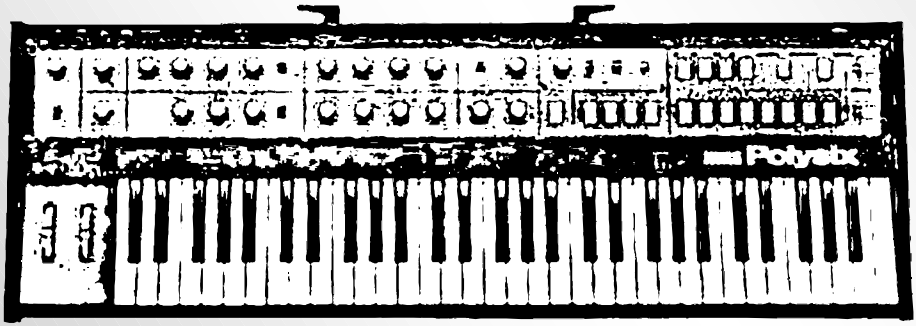
P6-KBD

MIDI Interface for KORG POLYSIX Keyboard

Model 8-431
ver. 1.1



OWNER'S MANUAL

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Manufacturer :

CHD Elektroservis
Nad kundratkou 27, 19000 Praha 9
Czech Republic

info@chd-el.cz
www.chd-el.cz

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1. INTRODUCTION

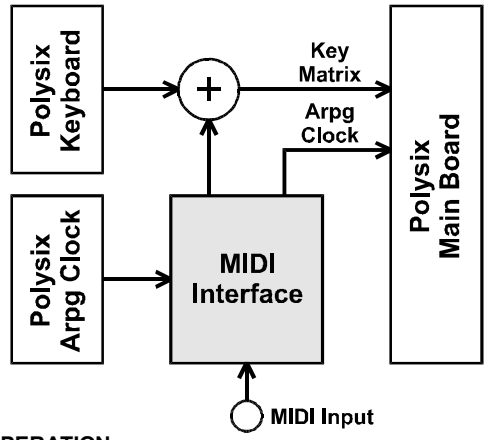
P6-KBD is a MIDI retrofit for the Korg Polysix synthesizer. The device enables the Polysix to be controlled via MIDI as a MIDI expander. P6-KBD also synchronizes the arpeggiator speed with the MIDI clock of an exteranal sequencer.

All P6-KBD functions can be adjusted via MIDI parameters. Standard channel and system MIDI parameters or System Exclusive Messages are used. The MIDI channel is user definable.

1.1. INTERFACE FUNCTIONS

The interface controls the keyboard in a parallel fashion. The Polysix's keyboard can be used at the same time as it is controlled by MIDI. The interface can synchronize the arpeggiator to an external MIDI clock or ignore the synchronization data and use the Polysix's internal clock generator.

Fig. 1 – Block diagram



2. INTERFACE BASIC OPERATION

There are no indicators or switches on the interface. All parameters are adjusted via MIDI commands from an external MIDI data source only. At instrument start-up, the following default settings are set up.

Table 1 – Default setting of the interface after the reset

Function	Setting	Value of correspond parameter
MIDI channel choice	11th channel	MIDI Channel : 10
Keyboard shift setting	+36 semitones	Key Shift : 36
Key priority setting	last key priority	Key Priority : 0
Pitch Wheel range setting	±12 semitones	Pitch Wheel Range : 12
Arpeggiator rate setting	internal generator	Arpeggio Clock Rate : 0

All interface functions are adjustable via MIDI controllers or SysEx messages. There are five user adjustable parameters, described in the following chapters.

