JU6-KBD

MIDI Interface for ROLAND JUNO-6 Keyboard

Model 8-429
ver. 1.0

OWNER'S MANUAL

Content

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1. DEVICE DESCRIPTION

JU6-KBD is a MIDI retrofit for Roland Juno-6 synthesizer. The device enables the instrument to be controlled via MIDI as a MIDI expander. JU6-KBD enables to control instrument's keyboard and it also synchronizes the arpeggiator speed with several sources of clock.

All JU6-KBD functions are controlled via parameters adjusted by user. Standard channel and system MIDI or System Exclusive messages are used for setting of all parameters. The interface has own internal memory banks for storage of user setting.

1.1. INTERFACE FUNCTIONS

Functional block schematics of the interface is on pic. 1. The interface controls the keyboard in a parallel fashion. The instrument's keyboard can be used at the same time as it is controlled by MIDI. The interface can synchronize the instrument's arpeggiator with four sources of clock pulses.

Pic. 1 – Functional block schematics
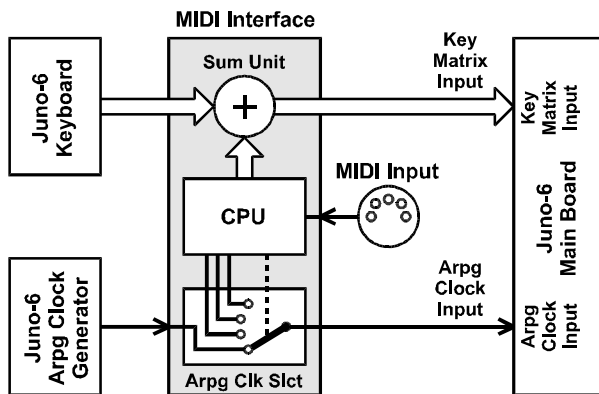
2. INTERFACE BASIC OPERATION

There are no indicators or switches on the interface. All parameters are adjusted via MIDI commands from an external MIDI data source only.

2.1. CONNECTION TO MIDI SYSTEM

The interface only receives MIDI data so it is equipped only by MIDI input. Interface's MIDI input have to be connected to MIDI output of MIDI host system (PC, sequencer, master keyboard …). Standard MIDI cable with DIN 41524 connector (5 pins / 180°) is used for connection.

2.2. INITIALIZATION SEQUENCE

Initialization sequence of interface's CPU is launched after every start-up of the instrument. Default status of system functions is set during initialization sequence and preset Nr. 1 is set as active – i.e. values of parameters stored in preset Nr. 1 are read into edit buffer – see pic. 2.

3. PARAMETERS

The parameters settings affects significantly the incoming MIDI commands processing and the Juno-6 circuits operation. Parameters are divided in to basic groups – system parameters and preset parameters – see pic. 2.

Pic. 2 – Structure of interface's memory
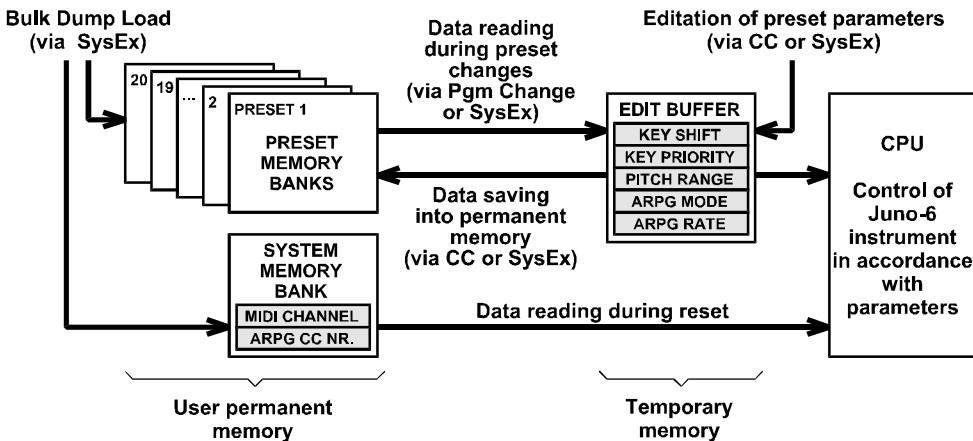
All parameters are stored in memory banks in internal memory of the interface – there is one bank for system parameters and 20 banks for preset parameters. The content of the memory banks can be changed by the "Bulk Dump Data Load" SysEx messages (see description of the System Exclusive communication).

