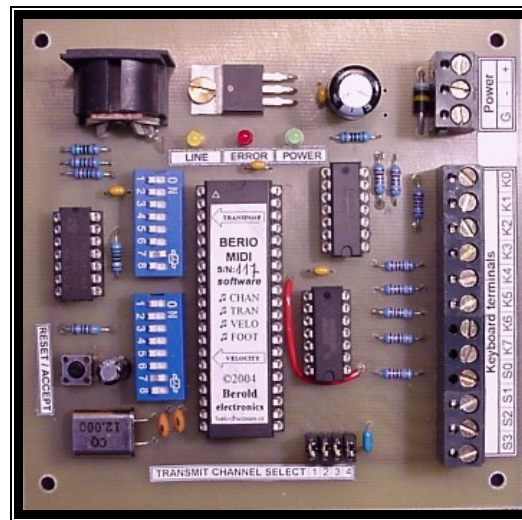


Intelligent MIDI interface for organ pedal-boards

BERIO MIDI 32

Description, installation instructions and user manual.

Berio MIDI 32 is microcomputer system, which is able to connect your pedalboard or another musical instrument with musical electronic system equipped with MIDI interface. Pedalboard (or another instrument) performance may be e.g. recorded by PC, merged with performance of other "MIDI signal source" (e.g. MIDI sequencer, duplicate keyboard, foot-keyboard), etc.



Technical characteristics:

- ◆ **Input data** - input data for Berio MIDI modules are signal from contacts of pedalboard keys or whatever keypad providing contact of your choice. **Berio MIDI 32** system is able to serve up to 32 pedal contacts. Keyboard state is scanned in time multiplex way. This means that keyboard with 32 keys may be connected to Berio system via 12 wires only. But it's necessary to connect one cheap small diode under each keypad. Diode and keypad wiring is described on diode matrices diagram below (see supplement). All wires on Berio system board are terminated by screw-connector.
- ◆ **Output data** - as output data, standard MIDI signal is generated. System board is equipped with standard 5-pin DIN connector MIDI OUT, which may be connected via standard MIDI cable to a personal computer or electronic keyboard with MIDI IN input. Standard MIDI cable schematic is drawn below (see supplement).
- ◆ **MIDI channel setting** - system is able to generate MIDI data on any one or two MIDI channels simultaneously. Basic MIDI channel number is set through four jumpers placed on system board. Additional channel may be set by DIP switch "Control" on system board. Data generation at additional MIDI channel may be enabled or disabled in the "Control" switch too. Modified

jumpers or DIP's setting is accepted every time system is restarted or powered up. Position of switches and jumper caps is described in table (see supplement).

Note: What is the reason for the same data generating at two MIDI channels simultaneously?

Most of electronic organ-type musical instruments have assigned one voice to one MIDI channel. When you need to play with more than one voice, you need data generated in two MIDI channels. With this feature, data from Berio MIDI 32 pedalboard module may be interpreted e.g. by "General" and "Bass" voices at the same time.

Example: Some electronic organ mfr. Viscount (e.g. Cantorum series) plays data received at channel 1 by "General" voice (basic voice, right hand) and data received at channel 4 as "Bass" voice (bass, left hand). Therefore Berio MIDI 32 module in pedalboard may sound by "General" or by "Bass" or by "General" and "Bass" simultaneously (when two-channel mode applied).

- ◆ ***Enabling and disabling of MIDI channels at play*** - generating of MIDI data may be permanently enabled or disabled via one of "Control" switches. When you want to enable or disable individual MIDI channel at play (it means e.g. enable or disable individual voices), "Control" switch nr. 7 must be turned into "ON" position. In this case, two highest (usually not wired, not used) keypads are working as individual MIDI channel enable switches. More detailed function is described in table below (see supplement).
- ◆ ***Transposition setting*** - system is able to transpose all generated MIDI data. Transposition may be performed over entire range of audible tones or, more precisely, over all tones supported by MIDI protocol. Transposition value is selected by seven miniature DIP switches located on system board. DIP's setting is accepted by system every time the system is restarted or powered up. Meaning of DIP settings is described in table (see supplement).
- ◆ ***Velocity setting*** - system is able to generate MIDI data with one of two velocity levels: "forte" (MIDI nr. 64, recommended value) or "forte fortissimo" (MIDI nr. 127, max. value). Used velocity level is selected by one of "Control" switches. For detailed description see supplement.
- ◆ ***Indication LEDs*** - system is equipped with three LED diodes:
 - Green LED Power indicates that power supply of proper polarity is present.
 - Red LED Error indicates any critical error due to which the system can't generate MIDI data. When system action is proper, this LED flashes for a short time only after system reset or power up. Exception to this rule is "Demo mode", which is described in detail in relevant paragraph.
 - Yellow LED Line - indicates data flow on MIDI line. It's useful when some communication problems are being located, esp. during system installation and testing. LED Line shortly flashes after system reset or power up.
- ◆ ***Reset/Accept button*** - Berio MIDI system is equipped with reset / accept push button. This button may be used for acceptance of new DIP switches or jumpers setting (MIDI channel, transposition,