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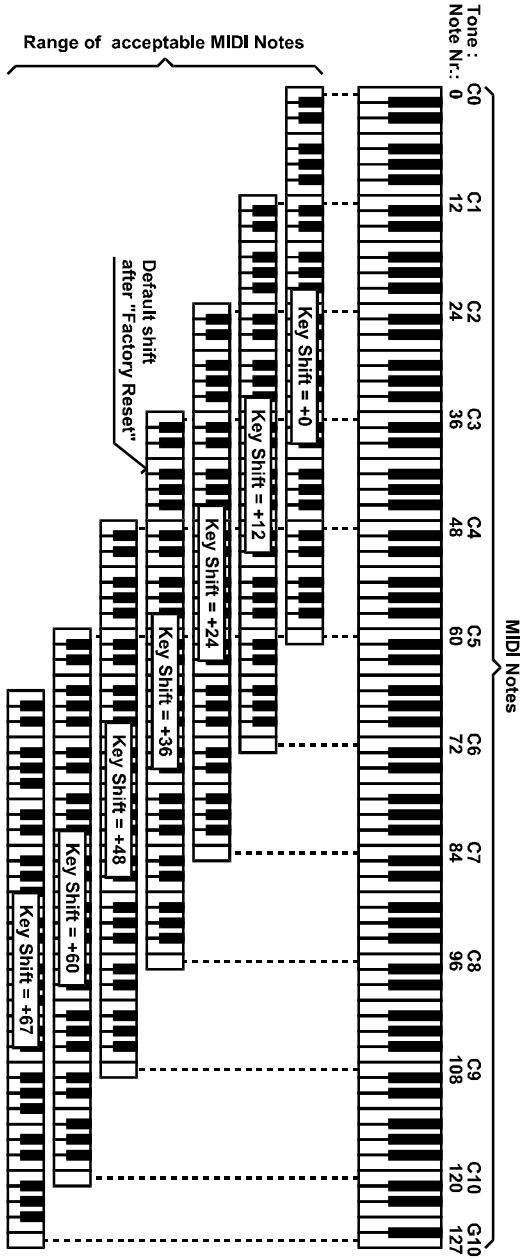
Fig. 2 –„Key Shift“ parameter description



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2.1. MIDI CHANNEL

This parameter sets the basic MIDI channel for communication with the MIDI master system. Any of the available 16 channels can be set, as well as MIDI OMNI mode. OMNI mode enables the instrument to receive data on all 16 MIDI channels.

Parameter values are 0 to 16. The values 0 to 15 represents MIDI channels 1 to 16. The value 16 is for OMNI MODE. The value of this parameter can be adjusted only with the MIDI System Exclusive Message - see chapter 3.3.

2.2. KEY SHIFT

The Key Shift parameter transposes the keyboard. The range of the Key Shift is 0 to +67 semitones. When a value of 0 is set, the lowest key of the keyboard is equal to MIDI note 0 and the highest is equal the MIDI note number 60.

When transposing +1 semitone, the lowest key of the keyboard has assigned the MIDI note number 1 and the highest number 61. When transposing +67 semitones the lowest key of the keyboard has assigned the MIDI note number 67 and the highest number 127. For more details see pic. 2.

Parameter values are 0 to 67. The value can be adjusted two ways:

a) MIDI controller (Control Changes) Nr. 16 – see chapter 3.1.2.
b) SysEx Message – see chapter 3.3.

2.3. KEY PRIORITY

The value of the parameter adjusts the incoming MIDI Note On/Off commands processing in case when all six tone generators of the instrument are used.

Parameter values are 0 to 3.

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

The value can be adjusted two ways:

a) MIDI controller (Control Changes) Nr. 17 - see chapter 3.1.2.
b) SysEx Message – see chapter 3.3.

2.4. PITCH WHEEL RANGE

Parameter adjusts the maximum range of the pitch bend controlled by the MIDI command "Pitch Wheel" ("Pitch Bend").

Parameter values are 0 to 24. The 0 value switches the pitch bend off. The MIDI command "Pitch Wheel" is ignored. The values of 1 to 24 are equal to the transposition semitones, The ±2 octave transposition is available thus.

The value can be adjusted two ways:

a) MIDI controller (Control Changes) Nr. 18 - see chapter 3.1.2.
b) SysEx Message – see chapter 3.3.

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2.5. ARPEGGIO CLOCK RATE

The Parameter adjusts the arpeggiator tempo. The parameter values are 0 to 127. The value of 0 switches the Polysix's internal clock generator on. (The arpeggio speed is adjusted by the SPEED knob on the instrument's panel or by external clock impulses from the ARPEGGIO TRIG IN connector on the rear panel.

The parameter values 1 to 127 synchronize the arpeggiator speed according to the incoming "MIDI Clock" data. The higher the value of the parameter is set, the higher the arpeggiator speed. The value 1 represents 127 MIDI clock pulses, 2 represents 126 MIDI clock pulses, etc. the highest value 127 is for one clock pulse. For the conversion rates see Table 1.

The value can be adjusted two ways:
a) MIDI controller (Control Changes) Nr. 19 - see chapter 3.1.2.
b) SysEx Message – see chapter 3.3.