Preset parameters, that directly controls the sound of the instruments, can be individually adjusted in the editing buffer by the MIDI Control Changes commands or by "Preset Parameter Change" SysEx messages (see description of the System Exclusive communication). All changes can be saved in one of the preset memory banks.

Presets can be changed by "Program Change" MIDI channel commands or by SysEx messages.

3.1. SYSTEM PARAMETERS

The system parameters control the basic function of the interface. System parameters are always valid independently on the actual preset settings – the change of the system parameters take effect the same way in all user presets.

The values of system parameters, that are saved in factory or if "Factory Reset" is executed (see description of the System Exclusive communication), shows table 1.

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Table 1 – Range of valid values and "Factory Reset" values of system parameters				
Parameter name	Range of valid values		"Factory Reset" values	
	[dec]	[hex]	[dec]	[hex]
MIDI Channel	0 ~ 16	00 ~ 10	0	00
Arpg CC Nr.	0 ~ 127	00 ~ 7F	21	15

System parameters can be changed only by "System Parameter Change" SysEx messages (see System Exclusive communication). All changes are activated after the interface reset – when the instrument is switched on next time (see pic. 2)!

3.1.1. "MIDI CHANNEL" PARAMETER

This parameter sets the basic MIDI channel for communication with the MIDI host 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 simultaneously.

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 4.3.

3.1.2. "ARPG CC Nr." PARAMETER

In working mode CONTROLLER, instrument's arpeggiator can be controlled via MIDI controller (Control Changes). User can select number of required controller by adjusting of "Arpg CC Nr." parameter. Parameter values are 0 to 118. Value of parameter corresponds to number of required controller directly. The value of this parameter can be adjusted only with the MIDI System Exclusive message - see chapter 4.3.
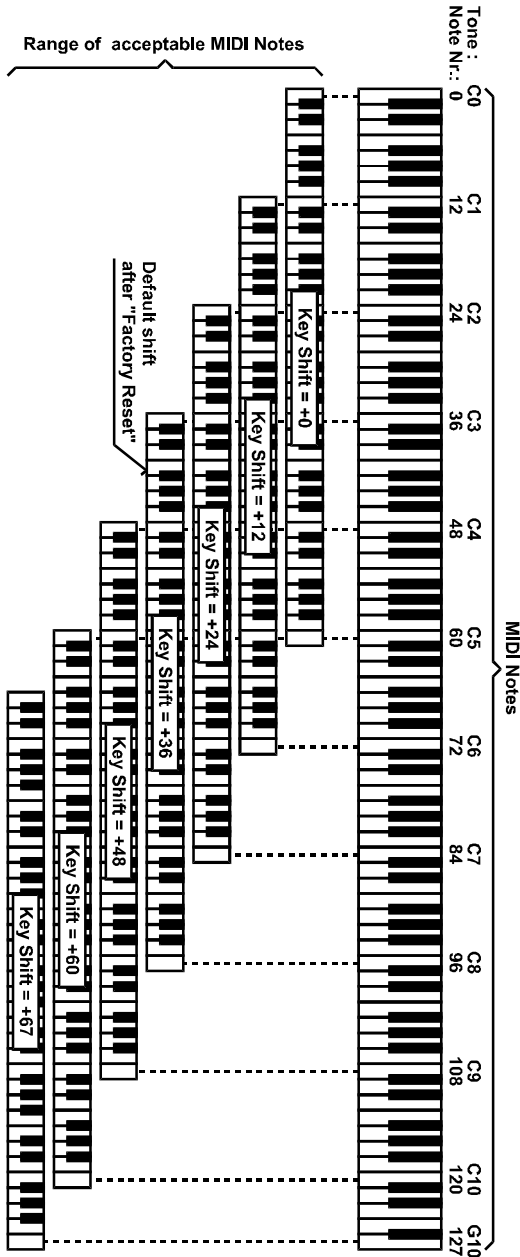
3.2. PRESET PARAMETERS

The preset parameters set function of the interface whose influence sound of the instrument. The preset parameters sets, which MIDI commands are going to control instrument's keyboard and arpeggiaror.