velocity). In normal action, this button needn't be used - acceptance is provided automatically after power-up.

- ◆ **Power supply** - system board is powered by DC voltage between 9 and 18 Volts. Supply current is approx. 50 mA, voltage polarity must be respected. Regular power supply adaptor for 230V/50Hz may be used (no special requirements). Recommended output parameters of power supply adaptor is 9 V/300 mA or 12 V/300 mA.
- ◆ **Input digital filtering** - for better performance, the Input digital filtering unit is implemented in the system. This unit should eliminate the surges on keypad contacts. Keyboard state is read periodically in approx. one-millisecond intervals. State of every keypad must be repeatedly read as unchanged. Only then a MIDI message can be sent on MIDI line.
- ◆ **Absolute polyphony** - Berio MIDI system does not restrict polyphony in any way. It means that if, in theory, all keys on keyboard are pressed simultaneously, all corresponding data will be sent on MIDI line.
- ◆ **Demonstration song** - if three lowest keypads are pressed during start up or system reset, Berio module plays short demonstration song. While it plays, red LED *Error* comes on. When demo song has finished, LED Error is goes off and system begins normal operation.
- ◆ **Diode matrix** - diode matrix should be implemented near keyboard contacts. Matrix wiring is shown in schematic (see supplement).
- ◆ **ESD protection** - system is based on high speed CMOS technology. Protection against damages due to electrostatic discharges is assured by integrated clamp diodes on all terminals for pedalboard.
- ◆ **Generated code compatibility** - MIDI code generated by Berio MIDI system is compatible with MIDI devices made by the following manufacturers:

360 Systems, Ad Lib, ADA, Adams-Smith, ADB, Akai, AKG Acoustics, Alesis, Allen & Heath Brenell, Allen Organ Co., AMEK Systems & Controls, Aphex, Apple Computer, ART, Artisyn, Audio Architecture, Audio Veritrieb, Audiomatica, Avab Electronik, Axxes, Baldwin, Berold electronics, Blue Sky Logic, Bontempi/Farfisa, Breakaway Technologies, Broderbund Software, BSS Audio, CAE, Cannon Research Corporation, Casio, Clarity, Clavia Digital Instruments, CTI Audio, DDA, Digidesign, Digigram, Digital Music Corporation, DOD Electronics, Dr.Bohm/Musician International, Dream, Dynacord, Elka, E-mu Systems, Encore Electronics, Ensoniq, ETA Lighting, Euphonix, Eventide, F.B.T. Electronica, Fender, Forefront Technology, Fostex, Fujitsu Electric, Gallien Krueger, Garfield Electronics, Grey Matter, GT Electronics/Groove Tubes, Gulbransen, Harmony Systems, Hinton Instruments, Hohner, Hoshino Gakki, Hotz Instruments Technologies, IBM, IDP, InterMIDI, Intone, Inventronics, IOTA Systems, IVL Technologies, J L Cooper, Japan Victor, Jellinghaus, JEN, Jim Marshall Products, Kamiya, KAT, Kawai, Kenton Electronics, Key Concepts, KMX, Korg, KTI, Kurzweil, Lake Butler Sound Company, Larking Audio, Lexicon, Lone Wolf, Lowrey, Marquis Musi, Matsushita Communication Industrial, Matsushita Electric, Meisoshia, Micon Audio Electronics, Microsoft, MIDITEMP, Midori Electronics, Moog Music, Moridaira, Music Quest, Musonix, New England Digital, Nishin Onpa, NSI Corporation, Oberheim, Opcode, Orban, Palm Tree Instruments, Passac, Passport Designs, Peavey Electronics, Perfect Fretworks, PianoDisc, PPG, Quasimidi, Rane Corporation, Real World Design, Richmond Sound Design, RJMG/Niche, Rocktron Corp., Rogers Instrument Corp., Roland, S&S Research, Sequential Circuits, SIEL, Solid State Logic, Solton, Sony, Soundcraft Electronics, Soundtracs, Southern Music Systems, Southworth, Spatial Sound/Anadi Inc, Spectrum Design & Development, Stepp, Strand Lighting, Studer-Editech,