Table 1 – Conversion of parameter value to length of arpeggiator interval

Parameter value	interval between clock pulses in notes										
	1/2	1/2 triplet	1/4	1/4 triplet	1/8	1/8 triplet	1/16	1/16 triplet	1/32	1/32 triplet	1/64 triplet
0	*)	*)	*)	*)	*)	*)	*)	*)	*)	*)	*)
1	-	-	-	-	-	-	-	-	-	-	127
2	-	-	-	-	-	-	21	-	42	63	126
3	-	-	-	-	-	-	-	-	-	-	125
4	-	-	-	-	-	-	-	31	-	62	124
5	-	-	-	-	-	-	-	-	41	-	123
6	-	-	-	-	-	-	-	-	-	61	122
7	-	-	-	-	-	-	-	-	-	-	121
8	-	-	5	-	10	15	20	30	40	60	120
9	-	-	-	-	-	-	-	-	-	-	119
10	-	-	-	-	-	-	-	-	-	59	118
11	-	-	-	-	-	-	-	-	39	-	117
12	-	-	-	-	-	-	-	29	-	58	116
13	-	-	-	-	-	-	-	-	-	-	115
14	-	-	-	-	-	-	19	-	38	57	114
15	-	-	-	-	-	-	-	-	-	-	113
16	-	-	-	7	-	14	-	28	-	56	112
17	-	-	-	-	-	-	-	-	37	-	111
18	-	-	-	-	-	-	-	-	-	55	110
19	-	-	-	-	-	-	-	-	-	-	109
20	-	-	-	-	9	-	18	27	36	54	108
21	-	-	-	-	-	-	-	-	-	-	107
22	-	-	-	-	-	-	-	-	-	53	106
23	-	-	-	-	-	-	-	-	35	-	105
24	-	-	-	-	-	13	-	26	-	52	104
25	-	-	-	-	-	-	-	-	-	-	103
26	-	-	-	-	-	-	17	-	34	51	102
27	-	-	-	-	-	-	-	-	-	-	101

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Table 1 – Conversion of parameter value to length of arpeggiator interval (continue)											
Parameter value	interval between clock pulses in notes										
	1/2	1/2 triplet	1/4	1/4 triplet	1/8	1/8 triplet	1/16	1/16 triplet	1/32	1/32 triplet	1/64 triplet
28	-	-	-	-	-	-	-	25	-	50	100
29	-	-	-	-	-	-	-	-	33	-	99
30	-	-	-	-	-	-	-	-	-	49	98
31	-	-	-	-	-	-	-	-	-	-	97
32	2	3	4	6	8	12	16	24	32	48	96
33	-	-	-	-	-	-	-	-	-	-	95
34	-	-	-	-	-	-	-	-	-	47	94
35	-	-	-	-	-	-	-	-	31	-	93
36	-	-	-	-	-	-	-	23	-	46	92
37	-	-	-	-	-	-	-	-	-	-	91
38	-	-	-	-	-	-	15	-	30	45	90
39	-	-	-	-	-	-	-	-	-	-	89
40	-	-	-	-	-	11	-	22	-	44	88
41	-	-	-	-	-	-	-	-	29	-	87
42	-	-	-	-	-	-	-	-	-	43	86
43	-	-	-	-	-	-	-	-	-	-	85
44	-	-	-	-	7	-	14	21	28	42	84
45	-	-	-	-	-	-	-	-	-	-	83
46	-	-	-	-	-	-	-	-	-	41	82
47	-	-	-	-	-	-	-	-	27	-	81
48	-	-	-	5	-	10	-	20	-	40	80
49	-	-	-	-	-	-	-	-	-	-	79
50	-	-	-	-	-	-	13	-	26	39	78
51	-	-	-	-	-	-	-	-	-	-	77
52	-	-	-	-	-	-	-	19	-	38	76
53	-	-	-	-	-	-	-	-	25	-	75
54	-	-	-	-	-	-	-	-	-	37	74
55	-	-	-	-	-	-	-	-	-	-	73
56	-	-	3	-	6	9	12	18	24	36	72
57	-	-	-	-	-	-	-	-	-	-	71
58	-	-	-	-	-	-	-	-	-	35	70
59	-	-	-	-	-	-	-	-	23	-	69
60	-	-	-	-	-	-	-	17	-	34	68
61	-	-	-	-	-	-	-	-	-	-	67
62	-	-	-	-	-	-	11	-	22	33	66
63	-	-	-	-	-	-	-	-	-	-	65
64	-	2	-	4	-	8	-	16	-	32	64
65	-	-	-	-	-	-	-	-	21	-	63
66	-	-	-	-	-	-	-	-	-	31	62
67	-	-	-	-	-	-	-	-	-	-	61
68	-	-	-	-	5	-	10	15	20	30	60