Table 2 – Range of valid values and "Factory Reset" values of preset parameters						
Parameter name	Range of valid values		"Factory Reset" values		Setting via MIDI CC Nr.	
	[dec]	[hex]	[dec]	[hex]	[dec]	[hex]
Key Shift	0 ~ 67	00 ~ 43	36	24	16	10
Key Priority	0 ~ 3	00 ~ 03	0	00	17	11
Pitch Bend Range	0 ~ 24	00 ~ 18	12	0C	18	12
Arpg Clock Mode	0 ~ 3	00 ~ 03	0	00	19	13
Arpg Clock Rate [1]	0 ~ 127	00 ~ 7F	122	7A	20	14
Remark: [1] Parameter has no signification in "Internal" and "Controller" working modes (Arpg Clock Mode = 0 and 3)						

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Pic. 3 –"Key Shift" parameter influence

Range of acceptable MIDI Notes

Default shift after "Factory Reset"

Key Shift = +0

Key Shift = +12

Key Shift = +24

Key Shift = +36

Key Shift = +48

Key Shift = +60

Key Shift = +67

Tone :
Note Nr.:

C0 0
C1 12
C2 24
C3 36
C4 48
C5 60
C6 72
C7 84
C8 96
C9 108
C10 120
G10 127

MIDI Notes

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Up to 20 setting of preset parameters can be stored in internal interface's memory. After reset or after actual preset change, data from corresponding memory bank (always from bank Nr. 1 after reset) are transferred into edit buffer. The instrument is then controlled in dependence on parameters in edit buffer (see pic. 2).

Default values of the preset parameters factory stored in the interface memory or after "Factory Reset" procedure (see SysEx communication), are shown in table 2 The "Factory Reset" values are valid for all 20 user presets.

Values of partial preset parameters in edit buffer are set by the MIDI controllers (Control Changes) or by "Preset Parameter Change" SysEx messages - it is possible to change them during the playing the instrument thus. Edited values of the parameters are stored in the edit buffer only. The content of the buffer is saved temporarily only, till the preset change or instrument switch off or hardware reset. To save the edited parameters it is necessary to save them as a memory preset. There are 20 available preset spaces. Saving the values in preset memories is done by MIDI Control Changes Nr. 119 or by the MIDI System Exclusive command (see SysEx communication).

3.2.1. "KEY SHIFT" PARAMETER

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. 3.

Parameter values are 0 to 67. The value in edit buffer can be adjusted by MIDI controller (Control Changes) Nr. 16 – see chapter 4.1.2.2 or by SysEx Message – see chapter 4.3.

3.2.2. "KEY PRIORITY" PARAMETER

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 parameter value in edit buffer can be adjusted by MIDI controller (Control Changes) Nr. 17 – see chapter 4.1.2.2 or by SysEx Message – see chapter 4.3.

3.2.3. "PITCH BEND RANGE" PARAMETER

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

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 are equal to the transposition semitones, The ±2 octave transposition is available thus.

The parameter value in edit buffer can be adjusted by MIDI controller (Control Changes) Nr. 18 – see chapter 4.1.2.2 or by SysEx Message – see chapter 4.3.

3.2.4. "ARPG CLOCK MODE" PARAMETER

Parameter selects source of clock pulses for instrument's arpeggiator. Parameter values are 0 to 3:

0 → INTERNAL: Arpeggiator is controlled by original instrument's hardware tempo generator in the same manner as without interface. Speed of arpeggio is given by potentiometer on instrument's panel or by external clock pulses incoming to ARPEGGIO CLOCK IN connector on instrument's rear panel. Parameter "Arpg Clock Rate" has no influence in this working mode.