Suzuki Musical Instrument Mfg., Synthaxe, TC Electronic, TEAC, The Software Toolworks, Trident, Twister, Uptown, Voce, Voyce Music, Voyetra/Octave Plateau, Waldorf Electronics, Warner New Media, Waveframe, Wersi, Yamaha, Yes Technology, Zero 88 Lighting, Zeta Systems a Zoom.

MIDI systems of other manufacturers are probably compatible too, but this compatibility is not guaranteed.

◆ **Installation recommendations** - wire length between keypad contact and Berio MIDI system board should be as short as possible. The wires must not be grounded, connected to power supply or connected to each other. If number of installed keypads is lower than nominal module number of keypads, the keypads should be wired in direction from the lowest to highest keypad, while some highest keypads may remain unconnected.

◆ **Manufactured system standard features:**

- Berio MIDI 32 system board
- powered by DC voltage 8 to 18 V (or by AC voltage 230V/50Hz)
- two transmit channels select option
- transposition select option
- two velocity levels option

Other system configurations can be manufactured (minimum of 5 pcs).

◆ **Mechanical data:**

- Dimensions: 105 mm x 105 mm x 25 mm (4.14" x 4.14" x 1")
- Weight: 85 g (3.04 ounce)

◆ **Guarantee:** 2 years (24 months)

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Technical questions will be answered at berio@akordeoncentrum.cz.

Supplement:

"Control" DIP switches function:

DIP switches "Control"						
Switch No.	Function	How to select concrete channel?				
1 up to 4	Additional MIDI channel select (1 up to 16)	Switch position			MIDI channel	
		č. 1	č. 2	č. 3		č. 4
		OFF	OFF	OFF	OFF	1
		ON	OFF	OFF	OFF	2
		OFF	ON	OFF	OFF	3
		ON	ON	OFF	OFF	4
		OFF	OFF	ON	OFF	5
		ON	OFF	ON	OFF	6
		OFF	ON	ON	OFF	7
		ON	ON	ON	OFF	8
		OFF	OFF	OFF	ON	9
		ON	OFF	OFF	ON	10
		OFF	ON	OFF	ON	11
		ON	ON	OFF	ON	12
		OFF	OFF	ON	ON	13
		ON	OFF	ON	ON	14
OFF	ON	ON	ON	15		
ON	ON	ON	ON	16		
5	Velocity select (Velocity for both transmit channels)	OFF	middle velocity level (MIDI Nr. 64, recommended)			
		ON	max. velocity level (MIDI nr. 127)			
6	Permanent enable of transmit MIDI data at additional channel	OFF	add. MIDI channel transmit enabled			
		ON	add. MIDI channel transmit disabled			
7	Function of two highest keypads (pedals)	OFF	ordinary pedalboard keypads			
		ON	Keypads has this function: - highest keypad (Nr. 31) enables MIDI data transmit at basic channel. Keypad connected = transmit enabled. Keypad disconnected = transmit disabled - 2nd highest keypad (Nr. 30) enables MIDI data transmit at additional channel. Keypad connected = transmit enabled. Keypad disconnected = transmit disabled			
8	switch has no function					

Notes:

- ◆ Switch Nr. 6 has no effect when switch Nr. 7 is turned into "ON" position
- ◆ Position of DIP switches should be changed in shutdown state. (without power supply).

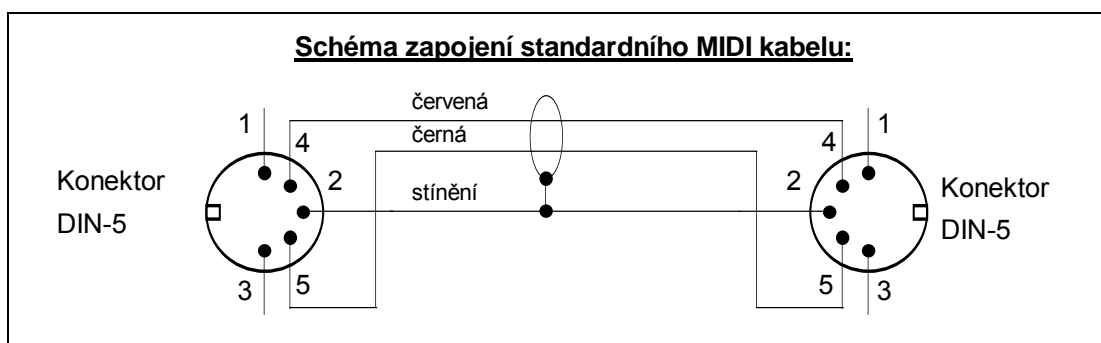
Basic MIDI Channel Jumpers Position Table