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Table 1 – Conversion of parameter value to length of arpeggiator interval (continue)											
Parameter value	interval between clock pulses in notes										
	1/2	1/2 triplet	1/4	1/4 triplet	1/8	1/8 triplet	1/16	1/16 triplet	1/32	1/32 triplet	1/64 triplet
69	-	-	-	-	-	-	-	-	-	-	59
70	-	-	-	-	-	-	-	-	-	29	58
71	-	-	-	-	-	-	-	-	19	-	57
72	-	-	-	-	-	7	-	14	-	28	56
73	-	-	-	-	-	-	-	-	-	-	55
74	-	-	-	-	-	-	9	-	18	27	54
75	-	-	-	-	-	-	-	-	-	-	53
76	-	-	-	-	-	-	-	13	-	26	52
77	-	-	-	-	-	-	-	-	17	-	51
78	-	-	-	-	-	-	-	-	-	25	50
79	-	-	-	-	-	-	-	-	-	-	49
80	1	-	2	3	4	6	8	12	16	24	48
81	-	-	-	-	-	-	-	-	-	-	47
82	-	-	-	-	-	-	-	-	-	23	46
83	-	-	-	-	-	-	-	-	15	-	45
84	-	-	-	-	-	-	-	11	-	22	44
85	-	-	-	-	-	-	-	-	-	-	43
86	-	-	-	-	-	-	7	-	14	21	42
87	-	-	-	-	-	-	-	-	-	-	41
88	-	-	-	-	-	5	-	10	-	20	40
89	-	-	-	-	-	-	-	-	13	-	39
90	-	-	-	-	-	-	-	-	-	19	38
91	-	-	-	-	-	-	-	-	-	-	37
92	-	-	-	-	3	-	6	9	12	18	36
93	-	-	-	-	-	-	-	-	-	-	35
94	-	-	-	-	-	-	-	-	-	17	34
95	-	-	-	-	-	-	-	-	11	-	33
96	-	1	-	2	-	4	-	8	-	16	32
97	-	-	-	-	-	-	-	-	-	-	31
98	-	-	-	-	-	-	5	-	10	15	30
99	-	-	-	-	-	-	-	-	-	-	29
100	-	-	-	-	-	-	-	7	-	14	28
101	-	-	-	-	-	-	-	-	9	-	27
102	-	-	-	-	-	-	-	-	-	13	26
103	-	-	-	-	-	-	-	-	-	-	25
104	-	-	1	-	2	3	4	6	8	12	24
105	-	-	-	-	-	-	-	-	-	-	23
106	-	-	-	-	-	-	-	-	-	11	22
107	-	-	-	-	-	-	-	-	7	-	21
108	-	-	-	-	-	-	-	5	-	10	20
109	-	-	-	-	-	-	-	-	-	-	19

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Table 1 – Conversion of parameter value to length of arpeggiator interval (continue)											
Parameter value	interval between clock pulses in notes										
	1/2	1/2 triplet	1/4	1/4 triplet	1/8	1/8 triplet	1/16	1/16 triplet	1/32	1/32 triplet	1/64 triplet
110	-	-	-	-	-	-	3	-	6	9	18
111	-	-	-	-	-	-	-	-	-	-	17
112	-	-	-	1	-	2	-	4	-	8	16
113	-	-	-	-	-	-	-	-	5	-	15
114	-	-	-	-	-	-	-	-	-	7	14
115	-	-	-	-	-	-	-	-	-	-	13
116	-	-	-	-	1	-	2	3	4	6	12
117	-	-	-	-	-	-	-	-	-	-	11
118	-	-	-	-	-	-	-	-	-	5	10
119	-	-	-	-	-	-	-	-	3	-	9
120	-	-	-	-	-	1	-	2	-	4	8
121	-	-	-	-	-	-	-	-	-	-	7
122	-	-	-	-	-	-	1	-	2	3	6
123	-	-	-	-	-	-	-	-	-	-	5
124	-	-	-	-	-	-	-	1	-	2	4
125	-	-	-	-	-	-	-	-	1	-	3
126	-	-	-	-	-	-	-	-	-	1	2
127	-	-	-	-	-	-	-	-	-	-	1
Note.: *) arpeggiator tempo is controlled by internal generator											

3. MIDI IMPLEMENTATION

The interface has only the MIDI input. It only receives MIDI commands. The interface recognizes channel commands, common system commands and System Exclusive messages.