1 → FIXED: Arpeggiator is controlled by clock generator embedded in the interface. Speed of arpeggio is given by adjusting of "Arpg Clock Rate" parameter – see table 3 and pic. 4.

2 → MIDI: Rate of arpeggio is derived from MIDI Clock. Number of received clock ticks is divided. Dividing ratio selects "Arpg Clock Rate" parameter – see table 3.

3 → CONTROLLER: Arpeggiator is controlled directly by MIDI controller (CC) chosen with help of "Arpg CC Nr." system parameter. Always after chosen CC is received (its value isn't significant), one clock pulse is generated. Parameter "Arpg Clock Rate" has no influence in this working mode.

The parameter value in edit buffer can be adjusted by MIDI controller (Control Changes) Nr. 19 – see chapter 4.1.2.2 or by SysEx Message – see chapter 4.3.

3.2.5. "ARPG CLOCK RATE" PARAMETER

Parameter adjusts instrument's arpeggio rate if the arpeggiator works in mode FIXED or MIDI (selected by "Arpg Clock Mode" parameter.) This parameter has no influence in INTERNAL and CONTROLLER working modes.

Parameter values are 0 to 127. Conversion of the parameter value to arpeggio speed / interval show table 3 and pic. 4.

The parameter value in edit buffer can be adjusted by MIDI controller (Control Changes) Nr. 20 – see chapter 4.1.2.2 or by SysEx Message – see chapter 4.3.

Table 3 – Conversion of "Arpg Clock Rate" parameter to arpeggiator speed									
Param. value	Mode (param. "Arpg Clk Mode")				Param. value	Mode (param. "Arpg Clk Mode")			
	FIXED		MIDI			FIXED		MIDI	
	Freq. [Hz]	Period [sec]	Ticks	Note		Freq. [Hz]	Period [sec]	Ticks	Note
0	1,00	1,000	128	-	8	1,28	0,782	120	-
1	1,03	0,970	127	-	9	1,32	0,758	119	-
2	1,06	0,940	126	-	10	1,36	0,735	118	-
3	1,10	0,912	125	-	11	1,40	0,713	117	-
4	1,13	0,884	124	-	12	1,45	0,691	116	-
5	1,17	0,857	123	-	13	1,49	0,670	115	-
6	1,20	0,831	122	-	14	1,54	0,650	114	-
7	1,24	0,806	121	-	15	1,59	0,630	113	-

|	Table 3 – Conversion of "Arpg Clock Rate" parameter to arpeggiator speed (continue)								
Param. value	Mode (param. "Arpg Clk Mode")				Param. value	Mode (param. "Arpg Clk Mode")			
	FIXED		MIDI			FIXED		MIDI	
	Freq. [Hz]	Period [sec]	Ticks	Note		Freq. [Hz]	Period [sec]	Ticks	Note
16	1,64	0,611	112	-	58	5,97	0,168	70	-
17	1,69	0,592	111	-	59	6,16	0,162	69	-
18	1,74	0,574	110	-	60	6,35	0,158	68	-
19	1,80	0,557	109	-	61	6,55	0,153	67	-
20	1,85	0,540	108	-	62	6,75	0,148	66	-
21	1,91	0,524	107	-	63	6,96	0,144	65	-
22	1,97	0,508	106	-	64	7,18	0,139	64	1/1[3]
23	2,03	0,492	105	-	65	7,41	0,135	63	-
24	2,09	0,477	104	-	66	7,64	0,131	62	-
25	2,16	0,463	103	-	67	7,88	0,127	61	-
26	2,23	0,449	102	-	68	8,12	0,123	60	-
27	2,30	0,435	101	-	69	8,38	0,119	59	-
28	2,37	0,422	100	-	70	8,64	0,116	58	-
29	2,44	0,409	99	-	71	8,91	0,112	57	-
30	2,52	0,397	98	-	72	9,19	0,109	56	-
31	2,60	0,385	97	-	73	9,48	0,106	55	-
32	2,68	0,373	96	1/1	74	9,77	0,102	54	-
33	2,76	0,362	95	-	75	10,08	0,099	53	-
34	2,85	0,351	94	-	76	10,39	0,096	52	-
35	2,94	0,340	93	-	77	10,72	0,093	51	-
36	3,03	0,330	92	-	78	11,05	0,090	50	-
37	3,13	0,320	91	-	79	11,40	0,088	49	-
38	3,22	0,310	90	-	80	11,76	0,085	48	1/2
39	3,32	0,301	89	-	81	12,12	0,082	47	-
40	3,43	0,292	88	-	82	12,50	0,080	46	-
41	3,54	0,283	87	-	83	12,89	0,078	45	-
42	3,65	0,274	86	-	84	13,30	0,075	44	-
43	3,76	0,266	85	-	85	13,71	0,073	43	-
44	3,88	0,258	84	-	86	14,14	0,071	42	-
45	4,00	0,250	83	-	87	14,58	0,069	41	-
46	4,12	0,242	82	-	88	15,04	0,066	40	-
47	4,25	0,235	81	-	89	15,51	0,064	39	-
48	4,39	0,228	80	-	90	16,00	0,063	38	-
49	4,52	0,221	79	-	91	16,50	0,061	37	-
50	4,67	0,214	78	-	92	17,01	0,059	36	-
51	4,81	0,208	77	-	93	17,54	0,057	35	-
52	4,96	0,202	76	-	94	18,09	0,055	34	-
53	5,12	0,195	75	-	95	18,66	0,054	33	-
54	5,28	0,189	74	-	96	19,24	0,052	32	1/2[3]
55	5,44	0,184	73	-	97	19,85	0,050	31	-
56	5,61	0,178	72	-	98	20,47	0,049	30	-
57	5,79	0,173	71	-	99	21,11	0,047	29	-