Channel number	Jumper presence:			
	No. 1	No. 2	No. 3	No. 4
1	yes	yes	yes	yes
2	no	yes	yes	yes
3	yes	no	yes	yes
4	no	no	yes	yes
5	yes	yes	no	yes
6	no	yes	no	yes
7	yes	no	no	yes
8	no	no	no	yes
9	yes	yes	yes	no
10	no	yes	yes	no
11	yes	no	yes	no
12	no	no	yes	no
13	yes	yes	no	no
14	no	yes	no	no
15	yes	no	no	no
16	no	no	no	no

Example:

If you want to transmit MIDI signal on channel No. 9, apply jumper caps on positions 1, 2 and 3. Do not apply jumper cap on position 4.

Standard MIDI cable wiring:



červená = red; černá = black; stínění = shielding, konektor = connector

Transposition and Velocity DIP Switch Settings

Chosen transposition	DIP switch positions:						
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
C ₃	OFF	OFF	OFF	OFF	OFF	OFF	OFF
C ₃ #	ON	OFF	OFF	OFF	OFF	OFF	OFF
D ₃	OFF	ON	OFF	OFF	OFF	OFF	OFF
D ₃ #	ON	ON	OFF	OFF	OFF	OFF	OFF
E ₃	OFF	OFF	ON	OFF	OFF	OFF	OFF
F ₃	ON	OFF	ON	OFF	OFF	OFF	OFF
F ₃ #	OFF	ON	ON	OFF	OFF	OFF	OFF
G ₃	ON	ON	ON	OFF	OFF	OFF	OFF
G ₃ #	OFF	OFF	OFF	ON	OFF	OFF	OFF
A ₃	ON	OFF	OFF	ON	OFF	OFF	OFF
A ₃ #	OFF	ON	OFF	ON	OFF	OFF	OFF
H ₃	ON	ON	OFF	ON	OFF	OFF	OFF
C ₂	OFF	OFF	ON	ON	OFF	OFF	OFF
C ₂ #	ON	OFF	ON	ON	OFF	OFF	OFF
D ₂	OFF	ON	ON	ON	OFF	OFF	OFF
D ₂ #	ON	ON	ON	ON	OFF	OFF	OFF
E ₂	OFF	OFF	OFF	OFF	ON	OFF	OFF
F ₂	ON	OFF	OFF	OFF	ON	OFF	OFF
F ₂ #	OFF	ON	OFF	OFF	ON	OFF	OFF
G ₂	ON	ON	OFF	OFF	ON	OFF	OFF
G ₂ #	OFF	OFF	ON	OFF	ON	OFF	OFF
A ₂	ON	OFF	ON	OFF	ON	OFF	OFF
A ₂ #	OFF	ON	ON	OFF	ON	OFF	OFF
H ₂	ON	ON	ON	OFF	ON	OFF	OFF
C ₁	OFF	OFF	OFF	ON	ON	OFF	OFF
C ₁ #	ON	OFF	OFF	ON	ON	OFF	OFF
D ₁	OFF	ON	OFF	ON	ON	OFF	OFF
D ₁ #	ON	ON	OFF	ON	ON	OFF	OFF
E ₁	OFF	OFF	ON	ON	ON	OFF	OFF
F ₁	ON	OFF	ON	ON	ON	OFF	OFF
F ₁ #	OFF	ON	ON	ON	ON	OFF	OFF
G ₁	ON	ON	ON	ON	ON	OFF	OFF
G ₁ #	OFF	OFF	OFF	OFF	OFF	ON	OFF
A ₁	ON	OFF	OFF	OFF	OFF	ON	OFF
A ₁ #	OFF	ON	OFF	OFF	OFF	ON	OFF
H ₁	ON	ON	OFF	OFF	OFF	ON	OFF
C	OFF	OFF	ON	OFF	OFF	ON	OFF
C#	ON	OFF	ON	OFF	OFF	ON	OFF
D	OFF	ON	ON	OFF	OFF	ON	OFF
D#	ON	ON	ON	OFF	OFF	ON	OFF
E	OFF	OFF	OFF	ON	OFF	ON	OFF
F	ON	OFF	OFF	ON	OFF	ON	OFF
F#	OFF	ON	OFF	ON	OFF	ON	OFF
G	ON	ON	OFF	ON	OFF	ON	OFF
G#	OFF	OFF	ON	ON	OFF	ON	OFF
A	ON	OFF	ON	ON	OFF	ON	OFF
A#	OFF	ON	ON	ON	OFF	ON	OFF
H	ON	ON	ON	ON	OFF	ON	OFF
c	OFF	OFF	OFF	OFF	ON	ON	OFF
c#	ON	OFF	OFF	OFF	ON	ON	OFF
d	OFF	ON	OFF	OFF	ON	ON	OFF
d#	ON	ON	OFF	OFF	ON	ON	OFF