3.1. CHANNEL COMMANDS

3.1.1. NOTE ON/OFF

The interface receives Note On/Off on the selected MIDI channel.

3.1.2. CONTROL CHANGES

The interface recognizes standard MIDI controllers Nr. 64, 120, 121, 123. Other controllers are used for adjusting the temporary settings of internal parameters (controllers 16 to 19). All acceptable controllers are received on MIDI channel chosen by "MIDI Channel" parameter.

CC 64 – Hold

The controller works in a standard way: Holds the tone generators sounding when the "Hold" pedal is pressed. Values (second databyte) 64 to 127 are recognized as ON (pressed), values 0 to 63 are recognized as OFF (pedal released).

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If the controller is active and the Note On command for an already playing note is received, the envelope generator is not trigged again - percussive sounds will not be played this way.

CC 120 – All Sound Off

When this controller is received (the second databyte must have the 0 value) all tone generators are muted independently if they are active by "Note On" command or the "Hold" controller.

CC 121 – Reset All Controllers

When this controller is received (the second databyte must have the 0 value) the "Hold" controller is switched off and the "Pitch Wheel" controller is set to the center position.

CC 123 – All Notes Off

When the controller is received (the second databyte must have the 0 value) all tone generators are muted if the "Hold" controller is inactive. If the "Hold" is active "All Notes Off" command is executed after the "Hold" pedal release.

CC 16 – Key Shift

The received value of the controller (its second databyte) adjusts the "Key Shift" parameter see pic. 3 and tab. 2. The value of the parameter is adjusted only temporarily; until the next instrument restart.

Table 2 – Conversion of CC 16 value to ”Key Shift“parameter value (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

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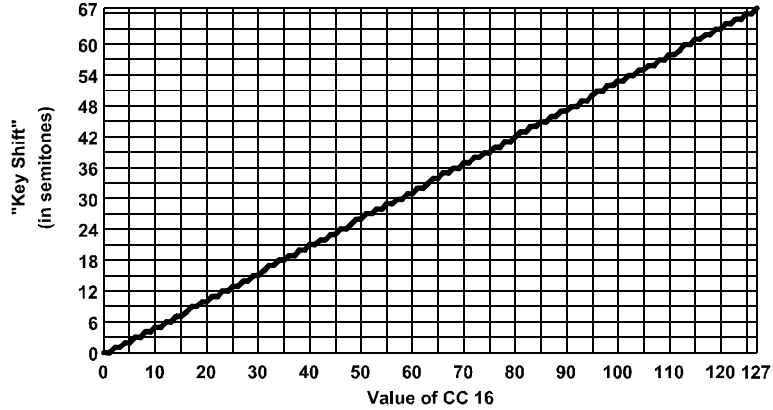
Fig. 3 – Conversion of CC 16 value to ”Key Shift“ parameter value

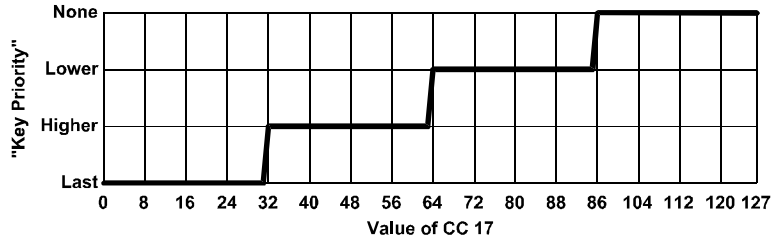


CC 17 – Key Priority controller

The received value of the controller (its second databyte) adjusts the "Key Priority" parameter see pic. 4 and tab. 3. The value of the parameter is set only temporarily. Until the next instrument restart.

Table 3 – Conversion of CC 18 value to ”Key Priority“ parameter value			
CC	Priority	CC	Priority
0 ~ 31	Last	64 ~ 95	Lower
32 ~ 63	Higher	96 ~ 127	None