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Table 3 – Conversion of "Arpg Clock Rate" parameter to arpeggiator speed (continue)									
Param. value	Mode (param. "Arpg Clk Mode")				Param. value	Mode (param. "Arpg Clk Mode")			
	FIXED		MIDI			FIXED		MIDI	
	Freq. [Hz]	Period [sec]	Ticks	Note		Freq. [Hz]	Period [sec]	Ticks	Note
100	21,77	0,046	28	-	114	33,50	0,030	14	-
101	22,45	0,045	27	-	115	34,55	0,029	13	-
102	23,15	0,043	26	-	116	35,63	0,028	12	1/8
103	23,87	0,042	25	-	117	36,75	0,027	11	-
104	24,62	0,041	24	1/4	118	37,90	0,026	10	-
105	25,39	0,039	23	-	119	39,08	0,026	9	-
106	26,19	0,038	22	-	120	40,30	0,025	8	$1/8^3$
107	27,00	0,037	21	-	121	41,56	0,024	7	-
108	27,85	0,036	20	-	122	42,86	0,023	6	1/16
109	28,72	0,035	19	-	123	44,21	0,023	5	-
110	29,62	0,034	18	-	124	45,59	0,022	4	$1/16^3$
111	30,55	0,033	17	-	125	47,01	0,021	3	1/32
112	31,50	0,032	16	$1/4^3$	126	48,49	0,021	2	$1/32^3$
113	32,49	0,031	15	-	127	50,00	0,020	1	$1/64^3$