Chosen transposition	DIP switch positions:						
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
e	OFF	OFF	ON	OFF	ON	ON	OFF
f	ON	OFF	ON	OFF	ON	ON	OFF
f#	OFF	ON	ON	OFF	ON	ON	OFF
g	ON	ON	ON	OFF	ON	ON	OFF
g#	OFF	OFF	OFF	ON	ON	ON	OFF
a	ON	OFF	OFF	ON	ON	ON	OFF
a#	OFF	ON	OFF	ON	ON	ON	OFF
h	ON	ON	OFF	ON	ON	ON	OFF
c ¹	OFF	OFF	ON	ON	ON	ON	OFF
c ¹ #	ON	OFF	ON	ON	ON	ON	OFF
d ¹	OFF	ON	ON	ON	ON	ON	OFF
d ¹ #	ON	ON	ON	ON	ON	ON	OFF
e ¹	OFF	OFF	OFF	OFF	OFF	OFF	ON
f ¹	ON	OFF	OFF	OFF	OFF	OFF	ON
f ¹ #	OFF	ON	OFF	OFF	OFF	OFF	ON
g ¹	ON	ON	OFF	OFF	OFF	OFF	ON
g ¹ #	OFF	OFF	ON	OFF	OFF	OFF	ON
a ¹	ON	OFF	ON	OFF	OFF	OFF	ON
a ¹ #	OFF	ON	ON	OFF	OFF	OFF	ON
h ¹	ON	ON	ON	OFF	OFF	OFF	ON
c ²	OFF	OFF	OFF	ON	OFF	OFF	ON
c ² #	ON	OFF	OFF	ON	OFF	OFF	ON
d ²	OFF	ON	OFF	ON	OFF	OFF	ON
d ² #	ON	ON	OFF	ON	OFF	OFF	ON
e ²	OFF	OFF	ON	ON	OFF	OFF	ON
f ²	ON	OFF	ON	ON	OFF	OFF	ON
f ² #	OFF	ON	ON	ON	OFF	OFF	ON
g ²	ON	ON	ON	ON	OFF	OFF	ON
g ² #	OFF	OFF	OFF	OFF	ON	OFF	ON
a ²	ON	OFF	OFF	OFF	ON	OFF	ON
a ² #	OFF	ON	OFF	OFF	ON	OFF	ON
h ²	ON	ON	OFF	OFF	ON	OFF	ON
c ³	OFF	OFF	ON	OFF	ON	OFF	ON
c ³ #	ON	OFF	ON	OFF	ON	OFF	ON
d ³	OFF	ON	ON	OFF	ON	OFF	ON
d ³ #	ON	ON	ON	OFF	ON	OFF	ON
e ³	OFF	OFF	OFF	ON	ON	OFF	ON
f ³	ON	OFF	OFF	ON	ON	OFF	ON
f ³ #	OFF	ON	OFF	ON	ON	OFF	ON
g ³	ON	ON	OFF	ON	ON	OFF	ON
g ³ #	OFF	OFF	ON	ON	ON	OFF	ON
a ³	ON	OFF	ON	ON	ON	OFF	ON
a ³ #	OFF	ON	ON	ON	ON	OFF	ON
h ³	ON	ON	ON	ON	ON	OFF	ON
c ⁴	OFF	OFF	OFF	OFF	OFF	ON	ON
c ⁴ #	ON	OFF	OFF	OFF	OFF	ON	ON
d ⁴	OFF	ON	OFF	OFF	OFF	ON	ON
d ⁴ #	ON	ON	OFF	OFF	OFF	ON	ON
e ⁴	OFF	OFF	ON	OFF	OFF	ON	ON
f ⁴	ON	OFF	ON	OFF	OFF	ON	ON
f ⁴ #	OFF	ON	ON	OFF	OFF	ON	ON
g ⁴	ON	ON	ON	OFF	OFF	ON	ON
g ⁴ #	OFF	OFF	OFF	ON	OFF	ON	ON
a ⁴	ON	OFF	OFF	ON	OFF	ON	ON