Fig. 4 – Conversion of CC 17 value to ”Key Priority“ parameter value



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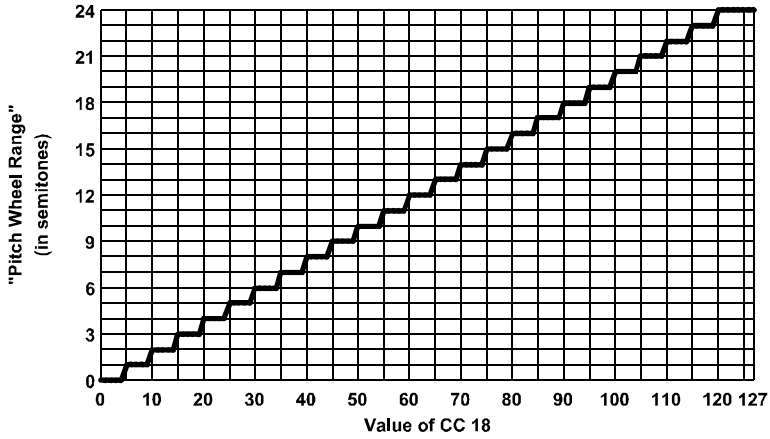
CC 18 – Pitch Wheel Range controller

The received value of the controller (its second databyte) adjusts the " Pitch Wheel Range " parameter see pic. 5 and tab. 4. The value of the parameter is set only temporarily. Until the next instrument restart.

Table 4 – Conversion of CC 18 value to "Pitch Wheel 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

Fig. 5 – Conversion of CC 18 value to "Pitch Wheel Range" parameter value



CC 19 – Arpeggio Clock Rate controller

The received value of the controller (its second databyte) adjusts the " Arpg Clock Rate " parameter. The value of the parameter is set only temporarily. Until the next instrument restart.

3.1.3. PITCH WHEEL (PITCH BEND)

"Pitch Wheel" ("Pitch Bend") has a standard function - it changes the tune of the notes played. The minimal / maximal range is adjusted by the "Pitch Wheel Range" parameter (±0 to ±24 semitones).

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 trigged.

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3.2. COMMON SYSTEM COMMANDS

3.2.1. CLOCK

If the "Arpg Clock Rate" parameter is equal to 0, MIDI clock commands are ignored. For larger values of "Arpg Clock Rate", the interface receives synchronization impulses of the MIDI Clock (status byte F8h) for the arpeggiator tempo (see chapter 2.5.).

The maximum arpeggiator tempo is limited by the instrument hardware. At extremely high speeds or tempos, the arpeggiator might play out of tempo or omit notes.

3.2.2. RESET

The complete interface reset is done after receiving "Reset" command (status byte FFh) - all parameters are adjusted to their default values.

3.3. SYSTEM EXCLUSIVE MESSAGES

The System Exclusive communication enables user to adjust the values of all interface parameters. System Exclusive communication is described in detail in standalone manual.

For easier SysEx Message creation please use the software generator available on the attached CD-ROM or at "http://www.chd-el.cz".

Cakewalk or Sonar users can use pre-defined Studio Ware Panel for easier operation, available on the enclosed CD-ROM.

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4. WARRANTY CONDITIONS

The equipment is provided with **thirty-month warranty** starting from the date of the 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.

The relevant legal regulations take effect in case of cancellation of purchase contract.

The 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 the 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 at variance with the instructions referred-to in the operating manual,
- mechanical damage caused by consumer during transportation or usage of equipment,
- unprofessional interference with the equipment or by equipment modification without manufacturer’s approval.

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APPENDIX

A. MIDI IMPLEMENTATION CHART

Device : **P6-KBD** Date : 5 / 2009
Model : **8-431** Version : 1.1

Function		Transmission	Reception	Remarks
Basic	Default	X	11	
Channel	Changed		1~16	[1])
Mode	Default	X	Mode 3	[2])
	Messages		X	
Note Number		X	0~127	[3])
Velocity	Note ON	X	X	
	Note OFF	X	X	
After	Key's	X	X	
Touch	Channel's	X	X	
Pitch Bender		X	O	
Control Changes	16	X	O	Own CC – Key Shift
	17	X	O	Own CC – Key Priority
	18	X	O	Own CC – Pitch Wheel Range
	19	X	O	Own CC – Arpg Clock Rate
	64	X	O	Hold
	120	X	O	All Sound Off
	121	X	O	Reset All Controllers
Program Change		X	X	
System Exclusive		X	O	See description
System	Song Position	X	X	
Common	Song Select	X	X	
	Tune	X	X	
System	Clock	X	O	
Real Time	Command	X	X	
Others	Local ON/OFF	X	X	
	All Notes Off	X	O	
	Active Sensing	X	X	
	Reset	X	O	

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** **O** : Yes
Mode 3 : **OMNI OFF, POLY** Mode 4 : **OMNI OFF, MONO** **X** : No

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