Pic. 4 – Speed / interval of arpeggiator in mode FIXED

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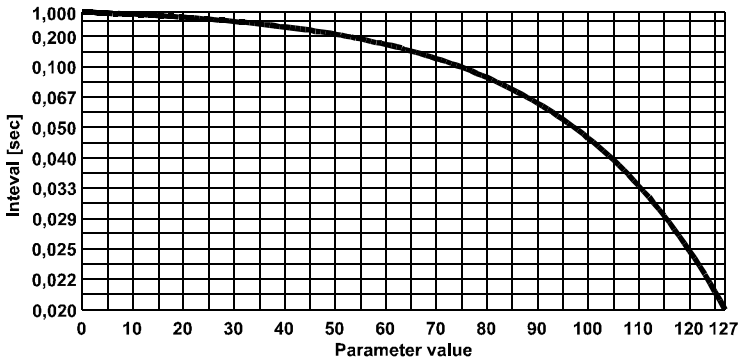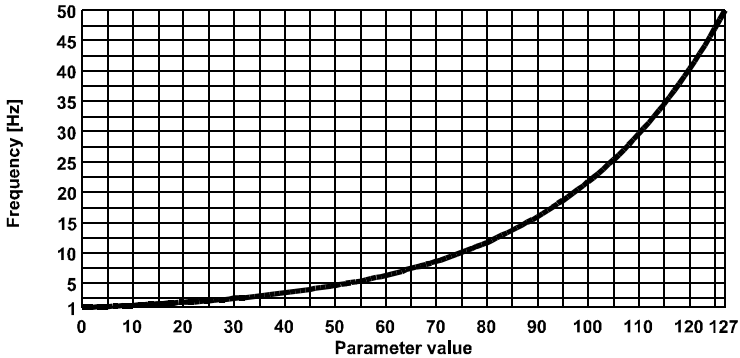
4. MIDI IMPLEMENTATION

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

4.1. CHANNEL COMMANDS

The interface receives MIDI channel commands on the channel defined by the system parameter "MIDI Channel". In OMNI mode, the interface receives MIDI channel commands on all MIDI channels simultaneously.

4.1.1. NOTE ON/OFF

Interface receives Note On/Off on MIDI channel chosen by "MIDI Channel" parameter. "Key Shift" parameter defines assignment of MIDI notes to instrument's keys. When six valid MIDI notes are received (all six tone generators are sounding), all following received MIDI Note commands are processed according to "Key Priority" parameter setting.

4.1.2. CONTROL CHANGES

Interface recognizes standard MIDI controllers Nr. 64, 120, 121, 123. Other controllers are used for temporary adjusting the parameters in edit buffer (controllers 16 – 20, 119). Besides this, one controller selected by user can be are used for direct control of arpeggiator (see chapters 3.1.2 and 3.2.4). All acceptable controllers are received on MIDI channel chosen by "MIDI Channel" parameter.

4.1.2.1. STANDARD CONTROLLERS

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).

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 Bend" 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.

4.1.2.2. OWN CONTROLLERS

CC 16 – Own controller : Key Shift

The received value of the controller (its second databyte) adjusts the "Key Shift" parameter - see pic. 5 and table 4. Value of the parameter in edit buffer is adjusted only temporarily; until the next change or instrument restart.

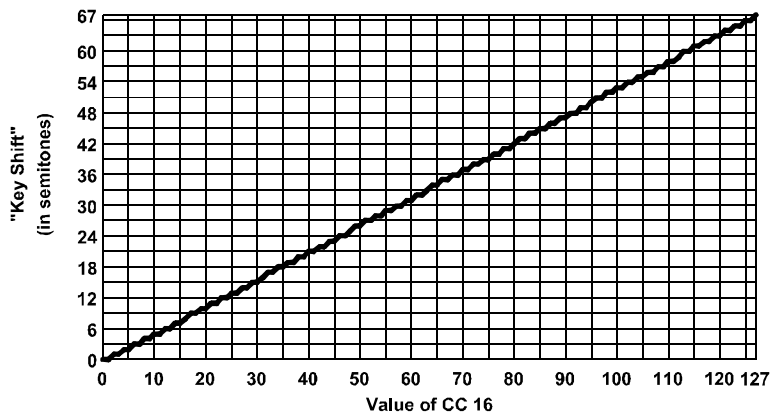**Pic. 5 – Conversion of CC 16 value to "Key Shift" parameter value**

Table 4 – 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

CC 17 – Own controller : Key Priority

The received value of the controller (its second databyte) adjusts the "Key Priority" parameter - see pic. 6 and table 5. Value of the parameter in edit buffer is adjusted only temporarily; until the next change or instrument restart.