Chosen transposition	DIP switch positions:						
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
a ⁴ #	OFF	ON	OFF	ON	OFF	ON	ON
h ⁴	ON	ON	OFF	ON	OFF	ON	ON
c ⁵	OFF	OFF	ON	ON	OFF	ON	ON
c ⁵ #	ON	OFF	ON	ON	OFF	ON	ON
d ⁵	OFF	ON	ON	ON	OFF	ON	ON
d ⁵ #	ON	ON	ON	ON	OFF	ON	ON
e ⁵	OFF	OFF	OFF	OFF	ON	ON	ON
f ⁵	ON	OFF	OFF	OFF	ON	ON	ON
f ⁵ #	OFF	ON	OFF	OFF	ON	ON	ON
g ⁵	ON	ON	OFF	OFF	ON	ON	ON
g ⁵ #	OFF	OFF	ON	OFF	ON	ON	ON
a ⁵	ON	OFF	ON	OFF	ON	ON	ON
a ⁵ #	OFF	ON	ON	OFF	ON	ON	ON
h ⁵	ON	ON	ON	OFF	ON	ON	ON
c ⁶	OFF	OFF	OFF	ON	ON	ON	ON
c ⁶ #	ON	OFF	OFF	ON	ON	ON	ON
d ⁶	OFF	ON	OFF	ON	ON	ON	ON
d ⁶ #	ON	ON	OFF	ON	ON	ON	ON
e ⁶	OFF	OFF	ON	ON	ON	ON	ON
f ⁶	ON	OFF	ON	ON	ON	ON	ON
f ⁶ #	OFF	ON	ON	ON	ON	ON	ON
g ⁶	ON	ON	ON	ON	ON	ON	ON

Transposition = tone of the lowest key on keyboard.

Example of transposition setting: If the lowest key should be C2, set "TRANSPOSE" DIP's Nos. 1, 2, 5, 6 and 7 OFF and DIP's Nos. 3 a 4 ON.

DIP No. 8 is not wired and its setting does not have any effect.

Notes:

a¹ = "international pitch"
c¹ = "middle C" in MIDI terminology

Should a tone corresponding with pressed keypad (depending on transposition used) be higher than g6, it will be interpreted as C3, C3#, D3 etc.
Example: using transposition g6, the second lowest key will be interpreted as C3, the third as C3# etc.

MIDI Implementation Chart

Function...	Transmitted	Recognized	Remarks
Basic Default	1 - 16	x	determined by jumpers
Channel : Changed	1 - 16	x	
Demo	1	x	
Note Number	0 - 127	x	
Velocity : Note ON	0 - 127	x	determined by DIP
Note OFF	0 - 127	x	determined by DIP
After Key's	x	x	
Touch Ch's	x	x	
Pitch Bender	x	x	
1	o *1	x	Modulation Wheel (MSB)
2	o *1	x	Breath controller (MSB)
7	o *1	x	Volume (MSB)
11	o *1	x	Expression (MSB)
64	o *2	x	Damper/Sustain pedal
65	o *2	x	Portamento
Control 66	o *2	x	Sostenuto pedal
67	o *2	x	Soft pedal
68	o *2	x	Legato pedal
Change 69	o *2	x	Soft 2 pedal
120	x	x	All sounds off
121	x	x	Reset all controllers
123	x	x	All notes off
Program Change	x	x	
System Exclusive	x	x	
Common Song pos.	x	x	
: Song sel.	x	x	
Tune req.	x	x	
System : Clock	x	x	
Real time : Reset	x	x	
Active sense	x	x	

Note:

*1 - Berio WIND in certain implementation only.

*2 - Version with pedal enhancement only.

x : No

o : Yes