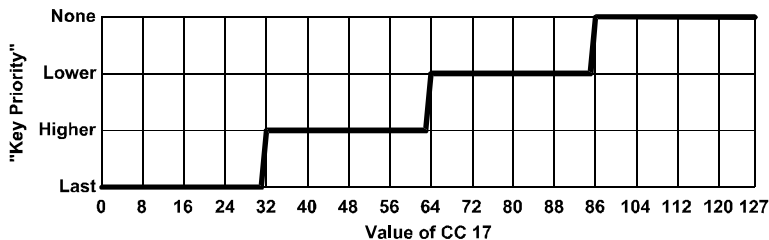**Pic. 6 – Conversion of CC 17 value to "Key Priority" parameter value**

Table 5 – 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

The received value of the controller (its second databyte) adjusts the "Pitch Wheel Range" parameter - see pic. 7 and table 6. Value of the parameter in edit buffer is adjusted only temporarily; until the next change or instrument restart.

**Pic. 7 – Conversion of CC 18 value to "Pitch Bend Range" parameter value**

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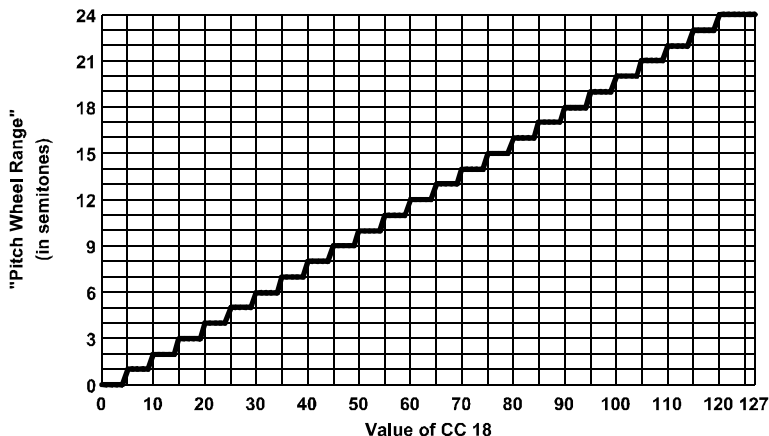
**Table 6 – Conversion of CC 18 value to "Pitch Wheel Range" parameter value (in semitones)**									
CC	Range	CC	Range	CC	Range	CC	Range	CC	Range
0 ~ 4	±0	25 ~ 29	±5	50 ~ 54	±10	75 ~ 79	±15	100 ~ 104	±20
5 ~ 9	±1	30 ~ 34	±6	55 ~ 59	±11	80 ~ 84	±16	105 ~ 109	±21
10 ~ 14	±2	35 ~ 39	±7	60 ~ 64	±12	85 ~ 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

CC 19 – Own controller: Arpg Clock Mode

The received value of the controller (its second databyte) adjusts the "Arpg Clock Mode" parameter - see pic. 8 and table 7. Value of the parameter in edit buffer is adjusted only temporarily; until the next change or instrument restart.

Pic. 8 – Conversion of CC 19 value to „Arpeggio Clock Mode" parameter value
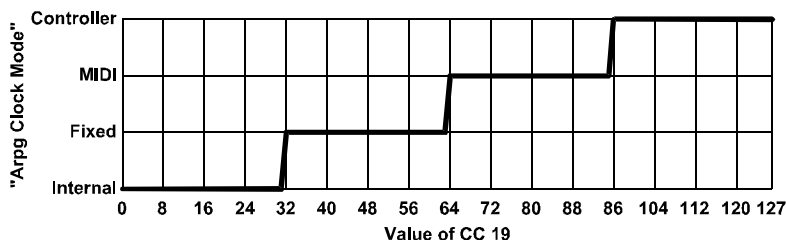
**Table 7 – Conversion of CC 19 value to "Arpeggio Clock Mode" parameter value**			
CC	Mode	CC	Priority
0 ~ 31	Internal	64 ~ 95	MIDI
32 ~ 63	Fixed	96 ~ 127	Controller

CC 20 – Own controller : Arpg Clock Rate

The received value of the controller (its second databyte) corresponds directly to the "Arpg Clock Rate" parameter value. The controller has influence only if arpeggiator works in FIXED or MIDI modes. Value of the parameter in edit buffer is adjusted only temporarily; until the next change or instrument restart.

CC 119 – Own controller : Save Preset

With help of this controller, it is allowed to store data from temporary edit buffer to permanent user memory - preset memory bank.

The received value of the controller (its second databyte) specifies number of memory bank (preset) to which the data will be stored. Acceptable values are from 0 to 19 (0 for preset Nr. 1, 1 for preset Nr. 2, etc. up to 19 for preset Nr. 20). Other values of the controller have no signification and they are ignored.

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CC @ Arpg CC Nr. – Freely definable own controller : Arpeggio Controller

Freely definable controller @ Arpg CC Nr. can directly start the arpeggiator of Juno-6, having the "Arpg Clock Mode" parameter of actual preset set to CONTROLLER. The particular number of the controller chosen for direct arpeggiator control (@ Arpg CC Nr.) is defined by "Arpg CC Nr." system parameter. The number can be set in the range of 0 - 118.

If that condition is satisfied, one arpeggiator synchronization pulse is generated when the defined controller is received by the interface (of any value).

If this way of arpeggiator control is used, MIDI controller Nr. 20 (Arpg Clock Rate) is ignored!

4.1.3. PROGRAM CHANGE

"Program Change" command has a standard function - it changes actual preset number (see pic. 2). Range of acceptable values of "Program Change" command is from 0 to 19. It corresponds to numbers of presets from 1 to 20. "Program Change" commands with values from 20 to 127 are ignored.

4.1.4. PITCH BEND

"Pitch Wheel" ("Pitch Bend") has a standard function - it changes the tune of the notes played. The minimal / maximal range of bend is adjusted by the "Pitch Wheel Range" parameter and it can be from ±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.

4.2. COMMON SYSTEM COMMANDS

The interface uses only "MIDI Clock" synchronization pulses (status byte F8h) and "System Reset" (status byte FFh). All other Common System commands are ignored.

4.2.1. CLOCK

If any other mode than MIDI mode is chosen by „Arpg Clock Mode" parameter, MIDI Clock commands are ignored.

In MIDI mode, the interface receives MIDI Clock commands and it derives synchronization pulses for arpeggiator from them - the arpeggiator is synchronized with tempo of played song. Speed of the arpeggiator is then controlled by "Arpg Clock Rate" parameter (see table 3).

Maximal speed of arpeggiator is limited by the hardware construction of the instrument. This may also cause that when the MIDI song has very high tempo, the synchronized arpeggio tones might be irregular or some tones might be omitted.

4.2.2. RESET

The complete interface reset is done after receiving "Reset" command (status byte FFh) - all functions are adjusted to their default values and data of preset Nr. 1 are read to edit buffer.

4.3. SYSTEM EXCLUSIVE MESSAGES

The System Exclusive communication enables user to adjust the values of all preset parameters in edit buffer and values of system parameters in system memory bank. Further it is possible to rewrite content of partial preset memory banks or to store data from edit buffer to any preset memory bank. Also, actual preset can be changed or if necessary, hardware reset or total "Factory" reset can be done. System Exclusive communication is described in detail in standalone manual.

Software generator for easy creation of SysEx messages for JU6-KBD control is available on supplemental CD-ROM. Any message for the interface setting described above can be created with help of this generator.

Pic. 9 – Software generator of System Exclusive Messages

APPENDICES

A. MIDI IMPLEMENTATION CHART

Device : **JU6-KBD**   Date : 4 / 2010
Model : **8-429**   Version : 1.0

Function		Transmission	Reception	Remarks
Basic	Default	X	1~16	[1])
Channel	Changed	X	1~16	
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	16	X	O	Own CC – Key Shift
Changes	17	X	O	Own CC – Key Priority
	18	X	O	Own CC – Pitch Bend Range
	19	X	O	Own CC – Arpg Clock Mode
	20	X	O	Own CC – Arpg Clock Rate
	64	X	O	Hold
	119	X	O	Own CC – Save Preset
	120	X	O	All Sound Off
	121	X	O	Reset All Controllers
Program Change		X	O	0~19
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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B. ERROR STATUS INDICATION

If any fatal errors occur during the interface operation (eg. error in 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.

C. 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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